Interface

Product Catalog



Interface Product Catalog v1.1 01-06-2023

interface
FORCE MEASUREMENT SOLUTIONS

The World Leader in Force Measurement Solutions™

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1000 FATIGUE RATED LOAD CELL (U.S. & METRIC)

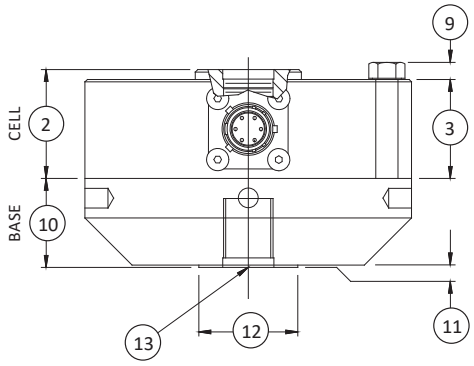
FEATURES & BENEFITS

- Capacities from 250 to 50K lbf (1.25 to 225 kN)
- Proprietary Interface temperature compensated strain gages
- 100 million fully reversed cycles
- Performance to 0.03%
- Eccentric load compensated
- Low deflection
- 0.0008%/°F (0.0015%/°C) temperature effect on output
- Barometric compensation
- Shunt calibration
- Tension and compression

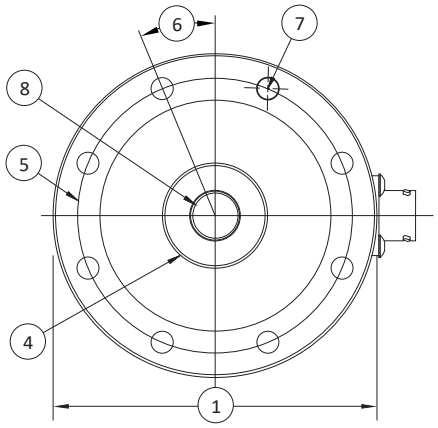
STANDARD CONFIGURATION



Model 1010ACK-2.5K (shown)



SIDE VIEW



TOP VIEW

DIMENSIONS

See Drawing	MODEL					
	1010		1020		1032	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	250, 500, 1K, 2.5K, 5K	1.25, 2.5, 5, 12.5, 25	12.5K, 25K	50, 125	50K	225
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	1.38	34.9	1.75	44.5	2.50	63.5
(3)	1.25	31.7	1.63	41.4	2.25	57.2
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3	Ø3.76	Ø95.2
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1
(6)	22.5°	22.5°	15.0°	15.0°	11.25°	11.25°
(7)	Ø0.28	Ø7.1	Ø0.41	Ø10.4	Ø0.53	Ø13.5
	8 places		12 places		16 places	
(8)	⅝-18 UNF-3B ↧ 1.12	M16x2-4H ↧ 28.4	1 ¼-12 UNF-3B ↧ 1.40	M33x2-4H ↧ 35.6	1 ¾-12 UNF-3B ↧ 2.15	M42x2-4H ↧ 54.6
(9)	0.20	5.1	0.30	7.6	0.40	10.2
(10)	1.13	28.6	1.75	44.5	2.00	50.8
(11)	0.03	0.8	0.03	0.8	0.03	0.8
(12)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(13)	⅝-18 UNF-3B ↧ 0.87	M16x2-4H ↧ 22.1	1 ¼-12 UNF-3B ↧ 1.40	M33x2-4H ↧ 35.6	1 ¾-12 UNF-3B ↧ 1.75	M42x2-4H ↧ 44.5

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1000 FATIGUE RATED LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL			
		1010	1010	1020	1032
		CAPACITY			
Measuring Range	U.S. (lbf)	250, 500, 1K	2.5K, 5K	12.5K, 25K	50K
	Metric (kN)	1.25, 2.5, 5	12.5, 25	50, 125	225
ACCURACY - (MAX ERROR)					
Static Error Band – %FS		±0.03	±0.04	±0.04	±0.05
Nonlinearity – %FS		±0.04	±0.04	±0.04	±0.05
Hysteresis – %FS		±0.03	±0.04	±0.05	±0.05
Nonrepeatability – %RO		±0.02	±0.02	±0.02	±0.02
Creep, in 20 min – %		±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.1	±0.1	±0.1	±0.1
Eccentric Load Sensitivity – % / in		±0.1	±0.1	±0.1	±0.1
TEMPERATURE					
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – % / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL					
Rated Output – mV/V (Nominal)		1.0	2.0	2.0	2.0
Excitation Voltage – VDC MAX		20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000
MECHANICAL					
Safe Overload – %CAP		±300	±300	±300	±300
Deflection @ RO	in	0.0005	0.001	0.001	0.002
	mm	0.013	0.025	0.025	0.050
Optional Base – P/N (Metric)		B101 (M)	B102 (M)	B103 (M)	B112 (M)
Natural Frequency – kHz		5.0, 6.9, 9.8	6.6, 9.4	6.5, 7.0	5.8
Weight	lbs	1.5	3.3	9.5	26
	kg	0.7	1.5	4.3	12
Calibration		Tension & Compression			
Material		Aluminum	Alloy Steel		

OPTIONS

- Base (recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable – 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

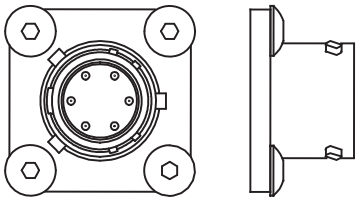
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1000 FATIGUE RATED LOAD CELL (U.S. & METRIC)

BAYONET CONNECTOR



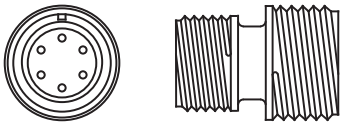
Model 1010ACK-2.5K-B (Shown)



SCREW TYPE CONNECTOR



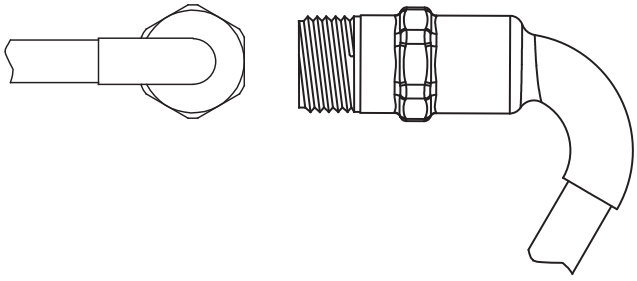
Model 1010AF-2.5K-B (Shown)



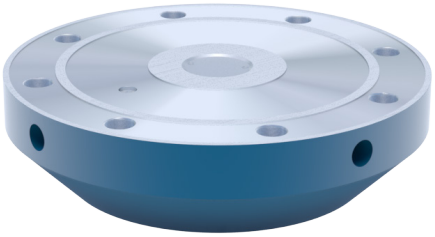
INTEGRAL 10 FT. CABLE CONNECTOR



Model 1010AJ-2.5K-B (Shown)



BASE



Model B1XX-1 (Shown)

1000 FATIGUE RATED HIGH CAPACITY LOAD CELL (U.S. & METRIC)

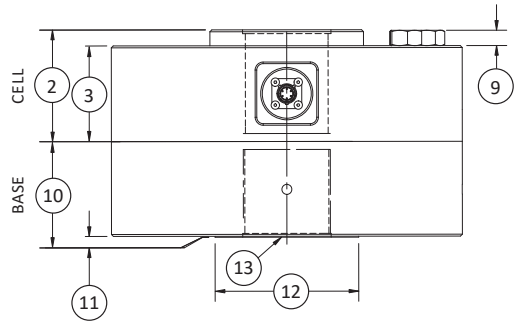
FEATURES & BENEFITS

- Capacities from 100K to 1000K lbf (450 to 4500 kN)
- Proprietary Interface temperature compensated strain gages
- 100 million fully reversed cycles
- Performance to 0.06%
- Eccentric load compensated
- Low deflection
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Barometric compensation
- Shunt calibration
- Tension and compression

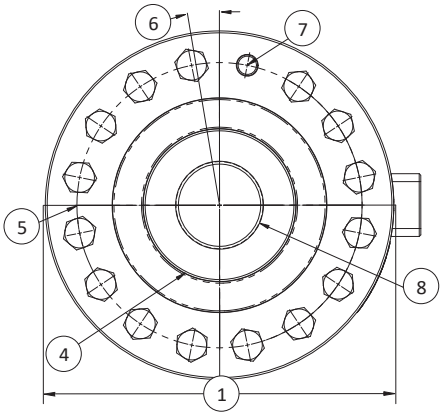
STANDARD CONFIGURATION



Model 1040CDS-100K (Shown)



SIDE VIEW



TOP VIEW

DIMENSIONS

See Drawing	MODEL											
	1040		1044		1052		1060		1080		1090	
	CAPACITY											
	US (lbf)	Metric (kN)	US (lbf)	Metric (kN)	US (lbf)	Metric (kN)	US (lbf)	Metric (kN)	US (lbf)	Metric (kN)	US (lbf)	Metric (kN)
	100K	450	135K	600	200K	900	300K	1500	500K	2250	1000K	4500
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	Ø11.00	Ø279.0	Ø11.00	Ø279.0	Ø12.00	Ø304.8	Ø15.50	Ø393.7	Ø20.50	Ø520.7	Ø26.00	Ø660.4
(2)	3.50	88.9	4.00	101.6	4.50	114.3	5.50	139.7	6.25	158.8	7.75	196.9
(3)	3.00	76.2	3.25	82.6	4.25	108.0	5.00	127.0	6.00	152.4	7.50	190.5
(4)	Ø4.81	Ø122.2	Ø4.81	Ø122.2	Ø5.68	Ø144.3	Ø7.73	Ø196.3	Ø10.55	Ø267.9	Ø13.79	Ø350.3
(5)	Ø9.00	Ø228.6	Ø8.75	Ø222.2	Ø9.88	Ø250.8	Ø12.68	Ø322.1	Ø16.50	Ø419.1	Ø20.50	Ø520.7
(6)	11.25°	11.25°	11.25°	11.25°	9.00°	9.00°	7.50°	7.50°	6.43°	6.43°	5.63°	5.63°
(7)	Ø0.65	Ø16.5	Ø0.79	Ø20.1	Ø0.79	Ø21.0	Ø0.94	Ø23.9	Ø1.06	Ø27.0	Ø1.31	Ø33.3
	16 Places		16 Places		20 Places		24 Places		28 Places		32 Places	
(8)	2 ¾-8 UNF-3B ↧3.25	M72 X 2-4H ↧82.6	2 ¾-8 UNF-3B ↧3.75	M72 X 2-4H ↧96.3	3 ½-8 UN-3B ↧3.75	M90 X 3-4H ↧95.3	4 ¼-8 UN-3B ↧4.25	M120 X 4-4H ↧108.0	6.00-8 UN-3B ↧5.63	M150 X 4-4H ↧130.0	8.00-8 UN-3B ↧7.00	M200 X 4-4H ↧178.0
(9)	0.50	12.7	0.50	12.7	0.59	15.0	0.69	17.5	1.00	25.4	1.25	31.3
(10)	3.00	76.2	4.00	101.6	4.50	114.3	5.00	127.0	7.00	177.8	9.00	228.6
(11)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8	0.10	2.5
(12)	Ø4.50	Ø114.3	Ø4.50	Ø114.3	Ø6.00	Ø152.4	Ø7.75	Ø196.9	Ø10.55	Ø267.9	Ø14.00	Ø355.6
(13)	2 ¾-8 UNF-3B ↧2.75	M72 X 2-4H ↧69.8	2 ¾-8 UNF-3B ↧3.75	M72 X 2-4H ↧95.3	3 ½-8 UN-3B ↧3.75	M90 X 3-4H ↧95.3	4 ¼-8 UN-3B ↧4.25	M120 X 4-4H ↧108.0	6.00-8 UN-3B ↧6.38	M150 X 4-4H ↧162.0	8.00-8 UN-3B ↧7.25	M200 X 4-4H ↧184.0

1000 FATIGUE RATED HIGH CAPACITY LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL					
		1040	1044	1052	1060	1080	1090
		CAPACITY					
Measuring Range	U.S. (lbf)	100K	135K	200K	300K	500K	1000K
	Metric (kN)	450	600	900	1500	2250	4500
ACCURACY – (MAX ERROR)							
Static Error Band – %FS		±0.06	±0.07	±0.09	±0.10	±0.15	±0.20
Nonlinearity – %FS		±0.06	±0.08	±0.09	±0.10	±0.15	±0.20
Hysteresis – %FS		±0.06	±0.08	±0.09	±0.10	±0.15	±0.20
Nonrepeatability – %RO		±0.02	±0.02	±0.02	±0.02	±0.02	±0.02
Creep, in 20 min – %		±0.025	±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.1	±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in		±0.1	±0.25	±0.25	±0.25	±0.25	±0.25
TEMPERATURE							
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – % / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL							
Rated Output – mV/V (Nominal)		2.0	2.0	2.0	2.0	2.0	2.0
Excitation Voltage – VDC MAX		20	20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350	350	350
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000	5000	5000
MECHANICAL							
Safe Overload – %CAP		±300	±300	±300	±300	±300	±300
Deflection @ RO	in	0.003	0.003	0.004	0.004	0.005	0.005
	mm	0.08	0.08	0.10	0.10	0.13	0.13
Optional Base – P/N (Metric)		B105 (M)	B116 (M)	B121 (M)	B122 (M)	B123 (M)	B125 (M)
Natural Frequency – kHz		4.9	5.0	5.5	5.5	5.5	5.5
Weight	lbs	68	70	100	200	450	860
	kg	30.9	31.8	45	90	205	390
Calibration		Tension & Compression					
Material		Alloy Steel					

OPTIONS

- Base (Recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range

CONNECTOR OPTIONS

- Integral cable – 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

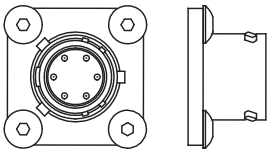
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1000 FATIGUE RATED HIGH CAPACITY LOAD CELL (U.S. & METRIC)

BAYONET CONNECTOR



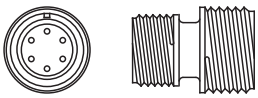
Model 1040CDS-100K-B (Shown)



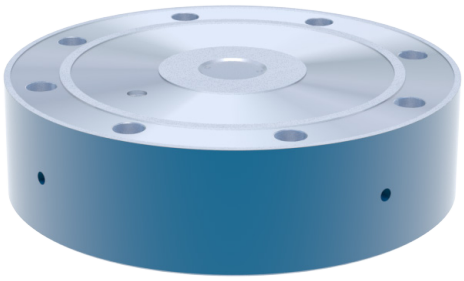
SCREW TYPE CONNECTOR



Model 1040ALD-100K-B (Shown)



BASE



Model B1XX (Shown)

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1100 ULTRA PRECISION LOAD CELL (U.S. & METRIC)

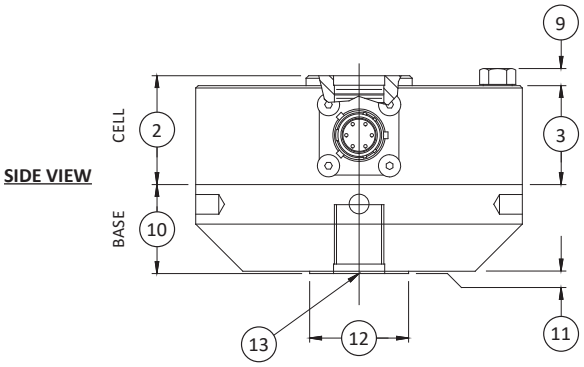
FEATURES & BENEFITS

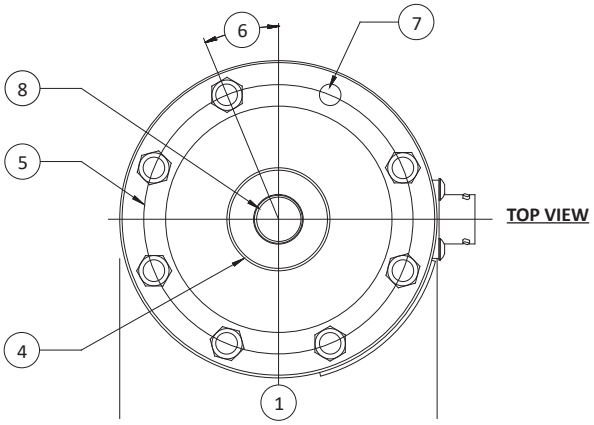
- Capacities from 300 to 200K lbf (1.5 to 900 kN)
- Proprietary Interface temperature compensated strain gages
- Performance to 0.02%
- High output – to 4 mV/V
- Eccentric load compensated
- Low deflection
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Shunt calibration
- High precision base included
- Barometric compensation
- Tension and compression

STANDARD CONFIGURATION



Model 1120ACK-50K (Shown)





DIMENSIONS

See Drawing	MODEL							
	1110		1120		1132		1140	
	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300, 500, 1K, 2K, 3K, 5K, 10K	1.5, 2.5, 5, 10, 25, 50	25K, 50K	100, 250	100K	450	200K	900
	in	mm	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2	Ø11.00	Ø279.0
(2)	1.38	34.9	1.75	44.5	2.50	63.5	3.50	88.9
(3)	1.25	31.7	1.63	41.4	2.25	57.2	3.00	76.2
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3	Ø3.76	Ø95.2	Ø4.81	Ø122.2
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1	Ø9.00	Ø228.6
(6)	22.5°		15.0°		11.25°		11.25°	
(7)	Ø0.28	Ø7.10	Ø0.41	Ø10.4	Ø0.53	Ø13.5	Ø0.65	Ø16.5
	8 Places		12 Places		16 Places			
(8)	⅝-18 UNF-3B ↧1.12	M16x2-4H ↧28.4	1 ¼-12 UNF-3B ↧1.40	M33x2-4H ↧35.6	1 ¾-12 UNF-3B ↧2.15	M42x2-4H ↧54.6	2 ¾-8 UNF-3B ↧3.25	M72x2-4H ↧82.6
(9)	0.20	5.1	0.30	7.6	0.40	10.2	0.50	12.7
(10)	1.13	28.6	1.75	44.5	2.00	50.8	3.00	76.2
(11)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8
(12)	1.25	Ø 31.8	Ø 2.25	Ø 57.2	Ø 3.00	Ø 76.2	Ø 4.50	Ø 114.3
(13)	⅝-18 UNF-3B ↧0.87	M16x2-4H ↧22.1	1 ¼-12 UNF-3B ↧1.40	M33x2-4H ↧35.6	1 ¾-12 UNF-3B ↧1.75	M42x2-4H ↧44.5	2 ¾-8 UNF-3B ↧2.75	M72x2-4H ↧69.8

1100 ULTRA PRECISION LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL				
		1110	1110	1120	1132	1140
		CAPACITY				
Measuring Range	U.S. (lbf)	300, 500, 1K, 2K, 3K	5K, 10K	25K, 50K	100K	200K
	Metric (kN)	1.5, 2.5, 5, 10	25, 50	100, 250	450	900
ACCURACY – (MAX ERROR)						
Static Error Band – % FS		±0.02	±0.025	±0.035	±0.05	±0.06
Nonlinearity – %FS		±0.03	±0.035	±0.035	±0.05	±0.06
Hysteresis – %FS		±0.02	±0.035	±0.045	±0.05	±0.06
Nonrepeatability – %RO		±0.01	±0.01	±0.01	±0.01	±0.01
Creep, in 20 min – %		±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.1	±0.1	±0.1	±0.1	±0.1
Eccentric Load Sensitivity – % / in		±0.1	±0.1	±0.1	±0.1	±0.1
TEMPERATURE						
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / deg	°F	±0.0004	±0.0004	±0.0004	±0.0004	±0.0004
	°C	±0.0007	±0.0007	±0.0007	±0.0007	±0.0007
Effect on Output – % / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL						
Rated Output – mV/V (Nominal)		2.0	4.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX		20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350	350
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000	5000
MECHANICAL						
Safe Overload – %CAP		±150	±150	±150	±150	±150
Deflection @ RO	in	0.002	0.004	0.004	0.006	0.012
	mm	0.05	0.10	0.10	0.15	0.20
Base – P/N (Ref) (Metric)		B101 (m)	B102 (m)	B103 (m)	B112 (m)	B105 (m)
Natural Frequency – kHz		2.7, 3.5, 4.9, 7.0, 8.5	4.7, 6.6	4.6, 5.0	4.0	3.5
Weight	lbs	1.1 (2.59 w/base)	1.1	9.4 (21.7 w/base)	24 (53 w/base)	62 (143 w/base)
	kg	0.49	049	10.9	23.6	28.1
Calibration		Tension & Compression				
Material		Aluminum	Alloy Steel			

OPTIONS

- Compression overload protection
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable 10ft (3m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

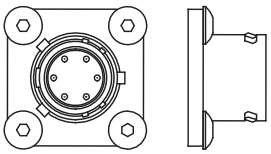
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1100 ULTRA PRECISION LOAD CELL (U.S. & METRIC)

BAYONET CONNECTOR



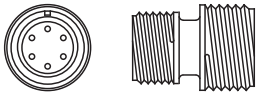
Model 1120ACK-50K (Shown)



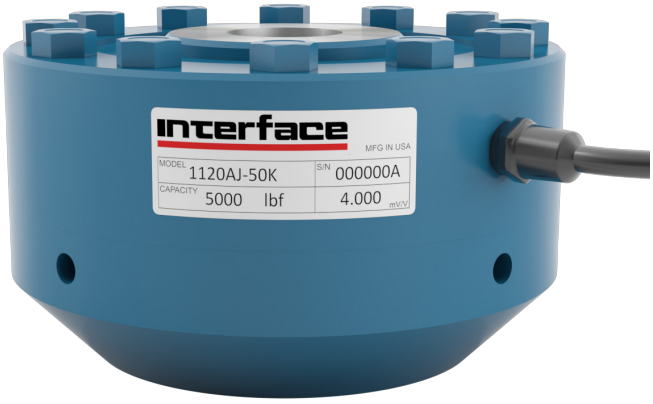
SCREW TYPE CONNECTOR



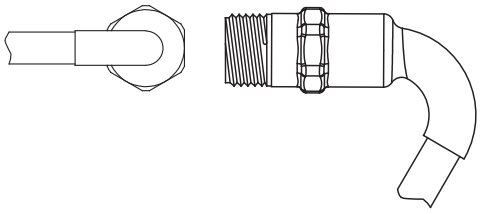
Model 1120AF-50K (Shown)



INTEGRAL 10FT CABLE CONNECTOR



Model 1120AJ-50K (Shown)

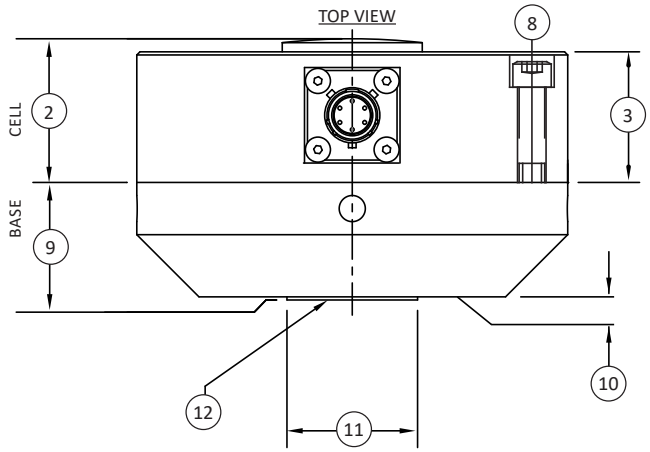


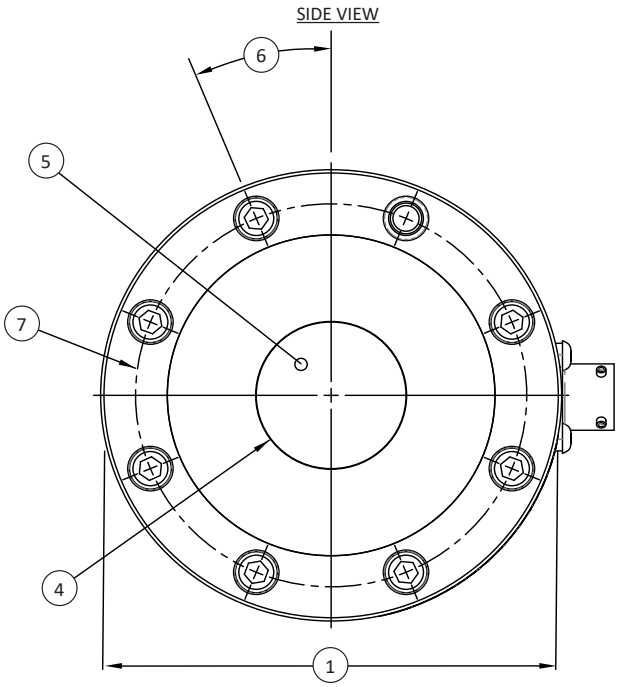
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1101 ULTRA PRECISION COMPRESSION ONLY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 1K to 50K lbf (5 to 250 kN)
- Proprietary Interface temperature compensated strain gages
- Performance to 0.02%
- High output - to 4 mV/V
- Eccentric load compensated
- Low deflection
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Shunt calibration
- High precision base included
- Barometric compensation





STANDARD CONFIGURATION



Model 1121BAY-50K (Shown)

DIMENSIONS

See Drawing	MODEL			
	1111		1121	
	CAPACITY			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 5K, 10K	5, 10, 25, 50	25K, 50K	100, 250
	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9
(2)	1.38	34.9	1.75	44.5
(3)	1.25	31.7	1.63	41.4
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3
(5)	SR 6.00	SR 152.4	SR 8.00	SR 203.2
(6)	22.5°	22.5°	15.0°	15.0°
(7)	Ø3.50	Ø88.9	Ø5.13	Ø130.3
(8)	8 Places		12 Places	
(9)	1.13	28.7	1.75	44.5
(10)	0.03	0.8	0.03	0.8
(11)	Ø 1.25	Ø 31.8	Ø 2.25	Ø 57.2
(12)	⅝-18 UNF-3B ↧0.87	M-16 X 2-4H ↧22.1	1 ¼-12 UNF-3B ↧1.40	M33 X 2-4H ↧35.6

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1101 ULTRA PRECISION COMPRESSION ONLY LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS			MODEL		
			1111	1111	1121
			CAPACITY		
Measuring Range		U.S. (lbf)	1K, 2K	5K, 10K	25K, 50K
		Metric (kN)	5, 10	25, 50	100, 250
ACCURACY – (MAX ERROR)					
Static Error Band – %FS			±0.02	±0.03	±0.03
Nonlinearity – %FS			±0.03	±0.04	±0.04
Hysteresis – %FS			±0.02	±0.04	±0.04
Nonrepeatability – %RO			±0.01	±0.01	±0.01
Creep, in 20 min – %			±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.1	±0.1	±0.1
Eccentric Load Sensitivity – % / in			±0.1	±0.1	±0.1
TEMPERATURE					
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / deg		°F	±0.0004	±0.0004	±0.0004
		°C	±0.0007	±0.0007	±0.0007
Effect on Output – % / deg		°F	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015
ELECTRICAL					
Rated Output – mV/V (Nominal)			2.0	4.0	4.0
Excitation Voltage – VDC MAX			20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350
Zero Balance – % RO			±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000
MECHANICAL					
Safe Overload – %CAP			±150	±150	±150
Deflection @ RO		in	0.002	0.004	0.004
		mm	0.05	0.10	0.10
Base Part Number (Ref)			B101	B102	B103
Natural Frequency – kHz			4.5, 6.4	4.3, 6.1	4.1, 4.6
Weight		lbs	3.3	7.3	21.5
		kg	1.5	3.3	9.8
Calibration			Compression		
Material			Tool steel		

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable 10 ft (3.0 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

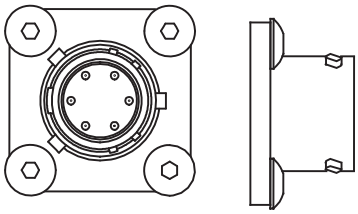
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1101 ULTRA PRECISION COMPRESSION ONLY LOAD CELL (U.S. & METRIC)

BAYONET CONNECTOR



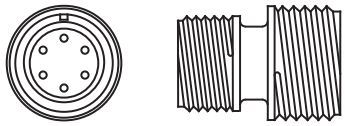
Model 1121BAY-50K (Shown)



SCREW TYPE CONNECTOR



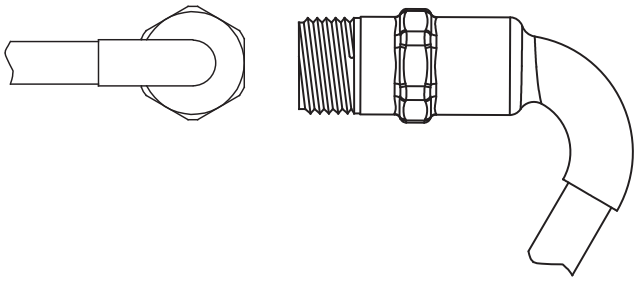
Model 1121HL-50K (Shown)



INTEGRAL 10FT CABLE CONNECTOR



Model 1121EX-50K (Shown)



1200 STANDARD LOAD CELL (U.S. & METRIC)

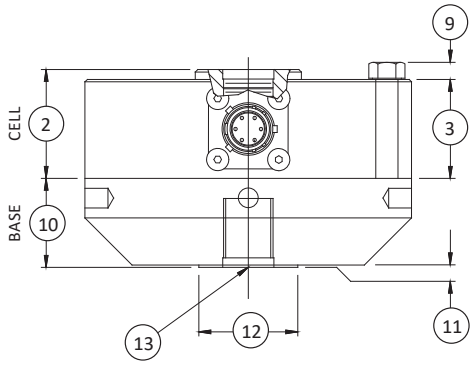
FEATURES & BENEFITS

- Capacities from 300 to 100K lbf (1.5 to 450 kN)
- Proprietary Interface temperature compensated strain gages
- Performance to 0.04%
- High output – to 4 mV/V
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Low deflection
- Shunt calibration
- Barometric compensation
- Tension and compression
- Compact size

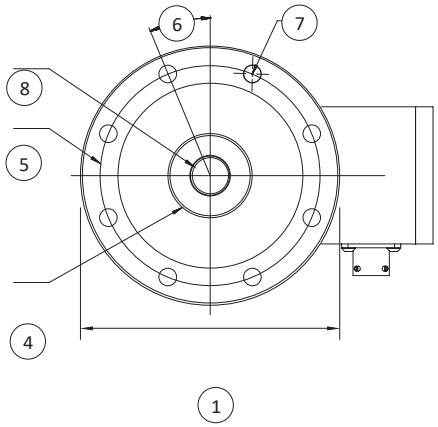
STANDARD CONFIGURATION



Model 1220ACK-50K (Shown)



SIDE VIEW



TOP VIEW

DIMENSIONS

See Drawing	MODEL					
	1210		1220		1232	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300, 500, 1K, 2K, 5K, 10K,	1.5, 2.5, 5, 10, 25, 50	25K, 50K	100, 250	100K	450
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	1.38	34.9	1.75	44.5	2.50	63.5
(3)	1.25	31.7	1.63	41.4	2.25	57.2
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3	Ø3.76	Ø95.2
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1
(6)	22.5°	22.5°	15.0°	15.0°	11.25°	11.25°
(7)	Ø0.28	Ø7.1	Ø0.41	Ø10.4	Ø0.53	Ø13.5
	8 places		12 places		16 places	
(8)	⅝-18 UNF-3B ↧ 1.12	M16 x 2-4H ↧ 28.4	1 ¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6	1 ¾-12 UN-3B ↧ 2.15	M42 x 2-4H ↧ 54.6
(9)	0.20	5.10	0.30	7.60	0.40	10.2
(10)	1.13	28.6	1.75	44.5	2.00	50.8
(11)	0.03	0.8	0.03	0.8	0.03	0.8
(12)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(13)	⅝-18 UNF-3B ↧ 0.87	M16 x 2-4H ↧ 22.1	1 ¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6	1 ¾-12 UNF-3B ↧ 1.75	M42 x 2-4H ↧ 44.5

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1200 STANDARD LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL			
		1210	1210	1220	1232
		CAPACITY			
Measuring Range	U.S. (lbf)	300, 500 1K, 2K	5K, 10K	25K, 50K	100K
	Metric (kN)	1.5, 2.5, 5, 10	25, 50	100, 250	450
ACCURACY – (MAX ERROR)					
Static Error Band – %FS		±0.04	±0.04	±0.04	±0.06
Nonlinearity – %FS		±0.04	±0.04	±0.04	±0.05
Hysteresis – %FS		±0.03	±0.04	±0.05	±0.06
Nonrepeatability – %RO		±0.01	±0.01	±0.01	±0.01
Creep, in 20 min – %		±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in		±0.25	±0.25	±0.25	±0.25
TEMPERATURE					
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero - %RO / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output - % / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL					
Rated Output – mV/V (Nominal)		2.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX		20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000
MECHANICAL					
Safe Overload – %CAP		±150	±150	±150	±150
Deflection @ RO	in	0.001	0.002	0.002	0.003
	mm	0.03	0.05	0.05	0.08
Optional Base – P/N (Metric)		B101 (M)	B102 (M)	B103 (M)	B112 (M)
Natural Frequency – kHz		3.9, 5.0, 6.9, 9.8	6.6, 9.4	6.5, 7.0	5.8
Weight	lbs	1.5	3.3	9.5	26
	kg	0.7	1.5	4.3	11.8
Calibration		Tension & Compression			
Material		Aluminum	Alloy Steel		

OPTIONS

- Base (recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

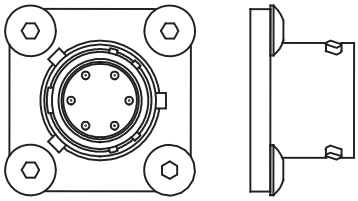
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1200 STANDARD LOAD CELL (U.S. & METRIC)

BAYONET CONNECTOR



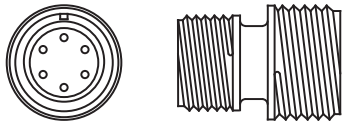
Model 1220ACK-50K



SCREW TYPE CONNECTOR



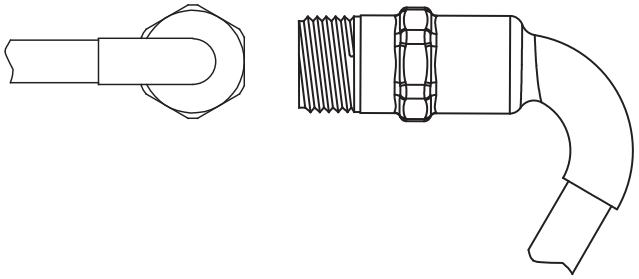
Model 1220AF-50K



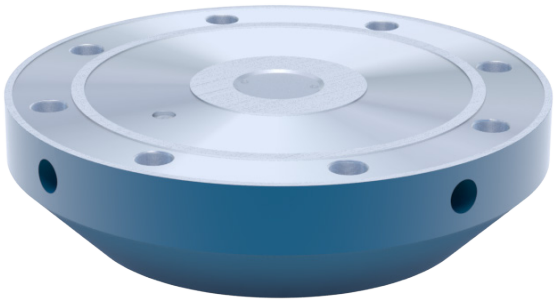
INTEGRAL 10 FT. CABLE CONNECTOR



Model 1220AJ-50K



BASE



Model B1XX

1200 STANDARD HIGH CAPACITY LOAD CELL (U.S. & METRIC)

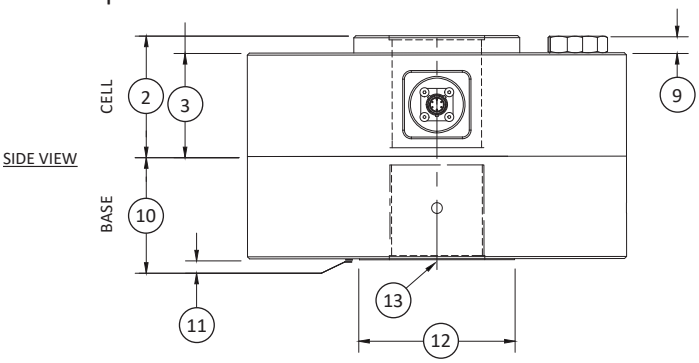
FEATURES & BENEFITS

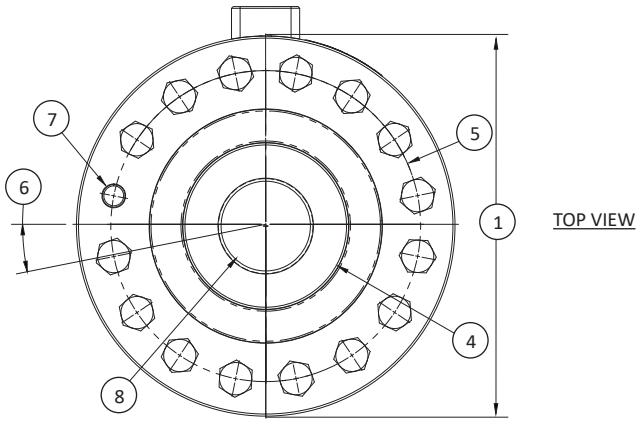
- Capacities from 200K to 2000K lbf (900 to 9000 kN)
- Proprietary Interface temperature
- Compensated strain gages
- Performance to 0.07%
- High output – to 4 mV/V
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Low deflection
- Shunt calibration
- Barometric compensation
- Tension and compression
- Compact size

STANDARD CONFIGURATION



Model 1240ACK-200K (shown)





DIMENSIONS

See Drawing	MODEL											
	1240		1244		1252		1260		1280		1290	
	CAPACITY											
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	200K	900	270K	1200	400K	1800	600K	2700	1000K	4500	2000K	9000
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	Ø11.0	Ø279.0	Ø11.0	Ø279.0	Ø12.0	Ø304.8	Ø15.5	Ø393.7	Ø20.50	Ø520.7	Ø26.00	Ø660.4
(2)	3.50	88.9	4.00	101.6	4.50	114.3	5.50	139.7	6.25	158.8	7.75	196.9
(3)	3.00	76.2	3.25	82.6	4.25	108.0	5.00	127.0	6.00	152.4	7.50	190.5
(4)	Ø4.81	Ø122.2	Ø4.81	Ø122.2	Ø6.18	Ø156.8	Ø7.73	Ø196.3	Ø10.55	Ø267.9	Ø13.79	Ø350.3
(5)	Ø9.00	Ø228.6	Ø8.75	Ø222.2	Ø9.875	Ø250.83	Ø12.68	Ø322.1	Ø16.5	Ø419.1	Ø20.50	Ø520.7
(6)	11.25°	11.25°	11.25°	11.25°	9.00°	9.00°	7.50°	7.50°	6.43°	6.43°	5.63°	5.63°
(7)	Ø0.65	Ø16.5	Ø0.79	20.1	Ø0.827	Ø21.01	Ø0.94	Ø23.9	Ø1.06	Ø27.0	Ø1.31	Ø33.3
	16 places		16 places		20 places		24 places		28 places		32 places	
(8)	2 ¾-8 UN-3B ↧ 2.75	M72 X 2-4H ↧ 70	2 ¾-8 UN-3B ↧ 3.75	M72 X 2-4H ↧ 95.3	3 ½-8 UN-3B ↧ 4.13	M90 X 3-4H ↧ 104.9	4 ¼-8 UN-3B ↧ 4.25	M120 X 4-4H ↧ 108	6.00-8 UN-3B ↧ 5.63	M150 X 4-4H ↧ 143	8.00-8 UN-3B ↧ 7.00	M200 X 4-4H ↧ 178
(9)	0.50	12.7	0.58	14.7	0.59	20.0	0.69	12.5	1.00	25.4	1.25	31.3
(10)	3.00	76.2	4.00	101.6	4.50	114.3	5.00	127.0	7.00	177.8	9.00	228.6
(11)	0.03	0.80	0.03	0.80	0.03	0.80	0.03	0.80	0.10	2.5	0.10	2.5
(12)	Ø4.50	Ø114.3	Ø4.50	Ø114.3	Ø6.00	Ø152.4	Ø7.75	Ø196.9	Ø10.55	Ø267.9	Ø14.00	Ø355.6
(13)	2 ¾-8 UNF-3B ↧ 2.75	M72 X 2-4H ↧ 69.8	2 ¾-8 UNF-3B ↧ 2.75	M72 X 2-4H ↧ 69.8	3 ½-8 UN-3B ↧ 3.75	M90 X 3-4H ↧ 95.3	4 ¼-8 UN-3B ↧ 4.25	M120 X 4-4H ↧ 108	6.00-8 UN-3B ↧ 6.38	M150 X 4-4H ↧ 162	8.00-8 UN-3B ↧ 7.25	M200 X 4-4H ↧ 184

1200 STANDARD HIGH CAPACITY LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL					
		1240	1244	1252	1260	1280	1290
		CAPACITY					
Measuring Range	U.S. (lbf)	200K	270K	400K	600K	1000K	2000K
	Metric (kN)	900	1200	1800	2700	4500	9000
ACCURACY – (MAX ERROR)							
Static Error Band – %FS		±0.07	±0.07	±0.10	±0.12	±0.15	±0.20
Nonlinearity – %FS		±0.07	±0.08	±0.10	±0.12	±0.15	±0.20
Hysteresis – %FS		±0.07	±0.08	±0.10	±0.12	±0.15	±0.20
Nonrepeatability – %RO		±0.01	±0.02	±0.02	±0.02	±0.02	±0.02
Creep, in 20 min – %		±0.025	±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.25	±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in		±0.25	±0.25	±0.25	±0.25	±0.25	±0.50
TEMPERATURE							
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – % / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL							
Rated Output – mV/V (Nominal)		4.0	4.0	4.0	4.0	4.0	4.0**
Excitation Voltage – VDC MAX		20	20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350	350	350
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000	5000	5000
MECHANICAL							
Safe Overload – %CAP		±150	±150	±150	±150	±150	±150
Deflection @ RO – w/Base	in	0.012	0.006	0.007	0.008	0.008	0.010
	mm	0.30	0.15	0.18	0.2	0.2	0.25
Optional Base – P/N (Metric)		B105 (M)	B116 (M)	B121 (M)	B122 (M)	B123 (M)	B125 (M)
Natural Frequency – kHz		4.9	5.0	5.5	5.5	5.5	5.5
Weight	lbs	68	70	100	200	450	860
	kg	30.9	31.8	45	90	205	390
Calibration		Tension & Compression					
Material		Alloy Steel					

***Calibrated to 1000K only*

OPTIONS

- Base (recommended)
- Multiple bridge
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Special temperature range

CONNECTOR OPTIONS

- PT02E-10-6P Bayonet Connector
- PC04E-10-6P Screw-Type Connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

WTS 1200 STANDARD PRECISION LOWPROFILE™ WIRELESS LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 300 to 100K lbf (1.5 to 450 kN)
- Proprietary Interface temperature compensated strain gages
- Performance to 0.0425%
- 2.4 GHZ transceiver
- Eccentric load compensated
- Low deflection
- Barometric compensation
- Tension and compression
- Compact size

OPTIONS

- Base (recommended)
- Standardized output
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm

COMPATIBLE WITH



Model WTS-BS-1-HA (Shown)

STANDARD CONFIGURATION



Model 1220WTS-50K (Shown)

TRANSCEIVER SPECIFICATIONS

MEASUREMENT SPECIFICATIONS		
Strain Gauge Excitation System		4-wire
Strain Gauge Excitation – VDC		3
Strain Gauge Resistance (min) – Ω		85
Strain Gauge Sensitivity (max) – mV/V		±4.5
Offset Temperature Stability (max) – ppm/°C		4
Gain Temperature Stability (max) – ppm/°C		5
Nonlinearity Before Linearization (max) – ppm of FR		25
Internal Resolution/Bits		16,000,000 / 24
Noise Free Resolution at 1 Sample Per Second		400,000 / 18.75
Transmission Rates – ms to day		From 5 to 1
BATTERY LIFE		
Battery		2 x AAA Alkaline
Battery Life – hrs		300 typically
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 610
	ft	Up to 2,000
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (WTS-AM-1 & WTS-AM-1-D)		IP67/Nema4
Telemetry Housing		Polyamide resin
Material		Heat Treated Steel or Stainless Steel

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

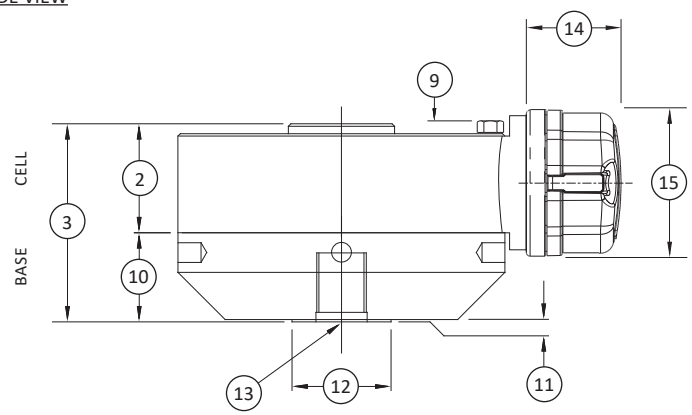
WTS 1200 STANDARD PRECISION LOWPROFILE™ WIRELESS LOAD CELL (U.S. & METRIC)

LOAD CELL SPECIFICATIONS

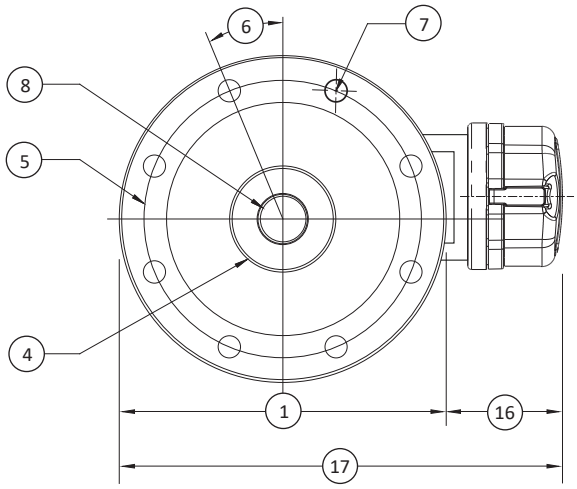
PARAMETERS		MODEL			
		1210	1210	1220	1232
		CAPACITY			
Measuring Range	U.S. (lbf)	300, 500 1K, 2K	5K, 10K	25K, 50K	100K
	Metric (kN)	1.5, 2.5, 5, 10	25, 50	100, 250	450
ACCURACY – (MAX ERROR)					
Static Error Band – %FS		±0.04	±0.04	±0.04	±0.06
Nonlinearity – %FS		±0.04	±0.04	±0.04	±0.05
Hysteresis – %FS		±0.03	±0.04	±0.05	±0.06
Nonrepeatability – %RO		±0.01	±0.01	±0.01	±0.01
Creep, in 20 min – %		±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in		±0.25	±0.25	±0.25	±0.25
TEMPERATURE					
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range *	°F	* Please reference Transceiver Operating Temperature Range			
	°C				
Effect on Zero – %RO / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – % / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL					
Rated Output – mV/V (Nominal)		2.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX		20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000
MECHANICAL					
Safe Overload – %CAP		±150	±150	±150	±150
Deflection @ RO	in	0.001	0.002	0.002	0.003
	mm	0.03	0.05	0.05	0.08
Optional Base – P/N (Metric)		B101 (M)	B102 (M)	B103 (M)	B112 (M)
Natural Frequency – kHz		3.9, 5.0, 6.9, 9.8	6.6, 9.4	6.5, 7.0	5.8
Weight	lbs	1.5	3.3	9.5	26
	kg	0.7	1.5	4.3	11.8
Calibration		Tension & Compression			
Material		Aluminum	Alloy Steel		

WTS 1200 STANDARD PRECISION LOWPROFILE™ WIRELESS LOAD CELL (U.S. & METRIC)

SIDE VIEW



TOP VIEW



DIMENSIONS

See Drawing	MODEL					
	1210		1220		1232	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300, 500, 1K, 2K, 5K, 10K,	1.5, 2.5, 5, 10, 25, 50	25K, 50K	100, 250	100K	450
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	1.38	34.9	1.75	44.5	2.50	63.5
(3)	2.51	63.5	3.5	89.0	4.5	114.3
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3	Ø3.76	Ø95.2
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1
(6)	22.5°	22.5°	15.0°	15.0°	11.25°	11.25°
(7)	Ø0.28	Ø7.1	Ø0.41	Ø10.4	Ø0.53	Ø13.5
	8 places		12 places		16 places	
(8)	⅝-18 UNF-3B ↧ 1.12	M16 x 2-4H ↧ 28.4	1 ¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6	1 ¾-12 UN-3B ↧ 2.15	M42 x 2-4H ↧ 54.6
(9)	0.20	5.10	0.30	7.60	0.40	10.2
(10)	1.13	28.6	1.75	44.5	2.00	50.8
(11)	0.03	0.8	0.03	0.8	0.03	0.8
(12)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(13)	⅝-18 UNF-3B ↧ 0.87	M16 x 2-4H ↧ 22.1	1 ¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6	1 ¾-12 UNF-3B ↧ 1.75	M42 x 2-4H ↧ 44.5
(14)	2.0	50.5	2.0	50.5	2.0	50.5
(15)	Ø3.1	Ø78	Ø3.1	Ø78	Ø3.1	Ø78
(16)	2.5	63.5	2.5	63.5	2.5	63.5
(17)	6.63	168.4	8.56	217.4	10.5	266.7

1201 STANDARD LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

FEATURES & BENEFITS

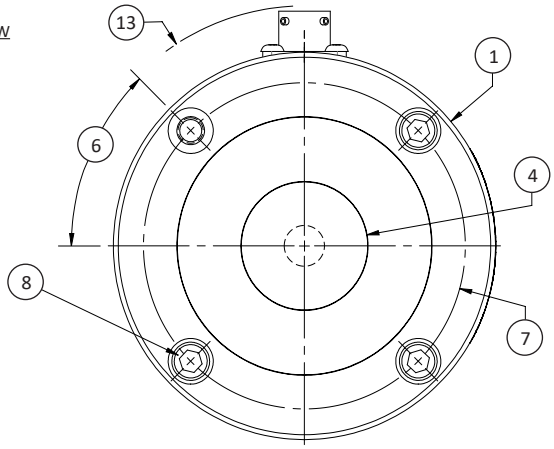
- Capacities from 1K to 400K lbf (5 to 1800 kN)
- Performance to 0.03%
- High output – to 4 mV/V
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Low deflection
- Shunt calibration
- Barometric compensation
- Compact size
- Counterbored mounting holes

STANDARD CONFIGURATION

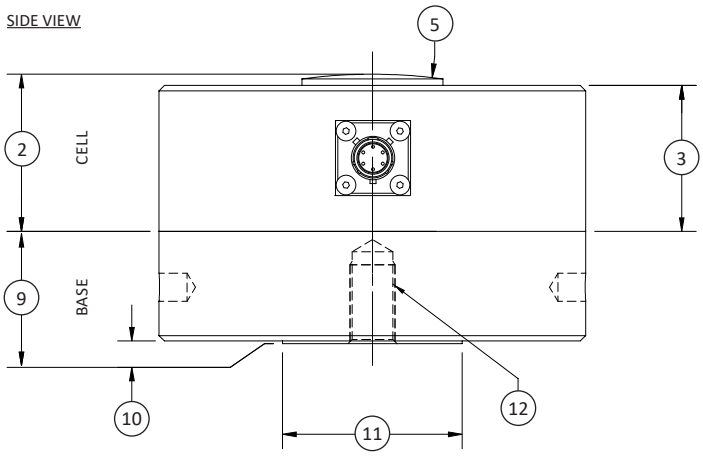


Model 1221BAY-50K (Shown without base)

TOP VIEW



SIDE VIEW



DIMENSIONS

See Drawing	MODEL									
	1211		1221		1231		1241		1243	
	CAPACITY									
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 5K, 10K	5, 10, 25, 50	25K, 50K	125, 250	100k	450	200K	900	300K 400K	1350 1800
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø4.75	Ø120.7	Ø7.50	Ø190.5	Ø8.25	Ø210	Ø11.00	Ø279.0
(2)	1.38	34.9	1.75	44.5	2.25	57.2	3.25	82.5	3.50	88.9
(3)	1.25	31.7	1.63	41.4	2.00	50.8	3.00	76.2	3.00	76.2
(4)	Ø1.34	Ø34.0	Ø1.57	Ø39.9	Ø3.13	Ø79.5	Ø3.16	Ø80.3	Ø4.81	Ø122.2
(5)	SR 6.00	SR 152.4	SR 6.00	SR 152.4	SR 8.00	SR 203.2	SR 12.00	SR 304.8	SR 18.00	SR 457.0
(6)	22.5°	22.5°	45.0°	45.0°	15.0°	15.0°	15.0°	15.0°	11.25°	11.25°
(7)	Ø3.50	Ø88.9	Ø4.00	Ø101.6	Ø6.25	Ø158.8	Ø6.75	Ø171.5	Ø9.00	Ø229.0
(8)	¼-28x1 ¼		5⁄16-24x1 ¾		7⁄16-20x2		⅝-18x3		⅝-18x3	
	8 places		4 places		12 places		12 places		16 places	
(9)	1.13	28.7	1.25	31.8	2.00	50.8	2.50	63.5	3.50	88.9
(10)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8
(11)	Ø1.25	Ø31.8	Ø2.00	Ø50.8	Ø3.00	Ø76.2	Ø3.00	Ø76.2	Ø4.50	Ø114.0
(12)	⅝-18 UNF-3B ↧0.87	M16 x 2-4H ↧22.1	½-20 UNF-3B ↧0.88	M16 x 2-6H ↧22.4	1 ¾-12 UNF-3B ↧1.75	M27 x 2-6H ↧44.5	¾-16 UNF-3B ↧1.50	M27 x 2-6H ↧38.1	1 ½-12 UNF-2B ↧2.00	M42 x 2-6H ↧50.8
(13)	2.52	64	3.00	76.2	4.34	110.2	4.71	119.6	6.44	163.6

1201 STANDARD LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS			MODEL					
			1211	1211	1221	1231	1241	1243
			CAPACITY					
Measuring Range	U.S. (lbf)		1K, 2K	5K, 10K	25K, 50K	100K	200K	300K, 400K
	Metric (kN)		5, 10	25, 50	125, 250	450	900	1350, 1800
ACCURACY – (MAX ERROR)								
Static Error Band – %FS			±0.03	±0.04	±0.04	±0.04	±0.05	±0.05
Nonlinearity – %FS			±0.03	±0.04	±0.05	±0.05	±0.05	±0.05
Hysteresis – %FS			±0.03	±0.04	±0.05	±0.05	±0.05	±0.05
Non-repeatability – %RO			±0.01	±0.01	±0.01	±0.01	±0.01	±0.01
Creep, in 20 min – %			±0.025	±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.25	±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in			±0.25	±0.25	±0.25	±0.25	±0.25	±0.25
TEMPERATURE								
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / deg		°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – % / deg		°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL								
Rated Output – mV/V (Nominal)			2.0	4.0	4.0	4.0	4.0	3.0, 4.0
Excitation Voltage – VDC MAX			20	20	20	20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350	350	350	350
Zero Balance – %RO			±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000	5000	5000	5000
MECHANICAL								
Safe Overload – %CAP			±150	±150	±150	±150	±150	±150
Deflection @ RO		in	0.001	0.002	0.002	0.003	0.004	0.005
		mm	0.03	0.05	0.05	0.08	0.10	0.13
Optional Base – P/N (Metric)			B101	B102	B106	B104	B108	B124
Natural Frequency – kHz			6.4, 9.0	6.1, 8.6	8.2, 11.7	7.6	6.7	5.0
Weight		lbs	1.5	3.3	6.8	13.5	40	74
		kg	0.7	1.5	3.1	6	18	34
Calibration			Compression					
Material			Aluminum	Alloy Steel				

OPTIONS

- Base (recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable – 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

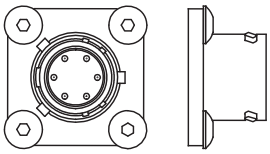
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1201 STANDARD LOAD CELL COMPRESSION-ONLY (US & METRIC)

BAYONET CONNECTOR



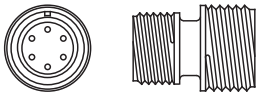
Model 1221BAY-50K (shown)



SCREW TYPE CONNECTOR



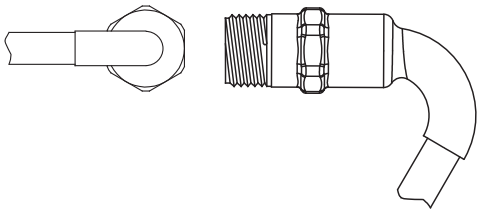
Model 1221HL-50K (shown)



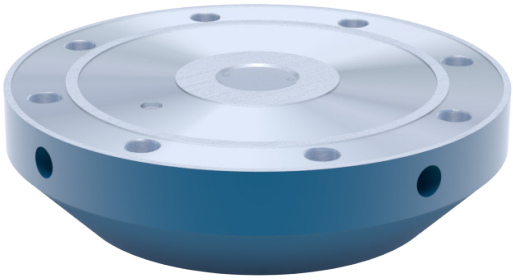
INTEGRAL 10 FT. CABLE CONNECTOR



Model 1221EX-50K (shown)



BASE



Model B1XX-1

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1200 AND 1201 SERIES 3-WIRE AMPLIFIED LOAD CELL UNIVERSAL OR COMPRESSION-ONLY (U.S. & METRIC)

FEATURES & BENEFITS

Why the Interface model 1200 and 1201 Standard 3-Wire Amplified:

- Load Cell is the best in class:
- Proprietary Interface temperature
- compensated strain gages
- Eccentric load compensated
- Low deflection
- Shunt calibration
- Tension and compression
- Compact size
- 3-wire internal amp choice of 4-20 mA, ±5V, ±10V, 0-5V, 0-10V

OPTIONS

- Base (recommended)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm

STANDARD CONFIGURATION



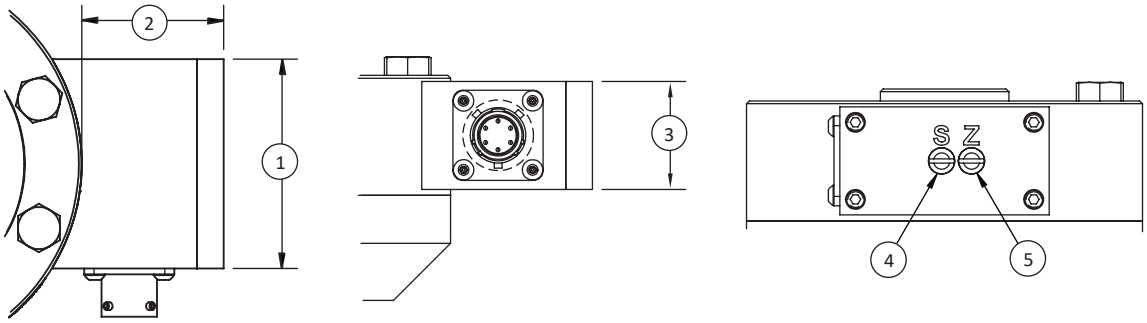
Model 1210ACK-5K-1 (Shown)

CONNECTOR OPTIONS

- PT02E-10-6P bayonet connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware



DIMENSIONS

See Drawing	AMPLIFIER HOUSING	
	ALL MODELS	
	ALL CAPACITIES	
	in	mm
(1)	2.18	55.4
(2)	1.48	37.6
(3)	1.13	28.6
(4)	Span Adjustment Cover Screw	
(5)	Zero Adjustment Cover Screw	

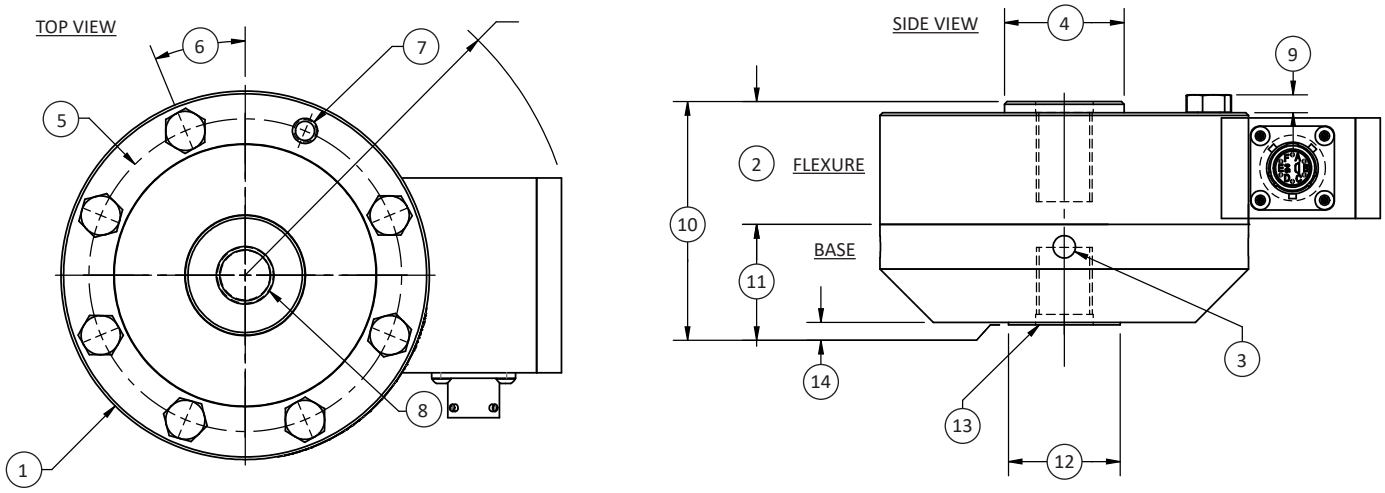
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1200 AND 1201 SERIES 3-WIRE AMPLIFIED LOAD CELL UNIVERSAL OR COMPRESSION-ONLY (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL			
UNIVERSAL		**1210**	**1210**	**1220**	**1232**
COMPRESSION-ONLY		**1211****	**1211**	**1221**	**1231**
CAPACITY					
U.S. MODELS (lbf)		**300, 500, 1K, 2K**	**5K, 10K**	**25K, 50K**	**100K**
METRIC MODELS (kN)		**1.5, 2.5, 5, 10**	**25, 50**	**100, 250**	**450**
ACCURACY – (MAX ERROR)					
Static Error Band – %FS		±0.06	±0.07	±0.07	±0.07
Nonlinearity – %FS		±0.06	±0.07	±0.07	±0.07
Hysteresis – %FS		±0.03	±0.05	±0.06	±0.06
Nonrepeatability – %RO		±0.02	±0.02	±0.02	±0.02
Creep, in 20 min – %		±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in		±0.25	±0.25	±0.25	±0.25
TEMPERATURE					
Compensated Range	°F	15 to 115	15 to 115	15 to 115	15 to 115
	°C	-10 to 45	-10 to 45	-10 to 45	-10 to 45
Operating Range	°F	-20 to 185	-20 to 185	-20 to 185	-20 to 185
	°C	-29 to 85	-29 to 85	-29 to 85	-29 to 85
Effect on Zero – %RO / deg	°F	±0.005	±0.003	±0.003	±0.003
	°C	±0.009	±0.005	±0.005	±0.005
Effect on Output – % / deg	°F	±0.005	±0.005	±0.005	±0.005
	°C	±0.009	±0.009	±0.009	±0.009
ELECTRICAL					
Rated Output		4-20 mA, ±5V, ±10V, 0-5V, 0-10V			
Supply Voltage – VDC MAX		12 to 28	12 to 28	12 to 28	12 to 28
Span Adjust Range – % RO		±10	±10	±10	±10
Zero Adjust Range – % RO		7	3.5	3.5	3.5
Insulation Resistance – Megohm		5000	5000	5000	5000
MECHANICAL					
Safe Overload – %CAP		±150	±150	±150	±150
Deflection @ RO	in	0.001	0.002	0.002	0.003
	mm	0.03	0.05	0.05	0.08
Optional Base – P/N (Metric)		B101 (M)	B102 (M)	B103 (M)	B112 (M)
Bandwidth Hz		200	200	200	200
Weight	lbf	1.5	3.3	9.5	26
	kg	0.7	1.5	4.3	11.8
Connector		PT02E-10-6P			
Calibration		Tension & Compression			
Material		Aluminum	Alloy steel		

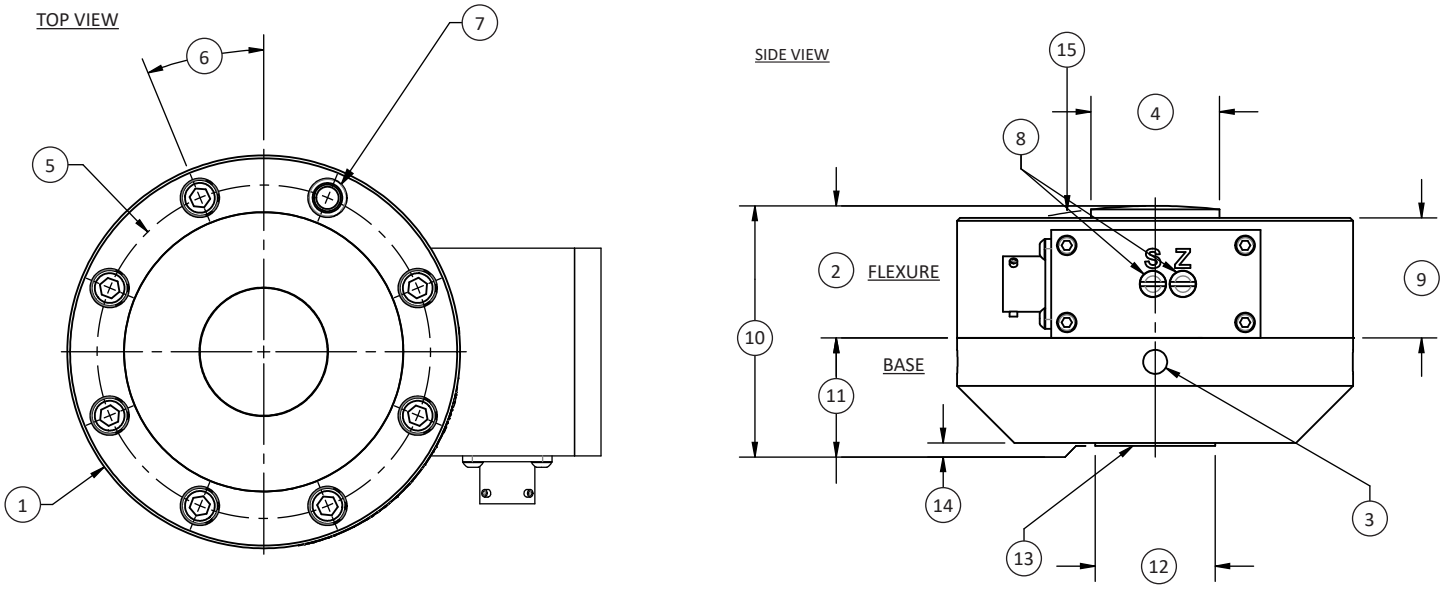
1200 AND 1201 SERIES 3-WIRE AMPLIFIED LOAD CELL UNIVERSAL OR COMPRESSION-ONLY (U.S. & METRIC)



DIMENSIONS

See Drawing	MODEL					
	1210		1220		1232	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300, 500, 1K, 2K, 5K, 10K,	1.5, 2.5, 5, 10, 25, 50	25K, 50K	100, 250	100K	450
	in	mm	in	mm	in	mm
(1)	Ø4.12	Ø104.7	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	1.38	34.9	1.75	44.5	2.50	63.5
(3)	4 x Ø0.25 ↧ 0.29	4 x Ø6.4 ↧ 7.4	4 x Ø0.31 ↧ 0.31 ES 90°	4 x Ø7.9 ↧ 7.9 ES 90°	4 x Ø0.31 ↧ 0.31 ES 90°	4 x Ø7.9 ↧ 7.9 ES 90°
(4)	Ø1.34	Ø34.0	Ø2.41	Ø61.2	Ø3.76	Ø95.5
(5)	Ø3.50	Ø88.9	Ø5.125	Ø130.18	Ø6.50	Ø165.1
(6)	22.5°		15.0°		11.25°	
(7)	8 x Ø0.28 THRU	8 x Ø7.1 THRU	12 x Ø0.41 THRU	12 x Ø10.3 THRU	16 x Ø0.53 THRU	16 x Ø13.5 THRU
(8)	⅝-18 UNF-3B ↧ 1.12 ⌴ Ø⅞ ↧ 0.12	M16 X 2-4H ↧ 28.6 ⌴ Ø16.4 ↧ 3.05	1.250-12 UNF-3B ↧ 1.40 ⌴ Ø1.27 ↧ 0.12	M33 X 2-4H ↧ 35.6 ⌴ Ø33.5 ↧ 3.0	1¾-12 UNF-3B ↧ 2.15 ⌴ Ø1.77 ↧ 0.12	M42 X 2-4H ↧ 54.6 ⌴ Ø42.5 ↧ 3.0
(9)	0.20	5.1	0.3	7.6	0.4	10.2
(10)	2.50	63.5	3.5	88.9	4.5	114.3
(11)	1.13	28.6	1.75	44.5	2.00	50.8
(12)	1.25	31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(13)	⅝-18 UNF-3B ↧ 0.87 ⌴ Ø⅞ ↧ 0.12	M16 X 2-4H ↧ 22.1 ⌴ Ø16.4 ↧ 3.05	1¼-12 UNF-3B ↧ 1.40 ⌴ Ø1.27 ↧ 0.12	M33 X 2-4H ↧ 35.6 ⌴ Ø33.5 ↧ 3	1¾-12 UNF-3B ↧ 1.75 ⌴ Ø1.77 ↧ 0.12	M42 X 2-4H ↧ 44.5 ⌴ Ø42.5 ↧ 3.0
(14)	0.03	0.8	0.03	0.8	0.03	0.8

1200 AND 1201 SERIES 3-WIRE AMPLIFIED LOAD CELL UNIVERSAL OR COMPRESSION-ONLY (U.S. & METRIC)



DIMENSIONS

See Drawing	MODEL							
	1211		1221		1231		1241	
	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 5K, 10K	5, 10, 25, 50	25K, 50K	125, 250	100k	450	200K	900
	in	mm	in	mm	in	mm	in	mm
(1)	Ø4.12	Ø104.7	Ø4.75	Ø120.6	Ø7.50	Ø190.4	Ø8.25	Ø209.5
(2)	1.38	34.9	1.75	44.5	2.25	57.2	3.25	82.6
(3)	4 x Ø0.25 ↧ 0.29	4 x Ø6.4 ↧ 7.4	4 x Ø0.31 ↧ 0.31	4 x Ø7.9 ↧ 7.9	4 x Ø0.31 ↧ 0.31	4 x Ø7.9 ↧ 7.9	4 X Ø0.31 ↧ 0.31	4 X Ø7.9 ↧ 7.9
(4)	Ø1.34	Ø34.0	Ø1.57	Ø39.9	Ø3.13	Ø79.4	Ø3.16	Ø80.3
(5)	Ø3.500	Ø88.90	Ø4.000	Ø101.60	Ø6.250	Ø158.75	Ø6.750	Ø171.45
(6)	22.5°		45.0°		15.0°		15.0°	
(7)	4 X Ø0.41 ↧ 0.25 ⌴ Ø0.28 THRU	4 X Ø10.3 ↧ 6.4 ⌴ Ø7.1 THRU	4 X Ø0.34 THRU Ø0.39 X 90°, NEAR SIDE	4 X Ø8.7 THRU Ø10.0 X 90°, NEAR SIDE	12 X Ø0.47 THRU ⌴ Ø0.69 ↧ 0.438	12 X Ø11.9 THRU ⌴ Ø17.5 ↧ 17.5	12 X Ø0.66 THRU ⌴ Ø1.00 ↧ 0.63	12 X Ø16.7 THRU ⌴ Ø25.4 ↧ 15.9
(8)	Span & Zero Adjustment Cover Screws		Span & Zero Adjustment Cover Screws		Span & Zero Adjustment Cover Screws		Span & Zero Adjustment Cover Screws	
(9)	1.25	31.8	1.63	41.3	2.00	50.8	3.00	76.2
(10)	2.50	63.5	3.00	76.3	4.25	108.0	5.75	146.1
(11)	1.13	28.6	1.25	31.8	2.00	50.8	2.50	63.5
(12)	Ø1.25	Ø31.8	2.00	50.8	Ø3.00	Ø76.2	3.00	76.2
(13)	Ø⅝-18 UNF-3B ↧ 0.87 ⌴ Øⁱ³⁄₃₂ ↧ 0.12	M16 x 2-4H ↧ 22.1 ⌴ Ø16.4 ↧ 3.0	Ø½-20 UNF-2B ↧ 0.88	M16 X 2-6H ↧ 22.4	Ø¾-12 UNF-3B ↧ 1.75 ⌴ Ø1.77 ↧ 0.12	M27 x 2-6H ↧ 44.5 ⌴ Ø45.0 ↧ 3.0	Ø¾-16 UNF-3B ↧ 1.50 ⌴ Ø0.77 ↧ 0.12	M27 x 2-6H ↧ 38.1
(14)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8
(15)	S R6.00	152.4	R6.00	152.4	R8.00	57.2	R12.00	304.8

12x8 FLANGE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Standard flange design mounts directly to cylinders
- Tension and compression
- Fatigue rated
- Proprietary Interface temperature compensated strain gages
- Performance to 0.05%
- Eccentric load compensated
- Low deflection
- Alignment hole
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Barometric compensation
- Ease of installation
- Increased accuracy
- Ability to measure torsion with optional bridges
- Fatigue rated – Can survive 100 million fully reversed load cycles. Ideal for long term cycle testing when failure is unfordable

CONNECTOR OPTIONS

- Integral cable
- PC04E-10-6P screw connector
- PT02E-10-6P bayonet connector

STANDARD CONFIGURATION



Model 1228ACK-30K (Shown)

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Add connector to cable
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range
- Cable length

ACCESSORIES

- Mating connector
- Instrumentation

Note:

- Dimensions are approximate
- Contact factory for current drawings
- *2.41 (61.2) for 50 kN
- For lower capacities; refer to the 1700 model

All product descriptions are for general information only. They are not to be understood as a guarantee of quality or durability and do not constitute any liability what so ever.

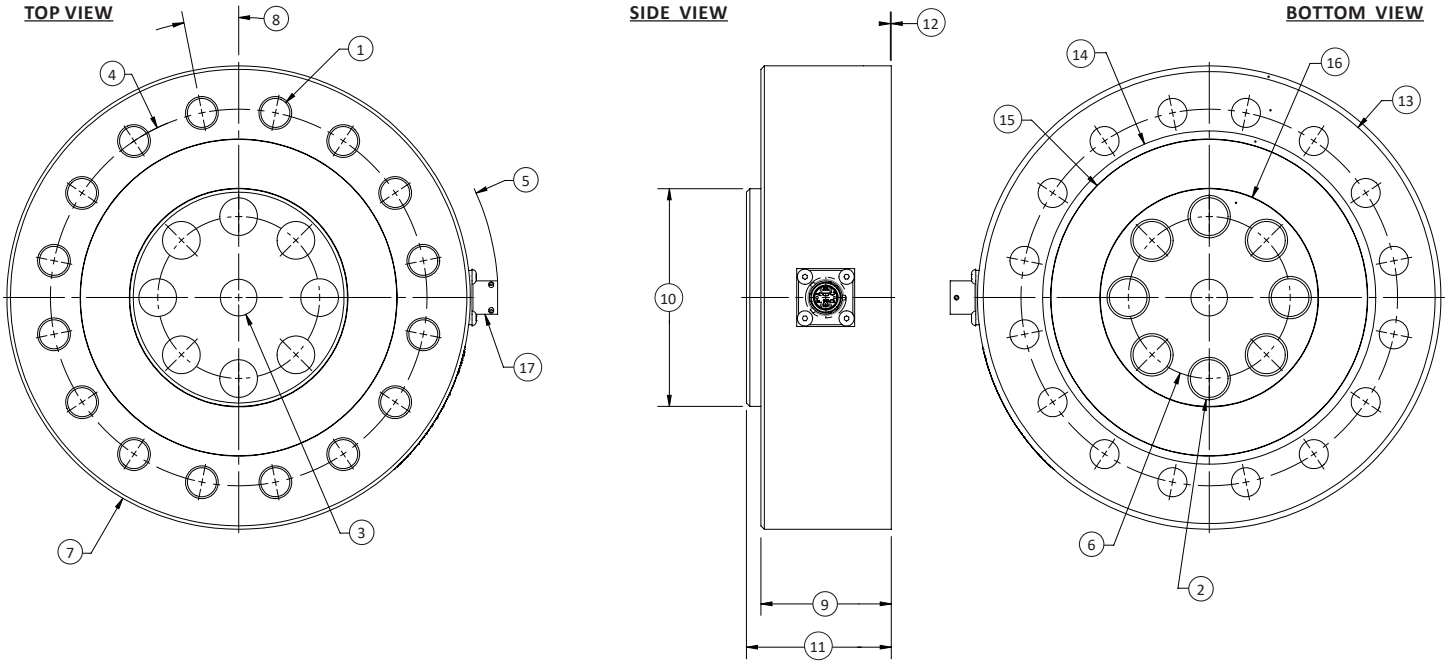
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12x8 FLANGE LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL						
		1228	1238	1248	1258	1268	1288	1298
		CAPACITY						
Measuring Range	U.S. (lbf)	11.2K, 22.4K, 30K	55K	110K	220K	330K	539.5K	741.9K
	Metric (kN)	50, 100, 140	250	500	1000	1500	2400	3300
ACCURACY – (MAX ERROR)								
Static Error Band– %FS		±0.05	±0.05	±0.06	±0.10	±0.12	±0.15	±0.20
Nonlinearity – %FS		±0.05	±0.05	±0.06	±0.10	±0.12	±0.15	±0.20
Hysteresis – %FS		±0.05	±0.05	±0.07	±0.10	±0.12	±0.15	±0.20
Nonrepeatability – %RO		±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01
Creep, in 20 min – %		±0.025	±0.025	±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.25	±0.25	±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – %	in	±0.25	±0.25	±0.25	±0.25	±0.25	±0.25	±0.50
	mm	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.02
TEMPERATURE								
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – % / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL								
Rated Output – mV/V (Nominal)		2.2	2.2	2.2	2.2	2.2	2.2	2.2
Excitation Voltage – VDC MAX		20	20	20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		350 ±3.5	350 ±3.5	350 ±3.5	350 ±3.5	350 ±3.5	350 ±3.5	350 ±3.5
Zero Balance – %RO MAX		±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm – MIN		5000	5000	5000	5000	5000	5000	5000
MECHANICAL								
Safe Overload – %CAP		±275	±275	±275	±275	±275	±275	±275
Deflection @ RO	in	0.001	0.002	0.004	0.005	0.006	Consult factory	
	mm	0.03	0.05	0.10	0.13	0.15	Consult factory	
Natural Frequency – kHz		7	5.9	4.4	5	5.1	5.5	5.5
Weight	lbs	9.32	23.16	65.42	102.00	203.79	442.00	901.48
	kg	4.28	10.51	29.67	46.27	92.44	200.49	408.90
Calibration		Tension & Compression						
Material		Alloy steel						

12x8 FLANGE LOAD CELL (U.S. & METRIC)

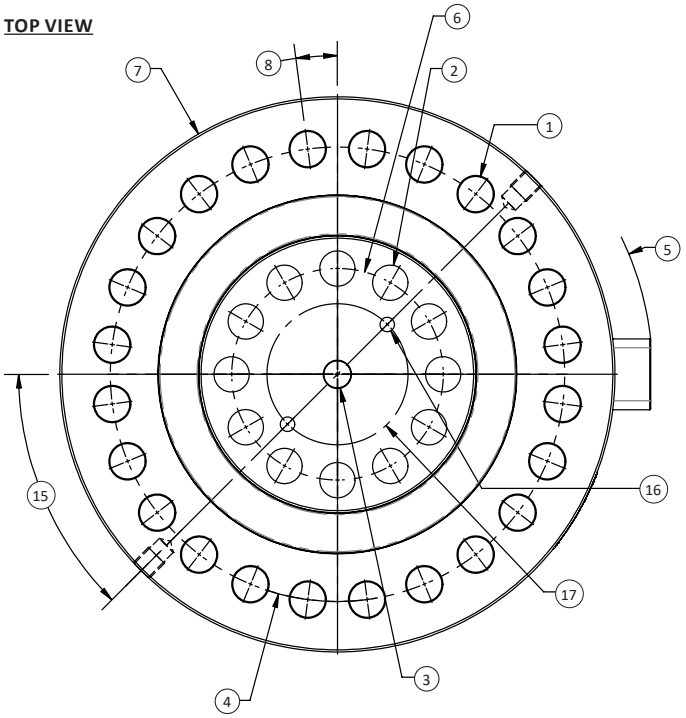


DIMENSIONS (1228, 1238, & 1248)

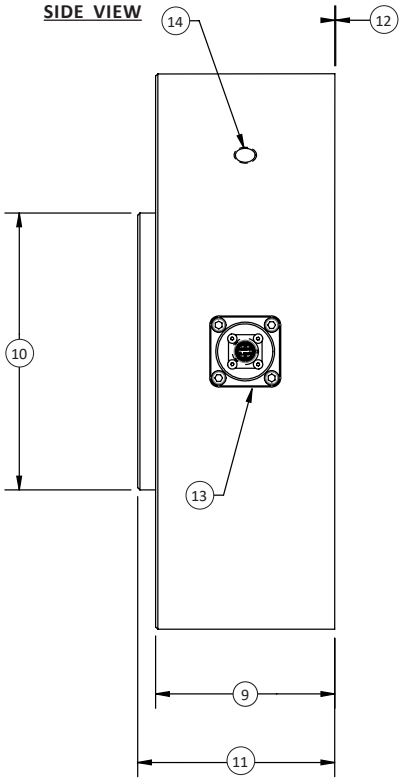
See Drawing	MODEL					
	1228		1238		1248	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	11.2K, 22.4K, 30K	50, 100, 140	55K	250	110K	500
	in	mm	in	mm	in	mm
(1)	12 x Ø0.406 THRU ⌵ 0.44 x (90°/60°)	12 x Ø10.3 THRU ⌵ Ø11.2 (90°/60°)	16 x Ø0.50 THRU	16 x Ø12.7 THRU	16 x Ø0.66 THRU ⌵ 0.69 x 90°	16 x Ø16.7 THRU ⌵ 17.5 x 90°
(2)	8 x Ø0.41 THRU ⌵ 0.46 x 90°	8 x Ø10.5 THRU ⌵ 11.7 x 90°	8 x Ø0.65 THRU ⌵ Ø0.73 x 90°	8 x Ø16.5 THRU ⌵ Ø18.5 x 90°	8 x Ø0.65 THRU	8 x Ø16.51 THRU
(3)	Ø0.31 THRU ⌴Ø0.3166/0.3155 ↧ 0.39 BOTH ENDS	Ø7.9 THRU ⌴Ø0.8.042/8.014 ↧ 10.0 BOTH ENDS	Ø0.6306/0.6299 THRU	Ø16.017/15.999 THRU	Ø0.6306/0.6299 THRU	Ø16.017/15.999 THRU
(4)	Ø5.125	Ø130.2	Ø6.500	Ø165.1	Ø9.000	Ø228.60
(5)	R3.66 MIN	R93.0 MIN	R4.46 MIN	R113.3	R6.57	R166.9
(6)	Ø1.772	Ø45.0	Ø2.795	Ø71.0	Ø2.798	Ø70.99
(7)	Ø6.06	Ø153.9	Ø8.00	Ø203.1	Ø11.00	Ø279.3
(8)	15°		11.25°		11.25°	
(9)	1.63	41.3	2.25	57.2	3.00	76.2
(10)	Ø2.41	Ø61.2	Ø3.76	Ø95.4	Ø4.81	Ø122.2
(11)	1.75	44.5	2.50	63.5	3.50	88.9
(12)	0.02	0.4	0.02	0.5	0.3	0.8
(13)	Ø5.86	Ø148.8	Ø7.80	Ø198.1	Ø10.60	Ø269.2
(14)	Ø4.3	Ø109.2	Ø5.75	Ø146.1	Ø7.40	Ø188.0
(15)	Ø4.01	Ø101.9	Ø5.47	Ø139.0	Ø6.78	Ø172.1
(16)	Ø2.41	Ø61.2	Ø3.76	Ø95.4	Ø4.81	Ø122.2
(17)	PC04E-10-6P		PT02E-10-6P		PT02E-10-6P	

12x8 FLANGE LOAD CELL (U.S. & METRIC)

TOP VIEW



SIDE VIEW



DIMENSIONS (1268)

See Drawing	MODEL	
	1268	
	CAPACITY	
	U.S. (lbf)	Metric (kN)
	330K	1500
	in	mm
(1)	0.98	25.0
(2)	12 x Ø0.984 THRU	12 x Ø24.99 THRU
(3)	Ø0.75 THRU ⌴ Ø(0.7882/0.7874) ↧ 0.79 BOTH ENDS	Ø19.05 THRU ⌴ Ø(20.02/20.00) ↧ 20.1 BOTH ENDS
(4)	Ø12.684	Ø322.17
(5)	R8.80 MIN	R223.6 MIN
(6)	Ø5.906	Ø150.01
(7)	Ø15.50	Ø393.7
(8)	7.5°	
(9)	5.00	127.0
(10)	Ø7.73	Ø196.3
(11)	5.50	139.7
(12)	0.03	0.8
(13)	PT02E-10-6P(023)	
(14)	2 x M16x2-6H ↧ 0.60 Lifting Threads	2 x M16x2-6H ↧ 15.2Lifting Threads
(15)	45°	
(16)	2 x M12x1.75-6H ↧ 0.70	2 x M12x1.75-6H ↧ 17.8
(17)	Ø3.937	Ø100.00

1331 COMPRESSION-ONLY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- High output – 4 mV/V
- Proprietary Interface temperature compensated strain gages
- Small footprint
- Integral load button
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp effect on output
- Barometric compensation

STANDARD CONFIGURATION



Model 1331FGT-100K-B (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Static Error Band – %FS		±0.07
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.08
Non-repeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Zero – % RO / deg	°F	±0.0008
	°C	±0.0015
Effect on Output – % / deg	°F	±0.0008
	°C	±0.0015
ELECTRICAL		
Rated Output – mV/V (Nominal)		4.0
Excitation Voltage – VDC MAX		20
Bridge Resistance – Ohm (Nominal)		350
Zero Balance – %RO		±1.0
Insulation Resistance – Megaohm		5000 @ 50 VDC
MECHANICAL		
Safe Overload – %CAP		+150
Deflection @ RO	in	0.003
	mm	0.0762
Weight	lbs	21.971
	kg	9.965
Material		Alloy steel
Seal		Environmental

OPTIONS

- Base (recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range

CONNECTOR OPTIONS

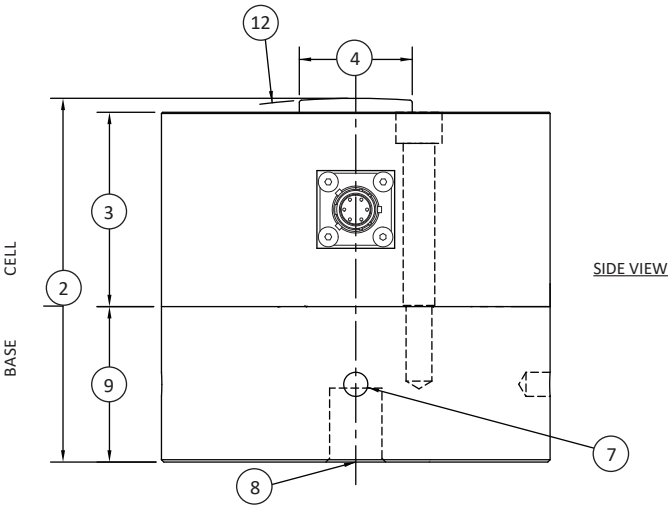
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

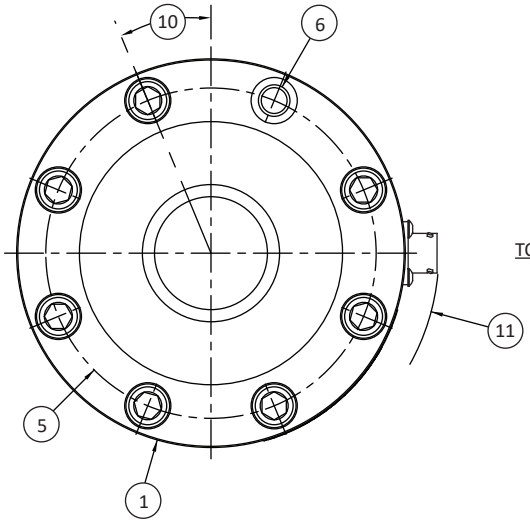
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1331 COMPRESSION-ONLY LOAD CELL (U.S. & METRIC)



SIDE VIEW



TOP VIEW

DIMENSIONS

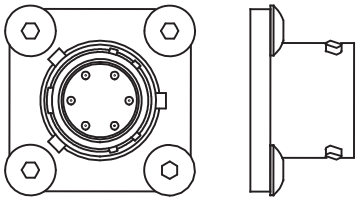
See Drawings	MODEL	
	1331	
	CAPACITY	
	U.S. (lbf)	Metric (kN)
	100K	450
	in	mm
(1)	Ø5.00	Ø127.0
(2)	4.68	118.9
(3)	2.50	63.5
(4)	Ø1.45	Ø36.9
(5)	Ø4.25	Ø108
(6)	Ø0.41 ↧ 2.1 ⌴ Ø 0.59 ↧ 0.40	Ø10.3 ↧ 53.3 ⌴ Ø15.0 ↧ 10.2
(7)	4x spaced 90 0.31 ↧ 0.31	4x spaced 90 7.9 ↧ 7.8
(8)	3/4-16 UNF-3B ↧ 1.00	
(9)	2.00	50.8
(10)	22.5°	
(11)	R 2.93	R 74.5
(12)	SR 10.0	SR 254

1331 COMPRESSION-ONLY LOAD CELL (U.S. & METRIC)

BAYONET CONNECTOR



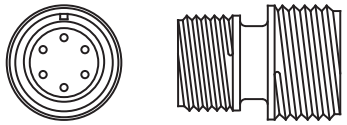
Model 1331FGT-100K-B (Shown)



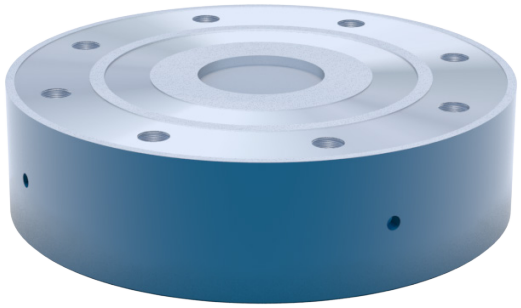
SCREW TYPE CONNECTOR



Model 1331EGJ-100K-B (Shown)



BASE



Model 19354 (Shown)

1500 STANDARD LOW CAPACITY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 25 to 300 lbf (125 to 1500 kN)
- Proprietary Interface temperature compensated strain gages
- Performance to 0.05%
- Compact 2 ¾ in (70 mm) diameter
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Shunt calibration
- Low deflection

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range
- Special connector

CONNECTOR OPTIONS

- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

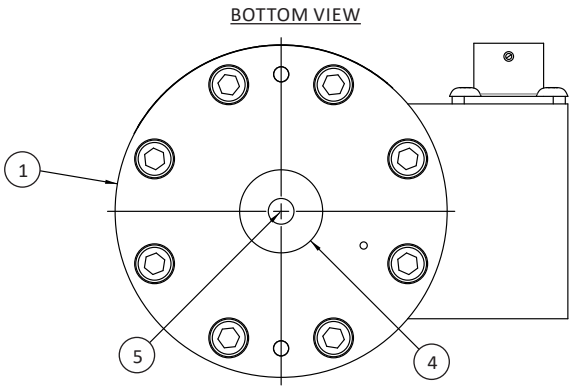
ACCESSORIES

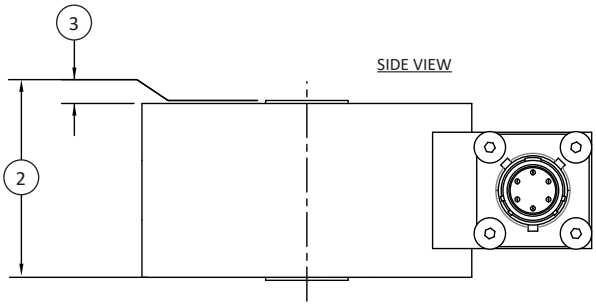
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

STANDARD CONFIGURATION



Model 1500ASK-300 (Shown)





DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	25, 50, 100, 200, 300	125, 250, 500, 1000, 1500
	in	mm
(1)	2.75	69.8
(2)	1.50	38.1
(3)	0.03 - 2X	0.6 - 2X
(4)	0.69	17.5
(5)	¼-28 UNF ↧ 0.25	M6 X 1-6H ↧ 6.4

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1500 STANDARD LOW CAPACITY LOAD CELL (U.S. & METRIC)

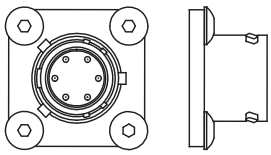
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Static Error Band – %FS		±0.05
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		±0.02
Creep, in 20 min – %		±0.03
Eccentric Load Sensitivity – % / in		±0.25
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % / deg	°F	±0.0008
	°C	±0.0015
Effect on Zero – %RO / deg	°F	±0.0015
	°C	±0.0027
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Zero Balance – %RO		±1.0
Bridge Resistance – Ohm (Nominal)		700
Excitation Voltage – VDC MAX		20
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Tension & Compression
Safe Overload – %CAP		±150
Deflection @ RO	in	0.003
	mm	0.08
Natural Frequency	(lbf)	25, 50, 100, 200, 300
	(N)	125, 250, 500, 1000, 1500
	(Hz)	2000, 2500, 4000, 6000, 7500
Weight	lbs	1
	kg	0.45
Material		Aluminum

BAYONET CONNECTOR

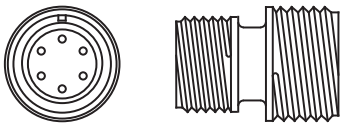


Model 1500ASK-300 (Shown)





Model 1500AF-300 (Shown)



1600 GOLD STANDARD™ CALIBRATION LOAD CELL (U.S. & METRIC)

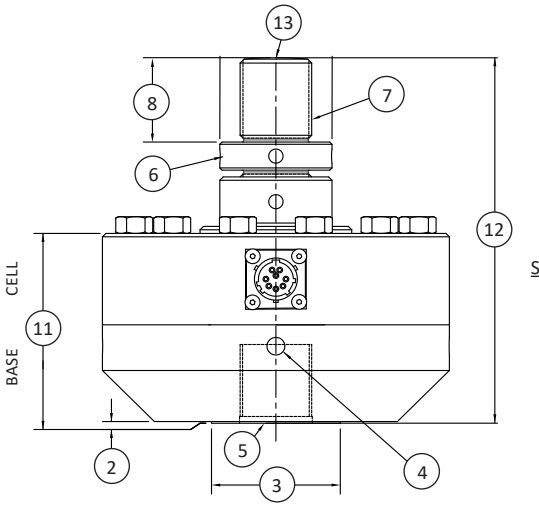
FEATURES & BENEFITS

- Capacities from 500 to 200K lbf (2.2 to 900 kN)
- Tension and compression in one unit
- 0.01% creep
- 0.0008%/°F temp. effect on output
- High output – to 4 mV/V
- Eccentric load compensated
- High precision base installed
- Factory installed calibration adapter
- 3 run NIST traceable ASTM E74 calibration
- 4% lower load limit per ASTM E74

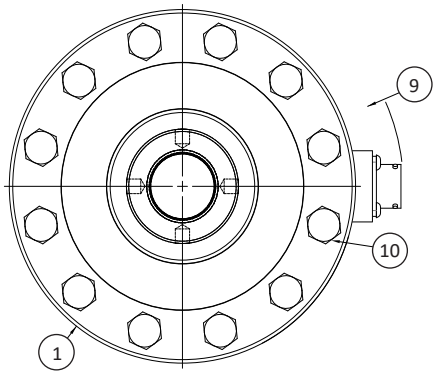
STANDARD CONFIGURATION



Model 1620AJH-50K (Shown)



SIDE VIEW



TOP VIEW

DIMENSIONS

See Drawing	MODEL							
	1610		1620		1632		1640	
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	500, 1K, 2K, 5K, 10K	2.2, 4.5, 9, 22, 45	25K, 50K	110, 225	100K	450	200K	900
	in	mm	in	mm	in	mm	in	mm
(1)	4.13	104.7	6.06	153.9	8.00	203.1	11.00	279.3
(2)	0.03	0.80	0.03	0.80	0.03	0.80	0.03	0.80
(3)	1.25	31.8	2.25	57.2	3.00	76.2	4.50	114.3
(4)	Ø 0.25 ↧ 0.29	Ø 6.4 ↧ 7.4	Ø 0.31 ↧ 0.31	Ø 7.9 ↧ 7.9	Ø 0.31 ↧ 0.31	Ø 7.9 ↧ 7.9	Ø 0.31 ↧ 0.31	Ø 7.9 ↧ 7.9
(5)	⅝-18 UNF-3B ↧ 0.87	M16x2-4H ↧ 22.1	1 ¼-12 UNF-3B ↧ 1.40	M33x2-4H ↧ 35.6	1 ¾-12 UN-3B ↧ 1.75	M42x2-4H ↧ 44.4	2 ¾-8 UN-3B ↧ 2.75	M72x2-4H ↧ 69.8
(6)	CA-101	CA-201	CA-102	CA-202	CA-103	CA-203	Integral	
(7)	⅝-18 UNF-3A	M16x2-4G	1 ¼-12 UNF-3A	M33x2-4G	1 ¾-12 UN-3A	M42x2-4G	2 ¾-8 UN-3A	M72x2-4H
(8)	0.75	19.0	1.50	38.1	2.00	50.8	2.75	69.8
(9)	2.81	71.4	3.52	89.4	4.50	114.3	6.00	152.4
(10)	8 Places		12 Places		16 Places		16 Places	
(11)	2.50	63.5	3.50	88.9	4.50	114.3	6.50	165.1
(12)	4.38 ±0.12	111.3 ±3.1	6.50 ±0.12	165.1 ±3.1	8.75 ±0.12	222.2 ±3.1	10.5 ±0.12	266.7 ±3.1
(13)	6.00	152.4	6.00	152.4	12.00	304.8	18.00	457.2

1600 GOLD STANDARD™ CALIBRATION LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL					
		1610	1610	1610	1620	1632	1640
		CAPACITY					
U.S. (lbf)		500	1K, 2K	5K, 10K	25K, 50K	100K	200K
Metric (kN)		2.2	4.5, 9	22, 45	110, 225	450	900
ACCURACY – (MAX ERROR)							
Static Error Band – %FS		±0.02		±0.025	±0.025	±0.05	±0.05
Nonlinearity – %FS		±0.03		±0.035	±0.035	±0.05	±0.05
Hysteresis – %FS		±0.02		±0.035	±0.045	±0.05	±0.05
Nonrepeatability – %RO		±0.005		±0.005	±0.005	±0.005	±0.005
Creep, in 20 min – %		±0.01		±0.01	±0.01	±0.01	±0.01
Side Load Sensitivity – %		±0.1		±0.1	±0.1	±0.1	±0.1
Eccentric Load Sensitivity – % / in		±0.1		±0.1	±0.1	±0.1	±0.1
Lower Load Limit – % Cap. (ASTM E74 Class A)		4.0		4.0	4.0	4.0	4.0
TEMPERATURE							
Compensated Range	°F	+15 to +115		+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45		-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200		-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90		-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / deg	°F	±0.0004		±0.0004	±0.0004	±0.0004	±0.0004
Effect on Output – % / deg	°F	±0.0008		±0.0008	±0.0008	±0.0008	±0.0008
ELECTRICAL							
Rated Output – mV/V (Nominal)		2.0		4.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX		20		20	20	20	20
Bridge Resistance – Ohm (Nominal)		350		350	350	350	350
Zero Balance – %RO		±1.0		±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000		5000	5000	5000	5000
MECHANICAL							
Safe Overload – %CAP		±150		±150	±150	±150	±150
Deflection @ RO	in	0.002		0.004	0.004	0.006	0.010
	mm	0.05		0.10	0.10	0.15	0.25
Weight	lbs	3.8		8.0	23.5	058	171
	kg	1.724		3.629	10.659	26.308	77.564
Calibration		Tension & Compression					
Material		Aluminum		Alloy steel			

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range

CONNECTOR OPTIONS

- PT02E-12-8P bayonet connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1601 GOLD STANDARD™ CALIBRATION COMPRESSION-ONLY LOAD CELL (U.S. & METRIC)

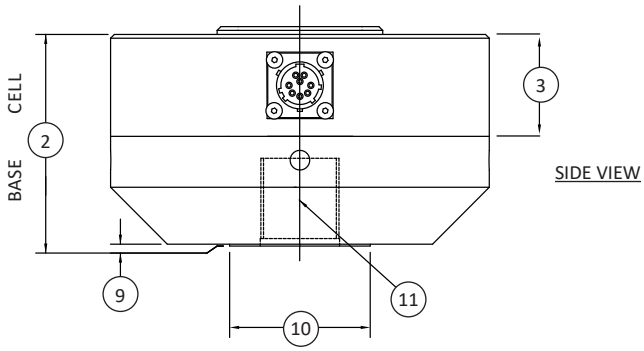
FEATURES & BENEFITS

- Capacities from 1K to 100K lbf (4.5 to 450 kN)
- 0.01% creep
- High output – to 4mV/V
- High precision base installed
- 3 run NIST traceable ASTM E74 calibration
- Eccentric load compensated
- 0.0008%/°F temperature effect on output
- 4% lower load limit

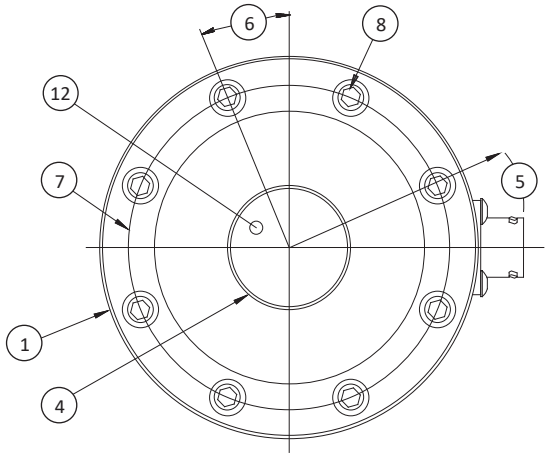
STANDARD CONFIGURATION



Model 1621BBI-50K (Shown)



SIDE VIEW



TOP VIEW

DIMENSIONS

See Drawing	MODEL					
	1611		1621		1633	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 5K, 10K	4.5, 9, 22, 45	25K, 50K	110, 225	100K	450
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	2.50	63.5	3.50	89.0	4.50	114.3
(3)	1.25	31.7	1.63	41.4	2.25	57.2
(4)	Ø1.34	Ø34.0	Ø2.41	Ø61.2	Ø3.76	Ø95.5
(5)	2.78	70.0	3.50	89.0	4.47	113.0
(6)	22.5°	22.5°	15.0°	15.0°	11.25°	11.25°
(7)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1
(8)	8 Places		12 Places		16 Places	
(9)	0.03	0.8	0.03	0.8	0.03	0.8
(10)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(11)	⅝-18 UNF-3B ↧ 0.87	M16x2-4H ↧ 22.1	1 ¼-12 UNF-3B ↧ 1.40	M33x2-4H ↧ 35.6	1 ¾-12 UNF-3B ↧ 1.75	M42x2-4H ↧ 44.5
(12)	SR 6.00	SR 152.0	SR 8.00	SR 203.0	SR 12.0	SR 305.0

1601 GOLD STANDARD™ CALIBRATION COMPRESSION-ONLY LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL									
		1611		1611		1611		1621		1633	
		CAPACITY									
		U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
		1K	4.5	2K	9	5K, 10K	22, 45	25K, 50K	110, 225	100K	450
ACCURACY – (MAX ERROR)											
Static Error Band – %FS		±0.02		±0.02		±0.025		±0.03		±0.04	
Nonlinearity – %FS		±0.03		±0.03		±0.04		±0.04		±0.04	
Hysteresis – %FS		±0.02		±0.02		±0.04		±0.04		±0.05	
Nonrepeatability – %RO		±0.005		±0.005		±0.005		±0.005		±0.005	
Creep, in 20 min – %		±0.01		±0.01		±0.01		±0.01		±0.01	
Side Load Sensitivity – %		±0.1		±0.1		±0.1		±0.1		±0.1	
Eccentric Load Sensitivity – % / in		±0.1		±0.1		±0.1		±0.1		±0.1	
Lower Load Limit – % Cap. (ASTM E74 Class A)		4.0		4.0		4.0		4.0		4.0	
TEMPERATURE											
Compensated Range	°F	+15 to +115		+15 to +115		+15 to +115		+15 to +115		+15 to +115	
	°C	-10 to +45		-10 to +45		-10 to +45		-10 to +45		-10 to +45	
Operating Range	°F	-65 to +200		-65 to +200		-65 to +200		-65 to +200		-65 to +200	
	°C	-55 to +90		-55 to +90		-55 to +90		-55 to +90		-55 to +90	
Effect on Zero – %RO / deg	°F	±0.0004		±0.0004		±0.0004		±0.0004		±0.0004	
Effect on Output – % / deg	°F	±0.0008		±0.0008		±0.0008		±0.0008		±0.0008	
ELECTRICAL											
Rated Output – mV/V (Nominal)		2.0		2.0		4.0		4.0		4.0	
Excitation Voltage – VDC MAX		20		20		20		20		20	
Bridge Resistance – Ohm (Nominal)		350		350		350		350		350	
Zero Balance – %RO		±1.0		±1.0		±1.0		±1.0		±1.0	
Insulation Resistance – Megohm		5000		5000		5000		5000		5000	
MECHANICAL											
Safe Overload – %CAP		±150		±150		±150		±150		±150	
Deflection @ RO	in	0.002		0.002		0.004		0.004		0.006	
	mm	0.05		0.05		0.10		0.10		0.15	
Weight	lbs	3.3		3.3		7.5		21.5		52	
	kg	1.5		1.5		3.4		1.75		23.59	
Calibration		Compression									
Material		Alloy steel									

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range

CONNECTOR

- PT02E-12-8P

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware
- Calibration software

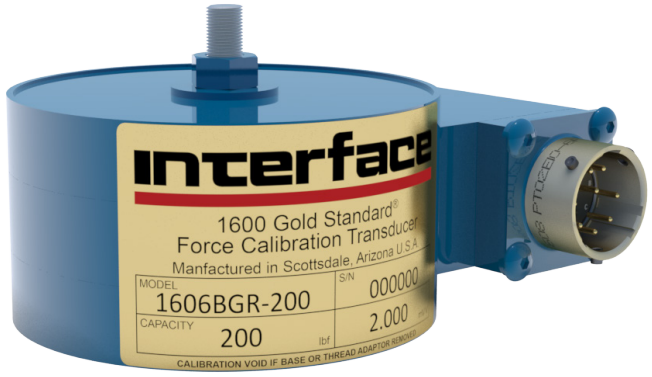
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1606 GOLD STANDARD™ LOW CAPACITY CALIBRATION LOAD CELL (U.S. & METRIC)

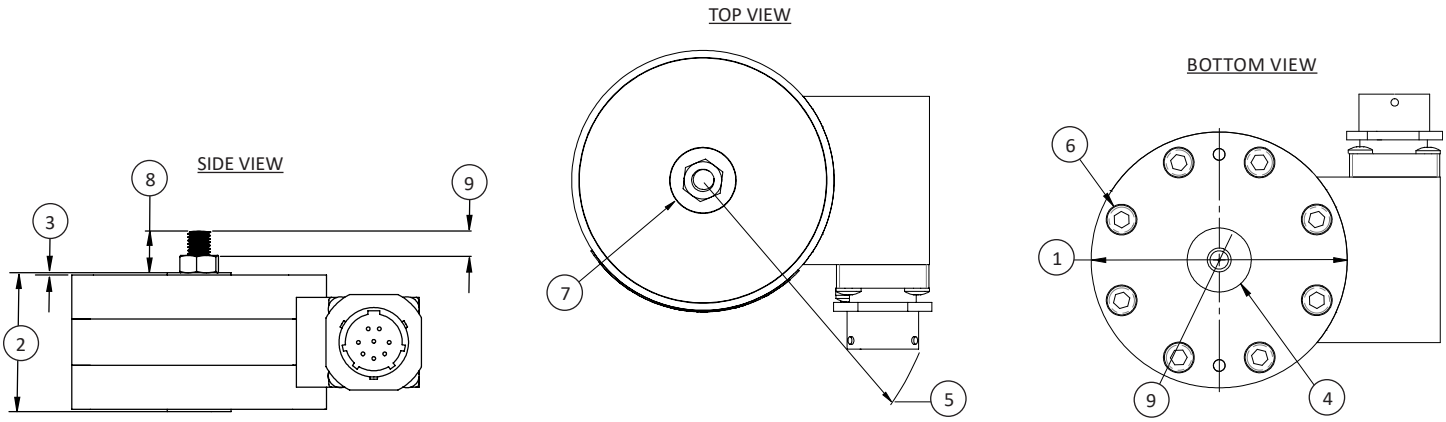
FEATURES & BENEFITS

- Capacities from 50 to 300 lbf (250 to 1,500 N)
- Tension & compression in one unit
- 0.02% creep
- 3 run NIST traceable ASTM E74 calibration
- Factory installed calibration adapter
- Eccentric load compensated
- 0.0008%/°F temperature effect on output
- 4% lower load limit per ASTM E74
- Higher capacities available

STANDARD CONFIGURATION



Model 1606BGR-2.5K (Shown)



DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	50, 100, 200, 300	250, 500, 1000, 1500
	in	mm
(1)	2.75	69.8
(2)	1.50	38.1
(3)	0.03 2x	0.6 2x
(4)	0.69	17.5
(5)	2.85	72.3
(6)	8 Places	
(7)	0.69	17.5
(8)	0.45	11.4
(9)	¼-28 UNF ↧ 0.25	M6x1-6H ↧ 6.4

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1606 GOLD STANDARD™ LOW CAPACITY CALIBRATION LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL			
		1606		1606	
		CAPACITY			
		U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
		50	250	100, 200, 300	500, 1000, 1500
ACCURACY – (MAX ERROR)					
Static Error Band – %FS		±0.03		±0.02	
Nonlinearity – %FS		±0.04		±0.03	
Hysteresis – %FS		±0.03		±0.02	
Nonrepeatability – %RO		±0.005		±0.005	
Creep, 20 min – %		±0.02		±0.02	
Side Load Sensitivity – %		±0.25		±0.25	
Eccentric Load Sensitivity – % / in		±0.25		±0.25	
Lower Load Limit – % Cap. (ASTM E74 CLASS A)		4.0		4.0	
TEMPERATURE					
Compensated Range	°F	+15 to +115		+15 to +115	
	°C	-10 to +45		-10 to +45	
Operating Range	°F	-65 to +200		-65 to +200	
	°C	-55 to +90		-55 to +90	
Effect on Zero – %RO / deg	°F	±0.0008		±0.0008	
Effect on Output – % / deg	°F	±0.0008		±0.0008	
ELECTRICAL					
Rated Output – mV/V (Nominal)		2.0		2.0	
Excitation Voltage – VDC MAX		20		20	
Bridge Resistance – Ohm (Nominal)		700		700	
Zero Balance – %RO		±1.0		±1.0	
Insulation Resistance – Megohm		5000		5000	
MECHANICAL					
Safe Overload – %CAP		±150		±150	
Deflection @ RO	in	0.003		0.003	
	mm	0.08		0.08	
Weight	lbs	1.0		1.0	
	kg	0.45		0.45	
Calibration		Tension & Compression			
Material		Tool steel			

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range

CONNECTOR

- PT02E-12-8P

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Calibration software

1700 FLANGE LOAD CELL (U.S. & METRIC)

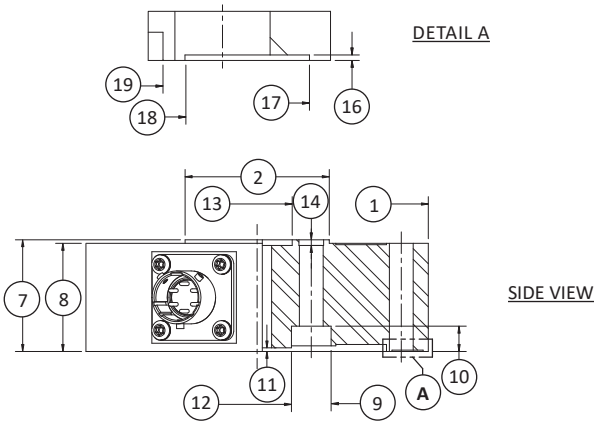
FEATURES & BENEFITS

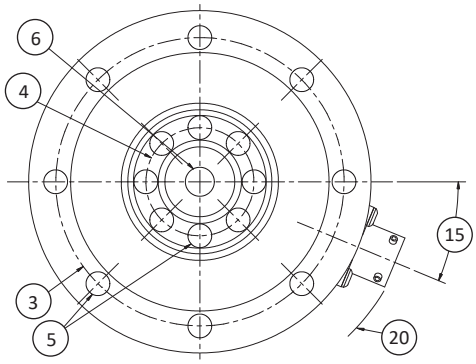
- Capacities from 220 to 14K lbf (1 to 63 kN)
- Standard flange design mounts directly to cylinders
- Tension and compression
- Proprietary Interface temp. compensated strain gages
- Performance to 0.05%
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output

STANDARD CONFIGURATION



Model 1720ACK-10KN (Shown)





DIMENSIONS

See Drawings	MODEL					
	1710		1720		1730	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	220, 550, 1.1K, 1.4K	1, 2.5, 5, 6.5	2.2K, 4.5K, 5.5K	10, 20, 25	11K, 14K	50, 63
	in	mm	in	mm	in	mm
(1)	Ø3.03	Ø77.0	Ø3.74	Ø95.0	Ø3.98	Ø101.0
(2)	Ø1.07	Ø27.3	Ø1.57	Ø40.0	Ø1.57	Ø40.0
(3)	Ø2.638	Ø67.0	Ø3.150	Ø80.00	Ø3.39±0.01	Ø86.0±0.01
(4)	Ø0.787	Ø20.0	Ø1.181	Ø30.00	Ø1.18±0.01	Ø30.0±0.01
(5)	Ø0.209	Ø5.30	Ø0.26 THRU	Ø6.6 THRU	Ø0.26 THRU	Ø6.6 THRU
	6 Places EQ SP		8 Places EQ SP			
(6)	M10 X 1 ↧ 0.67 2X ⌴ Ø0.500 + 0.002, -0.000 ↧ 0.08	M10 X 1 ↧ 17 2X ⌴ Ø12.70 +0.05, -0.00 ↧ 2.0	Ø0.315 H9	Ø8.0 H9	Ø0.315 H9	Ø8.0 H9
(7)	1.14	29.0	1.22	31.0	1.22	31.0
(8)	1.06	27.0	1.18	30.0	1.18	30.0
(9)	-	-	Ø1.61	Ø41.0	Ø1.61	Ø41.0
(10)	0.25	6.4	0.28	7.0	0.28	7.0
(11)	-	-	0.04	1.0	0.04	1.0
(12)	-	-	Ø0.75	Ø19.0	Ø0.75	Ø19.0
(13)	-	-	Ø0.76	Ø19.4	Ø0.76	Ø19.4
(14)	R 0.79	R 20.0	0.06 2x	1.6 2x	0.06 2x	1.6 2x
(15)	30°		22.5°		22.5°	
(16)	0.02	0.4	0.02	0.4	0.015	0.38
(17)	Ø2.94	Ø74.6	Ø3.63	Ø92.1	Ø3.91	Ø99.4
(18)	Ø2.40	Ø61	Ø2.95	Ø74.9	Ø2.89	Ø73.3
(19)	Ø2.300, +0.002, -0.000	Ø58.42 +0.5, -0.00	Ø2.83	Ø71.8	Ø2.83	Ø71.8

FORCE MEASUREMENT SOLUTIONS

1700 FLANGE LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL		
		1710	1720	1730
		CAPACITY		
Measuring Range	U.S. (lbf)	220, 550, 1.1K, 1.4K	2.2K, 4.5K, 5.5K	11K, 14K
	Metric (kN)	1, 2.5, 5	10, 20, 25	50, 63
ACCURACY – (MAX ERROR)				
Nonlinearlity – %FS		±0.04	±0.04	±0.04
Hysteresis – %FS		±0.03	±0.03	±0.05
Nonrepeatability – %RO		±0.01	±0.01	±0.01
Creep, in 20 min – %		±0.025	±0.025	±0.025
TEMPERATURE				
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90
Effect on Output – % / deg	°F	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015
Effect on Zero – %RO / deg	°F	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015
ELECTRICAL				
Rated Output – mV/V (nominal)		2.0	2.0	2.0
Zero Balance – %RO		±1.0	±1.0	±1.0
Bridge Resistance – Ohm (nominal)		350 ± 3.5	350 ± 3.5	350 ± 3.5
Excitation Voltage – VDC MAX		20	20	20
Insulation Resistance – Megohm		5000	5000	5000
MECHANICAL				
Safe Overload – %CAP		±150	±150	±150
Weight	lbs	1.34	3.0	3.0
	kg	0.61	1.36	1.36
Calibration		Tension & Compression		
Material		Aluminum	Alloy steel	

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Dual diaphragm
- Special temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral Cable – 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation

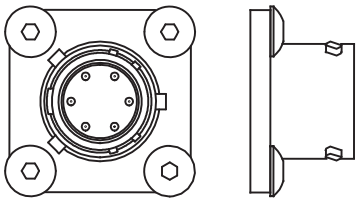
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1700 FLANGE LOAD CELL (U.S. & METRIC)

BAYONET CONNECTOR



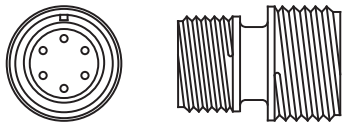
Model 1720ACK-10KN (Shown)



SCREW TYPE CONNECTOR



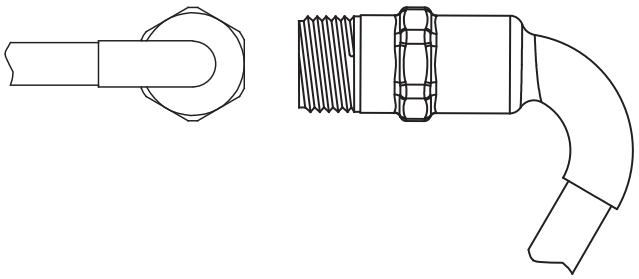
Model 1720AF-10KN (Shown)



INTEGRAL 10 FT. CABLE CONNECTOR



Model 1720AJ-10KN (Shown)



1800 PLATINUM STANDARD™ CALIBRATION LOAD CELL (U.S. & METRIC)

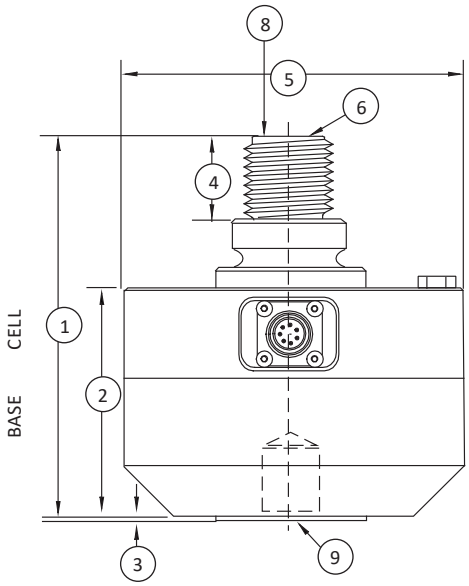
FEATURES & BENEFITS

- Capacities from 1.1K to 55K lbf (5 to 250 kN)
- Handcrafted excellence for the most demanding calibration requirements
- Tension and compression in one unit
- 0.005% nonrepeatability
- Capable of 2% lower load limit per ASTM E74
- High precision base installed
- ASTM E74 calibration standard
- Eccentric load compensated
- 0.0008%/°F temp. effect on output
- Connector protector standard

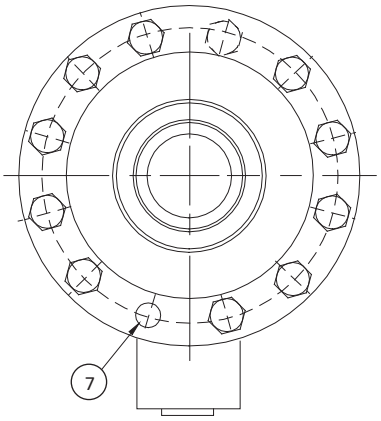
STANDARD CONFIGURATION



Model 1820CJY-50K (Shown)



SIDE VIEW



TOP VIEW

DIMENSIONS

See Drawing	MODEL					
	1810		1820		1830	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1.1K, 2.2K, 3.3K, 5.5K	5, 10, 15, 25	11K, 22K	50, 100	55K	250
	in	mm	in	mm	in	mm
(1)	4.65	118.1	6.85	174.0	8.26	209.7
(2)	3.28	83.3	4.13	104.9	5.00	127.0
(3)	0.03	0.8	0.03	0.8	0.03	0.8
(4)	0.75	19.1	1.50	38.1	1.88	47.8
(5)	4.13	104.9	6.06	154.0	8.00	203.2
(6)	6.00	152.4	6.00	152.4	8.00	203.2
(7)	8 Places		12 Places		16 Places	
(8)	⅝-18 UNF-3A	M16x2 - 4H	1¼-12 UNF - 3A	M33x2 - 4H	1¾-12 UNF - 3A	M42x2 - 4H
(9)	⅝-18 UNF - 3B ↧ 0.75	M16x2 - 4H ↧ 19.1	1¼-12 UNF - 3B ↧ 1.25	M33x2 - 4H ↧ 31.8	1¾-12 UNF- 3B ↧ 2.00	M42x2 - 4H ↧ 50.8

1800 PLATINUM STANDARD™ CALIBRATION LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL				
		1810	1810	1810	1820	1830
		CAPACITY				
Measuring Range	U.S. (lbf)	1.1K	2.2K, 3.3K	5.5K	11K, 22K	55K
	Metric (kN)	5	10, 15	25	50, 100	250
ACCURACY – (MAX ERROR)						
Static Error Band – %FS		±0.020	±0.020	±0.020	±0.020	±0.025
Nonlinearity – %FS		±0.020	±0.020	±0.020	±0.020	±0.020
Hysteresis – %FS		±0.020	±0.025	±0.025	±0.025	±0.030
Nonrepeatability – % RO		±0.005	±0.005	±0.005	±0.005	±0.005
Creep, in 20 min – %		±0.01	±0.01	±0.01	±0.01	±0.01
Side Load Sensitivity – %		±0.1	±0.1	±0.1	±0.1	±0.1
Eccentric Load Sensitivity – % / in		±0.05	±0.05	±0.05	±0.05	±0.05
Lower Load Limit – % Cap. (ASTM E74 Class A)		2.0	2.0	2.0	2.0	2.0
TEMPERATURE						
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / deg	°F	±0.0004	±0.0004	±0.0004	±0.0004	±0.0004
Effect on Output – % / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
ELECTRICAL						
Rated Output – mV/V (Nominal)		2.0	2.0	2.0	2.0	2.0
Excitation Voltage – VDC MAX		20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		700	700	700	700	700
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000	5000
MECHANICAL						
Safe Overload – %CAP		±150	±300	±300	±300	±300
Deflection @ RO	in	0.002	0.002	0.002	0.002	0.004
	mm	0.05	0.05	0.05	0.05	0.10
Weight	lbs	3.8	9	9	25	62
	kg	1.7	4.1	4.1	11.3	28.1
Calibration		Tension & Compression				
Material		Alloy steel				

OPTIONS

- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- PT02E-12-8P bayonet connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

2101 DUAL RANGE STANDARD LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

FEATURES & BENEFITS

- Dual range allows for accurate measurements throughout test range
- 4X to 5X overload protection on lower capacity load cell
- Proprietary Interface temperature compensated gages
- High output for both ranges-to 4 mV/V
- Eccentric load compensated
- Shunt calibration
- Low deflection
- Lower capacity same as 1201 Compression-Only Low Profile
- Higher capacity same as 1200 Universal Low Profile

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable (10 ft)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

STANDARD CONFIGURATION



Model 2121-10K/50K (Shown)

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

2101 DUAL RANGE STANDARD LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

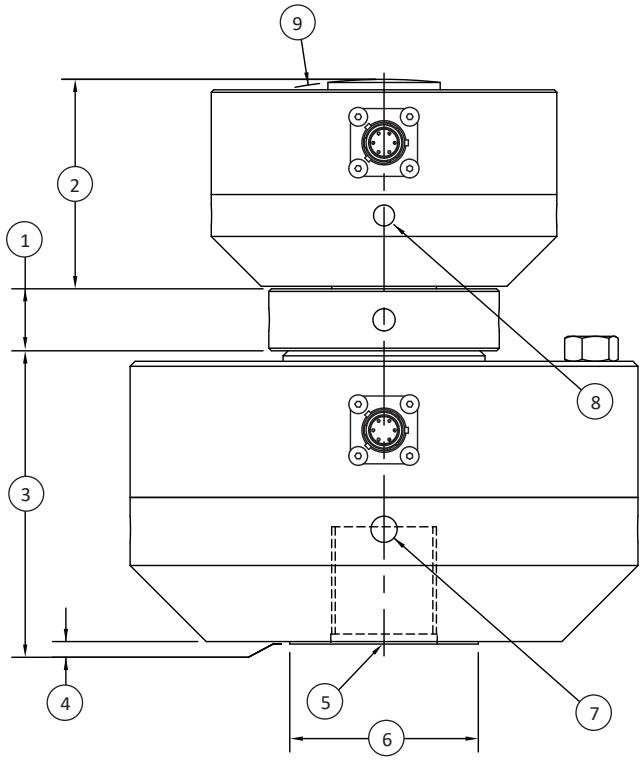
SPECIFICATIONS

PARAMETERS		MODEL				
		2111	2121	2131	2141	
		CAPACITY				
Measuring Range	U.S. (lbf)	1K/5K, 2K/10K	5K/25K, 10K/50K	25K/100K	50K/150K	100K/270K
	Metric (kN)	5/25, 10/50	25/100, 50/250	100/450	250/675	450/1200
ACCURACY – (MAX ERROR)						
Static Error Band – %FS		±0.03/±0.04	±0.04/±0.04	±0.04/±0.06	±0.04/±0.07	±0.04/±0.07
Nonlinearity – %FS		±0.03/±0.04	±0.04/±0.04	±0.05/±0.05	±0.05/±0.07	±0.05/±0.08
Hysteresis – %FS		±0.03/±0.04	±0.04/±0.05	±0.05/±0.06	±0.05/±0.07	±0.05/±0.08
Nonrepeatability – %RO		±0.01/±0.01	±0.01/±0.01	±0.01/±0.01	±0.01/±0.01	±0.01/±0.02
Creep, in 20 min – %		±0.025/±0.025	±0.025/±0.025	±0.025/±0.025	±0.025/±0.025	±0.025/±0.025
Side Load Sensitivity – %		±0.25/±0.25	±0.25/±0.25	±0.25/±0.25	±0.25/±0.25	±0.25/±0.25
Eccentric Load Sensitivity – %/in		±0.25/±0.25	±0.25/±0.25	±0.25/±0.25	±0.25/±0.25	±0.25/±0.25
TEMPERATURE						
Compensated Range	°F	+15 to +115/+15 to +115	+15 to +115/+15 to +115	+15 to +115/+15 to +115	+15 to +115/+15 to +115	+15 to +115/+15 to +115
	°C	-10 to +45/-10 to +45	-10 to +45/-10 to +45	-10 to +45/-10 to +45	-10 to +45/-10 to +45	-10 to +45/-10 to +45
Operating Range	°F	-65 to +200/-65 to +200	-65 to +200/-65 to +200	-65 to +200/-65 to +200	-65 to +200/-65 to +200	-65 to +200/-65 to +200
	°C	-55 to +90/-55 to +90	-55 to +90/-55 to +90	-55 to +90/-55 to +90	-55 to +90/-55 to +90	-55 to +90/-55 to +90
Effect on Zero – %RO / deg	°F	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008
	°C	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015
Effect on Output – % / deg	°F	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008
	°C	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015
ELECTRICAL						
Rated Output – mV/V (Nominal)		2.0/4.0	4.0/4.0	4.0/4.0	4.0/4.0	4.0/4.0
Excitation Voltage – VDC MAX		20/20	20/20	20/20	20/20	20/20
Bridge Resistance – Ohm (Nominal)		350/350	350/350	350/350	350/350	350/350
Zero Balance – %RO		±1.0/±1.0	±1.0/±1.0	±1.0/±1.0	±1.0/±1.0	±1.0/±1.0
Insulation Resistance – Megohm		5000/5000	5000/5000	5000/5000	5000/5000	5000/5000
MECHANICAL						
Safe Overload – %CAP		±150*	±150*	±150*	±150*	±150*
Deflection @ RO	in	0.001/0.002	0.002/0.002	0.002/0.003	0.002/0.012	0.003/0.006
	mm	0.03/0.05	0.05/0.05	0.05/0.08	0.05/0.30	0.08/0.15
Optional Base – P/N (Metric)		B101/B102 (M)	B102/B103 (M)	B106/B112 (M)	B106/B105 (M)	B104/B116 (M)
Natural Frequency – kHz		6.4, 9.0/6.6, 9.4	6.1, 8.6/ 6.5, 7.0	8.2, 11.7/5.8	8.2, 11.7/4.9	7.6/5.0
Weight	lbs	1.5/3.33	3.3/9.5	6.8/26	6.8/68	13.5/70
	kg	0.7/1.5	1.5/4.3	3.1/11.8	3.1/30.9	6/31.8
Calibration		Compression/Compression				
Material		Alloy Steel/Alloy Steel				

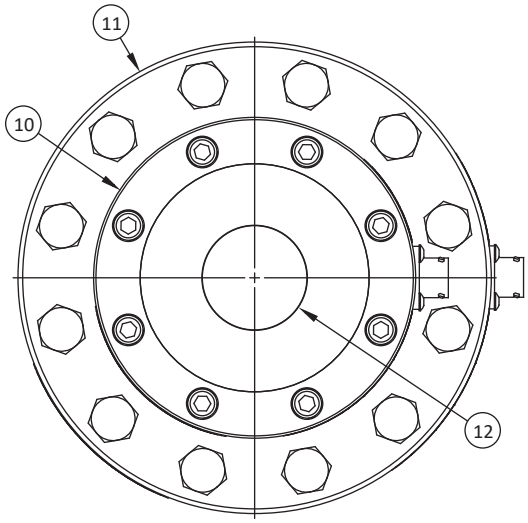
* Based on largest load cell capacity in stack.

2101 DUAL RANGE STANDARD LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

SIDE VIEW



TOP VIEW



DIMENSIONS

See Drawing	MODEL									
	2111		2121		2131		2141			
	CAPACITY									
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K/5K, 2K/10K	5/25, 10/50	5K/25K, 10K/50K	25/100, 50/250	25K/100K	100/450	50K/150K	250/675	100K/270K	450/1200
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	0.25	6.35	0.25	6.35	0.25	6.35	0.3125	7.938	0.3125	7.938
(2)	2.51	63.8	2.51	63.8	3.00	76.2	3.00	76.3	4.25	108
(3)	2.51	63.8	3.50	88.9	4.50	114.3	6.50	165.1	8.00	203.2
(4)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8
(5)	⅝-18 UNF-3B ↧ 0.87	M16 x 2-4H ↧ 22.1	1¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6	1¼-12 UNF-3B ↧ 1.75	M42 x 2-4H ↧ 44.5	2¾-8 UNF-3B ↧ 2.75	M72 x 2-4H ↧ 69.8	2¾-8 UNF-3B ↧ 2.75	M72 x 2-4H ↧ 69.8
(6)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2	Ø4.50	Ø114.3	Ø4.50	Ø114.3
(7)	4 X 0.25 ↧ 0.29	4 X 6.4 ↧ 7.4	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9
(8)	4 X 0.25 ↧ 0.29	4 X 6.4 ↧ 7.4	4 X 0.25 ↧ 0.29	4 X 6.4 ↧ 7.4	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9
(9)	SR6.00	SR152.4	SR6.00	SR152.4	SR6.00	SR152.4	SR6.00	SR152.4	SR8.00	SR203.2
(10)	Ø4.13	Ø104.8	Ø4.13	Ø104.8	Ø4.75	Ø120.7	Ø4.75	Ø120.7	Ø7.50	Ø190.5
(11)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2	Ø11.0	Ø279.0	Ø11.0	Ø279.0
(12)	Ø1.34	Ø34.0	Ø1.34	Ø34.0	Ø1.57	Ø39.9	Ø1.57	Ø39.9	Ø3.13	Ø79.5

Note:
- Dimensions are approximate
- Contact factory for current drawings

All product descriptions are for general information only. They are not to be understood as a guarantee of quality or durability and do not constitute any liability whatsoever.

2300 HIGH CAPACITY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities 630, 1000, 2000 kN (140K, 225K, 450K lbf)
- Accuracy class 0.05% FS
- Tension & compression
- Low profile, small mass
- Flange mounted
- Dual bridge available

SPECIFICATIONS

PARAMETERS		MODEL		
		2330	2340	2350
		CAPACITY		
Measuring Range	U.S. (lbf)	140K	225K	450K
	Metric (kN)	630	1000	2000
ACCURACY – (MAX ERROR)				
Static Error Band – %FS		±0.05		
Nonlinearlity – %FS		±0.05		
Hysteresis – %FS		±0.10		
Nonrepeatability – %RO		±0.05		
Creep, in 20 min – %		±0.025		
Side Load Sensitivity – %		±0.25		
Eccentric Load Sensitivity – % / mm		±0.02		
OVERLOAD RATING				
Safe, axial load – % Capacity MAX		150		
Ultimate, axial load – % Capacity MAX		300		
Safe, side load – % Capacity MAX		75		
Max torsional moment- kNm MAX		10.0	20.0	38.5
TEMPERATURE				
Compensated Range	°C	+10 to +60		
	°F	-12.2 to +15.6		
Operating Range	°C	+10 to +60		
	°F	-12.2 to +15.6		
Effect on Zero – %RO / deg	°C	±0.0025		
Effect on Output – %/ deg	°C	±0.005		
ELECTRICAL				
Rated Output, Tension – mV/V (Nominal)		2.00 ± 0.20		
Rated Output, Compression – mV/V (Nominal)		-2.00 ± 0.20		
Excitation Voltage – VDC (Nominal)		10		
Excitation Voltage – VDC MAX		20		
MECHANICAL				
Fatigue Range – %CAP		±80		

STANDARD CONFIGURATION



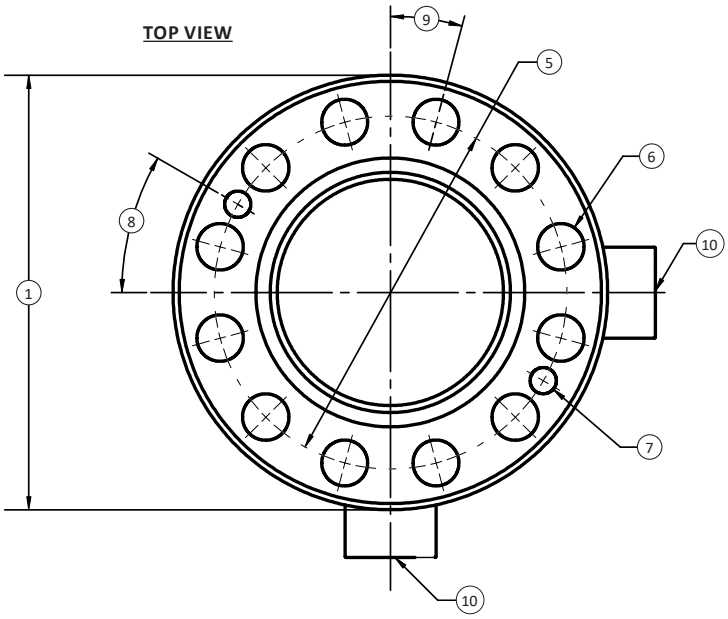
Model 2340 (Shown)

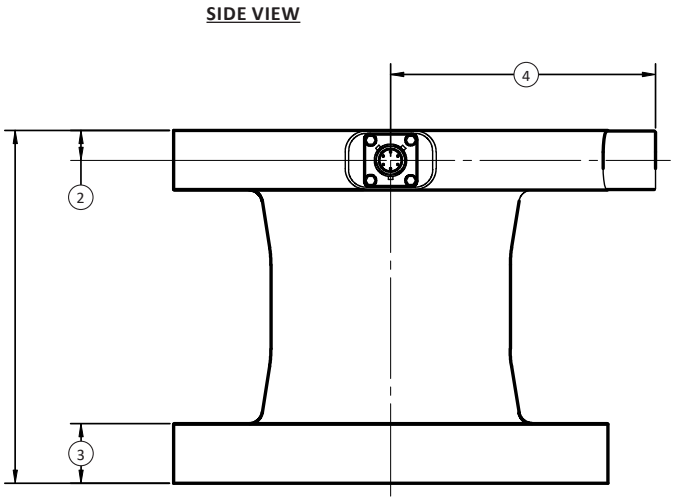
OPTIONS

- Fixed cable or plug connection
- Redundancy: Dual bridge for axial force measurement
- TEDS calibration IEEE 1451.4

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

2300 HIGH CAPACITY LOAD CELL (U.S. & METRIC)





DIMENSIONS

See Drawings	MODEL					
	2330		2340		2350	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	140K	630	225K	1000	450K	2000
	in	mm	in	mm	in	mm
(1)	Ø7.76	Ø197	Ø9.45	Ø240.0	12.01	305.0
(2)	0.53	13.5	7.9	201	1.13	28.7
(3)	1.06 TYP	27 TYP	1.57 TYP	230 TYP	2.26 TYP	57.5 TYP
(4)	4.73 TYP	120.1 TYP	1.6 TYP	40 TYP	6.85 TYP	174.1 TYP
(5)	Ø6.3	Ø160	Ø7.87	Ø200	Ø9.84	Ø250.0
(6)	Ø0.83 THRU	Ø21.1 THRU	Ø1.00 THRU	Ø25.4 THRU	Ø1.28 THRU	Ø32.5 THRU
	12 Holes ES Spaces		12 Holes ES Spaces		12 Holes ES Spaces	
(7)	Ø0.47 H8 X ↧ 0.47	Ø(0.4735/0.4724) ↧ 11.9	Ø0.47 H8 X ↧ 0.47	Ø(0.4735/0.4724) ↧ 11.9	Ø0.47 H8 X ↧ 0.47	Ø(0.4735/0.4724) ↧ 11.9
	2 Holes ES Both Ends		2 Holes ES Both Ends		2 Holes ES Both Ends	
(8)	30°		30°		30°	
(9)	15°		15°		15°	
(10)	PT02E-10-6P Connector (Dual Bridge Option)		PT02E-10-6P Connector (Dual Bridge Option)		PT02E-10-6P Connector (Dual Bridge Option)	
(11)	PT02E-10-6P Connector (Primary Bridge)		PT02E-10-6P Connector (Primary Bridge)		PT02E-10-6P Connector (Primary Bridge)	

2400 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

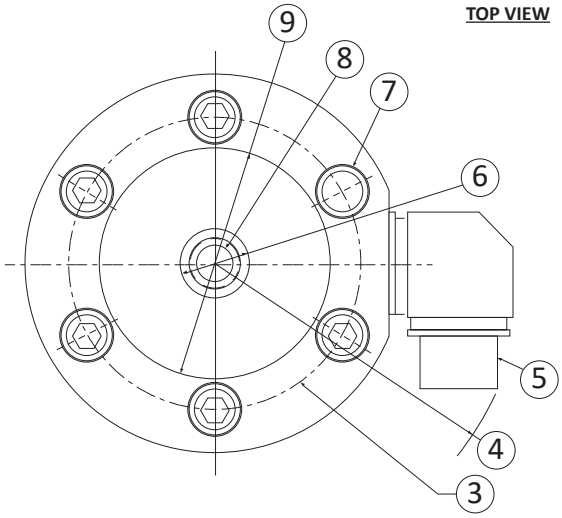
FEATURES & BENEFITS

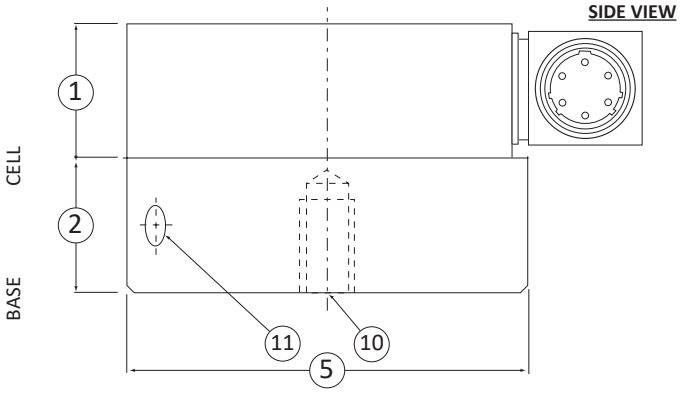
- Capacities from 100 to 5K lbf (0.5 to 22 kN)
- Proprietary Interface temperature compensated strain gages
- Stainless steel construction
- Hermetically sealed
- Tension and compression
- Compact size
- Counterbored mounting holes

STANDARD CONFIGURATION



Model 2420BLX-1000 (Shown)





(Shown with optional tension base)

DIMENSIONS

See Drawing	MODEL			
	2420		2430	
	CAPACITY			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	100, 250, 500, 1K	0.5, 1.25, 2.2, 4.5	2K, 5K	8.9, 22
	in	mm	in	mm
(1)	1.00	25.4	1.00	25.4
(2)	1.00	25.4	1.00	25.4
(3)	2.25	57.2	2.63	66.7
(4)	2.43	61.7	2.68	68.1
(5)	3.00	76.2	3.50	88.9
(6)	0.55	14.0	0.81	20.5
(7)	Counterbored for ¼-28 SHCS 6 Places		Counterbored for ⁵⁄₁₆-24 SHCS 6 Places	
(8)	⅜-24 UNF-3B THRU		½-20 UNF-3B THRU	
(9)	1.81	46.0	2.07	52.5
(10)	⅜-24 UNF		½-20 UNF	
	↧ 0.70	↧ 17.8	↧ 0.70	↧ 17.8
(11)	Spanner holes 2 SPACED @ 180°			

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

2400 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS			MODEL	
			2420	2430
			CAPACITY	
Measuring Range		U.S. (lbf)	100, 250, 500, 1K	2K, 5K
		Metric (kN)	0.5, 1.25, 2.2, 4.5	8.9, 22
ACCURACY – (MAX ERROR)				
Static Error Band – %FS			±0.10	±0.10
Nonlinearity – %FS			±0.10	±0.10
Hysteresis – %FS			±0.08	±0.08
Nonrepeatability – %RO			±0.02	±0.02
Creep, in 20 min – %			±0.05	±0.05
TEMPERATURE				
Compensated Range		°F	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90
Effect on Zero – %RO / deg		°F	±0.002	±0.002
Effect on Output – % / deg		°F	±0.002	±0.002
ELECTRICAL				
Rated Output – mV/V (Nominal)			3.0	3.0
Excitation Voltage – VDC MAX			15	15
Bridge Resistance – Ohm (Nominal)			350	350
Zero Balance – %RO			±2.0	±2.0
Insulation Resistance – Megohm			5000	5000
MECHANICAL				
Safe Overload – %CAP			±150	±150
Deflection @ RO		in	0.003, 0.002, 0.002, 0.002	0.002
		mm	0.076, 0.051, 0.051, 0.051	0.051
Optional Base – P/N			B318-2	B319-2
Natural Frequency – kHz			2.2, 4.4, 6.0, 8.3	9.1, 11.7
Weight		lbs	1.5	2.0
		kg	0.68	0.91
Seal			Glass-metal hermetic	
Material			Stainless steel	

OPTIONS

- Submersible with integral cable
- Base (recommended)
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Special threads
- Special temperature range

CONNECTOR OPTIONS

- PTWIH-10-6P

ACCESSORIES

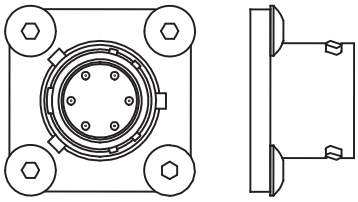
- Mating connector
- Instrumentation
- Loading hardware
- Mating cable

2400 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

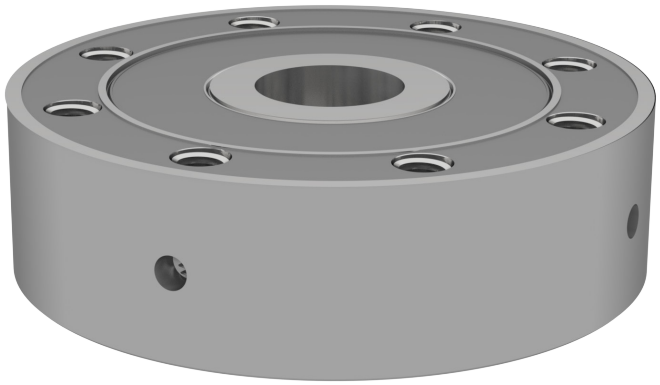
BAYONET CONNECTOR



Model 2420BLX-1000



BASE



Model B3XXX

2400 HIGH CAPACITY STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

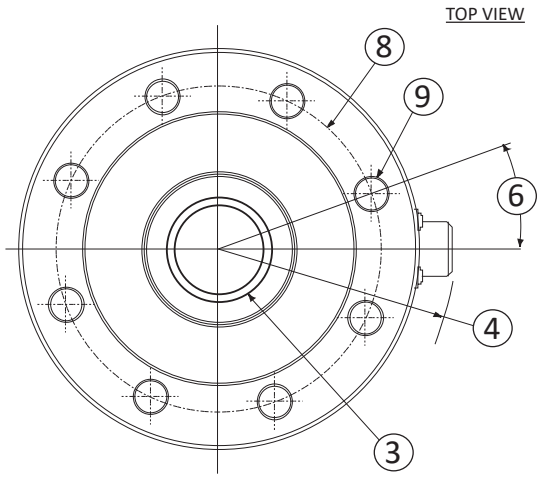
FEATURES & BENEFITS

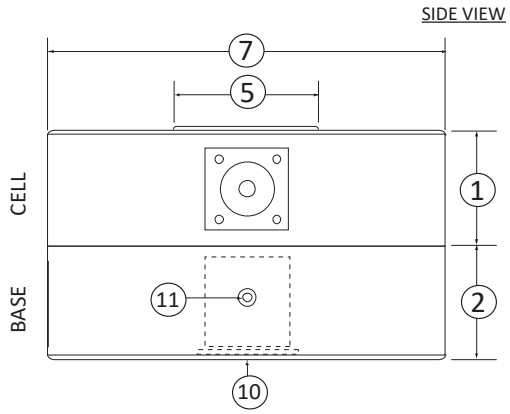
- Capacities from 7.5K to 50K lbf (33.4 to 250 kN)
- Proprietary Interface temperature compensated strain gages
- Welded diaphragm
- Tension & compression
- Compact size
- Counterbored mounting holes in 10K lbf (44.5 kN) model

STANDARD CONFIGURATION



Model 2450BXM-50K (Shown)





DIMENSIONS

See Drawing	MODEL			
	2440		2450	
	CAPACITY			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	7.5K, 10K, 15K	33.4, 50, 75	20K, 50K	100, 250
	in	mm	in	mm
(1)	1.80	45.7	1.80	45.7
(2)	1.75	44.5	1.75	44.5
(3)	1-14 UNS-3B		1 ½-12 UNF-3B	
(4)	Ø3.56	Ø85.2	Ø3.81	Ø96.8
(5)	Ø1.71	Ø43.5	Ø2.23	Ø56.6
(6)	22.5°		20.0°	
(7)	Ø5.50	Ø139.7	Ø6.00	Ø152.4
(8)	Ø4.50	Ø114.3	Ø4.88	Ø123.8
(9)	Ø0.41	Ø10.4	Ø0.53	Ø13.5
	8 places		8 places	
(10)	1-14 UNS-3B		1½-12 UNF-3B	
(11)	Spanner holes 4 SPACED @ 90°			

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

2400 HIGH CAPACITY STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL			
		2440		2450	
		CAPACITY			
Measuring Range		U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
		7.5K, 10K, 15K	37.5, 50, 75	20K, 50K	100, 250
ACCURACY – (MAX ERROR)					
Static Error Band – %FS		±0.10		±0.10	
Nonlinearity – %FS		±0.10		±0.10	
Hysteresis – %FS		±0.08		±0.08	
Nonrepeatability – %RO		±0.03		±0.03	
Creep, in 20 min – %		±0.03		±0.05	
TEMPERATURE					
Compensated Range	°F	+15 to +115		+15 to +115	
	°C	-10 to +45		-10 to +45	
Operating Range	°F	-65 to +200		-65 to +200	
	°C	-55 to +90		-55 to +90	
Effect on Zero – %RO / deg	°F	±0.0015		±0.0015	
Effect on Output – % / deg	°F	±0.0008		±0.0008	
ELECTRICAL					
Rated Output – mV/V (Nominal)		3.0		3.0	
Excitation Voltage – VDC MAX		20		20	
Bridge Resistance – Ohm (Nominal)		350		350	
Zero Balance – %RO		±2.0		±2.0	
Insulation Resistance – Megohm		5000		5000	
MECHANICAL					
Safe Overload – %CAP		±150		±150	
Deflection @ RO	in	0.003		0.004	
	mm	0.08		0.10	
Optional Base – P/N		B323-2		B320-1	
Natural Frequency – kHz		9.4		8.0	
Weight	lbs	6		9	
	kg	2.7		4.1	
Seal		Environmental			
Material		Stainless Steel		Stainless Steel	

OPTIONS

- Base (recommended)
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Special threads
- Special temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- MS3102E-14S-6P

ACCESSORIES

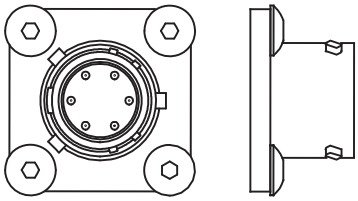
- Mating connector
- Instrumentation
- Loading hardware

2400 HIGH CAPACITY STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

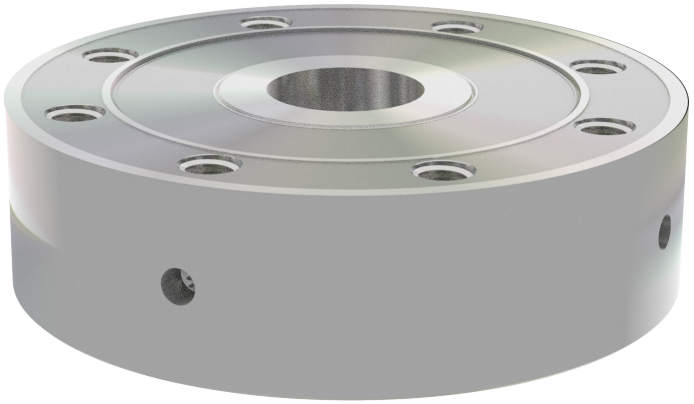
BAYONET CONNECTOR



Model 2450BXM-50K



BASE



Model B24XX

2404 STANDARD STAINLESS STEEL 2-WIRE AMPLIFIED LOAD CELL (U.S. & METRIC)

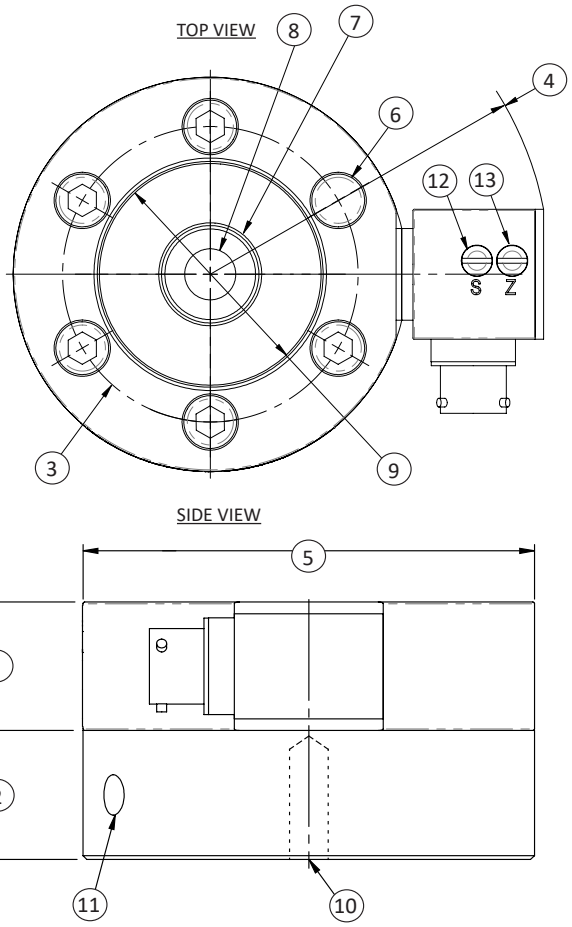
FEATURES & BENEFITS

- Capacities from 100 to 5K lbf (0.44 to 22.2 kN)
- Stainless steel construction
- Hermetically sealed
- Tension and compression
- Counterbored mounting holes
- Internally amplified with 4-20 mA output
- Proprietary Interface temperature compensated strain gages

STANDARD CONFIGURATION



Model 2424CSY-500 (Shown)



DIMENSIONS

See Drawing	MODEL			
	2424		2434	
	CAPACITY			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	100, 250, 500, 1000	0.44, 1.11, 2.22, 4.45	2K, 5K	89, 22.2
	in	mm	in	mm
(1)	1	25.4	1	25.4
(2)	1	25.4	1	25.4
(3)	2.25	57.2	2.625	66.68
(4)	2.76	70.1	3.01	76.3
(5)	3	76.2	3.5	88.9
(6)	Counterbored for ¼-28 SHCS 6 Places		Counterbored for ⁵⁄₁₆-24 SHCS 6 Places	
(7)	0.55	14	0.81	20.5
(8)	⅜-24 UNF-3B THRU		½-20 UNF-3B THRU	
(9)	1.81	46	2.07	52.5
(10)	⅜-24 UNF ↧ 0.70		½-20 UNF ↧ 0.70	
(11)	(2) Spanner holes spaced at 180°			
(12)	Span adjust			
(13)	Zero adjust			

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

2404 STANDARD STAINLESS STEEL 2-WIRE AMPLIFIED LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS			MODEL	
			2424	2434
			CAPACITY	
Measuring Range		U.S. (lbf)	100, 250, 500, 1000	2K, 5K
		Metric (kN)	0.44, 1.11, 2.22, 4.45	89, 22.2
ACCURACY – (MAX ERROR)				
Nonlinearity – %FS			±0.10	±0.10
Hysteresis – %FS			±0.08	±0.08
Nonrepeatability – %RO			±0.03	±0.03
Creep, in 20 min – %			±0.05	±0.05
TEMPERATURE				
Compensated Range		°F	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45
Operating Range		°F	-20 to +200	-20 to +200
		°C	-30 to +93	-30 to +93
Effect on Zero – %RO / deg		°F	±0.005	±0.005
Effect on Output – % / deg		°F	±0.009	±0.009
ELECTRICAL *RATED OUTPUT mA				
*Tension or Compression (unipolar)			+16.000 ±0.032	
*Universal Tension (bipolar)			+8.000 ±0.016	
*Universal Compression (bipolar)			-8.000 ±0.016	
Zero Balance			4.000 ±0.100 (unipolar) 12.000 ±0.100 (bipolar)	
Zero Adjustment			1 mA range	
Span Adjustment			5% range	
Supply Voltage range – VDC			9-28	
Bandwidth Hz			2000	
MECHANICAL				
Safe Overload – %CAP			±150	
Deflection @ RO		in	100: 0.003, 250 THRU 5K: 0.002	
		mm	0.44: 0.076, 1.11 THRU 22.2 : 0.051	
Optional Base – P/N			B319-2	
Natural Frequency – kHz			1.3, 2.2, 4.4, 6.0, 8.3, 9.1, 11.7	
Material			Stainless steel	

OPTIONS

- Base (recommended)
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Special threads
- Special temperature range

CONNECTOR OPTIONS

- PTWIH-10-6P

ACCESSORIES

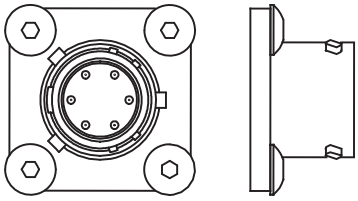
- Mating connector
- Instrumentation
- Loading hardware

2404 STANDARD STAINLESS STEEL 2-WIRE AMPLIFIED LOAD CELL (U.S. & METRIC)

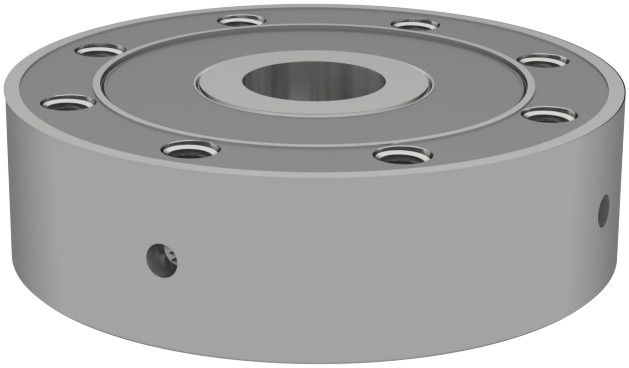
BAYONET CONNECTOR



Model 2424CSY-500 (Shown)



BASE



Model B24XX (Shown)

3200 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

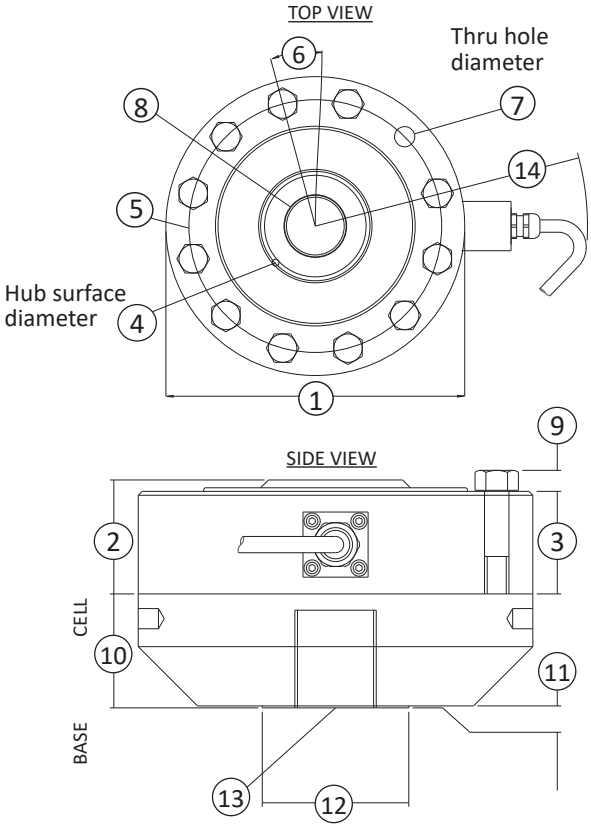
FEATURES & BENEFITS

- Capacities from 2.5K to 100K lbf (12.5 to 445 kN)
- Proprietary Interface temperature compensated strain gages
- Hermetically sealed cell
- Performance to 0.05%
- Compact size
- High 4 mV/V output
- Eccentric load compensated
- 0.0008%/°F temp. effect on output
- Low deflection
- Shunt calibration
- Barometric compensation

STANDARD CONFIGURATION



Model 3220BFG-50K (Shown)



DIMENSIONS

See Drawing	MODEL					
	3210		3220		3232	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	2.5K, 5K, 10K	12.5, 25, 50	25K, 50K	111, 222	100K	445
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.9	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	1.38	35.1	1.75	44.5	2.50	63.5
(3)	1.20	30.5	1.58	40.0	2.20	55.9
(4)	Ø0.90	Ø22.9	Ø1.97	Ø50.0	Ø3.14	Ø79.8
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1
(6)	22.5°	22.5°	15.0°	15.0°	11.25°	11.25°
(7)	Ø0.28	Ø7.10	Ø0.41	Ø10.4	Ø0.53	Ø13.5
	8 places		12 places		16 places	
(8)	⅝-18 UNF-3B		1 ¼-12 UNF-3B		1 ¾-12 UNF-3B	
	↧ 1.12	↧ 28.45	1.40	35.56	2.15	54.61
(9)	0.20	5.10	0.30	7.60	0.31	7.90
(10)	1.13	28.6	1.75	44.5	2.00	50.8
(11)	0.03	0.80	0.03	0.80	0.03	0.80
(12)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(13)	⅝-18 UNF-3B		1 ¼-12 UNF-3B		1 ¾-12 UNF-3B	
	↧ 0.87	↧ 22.1	↧ 1.40	↧ 35.56	↧ 1.75	↧ 44.45
(14)	4.80	121.9	5.52	140.2	5.30	134.6

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

3200 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL				
		3210	3210	3220	3220	3232
		CAPACITY				
Measuring Range	U.S. (lbf)	2.5K, 5K	10K	25K	50K	100K
	Metric (kN)	12.5, 25	50	111	222	445
ACCURACY – (MAX ERROR)						
Static Error Band – %FS		±0.05	±0.05	±0.05	±0.05	±0.06
Nonlinearity – %FS		±0.05	±0.05	±0.05	±0.05	±0.05
Hysteresis – %FS		±0.06	±0.06	±0.06	±0.06	±0.06
Nonrepeatability – %RO		±0.01	±0.01	±0.01	±0.01	±0.01
Creep, 20 min – %		±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in		±0.25	±0.25	±0.25	±0.25	±0.25
TEMPERATURE						
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
Effect on Output – % / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
ELECTRICAL						
Rated Output – mV/V (Nominal)		2.0 / 4.0	4.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX		20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350	350
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000	5000
MECHANICAL						
Safe Overload – %CAP		±150	±150	±150	±150	±150
Deflection @ RO	in	0.002	0.002	0.002	0.002	0.003
	mm	0.05	0.05	0.05	0.05	0.08
Optional Base – P/N		B302	B302	B303	B303	B312
Natural Frequency – kHz		6.6	9.4	6.5	7.0	5.8
Weight	lbs	3.3	3.3	9.5	9.5	26
	kg	1.5	1.5	4.3	4.3	11.8
Calibration		T & C				
Material		Stainless steel				

OPTIONS

- Base (recommended)
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Special temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral Cable – 20 ft (6 m)

ACCESSORIES

- Instrumentation
- Loading hardware

3200 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

INTEGRAL 20 FT. CABLE CONNECTOR



Model 3220XXX

BASE

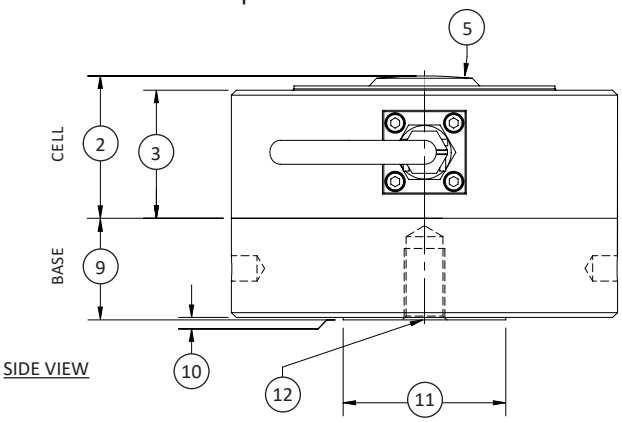


Model B32XX

3201 STANDARD STAINLESS STEEL LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from5K to 100K lbf (25 to 450 kN)
- Proprietary Interface temperature compensated strain gages
- Hermetically sealed cell
- Performance to 0.04%
- Compact size
- High 4 mV/V output
- Eccentric load compensated
- 0.0008%/°F temp. effect on output
- Low deflection
- Shunt calibration
- Barometric compensation

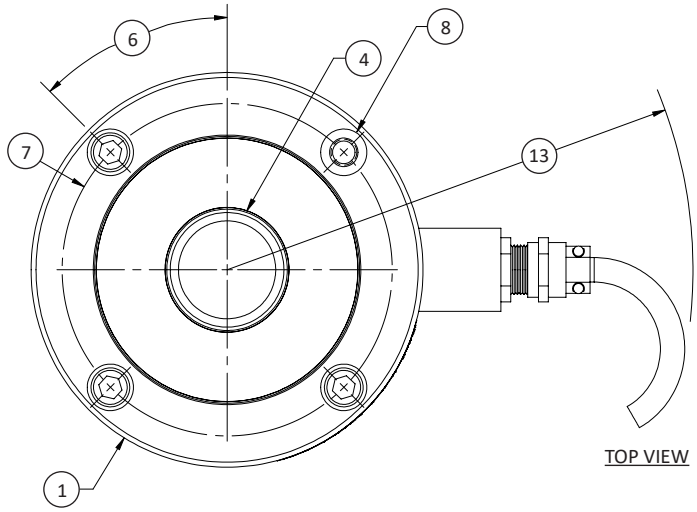


SIDE VIEW

STANDARD CONFIGURATION



Model 3221BBE-50K (Shown without base)



TOP VIEW

DIMENSIONS

See Drawing	MODEL					
	3211		3221		3231	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	2.5K, 5K, 10K	25, 50	25K, 50K	10, 250	100K	450
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.9	Ø4.75	Ø120.7	Ø7.50	Ø203.2
(2)	1.38	35.1	1.75	44.4	2.25	57.2
(3)	1.20	30.5	1.58	40.1	1.95	49.5
(4)	Ø0.90	Ø22.9	Ø1.19	Ø30.2	Ø2.67	Ø67.8
(5)	SR 6.00	SR 152.4	SR 6.00	SR 152.4	SR 8.00	SR 203.2
(6)	22.5°		45.0°		15.0°	
(7)	Ø3.50	Ø88.9	Ø4.00	Ø101.6	Ø6.25	Ø158.8
(8)	¼-28 x 1¼ 8 places		5/16-24 x 1½ 4 places		7/16-20 x 2 12 places	
(9)	1.13	28.7	1.25	31.8	2.00	50.8
(10)	0.03	0.8	0.03	0.8	0.03	0.8
(11)	Ø1.25	Ø31.8	Ø2.00	Ø50.8	Ø3.00	Ø76.2
(12)	⅝-18 UNF-3B ⌀ 0.87	M16 x 2-4H ⌀ 22.1	½-20 UNF-3B ⌀ 0.88	M16 x 2-6H ⌀ 22.4	1 ¾-12 UNF-3B ⌀ 1.75	M27 x 2-6H ⌀ 44.5
(13)	2.52	64	3.00	76.2	4.34	110.2

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

3201 STANDARD STAINLESS STEEL LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS		MODEL				
		3211	3211	3221	3221	3231
		CAPACITY				
Measuring Range	U.S. (lbf)	2.5K, 5K	10K	25K	50K	100K
	Metric (kN)	11.1, 25	50	100	250	450
ACCURACY – (MAX ERROR)						
Static Error Band – %FS		±0.04	±0.04	±0.04	±0.04	±0.04
Nonlinearity – %FS		±0.05	±0.05	±0.05	±0.05	±0.05
Hysteresis – %FS		±0.06	±0.06	±0.06	±0.06	±0.06
Nonrepeatability – %RO		±0.01	±0.01	±0.01	±0.01	±0.01
Creep, 20 min – % ±0.025		±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – %	in	±0.25	±0.25	±0.25	±0.25	±0.25
	mm	±6.4	±6.4	±6.4	±6.4	±6.4
TEMPERATURE						
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
Effect on Output – % / deg	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
ELECTRICAL						
Rated Output – mV/V (Nominal)		2.0, 4.0	4.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX		20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350	350
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000	5000
MECHANICAL						
Safe Overload – %CAP		±150	±150	±150	±150	±150
Deflection @ RO	in	0.002	0.002	0.002	0.002	0.003
	mm	0.051	0.051	0.051	0.051	0.076
Optional Base – P/N		B302	B302	B306	B306	B304
Natural Frequency – kHz		6.1	8.6	8.2	11.7	7.6
Weight	lbs	3.3	3.3	6.8	6.8	13.5
	kg	1.5	1.5	3.08	3.08	6.12
Calibration		Compression				

OPTIONS

- Base (Recommended)
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Special temperature range
- Cable length
- Add connector to cable

ACCESSORIES

- Instrumentation
- Loading hardware

BASE



Model B32XX

WSSCLC STAINLESS STEEL LOW PROFILE COMPRESSION LOAD CELL (U.S. & METRIC)

The WSSCLC series of load cells has been designed for a wide range of force measurement and weighing applications where space is limited. The WSSCLC is constructed from stainless steel and has a fully welded construction, offering a high level of corrosion resistance for use in harsh environments, with environmental sealing to IP68.

Available in capacities from 220 - 16.5K lbf (100 - 7,500 kg) to 22K - 440.9K lbf (10 - 200 MT), there are many applications ideally suited to the WSSCLC, including restricted height weighing applications, general force measurement and press calibration.

Interface, Inc. can provide the WSSCLC on its own or combined with any of our instrumentation range, to offer a more complete package. Please consult our technical department for any advice required on suitable instrumentation solutions.

FEATURES & BENEFITS

- Capacities from 220 - 16.5K lbf (100 - 7,500 kg) to 22K - 440.9K lbf (10 - 200 MT)
- High Stability
- Fully welded stainless steel construction
- Low height
- Environmentally sealed to IP68
- Accuracy <±0.023%

OPTIONS

- Load cap
- Weighing assembly up to 220.4K lbf (up to 100 MT) - See WSSCLC-MOUNT data sheet
- Mounting plate up to 220.4K lbf (up to 100 MT)
- TEDS option (when used with 9320 handheld display)

Rating	
220 lbf	100 kg
551 lbf	250 kg
1.1K lbf	500 kg
2.2K lbf	1000 kg
5.5K lbf	2500 kg
11K lbf	5000 kg
16.5K lbf	7500 kg
22Klbf	10 MT
44K lbf	20 MT
66.1K lbf	30 MT
110.2K lbf	50 MT
165.3K lbf	75 MT
220.4K lbf	100 MT
330.6K lbf	150 MT
440.9K lbf	200 MT

STANDARD CONFIGURATION



MODEL WSSCLC-100 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Rated load	lbf	220, 551, 1.1K, 2.2k, 5.5k, 11k 16.5k lbf
	kg	100, 250, 500, 1K, 2.5K, 5K, 7.5K kg
	lbf	22K, 44K, 66.1K, 110.2K, 165.3K, 220.4K, 330.6K, 440.9K lbf
	t	10, 20, 30, 50, 75, 100, 150, 200 MT
Overload range		150% full scale output (FSO)
Ultimate breaking load		>300% FSO
Maximum transverse load		50% FSO
Output		2mV/V (±0.1%)
Zero balance		<±1% FSO
Combined error		<±0.023% FSO (equivalent to OIML R60, C2)
Non-repeatability		<±0.01% FSO
Creep (at nominal load)		<±0.028% FSO over 30 minutes
		<±0.008% FSO over 20-30 minutes
Excitation voltage		10vdc recommended (18vdc maximum)
Input resistance		700Ω ±2Ω
Output resistance		700Ω ±2Ω
Insulation resistance		>5GΩ @50vdc
Compensated temperature range	F°	14 to 104
	C°	-10 to 40
Operating temperature range	F°	-4 to 158
	C°	-20 to 70
Storage temperature range	F°	-4 to 176
	C°	-20 to 80
Zero temperature coefficient		<±0.025% FSO/°C
Span temperature coefficient		<±0.017% FSO/°C
Environmental protection level		IP68 (100 hours in 1 metre of water)
Electrical connections		5 metres PVC cable via special cable gland

WIRING DIAGRAM

Description	Color
+ve Supply	Red
-ve Supply	Black
+ve Signal	White
-ve Signal	Yellow

TYPICAL APPLICATIONS

- Vessel weighing
- Press force monitoring
- Center of gravity systems

A4200 & A4600 WEIGHCHECK LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacity ranges from 2.5K to 50K lbf (11.1 to 222 kN)
- High output – 4 mV/V
- Self-centering in all directions
- High safe side load – to 400%
- Standardized output – ±0.1%
- Zinc plated (A4200) or stainless steel (A4600)
- Factory assembled for easy field installation
- Static/dynamic/in-motion capabilities
- Low height – 4.0 in (101.6 mm) for 2.5K, 5K, 10K (11.1, 22.2, 44.5 kN); 5.0 in (127 mm) for 25K, 50K lbf (111, 222 kN)

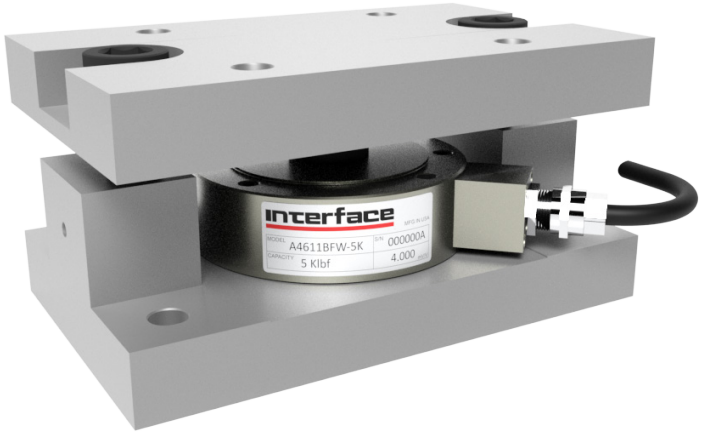
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Static Error Band – %FS		± 0.05
Nonlinearity – %FS		± 0.05
Hysteresis – %FS		± 0.03
Nonrepeatability – %RO		± 0.02
Creep, in 20 min – %		± 0.025
TEMPERATURE		
Compensated Range	°C	-10 to +45
	°F	+15 to +115
Operating Range	°C	-55 to +90
	°F	-65 to +200
Effect on Output – % / deg	°F	±0.0008
Effect on Zero – %RO / deg	°F	±0.0008
ELECTRICAL		
Rated Output – mV/V	2.5K lbf (11.1 kN)	2.000 ±0.1%
	5K-50K lbf (22.2-222 kN)	4.000 ±0.1%
Zero Balance – %RO		±1.0
Bridge Resistance – Ohms		350
Excitation Voltage – VDC MAX		20
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Compression
Safe Overload – % CAP		150
Cable length	ft	30
	m	9.1
Material	A4200	Zinc plated
	A4600	Stainless steel plated

OPTIONS

- Zinc plated (A4200)
- Stainless steel (A4600)
- Special cable length

STANDARD CONFIGURATION



MODEL 4611BFW-5K (Shown)

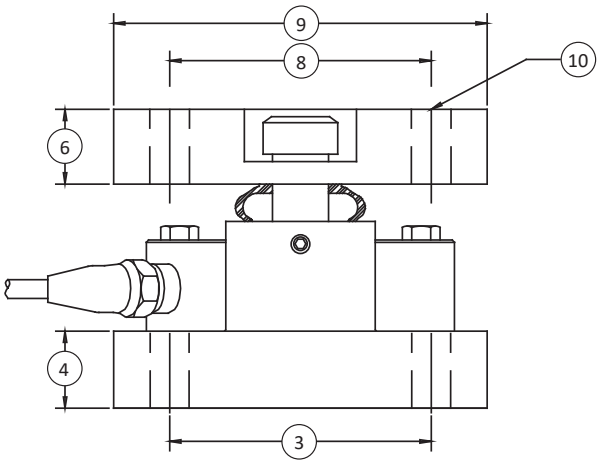
Mount Model	Material	Range		Safe Side Load		
		lbf	kN	lbs	kg	(% range)
M4200-1	Alloy	5K	22.2	20K	9,072	400
M4200-1	Alloy	10K	44.5	20K	22.7K	200
M4200-2	Alloy	25K	111	50K	22.8K	200
M4200-2	Alloy	50K	222	50K	22.8K	100
M4600-1	Stainless	5K	22.2	10K	4,536	200
M4600-1	Stainless	10K	44.5	10K	4,536	100
M4600-2	Stainless	25K	111	25K	11.3	100
M4600-2	Stainless	50K	222	25K	11.3	50

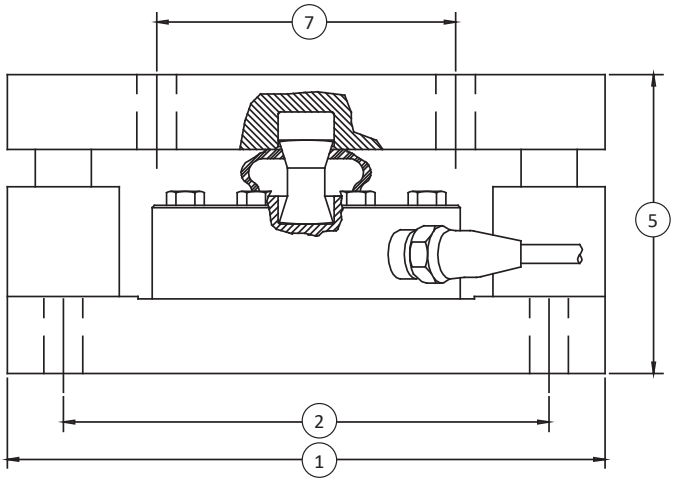
ACCESSORIES

- 9300
- 9390
- UMC600
- SGA
- Junction box

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

A4200 & A4600 WEIGHCHECK LOAD CELL (U.S. & METRIC)



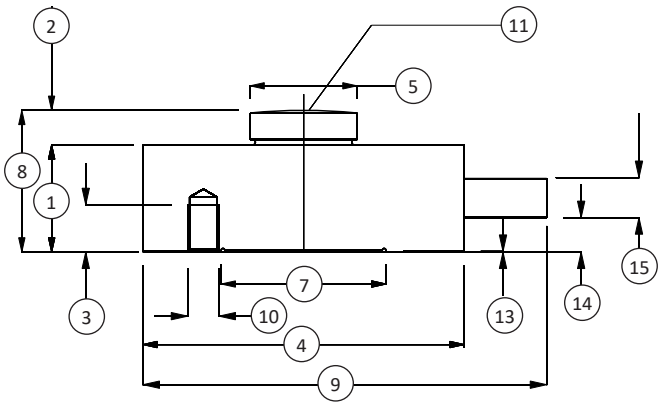


DIMENSIONS

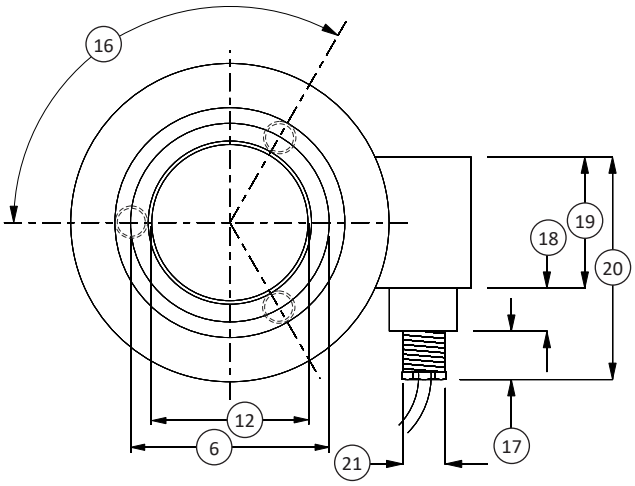
See Drawing	CAPACITY			
	A4211, A4611		A4221, A4621	
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	2.5K, 5K, 10K	11.1, 22.2, 44.5	25K, 50K	111, 222
	in	mm	in	mm
(1)	8.00	203.2	10.00	254.0
(2)	6.50	165.1	7.75	196.9
(3)	3.50	88.9	4.50	114.3
(4)	1.00	25.4	1.25	31.8
(5)	4.00	101.6	5.00	127.0
(6)	1.00	25.4	1.25	31.8
(7)	4.00	101.6	5.00	127.0
(8)	3.50	88.9	4.50	114.3
(9)	5.00	127.0	6.00	152.4
(10)	0.52	13.2	0.78	19.8

WSSCLC STAINLESS STEEL LOW PROFILE COMPRESSION LOAD CELL (U.S. & METRIC)

SIDE VIEW



TOP VIEW



DIMENSIONS

SEE DRAWING	U.S. (lbf)	Metric (kg)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)
	220, 551, 1.1K, 2.2k, 5.5k, 11k 16.5k	100, 250, 500, 1K, 2.5K, 5K, 7.5K	20K	10	44K, 66.1K	20, 30	110.2K, 165.3K, 220.4K	50, 75, 100	330.6K, 440.9K	150, 200
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	1.25	32	1.25	32	1.96	50	2.36	60	3.14	80
(2)	0.47	12	0.47	12	0.55	14	0.78	20	1.18	30
(3)	0.43	11	0.43	11	0.47	12	0.78	20	0.78	20
(4)	Ø 3.22	Ø 82	Ø 3.22	Ø 82	Ø 4.96	Ø 126	Ø 6.49	Ø 165	Ø 7.87	Ø 200
(5)	Ø 0.86	Ø 22	Ø 0.86	Ø 22	Ø 1.37	Ø 35	Ø 2.36	Ø 60	Ø 3.14	Ø 80
(6)	Ø 2.67	Ø 68	Ø 2.67	Ø 68	Ø 3.54	Ø 90	Ø 5.19	Ø 132	Ø 5.9	Ø 150
(7)	Ø 2.05	Ø 52.3	Ø 2.05	Ø 52.3	Ø 3	Ø 77.3	Ø 3.63	Ø 92.3	Ø 4.21	Ø 107
(8)	1.73	44	1.73	44	2.51	64	3.14	80	4.33	110
(9)	4	102	4	102	5.82	148	7.4	188	8.77	223
(10)	3x M8		3x M8		3x M8		4x M16		4x M16	
(11)	1.96	50	1.96	50	6.29	160	11.81	300	11.81	300
(12)	Ø 2.36	Ø 60	Ø 2.36	Ø 60	Ø 3.66	Ø 93	Ø 4.52	Ø 115	Ø 5	Ø 128
(13)	0.01	0.3	0.01	0.3	0.02	0.5	0.03	1	0.03	1
(14)	0.23	6	0.23	6	0.59	15	0.66	17	0.9	23
(15)	0.78	20	0.78	20	0.8	20	0.8	20	0.8	20
(16)	120°		120°		120°		120°		120°	
(17)	0.51	13	0.51	13	0.5	13	0.5	13	0.5	13
(18)	0.39	10	0.39	10	0.4	10	0.4	10	0.4	10
(19)	1.57	40	1.57	40	1.6	40	1.6	40	1.6	40
(20)	2.59	66	2.59	66	2.6	66	2.6	66	2.6	66
(21)	¼	6.35	¼	6.35	¼	6.35	¼	6.35	¼	6.35
Weight	2.8 (lbs)	1.3 (kg)	2.8 (lbs)	1.3 (kg)	7.4 (lbs)	3.4 (kg)	20.7 (lbs)	9.4 (kg)	40.1 (lbs)	18.2 (kg)

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WSSCLC-MOUNT WEIGHING ASSEMBLY (U.S. & METRIC)

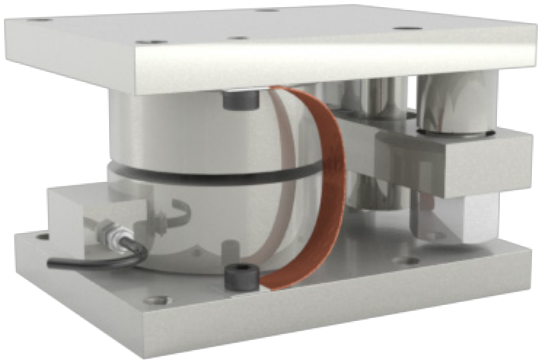
The WSSCLC-MOUNT is a complete weighing assembly for use with the WSSCLC range of load cells (see separate data sheet). The weighing assembly facilitates easy mounting for the engineer on site, and incorporates a number of key features that allows the best installed accuracy to be achieved. These include an anti-lift off mechanism, compensation for thermal expansion and for off-axis loading.

Manufactured from stainless steel, the WSSCLC-MOUNT is available in three sizes (assembly instructions are shown on the reverse of this data sheet). The unit is equipped with self load alignment to mitigate against positioning errors and deformation.

FEATURES & BENEFITS

- Stainless steel construction
- Ensures best installation accuracy is achieved
- Incorporates a safety retainer to prevent accidental vessel lifting or sliding
- Available in three sizes
- Suitable for use with the WSSCLC load cell series

STANDARD CONFIGURATION

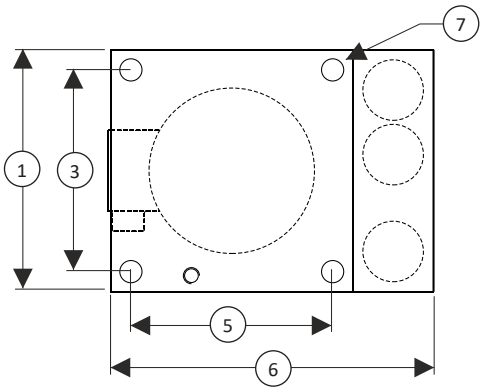


MODEL WSSCLC-MOUNT-1 (Shown)

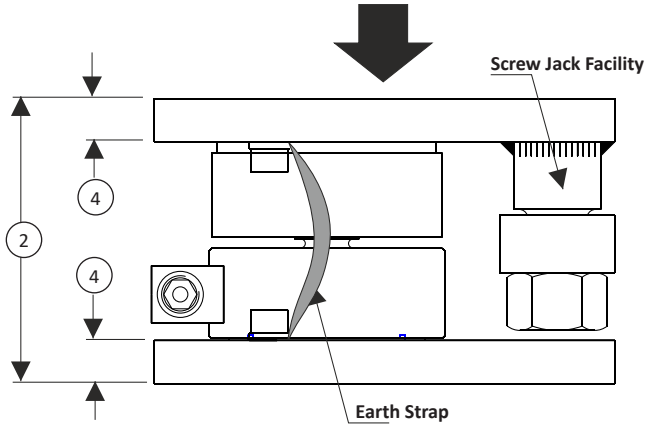
TYPICAL APPLICATIONS

- Vessel weighing
- Silo weighing
- Process weighing & control
- Tank weighing

TOP VIEW



SIDE VIEW

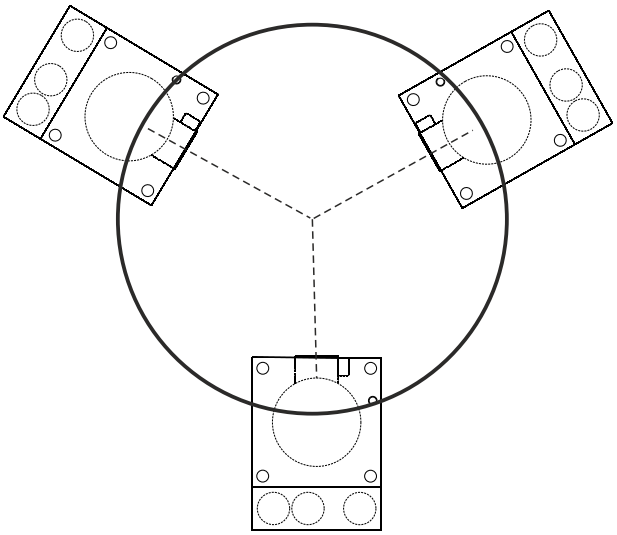


DIMENSIONS

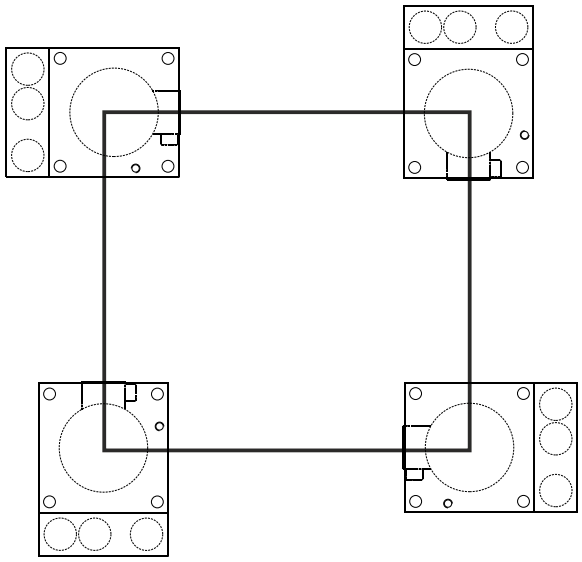
SEE DRAWING	U.S. (lbf)	Metric (kg)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)
	220, 551, 1.1K, 2.2k, 5.5k, 11k 16.5k	100, 250, 500, 1K, 2.5K, 5K, 7.5K	20K	10	44K, 66.1K	20, 30	110.2K, 165.3K, 220.4K	50, 75, 100
	in	mm	in	mm	in	mm	in	mm
(1)	4.72	120	4.72	120	7.87	200	10.6	270
(2)	3.93	100	3.93	100	4.4	112	5.3	135
(3)	3.93	100	3.93	100	6.29	160	8.4	214
(4)	0.59	15	0.59	15	0.59	15	0.59	15
(5)	3.93	100	3.93	100	4.33	110	6.8	174
(6)	6.29	160	6.29	160	7.87	200	11.8	300
(7)	Ø 0.43	Ø 11	Ø 0.43	Ø 11	Ø 0.7	Ø 18	Ø 0.98	Ø 25
Weight	15.4 (lbs)	7 (kg)	15.4 (lbs)	7 (kg)	30.8 (lbs)	14 (kg)	68.3 (lbs)	31 (kg)

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WSSCLC-MOUNT WEIGHING ASSEMBLY (U.S. & METRIC)



Circular system with three supporting points



Square system with four supporting points

Model		WSSCLC-MOUNT-1				WSSCLC-MOUNT-2		WSSCLC-MOUNT-3	
Capacity		U.S. (lbf)	Metric (kg)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)
		220 - 16.5K	100 - 7.5K	20K	10	44K - 66.1K	20 - 30	110.2K - 220.4K	50 - 100
Nominal load	lbf	22K				66.1K		220.4K	
	MT	10				30		100	
Maximum permissible horizontal force	lbf	5.6				11.2		26.9	
	kN	25				50		120	
Maximum permissible lifting force	lbf	8.9				17.9		47.2	
	kN	40				80		210	

ASSEMBLY INSTRUCTIONS

- Fix the WSSCLC-MOUNT loading plate (1) to the structure or to the floor, checking that the floor is flat and even. If not, use separate leveling plates.
- Place the system to be weighed on the upper plates (2), taking care that the load cells are not overloaded.
- Adjust and fix the upper plate (2), ensuring that it is parallel and in axis with the lower plate.
- Check that the safety retainer (3) is centered inside the hole, ensuring that it is free to move, especially during weighing.



LOAD CELL REPLACEMENT

- Lift the weighing units upper plate (2) by unscrewing the two lifting jacks (4), ensuring that the upper plate is jacked evenly.
- Replace the load cell
- Screw the two jacks (4) to lower the upper plate evenly back onto the load cells



2160 HIGH CAPACITY COLUMN LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 300K to 1000K (1335 to 4450 kN)
- Performance to ±0.15% FS
- Compact size
- Metric and English models

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.15
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		±0.03
Creep, in 20 min – %		±0.05
TEMPERATURE		
Compensated Range	°F	+32 to +132
	°C	0 to +56
Operating Range	°F	-30 to +200
	°C	-34 to +93
Effect on Zero – %RO / def	°F	+0.003
Effect on Output – % / deg	°F	+0.003
ELECTRICAL		
Rated Output – mV/V NOM		2.0
Excitation – VAC / VDC – NOM		10
Excitation – VAC / VDC - MAX		15
Bridge Resistance – Ohm NOM		350
Zero Balance – %RO		±1.0
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Safe Overload – %CAP		150
Connector		MS3102A-14S-5P
Material		Alloy steel

Notes:
– Compression-Only available. Ask factory for specifications and dimensions.
– Consult factory for more technical information.

STANDARD CONFIGURATION



Model 2160 (Shown)

OPTIONS

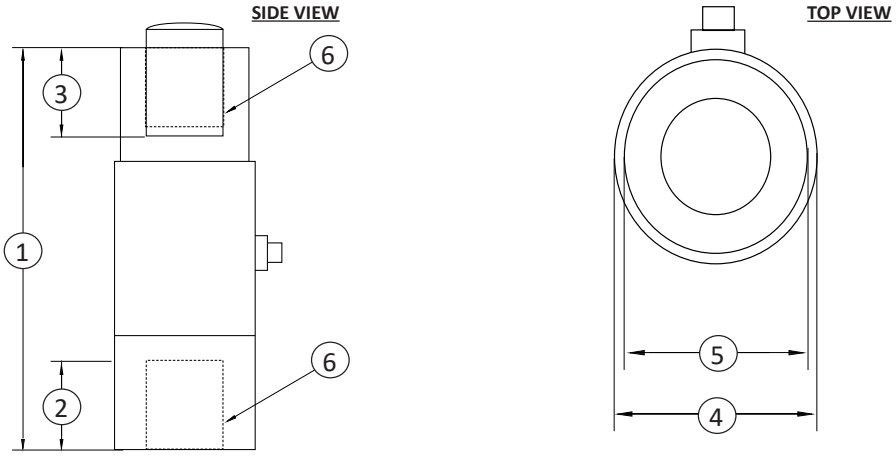
- Compression-only available. Ask factory for specifications and dimensions.
- Multiple bridge
- Standardized output
- ASTM E74 calibration
- Special thread size
- Handles

ACCESSORIES

- Mating connector
- Cable assembly

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

2160 HIGH CAPACITY COLUMN LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY											
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300K	1335	400K	1780	500K	2225	600K	2670	700K	3115	1000K	4450
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	16.50	419.1	19.00	482.6	21.26	540.0	23.25	590.6	25.50	647.7	27.80	706.1
(2)	3.75	95.3	4.00	101.6	4.50	114.3	5.00	127.0	5.50	139.7	6.50	165.1
(3)	3.75	95.5	4.00	101.6	4.50	114.3	5.00	127.0	5.50	139.7	6.50	165.1
(4)	5.50	139.7	5.50	139.7	6.00	152.4	7.00	177.8	7.50	190.5	9.50	241.3
(5)	5.00	127.0	5.00	127.0	5.50	139.7	6.50	165.1	7.00	177.8	9.00	228.6
(6)	3 ½-12	M76x2	3 ½-12	M90x2	4-12	M100x2	4 ½-8	M100x2	5-8	M125x4	6-8	M125x4

2161 HIGH CAPACITY COLUMN COMPRESSION ONLY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 300K to 1000K (1335 to 4450 kN)
- Performance to ±0.15% FS
- Compact size
- Metric and English models
- Screw in handles

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.15
Hysteresis – %FS		±0.10
Nonrepeatability – %RO		±0.10
Creep, in 20 min – %		±0.05
TEMPERATURE		
Compensated Range	°F	+32 to +132
	°C	0 to +56
Operating Range	°F	-30 to +200
	°C	-34 to +93
Effect on Zero – %RO / deg	°F	+0.003
Effect on Output – % / deg	°F	+0.003
ELECTRICAL		
Rated Output – mV/V NOM		2.0
Excitation – VAC / VDC – NOM		10
Excitation – VAC / VDC - MAX		15
Bridge Resistance – Ohm NOM		350
Zero Balance – %RO		±1.0
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Safe Overload – %CAP		150
Connector		MS3102A-14S-5P
Material		Alloy steel

STANDARD CONFIGURATION



Model 2161DQX-400K (Shown)

OPTIONS

- Multiple bridge
- Standardized output
- ASTM E74 calibration
- Special thread size
- Handles

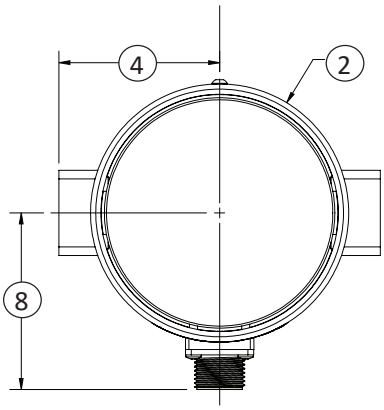
ACCESSORIES

- Mating connector
- Cable assembly

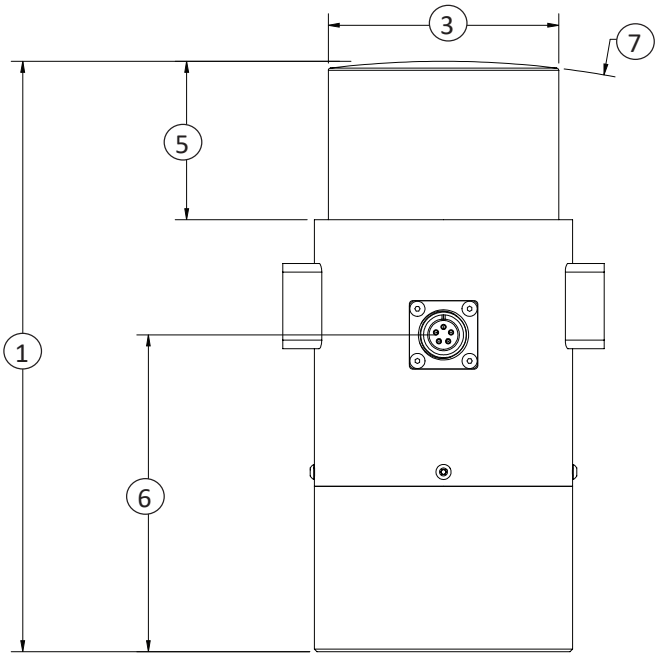
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

2161 HIGH CAPACITY COLUMN COMPRESSION ONLY LOAD CELL (U.S. & METRIC)

TOP VIEW



SIDE VIEW



DIMENSIONS

See Drawing	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300K	1335	400K	1780	500K	2225	1000K	4450
	in	mm	in	mm	in	mm	in	mm
(1)	9.50	241.3	10.25	260.4	10.75	273.1	12.00	304.8
(2)	Ø3.50	Ø88.9	Ø4.50	Ø114.3	Ø4.50	Ø114.3	Ø6.50	Ø165.1
(3)	Ø3.00	Ø76.2	Ø4.00	Ø101.6	Ø4.00	Ø101.6	Ø6.00	Ø152.4
(4)	2.29	58.15	2.79	70.9	-	-	4.23	107.4
(5)	2.00	50.8	2.75	69.9	-	-	-	-
(6)	5.50	139.7	5.50	139.7	-	-	-	-
(7)	SR 15.75	SR 400.1	SR 16.50	SR 419.1	-	-	R 40.00	R 1016.0
(8)	2.59	65.8	3.06	77.8	-	-	4.25	108.0

2200 CALIBRATION COLUMN LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 100K to 200K lbf (445 to 890 kN)
- Performance to <0.10%FS
- Quadruple the gages of standard column cell
- Lightweight
- Compact
- E74 calibration

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.10
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		±0.05
Creep, in 20 min – %		±0.05
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-9.4 to +46.1
Operating Range	°F	-30 to +175
	°C	-34.4 to +79.4
Effect on Zero – %RO / deg	°F	0.003
Effect on Output – % / deg	°F	0.003
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0 ± 0.20
Excitation – VAC / VDC – Nominal		10
Excitation – VAC / VDC MAX		15
Bridge Resistance – Ohm (Nominal)		350
Zero Balance – %RO		±1.0
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Safe Overload – %CAP		150
Weight	lbs	35, 45
	kg	16, 20
Material		Stainless steel

OPTIONS

- Compression-only available (Ask factory for specifications and dimensions)
- Multiple bridge
- Standardized output
- ASTM E74 calibration
- Special thread size

ACCESSORIES

- Mating connector
- Cable assembly

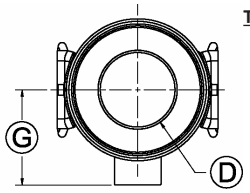
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

STANDARD CONFIGURATION

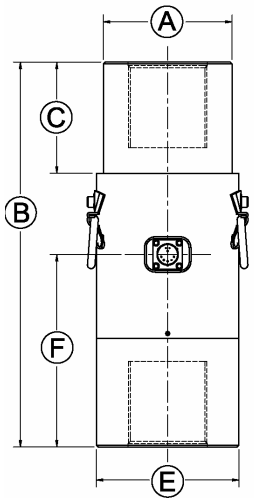


Model 2200 (Shown)

TOP VIEW



SIDE VIEW



DIMENSIONS

See Drawing	MODEL			
	2230		2240	
	CAPACITY			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	100K	445	200K	890
	in	mm	in	mm
(1)	3.0	76.2	4.5	114
(2)	10.1	257	13.5	343
(3)	2.75	70.0	3.9	99
(4)	1¾-12 UN 3B		2¾-8 UN 3B	
(5)	3.5	88.9	4.98	126.5
(6)	5.05	128.3	6.75	171.5
(7)	2.59	65.8	3.34	84.8

2000 HIGH PRECISION CANISTER LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

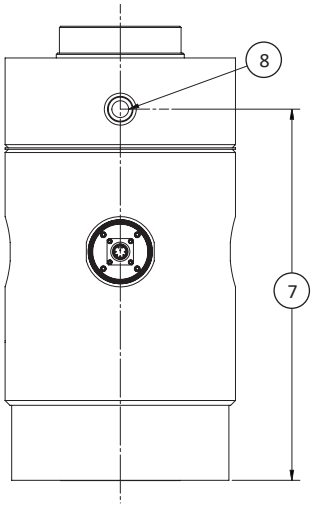
- Capacities from 50K to 300K lbf (250 to 1350 kN)
- Higher capacities available
- High performance
- Ring-type design
- Rugged construction
- Environmentally protected

STANDARD CONFIGURATION

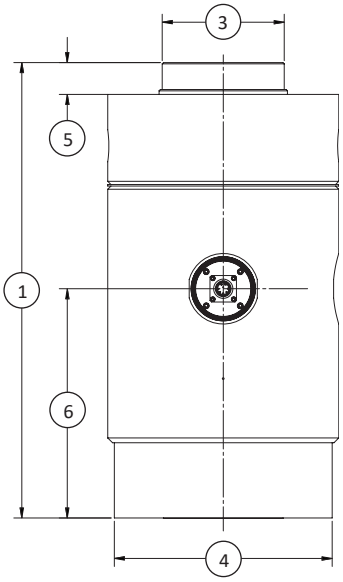


Model 2040EYH-100K (Shown)

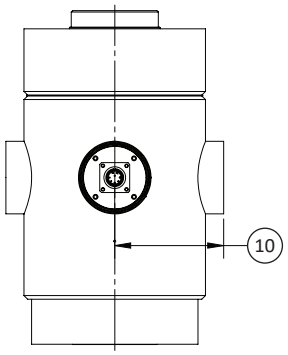
FRONT VIEW



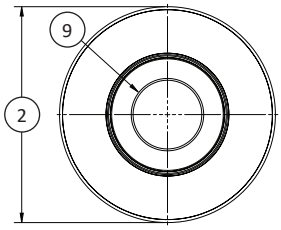
SIDE VIEW



50K ONLY



TOP VIEW



DIMENSIONS

See Drawings	MODEL					
	2030		2040		2060	
	CAPACITIES					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	50K	250	100K	450	200K, 300K	900, 1350
	in	mm	in	mm	in	mm
(1)	11.5	292.1	17.75	450.85	22.0	558.8
(2)	Ø6.25	Ø158.75	Ø9.0	Ø228.6	Ø10.0	Ø254
(3)	Ø3.0	Ø76.2	Ø4.75	Ø120.65	Ø5.75	Ø146.05
(4)	Ø5.73	Ø145.54	Ø8.49	Ø215.65	Ø9.49	Ø241.05
(5)	0.63	16.0	1.24	31.5	1.25	31.75
(6)	5.75	146.05	9.0	228.6	11.0	279.4
(7)	N/A	N/A	14.5	368.3	18.25	463.55
(8)	N/A	N/A	¾-10 UNC – 2B		¾-10 UNC – 2B	
			↧1	↧25.4	↧1	↧25.4
(9)	2-12 UN – 2B		3-8 UN – 2B		4-8 UN – 2B	
	↧2.5	↧127	↧4.5	↧114.3	↧4.5	↧114.3
(10)	3x 3.75	3x 95.25	N/A	N/A	N/A	N/A

2000 HIGH PRECISION CANISTER LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

PARAMETERS			MODEL		
			2030	2040	2060
			CAPACITY		
Measuring Range		U.S. (lbf)	50K	100K	200K, 300K
		Metric (kN)	250	450	900, 1350
ACCURACY – (MAX ERROR)					
Nonlinearity – %FS			± 0.05	± 0.05	± 0.05
Hysteresis – %FS			± 0.03	± 0.03	± 0.03
Nonrepeatability – %RO			± 0.02	± 0.02	± 0.02
Creep in 20 min – %			± 0.025	± 0.025	± 0.025
TEMPERATURE					
Compensated Range		°F	15 to +115	15 to +115	15 to +115
		°C	-10 to 45	-10 to 45	-10 to 45
Operating Range		°F	–65 to +200	–65 to +200	–65 to +200
		°C	-55 to 90	-55 to 90	-55 to 90
Effect on Zero – %RO / deg		°F	± 0.0008	± 0.0008	± 0.0008
Effect on Output – % / deg		°F	± 0.0008	± 0.0008	± 0.0008
ELECTRICAL					
Rated Output – mV/V (Nominal)			3.0 ± 0.3	3.0 ± 0.3	3.0 ± 0.3
Excitation – VDC (Nominal)			10	10	10
Excitation – VAC/VDC (Maximum)			20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350
Zero Balance – %RO			± 1.0	± 1.0	± 1.0
Insulation Resistance – Megohm			5000	5000	5000
MECHANICAL					
Safe Overload – %CAP			150	150	150
Weight		lbs	50	150	250
		kg	22.68	68.04	113.40
Material			Alloy steel		

OPTIONS

- ASTM E74 calibration
- Standardized output
- Special thread size
- Multiple bridge
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Special temperature range

CONNECTOR OPTIONS

- PC02E-12-8P connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

LWHP18 COMPRESSION LOAD WASHER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 5 to 5,000kN (1.12K to 1124K lbf)
- IP67 environmental protection
- Stainless steel construction

SPECIFICATIONS

ACCURACY – (MAX ERROR)			
Capacities	Metric	5 to 200kN	500 to 5000kN
	U.S.	1.12 to 45K lbf	112 to 1.12K lbf
Nonlinearity – %FS		±0.5	
Hysteresis – %FS		±0.5	
Nonrepeatability – %RO		±0.1	
Creep, in 30 min – %		±0.1	
TEMPERATURE			
Effect on Zero – %RO / deg	°C	±0.01	
Effect on Output – % / deg	°C	±0.01	
Compensated Range	°C	-10 to +70	
	°F	+14 to +158	
Operating Range	°C	-30 to +80	
	°F	-22 to +176	
ELECTRICAL			
Output – mV/V		1 ±20%	
Excitation Voltage – VDC		2 - 12	
Bridge Resistance – Ohm		350	
Electrical Connection – Cable	m	3	Connector – Binder581
	ft	9.8	
MECHANICAL			
Safe Overload – %RO		150	
Deflection at Rated Capacity – mm		< 0.1	
IP Rating		IP67	
Material		Stainless steel	

OPTIONS

- Special temperature range
- Internal shunt resistor – 100% output
- Standardized output
- Add connector to cable
- Custom calibration
- Transducer Electronic Data Sheet (TEDS)
- Cable length
- 100% control signal (internal shunt cal)

ACCESSORIES

- Instrumentation

STANDARD CONFIGURATION

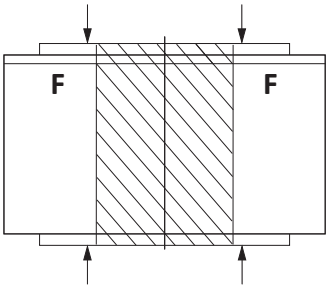


Model LWHP18 5 kN (Shown)



Model LWHP18 500 - 5000 kN (Shown)

LOADING DIAGRAM

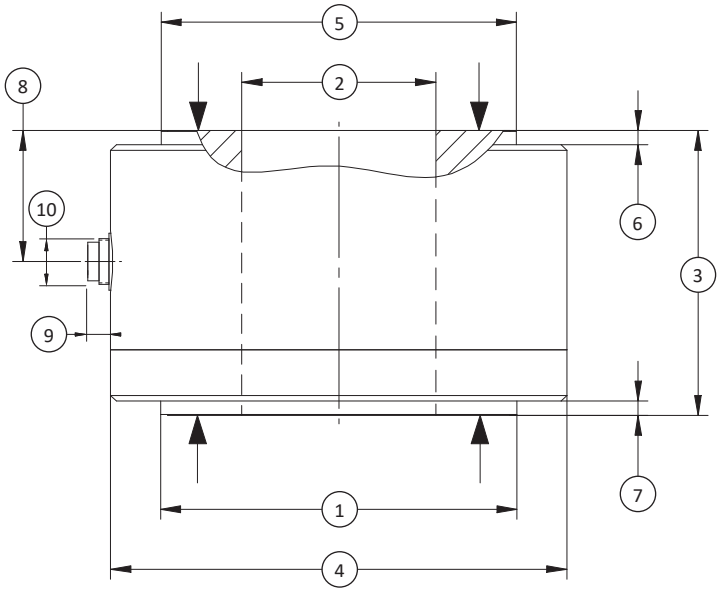


CONNECTOR OPTIONS

- 3 m (10 ft) integral cable
- Series 723 binder (5 to 5000 kN or
- 112 to 1124K lbf)

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

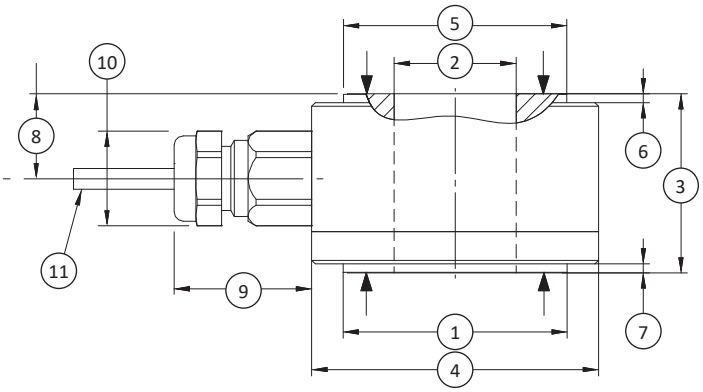
LWHP18 COMPRESSION LOAD WASHER (U.S. & METRIC)



DIMENSIONS

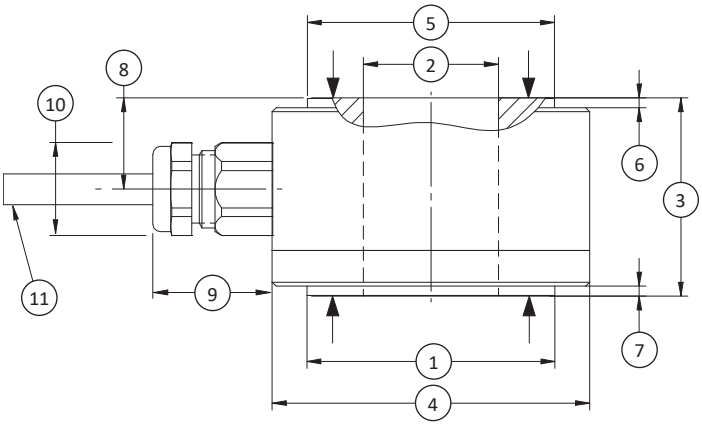
See Drawing	CAPACITY									
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	500	112K	1000	225K	2000	450K	3000	674K	5000	1124K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø60	Ø2.4	Ø88	Ø3.5	Ø105.6	Ø4.2	Ø125	Ø4.9	Ø220	Ø8.7
(2)	Ø30	Ø1.2	Ø68	Ø2.8	Ø68	Ø2.8	Ø68	Ø2.8	Ø100	Ø3.9
(3)	50	20	100	3.9	100	3.9	100	3.9	120	4.7
(4)	Ø80	Ø3.1	Ø129	Ø5.1	Ø160	Ø6.3	Ø160	Ø6.3	Ø270	Ø10.6
(5)	Ø60	Ø2.4	Ø88	Ø3.5	Ø106	Ø4.2	Ø124.6	Ø4.9	Ø220	Ø8.7
(6)	4	0.2	4	0.2	5	0.2	5	0.2	5	0.2
(7)	3	0.1	5	0.2	5	0.2	5	0.2	5	0.2
(8)	26	1.0	46.5	1.8	46	1.8	47	1.9	60	2.4
(9)	Ø20	Ø0.79	Ø20	Ø0.79	Ø20	Ø0.79	Ø20	Ø0.79	Ø20	Ø0.79
(10)	12.5	0.49	12.5	0.49	12.5	0.49	12.5	0.49	12.5	0.49

LWHP18 COMPRESSION LOAD WASHER (U.S. & METRIC)



DIMENSIONS

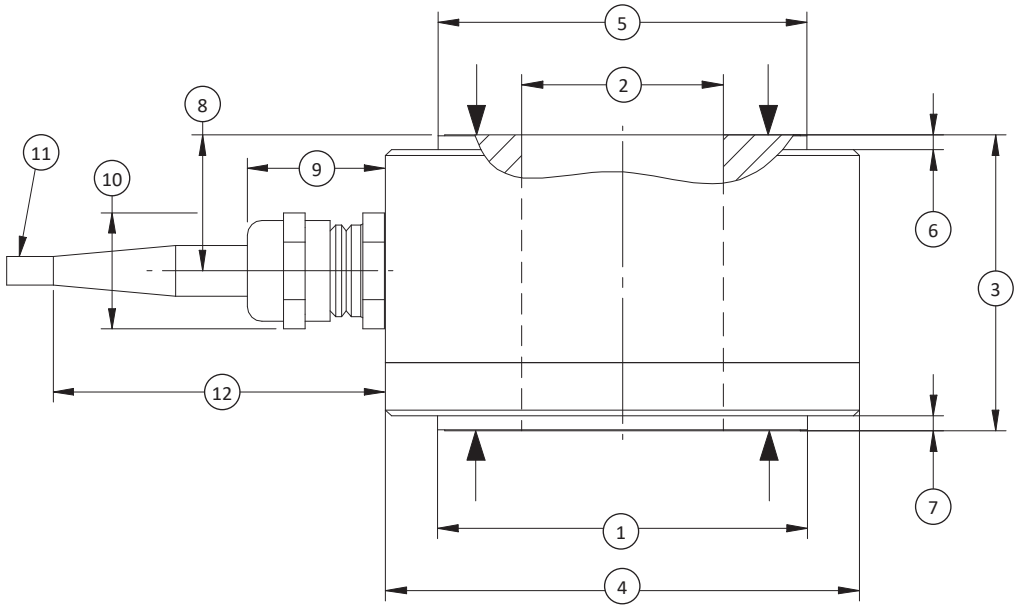
See Drawing	CAPACITY	
	Metric (kN)	U.S. (lbf)
	5	1.12K
	mm	in
(1)	Ø10	Ø0.4
(2)	Ø5	Ø0.2
(3)	30	1.2
(4)	Ø30	Ø1.2
(5)	Ø10	Ø0.4
(6)	2	0.1
(7)	2	0.1
(8)	15	0.6
(9)	14.5	0.57
(10)	Ø10	Ø0.394
(11)	Ø3.2	Ø0.13



DIMENSIONS

See Drawing	CAPACITY					
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	10	2.25K	20	4.5K	50	11.2K
	mm	in	mm	in	mm	in
(1)	Ø14	Ø0.6	Ø22	Ø0.9	Ø28	Ø1.1
(2)	Ø8	Ø0.3	Ø15	Ø0.6	Ø15	Ø0.6
(3)	30	1.2	30	1.2	30	1.2
(4)	Ø30	Ø1.2	Ø40	Ø1.6	Ø40	Ø1.6
(5)	Ø14	Ø0.6	Ø22	Ø0.9	Ø28	Ø1.1
(6)	2	0.1	2	0.1	2	0.1
(7)	2	0.1	2	0.1	2	0.1
(8)	15	0.6	15	0.6	15	0.6
(9)	15.5	0.61	15.5	0.61	15.5	0.61
(10)	Ø12	Ø0.47	Ø12	Ø0.47	Ø12	Ø0.47
(11)	Ø4.6	Ø0.18	Ø4.6	Ø0.18	Ø4.6	Ø0.18

LWHP18 COMPRESSION LOAD WASHER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY			
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	100	22.5K	200	45K
	mm	in	mm	in
(1)	Ø35	Ø1.4	Ø47.5	Ø1.9
(2)	Ø20	Ø0.8	Ø25	Ø1.0
(3)	40	1.6	40	1.6
(4)	Ø55	Ø2.2	Ø64	Ø2.5
(5)	Ø35	Ø1.4	Ø48	Ø1.9
(6)	2	0.1	2.5	0.1
(7)	2	0.1	2.5	0.1
(8)	20	0.8	20	0.8
(9)	19	0.75	19	0.75
(10)	Ø16.5	Ø0.65	Ø16.5	Ø0.65
(11)	Ø4.6	Ø0.18	Ø4.6	Ø0.18
(12)	46	1.8	46	1.8

WMC ROD END LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface temperature compensated strain gages
- Environmentally sealed
- Stainless steel construction
- Low deflection
- Tension & Compression

SPECIFICATIONS

CAPACITY	U.S. (lbf)	15K, 20K, 30K, 50K	100K	200K
	Metric (kN)	65, 90, 130, 220	450	900
ACCURACY – (MAX ERROR)				
Nonlinearity – %FS		±0.10	±0.15	±0.20
Hysteresis – %FS		±0.10	±0.15	±0.20
Nonrepeatability – %RO		±0.05		
Creep, in 20 min – %		±0.05		
TEMPERATURE				
Compensated Range	°F	+15 to +115		
	°C	-10 to +45		
Operating Range	°F	-65 to +250		
	°C	-54 to +121		
Effect on Output – % / deg	°F	±0.004	±0.005	±0.005
	°C	±0.0072	±0.009	±0.009
Effect on Zero – %RO / deg	°F	±0.0025	±0.005	±0.005
	°C	±0.0045	±0.009	±0.009
ELECTRICAL				
Rated Output – mV/V (Nominal)		2.0		
Zero Balance – %RO		±1.0		
Bridge Resistance – Ohm (Nominal)		350 ±3.5		
Excitation Voltage – VDC MAX		15		
Insulation Resistance – Megohm		> 5000		
MECHANICAL				
Calibration		T & C		
Safe Overload – %CAP		150		
Deflection @ RO	in	0.004		
	mm	0.10		
Weight	lbs	4	14	34.4
	kg	1.8	6.4	15.6
Material		Stainless steel		

STANDARD CONFIGURATION



Model WMC Rod End (Shown)

OPTIONS

- Special calibration
- Standardized output
- Special temperature range
- Custom calibration
- Transducer Electronic Data Sheet (TEDS)
- Amplifier

ACCESSORIES

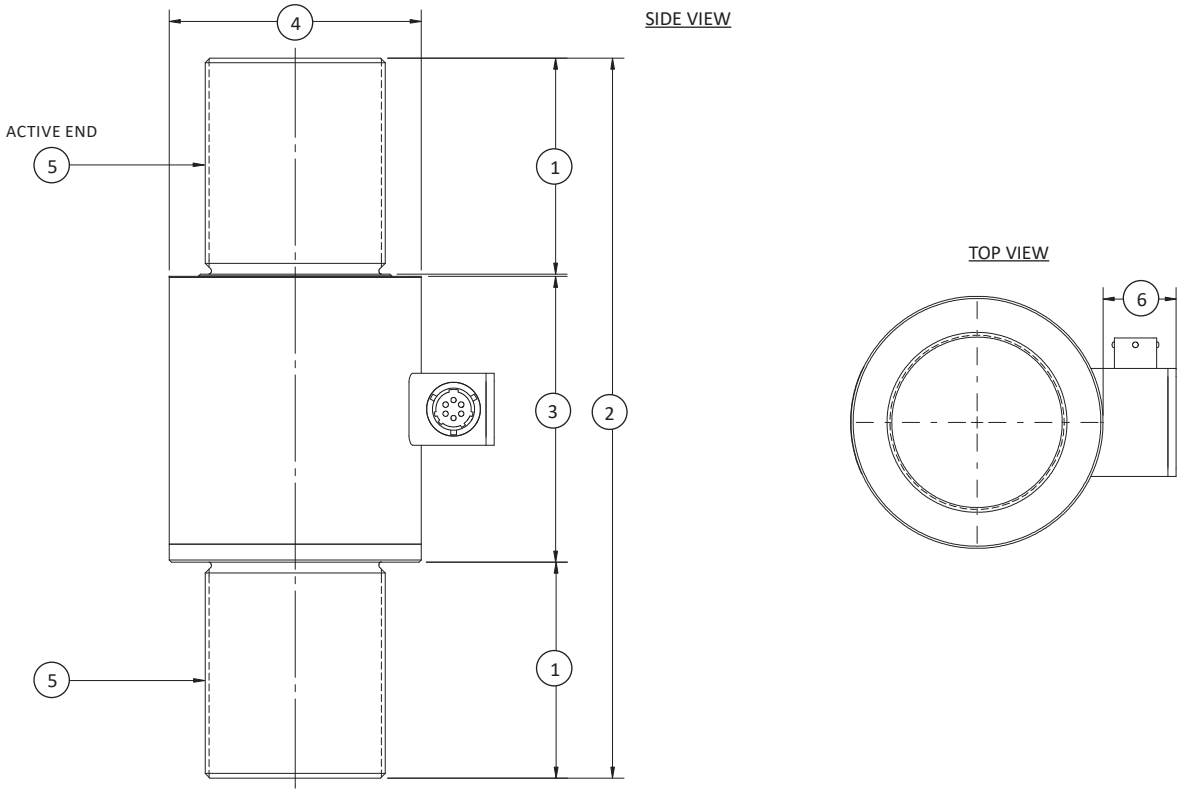
- Instrumentation
- Interconnect cable

CONNECTOR OPTIONS

- Integral cable
- PTWIH-10-6P Connector

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

WMC ROD END LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	15K, 20K, 30K, 50K	65, 90, 130, 220	100K	450	200K	900
	in	mm	in	mm	in	mm
(1)	2.00	50.8	3.00	76.20	4.00	101.60
(2)	6.5	165.1	10.00	254.00	13.00	330.20
(3)	2.47	62.7	3.97	100.84	4.97	126.24
(4)	2.5	63.5	3.50	88.90	4.47	113.54
(5)	1.5-12 UNF M36X4		2.50-12 UN M64x4		3.50-8 UN M90x4	
(6)	1.01	25.7	1.28	32.51	1.36	34.54

Notes:

Notes:

Interface Mini™ Load Cells

LowProfile® 90

Load Button Load Cell 92

Load Washer 99

Mini Beam 113

Rod End 121

S-Type 130

Platform 147

BPL BRAKE PEDAL LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Lowest nonlinearity and hysteresis of any brake pedal load cell – < 0.05%
- Ultra low height
- Low sensitivity to off-center loads – < 1.0% / in
- Mounts directly to pedal with included strap(s)
- Interchangeable mounting plates
- Storage case included
- For use with gas, brake or clutch pedal
- Storage case included

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Static Error Band		±0.05
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		±0.02
Creep, in 20 min – %		±0.05
Eccentric Load Sensitivity – % / in		±1
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % / deg	°F	±0.001
Effect on Zero – %RO / deg	°F	±0.002
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Zero Balance – %RO		±1.0
Bridge Resistance – Ohm (Nominal)		700
Excitation Voltage – VDC	MAX	15
	Nominal	10
Insulation Resistance – Megohm		> 5000
Deflection at Capacity	in	0.002
	mm	0.051
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP		150
Safe Overload – Side – %CAP		40, any direction
Material		Aluminum

STANDARD CONFIGURATION



Model BPL (Shown)

OPTIONS

- Cable length
- Custom calibration
- Special temperature range
- Add connector to cable
- Standardized output
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

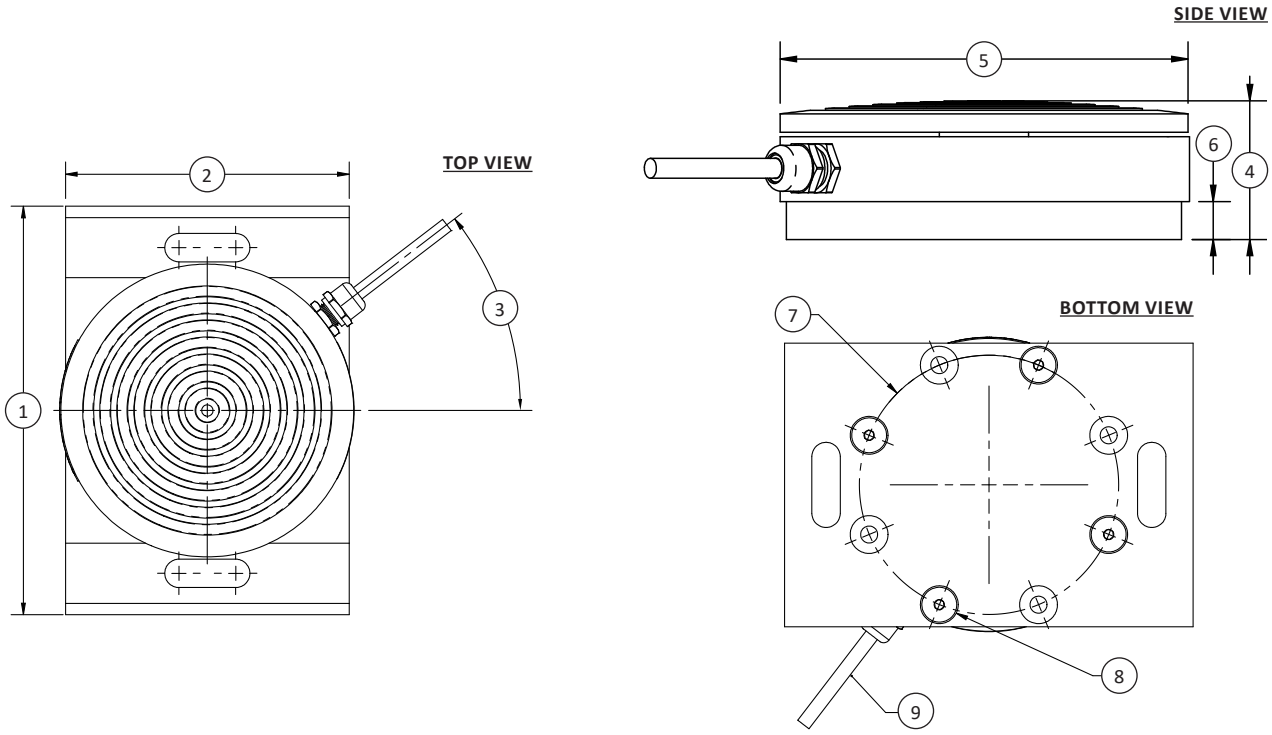
- Instrumentation

CONNECTOR OPTIONS

- 10 ft (3 m) integral cable

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BPL PEDAL LOAD CELL (U.S. & METRIC)



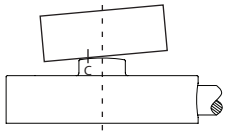
DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	50, 100, 200, 300, 500	222, 445, 890, 1.33K, 2.22K
	in	mm
(1)	3.60	91.4
(2)	2.50	63.5
(3)	37.5°	
(4)	0.88	22.3
(5)	Ø2.58	Ø65.5
(6)	0.24	6.1
(7)	Ø2.285	Ø58.04
(8)	4 x 6-32 UNC	
(9)	Ø0.13	Ø3.3

ConvexBT LOAD BUTTON LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Superior to any other load button
- Integral temperature compensation
- Enhanced eccentric load rejection
- Multi-point calibration
- Integral load button
- Small diameter
- Environmentally sealed
- Heat treated stainless steel



OFF CENTERLINE MISALIGNMENT

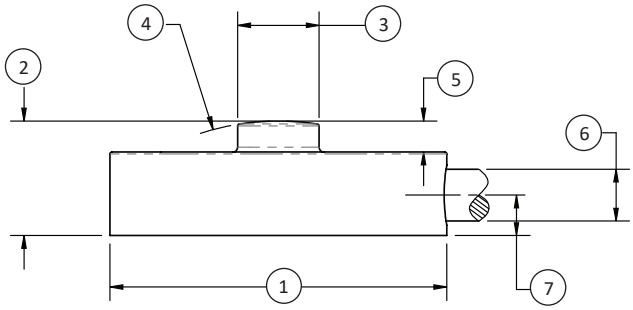
SPECIFICATIONS

Parameter		Capacity	
Measuring Range	lbf	5	10, 25, 50, 100, 250, 500, 1000
	kN	0.02	0.04, 0.11, 0.22, 0.44, 1.11, 2.22, 4.44
Rated Output – mV/V		1.00 ± 20%	2.00 ± 20%
Nonlinearity – %FS		± 0.25	
Hysteresis – %FS		± 0.25	
Static Error Band – %FS / MAX		± 0.50	
Nonrepeatability – %RO 0.5% @ 1°		± 0.10	
Temperature			
Compensated Range	°F	60 to 160	
	°C	21 to 77	
Operating Range	°F	-40 to 175	
	°C	-40 to 80	
Effect on Zero – %RO / deg	°F	± 0.50	
Effect on Output – % / deg	°F	± 0.20	
Creep, 20 minutes – %		± 0.15	
Input Resistance – Ohm		350 +50/-3.5	
Output Resistance – Ohm		350 ± 3.5	
Insulation Resistance – Megohm		5000	
Zero Balance – %RO		± 2	
Barometric Sensitivity		0	
Eccentric Load Sensitivity – %		0.5 @ 1deg	
Overload Ratings			
Safe, axial load – %CAP / MAX		150	
Ultimate, axial load – %CAP / MAX		300	
Deflection at capacity - inch / Nom		0.0011	
Excitation, nominal – VDC		5	
Excitation, maximum – VDC or VAC		7	
Weight (without cable) / Nom	lb	< 0.02	
	kg	< 0.009	
Material		17-4 PH Heat Treated Stainless Steel	

STANDARD CONFIGURATION



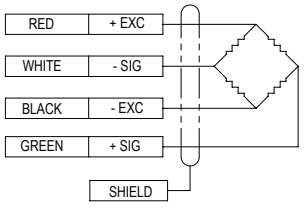
MODEL LBSU-100 (Shown)



DIMENSIONS

See Drawing	Model					
	LBSU-5-50		LBSU-100-250		LBSU-500-1000	
	Capacity					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	5, 10, 25, 50	0.02, 0.04, 0.11, 0.22	100, 250	0.44, 1.11	500, 1000	2.22, 4.44
	in	mm	in	mm	in	mm
(1)	Ø0.38	Ø9.5	Ø0.5	Ø12.70	Ø0.75	Ø19.1
(2)	0.125±0.01	3.18±0.25	0.15	3.8	0.25	6.4
(3)	Ø0.09	Ø2.3	Ø0.12	Ø3.1	Ø0.18	Ø4.5
(4)	SR0.25	SR6.4	SR0.38	SR9.5	SR4.0	SR101.6
(5)	0.005	0.14	0.03	0.7	0.07	1.7
(6)	Ø0.09	Ø2.2	Ø0.09	Ø2.2	Ø0.09	Ø2.2
(7)	0.06	1.5	0.06	1.5	0.06	1.5

WIRING DIAGRAM



COMPRESSION UPSCALE

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

LBM COMPRESSION LOAD BUTTON (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 25 to 50K lbf (0.11 to 222.4 kN)
- Temperature compensated
- Integral load button
- Small diameter
- Environmentally sealed

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.5
Hysteresis – %FS		±0.3
Nonrepeatability – %RO		±0.10
TEMPERATURE		
Compensated Range	°F	+70 to +170
	°C	+21 to +77
Operating Range	°F	-65 to +200
	°C	-54 to +93
Effect on Zero – %RO / deg	°F	±0.005
Effect on Output – % / deg	°F	±0.005
Zero Balance – %FS		±2.0
ELECTRICAL		
Rated Output – mV/V (nominal)		2.0
Bridge Resistance – Ohm (nominal)		350
Excitation Voltage – VDC MAX		10
MECHANICAL		
Calibration		Comp.
Deflection		0.001-0.003
Safe Overload – %CAP		150
Ultimate Overload % of CAP Cable		300
Material		Stainless steel

STANDARD CONFIGURATION



Model LBM-5K (Shown)

OPTIONS

- Custom calibration
- Standardized output
- Special temperature range
- Cable length
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

- Instrumentation

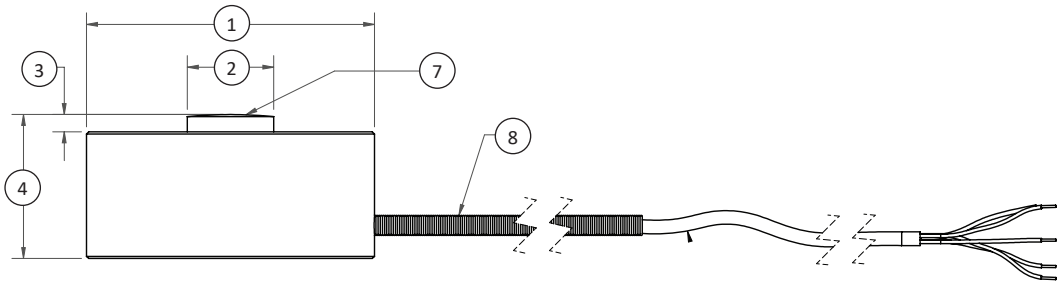
CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable (LBM)

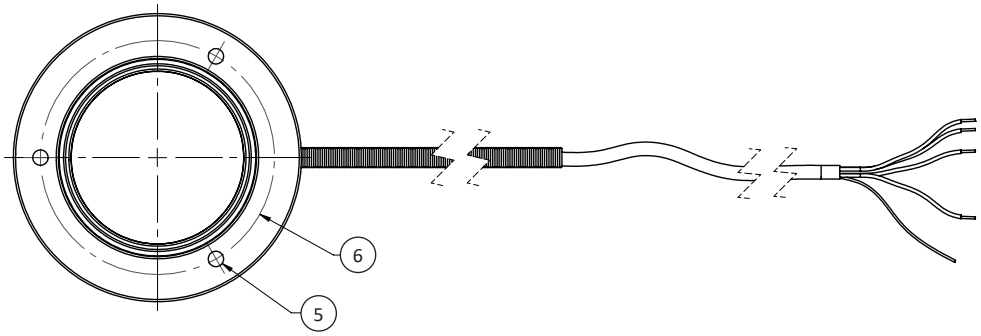
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

LBM COMPRESSION LOAD BUTTON (U.S. & METRIC)

SIDE VIEW



BOTTOM VIEW



DIMENSIONS

See Drawing	CAPACITY									
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	25, 50, 100	0.11, 0.22, 0.44	250, 500, 1K, 2K	1.11, 2.22, 4.44, 8.89	5K, 7.5K, 10K	22.2, 33.3, 44.4	20K	88.9	50K	222.4
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	Ø1.00	Ø25.4	Ø1.25	Ø31.8	Ø1.50	Ø38.1	Ø2.00	Ø50.8	Ø3.00	Ø76.2
(2)	Ø0.21	Ø5.3	Ø0.32	Ø8.1	Ø0.43	Ø10.9	Ø0.60	Ø15.2	Ø0.78	Ø19.8
(3)	0.05	1.3	0.07	1.8	0.08	1.9	0.12	3.0	0.18	4.6
(4)	0.63	15.9	0.39	9.9	0.63	15.9	1.00	25.4	1.50	38.1
(5)	3X #4-40 UNC-2B ↧0.21 EQ SP	3X #4-40 UNC-2B ↧5.3 EQ SP	3X #6-32 UNC-2B ↧0.25 EQ SP	3X #6-32 UNC-2B ↧6.3 EQ SP	3X #6-32 UNC-2B ↧0.25 EQ SP	3X #6-32 UNC-2B ↧6.3 EQ SP	3X #6-32 UNC-2B ↧0.25 EQ SP	3X #6-32 UNC-2B ↧6.3 EQ SP	3X #6-32 UNC ↧0.26 EQ SP	3X #6-32 UNC ↧6.6 EQ SP
(6)	Ø0.75	Ø19.1	Ø1.00	Ø25.4	Ø1.25	Ø31.8	Ø1.625	Ø41.28	Ø2.375	Ø60.33
(7)	SR1.38	SR35.1	SR1.50	SR38.1	SR	SR	SR	SR	SR	SR
(8)	Strain Relief Spring									

LBMP OVERLOAD PROTECTED COMPRESSION LOAD BUTTON (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.01 to 100 kN (2.25 to 22.5K lbf)
- Overload protected
- Temperature compensated
- Small diameter
- Environmentally sealed
- Stainless steel

SPECIFICATIONS

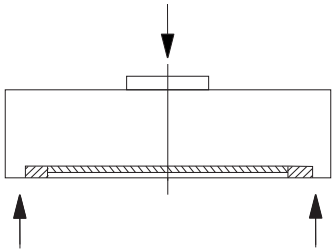
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS			±0.5
Hysteresis – %FS			±0.5
Nonrepeatability – %RO			±0.2
Creep, in 30 min – %			±0.1
TEMPERATURE			
Effect on Zero – %RO / deg		°C	±0.02
Effect on Output – % / deg		°C	±0.02
Compensated Range		°C	0 to +60
		°F	+32 to +140
Operating Range		°C	-10 to +70
		°F	+14 to +158
ELECTRICAL			
Output – mV/V ± %		(0.01 kN)	0.5 ± 20
		(2.25 lbf)	
		(0.02-100 kN)	1 ± 20
		(4.5-22.5K lbf)	
Excitation Voltage – VDC		(0.01 - 0.05 kN)	2 - 6
		(2.25-11.2 lbf)	
		(0.1 - 100 kN)	2 - 12
		(22.5-22.5K lbf)	
Bridge Resistance – Ohm			350
MECHANICAL			
Safe Overload – %CAP		(0.01 - 0.2 kN)	500
		(0.5 - 100 kN)	300
Deflection at Rated Capacity		mm	< 0.15
		in	< 0.006
IP Rating		(0.01 - 0.02 kN)	IP60
		(0.05 - 100 kN)	IP65
Net Weight	kg	(0.01-10 kN)	0.3
	lbs	(2.25-2.25K lbf)	0.66
	kg	(20 kN)	0.4
	lbs	(4.5K lbf)	0.88
	kg	(50 kN)	0.7
	lbs	(11.2K lbf)	1.54
	kg	(100 kN)	1.7
	lbs	(22.5K)	3.75
Material			Stainless steel

STANDARD CONFIGURATION



Model LBMP-50K (Shown)

LOADING DIAGRAM



OPTIONS

- Special temperature range
- Internal shunt resistor – 100% output
- Standardized output
- Cable length
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration

CONNECTOR OPTIONS

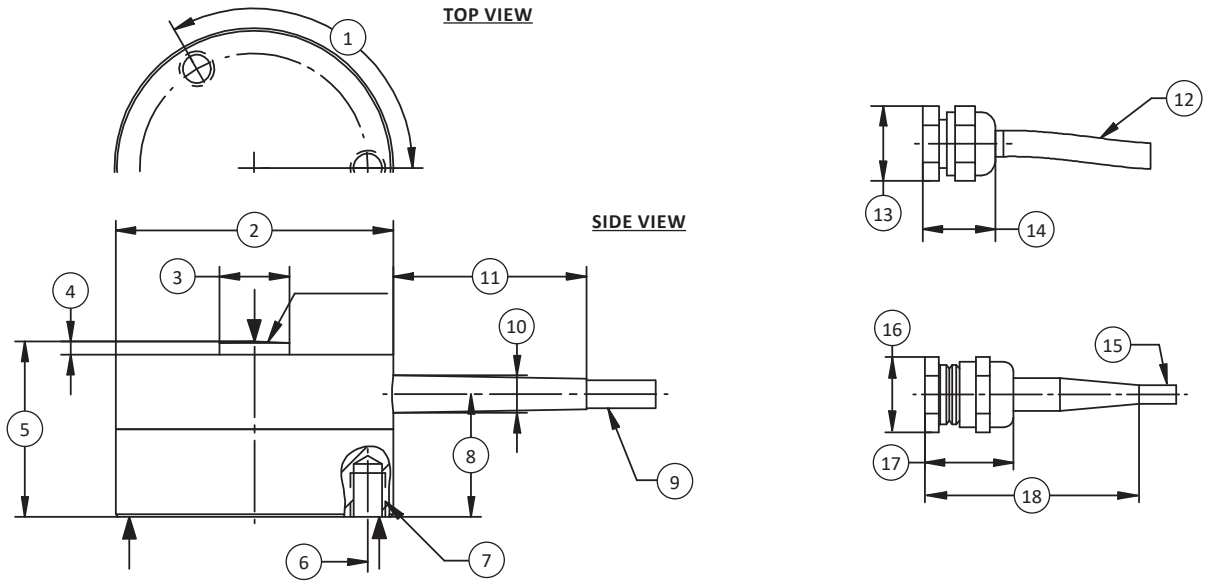
- 3 m (10 ft) integral cable

ACCESSORIES

- Instrumentation

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

LBMP OVERLOAD PROTECTED COMPRESSION LOAD BUTTON (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY							
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10	2.25, 4.50, 11.2, 22.5, 45, 112, 225, 450, 1.12K, 2.25K	20	4.5K	50	11.2K	100	22.5K
	mm	in	mm	in	mm	in	mm	in
(1)	3 x 120°							
(2)	32 (+0.2)	1.3 (+0.008)	39 (+0.2)	1.5 (+0.008)	52 (+0.2)	2.0 (+0.008)	79 (+0.2)	3.1 (+0.008)
(3)	8	0.3	11	0.4	15	0.6	20	0.8
(4)	1.8 (±0.2)	0.1 (±0.008)	2 (±0.2)	0.1 (±0.008)	3 (±0.2)	0.1 (±0.008)	5 (±0.2)	0.2 (±0.008)
(5)	20 (±0.2)	0.8 (±0.008)	24 (±0.2)	0.9 (±0.008)	40 (±0.2)	1.6 (±0.008)	50 (±0.2)	2.0 (±0.008)
(6)	26 (±0.1)	1.0 (±0.004)	32 (±0.1)	1.3 (±0.004)	42 (±0.1)	1.7 (±0.004)	65 (±0.1)	2.6 (±0.004)
(7)	M4 ↧ 5	0.1574 ↧ 0.2	M3 ↧ 5	0.1181 ↧ 0.2	M4 ↧ 5	0.1574 ↧ 0.2	M5 ↧ 6	0.1968 ↧ 0.2
(8)	14	0.6	12.5	0.49	25	1.0	21	0.8
(9)	Ø3.2	Ø0.13	–	–	–	–	–	–
(10)	Ø4.2	Ø0.17	Ø4.2	Ø0.17	Ø4.2	Ø0.17	Ø4.2	Ø0.17
(11)	22	0.9	22	0.9	22	0.9	22	0.9
(12)	–	–	Ø3.2	Ø0.13	–	–	–	–
(13)	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4
(14)	9	0.4	9	0.4	9	0.4	9	0.4
(15)	–	–	–	–	Ø4.6	Ø0.18	Ø4.6	Ø0.18
(16)	Ø17	Ø0.7	Ø17	Ø0.7	Ø17	Ø0.7	Ø17	Ø0.7
(17)	19	0.7	19	0.7	19	0.7	19	0.7
(18)	46	1.8	46	1.8	46	1.8	46	1.8

LBMU HIGH ACCURACY COMPRESSION LOAD BUTTON (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 100 - 1K lbf (0.45 - 4.45 kN)
- Temperature compensated
- Superior to any other load button
- Stainless steel
- Enhanced eccentric load rejection
- Low power

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.15
Hysteresis – %FS		±0.15
Nonrepeatability – %RO		±0.05
TEMPERATURE		
Compensated Range	°F	+70 to +170
	°C	+20 to +75
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Zero – %RO / deg	°F	±0.0005
Effect on Output – % / deg	°F	±0.0002
Zero Balance – %FS		±2.0
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Bridge Resistance – Ω (Nominal)		700
Excitational Voltage – VDC		5
MECHANICAL		
Safe Overload – %CAP		150
Calibration		Compression
Ultimate Overload – %CAP		300
Deflection	in	0.001 - 0.003
	mm	0.025 - 0.076
Cable Type		4-Conductor
Material		Stainless steel

OPTIONS

- Cable length
- Standardized output
- Custom calibration
- Add connector to cable
- Special temperature range
- Transducer Electronic Data Sheet (TEDS)

CONNECTOR OPTIONS

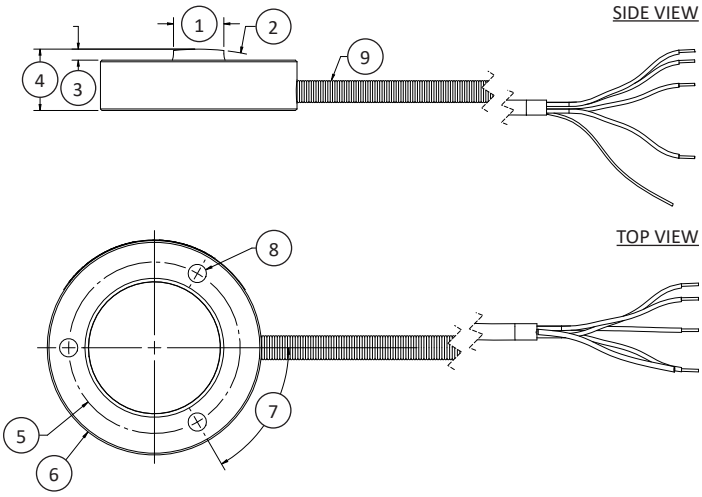
- 5 ft (1.5 m) integral cable

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

STANDARD CONFIGURATION



Model LBMU (Shown)



DIMENSIONS

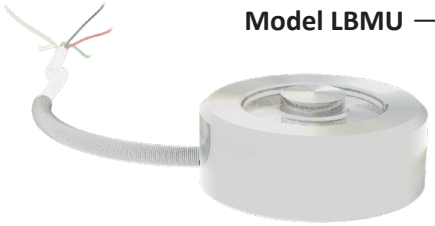
See Drawing	CAPACITY	
	U.S. (lbf)	Metric (kN)
	100, 250, 500, 1K	0.45, 1.10, 2.20, 4.45
	in	mm
(1)	Ø0.32	Ø8.1
(2)	1.50	38.1
(3)	0.07	1.8
(4)	0.39	9.9
(5)	1.00	25.4
(6)	1.25	31.8
(7)	60° ± 3°	
(8)	3 x (6-32) UNC-2B ↧ 0.25 EQ SP	3 x (M3.5x0.6) ↧ 6.4 EQ SP
(9)	Ø0.15 Spring O.D.	Ø3.81 Spring O.D.

ACCESSORIES

- Instrumentation

LBMU HIGH ACCURACY COMPRESSION LOAD BUTTON (U.S. & METRIC)

SAMPLE SYSTEM OVERVIEW



Model LBMU



SGA
CSC
DMA
CSD
OEM Low Cost



9860
9820
9840



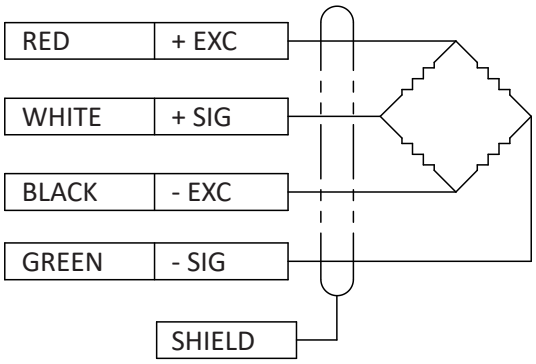
9320
9330

PC

Interface Graphing & Logging Software
65V-MULTI
9860
INF-USB

User Supplies
Data Acquisition
Chart Recorder
PLC

WIRING DIAGRAM



ORDERING INFORMATION

LBMU - xxx - xxx

Factory assigned option codes for custom / special configurations

Capacity Rating (lbf / kN)
[100, 250, 500, 1K] / [0.44, 1.11, 2.22, 4.45]

Model

LW LOAD WASHER (U.S. & METRIC)

FEATURES & BENEFITS

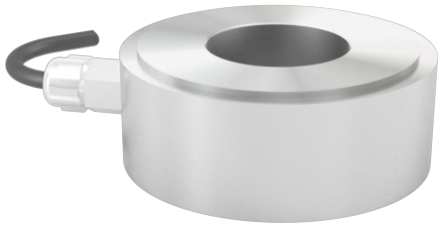
- Capacities from 5 to 100k lbf (0.02 to 44.5 kN)
- Wide selection of OD, ID, and height (as low as 0.25 in or 6.4 mm) combinations
- Stainless steel construction

SPECIFICATIONS

PARAMETERS		MODEL	
		LW10xx LW12xx	LW15xx LW20xx LW25xx LW30xx LW31xx LW40xx LW45xx
ACCURACY – (MAX ERROR)			
Combined Error – %FS		±1.0	±0.5
TEMPERATURE			
Compensated Range	°F	+60 to +160	
	°C	+16 to +71	
Operating Range	°F	-65 to +250	
	°C	-54 to +121	
Effect On Zero – %RO / deg	°F	±0.005	
	°C	±0.009	
ELECTRICAL			
Rated Output – mV/V (Nominal)		2.00	
Bridge Resistance – Ohm (Nominal)		350	
Excitation Voltage – VDC MAX		15	
MECHANICAL			
Safe Overload – % of RO		150	
Deflection @ R.O.	in	0.003	
	mm	0.08	
Material		Stainless steel	

***Height is 0.37" for 5 lb thru 100 lb. Height is 0.63" for 250 lb thru 10k lb.**
****Height is 1.00" for 1k thru 50k lb. Height is 2.00" for 100k lb.**

STANDARD CONFIGURATION



Model LW (Shown)

OPTIONS

- Cable length
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration accessories

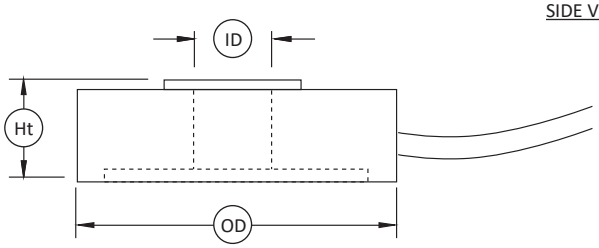
ACCESSORIES

- Instrumentation

CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable (LW)

SIDE VIEW



DIMENSIONS

MODEL LW	OD		ID		HEIGHT		CAPACITY	
	in	mm	in	mm	in	mm	U.S. (lbf)	Metric (kN)
1010	1.00	25.4	0.100	2.54	0.28	7.1	5, 10, 25, 50, 100, 200	0.02, 0.04, 0.11, 0.22, 0.44, 0.89
1012	1.00	25.4	0.125	3.18	0.28	7.1	5, 10, 25, 50, 100, 200	0.02, 0.04, 0.11, 0.22, 0.44, 0.89
1019	1.00	25.4	0.188	4.78	0.28	7.1	5, 10, 25, 50, 100, 200	0.02, 0.04, 0.11, 0.22, 0.44, 0.89
1020	1.00	25.4	0.200	5.08	0.28	7.1	5, 10, 25, 50, 100, 200	0.02, 0.04, 0.11, 0.22, 0.44, 0.89
1025	1.00	25.4	0.250	6.35	0.28	7.1	5, 10, 25, 50, 100, 200	0.02, 0.04, 0.11, 0.22, 0.44, 0.89
1210	1.25	31.75	0.100	2.54	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1212	1.25	31.75	0.125	3.18	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1219	1.25	31.75	0.188	4.78	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1220	1.25	31.75	0.200	5.08	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1225	1.25	31.75	0.250	6.35	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1231	1.25	31.75	0.312	7.92	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1238	1.25	31.75	0.375	9.53	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

LW LOAD WASHER (U.S. & METRIC)

DIMENSIONS (CONTINUED)

MODEL LW	OD		ID		HEIGHT		CAPACITY	
	in	mm	in	mm	in	mm	U.S. (lbf)	Metric (kN)
1510	1.50	38.1	0.100	2.54	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1513	1.50	38.1	0.125	3.18	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1520	1.50	38.1	0.200	5.08	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1525	1.50	38.1	0.250	6.35	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1531	1.50	38.1	0.312	7.92	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1538	1.50	38.1	0.375	9.53	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1550	1.50	38.1	0.500	12.70	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
2013	2.00	50.8	0.125	3.18	*		5, 10, 25, 50, 250, 500, 1K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45
2019	2.00	50.8	0.188	4.78	*		5, 10, 25, 50, 250, 500, 1K, 2K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45, 8.90
2025	2.00	50.8	0.250	6.35	*		5, 10, 25, 50, 250, 500, 1K, 2K, 3K, 5K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
2038	2.00	50.8	0.375	9.53	*		5, 10, 25, 50, 250, 500, 1K, 2K, 3K, 5K, 7.5K, 10K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2, 33.4, 44.5
2050	2.00	50.8	0.500	12.70	*		5, 10, 25, 50, 250, 500, 1K, 2K, 3K, 5K, 7.5K, 10K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45, 8.90, 13.34, 22.2, 33.4, 44.5
2063	2.00	50.8	0.625	15.88	*		5, 10, 25, 50, 250, 500, 1K, 2K, 3K, 5K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
2075	2.00	50.8	0.750	19.05	*		250, 500, 1K, 2K, 3K, 5K	1.11, 2.22, 4.45, 8.90, 22.2
2088	2.00	50.8	0.875	22.23	*		250, 500, 1K, 2K, 3K	1.11, 2.22, 4.45, 8.90, 13.3
20100	2.00	50.8	1.000	25.40	*		500, 1K, 2K	2.22, 4.45, 8.90
2525	2.50	63.5	0.250	6.35	1.00	25.4	1K, 2K, 3K	4.45, 8.90, 13.3
2538	2.50	63.5	0.375	9.53	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
2550	2.50	63.5	0.500	12.70	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
2563	2.50	63.5	0.625	15.88	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
2575	2.50	63.5	0.750	19.05	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
2588	2.50	63.5	0.875	22.23	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
2594	2.50	63.5	0.938	23.83	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178
25100	2.50	63.5	1.000	25.40	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
25113	2.50	63.5	1.130	28.70	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
25125	2.50	63.5	1.250	31.75	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
25138	2.50	63.5	1.380	35.05	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
25150	2.50	63.5	1.500	38.10	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
3025	3.00	76.2	0.250	6.35	1.00	25.4	1K, 2K, 3K	4.45, 8.90, 13.3
3038	3.00	76.2	0.375	9.53	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
3050	3.00	76.2	0.500	12.70	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
3063	3.00	76.2	0.625	15.88	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
3075	3.00	76.2	0.750	19.05	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
3088	3.00	76.2	0.875	22.23	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
3094	3.00	76.2	0.938	23.83	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

LW LOAD WASHER (U.S. & METRIC)

DIMENSIONS (CONTINUED)

MODEL LW	OD		ID		HEIGHT		CAPACITY	
	in	mm	in	mm	in	mm	U.S. (lbf)	Metric (kN)
30100	3.00	76.2	1.000	25.40	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
30113	3.00	76.2	1.130	28.70	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
30125	3.00	76.2	1.250	31.75	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
30138	3.00	76.2	1.380	35.05	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
30150	3.00	76.2	1.500	38.10	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
31200	3.13	79.5	2.000	50.80	0.50	12.7	1K, 3K, 5K	4.45, 13.3, 22.2
31213	3.13	79.5	2.130	54.10	0.50	12.7	1K, 3K, 5K	4.45, 13.3, 22.2
40200	4.00	101.6	2.00	50.8	**		1K, 3K, 5K, 10K, 25K, 50K, 100K	4.45, 13.3, 22.2, 44.5, 111, 222, 445
40213	4.00	101.6	2.130	54.10	**		1K, 3K, 5K, 10K, 25K, 50K, 100K	4.45, 13.3, 22.2, 44.5, 111, 222, 445
45300	4.50	114.3	3.000	76.20	1.25	31.8	1K, 3K, 5K, 10K	4.45, 13.3, 22.2, 44.5
45313	4.50	114.3	3.130	79.50	1.25	31.8	1K, 3K, 5K, 10K	4.45, 13.3, 22.2, 44.5

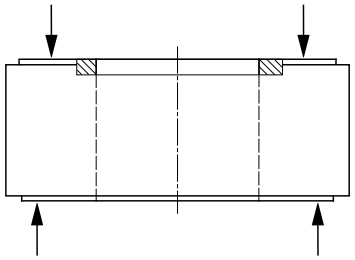
U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

LWCF CLAMPING FORCE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 15 to 1500 kN (3.37K to 337K lbf)
- Ideal for determining bolt preload
- Low height and robust design

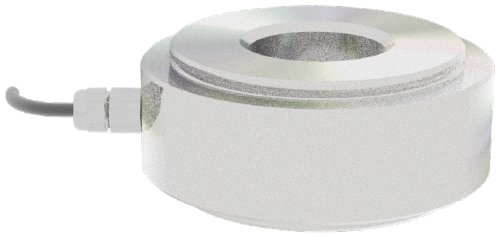
LOADING DIAGRAM



SPECIFICATIONS

ACCURACY - (MAX ERROR)		
Nonlinearity – %FS		±1
Nonrepeatability – %RO		±0.3
Creep, in 30 min – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.03
Effect on Output – % / deg	°C	±0.03
Compensated Range	°C	0 to +60
	°F	+32 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V ± %		1 ± 20
Excitation Voltage – VDC		2 - 6
Bridge Resistance – Ohm		250
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.1
	in	< 0.004
IP Rating		IP65
Material		Stainless steel

STANDARD CONFIGURATION



Model LWCF (Shown)

OPTIONS

- Special temperature range
- Internal shunt resistor – 100% output
- Standardized output
- Cable length
- Custom calibration
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

CONNECTOR OPTIONS

- 3 m (9.8 ft) integral cable

ACCESSORIES

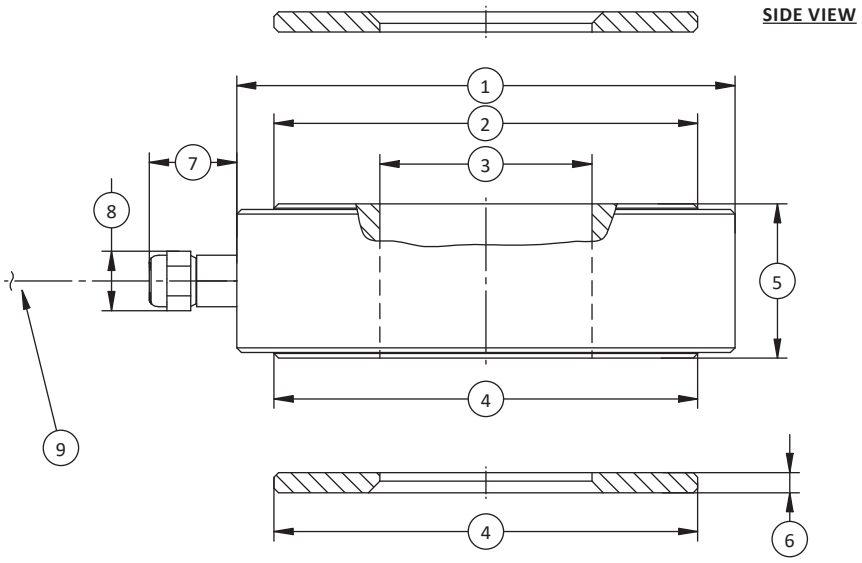
- Instrumentation

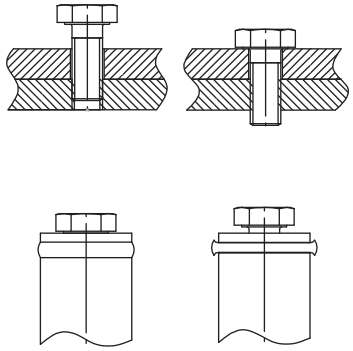
ELECTRICAL

Excitation (-)	Green
Excitation (+)	Brown
Signal (+)	Yellow
Signal (-)	White
Control signal (option)	Gray

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

LWCF CLAMPING FORCE LOAD CELL (U.S. & METRIC)





DIMENSIONS

See Drawing	CAPACITY													
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	15	3.37K	30	6.74K	60	13.5K	80	18K	120	27K	160	36K	350	78.7K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Screw	M6		M8		M10		M12		M16		M20		M24	
(1)	Ø24	Ø0.9	Ø27	Ø1.1	Ø33	Ø1.3	Ø37	Ø1.5	Ø44	Ø1.7	Ø50	Ø2.0	Ø65	Ø2.6
(2)	Ø12	Ø0.5	Ø16	Ø0.6	Ø22	Ø0.9	Ø26	Ø1.0	Ø33	Ø1.3	Ø39	Ø1.5	Ø54	Ø2.1
(3)	Ø6.3	Ø0.25	Ø8.3	Ø0.3	Ø10.3	Ø0.41	Ø12.3	Ø0.48	Ø16.3	Ø0.64	Ø20.3	Ø0.80	Ø24.5	Ø0.96
(4)	Ø12	Ø0.5	Ø16	Ø0.6	Ø22	Ø0.9	Ø26	Ø1.0	Ø33	Ø1.3	Ø39	Ø1.5	Ø54	Ø2.1
(5)	12	0.5	12	0.5	12	0.5	15	0.6	15	0.6	15	0.6	22	0.9
(6)	2	0.08	2	0.08	2	0.08	2.5	0.1	2.5	0.1	3	0.1	3	0.1
(7)	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6
(8)	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4
(9)	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13

See Drawing	CAPACITY											
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	500	112K	600	135K	720	162K	1K	225K	1.2K	270K	1.5K	337K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Screw	M30		M36		M39		M42		M48		M52	
(1)	Ø79	Ø3.1	Ø87	Ø3.4	Ø93	Ø3.7	Ø106	Ø4.2	Ø116	Ø4.6	Ø127	Ø5.0
(2)	Ø66	Ø2.6	Ø74	Ø2.9	Ø80	Ø3.1	Ø93	Ø3.7	Ø103	Ø4.1	Ø114	Ø4.5
(3)	Ø30.8	Ø1.2	Ø37	Ø1.5	Ø40	Ø1.6	Ø43	Ø1.7	Ø49	Ø1.9	Ø53.5	Ø2.1
(4)	Ø66	Ø2.6	Ø74	Ø2.9	Ø80	Ø3.1	Ø93	Ø3.7	Ø103	Ø4.1	Ø114	Ø4.5
(5)	27	1.1	27	1.1	27	1.1	30	1.2	30	1.2	35	1.4
(6)	3	0.1	3.5	0.1	4	0.2	4	0.2	4.5	0.2	4.5	0.2
(7)	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6
(8)	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4
(9)	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13

LWHP14 LOAD WASHER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.05 to 100 kN (11.2 to 22.5K lbf)
- Ideal for applications requiring a thru-hole

OPTIONS

- Cable length
- Standardized output
- Add connector to cable
- Custom calibration
- Special temperature range
- 100% control signal (internal shunt calibration)
- Transducer Electronic Data Sheet (TEDS)

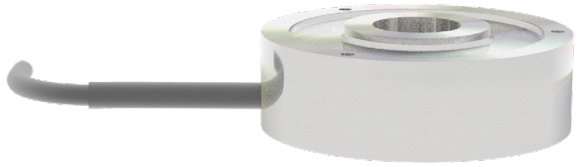
CONNECTOR OPTIONS

- 3 m (10 ft) integral cable

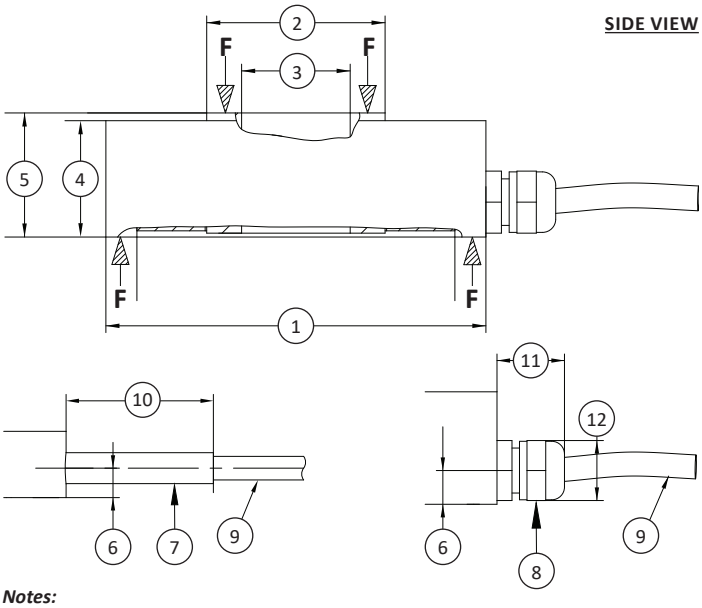
ACCESSORIES

- Instrumentation

STANDARD CONFIGURATION



Model LWHP14 (Shown)



Notes:
**** F indicates load direction***

DIMENSIONS

See Drawing	CAPACITY							
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	0.05, 0.1, 0.2, 0.5	11.2, 22.5, 45, 112	1, 2, 5, 10	225, 450, 1.12K, 2.25K	20, 50	4.5 K, 11.2K	100	22.5K
	mm	in	mm	in	mm	in	mm	in
1	Ø30	Ø1.2	Ø38	Ø1.5	Ø49	Ø1.9	Ø78	Ø3.1
2	Ø9.0	Ø0.35	Ø13.5	Ø0.53	Ø23	Ø0.9	Ø42	Ø1.7
3	Ø5.2	Ø0.20	Ø7	Ø0.3	Ø14	Ø0.6	Ø27	Ø1.1
4	8	0.3	9	0.4	15	0.6	24	0.9
5	9.5	0.37	10	0.4	16	0.6	25	1.0
6	4.5	0.18	4.0	0.16	4.5	0.18	7.5	0.30
7	X	X	X	X				
8					X	X	X	X
9	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13
10	22	0.9	22	0.9	22	0.9	22	0.9
11	9	0.4	9	0.4	9	0.4	9	0.4
12	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

LWHP14 LOAD WASHER (U.S. & METRIC)

SPECIFICATIONS

CAPACITY		Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
		0.05, 0.1, 0.2, 0.5	11.2, 22.5, 45, 112	1, 2, 5, 10	225, 450, 1.12K, 2.25K	20, 50	4.5K, 11.2K	100	22.5K
ACCURACY – (MAX ERROR)									
Nonlinearity – %FS		±0.5							
Hysteresis – %FS		±0.5							
Nonrepeatability – %RO		±0.2							
Creep, in 30 min – %		±0.1							
TEMPERATURE									
Effect on Zero – %RO / deg	°C	±0.02							
Effect on Output – % / deg	°C	±0.02							
Compensated Range	°C	0 to +60							
	°F	+32 to +140							
Operating Range	°C	-10 to +70							
	°F	+14 to +158							
ELECTRICAL									
Output – mV/V ± %		1 ± 20							
Excitation Voltage – VDC		2 - 12							
Bridge Resistance – Ohm		350							
MECHANICAL									
Safe Overload – %RO		150							
Deflection at Rated Capacity	mm	< 0.15							
	in	< 0.006							
IP Rating		IP60							
Weight	kg	0.2		0.2		0.3		0.8	
	lbs	0.44		0.44		0.66		1.76	
Material		Stainless steel							

LWMH1 THRU-HOLE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.2 to 10 kN (45 to 2.25K lbf)
- Ideal for press force control and measurement
- Mounting holes for installation

SPECIFICATIONS

ACCURACY → (MAX ERROR)		
Nonlinearity – %FS		±1
Hysteresis – %FS		±1
Nonrepeatability – %RO		±0.3
Creep, in 30 mon – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.02
Compensated Range	°C	0 to +60
	°F	+32 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V ± %		1 ± 20
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		350
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.15
	in	< 0.006
IP Rating		IP60
Material		Aluminum

OPTIONS

- Cable length
- Custom calibration
- Standardized output
- Add connector to cable
- Special temperature range
- Internal shunt resistor – 100% output
- Tranducer Electronic Data Sheet (TEDS)

CONNECTOR OPTIONS

- 3 m (9.8 ft) integral cable

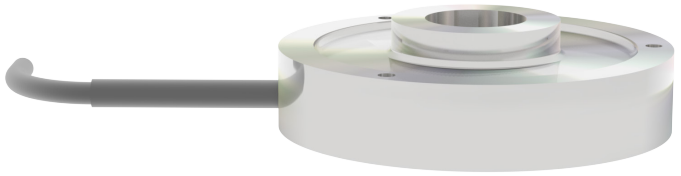
ACCESSORIES

- Instrumentation

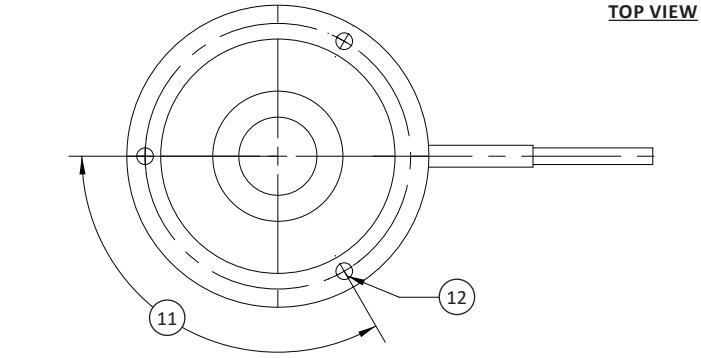
** F indicates load Direction*

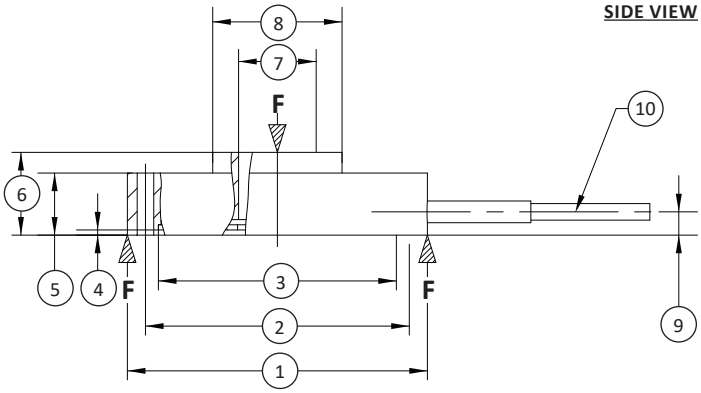
U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

STANDARD CONFIGURATION



Model LWMH1 (Shown)





DIMENSIONS

See Drawing	CAPACITY	
	Metric (kN)	U.S. (lbf)
	0.2, 0.5, 1, 2, 5, 10	45, 112, 225, 450, 2.25K
	mm	in
(1)	Ø58 2.3	Ø2.3
(2)	Ø51 2.0	Ø2.0
(3)	Ø46 1.8	Ø1.8
(4)	1	Ø0.04
(5)	12	0.5
(6)	16	0.6
(7)	Ø15	Ø0.6
(8)	Ø25	Ø1.0
(9)	4.5	0.2
(10)	Ø3.2	Ø0.1
(11)	3 X 120°	
(12)	3 x Ø3.2	3 x Ø0.13

LWMH2 THRU-HOLE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 500 N to 20 kN (112.4 to 4.5K lbf)
- Ideal for press force control and measurement
- Mounting holes for installation

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±1
Hysteresis – %FS		±1
Nonrepeatability – %RO		±0.3
Creep, in 30 min – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.02
Compensated Range	°C	0 to +60
	°F	+32 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V ± %		1 ± 20
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		350
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.15
	in	< 0.006
IP Rating		IP60
Material		Aluminum

OPTIONS

- Cable length
- Add connector to cable
- Custom calibration
- Standardized output
- Special temperature range
- Internal shunt resistor – 100% output
- Transducer Electronic Data Sheet (TEDS)

CONNECTOR OPTIONS

- 3 m (9.8 ft) integral cable

ACCESSORIES

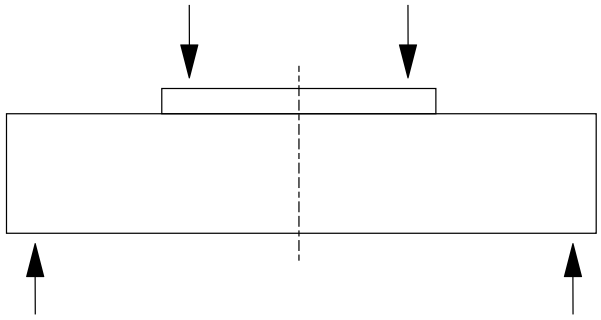
- Instrumentation

STANDARD CONFIGURATION



Model LWMH2 (Shown)

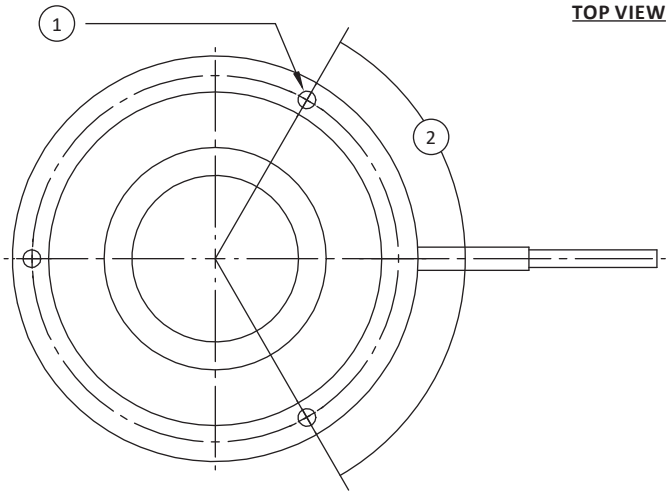
LOADING DIAGRAM



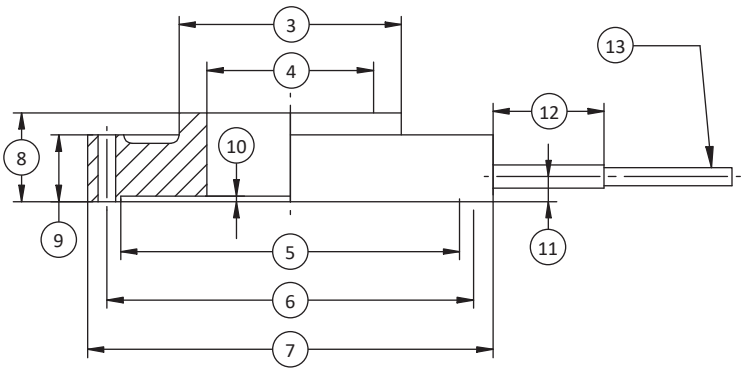
U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

LWMH2 THRU-HOLE LOAD CELL (U.S. & METRIC)

TOP VIEW



SIDE VIEW



DIMENSIONS

See Drawing	Metric	U.S.
	500, 1K, 2K, 5K, 10K, 20K	112.4, 225, 450, 1.12K, 2.25K, 4.5K
	mm	in
(1)	3 x Ø3.2	
(2)	3 x 120°	
(3)	Ø40	Ø1.6
(4)	Ø30	Ø1.2
(5)	Ø61 (+0.3)	Ø2.4 (+0.01)
(6)	Ø66 (±0.1)	Ø2.6 (±0.004)
(7)	Ø73 (-0.2)	Ø2.9 (-0.008)
(8)	16	0.6
(9)	12	0.5
(10)	1	0.04
(11)	4.5	0.18
(12)	22	0.9
(13)	Ø3.2	Ø0.13

LWPF1 PRESS FORCE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 2 to 100 kN (450K to 22.5K lbf)
- Short height
- Large thru-hole
- For press-force monitoring

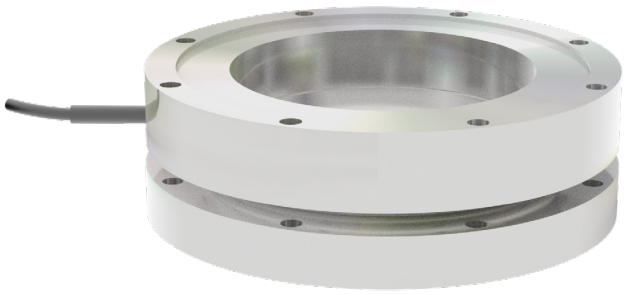
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.5
Hysteresis – %FS		±0.5
Nonrepeatability – %RO		±0.1
Creep, in 30 min – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.02
Compensated Range	°C	0 to +60
	°F	+32 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V		1 ±20%
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		700
Electrical Connection – Cable	m	3
	ft	10
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.15
	in	< 0.006
IP Rating		IP60
Material		Stainless steel / Aluminum

OPTIONS

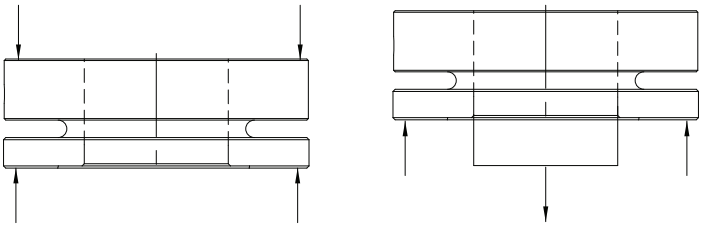
- Extended temperature range (-40 to +150°C or -40 to +302°F)
- Internal shunt resistor – 100% output

STANDARD CONFIGURATION



Model LWPF1 (Shown)

LOADING DIAGRAM

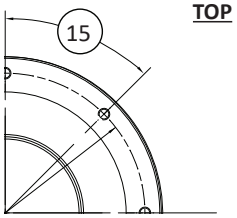


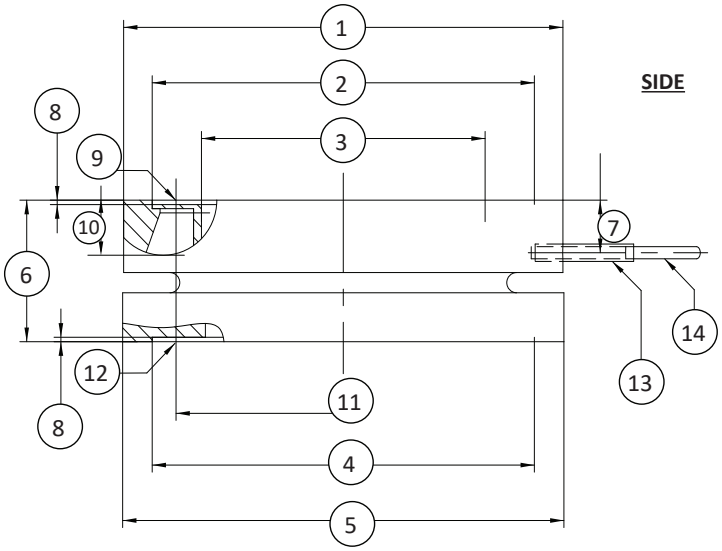
Compression Tension

Note: Loading on this transducer must take place through connections with the mounting holes

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

LWPF1 PRESS FORCE LOAD CELL (U.S. & METRIC)





DIMENSIONS

See Drawing	CAPACITY			
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	2, 5, 10, 20	450, 1.12K, 2.25K, 4.5K	50, 100	11.2K, 22.5K
	mm	in	mm	in
(1)	69.7	2.74	111.5	4.39
(2)	54	2.1	97	3.8
(3)	33	1.3	70	2.8
(4)	54	2.1	97	3.8
(5)	70g6	(2.7555/2.7548)	112g6	(4.4090/4.4081)
(6)	25	1.0	35	1.4
(7)	9	0.4	13	0.5
(8)	0.5	0.02	1.1	0.04
(9)	M5, 8 x 45°		M6, 8 x 45°	
(10)	5	0.2	6	0.2
(11)	62	2.4	104	4.1
(12)	M5, 8 X 45°		M6, 8 x 45°	
(13)	$18^{\pm 3}$	$0.7^{\pm 0.1}$	$18^{\pm 3}$	$0.7^{\pm 0.1}$
(14)	Ø3.2	Ø0.13	Ø3.2	Ø0.13
(15)	45°		45°	

LWPF2 PRESS FORCE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 100 kN to 600 kN
- Short height
- Large thru-hole
- For press-force monitoring

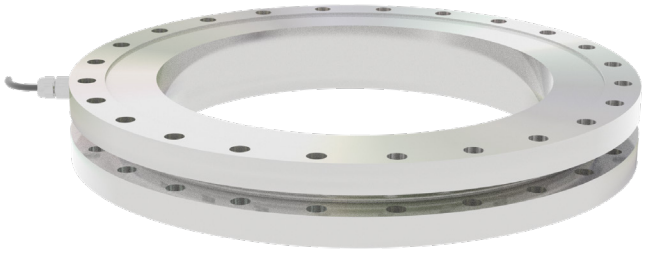
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.5
Hysteresis – %FS		±0.5
Nonrepeatability – %RO		±0.1
Creep, in 30 min – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.02
Compensated Range	°C	0 to +60
	°F	0 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V		1 ±20%
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		700
Electrical Connection – Cable	m	3
	ft	10
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.15
	in	< 0.006
IP Rating		IP60
Material		Stainless steel / Aluminum

OPTIONS

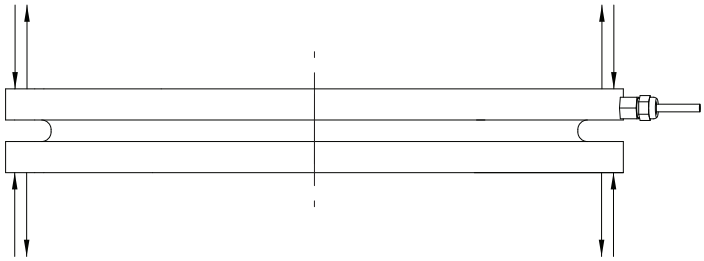
- Extended temperature range (-40 to +150°C or -40 to +302°F)
- Internal Shunt Resistor – 100% output

STANDARD CONFIGURATION

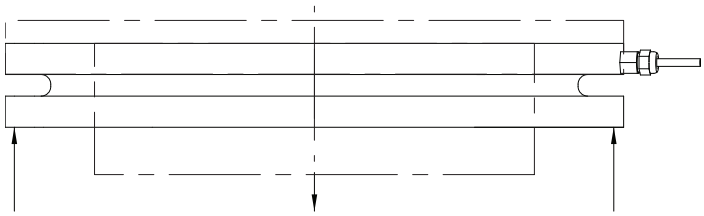


Model LWPF2 (shown)

LOADING DIAGRAM



Compression

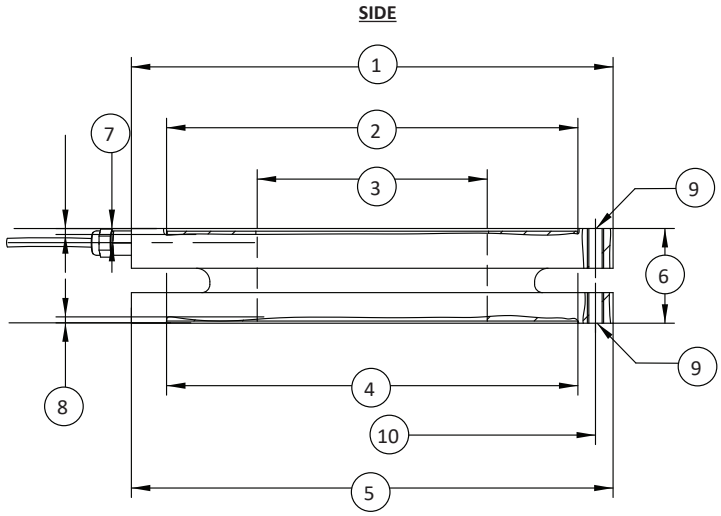


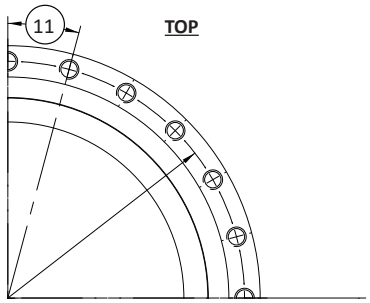
Tension

Note: Loading on this transducer must take place through connections with the mounting holes

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

LWPF2 PRESS FORCE LOAD CELL (U.S. & METRIC)





DIMENSIONS

See Drawing	CAPACITY									
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	100	22.5K	200	45K	300	67.4K	400	90K	600	135K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø178	Ø7.0	Ø196	Ø7.7	Ø258	Ø10.2	Ø258	Ø10.2	Ø320	Ø12.6
(2)	Ø152	Ø6.2	Ø170	Ø6.7	Ø226	Ø8.9	Ø226	Ø8.9	Ø266	Ø10.5
(3)	Ø85	Ø3.3	Ø120	Ø4.7	Ø180	Ø7.1	Ø170	Ø6.7	Ø205	Ø8.1
(4)	Ø152	Ø6.0	Ø170	Ø6.7	Ø226	Ø8.9	Ø226	Ø8.9	Ø266	Ø10.5
(5)	Ø178	Ø7.0	Ø196	Ø7.7	Ø258	Ø10.2	Ø258	Ø10.2	Ø320	Ø12.6
(6)	35	1.4	35	1.4	35	1.4	45	1.8	60	2.4
(7)	5.4	0.21	7	0.3	8	0.3	8	0.3	12.5	0.5
(8)	1	0.04	1	0.04	1	0.04	1	0.04	1	0.04
(9)	M6x24		M8x24		M10x24		M12x24		M16x24	
(10)	Ø165	Ø6.5	Ø182	Ø7.2	Ø242	Ø9.5	Ø242	Ø9.5	Ø290	Ø11.4

MB MINIATURE BEAM LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 5 to 250 lbf (22.2 to 1.11 kN)
- Proprietary Interface temperature compensated strain gages
- Performance to 0.03%
- Low height – 0.99 in (25.1 mm)
- 0.0008%/°F temp. effect on output

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.03
Hysteresis – %FS		±0.02
Nonrepeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	0 to 150
	°C	-17 to 65
Operating Range	°F	-65 to 200
	°C	-53 to 93
Effect on Output – % / deg	°F	±0.0008
Effect on Zero – %RO / deg	°F	±0.0015
ELECTRICAL		
Rated Output – mV/V (Nominal)		3.0
Zero Balance – %RO		±1.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP		±150
Material		Aluminum
Cable Length	ft	5
	m	1.5

NATURAL FREQUENCY/DEFLECTION

lbf	N	Deflection (in)	Deflection (mm)	Nat. Freq. (Hz)
5	22.2	0.005	0.127	950
10	44.5	0.005	0.127	1300
25	111	0.005	0.127	2250
50	222	0.004	0.102	3300
75	334	0.004	0.102	3900
100	445	0.005	0.127	4000
150	667	0.005	0.127	4750
250	1.11K	0.005	0.127	4400

STANDARD CONFIGURATION



Model MB-50 (Shown)

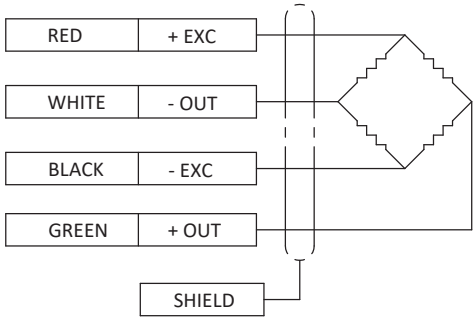
OPTIONS

- Cable length
- Standardized output
- Custom calibration
- Add connector to cable
- Special temperature range
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

- Instrumentation

WIRING DIAGRAM

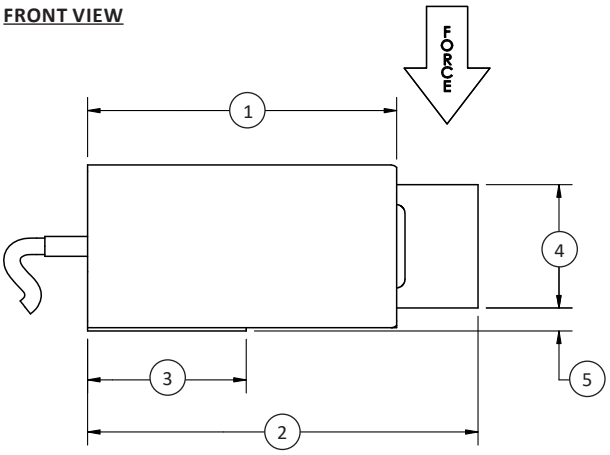


COMPRESSION UPSCALE

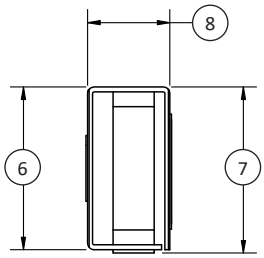
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

MB MINIATURE BEAM LOAD CELL (U.S. & METRIC)

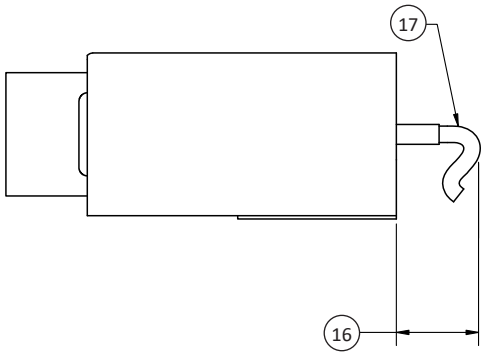
FRONT VIEW



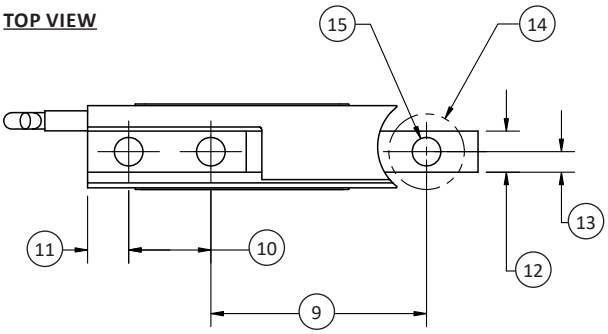
SIDE VIEW



BACK VIEW



TOP VIEW



DIMENSIONS

See Drawing	CAPACITY													
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	5, 10	22.2, 44.5	25	111	50	222	75	334	100	445	150	667	250	1.11K
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	1.88	47.8	1.88	47.8	1.88	47.8	1.88	47.8	1.88	47.8	1.88	47.8	1.88	47.8
(2)	2.38	60.3	2.38	60.3	2.38	60.3	2.38	60.3	2.38	60.3	2.38	60.3	2.38	60.3
(3)	0.97	24.5	0.97	24.5	0.97	24.5	0.97	24.5	0.97	24.5	0.97	24.5	0.97	24.5
(4)	0.75	19.1	0.81	20.6	0.72	18.3	0.75	19.1	0.78	19.8	0.82	20.8	0.79	20.1
(5)	0.14	3.6	0.11	2.8	0.15	3.8	0.14	3.6	0.13	3.3	0.10	2.5	0.12	3.0
(6)	0.99	25.1	0.99	25.1	0.99	25.1	0.99	25.1	0.99	25.1	0.99	25.1	0.99	25.1
(7)	1.01	25.7	1.01	25.7	1.01	25.7	1.01	25.7	1.01	25.7	1.01	25.7	1.01	25.7
(8)	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.75	19.1
(9)	1.31	33.3	1.31	33.3	1.31	33.3	1.31	33.3	1.31	33.3	1.31	33.3	1.31	33.3
(10)	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7
(11)	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4
(12)	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.50	12.7
(13)	0.13	3.2	0.13	3.2	0.13	3.2	0.13	3.2	0.13	3.2	0.13	3.2	0.25	6.4
(14)	R0.23 Radial Clearance Around Load Hole (R5.8 Radial Clearance Around Load Hole)													
(15)	3x Ø0.17	3x Ø4.4	3x Ø0.17	3x Ø4.4	3x Ø0.17	3x Ø4.4	3x Ø0.17	3x Ø4.4	3x Ø0.17	3x Ø4.4	3x Ø0.17	3x Ø4.4	3x Ø0.17	3x Ø4.4
(16)	0.50 Integral Cable Bend Clearance (12.7 Integral Cable Bend Clearance)													
(17)	Shielded Cable 0.13 O.D. 4 Conductor 28 Gage 5 FT Length (Shielded Cable 3.3 O.D. 4 Conductor 28 Gage 1.5M Length)													

MBP MINIATURE BEAM OVERLOAD PROTECTED LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 2.5 to 10 lbf (5 to 100 N & 0.5 to 5 kg)
- Proprietary Interface temperature compensated strain gages
- 10X overload protection
- Low height – 0.99 in (25.1 mm)
- 0.0008% °F temperature effect on output

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.03
Hysteresis – %FS		±0.02
Nonrepeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	0 to 150
	°C	-17 to 65
Operating Range	°F	-65 to 200
	°C	-53 to 93
Effect on Output – % / deg	°F	±0.0008
Effect on Zero – %RO / deg	°F	±0.0015
ELECTRICAL		
Rated Output – mV/V (Nominal)		3.0
Zero Balance – %RO		±1.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP	2.5 - 10 lbf	±1000
	10 - 50 N	
	0.5 - 5 kg	
	100 N	±500
Deflection @RO	in	0.005
	mm	0.13
Material		Aluminum
Cable Length	ft	5
	m	1.5

STANDARD CONFIGURATION



Model MBP-5 (Shown)

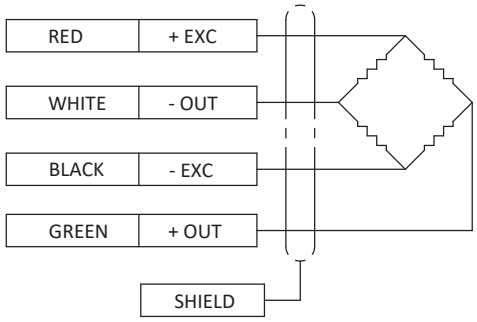
OPTIONS

- Cable length
- Standardized output
- Custom calibration
- Add connector to cable
- Special temperature range
- Transducer Electronic Datasheets (TEDS)

ACCESSORIES

- Instrumentation

WIRING DIAGRAM

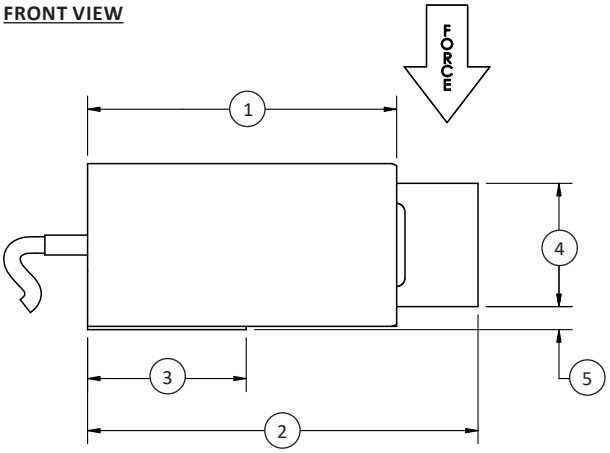


COMPRESSION UPSCALE

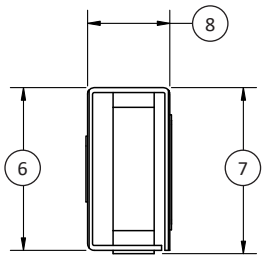
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

MBP MINIATURE BEAM OVERLOAD PROTECTED LOAD CELL (U.S. & METRIC)

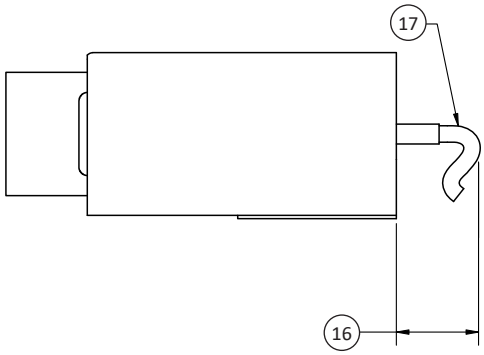
FRONT VIEW



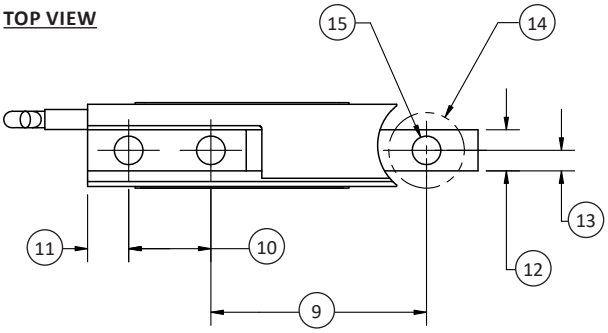
SIDE VIEW



BACK VIEW



TOP VIEW



DIMENSIONS

See Drawing	CAPACITY		
	U.S. (lbf)	Metric (N)	Metric (kg)
	2.5, 5, 10	5, 10, 20, 50, 100	0.5, 1, 2, 4, 5
	in	mm	mm
(1)	1.88	47.8	47.8
(2)	2.38	60.3	60.3
(3)	0.97	24.5	24.5
(4)	0.75	19.1	19.1
(5)	0.14	3.6	3.6
(6)	0.99	25.1	25.1
(7)	1.01	25.7	25.7
(8)	0.50	12.7	12.7
(9)	1.31	33.3	33.3
(10)	0.50	12.7	12.7
(11)	0.25	6.4	6.4
(12)	0.25	6.4	6.4
(13)	0.13	3.2	3.2
(14)	R0.23 Radial Clearance Around Load Hole	R5.8 Radial Clearance Around Load Hole	R5.8 Radial Clearance Around Load Hole
(15)	3x Ø0.17	3x Ø4.4	3x Ø4.4
(16)	0.50 Integral Cable Bend Clearance	12.7 Integral Cable Bend Clearance	12.7 Integral Cable Bend Clearance
(17)	Shielded Cable 0.13 O.D. 4 Conductor 28 Gage 5 FT Length	Shielded Cable 3.3 O.D. 4 Conductor 28 Gage 1.5M Length	Shielded Cable 3.3 O.D. 4 Conductor 28 Gage 1.5M Length

MBI FATIGUE RATED MINI BEAM OVERLOAD PROTECTED LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 2 to 10 lbf (10 to 50 N)
- Proprietary Interface temperature compensated strain gages
- Performance to 0.03%
- Low Height – 1 in (25.4 mm)
- 0.0008%/°F temp. effect on output
- 10x overload protection

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.03
Hysteresis – %FS		±0.03
Nonrepeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	+70 to +170
	°C	+21 to +77
Operating Range	°F	-40 to +175
	°C	-40 to +80
Effect on Output – % / deg	°F	±0.0008
Effect on Zero – %RO / deg	°F	±0.002
ELECTRICAL		
Rated Output – mV/V (Nominal)		2
Zero Balance – %RO		±5.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP		1000
Eccentric Load Sensitivity	% / in	±0.02
	% / mm	±0.5
Weight (without the cable)	lbs	0.14
	kg	0.04
Material		Aluminum

OPTIONS

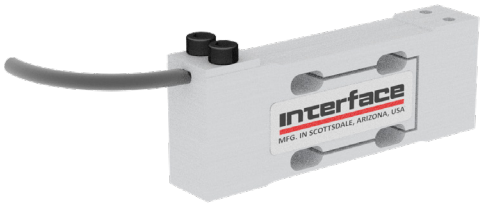
- Cable length
- Standardized output
- Custom calibration
- Add connector to cable
- Special temperature range
- Transducer Electronic Data Sheet (TEDS)

CONNECTOR OPTIONS

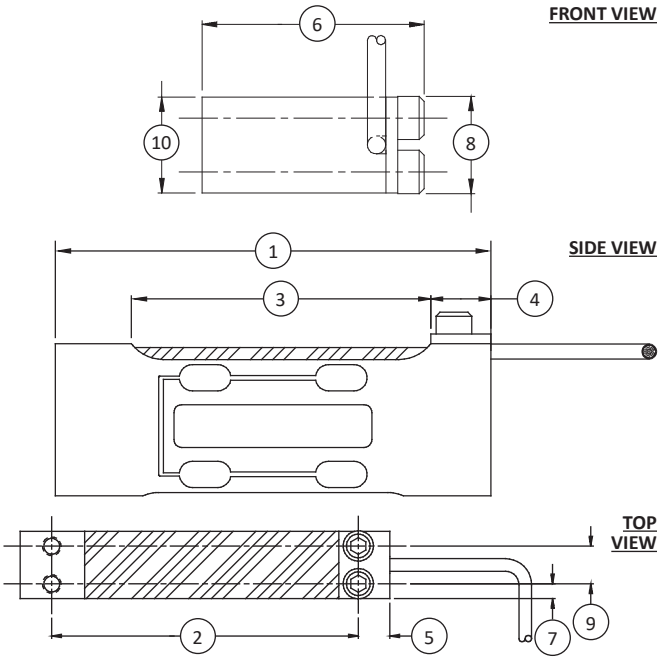
- 5 ft (1.5 m) integral cable (MBI)

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

STANDARD CONFIGURATION



Model MBI (Shown)



DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	2, 5, 10	10, 20, 50
	in	mm
(1)	2.750	69.90
(2)	2.281	57.94
(3)	1.890	48.00
(4)	0.380	9.70
(5)	0.234	5.94
(6)	1.160	29.50
(7)	0.110	2.79
(8)	0.510	13.00
(9)	0.281	7.14
(10)	0.500	12.70

ACCESSORIES

- Instrumentation

SSB SEALED BEAM LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface temperature compensated strain gages
- Environmentally sealed
- 0.01% non-repeatability
- 0.0008%/°F temp. effect on output
- Tension and compression
- Compact size

SPECIFICATIONS

CAPACITY		50 - 5K lbf (222 - 22.2K N)	10K lbf (44.5K N)
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		±0.03	
Hysteresis – %FS		±0.02	±0.03
Nonrepeatability – %RO		± 0.01	
Creep, in 20 min – %		± 0.025	
TEMPERATURE			
Compensated Range	°F	0 to +150	
	°C	-15 to +65	
Operating Range	°F	-65 to +200	
	°C	-55 to +90	
Effect on Output – % / deg	°F	±0.0008	
Effect on Zero – %RO / deg	°F	±0.0015	
ELECTRICAL			
Rated Output – mV/V (Nominal)		3.0	
Zero Balance – %RO		±1.0	
Bridge Resistance – Ohm (Nominal)		350	
Excitation Voltage – VDC MAX		15	
Insulation Resistance – Megohm		5000	
MECHANICAL			
Calibration		Compression	
Safe Overload – %CAP		±150	

NATURAL FREQUENCY/DEFLECTION				
lbf	N	Deflection		Nat. Freq. (Hz)
		in	mm	
50	222	0.004	0.1016	2130
100	445	0.004	0.1016	2400
250	1.11K	0.005	0.127	3000
500	2.22K	0.010	0.254	2220
1K	4.45K	0.013	0.3302	1970
2.5K	11.1K	0.025	0.635	1720
5K	22.2K	0.022	0.5588	1400
10K	44.5K	0.026	0.6604	1620

Material		
	50 - 2.5K lbf	Aluminum
	222 - 11.1K N	
	5K - 10K lbf	Alloy Steel
	22.2K - 44.5K N	

STANDARD CONFIGURATION



Model SSB-500 (Shown)

OPTIONS

- Standardized output
- Cable length
- Transducer Electronic Data Sheet (TEDS)
- Special temperature range
- Custom calibration
- Add connector to cable

ACCESSORIES

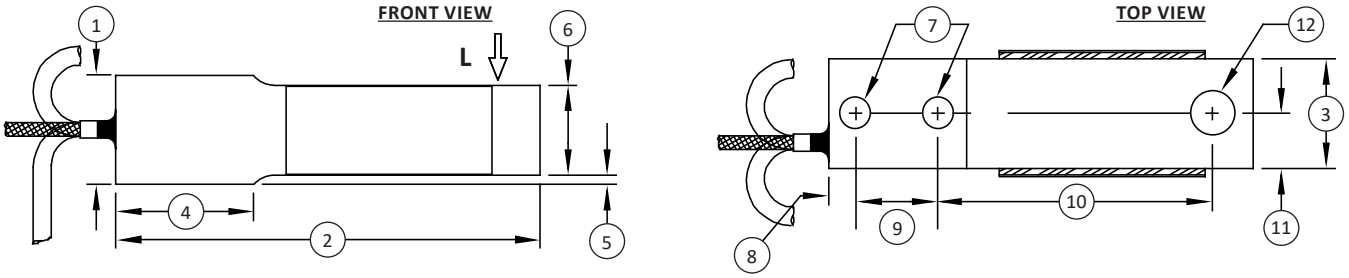
- Instrumentation

CONNECTOR OPTIONS

- 10 ft (3 m) integral cable

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

SSB SEALED BEAM LOAD CELL (U.S. & METRIC)

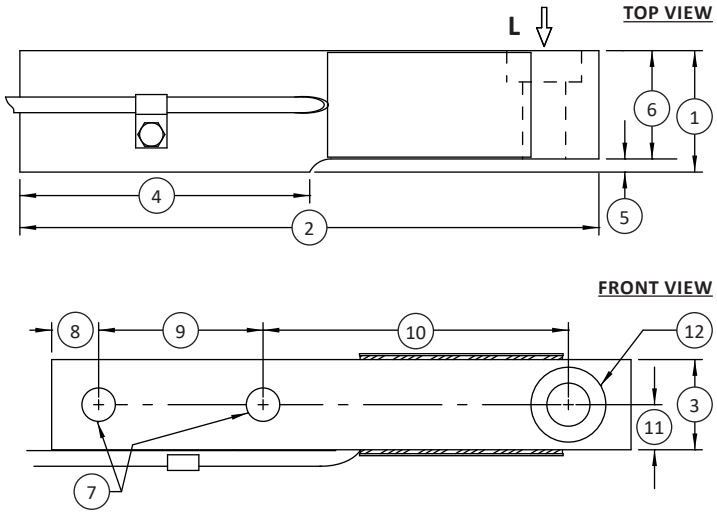


Notes:
**** L indicates load direction***

DIMENSIONS

See Drawing	CAPACITY									
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	50, 100, 250	222, 445, 1.11K	500	2.22K	1K	4.45K	2.5K, 5K	11.1K, 22.2K	10K	44.5K
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	0.98	24.9	1.00	25.4	1.50	38.1	1.45	36.8	1.94	49.3
(2)	2.38	60.5	3.88	98.6	5.00	127	8.0	203.0	9.25	235.0
(3)	0.50	12.7	1.00	25.4	1.00	25.4	1.44	36.6	1.44	36.6
(4)	0.97	24.6	1.25	31.8	1.75	44.5	3.75	95.0	4.63	117.6
(5)	0.11	2.8	0.09	2.3	0.10	2.5	0.10	2.5	0.21	5.3
(6)	0.82	20.8	0.82	20.8	1.36	34.5	1.35	34.3	1.73	43.9
(7)	Ø0.17	Ø4.3	Ø0.28	Ø7.1	Ø0.41	Ø10.3	2x Ø0.53	2x Ø13.6	2x Ø0.53	2x Ø13.6
(8)	0.25	6.4	0.25	6.4	0.38	9.7	0.75	19.0	0.75	19.1
(9)	0.50	12.7	0.75	19.1	1.00	25.4	2.50	63.5	2.63	66.7
(10)	1.31	33.3	2.50	63.5	3.25	82.6	3.88	98.6	4.88	123.8
(11)	0.25	6.4	0.50	12.7	0.50	12.7	0.72	18.3	0.72	18.3
(12)	Ø0.17	Ø4.3	Ø0.40	Ø10.2	Ø0.40	Ø10.2	Ø0.69	Ø17.5	Ø0.69 THRU ALL ⌴ Ø1.20 ↧ 0.50	Ø17.5 THRU ALL ⌴ Ø130.4 ↧ 12.7

SSB SEALED BEAM LOAD CELL (U.S. & METRIC)



Notes:
**** L indicates load direction***

DIMENSIONS (CONTINUED)

See Drawing	CAPACITY			
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	2.5K - 5K	11.1K - 22.2K	10K	44.5K
	in	mm	in	mm
(1)	1.45	36.8	1.94	49.3
(2)	8.00	203.0	9.25	235.0
(3)	1.44	36.6	1.44	36.6
(4)	3.75	95.0	4.63	117.0
(5)	0.10	2.5	0.21	5.3
(6)	1.35	34.3	1.73	44
(7)	Ø0.53	Ø13.0	Ø0.53	Ø13.5
(8)	0.75	19.0	0.75	19.0
(9)	2.50	63.5	2.63	66.8
(10)	3.88	98.6	4.88	124.0
(11)	0.72	18.3	0.72	18.3
(12)	Ø0.69	Ø17.5	Ø0.69	Ø17.5

REC ROD END LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 1K to 50K lbf (5 to 220 kN)
- Proprietary Interface temperature compensated strain gages
- Stainless steel construction (1K lbf or 5 kN is aluminum)
- Low deflection

OPTIONS

- 5K-50K: MS3102E-14-5P connector optional
- Standardized output
- Special temperature range
- Custom calibration
- Transducer Electronic Data Sheet (TEDS)
- Standardized output

ACCESSORIES

- Instrumentation
- Mating connector

STANDARD CONFIGURATION

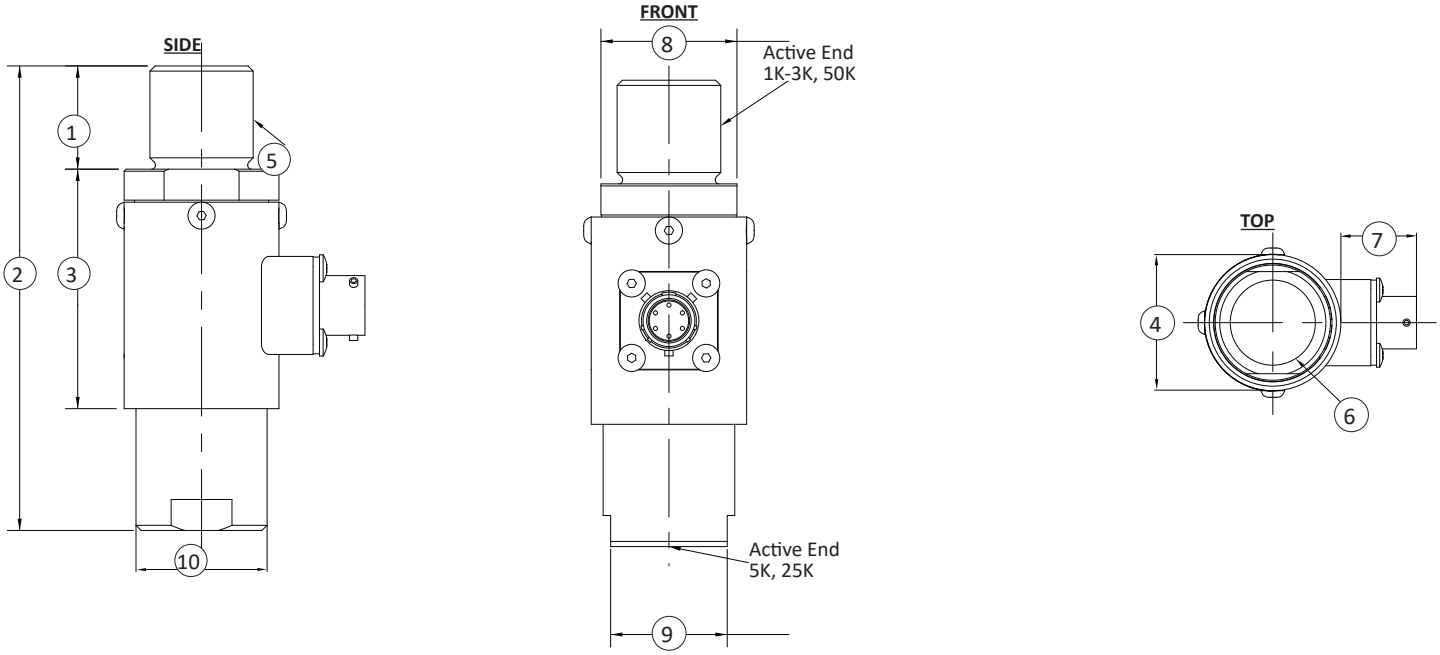


Model REC-5K (Shown)

SPECIFICATIONS

CAPACITY	lbf	1K	2K	3K	5K	10K	15K	20K	25K	50K
	kN	5	10	13	22	45	67	90	110	220
ACCURACY – (MAX ERROR)										
Nonlinearity – %FS		±0.25								
Hysteresis – %FS		±0.15								
Nonrepeatability – %FS		±0.05								
TEMPERATURE										
Compensated Range	°F	+60 to +160								
	°C	+15 to +72								
Operating Range	°F	-60 to +200								
	°C	-50 to +93								
Effect on Output – % / deg	°F	±0.005								
	°C	±0.01								
Effect on Zero – %RO / deg	°F	±0.005								
	°C	±0.01								
ELECTRICAL										
Rated Output – mV/V (nominal)	lbf	1.7 ± 0.3	2.00 ± 0.20							
	kN	2.0 ± 0.4								
Zero Balance – %RO		±3								
Bridge Resistance – Ohm (nominal)		350								
Excitation Voltage – VDC MAX		15								
MECHANICAL										
Calibration		T & C								
Safe Overload – %RO		150								
Deflection	in	0.0005	0.0012	0.0013	0.0018	0.0024	0.0026	0.0028	0.003	0.0042
	mm	0.0127	0.03048	0.03302	0.04572	0.06096	0.06604	0.07112	0.0762	0.10668
Weight	lbs	0.4	1.0				1.4			5.5
	kg	0.18	0.45				0.63			2.49
Material		Aluminum	Stainless steel							

REC ROD END LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 3K	5, 10, 13	5K, 10K	22, 45	15K, 20K 25K	67, 90, 110	50K	220
	in	mm	in	mm	in	mm	in	mm
(1)	1.00	25.4	1.00	25.4	1.00	25.4	1.50	38.1
(2)	4.25	108	4.50	114.3	4.50	114.3	7.00	177.8
(3)	N/A	N/A	2.32	58.9	2.32	58.9	N/A	N/A
(4)	N/A	N/A	Ø1.50	Ø38.1	Ø1.73	Ø43.9	N/A	N/A
(5)	¾-16 UNF-3A		1-14 UNS-2A		1-14 UNS-2A		1½-12 UNF-2A	
(6)	¾-16 UNF-2B		1-14 UNS-2B		1-14 UNS-2B		1½-12 UNF-2B	
	↧ 0.88	↧ 22.4	↧ 1.0	↧ 25.4	↧ 1.0	↧ 25.4	↧ 1.5	↧ 38.1
(7)	0.83	21.1	0.83	21.1	0.85	21.6	0.71	18
(8)	1.13	28.7	1.31	33.3	1.50	38.1	1.75	44.5
	Wrench Flats							
(9)	1.31	33.3	1.13	28.7	1.31	33.3	2.25	57.2
	Wrench Flats							
(10)	Ø1.50	Ø38.1	Ø1.27	Ø32.3	Ø1.50	Ø38.1	Ø2.50	Ø63.5

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

MTFS MINIATURE TENSION FORCE LOAD CELL (U.S. & METRIC)

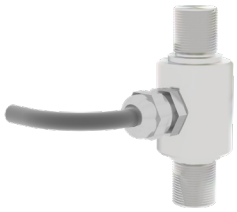
FEATURES & BENEFITS

- Capacities from 1 to 100 kN (0.22 to 22.5K lbf)
- Very small geometry
- IP65 environmental protection

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.3
Hysteresis – %FS		±0.3
Nonrepeatability – %RO		±0.08
Creep, in 30 min – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.02
Compensated Range	°C	0 to +60
	°F	+32 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V / %		1 ± 20
Excitation Voltage – VDC	≤ 5 kN (≤ 1.12K lbf)	2 - 6
	> 5 kN (> 1.12K lbf)	2 - 12
Bridge Resistance – Ohm		350
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.1
	in	< 0.004
IP Rating		IP65
Material		Stainless steel flexure aluminum cover

STANDARD CONFIGURATION



Model MTFS 100-5kN (Shown)

OPTIONS

- Special temperature range (selected capacities)
- Standardized output
- 100% control signal (internal shunt cal)
- Add connector to cable
- Custom calibration
- Cable length
- Transducer Electronic Data Sheet (TEDS)

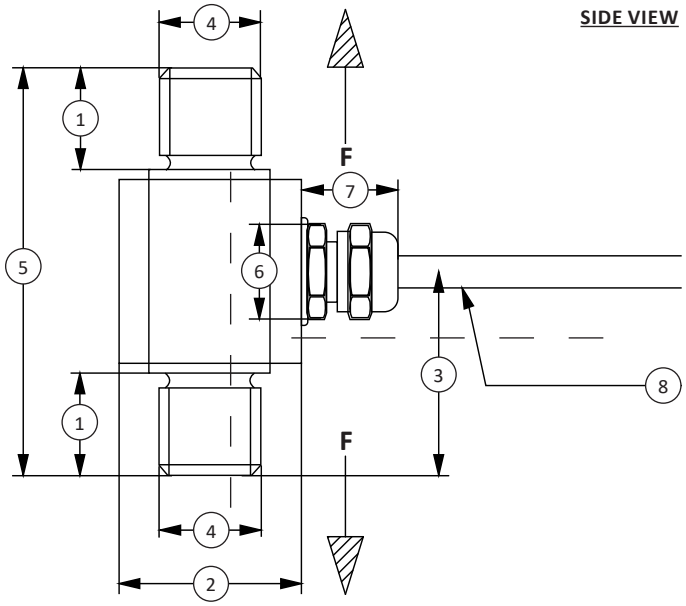
CONNECTOR OPTIONS

- (3 m) 10 ft integral cable

ACCESSORIES

- Instrumentation

MTFS MINIATURE TENSION FORCE LOAD CELL (U.S. & METRIC)



Notes:
**** F indicates load direction***

DIMENSIONS

See Drawing	CAPACITY											
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	1	225	5	1.12K	10	2.24K	20	4.49K	50	11.24K	100	22.48K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	8	0.3	8	0.3	10	0.4	12	0.5	15	0.6	20	0.8
(2)	14	0.6	14	0.6	18	0.7	24	0.9	29	1.1	35	1.4
(3)	17.5	0.7	17.5	0.7	20	0.8	22.5	0.9	25	1.0	35	1.4
(4)	M5	M5	M8	M8	M10	M10	M12	M12	M16	M16	M24x2	M24x2
(5)	35	1.4	35	1.4	40	1.6	45	1.8	50	2.0	70	2.8
(6)	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4
(7)	10	0.4	10	0.4	10	0.4	10	0.4	10	0.4	10	0.4
(8)	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WMC MINIATURE SEALED STAINLESS STEEL LOAD CELL (U.S. & METRIC)

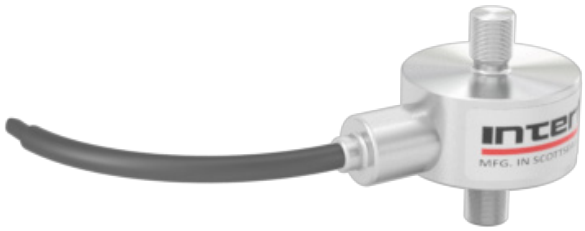
FEATURES & BENEFITS

- Capacities 1k - 10k lbf (4500 - 45000 N)
- Proprietary Interface temperature compensated strain gages
- Tension & compression
- Small size
- Environmentally sealed

SPECIFICATIONS

ACCURACY – (MAX ERROR)			
Nonlinearity – %FS			±0.20
Hysteresis – %FS			±0.20
Nonrepeatability – %RO			±0.05
Creep, in 20 min – %			±0.05
TEMPERATURE			
Compensated Range		°F	+15 to +115
		°C	-10 to +45
Operating Range		°F	-65 to +250
		°C	-54 to +121
Effect on Output – % / deg		°F	±0.002
Effect on Zero – %RO / deg		°F	±0.005
ELECTRICAL			
Rated Output – mV/V (Nominal)			2.0
Zero Balance – %RO			±2.0
Bridge Resistance – Ohm (Nominal)			350
Excitation Voltage – VDC MAX			15.0
Insulation Resistance – Megohm			> 5000
MECHANICAL			
Calibration			T & C
Deflection @ RO	1K (lbf)	in	0.0022
	4.5 (kN)	mm	0.056
	2K, 3K (lbf)	in	0.0020
	9.13 (kN)	mm	0.051
	5K (lbf)	in	0.0017
	22 (kN)	mm	0.043
	7.5K, 10K (lbf)	in	0.0016
	33 (kN)	mm	0.041
	10K (lbf)	in	0.0015
	45 (kN)	mm	0.038
Safe Overload – % CAP			150
Weight		lbs	0.13 - 0.50
		g	59.0 - 226.8
Material			Stainless steel

STANDARD CONFIGURATION



Model WMC-5K (Shown)

OPTIONS

- Cable length
- Custom calibration
- Standardized output
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)
- Standardized output
- Submersible
- Special temperature range

ACCESSORIES

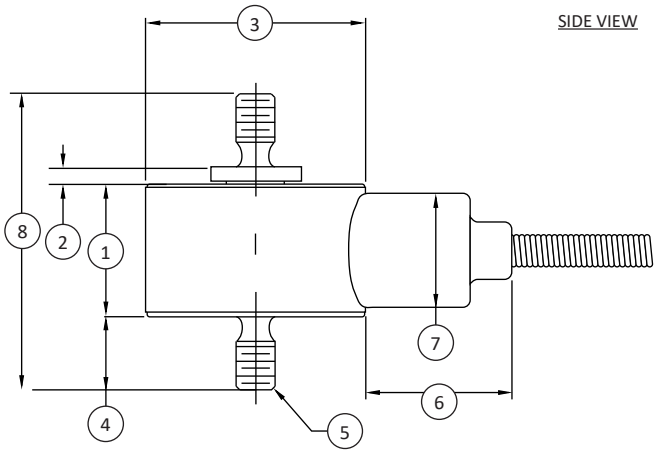
- Instrumentation

CONNECTOR OPTIONS

- 5 ft. (1.5m) integral cable

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

WMC MINIATURE SEALED STAINLESS STEEL LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K	4.5	2K, 3K	9, 13	5K	22	7.5K, 10K	33, 45
	in	mm	in	mm	in	mm	in	mm
(1)	0.53	13.4	0.72	18.3	0.94	23.9	1.09	27.7
(2)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8
(3)	Ø1.00	Ø25.4	Ø1.00	Ø25.4	Ø1.25	Ø31.8	Ø1.38	Ø34.9
(4)	0.38 TYP	9.7 TYP	0.50 TYP	12.7 TYP	0.63 TYP	16.0 TYP	0.88 TYP	22.4 TYP
(5)	¼-28 UNF	M6x1 TYP	⅜-24 UNF	M10x1.5 TYP	0.500-20 UNF	M12x1.75 TYP	0.750-16 UNF	M16x2 TYP
(6)	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7
(7)	Ø0.39	Ø9.9	Ø0.39	Ø9.9	Ø0.39	Ø9.9	Ø0.39	Ø9.9
(8)	1.32	33.5	1.75	44.5	2.23	56.6	2.88	73.2

WMC MINIATURE SEALED STAINLESS STEEL LOAD CELL (U.S. & METRIC)

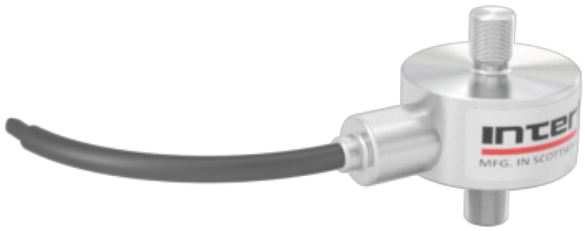
FEATURES & BENEFITS

- Proprietary Interface temperature compensated strain gages
- Tension & compression
- Small size
- Environmentally sealed

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.15
Hysteresis – %FS		±0.15
Nonrepeatability – %RO		±0.05
Creep, in 20 min – %		±0.05
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +250
	°C	-54 to +121
Effect on Output – % / deg	°F	±0.002
Effect on Zero – %RO / deg	°F	±0.005
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Zero Balance – %RO		±2.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		12.0
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Calibration		T & C
Deflection @ RO	5 (lbf)	0.0012
	22 (N)	0.030
	10 (lbf)	0.0010
	45 (N)	0.025
	25 (lbf)	0.0014
	110 (N)	0.036
	50 (lbf)	0.0010
	220 (N)	0.025
	100 (lbf)	0.0007
	450 (N)	0.018
	250 (lbf)	0.0026
	1100 (N)	0.066
	500 (lbf)	0.0025
	2200 (N)	0.064
Safe Overload – %CAP		150
Weight	lbs	0.05 - 0.12
	g	22.7 - 54.4
Material		Stainless steel

STANDARD CONFIGURATION



Model WMC-100 (Shown)

OPTIONS

- Cable length
- Special calibration
- Standardized output
- Special temperature range
- Custom calibration
- Add connector to cable
- Submersible
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

- Instrumentation

CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

WMCP STAINLESS STEEL LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 500 to 1000 gf (1.1 to 2.2 lbf)
- Proprietary Interface temperature compensated in gages
- Tension and compression
- Small size
- Environmentally sealed
- Overload protected to 8x capacity

SPECIFICATIONS

CAPACITY	Metric (gf)	500	1000
	U.S. (lbf)	1.1	2.2
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		±0.15	
Hysteresis – %FS		±0.15	
Nonrepeatability – %RO		±0.15	±0.1
Creep, in 20 min – %		±0.1	±0.05
TEMPERATURE			
Compensated Range	°C	+10 to +66	
	°F	+50 to +150	
Operating Range	°C	-54 to +121	
	°F	-65 to -250	
Effect on Output – % / deg	°F	±0.20	
Effect on Zero – %RO / deg	°F	±2.00	±1.00
ELECTRICAL			
Rated Output – mV/V (Nominal)		0.75 (±0.15)	1.50 (±0.30)
Zero Balance – %RO		±2.0	
Bridge Resistance – Ohm (Nominal)		350 (±3.5)	
Excitation Voltage – VDC or VAC MAX		7	
Insulation Resistance – Megohm		5000	
MECHANICAL			
Calibration		Tension	
Safe Overload – %CAP		1600	800
Deflection @RO	mm	0.127	0.254
	in	0.005	0.010
Weight	kg	0.08	
	lbs	0.18	
Material		Stainless steel	

OPTIONS

- Special calibration
- Standard output
- Special temperature range
- Custom calibration
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

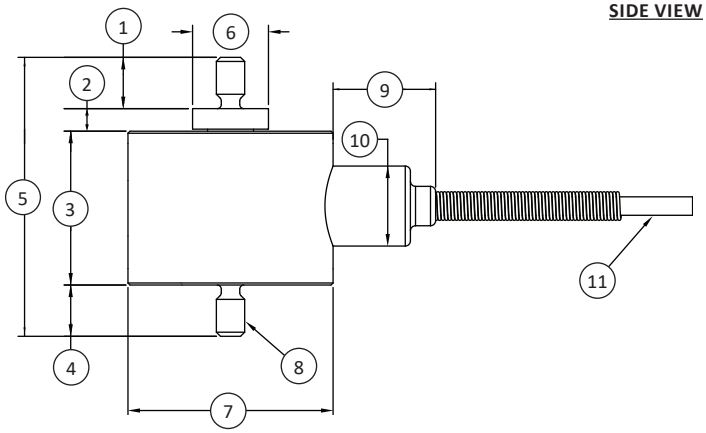
- Instrumentation

STANDARD CONFIGURATION



Model WMCP - 1000G (Shown)

SIDE VIEW



DIMENSIONS

See Drawing	CAPACITY	
	Metric (gf)	U.S. (lbf)
	500, 1000	1.1, 2.2
	mm	in
(1)	6.4	0.25
(2)	2.8	0.11
(3)	19.1	0.75
(4)	6.4	0.25
(5)	34.5	1.36
(6)	Ø9.4	Ø0.37
(7)	Ø25.4	Ø1.00
(8)	#6-32 UNC-3A (Both Ends)	
(9)	12.7	0.50
(10)	Ø9.9	Ø0.39
(11)	Ø2.3	Ø0.09

CONNECTOR OPTIONS

- 1.5 m (5 ft) integral cable

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

WMCFP MINIATURE SEALED STAINLESS STEEL LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 500 to 1000 gf (1.10 to 2.20 lbf)
- Proprietary Interface temperature compensated strain gages
- Tension and compression
- Environmentally sealed
- Overload protected to 8x capacity

SPECIFICATIONS

Capacities	Metric (gf)	500	1000
	U.S. (lbf)	1.10	2.20
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		±0.20	
Hysteresis – %FS		±0.20	
Nonrepeatability – %RO		±0.05	
Creep, in 20 min – %		±0.05	
TEMPERATURE			
Compensated Range	°C	-10 to +45	
	°F	+15 to +115	
Operating Range	°C	-54 to +121	
	°F	-65 to +250	
Effect on Output – % / deg	°F	±0.002	
Effect on Zero – %RO / deg	°F	±0.005	
ELECTRICAL			
Rated Output – mV/V (Nominal)		1.0	
Zero Balance – %RO		±2.0	
Bridge Resistance – Ohm (Nominal)		350	
Excitation Voltage – VDC MAX		7	
Insulation Resistance – Megohm		> 5000	
MECHANICAL			
Calibration		Tension	
Safe Overload – %CAP		800	
Deflection @RO	mm	0.013	0.003
	in	0.005	0.001
Weight	kg	0.09	
	lbs	0.2	

OPTIONS

- Cable length
- Special calibration
- Standardized output
- Special temperature range
- Custom calibration
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

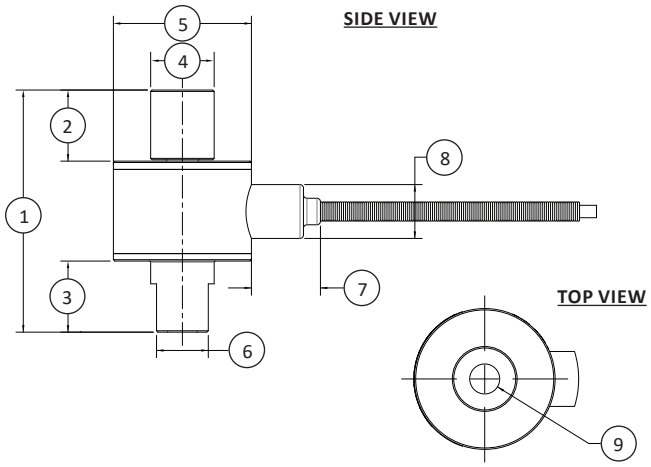
ACCESSORIES

- Instrumentation

STANDARD CONFIGURATION



Model WMCFP (Shown)



DIMENSIONS

See Drawing	CAPACITY	
	Metric (gf)	U.S. (lbf)
	500, 1000	1.10, 2.20
	mm	in
(1)	44.5	1.75
(2)	13.2	0.52
(3)	13.2	0.52
(4)	Ø11.7	Ø0.46
(5)	Ø25.4	Ø1.00
(6)	Ø9.5	Ø0.38
(7)	12.7	0.50
(8)	9.9	0.39
(9)	0.250-28 UNF ↧ 0.32	

CONNECTOR OPTIONS

- 1.5 m (5 ft) integral cable

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

SM S-TYPE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface temperature compensated strain gages
- High performance
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Lowest creep – 0.025%
- Tension and compression

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.03
Hysteresis – %FS		±0.02
Nonrepeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	0 to +150
	°C	-15 to +65
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % / deg	°F	±0.0008
	°C	±0.0015
Effect on Zero – %RO / deg	°F	±0.0015
	°C	±0.0027
ELECTRICAL		
Rated Output – mV/V (Nominal)		3.0
Zero Balance – %RO		±1.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Calibration		Tension
Safe Axial Load – %CAP MAX		±150

NATURAL FREQUENCY / DEFLECTION

lbf	N	Deflection		Natural Frequency (Hertz)
		in	mm	
10	50	0.003	0.08	600
25	100	0.003	0.08	1000
50	200	0.003	0.08	1550
100	500	0.004	0.1	1850
250	1000	0.006	0.15	2350
500	2000	0.006	0.15	2150
1000	5000	0.005	0.13	3350
Material				Aluminum

STANDARD CONFIGURATION



Model SM-25 (Shown)

OPTIONS

- Cable length
- Standardized output
- Custom calibration
- Transducer Electronic Data Sheets (TEDS)
- Add connector to cable
- Special temp range

ACCESSORIES

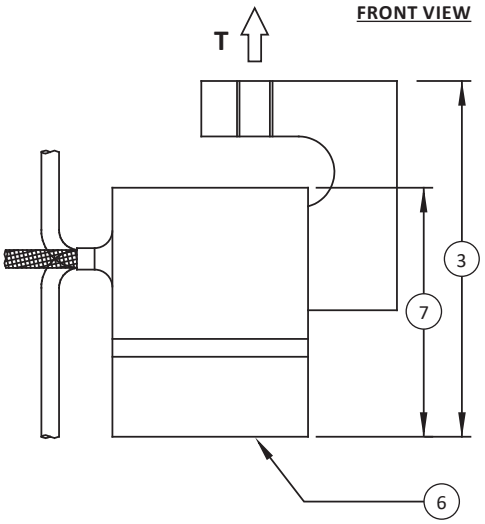
- Load button
- Mounting hardware
- Instrumentation

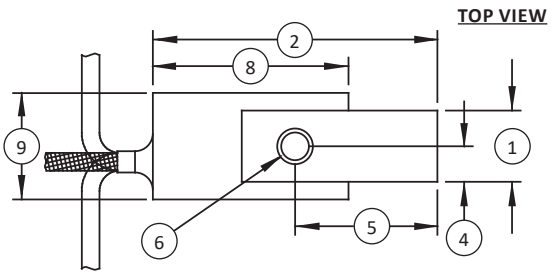
CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

SM S-TYPE LOAD CELL (U.S. & METRIC)





Notes:
**** T indicates tension load direction / primary axis***

DIMENSIONS

See Drawing	CAPACITY			
	US (lbf)	Metric (N)	US (lbf)	Metric (N)
	10, 25, 50, 100, 150, 250	50, 100, 200, 500, 1K	500, 1K	2K, 5K
	in	mm	in	mm
(1)	0.50	12.7	1.00	25.4
(2)	2.00	50.8	2.00	50.8
(3)	2.50	63.5	3.00	76.2
(4)	0.25	6.40	0.50	12.7
(5)	1.00	25.4	1.00	25.4
(6)	¼-28 UNF-2B	M6 x 1-6H	½-20 UNF-2B	M12 x 1.75-6H
(7)	1.75	44.5	2.00	50.8
(8)	1.38	35.1	1.94	49.3
(9)	0.75	19.1	1.25	31.8

SMA SERIES MINI S-TYPE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface temperature compensated strain gages
- Performance to 0.05%
- Small compact design
- Tension & compression

SPECIFICATIONS

ACCURACY - (MAX ERROR)		
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		± 0.02
Creep, in 20 min – %		± 0.05
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % /deg	°F	±0.0008
	°C	±0.0014
Effect on Zero – % RO / deg	°F	±0.005
	°C	±0.009
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.5
Zero Balance – %RO		-0.6 to 0.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		>5000
MECHANICAL		
Calibration		Tension
Safe Overload – %CAP		150
Material		Aluminum

OPTIONS

- Cable length
- Standardized output
- Custom calibration
- Add connector to cable
- Special temperature range
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

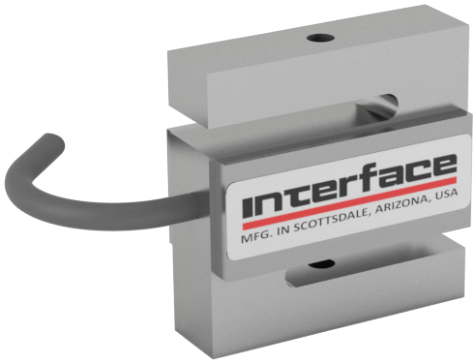
- Instrumentation

CONNECTOR OPTIONS

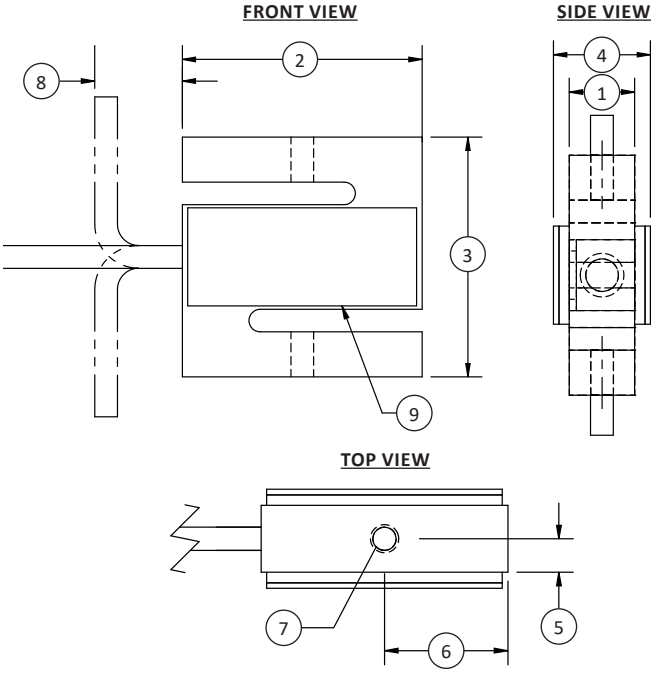
- 1.5 m (5 ft) integral cable

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

STANDARD CONFIGURATION



Model SMA (Shown)



DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	15, 100, 150, 200	60, 500, 600, 900
	in	mm
(1)	0.38	9.5
(2)	1.38	35
(3)	1.38	35
(4)	0.56	14.2
(5)	0.19	4.8
(6)	0.69	17.5
(7)	#10-32 UNF – 2B	M4 X 0.7 – 6
(8)	0.5	12.7
(9)	Identification label	

SML LOW HEIGHT LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR)			
U.S. (lbf)	Metric (N)	Nonlinearity – %FS	Hysteresis – %FS
5 - 300	22 - 1.3K	±0.05	±0.05
500 - 1K	2.2K - 4.5K	±0.10	±0.10
2K	9K	±0.20	±0.10
Nonrepeatability – %RO		±0.03	
Creep, in 20 min – %		±0.05	

TEMPERATURE		
Compensated Range	°F	0 to +150
	°C	-15 to +65
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % / deg	°F	±0.0008
	°C	±0.0015
Effect on Zero – %RO / deg	°F	±0.005
	°C	±0.009

ELECTRICAL	
Rated Output – mV/V (Nominal)	2.0
Zero Balance – %RO	±1.0
Bridge Resistance – Ohm (Nominal)	350
Excitation Voltage – VDC MAX	15
Insulation Resistance – Megohm	> 5000

MECHANICAL		
Calibration		Tension
Safe Overload – %CAP	5 - 10 lbf	800
	22 - 45 N	
	25 - 2K lbf	150
	110 - 9K N	

NATURAL FREQUENCY/DEFLECTION				
U.S. (lbf)	Metric (N)	Defelection		Natural Frequency (Hertz)
		in	mm	
5 - 10	22 - 45	0.005	0.13	3000
25	110	0.004	0.09	2500
50	220	0.003	0.08	3300
100	450	0.003	0.08	5000
200 - 300	900 - 1.3K	0.003	0.08	4500
500 - 1K	2200 - 4.5K	0.003	0.08	1800
2K	9K	0.004	0.09	1800

Material	5 - 300 (lbf)	Aluminum
	22 - 1.3K (N)	
	500 - 2K (lbf)	Stainless Steel
	2.2K - 9K (N)	

STANDARD CONFIGURATION



Model SML-200 (Shown)

FEATURES & BENEFITS

- Proprietary Interface temperature comp. strain gages
- From 0.75 in (19mm) high
- Performance to 0.05%
- Low extraneous load sensitivity
- Overload protection, SML-5 and SML-10 (SML-22N and SML-45N)

OPTIONS

- Cable length
- Standarized output
- Custom calibration
- Transducer Electronic Data Sheet (TEDS)
- Add connector to cable
- Special temperature range

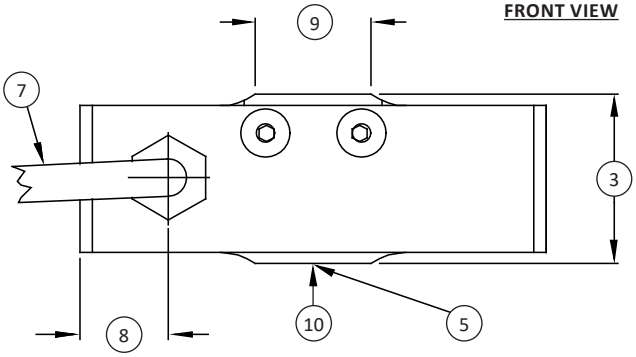
ACCESSORIES

- Instrumentation

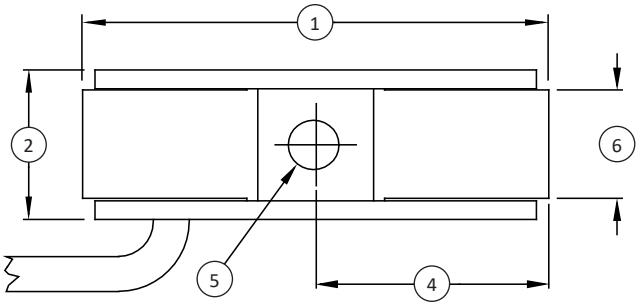
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SML LOW HEIGHT LOAD CELL (U.S. & METRIC)

FRONT VIEW



TOP VIEW



DIMENSIONS

See Drawing	CAPACITY							
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	5 - 10	22 - 45	25, 50, 100	110, 220, 450	200, 300, 500, 1000	900, 1300, 2200, 4500	2000	9000
	in	mm	in	mm	in	mm	in	mm
(1)	1.80	45.7	2.00	50.8	2.12	53.8	2.80	71.1
(2)	0.52	13.1	0.64	16.3	0.89	22.6	1.16	29.6
(3)	0.73	18.5	0.73	18.5	0.98	24.8	1.24	31.5
(4)	0.90	22.9	1.00	25.4	1.06	26.9	1.40	35.6
(5)	10-32 UNF-2B ↧0.20	M5x0.8-6H ↧5.0	¼-28 UNF-2B ↧0.25	M6x1-6H ↧6.0	⅜-24 UNF-2B ↧0.38	M8x1.25-6H ↧8.0	½-20 UNF-2B ↧0.49	M12x1.75-6H ↧12.0
(6)	0.34	8.6	0.46	11.8	0.71	18.1	1.00	25.5
(7)	0.13	3.3	0.13	3.3	0.13	3.3	0.13	3.3
(8)	0.29	7.4	0.38	9.7	0.46	11.7	0.75	19.0
(9)	0.50	12.7	0.50	12.7	0.57	14.5	0.77	19.6
(10)	Live end							

SMT S-TYPE OVERLOAD PROTECTED LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface temperature compensated strain gages
- Overload protected in both tension and compression
- Safe overload to 10X capacity
- Low creep
- 1.1 to 450 lbf (5 - 2000 N)
- High performance

SPECIFICATIONS

ACCURACY – (MAX ERROR)			
Nonlinearity – %FS			±0.05
Hysteresis – %FS			±0.03
Nonrepeatability – %RO			±0.02
Creep, in 20 min – %			±0.025
TEMPERATURE			
Compensated Range		°F	0 to +125
		°C	-15 to +50
Operating Range		°F	-10 to +175
		°C	-25 to +80
Effect on Output – % / deg		°F	±0.0010
		°C	±0.0018
Effect on Zero – %RO / deg		°F	±0.0015
		°C	±0.0027
ELECTRICAL			
Rated Output – mV/V (Nominal)			2.0
Zero Balance – %RO			±3.0
Bridge Resistance – Ohm (Nominal)			350
Excitation Voltage – VDC MAX			15
Insulation Resistance – Megohm			> 5000
MECHANICAL			
Calibration			T & C
Safe Overload – % CAP	1.1, 2.2, 5.6, 11, 22, 56 lbf		1000
	5, 10, 25, 50, 100, 250 N		
	112, 225, 450 lbf		500
	500, 1000, 2000 N		

NATURAL FREQUENCY/DEFLECTION				
lbf	N	Deflection		Nat. Freq. (Hz)
		in	mm	
1.1	5	0.014	0.356	100
2.2	10	0.012	0.305	160
5.6	25	0.011	0.279	260
11	50	0.009	0.229	380
22	100	0.007	0.178	600
56	250	0.006	0.152	900
112	500	0.007	0.178	600
225	1000	0.007	0.178	1200
450	2000	0.007	0.178	1500
Material		Aluminum		

Notes:
Consult factory for more technical information

STANDARD CONFIGURATION



Model SMT1-11 (Shown)

OPTIONS

- Cable length
- Standardized outputs
- Custom calibration
- Transducer Electronic Data Sheets (TEDS)
- Add connector to cable
- Special temperature range

ACCESSORIES

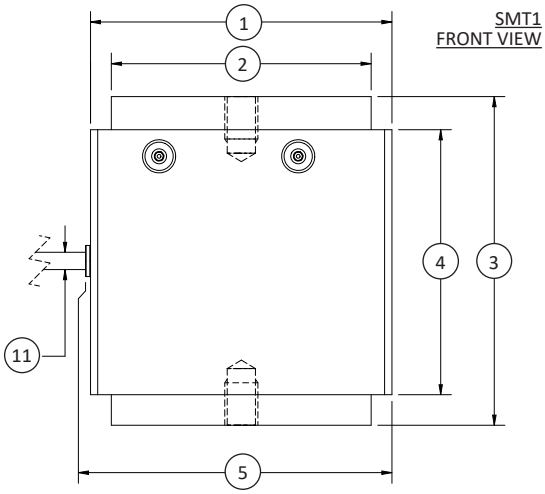
- Instrumentation
- Mounting hardware

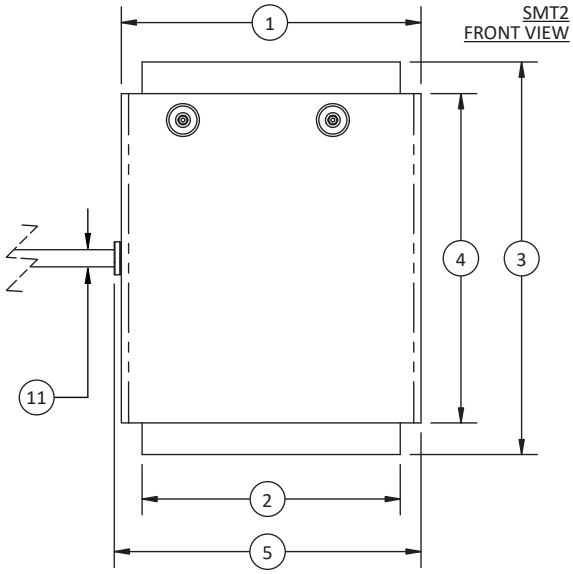
CONNECTION OPTIONS

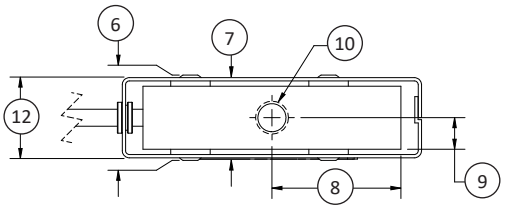
- 5 ft (1.5 m) integral cable

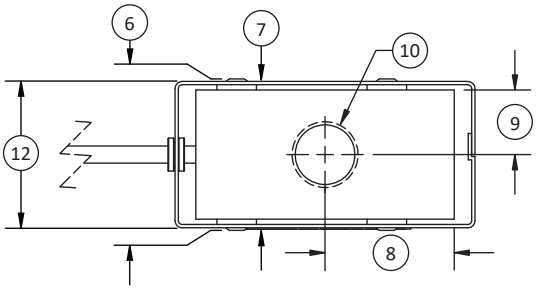
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SMT S-TYPE OVERLOAD PROTECTED LOAD CELL (U.S. & METRIC)









DIMENSIONS

See Drawing	MODEL			
	SMT1		SMT2	
	CAPACITY			
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	1.1, 2.2, 5.6, 11, 22, 56	5, 10, 25, 50, 100, 250	112, 225, 450	500, 1000, 2000
	in	mm	in	mm
(1)	2.28	57.8	2.28	57.8
(2)	1.96	49.8	1.96	49.8
(3)	2.48	63.0	2.98	75.7
(4)	2.00	50.8	2.50	63.5
(5)	2.33	59.2	2.33	59.1
(6)	0.65	16.5	1.15	29.2
(7)	0.60	15.2	1.11	28.2
(8)	0.98	24.9	0.98	24.9
(9)	0.24	6.1	0.49	12.4
(10)	¼-28 UNF-3B ↧ 0.31	M6 x 1-6H ↧ 8.0	½-20 UNF-3B ↧ 0.57	M12 x 1.75-6H ↧ 14.5
(11)	Ø0.13	Ø3.3	Ø0.13	Ø3.3
(12)	0.48	12.2	1.11	28.2

SMTM MICRO S-TYPE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacity 5, 25, 50 lbf (20, 100, 200 N)
- Can be used in tension & compression
- Micro sized – 0.68 x 0.75 x 0.29 in (17.3 x 19.1 x 7.3 mm)
- Excellent temperature compensation (0.005% / °F temperature effect on output)
- Overload protected up to 10x capacity

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.1
Hysteresis – %FS		±0.1
Nonrepeatability – %RO		±0.05
Creep, in 20 min – %		±0.1
TEMPERATURE		
Compensated Range	°F	+60 to +165
	°C	+15 to +75
Operating Range	°F	-55 to +200
	°C	-50 to +95
Effect on Output – % / deg	°F	±0.005
	°C	±0.010
Effect on Zero – %RO / deg	°F	±0.015
	°C	±0.018
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Zero Balance – %RO		±3.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		5
Insulation Resistance – Megohm		> 2500
MECHANICAL		
Calibration		Tension
Safe Overload – % CAP		1000**
Material	5 (lbf)	Aluminum
	20 (N)	
	25 - 50 (lbf)	Alloy Steel
	100 - 200 (N)	

STANDARD CONFIGURATION



Model SMTM (Shown)

OPTIONS

- Cable length
- Custom calibration
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Add connector to cable
- Special temperature range

ACCESSORIES

- Instrumentation
- Mounting hardware

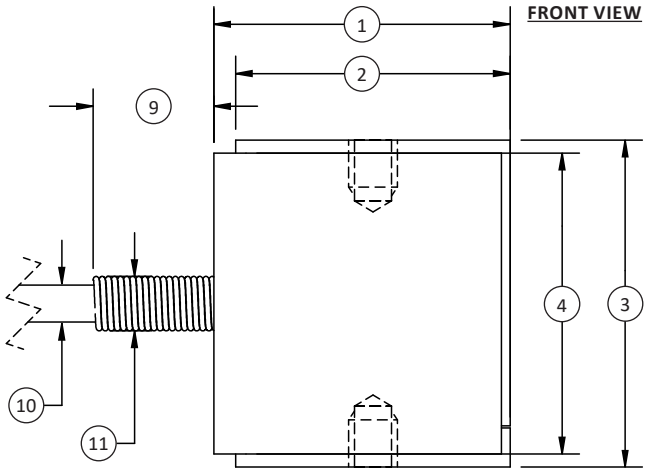
CONNECTION OPTIONS

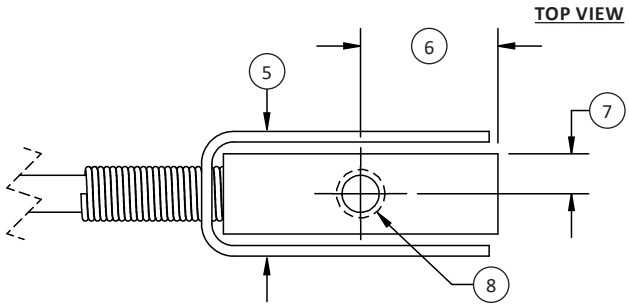
- 5 ft (1.5 m) integral cable

***50 lbf capacity rated to 200% CAP**
Consult factory for more technical information

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SMTM MICRO S-TYPE LOAD CELL (U.S. & METRIC)





DIMENSIONS

See Drawing	U.S. (lbf)	Metric (N)
	5, 25, 50	20, 100, 200
	in	mm
(1)	0.68	17.3
(2)	0.63	16.0
(3)	0.75	19.1
(4)	0.69	17.5
(5)	0.29	7.3
(6)	0.32	8.0
(7)	0.09	2.3
(8)	#4-40 UNC-2B ↧ 0.11	M3x0.5-6H ↧ 2.8
(9)	0.27	6.9
(10)	Ø0.08	Ø2.1
(11)	Ø0.13	Ø3.3

SSM/SSM2 SEALED S-TYPE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface temperature compensated strain gages
- Environmentally sealed
- 0.02% non-repeatability
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- 0.025% creep
- Tension and compression

SPECIFICATIONS

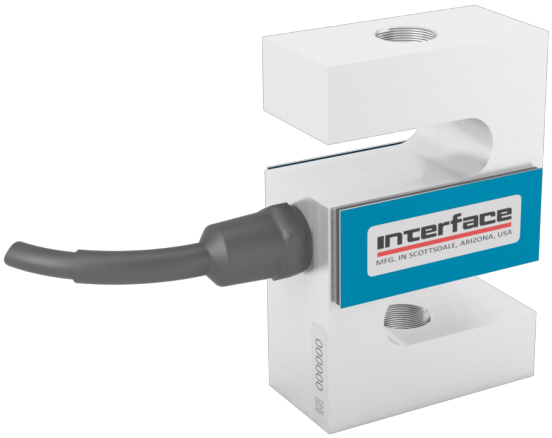
ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.03
Nonrepeatability – %RO		±0.02
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	0 to +150
	°C	-15 to +65
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect On Output – % / deg	°F	±0.0008
	°C	±0.0015
Effect On Zero – %RO / deg	°F	±0.0015
	°C	±0.0027
ELECTRICAL		
Rated Output – mV/V (Nominal)		3
Zero Balance – %RO		±1
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Safe Overload – % CAP		150

NATURAL FREQUENCY/DEFLECTION

Model	lbf	N	Deflection		Nat. Freq. (Hz)
			in	mm	
	50	200	0.003	0.08	1500
	100	250	0.004	0.1	1850
	-	500	0.004	0.1	1850
	150	700	0.004	0.1	1850
	250	1K	0.006	0.15	2350
	500	2K	0.005	0.13	2150
	700	2K	0.005	0.13	2350
	1K	5K	0.005	0.13	3350
	2K	10K	0.005	0.13	2400
	3K	N/A	0.005	0.13	3000
	5K	20K	0.005	0.13	2520
SSM2	5K, 10K	25K, 50K	0.005	0.13	2520

Material		
	25 - 1K lbf	Aluminum
	100 - 5K N	
	2K - 10K lbf	Alloy steel
	10K - 50K N	

STANDARD CONFIGURATION



MODEL SSM-AJ-100 (Shown)

OPTIONS

- PC04E-10-6P connector on load cell body (SSM-500 lbf / SSM-2 kN and above)
- Standardized output
- Special temperature range
- Cable length
- Transducer Electronic Data Sheets (TEDS)
- Add connector to cable

ACCESSORIES

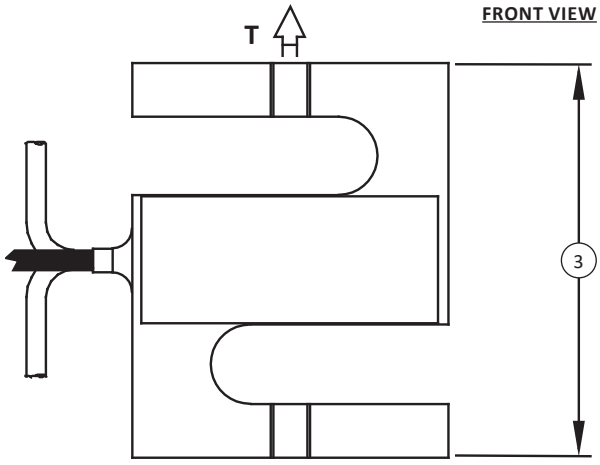
- Load button
- Instrumentation
- Mounting hardware

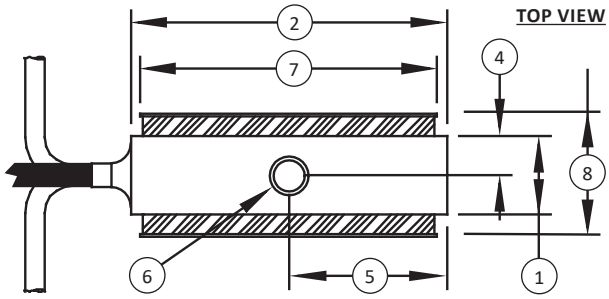
CONNECTOR OPTIONS

- 10 ft (3 m) integral cable

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

SSM/SSM2 SEALED S-TYPE LOAD CELL (U.S. & METRIC)





Notes:
**** T indicates tension load direction / primary axis***

DIMENSIONS

See Drawing	MODEL							
	SSM							
	CAPACITY							
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	50	200	100, 150	250, 500, 700	250	1K	500, 700	2K, 5K
	in	mm	in	mm	in	mm	in	mm
(1)	0.50	12.7	0.50	12.7	0.50	12.7	1.00	25.4
(2)	2.00	50.8	2.00	50.8	2.00	50.8	2.00	50.8
(3)	2.50	63.5	2.50	63.5	2.50	63.5	3.00	76.2
(4)	0.25	6.40	0.25	6.40	0.25	6.40	0.50	12.7
(5)	1.00	25.4	1.00	25.4	1.00	25.4	1.00	25.4
(6)	2X .250-28 UNF-2B	M6 X 1-6H	2X .250-28 UNF-2B	M6 X 1-6H	2X .250-28 UNF-2B	M6 X 1-6H	0.5-20 UNF-2B	M12 X 1.75-6H
(7)	1.88	47.8	1.88	47.8	1.88	47.8	1.88	47.8
(8)	0.82	20.8	0.72	18.3	0.72	18.3	1.18	30.0

See Drawing	MODEL							
	SSM				SSM2			
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	2K, 3K	10K	5K	20K	5K	25K	10K	50K
	in	mm	in	mm	in	mm	in	mm
(1)	0.98	24.9	1.50	38.1	1.48	37.6	1.48	37.6
(2)	1.98	50.3	2.50	63.5	2.98	75.7	2.98	75.7
(3)	2.98	75.7	3.50	88.9	3.98	101.1	3.98	101.1
(4)	0.50	12.7	0.75	19.1	0.74	18.8	0.74	18.8
(5)	1.00	25.4	1.25	31.8	1.49	37.8	1.49	37.8
(6)	½-20 UNF-2B	M12 x 1.75-6H	⅝-18 UNF-2B	M16 x 2-6H	0.75-16 UNF-2B ↧ 0.75	M20 X 1.5-6H ↧ 18.5	0.75-16 UNF-2B ↧ 0.75	M20 X 1.5-6H ↧ 18.5
(7)	1.88	47.8	2.38	60.5	2.88	73.2	2.88	73.2
(8)	1.23	31.2	1.75	44.5	1.76	44.8	1.76	44.8

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

SSMF FATIGUE RATED S-TYPE LOAD CELL (U.S. & METRIC)

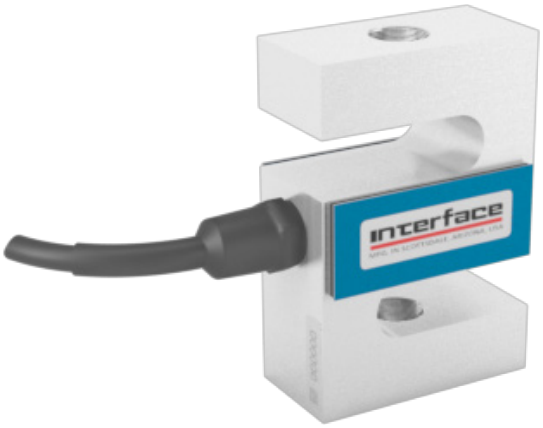
FEATURES & BENEFITS

- Fatigue-rated: 1x10⁷ fully reversed cycles
- Proprietary Interface temperature compensated strain gages
- Capacities 25 to 2.5K lbf (100 to 10K N)
- Environmentally sealed
- 0.02% nonrepeatability
- Near zero temp. effect on output – 0.0008%/°F (0.0015%/°C)
- Very low creep – 0.025%
- Tension and compression

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.03
Nonrepeatability – %RO		±0.02
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	0 to +150
	°C	-15 to +65
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % / deg	°F	±0.0008
	°C	±0.0015
Effect on Zero – %RO / deg	°F	±0.0015
	°C	±0.0027
ELECTRICAL		
Rated Output – mV/V (Nominal)		1.5
Zero Balance – %RO		±1.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Calibration		Tension
Safe Overload – %CAP		300
Deflection	in	0.002 to 0.003
	mm	0.05 to 0.08
Nat. Freq (Hz)		1500 to 3300
Fatigue-Rated		1x10⁷ fully reversed loading cycles
Material	25 -500 lbf	Aluminum
	100 - 2.5K N	
	1K - 2.5K lbf	Alloy steel
	5K - 10K N	

STANDARD CONFIGURATION



Model SSMF (Shown)

OPTIONS

- RC04E-10-6P connector – 250 lbf (11.1 kN) & higher on load cell body
- Standardized output
- Special temperature range
- Cable length
- Add connector cable
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

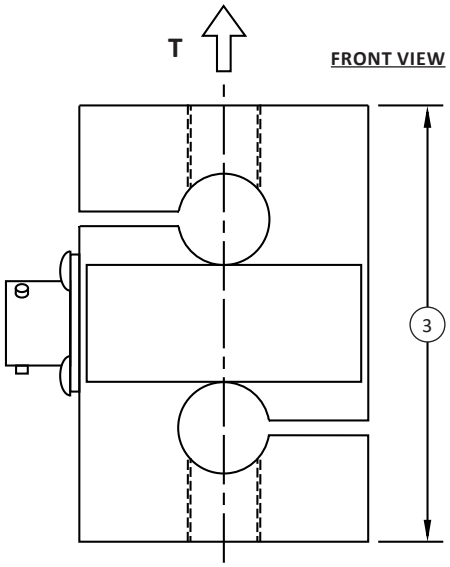
- Instrumentation
- Mounting hardware
- Load button

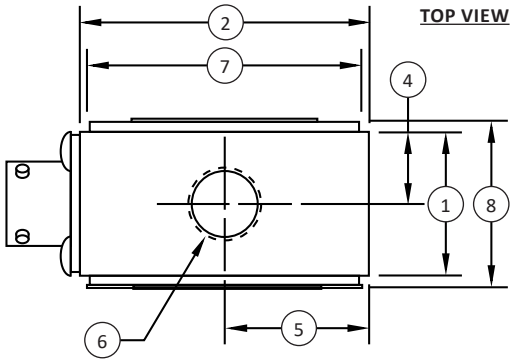
CONNECTOR OPTIONS

- 10 ft (3 m) integral cable

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

SSMF FATIGUE RATED S-TYPE LOAD CELL (U.S. & METRIC)





Notes:
**** T indicates tension load direction / primary axis***

DIMENSIONS

See Drawing	CAPACITY							
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	25	100	50, 125	250, 500	250, 500, 1K	1K, 2.5K, 5K	2.5K	10K
	in	mm	in	mm	in	mm	in	mm
(1)	0.50	12.7	0.50	12.7	1.00	25.4	1.50	38.1
(2)	2.00	50.8	2.00	50.8	2.00	50.8	2.50	63.5
(3)	2.50	63.5	2.50	63.5	3.00	76.2	3.50	88.9
(4)	0.25	6.40	0.25	6.40	0.50	12.7	0.75	19.1
(5)	1.00	25.4	1.00	25.4	1.00	25.4	1.25	31.8
(6)	¼-28 UNF-2B	M6 x 1-6H	¼-28 UNF-2B	M6 x 1-6H	½-20 UNF-2B	M12 x 1.75-6H	⅝-18 UNF-2B	M16 x 2-6H
(7)	1.88	47.8	1.88	47.8	1.88	47.8	2.38	60.5
(8)	0.82	20.8	0.72	18.3	1.22	31.0	1.75	44.5

SSM-FDH HIGH TEMPERATURE S-TYPE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface temperature compensated strain gages
- Environmentally sealed
- Tension and compression

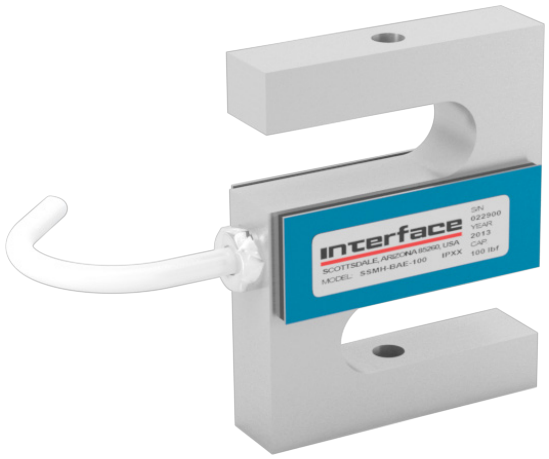
SPECIFICATIONS

ACCURACY – (MAX ERROR)			
Nonlinearity – %FS			±0.05
Hysteresis – %FS			±0.03
Nonrepeatability – %RO			± 0.02
Creep, in 20 min – %			± 0.03
TEMPERATURE			
Compensated Range	°F		0 to +300
	°C		-20 to +150
Operating Range	°F		-65 to +320
	°C		-50 to +160
Effect on Output – % / deg	°F		±0.0008
	°C		±0.0015
Effect on Zero – %RO / deg	°F		±0.0008
	°C		±0.0015
ELECTRICAL			
Rated Output – mV/V (Nominal)			3
Zero Balance – %RO			±1
Bridge Resistance – Ohm (Nominal)			350
Excitation Voltage – VDC MAX			15
Insulation Resistance – Megohm			> 5000
MECHANICAL			
Calibration			Tension
Safe Overload – %CAP			150

NATURAL FREQUENCY/DEFLECTION

lbf	N	Deflection		Nat. Freq. (Hz)
		in	mm	
50	200	0.08	0.003	1500
100	500	0.004	0.10	1850
150	667	0.004	0.10	1850
250	1K	0.006	0.15	2350
500	2K	0.005	0.127	2150
750	N/A	0.005	0.127	2350
1K	5K	0.005	0.127	3350
2K	10K	0.005	0.127	2400
3K	N/A	0.005	0.127	3000
5K	20K	0.005	0.127	2520
Material				Aluminum

STANDARD CONFIGURATION



MODEL SSM-FDH (Shown)

OPTIONS

- Add connector to cable
- Standardized output
- Cable length
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

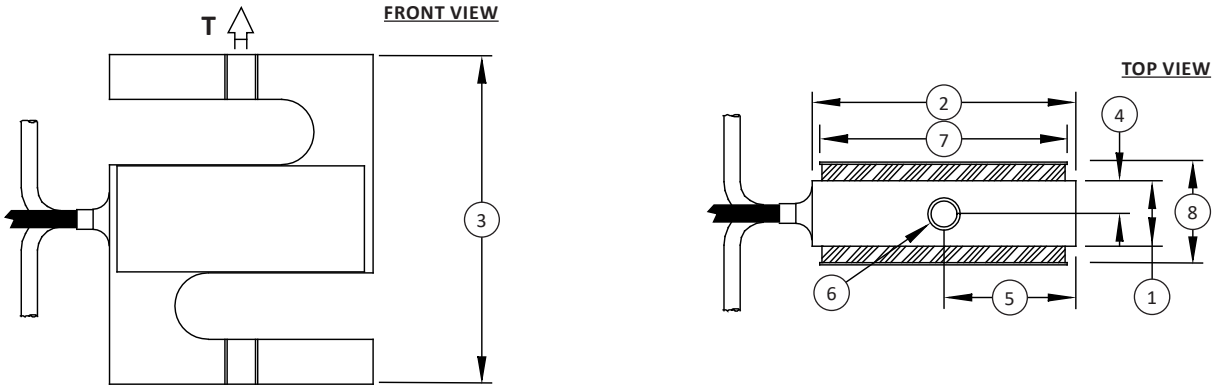
- Instrumentation
- Mounting hardware
- Load button

CONNECTOR OPTIONS

- 15 ft (4.5 m) integral cable

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

SSM-FDH HIGH TEMPERATURE S-TYPE LOAD CELL (U.S. & METRIC)



Notes:
**** T indicates tension load direction / primary axis***

DIMENSIONS

See Drawing	MODEL													
	SSM												SSM2	
	CAPACITY													
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	50	200	100, 150, 250	500, 700, 1000	500	2K	750, 1K	2.5K, 3K, 5K	2K, 3K	10K	5K	20K	5K	25K
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	0.50	12.7	0.50	12.7	1.00	25.4	1.00	25.4	0.98	24.9	1.50	38.1	1.48	37.6
(2)	2.00	50.8	2.00	50.8	2.00	50.8	2.00	50.8	1.98	50.3	2.50	63.5	2.98	75.7
(3)	2.50	63.5	2.50	63.5	3.00	76.2	3.00	76.2	2.98	75.7	3.50	88.9	3.98	101.1
(4)	0.25	6.40	0.25	6.40	0.50	12.7	0.50	12.7	0.50	12.7	0.75	19.1	0.74	18.8
(5)	1.00	25.4	1.00	25.4	1.00	25.4	1.00	25.4	1.00	25.4	1.25	31.8	1.49	37.8
(6)	¼-28 UNF-2B	M6 x 1-6H	¼-28 UNF-2B	M6 x 1-6H	½-20 UNF-2B	M12 x 1.75-6H	½-20 UNF-2B	M12 x 1.75-6H	½-20 UNF-2B	M12 x 1.75-6H	⅜-18 UNF-2B	M16 x 2-6H	¾-16 UNF-2B	M20 x 1.5-6H
(7)	1.88	47.8	1.88	47.8	1.88	47.8	1.88	47.8	1.88	47.8	2.38	60.5	2.88	73.2
(8)	0.82	20.8	0.72	18.3	1.18	30.0	1.25	31.8	1.23	31.2	1.75	44.5	1.76	44.8

MCC MINIATURE COMPRESSION LOAD CELL (U.S. & METRIC)

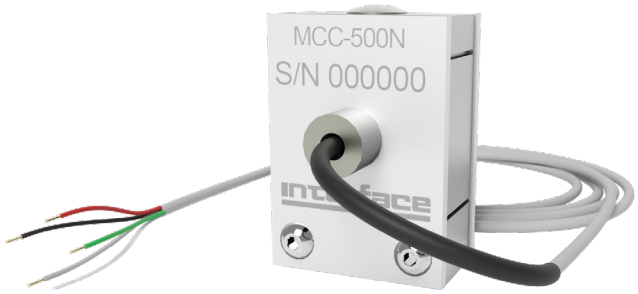
FEATURES & BENEFITS

- Proprietary Interface temperature compensated strain gages
- Performance to 0.10%
- Low height – 1.12 in (28.3 mm)
- 0.002%/°F temp. effect on output

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.10
Hysteresis – %FS		±0.10
Nonrepeatability – %RO		±0.05
Creep, in 20 min – %		±0.05
TEMPERATURE		
Compensated Range	°F	15 to 115
	°C	-10 to 45
Operating Range	°F	65 to 200
	°C	-55 to 90
Effect On Output – % / deg	°F	±0.001
	°C	±0.002
Effect On Zero – %RO / deg	°F	±0.005
	°C	±0.009
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.20 ± 0.20 Compression
Zero Balance – %RO		±2.0
Input Resistance – Ohm (Nominal)		350 +35 /-3.5
Output Resistance – Ohm (Nominal)		350 ± 3.5
Insulation Resistance – Megohm		5000
Excitation Voltage – VDC MAX		12
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP		±150
Weight (with cable)	lb	0.05
	kg	0.02
Cable Length	ft	5.0
	m	1.5
Material		Aluminum

STANDARD CONFIGURATION



Model MCC-500N (Shown)

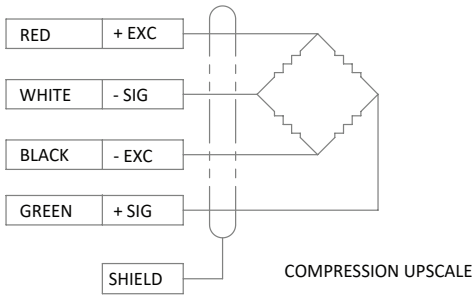
OPTIONS

- Cable length
- Standardized output
- Custom calibration
- Add connector to cable
- Special temperature range
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

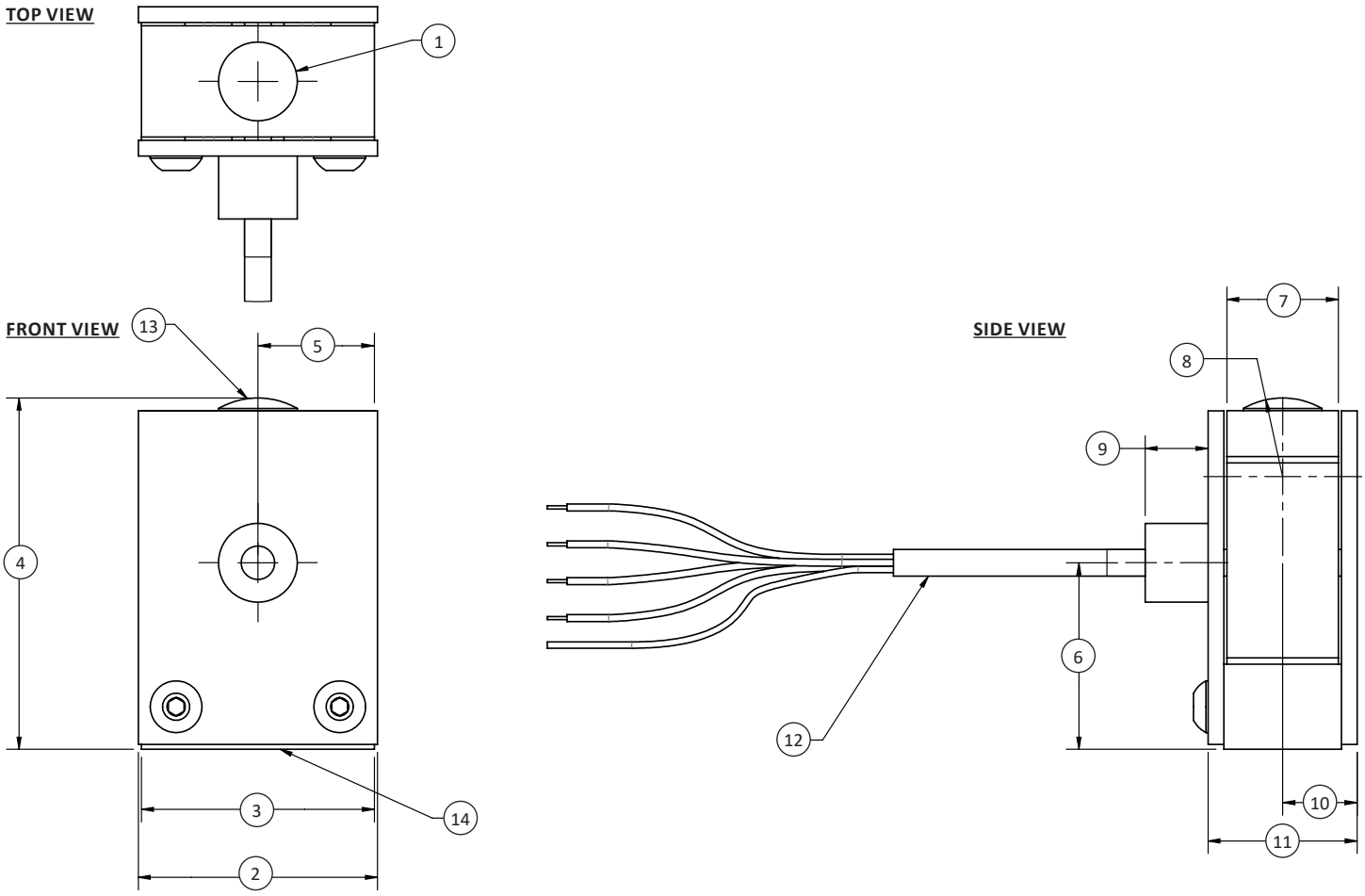
- Instrumentation

WIRING DIAGRAM



International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

MCC MINIATURE COMPRESSION LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	112.4	500
	in	mm
(1)	Ø0.25	Ø6.4
(2)	0.76	19.3
(3)	0.74	18.8
(4)	1.12	28.3
(5)	0.37	9.4
(6)	0.59	15.0
(7)	0.35	9.0
(8)	SR 0.25	SR 6.4
(9)	0.20	5.1
(10)	0.24	6.0
(11)	0.47	12.0
(12)	0.08 O.D. 4 Conductor 30 Gage Shielded Cable	2.1 O.D. 4 Conductor 30 Gage Shielded Cable
(13)	ACTIVE END	
(14)	INACTIVE END	

SPI PLATFORM SCALE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

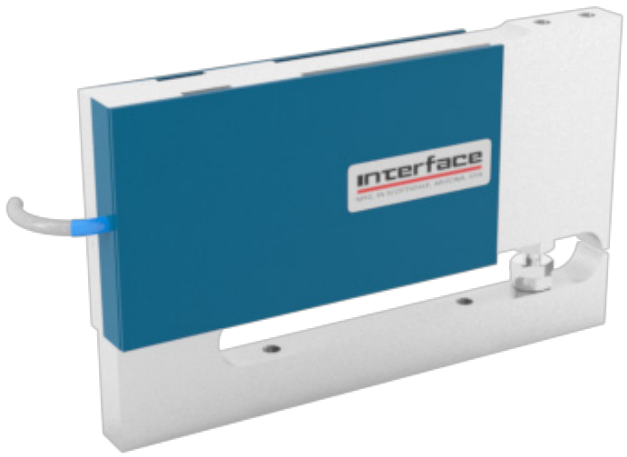
- Proprietary Interface temperature compensated strain gages
- 0.01% non-repeatability
- 400% compression overload protection
- 0.0008% / °F temp. effect on output
- Eccentric load compensated
- Space saving narrow housing per DIN EN 50022

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.02
Hysteresis – %FS		±0.02
Nonrepeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
Eccentric Load Sensitivity – % / in		0.012
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % / deg	°F	±0.0008
Effect on Zero – %RO / deg	°F	±0.0015
ELECTRICAL		
Rated Output – mV/V (Nominal)		3.0
Zero Balance – %RO		±5.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – MAX VDC		15
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Comp.
Safe Overload – %CAP		400

NATURAL FREQUENCY/DEFLECTION				
lbf	N	Deflection		Nat. Freq. – Hertz
		in	mm	
3	13.3	0.015	0.38	130
7.5	33.4	0.009	0.23	220
15	66.7	0.009	0.23	220
Material		Aluminum		

STANDARD CONFIGURATION



Model SPI (Shown)

OPTIONS

- Standardized output
- Custom calibration
- Transducer Electronic Data Sheet (TEDS)
- Add connector to cable
- Special temperature range

ACCESSORIES

- Instrumentation

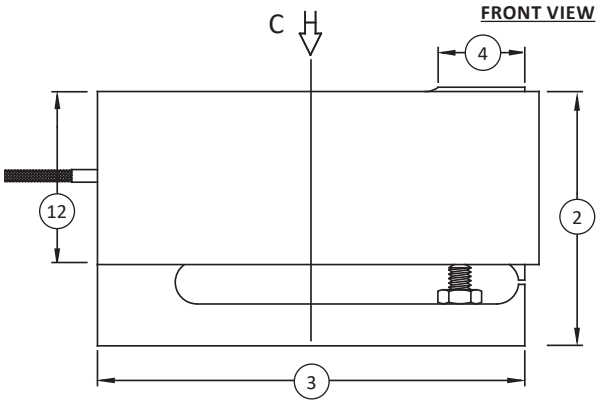
CONNECTOR OPTIONS

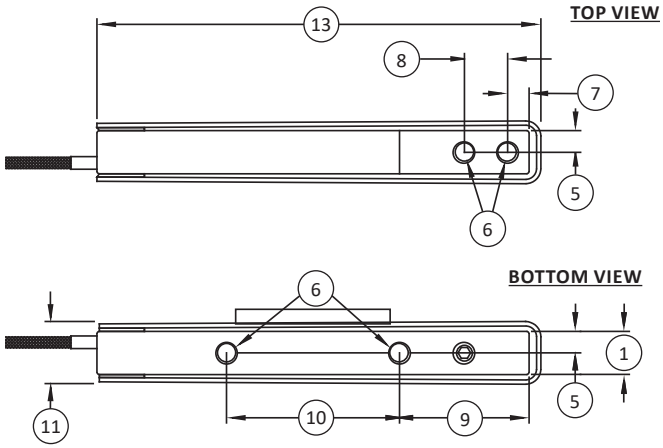
- 5 ft (1.5 m) integral cable

* Consult factory for more technical information

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SPI PLATFORM SCALE LOAD CELL (U.S. & METRIC)





Notes:
**** C indicates compression load direction / primary axis***

DIMENSIONS

See Drawing	CAPACITY					
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	3	**13.3**	**7.5**	**33.4**	**15**	**66.7**
	in	**mm**	**in**	**mm**	**in**	**mm**
(1)	0.38	9.60	0.50	12.7	1.00	25.4
(2)	2.99	75.9	2.99	75.9	2.99	75.9
(3)	5.00	127	5.00	127	5.00	127
(4)	1.00	25.4	1.00	25.4	1.00	25.4
(5)	0.19	4.80	0.25	6.40	0.5	12.7
(6)	10-32 UNF-2B ↧ 0.50	10-32 UNF-2B ↧ 12.7	¼-28 UNF-2B ↧ 0.56	¼-28 UNF-2B ↧ 14.2	¼-28 UNF-2B ↧ 0.56	¼-28 UNF-2B ↧ 14.2
(7)	0.25	6.40	0.25	6.40	0.25	6.40
(8)	0.50	12.7	0.50	12.7	0.50	12.7
(9)	1.50	38.1	1.50	38.1	1.50	38.1
(10)	2.00	50.8	2.00	50.8	2.00	50.8
(11)	0.62	15.7	0.75	19.0	1.25	31.8
(12)	2.00	50.8	2.00	50.8	2.00	50.8
(13)	5.13	130.3	5.13	130.3	5.13	130.3

SPI PLATFORM HIGH CAPACITY SCALE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

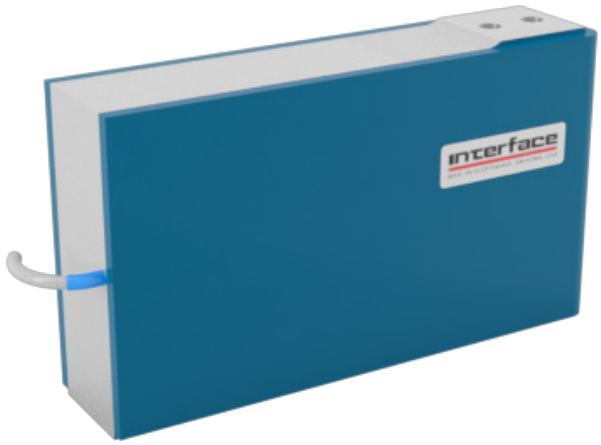
- Capacities: 25, 50, 100, 150 lbf (111, 222, 445, 667 N)
- Proprietary Interface temperature compensated strain gages
- 0.01% non-repeatability
- Safe overload to 200%
- 0.0008%/°F temp. effect on output
- Eccentric load compensated

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.02
Hysteresis – %FS		±0.02
Nonrepeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
Eccentric Load Sensitivity – % / in		0.012
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % / deg	°F	±0.0008
Effect on Zero – %RO / deg	°F	±0.0015
ELECTRICAL		
Rated Output – mV/V (Nominal)		3.0
Zero Balance – %RO		±5.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP		200

NATURAL FREQUENCY/DEFLECTION				
lbf	N	Deflection		Nat. Freq. – Hertz
		in	mm	
25	111	0.008	0.20	240
50	222	0.008	0.20	310
100	445	0.007	0.18	470
150	667	0.005	0.13	580
Material				Aluminum

STANDARD CONFIGURATION



Model SPI (Shown)

OPTIONS

- Cable length
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Special temperature range
- Add connector to cable

ACCESSORIES

- Instrumentation

CONNECTOR OPTIONS

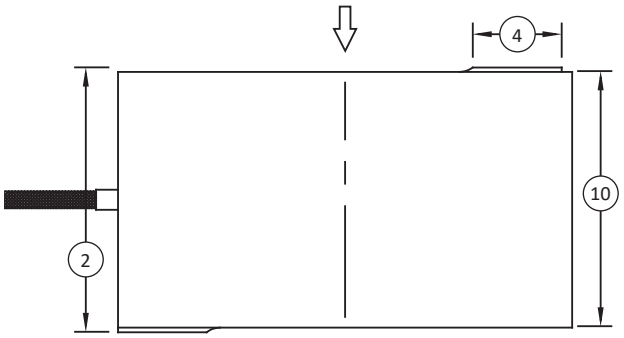
- 5 ft (1.5 m) integral cable

* Consult factory for more technical information.

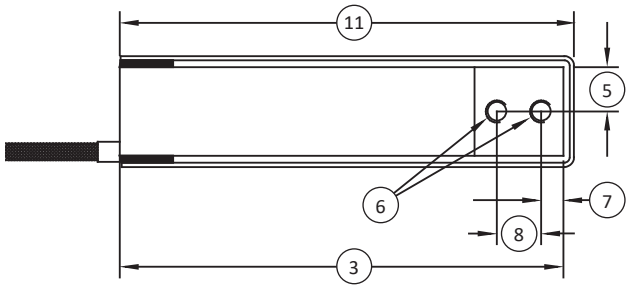
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

SPI PLATFORM HIGH CAPACITY SCALE LOAD CELL (U.S. & METRIC)

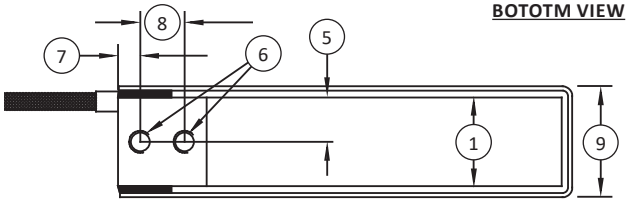
FRONT VIEW



TOP VIEW



BOTOTM VIEW



DIMENSIONS

See Drawing	CAPACITY			
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	25, 50	111, 222	100, 150	445, 667
	in	mm	in	mm
(1)	1.00	25.4	1.00	25.4
(2)	3.00	76.2	3.00	76.2
(3)	5.00	127	6.00	152.4
(4)	1.00	25.4	1.50	38.1
(5)	0.50	12.7	0.50	12.7
(6)	¼-28 UNF-2B ↧ 0.56	¼-28 UNF-2B ↧ 14.2	¼-28 UNF-2B ↧ 0.56	¼-28 UNF-2B ↧ 14.2
(7)	0.25	6.4	0.25	6.4
(8)	0.50	12.7	1.00	25.4
(9)	1.25	31.8	1.25	31.8
(10)	2.88	73.0	2.88	73.0
(11)	5.12	130	6.12	155.4

ULC ULTRA LOW CAPACITY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface temperature compensated strain gages
- Highest performance gram cell in the world
- Overload protected
- Safe side load overload to 5X capacity
- Low extraneous load sensitivity
- Low temperature effect on zero (0.002%/°F)
- Capacity down to 50 grams
- Tension and compression

SPECIFICATIONS

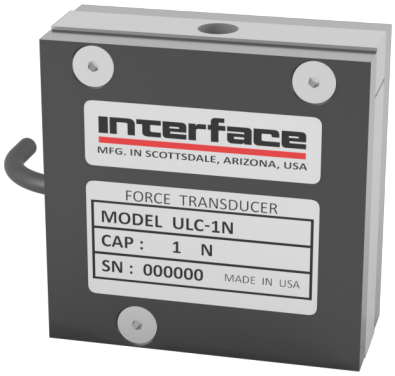
ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		±0.05
Creep, in 20 min – %	(0.5 N)	±0.1
	(0.11 lbf)	
	(All others)	±0.05
TEMPERATURE		
Compensated Range	°C	-10 to +45
	°F	+15 to +115
Operating Range	°C	-55 to +90
	°F	-65 to +200
Effect on Output – % / deg	°C	±0.002
	°F	±0.001
Effect on Zero – %RO / deg	°C	±0.004
	°F	±0.002
ELECTRICAL		
Rated Output – mV/V (Nominal)	(0.5 N)	±1.5
	(0.11 lbf)	
	(All others)	±2.0
Zero Balance – %RO (horiz.)		±2.0
Input Resistance – Ohms		350 (+35/-3.5)
Output Resistance – Ohms		350 (±3.5)
Excitation Voltage – VDC MAX		12
Insulation Resistance – Megohms		> 5000
MECHANICAL		
Calibration		Tension
Safe Axial Overload – %CAP		±1000
Safe Side Overload – %CAP		±500
Safe Load Axis Moment – %CAP x 1 in		±500

NATURAL FREQUENCY/DEFLECTION

N	lbf	Deflection		Nat. Freq. (Hz)
		mm	in	
0.5	0.11	0.2794	0.011	120
1	0.22	0.2794	0.011	125
2	0.45	0.2032	0.008	200

Material	Aluminum

STANDARD CONFIGURATION



Model ULC-1N (Shown)

OPTIONS

- Cable length
- Transducer Electronic Data Sheets (TEDS)
- Custom calibration
- Standardized output
- Special temperature range

ACCESSORIES

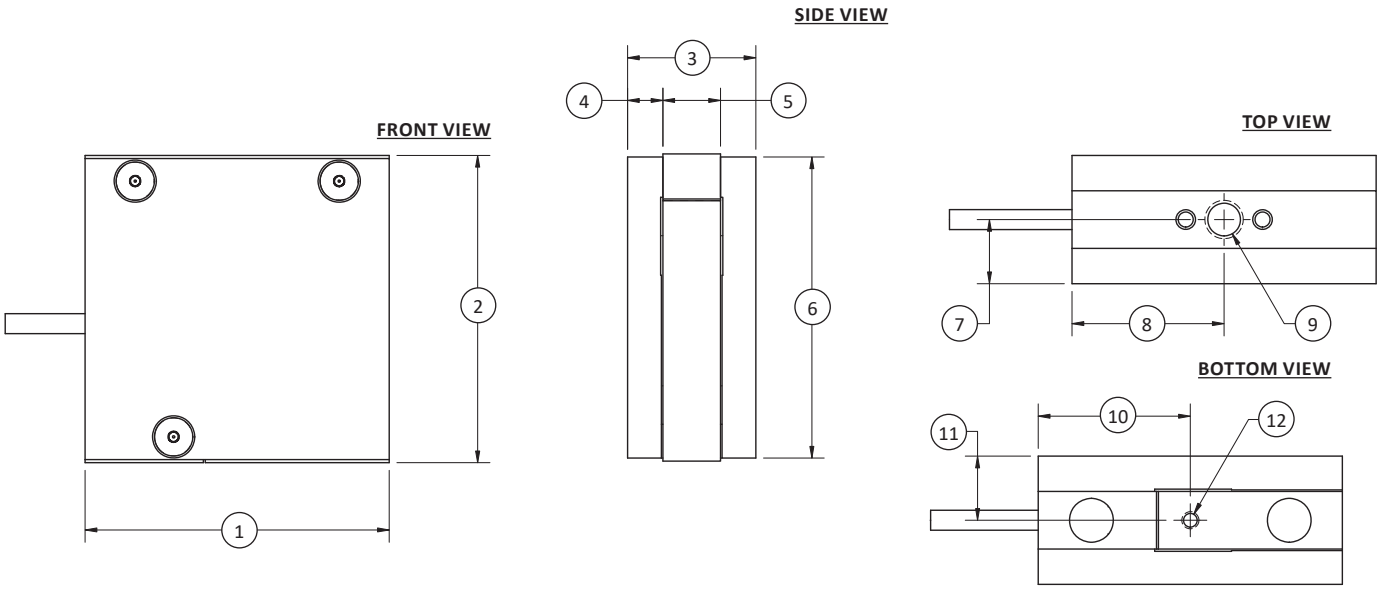
- Instrumentation

CONNECTOR OPTIONS

- 1.5 m (5 ft) cable

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

ULC ULTRA LOW CAPACITY LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY	
	Metric (N*)	U.S. (lbf)
	0.1, 0.5, 1, 2	0.02, 0.11, 0.22, 0.45
	mm	in
(1)	50.3	1.98
(2)	50.8	2.00
(3)	21.2	0.84
(4)	5.8	0.23
(5)	9.5	0.38
(6)	49.8	1.96
(7)	10.6	0.42
(8)	25.1	0.99
(9)	¼-28 UNF ↧ 8.1	¼-28 UNF ↧ 0.32
(10)	25.1	0.99
(11)	10.6	0.42
(12)	4-40 UNC-2B ↧ 4.8	4-40 UNC-2B ↧ 0.19

1 Newton = 102 gram force
Note: Other sizes are available – contact factory

Notes:

Notes:

Torque Transducers

Reaction (Static) Flange Style 156

Reaction (Static) Shaft Style 191

Reaction (Static) Rod End 206

Rotary (Dynamic) Wireless 207

Rotary (Dynamic) 210

Spindle Style 267

USB Options 271

5330 HOLLOW FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- High torsional stiffness
- Extraneous load resistance
- Compact size
- Large thru-hole

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.1
Hysteresis – %FS		±0.25
Nonrepeatability – %RO		±0.05
TEMPERATURE		
Effect on Output – % / deg	°F	±0.002
Effect on Zero – %RO / deg	°F	±0.002
Compensated Range	°F	+75 to +175
	°C	+24 to +80
Operating Range	°F	-65 to +225
	°C	-54 to +107
ELECTRICAL		
Rated Output – mV/V (Nominal)	60, 120 lbf-in	1.25
	6.78, 13.6 Nm	
	240 lbf-in	1.5
	27.1 Nm	
	600, 1.2K lbf-in	1.25
	67.8, 136 Nm	
	3K, 6K lbf-in	1.0
	339, 679 Nm	
	10K, 20K, 50K, 100K lbf-in	2.0
	1.13K, 2.26K5.56K, 11.3K Nm	
Bridge Resistance – Ohm (Nominal)	60 - 1.2K lbf-in	350
	6.78 - 136 Nm	
	3K - 100K lbf-in	700
	339 - 11.3K Nm	
Excitation Voltage – VDC MAX		10
MECHANICAL		
Calibration		CW & CCW
Safe Overload – %CAP		200
Material	60 - 120 lbf-in	Aluminum
	6.78 - 13.6 Nm	
	240 - 100K lbf-in	4340 Nickel Plated Stainless steel
	27.1 - 11.3K Nm	

STANDARD CONFIGURATION



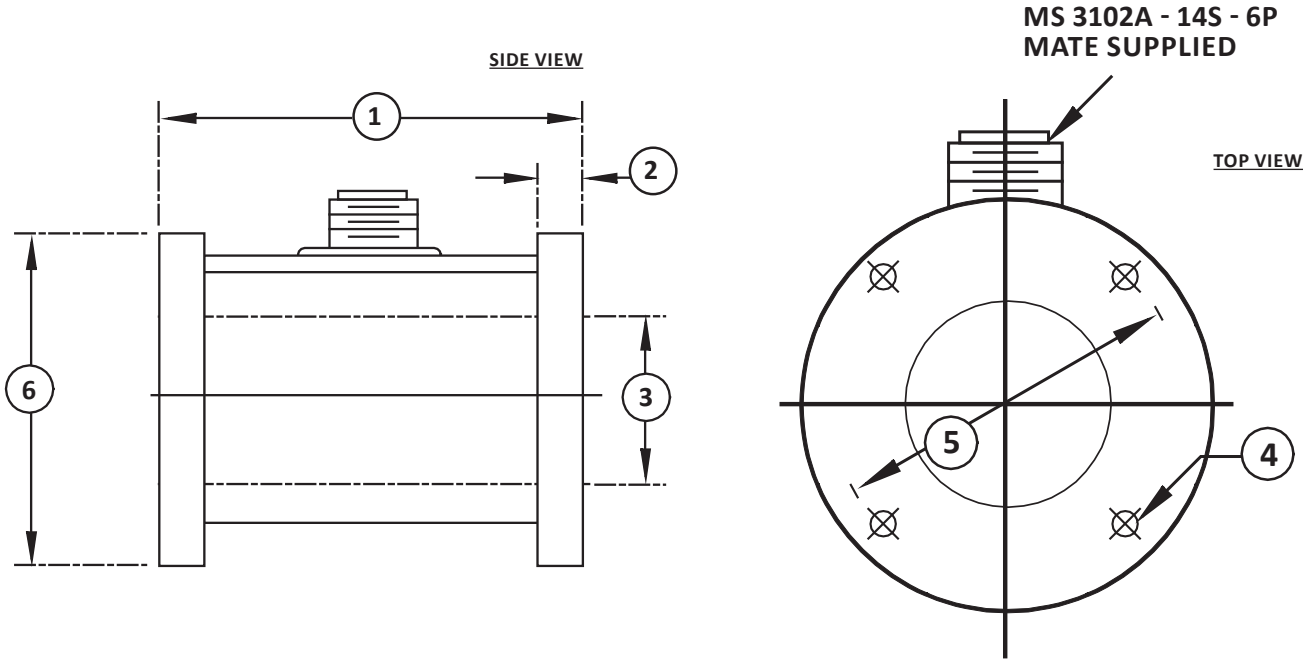
MODEL 5330 (Shown)

PERFORMANCE PARAMETERS

CAPACITY		MAX THRUST LOAD		MAX BENDING MOMENT	
lbf-in	Nm	lbf	N	lbf-in	Nm
60	6.78	100	445	50	5.65
120	13.6	120	534	60	6.78
240	27.1	240	1.07K	120	13.6
600	67.8	600	2.67K	300	33.9
1.2K	136	1.2K	5.34K	600	67.8
3K	339	3K	13.3K	1.5K	169
6K	678	6K	26.7K	3K	339
10K	1.13K	2.5K	11.1K	2.25K	254
20K	2.26K	5K	22.2K	4.5K	508
50K	5.65K	10K	44.5K	10K	1.13K
100K	11.3K	20K	89K	20K	2.26K

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

5330 HOLLOW FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY									
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	60, 120, 240	6.78, 13.6, 17.1	600, 1200	67.8, 136	3K, 6K	339, 678	10K, 20K	1.13K, 2.26K	50K, 100K	5.65K, 11.3K
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	2.125	53.98	2.125	53.98	2.125	53.98	3.5	88.9	3.5	88.9
(2)	0.3125	7.938	0.3125	7.938	0.3125	7.938	0.625	15.88	0.625	15.88
(3)	0.875 THRU	22.23 THRU	1.375 THRU	34.93 THRU	2.375 THRU	60.33 THRU	3.375 THRU	85.73 THRU	3.375 THRU	85.73 THRU
(4)	0.203 THRU 2 places	5.16 THRU 2 places	0.39 THRU 2 places	9.9 THRU 2 places	0.406 THRU 4 places	10.31 THRU 4 places	3/8 - 24 UNF 6 places		0.63 THRU 8 places	16.0 THRU 8 places
(5)	2.0	50.8	2.5	63.5	3.375	85.73	4.375	111.13	7.00	177.8
(6)	2.5	63.5	3.25	82.6	4.0	101.6	5.0	127.0	8.5	215.9

Notes:
– Error due to bending <1% FS at maximum allowable bending load.
– Allowable loads cannot be applied simultaneously

5350 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Threaded mounting holes
- Compact size
- Optional ±10 VDC output available on 100 ozf-in and above

STANDARD CONFIGURATION



MODEL 5350 (Shown)

SPECIFICATIONS

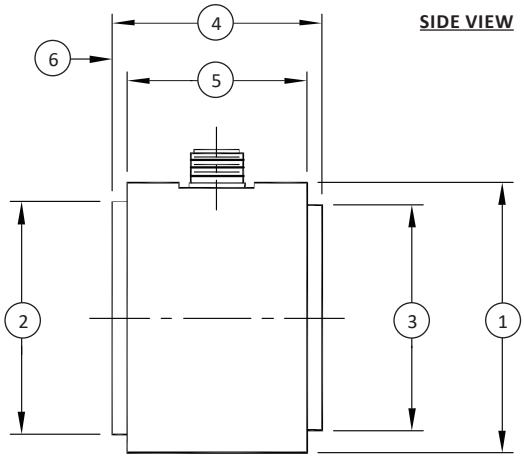
ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.1
Hysteresis – %FS		± 0.1
Nonrepeatability – %RO		± 0.05
TEMPERATURE		
Compensated Range	°F	+75 to +175
	°C	+24 to +80
Operating Range	°F	-65 to +225
	°C	-54 to +107
Effect on Output – % /deg	°F	±0.002
Effect on Zero – %RO / deg	°F	±0.002
ELECTRICAL		
Rated Output – mV/V (Nominal)	10 ozf-in	2.0
	0.07 Nm	1.3
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		10
MECHANICAL		
Calibration		CW & CCW
Safe Overload – %CAP		200
Material		Aluminum

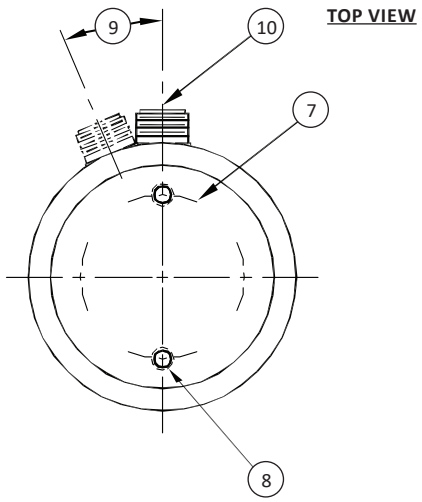
PERFORMANCE PARAMETERS

CAPACITY		TORQUE OVERLOAD		TORSIONAL STIFFNESS (FROM FLANGE FACE-TO-FACE)		WEIGHT		MAX THRUST LOAD		MAX BENDING MOMENT		MAX SHEAR LOAD	
lbf-in	Nm	lbf-in	Nm	lbf-in/rad	Nm/rad	lbs	kg	lbf	N	lbf-in	Nm	lbf	N
10	1.13	20	2.26	650	73.5	0.5	0.2	40	178	10	1.13	10	44.5
20	2.26	40	4.52	1.8K	203			80	356	20	2.26	20	89
50	5.65	100	11.3	7.4K	836			200	890	50	5.65	50	222
100	11.3	200	22.6	13.4K	1.51K	1.2	0.5	100	445	50	5.65	50	222
200	22.6	400	45.2	37.5K	4.24K			200	890	100	11.3	100	445

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

5350 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)





DIMENSIONS

See Drawing	CAPACITY	
	U.S. (ozf-in)	Metric (Nm)
	10, 20, 50, 100, 200	0.07, 0.14, 0.35, 0.71, 1.41
	in	mm
(1)	Ø1.50	Ø38.1
(2)	Ø1.00	Ø25.4
(3)	Ø0.875	Ø22.225
(4)	1.50	38.1
(5)	1.375	34.925
(6)	0.0625	1.5875
(7)	Ø0.563	Ø14.3002
(8)	#4-40 UNC-2B 2 places	
(9)	0°	
(10)	Conxall 7282-6PG-300	

5355 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Threaded mounting holes
- Compact size
- Optional ±10 VDC output available on 100 ozf-in (0.71 Nm) and above

STANDARD CONFIGURATION



Model 5355 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.1
Hysteresis – %FS		± 0.1
Nonrepeatability – %RO		± 0.05
TEMPERATURE		
Compensated Range	°F	+75 to +175
	°C	+24 to +80
Operating Range	°F	-65 to +225
	°C	-54 to +107
Effect on Output – % / deg	°F	±0.002
Effect on Zero – %RO / deg	°F	±0.002
ELECTRICAL		
Rated Output – mV/V (Nominal)	10 ozf-in	2.0
	0.07 Nm	1.3
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		10
MECHANICAL		
Calibration		CW & CCW
Safe Overload – %CAP		200
Material	10 - 500 lbf-in	Aluminum
	1K - 100K lbf-in	Stainless steel

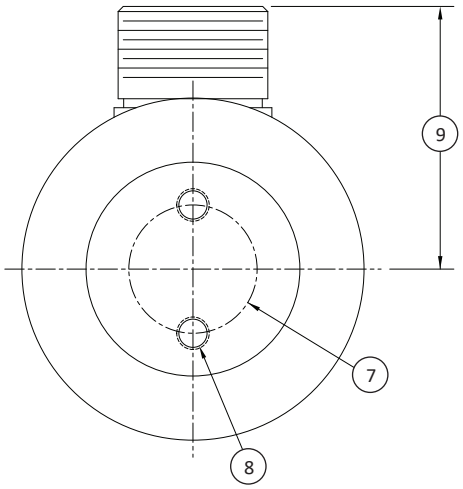
PERFORMANCE PARAMETERS

CAPACITY		TORQUE OVERLOAD		TORSIONAL STIFFNESS (FROM FLANGE FACE-TO-FACE)		WEIGHT		MAX THRUST LOAD		MAX BENDING TORQUE		MAX SHEAR LOAD	
lbf-in	Nm	lbf-in	Nm	lbf-in/rad	Nm/rad	lbs	kg	lbf	N	lbf-in	Nm	lbf	N
20	2.26	40	4.52	1.8K	203	0.5	0.2	80	356	20	2.26	20	89
50	5.65	100	11.3	7.4K	836			200	890	50	5.65	50	222
100	11.3	200	22.6	13.4K	1,510	1.2	0.5	100	445	50	5.65	50	222
200	22.6	400	45.2	37.5K	4,240			200	890	100	11.3	100	445
500	56.5	1K	113	145K	16.4K			500	2.24K	250	28.2K	250	1.11K
1K	113	2K	226	270K	30.5K	8	4	1K	4.45K	500	56.5	500	2.24K
2K	226	4K	452	775K	87.6K			2K	8.9K	1K	113	1K	4.45K
5K	565	10K	1.13K	3000K	339K			5K	22.2K	2.5K	282	2.5K	11.1K
10K	1.13K	20K	2.26K	2000K	226K	20	9	10K	44.5K	5K	565	5K	22.2K
20K	2.26K	40K	4.52K	5000K	565K			20K	89K	10K	1.13K	10K	44.5K
50K	5.65K	100K	11.3K	13000K	1470K	41	19	50K	222K	25K	2.82K	25K	111K
100K	11.3K	200K	22.6K	33000K	3730K	42	19	100K	445K	50K	5.65K	50K	222K

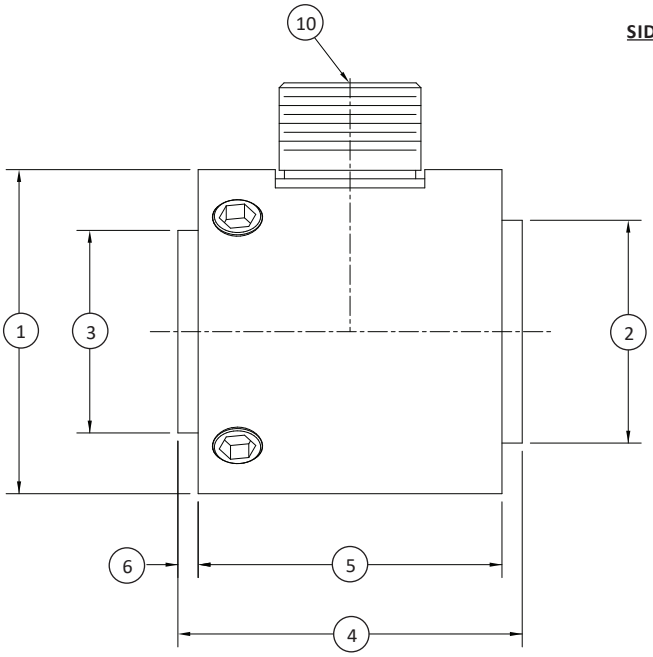
U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

5355 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

TOP VIEW



SIDE VIEW



DIMENSIONS

See Drawing	CAPACITY									
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	20, 50	2.26, 5.65	100, 200, 500	11.3, 22.6, 56.5	1K, 2K, 5K	113, 226, 565	10K, 20K	1.13K, 2.26K	50K, 100K	5.65K, 11.3K
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	2.00	50.8	2.75	69.85	4.50	114.3	6.00	152.4	8.00	203.2
(2)	1.375	34.93	2.000	50.8	3.875	98.43	5.375	136.5	7.375	187.3
(3)	1.250	31.75	1.875	47.63	3.750	95.25	5.25	133.4	7.250	184.2
(4)	2.125	53.98	2.75	69.85	3.50	88.9	4.50	114.3	5.50	139.7
(5)	1.875	47.63	2.375	60.33	3.00	76.2	3.75	95.25	4.75	120.7
(6)	0.125	3.175	0.188	4.775	0.25	6.35	0.375	9.525	0.375	9.525
(7)	0.750	19.05	1.250	31.75	2.750	69.85	4.000	101.6	5.750	146.1
(8)	#10-32 UNF-2B – 2 places		¼-20 UNC-2B – 4 places		⅜-24 UNF-2B – 4 places		7⁄16-20 UNF-2B – 8 places		⅝-18 UNF-2B – 12 places	
	↧0.25	↧6.4	↧0.38	↧9.7	↧0.50	↧12.7	↧0.62	↧15.7	↧0.75	↧19.1
(9)	1.563	39.7	1.938	49.2	2.813	71.4	3.625	92.1	4.656	118.3
(10)	MS3102A-14S-6P		MS3102A-14S-6P		MS3102A-14S-6P		MS3102A-14S-6P		MS3102A-14S-6P	

5400 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 1K to 500K lbf-in (110 to 55K Nm)
- High torsional stiffness
- Flange mount
- Low deflection
- Metric models have mounting holes sized for metric fasteners

STANDARD CONFIGURATION



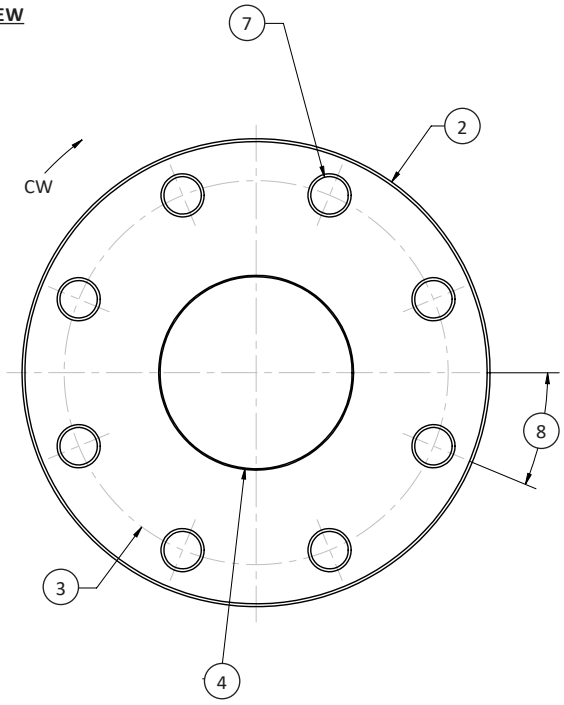
MODEL 5410-5K (Shown)

SPECIFICATIONS

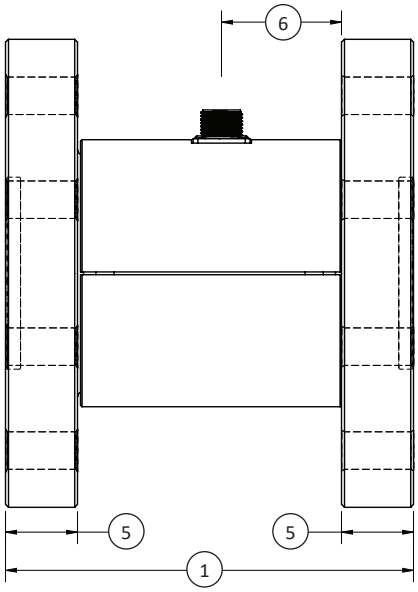
PARAMETERS		MODEL									
		5410		5411		5412		5413		5414	
		CAPACITY									
		U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
		1K, 2K, 5K	110, 220, 550	10K, 20K	1.1K, 2.2K	50K, 100K	5.5K, 11K	200K	22K	300K, 500K	33K, 55K
ACCURACY – (MAX ERROR)											
Nonlinearity – %FS		±0.1		±0.1		±0.1		±0.1		±0.1	
Combined Error – %FS		±0.1		±0.1		±0.1		±0.1		±0.1	
Nonrepeatability – %RO		±0.02		±0.02		±0.02		±0.02		±0.02	
TEMPERATURE											
Compensated Range	°F	+70 to +170		+70 to +170		+70 to +170		+70 to +170		+70 to +170	
	°C	+21 to +77		+21 to +77		+21 to +77		+21 to +77		+21 to +77	
Operating Range	°F	-65 to +200		-65 to +200		-65 to +200		-65 to +200		-65 to +200	
	°C	-54 to +93		-54 to +93		-54 to +93		-54 to +93		-54 to +93	
Effect on Zero – %RO / deg	°F	±0.002		±0.002		±0.002		±0.002		±0.002	
	°C	±0.004		±0.004		±0.004		±0.004		±0.004	
Effect on Output – % / deg	°F	±0.002		±0.002		±0.002		±0.002		±0.002	
	°C	±0.004		±0.004		±0.004		±0.004		±0.004	
ELECTRICAL											
Rated Output – mV/V (Nominal)		2.0		2.0		2.0		2.0		2.0	
Excitation Voltage – VDC MAX		20		20		20		20		20	
Bridge Resistance – Ohm (Nominal)		350		350		350		350		350	
Electrical Connection		MS3102E-14S-5P		MS3102E-14S-5P		MS3102E-14S-5P		MS3102E-14S-5P		MS3102E-14S-5P	
MECHANICAL											
Safe Overload – %CAP		±150		±150		±150		±150		±150	
Deflection at Capacity – rad		0.005		0.004		0.006, 0.005		0.006		0.005	
Overhung Moment MAX	U.S. (lbf-in)	500, 1K, 2K		5K, 10K		24K, 50K		90K		150K, 200K	
	Metric (Nm)	56.5, 110, 220		550, 1.1K		2.71K, 5.65K		10.2K		16.9K, 22.6K	
Side Load – MAX	U.S. (lbf)	1K, 1.5K, 2K		4K, 6.5K		12K, 20K		30K		42K, 55K	
	Metric (kN)	4.45, 6.67, 8.9		17.8, 28.9		53.4, 89		133		187, 245	
Axial Load – MAX	U.S. (lbf)	1.5K, 2K, 3K		6K, 10K		18K, 30K		40K		60K, 80K	
	Metric (kN)	6.67, 8.9, 13.3		26.7, 44.5		80.1, 133		178		267, 356	
Material		Alloy steel		Alloy steel		Alloy steel		Alloy steel		Alloy steel	

5400 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

TOP VIEW



SIDE VIEW



DIMENSIONS

See Drawing	MODEL									
	5410		5411		5412		5413		5414	
	CAPACITY									
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	1K, 2K, 5K	110, 220, 550	10K, 20K	1.1K, 2.2K	50K, 100K	5.5K, 11K	200K	22K	300K, 500K	33K, 55K
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	3.0	76.2	3.5	88.9	7.38	187.5	8.5	219.5	10.5	266.7
(2)	Ø 4.0	Ø 101.6	Ø 5.0	Ø 127.0	Ø 8.0	Ø 203.2	Ø 9.75	Ø 247.7	Ø 14.0	Ø 355.6
(3)	Ø 3.25	Ø 82.55	Ø 4.25	Ø 107.95	Ø 6.5	Ø 165.1	Ø 8.0	Ø 203.2	Ø 11.0	Ø 279.4
(4)	Ø 1.5 +0.002, -0.00 ↧ 0.13	Ø 38.1 +0.05, -0.00 ↧ 3.3	Ø 2.0 +0.002, -0.00 ↧ 0.25	Ø 50.8 +0.05, -0.00 ↧ 6.4	Ø 3.5 +0.002, -0.00 ↧ 0.31	Ø 88.9 +0.05, -0.00 ↧ 7.9	Ø 4.0 +0.002, -0.00 ↧ 0.31	Ø 101.6 +0.05, -0.00 ↧ 7.9	Ø 6.0 +0.002, -0.00 ↧ 0.31	Ø 152.4 +0.05, -0.00 ↧ 7.9
(5)	0.5	12.7	0.75	19.1	1.5	38.1	1.5	38.1	2.0	50.8
(6)	0.94	23.9	0.94	23.9	2.5	63.5	2.5	63.5	3.5	88.9
(7)	8x Ø 0.328	8x Ø 8.33	8x Ø 0.39	8x Ø 9.91	8x Ø 0.65	8x Ø 16.51	8x Ø 0.781	8x Ø 19.84	8x Ø 1.031	8x Ø 26.19
(8)	22.5 °		22.5 °		22.5 °		22.5 °		22.5 °	
*1	5⁄16 - 24	M8 x 1.25	3⁄8 - 24	M10 x 1.5	5⁄8 - 18	M16 x 2	3⁄4 - 16	M20 x 2.5	1 - 12	M24 x 3
*2	300	34	600	68	2400	270	4400	500	9000	1000

***1 - Recommended mounting screw size**

***2 - Recommended mounting torque – lbf-in/Nm**

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

5500 CALIBRATION GRADE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

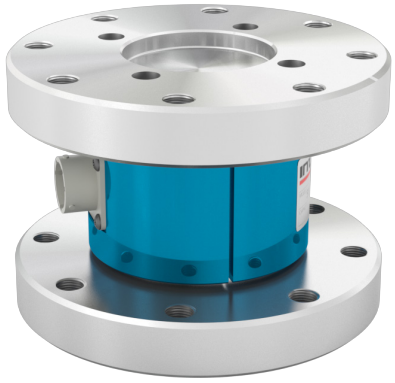
FEATURES & BENEFITS

- Capacities from 2K to 300K lbf-in (220 to 33K Nm)
- High torsional stiffness
- Flange to flange mounting
- Low deflection
- Low overhang moment sensitivity
- Low axial force sensitivity

OPTIONS

- ASTM E2428 Calibration (Some limitations apply, consult factory)
- Mating connector
- Mating cable

STANDARD CONFIGURATION



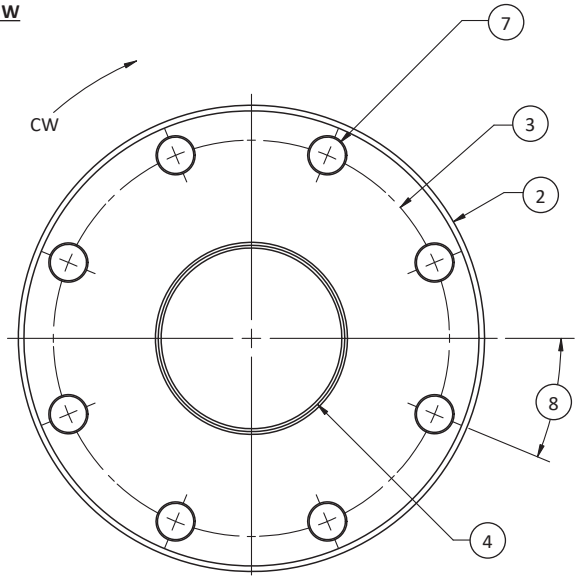
MODEL 5500 (Shown)

SPECIFICATIONS

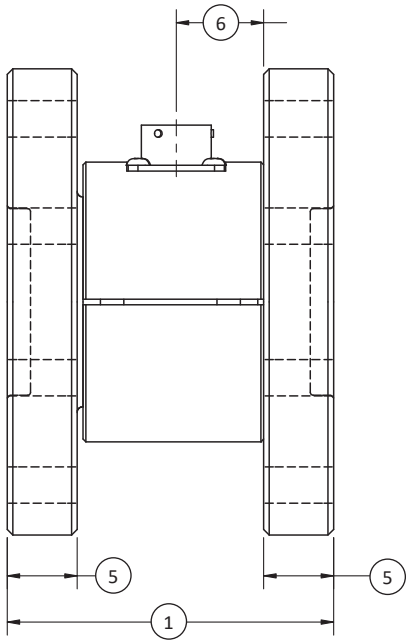
PARAMETERS		MODEL									
		5510		5511		5512		5513		5514	
		CAPACITY									
		U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
		2K, 5K	220, 550	10K, 20K	1.1K, 2.2K	50K, 100K	5.5K, 11K	200K	22K	300K	33K
ACCURACY – (MAX ERROR)											
Nonlinearity – %FS		±0.05		±0.05		±0.05		±0.05		±0.05	
Hysteresis – %FS		±0.04		±0.04		±0.04		±0.04		±0.04	
Nonrepeatability – %RO		±0.01		±0.01		±0.01		±0.01		±0.01	
TEMPERATURE											
Compensated Range	°F	+50 to +150		+50 to +150		+50 to +150		+50 to +150		+50 to +150	
	°C	+10 to +65		+10 to +65		+10 to +65		+10 to +65		+10 to +65	
Operating Range	°F	-65 to +200		-65 to +200		-65 to +200		-65 to +200		-65 to +200	
	°C	-54 to +93		-54 to +93		-54 to +93		-54 to +93		-54 to +93	
Effect on Zero – %RO / deg	°F	±0.0008		±0.0008		±0.0008		±0.0008		±0.0008	
	°C	±0.0015		±0.0015		±0.0015		±0.0015		±0.0015	
Effect on Output – % / deg	°F	±0.001		±0.001		±0.001		±0.001		±0.001	
	°C	±0.002		±0.002		±0.002		±0.002		±0.002	
ELECTRICAL											
Rated Output – mV/V (Nominal)		2.0		2.0		2.0		2.0		2.0	
Excitation Voltage – VDC MAX		20		20		20		20		20	
Bridge Resistance – Ohm (Nominal)		700		700		700		700		700	
Electrical Connection		PT02E-12-8P		PT02E-12-8P		PT02E-12-8P		PT02E-12-8P		PT02E-12-8P	
MECHANICAL											
Safe Overload – %CAP		±150		±150		±150		±150		±150	
Deflection at Capacity – rad		0.005		0.004		0.006, 0.005		0.006		0.005	
Overhung Moment MAX	U.S. (lbf-in)	1K, 2K		5K, 10K		24K, 50K		90K		150K	
	Metric (Nm)	113, 226		565, 1.13K		2.71K, 5.65K		10.2K		16.9K	
Side load MAX	U.S. (lbf)	1.5K, 2K		4K, 6.5K		12K, 20K		30K		42K	
	Metric (kN)	6.67, 8.9		17.8, 28.9		53.4, 89		133		187	
Axial load MAX	U.S. (lbf)	2K, 3K		6K, 10K		18K, 30K		40K		60K	
	Metric (kN)	8.9		26.7, 44.5		80.1, 133		178		267	
Material		Alloy steel		Alloy steel		Alloy steel		Alloy steel		Alloy steel	

5500 CALIBRATION GRADE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

TOP VIEW



SIDE VIEW



DIMENSIONS

See Drawing	MODEL					
	5510		5511		5514	
	CAPACITY					
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	2K, 5K	220, 550	10K, 20K	1.1K, 2.2K	300K	33K
	in	mm	in	mm	in	mm
(1)	3.0	76.2	3.5	88.9	10.5	266.7
(2)	Ø 4.0	Ø 101.6	Ø 5.0	Ø 127.0	Ø 14.0	Ø 355.6
(3)	Ø 3.25	Ø 82.55	Ø 4.25	Ø 107.95	Ø 11.0	Ø 279.4
(4)	Ø 1.5 +0.002, -0.00 ↧ 0.13	Ø 38.1 +0.05, -0.00 ↧ 3.3	Ø 2.0 +0.002, -0.00 ↧ 0.25	Ø 50.8 +0.05, -0.00 ↧ 6.4	Ø 6.0 +0.002, -0.00 ↧ 0.31	Ø 152.4 +0.05, -0.00 ↧ 7.9
(5)	0.5	12.7	0.75	19.1	2.0	50.8
(6)	0.94	23.9	0.94	23.9	3.5	88.9
(7)	8x Ø 0.328	8x Ø 8.33	8x Ø 0.39	8x Ø 9.91	8x Ø 1.031	8x Ø 26.19
(8)	22.5 °		22.5 °		22.5 °	
*1	5⁄16 - 24	M8 x 1.25	3⁄8 - 24	M10 x 1.5	1 - 12	M24 x 3
*2	300	34	600	68	9000	1000

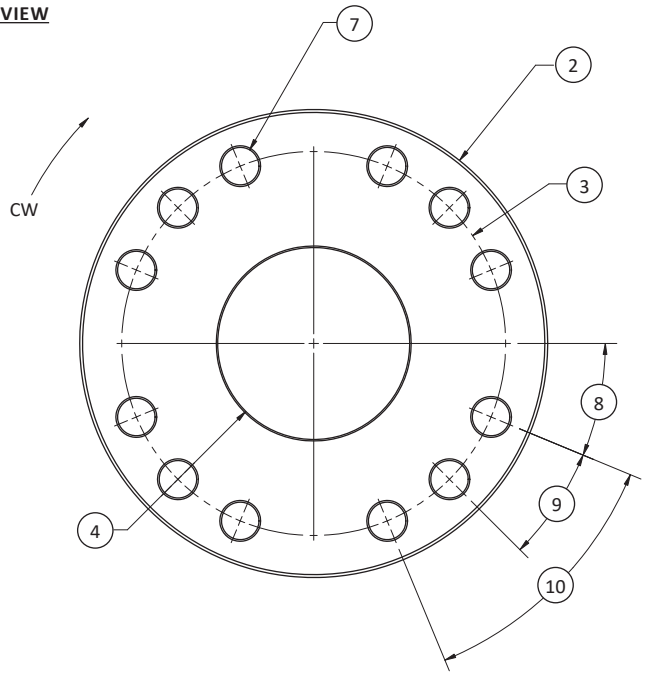
***1 - Recommended mounting screw size**

***2 - Recommended mounting torque – lbf-in/Nm**

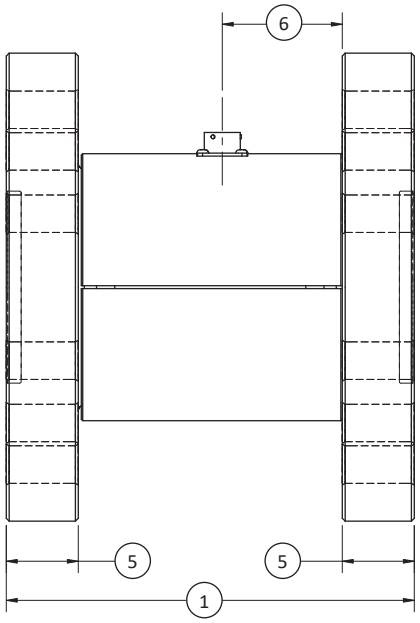
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5500 CALIBRATION GRADE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

TOP VIEW



SIDE VIEW



DIMENSIONS

CAPACITY	5512		5513	
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	50K, 100K	5.5K, 11K	200K	22K
	in	mm	in	mm
(1)	7.38	187.5	8.5	219.5
(2)	Ø 8.0	Ø 203.2	Ø 9.75	Ø 247.65
(3)	Ø 6.5	Ø 165.1	Ø 8.0	Ø 203.2
(4)	Ø 3.5 +0.002, -0.00 ↧ 0.31	Ø 88.9 +0.05, -0.00 ↧ 7.9	Ø 4.0 +0.002, -0.00 ↧ 0.31	Ø 101.6 +0.05, -0.00 ↧ 7.9
(5)	1.5	38.1	1.5	38.1
(6)	2.5	63.5	2.5	63.5
(7)	12x Ø 0.65	12x Ø 16.51	12x Ø 0.781	12x Ø 19.8
(8)	22.5 °		22.5 °	
(9)	4x 22.5 °		4x 22.5 °	
(10)	8x 45 °		8x 45 °	
*1	⅝ - 18	M16 x 2	¾ - 16	M20 x 2.5
*2	2400	270	4400	500

***1 - Recommended mounting screw size**

***2 - Recommended mounting torque – lbf-in/Nm**

MRT MINIATURE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Low capacity – 0.2 to 20 Nm (1.77 to 177 lbf-in)
- Proprietary Interface temperature compensated strain gages
- Small size – 41 x 33 mm (1.6 in OD x 1.25 in)
- Excellent linearity & repeatability
- Low deflection – high torsional stiffness

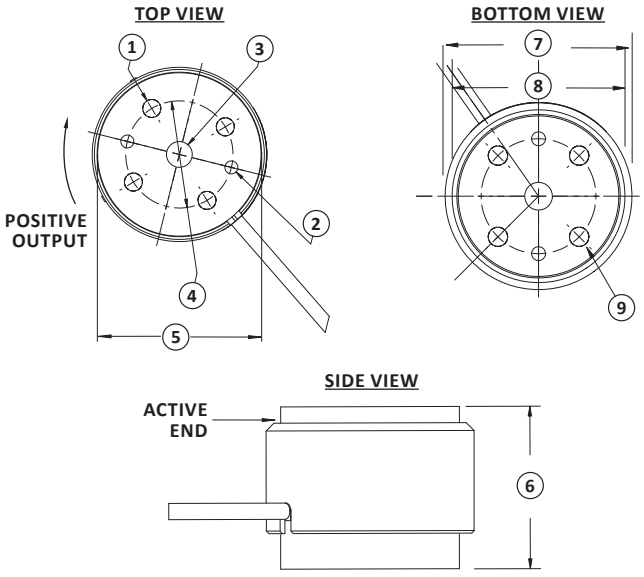
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.10
Hysteresis – %FS		± 0.10
Nonrepeatability – %RO		± 0.05
Creep, in 20 min – %		± 0.10
TEMPERATURE		
Effect on Zero – %RO / deg	°F	±0.20
Effect on Output – % / deg	°F	±0.10
Compensated Range	°C	-10 to +45
	°F	+15 to +115
Operating Range	°C	-55 to +90
	°F	-65 to +200
ELECTRICAL		
Rated Output – mV/V		2.00 ± 0.30
Zero Balance – %RO		±1.0
Input Resistance – Ohms		700 +100/-7
Output Resistance – Ohms		700 ±7
Insulation Resistance – Megohm		> 5000
Excitation – VDC NOM		10
Excitation – VDC MAX		20
MECHANICAL		
Overload:		
Safe Torsion – %CAP		±150
Ultimate Torsion – %CAP		±400
Safe Side Load	N	13, 110, 160, 280, 400
	lbf	3, 25, 36, 63, 90
Safe Overhung Moment – %CAP		100
Safe Mounting Torque	Nm	0.3, 3, 5, 6, 9
	lbf-in	2.7, 27, 44, 55, 80
Deflection at Capacity – Radian		0.007, 0.003, 0.003, 0.003, 0.003
Cable Length	m	1.5
	ft	5
Material		Aluminum

STANDARD CONFIGURATION



MODEL MRT (Shown)



DIMENSIONS

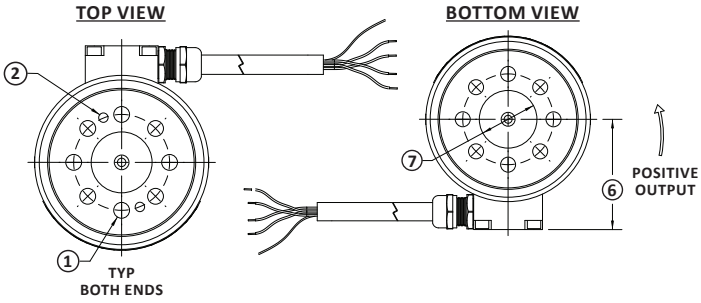
See Drawing	CAPACITY	
	Metric (Nm)	U.S. (lbf-in)
	0.2, 2, 5, 10, 20	1.77, 17.7, 44, 89, 177
	mm	in
(1)	M5x0.8 - 6H x ↧ 5.1	M5x0.8 - 6H x ↧ 0.20
(2)	Ø3.02$^{\pm 0.03}$ ↧ 3.0	Ø0.119$^{\pm 0.001}$ ↧ 0.12
(3)	Ø6.02$^{+0.03}$ THRU	Ø0.237 THRU
(4)	Ø25.0	Ø0.984
(5)	Ø34.93	Ø1.375
(6)	31.8	1.25
(7)	40.6	1.60
(8)	38.1	1.50
(9)	M5x0.8 - 6H x ↧ 5.1	M5x0.8 - 6H x ↧ 0.20

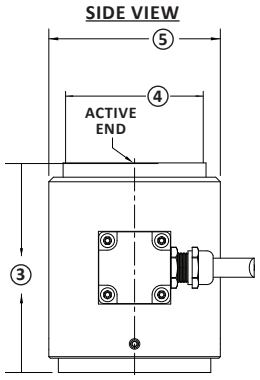
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

MRT2 MINIATURE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 5 to 50 Nm (44 to 443 lbf-in)
- Proprietary Interface temperature compensated strain gages
- Small size - 70 x 60 mm (2.75 x 2.25 in)
- Excellent linearity & repeatability
- Low deflection - high torsional stiffness





DIMENSIONS

See Drawing	CAPACITY	
	Metric (Nm)	U.S. (lbf-in)
	5, 10, 20, 50	44.3, 88.5, 177, 443
	mm	in
(1)	M5x0.8 - 6H x ↧ 8.1 8 PL EQ SP on 31.50 B.C.	M5x0.8 - 6H x ↧ 0.32 8 PL EQ SP on 1.240 B.C.
(2)	Ø3.18$^{+0.013/-0.000}$ 2 PL EQ SP on Ø34.93 B.C.	Ø0.125$^{+0.0005/-0.0000}$ 2 PL EQ SP on Ø1.375 B.C.
(3)	69.85	2.75
(4)	47.625	1.875
(5)	57.15	2.25
(6)	38.1	1.50
(7)	Ø20.000$^{+0.020/-0.000}$	Ø0.7874$^{+0.0008/-0.0000}$

STANDARD CONFIGURATION



MODEL MRT2-50Nm (Shown)

SPECIFICATIONS

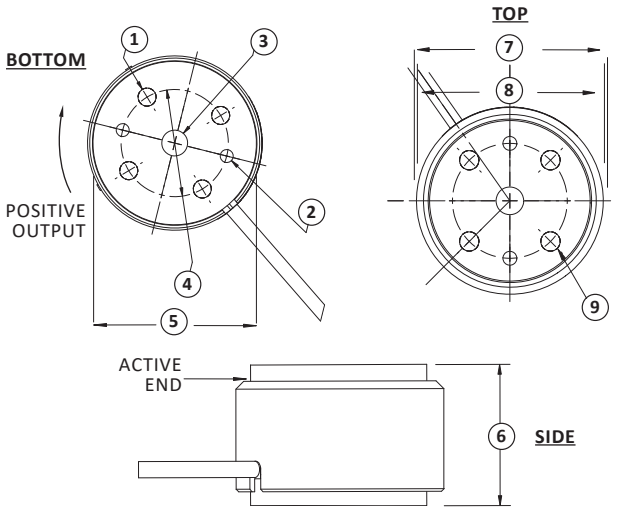
ACCURACY – (MAX ERROR)					
Nonlinearity – %FS		± 0.10			
Hysteresis – %FS		± 0.10			
Nonrepeatability – %RO		± 0.05			
TEMPERATURE					
Effect on Zero – % / deg	°F	±0.20			
Effect on Output – %RO / deg	°F	±0.10			
Compensated Range	°C	-9 to +46			
	°F	+15 to +115			
Operating Range	°C	-54 to +93			
	°F	-65 to +200			
ELECTRICAL					
Output – mV/V		2.00$^{\pm 0.30}$			
Excitation – VDC MAX		20			
Bridge Resistance – Ohms		700 ± 7			
Electrical Connection – Integral Cable	m	1.5			
	ft	5			
MECHANICAL					
Safe torsion – %RO		150	150	150	150
Deflection at Capacity – rad		0.003	0.003	0.003	0.002
Overhung Moment – %CAP MAX		100	100	100	100
Shear – MAX	N	225	333	400	900
	lbf	50.6	74.9	89.9	202
Material		Aluminum			

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

MRTP MINIATURE PROTECTED TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacity 0.2 Nm (1.77 lbf-in)
- 7x overload protection
- Proprietary Interface temperature compensated strain gages
- Small size - 41 x 33 mm (1.6 in OD x 1.25 in)
- Excellent linearity & repeatability
- Low deflection - high torsional stiffness



Note:
Do not bridge overload stop and active end

DIMENSIONS

See Drawing	CAPACITY	
	Metric (Nm)	U.S. (lbf-in)
	0.2	1.77
	mm	in
(1)	M5x0.8 - 6H x ↧ 5.1	M5x0.8 - 6H x ↧ 0.20
(2)	Ø3.02 ± 0.03	Ø0.119 ± 0.001
(3)	Ø6.02 thru	Ø0.237 thru
(4)	Ø24.99	Ø0.984
(5)	34.95	1.375
(6)	31.8	1.25
(7)	40.6	1.60
(8)	38.1	1.50
(9)	M5x0.8 - 6H x ↧ 5.1	M5x0.8 - 6H x ↧ 0.20

OPTIONS

- Extra cable length

STANDARD CONFIGURATION



MODEL MRTP (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.10
Hysteresis – %FS		± 0.10
Nonrepeatability – %RO		± 0.05
Creep, in 20 min – %		± 0.10
TEMPERATURE		
Compensated Range	°C	-10 to +45
	°F	+15 to +115
Operating Range	°C	-55 to +90
	°F	-65 to +200
Effect on Zero – %RO / deg	°F	±0.20
Effect on Output – % / deg	°F	±0.10
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.00 ±0.30
Zero Balance – %RO		±1.0
Input Resistance – Ohms		700 + 100/-7
Output Resistance – Ohms		700 ± 7
Insulation Resistance – Megohm		> 5000
Excitation, VDC NOM		10
Excitation, VDC MAX		20
MECHANICAL		
Overload:		
Safe Torsion – %CAP		±700
Safe Side Load	N	13
	lbf	3
Safe Overhung Moment – %CAP		100
Safe Mounting Torque	Nm	0.3
	lbf-in	2.7
Deflection at Capacity – Radian		0.007
Cable Length – Integral Cable	m	1.5
	ft	5
Material		Aluminum

ACCESSORIES

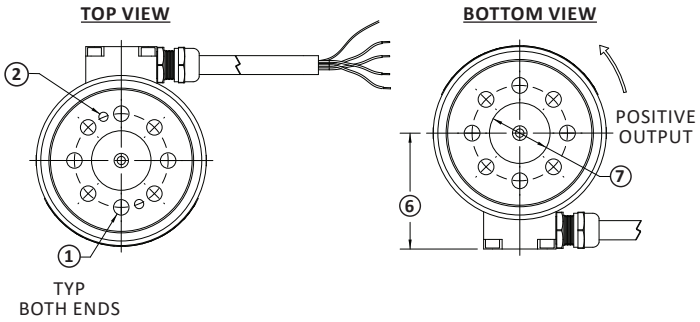
- Instrumentation

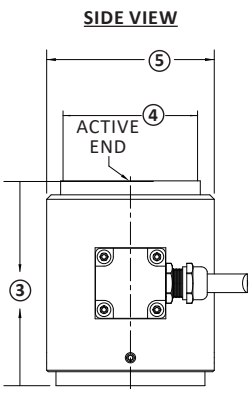
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

MRT2P MINIATURE OVERLOAD PROTECTED TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.2 to 2 Nm(1.77 to 17.7 lbf-in)
- 3x overload protection
- Proprietary Interface temperature compensated strain gages
- Small size - 70 x 60 mm (2.75 x 2.25 in)
- Excellent linearity & repeatability
- Low deflection - high torsional stiffness





DIMENSIONS

See Drawing	CAPACITY	
	Metric (Nm)	U.S. (lbf-in)
	0.2, 2	1.77, 17.7
	mm	in
(1)	ØM5x0.8 - 6H x ↧ 8.1 8 PL EQ SP on 31.50 B.C.	ØM5x0.8 - 6H x ↧ 0.32 8 PL EQ SP on 1.240 B.C.
(2)	Ø3.18$^{+0.013/-0.000}$ 2 PL EQ SP on 34.93 B.C.	Ø0.125$^{+0.0005/-0.0000}$ 2 PL EQ SP on 1.375 B.C.
(3)	6.985	0.275
(4)	47.625	1.875
(5)	57.15	2.25
(6)	38.1	1.50
(7)	Ø20.000$^{+0.020/-0.000}$	Ø0.7874$^{+0.0008/-0.0000}$

STANDARD CONFIGURATION



MODEL MRT2P (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		± 0.10	
Hysteresis – %FS		± 0.10	
Nonrepeatability – %RO		± 0.05	
TEMPERATURE			
Compensated Range	°C	-9 to +46	
	°F	+15 to +115	
Operating Range	°C	-54 to +93	
	°F	-65 to +200	
Effect on Zero – % / deg	°F	±0.20	
Effect on Output – %RO / deg	°F	±0.10	
ELECTRICAL			
Output – mV/V		2.00 ± 0.30	
Excitation – VDC MAX		20	
Bridge Resistance – Ohms		700 ± 7	
Electrical Connection – Integral Cable	m	1.5	
	ft	5	
MECHANICAL			
Safe torsion – %RO		300	300
Deflection at Capacity – rad		0.01	0.007
Overhung Moment – %CAP MAX		100	100
Shear MAX	N	13	110
	lbf	2.9	25
Material		Aluminum	

***Patent Pending**

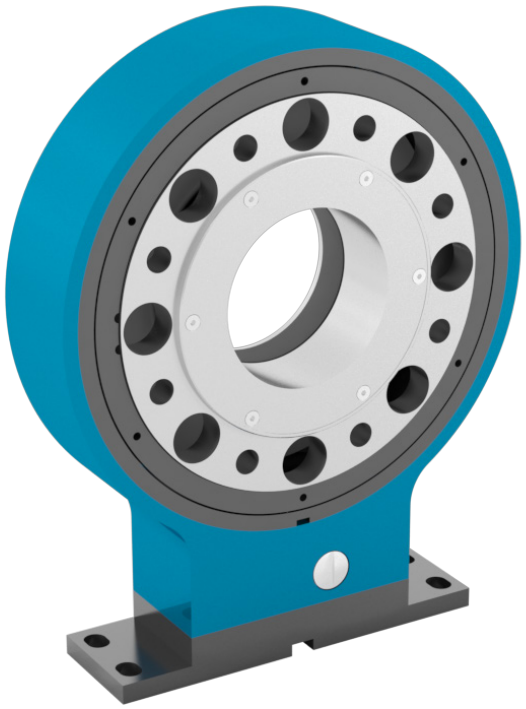
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T27 HOLLOW FLANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 50 to 10K Nm (443 to 88.5K lbf-in)
- ±5V output
- Very short axial length
- Large thru-hole design
- Bearingless

STANDARD CONFIGURATION



Model T27 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %RO		±0.02
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		1 – 3
Supply Voltage – VDC		12 - 28
Supply Current – mA		90
Electrical Connection		12-pin binder
Resolution		Analog
MECHANICAL		
Safe Overload – %RO		200
Balance Grade – DIN ISO 1940		6.3
IP Rating		IP54
Material		Alloy steel

OPTIONS

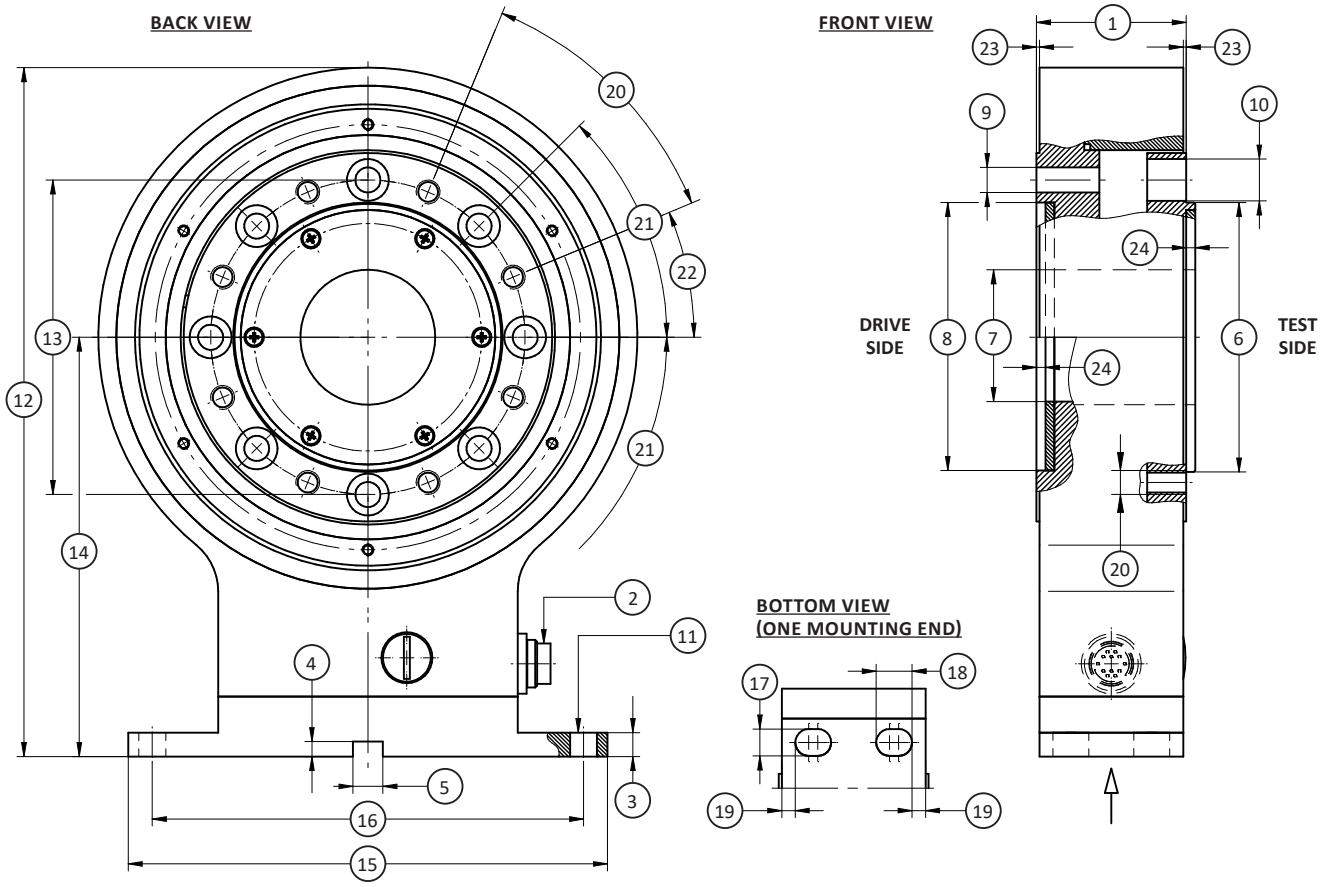
- ±10V output
- Speed measurement – 30 pulse, +5V TTL

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA ($kg \cdot m^2$)		MAX THRUST LOAD**		MAX SHEAR FORCE**	
(Nm)	(lbf-in)		(NM/rad)	Drive Side	Test Side	(N)	(lbf)	(N)	(lbf)
50	443	15,000	$8.3x10^{4}$	$5.8x10^{-4}$	$1.1x10^{-3}$	650	146	190	42.7
100	885	15,000	$1.4x10^{5}$	$5.8x10^{-4}$	$1.1x10^{-3}$	1.1K	247	330	74.2
200	1.77K	15,000	$3.2x10^{5}$	$9.2x10^{-4}$	$1.8x10^{-3}$	1.6K	360	550	124
500	4.43K	12,000	$1.1x10^{6}$	$1.3x10^{-4}$	$4.0x10^{-3}$	2K	450	1200	270
1K	8.85K	12,000	$3.5x10^{6}$	$1.3x10^{-4}$	$4.1x10^{-3}$	4K	899	2700	607
2K	17.7K	10,000	$6.7x10^{6}$	$3.1x10^{-3}$	$1.3x10^{-2}$	5.4K	1.21K	3300	742
5K	44.3K	8,000	$14.3x10^{6}$	$7.8x10^{-3}$	$3.0x10^{-2}$	5.7K	1.28K	5200	1.17K
10K	8.85K	8,000	$14.3x10^{6}$	$7.8x10^{-3}$	$3.0x10^{-2}$	5.7K	1.28K	5200	1.17K

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T27 HOLLOW FLANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	50, 100	443, 885	200	1.77K	500, 1K	4.43K, 8.85K	2K	17.7K	5K, 10K	44.3K, 88.5K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	50	2.0	50	2.0	50	2.0	55	2.2	55	2.2
(2)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(3)	8	0.3	8	0.3	8	0.3	8	0.3	8	0.3
(4)	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2
(5)	Ø10$^{+0.1}$	Ø0.4$^{+0.004}$	Ø10$^{+0.1}$	Ø0.4$^{+0.004}$	Ø10$^{+0.1}$	Ø0.4$^{+0.004}$	Ø10$^{+0.1}$	Ø0.4$^{+0.004}$	Ø10$^{+0.1}$	Ø0.4$^{+0.004}$
(6)	Ø75 g6	Ø(2.9524 / 2.9516)	Ø90 g6	Ø(3.5428 / 3.5420)	Ø110 g6	Ø(4.3302 / 4.3294)	Ø140 g6	Ø(5.5112 / 5.5103)	Ø174 g6	Ø(6.8498 / 6.8488)
(7)	Ø40$^{+0.2}$	Ø1.6$^{+0.008}$	Ø45$^{+0.2}$	Ø1.6$^{+0.008}$	Ø70$^{+0.2}$	Ø2.8$^{+0.008}$	Ø80$^{+0.2}$	Ø3.1$^{+0.008}$	Ø100$^{+0.2}$	Ø3.9$^{+0.008}$
(8)	Ø75 H7	Ø2.9539 / 2.9527	Ø90 H7	Ø3.5447 / 3.5433	Ø110 H7	Ø4.3321 / 4.3307	Ø140 H7	Ø5.5134 / 5.5112	Ø174 H7	Ø6.8519 / 6.8504
(9)	Ø6.4	Ø0.25	Ø8.4	Ø0.33	Ø13	Ø0.5	Ø15	Ø0.6	Ø19	Ø0.7
(10)	Ø11	Ø0.4	Ø14	Ø0.6	Ø20	Ø0.8	Ø24	Ø0.9	Ø30	Ø1.2
(11)	M8 x 4		M8 x 4		M8 x 4		M8 x 4		M8 x 4	
(12)	211	8.3	230	9.1	250	9.8	300	11.8	360	14.2
(13)	Ø87$^{\pm0.1}$	Ø3.4$^{+0.004}$	Ø105$^{\pm0.1}$	Ø4.1$^{\pm0.004}$	Ø133$^{\pm0.1}$	Ø5.2$^{\pm0.004}$	Ø165$^{\pm0.1}$	Ø6.5$^{\pm0.004}$	Ø206$^{\pm0.1}$	Ø8.1$^{\pm0.004}$
(14)	130.5$^{\pm0.1}$	5.14$^{+0.004}$	140$^{\pm0.1}$	5.5$^{\pm0.004}$	150$^{\pm0.1}$	5.9$^{\pm0.004}$	175$^{\pm0.1}$	6.9$^{\pm0.004}$	205$^{\pm0.1}$	8.1$^{\pm0.004}$
(15)	160	6.3	160	6.3	160	6.3	160	6.3	160	6.3

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T27 HOLLOW FLANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	50, 100	443, 885	200	1.77K	500, 1K	4.43K, 8.85K	2K	17.7K	5K, 10K	44.3K, 88.5K
	mm	in	mm	in	mm	in	mm	in	mm	in
(16)	$144^{\pm0.1}$	$5.7^{\pm0.004}$	$144^{\pm0.1}$	$5.7^{\pm0.004}$	$144^{\pm0.1}$	$5.7^{\pm0.004}$	$144^{\pm0.1}$	$5.7^{\pm0.004}$	$144^{\pm0.1}$	$5.7^{\pm0.004}$
(17)	9	0.4	9	0.4	9	0.4	9	0.4	9	0.4
(18)	12	0.5	12	0.5	12	0.5	12	0.5	12	0.5
(19)	4.5	0.18	4.5	0.18	4.5	0.18	4.5	0.18	4.5	0.18
(20)	8 x 45° (=360°)		8 x 45° (=360°)		8 x 45° (=360°)		8 x 45° (=360°)		8 x 45° (=360°)	
(21)	45°		45°		45°		45°		45°	
(22)	22.5°		22.5°		22.5°		22.5°		22.5°	
(23)	1	0.04	1	0.04	1	0.04	3.5	0.14	3.5	0.14
(24)	3	0.1	3	0.1	3	0.1	3	0.1	3	0.1

TS11 FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 10 to 20K Nm (88.5 to 177K lbf-in)
- Compact
- Thru-hole design
- Threaded mounting holes

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.1
Nonrepeatability – %		± 0.02
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output–mV/V	10 Nm	0.5
	88.5 lbf-in	
	10 - 20K Nm	1.0
	221 - 177K lbf-in	
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		350
Electrical Connection – pin		6
MECHANICAL		
Safe Overload – %RO		150
Safe Overhung Moment – %FS		50
Deflection at Capacity – rod		0.003
Material		Alloy Steel

OPTIONS

- 100 % control signal (internal shunt cal)
- High accuracy to 0.05% FS
- A2LA accredited calibration
- Mating cable (straight or right angle)
- Extended temperature range

STANDARD CONFIGURATION



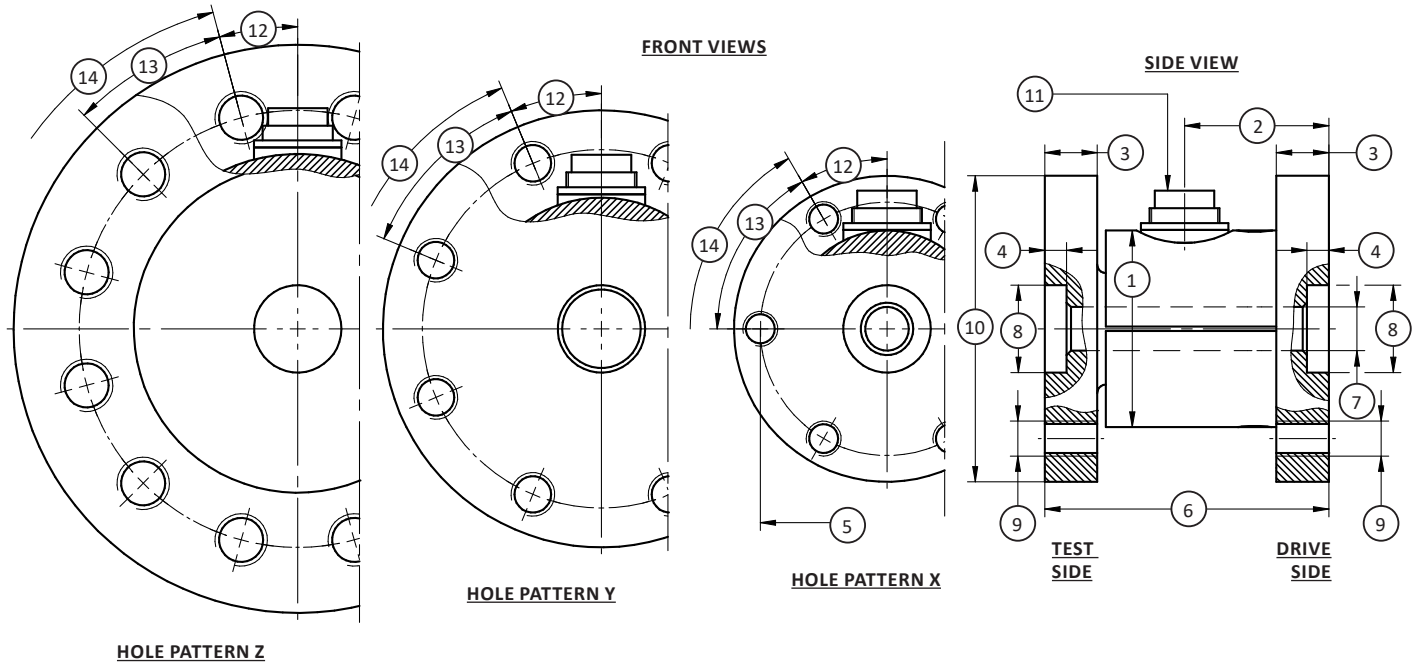
Model TS11 (Shown)

ELECTRICAL CONNECTION

Pin	6-PIN ELECTRICAL CONNECTION
	Function
1	Excitation (-)
2	Excitation (+)
3	Shield
4	Signal (+)
5	Signal (-)
6	Control signal (option)

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TS11 FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY									
	Hole Pattern X		Hole Pattern Y		Hole Pattern Z		Hole Pattern Z		Hole Pattern Y	
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	10, 20, 50, 100, 200	88.5, 177, 443, 885, 1.77K	500, 1K	4.43K, 8.85K	2K	17K	5K	44.3K	10K, 20K	88.5K, 177K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø45	Ø1.77	Ø60	Ø2.36	Ø80	Ø3.15	Ø80	Ø3.15	Ø145	Ø5.71
(2)	33	1.30	39.5	1.56	45	1.77	45	1.77	67.5	2.66
(3)	12	0.47	15	0.59	20	0.79	20	0.79	32	1.26
(4)	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2
(5)	Ø58	Ø2.28	Ø82	Ø3.23	Ø100	Ø3.94	Ø100	Ø3.94	Ø210	Ø8.27
(6)	65	2.56	80	3.15	100	3.94	100	3.94	124	4.88
(7)	Ø10	Ø0.39	Ø18	Ø0.71	Ø20	Ø0.79	Ø20	Ø0.79	Ø105	Ø4.13
(8)	Ø20 H7	Ø(0.7874/ 0.7866)	Ø20 H7	Ø(0.7874/ 0.7866)	Ø75 H7	Ø(2.9528/ 2.9516)	Ø75 H7	Ø(2.9528/ 2.9516)	Ø105 H7	Ø(4.1139/ 4.1325)
(9)	M8, 6 places		M10, 8 places		M12, 12 places		M12, 12 places		M24, 8 places	
(10)	Ø70	Ø2.76	Ø100	Ø3.94	Ø130	Ø5.12	Ø130	Ø5.12	Ø260	Ø10.24
(11)	Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin	
(12)	30°		22.5°		15°		15°		22.5°	
(13)	60°		45°		30°		30°		45°	
(14)	6 x 60°		8 x 45° (=360°)		12 x 30 (=360°)		12 x 30 (=360°)		8 x 45° (=360°)	

TS11 FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MOMENT OF INERTIA ($kg \cdot m^2$)		MAX THRUST LOAD**		MAX SHEAR FORCE**	
(Nm)	(lbf-in)	(NM/rad)	Drive Side	Test Side	(N)	(lbf)	(N)	(lbf)
10	88.5	$4.7x10^{2}$	$2.3x10^{-4}$	$2.0x10^{-4}$	920	207	85	19.1
20	177	$4.9x10^{3}$	$2.3x10^{-4}$	$2.0x10^{-4}$	970	218	90	20.2
50	443	$1.2x10^{4}$	$2.3x10^{-4}$	$2.0x10^{-4}$	2.1K	472	200	45.0
100	885	$2.7x10^{4}$	$2.3x10^{-4}$	$2.0x10^{-4}$	4.3K	967	450	101
200	1.77K	$4.7x10^{4}$	$2.3x10^{-4}$	$2.0x10^{-4}$	6.7K	1.51K	730	164
500	4.43K	$1.6x10^{5}$	$1.2x10^{-3}$	$1.0x10^{-3}$	12.5K	2.81K	1.6K	360
1K	8.85K	$3.1x10^{5}$	$1.2x10^{-3}$	$1.0x10^{-3}$	21K	4.72K	3K	674
2K	17.7K	$7.8x10^{5}$	$4.4x10^{-3}$	$4.0x10^{-3}$	42K	9.44K	5K	1.12K
5K	44.3K	$1.1x10^{6}$	$4.4x10^{-3}$	$4.1x10^{-3}$	60K	13.5K	8.5K	1.91K
10K	88.5K	$9.9x10^{6}$	$1.3x10^{-1}$	$5.3x10^{-2}$	70K	15.7K	15K	3.37K
20K	177K	$1.5x10^{7}$	$1.3x10^{-1}$	$5.4x10^{-2}$	96K	21.6K	30K	6.74K

TS15 SQUARE FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 2 to 5K Nm (17.7 to 44.3K lbf-in)
- Compact
- Convenient flange mounting
- Useful for checking torque wrenches

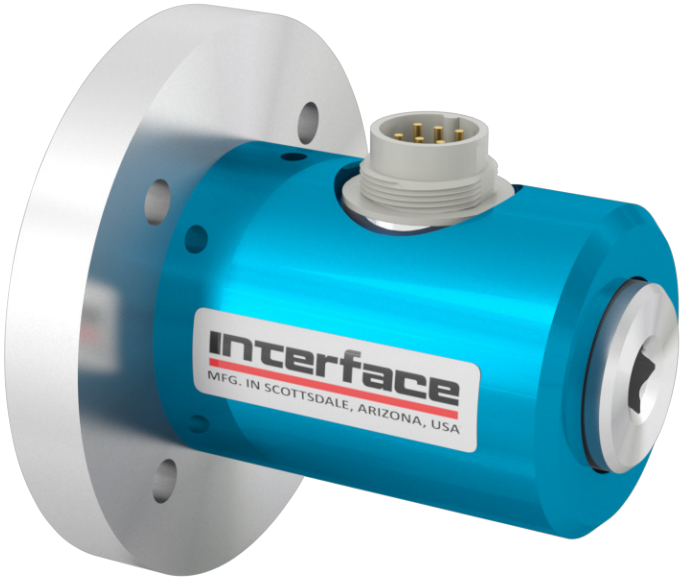
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.2
Nonrepeatability – %		± 0.02
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V		1
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		350
Electrical Connection		6-pin binder
MECHANICAL		
Safe Overload – %RO		150
Angular Deflection @ Rated Torque		< 0.2
Material		Alloy steel

OPTIONS

- 100% Control Signal (RCAL)
- Combined Error 0.1% FS

STANDARD CONFIGURATION



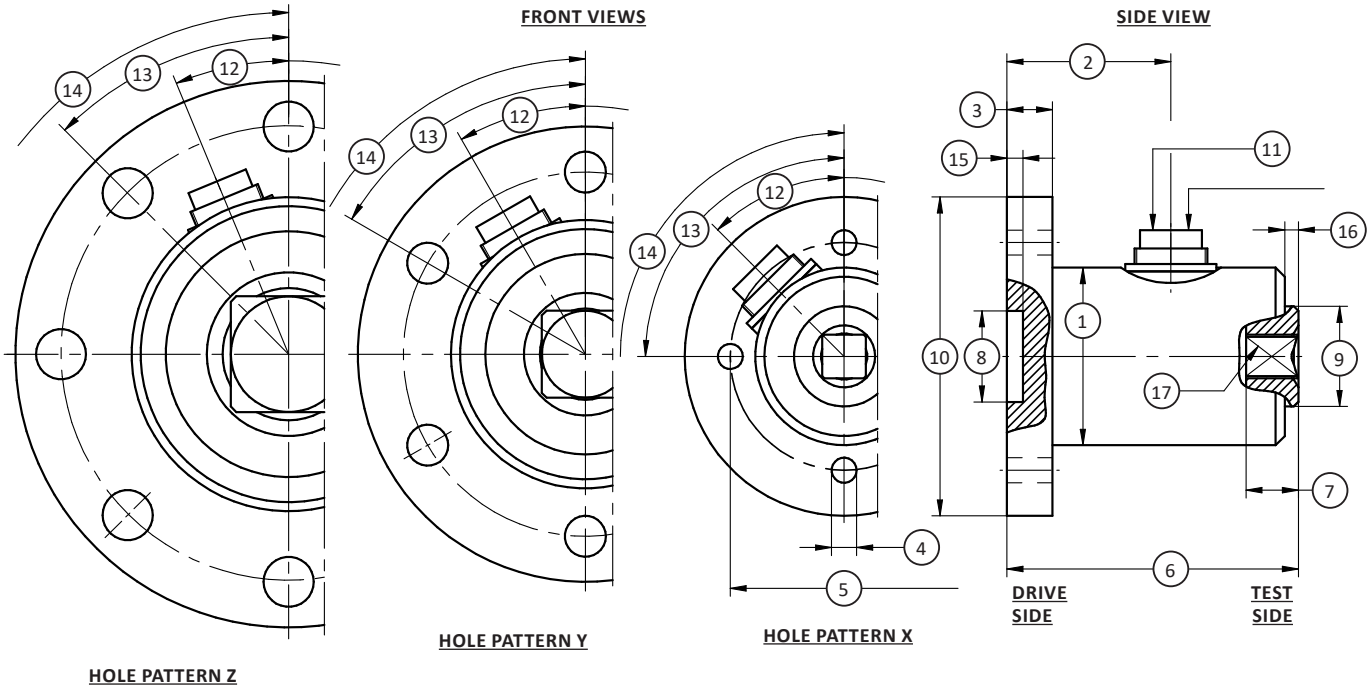
MODEL TS15 (Shown)

ELECTRICAL CONNECTION

Pin	6-PIN ELECTRICAL CONNECTION
	Function
1	Excitation (-)
2	Excitation (+)
3	Shield
4	Signal (+)
5	Signal (-)
6	Control signal (option)

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TS15 SQUARE FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY													
	Hole Pattern X		Hole Pattern X		Hole Pattern X		Hole Pattern Y		Hole Pattern Z		Hole Pattern Z		Hole Pattern Z	
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	2, 5, 12	17.7, 44.3, 106	25, 63	221, 558	100, 160, 200	885, 1.42K, 1.77K	500	4.43K	1K	8.85K	2K	17.7K	5K	44.3K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	39.0	1.54	39.0	1.54	45.0	1.77	59.0	2.32	69.0	2.72	90.0	3.54	125.0	4.92
(2)	36	1.4	36	1.4	41	1.6	45	1.8	45	1.8	55	2.2	57	2.2
(3)	10	0.4	10	0.4	12	0.5	15	0.6	15	0.6	20	0.8	25	1.0
(4)	Ø5.5	Ø0.22	Ø5.5	Ø0.22	Ø6.6	Ø0.26	Ø9.0	Ø0.35	Ø11.0	Ø0.43	Ø13.0	Ø0.51	Ø17.0	Ø0.67
(5)	Ø50	Ø2.0	Ø50	Ø2.0	Ø60	Ø2.4	Ø80	Ø3.1	Ø100	Ø3.9	Ø120	Ø4.7	Ø170	Ø6.7
(6)	64	2.5	64	2.5	75	3.0	88	3.5	94	3.7	124.5	4.9	129.5	5.1
(7)	8	0.3	11.5	0.5	16	0.6	24	0.9	28.6	1.1	41.5	1.6	41.5	1.6
(8)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø105 H7	Ø(4.1352 / 4.1338)
(9)	Ø22	Ø0.9	Ø22	Ø0.9	Ø29.8	Ø1.14	Ø44	Ø1.7	Ø54	Ø2.1	Ø76	Ø3.0	Ø95	Ø3.7
(10)	Ø70	Ø2.8	Ø70	Ø2.8	Ø80	Ø3.1	Ø100	Ø3.9	Ø120	Ø4.7	Ø145	Ø5.7	Ø200	Ø7.9
(11)	Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin	
(12)	45°		45°		45°		30°		22.5°		22.5°		22.5°	
(13)	90°		90°		90°		60°		45°		45°		45°	
(14)	4x90° (=360°)		4x90° (=360°)		4x90° (=360°)		6x60° (=360°)		8x45° (=360°)		8x45° (=360°)		8x45° (=360°)	
(15)	3.5	0.14	3.5	0.14	3.5	0.14	3.5	0.14	3.5	0.14	3.5	0.14	4	0.2
(16)	3	0.1	3	0.1	15	0.6	3	0.1	5	0.2	5	0.2	5	0.2
(17)	q 1/4"		3/8"		1/2"		3/4"		1"		1 1/2"		1 1/2"	

TS15 SQUARE FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	lbf-in	NM/rad	Drive Side	Test Side	N	lbf	N	lbf
2	17.7	$2.2x10^{2}$	$2.1x10^{-4}$	$3.0x10^{-6}$	400	89.9	9	2.02
5	44.3	$7.5x10^{2}$	$2.1x10^{-4}$	$3.0x10^{-6}$	730	164	22	4.95
12	106	$2.2x10^{3}$	$2.1x10^{-4}$	$3.1x10^{-6}$	1.3K	292	51	11.5
25	221	$5.3x10^{3}$	$2.1x10^{-4}$	$1.6x10^{-6}$	2.1K	472	120	27
63	558	$1.4x10^{4}$	$2.2x10^{-4}$	$2.0x10^{-6}$	4K	899	270	60.7
100	885	$1.9x10^{4}$	$4.2x10^{-4}$	$1.4x10^{-5}$	5K	1.12K	300	67.4
160	1.42K	$3.6x10^{4}$	$4.2x10^{-4}$	$1.5x10^{-5}$	7.1K	1.6K	500	112
200	1.77K	$4.9x10^{4}$	$4.2x10^{-4}$	$1.6x10^{-5}$	8.6K	1.93K	680	153
500	4.43K	$1.2x10^{5}$	$1.3x10^{-3}$	$9.1x10^{-5}$	12K	2.7K	1600	360
1K	8.85K	$5.4x10^{5}$	$2.8x10^{-3}$	$2.4x10^{-4}$	21K	4.72K	2900	652
2K	17.7K	$1.1x10^{6}$	$8.0x10^{-3}$	$1.3x10^{-3}$	35K	7.87K	3900	877
5K	44.3K	$4.1x10^{6}$	$3.6x10^{-2}$	$4.0x10^{-3}$	63K	14.2K	8500	1.91K

TS16 SQUARE FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 2 to 2K Nm (17.7 to 17.7K lbf-in)
- Convenient flange mounting
- Accepts standard sockets

OPTIONS

- 100% Control Signal (RCAL)
- Combined Error 0.1% FS

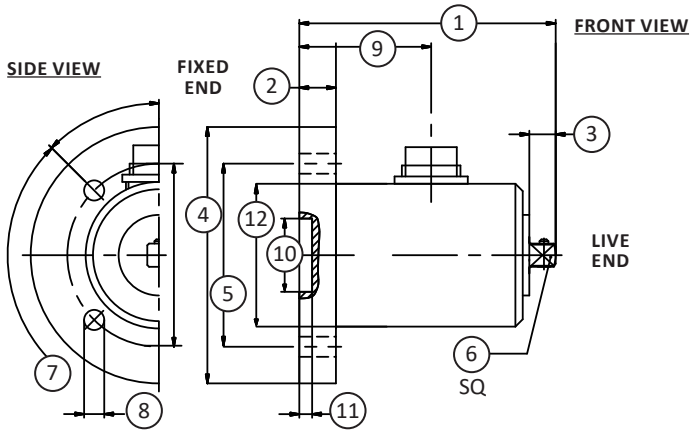
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.2
Nonrepeatability – %		±0.02
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated rRange	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V		1
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		350
Electrical Connection		6-pin binder
MECHANICAL		
Safe Overload – %RO		150
Angular Deflection @ Rated Torque		< 0.2
Material		Alloy steel

STANDARD CONFIGURATION



MODEL TS16 (Shown)



Not oriented relative to mounting holes

DIMENSIONS

See Drawing	CAPACITY											
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	2, 5, 12	17.7, 44.3, 106	25, 63	221, 1K	160	1.41K	500	4.43K	1K	8.85K	2K	17.7K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
1	70.0	2.76	70.0	2.76	90.0	3.54	120.0	4.72	140.0	5.51	180.0	7.09
2	10.0	0.39	10.0	0.39	12.0	0.47	15.0	0.59	15.0	0.59	20.0	0.79
3	7.2	0.28	10.4	0.41	15.1	0.59	22.6	0.89	27.4	1.08	39.3	1.55
4	70.0	2.76	70.0	2.76	80.0	3.15	100.0	3.94	120.0	4.72	145.0	5.71
5	50.0	1.97	50.0	1.97	60.0	2.36	80.0	3.15	100.0	3.94	120.0	4.72
6	¼		⅜		½		¾		1		1 ½	
7	4x90°		4x90°		4x90°		6x60°		8x45°		8x45°	
8	Ø5.5	Ø0.22	Ø5.5	Ø0.22	Ø6.6	Ø0.26	Ø9.0	Ø0.35	Ø11.0	Ø0.43	Ø13.0	Ø0.51
9	36.0	1.42	36.0	1.42	41.0	1.61	60.0	2.36	70.0	2.76	82.0	3.23
10	Ø20 H7	Ø2.5209 / 2.5197	Ø20 H7	Ø2.5209 / 2.5197	Ø20 H7	Ø2.5209 / 2.5197	Ø20 H7	Ø2.5209 / 2.5197	Ø20 H7	Ø2.5209 / 2.5197	Ø20 H7	Ø2.5209 / 2.5197
11	4.0	0.16	4.0	0.16	4.0	0.16	4.0	0.16	4.0	0.16	4.0	0.16
12	Ø39.0	Ø1.54	Ø40.0	Ø1.57	Ø45.0	Ø1.77	Ø49.0	Ø1.93	Ø59.0	Ø2.32	Ø70.0	Ø2.76

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TS18 SHAFT TO FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 5 to 2K Nm (44.3 to 17.7K lbf-in)
- Keyed shaft per DIN 6885.1
- Convenient flange mounting

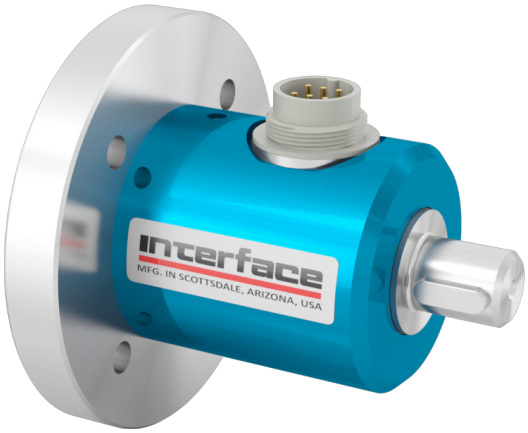
OPTIONS

- 100% Control Signal (RCAL)
- Combined Error 0.1% FS

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.2
Nonrepeatability – %		± 0.02
TEMPERATURE		
Effect on Zero – %RO/ deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V		1
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		350
Electrical Connection		6-pin binder
MECHANICAL		
Safe Overload – %RO		150
Angular Deflection @ Rated Torque		< 0.2
Material		Alloy steel

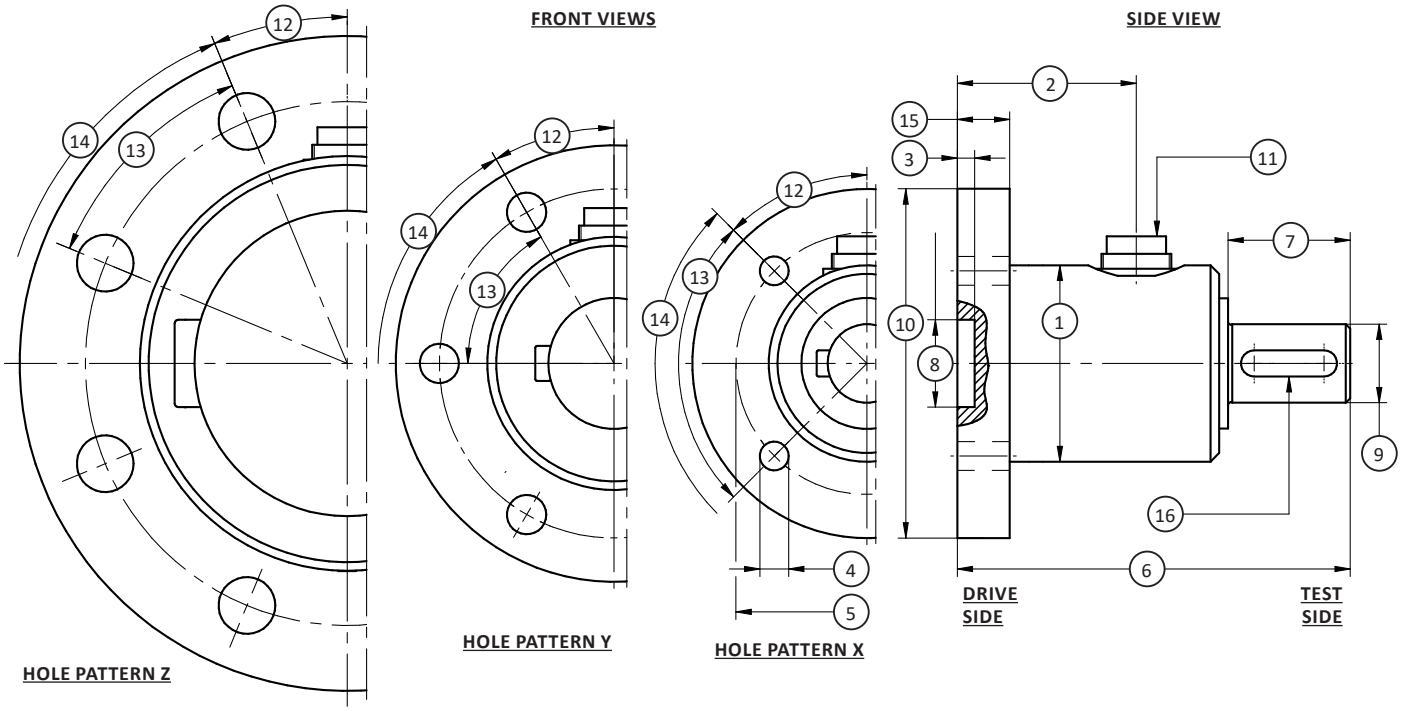
STANDARD CONFIGURATION



MODEL TS18 (Shown)

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TS18 SHAFT TO FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY									
	Hole Pattern X		Hole Pattern X		Hole Pattern Y		Hole Pattern Y		Hole Pattern Z	
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	2, 5, 10, 20	17.7, 44.3, 88.5, 177	50, 100	443, 885	200, 500	1.77K, 4.43K	1K	8.85K	2K	17.7K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø40	Ø1.6	Ø45	Ø1.8	Ø58	Ø2.3	Ø65	Ø2.6	Ø95	Ø3.7
(2)	36	1.4	41	1.6	43	1.7	41	1.6	46	1.8
(3)	3.5	0.14	3.5	0.14	3.5	0.14	3.5	0.14	3.5	0.14
(4)	Ø5.5	Ø0.22	Ø6.6	Ø0.26	Ø9	Ø0.4	Ø11	Ø0.4	Ø13	Ø0.5
(5)	Ø50	Ø2.0	Ø60	Ø2.4	Ø80	Ø3.1	Ø100	Ø3.9	Ø120	Ø4.7
(6)	70	2.8	90	3.5	120	4.7	140	5.5	165	6.5
(7)	15	0.6	28	1.1	50	2.0	70	2.8	90	3.5
(8)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)
(9)	Ø12 g6	Ø(0.4722 / 0.4718)	Ø18 g6	Ø(0.7084 / 0.7080)	Ø30 g6	Ø(1.1808 / 1.1803)	Ø40 g6	Ø(1.5744 / 1.5738)	Ø70 g6	Ø(2.7555 / 2.7548)
(10)	Ø70	Ø2.8	Ø80	Ø3.1	Ø100	Ø3.9	Ø120	Ø4.7	Ø150	Ø5.9
(11)	Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin	
(12)	45°		45°		30°		30°		22.5°	
(13)	90°		90°		60°		60°		45°	
(14)	4x90° (=360°)		4x90° (=360°)		4x60° (=360°)		6x60° (=360°)		8x45° (=360°)	
(15)	10	0.4	12	0.5	15	0.6	15	0.6	20	0.8
(16)	Key DIN 6885-1		Key DIN 6885-1		Key DIN 6885-1		Key DIN 6885-1		Key DIN 6885-1	

TS19 SHORT HOLLOW FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

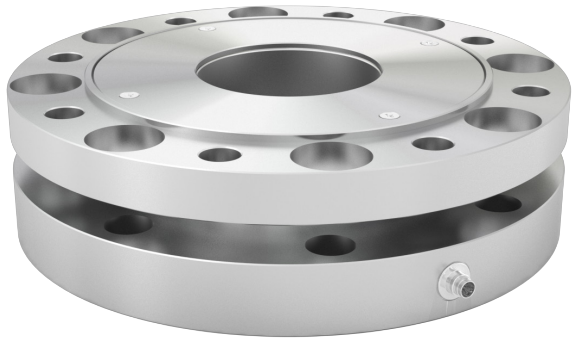
FEATURES & BENEFITS

- Capacities from 50 to 10K Nm (443 to 88.5K lbf-in)
- Short, rugged, compact design
- Both ends with flange
- Thru-Hole

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.1
Nonrepeatability – %		± 0.02
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated Range	°C	-5 to +45
Operating Range –	°C	-15 to +55
ELECTRICAL		
Output – mV/V	50 Nm	0.5
	443 lbf-in	
	100 - 10K Nm	1.0
	885 - 88.5K lbf-in	
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		2,000
Electrical Connection		7-Pin Binder 712
MECHANICAL		
Safe Overload – %RO		150
Safe Overhung Moment – %FS		50
Material		Alloy steel
Protection Level		IP54

STANDARD CONFIGURATION



Model TS19 (Shown)

OPTIONS

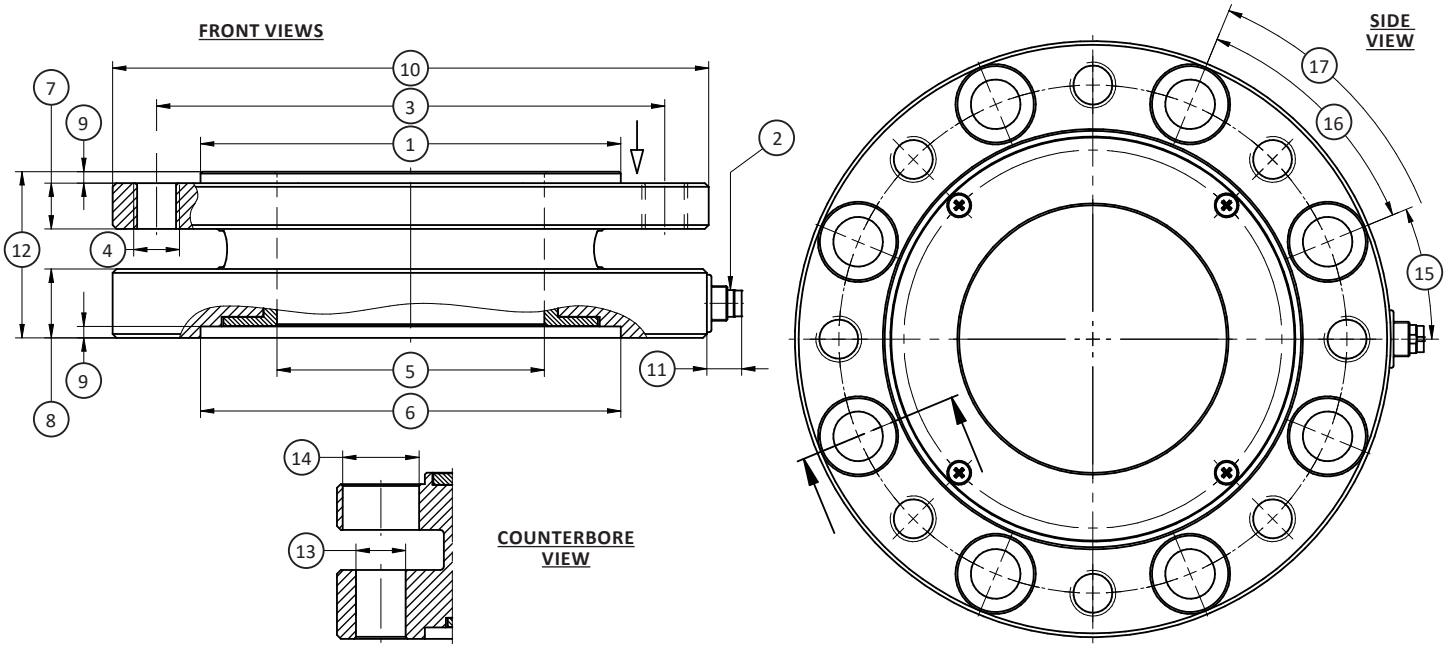
- 100% Control Signal (Internal shunt cal)
- High accuracy to 0.05% FS
- A2LA accredited calibration
- Mating cable (straighter or right angle)
- Extended temperature range

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MOMENT OF INERTIA – ($Kg \cdot m^2$)		MAX THRUST LOAD		MAX SHEAR LOAD		SHEAR FORCE	
Nm	lbf-in	NM/rad	Drive Side	Test Side	N	lbf	N	lbf	N	lbf
50	443	$2.0x10^5$	$1.1x10^3$	$4.0x10^4$	600	135	280	62.9	280	62.9
100	885	$2.0x10^5$	$1.1x10^3$	$4.0x10^4$	600	135	280	62.9	280	62.9
200	1.77K	$3.6x10^5$	$2.5x10^3$	$1.0x10^3$	920	207	400	89.9	400	89.9
500	4.43K	$1.2x10^6$	$7.4x10^3$	$3.4x10^3$	2.1K	472	620	139	620	139
1K	8.85K	$2.1x10^6$	$7.4x10^3$	$3.4x10^3$	2.8K	629	1200	270	1.2K	270
2K	17.7K	$6.2x10^6$	$1.6x10^2$	$9.1x10^3$	3.8K	854	1900	427	1.9K	427
5K	44.3K	$1.3x10^7$	$6.5x10^2$	$4.2x10^2$	6.6K	1.48K	5200	1.17K	5.2K	1.17K
10K	88.5K	$2.6x10^7$	$6.5x10^2$	$4.2x10^2$	8.1K	1.82K	9000	2.02K	9K	2.02K

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TS19 SHORT HOLLOW FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

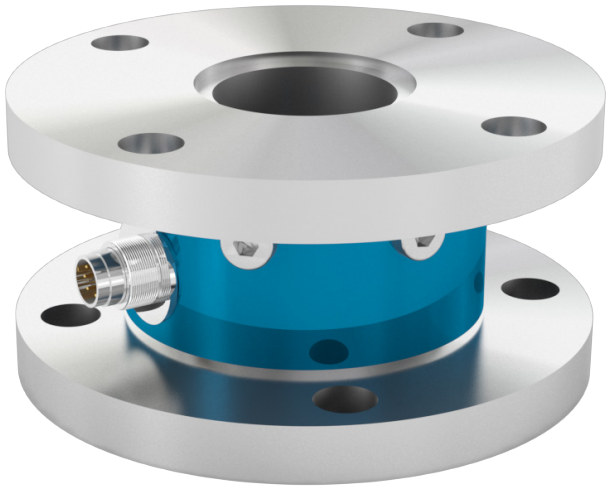
See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	50, 100	443, 885	200	1.77K	500, 1K	4.43K, 8.85K	2K	17.7K	5K, 10K	44.3K, 88.5K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø75 g6	Ø(2.9524 / 2.9516)	Ø90 g6	Ø(3.5035 / 3.5420)	Ø110 g6	Ø(4.33022 / 4.3294)	Ø140 g6	Ø(5.5112 / 5.5103)	Ø174 g6	Ø(6.8498 / 6.8488)
(2)	Connector 7-pin		Connector 7-pin		Connector 7-pin		Connector 7-pin		Connector 7-pin	
(3)	Ø87	Ø3.4	Ø105	Ø4.1	Ø133	Ø5.2	Ø165	Ø6.5	Ø206	Ø8.1
(4)	8 x M6		8 x M8		8 x M12		8 x M14		8 x M18	
(5)	Ø40	Ø1.6	Ø45	Ø1.8	Ø70	Ø2.8	Ø75	Ø3.0	Ø79	Ø3.1
(6)	Ø75 H7	Ø(2.9539 / 2.9527)	Ø90	Ø(3.5447 / 3.5433)	Ø110	Ø(4.3321 / 4.3307)	Ø140	Ø(5.5134 / 5.5118)	Ø174	Ø(6.8519 / 6.8504)ww
(7)	6	0.2	8	0.3	12	0.5	14	0.6	20	0.8
(8)	16	0.6	17	0.7	18	0.7	18	0.7	29	1.1
(9)	3	0.1	3	0.1	3	0.1	3	0.1	3	0.1
(10)	Ø100	Ø3.9	Ø121	Ø4.8	Ø156	Ø6.1	Ø191	Ø7.5	Ø238	Ø9.4
(11)	9	0.4	9	0.4	9	0.4	9	0.4	9	0.4
(12)	33	1.3	38.5	1.5	43.5	1.7	45.5	1.8	67	2.6
(13)	Ø6.4	Ø0.25	Ø8.4	Ø0.3	Ø13	Ø0.5	Ø15	Ø0.6	Ø	Ø0.7
(14)	Ø11	Ø0.4	Ø14	Ø0.6	Ø20	Ø0.8	Ø24	Ø0.9	Ø30	Ø1.2
(15)	22.5°		22.5°		22.5°		22.5°		22.5°	
(16)	45°		45°		45°		45°		45°	
(17)	8 x 45°		8 x 45°		8 x 45°		8 x 45°		8 x 45°	

TS20 HOLLOW FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 10 to 200 Nm (88.5 to 1.77K lbf-in)
- Very short axial length
- Thru-hole

STANDARD CONFIGURATION



Model TS20 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.1
Hysteresis – %FS		±0.1
Nonrepeatability – % RO		±0.02
TEMPERATURE		
Effect on Zero – %RO/ deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Compensated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V ± %		1 ± 0.1
Excitation Voltage – VDC		2-12
Bridge Resistance – Ohm		350
Electrical Connection		7-pin Binder
MECHANICAL		
Safe Overload – %RO		150
Protection Level		IP50

OPTIONS

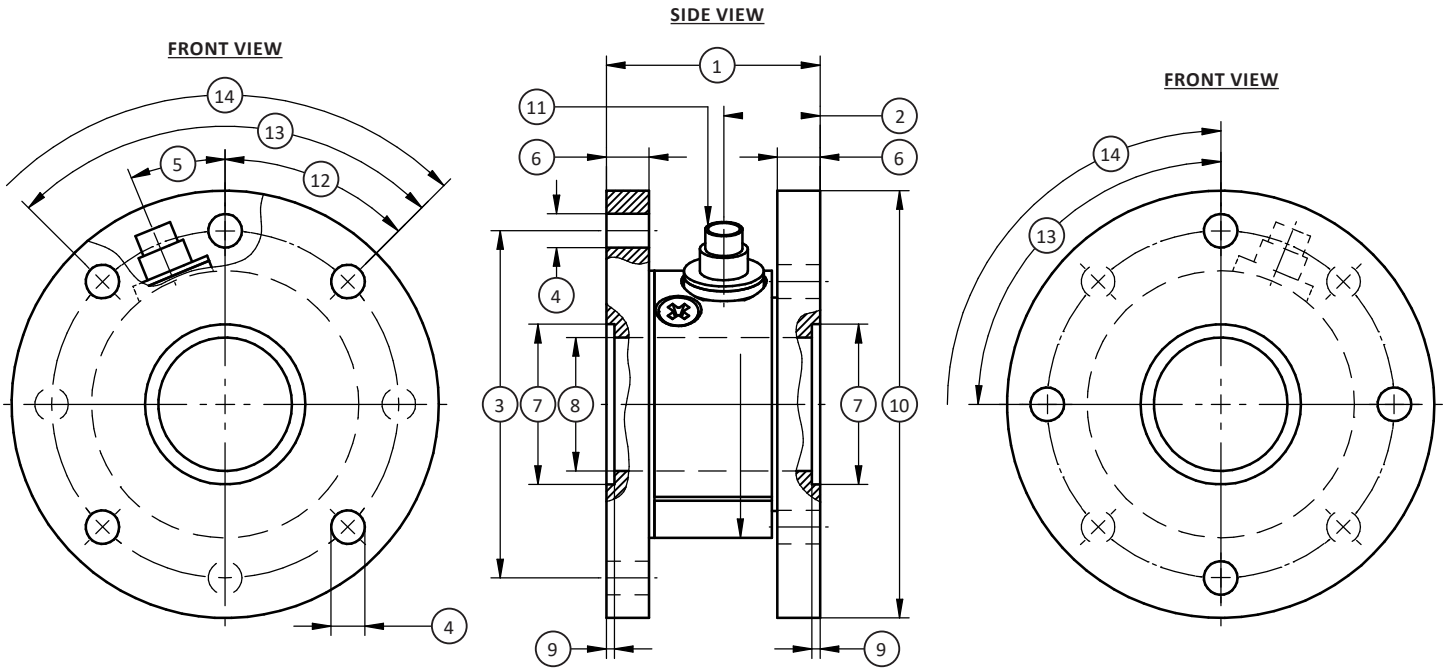
- High accuracy to 0.05% FS
- 100% control signal (internal shunt cal)
- Extended temperature range
- A2LA accredited calibration
- Mating cable (straight or right angle)

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MASS MOMENT OF INERTIA – ($Kg \cdot m^2$)		MAX THRUST LOAD		MAX SHEAR LOAD	
Nm	lbf-in	NM/rad	Drive Side	Test Side	N	lbf	N	lbf
10	88.5	$6.77x10^{3}$	$1.08x10^{-4}$	$8.83x10^{-5}$	1.1K	247	190	42.7
20	177	$1.28x10^{4}$	$1.08x10^{-4}$	$8.83x10^{-5}$	1.6K	360	380	85.4
50	443	$5.15x10^{4}$	$1.10x10^{-4}$	$8.87x10^{-5}$	3.1K	697	850	191
100	885	$9.44x10^{4}$	$2.83x10^{-4}$	$2.56x10^{-4}$	2.5K	562	600	135
200	1.77K	$1.97x10^{5}$	$2.84x10^{-4}$	$2.57x10^{-4}$	4.2K	944	1.2K	270

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TS20 HOLLOW FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	10, 20, 50	88.5, 177, 443	100, 200	885, 1.77K
	mm	in	mm	in
(1)	40	1.6	40	1.6
(2)	18	0.7	18	0.7
(3)	Ø65	Ø2.6	Ø65	Ø2.6
(4)	Ø6.3	Ø0.25	Ø8.3	Ø0.33
(5)	22.5°		22.5°	
(6)	8	0.3	8	0.3
(7)	Ø30 H7	Ø(1.1819 / 1.1811)	Ø30 H7	Ø(1.1819 / 1.1811)
(8)	Ø25	Ø1.0	Ø25	Ø1.0
(9)	1.5	0.06	1.5	0.06
(10)	Ø80	Ø3.1	Ø80	Ø3.1
(11)	Connector 7-pin		Connector 7-pin	
(12)	45°		45°	
(13)	90º		90º	
(14)	4 x 90º (=360°)		4 x 90º (=360°)	

Note:
4 mounting holes per flange 45º offset

TS22 MINIATURE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.005 to 20 Nm (0.04 to 177 lbf-in)
- 5X safe overload on capacities up to 2 Nm (17.7 lbf-in)
- Very small measuring ranges

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.2
Hysteresis – %FS		±0.2
Nonrepeatability – %RO		±0.02
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Compensated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V	0.005 to 2 Nm	0.5
	0.04 to 17.7 lbf-in	
	1 to 20 Nm	1.0
	8.85 to 177 lbf-in	
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		350
Electrical Connection		6-pin binder
MECHANICAL		
Safe Overload – %RO	0.005 to 2 Nm	500
	0.04 to 17.7 lbf-in	
	1 to 20 Nm	200
	8.85 to 177 lbf-in	
Angular Deflection at Rated Torque		< 0.2
IP Rating		IP50
Material		Alloy steel

STANDARD CONFIGURATION



MODEL TS22 (Shown)

OPTIONS

- Enhanced Accuracy – 0.05% FS
- 100% control signal (internal shunt cal)
- Special temperature range

ACCESSORIES

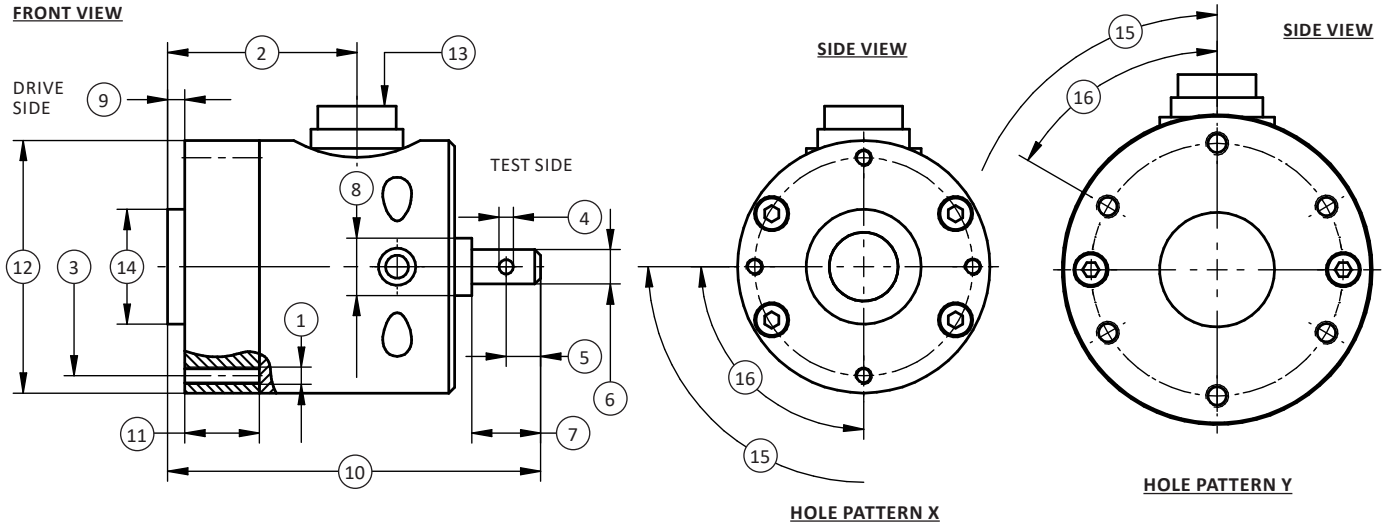
- Mating cable
- Instrumentation

PERFORMANCE PARAMETERS

CAPACITY		Nominal Output ±0.1	SPRING RATE	MASS MOMENT OF INERTIA – ($Kg \cdot m^2$)		MAX THRUST LOAD		MAX SHEAR LOAD	
Nm	lbf-in	mV/V	NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.005	0.04	0.3	0.5	$6.7x10^{-5}$	$6.2x10^{-7}$	36	8.09	0.6	0.13
0.01	0.09	0.5	0.5	$6.7x10^{-5}$	$6.2x10^{-7}$	36	8.09	0.6	0.13
0.02	0.18	0.5	3.7	$6.7x10^{-5}$	$6.2x10^{-7}$	36	8.09	0.6	0.13
0.05	0.44	0.5	3.7	$6.7x10^{-5}$	$6.2x10^{-7}$	39	8.09	0.6	0.13
0.1	0.89	0.5	18	$6.7x10^{-5}$	$7.6x10^{-7}$	39	8.09	0.7	0.16
0.2	1.77	0.5	18	$6.7x10^{-5}$	$7.6x10^{-7}$	57	12.8	1.2	0.27
0.5	4.43	0.5	182	$6.7x10^{-5}$	$8.0x10^{-7}$	185	41.6	2	0.45
1	8.85	1	182	$6.7x10^{-5}$	$8.0x10^{-7}$	260	58.5	3.2	0.72
2	17.7	1	276	$6.7x10^{-5}$	$8.0x10^{-7}$	400	89.9	6.5	1.46
5	44.3	1	757	$1.4x10^{-4}$	$5.7x10^{-7}$	710	160	16	3.6
10	88.5	1	2379	$1.4x10^{-4}$	$6.1x10^{-7}$	450	101	35	7.87
20	177	1	3913	$1.4x10^{-4}$	$6.6x10^{-7}$	1.05K	236	68	15.3

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TS22 MINIATURE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY					
	Hole Pattern X		Hole Pattern X		Hole Pattern Y	
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.005, 0.01	0.04, 0.009	0.02, 0.05 0.1, 0.2, 0.5, 1, 2	0.18, 0.44, 0.89, 1.77, 4.43, 8.85, 17.7	5, 10, 20	44.3, 88.5, 177
	mm	in	mm	in	mm	in
(1)	M3		M3		M4	
(2)	33	1.3	33	1.3	31	1.2
(3)	$Ø38^{\pm 0.1}$	$1.5^{\pm 0.004}$	$38^{\pm 0.1}$	$1.5^{\pm 0.004}$	$44^{\pm 0.1}$	$1.7^{\pm 0.004}$
(4)	–		2.5	0.10	4	0.2
(5)	–		6		8	
(6)	Ø3g6	Ø(0.1185/0.1181)	Ø6g6	Ø(0.2367/0.2362)	Ø12g6	Ø(0.4731/0.4724)
(7)	5	0.2	12	0.2	18	0.7
(8)	10	0.4	10	0.4	14	0.6
(9)	3	0.1	3	0.1	3	0.1
(10)	58	2.3	65	2.6	65	2.6
(11)	13	0.5	13	0.5	14	0.6
(12)	44	1.7	44	1.7	54	2.1
(13)	Connector 6-Pin		Connector 6-Pin		Connector 6-Pin	
(14)	Ø20g6	Ø0.7882/0.7874	Ø20g6	Ø0.7882/0.7874	Ø20g6	Ø0.7882/0.7874
(15)	4x90° = (360°)		4x90° = (360°)		6x60° = (360°)	
(16)	90°		90°		60°	

FORCE MEASUREMENT SOLUTIONS

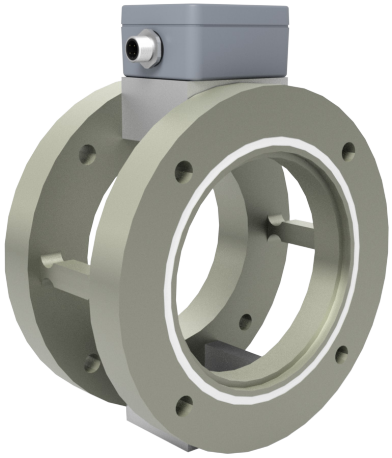
TSCF C-FACE FLANGE TORQUE TRANSDUCER (U.S. & METRIC)

SPECIFICATIONS

ACCURACY - (MAX ERROR)						
Accuracy class		0.1%				
Relative linearity error		0.1 %FS				
Relative zero signal hysteresis		0.1 %FS				
Temperature effect on zero signal		0.01 %FS/K				
Temperature effect on characteristic value		0.01 %RD/K				
Relative creep		0.05 %FS				
TEMPERATURE						
Rated temperature range	°F	14 to 158				
	°C	-10 to 70				
Operating temperature range	°F	14 to 185				
	°C	-10 to 85				
Storage temperature range	°F	14 to 185				
	°C	-10 to 85				
Environmental protection		IP65				
ELECTRICAL						
Input resistance		700 Ohm				
Tolerance input resistance		10 Ohm				
Output resistance		700 Ohm				
Tolerance output resistance		10 Ohm				
Insulation resistance		5 GOhm				
Rated range of excitation voltage		2.5 - 5 VDC				
Operating range of excitation voltage		1 - 10 VDC				
Zero signal		0.05 mV/V				
Rated output		1 mV/V				
MECHANICAL						
Type		Bending spring				
Rated torque	lbf-in	88.5	177	442.5	885	
	Nm	10	20	50	100	
Bending moment limit	lbf-in	1770.1				
	Nm	200				
Maximum operating torque		150 %FS				
Breaking torque		400 %FS				
Rated torsion angle		0.7 °/FS				
Axial force limit	lbf	112				
	N	500				
Lateral force limit	lbf	112				
	N	500				
Torque introduction		Bolt circle				
Material		Aluminum alloy				

MODEL							
TSCF-10		TSCF-20		TSCF-50		TSCF-100	
CAPACITY							
U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
88.5	10	177	20	442.5	50	885	100

STANDARD CONFIGURATION



MODEL TSCF-10 (Shown)

The TSCF is used in test benches for measuring the reaction torque (Wired and non-rotating).

The torque transducer consists of two flanges, which are connected with each other via 4 measuring spokes. The two flanges have the same bolt circle of 5.8 in (149 mm). The pilots are designed as an external and internal collar with Ø 4.5 in (Ø 114.3 mm).

Due to the large diameter of the torque transducer TSCF and the arrangement of the measuring spokes in the axial direction, this torque transducer can also absorb bending moments up to 1770 lbf-in (200 Nm), which are caused by the dead weight of the drive motor.

The connection is made via a terminal box with M12 connectors.

Optionally, an integral measuring amplifier can be provided instead of the terminal box so that the transducer has a voltage output of +/-10V.

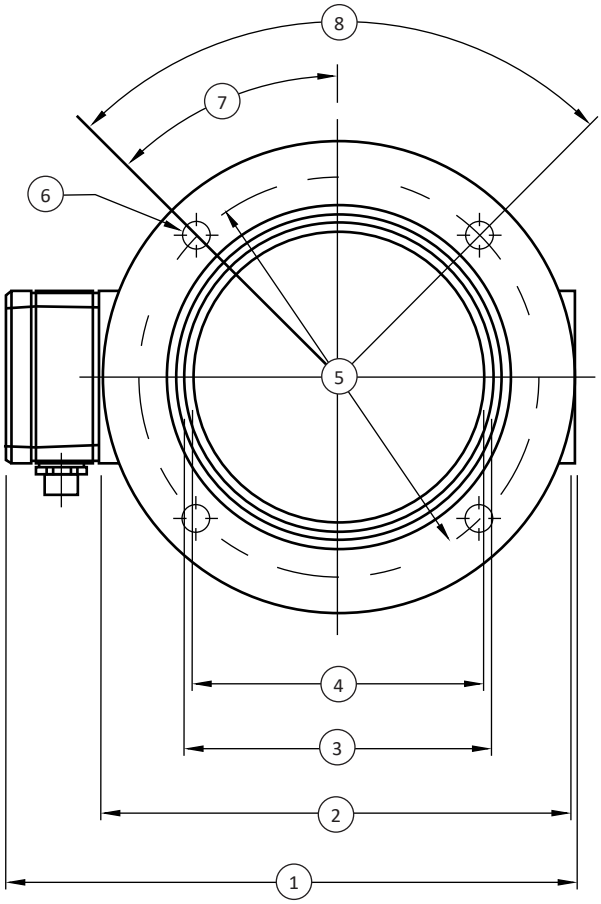
WIRING DIAGRAM

Pin	Description	Color	Symbol
Pin 1	Positive bridge supply	Brown	+Us
Pin 2	Negative bridge supply	White	-Us
Pin 3	Positive bridge output	Blue	+Ud
Pin 4	Negative bridge output	Black	-Ud

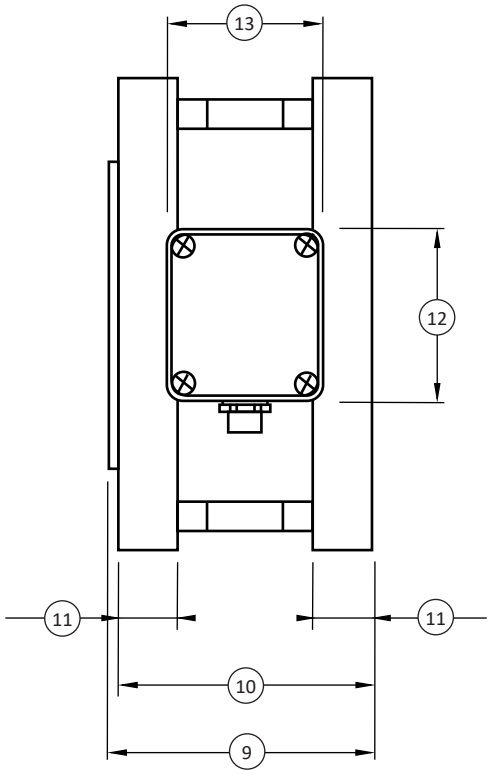
U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TSCF C-FACE FLANGE TORQUE TRANSDUCER (U.S. & METRIC)

SIDE VIEW



TOP VIEW



DIMENSIONS

SEE DRAWING	MODEL	
	TSCF-10, TSCF-20, TSCF-50, TSCF-100	
	CAPACITY	
	U.S. (lbf-in)	Metric (Nm)
	88.5, 177, 442.5, 885	10, 20, 50, 100
	in	mm
(1)	8.3	212
(2)	Ø 6.9	Ø 175
(3)	Ø 4.5	Ø 114.3
(4)	Ø 4.3	Ø 108
(5)	Ø 5.9	Ø 149
(6)	4x Ø 0.4	4x Ø 10
(7)	45°	
(8)	4x 90°	
(9)	3.9	98
(10)	3.7	95
(11)	0.9	22
(12)	2.5	64
(13)	2.3	58

AT104 COMPACT SIZE FORCE/TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 20/0.1 & 50/0.5 N/Nm (4.5/0.89 & 11.2/4.4 lbf/lbf-in)
- Reaction torque/force sensor, non-rotating
- Very short axial length
- Reliable and durable
- Simple handling and assembly
- Side cable exit

SPECIFICATIONS

ACCURACY – (MAX ERROR)			
Capacities		20/0.1	50/0.5
Nonlinearity – Torque %FS		± 0.2	
Hysteresis – Torque %FS		± 0.2	
Nonrepeatability – %RO		± 0.1	
Crosstalk – %FS		< 1	
Creep, in 30 min – %		± 0.1	
TEMPERATURE			
Effect on Zero – %RO / deg	°C	± 0.02	
Effect on Output – % / deg	°C	± 0.02	
Compensated Range	°C	-5 to +45	
	°F	+23 to +113	
Operating Range	°C	-15 to +55	
	°F	+5 to + 131	
ELECTRICAL			
Output – mV/V ± %		0.5 +/-0.1	
Excitation Voltage – VDC		2 to 8	
Bridge Resistance – Ohm		350	
Electrical Connection	m	3	
	ft	9.8	
MECHANICAL			
Safe Overload – %RO		150	
IP Rating		IP50	
Weight	kg	0.3	
	lb	0.7	
Material		Aluminum	Stainless Steel

STANDARD CONFIGURATION



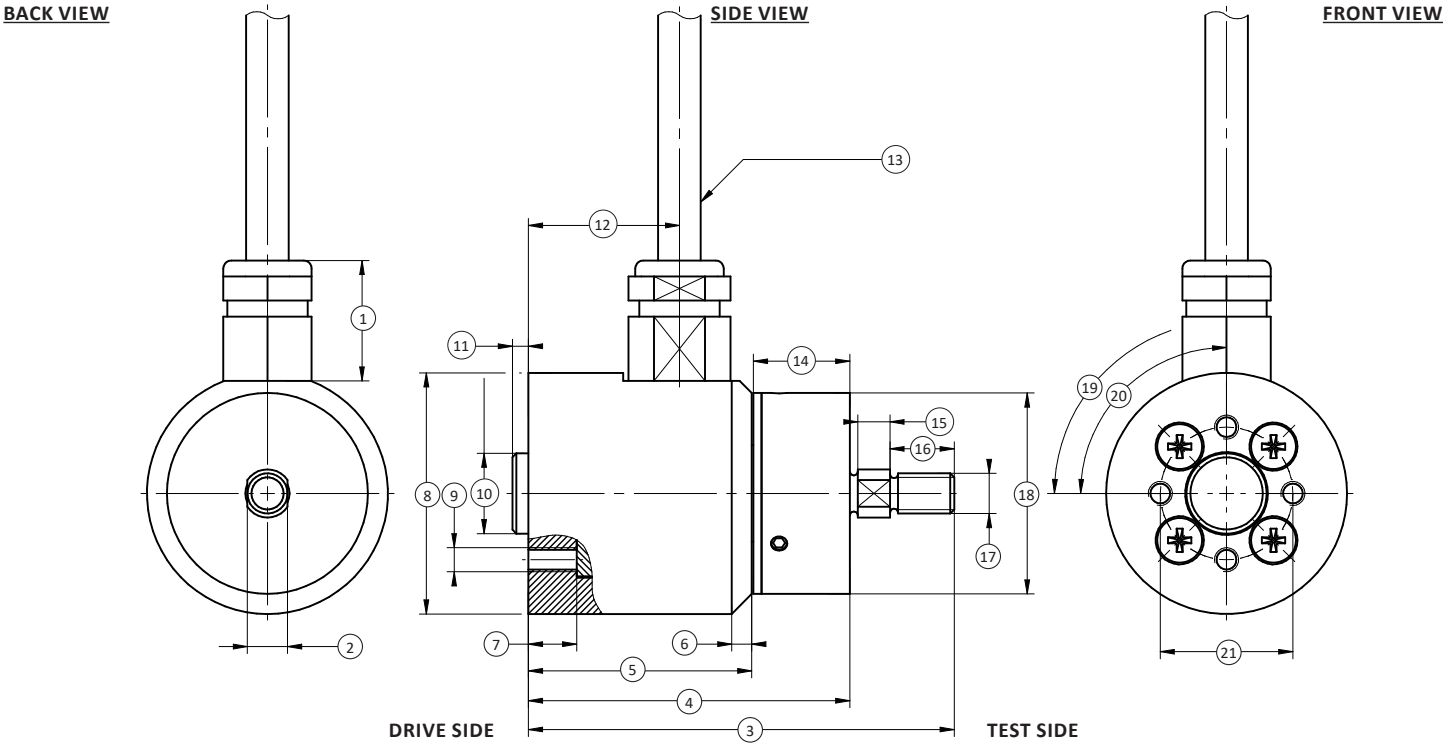
Model AT104-20/0.1 (Shown)

WIRING

ELECTRICAL CONNECTION	
Excitation (-) torque	Blue
Excitation (+) torque	Red
Signal (+) torque	Pink
Signal (-) torque	Gray
Control signal torque (option)	Violet
Excitation (-) force	Green
Excitation (+) force	Brown
Signal (+) force	Yellow
Signal (-) force	White
Control signal force (option)	Black
Shield	Shield

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

AT104 COMPACT SIZE FORCE/TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	Metric (N/Nm)	U.S. (lbf/lbf-in)
	20/0.1, 50/0.5	4.5/0.89, 11.2/4.4
	mm	in
(1)	15.0	0.59
(2)	SW 5.0	SW 0.20
(3)	53.0	2.08
(4)	40.0	1.57
(5)	27.8	1.09
(6)	2.5 x 45°	0.1 x 45°
(7)	6.0	0.24
(8)	Ø30.0	Ø1.18
(9)	4 x M3	4 x M3
(10)	Ø10.0 g6	Ø0.4 g6
(11)	2.0	0.08
(12)	19.0	0.75
(13)	Cable Ø5.8, 3M Length	Cable Ø0.23, 9.84ft Length
(14)	12.0	0.47
(15)	4.0	0.16
(16)	8.0	0.31
(17)	M5	M5
(18)	Ø25.0	Ø0.98
(19)	4 x 90° (=360°)	4 x 90° (=360°)
(20)	90°	90°
(21)	TK Ø16.5	TK Ø0.65

TS12 SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.005 to 20K Nm (0.04 to 177K lbf-in)
- Stainless steel shafts
- Compact

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.1
Nonrepeatability – %		± 0.02
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V	0.005 to 0.1 Nm	0.5
	0.04 to 0.89 lbf-in	
	0.2 to 5K Nm	0.8
	1.77 to 44.3K lbf-in	
	10K to 20K Nm	1.5
	88.5K to 17.7K lbf-in	
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		1,000
Electrical Connection		6 or 7 pin
MECHANICAL		
Safe Overload – %RO	0.005 to 0.1 Nm	300
	0.04 to 0.89 lbf-in	
	0.2 to 5K Nm	200
	1.77 to 44.3K lbf-in	
	10K to 20K Nm	150
	88.5K to 17.7K lbf-in	
Safe Overhung Moment – %FS		50
Material	Shaft	Alloy steel
	Housing	Aluminum

STANDARD CONFIGURATION



MODEL TS12 (Shown)

ELECTRICAL CONNECTION

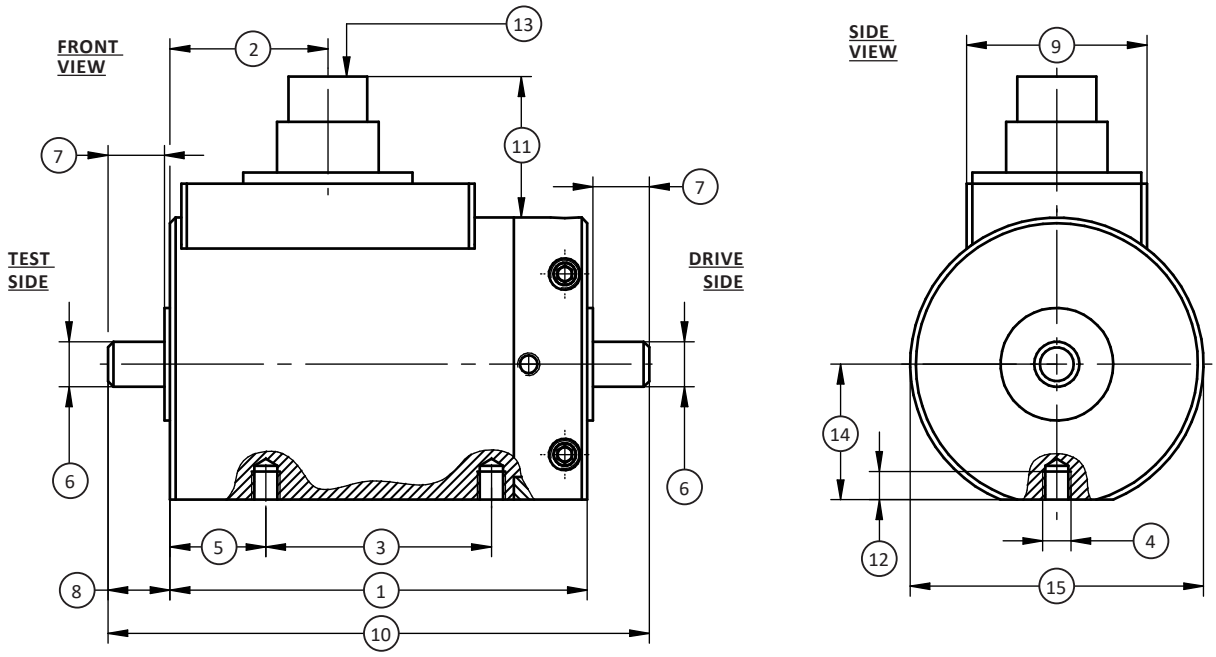
6-PIN TS12 ELECTRICAL CONNECTION		7-PIN TS12 ELECTRICAL CONNECTION	
PIN	**FUNCTION**	**PIN**	**FUNCTION**
1	Excitation (-)	1	Excitation (-)
2	Excitation (+)	2	Excitation (+)
3	Shield	3	Shield
4	Signal (+)	4	Signal (+)
5	Signal (-)	5	Signal (-)
6	Cal. Control (Option)	6	Cal. Control (Option) Connect to Pin 2
		7	NC

OPTIONS

- 100% Control Signal (RCAL)
- Key DIN 6885-1

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TS12 SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.005, 0.001, 0.02	0.044, 0.089, 0.177	0.05	0.44	0.1, 0.2, 0.5, 1, 2, 5	0.85, 1.77, 4.43, 8.85, 17.7, 44.3	10	88.5	20	177
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	37	1.6	48	1.9	48	1.9	48	1.9	73	2.9
(2)	14	0.6	25	1.0	25	1.0	25	1.0	40	1.6
(3)	20	0.8	–	–	–	–	–	–	–	–
(4)	M2.5		–		–		–		–	
(5)	8.5	0.33	–	–	–	–	–	–	–	–
(6)	Ø4 g6	Ø(0.1573/ 0.1570)	Ø6 g6	Ø(0.2361/ 0.2357)	Ø8 g6	Ø(0.3148/ 0.3148)	Ø10 g6	Ø(0.3935/ 0.3931)	Ø18 h6	Ø(0.7087/ 0.7082)
(7)	5	0.2	7	0.3	17	0.7	17	0.7	18	0.7
(8)	5.5	0.22	8	0.3	18	0.7	18	0.7	19	0.7
(9)	16	0.6	–	–	–	–	–	–	–	–
(10)	48	1.9	65	2.6	85	3.3	85	3.3	111.5	4.39
(11)	12.5	0.5	8	0.3	8	0.3	8	0.3	7	0.3
(12)	25	1.0	–	–	–	–	–	–	–	–
(13)	Connector 7-pin		Connector 7-pin		Connector 7-pin		Connector 7-pin		Connector 6-pin	
(14)	12	0.5	–	–	–	–	–	–	–	–
(15)	Ø26	Ø1.0	Ø32	Ø1.3	Ø32	Ø1.3	Ø32	Ø1.3	Ø51	Ø2.0

TS12 SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

DIMENSIONS (CONTINUED)

See Drawing	CAPACITY									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	50, 100	443, 885	200, 500	1.77K, 4.43K	1K	8.85K	2K, 5K	17K, 44.3K	10K, 20K	85.5K 177K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	73	2.9	79.5	3.1	107	4.2	107	4.2	140	5.5
(2)	40	1.6	40	1.6	53.5	2.1	53.5	2.1	53.5	2.1
(3)	–	–	–	–	–	–	–	–	–	–
(4)	–		–		–		–		–	
(5)	–	–	–	–	–	–	–	–	–	–
(6)	Ø18 h6	Ø(0.7087/ 0.7082)	Ø32 h6	Ø(1.2598/ 1.2592)	Ø50 h7	Ø(1.9685/ 1.9675)	Ø70 h7	Ø(2.7559/ 2.7549)	Ø110 h7	Ø(4.3307/ 4.3293)
(7)	36	1.4	38	1.5	58	2.3	110	4.3	120	4.7
(8)	37	1.5	40	1.6	66	2.6	126	5.0	160	6.3
(9)	–	–	–	–	–	–	–	–	–	–
(10)	147.5	5.81	159.5	6.28	262	10.3	377	14.8	470	18.5
(11)	7	0.3	7	0.3	8	0.3	8	0.3	8	0.3
(12)	–	–	–	–	–	–	–	–	–	–
(13)	Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin	
(14)	–	–	–	–	–	–	–	–	–	–
(15)	Ø51	Ø2.0	Ø66	Ø2.6	Ø97	Ø3.8	Ø112	Ø4.4	Ø173	Ø6.8

TS12 SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		Rated Characteristic Value [mV/V] ±0.1%	SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	lbf-in	in	NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.005	0.04	0.3	0.46	$3.9x10^{-6}$	$1.1x10^{-8}$	35	7.9	0.9	0.2
0.01	0.09	0.5	0.46	$3.9x10^{-6}$	$1.1x10^{-8}$	35	7.9	0.9	0.2
0.02	0.18	0.5	3.6	$3.9x10^{-6}$	$1.1x10^{-8}$	35	7.9	0.9	0.2
0.05	0.44	0.5	3.7	$1.1x10^{-5}$	$1.9x10^{-7}$	40	9.0	0.9	0.2
0.1	0.88	0.5	$1.8x10^{1}$	$1.1x10^{-5}$	$6.1x10^{-7}$	42	9.4	0.9	0.2
0.2	1.77	0.8	$1.8x10^{1}$	$1.1x10^{-5}$	$6.1x10^{-7}$	58	13.0	1.2	0.27
0.5	4.43	0.8	$9.7x10^{1}$	$1.1x10^{-5}$	$6.1x10^{-7}$	172	38.7	1.9	0.43
1	8.85	0.8	$1.2x10^{2}$	$1.1x10^{-5}$	$6.1x10^{-7}$	227	51.0	2.9	0.65
2	17.7	0.8	$3.6x10^{2}$	$1.1x10^{-5}$	$6.3x10^{-7}$	348	78.2	5.5	1.24
5	44.3	0.8	$4.1x10^{2}$	$1.1x10^{-5}$	$6.3x10^{-7}$	650	146	14	3.1
10	88.5	0.8	$9.1x10^{2}$	$1.1x10^{-5}$	$7.4x10^{-7}$	1K	245	26	5.8
20	177	0.8	$4.2x10^{3}$	$1.0x10^{-4}$	$7.0x10^{-6}$	1.68K	378	43	9.7
50	443	0.8	$6.1x10^{3}$	$1.1x10^{-4}$	$8.6x10^{-6}$	3.1K	697	80	18
100	885	0.8	$8.5x10^{3}$	$1.1x10^{-4}$	$8.8x10^{-6}$	4.8K	1.08K	160	36
200	1.77K	0.8	$6.6x10^{4}$	$3.6x10^{-4}$	$7.9x10^{-5}$	8K	1.8K	290	65.2
500	4.43K	0.8	$7.1x10^{4}$	$7.1x10^{-4}$	$8.0x10^{-5}$	14K	3.15K	700	157
1K	8.85K	0.8	$3.1x10^{5}$	$3.1x10^{-3}$	$1.1x10^{-3}$	23K	5.17K	900	202
2K	17.7K	0.8	$7.2x10^{5}$	$7.2x10^{-3}$	$4.1x10^{-3}$	33K	7.42K	1200	270
5K	44.3K	0.8	$8.0x10^{5}$	$8.0x10^{-3}$	$4.2x10^{-3}$	57K	12.8K	2800	629
10K	88.5K	1.5	$3.1x10^{6}$	$3.1x10^{-2}$	$3.0x10^{-2}$	90K	20.2K	4400	989
20K	177K	1.5	$3.7x10^{6}$	$3.7x10^{-2}$	$3.0x10^{-2}$	130K	29.2K	8200	1.84K

TS14 SQUARE DRIVE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 1 to 5K Nm (8.85 to 44.2K lbf-in)
- Simple operation - no moving parts
- Useful for auditing fastener torques
- Fits standard socket wrenches

OPTIONS

- 100% Control Signal (Internal Shunt Cal)
- High accuracy +0.1%FS
- A2LA Accredited Calibration
- Mating Cable (straight or right angle)
- Extended Temperature Range

STANDARD CONFIGURATION



MODEL TS14 (Shown)

SPECIFICATIONS

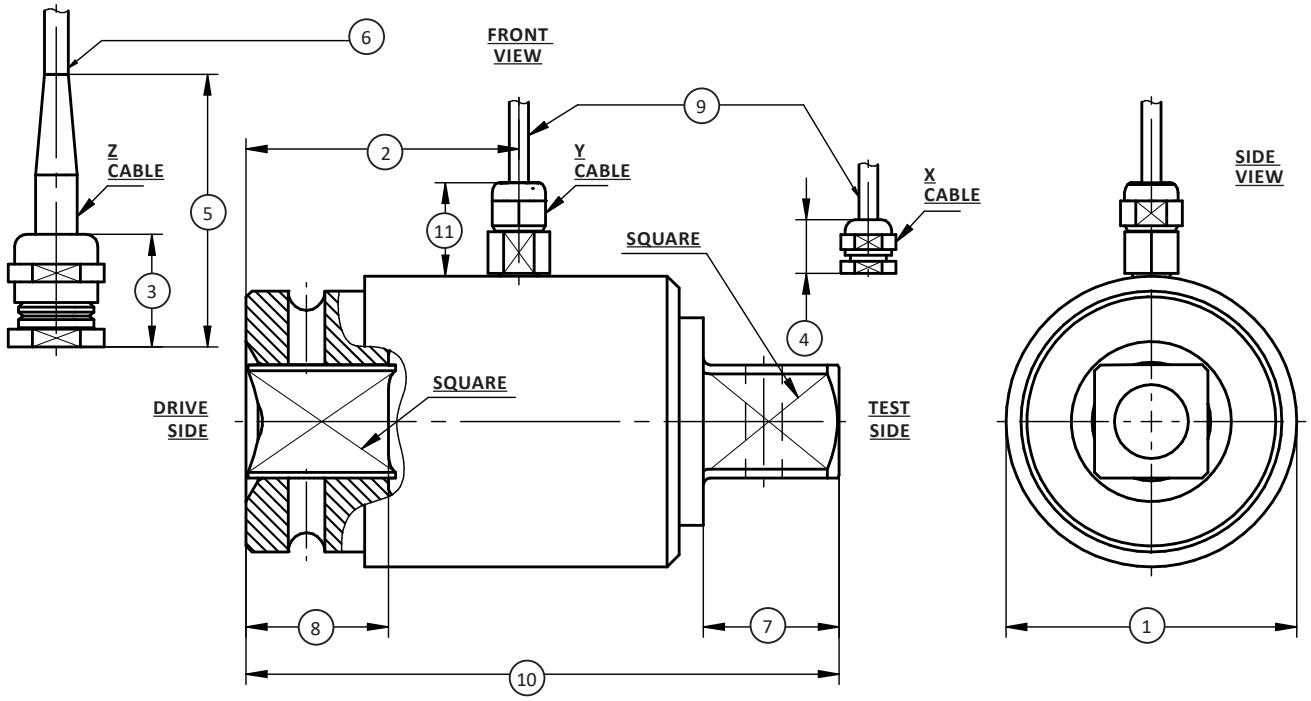
CAPACITY		1 Nm	8.85	2 - 5K	17.7 - 44.3K
		Nm	lbf-in	Nm	lbf-in
ACCURACY – (MAX ERROR)					
Combined Error – %FS		± 0.2			
Nonrepeatability – %		± 0.02			
TEMPERATURE					
Effect on Zero – %RO / deg	°C	±0.02			
Effect on Output – % / deg	°C	±0.01			
Rated Range	°C	-5 to +45			
	°F	+23 to +113			
Operating Range	°C	-15 to +55			
	°F	+5 to +131			
ELECTRICAL					
Output–mV/V		0.5		1.0	
		≥ 21.0			
Excitation Voltage – VDC MAX		12			
Bridge Resistance – Ohm		350			
Cable Length – m		3			
MECHANICAL					
Safe Overload – %RO		150			
Material		Alloy steel			
Protection Class		IP50			

ELECTRICAL CONNECTION

Wire	Function
green	Excitation (-)
brown	Excitation (+)
yellow	Signal (+)
white	Signal (-)
grey	Control signal (option)
Shield	Shield

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TS14 SQUARE DRIVE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY													
	X Cable		Y Cable								Z Cable			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1, 2, 5, 12	8.85, 17.7, 44.3, 106	25, 63	221, 560	100, 160, 200	885, 1.41K, 1.77K	500	4.42K	1K	8.85K	2K	17.K	5K	44.2K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø15	Ø0.6	Ø30	Ø1.2	Ø30	Ø1.2	Ø49	Ø1.9	Ø49	Ø1.9	Ø100	Ø3.9	Ø100	Ø3.9
(2)	22.7	0.89	34.5	1.36	35	1.4	46	1.8	60	2.4	120	4.7	120	4.7
(3)	–	–	–	–	–	–	–	–	–	–	20	0.8	20	0.8
(4)	10	0.4	–	–	–	–	–	–	–	–	–	–	–	–
(5)	–	–	–	–	–	–	–	–	–	–	50	2.0	50	2.0
(6)	–	–	–	–	–	–	–	–	–	–	4.8	0.19	4.8	0.19
(7)	7.2	0.28	10.4	0.41	15.1	0.59	22.9	0.90	27.4	1.08	39	1.5	39	1.5
(8)	8	0.3	12.2	0.48	15	0.6	24	0.9	27	1.1	41.5	1.63	41	1.6
(9)	3.2	0.13	3.2	0.13	3.2	0.13	3.2	0.13	3.2	0.13	–	–	–	–
(10)	64	2.5	71	2.8	76	3.0	100	3.9	132	5.2	250	9.8	250	9.8
(11)	–	–	14	0.6	14	0.6	14	0.6	14	0.6	–	–	–	–
SQUARE	1/4"		3/8"		1/2"		3/4"		1"		1 1/2"		1 1/2"	

TS14 SQUARE DRIVE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	lbf-in	NM/rad	Drive Side	Test Side	N	lbf	N	lbf
1	8.85	$2.1x10^{2}$	$2.4x10^{-7}$	$3.9x10^{-7}$	380	85.4	7	1.6
2	17.7	$2.1x10^{2}$	$2.4x10^{-7}$	$3.9x10^{-7}$	380	85.4	7	1.6
5	44.3	$5.5x10^{2}$	$2.6x10^{-7}$	$4.0x10^{-7}$	700	157	17	3.8
12	106	$6.9x10^{2}$	$2.6x10^{-7}$	$4.1x10^{-7}$	840	189	21.5	4.8
25	221	$4.7x10^{3}$	$9.6x10^{-6}$	$2.2x10^{-6}$	2.1K	472	83	18.7
63	558	$1.1x10^{4}$	$9.9x10^{-6}$	$2.5x10^{-6}$	3.9K	877	210	47.2
100	885	$1.8x10^{4}$	$1.3x10^{-5}$	$3.3x10^{-6}$	5.3K	1.19K	300	67.4
160	1.42K	$1.9x10^{4}$	$1.4x10^{-5}$	$3.4x10^{-6}$	5.5K	1.24K	320	71.9
200	1.77K	$1.9x10^{4}$	$1.4x10^{-5}$	$3.4x10^{-6}$	5.5K	1.24K	320	71.9
500	4.43K	$1.1x10^{5}$	$1.1x10^{-4}$	$3.3x10^{-5}$	14K	3.15K	1.1K	247
1K	8.85K	$1.2x10^{5}$	$2.4x10^{-4}$	$6.0x10^{-5}$	16.5K	3.71K	950	214
2K	17.7K	$4.6x10^{5}$	$4.6x10^{-3}$	$9.8x10^{-4}$	37K	8.32K	1.8K	405
5K	44.3K	$6.2x10^{5}$	$4.7x10^{-3}$	$1.1x10^{-3}$	55K	12.4K	3.4K	764

TS17 HEX DRIVE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

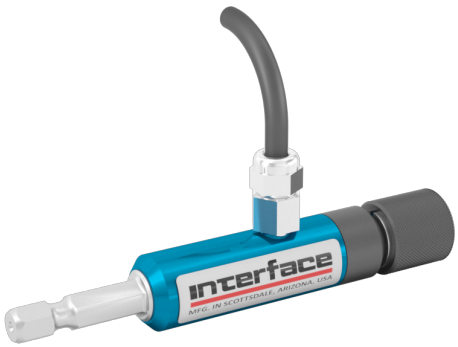
FEATURES & BENEFITS

- Capacities from 0.1 to 20 Nm (0.07 to 177 lbf-in)
- Simple operation - no moving parts
- Useful for auditing fastener torques
- Quick-connect chuck

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.1
Nonrepeatability – %		± 0.05
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated Range	°C	+5 to +50
	°F	+41 to +122
Operating Range	°C	-10 to +60
	°F	+14 to +140
ELECTRICAL		
Output – mV/V	0.2 - 5 Nm	1
	1.77 - 44.3 lbf-in	
	10 - 20 Nm	2
	88.5 - 177 lbf-in	
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		350
Cable Length – m		3
MECHANICAL		
Safe Overload – %RO		130
Material		Alloy steel

STANDARD CONFIGURATION



MODEL TS17 (Shown)

OPTIONS

- 100% Control Signal (RCAL)

ELECTRICAL CONNECTION

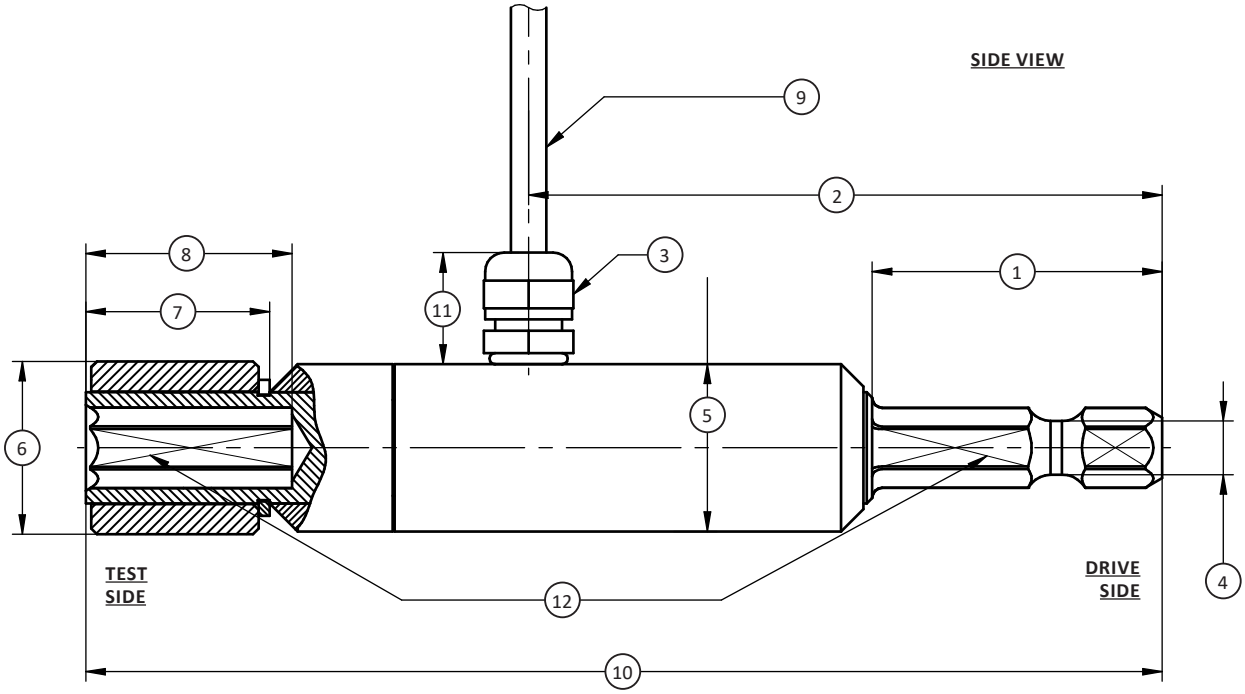
Wire	6-PIN ELECTRICAL CONNECTION
	Function
Green	Excitation (-)
Brown	Excitation (+)
Yellow	Shield
White	Signal (+)
Grey	Signal (-)
Shield	Control signal (option)

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	lbf-in	NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.1	0.89	$1.8x10^{1}$	$6.7x10^{-7}$	$5.7x10^{-7}$	43	9.7	0.6	0.13
0.2	1.78	$1.8x10^{1}$	$6.7x10^{-7}$	$5.7x10^{-7}$	43	9.7	0.6	0.13
0.5	4.43	$1.1x10^{2}$	$6.7x10^{-7}$	$5.7x10^{-7}$	95	21.4	1.2	0.27
1	8.85	$1.1x10^{2}$	$6.7x10^{-7}$	$5.7x10^{-7}$	380	85.4	3.7	0.83
2	17.7	$1.9x10^{2}$	$6.8x10^{-7}$	$5.7x10^{-7}$	380	85.4	3.7	0.83
5	44.3	$3.7x10^{2}$	$6.9x10^{-7}$	$5.8x10^{-7}$	700	157	9.5	2.14
10	88.5	$3.7x10^{2}$	$6.9x10^{-7}$	$5.8x10^{-7}$	1.15K	259	19	4.3
20	177	$4.8x10^{2}$	$7.1x10^{-7}$	$6.0x10^{-7}$	1.15K	259	19	4.3

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TS17 HEX DRIVE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY	
	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5, 10, 20	0.07, 0.15, 0.37, 0.7, 1.5, 3.7, 88.5, 177
	mm	in
(1)	$26^{+0.2}$	$1.0^{+0.008}$
(2)	57	2.2
(3)	SW 8	
(4)	$Ø4.8^{-0.1}$	$Ø0.19^{-0.004}$
(5)	Ø15	Ø0.6
(6)	Ø15.5	Ø0.61
(7)	16.5	0.65
(8)	18.5	0.73
(9)	Ø3.2	Ø0.13
(10)	96.5	3.80
(11)	10	0.4
(12)	○1/4"	

TS21 MINIATURE SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

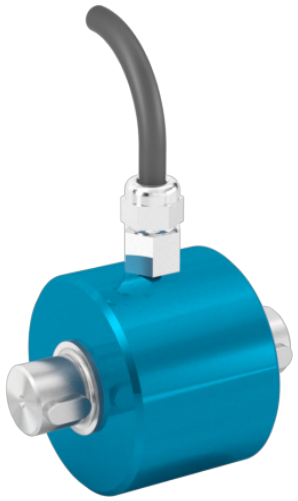
FEATURES & BENEFITS

- Capacities from 1 to 100 Nm (8.85 to 885 lbf-in)
- Shaft ends with keys
- Very small measuring ranges

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.2
Hysteresis – %FS		±0.2
Nonrepeatability – %RO		±0.01
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Compensated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V		1
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		350
Electrical Connection	m	3
	ft	9.8
MECHANICAL		
Safe Overload – %RO		150
Angular Deflection at Rated Torque		< 0.2
IP Rating		50
Material		Alloy steel

STANDARD CONFIGURATION



MODEL TS21 (Shown)

OPTIONS

- Enhanced Accuracy – 0.1% nonlinearity & hysteresis
- Internal Shunt Resistor – 100% output

ELECTRICAL CONNECTION

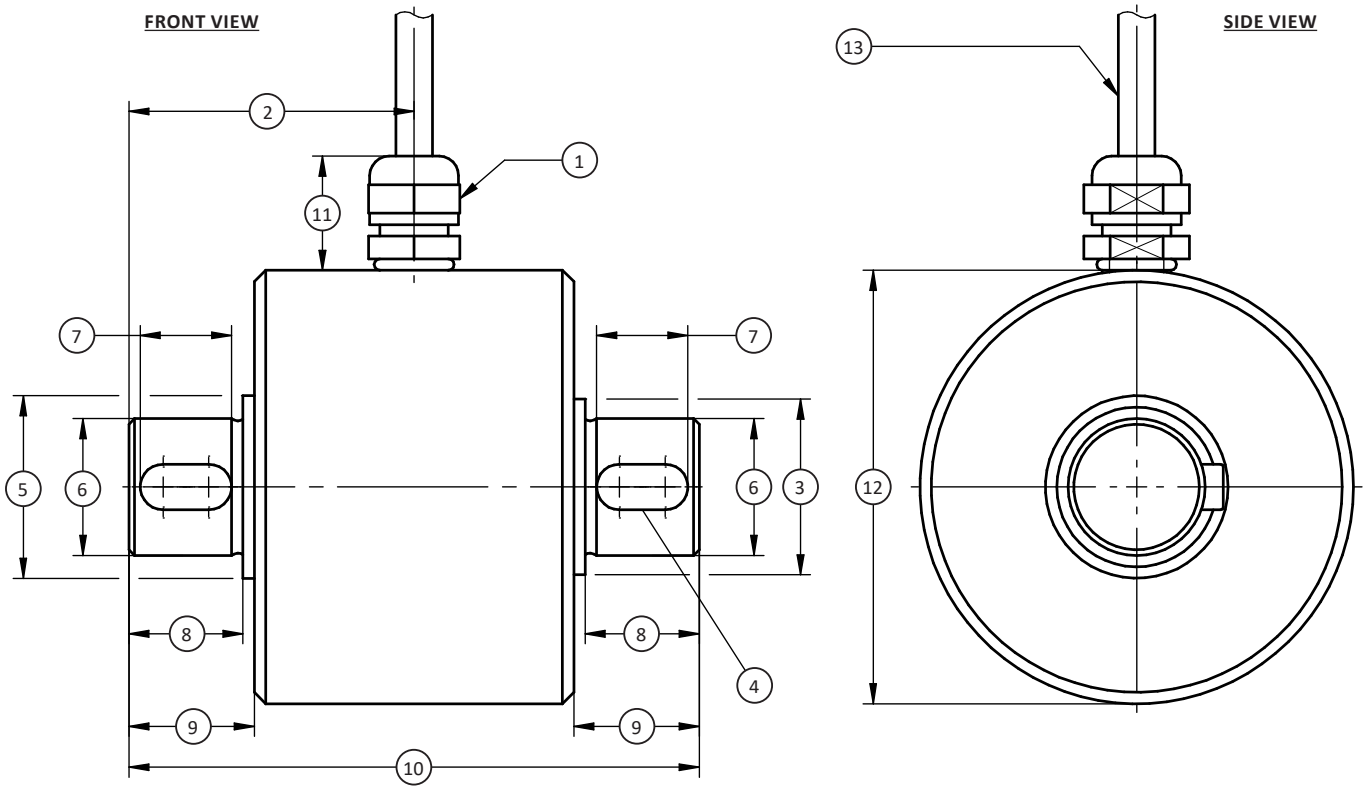
Wire	6-PIN ELECTRICAL CONNECTION
	Function
Green	Excitation (-)
Brown	Excitation (+)
Yellow	Signal (+)
White	Signal (-)
Grey	Control signal (option)
Shield	Shield

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MASS MOMENT OF INERTIA – ($Kg \cdot m^2$)		MAX THRUST LOAD		MAX SHEAR LOAD	
Nm	lbf-in	Nm/rad	Drive Side	Test Side	N	lbf	N	lbf
1	8.85	$2.78x10^{2}$	$1.10x10^{-5}$	$3.78x10^{-7}$	400	89.9	11	2.5
2	17.7	$2.78x10^{2}$	$1.10x10^{-5}$	$3.78x10^{-7}$	400	89.9	11	2.5
5	44.3	$8.03x10^{2}$	$1.10x10^{-5}$	$3.86x10^{-7}$	700	157	25	5.6
10	88.5	$3.22x10^{3}$	$1.10x10^{-5}$	$4.07x10^{-7}$	1.15K	259	51	11.5
20	177	$3.50x10^{3}$	$1.11x10^{-5}$	$4.47x10^{-7}$	1.7K	382	95	21.4
50	443	$1.17x10^{4}$	$3.24x10^{-5}$	$4.44x10^{-6}$	3.7K	832	190	42.7
100	885	$1.55x10^{4}$	$3.26x10^{-5}$	$4.63x10^{-6}$	4.35K	978	270	60.7

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TS21 MINIATURE SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

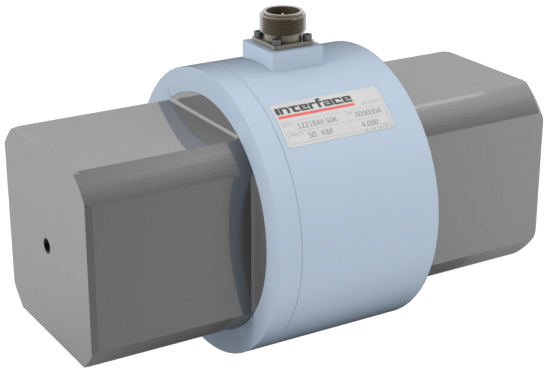
See Drawing	CAPACITY			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1, 2, 5, 10, 20	8.85, 17.7, 44.3, 88.5, 177	50, 100	443, 885
	mm	in	mm	in
(1)	SW 8		SW 8	
(2)	25	1.0	35	1.4
(3)	Ø15.4	Ø0.61	Ø20.5	Ø0.81
(4)	Key DIN 6885-1		Key DIN 6885-1	
(5)	Ø16	Ø0.6	Ø21	Ø0.8
(6)	Ø12 g6	Ø0.4722 / 0.4718	Ø18 g6	Ø0.7084 / 0.7080
(7)	8	0.3	18	0.7
(8)	10	0.4	20	0.8
(9)	11	0.4	21.5	0.8
(10)	50	2.0	70	2.8
(11)	10	0.4	10	0.4
(12)	Ø38	Ø1.5	Ø49	Ø1.9
(13)	Ø3.2	Ø0.13	Ø3.2	Ø0.13

TSQ HIGH CAPACITY SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- 300K to 3,000K lbf-in capacities (34K to 340K Nm)
- Male square on each end
- High stiffness
- 2X save overload
- Fully calibrated, CW & CCW

STANDARD CONFIGURATION



Model TSQ1-600K (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.25 (TSQ1-1200K ±0.50)
Hysteresis – %FS		±0.25 (TSQ1-1200K ±0.50)
Nonrepeatability – %RO		±0.05
TEMPERATURE		
Effect on Zero – %RO / deg	°F	±0.0002
Effect on Output – % / deg	°F	±0.0002
Compensated range	°F	+75 to +175
	°C	+24 to +175
Operating range	°F	-65 to +225
	°C	-54 to +107
ELECTRICAL		
Rated output – mV/V (Nominal)		3
Input resistance – Ohms		350
Output resistance – Ohms		350
Excitation, nominal – VDC		10
Excitation, MAX – VDC		15
MECHANICAL		
Safe overload – %RO		200
Connector		CF 3102E-14S-6P
Calibration		CW & CCW to rated capacity
Material		Alloy steel

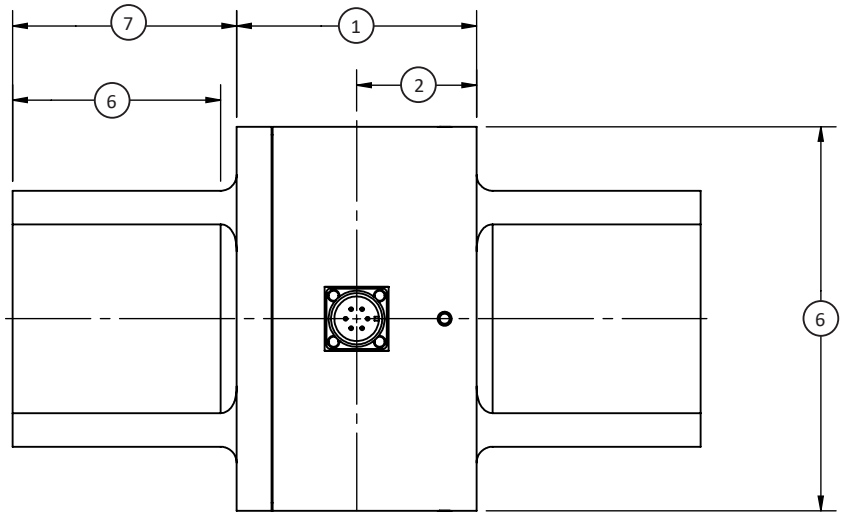
PERFORMANCE PARAMETERS

MODEL	CAPACITY		TORQUE OVERLOAD		TORSIONAL STIFFNESS		WEIGHT		MAX THRUST LOAD		MAX BENDING MOMENT	
	lbf-in	Nm	lbf-in	Nm	lbf-in/rad	Nm/rad	lbs	kg	lbf	N	lbf-in	Nm
TSQ1	300K	33.9K	600K	67.8K	52,200K	5,898K	57	25.9	400K	1779K	400K	45.2K
	600K	67.8K	1,200K	136K	56,600K	6,395K	57	25.9	400K	1779K	400K	45.2K
	1200K	136K	2,400K	271K	57,200K	6,460K	57	25.9	400K	1779K	400K	45.2K
TSQ2	750K	84.8K	1,500K	170K	171,000K	19,320K	166	75.3	1,500K	6672K	1,500K	169K
	1500K	170K	3,000K	339K	207,000K	23,390K	166	75.3	1,500K	6672K	1,500K	169K
	3000K	339K	6,000K	678K	220,000K	24,856K	166	75.3	1,500K	6672K	1,500K	169K

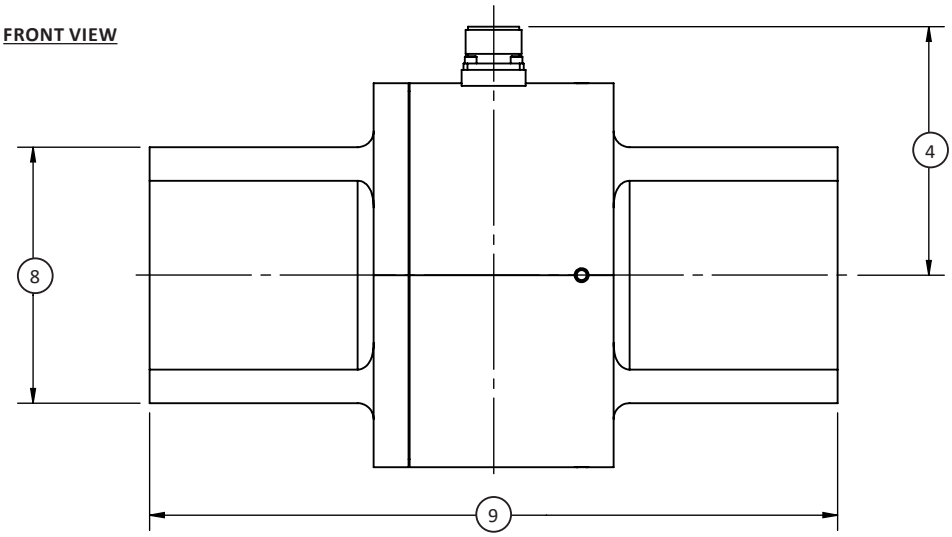
U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

TSQ HIGH CAPACITY SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)

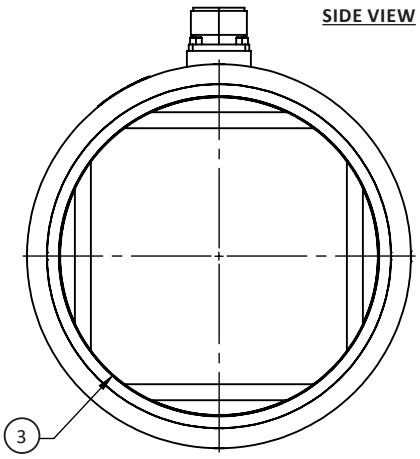
TOP VIEW



FRONT VIEW



SIDE VIEW



DIMENSIONS

See Drawings	MODEL			
	TSQ1		TSQ2	
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	300K, 600K, 1200K	33.9K, 67.8K, 136K	750K, 1500K, 3000K	84.8K, 170K, 339K
	in	mm	in	mm
(1)	3.75	95.3	16	406
(2)	1.875	47.63	2.5	34
(3)	Ø4.970	Ø126.24	Ø7.5	Ø191
(4)	3.883	98.63	5.125	130.18
(5)	Ø6.0	Ø152.4	Ø8.5	Ø216
(6)	3.25	82.6	5	127
(7)	3.5	88.9	5.5	140
(8)	4.0	101.6	5.5 TYP ACROSS FLATS	140 TYP ACROSS FLATS
(9)	10.75	273.1	16	406

TR1 ROD END REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 25 ozf-in to 1K lbf-in (0.18 to 110 Nm)
- Small size
- Heavy-duty mounting

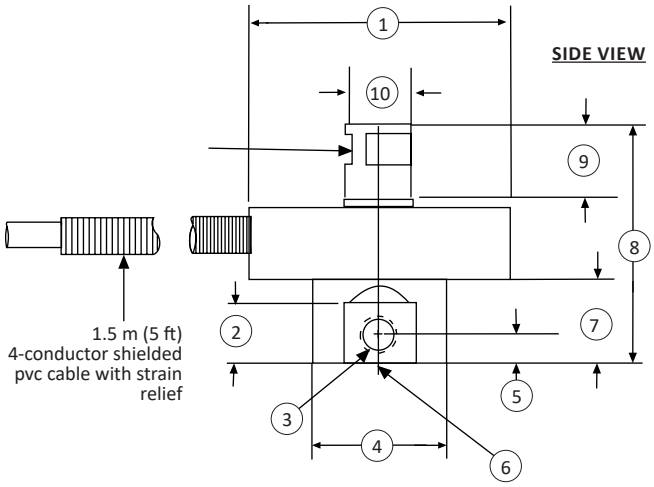
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Accuracy class – %FS		±0.2
Nonlinearity – %FS		±0.15
Hysteresis – %FS		±0.10
Nonrepeatability – %RO		±0.03
TEMPERATURE		
Operating Range	°F	-65 to +225
	°C	-55 to +107
Compensated Range	°F	+60 to +160
	°C	+16 to +71
Thermal Effects	Zero – %FS / °F	±0.005
	Span – % / °F	±0.005
ELECTRICAL		
Output – mV/V		2
Excitation Voltage – VDC		10
Excitation Voltage – V MAX		15
Input Resistance – Ohm – min		350
Output Resistance – Ohm – min		350
MECHANICAL		
Material		Stainless steel

STANDARD CONFIGURATION



Model TR1 (Shown)



DIMENSIONS

See Drawing	CAPACITIES			
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	25 (ozf-in) to 250 (lbf-in)	0.175 to 28	500 to 1K	56.5 to 113
	in	mm	in	mm
(1)	Ø1.5	Ø38	Ø2.0	Ø51
(2)	0.38	9.5	0.38	9.5
(3)	10-32 UNF-2B 3 Holes EQ. SP. for setscrew			
(4)	Ø0.75	Ø19	Ø1.25	32
(5)	0.19	4.9	0.19	4.9
(6)	Ø0.376 ↧ 0.015	Ø9.6 ↧ 0.38	Ø0.751	Ø19
(7)	0.50	13	0.50	13
(8)	1.50	38	1.50	38
(9)	0.50	13	0.50	13
(10)	Ø0.38	Ø9.5	Ø0.75	Ø19

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

AxialTQ™ WIRELESS ROTARY TORQUE TRANSDUCER

The Interface AxialTQ torque measurement system was developed in direct collaboration with over 30 end-users who shared their wish-lists for operational priorities, user interface, design, features, real-world field issues and more.
AxialTQ torque measurement system redefines the category in terms of function, accuracy and customizable compatibility.
The rotor sensing element and electronics are the heart of the system which will be offered in 8 torque capacities in 5 DIN sizes. With the flexible capability of stator and output module mounting, the AxialTQ system offers an infinite number of configurations to meet any application need.

SPECIFICATIONS

ACCURACY / DATA RATE	
Model	EX
Accuracy Class	0.05
Temp Effect on Zero – %RO/10°C	±0.05
Temp Effect on Output – %RO/10°C	±0.05
Data Rate (max) samples/sec	5K
Accuracy Class Output	Analog or digital

DIN Size	Capacity		Rated Speed	
	U.S. (lbf-in)	Metric (Nm)	Nominal	Extended (0.10% Accuracy Class)
100	885, 2.21K	100, 250	15K	20K
120	4.42K, 8.85K	500, 1K	14K	20K
150	17.7K, 26.5K	2K, 3K	11K	15K
180	44.2K	5K	7K	10K
225	88.5K	10K	5K	6K

ENVIRONMENTAL		
Compensated Operating Range	°F	+50 to +158
	°C	+10 to +70
Maximum Operating Range	°F	+4to +158
	°C	-20 to +70
Storage Range	°F	-40 to +185
	°C	-40 to +85

ELECTRICAL		
Output Types	Voltage, Frequency, USB	
Power Supply – VDC	24 ± 6	
ANALOG OUTPUT		
10 kHz ± 5kHz	± 10 VDC	
60 kHz ± 3Q0kHz	± 5 VDC	
60 kHz ± 20kHz	12 mA ± 8 mA	
MECHANICAL		
Safe Overload – % RO	200	
Rotor / Stator Axial Gap	in	0.118 ± 0.078
	mm	3 ± 2
Radial Clearance	in	0.472
	mm	12
IP Rating	IP65	
DIN Size	100	120, 150, 180, 225
Material	Aluminum	Steel

STANDARD CONFIGURATION



Model ATQ10D12-01KEX (Shown)

MODELS

AxialTQ-EX

- Designed to minimize uncertainty while covering a broad array of torque measurement applications.
- An accuracy class of 0.05 with an axial gap and dual analog and digital simultaneous outputs.

FEATURES & BENEFITS

- Crash-Proof Design for Maximum Reliability
- Versatile Design for Application Flexibility
- Flexible Configuration
- Simultaneous Analog and Digital Outputs Enables Real-time Control and Data Collection
- Interchangeable Stators and Output Modules to Minimize Parts Inventory
- Wide Range of Standard Components to Match Any Application

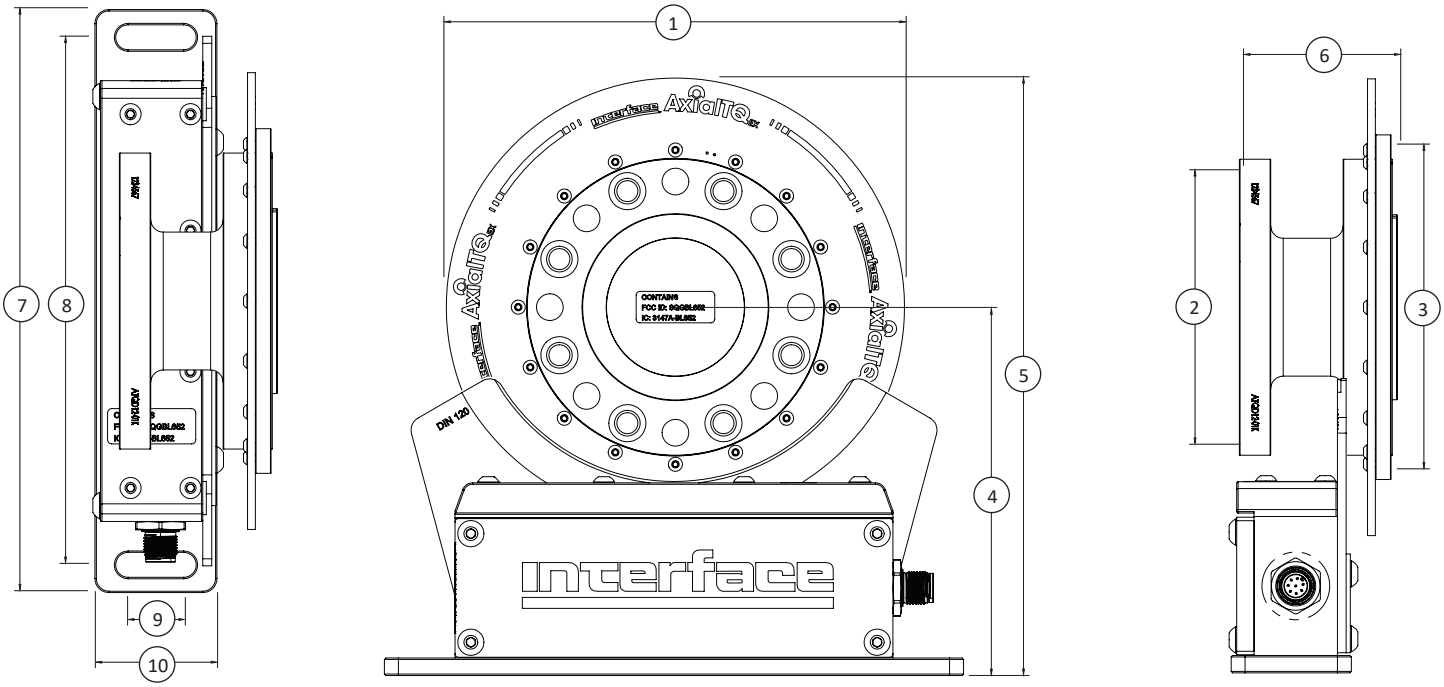
OPTIONS

- Balanced Rotor to G2.5
- Speed Sensing 60 PPR

Euro Pat App 3 662 236

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI

AxialTQ™ WIRELESS ROTARY TORQUE TRANSDUCER



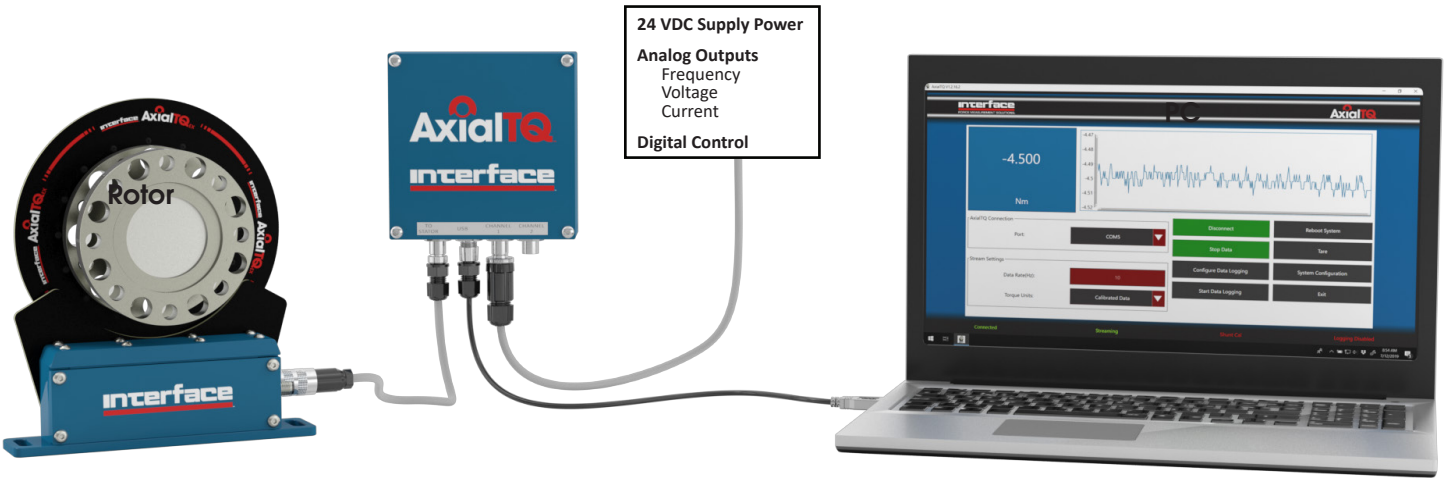
DIMENSIONS

Din Size	100		120		150		180		225	
Torque Capacity	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	885, 2.21K	100, 250	4.42K, 8.85K	500, 1K	17.7K, 26.5K	2K, 3K	44.2K	5K	88.5K	10K
See Drawing	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	6.57	167	7.28	185	8.66	220	9.60	244	11.29	287
(2)	Ø3.93	Ø100	Ø4.72	Ø120	Ø5.90	Ø150	Ø7.08	Ø180	Ø8.85	Ø225
(3)	Ø4.60	Ø117	Ø5.51	Ø140	Ø6.69	Ø170	Ø7.87	Ø200	Ø9.64	Ø245
(4)	5.23	133	5.66	144	6.33	161	6.90	175.5	7.83	199
(5)	8.54	217	9.29	236	10.66	271	11.73	298	13.50	343
(6)	2.15	54.8	2.44	62	2.44	62	2.44	62	2.44	75.7
(7)	8.26	210	8.26	210	8.26	210	8.26	210	8.26	210
(8)	7.48	190	7.48	190	7.48	190	7.48	190	7.48	190
(9)	0.78	20	0.78	20	0.78	20	0.78	20	0.78	20
(10)	1.73	44	1.73	44	1.73	44	1.73	44	1.73	44

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

AxialTQ™ WIRELESS ROTARY TORQUE TRANSDUCER

SYSTEM ARCHITECTURE



Output Module

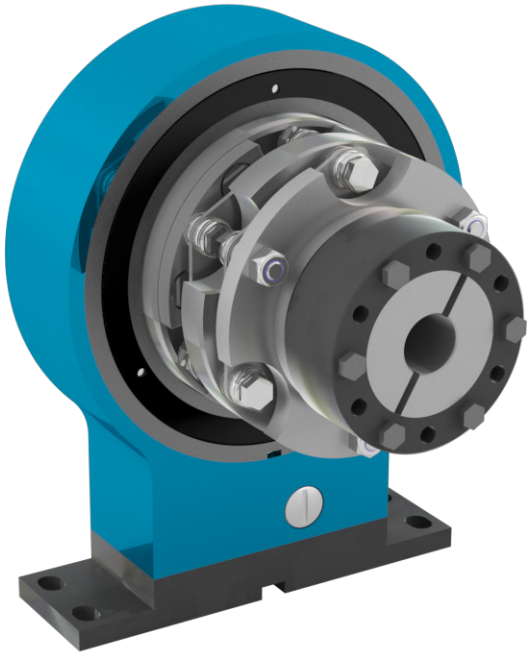
Stator

T1 TORQUE COUPLING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 50 to 1K Nm (443 to 8.85K)
- Shortest installed length
- Integrated double-flex disc coupling
- Hollow
- Bearingless non-contact design
- 16-bit resolution

STANDARD CONFIGURATION



MODEL T1 (Shown)

SPECIFICATIONS

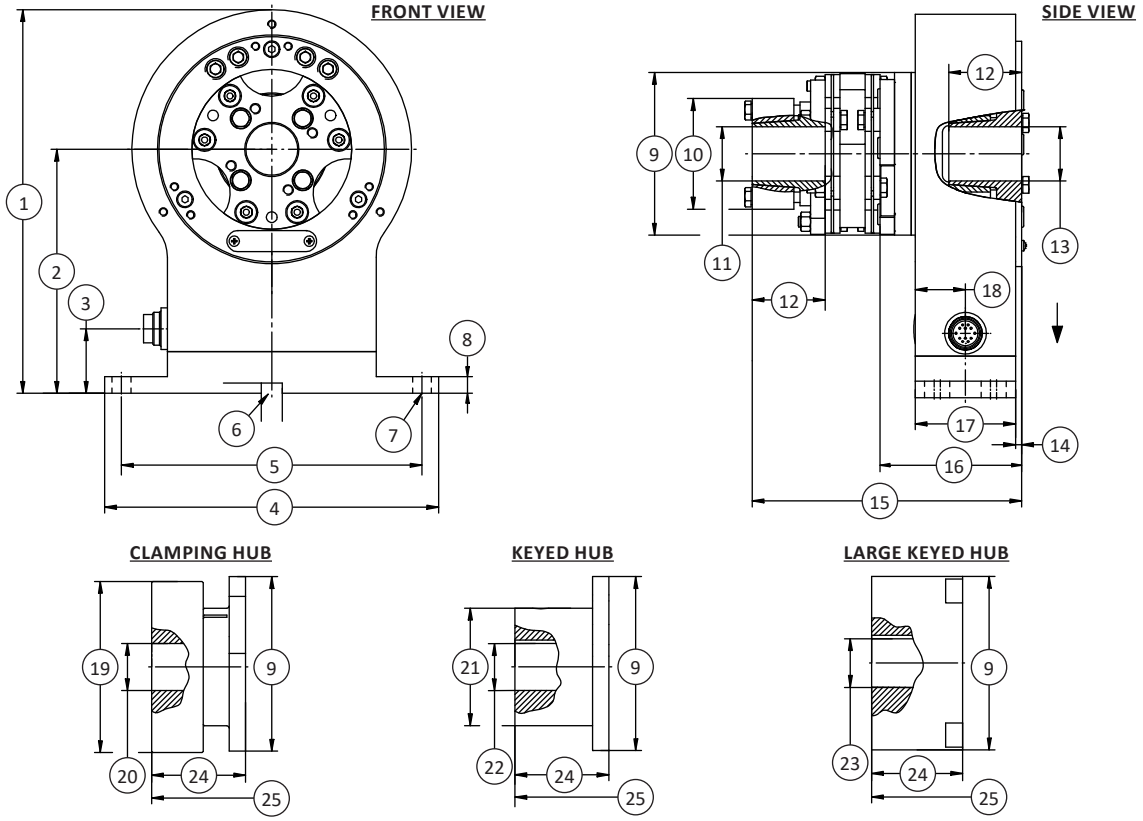
ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %		±0.02
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth, Hz		3 kHz, 3dB
Sample Rate – kHz		10
Calibration Signal – %FS		100
Supply Voltage – VDC		12 - 18
Supply Current – mA		< 100
Electrical Connection – pin		12
Resolution – bit		16
MECHANICAL		
Safe Overload – %RO		200
Ultimate Overload – %RO		300
Max Speed – rpm		13.6K – See table
Material		Alloy steel

OPTIONS

- Speed Measurement – 30 Pulse +5V TTL
- Keyway Side 1 (Reduced max diam dA)
- ±10 VDC Output
- RS485

Size	Nominal Torque		Max Revolution	*Max Thrust Load		*Axial Displacement Max		*Angular Displacement Max (°)	*Radial Displacement Max	Spring-rate (Nm/rad)	Moment of Inertia (kg•m²)	
	Nm	lbf-in		N	lbf	mm	in				Side 1	Side 2
16	50	443	13,600	150	38.7	0.25	0.01	0.4° (0.2° per disc pack)	0.05	4.9E+04	2.1E-03	1.0E-03
	100	885								6.2E+04		
	150	1.33K								6.2E+04		
25	150	1.33K	11,800	190	42.7	0.25	0.01		0.05	1.2E+05	4.0E-03	1.8E-03
	200	1.77K								1.2E+05		
	250	2.21K								1.2E+05		
40	200	1.77K	10,100	250	56.2	0.3	0.012		0.06	1.3E+05	6.4E-03	3.7E-03
	300	2.66K								1.3E+05		
	400	3.54K								1.3E+05		
64	400	3.54K	8,500	450	101	0.3	0.012		0.06	3.1E+05	9.3E-03	8.5E-03
	500	4.43K								3.1E+05		
	600	5.31K								3.1E+05		
100	600	5.31K	7,300	600	135	0.45	0.018		0.07	4.8E+05	1.9E-02	1.6E-02
	750	6.64K								4.8E+05		
	1K	8.85K								4.8E+05		

T1 TORQUE COUPLING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing		(1)		(2)		(3)		(4)		(5)		(6)		(7)	(8)		(9)	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		mm	in	mm	in
Size	16	184	7.2	$117^{\pm0.1}$	$4.6^{\pm0.004}$	31	1.2	160	6.3	$144^{\pm0.1}$	$9.7^{\pm0.004}$	$Ø10^{+0.1}\,↧5$	$Ø0.4^{\pm0.004}\,↧0.2$	M8	8	0.3	77	3.0
	25	195	7.7	$122.5^{\pm0.1}$	$4.8^{\pm0.004}$	31	1.2	160	6.3	$144^{\pm0.1}$	$9.7^{\pm0.004}$	$Ø10^{+0.1}\,↧5$	$Ø0.4^{\pm0.004}\,↧0.2$	M8	8	0.3	89	3.5
	40	211	8.3	$130.5^{\pm0.1}$	$5.1^{\pm0.004}$	31	1.2	160	6.3	$144^{\pm0.1}$	$9.7^{\pm0.004}$	$Ø10^{+0.1}\,↧5$	$Ø0.4^{\pm0.004}\,↧0.2$	M8	8	0.3	104	4.1
	64	230	9.1	$140^{\pm0.1}$	$5.5^{\pm0.004}$	31	1.2	160	6.3	$144^{\pm0.1}$	$9.7^{\pm0.004}$	$Ø10^{+0.1}\,↧5$	$Ø0.4^{\pm0.004}\,↧0.2$	M8	8	0.3	123	4.8
	100	250	9.8	$150^{\pm0.1}$	$5.9^{\pm0.004}$	31	1.2	160	6.3	$144^{\pm0.1}$	$9.7^{\pm0.004}$	$Ø10^{+0.1}\,↧5$	$Ø0.4^{\pm0.004}\,↧0.2$	M8	8	0.3	143	5.6

See Drawing		(10)		(11)		(12)		(13)		(14)		(15)		(16)		(17)	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Size	16	53	2.1	14-26	0.6-1.0	35	1.4	14-26	0.6-1.0	3	0.1	129	5.1	68	2.7	48	1.9
	25	64	2.5	20-36	0.8-1.4	40	1.6	20-36	0.8-1.4	3	0.1	134.6	5.3	68	2.7	48	1.9
	40	74	2.9	25-45	1.0-1.8	45	1.8	25-45	1.0-1.8	3	0.1	143.8	5.7	68	2.7	48	1.9
	64	84	3.3	30-45	1.2-1.8	50	20	30-45	1.2-1.8	3	0.1	155.2	6.1	68	2.7	48	1.9
	100	104	4.1	35-55	1.4-2.2	55	2.2	35-55	1.4-2.2	3	0.1	160.2	6.3	68	2.7	48	1.9

See Drawing		(18)		(19)		(20)		(21)		(22)		(23)		(24)		(25)	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Size	16	24	0.9	73	2.9	20-35	0.8-1.4	50	2.0	16-32	0.6-1.3	30-45	1.2-1.8	40	1.6	121	4.8
	25	24	0.9	84	3.3	22-40	0.9-1.6	60	2.4	20-40	0.8-1.6	35-55	1.4-2.2	45	1.8	139.6	5.5
	40	24	0.9	97	3.8	25-45	1.0-1.8	70	2.8	25-50	1.0-2.0	45-65	1.8-2.6	55	2.2	153.8	6.1
	64	24	0.9	115	4.5	28-55	1.1-2.2	80	3.1	30-55	1.2-2.2	55-75	2.2-3.0	65	2.6	170.2	6.7
	100	24	0.9	135	4.5	32-68	1.3-2.7	100	3.9	35-70	1.4-2.8	65-95	2.6-3.7	75	3.0	180.2	7.1

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T2 PRECISION ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.1 to 20K Nm (0.88 to 177K lbf-in)
- Speed up to 15K RPM
- ±5 VDC output
- 12-28 VDC supply
- Contactless data transmission
- Digital electronics with on-shaft shunt
- 0.1% combined error
- 10 kHz sample rate
- 16-bit resolution
- Very short overall length

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %FS		±0.02
Resolution – bit		16
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
Storage Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Supply Voltage – VDC		12 - 28
Supply Current – mA		≤ 60
Output – VDC		±5
Bandwidth, Hz (-3dB)		1,000
Sample Rate – Hz		10,000
Calibration Signal – %FS		100
Electrical Connection		12-pin binder series 581 (Includes mate)
ENCODER OPTION		
Capacities	0.1 - 1K Nm	360 pulse/rev, 2-track, +5V TTL, 90° offset, quadrature encoder
	0.88 - 8.85K lbf-in	
	2K - 20K Nm	60 pulse/rev, 1-track, +5V TTL
	17K - 177K lbf-in	
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with Capacity (see table)
Shaft Material		Alloy steel
Housing Material		Aluminum

STANDARD CONFIGURATION



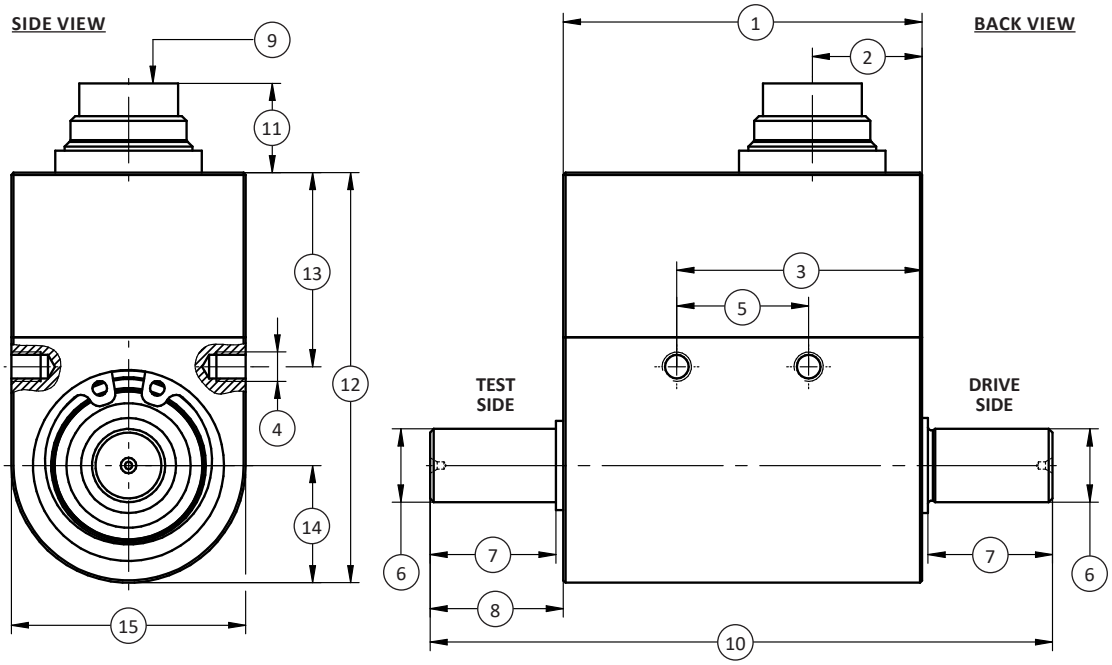
MODEL T2 (Shown)

OPTIONS

- Speed and angle output – 360 Pulse TTL, 2-Tracks
- 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- +10V Torque Output
- RS485
- Keyed shafts – per DIN 6885.1
- ±0.05% combined error
- Mating cable assembly

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

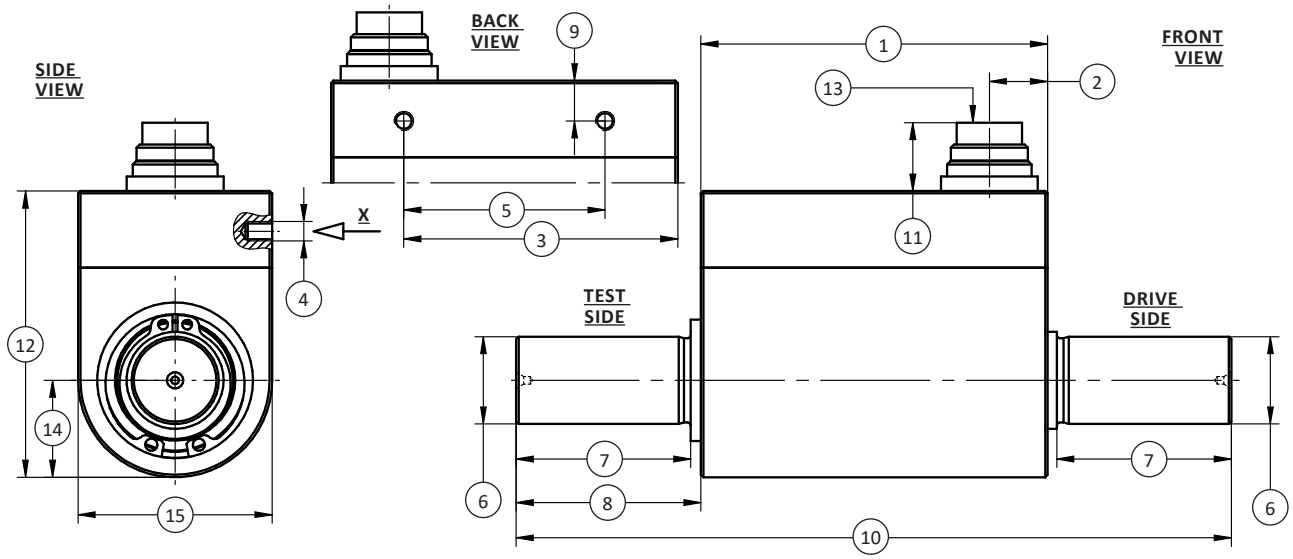
T2 PRECISION ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5	0.88, 1.77, 4.43, 8.85, 17.7, 44.3	10	88.5
	mm	in	mm	in
(1)	49	1.9	49	1.9
(2)	15	0.6	15	0.6
(3)	33.5	1.32	33.5	1.32
(4)	M4 ↧ 4	M4 ↧ 0.2	M4 ↧ 4	M4 ↧ 0.2
(5)	18	0.7	18	0.7
(6)	Ø8g6	Ø0.3148 / 0.3144	Ø10g6	Ø0.3935 / 0.3931
(7)	17	0.67	17	0.67
(8)	18	0.7	18	0.7
(9)	Connector 12-pin		Connector 12-pin	
(10)	85	3.35	85	3.35
(11)	12	0.5	12	0.5
(12)	56	2.2	56	2.2
(13)	26.5	1.04	26.5	1.04
(14)	16	0.6	16	0.6
(15)	32	1.3	32	1.3

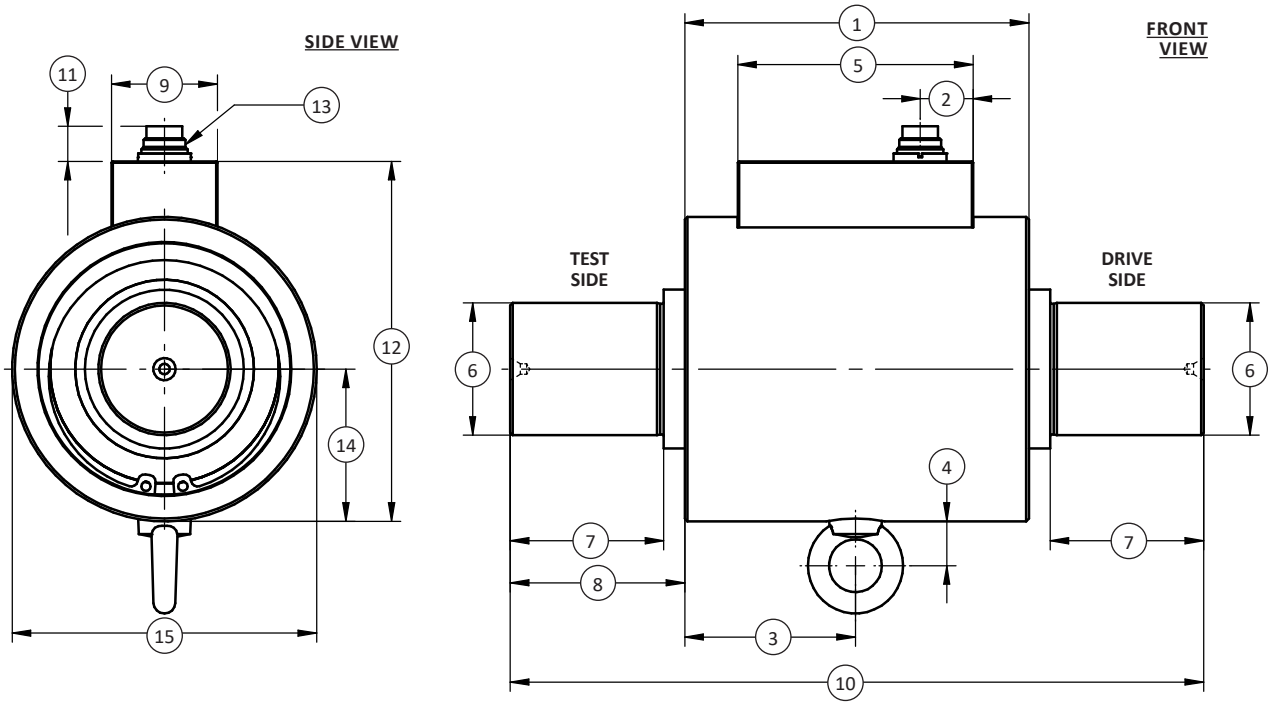
T2 PRECISION ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	20, 30	177, 265	50, 100	443, 885	200, 500	1.77K, 4.43K
	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	72.5	2.85
(2)	12	0.5	12	0.5	15	0.6
(3)	56.5	2.2	56.5	2.2	51.5	2.03
(4)	M4 ↧ 5	M4 ↧ 0.2	M4 ↧ 5	M4 ↧ 0.2	M4 ↧ 6	M4 ↧ 0.2
(5)	41.5	1.63	41.5	1.63	29.5	1.16
(6)	Ø18g6	Ø0.7087 / 0.7082	Ø18g6	Ø0.7087 / 0.7082	Ø32g6	Ø1.2595 / 1.2589
(7)	18	0.71	36	1.42	38	1.50
(8)	20	0.79	38	1.50	43.5	1.71
(9)	8.3	0.33	8.3	0.33	8.3	0.33
(10)	111.5	4.39	147.5	5.81	159.5	6.28
(11)	14	0.6	14	0.6	14	0.6
(12)	59	2.32	59	2.32	76	2.99
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	20	0.79	20	0.79	29	1.14
(15)	40	1.57	40	1.57	58	2.28

T2 PRECISION ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1K	8.85K	2K, 5K	17K, 44.3K	10K, 20K	85.5K, 177K
	mm	in	mm	in	mm	in
(1)	130	5.12	135	5.31	190	6.70
(2)	20	0.8	20	0.8	20	0.8
(3)	64.5	2.54	67.5	2.66	95	3.7
(4)	17	0.7	17	0.7	17	0.7
(5)	89	3.5	89	3.5	89	3.5
(6)	Ø50g6	Ø1.9685 / 1.9675	Ø70g6	Ø2.7559 / 2.7547	Ø110g6	Ø4.3307 / 4.3293
(7)	58	2.28	110	4.33	120	4.72
(8)	66	2.60	121	4.76	140	5.51
(9)	40	1.6	40	1.6	40	1.6
(10)	262	10.3	377	14.8	470	18.5
(11)	13	0.5	13	0.5	13	0.5
(12)	136	5.4	161	6.3	233	9.2
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	57.5	2.26	69.5	2.74	105	4.1
(15)	Ø115	Ø4.5	Ø139	Ø5.5	Ø210	Ø8.3

T2 PRECISION ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA (kg•m²) 1		MAX THRUST LOAD 2		MAX SHEAR LOAD 2	
Nm	lbf-in		NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.1	0.88	15,000	$1.8x10^{1}$	$1.9x10^{-6}$	$2.8x10^{-7}$	42	9.44	0.9	0.20
0.2	1.77	15,000	$1.8x10^{1}$	$1.9x10^{-6}$	$2.8x10^{-7}$	58	13.0	1.2	0.27
0.5	4.43	15,000	$1.2x10^{2}$	$1.9x10^{-6}$	$2.8x10^{-7}$	172	38.7	1.9	0.43
1	8.85	15,000	$1.2x10^{2}$	$1.9x10^{-6}$	$2.8x10^{-7}$	227	51.0	2.9	0.65
2	17.7	15,000	$3.6x10^{2}$	$1.9x10^{-6}$	$2.9x10^{-7}$	348	78.2	5.5	1.24
5	44.3	15,000	$4.0x10^{2}$	$1.9x10^{-6}$	$2.9x10^{-7}$	650	146	14	3.15
10	88.5	15,000	$9.3x10^{2}$	$2.1x10^{-6}$	$3.8x10^{-7}$	1K	225	26	5.85
20	177	15,000	$4.5x10^{3}$	$1.2x10^{-5}$	$9.9x10^{-6}$	1.68K	378	43	9.67
30	265	15,000	$4.5x10^{3}$	$1.2x10^{-5}$	$9.9x10^{-6}$	2.2K	495	65	14.6
50	443	15,000	$8.5x10^{3}$	$1.3x10^{-5}$	$1.2x10^{-5}$	3.1K	697	80	18.0
100	885	12,000	$8.5x10^{3}$	$1.3x10^{-5}$	$1.2x10^{-5}$	4.8K	1.08K	160	36.0
200	1.77K	10,000	$6.7x10^{4}$	$1.0x10^{-4}$	$9.0x10^{-5}$	8K	1.80K	290	65.2
500	4.43K	10,000	$7.1x10^{4}$	$1.0x10^{-4}$	$9.0x10^{-5}$	14K	3.15K	700	157
1K	8.85K	8,000	$3.1x10^{5}$	$1.6x10^{-3}$	$1.1x10^{-3}$	23K	5.17K	900	202
2K	17K	5,500	$7.2x10^{5}$	$5.3x10^{-3}$	$4.3x10^{-3}$	33K	7.42K	1.2K	270
5K	44.3K	5,500	$8.0x10^{5}$	$5.4x10^{-3}$	$4.3x10^{-3}$	57K	12.8K	2.8K	629
10K	85.5K	5,000	$3.1x10^{6}$	$4.0x10^{-2}$	$3.7x10^{-2}$	90K	20.2K	4.4K	989
20K	177K	5,000	$3.7x10^{6}$	$4.0x10^{-2}$	$3.8x10^{-2}$	130K	29.2K	8.2K	1.84K

Notes:
1 = Without encoder option
2 = Unsupported shaft

ELECTRICAL CONNECTION

Pin	12-PIN ELECTRICAL CONNECTION		12-PIN RS485 OPTION	
	Function	Description	Function	Description
A	NC	–	NC	–
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC (±10 VDC)	NC	–
D	Signal (GND)	0 VDC	NC	–
E	Supply (GND)	0 VDC, TTL	Supply (GND)	0 VDC
F	Supply (+)	12-28 V	Supply (+)	12-28 VDC
G	Option Angle A	TTL	Option Angle A	TTL
H	NC	–	NC	–
J	NC	–	RS485 Option	RS485 (B)
K	Cal. Control	L < 2.0 V / H > 3.5 V	NC	–
L	NC	–	RS485 Option	RS485 (A)
M	Housing	–	Housing	–

T3 PRECISION-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

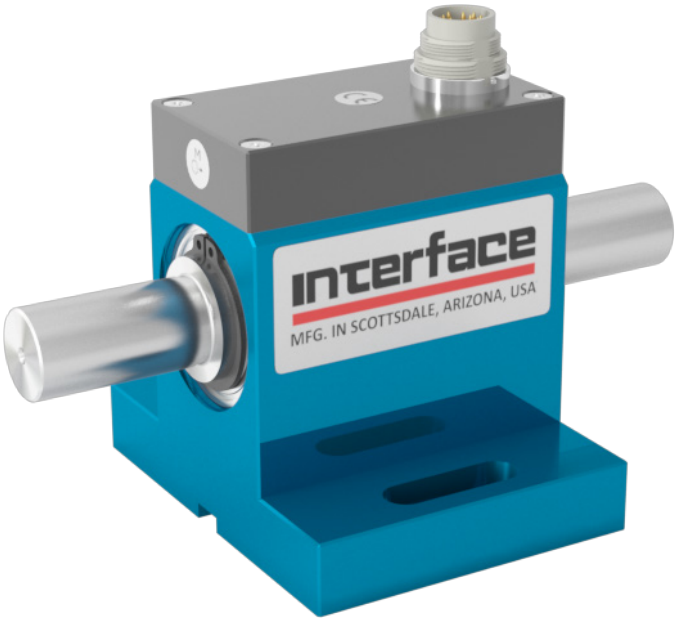
FEATURES & BENEFITS

- Capacities from 0.1 to 20K Nm (0.88 to 177K lbf-in)
- Speed up to 15K RPM
- ±5 VDC output
- 12-28 VDC supply
- Contactless data transmission
- Digital electronics with on-shaft shunt
- 0.1% combined error
- 10 kHz sample rate
- 16-bit resolution
- Very short overall length

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %FS		±0.02
Resolution – bit		16
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
Storage Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Supply Voltage – VDC		12 - 28
Supply Current – mA		≤ 60
Output – VDC		±5
Bandwidth – kHz – dB		1 – -3
Sample Rate – kHz		10
Calibration Signal – %FS		100
Electrical Connection		12-pin binder series 581 (includes mate)
ENCODER OPTIONS		
Capacities	0.1 - 1K Nm	360 pulse/rev, 2-track, +5V TTL, 90° offset, quadrature encoder
	0.88 - 8.85K lbf-in	
	2K - 20K Nm	60 pulse/rev, 1-track, +5V TTL,
	17K - 177K lbf-in	
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity (see table)
Shaft Material		Alloy steel
Housing Material		Aluminum

STANDARD CONFIGURATION



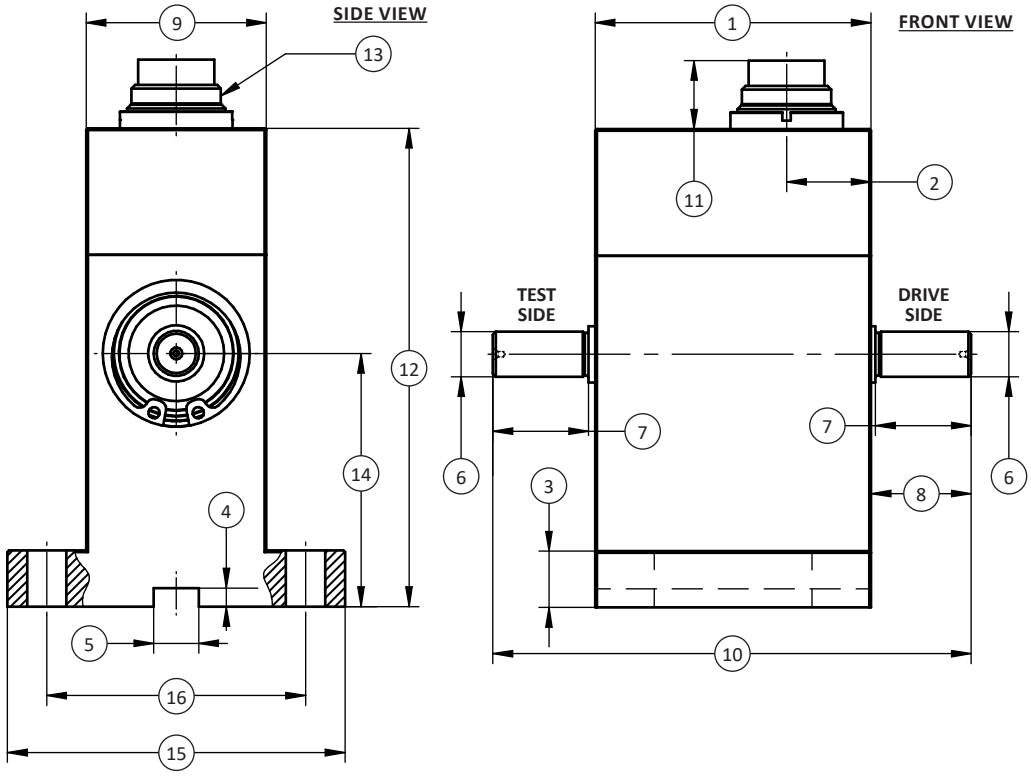
MODEL T3 (Shown)

OPTIONS

- Speed and angle output - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- Speed output - 60 Pulse TTL, 1-Track, available on capacities 2K Nm (17.7K lbf-in) and above
- +10V output
- RS485
- Keyed shafts - per DIN 6885.1
- ±0.05% combined error
- Mating cable assembly

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

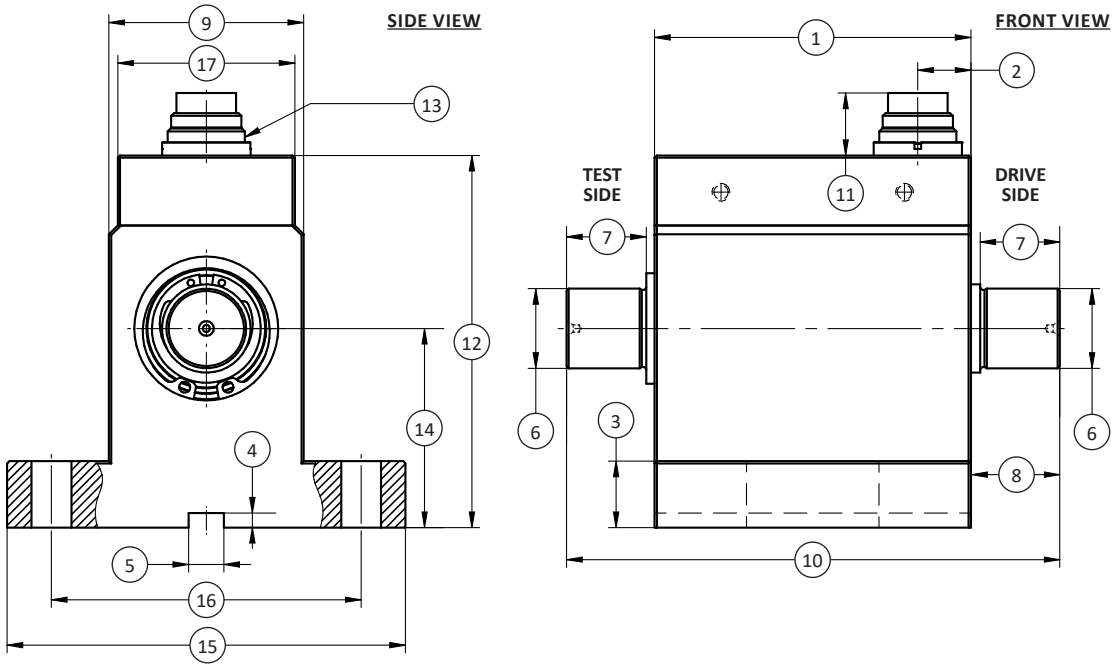
T3 PRECISION-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2	0.88, 1.77	0.5, 1	4.43, 8.85
	mm	in	mm	in
(1)	49	1.9	49	1.9
(2)	15	0.6	15	0.6
(3)	10	0.4	10	0.4
(4)	33	1.3	33	1.3
(5)	8N9	0.3150 / 0.3135	8N9	0.3150 / 0.3135
(6)	Ø8g6	Ø0.3148 / 0.3144	Ø8g6	Ø0.3148 / 0.3144
(7)	17	0.67	17	0.67
(8)	18	0.7	18	0.7
(9)	32	1.3	32	1.3
(10)	85	3.35	85	3.35
(11)	12	0.5	12	0.5
(12)	85	3.35	85	3.35
(13)	Connector 12-pin		Connector 12-pin	
(14)	45	1.8	45	1.8
(15)	60	2.4	60	2.4
(16)	46	1.8	46	1.8

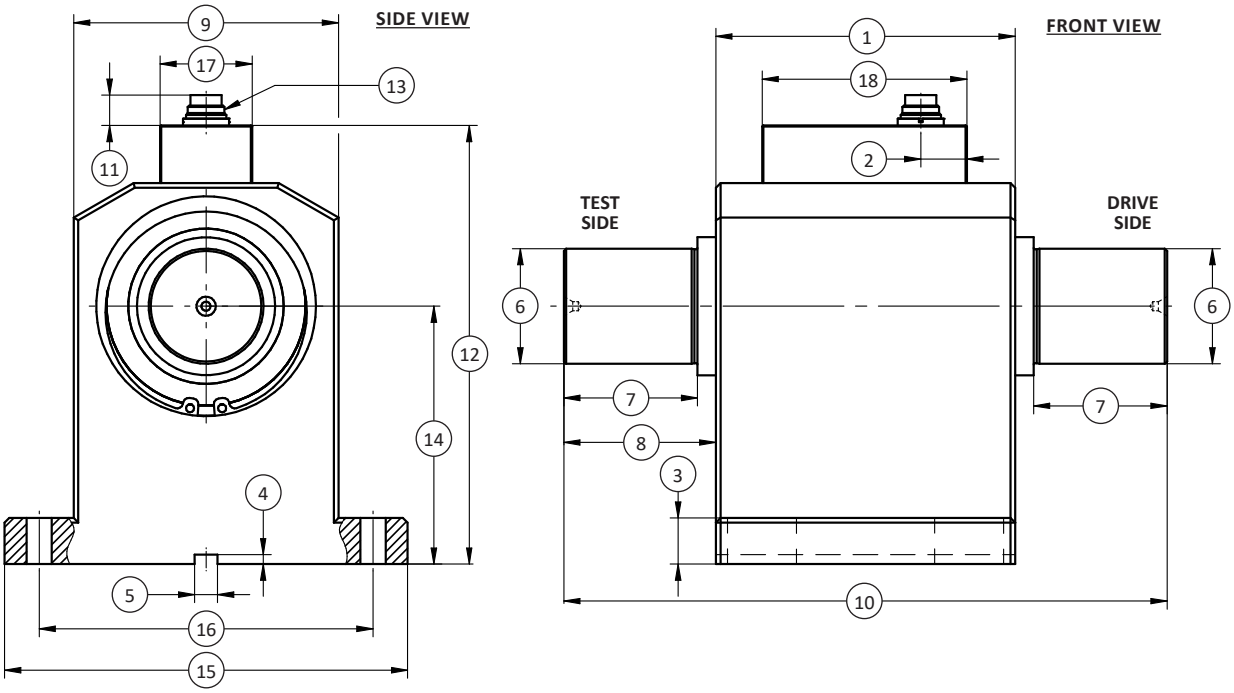
T3 PRECISION-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	2, 5	17.7, 44.3	10	8.85	20, 30	177, 265	50, 100	443, 885
	mm	in	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	71.5	2.81	71.5	2.81
(2)	12	0.5	12	0.5	12	0.5	12	0.5
(3)	15	0.6	15	0.6	15	0.6	15	0.6
(4)	33	1.3	33	1.3	33	1.3	33	1.3
(5)	8N9	0.3150 / 0.3135	8N9	0.3150 / 0.3135	8N9	0.3150 / 0.3135	8N9	0.3150 / 0.3135
(6)	Ø8g6	Ø0.3156 / 0.3150	Ø10g6	Ø0.3943 / 0.3937	Ø18g6	Ø0.7094 / 0.7087	Ø18g6	Ø0.7094 / 0.7087
(7)	17	0.67	17	0.67	18	0.7	36	1.4
(8)	18	0.7	18	0.7	20	0.8	38	1.5
(9)	44	1.7	44	1.7	44	1.7	44	1.7
(10)	107.5	4.23	107.5	4.23	111.5	4.39	147.5	5.81
(11)	14	0.6	14	0.6	14	0.6	14	0.6
(12)	84	3.3	84	3.3	84	3.3	84	3.3
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	45	1.8	45	1.8	45	1.8	45	1.8
(15)	90	3.5	90	3.5	90	3.5	90	3.5
(16)	70	2.8	70	2.8	70	2.8	70	2.8
(17)	40	1.6	40	1.6	40	1.6	40	1.6

T3 PRECISION-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	200, 500	1.77K, 4.43K	1K	8.85K	2K, 5K	17K, 44.3K	10K, 20K	85.5K, 177K
	mm	in	mm	in	mm	in	mm	in
(1)	130	5.12	130	5.12	135	5.31	190	7.48
(2)	20	0.79	20	0.79	20	0.79	20	0.79
(3)	20	0.79	20	0.79	25	0.98	40	1.57
(4)	4.1	0.16	4.1	0.16	4.1	0.16	4.1	0.16
(5)	10N9	0.3937 / 0.3923	10N9	0.3937 / 0.3923	10N9	0.3937 / 0.3923	10N9	0.3937 / 0.3923
(6)	Ø32g6	Ø1.2595 / 1.2589	50g6	Ø1.9681 / 1.9675	70g6	Ø2.7555 / 2.7548	110g6	Ø4.3302 / 4.3294
(7)	38	1.50	58	2.28	110	4.33	120	4.72
(8)	43.5	1.71	66	2.60	121	4.76	140	5.51
(9)	115	4.53	115	4.63	139	5.47	210	8.27
(10)	217	8.54	262	10.31	377	14.84	470	18.50
(11)	13	0.5	13	0.5	13	0.5	13	0.5
(12)	190.4	7.50	190.4	7.50	251.5	9.90	343	13.5
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	112	4.41	112	4.41	160	6.30	215	8.46
(15)	175	6.89	175	6.89	207	8.15	300	11.81
(16)	145	5.7	145	5.7	173	6.8	260	10.2
(17)	40	1.5	40	1.5	40	1.5	40	1.5
(18)	89	3.50	89	3.50	89	3.50	89	3.50

T3 PRECISION-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA (Kg•m²) [1]		MAX THRUST LOAD [2]		MAX SHEAR LOAD [2]	
Nm	lbf-in		(NM/rad)	Drive Side	Test Side	N	lbf	N	lbf
0.1	0.88	15,000	$1.8x10^{1}$	$1.9x10^{-6}$	$2.8x10^{-7}$	30	6.74	0.9	0.20
0.2	1.77	15,000	$1.8x10^{1}$	$1.9x10^{-6}$	$2.8x10^{-7}$	30	6.74	1.2	0.27
0.5	4.43	15,000	$1.2x10^{2}$	$1.9x10^{-6}$	$2.8x10^{-7}$	30	6.74	2.9	0.65
1	8.85	15,000	$1.2x10^{2}$	$2.0x10^{-6}$	$2.8x10^{-7}$	30	6.74	2.9	0.65
2	17.7	12,000	$4.4x10^{2}$	$1.0x10^{-5}$	$8.1x10^{-6}$	62	13.9	8.5	1.91
5	44.3	12,000	$4.4x10^{2}$	$1.0x10^{-5}$	$8.1x10^{-6}$	62	13.9	8.5	1.91
10	88.5	12,000	$1.7x10^{3}$	$1.0x10^{-5}$	$8.2x10^{-6}$	62	13.9	28	6.29
20	177	12,000	$4.5x10^{3}$	$1.2x10^{-5}$	$9.9x10^{-6}$	62	13.9	43	9.67
30	265	12,000	$4.5x10^{3}$	$1.2x10^{-5}$	$9.9x10^{-6}$	62	13.9	65	14.6
50	443	12,000	$8.5x10^{3}$	$1.3x10^{-5}$	$1.2x10^{-5}$	62	13.9	64	14.4
100	885	12,000	$8.4x10^{3}$	$1.3x10^{-5}$	$1.2x10^{-5}$	62	13.9	64	14.4
200	1.77K	7,000	$9.2x10^{4}$	$1.3x10^{-3}$	$8.0x10^{-4}$	760	171	350	78.7
500	4.43K	7,000	$9.2x10^{4}$	$1.3x10^{-3}$	$8.0x10^{-4}$	760	171	420	94.4
1K	8.85K	7,000	$3.1x10^{5}$	$1.6x10^{-3}$	$1.1x10^{-3}$	760	171	800	180
2K	17K	5,500	$7.2x10^{5}$	$5.3x10^{-3}$	$4.3x10^{-3}$	1.1K	247	860	193
5K	44.3K	5,500	$8.0x10^{5}$	$5.4x10^{-3}$	$4.3x10^{-3}$	1.1K	247	860	193
10K	85.5K	3,500	$3.1x10^{6}$	$4.0x10^{-2}$	$3.7x10^{-2}$	2.8K	629	2.3K	517
20K	177K	3,500	$3.7x10^{6}$	$4.0x10^{-2}$	$3.8x10^{-2}$	2.8K	629	2.3K	517

1 = Without encoder option
2 = Unsupported shaft

ELECTRICAL CONNECTION

Pin	12-PIN ELECTRICAL CONNECTION		12-PIN RS485 OPTION	
	Function	Description	Function	Description
A	NC	–	NC	–
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC (±10 VDC)	NC	–
D	Signal (GND)	0 VDC	NC	–
E	Supply (GND)	0 VDC, TTL	Supply (GND)	0 VDC
F	Supply (+)	12-28 V	Supply (+)	12-28 VDC
G	Option Angle A	TTL	Option Angle A	TTL
H	NC	–	NC	–
J	NC	–	RS485 Option	RS485 (B)
K	Cal. Control	L < 2.0V / H > 3.5V	NC	–
L	NC	–	RS485 Option	RS485 (A)
M	Housing	–	Housing	–

T4 GENERAL PURPOSE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.1 to 1K Nm (0.88 to 8.85K lbf-in)
- Speed up to 15K RPM
- ±5 VDC output
- 12-28 VDC supply
- Contactless data transmission
- Digital electronics with on-shaft shunt
- 0.2% combined error
- 10 kHz sample rate
- 12-bit resolution
- Very short overall length

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.2
Nonrepeatability – %FS		±0.04
Resolution – bit		12
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.03
Effect on Output – % / deg	°C	±0.015
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
Storage Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Supply Voltage – VDC		12 - 28
Supply Current – mA		≤ 60
Output – VDC		±5
Bandwidth, Hz (-3dB)		1K
Sample Rate – Hz		10K
Calibration Signal – %FS		100
Electrical Connection		12-pin Binder series 581 (Includes Mate)
ENCODER OPTIONS		
Capacities	0.1 - 1K Nm	360 Pulse/Rev, 2-Track, +5V TTL, 90° Offset, Quadrature Encoder
	0.88 - 8.85K lbf-in	
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with Capacity (see table)
Shaft Material		Alloy Steel
Housing Material		Aluminum

STANDARD CONFIGURATION



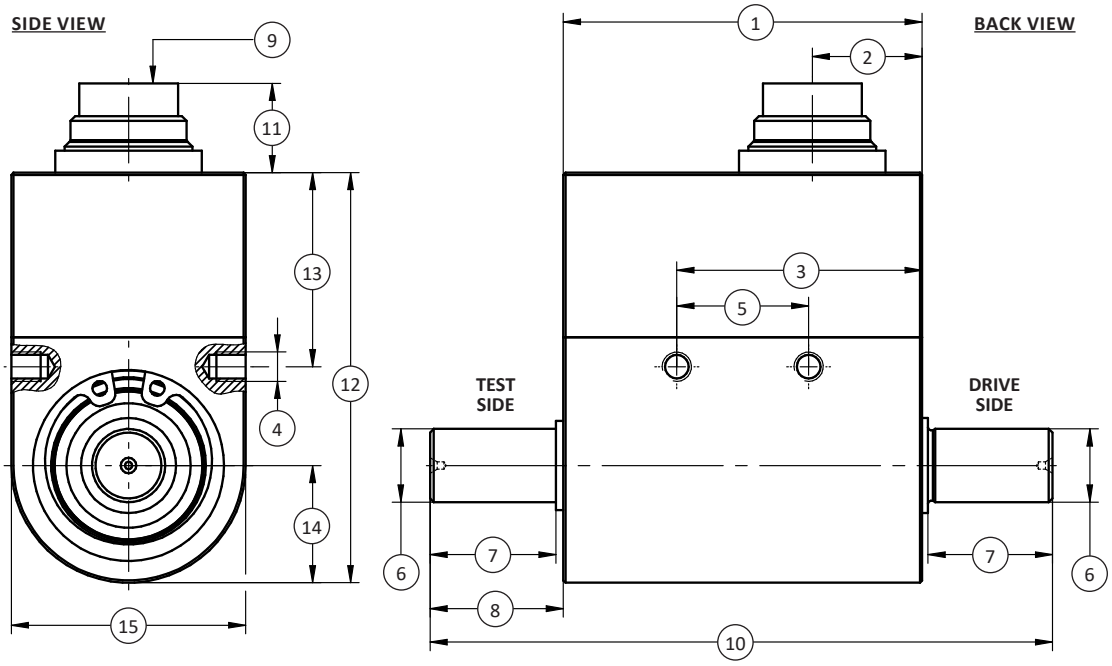
MODEL T4 (Shown)

OPTIONS

- Speed and angle output – 360 pulse TTL, 2-tracks 90° offset
- ±10V torque output
- RS485
- Keyed shafts – per DIN 6885.1
- Mating cable assembly

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

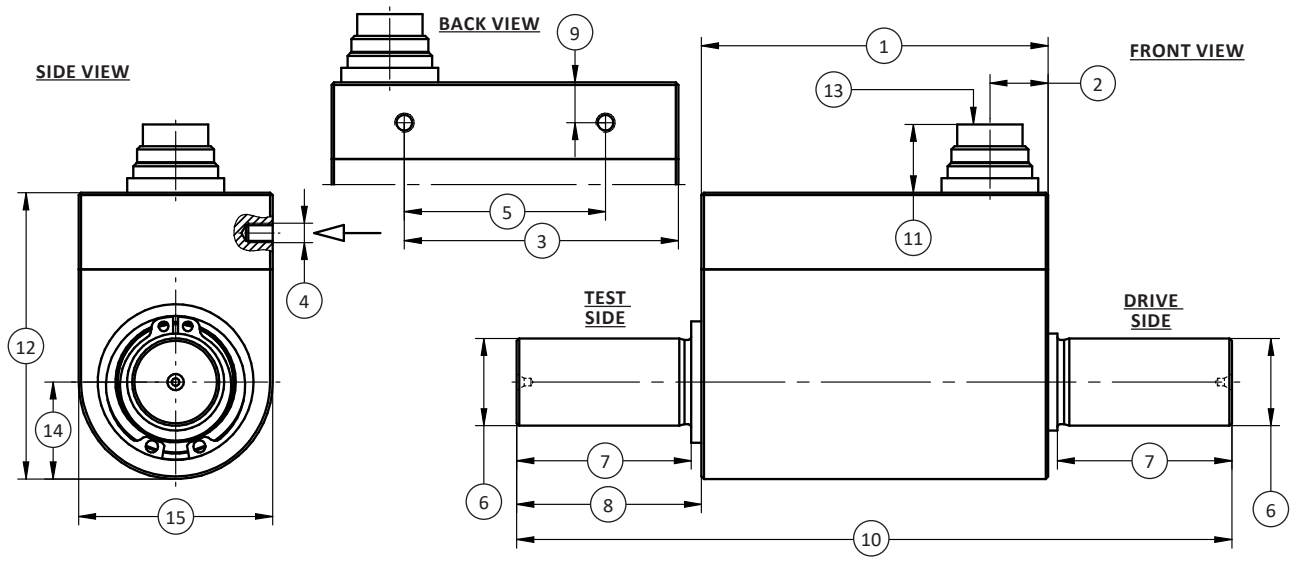
T4 GENERAL PURPOSE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5	0.88, 1.77, 4.43, 8.85, 17.7, 44.3	10	88.5
	mm	in	mm	in
(1)	49	1.9	49	1.9
(2)	15	0.6	15	0.6
(3)	33.5	1.32	33.5	1.32
(4)	M4 ↧ 4	M4 ↧ 0.2	M4 ↧ 4	M4 ↧ 0.2
(5)	18	0.7	18	0.7
(6)	Ø8g6	Ø0.3148 / 0.3144	Ø10g6	Ø0.3935 / 0.3931
(7)	17	0.67	17	0.67
(8)	18	0.7	18	0.7
(9)	Connector 12-pin		Connector 12-pin	
(10)	85	3.35	85	3.35
(11)	12	0.5	12	0.5
(12)	56	2.2	56	2.2
(13)	26.5	1.04	26.5	1.04
(14)	16	0.6	16	0.6
(15)	32	1.3	32	1.3

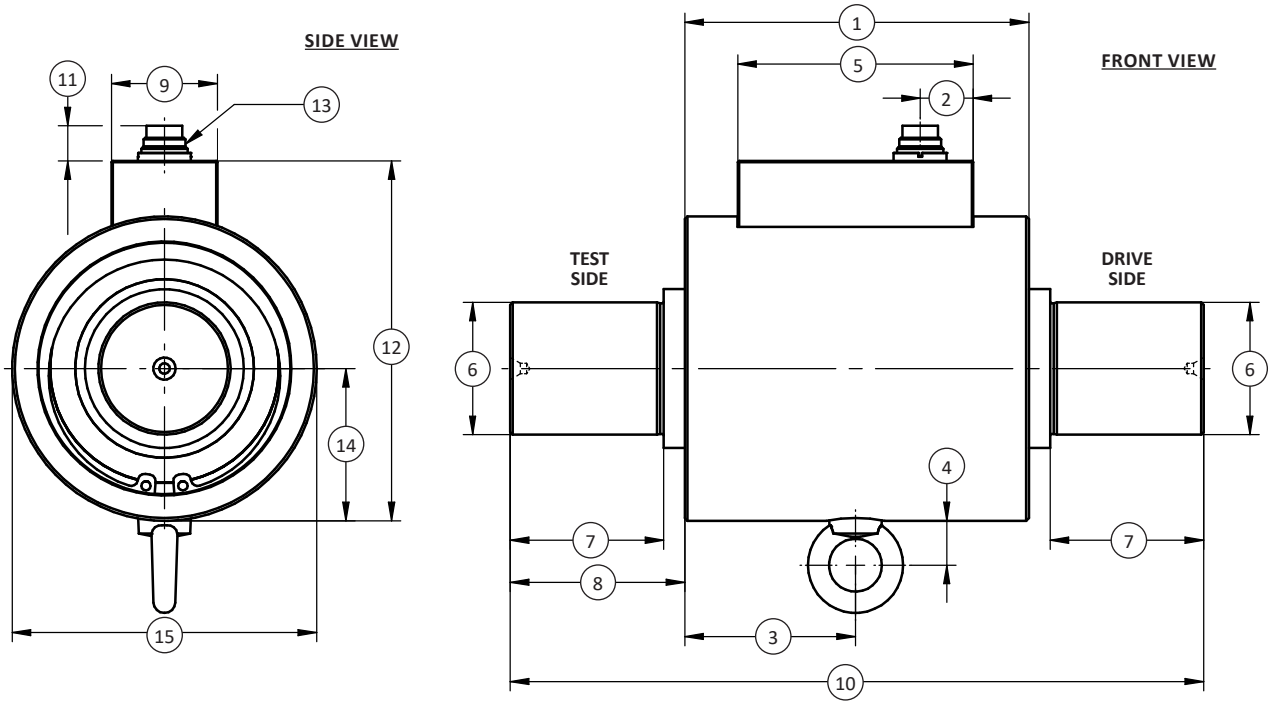
T4 GENERAL PURPOSE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	20, 30	177, 265	50, 100	443, 885	200, 500	1.77K, 4.43K
	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	72.5	2.85
(2)	12	0.5	12	0.5	15	0.6
(3)	56.5	2.2	56.5	2.2	51.5	2.03
(4)	M4 ↧ 5	M4 ↧ 0.2	M4 ↧ 5	M4 ↧ 0.2	M4 ↧ 6	M4 ↧ 0.2
(5)	41.5	1.63	41.5	1.63	29.5	1.16
(6)	Ø18g6	Ø0.7087 / 0.7082	Ø18g6	Ø0.7087 / 0.7082	Ø32g6	Ø1.2595 / 1.2589
(7)	18	0.71	36	1.42	38	1.50
(8)	20	0.79	38	1.50	43.5	1.71
(9)	8.3	0.33	8.3	0.33	8.3	0.33
(10)	111.5	4.39	147.5	5.81	159.5	6.28
(11)	14	0.6	14	0.6	14	0.6
(12)	59	2.32	59	2.32	76	2.99
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	20	0.79	20	0.79	29	1.14
(15)	40	1.57	40	1.57	58	2.28

T4 GENERAL PURPOSE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	1K	8.85K
	mm	in
(1)	130	5.12
(2)	20	0.8
(3)	64.5	2.54
(4)	17	0.7
(5)	89	3.5
(6)	Ø50g6	Ø1.9685 / 1.9675
(7)	58 TYP	2.28 TYP
(8)	66 TYP	2.60 TYP
(9)	40	1.6
(10)	262	10.3
(11)	13	0.5
(12)	136	5.4
(13)	Connector 12-pin	
(14)	57.5	2.26
(15)	Ø115	Ø4.5

T4 GENERAL PURPOSE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

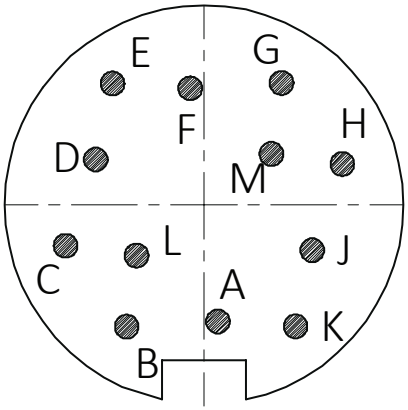
PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA (kg•m²) 1		MAX THRUST LOAD 2		MAX SHEAR FORCE 2	
(Nm)	(lbf-in)		(NM/rad)	Drive Side	Test Side	(N)	(lbf)	(N)	(lbf)
0.1	0.88	15,000	$1.8x10^{1}$	$1.9x10^{-6}$	$2.8x10^{-7}$	42	9.44	0.9	0.20
0.2	1.77	15,000	$1.8x10^{1}$	$1.9x10^{-6}$	$2.8x10^{-7}$	58	13.0	1.2	0.27
0.5	4.43	15,000	$1.2x10^{2}$	$1.9x10^{-6}$	$2.8x10^{-7}$	172	38.7	1.9	0.43
1	8.85	15,000	$1.2x10^{2}$	$1.9x10^{-6}$	$2.8x10^{-7}$	227	51.0	2.9	0.65
2	17.7	15,000	$3.6x10^{2}$	$1.9x10^{-6}$	$2.9x10^{-7}$	348	78.2	5.5	1.24
5	44.3	15,000	$4.0x10^{2}$	$1.9x10^{-6}$	$2.9x10^{-7}$	650	146	14	3.15
10	88.5	15,000	$9.3x10^{2}$	$2.1x10^{-6}$	$3.8x10^{-7}$	1K	225	26	5.85
20	177	15,000	$4.5x10^{3}$	$1.2x10^{-5}$	$9.9x10^{-6}$	1.68K	378	43	9.67
30	265	15,000	$4.5x10^{3}$	$1.2x10^{-5}$	$9.9x10^{-6}$	2.2K	495	65	14.6
50	443	15,000	$8.5x10^{3}$	$1.3x10^{-5}$	$1.2x10^{-5}$	3.1K	697	80	18.0
100	885	12,000	$8.5x10^{3}$	$1.3x10^{-5}$	$1.2x10^{-5}$	4.8K	1.08K	160	36.0
200	1.77K	10,000	$6.7x10^{4}$	$1.0x10^{-4}$	$9.0x10^{-5}$	8K	1.80K	290	65.2
500	4.43K	10,000	$7.1x10^{4}$	$1.0x10^{-4}$	$9.0x10^{-5}$	14K	3.15K	700	157
1K	8.85K	8,000	$3.1x10^{5}$	$1.6x10^{-3}$	$1.1x10^{-3}$	23K	5.17K	900	202

Notes:
1 = Without encoder option
2 = Unsupported shaft

ELECTRICAL CONNECTION

Pin	12-PIN ELECTRICAL CONNECTION		12-PIN RS485 OPTION	
	Function	Description	Function	Description
A	NC	–	NC	–
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC (±10 VDC)	NC	–
D	Signal (GND)	0 VDC	NC	–
E	Supply (GND)	0 VDC, TTL	Supply (GND)	0 VDC
F	Supply (+)	12-28 V	Supply (+)	12-28 VDC
G	Option Angle A	TTL	Option Angle A	TTL
H	NC	–	NC	–
J	NC	–	RS485 Option	RS485 (B)
K	Cal. Control	L < 2.0 V / H > 3.5 V	NC	–
L	NC	–	RS485 Option	RS485 (A)
M	Housing	–	Housing	–



T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

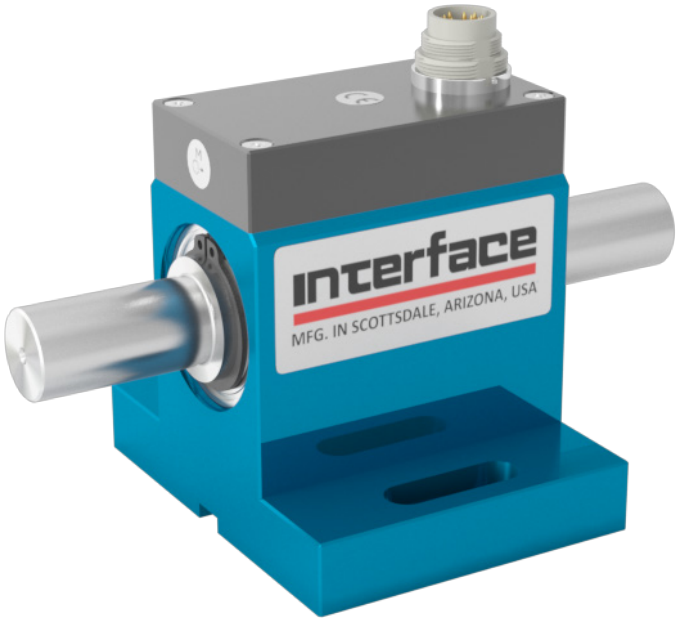
FEATURES & BENEFITS

- Capacities from 0.1 to 1K Nm (0.89 to 8.85K lbf-in)
- Speed up to 15K RPM
- ±5 VDC output
- 12-28 VDC supply
- Contactless data transmission
- Digital electronics with on-shaft shunt
- 0.2% combined error
- 10 kHz sample rate
- 12-bit resolution
- Very short overall length

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.2
Nonrepeatability – %FS		±0.04
Resolution – bit		12
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.03
Effect on Output – % / deg	°C	±0.015
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
Storage Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Supply Voltage – VDC		12 - 28
Supply Current – mA		≤ 60
Output – VDC		±5
Bandwidth – kHz – dB		1K, -3
Sample Rate – kHz		10
Calibration Signal – %FS		100
Electrical Connection		12-pin binder series 581 (includes mate)
ENCODER OPTIONS		
Capacities	0.1 - 1K Nm	360 pulse/rev, 2-track, +5V TTL, 90° offset, quadrature encoder
	0.88 - 8.85K lbf-in	
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity (see table)
Shaft Material		Alloy steel
Housing Material		Aluminum

STANDARD CONFIGURATION



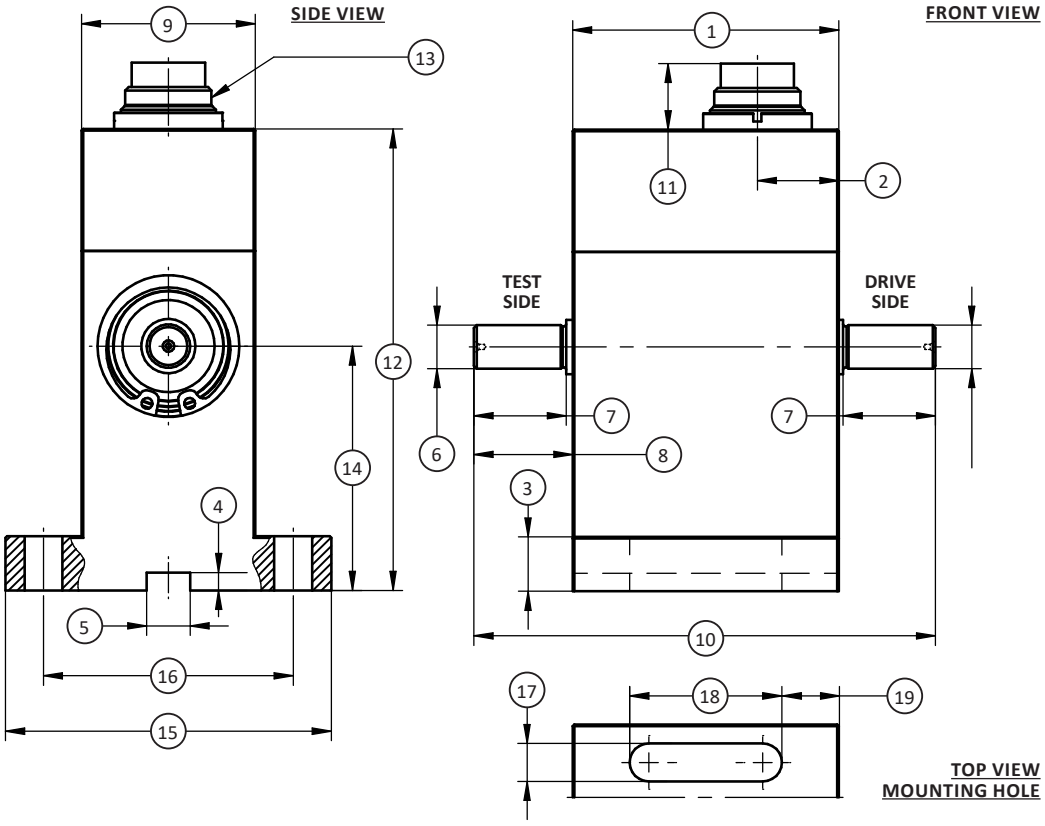
MODEL T5 (Shown)

OPTIONS

- Speed & angle measurement - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- ±10V output
- RS485
- Keyed shafts - per DIN 6885.1
- Mating cable assembly

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

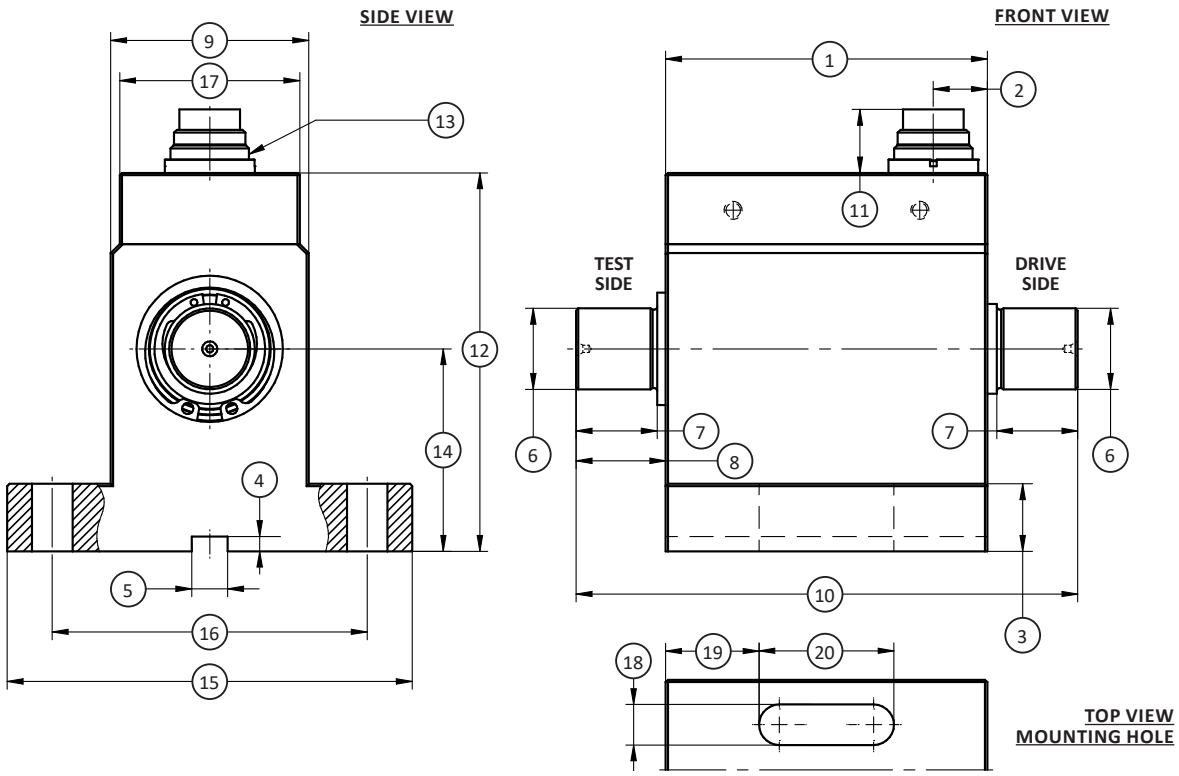
T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1	0.89, 1.77, 4.43, 8.85
	mm	in
(1)	49	1.9
(2)	15	0.6
(3)	10	88.5
(4)	3.3	0.4
(5)	Ø 8 N9	Ø 0.3150 / 0.3135
(6)	Ø 8g6	Ø 0.3148 / 0.3144
(7)	17	0.7
(8)	18	0.7
(9)	32	1.3
(10)	85	3.3
(11)	12	0.5
(12)	85	3.3
(13)	Connector 12-pin	
(14)	45	1.8
(15)	60	2.4
(16)	46	1.8
(17)	7	0.3
(18)	28	1.1
(19)	10.5	0.4

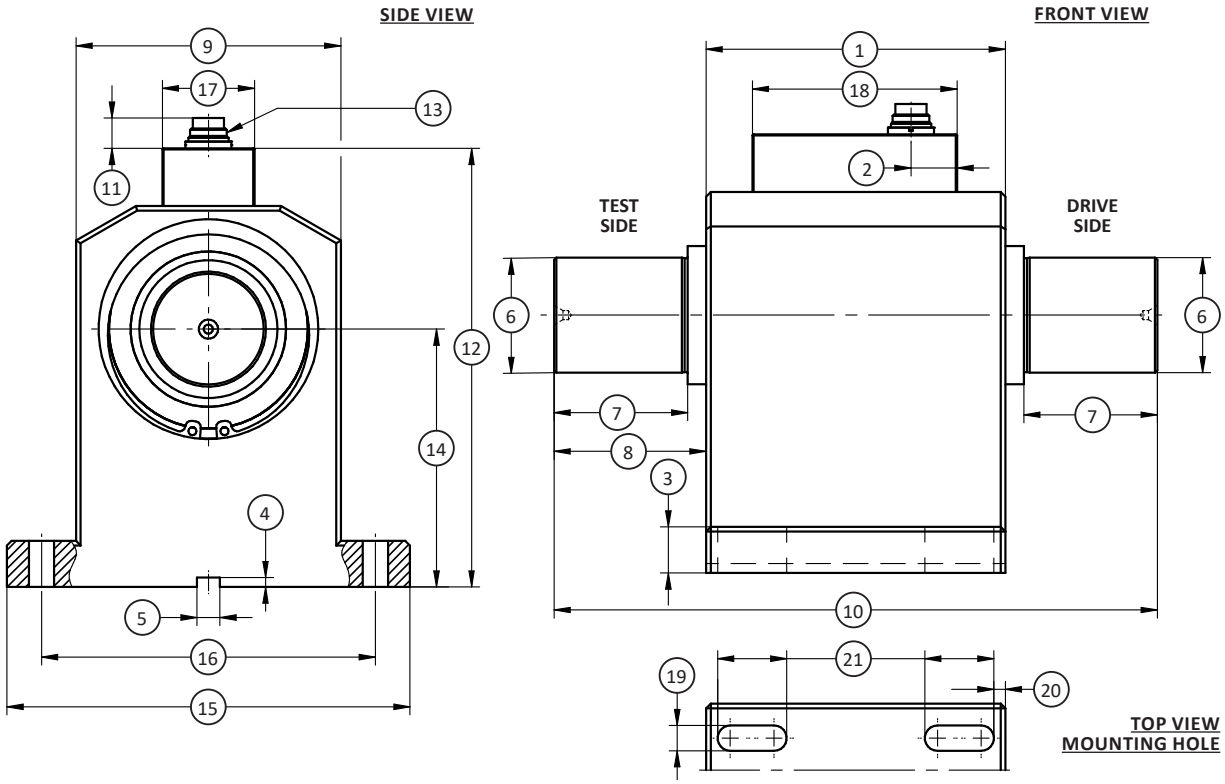
T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	2, 5	17.7, 44.3	10	8.85	20, 30	177, 265	50, 100	443, 885
	mm	in	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	71.5	2.81	71.5	2.81
(2)	12	0.5	12	0.5	12	0.5	12	0.5
(3)	15	0.6	15	0.6	15	0.6	15	0.6
(4)	3.3	0.13	3.3	0.13	3.3	0.13	3.3	0.13
(5)	Ø 8 N9	Ø 0.3150/0.3135	Ø 8 N9	Ø 0.3150/0.3135	Ø 8 N9	Ø 0.3150/0.3135	Ø 8 N9	Ø 0.3150/0.3135
(6)	Ø8g6	Ø 0.3148/0.3144	Ø10g6	Ø 0.3935/0.3931	Ø18g6	Ø 0.7084/0.7080	Ø18g6	Ø 0.7084/0.7080
(7)	17	0.7	17	0.7	18	0.7	36	1.4
(8)	18	0.7	18	0.7	20	0.8	38	1.5
(9)	44	1.7	44	1.7	44	1.7	44	1.7
(10)	107.5	4.23	107.5	4.23	111.5	4.39	147.5	5.81
(11)	14	0.6	14	0.6	14	0.6	14	0.6
(12)	84	3.3	84	3.3	84	3.3	84	3.3
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	45	1.8	45	1.8	45	1.8	45	1.8
(15)	90	3.5	90	3.5	90	3.5	90	3.5
(16)	70	2.8	70	2.8	70	2.8	70	2.8
(17)	40	1.6	40	1.6	40	1.6	40	1.6
(18)	9	0.4	9	0.4	9	0.4	9	0.4
(19)	20.75	0.817	20.75	0.817	20.75	0.817	20.75	0.817
(20)	30	1.2	30	1.2	30	1.2	30	1.2

T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	200, 500	1.77K, 4.43K	1K	8.85K
	mm	in	mm	in
(1)	130	5.1	130	5.1
(2)	20	0.8	20	0.8
(3)	20	0.8	20	0.8
(4)	4.1	0.16	4.1	0.16
(5)	Ø10 N9	Ø0.7087 / 0.7070	Ø10 N9	Ø0.7087 / 0.7070
(6)	Ø32 g6	Ø1.2595 / 1.2589	Ø50 g6	Ø1.9681 / 1.9675
(7)	38	1.5	58	2.3
(8)	43.5	1.71	66	2.6
(9)	115	4.5	115	4.5
(10)	217	8.5	262	10.3
(11)	13	0.5	13	0.5
(12)	190.4	7.50	190.4	7.50
(13)	Connector 12-pin		Connector 12-pin	
(14)	112	4.4	112	4.4
(15)	175	6.9	175	6.9
(16)	145	5.7	145	5.7
(17)	Ø40	Ø1.6	Ø40	Ø1.6
(18)	89	3.5	89	3.5
(19)	11	0.4	11	0.4
(20)	5	0.2	5	0.2
(21)	30	1.2	30	1.2

T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA ($Kg \cdot m^2$)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	lbf-in		(NM/rad)	Drive Side	Test Side	N	lbf	N	lbf
0.1	0.88	15,000	$1.8x10^{1}$	$1.9x10^{-6}$	$2.8x10^{-7}$	30	6.74	0.9	0.20
0.2	1.77	15,000	$1.8x10^{1}$	$1.9x10^{-6}$	$2.8x10^{-7}$	30	6.74	1.2	0.27
0.5	4.43	15,000	$1.2x10^{2}$	$1.9x10^{-6}$	$2.8x10^{-7}$	30	6.74	2.9	0.65
1	8.85	15,000	$1.2x10^{2}$	$2.0x10^{-6}$	$2.8x10^{-7}$	30	6.74	2.9	0.65
2	17.7	12,000	$4.4x10^{2}$	$1.0x10^{-5}$	$8.1x10^{-6}$	62	13.9	8.5	1.91
5	44.3	12,000	$4.4x10^{2}$	$1.0x10^{-5}$	$8.1x10^{-6}$	62	13.9	8.5	1.91
10	88.5	12,000	$1.7x10^{3}$	$1.0x10^{-5}$	$8.2x10^{-6}$	62	13.9	28	6.29
20	177	12,000	$4.5x10^{3}$	$1.2x10^{-5}$	$9.9x10^{-6}$	62	13.9	43	9.67
30	265	12,000	$4.5x10^{3}$	$1.2x10^{-5}$	$9.9x10^{-6}$	62	13.9	65	14.6
50	443	12,000	$8.5x10^{3}$	$1.3x10^{-5}$	$1.2x10^{-5}$	62	13.9	64	14.4
100	885	12,000	$8.4x10^{3}$	$1.3x10^{-5}$	$1.2x10^{-5}$	62	13.9	64	14.4
200	1.77K	7,000	$9.2x10^{4}$	$1.3x10^{-3}$	$8.0x10^{-4}$	760	171	350	78.7
500	4.43K	7,000	$9.2x10^{4}$	$1.3x10^{-3}$	$8.0x10^{-4}$	760	171	420	94.4
1K	8.85K	7,000	$3.1x10^{5}$	$1.6x10^{-3}$	$1.1x10^{-3}$	760	171	800	180

1 = Without encoder option
2 = Unsupported shaft

ELECTRICAL CONNECTION

Pin	12-PIN ELECTRICAL CONNECTION		12-PIN RS485 OPTION	
	Function	Description	Function	Description
A	NC	–	NC	–
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC (±10 VDC)	NC	–
D	Signal (GND)	0 VDC	NC	–
E	Supply (GND)	0 VDC	Supply (GND)	0 VDC
F	Supply (+)	12-28 VDC	Supply (+)	12-28 VDC
G	Option Angle A	TTL	Option Angle A	TTL
H	NC	–	NC	–
J	NC	–	RS485 Option	RS485 (B)
K	Cal. Control	L < 2.0V / H > 3.5V	NC	–
L	NC	–	RS485 Option	RS485 (A)
M	Housing	–	Housing	–

T6 DUAL RANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Dual range capacities – 10:1 ratio (5/0.5 to 20K/2K Nm) (44.3/4.43 to 177K to 17.7K lbf-in)
- ±5 VDC output
- Digital electronics
- Stainless steel shaft
- 12 to 28 VDC supply
- Contactless
- 5 kHz sample rate – each range
- 16-bit

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %FS		±0.02
TEMPERATURE		
Effect on Zero – % RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		3 – 3
Calibration Signal – %RO		100
Speed Output – puls/rev.		60
Supply Voltage – VDC		+12 to +28
Supply Current – mA		60
Electrical Connection – pin		12
Resolution – bit		16
Sample Rate – kHz		5
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity (see table)
Shaft Material		Stainless steel
Housing Material		Aluminum

STANDARD CONFIGURATION



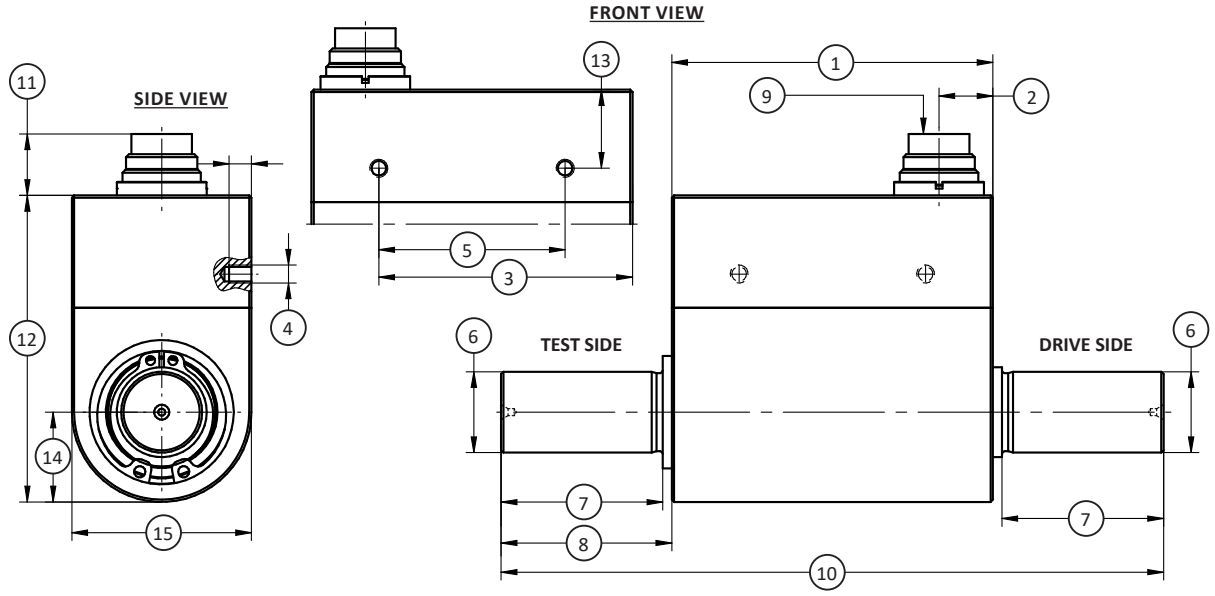
MODEL T6 (Shown)

OPTIONS

- Speed & angle measurement – 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- Speed output - 60 Pulse TTL, 1-track, available on capacities 2K Nm (17K lbf-in)& above
- +10V torque output
- RS485
- Keyed shafts - per Din 6885.1

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T6 DUAL RANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

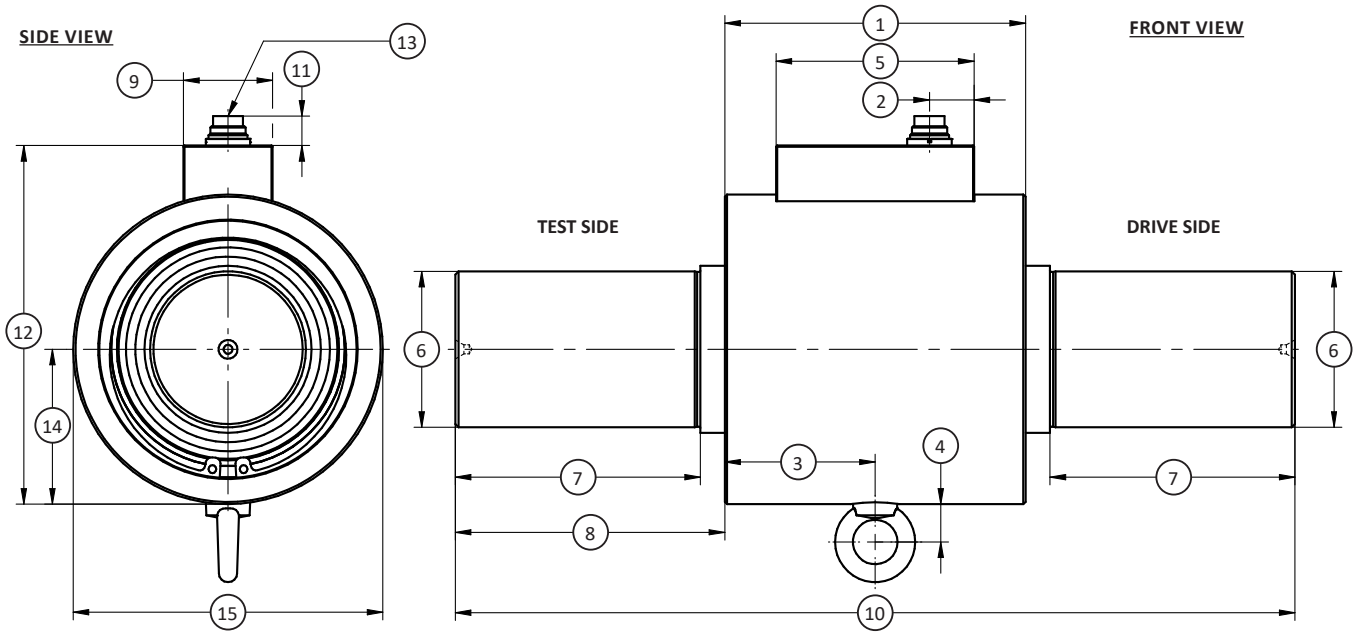


DIMENSIONS

See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	5/0.5	44.3/4.43	10/1	88.5/8.85	20/2, 30/3	177/17.7, 265/26.5	50/5, 100/10	443/44.3, 885/88.5	200/20, 300/30, 500/50	1.77K/177, 2.7K/267, 4.43K/443
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	71.5	2.81	71.5	2.81	80.5	3.17
(2)	12	0.5	12	0.5	12	0.5	12	0.5	12	0.5
(3)	56.5	2.22	56.5	2.22	56.5	2.22	56.5	2.22	55.5	2.12
(4)	2 x M4		2 x M4		2 x M4		2 x M4		2 x M4	
(5)	41.5	1.63	41.5	1.63	41.5	1.63	41.5	1.63	29.5	1.16
(6)	Ø8g6	Ø(0.3156 / 0.3150)	Ø10g6	Ø(0.3943 / 0.3937)	Ø18g6	Ø(0.7094 / 0.7087)	Ø18g6	Ø(0.7094 / 0.7087)	Ø32g6	Ø(1.2608 / 1.2598)
(7)	17	0.7	17	0.7	18	0.7	36	1.4	38	1.5
(8)	18	0.7	18	0.7	20	0.8	38	1.5	39.5	1.6
(9)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(10)	107.5	4.23	107.5	4.23	111.5	4.39	147.5	5.81	159.5	6.28
(11)	14	0.5	14	0.5	14	0.5	14	0.5	14	0.5
(12)	68.2	2.69	68.2	2.69	68.2	2.69	68.2	2.69	86.2	3.39
(13)	17.5	0.69	17.5	0.69	17.5	0.69	17.5	0.69	17	0.7
(14)	20	0.8	20	0.8	20	0.8	20	0.8	30.5	1.20
(15)	40	1.6	40	1.6	40	1.6	40	1.6	61	2.4

5/0.1 Nm capacity has 8 mm g6 shaft and 110/11 Nm capacity has 10 mm g6 shaft

T6 DUAL RANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1K/100	8.85K/885	2K/200, 5K/500	17.7K/1.77K, 44.3K/4.43K	10K/1K, 20K/2K	88.5K/8.85K, 177K/17K
	mm	in	mm	in	mm	in
(1)	130	5.12	135	5.31	190	7.48
(2)	20	0.8	20	0.8	20	0.8
(3)	64.5	2.54	67.5	2.66	95	3.7
(4)	17	0.7	17	0.7	17	0.7
(5)	89	3.5	89	3.5	89	3.5
(6)	Ø50 g6 TYP	Ø(1.9695 / 1.9685) TYP	Ø70 g6 TYP	Ø(2.7571 / 2.7559) TYP	Ø110 g6 TYP	Ø(4.3321 / 4.3307) TYP
(7)	58 TYP	2.28 TYP	110 TYP	4.33 TYP	120 TYP	4.72 TYP
(8)	66 TYP	2.60 TYP	121 TYP	4.76 TYP	140 TYP	5.51 TYP
(9)	40	1.6	40	1.6	40	1.6
(10)	262	10.31	377	14.84	470	18.50
(11)	13	0.5	13	0.5	13	0.5
(12)	136	5.35	161	6.34	233	9.17
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	57.5	2.26	69.5	2.74	105	4.09
(15)	115	4.53	139	5.47	210	8.27

T6 DUAL RANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA (Kg•m²)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	lbf-in		(NM/rad)	Drive Side	Test Side	N	lbf	N	lbf
5/0.5	44.3/4.43	15,000	$2.1x10^{2}$	$9.0x10^{-6}$	$8.4x10^{-6}$	450	101	3	0.67
10/1	88.5/8.85	15,000	$7.1x10^{2}$	$9.3x10^{-6}$	$8.5x10^{-6}$	710	160	12	2.70
20/2	177/17.7	15,000	$1.9x10^{3}$	$1.1x10^{-5}$	$9.9x10^{-6}$	1.15K	259	23	5.17
30/3	266/26.6	15,000	$2.9x10^{3}$	$1.1x10^{-5}$	$9.9x10^{-6}$	1.5K	337	35	7.87
50/5	443/44.3	15,000	$5.4x10^{3}$	$1.3x10^{-5}$	$1.1x10^{-5}$	2.15K	483	45	10.1
100/10	885/88.5	12,000	$8.0x10^{3}$	$1.3x10^{-5}$	$1.2x10^{-5}$	3.4K	764	90	20.3
200/20	1.77K/177	12,000	$3.4x10^{4}$	$1.1x10^{-4}$	$8.4x10^{-5}$	5.8K	1.3K	175	39.3
500/50	4.43K/443	10,000	$6.3x10^{4}$	$1.2x10^{-4}$	$8.6x10^{-5}$	10K	2.25K	410	92.2
1K/100	8.85/885	8,000	$2.0x10^{5}$	$1.6x10^{-3}$	$1.1x10^{-3}$	16.2K	3.65K	530	119
2K/200	17.7K/1.77K	5,500	$5.1x10^{5}$	$5.3x10^{-3}$	$4.2x10^{-3}$	25K	5.62K	720	162
5K/500	44.3K/4.43K	5,500	$7.2x10^{5}$	$5.3x10^{-3}$	$4.3x10^{-3}$	42K	9.44K	1850	416
10K/1K	88.5K/8.85	5,000	$3.1x10^{6}$	$4.1x10^{-2}$	$3.6x10^{-2}$	66K	14.8K	2700	607
20K/2K	177K/17.7K	5,000	$3.7x10^{6}$	$4.1x10^{-2}$	$3.7x10^{-2}$	98K	22K	5200	1.17K

ELECTRICAL CONNECTION

Pin	12-PIN ELECTRICAL CONNECTION	
	Function	Description
A	NC	–
B	Option Angle B	TTL
C	Signal (+)	±5 (±10) VDC
D	Signal (GND)	0 VDC
E	Supply (GND)	0 VDC
F	Supply (+)	12-28 V
G	Option Angle A	TTL
H	Signal 2 (+)	±5 (±10) VDC
J	NC	–
K	Cal. Control	L < 2.0V / H > 3.5V
L	NC	–
M	Shield	Transducer Housing

T7 DUAL RANGE-PEDESTAL ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

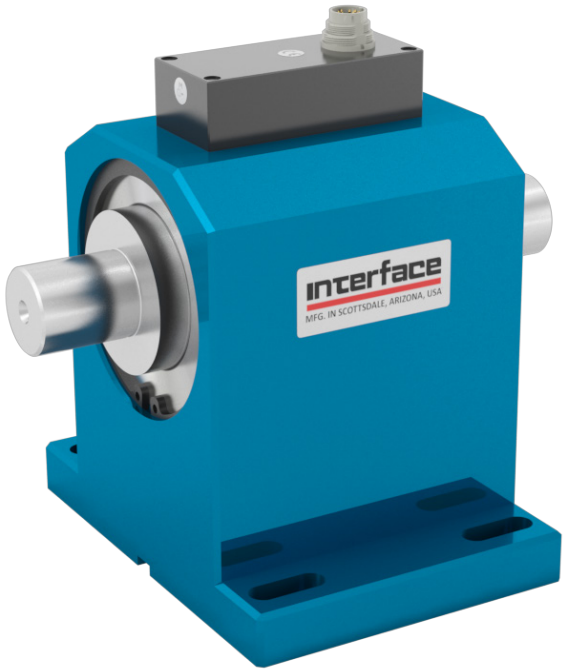
FEATURES & BENEFITS

- Dual range capacities – 10:1 ratio (5/0.5 to 20K/2K Nm) (44.3/4.43 to 177K to 17.7K lbf-in)
- ±5 VDC output
- Digital electronics
- Stainless steel shaft
- 12 to 28 VDC supply
- Contactless
- 5 kHz sample rate - each range
- 16-bit resolution

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined error – %FS		±0.1
Nonrepeatability – %FS		±0.02
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		3, 3
Calibration Signal – %RO		100
Speed Output – puls/rev.		60
Supply Voltage – VDC		+12 to +28
Supply Current – mA		60
Electrical Connection – pin		12
Resolution – bit		16
Sample Rate – kHz each range		5
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity (see table)
Shaft Material		Stainless steel
Housing Material		Aluminum

STANDARD CONFIGURATION



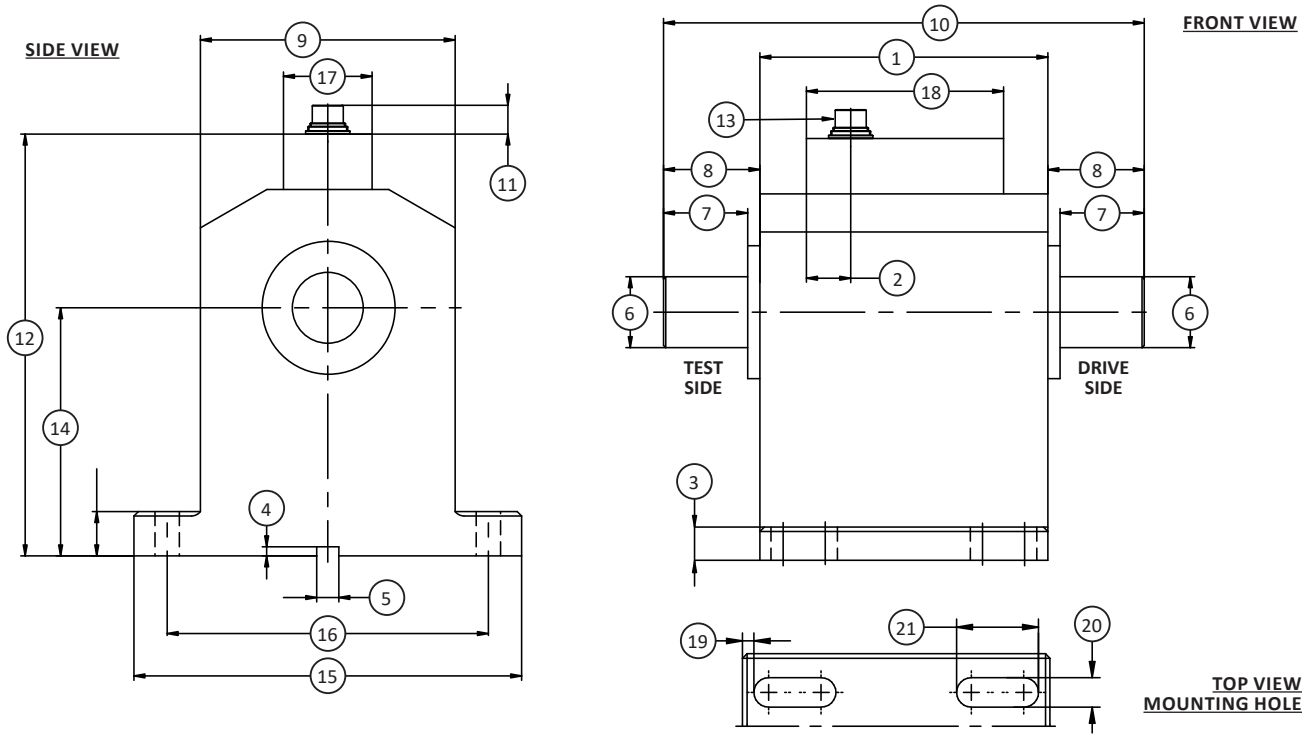
MODEL T7 (Shown)

OPTIONS

- Speed & angle measurement - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- Speed output - 60 pulse TTL, 1-track, available on capacities 2K Nm (17K lbf-in) & above
- +10 V torque output
- RS485
- Keyed shafts – per Din 6885.1

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T7 DUAL RANGE-PEDESTAL ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	5/0.5	44.3/4.43	10/1	88.5/8.85	20/2, 30/3	177/17.7, 265/26.5	50/5, 100/10	443/44.3, 885/88.5
	mm	in	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	71.5	2.81	71.5	2.81
(2)	12	0.5	12	0.5	12	0.5	12	0.5
(3)	15	0.6	15	0.6	15	0.6	15	0.6
(4)	3.3	0.13	3.3	0.13	3.3	0.13	3.3	0.13
(5)	Ø8 N9	Ø0.3150 / 0.3135	Ø8 N9	Ø0.3150 / 0.3135	Ø8 N9	Ø0.3150 / 0.3135	Ø8 N9	Ø0.3150 / 0.3135
(6)	Ø8 g6	Ø0.3148 / 0.3144	10g6	Ø0.3935 / 0.3931	18g6	Ø0.7084 / 0.7080	18g6	Ø0.7084 / 0.7080
(7)	17	0.7	17	0.7	18	0.7	36	1.4
(8)	18	0.7	18	0.7	20	0.8	38	1.5
(9)	44	1.7	44	1.7	44	1.7	44	1.7
(10)	107.5	4.23	107.5	4.23	111.5	4.39	147.5	5.81
(11)	14	0.5	14	0.5	14	0.5	14	0.5
(12)	93.3	3.67	93.3	3.67	93.3	3.67	93.3	3.67
(13)	Connector12-pin		Connector12-pin		Connector12-pin		Connector12-pin	
(14)	45	1.8	45	1.8	45	1.8	45	1.8
(15)	90	3.5	90	3.5	90	3.5	90	3.5
(16)	70	2.8	70	2.8	70	2.8	70	2.8
(17)	40	1.6	40	1.6	40	1.6	40	1.6
(18)	–		–		–		–	
(19)	20.75	0.817	20.75	0.817	20.75	0.817	20.75	0.817
(20)	9	0.4	9	0.4	9	0.4	9	0.4
(21)	21	0.8	21	0.8	21	0.8	21	0.8

T7 DUAL RANGE-PEDESTAL ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	200/20, 500/50	1.77K/177, 4.43K/443	1K/100	8.85K/885	2K/200, 5K/500	17.7K/1.77K, 44.3K/4.43K	10K/1K, 20K/2K	88.5K/8.85K, 177k/17.7K
	mm	in	mm	in	mm	in	mm	in
(1)	130	29.2	130	29.2	135	30.3	190	42.7
(2)	20	4.5	20	4.5	20	4.5	20	4.5
(3)	20	4.5	20	4.5	25	5.6	40	9.0
(4)	4.1	0.92	4.1	0.92	4.1	0.92	4.1	0.92
(5)	Ø10 N9	Ø0.3937 / 0.3933	Ø10 N9	Ø0.3937 / 0.3933	Ø10 N9	Ø0.3937 / 0.3933	Ø10 N9	Ø0.3937 / 0.3933
(6)	Ø32 g6	Ø1.2598 / 1.2574	Ø50 g6	Ø1.9685 / 1.9661	Ø70 g6	Ø2.7559 / 2.7530	Ø110 g6	Ø4.3307 / 4.3273
(7)	38	1.5	58	2.3	110	4.3	120	4.7
(8)	43.5	1.71	66	2.6	121	4.8	140	5.5
(9)	115	4.5	115	4.5	139	5.5	210	8.3
(10)	217	8.5	262	10.3	377	14.8	470	18.5
(11)	13	0.5	13	0.5	13	0.5	13	0.5
(12)	190.4	7.50	190.4	7.50	251.5	9.90	343	13.5
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	112	4.4	112	4.4	160	6.3	215	8.5
(15)	175	6.9	175	6.9	207	8.1	300	11.8
(16)	145	5.7	145	5.7	173	6.8	260	10.2
(17)	40	1.6	40	1.6	40	1.6	40	1.6
(18)	89	3.5	89	3.5	89	3.5	89	3.5
(19)	5	0.2	5	0.2	5	0.2	15	0.6
(20)	11	0.4	11	0.4	13	0.5	17	0.7
(21)	30	1.2	30	1.2	36	1.4	45	1.8

T7 DUAL RANGE-PEDESTAL ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA – J (Kgxm²)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	lbf-in		(NM/rad)	Drive Side	Test Side	N	lbf	N	lbf
5/0.5	44.3/4.43	12,000	$2.4x10^{2}$	$9.7x10^{-6}$	$7.9x10^{-6}$	62	13.9	3	0.67
10/1	88.5/8.85	12,000	$7.2x10^{2}$	$1.0x10^{-5}$	$7.9x10^{-6}$	62	13.9	12	2.70
20/2	177/17.7	12,000	$1.9x10^{3}$	$1.1x10^{-5}$	$9.9x10^{-6}$	62	13.9	23	5.17
30/3	266/26.6	12,000	$2.9x10^{3}$	$1.1x10^{-5}$	$9.9x10^{-6}$	62	13.9	35	7.87
50/5	443/44.3	12,000	$5.4x10^{3}$	$1.4x10^{-5}$	$1.1x10^{-5}$	62	13.9	45	10.1
100/10	885/88.5	12,000	$8.0x10^{3}$	$1.4x10^{-5}$	$1.2x10^{-5}$	62	13.9	64	14.4
200/20	1.77K/177	7,000	$3.3x10^{4}$	$1.3x10^{-3}$	$8.0x10^{-4}$	770	173	175	39.3
500/50	4.43K/443	7,000	$7.7x10^{4}$	$1.3x10^{-3}$	$8.0x10^{-4}$	770	173	410	92.2
1K/100	8.85/885	7,000	$1.9x10^{5}$	$1.6x10^{-3}$	$1.1x10^{-3}$	770	173	530	119
2K/200	17.7K/1.77K	5,500	$5.1x10^{5}$	$5.4x10^{-3}$	$4.2x10^{-3}$	1100	247	720	162
5K/500	44.3K/4.43K	5,500	$7.8x10^{5}$	$5.5x10^{-3}$	$4.3x10^{-3}$	1100	247	860	193
10K/1K	88.5K/8.85	3,500	$2.9x10^{6}$	$4.1x10^{-2}$	$3.6x10^{-2}$	2800	629	2400	540
20K/2K	177K/17.7K	3,500	$3.8x10^{6}$	$4.1x10^{-2}$	$3.7x10^{-2}$	2800	629	2400	540

ELECTRICAL CONNECTION

Pin	12-PIN DUAL RANGE	
	Function	Description
A	NC	–
B	Option Angle B, option	5 VDC TTL
C	Signal 1 (+)	±5 (±10) VDC
D	Signal (GND)	0 VDC
E	Supply (GND)	0 VDC
F	Supply (+)	12-28 VDC
G	Option Angle A, option	5 VDC TTL
H	Signal 2 (+)	±5 (±10) VDC
J	NC	–
K	Cal. Control	L < 2.0V / H > 3.5V
L	NC	–
M	Shield	Transducer housing

T8 ECO ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.2 to 200 Nm (1.77 to 1.77K lbf-in)
- Stainless steel shaft
- ±5 VDC output
- 12 to 28 VDC supply
- Contactless

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.25
Nonrepeatability – %FS		±0.05
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.04
Effect on Output – % / deg	°C	±0.02
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		1 – 3
Supply Voltage – VDC		+12 to +28
Supply Current – mA		90
Resolution		Analog
MECHANICAL		
Safe Overload – %RO		180
Max Speed – RPM		Varies with capacity (see table)
Cable Length	m	1
	ft	3
Shaft Material		Stainless steel
Housing Material		Aluminum

STANDARD CONFIGURATION



MODEL T8 (Shown)

OPTIONS

- Keyed shafts – per Din 6885.1

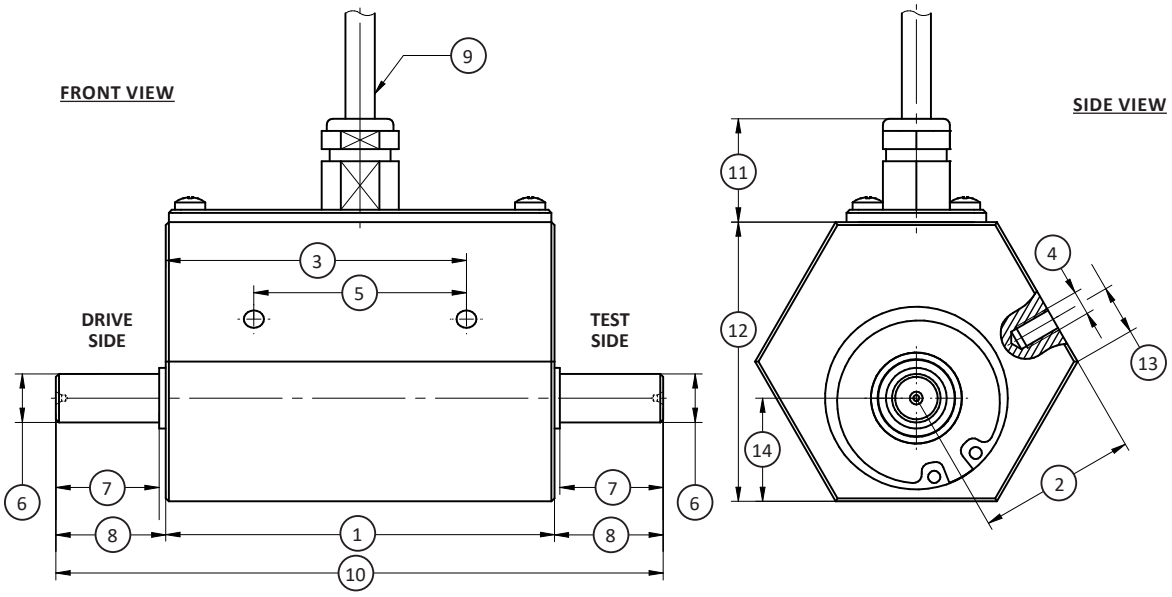
T8 INTEGRAL CABLE WIRING CODE		
Function	**Description**	**Color**
Supply (+)	+12 to +28 VDC	Brown
Supply (GND)	0 VDC	Green
Signal (+)	±5 VDC (+10 VDC)	Yellow
Signal (GND)	0 VDC	White
Shield	Shield	Shield

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA ($Kg \cdot m^2$)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	**lbf-in**		**(NM/rad)**	**Drive Side**	**Test Side**	**N**	**lbf**	**N**	**lbf**
0.2	1.77	10,000	$1.8x10^{1}$	$1.6x10^{-6}$	$1.0x10^{-6}$	58	13	1.5	0.34
0.5	4.43	10,000	$1.1x10^{2}$	$1.6x10^{-6}$	$1.0x10^{-6}$	185	41.6	2.1	0.47
1	8.85	10,000	$2.2x10^{2}$	$1.6x10^{-6}$	$1.1x10^{-6}$	340	76.4	5.1	1.15
2	17.7	10,000	$2.1x10^{2}$	$1.6x10^{-6}$	$1.1x10^{-6}$	340	76.4	5.1	1.15
5	44.3	10,000	$8.9x10^{2}$	$1.7x10^{-6}$	$1.1x10^{-6}$	1.05K	236	29	6.52
10	88.5	10,000	$8.9x10^{2}$	$1.7x10^{-6}$	$1.1x10^{-6}$	1.05K	236	29	6.52
20	177	8,000	$8.4x10^{3}$	$4.2x10^{-5}$	$2.1x10^{-5}$	2.6K	585	98	22.0
50	443	8,000	$8.4x10^{3}$	$4.2x10^{-5}$	$2.1x10^{-5}$	2.6K	585	98	22.0
100	885	8,000	$2.0x10^{4}$	$4.7x10^{-5}$	$2.7x10^{-5}$	6.4K	1.44K	250	56.2
200	1.77K	8,000	$2.0x10^{4}$	$4.7x10^{-5}$	$2.7x10^{-5}$	6.4K	1.44K	250	56.2

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T8 ECO ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.2, 0.5, 1, 2	1.77, 4.43, 8.85, 17.7	5, 10	44.3, 88.5, 133	20, 50	177, 443	100, 200	885, 1.77K
	mm	in	mm	in	mm	in	mm	in
(1)	82	3.2	82	3.2	110	4.3	120	4.7
(2)	26	1.02	26	1.02	34.8	1.37	34.8	1.37
(3)	49.5	1.95	49.5	1.95	60	2.4	60	2.4
(4)	M4		M4		M5		M5	
(5)	35	1.38	35	1.38	40	1.57	40	1.57
(6)	Ø8g6	Ø0.3148/0.3144	Ø10g6	Ø0.3935/0.3931	Ø18g6	Ø0.7087/0.7082	Ø22g6	Ø0.8659/0.8654
(7)	17	0.67	17	0.67	29	1.14	39	1.53
(8)	18	0.71	18	0.71	30	1.18	40	1.57
(9)	Ø4.8	Ø0.19	Ø4.8	Ø0.19	Ø4.8	Ø0.19	Ø4.8	Ø0.19
(10)	100	3.94	100	3.94	140	5.51	160	6.30
(11)	17	0.67	17	0.67	17	0.67	17	0.67
(12)	⌀46	⌀1.81	⌀46	⌀1.81	⌀65	⌀2.56	⌀65	⌀2.56
(13)	8	0.31	8	0.31	15	0.59	15	0.59
(14)	17	0.67	17	0.67	28	1.1	28	1.1

T11 BEARINGLESS ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

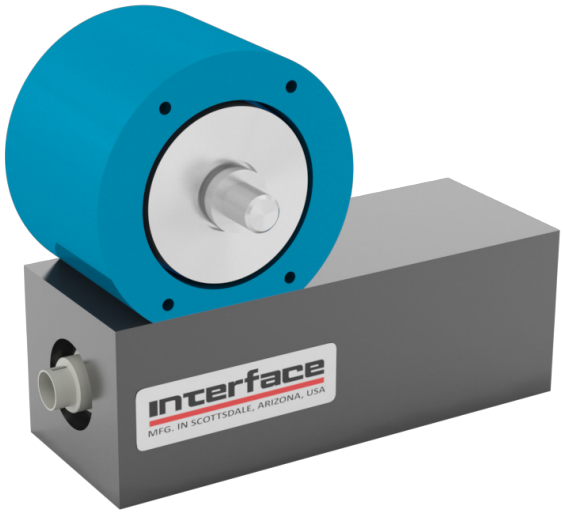
FEATURES & BENEFITS

- Capacities from 0.005 to 150 Nm (0.04 to 1.33K lbf-in)
- Bearingless
- High speed – to 30K RPM
- ±5 VDC output
- Very low range
- Eliminates bearing friction effects
- 10 kHz sample rate
- 12 to 28 VDC supply
- 16-bit resolution

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %FS		±0.02
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		3 – 3
Calibration Signal – %RO		100
Supply Voltage – VDC		+12 to +28
Supply Current – mA		60
Electrical Connection – pin		8
Resolution – bit		16
Sample Rate – kHz		10
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		30K (see table)
Shaft Material		Stainless steel
Housing Material		Aluminum

STANDARD CONFIGURATION



MODEL T11 (Shown)

OPTIONS

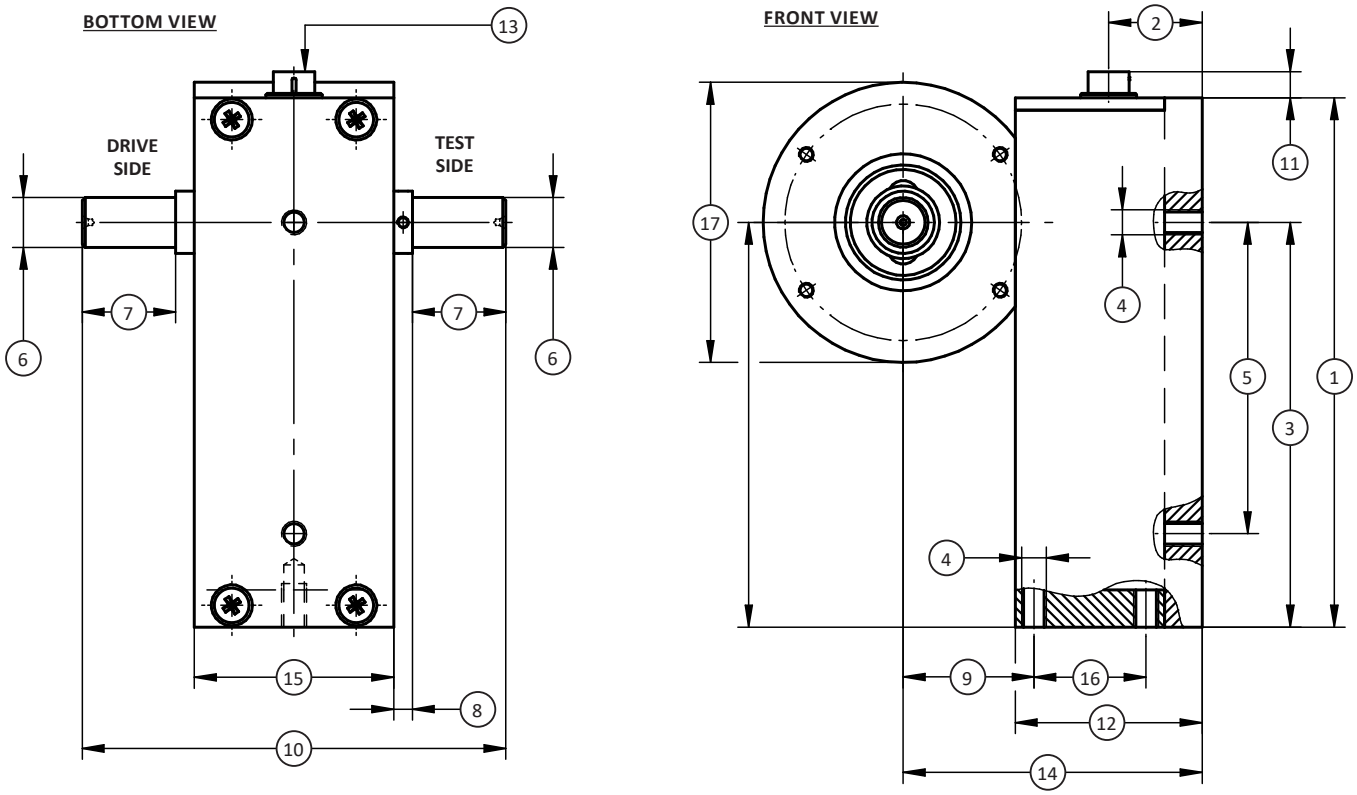
- +10 VDC output
- Speed output – 6 Pulse TTL, 1-track

ELECTRICAL CONNECTION

Pin	8-PIN ELECTRICAL CONNECTION	
	Function	Description
1	Supply (+)	12-28 V
2	Supply (GND)	0 VDC
3	Signal (+)	±5 (±10)VDC
4	Signal (GND)	0 VDC
5	Cal. Control	L < 2.0V / H > 3.5V
6	Option Angle A	5VDC TTL
7	NC	–
8	NC	–
	Housing	Shield

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T11 BEARINGLESS ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.005, 0.01	0.04, 0.62	0.02, 0.05, 0.1, 0.2, 0.5, 1	0.18, 0.44, 0.85, 1.77, 4.43, 8.85	2, 5	17.7, 44.3	10	88.5	20, 50, 100, 150	177, 443, 885, 1.33K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	85	3.3	85	3.3	85	3.3	85	3.3	85	3.3
(2)	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6
(3)	65	2.6	65	2.6	65	2.6	65	2.6	65	2.6
(4)	M4		M4		M4		M4		M4	
(5)	50	2.0	50	2.0	50	2.0	50	2.0	50	2.0
(6)	4g6	0.1573/0.1570	6g6	0.2361/0.2357	8g6	0.3148/0.3144	10g6	0.3935/0.3931	18g6	0.7084/0.7080
(7)	5	0.20	7	0.28	15	0.59	15	0.59	36	1.42
(8)	3	0.1	3	0.1	3	0.1	3	0.1	9	0.4
(9)	21	0.8	21	0.8	21	0.8	21	0.8	21	0.8
(10)	48	1.89	52	2.05	68	2.68	68	2.68	122	4.80
(11)	4	0.2	4	0.2	4	0.2	4	0.2	4	0.2
(12)	30	1.2	30	1.2	30	1.2	30	1.2	30	1.2
(13)	Connector 8-pin		Connector 8-pin		Connector 8-pin		Connector 8-pin		Connector 8-pin	
(14)	48	1.89	48	1.89	48	1.89	48	1.89	53	2.09
(15)	32	1.3	32	1.3	32	1.3	32	1.3	32	1.3
(16)	18	0.7	18	0.7	18	0.7	18	0.7	18	0.7
(17)	45	1.77	45	1.77	45	1.77	45	1.77	59.5	2.34

T11 BEARINGLESS ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA – (Kg•m²)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	lbf-in		NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.005	0.04	20,000	$4.6x10^{-1}$	$7.5x10^{-7}$	$1.1x10^{-8}$	35	7.9	1	0.22
0.01	0.09	20,000	$4.6x10^{-1}$	$7.5x10^{-7}$	$1.1x10^{-8}$	35	7.9	1	0.22
0.02	0.18	30,000	$3.7x10^{0}$	$7.6x10^{-7}$	$1.3x10^{-8}$	35	7.9	1	0.22
0.05	0.44	30,000	$3.7x10^{0}$	$7.6x10^{-7}$	$1.3x10^{-8}$	40	9.0	1.1	0.25
0.1	0.89	30,000	$1.8x10^{1}$	$8.6x10^{-7}$	$3.8x10^{-8}$	43	10.0	1.5	0.34
0.2	1.77	30,000	$1.8x10^{1}$	$8.6x10^{-7}$	$3.8x10^{-8}$	59	13.3	2.3	0.52
0.5	4.43	30,000	$1.2x10^{2}$	$8.6x10^{-7}$	$3.8x10^{-8}$	185	41.6	4.2	0.94
1	8.85	30,000	$1.2x10^{2}$	$8.6x10^{-7}$	$3.8x10^{-8}$	255	57.3	7.2	1.62
2	17.7	30,000	$6.2x10^{2}$	$9.1x10^{-7}$	$8.3x10^{-8}$	520	117	14	3.15
5	44.3	30,000	$6.2x10^{2}$	$9.1x10^{-7}$	$8.3x10^{-8}$	520	117	14	3.15
10	88.5	30,000	$1.5x10^{3}$	$9.8x10^{-7}$	$1.6x10^{-7}$	900	202	33	7.42
20	177	20,000	$7.4x10^{3}$	$1.2x10^{-5}$	$3.6x10^{-6}$	2.15K	483	62	13.9
50	443	20,000	$1.1x10^{4}$	$1.2x10^{-5}$	$3.9x10^{-6}$	4K	899	160	36.0
100	885	20,000	$1.1x10^{4}$	$1.2x10^{-5}$	$3.9x10^{-6}$	4K	899	160	36.0
150	1.33K	20,000	$1.2x10^{4}$	$1.2x10^{-5}$	$4.2x10^{-6}$	5K	1.12K	220	49.5

T12 SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)

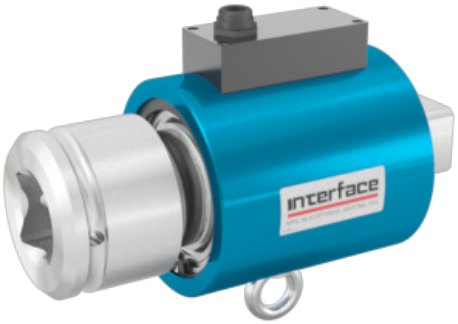
FEATURES & BENEFITS

- Capacities from 0.1 to 5K Nm (0.89 to 44.3K lbf-in)
- ±5 VDC output
- 12 to 28 VDC supply
- Contactless - no slip rings

SPECIFICATIONS

		Standard	Enhanced
ACCURACY – (MAX ERROR)			
Combined Error – %FS		±0.25	±0.1
Nonrepeatability – %FS		±0.05	±0.02
TEMPERATURE			
Effect on Zero – %RO / deg	°C	±0.05	±0.02
Effect on Output – % / deg	°C	±0.02	±0.01
Rated Range	°C	+5 to +45	+5 to +45
	°F	+41 to +113	+41 to +113
Operating Range	°C	0 to +60	0 to +60
	°F	+32 to +140	+32 to +140
ELECTRICAL			
Torque Output – VDC		±5	±5
Bandwidth – kHz – dB		1 – 3	3 – 3
Calibration Signal – %RO		100	100
Supply Voltage – VDC		+12 to +28	+12 to +28
Supply Current – mA		60	60
Electrical Connection – pin		8 or 12	8 or 12
Resolution – bit		12	16
Sample Rate – kHz		10	10
MECHANICAL			
Safe Overload – %RO		200	200
Max Speed – RPM		Varies with capacity (see table)	Varies with capacity (see table)
Housing Material		Aluminum	Aluminum

STANDARD CONFIGURATION



MODEL T12 (Shown)

OPTIONS

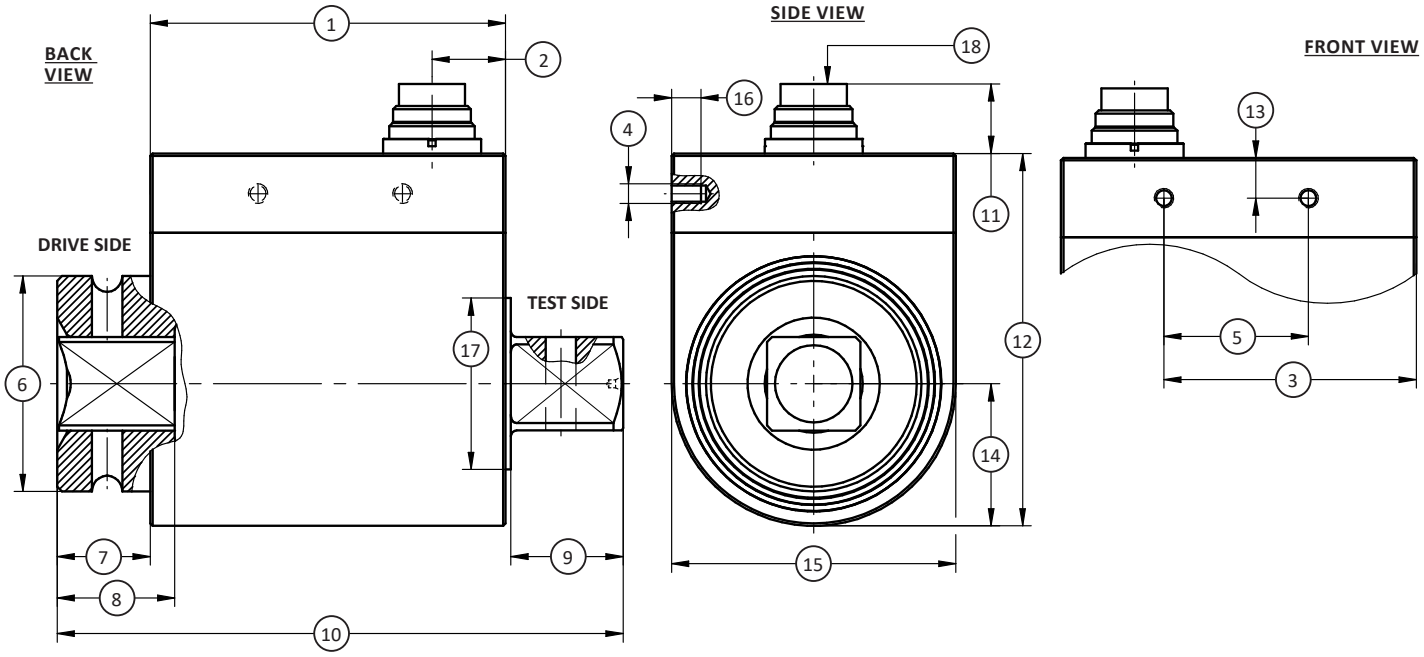
- Angle measurement - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm only
- +10 V torque output
- Enhanced accuracy – combined error ±0.1%
- RS485 output (requires enhanced accuracy)
- USB Option Available

ELECTRICAL CONNECTION

Pin	12-PIN ELECTRICAL CONNECTION		12-PIN RS485 OPTION	
	Function	Description	Function	Description
A	NC	–	NC	–
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC	NC	–
D	Signal (GND)	0 VDC	NC	–
E	Supply (GND)	0 VDC	Supply (GND)	0 VDC
F	Supply (+)	12-28 V	Supply (+)	12-28 VDC
G	Option Angle A	TTL	Option Angle A	TTL
H	NC	–	NC	–
J	NC	–	RS485 Option	RS485 (B)
K	Cal. Control	L< 2.0 / H > 3.5V	NC	–
L	NC	–	RS485 Option	RS485 (A)
M	Housing	–	Housing	–

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

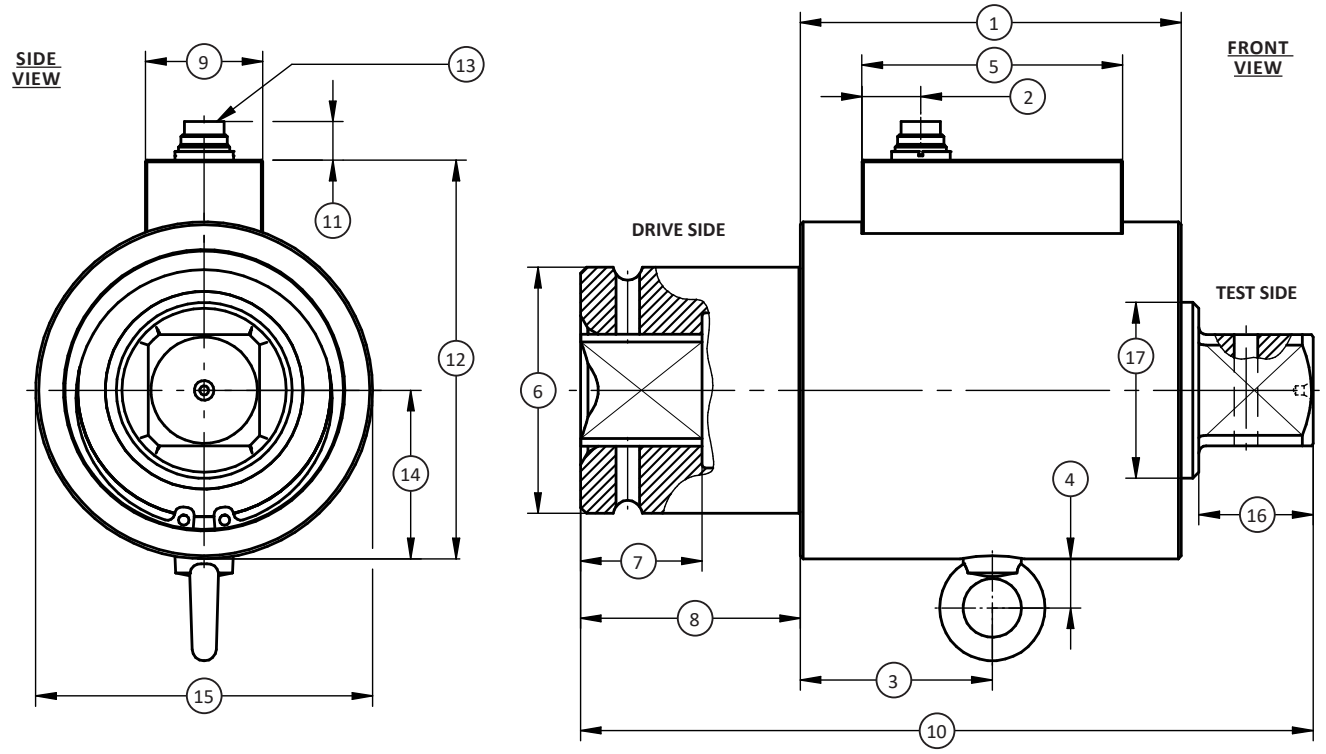
T12 SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5, 10, 15, 20	0.85, 1.77, 4.43, 8.85, 17.7, 44.3, 88.5, 133, 177	35, 50, 63	310, 442, 558	100, 160, 200	885, 1.41K, 1.77K	500	4.43K	1K	8.85K
	1/4"		3/8"		1/2"		3/4"		1"	
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	49	1.9	71.5	2.82	71.5	2.82	72.5	2.86	72.5	2.86
(2)	15	0.6	12	0.47	29.8	1.17	15	0.6	15	0.6
(3)	33.5	1.3	56.5	2.22	56.5	2.22	51.5	2.03	51.5	2.03
(4)	M4		M4		M4		M4		M4	
(5)	18	0.7	41.5	1.64	41.5	1.64	29.5	1.16	29.5	1.16
(6)	Ø13	Ø0.5	Ø22	Ø0.87	Ø29.8	Ø1.17	Ø44	Ø1.7	Ø54	Ø2.1
(7)	6.5	0.3	11	0.43	13	0.51	19	0.75	29	1.14
(8)	8	0.3	–	–	–	–	24	0.9	26.5	1.04
(9)	7.2	0.3	10.4	0.41	15.1	0.61	22.9	0.90	27.4	1.08
(10)	64	2.5	94.5	3.72	100.5	3.96	115.5	4.55	130.5	5.14
(11)	12	0.5	14	0.6	14	0.6	14	0.6	14	0.6
(12)	56	2.2	59	2.32	59	2.32	76	2.99	76	2.99
(13)	26.5	1.0	8.2	0.32	8.2	0.32	8.2	0.32	8.2	0.32
(14)	16	0.6	20	0.79	20	0.79	29	1.14	29	1.14
(15)	32	1.3	40	1.58	40	1.58	58	2.29	58	2.29
(16)	4	0.2	5	0.2	5	0.2	6	0.24	6	0.24
(17)	Ø10	Ø0.4	Ø20	Ø0.8	Ø20	Ø0.8	Ø35	Ø1.4	Ø35	Ø1.4
(18)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	

T12 SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS (CONTINUED)

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	2K, 5K	17K, 44.3 K
	1 1/2"	
	mm	in
(1)	130	5.1
(2)	20	0.8
(3)	65.5	2.6
(4)	17	0.7
(5)	89	3.5
(6)	Ø84	Ø3.3
(7)	41.5	1.6
(8)	75	3.0
(9)	40	1.6
(10)	250	9.8
(11)	13	0.5
(12)	136	5.4
(13)	Connector 12-pin	
(14)	57.5	2.3
(15)	Ø115	Ø4.5
(16)	39	1.5
(17)	Ø60	Ø2.4

T12 SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		SQUARE	MAX RPM	SPRING RATE	MOMENT OF INERTIA – J ($Kg \cdot m^2$)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	lbf-in	in		NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.1	0.88	1/4	3,000	$1.8x10^{1}$	$2.1x10^{-6}$	$2.3x10^{-7}$	42	9.4	1.2	0.27
0.2	1.77	1/4	3,000	$1.8x10^{1}$	$2.1x10^{-6}$	$2.3x10^{-7}$	42	9.4	1.2	0.27
0.5	4.43	1/4	3,000	$1.2x10^{2}$	$2.1x10^{-6}$	$2.3x10^{-7}$	185	41.6	2.9	0.65
1	8.85	1/4	3,000	$1.2x10^{2}$	$2.1x10^{-6}$	$2.3x10^{-7}$	260	58.5	4.7	1.06
2	17.7	1/4	4,000	$3.0x10^{2}$	$2.1x10^{-6}$	$2.4x10^{-7}$	480	108	12.2	2.74
5	44.3	1/4	4,000	$5.9x10^{2}$	$2.1x10^{-6}$	$2.5x10^{-7}$	870	196	30	6.74
10	88.5	1/4	4,000	$7.3x10^{2}$	$2.1x10^{-6}$	$2.7x10^{-7}$	1.15K	259	45	10.1
15	133	1/4	4,000	$7.3x10^{2}$	$2.1x10^{-6}$	$2.7x10^{-7}$	1.15K	259	45	10.1
20	177	1/4	4,000	$7.3x10^{2}$	$2.1x10^{-6}$	$2.7x10^{-7}$	1.15K	259	45	10.1
35	310	3/8	3,000	$8.6x10^{3}$	$9.8x10^{-6}$	$1.1x10^{-5}$	3.3K	742	110	24.7
50	443	3/8	3,000	$1.0x10^{4}$	$9.9x10^{-6}$	$1.1x10^{-5}$	4.2K	944	155	34.8
63	558	3/8	3,000	$1.1x10^{4}$	$1.0x10^{-5}$	$1.1x10^{-5}$	4.9K	1.1K	190	42.7
100	885	1/2	2,500	$1.2x10^{4}$	$1.6x10^{-5}$	$1.1x10^{-5}$	4K	899	135	30.3
160	1.42K	1/2	2,500	$1.5x10^{4}$	$1.6x10^{-5}$	$1.2x10^{-5}$	5.5K	1.24K	215	48.3
200	1.77K	1/2	2,500	$1.5x10^{4}$	$1.6x10^{-5}$	$1.2x10^{-5}$	5.5K	1.24K	215	48.3
500	4.43K	3/4	2,500	$8.8x10^{4}$	$9.8x10^{-5}$	$7.7x10^{-5}$	13.5K	3.03K	840	189
1K	8.85K	1	1,500	$1.3x10^{5}$	$2.1x10^{-4}$	$1.1x10^{-4}$	16.5K	3.71K	1K	225
2K	17.7K	1 1/2	1,000	$2.1x10^{5}$	$3.5x10^{-3}$	$1.8x10^{-3}$	27K	6.07K	1.65K	371
5K	44.3K	1 1/2	1,000	$2.7x10^{5}$	$3.5x10^{-3}$	$1.8x10^{-3}$	51K	11.5K	4K	899

T14 SLIP-RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 1 to 500 Nm (8.85 to 4.4K lbf-in)
- Integrated speed and angle measurement option
- Keyed shaft
- mV/V output
- Small, compact size
- 360 pulse speed and angle measurement

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined error – %FS		±0.1
Nonrepeatability – %		±0.05
TEMPERATURE		
Effect on zero – %RO / deg	°C	±0.02
Effect on output – % / deg	°C	±0.01
Rated range	°C	+5 to +50
	°F	+41 to +122
Operating range	°C	-10 to +60
	°F	+14 to +140
ELECTRICAL		
Output – mV/V	1 Nm	±0.5
	8.85 lbf-in	
	2 - 500 Nm	±1.0
	17.7 - 4.43K lbf-in	
Excitation Voltage- VDC MAX		12
Bridge resistance – Ohm		350
Electrical connection – pin		12
MECHANICAL		
Safe overload – %RO		150
Shaft material		Alloy steel

STANDARD CONFIGURATION



MODEL T14 (Shown)

BRUSH LIFE

Speed (rpm)	CAPACITY					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1, 2, 5, 10	8.85, 17.7, 44.3, 88.5	20, 50, 100	177, 443, 885	200, 500	1.77K, 4.43K
10	10 years		7.6 years		5.7 years	
100	138 days		62 days		55 days	
500	233 hours		166 hours		100 hours	
1000	83 hours		50 hours		33 hours	
1500	44 hours		27 hours		-	
2000	25 hours		-		-	

ELECTRICAL CONNECTION

Pin	T14 12-Pin with Encoder	
	Function	Description
A	Excitation (-)	0 V
B	Excitation (+)	2-12 V
C	Signal (+)	+ Output
D	Signal (-)	- Output
E	Excitation Angle	0 V
F	Excitation Angle	+5 V
G	Angle A	TTL
H	Angle B	TTL
J	Angle	0 V
K	100% R-Cal Option	Connect to Pin B
L	NC	–
M	Shield	–

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T14 SLIP-RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

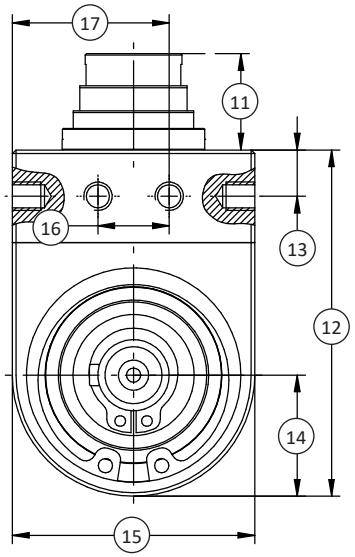
CAPACITY		MAX RPM MIN*1	SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)*1		MAX THRUST LOAD*2		MAX SHEAR LOAD*2	
Nm	lbf-in		NM/rad	Drive Side	Test Side	N	lbf	N	lbf
1	8.85	2,000	$2.2x10^2$	$3.5x10^{-6}$	$3.5x10^{-6}$	380	85.4	4.5	1
2	17.7	2,000	$2.2x10^2$	$3.5x10^{-6}$	$3.5x10^{-6}$	380	85.4	4.5	1
5	44.3	2,000	$5.6x10^2$	$3.5x10^{-6}$	$3.5x10^{-6}$	690	155	11	2.5
10	88.5	2,000	$6.5x10^2$	$3.5x10^{-6}$	$3.5x10^{-6}$	780	175	13	2.9
20	177	1,500	$3.4x10^3$	$1.1x10^{-5}$	$1.1x10^{-5}$	1,750	393	31	7
50	443	1,500	$8.2x10^3$	$1.2x10^{-5}$	$1.2x10^{-5}$	3,300	742	80	18
100	885	1,500	$1.3x10^4$	$1.4x10^{-5}$	$1.4x10^{-5}$	5,200	1.17K	150	33.7
200	1.77K	1,000	$4.6x10^4$	$1.1x10^{-4}$	$1.1x10^{-4}$	8,500	1.91K	230	51.7
500	4.43K	1,000	$7.4x10^4$	$1.2x10^{-4}$	$1.2x10^{-4}$	15,000	3.37K	560	125.9

**1 = Female cable connector in scope of delivery at first delivery *2 = Unsupported shaft*

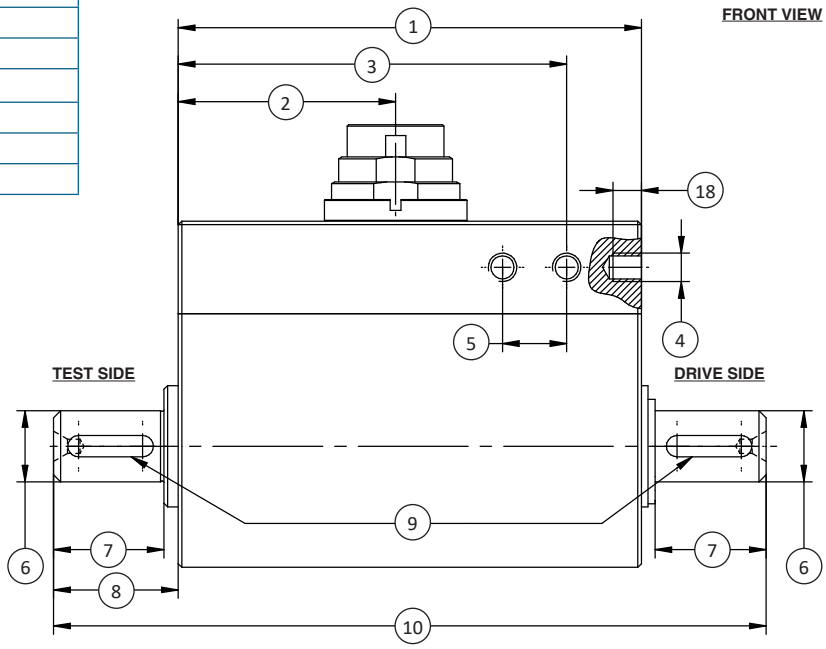
DIMENSIONS

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	1, 2, 5, 10	8.85, 17.7, 44.3, 88.5
	mm	in
(1)	65	2.56
(2)	30.5	1.2
(3)	54.5	2.15
(4)	M4 (6 X)	
(5)	9	0.35
(6)	Ø 10 g6	
(7)	15.5	0.61
(8)	17.5	0.28
(9)	DIN 6885-1	
(10)	100	3.94
(11)	13.5	0.53
(12)	48.6	1.91
(13)	6.5	0.26
(14)	17	0.67
(15)	34	1.34
(16)	10	0.39
(17)	22	0.87
(18)	4	0.16

SIDE VIEW

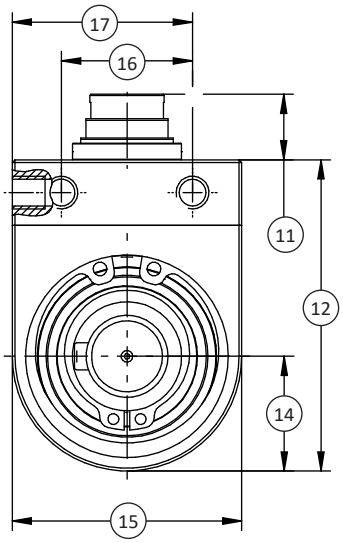


FRONT VIEW

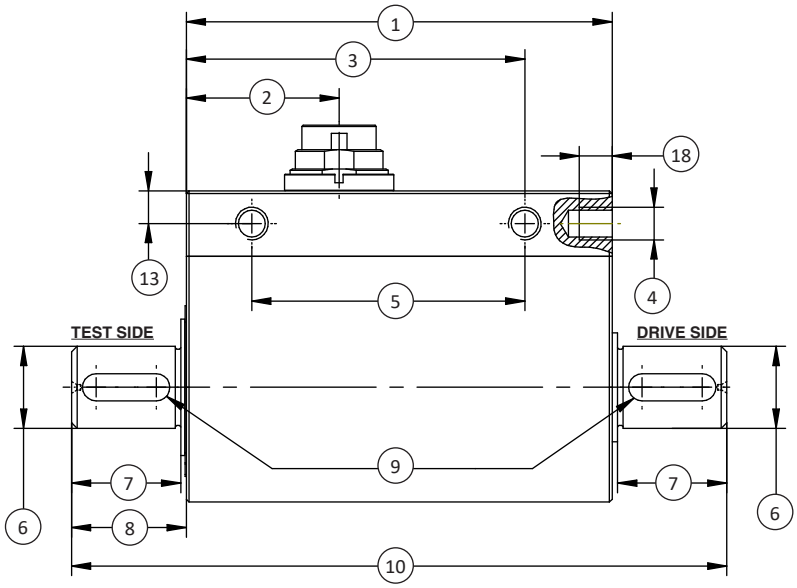


T14 SLIP-RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

SIDE VIEW



FRONT VIEW



DIMENSIONS

See Drawing						
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	20, 50	177, 443	100	885	200, 500	1770, 4425
	mm	in	mm	in	mm	in
(1)	78	3.07	78	3.07	92	3.62
(2)	28	1.1	28	1.1	43	1.69
(3)	62	2.44	62	2.44	79	3.11
(4)	M6 (4 X)		M6 (4 X)		M6 (6 X)	
(5)	50	1.97	50	1.97	66	2.6
(6)	Ø 15 g6	Ø 0.59 g6	Ø 18 g6	Ø 0.71 g6	Ø 32 g6	Ø 1.26 g6
(7)	20	0.79	24	0.94	40	1.57
(8)	21	0.83	25	0.98	44	1.73
(9)	DIN 6885-1		DIN 6885-1		DIN 6885-1	
(10)	120	4.72	128	5.04	180	7.08
(11)	12	0.47	12	0.47	12	0.47
(12)	57	2.24	57	2.24	70	2.76
(13)	6	0.24	6	0.24	6	0.24
(14)	21	0.83	21	0.83	28	1.1
(15)	42	1.65	42	1.65	56	2.2
(16)	24	0.94	24	0.94	24	0.94
(17)	33	1.3	33	1.3	40	1.57
(18)	6	0.24	6	0.24	10	0.39

T15 HEX DRIVE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.2 to 20 Nm (1.77 to 177 lbf-in)
- Contactless - no slip rings
- High-level ±5V output
- 12-28V supply
- Bearingless non-contact design
- Angle measurement option
- Quick-Connect chuck
- 16-bit resolution

SPECIFICATIONS

		STANDARD	ENHANCED
ACCURACY – (MAX ERROR)			
Combined Error – %FS		±0.25	±0.1
Nonrepeatability – %		±0.05	±0.02
TEMPERATURE			
Effect on Zero – %RO / deg	°C	±0.05	±0.02
Effect on Output – % / deg	°C	±0.02	±0.01
Rated Range	°C	+5 to +45	
	°F	+41 to +113	
Operating Range	°C	0 to +60	
	°F	+32 to +140	
ELECTRICAL			
Output – VDC		±5	
Bandwidth – kHz – dB		1 –3	3 –3
Calibration Signal – % RO		100	
Supply Voltage – VDC		+12 to +28	
Supply Current – mA		60	
Electrical Connection – pin		12	
MECHANICAL			
Safe Overload – %RO		200	
Max Speed – rpm		See table	
Material		Aluminum	

ELECTRICAL CONNECTION

12-PIN ELECTRICAL CONNECTION		
PIN	**FUNCTION**	**DESCRIPTION**
1	NC	-
2	Signal angle B (option)	5V TTL
3	Signal (+)	±5V (±10V)
4	Signal (GND)	0V
5	Supply (GND)	0V
6	Supply (+)	12 - 28VDC
7	Signal angle A (option)	5V TTL
8	NC	-
9	NC	-
10	Control signal	L <2.0V; H >3.5V
11	NC	-
12	Shield	

STANDARD CONFIGURATION



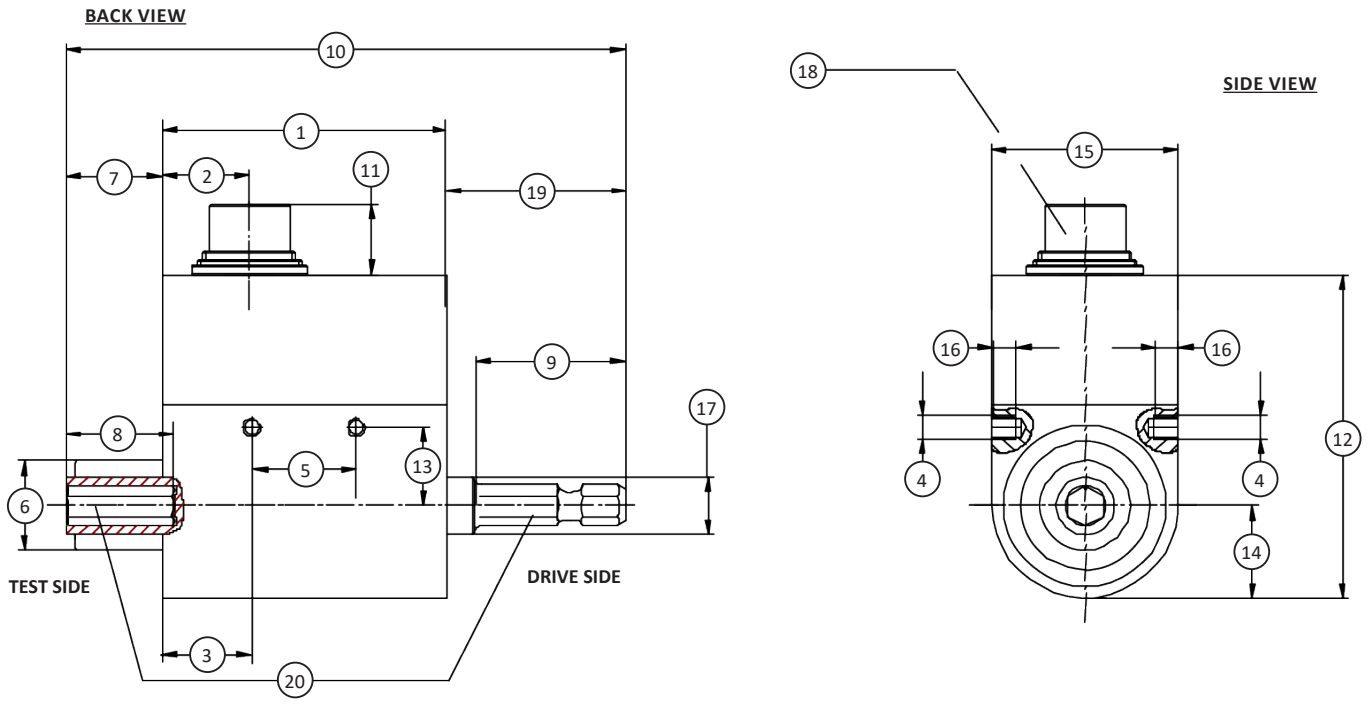
MODEL T15 (Shown)

OPTIONS

- Angle measurement - 360 pulse TTL, 2-tracks 90° offset
- +10V torque output
- Enhanced accuracy - combined error +0.1%
- RS485 Output (Uses 12-pin connector, replaces +5 V)
- USB Option Available

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T15 HEX DRIVE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5, 10, 15, 20	0.89, 1.77, 4.43, 8.85, 17.7, 44.3, 88.5, 133, 177
	mm	in
(1)	49	1.9
(2)	15	0.6
(3)	15.5	0.61
(4)	M4	
(5)	18	0.7
(6)	Ø15.5	Ø0.61
(7)	16.5	0.65
(8)	18.5	0.73
(9)	$26^{+0.2}$	$1.0^{+0.008}$
(10)	96.5	3.80
(11)	12	0.5
(12)	56	2.2
(13)	13.5	0.53
(14)	16	0.6
(15)	32	1.3
(16)	4	0.2
(17)	Ø10	Ø0.4
(18)	Connector 12-pin	
(19)	31	1.2
(20)	1/4" Hegaon DIN 3126 (ISO 1173) Design E/F –Quick action chuck	

T15 HEX DRIVE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		Hexagon		MAX RPM	SPRING RATE	MOMENT OF INERTIA – ($Kg \cdot m^2$)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	lbf-in	mm	in		NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.1	0.89	6.35	0.25	3,000	$1.8x10^{1}$	$2.6x10^{-6}$	$2.9x10^{-7}$	43	9.7	1.2	0.27
0.2	1.77	6.35	0.25	3,000	$1.8x10^{1}$	$2.6x10^{-6}$	$2.9x10^{-7}$	58	13.0	1.6	0.36
0.5	4.43	6.35	0.25	3,000	$1.1x10^{2}$	$2.6x10^{-6}$	$2.9x10^{-7}$	185	41.6	1.6	0.36
1	8.85	6.35	0.25	4,000	$1.1x10^{2}$	$2.6x10^{-6}$	$2.9x10^{-7}$	260	58.5	2.6	0.58
2	17.7	6.35	0.25	4,000	$2.9x10^{2}$	$2.6x10^{-6}$	$3.0x10^{-7}$	480	108	6.6	1.48
5	44.3	6.35	0.25	4,000	$4.6x10^{2}$	$2.6x10^{-6}$	$3.1x10^{-7}$	865	194	17	3.8
10	88.5	6.35	0.25	4,000	$5.2x10^{2}$	$2.6x10^{-6}$	$3.3x10^{-7}$	1150	259	24	5.4
15	133	6.35	0.25	4,000	$5.2x10^{2}$	$2.6x10^{-6}$	$3.3x10^{-7}$	1150	259	24	5.4
20	177	6.35	0.25	4,000	$5.2x10^{2}$	$2.6x10^{-6}$	$3.3x10^{-7}$	1150	259	24	5.4

T16 COMPACT SLIP RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 1 to 500 Nm (8.85 to 4.43K lbf-in)
- Very short axial length
- Compact design
- High accuracy 0.1% FS
- Keyed shaft

STANDARD CONFIGURATION



MODEL T16 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)			
Combined Error – %FS			±0.1
Nonrepeatability – %RO			±0.05
TEMPERATURE			
Effect on Zero – %RO / deg		°C	±0.04
Effect on Output – RO% / deg		°C	±0.02
Rated Range		°C	+5 to +50
		°F	+41 to +122
Operating Range		°C	-10 to +60
		°F	+14 to +140
ELECTRICAL			
Output – mV/V	1 Nm		+0.5
	8.85 lbf-in		
	2 - 500 Nm		+1.0
	17.7 - 4.43K lbf-in		
Excitation Voltage – VDC			2 - 12
Bridge Resistance – Ohm			350
Electrical Connection – pin			6
MECHANICAL			
Safe Overload – %RO			200
Shaft Material			Stainless steel
Housing Material			Aluminum

BRUSH LIFE

Speed (RPM)	CAPACITY					
	Nm	lbf-in	Nm	lbf-in	Nm	lbf-in
	1, 2, 5, 10	8.85, 17.7, 44.3, 88.5	20, 50, 100	177, 443, 885	200, 500	1.77K, 4.43K
10	10 years		7.6 years		5.7 years	
100	138 days		62 days		55 days	
500	233 hours		166 hours		100 hours	
1000	83 hours		50 hours		33 hours	
1500	44 hours		27 hours		-	
2000	25 hours		-		-	

OPTIONS

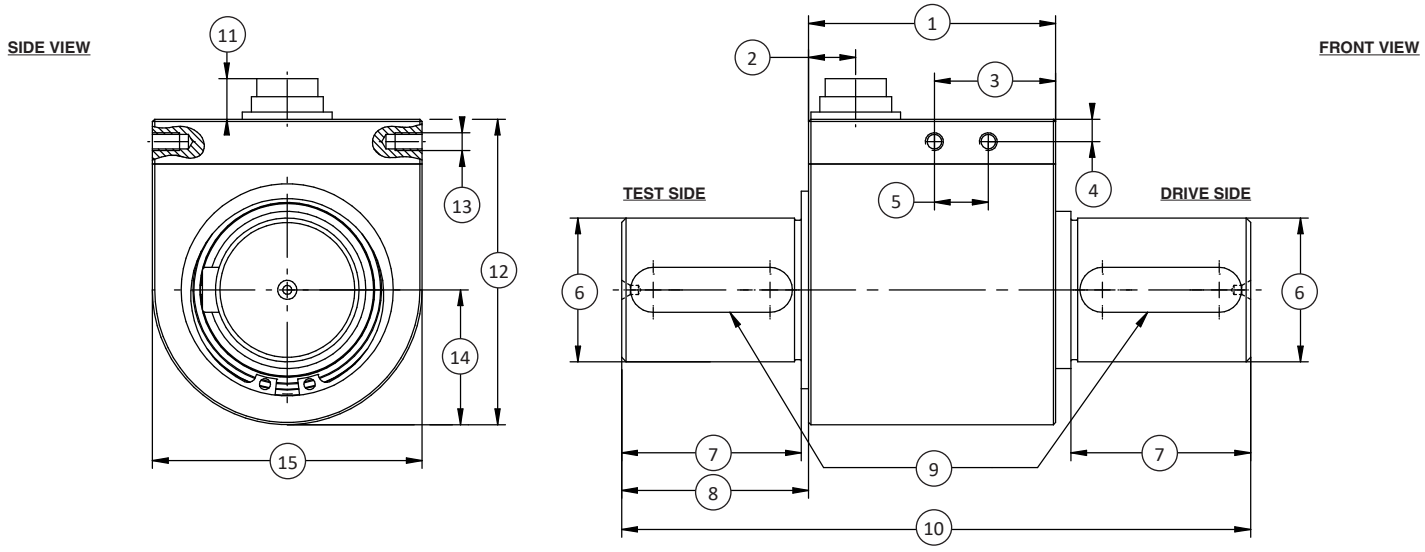
- Internal R-CAL Resistor – 100% output

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX THRUST LOAD		MAX SHEAR LOAD	
Nm	lbf-in		NM/rad	Drive Side	Test Side	N	lbf	N	lbf
1	8.85	2,000	2.1E + 02	1.3E - 06	3.1E - 07	380	85.4	6	1.35
2	17.7	2,000	2.1E + 02	1.3E - 06	3.1E - 07	380	85.4	6	1.35
5	44.3	2,000	5.5E + 02	1.4E - 06	3.3E - 07	690	155	14.5	3.26
10	88.5	2,000	6.4E + 02	1.4E - 06	3.3E - 07	780	175	15.5	3.48
20	177	1,500	4.1E + 03	1.2E - 05	6.7E - 06	1750	393	53	11.9
50	443	1,500	1.1E + 04	1.2E - 05	7.0E - 06	3300	742	135	30.3
100	885	1,500	1.9E + 04	1.4E - 05	8.6E - 06	5200	1.17K	260	58.5
200	1.77K	1,000	5.4E + 04	9.6E - 05	6.7E - 05	8500	1.91K	340	76.4
500	4.43K	1,000	9.0E + 04	1.0E - 04	7.3E - 05	15000	3.37K	850	191

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T16 COMPACT SLIP RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1, 2, 5, 10	8.85, 17.7, 44.3, 88.5	20, 50	177, 443	100	885	200, 500	1770, 4425
	mm	in	mm	in	mm	in	mm	in
(1)	45.5	1.79	47.4	1.87	47.4	1.87	55	2.2
(2)	12.2	0.48	10.5	0.41	10.5	0.41	10.5	0.41
(3)	17.6	0.69	20.5	0.81	20.5	0.81	27	1.1
(4)	5	0.2	5	0.2	5	0.2	5	0.2
(5)	9	0.4	9.5	0.37	9.5	0.37	12	0.5
(6)	Ø8 g6	Ø(0.3156/0.3150)	Ø15g6	Ø(0.5913/0.5905)	Ø18g6	Ø(0.7094/0.7087)	Ø32g6	Ø(1.2608/1.2598)
(7)	18	0.7	20	0.8	22	0.9	40	1.6
(8)	19.7	0.78	21.1	0.83	24.1	0.95	41.6	1.64
(9)	Key DIN 6885-1		Key DIN 6885-1		Key DIN 6885-1		Key DIN 6885-1	
(10)	85	3.3	90	3.5	95	3.7	140	5.5
(11)	10	0.4	10	0.4	10	0.4	10	0.4
(12)	39	1.5	54	2.1	54	2.1	68	2.7
(13)	M4 ↧ 6	M4 ↧ 0.2	M4 ↧ 6	M4 ↧ 0.2	M4 ↧ 6	M4 ↧ 0.2	M4 ↧ 6	M4 ↧ 0.2
(14)	12	0.5	21	0.8	21	0.8	30	1.2
(15)	24	0.9	42	1.7	42	1.7	60	2.4

FORCE MEASUREMENT SOLUTIONS

T18 ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 10 to 100 Nm (88.5 to 885 lbf-in)
- Keyed Shaft per DIN 6885
- ±5 VDC output
- Speed Measurement Option Available
- Contactless
- Low Cost
- Short overall length

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.25
Nonrepeatability – %FS		±0.05
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.04
Effect on Output – % / deg	°C	±0.02
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		1 – 3
Supply Voltage – VDC		+12 to +28
Supply Current – mA		90
Resolution		Analog
MECHANICAL		
Safe Overload – %RO		180
Max Speed – RPM		8,000
Cable Length	m	2
	ft	6.5
Shaft Material		Alloy steel
Housing Material		Aluminum

STANDARD CONFIGURATION



MODEL T18-10NM (Shown)

OPTIONS

- +/-10V Output
- 30-pulse Speed Measurement Option

ELECTRICAL

Function	Description	Color
Supply (+)	+12 to +28 VDC	Brown
Supply (GND)	0 VDC	Green
Signal (+)	±5 VDC (+10 VDC)	Yellow
Signal (GND)	0 VDC	White
Speed Control (Option)	5V TTL	Gray
Shield	Shield	Shield

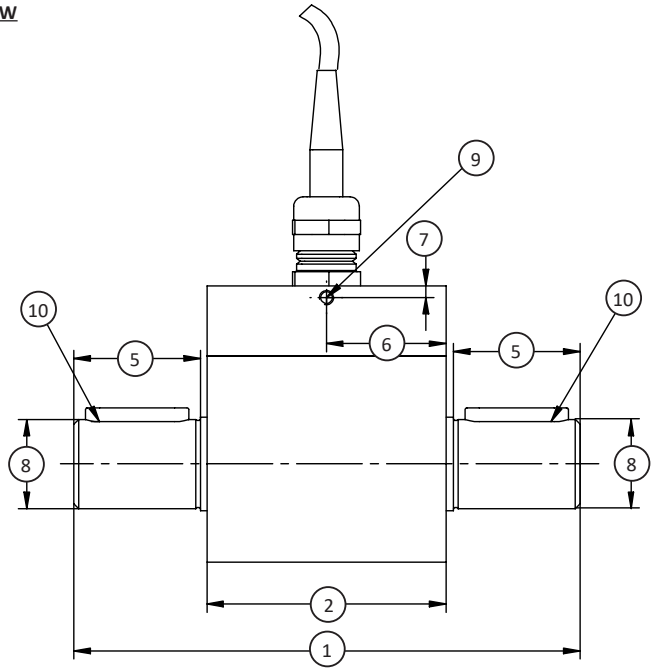
PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA ($Kg \cdot m^2$)		MAX THRUST LOAD	
Nm	lbf-in		(Nm/rad)	Drive Side	Test Side	N	lbf
10	88.5	8,000	4,500	0.1	0.09	1,000	224.8
15	132.8	8,000	4,500	0.1	0.09	1,000	224.8
20	177	8,000	4,500	0.1	0.09	1,000	224.8
50	442.5	8,000	13,200	0.12	0.1	1,500	337.2
100	885	8,000	13,200	0.12	0.1	1,500	337.2

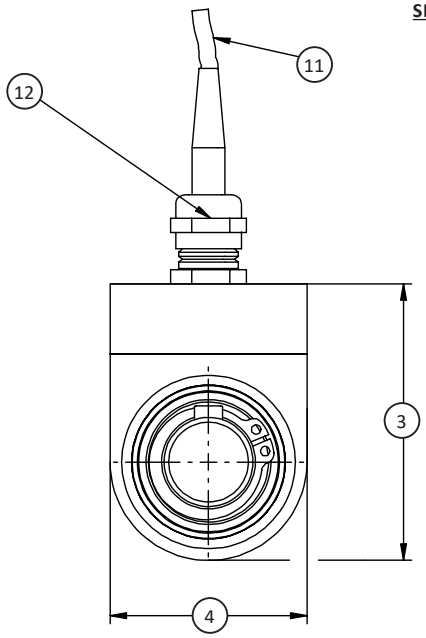
U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T18 ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FRONT VIEW



SIDE VIEW



DIMENSIONS

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	10, 15, 20, 50, 100	88.5, 132.8, 177, 442.5, 885
	mm	in
(1)	108.0	4.25
(2)	51.0	2.00
(3)	59.0	2.32
(4)	42.0	1.65
(5)	27.0	1.06
(6)	25.5	1.00
(7)	2.5	0.09
(8)	Ø19 g6	Ø0.7492/0.7497
(9)	M3 x 6	
(10)	Key DIN 6885 6 x 22	
(11)	Cable Length 2 m	Cable Length 6.5 ft
(12)	Threaded Cable Gland M12 x 1.5	

T22 PULLEY ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 20 to 5K Nm (177 to 44K lbf-in)
- ±5 VDC output
- Digital electronics
- 10 kHz sample rate
- Contactless
- 16-bit resolution

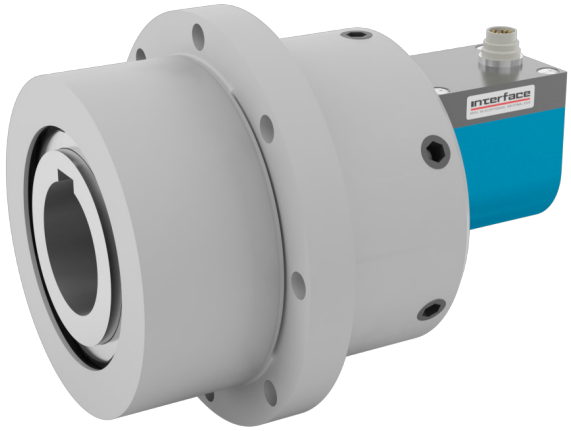
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %		±0.02
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.01
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	+0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		+5
Bandwidth – kHz – db		1 – 3
Calibration Signal – %RO		100
Supply Voltage – VDC		12 to 28
Supply Current – mA		60
Electrical Connection – pin		12
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity. (See table)
Housing Material		Aluminum

ELECTRICAL CONNECTION

8-PIN T12 ELECTRICAL CONNECTION		
PIN	**FUNCTION**	**DESCRIPTION**
1	NC	-
2	Option Angle B	5VDC TTL
3	Signal (+)	±5 VDC (±10VDC)
4	Signal (GND)	0 VDC
5	Supply (GND)	0 VDC
6	Supply (+)	12-28 VDC
7	Option Angle A	5VDC TTL
8	NC	-
9	NC	-
10	Cal. Control	L< 2.0 / H >; 3.5 V
11	NC	-
12	Shield	Transducer Housing

STANDARD CONFIGURATION



MODEL T22 (Shown)

OPTIONS

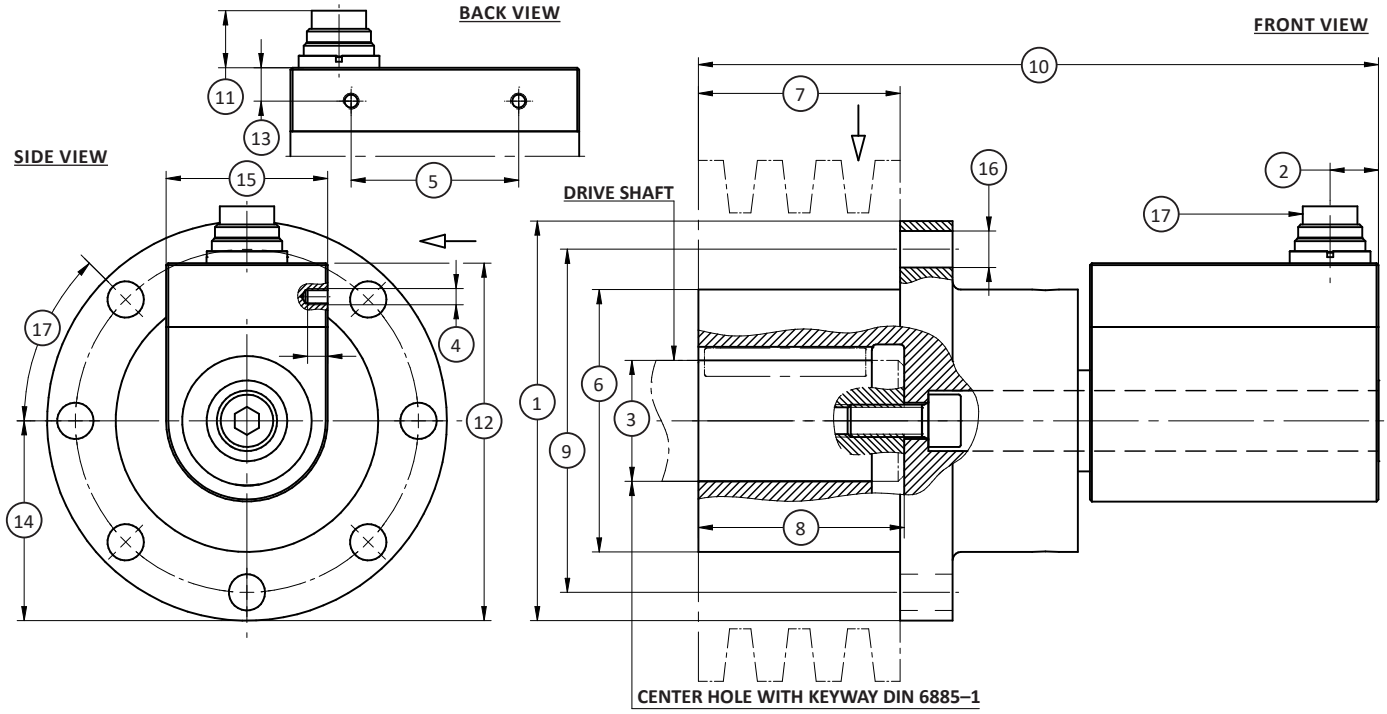
- Speed & angle measurement - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- Speed output - 60 pulse TTL, 1-track, available on capacities 2K Nm (17.7K lbf-in) & above
- ±10V torque output
- USB output & software

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX SHEAR FORCE	
Nm	lbf-in		NM/rad	Drive Side	Test Side	N	lbf
20	177	12,000	$1.3x10^{4}$	$1.6x10^{-4}$	$1.7x10^{-3}$	11K	2.47K
50	443	12,000	$2.6x10^{4}$	$1.6x10^{-4}$	$1.7x10^{-3}$	11K	2.47K
100	885	12,000	$5.3x10^{4}$	$1.6x10^{-4}$	$1.7x10^{-3}$	11K	2.47K
200	1.77K	12,000	$1.1x10^{5}$	$1.6x10^{-4}$	$1.7x10^{-3}$	11K	2.47K
500	4.43K	10,000	$3.1x10^{5}$	$2.4x10^{-3}$	$4.6x10^{-2}$	37K	8.32K
1K	8.85K	10,000	$6.7x10^{5}$	$2.4x10^{-3}$	$4.6x10^{-2}$	37K	8.32K
2K	17.7K	5,000	$9.4x10^{5}$	$1.8x10^{-2}$	$1.2x10^{-1}$	48K	10.8K
5K	44.3K	5,000	$2.5x10^{6}$	$1.8x10^{-2}$	$1.2x10^{-1}$	48K	10.8K

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T22 PULLEY ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	20, 50, 100, 200	177, 443, 885, 1.77K	500	4.43K	1K	8.85K	2K, 5K	17.7K, 44.3K
	mm	in	mm	in	mm	in	mm	in
(1)	Ø99	Ø3.90	Ø176	Ø6.93	Ø176	Ø6.93	Ø220	Ø8.66
(2)	12	0.47	15	0.59	15	0.59	15	0.59
(3)	Ø15 H7 - Ø30 H7	Ø(0.5913 / 0.5905) - Ø(1.1819 / 1.1811)	Ø40 H7 - Ø55H7	Ø(1.5758 / 1.5748) - Ø(2.1665 / 2.1653)	Ø50 H7 - Ø55 H7	Ø(1.9695 / 1.9685) - Ø(2.1665 / 2.1653)	Ø60 H7 - Ø85 H7	Ø(1.9695 / 1.9685) - Ø(3.3478 / 3.3464)
(4)	M4		M4		M4		M4	
(5)	41.5	1.63	29.5	1.16	29.5	1.16	29.5	1.16
(6)	Ø65g6	Ø2.56	Ø140g6	Ø5.51	Ø140g6	Ø5.51	Ø170g6	Ø6.69
(7)	$50^{+0.2}$	$1.97^{+0.008}$	$60^{+0.2}$	$2.36^{+0.008}$	$60^{+0.2}$	$2.36^{+0.008}$	$110^{+0.2}$	$4.43^{+0.008}$
(8)	51	2.01	80	3.15	80	3.15	130	5.12
(9)	$Ø85^{\pm0.2}$	$Ø3.35^{\pm0.008}$	$Ø158^{\pm0.2}$	$Ø6.22^{\pm0.008}$	$Ø158^{\pm0.2}$	$Ø6.22^{\pm0.008}$	$Ø195^{\pm0.2}$	$Ø7.68^{\pm0.008}$
(10)	168.5	6.63	227.5	8.96	227.5	8.96	287.5	11.32
(11)	14	0.6	14	0.6	14	0.6	14	0.6
(12)	88.5	3.48	135	5.31	135	5.31	157	6.18
(13)	$8.2^{+\pm0.1}$	$0.32^{\pm0.004}$	$8.2^{+\pm0.1}$	$0.32^{\pm0.004}$	$8.2^{+\pm0.1}$	$0.32^{\pm0.004}$	$8.2^{+\pm0.1}$	$0.32^{\pm0.004}$
(14)	49.5	1.95	88	3.43	88	3.43	110	4.33
(15)	40	1.57	58	2.28	58	2.28	58	2.28
(16)	Ø9	Ø0.35	Ø11	Ø0.43	Ø11	Ø0.43	Ø13	Ø0.51
(17)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	

T22 PULLEY ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX THRUST LOAD		MAX SHEAR FORCE	
Nm	lbf-in		NM / rad	Drive Side	Test Side	N	lbf	N	lbf
20	177	12,000	$1.3x10^{4}$	$1.6x10^{-4}$	$1.7x10^{-3}$	950	214	11K	2.47K
50	443	12,000	$2.6x10^{4}$	$1.6x10^{-4}$	$1.7x10^{-3}$	1.9K	427	11K	2.47K
100	885	12,000	$5.3x10^{4}$	$1.6x10^{-4}$	$1.7x10^{-3}$	4K	899	11K	2.47K
200	1.77K	12,000	$1.1x10^{5}$	$1.6x10^{-4}$	$1.7x10^{-3}$	7.4K	1.66K	11K	2.47K
500	4.43K	10,000	$3.1x10^{5}$	$2.4x10^{-3}$	$4.6x10^{-2}$	12.5K	2.81K	37K	8.32K
1K	8.85K	10,000	$6.7x10^{5}$	$2.4x10^{-3}$	$4.6x10^{-2}$	21K	4.72K	37K	8.32K
2K	17.7K	5,000	$9.4x10^{5}$	$1.8x10^{-2}$	$1.2x10^{-1}$	24K	5.40K	48K	10.8K
5K	44.3K	5,000	$2.5x10^{6}$	$1.8x10^{-2}$	$1.2x10^{-1}$	39K	8.77K	48K	10.8K

T23 LC ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 300 and 500 Nm (2.66K and 4.43K lbf-in)
- Stainless steel shaft
- +5 VDC output
- 12-28 VDC supply
- Contactless

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.25
Nonrepeatability – %		±0.05
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.04
Effect on Output – % / deg	°C	±0.02
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		1 – 3
Supply Voltage – VDC		+11 to +28
Supply Current – mA		< 90
Electrical Connection – Cable	m	1
	ft	3
MECHANICAL		
Safe Overload – %RO		180
Max Speed – rpm		3,500
Shaft Material		Stainless steel
Housing Material		Aluminum

STANDARD CONFIGURATION



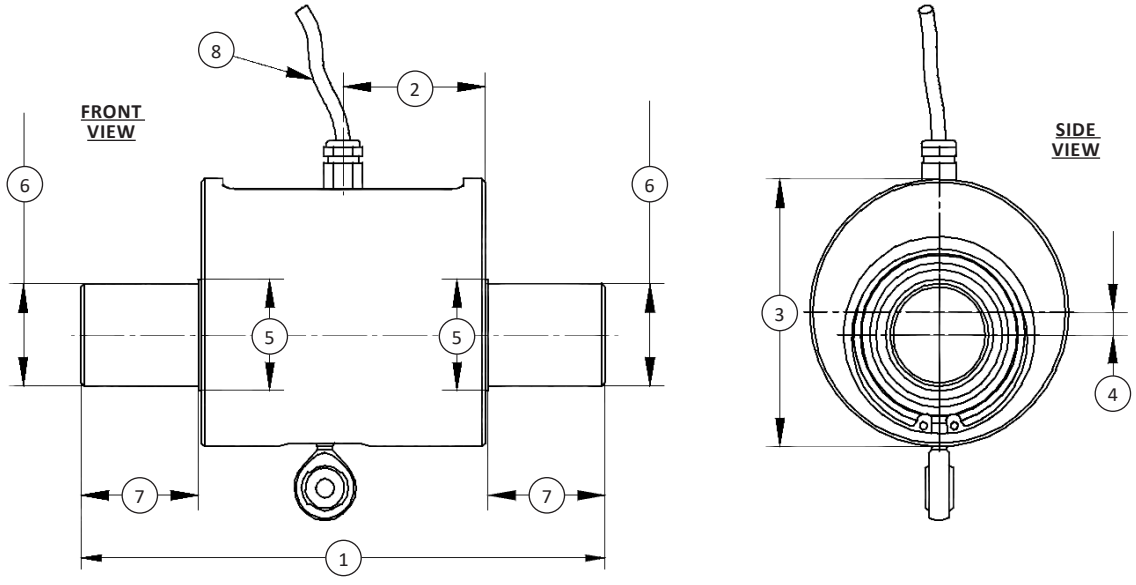
Model T23 (Shown)

OPTIONS

- Cable length
- Speed/angle

DIMENSIONS

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	300, 500	2.66K, 4.43K
	mm	in
(1)	170	6.7
(2)	46	1.8
(3)	Ø84	Ø3.3
(4)	7	0.3
(5)	Ø35	Ø1.4
(6)	Ø32g6	Ø(1.2595 / 1.2589)
(7)	38	1.5
(8)	Ø5	Ø0.2



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T25 HIGH SPEED ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

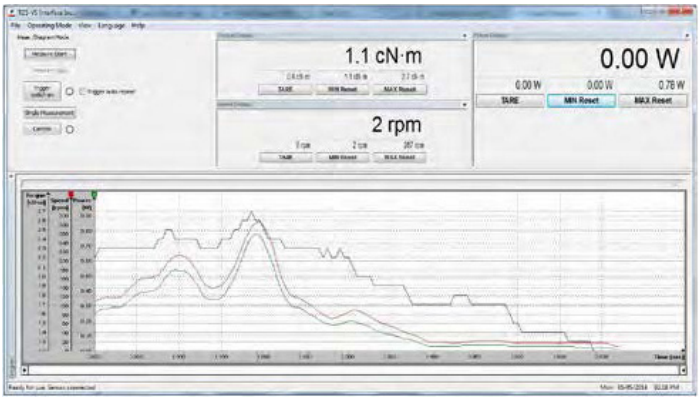
FEATURES & BENEFITS

- Capacities from 0.1 Nm to 5K Nm (0.885 to 44.3K lbf-in)
- 0.1% combined error
- Speed up to 30K RPM
- Unique design eliminates RPM dependent bearing friction effects
- Foot or float mount
- Remote activated on-shaft shunt calibration
- ±5VDC output
- 12-28 VDC supply
- Contactless data transmission
- Digital electronics
- 10 kHz sample rate
- 16-bit resolution

OPTIONS

- ±0.05% combined error
- Encoder for speed/angle measurement
- Keyed shaft per DIN 6885.1
- Right angle mating connector or cable assembly
- ±10 VDC output
- RS485 output
- USB output – includes encoder option and display graphing and logging software (replaces ±5V output)
- USB Option Available

SOFTWARE FOR USB OPTION



STANDARD CONFIGURATION



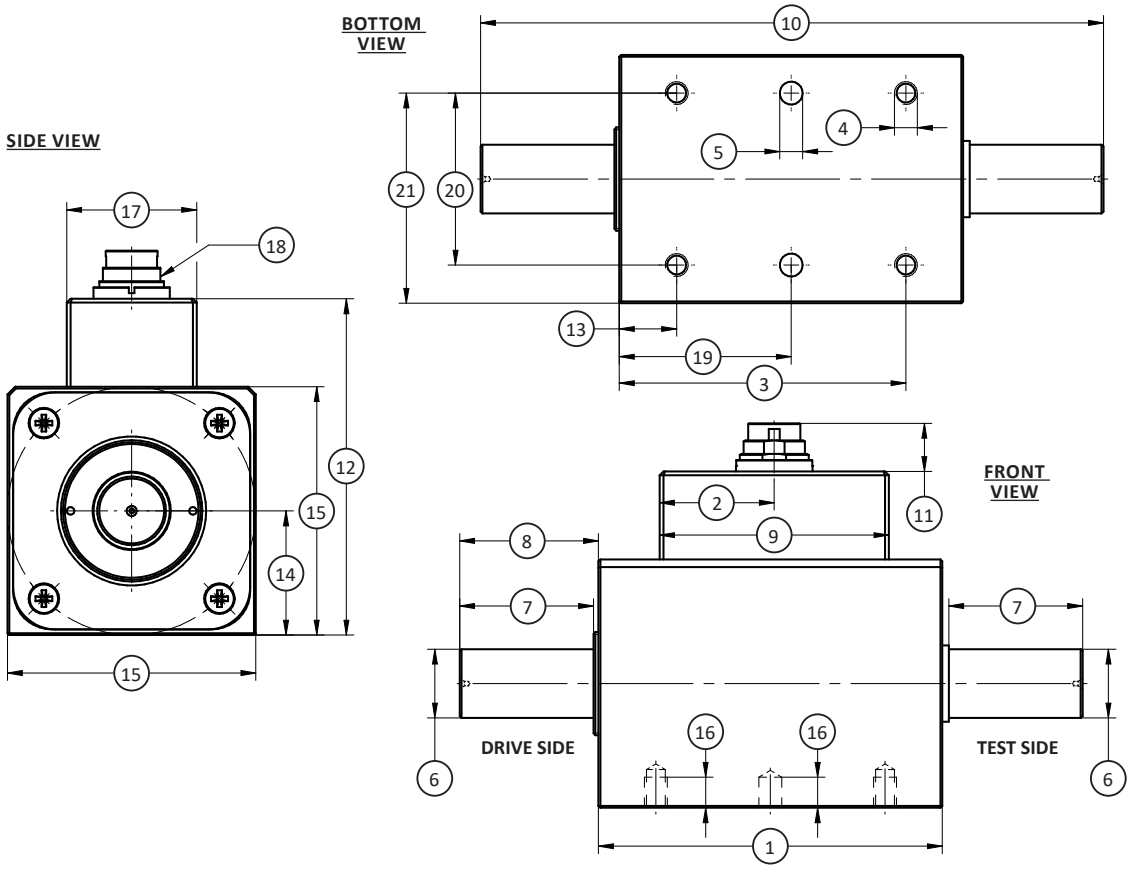
Model T25 (Shown)

SPECIFICATIONS

ACCURACY - (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %RO		±0.02
Resolution – bit		16
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
	°F	±0.01
Effect on Output – % / deg	°C	±0.01
	°F	±0.006
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
Storage Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Supply Voltage – VDC		+12 to +28
Supply Current – mA		≤60
Output – VDC		±5
Bandwidth – kHz – dB		1, 3
Sample Rate – kHz		10
Calibration Signal – %FS		100
Electrical Connection		12-pin binder series 581 (includes mate)
Encoder Option		360 pulse/rev, 2-track, +5V TTL, 90° offset, quadrature encoder
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity (see table)
Shaft Material		Alloy Steel
Housing Material		Aluminum
Level of Protection		IP 50

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

T25 HIGH SPEED ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

Parameters	NOMINAL TORQUE											
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5	0.885, 1.77, 4.43, 8.85, 17.7, 44.3	10	88.5	20, 30, 50, 100	177, 266, 443, 885	200, 500	1770, 4425	1K	8.85K	2K, 5K	17.7K, 44.3K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	71	2.8	71	2.8	90	3.5	120	4.7	120	4.7	144	5.7
(2)	30	1.2	30	1.2	30	1.2	30	1.2	30	1.2	30	1.2
(3)	59	2.3	59	2.3	75	3.0	10	0.4	10	0.4	119	4.7
(4)	M4		M4		M6		M8		M8		M12	
(5)	Ø4 H7	Ø(0.1580 / 0.1575)	Ø4 H7	Ø(0.1580 / 0.1575)	Ø6 H7	Ø(0.2367 / 0.2362)	Ø8 H7	Ø(0.3156 / 0.3150)	Ø8H7	Ø (0.3156 / 0.3150)	Ø12 H7	Ø(0.4731 / 0.4724)
(6)	Ø8 g6	Ø(0.3148 / 0.3144)	Ø10 g6	Ø(0.3935 / 0.3931)	Ø18 g6	Ø(0.7084 / 0.7080)	Ø32 g6	Ø(1.2595 / 1.2589)	Ø42 g6	Ø(1.6532 / 1.6526)	Ø70 g6	Ø(2.7555 / 2.7548)
(7)	16.5	0.65	16.5	0.65	35	1.4	55	2.2	55	2.2	110	4.3
(8)	19	0.7	19	0.7	35.5	1.40	56.5	2.22	56.5	2.22	114	4.5
(9)	60	2.4	60	2.4	60	2.4	60	2.4	60	2.4	60	2.4
(10)	110	4.3	110	4.3	163	6.4	234	9.2	234	9.2	372	14.6
(11)	13	0.5	13	0.5	13	0.5	13	0.5	13	0.5	13	0.5
(12)	63	2.5	63	2.5	88	3.5	118	4.6	118	4.6	163	6.4
(13)	12	0.5	12	0.5	15	0.6	20	0.8	20	0.8	25	1.0

T25 HIGH SPEED ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

DIMENSIONS (CONTINUED)

Parameters	NOMINAL TORQUE											
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5	0.89, 1.77, 4.43, 8.85, 17.7, 44.3	10	88.5	20, 30, 50, 100	177, 266, 443, 885	200, 500	1770, 4425	1K	8.85K	2K, 5K	17.7K, 44.3K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(14)	$20^{\pm0.05}$	$0.8^{\pm0.002}$	$20^{\pm0.05}$	$0.8^{\pm0.002}$	$32.5^{\pm0.05}$	$1.28^{\pm0.002}$	$47.5^{\pm0.05}$	$1.87^{\pm0.002}$	$47.5^{\pm0.05}$	$1.87^{\pm0.002}$	$70^{\pm0.05}$	$2.8^{\pm0.002}$
(15)	40	1.6	40	1.6	65	2.6	95	3.7	95	3.7	140	5.5
(16)	8	0.3	8	0.3	8	0.3	14	0.6	14	0.6	20	0.8
(17)	34	1.3	34	1.3	34	1.3	34	1.3	34	1.3	34	1.3
(18)	12-pin connector		12-pin connector		12-pin connector		12-pin connector		12-pin connector		12-pin connector	
(19)	$35.5^{\pm0.05}$	$1.40^{\pm0.002}$	$35.5^{\pm0.05}$	$1.40^{\pm0.002}$	$45^{\pm0.05}$	$1.8^{\pm0.002}$	$60^{\pm0.05}$	$2.4^{\pm0.002}$	$60^{\pm0.05}$	$2.4^{\pm0.002}$	$72^{\pm0.05}$	$2.8^{\pm0.002}$
(20)	30	1.2	30	1.2	45	1.8	70	2.8	70	2.8	100	3.9
(21)	35	1.4	35	1.4	55	2.3	82.5	3.25	82.5	3.25	120	4.7

PERFORMANCE PARAMETERS

CAPACITY		WEIGHT		MAX RPM	SPRING RATE	MOMENT OF INERTIA ($kg \cdot m^2$)		MAX THRUST LOAD**		MAX SHEAR FORCE**	
(Nm)	(lbf-in)	(kg)	lbs		(NM/rad)	Drive Side	Test Side	(N)	(lbf)	(N)	(lbf)
0.1	0.89	0.5	1.10	30,000	$1.8x10^{1}$	$9.2x10^{-6}$	$2.5x10^{-7}$	43	10.0	1.5	0.34
0.2	1.77	0.5	1.10	30,000	$1.8x10^{1}$	$9.2x10^{-6}$	$2.5x10^{-7}$	58	13.0	2	0.4
0.5	4.43	0.5	1.10	30,000	$9.4x10^{1}$	$9.2x10^{-6}$	$2.5x10^{-7}$	240	54.0	3	0.7
1	8.85	0.5	1.10	30,000	$9.4x10^{1}$	$9.2x10^{-6}$	$2.5x10^{-7}$	240	54.0	3	0.7
2	17.7	0.5	1.10	30,000	$3.7x10^{2}$	$9.2x10^{-6}$	$2.5x10^{-7}$	480	108	7	1.6
5	44.3	0.5	1.10	30,000	$7.7x10^{2}$	$9.2x10^{-6}$	$2.6x10^{-7}$	900	202	16.5	3.71
10	88.5	0.6	1.32	30,000	$8.8x10^{2}$	$9.3x10^{-6}$	$3.4x10^{-7}$	1.05K	236	21	4.7
20	177	1.6	3.53	20,000	$5.1x10^{3}$	$1.2x10^{-4}$	$6.8x10^{-6}$	2.3K	517	44	9.9
30	266	1.6	3.53	20,000	$5.1x10^{3}$	$1.2x10^{-4}$	$6.8x10^{-6}$	2.3K	517	44	9.9
50	443	1.6	3.53	20,000	$9.6x10^{3}$	$1.2x10^{-4}$	$7.4x10^{-6}$	5K	1.12K	142	31.9
100	885	1.6	3.53	20,000	$9.6x10^{3}$	$1.2x10^{-4}$	$7.4x10^{-6}$	5K	1.12K	142	31.9
200	1.77K	4.8	10.58	15,000	$8.9x10^{4}$	$5.4x10^{-4}$	$4.4x10^{-4}$	10K	2.25K	275	61.8
500	4.43K	4.8	10.58	15,000	$1.3x10^{5}$	$5.4x10^{-4}$	$4.4x10^{-4}$	13K	2.92K	400	89.9
1K	8.85K	5.6	12.35	15,000	$1.7x10^{5}$	$6.4x10^{-4}$	$5.3x10^{-4}$	20K	4.5K	920	207
2K	17.7K	19.0	41.89	12,000	$6.3x10^{5}$	$5.7x10^{-3}$	$5.1x10^{-3}$	34K	7.64K	1.25K	281
5K	44.3K	19.0	41.89	12,000	$9.6x10^{5}$	$5.8x10^{-3}$	$5.2x10^{-3}$	64K	14.4K	2.9K	652

T25 HIGH SPEED ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

ELECTRICAL CONNECTION

Pin	12-PIN ELECTRICAL CONNECTION		12-Pin RS485 Option	
	Function	Description	Function	Description
A	NC	-	NC	-
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC (±10 VDC)	NC	-
D	Signal (GND)	0 VDC	NC	-
E	Supply (GND)	0 VDC, TTL	Supply (GND)	0 VDC
F	Supply (+)	12-28 V	Supply (+)	12-28 VDC
G	Option Anfle A	TTL	Option Angle A	TTL
H	NC	-	NC	-
J	NC	-	RS485 Option	RS485 (B)
K	Cal, Control	L <2.0 V/H> 3.5 V	NC	-
L	NC	-	RS485 Option	RS485 (A)
M	Housing	-	Housing	-

*** Allowable without significant effect on measurement and applies to unsupported shaft only*

T31, T32, T33, & T34 SPINDLE TORQUE TRANSDUCER (U.S. & METRIC)

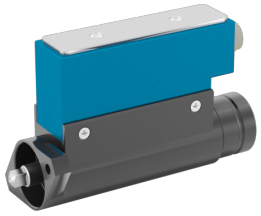
FEATURES & BENEFITS

- Capacities From 1 - 500 Nm (8.85 - 4.43K lbf-in)
- ±5V output (10V option)
- Speeds up to 2000 rpm
- Integrated speed/angle measurement
- Very short axial length
- High torsional stiffness
- Reliable and durable
- Simplifies installation

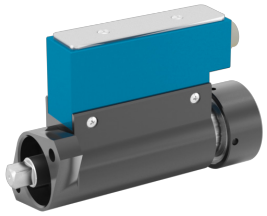
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.3
Nonrepeatability – %RO		±0.05
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.05
Effect on Output – % / deg	°C	±0.02
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Supply Voltage – VDC		12 - 28
Supply Current – mA		90
Output – VDC		±5
Sample Rate – kHz		10
Bandwidth – kHz – dB		1 – 3
Resolution – bit		12
Calibration Signal – %FS		100
Electrical Connection		12-pin binder
Encoder		360/rev, 2-track, +5V TTL, 90° offset, quadrature
MECHANICAL		
Safe Overload – %RO		150
Maximum RPM		2000
Protection Class		IP50
Material		Alloy steel

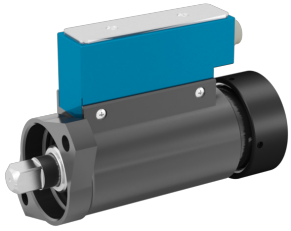
STANDARD CONFIGURATION



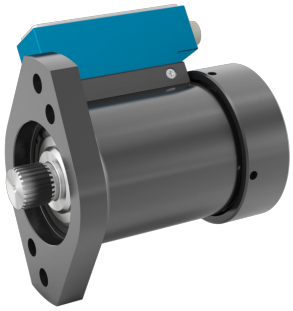
Model T31 (Shown)



Model T32 (Shown)



Model T33 (Shown)



Model T34 (Shown)

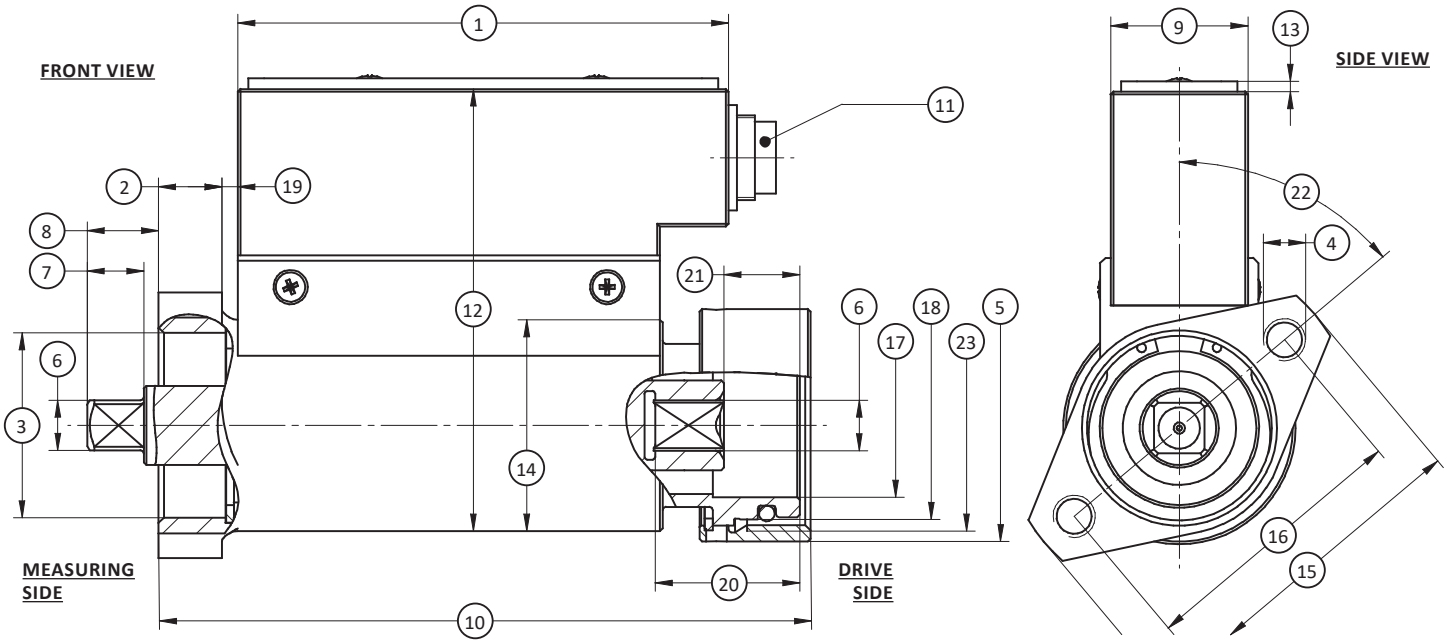
ELECTRICAL CONNECTION

Pin	12-PIN ELECTRICAL CONNECTION	
	Function	Description
A	NC	–
B	Option Angle B	5VDC TTL
C	Signal (+)	±5VDC (±10VDC)
D	Signal (GND)	0V
E	Supply (GND)	0V
F	Supply (+)	12-28 VDC
G	Option Angle A	5VDC TTL
H	NC	–
J	NC	–
K	Control Signal	L < 2.0V / H > 3.5VDC
L	NC	–
M	Shield	–

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

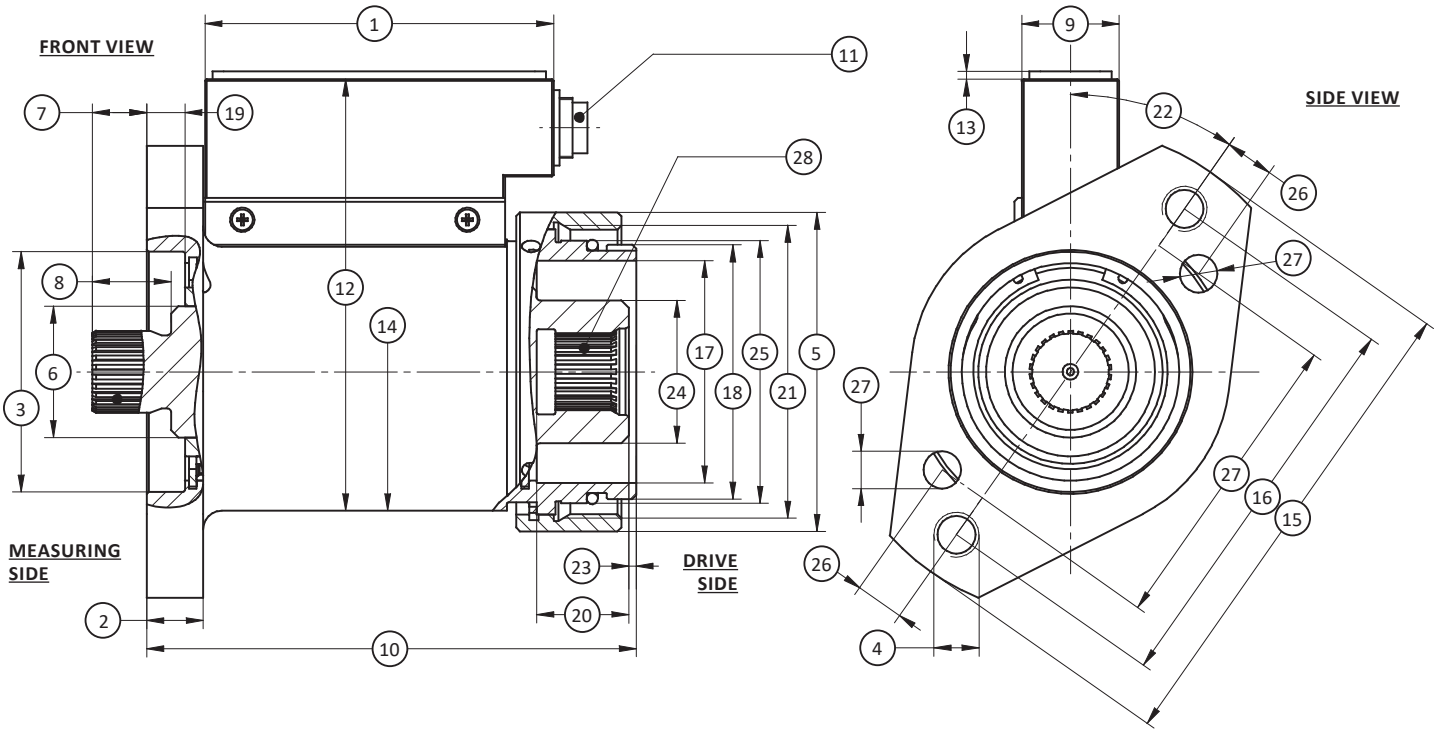
T31, T32, T33, & T34 SPINDLE TORQUE TRANSDUCER (U.S. & METRIC)

T31, T32, T33 DIMENSIONS



See Drawing	T31		T32		T33	
	CAPACITIES					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1, 3, 6, 12	8.85, 26.6, 53.1, 106	4, 6, 12, 35, 60, 80	35.4, 53.1, 106, 310, 531, 708	60, 90, 95, 160, 200, 240	531, 797, 841, 1.42K, 1.77K, 2.12K
	mm	in	mm	in	mm	in
(1)	93	3.7	93	3.7	93	3.7
(2)	8	0.3	12	0.5	12	0.5
(3)	Ø30 H8	Ø(1.1824 / 1.1811)	Ø35 H8	Ø(1.3795 / 1.3779)	Ø50 H10	Ø(1.9724 / 1.9685)
(4)	M6		M8		M10	
(5)	–	–	Ø44	Ø1.7	Ø58	Ø2.3
(6)	□1/4"		□3/8"		□1/2"	
(7)	7.3	0.29	10.7	0.42	15.5	0.61
(8)	10	0.4	13.5	0.53	19.5	0.77
(9)	26	1.02	26	1.02	26	1.02
(10)	117	4.6	123.5	4.86	135.4	5.33
(11)	Connector 12-pin		Connector 12-pin		Connector 12-pin	
(12)	77.5	3.05	83.5	3.29	96.5	3.80
(13)	2	0.1	2	0.1	2	0.1
(14)	Ø33 h11	Ø(1.2992 / 1.2929)	Ø40 h11	Ø(1.5748 / 1.5685)	Ø54 h11	Ø(2.1260 / 2.1185)
(15)	Ø56	Ø2.2	Ø67	Ø2.64	Ø88	Ø3.5
(16)	$44^{\pm 0.1}$	$1.7^{\pm 0.004}$	$52^{\pm 0.1}$	$2.05.^{\pm 0.004}$	$72^{\pm 0.1}$	$2.8^{\pm 0.004}$
(17)	Ø26.1 H11	Ø(1.0327 / 1.0276)	Ø27.2 H8	Ø(1.0722 / 1.0709)	Ø40 H8	Ø(1.5763 / 1.5748)
(18)	–	–	Ø35.6 g6	Ø(1.4012 / 1.4006)	–	–
(19)	3	0.1	3	0.1	4	0.2
(20)	25	1.0	28.4	1.12	34.2	1.35
(21)	15	0.6	14.4	0.57	34.2	1.35
(22)	60°		50°		45°	
(23)	M30x1 LH		M40x1		M54x1	

T31, T32, T33, & T34 SPINDLE TORQUE TRANSDUCER (U.S. & METRIC)



T34 DIMENSIONS

See Drawing	T34	
	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	150, 250, 500	1.33K, 2.21K, 4.43K
	mm	in
(1)	93	3.7
(2)	15	0.6
(3)	Ø64 H7	Ø2.5209 / 2.5197
(4)	M12	
(5)	Ø85	Ø3.3
(6)	Ø35	Ø1.4
(7)	14.5	0.59
(8)	21	0.8
(9)	26	1.02
(10)	130.5	5.14
(11)	Connector 12-pin	
(12)	115	4.5
(13)	2	0.1
(14)	Ø74	Ø2.9
(15)	$Ø130^{-2}$	$Ø5.1^{-0.08}$
(16)	$106^{\pm 0.1}$	$4.2^{\pm 0.004}$
(17)	Ø59.2	Ø2.33
(18)	Ø67.8	Ø2.67
(19)	10.2	0.40
(20)	24.5	1.0

T31, T32, T33, & T34 SPINDLE TORQUE TRANSDUCER (U.S. & METRIC)

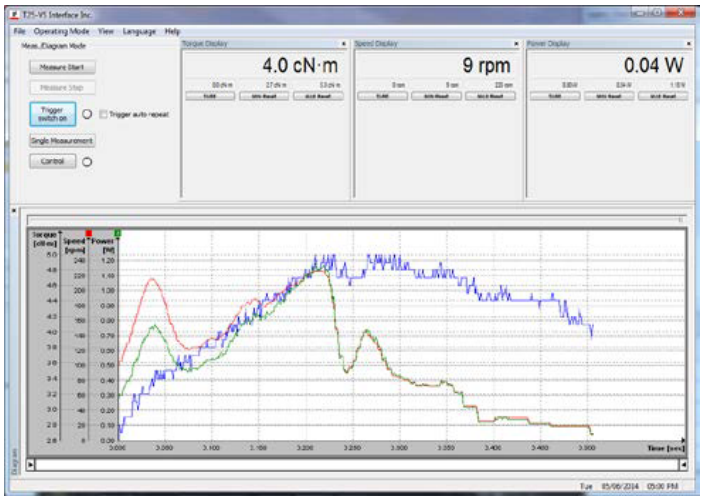
T34 DIMENSIONS (CONTINUED)

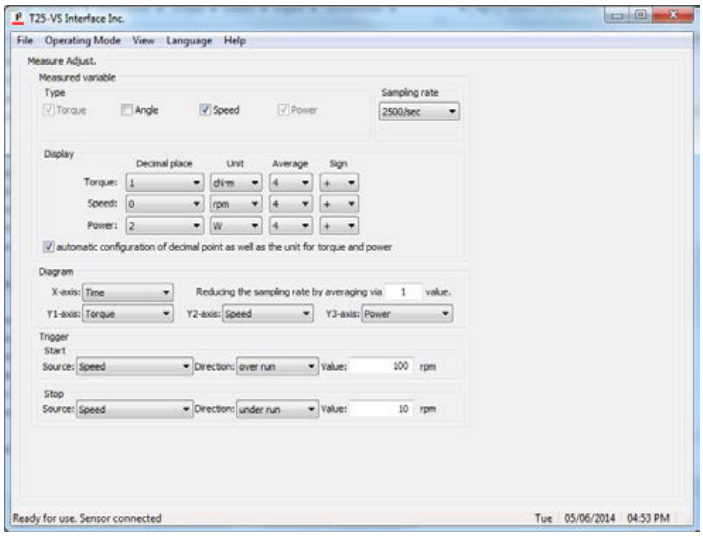
See Drawing	T34	
	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	150, 250, 500	1.33K, 2.21K, 4.43K
	mm	in
(21)	M79x1.5	
(22)	35°	
(23)	1.9	0.07
(24)	Ø38	Ø1.5
(25)	Ø70 g6	Ø2.7556 / 2.7548
(26)	$13^{\pm 0.03}$	$0.5^{\pm 0.001}$
(27)	Ø10 D8	Ø(0.3961 / 0.3953)
(28)	DIN 5480	

USB OUTPUT OPTION AVAILABLE ON T12, T15, T25 ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

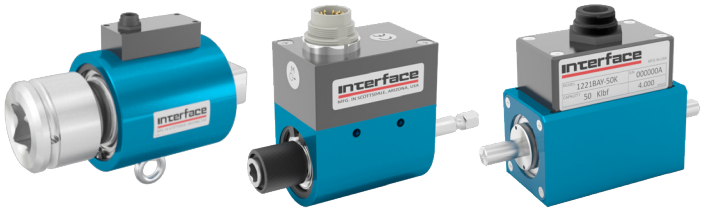
- Torque, speed & power OR torque = angle
- Display, graph & log
- Up to 2500 measurments/second
- 16-bit resolution
- Peak & valley
- Unit conversion
- Triggered start & stop for automatic event capture
- Automatic scaling of Y-Axis
- Log files are in Excel compatible .csv format
- Supply over USB – no separate power cord
- Configuration & calibration stored in sensor
- Includes software & USB cable





SPECIFICATIONS

USB SPECIFICATIONS	
Output signal – torque	±25,000
Output signal – speed/angle	±32,511
Speed resolution – rpm	1
Angle resolution – degree	0.25
Speed accuracy – %FS	±1
ELECTRICAL	
Sampel rate – samples/sec	2500
Supply voltage – VDC	4 - 6 from USB
Supply current – mA	≤ 250
Calibration signal – %FS	100 (software activated)
Electrical connection	PX0446 IP68 Mini B USB – includes 3m (9.8 ft)



T12 SQUARE DRIVE* T15 HEX DRIVE* T25*

For more information, see datasheet for this product.

Notes:

Notes:

Multi-Axis Sensors

2-Axis/Axial Torsion 275

3-Axis 295

3-Axis (Round) 309

6-Axis (Low Capacity) 315

6-Axis (High Capacity).....327

6-Axis (DIN Flange) 330

1216 AXIAL TORSION LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Measures load and torque
- Minimal crosstalk
- Extraneous load resistance
- Fatigue rated

SPECIFICATIONS

		Axial Bridge A	Torsion Bridge B
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		±0.04	±0.07
Hysteresis – %FS		±0.04	±0.05
Nonrepeatability – %RO		±0.02	±0.05
Creep, in 20 min – %		±0.025	±0.025
TEMPERATURE			
Effect on Zero – %RO / deg	°F	±0.08	±0.08
Effect on Output – % / deg	°F	±0.08	±0.08
Compensated Range	°F	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90
ELECTRICAL			
Rated Output – mV/V (Nominal)		1.50	1.80
Zero Balance – %RO		±2.0	±2.0
Input Resistance – Ohms		700 ±7	700 ±7
Output Resistance – Ohms		700 ±7	700 ±7
Excitation Voltage – VDC MAX		20	20
MECHANICAL			
Calibration		T & C	CW & CCW
Safe Overload – %CAP		±200	±200
Ultimate Overload – %CAP		±400	±400
Material		Aluminum	

STANDARD CONFIGURATION



Model 1216CEW-2K (Shown)

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Special temperature range

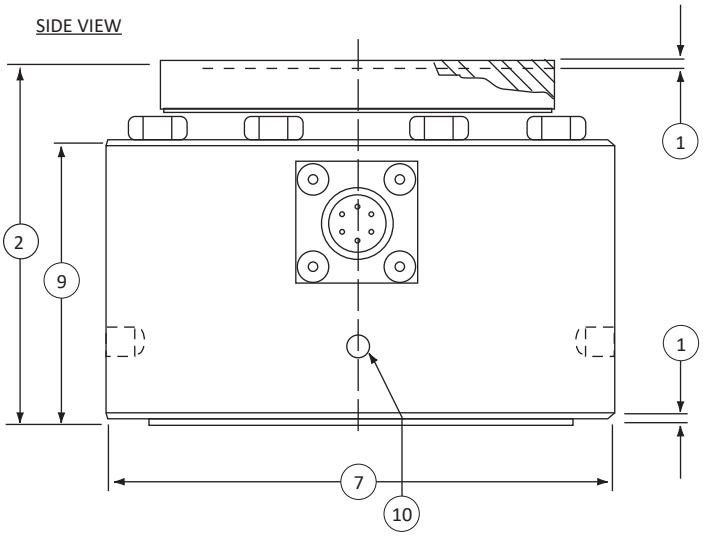
ACCESSORIES

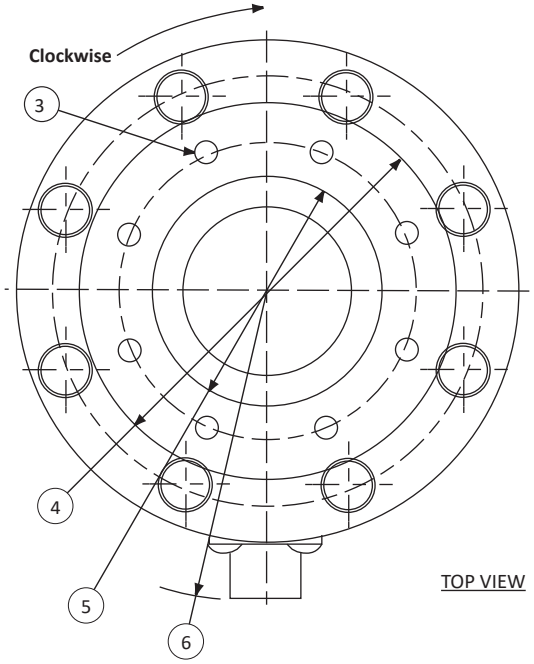
- Mating connector
- Instrumentation

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1216 AXIAL TORSION LOAD CELL (U.S. & METRIC)

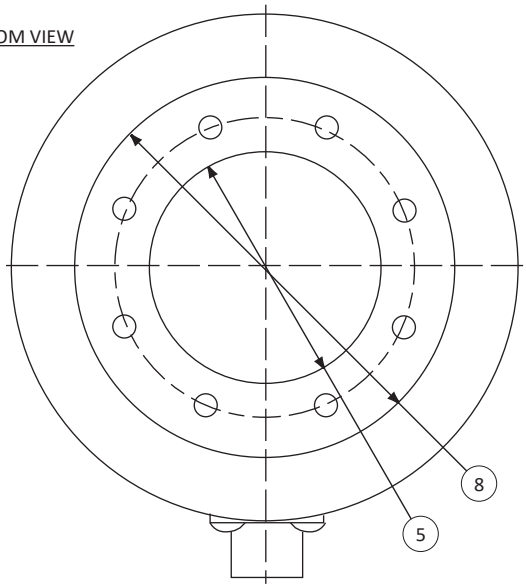
SIDE VIEW





TOP VIEW

BOTTOM VIEW



DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf/lbf-in)	Metric (kN/Nm)
	250/125, 500/250, 1K/500, 2K/1K	1.11/14.1, 2.22/28.2, 4.45/56.5, 8.9/113
	in	mm
(1)	0.070	1.78
(2)	3.00	76.2
(3)	(¼-28) UNF x ↧ 0.43 on a 2.600 B.C.	M6 x 1-6H x ↧ 10.9 on a 66.00 B.C.
(4)	Ø3.20	Ø81.3
(5)	Ø2.000 (+0.002 / -0.000)	Ø50.00 (+0.51/-0.00)
(6)	2.77	70.3
(7)	Ø4.13	Ø104.3
(8)	Ø3.2	Ø81.3
(9)	2.33	59.2
(10)	Ø0.25 ↧ 0.29	Ø6.4 ↧ 7.4

1516 AXIAL TORSION LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacity: Axial lbf (kN) / Torsion lbf-in (Nm) – 100(0.44) / 50(5.6)
- Axial force torque
- Minimal crosstalk
- Fatigue rated

SPECIFICATIONS

		Axial Bridge A	Torsion Bridge B
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		±0.04	±0.05
Hysteresis – %FS		±0.04	±0.05
Nonrepeatability – %RO		±0.02	±0.05
Creep, in 20 min – %		±0.025	±0.025
TEMPERATURE			
Effect on Zero – %RO / deg	°F	±0.15	±0.15
Effect on Output – % / deg	°F	±0.08	±0.08
Compensated Range	°F	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90
ELECTRICAL			
Rated Output – mV/V (T & C)		±1.50 ±0.15	±1.50 ±0.15
Zero Balance – %RO MAX		±2.0	±2.0
Input Resistance – Ohms		700 ±7	700 ±7
Output Resistance – Ohms		700 ±7	700 ±7
Excitation Voltage – VDC MAX		20	20
MECHANICAL			
Calibration		T & C	CW & CCW
Safe Overload – %CAP		±200	±200
Ultimate Overload – %CAP		±400	±400
Material		Alluminum	

STANDARD CONFIGURATION



Model 1516DXB-100 (Shown)

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Special temperature range

ACCESSORIES

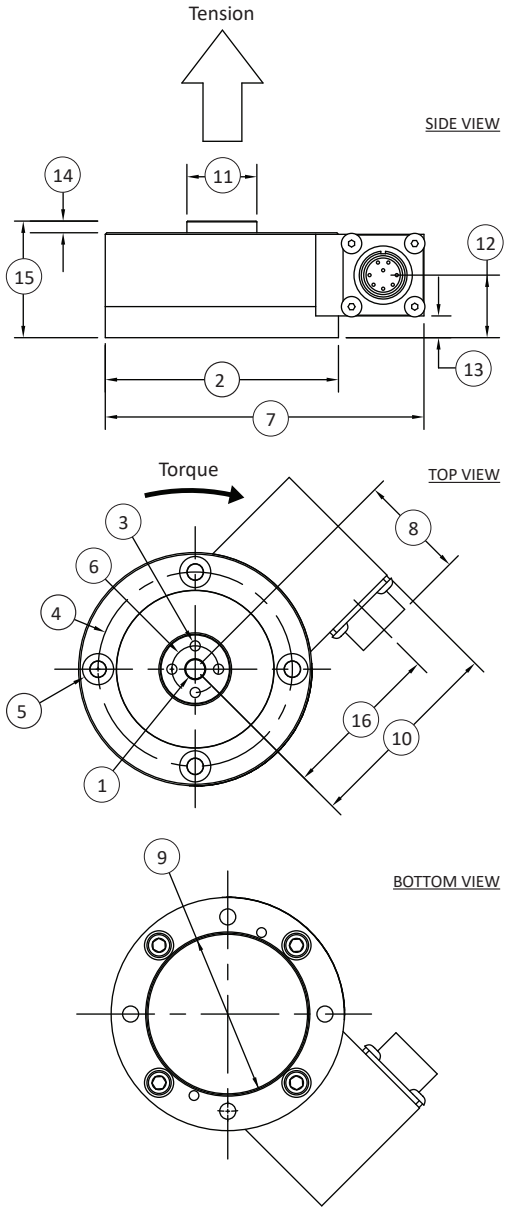
- Mating connector
- Instrumentation
- Loading hardware

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

1516 AXIAL TORSION LOAD CELL (U.S. & METRIC)

DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf/lbf-in)	Metric (kN/Nm)
	100 / 50	0.44 / 5.6
	in	mm
(1)	Ø 0.250 (±0.0005), ↧ 0.15	Ø 6.35 (±0.013), ↧ 76.2
(2)	Ø 3.00	Ø 76.2
(3)	M4x0.7-6H, ↧ 0.31	
(4)	Ø 2.500	Ø 63.5
(5)	⌴ for an M5 4 hole EQ SP oriented as shown	
(6)	Ø 0.600	Ø 15.24
(7)	Ø 4.10	Ø 76.2
(8)	1.36	34.5
(9)	Ø 2.082 (+0.005/-0.000), ↧ 0.10	Ø 52.88 (+0.03/-0.00), ↧ 2.5
(10)	2.60	66.0
(11)	Ø 0.90	Ø 22.9
(12)	0.81	20.6
(13)	0.28	7.1
(14)	0.15	3.81
(15)	1.50	38.1
(16)	2.08	52.8



FORCE MEASUREMENT SOLUTIONS

2816 AXIAL TORSION LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Measures load and torque simultaneously
- Extraneous load resistance
- Minimal crosstalk
- Fatigue rated

SPECIFICATIONS

		Axial Bridge A	Torsion Bridge B
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		±0.05	±0.07
Hysteresis – %FS		±0.05	±0.05
Nonrepeatability – %RO		±0.02	±0.05
Creep, in 20 min – %		±0.025	±0.025
TEMPERATURE			
Effect on Zero – %RO / deg	°F	±0.0015	±0.0015
	°C	±0.0027	±0.0027
Effect on Output – % / deg	°F	±0.0008	±0.0008
	°C	±0.0015	±0.0015
Compensated Range	°F	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90
ELECTRICAL			
Rated Output – mV/V (T & C)		+2.0 ±0.3 / -2.0 ±0.3	
Zero Balance – %RO MAX		±2.0	±2.0
Input Resistance – Ohms		350 ±3.5	700 ±7
Output Resistance – Ohms		350 ±3.5	700 ±7
Excitation Voltage – VDC MAX		20	20
MECHANICAL			
Calibration		T & C	CW & CCW
Safe Overload – %CAP MAX		±200	±200
Ultimate Overload – %CAP MAX		±400	±400
Material		Alloy steel	

STANDARD CONFIGURATION



MODEL 2816DYM-10K (Shown)

OPTIONS

- Base (recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Custom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

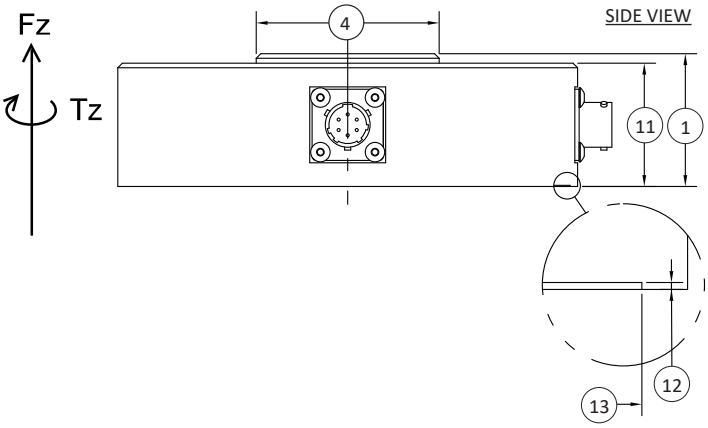
- Mating connector
- Instrumentation
- Loading hardware

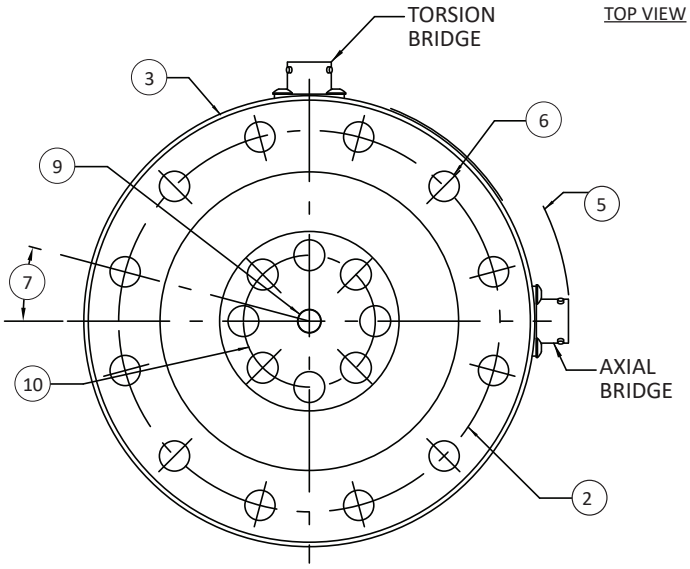
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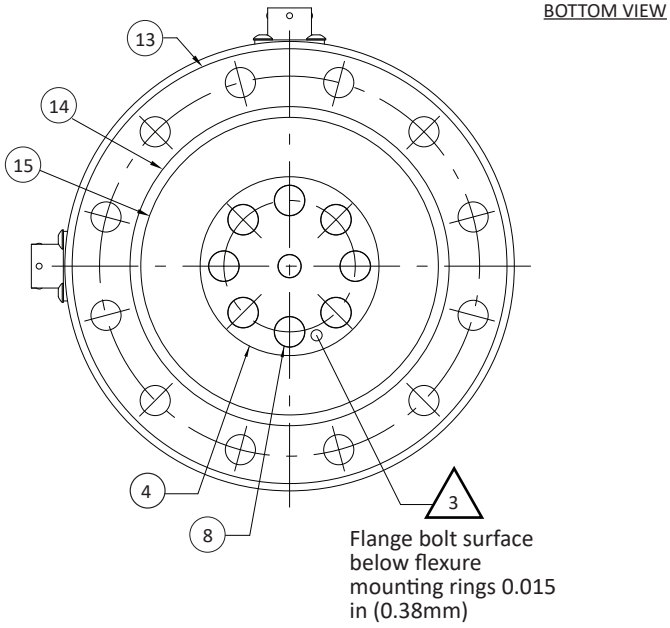
2816 AXIAL TORSION LOAD CELL (U.S. & METRIC)

DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf/lbf-in)	Metric (N/Nm)
	3.3K/2K, 5K/3K 10K/6K, 15K/7.5K	16K/220, 25K/340 45K/680, 63K/900
	in	mm
1	1.75	44.4
2	5.120	130.18
3	6.06	153.9
4	2.41	61.2
5	3.55	90.2
6	0.41	10.3
7	15°	
8	Ø0.41 THRU, ⌵ 90°, Ø0.46	Ø10.5 THRU, ⌵ 90°, Ø11.7
9	Ø0.31 THRU, ⌴ Ø0.3155–3166, ↧ 0.39 – This side only	Ø7.8 THRU, ⌴ Ø8.014–8.042, ↧ 10.0 – This side only
10	1.772	45.00
11	1.62	41.3
12	0.015	0.38
13	Ø5.86	Ø148.8
14	Ø4.30	Ø109.2
15	Ø4.01	Ø101.9



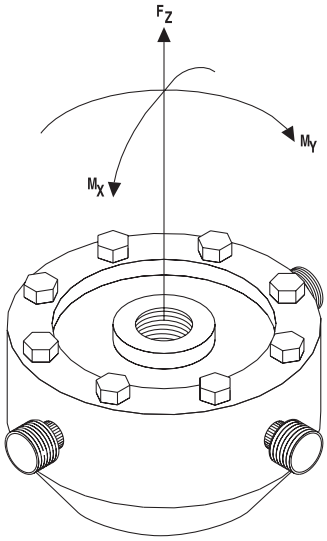




5200 MULTI-AXIS LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Simultaneously measures thrust and moment perpendicular to the thrust axis
- Thrust axis functions to the same specifications as a Model 1200
- Thrust stiffness and moment stiffness are both very high because of the low profile construction



PERFORMANCE PARAMETERS

Model 5200	RATED THRUST		RATED MOMENT	
	U.S. (lbf)	Metric (kN)	U.S. (lbf-in)	Metric (Nm)
5210XYZ-1K	1K	4.45	400	45.2
5210XYZ-2K	2K	8.9	800	90.4
5210XYZ-5K	5K	22.2	1K	113
5210XYZ-10K	10K	44.5	2K	226
5220XYZ-25K	25K	111	10K	1.13K
5220XYZ-50K	50K	222	20K	2.26K

STANDARD CONFIGURATION



Model 5200 (shown)

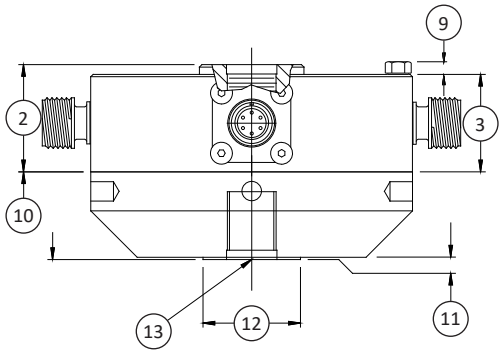
SPECIFICATIONS

Static Error Band – Thrust	1K-10K	±0.04
	25K & 50K	±0.05
Deflection – Thrust – FS	in	0.001 to 0.002
	mm	0.03 to 0.05
Calibration – Thrust		Same as 1200 Series Universal
Deflection – Moment – FS / sec		From 20 (depending on range)
Output - Moment – mV/V		Approx. ½ of rated thrust output
Cross-Talk - Moment – %		1 or less
Calibration Uncertainty – Moment – %		±1

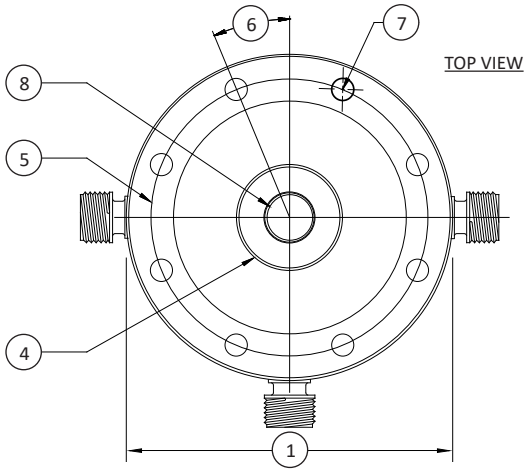
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

5200 MULTI-AXIS LOAD CELL (U.S. & METRIC)

SIDE VIEW



TOP VIEW



DIMENSIONS

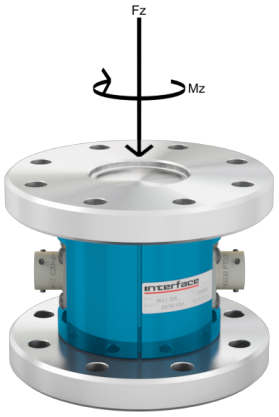
See Drawing	MODEL			
	5210		5220	
	CAPACITY			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 5K, 10K,	1.5, 2.5, 5, 10, 25, 50	25K, 50K	100, 250
	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9
(2)	1.38	34.9	1.75	44.5
(3)	1.25	31.7	1.63	41.4
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3
(6)	22.5°	22.5°	15.0°	15.0°
(7)	Ø0.28	Ø7.1	Ø0.41	Ø10.4
	8 places		12 places	
(8)	⅝-18 UNF-3B ↧ 1.12	M16 x 2-4H ↧ 28.4	1 ¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6
(9)	0.20	5.10	0.30	7.60
(10)	1.13	28.6	1.75	44.5
(11)	0.03	0.8	0.03	0.8
(12)	Ø1.25	Ø31.8	Ø2.25	Ø57.2
(13)	⅝-18 UNF-3B ↧ 0.87	M16 x 2-4H ↧ 22.1	1 ¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6

5600 AXIAL TORSION FORCE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities: Force lbf(kN) / Torque lbf-in(Nm) – from 6K(26.7)/5K(565) to 180K(801)/300K(33.9K)
- Measures compressive force and torque
- Low cross talk
- High stiffness
- Extraneous load resistance

STANDARD CONFIGURATION



Model 5611-20K (Shown)

WIRING DIAGRAM

TORSION

CONNECTOR PINOUT	
PIN	FUNCTION
A	+ EXCITATION
B	+ SIGNAL
C	- SIGNAL
D	- EXCITATION
E	N / C

CW UPSCALE

CONNECTOR PINOUT	
PIN	FUNCTION
A	+ EXCITATION
B	+ SIGNAL
C	- SIGNAL
D	- EXCITATION
E	N / C

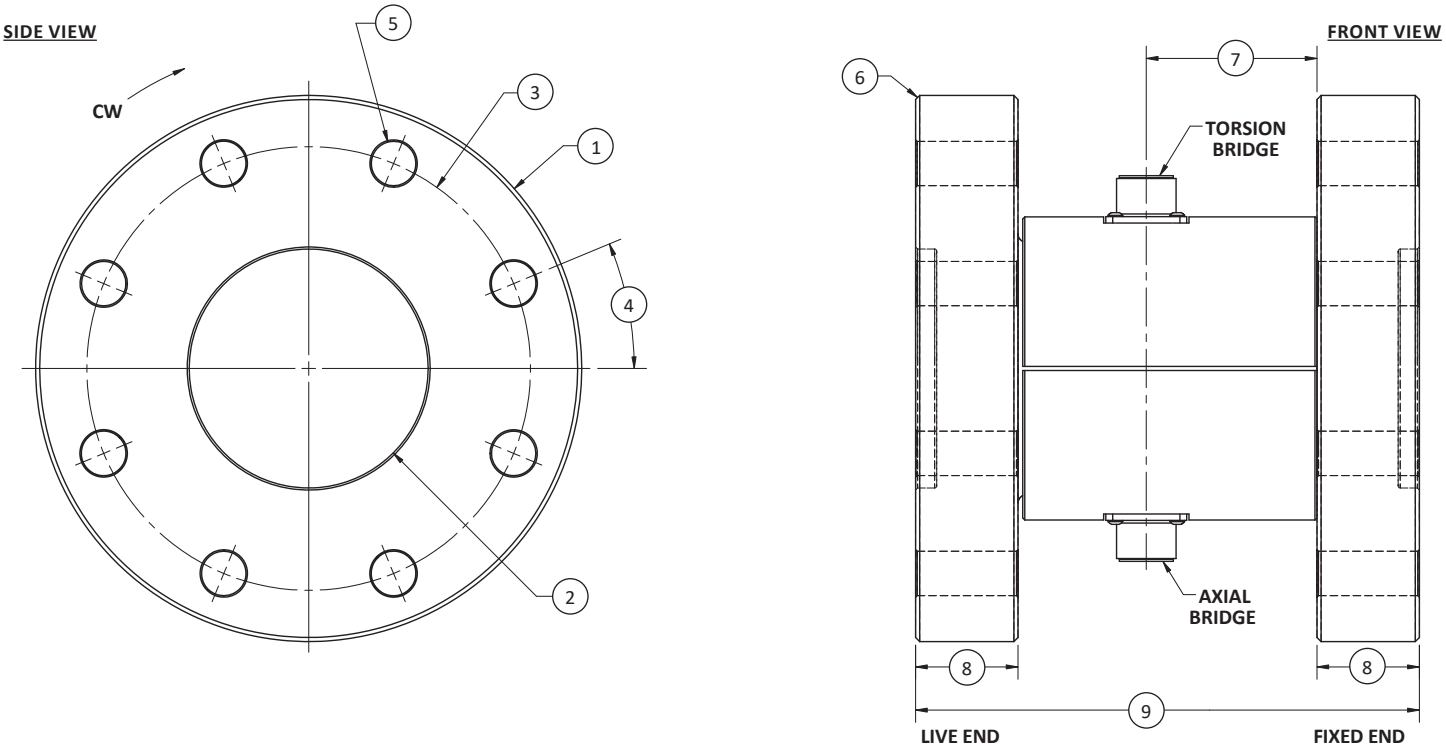
AXIAL

TENSION UPSCALE

SPECIFICATIONS

PARAMETERS			MODEL				
			5610-5K	5611 - 20K	5612 - 100K	5613 - 200K	5614 - 300K
			CAPACITY				
Measuring Range	Mz	lbf-in	5K	20K	100K	200K	300K
		Nm	560	2.2K	11K	22K	33K
	Fz (Compression)	lbf	6K	30K	100K	150K	180K
		kN	27	130	450	670	800
ACCURACY							
Nonlinearity – %FS			±0.1	±0.1	±0.1	±0.1	±0.1
Hysteresis – %FS			±0.1	±0.1	±0.1	±0.1	±0.1
Nonrepeatability – %RO			±0.02	±0.02	±0.02	±0.02	±0.02
TEMPERATURE							
Effect on Zero – %RO / deg	°C	Fz	±0.007	±0.007	±0.007	±0.007	±0.007
		Mz	±0.004	±0.004	±0.004	±0.004	±0.004
	°F	Fz	±0.004	±0.004	±0.004	±0.004	±0.004
		Mz	±0.002	±0.002	±0.002	±0.002	±0.002
Effect of Output – % / deg		°C	±0.004	±0.004	±0.004	±0.004	±0.004
		°F	±0.002	±0.002	±0.002	±0.002	±0.002
Compensated Range		°C	+21 to +77	+21 to +77	+21 to +77	+21 to +77	+21 to +77
		°F	+70 to +170	+70 to +170	+70 to +170	+70 to +170	+70 to +170
Operating Range		°C	-54 to +93	-54 to +93	-54 to +93	-54 to +93	-54 to +93
		°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
ELECTRICAL							
Rated Output – mV/V (Nominal)		Fz	0.25	0.5	0.5	0.5	0.5
		Mz	2	2	2	2	2
Excitation Voltage – VDC MAX			20	20	20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350	350	350
Electrical Connection			MS3102E-14S-5P	MS3102E-14S-5P	MS3102E-14S-5P	MS3102E-14S-5P	MS3102E-14S-5P
MECHANICAL							
Safe Overload – % CAP			±150	±150	±150	±150	±150
Deflection at Capacity – (in/rad)		Fz	0.001	0.001	0.002	0.002	0.002
		Mz	0.005	0.004	0.005	0.006	0.005
Overhung Moment – lbf-in MAX			2	10	50	90	200
Side load – lbf MAX			2K	7K	20K	30K	55K

5600 AXIAL TORSION FORCE TRANSDUCER (U.S. & METRIC)



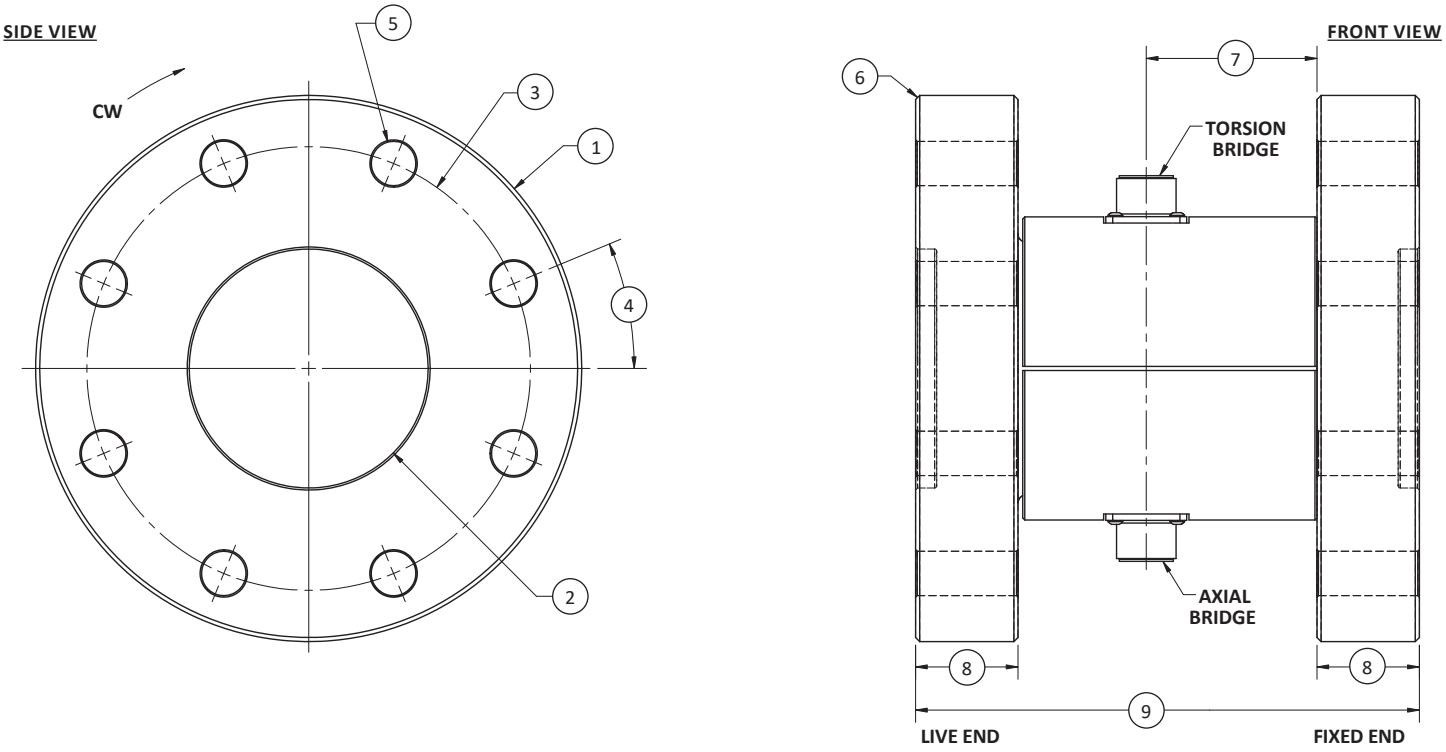
DIMENSIONS

See Drawing	MODEL									
	5610		5611		5612		5613		5614	
	CAPACITY									
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	5K	550	20K	2.2K	100K	11K	200K	22K	300K	33K
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	Ø4.0	Ø101.6	Ø5.0	Ø127.0	Ø8.0	Ø203.2	Ø9.75	Ø247.7	Ø14.0	Ø355.6
(2)	Ø1.500 +0.002 -0.000 ↧ 0.13 BOTH ENDS	Ø38.10 +0.002 -0.000 ↧ 3.3 BOTH ENDS	Ø2.000 +0.002 -0.000 ↧ 0.25 BOTH ENDS	Ø50.80 +0.05 -0.00 ↧ 6.4 BOTH ENDS	Ø3.500 +0.002 -0.000 ↧ 0.31 BOTH ENDS	Ø88.90 +0.05 -0.00 ↧ 7.9 BOTH ENDS	Ø4.000 +0.002 -0.000 ↧ 0.31 BOTH ENDS	Ø101.60 +0.05 -0.00 ↧ 7.9 BOTH ENDS	Ø6.000 +0.002 -0.000 ↧ 0.31 BOTH ENDS	Ø152.40 +0.05 -0.00 ↧ 7.9 BOTH ENDS
(3)	Ø3.25	Ø82.55	Ø4.25	Ø107.95	Ø6.5	Ø165.1	Ø8.0	Ø203.2	Ø11.0	Ø279.4
(4)	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°		
(5)	8X Ø0.328 THRU, EQ SP BOTH FLANGES	8X Ø8.33 THRU, EQ SP BOTH FLANGES	8X Ø0.390 THRU, EQ SP BOTH FLANGES	8X Ø9.91 THRU, EQ SP BOTH FLANGES	8X Ø0.650 THRU, EQ SP BOTH FLANGES	8X Ø16.51 THRU, EQ SP BOTH FLANGES	8X Ø0.781 THRU, EQ SP BOTH FLANGES	8X Ø19.84 THRU, EQ SP BOTH FLANGES	12X Ø1.031 THRU, EQ SP BOTH FLANGES	12X Ø26.19 THRU, EQ SP BOTH FLANGES
(6)	4x 0.06 x 45°	4x 1.5 x 45°	4x 0.06 x 45°	4x 1.5 x 45°	4x 0.06 x 45°	4x 1.5 x 45°	4x 0.06 x 45°	4x 1.5 x 45°	4x 0.06 x 45°	4x 1.5 x 45°
(7)	0.94	23.8	0.94	23.8	2.5	63.5	2.5	63.5	3.5	88.9
(8)	0.5	12.7	0.75	19.1	1.5	38.1	1.5	38.1	3.0	76.2
(9)	3.0	76.2	3.5	88.9	7.38	187.5	8.5	215.9	12.5	317.5

**** Metric Model 5611, 5613, & 5614 have larger mounting holes than their equivalents to accommodate standard metric fasteners***

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5600 AXIAL TORSION FORCE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	MODEL									
	5610		5611		5612		5613		5614	
	CAPACITY									
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	5K	550	20K	2.2K	100K	11K	200K	22K	300K	33K
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	Ø4.0	Ø101.6	Ø5.0	Ø127.0	Ø8.0	Ø203.2	Ø9.75	Ø247.7	Ø14.0	Ø355.6
(2)	Ø1.500 $^{+0.002}_{-0.000}$ ↧0.13 BOTH ENDS	Ø38.10 $^{+0.002}_{-0.000}$ ↧3.3 BOTH ENDS	Ø2.000 $^{+0.002}_{-0.000}$ ↧0.25 BOTH ENDS	Ø50.80 $^{+0.05}_{-0.00}$ ↧6.4 BOTH ENDS	Ø3.500 $^{+0.002}_{-0.000}$ ↧0.31 BOTH ENDS	Ø88.90 $^{+0.05}_{-0.00}$ ↧7.9 BOTH ENDS	Ø4.000 $^{+0.002}_{-0.000}$ ↧0.31 BOTH ENDS	Ø101.60 $^{+0.05}_{-0.00}$ ↧7.9 BOTH ENDS	Ø6.000 $^{+0.002}_{-0.000}$ ↧0.31 BOTH ENDS	Ø152.40 $^{+0.05}_{-0.00}$ ↧7.9 BOTH ENDS
(3)	Ø3.25	Ø82.55	Ø4.25	Ø107.95	Ø6.5	Ø165.1	Ø8.0	Ø203.2	Ø11.0	Ø279.4
(4)	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°	22.5°		
(5)	8X Ø0.328 THRU, EQ SP BOTH FLANGES	8X Ø8.33 THRU, EQ SP BOTH FLANGES	8X Ø0.390 THRU, EQ SP BOTH FLANGES	8X Ø9.91 THRU, EQ SP BOTH FLANGES	8X Ø0.650 THRU, EQ SP BOTH FLANGES	8X Ø16.51 THRU, EQ SP BOTH FLANGES	8X Ø0.781 THRU, EQ SP BOTH FLANGES	8X Ø19.84 THRU, EQ SP BOTH FLANGES	12X Ø1.031 THRU, EQ SP BOTH FLANGES	12X Ø26.19 THRU, EQ SP BOTH FLANGES
(6)	4x 0.06 x 45°	4x 1.5 x 45°	4x 0.06 x 45°	4x 1.5 x 45°	4x 0.06 x 45°	4x 1.5 x 45°	4x 0.06 x 45°	4x 1.5 x 45°	4x 0.06 x 45°	4x 1.5 x 45°
(7)	0.94	23.8	0.94	23.8	2.5	63.5	2.5	63.5	3.5	88.9
(8)	0.5	12.7	0.75	19.1	1.5	38.1	1.5	38.1	3.0	76.2
(9)	3.0	76.2	3.5	88.9	7.38	187.5	8.5	215.9	12.5	317.5

**** Metric Model 5611, 5613, & 5614 have larger mounting holes than their equivalents to accommodate standard metric fasteners***

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

AT101 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

FLANGE TYPE 1



Model AT101-2/50

FEATURES & BENEFITS

- Capacities: Force kN(lbf) / Torque Nm(lbf-in)- 0.5(112) / 5(44.3), 1(225) / 10(88.5), 1(225) / 30(266), 20(4.5K) / 20(177), 0.5(112) / 50(443), 2(450) / 50(443),
- Measures force & torque in one unit
- Thru-hole

OPTIONS

- 100% Cal Control (Internal Shunt Cal)

CAPACITIES

Model	Force		Torque		Flange Type
	kN	lbf	Nm	lbf-in	
AT101 – 0.5/5	0.5	112	5	44.3	1
AT101 – 1/10	1	225	10	88.5	1
AT101 – 1/30	1	225	30	266	1
AT101 – 20/20	20	4.5K	20	177	2
AT101 – 0.5/50	0.5	112	50	443	1
AT101 – 2/50	2	450	50	443	1

SPECIFICATIONS

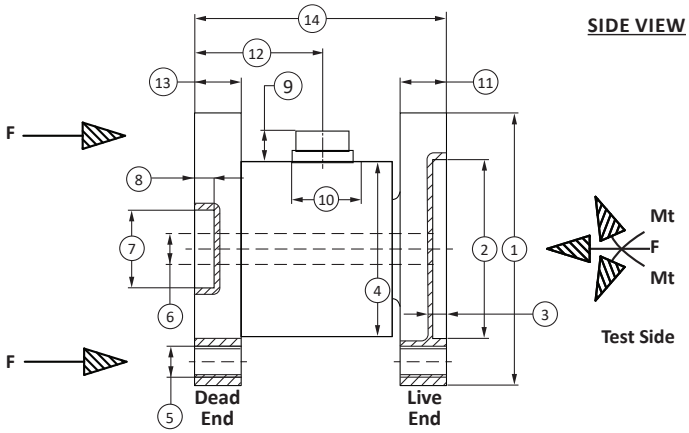
ACCURACY – (MAX ERROR)		
Nonlinearity – torque %FS		± 0.2
Hysteresis – torque %FS		± 0.2
Nonlinearity – torque %FS		± 0.3
Hysteresis – torque %FS		± 0.3
Hysteresis – %FS		± 0.2
Nonrepeatability – %RO		± 0.1
Cross talk – %FS		< 1%
TEMPERATURE		
Effect on Zero – %RO / deg	°C	± 0.02
Effect on Output – % / deg	°C	± 0.02
Compensated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V		1
Excitation Voltage – VDC		2-12
Bridge Resistance – torque – ohm		350
Bridge Resistance – force – ohm		700
MECHANICAL		
Safe Overload – %RO		150
Protection Level		IP50
Material		Alloy Steel

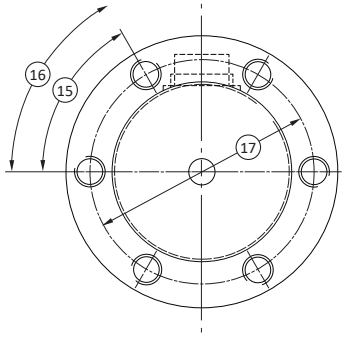
U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

AT101 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

DIMENSIONS: FLANGE TYPE 1

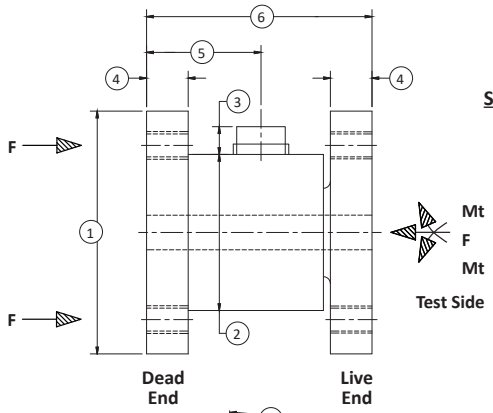
Model	AT101 – 0.5/5, 1/10, 1/30, 0.5/50, 2/50			
	Force (kN)	Torque (Nm)	Force (lbf)	Torque (lbf-in)
Capacity	0.5	5	112	44.3
	1	10	225	88.5
	1	30	225	266
	0.5	50	112	443
	2	50	450	443
See Drawing	Metric (mm)		U.S. (in)	
(1)	Ø70		Ø2.8	
(2)	Ø46 H7		Ø(1.8110/1.8100)	
(3)	3.5		0.1	
(4)	Ø45		Ø1.8	
(5)	M8			
(6)	Ø8		Ø0.3	
(7)	Ø20 H7		Ø(0.7874/0.7866)	
(8)	5 (+0.2)		0.197 (±0.008)	
(9)	8		0.3	
(10)	Ø18		Ø0.7	
(11)	12		0.5	
(12)	33		1.3	
(13)	12		0.5	
(14)	65 (±0.1)		2.559 (±0.004)	
(15)	60°			
(16)	6x60° (360°)			
(17)	Ø58 (±0.1)		Ø2.283 (±0.004)	

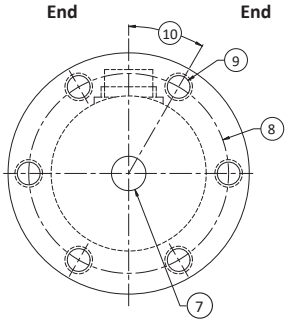




DIMENSIONS: FLANGE TYPE 2

Model	AT101 - 20/20			
	Force (kN)	Torque (Nm)	Force (lbf)	Torque (lbf-in)
Capacity	20	20	4.5K	177
See Drawing	Metric (mm)		U.S. (in)	
(1)	Ø70		Ø2.8	
(2)	Ø45		Ø1.8	
(3)	8		0.3	
(4)	12		0.5	
(5)	33		1.3	
(6)	65		2.6	
(7)	Ø6 H7 ↧ (≥6)		Ø(0.2362/0.2357) ↧ (≥0.2)	
(8)	Ø58 (±0.1)		Ø2.283 (±0.004)	
(9)	M8			
(10)	12x30°(360°)			





AT102 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacity: Force kN(lbf) / Torque Nm(lbf-in) – 10(2.25K) / 10(88.5)
- Compact design
- Side cable exit

OPTIONS

- Internal shunt resistor – 100% output

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – Torque %FS		± 0.2
Hysteresis – Torque %FS		± 0.2
Nonrepeatability – %RO		± 0.08
Cross Talk – %FS		< 1
Creep, in 30 min – %		± 0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	± 0.02
Effect on Output – % / deg	°C	± 0.02
Compensated Range	°C	-10 to +50
	°F	+14 to +122
Operating Range	°C	-30 to +80
	°F	-22 to +176
ELECTRICAL		
Output – mV/V ± %		1 ±15
Excitation Voltage – VDC		2-12
Bridge Resistance – Ohm		350
Electrical Connection	m	2 cables (3 each)
	ft	2 cables (9.8 each)
MECHANICAL		
Safe Overload – %RO		150
IP Rating		IP40
Material		Alloy steel

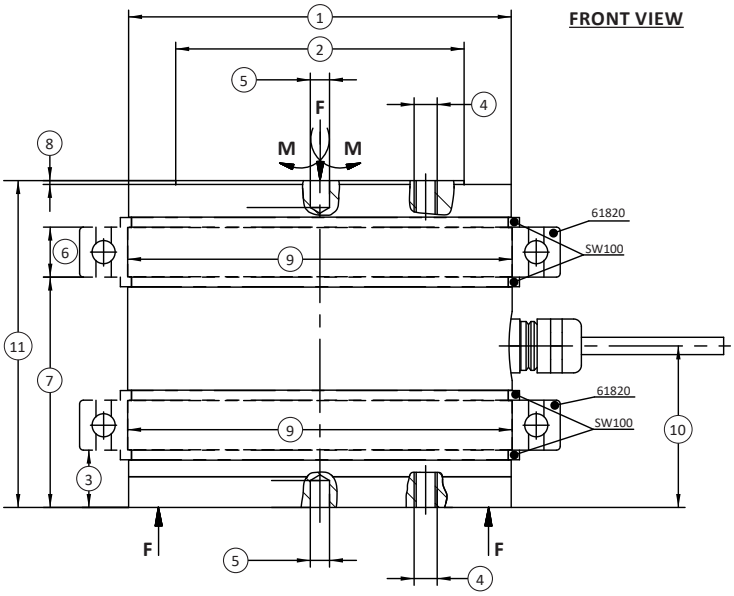
STANDARD CONFIGURATION

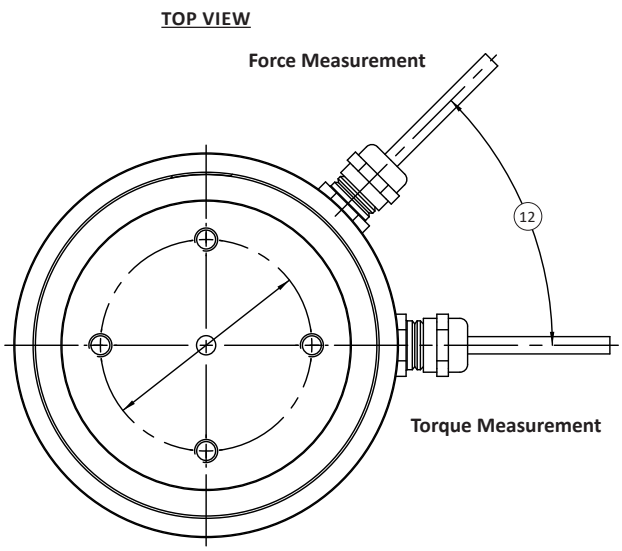


Model AT102 (Shown)

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

AT102 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)





DIMENSIONS

See Drawing	Metric (kN/Nm)	U.S. (lbf/lbf-in)
	10/10	2.25K/88.5
	mm	in
(1)	Ø 99.5$^{-0.2}$	Ø 3.92$^{-0.008}$
(2)	Ø 75$^{-0.1}$	Ø 3.0$^{-0.004}$
(3)	15	0.6
(4)	M6 ↧ 8	
(5)	Ø5 H7	Ø(1.1835/1.1827)
(6)	13	0.5
(7)	60	2.4
(8)	1	0.04
(9)	Ø100g6	Ø(3.9365/3.9357)
(10)	42	1.7
(11)	85	3.3
(12)	45°	

AT103 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities: Force kN(lbf) / Torque Nm(lbf-in) – 10 (2.25K) / 10 (88.5), 20 (4.5K) / 20 (177)
- Compact design
- Bottom cable exit

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – Torque %FS		± 0.2
Hysteresis – Torque %FS		± 0.2
Nonrepeatability – %RO		± 0.08
Crosstalk – %FS		< 1
Creep, in 30 min – %		± 0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	± 0.02
Effect on Output – % / deg	°C	± 0.02
Compensated Range	°C	0 to +100
	°F	+32 to +212
Operating Range	°C	-30 to +120
	°F	-22 to +248
ELECTRICAL		
Output – mV/V ± %		1 ±0.5
Excitation Voltage – VDC		2-12
Bridge Resistance – Ohm		350
Electrical Connection	m	2 cables (3 each)
	ft	2 cables (9.8 each)
MECHANICAL		
Safe Overload – %RO		150
IP Rating		IP40
Material		Alloy steel

STANDARD CONFIGURATION

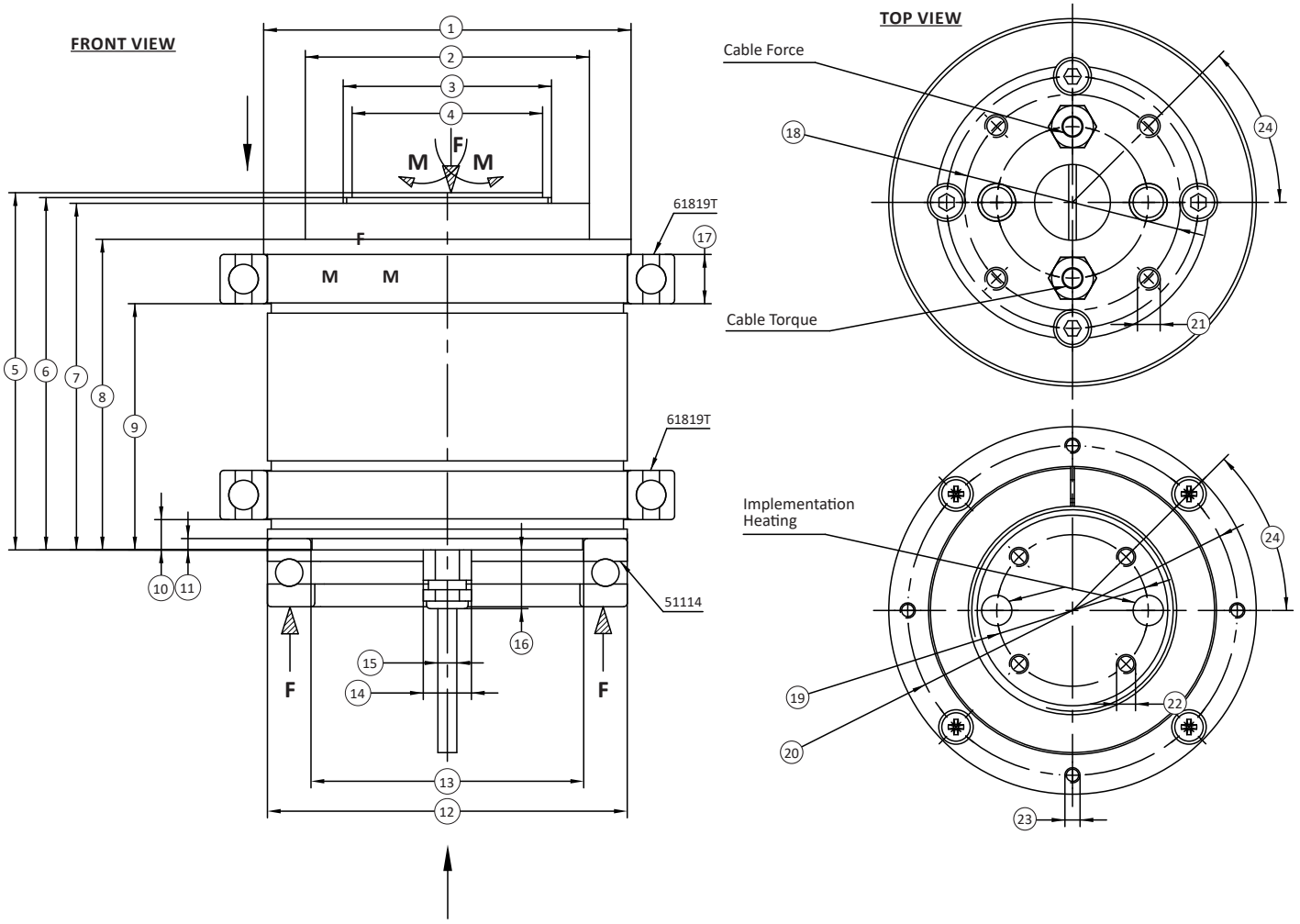


Model AT103 (Shown)

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

AT103 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

DIMENSIONS



AT103 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

DIMENSIONS (CONTINUED)

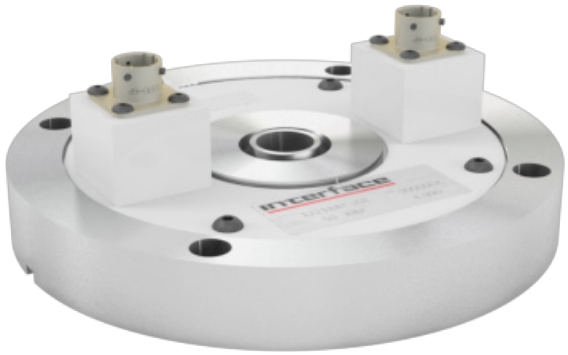
See Drawing	Metric (kN/Nm)	U.S. (lbf/lbf-in)
	10/10	2.25K/88.5
	mm	in
(1)	Ø $97^{+0.2}$	Ø$3.8^{+0.008}$
(2)	Ø $75^{-0.1}$	Ø $3.0^{-0.004}$
(3)	Ø55	Ø2.2
(4)	Ø$50^{-0.1}$	Ø$2.0^{-0.004}$
(5)	94	3.7
(6)	93	3.7
(7)	91.5	3.60
(8)	82	3.23
(9)	65	2.6
(10)	8	0.3
(11)	3	0.1
(12)	Ø95 g6	Ø(3.7197/3.7388)
(13)	Ø $72^{-0.1}$	Ø2.8
(14)	Ø13	Ø0.5
(15)	Ø5.1	Ø0.2
(16)	16	0.6
(17)	13	0.5
(18)	TK Ø$57^{\pm0.1}$	TK Ø$2.2^{\pm0.004}$
(19)	TK Ø$40^{\pm0.1}$	TK Ø$1.6^{\pm0.004}$
(20)	TK Ø$87^{\pm0.1}$	TK Ø$3.4^{\pm0.004}$
(21)	M6	
(22)	M5	
(23)	M4	
(24)	45°	

TXY MULTI-AXIS LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Measures X & Y forces
- Low crosstalk – <1.0%
- Linearity 0.1%
- Mating cable supplied. Right angle plug MS3108E14S-5S.
- 4 Keys supplied

STANDARD CONFIGURATION



Model TXY (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Side Force Capacity	lbf	500
	N	2.22K
Radial Force Capacity	lbf	1K, 1.5K, 2K
	N	4.45K, 6.67K, 89K
Rated Output – mV/V ± %		2 ±0.25
Nonlinearity – %FS		± 0.1
Hysteresis – %FS		± 0.1
Nonrepeatability – %FS		±0.05
TEMPERATURE		
Effect on Zero – %RO / deg	°F	±0.002
Effect of Output – % / deg	°F	±0.002
Compensated Range	°C	+21.11 to +76.67
	°F	+70 to +170
Operating Range	°C	-53.89 to +93.33
	°F	-65 to +200
ELECTRICAL		
Input Resistance (nominal) – Ω		350
Output Resistance (nominal) – Ω		350
Insulation Resistance (50 VDC) – MΩ		5000
MECHANICAL		
Safe Overload – %CAP		150
Weight	lbs	6.81
	kg	3.1
Material		Alloy Steel

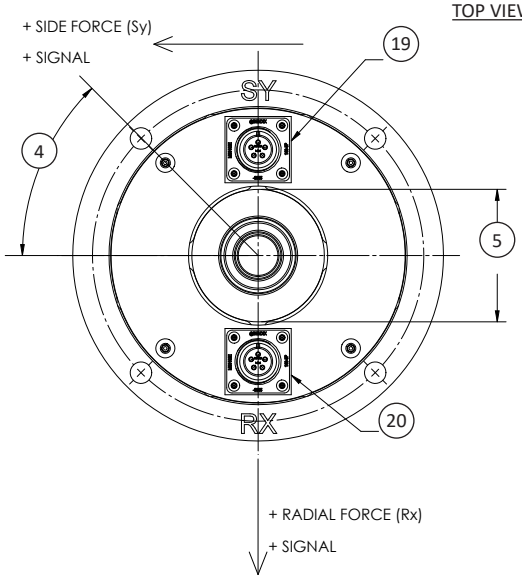
International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

TXY LOAD CELL (U.S. & METRIC)

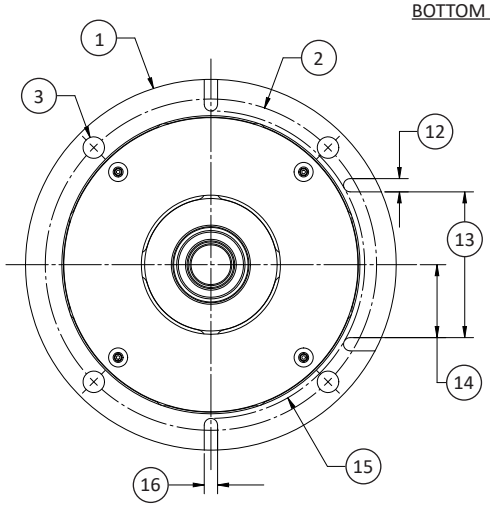
DIMENSIONS

See Drawing	U.S.	Metric
	in	mm
1	Ø7.00	Ø177.8
2	Ø6.25	Ø158.8
3	Ø0.406 THRU 4 Holes EQ SP	Ø10.3124 THRU 4 Holes EQ SP
4	45°	
5	Ø2.50 TYP	63.5
6	2.0	51
7	1.1250 (±0.001)	28.575 (±0.03)
8	0.06	1.5
9	2.65	67.3
10	0.031	0.79
11	Ø(0.7500/0.7495) THRU	Ø(19.050/19.037) THRU
12	0.250 (+0.001/-0.000) TYP	6.35 (+0.03/-0.00) TYP
13	2.750 (±0.001)	69.85 (±0.03)
14	1.375 (±0.0005)	34.93 (±0.0127)
15	r 2.900	r 73.66
16	0.251	6.38
17	0.250 (+0.000/-0.002)	6.35 (+0.000/-0.05)
18	0.50	12.7
19	Sy – Side force	
20	Rx – Radial force	
21	BEARING OFFSET	

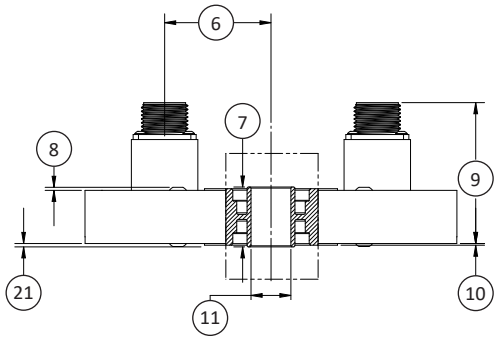
TOP VIEW



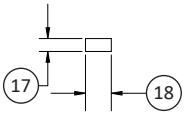
BOTTOM VIEW



SIDE VIEW



KEYS VIEW



3A40 3-AXIS LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR*)		
Nonlinearity – %FS		+/-0.2
Hysteresis – %FS		+/-0.1
Creep, in 30 min – %		+/-0.05
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.05
Effect on Output – % / def	°C	±0.05
Operating Range	°C	-20 to +70
	°F	-4 to +185
ELECTRICAL		
Rated Output (Nominal) – mV/V		0.5
Max. Excitation Voltage – V		10
Zero Balance – mV/V		<0.1
Input Resistance, x, y, & z axis – Ω		350
Output Resistance, x, y, & z axis – Ω		350
MECHANICAL		
Rated Capacity (FS)	N	±2,±10, ±20, ±50
	lbf	±0.44, ±2.24, ±4.49, ±11.24
Cable length	m	3
	ft	9.8
Material		Aluminum Alloy
Total Weight	g	85
	lbs	0.18
Safe Overload – %CAP		150
Ultimate Overload – %RO		300
Dimensions		40 mm x 40mm x 20mm
Standard Connector		37-pin D-sub
ECCENTRICITY AND MOMENT*		
x into y - %FS		0.5
y into x - %FS		0.5
z into x - %FS		1
z into y - %FS		1
x into z - %FS		1
y into z - %FS		1
Influence of Eccentric load %FS/2Nm		0.5

**** Note: Temperature compensation is not available for this product***

STANDARD CONFIGURATION



Model 3A40 (Shown)

FEATURES & BENEFITS

- 3-Axis – Fx Fy Fz; independent bridges
- 2N to 50N force range
- Compact size
- Low crosstalk

Model 3A40 has 3 independent axes in a small package size. Capacities available are 2N, 10N, 20N, and 50N. Product is made from aluminum alloy so it is very light weight.

Interface's 3-axis load cell measures forces simultaneously in 3 mutually perpendicular axes: X, Y, and Z - positive and negative. Each axis provides a unique mV/V output and requires no mathematical manipulation. The 3-axis load cell is built to minimize eccentric loading effects and crosstalk between axes.

The 3A Series 3-axis load cell is ideally suited to many industrial and scientific applications, such as aerospace, robotics, automotive and medical research (orthopedics and bio-mechanical). The load cell is provided in various capacity ranges and sizes with each of the three axes providing the same capacity.

We are happy to work with your design needs – providing a custom design if warranted for varying capacities (between X, Y, and Z), higher temperature capability, or OEM/private labeling if needed.

**** Nominal***

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

3A40 3-AXIS LOAD CELL (U.S. & METRIC)

CHARACTERISTICS

See Drawing	MODEL			
	2N	10N	20N	50N
Fx (N)	2	10	20	50
Fy (N)	2	10	20	50
Fz (N)	2	10	20	50
Max Bending Moment (Nm)	5	5	5	5
Torque Limit (Nm)	5	5	5	5
Breaking Force %FS	600	600	600	600

WIRING DIAGRAM

	Description	Wire Color	37-pin D-SUB
Shield	Shield	Shield	1
X-Axis	+ Excitation	Brown	20
	- Excitation	White	27
	+ Output	Green	22
	- Output	Yellow	25
Y-Axis	+ Excitation	Pink	2
	- Excitation	Gray	9
	+ Output	Blue	4
	- Output	Red	7
Z-Axis	+ Excitation	Purple	11
	- Excitation	Black	18
	+ Output	Orange	13
	- Output	Transparent	16

ACCESSORIES



Model BSC4D (Shown)
4-Channel Digital USB Amplifier

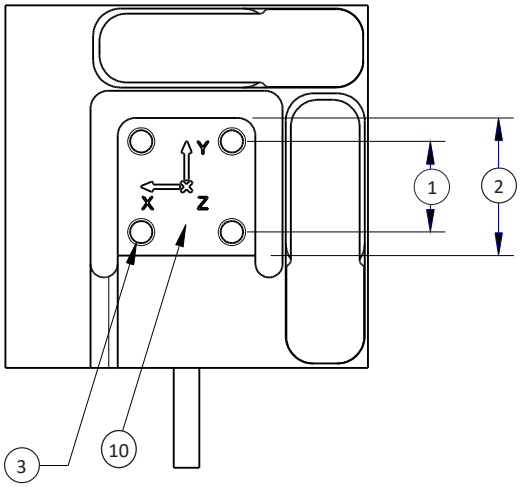


Model BSC4A (Shown)
4-Channel Analog Amplifier

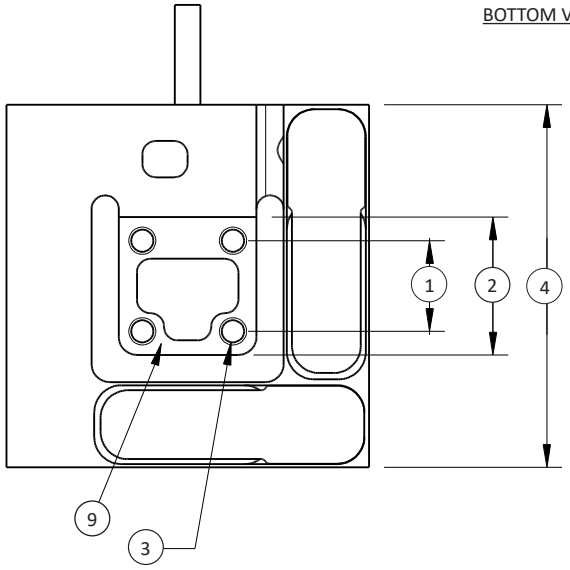
U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

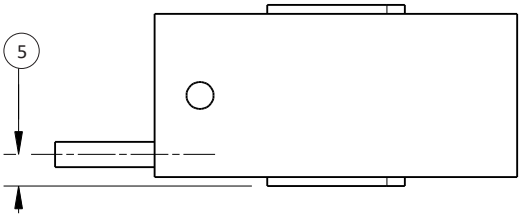
3A40 3-AXIS LOAD CELL (U.S. & METRIC)

TOP VIEW

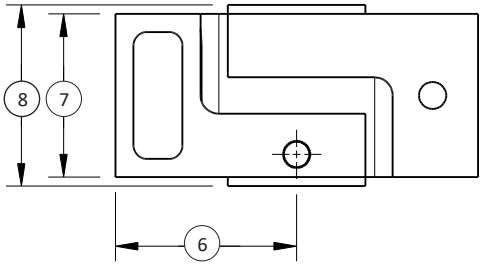


BOTTOM VIEW





SIDE VIEW



FRONT VIEW

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	10 Square	0.39
(2)	15.2 Square	0.59
(3)	4 x M3X0.5 ↧ 8	4 x M3X0.5 ↧ 0.31
(4)	40	1.57
(5)	3.5	0.13
(6)	20	0.78
(7)	18	0.70
(8)	20	0.78
(9)	Mounting Surface / Dead End	
(10)	Mounting Surface / Live End	

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

3A SERIES 3-AXIS LOAD CELLS (U.S. & METRIC)

FEATURES & BENEFITS

- 3-Axis – Fx Fy Fz; independent bridges
- 20N to 500kN (4.5 to 112K lbf) force range
- Compact size
- Low crosstalk
- Temperature compensated

Interface's 3-axis load cell measures forces simultaneously in 3 mutually perpendicular axes: X, Y, and Z - tension and compression. Each axis provides a unique mV/V output and requires no mathematical manipulation. The 3-axis load cell is built to minimize eccentric loading effects and crosstalk between axes.
The 3A Series 3-axis load cell is ideally suited to many industrial and scientific applications, such as aerospace, robotics, automotive and medical research (orthopedics and bio-mechanical).

The load cell is provided in various capacity ranges and sizes with each of the three axes providing the same capacity.

We are happy to work with your design needs – providing a custom design if warranted for varying capacities (between X, Y, and Z), higher temperature capability, or OEM/private labeling if needed.

WIRING DIAGRAM

	Description	Wire Color	37-pin D-SUB	16-pin M23
Shield	Shield	Shield	1	N/C
X-Axis	+ Excitation	Brown	20	2
	- Excitation	White	27	1
	+ Output	Green	22	3
	- Output	Yellow	25	4
Y-Axis	+ Excitation	Pink	2	6
	- Excitation	Gray	9	5
	+ Output	Blue	4	7
	- Output	Red	7	8
Z-Axis	+ Excitation	Purple	11	10
	- Excitation	Black	18	9
3A60A	+ Output	Orange	13	11
	- Output	Transparent	16	12
3A120, 3A160, 3A300, & 3A400	+ Output	Gray/Pink	13	11
	- Output	Red/Blue	16	12

STANDARD CONFIGURATION



Model 3A120 (Shown)

ACCESSORIES



Model BSC4D (Shown)
4-Channel Digital Amplifier



Model BSC4A (Shown)
4-Channel USB Analog Amplifier

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

3A60A SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR*)							
Nonlinearity – %FS		±0.2					
Hysteresis – %FS		±0.02					
Creep, in 30 min – %		±0.5					
TEMPERATURE							
Effect on Zero – %RO / deg	°C	±0.02					
Effect on Output – % / def	°C	±0.02					
Compensated Range	°C	-10 to +70					
	°F	+14 to +158					
Operating Range	°C	-10 to +85					
	°F	+14 to +185					
ELECTRICAL							
Rated Output (Nominal) – mV/V		±0.5					
Max. Excitation Voltage – V		10					
Zero Balance – mV/V		0.1					
Input Resistance, x/y axis – Ω		395 ±5			375 ±5		
Output Resistance, z axis – Ω		355 ±5					
Insulation Resistance – Ω		> 5 × 10⁹					
Electrical Connection		3 m Cable with 37-PIN Connector. Includes Mating Connector.					
MECHANICAL							
Rated Capacity (FS)	N	10	20	50	100	200	500
	lbf	2.25	4.5	11.2	22.5	45	112
Material		Aluminum				Stainless Steel	
Deflection – Fx, Fy	mm	0.10				0.20	
	in	0.004				0.008	
Deflection – Fz	mm	0.15					
	in	0.006					
Total Weight	kg	0.110				0.2	
	lbs	0.2425				0.44	
Safe Overload – %RO		150					
Ultimate Overload – %RO		300					
Protection Level		IP54					
ECCENTRICITY AND MOMENT*							
Allowable Moment	Nm	20				50	
	lbf-in	177				443	
Crosstalk: x:y / y:x – %		±2					
Crosstalk: z:x/y – %		±2					
Crosstalk: x/y:z – %		±2					
Influence of Eccentric Load to FS – %FS / 10Nm		±1					

**** Nominal***

STANDARD CONFIGURATION



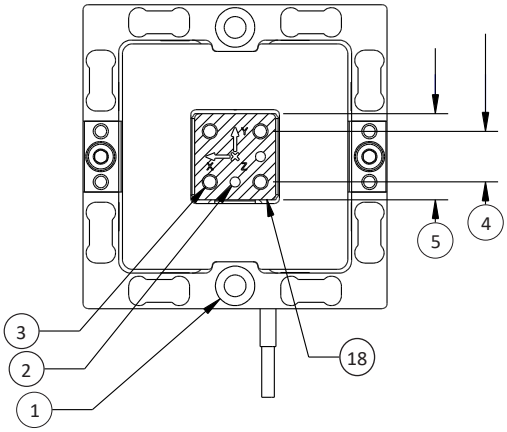
Model 3A60A (Shown)

FEATURES & BENEFITS

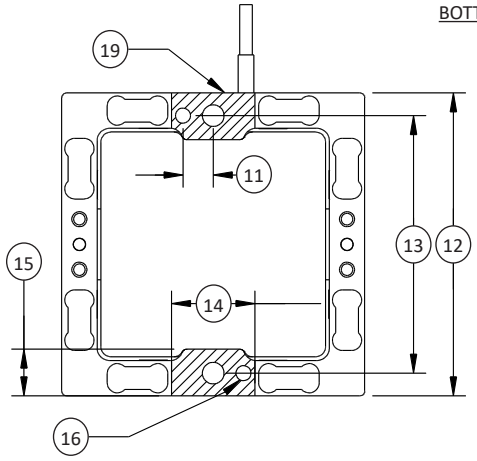
The 3A60A is a new and improved version of the original 3A60 with revised mounting holes and extended capacity ranges. The 3A60A is NOT backward compatible with the old 3A60.

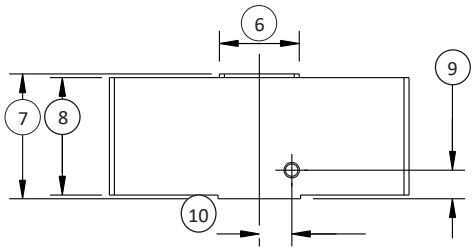
3A60A SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

TOP VIEW

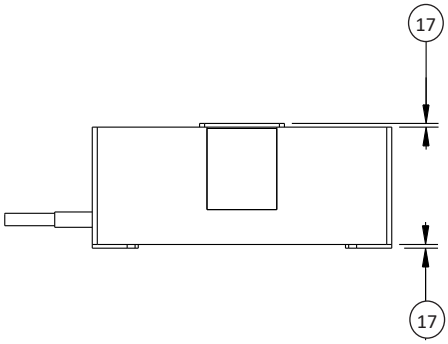


BOTTOM VIEW





FRONT VIEW



SIDE VIEW

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	2 x Ø4.3 ↧ 24.25, ⌴ Ø7.8 ↧ 17.25	2 x Ø0.17 ↧ 0.955, ⌴ Ø0.31 ↧ 0.679
(2)	2 x Ø2 E7 ↧ 5, ⌵ 118°	2x Ø(0.0797/0.0793) ↧ 0.2, ⌵ 118°
(3)	4 x (M3X0.5) ↧ 10, ⌵ 118°	4 x (M3X0.5) ↧ 0.4, ⌵ 118°
(4)	10	0.4
(5)	17	0.7
(6)	16	0.6
(7)	25	1.0
(8)	23.5	0.9
(9)	5.75	0.226
(10)	6.5	0.3
(11)	6	0.2
(12)	60	2.4
(13)	51	2.0
(14)	16.5	0.6
(15)	9.25	0.4
(16)	2 x Ø3 E7 ↧ 5, ⌵ 118°	2x Ø(0.1191/0.1187) ↧ 0.2, ⌵ 118°
(17)	0.75	0.030
(18)	Bolting Surface / Measuring Platform	
(19)	Bolting Surface	

3A120 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR*)									
Nonlinearity – %FS		±0.2							
Hysteresis – %FS		±0.02							
Creep, in 30 min – %		±0.5							
TEMPERATURE									
Effect on Zero – %RO / deg	°C	±0.02							
Effect on Output – % / deg	°C	±0.02							
Compensated Range	°C	-10 to +70							
	°F	+14 to +158							
Operating Range	°C	-10 to +85							
	°F	+14 to +185							
ELECTRICAL									
Rated Output (Nominal) – mV/V		±0.5	±1						
Max. Excitation – V		10							
Zero Balance – mV/V		0.1							
Input Resistance, x/y axis – Ω		780 ±5					740 ±5		
Output Resistance, z axis – Ω		700 ±5							
Insulation Resistance – Ω		> 5 × 10⁹							
Electrical Connection		3 m Cable with 37-PIN Connector. Includes Mating Connector.							
MECHANICAL									
Rated Capacity (FS)	N	50	100	200	500	1K	1K **	2K	5K
	lbf	11.2	22.5	45	112	225	225	450	1.12K
Material		Aluminum					Stainless steel		
Deflection – Fx, Fy	mm	0.06					0.08		
	in	0.002					0.003		
Deflection – Fz	mm	0.12					0.16		
	in	0.005					0.006		
Total Weight	kg	1.1					2.0		
	lbs	2.43					4.41		
Safe Overload – %RO		150							
Ultimate Overload – %RO		300							
Protection Level		IP54 (option IP68)							
ECCENTRICITY AND MOMENT*									
Allowable Moment	Nm	100					200	250	300
	lbf-in	885					1.77K	2.21K	2.66K
Crosstalk: x:y / y:x – %		±1							
Crosstalk: z:x/y – %		±2							
Crosstalk: x/y:z – %		±1							
Influence of Eccentric Load to FS – %FS / 100Nm		±1							

STANDARD CONFIGURATION

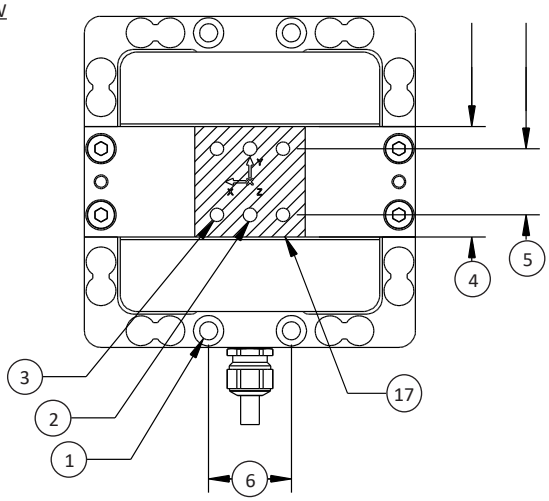


Model 3A120 (Shown)

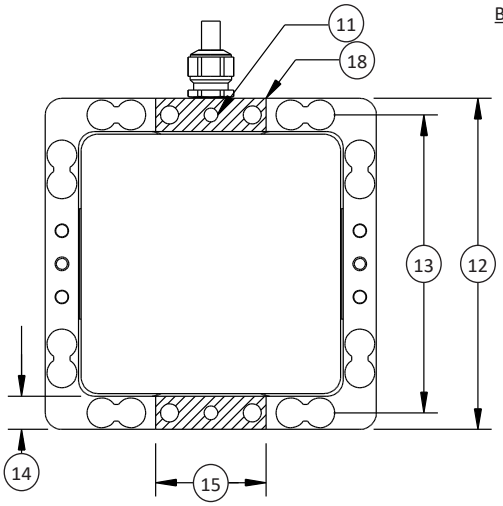
**** Nominal***
***** Stainless Version denoted by 3A120S-1KN***

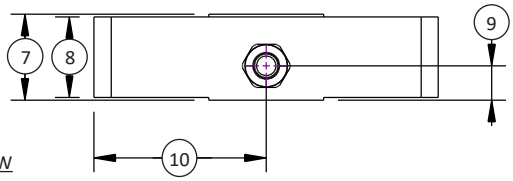
3A120 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

TOP VIEW

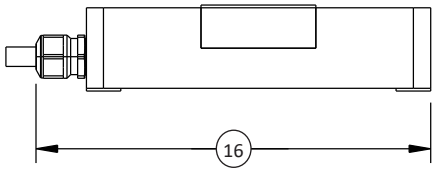


BOTTOM VIEW





FRONT VIEW



SIDE VIEW

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	4 x Ø6.6 ↧ 29 ⌵ 118°, ⌴ Ø11.0 ↧ 22.5	4 x Ø0.26 ↧ 1.1 ⌵ 118°, ⌴ Ø0.43 ↧ 0.89
(2)	2 x Ø5 E7 ↧ 12, ⌵ 118°	2 x Ø(0.1981/0.1976) ↧ 0.5, ⌵ 118°
(3)	4 x (M6x1) ↧ 12	4 x (M6x1) ↧ 0.5
(4)	40	1.6
(5)	24	0.9
(6)	30	1.2
(7)	30	1.2
(8)	28	1.1
(9)	12	0.5
(10)	60	2.4
(11)	2 x Ø5 E7 ↧ 3	2 x Ø(0.1981/0.1976) ↧ 0.1
(12)	120	4.7
(13)	108	4.3
(14)	12	0.5
(15)	40	1.6
(16)	137.5	5.4
(17)	Bolting Surface / Measuring Platform	
(18)	Bolting Surface	

3A160 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR*)				
Nonlinearity – %FS		±0.2		
Hysteresis – %FS		±0.1		
Creep, in 30 min – %		±0.5		
TEMPERATURE				
Effect on Zero – %RO / deg	°C	±0.02		
Effect on Output – % /deg	°C	±0.02		
Compensated Range	°C	-10 to +70		
	°F	+14 to +158		
Operating Range	°C	-10 to +85		
	°F	+14 to +158		
ELECTRICAL				
Rated Output (Nominal) – mV/V		±1		
Max. Excitation Voltage – V		10		
Zero Balance – mV/V		0.1		
Input Resistance, x/y axis – Ω		740 ±5		
Output Resistance, z axis – Ω		700 ±5		
Insulation Resistance – Ω		$> 5 \times 10^9$		
Electrical Connection		3 m Cable with 37-PIN Connector. Includes Mating Connector.		
MECHANICAL				
Rated Capacity (FS)	N	2K, 5K, 10K	20K	50K
	lbf	450, 1.2K, 2.25K	4.5K	11.2K
Material		Nickel plated steel		
Deflection – Fx, Fy – mm	mm	0.08		
	in	0.003		
Deflection – Fz – mm	mm	0.16		
	in	0.006		
Total Weight – kg	kg	8.2		
	lbs	18.08		
Safe Overload – %RO		150		
Ultimate Overload – %RO		300		
Protection Level		IP54		
ECCENTRICITY AND MOMENT*				
Allowable Moment	Nm	1K	2K	
	lbf-in	8.85K	17.7K	
Crosstalk: x:y / y:x – %		±1		
Crosstalk: z:x/y – %		±2		
Crosstalk: x/y:z – %		±2		

**** Nominal***

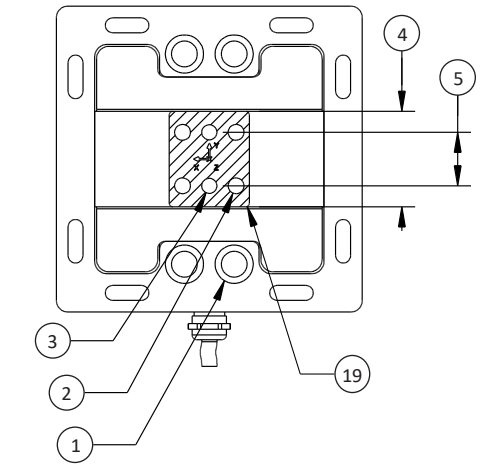
STANDARD CONFIGURATION



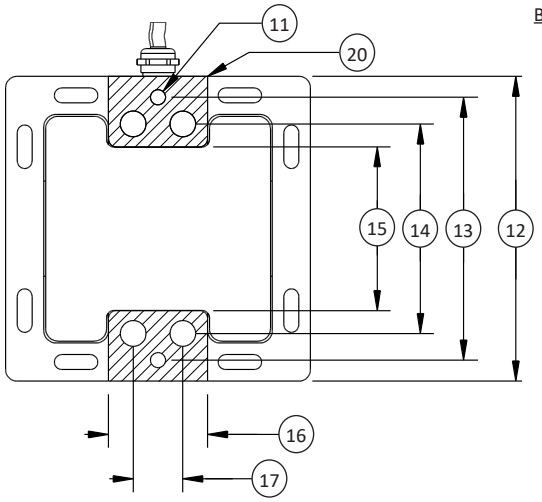
Model 3A160 (Shown)

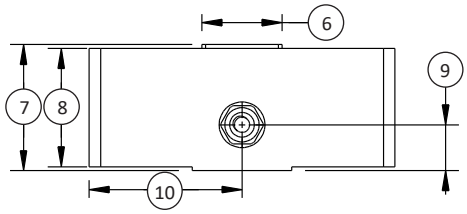
3A160 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

TOP VIEW

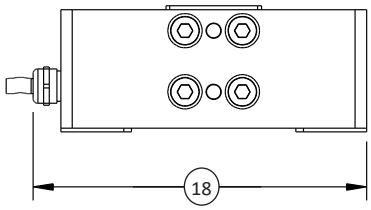


BOTTOM VIEW





FRONT VIEW



SIDE VIEW

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	4 x Ø14 THRU, ⌴ Ø20 ↧ 13	4 x Ø0.6 THRU, ⌴ Ø0.8 ↧ 0.5
(2)	4 x (M10x1.5) ↧ 15, ⌵ 118°	4 x (M10x1.5) ↧ 0.6, ⌵ 118°
(3)	2 x Ø8 H7 ↧ 15, ⌵ 118°	2 x Ø(0.3156/0.3150) ↧ 0.6, ⌵ 118°
(4)	50	2.0
(5)	28	1.1
(6)	42	1.7
(7)	66	2.6
(8)	62	2.4
(9)	24	0.9
(10)	80	3.1
(11)	2 x Ø8 H7 ↧ 5, ⌵ 118°	2 x Ø(0.3156/0.3150) ↧ 0.2, ⌵ 118°
(12)	160	6.3
(13)	138	5.4
(14)	110	4.3
(15)	86	3.4
(16)	52	2.0
(17)	26	1.0
(18)	174.5 (+1)	6.9 (+0.04)
(19)	Bolting Surface / Measuring Platform	
(20)	Bolting Surface	

3A300 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR*)				
Nonlinearity – %FS		±0.2		
Hysteresis – %FS		±0.1		
Creep, in 30 min – %		±0.5		
TEMPERATURE				
Effect on Zero – %RO / deg	°C	±0.02		
Effect on Output – % / deg	°C	±0.02		
Compensated Range	°C	-10 to +70		
	°F	+14 to +158		
Operating Range	°C	-10 to +85		
	°F	+14 to +185		
ELECTRICAL				
Rated Output (Nominal) – mV/V		±1		
Max. Excitation Voltage – V		10		
Zero Balance – mV/V		0.1		
Input Resistance, z axis – Ω		740 ±5		
Output Resistance, z axis – Ω		700 ±5		
Input Resistance, x/y axis – Ω		370 ±5		
Output Resistance, x/y axis – Ω		350 ±5		
Insulation Resistance – Ω		$> 5 \times 10^9$		
Electrical Connection		16-PIN Connector. 3 m Cable with 37-PIN Connector.		
MECHANICAL				
Rated Capacity (FS)	N	50K	100K	200K
	lbf	11.2K	22.5K	45K
Material		Nickel plated steel		
Deflection – Fx, Fy	mm	±0.2		
	in	±0.008		
Deflection – Fz	mm	±0.4		
	in	±0.016		
Total Weight	kg	45		
	lbs	99.2		
Safe Overload – %RO		150		
Ultimate Overload – %RO		300		
Protection Level		IP54		
ECCENTRICITY AND MOMENT*				
Allowable Moment	Nm	4K	8K	12K
	lbf-in	35.4K	70.8K	106K
Crosstalk: x:y / y:x – %		±1		
Crosstalk: z:x/y – %		±1		
Crosstalk: x/y:z – %		±2		
Influence of Eccentric Load to FS – %FS / 500Nm		±1		

STANDARD CONFIGURATION

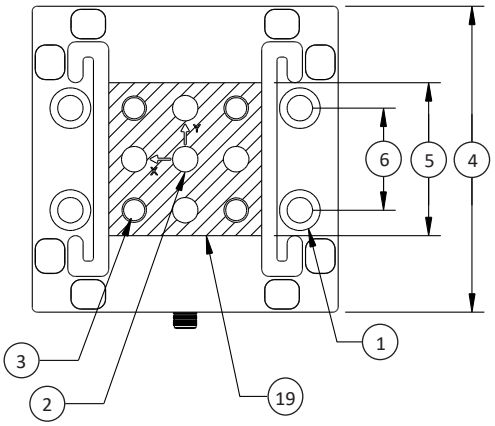


Model 3A300 (Shown)

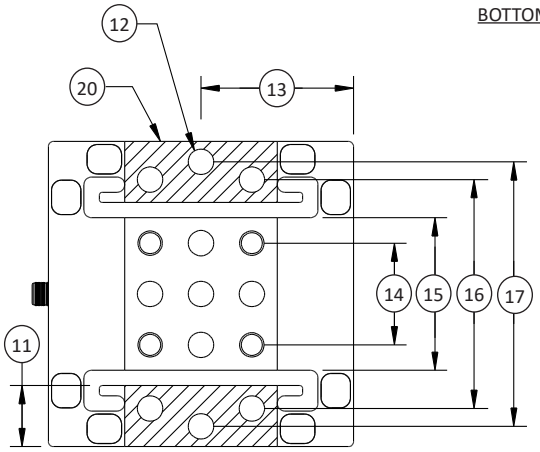
**** Nominal***

3A300 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

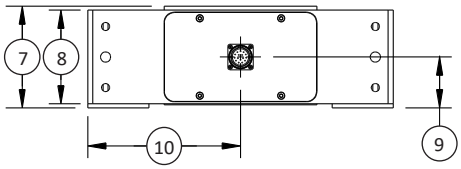
TOP VIEW

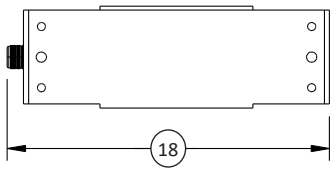


BOTTOM VIEW



FRONT VIEW





SIDE VIEW

DIMENSIONS

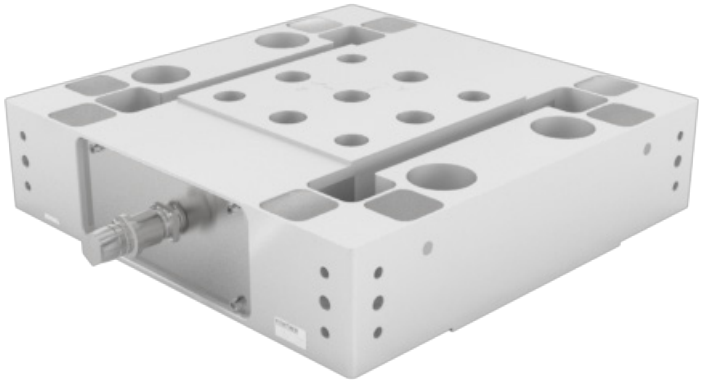
See Drawing	Metric	U.S.
	mm	in
(1)	4 x Ø25 THRU, ⌴ Ø40 ↧ 30	4 x Ø1.0 THRU, ⌴ Ø1.6 ↧ 1.2
(2)	5 x Ø25 H7 THRU	5 x Ø(0.9851/0.9842) THRU
(3)	4 x (M24x3) THRU	
(4)	300	11.8
(5)	150	5.9
(6)	100	3.9
(7)	100	3.9
(8)	92	3.6
(9)	50	2.0
(10)	150	5.9
(11)	60	2.4
(12)	2 x Ø25 H7 ↧ 40	2 x Ø(0.9851/0.9842) ↧ 1.6
(13)	150	5.9
(14)	100	3.9
(15)	150	5.9
(16)	225	8.9
(17)	260	10.2
(18)	316	12.4
(19)	Bolting Surface / Measuring Platform	
(20)	Bolting Surface	

3A400 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR*)		
Nonlinearity – %FS		±0.2
Hysteresis – %FS		±0.1
Creep, in 30 min – %		±0.5
TEMPERATURE		
Effect on Zero – %RO / deg	°C	±0.02
Effect on Output – % / deg	°C	±0.02
Compensated Range	°C	-10 to +70
	°F	+14 to +158
Operating Range	°C	-10 to +85
	°F	+14 to +185
ELECTRICAL		
Rated Output (Nominal) – mV/V		±1
Max. Excitation Voltage – V		10
Zero Balance – mV/V		0.1
Output Resistance, z axis – Ω		340 ±5
Input Resistance, x/y axis – Ω		370 ±5
Insulation Resistance – Ω		> 5 × 10^9
Electrical Connection		16-PIN Connector. 3 m Cable with 37-PIN Connector.
MECHANICAL		
Rated Capacity (FS)	N	500K
	lbf	112K
Material		Nickel plated steel
Deflection – Fx, Fy	mm	0.3
	in	0.01
Deflection – Fz	mm	0.6
	in	0.02
Total Weight	kg	120
	lbs	4.7
Safe Overload – %RO		150
Ultimate Overload – %RO		300
Protection Level		IP54
ECCENTRICITY AND MOMENT*		
Allowable Moment	Nm	15K
	lbf-in	133K
Crosstalk: x:y / y:x – %		±1
Crosstalk: z:x/y – %		±1
Crosstalk: x/y:z – %		±1
Influence of Eccentric Load to FS – %FS / 500Nm		±1

STANDARD CONFIGURATION

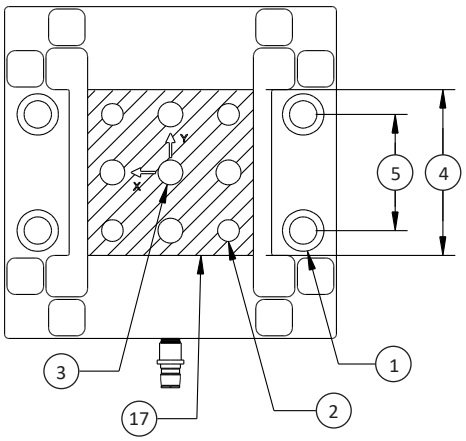


Model 3A400 (Shown)

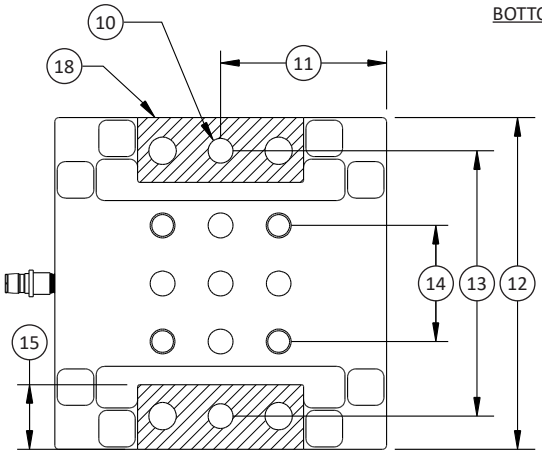
**** Nominal***

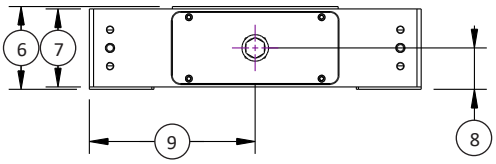
3A400 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

TOP VIEW

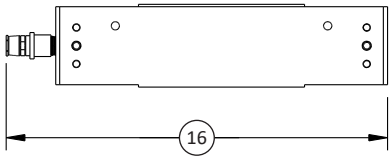


BOTTOM VIEW





FRONT VIEW



SIDE VIEW

DIMENSIONS

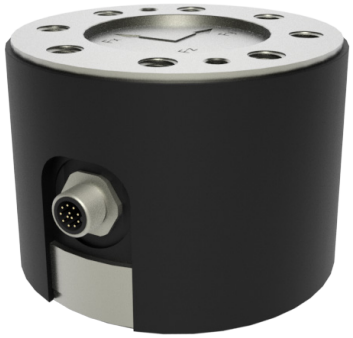
See Drawing	Metric	U.S.
	mm	in
(1)	4 x Ø33 THRU, ⌴ Ø50 ↧ 36	4 x Ø1.3 THRU, ⌴ Ø2.0 ↧ 1.4
(2)	4 x (M30x3.5) THRU	4 x (M30x3.5) THRU
(3)	5 x Ø30 E7 THRU	5 x Ø(1.1835/1.1827) THRU
(4)	200	7.9
(5)	140	5.5
(6)	100	3.9
(7)	94	3.7
(8)	50	2.0
(9)	200	7.9
(10)	2 x Ø30 E7 ↧ 40	2 x Ø(1.1835/1.1827) ↧ 1.6
(11)	200	7.9
(12)	400	15.7
(13)	320	12.6
(14)	140	5.5
(15)	78	3.1
(16)	460 (+5)	18.1 (+0.2)
(17)	Bolting Surface / Measuring Platform	
(18)	Bolting Surface	

3AR SERIES ROUND 3-AXIS LOAD CELLS (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.2
Hysteresis – %FS		± 0.2
Nonrepeatability – %RO		± 0.2
Creep, in 20 min – %		± 0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	± 0.01
Effect on Output – % / deg	°C	± 0.01
Compensated Range	°C	-10 to +70
	°F	+14 to +158
Operating Range	°C	-10 to +85
	°F	+14 to +185
ELECTRICAL		
Rated Output x and y axis - mV/V		1.5mV/V
Rated Output z axis - mV/V		0.8
Excitation - V MAX		10
Zero Balance - mV/V		<0.05
Input Resistance x and y axis – Ω		700
Input Resistance z axis – Ω		1400
Output Resistance x and y axis – Ω		700
Output Resistance z axis – Ω		1400
CROSSTALK		
x into y - %FS		2
y into x - %FS		2
z into x - %FS		1
z into y - %FS		1
x into z - %FS		1
y into z - %FS		1
MECHANICAL		
Safe Overload – %CAP		150
Ultimate Overload – %RO		300
Cable Length	m	5
	ft	16.4
Connector		M12, 12-pin

STANDARD CONFIGURATION



Model 3AR100 (Shown)

FEATURES & BENEFITS

- 3-Axis - Fx Fy Fz; independent bridges
- Capacities - 10KN to 500KN
- Compact size
- Low crosstalk
- Temperature compensated
- Optional BSC4A Amplifier can provide scaled analog outputs for all 3 channels simultaneously
- Optional BSC4D PC Interface Module can log, graph and display data for all 3 channels simultaneously

Interface's 3-axis load cell measures forces simultaneously in 3 mutually perpendicular axes: X, Y, and Z - tension and compression. Each axis provides a unique mV/V output and requires no mathematical manipulation. The 3-axis load cell is built to minimize eccentric loading effects and crosstalk between axes.

The 3A Series 3-axis load cell is ideally suited to many industrial and scientific applications, such as aerospace, robotics, automotive and medical research (orthopedics and bio-mechanical).

The load cell is provided in various capacity ranges and sizes with each of the three axes providing the same capacity.

We are happy to work with your design needs - providing a custom design if warranted for varying capacities (between X, Y, and Z), higher temperature capability, or OEM/private labeling if needed.

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

3AR SERIES ROUND 3-AXIS LOAD CELLS (U.S. & METRIC)

CHARACTERISTICS

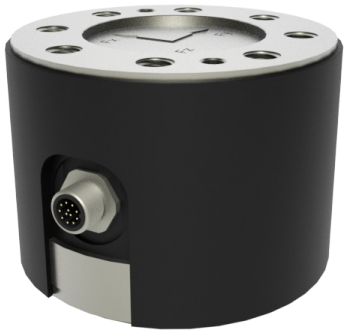
See Drawing	3AR100		3AR125		3AR155	
	A	B	A	B	A	B
Fx (N)	10K	25K	30K	30K	50K	100K
Fy (N)	10K	25K	30K	30K	50K	100K
Fz (N)	20K	60K	60K	120K	200K	250K
Diameter (mm)	100	100	125	125	155	155
Height (mm)	72	72	90	90	105	105
Weight (g)	2.5K	2.5K	4.5K	4.5K	10K	10K
Material	Tool Steel	Tool Steel	Tool Steel	Tool Steel	Tool Steel	Tool Steel
Protection (IP)	65	65	65	65	65	65
Max Bending Moment	0.5KNm	1kNm	2kNm	2kNm	4kNm	6kNm
Torque Limit	1.5kNm	4kNm	6kNm	6kNm	15kNm	20kNm

See Drawing	MODEL		
	3AR225		
	A	B	C
Fx (N)	100K	200K	250K
Fy (N)	100K	200K	250K
Fz (N)	200K	400K	500K
Diameter (mm)	225	225	225
Height (mm)	150	150	150
Weight (g)	30K	30K	30K
Material	Stainless Steel	Stainless Steel	Stainless Steel
Protection (IP)	65	65	65
Max Bending Moment	10kNm	20kNm	20kNm
Torque Limit	40kNm	60kNm	60kNm

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3AR ROUND 3-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 3AR100 (Shown)

APPLICATIONS

- Integration into wind tunnel models
- Integration into handles of medical tools
- Sports medicine
- Biomechanics
- Control of assembly and handling processes in micromechanics

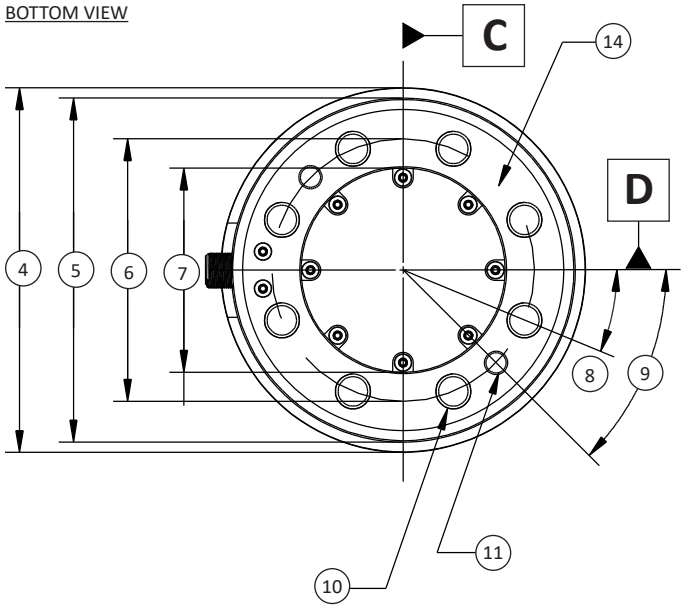
CABLE CONNECTION OPTIONS (Included with purchase)

- M12 to 37-Pin D-Sub
- M12 to M16 24-pin
- M12 to 44-pin High Density D-Sub

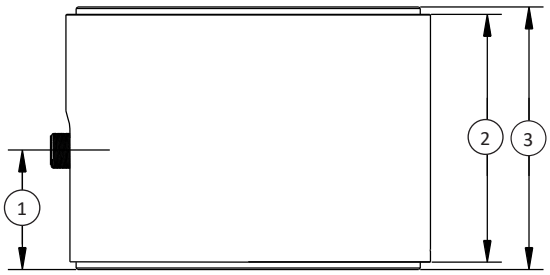
DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	35	1.38
(2)	68	2.68
(3)	72	2.83
(4)	Ø100 - 0.2	Ø3.94 - 0.008
(5)	Ø90	Ø3.54
(6)	Ø75 ± 0.1	Ø2.95 ± 0.004
(7)	Ø55 H8 ↧ 4	Ø2.17 H8 ↧ 4
(8)	22.5°	22.5°
(9)	45°	45°
(10)	8 x M10 x 1.5 ↧ 12 ⌵ 118°	8 x M10 x 0.06 ↧ 0.47 ⌵ 118°
(11)	6 x Ø6E7 ↧ 10 ⌵ 118° ⌖0.02/C/D	6 x Ø6E7 ↧ 0.39 ⌵ 118° ⌖0.0008/C/D
(12)	6 x Ø6E7 ↧ 10 ⌵ 118° ⌖0.02/A/B	6 x Ø6E7 ↧ 0.39 ⌵ 118° ⌖0.0008/A/B
(13)	Live End / Measuring Surface	
(14)	Dead End	

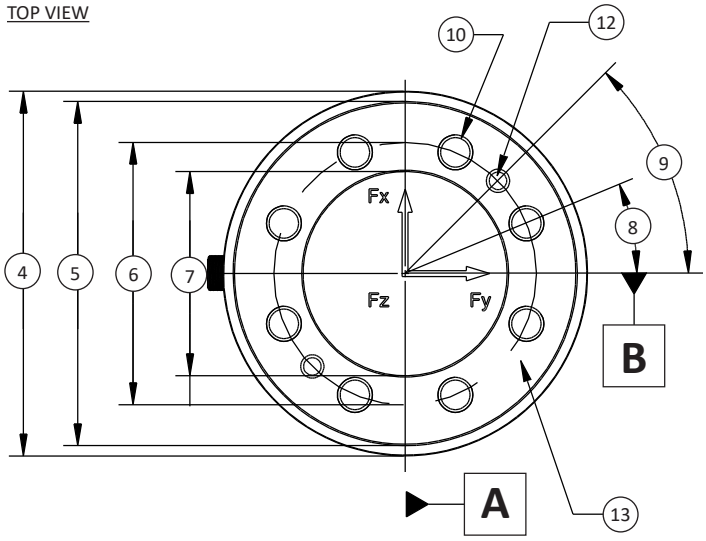
BOTTOM VIEW



SIDE VIEW



TOP VIEW



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

3AR125 ROUND 3-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 3AR125 (Shown)

APPLICATIONS

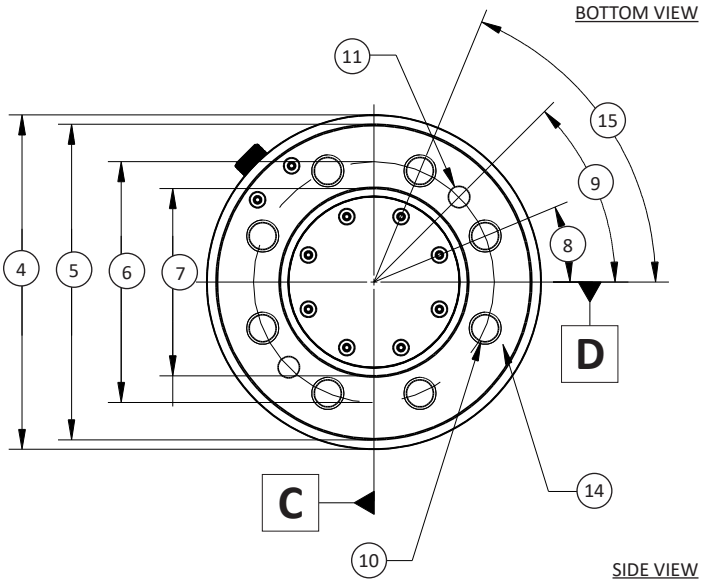
- Integration into wind tunnel models
- Integration into handles of medical tools
- Sports medicine
- Biomechanics
- Control of assembly and handling processes in micromechanics

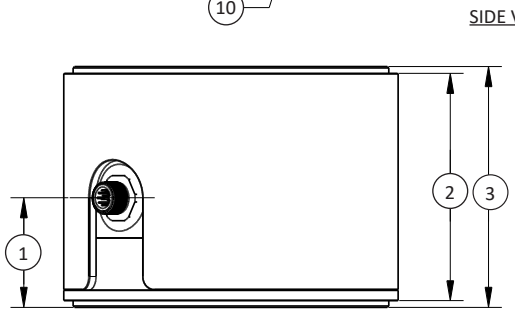
CABLE CONNECTION OPTIONS (Included with purchase)

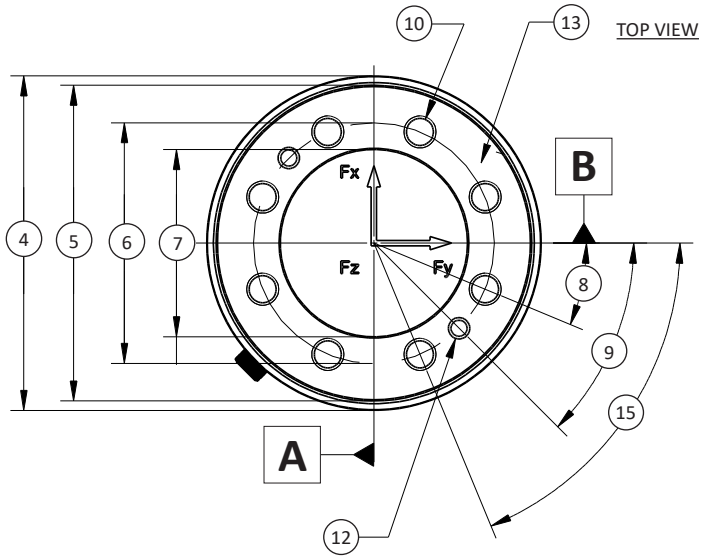
- M12 to 37-Pin D-Sub
- M12 to M16 24-pin
- M12 to 44-pin High Density D-Sub

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	41	1.61
(2)	85	3.35
(3)	90	3.54
(4)	Ø125	Ø4.92
(5)	Ø118	Ø4.65
(6)	Ø90 ± 0.1	Ø3.54 ± 0.004
(7)	Ø70 H8 ↧ 4	Ø2.75 H8 ↧ 0.16
(8)	22.5°	22.5°
(9)	45°	45°
(10)	8 x M12 x 1.75 ↧ 16.5 ⌵ 118°	8 x M12 x 0.06 ↧ 0.65 ⌵ 118°
(11)	2 x Ø8E7 ↧ 15 ⌵ 118° ⌖0.02/C/D	2 x Ø8E7 ↧ 0.6 ⌵ 118° ⌖0.0008/C/D
(12)	2 x Ø8E7 ↧ 15 ⌵ 118° ⌖0.02/A/B	2 x Ø8E7 ↧ 0.6 ⌵ 118° ⌖0.0008/A/B
(13)	Live End / Measuring Surface	
(14)	Dead End	
(15)	67.5°	67.5°







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3AR155 ROUND 3-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 3AR155 (Shown)

APPLICATIONS

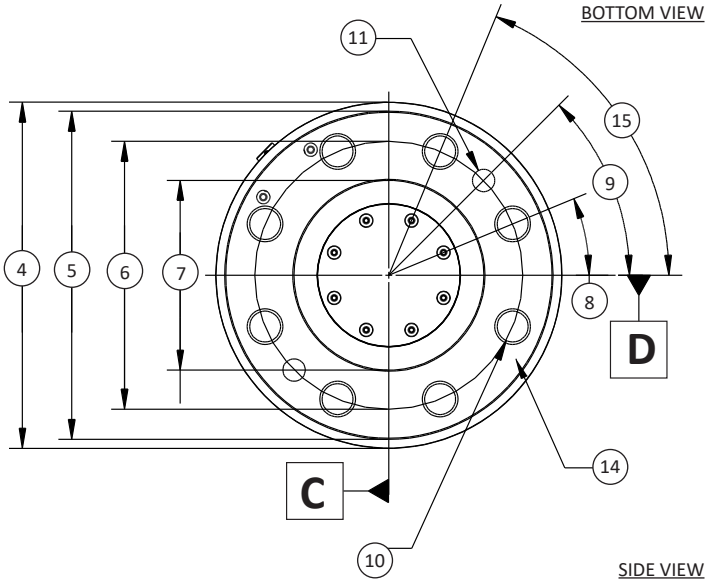
- Integration into wind tunnel models
- Integration into handles of medical tools
- Sports medicine
- Biomechanics
- Control of assembly and handling processes in micromechanics

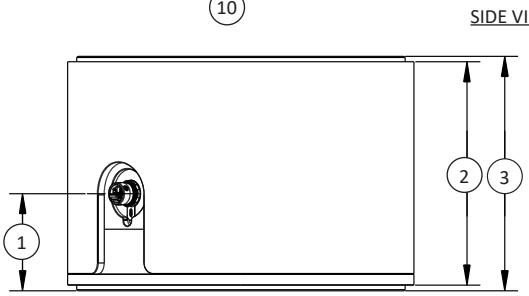
CABLE CONNECTION OPTIONS (Included with purchase)

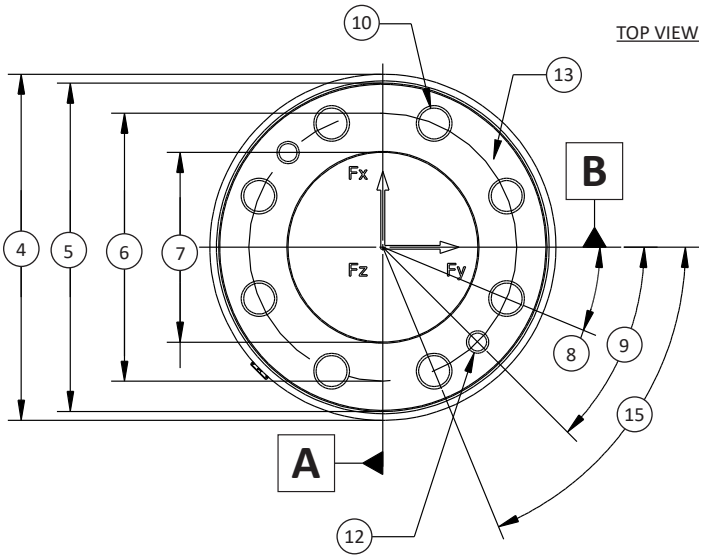
- M12 to 37-Pin D-Sub
- M12 to M16 24-pin
- M12 to 44-pin High Density D-Sub

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	43.5	1.71
(2)	100	3.94
(3)	105	4.13
(4)	Ø155	Ø6.10
(5)	Ø147	Ø5.79
(6)	Ø120 ± 0.1	Ø4.72 ± 0.004
(7)	Ø85 H8 ↧ 4	Ø3.35 H8 ↧ 0.16
(8)	22.5°	22.5°
(9)	45°	45°
(10)	8 x M16 x 2 ↧ 20 ⌵ 118°	8 x M16 x 0.08 ↧ 0.79 ⌵ 118°
(11)	2 x Ø10E7 ↧ 20 ⌵ 118° ⌖0.02/C/D	2 x Ø10E7 ↧ 0.79 ⌵ 118° ⌖0.0008/C/D
(12)	2 x Ø10E7 ↧ 20 ⌵ 118° ⌖0.02/A/B	2 x Ø10E7 ↧ 0.79 ⌵ 118° ⌖0.0008/A/B
(13)	Live End / Measuring Surface	
(14)	Dead End	
(15)	67.5°	67.5°







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3AR225 ROUND 3-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 3AR225 (Shown)

APPLICATIONS

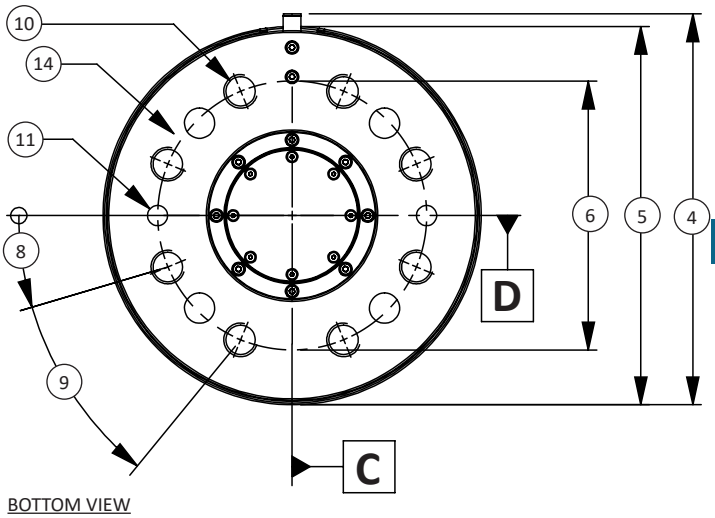
- Integration into wind tunnel models
- Integration into handles of medical tools
- Sports medicine
- Biomechanics
- Control of assembly and handling processes in micromechanics

CABLE CONNECTION OPTIONS (Included with purchase)

- M12 to 37-Pin D-Sub
- M12 to M16 24-pin
- M12 to 44-pin High Density D-Sub

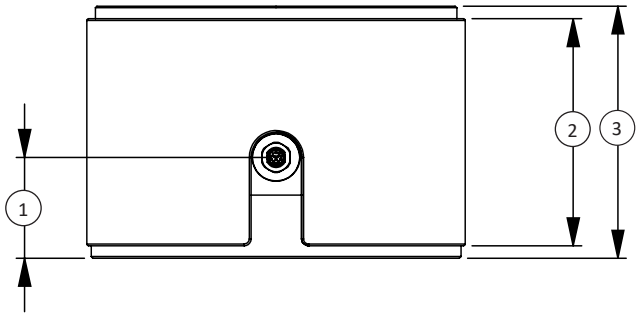
DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	60	2.36
(2)	135	5.31
(3)	150	5.90
(4)	ca. 232.50	ca. 9.15
(5)	Ø225	Ø8.86
(6)	Ø160	Ø6.30
(7)	22.5°	22.5°
(8)	16.45°	16.45°
(9)	50.76°	50.76°
(10)	8 x Ø17.50 ↧ 32.50 M20 - 6H ↧ 25	8 x Ø0.69 ↧ 1.28 M20 - 6H ↧ 0.98
(11)	2 x Ø12 E7 ↧ 20 ⌖0.02/C/D	2 x Ø0.47 E7 ↧ 0.79 ⌖0.0008/C/D
(12)	2 x Ø8 ↧ 75 ⌴ Ø12 E7 ↧ 20 ⌖ Ø0.02/A/B	2 x Ø0.31 ↧ 2.95 ⌴ Ø0.47 E7 ↧ 0.79 ⌖Ø0.0008/A/B
(13)	Live End / Measuring Surface	
(14)	Dead End	
(15)	67.5°	67.5°

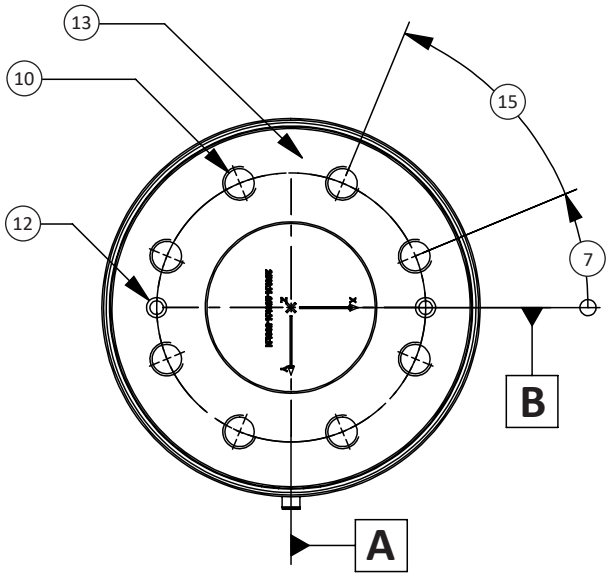


BOTTOM VIEW

SIDE VIEW



TOP VIEW



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

6A SERIES 6-AXIS STANDARD CAPACITY LOAD CELLS - Fx Fy Fz Mx My Mz (U.S. & METRIC)

FEATURES & BENEFITS

- 6-Axis – force and torque in all six axes
- Capacities: Force N(lbf) / Torque Nm(lbf-in) – 50(11.2)/1(8.85) to 100K(22.48K)/10K(88.51K)
- Compact size
- Force and moment values MUST be calculated using supplied 36-term coefficient matrix
- Low crosstalk
- Temperature compensated
- Optional BX8 amplifier and software can be used for force and moment value calculation

Interface's 6-axis load cell measures forces simultaneously in three mutually perpendicular axes and three simultaneous torques about those same axes. Six full bridges provide mV/V output on six independent channels.

Interface's 6-axis load cell is ideally suited to many industrial and scientific applications, such as aerospace, robotics, automotive and medical research (orthopedics and biomechanical).

A 36-term coefficient matrix is included for calculating the load and torque values in each axis.

An 8-channel amplifier with USB PC interface is also available which simplifies data analysis.

STANDARD CONFIGURATION



Model 6A27 (Shown)



Model 6A175 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.1
Hysteresis – %FS		± 0.1
Nonrepeatability – %RO		± 0.5
Creep, in 20 min – %		± 0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	± 0.01
Effect on Output – % / deg	°C	± 0.05
Compensated Range	°C	-10 to +70*
	°F	+14 to +158*
Operating Range	°C	-10 to +85
	°F	+14 to +185
ELECTRICAL		
Rated Output – mV/V (Nominal)		±0.4
Excitation Voltage – V MAX		5
Crosstalk – %		±1
Zero Balance – mV/V		< 2
Input Resistance (6A27) – Ω		1K ±10
Output Resistance (6A27) – Ω		1K ±10
Input Resistance – Ω		350 ±10
Output Resistance – Ω		350 ±10
MECHANICAL		
Safe Overload – %CAP		150
Ultimate Overload – %RO		300
Cable Length	m	5
	ft	16.4

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

**** Temperature compensation not available on Models 6A27 and 6A40***

6A SERIES 6-AXIS STANDARD CAPACITY LOAD CELLS - Fx Fy Fz Mx My Mz (U.S. & METRIC)

CHARACTERISTICS

See Drawing	MODEL												
	6A27	6A40			6A68					6A80			
	A	A	B	C	A	B	C	D	E	A	B	C	D
Fx (N)	50	200	500	50	1K	2K	5K	10K	10K	1K	2K	5K	500
Fy (N)	50	200	500	50	1K	2K	5K	10K	10K	1K	2K	5K	500
Fz (N)	200	500	2K	200	2K	4K	10K	20K	20K	2.5K	5K	15K	1K
Mx (Nm)	1	5	20	5	20	50	50	100	500	50	100	250	20
My (Nm)	1	5	20	5	20	50	50	100	500	50	100	250	20
Mz (Nm)	1	10	40	10	20	50	50	100	500	50	100	250	20
Diameter (mm)	Ø27	Ø60		Ø60	Ø83					Ø80			
Height (mm)	25	40		40	64					50			
Weight (g)	25	250	400	160	830		1050			450		1000	450
Material	SS	AL	SS		AL		SS			AL		SS	AL

See Drawing	MODEL						
	6A110				6A130		
	A	B	C	D	A	B	C
Fx (N)	4K	10K	1K	8K	5K	15K	1K
Fy (N)	4K	10K	1K	8K	5K	15K	1K
Fz (N)	10K	25K	2.5K	20K	15K	50K	2.5K
Mx (Nm)	250	750	100	500	500	1.2K	200
My (Nm)	250	750	100	500	500	1.2K	200
Mz (Nm)	250	750	100	500	500	1.2K	200
Diameter (mm)	Ø110		Ø110	Ø110	Ø130		Ø130
Height (mm)	60		60	60	80		80
Weight (g)	880	1800	880	880	1500	3200	1500
Material	AL	SS	AL	AL	AL	SS	AL
Protection (IP)	65		65	65	65		65

See Drawing	MODEL										
	6A150				6A154				6A175		
	A	B	C	D	A	B	C	D	A	B	C
Fx (N)	2K	4K	10K	30K	50	100	200	500	10K	20K	50K
Fy (N)	2K	4K	10K	30K	50	100	200	500	10K	20K	50K
Fz (N)	5K	10K	25K	90K	100	200	500	1K	20K	50K	100K
Mx (Nm)	200	500	1K	3K	5	10	20	50	1K	2K	5K
My (Nm)	200	500	1K	3K	5	10	20	50	1K	2K	5K
Mz (Nm)	200	500	1K	3K	5	10	20	50	1K	2K	10K
Diameter (mm)	Ø150				Ø154				Ø175		
Height (mm)	90				120				116		
Weight (g)	1500			2100	800				11,000		
Material	AL			SS	AL				SS		
Protection (IP)	65				65				65		

Note: Higher capacities available upon request

6A27 6-AXIS STANDARD CAPACITY LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6A27 (Shown)

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	6 x (M2x0.4) ↧ 4 ⌵ 118°	6 x (M2x0.4) ↧ 0.2 ⌵ 118°
(2)	Ø2 E7 ↧ 4	Ø(0.0797/0.0793) ↧ 0.2
(3)	60°	
(4)	Ø27	Ø1.1
(5)	Ø23 (+0.000/-0.025)	Ø0.9 (+0.0000/-0.0010)
(6)	Ø 20	Ø 0.8
(7)	Ø17 (+0.10/+0.05)	Ø0.7 (+0.004/+0.002)
(8)	25	1.0
(9)	23	0.9
(10)	3.5	0.14
(11)	Bolting Surface / Measuring Platform	
(12)	Bolting Surface	

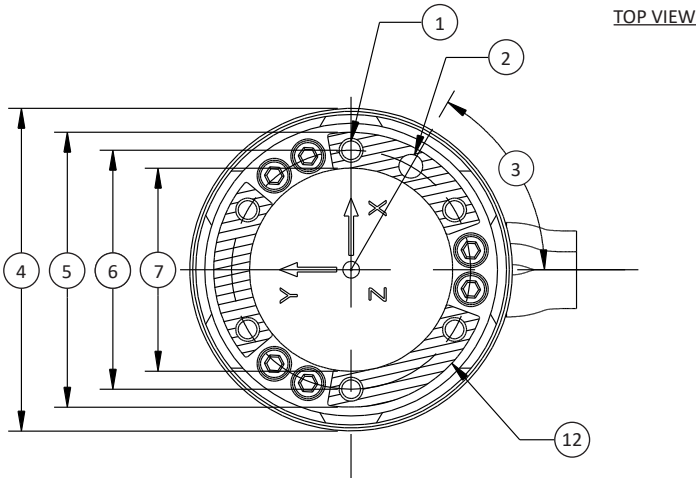
U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

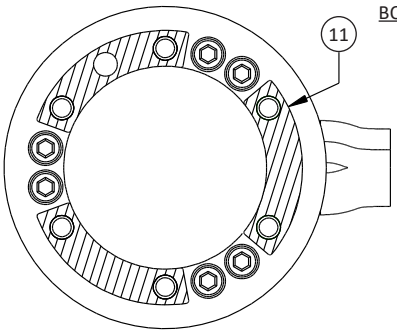
APPLICATIONS

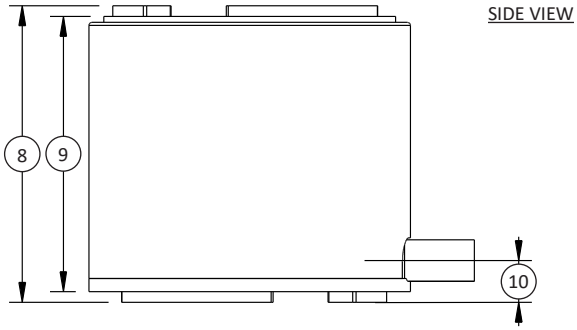
- Integration into wind tunnel models
- Integration into handles of medical tools
- Sports medicine
- Biomechanics
- Control of assembly and handling processes in micromechanics

CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub







6A40 6-AXIS STANDARD CAPACITY LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6A40 (Shown)



Model 6A40 (Shown)

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	Ø3 E7 ↧ 7	Ø(0.1192/0.1187) ↧ 0.3
(2)	6 x (M5x0.8) ↧ 6	6 x (M5x0.8) ↧ 0.2
(3)	60°	
(4)	Ø60	Ø2.4
(5)	Ø52 (+0.000/-0.050)	Ø2.0 (+0.0000/-0.0020)
(6)	Ø47	Ø1.9
(7)	Ø42	Ø1.7
(8)	40	1.6
(9)	36	1.4
(10)	17	0.7
(11)	30	1.2
(12)	64	2.5
(13)	Bolting Surface / Measuring Platform	
(14)	Bolting Surface	

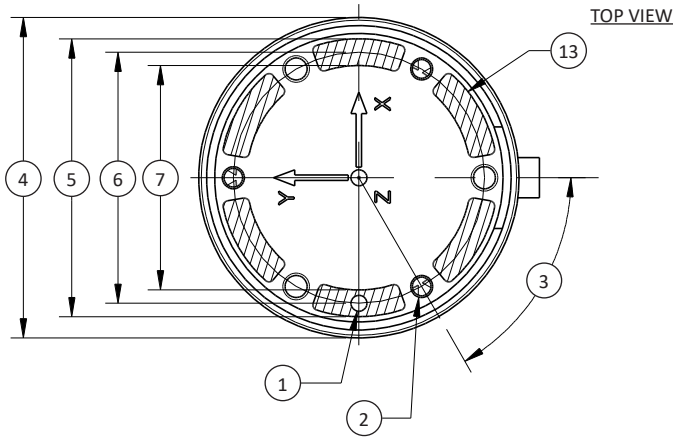
U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

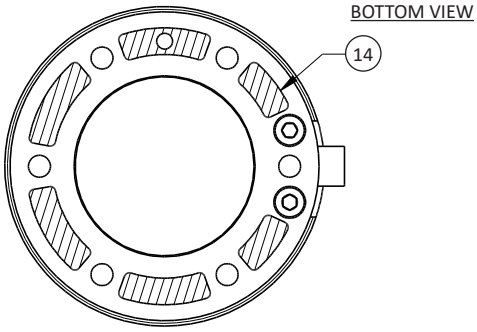
APPLICATIONS

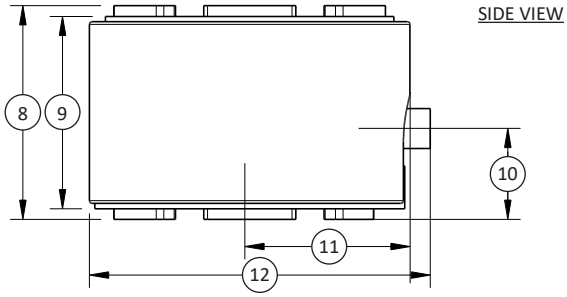
- Collision detection
- "Teach-In"
- Presence or error detection
- Medical / prosthetics / orthopedics
- Gait analysis
- Sports medicine
- Comfort / ergonomics

CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub







6A68 6-AXIS STANDARD CAPACITY LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6A68 (Shown)

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	6 x (M10x1.5) ↧ 12	6 x (M10x1.5) ↧ 0.5
(2)	2 x Ø6 H7 ↧ 12	2 x Ø(0.2367/0.2362) ↧ 0.5
(3)	30°	
(4)	Ø84	Ø3.3
(5)	Ø69	Ø2.7
(6)	Ø65	Ø2.6
(7)	64	2.5
(8)	63	2.5
(9)	24	0.9
(10)	42	1.7
(11)	105 (+5)	4.1 (+0.2)
(12)	Bolting Surface / Measuring Platform	
(13)	Bolting Surface	

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

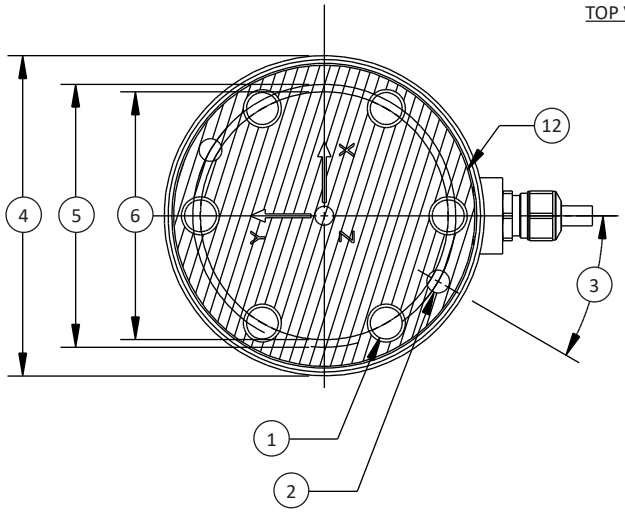
APPLICATIONS

- Collision detection
- "Teach-In"
- Presence or error detection
- Medical / prosthetics / orthopedics
- Gait analysis
- Sports medicine
- Comfort / ergonomics

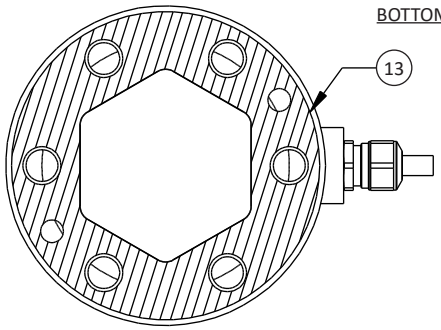
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

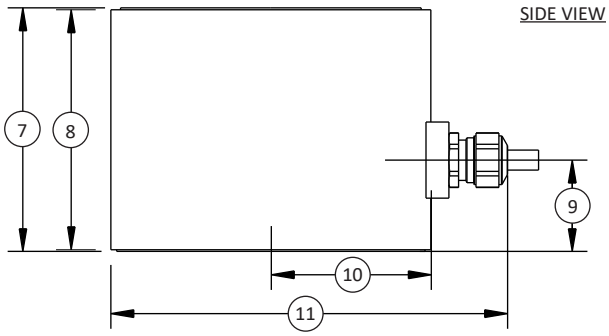
TOP VIEW



BOTTOM VIEW



SIDE VIEW



See adapter plates for 6A68 on the next page

6A68 6-AXIS STANDARD CAPACITY LOAD CELL (U.S. & METRIC)

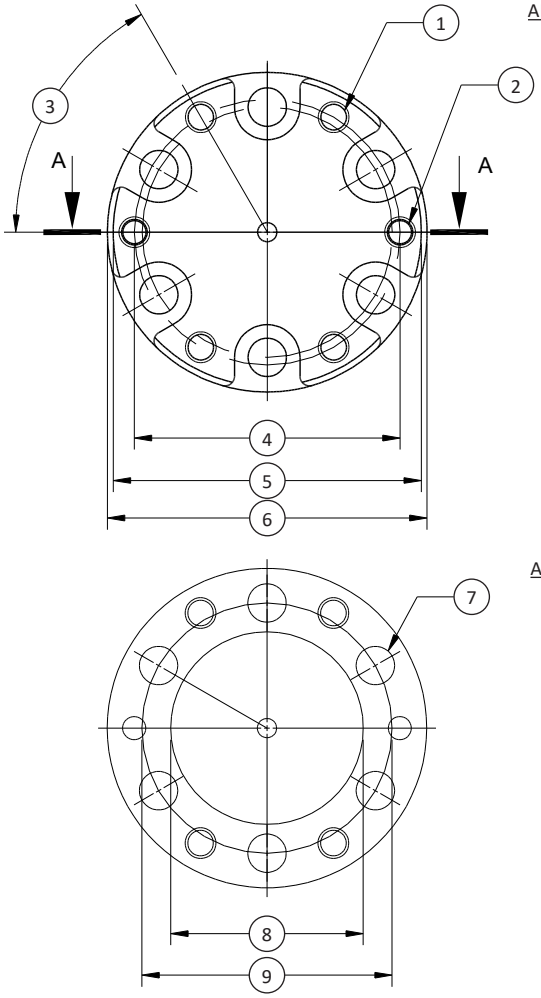
ADAPTER PLATES

- Two required per sensor
- Aluminum or stainless steel depending on capacity
- 6A68 only

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	4 x (M8x1.25) THRU	4 x (M8x1.25) THRU
(2)	2 x Ø6 H7 THRU, (M8x1.25) ↧ 12 ⌵ 118°	2 x Ø(0.2367/0.2362) THRU, (M8x1.25) ↧ 0.5 ⌵ 118°
(3)	6 x 60°	
(4)	Ø69	Ø2.7
(5)	Ø80 h7	Ø(3.1496/3.1484)
(6)	Ø83	Ø3.3
(7)	6 x Ø10 THRU	6 x Ø0.4 THRU
(8)	Ø50	2.0
(9)	Ø65	2.6
(10)	4	0.2
(11)	15	0.6
(12)	3	0.1
(13)	2	0.08
(14)	Ø6 H7	Ø(0.2367/0.2362)
(15)	12	0.5
(16)	Ø5 h7	Ø(0.1968/0.1964)
(17)	M8x1.25	5/16-24

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.



Adapter Plates (Shown)

6A80 6-AXIS STANDARD CAPACITY LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6A80 (Shown)



Model 6A80 (Shown)

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	2 x Ø5 E7 ↧ 6	2 x Ø(0.1981/0.1976) ↧ 0.2
(2)	6 x (M8x1.25) ↧ 9	6 x (M8x1.25) ↧ 0.4
(3)	Ø80	Ø3.1
(4)	Ø75	Ø3.0
(5)	Ø60	Ø2.4
(6)	Ø45 H8 ↧ 3	Ø(1.7732/1.7716) ↧ 0.1
(7)	60°	
(8)	45°	
(9)	50	2.0
(10)	1	0.04
(11)	21.5	0.85
(12)	94 (+1)	3.7 (+0.04)
(13)	Bolting Surface / Measuring Platform	
(14)	Bolting Surface	
(15)	Ø45 H8 – Spigot	Ø(1.7732/1.7716) – Spigot

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

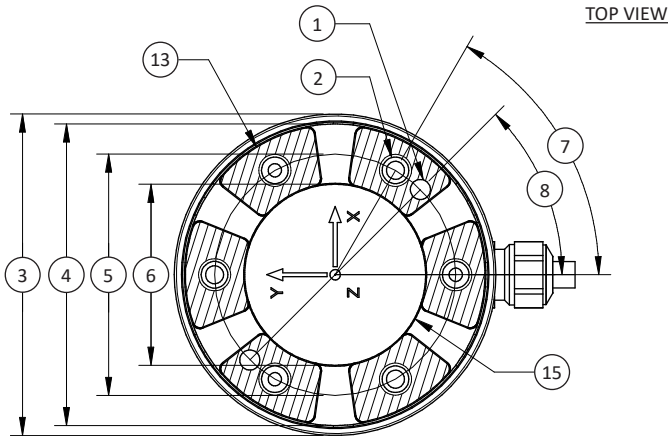
APPLICATIONS

- Collision detection
- "Teach-In"
- Presence or error detection
- Medical / prosthetics / orthopedics
- Force or torque-controlled operation
- Sports medicine
- Comfort / ergonomics

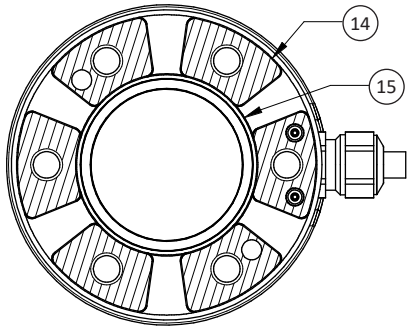
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

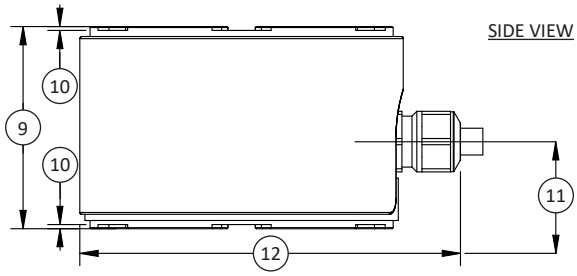
TOP VIEW



BOTTOM VIEW



SIDE VIEW

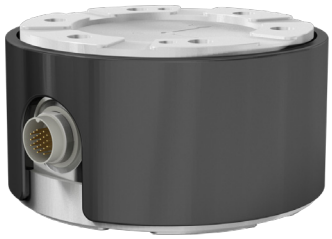


6A110 6-AXIS STANDARD CAPACITY LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6A110 (Shown)



Model 6A110 (Shown)



Model 6A110 (Shown)

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	2 x Ø6 E7 ↧ 10	2 x Ø(0.2375/0.2370) ↧ 0.4
(2)	6 x (M10x1.5) ↧ 10	6 x (M10x1.5) ↧ 0.4
(3)	Ø110	Ø4.3
(4)	Ø100	Ø3.9
(5)	Ø80	Ø3.1
(6)	Ø65 H8 ↧ 3	Ø(2.5609/2.5590) ↧ 0.1
(7)	60°	
(8)	45°	
(9)	60	2.4
(10)	1	0.04
(11)	28.5	1.12
(12)	120 (±1)	4.7 (±0.04)
(13)	Bolting Surface / Measuring Platform	
(14)	Bolting Surface	
(15)	Ø65 H8 – Spigot	Ø(2.5609/2.5590) – Spigot

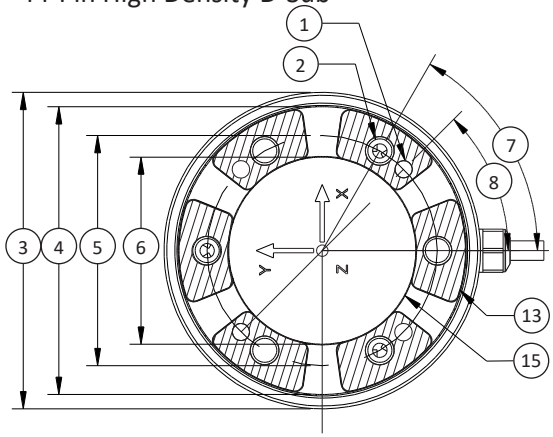
APPLICATIONS

- Collision detection
- "Teach-In"
- Presence or error detection
- Medical / prosthetics / orthopedics
- Force or torque-controlled operation
- Sports medicine
- Comfort / ergonomics

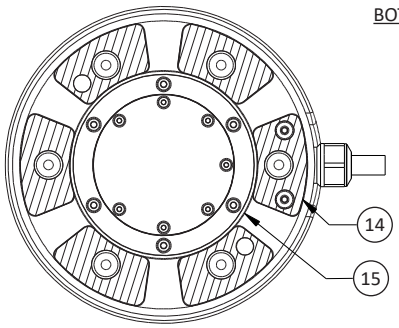
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

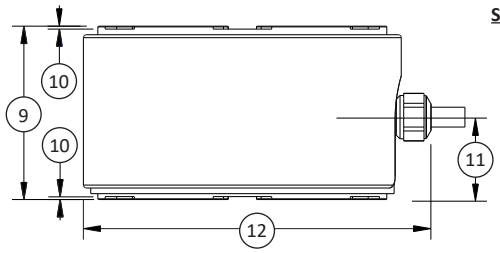
TOP VIEW



BOTTOM VIEW



SIDE VIEW



U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

6A130 6-AXIS STANDARD CAPACITY LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6A130 (Shown)



Model 6A130 (Shown)



Model 6A130 (Shown)

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	2 x Ø8 E7 ↧ 15	2 x Ø(0.3165/0.3159) ↧ 0.6
(2)	6 x (M12x1.75) ↧ 15	6 x (M12x1.75) ↧ 0.6
(3)	Ø130	Ø5.1
(4)	Ø120	Ø4.7
(5)	Ø100	Ø3.9
(6)	Ø80 H8 ↧ 3	Ø(3.1514/3.1496) ↧ 0.1
(7)	60°	
(8)	45°	
(9)	80	3.1
(10)	1	0.04
(11)	36	1.4
(12)	140 (±1)	5.5 (±0.04)
(13)	Bolting Surface / Measuring Platform	
(14)	Bolting Surface	
(15)	Ø80 H8 – Spigot	Ø(3.1514/3.1496) – Spigot

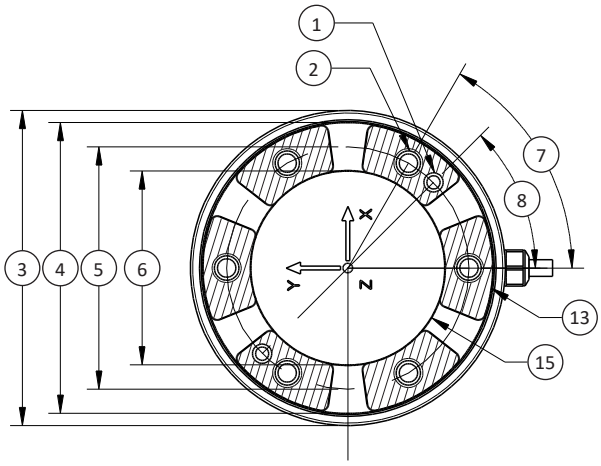
APPLICATIONS

- Collision detection
- “Teach-In”
- Presence or error detection
- Medical / prosthetics / orthopedics
- Force or torque-controlled operation
- Sports medicine
- Comfort / ergonomics

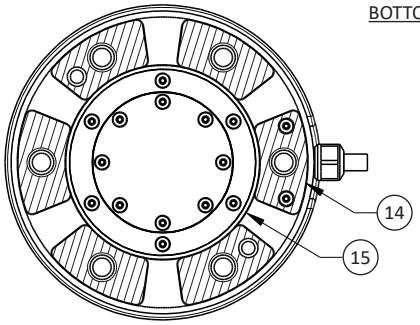
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

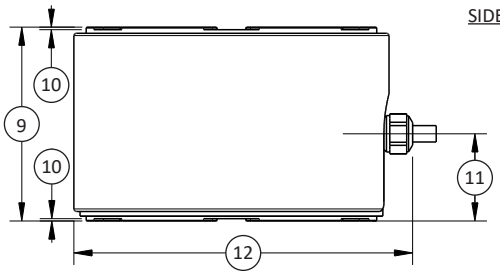
TOP VIEW



BOTTOM VIEW



SIDE VIEW



U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

6A150 6-AXIS STANDARD CAPACITY LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6A150 (Shown)

DIMENSIONS

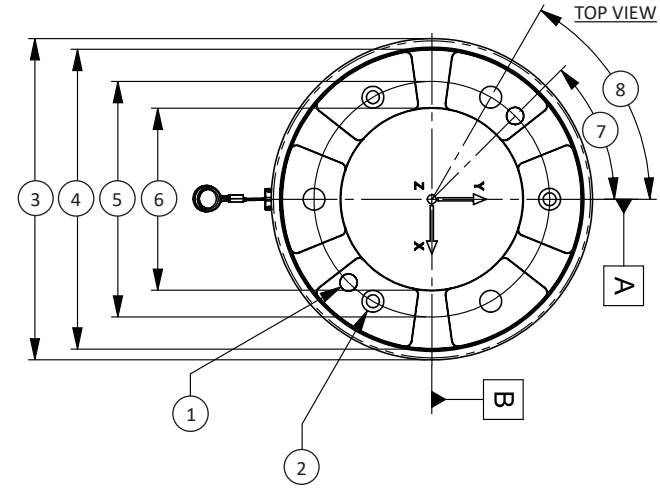
See Drawing	Metric	U.S.
	mm	in
(1)	+0.04 2x Ø8 E7 +0.03 ↧ 15 Ø8.05 X 90° Above ⌖ Ø0.02/A/B	+0.001 2x Ø0.3 E7 +0.001 ↧ 0.5 Ø0.31 X 90° Above ⌖Ø0.0007/A/B
(2)	6x Ø10.20 ↧ 18 M12 - 6H ↧ 16	6x Ø0.4 ↧ 0.7 M12 - 6H ↧ 0.6
(3)	Ø150	Ø5.90
(4)	Ø140	Ø5.51
(5)	Ø110	Ø4.33
(6)	Ø85 H8	Ø3.3 H8
(7)	45°	45°
(8)	60°	60°
(9)	90	3.54
(10)	2.50	0.09
(11)	4	0.15
(12)	38.50	1.51
(13)	152.90	6.01
(1)	+0 2x Ø8 E7 +0 ↧ 15 Ø8.05 X 90° Above ⌖ Ø0.02/A/B	+0 2x Ø0.3 E7 +0 ↧ 0.5 Ø0.31 X 90° Above ⌖ Ø0.0007/A/B

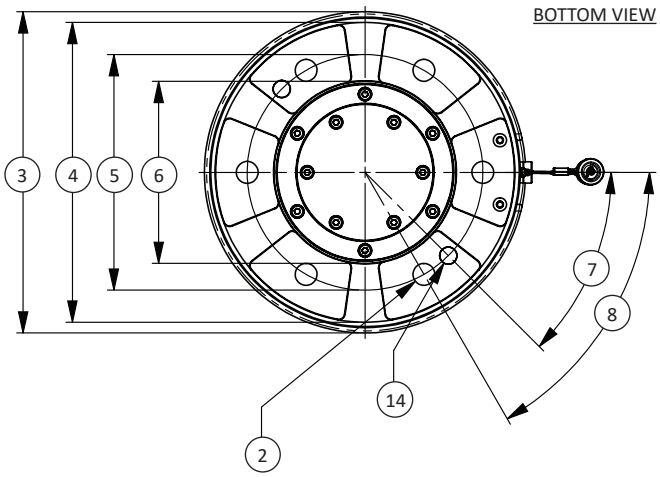
APPLICATIONS

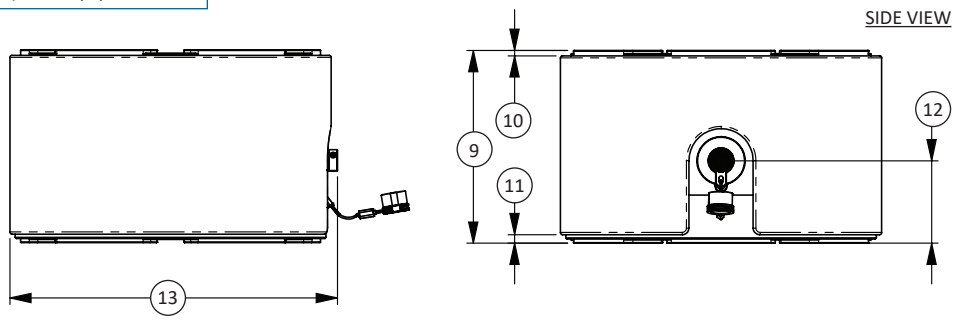
- Wind tunnel balances
- Combines low force with high moment capacity

CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub







6A154 6-AXIS STANDARD CAPACITY LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6A154 (Shown)

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	6 x (M6x1) ↧ 8	6 x (M6x1) ↧ 0.3
(2)	Ø6 E7 ↧ 8	Ø(0.2375/0.2370) ↧ 0.3
(3)	Ø154	Ø6.1
(4)	Ø147	Ø5.8
(5)	Ø132 (+0.000/-0.025)	Ø5.2 (+0.0000/-0.0010)
(6)	Ø128	Ø5.0
(7)	60°	
(8)	30°	
(9)	Ø130	Ø5.1
(10)	100	3.9
(11)	96	3.8
(12)	28	1.1
(13)	77	3.0
(14)	158 (+4)	6.2 (+0.2)
(15)	Bolting Surface / Measuring Platform	
(16)	Bolting Surface	

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

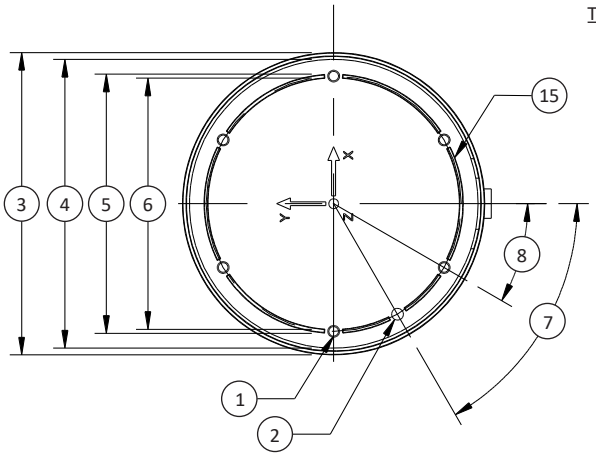
APPLICATIONS

- Wind tunnel balances
- Combines low force with high moment capacity

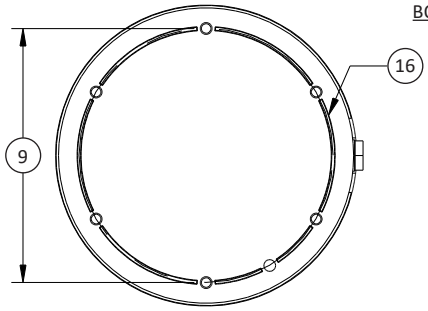
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

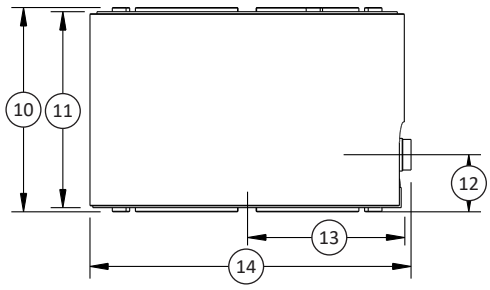
TOP VIEW



BOTTOM VIEW



SIDE VIEW



6A175 6-AXIS STANDARD CAPACITY LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6A175 (Shown)



Model 6A175 (Shown)



Model 6A175 (Shown)

DIMENSIONS

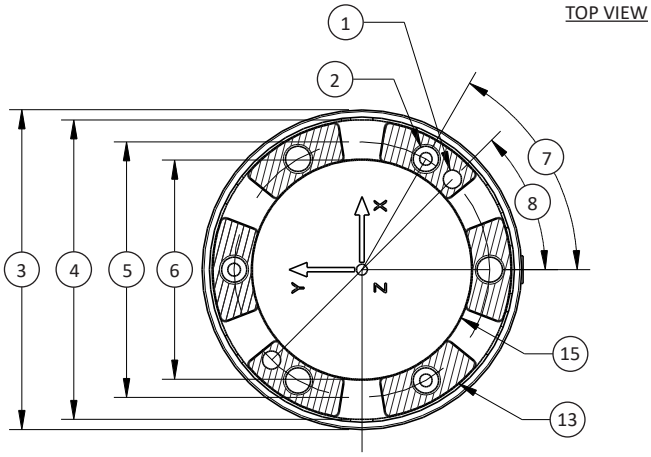
See Drawing	Metric	U.S.
	mm	in
(1)	2 x Ø10 E7 ↧ 25	2 x Ø(0.3953/0.3947) ↧ 1.0
(2)	6 x (M16x2) ↧ 25	6 x (M16x2) ↧ 1.0
(3)	Ø175	Ø6.9
(4)	Ø164	Ø6.5
(5)	Ø140	Ø5.5
(6)	Ø10 H8 ↧ 4	Ø(4.7265/4.7244) ↧ 0.2
(7)	60°	
(8)	45°	
(9)	110	4.3
(10)	1.7	0.07
(11)	46	1.8
(12)	176 (+3)	6.9 (+0.1)
(13)	Bolting Surface / Measuring Platform	
(14)	Bolting Surface	
(15)	Ø120 H8 – Spigot	Ø(4.7265/4.7244) – Spigot

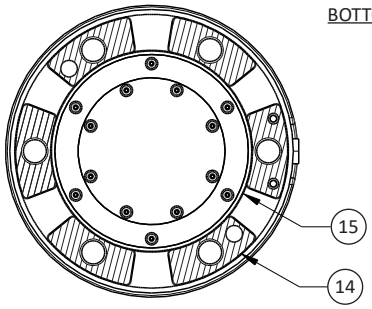
APPLICATIONS

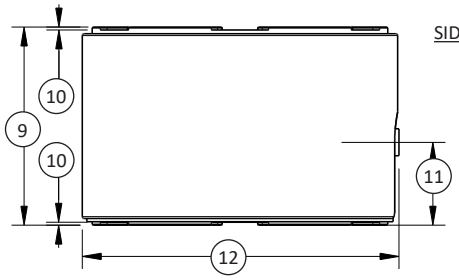
- Automation and robotics
- Press force
- Seismic studies

CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub







U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

6A SERIES 6-AXIS HIGH CAPACITY LOAD CELLS - Fx Fy Fz Mx My Mz (U.S. & METRIC)

FEATURES & BENEFITS

- 6-Axis – force and torque in all six axes
- Capacities: Force N(lbf)/Torque Nm(lbf-in)
  - 50kN(11.2K lbf)/10kNm(88.5K lbf-in)
  - 100kN(22.4K lbf)/15kNm(132.7K lbf-in)
  - 200kN(44.9K lbf)/20kNm(177K lbf-in)

  Nominal Force:
  - Fx: 400kN(89.9K lbf)
  - Fy: 400kN(89.9K lbf)
  - Fz: 800kN(179.8K lbf)

  Nominal Torque:
  - Mx: 40kNm(354K lbf-in)
  - My: 40kNm(354K lbf-in)
  - Mz: 40kNm(354K lbf-in)
- Compact size
- Force and moment values MUST be calculated using supplied 72-term coefficient matrix
- Low crosstalk - <1%
- Temperature compensated
- Optional BX8 amplifier and software can be used for force and moment value calculation

Interface's 6-axis load cell measures forces simultaneously in three mutually perpendicular axes and three simultaneous torques about those same axes. 12 full bridges provide mV/V output on 12 independent channels.
Interface's 6-axis load cell is ideally suited to many industrial and scientific applications, such as aerospace, robotics, automotive and medical research (orthopedics and biomechanical).
A 72-term coefficient matrix is included for calculating the load and torque values in each axis.
Interface's BX8 Amplifiers including BlueDAQ software greatly simplify the data acquisition process.

CHARACTERISTICS

See Drawing	MODEL			
	6A225			6A300
	A	B	C	A
Fx (N)	50K	100K	200K	400K
Fy (N)	50K	100K	200K	400K
Fz (N)	100K	250K	500K	800K
Mx (Nm)	10K	15K	20K	40K
My (Nm)	10K	15K	20K	40K
Mz (Nm)	10K	15K	20K	40K
Diameter (mm)	225			300
Height (mm)	140			175
Weight (kg)	24			25
Material	Stainless steel with stainless steel housing			
Protection (IP)	65			65

STANDARD CONFIGURATION



Model 6A225 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.2%
Hysteresis – %FS		± 0.2%
Creep, in 20 min – %		± 0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	± 0.01
Effect on Output – % / deg	°C	± 0.05
Compensated Range	°C	-10 to +70
	°F	+14 to +158
Operating Range	°C	-10 to +85
	°F	+14 to +185
ELECTRICAL		
Rated Output – mV/V (Nominal)		±0.4
Excitation Voltage – V MAX		5
Crosstalk – %		±1
Zero Balance – mV/V		< 2
Input Resistance – Ω		1K ±10
Output Resistance – Ω		1K ±10
Input Resistance – Ω		350 ±10
Output Resistance – Ω		350 ±10
MECHANICAL		
Safe Overload – %CAP		150
Ultimate Overload – %RO		300
Cable Length	m	5
	ft	16.4

Note: Higher capacities available upon request

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

6A300 6-AXIS HIGH CAPACITY LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6A225 (Shown)

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	2x Ø12 E7 ↧ 18 ⌖ 0.02/A/B	2x Ø0.47 E7 ↧ 0.7 ⌖ 0.0007/A/B
(2)	12x M20 x 2.5 ↧ 25 ⌵ 118°	12x M20 x 2.5 ↧ 0.98 ⌵ 118°
(3)	Ø225	Ø8.85
(4)	Ø215	Ø8.46
(5)	Ø180	Ø7.08
(6)	Ø145 H8 ↧ 4	Ø5.7 H8 ↧ 0.15
(7)	2x Ø12 E7 ↧ 18 ⌖ 0.02/C/D	2x Ø0.47 E7 ↧ 0.7 ⌖ 0.0007/C/D
(8)	30°	
(9)	45°	
(10)	58	2.28
(11)	140	5.51
(12)	224.5	8.83
(13)	5	0.19

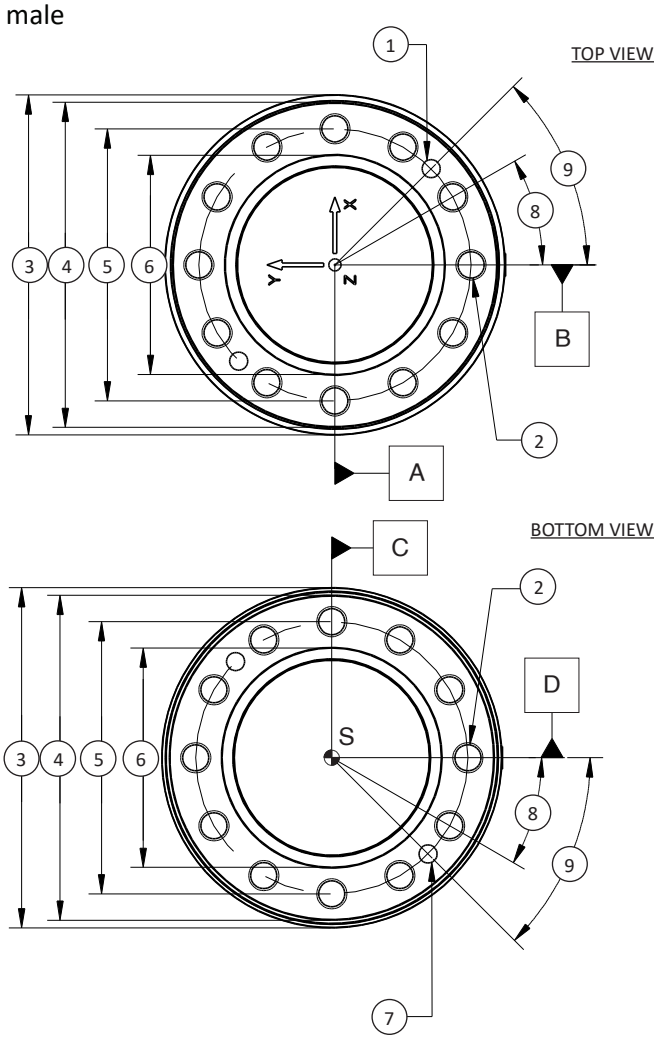
U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

APPLICATIONS

- Automation and robotics

CONNECTOR

- 2x integrated round plug connector (UP13), 27-pole, male



6A300 6-AXIS HIGH CAPACITY LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION



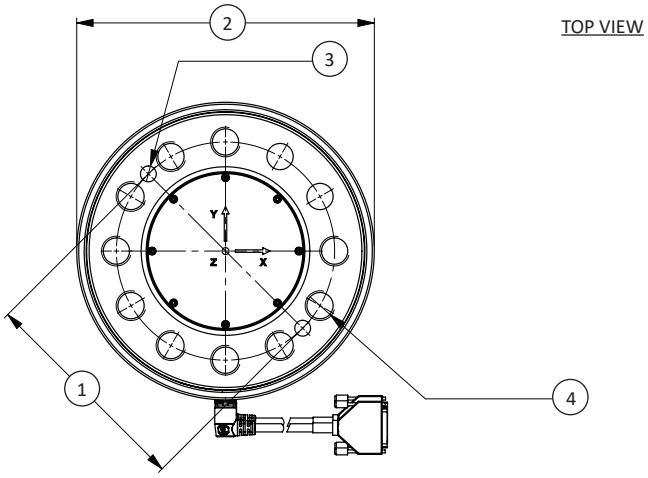
Model 6A300 (Shown)

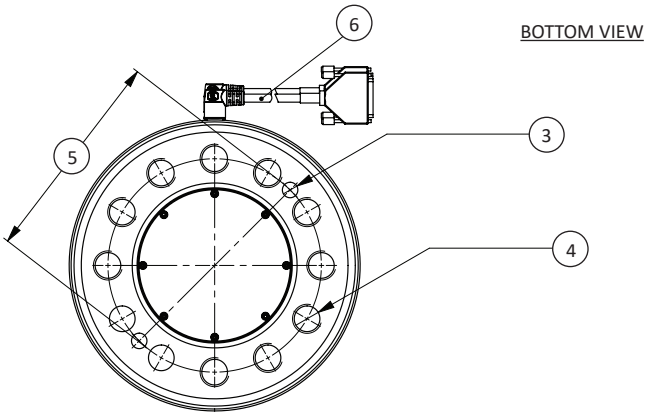
APPLICATIONS

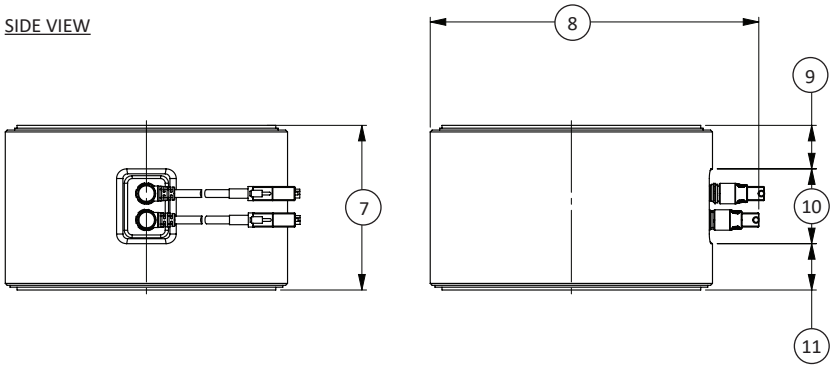
- Automation and robotics

CONNECTOR

- 2x integrated round plug connector (UP13), 27-pole, male







DIMENSIONS

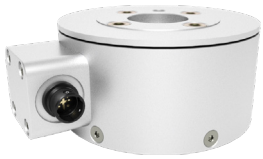
See Drawing	Metric	U.S.
	mm	in
(1)	Ø220 +0.02	Ø8.66 +0.0007
(2)	Ø300	Ø11.81
(3)	2x Ø16 E7 ↧ 30	2x Ø0.62 E7 ↧ 1.18
(4)	12x Ø26.50 ↧ 50 M30 - 6H ↧ 45	12x Ø1.04 ↧ 1.96 M30 - 6H ↧ 1.77
(5)	Ø220 ±0.02	Ø8.66 +0.0007
(6)	Cable Length 5m	Cable Length 16.4ft
(7)	175	6.88
(8)	349	13.74
(9)	46	1.811
(10)	80	3.14
(11)	49	1.92

6ADF SERIES 6-AXIS DIN FLANGE-TYPE LOAD CELLS - Fx Fy Fz Mx My Mz (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6ADF45 (Shown)



Model 6ADF80 (Shown)



Model 6ADF100 (Shown)

FEATURES & BENEFITS

- 6-Axis – force and torque in all six axes
- Capacities - Force 20N to 1.2kN, Torque 1Nm to 60Nm
- Compact size
- Force and moment values MUST be calculated using supplied 36-term coefficient matrix
- Low crosstalk
- Temperature compensated
- Mounting per DIN EN ISO 9409-1
- Optional BX8 amplifier and software can be used for force and moment value calculation

Interface's 6-axis load cell measures forces simultaneously in three mutually perpendicular axes and three simultaneous torques about those same axes. Six full bridges provide mV/V output on six independent channels.

Interface's 6-axis load cell is ideally suited to many industrial and scientific applications, such as aerospace, robotics, automotive and medical research (orthopedics and biomechanical).

A 36-term coefficient matrix is included for calculating the load and torque values in each axis.

An 8-channel amplifier with USB PC interface is also available which simplifies data analysis.

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.1
Hysteresis – %FS		± 0.1
Nonrepeatability – %RO		± 0.5
Creep, in 20 min – %		± 0.1
TEMPERATURE		
Effect on Zero – %RO / deg	°C	± 0.01
Effect on Output – % / deg	°C	± 0.05
Compensated Range	°C	-10 to +70
	°F	+14 to +158
Operating Range	°C	-10 to +85
	°F	+14 to +185
ELECTRICAL		
Rated Output – mV/V (Nominal)		<2
Excitation Voltage – V MAX		5
Crosstalk – %		3
Zero Balance – mV/V		< 1
Input Resistance – Ω		1K ±10
Output Resistance – Ω		1K ±10
MECHANICAL		
Safe Overload – %CAP		150
Ultimate Overload – %RO		600
Cable Length	m	5
	ft	16.4

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

6ADF SERIES 6-AXIS DIN FLANGE-TYPE LOAD CELLS - Fx Fy Fz Mx My Mz (U.S. & METRIC)

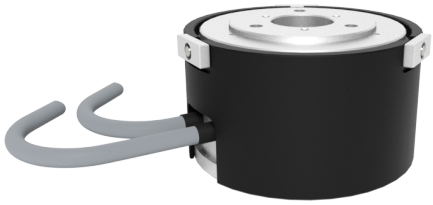
CHARACTERISTICS

See Drawing	MODEL				
	6ADF45	6ADF80		6ADF100	
	A	A	B	A	B
Fx (N)	20	100	300	200	600
Fy (N)	20	100	300	200	600
Fz (N)	50	200	600	400	1200
Mx (Nm)	1	10	30	20	60
My (Nm)	1	10	30	20	60
Mz (Nm)	1	10	30	20	60
Diameter (mm)	45	80	80	100	100
Height (mm)	27	40	40	40	40
Thru-hole (mm)	12	20	20	25	25
Weight (g)	180	320	320	470	470
Material	Aluminum Alloy	Aluminum Alloy	Aluminum Alloy	Aluminum Alloy	Aluminum Alloy
Protection (IP)	64	64	64	64	64
DIN Type	DIN EN ISO 9409-1	DIN EN ISO 9409-1	DIN EN ISO 9409-1	DIN EN ISO 9409-1	DIN EN ISO 9409-1
Nominal mV/V	< 2	< 1	< 1	< 1	< 1

U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

6ADF45 6-AXIS DIN FLANGE-TYPE LOAD CELLS (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6ADF45 (Shown)

FEATURES & BENEFITS

- Low forces Fx, Fy 20N, Fz: 50 N
- Low torque Mx, My, Mz: 1 Nm
- Light weight aluminum construction
- Center through-hole
- Integrated overload protection
- Robust connection cable
- DIN EN ISO-9409-1 mounting

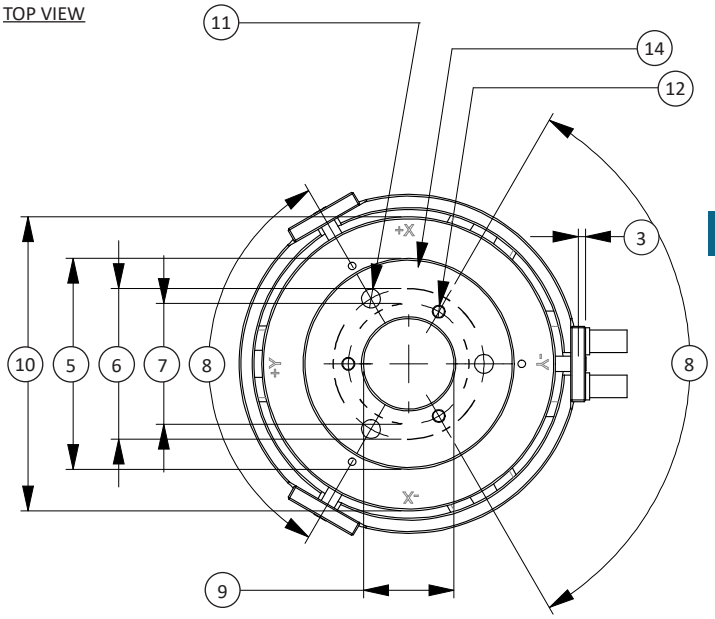
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

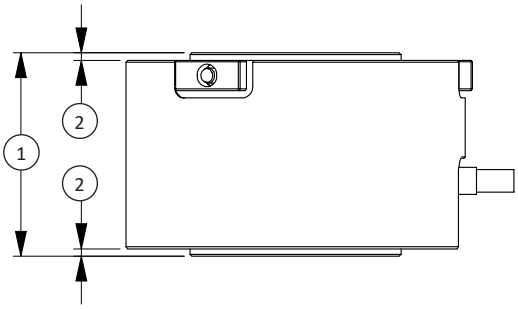
DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	27	1.06
(2)	1	0.04
(3)	1	0.04
(4)	Ø45	Ø1.77
(5)	Ø28	Ø1.10
(6)	Ø20	Ø0.79
(7)	Ø16	Ø0.63
(8)	120°	
(9)	Ø12 H10	Ø0.47 H10
(10)	Ø39	Ø1.54
(11)	3 x Ø2.5 E7 ↧ 8 M3 - 6H ↧ 6	3 x Ø0.1 E7 ↧ 0.31 M3 - 6H ↧ 0.24
(12)	3 x Ø1.5 E7/m6 - ↧ 5	3 x Ø0.06 E7/m6 - ↧ 0.2
(13)	Dead End	
(14)	Live End / Measuring Surface	

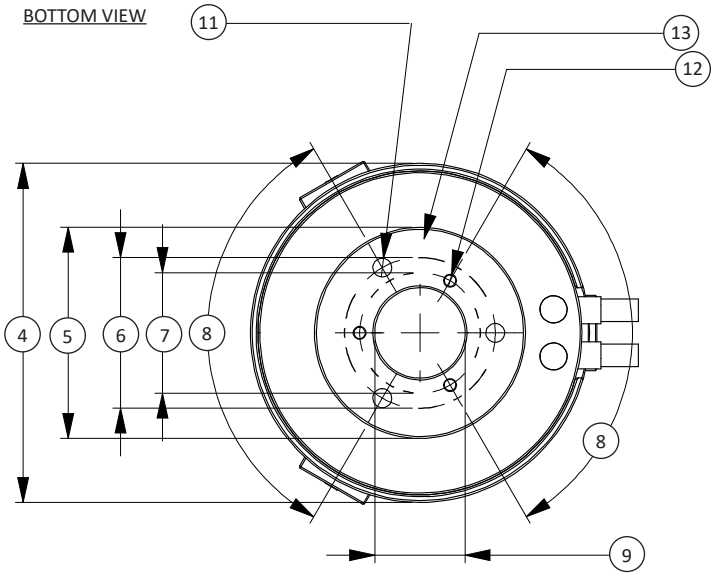
TOP VIEW



SIDE VIEW



BOTTOM VIEW



U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

6ADF80 6-AXIS DIN FLANGE-TYPE LOAD CELLS (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6ADF80 (Shown)

CABLE CONNECTION OPTIONS (Included with purchase)

- MP11 to M16 24-pin
- MP11 to 44-pin High Density D-Sub

OPTIONS

- CANbus

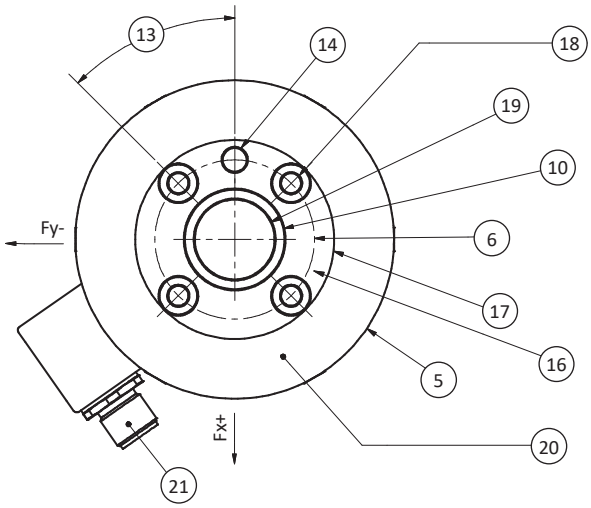
DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	40.0	1.57
(2)	26.0	1.02
(3)	3.0	0.12
(4)	27.0	1.06
(5)	Ø80.0	Ø3.15
(6)	Ø40.0	Ø1.57
(7)	Ø60.0	Ø2.36
(8)	Ø25.0 h6	Ø h6
(9)	4x M6x1.0 Socket Head Cap Screws, accessible with 4 mm socket wrench through opposite side mounting holes	
(10)	Ø25.0 H7 ↧ 6.0	Ø H7 ↧ 0.24
(11)	4x 5.9	4x 0.23
(12)	57.8	2.28
(13)	45°	
(14)	Ø6.0 H7 ↧ 6.0	Ø0.24 H7 ↧ 0.24
(15)	Dead End	
(16)	Live End / Measuring Surface	
(17)	Ø50.0	Ø1.97
(18)	4x ENSAT M6x1.0	
(19)	Ø20.0 THRU	Ø0.79 THRU
(20)	This Surface ↧ 3.0	This Surface ↧ 0.12
(21)	MP11 Connector for mV/V Output or M12 Connector for CANbus Output	

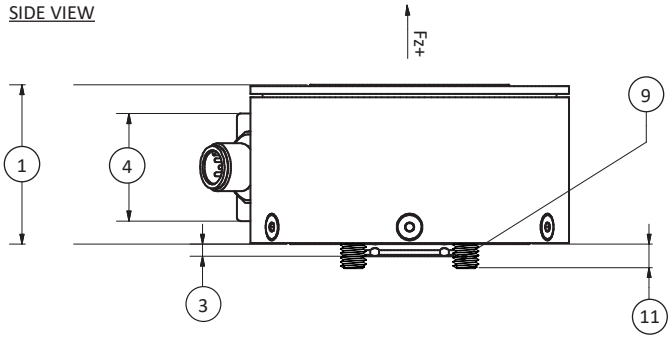
FEATURES & BENEFITS

- Light weight aluminum construction
- Compact design
- Center through hole
- DIN EN ISO-9409-1 mounting

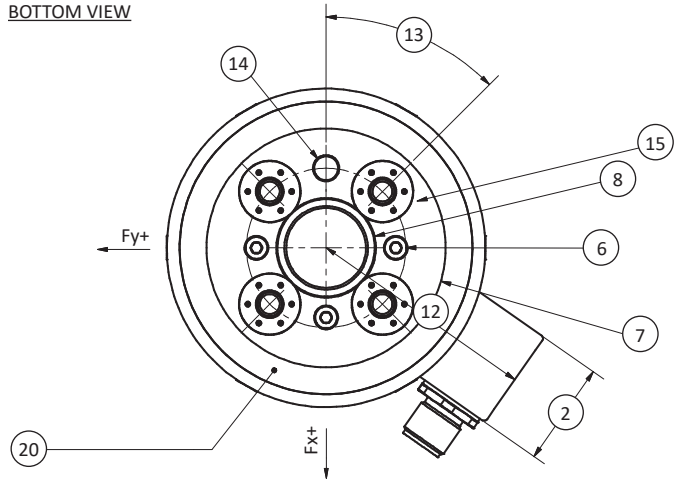
TOP VIEW



SIDE VIEW



BOTTOM VIEW



U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

6ADF100 6-AXIS DIN FLANGE-TYPE LOAD CELLS (U.S. & METRIC)

STANDARD CONFIGURATION



Model 6ADF100 (Shown)

CABLE CONNECTION OPTIONS (Included with purchase)

- MP11 to M16 24-pin
- MP11 to 44-pin High Density D-Sub

OPTIONS

- CANbus

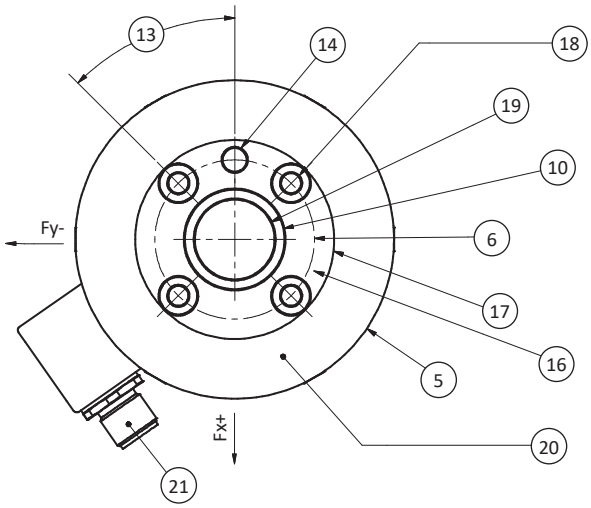
DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	40.0	1.57
(2)	26.0	1.02
(3)	3.0	0.12
(4)	27.0	1.06
(5)	Ø100.0	Ø3.94
(6)	Ø50.0	Ø1.97
(7)	Ø70.0	Ø2.75
(8)	Ø31.5 h6	Ø1.24 h6
(9)	4x M6x1.0 Socket Head Cap Screws, accessible with 4 mm socket wrench through opposite side mounting holes	
(10)	Ø31.5 H7 ↧ 6.0	Ø1.24 H7 ↧ 0.24
(11)	4x 5.9	4x 0.23
(12)	68.3	2.69
(13)	45°	
(14)	Ø6 H7 ↧ 6.0	Ø0.24 H7 ↧ 0.24
(15)	Dead End	
(16)	Live End / Measuring Surface	
(17)	Ø63.0	Ø2.48
(18)	4x ENSAT M6x1.0	
(19)	Ø25.0 THRU	Ø0.98 THRU
(20)	This Surface ↧ 3.0	This Surface ↧ 0.12
(21)	MP11 Connector for mV/V Output or M12 Connector for CANbus Output	

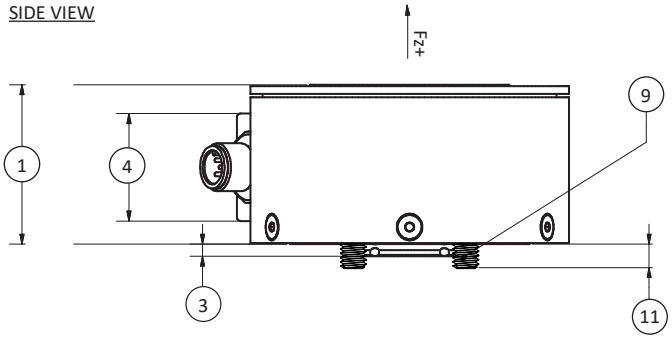
FEATURES & BENEFITS

- Light weight aluminum construction
- Compact design
- Center through hole
- DIN EN ISO-9409-1 mounting

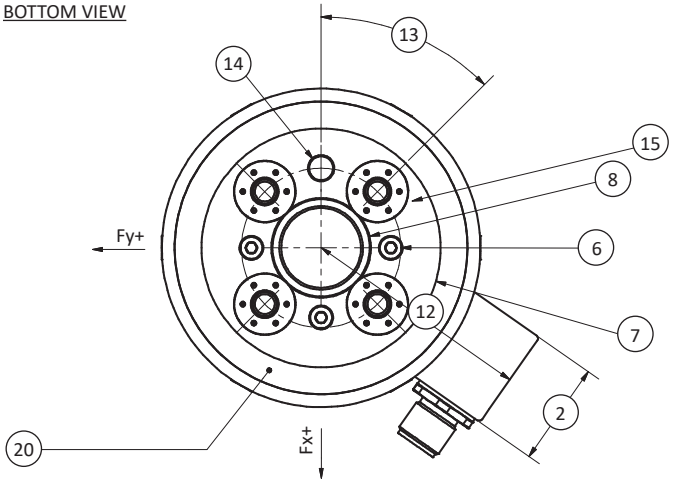
TOP VIEW



SIDE VIEW



BOTTOM VIEW



U.S. dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric dimensions. U.S. capacities available upon special request and at an additional cost.

Notes:

Notes:

Notes:

Load Pins

Standard.....339

Wireless 341

LP LOAD PIN (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities range up to 3,000K lbf (1,360 MT)
- Designed to replace pins or bolts that carry a load
- Stainless steel construction
- Used with clevises, or pulley shafts to monitor loads
- Custom designs

Industry applications:

- Tension / Compression Measurements
- Clevis Pin / Shackle Loading
- Sprockets & Pulley Axle
- Crane, Lifting & Winch System
- Mooring Line Tension Measurements
- Hydraulic Systems

Interface Load Pins are made with a dual-shear design and are designed which for center-loading with support from both ends. Interface load pins are strain gage based, the strain gages are installed in the inside-center, neutral axis of the load pin where they are protected from both physical damage and the environment. A full Wheatstone Bridge ensures the best specifications, while the physical design ensures proper alignment and anti-rotation of the application.

OPTIONS

- Integral connector
- Amplification (5VDC, 10VDC, 4-20mA)
- Wireless communication
- Bidirectional loading
- Dual bridge
- ATEX Approval
- High Temperature
- Submersible
- TEDS
- Anti-rotation Plate
- Shackles

STANDARD CONFIGURATION



Model 3461EGY-3K (Shown)

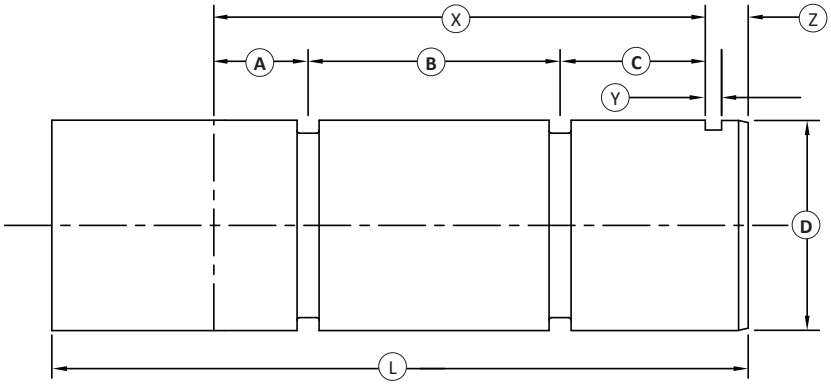
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.2 to 1.5 (typically) depending on pin geometry
Nonrepeatability – %FS		±0.1
TEMPERATURE		
Compensated Range	°F	+14 to +158
	°C	-10 to +70
Operating Range	°F	-4 to +158
	°C	-20 to +70
Zero Temperature Coefficient – % of Rated Load / °C		±0.1
Span Temperature Coefficient – % of Rated Load / °C		±0.1
ELECTRICAL		
Rated Output – mV/V (Nominal)		1.5
Zero Balance – %RO		±1
Bridge Resistance – Ohm		350, 1000, 5000
Excitation Voltage – VDC MAX		15.0
Insulation Resistance – Megohm@VDC		500 @ 500
MECHANICAL		
Standard Calibration		Compression
Safe Overload – %Capacity		150
Ultimate Overload – %Capacity		300
Cable Length	ft	16.4
	m	5
Environmental Rating		IP67
Material		Heat Treated Steel or Stainless Steel

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

LP LOAD PIN (U.S. & METRIC)

LOAD PIN CONFIGURATOR



SECTION ONE PHYSICAL DIMENSIONS

Required Dimensions:						Computed Dimensions:			
	in	mm		in	mm	X	Y	Z	L
A:			C:						
B:			D:			*estimated - final dimensions may vary			

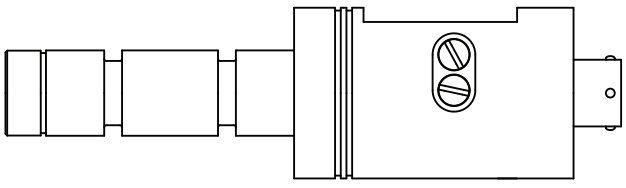
SECTION TWO FEATURES & APPLICATION

Application:					
	1. Static Force / Load		4. Tractor Draw Bar Pull		7. Conveyor Loading
	2. Dynamic Force / Load		5. Mooring Linkage		8. Line Tensiometer
	3. Hoisting Load		6. Fork Lift Loading		9. Other

Capacity:			Output Signal:		ATEX Required:	
		tonne	mV/V		No	
		K lbf	4-20mA		ATEX"D"	
		kN	0-10V		ATEX"N"	
			RS485		ATEX"I"	

EN 60529 Protection Level:		Cable Length:	
	IP65		
	IP66		
	IP67		
	IP68		
	IP69K		

MOUNTING CONFIGURATION



Various mounting configurations are available.

Shown: Typical mounting with anti-rotational slot near the end; connector output at housing base.

WTSLP WIRELESS LOAD PINS (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities range up to 3,000K lbf (1,360 MT)
- Low power consumption for long battery life
- Wireless communication
- 1,969 ft (600 m) range
- Configured and calibrated via PC using a base station and telemetry toolkit
- Compatible with Interface WTS Wireless Products
- Robust, lightweight housing
- Environmentally sealed to IP67

TYPICAL APPLICATIONS

- Crane weighing
- Center of gravity systems
- Vessel weighing
- Platform weighing
- General weighing
- Line Tension

OPTIONS

- Bidirectional loading
- Anti-rotation plate
- Shackles

Compatible with wireless hand-held WTS-BS-1

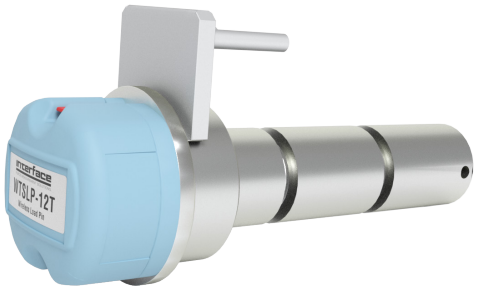
- 8 digit display
- Fully functional tare capability
- Power-off transmitter from receiver enabled
- IP65 waterproof enclosure 3.5 x 5.9 x 1.4 in (90 x 150 x 35 mm)

COMPATIBLE WITH

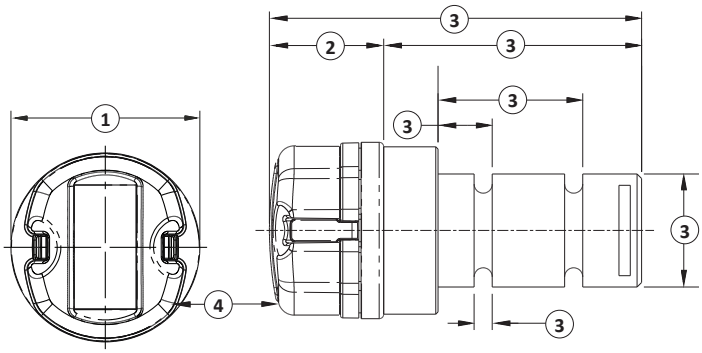


Model WTS-BS-1-HA (Shown)

STANDARD CONFIGURATION



Model WTSLP-12T (Shown)



DIMENSIONS

See Drawing		
	in	mm
(1)	Ø 3.1	Ø 78
(2)	2.0	50.5
(3)	See Load pin Configurator on page 2	
(4)	Battery Housing	

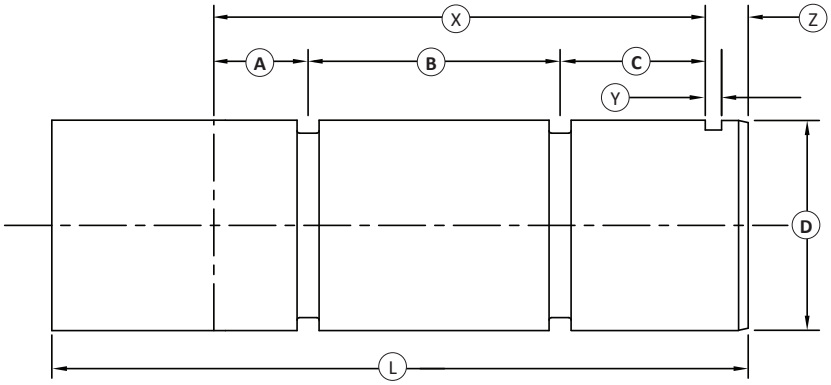
SPECIFICATIONS

Excitation Voltage – VDC		5
Radio Type / Frequency – GHz		2.4; FCC conforming
Transmit Rate – sec		3 / typical
Available Channels		16
Operating Temperature	°F	-4 to +131
	°C	-20 to +55
Battery		2 x AAA Alkaline
Battery Life – hrs		300 typically
Transmission Range – ft (m)		Up to 2,000 (610) (clear line of sight)
Telemetry Housing		Polyamide resin
IP Ratng		IP67
Material		Heat Treated Steel or Stainless Steel

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTSLP WIRELESS LOAD PINS (U.S. & METRIC)

LOAD PIN CONFIGURATOR



SECTION ONE PHYSICAL DIMENSIONS

Required Dimensions:						Computed Dimensions:			
	in	mm		in	mm	X	Y	Z	L
A:			C:						
B:			D:			*estimated - final dimensions may vary			

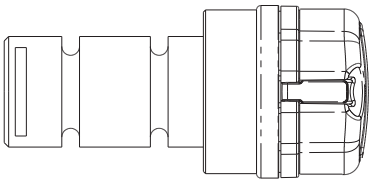
SECTION TWO FEATURES & APPLICATION

Application:					
	1. Static Force / Load		4. Tractor Draw Bar Pull		7. Conveyor Loading
	2. Dynamic Force / Load		5. Mooring Linkage		8. Line Tensiometer
	3. Hoisting Load		6. Fork Lift Loading		9. Other

Capacity:			Output Signal:		ATEX Required:	
		tonne	mV/V		No	
		K lbf	4-20mA		ATEX"D"	
		kN	0-10V		ATEX"N"	
			RS485		ATEX"I"	

EN 60529 Protection Level:		Cable Length:	
	IP65		
	IP66		
	IP67		
	IP68		
	IP69K		

MOUNTING CONFIGURATION



Various mounting configurations are available.

Shown: Typical mounting with anti-rotational slot near the end; connector output at housing base.

Notes:

Notes:

Tension Links

Digital.....346

Standard.....348

Wireless 350

ISITL SELF-INDICATING TENSION LINK LOAD CELL (U.S. & METRIC)

DESCRIPTION

The ISITL series have been designed for lifting and weighing in rugged or harsh environments, being manufactured from high tensile aluminum to minimize weight. They are ideal for mobile use (steel brushed holes provide added wear protection from shackles etc).

The ISITL self-indicating tension link load cell is simple to install and is matched to standard shackle sizes. They have a built in display which can be selected by the user to display the applied weight or force in tons, kgs, lbs or kN. There is an in-built audible alarm, which can be set by the operator to warn when an applied weight/force is met.

For applications where the operator is unable to read the display, there is a handheld remote available. This remote replicates exactly all the functionality that is available on the link itself. Other features include peak hold, gross/net and pre-set tare entry. There is also an RS485 digital output available. Interface can also offer a custom software design facility to meet any specific application requirements.

SPECIFICATIONS

Rated Load	MT	1, 2.5, 6.5, 12, 25, 35, 55, 75, 100, 150, 200, 250, 300
	lbf	2.2K, 5.51K, 14.3K, 26.5K, 55.1K, 77.2K, 121K, 165K, 220K, 331K, 441K, 551K, 661K
Proof Load – %		200 of rated load
Safety Factor – % of rated load		1200 (1 MT / 2.2K lbs)
		700 (2.5, 6.5, 12 mt / 5.51K, 14.3K, 26.5K lbs)
		500 (25, 35, 55, 75, 100, 200, 300 mt / 55.1K, 77.2K, 121K, 165K, 220K, 441K, 661K
		400 (150, 250 mt / 331K, 551K)
Display – digits		6 LCD, 25mm (1 in) high digits with unit indication
Display Units		MT, lbs, kg & kN
Accuracy – % of rated load		< ±0.3
Power Supply – V		9 PP3 battery (life 80 hours min)
Compensated Range	°C	-10 to +50
	°F	+14 to +122
Operating Range	°C	-10 to +50
	°F	+14 to +122
Zero Temperature Coefficient – % of rated load / °C		< ±0.02
Span Temperature Coefficient – % of rated load / °C		< ±0.02
Environmental Protection Level		IP65
Material		Aluminum

STANDARD CONFIGURATION



Model ISITL-6.5T (Shown)

OPTIONS

- Remote handheld load cell indicator
- Crosby shackle supply

FEATURES AND BENEFITS

- Ranges from 1 to 300 MT (2.2K to 661K lbf)
- Lightweight aluminum construction
- Shackle holes are steel brushed
- Environmentally sealed to IP65
- Audible alarm facility as standard
- Can display in MT, kg, lb and kN as standard (selectable by operator)
- Peak hold facility

TYPICAL APPLICATIONS

- Under hook crane weighing
- Crane load testing
- Beam proof testing
- Water bag calibration
- Cable tension measurement

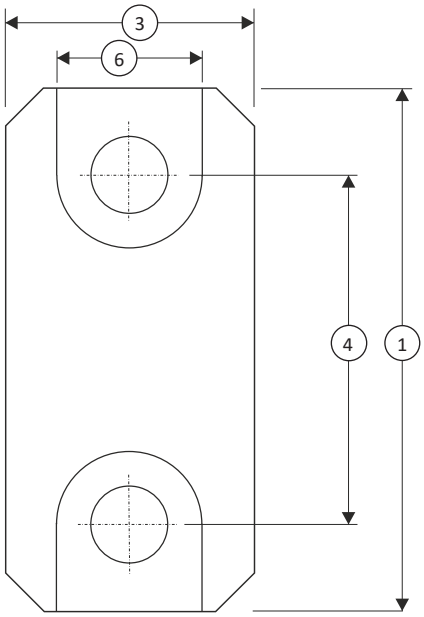
OPTIONAL HANDSET

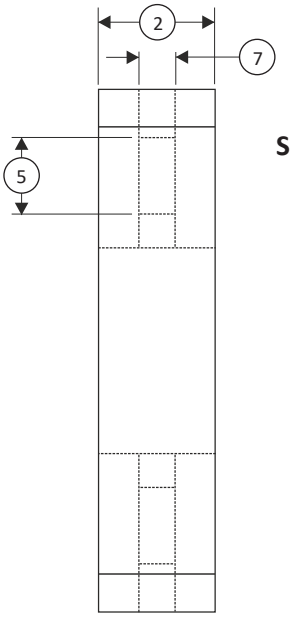
- Push button control
- Tare, units (kg, lbs, kN & metric tons)
- Peak hold
- Preset tare
- Audible set point alarm
- Overload counter

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

ISITL SELF-INDICATING TENSION LINK LOAD CELL (U.S. & METRIC)

TOP VIEW





SIDE VIEW

DIMENSIONS

See Drawing	CAPACITY													
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	1	2.2K	2.5	5.51K	6.5	14.3K	12	26.5K	25	55.1K	35	77.2K	55	121K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	204	8.0	204	8.0	249	21.6	305	12.0	340	13.4	393	15.5	424	16.7
(2)	43	1.7	43	1.7	43	1.7	47	1.9	60	2.4	75	3.0	75	3.0
(3)	104	4.1	104	4.1	113	4.4	113	4.4	115	4.5	126	5.0	180	7.1
(4)	146	5.7	146	5.7	165	6.5	193	7.6	215	8.5	225	8.9	230	9.1
(5)	24.5	0.96	24.5	0.96	38	1.5	47.5	1.87	55	2.2	60	2.4	76	3.0
(6)	48	1.9	48	1.9	66	2.6	N/A		N/A		N/A		N/A	
(7)	19	0.7	19	0.7	32	1.3	N/A		N/A		N/A		N/A	
Resolution (mt)	0.0005		0.001		0.001		0.002		0.005		0.005		0.01	
Weight (kg)	1.5		1.5		2.2		3.5		5.2		9		11	

See Drawing	CAPACITY											
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	75	165K	100	220K	150	331K	200	441K	250	551K	300	661K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	470	18.5	608	23.9	670	26.4	700	27.6	700	27.6	806	31.7
(2)	75	3.0	99	3.9	99	3.9	144	5.7	144	5.7	150	5.9
(3)	202	8.0	255	10.0	303	11.9	350	13.8	350	13.8	426	16.8
(4)	260	10.2	320	12.6	360	14.2	350	13.8	350	13.8	350	13.8
(5)	76	3.2	109	4.3	109	4.3	145	5.7	145	5.7	160	6.3
(6)	0.01		0.05		0.05		0.01		0.01		0.01	
(7)	N/A		N/A		N/A		N/A		N/A		N/A	
Resolution (mt)	0.01		0.05		0.05		0.1		0.1		0.1	
Weight (kg)	18		37		51		80		80		132	

ITL STAINLESS STEEL TENSION LINK LOAD CELL (U.S. & METRIC)

DESCRIPTION

The Interface series ITL Tension Link Load Cell has been designed for lifting and weighing in rugged or harsh environments and is manufactured entirely from stainless steel.

The ITL series products are simple to install and are matched to standard shackle sizes. ITL series tension link load cells are normally supplied with a MIL specification plug and socket, and are environmentally sealed to IP66.

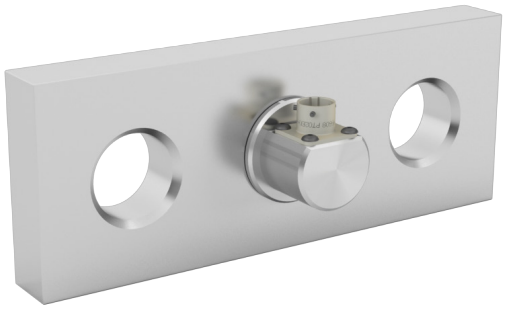
The ITL series can be supplied as shown in this data sheet, or can be modified to meet a particular application requirement. We are always pleased to discuss any special requirements that can be accommodated.

This product can be supplied on its own or combined with our extensive range of instrumentation to provide a complete load monitoring system.

SPECIFICATIONS

Rated Load	mt	5, 10, 20, 25 30, 40, 50, 100
	lbs	11K, 22K, 44.1K, 55K, 66K, 88.2K, 110K, 220K
ACCURACY – (MAX ERROR)		
Accuracy – %FS		< ±0.25
Non-repeatability – %FS		< ±0.04
TEMPERATURE		
Compensated Range	°C	-10 to +50
	°F	+14 to +122
Operating Range	°C	-20 to +70
	°F	-4 to +158
Zero Temperature Coefficient – %FS / °C		< ±0.01
Span Temperature Coefficient – %FS / °C		< ±0.01
ELECTRICAL		
Output – mV/V at %FS		1.3 at ±10
Bridge Resistance – Ohm		350
Excitation Voltage – VDC MAX		10 recommended, 15 MAX
Insulation Resistance – Megohm @ VDC		> 500 @ 500
MECHANICAL		
Safe Overload – %FS		150
Ultimate Breaking Load – %FS		> 300
Connection Type – Cable	m	5
	ft	16.4
Environmental Protection Level		IP66 (IP67 optional)
Wiring Connections		+ve supply: Red (A) -ve supply: Blue (B) +ve signal: Green (C) -ve signal: Yellow (D)
Material		Stainless steel

STANDARD CONFIGURATION



Model ITL-11K (Shown)

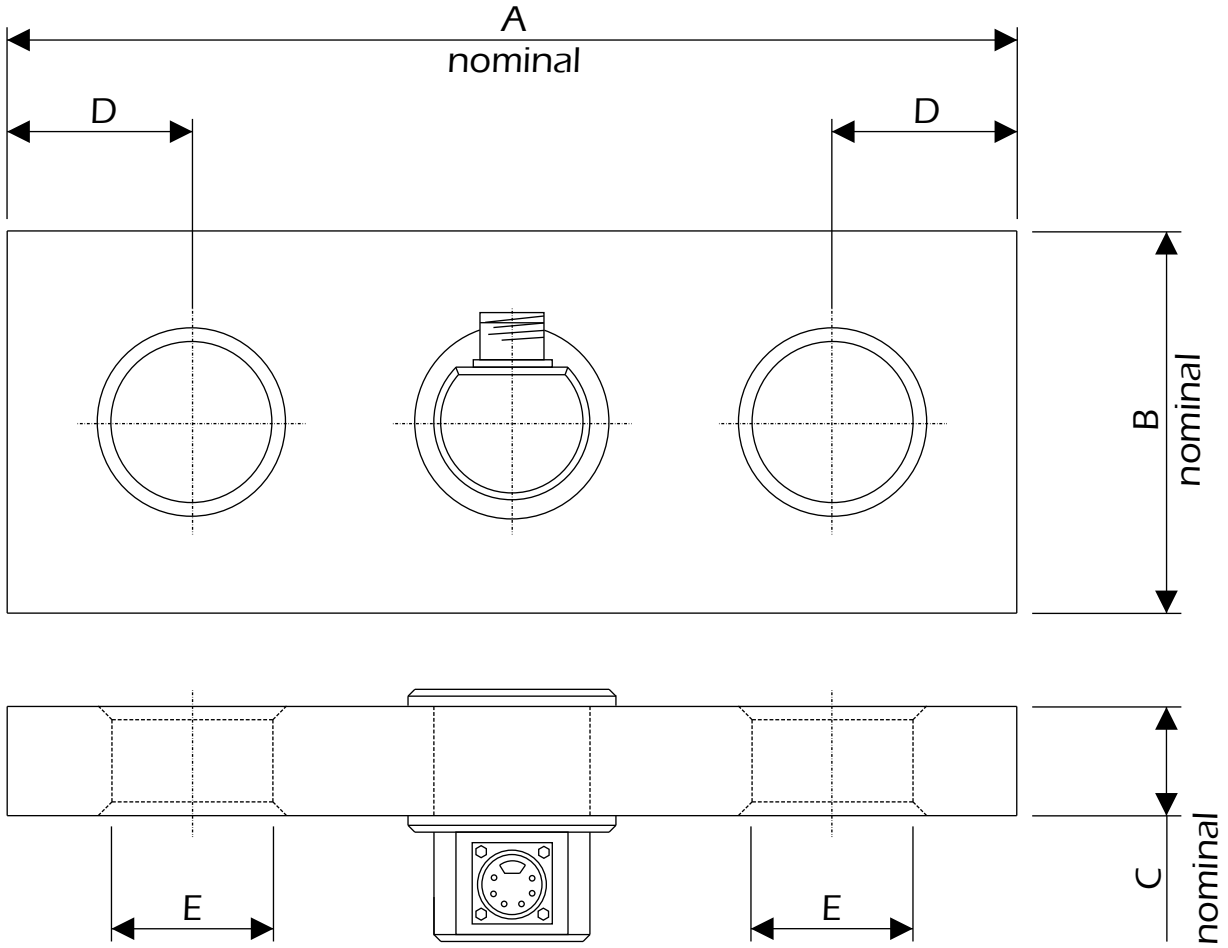
OPTIONS

- Special ranges and sizes available (including high ranges up to 3000K lbf)
- Custom designs
- Can be supplied complete with shackles
- Can be supplied with integral signal conditioning
- Optional carry kit
- Special electrical connectors
- ATEX version available

FEATURES AND BENEFITS

- Range: 11K to 220.4K lbf (5 to 100 mt)
- Stainless steel construction (17-4PH)
- Environmentally sealed to IP66 (IP67 available)

ITL STAINLESS STEEL TENSION LINK LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing		CAPACITY															
		Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)
		5	11K	10	22K	20	44.1K	25	55.1K	30	66.1K	40	88.2K	50	110.2K	100	220.4K
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(A)		230	9.055	260	10.24	330	12.99	330	12.99	370	13.57	420	16.54	430	16.93	480	18.90
(B)		75	2.953	75	2.953	100	3.937	100	3.937	125	4.921	140	5.512	140	5.512	166	6.535
(C)		25	0.984	25	0.984	40	1.575	40	1.575	40	1.575	50	1.968	50	1.968	69	2.717
(D)		37.5	1.476	40	1.575	60	2.362	60	2.362	67.5	2.657	79	3.110	77.5	3.051	101	3.976
(E)		Ø27	Ø1.063	Ø38	Ø1.496	Ø53	Ø2.087	Ø53	Ø2.087	Ø59	Ø2.323	Ø72	Ø2.835	Ø72	Ø2.835	Ø84	Ø3.307
Weight	kg	2.5		3		7.5		7.5		12		15		18		37	
	lbs	0.098		0.118		0.295		0.295		0.472		0.591		0.709		1.457	

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTSLTL LIGHTWEIGHT WIRELESS TENSION LINK (U.S. & METRIC)

DESCRIPTION

The WTSLTL series have been designed for lifting and weighing in rugged or harsh environments. Being manufactured from high tensile aluminum to minimize weight also makes them ideal for mobile use (brushed steel holes provide added wear protection from shackles and other applications).

The WTSLTL tension link range is simple to install and are matched to standard shackle sizes. They can be supplied complete with a battery powered handheld indicator, which will display the load in MT or lbf (other measurement units are available on request). The handheld indicator is very easy to operate, with just three buttons. One turns the unit

On/Off, one toggles between Gross/Net, and the third allows you to switch units from MT or lbf and vice versa.

The WTSLTL can be supplied as a simple load link or as part of a more complex wireless telemetry system. Please contact our application engineers to discuss any specific requirements you may have.

FEATURES AND BENEFITS

- Ranges from 1 to 300 MT (2.2K to 661K lbf)
- Lightweight aluminum construction
- High accuracy
- Environmentally sealed to IP67
- License Free 2.4GHz radio
- Internal antenna
- 1200 hours battery life using standard AA batteries
- Can be supplied with various bespoke telemetry and/or software packages

TYPICAL APPLICATIONS

- Underhook crane weighing
- Cable tension monitoring
- Crane/hoist proof loading
- Water weights calibration
- Warehouse despatch weighing

OPTIONS

- Wireless overload alarm module
- Wireless base station with analogue output
- Wireless signal booster
- Multiple wireless load cell controller software
- Wireless slave display
- Crosby shackle supply

STANDARD CONFIGURATION



Model WTSLTL-6.5T (Shown)

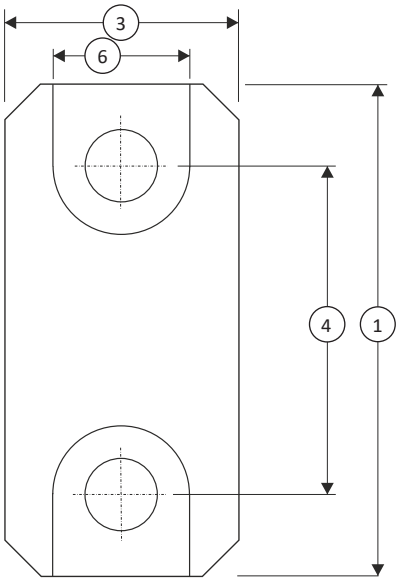
SPECIFICATIONS

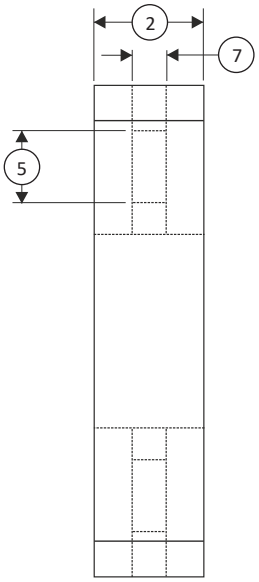
Rated Load	MT	1, 2.5, 6.5, 12, 25, 35, 55, 75, 100, 150, 200, 250, 300
	lbf	2.2K, 5.51K, 14.3K, 26.5K, 55.1K, 77.2K, 121K, 165K, 220K, 331K, 441K, 551K, 661K
Proof Load – %		200 of rated load
Safety Factor – % of rated load		1200 (1 MT / 2.2K lbs)
		700 (2.5, 6.5, 12 mt / 5.51K, 14.3K, 26.5K lbs)
		500 (25, 35, 55, 75, 100, 200, 300 mt / 55.1K, 77.2K, 121K, 165K, 220K, 441K, 661K
		400 (150, 250 mt / 331K, 551K)
Display – digits		7 digit LCD, 0.35 in (9 mm) high digits
Display Units		MT, lbs, kg & kN
Accuracy – % of rated load		< ±0.3
Power Supply – V		4 x AA alkaline batteries for tension link
		2 x AA alkaline batteries for WTS-BS-1-HS display
Battery Life		1200 hours continuous use for tension link
		60 hours continuous use for WTS-BS-1-HS display
Transmission range		2296.5 ft (700 m) clear line of sight
Radio frequency		2.4GHz
Update rate		Standard is 3 per second
Compensated Range	°C	-10 to +50
	°F	+14 to +122
Operating Range	°C	-10 to +50
	°F	+14 to +122
Zero Temperature Coefficient – % of rated load / °C		< ±0.02
Span Temperature Coefficient – % of rated load / °C		< ±0.02
Environmental Protection Level		IP65
Material		Aluminum

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTSLTL LIGHTWEIGHT WIRELESS TENSION LINK (U.S. & METRIC)

TOP VIEW





SIDE VIEW

DIMENSIONS

See Drawing	CAPACITY													
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	1	2.2K	2.5	5.51K	6.5	14.3K	12	26.5K	25	55.1K	35	77.2K	55	121K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	204	8.0	204	8.0	249	21.6	305	12.0	340	13.4	393	15.5	424	16.7
(2)	43	1.7	43	1.7	43	1.7	47	1.9	60	2.4	75	3.0	75	3.0
(3)	104	4.1	104	4.1	113	4.4	113	4.4	115	4.5	126	5.0	180	7.1
(4)	146	5.7	146	5.7	165	6.5	193	7.6	215	8.5	225	8.9	230	9.1
(5)	24.5	0.96	24.5	0.96	38	1.5	47.5	1.87	55	2.2	60	2.4	76	3.0
(6)	48	1.9	48	1.9	66	2.6	N/A		N/A		N/A		N/A	
(7)	19	0.7	19	0.7	32	1.3	N/A		N/A		N/A		N/A	
Resolution (mt)	0.0005		0.001		0.001		0.002		0.005		0.005		0.01	
Resolution (lbs)	1		2		2		5		10		10		20	
Weight (kg)	1.5		1.5		2.2		3.5		5.2		9		11	

See Drawing	CAPACITY											
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	75	165K	100	220K	150	331K	200	441K	250	551K	300	661K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	470	18.5	608	23.9	670	26.4	700	27.6	700	27.6	806	31.7
(2)	75	3.0	99	3.9	99	3.9	144	5.7	144	5.7	150	5.9
(3)	202	8.0	255	10.0	303	11.9	350	13.8	350	13.8	426	16.8
(4)	260	10.2	320	12.6	360	14.2	350	13.8	350	13.8	350	13.8
(5)	76	3.2	109	4.3	109	4.3	145	5.7	145	5.7	160	6.3
(6)	0.01		0.05		0.05		0.01		0.01		0.01	
(7)	N/A		N/A		N/A		N/A		N/A		N/A	
Resolution (mt)	0.01		0.05		0.05		0.1		0.1		0.1	
Resolution (lbs)	20		100		100		200		200		200	
Weight (kg)	18		37		51		80		80		132	

WTSTL WIRELESS STAINLESS STEEL TENSION LINK LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 11K to 220K lbf (5 to 100 MT)
- IP67 environmental protection
- Stainless steel construction
- Simple installation and operation
- Transmission range up to 600 meters (1,968.5 ft)
- Long battery life

OPTIONS

- Larger capacities or sizes
- Compatible with other Interface WTS products
- WTS products support multiple load cell solutions
- Can be supplied complete with shackles
- Lockable storage case

STANDARD CONFIGURATION



Model WTSTL-11K (Shown)

COMPATIBLE WITH



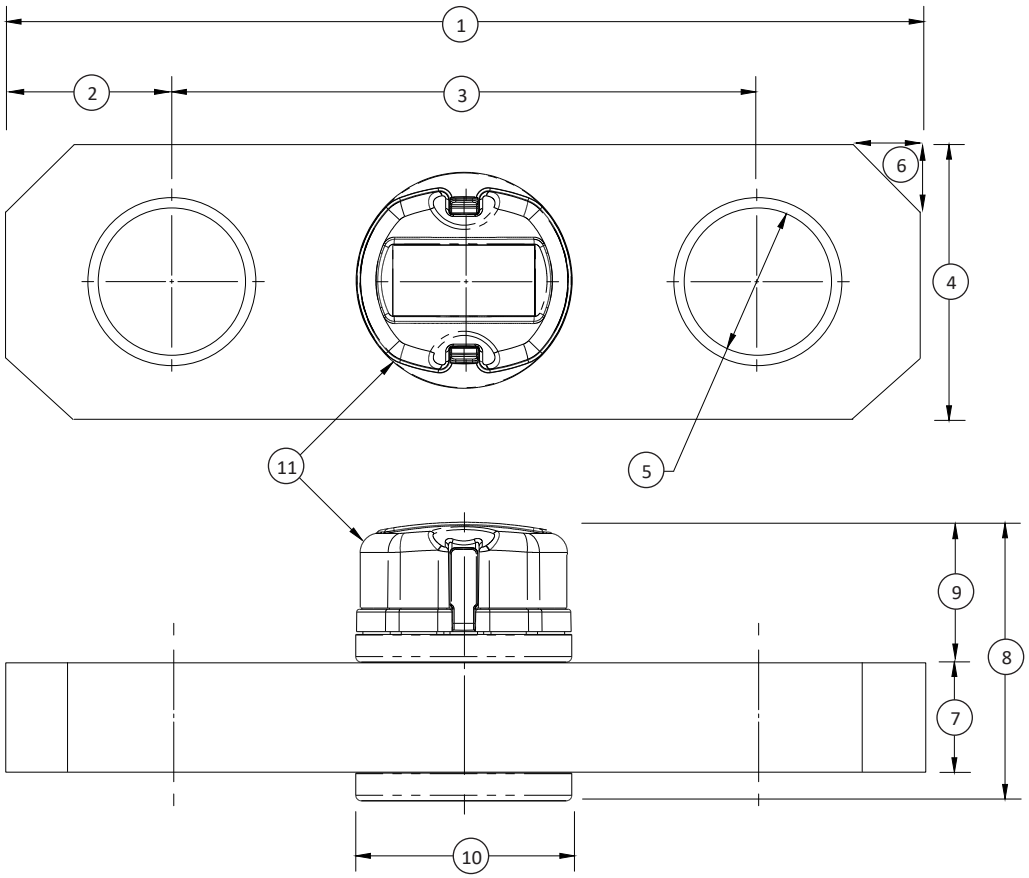
Model WTS-BS-1-HA (Shown)

SPECIFICATIONS

CAPACITY	Metric (mt)	5	12	25	35	50	100
	U.S. (lbf)	11K	26.5K	55.1K	77.1K	110.2K	220.4K
ACCURACY – (MAX ERROR)							
Nonlinearity Error – %FS		±0.15%					
Nonrepeatability – %FS		±0.1%					
TEMPERATURE							
Compensated Range	°C	-10 to +50					
	°F	+14 to +122					
Operating Range	°C	-20 to +55					
	°F	-4 to +131					
Zero Temperature Coefficient – % of Rated Load / °C		±0.01%					
Span Temperature Coefficient – % of Rated Load / °C		±0.01%					
ELECTRICAL							
Excitation Voltage – VDC		5					
Radio Type / Frequency – GHz		2.4; FCC conforming					
Transmit Rate – sec (typically)		3					
Available Channels		16					
Battery Type		2 x AAA Alkaline					
Battery Life – hours (typically)		> 300					
Transmission Range	m	Up to 600 (clear line of sight)					
	ft	Up to 1,968.5 (clear line of sight)					
MECHANICAL							
Standard Calibration		Tension					
Safe Overload – %Capacity		200%					
Ultimate Overload – %Capacity		500%					
Weight	kg	3.0	5.0	9.7	13.0	20.0	43.5
	lbs	6.61	11.02	21.38	28.66	44.09	95.90
Telemetry Housing		Polyamide resin					
Load Cell Construction		Stainless steel					
Environmental Rating		IP67					

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTSTL WIRELESS STAINLESS STEEL TENSION LINK LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY											
	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)
	5	11K	12	26.5K	25	55.1K	35	77.1K	50	110.2K	100	220.4K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	220	8.7	260	10.2	320	12.6	350	13.8	400	15.7	460	18.1
(2)	32.5	1.3	40	1.6	55	2.2	57.5	2.3	62.5	2.5	91	3.6
(3)	155	6.1	180	7.1	210	8.3	235	9.3	275	10.8	278	10.9
(4)	78	3.1	85	3.3	102	4.0	122	4.8	140	5.5	200	7.9
(5)	Ø27	Ø1.1	Ø37	Ø1.5	Ø53	Ø2.1	Ø52	Ø2.0	Ø59	Ø2.3	Ø84	Ø3.3
(6)	20 x 45°		20 x 45°		25 x 45°		30 x 45°		35 x 45°		50 x 45°	
(7)	22	0.9	32	1.3	43	1.7	42	1.7	50	2.0	68	2.7
(8)	82	3.2	92	3.6	103	4.1	102	4.0	110	4.3	120	4.7
(9)	50	2.0	50	2.0	50	2.0	50	2.0	50	2.0	50	2.0
(10)	78	3.1	78	3.1	78	3.1	78	3.1	78	3.1	78	3.1
(11)	Battery Compartment											

Notes:

Notes:

Load Shackles

Bow Type 357

'D' Type 361

Wireless 364

ISHK-B BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

DESCRIPTION

The Interface range of ISHK-B load shackles are designed for lifting and weighing in rugged or harsh environments, including submersible applications. The shackle pins are forged from high tensile stainless steel to 6.5 MT (14.3K lbf) and high tensile carbon steel from 9.5 MT (20.9K lbf), and are machined to an exacting specification. The basic shackle uses the Crosby G2130 (1 to 25 MT / 2205 to 55.1K lbf), G2140 (40 to 120 MT / 88.2K to 265K lbf) and GN Rope H10 (150 to 1K MT / 331K to 2205K lbf).

This range of loads cells are proof loaded to 150% of the normal rated load, and are available in a range from 1 to 1K MT (2205 to 2205K lbf). The integral cable is normally protected by the anti-rotation bracket or by a separate protective plate. The ISHK-B is internally gaged and the whole instrumented area is sealed to IP67 to protect it in service.

They are simple to install and are available in standard shackle sizes. As an option, a rotating bobbin can be supplied to centralize the load and to minimize any point load effects when the shackle is placed under load. We are also always happy to discuss any special requirements that can be accommodated.

The ISHK-B series can be supplied on its own or combined with our extensive range of instrumentation to provide a complete load monitoring package. A wireless version is also available (see WTSSHK-B for details).

TYPICAL APPLICATIONS

- Under-hook hoist/crane weighing
- Cable tension monitoring
- Towing/mooring tension
- Crane safe load monitoring



ISHK-B (Shown)

FEATURES & BENEFITS

- Ranges from 1 to 1K MT (2205 to 2205K lbf)
- High tensile stainless steel construction (to 6.5 MT / 14.3K lbf) and high tensile carbon steel construction (9.5 MT / 20.9K lbf and above)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and pin fully certified

OPTIONS

- Special ranges and capacities up to 2K MT (4409K lbf)
- Special electrical connections
- Integral signal conditioning
- Centralizing load bobbin
- Subsea, offshore and ROV friendly versions
- TEDS option
- Wireless version available
- 3.2 material certification
- Submersible
- Amplified output
- ATEX version available

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

ISHK-B BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

SPECIFICATIONS

Rated Load	MT	1, 2, 3.25, 4.75, 6.5	9.5, 12, 17, 25, 40, 55, 85, 120, 150, 200, 250, 300, 400, 500, 600, 700, 800, 900, 1K
	lbf	2.21K, 4.41K, 7.17K, 10.5K, 14.3K	20.9K, 26.5K, 37.5K, 55.1K, 88.2K, 121K, 187K, 265K, 331K, 441K, 551K, 661K, 882K, 1102K, 1322K, 1543K, 1764K, 1984K, 2205K
Proof Load – %		150 of rated load	
Ultimate Breaking Load – %		300 of rated load	
Output – mV		Between 1.8 and 3.6	
Nonlinearity – %		< ±1 of rated load (typically)	
Nonrepeatability – %		< ±0.1 of rated load	
Excitation Voltage – VDC		10 recommended, 15 maximum	
Bridge Resistance – Ω		350	
Insulation Resistance – MΩ @ VDC		> 500 @ 500	
Operating Temperature Range	°C	-20 to +70	
	°F	-4 to +158	
Compensated Temperature Range	°C	-10 to +50	
	°F	+14 to +122	
Zero temperature Coefficient – % / °C		< ±0.01 of rated load	
Span temperature Coefficient – % / °C		< ±0.01 o rated load	
Environmental Protection Level		IP67	
Connection type	m	10, 4-conductor shielded cable	
	ft	32.8, 4-conductor shielded cable	
Wiring Connections		+ve supply: Red, -ve supply: Blue, +ve signal: Green, -ve signal: Yellow	
Material		Stainless steel	Alloy steel

SPECIFICATIONS CONTINUED		CAPACITY															
		Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
		1	2.21K	2	4.41K	3.25	7.17K	4.75	10.5K	6.5	14.3K	9.5	20.9K	12	26.5K	17	37.5K
Weight	kgs	2		2.3		2.8		3		3.2		5.2		8		12	
	lbs	4		5.1		6.2		7		7.1		11.5		18		26	
Resolution	MT	0.001		0.002		0.005		0.005		0.005		0.01		0.01		0.02	
	lbf	2.205		4.409		11.023		11.023		11.023		22.05		22.05		44.09	

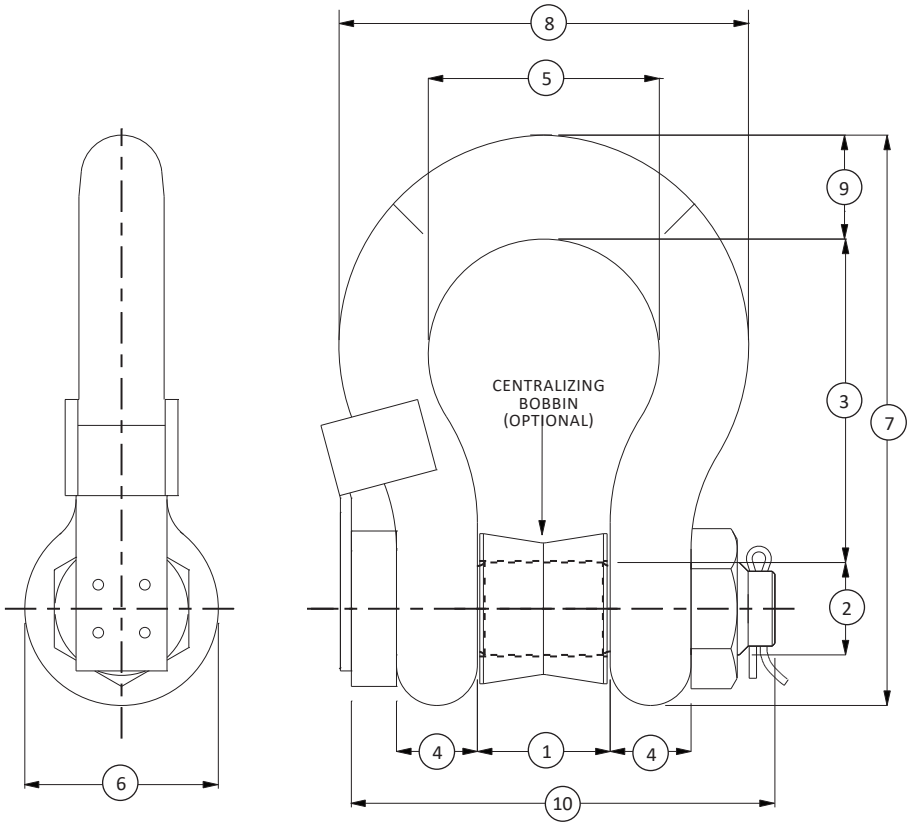
SPECIFICATIONS CONTINUED		CAPACITY															
		Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
		25	55.1K	40	88.2K	55	121K	85	187K	120	265K	150	331K	200	441K	250	551K
Weight	kgs	18		18		25		45		85		160		235		285	
	lbs	40		40		55		99		187		353		518		628	
Resolution	MT	0.02		0.05		0.05		0.1		0.1		0.1		0.2		0.2	
	lbf	44.09		110.23		110.23		220.5		220.5		220.5		440.9		440.9	

SPECIFICATIONS CONTINUED		CAPACITY															
		Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
		300	661K	400	882K	500	1102K	600	1322K	700	1543K	800	1764K	900	1984K	1K	2205K
Weight	kgs	340		560		685		880		980		1100		1280		1460	
	lbs	750		1,235		1,510		1,940		2,161		2,425		2,822		3,219	
Resolution	MT	0.5		0.5		0.5		0.5		1		1		1		1	
	lbf	1,102.3		1,102.3		1,102.3		1,102.3		2,205		2,205		2,205		2,205	

ISHK-B BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

SPECIAL OPTIONS

Special Ranges			The ISHK-B can be supplied in any range, between 1 and 1K MT (2205 to 2205K lbf) and calibrated as required. Usually we will choose the nearest standard shackle size. We can also offer special design shackles up to 2K MT (4409K lbf). Please contact our design team for more details.
Special Electrical			150 of rated load
Integral Signal Conditioning	Analog Signals	mA (VDC)	4-20 2-wire current output (7.5 to 30 supply)
			4-20 3-wire current output (10 to 30 supply)
		VDC (VDC)	0.1-5.1 3-wire voltage output (8.5 to 28 supply)
			0.1-10.1 3-wire voltage output (13 to 30 supply)
	Digital Signals	(VDC)	RS232 digital – various protocols (5.4 to 18 supply)
			RS485 digital – various protocols (5.4 to 18 supply)
Centralizing Bobbin			We can offer an optional centralizing bobbin. This helps improve the overall load cell accuracy in certain cable tension applications. The bobbin is shown pictorially in the drawing below.
Telemetry			We have a version available that requires no cable connection, using radio telemetry to transmit data. There is a separate data sheet available for this product WTSSHK-B.
Subsea or Offshore			We are able to offer fully submersible versions, which are normally supplied with underwater mateable connectors, making them suitable for use in environmental pressures up to 10,000psi. See below for examples of our submersible load shackles.



ISHK-B BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

DIMENSIONS

See Drawing	CAPACITY															
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	1	2.2K	2	4.41K	3.25	7.17K	4.75	10.5K	6.5	14.3K	9.5	20.9K	12	26.5K	17	37.5K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	16.8	0.66	20.6	0.81	26.9	1.06	31.8	1.25	36.6	1.44	46	1.8	51.5	2.03	60.5	2.38
(2)	Ø11.2	Ø0.44	Ø16	Ø0.6	Ø19.1	Ø0.75	Ø22.4	Ø0.88	Ø25.4	Ø1.00	Ø31.8	Ø1.25	Ø35.1	Ø1.38	Ø41.4	Ø1.63
(3)	36.6	1.44	47.8	1.88	60.5	2.38	71.5	2.81	84	3.3	108	4.3	119	4.7	146	5.7
(4)	9.65	0.380	12.7	0.50	16	0.6	19.1	0.75	22.4	0.88	28.7	1.23	31.8	1.25	38.1	1.50
(5)	26.2	1.03	33.3	1.31	42.9	1.69	51	2.0	58	2.3	74	2.9	82.5	3.25	98.5	3.88
(6)	23.1	0.91	30.2	1.19	38.1	1.50	46	1.8	53	2.1	68.5	2.70	76	3.0	92	3.6
(7)	63	2.5	83.5	3.29	106	4.2	126	5.0	148	5.8	190	7.5	210	8.3	254	10.0
(8)	45.2	1.78	58.5	2.30	74.5	2.93	89	3.5	102	4.0	131	5.2	146	5.7	175	6.9
(9)	Ø9.65	Ø0.380	Ø12.7	Ø0.50	Ø17.5	Ø0.69	Ø20.6	Ø0.81	Ø24.6	Ø0.97	Ø31.8	Ø1.25	Ø35.1	Ø1.38	Ø41.1	Ø1.62
(10)	90	3.5	97	3.8	96	3.8	111	4.4	122	4.8	156	6.1	171	6.7	201	7.9

See Drawing	CAPACITY															
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	25	55.1K	40	88.2K	55	121K	85	187K	120	265K	150	331K	200	441K	250	551K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	73	2.9	73.2	2.88	82.6	3.25	105	4.1	127	5.0	170	6.7	180	7.1	205	8.1
(2)	Ø51	Ø2.0	Ø50.8	Ø2.0	Ø57.2	Ø2.25	Ø69.9	Ø2.75	Ø82.6	Ø3.3	Ø108	Ø4.3	Ø125	Ø4.9	Ø140	Ø5.5
(3)	178	7.0	178	7.0	197	7.8	267	10.5	330	13.0	400	15.7	500	19.7	540	21.3
(4)	44.5	1.75	44.5	1.75	50.8	2.0	66.5	2.62	76.2	3.00	102	4.0	120	4.7	125	4.9
(5)	127	5.0	127	5.0	146	5.7	184	7.2	200	7.9	275	10.8	290	11.4	305	12.0
(6)	106	4.2	106	4.2	122	4.8	148	5.8	165	6.5	230	9.1	260	10.2	260	10.2
(7)	313	12.3	313	12.3	347	13.7	455	17.9	546	21.5	671	26.4	813	32.0	865	34.0
(8)	225	8.9	224	8.8	258	10.2	324	12.8	371	14.6	479	18.9	530	20.9	555	21.9
(9)	Ø57	Ø2.2	Ø57.2	Ø2.25	Ø61	Ø2.4	Ø79.2	Ø3.12	Ø92.2	Ø3.63	Ø102	Ø4.0	Ø120	Ø4.7	Ø125	Ø4.9
(10)	236	9.3	236	9.3	269	10.6	351	13.8	387	15.2	475	18.7	520	20.5	560	22.0

See Drawing	CAPACITY															
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	300	661K	400	882K	500	1102K	600	1324K	700	1543K	800	1764K	900	1984K	1K	2205K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	205	8.1	230	9.1	255	10.0	285	11.2	310	12.2	310	12.2	330	13.0	350	13.8
(2)	Ø150	Ø5.9	Ø175	Ø6.9	Ø185	Ø7.3	Ø205	Ø8.1	Ø217	Ø8.5	Ø217	Ø8.5	Ø230	Ø9.1	Ø240	Ø9.4
(3)	600	23.6	680	26.8	700	27.6	700	27.6	700	27.6	700	27.6	700	27.6	750	29.5
(4)	130	5.1	165	6.5	180	7.1	195	7.7	205	8.1	210	8.3	220	8.7	230	9.1
(5)	305	12.0	325	12.8	350	13.8	375	14.8	400	15.7	400	15.7	420	16.5	420	16.5
(6)	305	12.0	350	13.8	370	14.6	405	15.9	435	17.1	435	17.1	465	18.3	480	18.9
(7)	958	37.7	1108	43.6	1158	45.6	1200	47.2	1231	48.5	1236	48.7	1268	49.9	1290	50.8
(8)	565	22.4	655	25.8	710	28.0	765	30.1	810	31.9	820	32.3	860	33.9	880	34.6
(9)	Ø130	Ø5.1	Ø165	Ø6.5	Ø180	Ø7.1	Ø195	Ø7.7	Ø205	Ø8.1	Ø210	Ø8.3	Ø220	Ø8.7	Ø230	Ø9.1
(10)	570	22.4	655	25.8	720	28.3	815	32.1	860	33.9	870	34.3	910	35.8	950	37.4

ISHK-D 'D' TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

DESCRIPTION

The Interface range of load shackles is designed for lifting and weighing in rugged or harsh environments. The shackle pins are forged from high tensile alloy steel and are machined to an exacting specification. The basic shackle uses the Crosby G2150 series.

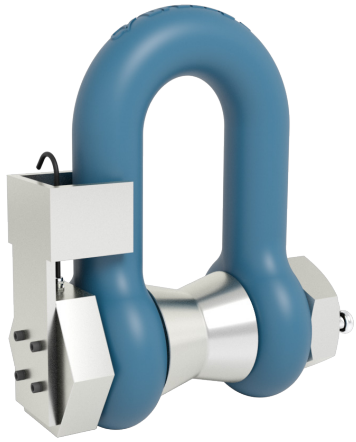
This range of load cells are proof loaded to 150% of the normal rated load, and are available in a range from 1 MT to 35 MT (2.2K to 77.2K lbf). The ISHK-D is internally gaged and the whole instrumented area is sealed to IP67 to protect it in service.

They are simple to install and are available in standard shackle sizes. As an option, a rotating bobbin can be supplied to centralize the load and to minimize any point-load effects when the shackle is placed under load. We are also always happy to discuss any special requirements that can be accommodated.

The ISHK-D series can be supplied on its own or combined with our extensive range of instrumentation to provide a complete load monitoring package.

FEATURES & BENEFITS

- Ranges from 1 to 35 MT (2.2K to 77.2K lbf)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified



ISHK-D (Shown)

TYPICAL APPLICATIONS

- Under-hook hoist/crane weighing
- Cable tension monitoring
- Towing/mooring tension
- Crane safe load monitoring

OPTIONS

- Special ranges and capacities up to 2K MT (4409K lbf)
- Special electrical connections
- Integral signal conditioning
- Centralizing load bobbin
- Subsea and offshore versions
- TEDS option
- ATEX version available

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

ISHK-D 'D' TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

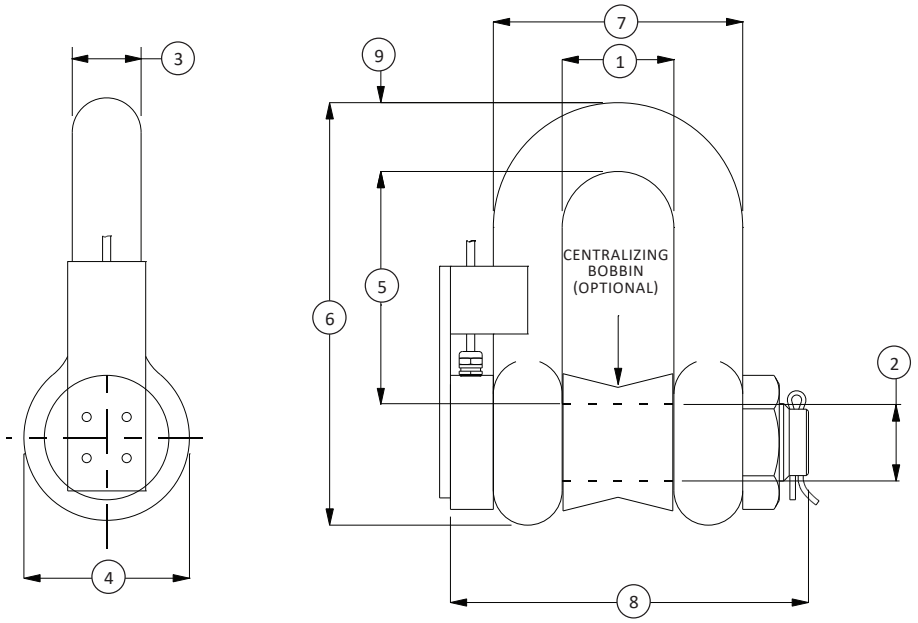
SPECIFICATIONS

Rated Load (MT)	Metric (MT)	1	2	3.25	4.75	6.5	9.5	12	17	25	35
	U.S. (lbf)	2.2K	4.41K	7.17K	10.5K	14.3K	20.9K	26.5K	37.5K	55.1K	55.1K
Proof Load – %		150 of rated load									
Ultimate Breaking Load – %		300 of rated load									
Output – mV		Between 1.8 and 2.4									
Nonlinearity – %		< ±1 of rated load (typically)									
Nonrepeatability – %		< ±0.1 of rated load									
Excitation Voltage – VDC		10 recommended, 15 maximum									
Bridge Resistance – Ω		350									
Insulation Resistance – MΩ @ VDC		>500 @ 500									
Operating Temperature Range	°C	-20 to +70									
	°F	-4 to +158									
Compensated Temperature Range	°C	-10 to +50									
	°F	+14 to +122									
Zero temperature Coefficient – % / °C		< ±0.01 of rated load									
Span temperature Coefficient – % / °C		< ±0.01 of rated load									
Environmental Protection level		IP67									
Connection Type	m	10, 4-conductor shielded cable									
	ft	32.8, 4-conductor shielded cable									
Wiring Connections		+ve supply: Red, -ve supply: Blue, +ve signal: Green, - ve signal: Yellow									
Weight	kgs	2	2.2	2.4	2.8	3.5	6	8	10	15	22
	lbs	4.4	4.85	5.29	6.17	7.72	13.2	17.6	22.0	33.1	48.5
Resolution	MT	0.001	0.002	0.005	0.005	0.005	0.01	0.01	0.02	0.02	0.05
	lbf	2.205	4.409	11.023	11.023	11.023	2.20	2.20	4.41	4.41	11.02
Material		Alloy steel									

SPECIAL OPTIONS

Special Ranges			The ISHK-D can be supplied in any range, between 1 and 35 MT (2.20K to 77.2K lbf) and calibrated as required. Usually we will choose the nearest standard shackle size. We can also offer special design shackles up to 2K MT (4409K lbf). Please contact our design team for more details
Special Electrical			The standard ISHK-D cable exits the shackle pin via a gland and is restrained using the anti-rotation bracket. We can offer variations to the electrical connection method. For example, integral connectors, special cable length etc.
Integral Signal Conditioning	Analog Signals	mA (VDC)	4-20 2-wire current output (7.5 to 30 supply)
			4-20 3-wire current output (10 to 30 supply)
		VDC (VDC)	0-5 3-wire voltage output (8.5 to 28 supply)
			0-10 3-wire voltage output (13 to 30 supply)
	Digital Signals	(VDC)	RS232 digital – various protocols (5.4 to 18 supply)
			RS485 digital – various protocols (5.4 to 18 supply)
Centralizing Bobbin			We can offer an optional centralizing bobbin. This helps improve the overall accuracy in certain cable tension applications. The bobbin is shown pictorially in the dimensions drawing.
Radio Telemetry			We have a version available that requires no cable connection, using radio telemetry to transmit data. There is a separate data sheet available for this product (WTSSHK-D).
Subsea or Offshore			We are able to offer fully submersible versions, which are normally supplied with underwater mateable connectors, making them suitable for use in environmental pressures up to 10,000psi.

ISHK-D 'D' TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY									
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	1	2.2K	2	4.41K	3.25	7.17K	4.75	10.5K	6.5	14.3K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	16.8	0.66	20.6	0.81	26.9	1.06	31.8	1.25	36.6	1.44
(2)	Ø11.2	Ø0.44	Ø16	Ø0.6	Ø19.1	Ø0.75	Ø22.4	Ø0.88	Ø25.4	Ø1.00
(3)	Ø9.65	Ø0.380	Ø12.7	Ø0.50	Ø16	Ø0.6	Ø19.1	Ø0.75	Ø22.4	Ø0.88
(4)	Ø23.1	Ø0.91	Ø30.2	Ø1.19	Ø38.1	Ø1.50	Ø46	Ø1.8	Ø53	Ø2.1
(5)	31	1.2	41.4	1.63	51	2.0	60.5	2.38	71.5	2.81
(6)	58.5	2.30	77	3.0	95.5	3.76	115	4.5	135	5.3
(7)	35.8	1.41	46	1.8	58.5	2.30	70	2.8	81	3.2
(8)	55	2.2	84	3.3	89.5	3.52	103	4.1	120	4.7
(9)	9.65	0.380	12.7	0.50	16	0.6	20.6	0.81	24.6	0.97

See Drawing	CAPACITY									
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	9.5	20.9K	12	26.5K	17	37.5K	25	55.1K	35	77.2K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	46.0	1.81	51.5	2.03	60.5	2.38	73.0	2.87	82.5	3.25
(2)	Ø31.8	Ø1.25	Ø35.1	Ø1.38	Ø41.4	Ø1.63	Ø51	Ø2.0	Ø57	Ø2.2
(3)	Ø28.7	Ø1.13	Ø31.8	Ø1.25	Ø38.1	Ø1.50	Ø44.5	Ø1.75	Ø51	Ø2.0
(4)	Ø68.5	Ø2.70	Ø76	Ø3.0	Ø92	Ø3.6	Ø106	Ø4.2	Ø122	Ø4.8
(5)	91	3.6	100	3.9	122	4.8	146	5.7	172	6.8
(6)	172	6.8	191	7.5	230	9.1	279	11.0	312	12.3
(7)	103	4.1	115	4.5	137	5.4	162	6.4	184	7.2
(8)	150	5.9	165	6.5	196	7.7	230	9.1	264	10.4
(9)	31.8	1.25	35.1	1.38	41.1	1.62	54	2.1	60	2.4

WTSSHK-B WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & SHACKLE)

DESCRIPTION

The WTSSHK-B range of telemetry load shackles are manufactured using the Crosby™ G2130 (12 to 15 MT / 26.5K and 33.1K lbf) and G2140 (40 to 120 MT / 88.2K to 265K lbf) shackles. Suitable for use in a wide range of industrial and marine weighing applications, these load shackles are robust, reliable and easy to install.

The unique telemetry housing is manufactured from tough high performance polyamide resin making it strong yet light, resulting in a better balanced load shackle when compared to others available on the market. Two clips enable you to open the housing to access and change the batteries, while the internal electronics underneath remain completely sealed. This includes the antenna to ensure maximum protection from damage. The built in radio telemetry electronics operates on the 2.4GHz license free frequency.

The WTSSHK-B can be supplied as standard with a handheld battery powered display which can toggle between MT or lbs, or alternatively, for multi-shackle applications. A single display can address up to 12 shackles for individual monitoring, or for summation/ weighing applications.

Interface can also supply more complex telemetry systems. For further information on what we can offer, please contact our technical department with details of your application requirements.



WTS-BS-1-HA with WTSSHK-B (Shown)

FEATURES & BENEFITS

- Ranges from 12 to 120 MT (26.5K and 265K lbf)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified

TYPICAL APPLICATIONS

- Under-hook hoist/crane weighing
- Cable tension monitoring
- Towing/mooring tension
- Crane safe load monitoring
- Beam proof loading

OPTIONS

- Special ranges and capacities up to 2K MT (4409K lbf)
- Centralizing load bobbin
- Special telemetry systems available

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTSSHK-B WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & SHACKLE)

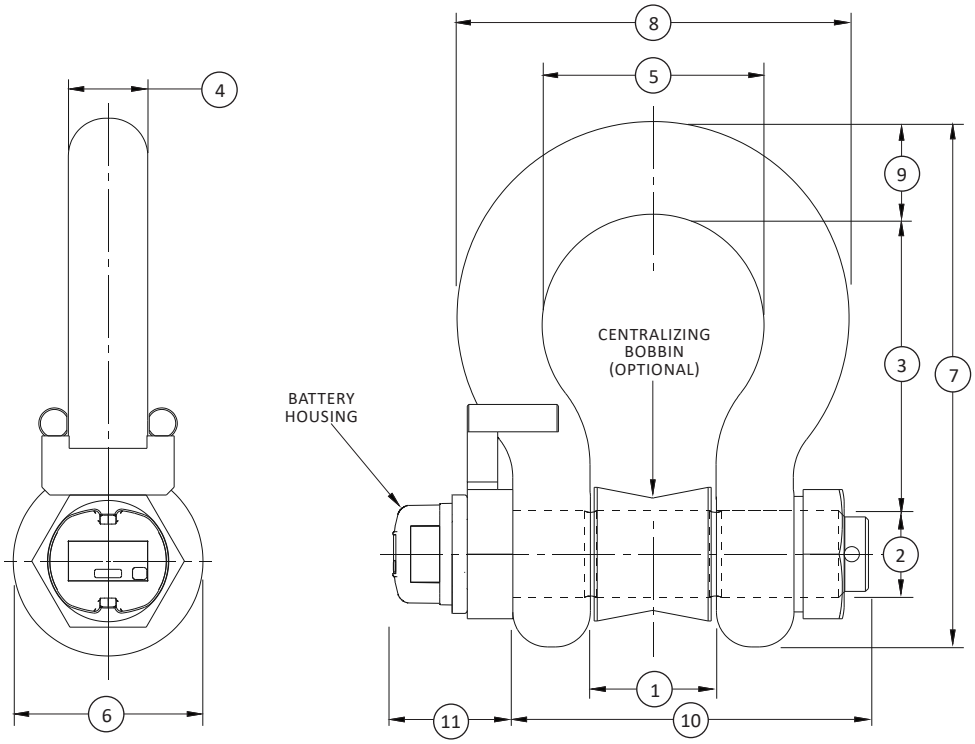
SPECIFICATIONS

Rated Load	Metric (MT)	12	17	25	40	55	85	120
	U.S. (lbf)	26.5K	37.5K	55.1K	88.2K	121K	187K	265K
Proof Load – %		150 of rated load						
Ultimate Breaking Load – %		300 of rated load						
Nonlinearity – %		< ±1 of rated load (typically)						
Nonrepeatability – %		< ±0.1 of rated load						
Transmission Distance	m	Up to 610 (clear line of sight)						
	ft	Up to 2,000 (clear line of sight)						
Battery Life		>300 hours typically (continuous use with 1.2Ah batteries)						
Battery		2 x AAA Alkaline (supplied with 1.2Ah batteries)						
Operating Temperature Range	°C	-20 to +55						
	°F	-4 to +131						
Environmental Protection Level		IP67						
Weight	kg	8	12	18	18	25	45	85
	lbs	17.6	26.5	39.7	39.7	55.1	99.2	187
Resolution	MT	0.01	0.02	0.02	0.05	0.05	0.1	0.1
	lbf	22.046	44.092	44.092	110.231	110.231	220.46	220.46
Telemetry Housing		Polyamide resin						
Material		Alloy steel						

SPECIAL OPTIONS

Special Ranges	The WTSSHK-B can be supplied in any range, between 12 and 120 MT (26.5K and 265K lbf) and calibrated as required. Usually we will choose the nearest standard shackle size. We can also offer special design shackles up to 2K MT (4,409K lbf). Please contact our sales team for more details.
Centralizing Bobbin	We can offer an optional centralizing bobbin. This helps improve the overall load cell accuracy in certain cable tensions applications. The bobbin is shown pictorially in the drawing below.
Multi-Shackle Systems	It is possible with the standard handheld telemetry display to use up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be used to view individual load cells or summated load cells. These values can be sent to a printer or a PC.

WTSSHK-B WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & SHACKLE)



DIMENSIONS

See Drawing	CAPACITY													
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	12	26.5K	17	37.5K	25	55.1K	40	88.2K	55	121K	85	187K	120	265K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
1	51.5	2.03	60.5	2.38	73	2.9	73.2	2.9	82.6	3.3	105	4.1	127	5.0
2	Ø35.1	Ø1.38	Ø41.4	Ø1.63	Ø51	Ø2.0	Ø50.8	Ø2.0	Ø57.2	Ø2.25	Ø69.9	Ø2.75	Ø82.6	Ø3.25
3	119	4.7	146	5.7	178	7.0	178	7.0	197	7.8	267	10.5	330	13.0
4	31.8	1.25	38.1	1.50	44.5	1.75	46.7	1.74	52.8	2.08	68.8	2.71	79.2	3.12
5	82.5	3.2	98.5	3.88	127	5.0	127	5.0	146	5.7	184	7.2	200	7.9
6	Ø76	Ø3	Ø92	Ø3.6	Ø106	Ø4.2	Ø106	Ø4.2	Ø122	Ø4.8	Ø148	Ø5.8	Ø165	Ø6.5
7	210	8.3	254	10.0	313	12.3	313	12.3	347	13.7	455	17.9	546	21.5
8	146	5.7	175	6.9	225	8.9	224	8.8	258	10.2	324	12.8	371	14.6
9	Ø35.1	Ø1.38	Ø41.4	Ø1.63	Ø51	Ø2.0	Ø50.8	Ø2.0	Ø57.2	Ø2.25	Ø69.9	Ø2.75	Ø82.6	Ø3.25
10	171	6.7	201	7.9	236	9.3	236	9.3	269	10.6	351	13.8	387	15.2
11	79	3.1	79	3.1	79	3.1	79	3.1	79	3.1	79	3.1	79	3.1

WTSSHK-B-HL WIRELESS BOW LOAD SHACKLE (U.S. & METRIC)

DESCRIPTION

The WTSSHK-B-HL range of telemetry load shackles are manufactured using the GN rope H10 shackle. Suitable for use in a wide range of industrial and marine heavy lift weighing applications, these load shackles provide a robust and effective method of measuring large tensile loads. They are particularly suited to offshore applications, as they include 3.1 material certification as standard and the proof load test.

The unique telemetry housing is manufactured from tough high performance polyamide resin making it strong yet light, resulting in a better balanced load shackle when compared to others available on the market. Two clips enable you to open the housing to access and change the batteries, while the internal electronics underneath remain completely sealed. This includes the antenna to ensure maximum protection from damage. The built in radio telemetry electronics operates on the 2.4GHz license free frequency.

The WTSSHK-B can also supply as standard with a handheld battery powered display which can toggle between MT or lbs, or alternatively, for multi-shackle applications, a single display can address up to 12 shackles for individual monitoring, or for summation/weighing applications.

Interface can also supply more complex telemetry systems. For further information on what we can offer, please contact our technical department with details of your application requirements.

SPECIAL OPTIONS

Special Ranges	The WTSSHK-B-HL can be supplied in any load rating, between 120 and 2K MT (265K to 4409K lbf)and calibrated as required. Usually we will choose the nearest standard shackle size. We can also offer special design shackles up to 2K MT. Please contact our design team for more details.
Centralizing Bobbin	We can offer an optional centralizing bobbin. This helps improve the overall load cell accuracy in certain cable tension applications. The bobbin is shown pictorially in the drawing below.
Multi-Shackle Systems	It is possible with the standard handheld telemetry display to use up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be used to view individual load cells or summated load cells. These values can be sent to a printer or a PC.



WTS-BS-1-HA with WTSSHK-B-HL (Shown)

FEATURES & BENEFITS

- Ranges from 120 to 1K MT (265K to 2205K lbf)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified

TYPICAL APPLICATIONS

- Towing/mooring tension
- Winch load monitoring
- Water bag testing

OPTIONS

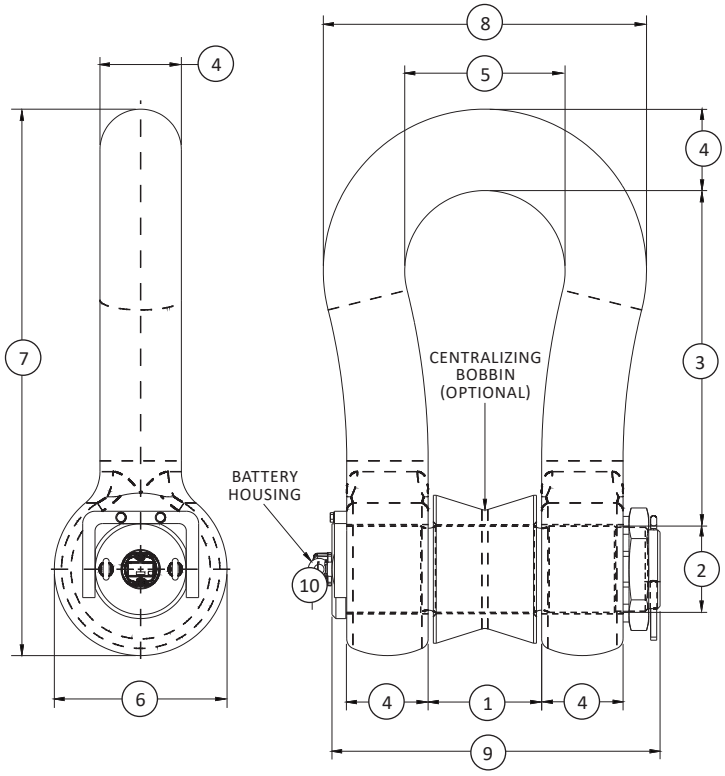
- Special ranges and capacities up to 2K MT (4409K lbf)
- Centralizing load bobbin
- Special telemetry systems available

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTSSHK-B-HL WIRELESS BOW LOAD SHACKLE (U.S. & METRIC)

SPECIFICATIONS

Rated Load	Metric (MT)	120	150	200	250	300	400	500	600	700	800	900	1000
	U.S. (lbf)	265K	331K	441K	551K	661K	882K	1102K	1324K	1543K	1764K	1984K	2205K
Proof Load – %		150 of rated load											
Ultimate Breaking Load – %		300 of rated load											
Nonlinearity – %		< ±1 of rated load (typically)											
Nonrepeatability – %		< ±0.1 of rated load											
TransmissionDistance	m	Up to 610 (clear line of sight)											
	ft	Up to 2,000 (clear line of sight)											
Battery Life		>300 hours typically (continuous use with 1.2Ah batteries)											
Battery		2 x AAA Alkaline (supplied with 1.2Ah batteries)											
Operating Temperature Range	°C	-20 to +55											
	°F	-4 to +131											
Weight	kgs	110	160	235	285	340	560	685	880	980	1100	1280	1460
	lbs	242.5	352.7	518.1	628.3	749.6	1234.6	1510.2	1940.1	2160.5	2425.1	2821.9	3218.7
Resolution	MT	0.1	0.1	0.2	0.2	0.5	0.5	0.5	0.5	1	1	1	1
	lbf	220	220	441	441	1.1K	1.1K	1102	1102	2205	2205	2205	2205
Environmental Protection Level		IP67											
Telemetry Housing		Polyamide resin											
Material		Alloy steel											



WTSSHK-B-HL WIRELESS BOW LOAD SHACKLE (U.S. & METRIC)

DIMENSIONS

See Drawing	CAPACITY											
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	120	265K	150	331K	200	441K	250	551K	300	661K	400	882K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	150	5.9	170	6.7	180	7.1	205	8.1	205	8.1	230	9.1
(2)	Ø95	Ø3.7	Ø108	Ø4.3	Ø125	Ø4.9	Ø140	Ø5.5	Ø150	Ø5.9	Ø175	Ø6.9
(3)	380	15.0	400	15.7	500	19.7	540	21.3	600	23.6	680	26.8
(4)	89	3.5	102	4.0	120	4.7	125	4.9	130	5.1	165	6.5
(5)	238	9.4	275	10.8	290	11.4	305	12.0	305	12.0	325	12.8
(6)	Ø200	Ø7.9	Ø230	Ø9.1	Ø260	Ø10.2	Ø260	Ø10.2	Ø305	Ø12.0	Ø350	Ø13.8
(7)	617	24.3	671	26.4	813	32.0	865	34.1	958	37.7	1,108	43.6
(8)	416	16.4	479	18.9	530	20.9	555	21.9	565	22.2	655	25.8
(9)	420	16.5	475	18.7	520	20.5	560	22.0	570	22.4	655	25.8
(10)	40	1.6	40	1.6	40	1.6	40	1.6	40	1.6	40	1.6

See Drawing	CAPACITY											
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	500	1102K	600	1324K	700	1543K	800	1764K	900	1984K	1K	2205K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	255	10.0	285	11.2	310	12.2	310	12.2	330	13.0	350	13.8
(2)	Ø185	Ø7.3	Ø205	Ø8.1	Ø217	Ø8.5	Ø217	Ø8.5	Ø230	Ø9.1	Ø240	Ø9.4
(3)	700	27.6	700	27.6	700	27.6	700	27.6	700	27.8	750	29.5
(4)	180	7.1	195	7.7	205	8.1	210	8.3	220	8.7	230	90.1
(5)	350	13.8	375	14.8	400	15.7	400	15.7	420	16.5	420	16.5
(6)	Ø370	Ø14.6	Ø405	Ø15.9	Ø435	Ø17.1	Ø435	Ø17.1	Ø465	Ø18.3	Ø480	Ø18.9
(7)	1158	45.6	1,200	47.2	1,231	48.5	1,236	48.7	1,268	49.9	1,290	50.8
(8)	710	28.0	765	30.1	810	31.9	820	32.3	860	33.9	880	34.6
(9)	720	28.3	815	32.1	860	33.9	870	34.3	910	35.8	950	37.4
(10)	40	1.6	40	1.6	40	1.6	40	1.6	40	1.6	40	1.6

WTSSHK-B-JR WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & METRIC)

DESCRIPTION

The WTSSHK-B-JR range of telemetry load shackles are manufactured using the Crosby™ G2130 shackle. Suitable for use in a wide range of lower capacity industrial weighing applications, these load shackles are accurate, reliable and simple to install. They are particularly popular in theatrical applications for measuring the loads on rigging, hoists and stage lifts.

The IP67 rated telemetry housing is manufactured from ABS plastic making it strong yet light, and the telemetry housing is manufactured from ABS plastic making it strong yet light, and the telemetry electronics contained within are powered by two AA batteries. The unit also features an internal antenna for maximum protection from damage.

The WTSSHK-B-JR can also be supplied with a handheld battery powered display which can toggle between MT or lbs, or alternatively, for multi-shackle applications. A single display can address up to 12 shackles for individual monitoring, or for summation/weighing applications.

Interface can also supply more complex telemetry systems. For further information on what we can offer, please contact our technical department with details of your application requirements.

SPECIFICATIONS

Rated Load	MT	3.25	4.75	6.5	9.5
	lbf	7.17K	10.5K	14.3K	20.9K
Proof Load – %		150 of rated load			
Ultimate Breaking Load – %		500 of rated load			
Nonlinearity – %		< ±1 of rated load (typically)			
Nonrepeatability – %		< ±0.1 of rated load			
Transmission Distance	m	Up to 600 (clear line of sight)			
	ft	Up to 1968.5 (clear line of sight)			
Battery Life		>650 hours (continuous use, with 2.3Ah batteries)			
Battery		AA Alkaline x 2			
Operating Temperature Range	°C	-20 to +55			
	°F	-4 to +131			
Environmental Protection Level		IP67			
Telemetry Housing		ABS plastic			
Weight	kgs	0.62	1.23	1.79	3.75
	lbf	1.37	2.71	3.95	8.27
Resolution	MT	0.01	0.01	0.01	0.01
	lbf	22.0	22.0	22.0	22.0
Material – Load Pin		Stainless steel			



WTS-BS-1-HA with WTSSHK-B-JR (Shown)

FEATURES & BENEFITS

- Ranges from 3.25 to 9.5 MT (7.17K to 20.9K lbf)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified

TYPICAL APPLICATIONS

- Rigging/hoist monitoring
- Vessel weighing
- Cable tension monitoring
- Lift/stage weighing/monitoring
- Vehicle testing

OPTIONS

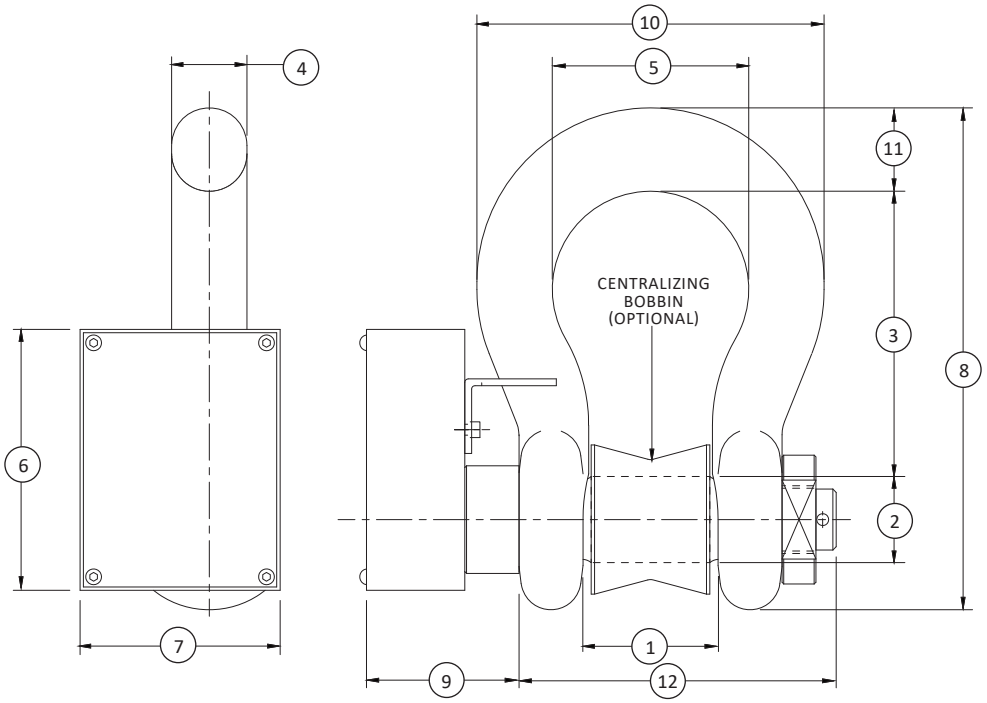
- Special ranges and capacities
- Integral signal conditioning
- Special telemetry systems available
- Longer battery life with different transmission rate settings (1 update per second extends battery life to 2000 hours)
- Multiple load cell systems
- Tablet PC option with data logging and other customized features
- Centralizing bobbin
- Amplified output option

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTSSHK-B-JR WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & METRIC)

SPECIAL OPTIONS

Special Ranges	The WTSSHK-B-JR can be supplied in any range, between 3.25 and 9.5 MT (7.17K and 20.9K lbf) calibrated as required. Usually we will choose the nearest standard shackle size.
Multi-Shackle Systems	It is possible with the standard handheld telemetry display to use up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be used to view individual load cells or summated load cells. These values can be sent to a printer or a PC.



DIMENSIONS

See Drawing	CAPACITY							
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	3.25	7.17K	4.75	10.5K	6.5	14.3K	9.5	20.9K
	mm	in	mm	in	mm	in	mm	in
(1)	27	1.0	31.8	1.25	36.6	1.44	46	1.8
(2)	Ø19.1	Ø0.75	Ø22.4	Ø0.89	Ø25.4	Ø1.00	Ø31.8	Ø1.25
(3)	60.5	2.38	71.5	2.81	84	3.3	108	4.3
(4)	16	0.6	19.1	0.75	22.4	0.89	28.9	1.14
(5)	42.9	1.69	51	2.0	58	2.3	74	2.9
(6)	77	3.0	77	3.0	77	3.0	59	2.3
(7)	59	2.3	59	2.3	59	2.3	77	3.0
(8)	106	4.2	126	5.0	148	5.8	190	7.5
(9)	41	1.6	41	1.6	45	1.8	54	2.1
(10)	74.6	2.94	89	3.5	102	4.0	131	5.2
(11)	17.5	0.69	20.6	0.81	24.6	0.97	31.8	1.3
(12)	73	2.9	83	3.3	94	3.7	119	4.7

WTSSHK-D WIRELESS CROSBY™ LOAD SHACKLE (U.S. & METRIC)

DESCRIPTION

The WTSSHK-D range of telemetry load shackles are manufactured using the Crosby™ G2150 shackles. Versions are also available using the popular GreenPin™ range of shackles. The built in radio telemetry electronics operates on the 2.4GHz license free frequency.

The unique telemetry housing is manufactured from tough high performance polyamide resin making it strong yet light, resulting in a better balanced load shackle when compared to others available on the market. Two clips enable you to open the housing to access and change the two AAA batteries, while the internal electronics underneath remain completely sealed. This includes the antenna to ensure maximum protection from damage.

The WTSSHK-D can also be supplied with a handheld battery powered display which can toggle between MT or lbs, or alternatively, for multi-shackle applications. A single display can address up to 12 shackles for individual monitoring, or for summation/weighing applications.

Interface can also supply more complex telemetry systems. For further information on what we can offer, please contact our technical department with details of your application requirements.

SPECIFICATIONS

Rated Load	MT	12	17	25	35
	lbf	26.5K	37.5K	55.1K	77.2K
Proof Load – %		150 of rated load			
Ultimate Breaking Load – %		300 of rated load			
Nonlinearity – %		< ±1 of rated load (typically)			
Nonrepeatability – %		< ±0.1 of rated load			
Transmission Distance	m	Up to 600 (clear line of sight)			
	ft	Up to 1968.5 (clear line of sight)			
Battery Life		>300 hours (continuous use, with 1.2Ah batteries)			
Battery		AAA Alkaline x 2 (supplied with 1.2Ah batteries)			
Operating Temperature Range	°C	-20 to +55			
	°F	-4 to +131			
Environmental Protection Level		IP67			
Telemetry Housing		Polyamide resin			
Weight	kgs	6.5	11	17	23
	lbs	14.3	24.3	37.5	50.7
Resolution	MT	0.01	0.02	0.02	0.05
	lbf	22.0	44.1	44.1	110
Material		Alloy steel			



WTS-BS-1-HA with WTSSHK-D (Shown)

FEATURES & BENEFITS

- Ranges from 12 to 35 MT (26.5K to 77.2K lbf)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified

TYPICAL APPLICATIONS

- Under-hook hoist/crane weighing
- Cable tension monitoring
- Towing/mooring tension
- Crane safe load monitoring
- Beam proof loading

OPTIONS

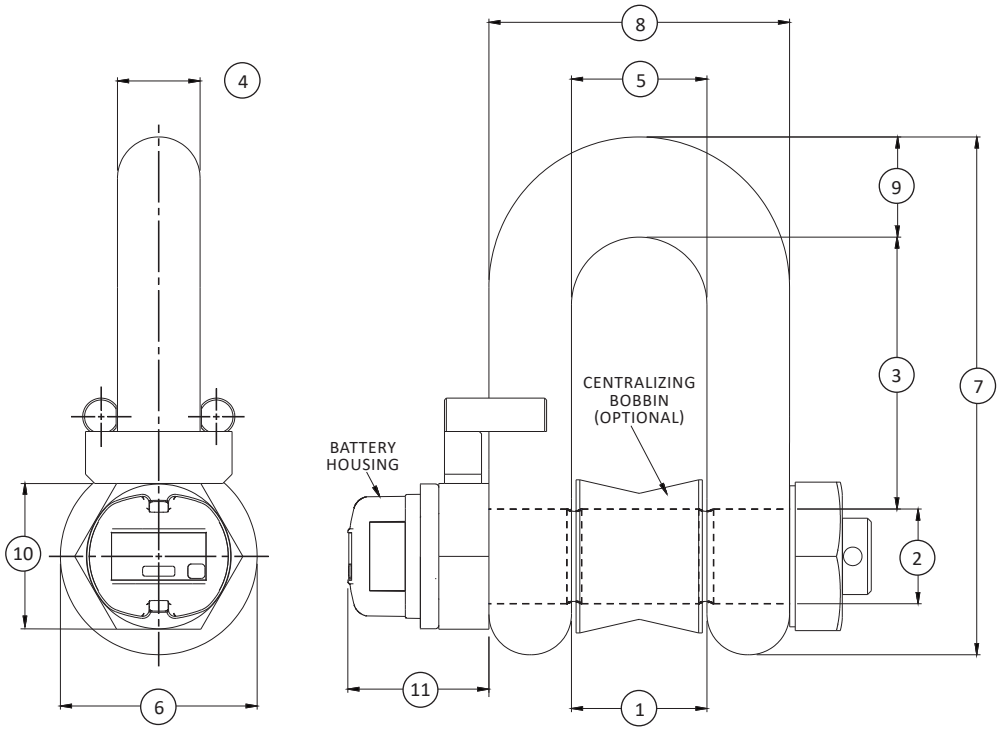
- Special ranges available
- Integral signal conditioning
- Centralizing load bobbin
- Special telemetry systems available
- Amplified output option

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTSSHK-D WIRELESS CROSBY™ LOAD SHACKLE (U.S. & METRIC)

SPECIAL OPTIONS

Special Ranges	The WTSSHK-D can be supplied in any range, between 12 and 35 MT (26.5K and 77.2K lbf) and calibrated as required. Usually we will choose the nearest standard shackle size. We can also offer special design shackles up to 2K MT (4409K lbf). Please contact our design team for more details
Centralizing Bobbin	We can offer an optional centralizing bobbin. This helps improve the overall accuracy in certain cable tension applications. The bobbin is shown pictorially in the drawing below.
Multi-Shackle Systems	It is possible with the standard handheld telemetry display to use up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be used to view individual load cells or summated load cells. These values can be sent to a printer or a PC.



DIMENSIONS

See Drawing	CAPACITY							
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	mm	in	mm	in	mm	in	mm	in
	12	26.5K	17	37.5K	25	55.1K	35	77.2K
(1)	51.5	2.03	60.5	2.38	73	2.9	82.5	3.25
(2)	Ø35.1	Ø1.38	Ø41.4	Ø1.63	Ø51	Ø2.0	Ø57	Ø2.2
(3)	100	3.94	122	4.8	146	5.7	172	6.8
(4)	31.8	1.25	38.1	1.50	44.5	1.75	51	2.0
(5)	51.5	2.03	60.5	2.38	73	2.9	82.5	3.25
(6)	Ø76	Ø3.0	Ø92	Ø3.6	Ø106	Ø4.2	Ø122	Ø4.8
(7)	191	7.5	230	9.1	279	11.0	312	12.3
(8)	115	4.5	137	5.4	162	6.4	184	7.2
(9)	35.1	1.38	41.1	1.62	54	2.1	60	2.4
(10)	Ø78	Ø3.1	Ø78	Ø3.1	Ø78	Ø3.1	Ø78	Ø3.1
(11)	76	3.0	76	3.0	76	3.0	76	3.0

Notes:

Notes:

Notes:

Instrumentation

Data Acquisition/Indicators 378

Junction Boxes 407

Signal Conditioner 408

USB Interface Modules 414

480 BIDIRECTIONAL DIGITAL WEIGHT INDICATOR (U.S. & METRIC)

FEATURES & BENEFITS

- Large 0.8 in LED 6-digit display
- 100,000 displayed graduations
- ±523,000 internal counts
- Powers up to 10 load cells
- Tension/Compression operation
- NEMA 4X stainless steel enclosure
- Measurement rate up to 40/sec
- 0.1uV/graduation signal sensitivity

SPECIFICATIONS

ELECTRICAL		
Excitation Voltage – VDC		5, 10 x 350Ω load cells or 20 x 700Ω load cells
Current – mA @ VAC		70 @115 35 @ 230
PERFORMANCE		
Maximum Display Counts		±99999
Internal Resolution Counts		±523,000
Analog Input Range – mV/V		±5
Readings Per Second		up to 40 selectable
Nonlinearity – % FS		0.01
Sensitivity – uV		to 0.1/graduation min
ENVIRONMENTAL		
Operating Temperature	°C	-10 to +50
	°F	+14 to +122
Enclosure		NEMA 4X/IP66 stainless steel washdown
POWER		
AC Power	VAC	115 - 230
	Hz	50 or 60
MECHANICAL		
Weight	kg	
	lbs	8
Display		6 digit LED
Material		Stainless Steel Enclosure

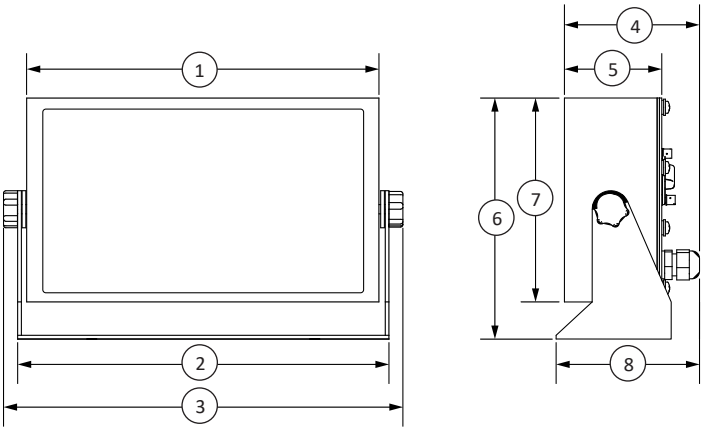
OPTIONS

- Analog output, 0-10 VDC, 0-20 mA, 4-20 mA, selection for 20% offset
- Relay output, two digital inputs, four dry contact relays (supports two boards)
- Battery, rechargeable lithium ion power for 18 hours of battery life on one 350 ohm load (LCD current draw vs LED current draw)
- Ethernet TCP/IP and USB interface

STANDARD CONFIGURATION



MODEL 480-0-1 (Shown)



DIMENSIONS

See Drawing	U.S. (in)	Metric (mm)
(1)	9.50	241
(2)	10.00	254
(3)	11.00	279
(4)	3.65	92
(5)	2.75	70
(6)	7.00	178
(7)	6.00	152
(8)	3.75	95

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

482 BATTERY POWERED BIDIRECTIONAL WEIGHT INDICATOR (U.S. & METRIC)

FEATURES & BENEFITS

- Large 0.8 in LCD 6-digit display
- 100,000 displayed graduations
- ±523,000 internal counts
- Powers up to 10 load cells
- Tension/Compression operation
- NEMA 4X stainless steel enclosure
- Measurement rate up to 40/sec
- 0.1uV/graduation signal sensitivity

SPECIFICATIONS

ELECTRICAL		
Excitation Voltage – VDC		5, 10 x 350Ω load cells or 20 x 700Ω load cells
Current – mA @ VAC		70 @115 35 @ 230
PERFORMANCE		
Maximum Display Counts		±99999
Internal Resolution Counts		±523,000
Analog Input Range – mV/V		±5
Readings Per Second		up to 40 selectable
Nonlinearity – % FS		0.01
Sensitivity – uV		to 0.1/graduation min
ENVIRONMENTAL		
Operating Temperature	°C	-10 to +50
	°F	+14 to +122
Enclosure		NEMA 4X/IP66 stainless steel washdown
POWER		
AC Power	VAC	115 - 230
	Hz	50 or 60
MECHANICAL		
Weight	kg	
	lbs	8
Display		6 digit LED
Material		Stainless Steel Enclosure

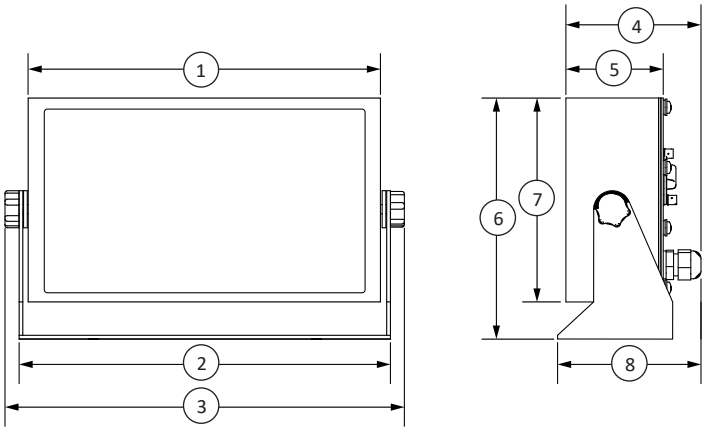
OPTIONS

- Analog Output (0-10VDC, 4-20mA)
- Battery, rechargeable lithium ion power for 40 hours of battery life on one 350 ohm load Power-saving modes for sleep and wake-up threshold

STANDARD CONFIGURATION



MODEL 482-0-1 (Shown)



DIMENSIONS

See Drawing	U.S. (in)	Metric (mm)
(1)	9.50	241
(2)	10.00	254
(3)	11.00	279
(4)	3.65	92
(5)	2.75	70
(6)	7.00	178
(7)	6.00	152
(8)	3.75	95

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

920i PROGRAMMABLE WEIGHT INDICATOR/CONTROLLER (U.S. & METRIC)

FEATURES & BENEFITS

- LCD display, (W x H) 4.6 in x 3.4 in
- Selectable character sizes from 0.25 in to 1.2 in
- 60 configurable operator prompts
- Display up to four scale channels per screen with required Legal for Trade information
- 32 scale accumulators
- 5 softkeys with 10 user-defined, 14 preset functions per screen
- 10 programmable display screens
- Millivolt calibration, 5-point linearization and geographical calibration
- NEMA Type 4X/IP66 stainless steel enclosure
- Selectable A/D measurement rate up to 960/second
- 100 setpoints, 30 configurable setpoint types
- 2 slots for option cards
- 1,000-ID truck register for in/out weighing
- 64 K user on-board NV RAM
- User programmable 128 K flash memory
- Reflash memory to upgrade firmware
- Power for 16, 350 ohms load cells per A/D board
- Local-remote indicators
- Multi range/interval
- Audit trail tracking
- Peak hold
- Rate of change

OPTIONS

- Provides streaming ASCII for print, remote display and logging
- Internal mV/V calibration
- USB Interface
- Analog Output: 0-10V and 0-20mA
- Digital I/O, 24-Channel TTL Output
- Ethernet

STANDARD CONFIGURATION



Model 920i Universal (Shown)



Model 920i Deep Universal (Shown)



Model 920i Panel Mount (Shown)



Model 920i Wall Mount (Shown)

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

920i PROGRAMMABLE WEIGHT INDICATOR/CONTROLLER (U.S. & METRIC)

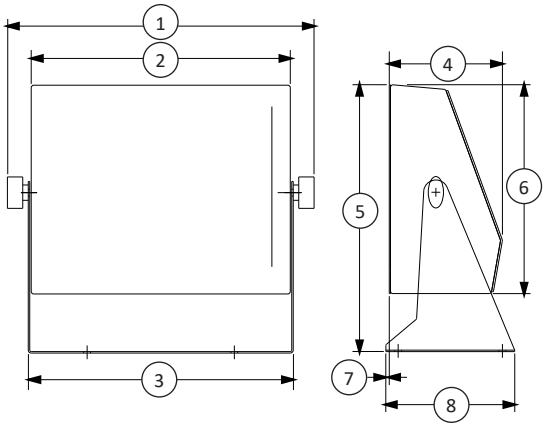
SPECIFICATIONS

ELECTRICAL		
Excitation Voltage – VDC		10 ± 8x350Ω or 16x700Ω load cells per A/D card
Analog Signal Input Range – mV/V		-45 to +45
Analog Signal Sensitivity – µV/GRAD – Hz		0.3 minimum at 7.5 1.0 recommended
A/D Sample Rate – Hz		7.5 to 960, software selectable
PERFORMANCE		
Maximum Display		+9999999
Internal Resolution – counts		8 million
Nonlinearity – %FS		0.01% full scale
Digital I/O		Six I/O channels on CPU board; optional 24-channel I/O expansion boards available
Communication Ports – mA	Four ports on CPU board support up to 115,200 bps	
	Port 1	Full duplex RS-232
	Port 2	RS-232 with CTS/RTS; PS/2 keyboard interface via DB-9 connector
	Port 3	Full duplex RS-232, 20 output
	Port 4	Full duplex RS-232, 2-wire RS-485, 20 output
	Optional dual-channel serial expansion boards available	
	Channel A	RS-232, RS-485, 20
	Channel B	RS-232, 20
ENVIRONMENTAL		
Certified Temperature	°F	+14 to +104
	°C	-10 to +40
Operating Temperature	°F	+14 to +122
	°C	-10 to +50

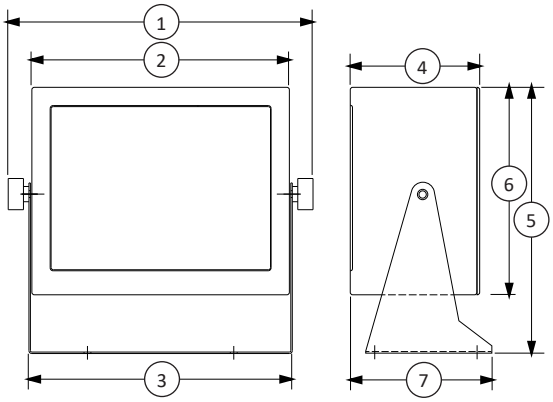
POWER			
AC Voltages – VAC, Hz			100-240, Frequency: 50-60
DC Voltages – VDC			12-24
Consumption – W		AC	25 universal, 65 panel & wall mount
		DC	25
MECHANICAL			
Dimensions – W x H x D		mm	90 x 152 x 34
		in	3.5 x 6.0 x 1.3
Weight	Universal Enclosure	kg	4.3
		lbs	9.5
	Wall Mount Enclosure	kg	10.4
		lbs	23.0
	Panel Mount Enclosure	kg	3.9
		lbs	8.5
	Deep Universal	kg	5.0
		lbs	11.0
Display – mm (in)			(W x H) 4.6 in x 3.4 in (116 mm x 86 mm), 320 x 240 pixel LCD module with adjustable contrast Transmissive display Transflective display (optional)
Keys/Buttons			27-key membrane panel, tactile feel, PS/2 port for external keyboard connection
EMC Immunity			EN 50082 Part 2 IEC EN 61000-4-2, 3, 4, 5, 6, 8, and 11
Rating			NEMA Type 4X/IP66
Material			Stainless steel

920i PROGRAMMABLE WEIGHT INDICATOR/CONTROLLER (U.S. & METRIC)

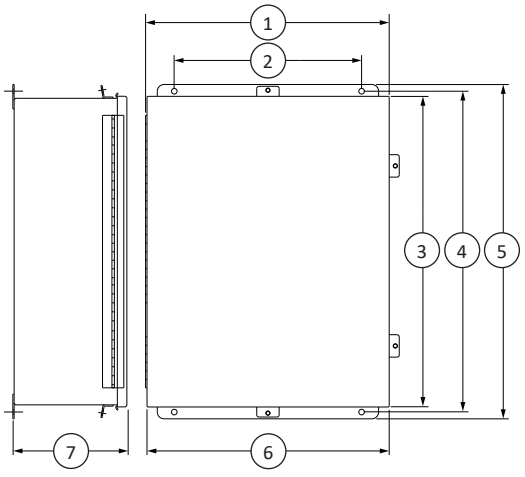
DIMENSIONS



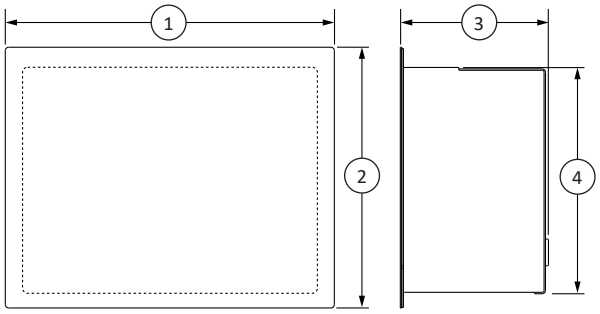
920i UNIVERSAL		
See Drawing	U.S. (in)	Metric (mm)
(1)	12.50	318
(2)	10.56	268
(3)	10.80	203
(4)	4.61	117
(5)	10.87	276
(6)	8.50	216
(7)	0.14	3.5
(8)	5.25	206



920i DEEP UNIVERSAL		
See Drawing	U.S. (in)	Metric (mm)
(1)	12.50	318
(2)	10.56	268
(3)	10.80	203
(4)	5.36	216
(5)	10.87	61
(6)	8.50	216
(7)	4X 5.88	4X 7



920i WALL MOUNT		
See Drawing	U.S. (in)	Metric (mm)
(1)	14.30	363
(2)	11.00	279
(3)	18.00	457
(4)	18.84	479
(5)	19.63	499
(6)	14.00	356
(7)	6.75	171



920i PANEL MOUNT		
See Drawing	U.S. (in)	Metric (mm)
(1)	11.56	294
(2)	9.16	233
(3)	5.20	132
(4)	7.95	202

9320 HANDHELD BATTERY POWERED INDICATOR (U.S. & METRIC)

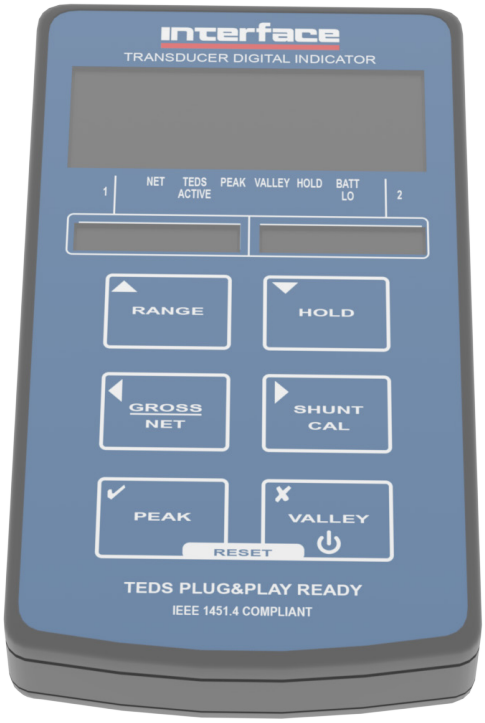
FEATURES & BENEFITS

- TEDS Plug & Play Ready
- 7 1/2 digital bipolar LCD display
- Dual range with unit labels
- Environmentally sealed
- Peak/valley hold
- Display hold
- Gross/net
- 25 Hz selectable update rate
- Shunt calibration
- Power save mode

SPECIFICATIONS

ELECTRICAL		
Excitation Voltage – VDC		5
Current – mA		59
PERFORMANCE		
Maximum Display		+9999999
Internal Resolution – bit		24
Signal Input Range – mV/V		5
Readings Per Second		to 25 selectable
Nonlinearity – %FS		0.005
ENVIRONMENTAL		
Operating Temperature	°C	-10 to +50
	°F	+14 to +122
Enclosure		Sealed IP65/NEMA 4X (when mating plug fitted)
POWER		
Power		2 x AA alkaline batteries
Battery Life – hrs		45 (450 in low power mode)
MECHANICAL		
Dimensions - W x H x D	mm	90 x 152 x 34
	in	3.5 x 6.0 x 1.3
Weight	g	250
	lbs	0.5
Display	mm	7 ½ digit LCD display, 8.8 digits
	in	7 ½ digit LCD display, 0.35 digits

STANDARD CONFIGURATION



MODEL 9320-1 (Shown)

OPTIONS

- Provides streaming ASCII for print, remote display and logging
- Internal mV/V calibration

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

9330 HIGH SPEED PORTABLE DISPLAY & DATA LOGGER (U.S. & METRIC)

FEATURES & BENEFITS

- 24-bit resolution
- 3750 Hz update rate
- Peak and valley capture
- Log to SD card at 1000Hz
- USB Port with software
- ±5V analog output
- Rechargeable battery
- 20 Hour battery life/300 hour standby
- Stores up to 6 sensor calibrations
- Powers up to 4x 350 ohm sensors
- 7 digit display

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		+/- 0.02
TEMPERATURE		
Effect on Zero – %FS / °C		+/- 0.01
Effect on Output – % / °C		+/- 0.001
Operating Range	°C	-0 to +50
	°F	+32 to 122
Storage Range	°C	-20 to +70
	°F	-4 to +158
ELECTRICAL		
Input–mV/V		+/-3.5
Excitation Voltage – VDC		2.5 or 5
Internal Resolution – bit		24
Conversion rate – Hz		3750
Logging Rate to SD Card – Hz		1000
Filters		Selectable
Electrical Connection		15-pin DSUB
Supply – VDC		7-27
MECHANICAL		
Dimensions - W x H x D	mm	165.1 x 108.0 x 31.8
	in	6.50 x 4.25 x 1.25
Backlit Display	mm	9 HIGH, 16 character
	in	0.35 HIGH, 16 character
Weight	g	610
	lbs	1.34
Protection		IP51 / IP65

STANDARD CONFIGURATION



MODEL 9330-1 (Shown)

OPTIONS & ACCESSORIES

- IP65 Environmental Protection
- SD Card – Class 10

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

9812-WTS WIRELESS PANEL MOUNT DISPLAY FOR SINGLE TRANSMITTERS

FEATURES & BENEFITS

- Bipolar
- 6 digit LED display (-199999 to +999999)
- Four SPST mechanical relay alarms (2A@250VAC)
- Peak and valley monitoring
- Wireless communication and compatible with all WTS products

SPECIFICATIONS

EXCITATION		
Excitation Voltage – VDC		10V (5V Optional)
Current – mA		120 mA
PERFORMANCE		
Display		-199999 to +999999
Internal Resolution Counts		See WTS-AM-1E
Signal Input		Wireless
RADIO		
Radio Type		License exempt transceiver
Radio Frequency - GHz		2.4
Range	m	up to 800
	ft	up to 2,625
ENVIRONMENTAL		
Operating Temperature	°C	0 to +50
	°F	+32 to +122
Relative Humidity – % MAX		95% non-condensing
POWER		
DC	VDC	11 to 30
Power Burden-VA MAX		10
MECHANICAL		
Dimensions - W x H x D	mm	96 x 48 x 125
	in	3.78 x 1.89 x 4.92
Weight	g	300
	lbs	0.66
Display Height	mm	14
	in	0.55
Panel Cutout - W x H	mm	92 x 45
	in	3.62 x 1.77
Connection Type		Detachable Screw Terminals

OPTIONS

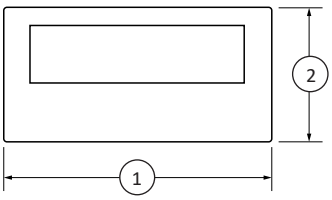
- Bench top enclosure
- Analog Output +/-10V, 4-20mA, 0-10V
- 100-240V AC Power, 45-60 Hz

STANDARD CONFIGURATION

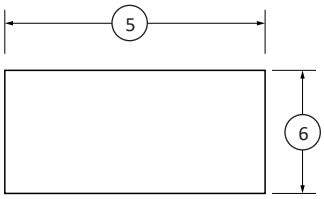


MODEL 9812-WTS (Shown)

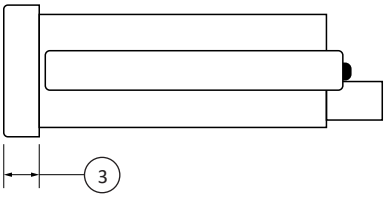
FRONT VIEW



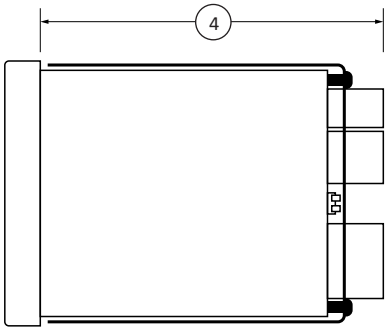
PANEL CUTOUT



SIDE VIEW



TOP VIEW



DIMENSIONS

	mm	in
(1)	96.0	3.78
(2)	48.0	1.89
(3)	13.0	0.51
(4)	125.0	4.92
(5)	92.0 (+1.0, -0.0)	3.62 (+1.0, -0.0)
(6)	45.0 (+1.0, -0.0)	1.77 (+1.0, -0.0)

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

9840 INTELLIGENT INDICATOR (U.S. & METRIC)

FEATURES & BENEFITS

- TEDS Plug & Play Ready IEEE 1451.4 compliant
- 1 or 2 channel
- Remote sense excitation
- 5 & 6 point linearization
- Bipolar
- ±999,999 display counts
- Nonlinearlity < ±0.005%
- Auto setup for multiple load cells
- Fast, direct analog output
- ±10 VDC scalable analog output – 16 bit
- Full duplex RS232C communication
- Peak/valley hold with front panel reset
- Front panel and remote tare
- 8 selectable digital filters
- Auto zero
- Front panel shunt calibration with two selectable resistors
- Display units conversion: Lb, Kg, N, Psi, Mpa, Klb, kN, t, mV/V, lbf-in, oz-in, Nm
- Two-line display
- Quadrature encoder channel available
- mV/V calibration
- USB port

OPTIONS

- TEDS read/write template 33, 40, 41
- 2nd channel
- 2nd 16-bit scalable analog output
- Display Freeze/Remote Display Freeze
- 4-20 mA analog output
- Quad Limits
- RS485
- Multi-drop RS232
- Print Button
- 7-pin circular load cell connector
- Encoder Channel
- Second Line Enable on 1-channel unit
- Keylock

STANDARD CONFIGURATION



MODEL 9840-100-1-T (Shown)

SPECIFICATIONS

EXCITATION		
Voltage – VDC		5 or 10
Current – MAX – mA		180
OUTPUTS		
Serial Interface		RS232 duplex
Output – Analog, 16 bit – VDC		Scalable, ±10
Output – Analog, Direct – Hz		1.5K
Output – Analog – mA		4–20 (optional)
Limits		Quad-programmable
PERFORMANCE		
Maximum Display Counts		±999,999
Display Update / sec.		4
Internal Resolution – bits		24
Signal Input Range – mV/V		±4.5
Programmable Count - by		1, 2, 5, 10, and 20
Conversion Rate / sec.		60
Maximum Error – %FS		0.01 ±1 count
CMRR – dB		115
ENVIRONMENTAL		
Operating Temperature	°F	+32 to +122
	°C	0 to +50
Storage Temperature	°F	+14 to +140
	°C	-10 to +60
Relative Humidity – % MAX	°F	95 (104) non-condensing
	°C	95 (40) non-condensing
POWER		
AC Power – VAC, Hz		115 or 230, 50–60
DC Power (option)		Available as a special
Power Consumption – watts		12
MECHANICAL		
Dimensions - W x H x D	in	7.5 x 2.5 x 9.5
	mm	190. 50 x 63.50 x 241.30
Weight	lbs	5
	kg	2.26796
Display		Vacuum Fluorescent
Unit Annunciator		Lb, Kg, Klb, kN, N, mV/V, lbf-in, oz-in, Nm

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

4 CHANNEL 9840-400-1-T INTELLIGENT INDICATOR

FEATURES & BENEFITS

- TEDS Plug & Play Ready! IEE1451.4 compliant
- 4 channel
- Remote sense excitation
- 5 & 6 point linearization
- Bipolar
- ±999,999 display counts
- Nonlinearity < ±0.005%
- Auto setup for multiple load cells
- Fast, direct analog output
- ±10 VDC scalable analog output – 16 bit
- USB 2.0 serial communication
- Peak/valley hold with front panel reset
- Front panel and remote tare
- 8 selectable digital filters
- Auto zero
- Front panel shunt calibration with two selectable resistors
- Display units conversion: Lb, Kg, N, Psi, Mpa, Klb, KN, t, mV/V, lb-in, oz-in, Nm
- (2) Interactive 7" graphical touch screen displays
- Quadrature encoder channel available
- mV/V calibration
- Compatible with Gold Standard® Calibration Systems

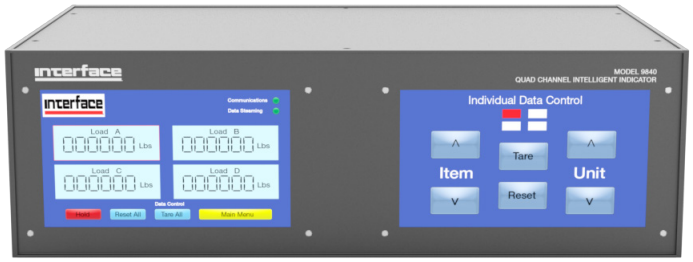
POWER OPTIONS

- 9840-400-1-T 115 VAC
- 9840-400-2-T 230 VAC

OPTIONS

- Up to three additional 16-bit scalable analog outputs
- Display Freeze/Remote Display Freeze
- 4-20 mA analog output
- Quad Limits
- RS485
- Multi-drop RS232
- 7-pin circular load cell connector
- Encoder Channel
- Keylock
- High level input channel

STANDARD CONFIGURATION



MODEL 9840-400-1-T (Shown)

SPECIFICATIONS

EXCITATION		
Voltage – VDC		5 or 10
Current – MAX – mA		180
OUTPUTS		
Serial Interface		USB 2.0
Output – Analog, 16 bit – VDC		Scalable, ±10
Output – Analog, Direct – Hz		1.5K BW
Output – Analog – mA		4–20 (optional)
Limits		Quad-programmable
PERFORMANCE		
Maximum Display Counts		±999,999
Display Update / sec.		15 Hz
Internal Resolution – bits		24
Signal Input Range – mV/V		±4.5
Programmable Count – by		1, 2, 5, 10, and 20
Conversion Rate / sec.		60
Maximum Error – %FS		0.01 ±1 count
CMRR – dB		115
ENVIRONMENTAL		
Operating Temperature	°F	+32 to +122
	°C	0 to +50
Storage Temperature	°F	+14 to +140
	°C	-10 to +60
Relative Humidity – % MAX	°F	95 (104) non-condensing
	°C	95 (40) non-condensing
POWER		
AC Power		110-120VAC/60Hz; 220-240VAC/50Hz
DC Power (option)		Available as a special
MECHANICAL		
Dimensions – W x H x D	in	17 x 5.25 x 10 (19 w/L-Brackets)
	mm	431.8 x 133.35 x 254 (482.6 w/L-Brackets)
Weight	lbs	9
	kg	4.08233
Display		(2) Interactive 7" graphical touch screen displays
Unit Annunciator		Lb, Kg, Klb, kN, N, mV/V, lbf-in, oz-in, Nm

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9850 MULTI-CHANNEL INDICATOR (U.S. AND METRIC)

FEATURES & BENEFITS

- High speed - 7800 samples/sec/channel
- Torque, speed, HP, load, angle, position display
- Works with torque sensors, load cells, encoders, LVDTs and speed pickups
- Powers up to 4 load cells
- 5 or 7-pole (based on input type) 200 Hz anti-alias filter plus 4-pole digital filters
- Includes graphical logging software
- RS232, RS422, RS485
- Max/Min capture
- Two-line backlit LCD display
- Math channel for calculated values
- User definable units
- Scalable analog outputs

AVAILABLE INPUT CHANNELS

- AC mV/V
- DC mV/V
- ±5 or ±10 VDC
- 4-20 mA current
- Frequency (speed)
- Encoder/totalizer (angle or position)
- LVDT (position)

OPTIONS

- Second transducer channel
- Input type
- DC power
- Panel mount kit

STANDARD CONFIGURATION



MODEL 9850-100-1 (Shown)

SPECIFICATIONS

TRANSDUCER EXCITATION/SUPPLY		
AC mV/V – V rms, Hz - %		3, 3030, ±0.01
DC mV/V – VDC		5 or 10
±5 or ±10 VDC – V, mA		12, 220
4-20 mA – V, mA		15, 30
Frequency/Encoder/Totalizer – V, mA		5, 250 and/or 12, 125
LVDT – V rms		2, selectable frequency
OUTPUTS		
Serial Interface		RS232/RS422/RS485
Output – Analog, 12 bit – VDC		2 Scalable, ±5, or ±10
Limits		HI/LO, per channel
PERFORMANCE		
Maximum Display Counts		10,000
Display Update / sec.		4
Internal Resolution – bits		±14
Conversion Rate / sec.		7800
Maximum Error – %FS		0.02
ENVIRONMENTAL		
Operating Temperature	°F	+41 to +122
	°C	+5 to +50
Relative Humidity – MAX %	°F	95(104), non-condensing
	°C	95(40), non-condensing
POWER		
AC Power	VAC	90 to 250
	Hz (VA MAX)	50-60 (25)
DC Power – VDC (watts MAX)		10-15 (15)
MECHANICAL		
Dimensions – W x H x D	in	6.5 x 2.5 x 8.7
	mm	165.1 x 63.5 x 220.98
Weight	lbs	3
	kg	1.36078
Display		Backlit LCD

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

9870 HIGH-SPEED HIGH PERFORMANCE TEDS READY INDICATOR (U.S. & METRIC)

FEATURES & BENEFITS

- High Performance Color Graphic LCD Screen
- TEDS Plug and Play
- Sampling and Response Time from 4,000 to 20,000 per second
- Nonlinearity 0.01% Full Scale
- 24 Bit A/D Converter
- Remote Sense Function
- Variety of Hold Functions
- Scalable Analog Output (0-5 VDC, ±5 VDC, 0-10 VDC, ±10VDC, 4-20mA Unipolar)
- Bar Graph, Process Waveform and Visual Alarm Mode Displays

SPECIFICATIONS

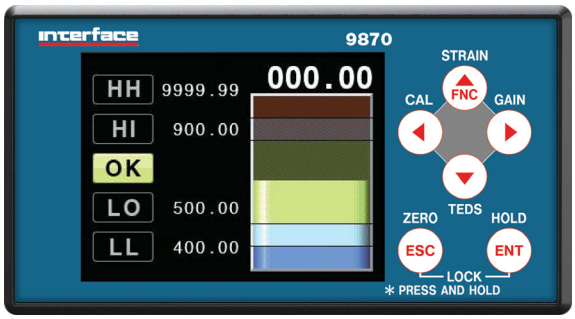
Input Signal Range		Strain gage type transducer ±5 mV/V
Excitation Voltage		DC 10V or 2.5V ±10% (Max Current: 30mA, remote sense can be used)
Calibration Method		Actual load calibration, Equivalent load calibration, TEDS calibration
ACCURACY		
Non-linearity		0.01% F.S.
Zero drift		0.5uV/ °C (Input equivalent value)
Gain drift		±0.005% F.S. °C
Analog to Digital Converting Rate		4000 times per sec 20000 times per sec when hold mode selected, 24 bits AID converter
Analog Output		± Voltage Output 0+1 to 10V 1V step or Current Output 4 to 20 mA Unipolar 4000 Hz
TEDS Function		Template 33 Read Only Functionality
DISPLAY		
Display Unit		2.4" (60.96 mm) TFT color LCD
Display Range		-99999 to 99999
Display Times		Select 4, 6, 10, 20 times per sec
Display Mode		Select Normal, Bar meter, Large Indicator Value, Static Strain, Graph
Hold function (20000 times per sec)		Sample, Peak, Bottom, Peak to Peak, Peak and Bottom, Average *Zone Definition Available except Sample Hold
Setpoints		Open Collector Output
ELECTRICAL		
Power		100 - 240 VAC 12W adapter (Included as a standard accessory) 50/60Hz
ENVIRONMENT		
Operating Temperature	°C	0 to 40
	°F	32 to 104
Storage Temperature	°C	-20 to 60
	°F	-4 to 140
Operating Humidity		85% RH (No condensation)
MECHANICAL		
Weight	g	300
	oz	10.5

STANDARD CONFIGURATION

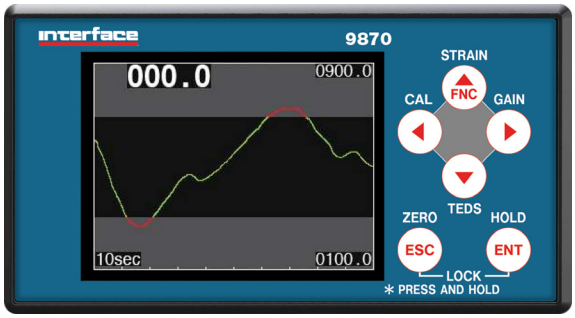


MODEL 9870 (Shown)

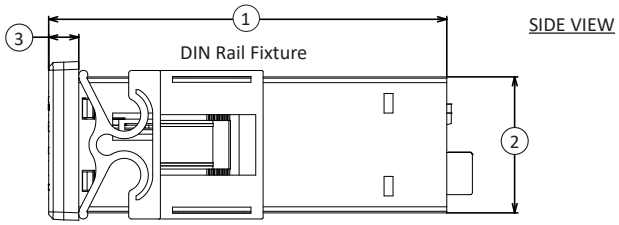
BAR GRAPH

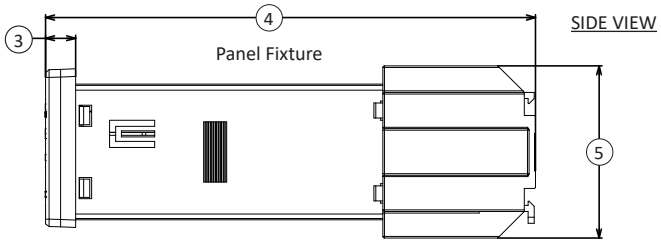


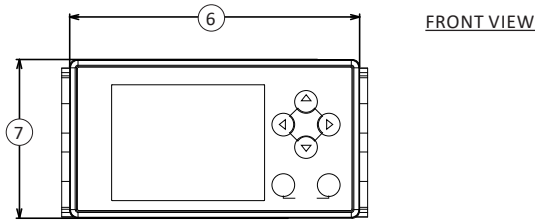
ACTUAL PROCESS WAVEFORM

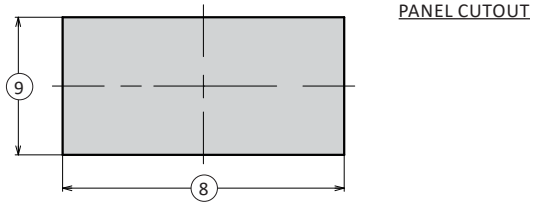


9870 HIGH-SPEED HIGH PERFORMANCE TEDS READY INDICATOR (U.S. & METRIC)



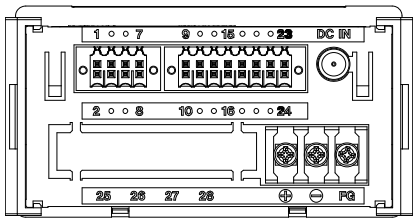






DIMENSIONS

See Drawing	1	2	3	4	5	6	7	8	9
in	5.18	1.77	0.39	6.38	2.24	3.77	2.06	3.62	1.77
mm	131.7	45	10	162.25	57	96	52.5	92	45



ELECTRICAL CONNECTION

Pin	Assign
1	+SEN/TEDS
2	-SEN/GND
3	+ EXC
4	- SIG
5	- EXC
6	+ SIG
7	SHIELD
8	NC
9	V-OUT
10	I-OUT
11	COM
12	CLEAR
13	COMPARATOR MODE
14	HOLD
15	D/Z
16	SEL1
17	SEL2
18	COM
19	LL
20	LO
21	HH
22	HI
23	OK
24	COM

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

9890 STRAIN GAGE, LOAD CELL, & mV/V INDICATOR (U.S. & METRIC)

FEATURES & BENEFITS

- Large Dual-Line 6-Digit Display, 0.60" & 0.46"
- 0.03% Accuracy
- Peak and valley monitoring
- 24-bit resolution
- USB Port with programming and viewing software
- Powers up to 12 x 350 ohm Sensors
- 32-point linearization
- ±15, ±25, ±150, ±250 mV Bipolar Input Ranges

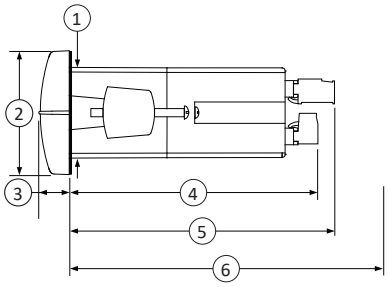
OPTIONS

- 12-24 VDC Power
- 4-20mA Analog Output
- Internal relays (2 or 4)
- Sunbright display for outdoor use
- RS232 & RS485 serial communication
- Additional external relay module
- Digital I/O expansion module
- Scalable Analog Output 4-20mA

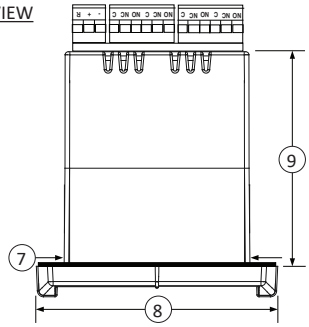
ACCESSORIES

- NEMA 4X Bench Top Enclosure
- Plexiglas bench top tilt stand

SIDE VIEW



TOP VIEW



DIMENSIONS

See Drawing	1	2	3	4	5	6	7	8	9
in	1.76	2.45	0.59	4.77	5.05	6	3.61	4.68	4.17
mm	44.5	62	15	121	128	152	91.5	119	106

Notes:

1. *Panel cutout required: 1.772" x 3.622" (45 mm x 92 mm)*
2. *Panel thickness: 0.040 - 0.250" (1.0 mm - 6.4 mm)*
3. *Mounting brackets lock in place for easy mounting*
4. *Clearance: Allow 6" (152 mm) behind the panel*

STANDARD CONFIGURATION



MODEL 9890 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		+/-0.03
PERFORMANCE		
Maximum Display Counts		6 digits (-99999 to 999,999)
Display Update/sec		5
Internal Resolution – bit		24
Signal Input Range	Unipolar	15, 30, 150, 300 mV
	Bipolar	±15, ±25, ±150, ±250 mV
Normal Mode Rejection – dB		>60 at 50/60Hz
Readings Per Second		5
Excitation – VDC		5, 10
ENVIRONMENTAL		
Operating Temperature	°F	-40 to 149
	°C	-40 to 65
Relative Humidity – %		0 to 90
POWER		
AC – VAC		85-265
AC – Hz		50/60
Power Consumption – w		20 max
MECHANICAL		
Dimensions – W x H x D	in	4.68 x 2.45 x 5.63
	mm	119 x 62 x 143
Weight	oz	9.5
	kg	0.27
Display	in	0.60 & 0.46
	mm	15.24 & 11.68
Panel Cutout – mm	in	3.62 x 1.77
	mm	92 x 45 (1/8 DIN)

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9894 ANALOG INPUT PROCESS INDICATOR (U.S. & METRIC)

FEATURES & BENEFITS

- 0-20 mA, 4-20 mA, 0-5 V, 1-5 V, and ±10 V Inputs
- 0.03% Accuracy
- Peak and valley monitoring
- 24-bit resolution
- USB Port with programming and viewing software
- Large Dual-Line 6-Digit Display, 0.60" & 0.46"
- 32-point linearization

OPTIONS

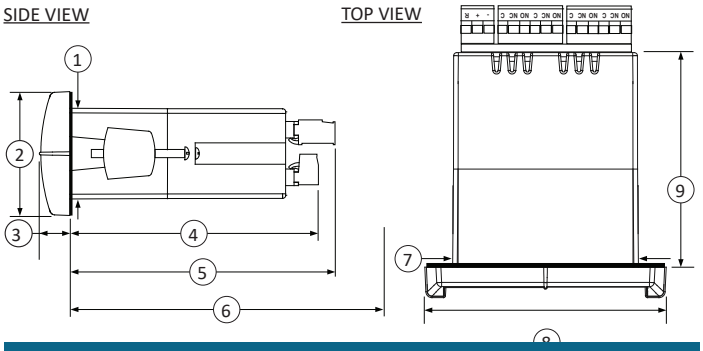
- 12-24 VDC Power
- 4-20mA Analog Output
- Internal relays (2 or 4)
- Sunbright display for outdoor use
- RS232 & RS485 serial communication
- Additional external relay module
- Digital I/O expansion module
- Modbus RTU serial communications
- Scalable Analog Output 4-20mA

ACCESSORIES

- NEMA 4X Bench Top Enclosure
- Plexiglas bench top tilt stand

SIDE VIEW

TOP VIEW



DIMENSIONS

See Drawing	1	2	3	4	5	6	7	8	9
in	1.76	2.45	0.59	4.77	5.05	6	3.61	4.68	4.17
mm	44.5	62	15	121	128	152	91.5	119	106

Notes:

1. *Panel cutout required: 1.772" x 3.622" (45 mm x 92 mm)*
2. *Panel thickness: 0.040 - 0.250" (1.0 mm - 6.4 mm)*
3. *Mounting brackets lock in place for easy mounting*
4. *Clearance: Allow 6" (152 mm) behind the panel*

STANDARD CONFIGURATION



MODEL 9894 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		+/-0.03
PERFORMANCE		
Maximum Display Counts		6 digits (-99999 to 999,999)
Display Update/sec		5
Internal Resolution – bit		24
Signal Input Range		0-20 mA, 4-20 mA, 0-5 V, 1-5 V, and ±10 V
Normal Mode Rejection – dB		>60 at 50/60Hz
Readings Per Second		5
Excitation – VDC		5, 10, & 24V
ENVIRONMENTAL		
Operating Temperature	°F	-40 to 149
	°C	-40 to 65
Relative Humidity – %		0 to 90
POWER		
AC – VAC		85-265
AC – Hz		50/60
Power Consumption – w		20 max
MECHANICAL		
Dimensions – W x H x D	in	4.68 x 2.45 x 5.63
	mm	119 x 62 x 143
Weight	oz	9.5
	kg	0.27
Display	in	0.60 & 0.46
	mm	15.24 & 11.68
Panel Cutout – mm	in	3.62 x 1.77
	mm	92 x 45 (1/8 DIN)

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BSC4 4-CHANNEL BRIDGE AMPLIFIER (U.S. & METRIC)

FEATURES & BENEFITS

- ±10V and 4-20mA or USB outputs
- 4 independent channels
- For use with model 3AXX series 3-axis load cells
- Can be used with up to any 4 standard load cells (with mV/V output)

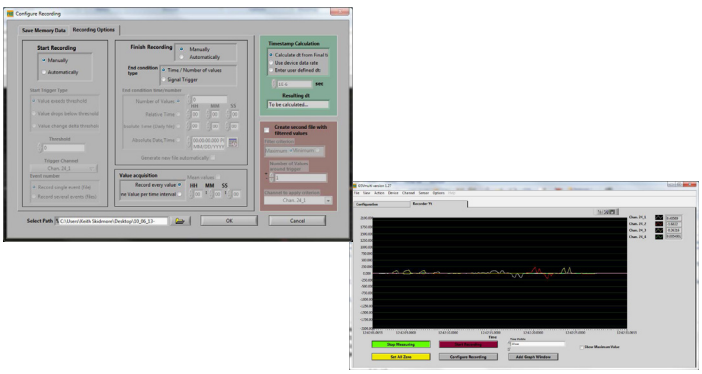
SPECIFICATIONS

PERFORMANCE		BSC4A	BSC4D
Signal Input Range – mV/V		up to 10	up to 10
Accuracy Class – %		0.05	0.05
CMR – dB @ 60 Hz		95 - 110	95 - 110
Data Rate – Hz		N/A	0 - 900
Sampling Frequency – MHz		N/A	1.92
Cut-Off Frequency – analog – Hz		250	1000
Cut-Off Frequency – digital		N/A	Notch Filler
Resolution – bit		Analog	16
EXCITATION			
Excitation Voltage - V		5	2.5
Excitation Current – mA		10	10
Supply Voltage – VDC		11 to 30	4.5 - 5.5 from USB
Supply Current – mA		< 1000	< 200
ENVIRONMENTAL			
Operating Range	°C	-10 to +65	-10 to +65
	°F	+14 to +149	+14 to +149
Storage Range	°C	-40 to +85	-40 to +85
	°F	-40 to +185	-40 to +185
Zero Drift/ °C		0.005%	0.005%
Sensitivity Drift/ °C		0.001%	0.001%

OPTIONS

- M12 load cell connectors (4x)

SOFTWARE SCREEN SHOTS



STANDARD CONFIGURATION

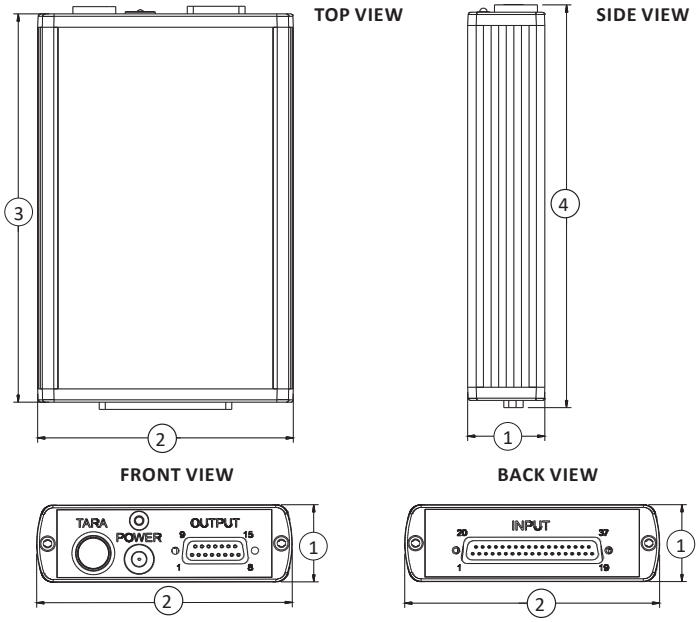


BSC4A (Shown)



BSC4D (Shown)

MODEL	DESCRIPTION
BSC4A	±10V and 4-20mA output, up to 10 mV/V input, 37-pin input connector. Includes power supply
BSC4D	USB output, up to 10 mV/V input, 37-pin input connector, USB powered. Includes graphing and logging software



DIMENSIONS

1		2		3		4	
mm	in	mm	in	mm	in	mm	in
32.0	1.25	106.0	4.17	161.0	6.33	169.0	6.65

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

BX8-AS INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

FEATURES & BENEFITS

- 8-Channel synchronized sampling
- Internal calculation of axis load values for 6-axis sensors
- Active scaling of analog outputs according to internal calculations
- ±5V, ±10V, 4-20mA, and 0-20 mA outputs
- 48K samples/sec/channel
- 24-bit internal resolution
- USB connection to PC
- Includes graphing and logging software
- Strain gage, mV/V, ±10VDC, and PT 1000 temperature inputs
- Excitation sense
- Full, ½ and ¼ bridge compatible with 120, 350, and 1000 ohm bridge completion
- TEDS compatible
- ZERO button for 8-channel simultaneous tare
- 16 digital I/O
- Galvanic isolation: Analog input, analog output, digital I/O, USB

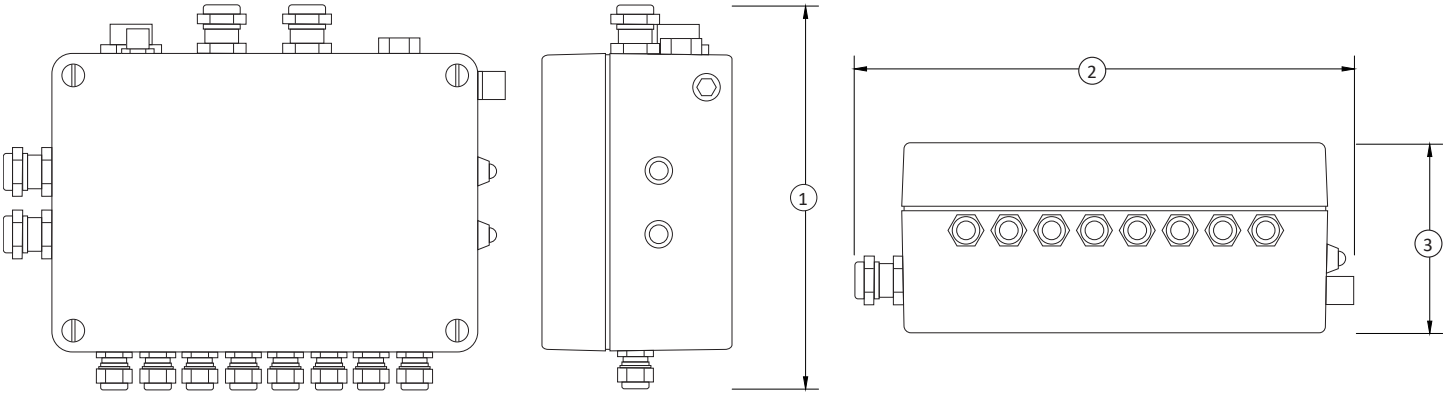
OPTIONS

- EtherCat
- CANbus/CANopen

STANDARD CONFIGURATION



MODEL BX8-AS (Shown)



DIMENSIONS

1		2		3	
mm	in	mm	in	mm	in
180	7.1	225	8.87	89.5	3.5

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

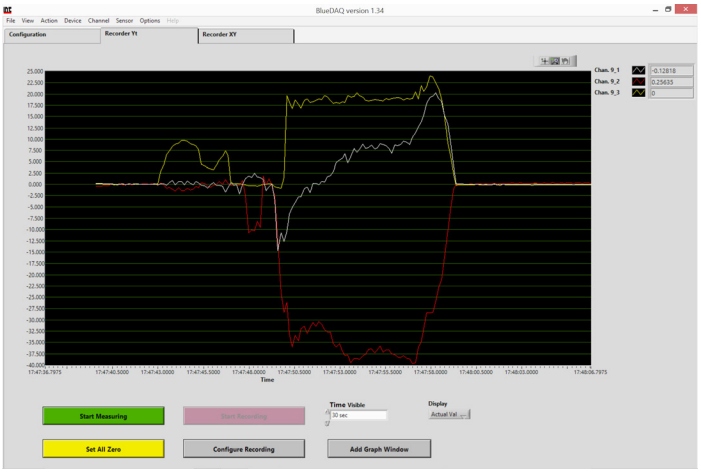
BX8-AS INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

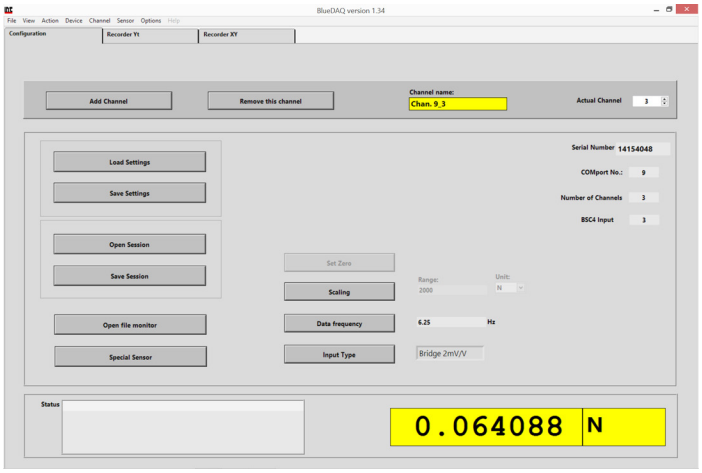
SPECIFICATIONS

PERFORMANCE	
Accuracy Class – %	0.05
Nonlinearity – % range	+/- 0.02
Sample Rate - per channel – samples/sec	48,000S synchronous
Digital Output Data Rate – values/sec	0.75 to 48,000
Resolution – bit	24
Resolution – noise limited	> 100,000 parts @ 10/s data rate > 20,000 parts @ 2000/s data rate > 9,400 parts @ 12,000/s data rate
Signal Input Filter – (3dB) – Hz	28, 850, 11.4k 1st order, switchable
Digital Onput Filter – (3dB) – Hz *Individually configurable for each channel*	0.18 to 15K includes high pass, low pass, band pass and band stop
SENSOR INPUTS	
Input Channels	8
Bridge Input Range – mV/V	2.0, 3.5, or 7.0
Bridge Input Impedance – MΩ - (pF)	> 20 (300)
Bridge Excitation Voltage – VDC	8.75, 5, or 2.5
Bridge Excitation Current – mA	135
Bridge Input Type – wire	4 or 6
Bridge Completion – Ω	¼ and ½, 120, 350 or 1000
CMMR – dB – DC – 100 Hz	>120, >100
Analog Input Range – VDC	+/-10
Analog Input Resistance – MΩ	10
PT1000 thermocouple – Ω	1000

ANALOG OUTPUTS		
Outputs types – V – mA *Individually configurable for each channel*		±10, ±5, 0-5, 0-10, 4-20, 0-20
Analog Output Scaling		Via software, active scaling capability
Analog Output Resolution – bit		16 over scaled range
Analog Output Update Rate – Hz		Up to 48K
DIGITAL INPUTS/OUTPUTS		
DIOs		16 configurable
USB - 8 channel packets – bit – /sec		16 integer, 48K, raw data 24 integer, 24K, raw data 32 floating point, 9.6K, scaled data 6-axis sensor: 32 floating point, 6K scaled data
ENVIRONMENTAL		
Operating Temperature Range	°C	0 to +50
	°F	+32 to +122
Storage Temperature Range	°C	-20 to +70
	°F	-4 to +158
POWER		
Supply – VDC		12-28
Supply – Watt		< 12
MECHANICAL		
Dimensions (L x W x H)	mm	222 x 180 x 89.5
	in	8.7 x 7.1 x 3.52
Weight	kg	2.4
	lbs	5.29
Protection Level		IP67
Connection Type		24-pin M16 or screw terminals

BLUEDAQ SOFTWARE





BX8-HD15 INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

FEATURES & BENEFITS

- 8-Channel synchronized sampling
- Internal calculation of axis load values for 6-axis sensors
- Active scaling of analog outputs according to internal calculations
- ±5V, ±10V, 4-20mA, and 0-20 mA outputs
- 48K samples/sec/channel
- 24-bit internal resolution
- USB connection to PC
- Includes graphing and logging software
- Strain gage, mV/V, ±10VDC, and PT 1000 temperature inputs
- Excitation sense
- Full, ½ and ¼ bridge compatible with 120, 350, and 1000 ohm bridge completion
- TEDS compatible
- ZERO button for 8-channel simultaneous tare
- 16 digital I/O
- Galvanic isolation: Analog input, analog output, digital I/O, USB

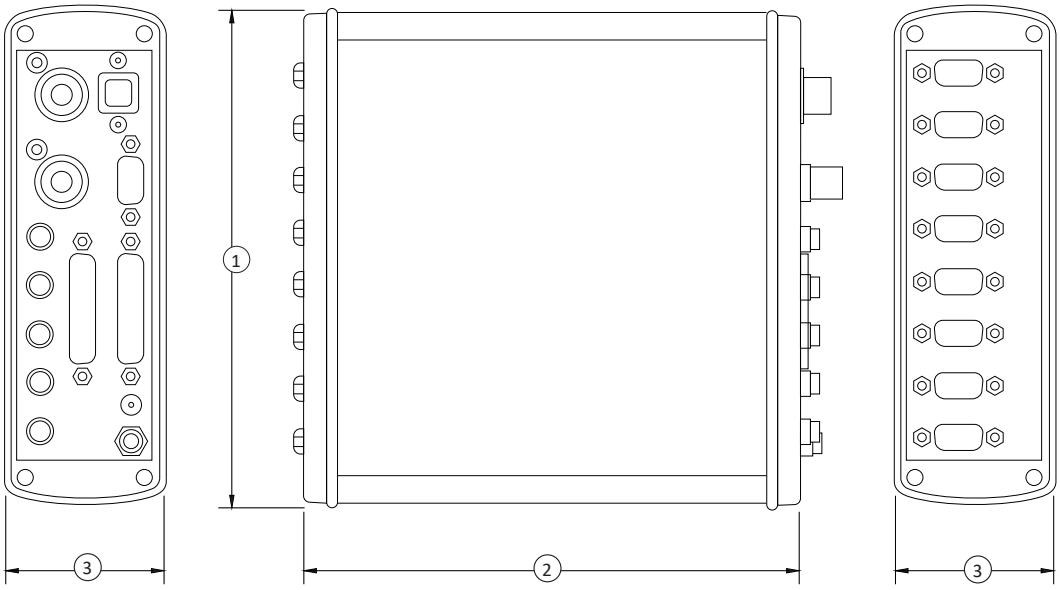
STANDARD CONFIGURATION



MODEL BX8-HD15 (Shown)

OPTIONS

- EtherCat
- CANbus/CANopen



DIMENSIONS

1		2		3	
mm	in	mm	in	mm	in
172	6.8	172	6.8	55	2.2

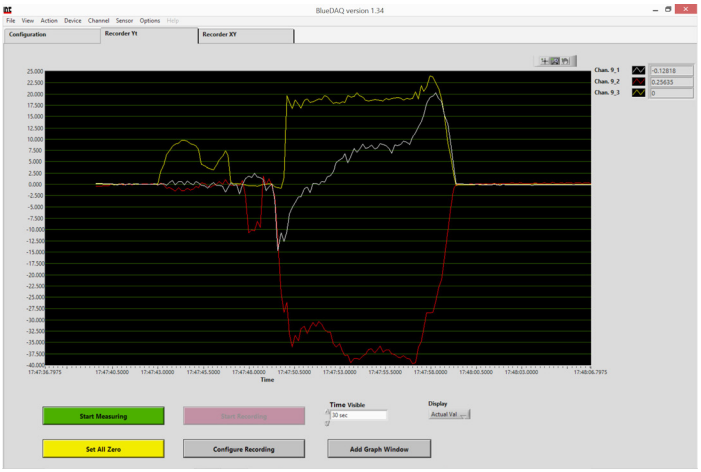
BX8-HD15 INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

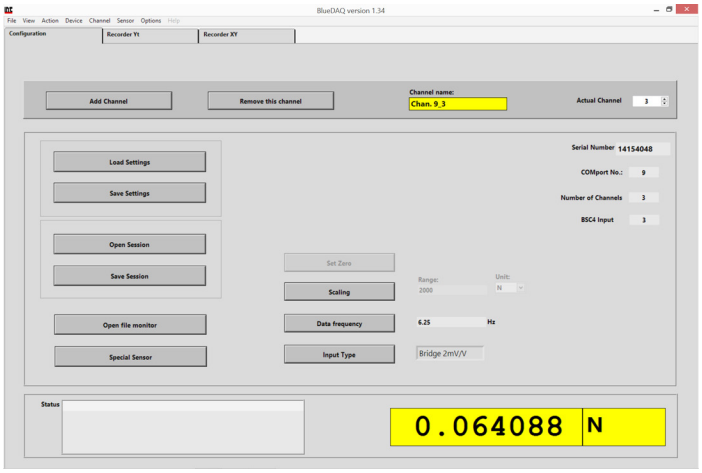
SPECIFICATIONS

PERFORMANCE	
Accuracy Class – %	0.05
Nonlinearity – % range	±0.02
Sample Rate – per channel – samples/sec	48,000 synchronous
Digital Output Data Rate – values/sec	0.75 to 48,000
Resolution – bit	24
Resolution – noise limited	> 100,000 parts @ 10/s data rate > 20,000 parts @ 2000/s data rate > 9,400 parts @ 12,000/s data rate
Signal Input Filter – (3dB) – Hz	28, 850, 11.4k 1st order, switchable
Digital Onput Filter – (3dB) – Hz *Individually configurable for each channel*	0.18 to 15K includes high pass, low pass, band pass and band stop
SENSOR INPUTS	
Input Channels	8
Bridge Input Range – mV/V	2.0, 3.5, or 7.0
Bridge Input Impedance – MΩ – (pF)	> 20 (300)
Bridge Excitation Voltage – VDC	8.75, 5, or 2.5
Bridge Excitation Current – mA	135
Bridge Input Type – wire	4 or 6
Bridge Completion – Ω	¼ and ½, 120, 350 or 1000
CMMR – dB – DC – 100 Hz	>120, >100
Analog Input Range – VDC	±10
Analog Input Resistance – MΩ	10
PT1000 thermocouple – Ω	1000

ANALOG OUTPUTS		
Outputs types – V – mA *Individually configurable for each channel*		±10, ±5, 0-5, 0-10, 4-20, 0-20
Analog Output Scaling		Via software, active scaling capability
Analog Output Resolution – bit		16 over scaled range
Analog Output Update Rate – Hz		Up to 48K
DIGITAL INPUTS/OUTPUTS		
DIOs		16 configurable
USB – 8 channel packets – bit – /sec		16 integer, 48K, raw data 24 integer, 24K, raw data 32 floating point, 9.6K, scaled data 6-axis sensor: 32 floating point, 6K scaled data
ENVIRONMENTAL		
Operating Temperature Range	°C	0 to +50
	°F	+32 to +122
Storage Temperature Range	°C	-20 to +70
	°F	-4 to +158
POWER		
Supply – VDC		12-28
Supply – Watt		< 12
MECHANICAL		
Dimensions (L x W x H)	mm	172 x 171 x 55
	in	6.8 x 6.7 x 2.2
Weight	kg	1.3
	lbs	2.87
Protection Level		IP67
Connection Type		15-pin High Density D-Sub Connector

BLUEDAQ SOFTWARE





U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

BX8-HD44 INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

FEATURES & BENEFITS

- 8-Channel synchronized sampling
- Internal calculation of axis load values for 6-axis sensors
- Active scaling of analog outputs according to internal calculations
- ±5V, ±10V, 4-20mA, and 0-20 mA outputs
- 48K samples/sec/channel
- 24-bit internal resolution
- USB connection to PC
- Includes graphing and logging software
- Strain gage, mV/V, ±10VDC, and PT 1000 temperature inputs
- Excitation sense
- Full, ½ and ¼ bridge compatible with 120, 350, and 1000 ohm bridge completion
- TEDS compatible
- ZERO button for 8-channel simultaneous tare
- 16 digital I/O
- Galvanic isolation: Analog input, analog output, digital I/O, USB

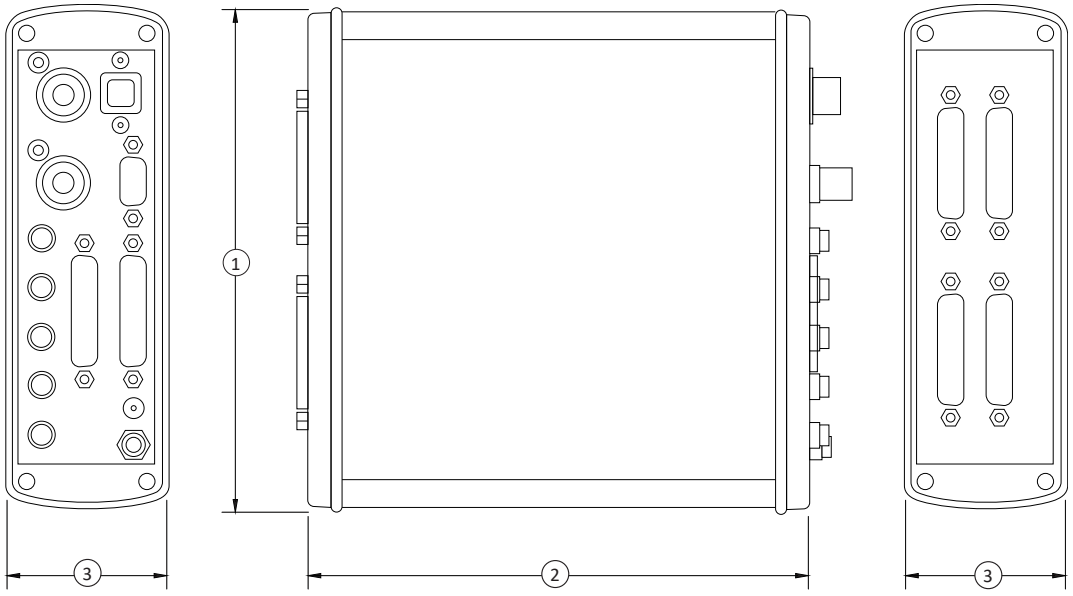
STANDARD CONFIGURATION



MODEL BX8-HD44 (Shown)

OPTIONS

- EtherCat
- CANbus/CANopen



DIMENSIONS

1		2		3	
mm	in	mm	in	mm	in
172	6.8	172	6.8	55	2.2

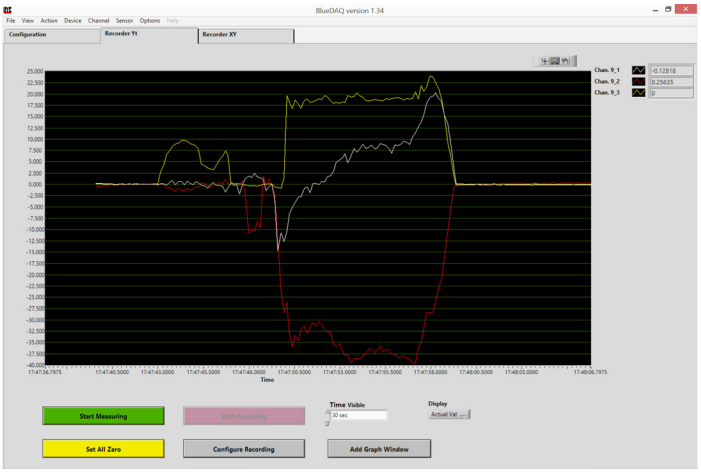
BX8-HD44 INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

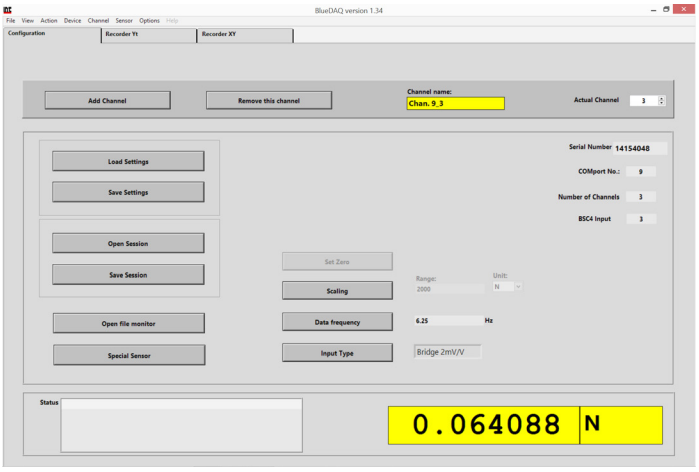
SPECIFICATIONS

PERFORMANCE	
Accuracy Class – %	0.05
Nonlinearity – % range	±0.02
Sample Rate – per channel – samples/sec	48,000 synchronous
Digital Output Data Rate – values/sec	0.75 to 48,000
Resolution – bit	24
Resolution – noise limited	> 100,000 parts @ 10/s data rate > 20,000 parts @ 2000/s data rate > 9,400 parts @ 12,000/s data rate
Signal Input Filter – (3dB) – Hz	28, 850, 11.4k 1st order, switchable
Digital Onput Filter – (3dB) – Hz Individually configurable for each channel	0.18 to 15K includes high pass, low pass, band pass and band stop
SENSOR INPUTS	
Input Channels	8
Bridge Input Range – mV/V	2.0, 3.5, or 7.0
Bridge Input Impedance – MΩ – (pF)	> 20 (300)
Bridge Excitation Voltage – VDC	8.75, 5, or 2.5
Bridge Excitation Current – mA	135
Bridge Input Type – wire	4 or 6
Bridge Completion – Ω	¼ and ½, 120, 350 or 1000
CMMR – dB – DC – 100 Hz	>120, >100
Analog Input Range – VDC	±10
Analog Input Resistance – MΩ	10
PT1000 thermocouple – Ω	1000

ANALOG OUTPUTS		
Outputs types – V – mA Individually configurable for each channel		±10, ±5, 0-5, 0-10, 4-20, 0-20
Analog Output Scaling		Via software, active scaling capability
Analog Output Resolution – bit		16 over scaled range
Analog Output Update Rate – Hz		Up to 48K
DIGITAL INPUTS/OUTPUTS		
DIOs		16 configurable
USB – 8 channel packets – bit – /sec		16 integer, 48K, raw data 24 integer, 24K, raw data 32 floating point, 9.6K, scaled data 6-axis sensor: 32 floating point, 6K scaled data
ENVIRONMENTAL		
Operating Temperature Range	°C	0 to +50
	°F	+32 to +122
Storage Temperature Range	°C	-20 to +70
	°F	-4 to +158
POWER		
Supply – VDC		12-28
Supply – Watt		< 12
MECHANICAL		
Dimensions (L x W x H)	mm	172 x 171 x 55
	in	6.8 x 6.7 x 2.2
Weight	kg	1.3
	lbs	2.87
Protection Level		IP67
Connection Type		44-pin High Density D-Sub Connector

BLUEDAQ SOFTWARE





U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

CSD EMBEDDED LOAD CELL CONVERTER & DIGITIZER MODULE (U.S. & METRIC)

FEATURES & BENEFITS

- Available outputs RS485, Modbus, CANbus, CANopen, and ASCII
- Linearity compensation 2 to 7-points
- 24-bit resolution (18-bit usable)
- Up to 500 samples/second
- Industrial or high stability

SPECIFICATIONS

EXCITATION			
Excitation Voltage – VDC			5
Excitation Current – mA MAX			60
Device Drive Capability – Ohms			320 to 5000
PERFORMANCE			
Bandwidth – Hz			500
Data Transmission Rate – bps			230, 400
Power Supply Ripple – mV			100 ac pk-pk
Nonlinearity before linearization – %FS			0.02
ENVIRONMENTAL			
Operating Range		°C	-40 to +85
		°F	-40 to +185
Storage Temperature		°C	-40 to +85
		°F	-40 to +185
MECHANICAL			
Enclosure	Board Only		None
	IP67 Enclosure		Stainless Steel
Dimensions	Board only - Ø, Height	mm	Ø20 x 5.3
		in	Ø0.8 X 0.21
	IP67 Enclosure	mm	Ø1.1 x 2.2
		in	Ø0.04 x 0.09

HIGH STABILITY	
Resolution @ 1Hz – counts	200,000
Resolution @ 10Hz – counts	120,000
Resolution @ 100Hz – counts	50,000
Resolution @ 500Hz – counts	18,000

INDUSTRIAL STABILITY	
Resolution @ 1Hz – counts	66,000
Resolution @ 10Hz – counts	40,000
Resolution @ 100Hz – counts	10,000
Resolution @ 500Hz – counts	5,000

STANDARD CONFIGURATION



IP67 ENCLOSURE INLINE MODULE (Shown)



LOAD CELL WITH INTEGRATED CSD (Shown)

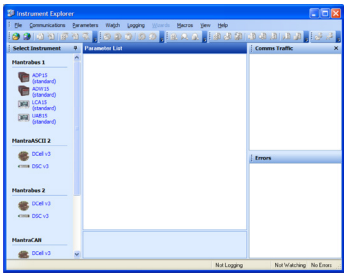
OPTIONS

- Temperature compensation (using optional board and sensor)
- User specified cable lengths
- Special calibration

INCLUDED SOFTWARE



24 Channel Logging
View and log up to 24 channels



Instrument Explorer
Quick setup software event monitoring, data logging, calibration and configuration

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

INF1 SERIES MODBUS TCP WEIGHT TRANSMITTER AND INDICATOR (U.S. AND METRIC)

FEATURES & BENEFITS

Connection to:

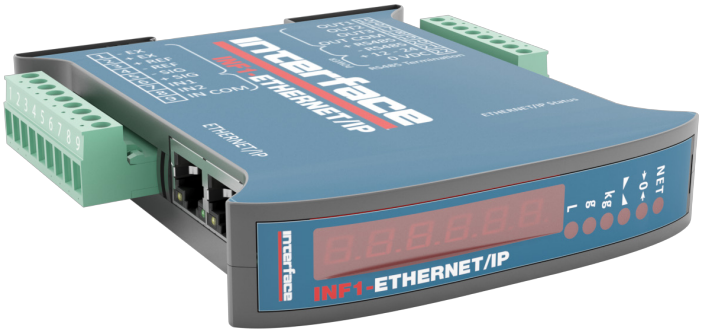
- PLC via analog output or fieldbus
- PC/PLC via RS485 (Up to 99 instruments with line repeaters, up to 32 without line repeaters)
- Remote display via RS485
- 8 load cells in parallel

- Digital Filter to reduce the effects of weight oscillation
- Theoretical calibration and real calibration with the possibility of weight linearizion up to 5 points
- Tare weight zero setting
- Automatic zero setting at power on
- Semi-automatic tare (net/gross weight) and predetermined tare
- Semi-automatic zero
- Direct connection between RS485 and RS232 without converter

SPECIFICATIONS

Parameter	
Power Supply and Consumption	12-24 VDC ±10% ;5W
Number of Load Cells	up to 8 (350 ohm) 4-6 wires
Load Cells Supply	5 VDC/240 mA
Linearity	<0.01% Full Scale
Linearity of Analog Output	<0.01% Full Scale
Thermal Drift	<0.0005% Full Scale/ºC
Thermal Drift of Analog Output	<0.003% Full Scale/ºC
A/D Converter	1 Channel - 24 bit (16000000 Points) - 4.8 kHz
Divisions (Range ±10mV , Sensitivity 2mV/V)	±999999 0,01 µV/d
Measure Range	±39 mV
Load Cell Sensitivity	±7 mV/V
Conversions Per Second	300/s
Display Range	±999999
Decimals	0-4
Display Increments	x1 x2 x5 x10 x20 x50 x100
Digital Filter	10 levels
Digital Conversion Rate	5 - 300 Hz
3 Relay Logic Outputs	115 VAC/150 mA
2 Optoisolated Logic Inputs	5 - 24 VDC PNP
Serial Ports	RS485
Baud Rate	2400, 4800, 9600, 19200, 38400, 115200 (Bit/s)
Analog Output	16 bit = 65535 Divisions. 0-20 mA; 4-20 mA (Up to 300 ohm) 0-10 V; 0-5 V; ±10 V; ±5 V (min 10k ohm)
Maximum Humidity (Condensation Free)	85 %
Storage Temperature	-30ºC +80ºC
Working Temperature	-20ºC +60ºC
3 Relay Digital Outputs	30 VAC, 60 VDC/150 mA

STANDARD CONFIGURATION

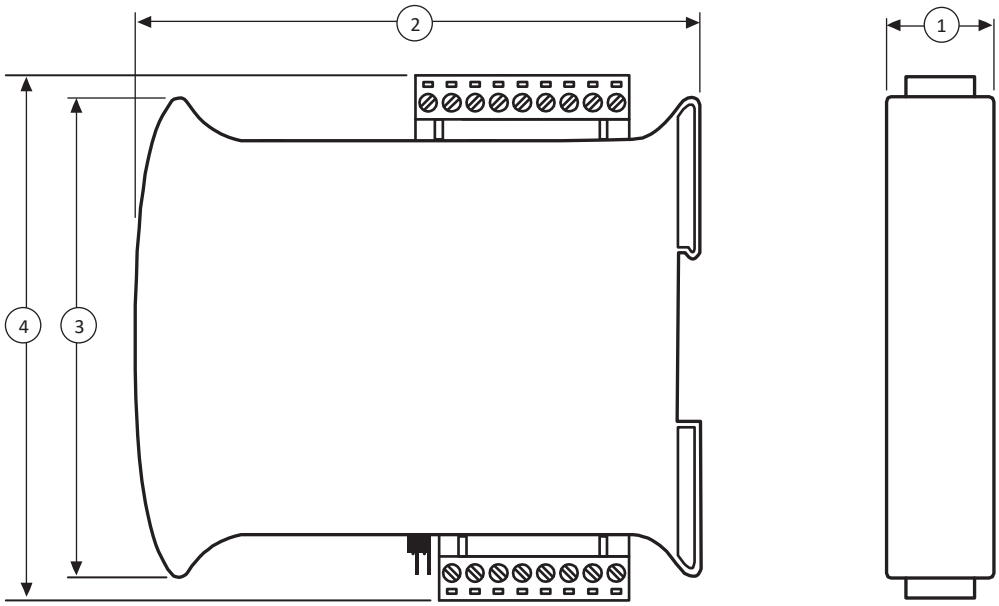


MODEL INF1-ETHERNET/IP (Shown)

- RS485 serial port for communication via Modbus RTU protocol, ASCII bidirectional or continuous one way transmission
- 3 relay logic outputs controlled by setpoint values or via protocols
- 2 optoisolated PNP logic inputs: status reading via serial communication protocols
- 1 load cell dedicated input
- Back panel mounting on Omega/DIN rail
- Dimensions: 25x115x120 mm
- Six-digit red LED semi-alphanumeric display (8 mm height), 7 segment
- Six indicator LED
- Four buttons for system calibration
- Extractable screw terminal boards

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

INF1 SERIES MODBUS TCP WEIGHT TRANSMITTER AND INDICATOR (U.S. AND METRIC)

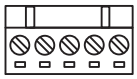
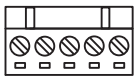
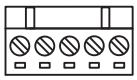
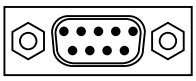
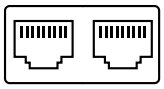
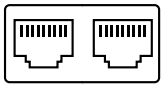
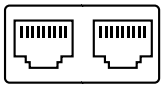
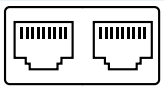
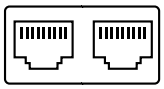


DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	22.5	0.89
(2)	120	4.72
(3)	101	3.98
(4)	111	4.37

INF1 SERIES MODBUS TCP WEIGHT TRANSMITTER AND INDICATOR (U.S. AND METRIC)

FIELDBUS OPTIONS

Port	Model	Description
	INF1-RS485	**RS485** serial port. Baud rate: 2400, 4800, 9600, 19200, 38400, 115200 (bit/s).
	INF1-Analog	Optoisolated 16 bit **analog output**. Current: 0-20 mA, 4÷20 mA (up to 300 Ω). Voltage: 0-10 V, 0-5 V, ±10 V, ±5 V (min 10 kΩ). Equipped with RS485 serial port.
	INF1-CANopen	**CANopen** port. Baud rate: 10, 20, 25, 50, 100, 125, 250, 500, 800, 1000 (kbit/s). The instrument works as slave in a synchronous CANopen network. Equipped with RS485 serial port.
	INF1-DeviceNet	**DeviceNet** port. Baud rate: 125, 250, 500 (kbit/s). The instrument works as slave in a DeviceNet network. Equipped with RS485 serial port.
	INF1-CC-Link	**CC-Link** port. Baud rate: 156, 625, 2500, 5000, 10000 (kbit/s). The instrument works as Remote Device Station in a CC-Link network and occupies 3 stations. Equipped with RS485 serial port.
	INF1-PROFIBUS DP	**PROFIBUS DP** port. Baud rate: up to 12 Mbit/s. The instrument works as slave in a Profibus DP network. Equipped with RS485 serial port.
	INF1-Modbus/TCP	**Modbus/TCP** port. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works as slave in a Modbus/TCP network. Equipped with RS485 serial port.
	INF1-Ethernet TCP/IP	**Ethernet TCP/IP** port. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works in an Ethernet TCP/IP network and it is accessible via web browser. Equipped with RS485 serial port.
	INF1-Ethernet/IP	**2x Ethernet/IP** ports. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works as adapter in an Ethernet/IP network. Equipped with RS485 serial port.
	INF1-PROFINET IO	**2x PROFINET IO** ports. Type: RJ45 100Base-TX. The instrument works as device in a Profinet IO network. Equipped with RS485 serial port.
	INF1-EtherCAT	**2x EtherCAT** ports. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works as slave in an EtherCAT network. Equipped with RS485 serial port.
	INF1-POWERLINK	**2x POWERLINK** ports. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works as slave in a Powerlink network. Equipped with RS485 serial port.
	INF1-SERCOS III	**2x SERCOS III** ports. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works as slave in a Sercos III network. Equipped with RS485 serial port.

INF4 SERIES MODBUS TCP WEIGHT TRANSMITTER AND INDICATOR (U.S. AND METRIC)

STANDARD CONFIGURATION

- RS485 serial port for communication via Modbus RTU protocol, ASCII bidirectional or continuous one way transmission.
- 3 relay logic outputs controlled by setpoint values or via protocols.
- 2 optoisolated PNP logic inputs: status reading via serial communication protocols.
- 4 load cell dedicated input.
- Back panel mounting on Omega/DIN rail or front panel (except PROFIBUS DP version) with fixing kit included (panel drilling template 23x96 mm; panel thickness 2.5 mm).
- Dimensions: 26x115x120 mm.
- Six-digit red LED semi-alphanumeric display (8 mm height), 7 segment.
- Six indicator LED.
- Four buttons for system calibration.
- Extractable screw terminal boards.

FEATURES & BENEFITS

- 4 independent channels for monitoring and direct management of individual load cells.
- Digital Equalization.
- 4 channel load distribution signaling with archive backups.
- Automatic Diagnostics can make comparisons between recorded values and display an alert if significant variations between the values are detected.
- Event Log archives data in chronological order of the last 50 events related to calibrations, zero settings, errors and equalizations.

Connection to:

- PLC via analog output or fieldbus.
- PC/PLC via RS485 (Up to 99 instruments with line repeaters, up to 32 without line repeaters).
- Remote display via RS485.
- 16 load cells in parallel.

- Digital Filter to reduce the effects of weight oscillation.
- Theoretical calibration and real calibration with the possibility of weight linearizion up to 5 points.
- Tare weight zero setting.
- Automatic zero setting at power on.
- Semi-automatic tare (net/gross weight) and predetermined tare.
- Semi-automatic zero.
- Direct connection between RS485 and RS232 without converter.



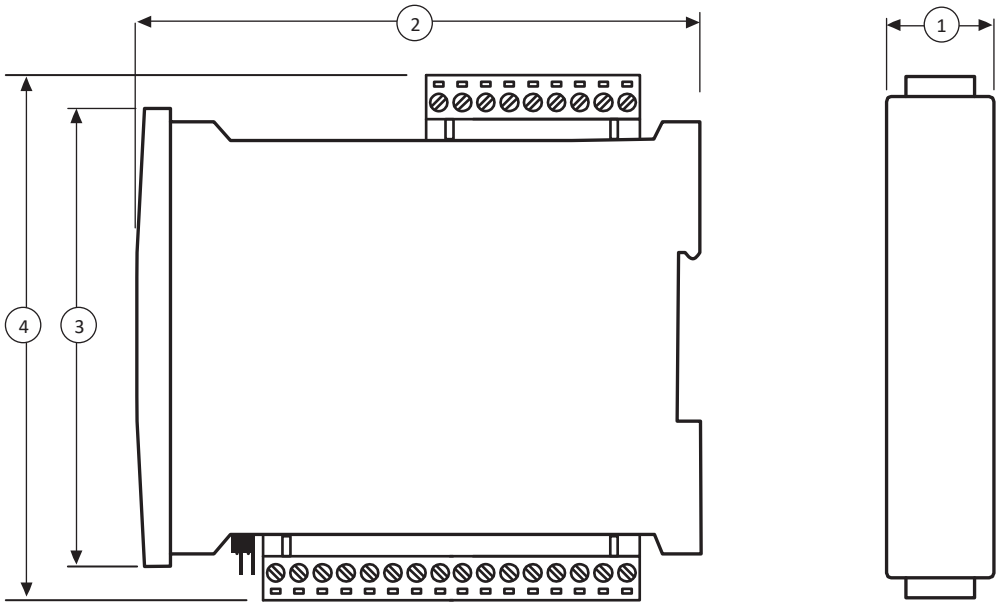
MODEL INF4-MODBUS/TCP (Shown)

SPECIFICATIONS

Parameter	
Power Supply and Consumption	12-24 VDC ±10% ;5W
Number of Load Cells	up to 16 (350 ohm) 4-6 wires
Load Cells Supply	5 VDC/240 mA
Linearity	<0.01% Full Scale
Linearity of Analog Output	<0.01% Full Scale
Thermal Drift	<0.0005% Full Scale/ºC
Thermal Drift of Analog Output	<0.003% Full Scale/ºC
A/D Converter	4 Channels - 24 bits (16000000 Points) - 4.8 kHz
Divisions (Range ±10mV , Sensitivity 2mV/V)	±999999 0,01 µV/d
Measure Range	±39 mV
Load Cell Sensitivity	±7 mV/V
Conversions Per Second	600/s
Display Range	±999999
Decimals	0-4
Display Increments	x1 x2 x5 x10 x20 x50 x100
Digital Filter	0.006 - 7s
Digital Conversion Rate	5 - 600 Hz
Relay Logic Outputs (3)	115 VAC/150 mA
Optoisolated Logic Inputs (2)	5 - 24 VDC PNP
Serial Ports	RS485
Baud Rate	2400, 4800, 9600, 19200, 38400, 115200 (Bit/s)
Analog Output	16 bit = 65535 Divisions. 0-20 mA; 4-20 mA (Up to 300 ohm) 0-10 V; 0-5 V; ±10 V; ±5 V (min 10k ohm)
Maximum Humidity (Condensation Free)	85 %
Storage Temperature	-30ºC +80ºC
Working Temperature	-20ºC +60ºC
Relay Digital Outputs (3)	30 VAC, 60 VDC/150 mA

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

INF4 SERIES MODBUS TCP WEIGHT TRANSMITTER AND INDICATOR (U.S. AND METRIC)



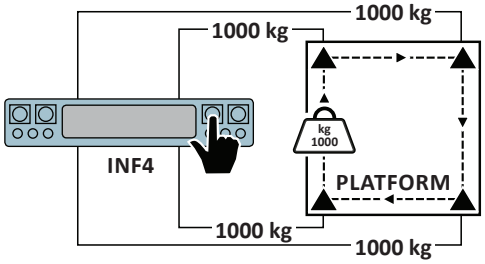
DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	26	1.02
(2)	120	4.72
(3)	100	3.94
(4)	115	4.53

WITH DIGITAL EQUALIZATION

Digital Equalization

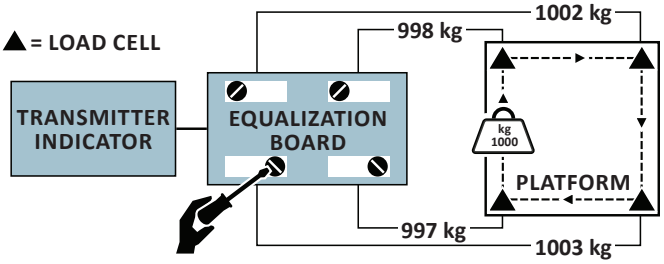
The INF4 does not require the use of a junction box, thanks to the support of 4 independent channels. Furthermore the digital equalizer function simplifies the procedure to a single step and it is free of drift over time.



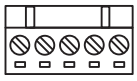
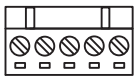
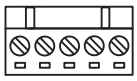
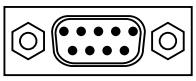
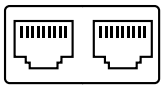
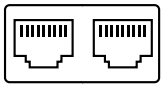
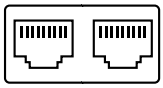
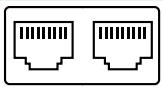
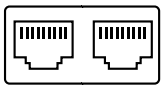
WITHOUT DIGITAL EQUALIZATION

Equalization with Junction Boews

The equalization procedure with a junction box involves more manual steps and over time it can be susceptible to drift phenomena, requiring further adjustment.



FIELDBUS OPTIONS

Port	Model	Description
	INF4-RS485	**RS485** serial port. Baud rate: 2400, 4800, 9600, 19200, 38400, 115200 (bit/s).
	INF4-Analog	Optoisolated 16 bit **analog output**. Current: 0-20 mA, 4÷20 mA (up to 300 Ω). Voltage: 0-10 V, 0-5 V, ±10 V, ±5 V (min 10 kΩ). Equipped with RS485 serial port.
	INF4-CANopen	**CANopen** port. Baud rate: 10, 20, 25, 50, 100, 125, 250, 500, 800, 1000 (kbit/s). The instrument works as slave in a synchronous CANopen network. Equipped with RS485 serial port.
	INF4-DeviceNet	**DeviceNet** port. Baud rate: 125, 250, 500 (kbit/s). The instrument works as slave in a DeviceNet network. Equipped with RS485 serial port.
	INF4-CC-Link	**CC-Link** port. Baud rate: 156, 625, 2500, 5000, 10000 (kbit/s). The instrument works as Remote Device Station in a CC-Link network and occupies 3 stations. Equipped with RS485 serial port.
	INF4-PROFIBUS DP	**PROFIBUS DP** port. Baud rate: up to 12 Mbit/s. The instrument works as slave in a Profibus DP network. Equipped with RS485 serial port.
	INF4-Modbus/TCP	**Modbus/TCP** port. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works as slave in a Modbus/TCP network. Equipped with RS485 serial port.
	INF4-Ethernet TCP/IP	**Ethernet TCP/IP** port. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works in an Ethernet TCP/IP network and it is accessible via web browser. Equipped with RS485 serial port.
	INF4-Ethernet/IP	**2x Ethernet/IP** ports. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works as adapter in an Ethernet/IP network. Equipped with RS485 serial port.
	INF4-PROFINET IO	**2x PROFINET IO** ports. Type: RJ45 100Base-TX. The instrument works as device in a Profinet IO network. Equipped with RS485 serial port.
	INF4-EtherCAT	**2x EtherCAT** ports. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works as slave in an EtherCAT network. Equipped with RS485 serial port.
	INF4-POWERLINK	**2x POWERLINK** ports. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works as slave in a Powerlink network. Equipped with RS485 serial port.
	INF4-SERCOS III	**2x SERCOS III** ports. Type: RJ45 10Base-T or 100Base-TX (auto-sensing). The instrument works as slave in a Sercos III network. Equipped with RS485 serial port.

JUNCTION BOXES (U.S. & METRIC)

FEATURES & BENEFITS

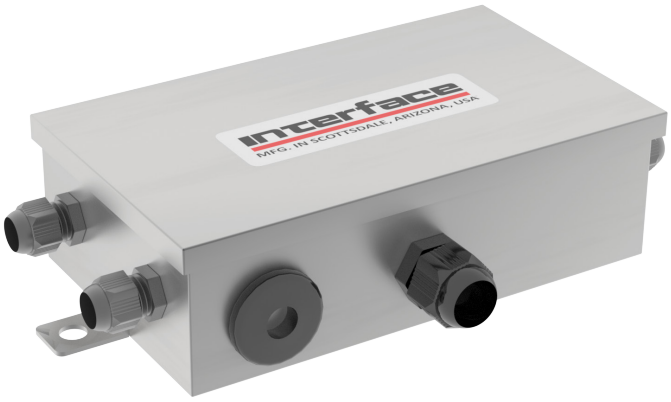
- A convenient method for wiring multiple load cells to a single indicator
- Commonly used in multi-load cell weighing applications
- Ability to coil excess cable inside the box

The JB104SS junction box model is designed to connect and trim up to four load cells per board. It may also be used in combination with additional juction boxes through the use dof an expansion port on the main board to connect multiple junction boxes thus allowing the summing of more than four load cells.

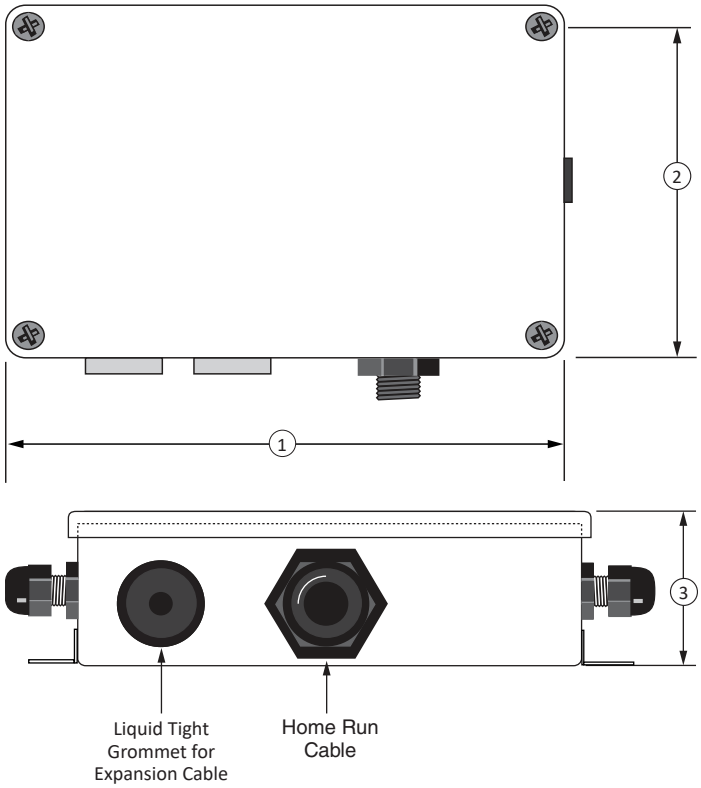
In its most basic form a junction box provides a convenient method for wiring multiple load cells to a single indicator. Junction boxes are commonly used in weighing applications where a tank or scale is supported by more than one load cell. The individual load cell cables are wired into the junction box and then a single cable connects the junction box to the instrumentation.

The JB104SS is a small 4 x 6.5 x 1.75 in (102 x 165 x 44.5 mm) stainless steel NEMA 4 rated box suitable for installations where space is limited. Standard configuration is for up to 4 load cells and provides three trim ranges; no trim, 10% and 30%. Spring clips are used for the load cell connections.

STANDARD CONFIGURATION



MODEL JB104SS (Shown)



DIMENSIONS

1		2		3	
in	mm	in	mm	in	mm
5.75	146	4.00	102	1.60	40.6

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

CSC & LCSC-OEM INTEGRAL INLINE SIGNAL CONDITIONER

FEATURES & BENEFITS

- Outputs 4-20mA, 0-10V, 0-5V, ±10V, ±5V
- Zero and span adjustments
- 1kHz bandwidth
- CE approved (CSC)
- High noise immunity
- Great for OEM applications (LCSC)
- Reverse polarity protected

SPECIFICATIONS

EXCITATION			
Excitation Voltage – VDC			5
Excitation Current – mA MAX			15
PERFORMANCE			
Bandwidth – Hz			1000
Span Adjustment Range – %FRO			±8
Zero Adjustment Range – %FRO			±2
Nonlinearity – %FS			0.02
Span Temperature Coefficient – % °F			±0.0036
Zero Temperature Coefficient – %FRO °F			±0.0014
ENVIRONMENTAL			
Operating Range		°C	-40 to +85
		°F	-40 to +185
MECHANICAL			
Enclosure	CSC		Stainless steel IP67
	LCSC		Plastic
Reverse Polarity Protection – V			~30
Dimensions – W x H x D	CSC	mm	Ø 55.8 x 27.94
		in	Ø 2.2 X 1.1
	LCSC	mm	69.85 x 16.51 x 31.75
		in	2.75 x 0.65 x 1.25

OPTIONS

- User-specified cable lengths
- User-specified conditioner in data path
- Special calibration

STANDARD CONFIGURATION



CSC (Shown)



LCSC-OEM (Shown)

Model	Output	Power Supply	
		VDC	mA nom
CSC and LCSC-0	4-20mA Unipolar Comp +	13 to 28	26
CSC and LCSC-1	±10 V Bipolar	14 to 18	30
CSC and LCSC-2	0.1-10 V Unipolar Ten +	13 to 28	22
CSC and LCSC-3	0.1-10 V Unipolar Comp +	13 to 28	22
CSC and LCSC-4	±10V Bipolar	±13 to ±15	22
CSC and LCSC-5	±5V Bipolar	14 to 18	30
CSC and LCSC-6	0.1-5V Unipolar Ten +	8.5 to 28	22
CSC and LCSC-7	0.1-5V Unipolar Comp +	8.5 to 28	22
CSC and LCSC-8	4-20mA Bipolar Ten +	13 to 28	26
CSC and LCSC-9	4-20mA Unipolar Ten +	13 to 28	26
CSC and LCSC-10	4-20mA Unipolar Ten + (2-wire)	7.5 to 28	20
CSC and LCSC-11	4-20mA Unipolar Comp + (2-wire)	7.5 to 28	20

Applications Note: The Signal Conditioner models CSC and LCSC come installed and calibrated to your choice of load cell and cabling.

Reference Note: For information regarding Model CSD Embedded Load Cell Converter and Digitizer modules, see product-specific datasheet.

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

DMA2 DIN RAIL MOUNT SIGNAL CONDITIONER (U.S. & METRIC)

FEATURES & BENEFITS

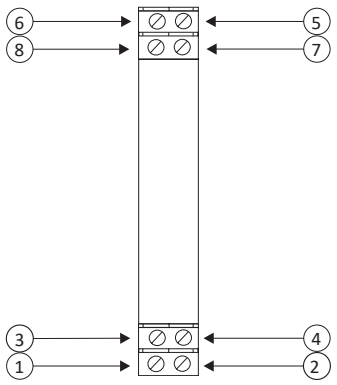
- 10-28 VDC power
- User selectable analog output ±10V, ±5V or 4-20 mA
- Selectable full scale input range 5-50mV
- DIN rail mountable

SPECIFICATIONS

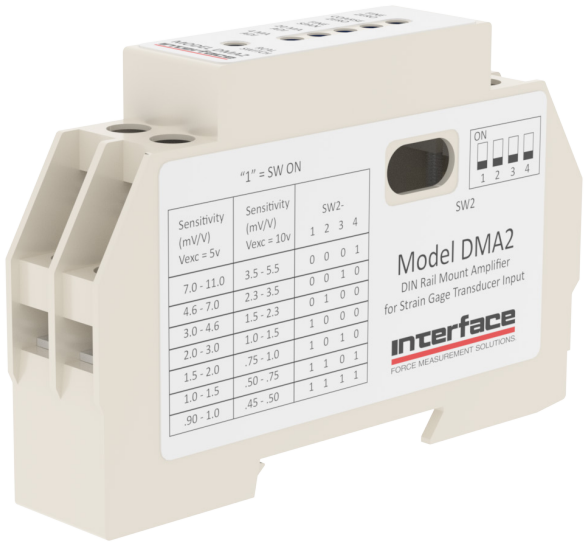
EXCITATION		
Excitation Voltage – VDC		5-10
Excitation Current – mA MAX		30
PERFORMANCE		
Output 1 – VDC		±5 or ±10 Full Scale Bipolar Jumper Selectable
Output 2 – mA		4-20 Full Scale Unipolar
Input Range – mV FS		5 to 50 Coarse & Fine Adjust
Dynamic Response – Hz		DC to 1000
Zero Offset Range – % FS		±50 Output Coarse & Fine Adjust
Nonlinearity – %FS		0.01
Span Temperature Coefficient – % / °F Max		0.004
Zero Temperature Coefficient – µV / °F Max		0.5
ENVIRONMENTAL		
Operating Temperature	°C	0 to +70
	°F	+32 to +158
MECHANICAL		
Mounting – mm		35 DIN Rail
POWER		
DC – VDC		10-28

WIRING DIAGRAM

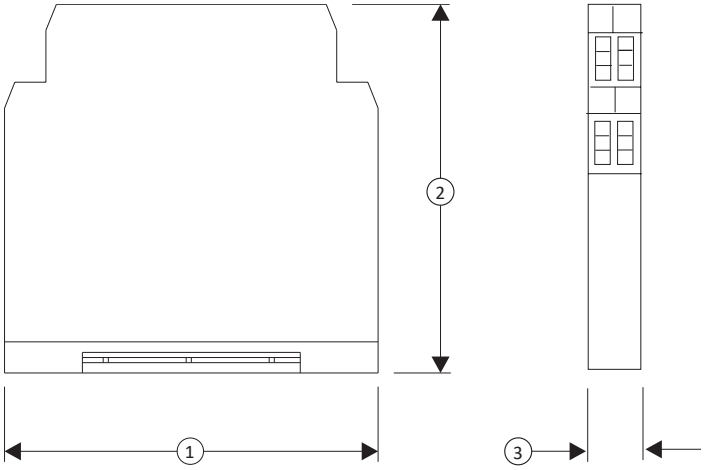
1	Ground
2	Vsupply (10-28VDC)
3	Iout (4-20mA)
4	Vout (±5 or ±10V)
5	- Excitation
6	+ Excitation
7	- Signal
8	+ Signal



STANDARD CONFIGURATION



MODEL DMA2 (Shown)



DIMENSIONS

1		2		3	
in	mm	in	mm	in	mm
3.9	99.1	2.3	58.4	0.7	17.8

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

ISG ISOLATED DIN RAIL MOUNT SIGNAL CONDITIONER

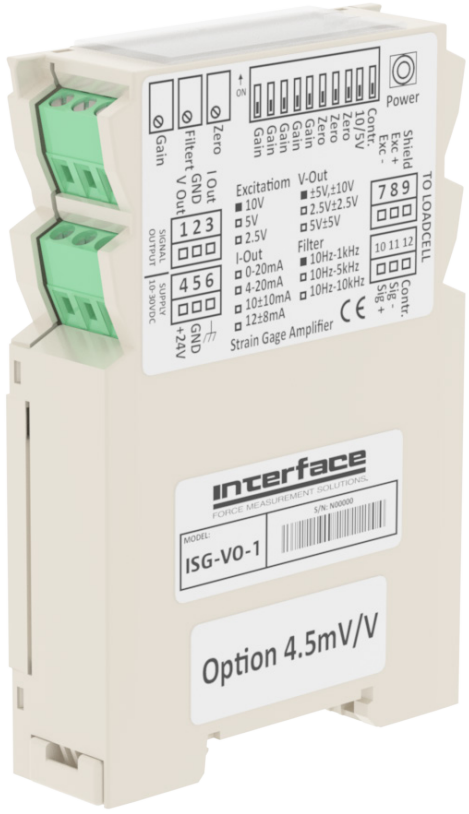
FEATURES & BENEFITS

- High Accuracy
- ±5 or ±10 VDC Analog Output (4-20mA Optional)
- 10 to 30 VDC Supply Voltage
- Accepts inputs up to 4.5mV/V
- 1 Hz to 1 kHz adjustable filter (up to 10kHz optional)
- Space saving narrow housing per DIN EN 50022
- Isolated power supply

SPECIFICATIONS

POWER		
DC – VDC		10-30
Ripple – %		<10
Current – V < mA		10 <200 / 24 <120
Fuse – mA		Self Re-Setting 500
Isolation		Galvanic from output and measurement circuits
EXCITATION		
Voltage – VDC(V)		10 (Option 5)
Temperature Coefficient – ppm/K		25
Current – mA (mA @ V)		90 (60 @ 5)
PERFORMANCE		
Output – V < mA		±5, ±10 <2
Ripple – mV		< 20
Input Range – mV/V % FS		0.3 to 4.5 Switch Selectable
Input Resistance		1.00E+10
Max Bandwidth – Hz		1000
Filter – 3dB – Hz		10 to 1000 Potentiometer Adjustable
Offset – % FS		Up to 50% course and fine adjust
Nonlinearity – % FS		< 0.02
Span Temperature Coefficient – %/ K		< 0.02/10
Zero Temperature Coefficient – %/ K		< 0.02/10
ENVIRONMENTAL		
Operating Temperature	°C	0 to +60
	°F	+32 to +140
MECHANICAL		
Dimensions - W x H x D	mm	23.1 x 111.0 x 75.9
	in	0.91 x 4.37 x 2.99
Protection Level		IP20
Electrical Connections		Screw Terminal
DIN Rail		DIN EN 50022

STANDARD CONFIGURATION



MODEL ISG-VO-1 (Shown)

OPTIONS

- Outputs: 5±5V, 4-20mA, 0-20mA, 12±8mA, 10±10mA
- Increased dynamics: 5kHz-3 dB, 10kHz-3 dB
- Excitation: 5V ≤60MA

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

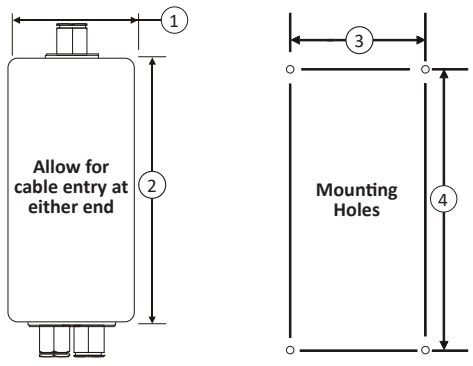
SGA AC/DC POWERED SIGNAL CONDITIONER (U.S. & METRIC)

FEATURES & BENEFITS

- User selectable analog output ±10V, ±5V, 0-10V, 0-5V, 0-20 mA, 4-20 mA
- 110 VAC, 220 VAC OR 18-24 VDC power
- Switch selectable filtering 1 Hz to 5 kHz
- Single channel powers up to 4 transducers
- Selectable full scale input range 0.06 to 30 mV/V
- Switch selectable offset ±70% FS
- Sealed ABS enclosure

SPECIFICATIONS

POWER		
AC – VAC, Hz		110, 60 or 220, 50
DC – VDC		18-24
EXCITATION		
Voltage – VDC ± %		10 ±5
Current – mA		118
PERFORMANCE		
Output	V	±10, ±5 Bipolar 0-5, 0-10 Unipolar
	mA	0-20, 4-20 Unipolar or Bipolar
Input Range – mV/V		±0.06 to ±30
Max Bandwidth – kHz		6
Filter – Hz		1 to 5K
Offset – %FS		±70
Nonlinearity – %FS		0.03
Span Temperature Coefficient – % / °F Max		0.004
Zero Temperature Coefficient – µV / °F Max		0.5
ENVIRONMENTAL		
Operating Temperature	°F	+32 to +122
	°C	0 to +50
Storage Temperature	°F	-4 to +158
	°C	-20 to +70
Dimensions – L x W x H	in	6.3 X 3.1 X 2.2
	mm	160 x 79 x 56
Enclosure		Sealed ABS case, Compression cable seals

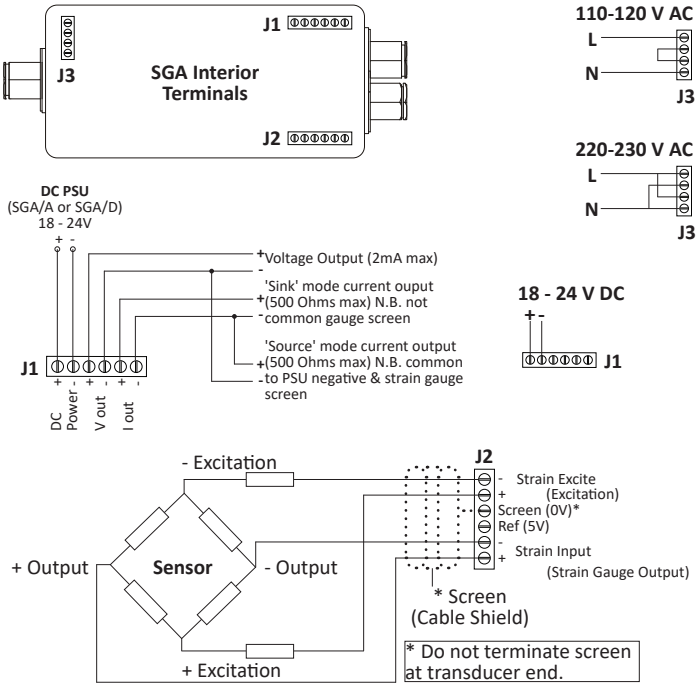


STANDARD CONFIGURATION



MODEL SGA (Shown)

WIRING DIAGRAM



ACCESSORIES

- AC Power Cord (PWRCRD-SGA-110)

DIMENSIONS

1		2		3		4		Depth	
mm	in	mm	in	mm	in	mm	in	mm	in
80	3.15	160	6.30	50	1.97	148	5.83	55	2.16

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

VSC VEHICLE POWERED SIGNAL CONDITIONER

FEATURES & BENEFITS

- High accuracy precision bi-polar differential amplifier
- +/-5VDC Output
- Accepts inputs from 1mV/V to 4.5 mV/V
- 50 Hz bandwidth
- Internal shunt calibration resistor
- Compact size

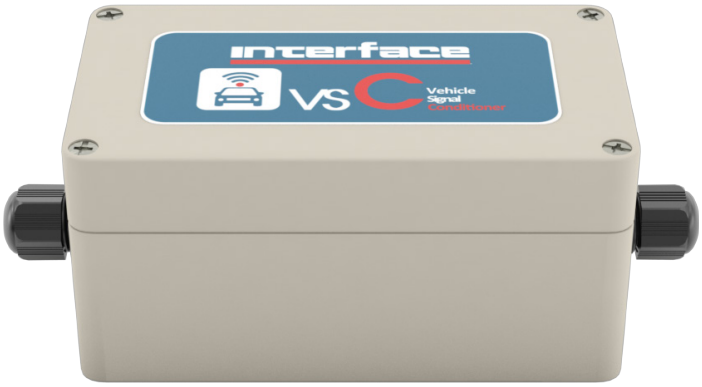
OPTIONS

- Up to 10KHz bandwidth
- Special gain
- Remote shunt calibration

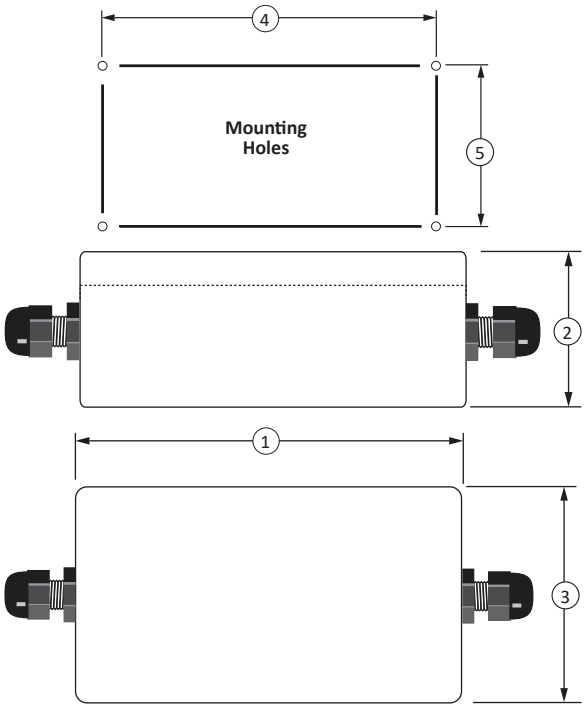
SPECIFICATIONS

EXCITATION		
Excitation Voltage – VDC		8
PERFORMANCE		
Output – V		+/-5
Ripple – mV		1.2mV RMS typical (5mV P-P max)
Input Range – mV/V		1-4.5
Bridge Resistance - Ohms		350
Filter – 3dB-Hz		50
Offset Adjustment		+/-30% typical
Nonlinearity - %		0.005
Zero and Span Temp - %FS/°C		<0.01
Internal Shunt Cal Resistor - Ohms		59K
ENVIRONMENTAL		
Operating Temperature	°C	0 to +70
	°F	+32 to +158
POWER		
Supply – VDC		9-36
Ripple - %		<10
Current - mA (mA @ V)		65 @ 12
Protection		Reverse Polarity
MECHANICAL		
Protection Level		IP67

STANDARD CONFIGURATION



MODEL VSC (Shown)



DIMENSIONS

	in	mm
1	4.5	114.3
2	2.1875	55.56
3	2.5	63.5
4	4.0625	103.19
5	2.125	53.96

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

LCT-1 ULTIMATE LOAD CELL TEST INSTRUMENT (U.S. & METRIC)

FEATURES & BENEFITS

- Continuous signal readout provides checking of linearity and repeatability
- User friendly: fully test the load cell without intervention
- Alphanumeric display: 16 x 2 lines
- Rugged ABS enclosure with rubberized over
- Industrial 8-pin screw connector
- Weight: 250 g

The LCT-1 Ultimate provides fast and accurate testing on all load cells to ensure proper operating performance. This instrument is battery-powered and comes with a rubberized enclosure for drop protection. Using 4-AA batteries, it's completely portable and the industrialized connector allows for any 4 or 6 wire load cell to be connected.

PRODUCT DESCRIPTION

The LCT-1 Ultimate is a hand-held device that is specifically designed to fully troubleshoot strain-gage based load cells. It provides several tests that indicate bridge resistance & integrity, overload, and insulation resistance - which can indicate moisture or chemical contamination into the load cell.

SPECIFICATIONS

A/D conversion – bit	16
Bridge test – VDC	1.25
High resistance test – VDC	10
Input and output resistance – Ω	5k at 0.5 resolution & ±0.5 accuracy
Sense resistance (for 6 wire L/C) – Ω	Up to 500 at 0.1 resolution
Insulation resistance – GΩ – % – MΩ	5 at 10 accuracy (min. >10)
Load cell output in percentage of full scale (input resistance > 175 Ω) – %	±250 at 0.01 resolution and 0.1 accuracy
Gain adjustment – mv/V	0.1 to 5 in steps of 0.01

DIMENSIONS

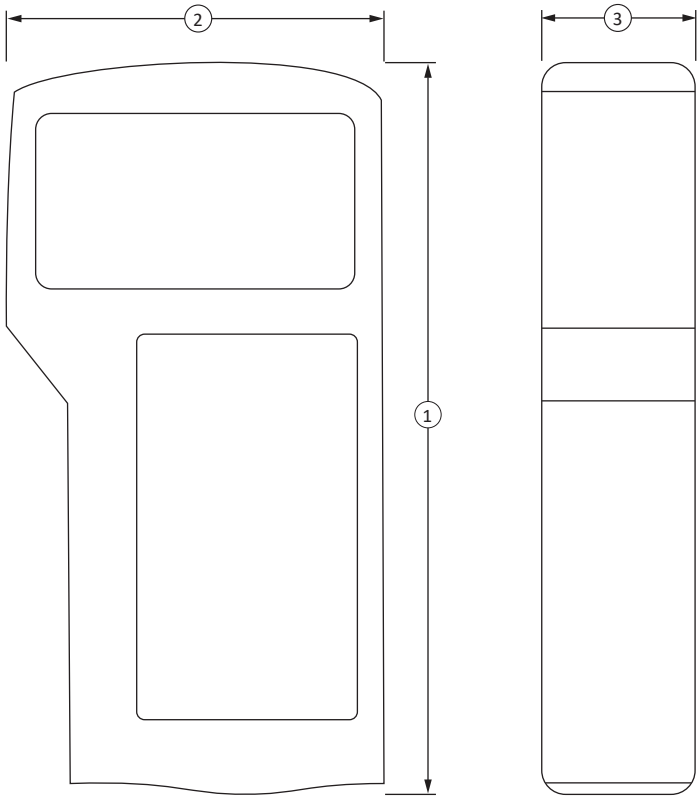
1		2		3	
mm	in	mm	in	mm	in
150	5.9	80	3.1	28	1.1

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

STANDARD CONFIGURATION



MODEL LCT-1 (Shown)



DIG-USB & DIG-USB-OEM (U.S. & METRIC)

FEATURES & BENEFITS

- Digital I/O
- High stability
- Peak and valley recording
- OEM PCB version available
- Up to 500 samples/seconds
- Windows driver DLL's available
- Rugged ABS IP50 enclosure (DIG-USB)
- Works with mV/V force and torque devices
- Includes configuration, calibration, graphing, logging, and display software
- Simple and easy to connect to your strain gage sensor
- USB Interface – device appears as virtual com port

Digital USB output modules for load cells, torque transducers and other strain gaged devices

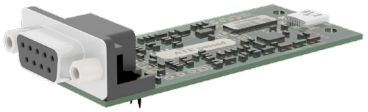
SPECIFICATIONS

POWER		
DIG-USB (from USB) – VDC, mA		5, 75
Strain Gage Excitation System		4 wire
PERFORMANCE		
Sample Rate / sec.		500
Data Transmission Rate – kbps Max		460.8
Input Range – mV/V		±4.5
Nonlinearity Before Linearization – % FS Max		0.0025
Offset Temperature Stability – ppm FS Max		160
Gain Temperature Stability – ppm FS Max		300
Overall Resolution		16 Million
Res @ 1Hz Readings (Noise Stable) Over 100s		200,000 Counts/Divs
Res @ 10Hz Readings (Noise Stable) Over 100s		120,000 Counts/Divs
Res @ 100Hz Readings (Noise Stable) Over 100s		50,000 Counts/Divs
Res @ 500Hz Readings (Noise Stable) Over 100s		18,000 Counts/Divs
Signal Filter		Dynamic recursive type user programmable
ENVIRONMENTAL		
Operating Temperature Range	°C	-40 to +85
	°F	-40 to +185
Storage Temperature Range	°C	-40 to +85
	°F	-40 to +185
Material		
USB to Micro USB Cache	m	1.5
	ft	5

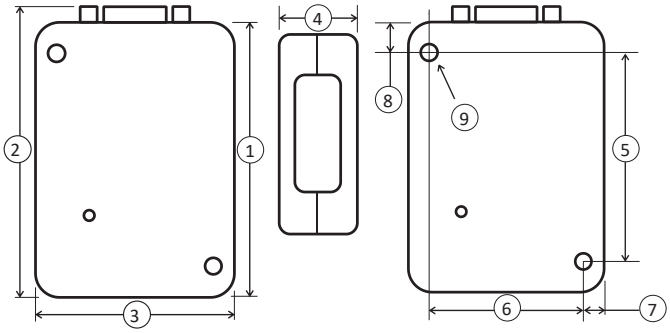
STANDARD CONFIGURATION



MODEL DIG-USB (Shown)



MODEL DIG-USB-OEM (Shown)



DIMENSIONS

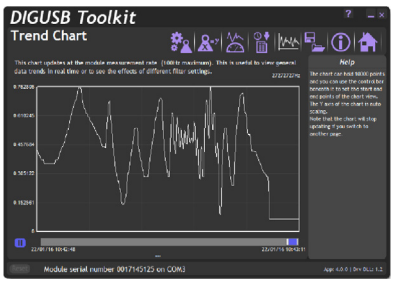
See Drawing	1	2	3	4	5	6	7	8	9
mm	70.5	74.5	51.0	20.0	54.5	40	4	8	Ø4.2
in	2.78	2.93	2.01	0.79	2.15	1.57	0.16	0.31	Ø0.17

OPTIONS

- DIG-USB (with case)
- DIG-USB-OEM (without case)
- DIN Rail Mount Kit

SOFTWARE

- XP, Vista, Win 7, 8, 10



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

DIG-USB-F & DIG-USB-F-OEM (U.S. & METRIC)

FEATURES & BENEFITS

- Up to 4,800 samples / second
- 13-bit noise-free resolution
- Extremely low temperature drift
- Simple USB 'Plug and Measure' device connects directly to a PC
- Powers up to four 350 ohm load cells
- Works with mV/V force or torque transducer
- Rugged ABS IP50 enclosure (DIG-USB)
- Includes configuration, calibration, graphing, logging and display software
- Peak/valley recording and monitoring
- OEM PCB version available
- Windows driver DLL's available
- Simple and easy to connect to your strain gage sensor
- Ideal for impact, drop, reaction torque, vibration and materials testing

SPECIFICATIONS

POWER		
Current (from USB) – mA		75
Excitation – VDC		5
Strain Gauge Excitation System		4-wire
PERFORMANCE		
Sample Rate / sec		4,800
Input Range – mV/V		±4.5
Nonlinearity Before Linearization – %FS Max		±0.0025
Offset Temperature Stability – °C		±0.0004
Gain Temperature Stability – °C		±0.0005
Overall Resolution		16 Million counts/divs
Res @4.8 kHz Readings (Noise Stable) over 1s		8,192 or 13 Bits counts/divs
ENVIORNMENTAL		
Operating Temperature Range	°C	-40 to +85
	°F	-40 to +185
Storage Temperature Range	°C	-40 to +85
	°F	-40 to +185
MECHANICAL		
IP Ratings for DIG-USB-F (Enclosure)		IP50
USB to Micro USB Cable Length	m	1.5
	ft	5

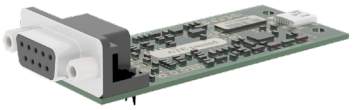
OPTIONS

- DIG-USB-F (with case)
- DIG-USB-F-OEM (without case)
- DIN Rail Mount Kit

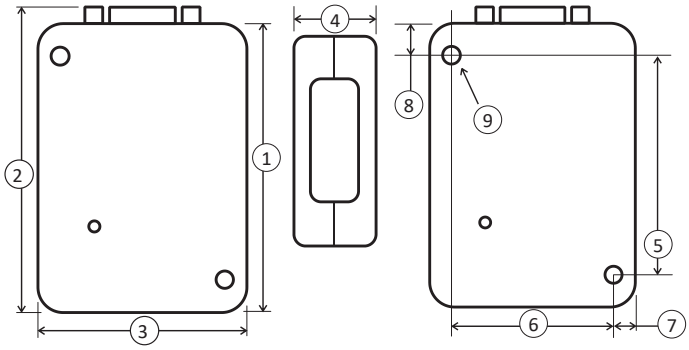
STANDARD CONFIGURATION



MODEL DIG-USB-F (Shown)



MODEL DIG-USB-F-OEM (Shown)

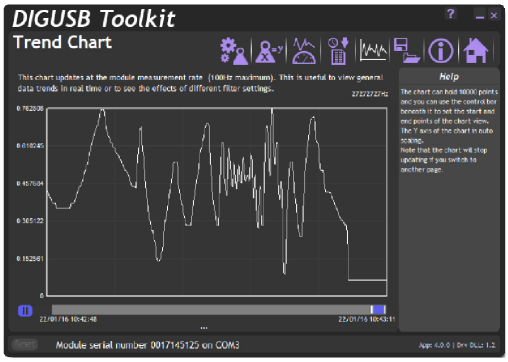


DIMENSIONS

See Drawing	1	2	3	4	5	6	7	8	9
mm	70.5	74.5	51.0	20.0	54.5	40	4	8	Ø 4.2
in	2.78	2.93	2.01	0.79	2.15	1.6	0.2	0.3	Ø 0.17

SOFTWARE

- XP, Vista, Win 7, 8, 10



INF-USB3 SINGLE CHANNEL USB INTERFACE MODULE (U.S. & METRIC)

FEATURES & BENEFITS

- Easy USB connection to load and torque transducers
- Up to 5000 sample/second
- Graphing and logging software included
- 16-bit resolution
- Data logged into MS Excel compatible CSV file format
- Shunt calibration trigger via software
- Works with ±3 mV/V, ±4.5 mV/V ±5 VDC, ±10 VDC, 4-20 mA, 12 ±8 mA and 5V TTL output transducers
- Environmentally sealed to IP67

SPECIFICATIONS

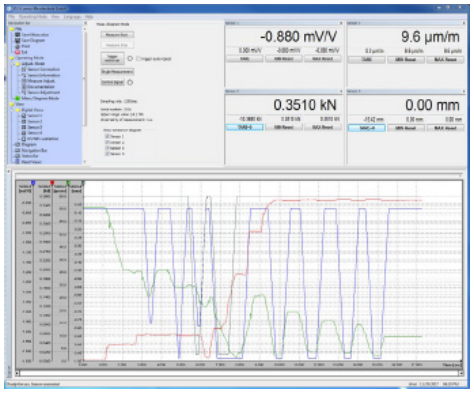
POWER			
Supply From USB			4-6 VDC ≤ 350 mA
PERFORMANCE			
Measuring Rate:	Internal Sample Rate/sec		5000
Temperature Drift		°C	4 counts/(+10)
		°F	4 counts/(+50)
Nonlinearity – %			0.1
Accuracy – %			0.1
Zero Point – counts			0
ENVIRONMENTAL			
Nominal Temperature Range		°C	+10 to +40
		°F	+50 to +104
Operating Temperature Range		°C	0 to +50
		°F	+32 to +122
Storage Temperature Range		°C	-10 to +70
		°F	+14 to +158
ENVIRONMENTAL			
Material			Aluminum

STANDARD CONFIGURATION

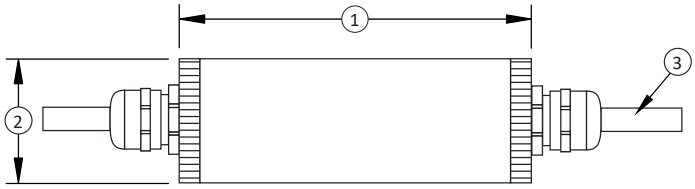


MODEL INF-USB3-C (Shown)

SOFTWARE



- Windows 7 - 10 32/64 Bit Dual-Core 1.8 GHz
- System includes USB connection to computer and software



DIMENSIONS

1		2		3	
mm	in	mm	in	mm	in
101.6	4.00	Ø25.4	Ø0.98	5	196.8

INPUT

AVAILABLE INPUT RANGES			EXCITATION TO SENSOR	INPUT RESISTANCE	AVAILABLE CONFIGURATIONS
Range	Input	Counts			Single Channel
A	±5 V	±25,000	12V, ≤80 mA	>1MΩ	INF-USB3-A
E	±10 V	±25,000	12V, ≤80 mA	>1MΩ	INF-USB3-E
G	12 ±8 MA	20,000	12V, ≤80 mA	62Ω	INF-USB3-G
B	4-20 mA	20,000	12V, ≤80 mA	62Ω	INF-USB3-B
C	±4.5 mV/V	±30,000	4V, ≤20 mA	>1MΩ	INF-USB3-C
F	5V TTL	±32,511	5V, ≤85 mA	62Ω	INF-USB3-F

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

SI-USB DUAL CHANNEL USB INTERFACE MODULE (U.S. & METRIC)

FEATURES & BENEFITS

- Easy USB connection to load and torque transducers
- Up to 2500 sample/second
- Graphing and logging software included
- 16-bit resolution
- Data logged into MS Excel compatible CSV file format
- Shunt calibration trigger via software
- Works with mV/V, ±5VDC and 4-20mA output transducers
- 2 Channel

SPECIFICATIONS

POWER			
AC Adapter Supplied – VDC			24
PERFORMANCE			
Measuring Rate	Internal Sample Rate/sec		5000
	Software Selectable/min – /sec		1 to 2500
Temperature Drift		°C	4 counts/(+10)
		°F	4 counts/(+50)
Nonlinearity – %			0.1
Accuracy – %			0.1
Zero Point – counts			0
ENVIRONMENTAL			
Nominal Temperature Range		°C	+10 to +40
		°F	+50 to +104
Operating Temperature Range		°C	0 to +50
		°F	+32 to +122
Storage Temperature Range		°C	-10 to +70
		°F	+14 to +158

INPUT

AVAILABLE INPUT RANGES			EXCITATION TO SENSOR	INPUT RESISTANCE	AVAILABLE CONFIGURATIONS
Range	Input	Counts			Dual Channel*
A	±5 V	±25,000	12V, 200 mA	1 MΩ	SI-USB-AA
E	±10 V	±25,000	12V, 200 mA	1 MΩ	SI-USB-EE
B	4-20 mA	20,000	12V, 200 mA	62 Ω	SI-USB-BB
C	±4.5 mV/V	±30,000	5V, 20 mA	200 GΩ	SI-USB-CC
D	± 3 mV/V	±30,000	5V, 20 mA	200 GΩ	SI-USB-DD

Mixed ranges also available. Example:* ***SI-USB-AD.*

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

STANDARD CONFIGURATION

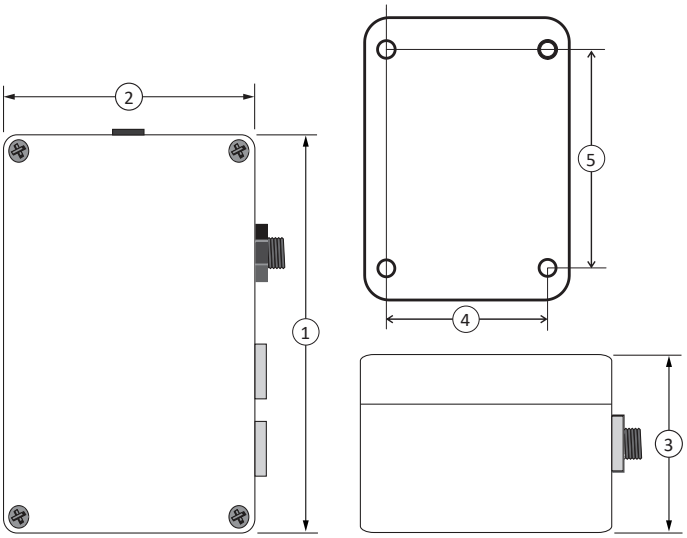


SI-USB (Shown)

SOFTWARE



- Windows 7 - 10 32/64 Bit Dual-Core 1.8 GHz
- System includes USB connection to computer and software
- SI-USB includes two mating connectors



DIMENSIONS

1		2		3		4		5	
mm	in	mm	in	mm	in	mm	in	mm	in
124.46	4.90	78.74	3.100	55.88	2.200	52	2.05	113	4.45

SI-USB4 4 CHANNEL USB INTERFACE MODULE(U.S. & METRIC)

The interface module SI-USB4 is connected between the sensors and PC.

In this way, analog sensor signals will be digitized with up to 16 bit resolution.

By the measuring rate of 5000 measurements/s per measuring channel, high-dynamic measurements can be achieved. The measured values are transferred to a PC via the USB interface and visualized by means of software. If a control signal is integrated in the sensor, an automatic adjustment can be carried out and checked at any time (measuring chain monitoring).

Following sensor output signals can be digitally converted and conveniently displayed and evaluated via the free evaluation software:

.../Input range ±4.5 mV/V
(Strain gauges) (Excitation 4V ≤20 mA)

.../Input range ±5V/±10V
(Sensor supply 12V ≤80 mA)

.../Input range 0/4 ... 20 mA
(Sensor supply 12V ≤80 mA)

.../Input range 0 ... 5V
(Linear potentiometer) (Sensor supply +5V ≤170 mA)

.../Input range -200 ... 860 °C
(Temperature probes) (Sensor supply 4V ≤20 mA)

.../Input range 5V TTL
(Quadrature encoder: For (Sensor supply 5V ≤85 mA)
torque sensors with speed / angle measurement)

Many standard sensors, such as force, torque, displacement, and pressure sensors, along with linear potentiometers, temperature probes PT100 etc., can be used with the SI-USB4. The sensor parameters can be stored in the SI-USB4. After a single parameterization, each sensor is automatically recognized by the software.

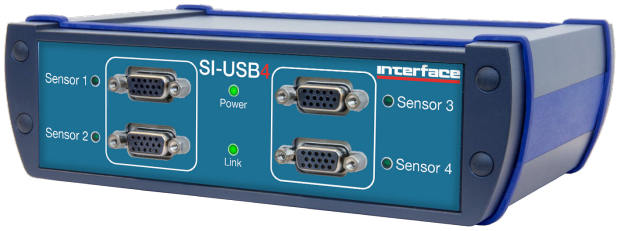
The voltage supply of the SI-USB4 is provided by an external power supply or by a polarity-protected power connection The connected sensors are directly supplied with voltage through the measuring amplifier which eliminates the need for separate sensor supply voltage.

The low-pass filter 2nd order allows filtration of unwanted frequencies.

Here you can distinguish between 4 cutoff frequencies.

The connection to LabVIEW or integration into own programs is possible with the available driver package.

STANDARD CONFIGURATION



SI-USB4 (Shown)

FEATURES & BENEFITS

- Fast measurement of up to 5000 meas./s per measuring channel
- Input ranges for mV/V, V and mA
- Input ranges for linear potentiometer, temperature probe PT100 and quadrature encoder
- Input ranges combinable with one another
- Digitally switchable analogue input filter
- Full synchronization of all measuring channels
- Adjustment and control signal activation via software
- Shunt Cal

TYPICAL APPLICATIONS

- Mobile test measurements by laptop
- Experimental setups in test laboratories
- Measuring and control devices
- Diagnosis measurements in chemical industries
- PC-based recordings of strain characteristics in biotechnology

OPTIONS

- Adjustment amplifier with simulator

CALIBRATIONS mV/V

Proprietary calibration acc. to ISO 10012	10 steps
Proprietary calibration acc. to ISO 10012	20 steps

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

SI-USB4 4 CHANNEL USB INTERFACE MODULE(U.S. & METRIC)

SPECIFICATIONS

USB INTERFACE MODULE SI-USB4										
Type of Basic Unit	SI-USB4									
Type of Board	C	A	E	H	B	I	J	K	L	F
Input Range	±4.5 mV/V	±5V	±10V	0 - 20 mA	4 - 20 mA	10 ±10 mA	12 ±8 mA	0 - 5V	-200 - 860 °C	5V TTL
Measured Values	±30000 digits	±25000 digits		0 - 20000 digits				0 - 25000 digits	-6400 - 27520 digits	±32511 digits
Resolution	1 mV/V ≙ 10000 digits	1 V ≙ 5000 digits	1 V ≙ 2500 digits	1 mA ≙ 1000 digits				1 V ≙ 5000 digits	32 digits/K	
Connection Type	4 wire	-	-	2 or 3 wire				3 wire	4 wire	-

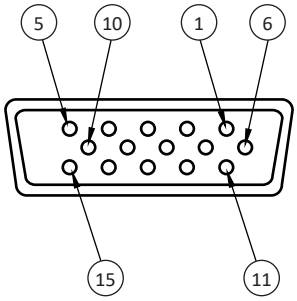
EVALUATION SIDE	
Zero point	0 digits
Output format	16 Bit Signed Int.
Input resistance	>1 MΩ (only for mV/V, 5 VDC, 10 VDC)
Rated burden	62 Ω (only for 0 - 20 mA, 4 - 20 mA)
Low-pass filter 2nd order	30/300/1000/3000 Hz
Measuring rate	max. 5000 measurements per second
Temperature drift	4 Bit/10 K
Linearity error	±32 digits
Accuracy	±32 digits
Supply voltage of mains adapter	100 - 240VAC
Output of mains adapter	24VDC, 1.25 A
Supply voltage SI-USB4	10 - 30VDC ≤880 mA

SENSOR SIDE					
Sensor supply	4V ≤20 mA	12V ≤80 mA	5V ≤170 mA	4V ≤20 mA	5V ≤85 mA

ENVIRONMENTAL		
Nominal Temperature Range	°C	+10 to +40
	°F	+50 to +104
Operating Temperature Range	°C	0 to +50
	°F	+32 to +122
Storage Temperature Range	°C	-10 to +70
	°F	+14 to +158

MECHANICAL		
Dimension (L x W x H)	in	5.1 x 7.4 x 2.3
	mm	130 x 190 x 60
Weight	lbs	2.6
	kg	1.2
Material		Aluminum
Cable	ft	9.8
	m	3
Electrical connection	15-pin DSub Connector and USB-B	

SI-USB4 4 CHANNEL USB INTERFACE MODULE(U.S. & METRIC)



WIRING DIAGRAM

Pin 1	Ground (supply 4V and 12V)	0V; 1-Wire GND
Pin 2	+12V (active supply)	12VDC
Pin 3	NC	-
Pin 4	Signal angle A	5V TTL
Pin 5	Signal angle B	5V TTL
Pin 6	Ground	0V
Pin 7	NC	-
Pin 8	Supply	4VDC
Pin 9	NC	-
Pin 10	Control signal or TEDS	L <2.0V; H >3.5V or 1-Wire DATA
Pin 11	Signal (+) (active or passive)	mV/V; ±5V; ±10V; 0/4 - 20 mA
Pin 12	Signal (-) (when active connect to ground)	0V
Pin 13	Ground	0V
Pin 14	NC	-
Pin 15	+5V reference voltage	5VDC

ORDER EXAMPLE

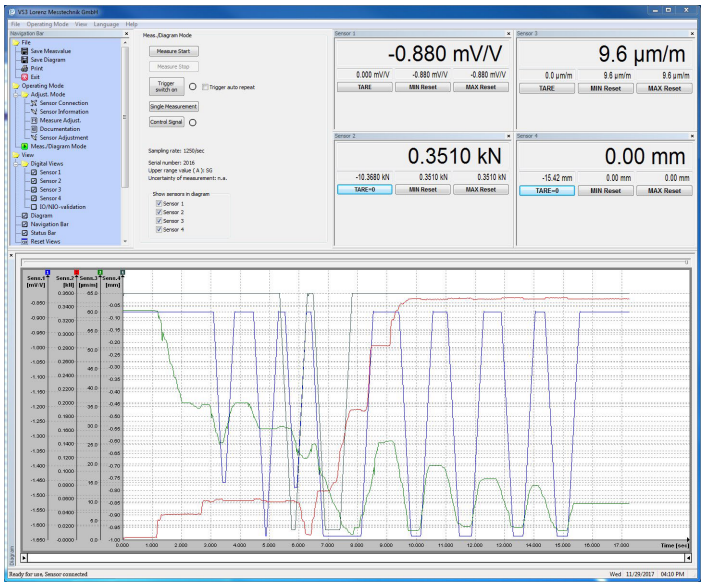
Board of SI-USB4	Sensor 1	Sensor 2	Sensor 3	Sensor 4
A	x	**X**	**X**	x
B	x	x	x	x
C	x	x	x	x
E	x	x	x	x
F	x	x	x	x
G	x	x	x	x
H	x	x	x	x
I	x	x	x	x
J	**X**	-	-	**X**
K	x	-	x	-

ACCESSORIES

Description	Type
Wall mounting	SI-USB4/WB
Tower foot	SI-USB4/TF

SI-USB4 4 CHANNEL USB INTERFACE MODULE(U.S. & METRIC)

SOFTWARE



The configuration and evaluation software serves for easy evaluation and graphical visualization of the evaluated data on a PC.

The software allows direct read-in of measured data into a text file in CSV-format through the USB port of a PC. This enables further analyses with a commercially available spreadsheet program at any time.

- Windows 7 - 10 32/64 Bit Dual-Core 1.8 GHz
- System includes USB connection to computer and software
- SI-USB includes two mating connectors

TECHNICAL DATA

Type	VS3
Interface	USB
Protocol	Interface Standard Protocol
System Requirements	Windows® 7 - 10 32/64 Bit5 Dual-Core from 1.8 GHz (with diagram)

HIGHLIGHTS AT A GLANCE

Conversion in physical values	✓
Simultaneous measuring	Up to 4 input channels
Automatic scaling of y-Axis	✓
Graphical display of the measured variables	✓
Automated or manual storage in a CSV- and BMP-file	✓
Print-out of the diagram with date and definable superscription	✓
Scaling function of the input variable to any display value with unit	✓
Resettable minimum value memory for each measured value	✓
Resettable maximum value memory for each measured value	✓
Floating averaging	✓
Simple evaluations (OK/NOK)	✓
Tara for each measured Size	✓

Notes:

Notes:

Notes:

Wireless Telemetry System

Acquisition Module 426

Base Station 434

LED Display 436

Modbus ASCII Serial Output.....438

Handheld Display.....440

Analog Output Receiver Module.....443

Repeater Module 445

Relay Output Receiver Module.....446

Telemetry Antenna 447

Wind Speed Transmitter Module 449

Wireless Telemetry Printer.....451

WTS-AM-1E WIRELESS STRAIN BRIDGE TRANSMITTER MODULE

The WTS-AM-1E transmitter connects to strain bridge transducers such as load cells, torque sensors, strain gauges and pressure modules and forms part of the WTS modular telemetry system. The data transmitted by the WTS-AM-1E can be received by multiple WTS receivers that include displays, handheld readers, analog outputs, relay modules and computer interfaces.

WTS transmitters have been designed for battery operation and support an ultra low-power sleep mode whilst offering class leading wireless coverage and range. Configurable transmission rates from once per day to 200 per second cope with a wide range of measurement and monitoring applications. A choice of enclosures enabling battery connection, field connectivity and environmental sealing up to IP67 ensure these modules provide a flexible solution to your wireless sensor requirements.

The WTS-AM-1E provides 5 V excitation to drive transducer loads down to 85 ohms. This transmitter is highly accurate, low noise and uses up to nine point linearization giving quality measurements from a wide range of strain bridge transducers.

SPECIFICATIONS

MEASUREMENT SPECIFICATIONS		
Strain Gauge Excitation System		4-wire
Strain Gauge Excitation – VDC		5
Strain Gauge Resistance (min) – Ω		85
Strain Gauge Sensitivity (max) – mV/V		±4.5
Offset Temperature Stability (max) – ppm/ºC		4
Gain Temperature Stability (max) – ppm/ºC		5
Nonlinearity Before Linearization (max) – ppm of FR		25
Internal Resolution/Bits		16,000,000 / 24
Noise Free Resolution at 1 Sample Per Second		400,000 / 18.75
Transmission Rates – Hz		From 5 to 1
BATTERY LIFE		
Based on transmitting results at 3 per second , 350R strain bridge		
Pair AA Cells Constantly On – weeks		3
Pair AA Cells 12 Sessions Per Day of 5 Mins – years		2
Pair DD Cells Constantly On – months		3.5
Pair DD Cells 12 Sessions Per Day of 5 mins – years		5
POWER SUPPLY		
WTS-AM-1E – VDC		2.1 to 3.6
WTS-AM-1E-D – VDC		5 to 18
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (WTS-AM-1F & WTS-AM-1-D)		IP67/Nema4

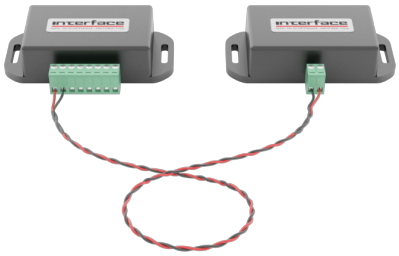
STANDARD CONFIGURATION



WTS-AM-1E-D (Shown) - (2) "D" Size Batteries



WTS-AM-1E (Shown) - (2) "AA" Size Batteries



WTS-AM-4 (Shown) - (2) "AAA" Size Batteries with BB1

FEATURES & BENEFITS

- Simple wireless configuration and calibration
- Wireless range up to 800 m (2,625 ft)
- Low power mode for long battery life
- Free Visualization software

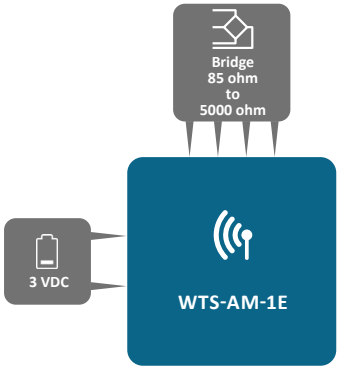
INDUSTRY SOLUTIONS

- **Construction**
  - Monitoring tension & compression on shoring struts
  - Crane/Under Hook Scales
- **Automotive & Vehicle**
  - Torque measurement on rotating shaft
  - Wheel balance in high performance cars

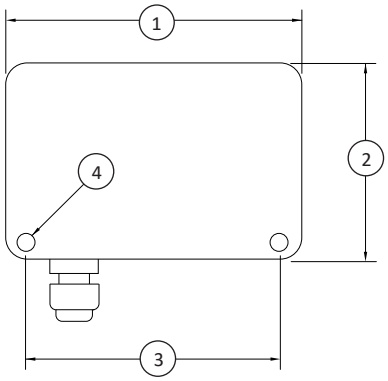
OPTIONS

WTS-AM-1E-D
Wireless strain bridge transmitter module in IP67 enclosure supporting two D batteries or external power supply
WTS-AM-1E
Wireless strain bridge transmitter module in IP67 enclosure for two AA batteries
WTS-AM-4
Wireless strain bridge transmitter module in miniature IP50 enclosure

WTS-AM-1E WIRELESS STRAIN BRIDGE TRANSMITTER MODULE



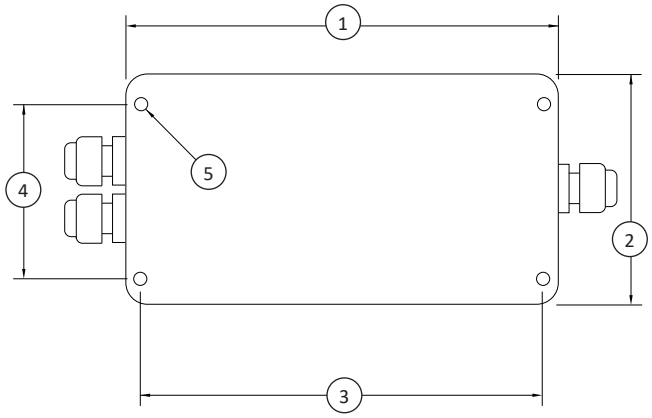
ELECTRICAL



WTS-AM-1E (2) "AA" Size Batteries

DIMENSIONS

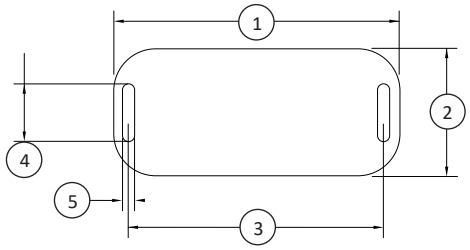
See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.6
(4)	Ø4.8	Ø0.2
Height	34	1.3



WTS-AM-1F-D (2) "D" Size Batteries

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2



WTS-AM-4 (2) "AAA" Size Batteries with BB1

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	76	2.9
(2)	35	1.3
(3)	68	2.6
(4)	15	0.5
(5)	3.2	0.1
Height	20	0.7

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-AM-1F WIRELESS STRAIN BRIDGE TRANSMITTER MODULE FOR FAST MEASUREMENTS

The WTS-AM-1F transmitter connects to strain bridge transducers such as load cells, torque sensors, strain gauges and pressure modules and forms part of the WTS modular telemetry system. The data transmitted by the WTS-AM-1F can be received by multiple WTS receivers that include handheld readers, analog outputs and computer interfaces.

WTS transmitters have been designed for battery operation and support an ultra low-power sleep mode whilst offering class leading wireless coverage and range. A choice of enclosures enabling battery connection, field connectivity and environmental sealing up to IP67 ensure these modules provide a flexible solution to your wireless sensor requirements.

The WTS-AM-1F is a 2000 samples per second (fixed) version of the WTS-SA for high speed monitoring. WTS-AM-1F provides 5 V excitation to drive transducer loads down to 85 ohms. This transmitter is highly accurate, low noise and outputs in nV/V giving quality measurements from a wide range of strain bridge transducers.

SPECIFICATIONS

MEASUREMENT SPECIFICATIONS		
Strain Gauge Excitation System		4-wire
Strain Gauge Excitation – VDC		5
Strain Gauge Resistance (min) – Ω		85
Strain Gauge Sensitivity (max) – mV/V		±4.5
Offset Temperature Stability (max) – ppm/ºC		4
Gain Temperature Stability (max) – ppm/ºC		5
Nonlinearity Before Linearization (max) – ppm of FR		25
Internal Resolution/Bits		16,000,000/24
Noise Free Resolution at 1 Sample Per Second		8,000/13
Transmission Rates – Hz		2,000
BATTERY LIFE		
Based on transmitting results at 3 per second , 350R strain bridge		
Pair AA Cells Constantly On – hours		30
Pair AA Cells 12 Sessions Per Day of 5 Mins – days		30
Pair D Cells Constantly On – days		5.5
Pair D Cells 12 Sessions Per Day of 5 mins – months		4.5
POWER SUPPLY		
WTS-AM-1F – VDC		2.1 to 3.6
WTS-AM-1F-D – VDC		5 to 18
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (WTS-AM-1F & WTS-AM-1F)		IP67/Nema4

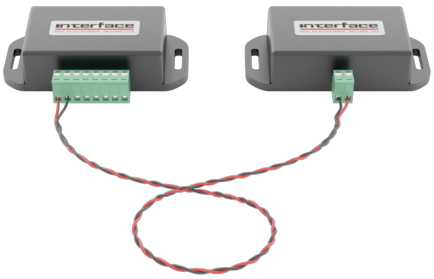
STANDARD CONFIGURATION



WTS-AM-1F-D (Shown) - (2) "D" Size Batteries



WTS-AM-1F (Shown) - (2) "AA" Size Batteries



WTS-AM-4F (Shown) - (2) "AAA" Size Batteries with BB1

FEATURES & BENEFITS

- Ultra-fast update rate of 2000 per second
- Wireless range up to 800 m (2,625 ft)
- Low power mode for long battery life
- Free Visualization software

OPTIONS

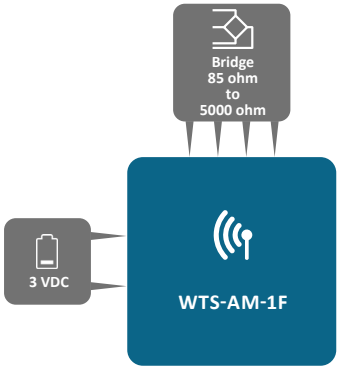
WTS-AM-1F-D
Wireless strain bridge fast transmitter module in IP67 enclosure supporting two D batteries or external power supply

WTS-AM-1F
Wireless strain bridge fast transmitter module in IP67 enclosure for two AA batteries

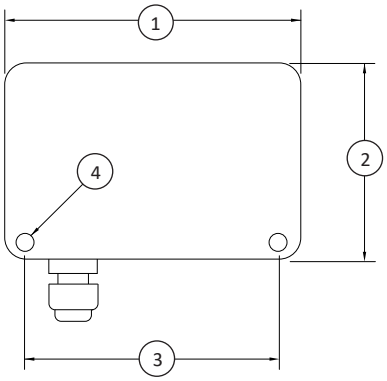
WTS-AM-4F
Wireless strain bridge fast transmitter module in miniature IP50 enclosure

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-AM-1F WIRELESS STRAIN BRIDGE TRANSMITTER MODULE FOR FAST MEASUREMENTS



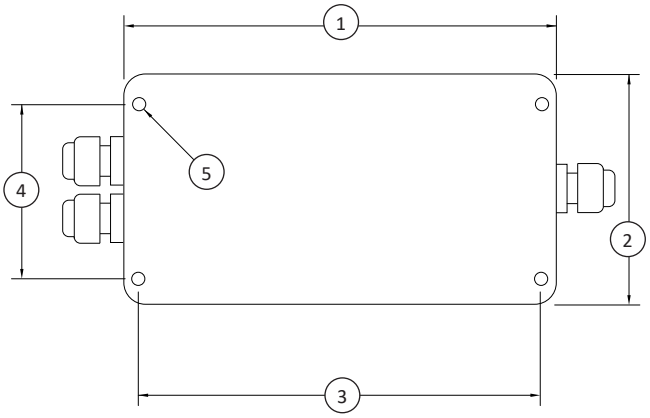
ELECTRICAL



WTS-AM-1F (2) "AA" Size Batteries

DIMENSIONS

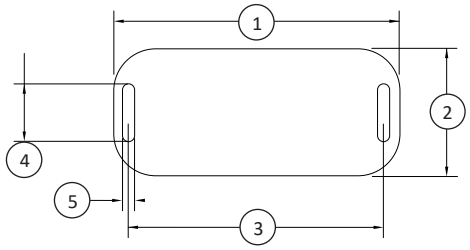
See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.6
(4)	Ø4.8	Ø0.2
Height	34	1.3



WTS-AM-1F-D (2) "D" Size Batteries

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2



WTS-AM-4F (2) "AAA" Size Batteries with BB1

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	76	3
(2)	35	1.4
(3)	68	2.7
(4)	15	0.6
(5)	3.2	0.1
Height	20	0.8

WTS-AM-2 WIRELESS VOLTAGE SENSOR TRANSMITTER

The WTS-AM-2 transmitter module connects to 0-10 V conditioned sensors such as pressure, %RH, inclinometer, accelerometer, depth, vibration, temperature and flow. It forms part of the WTS modular telemetry system. The data transmitted by the WTS-AM-2 can be received by multiple WTS receivers that include displays, handheld readers, analog outputs, relay modules and computer interfaces.

WTS transmitters have been designed for battery operation and support an ultra low-power sleep mode whilst offering class leading wireless coverage and range. Configurable transmission rates from once per day to 200 per second cope with a wide range of measurement and monitoring applications. A choice of enclosures enabling battery connection, field connectivity and environmental sealing up to IP67 ensure these modules provide a flexible solution to your wireless sensor requirements.

The WTS-AM-2 provides 5 V excitation to power external sensors. This transmitter provides up to nine point linearization giving quality measurements from a wide range of sensors.

SPECIFICATIONS

MEASUREMENT SPECIFICATIONS		
Input Range – VDC		0 to 10
Calibrated Range – VDC		0 to 10
Input Impedance – Ω		100,000
Input Calibration Accuracy – %FR		0.1
Offset Temperature Stability (max) – ppm/°C		0.5
Gain Temperature Stability (max) – ppm/°C		50
Nonlinearity Before Linearization (max) – ppm of FR		25
Internal Resolution/Bits		16,000,000/24
Noise Free Resolution/Bits at 1 Sample Per Second		15,000/13.75
Transmission Rates – ms to day		From 5 to 1
Excitation Available – VDC @ mA		5 @ 50
BATTERY LIFE		
Transmitting results at 3 per second , no excitation required		
Pair AA Cells Constantly On – month		1
Pair AA Cells 12 Sessions Per Day of 5 Mins – years		2
Pair D Cells Constantly On – months		4.5
Pair D Cells 12 Sessions Per Day of 5 mins – years		>9
POWER SUPPLY		
WTS-AM-2 – VDC		2.1 to 3.6
WTS-AM-2-D – VDC		5 to 18
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (WTS-AM-2 & WTS-AM-2-D)		IP67/Nema4

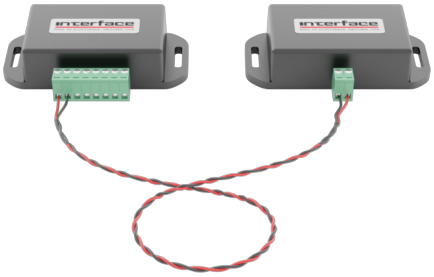
STANDARD CONFIGURATION



WTS-AM-2-D (Shown) - (2) "D" Size Batteries



WTS-AM-2 (Shown) - (2) "AA" Size Batteries



WTS-AM-5 (Shown) - (2) "AAA" Size Batteries with BB1

FEATURES & BENEFITS

- Simple wireless configure and calibration
- Wireless range up to 800 m (2,625 ft)
- Low power mode for long battery life
- Free Visualization software
- Ideal for conditioned transducers

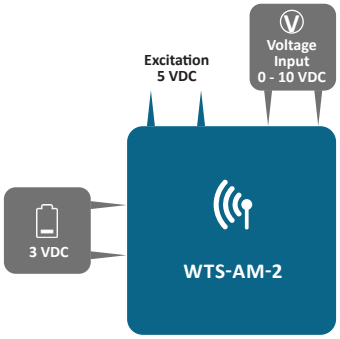
OPTIONS

WTS-AM-2-D
Wireless 0-10 V transmitter module in IP67 enclosure supporting two D batteries or external power supply

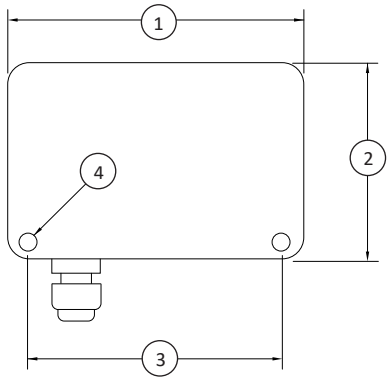
WTS-AM-2
Wireless 0-10 V transmitter module in IP67 enclosure for two AA batteries

WTS-AM-5
Wireless 0-10 V transmitter module in miniature IP50 enclosure

WTS-AM-2 WIRELESS VOLTAGE SENSOR TRANSMITTER



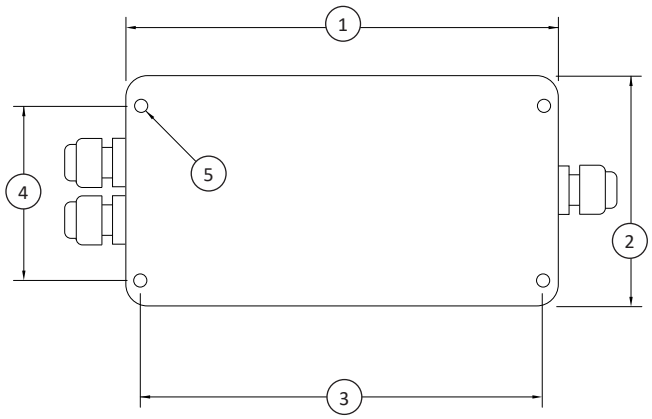
ELECTRICAL



WTS-AM-2 (2) "AA" Size Batteries

DIMENSIONS

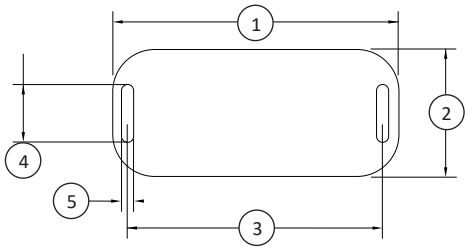
See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.62
(4)	Ø4.8	Ø0.19
Height	34	1.3



WTS-AM-2-D (2) "D" Size Batteries

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2



WTS-AM-5 (2) "AAA" Size Batteries with BB1

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	76	3
(2)	35	1.4
(3)	68	2.7
(4)	15	0.6
(5)	3.2	0.1
Height	20	0.8

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-AM-3 WIRELESS 4-20 mA TRANSMITTER MODULE

The WTS-AM-3 transmitter module connects to 4-20 mA conditioned sensors such as pressure, %RH, inclinometer, accelerometer, depth, vibration, temperature and flow. It forms part of the WTS modular telemetry system. The data transmitted by the WTS-AM-3 can be received by multiple WTS receivers that include displays, handheld readers, analog outputs, relay modules and computer interfaces.

WTS transmitters have been designed for battery operation and support an ultra low-power sleep mode whilst offering class leading wireless coverage and range. Configurable transmission rates from once per day to 200 per second cope with a wide range of measurement and monitoring applications. A choice of enclosures enabling battery connection, field connectivity and environmental sealing up to IP67 ensure these modules provide a flexible solution to your wireless sensor requirements.

The WTS-AM-3 provides 5 V excitation to power external sensors. This transmitter provides up to nine point linearization giving quality measurements from a wide range of sensors.

SPECIFICATIONS

MEASUREMENT SPECIFICATIONS		
Input Range – mA		0 to 20
Calibrated Range – mA		4 to 20
Input Impedance – Ω		47
Input Calibration Accuracy – %FR		0.1
Offset Temperature Stability (max) – ppm/°C		0.5
Gain Temperature Stability (max) – ppm/°C		50
Nonlinearity Before Linearization (max) – ppm of FR		25
Internal Resolution/Bits		16,000,000/24
Noise Free Resolution/Bits at 1 Sample Per Second		30,000/14.75
Transmission Rates – ms to day		From 5 to 1
Excitation Available – VDC @ mA		5 @ 50
BATTERY LIFE		
Transmitting results at 3 per second , no excitation required		
Pair AA Cells Constantly On – month		1
Pair AA Cells 12 Sessions Per Day of 5 Mins – years		2
Pair D Cells Constantly On – months		4.5
Pair D Cells 12 Sessions Per Day of 5 mins – years		>9
POWER SUPPLY		
WTS-AM-3 – VDC		2.1 to 3.6
WTS-AM-3-D – VDC		5 to 18
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (WTS-AM-3 & WTS-AM-3-D)		IP67/Nema4

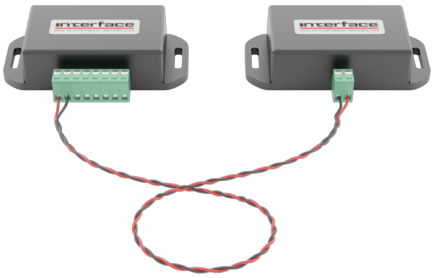
STANDARD CONFIGURATION



WTS-AM-3-D (Shown) - (2) "D" Size Batteries



WTS-AM-3 (Shown) - (2) "AA" Size Batteries



WTS-AM-6 (Shown) - (2) "AAA" Size Batteries with BB1

FEATURES & BENEFITS

- Simple wireless configure and calibration
- Wireless range up to 800 m (2,625 ft)
- Low power mode for long battery life
- Free visualisation software
- Ideal for conditioned transducers

OPTIONS

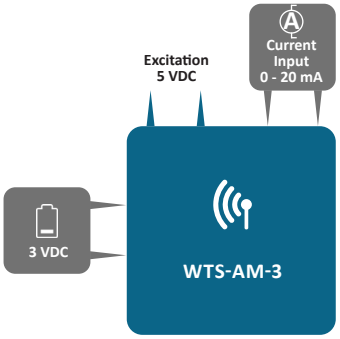
WTS-AM-3-D
Wireless 4-20 mA transmitter module in IP67 enclosure supporting two D batteries or external power supply

WTS-AM-3
Wireless 4-20 mA transmitter module in IP67 enclosure for two AA batteries

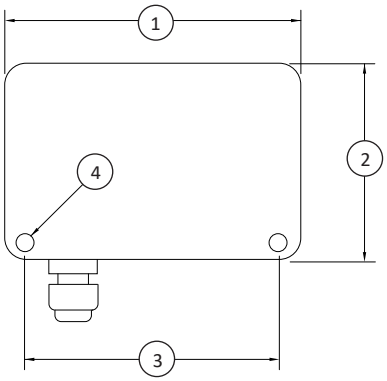
WTS-AM-6
Wireless 4-20 mA transmitter module in miniature IP50 enclosure

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-AM-3 WIRELESS 4-20 mA TRANSMITTER MODULE



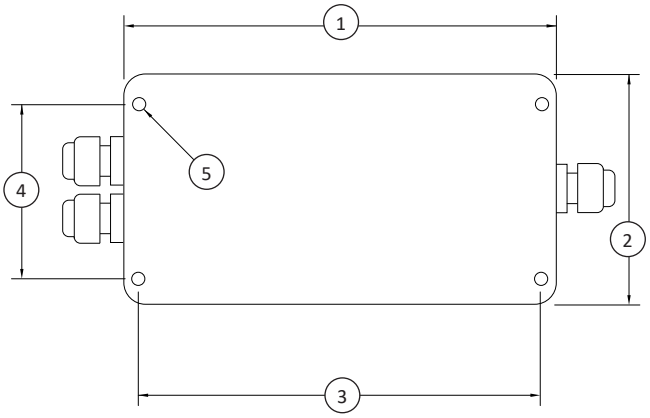
ELECTRICAL



WTS-AM-3 (2) "AA" Size Batteries

DIMENSIONS

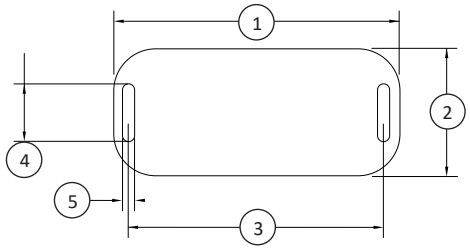
See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.6
(4)	Ø4.8	Ø2.0
Height	34	1.3



WTS-AM-3-D (2) "D" Size Batteries

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2



WTS-AM-6 (2) "AAA" Size Batteries with BB1

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	76	3
(2)	35	1.4
(3)	68	2.7
(4)	15	0.6
(5)	3.2	0.1
Height	20	0.8

WTS-BS-3E WIRELESS BASE STATION WITH USB INTERFACE

The WTS-BS-3E is one of a range of base stations that are required for configuration and calibration of the WTS modular telemetry system. Base stations can also be used for data collection systems by making available the WTS wireless transmitter data over the USB interface.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-3E is housed in an IP50 enclosure. On Windows PCs the free WTS Toolkit is used to configure and calibrate the WTS modular telemetry system while the free WTS logging and visualization software allows monitoring and data collection.

FEATURES & BENEFITS

- Simple plug & play USB
- Configure & calibrate the WTS range
- Data collection for PC/PLC

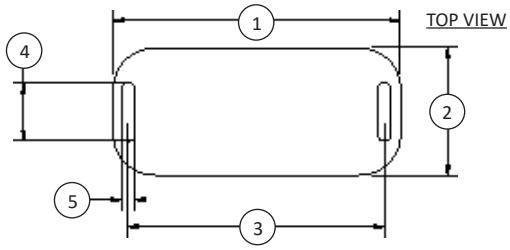
SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage (USB) – VDC		4.875 to 5.125*
* As defined by USB 2.0 specification		
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 500
	ft	Up to 1,640
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating		IP50

STANDARD CONFIGURATION



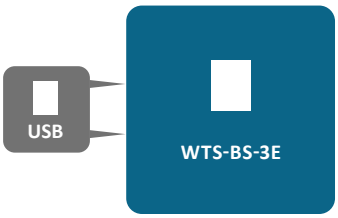
WTS-BS-3E (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	76	3
(2)	35	1.4
(3)	68	2.7
(4)	15	0.6
(5)	3.2	0.1
Height	20	0.8

ELECTRICAL



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-BS-4 WIRELESS BASE STATION WITH USB INTERFACE IN INDUSTRIAL ENCLOSURE

The WTS-BS-4 is one of a range of base stations that are required for configuration and calibration of the WTS modular telemetry system. Base stations can also be used for data collection systems by making available the WTS wireless transmitter data over the USB interface.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage. The WTS-BS-4 is housed in an IP67 enclosure and has better coverage than the WTS-BS-3E.

On Windows PCs the free WTS Toolkit is used to configure and calibrate the WTS modular telemetry system while the free WTS logging and visualization software allows monitoring and data collection.

FEATURES & BENEFITS

- Up to 800 m (2,625 ft) range
- Simple plug & play USB
- Configure & calibrate the WTS range
- IP67/NEMA 4 rated enclosure

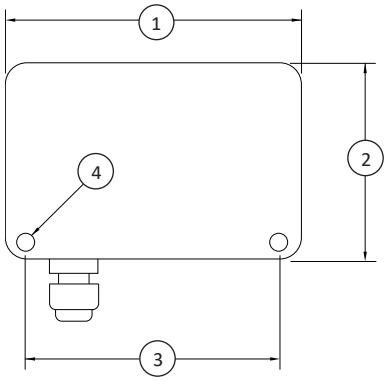
SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage (USB) – VDC		4.875 to 5.125*
* As defined by USB 2.0 specification		
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating		IP67/Nema4

STANDARD CONFIGURATION



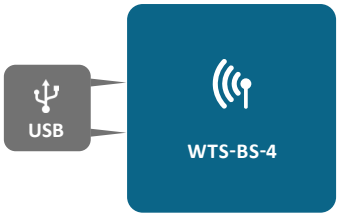
WTS-BS-4 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.6
(4)	Ø4.8	Ø0.2
Height	34	1.3

ELECTRICAL



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-LD1 WIRELESS LARGE LED DISPLAY

The WTS-LD1 provides the user with a large format four-digit display capable of displaying individual WTS transmitter values or the summed value of up to eight modules.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage.

Using the PC based WTS Toolkit software and a USB base station the user can quickly and easily select and configure the associated transmitter modules. The WTS Toolkit also provides configuration of the display format and zero functions. Further wired Logic Inputs allow the user to remotely control Tare and Net/Gross toggle functions.

FEATURES & BENEFITS

- Large screen with 4-digit, 100 mm (4 in) LED display
- Mounting options: ceiling suspended or wall mounted
- Tare function
- Suitable for crane and weighing applications

SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage – VDC		11 to 30
Supply Current (Max) – A		3.5
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	0 to 50
	°F	32 to 122
Storage Temperature Range	°C	-20 to 70
	°F	-4 to 158
Maximum Humidity – %		95 non-condensing
IP Rating (excluding USB connector)		IP65

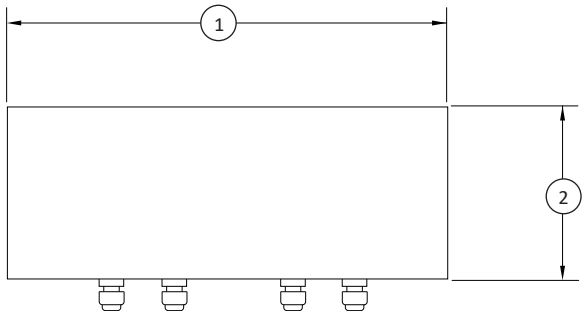
POSSIBLE DISPLAY VALUES

Negative Display Values	Positive Display Values
-1999	9999
-199.9	999.9
-19.99	99.99
-1.999	9.999

STANDARD CONFIGURATION



WTS-LD1 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	435	17.1
(2)	195	7.7
Depth	77	3.0

ELECTRICAL



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-LD2 WIRELESS LARGE LED DISPLAY

The WTS-LD2 provides the user with a large format four-digit display capable of displaying individual WTS transmitter values or the summed value of up to eight modules.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage.

Using the PC based WTS Toolkit software and a USB base station the user can quickly and easily select and configure the associated transmitter modules. The WTS Toolkit also provides configuration of the display format and zero functions. Further wired Logic Inputs allow the user to remotely control Tare and Net/Gross toggle functions.

FEATURES & BENEFITS

- Large screen with 6-digit, 102 mm (4 in) LED display
- Mounting options: ceiling suspended or wall mounted
- Tare function
- Suitable for crane and weighing applications

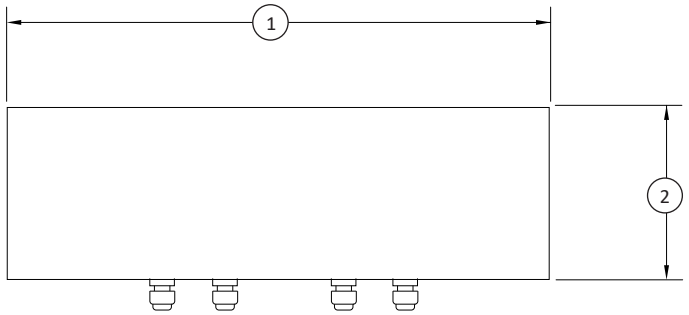
SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage – VDC		11 to 30
Supply Current (Max) – A		3.5
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	0 to 50
	°F	32 to 122
Storage Temperature Range	°C	-20 to 70
	°F	-4 to 158
Maximum Humidity – %		95 non-condensing
IP Rating (excluding USB connector)		IP65

STANDARD CONFIGURATION



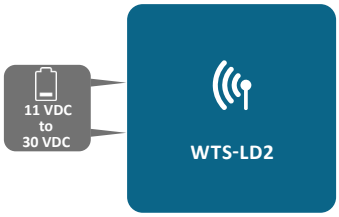
WTS-LD2 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	616	24.25
(2)	195.5	7.7
Depth	100	3.94

ELECTRICAL



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-SO WIRELESS INTERFACE WITH ASCII SERIAL OUTPUT

The WTS-SO outputs a user defined ASCII report that can contain live values and sum of up to eight WTS transmitters and forms part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-SO supports RS232 and RS485 connectivity.

The WTS Toolkit software offers a fast and simple way to configure the report format and to choose the associated transmitter modules. The reports could be just a single line giving a value to be fed into a serial display, for example, or could be a multi-line report for delivery to a printer.

FEATURES & BENEFITS

- ASCII serial output
- Serial output to printer, display, PC or PLC
- Simple configuration and calibration
- Wireless range of up to 800 m (up to 2,625 ft)

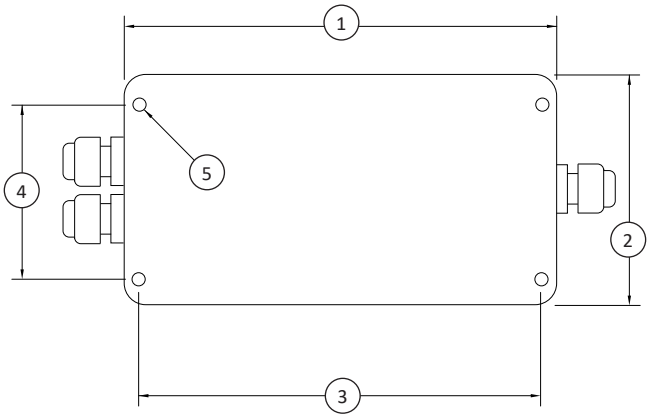
SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage – VDC		9 to 32
Supply Current at 12V (typical) – mA		100
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (excluding USB connector)		IP67/Nema4

STANDARD CONFIGURATION



WTS-SO (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.46
(2)	84	3.31
(3)	148	5.83
(4)	50	1.97
(5)	Ø4.5	Ø0.18
Height	57	2.24

ELECTRICAL



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-GW1 WIRELESS GATEWAY WITH MODBUS AND ASCII SERIAL OUTPUT

The WTS-GW1 is a gateway that provides a standard serial interface to gather data from up to 100 transmitter modules in a WTS telemetry system using either the Modbus RTU protocol or a simple ASCII protocol.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-GW1 supports RS232 and RS485 connectivity. Some simple commands are available to wake, sleep, and keep awake WTS transmitter modules.

The WTS Toolkit software offers a fast and simple way to configure the gateway module.

FEATURES & BENEFITS

- Can gather data from up to 100 acquisition modules
- Standard communication interface
- Wireless configuration
- Range of up to 800 m (2,625 ft)
- Free software

INDUSTRY SOLUTIONS

- Interface with industrial PLC's
- Simple connection to existing DAQ systems (i.e. LabVIEW or DASYLab)

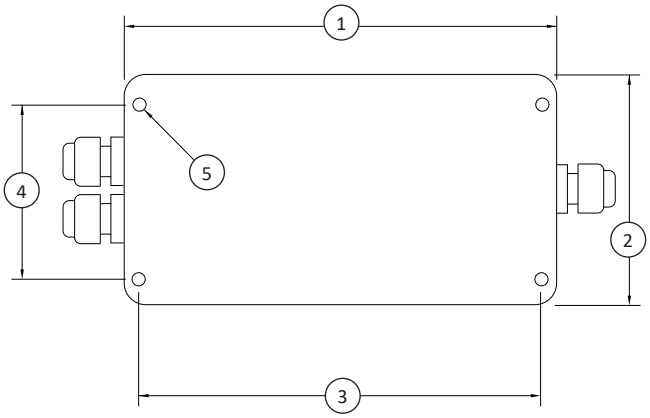
SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage – VDC		9 to 32
Supply Current at 12V (typical) – mA		100
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (excluding USB connector)		IP67/Nema4

STANDARD CONFIGURATION



WTS-GW1 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2

ELECTRICAL



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WTS-BS-1 WIRELESS HANDHELD DISPLAY FOR UNLIMITED TRANSMITTERS

The WTS-BS-1 is a roaming handheld allowing the operator to cycle the display between all available transmitter modules and forms part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-1 does not require pre-configuration of associated transmitters and will wake transmitters as they come within wireless range. Two AA batteries power the handheld which has been designed for low power operation.

The WTS Toolkit software offers a fast and simple way to configure the display format.

FEATURES & BENEFITS

- Roams between transmitters in range
- Sleep / wake
- Auto shutdown
- Rugged construction

SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage – VDC		2.5 to 3.6
2 each AA 1.5V primary cells		
BATTERY LIFE		
Based on 2 Ah capacity batteries		
Continuous Operation – hours		35
Standby Mode (powered off) – years		1.5
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-10 to 50
	°F	14 to 122
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating Enclosure		IP67

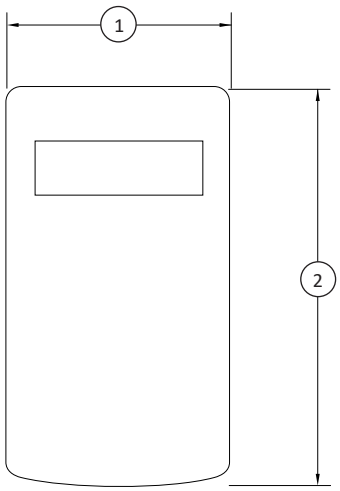
ACCESSORIES

WTS-Case
Black leather case with clear viewing window with shoulder strap

STANDARD CONFIGURATION



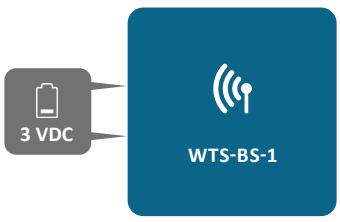
WTS-BS-1 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	90	3.5
(2)	152	6.0
Height	34	1.3

ELECTRICAL



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WTS-BS-1-HA WIRELESS HANDHELD DISPLAY FOR MULTIPLE TRANSMITTERS

The WTS-BS-1-HA handheld displays data from up to 12 wireless transmitter modules and forms part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analogue outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-1-HA provides either a summed total from all selected transmitters and the ability to view individual transmitters. Two AA batteries power the handheld, which has been designed for low power operation.

The WTS Toolkit software offers a fast and simple way to configure the display format, unit conversion, zero adjustment and transmitter selection. A function key can send the displayed value to other receivers such as a printer.

FEATURES & BENEFITS

- Connect up to 12 transmitters
- Tare function
- Provides summation of up to 12 transmitters
- Sleep/ wake acquisition modules
- Auto shut down
- Rugged construction

SPECIFICATIONS

POWER SUPPLY		
Power supply voltage – VDC		2.5 to 3.6
2 each AA 1.5V primary cells		
BATTERY LIFE		
Based on 2 Ah capacity batteries		
Continuous Operation – hours		35
Standby Mode (powered off) – years		1.5
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-10 to 50
	°F	14 to 122
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating Enclosure		IP67

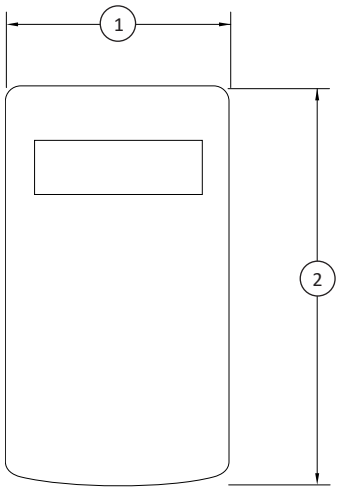
ACCESSORIES

WTS-Case
Black leather case with clear viewing window with shoulder strap

STANDARD CONFIGURATION



WTS-BS-1-HA (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	90	3.5
(2)	152	6.0
Height	34	1.3

ELECTRICAL



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-BS-1-HS WIRELESS HANDHELD DISPLAY FOR SINGLE TRANSMITTERS

The WTS-BS-1-HS handheld displays data from any of the WTS wireless transmitter modules and forms part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-1-HS provides a point to point connection to a single transmitter. The transmitter can be woken and sent to sleep as the handheld is turned on or off. Two AA batteries power the handheld which has been designed for low power operation.

The WTS Toolkit software offers a fast and simple way to configure the display format, unit conversion, zero adjustment and transmitter selection.

FEATURES & BENEFITS

- Simple operation
- Connection to single transmitter module
- Tare function
- Auto shutdown
- Rugged construction

SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage – VDC		2.5 to 3.6
2 each AA 1.5V primary cells		
BATTERY LIFE		
Based on 2 Ah capacity batteries		
Continuous Operation – hours		35
Standby Mode (powered off) – years		1.5
RADIO		
Radio Type		License exempt transceiver
Radio Frequency - GHz		2.4
Transmit Power - mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-10 to 50
	°F	14 to 122
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating Enclosure		IP67

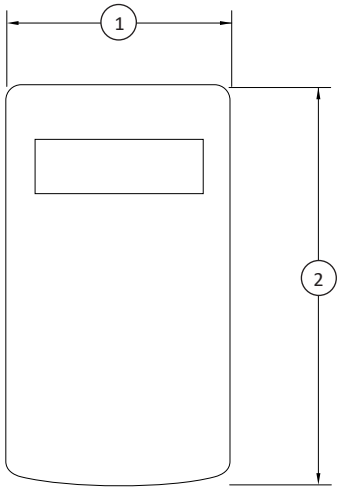
ACCESSORIES

WTS-Case
Black leather case with clear viewing window with shoulder strap

STANDARD CONFIGURATION



WTS-BS-1-HS (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	90	3.5
(2)	152	6.0
Height	34	1.3

ELECTRICAL



OPTIONS

- Peak hold functionality

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-BS-5/DT WIRELESS ANALOG OUTPUT RECEIVER MODULE

The WTS-BS-5 Receiver converts data from a WTS wireless transmitter module into an analogue output and forms part of the WTS modular telemetry system. Data from any of the WTS range of transmitters can be used.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-5 offers, as standard, a user choice of analog outputs; 0-10 V, 4-20 mA, 0-20 mA, ±10 V, ±5 V. A choice of a desktop enclosure or an IP67 sealed enclosure allows selection of a module to suit your individual application. The WTS Toolkit offers a fast and simple way to configure the analog output scaled from any engineering unit input.

SPECIFICATIONS

VOLTAGE OUTPUT SPECIFICATIONS		
Voltage Ranges – V		0-5, 0-10, ±5, ±10
Resolution / Bits		65,000 / 16
Output Gain Stability – %FS / °C MAX		±0.015
Output Zero Stability – %FS / °C MAX		±0.015
Linearity – % FS MAX		±0.01
Minimum Load Impedance – Ω		5000
CURRENT OUTPUT SPECIFICATIONS		
Current Ranges – mA		4-20, 0-20 sink & source
Resolution / Bits		65,000 / 16
Output Gain Stability – %FS / °C MAX		±0.03
Output Zero Stability – %FS / °C MAX		±0.02
Linearity – %FS MAX		±0.02
Minimum Load Impedance – Ω		500
POWER SUPPLY		
Power Supply Voltage – VDC		9 to 32
Supply Current at 12V (typical) – mA		100
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
WTS-BS-5DT Range	m	Up to 500
	ft	Up to 1,640
WTS-BS-5 Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
WTS-BS-5DT IP Rating		IP50
WTS-BS-5 IP Rating		IP67/Nema4

STANDARD CONFIGURATION



WTS-BS-5DT (Shown)



WTS-BS-5 (Shown)

FEATURES & BENEFITS

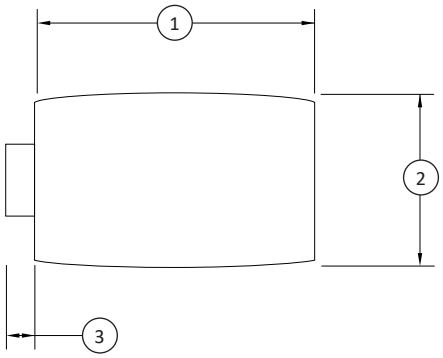
- Provide analog output for WTS acquisition modules
- One to one transmission up to 2000 updates per second (dependent on acquisition module)
- Industrial & desktop versions available

ELECTRICAL



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

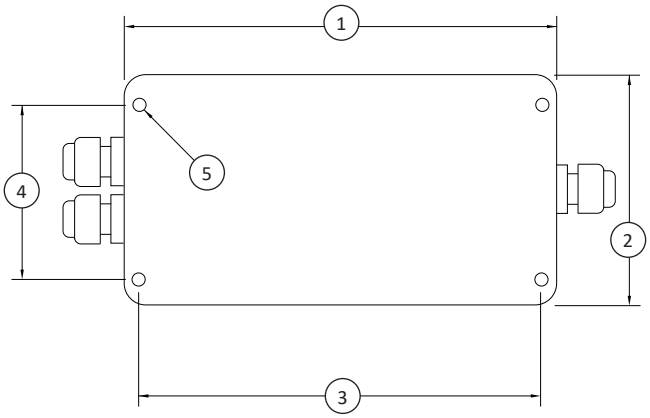
WTS-BS-5/DT WIRELESS ANALOG OUTPUT RECEIVER MODULE



WTS-BS-5DT (Shown)

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	146	5.7
(2)	88	3.5
(3)	13	0.5
Height	25	1.0



WTS-BS-5 (Shown)

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2

WTS-AR WIRELESS REPEATER MODULE

The WTS-AR is a repeater which will allow the WTS telemetry system modules to span around obstacles, increase range and coverage by retransmitting received messages.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-AR is housed in an IP67 rated enclosure which accepts two D batteries as well as an external power supply. The repeater enables messages to be repeated once so therefore extends the achievable wireless range. Adding further repeaters to the system will increase coverage but will not further increase the range.

FEATURES & BENEFITS

- Extends and enhances range of WTS devices
- Allows communication around obstacles
- Improves propagation of signal

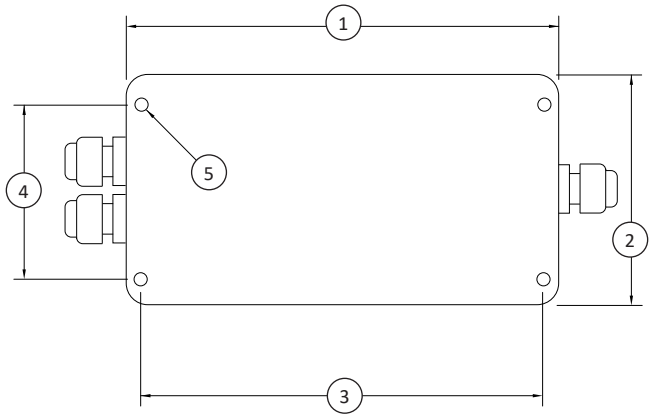
SPECIFICATIONS

BATTERY LIFE		
AR Permanently Activated (Pair D Cells) – hours		240
POWER SUPPLY		
Internal Batteries (D cells) – VDC		2.1 to 3.6
External Power Supply – VDC		5 to 18
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating		IP67/Nema4

STANDARD CONFIGURATION



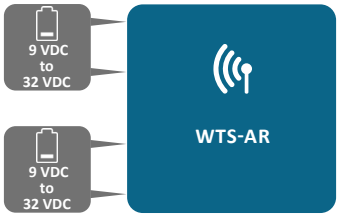
WTS-AR (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2

ELECTRICAL



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-RM1 WIRELESS RELAY OUTPUT RECEIVER MODULE

The WTS-RM1 Receiver acts on data from any of the WTS wireless transmitter modules and can be used for alarm and control purposes forming part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies and are available in robust IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-RM1 offers two single pole changeover relays with mains rated 5 amp contacts for power switching. Functionality includes set-points, inversion, latching and hysteresis. The WTS Toolkit offers a fast and simple way to configure the relays operation and set-point values, which are entered in the engineering units of the associated transmitter modules.

FEATURES & BENEFITS

- Provides limit switching
- Two relays mains rated
- Accepts up to 16 devices
- Provides a range of relay operation modes
- Loss of signal alarm relay
- Latch and inversion options for all relays

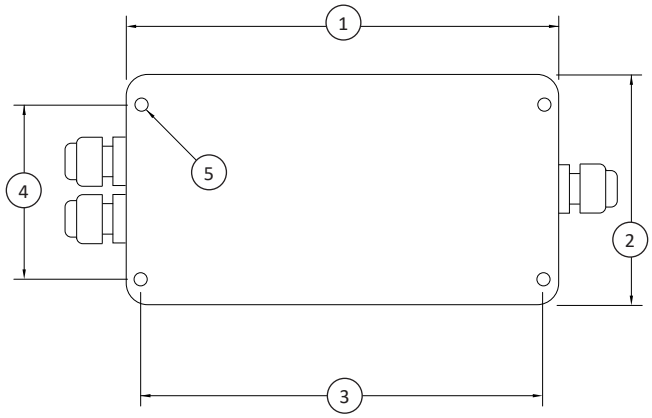
SPECIFICATIONS

POWER RELAY OUTPUTS		
Number of Power Relays		2
Type of Relay		SPCO
Contact Rating – A @ VAC		5 @ 24
ALARM RELAY OUTPUTS		
Number of Alarm Relays		1
Type of Relay		SPCO
Contact Rating – A @ VDC		1 @ 24
DIGITAL INPUTS		
Number of Digital Inputs		3
Type of Input		Volt free contact
POWER SUPPLY		
Power Supply Voltage – VDC		9 to 32
Supply Current at 12V (typical) – mA		150
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (excluding USB connector)		IP67/Nema4

STANDARD CONFIGURATION



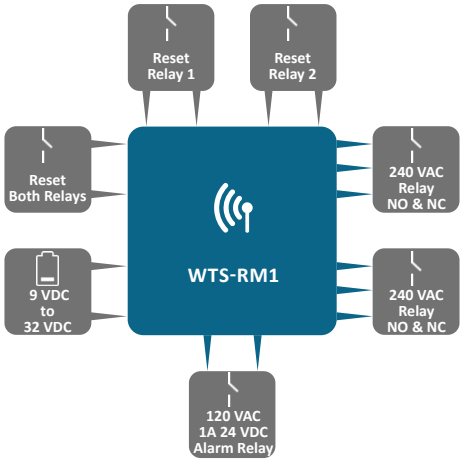
WTS-RM1 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2

ELECTRICAL



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-ANTA / ANTB / ANTC TELEMETRY ANTENNA OPTIONS

The WTS-ANTA, WTS-ANTB and WTS-ANTC can be integrated with any of the WTS modules which are factory fitted with UFL antenna connectors (such as the external antenna options of the acquisition modules e.g. WTS-AM-1, WTS-AM-2, WTS-AM-3). Options also exist for antennas to be fitted to other modules within the WTS range.

The WTS-ANTA is a PCB antenna designed to be fitted inside a plastic enclosure. Cable length 100 mm (4 in) UFL-UFL.

The WTS-ANTB is a whip antenna with a fixed 90 degree elbow designed for mounting externally. Cable length 100 mm (4 in) UFL – Reversed SMA. IP67 rated.

The WTS-ANTC is a whip antenna with a variable angled elbow for mounting externally. Cable length 100 mm (4 in) UFL – Reversed SMA. IP67 rated.

The WTS-ANTD is a 'puck' antenna designed for mounting externally. It is suitable for applications requiring a low physical profile and high gain. Fitted with a 0.6 m (2 ft) cable, RPSMA connector and supplied with a 100 mm (4 in) RPSMA to UFL adaptor cable. IP69K rated.

The WTS-ANTE is a 'puck' antenna designed for mounting externally. It is suitable for applications requiring a low physical profile and high gain. Fitted with a 100 mm (4 in) cable and UFL connector with an environmental rating of IP69K.

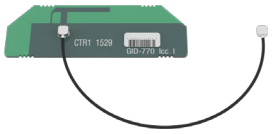
FEATURES & BENEFITS

- 4 different versions (PCB, fixed, variable, puck)
- Offers flexibility to OEM installers
- Surface & bulkhead options

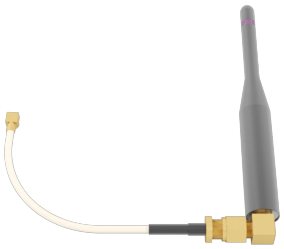
SPECIFICATIONS

Approved telemetry antenna options for various T24 modules		
External antennas are weatherized		
UFL antenna connectors		
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 85
	°F	-4 to 185
Storage Temperature Range	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
CE Environmental Approvals		European EMC Directive 2004/108/EC
		Low Voltage Directive 2006/95/EC

STANDARD CONFIGURATION



WTS-ANTA (Shown)



WTS-ANTB (Shown)



WTS-ANTC (Shown)



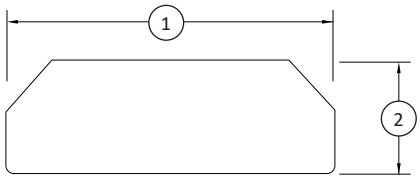
WTS-ANTD (Shown)



WTS-ANTE (Shown)

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

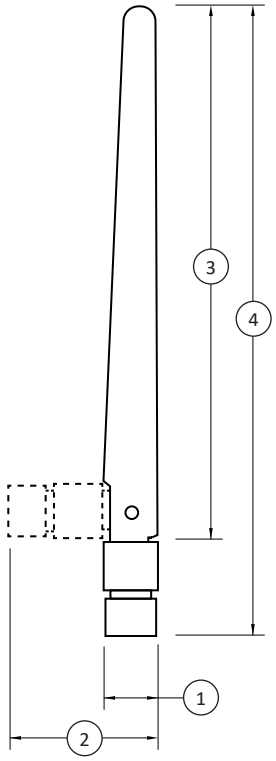
WTS-ANTA / ANTB / ANTC TELEMETRY ANTENNA OPTIONS



WTS-ANTA

DIMENSIONS

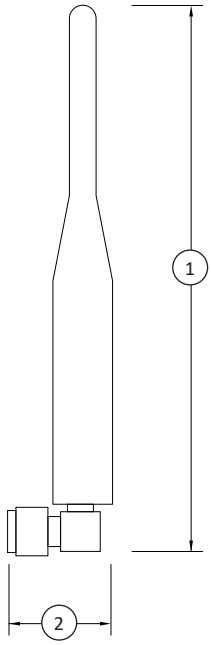
See Drawing	Metric (mm)	U.S. (in)
(1)	58	2.3
(2)	20	0.8
Height	4	0.2



WTS-ANTC

DIMENSIONS

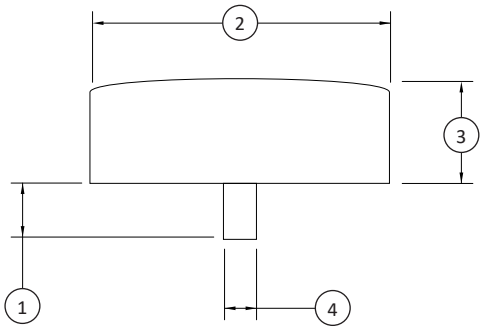
See Drawing	Metric (mm)	U.S. (in)
(1)	28	1.1
(2)	Ø10	0.4
(3)	95	3.7
(4)	113	4.4



WTS-ANTB

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	98	3.9
(2)	19	0.7



WTS-ANTD & WTS-ANTE

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	6	0.2
(2)	Ø53	2.1
(3)	19	0.7
(4)	Ø10	0.4
Thread	M10 X 1	

WTS-WSS WIRELESS WIND SPEED TRANSMITTER MODULE

The wireless wind speed transmitter module (WTS-WSS) provides high accuracy measurement and offers a quick and effective solution for monitoring wind speeds in a wide variety of applications and industries.

The WTS-WSS uses a low power mode between transmissions to maximize battery life in the field whilst offering class leading wireless coverage range of up to 800 m (2,625 ft).

The Anemometer features a high quality 3-cup rotor in a rugged enclosure, providing rolling average wind speeds between 5 mph to 125 mph. It will also measure gusts at user defined periods of 1, 3, 5, or 10 sec. Wind speed measurement is available in m/s, fps, mph, km/h, or kn.

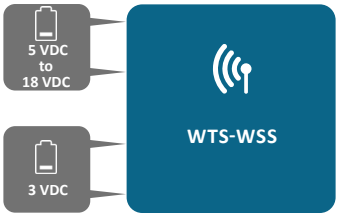
The device is powered either from internal batteries or an external supply. For applications which require high sampling rates for long periods, Interface's power pack (WTS-PP1) and solar panel (WTS-SP1) offer an ideal solution.

Forming part of the WTS modular telemetry system, the data transmitted by the WTS-WSS can be received by multiple WTS receivers that include displays, handheld readers, analogue outputs, relay modules and computer interfaces.

FEATURES & BENEFITS

- Low power mode providing exceptional battery life in excess of 12 months
- Constantly monitors average wind speed
- Measures gusts at user defined periods
- Quick and simple installation
- Wireless range up to 800 m (2,625 ft)
- Supplied pre-calibrated
- Simple configuration via WTS Toolkit software
- Improved flexible design
- Variable sampling
- Variety of different output units available
- Can be linked to a variety of the WTS peripherals
- Free visualization software also available

ELECTRICAL



STANDARD CONFIGURATION



WTS-WSS (Shown)

SPECIFICATIONS

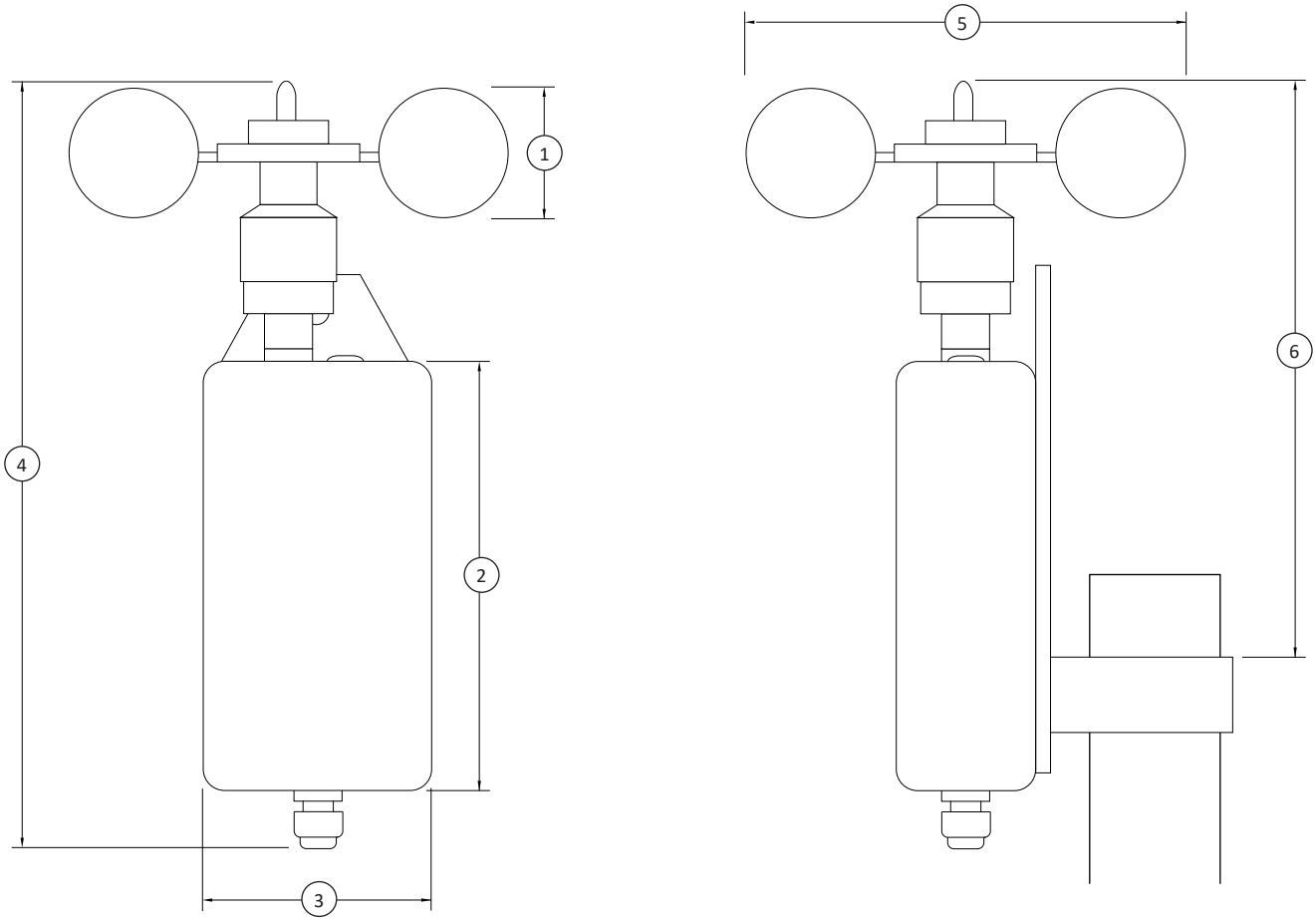
PARAMETER		
Measurement Range – mph		5 – 125
Accuracy 5 to 10 mph – mph		±0.5
Accuracy 10 to 125 mph – %		±4
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %RH		95
Environmental Protection with Suitable Cables Existing Through Cable Glands		IP67
POWER SUPPLY		
Standby/Low Power Mode – µA		5 – 20
Normal Mode on Constantly – mA		55 – 60
Reverse Polarity Protection – VDC		-32
INTERNAL		
Battery Supply Voltage (2 each D Cells) – VDC		2.1 – 3.6
EXTERNAL		
Power Supply Voltage – VDC		5 – 18
Power Supply Ripple – mV ac pk-pk		50
BATTERY LIFE IN LOW POWER MODE GENERATING RESULTS EVERY SECOND		
Pair of D Cells Constantly On – year		1
Pair of D Cells 12 Sessions Per Day of 10 mins – years		6

ACCESSORIES

WTS-WSS-P
Wireless wind speed transmitter module with pivot bar for mounting to moving booms

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

WTS-WSS WIRELESS WIND SPEED TRANSMITTER MODULE



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	50	2.0
(2)	163	6.4
(3)	84	3.3
(4)	295	11.6
(5)	165	6.5
(6)	230	9.1

WTS-PR1 WIRELESS TELEMETRY PRINTER

The WTS-PR1 is a thermal printer module that can generate a user defined ticket that can contain live values and sum of up to eight WTS transmitters and forms part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common industrial power supplies with internal antennas optimized to give outstanding coverage.

The printout can be triggered from the arrival of data from a specific module or alternatively by a handheld module. The WTS Toolkit software offers a fast and simple way to configure the ticket format and to choose the associated transmitter modules.

FEATURES & BENEFITS

- Prints screen from the handheld WTS-BS-1-HA
- Simple design (F1 button)
- User definable reports/print outs
- Suitable for vehicle applications

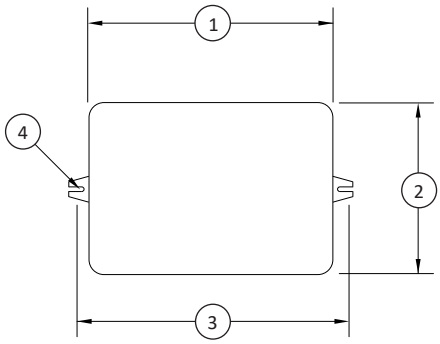
SPECIFICATIONS

PRINTER		
Printing Method		Direct Thermal Line printing
Paper Width – mm		57
Paper Roll Diameter – mm		35
Print Width – mm		48
POWER SUPPLY		
Power Supply Voltage – VDC		9 to 32
Supply Current When Idle – mA		100
Supply Current When Printing (peak) – A		3
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	5 to 50
	°F	41 to 122
Storage Temperature Range	°C	-20 to 60
	°F	-4 to 140
Maximum Humidity – %		95 non-condensing
IP Rating (excluding USB connector)		IP20

STANDARD CONFIGURATION



WTS-PR1 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	150	5.9
(2)	100	3.9
(3)	170	6.7
(4)	Ø4.5	Ø0.2
Height	100	3.9

ELECTRICAL



U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

Notes:

Notes:

Bluetooth®

BTS Bluetooth® Telemetry System.....455

BTS Bluetooth® TELEMETRY SYSTEM

The BTS-AM-1 is a Bluetooth Low Energy (BLE) strain bridge transmitter module that provides access to high quality measurements on a mobile platform such as a phone or tablet.

The delivery mechanism is BLE which utilizes the flexibility and availability of Bluetooth receivers while maintaining the low power requirements of embedded systems. BTS is built upon two complimentary principles of BLE: 1) broadcast advertising data which enables users to deliver the same data to multiple receivers simultaneously and 2) low power paired connections which can be used in a point to point system.



One to One



Multiple to One



One to Multiple



Multiple to Multiple

The BTS comes in two versions:

- Housed in an our 'C' style enclosure with integrated battery holder, which makes it suitable for integration
- Bare board format, which allows the module to be built into OEM applications

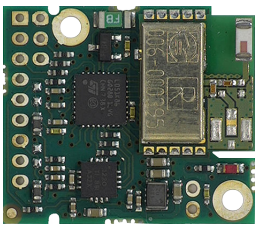
FEATURES & BENEFITS

- **High Measurement Resolution:** BTS-AM-1 can produce a noise free resolution of 1 in 92000 counts (16.5 bit) when used with a 3mV/V sensor and 1 in 184,000 counts (17.5 bit) when used with a 6mV/V sensor.
- **Simple Integration into iOS and Android Apps:** Advert format and encoding as well as details on connected services are available to facilitate integration of the device within custom apps for OEM applications.
- **Range:** Ranges achievable between 30 to 90 m line of sight depending on age and quality of viewing device.
- **Advanced Protection:** Configuration PIN, View PIN and Calibration PIN allow you to take control of your end users experience and prevent any unwanted changes in configuration that can compromise measurement quality.

STANDARD CONFIGURATION



MODEL BTS-AM-1 (Shown)



MODEL BTS-OEM-1 (Shown)



BTS MOBILE APP (Shown)

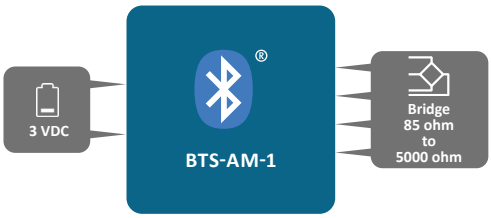
A free iOS and Android app is available for download, which enables users to create dashboards with varying degrees of detail based on application requirements. It enables BTS systems to be visualized on phones and tablets by using digital displays, gages, tanks and charts. Displayed data can be defined as mathematical expressions consisting of readings from multiple transmitters, functions and constants. The app also facilitates BTS module configuration and calibration.

U.S. dimensions and capacities are provided for conversion only. Standard products have International System of Units (SI) capacities and dimensions.

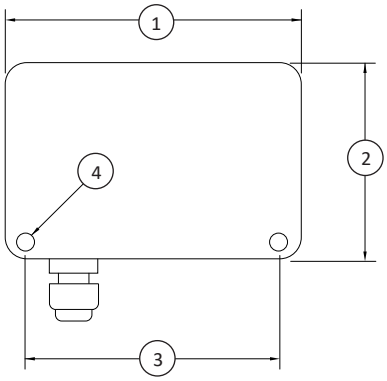
BTS Bluetooth® TELEMETRY SYSTEM

SPECIFICATIONS

Parameter	
Strain Gauge Excitation System	4 Wire
Strain Gauge Excitation Voltage (Nom)	3 V dc
Strain Gauge Drive Capability	85 to 5000 ohms
Strain Gauge Sensitivity	Up to ±48 mV/V
Offset Temperature Stability	±5 ppm / ºC
Gain Temperature Stability (Max)	4 ppm / ºC
Non Linearity before Linearization	6 ppm of FR
Internal Resolution	24 bits
Noise free resolution @ 2.5 mV/V:	
At 1 sample	14.25 bits
At 2 samples	15.25 bits
At 4 samples	16.00 bits
At 8 samples	16.75 bits
Battery Life at 1 Sample per Second	
2 X AA cells, Transmitting 24 hr/day	10 months
Power Supply	
Standby (Max)	10 µA
Power Supply Voltage	2.3 – 3.6 Vdc
Power Supply Ripple	50 mV ac pk-pk
Peak Current (1K Bridge)	30 mA
Environmental	
Operating Temperature Range	-40 to +85 ºC
Storage Temperature Range	-40 to +85 ºC
Maximum Humidity	Up to 95% non condensing
Protection (B24-SSBC only)	IP67



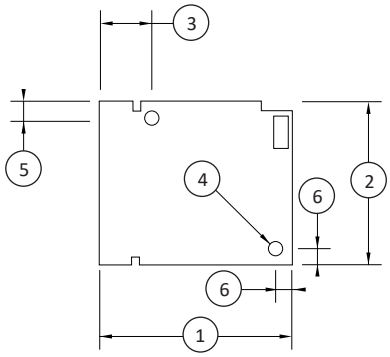
ELECTRICAL



BTS-AM-1 (2) "AA" Size Batteries

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.6
(4)	Ø4.8	Ø0.2
Height	34	1.3



BTS-OEM-1

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	25	0.98
(2)	21.5	0.85
(3)	6.8	0.27
(4)	Ø2.1	Ø0.08
(5)	2.1	0.08
(6)	2.3	0.09
Height	3.6	0.14

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Notes:

Notes:

Calibration Systems

Load Frame 460

Portable.....464

Transfer Standard.....466

Verification Load Frame.....467

GOLD STANDARD® CALIBRATION SYSTEM (U.S. & METRIC)

FEATURES AND BENEFITS

- Capacities from 55K and 100K lbf
- Less than 0.04% uncertainty
- Fully automated system will reduce calibration time by 50% to 90%
- Automated tension and compression calibration runs can be completed in less than 5 minutes
- 4-post design provides superior stability throughout the calibration
- Innovative fixturing allows for tension and compression calibration without changing setup
- 12 inches of clearance between posts allows for easy load cell installation and removal
- Accurate and reliable load control achieved by proprietary load feedback design
- Testing and reporting per ASTM E74, ISO 376, and EN100002-3 standards
- Automatically produces standard reports, graphs, and performance parameter calculations
- Ability to customize reports and graphs
- Automatically archives data

The Interface Gold Standard® Calibration System using the Interface Gold or Platinum Standard® Load Cells ensures a metrology system of the highest accuracy and lowest uncertainty available.

The Gold Standard® Calibration System includes:

- Precision load frame
- Integrated control and measurement system
- Integrated computer system with Interface Gold Standard® Calibration Software

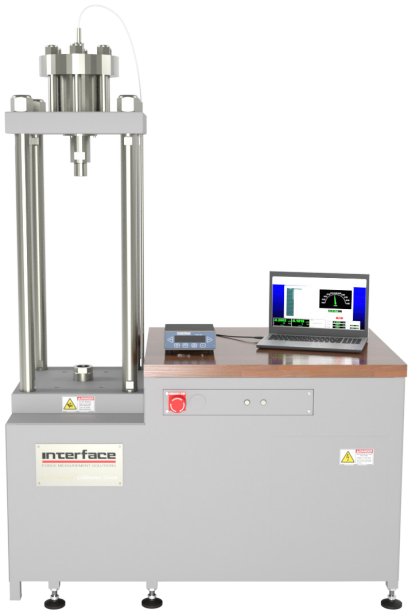
OPTIONS

- Interface Gold or Platinum Standard® reference load cells
- Thread adapters for easy set-up and use
- Additional input channels for multiple bridge load cells or transducers with high level outputs
- Special threads and calibration adapters
- CX Series Precision mV/V transfer standard for system calibration
- On-site training

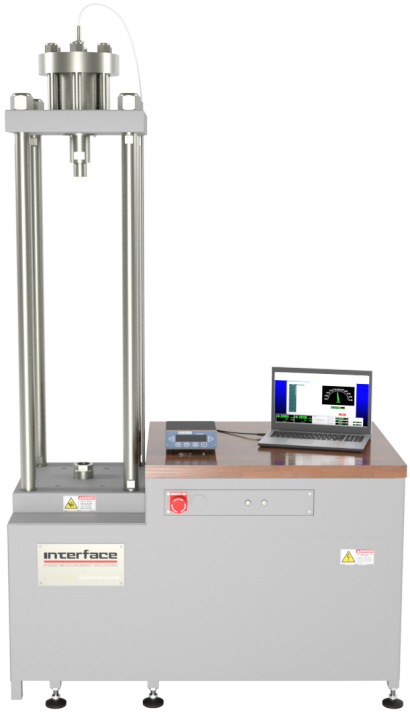
SOFTWARE

- Load points can be preset as required per your test specifications
- The ICS-202 Gold Standard® Calibration Software ICS-202 Gold Standard® Calibration Software will provide exact load output at specific load points
- Calibration results from other runs can be compared, measured, and displayed with current run results

STANDARD CONFIGURATION



Model LF1-55K-1-6 (Shown)



Model LF1-100K-1-7 (Shown)



FORCE MEASUREMENT SOLUTIONS

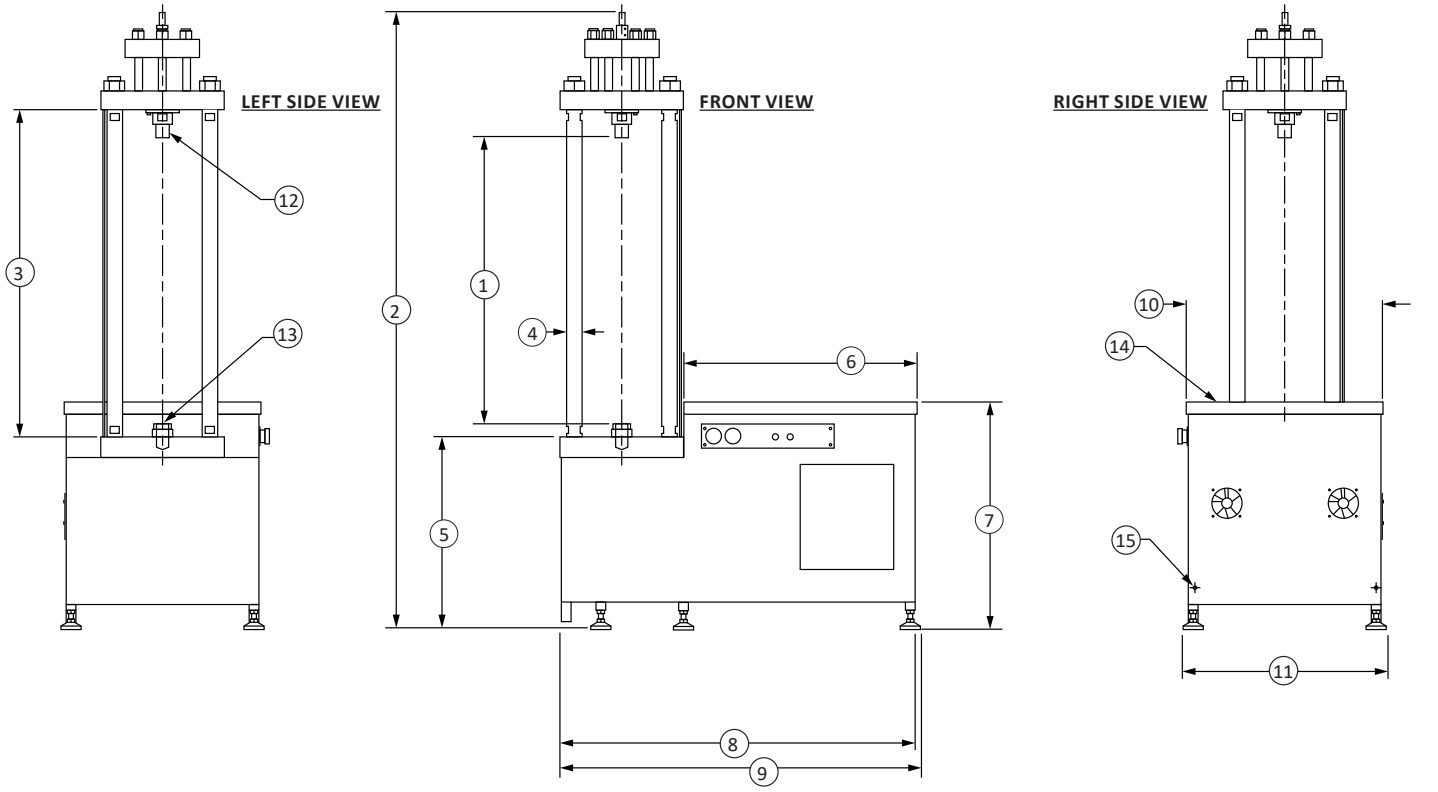
GOLD STANDARD® CALIBRATION SYSTEM (U.S. & METRIC)

SPECIFICATIONS

LOAD FRAME			
Model			
Capacity	**lbf**	55K	100K
	kN	244	444
Max Working Height	**in**	44	44
	mm	1117.6	1117.6
Weight - TYP	**lbs**	2500	2650
	kg	1133.9	1202
Type		Four Column, Dual Action Hydraulic	
Test Type		Compression or Tension	
Piston Stroke	**in**	6	
	mm	152.4	
Measurement Range		2% to 100% of Rated Load Frame Capacity	
INSTALLATION REQUIREMENTS			
Power		208/240 VAC, 50/60 Hz, Single Phase, 30 Amp Circuit	
HYDRAULICS			
Oil Capacity	**gal**	5 - 10	
	l	18.9 - 37.8	
Oil Type		ISO 32	
Oil Temperature		Indicator with automatic over temperature cutoff	
Oil Level		Indicator with automatic low level cutoff	
LOAD FRAME CONTROLS			
Force Control		Closed loop, PID	
Piston Sensor		LVDT	
Slack Adapter Range	**in**	+/- 0.25	
	mm	+/- 6.35	
Setpoint Input		+/- 10 VDC	
Force Limit		User Selectable, requires acknowledgment	
Setpoint Interface		USB to +/- 10 VDC Converter	
GOLD STANDARD SOFTWARE			
Operating System		Windows 10	
Hardware Requirement			
Reports		ASTM E74, ISO 376, Custom	
Shunt Calibration		Automatic or Manual	
Calibration Control		Automatic	
Curve Fit		Least Squares Method	
Calibration Management		Compare Current and Previous Test Results	
SHIPPING			
Shipping Weight - Nominal	**lbs**	2700	2850
	kg	1224.6	1292.7
Crate Dimensions - Typ W x H x D	**in**	72 X 104 X 48	72 X 104 X 48
	mm	1828.8 x 2641.6 x 1219.2	1828.8 x 2641.6 x 1219.2

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

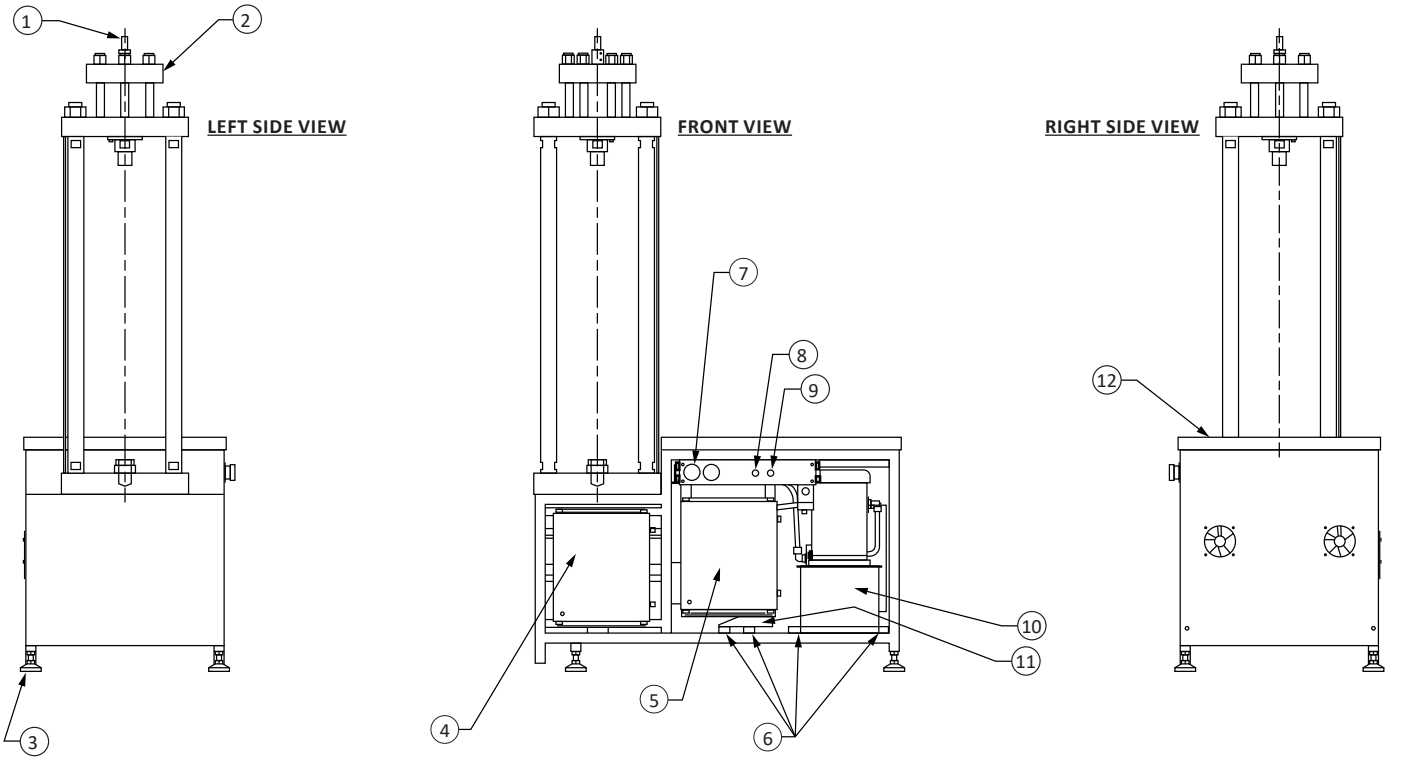
GOLD STANDARD® CALIBRATION SYSTEM (U.S. & METRIC)



DIMENSIONS

See Drawing	Model			
	LF1-55K-1-6		LF1-100K-1-7	
	Capacity			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	55K	244	100K	444
	in	mm	in	mm
(1)	38.4/44.4 (MIN/MAX)	975.36/1127.86 (MIN/MAX)	38.4/44.4 (MIN/MAX)	975.36/1127.86 (MIN/MAX)
(2)	96.0 (98.0 installed)	2438.4 (2489.2 installed)	96.0 (98.0 installed)	2438.4 (2489.2 installed)
(3)	50.5	1282.7	50.5	1282.7
(4)	Ø2.25 TYP.	Ø57.15 TYP.	Ø2.25 TYP.	Ø57.15 TYP.
(5)	29.688	754.08	29.688	754.08
(6)	36.0	914.4	36.0	914.4
(7)	35.063	890.6	35.063	890.6
(8)	55.0	1397.0	55.0	1397.0
(9)	55.719	1415.26	55.719	1415.26
(10)	30.0	762.0	30.0	762.0
(11)	31.25	793.75	31.25	793.75
(12)	Slack Adapter Assembly: 2-12 Male Thread, 3 (76.2) Dia. Rod, Vertical Range 0.5			
(13)	2-12 UN-2B Thread 3 (76.2) Deep			
(14)	Maple Table Top 36.0 x 30.0 x 1.75 (914.4 x 762.0 x 44.45)			
(15)	½-13 UNC CL2B Thread 1.5 Deep 2 - holes			

GOLD STANDARD® CALIBRATION SYSTEM (U.S. & METRIC)



COMPONENTS

See Drawing	Model			
	LF1-55K-1-6		LF1-100K-1-7	
	Capacity			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	55K	244	100K	444
(1)	LVDT Mounting Bracket			
(2)	Slack Adapter Cover/Support Assembly			
(3)	Swivel Leveling Mount			
(4)	Delta Electrical Enclosure			
(5)	Hydraulic Power Unit (HPU) Electrical Enclosure			
(6)	Oil Resistant Vibration Damping Mount			
(7)	Emergency Stop Button			
(8)	Activate/De-Activate Button			
(9)	Down Button			
(10)	Hydraulic Power Unit (HPU)			
(11)	Power Unit Chiller			
(12)	Maple Table Top			

GS-SYS03 GOLD STANDARD® PORTABLE LOAD CELL CALIBRATION SYSTEM

Fully Integrated PC-Based Solution for Calibration of Load Cells or Torque Transducers

STANDARD CONFIGURATION



Model GS-SYS03 (Shown)

- Windows software provides flexibility and produces consistent calibration results
- Performs ASTM E74, ISO376, and EN100002-3 calibrations
- Nonlinearity less than 0.005% FS
- Automatically archives test data
- Generates standard reports, graphs, and performance parameter calculations
- Permits easy generation of customized reports and graphics

GOLD STANDARD® LOAD CELL CALIBRATION SYSTEMS

Every new transducer or testing system must be calibrated to determine its properties and accuracy. It is also necessary to recalibrate transducers periodically because of drift, possible undetected damage, and normal wear and tear. The Gold Standard® System is a complete PC-based system for the calibration of load cells and torque transducers. Normally the system is used with a hydraulic load frame which can either be supplied by the user or by Interface. A separate software is available for the calibration of load cells in a deadweight system. Utilizing the experience obtained in almost five decades of force calibration of tens of thousands of load cells, the system provides state-of-the-art accuracy. The system is user-friendly and calibrations can be conducted with minimal training. Pull-down menus and step-by-step instructions are available to guide the operator through a complete calibration.

SYSTEM INCLUDES

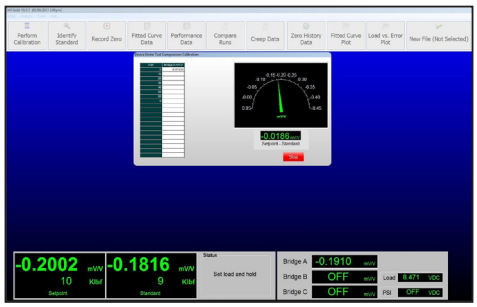
- 9840 Dual Channel 16-bit Intelligent Indicator with 0.005% non-linearity
- Internal mV/V calibration of Model 9840
- ICS-202 Gold Standard® Calibration Software
- Two Gold Standard® interconnect cable assemblies
- CX-0440 ±4 mV/V transfer standard
- SIS-103 one-day training at Interface Inc.

OPTIONS

- Laptop PC
- CX-0610 or other multi-step mV/V transfer standards
- Gold or Platinum Standard® Calibration Grade Load Cells
- 9840 and software for high level outputs (UDC)
- System calibration software for transducers with indicators

SOFTWARE

- Load points can be preset as required per your test specifications
- The Gold Standard® Calibration Software measures exact load output at specific load points
- Results from earlier runs can be compared, measured, and displayed with current run results



International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

GS-SYS04 GOLD STANDARD® PORTABLE E4 MACHINE CALIBRATION SYSTEM

Fully Integrated PC-Based Solution for Machine Calibration

STANDARD CONFIGURATION



Model GS-SYS04 (Shown)

- Windows software provides flexibility and produces consistent calibration results
- Performs ASTM E4 Machine calibrations
- Nonlinearity less than 0.005% FS
- Automatically archives data
- Generates standard reports, graphs, and performance parameter calculations
- Permits easy generation of customized reports and graphs

The Interface Portable E4 Machine Calibration System

The Interface GS-SYS04 Gold Standard® ASTM E4 Machine Calibration integrates our Model 9840 Intelligent Indicator with any Windows-based laptop computer. This solution creates a portable system for in-field calibration of force test machines. This verification involves insertion of a reference load cell (such as the Interface Gold Standard® Load Cell) into the equipment under test. Each data point in the test frame controller is compared against the reading from the reference load cell.

SYSTEM INCLUDES

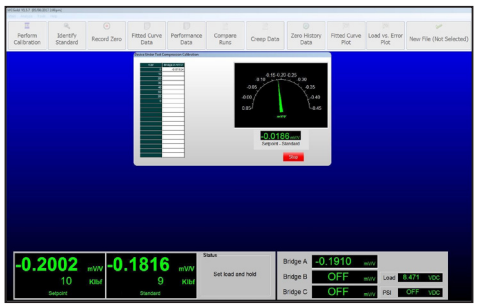
- 9840 Single Channel 16-bit Intelligent Indicator with 0.005% nonlinearity
- Internal mV/V calibration of Model 9840
- ICS-205 Gold Standard® E4 Machine Calibration Software
- Gold Standard® interconnect cable assembly
- CX-0440 ±4mV/V transfer standard
- SIS-103 one-day training at Interface

OPTIONS

- Laptop PC
- CX-0610 or other multi-step mV/V transfer standards
- Gold or Platinum Standard® Calibration Grade reference standard load cells

SOFTWARE

- Results from other runs can be compared, measured, and displayed with current run results



International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

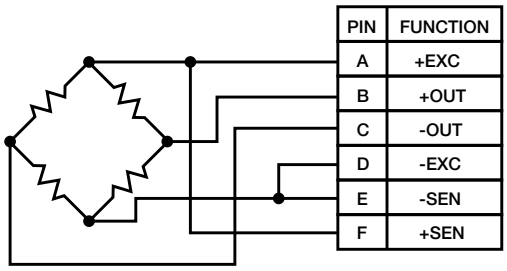
CX SERIES PRECISION mV/V TRANSFER STANDARD

FEATURES & BENEFITS

Models CX-0202, CX-0610, CX-0440, CS-0330, and CX-0220 are used for setting up and checking the Gold Standard® System Hardware. CX-0440, CX-0330, and CX-0220 are single-step mV/V transfer standards providing precision outputs of ±4, ±3, and ±2 mV/V respectively. CX-0610 is a multi-step unit that allows the user to go from -6 mV/V to +6 mV/V in 1 mV/V steps. Model CX-0404 is specifically designed for instrument substitution testing as per ASTM E74.

- Most accurate load cell simulator
- Special low thermal EMF construction
- Each unit individually calibrated, aged and calibrated
- Strong, rugged design
- Instrument substitution testing

WIRING DIAGRAM



PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	-SEN
F	+SEN

STANDARD CONFIGURATION



Model CX-0440 (Shown)



Model CX-0610 (Shown)

SPECIFICATIONS

Specification	CX-0404 Multi-Step Model	CX-0610 Multi-Step Model	CX-0440 Single-Step Model	CX-0330 Single-Step Model	CX-0220 Single-Step Model
Output at Zero Setting – µV	< 0.5	< 0.5	< 1.0	< 1.0	< 1.0
Output Settings – mV/V	0, ±0.04, ±0.08, ±0.2, ±0.4, ±0.8, ±1.2,±1.6, ±2.0, ±2.4, ±3.2, ±4.0, ±4.4	-6, -5, -4, -3, -2, -1, 0, +1, +2, +3, +4, +5, +6	-4, 0, +4	-3, 0, +3	-2, 0, +2
Output Accuracy at any Non-Zero Setting, Normalized to Actual Zero Setting Output:					
Relative to Nominal Value – %	0.01 to 0.05 of setting	0.01 of setting	0.01 of setting	0.01 of setting	0.01 of setting
Relative to Value Provided in Unit-Specific Calibration Chart – %	0.0015 of setting for one year	0.0015 of setting for one year	0.0025 of setting for one year	0.0025 of setting for one year	0.0025 of setting for one year
Temperature Coefficient of Normalized Output – ppm/°C	< 5 of setting	< 5 of setting	< 5 of setting	< 5 of setting	< 5 of setting
Input and Output Resistance:					
At Zero Setting – ohms %	350 ±0.005	350 ±0.005	350 ±0.005	350 ±0.005	350 ±0.005
At Output Setting (Value Decreases With Increasing Setting, Either Polarity) – ohms	347.5	347.5	348.5	348.5	348.5

IFVF INTERFACE FORCE VERIFICATION FRAME (U.S. & METRIC)

The Interface Force Verification Frame is a portable high force capacity frame and accessories designed to apply tension and compression forces to load cells with high resolution and accuracy. The system features a reaction frame, manual actuator, thread/adapter accessories, and optional force sensor(s) and instrumentation. The hardware can be used to verify operation of a device under test or calibrate relative to a second reference load cell.

FEATURES & BENEFITS

- Up to 5,000 lbf capacity. 0.006” per turn High Resolution Actuator
- Portable, Lightweight, and Accurate
- Quick Change Thread Adapters with Adjustment

SPECIFICATIONS

Actuation		Manual, High Resolution, 0.006 in (0.15 mm) per turn 1K via Hand Wheel and 2.5K & 5K via Radial Handles	
Force Capacity (Tension and Compression Capability)		IFVF-1K	± 1k lbf Hand Wheel Rotation
		IFVF-2.5K	± 2.5k lbf Handle Rotation
		IFVF-5K	± 5k lbf Handle Rotation
Dimensions	in	8.0 x 9.5 x 20.5	
	mm	203.2 x 241.3 x 520.7	
Weight	lbs	Under 20	
	kg	Under 9	

OPTIONS

- Custom Sizes, Fixtures, and Materials
- Calibration Grade Load Cells
- Digital Indicators
- Data Logging

STANDARD CONFIGURATION



MODELS IFVF-1K & IFVF-2.5K (Shown)



MODEL IFVF-5K (Shown)

ACCESSORIES



Thread Adapters
Female - Male
Male - Male
Female - Female
Common Adapter Sizes

U.S.	Metric
6-32, 10-32, 1/4-28, 3/8-24, 1/2-20, 5/8-18	M6, M8, M10, M12
Pre-configured kits with common sizes available	



Post Adapters and Platens
Post - Male
Post - Female
Compression Platens
Common Adapter Sizes

U.S.	Metric
6-32, 10-32, 1/4-28, 3/8-24, 1/2-20, 5/8-18	M6, M8, M10, M12
Pre-configured kits with common sizes available	

IFVF INTERFACE FORCE VERIFICATION FRAME (U.S. & METRIC)



± 1000 LBF MODEL IFVF-1K

Reference/Calibration Load Cells



1200 Standard Precision LowProfile® Load Cell



SSM or SSM2 Sealed S-Type Load Cell



WMC Sealed Stainless Steel Miniature Load Cell



SM S-Type Load Cell

Male/Female Thread Adapters



Female to Male



Female to Female



Male to Male

Indicator(s) or DAQ



9320 Battery Powered Portable Load Cell Indicator



9840 Calibration Grade Multi-Channel Load Cell Indicator



SI-USB Universal Serial Bus Dual Channel PC Interface Module

Post Adapters and Platen



Post to Male

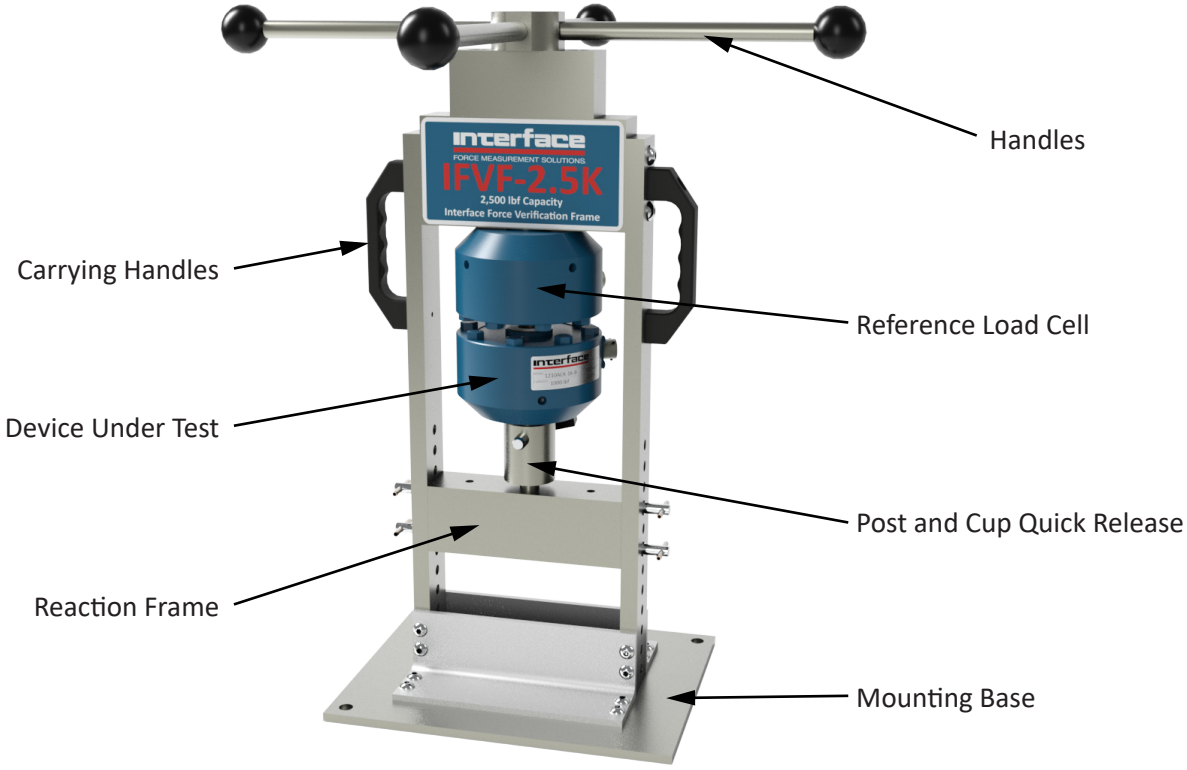


Post to Female



Compression Platen

IFVF INTERFACE FORCE VERIFICATION FRAME (U.S. & METRIC)



± 2500 LBF MODEL IFVF-2.5K

Reference/Calibration Load Cells



1200 Standard Precision LowProfile® Load Cell



SSM or SSM2 Sealed S-Type Load Cell



WMC Sealed Stainless Steel Miniature Load Cell



SM S-Type Load Cell

Male/Female Thread Adapters



Female to Male



Female to Female



Male to Male

Indicator(s) or DAQ



9320 Battery Powered Portable Load Cell Indicator



9840 Calibration Grade Multi-Channel Load Cell Indicator



SI-USB Universal Serial Bus Dual Channel PC Interface Module

Post Adapters and Platen



Post to Male

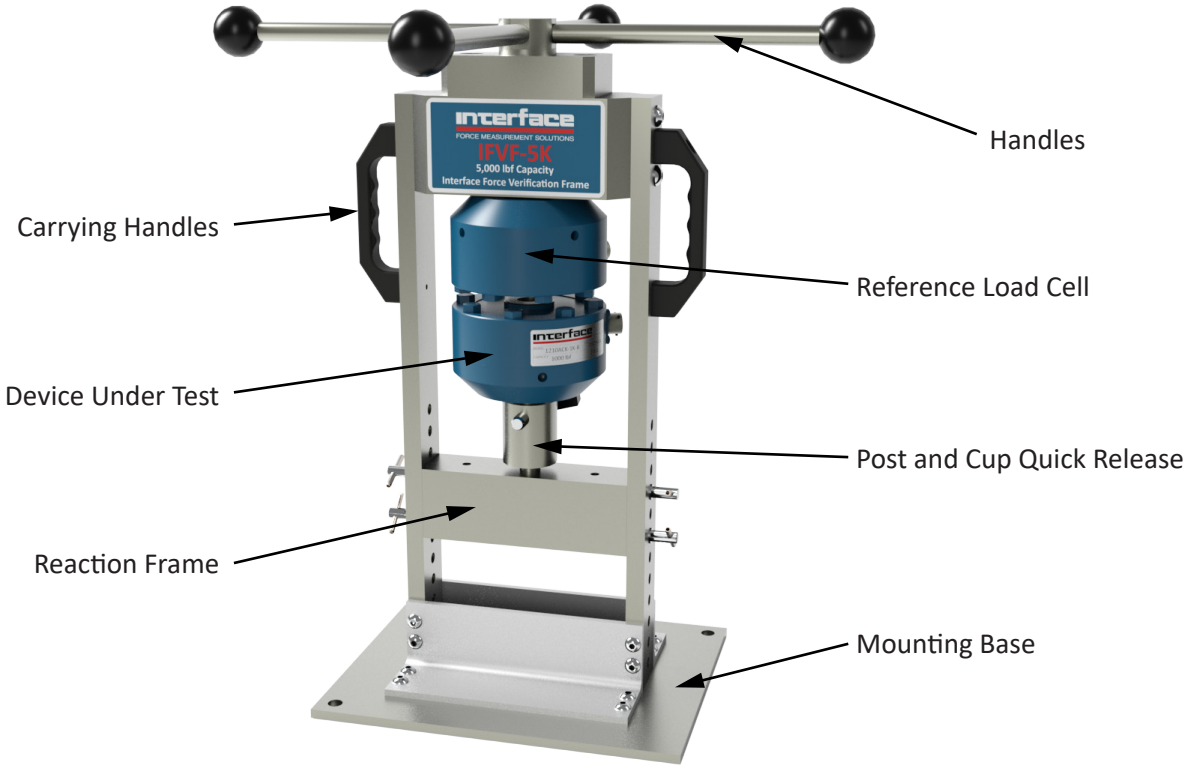


Post to Female



Compression Platen

IFVF INTERFACE FORCE VERIFICATION FRAME (U.S. & METRIC)



± 5000 LBF MODEL IFVF-5K

Reference/Calibration Load Cells



1200 Standard Precision LowProfile® Load Cell



SSM or SSM2 Sealed S-Type Load Cell



WMC Sealed Stainless Steel Miniature Load Cell



SM S-Type Load Cell

Male/Female Thread Adapters



Female to Male



Female to Female



Male to Male

Indicator(s) or DAQ



9320 Battery Powered Portable Load Cell Indicator



9840 Calibration Grade Multi-Channel Load Cell Indicator



SI-USB Universal Serial Bus Dual Channel PC Interface Module

Post Adapters and Platen



Post to Male



Post to Female

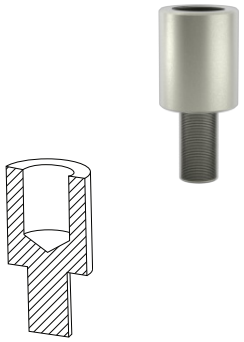


Compression Platen

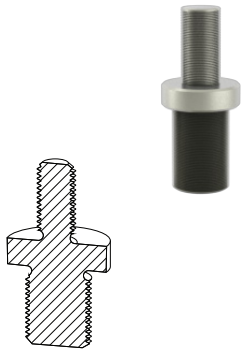
IFVF INTERFACE FORCE VERIFICATION FRAME (U.S. & METRIC)

ACCESSORIES

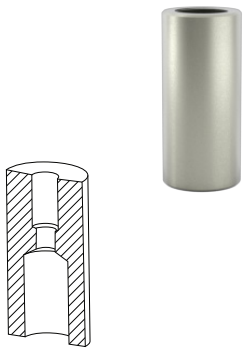
Female-Male	
Model Number	**Thread (F,M)**
FM-10	5/8-18, 6-32
FM-11	5/8-18, 10-32
FM-12	5/8-18, 1/4-28
FM-13	5/8-18, 3/8-24
FM-14	5/8-18, 1/2-20
FM-15	5/8-18, 5/8-18
FM-16	5/8-18, M4x0.7
FM-17	5/8-18, M5x0.8
FM-18	5/8-18, M6x1.0
FM-19	5/8-18, M8x1.25
FM-20	5/8-18, M10x1.5
FM-21	5/8-18, M12x1.75



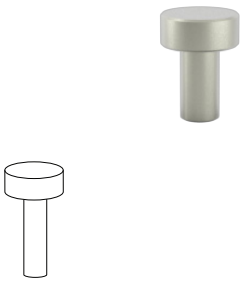
Male-Male	
Model Number	**Thread (M,M)**
MM-10	5/8-18, 6-32
MM-11	5/8-18, 10-32
MM-12	5/8-18, 1/4-28
MM-13	5/8-18, 3/8-24
MM-14	5/8-18, 1/2-20
MM-15	5/8-18, 5/8-18
MM-16	5/8-18, M4x0.7
MM-17	5/8-18, M5x0.8
MM-18	5/8-18, M6x1.0
MM-19	5/8-18, M8x1.25
MM-20	5/8-18, M10x1.5
MM-21	5/8-18, M12x1.75



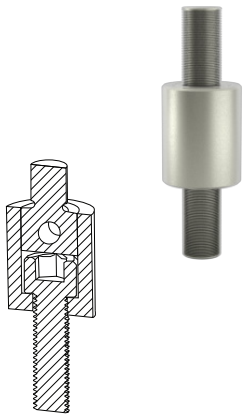
Female-Female	
Model Number	**Thread (F,F)**
FF-10	5/8-18, 6-32
FF-11	5/8-18, 10-32
FF-12	5/8-18, 1/4-28
FF-13	5/8-18, 3/8-24
FF-14	5/8-18, 1/2-20
FF-15	5/8-18, 5/8-18
FF-16	5/8-18, M4x0.7
FF-17	5/8-18, M5x0.8
FF-18	5/8-18, M6x1.0
FF-19	5/8-18, M8x1.25
FF-20	5/8-18, M10x1.5
FF-21	5/8-18, M12x1.75



Compression Platen	
Model Number	**Thread M, Diameter**
CP-10	5/8-18, 1.0"
CP-11	5/8-18, 1.5"
CP-12	5/8-18, 2.0"

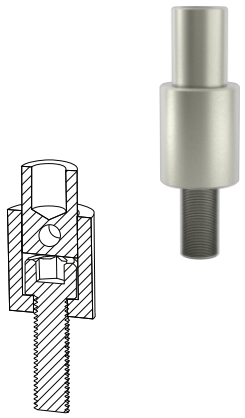


Post-Male	
Model Number*	**Thread (F,M)**
PM-10	6-32
PM-11	10-32
PM-12	1/4-28
PM-13	3/8-24
PM-14	1/2-20
PM-15	5/8-18
PM-16	M4x0.7
PM-17	M5x0.8
PM-18	M6x1.0
PM-19	M8x1.25
PM-20	M10x1.5
PM-21	M12x1.75



**** Cup and screw included with base system***

Post-Female	
Model Number*	**Thread (F,M)**
PF-10	6-32
PF-11	10-32
PF-12	1/4-28
PF-13	3/8-24
PF-14	1/2-20
PF-15	5/8-18
PF-16	M4x0.7
PF-17	M5x0.8
PF-18	M6x1.0
PF-19	M8x1.25
PF-20	M10x1.5
PF-21	M12x1.75



**** Cup and screw included with base system***

Notes:

Notes:

Accessories

Calibration Adapters.....475

Clevises.....476

Jam Nuts.....477

Load Buttons.....478

Mating Connectors.....479

Mounting Plates.....480

RCAL Resistors.....482

Rod End Bearings.....483

TEDS.....484

Thread Adapters.....485

Load Cell Simulator.....486

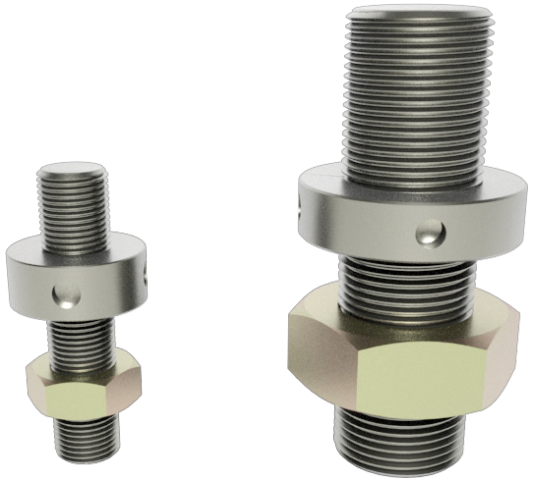
CALIBRATION ADAPTORS (U.S. & METRIC)

FEATURES & BENEFITS

- Improves accuracy
- Spherical end for compression loading
- Metric sizes available

Contact Us today to discuss the right Calibration Adaptor for your application.

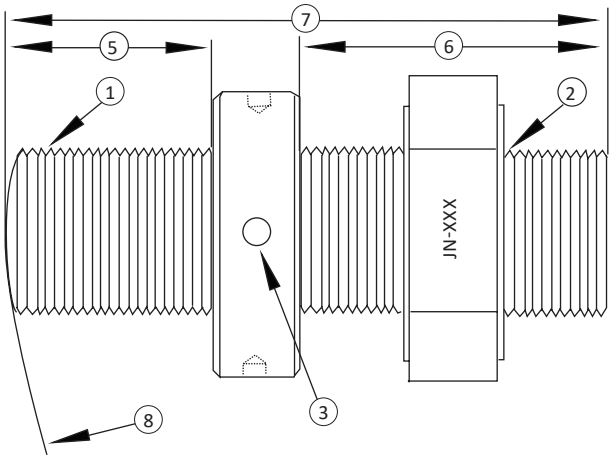
STANDARD CONFIGURATION

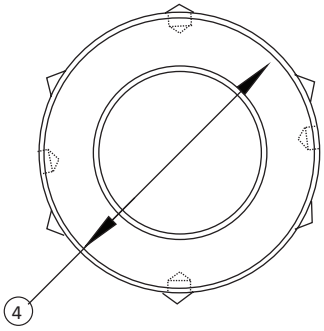


Models CA-102 w/JN-105 & CA-104 w/JN-107 (Shown)

SPECIFICATIONS

MECHANICAL	
Material	Heat treated steel





DIMENSIONS

Model	Jam nut included	Size 1 to 2	Application	3		4		5		6		7		8	
				in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
CA-101	JN-103	⅝-18 to ⅝-18	1X10 to 10K	0.25	6.35	1.25	31.8	0.75	19.1	1.5625	39.688	2.8125	71.438	SR 6	SR 152
CA-102	JN-105	1 ¼-12 to 1 ¼-12	1X20 to 50K	0.25	6.35	2	51	1.5	38	2.1875	55.563	4.1875	106.363	SR 6	SR 152
CA-103	JN-106	1 ¾-12 to 1 ¾-12	1X32 to 100K	0.25	6.35	3	76	2	51	3.125	79.38	6	152	SR 12	SR 305
CA-105	JN-106	1 ¾-12 to 2 ¾-8	1X32 to 100K	0.25	6.35	3.5	89	2	51	4.875	123.83	7.375	187.33	SR 12	SR 305
CA-104	JN-107	2 ¾-8 to 2 ¾-8	1X40 to 200K	0.3125	7.938	3.5	89	2.5	64	4.875	123.83	8.125	206.38	SR 12	SR 305
CA-201	JN-203	M16X2 to M16X2	1X10 to 50kN	0.25	6.35	1.25	31.8	0.75	19.1	1.5625	39.688	2.8125	71.438	SR 6	SR 152
CA-202	JN-205	M33X2 to M33X2	1X20 to 250kN	0.25	6.35	2	51	1.5	38	2.1875	55.563	4.1875	106.363	SR 6	SR 152
CA-203	JN-206	M42X2 to M42X2	1X32 to 450kN	0.3125	7.938	2.9375	74.613	1.8125	46.038	3.1875	80.963	5.75	146.1	SR 12	SR 305
CA-204	JN-207	M72X2 to M72X2	1X40 to 900kN	0.3125	7.938	4.25	108.0	2.75	70.0	4.75	120.7	8.25	209.6	SR 12	SR 305

Note: X refers to Low Profile™ Load Cell model numbers. For example, 1X10 could be 1010, 1110, or 1210.

CLEVISES (U.S. & METRIC)

FEATURES & BENEFITS

- Precision machined
- Commonly used with Rod End Bearings
- Male threads

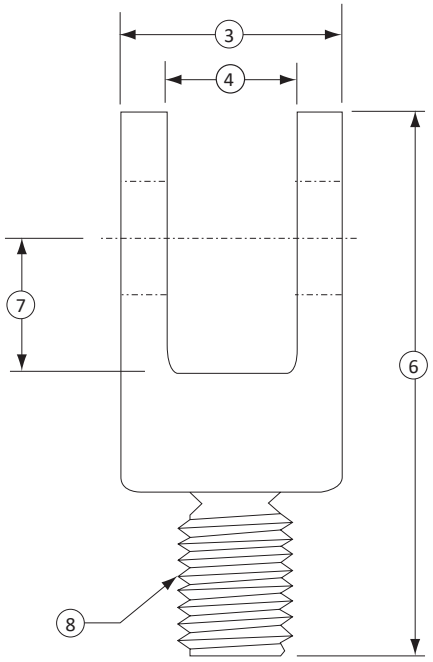
SPECIFICATIONS

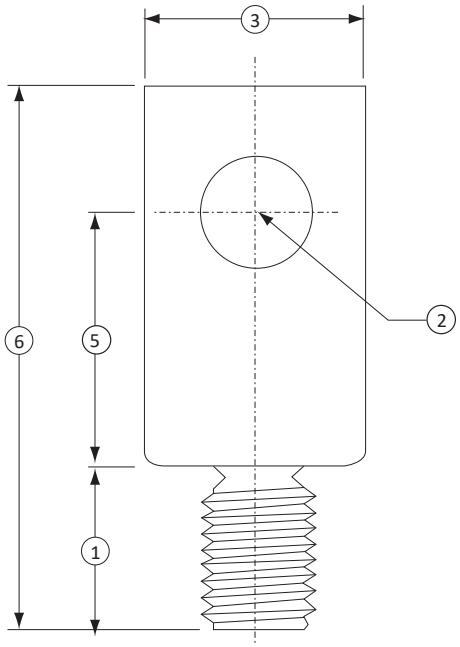
MECHANICAL		
Model	CLV-104 CLV-104M CLV-105	CLV-101 CLV-101M CLV-102 CLV-106
Material	Aluminum	Heat treated steel

STANDARD CONFIGURATION



Models CLV-104 & CLV-102 (Shown)





DIMENSIONS

See Drawing	CLV-104	CLV-104M	CLV-105		CLV-106		CLV-101	CLV-101M	CLV-102	
	SM-10 - 250, SSM-50 - 250		SM-500, 1000 SSM-500 - 1000		SSM-2000, 3000		1110 & 1210-300 - 10K, SSM-5K		1120 & 1220-25K, 50K	
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	5/16	7.9	½	12.7	9/16	14.3	⅞	22.2	1 ⅜	34.9
(2)	0.251 ±0.001	6.38 ±0.025	0.501 ±0.001	12.73 ±0.025	0.501 ±0.001	12.73 ±0.025	0.626 ±0.001	15.90 ±0.025	1.001 ±0.001	25.43 ±0.025
(3)	0.75	19.1	1.5	38.1	1	25.4	1.25	31	2.5	64
(4)	0.377 ±0.001	9.58 ±0.025	0.627 ±0.001	15.93 ±0.025	0.627 ±0.001	15.93 ±0.025	0.752 ±0.002	19.10 ±0.05	1.380 ±0.002	35.05 ±0.05
(5)	0.75	19.1	1.5	38.1	1.5	38.1	1.5	38.1	2.875	73.03
(6)	1.4375	36.513	2.75	69.9	2.4375	61.913	3.125	79.38	5.75	146.1
(7)	0.4375	11.113	0.75	19.1	0.75	19.1	0.875	22.23	1.625	41.28
(8)	0.25-28 UNF-2A	M6 x 1.0-6g	0.50-20 UNF-2A		0.50-20 UNF-2A		0.625-18 UNF-3A	M16 x 2-4g6g	1-¼ - 12 UNF-3A	

JAM NUTS (U.S. & METRIC)

FEATURES & BENEFITS

- Used with REB's, clevises & calibration adapters
- Flat, parallel surfaces
- Standard thread sizes

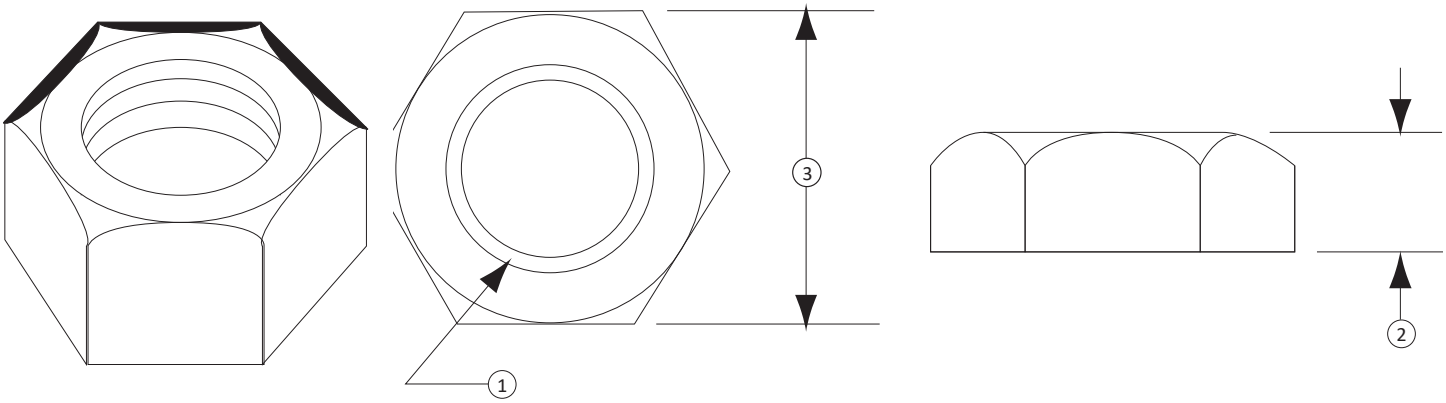
STANDARD CONFIGURATION



Models JN-101, JN-105, & JN-107 (Shown)

SPECIFICATIONS

MECHANICAL	
Material	Heat treated steel



DIMENSIONS

See Drawing	U.S.	Metric	U.S.	Metric	U.S.	Metric	U.S.	Metric	U.S.	Metric	U.S.	Metric	U.S.	Metric
	Model													
	JN-101	JN-201	JN-102	JN-202	JN-103	JN-203	JN-104	JN-204	JN-105	JN-205	JN-106	JN-206	JN-107	JN-207
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	1/4-28	M6X1	1/2-20	M12X1.75	5/8-18	M16X2	3/4-16	M27X2	1 1/4-12	M33X2	1 3/4-12	M42X2	2 3/4-8	M72X2
(2)	0.219	5.0	0.438	10.0	0.547	13.0	0.641	18.8	0.880	25.4	1.250	31.8	1.900	48.3
(3)	0.438	10.0	0.750	19.0	0.938	24.0	1.125	47.6	1.880	57.0	2.750	70.0	4.250	110.0

LOAD BUTTONS (U.S. & MERTIC)

FEATURES & BENEFITS

- Converts universal cell to compression only
- Spherical loading surface
- For Low Profile, "S" type, and miniature beam

STANDARD CONFIGURATION



Model LB-104 (Shown)

SPECIFICATIONS

MECHANICAL	
Material	Heat treated steel

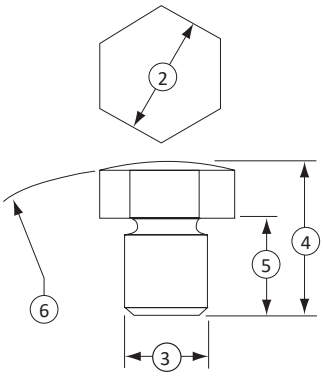


Figure 1

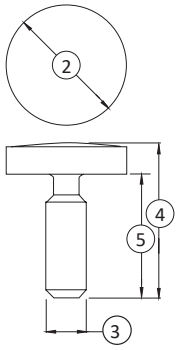


Figure 2

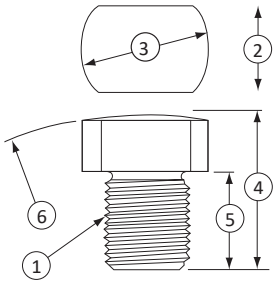


Figure 3

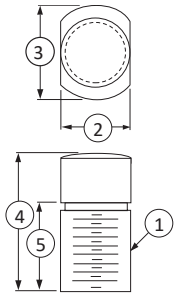


Figure 4

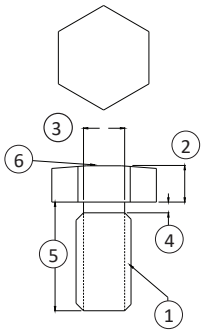


Figure 5

DIMENSIONS

Model	Application	1	2		3		4		5		6		Figure
		Thread	in	mm	in	mm	in	mm	in	mm	in	mm	
LB-106	SM-10-250 & SSM-50-250	¼-28	7/16	11.11	½	12.70	⅝	15.88	½	12.70	SR 2	SR 51	3
LB-109	SM-500 & 1000 SSM-500-3000	½-20	15/16	23.81	1 1/16	26.99	1 5/16	33.34	1	25	SR 4	SR 102	3
LB-110	SSM-5000	⅝-18	15/16	23.81	1 1/16	26.99	1 5/16	33.34	1	25	SR 4	SR 102	3
LB-101	1110 & 1210-300 - 10K	⅝-18	15/16	23.81	1 1/16	26.99	1 9/32	32.54	1	25	SR 4	SR 102	3
LB-102	1120 & 1220-25K, 50K	1 ¼-12	1 ½	38.10	1 ¾	44.45	1 9/16	39.69	11/16	17.46	SR 6	SR 152	3
LB-103	1132 & 1232-100K	1 ¾-12	2 ⅛	53.98	2 ½	63.50	3 ¾	95.25	2 ⅛	53.98	SR 12	SR 305	3
LB-104	1140 & 1240-200K	2 ¾-8	3 ½	88.90	4	102	5	127	3 ⅛	79.38	SR 12	SR 305	3
LB-111	SSB-500, 1000	Ø0.395 ± 0.001	¾	19.05	Ø 0.395	Ø 10.03	¾	19.05	½	12.70	SR 4	SR 102	1
LB-114	MB-All & SSB-50 - 250	Ø0.169 ± 0.001	0.50	12.7	Ø 0.169	Ø 4.29	0.63	16.0	0.50	12.7	SR 2	SR 51	2
LB-101M	1110 & 1210-5kN to 50kN	M16x2	15/16	23.81	1 1/16	26.99	1 9/32	32.54	1	25	SR 4	SR 102	3
LB-102M	1120 & 1220-100kN, 250kN	M32x2	1 ½	38.10	1 ¾	44.45	1 9/16	39.69	11/16	17.46	SR 6	SR 152	3
LB-103M	1132 & 1232-450kN	M42x2	2 ⅛	53.98	2 ½	63.50	3 ¾	95.25	2 ⅛	53.98	SR 12	SR 305	3
LB-104M	1140 & 1240-900kN	M72x2	3 ½	88.90	4	102	5	127	3 ⅛	79.38	SR 12	SR 305	3
LB-105M	SM-50-1K & SSM-200-1K	M6x1	0.16	4.06	Ø 0.18	Ø 4.57	0.05	1.27	0.47	11.93	SR 2	SR 51	5

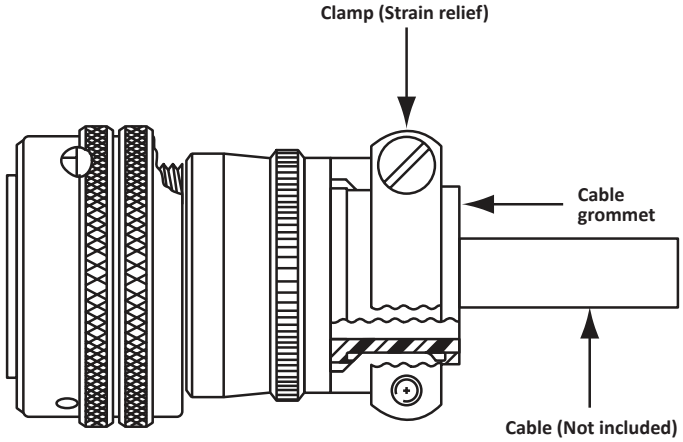
A load button may be installed in an INTERFACE universal load cell if it is used as a compression cell with the load applied by a plate or other flat surface.

For compression applications only, an INTERFACE compression load cell should usually be specified. Compression load cells are usually smaller, less expensive and have an integral load button.

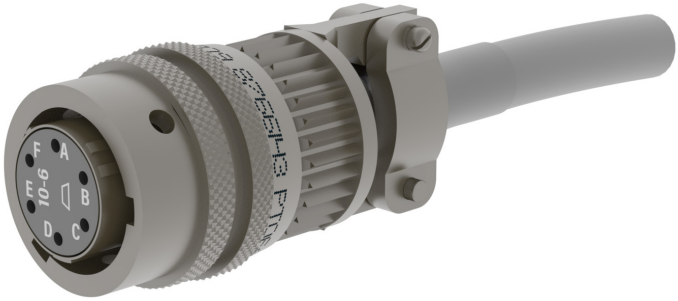
MATING CONNECTORS (U.S. & METRIC)

FEATURES & BENEFITS

- Mating connector & cable
- Dressed pigtails
- Interconnects between load cell & instruments



STANDARD CONFIGURATION



Model PT06A-10-6S (SR) (Shown)

SPECIFICATIONS

Transducer		Mating Connector	
Model	**Receptacle Type**	**Plug Type**	**Order Number**
1000, 1100, 1200 Standard	PC04E-10-6P	PC06W-10-6S	MC-001
1000, 1100, 1200 Bayonet	PT02E-10-6P	PT06A-10-6S (SR)	CN-207
1216	PT02E-12-8P	PT06A-12-8S (SR)	MC-002
1500	PT02E-10-6P	PT06A-10-6S (SR)	CN-207
1600, 1800	PT02E-12-8P	PT06A-12-8S (SR)	MC-002
2420, 2430	PTW1H-10-6P	PT06A-10-6S (SR)	CN-207
2440, 2450	MS3102E-14S-6P	MS3106A-14S-6S	CN-208
2160, 2161	MS3102A-14S-5P	MS3106A-14S-5S	CN-214
5200	PC04E-10-6P	PC06W-10-6S	MC-001
WMC-20K, 30K, 50K	PT02E-10-6P	PT06A-10-6S (SR)	CN-207
SSM	PC04E-10-6P	PC06W-10-6S	MC-001

MOUNTING PLATES FOR LOW PROFILE™ LOAD CELLS (U.S. & METRIC)

FEATURES & BENEFITS

- Distributes the load over the foundation of the supporting structure
- Provides a prepared surface for the load cell
- Eliminates the requirement for expansion assemblies in most installations

Mounting Plates for Low Profile™ Load Cells

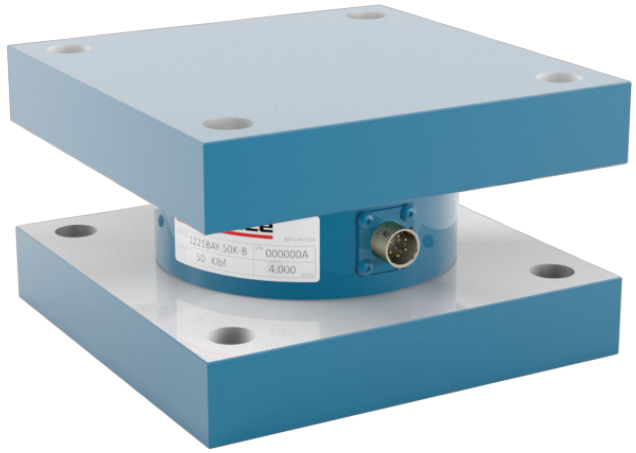
The installation of a compression load cell under a weigh bridge, tank, or other structure normally requires that mounting plates be used. The bottom plate, ground flat to 0.0002 T.I.R. to mate with the load cell and fabricated of mild steel, distributes the load over the foundation or supporting structure and provides a prepared surface for the load cell.

The top plate distributes the load to the weighing structure and provides a hard (R_c45) surface for the load button. The top plate will move on the button due to thermal expansion, load shifting, wind loading, and other side loads. The high side load capacity of the Interface load cell eliminates the requirement for expansion assemblies in most installations. Mounting plates are suitable for compression loads only; they will not properly support a universal load cell used in tension.

SPECIFICATIONS

MECHANICAL		
Model	TP-101, BP-101 TP-101, BP-108 TP-102, BP-102 TP-103, BP-103 TP-104, BP-104	TP-301, BP-308 TP-302, BP-302 TP-303, BP-303
Material	Heat Treated steel	Stainless steel

STANDARD CONFIGURATION



Models TP-102 & BP-102 with 1221BAY-50K (Shown)



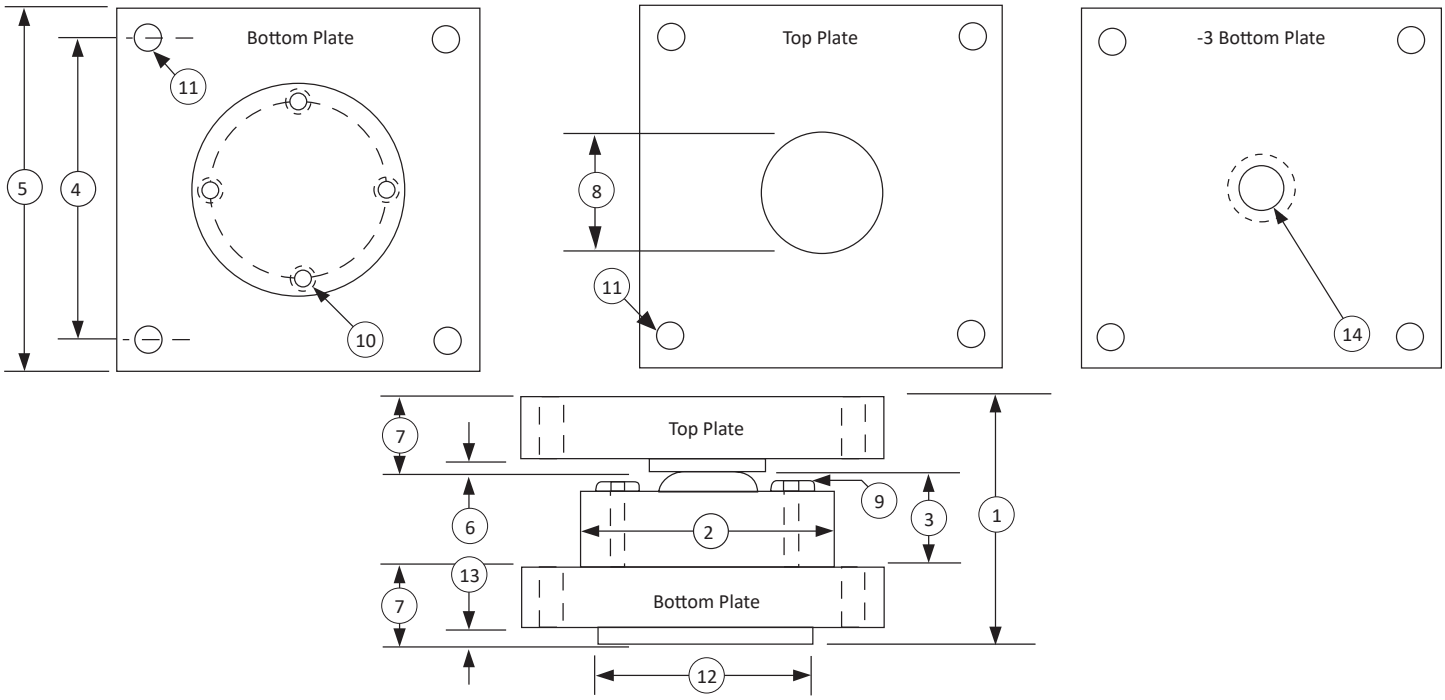
Models BP-102-3 with 1221BAY-50K-B (Shown)

BASE PLATE OPTIONS

Add the dash number after the basic part number of bottom plate to specify exact configuration of the plate and type of mounting screws supplied in the kit.			
Dash #	**Description**	**Pad**	**Usage**
-3	Single threaded stud in center	No	Load cell with base installed
-11	Tapped holes and hex head cap screws	Yes	Uncounterbored load cell
-12	Tapped holes and socket head cap screws	Yes	Counterbored load cell
-21	Tapped holes and hex head cap screws	No	Uncounterbored load cell
-22	Tapped holes and socket head cap screws	No	Counterbored load cell

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

MOUNTING PLATES FOR LOW PROFILE™ LOAD CELLS (U.S. & METRIC)



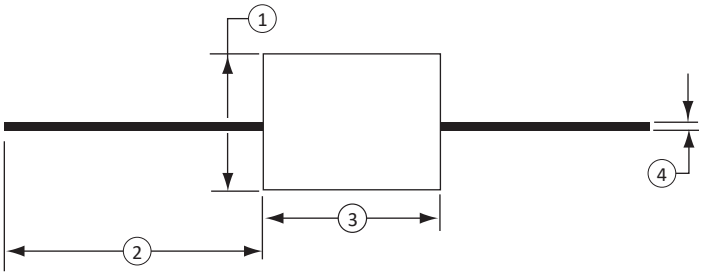
DIMENSIONS

MODEL	TP-101, BP-101		TP-101, BP-108		TP-102, BP-102		TP-103, BP-103		TP-104, BP-104		TP-301, BP-308		TP-302, BP-302		TP-303, BP-303	
L/C Range	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K	5, 10	5K, 10K	25, 50	25K, 50K	125, 250	100K	450	200K	900	5K, 10K	25, 50	25K, 50K	125, 250	100K	450
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	3.62	91.9	3.62	91.9	4.25	108.0	5.25	113.4	8.25	209.6	3.49	88.6	4.25	108.0	5.25	133.4
(2)	4.12	104.6	4.12	104.6	4.75	120.7	7.50	190.5	8.25	209.6	4.12	104.6	4.75	120.7	7.50	190.5
(3)	1.37	34.8	1.37	34.8	1.75	44.5	2.25	57.2	3.25	82.6	1.37	34.8	1.75	44.5	2.25	57.2
(4)	5.0	127	5.0	127	5.5	140	6.5	165	8.0	203	5.0	127	5.5	140	6.5	165
(5)	6	152	6	152	7	178	8	203	10	254	6	152	7	178	8	203
(6)	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.37	9.4	0.12	3.0	0.25	6.4	0.25	6.4
(7)	1.12	28.4	1.12	28.4	1.25	31.8	1.50	38.1	2.50	63.5	1.12	28.4	1.25	31.8	1.50	38.1
(8)	2.00	50.8	2.00	50.8	2.25	57.2	2.75	69.9	4.00	101.6	1.9	48	1.9	48	1.9	48
(9)	¼-20 to 1 ½		¼-20 X 1-½		⁵⁄₁₆-18 X 2		⁷⁄₁₆-20 X 2 -½		⅜-11 X 3 ¾		¼-20 X 1-½		⁵⁄₁₆-18 X 2		⁷⁄₁₆-20 X 2-½	
(10)	¼-20		¼-20		⁵⁄₁₆-18		⁷⁄₁₆-20		⅜-11		¼-20		⁵⁄₁₆-18		⁷⁄₁₆-20	
	8 Places		8 Places		4 Places		12 Places		12 Places		8 Places		4 Places		12 Places	
	3.50	88.9	3.50	88.9	4.00	101.6	6.25	158.8	6.75	171.5	3.50	88.9	4.00	101.6	6.25	158.8
(11)	↧Ø0.56	↧Ø14.2	↧Ø0.56	↧Ø14.2	↧Ø0.69	↧Ø17.5	↧Ø0.69	↧Ø17.5	↧Ø0.69	↧Ø17.5	↧Ø0.56	↧Ø14.2	↧Ø0.69	↧Ø17.5	↧Ø0.69	↧Ø17.5
(12)	3.00	76.2	3.00	76.2	3.50	88.9	4.00	101.6	8.25	209.6	3.00	76.2	3.50	88.9	4.00	101.6
(13)	0.03 TYP	0.8 TYP	0.03 TYP	0.8 TYP	0.03 TYP	0.8 TYP	0.03 TYP	0.8 TYP	0.03 TYP	0.8 TYP	0.03 TYP	0.8 TYP	0.03 TYP	0.8 TYP	0.03 TYP	0.8 TYP
(14)	⅝-18 UNF-3B		⅝-18 UNF-3B		½-20 UNF-3B		1 ¾-12 UNF-3B		¾-16 UNF-3B		⅝-18 UNF-3B		½-20 UNF-3B		1 ¾-12 UNF-3B	
	0.87	22.1	0.87	22.1	0.88	22.4	1.75	44.5	1.50	38.1	0.87	22.1	0.88	22.4	1.75	44.5

RCAL RESISTORS (U.S. & METRIC)

FEATURES & BENEFITS

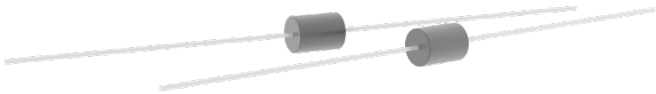
- Precision wire-wound
- 5 ppm/°C, 0.01%
- Used for shunt calibration



DIMENSIONS

1		2		3		4	
in	mm	in	mm	in	mm	in	mm
Ø 0.25	Ø 6.35	2 TYP	50.8	0.35	8.89	Ø 0.03 TYP	Ø 0.762 TYP

STANDARD CONFIGURATION



Model RS-100-30K (Shown)

SPECIFICATIONS

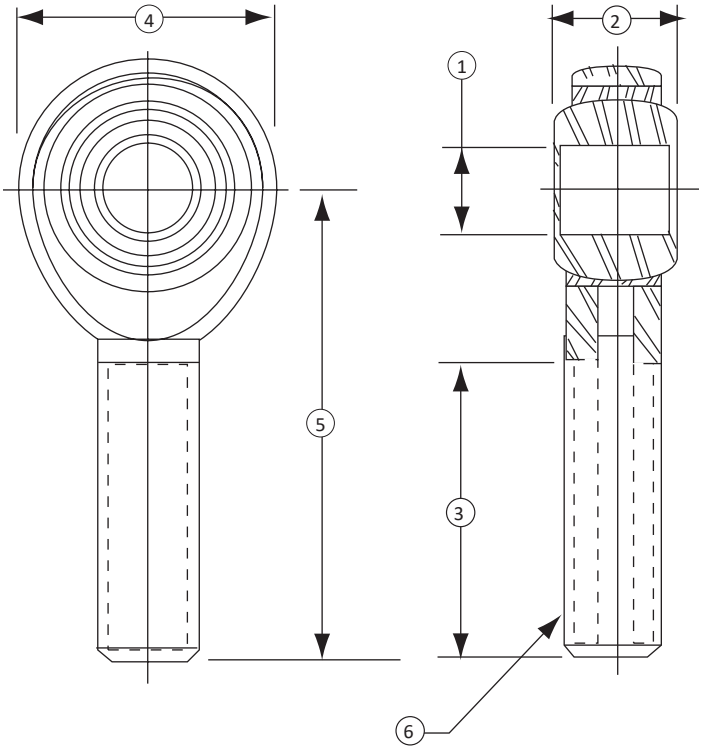
Model	Resistance (Kohm)	Application
RS-100-30K	30 ±0.01%	4mV/V Load Cells
RS-100-40K	40 ±0.01%	3mV/V Load Cells
RS-100-60K	60 ±0.01%	2mV/V Load Cells
RS-100-120K	120 ±0.01%	1mV/V Load Cells

U.S. dimensions and capacities are provided for conversion only. Standard product has metric capacities and dimensions. U.S. capacities available upon special request and at an additional cost.

ROD END BEARINGS (U.S. & METRIC)

FEATURES & BENEFITS

- For tension applications
- Reduces alignment error
- Metric sizes available



STANDARD CONFIGURATION



Model REB-104 w/JN-101 & REB-102 w/JN-105 (Shown)

SPECIFICATIONS

MECHANICAL	
Material	Heat Treated Steel

DIMENSIONS

Model	Application	Jam Nut Included	1		2		3		4		5		6	
			in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
REB-104	SM-10 - 250, SSM-5O - 250	JN-101	1/4	6.3500	3/8	9.5250	1	25.400	3/4	19.050	1 9/16	39.6875	1/4-28	
REB-106	SM-500, 1000, SSM-500, 1000 SSM-2000, & 3000	JN-102	1/2	12.700	5/8	15.875	1 1/2	38.1000	1 5/16	33.3375	2 7/16	61.9125	1/2-20	
REB-101	1110 & 1210-300 - 10K, SSM-5K	JN-103	5/8	15.875	3/4	19.050	1 5/8	41.2750	1 1/2	38.1000	2 5/8	66.6750	5/8-18	
REB-102	1120 & 1220-25K, 50K	JN-105	1	25.400	1 3/8	34.925	2 11/32	59.5313	2 3/4	69.8500	4 1/8	104.775	1 1/4-12	

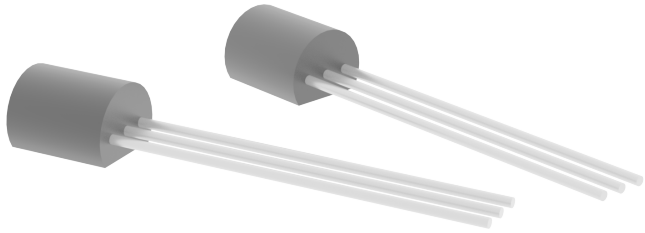
NOTE: When connecting a ROD END BEARING directly to a LOAD CELL, use of the JAM NUT is recommended.

TRANSDUCER ELECTRONIC DATA SHEET (TEDS)

FEATURES & BENEFITS

- Sensor with electronic identification inside
- Meets IEEE 1451.4 standard for smart transducer interface
- Plug & play ready
- Contains sensor information and calibration data
- Available on new or existing sensors
- Eliminates potential for data entry error
- Simplifies & reduces setup
- Makes swapping of load cells easy
- Increases safety by making certain that the system has the correct sensors
- Can be used to identify location of sensors
- Improves inventory control of your sensors
- Sensors can be changed out without jeopardizing integrity of system

STANDARD CONFIGURATION



TEDS CHIP (Shown)

IEEE 1451.4 specifies a table of identifying parameters that are stored in the TEDS (Transducer Electronic Data Sheet) template. This template is on an EEPROM inside the load cell or load cell cable that can be accessed by external electronics.

PLUG & PLAY READY INSTRUMENTS



MODEL 9840 - 100 - 1 - T (Shown)

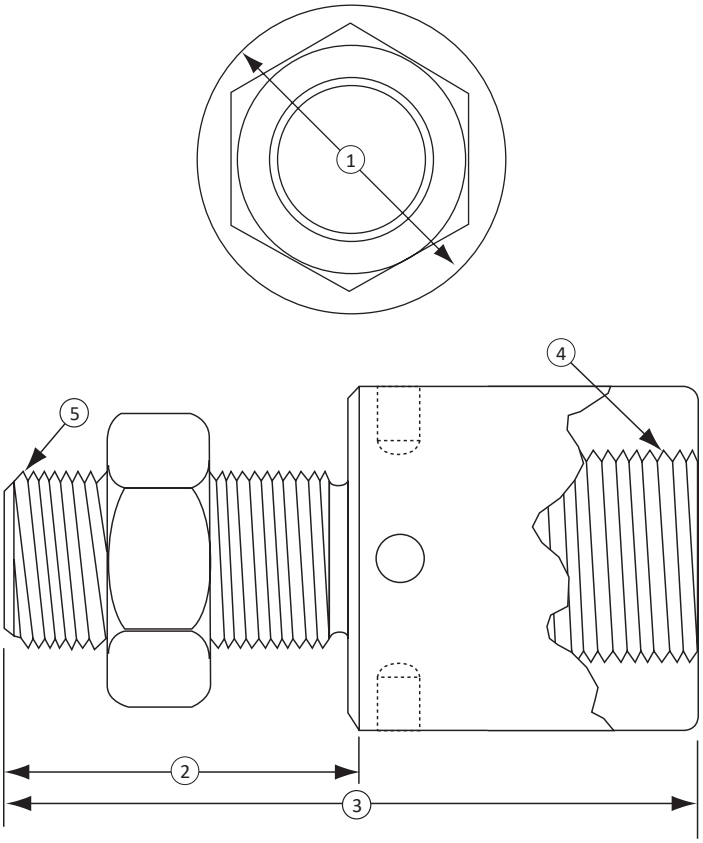


MODEL 9320 - 1 (Shown)

THREAD ADAPTORS (U.S. & METRIC)

FEATURES & BENEFITS

- Adapts male to female
- Common Interface thread sizes
- Adapts one thread size to another



STANDARD CONFIGURATION



Model TA-102 & THD-105 w/JN-107 (Shown)

SPECIFICATIONS

MECHANICAL	
Material	Heat Treated Steel

DIMENSIONS

Model	Jam Nut Included	Application	1		2		3		4	5
			in	mm	in	mm	in	mm	Thread	Male to Female
TA-102	N/A	SM & SSM TO 250	0.75	19.1	0.38	9.7	1.50	38.1	1/2-20x0.63	1/4-28 to 1/2-20
TA-103	N/A	SM & SSM TO 250	0.75	19.1	0.38	9.7	1.50	38.1	3/8-24x0.50	1/4-28 to 3/8-24
TA-106	N/A	SM & SSM TO 250	1.19	30.2	0.44	11.2	1.56	39.6	5/8-18x0.63	1/4-28 to 5/8-18
THD-101	JN-103	LOW PROFILES TO 10K	1.25	31.8	1.75	44.5	3.19	81.0	1/2-20x0.50	5/8-18 to 1/2-20
THD-112	JN-103	LOW PROFILES TO 10K	1.62	41.1	1.75	44.5	4.56	115.8	1-14x1.25	5/8-18 to 1-14
THD-153	JN-105	LOW PROFILES 25K TO 50K	2.00	50.8	2.50	63.5	4.50	114.3	1-14x1.0	1 1/4-12 to 1-14
THD-103	JN-105	LOW PROFILES 25K TO 50K	2.50	63.5	2.34	59.4	4.42	112.3	1 1/2-12x1.40	1 1/4-12 to 1 1/2-12
THD-163	N/A	LOW PROFILES 25K TO 50K	2.50	63.5	1.50	38.1	3.58	90.9	1 1/2-12x1.40	1 1/4-12 to 1 1/2-12
THD-143	JN-105	LOW PROFILES 25K TO 50K	3.38	85.9	2.34	59.4	5.89	149.6	2-12x2.62	1 1/4-12 to 2-12
THD-144	N/A	LOW PROFILES 25K TO 50K	3.38	85.9	1.50	38.1	5.05	128.3	2-12x2.62	1 1/4-12 to 2-12
THD-114	JN-106	LOW PROFILES TO 100K	4.00	101.6	3.75	95.3	9.62	244.3	3-8x4.50	1 3/4-12 to 3-8
THD-115	N/A	LOW PROFILES TO 100K	4.00	101.6	1.75	44.5	7.62	193.5	3-8x4.50	1 3/4-12 to 3-8
THD-105	JN-107	LOW PROFILES TO 200K	5.50	139.7	5.25	133.4	13.0	330	4-8x6.00	2 3/4-8 to 4-8
THD-106	N/A	LOW PROFILES TO 200K	5.50	139.7	2.75	69.9	10.5	267	4-8x6.00	2 3/4-8 to 4-8

EVALUATOR 3 LOAD CELL SIMULATOR

FEATURES & BENEFITS

- ABS plastic case, weighs less than 1 lb (0.45 kg)
- Fixed rotary switch, -0.5 mV/V to 4.5 mV/V in 9 steps of 0.5mV/V per step
- Used in testing, troubleshooting mV/V instrumentation

SPECIFICATIONS

ELECTRICAL		
Range – mV/V		-0.5 to 4.5, fixed
Impedance – ohms		350
PERFORMANCE		
Nonlinearity – %		Less than 0.02
ENVIRONMENTAL		
Temperature Coefficient	°C	±5 ppm
	°F	±41 ppm
MECHANICAL		
Dimensions - L x W x H	mm	114.3 x 88.9 x 31.8
	in	4.5 x 3.5 x 1.25
Connectors		Binding posts-suitable for banana plug or 14 gauge wire

OPTIONS

- Evaluator 3 Simulator Banana Plug Cable Set

STANDARD CONFIGURATION



MODEL EVALUATOR 3 (Shown)

International System of Units (SI) dimensions and capacities are provided for conversion only. Standard products have U.S. capacities and dimensions. SI capacities available upon special request and at an additional cost.

Note: This product is intended for troubleshooting. For calibrating instruments, Interface recommends Model CX Traceable mV/V Transfer Standard Product.

Notes:

Appendix

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TRANSDUCER INTERCONNECT CABLE ASSEMBLIES

FOR CONNECTING TRANSDUCERS WITH RECEPTACLES TO INSTRUMENTATION

INTERCONNECT CABLE ASSEMBLY

TRANSDUCER	TRANSDUCER END	INSTRUMENT END				
		UNIVERSAL	9820, 9300, SGA, DCA, DMA	9830, 9840	9850	9320
Model	Plug Type	Pigtail	Screw Term	DE-9P	DE-9P	Binder
1000, 1100, 1200 Standard	PC06A-10-6S(SR)	CT-101-10	CT-101-10	CT-173-10	CT-516-10	CT-236-10
1000, 1100, 1200 Bayonet	PC06A-10-6S(SR)	CT-152-10	CT-152-10	CT-175-10	CT-249-10	CT-239-10
1216	PT06A-12-8S(SR)	CT-122-10	CT-122-10	CT-246-10	*	*
1500	PC06A-10-6S(SR)	CT-152-10	CT-152-10	CT-175-10	CT-249-10	CT-239-10
1600, 1800	PT06A-12-8S(SR)	CT-153-10	CT-153-10	CT-177-10	*	CT-237-10
2420, 2430	PC06A-10-6S(SR)	CT-179-10	CT-179-10	CT-254-10	CT-251-10	CT-253-10
2440, 2450	MS3106A-14S-6S	CT-204-10	CT-204-10	CT-260-10	*	CT-252-10
2160, 2161	MS3106A-14S-5S	CT-259-10	CT-259-10	CT-191-10	*	CT-255-10
5200	PC06A-10-6S(SR)	CT-101-10	CT-101-10	CT-173-10	*	CT-236-10
WMC-20K, 30K, 50K	PC06A-10-6S(SR)	CT-179-10	CT-179-10	CT-254-10	*	CT-253-10
SSM	PC06A-10-6S(SR)	CT-101-10	CT-101-10	CT-173-10	*	CT-236-10

CABLE SPECIFICATION FOR ABOVE ASSEMBLIES

NOTE: "CT" prefix on cable assembly order numbers is for the most common polarity which is tension upscale. For compression upscale substitute "CC".

"-10" suffix on cable assembly part number is the most common cable length of 10 ft. Other lengths may be ordered by substituting the desired length in feet.

EXAMPLE: For a 20 ft cable to connect to a model 1221HL-50K transducer and have the convention of the green pigtail as + signal for a compression load, order CC-101-20.

Call factory for more information.

INTERCONNECT CABLE ASSEMBLY

INSTRUMENT		EXTRA MATING PLUG		Order number for extra plug plus installation on end of transducer integral cable	
Model	Receptacle	Type	Order Number	Tension Upscale	Compression Upscale
9320	Binder	Binder	CN-219	MIC-9320-T	MIC-9320-C
9830	DE-9S	DE-9P	CN-212	MIC-9830-T	MIC-9830-C
9840	DE-9S	DE-9P	CN-212	MIC-9840-T	MIC-9840-C
9850	DE-9S	DE-9P	CN-212	MIC-9850-T	MIC-9850-C
500	DE-9S	DE-9P	CN-212	MIC-500-T	MIC-500-C

Instruments not listed use screw terminal connections.

ELECTRICAL INFORMATION

Load Cell Series	Cell Type	Upscale (4) Mode	Integral Cable Wiring	Std. Cable Type	Cable Length, Feet (5)	Connector Wiring	Mating Connector (2)
1000	Univ.	Tension	W1	A	10	C1	PC06W-10-6S(SR)
1100	Univ.	Tension	W1	A	10	C1	PC06W-10-6S(SR)
1100	Comp.	Tension	W1	A	10	C1	PC06W-10-6S(SR)
1200	Univ.	Tension	W1	A	10	C1	PC06W-10-6S(SR)
1200	Comp.	Tension	W1	A	10	C1	PC06W-10-6S(SR)
1500	Univ.	Tension	-	-	-	C1	PT06A-10-6S(SR)
1600	Univ.	Tension	-	-	-	C2	PT06A-12-8S(SR)
1600	Comp.	Tension	-	-	-	C2	PT06A-12-8S(SR)
1700	Univ.	Tension	-	-	-	C6	PT06A-10-6S(SR)
1800	Univ.	Tension	-	-	-	C2	PT06A-12-8S(SR)
3200	Univ.	Tension	W2	B	20	-	-
3200	Comp.	Tension	W2	B	20	-	-
4200	Comp.	Tension	W2	B	20	-	-
4600	Comp.	Tension	W2	B	20	-	-
5200	Univ.	Tension (1)	W1	A	10	C1	PC06W-10-6S(SR)
SSB	Comp.	Comp.	W2	C	5	-	-
MB, MBP	Comp.	Comp.	W2	C	5	-	-
SM	Univ.	Tension	W2	C	5	-	-
SSM	Univ.	Tension	W2	A	10	C1	PC06W-10-6S(SR)
SMT	Univ.	Tension	W2	D	5	-	-
SPI	Univ.	Comp.	W2	C	5	-	-
SML	Univ.	Tension	W2	D	5	-	-
LBM	Comp.	Tension	W3	G	5	-	-
LBS	Comp.	Tension	W2	G	5	-	-
LW	Comp.	Comp.	W2	-	5	-	-
WeighCheck	Comp.	Tension	W2	B	30	-	-
WMC	Univ.	Tension	W3	G	-	-	-
WMC ≥15K	Univ.	Tension	-	-	-	C3	PT06A-10-6S(SR)
2410-2430	Univ.	Tension	-	-	-	C3	PT06A-10-6S(SR)
2440-2450	Univ.	Tension	-	-	-	C3	MS3106A-145-6S
2100	Univ.	Tension	-	-	-	C4	MS3106A-145-6S
2100	Comp.	Tension	-	-	-	C4	MS3106A-145-6S
MRT	Torque	CW	W2	D	5	-	-
ULC	Univ.	Tension	W2	D	5	-	-
MCC	Comp.	Comp.	W2	E	5	-	-
CX	-	-	-	-	--	C5	PT06A-12-8S(SR)

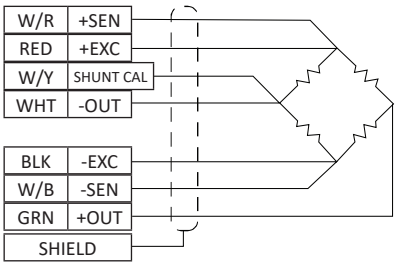
Note:
1) ThrU.S.t axis only.
2) Mating connector for the stock version of cell. Consult factory for alternate connectors and specials.
3) Consult factory. Several connectors and mating cable types are available.
4) Indicates the loading direction which caUses a positive output.
5) Stock length; other lengths available on special order.

LOAD CELL INTEGRAL CABLES				
Cable Type	Wire Size	No. of Wires	Shield	Description
A	22 AWG	7	Braid	Heavy-duty, PVC jacket
B	22 AWG	4	Braid	Heavy-duty, polyurethane jacket
C	28 AWG	4	Braid	Tough, clear PVC jacket
D	28 AWG	4	Spiral	Ultra-flexible, black PVC jacket
E	30 AWG	4	Braid	Ultra-flexible, gray PVC jacket
F	20 AWG	4	Braid	Teflon jacket
G	30 AWG	4	Braid	Teflon jacket

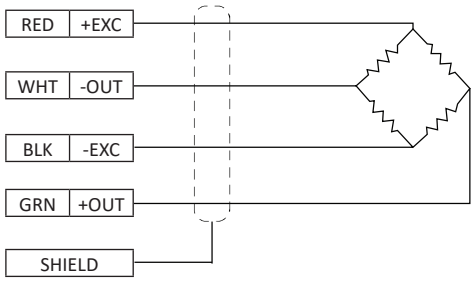
ELECTRICAL INFORMATION

LOAD CELL CABLE WIRING

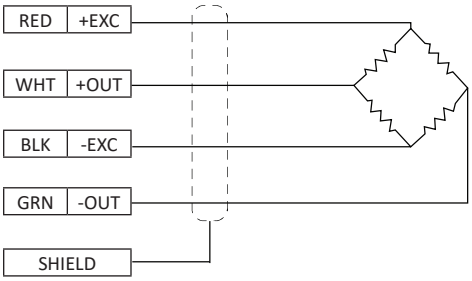
W1



W2

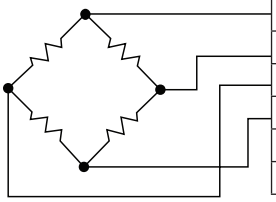


W3



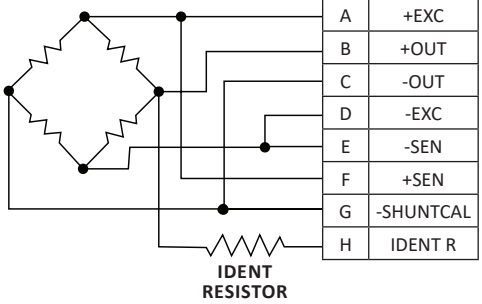
LOAD CELL CONNECTOR WIRING

C1



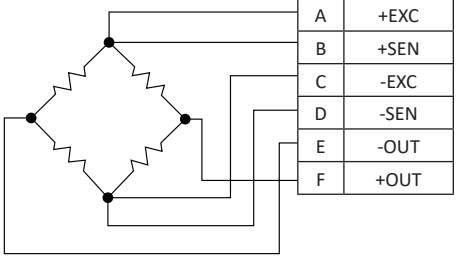
PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	N/C
F	N/C

C2



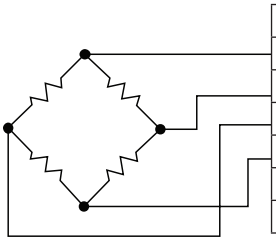
PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	-SEN
F	+SEN
G	-SHUNTCAL
H	IDENT R

C3



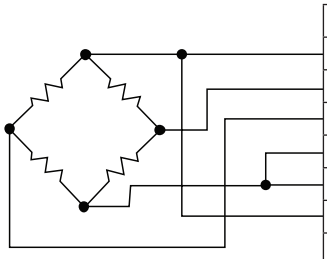
PIN	FUNCTION
A	+EXC
B	+SEN
C	-EXC
D	-SEN
E	-OUT
F	+OUT

C1 with TEDS option



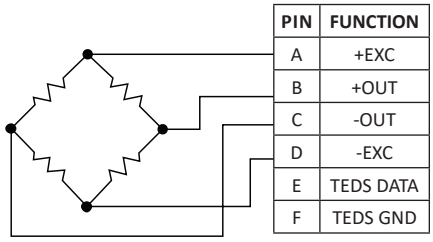
PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	TEDS DATA
F	TEDS GND

C2 with TEDS option



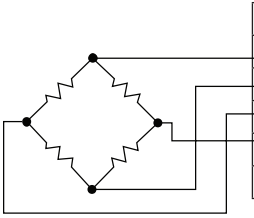
PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	-SEN
F	+SEN
G	TEDS DATA
H	TEDS GND

C3 with TEDS option



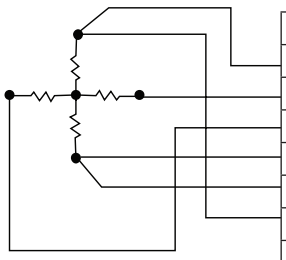
PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	TEDS DATA
F	TEDS GND

C4



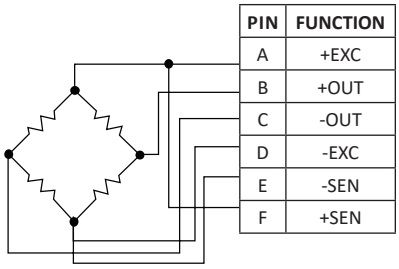
PIN	FUNCTION
A	+EXC
B	-EXC
C	-OUT
D	+OUT
E	N/C

C5



PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	-SEN
F	+SEN
G	N/C
H	N/C

C6



PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	-SEN
F	+SEN

LOAD CELL TERMS AND DEFINITIONS

This document defines the terminology and performance parameters pertaining to engineering Specifications of load cell products. The objective of this terminology Standard is to promote effective communication of Specifications and to constitute a reference for uniformity. The definitions herein are generally compatible with common understanding in the load cell community and are an expansion of those found in "Load Cell Terminology and Test Procedure Recommendations," Third Edition, 1985, Scale Manufacturers Association, and in OIML International Recommendation R60, 1991 Edition. This document includes modifications to the definitions in the above referenced Standards to correct some of their inconsistencies and inadequacies.

For convenience, terms which are defined in this Standard are printed in upper case when Used in the definition of another term.

AMBIENT Temperature
The Temperature of the medium surrounding the LOAD CELL.

AXIAL LOAD
A load applied along the PRIMARY AXIS.

BAROMetric SENSITIVITY
The change in ZERO BALANCE due to a change in ambient baroMetric pressure. Normally expressed in units of %RO/atm.

CALIBRATION
The comparison of LOAD CELL OUTPUT against Standard test loads.

CAPACITY
The maximum AXIAL LOAD a LOAD CELL is designed to measure within its Specifications.

COMBINED ERROR
The maximum deviation of the CALIBRATION curve from the straight line drawn between MINIMUM LOAD OUTPUT and MAXIMUM LOAD OUTPUT, normally expressed in units of %FS. Both ascending and descending curves are considered.

CREEP
The change in LOAD CELL SIGNAL occurring with time while under load and with all environmental conditions and other variables remaining constant. Normally expressed in units of % of applied load over a specified time interval. It is common for characterization to be measured with a constant load at or near CAPACITY.

CREEP RECOVERY
The change in LOAD CELL SIGNAL occurring with time immediately after removal of a load which had been applied for a specified time interval, environmental conditions and other variables remaining constant during the loaded and unloaded intervals. Normally expressed in units of % of applied load over a specified time interval. Normally the applied interval and the recovery interval are equal. It is common for characterization to be measured with a constant load at or near CAPACITY.

CREEP RETURN
The difference between LOAD CELL SIGNAL immediately after removal of a load which had been applied for a specified time interval, environmental conditions and other variables remaining constant during the loaded interval, and the SIGNAL before application of the load. Normally expressed in units of % of applied load over a specified time interval. It is common for characterization to be measured with a constant load at or near CAPACITY.

DEFLECTION
The displacement of the point of AXIAL LOAD application in the PRIMARY AXIS between the MDL and MDL+CAPACITY load conditions.

ECCENTRIC LOAD
Any load applied parallel to but not concentric with the PRIMARY AXIS.

FULL SCALE or FS
The OUTPUT corresponding to MAXIMUM LOAD in any specific test or application.

HYSTERESIS
The algebraic difference between OUTPUT at a given load descending from MAXIMUM LOAD and OUTPUT at the same load ascending from MINIMUM LOAD. Normally expressed in units of %FS. It is common for characterization to be measured at 40-60% FS.

INPUT RESISTANCE
The resistance of the LOAD CELL circuit measured at the excitation terminals with no load applied and with the output terminals open-circuited.

INSULATION RESISTANCE
The DC resistance measured between the bridge circuit and the case. Normally measured at 50 VDC.

LOAD CELL
A device which produces an OUTPUT proportional to an applied force load.

MAXIMUM AXIAL LOAD, SAFE
The maximum AXIAL LOAD which can be applied without producing a permanent shift in performance characteristics beyond those specified. Normally expressed in units of % CAPACITY.

MAXIMUM LOAD
The highest load in a specific test or application, which may be any load up to and including CAPACITY + MINIMUM LOAD, but may not exceed CAPACITY significantly.

MAXIMUM AXIAL LOAD, ULTIMATE
The maximum AXIAL LOAD which can be applied without producing a structural failure. Normally expressed in units of % CAPACITY.

LOAD CELL TERMS AND DEFINITIONS

MAXIMUM LOAD AXIS MOMENT, SAFE
The maximum moment with respect to the PRIMARY AXIS which can be applied without producing a permanent shift in performance characteristics beyond those specified.

MAXIMUM MOUNTING TORQUE, SAFE
The maximum torque which can be applied concentric with the primary axis without producing a permanent shift in performance characteristics beyond those specified.

MAXIMUM SIDE LOAD, SAFE
The maximum SIDE LOAD which can be applied without producing a permanent shift in performance characteristics beyond those specified.

MEASURING RANGE
The difference between MAXIMUM LOAD and MINIMUM LOAD in a specific test or application. It may not exceed CAPACITY.

MINIMUM DEAD LOAD or MDL
The smallest load for which specified performance will be met. It is normally equal to or near NO LOAD in single mode apwplications and is of necessity equal to NO LOAD in double mode applications.

MINIMUM LOAD
The lowest load in a specific test or application, differing from NO LOAD by the weight of fixtures and load receptors which are attached plU.S. any intentional pre-load which is applied.

MODE
The direction of load. Tension & compression are each one mode.

NATURAL FREQUENCY
The frequency of free oscillations under conditions of NO LOAD.

NO LOAD
The condition of the LOAD CELL when in its normal physical orientation, with no force input applied, and with no fixtures or load receptors attached.

NONLINEARITY
The algebraic difference between OUTPUT at a specific load and the corresponding point on the straight line drawn between MINIMUM LOAD and MAXIMUM LOAD. Normally expressed in units of %FS. It is common for characterization to be measured at 40-60 %FS.

NONREPEATABILITY
The maximum difference between OUTPUT readings for repeated loadings under identical loading and environmental conditions. Normally expressed in units of %RO.

OUTPUT
The algebraic difference between the SIGNAL at applied load and the SIGNAL at MINIMUM LOAD.

OUTPUT RESISTANCE
The resistance of the LOAD CELL circuit measured at the SIGNAL terminals with no load applied and with the excitation terminals open-circuited.

PRIMARY AXIS
The axis along which the LOAD CELL is designed to be loaded.

RATED OUTPUT or RO
The OUTPUT corresponding to CAPACITY, equal to the algebraic difference between the SIGNAL at (MINIMUM LOAD + CAPACITY) and the SIGNAL at MINIMUM LOAD.

RESOLUTION
The smallest change in load which produces a detectable change in the SIGNAL.

SHUNT CALIBRATION
Electrical simulation of OUTPUT by connection of shunt resistors of known values at appropriate points in the circuitry.

SIDE LOAD
Any load at the point of AXIAL LOAD application acting at 90˚ to the PRIMARY AXIS.

SIGNAL
The absolute level of the measurable quantity into which a force input is converted.

SPAN
Another name for RATED OUTPUT.

STATIC ERROR BAND or SEB
The band of maximum deviations of the ascending and descending calibration points from a best fit line through zero OUTPUT. It includes the effects of NONLINEARITY, HYSTERESIS, and non-return to MINIMUM LOAD. Normally expressed in units of %FS.

SEB OUTPUT
A computed value for OUTPUT at CAPACITY derived from a line best fit to the actual ascending and descending calibration points and through zero OUTPUT.

SYMMETRY ERROR
The algebraic difference between the RATED OUTPUT in tension and the average of the absolute values of RATED OUTPUT in tension and RATED OUTPUT in compression. Normally expressed in units of %RO.

Temperature EFFECT ON OUTPUT
The change in OUTPUT due to a change in AMBIENT Temperature. Normally expressed as the slope of a chord spanning the COMPENSATED Temperature RANGE and in units of %/°F or %/100°F.

Temperature EFFECT ON ZERO
The change in ZERO BALANCE due to a change in AMBIENT Temperature. Normally expressed as the slope of a chord spanning the COMPENSATED Temperature RANGE and in units of %RO/°F or %RO/100°F.

LOAD CELL TERMS AND DEFINITIONS

Temperature RANGE, COMPENSATED
The range of Temperature over which the LOAD CELL is compensated to maintain OUTPUT and ZERO BALANCE within specified limits.

Temperature RANGE, OPERATING
The extremes of AMBIENT Temperature within which the LOAD CELL will operate without permanent adverse change to any of its performance characteristics.

TOGGLE
Another name for ZERO FLOAT.

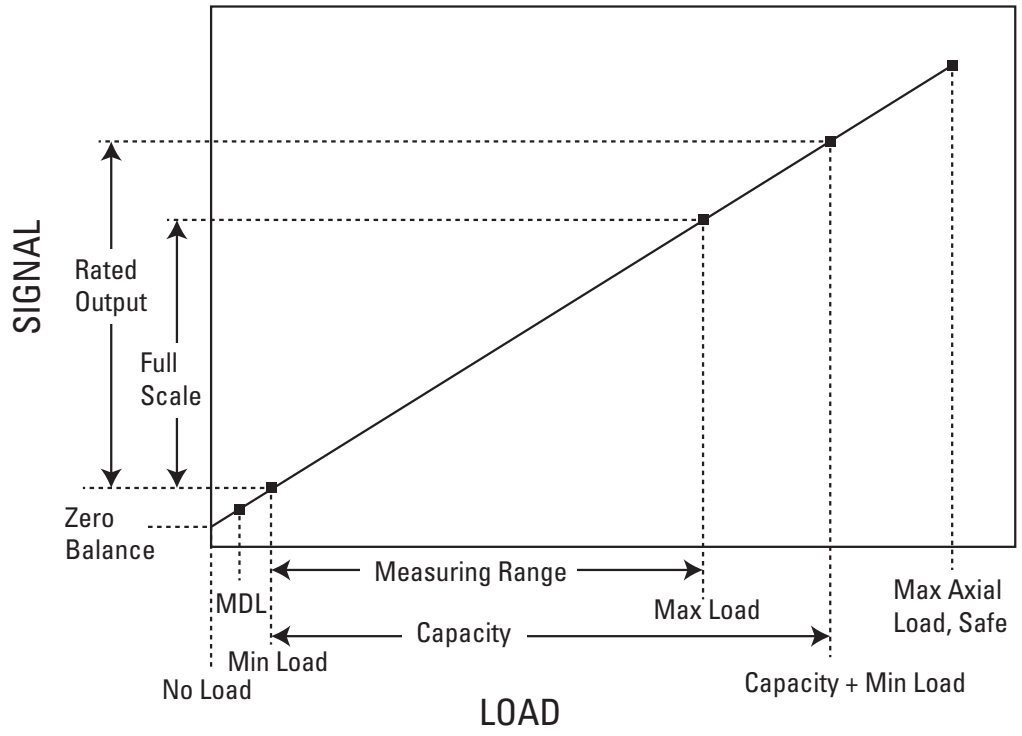
ZERO BALANCE
The SIGNAL of the LOAD CELL in the NO LOAD condition.

ZERO DEAD BAND
Another name for ZERO FLOAT.

ZERO FLOAT
The shift in ZERO BALANCE resulting from a complete cycle of equal tension & compression loads. Normally expressed in units of %FS and Usually characterized at FS = CAPACITY.

ZERO STABILITY
The degree to which ZERO BALANCE is maintained over a specified period of time with all environmental conditions, loading history, and other variables remaining constant.

ILLUSTRATION OF TERMS



ABBREVIATIONS
(All abbreviations are case-specific, are not to be pluralized, and do not Use trailing periods.)

A	ampere	kgf	kilogram force	lb	pound
CE	combined error	kN	kilonewton	lb-in	pound-inch
˚C	degree CelsiU.S.	K	kilopound (kip)	lb-ft	pound-foot
˚F	degree Fahrenheit	K	lbf kilopound force	lbf	pound force
˚K	degree Kelvin	MN	meganewton	psi	pound per square inch
ft	foot	m	meter	RO	rated output
ft-lb	foot-pound	mA	milliampere	SEB	static error band
FS	full scale	mm	millimeter	t	ton, Metric
g	gram	mV	millivolt	V	volt
Hz	hertz	mV/V	millivolt/volt	VDC	volt direct current
in	inch	MDL	minimum dead load	VAC	volt alternating current
in-lb	inch-pound	N	newton	WA	watt
kg	kilogram	Nm	newton-meter		

TROUBLESHOOTING GUIDE FOR LOAD CELLS

1. INTRODUCTION

Performance of a load cell force (or weigh) measurement system is dependent upon the integrity of the physical installation, correct interconnection of the components, proper performance of the basic components which make up the system, and calibration of the system. Presuming that the installation was originally operating and was calibrated, troubleshooting can begin by checking the components individually to determine if they have been damaged or have failed.

The basic components are:

- Load cells
- Mechanical supports and load connections
- Interconnecting cables
- Junction boxes
- Signal conditioning electronics

1.1 MECHANICAL INSTALLATION

Load Cells which are not mounted in accordance with the manufacturer's recommendations may not perform to manufacturer's Specifications. It is always worthwhile to check:

- Mounting surfaces for cleanliness, flatness, and alignment
- Torque of all mounting hardware
- Load cell orientation: "Dead" end on mechanical reference or load forcing source, "live" end connected to the load to be measured. (Dead end is the end closest mechanically to the cable exit or connector.)

Proper hardware (thread sizes, jam nuts, swivels, etc) as required to connect the load to the load cell. A fundamental requirement is that there be one, and only one load path! This load path must be through the load axis of the load cell. This may sound elementary, however it is a commonly overlooked problem.

1.2 Electrical INSTALLATION

Proper load cell performance is also dependent upon the Electrical "system." The following items are common problem areas:

- Loose or dirty Electrical connections, or incorrect connection of color coded wires.
- Failure to make Use of remote sensing of excitation voltage on long cables.
- Incorrect setting of excitation voltage. (The best setting is 10 VDC, becaUse that voltage is Used to calibrate the load cell in the factory. The maximum voltage allowed is 15 or 20 volts, depending on the model. Some battery-operated signal conditioners Use smaller voltages, down to 1.25 volts, to conserve battery power.)

Loading of the bridge circuit. (Highly accurate load cell systems require highly accurate read-out instruments. Such instruments typically have very high input impedances to avoid circuit loading errors.)

2. LOAD CELL EVALUATIONS

It is quite easy to make a quick diagnostic check of a load cell. The procedure is quite simple and a minimum of equipment is required. Should it be determined that the load cell is at fault, the unit should be returned to the factory for further evaluation and repair as may be required. Many of the checks may be performed with an ohmmeter.

2.1 CHECK BRIDGE CIRCUITRY AND ZERO BALANCE

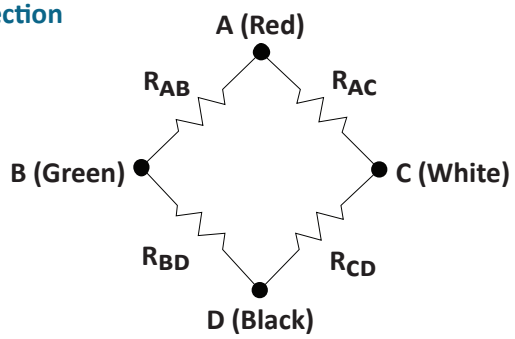
(Numbers apply to Standard 350 ohm bridges.)

- Instrument required: Ohmmeter with 0.1 ohms resolution in the range of 250-400 ohms.
- Bridge Input Resistance: RAD should be 350 ±3.5 ohms (unless the cell has "Standardized output," in which case the resistance should be less than 390 ohms)

TROUBLESHOOTING GUIDE FOR LOAD CELLS

- Bridge Output Resistance: RBC should be 350 ±3.5 ohms
- Bridge Leg Resistances: Comparing the leg resistances at no load permits evaluation of the caUse of any permanent damage in the load cell flexure. The “computed unbalance” of the bridge shows the general condition of the cell.
- The computed unbalance, in units of “mV/V,” is determined as follows: Unbalance = 1.4 • (RAC – RAB + RBD – RCD)
- The Zero Offset, in units of “% of Rated Output”, is determined as follows: Zero Offset = 100 • Unbalance ÷ Rated Output

Typical Connection



If the ohmmeter resolution is 0.1 ohm or better, then a computed Zero Offset of greater than 20 percent is a clear indication of overload. A computed zero balance of 10-20% is an indication of probable overload. If the load cell has been overloaded, mechanical damage has been done that is not repairable, becaUse overloading results in permanent deformation within the flexural element and gages, destroying the carefully balanced processing that results in performance to Interface Specifications. While it is possible to Electrically re-zero a load cell following overload, it is not recommended becaUse this does nothing to restore the affected performance parameters or the degradation to structural integrity.

If the degree of overload is not severe the cell may in some cases be Used at the User’s discretion, although some performance parameters may violate Specifications and the cyclic life of the load cell may be reduced.

2.2 INSULATION RESISTANCE TESTS

- Insulation resistance, shield to conductors: Connect all the conductors together, and measure the resistance between all those wires and the shield in the cable.
- Insulation resistance, load cell flexure to conductors: Connect all the conductors together, and measure the resistance between all those wires and the metal body of the load cell.

The tests described above can be performed Using a Standard ohm meter, although best results are obtained with a megohm meter. If resistance is beyond the Standard ohmmeter range, about 10 megohms, the cell is probably OK. However, some kinds of Electrical shorts show up only when Using a megohm meter or with voltages higher than most ohmmeters can supply.

CAUTION:

Never Use a voltage higher than 50 VDC or 35 VRMS AC to measure insulation resistance, or breakdown of the insulation between the gages and the flexure may result. Low resistance (below 5000 megohms) is often caUsed by moisture or pinched wires. The caUse and extent of damage must be established at the factory to determine if the load cell may be salvaged.

3. FACTORY EVALUATION

If the load cell is defective for reasons other than overload, return to factory for detailed evaluation. Factory evaluation may show that the cell is repairable or non-repairable and if repair or replacement will be under warranty. If non-warranty, the Customer will be contacted with the cost of repairs and recalibration, and a delivery date after receipt of authorization to proceed.

LOAD CELLS FATIGUE THEORY

BACKGROUND

Interface has specialized in fatigue-rated load cells and their applications since its founding in 1968. Fatigue rating is a distinct specification which guarantees the Customer a load cell which has a service life of 100 million fully reversed loading cycles at full rated capacity.

The very first products at Interface were fatigue-rated load cells, and over the years a history has been built up by thousands of cells in Use all over the world. Many have been supplied to major manufacturers of materials test machines and to major aerospace manufacturers, for Use in long term structural fatigue test programs on aircraft, space, and automotive equipment. **No fatigue failure of any fatigue-rated Interface load cell, Used within its ratings, has ever been reported.**

FATIGUE FAILURE THEORY

It is well known that metals will fail in a statically loaded situation if the yield strength is exceeded. In as much as load cells are structural members which are stressed in the course of their normal Use, they are commonly given ultimate overload ratings in an effort to characterize the magnitude of static load they will withstand without failing structurally.

However, all metal structures, including load cells, are also subject to failure as a result of repetitive loadings which are much lower than the ultimate overload rating. This phenomenon is known as a fatigue failure, and it is due to the fact that the stress which a metal can withstand under cyclic loading Usually becomes less and less as the number of cyclic loadings is increased.

The caUse of this apparent anomaly can be explained by noting that metals are typically not perfectly homogeneoU.S. solids. They are composed of crystals, and at locations called grain boundaries, along slip planes or in a region of a microscopic defect there can be minute strains under load which do not completely reverse during unload, leaving the material with a slight plastic deformation at the end of each complete cycle. This effect is highly dependent on the magnitude of the load and the number of cycles.

ANATOMY OF A FATIGUE FAILURE

It is generally acknowledged that a structural fatigue failure develops in three stages:

1. Repeated cycling builds up local plastic deformation, and a microscopic crack is initiated.
2. The crack propagates and a larger section becomes weakened.
3. Stress concentration in the section of cracking increases rapidly, and continued cycling enlarges the crack until sudden fracture occurs.

FATIGUE LIFE PREDICTION

Accurate prediction of fatigue life of any structure is not a reality. Well controlled tests on the most simple configurations of test specimens result in a wide scatter band of results. With complex structures typical of a load cell, analysis is even more complex. Theoretical analysis can produce approximations, however, which can be Useful in estimating the margin of safety at which a particular load cell design is operating.

In materials science, the S-N curve is a well known tool. It is a graphical representation of the number of load cycles required to break a specimen, at a range of peak cyclic stress levels. S-N curves for the high quality materials Used in Interface load cells have been experimentally determined, and are shown in Figure 1 for stainless steel and alloy steel, and in Figure 2 for aluminum alloy.

Thus, if the stress level is known, the fatigue life can be approximately known. However, there are factors which make fatigue life difficult to characterize.

LOAD CELL FATIGUE FAILURE MODES

COMPONENTS SUBJECT TO FAILURE

There are two metal components in a load cell that must be considered in fatigue analysis, the flexure (spring element) and the strain gage (sensor).

1. The flexure bears the load; therefore failure of the flexure is structural.
2. Since the gages function is Electrical measurement of minute deflections, failure of the strain gages, on the other hand, is typically not structural; failure is noted by a shift in resistance or gage factor.

The relative propensity to first encounter flexure or strain gage fatigue failure depends upon the design of the transducer.

LOAD CELLS FATIGUE THEORY

FLEXURES

There are several metals Used for flexures in Interface load cells including aircraft quality alloy steel, stainless steel, and high strength fatigue-resistant aluminum alloy. S-N curves for these three materials are presented in Figure 1 and Figure 2.

Stress is normally expressed in units of psi (pounds per square inch), but for convenience we Use units of Ksi which are equal to 1000 psi. Shear stress is on the vertical axis, corresponding to the state of stress in Low Profile load cells. Readers with some materials science familiarity will recognize that classical fatigue strength for these materials is higher than indicated in the figures. This is becaUse classical data is for bending or direct stress, whereas Interface fatigue-rated cells operate in shear mode. This analysis therefore appropriately Uses the required factor for shear, avoiding a falsely optimistic result.

Note that the shear S-N curve for steel becomes essentially flat at about 55 KSI. This is a characteristic of steel. The stress level at the flat portion of the curve is called the endurance limit. If operated below this limit, theoretically the material will endure an infinite number of load cycles. NonferroU.S. metals do not generally exhibit an endurance limit, their curves continuing on with a small slope.

GAGES

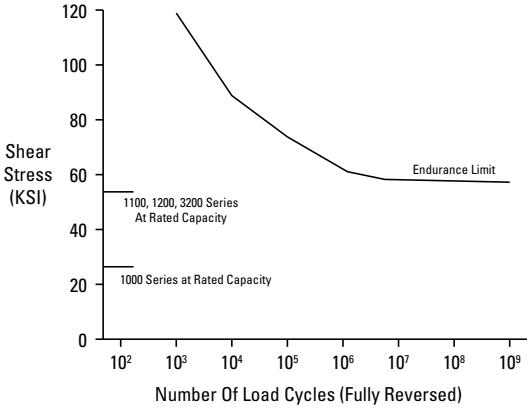


Fig 1. S-N Curve, Interface Alloy Steel & Stainless Steel

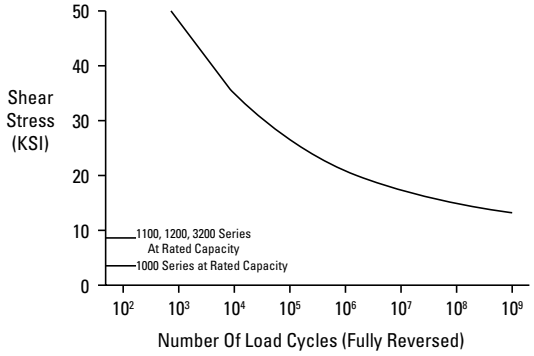


Fig 2. S-N Curve, Interface Aluminum

Interface strain gages are specially made of fatigue-resistant nickel-chromium alloy. Strain gage fatigue characteristics are most conveniently viewed in terms of strain rather than stress. Figure 3 shows a Strain-N curve for Interface strain gage material. Strain is a dimensionless quantity of normally very small magnitude. The microstrain unit is simply 106 strain units and is Used for convenience. Stress and strain for any particular material are related by a constant which is the modulU.S. of elasticity (30X106 for steel and 10X106 for aluminum), allowing convenient comparison of S-N curves and Strain-N curves.

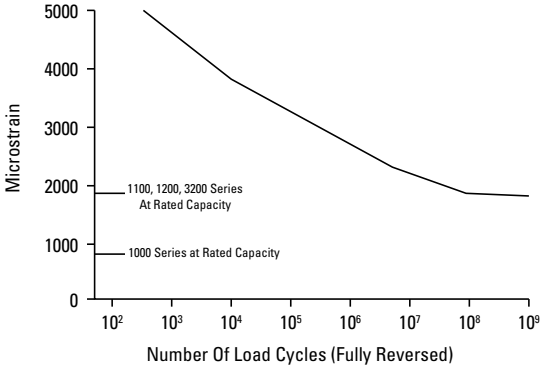


Fig 3. S-N Curve, Interface Strain Gages

NOTE:

The curves in Figures 1, 2, and 3 are for fully reversed load cycles, meaning that for 2000 microstrain as an example, a cycle starts at zero load and consists of one load to (+2000), one load to (-2000), with a return to zero.

COMPARISON OF LOADING LEVELS

Superimposed on the curves are operating levels of Interface Low Profile load cells by model series. This provides a convenient visualization of the fact that all of these load cells are designed to have very long, if not infinite, theoretical fatigue lives. Remember that in actual practice things are not necessarily so ideal. Therefore, in order to establish the correlation between theoretical and realizable fatigue life, actual test results are desirable.

LOAD CELLS FATIGUE THEORY

DESIGN VERIFICATION TESTS

TEST PROTOCOL

Interface conducted Design Verification Tests to substantiate the theoretical life predictions by means of actual load tests of the product. ObvioU.S.ly, building up millions of load cycles on a high capacity load cell is not a trivial task. Many hours of costly machine time are required. Tests were conducted on three representative Interface Low Profile load cells: (1) an aluminum cell of 5,500 lbf capacity, (2) a steel cell of 11,000 lbf capacity, and (3) a steel cell of 22,000 lbf capacity.

Loading to 130% of rating was selected as an acceleration factor, to bring down the test time to a realizable length, since 100 million cycles at 1 hertz and 100% loading would consume 3 years and 2 months of testing, 24 hours per day. Based on the slopes of the S-N curves, a cycle acceleration factor of at least 10 can be achieved with 130% loading, thus ensuring that the more stringent test at 107 cycles will prove a fatigue life of 108 cycles at 100% loading.

TEST RESULTS

Analysis of the test data showed that there were no indications of fatigue failure nor degradation of load cell performance outside specified limits, for the critical load cell parameters of output, zero balance, nonlinearity, hysteresis, and creep, during or after completion of the Verification Test program.

BENEFITS OF REDUCED STRESS LEVELS

LOWER STRESS BY DESIGN

Interface load cells are designed for optimum fatigue life. Other load cells are not necessarily equivalent. Table 1 below is a comparison of actual strain levels in Low Profile™ and typical competitive load cells. The safety factors are a means of visualizing the design merit of the various designs. The value of fatigue rated load cells for fatigue applications is evident from the safety factor data. It is also apparent that Interface load cells with 4 mV/V output have lower stress levels and, therefore, more fatigue resistance than competitors' cells, even though their output is only 3 mV/V or less.

LOWER STRESS BY USER LIMITS

Note that the tests and S-N curves are based on fully reversed load cycles. This type of loading cycle is considerably more stringent than unidirectional loading, which is the more common application of load cells. If a fatigue load cell is repeatedly loaded in only one direction, the Goodman Law predicts that it can be loaded to about 133% of the bidirectional fatigue-rated capacity with no degradation of its fatigue rating. Conversely, unidirectional loading to a fatigue cell's rated capacity is much less stressful on the cell than bidirectional loading and can be expected to yield a fatigue life well beyond the number of cycles which could be reasonably and economically applied in a verification test program.

Design Characteristic	Interface 1000 Series (Fatigue)	Interface 1000 Series (Fatigue)	Interface 1100 Series & 1200 Series	Interface 1100, 1200, 3200, 4200, & 4600 Series	Competition Generic Load Cell
	Aluminum	Steel	Aluminum	Steel	Steel
Output, mV/V	1	2	3	4	3
Fatigue Life Rating (Cycles)	10^8	10^8			?
Microstrain at Rated Capacity	450	900	900	1800	1790 (1)
Max Microstrain on Flexture Allowed for 108 Cycle Life	1400	1850	1400	1850	1850
Max Microstrain on Gages Allowed for 108 Cycle Life	2000	2000	2000	2000	1400 (2)
Safety Factor, Flexture (Rotation Allowed / Actual Strain)	3.1	2.1	1.6	1.0	1.0
Safety Factor, Gages (Ratio Allowed / Actual Strain)	4.4	2.2	2.2	1.1	0.8

Table 1. Load Cell Strain and Safety Factor Comparison

NOTE:

1. ***In typical competitors' load cells, the copper-nickel alloy gages have approximately 20% lower Gage Factor than Interface gages and lose approximately 10% of their natural output to Temperature compensation circuitry, a loss which is not present with Interface self-compensated gages. The result is that generic 3 mV/V load cells are stressed about equally with Interface 4 mV/V load cells.***
2. ***Typical copper-nickel alloy gages have approximately 70% of the fatigue resistance of Interface nickel-chromium alloy gages.***

LOAD CELL RESOLUTION

Load cells are constructed Using electric resistance metal foil strain gages bonded to an elastic flexure element. The load cell is a passive analog device with continuous resolution limited ultimately by noise, due to electron motion on the order of 10-9 volts (1 nanovolt). Therefore, practically speaking, resolution is limited by the type and quality of the electronic instrumentation Used, rather than by the load cell itself. Many reasonably priced instruments can resolve 0.8 to 1.0 microvolt/count as a minimum signal level.

For example, consider a load cell with Rated Output of 3mV/V. Assume that 10VDC excitation is Used. At Rated Output, the signal level produced would be:

3mV/V x 10V = 30 mV

If the indicating instrument can resolve 1 microvolt in the rightmost digit of the display, then:

$$\text{Resolution} = \frac{1\ \mu\text{volt}}{30\ \text{mV}}$$

$$= \frac{1\ \mu\text{volt}}{30{,}000\ \mu\text{volt}}$$

= 0.000033, fraction of Rated Output

= 0.0033 % of Rated Output

If, for example, an MB-5 (5 lbf Rated Capacity) load cell were being Used, the resolution in pounds could be calculated as:

Resolution = 5 lbf x 0.000033

= 0.00017 lbf

If an instrument capable of 0.5 microvolt resolution were Used, the resolution would be approximately 1 part in 60,000 or 0.000083 pounds for the 5 pound capacity cell. Maximum resolution may be limited by the instrument to the total number of counts that can be displayed.

Another typical example would be the case where only a portion of the range of the load cell is to be Used. If the maximum load on the MB-5 were to be 3 pounds, then the output would be:

3 mV/V x 3 lbf / 5 lbf =

1.8 mV/V

Using 10V excitation provides a signal of 18 mV output for 3 pounds input. If the instrument displays is to display 30,000 counts a signal strength of

18 mV / 30,000 counts =

0.6 microvolt/count

results in a display of 0.00015 pound/count resolution. Of course, the instrument must have a sensitivity of at least 0.6 µvolt/count for this example.

It can be seen from the above examples that the sensitivity and stability of the electronic instrumentation is critical, when high resolution is required. High electronic gain alone will not achieve good results if the zero stability or gain stability is poor becaUse the readings will drift with time or Temperature changes.

Also, keep in mind that excessive resolution can be detrimental in situations where the stability of the applied force is low, as in some hydraulic systems.

Generally, it is desired to read physical units instead of counts. Most instruments provide a count-by feature of 1, 2, 5 or 10 to facilitate this. For the above example, an instrument could be set up to read 30,000 counts by 2 for the 3 pound load, providing resolution of 0.0002 lbf Premium instruments are available that offer as good as 0.001µvolt/count.

GROUNDING AND SHIELDING IN LOAD CELL INSTALLATIONS

Proper grounding and shielding can be critical to the successful application of load cells generating low level signals. There is no “best way” to set up all systems and the specifics of the installation and associated instrumentation must be considered in arriving at a system configuration that is satisfactory.

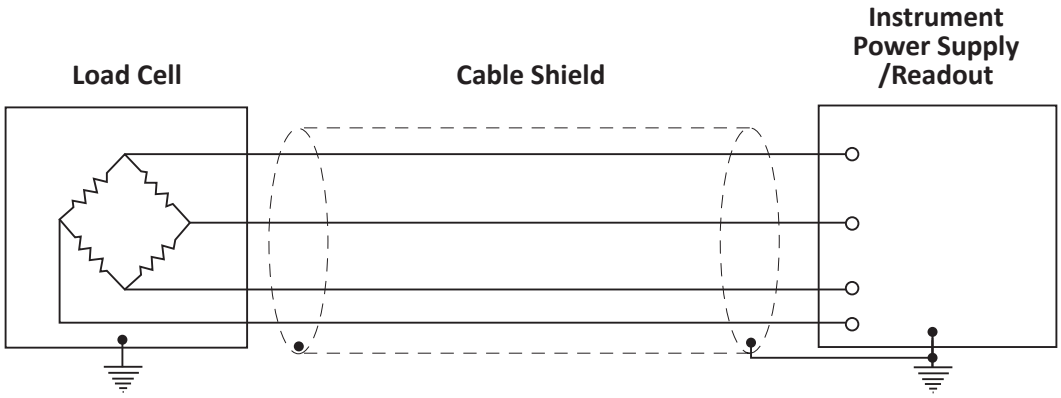
The basic rule that should not be violated is that continuous ground loops should be avoided, i.e., a system should not be grounded at multiple points.

This could occur, for example, if the shield of the load cell cable were grounded at both ends.

Interface load cell cables are supplied with a braided shield which provides protection from electrostatic interference when properly grounded. This shield is floating (not connected) at the load cell end so that a “ground loop” will not be inadvertently created.

A basic system layout that is easily achieved and Usually is satisfactory is as follows:

1. The load cell case is grounded by mechanical attachment to the structure to which it is mounted.
2. This structure should be properly grounded to the Electrical circuits which drive the excitation for the load cell.
3. The braided shield enclosing the load cell leads is grounded at the instrument and the instrument is grounded through the power cord.



EXCITATION VOLTAGE

INTRODUCTION

Unless otherwise specified, all Interface load cells are calibrated with an excitation voltage of 10 VDC.

Although Low Profile™ cells may be operated with excitation as high as 20 VDC, and Mini Series cells can be excited with up to 15 VDC, it is always best to operate a load cell at the same voltage Used for the calibration, becaUse certain parameters of the cell are affected by the applied voltage.

The basic construction of a load cell consists of strain gages bonded to a flexure inside the load cell with a very thin layer of an Electrically insulating epoxy. Typically, four gages are connected together in a bridge circuit. When voltage is applied to the bridge, the current through the each gage generates heat, which is conducted through the epoxy into the larger mass of the flexure. Thus, the Temperature of the bridge is always slightly higher than the flexure during normal operation.

GAGE HEATING

Each 350 ohm leg of a bridge will dissipate over 71 milliwatts at 10 VDC excitation. Since power is proportional to the square of the voltage, the leg would be dissipating over a quarter of a watt at 20 VDC, but only 18 milliwatts at 5 VDC.

ZERO BALANCE

Slight differences in the Temperature coefficient of resistance in each leg of a bridge will caUse the zero balance to shift slightly as the gage Temperature changes. The effect is Usually small. For example, a change of excitation from 10.00 VDC to 10.25 VDC will caUse a zero shift of less than 0.0014% of rated output.

SENSITIVITY

The gage factor of each gage is adjusted so as to compensate for the Temperature coefficient of the modulU.S. of the flexure. This matching is exactly valid only at an excitation of 10 VDC. An increase of excitation voltage to 10.25 VDC would lower the bridge sensitivity by only 0.001%, but Use of 20 VDC would caUse the sensitivity of a Low Profile cell to decrease by 0.07%, which could be significant. 20

VDC applied to Mini Series cell would caUse a more serioU.S. effect due to gage heating, and could possibly even shorten the life of the cell.

CREEP

Creep is influenced by Temperature, but the magnitude and direction of the effect of large changes in applied voltage is not predictable.

At room Temperature, changing the applied voltage from 10.00 VDC to 10.25 VDC caUses a negligible effect. However, increasing the voltage on a Low

Profile cell to 20 VDC could caUse the creep to increase (or decrease) by less than 10% of the creep specification.

CONCLU.S.ION

BecaUse of the inherent Temperature stability of the design of Interface load cells, reasonable shifts in excitation voltage will result in paraMetric shifts which would not be detectable in most normal applications.

However, in applications where the load cell is to be Used as a transfer Standard, or where the stability of the cell's characteristics is necessary, precautions should be Used to assure the stability of the excitation voltage.

MOMENT COMPENSATION

Do you know if you have an accurate force reading?

In most applications it is difficult, if not impossible, to calculate or even estimate the effect of misalignments on the precision of a force measurement system. Moment sensitivity introduces errors into force measurements whenever forces cannot be applied precisely on-axis.

The Low Profile™ design by Interface has the intrinsic capability of canceling moment loads becaUse of its radial design.

- The radial flexure beams are precision machined to balance the on-axis loading.
- The gages are precisely placed so that strains due to on-axis loads are additive and strains due to moment loads tend to cancel under actual moment loading.
- Interface Uses eight gages, as opposed to the four Used by many manufacturers, which helps to further minimize error from the loads not being perfectly aligned.
- Slight discrepancies between gage outputs are carefully measured and each load cell is adjusted to further reduce extraneoU.S. load sensitivity, to meet the Specifications in the table below.

RESISTANCE TO EXTRANEOU.S. LOADS

The INTERFACE Low Profile™ design provides optimum resistance to extraneoU.S. loads to insure maximum operation life and minimize reading errors. The above chart tabulates maximum allowable extraneoU.S. loads that may be applied singularly without Electrical or mechanical damage to the cell and the maximum error that can be expected from side forces or bending moments.

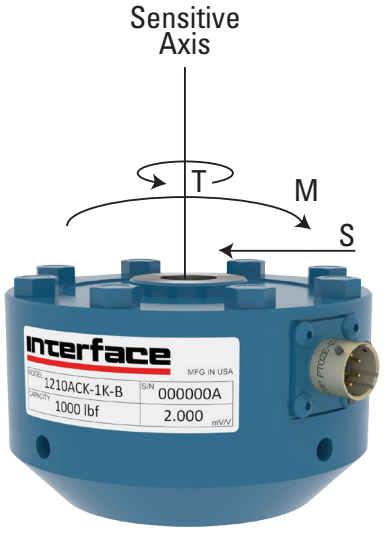
Several loads can be tolerated simultaneoU.S.ly if the total combined load is not more than 100% of the allowable maximum extraneoU.S. load.

Only Interface guarantees maximum extraneoU.S. load error and physically adjusts every load cell.

The Interface 1200 Series cells have eccentric load sensitivity less than ±0.25% of reading per inch, and the 1000, 1100, and 1600 Series are further adjusted to come in at less than ±0.1% of reading per inch.

Most competing load cells will have extraneoU.S. load error ten, or more, times higher than with a superior Interface load cell.

SERIES	S	M	T	MAX ERROR DUE TO S OR M (% RATED RANGE)
	Max Side Force (% Rated Range)	Max Moment (% Rated Range x 1 inch)	Max Moment (% Rated Range x 1 inch)	
1000	100%	100%	100%	0.10%
1100	40%	40%	40%	0.04%
1200	40%	40%	40%	0.10%
1500	40%	40%	40%	0.10%
1600	40%	40%	60 in-lb	0.04%
1800	100%	100%	100%	0.05%



TEMPERATURE COMPENSATION OF ZERO

THE ADVANTAGES OF FULL Temperature RANGE COMPENSATION

Temperature compensation of zero balance of load cells is conventionally performed Using the chordslope method. A partial-range implementation of this method, acting on a chord between room Temperature and one extreme Temperature is often Used. A better implementation is full-range Using three test Temperatures and acts on a chord between the cold and hot extremes.

The top curve on the plot represents the zero Temperature characteristics of an uncompensated load cell. This curve would ideally be a straight line but often has some nonlinearity such as shown here.

The objective of the compensation process is to rotate the curve to a more level position. The middle curve represents a compensation based on room Temperature (T_r) and hot Temperature (T_h) and is consequently labeled “r-h compensated.” The process equalizes the zero balance values at T_r and T_h.

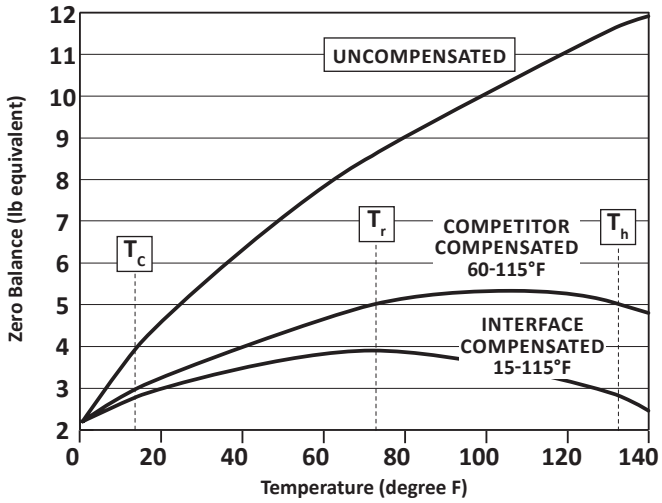
The lower curve represents a compensation based on cold Temperature (T_c) and hot Temperature (T_h) and is labeled “c-h compensated.” This process equalizes the zero balance values at T_c and T_h, producing a relatively full-range solution.

It is now apparent why the full range procedure (lower curve) is superior:

1. The slope of the characteristic near room Temperature, the Temperature at which most applications are of most interest, is near zero.

2. The total range of zero balance over the Temperature range of the plot is minimal, approximately one-half that of the partial-range compensated curve in this example.

COMPENSATED vs NON-COMPENSATED
Temperature Effect on Zero Compensation
2,000 lbf Load Cell Example



Every Interface Load Cell is Compensated Cold and Hot

INSTRUMENT CALIBRATION USING A SHUNT CALIBRATION RESISTOR

INTRODUCTION

Since a strain gage load cell is a passive Electrical device, there exists a simple, yet effective, method for checking the calibration of a load cell system in the field or when a means of applying actual forces is unavailable. Inducing an Electrical imbalance in the cell's bridge circuit will simulate the bridge imbalance caUsed by the application of actual forces to the load cell. Then the system gain may be adjusted so that the system output signal or display indicates a known force on the load cell.

NOTE:

Be careful not to Use Shunt Calibration as a substitute for actual force calibration of a system. Shunt Calibration merely supplies a known signal to the signal conditioning unit, in order to check its gain or span adjustment.

EQUIVALENT FORCE

On the Calibration Certificate for each Low Profile load cell, Interface routinely supplies the value of the equivalent force resulting from connecting a specified shunt calibration resistor across one leg of the bridge. For other types of cells, Interface will supply shunt calibration values on special request.

SHUNT CALIBRATION CONNECTIONS

The Standard connections Used by Interface for tension & compression shunt calibration are specified on the Calibration Certification for each load cell.

It is important that the Standard connection be Used, although a similar (but not equal) output would result from connecting to the opposite leg of the bridge.

Shunt calibration is relatively insensitive to small changes in Temperature, although the calibration is precisely correct only at the "Lab Standard" conditions noted on the load cell's Calibration Certificate.

RESISTOR VALUES

The following values of shunt resistors will caUse an output of approximately 73% of Rated Output for the load cell types indicated when connected across the specified load cell terminals.

For 4 mV/V cells:

RS-100-30K (30,000 ohms, ±0.01%)

For 3 mV/V cells:

RS-100-40K (40,000 ohms, ±0.01%)

For 2 mV/V cells:

RS-100-60K (60,000 ohms, ±0.01%)

For 1 mV/V cells:

RS-100-120K (120,000 ohms, ±0.01%)

PROCEDURE

To perform a shunt calibration, Use the following procedure:

1. Remove or stabilize all forces on the load cell.
2. Adjust the display or indicator ZERO to read exactly zero.
3. Connect the shunt calibration resistor to the terminals specified on the Calibration Certificate, and adjust the SPAN or GAIN until the display reads the force value stated on the Certificate.
4. Repeat the procedure to insure a valid calibration.

LOAD CELL PERFORMANCE AS AFFECTED BY CABLE LENGTH

INTRODUCTION

For high accuracy force measurement the effects of the cable on the measurement must be considered.

For constant voltage excitation there are two effects of significance. These are:

1. An effect on the sensitivity due to voltage drops over the cable length.
2. An effect on the thermal span characteristics of the load cell due to the change of cable resistance with Temperature.

CABLE LENGTH EFFECTS

If the load cell is sold with a cable of any length, the sensitivity is determined with the installed cable in calibration and this is not a problem. For load cells with connectors, or if the Customer adds cable himself, there will be a loss of sensitivity of approximately 0.37% per 10 feet of 28 gage cable and .09% per 10 feet of 22 gage cable. This error can be eliminated if a six wire cable is run to the end of the load cell cable or connector and Used in conjunction with an indicator that has sense lead capability.

Temperature EFFECTS

Since cable resistance is a function of Temperature, the cable response to Temperature change affects the thermal span characteristics of the load cell/cable system. For 6-wire systems this effect is eliminated. For 4-wire cables the effect is compensated for in the Standard cable lengths offered with the load cells if the load cell and cable are at the same Temperature at the same time. For non-Standard cable lengths, there will be an effect on thermal span performance. The effect of adding 10 feet of 28 gage cable is to caUse a decrease in sensitivity with Temperature equal to 0.0008%/˚F (an amount equal to the Standard Interface specification). For an added 10 feet of 22 gage cable the effect is to decrease sensitivity by .0002%/˚F (one-fourth Interface spec). In many cases a Customer can tolerate the degraded performance since our Standard specification is extremely tight. However, for long cable runs or high accuracy applications, this can be a significant factor. In such cases, the best approach to the problem is to run six wires to the end of the Standard cable length and sense the excitation voltage at that point. This eliminates the problem.

PROPRIETARY INTERFACE STRAIN GAGES

UNIQUE FORMULATION, MADE IN-HOUse

Interface load cells are constructed with strain gages manufactured by Interface from a unique proprietary alloy which provides inherently Temperature compensated output. They are manufactured in our facility, in order to provide the necessary strict control of the formulation and the forming process.

MATCHED Temperature CHARACTERISTICS

The Temperature characteristic of the strain gages is adjusted by special processes to exactly match and counteract the Temperature characteristic of the modulU.S. of the load cell structural material, thereby providing output which is relatively Temperature insensitive. The bridge circuit is simple, reliability is high, and changes in output sensitivity caUsed by Temperature variations are automatically compensated.

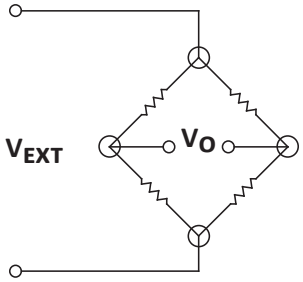
By contrast, competitive load cells Use strain gage alloys which require the addition of Temperature sensitive resistors in the bridge circuit for compensation, thus reducing reliability. Since the resistors aren't in intimate thermal contact with the cell's flexure, the dynamic thermal performance, resistance to thermal gradients, and thermal response times are also severely affected.

LONGER FATIGUE LIFE

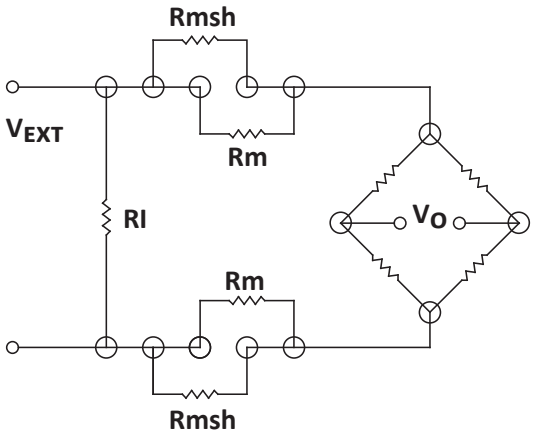
The Interface strain gage alloy provides significantly greater fatigue life than the widely-Used constantan gages Used by the competition.

HIGHER OUTPUT

A third advantage of the Interface strain gage is higher output, providing higher signal-to-noise ratio and opportunity for higher resolution in precision measurement applications.



INTERFACE LOAD CELL



TYPICAL COMPETITOR'S LOAD CELL

Rm = ModulU.S. compensating resistor

Rmsh = Fine trim for Rm

Ri = Bridge input resistance trim

WARRANTY AND REPAIR POLICY

WARRANTY

1. Interface warrants that its products shall be free from defects in material and workmanship for the full warranty period under normal and proper Use when correctly installed. The warranty period for most load cells is two years and for other products is one year, from date of shipment by Interface.

2. Any Interface product, which proves defective in material or in workmanship within the warranty period, will be repaired or replaced free of charge provided that the buyer; (1) provides Interface with satisfactory proof of the defect and that the product was properly installed, maintained and operated within the limits of rated and normal Usage; (2) buyer obtains from Interface authorization to return the product; and (3) products claimed to be defective must be returned with transportation charges prepaid, and will be returned to buyer with transportation charges collect unless the item is found to be defective, in which case, Interface will pay the return transportation charges.

3. The remedy set forth herein does not apply to damage to or defects in any product caUsed by the buyer's misUse or neglect, nor does it apply to any product which has been repaired or disassembled which in the sole judgement of Interface affects the performance of the product.

4. Interface makes no warranty concerning components not manufactured by it. However, in the event of the failure of any component or accessory not manufactured by Interface, reasonable assistance will be given to buyer in obtaining from the respective manufacturer whatever adjustment is reasonable based on the manufacturer's own warranty.

5. Interface expressly disclaims any liability to its Customers, dealers, and representatives, and to Users of its products, and to any other person for special or consequential damages of any kind and from any caUse whatsoever arising out of or in any way connected with the manufacture, sale, handling, repair, maintenance, or replacement arising out of or in any way connected with the Use of Interface products.

6. Representations and warranties made by any person, including dealers and representatives of Interface, which are inconsistent or in conflict with the terms of this warranty (including but not limited to the limitations of the liability of, Interface, as set forth above), shall not be binding upon Interface unless reduce to writing and approve by an officer of Interface, Inc.

THIS EXPRESS WARRANTY SUPERCEDES ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

OBTAINING SERVICE UNDER WARRANTY

Advance authorization is required before any product is returned to Interface. Prior to the return of any product, write or call the Repair Department at Interface advising them of; (1) a part number; (2) a serial number of the defective product; (3) a technical description of the defect including specific test data, written observations on the failure and specific corrective action required; (4) a no-charge purchase order number (so the product can be returned to sender correctly); and (5) ship and bill addresses. Non-verified problems or defects may be subject to an evaluation charge. Please return the original calibration data with the unit.

REPAIR WARRANTY

All repairs of Interface products are warranted for a period of 90 days from date of shipment. This warranty applies only to those items which were found defective and repaired; it does not apply to products in which no defect was found and returned as is or merely recalibrated. Out of warranty products may not be capable of being returned to the exact original Specifications.

FORCE MEASUREMENT SOLUTIONS

TERMS AND CONDITIONS

The following Terms and Conditions shall apply to any order between Interface Inc., (seller) and buyer, unless overridden by written agreement.

1. ACCEPTANCE

All orders and sales contracts are subject to acceptance or rejection by Interface and are not binding on Interface unless and until so accepted. Acceptance of an order by Interface constitutes a complete and binding contract governed by the terms and conditions of sale expressed herein and by the laws of the state of Arizona. Acceptance is at all time subject to availability for delivery of the goods covered by each order, and prices in effect at the time of shipment, unless otherwise agreed in a separate agreement signed by buyer and Interface.

2. CANCELLATION

In the event of cancellation, buyer will pay promptly upon receipt of invoice from Interface:

a.) The full contract price for all products which have been completed prior to receipt of notice of cancellation.

b.) All costs incurred by Interface in connection with the uncompleted portion of the order.

c.) Cancellation charges incurred by Interface on account of its purchasing commitments made to its suppliers under the order.

4. PATENTS

No license or other rights under any patents, copyrights or trademarks owned or controlled by Interface or under which Interface is licensed are granted to buyer or implied by the sale of products or services hereunder. Buyer shall not identify as genuine products of Interface products purchased hereunder which buyer has modified, or altered in any way nor shall buyer Use Interface's trademarks to identify such products; provided, however, that buyer may identify such products as utilizing, containing, or having been manufactured from genuine products of Interface as modified or altered by buyer or buyer's representative. If products or services sold hereunder are manufactured or performed according to buyer's Specifications, buyer shall indemnify Interface against any liability for patent, copyright or trademark infringement on account of such manufacture or performance.

5. PRICES

Unless otherwise stated, prices are subject to change without notice. No cash discounts or other discounts for prompt payment are offered unless specifically stated on the face thereof. The prices quoted are based upon the manufacture of the quantity and type ordered and are subject to revision when interruptions, engineering changes, or changes in quantity are caUsed or required by buyer. Clerical errors made by Interface are subject to correction.

6. TAXES & OTHER CHARGES

To the extent legally permissible, all present and future excise levies, taxes, or any similar charges imposed by any federal, state, foreign or local authority which Interface may be required to pay or collect, upon or with reference to the sale, purchase, transportation, Use or consumption of products or services, including taxes measured by the receipts therefrom (except net income and franchise taxes), shall be for the account of buyer.

7. DELIVERY

All sales are F.O.B. Interface's Plant. Delivery dates are approximate and estimated, and are based on prompt receipt of all necessary information from buyer. Interface may make partial shipments of any one or more items covered by the quotation or acknowledgment. Interface assumes no liability for loss, damage, or consequential damages due to delays.

8. TERMS OF PAYMENT

All invoices are payable only in U.S. funds. Payment terms are net 30 days. Credit and delivery of products shall be subject to the approval of Interface to whom all bills are payable and who reserves the right to alter the terms and set a limit of credit. Each shipment shall be treated as a separate and independent contract; but if the buyer fails to fulfill the terms of payment under this or any other contract, Interface at its option may defer further shipments, until payment have been made. Invoices that are not paid by the due date are subject to a late charge of 1.5% per month on the unpaid balance.

9. CONFIDENTIAL INFORMATION

Selected software and hardware, drawings, diagrams, manuals, Specifications, and other materials furnished by Interface relating to the Use and service of products furnished hereunder, including any information which may be identified as proprietary to Interface. Such software and hardware, diagrams, manuals, drawings, Specifications and other materials, have been developed at great expense and are considered to be trade secrets to Interface and buyer may not reproduce them in any way without the express written permission of Interface except as needed to operate and maintain the equipment supplied by Interface.

10. DISPUTE RESOLUTION

This agreement and all transactions hereunder are governed by the laws of the state of Arizona.

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Notes:

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Bolt Fastening Force and Torque

Load Washer and Torque Transducer

Industry: Test and Measurement, Industrial Automation

Summary

Customer Need / Challenge

An Aerospace Company was working on a test plan that involved taking torque & compression measurements on fasteners with varying joint materials. The system required both high and low sampling rates, in addition to the capability of precisely measuring force and torque simultaneously. They required reliable accuracy and long-term stability. The test plan intended to provide verification of required force and torque specifications for fasteners, to ensure safety without compromising installation.

Interface Solution

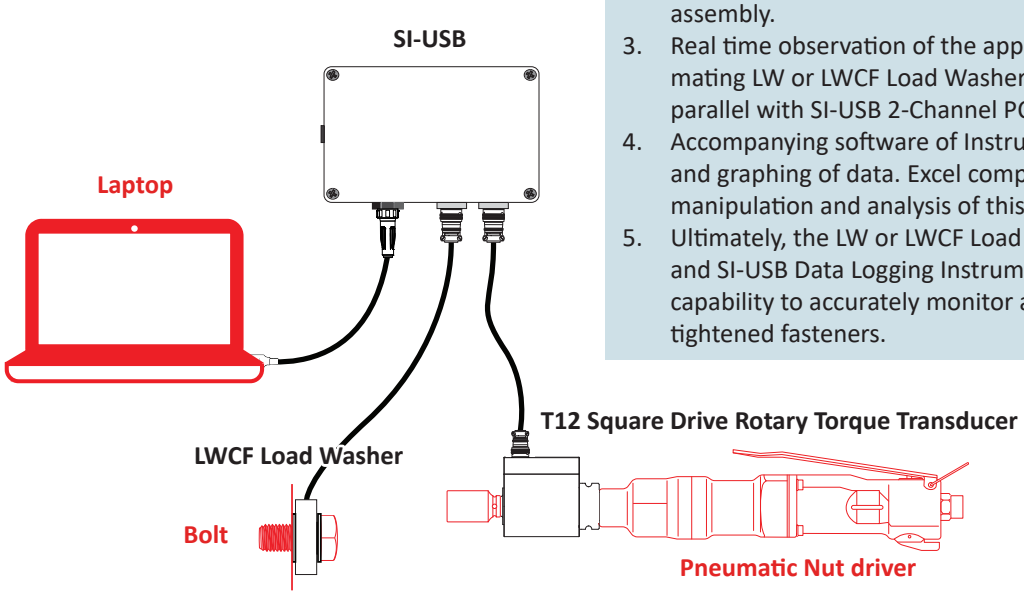
Using a Model LW or LWCF Load Washer in conjunction with a Model T12 Square Drive Rotary Torque Transducer, the customer was able to align force and torque measurements to desired levels. This was accomplished by combining the sensors with the high sample rate of the data logging and graphing capabilities of the SI-USB, capturing real-time force and torque levels for examination.

Results

The fasteners were tightened to the specified force and torque requirements and were safely installed without impairment to themselves or the joint material. The customer was able to measure the rapid event effectively and accurately.

Materials

- Model LW or LWCF Load Washer.
- Rotary Torque Model T12.
- SI-USB Universal Serial Bus Dual Channel PC Interface Module.



How It Works

1. Interface's Model LW or LWCF Load Washer is installed between the bolt head and nut. The load washer will measure the load as torque is applied to the nut.
2. A Model T12 Square Drive Rotary Torque Transducer is installed in-line with the electric nut runner to measure applied torque within assembly.
3. Real time observation of the applied force and torque is provided by mating LW or LWCF Load Washer and Rotary Torque Transducer in parallel with SI-USB 2-Channel PC Interface Module.
4. Accompanying software of Instrumentation enables customer logging and graphing of data. Excel compatible file then allows for further manipulation and analysis of this data.
5. Ultimately, the LW or LWCF Load Washer, Rotary Torque Transducer, and SI-USB Data Logging Instrumentation configuration offers End-user capability to accurately monitor applied load and rotational torque of tightened fasteners.

Bolt Fastening-Force
Load Washer

Industry: Industrial Automation, Test and Measurement

Summary

Customer Need / Challenge

Over-tightening bolts during installation can cause damage to the objects being installed.

Interface Solution

Using Interface Model LWCF Load Washers along with Interface Instrumentation can provide a solution that monitors the force being applied during bolt tightening.

Results

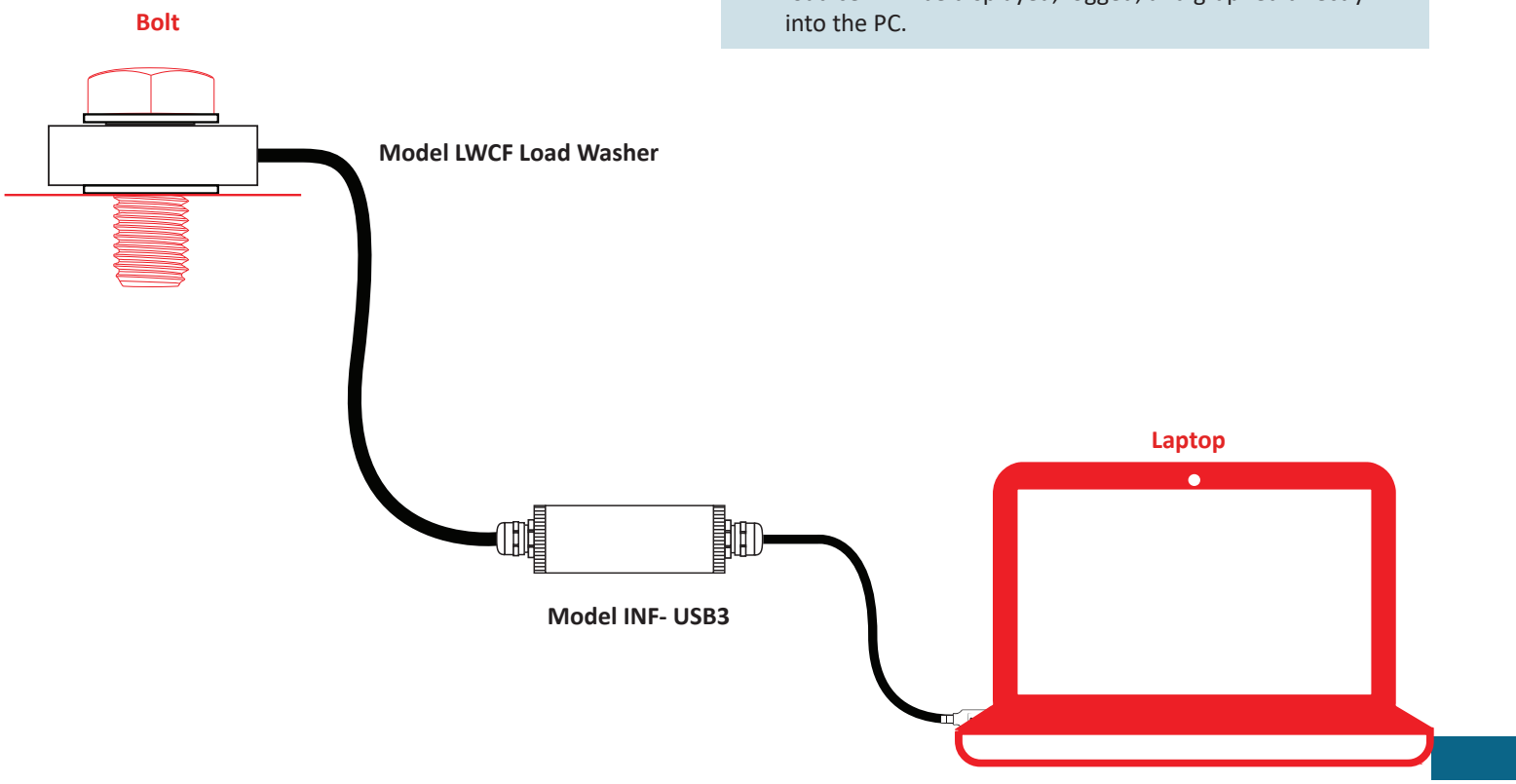
Bolts are tightened to the correct force targets and objects are installed undamaged.

Materials

- Model LWCF Load Washer
- Model INF-USB3 PC Interface Module which comes with logging and graphing software
- Customer supplied bolt and nut

How It Works

1. Model LWCF Load Washer is installed between the bolt head and nut. The load washer will measure the load as torque is applied to the nut.
2. Using Model INF-USB3 PC Module, force readings from the load cell will be displayed, logged, and graphed directly into the PC.



Parachute Deployment & Deceleration Testing

Load Cell

Industry: Aerospace, Industrial Automation

Summary

Customer Need / Challenge

Spacecraft landing on a lunar or planetary surface require parachutes to deploy at high speeds under high loads. For example, NASA tested the Mars Science Laboratory parachute in an 80x120-foot wind tunnel at 80 mph speeds and loads up to 85,000 pounds.

Interface Solution

A 1000-series fatigue-rated LowProfile™ load cells with eccentric load compensation is employed to sustain and measure high loads with 300% overload protection.

Results

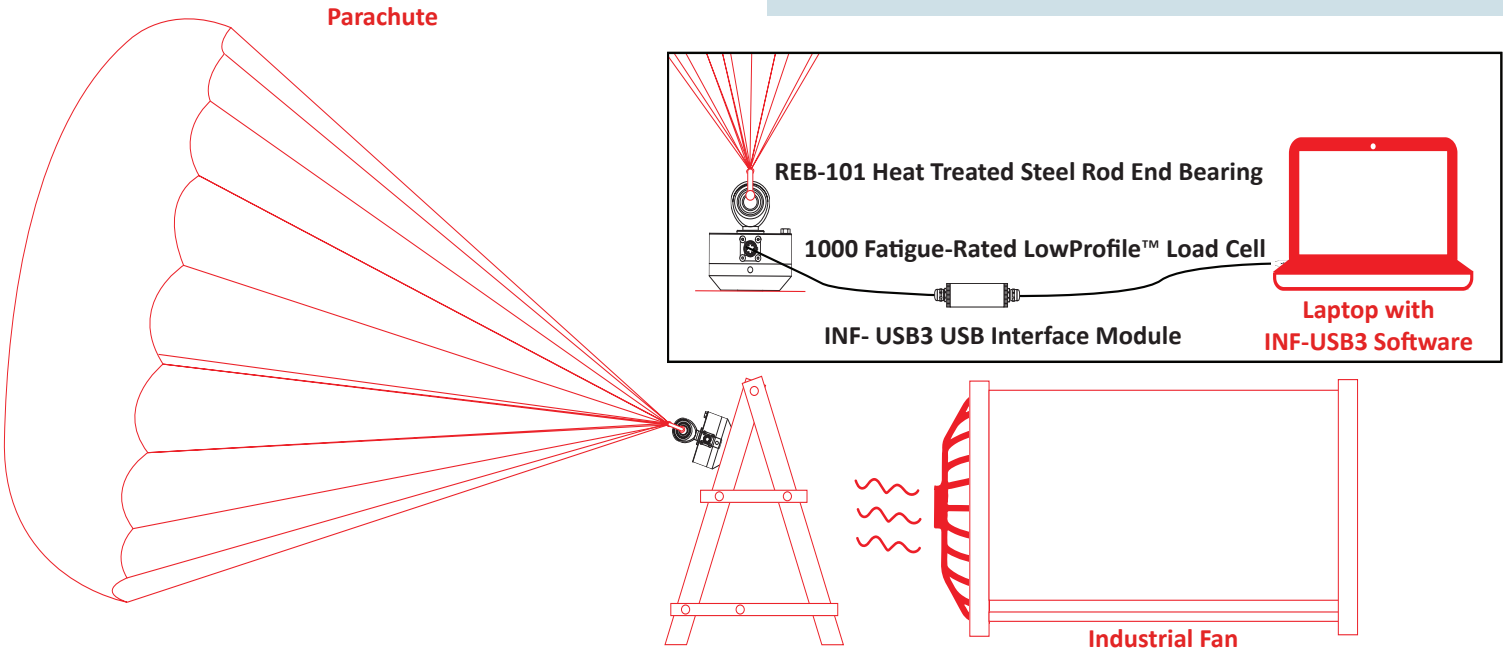
Load cells ensure accurate measurement of applied loads during parachute deployment testing. Multiple tests allow engineers to test various parachute packing techniques.

Materials

- 1000 Fatigue-Rated LowProfile™ Load Cells capacity up to 50K pounds-force (lbf).
- REB-101 Heat Treated Steel Rod End Bearing.
- INF-USB3 USB Interface Module.

How It Works

1. Support structure capable of sustaining required loads is built inside wind tunnel.
2. A single load cell is installed as part of the support structure and connected to the parachute deployment system.
3. After the wind tunnel is brought up to speed, a mortar launches the parachute, aiming toward the upper middle portion of the tunnel where speeds are highest.
4. As the parachute canopy deploys, the load cell(s) measure the force applied with an accuracy of 0.03%.



Reduced Gravity Simulation
Load Cell

Industry: Aerospace

Summary

Customer Need / Challenge

Develop a system to provide a full range of natural motion for a realistic simulation of reduced gravity environments. The system can simulate future missions to the moon, mars, asteroids, or any other celestial destination. The simulated weightlessness can train crew how to handle a wide range of microgravity activities, including walking, running, and jumping. The system can also be used for surface operation studies, suit and vehicle development, robotic development, and mass handling studies.

Interface Solution

Model 1100 series load cell is installed in-line with a steel support cable to actively measure the vertical load on the system. A control system, (which includes model 9860 High Speed Digital Indicator), monitors the load cell output and continuously offloads a portion of a human or robotic payload weight during all dynamic motions.

Results

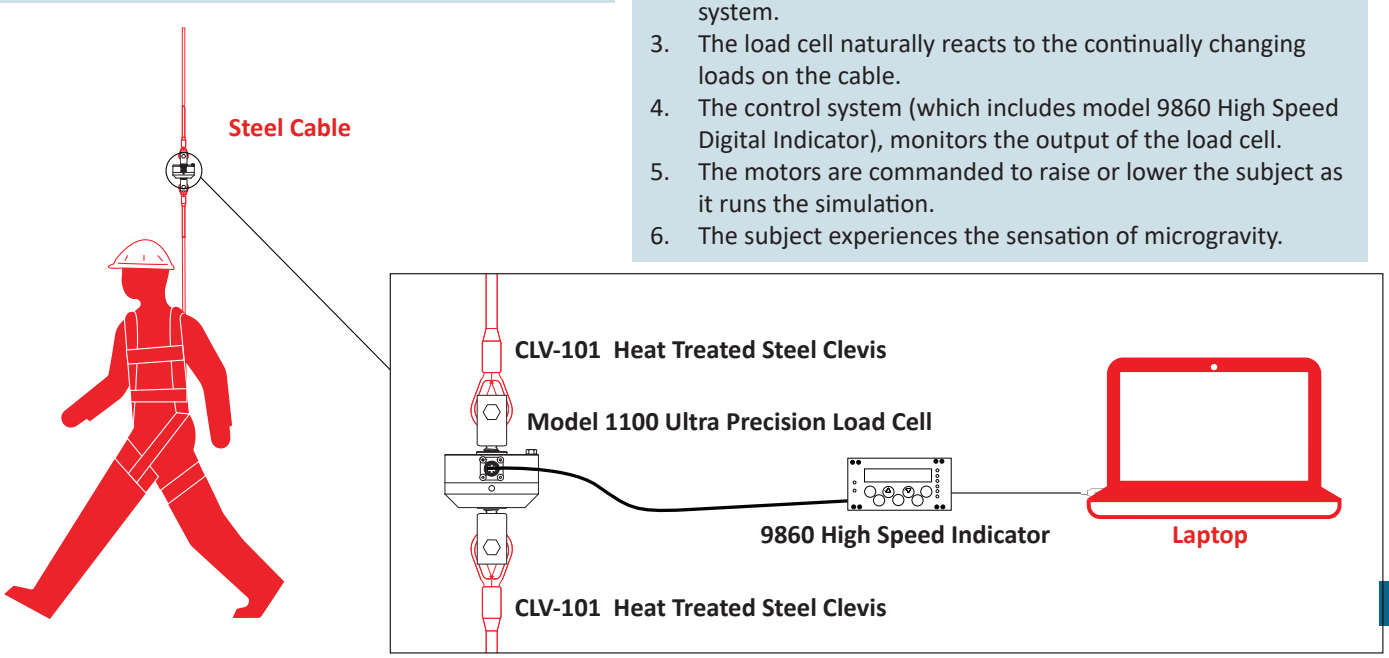
Using the precise feedback from the load cell, the control system is able to command a motor to raise or lower the subject to maintain a constant offload force. During the simulation, the system actively compensates for the movement of the subject to accurately reproduce a microgravity environment.

Materials

- Model 1100 Ultra Precision Load Cell.
- CLV-101 Heat Treated Steel Clevis.
- Model 9860 High Speed Digital Indicator.

How It Works

1. The 1100 series load cell is installed in the vertical axis steel cable.
2. The subject and simulation exercise are loaded into to system.
3. The load cell naturally reacts to the continually changing loads on the cable.
4. The control system (which includes model 9860 High Speed Digital Indicator), monitors the output of the load cell.
5. The motors are commanded to raise or lower the subject as it runs the simulation.
6. The subject experiences the sensation of microgravity.



Rocket Structural Testing
Load Cell
Industry: Aerospace

Summary

Customer Need / Challenge

NASA's Space Launch System (SLS) core stage will be the largest ever built at 27 feet in diameter and 200+ feet tall. Core components including liquid hydrogen and oxygen tanks must withstand launch loads up to 9 million pounds-force (lbf).

Interface Solution

Interface load cells attached to hydraulic cylinders at various locations along test stands to provide precise test forces. Strain gages bonded to rocket structure surface and connected to data acquisition system for stress analysis.

Results

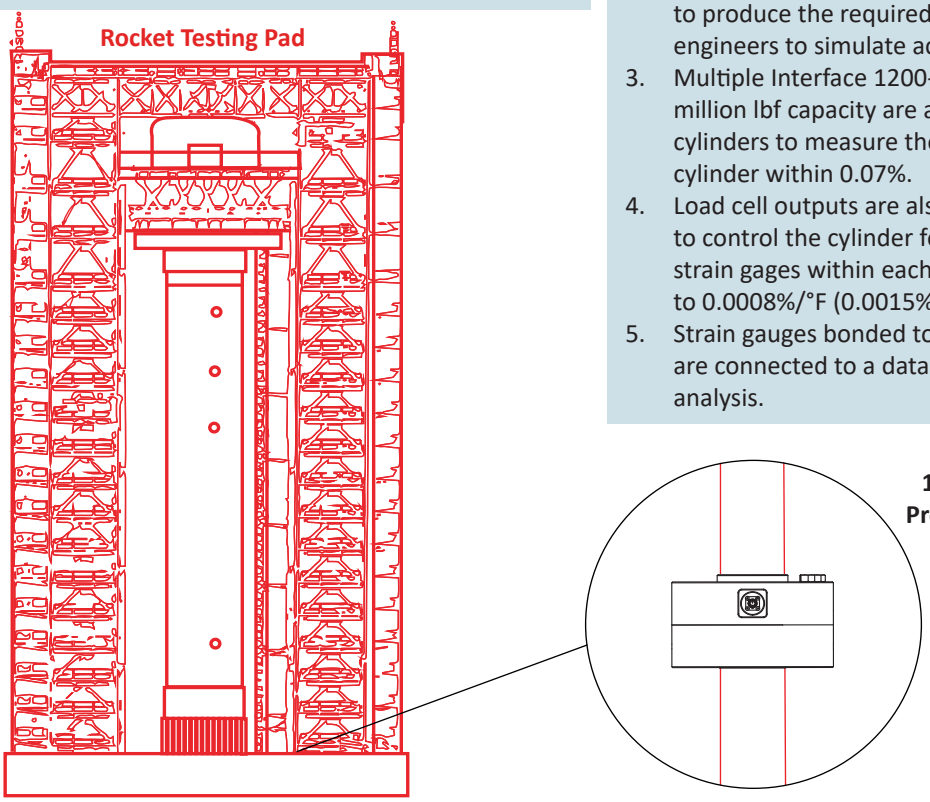
Engineers are able to measure loads applied at various areas on the rocket structure, verifying the structural performance under simulated launch conditions.

Materials

- 1200 High Capacity Standard Precision Low-Profile™ Load Cell Model 1260 for 600,000 lbf capacity.
- 1200 High Capacity Standard Precision LowProfile™ Load Cell Model 1280 for 1,000,000 lbf capacity.
- 1200 High Capacity Standard Precision LowProfile™ Load Cell Model 1290 for 2,000,000 lbf capacity.

How It Works

1. Marshall Space Flight Center in Hunstville, Alabama built a 215-foot twin tower static test stand to test the 185-foot hydrogen tank. A second 85-foot test stand was built to test oxygen tank and forward skirt.
2. The test stands contain hydraulic cylinders placed at strategic locations to push, pull or twist the structure to produce the required loads calculated by the test engineers to simulate actual launch conditions.
3. Multiple Interface 1200-series load cells of up to 2 million lbf capacity are attached in arrays to the hydraulic cylinders to measure the load being produced by each cylinder within 0.07%.
4. Load cell outputs are also fed back to the control system to control the cylinder forces. Temperature-compensated strain gages within each load cell reduce errors in output to 0.0008%/°F (0.0015%/°C).
5. Strain gauges bonded to the rocket structure being tested are connected to a data acquisition system for stress analysis.



1200 High Capacity Standard Precision LowProfile™ Load Cell

WTS Pedal Force Testing

Interface Mini™

Industry: Automotive

Summary

Customer Need / Challenge

- To meet certain vehicle safety protocols, pedal force must be measured and recorded. In order to quantify the quality of the braking system, the relationship between pedal force and braking force at the axle must be ascertained, either during an on-road stopping test or in a simulated indoor environment with a dynamometer, where pedal force can be measured.

Interface Solution

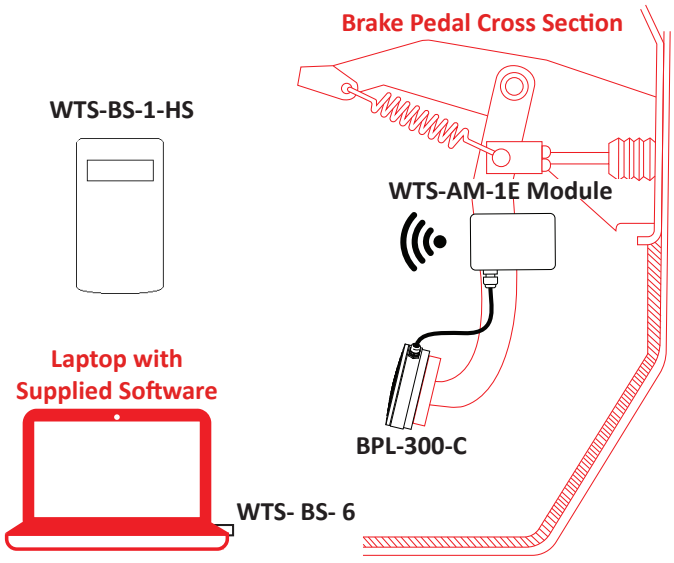
- Using an Interface Model BPL Pedal Load Cell along with the Model Wireless Telemetry System (WTS) provides a solution that measures the force being applied during the use of a brake pedal cycle. Utilizing wireless telemetry with the following Interface components, the valuable data can be displayed and/or recorded in real time using a PC and/or a handheld receiver depending on the requirements and preferences of the customer.

Results

- The relationship between pedal force and axle braking force is measured and recorded to ensure compliance with required safety regulations. Any necessary calibrations, adjustments, or modifications to the braking system can be assessed by whether the results of the brake testing fall within appropriate ranges of a pre-determined testing protocol.

Materials

- Model BPL Pedal Load Cell (mounting equipment - straps included)
- Model WTS Wireless Modules:
  - Transmitter Module (WTS-AM-1E)
  - Handheld Module (WTS-BS-1-HS)
  - Base Station Module (WTS-BS-6)



How It Works

1. Model BPL Pedal Load Cell Load is installed onto pedal so that the output cable to the transmitter has clearance from any snagging throughout the entire pedal pumping cycle.
2. Mount the transmitter WTS-AM-1E in a safe location so that there is enough slack in the cable for a full pedal pumping cycle. The Module transmits wirelessly to the WTS Toolkit App.
3. Using WTS Wireless System with the receiver (WTS-BS-6), force readings from the load cell can be displayed, logged and graphed directly on a PC. To do so, plug in the WTS-BS-6 receiver into USB port on the PC, install the WTS Toolkit software, and finally pair the transmitter to the receiver as outlined in the documentation with the software.
4. Using WTS Wireless System with the handheld receiver (WTS-BS-1-HS), force readings from the load cell can be displayed on a wireless battery powered receiver.

Aircraft Wing Fatigue Load Cell

Industry: Aerospace, Test and Measurement

Summary

Customer Need / Challenge

- Before any of the U.S. Navy's F/A-18 twin-engine supersonic fighter jets can be put into operation, the wings of the aircraft must undergo fatigue testing in a controlled environment to ensure that they are capable of withstanding the forces that will be encountered during real-world flight throughout the lifetime of the aircraft. Highly accurate measurements must be recorded in order to make sure that a near-exact replication of in-flight conditions are being achieved.

Interface Solution

- During fatigue tests, Interface Model 1248 Standard Precision Flange LowProfile™ Load Cells are installed in line with the hydraulic cylinders, which apply back-and-forth loading forces to the aircraft. This is carried out over the course of 18 months to simulate in-flight stresses and strains on the wings. Load cells are connected to indicators, which record output.

Results

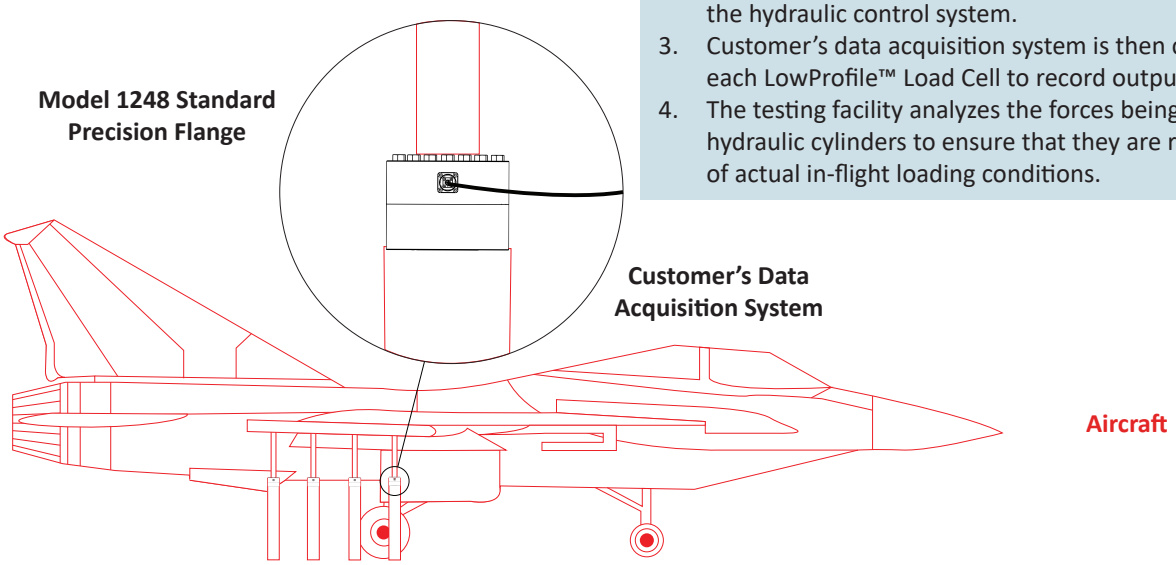
- Capable of withstanding more than 100 million ($1x10^8$) fully reversible load cycles, Interface's LowProfile™ fatigue-rated load cells have performed flawlessly in F/A-18 wing testing - with zero recorded failures in the many years that testing facilities around the world have been using them.

Materials

- Model 1248 Standard Precision Flange LowProfile™ Load Cell in 500 kN capacity with dual bridge option.
- Customer's data acquisition system.
- Customer's hydraulic control system.

How It Works

1. The F/A-18 is placed on a hydraulic testing bed where it is subjected to loading that simulates in-flight conditions.
2. Interface Model 1248 Standard Precision Flange LowProfile™ load cells are connected to each hydraulic cylinder that applies force to the wings and data is sent to the hydraulic control system.
3. Customer's data acquisition system is then connected to each LowProfile™ Load Cell to record output.
4. The testing facility analyzes the forces being created by hydraulic cylinders to ensure that they are representative of actual in-flight loading conditions.



Engine Dynamometer
Load Cell

Industry: Automotive and Vehicle

Summary

Customer Need / Challenge

Internal combustion engines are by far the most common power source for land vehicles. From a 2-stroke motor in a lawn mower, to a V-8 stock car engine, horsepower and torque are the bench marks of engine performance. Engine manufacturers and aftermarket suppliers use an engine dynamometer (dyno for short) to accurately measure an engines performance. An engine dyno isolates an engine's power output to help quantify its overall performance, applying a load directly to the engine and utilizing a load cell to measure the torque absorbed by the loading mechanism. Horsepower is then calculated using the torque and RPM of the engine.

Interface Solution

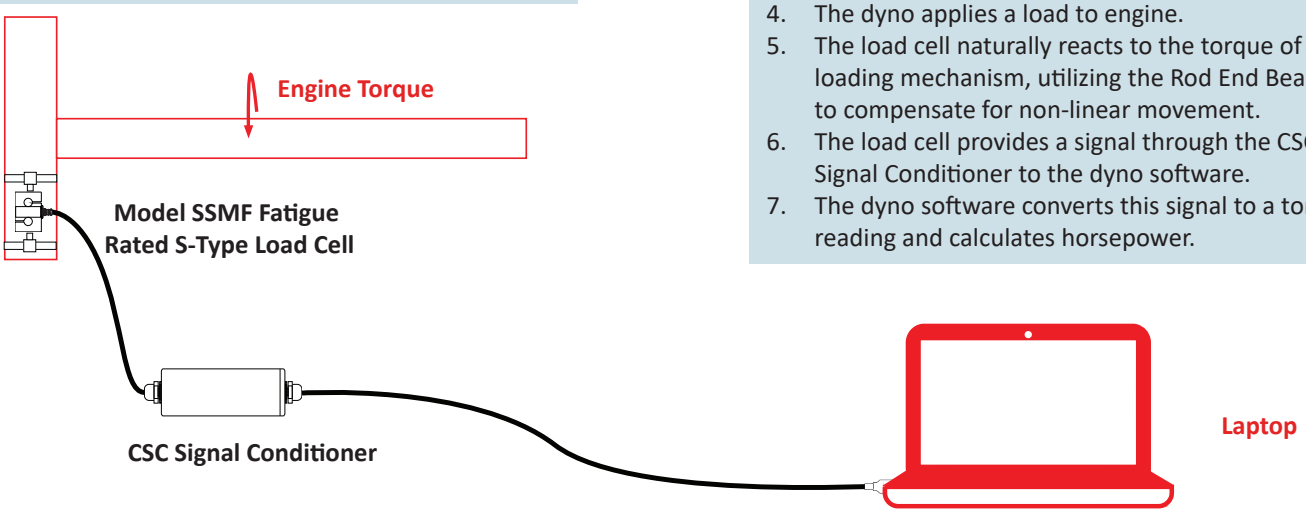
A precision S-Type Load Cell is attached to a torque arm which "feels" the torque from the engine loading system. The Interface Model SSMF is a great choice because it is fatigue-rated for 1x107 fully reversed cycles, and is environmentally sealed to withstand harsh environments. Utilizing the Model CSC Signal Conditioner provides a clear signal to a data-acquisition system.

Results

The load cell reacts precisely with the amount of torque being produced by the engine and provides accurate signals to the data-acquisition system. Engineers are then able to analyze the power transfer for the engine and optimize for performance.

Materials

- Model SSMF Fatigue Rated S-Type Load Cell.
- Rod End Bearings.
- CSC Environmentally Sealed Signal Conditioner.



How It Works

1. The engine is loaded and secured into the dyno.
2. All support systems are installed and tested.
3. The engine is started.
4. The dyno applies a load to engine.
5. The load cell naturally reacts to the torque of the loading mechanism, utilizing the Rod End Bearings to compensate for non-linear movement.
6. The load cell provides a signal through the CSC Signal Conditioner to the dyno software.
7. The dyno software converts this signal to a torque reading and calculates horsepower.

Hydrofoil Testing in Wave Tank
Load Cell

Industry: Automotive and Vehicle

Summary

Customer Need / Challenge

Hydrofoil design is a delicate balance between performance and complexity. Finding the right shape without using overly complex angles to achieve the desired amount of lift is crucial when designing a successful hydrofoil. Once an engineer's concepts are ready for testing, using the best force measurement equipment is required to sense the subtle differences between hydrofoil designs.

Interface Solution

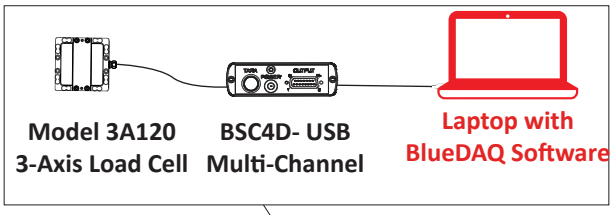
Lift and drag are the most important characteristics of a hydrofoil. Model 3A120 3-Axis load cell is needed to read these forces. The Fz senses lift and the Fx and Fy sense the drag. Using a model BSC4D-USB bridge amplifier increases the visibility of the load cells output signals.

Results

When using the load cell and bridge amplifier, the engineers are able to record the real world lift and drag forces the hydrofoils are having on the water craft. This data allows a more in-depth comparison of proposed hydrofoil designs to find the best model for the job.

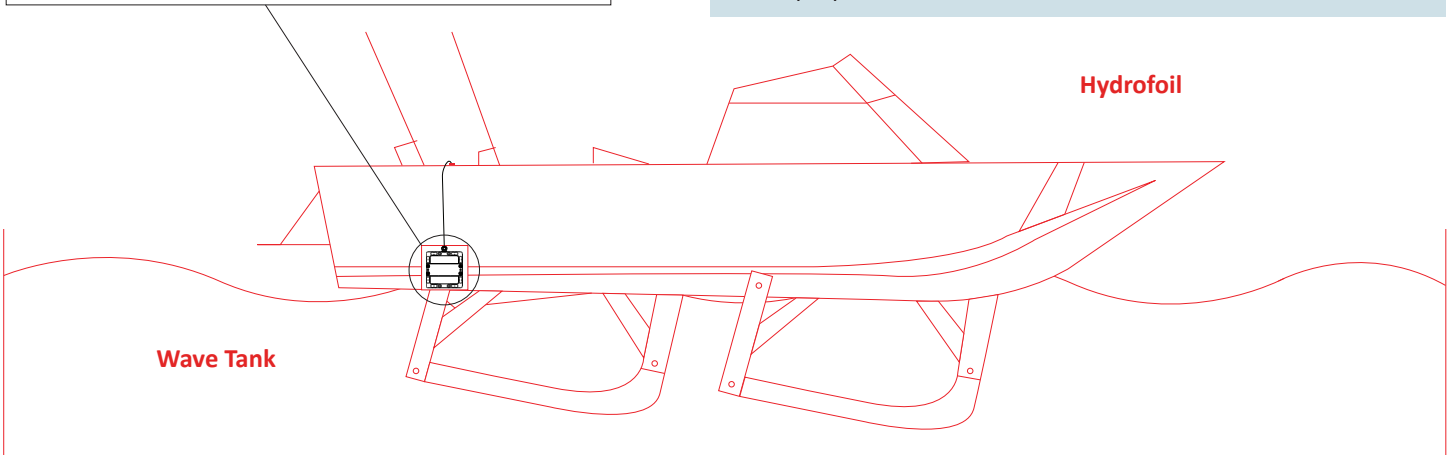
Materials

- Model 3A120 3-Axis Load Cell.
- BSC4D-USB Multi-Channel, which includes BlueDAQ display, graphing, and logging software & PC Interface Module.



How It Works

1. Model 3A120 3-Axis load cell is fixed to the hull of the water craft.
2. 2. The BSC4D-USB is connected to the load cell.
3. The hydrofoil boom is attached to the 3-Axis load cell.
4. The 3-Axis load cell and bridge amplifier are protected in a waterproof housing.
5. The water craft is placed in a wave tank or current simulator.
6. The 3-Axis load cell naturally reacts to the lift and drag loads of the hydrofoil.
7. The data is logged and stored via the BSC4D-USB on a PC laptop.



In-Motion Rail Weigh
Load Cell

Industry: Automotive and Vehicle

Summary

Customer Need / Challenge

A rail station owner wanted to collect data on the load profiles for rail cars as they were entering into the station in-motion. The customer wanted to build their own low cost set-up using components from Interface Inc. and their existing PC setup for the purpose of logging weight load characteristics in order to diagnose possible side to side loading issues, overload issues, wheel flats or wheel impact issues, at any rail car speed.

Interface Solution

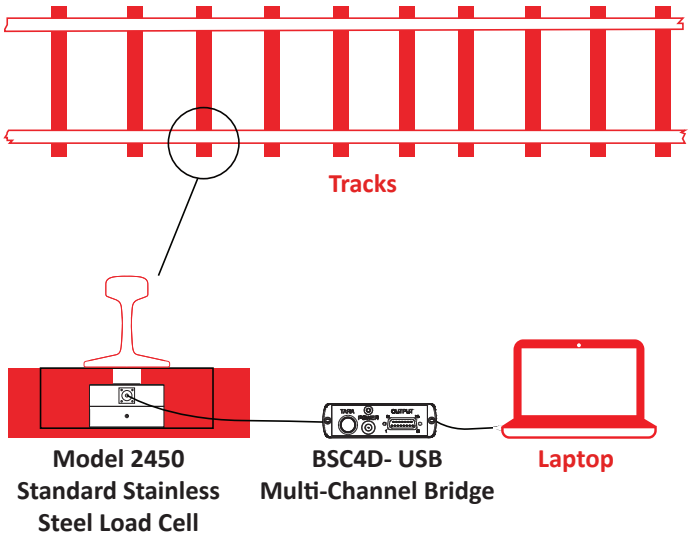
(12) Model 2450 50K capacity standard stainless steel load cells were mounted in to metal fabricated box-like structures and bolted into 6 consecutive cement rail ties, 1 on each side of each tie under the rail with a direct line of force with the rail. The cells were split into three groups of four: front, middle, and back. Each group of cells was connected to a dedicated BSC4D that accepted four load cell inputs. The BSC4D were connected to a PC through a USB hub.

Results

After all the connections were made the operator had a valuable tool for monitoring load characteristics which were used to detect a number of diagnostic conditions. The manager saved cost by creating his own set-up in-house for in-motion rail car load measuring as compared to alternative solutions/ proposals from other competitors.

Materials

- (12) Model 2450 50K capacity Standard Stainless Steel Load Cell.
- (3) Model BSC4D-USB Multi-Channel Bridge.
- Amplifier & PC Interface Module.



How It Works

1. The customer made a special fixture that allowed for the mounting of the Model 2450 50K Capacity Standard Stainless Steel Load Cell. On the top there was a plate with a threaded rod which threaded into the load cell and on the bottom was an encasement that ensured proper clearance, stability, and proper enclosure from the elements.
2. The cement rail ties were modified on both sides underneath the rail area to provide a recessed clearance for the cell fixtures. The fixtures were then fastened into the tie. Each tie has 2 fixtures. There were 6 ties altogether. There were 2 ties (4 cells) per group: front, middle, and back.
3. The load cells within the installed fixtures were connected via cables to the appropriate BSC4D -USB Multi-Channel Bridge Amplifier & PC Interface Module, using proper protective accessories and maintaining clearance from any potential snag or crush points.
4. The interface modules were each connected to a PC through a USB hub.
5. The PC had the BlueDAQ software installed that came with the interface modules.
6. After the set-up was complete the operator had full access to logged load data from all 12 load cells which was used to diagnose railcar issues.

Race car Suspension Testing
Load Cell

Industry: Automotive and Vehicle, Test and Measurement

Summary

Customer Need / Challenge

- Race car suspensions require fine tuning for best performance on various tracks.
- Simulation of bumps, banking and other track conditions result in off-axis loading.

Interface Solution

- Interface 1200-series load cell mounted on top of each post in a 4-, 5-, or 7-post rig allows race teams to measure forces during simulated laps. Moment compensating design of 1200-series load cells provide accurate readings during off-axis loading.

Results

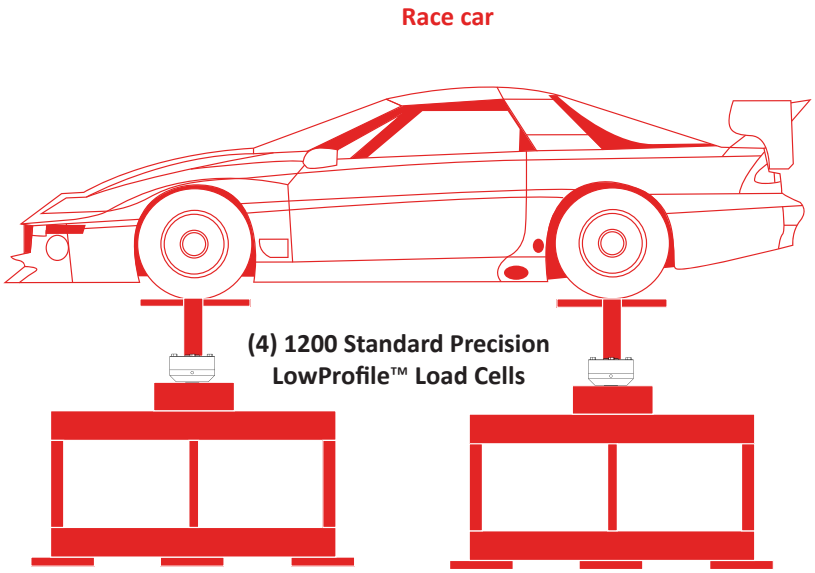
- Highly accurate (0.04%) measurement of loads applied to individual suspension points.

Materials

- (4) 1200 Standard Precision LowProfile™ Load Cells.

How It Works

1. A multiple-post vehicle suspension test rig is built into or under the floor of a race team facility. A 4-post rig tests forces at each wheel; 5-post rig adds a rear suspension point and a 7-post rig tests aerodynamic forces in addition to road (wheel) loading.
2. An Interface 1200-series load cell is mounted on each post.
3. Hydraulic actuators individually apply forces to each post to simulate the surface conditions of the track.
4. Load cells measure the aggregate of the forces being applied from both the post on which the load cell is mounted and forces from other posts being applied to the vehicle (such as when simulating a banked surface).
5. Load cell output is fed to the control system to determine cylinder force required to produce the correct force to simulate the track condition.



Vehicle Suspension Rig

Chemical Reaction-Mixing Torque Transducer

Industry: Industrial Automation

Summary

Customer Need / Challenge

- An end product is made by mixing various raw materials together in a mixing tank.
- To ensure product quality and safety, it's important that the ingredients are mixed properly without under or over-mixing.
- To do this, the density and viscosity of the mixture must be continuously analyzed during the mixing process.

Interface Solution

- Mount the mixing motor to a hollow flange reaction torque transducer to measure mixing torque.

Results

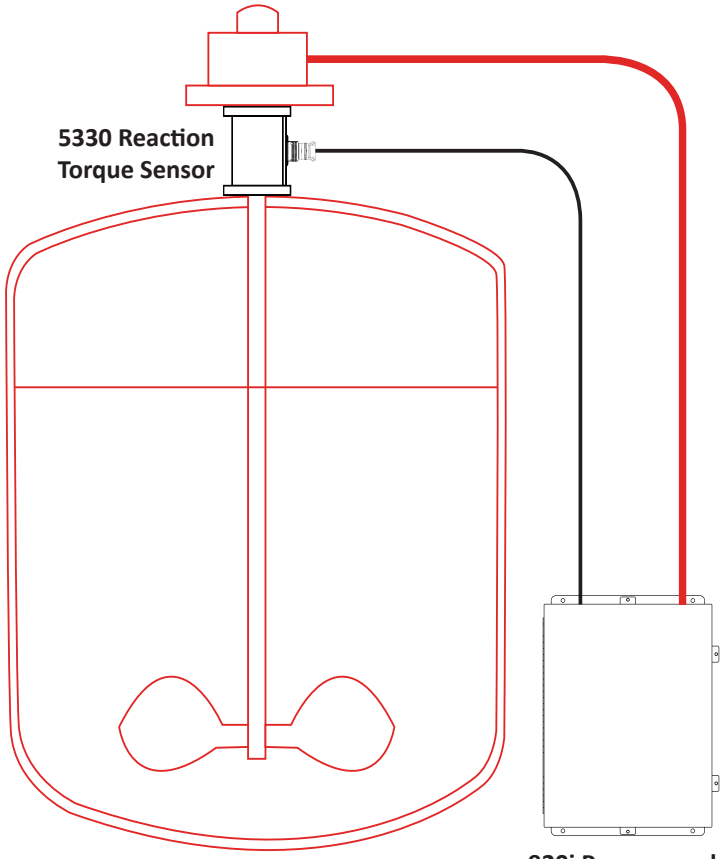
- Customer is able to determine ideal density and viscosity based on torque measurements in order to monitor the ingredient mixing and maintain product quality and safety.

Materials

- 5330 Reaction Torque Sensor.
- 920i Programmable Weight Indicator and Controller.

How It Works

1. The 5330 Reaction Torque Sensor is mounted to the adapter plate between the mixing motor and the tank lid.
2. The motor shaft passes through the hollow sensor and mobilizes the mixer shaft and blades.
3. The sensor measures the torque and feeds information back to the 920i Programmable Weight Indicator and Controller.
4. Mixing speed and duration is controlled.



Seat Testing Machine
Multi-Axis

Industry: Automotive and Vehicle

Summary

Customer Need / Challenge

- An Automotive Seat Manufacturer was conducting durability testing on their seats. During testing, the customer was consistently overloading and replacing their single-axis load cells. After a thorough inspection, it was discovered that this was due to bending moments that had never been quantified.

Interface Solution

- An Interface Model 6A68C 6-Axis load cell was installed in their existing test machine. The 6-Axis Sensor was intentionally oversized allowing the customer to measure the unidentified bending moments while preventing any damage to the 6-Axis Sensor. A Model BX8 was used to graph, log, & store the data collected at the sensor.

Results

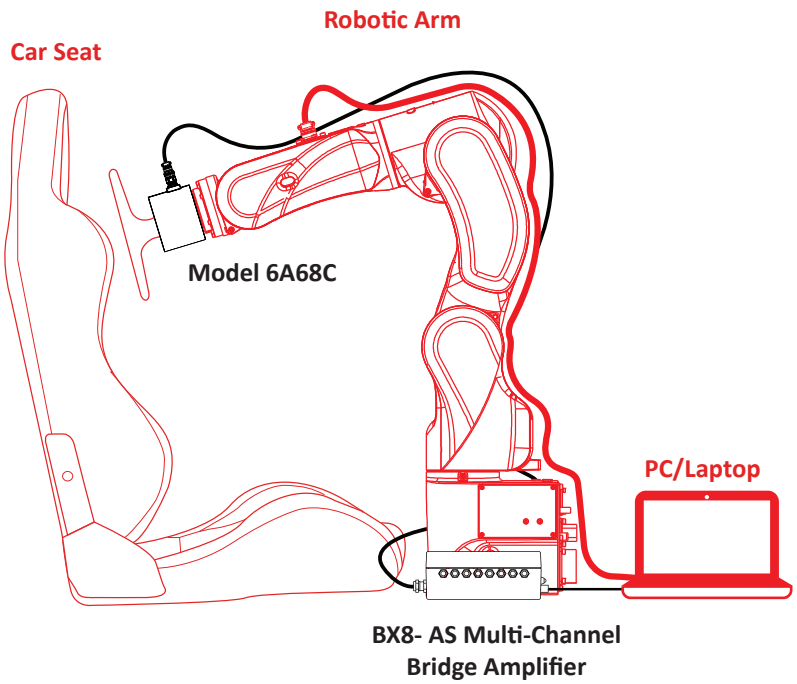
- The customer was able to identify previously unknown bending moments, permitting them to choose how they would like to proceed with testing.
- Select a more appropriate single-axis load cell capacity, capable of withstanding the entire combined loads; including the bending moment.
- Continue using a 6-Axis Sensor to take measurements.
- Redesign their testing fixture to eliminate bending moment.

Materials

- Model 6A68C 6-Axis Load Cell.
- Model BX8- AS Multi-Channel Bridge Amplifier & PC Interface Module with Software.
- Appropriate Cabling.

How It Works

1. The model 6A68C 6-Axis sensor is installed between simulated seated human and the robotic arm.
2. The model BX8- AS connected between the 6-Axis Sensor and the customer's PC Laptop.
3. The testing machine repetitively places simulated human in tested seat.
4. The 6-Axis sensor measures loads in all six axes (Fx, Fy, Fz, Mx, My, Mz).
5. The sensor's output is fed to the BX8 and to the PC laptop where it is displayed using the included software.



Wave Energy Generator
Load Cell

Industry: Energy

Summary

Customer Need / Challenge

A scientist has been tasked to create electricity by using the energy that is generated by ocean waves.

Interface Solution

As electricity is generated by ocean waves, an Interface load cell will measure tether line tension using a submersible 3200 Hermetically Sealed LowProfile® Precision Stainless Load Cell. The mooring line was attached to the load cell base and the platform generator was connected to the load cell hub. This measured the forces that were generated by the ocean waves and data was later analyzed by the customer's Data Acquisition System (DAQ).

Results

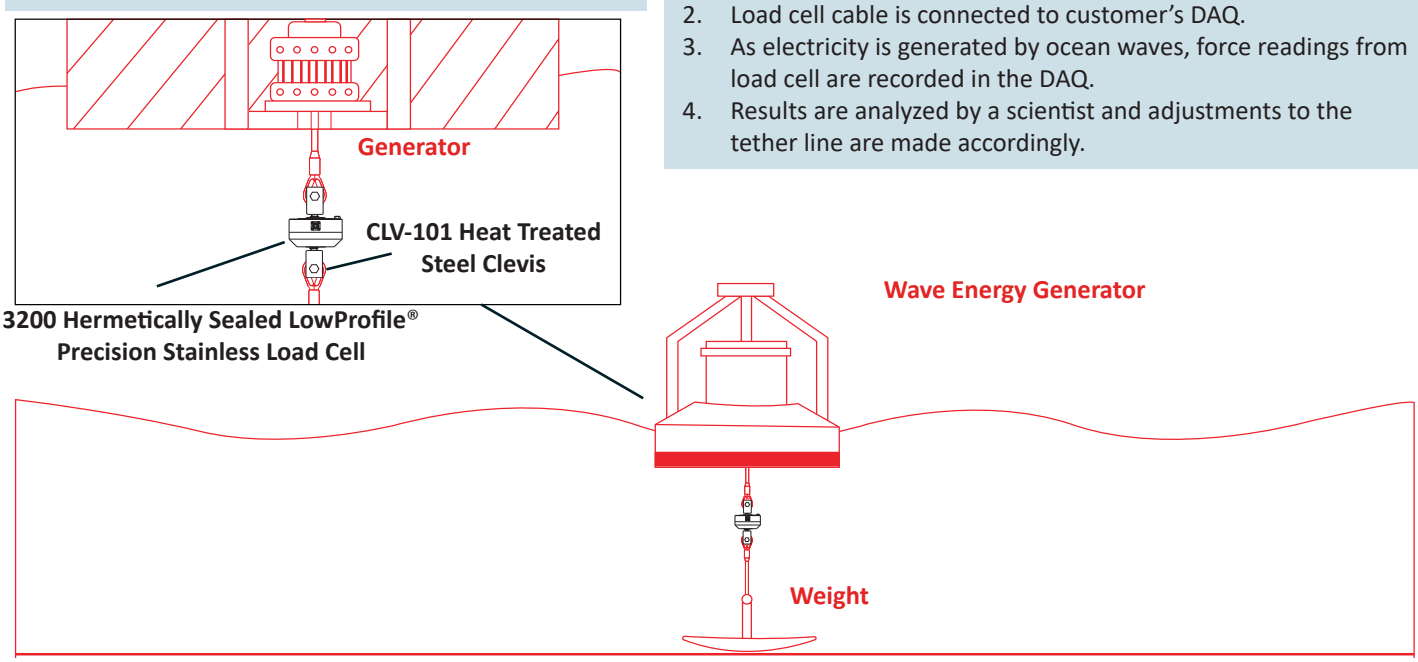
Scientists used force data to make adjustments to tether line. Also, if tether line breaks free, the scientist can be notified immediately to reattach the tether line.

Materials

- 3200 Hermetically Sealed LowProfile® Precision Stainless Load Cell.
- CLV-101 Heat Treated Steel Clevis.

How It Works

1. 3200 Hermetically Sealed LowProfile® Precision Stainless Load Cell is connected between a mooring line on the sea floor and a wave energy generator platform.
2. Load cell cable is connected to customer's DAQ.
3. As electricity is generated by ocean waves, force readings from load cell are recorded in the DAQ.
4. Results are analyzed by a scientist and adjustments to the tether line are made accordingly.



Windmill Energy
Torque Transducer
Industry: Energy

Summary

Customer Need / Challenge

Customer wants to improve the performance of a windmill by adjusting the blade pitch and measuring the torque generated as power ramps are studied.

Interface Solution

Interface Model T2 is coupled between windmill blade propeller and electric generator. Information will be sent to customer's Data Acquisition System (DAQ).

Results

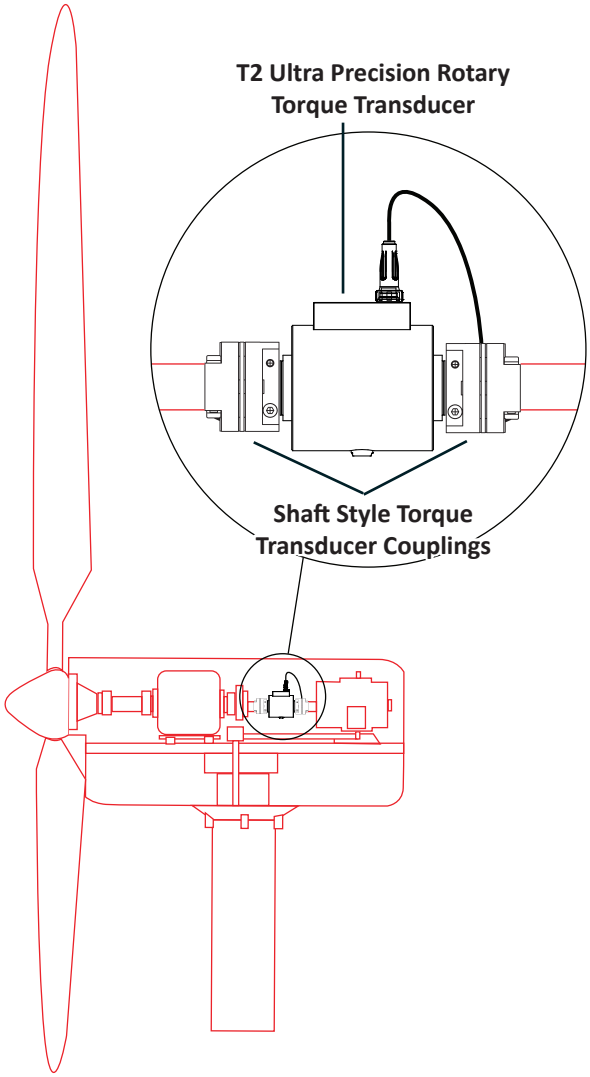
Customer was able to use torque data to determine the optimal blade pitch for the windmill. The windmill will generate more power and with less stress on the bearings.

Materials

- Model T2 Ultra Precision Rotary Torque Transducer.
- Interface Shaft Style Torque Transducer Couplings.

How It Works

1. Model T2 Torque Transducer is installed between windmill propeller and electric generator using Interface torque couplings.
2. Model T2 is connected customer's DAQ.
3. Tests are performed and torque data is logged into customer's DAQ.
4. Results are examined by customer and optimal blade pitch is determined.



Lifting Heavy Objects
Wireless Telemetry System

Industry: Industrial Automation

Summary

Customer Need / Challenge

Customer needs to use a crane to move heavy construction materials around the work site and need to monitor the weight of these objects as they are lifted.

Interface Solution

Interface Model WTSSHK-B Wireless Load Shackle are connected in crane load string to measure forces. Model WTS-BS-1-HA Battery Powered Handheld Display is used to wirelessly receive load information and display results.

Results

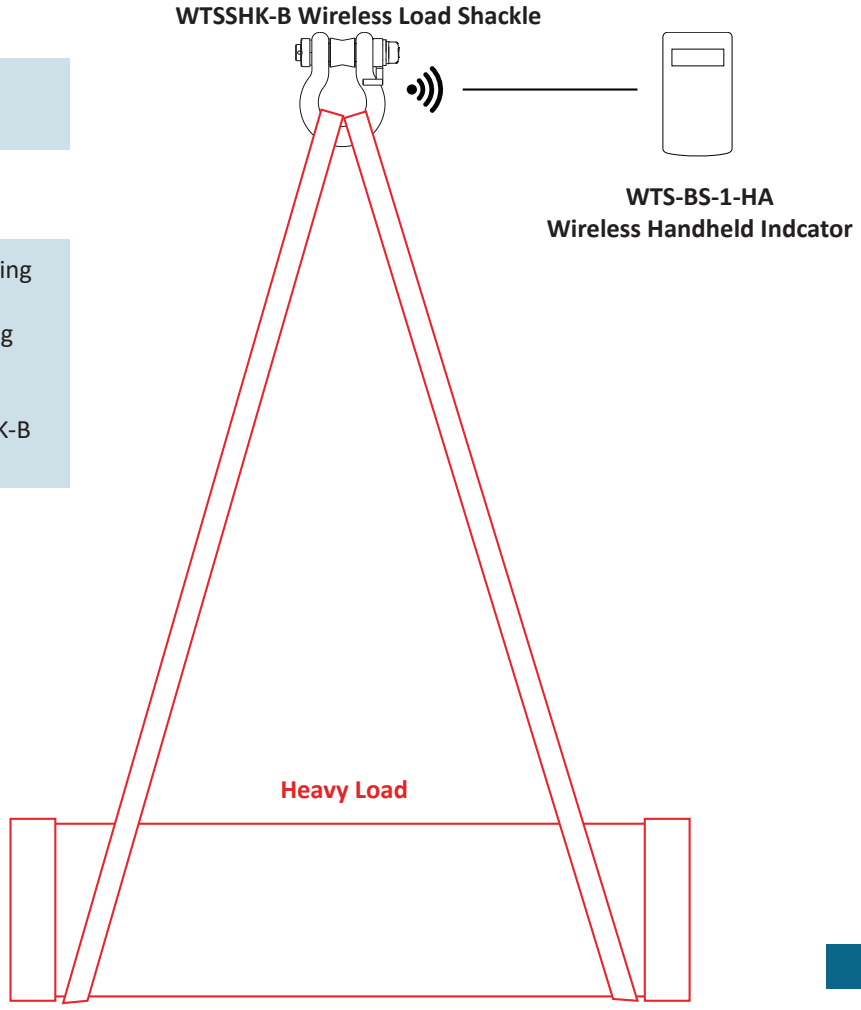
Customer is successfully lifting and reading weight (wirelessly) on a handheld display while material is being relocated.

Materials

- WTSSHK-B Wireless Load Shackle.
- WTS-BS-1-HA Wireless Handheld Indicator.

How It Works

1. Wireless Load Shackle is connected in the load string of the crane.
2. Customer connects straps to the item that is being lifted and to the load shackle.
3. WTS-BS-1-HA Battery Powered Handheld Display will wirelessly display force readings from WTSSHK-B Wireless Load Shackle.



Tablet Forming Machine Optimization

Load Cell

Industry: Industrial Automation, Medical and Healthcare

Summary

Customer Need / Challenge

A pharmaceutical tablet producer wanted to monitor the forces applied by the tablet forming machine in an effort to understand the relationship between raw material, die set, forming force, and motor cycle speed. The goal was to improve productivity and efficiency of the tablet forming process, while reducing losses (i.e. cracked tablets or voids) by adding a dimension of feedback that could be used to assign specific press adjustment criterion for given inputs.

Interface Solution

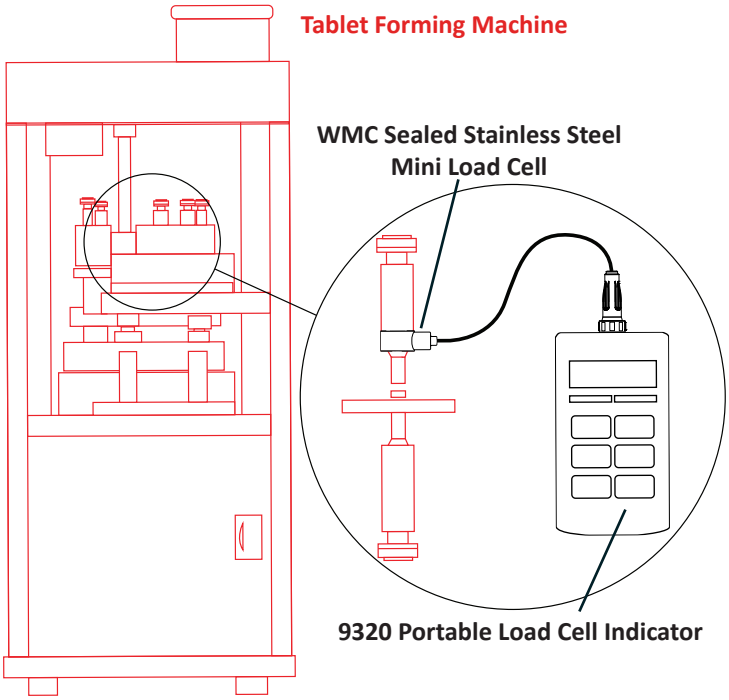
An Interface Model WMC Sealed Stainless Steel Mini Load Cell (10K lbf Capacity) was mounted in the section of the downward press bar. The machine was modified to accomplish this. The load cell was then connected to a Model 9320 Portable Load Cell Indicator to collect the needed data.

Results

After analyzing the data, the tablet producer was able to quantify adjustment levels by monitoring which forces produced the most optimal results for a given cycle speed, die set, and raw material. Productivity and efficiency was greatly improved by the enhancement of the data feedback.

Materials

- WMC Sealed Stainless Steel Mini Load Cell.
- 9320 Portable Load Cell Indicator.



How It Works

1. The customer made a custom fixture that allowed for the mounting of the WMC Sealed Stainless Steel Mini Load Cell between the downward press bar and the tablet, replacing a section of that downward press bar.
2. The output of the load cell was connected to the 9320 Portable Load Cell Indicator and set aside so that the cable did not interfere with the cycle and no snagging would occur. A cable tie was used to stow aside the cable and to ensure there was enough clearance for the entire cycle.
3. The customer then set out to establish a data correlation between the press forces for tablet forming and the outcome of the tablet itself for given raw materials, die sets, and speeds. Any variation in those variables warranted the possibility of a different optimal force.
4. The customer was then able to produce a set of guidelines to adjust the press force for the given inputs (raw materials, die sets, and speeds). These guidelines, when followed, increased productivity and efficiency while reducing losses by being able to calibrate the force.

Harness Durability Testing

Load Cell

Industry: Industrial Automation, Test and Measurement

Summary

Customer Need / Challenge

Harnesses are often used to strap humans of various weights to safety equipment or sports gear. Harness manufacturers must determine load and durability factors for harnesses and their attachment points.

Interface Solution

A drop test apparatus uses an Interface 1200 Standard Precision LowProfile® Load Cell attached to a cable and loaded harness. The loaded harness is dropped from a specified height to measure the force generated during sudden stop at maximum cable extension.

Results

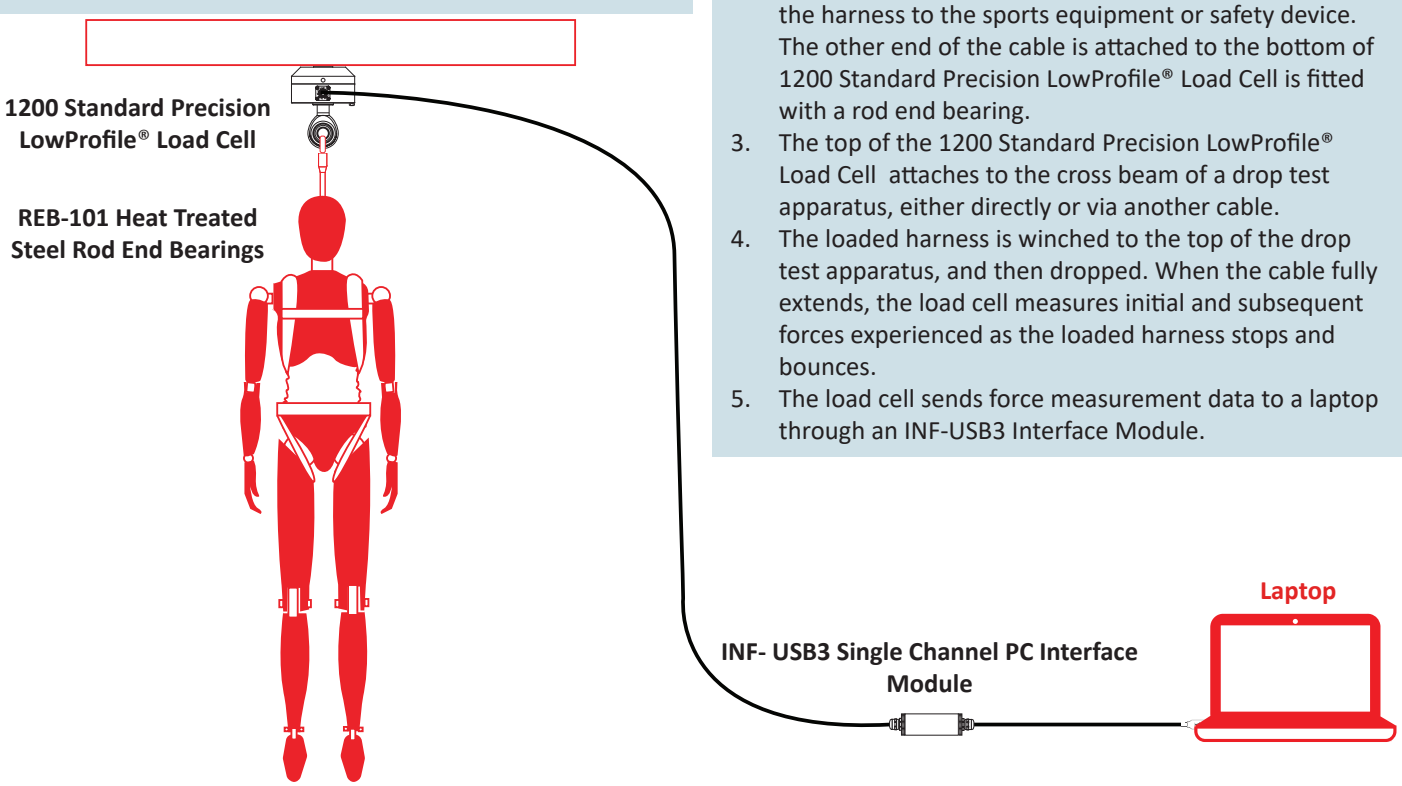
Engineers determine the total force on the harness for various body weights dropped from maximum usage heights to set harness limits. Tests can be repeated numerous times to determine fatigue and durability limits.

Materials

- 1200 Standard Precision LowProfile® Load Cell.
- REB-101 Heat Treated Steel Rod End Bearings.
- INF-USB3 Single Channel USB Interface Module with supplied software.

How It Works

1. Test engineers place the harness to be tested on a dummy of known weight.
2. The loaded harness is attached to one end of a cable. Ideally this is the same type of cable used to attach the harness to the sports equipment or safety device. The other end of the cable is attached to the bottom of 1200 Standard Precision LowProfile® Load Cell is fitted with a rod end bearing.
3. The top of the 1200 Standard Precision LowProfile® Load Cell attaches to the cross beam of a drop test apparatus, either directly or via another cable.
4. The loaded harness is winched to the top of the drop test apparatus, and then dropped. When the cable fully extends, the load cell measures initial and subsequent forces experienced as the loaded harness stops and bounces.
5. The load cell sends force measurement data to a laptop through an INF-USB3 Interface Module.



Furniture Fatigue Cycle Testing

Load Cell

Industry: Industrial Automation

Summary

Customer Need / Challenge

To meet safety protocols in relation to the manufacturing of various furniture products, fatigue testing, shock testing, and proof testing must be rigorously performed before diffusion into the marketplace. Force testing simulations on furniture products are critical in determining the posted max loads in order to protect manufacturers from liability due to damages that might result from the misuse of those products and overloading.

Interface Solution

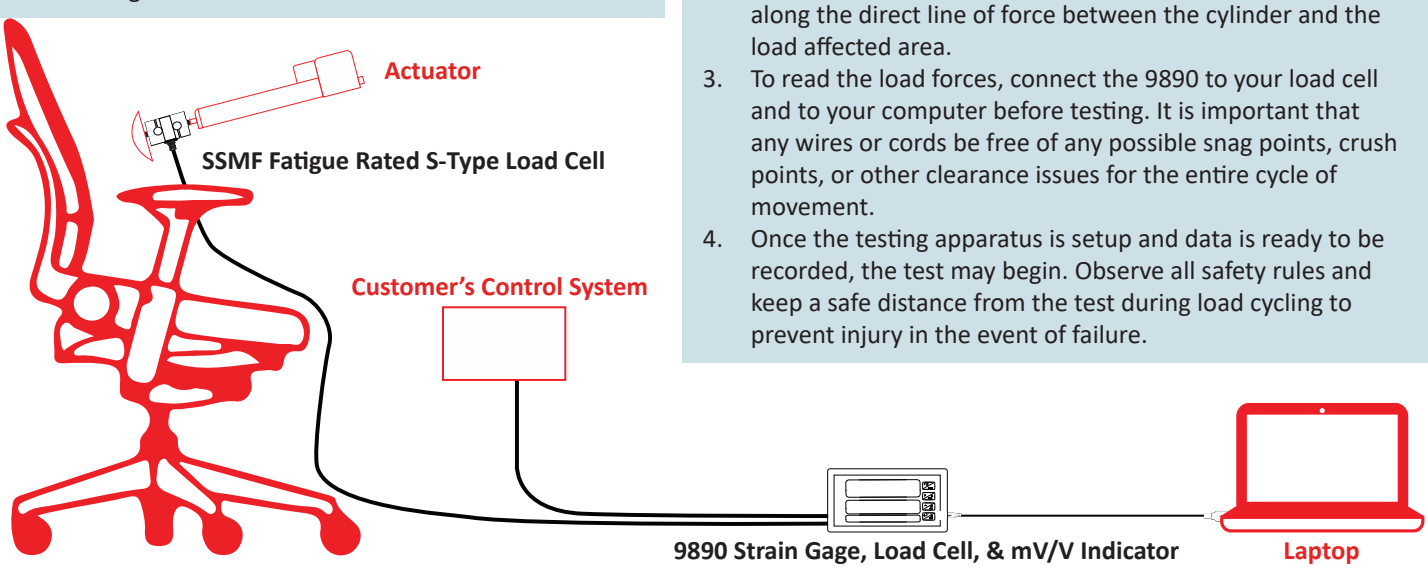
Using an Interface Model SSMF Fatigue Rated S-Type Load Cell along with Interface Model 9890 Strain Gage, Load Cell, & mV/V Indicator provides a solution that measures the force being applied in fatigue cycle testing of a furniture product, in this case testing the rocking mechanism in an office chair. Unlike other similar load cells, the Model SSMF is fatigue rated making it highly suitable for fatigue testing. No fatigue failure of any fatigue-rated Interface load cell, used within it's ratings, has ever been reported.

Results

The furniture manufacturer was able to obtain accurate data about the rocking mechanism the office chair as it was fatigue cycled into failure. Adjustments were made to the design to improve the safety and life of the furniture, ensuring product quality and protecting the manufacturer from future liability.

Materials

- Model SSMF Fatigue Rated S-Type Load Cell.
- 9890 Strain Gage, Load Cell, & mV/V Indicator, which comes standard with logging and configuration software.



How It Works

1. Determine the feature on the product to be tested, and build an apparatus that will focus loads into that area.
2. Once the load applicators or cylinders are in place, install the Model SSMF Fatigue Rated S-Type Load cell somewhere along the direct line of force between the cylinder and the load affected area.
3. To read the load forces, connect the 9890 to your load cell and to your computer before testing. It is important that any wires or cords be free of any possible snag points, crush points, or other clearance issues for the entire cycle of movement.
4. Once the testing apparatus is setup and data is ready to be recorded, the test may begin. Observe all safety rules and keep a safe distance from the test during load cycling to prevent injury in the event of failure.

Candy Stamp Force Testing
Load Cell

Industry: Industrial Automation

Summary

Customer Need / Challenge

- Manufacturers of hard shell candies often stamp text or logos on the candy shells.
- Stamping too hard breaks the candy shell. Stamping too light results in an uneven or incomplete imprint.

Interface Solution

- A test apparatus uses an Interface Model WMC Mini Load Cell attached to hydraulic actuators to measure the compression force required.

Results

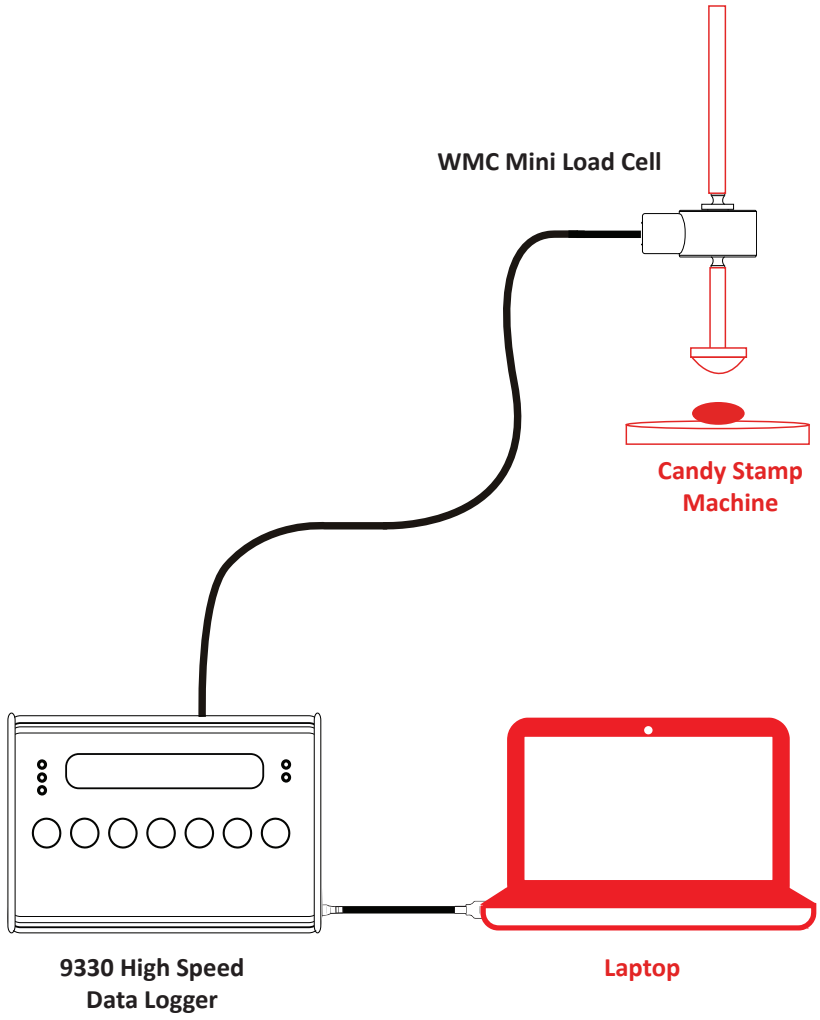
- Engineers determine specific force needed to properly apply the imprint without breaking the candy shell.

Materials

- WMC Sealed Stainless Steel Mini Load Cell.
- 9330 High Speed Data Logger.

How It Works

1. A hard shell candy is placed in a support under the test apparatus.
2. An Interface Model WMC Mini Load Cell is mounted between the hydraulic actuator and the candy being tested.
3. Force applied by the hydraulic actuator bends the top of the sealed load cell while the resistance from the candy bends the bottom of the load cell.
4. The two ends of the load compress toward the center where strain gages convert the applied force to an electrical signal.
5. Electrical signals are sent to the Interface Model 9330 and displayed in lbs. A USB connection to a laptop running the included graphical software shows the force profile as the load is applied.
6. The test engineer continues to apply hydraulic force until the shell cracks.



Friction Testing
Multi-Axis

Industry: Industrial Automation, Test and Measurement

Summary

Customer Need / Challenge

A testing laboratory was looking to replace two single axis load cells used in their friction testing machine with one sensor that could measure force on the x, y, and z axis simultaneously.

Interface Solution

An Interface Model 3A60 3-Axis load cell was installed on their existing machine with an Interface BSC4D-USB Multi-Channel PC Interface hooked directly to a PC laptop to monitor and log the data in real time.

Results

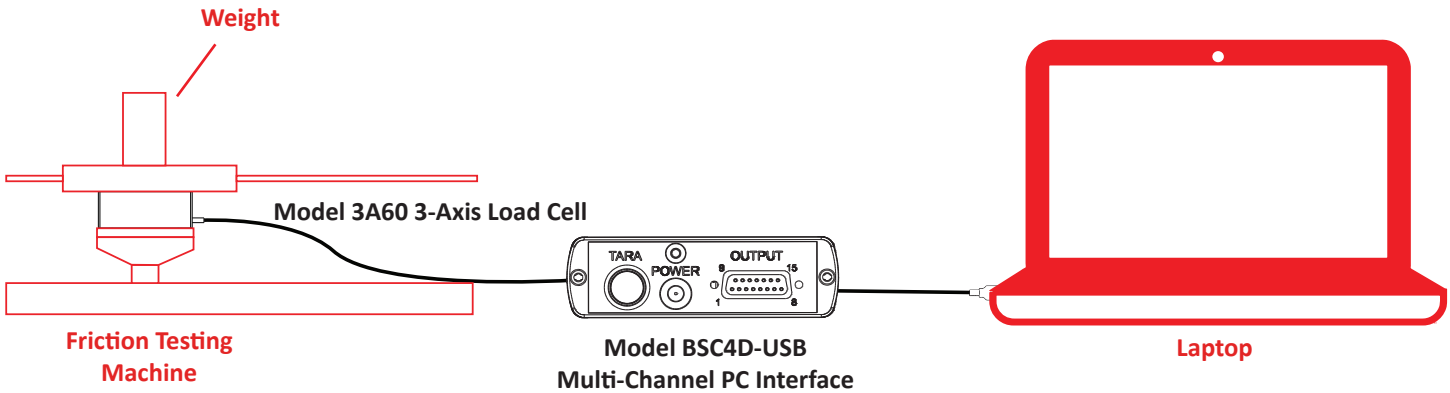
The testing laboratory was able to simplify their sensor set-up and improve their data collection, creating more value for their end customer.

Materials

- Model 3A60 3-Axis Load Cell.
- Model BSC4D-USB Multi-Channel PC Interface.
- Module which includes BlueDAQ – display, graphing, and logging software.
- Appropriate cabling.

How It Works

1. The 3-Axis load cell is installed between the arm of the friction testing machine and the test specimen.
2. The BSC4D is installed between the 3-Axis load cell and the PC laptop.
3. Weights are placed on the top of the arm to create a down force.
4. The machine arm drags the test specimen across the material resting on the bed.
5. The 3-Axis load cell measures the forward/back force (x), side to side force (y) and down force (z) being applied to the test specimen.
6. The sensor's output is fed to the BSC4D and to the PC laptop where it is displayed using the included software.



Bridge Seismic Force Monitoring Solution

Load Pin

Industry: Industrial Automation

Summary

Customer Need / Challenge

Customer would like to monitor seismic activity that occurs to a bridge by using force sensors and then continuously monitoring bridge forces before, during and after earthquakes occur. Customer would prefer a wireless solution so they would not need to run long cables on the bridge.

Interface Solution

Using Interface Inc. WTSLP Load Pin custom made to fit their needs along Interface Inc. WTS Wireless Telemetry System continuous force monitoring was able to take place without long cables.

Results

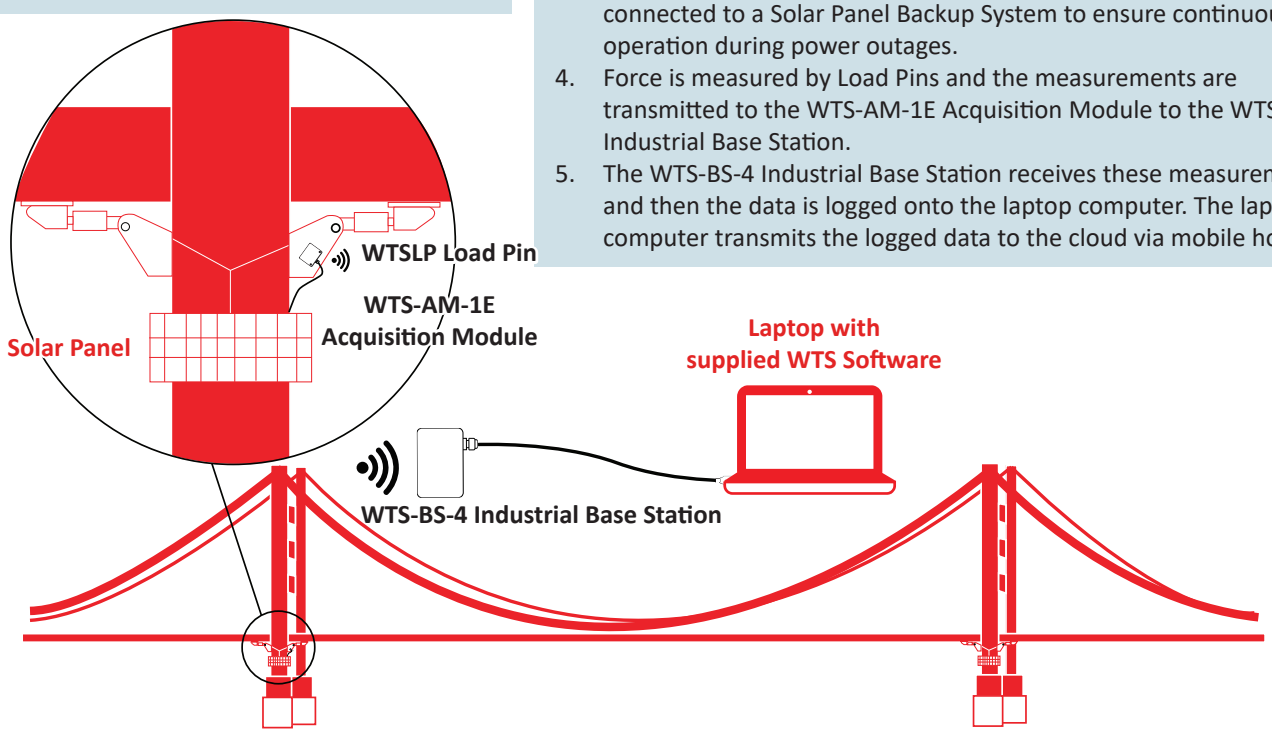
Customer was able to monitor continuous loads, log information to the cloud and review information.

Materials

- WTSLP Load Pin.
- WTS-AM-1E Acquisition Module.
- WTS-BS-4 Industrial Base Station.
- Customer's Data Acquisition System.
- PC computer with supplied WTS Software.
- Solar Panel.

How It Works

1. WTSLP Load Pins and the WTS-AM-1E Acquisition Module are installed onto the bridge. The WTS-AM-1E Acquisition Module is installed in a way that will be a clear line of site.
2. WTS-BS-4 Industrial Base Station is connected to the PC computer and installed up to 800 meters of the WTS-AM-1E Acquisition Module.
3. WTS-AM-1E Acquisition Module and Laptop Computer are also connected to a Solar Panel Backup System to ensure continuous operation during power outages.
4. Force is measured by Load Pins and the measurements are transmitted to the WTS-AM-1E Acquisition Module to the WTS-BS-4 Industrial Base Station.
5. The WTS-BS-4 Industrial Base Station receives these measurements and then the data is logged onto the laptop computer. The laptop computer transmits the logged data to the cloud via mobile hot spot.



Ball and Socket Prosthetic Multi-Axis

Industry: Medical and Healthcare

Summary

Customer Need / Challenge

- A medical device manufacturer was developing a new design for an artificial hip joint, and needed to validate load consistency, and the durability of their design.

Interface Solution

- A Model 6A40B 6-Axis Load Cell was mounted to the manufacturer's test machine, where loads were applied to simulate actual use. A Model BX8 was connected to the sensor to collect data.

Results

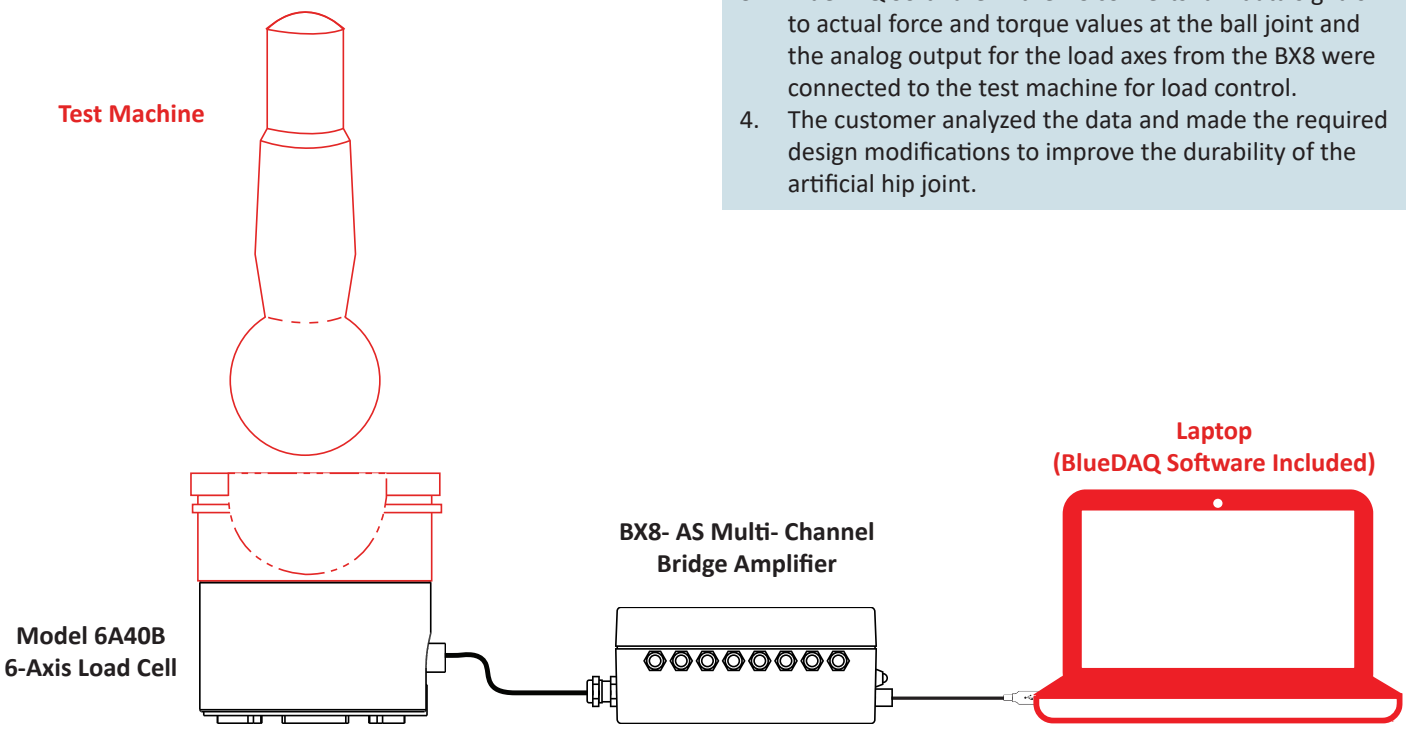
- After analyzing the data the manufacturer was able to improve the durability of their design.

Materials

- Model 6A40B 6-Axis Load Cell.
- BX8- AS Multi-Channel Bridge Amplifier with BlueDAQ Software.
- Customer PC for data logging and analysis.

How It Works

1. A test profile was set and the loads monitored and fed back into the test machine to control the loads.
2. The output of the 6-Axis sensor was connected to the Model BX8 Data Acquisition Amplifier which was connected via USB cable to the PC.
3. BlueDAQ Software in the PC converts raw data signals to actual force and torque values at the ball joint and the analog output for the load axes from the BX8 were connected to the test machine for load control.
4. The customer analyzed the data and made the required design modifications to improve the durability of the artificial hip joint.



Surgical Stapler Force Verification

Load Button

Industry: Medical and Healthcare, Test and Measurement

Summary

Customer Need / Challenge

- A large medical manufacturer required a load button load cell for verification of the manual forces needed to activate their surgical stapler. In addition to measuring force to a very precise degree, the cell also needed to be relatively small, easy to mount, and provide reliable accuracy.

Interface Solution

- With a small diameter and capacities ranging from 100 – 1k lbf, the Interface LBMU Compression Load Button is ideal for surgical staple testing applications. The cell was mounted to the surgical stapler to enable force verification, and then connected to a 9890 Load Cell Indicator (installed in the customer's test rig) which recorded output.

Results

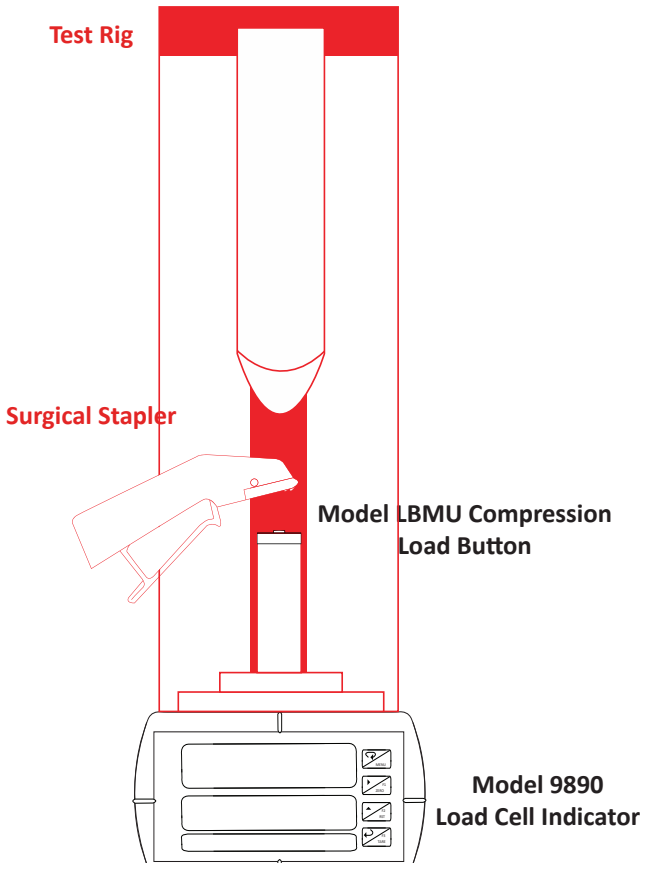
- After data was collected and analyzed, the medical manufacturer was able to optimize their design and minimize the excessive force applied by users (e.g., surgeons). The adjustments minimized hand fatigue and improved the stapler's performance in real-world surgical applications.

Materials

- Model LBMU Compression Load Button, 100 lbf Capacity.
- Model 9890 Load Cell Indicator with supplied software (Shown Mounted in customer test rig.)

How It Works

1. The LBMU Compression Load Button load cell is mounted beneath the surgical stapler to enable force verification.
2. The 9890 Load Cell Indicator with supplied software is connected to the load cell and PC for logging so that output can be recorded.
3. Testers then activate the stapler to simulate typical use, and the load cell converts applied force into signals, which are then fed to the indicator and displayed on the screen.
4. Data is then collected and analyzed in order to minimize the excessive force applied by users, and improve upon the overall design of the stapler.



Prosthetics Load and Fatigue Testing

Load Cell

Industry: Medical and Healthcare, Test and Measurement

Summary

Customer Need / Challenge

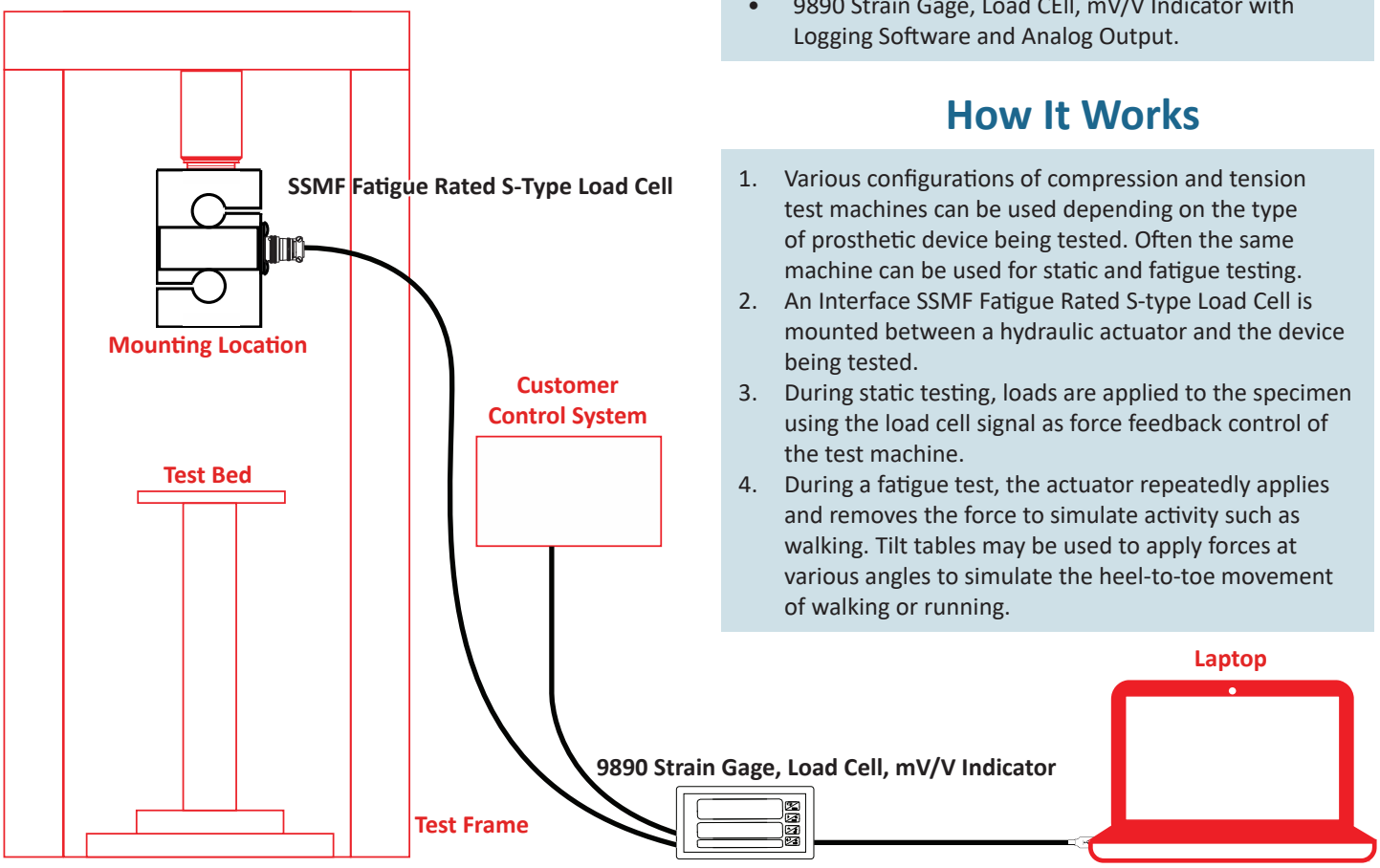
Prosthetic limbs must be tested for extreme loading that can occur during falls, accidents, and sports movements. Fatigue testing of prosthetic components determines the expected lifespan of the components under normal usage.

Interface Solution

A static load test apparatus uses SSMF Fatigue Rated S-type Load Cell attached to hydraulic actuators to apply and measure loads. A fatigue testing machine uses SSMF Fatigue Rated S-type Load Cell to apply and measure cyclic loads.

Results

Engineers determine whether prosthetic materials and designs will withstand the rigors of daily use and occasional highload situations.



Materials

- SSMF Fatigue Rated S-type Load Cell.
- 9890 Strain Gage, Load CEll, mV/V Indicator with Logging Software and Analog Output.

How It Works

1. Various configurations of compression and tension test machines can be used depending on the type of prosthetic device being tested. Often the same machine can be used for static and fatigue testing.
2. An Interface SSMF Fatigue Rated S-type Load Cell is mounted between a hydraulic actuator and the device being tested.
3. During static testing, loads are applied to the specimen using the load cell signal as force feedback control of the test machine.
4. During a fatigue test, the actuator repeatedly applies and removes the force to simulate activity such as walking. Tilt tables may be used to apply forces at various angles to simulate the heel-to-toe movement of walking or running.

Medical Bag Weighing
Load Cell

Industry: Medical and Healthcare

Summary

Customer Need / Challenge

It is important to monitor the amount of material in a medical bag. Medical staff needs to know if a medical bag is empty or if the dispensing tubes are blocked. Force measurements can track this.

Interface Solution

Using Interface Model MB Miniature Beam or MBP Miniature Beam with built-in overload protection combined with Interface instrumentation, force readings can be captured, displayed and stored for this need.

Results

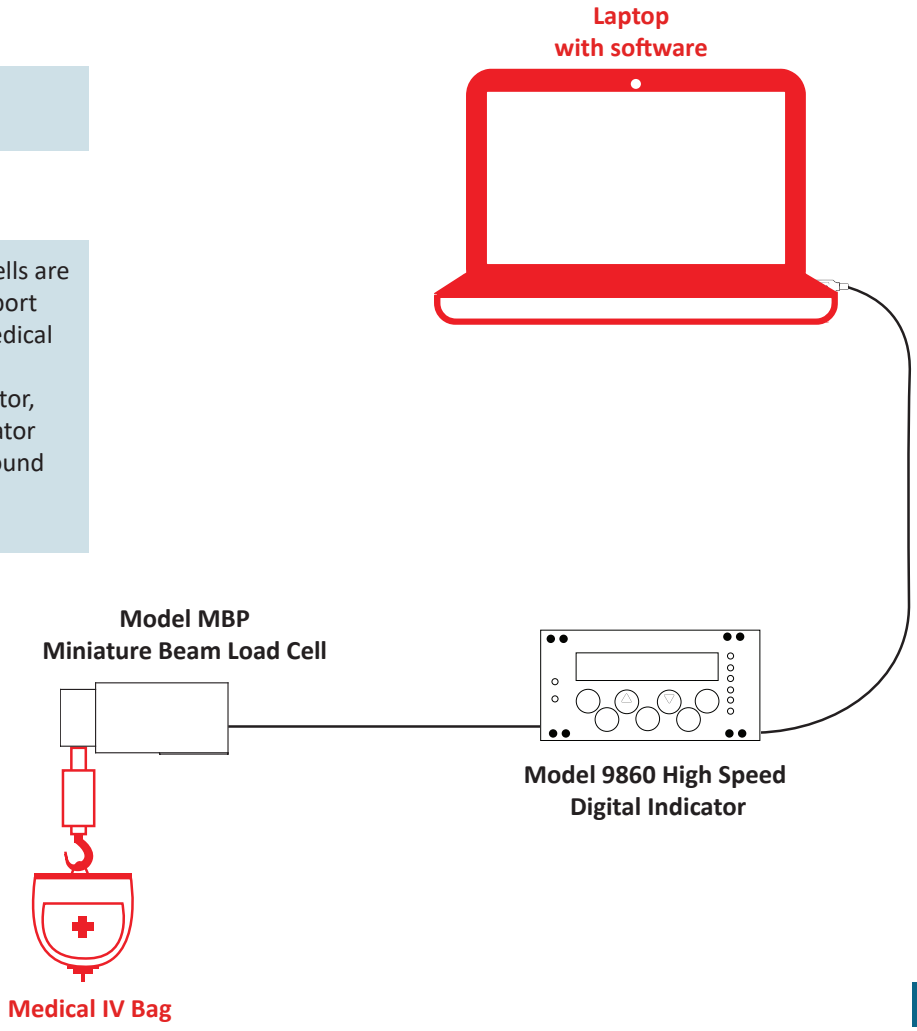
Health Professionals can review and monitor medical bag weights to ensure medicine is properly dispensed and bag is replaced when empty.

Materials

- Model MBP Miniature Beam Load Cell.
- Model 9860 High Speed Digital Indicator.

How It Works

1. Model MP or MBP Miniature Beam Load Cells are installed between the medical bag and support structure. The load cell will measure the medical bag weight that is hanging from it.
2. Using Model 9860 High Speed Digital Indicator, weight readings will display on a local indicator and can trigger open collector outputs to sound alarms or stop machines as needed.



Vascular Clamp Force Load Button

Industry: Medical and Healthcare

Summary

Customer Need / Challenge

Customer wants to examine different types of vascular clamps to see which types will generate the best clamping force of surgery.

Interface Solution

Interface Model 9330 High Speed Data Logging Indicator and ConvexBT Load Button Load Cell were used to record the force measurements of these different clamps.

Results

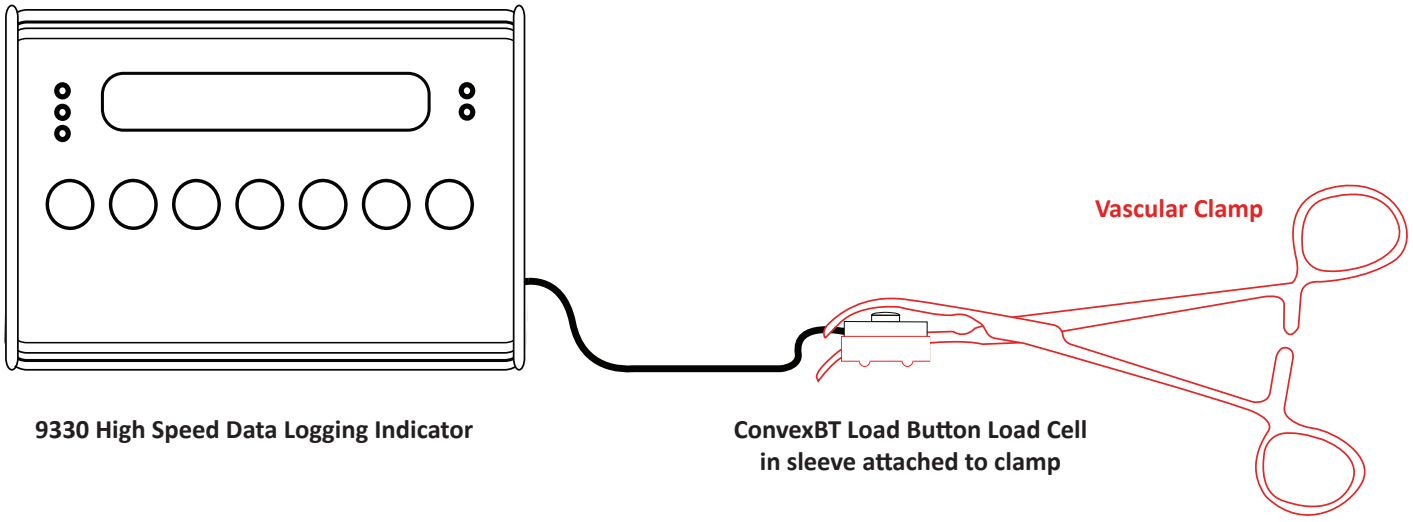
Customer was able to compare three different types of clamps and determine the best one to use during surgery.

Materials

- 9330 High Speed Data Logging Indicator
- ConvexBT Load Button load Cell
- Vascular clamps
- Load cell mounting hardware

How It Works

1. The ConvexBT is mounted to the jaw of the vascular clamp (this will require customer supplied fixtures).
2. 9330 High Speed Data Logging Indicator is connected to Model LBS Load cell.
3. Customer performs required tests and data is stored to SD card (can be stored directly to PC as well).
4. Customer downloads logging information from SD card to PC (if not directly logged to PC).
5. Customer evaluates results by reviewing logged data using a PC computer.



9330 High Speed Data Logging Indicator

ConvexBT Load Button Load Cell in sleeve attached to clamp

Stent and Catheter Testing
Load Cell

Industry: Medical and Healthcare, Test and Measurement

Summary

Customer Need / Challenge

- Customer needs to apply known forces to stent and catheters to ensure they pass all necessary strength and flexibility testing.

Interface Solution

- Model MBP Overload Protected Beam Miniature Load Cell is placed behind the guide wire for the stent or catheter. The motor will spin the linear drive and push the load cell and guide the wire through the testing maze. Model MBP Overload Protected Beam Miniature Load Cell is connected to Model DIG-USB PC Interface Module. All forces are measured and stored on PC.

Results

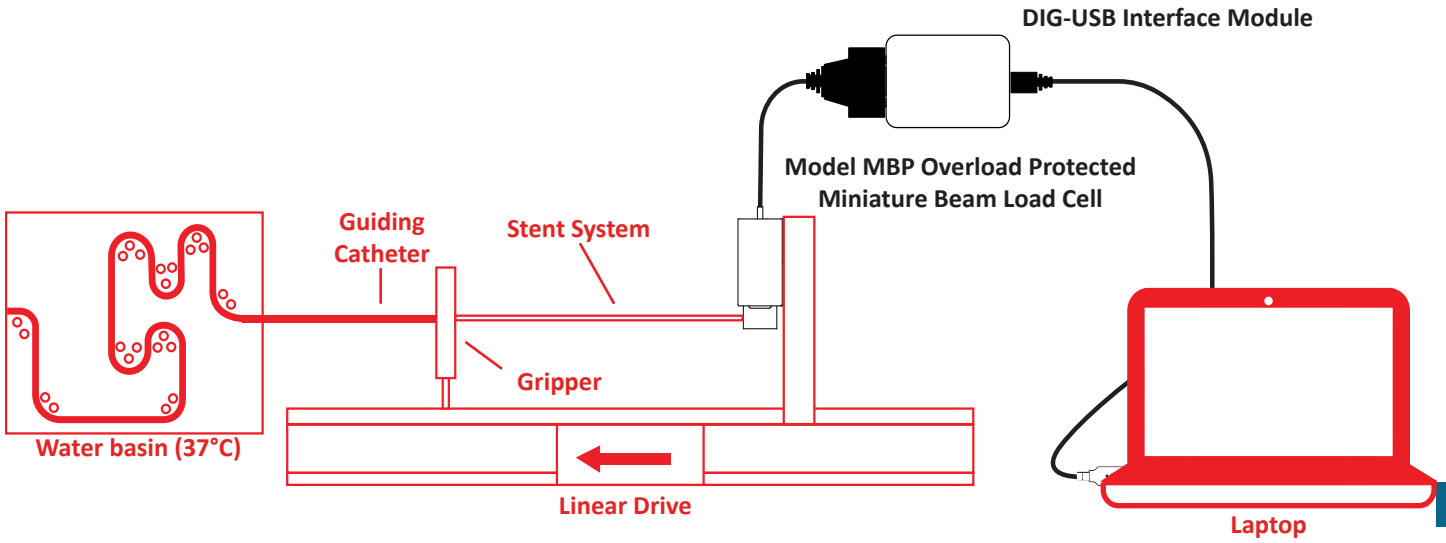
- Customer was able to perform required testing and log to PC, followed by being able to review results and take actions as needed.

Materials

- Model MBP Overload Protected Beam Miniature Load Cell.
- DIG-USB PC Interface Module.
- Interconnect cable.

How It Works

1. Install Model MBP Overload Protected Beam Miniature Load Cell onto linear guide.
2. Connect Model MBP Overload Protected Beam Miniature Load Cell to Model DIG-USB PC Interface Module.
3. Connect Model DIG-USB to customer's PC.
4. Forces measured by Model MBP Overload Protected Beam Miniature Load Cell will be displayed and logged onto customer's PC.



Bluetooth®
Interface Mini™
Industry: Automotive

Summary

Customer Need / Challenge

- The customer needs to measure brake pedal force when the pedal is pressed during automobile testing.

Interface Solution

- As the pedal is pressed, force is measured by the BPL-300-C Brake Pedal Load Cell. Results are transmitted by the BTS-AM-1 Bluetooth Low Energy (BLE) Strain Bridge Transmitter Module to the BTS Toolkit Mobile App and displayed on a mobile device.

Results

- The customer objective has been achieved when a brake test was executed the force measurement was simultaneously displayed and graphed for examination in real time in the tested vehicle.

Materials

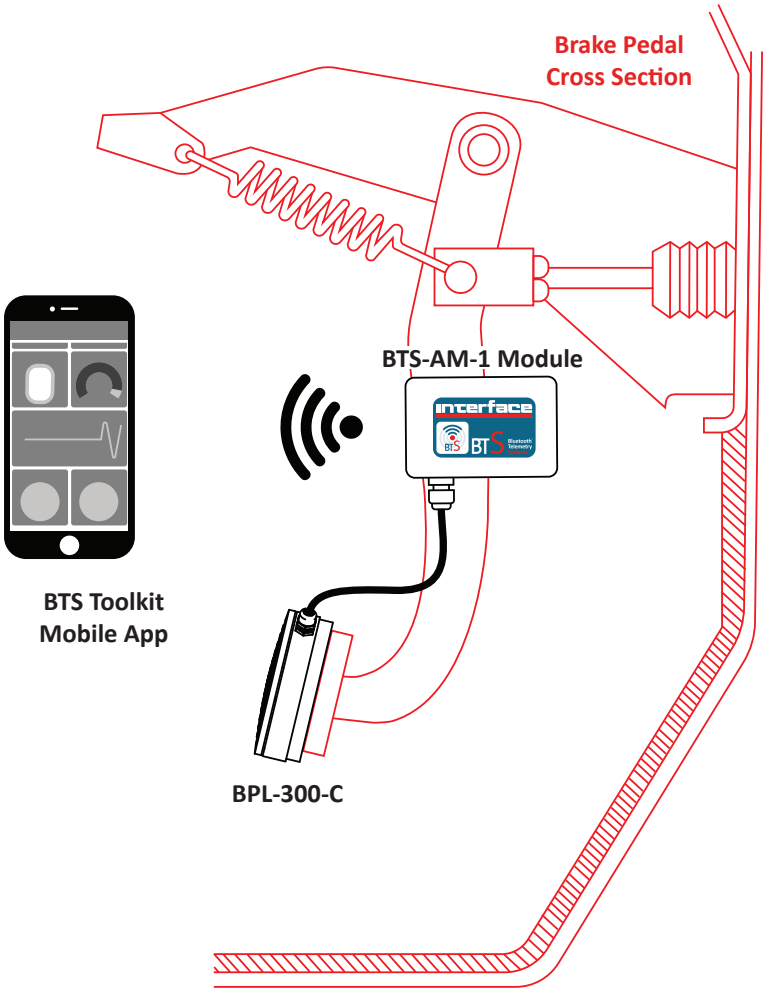
- BPL-300-C Brake Pedal Load Cell
- BTS-AM-1 Bluetooth Low Energy (BLE) Strain Bridge Transmitter Module
- BTS Toolkit Mobile App on iPhone or Android Devices

How It Works

1. The Interface BPL-300-C is securely mounted on the top of the brake pedal.
2. The load cell is connected to the BTS-AM-1 Module.
3. The BTS-AM-1 Module transmits via Bluetooth to the BTS Toolkit Mobile App.
4. The BTS Toolkit Mobile App runs on iPhone or Android devices.
5. Brake test is performed and results are displayed in real time.

The BTS Toolkit Mobile App is available for Apple iOS and Android devices and is available for download at the Apple App Store and Google Play Store.

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Drone Parcel Delivery

Load Cell and Torque Transducer

Industry: Industrial Automation

Summary

Customer Need / Challenge

- Rapid delivery of packages has now migrated to the use of “Delivery Drones”.
- Customer needs to weigh the payload (force) of package being delivered while measuring the amount torque it takes from the propeller motors to lift and fly this package to its destination.

Interface Solution

- A 1200 Series Standard of Precision Low Profile Load Cell to measure payload and six T2 Series Ultra Precision Shaft Style Rotarty Torque Transducers to measure torque.

Results

- The 1200 Series load cell accurately measured the payload weight and the T2 torque transducers accurately measured the propeller motors torque. This information, was communicated to the droids on-board processor for monitoring and recording this information during flight.

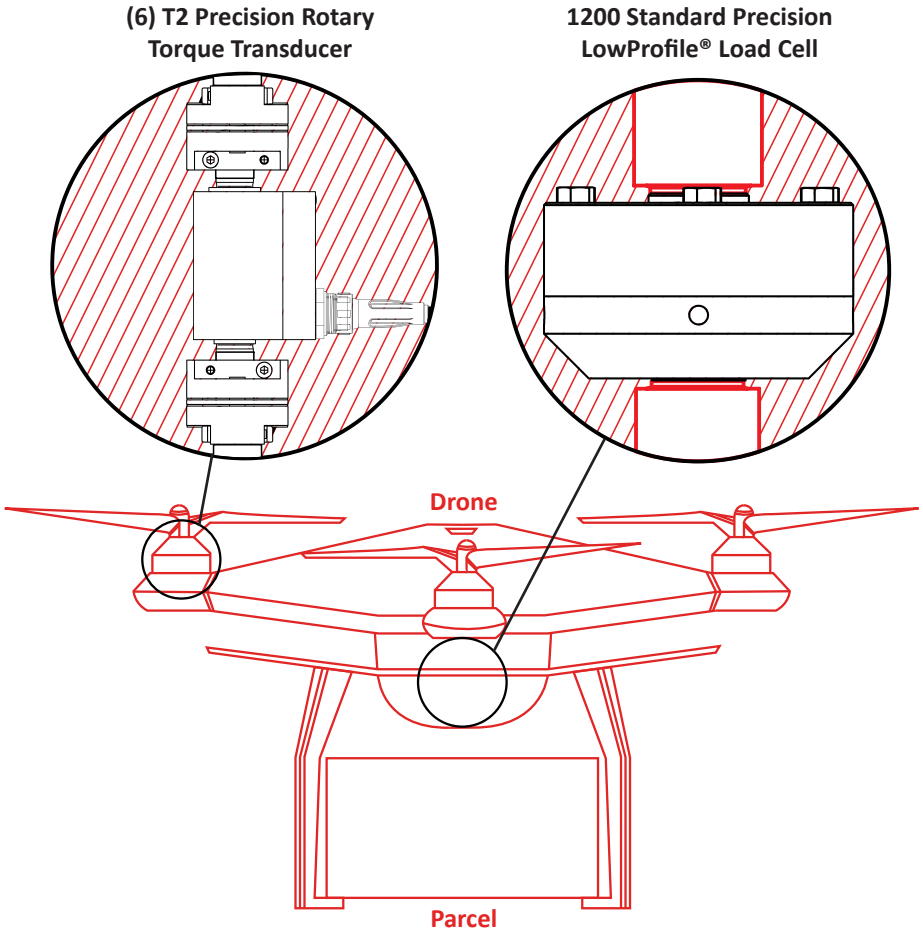
Materials

Interface Solution

- Model T2 Series Ultra Precision Rotary Torque Transducer with Model T2 compatible couplings which were supplied by Interface.
- Model 1200 Series Standard Precision Load Cell with customer supplied payload carriage device.

How It Works

1. Model 1200 Series Standard Precision Load Cell is connected to the drone body on one side and the payload carriage device on the other. Once connected to the drones processor, weight of payload is immediately communicated and stored.
2. Six Model T2 Series Ultra Precision Rotary Torque Transducers are connected to the six propeller motors and propellers using twelve couplings (2 per torque transducer). Once connected to the drones processor, torque values are immediately communicated and stored.



Engine Head Bolt Tightening
Torque Transducer

Industry: Automotive and Vehicle

Summary

Customer Need / Challenge

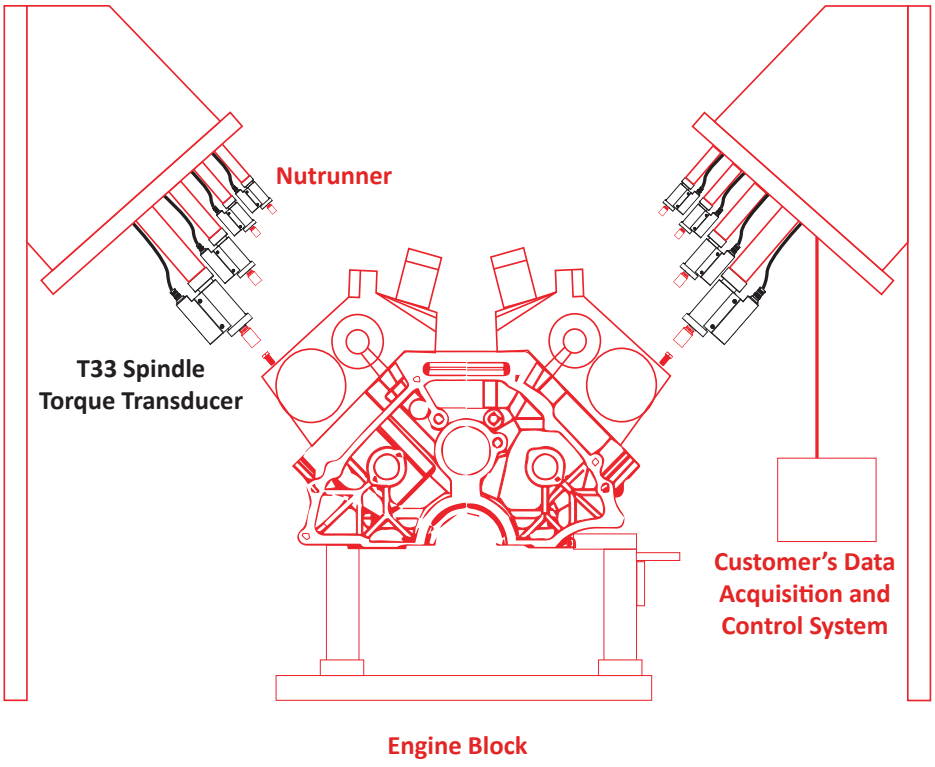
An industrial automation company was building an automated assembly machine for an auto manufacturing plant. They needed to tighten all of the head bolts on an engine on their assembly line to a specific torque value. Having the head bolts precisely and consistently tightened to the engine block is critical to the operation of the engine.

Interface Solution

Several Interface Model T33 Spindle Torque Transducers were installed in their new machine to control torque and angle, and ensure the head bolt was properly tightened. The square drive of the T33 allowed the customer to fix their tool directly to the end of the torque sensor, streamlining the installation.

Results

The head bolts were correctly installed according to manufacturer specifications, producing an engine that meets performance and reliability expectations of the auto manufacturing plant.



Materials

- T33 Spindle Torque Transducer.

How It Works

1. Several Interface Model T33 Spindle Torque Transducers are installed in-line with the nutrunner/screwing spindle.
2. Fastening tools are attached to the end of each T33.
3. The machine comes down and screws on the engine head bolts.
4. The torque and angle profile are sent to the customer's machine controller.
5. Based on the feedback received by the machine controller, the automation will pass the engine to the next step in the assembly line or fail and have the engine evaluated further.

Fastening Work Bench

Torque Transducer

Industry: Automotive and Vehicle

Summary

Customer Need / Challenge

- Customer is looking for a way to increase productivity by creating a fastening work bench for screw installation with related data collection. This increased productivity will come through the use of automated tooling and torque transducer measurements which are included as a part of an organized and efficient process.

Interface Solution

- Interface supplied a Model T15 Hex Drive Rotary Torque Transducer with integrated USB output for this project. USB output can measure and record torque, rotational speed and angle.

Results

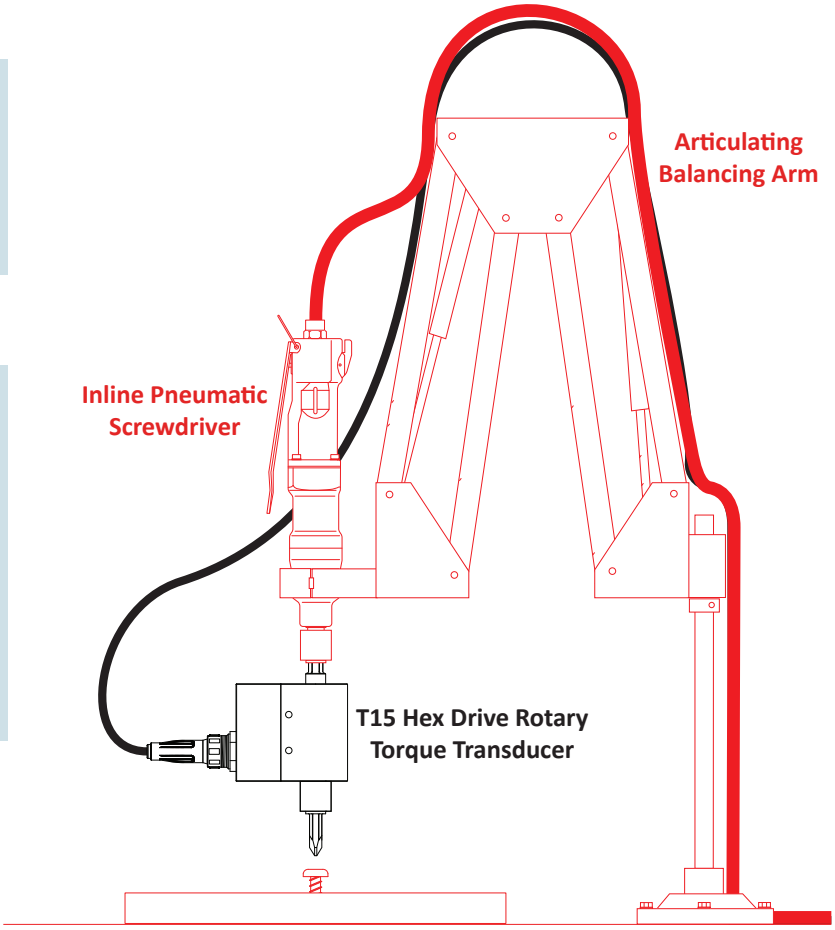
- Customer was able to use many different screwdriver bit types with ease of installation due to the quick release feature of Model T15.

Materials

- T15 Hex Drive Rotary Torque Transducer with integrated USB Output Option
- T-USB-VS Software
- PC Computer
- Inline Electric or Pneumatic Screwdriver
- Articulating Balancing Arm

How It Works

1. Customer attaches T15 Hex Drive Rotary Torque Transducer to an electric or pneumatic screwdriver.
2. Customer attaches bit to T15 Hex Drive Rotary Torque Transducer.
3. T15 Hex Drive Rotary Torque Transducer is connected to USB and supplied software is loaded.
4. Customer performs fastening operations and fastening details are automatically recorded to the PC.



Fuel Pump Optimization - Rotary Torque

Torque Transducer

Industry: Industrial Automation

Summary

Customer Need / Challenge

A nationally renowned race team was using a flow bench to measure fuel pump performance. They wanted to determine if they could reduce the power consumption of the pump by further analyzing the precise torque it produced.

Interface Solution

An Interface Model T25 High Speed Rotary Torque Transducer was integrated into the pump drive to directly measure the torque required to spin the pump.

Results

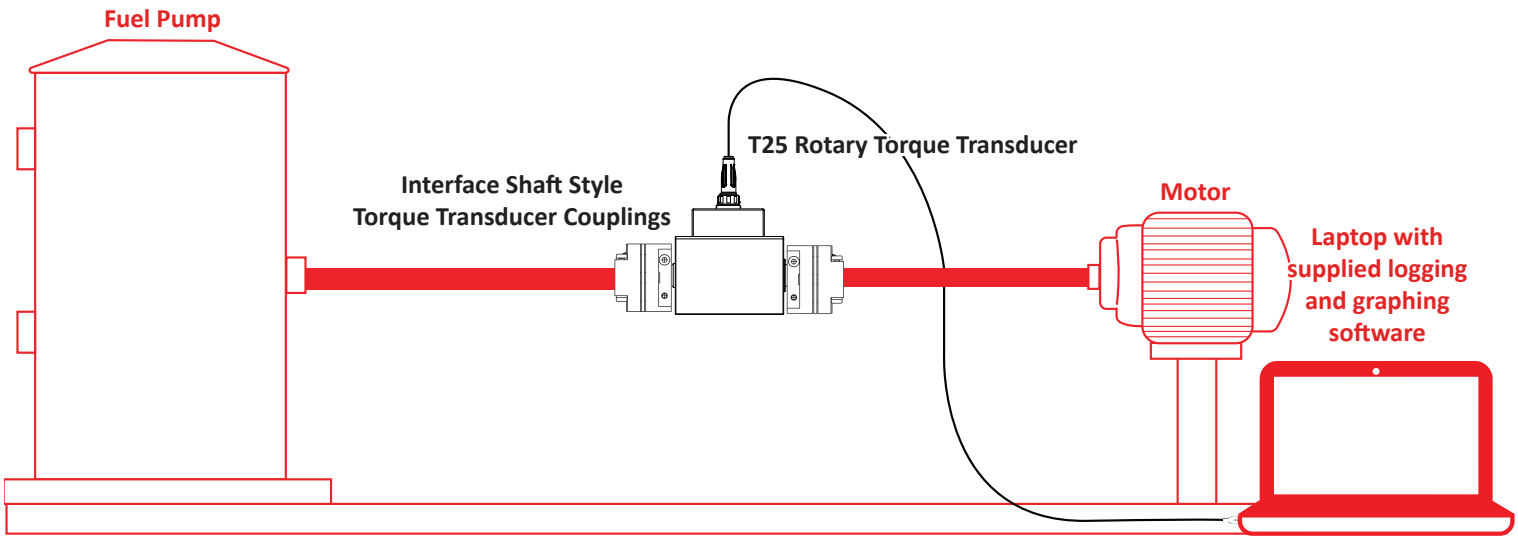
Using this data collected from the T25 in conjunction with the pressure and volume measurements of the fuel flow, the race team was able to characterize fuel pump performance vs. drive line torque, and then minimize the required drive power while maintaining the needed pressure and flow for efficient fuel delivery.

Materials

- T25 Rotary Torque Transducer with USB logging and graphing option.
- Interface Shaft Style Torque Transducer Couplings.

How It Works

1. The electric motor spins the fuel pump.
2. The Model T25 Rotary Torque Transducer measures the torque required to spin the pump.
3. The Data feeds to the PC Software for analysis. The software displays Torque, RPM & Horsepower.
4. Flow bench measures pressure and volume of fuel flow.
5. The Fuel pump is tuned to minimize required drive power while maintaining the required pressure and flow for proper fuel delivery.



Industrial Robotic Arm
Multi-Axis

Industry: Industrial Automation

Summary

Customer Need / Challenge

A manufacturer of a robot arm needs to measure force and torque when the arm picks up and places objects.

Interface Solution

Interface supplied Model 6A40A 6-Axis Load Cell with Model BX8-HD44 Data Acquisition/Amplifier.

Results

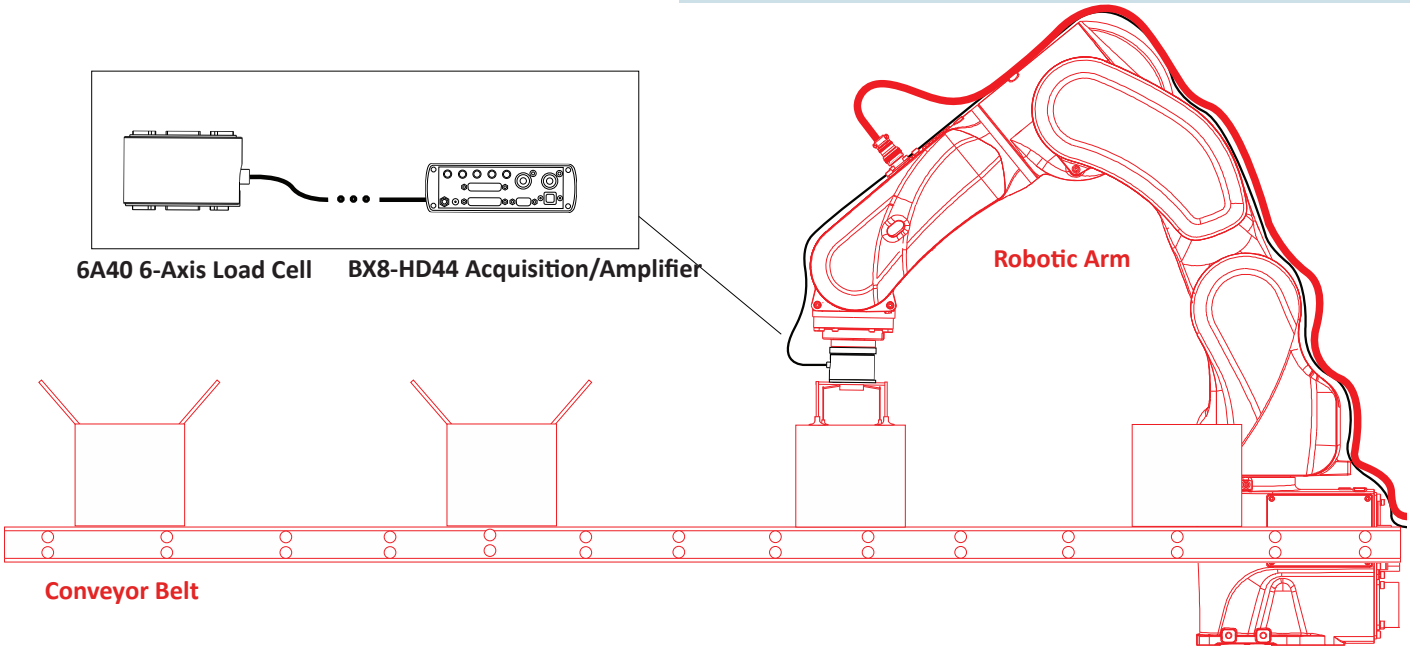
The 6A40-6 Axis Load Cell was able to measure all forces and torques (F_x, F_y, F_z, M_x, M_y, M_z) and the BXB-HD44 Data Acquisition/Amplifier was able to log, display, and graph these measurements while sending scaled analog output signals for these axes to the robot's control system

Materials

- 6A40 6-Axis Load Cell.
- BX8- Data Acquisition/Amplifier with includes BlueDAQ configuration, logging, display and graphing software.
- Customer's robotic arm and control system.

How It Works

1. Customer installed 6A40 6-Axis Load Cell between robot flange and robot grabber.
2. 6A40 6-Axis Load Cell was connected to BX8-HD44 Data Acquisition/Amplifier.
3. Customer connected analog outputs to their control system.
4. Result, customer is now able to measure forces and torques in 6 axes and send a scaled analog output signal to their robotic arm control system.



Linear Test Stand
Load Cell

Industry: Test and Measurement

Summary

Customer Need / Challenge

Customer would like to crush test a specimen in their linear stand. The customer would like to use force to determine when the deformation actually occurs.

Interface Solution

Interface provided Model 1210 Precision LowProfile® Load Cell with internal amplification of 0-10VDC Output.

Results

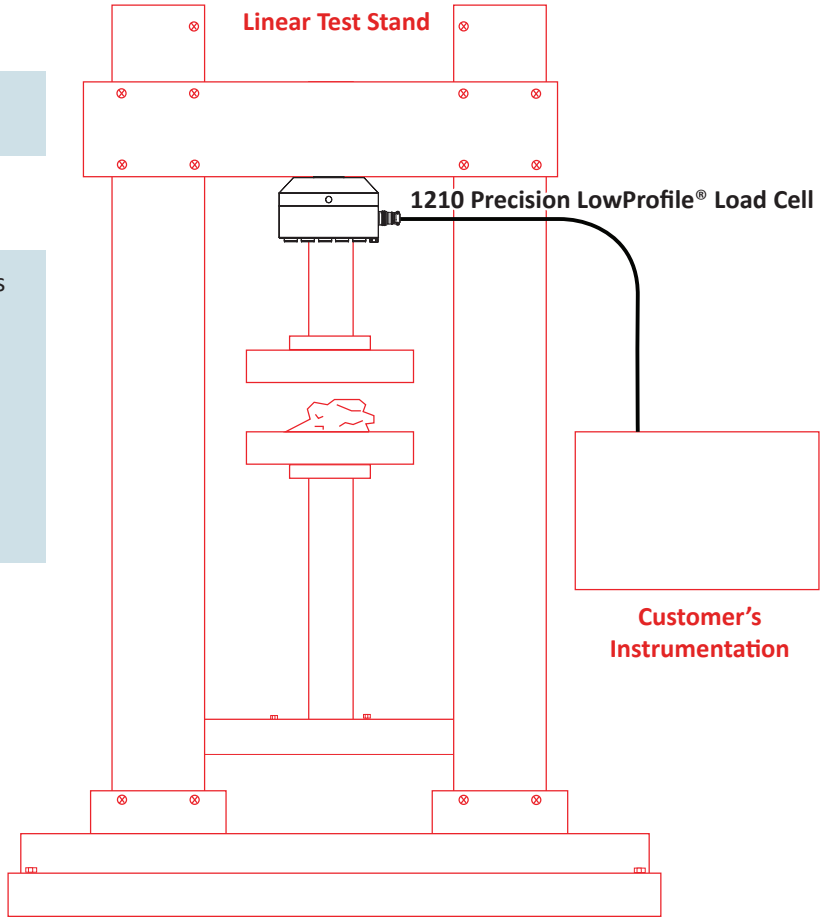
Amplified Model 1210 Precision LowProfile® Load Cell was installed into the load string of the customer's load frame and the scaled analog output from the load cell was connected to the customer's instrumentation. When the force levels reached the crushing point, the customer's software was able to read the output of the amplified load cell and record the value.

Materials

- 1210 Precision LowProfile® Load Cell.
- Customer supplied linear test stand.

How It Works

1. Amplified 1210 Precision LowProfile® Load Cell was installed into the load string of the customer's load frame.
2. Scaled analog output from the load cell was connected to the customer's instrumentation.
3. When the force levels reached the crushing point, the customer's software was to read the output of the amplified load cell.
4. Customer's instrumentation recorded the value.



Lug Nut Assembly
Torque Transducer
Industry: Automotive and Vehicle

Summary

Customer Need / Challenge

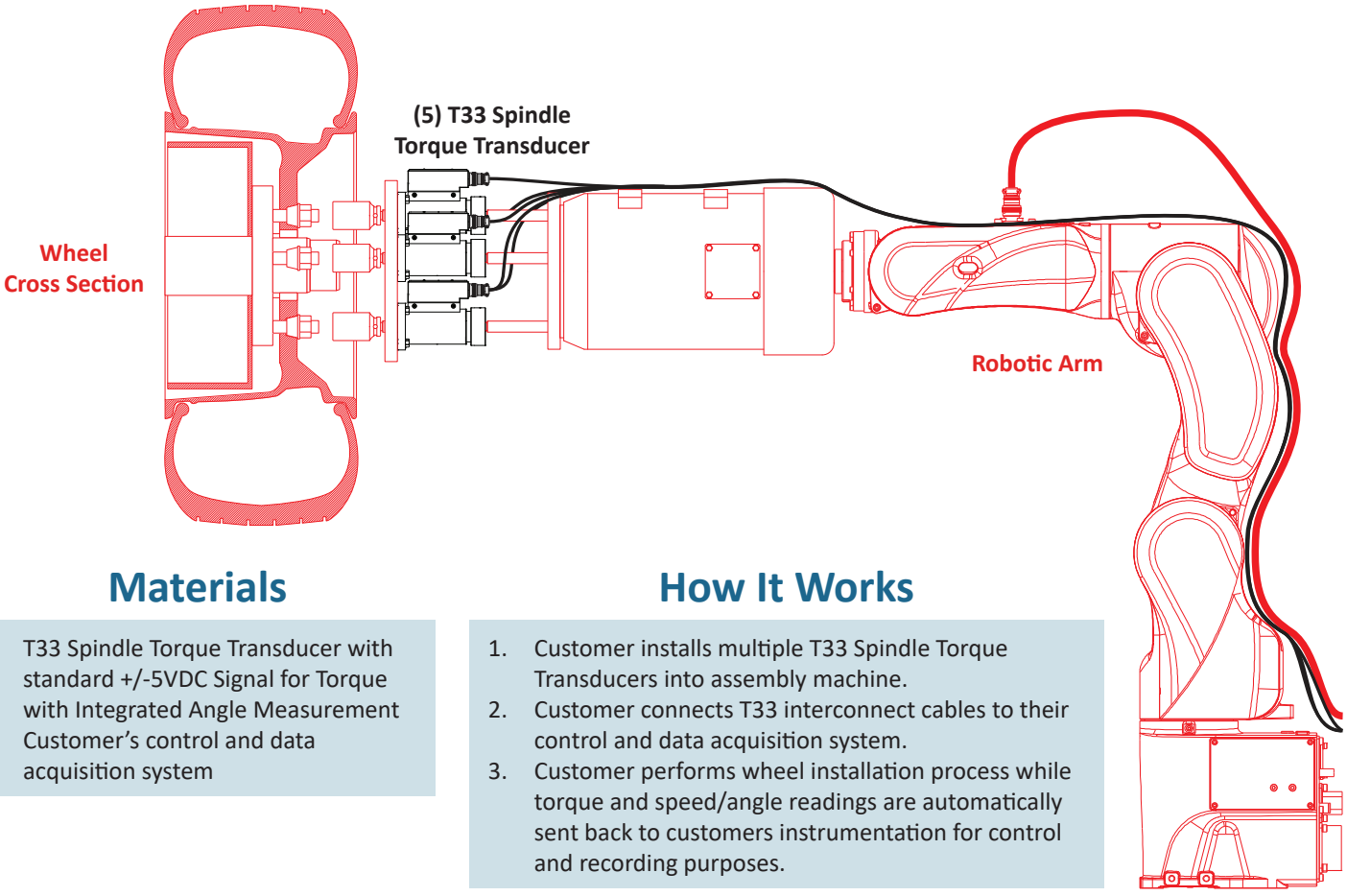
- Customer is looking for a way to increase productivity for automobile wheel installation while ensuring that the lug nuts are installed to the proper torque values for safety purposes.

Interface Solution

- Interface supplied 5 each Interface Model T33 Spindle Torque Transducers for use in customer's Wheel Installation Assembly Machine which come standard with +/-5VDC analog output for torque measurements and a 360 pulse, 2-track encoder for Speed/ Angle measurement.

Results

- Customer was able to perform 5 simultaneous torque measurements during wheel installation in seconds. Model T33 Spindle Torque Transducer provided a +/-5VDC Signal for torque and TTL Signal for angle measurement back to customer's control system so proper values could be applied and recorded.



Materials

- T33 Spindle Torque Transducer with standard +/-5VDC Signal for Torque with Integrated Angle Measurement
- Customer's control and data acquisition system

How It Works

1. Customer installs multiple T33 Spindle Torque Transducers into assembly machine.
2. Customer connects T33 interconnect cables to their control and data acquisition system.
3. Customer performs wheel installation process while torque and speed/angle readings are automatically sent back to customers instrumentation for control and recording purposes.

Prosthetic Foot Performance
Multi-Axis

Industry: Medical and Healthcare

Summary

Customer Need / Challenge

- Customer would like to know how a prosthetic foot responds as it is loaded during different stances.

Interface Solution

- Interface Model 3A120 3-Axis Load Cell was installed between the leg socket and the prosthetic foot. Model 3A120 was then connected to customer's portable data acquisition system.

Results

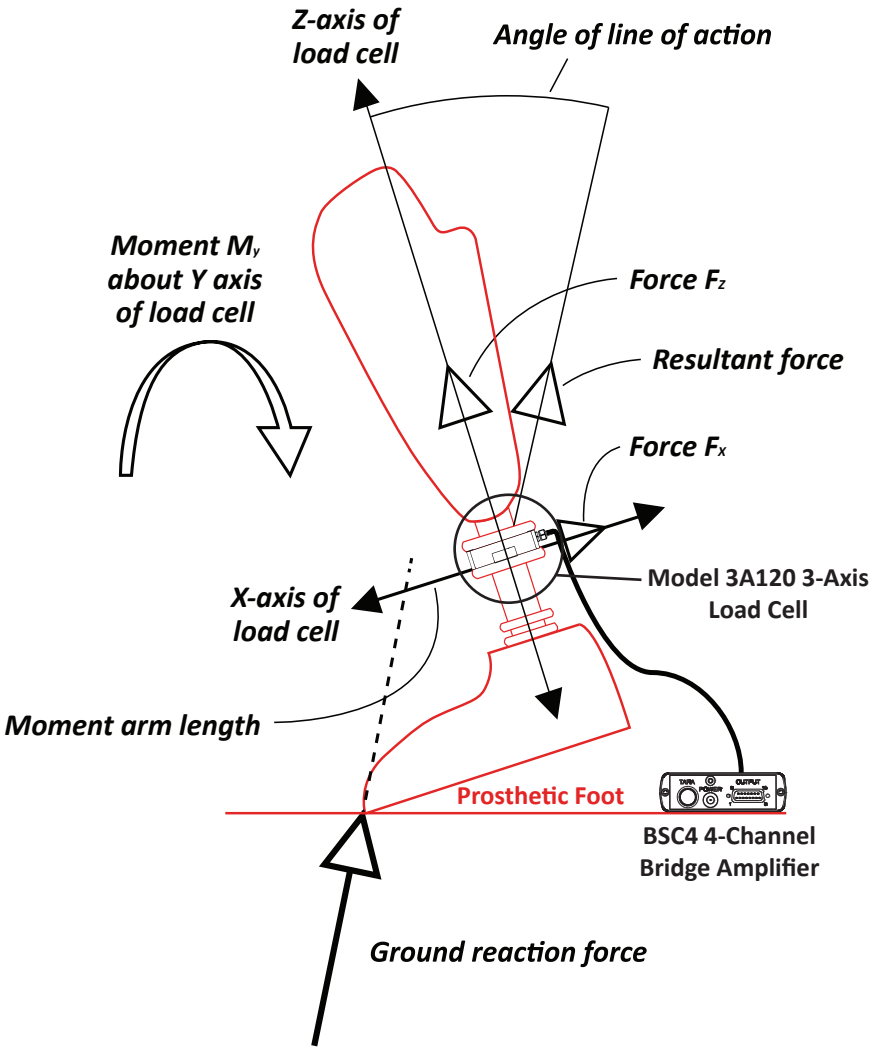
- Data was logged for X, Y, and Z axis. Customer was able to review the results and identify premature foot flat and dead spots during foot's use. They can now make improvements to the design.

Materials

- Model 3A120 3-Axis Load Cell.
- Portable Data Acquisition System.
- Prosthetic foot.

How It Works

1. Install Model 3A120 into prosthetic foot load stream.
2. Connect to customer's portable data acquisition system.
3. Review X, Y and Z force measurements to determine foot flat and dead spots.



Syringe Plunger Force Measurement

Multi-Axis

Industry: Medical and Healthcare

Summary

Customer Need / Challenge

A manufacturer of syringes needed to measure the force required to dispense liquid from a syringe and ensure their product is within ISO guidelines.

Interface Solution

Interface supplied Model SMT Capacity Overload Protected S-Type Load Cell coupled with Model 9320 Battery Powered Handheld Indicator. This product was implemented into the customer's test frame for syringe testing.

Results

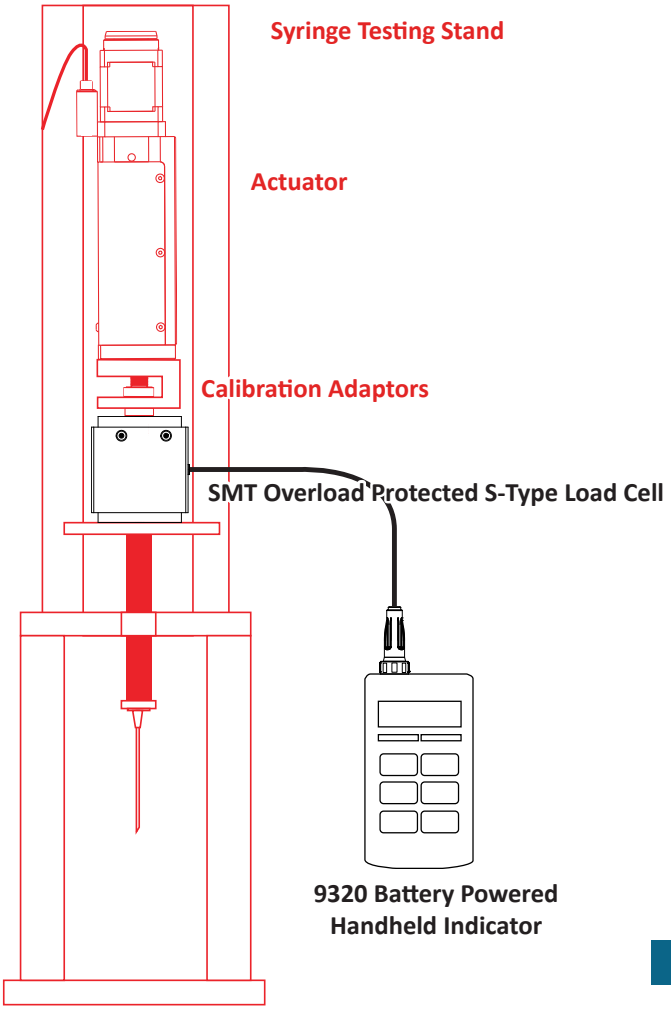
As the customer's load frame applied to the force of the syringe, Model SMT Capacity Overload Protected S-Type Load Cell measured the force applied to dispense this material. Model 9320 Battery Powered Handheld Indicator showed all measured forces and captured the peak values.

Materials

- SMT Capacity Overload Protected S-Type Load Cell.
- 9320 Battery Powered Handheld Indicator.
- Customer supplied calibration adaptors and calibration frame.

How It Works

1. SMT Capacity Overload Protected S-Type Load Cell measure the forces applied to dispense this material.
2. 9320 Battery Powered Handheld Indicator shows all measured forces.
3. The 9320 captures the peak values used to dispense this material for further evaluation.



Tank Weighing & Center of Gravity

Load Cell

Industry: Test and Measurement, Industrial Automation

Summary

Customer Need / Challenge

Customer needs to monitor the amount of material in a tank by weight and locate the center of gravity.

Interface Solution

Using Interface Model A4200 Zinc Plated or A4600 Stainless Steel Weigh-check Load Cells, along with Interface Instrumentation, Interface Inc. provided a solution that monitors the amount of material by weight in their tank while locating the Center of Gravity.

Results

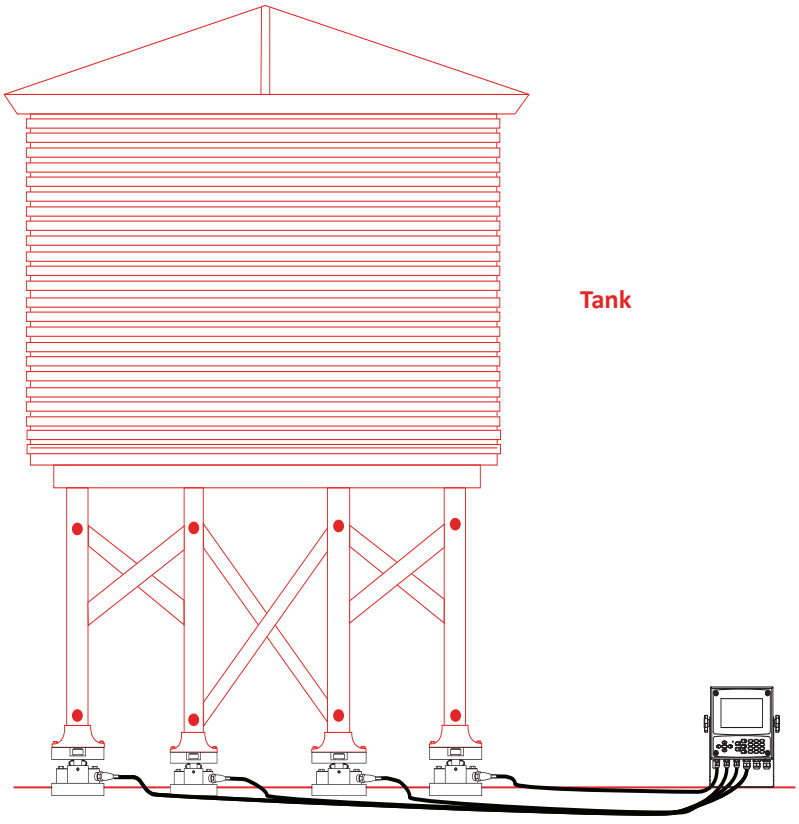
Tank weights are monitored so refilling, dispensing or emptying takes place safely while monitoring center of gravity.

Materials

- Model A4200 Zinc Plated or Model A4600 Stainless Steel Weigh-check Load Cells.
- Model 1280 Programmable/Controller.
- Setup & Scaling of Load Cells and Instrument by Interface, Inc.

How It Works

1. Model A4200 or A4600 Weigh-check Load Cell is installed between the support arm of tank and support pedestal of tank. The Weigh-check Load Cell will measure the load as material is loaded into or unloaded out of the tank.
2. Model 1280 Programmable/Controller will use weight measurements and display the weight for each leg and corresponding total weight.
3. Model 1280 Programmable/Controller will use weight measurements in conjunction with programmed formula to calculate the relevant Center of Gravity.



Torque Verification

Torque Transducer

Industry: Test and Measurement, Automotive and Vehicle

Summary

Customer Need / Challenge

Customer wants to perform regular torque testing on his ratchet-type torque wrench while recording these values for future examination.

Interface Solution

Interface supplied Model TS15 Square Drive to Flange Reaction Torque Transducer with Model INF-USB3 PC Interface Module for the customer to use.

Results

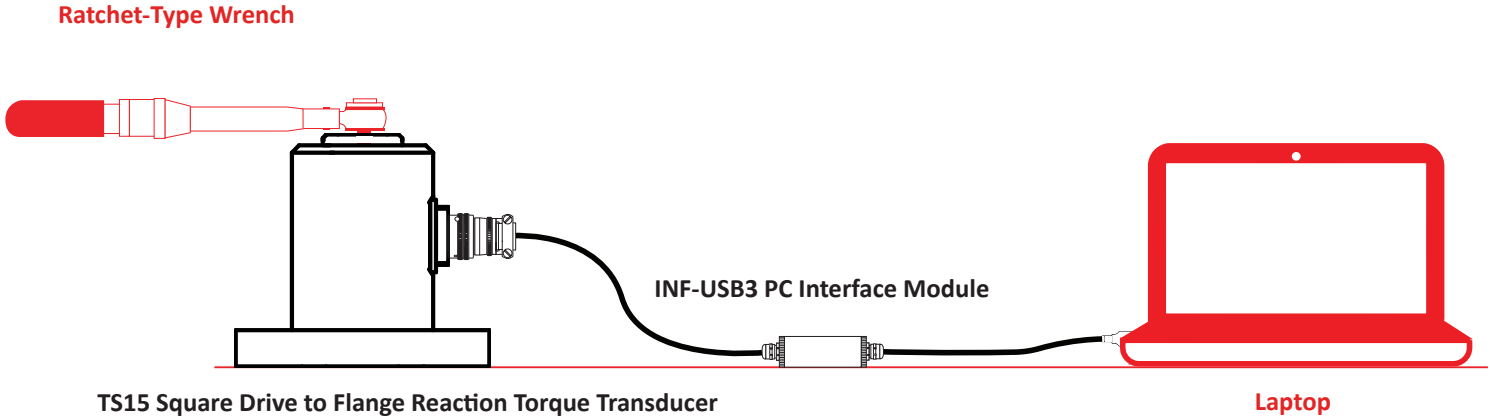
Customer was able to easily insert their ratchet-type torque wrench into the TS15 Square Drive, perform their calibration checks and view the results while logging them to their PC Computer.

Materials

- TS15 Square Drive to Flange Reaction Torque Transducer.
- INF-USB3 PC Interface Module with included configuration, display, graphing and logging software.
- Customer supplied ratchet-type wrench.

How It Works

1. Customer mounted TS15 to work bench through flange.
2. Customer inserted the ratchet-type torque transducer into the TS15 Square Flange Reaction Torque Transducer.
3. Customer performs calibration checks and views the results while logging them to the PC Computer.



Verification Test Stand

Load Cell

Industry: Test and Measurement

Summary

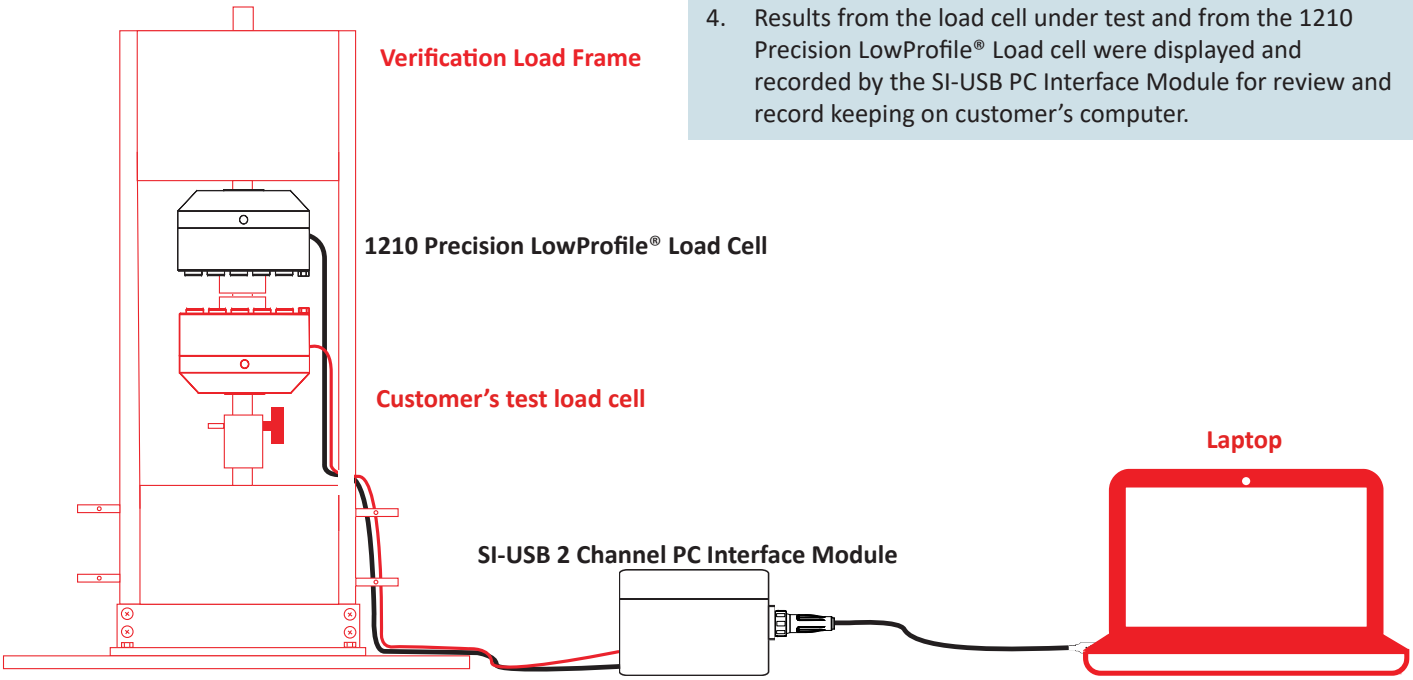
Customer Need / Challenge	Interface Solution	Results
Customer is looking for a way to verify if the load cell is in “good working order” for an upcoming test.	Interface proposed a solution with the customer’s supplied verification load frame, Model 1210 Precision LowProfile® Load Cell, connected with Model SI-USB 2-Channel PC Interface Module.	Customer installed their load cell and Model 1210 Precision LowProfile® Load cell into the verification load frame, and applied forces were displayed and recorded by Model SI-USB PC Interface Module for review and record keeping on customer’s computer.

Materials

- 1210 Precision LowProfile® Load Cell.
- SI-USB 2-Channel PC Interface Module with included setup, logging, and graphing software.
- Customer’s verification load frame.
- Customer’s test load cell.
- Customer’s supplied PC computer.

How It Works

1. Customer installed their load cell to the customer’s verification load frame, connecting it to 1210 Precision LowProfile® Load Cell.
2. Customer applied the specific load by turning the manual actuator.
3. Applied forces were measured by the 1210 Precision LowProfile® Load Cell.
4. Results from the load cell under test and from the 1210 Precision LowProfile® Load cell were displayed and recorded by the SI-USB PC Interface Module for review and record keeping on customer’s computer.



Wind Tunnel
Multi-Axis

Industry: Aerospace

Summary

Customer Need / Challenge

A major aerospace company was developing a new airplane and needed to test their scaled model for aerodynamics in a wind tunnel, by measuring loads created by lift and drag.

Interface Solution

A Model 6A154 6-Axis Load Cell was mounted in the floor of the wind tunnel, and connected to the scaled model by a "stalk". A Model BX8-AS was connected to the sensor to collect data.

Results

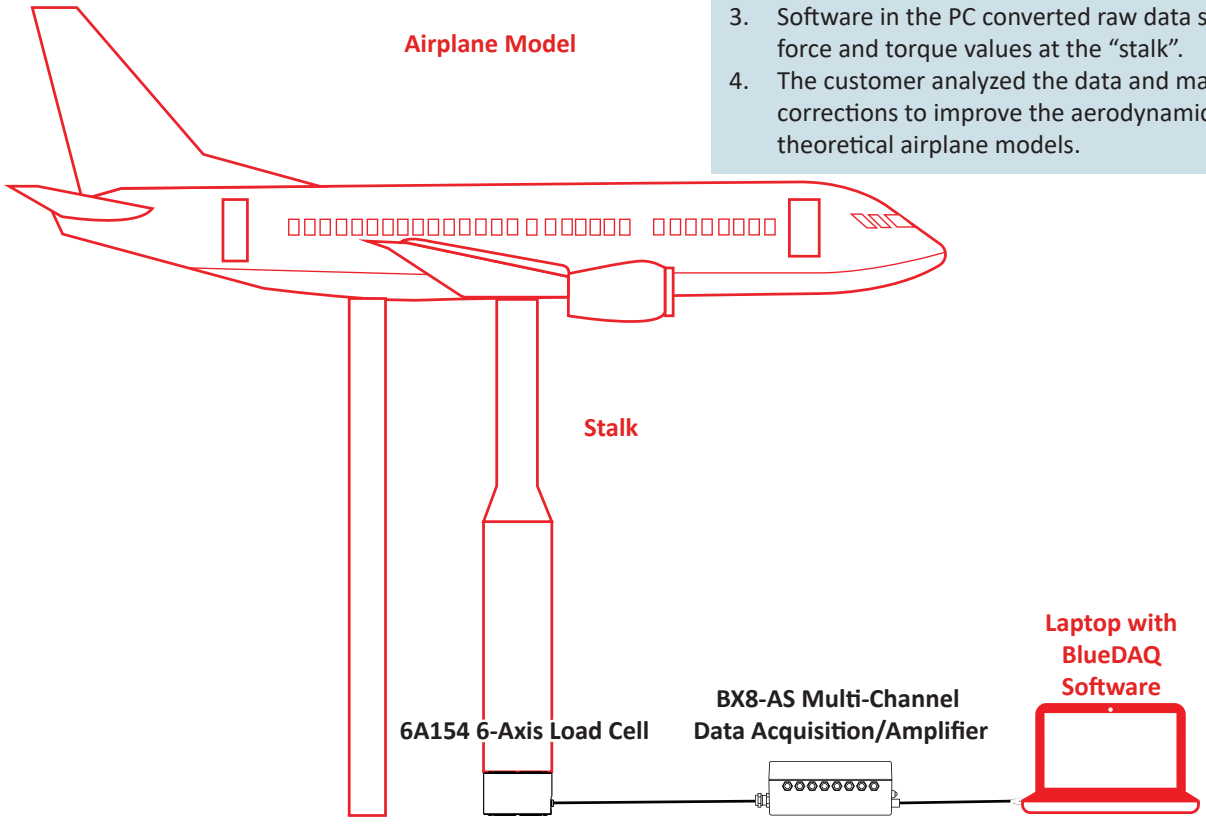
The company analyzed the collected data and made the necessary adjustments in their design to improve the aerodynamics of their theoretical airplane models.

Materials

- 6A154 6-Axis Load Cell.
- BX8-AS Multi-Channel Data Acquisition/ Amplifier.
- BlueDAQ Software.

How It Works

1. The wind tunnel blew air over the scaled model creating lift and drag, which was measured and compared to the theoretical airplane models.
2. The output of the 6-Axis sensor was connected to the BX8-AS Amplifier, which was connected via USB cable to the PC.
3. Software in the PC converted raw data signals to actual force and torque values at the "stalk".
4. The customer analyzed the data and made the needed corrections to improve the aerodynamics of their theoretical airplane models.



BTS Equine Bridle Tension System

Interface Mini™ and BlueTooth®

Industry: Agriculture

Summary

Customer Need / Challenge

The customer needs to quantify the so-called “poll pressure.” Bits designed to give strong poll pressure using simple pulley lever principles show a much attenuated transfer of the rein tension through the bit to the poll. The attenuation is readily understood when the equine mouth is recognized as a “floating” fulcrum degrading the otherwise required fixed pivot point of an ideal lever.

Interface Solution

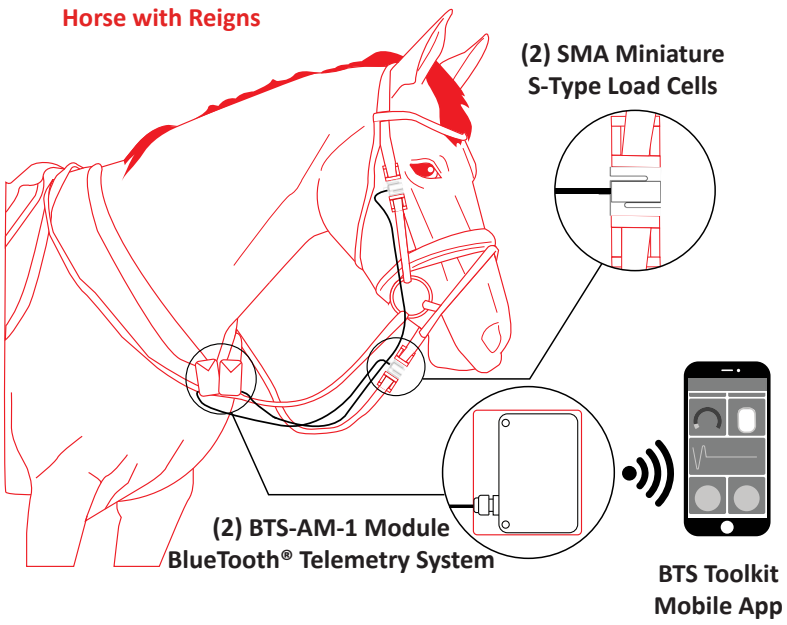
A BTS Equine Bridle Tension System, with 2 SMA Miniature S-Type Load Cells in both the line of the reins and that of the cheekpiece on one side of the horse, is used to study the dynamic response of the cheekpiece tension to rein tension in the ridden horse. Results are transmitted by the BTS-AM-1 Bluetooth Low Energy (BLE) Strain Bridge Transmitter Module to the BTS Toolkit Mobile App and displayed on a mobile device.

Results

The fundamental operation of the bits could in principle be discovered on the laboratory bench. But in practice of course, the equine mouth is expected to provide the fulcrum. Within the real experimental system comprising the rider’s hands, the horse’s mouth, and the bit, the elasticity of the equine mouth provides a “floating” fulcrum and a potential source of time-lag and decoherence between the dynamic rein and cheekpiece tensions.

Materials

- (2) SMA Miniature S-Type Load Cells
- (2) BTS-AM-1 Module BlueTooth® Telemetry System
- BTS Toolkit Mobile App



How It Works

The SMA Miniature S-Type Load Cells are inserted into the line of the cheekpiece and reins on one side of the horse. The SMA Miniature S-Type Load Cells are resistive wire strip strain gages whose changes in potential difference, produced with strain, are transferred to transmitters which send the data by the BTS Bluetooth® Telemetry System to a receiver connected to a USB port of a PC/ laptop. The BTS-AM-1 Bluetooth® Low Energy (BLE) Strain Bridge Transmitter Modules are held inside modified camera cases attached to a breastplate on the horse. The rider is therefore not carrying any of the electrical equipment. Before the data is collected and after the cheekpiece is pretensioned, the SMA Miniature S-Type Load Cells are tared to zero. This makes it possible in some cases to see negative net values for cheekpiece tension when rein tension is applied to the cheek. The rider takes a normal contact on both reins and performs ridden exercises in the three lower gaits, and the natural resistive counter-contact from the body of the horse provides pairs of force data from the rein and cheekpiece. Because the cheekpiece is directly attached to the headpiece, we can assume that forces seen in the cheekpiece are those that are applied to the poll of the horse.

WTS Equine Bridle Tension System

Interface Mini™ and Wireless Telemetry System

Industry: Agriculture

Summary

Customer Need / Challenge

The customer needs to quantify the so-called "poll pressure." Bits designed to give strong poll pressure using simple pulley lever principles show a much attenuated transfer of the rein tension through the bit to the poll. The attenuation is readily understood when the equine mouth is recognized as a "floating" fulcrum degrading the otherwise required fixed pivot point of an ideal lever.

Interface Solution

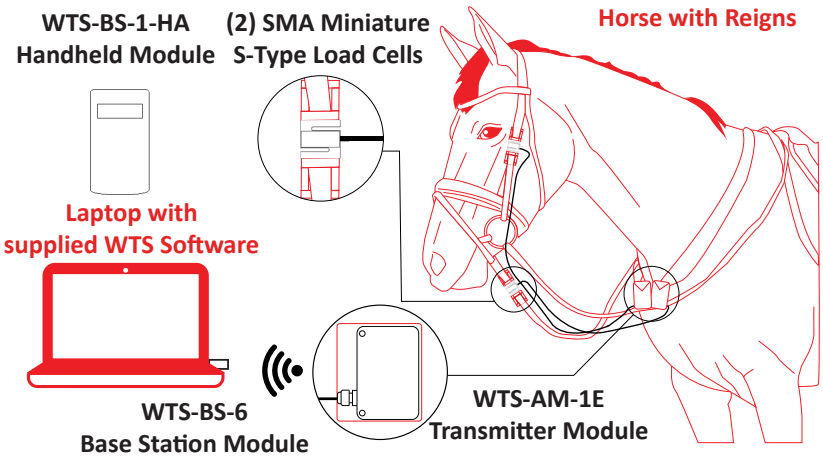
A WTS Equine Bridle Tension System, with 2 SMA Miniature S-Type Load Cells in both the line of the reins and that of the cheekpiece on one side of the horse, is used to study the dynamic response of the cheekpiece tension to rein tension in the ridden horse. Utilizing the Wireless Telemetry System (WTS), the valuable data can be displayed and/or recorded in real time using a PC and/or a handheld receiver depending on the requirements and preferences of the customer.

Results

The fundamental operation of the bits could in principle be discovered on the laboratory bench. But in practice of course, the equine mouth is expected to provide the fulcrum. Within the real experimental system comprising the rider's hands, the horse's mouth, and the bit, the elasticity of the equine mouth provides a "floating" fulcrum and a potential source of time-lag and decoherence between the dynamic rein and cheekpiece tensions.

Materials

- (2) SMA Miniature S-Type Load Cells
- (2) WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- WTS Toolkit Software & Log100 Software included
- Customer supplied PC/Laptop



How It Works

The SMA Miniature S-Type Load Cells are inserted into the line of the cheekpiece and reins on one side of the horse. The SMA Miniature S-Type Load Cell's are resistive wire strip strain gages whose changes in potential difference, produced with strain, are transferred to transmitters which send the data wirelessly to a receiver connected to a USB port of a PC/laptop or a WTS-BS-1-HA Handheld Module. The WTS-AM-1E Transmitter Module are held inside modified camera cases attached to a breastplate on the horse. The rider is therefore not carrying any of the electrical equipment. Before the data is collected and after the cheekpiece is pretensioned, the SMA Miniature S-Type Load Cells are tared to zero. This makes it possible in some cases to see negative net values for cheekpiece tension when rein tension is applied to the cheek. The rider takes a normal contact on both reins and performs ridden exercises in the three lower gaits, and the natural resistive counter-contact from the body of the horse provides pairs of force data from the rein and cheekpiece. Because the cheekpiece is directly attached to the headpiece, we can assume that forces seen in the cheekpiece are those that are applied to the poll of the horse.

Crane Force Regulation

Load Pin

Industry: Industrial Automation

Summary

Customer Need / Challenge

Customer wants to regulate the maximum amount of heavy loads being lifted, so that production time can be both safe for workers and efficient. The customer wants to complete lifting duties faster and with little or no expense. A wireless solution is preferred, so that there would be no long cable interference during production.

Interface Solution

With Interface Inc. WTSLP Wireless Stainless Steel Load Pin, this product can be custom made to be used for any and all types of cranes. It is also great for lifting both short and long distances. Paired with the WTS Wireless Telemetry System, force is measured and logged.

Results

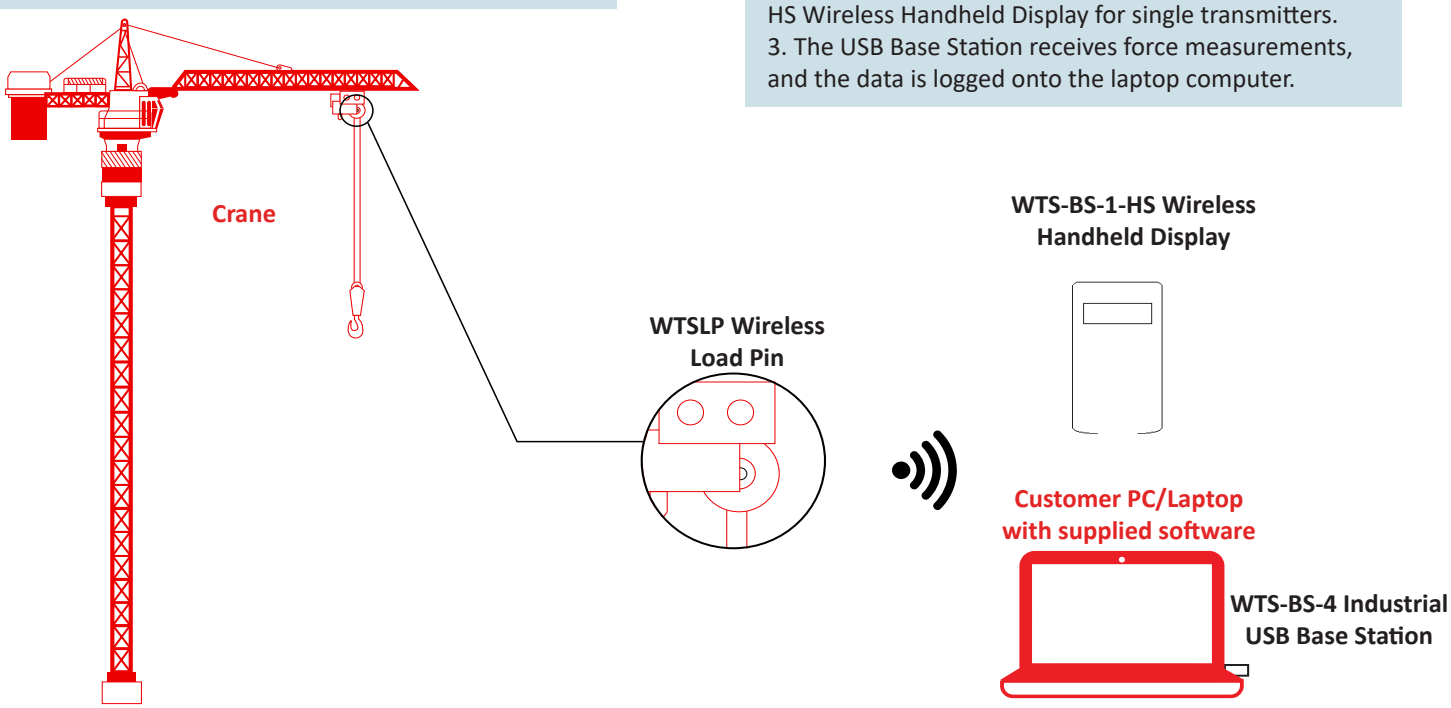
Customer was able to monitor the continuous force from the crane, and gather information on loads being lifted. Data is transmitted and logged to the customer's PC/laptop and is available to be reviewed.

Materials

- WTSLP Wireless Load Pin
- WTS-BS-4 Industrial USB Base Station
- WTS-BS-1-HS Wireless Handheld Display for Single Transmitters
- WTS Toolkit Software & Log100 Software Included
- Customer PC/Laptop

How It Works

1. The WTSLP Wireless Load Pin is installed at the turning block of the crane.
2. WTS-BS-4 Industrial USB Base Station is connected to the customers PC Computer/laptop via USB port. The WTSLP can wirelessly transmit information up to 600 meters in distance to both the laptop or the WTS-BS-1-HS Wireless Handheld Display for single transmitters.
3. The USB Base Station receives force measurements, and the data is logged onto the laptop computer.



Crane Capacity Verification
Tension Link

Industry: Industrial Automation

Summary

Customer Need / Challenge

A customer wants to verify that their crane is strong enough to safely lift a heavy load, at it's rated maximum load capacity. A wireless solution is needed to avoid long cables, and to have a faster installation time.

Interface Solution

Interface, Inc's Model WTSLTL Lightweight Wireless Tension Link Load Cell can measure the load's maximum capacity. The WTS-RM1 Wireless Relay Output Receiver Modules also can trigger an alarm that can be set when the maximum capacity of weight/ force has been reached. The data is transmitted and can be reviewed with the WTS-BS-1-HS Wireless Handheld Display, or, on the customer's PC/ Laptop.

Results

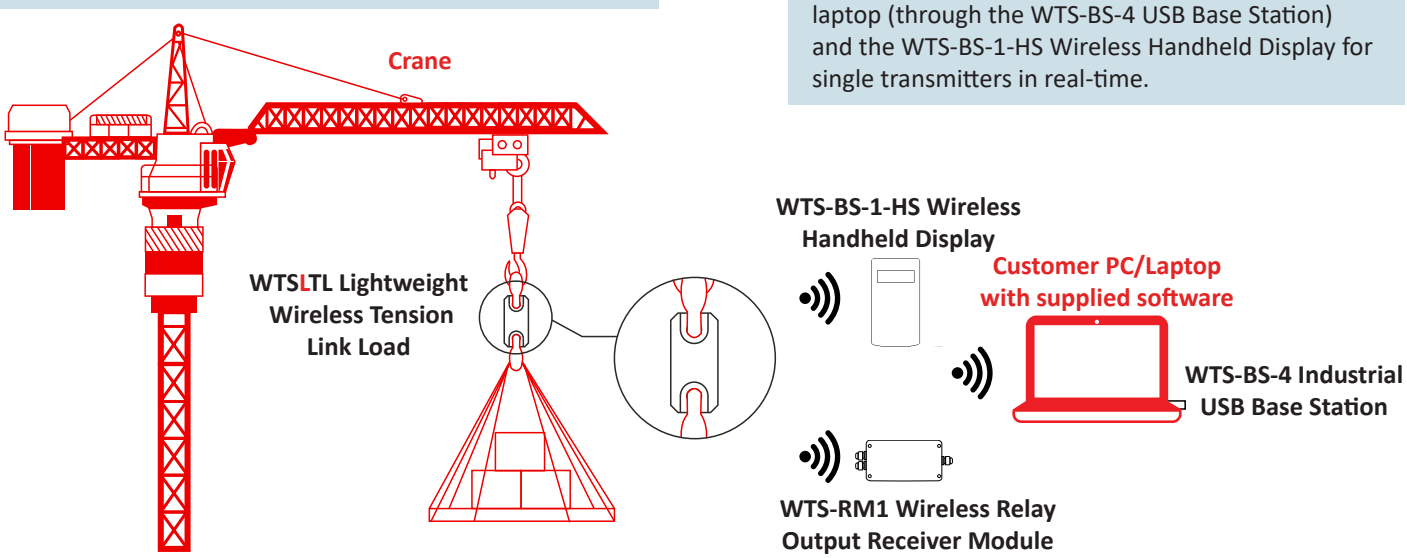
Customer was able to verify if the crane is safe and functional enough to lift it's working load limit (WLL) or safe working load (SWL) capacity. The data is transmitted and logged to the customer's PC/laptop, or to a handheld device in real-time.

Materials

- WTSLTL Lightweight Wireless Tension Link Load Cell
- WTS-RM1 Wireless Relay Output Receiver Module
- WTS-BS-1-HS Wireless Handheld Display for Single Transmitters
- WTS-BS-4 Industrial USB Base Station
- WTS Toolkit Software & Log100 Software Included
- Customer PC/Laptop

How It Works

1. The WTSLTL Lightweight Wireless Tension Link Load Cell is installed on the crane, lifting an item that maxes out to the crane's working load limit (WLL).
2. The WTSLTL transmits data to the WTS-RM1 Wireless Relay Output Receiver Module and can trigger an alarm when the capacity has been reached. Information is also transmitted both to the laptop (through the WTS-BS-4 USB Base Station) and the WTS-BS-1-HS Wireless Handheld Display for single transmitters in real-time.



Crane Block Safety Check
Load Pin

Industry: Industrial Automation

Summary

Customer Need / Challenge

A customer wants a system to detect if their crane block can lift heavy loads securely, in order to keep working conditions and personnel safe. If lifting capacities are exceeded, the customer wants a system to alarm them in real-time.

Interface Solution

Interface, Inc.'s WTSLP Wireless Stainless Steel Load Pin can replace the existing load bearing pin in the crane block in order to measure the force being applied by the heavy load. Data will be transmitted and displayed through both the WTS-BS-4 USB Base Station (when paired with the customer's supplied PC computer/ Laptop) and the WTS-BS-1-HA Wireless Handheld for real-time results. The WTS-RM1 Wireless Relay Output Receiver Module will also trigger an alarm when maximum capacity has been reached.

Results

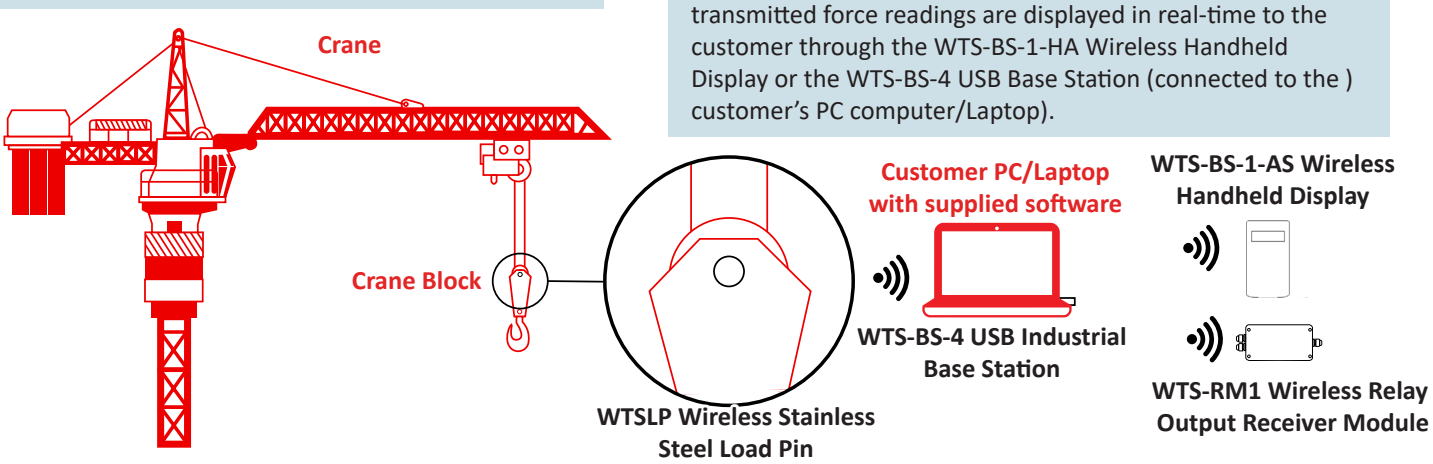
The WTSLP Wireless Stainless Steel Load Pin, combined with the WTS products, was able to measure and determine force applied the moment a heavy load is lifted. The results were transmitted wirelessly, and ensured the customer whether or not the crane block was safely operational during production.

Materials

- WTSLP Wireless Stainless Steel Load Pin
- WTS-RM1 Wireless Relay Output Receiver Module
- WTS-BS-1-HA Wireless Handheld Display for Multiple Transmitters
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit Software & Log100 Software Included
- Customer PC/Laptop

How It Works

1. WTSLP Wireless Stainless Steel Load Pin is installed, replacing the normal load bearing pin on the block of the crane. A heavy load is added to the end of the block.
2. The WTS-RM1 Wireless Relay Output Receiver Module captures the data transmitted from the WTSLP Wireless Stainless Steel Load Pin and uses this to trigger and alarm when the setpoint is reached. Simultaneously, these transmitted force readings are displayed in real-time to the customer through the WTS-BS-1-HA Wireless Handheld Display or the WTS-BS-4 USB Base Station (connected to the) customer's PC computer/Laptop).



AxialTQ™ Engine Dynamometer

Torque Transducer

Industry: Automotive and Vehicle, Test and Measurement

Summary

Customer Need / Challenge

- The customer needs to measure the torque and the speed (RPM) produced by an engine and calculate it simultaneously.

Interface Solution

- The Interface AxialTQ Wireless Rotary Torque Measurement System was developed in direct collaboration with over 30 end-users who shared their wish-lists for operational priorities, user interface, design, features, real-world field issues and more.

Results

- The Interface AxialTQ Wireless Rotary Torque Measurement System accurately and simultaneously measured and calculated the torque and rotational speed (RPM) of the engine in real-time while collecting the data.

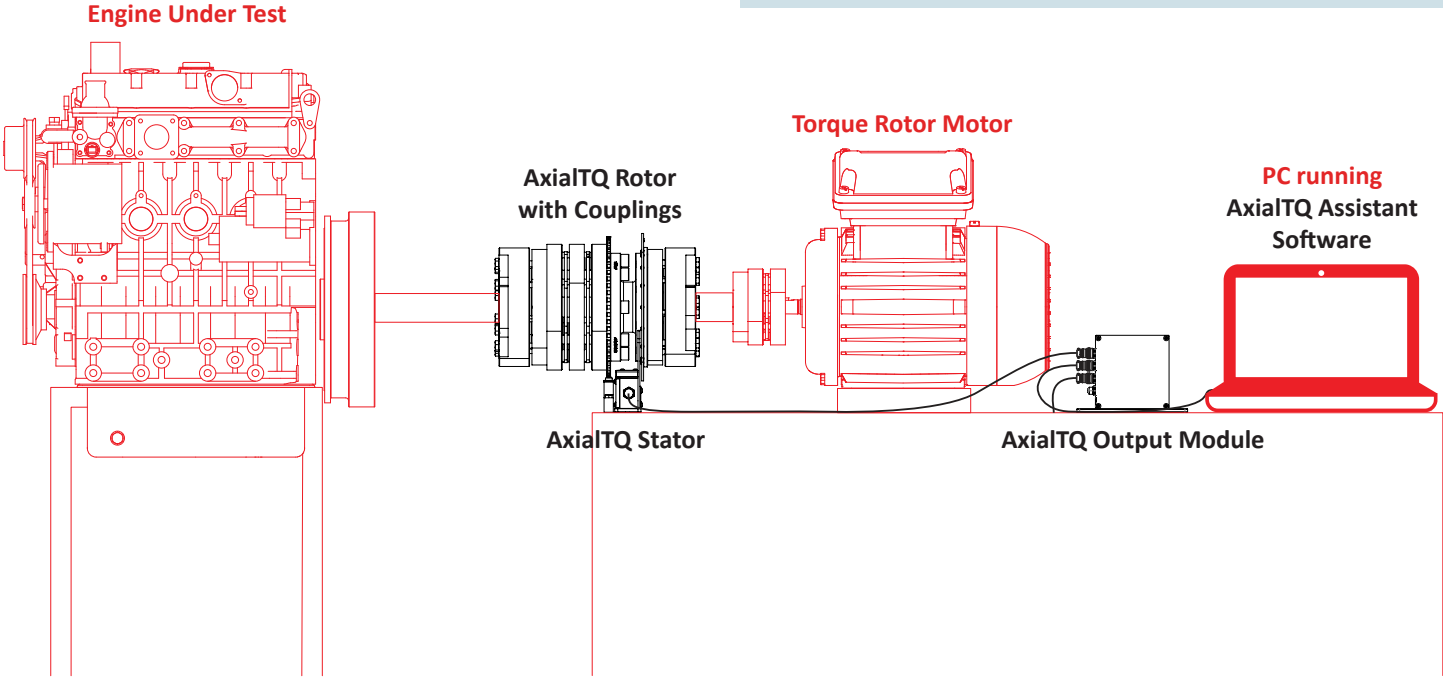
Materials

Interface Solution

- AxialTQ Wireless Rotary Torque Transducer
- AxialTQ Output Module
- Customer PC running AxialTQ Assistant Software

How It Works

- The AxialTQ rotor senses the torque with a high precision sensing element and strain gages. The electrical output is converted from an analog to a digital signal in the rotor. The high accuracy of the system is based on this combination of the proven sensing element technology with next generation electronics to provide the highest quality torque measurement available in the industry.



WTS Yacht Rigging Inspection

Load Shackle

Industry: Maritime

Summary

Customer Need / Challenge

A customer wants to have a complete rigging inspection to make sure the mast, still lines, and all movable hoisting lines are functional and meet the proper specifications for sailing. The customer wants to test the tension of the forestay, shroud, and backstay cables. They also want to test the tension of the movable lines when sailing.

Interface Solution

With Interface, Inc's WTSSHK-B Wireless Crosby™ Bow Load Shackle paired with the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters, the customer can switch and view between multiple shackles being tested. The WTS-BS-4 USB Industrial Base Station can also be attached to the customer's PC/Laptop to display realtime measurements from the shackles and log data.

Results

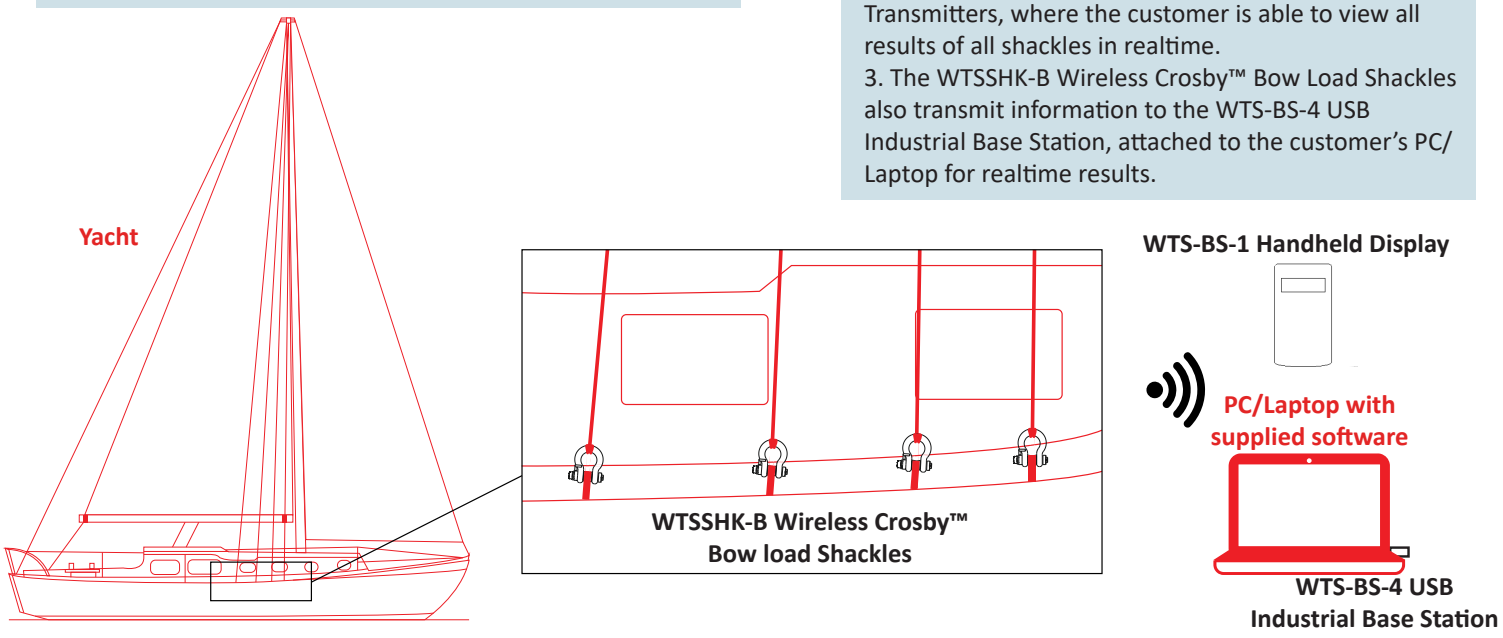
The customer was able to conduct both a running and standing rigging inspection of their ship or vessel, and was able to determine if all lines were functional and met safety standards.

Materials

- WTSSHK-B Wireless Crosby™ Bow Load Shackles
- WTS-BS-4 USB Industrial Base Station
- WTS-BS-1 Handheld Display for Unlimited Transmitters
- WTS Toolkit & Log100 Software
- Customer supplied PC/Laptop

How It Works

1. WTSSHK-B Wireless Crosby™ Bow Load Shackles are attached to the vessels forestay, shroud, and backstay cables.
2. The measurement at a is transmitted wirelessly to the WTS-BS-1 Wireless Handheld Display for Unlimited Transmitters, where the customer is able to view all results of all shackles in realtime.
3. The WTSSHK-B Wireless Crosby™ Bow Load Shackles also transmit information to the WTS-BS-4 USB Industrial Base Station, attached to the customer's PC/Laptop for realtime results.



Mooring Line Tension Testing

Tension Link

Industry: Maritime

Summary

Customer Need / Challenge

Due to the changing weather conditions, mooring cable lines undergo wear and tear. A customer wants to ensure all mooring lines for ships or vessels are securely docked at the same loading tension, so that they do not risk the mooring lines to break or cause damage.

Interface Solution

Interface, Inc.'s WTSLTL Lightweight Wireless Tension Link can be attached to each mooring cable in use. Results are sent to the customers through the WTS-BS-4 USB Industrial Base Station when connected to the customer's supplied PC computer/Laptop. Data can also be transmitted to the WTS-BS-1-HA Handheld Display for Multiple Transmitters, giving the customer the option to view multiple mooring cable line tensions.

Results

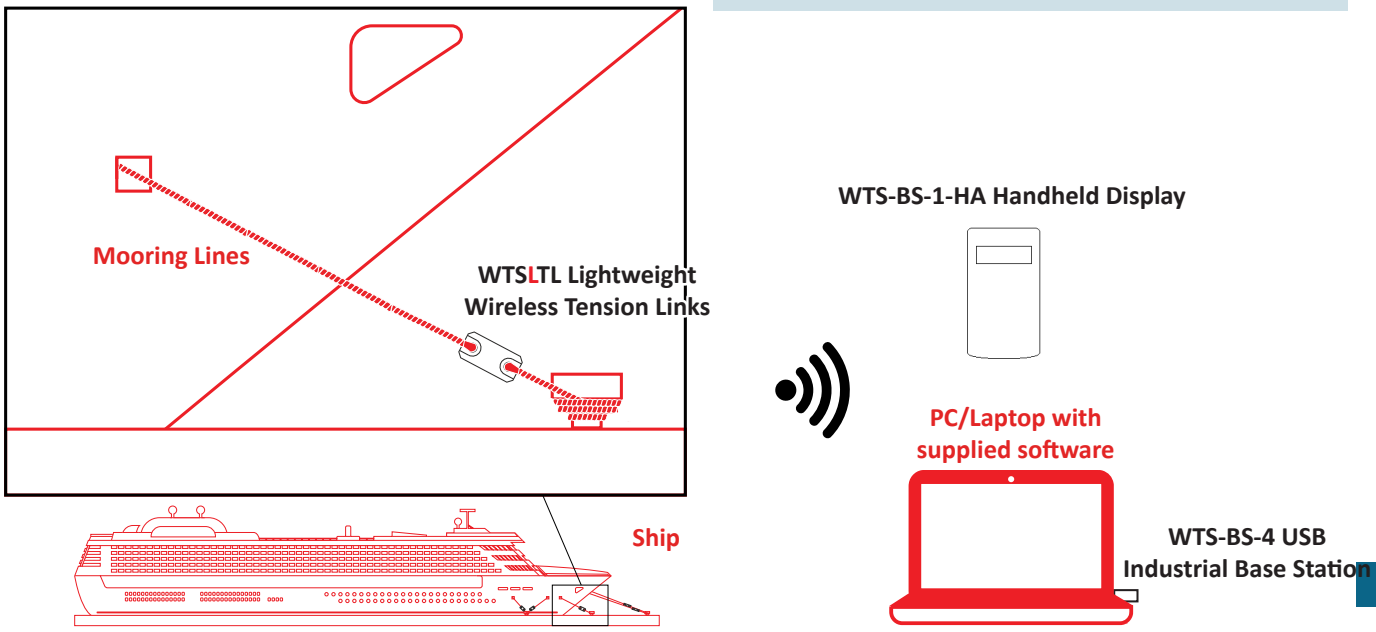
The customer was able to verify the tensions to multiple mooring cable lines. Thus, resulting in the security of their ship being safely docked.

Materials

- WTSLTL Lightweight Wireless Tension Links
- WTS-BS-4 USB Industrial Base Station
- WTS-BS-1-HA Handheld Display for Multiple Transmitters
- WTS Toolkit & Log100 Software
- Customer supplied PC/Laptop

How It Works

1. The WTSLTL Lightweight Wireless Tension Links are attached to all mooring cables being tested.
2. Force measurements are transmitted wirelessly in realtime to the customer's PC/Laptop through the WTS-BS-4 USB Industrial Base Station, or to the WTS-BS-1-HA Handheld Display for multiple transmitters.



Rescue Helicopter Hoist Test
Load Shackle

Industry: Aerospace

Summary

Customer Need / Challenge

A customer wants to test the strength of the cable line used in the hoist of their helicopter during rescue missions and situations. They want to see if both the cable and the hoist can withstand a heavy load safely, and for long periods of time while the helicopter is in flight.

Interface Solution

Interface, Inc.'s WTSSHK-D Wireless Crosby™ Load Shackle is attached to each mooring cable in use. Results are sent to the customers through the WTS-BS-4 USB Industrial Base Station when connected to the customer's supplied PC computer/ Laptop. Data can also be transmitted to the WTS-BS-1-HS Handheld Display for Single Transmitters, giving the customer the option to view mooring cable line tension.

Results

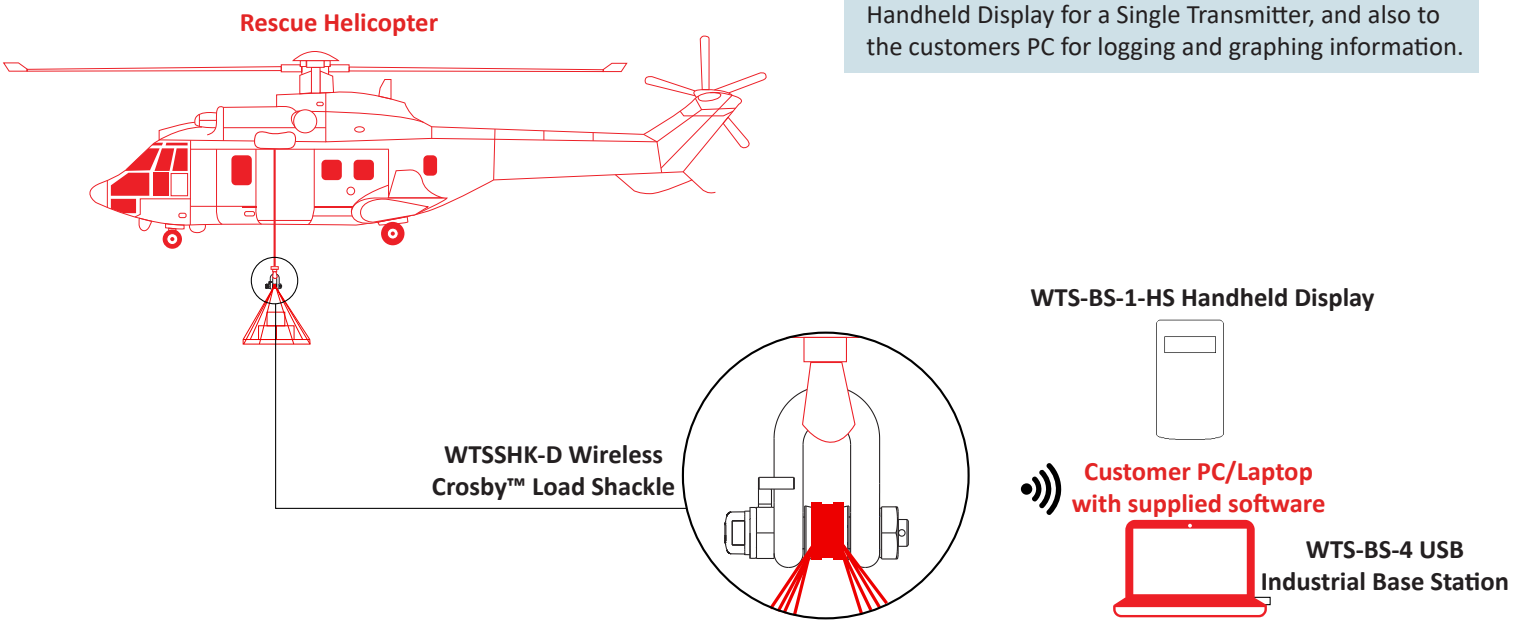
The customer was able to add a heavy load to the end of the helicopter hoist, to ensure it is strong and safe enough to carry both rescue personnel and objects while being in midair.

Materials

- WTSSHK-D Wireless Crosby™ Load Shackle
- WTS-BS-1-HS Handheld Display for Single Transmitters
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit & Log100 Software
- Customer supplied PC/Laptop

How It Works

1. The WTSSHK-D Wireless Crosby™ Load Shackle is installed at the end of the hoist.
2. A heavy load is attached to the shackle at its maximum capacity, and tested through mid flight in order to monitor the condition of the helicopter hoist.
3. Data is transmitted wirelessly to the WTS-BS-1-HS Handheld Display for a Single Transmitter, and also to the customers PC for logging and graphing information.



Silo Monitoring and Weighing
Load Cell

Industry: Agriculture

Summary

Customer Need / Challenge

A customer wants weigh and monitor the content inside their silo.

Interface Solution

Using Interface, Inc.'s A4200 Zinc Plated or A4600 Stainless Steel Weigh-check Load Cells, paired with 1280 Programmable Weight Indicator and Controller, the customer is able to monitor the amount of content by weight in their silo.

Results

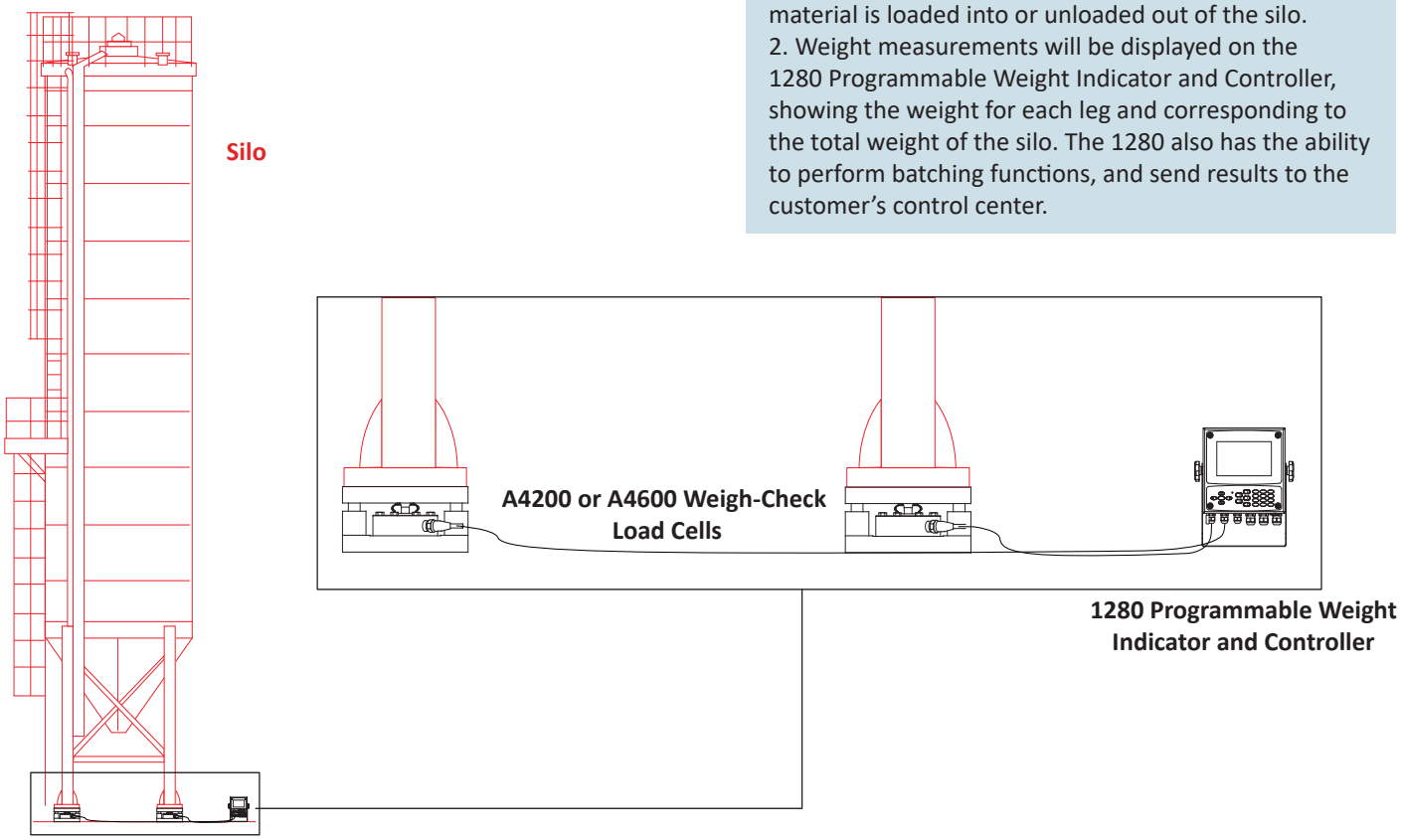
The customer was provided a customizable solution to monitor and weigh their silo with Interface, Inc.'s load cells and instrumentation. Results from the 1280 Programmable Weight Indicator and Controller was sent to the customer's control center.

Materials

- A4200 or A4600 Weigh-Check Load Cells
- 1280 Programmable Weight Indicator and Controller

How It Works

1. The A4200 or A4600 Weigh-Check Load Cells is installed under the legs of the silo, or base of the silo. The Weigh-Check Load Cell will measure the load as material is loaded into or unloaded out of the silo.
2. Weight measurements will be displayed on the 1280 Programmable Weight Indicator and Controller, showing the weight for each leg and corresponding to the total weight of the silo. The 1280 also has the ability to perform batching functions, and send results to the customer's control center.



Concrete Dam Flood Monitoring

Interface Mini™

Industry: Infrastructure

Summary

Customer Need / Challenge

A customer wants to monitor and be notified if a concrete dam has reached high flooding levels.

Interface Solution

Interface's WMC Miniature Sealed Stainless Steel Load Cells with multiple WTS-AM-1E Wireless Acquisition Modules connected to them, are small in size and perfect for measuring tension and compression. Multiple WMC's can be installed around the arch of the dam, so when flooding occurs, the WMC can transmit data and notify the customer through one of our Wireless Telemetry Systems.

Results

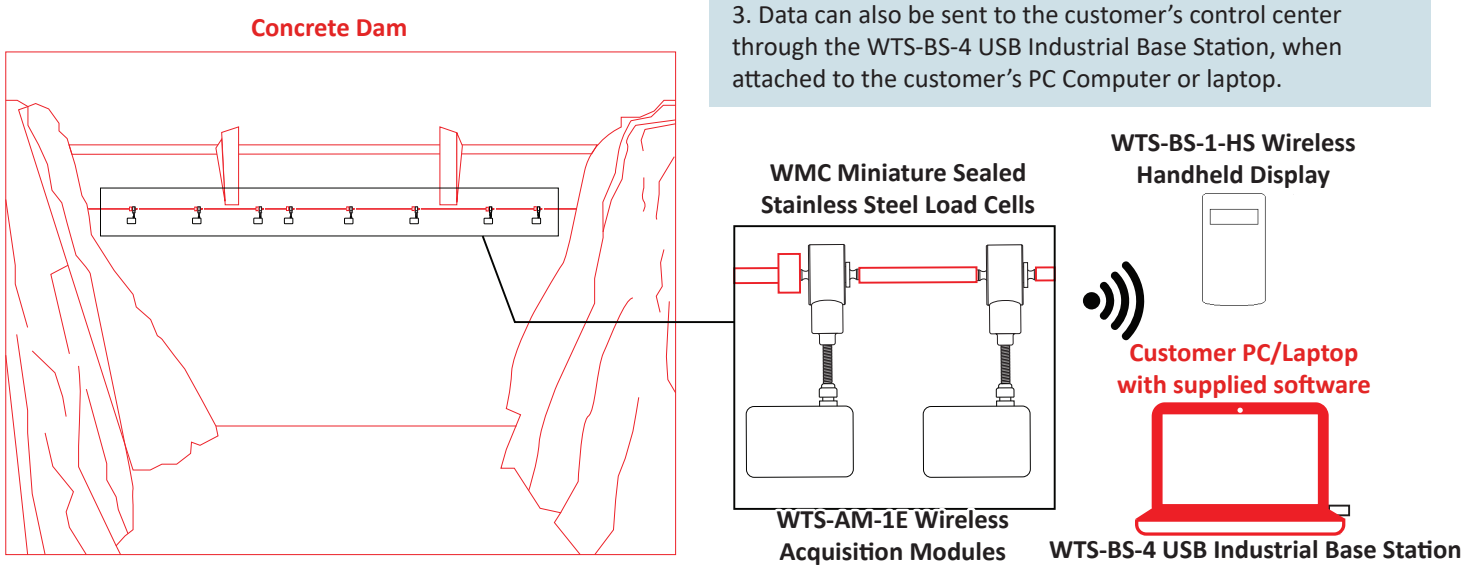
The customer was notified wirelessly when flood level became too high for the dam in their control center.

Materials

- WMC Miniature Sealed Stainless Steel Load Cells
- WTS-AM-1E Wireless Acquisition Modules
- WTS-BS-4 USB Industrial Base Station
- WTS-BS-1-HS Wireless Handheld Display for Single Transmitters
- Customer PC Computer or Laptop

How It Works

1. Multiple WMC Miniature Sealed Stainless Steel Load Cells with multiple WTS-AM-1E Wireless Acquisition Modules connected to them, are anchored to the concrete dam at the maximum height preferred.
2. If flooding occurs, the force from the water triggers the WMC's, and data is transmitted wirelessly to the customer's WTS-BS-1-HS Wireless Handheld Display for single transmitters.
3. Data can also be sent to the customer's control center through the WTS-BS-4 USB Industrial Base Station, when attached to the customer's PC Computer or laptop.



Chicken Weighing
Load Beam
Industry: Agriculture

Summary

Customer Need / Challenge

A customer wants a weighing system to help them determine a specific weight for their chickens. They need a weighing system that will ensure accurate weight measurements to keep their birds at their weight in order to sell to supermarkets. They also need a system that will be able to undergo harsh conditions and unusual temperatures.

Interface Solution

Interface's SPI Low Capacity Platform Scale Load Cell is able to undergo strained temperatures and transmits highly accurate results. A plate can be put on top of the SPI, and then a chicken can be weighed on top of the plate. Data results can be displayed on the 480 Bidirectional Digital Weight Indicator.

Results

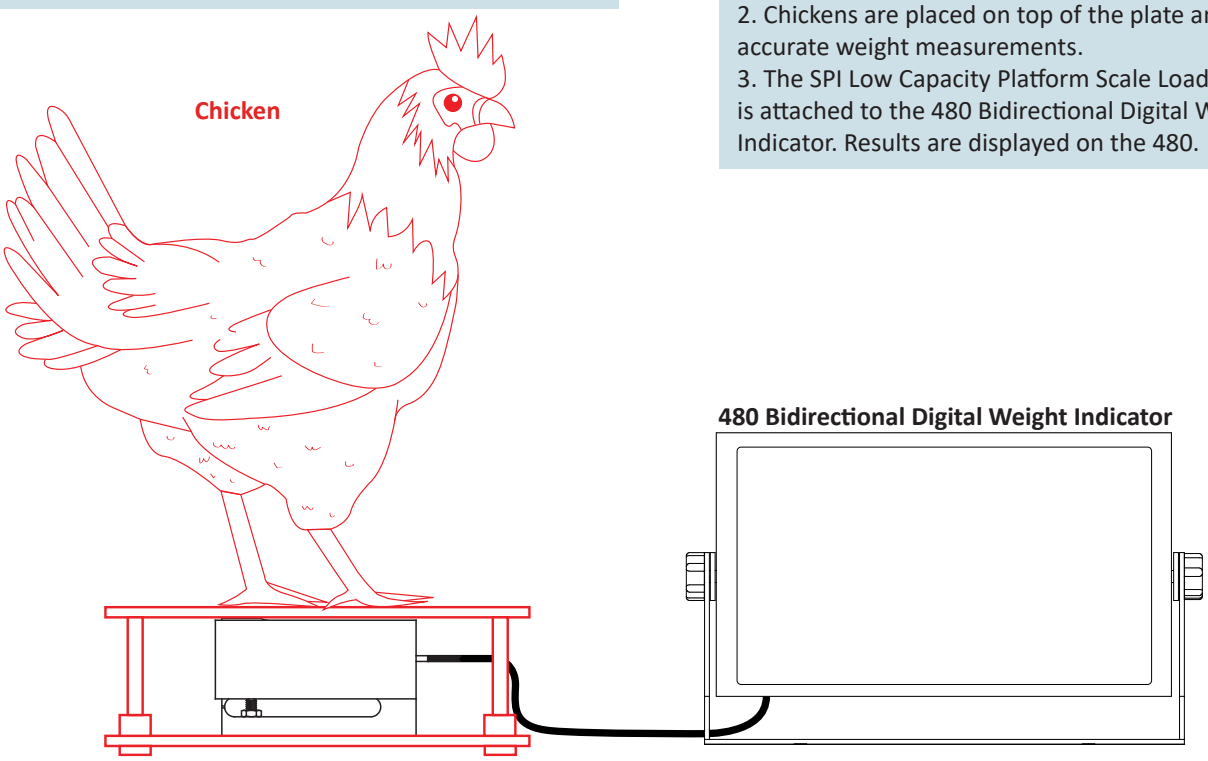
The customer is able to weigh their chickens, and maintain their weight through the accurate results from Interface's SPI Low Capacity Platform Scale Load Cell.

Materials

- SPI Low Capacity Platform Scale Load Cell
- 480 Bidirectional Digital Weight Indicator

How It Works

1. Metal plates are attached on the top and the bottom of the SPI Low Capacity Platform Scale Load Cell.
2. Chickens are placed on top of the plate and SPI for accurate weight measurements.
3. The SPI Low Capacity Platform Scale Load Cell is attached to the 480 Bidirectional Digital Weight Indicator. Results are displayed on the 480.



Hydraulic Jacking System Testing

Load Cell

Industry: Infrastructure

Summary

Customer Need / Challenge

A heavy lift company wants to test their hydraulic jacking system has the ability to lift heavy loads and objects, like a bridge during construction. They want to monitor the forces being applied to ensure the hydraulic jack is not only safe to use, but works well enough to avoid any potential structural issues. They also want the results in real-time.

Interface Solution

Interface's 1200 Standard High Capacity Load Cell can be attached in between the hydraulic jack and a heavy load. The 1200 Standard High Capacity Load Cell will measure the forces of the hydraulic jack as it lifts the load cell located in between the jack and the object. With the 9890 Strain Gage, Load Cell, & mV/V Indicator, the customer is also able to see the results in real-time.

Results

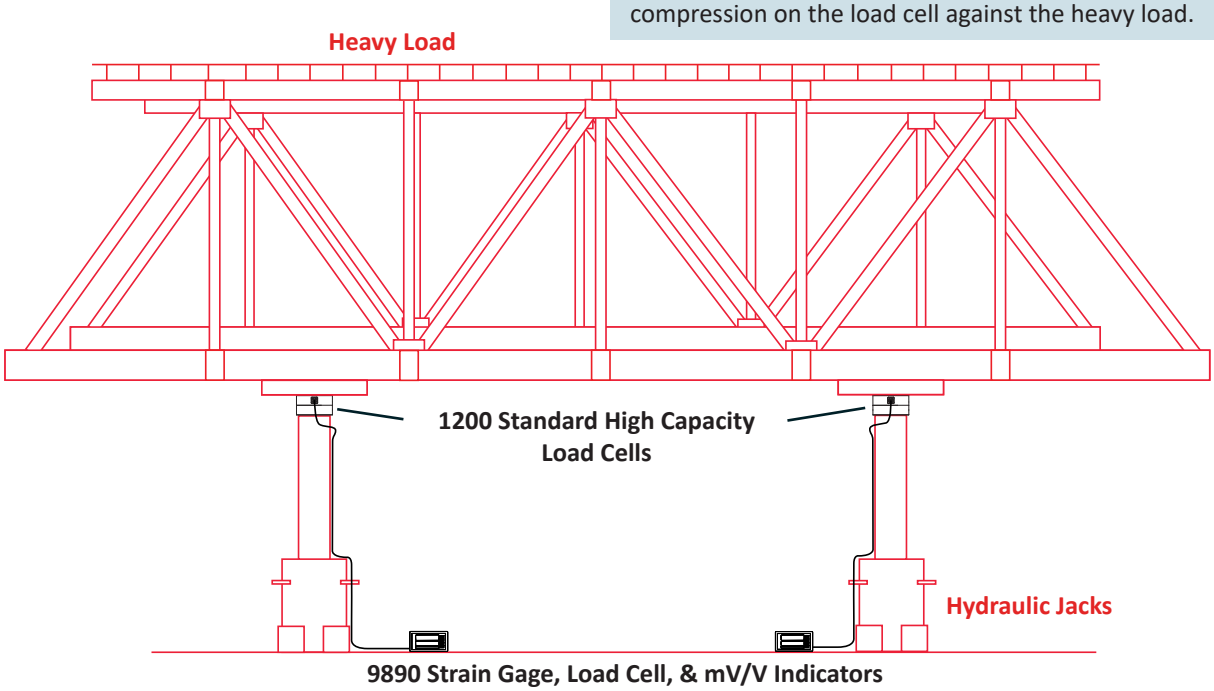
The heavy lift company tested their hydraulic jack, resulting in it being safe and functions properly to be sold. It also ensures buyers that the hydraulic jack system upholds its use of continuous heavy load lifting or moving, and maintains structural probity.

Materials

- 1200 Standard High Capacity Load Cell
- 9890 Strain Gage, Load Cell, & mV/V Indicator

How It Works

1. Multiple 1200 Standard High Capacity Load Cell's are located in between the hydraulic jack and a heavy lifting load.
2. The 1200's will be connected to its own 9890 Strain Gage, Load Cell, & mV/V Indicator to give accurate and real-time results of the forces from hydraulic jacking system when it puts compression on the load cell against the heavy load.



Tractor Linkage Draft Control

Load Pin

Industry: Agriculture

Summary

Customer Need / Challenge

A farmer wants to measure the forces applied on their tractor's draft control, between the tractor and any linked on attachments. Measuring the force will help the farmer be able sense any strains on the hitch of the tractor, and will be needed in order to apply any specific settings to the draft control when the tractor encounters rough terrain.

Interface Solution

Interface's WTSLP Wireless Stainless Steel Load Pin is a wireless load pin that can be installed directly in the hitch, replacing the normal shear pin of the tractor. Force results are transmitted wirelessly to the WTS-BS-4 USB Industrial Base Station, where the customer can view the results on their PC computer or Laptop with the supplied WTS toolkit. The customer can also view results on the WTS-BS-1-HS Handheld Display for Single Transmitters in real-time.

Results

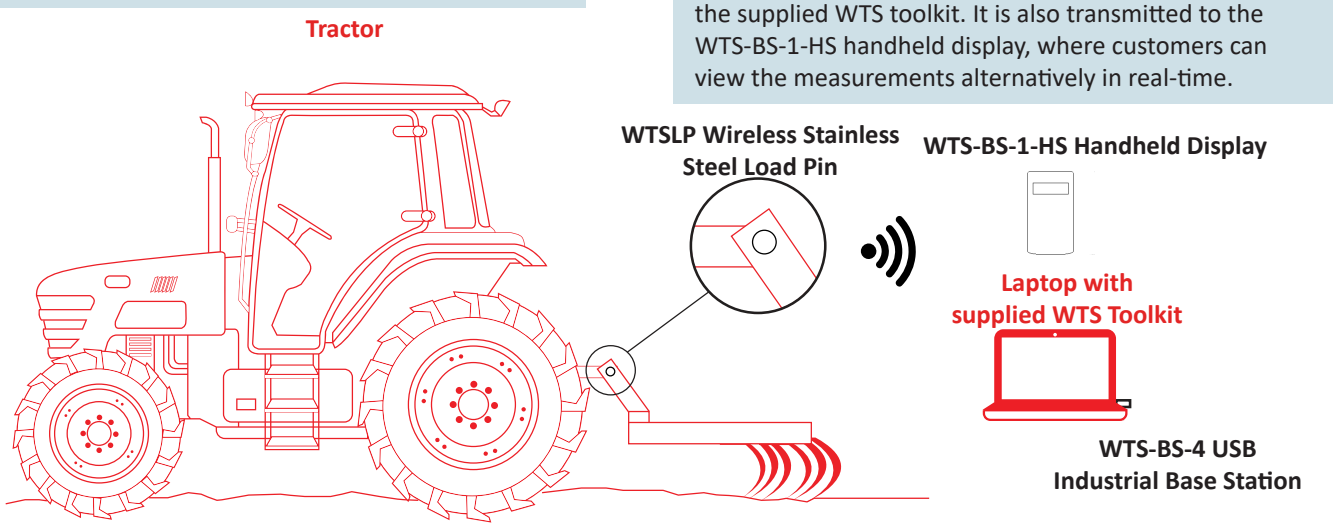
The customer is able to determine the specific draft control settings for their tractor after using Interface's custom solution Wireless Load Pin and Wireless Telemetry System products.

Materials

- WTSLP Wireless Stainless Steel Load Pin
- WTS-BS-1-HS Handheld Display for Single Transmitters
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit (graphing, logging, and set up software, included with WTS-BS-4)
- Customer PC Computer or Laptop

How It Works

1. The WTSLP Wireless Stainless Steel Load Pin is installed where the tractor's original shear pin would be located.
2. An implement is installed to the hitch.
3. The force results are measured and relayed to the wireless telemetry systems, such as the WTS-BS-4 USB Industrial Base Station, where the customer is able to review the results on their PC computer or laptop with the supplied WTS toolkit. It is also transmitted to the WTS-BS-1-HS handheld display, where customers can view the measurements alternatively in real-time.



Mooring Quick Release Hooks (QRH)

Load Pin

Industry: Maritime

Summary

Customer Need / Challenge

A customer wants to test their Quick Release Hook (QRH) system when their vessels are docked. They want to ensure the mooring lines are secured, but also, the quick release hooks are able to be easily and safely released

Interface Solution

Interface's WTSLP Stainless Steel Load Pin can be installed into the quick release hook, where forces from the mooring lines can be measured and displayed when paired with the WTS-BS-4 USB Industrial Base Station. The load tension forces are displayed in real-time on the customers PC or laptop. The WTS-RM1 Wireless Relay Output Receiver Module alarm can also be triggered for the customer when maximum safety work load capacities have been reached or are overloaded.

Results

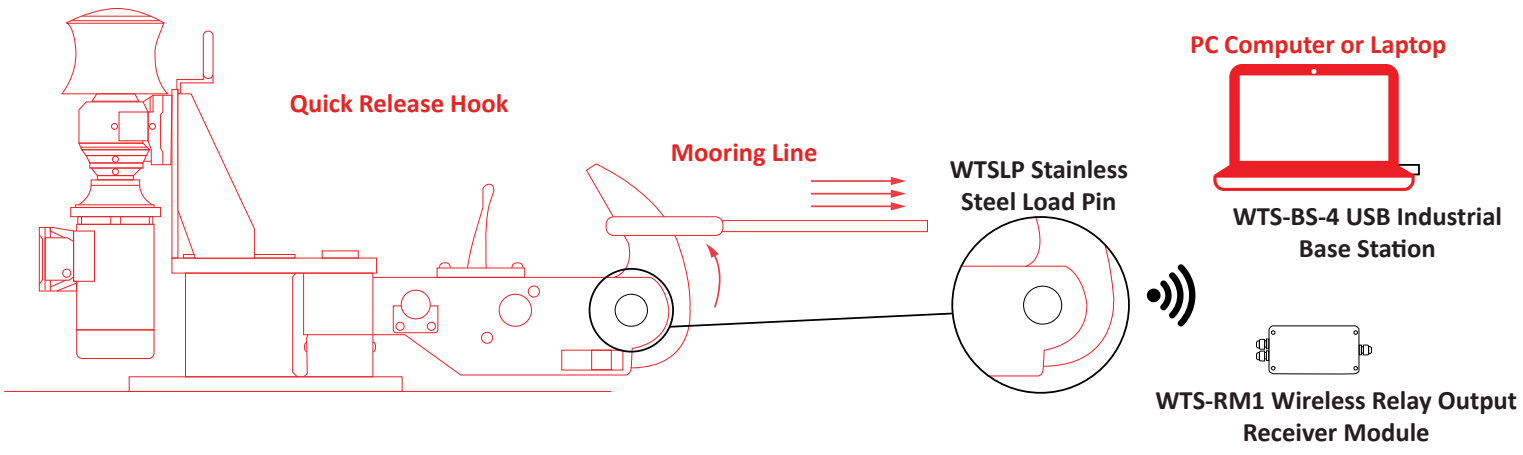
The customer was able to determine if their quick release hooks worked effectively within the safe working limit specifications, and was aware of any potential overload situations.

Materials

- WTSLP Stainless Steel Load Pin
- WTS-RM1 Wireless Relay Output Receiver Module
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit (graphing, logging, and set up software, included with WTS-BS-4)
- Customer PC Computer or Laptop

How It Works

1. The WTSLP Stainless Steel Load Pin is installed in the quick release hook.
2. Forces are measured and recorded using the WTS-BS-4 USB Industrial Base Station, and results are displayed on the customers PC computer or laptop.
3. When maximum capacities have been reached, the WTS-RM1 Wireless Relay Output Receiver Module triggers an alarm for the customer to be notified.



Livestock Weighing System
Load Beam
Industry: Agriculture

Summary

Customer Need / Challenge

A rancher wants to accurately weigh their cows for multiple reasons. They want to make sure their cows are at a healthy weight, and also want to maintain their weight. But they also want to know the optimal time for breeding based on the weight of their livestock.

Interface Solution

Interface's solution is to bolt 4 SSB Sealed Beam Load Cells at the bottom of a metal platform, that is placed on the inside of the customer's cattle cage. Once the cow has walked onto the plate, the SSB Sealed Beam Load Cells will measure the force pressure applied. With all 4 connected to JB104SS Junction Box, which is then connected to the 480 Bidirectional Weight Indicator, combined accurate weight results will be displayed.

Results

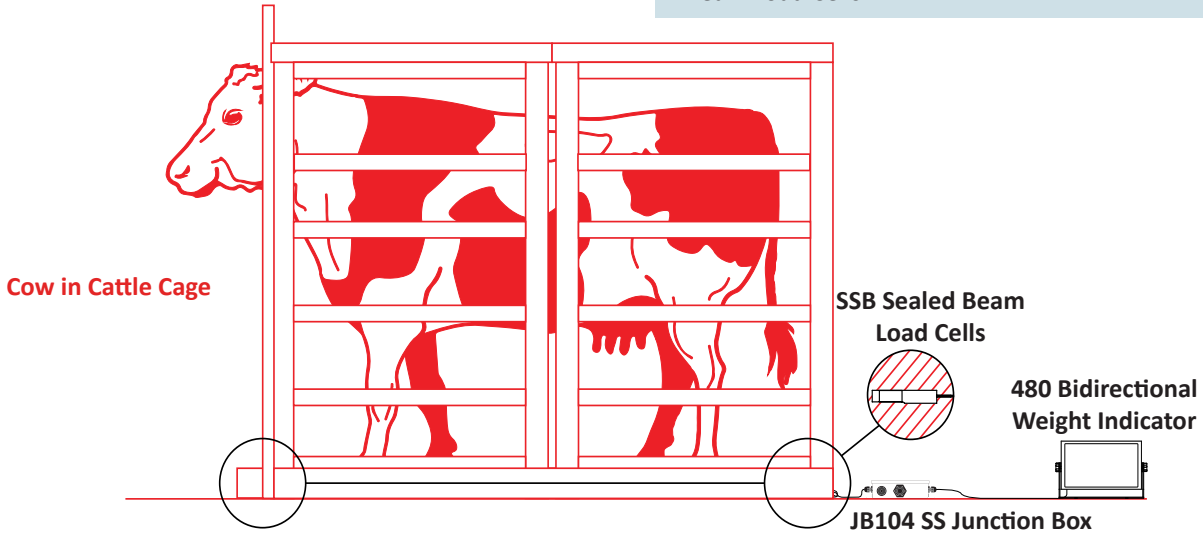
The customer was able to determine accurate weight measurements of their livestock in order to keep them healthy, or, to determine when was a good time to breed.

Materials

- (4) SSB Sealed Beam Load Cells
- JB104SS Junction Box
- 480 Bidirectional Weight Indicator

How It Works

1. (4) SSB Sealed Beam Load Cells are bolted to the bottom of a metal platform, which was placed inside a cattle cage.
2. A cow was led inside the cattle cage, where it was weighed on the metal platform.
3. The multiple SSB's were wired together to a JB104SS Junction Box, which was then connected to the 480 Bidirectional Weight Indicator to measure the combined results of the 4 SSB Sealed Beam Load Cells.



Aircraft Lifting Equipment

Load Cell

Industry: Aerospace

Summary

Customer Need / Challenge

An aerospace company wants to check if the valves on their aircraft lifting equipment is working safely and properly.

Interface Solution

Interface's solution is to install a 1200 Standard High Capacity Load Cell in between the aircraft testing rig and the lifting jack. The load cell will measure the load's force safety valve when the lifting equipment opens. Results will be sent to the 9890 Strain Gage, Load Cell, & mV/V Indicator, where the customer can see it displayed in real-time.

Results

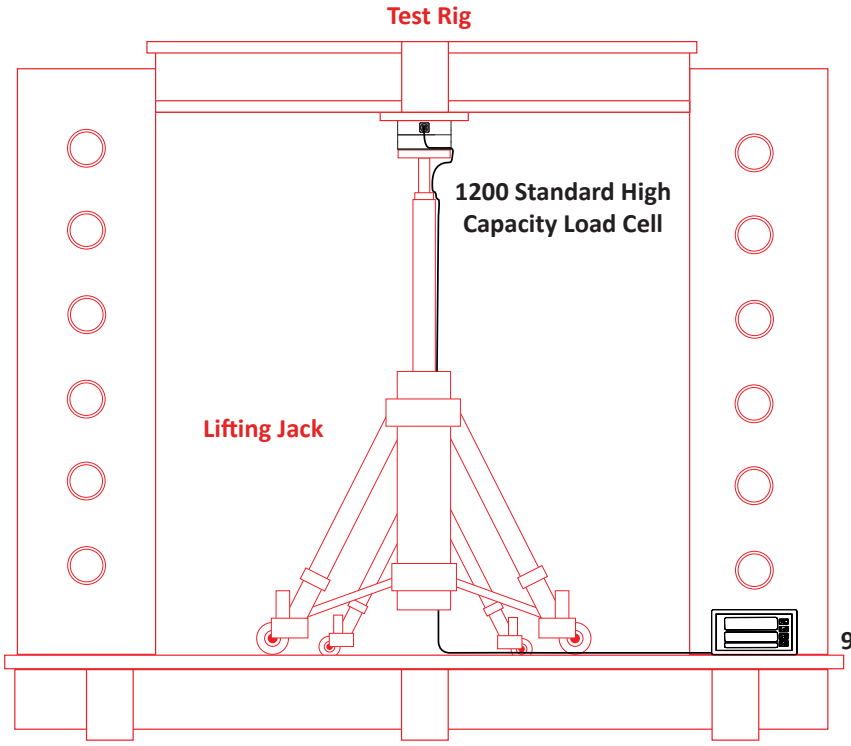
The customer was able to determine that the aircraft lifting equipment was working properly. Since they are ensured of its safe functionality, it can now be used on real aircrafts that need to be lifted.

Materials

- 1200 Standard High Capacity Load Cell
- 9890 Strain Gage, Load Cell, & mV/V Indicator

How It Works

1. A 1200 Standard High Capacity Load Cell is placed between the aircraft test rig and the lifting jack.
2. The1200 Standard High Capacity Load Cell measures the forces of the lifting jack, to ensure it can lift the rig properly.
3. Force results are sent 9890 Strain Gage, Load Cell, & mV/V Indicator, where the customer can view displayed results in real-time.



Aircraft Engine Hoist

Load Shackle

Industry: Aerospace

Summary

Customer Need / Challenge

An aerospace company wants to test their aircraft engine hoist in order to safely lift, remove, or install engines efficiently and safety.

Interface Solution

Interface's solution is to install WTSSHK-B-HL Wireless Bow Shackles to the aircraft engine hoist. A heavy load will be added to the hooks where the aircraft engine would be. Results from the heavy load will be sent wirelessly to both the WTS-BS-4 USB Industrial Base Station attached to the customers computer or laptop, and the WTS-1-HS Handheld display for single transmitters

Results

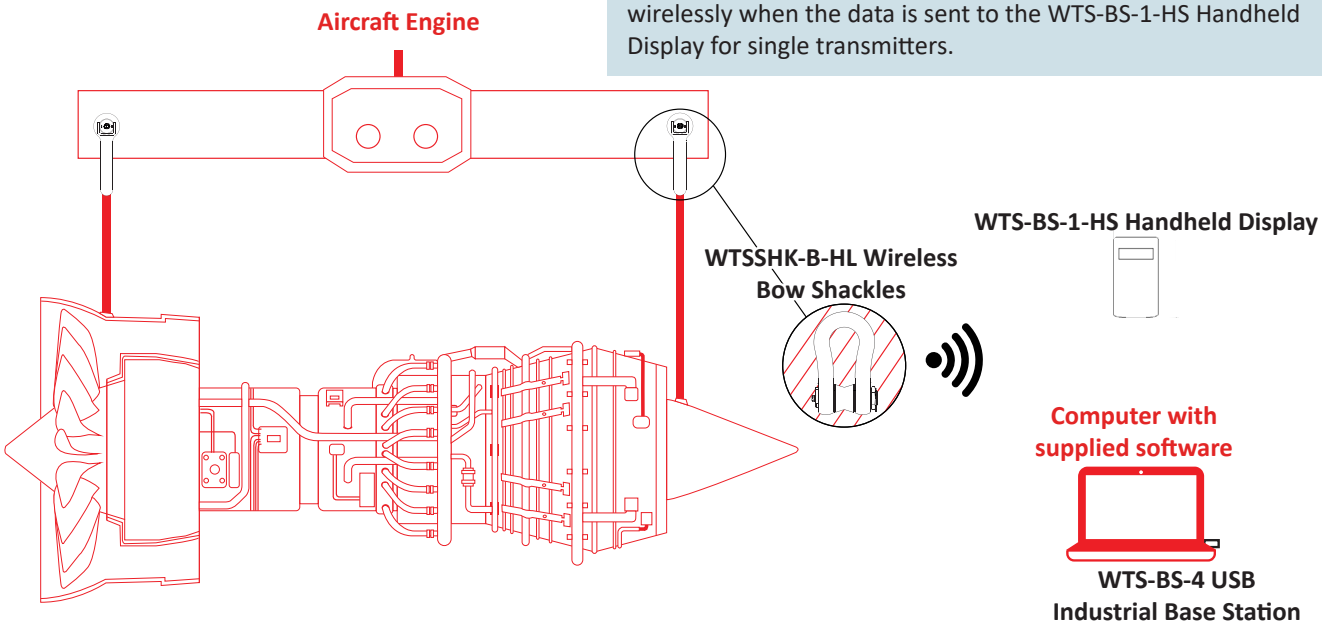
The customer was assured that the aircraft engine hoist was strong and secure enough to lift a heavy engine when installing or removing an engine inside of an aircraft.

Materials

- (2) WTSSHK-B-HL Wireless Bow Shackles
- WTS-BS-4 USB Industrial Base Station
- WTS-BS-1-HS Handheld Display for Single Transmitters
- Customer PC or Laptop

How It Works

1. 2 WTSSHK-B-HL Wireless Bow Shackles are installed onto the aircraft engine hoist.
2. A heavy load is attached to the hooks of the hoist and slings.
3. The WTSSHK-B-HL Wireless Bow Shackles measure the forces of the heavy load, and transmit the data wirelessly to the customers computer or laptop through the WTS-BS-4 USB Industrial Base Station. The customer can also view results wirelessly when the data is sent to the WTS-BS-1-HS Handheld Display for single transmitters.



Commercial Fishing Wire Rope Testing

Tension Link

Industry: Maritime

Summary

Customer Need / Challenge

A commercial fishing owner wants to measure the force tension of the wire fishing rope connected to the fishing cage or net when their vessel goes to catch. They want to ensure the wire rope is strong enough and safe enough to hold the maximum capacity of fish caught in the cage or net.

Interface Solution

Interface's WTSTL Wireless Tension Link Load Cell was attached between the end of the cable, and the end that hooks onto the fishing net. This tension link will be able to measure the forces of the full net of fish, or, a heavy load at maximum capacities. The data information can be transmitted to both the WTS-BS-1-HS Handheld Display for Single Transmitters, or to the customers computer laptop through the WTS-BS-4 USB Industrial Base Station.

Results

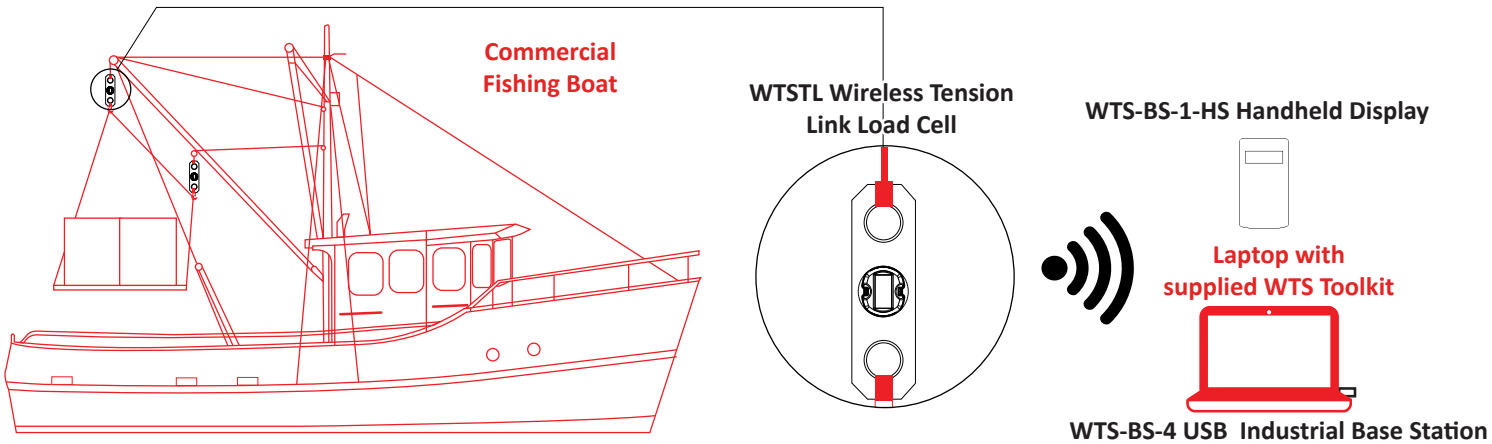
The customer was able to determine if the fishing cable on their vessel was strong enough to hold the fish cage or net at maximum capacity when out catching.

Materials

- WTSTL Wireless Tension Link Load Cell
- WTS-BS-1-HS Handheld Display for Single Transmitters
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit (graphing, logging, and set up software, included with WTS-BS-4)
- Customer PC Computer or Laptop

How It Works

1. The WTSTL Wireless Tension Link Load Cell is attached at the end of the wire fishing rope.
2. A heavy load that reaches maximum capacity for the wire rope, was added to the end of the WTSTL Wireless Tension Link Load Cell.
3. Force measurements are transmitted to the WTS-BS-1-HS Handheld Digital Display for Single Transmitters and to the customers computer or laptop through the WTS-BS-4 USB Industrial Base Station. With the WTS Toolkit (included with the WTS-BS-4) the customer is able to graph and log the data results with this software onto their computer.



Poultry Feeder Monitoring

Torque Transducer

Industry: Agriculture

Summary

Customer Need / Challenge

A customer wants to monitor the motor that operates their poultry feeders. The poultry feeders must give out an equal distribution of feed per poultry house.

Interface Solution

Interface's solution is to use the T5 Standard Precision Pedestal Mount Shaft Style Rotary Torque Transducer, with the speed/angle option, which will be attached between a poultry feeder and a motor with Interface's couplings. Torsion measurements can be graphed and logged sing the 9850 Torque Transducer and Load Cell Indicator.

Results

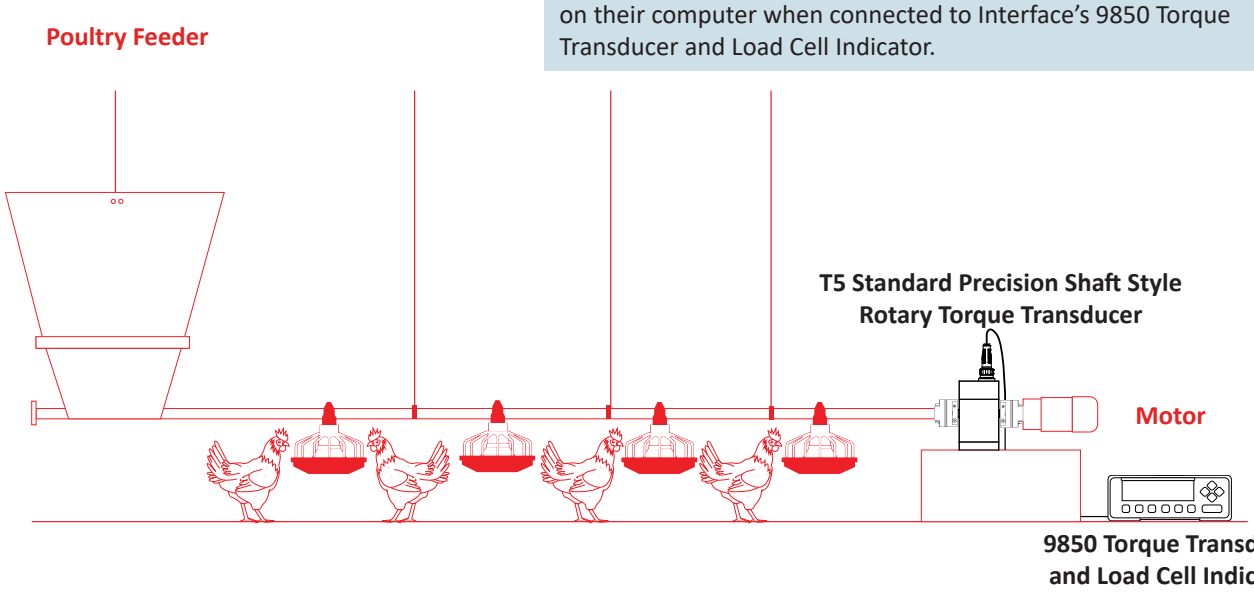
The customer was able to monitor their poultry feeders, and that every feeder got the same amount of food distributed to it.

Materials

- T5 Standard Precision Pedestal Mount Shaft Style Rotary Torque Transducer
- 9850 Torque Transducer and Load Cell Indicator

How It Works

1. The T5 Standard Precision Pedestal Mount Shaft Style Rotary Torque Transducer is attached with Interface's Couplings in between the poultry feeder and the motor.
2. The T5 can measure the torque to see if any of the feed is stuck, which would stop the motor from dispensing the food. It can also detect if the motor is dispensing too much food with the angle measurement, and also count the number of rotations so the food is dispensed is at the same amount each and every time.
3. The customer was able to log and graph the torque results on their computer when connected to Interface's 9850 Torque Transducer and Load Cell Indicator.



Landing Gear Joint Testing
Load Pin

Industry: Aerospace

Summary

Customer Need / Challenge

An aerospace company wants to test their new spacecraft assembly and design by testing its landing gear joints. They want to ensure there are no flaws in the gear shock absorber design and can handle the applied forces when the craft lands from a flight.

Interface Solution

Interface's WTSLP Wireless Stainless Steel Load Pins can be installed and replace the normal pin joints. The spacecraft undergoes multiple drop tests at different heights, where the forces applied on the load pins are measured. The force results are transmitted wirelessly to the WTS-BS-4 USB Industrial Base Station in the customer's computer, and the WTS-BS-1-Ha Handheld Digital Display for multiple transmitters.

Results

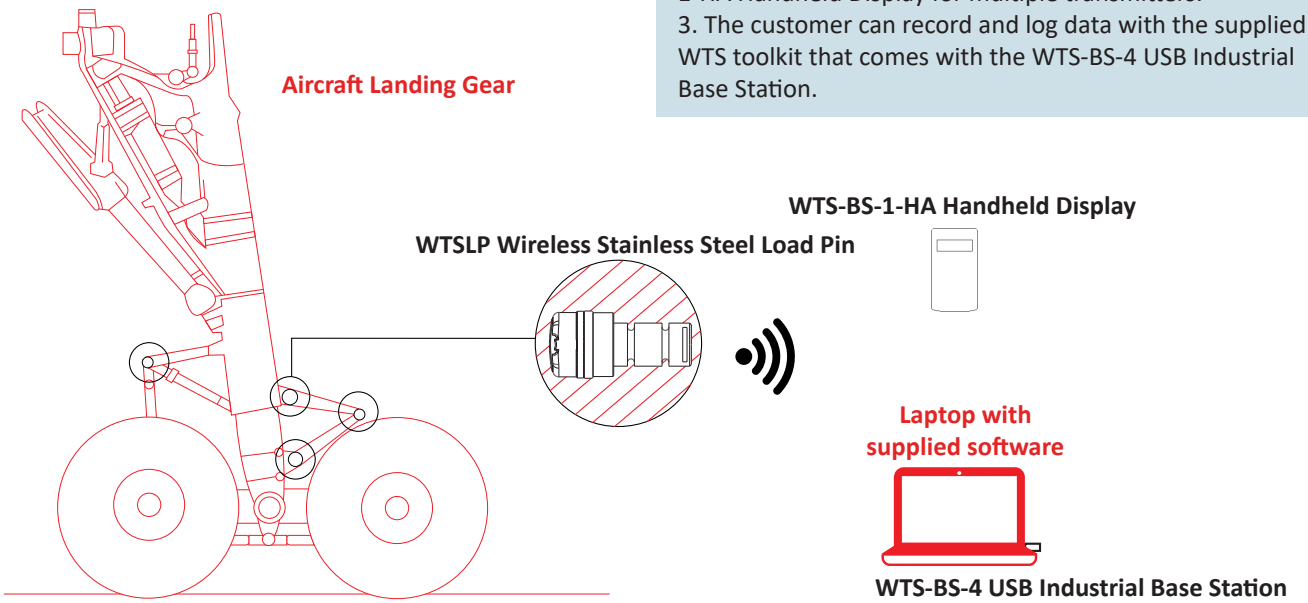
The customer was able to validate their spacecraft's landing gear structure is working effectively and safely.

Materials

- WTSLP Wireless Stainless Steel Load Pins
- WTS-BS-4 USB Industrial Base Station
- WTS Toolkit
- WTS-BS-1-HA Handheld Display for multiple transmitters
- Customer PC or Laptop

How It Works

1. The WTSLP Wireless Stainless Steel Load Pins are installed in the multiple articulating pin joints.
2. After multiple drop tests, the force measurements are transmitted wirelessly to the customer's computer through the WTS-BS-4 USB Industrial Base Station and the WTS-BS-1-HA Handheld Display for multiple transmitters.
3. The customer can record and log data with the supplied WTS toolkit that comes with the WTS-BS-4 USB Industrial Base Station.



FORCE MEASUREMENT SOLUTIONS

Hydropower Turbine Generator Monitoring

Torque Transducer

Industry: Infrastructure

Summary

Customer Need / Challenge

A customer wants to monitor and detect any turbine generator faults in their hydroelectric power plant located on a river.

Interface Solution

Interface's solution is to use the T2 Ultra Precision Shaft Style Rotary Torque Transducer and attach it to the turbine generator with Interface's Shaft Style Torque Transducer Couplings. When water from the river pushes through the penstock to the outflow, it moves the turbine blades, creating electricity through the generator shaft. Torsion measurements can be graphed and logged with the 9850 Torque Transducer and Load Cell Indicator- catching any unusual fluctuations and vibrations.

Results

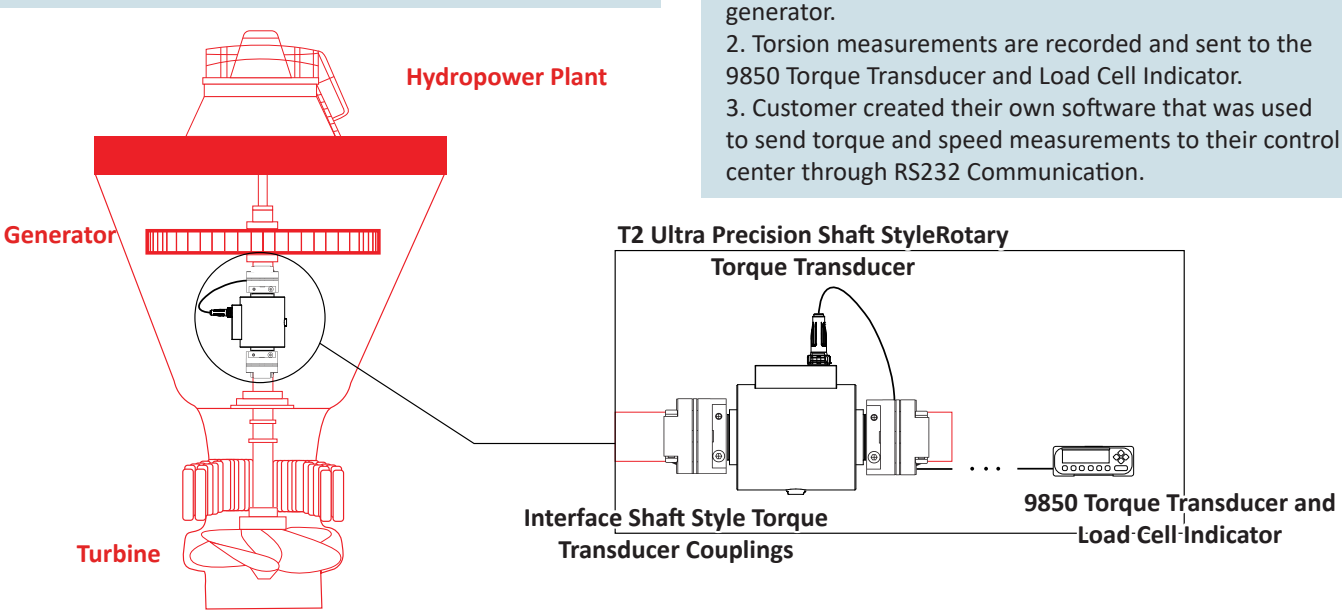
The customer was able to monitor, graph, and log the torque measurement results of the turbine generator.

Materials

- T2 Ultra Precision Shaft Style Rotary Torque Transducer
- Interface Shaft Style Torque Transducer Couplings
- 9850 Torque Transducer and Load Cell Indicator

How It Works

1. The T2 Ultra Precision Shaft Style Rotary Torque Transducer is installed with Interface's Shaft Style Torque Transducer Couplings onto the hydropower turbine generator.
2. Torsion measurements are recorded and sent to the 9850 Torque Transducer and Load Cell Indicator.
3. Customer created their own software that was used to send torque and speed measurements to their control center through RS232 Communication.



Automotive Head Rest Testing

Load Cell and Instrumentation

Industry: Test and Measurement

Summary

Customer Need / Challenge

A manufacturer for automotive head rests wants to test the durability of their products. They want to do a number of fatigue testing and force testing on the head rests to make sure it meets durability and high quality standards.

Interface Solution

Interface's solution is to install Model 1000 Fatigue-Rated LowProfile™ Dual-Bridge Load Cell to the customer's actuator mechanism. This load cell is perfect for fatigue testing and reports highly accurate results through the fatigue cycling. The results are collected by using the SI-USB Universal Serial Bus Dual Channel PC Interface Module, which synchronizes the data directly from the load cell and the string pot (for measuring distance) to the customer's computer.

Results

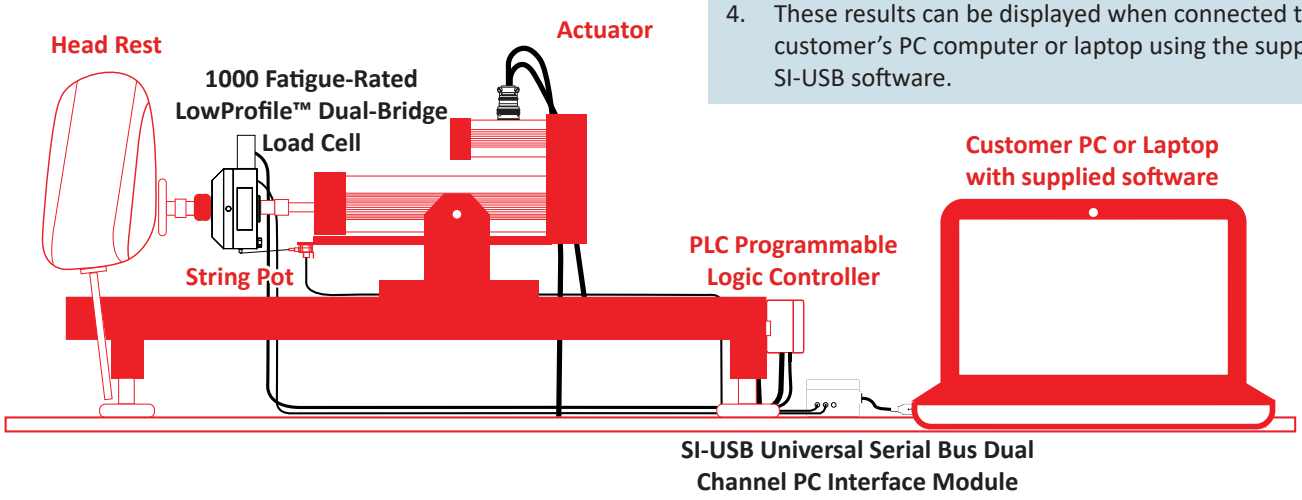
The head rest manufacturer was able to get highly accurate data through the fatigue testing cycle, using Interface's products.

Materials

- 1000 Fatigue-Rated LowProfile™ Dual-Bridge Load Cell
- SI-USB Universal Serial Bus Dual Channel PC Interface Module with included SI-USB software
- PLC Programmable Logic Controller
- String Pot
- Customer Actuator Mechanism
- Customer's PC or Laptop

How It Works

1. The 1000 Fatigue-Rated LowProfile™ Dual-Bridge Load Cell is installed at the end of the customer's actuator mechanism.
2. The head rest undergoes a cycle of fatigue testing, where the results are recorded using the 1000 Fatigue-Rated LowProfile™ Dual-Bridge Load Cell.
3. The data results are collected with the SI-USB Universal Serial Bus Dual Channel PC Interface Module.
4. These results can be displayed when connected to the customer's PC computer or laptop using the supplied SI-USB software.



Aircraft Screwdriver Fastening Control

Torque Transducer

Industry: Test and Measurement

Summary

Customer Need / Challenge

An airplane manufacturer needs a solution where they can control the torque when fastening screws on their airplane models. They do not want to create any damage to materials, or apply too much torque when plane components are being fastened together.

Interface Solution

Interface's Model T15 Hex Drive Rotary Torque Transducer can be attached to the fastening work bench, measuring and recording torque, rotational speed, and angle of the screwdriver. The LWCF Clamping Force Load Cell is installed, measuring the forces applied on the screw being fastened. Results are sent to the SI-USB4 4-channel USB Interface Module, which is connected to the customer's PC or laptop where data is logged, graphed, and displayed.

Results

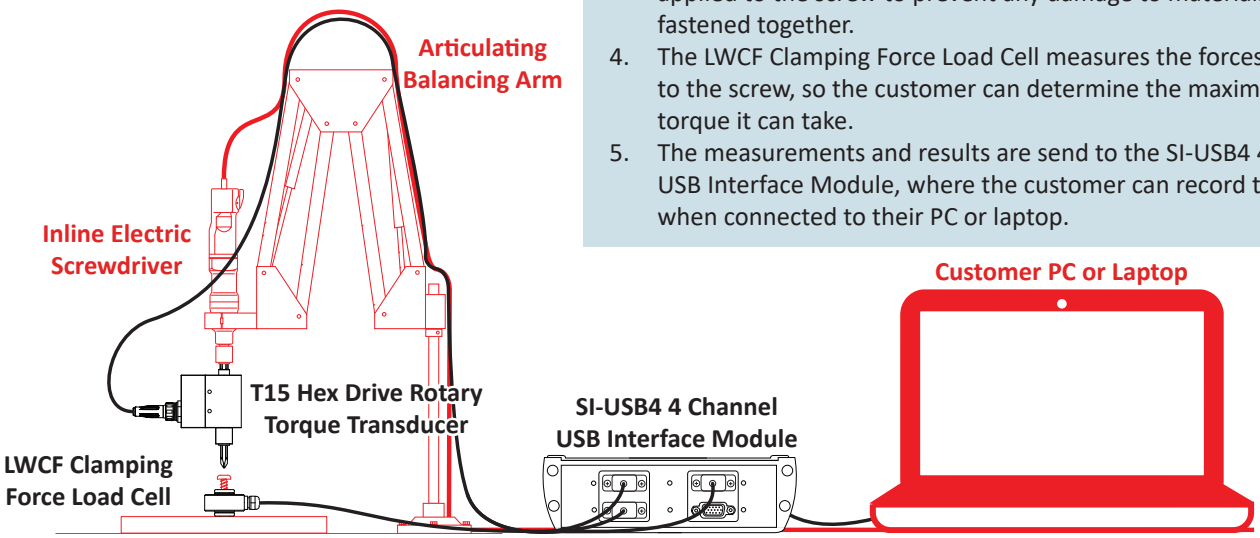
The airplane manufacturer was able to calibrate their screwdriver by measuring its torque, rotational speed, and angle, when attaching materials together for their airplane. They were also able to measure the forces being applied to the screw, to ensure it was not applying too much torque to the components.

Materials

- T15 Hex Drive Rotary Torque Transducer
- LWCF Clamping Force Load Cell
- SI-USB4 4-channel USB Interface Module
- Customer PC or Laptop

How It Works

1. The T15 Hex Drive Rotary Torque Transducer is attached to the screwdriver fastening bench.
2. The LWCF Clamping Force Load Cell is placed beneath the bolt head.
3. The T15 Hex Drive Rotary Torque Transducer measures the screwdrivers torque, rotational speed, and angle, in order for the customer to determine the right amount of torque needed to be applied to the screw to prevent any damage to materials being fastened together.
4. The LWCF Clamping Force Load Cell measures the forces applied to the screw, so the customer can determine the maximum torque it can take.
5. The measurements and results are send to the SI-USB4 4-Channel USB Interface Module, where the customer can record the results when connected to their PC or laptop.



Aerial Lift Overload Control
Load Cell

Industry: Infrastructure, Test and Measurement

Summary

Customer Need / Challenge

A manufacturing company for aerial lifts wants to test its self-propelled boom lift to ensure it can operate at heavy capacities when in use, and at different angles. They want to prevent any accidents in case of a lifting overload, for the safety of any working individual who uses it.

Interface Solution

Interface's solution is to attach the 3A160 3-Axis Force Load Cell to the bottom of the bucket of the boom lift. The 3A160 3-Axis Force Load Cell gives high accuracy results, which can be displayed using the 920i Programmable Weight Indicator and Controller in real time.

Results

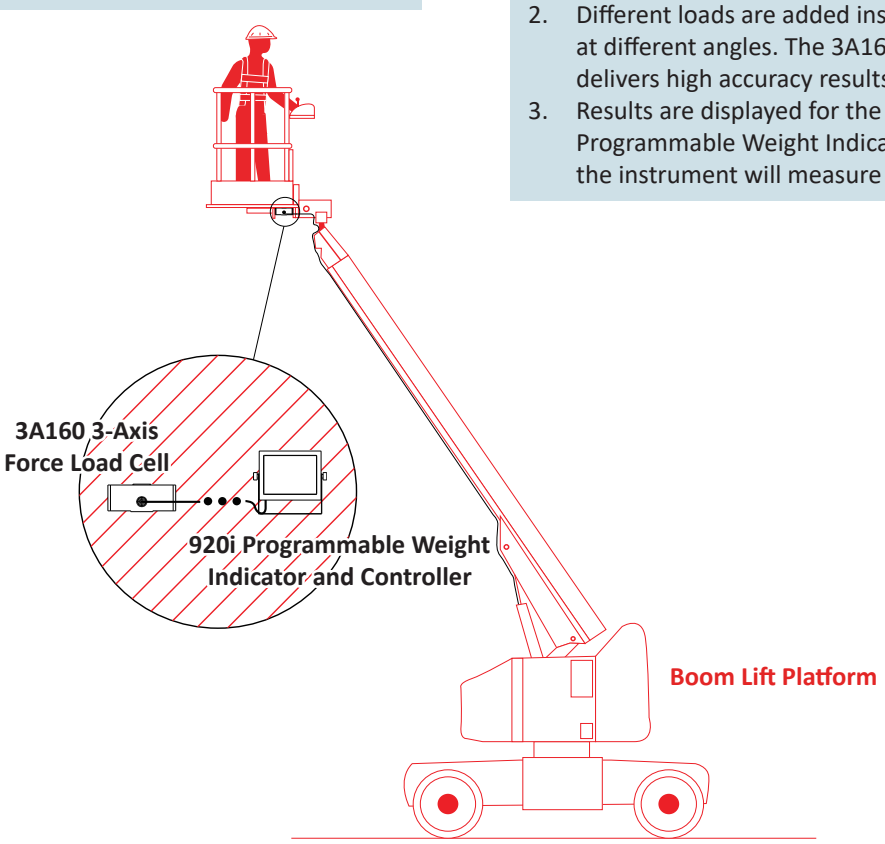
The manufacturing company tested their aerial boom lifts and determined it was safely operable when maximum capacities has been reached.

Materials

- 3A160 3-Axis Force Load Cell
- 920i Programmable Weight Indicator and Controller

How It Works

1. The 3A160 3-Axis Force Load Cell is installed where the lift's arm ends at the bottom of the boom lift's bucket.
2. Different loads are added inside the boom lift's bucket, at different angles. The 3A160 3-Axis Force Load Cell delivers high accuracy results at each capacity.
3. Results are displayed for the customer using the 920i Programmable Weight Indicator and Controller, where the instrument will measure all three bridges.



Garbage Truck On-Board Weighing

Torque Transducer

Industry: Test and Measurement

Summary

Customer Need / Challenge

A garbage disposal company wants to test the load capacity of their garbage truck bins, so they know when it has reached maximum capacity.

Interface Solution

Interface's solution is to customize and install 4 SSB Sealed Beam Load Cells under the garbage box body, on either side. When trash continues to be piled inside the box body, it will push more force down onto the SSB Sealed Beam Load Cells. When maximum load capacity has been reached, the results can be reviewed and displayed when connected to the 482 Battery Powered Bidirectional Weight Indicator in real time.

Results

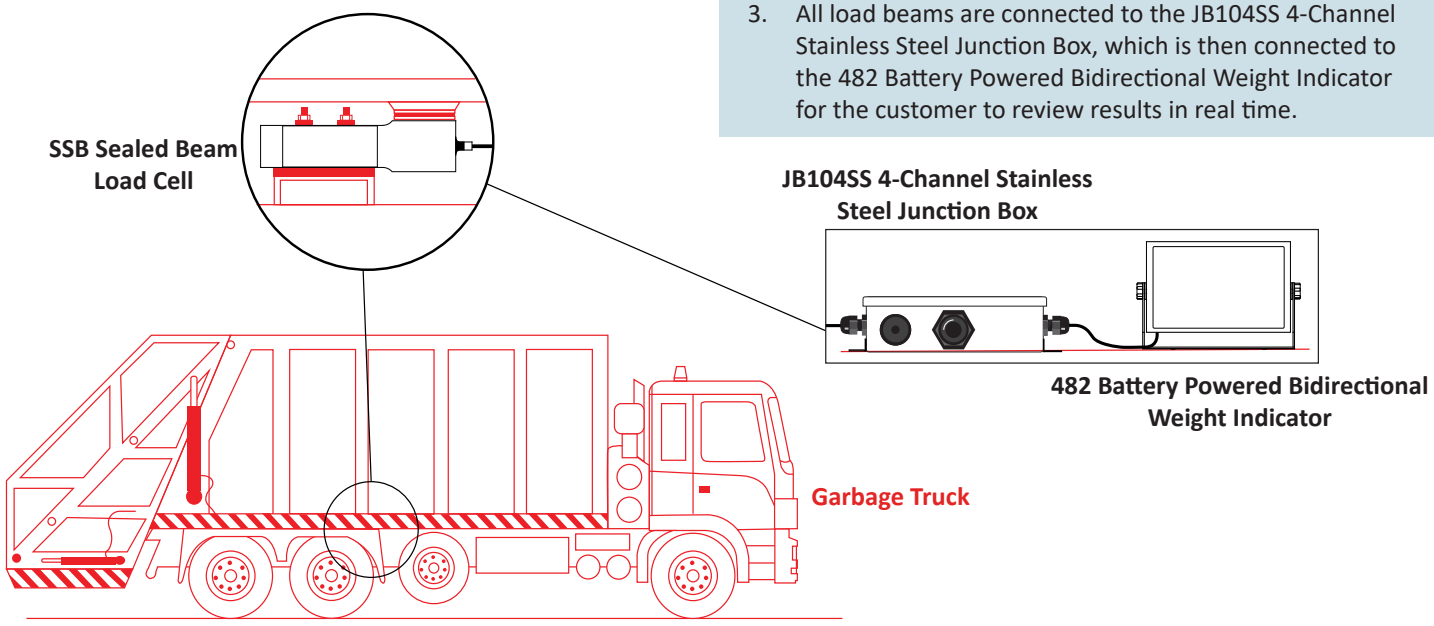
The customer was able to test the maximum load capacity of the garbage bin attached to the truck, so they know when to empty the truck's garbage at the transfer station.

Materials

- (4) SSB Sealed Beam Load Cells
- JB104SS 4-Channel Stainless Steel Junction Box
- 482 Battery Powered Bidirectional Weight Indicator

How It Works

1. The SSB Sealed Beam Load Cells are installed under the truck's garbage box body, on opposite sides.
2. As more trash is collected into the box body, more force weight is added and measured using the SSB Sealed Beam Load Cells.
3. All load beams are connected to the JB104SS 4-Channel Stainless Steel Junction Box, which is then connected to the 482 Battery Powered Bidirectional Weight Indicator for the customer to review results in real time.



Silo Grain Dispensing

Load Cell and Wireless Telemetry System

Industry: Agriculture

Summary

Customer Need / Challenge

A silo is returning grain into a dispensing container. A customer wants to measure and record the grain being put in and out of their grain dispensing container, as it dispenses content into a carrier truck for transportation. The customer would also prefer a wireless solution.

Interface Solution

Interface suggests a wireless solution, by installing WTS 1200 Standard Precision LowProfile™ Wireless Load Cells at the legs of the grain dispensing container. The 1200 can measure the distribution correlation of the grain as it inputted and outputted from the container. Results will be transmitted and displayed using the WTS-BS-1-HA Handheld Display for multiple transmitters, and will be logged and graphed using the WTS-BS-4 USB Industrial Base Station.

Results

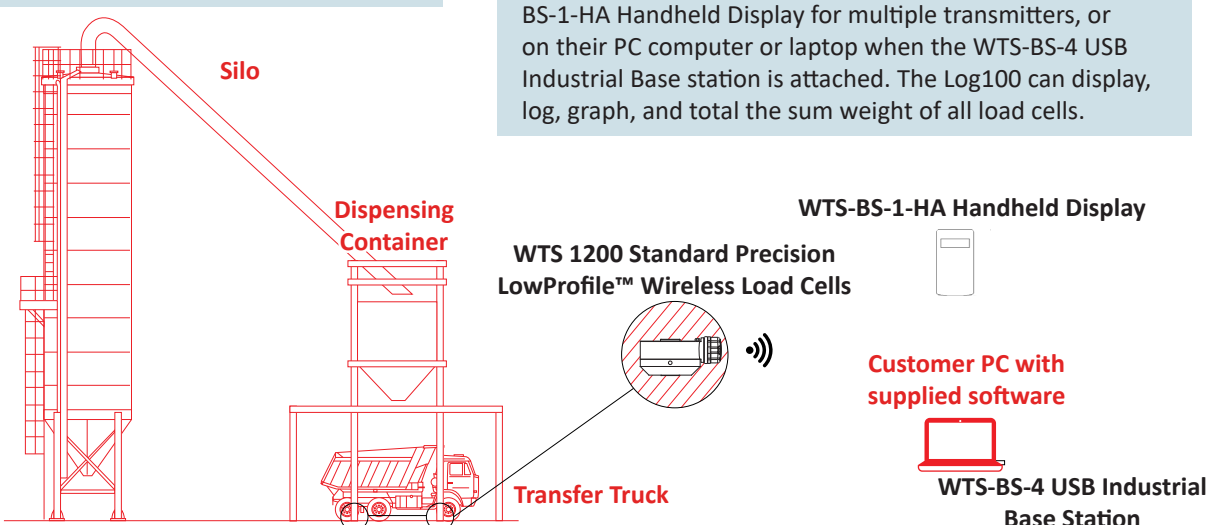
The customer was able to log and graph the measurement results of the grain content that the silo dispenses into the grain dispensing container, and also when the grain is dispensed into the carrier truck.

Materials

- WTS 1200 Standard Precision LowProfile™ Wireless Load Cells
- WTS-BS-4 USB Industrial Base Station
- WTS-BS-1-HA Handheld Display for multiple transmitters
- WTS Toolkit and Log100 Software
- Customer PC or Laptop

How It Works

1. Multiple WTS 1200 Standard Precision LowProfile™ Wireless Load Cells are installed at the legs of the grain dispensing container.
2. As the silo puts grain into the grain dispensing container, force measurements of the distribution is measured and totaled using the supplied Log100 Software.
3. The customer can view real-time results using the WTS-BS-1-HA Handheld Display for multiple transmitters, or on their PC computer or laptop when the WTS-BS-4 USB Industrial Base station is attached. The Log100 can display, log, graph, and total the sum weight of all load cells.



Waste Management Container Weighing

Load Cell

Industry: Test and Measurement, Infrastructure

Summary

Customer Need / Challenge

A waste management company wants to measure the capacity of their waste containers in order to know when it is time to dispose the waste.

Interface Solution

Interface's Model WTS 1200 Standard Precision LowProfile™ Wireless Load Cells can be installed at the bottom of each waste container leg to measure the sum weight of the container. The data is transmitted to the WTS-BS-4 USB Industrial Base Station with the supplied Log100 software.

Results

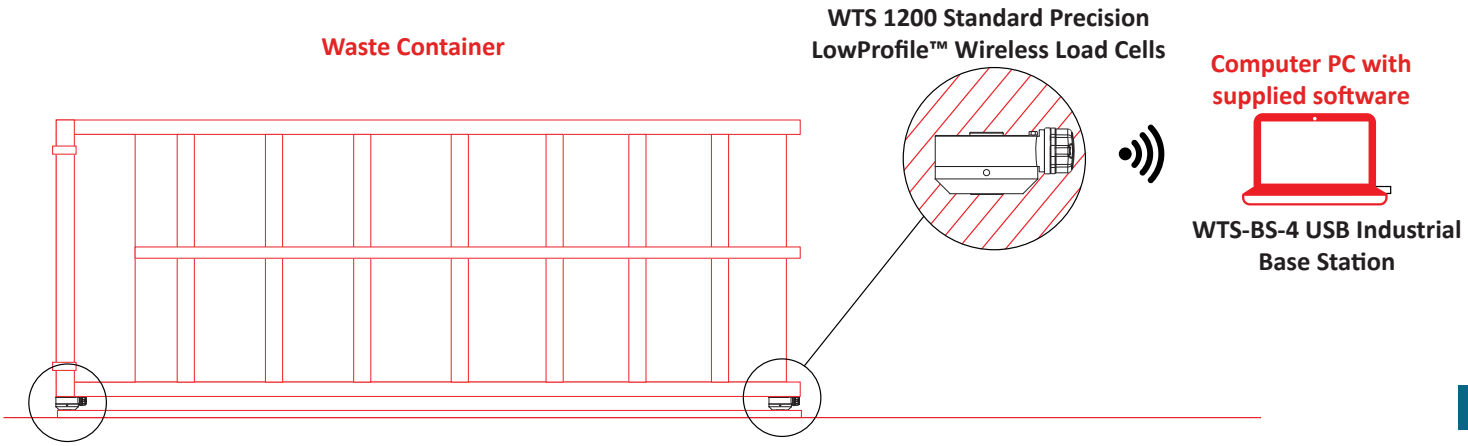
The customer was able to determine when their waste container was at full capacity in order to dispose of the waste, or to transfer it.

Materials

- (4) WTS 1200 Standard Precision LowProfile™ Wireless Load Cells
- WTS Toolkit and Log100 Software
- WTS-BS-4 USB Industrial Base Station
- Computer PC or Laptop

How It Works

1. Four WTS 1200 Standard Precision LowProfile™ Wireless Load Cells are installed and mounted to the bottom of the waste container legs.
2. The load cells collect the force measurements and sum the total weight of the waste container. The data is transmitted to the customer's laptop through the WTS-BS-4 USB Industrial Base Station using the Log100 Software. Data can be logged, graphed, and sent to the cloud using the supplied software.



Snack Weighing and Packaging Machine

Interface Mini™

Industry: Test and Measurement

Summary

Customer Need / Challenge

A snack manufacturing brand wants to weigh the amount of their snacks that is automatically dispersed into the bags during the packaging process. In this case, they want to weigh their potato chips being packaged. The company wants to ensure the potato chips are at the exact weight needed due to regulatory standards.

Interface Solution

Interface's solution is to use multiple SPI Platform Scale Load Cells, and install it to the potato multi-head weigher and packaging machine. The SPI Platform Scale Load cells are installed inside of the mount that attaches the head weigher to the packaging machine. Force results from the potato chips are read by the load cells and sent to the ISG Isolated DIN Rail Mount Signal Conditioner, where the customer is able to control the automated production from their command center.

Results

The customer was able to determine the weight of the potato chips being distributed into their bags with highly accurate results. They also were able to control the automated production process with the provided instrumentation. They will use this same weighing method for other snacks that need to be packaged.

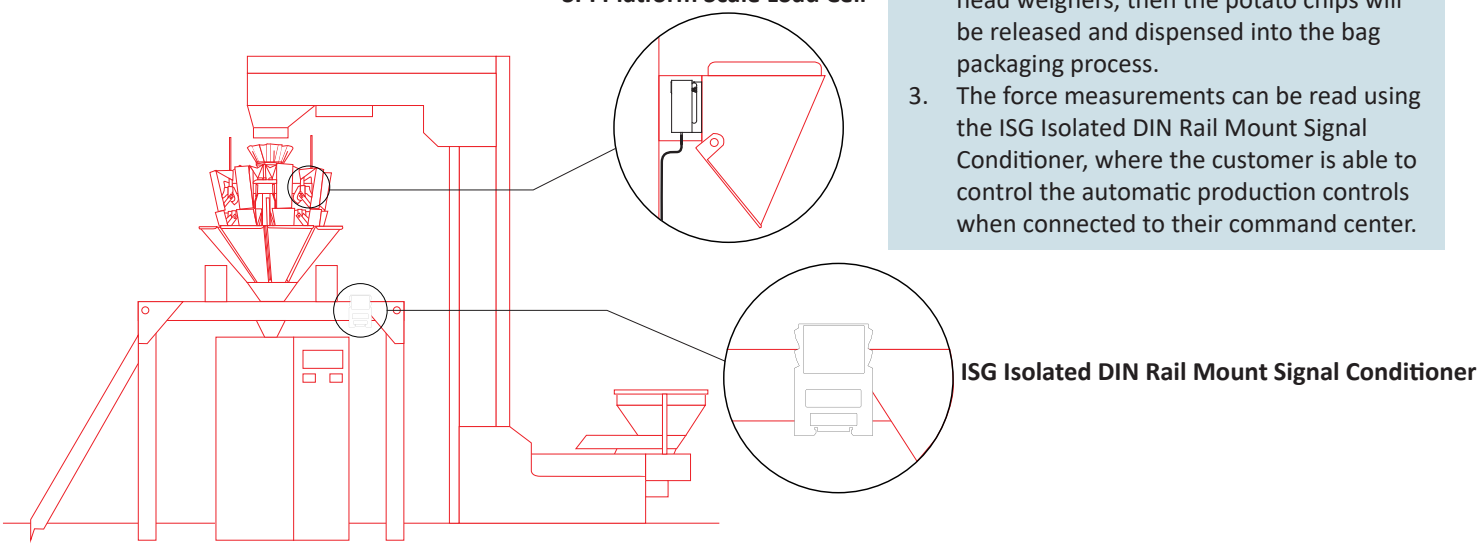
Materials

- Multiple SPI Platform Scale Load Cells
- ISG Isolated DIN Rail Mount Signal Conditioner

How It Works

1. Multiple SPI Platform Scale Load Cells are installed onto the insides of the head weighers of the packaging machines.
2. When potato chips are dispensed into the heads, the SPI Platform Scale Load Cells will measure the force applied to the head weighers, then the potato chips will be released and dispensed into the bag packaging process.
3. The force measurements can be read using the ISG Isolated DIN Rail Mount Signal Conditioner, where the customer is able to control the automatic production controls when connected to their command center.

Snack Weighing and Packaging Machine



Water Bottle Dispensing and Weighing

Interface Mini™

Industry: Test and Measurement

Summary

Customer Need / Challenge

A water bottle manufacturer wants to dispense the right amount of fluid into their bottles, and then weigh the water bottles to ensure it is at the labeled weight on their product packaging. This is both to minimize waste, but also to meet the standard requirements.

Interface Solution

Interface suggests using the MBP Miniature Beam Load Cell, and attaching it under a plate or platform the water bottle is placed on while it is being filled with fluids. The force weight is measured by the MBP Miniature Beam Load Cell, and connected to the 9870 High Speed High Performance TEDS Ready Indicator where results are captures, displayed, and can be recorded by the customer based on their needs.

Results

The water bottle manufacturer received high accurate results of each water bottle being weighed in real time.

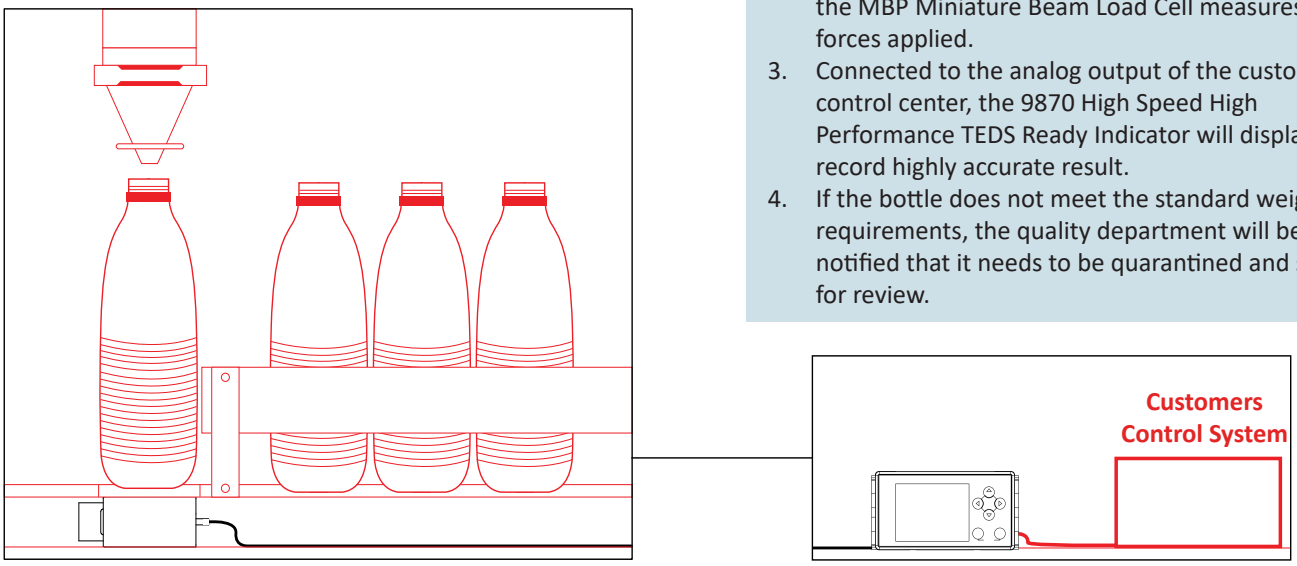
Materials

- MBP Miniature Beam Load Cell
- 9870 High Speed High Performance TEDS Ready Indicator

How It Works

1. The MBP Miniature Beam Load Cell is installed under the mechanism that dispenses water into the water bottles, with a plate or platform on top.
2. After the fluid is dispensed into the water bottle, the MBP Miniature Beam Load Cell measures the forces applied.
3. Connected to the analog output of the customer's control center, the 9870 High Speed High Performance TEDS Ready Indicator will display and record highly accurate result.
4. If the bottle does not meet the standard weight requirements, the quality department will be notified that it needs to be quarantined and sent for review.

Water Bottle Dispensing Assembly



MBP Miniature Beam Load Cell

9870 High Speed High Performance TEDS Ready Indicator

Tablet Hardness Testing

Interface Mini™

Industry: Medical and Healthcare

Summary

Customer Need / Challenge

A pharmaceutical tablet producer wanted to test and monitor the hardness of the tablets being created in their tablet forming machine.

Interface Solution

Interface's SML Low Height S-Type Load Cell was mounted to the hardness device inside the tablet forming machine. The SML Low Height S-Type Load Cell was then connected to the 9870 High-Speed High Performance TEDS Ready Indicator to record the force measurements.

Results

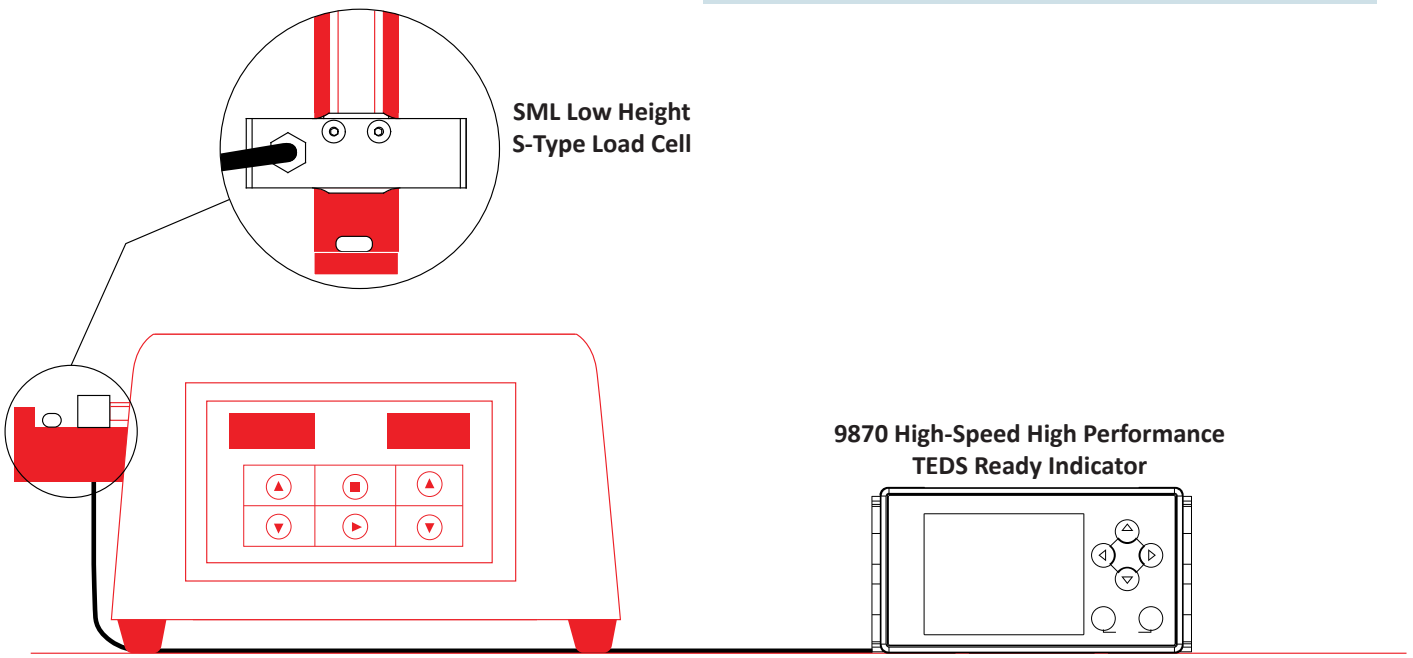
The tablet producer was able to verify and test the specific hardness needed for their tablets being produced by their tablet forming machine.

Materials

- SML Low Height S-Type Load Cell
- 9870 High-Speed High Performance TEDS Ready Indicator

How It Works

1. The SML Low Height S-Type Load cell was customized to fit into the hardness testing device inside the tablet forming machine.
2. The output of the SML was connected to the 9870 High-Speed High Performance TEDS Ready Indicator.
3. The customer was able to calibrate and clarify the specified hardness for the tablets being formed.



Spring Compression Testing
Multi-Axis

Industry: Test and Measurement

Summary

Customer Need / Challenge

A customer wants to test the performance of their springs, but also the functionality of their spring test stand with a wireless solution.

Interface Solution

Interface suggests using one of their 5200XYZ 3-Axis Force Moment Load Cell,and installing it into the customer's spring compression frame. The 5200XYZ 3-Axis Force Moment Load Cell will measure the force compression of the spring, connect to multiple WTS-AM-1E Wireless Strain Bridge Transmitter Modules, which will display the information wirelessly to the 9812-WTS-AL4-3, and also triggers an alarm if needed.

Results

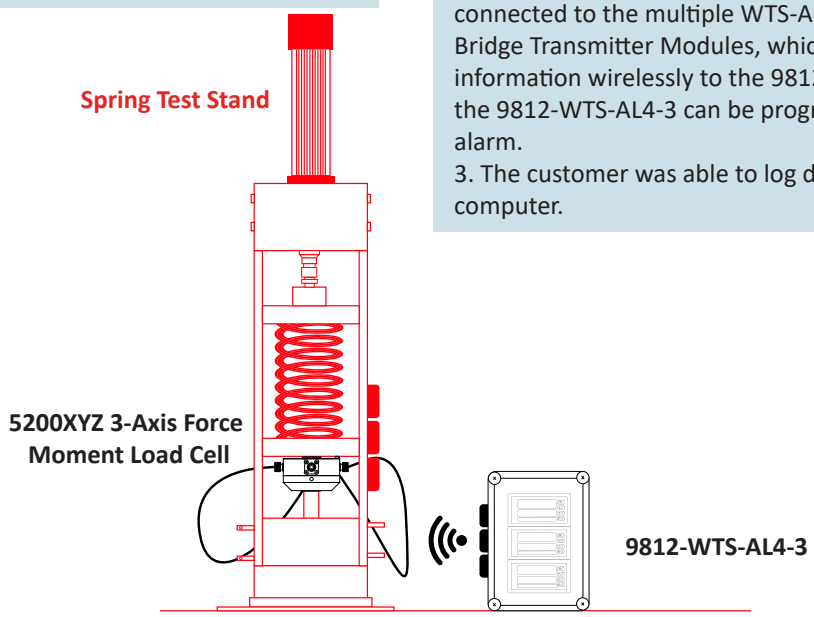
The customer was able to wirelessly get compression results on the spring being tested. They were also able to verify their spring compression test stand was working effectively.

Materials

- 5200XYZ 3-Axis Force Moment Load Cell
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- 9812-WTS-AL4-3
- Customer Spring Test Stand
- Customer PC or Laptop

How It Works

1. The 5200XYZ 3-Axis Force Moment Load cell is installed into the customer's spring compression frame, under the spring itself, containing 3 total outputs.
2. The spring was compressed, and force measurements read by the 5200XYZ 3-Axis Force Moment Load Cell is connected to the multiple WTS-AM-1E Wireless Strain Bridge Transmitter Modules, which then transmits output information wirelessly to the 9812-WTS-AL4-3. If needed, the 9812-WTS-AL4-3 can be programmed to trigger an alarm.
3. The customer was able to log data onto their PC computer.



Tablet Machine Hardness Tester Calibration

Interface Mini™

Industry: Medical and Healthcare

Summary

Customer Need / Challenge

A customer wants to conduct a tablet hardness tester calibration in their tablet machine. The customer needs a load cell that specifically lays and measures the forces horizontally, due to the horizontal lay out of the tablet machine.

Interface Solution

Interface's MCC Miniature Compression Load Cell can measure forces on its side, with a small cable exit that attaches to the customer's tablet machine. This measures the force applied to the hardness testing mechanism inside of the machine. The BlueDAQ software included also records the results and compares it to the reference load cell. Data is sent to the 9330 Battery Powered High Speed Data Logging Indicator for the customer to view, log, and graph the results.

Results

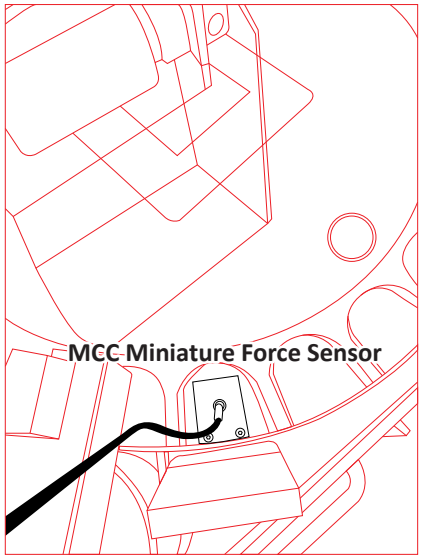
The customer successfully was able verify and calibrate the tablet machine's hardness tester in order to conduct accurate hardness testing on tablets. Compared to other load cells, Interface's MCC Miniature Compression Load Cell was perfect due to its small size, and convenient to measure the forces on its side.

Materials

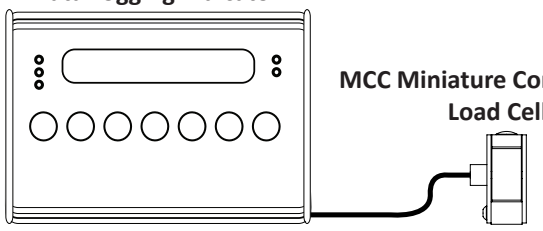
- MCC Miniature Compression Load Cell
- 9330 Battery Powered High Speed Data Logging Indicator
- BlueDAQ Software included with instrument purchase
- Customer's PC or Laptop

How It Works

1. The MCC Miniature Compression Load Cell is connected to the hardness testing mechanism inside of the tablet machine.
2. Calibration results are sent to the 9330 Battery Powered High Speed Data Logging Indicator, where data is logged and graphed.
3. Data is processed using BlueDAQ Software, which stores and logs data in the customer's PC computer or laptop.



Tablet Machine



Mobile Force System
Wireless Telemetry System

Industry: Test and Measurement

Summary

Customer Need / Challenge

A customer wants a mobile measurement system that can perform force tests. They need a customizable portable system that can both withstand extreme temperatures and rough environments. They also need a system that has a rechargeable battery included.

Interface Solution

Interface's solution is to create a portable case with multiple WTS 1200 Standard Precision LowProfile™ Wireless Load Cells, 9812-WTS Wireless Panel Mount Display for Single Transmitters, and the WTS-BS-3E Wireless Base Station. This can connect to the tablet computer to view results. Multiple WTS-ANTE Telemetry Antennas can also extend wireless range. An inverter and rechargeable battery is also installed at the bottom of the foam case so the customer can charge on the go, using a wall outlet or vehicle power outlet.

Results

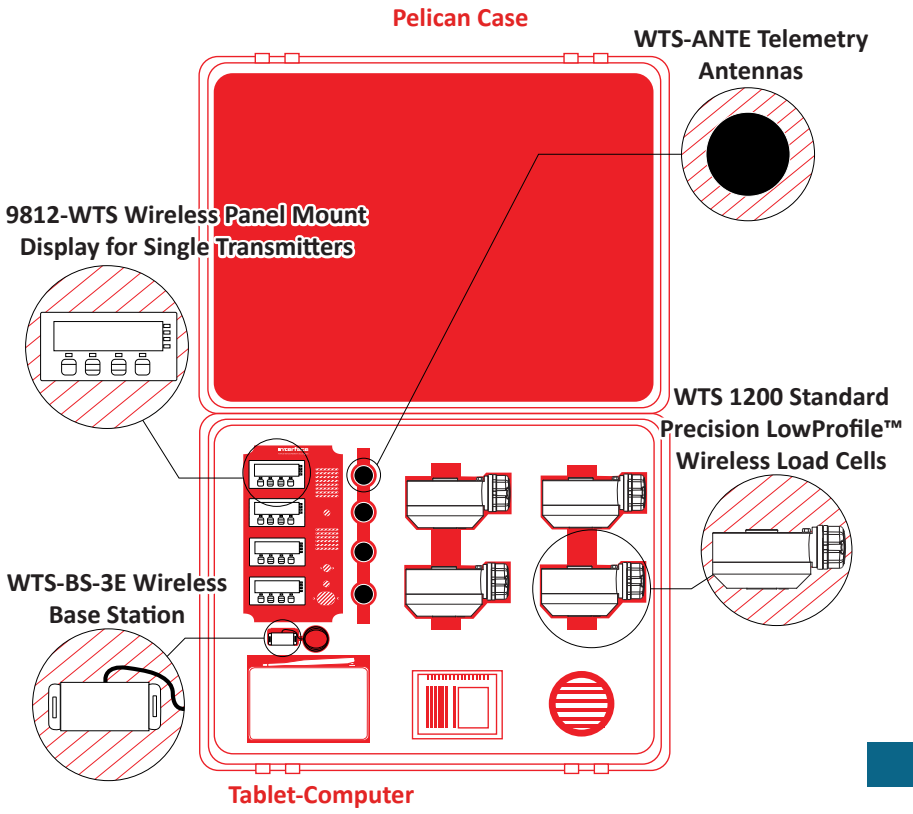
The customer was able to easily perform multiple force tests wirelessly in multiple different environments with Interface's customizable mobile portable system.

Materials

- WTS 1200 Standard Precision LowProfile™ Wireless Load Cells
- WTS-BS-3E Wireless Base Station
- 9812-WTS Wireless Panel Mount Display for Single Transmitters
- WTS-ANTE Telemetry Antennas
- Windows Based Tablet-Computer
- Custom made Pelican case with inverter and rechargable battery pack

How It Works

1. The WTS 1200 Standard Precision LowProfile™ Wireless Load Cells and the 9812-WTS Wireless Panel Mount Display for Single Transmitters are installed safely in the custom made mobile case.
2. When ready for transport, the load cells can be removed and attached to perform force tests.
3. When all force measurements have been recorded, all load cells and instrumentation can be returned back into it's casing for further transport.



Bike Frame Fatigue Testing
Load Cell

Industry: Test and Measurement

Summary

Customer Need / Challenge

A bike manufacturing company wants to perform a fatigue test on their bike frames. They want to analyze the strength of their bike frames in order to ensure durability and high quality standards.

Interface Solution

Interface suggests installing Model 1000 Fatigue-Rated LowProfile™ Load Cell to the customer's bike frame fatigue tester. This load cell will provide the customer highly accurate results through the fatigue cycling. Results are collected using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, and displayed on the customer's PC or Laptop with Interface's provided software.

Results

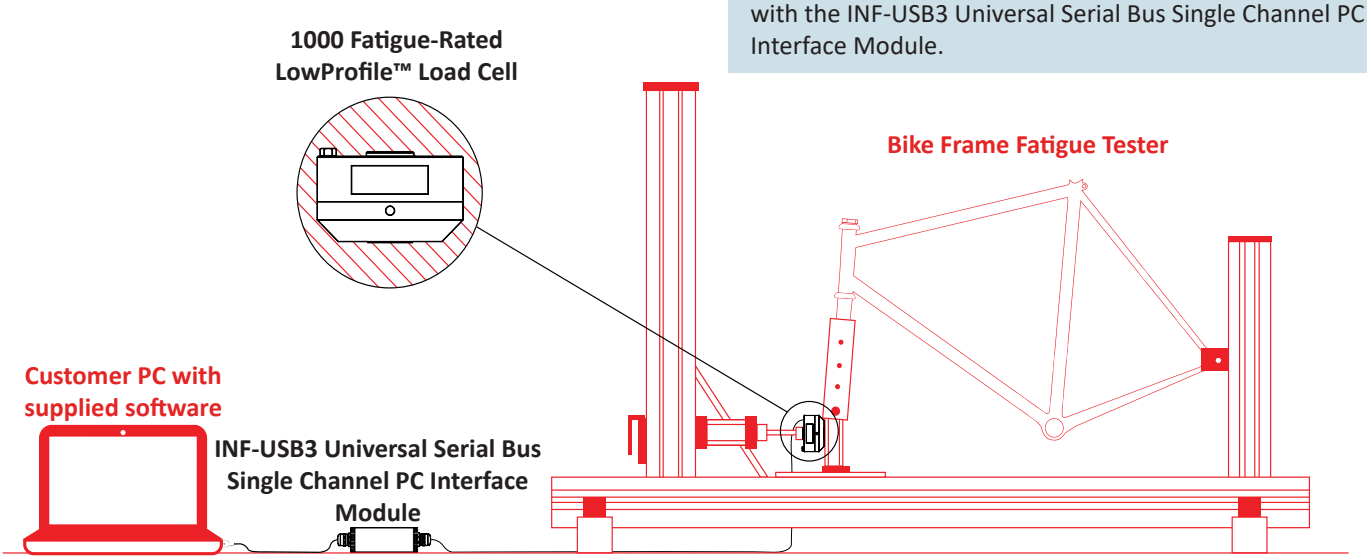
The bike manufacturing company successfully had their bikes undergo fatigue frame testing, receiving highly accurate results with Interface's load cell and instrumentation.

Materials

- 1000 Fatigue-Rated LowProfile™ Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module with supplied software
- Customer PC or Laptop

How It Works

1. The 1000 Fatigue-Rated LowProfile™ Load Cell is attached to the actuator of the fatigue testing machine.
2. The load cell undergoes a number of fatigue cycles on the bike frame, and records highly accurate results.
3. The data results are collected using the INF-USB3 Universal Serial Bus Single Channel PC Interface Module. These results can be displayed when connected to the customer's PC or laptop using the supplied software with the INF-USB3 Universal Serial Bus Single Channel PC Interface Module.



Bike Load Testing

Interface Mini™ and Wireless Telemetry System

Industry: Test and Measurement

Summary

Customer Need / Challenge

A mountain bike manufacturing company wants a system that measures their bike frames load capacities and vibrations on the frame. They want to ensure the bike's high quality and frame load durability during this final step of the product testing process.

Interface Solution

Interface suggests installing Model SSMF Fatigue Rated S-Type Load Cell, connected to the WTS-AM-1E Wireless Strain Bridge , between the mountain bike's seat and the bike frame. This will measure the vibrations and load forces applied onto the bike frame. The results will be captured by the WTS-AM-1E and transmitted to the customer's PC using the WTS-BS-6 Wireless Telemetry Dongle Base Station.

Results

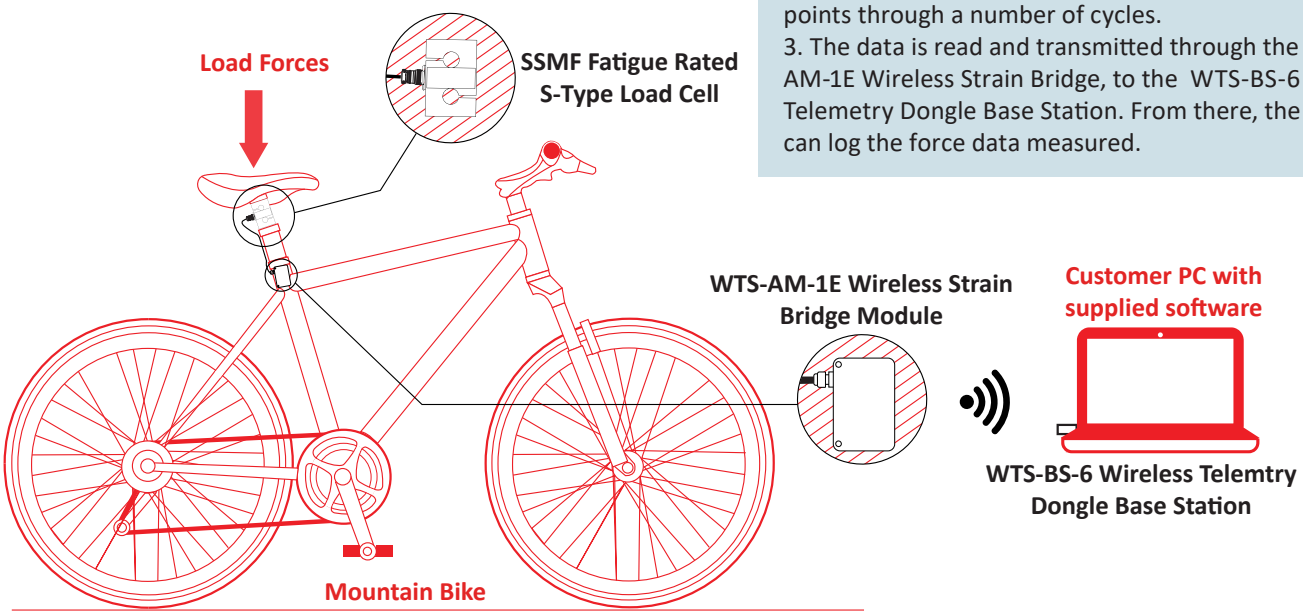
The mountain bike manufacturing company was able to gather highly accurate data to determine that their bikes met performance standards through this final testing.

Materials

- SSMF Fatigue Rated S-Type Load Cell
- WTS-AM-1E Wireless Strain Bridge
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Customer PC or Laptop

How It Works

1. The SSMF Fatigue Rated S-Type Load Cell is connected to the WTS-AM-1E Wireless Strain Bridge, and installed between the mountain bike's seat and the bike frame.
2. A heavy load is added to the seat, where the SSMF Fatigue Rated S-Type Load Cell measures the vibrations and load forces applied to the bike to indicate any stress points through a number of cycles.
3. The data is read and transmitted through the WTS-AM-1E Wireless Strain Bridge, to the WTS-BS-6 Wireless Telemetry Dongle Base Station. From there, the customer can log the force data measured.



Bike Power Pedals

S-Type and Wireless Telemetry System

Industry: Test and Measurement

Summary

Customer Need / Challenge

A bike manufacturer wants to test the functionality of their power pedals. They need a reliable system to measure how much force the cyclist pushes down onto the bike pedals, and they would prefer a wireless system that can be paired with their computer to review data results.

Interface Solution

Interface suggests 4 Model SML Low Height S-Type Load Cells installed within the bike's pedals. The 4 SMLs are paired with 2 WTS-AM-4 Wireless Strain Bridge Transmitter Modules, which will transmit the force data from the cyclist to the WTS-BS-6 Wireless Telemetry Dongle Base Station Dongle connected to the customer's PC or laptop. Interface will also provide the software needed with their wireless products.

Results

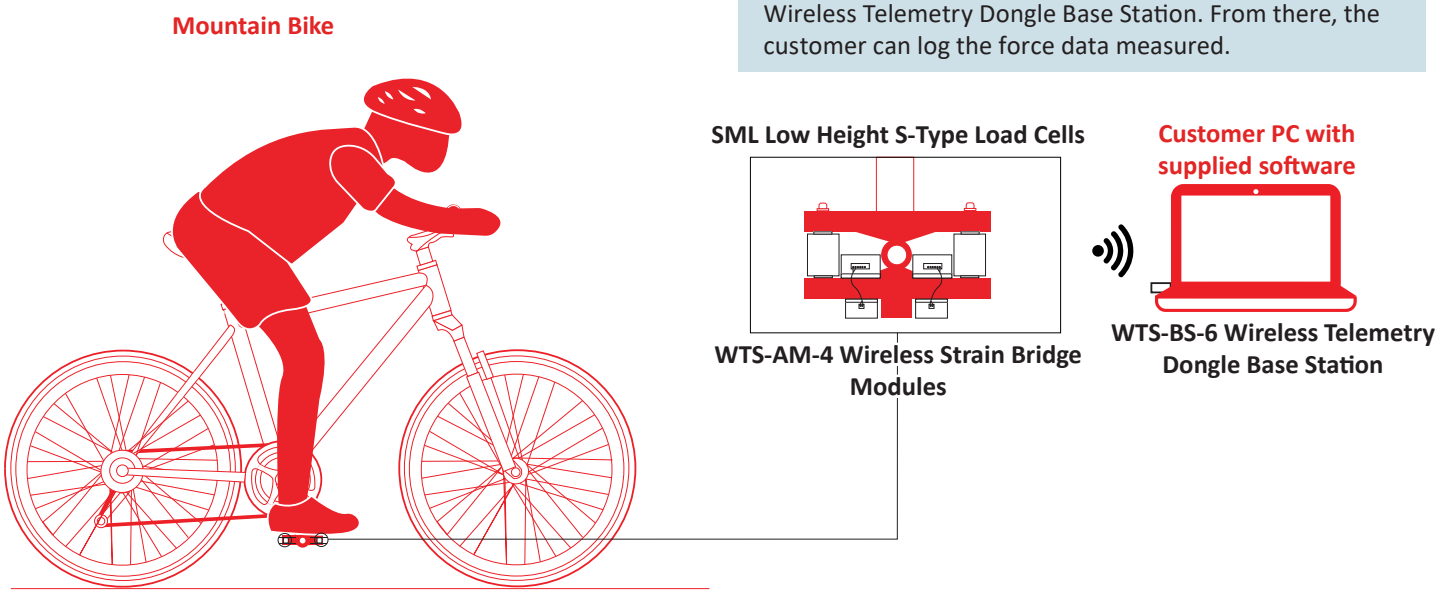
The bike manufacturer was able to measure the pedal power applied by the cyclist. The customer was able to measure and log the data wirelessly transmitted to their PC computer.

Materials

- (4) SML Low Height S-Type Load Cells
- (2) WTS-AM-4 Wireless Strain Bridge Transmitter Modules
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Customer PC or Laptop

How It Works

1. The SML Low Height S-Type Load Cells are installed inside the bike pedal, connected to the WTS-AM-4 Strain Bridge Transmitter Modules.
2. During the testing stage, a cyclist uses the bike and pushes force down onto the bike pedals.
3. The data is read and transmitted through the WTS-AM-4 Wireless Strain Bridge Modules, to the WTS-BS-6 Wireless Telemetry Dongle Base Station. From there, the customer can log the force data measured.



E-Bike Torque Measurement

Torque Transducer

Industry: Test and Measurement

Summary

Customer Need / Challenge

An E-Bike manufacturer needs to test the torque on their electronic bicycles. They need a torque sensing system that measures how much force the bike rider is pedaling onto the pedals, because this determines how much electric power the bike's motor generates.

Interface Solution

Interface suggests installing the Model T12 Square Drive Torque Transducer where the pedal assist sensor would normally be. The T12 Square Drive Torque Transducer's results can be recorded, graphed, and logged using the SI-USB4 4 Channel USB Interface Module when connected to the customer's PC.

Results

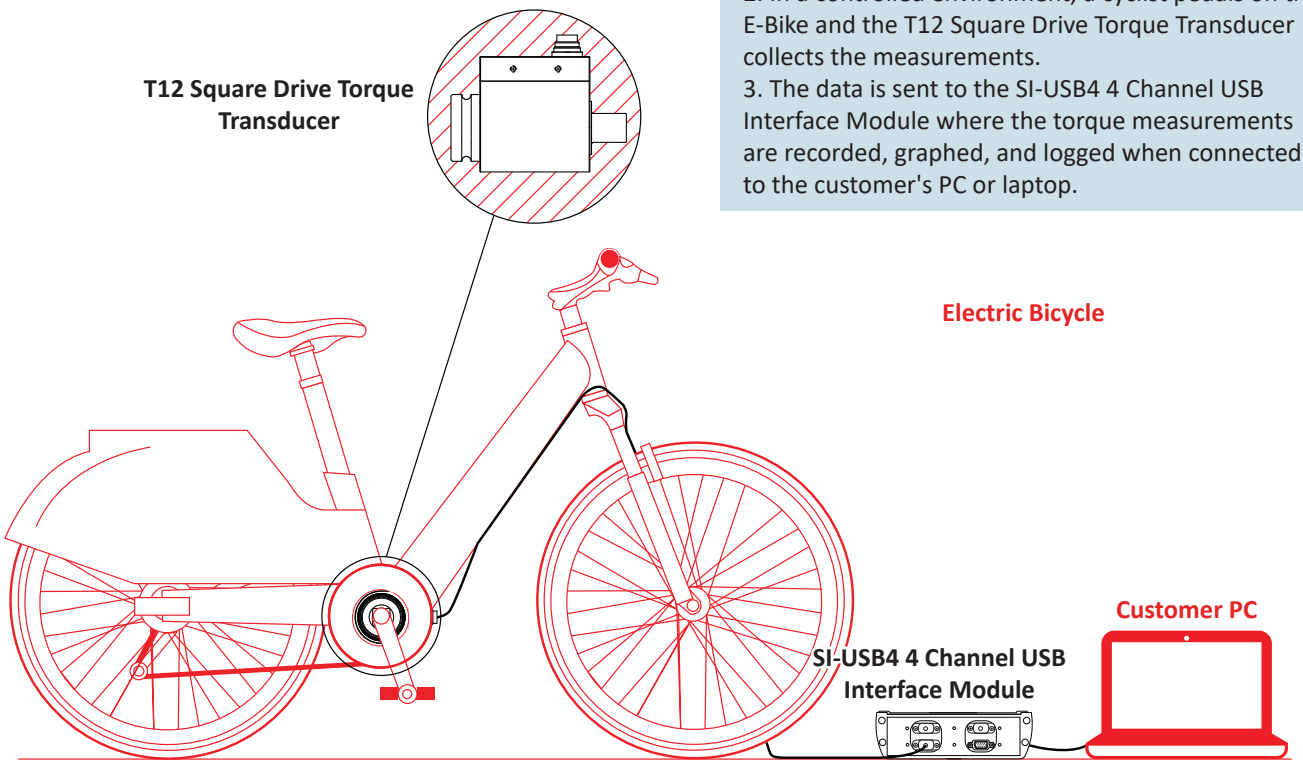
The E-Bike manufacturing company successfully tested the torque on their electronic bicycles with Interface's products and instrumentation.

Materials

- T12 Square Drive Torque Transducer
- SI-USB4 4 Channel USB Interface Module
- Customer PC or Laptop

How It Works

1. The T12 Square Drive Torque Transducer is installed and replaces where the outdated pedal sensor is normally located. The T12 is attached to the SI-USB4 4 Channel USB Interface Module.
2. In a controlled environment, a cyclist pedals on the E-Bike and the T12 Square Drive Torque Transducer collects the measurements.
3. The data is sent to the SI-USB4 4 Channel USB Interface Module where the torque measurements are recorded, graphed, and logged when connected to the customer's PC or laptop.



Mountain Bike Shocks Testing

Load Cell

Industry: Test and Measurement

Summary

Customer Need / Challenge

A mountain bike manufacturing company wants to test the durability of the forks on the front of their bikes, and the rear shocks of their bikes as well. They want to test the front suspension, and ensure that the bikes shocks absorption is working properly for bike riders.

Interface Solution

Interface suggests installing the 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell in a fatigue frame using the company's bike forks. The forks undergo a fatigue test for a number of hours. Test results from the 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell will be sent to the INF-USB3 Universal Serial Bus Single Channel PC Interface Module where the customer can view, log, and graph the results on their PC computer or laptop with provided software.

Results

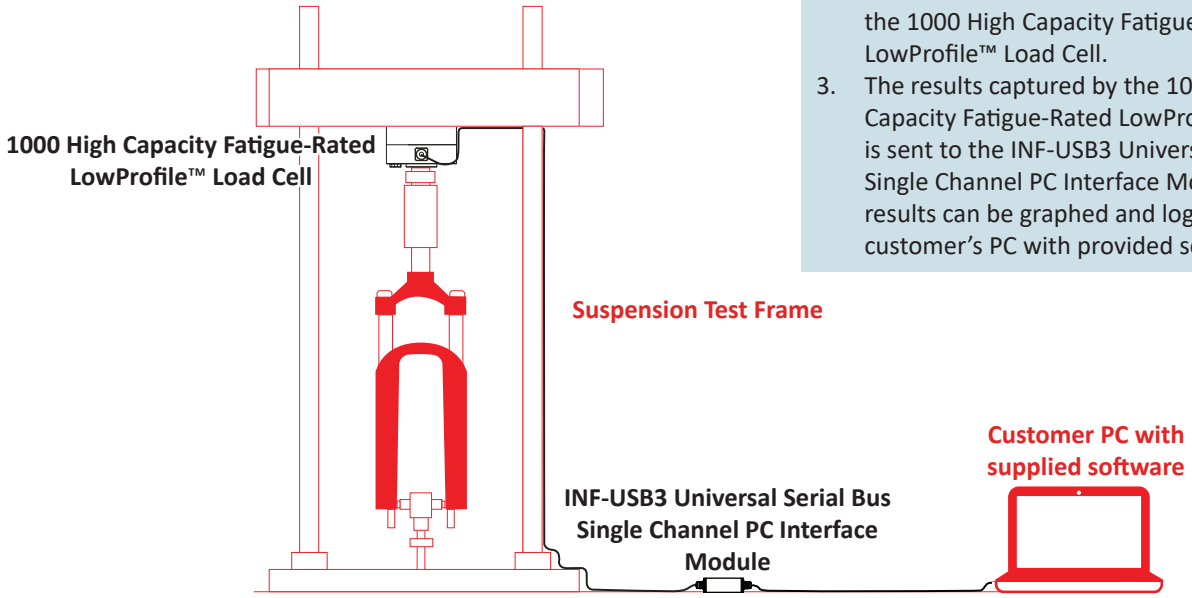
The customer was able to test the bike's front and rear shocks using Interface's products. They determined if there were any weak spots in the forks or if it was working properly.

Materials

- 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell
- INF-USB3 Universal Serial Bus Single Channel PC Interface Module
- Customer's PC or Laptop

How It Works

1. The 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell is attached to the actuator of the fatigue testing machine.
2. The bike's forks undergoes a fatigue cycling test where force results are collected by the 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell.
3. The results captured by the 1000 High Capacity Fatigue-Rated LowProfile™ Load Cell is sent to the INF-USB3 Universal Serial Bus Single Channel PC Interface Module, where results can be graphed and logged on the customer's PC with provided software.



Gaming Simulation Brake Pedal

Interface Mini™

Industry: Test and Measurement

Summary

Customer Need / Challenge

A gaming company wants to switch from the standard racing pedals, to a load cell based pedal system for their racing simulation game. Compared to the standard racing simulation pedals, load cell pedals are more advanced and offer more accurate results. They want a wireless system that will measure the strength of the pressure received by the pedals that will detect the perfect amount of braking power.

Interface Solution

Interface's BPL Pedal Load Cell can be installed onto the gaming brake pedal to measure the force applied when someone puts their foot on it. Forces are measured and recorded using the WTS-AM-1E Wireless Strain Bridge Transmitter Modules, where data is transmitted to the WTS-BS-6 Dongle Base Station when connected to the customer's PC or laptop.

Results

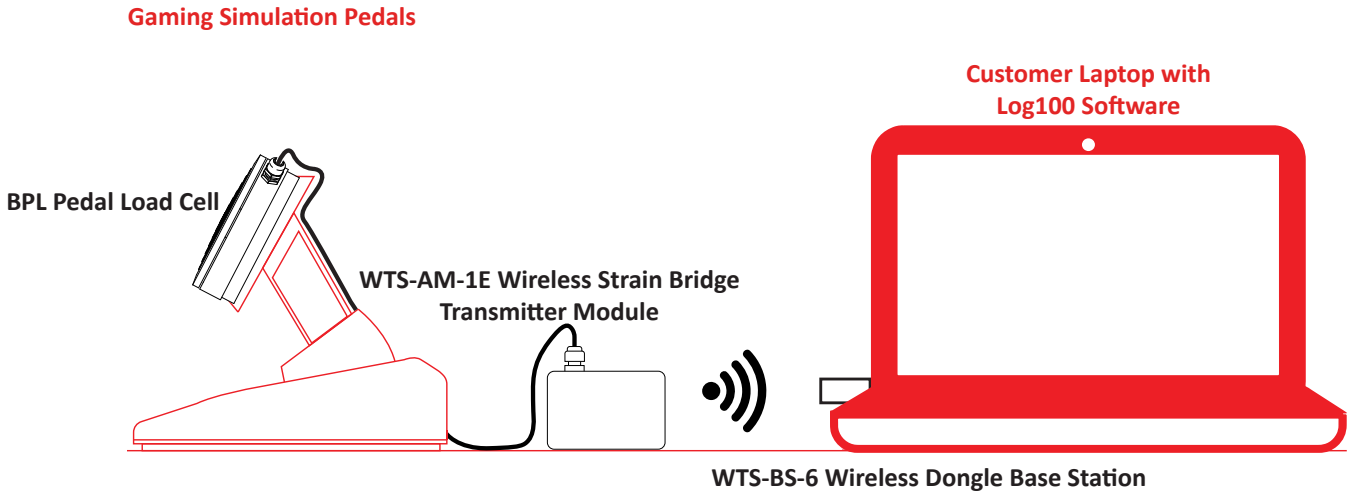
Interface's BPL Pedal Load Cell measured and recorded the pedal forces applied to their racing gaming brake pedals. In comparison to traditional simulation pedals that measure the distance of the pedals when pressed, Interface's load cell pedal system provided a more realistic experience for gamers.

Materials

- BPL Pedal Load Cell
- WTS-AM-1E Wireless Strain Bridge Transmitter Module
- WTS-BS-6 Wireless Telemetry Dongle Base Station
- Log100 Software
- Customer PC or Laptop

How It Works

1. The BPL Pedal Load Cell is installed onto the gaming brake pedal, and is connected to the WTS-AM-1E Wireless Strain Bridge Transmitter Module.
2. The BPL Pedal Load Cell measure the forces applied by the gamer when they put pressure onto the brake pedal.
3. The force results are wireless transmitted to the customer's laptop through the WTS-BS-6 Wireless telemetry Dongle Base Station. The customer was able to log, graph and record using the supplied Log100 Software.



Tractor PTO Torque Testing

Torque Transducer

Industry: Agriculture

Summary

Customer Need / Challenge

A customer wants to measure the torque and speed of their tractor's PTO (power takeoff test) system. They want to ensure the tractor's PTO system is functioning properly, and they want to measure the torque being delivered to an implement.

Interface Solution

Interface's solution is to use their T27 Bearingless Hollow Flange Style Rotary Torque Transducer to measure the tractor's torque and speed of their tractor's PTO system.

Results

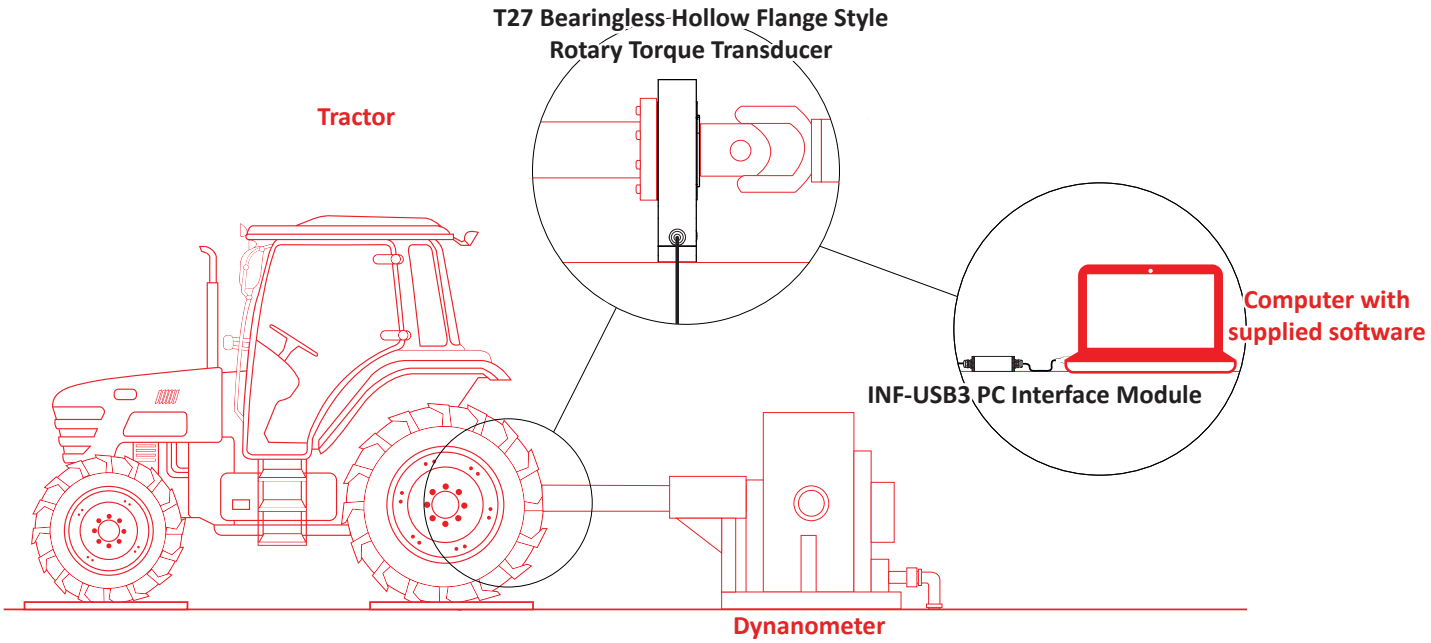
Interface's T27 Bearingless Hollow Flange Style Rotary Torque Transducer successfully and accurately measured the torque and speed of the tractor's PTO system.

Materials

- Customer supplied dynamometer
- T27 Bearingless Hollow Flange Style Rotary Torque Transducer
- INF3-USB Universal Serial Bus Single Channel PC Interface Module
- Supplied configuration, display, graphing, and logging software
- Customer PC or Laptop

How It Works

1. The T27 Bearingless Hollow Flange Style Rotary Torque Transducer is bolted to the tractors PTO shaft. A dynamometer is attached on the other end.
2. The T27 Bearingless Hollow Flange Style Rotary Torque Transducer measures the tractor's torque and speed with high accurate results.
3. With the INF3-USB PC Interface Module the customer was able to display, graph, and log the recorded torque and speed of the tractor's PTO system with the supplied INF3-USB software.



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Interface is the world's trusted leader in technology, design and manufacturing of force measurement solutions. Our clients include a "who's who" of the aerospace, automotive and vehicle, medical device, energy, industrial manufacturing, test and measurement industries.

Interface engineers around the world are empowered to create high-level tools and solutions that deliver consistent, high quality performance. These products include load cells, torque transducers, multi-axis sensors, wireless telemetry, instrumentation and calibration equipment.

Interface, Inc., was founded in 1968 and is a US-based, woman-owned technology manufacturing company headquartered in Scottsdale, Arizona.

Interface
FORCE MEASUREMENT SOLUTIONS

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