# Interface

## Product Catalog




interface
FORCE MEASUREMENT SOLUTIONS

The World Leader in Force Measurement Solutions™

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# Notes:

# Load Cells

## LowProfile®

## Canister

## Column

## Intrinsically Safe

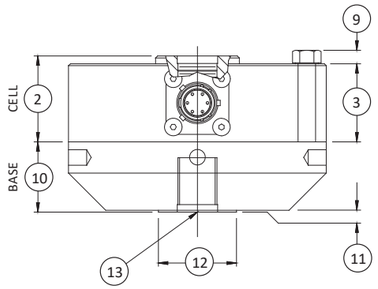


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# 1000 FATIGUE RATED LOAD CELL (U.S. & METRIC)

## 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

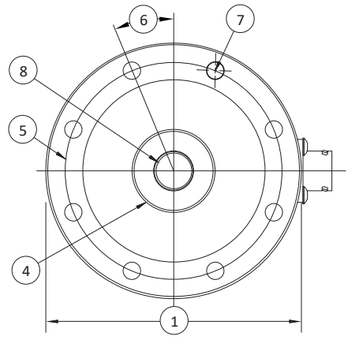



SIDE VIEW

## STANDARD CONFIGURATION




**Model 1010ACK-2.5K** (shown)




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) | ⅜-18 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) | ⅜-18 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 |





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FORCE MEASUREMENT SOLUTIONS

# 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 MAX | °F | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| | °C | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Output – %RO MAX | °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)
- CU.S.tom 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

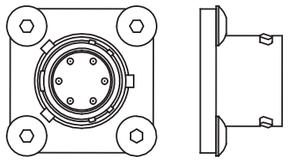
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# 1000 FATIGUE RATED LOAD CELL (U.S. & METRIC)

## BAYONET CONNECTOR



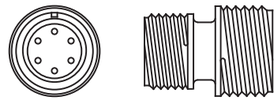

**Model 1010ACK-2.5K-B** (Shown)



## SCREW TYPE CONNECTOR



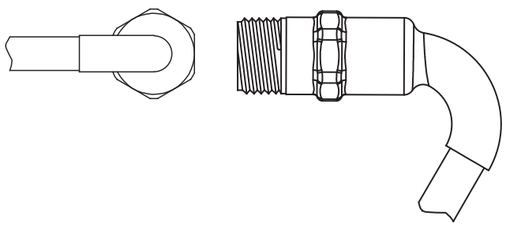

**Model 1010AF-2.5K-B** (Shown)



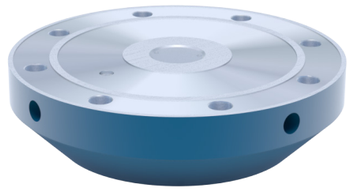
## INTEGRAL 10 FT. CABLE CONNECTOR




**Model 1010AJ-2.5K-B** (Shown)



## BASE



**Model B1XX-1** (Shown)



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

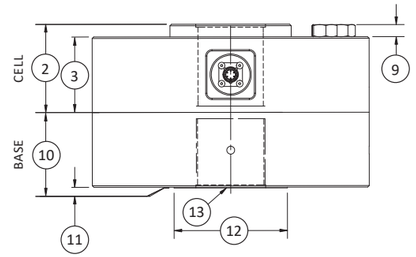
## FEATURES & BENEFITS

- 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

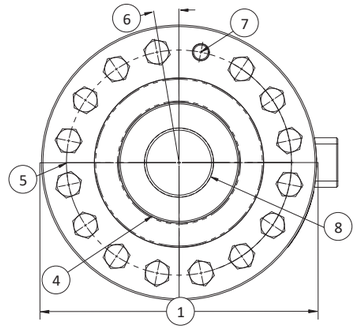
## STANDARD CONFIGURATION




**Model 1040CDS-100K** (Shown)




SIDE VIEW




TOP VIEW

## Dimensions

| See Drawing | MODEL | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1040 | | 1044 | | 1052 | | 1060 | | 1080 | | 1090 | |
| | CAPACITY | | | | | | | | | | | |
| | 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) |
| | 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 MAX | °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 – %RO MAX | °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)
- CU.S.tom 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

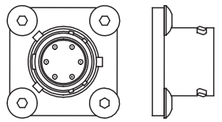


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FORCE MEASUREMENT SOLUTIONS
1000 FATIGUE RATED HIGH CAPACITY LOAD CELL (U.S. & METRIC)

## BAYONET CONNECTOR



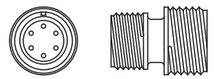
**Model 1040CDS-100K-B** (Shown)



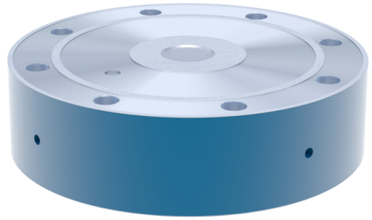
## SCREW TYPE CONNECTOR



**Model 1040ALD-100K-B** (Shown)



## BASE

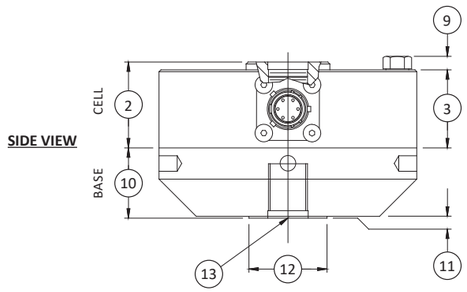


**Model B1XX** (Shown)

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

## FEATURES & BENEFITS

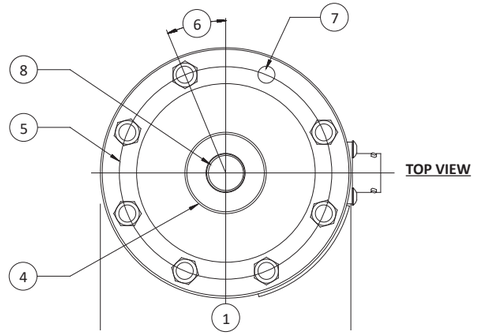
- Capacities from 300 to 200K lbf (1.5 to 900 kN)
- Proprietary Interface Temperature compensated strain gages
- Performance to 0.02%
- High output – to 4 mV/V
- Eccentric load compensated
- Low deflection
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Shunt calibration
- High precision base included
- 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 MAX | °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 – %RO MAX | °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 | 3.3 | 7.3 | 21.5 | 52 | 146 |
| | kg | 1.5 | 3.3 | 9.8 | 24 | 66 |
| Calibration | | Tension & Compression | | | | |
| Material | | Aluminum | Alloy Steel | | | |

## OPTIONS

- Compression overload protection
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom 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

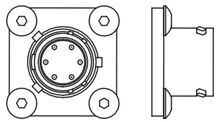
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

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

## BAYONET CONNECTOR



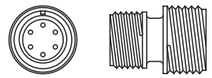

**Model 1120ACK-50K** (Shown)



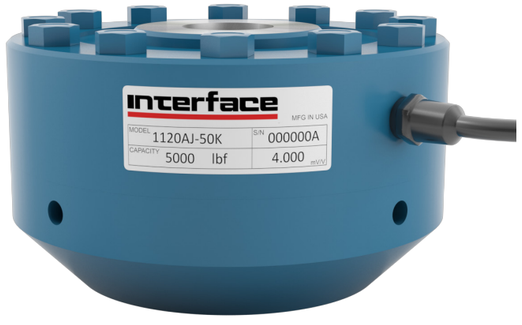
## SCREW TYPE CONNECTOR



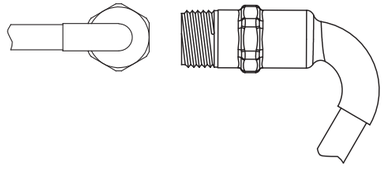

**Model 1120AF-50K** (Shown)



## INTEGRAL 10FT CABLE CONNECTOR




**Model 1120AJ-50K** (Shown)



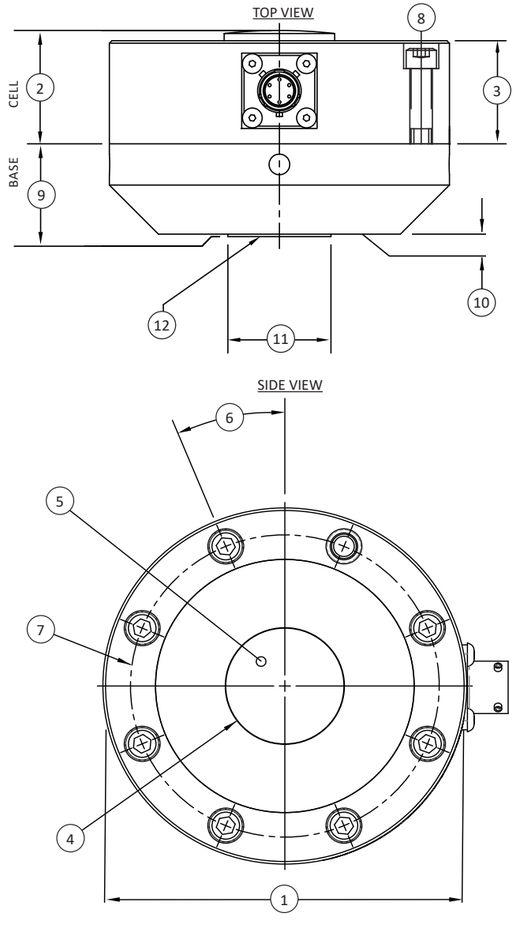
Catalog 2019 06-15-2020



# 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) | ⅜-18 UNF-3B ↧ 0.87 | M-16 X 2-4H ↧ 22.1 | 1 ¼-12 UNF-3B ↧ 1.40 | M33 X 2-4H ↧ 35.6 |

# 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 MAX | °F | ±0.0004 | ±0.0004 | ±0.0004 |
| | °C | ±0.0007 | ±0.0007 | ±0.0007 |
| Effect on Output – %RO MAX | °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)
- CU.S.tom 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

Catalog 2019 06-15-2020



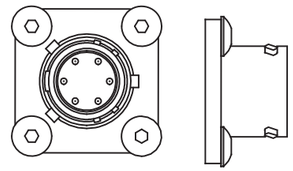
FORCE MEASUREMENT SOLUTIONS

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

## BAYONET CONNECTOR



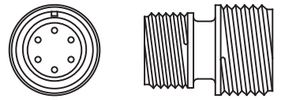

**Model 1121BAY-50K** (Shown)



## SCREW TYPE CONNECTOR



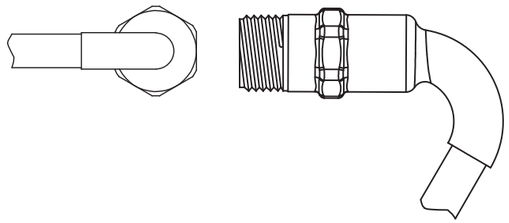

**Model 1121HL-50K** (Shown)



## INTEGRAL 10FT CABLE CONNECTOR



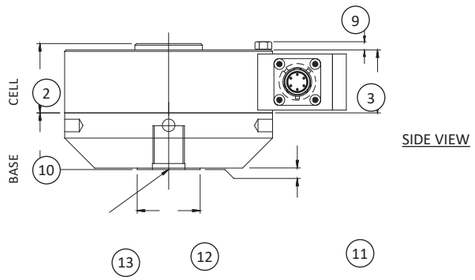

**Model 1121EX-50K** (Shown)



# 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

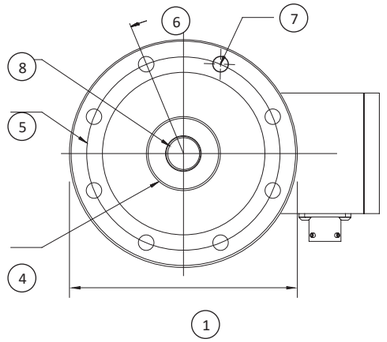



SIDE VIEW

## STANDARD CONFIGURATION




**Model 1220ACK-50K** (Shown)




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) | ⅜-18 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) | ⅜-18 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 |




# 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 MAX | °F | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| | °C | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Output – %RO / °F MAX | °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)
- CU.S.tom 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

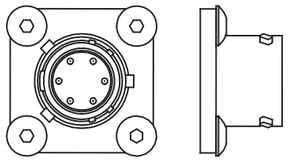
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

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

## BAYONET CONNECTOR



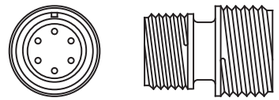

**Model 1220ACK-50K**



## SCREW TYPE CONNECTOR



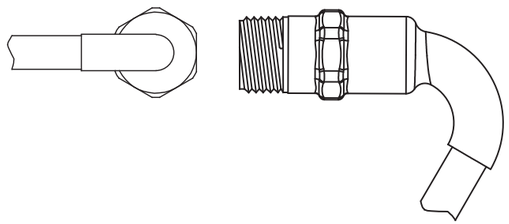

**Model 1220AF-50K**



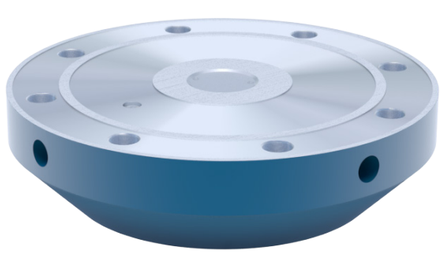
## INTEGRAL 10 FT. CABLE CONNECTOR




**Model 1220AJ-50K**



## BASE



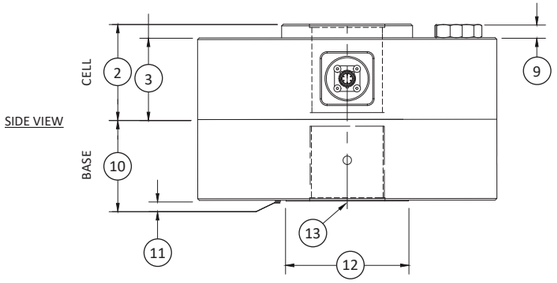
**Model B1XX**



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

## FEATURES & BENEFITS

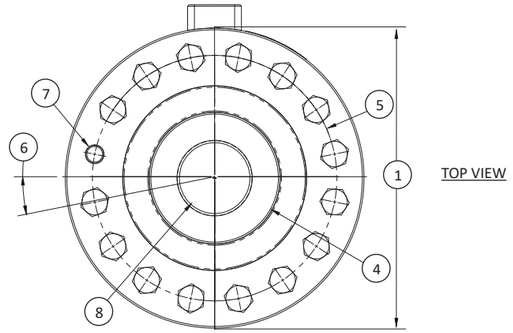
- Capacities from 200K to 2000K lbf (900 to 9000 kN)
- Proprietary Interface Temperature
- Compensated strain gages
- Performance to 0.07%
- High output – to 4 mV/V
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Low deflection
- Shunt calibration
- BaroMetric compensation
- 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 | Ø9.88 | Ø250.8 | 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 | Ø0.79 | 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 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 MAX | °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 – %RO MAX | °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





# 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
- CU.S.tom 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 |
| Range – ft | Up to 2,000 |
| **ENVIRONMENTAL** | |
| Operating Temperature Range – °C | -20 to 55 |
| Operating Temperature Range – °F | -4 to 131 |
| Storage Temperature Range (no batteries) – °C | -40 to 85 |
| Storage Temperature Range (no batteries) – °F | -40 to 185 |
| Maximum Humidity – % | 95 non-condensing |
| IP Rating (WTS-AM-1 & WTS-AM-1-D) | IP67/Nema4 |
| Telemetry HoU.S.ing | Polyamide resin |
| Material | Heat Treated Steel or Stainless Steel |

## LOAD CELL Specifications

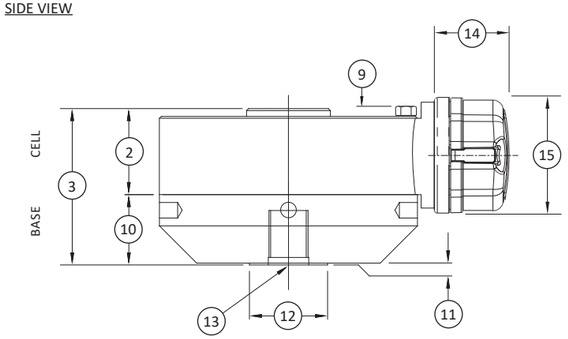
| PARAMETERS | | MODEL | | | |
|---|---|---|---|---|---|
| | | 1210 | 1210 | 1220 | 1232 |
| | | CAPACITY | | | |
| Measuring Range | U.S. (lbf) | 300, 500 1K, 2K | 5K, 10K | 25K, 50K | 100K |
| | Metric (kN) | 1.5, 2.5, 5, 10 | 25, 50 | 100, 250 | 450 |
| ACCURACY – (MAX ERROR) | | | | | |
| Static 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 MAX | °F | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| | °C | ±0.0015 | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Output – %RO / °F MAX | °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 | | |



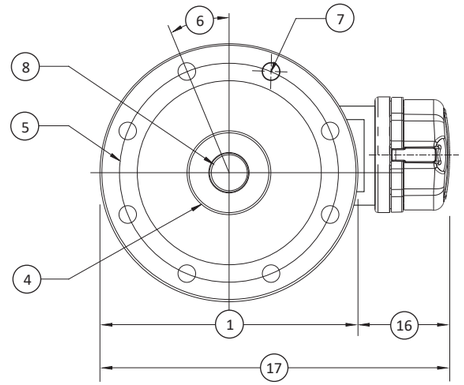
FORCE MEASUREMENT SOLUTIONS

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) | ⅜-18 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) | ⅜-18 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 |

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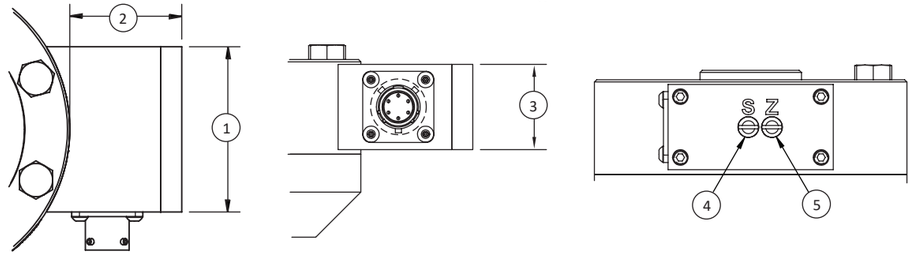
## FEATURES & BENEFITS

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)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm




## STANDARD CONFIGURATION




**Model 1210ACK-5K-1** (Shown)

## CONNECTOR OPTIONS

- PT02E-10-6P bayonet connector

## ACCESSORIES

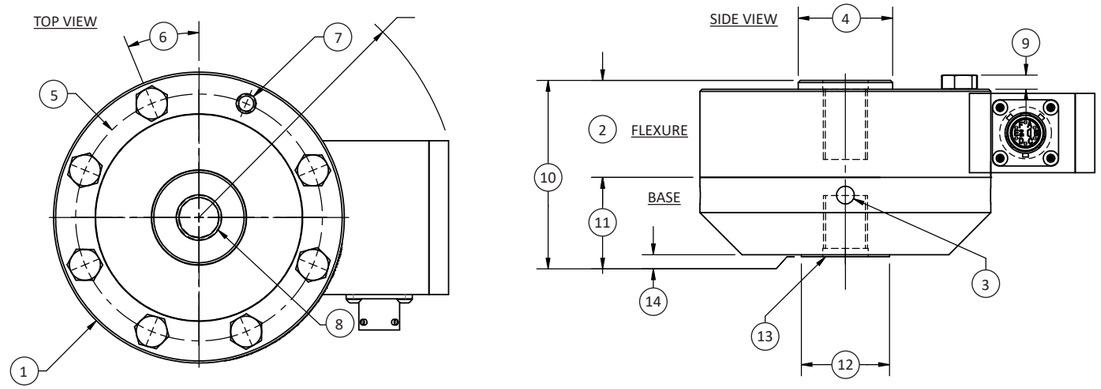
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

## Dimensions

| See Drawing | AMPLIFIER HOU.S.ING | |
|---|---|---|
| | ALL MODELS | |
| | ALL CAPACITIES | |
| | in | mm |
| (1) | 2.18 | 55.4 |
| (2) | 1.48 | 37.6 |
| (3) | 1.13 | 28.6 |
| (4) | Span AdjU.S.tment Cover Screw | |
| (5) | Zero AdjU.S.tment Cover Screw | |

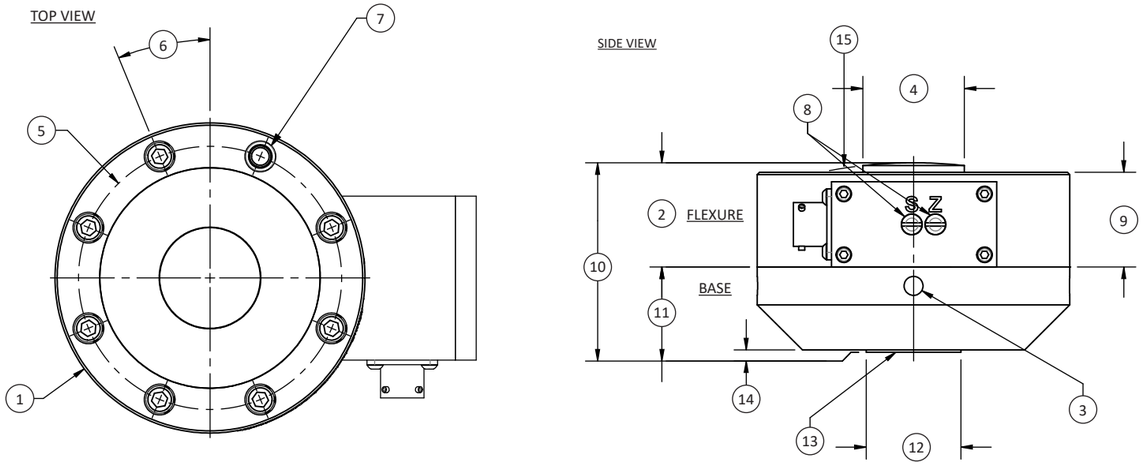


1200 AND 1201 SERIES 3-WIRE AMPLIFIED LOAD CELL UNIVERSAL OR COMPRESSION-ONLY (U.S. & METRIC)




## 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) | ⅜-18 UNF-3B ↧ 1.12 ⌴ Ø⅝ ↧ 0.12 | M16 X 2-4H ↧ 28.6 ⌴ Ø16.4 ↧ 3.05 | 1¼-12 UNF-3B ↧ 1.40 ⌴ Ø1.27 ↧ 0.12 | M33 X 2-4H ↧ 35.6 ⌴ Ø33.5 ↧ 3.0 | 1¼-12 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) | ⅜-18 UNF-3B ↧ 0.87 ⌴ Ø⅝ ↧ 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 | 1¼-12 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 |




## 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 AdjU.S.tment Cover | | Span & Zero AdjU.S.tment Cover | | Span & Zero AdjU.S.tment Cover | | Span & Zero AdjU.S.tment Cover | |
| (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 ⌴ Ø⅞ ↧ 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 | Ø⅝-16 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 |



interface
FORCE MEASUREMENT SOLUTIONS

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

## Specifications

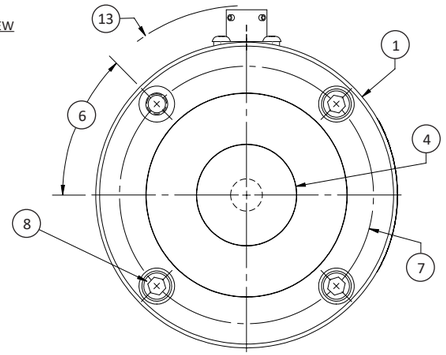
| PARAMETERS | | MODEL | | | |
|---|---|---|---|---|---|
| UNIVERSAL | | 1210 | 1210 | 1220 | 1232 |
| COMPRESSION-ONLY | | 1211** | 1211 | 1221 | 1231 |
| CAPACITY | | | | | |
| U.S. MODELS (lbf) | | 300, 500, 1K, 2K | 5K, 10K | 25K, 50K | 100K |
| METRIC MODELS (kN) | | 1.5, 2.5, 5, 10 | 25, 50 | 100, 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 MAX | °F | ±0.005 | ±0.003 | ±0.003 | ±0.003 |
| | °C | ±0.009 | ±0.005 | ±0.005 | ±0.005 |
| Effect on Output – % MAX | °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 AdjU.S.t Range – % RO | | ±10 | ±10 | ±10 | ±10 |
| Zero AdjU.S.t 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 | | |

# 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

TOP VIEW

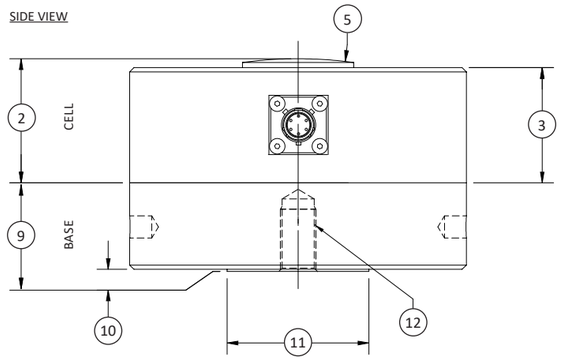



## STANDARD CONFIGURATION




**Model 1221BAY-50K** (Shown without base)

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 |



interface
FORCE MEASUREMENT SOLUTIONS
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 MAX | °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 – %RO MAX | °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)
- CU.S.tom 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

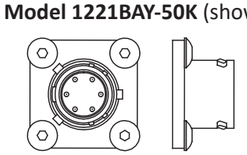
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

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

## BAYONET CONNECTOR



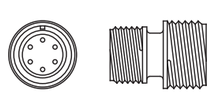

**Model 1221BAY-50K** (shown)



## SCREW TYPE CONNECTOR



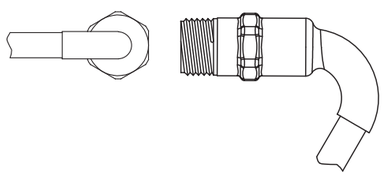

**Model 1221HL-50K** (shown)



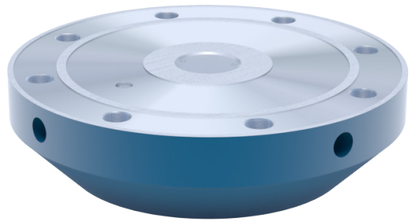
## INTEGRAL 10 FT. CABLE CONNECTOR




**Model 1221EX-50K** (shown)



## BASE



**Model B1XX-1**

Catalog 2019 06-15-2020



# 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-50K** (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

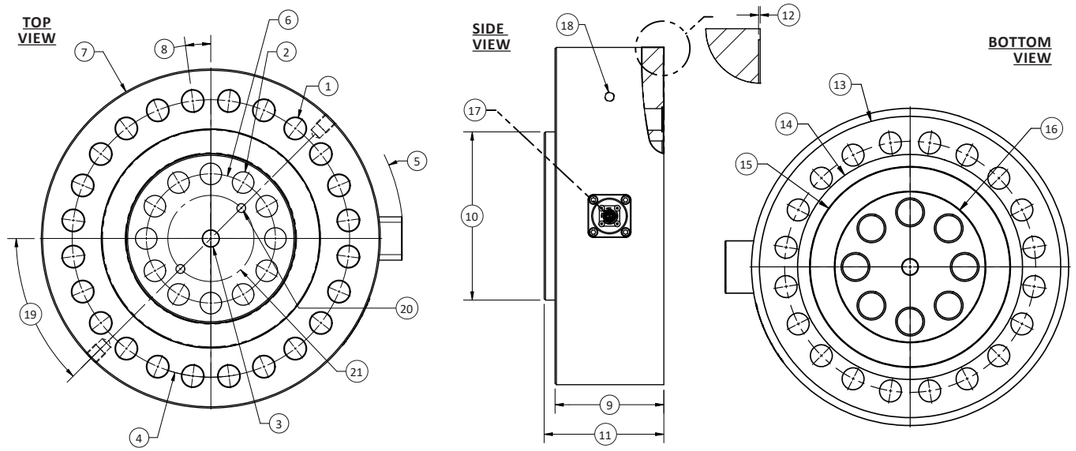
- Mating connector
- Instrumentation

**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 whatsoever.**

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




## Dimensions (CONTINUED)

| See Drawing | MODEL | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1228 | | 1238 | | 1248 | | 1258 | |
| | CAPACITY | | | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 30K | 50, 100, 140 | 55K | 250 | 110K | 500 | 220K | 1000 |
| | in | mm | 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° | 20 x Ø0.83 THRU ⌵ 0.89 x 90° | 20 x Ø21 THRU ⌵ 22 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 | 8 x Ø0.969 THRU | 8 x Ø24.61 THRU |
| (3) | Ø0.31 THRU ⌴Ø(0.3166/0.3155) ↧0.39 BOTH ENDS | Ø7.9 THRU ⌴Ø(0.8.042/8.014) ↧10.0 BOTH ENDS | Ø(0.6306/0.6299) THRU | Ø(16.017/15.999) THRU | Ø(0.6306/0.6299) THRU | Ø(16.017/15.999) THRU | Ø0.59 THRU ⌴Ø(0.6299/0.6306) ↧0.79 BOTH ENDS | Ø15.0 THRU ⌴Ø(15.999/16.017) ↧20.0 BOTH ENDS |
| (4) | Ø5.125 | Ø130.2 | Ø6.500 | Ø165.1 | Ø9.000 | Ø228.60 | Ø9.500 | Ø241.30 |
| (5) | R3.66 MIN | 93.0 MIN | R4.46 MIN | 113.3 | R6.57 | 166.9 | R7.07 | 179.5 |
| (6) | Ø1.772 | Ø45.0 | Ø2.795 | Ø71.0 | Ø2.798 | Ø70.99 | Ø4.134 | Ø105.00 |
| (7) | Ø6.06 | Ø153.9 | Ø8.00 | Ø203.1 | Ø11.00 | Ø279.3 | Ø12.00 | Ø304.8 |
| (8) | 15° | | 11.25° | | 11.25° | | 9° | |
| (9) | 1.63 | 41.3 | 2.25 | 57.2 | 3.00 | 76.2 | 4.25 | 108.0 |
| (10) | Ø2.41 | Ø61.2 | Ø3.76 | Ø95.4 | Ø4.81 | Ø122.2 | Ø5.68 | Ø144.3 |
| (11) | 1.75 | 44.5 | 2.50 | 63.5 | 3.50 | 88.9 | 4.50 | 114.3 |
| (12) | 0.02 | 0.4 | 0.02 | 0.5 | 0.3 | 0.8 | 0.03 | 0.8 |
| (13) | Ø5.86 | Ø148.8 | Ø7.80 | Ø198.1 | Ø10.60 | Ø269.2 | Ø11.40 | Ø289.6 |
| (14) | Ø4.3 | Ø109.2 | Ø5.75 | Ø146.1 | Ø7.40 | Ø188.0 | Ø8.51 | Ø216.2 |
| (15) | Ø4.01 | Ø101.9 | Ø5.47 | Ø139.0 | Ø6.78 | Ø172.1 | Ø7.60 | Ø193.0 |
| (16) | Ø2.41 | Ø61.2 | Ø3.76 | Ø95.4 | Ø4.81 | Ø122.2 | Ø5.68 | Ø144.3 |
| (17) | PC04E-10-6P | | PT02E-10-6P | | PT02E-10-6P | | PT02E-10-6P | |
| (18) | – | | – | | – | | 2 x M16x2-6H ↧0.60 | 2 x M16x2-6H ↧15.2 |
| (19) | – | | – | | 33.75° | | 45° | |
| (20) | – | | – | | – | | – | |
| (21) | – | | – | | – | | – | |





interface
FORCE MEASUREMENT SOLUTIONS

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

## Dimensions (CONTINUED)

| See Drawing | MODEL | | | | | |
|---|---|---|---|---|---|---|
| | 1268 | | 1288 | | 1298 | |
| | CAPACITY | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 330K | 1500 | 540K | 2400 | 742K | 3300 |
| | in | mm | in | mm | in | mm |
| (1) | 0.98 | 25.0 | 28 x Ø1.06 THRU | 28 x Ø26.9 THRU | 32 x Ø1.32 THRU | 32 x Ø33.53 THRU |
| (2) | 12 x Ø0.984 THRU | 12 x Ø24.99 THRU | 18 x Ø1.37 THRU ⌵ $1.46^{\pm 0.02}$ x 90° FAR SIDE | 18 x Ø34.8 THRU ⌵ $37.1^{\pm 0.4}$ x 90° FAR SIDE | 12 X 1.72 THRU ⌵ $Ø1.84^{\pm 0.02}$ X 90° NEAR SIDE | 12 X 43.69 THRU ⌵ $Ø46.74^{\pm 0.51}$ X 90° NEAR SIDE |
| (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 | Ø1.00 THRU ⌴Ø(1.0236/1.0244) ↧1.05 BOTH ENDS | Ø31.8 THRU ⌴Ø(26.000/26.020) ↧26.7 BOTH ENDS | Ø1.25 THRU ⌴$Ø1.3391^{\pm 0.0005}$ ↧1.33 BOTH ENDS | Ø31.8 THRU ⌴$Ø34.013^{\pm 0.013}$ ↧33.8 BOTH ENDS |
| (4) | Ø12.684 | Ø322.17 | Ø16.500 | Ø419.10 | Ø20.500 | Ø520.70 |
| (5) | R8.80 MIN | 223.6 MIN | R11.29 MIN | 286.8 MIN | Ø20.500 | Ø520.70 |
| (6) | Ø5.906 | Ø150.01 | Ø8.465 | Ø215.00 | 10.63 | 270.0 |
| (7) | Ø15.50 | Ø393.7 | Ø20.50 | Ø520.7 | – | |
| (8) | 7.5° | | 6.43° | | 5.63° | |
| (9) | 5.00 | 127.0 | 6.00 | 152.4 | 7.50 | 190.5 |
| (10) | Ø7.73 | Ø196.3 | Ø10.55 | Ø267.9 | 13.79 | 350.27 |
| (11) | 5.50 | 139.7 | 6.25 | 158.8 | 7.75 | 196.85 |
| (12) | 0.03 | 0.8 | 0.03 | 0.8 | 0.03 | 0.76 |
| (13) | – | | Ø19.63 | Ø498.6 | 24.70 | 627.38 |
| (14) | – | | Ø14.46 | Ø367.3 | 18.10 | 459.74 |
| (15) | – | | Ø13.20 | Ø335.2 | 16.21 | 411.73 |
| (16) | – | | – | – | – | – |
| (17) | PT02E-10-6P(023) | | PT02E-10-6P | | 2 x LEMO FWG.2B.306.CLA | |
| (18) | 2 x M16x2-6H ↧0.60 Lifting Threads | 2 x M16x2-6H ↧15.2 Lifting Threads | 4 x M20x2.5-6G ↧1.00 | 4 x M20x2.5-6G ↧25.4 | 4 x M24x3 ↧1.40 | 4 x M24x3 ↧35.6 |
| (19) | 45° | | – | | 30° | |
| (20) | 2 x M12x1.75-6H ↧0.70 | 2 x M12x1.75-6H ↧17.8 | – | | – | |
| (21) | Ø3.937 | Ø100.00 | – | | – | |

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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) | 30K | 55K | 110K | 220K | 330K | 540K | 742K |
| | 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 MAX | °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 – %RO / °F MAX | °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 | 9.5 | 26 | 71 | 103 | 204 | 450 | 860 |
| | kg | 4.3 | 11.8 | 32.2 | 46.7 | 92.5 | 204 | 390 |
| Connector | | PT02E-10-6P | | | | | | |
| Calibration | | Tension & Compression | | | | | | |
| Material | | Alloy steel | | | | | | |



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

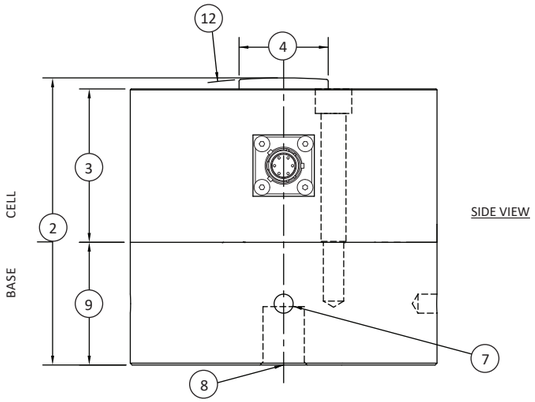
## FEATURES & BENEFITS

- 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

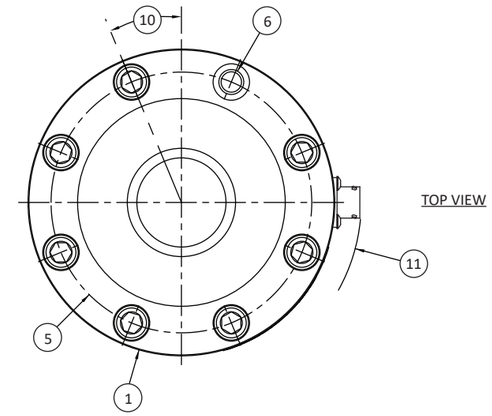
## STANDARD CONFIGURATION




**Model 1331FGT-100K-B** (Shown)




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)

## 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 MAX | °F | ±0.0008 |
| | °C | ±0.0015 |
| Effect on Output – % MAX | °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)
- CU.S.tom 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

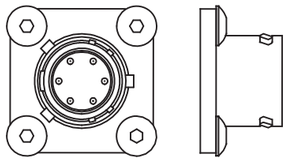


# 1331 COMPRESSION-ONLY LOAD CELL (U.S. & METRIC)

## BAYONET CONNECTOR



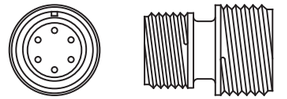

**Model 1331FGT-100K-B** (Shown)



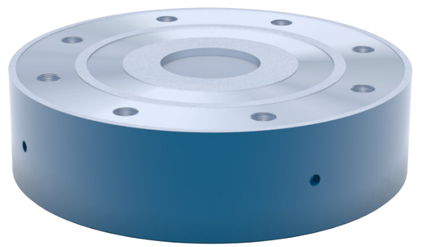
## SCREW TYPE CONNECTOR




**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)
- CU.S.tom 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

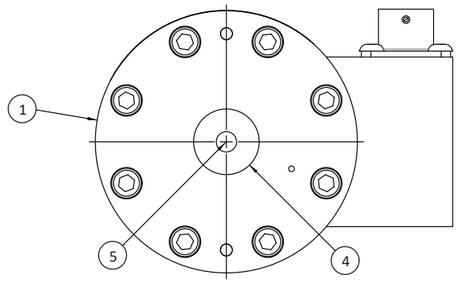
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

## STANDARD CONFIGURATION

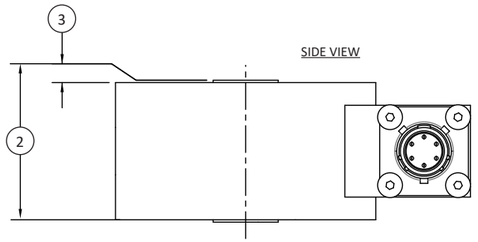



**Model 1500ASK-300** (Shown)

BOTTOM VIEW




SIDE VIEW




## 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 |

Catalog 2019 06-15-2020



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

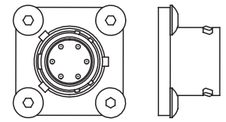
## Specifications

| 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 – % MAX | °F | ±0.0008 |
| | °C | ±0.0015 |
| Effect on Zero – %RO MAX | °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

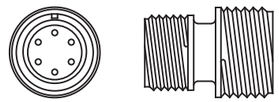



**Model 1500ASK-300** (Shown)





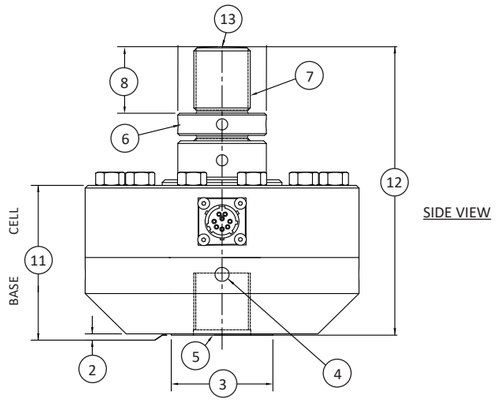

**Model 1500AF-300** (Shown)



# 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

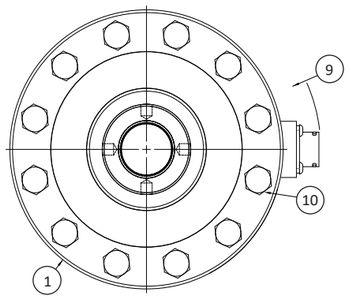



SIDE VIEW

## STANDARD CONFIGURATION




**Model 1620AJH-50K** (Shown)




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 |





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# 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 | ±0.02 | ±0.025 | ±0.025 | ±0.05 | ±0.05 |
| Nonlinearity – %FS | | ±0.03 | ±0.03 | ±0.035 | ±0.035 | ±0.05 | ±0.05 |
| Hysteresis – %FS | | ±0.02 | ±0.02 | ±0.035 | ±0.045 | ±0.05 | ±0.05 |
| Nonrepeatability – %RO | | ±0.005 | ±0.005 | ±0.005 | ±0.005 | ±0.005 | ±0.005 |
| Creep, in 20 min – % | | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| Side Load Sensitivity – % | | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |
| Eccentric Load Sensitivity – % / in | | ±0.1 | ±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 | 4.0 |
| 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 / °F MAX | | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 |
| Effect on Output – %RO / °F MAX | | ±0.0008 | ±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 | 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 | 0.002 | 0.002 | 0.004 | 0.004 | 0.006 | 0.010 |
| | mm | 0.05 | 0.05 | 0.10 | 0.10 | 0.15 | 0.25 |
| Weight | lbs | 3.8 | 3.8 | 8.0 | 23.5 | 058 | 171 |
| | kg | 1.724 | 1.724 | 3.629 | 10.659 | 26.308 | 77.564 |
| Calibration | | Tension & Compression | | | | | |
| Material | | Alloy steel | | | | | |

## OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range

## CONNECTOR OPTIONS

- PT02E-12-8P bayonet connector

## ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation

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

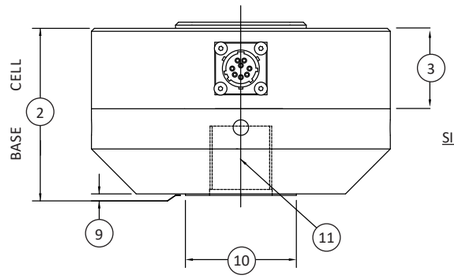
## FEATURES & BENEFITS

- 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

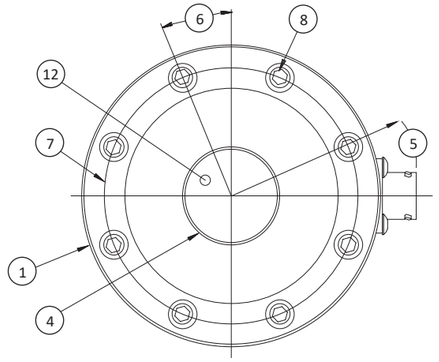
## STANDARD CONFIGURATION




**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 |

Catalog 2019 06-15-2020



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FORCE MEASUREMENT SOLUTIONS
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 / °F MAX | | ±0.0004 | | ±0.0004 | | ±0.0004 | | ±0.0004 | | ±0.0004 | |
| Effect on Output – %RO / °F MAX | | ±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)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range

## CONNECTOR

- PT02E-12-8P

## ACCESSORIES

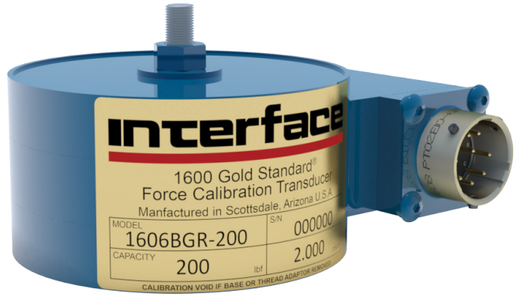
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware
- Calibration software

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

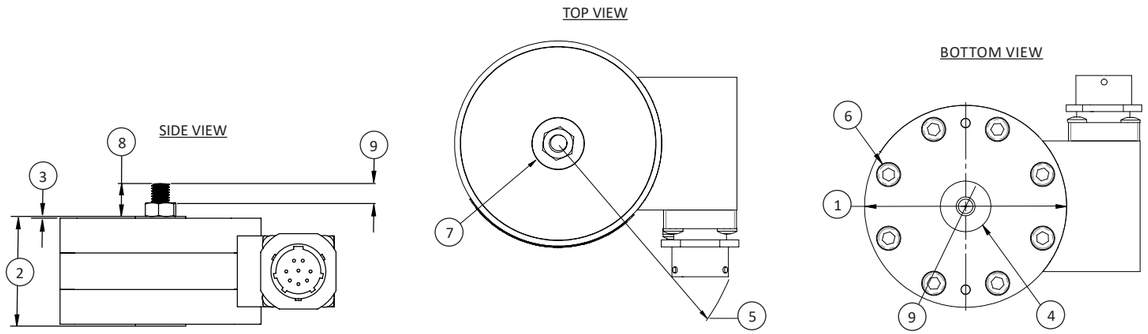
## FEATURES & BENEFITS

- 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 |



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FORCE MEASUREMENT SOLUTIONS

# 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 / °F MAX | | ±0.0008 | | ±0.0008 | |
| Effect on Output – % / °F MAX | | ±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)
- CU.S.tom 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)

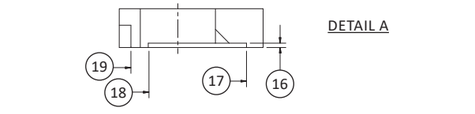
## FEATURES & BENEFITS

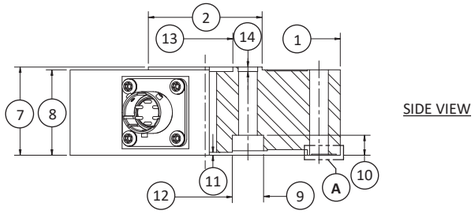
- Capacities from 220 to 14K lbf (1 to 63 kN)
- Standard flange design mounts directly to cylinders
- Tension and compression
- Proprietary Interface temp. compensated strain gages
- Performance to 0.05%
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output

## STANDARD CONFIGURATION

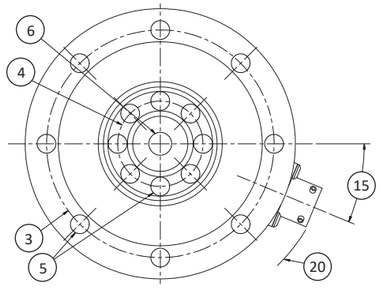



**Model 1720ACK-10KN** (Shown)




SIDE VIEW




TOP VIEW

## 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<br>2X ⌴ Ø0.500 + 0.002, -0.000 ↧ 0.08 | M10 X 1 ↧ 17<br>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 |




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

## FEATURES & BENEFITS

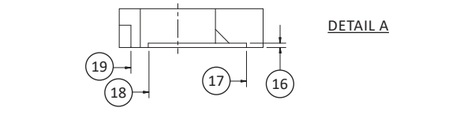
- Capacities from 220 to 14K lbf (1 to 63 kN)
- Standard flange design mounts directly to cylinders
- Tension and compression
- Proprietary Interface temp. compensated strain gages
- Performance to 0.05%
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output

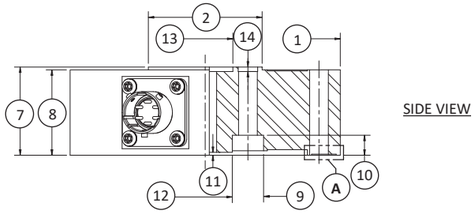
## STANDARD CONFIGURATION





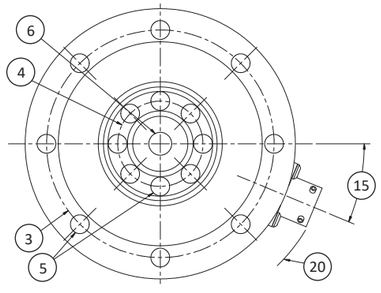

**Model 1720ACK-10KN** (Shown)



SIDE VIEW



TOP VIEW

## 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<br>2X ⌴ Ø0.500 + 0.002, -0.000 ↧ 0.08 | M10 X 1 ↧ 17<br>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 |

# 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) | | | | |
| Nonlinearity – %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 – % MAX | °F | ±0.0008 | ±0.0008 | ±0.0008 |
| | °C | ±0.0015 | ±0.0015 | ±0.0015 |
| Effect on Zero – %RO MAX | °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)
- CU.S.tom 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

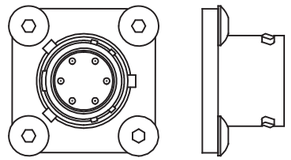


# 1700 FLANGE LOAD CELL (U.S. & METRIC)

## BAYONET CONNECTOR



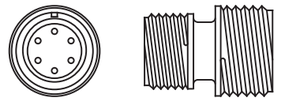

**Model 1720ACK-10KN** (Shown)



## SCREW TYPE CONNECTOR



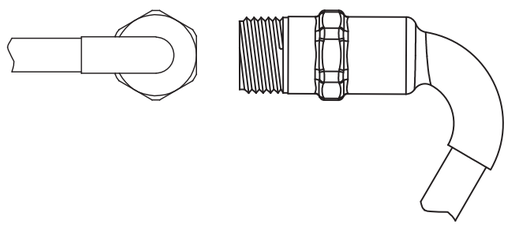

**Model 1720AF-10KN** (Shown)



## INTEGRAL 10 FT. CABLE CONNECTOR




**Model 1720AJ-10KN** (Shown)



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

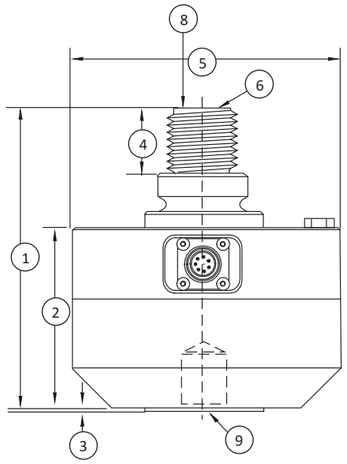
## FEATURES & BENEFITS

- 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

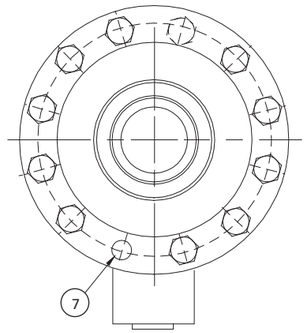
## STANDARD CONFIGURATION




**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) | ⅜-18 UNF-3A | M16x2 - 4H | 1¼-12 UNF - 3A | M33x2 - 4H | 1¾-12 UNF - 3A | M42x2 - 4H |
| (9) | ⅜-18 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 / °F MAX | | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 | ±0.0004 |
| Effect on Output – %RO / °F MAX | | ±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)
- CU.S.tom 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

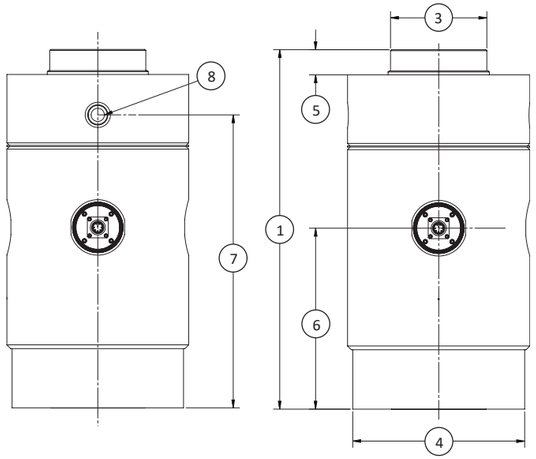
# 2000 HIGH PRECISION CANISTER LOAD CELL (U.S. & METRIC)

## FEATURES & BENEFITS

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

FRONT VIEW

SIDE VIEW

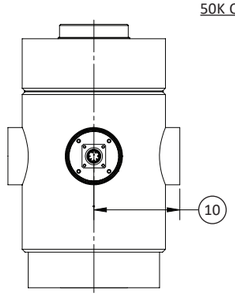



## STANDARD CONFIGURATION

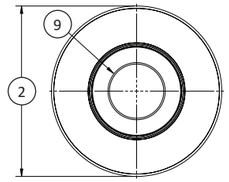


**Model 2040EYH-100K** (Shown)

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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.





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FORCE MEASUREMENT SOLUTIONS

# 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 / °F | | ± 0.0008 | ± 0.0008 | ± 0.0008 |
| Effect on Output – %RO / °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)
- CU.S.tom calibration
- Special Temperature range

## CONNECTOR OPTIONS

- PC02E-12-8P connector

## ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

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# 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)
- CU.S.tom 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

Catalog 2019 06-15-2020



FORCE MEASUREMENT SOLUTIONS

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

## Specifications

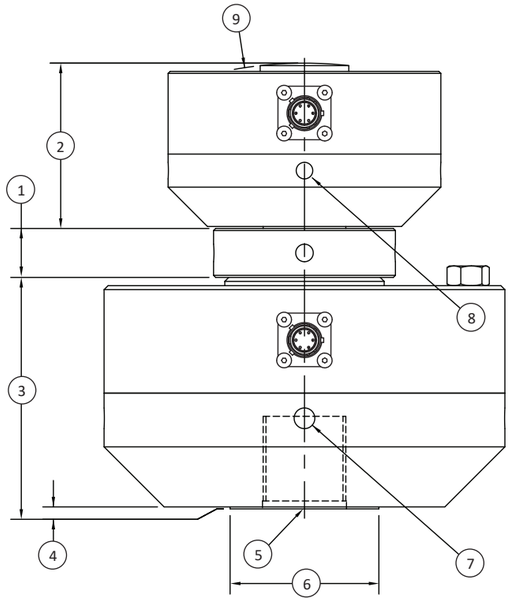
| PARAMETERS | | MODEL | | | | |
|---|---|---|---|---|---|---|
| | | 2111 | 2121 | 2131 | 2141 | |
| | | CAPACITY | | | | |
| Measuring Range | U.S. (lbf) | 1K/5K, 2K/10K | 5K/25K, 10K/50K | 25K/100K | 50K/150K | 100K/270K |
| | Metric (kN) | 5/25, 10/50 | 25/100, 50/250 | 100/450 | 250/675 | 450/1200 |
| 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 MAX | °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 – %RO/°F MAX | °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.

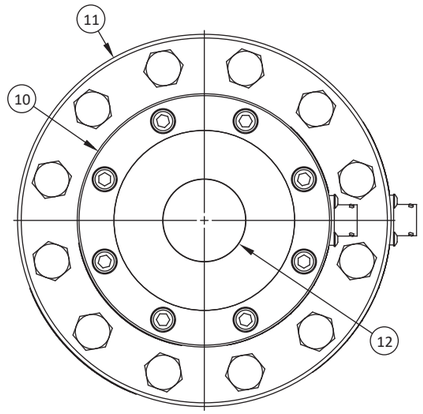
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# 2101 DUAL RANGE STANDARD LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

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.



# 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 / °F | | +0.003 |
| Effect on Output – % / °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)

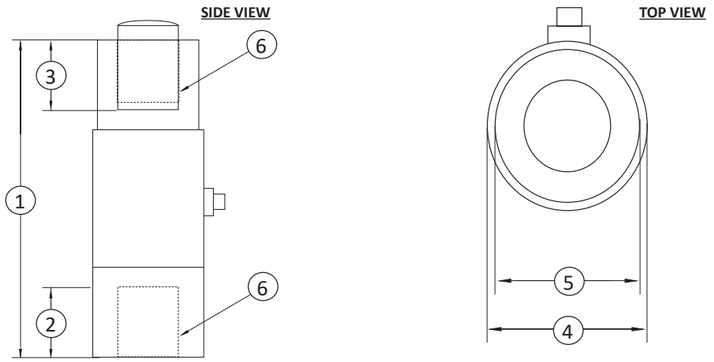
## OPTIONS

- 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

# 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 |
| Non-repeatability – %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 / °F | | +0.003 |
| Effect on Output – % / °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

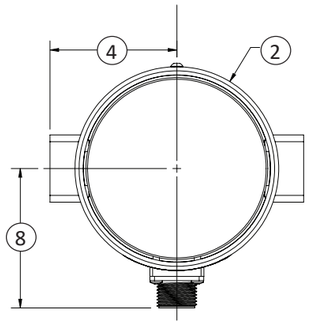
- Multiple bridge
- Standardized output
- ASTM E74 calibration
- Special thread size
- Handles

## ACCESSORIES

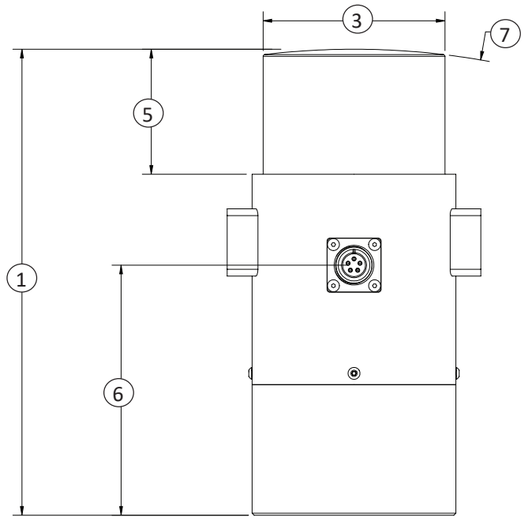
- Mating connector
- Cable assembly

# 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 |

Catalog 2019 06-15-2020



# 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 / °F | | 0.003 |
| Effect on Output – % / °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

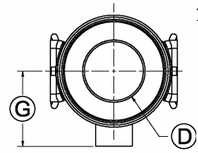
* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

## STANDARD CONFIGURATION

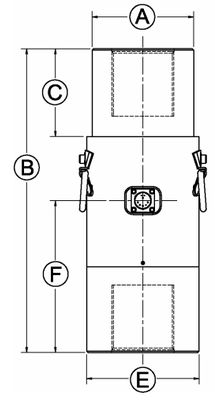


**Model 2200** (Shown)

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 |

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

## FEATURES & BENEFITS

- Capacities 630, 1000, 1200, 2000 kN (140K, 225K, 270K, 450K lbf)
- Accuracy class 0.05% FS
- Tension & compression
- Low profile, small mass
- Flange mounted
- Dual bridge available

## Specifications

| CAPACITY | | | | |
|---|---|---|---|---|
| | METRIC (kN) | 630 | 1000, 1200 | 2000 |
| | U.S. (lbf) | 140K | 225K, 270K | 450K |
| **ACCURACY – (MAX ERROR)** | | | | |
| Static Error Band – %FS | | ±0.05 | | |
| Nonlinearlity – %FS | | ±0.05 | | |
| Hysteresis – %FS | | ±0.1 | | |
| Nonrepeatability – %RO | | ±0.05 | | |
| Creep, in 20 min – % | | ±0.025 | | |
| Side Load Sensitivity – % | | ±0.25 | | |
| Eccentric Load Sensitivity – % / mm | | ±0.02 | | |
| **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 / °C MAX | | 0.0025 | | |
| **ELECTRICAL** | | | | |
| Rated Output – mV/V (Nominal) | | 2 | | |
| Excitation Voltage – VDC MAX | | 20 | | |
| **MECHANICAL** | | | | |
| Fatigue Range – %CAP | | ±80 | | |
| Weight | kg | 70 | 100 | 140 |
| | lbs | 154 | 220 | 309 |

## STANDARD CONFIGURATION



**Model 2300** (Shown)

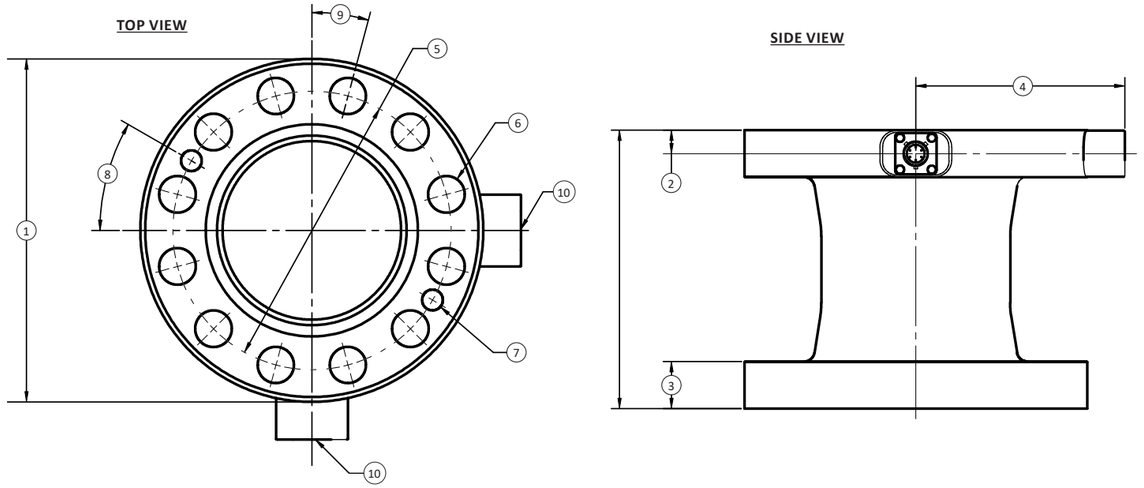
## OPTIONS

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

* 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.



# 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, 270K | 1000, 1200 | 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) | |

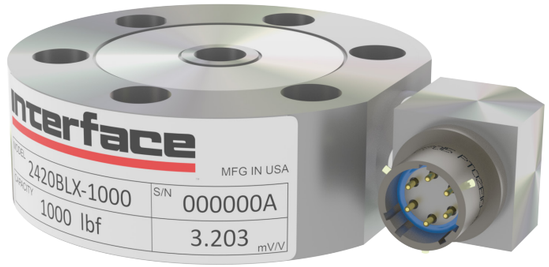
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# 2400 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

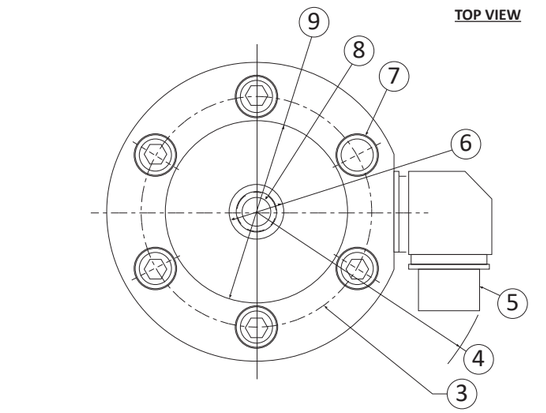
## FEATURES & BENEFITS

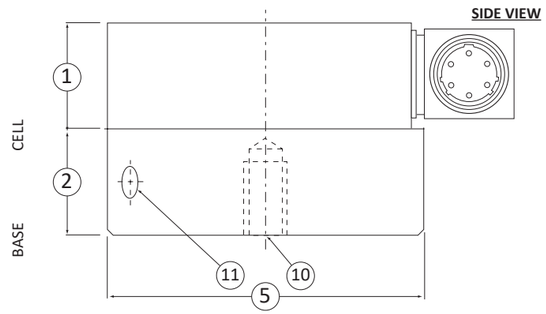
- Capacities from 100 to 5K lbf (0.5 to 22 kN)
- Proprietary Interface Temperature compensated strain gages
- Stainless steel construction
- Hermetically sealed
- Tension and compression
- Compact size
- Counterbored mounting holes

## 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 ⅝-24 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° | | | |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric 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 / °F MAX | | ±0.002 | ±0.002 |
| Effect on Output – %RO / °F MAX | | ±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)
- CU.S.tom calibration
- Special threads
- Special Temperature range

## CONNECTOR OPTIONS

- PTWIH-10-6P

## ACCESSORIES

- Mating connector
- Instrumentation
- Loading hardware
- Mating cable

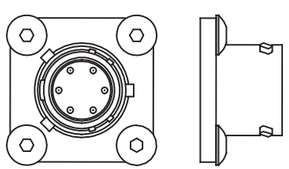

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

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

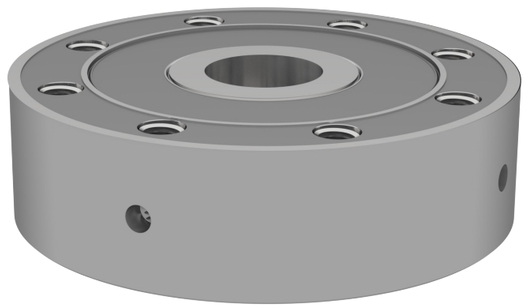
## BAYONET CONNECTOR




**Model 2420BLX-1000**



## BASE



**Model B3XXX**



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

## FEATURES & BENEFITS

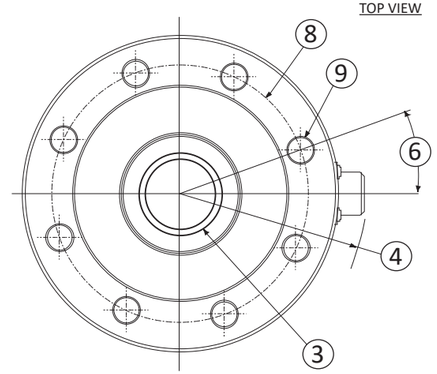
- Capacities from 7.5K to 300K lbf (33.4 to 1350 kN)
- Proprietary Interface Temperature compensated strain gages
- Welded diaphragm
- Tension & compression
- Compact size
- Counterbored mounting holes in 10K lbf (44.5 kN) model

## STANDARD CONFIGURATION

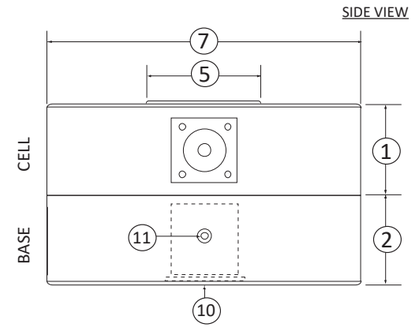



**Model 2450BXM-50K** (Shown)

TOP VIEW




SIDE VIEW




## Dimensions

| See Drawing | MODEL | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2440 | | 2450 | | 2470 | | 2480 | |
| | CAPACITY | | | | | | | |
| | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | 7.5K, 10K, 15K | 33.4, 50, 75 | 20K, 50K | 100, 250 | 150K, 200K | 750, 1000 | 300K | 1350 |
| | in | mm | in | mm | in | mm | in | mm |
| (1) | 1.80 | 45.7 | 1.80 | 45.7 | 2.50 | 63.5 | 4.25 | 108.0 |
| (2) | 1.75 | 44.5 | 1.75 | 44.5 | 2.50 | 63.5 | 4.25 | 108.0 |
| (3) | 1-14 UNS-3B | | 1 ½-12 UNF-3B | | 2.50-12 UN | | 3.50-8 UN | |
| (4) | Ø3.56 | Ø85.2 | Ø3.81 | Ø96.8 | Ø6.31 | Ø160.3 | Ø8.07 | Ø205.0 |
| (5) | Ø1.71 | Ø43.5 | Ø2.23 | Ø56.6 | Ø4.66 | Ø118.3 | Ø7.36 | Ø186.9 |
| (6) | 22.5° | | 20.0° | | 11.25° | | 15° | |
| (7) | Ø5.50 | Ø139.7 | Ø6.00 | Ø152.4 | Ø11.00 | Ø279.4 | Ø14.00 | Ø355.6 |
| (8) | Ø4.50 | Ø114.3 | Ø4.88 | Ø123.8 | Ø9.50 | Ø241.3 | Ø11.75 | Ø298.5 |
| (9) | Ø0.41 | Ø10.4 | Ø0.53 | Ø13.5 | Ø0.78 | Ø19.9 | Ø1.03 | Ø26.2 |
| | 8 places | | 8 places | | 12 places | | 12 places | |
| (10) | 1-14 UNS-3B | | 1½-12 UNF-3B | | 2½-12 UN | | 3½-8 UN | |
| (11) | Spanner holes 4 SPACED @ 90° | | | | | | | |

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

## Specifications

| PARAMETERS | | MODEL | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2440 | | 2450 | | 2470 | | 2480 | |
| | | CAPACITY | | | | | | | |
| | | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) | U.S. (lbf) | Metric (kN) |
| | | 7.5K, 10K, 15K | 37.5, 50, 75 | 20K, 50K | 100, 250 | 150K, 200K | 750, 1000 | 300K | 1350 |
| **ACCURACY – (MAX ERROR)** | | | | | | | | | |
| Static Error Band – %FS | | ±0.10 | | ±0.10 | | ±0.10 | | ±0.10 | |
| Nonlinearity – %FS | | ±0.10 | | ±0.10 | | ±0.10 | | ±0.10 | |
| Hysteresis – %FS | | ±0.08 | | ±0.08 | | ±0.08 | | ±0.08 | |
| Nonrepeatability – %RO | | ±0.03 | | ±0.03 | | ±0.03 | | ±0.03 | |
| Creep, in 20 min – % | | ±0.03 | | ±0.05 | | ±0.03 | | ±0.03 | |
| **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 / °F MAX | | ±0.0015 | | ±0.0015 | | ±0.0015 | | ±0.0015 | |
| Effect on Output – %RO / °F MAX | | ±0.0008 | | ±0.0008 | | ±0.0008 | | ±0.0008 | |
| **Electrical** | | | | | | | | | |
| Rated Output – mV/V (Nominal) | | 3.0 | | 3.0 | | 3.0 | | 3.0 | |
| Excitation Voltage – VDC MAX | | 20 | | 20 | | 20 | | 20 | |
| Bridge Resistance – Ohm (Nominal) | | 350 | | 350 | | 350 | | 350 | |
| Zero Balance – %RO | | ±2.0 | | ±2.0 | | ±2.0 | | ±2.0 | |
| Insulation Resistance – Megohm | | 5000 | | 5000 | | 5000 | | 5000 | |
| **MECHANICAL** | | | | | | | | | |
| Safe Overload – %CAP | | ±150 | | ±150 | | ±150 | | ±150 | |
| Deflection @ RO | in | 0.003 | | 0.004 | | 0.010 | | 0.010 | |
| | mm | 0.08 | | 0.10 | | 0.25 | | 0.25 | |
| Optional Base – P/N | | B323-2 | | B320-1 | | N/A | | N/A | |
| Natural Frequency – kHz | | 9.4 | | 8.0 | | 4.5 | | 4.1 | |
| Weight | lbs | 6 | | 9 | | 46 | | 130 | |
| | kg | 2.7 | | 4.1 | | 20.9 | | 59 | |
| Seal | | Environmental | | | | | | | |
| Material | | Stainless Steel | | Stainless Steel | | Stainless Steel | | Carbon Steel | |

## OPTIONS

- Base (recommended)
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Special threads
- Special Temperature range
- Cable length
- Add connector to cable

## CONNECTOR OPTIONS

- MS3102E-14S-6P

## ACCESSORIES

- Mating connector
- Instrumentation
- Loading hardware



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

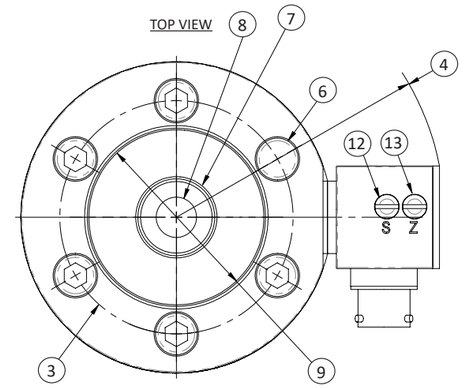
## FEATURES & BENEFITS

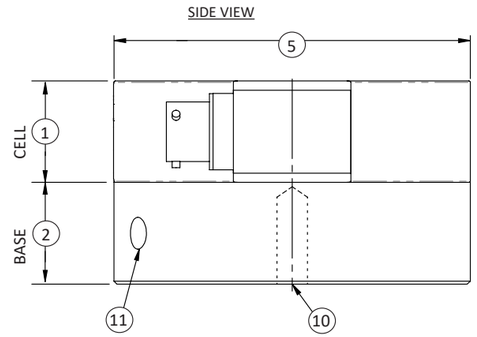
- Capacities from 100 to 5K lbf ( 0.44 to 22.2 kN)
- Stainless steel construction
- Hermetically sealed
- Tension and compression
- Counterbored mounting holes
- Internally amplified with 4-20 mA output
- Proprietary Interface Temperature compensated strain gages

## STANDARD CONFIGURATION




**Model 2424CSY-500** (Shown)




**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 adjU.S.t | | | |
| (13) | Zero adjU.S.t | | | |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric 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 / °F MAX | | ±0.005 | ±0.005 |
| Effect on Output – %RO / °F MAX | | ±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 AdjU.S.tment | | 1 mA range | |
| Span AdjU.S.tment | | 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)
- CU.S.tom calibration
- Special threads
- Special Temperature range

## CONNECTOR OPTIONS

- PTWIH-10-6P

## ACCESSORIES

- Mating connector
- Instrumentation
- Loading hardware

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

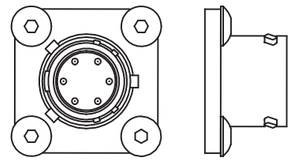


interface
FORCE MEASUREMENT SOLUTIONS
2404 STANDARD STAINLESS STEEL 2-WIRE AMPLIFIED LOAD CELL (U.S. & METRIC)

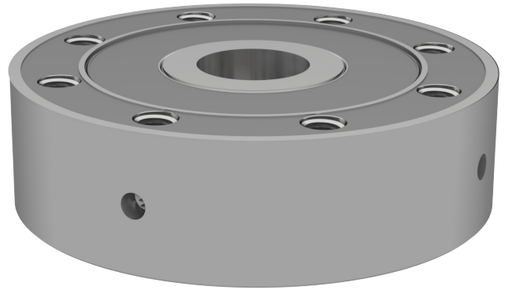
## BAYONET CONNECTOR




Model 2424CSY-500 (Shown)



## BASE



Model B24XX (Shown)

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

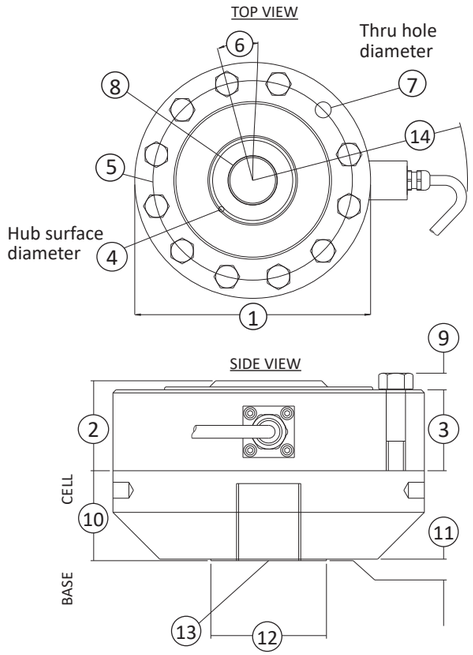
## FEATURES & BENEFITS

- 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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric 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 / °F MAX | | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output – %RO / °F MAX | | ±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)
- CU.S.tom 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


* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

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

## INTEGRAL 20 FT. CABLE CONNECTOR




**Model 3220XXX**

## BASE



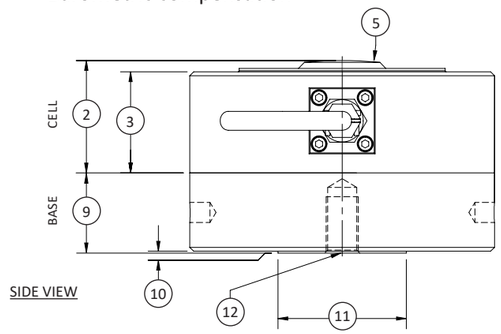
**Model B32XX**



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

## FEATURES & BENEFITS

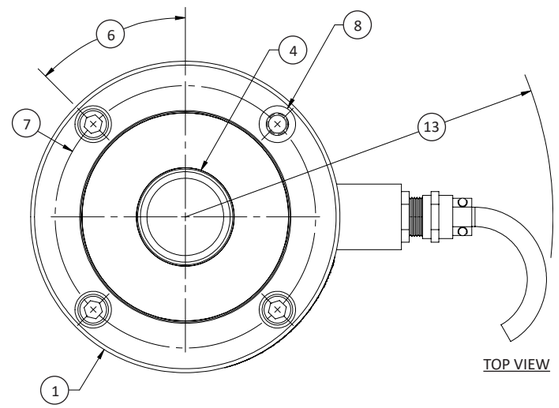
- Capacities from5K to 100K lbf (25 to 450 kN)
- Proprietary Interface Temperature compensated strain gages
- Hermetically sealed cell
- Performance to 0.04%
- Compact size
- High 4 mV/V output
- Eccentric load compensated
- 0.0008%/°F temp. effect on output
- Low deflection
- Shunt calibration
- BaroMetric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




## STANDARD CONFIGURATION




**Model 3221BBE-50K** (Shown without base)




## 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 | 11.1, 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 | | ⅜-24 x 1½ 4 places | | ⅞-20 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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric 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 / °F MAX | | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 | ±0.0008 |
| Effect on Output – %RO / °F MAX | | ±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 | | | | |
| Material | | Stainless Steel | | | | |

## OPTIONS

- Base (Recommended)
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Special Temperature range
- Cable length
- Add connector to cable

## ACCESSORIES

- Instrumentation
- Loading hardware

## BASE



**Model B32XX**

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



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# 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

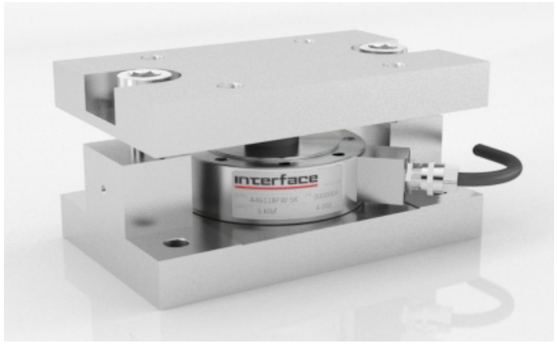
| ACCURACY – (MAX ERROR) | | |
|---|---|---|
| Static Error Band – %FS | | ± 0.05 |
| Nonlinearity – %FS | | ± 0.05 |
| Hysteresis – %FS | | ± 0.03 |
| Nonrepeatability – %RO | | ± 0.02 |
| Creep, in 20 min – % | | ± 0.025 |
| **TEMPERATURE** | | |
| Compensated Range | °C | -10 to +45 |
| | °F | +15 to +115 |
| Operating Range | °C | -55 to +90 |
| | °F | -65 to +200 |
| Effect on Output – % / °F MAX | | ±0.0008 |
| Effect on Zero – %RO / °F MAX | | ±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

***See appendix for more technical info.***

## STANDARD CONFIGURATION




**MODEL A4200 & A4600** (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

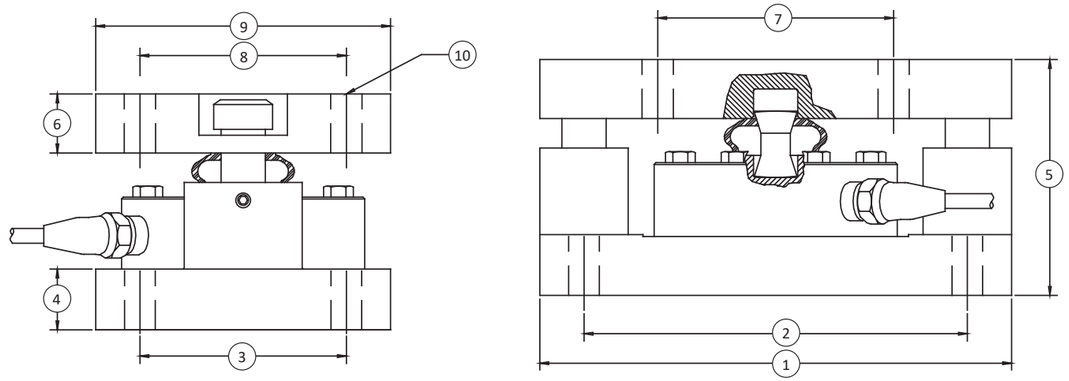
Catalog 2019 06-15-2020

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



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# 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 |

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

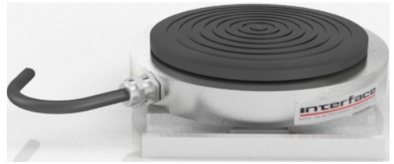
## FEATURES & BENEFITS

- 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 U.S.e 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 – % / °F MAX | | ±0.001 |
| Effect on Zero – %RO / °F MAX | | ±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
- CU.S.tom calibration
- Special Temperature range
- Add connector to cable
- Standardized output
- Transducer Electronic Data Sheet (TEDS)

## ACCESSORIES

- Instrumentation

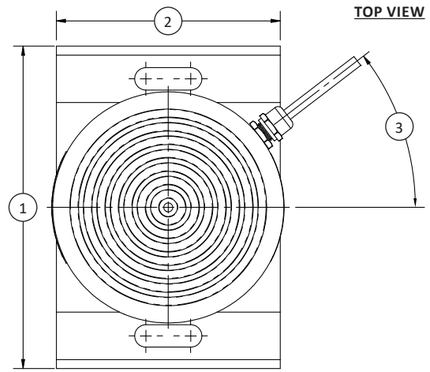
## CONNECTOR OPTIONS

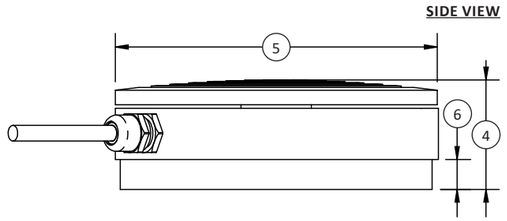
- 10 ft (3 m) integral cable

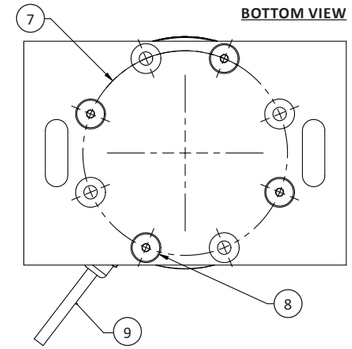
* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



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 |

# Notes:



# Mini Load Cells

LowProfile®

Load Button

Load Washer

Mini Beam

Column

Rod End

S-Type

# Platform

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

## FEATURES & BENEFITS

- Capacities from 25 to 50K lbf (0.11 to 222 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 / °F MAX | | ±0.005 |
| Effect on Output – %RO / °F MAX | | ±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

- CU.S.tom 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)

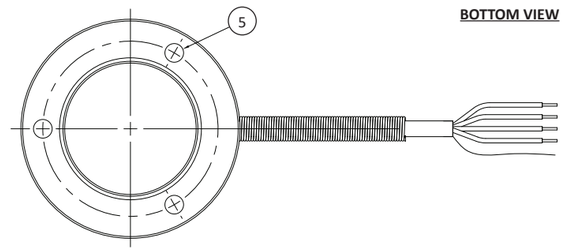


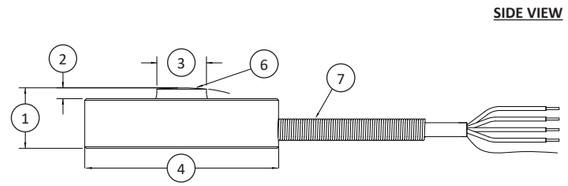
* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



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# LBM COMPRESSION LOAD BUTTON (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) |
| | 25, 50, 100 | 0.11, 0.22, 0.44 | 250, 500, 1K, 2K | 1.11, 2.22, 4.45, 8.9 | 5K, 10K | 22.2, 44.5 | 20K | 89 | 50K | 222 |
| | in | mm | in | mm | in | mm | in | mm | in | mm |
| (1) | 0.63 | 16.0 | 0.39 | 9.90 | 0.63 | 16.0 | 1.0 | 25.4 | 1.50 | 38.1 |
| (2) | 0.05 | 1.30 | 0.07 | 1.80 | 0.08 | 2.00 | 0.12 | 3.00 | 0.18 | 4.60 |
| (3) | 0.21 | 5.30 | 0.32 | 8.10 | 0.43 | 10.9 | 0.60 | 15.0 | 0.78 | 19.8 |
| (4) | 1.00 | 25.4 | 1.25 | 31.8 | 1.50 | 38.1 | 2.00 | 50.8 | 3.00 | 76.2 |
| (5) | (4-40) UNC ↧0.19 EQ SP Ø0.75 B.C. | (4-40) UNC ↧4.83 EQ SP Ø19.0 B.C. | (6-32) UNC ↧0.25 EQ SP Ø1.00 B.C. | (6-32) UNC ↧6.35 EQ SP Ø25.4 B.C. | (6-32) UNC ↧0.25 EQ SP Ø1.25 B.C. | (6-32) UNC ↧6.35 EQ SP Ø31.8 B.C. | (6-32) UNC ↧0.25 EQ SP Ø1.63 B.C. | (6-32) UNC ↧6.35 EQ SP Ø41.3 B.C. | (6-32) UNC ↧0.25 EQ SP Ø2.38 B.C. | (6-32) UNC ↧6.35 EQ SP Ø60.3 B.C. |
| | 3 Places | | | | | | | | | |
| (6) | Sphercial load button | | | | | | | | | |
| (7) | Stainless steel spring strain relief | | | | | | | | | |

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# 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

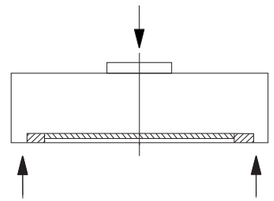
| | | |
|---|---|---|
| **ACCURACY – (MAX ERROR)** | | |
| Nonlinearity – %FS | | ±0.5 |
| Hysteresis – %FS | | ±0.5 |
| Nonrepeatability – %RO | | ±0.2 |
| Creep, in 30 min – % | | ±0.1 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO / °C | | ±0.02 |
| Effect on Output – %RO / °C | | ±0.02 |
| Compensated 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 |
| Net Weight lbs | (2.25-2.25K lbf) | 0.66 |
| Net Weight kg | (20 kN) | 0.4 |
| Net Weight lbs | (4.5K lbf) | 0.88 |
| Net Weight kg | (50 kN) | 0.7 |
| Net Weight lbs | (11.2K lbf) | 1.54 |
| Net Weight kg | (100 kN) | 1.7 |
| Net Weight 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)
- CU.S.tom calibration

## CONNECTOR OPTIONS

- 3 m (10 ft) integral cable

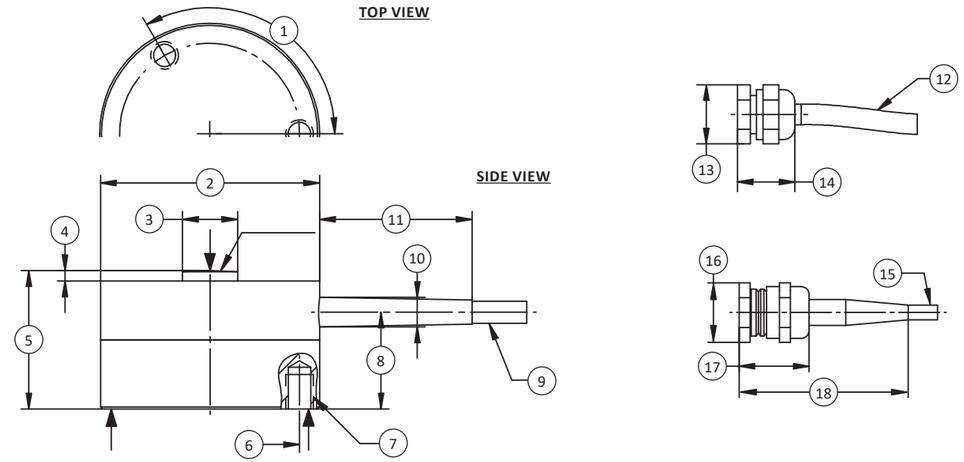
## ACCESSORIES

- Instrumentation

* 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.



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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 |

* 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.

# 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 / °F MAX | | ±0.0005 |
| Effect on Output – % / °F MAX | | ±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
- CU.S.tom calibration
- Add connector to cable
- Special Temperature range
- Transducer Electronic Data Sheet (TEDS)

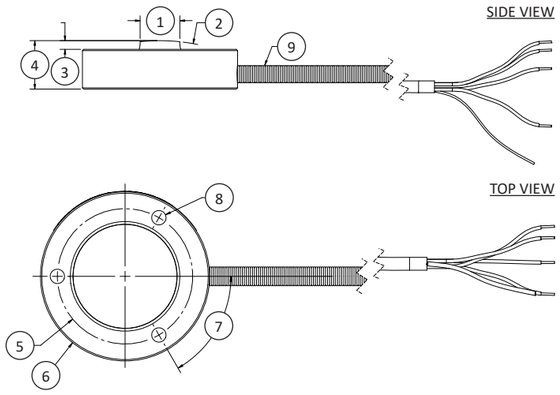
## CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

## 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



interface
FORCE MEASUREMENT SOLUTIONS
LBMU HIGH ACCURACY COMPRESSION LOAD BUTTON (U.S. & METRIC)

## SAMPLE SYSTEM OVERVIEW



**Model LBMU**



**SGA**
**CSC**
**DMA**
**CSD**
**OEM Low Cost**



**9860**
**9820**
**9840**



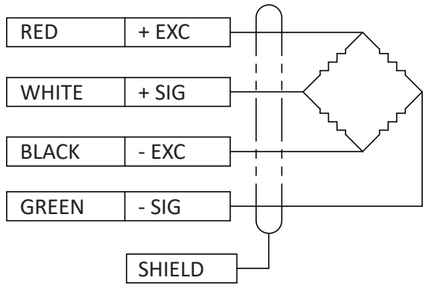
**9320**
**9330**

**PC**

**Interface Graphing & Logging Software**
65V-MULTI
9860
INF-U.S.B

**U.S.er Supplies**
Data Acquisition
Chart Recorder
PLC

## Wiring DIAGRAM




## ORDERING INFORMATION

**LBMU - xxx - xxx**

- Factory assigned option codes for cU.S.tom / special configurations
- **Capacity Rating (lbf / kN)** [100, 250, 500, 1K] / [0.44, 1.11, 2.22, 4.45]
- **Model**

# LBS MINIATURE COMPRESSION LOAD BUTTON (U.S. & METRIC)

## FEATURES & BENEFITS

- Capacities from 5 to 1K lbf (0.02 to 4.45 kN)
- Temperature compensated
- Integral load button
- Small diameter
- From 0.12 inch (3 mm) height

## SPECIFICATIONS

| | | |
|---|---|---|
| **ACCURACY – (MAX ERROR)** | | |
| Nonlinearity – %FS | | ±0.50 |
| Hysteresis – %FS | | ±0.50 |
| Nonrepeatability – %RO | | ±0.10 |
| **TEMPERATURE** | | |
| Compensated Range | °F | +60 to +160 |
| | °C | +15 to +71 |
| Operating Range | °F | -65 to +250 |
| | °C | -54 to +121 |
| Effect on Zero – %RO / °F MAX | | ±0.005 |
| Zero Balance – %FS | | ±2.0 |
| **ELECTRICAL** | | |
| Rated Output – mV/V (Nominal) | | 2.0 |
| Bridge Resistance – Ohm (Nominal) | | 350 |
| Excitation Voltage – VDC | | 5 |
| Excitation Voltage – VDC MAX | | 7 |
| **MECHANICAL** | | |
| Calibration | | Compression |
| Deflection | | 0.001 - 0.003 |
| Safe Overload – %CAP | | 150 |
| Ultimate Overload % of CAP | | 300 |
| Weight | lbs | 0.5 |
| | kg | 0.23 |
| Material | | Stainless steel |

## OPTIONS

- CU.S.tom calibration
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

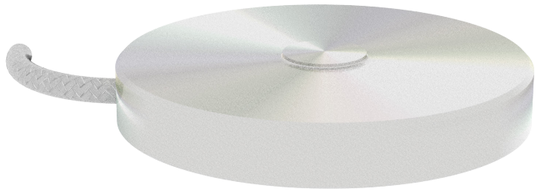
## ACCESSORIES

- Instrumentation

## CONNECTOR OPTIONS

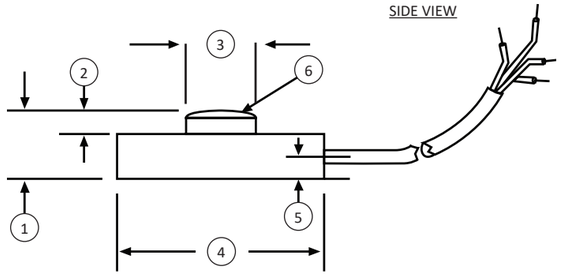
- 5 ft (1.5 m) integral cable

## STANDARD CONFIGURATION



**Model LBS** (Shown)

SIDE VIEW




## Dimensions

| See Drawing | 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, 1K | 2.22, 4.45 |
| | in | mm | in | mm | in | mm |
| (1) | 0.12 | 3.00 | 0.15 | 3.80 | 0.25 | 6.4 |
| (2) | 0.03 | 0.80 | 0.02 | 0.50 | 0.03 | 0.80 |
| (3) | 0.09 | 2.20 | 0.12 | 3.00 | 0.24 | 6.10 |
| (4) | 0.38 | 9.60 | 0.50 | 13.0 | 0.75 | 19.0 |
| (5) | 0.04 | 1.00 | 0.06 | 1.50 | 0.10 | 2.50 |
| (6) | Spherical radiU.S. | | | | | |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



# 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

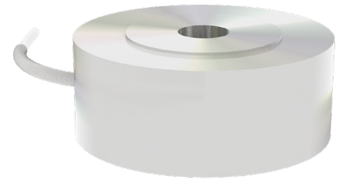
## Specifications

| 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 MAX | °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 in. (9.4 mm) for 5.000 lbf (0.02 kN) thru 100.000 lbf (0.44 kN)***
- ***0.63 in. (16.0 mm) for 250.000 lbf (1.11 kN) thru 10k lbf (44.5 kN)***

## STANDARD CONFIGURATION



**Model LW** (Shown)

## OPTIONS

- Cable length
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration Accessories

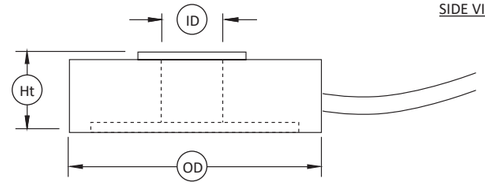
## ACCESSORIES

- Instrumentation

## CONNECTOR OPTIONS

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

SIDE VIEW




***Height is**

- ***1.00 in. (25.4 mm) for 1k lbf (4.45 kN) thru 50k lbf (222 kN)***
- ***2.00 in. (50.8 mm) for 100k lbf (445 kN)***

## 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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

# 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, 50K, 75K, 100K | 4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445 |
| **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 |



interface
FORCE MEASUREMENT SOLUTIONS

# 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 |

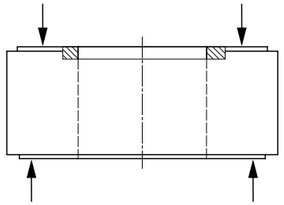
* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

# 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 robU.S.t design

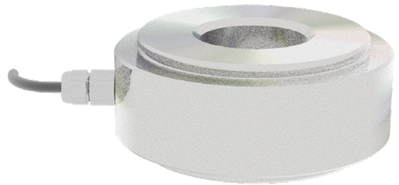
## LOADING DIAGRAM



## Specifications

| ACCURACY - (MAX ERROR) | | |
|---|---|---|
| Nonlinearity – %FS | | ±1 |
| Nonrepeatability – %RO | | ±0.3 |
| Creep, in 30 min – % | | ±0.1 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO / °C | | ±0.03 |
| Effect on Output – %RO / °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
- CU.S.tom calibration
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

## CONNECTOR OPTIONS

- 3 m (9.8 ft) integral cable

## ACCESSORIES

- Instrumentation

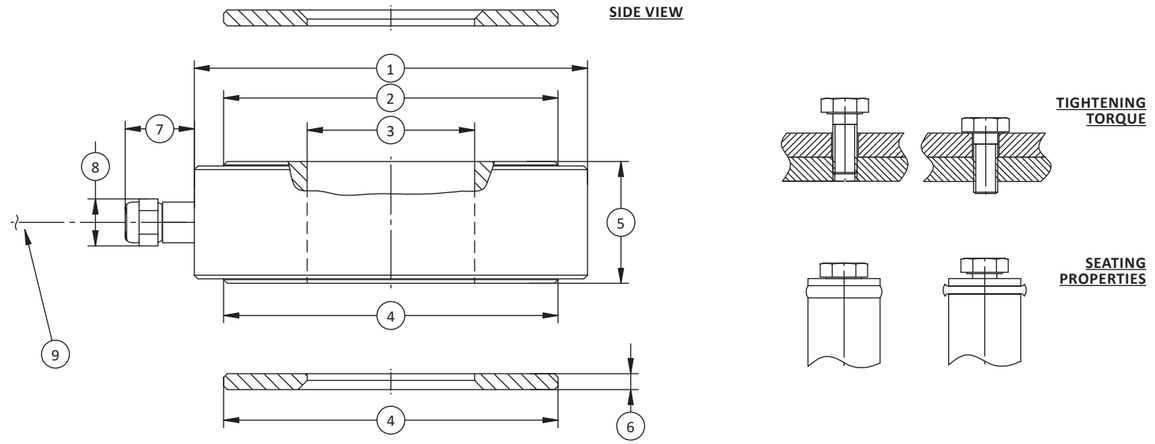
Catalog 2019 06-15-2020

* 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.



FORCE MEASUREMENT SOLUTIONS

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 | 1/4 | M8 | 5/16 | M10 | 7/16 | M12 | 1/2 | M16 | 5/8 | M20 | 3/4 | M24 | 1 |
| (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 | 1 1/4 | M36 | 1 1/2 | M39 | 1 1/2 | M42 | 1 3/4 | M48 | 2 | M52 | 2 |
| (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 |

* 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.

# 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
- CU.S.tom calibration
- Special Temperature range
- 100% control signal (internal shunt calibration)
- Transducer Electronic Data Sheet (TEDS)

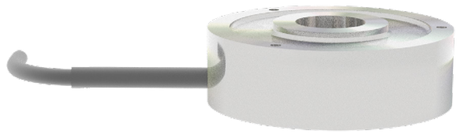
## CONNECTOR OPTIONS

- 3 m (10 ft) integral cable

## ACCESSORIES

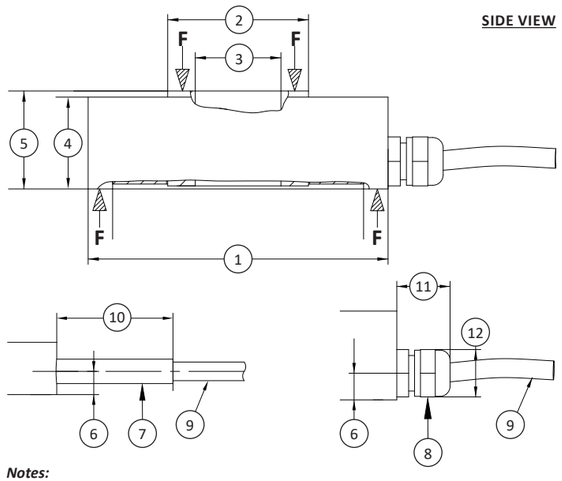
- Instrumentation

## STANDARD CONFIGURATION



**Model LWHP14** (Shown)

SIDE VIEW




***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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.




# 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 / °C | | ±0.02 | | | | | | | |
| Effect on Output – %RO / °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 | | | | | | | |


* 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.

# 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. | 1.12K to 45K lbf | 112K 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 / °C | | ±0.01 | |
| Effect on Output – %RO / °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
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Cable length
- 100% control signal (internal shunt cal)

## ACCESSORIES

- Instrumentation

## STANDARD CONFIGURATION

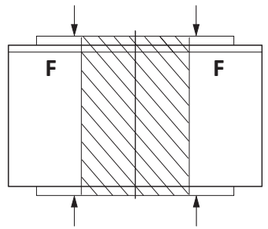


Model LWHP18 5 kN (Shown)



Model LWHP18 500 - 5000 kN (Shown)

## LOADING DIAGRAM



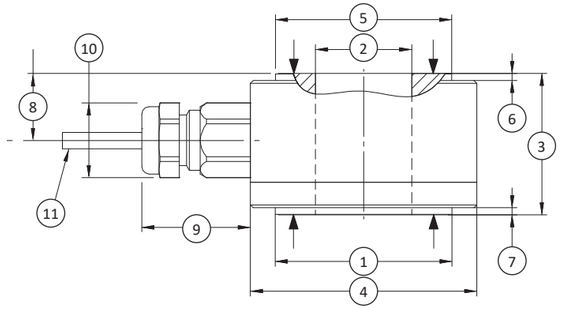

## CONNECTOR OPTIONS

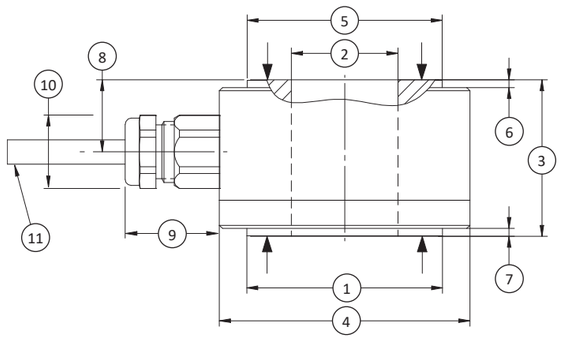
- 3 m (10 ft) integral cable
- Series 723 binder (5 to 5000 kN or
- 112 to 1124K lbf)

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.




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

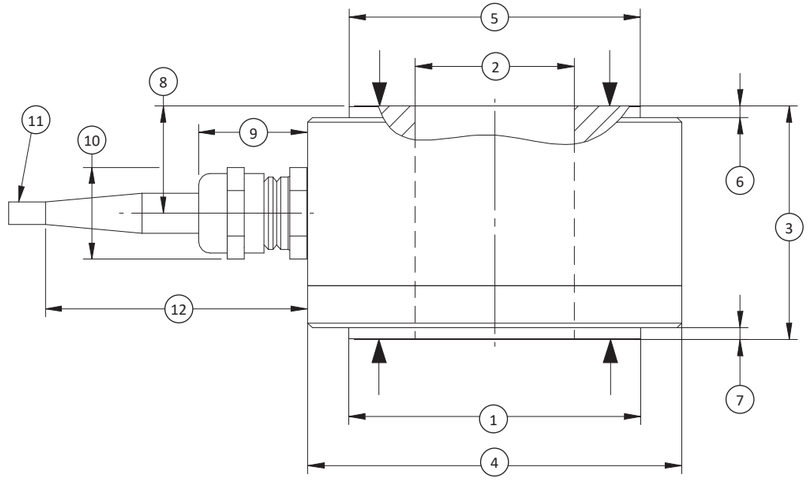

## Dimensions

| 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)



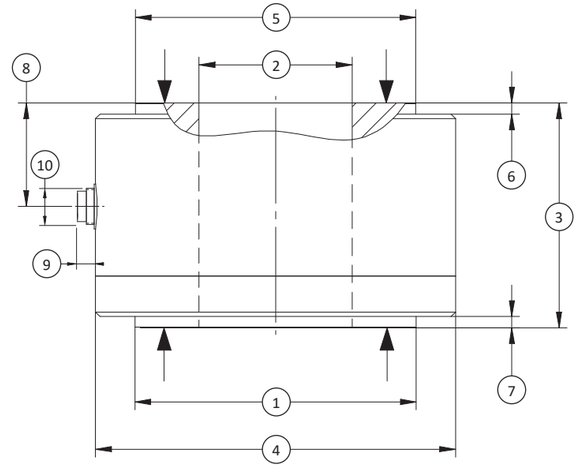

## Dimensions

| 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 |



FORCE MEASUREMENT SOLUTIONS

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 |

# 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 / °C | | ±0.02 |
| Effect on Output – %RO / °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
- CU.S.tom calibration
- Standardized output
- Add connector to cable
- Special Temperature range
- Internal shunt resistor – 100% output
- Tranducer Electronic Data Sheet (TEDS)

## CONNECTOR OPTIONS

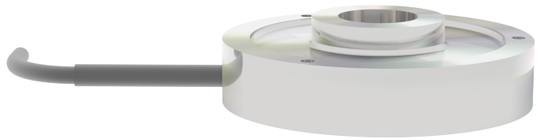
- 3 m (9.8 ft) integral cable

## ACCESSORIES

- Instrumentation

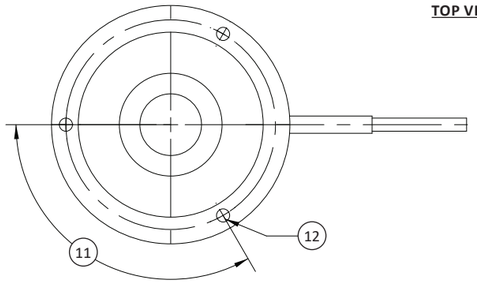
** F indicates load Direction*
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

## STANDARD CONFIGURATION

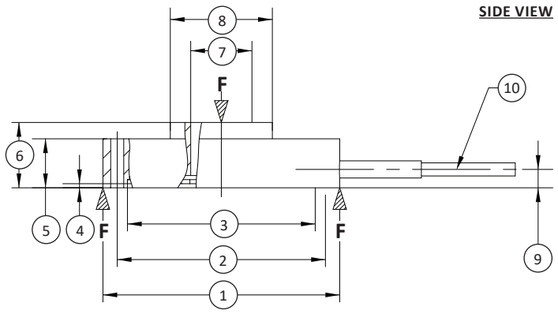


**Model LWMH1** (Shown)

TOP VIEW




SIDE VIEW




## 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 / °C | | ±0.02 |
| Effect on Output – %RO / °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
- CU.S.tom 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

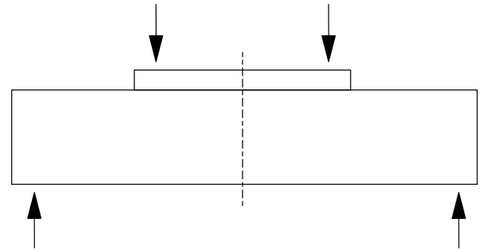
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

## STANDARD CONFIGURATION

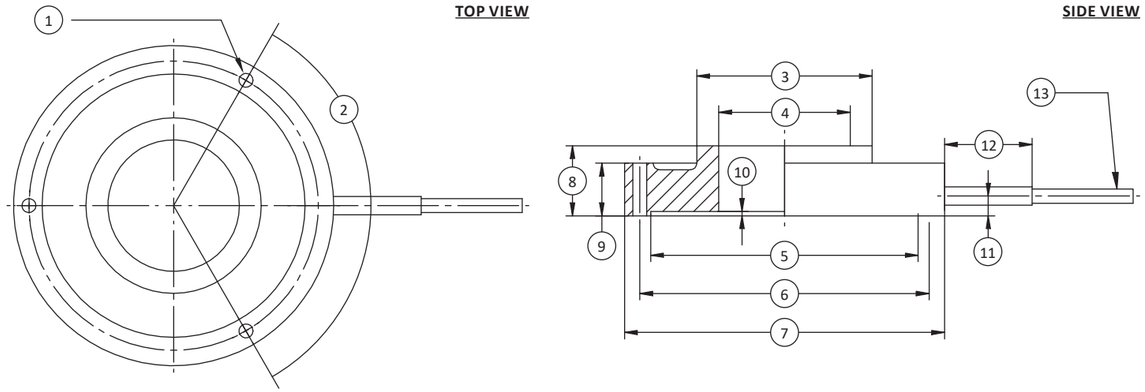


**Model LWMH2** (Shown)

## LOADING DIAGRAM



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




## 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 |

* 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.



# 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

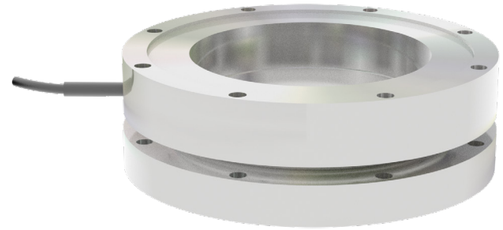
## Specifications

| | | |
|---|---|---|
| **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 / °C | | ±0.02 |
| Effect on Output – %RO / °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

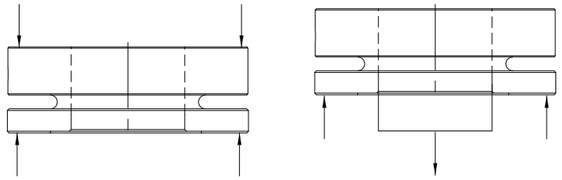
- Extended Temperature range (-40 to +150°C or -40 to +302°F)
- Internal shunt resistor – 100% output

## STANDARD CONFIGURATION



**Model LWPF1** (Shown)

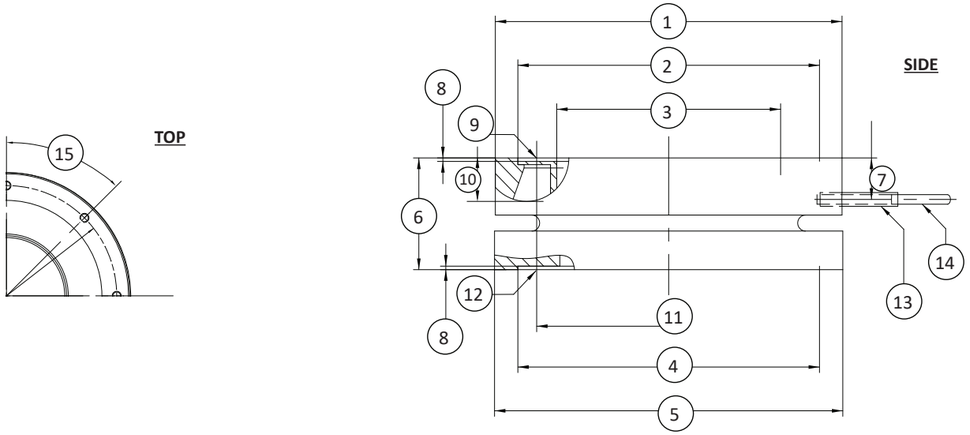
## LOADING DIAGRAM



Compression Tension

* 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.

# 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° | |

* 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.



# 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

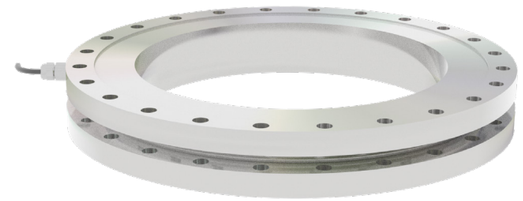
## Specifications

| | | |
|---|---|---|
| **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 / °C | | ±0.02 |
| Effect on Output – %RO / °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

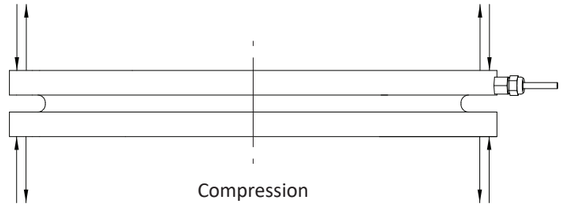
- Extended Temperature range (-40 to +150°C or -40 to +302°F)
- Internal Shunt Resistor – 100% output

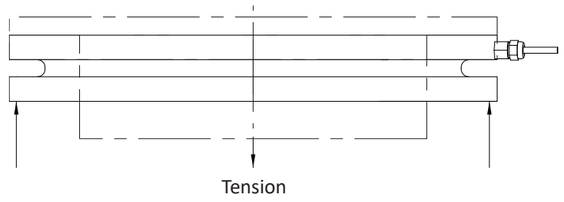
## STANDARD CONFIGURATION



**Model LWPF2** (shown)

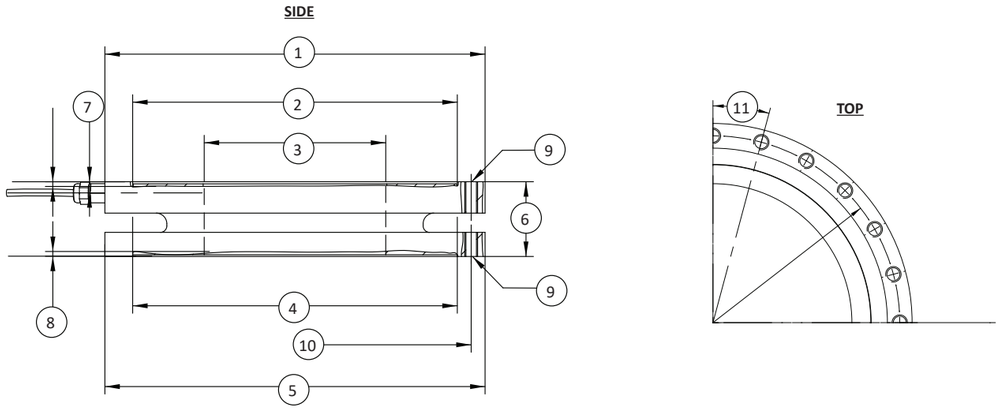
## LOADING DIAGRAM




* 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.

# 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 |

* 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.



# 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 – 1 in (25.4 mm)
- 0.0008%/°F temp. effect on output

## STANDARD CONFIGURATION




**Model MB** (Shown)

## OPTIONS

- Cable length
- Standardized output
- CU.S.tom calibration
- Add connector to cable
- Special Temperature range
- Transducer Electronic Data Sheet (TEDS)

## CONNECTOR OPTIONS

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

## ACCESSORIES

- Instrumentation

## Specifications

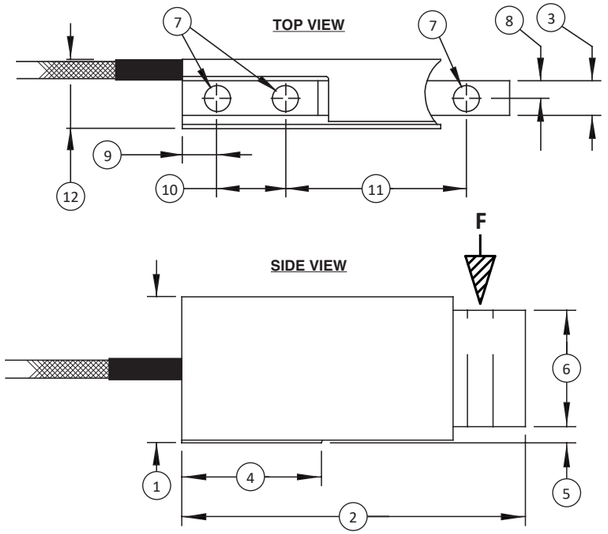
| ACCURACY – (MAX ERROR) | | |
|---|---|---|
| Nonlinearity – %FS | | ±0.03 |
| Hysteresis – %FS | | ±0.02 |
| Nonrepeatability – %RO | | ±0.01 |
| Creep, in 20 min – % | | ±0.025 |
| **TEMPERATURE** | | |
| Compensated Range | °F | 0 to +150 |
| | °C | +32 to +65.56 |
| Operating Range | °F | -65 to +200 |
| | °C | -53.89 to + 93.33 |
| Effect On Output – % / °F MAX | | ±0.0008 |
| Effect On Zero – %RO / °F MAX | | ±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 |

**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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

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




## 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) | 1.01 | 25.7 | 1.01 | 25.7 | 1.01 | 25.7 | 1.01 | 25.7 | 1.01 | 25.7 | 1.01 | 25.7 | 1.02 | 25.9 |
| (2) | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 |
| (3) | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.5 | 12.8 |
| (4) | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 |
| (5) | 0.14 | 3.6 | 0.11 | 2.8 | 0.15 | 3.8 | 0.14 | 3.6 | 0.13 | 3.3 | 0.1 | 2.5 | 0.12 | 3.0 |
| (6) | 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 |
| (7) | 0.17 | 4.3 | 0.17 | 4.3 | 0.17 | 4.3 | 0.17 | 4.3 | 0.17 | 4.3 | 0.17 | 4.3 | 0.17 | 4.3 |
| (8) | 0.13 | 3.3 | 0.13 | 3.3 | 0.13 | 3.3 | 0.13 | 3.3 | 0.13 | 3.3 | 0.13 | 3.3 | 0.25 | 6.4 |
| (9) | 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 |
| (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) | 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 |
| (12) | 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 |

Catalog 2019 06-15-2020

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



# 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 – %RO / °F MAX | | ±0.0008 |
| Effect on Zero – %RO / °F MAX | | ±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
- CU.S.tom calibration
- Add connector to cable
- Special Temperature range
- Transducer Electronic Data Sheet (TEDS)

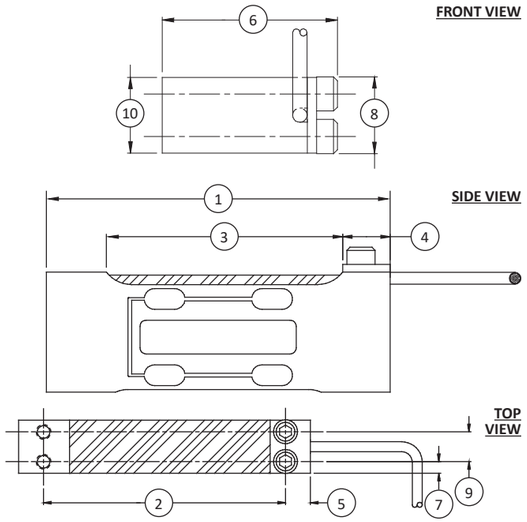
## CONNECTOR OPTIONS

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

## 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

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

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

## FEATURES & BENEFITS

- Capacities from 2.5 to 10 lbf (5 to 100 N)
- Proprietary Interface Temperature compensated strain gages
- 10X overload protection
- Low height – 1 in (25.4 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 | +32 to +65.6 |
| Operating Range | °F | -65 to +200 |
| | °C | -53.9 to +93.3 |
| Effect on Output – % / °F MAX | | ±0.0008 |
| Effect on Zero – %RO / °F MAX | | ±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 | |
| | 100 N | ±500 |
| Deflection @RO | in | 0.005 |
| | mm | 0.13 |
| Material | | Aluminum |

## OPTIONS

- Cable length
- Standardized output
- CU.S.tom calibration
- Add connector to cable
- Special Temperature range
- Transducer Electronic Datasheets (TEDS)

## CONNECTOR OPTIONS

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

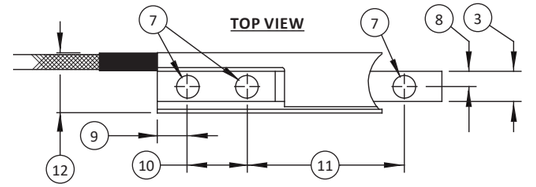
## ACCESSORIES

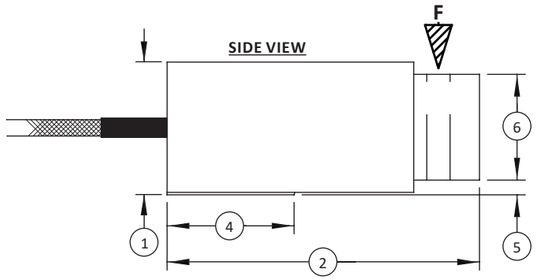
- Instrumentation

## STANDARD CONFIGURATION




**Model MBP** (Shown)




***Notes:***
***F indicates load Direction***
**** 5N Capacity: 1.50 (38.10)***

## Dimensions

| See Drawing | CAPACITY | |
|---|---|---|
| | U.S. (lbf) | Metric (N) |
| | 2.5, 5, 10 | *5, 10, 20, 50, 100 |
| | in | mm |
| (1) | 1.01 | 25.7 |
| (2) | 2.38 | 60.5 |
| (3) | 0.25 | 6.4 |
| (4) | 0.97 | 24.6 |
| (5) | 0.14 | 3.6 |
| (6) | 0.75 | 19.1 |
| (7) | 0.17 | 4.3 |
| (8) | 0.13 | 3.3 |
| (9) | 0.25 | 6.4 |
| (10) | 0.50 | 12.7 |
| (11) | 1.31 | *33.3 |
| (12) | 0.50 | 12.7 |





# MSC SMALL DIAMETER HIGH CAPACITY LOAD BUTTON (U.S. & METRIC)

## FEATURES & BENEFITS

- Proprietary Interface Temperature compensated strain gages
- Small compact design
- Environmentally sealed
- Low deflection

## SPECIFICATIONS

| | | |
|---|---|---|
| **ACCURACY – (MAX ERROR)** | | |
| Nonlinearity – %FS | | ± 0.5 |
| Hysteresis – %FS | | ± 0.5 |
| Nonrepeatability – %RO | | ± 0.10 |
| Creep, in 20 min – % | | ± 0.15 |
| **TEMPERATURE** | | |
| Compensated Range | °F | +40 to +140 |
| | °C | +5 to +60 |
| Operating Range | °F | -40 to +175 |
| | °C | -40 to +80 |
| Effect on Output – % MAX | °F | ±0.2 |
| | °C | ±0.005 |
| Effect on Zero – %RO MAX | °F | ±0.5 |
| | °C | ±0.002 |
| **ELECTRICAL** | | |
| Rated Output – mV/V (Nominal) ± % | | 2 +40/-20 |
| Zero Balance – %RO | | ±2 |
| Bridge Resistance – Ohm (Nominal) | | 700 |
| Excitation Voltage – VDC MAX | | 15 |
| Insulation Resistance – Megohm | | 5000 |
| **MECHANICAL** | | |
| Calibration | | Compression |
| Safe Overload – %CAP | | 150 |
| Material | | Stainless steel |

## OPTIONS

- Cable length
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Starndard output
- Add connector to cable
- Special Temperature range

## CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

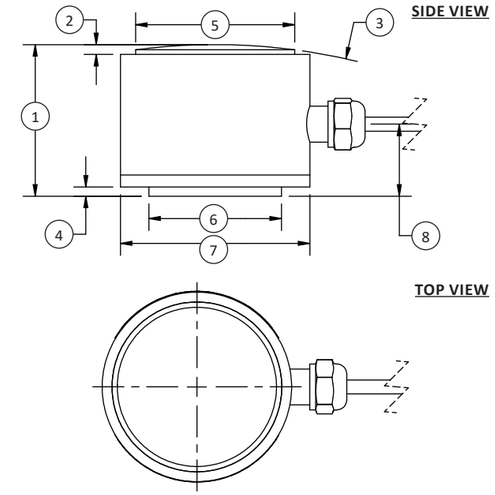
## ACCESSORIES

- Instrumentation

## STANDARD CONFIGURATION




**Model MSC** (Shown)




## DIMENSIONS

| See Drawing | CAPACITY | |
|---|---|---|
| | U.S. (lbf) | Metric (N) |
| | 15K, 20K, 30K | 65K, 90K, 130K |
| | in | mm |
| (1) | 1.00 | 25.4 |
| (2) | 0.06 | 1.52 |
| (3) | R 4.0 ±0.5 | R 101.6 ±13 |
| (4) | 0.06 | 1.52 |
| (5) | 1.05 | 26.67 |
| (6) | 0.875 | 22.23 |
| (7) | 1.25 | 31.75 |
| (8) | 0.5 ±0.1 | 12.32 |

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

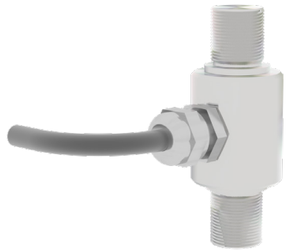
## FEATURES & BENEFITS

- 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 / °C | | ±0.02 |
| Effect on Output – %RO / °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
- CU.S.tom calibration
- Cable length
- Transducer Electronic Data Sheet (TEDS)

## CONNECTOR OPTIONS

- (3 m) 10 ft integral cable

## ACCESSORIES

- Instrumentation

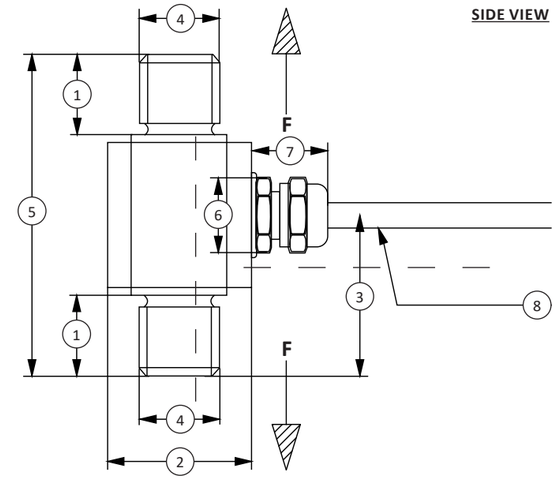
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* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



interface
FORCE MEASUREMENT SOLUTIONS

# 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

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# 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

## Specifications

| 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 – % | °F | ±0.005 |
| | °C | ±0.01 |
| Effect on Zero – %RO | °F | ±0.005 |
| | °C | ±0.01 |
| **ELECTRICAL** | | |
| Rated Output – mV/V (nominal) | | 2 |
| Zero Balance – %RO | | ±3 |
| Bridge Resistance – Ohm (nominal) | | 350 |
| Excitation Voltage – VDC MAX | | 15 |
| **MECHANICAL** | | |
| Calibration | | T & C |
| Safe Overload – %RO | | 150 |
| Deflection | in | 0.001 |
| | mm | 0.025 |
| Material | | Stainless steel (1K lbf or 5 kN aluminum) |

## STANDARD CONFIGURATION



**Model REC-5K** (Shown)

## OPTIONS

- 5K-50K: MS3102E-14-5P connector optional
- Standardized output
- Special Temperature range
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Standardized output

## ACCESSORIES

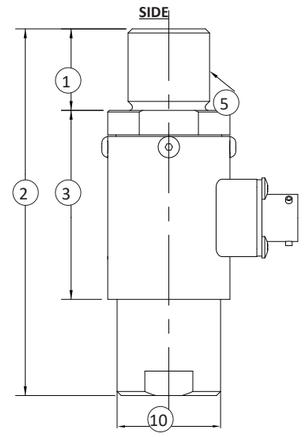
- Instrumentation
- Mating connector

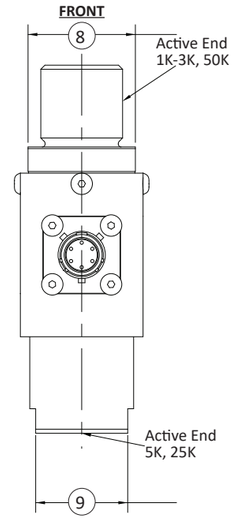
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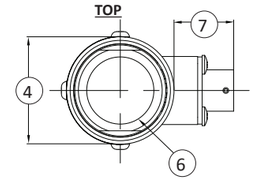


FORCE MEASUREMENT SOLUTIONS

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 |

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

## FEATURES & BENEFITS

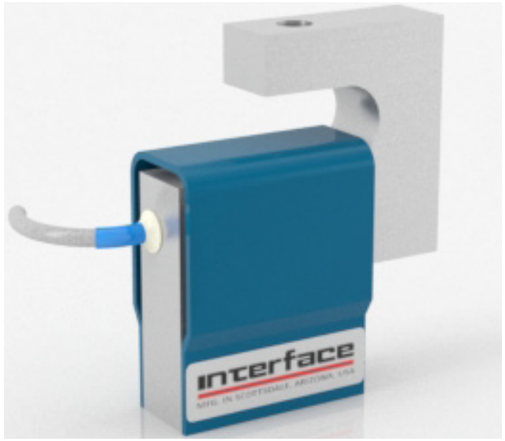
- Proprietary Interface Temperature compensated strain gages
- High performance
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Lowest creep – 0.025%
- Tension and compression

## 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 – % MAX | °F | ±0.0008 |
| | °C | ±0.0015 |
| Effect on Zero – %RO / °C MAX | °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 torsion – %CAP | | ±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** (shown)

## OPTIONS

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

## ACCESSORIES

- Load button
- Mounting hardware
- Instrumentation

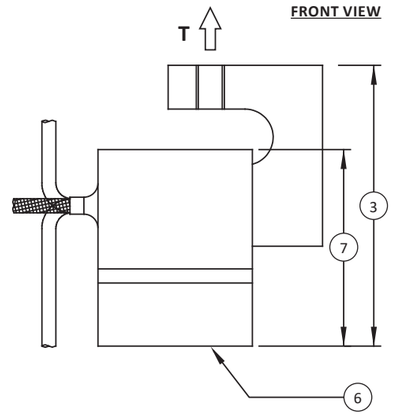
## CONNECTOR OPTIONS

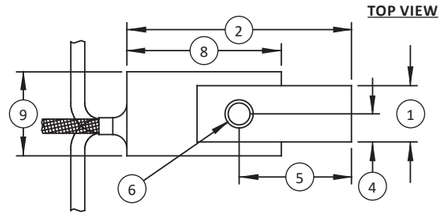
- 5 ft (1.5 m) integral cable

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# SM 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) |
| | 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 |

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# 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 – % MAX | °F | ±0.0008 |
| | °C | ±0.0014 |
| Effect on Zero – % RO / °C MAX | °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
- CU.S.tom calibration
- Add connector to cable
- Special Temperature range
- Transducer Electronic Data Sheet (TEDS)

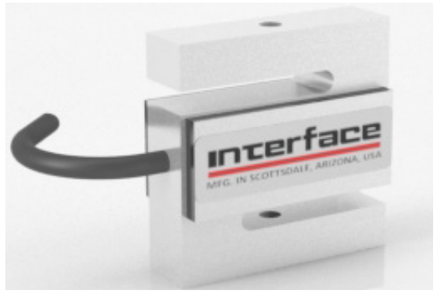
## ACCESSORIES

- Instrumentation

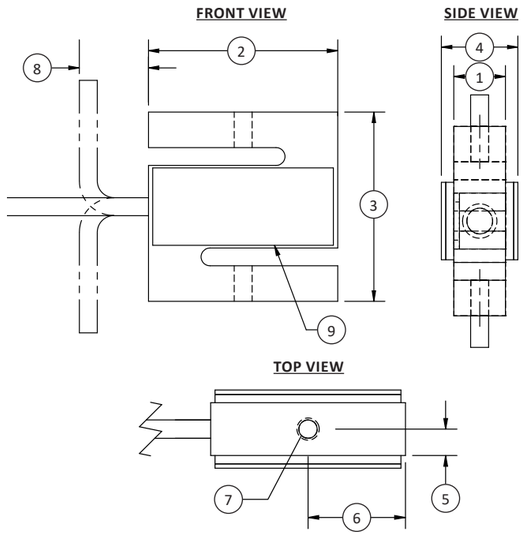
## CONNECTOR OPTIONS

- 1.5 m (5 ft) integral cable

## 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 – % | °F | ±0.0008 | |
| | °C | ±0.0015 | |
| Effect on Zero – % RO | °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<br>22 - 45 N | 800 | |
| | 25 - 2K lbf<br>110 - 9K N | 150 | |

| 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)<br>22 - 1.3K (N) | Aluminum |
| | 500 - 2K (lbf)<br>2.2K - 9K (N) | Stainless Steel |

## STANDARD CONFIGURATION




**Model SML** (Shown)

## FEATURES & BENEFITS

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

## OPTIONS

- Cable length
- Standarized output
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Add connector to cable
- Special Temperature range

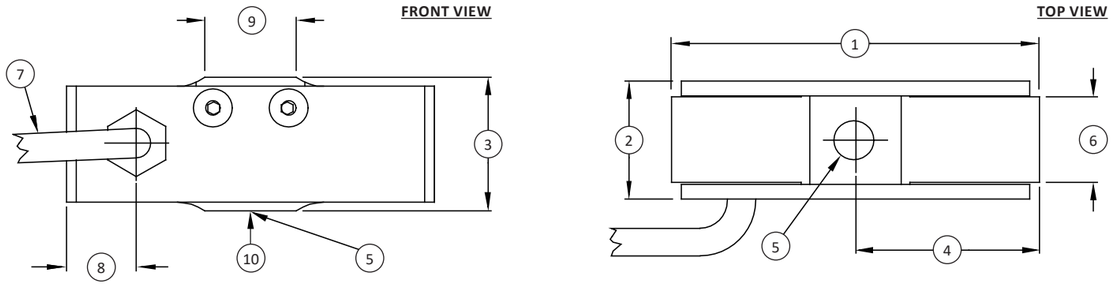
## CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

## ACCESSORIES

- Instrumentation

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




## 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 | | | | | | | |

Catalog 2019 06-15-2020



# 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 – % MAX | °F | ±0.0010 |
| | °C | ±0.0018 |
| Effect on Zero – %RO MAX | °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<br>5, 10, 25, 50, 100, 250 N | 1000 |
| | 112, 225, 450 lbf<br>500, 1000, 2000 N | 500 |

| NATURAL FREQUENCY/DEFLECTION | | | | |
|---|---|---|---|---|
| lbf | N | Deflection in | Deflection mm | Nat. Freq. (Hz) |
| 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
- CU.S.tom calibration
- Transducer Electronic Data Sheets (TEDS)
- Add connector to cable
- Special Temperature range

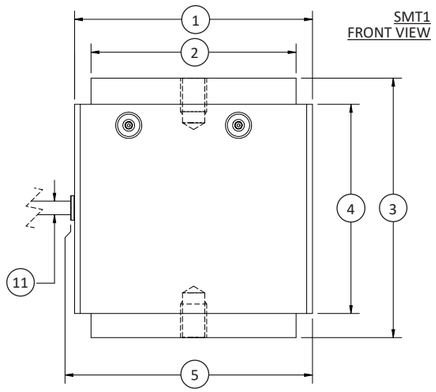
## ACCESSORIES

- Instrumentation
- Mounting hardware

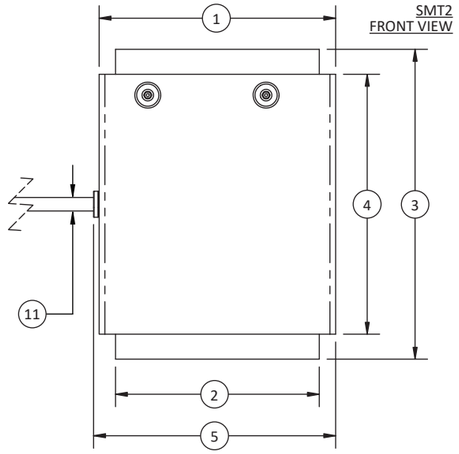
## CONNECTION OPTIONS

- 5 ft (1.5 m) integral cable

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

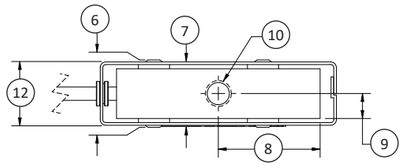


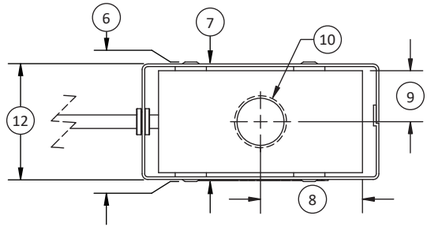

SMT1
FRONT VIEW




SMT2
FRONT VIEW

SMT1
TOP VIEW




SMT2
TOP VIEW

## 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 |





interface
FORCE MEASUREMENT SOLUTIONS

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

## FEATURES & BENEFITS

- Capacity 5, 25, 50 lbf (20, 100, 200 N)
- Can be U.S.ed 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 – % MAX | °F | ±0.005 |
| | °C | ±0.010 |
| Effect on Zero – %RO MAX | °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) 20 (N) | Aluminum |
| | 25 - 50 (lbf) 100 - 200 (N) | Alloy Steel |

## STANDARD CONFIGURATION



**Model SMTM** (Shown)

## OPTIONS

- Cable length
- CU.S.tom calibration
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Add connector to cable
- Special Temperature range

## ACCESSORIES

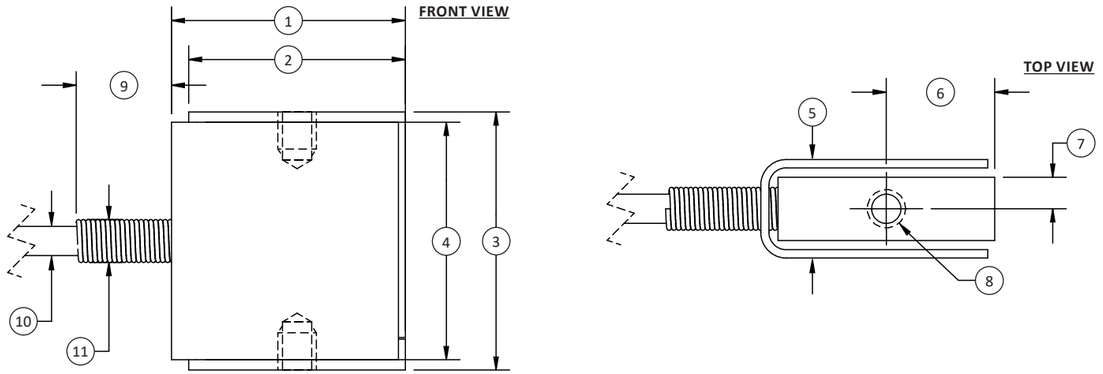
- Instrumentation
- Mounting hardware

## CONNECTION OPTIONS

- 5 ft (1.5 m) integral cable

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

# 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 |





# 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 – % / °F MAX | | ±0.008 | |
| Effect on Zero – %RO / °F MAX | | ±0.15 | |
| **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 in | Deflection mm | Nat. Freq. (Hz) |
| 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** (Shown)

## OPTIONS

- Standardized output
- Cable length
- Transducer Electronic Data Sheet (TEDS)
- Special Temperature range
- CU.S.tom calibration
- Add connector to cable

## ACCESSORIES

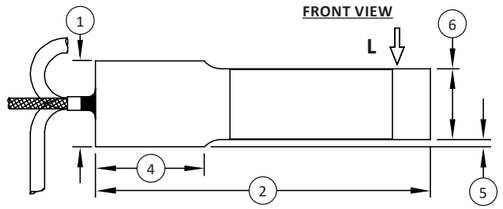
- Instrumentation

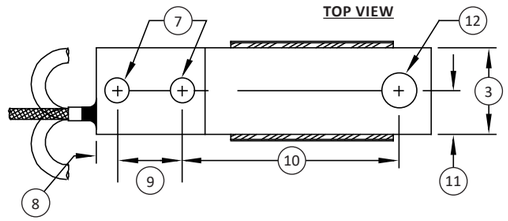
## CONNECTOR OPTIONS

- 10 ft (3 m) integral cable

Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

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




*Notes:*
** L indicates load direction*

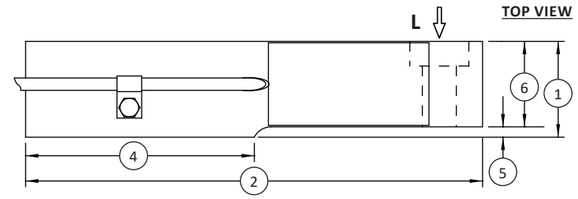
## DIMENSIONS

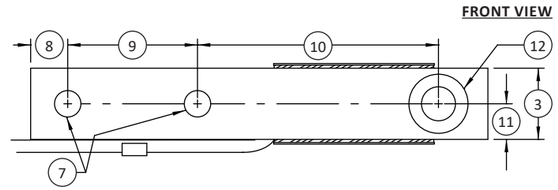
| See Drawing | CAPACITY | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) |
| | 50 | 222 | 100 | 445 | 250 | 1.11K | 500 | 2.22K | 1K | 4.45K |
| | in | mm | in | mm | in | mm | in | mm | in | mm |
| (1) | 0.98 | 24.9 | 0.98 | 24.9 | 0.98 | 24.9 | 1.00 | 25.4 | 1.50 | 38.1 |
| (2) | 2.38 | 60.5 | 2.38 | 60.5 | 2.38 | 60.5 | 3.88 | 98.6 | 5.00 | 127 |
| (3) | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 1.00 | 25.4 | 1.00 | 25.4 |
| (4) | 0.97 | 24.6 | 0.97 | 24.6 | 0.97 | 24.6 | 1.25 | 31.8 | 1.75 | 44.5 |
| (5) | 0.11 | 2.8 | 0.15 | 3.9 | 0.11 | 2.8 | 0.09 | 2.3 | 0.10 | 2.5 |
| (6) | 0.82 | 20.8 | 0.73 | 18.4 | 0.82 | 20.8 | 0.82 | 20.8 | 1.36 | 34.5 |
| (7) | Ø0.17 | Ø4.3 | Ø0.17 | Ø4.3 | Ø0.17 | Ø4.3 | Ø0.28 | Ø7.1 | Ø0.41 | Ø10.3 |
| (8) | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.38 | 9.7 |
| (9) | 0.50 | 12.7 | 0.50 | 12.7 | 0.50 | 12.7 | 0.75 | 19.1 | 1.00 | 25.4 |
| (10) | 1.31 | 33.3 | 1.31 | 33.3 | 1.31 | 33.3 | 2.50 | 63.5 | 3.25 | 82.6 |
| (11) | 0.25 | 6.4 | 0.25 | 6.4 | 0.25 | 6.4 | 0.50 | 12.7 | 0.50 | 12.7 |
| (12) | Ø0.17 | Ø4.3 | Ø0.17 | Ø4.3 | Ø0.17 | Ø4.3 | Ø0.40 | Ø10.2 | Ø0.40 | Ø10.2 |

Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.




# 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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

# 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 hoU.S.ing 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 – % / °F MAX | | ±0.0008 |
| Effect on Zero – %RO / °F MAX | | ±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
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Add connector to cable
- Special Temperature range

## ACCESSORIES

- Instrumentation

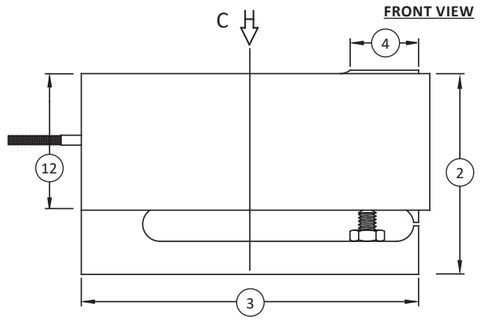
## CONNECTOR OPTIONS

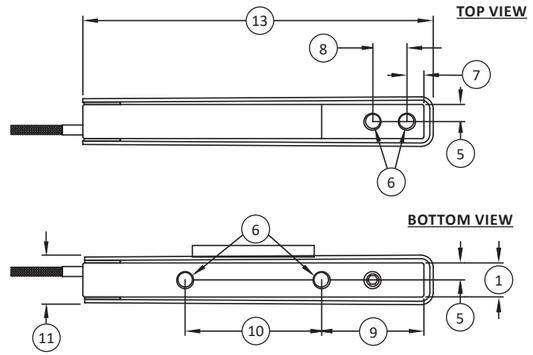
- 5 ft (1.5 m) integral cable

* Consult factory for more technical information
Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



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 |

Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

# 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 – % / °F MAX | | ±0.0008 |
| Effect on Zero – %RO / °F MAX | | ±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

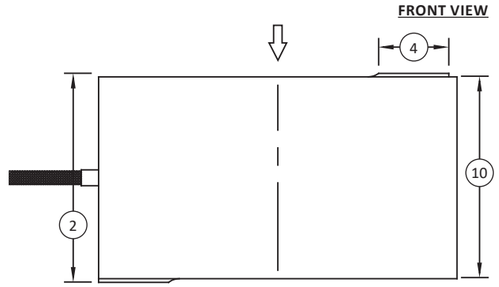
* Consult factory for more technical information.
Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

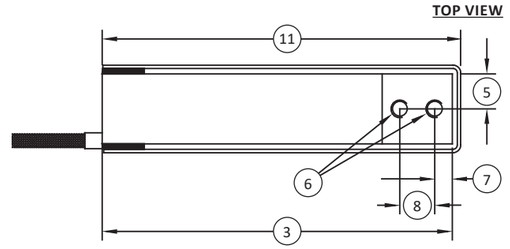


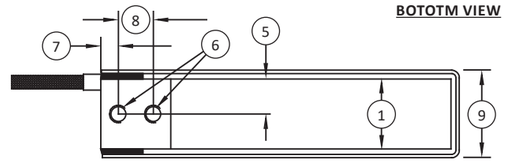


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SPI PLATFORM HIGH CAPACITY SCALE LOAD CELL (U.S. & METRIC)




## 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 |

Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

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# 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

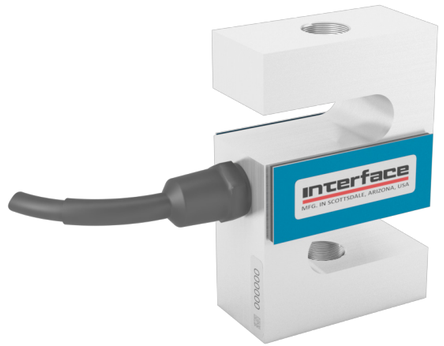
## SPECIFICATIONS

| | | |
|---|---|---|
| **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 – %MAX | °F | ±0.0008 |
| | °C | ±0.0015 |
| Effect On Zero – %RO MAX | °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** | | |
| Calibration | | Tension |
| Safe Overload – % CAP | | 150 |

| **NATURAL FREQUENCY/DEFLECTION** | | | | |
|---|---|---|---|---|
| lbf | N | Deflection in | Deflection mm | Nat. Freq. (Hz) |
| 50 | 200 | 0.003 | 0.08 | 1500 |
| 100 | 500 | 0.004 | 0.1 | 1850 |
| 150 | 500 | 0.004 | 0.1 | 1850 |
| 250 | 1K | 0.006 | 0.15 | 2350 |
| 500 | 2K | 0.005 | 0.13 | 2150 |
| 750 | N/A | 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 |

| | | |
|---|---|---|
| Material | 50 - 1K lbf | Aluminum |
| | 200 - 5K N | |
| | 2K - 5K lbf | Alloy steel |
| | 10K - 20K N | |

## STANDARD CONFIGURATION




**MODEL SSM/SSM2** (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

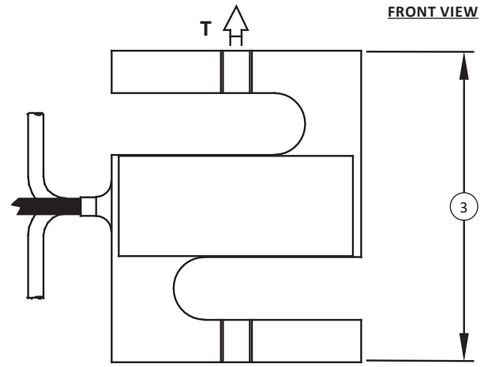
## CONNECTOR OPTIONS

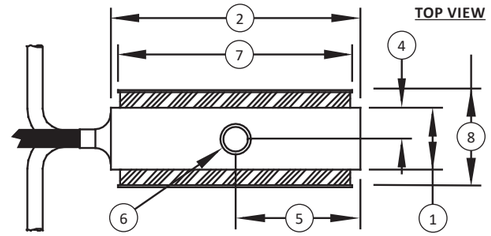
- 10 ft (3 m) integral cable

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



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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) | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) | SSM2 – 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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

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

## FEATURES & BENEFITS

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

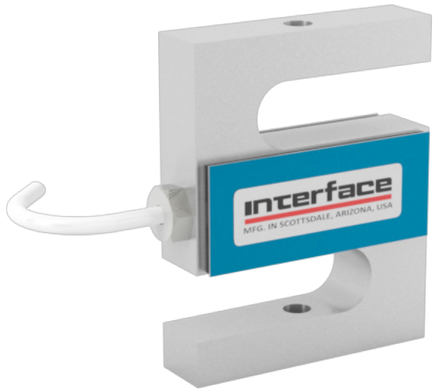
## SPECIFICATIONS

| | | |
|---|---|---|
| **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 – % MAX | °F | ±0.0008 |
| | °C | ±0.0015 |
| Effect on Zero – %RO MAX | °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 in | Deflection mm | Nat. Freq. (Hz) |
|---|---|---|---|---|
| 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

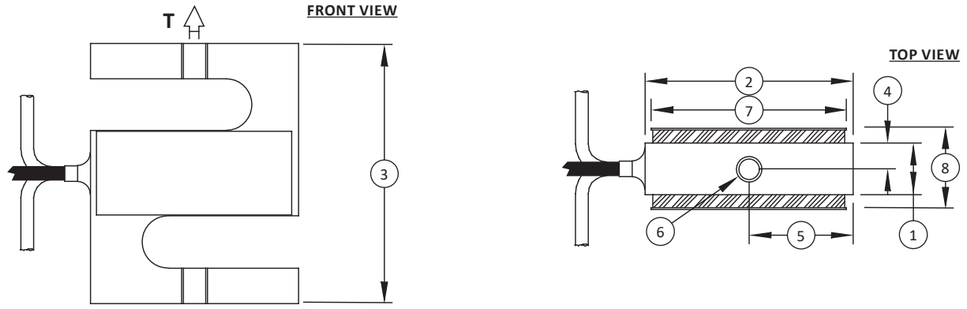
## CONNECTOR OPTIONS

- 15 ft (4.5 m) integral cable



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




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

## DIMENSIONS

| See Drawing | CAPACITY | |
|---|---|---|
| | U.S. (lbf) | Metric (N) |
| | 50, 100, 150, 250, 500, 750, 1K, 2K, 3K, 5K | 200, 500, 1K, 2K, 5K, 10K, 20K |
| | in | mm |
| (1) | 0.50 | 12.7 |
| (2) | 2.00 | 50.8 |
| (3) | 2.50 | 63.5 |
| (4) | 0.25 | 6.40 |
| (5) | 1.00 | 25.4 |
| (6) | ¼-28 UNF-2B | M6 x 1-6H |
| (7) | 1.88 | 47.8 |
| (8) | 0.72 | 18.3 |

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

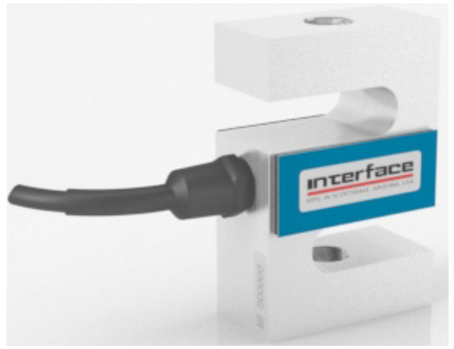
## FEATURES & BENEFITS

- 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 – % MAX | °F | ±0.0008 |
| | °C | ±0.0015 |
| Effect on Zero – %RO MAX | °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<br>100 - 2.5K N | Aluminum |
| | 1K - 2.5K lbf<br>5K - 10K N | Alloy steel |

## 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

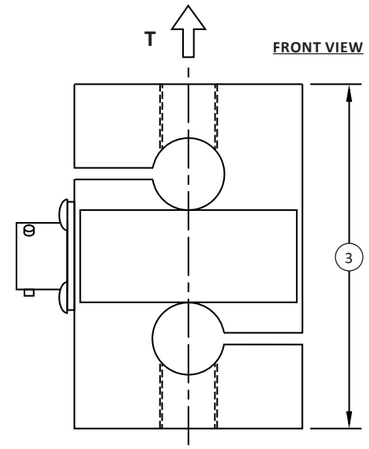
## CONNECTOR OPTIONS

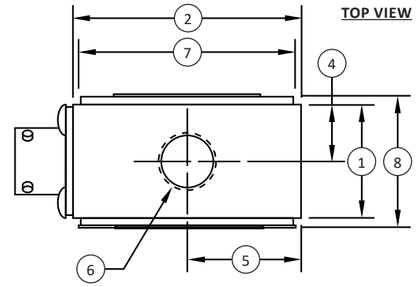
- 10 ft (3 m) integral cable





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 | ⅜-18 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 |

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# SSMH SEALED S-TYPE LOAD CELL FOR HAZARDOU.S. ENVIRONMENTS (U.S. &

## FEATURES & BENEFITS

- Tension and compression
- Environmentally sealed IP65
- Certified for U.S.e in hazardoU.S. locations when installed per supplied instructions
- High Temperature rated, up to 290°F (143°C)
- Ex ib IIC T4 Gb (-40° < Ta < 112°C)
- Ex ib IIIC T160°C Db (-40° < Ta < 143°C)
- 15 ft (5 m) cable

## SPECIFICATIONS

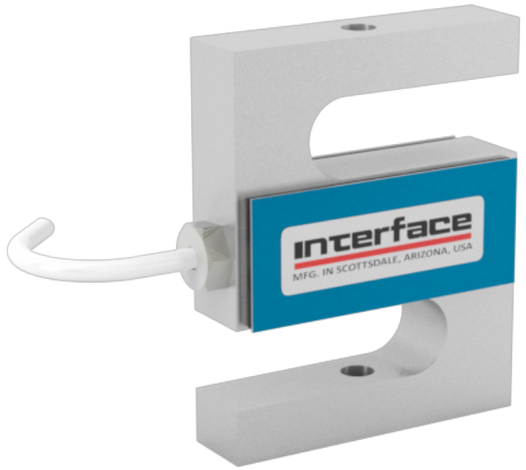
| | | |
|---|---|---|
| **ACCURACY – (MAX ERROR)** | | |
| Nonlinearity – %FS | | ±0.05 |
| Hysteresis – %FS | | ±0.03 |
| Nonrepeatability – %RO | | ± 0.02 |
| Creep, in 20 min – % | | ± 0.025 |
| **TEMPERATURE** | | |
| Compensated Range | °F | 0 to +150 |
| | °C | -15 to +65 |
| Operating Range | °F | -40 to +290 |
| | °C | -40 to +143 |
| Effect on Zero – %RO MAX | °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** | | |
| Calibration | | Tension |
| Safe Overload – %CAP | | 150 |

**NATURAL FREQUENCY/DEFLECTION**

| lbf | N | Deflection in | Deflection mm | Nat. Freq. (Hz) |
|---|---|---|---|---|
| 50 | 200 | 0.003 | 0.08 | 1500 |
| 100 | 500 | 0.004 | 0.1 | 1850 |
| 150 | 700 | 0.004 | 0.1 | 2000 |
| 250 | 1K | 0.006 | 0.15 | 2350 |
| 500 | 2K | 0.005 | 0.13 | 2150 |
| 750 | 3K | 0.005 | 0.13 | 2350 |
| 1K | 5K | 0.005 | 0.13 | 3350 |
| 2K | 10K | 0.005 | 0.13 | 2400 |
| 3K | 15K | 0.005 | 0.13 | 3000 |
| 5K | 20K | 0.005 | 0.13 | 2520 |

| | | |
|---|---|---|
| Material | 50 to 1K lbf | Aluminum |
| | 200 to 5K N | |
| | 2K to 5K lbf | Alloy steel |
| | 10K to 20K N | |

## STANDARD CONFIGURATION




**Model SSMH** (Shown)

| INTRINSIC SAFETY ENTITY PARAMETERS | |
|---|---|
| Ui | 20 V |
| Ii | 460 mA |
| Pi | 1.3 W |
| Ci* | 15 nF |
| Li* | 51 µH |

***With up to 300 ft (100 m) cable***

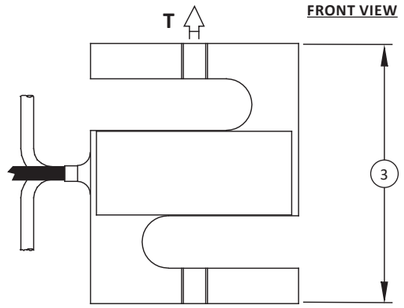
## OPTIONS

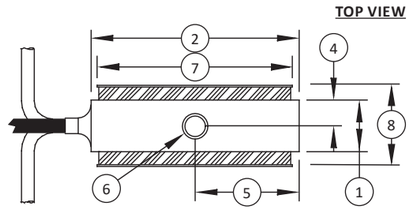
- Cable length
- CU.S.tom calibration
- Special Temperature range



FORCE MEASUREMENT SOLUTIONS

SSMH SEALED S-TYPE LOAD CELL FOR HAZARDOU.S. ENVIRONMENTS (U.S. &




***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) |
| | 50, 100, 150, 250 | 200 , 500, 700, 1K | 500, 750, 1K,2K, 3K | 2K, 3K, 5K, 10K, 15K | 5K | 20K |
| | in | mm | in | mm | in | mm |
| **(1)** | 0.50 | 12.7 | 1.00 | 25.4 | 1.50 | 38.1 |
| **(2)** | 2.00 | 50.8 | 2.00 | 50.8 | 2.50 | 63.5 |
| **(3)** | 2.50 | 63.5 | 3.00 | 76.2 | 3.50 | 88.9 |
| **(4)** | 0.25 | 6.40 | 0.50 | 12.7 | 0.75 | 19.1 |
| **(5)** | 1.00 | 25.4 | 1.00 | 25.4 | 1.25 | 31.8 |
| **(6)** | 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 | 2.38 | 60.5 |
| **(8)** | 0.70 | 17.8 | 1.20 | 35.0 | 1.72 | 43.7 |

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

## FEATURES & BENEFITS

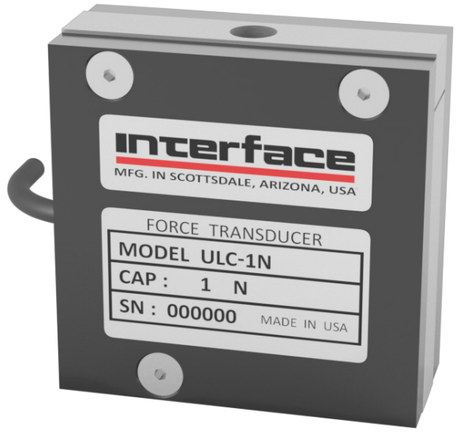
- Proprietary Interface Temperature compensated strain gages
- Highest performance gram cell in the world
- Overload protected
- Safe side load overload to 5X capacity
- Low extraneoU.S. load sensitivity
- Low Temperature effect on zero (0.002%/°F)
- Capacity down to 50 grams
- Tension and compression

## SPECIFICATIONS

| ACCURACY – (MAX ERROR) | | |
|---|---|---|
| Nonlinearity – %FS | | ±0.05 |
| Hysteresis – %FS | | ±0.05 |
| Nonrepeatability – %RO | | ±0.05 |
| Creep, in 20 min – % | (0.5 N) (0.11 lbf) | ±0.1 |
| | (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 – % MAX | °C | ±0.002 |
| | °F | ±0.001 |
| Effect on Zero – %RO MAX | °C | ±0.004 |
| | °F | ±0.002 |
| **ELECTRICAL** | | |
| Rated Output – mV/V (Nominal) | (0.5 N) (0.11 lbf) | ±1.5 |
| | (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 mm | Deflection in | Nat. Freq. (Hz) |
| 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)
- CU.S.tom calibration
- Standardized output
- Special Temperature range

## ACCESSORIES

- Instrumentation

## CONNECTOR OPTIONS

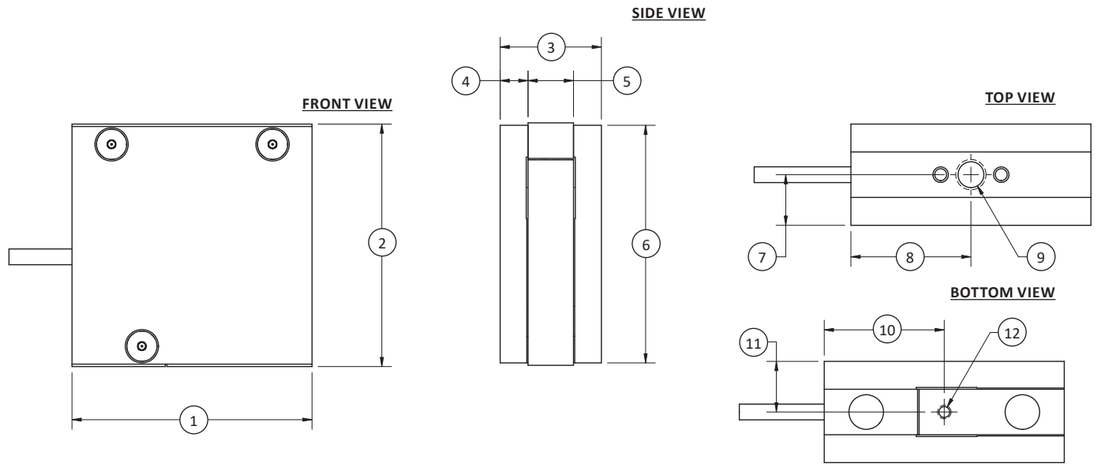
- 1.5 m (5 ft) cable

Catalog 2019 06-15-2020

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.




# 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***


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.

# 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 - 50K | 100K | 200K |
| | Metric (kN) | 65 - 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 – % | °F | ±0.004 | ±0.005 | ±0.005 |
| | °C | ±0.0072 | ±0.009 | ±0.009 |
| Effect on Zero – %RO | °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
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Amplifier

## ACCESSORIES

- Instrumentation
- Interconnect cable

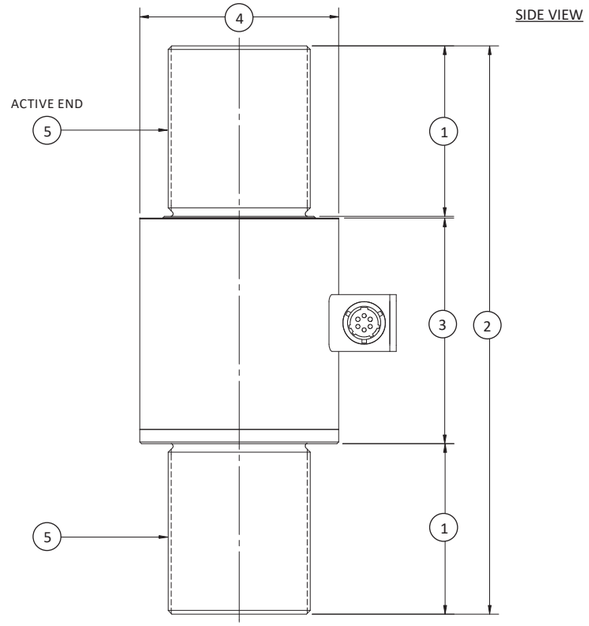
## CONNECTOR OPTIONS

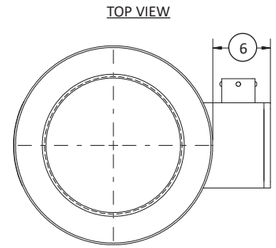
- Integral cable
- PTWIH-10-6P Connector



interface
FORCE MEASUREMENT SOLUTIONS

# 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 -50K | 65-220 | 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 |

# 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 – % / °F MAX | | ±0.002 |
| Effect on Zero – %RO / °F MAX | | ±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 |
| Safe Overload – %CAP | | 150 |
| Weight | lbs | 0.05 - 0.12 |
| | g | 22.7 - 54.4 |
| Material | | Stainless steel |

## OPTIONS

- Cable length
- Special calibration
- Standardized output
- Special Temperature range
- CU.S.tom calibration
- Add connector to cable
- Submersible
- Transducer Electronic Data Sheet (TEDS)

## ACCESSORIES

- Instrumentation

## CONNECTOR OPTIONS

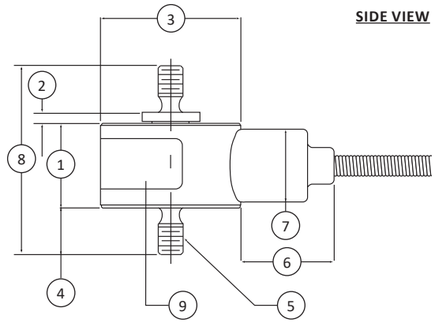
- 5 ft (1.5 m) integral cable

## STANDARD CONFIGURATION




**Model WMC** (Shown)

**SIDE VIEW**




## DIMENSIONS

| See Drawing | CAPACITY | | | | | |
|---|---|---|---|---|---|---|
| | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) | U.S. (lbf) | Metric (N) |
| | 5 - 10 | 22 - 45 | 25 - 100 | 110 - 450 | 250 - 500 | 1100 - 2200 |
| | in | mm | in | mm | in | mm |
| (1) | 0.45 | 11.4 | 0.52 | 13.2 | 0.53 | 13.4 |
| (2) | 0.06 | 1.5 | 0.03 | 0.8 | 0.03 | 0.8 |
| (3) | Ø0.75 | Ø19.1 | Ø1.00 | Ø25.4 | Ø1.00 | Ø25.4 |
| (4) | 0.25 TYP | 6.4 TYP | 0.25 TYP | 6.4 TYP | 0.38 TYP | 9.7 TYP |
| (5) | 6-32 UNC M4X0.7 TYP | | 10-32 UNF M5X0.8 TYP | | ¼-28 UNF M6X1 TYP | |
| (6) | 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 |
| (8) | 1.01 | 25.7 | 1.05 | 26.7 | 1.32 | 33.5 |

| DEFLECTION @ RO | | | | | | | |
|---|---|---|---|---|---|---|---|
| lbf | N | lbf | N | lbf | N | lbf | N |
| 5 | 22 | 10 | 45 | 25 | 110 | 50 | 220 |
| in | mm | in | mm | in | mm | in | mm |
| 0.0012 | 0.030 | 0.0010 | 0.025 | 0.0014 | 0.036 | 0.0010 | 0.025 |

| DEFLECTION @ RO (CONTINUED) | | | | | |
|---|---|---|---|---|---|
| lbf | N | lbf | N | lbf | N |
| 100 | 450 | 250 | 1100 | 500 | 2200 |
| in | mm | in | mm | in | mm |
| 0.0007 | 0.018 | 0.0026 | 0.066 | 0.0025 | 0.064 |

Catalog 2019 06-15-2020



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

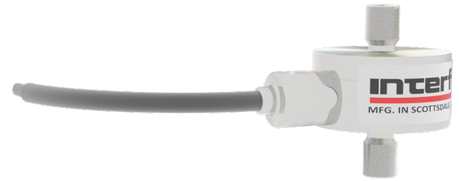
## FEATURES & BENEFITS

- 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 – % / °F MAX | | | ±0.002 |
| Effect on Zero – %RO / °F MAX | | | ±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 (Shown)**

## OPTIONS

- Cable length
- CU.S.tom calibration
- Standardized output
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)
- Standardized output
- Submersible
- Special Temperature range

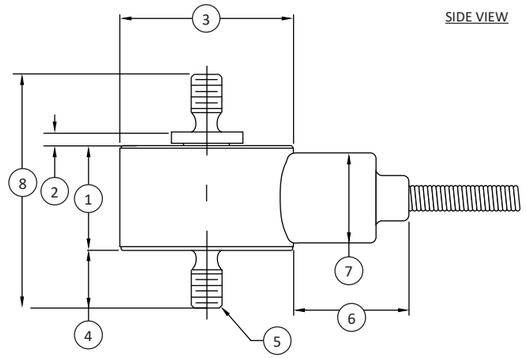
## ACCESSORIES

- Instrumentation

## CONNECTOR OPTIONS

- 5 ft. (1.5m) integral cable

# 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 |

Catalog 2019 06-15-2020



# 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 – % / °F MAX | | ±0.002 | |
| Effect on Zero – %RO / °F MAX | | ±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 | |
| Material | | Stainless steel | |

## OPTIONS

- Cable length
- Special calibration
- Standardized output
- Special Temperature range
- CU.S.tom calibration
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

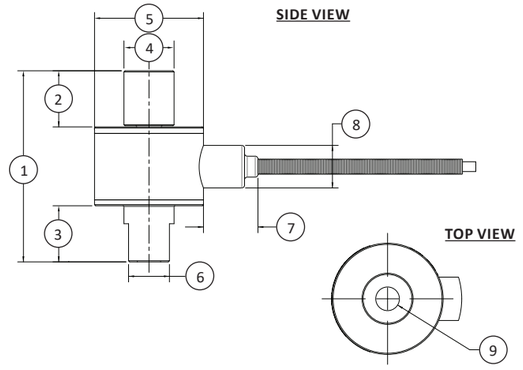
## ACCESSORIES

- 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

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric 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 – % / °F | | ±0.20 | |
| Effect on Zero – %RO / °F MAX | | ±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
- CU.S.tom calibration
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

## ACCESSORIES

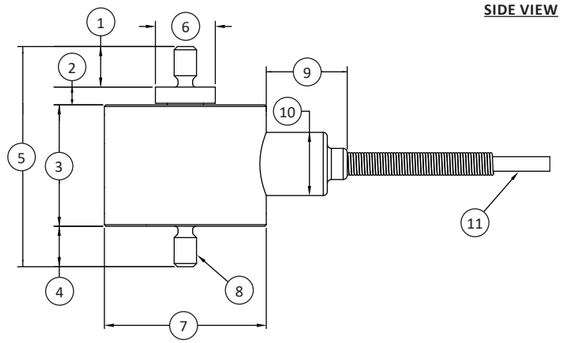
- Instrumentation

## 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

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



# Notes:

# Notes:

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

## FEATURES & BENEFITS

- High torsional stiffness
- ExtraneoU.S. 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 – % / °F – MAX | | ±0.002 |
| Effect on Zero – %RO / °F – MAX | | ±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 - 6K lbf-in | 1.0 |
| | 6.78 - 678 Nm | |
| | 10K - 100K lbf-in | 2.0 |
| | 1.13K - 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 | Stainless steel |
| | 27.1 - 11.3K Nm | |

## STANDARD CONFIGURATION




**MODEL 5330 (Shown)**

## PERFORMANCE PARAMETERS

| CAPACITY | | MAX THRU.S.T 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 |

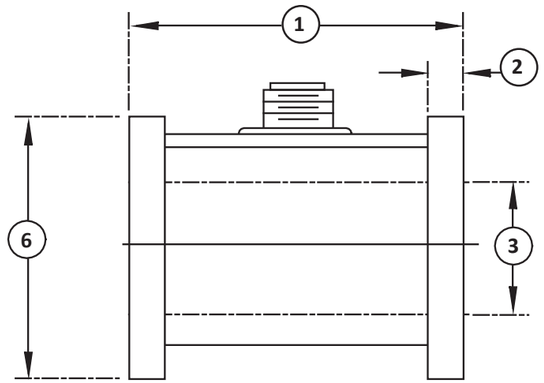
Catalog 2019 06-15-2020

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



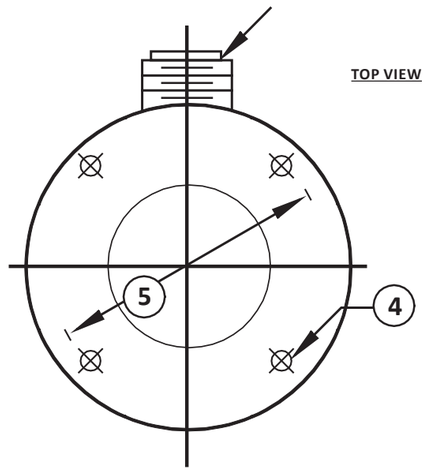
interface
FORCE MEASUREMENT SOLUTIONS
5330 HOLLOW FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

SIDE VIEW




MS 3102A - 14S - 6P
MATE SUPPLIED

TOP 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) |
| | 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 simultaneoU.S.ly***

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

# 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

## 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 – % / °F MAX | | ±0.002 |
| Effect on Zero – %RO / °F MAX | | ±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 |

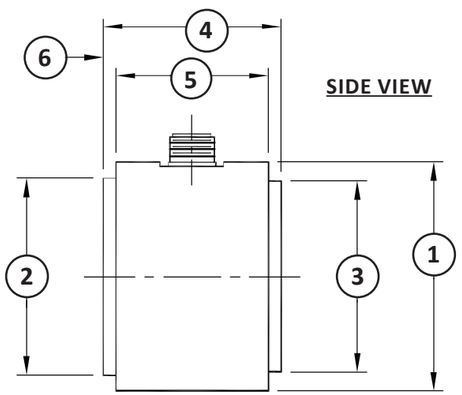
## STANDARD CONFIGURATION

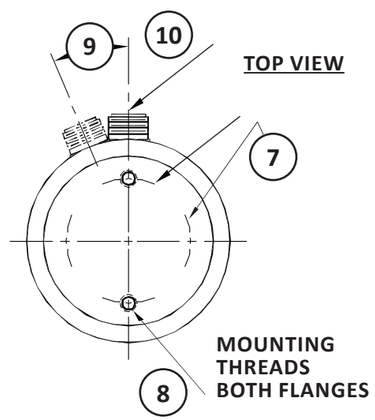



**MODEL 5350 (Shown)**

## 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 | |




* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



interface
FORCE MEASUREMENT SOLUTIONS
5350 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

| CAPACITY | | TORQUE OVERLOAD | | TORSIONAL STIFFNESS (FROM FLANGE FACE-TO-FACE) | | WEIGHT | | MAX THRU.S.T 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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

# 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

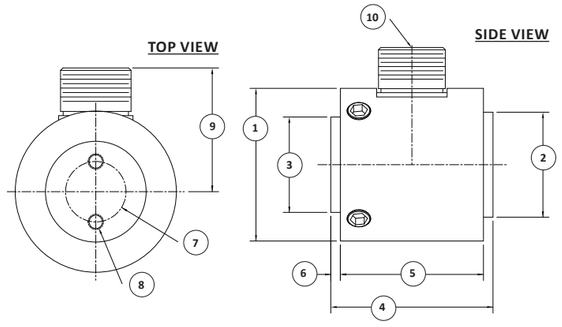
## SPECIFICATIONS

| 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 – % / °F MAX | | ±0.002 |
| Effect on Zero – %RO / °F MAX | | ±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 |

## STANDARD CONFIGURATION




**Model 5355** (Shown)




## 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 | |



interface
FORCE MEASUREMENT SOLUTIONS
5355 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

| CAPACITY | | TORQUE OVERLOAD | | TORSIONAL STIFFNESS (FROM FLANGE FACE-TO-FACE) | | WEIGHT | | MAX THRU.S.T 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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

# 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 5400** (Shown)

## Specifications

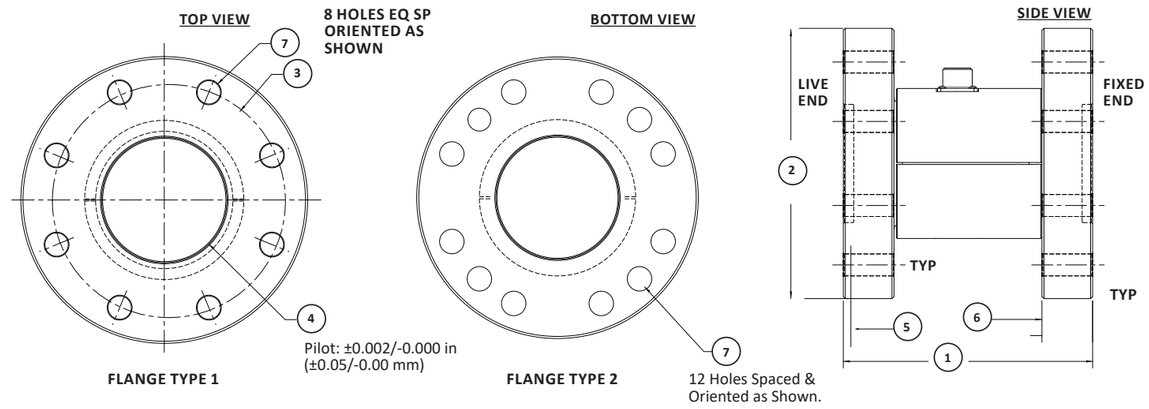
| PARAMETERS | | MODEL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5410 | | 5411 | | 5412 | | 5413 | | 5414 | |
| | | CAPACITY | | | | | | | | | |
| | | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | 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 MAX | °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 – % MAX | °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 | |





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FORCE MEASUREMENT SOLUTIONS

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




## 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) | 3.00 | 76.2 | 3.50 | 88.9 | 7.38 | 187.5 | 8.50 | 215.9 | 10.50 | 266.7 |
| (2) | 4.00 | 101.6 | 5.00 | 127.0 | 8.00 | 203.2 | 9.75 | 247.7 | 14.00 | 355.6 |
| (3) | 3.25 | 82.6 | 4.25 | 108.0 | 6.50 | 165.1 | 8.00 | 203.2 | 11.0 | 279.4 |
| (4) | 1.500 | 38.10 | 2.000 | 50.80 | 3.500 | 88.90 | 4.000 | 101.60 | 6.000 | 152.40 |
| (5) | 0.13 | 3.3 | 0.25 | 6.4 | 0.31 | 7.9 | 0.31 | 7.9 | 0.31 | 7.9 |
| (6) | 0.50 | 12.7 | 0.75 | 19.1 | 1.50 | 38.1 | 1.50 | 38.1 | 2.00 | 50.8 |
| (7) | 0.328 | 8.33 | 0.390 | 10.41* | 0.650 | 16.51 | 0.781* | 20.65 | 1.031 | 24.64* |
| Flange Type | 1 | 1 | 1 | 1 | 1 2 | 1 2 | 2 | 2 | 1 | 1 |
| Recommended mtg screw size – lbf-in/Nm | 5/16 - 24 | M8 x 1.25 | 3/8 - 24 | M10 x 1.5 | 3/8 - 18 | M16 x 2 | 3/4 - 16 | M20 x 2.5 | 1 - 12 | M24 x 3 |
| Recommended mtg torque – lbf-in/Nm | 300 | 34 | 600 | 68 | 2400 | 270 | 4400 | 500 | 9000 | 1000 |

**** Metric Model 5411, 5413, & 5414 have larger mounting holes than their equivalents to accommodate Standard Metric***

** Metric Model 5411, 5413 & 5414 have larger mounting holes than their equivalents to accomodate Standard Metric fasteners*

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

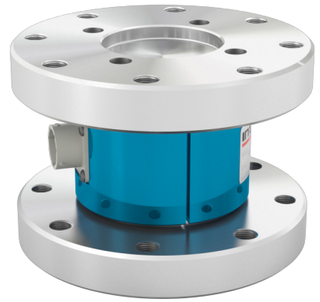
## FEATURES & BENEFITS

- 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

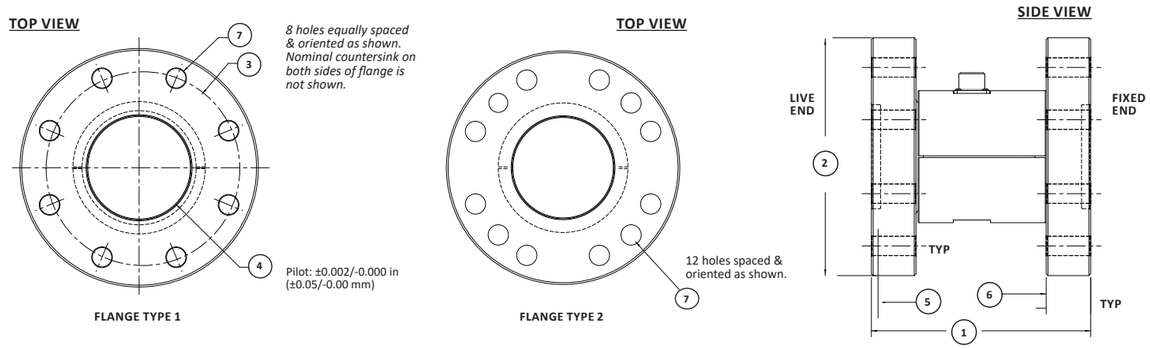
| PARAMETERS | | MODEL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5510 | | 5511 | | 5512 | | 5513 | | 5514 | |
| | | CAPACITY | | | | | | | | | |
| | | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | 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 MAX | °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 – % MAX | °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 | |





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FORCE MEASUREMENT SOLUTIONS

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




## DIMENSIONS

| CAPACITY | 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 |
| | in | mm | in | mm | in | mm | in | mm | in | mm |
| (1) | 3.00 | 76.2 | 3.50 | 88.9 | 7.38 | 187.5 | 8.50 | 215.9 | 10.50 | 266.7 |
| (2) | 4.00 | 101.6 | 5.00 | 127.0 | 8.00 | 203.2 | 9.75 | 247.7 | 14.00 | 355.6 |
| (3) | 3.25 | 82.6 | 4.25 | 108.0 | 6.50 | 165.1 | 8.00 | 203.2 | 11.0 | 279.4 |
| (4) | 1.50 | 38.1 | 2.00 | 50.8 | 3.500 | 88.90 | 4.00 | 101.60 | 6.00 | 152.4 |
| (5) | 0.13 | 3.3 | 0.25 | 6.4 | 0.31 | 7.9 | 0.31 | 7.9 | 0.31 | 7.9 |
| (6) | 0.50 | 12.7 | 0.75 | 19.1 | 1.50 | 38.1 | 1.50 | 38.1 | 2.00 | 50.8 |
| (7) | 0.328 | 8.33 | 0.39 | 10.41 | 0.65 | 16.51 | 0.781 | 20.65 | 1.031 | 24.64 |
| Flange Type | 1 | 1 | 1 | 1 | 1 2 | 1 2 | 2 | 2 | 1 | 1 |
| Recommended mtg screw size – lbf-in/Nm | 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 |
| Recommended mtg torque – lbf-in/Nm | 300 | 34 | 600 | 68 | 2400 | 270 | 4400 | 500 | 9000 | 1000 |

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# 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

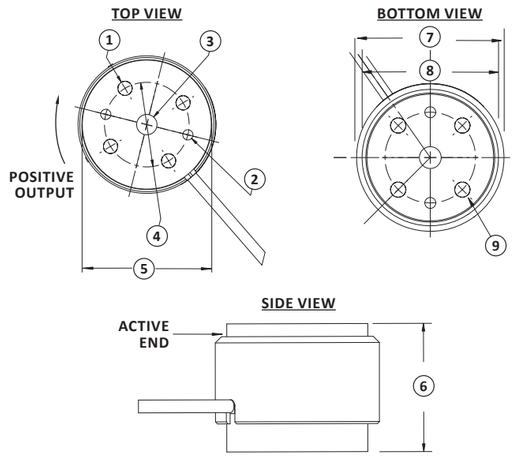
## SPECIFICATIONS

| | | |
|---|---|---|
| **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 / 100F° | | ±0.20 |
| Effect on Output – % / 100F° | | ±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 |
| | in-lbf | 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 |

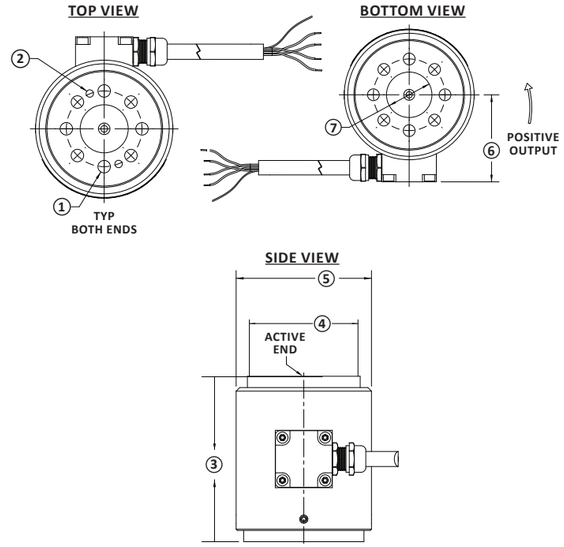
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



# 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 MINIATURE REACTION** (Shown)

## SPECIFICATIONS

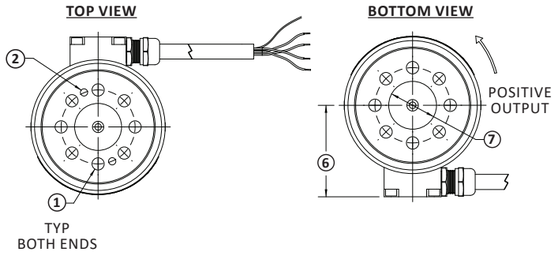
| | | | | | |
|---|---|---|---|---|---|
| **ACCURACY – (MAX ERROR)** | | | | | |
| Nonlinearity – %FS | | ± 0.10 | | | |
| Hysteresis – %FS | | ± 0.10 | | | |
| Nonrepeatability – %RO | | ± 0.05 | | | |
| **TEMPERATURE** | | | | | |
| Effect on Zero – % / 100F° | | ±0.20 | | | |
| Effect on Output – %RO / 100F° | | ±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 | | | |

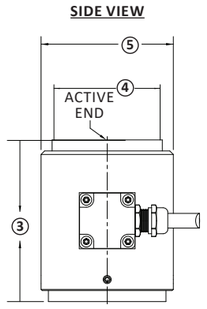
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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




## 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 – % / 100F° | | ±0.20 |
| Effect on Output – %RO / 100F° | | ±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-in | 2.9 / 25 |
| Material | | Aluminum |

***Patent Pending**

## 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 |

Catalog 2019 06-15-2020

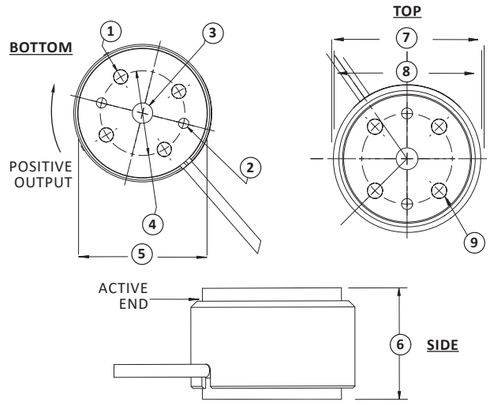
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



# 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 / 100°F | | ±0.20 |
| Effect on Output – % / 100°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

* 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.

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

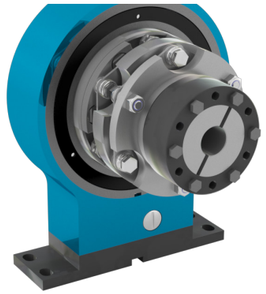
## FEATURES & BENEFITS

- 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

## Specifications

| ACCURACY – (MAX ERROR) | | |
|---|---|---|
| Combined Error – %FS | | ±0.1 |
| Nonrepeatability – % | | ±0.02 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO / °C | | ±0.02 |
| Effect on Output – % / °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 |

## STANDARD CONFIGURATION



**MODEL T1** (Shown)

## OPTIONS

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

* 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.

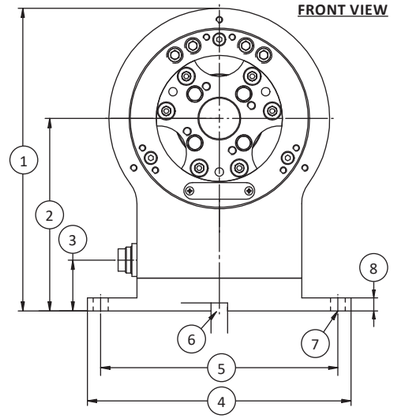
| Size | Nominal Torque | | Max Revolution | *Max ThrU.S.t Load | | *Axial Displacement Max | | *Angular Displacement Max (°) | *Radial Displacement Max | Spring-rate (Nm/rad) | Moment of Inertia (kg•m²) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | lbf-in | | N | lbf | mm | in | | | | 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 | | |

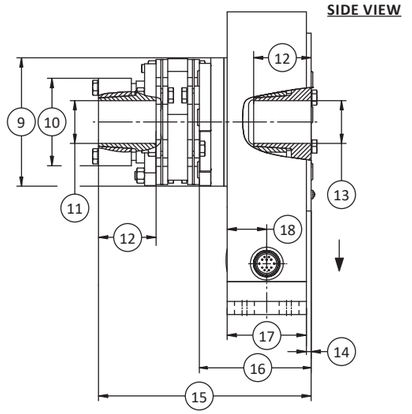


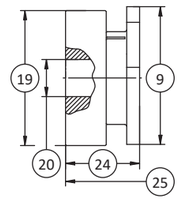


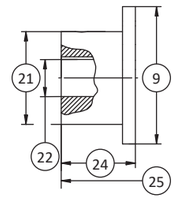
interface
FORCE MEASUREMENT SOLUTIONS

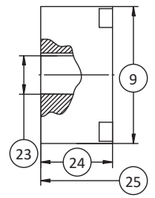
T1 TORQUE COUPLING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)




## 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 |

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# 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 / °C | | ±0.02 |
| Effect on Output – % / °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 |
| HoU.S.ing Material | | Aluminum |

## STANDARD CONFIGURATION




**MODEL T2** (Shown)

## OPTIONS

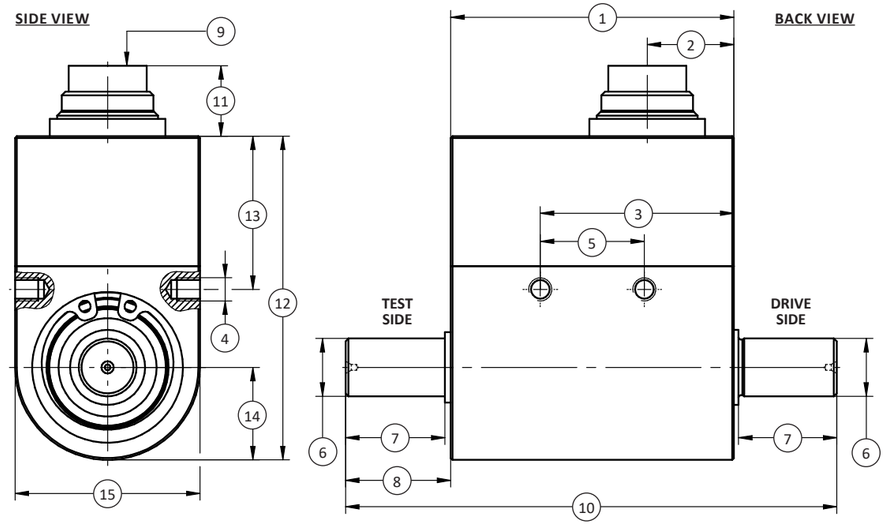
- Speed and angle output – 360 Pulse TTL, 2-Tracks
- 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- +10V Torque Output
- RS485
- Keyed shafts – per DIN 6885.1
- ±0.05% combined error
- Mating cable assembly

Catalog 2019 06-15-2020

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



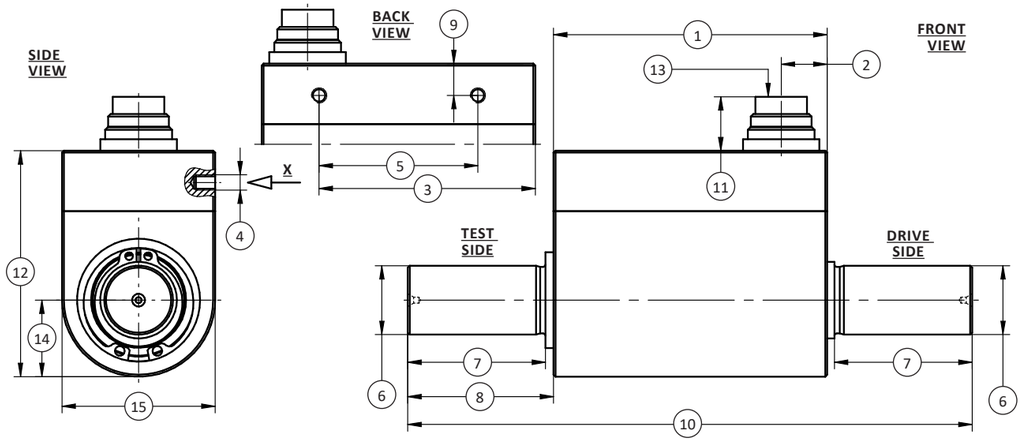

## Dimensions

| 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 |

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




## Dimensions (CONTINUED)

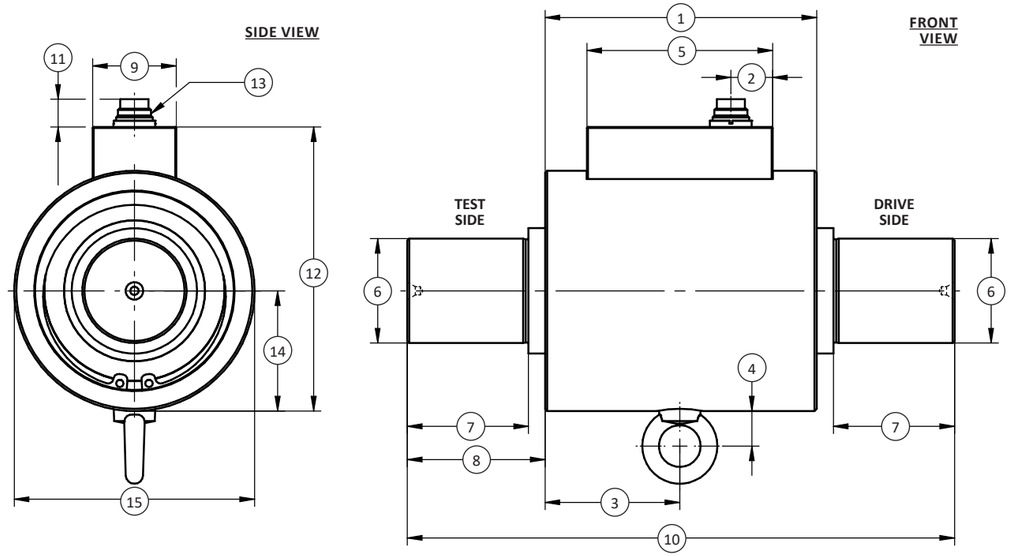
| See Drawing | CAPACITIES | | | | | |
|---|---|---|---|---|---|---|
| | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) |
| | 20, 30 | 177, 265 | 50, 100 | 443, 885 | 200, 500 | 1.77K, 4.43K |
| | mm | in | mm | in | mm | in |
| (1) | 71.5 | 2.81 | 71.5 | 2.81 | 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 |

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FORCE MEASUREMENT SOLUTIONS

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 |

* 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.

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

## PERFORMANCE PARAMETERS

| CAPACITY | | MAX RPM | SPRING RATE | MOMENT OF INERTIA (kg•m²) 1 | | MAX THRU.S.T LOAD 2 | | MAX SHEAR LOAD 2 | |
|---|---|---|---|---|---|---|---|---|---|
| Nm | lbf-in | | NM/rad | Drive Side | Test Side | N | lbf-in | N | lbf-in |
| 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 | HoU.S.ing | – | HoU.S.ing | – |



* 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.



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

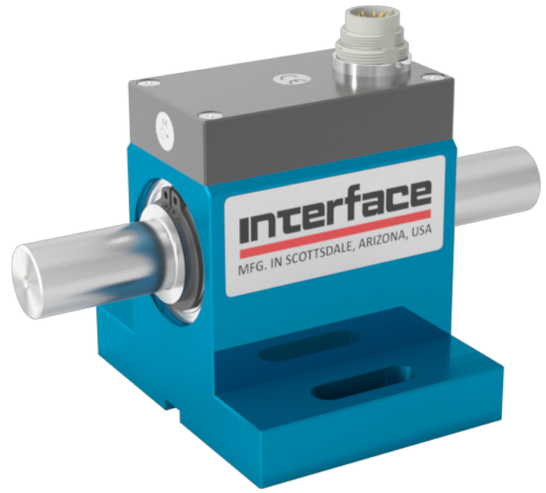
## FEATURES & BENEFITS

- 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 / °C | | ±0.02 |
| Effect on Output – % / °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 |
| HoU.S.ing Material | | Aluminum |

## STANDARD CONFIGURATION




**MODEL T3** (Shown)

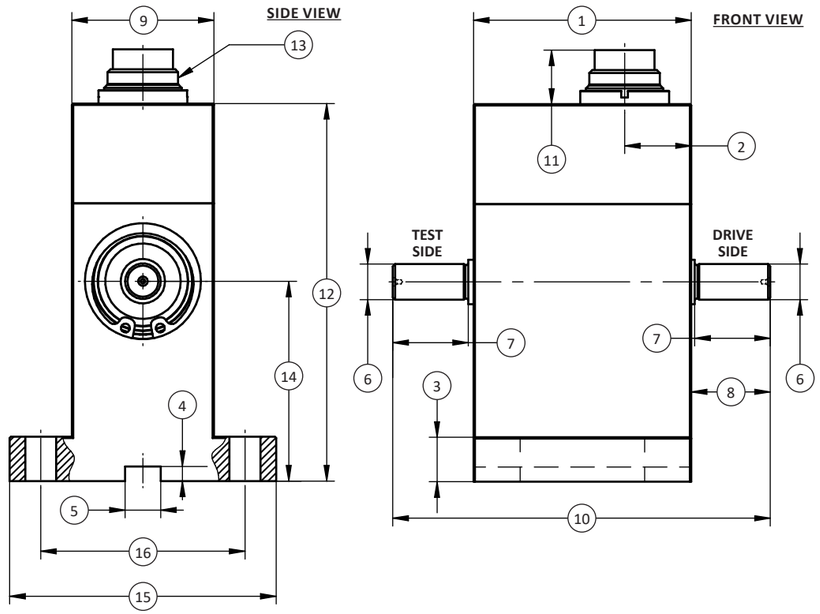
## OPTIONS

- 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

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




## Dimensions

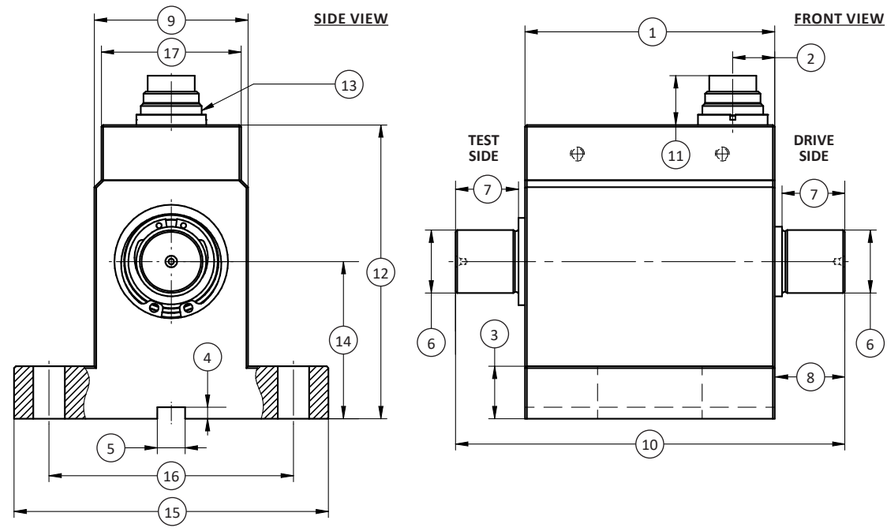
| See Drawing | CAPACITIES | | | |
|---|---|---|---|---|
| | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) |
| | 0.1, 0.2 | 0.88, 1.77 | 0.5, 1 | 4.43, 8.85 |
| | mm | in | mm | in |
| (1) | 49 | 1.9 | 49 | 1.9 |
| (2) | 15 | 0.6 | 15 | 0.6 |
| (3) | 10 | 0.4 | 10 | 0.4 |
| (4) | 33 | 1.3 | 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 |

* 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.



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



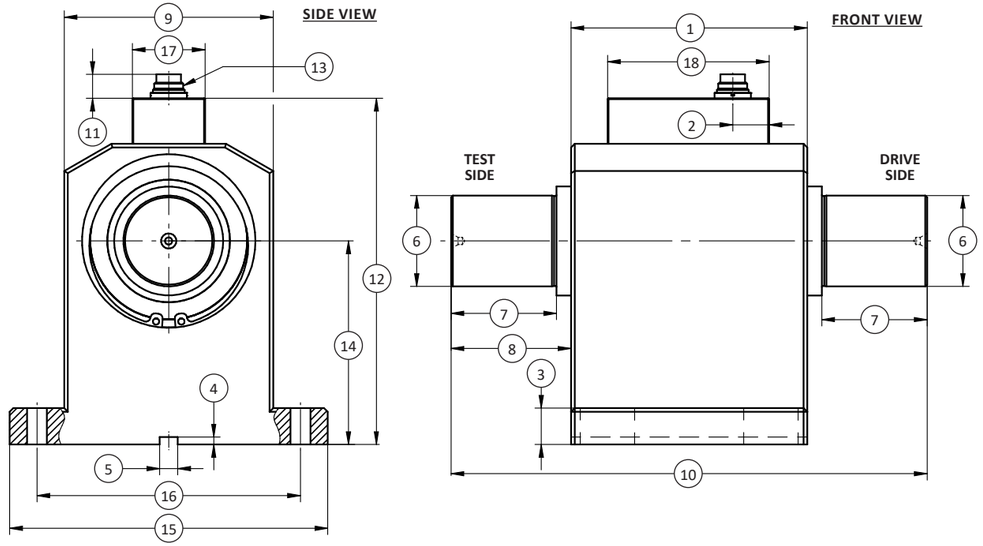

## Dimensions (CONTINUED)

| 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 |

* 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.

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# 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 |

* 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.



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

## PERFORMANCE PARAMETERS

| CAPACITY | | MAX RPM | SPRING RATE | MOMENT OF INERTIA (Kg•m²) [1] | | MAX THRU.S.T 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 | HoU.S.ing | – | HoU.S.ing | – |

* 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.

# 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 / °C | | ±0.03 |
| Effect on Output – % / °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 |
| HoU.S.ing 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

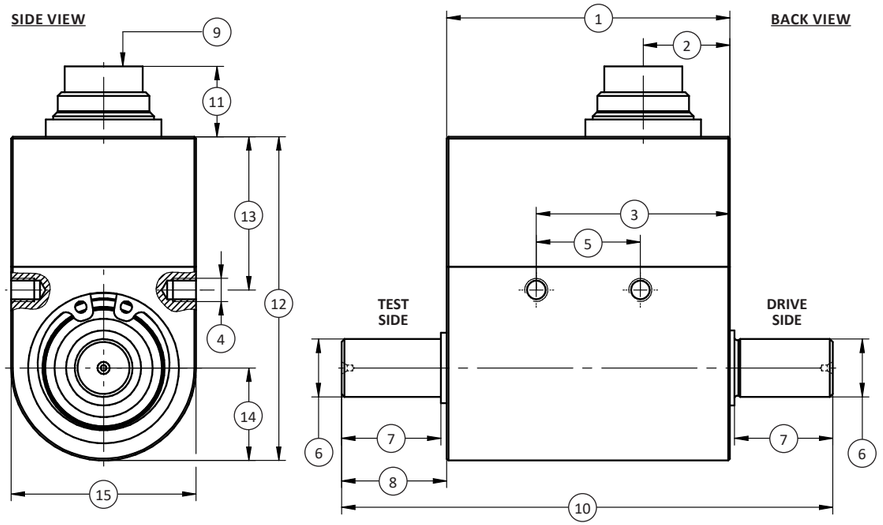
Catalog 2019 06-15-2020

* 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.



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



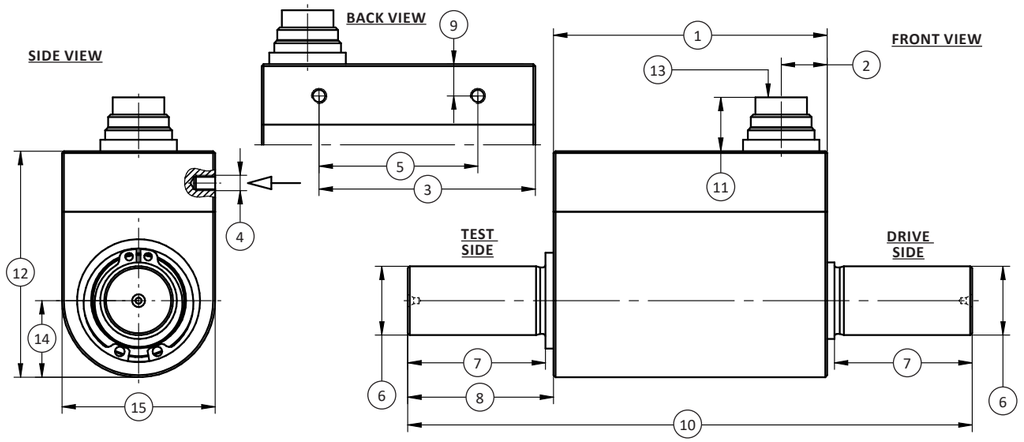

## Dimensions

| 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 |

* 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.

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




## Dimensions (CONTINUED)

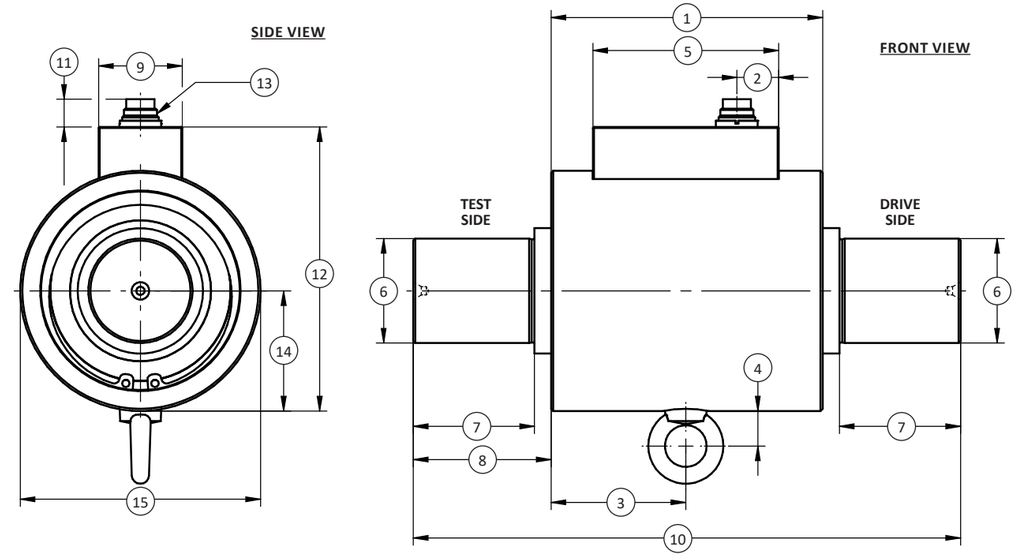
| See Drawing | CAPACITIES | | | | | |
|---|---|---|---|---|---|---|
| | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) |
| | 20, 30 | 177, 265 | 50, 100 | 443, 885 | 200, 500 | 1.77K, 4.43K |
| | mm | in | mm | in | mm | in |
| (1) | 71.5 | 2.81 | 71.5 | 2.81 | 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 |

* 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.



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# 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 |

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

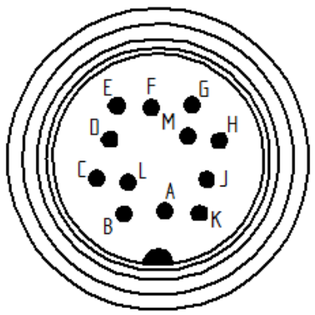
## PERFORMANCE PARAMETERS

| CAPACITY | | MAX RPM | SPRING RATE | MOMENT OF INERTIA (kg•m²) 1 | | MAX THRU.S.T 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 | HoU.S.ing | – | HoU.S.ing | – |




* 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.



# 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 / °C | | ±0.03 |
| Effect on Output – % / °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 |
| HoU.S.ing Material | | Aluminum |

## STANDARD CONFIGURATION

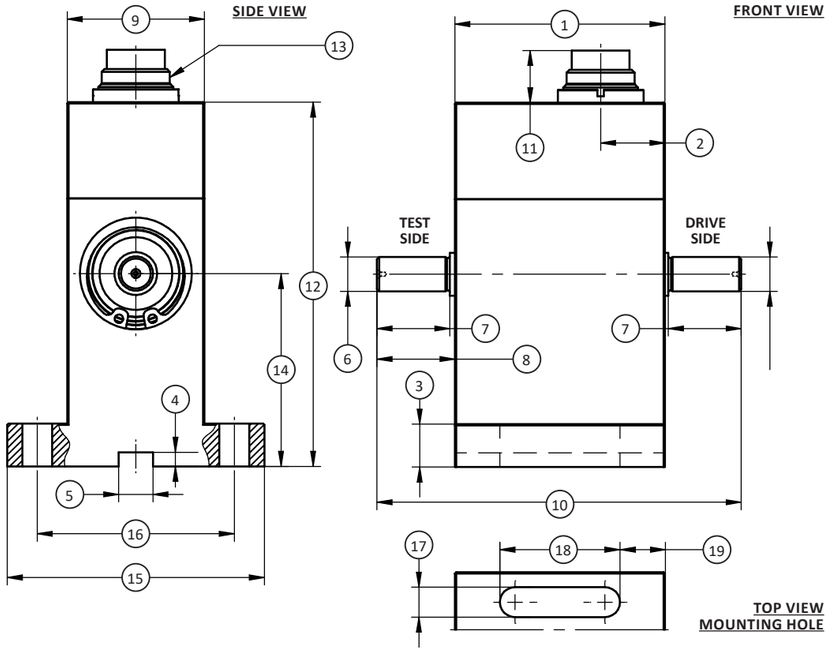
**MODEL T5** (Shown)

## 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



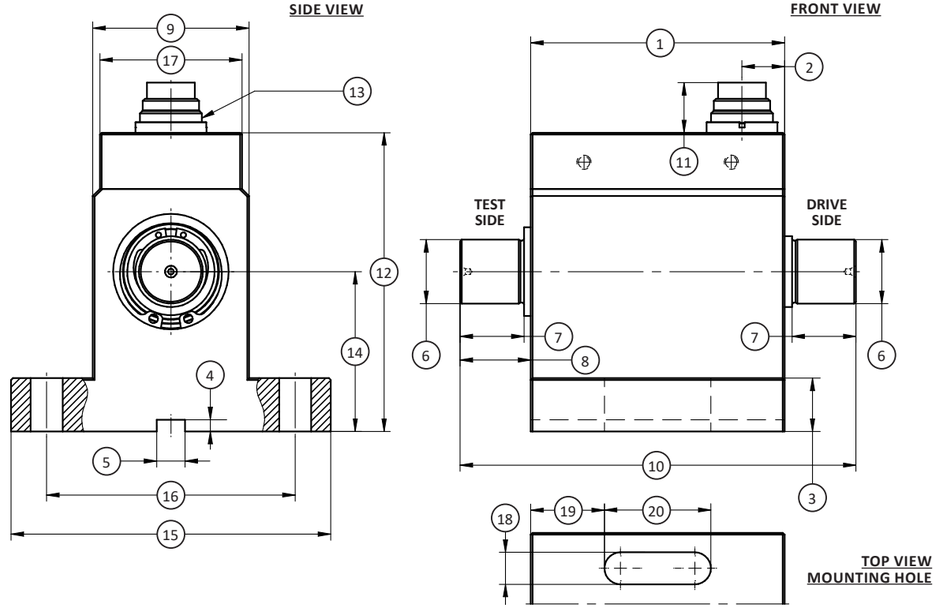

## Dimensions

| 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 |

* 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.



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T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

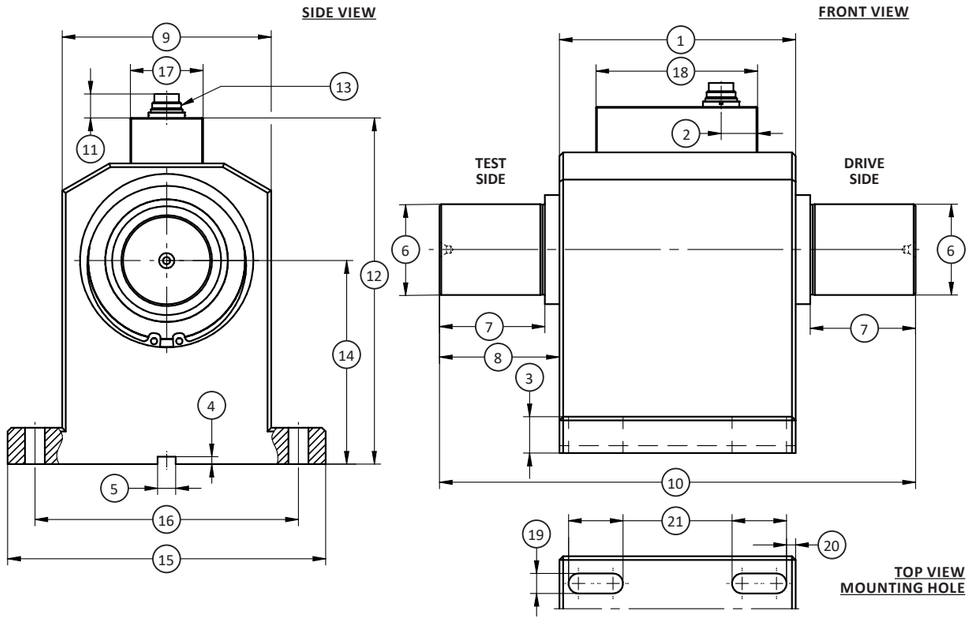



## Dimensions (CONTINUED)

| 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 |

* 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.

# 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 |

* 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.



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# T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

| CAPACITY | | MAX RPM | SPRING RATE | MOMENT OF INERTIA (Kg•m²) | | MAX THRU.S.T 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 | HoU.S.ing | – | HoU.S.ing | – |

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# 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 / °C | | ±0.02 |
| Effect on Output – % / °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 |
| HoU.S.ing 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

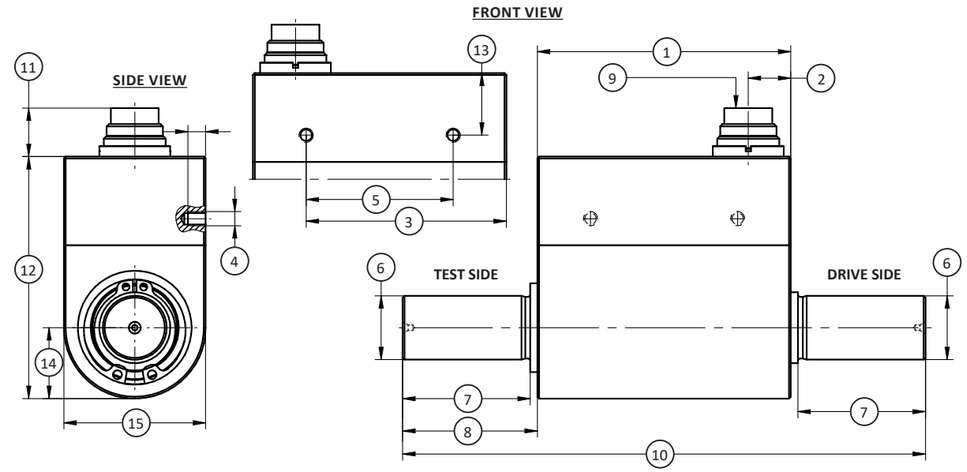
Catalog 2019 06-15-2020

* 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.



FORCE MEASUREMENT SOLUTIONS

T6 DUAL RANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)




## Dimensions

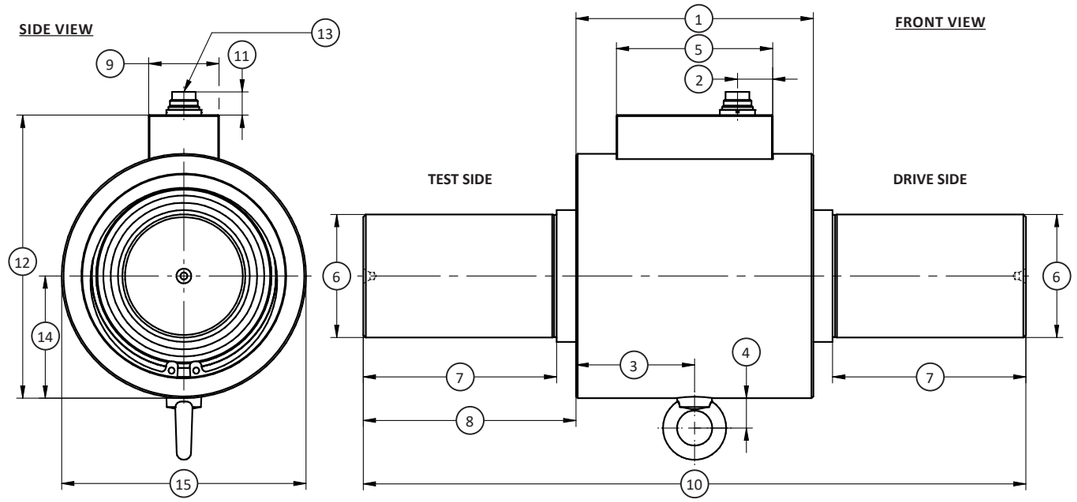
| See Drawing | CAPACITIES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) |
| | 5/0.5 | 44.3/4.43 | 10/1 | 88.5/8.85 | 20/2, 30/3 | 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***

* 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.

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# 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 |



* 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.



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FORCE MEASUREMENT SOLUTIONS
T6 DUAL RANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

| CAPACITY | | MAX RPM | SPRING RATE | MOMENT OF INERTIA (Kg•m²) | | MAX THRU.S.T 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 HoU.S.ing |

* 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.

# T7 DUAL RANGE-PEDESTAL ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

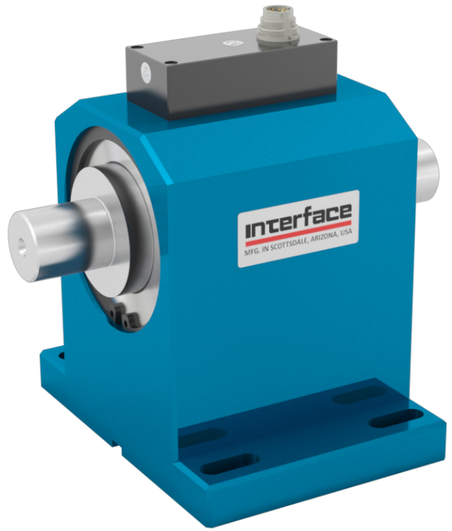
## FEATURES & BENEFITS

- 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 / °C | | ±0.02 |
| Effect on Output – % / °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 |
| HoU.S.ing Material | | Aluminum |

## STANDARD CONFIGURATION




**MODEL T7** (Shown)

## OPTIONS

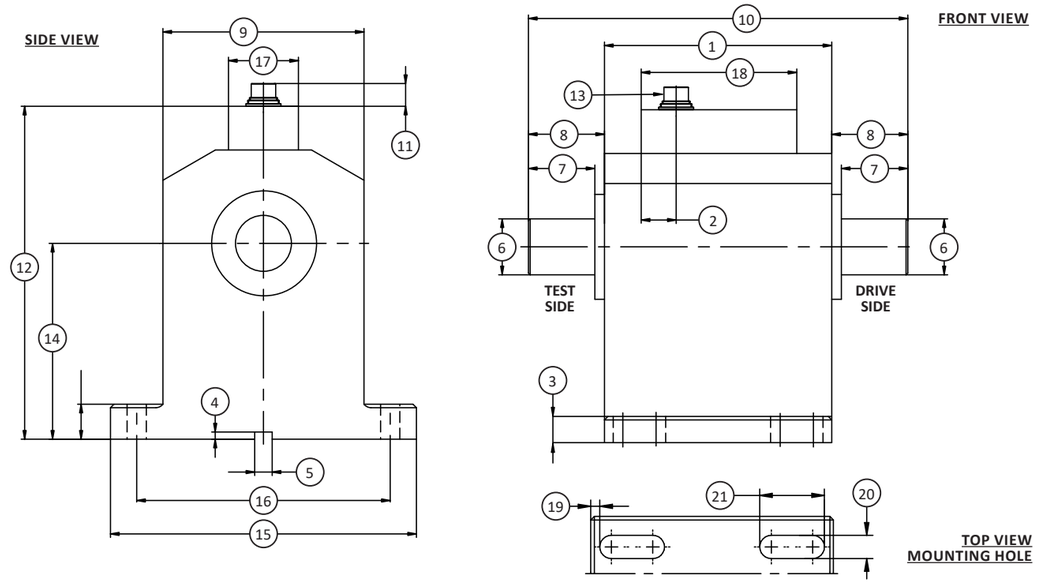
- Speed & angle measurement - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- Speed output - 60 pulse TTL, 1-track, available on capacities 2K Nm (17K lbf-in) & above
- +10 V torque output
- RS485
- Keyed shafts – per Din 6885.1

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



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FORCE MEASUREMENT SOLUTIONS

# 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 |

* 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.

# 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 |

* 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.



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FORCE MEASUREMENT SOLUTIONS
T7 DUAL RANGE-PEDESTAL ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

| CAPACITY | | MAX RPM | SPRING RATE | MOMENT OF INERTIA – J (Kgxm²) | | MAX THRU.S.T 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 hoU.S.ing |

* 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.

# 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 / °C | | ±0.04 |
| Effect on Output – % / °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 |
| HoU.S.ing 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 |

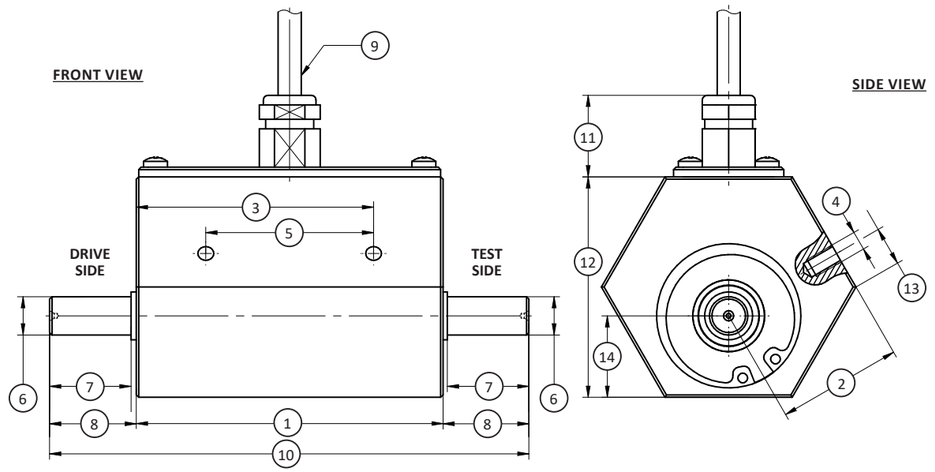
## PERFORMANCE PARAMETERS

| CAPACITY | | MAX RPM | SPRING RATE | MOMENT OF INERTIA (Kg•m²) | | MAX THRU.S.T 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



interface
FORCE MEASUREMENT SOLUTIONS
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 |

* 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.

# T11 BEARINGLESS ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

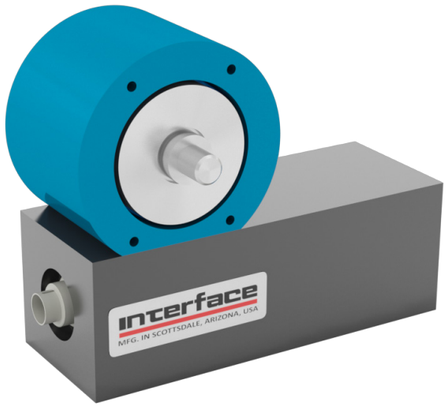
## FEATURES & BENEFITS

- 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 / °C | | ±0.02 |
| Effect on Output – % / °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 |
| HoU.S.ing Material | | Aluminum |

## STANDARD CONFIGURATION




**MODEL T11** (Shown)

## OPTIONS

- +10 VDC output
- Speed output – 6 Pulse TTL, 1-track

## Electrical CONNECTION

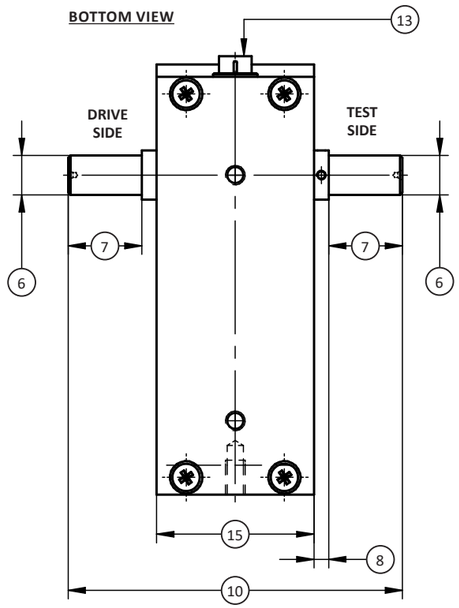
| Pin | 8-PIN Electrical CONNECTION | |
|---|---|---|
| | Function | Description |
| 1 | Supply (+) | 12-28 V |
| 2 | Supply (GND) | 0 VDC |
| 3 | Signal (+) | ±5 (±10)VDC |
| 4 | Signal (GND) | 0 VDC |
| 5 | Cal. Control | L < 2.0V / H > 3.5V |
| 6 | Option Angle A | 5VDC TTL |
| 7 | NC | – |
| 8 | NC | – |
| | HoU.S.ing | Shield |

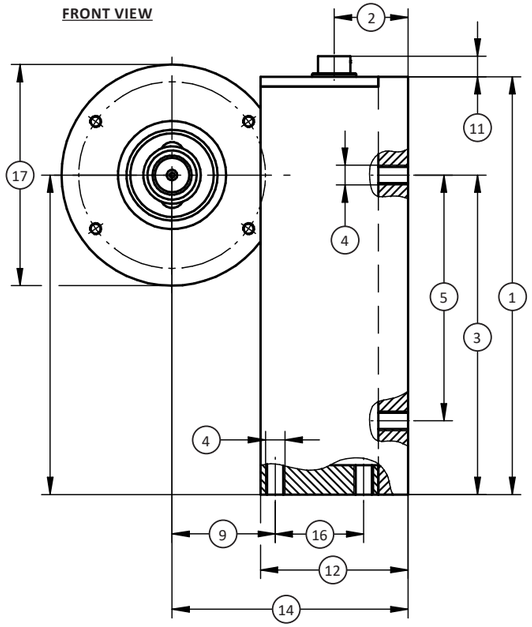
Catalog 2019 06-15-2020

* 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.



interface
FORCE MEASUREMENT SOLUTIONS
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 |

* 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.

# T11 BEARINGLESS ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

| CAPACITY | | MAX RPM | SPRING RATE | MOMENT OF INERTIA – (Kg•m²) | | MAX THRU.S.T 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)

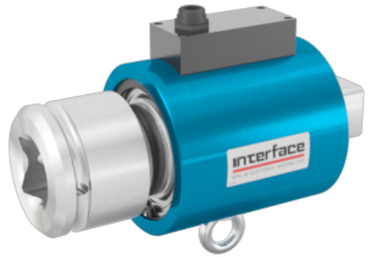
## FEATURES & BENEFITS

- 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 / °C | | ±0.05 | ±0.02 |
| Effect on Output – % / °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) |
| HoU.S.ing Material | | Aluminum | Aluminum |

## STANDARD CONFIGURATION




**MODEL T12** (Shown)

## OPTIONS

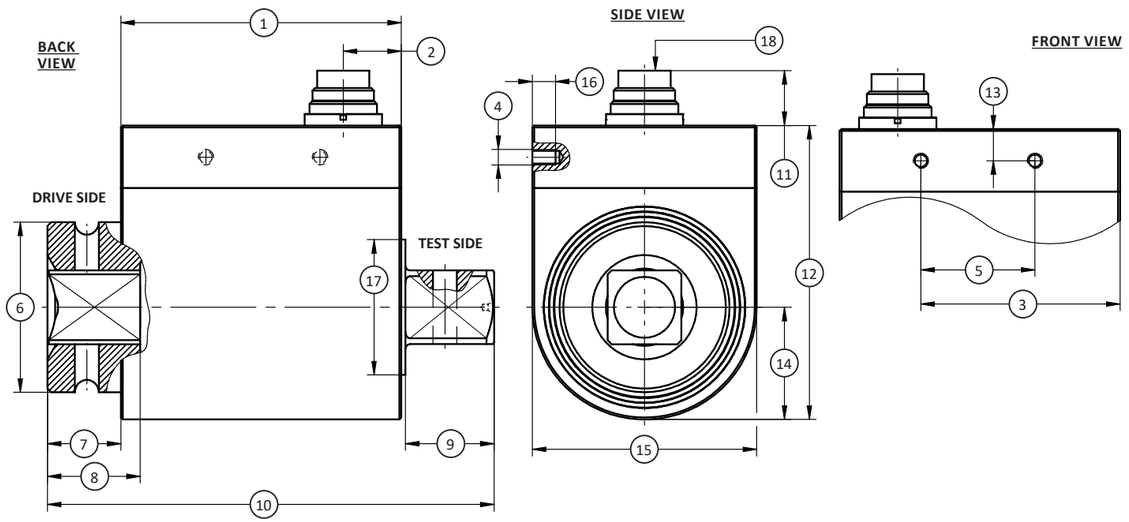
- Angle measurement - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm only
- +10 V torque output
- Enhanced accuracy – combined error ±0.1%
- RS485 output (requires enhanced accuracy)

## 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 | HoU.S.ing | – | HoU.S.ing | – |

* 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.

# T12 SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)



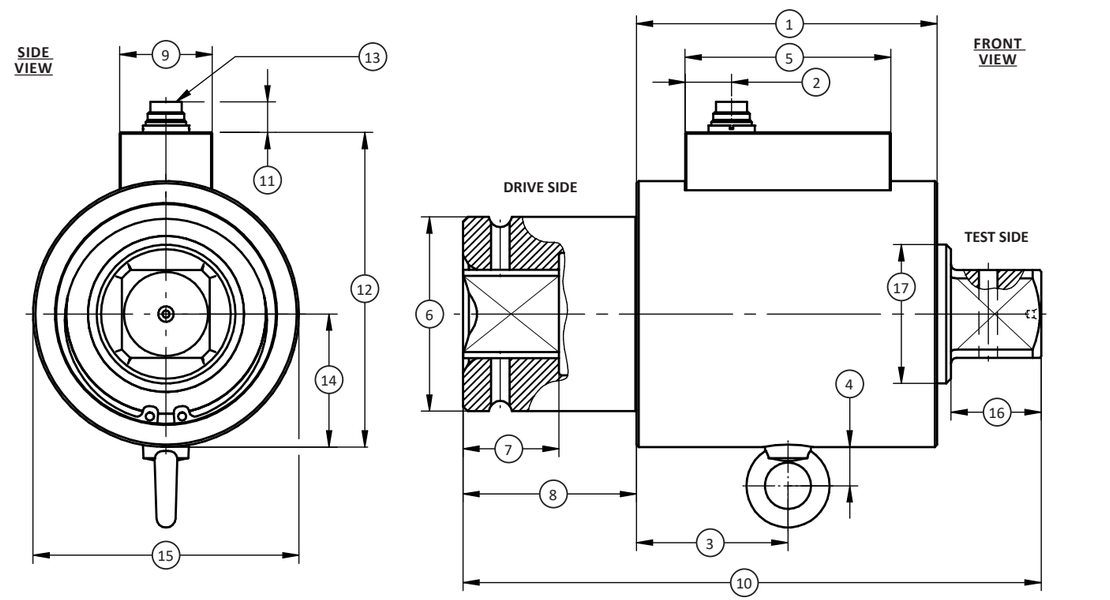

## Dimensions

| 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 | 2.26K, 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 | |

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interface
FORCE MEASUREMENT SOLUTIONS
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 |

* 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.

# T12 SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

| CAPACITY | | SQUARE | MAX RPM | SPRING RATE | MOMENT OF INERTIA – J (Kg•m²) | | MAX THRU.S.T 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 |

* 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.



# 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 / °C | | ±0.02 |
| Effect on output – % / °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 – VDC | 1 Nm | ±0.5 |
| | 8.85 lbf-in | |
| | 2 - 500 Nm | ±1.0 |
| | 17.7 - 4.43K lbf-in | |
| Bridge resistance – Ohm | | 350 |
| Electrical connection – pin | | 6 |
| **MECHANICAL** | | |
| Safe overload – %RO | | 150 |
| Shaft material | | Alloy steel |
| HoU.S.ing material | | Aluminum |

## STANDARD CONFIGURATION




**MODEL T14** (Shown)

## BRU.S.H 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# T14 SLIP-RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

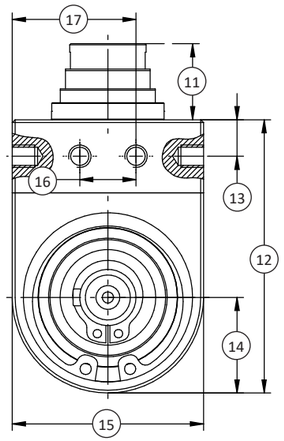
| CAPACITY | | MAX RPM MIN*1 | SPRING RATE | MOMENT OF INERTIA – J (Kg•m²)*1 | | MAX THRU.S.T LOAD*2 | | MAX SHEAR LOAD*2 | |
|---|---|---|---|---|---|---|---|---|---|
| Nm | lbf-in | | NM/rad | Drive Side | Test Side | N | lbf | N | lbf |
| 1 | 8.85 | 2,000 | $2.2x10^2$ | $3.5x10^{-6}$ | $3.5x10^{-6}$ | 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*

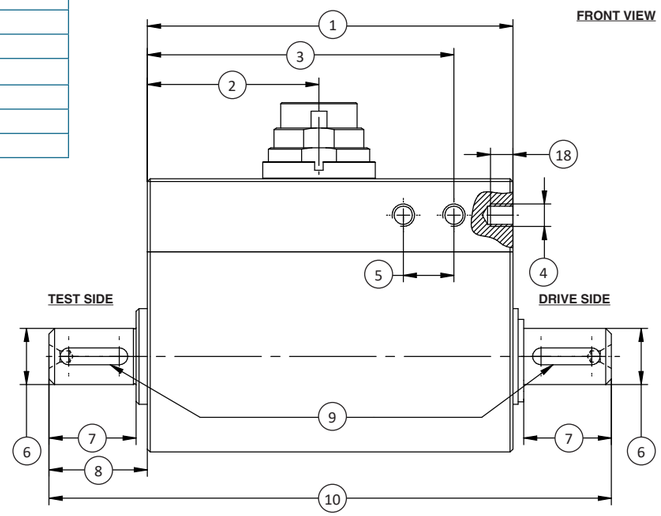
## Dimensions

| 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



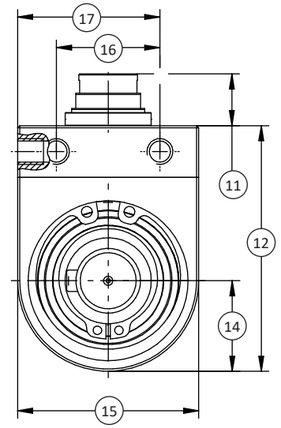

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



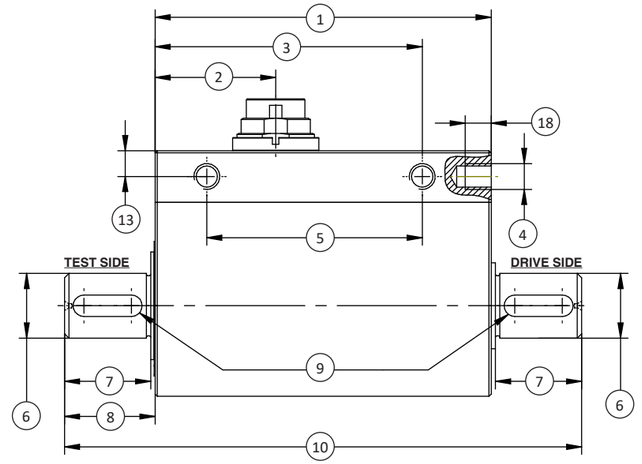
interface
FORCE MEASUREMENT SOLUTIONS

# T14 SLIP-RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

SIDE VIEW




FRONT VIEW




## Dimensions

| See Drawing | CAPACITIES | | | | | |
|---|---|---|---|---|---|---|
| | 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 |

* 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.

# 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 / °C | | ±0.05 | ±0.02 |
| Effect on Output – % / °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 | | 8 | |
| **MECHANICAL** | | | |
| Safe Overload – %RO | | 200 | |
| Max Speed – rpm | | See table | |
| Material | | Aluminum | |

## ELECTRICAL CONNECTION

| 8-PIN T12 ELECTRICAL CONNECTION | | |
|---|---|---|
| **PIN** | **FUNCTION** | **DESCRIPTION** |
| **1** | Supply (+) | 12-28 VDC |
| **2** | Supply (GND) | 0 VDC, TTL |
| **3** | Signal (+) | +5 VDC |
| **4** | Signal (GND) | 0 VDC |
| **5** | Cal. Control | L < 2.0V / H > 3.5V |
| **6** | Option Angle A | TTL |
| **7** | Option Angle B | TTL |
| **8** | NC | – |

## STANDARD CONFIGURATION




**MODEL T15** (Shown)

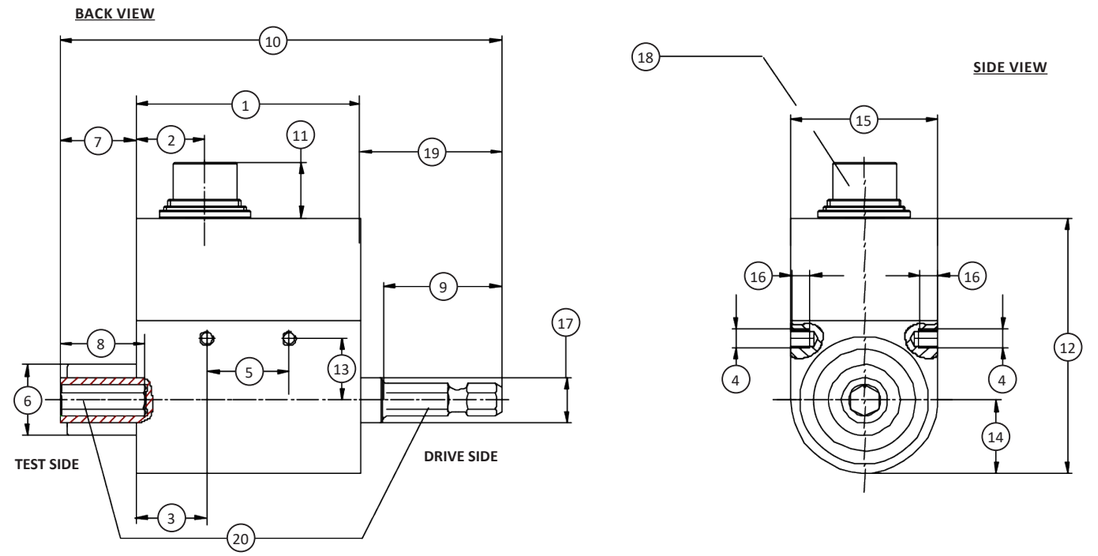
## OPTIONS

- Angle measurement - 360 pulse TTL, 2-tracks 90° offset
- +10V torque output
- Enhanced accuracy - combined error +0.1%
- RS485 Output (U.S.es 12-pin connector, replaces +5 V)

* 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.




# 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 | |


* 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.

# T15 HEX DRIVE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

| CAPACITY | | Hexagon | | MAX RPM | SPRING RATE | MOMENT OF INERTIA – ($Kg•m^2$) | | MAX THRU.S.T 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 |

* 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.

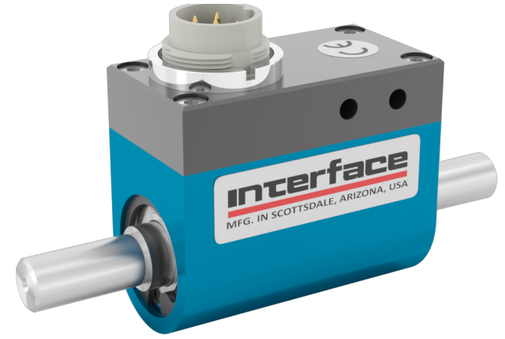


# T16 COMPACT SLIP RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

## 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 / °C | | ±0.04 |
| Effect on Output – RO% / °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 |
| HoU.S.ing Material | | Aluminum |

## BRU.S.H 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

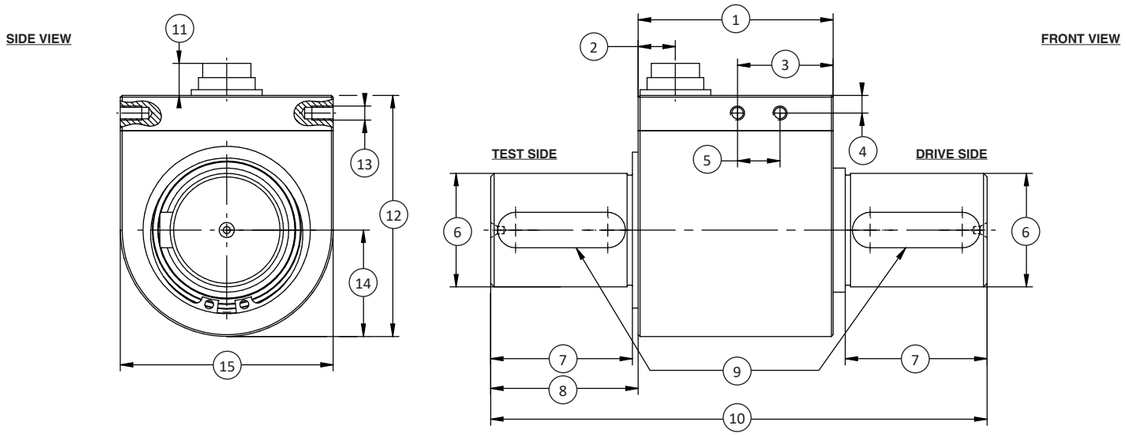
- Internal R-CAL Resistor – 100% output

## PERFORMANCE PARAMETERS

| CAPACITY | | MAX RPM | SPRING RATE | MOMENT OF INERTIA – J ($Kg•m^2$) | | MAX THRU.S.T 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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 |

* 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.



# 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

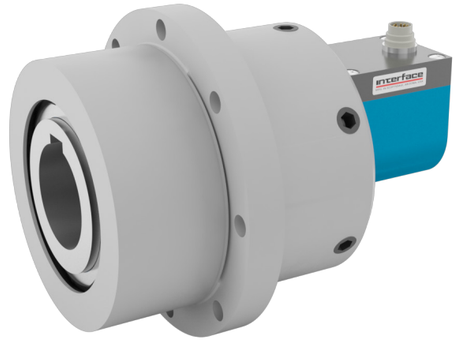
## Specifications

| ACCURACY – (MAX ERROR) | | |
|---|---|---|
| Combined Error – %FS | | ±0.1 |
| Nonrepeatability – % | | ±0.02 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO / °C | | ±0.02 |
| Effect on Output – % / °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) |
| HoU.S.ing 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 HoU.S.ing |

## STANDARD CONFIGURATION



**MODEL T22** (Shown)

## OPTIONS

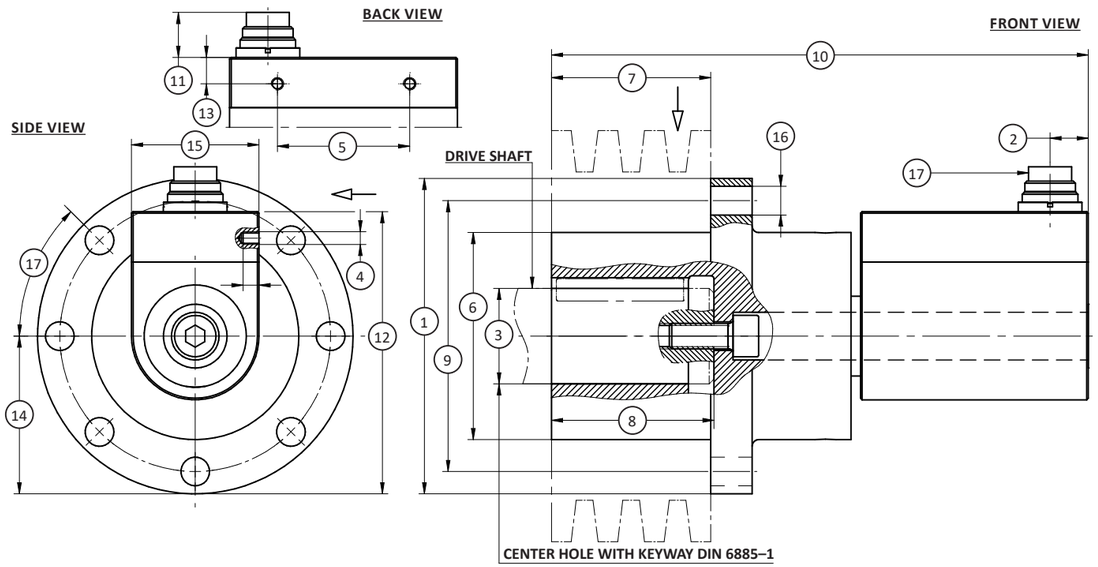
- Speed & angle measurement - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- Speed output - 60 pulse TTL, 1-track, available on capacities 2K Nm (17.7K lbf-in) & above
- ±10V torque output
- U.S.B output & software

## 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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 | |

* 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.



interface
FORCE MEASUREMENT SOLUTIONS
T22 PULLEY ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

| CAPACITY | | MAX RPM | SPRING RATE | MOMENT OF INERTIA – J (Kg•m²) | | MAX THRU.S.T 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 |

* 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.

# 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 / °C | | ±0.04 |
| Effect on Output – % / °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 |
| HoU.S.ing Material | | Aluminum |

## STANDARD CONFIGURATION



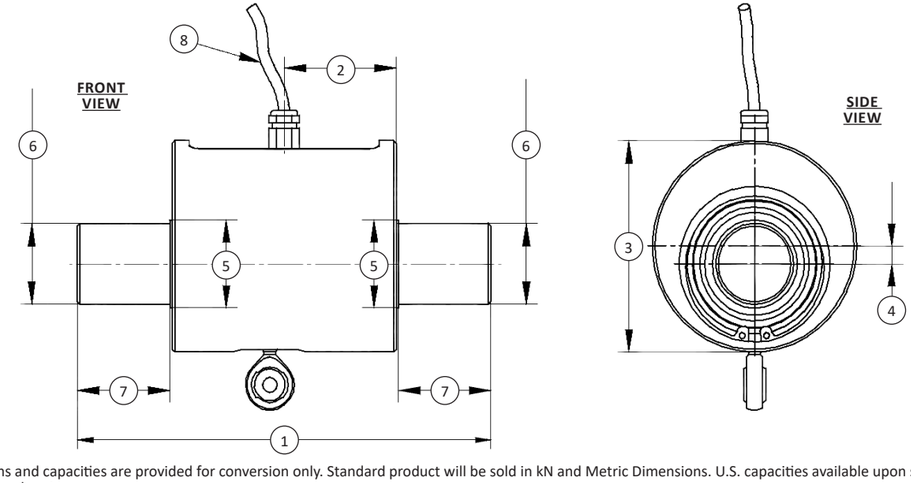
**Model T23 (Shown)**

## 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



# T25 HIGH SPEED ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

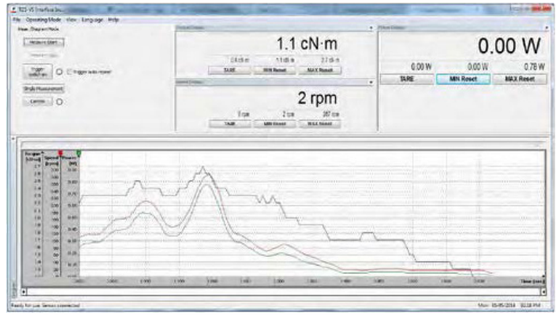
## FEATURES & BENEFITS

- 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
- U.S.B output – includes encoder option and display graphing and logging software (replaces ±5V output)

## SOFTWARE FOR U.S.B OPTION




## STANDARD CONFIGURATION



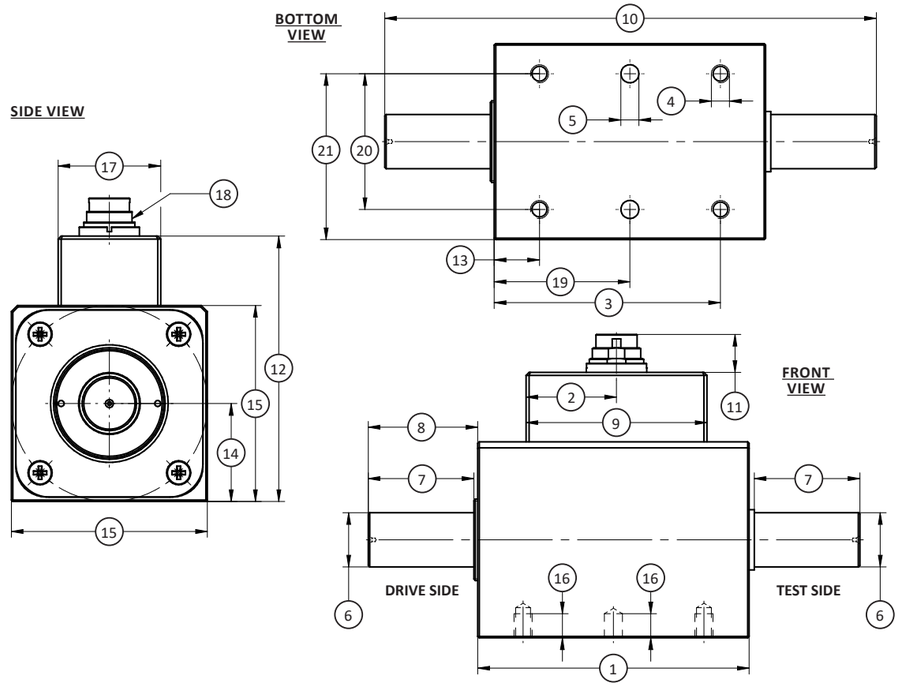
**Model T25** (Shown)

## Specifications

| ACCURACY - (MAX ERROR) | | |
|---|---|---|
| Combined Error – %FS | | ±0.1 |
| Nonrepeatability – %RO | | ±0.02 |
| Resolution – bit | | 16 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO | °C | ±0.02 |
| | °F | ±0.01 |
| Effect on Output – % | °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 |
| HoU.S.ing Material | | Aluminum |
| Level of Protection | | IP 50 |

* 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.

# 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 | in | mm | in | mm | in | mm | in | mm | in | mm |
| (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 |

* 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.



interface
FORCE MEASUREMENT SOLUTIONS
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 |
| | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| (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 ($kg \bullet m^2$) | | MAX THRU.S.T 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 | HoU.S.ing | - | HoU.S.ing | - |

*** Allowable without significant effect on measurement and applies to unsupported shaft only*

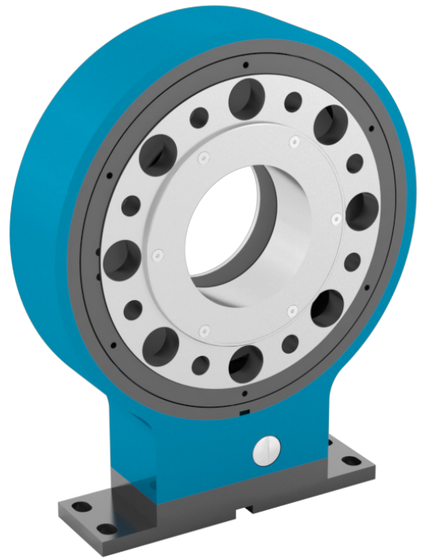


# T27 HOLLOW FLANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

## 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 / °C | | ±0.02 |
| Effect on Output – % / °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

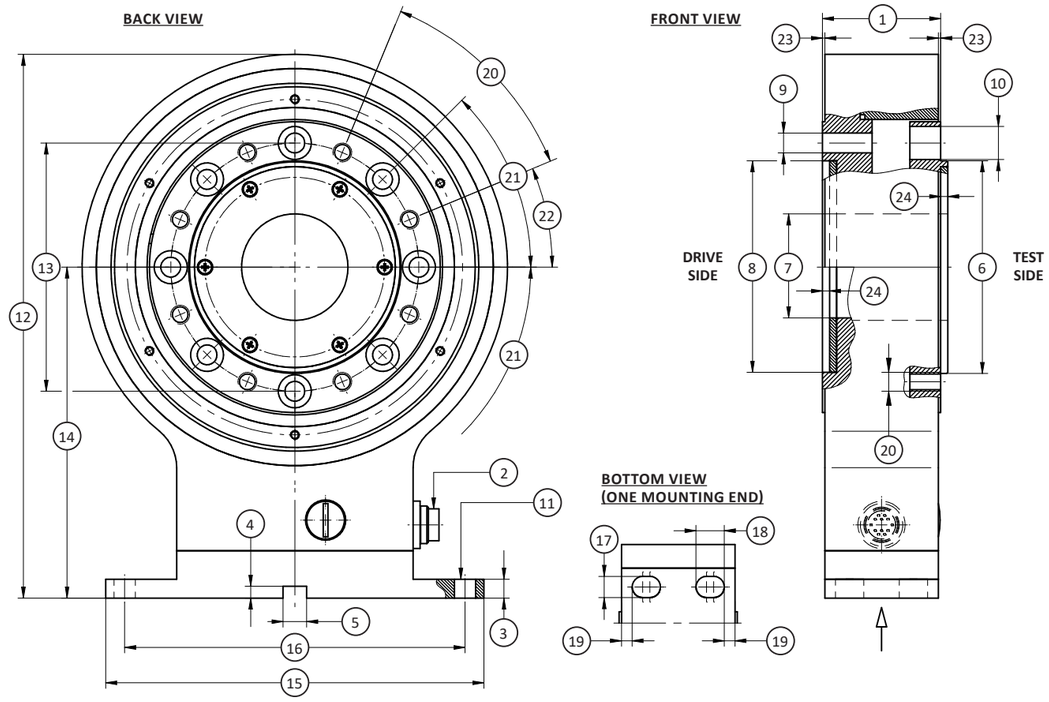
- ±10V output
- Speed measurement – 30 pulse, +5V TTL

## PERFORMANCE PARAMETERS

| CAPACITY | | MAX RPM | SPRING RATE | MOMENT OF INERTIA ($kg \cdot m^2$) | | MAX THRU.S.T 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



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FORCE MEASUREMENT SOLUTIONS
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 |

# T31, T32, T33, & T34 SPINDLE TORQUE TRANSDUCER (U.S. & METRIC)

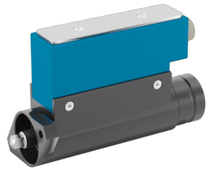
## FEATURES & BENEFITS

- 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

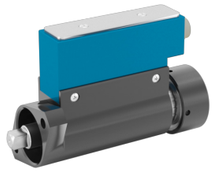
## Specifications

| | | |
|---|---|---|
| **ACCURACY – (MAX ERROR)** | | |
| Combined Error – %FS | | ±0.3 |
| Nonrepeatability – %RO | | ±0.05 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO / °C | | ±0.05 |
| Effect on Output – % / °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 |

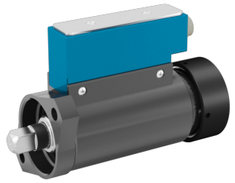
## STANDARD CONFIGURATION



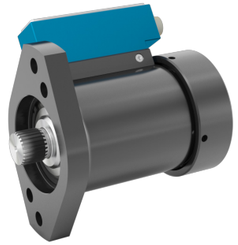
**Model T31** (Shown)



**Model T32** (Shown)



**Model T33** (Shown)



**Model T34** (Shown)

## Electrical CONNECTION

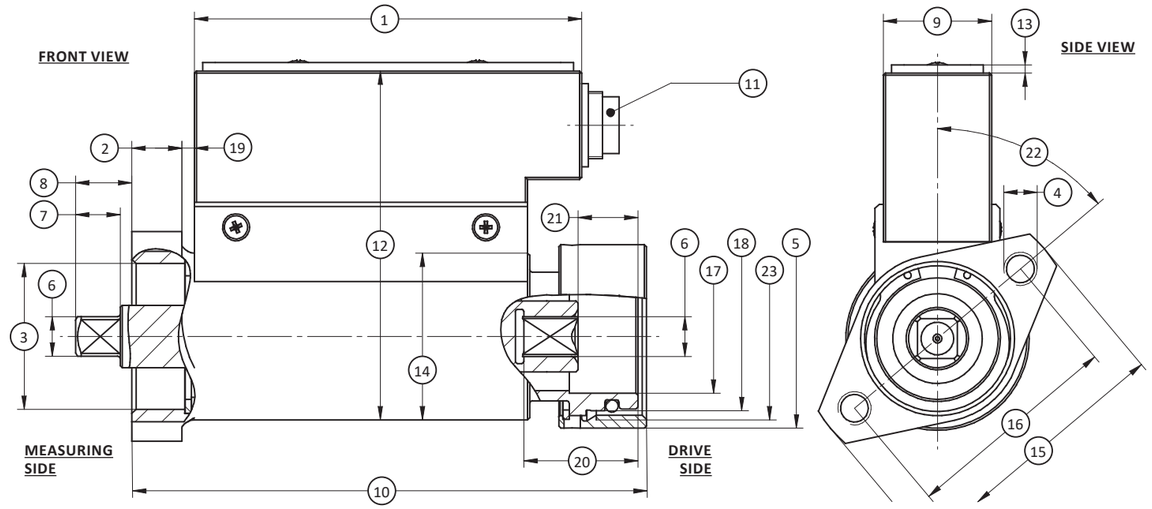
| Pin | 12-PIN Electrical CONNECTION | |
|---|---|---|
| | Function | Description |
| A | NC | – |
| B | Option Angle B | 5VDC TTL |
| C | Signal (+) | ±5VDC (±10VDC) |
| D | Signal (GND) | 0V |
| E | Supply (GND) | 0V |
| F | Supply (+) | 12-28 VDC |
| G | Option Angle A | 5VDC TTL |
| H | NC | – |
| 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



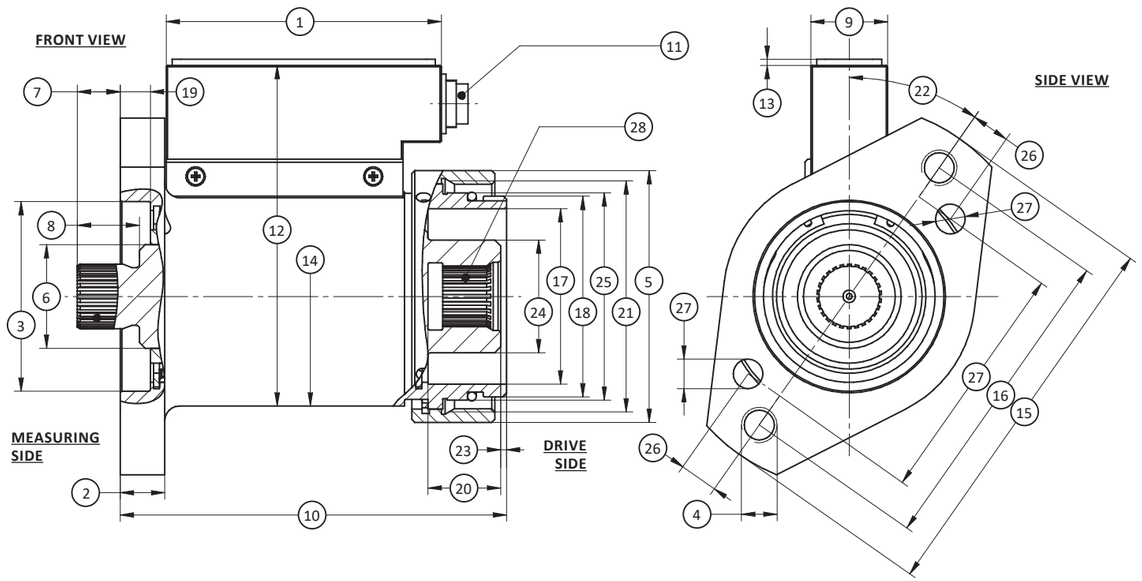
interface
FORCE MEASUREMENT SOLUTIONS
T31, T32, T33, & T34 SPINDLE TORQUE TRANSDUCER (U.S. & METRIC)

## 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) | $44^{\pm0.1}$ | $1.7^{\pm0.004}$ | $52^{\pm0.1}$ | $2.05^{\pm0.004}$ | $72^{\pm0.1}$ | $2.8^{\pm0.004}$ |
| (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 | |

* 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.




## 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) | $106^{\pm0.1}$ | $4.2^{\pm0.004}$ |
| (17) | Ø59.2 | Ø2.33 |
| (18) | Ø67.8 | Ø2.67 |
| (19) | 10.2 | 0.40 |
| (20) | 24.5 | 1.0 |

* 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.



FORCE MEASUREMENT SOLUTIONS

# 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) | $13^{\pm0.03}$ | $0.5^{\pm0.001}$ |
| (27) | Ø10 D8 | Ø(0.3961 / 0.3953) |
| (28) | DIN 5480 | |

* 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.

# 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

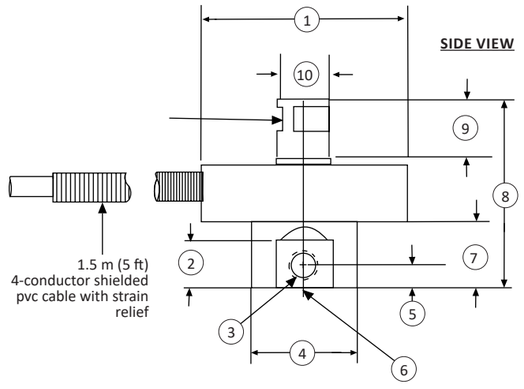
## Specifications

| 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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



# 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

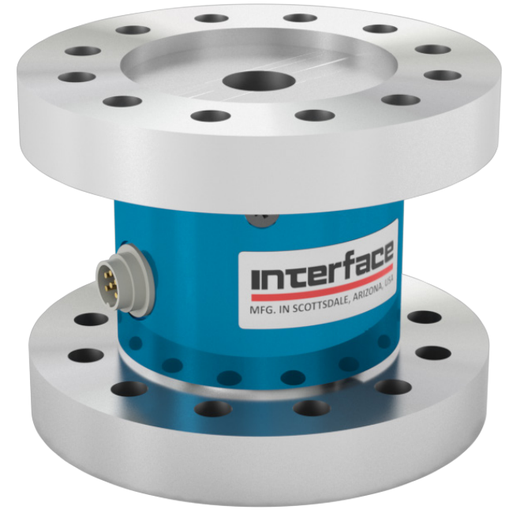
## SPECIFICATIONS

| ACCURACY – (MAX ERROR) | | |
|---|---|---|
| Combined Error – %FS | | ± 0.1 |
| Nonrepeatability – % | | ± 0.02 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO / °C | | ±0.02 |
| Effect on Output – % / °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



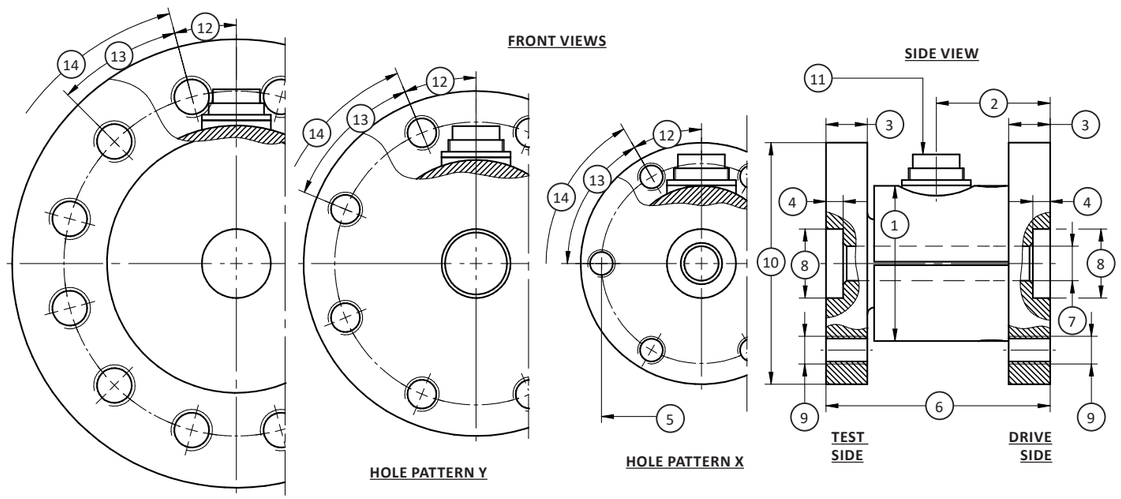

**Model TS11** (Shown)

## 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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°) | |

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interface
FORCE MEASUREMENT SOLUTIONS
TS11 FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

| CAPACITY | | SPRING RATE | MOMENT OF INERTIA ($kg \cdot m^2$) | | MAX THRU.S.T 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 |

# 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/ °C | | ±0.02 |
| Effect on Output – % / °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 |
| | HoU.S.ing | 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

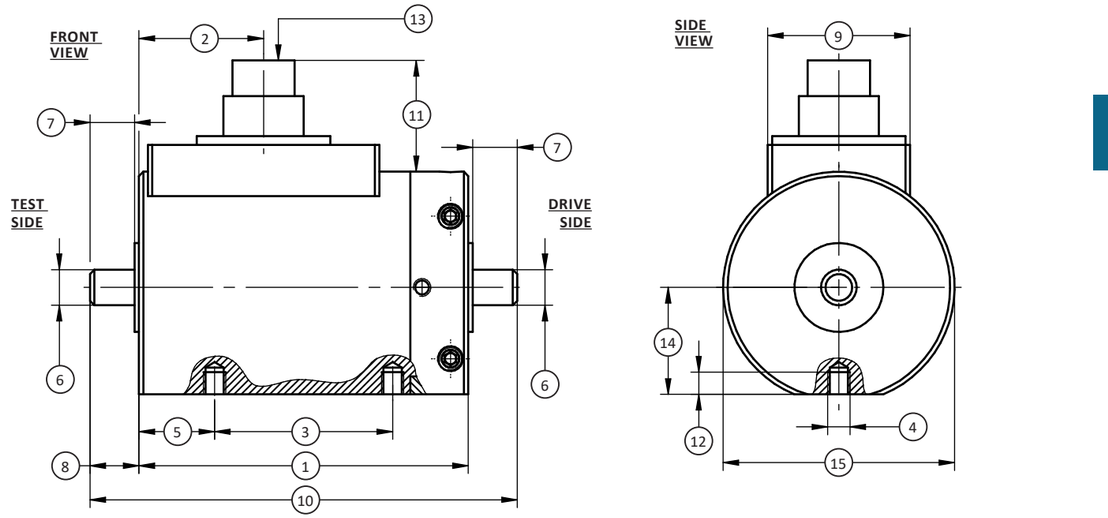
- 100% Control Signal (RCAL)
- Key DIN 6885-1

Catalog 2019 06-15-2020

* 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.



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 |

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# 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 |

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FORCE MEASUREMENT SOLUTIONS

# 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 THRU.S.T 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 |

* 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.

# 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
- U.S.eful 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

## SPECIFICATIONS

| | | |
|---|---|---|
| **ACCURACY – (MAX ERROR)** | | |
| Combined Error – %FS | | ± 0.2 |
| Nonrepeatability – % | | ± 0.02 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO / °C | | ±0.02 |
| Effect on Output – % / °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 Nm | | 10.5 |
| | | ≥ 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 |

## STANDARD CONFIGURATION




**MODEL TS14 (Shown)**

## Electrical CONNECTION

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

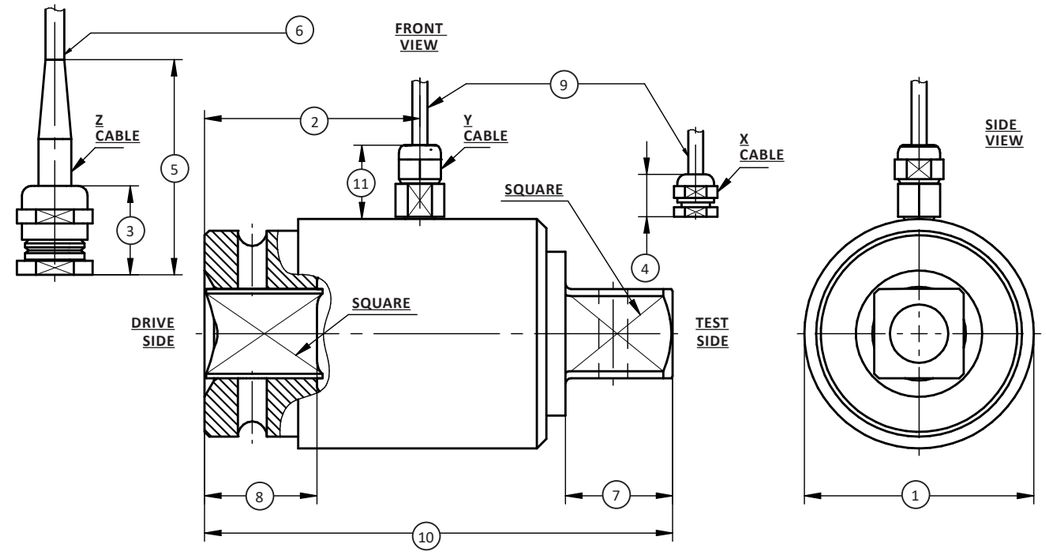


* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



interface
FORCE MEASUREMENT SOLUTIONS

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" | |

* 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.

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

## PERFORMANCE PARAMETERS

| CAPACITY | | SPRING RATE | MOMENT OF INERTIA – J (Kg•m²) | | MAX THRU.S.T 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 |

* 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.



# 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
- U.S.eful for checking torque wrenches

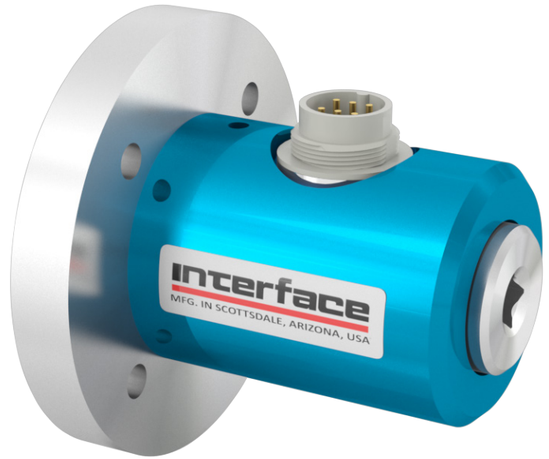
## SPECIFICATIONS

| ACCURACY – (MAX ERROR) | | |
|---|---|---|
| Combined Error – %FS | | ± 0.2 |
| Nonrepeatability – % | | ± 0.02 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO / °C | | ±0.02 |
| Effect on Output – % / °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



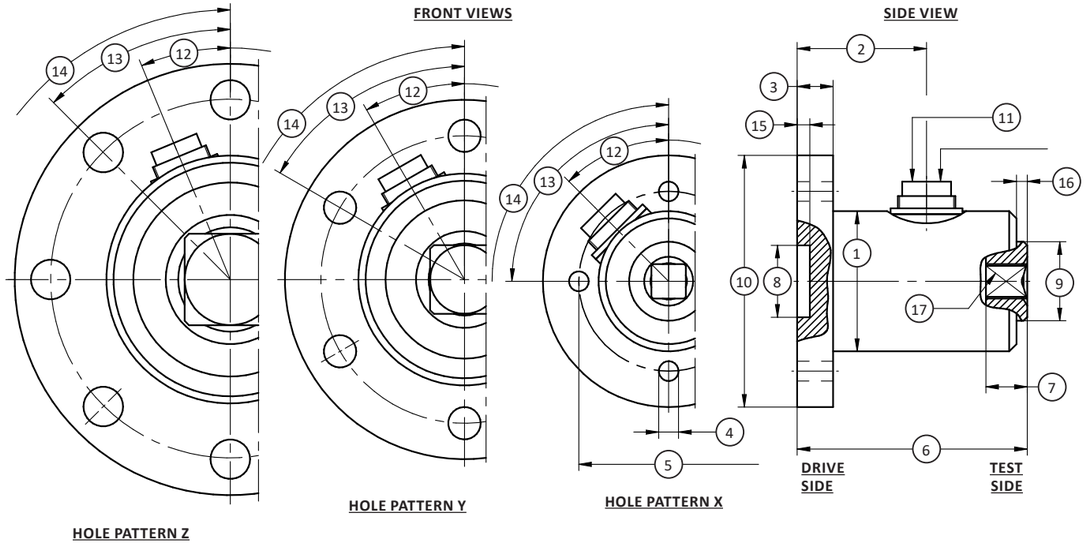

**MODEL TS15 (Shown)**

## 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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" | |

* 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.



interface
FORCE MEASUREMENT SOLUTIONS
TS15 SQUARE FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

## PERFORMANCE PARAMETERS

| CAPACITY | | SPRING RATE | MOMENT OF INERTIA – J (Kg•m²) | | MAX THRU.S.T 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 |

* 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.

# 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

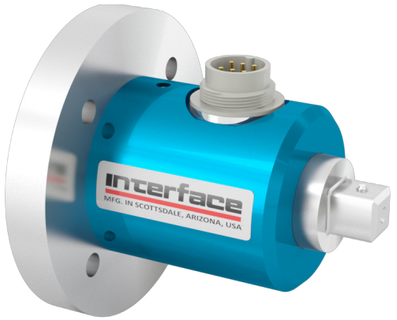
## OPTIONS

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

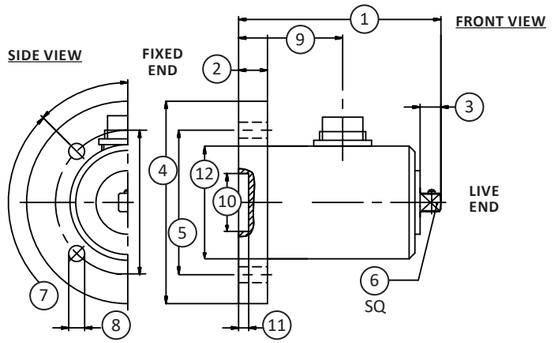
## SPECIFICATIONS

| ACCURACY – (MAX ERROR) | | |
|---|---|---|
| Combined Error – %FS | | ±0.2 |
| Nonrepeatability – % | | ±0.02 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO / °C | | ±0.02 |
| Effect on Output – % / °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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



# 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
- U.S.eful for auditing fastener torques
- Quick-connect chuck

## SPECIFICATIONS

| ACCURACY – (MAX ERROR) | | |
|---|---|---|
| Combined Error – %FS | | ± 0.1 |
| Nonrepeatability – % | | ± 0.05 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO / °C | | ±0.02 |
| Effect on Output – % / °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

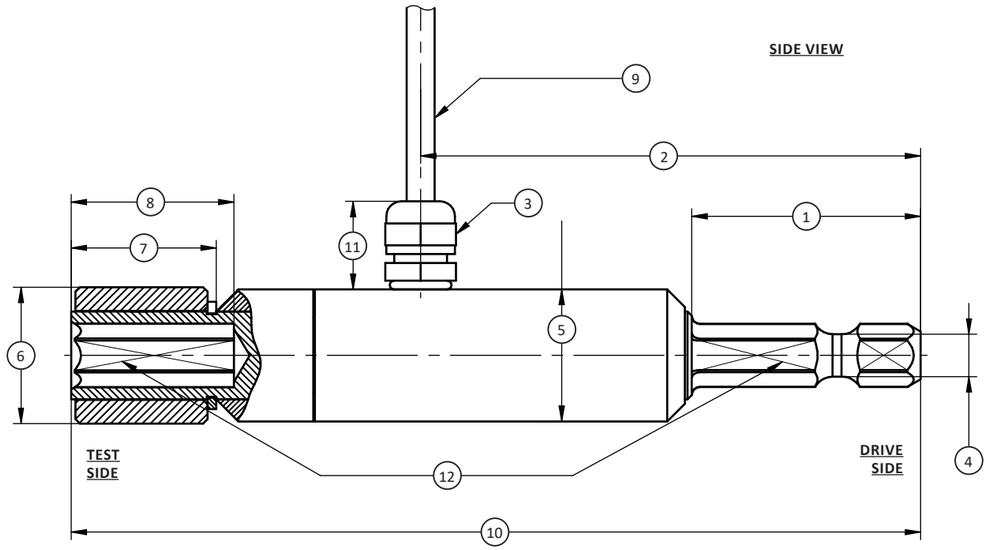
| Wire | 6-PIN Electrical CONNECTION |
|---|---|
| | Function |
| Green | Excitation (-) |
| Brown | Excitation (+) |
| Yellow | Shield |
| White | Signal (+) |
| Grey | Signal (-) |
| Shield | Control signal (option) |

## PERFORMANCE PARAMETERS

| CAPACITY | | SPRING RATE | MOMENT OF INERTIA – J (Kg•m²) | | MAX THRU.S.T 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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" | |

* 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.



# 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

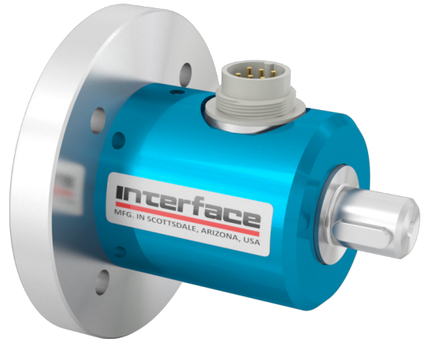
## OPTIONS

- 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/ °C | | ±0.02 |
| Effect on Output – % / °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 |

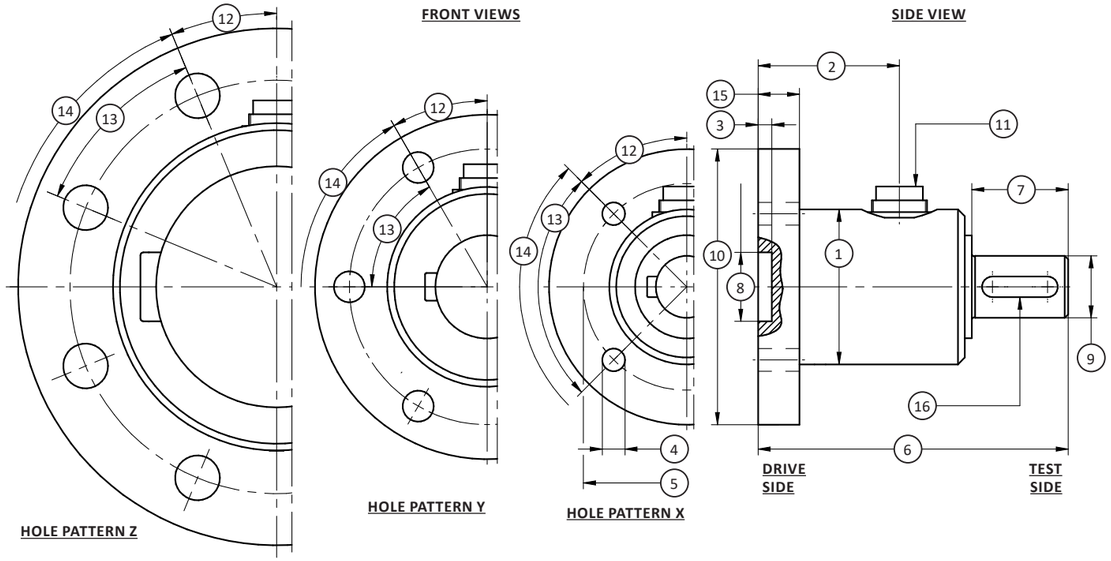
## STANDARD CONFIGURATION




**MODEL TS18 (Shown)**

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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 | |

* 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.



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

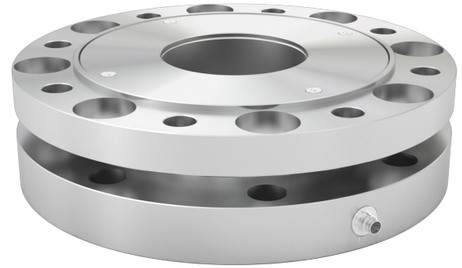
## FEATURES & BENEFITS

- 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/ °C | | ±0.02 |
| Effect on Output – % / °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

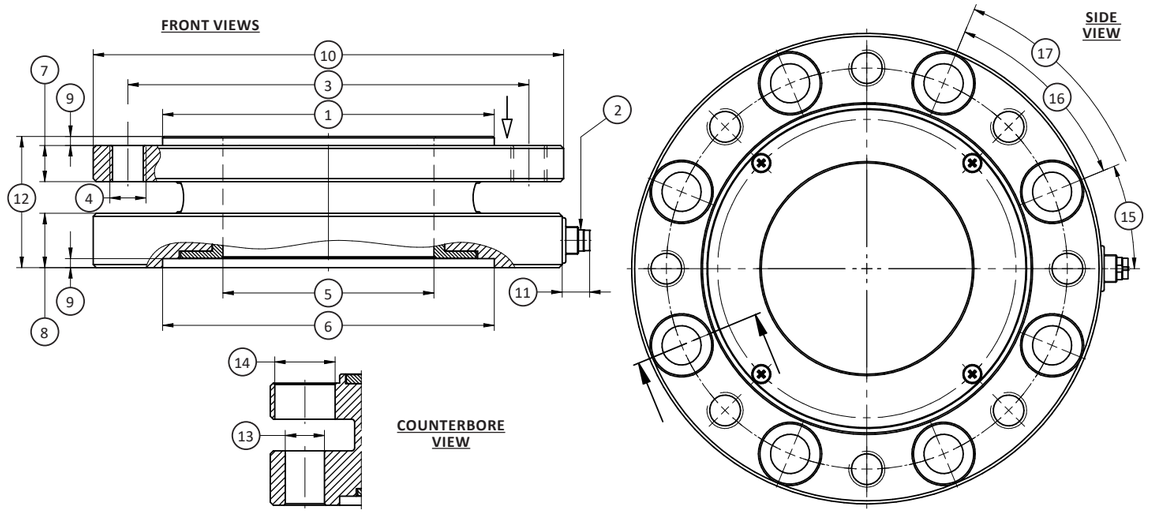
- 100% Control Signal (Internal shunt cal)
- High accuracy to 0.05% FS
- A2LA accredited calibration
- Mating cable (straighter or right angle)
- Extended Temperature range

## PERFORMANCE PARAMETERS

| CAPACITY | | SPRING RATE | MOMENT OF INERTIA – ($Kg \cdot m^2$) | | MAX THRU.S.T 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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° | |

* 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.

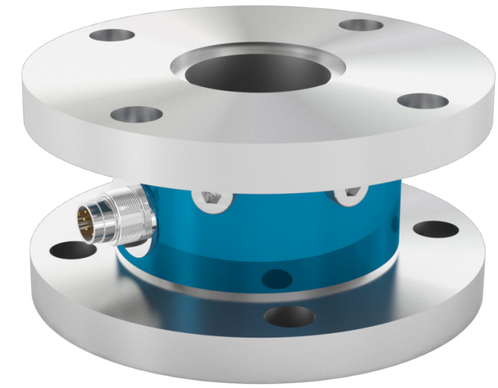


# TS20 HOLLOW FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

## 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/ °C | | ±0.02 |
| Effect on Output – % / °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

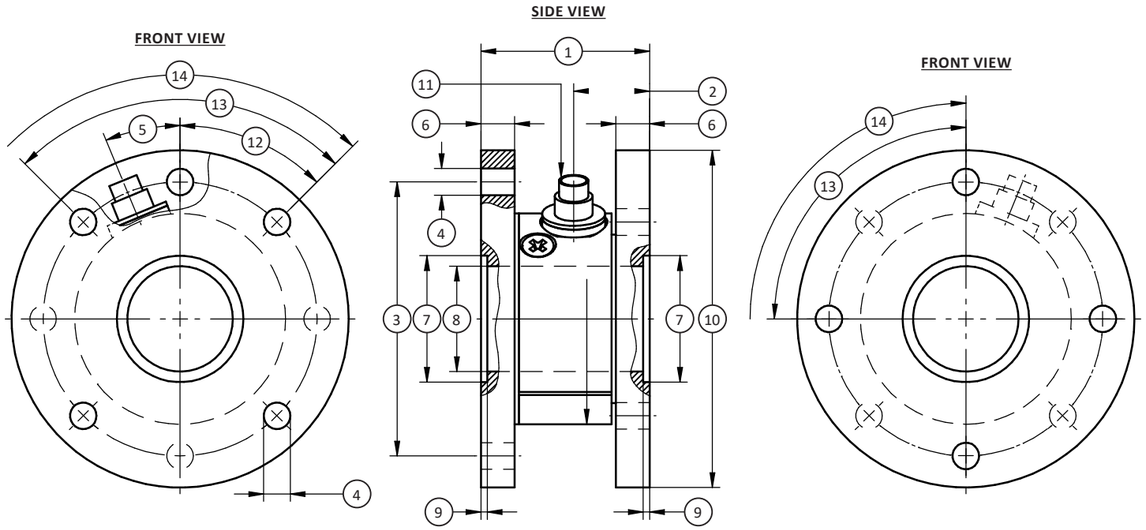
- High accuracy to 0.05% FS
- 100% control signal (internal shunt cal)
- Extended Temperature range
- A2LA accredited calibration
- Mating cable (straight or right angle)

## PERFORMANCE PARAMETERS

| CAPACITY | | SPRING RATE | MASS MOMENT OF INERTIA – ($Kg \cdot m^2$) | | MAX THRU.S.T 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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***

Catalog 2019 06-15-2020

* 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.



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

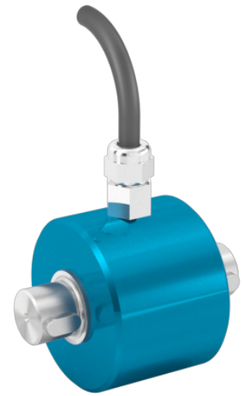
## FEATURES & BENEFITS

- 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 / ºC | | ±0.02 |
| Effect on Output – % / ºC | | ±0.01 |
| Compensated Range | ºC | -5 to +45 |
| | ºF | +23 to +113 |
| Operating Range | ºC | -15 to +55 |
| | ºF | +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

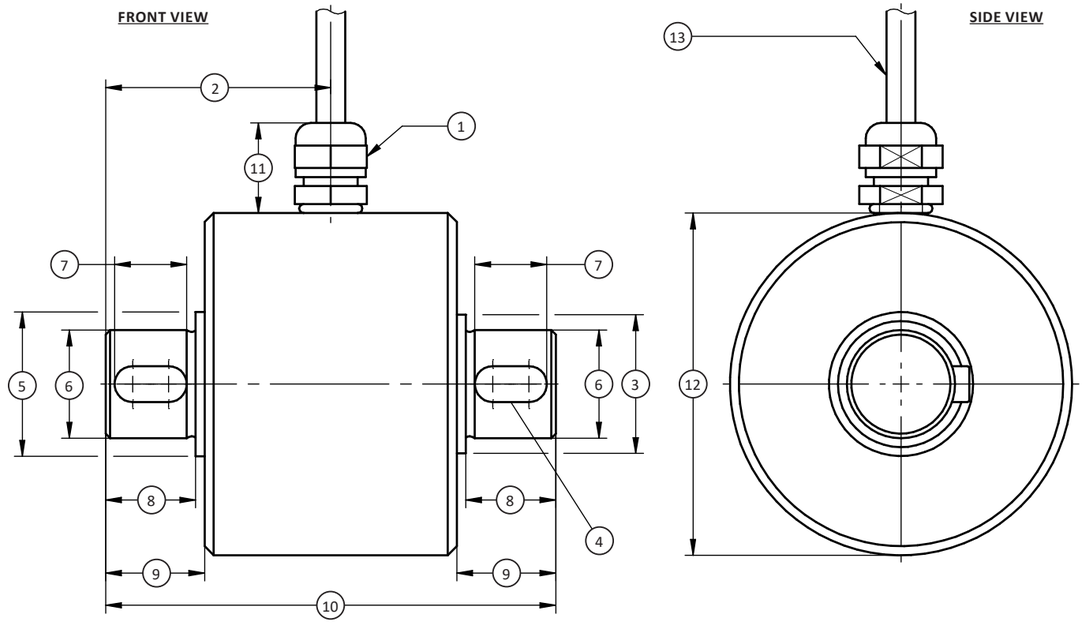
| Wire | 6-PIN Electrical CONNECTION |
|---|---|
| | Function |
| Green | Excitation (-) |
| Brown | Excitation (+) |
| Yellow | Signal (+) |
| White | Signal (-) |
| Grey | Control signal (option) |
| Shield | Shield |

## PERFORMANCE PARAMETERS

| CAPACITY | | SPRING RATE | MASS MOMENT OF INERTIA – ($Kg \bullet m^2$) | | MAX THRU.S.T 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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 |

* 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.



# 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 / °C | | ±0.02 |
| Effect on Output – % / °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

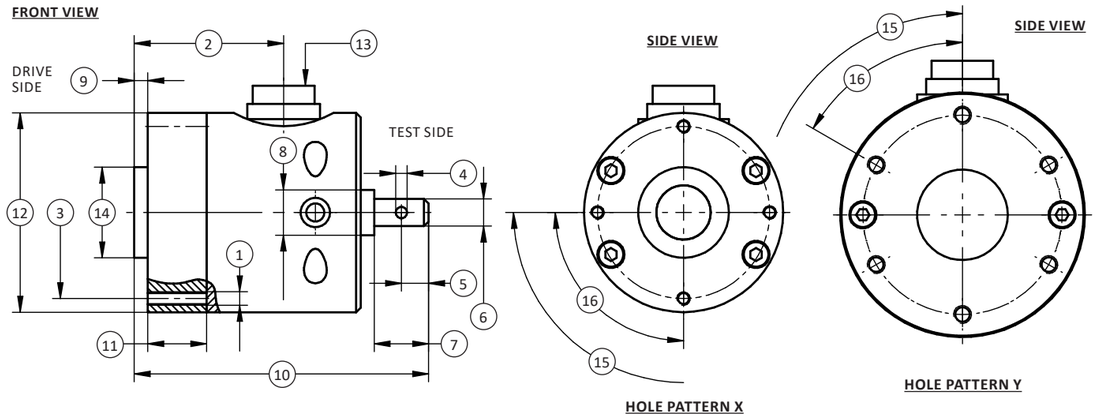
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

## PERFORMANCE PARAMETERS

| CAPACITY | | Nominal Output ±0.1 | SPRING RATE | MASS MOMENT OF INERTIA – ($Kg \cdot m^2$) | | MAX THRU.S.T 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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<br>0.1, 0.2, 0.5, 1, 2 | 0.18, 0.44, 0.89, 1.77,<br>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) | $Ø38^{\pm0.1}$ | $1.5^{\pm0.004}$ | $38^{\pm0.1}$ | $1.5^{\pm0.004}$ | $44^{\pm0.1}$ | $1.7^{\pm0.004}$ |
| (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° | |

* 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.



# 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 TSQ** (Shown)

## Specifications

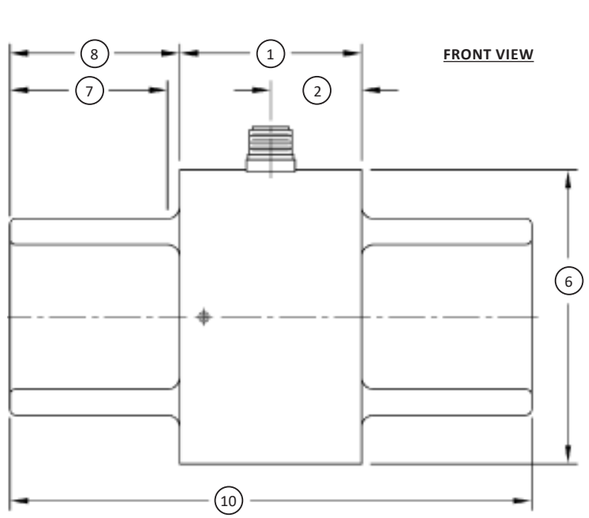
| | | |
|---|---|---|
| **ACCURACY – (MAX ERROR)** | | |
| Nonlinearity – %FS | | ±0.25 (TSQ1-1200K ±0.50) |
| Hysteresis – %FS | | ±0.25 (TSQ1-1200K ±0.50) |
| Nonrepeatability – %RO | | ±0.05 |
| **TEMPERATURE** | | |
| Effect on zero – %RO / °F | | ±0.0002 |
| Effect on output – % / °F | | ±0.0002 |
| 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

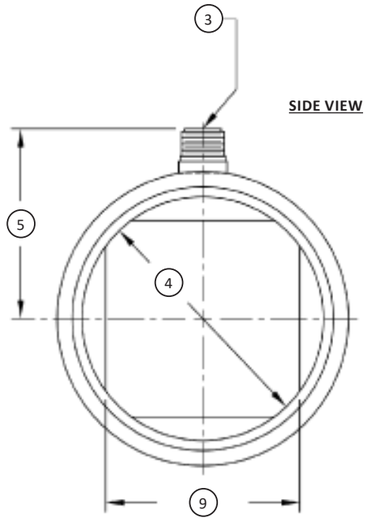
| MODEL | CAPACITY | | TORQUE OVERLOAD | | TORSIONAL STIFFNESS | | WEIGHT | | MAX THRU.S.T LOAD | | MAX BENDING MOMENT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lbf-in | Nm | lbf-in | Nm | lbf-in/rad | Nm/rad | lbs | kg | lbf | N | lbf-in | Nm |
| TSQ1 | 300K | 33.9K | 600K | 67.8K | 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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

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




FRONT VIEW




SIDE VIEW

## Dimensions

| See Drawings | MODEL | | | |
|---|---|---|---|---|
| | TSQ1 | | TSQ2 | |
| | in | mm | in | mm |
| (1) | 10.75 | 273.1 | 16 | 406 |
| (2) | 1.875 | 47.63 | 2.5 | 34 |
| (3) | CF 3102E 14S-6P Connector Mating Connector Supplied (MS 3106A 14S-6S) | | | |
| (4) | Ø4.969 | Ø126.21 | Ø7.5 | Ø191 |
| (5) | 3.875 | 98.43 | 5.125 | 130.18 |
| (6) | Ø6 | Ø152 | Ø8.5 | Ø216 |
| (7) | 3.25 | 82.6 | 5 | 127 |
| (8) | 3.5 | 89 | 5.5 | 140 |
| (9) | 4 TYP ACROSS FLATS | 102 TYP ACROSS FLATS | 5.5 TYP ACROSS FLATS | 140 TYP ACROSS FLATS |
| (10) | 10.75 | 273.1 | 16 | 406 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

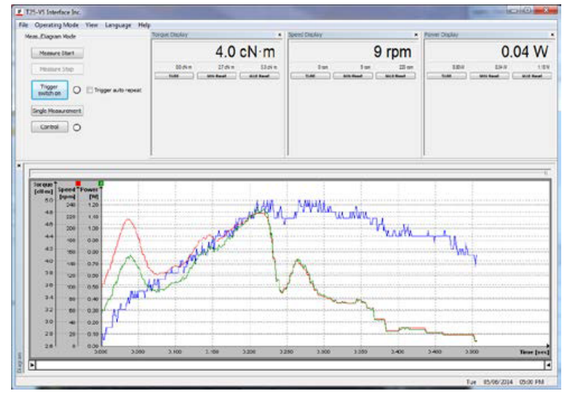


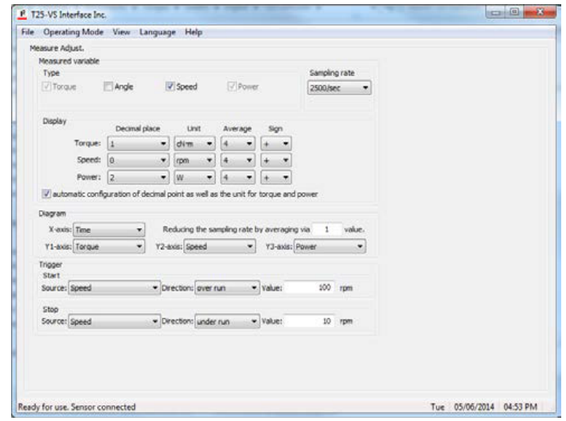


# U.S.B OUTPUT OPTION AVAILABLE ON T12, T15, T25 ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

## FEATURES & BENEFITS

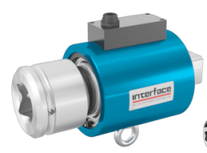
- Torque, speed & power OR torque = angle
- Display, graph & log
- Up to 2500 measurments/second
- 16-bit resolution
- Peak & valley
- Unit conversion
- Triggered start & stop for automatic event capture
- Automatic scaling of Y-Axis
- Log files are in Excel compatible .csv format
- Supply over U.S.B – no separate power cord
- Configuration & calibration stored in sensor
- Includes software & U.S.B cable




## Specifications

| U.S.B 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 U.S.B |
| Supply Current – mA | ≤ 250 |
| Calibration Signal – %FS | 100 (software activated) |



T12 SQUARE DRIVE*



T15 HEX DRIVE*



T25*

***For more information, see datasheet for this product.***

# Notes:

# Multi-Axis Sensors

2-Axis

3-Axis

6-Axis

Axial Torsion

# 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 simultaneoU.S.ly 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 indU.S.trial and scientific applications, such as aerospace, robotics, automotive and medical research (orthopedics and biomechanical).

The load cell is provided in varioU.S. 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 cU.S.tom design if warranted for varying capacities (between X, Y, and Z), higher Temperature capability, or

## 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 Analog Amplifier**




**Model BSC4A** (Shown)
**4-Channel U.S.B Digital Amplifier**

Catalog 2019 06-15-2020

* 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 – %** | | ±0.1 | | | | | |
| **TEMPERATURE** | | | | | | | |
| **Effect on Zero – %RO / °C** | | ±0.02 | | | | | |
| **Effect on Output – % / °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 – m** | | 5 Cable with 37-PIN Connector. Includes Mate | | | | | |
| **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 | | | | | |

## STANDARD CONFIGURATION




**Model 3A60A** (Shown)

## FEATURES & BENEFITS

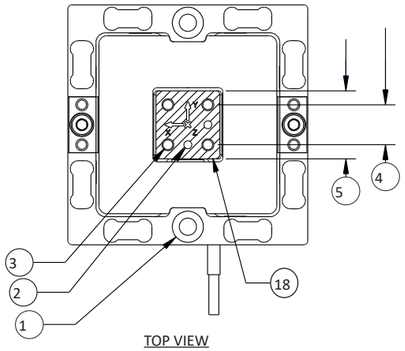
The 3A60A is a new and improved version of the original 3A60 with revised mounting holes and extended capacity ranges. The 3A60A is NOT backward compatible with the old 3A60.

* ***Nominal***

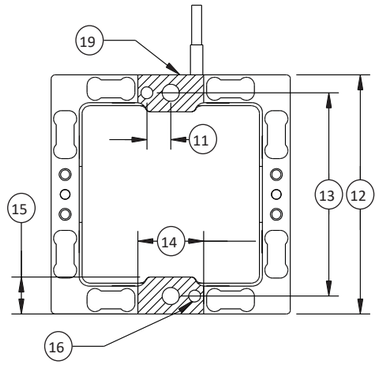
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 3A60A SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

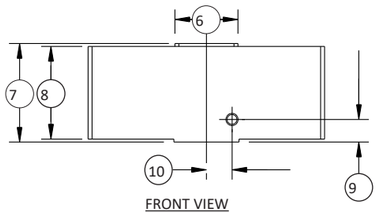
## DIMENSIONS



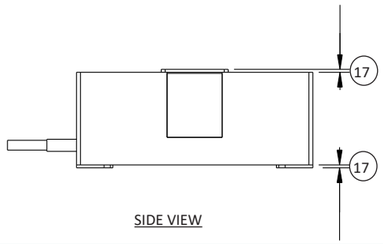

TOP VIEW




BOTTOM VIEW




FRONT VIEW




SIDE VIEW

| 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 | |

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.



# 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 – % | | ±0.1 | | | | | | | |
| **TEMPERATURE** | | | | | | | | | |
| Effect on Zero – %RO / °C | | ±0.02 | | | | | | | |
| Effect on Output – % / °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 – m | | 5 Cable with 37-PIN Connector. Includes Mate | | | | | | | |
| **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

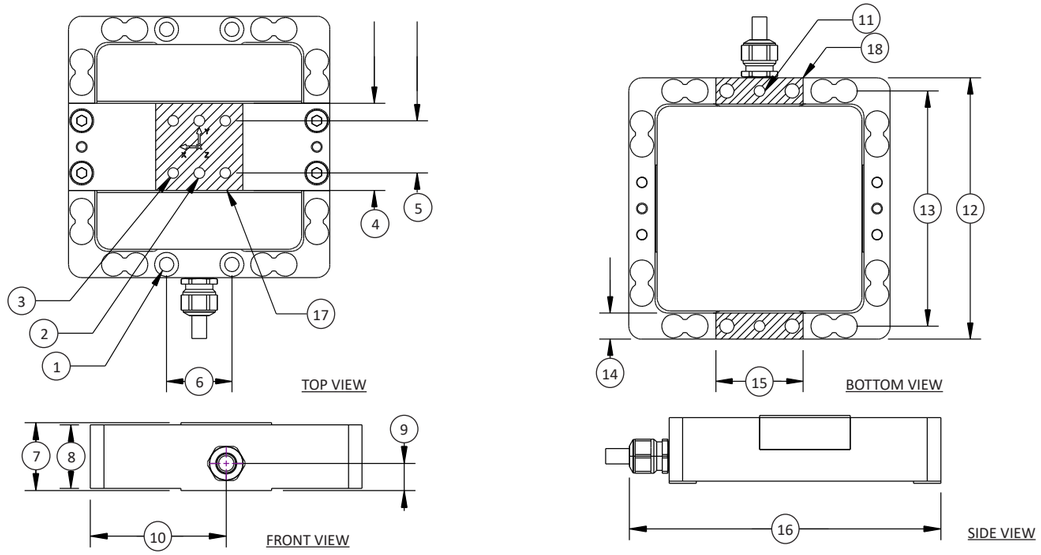



**Model 3A120** (Shown)

**** Nominal***
***** Stainless Version denoted by 3A120S-1KN***
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.

# 3A120 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

## 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 | |

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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.



# 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 – % | | ±0.05 | | |
| **TEMPERATURE** | | | | |
| Effect on Zero – %RO / °C | | ±0.02 | | |
| Effect on Output – % / °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 × $10^9$ | | |
| Electrical Connection – m | | 5 Cable with 37-PIN Connector. Includes Mate | | |
| **MECHANICAL** | | | | |
| Rated Capacity (FS) | N | 2K - 10K | 20K | 50K |
| | lbf | 450 - 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 | | |

## STANDARD CONFIGURATION



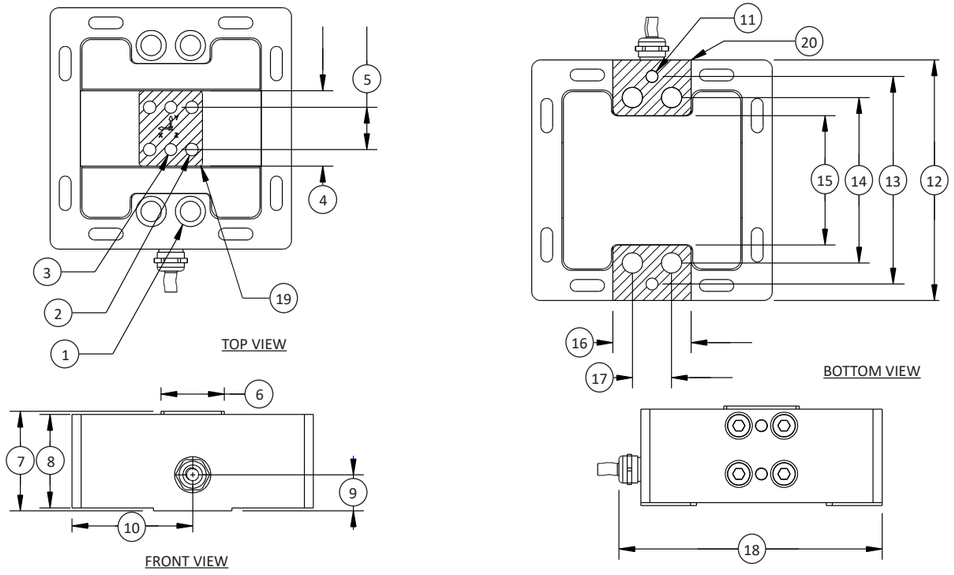
**Model 3A160** (Shown)

**** 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.

# 3A160 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

## 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 | |

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.



# 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 / °C** | | ±0.02 | | |
| **Effect on Output – % / °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 – m** | | 16-PIN Connector. Includes 5 mating 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 | | |

**** Nominal***

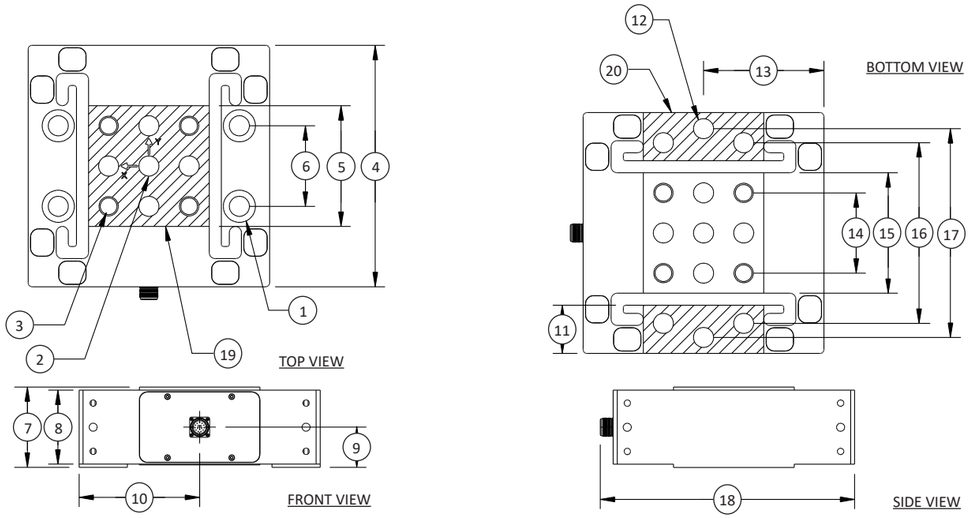
## STANDARD CONFIGURATION



**Model 3A300** (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.

# 3A300 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)




## 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 | |

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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.



# 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 – % | | ±0.05 |
| **TEMPERATURE** | | |
| Effect on Zero – %RO / °C | | ±0.02 |
| Effect on Output – % / °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 – m | | 16-PIN Connector. Includes 5 mating 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 |

* ***Nominal***

## STANDARD CONFIGURATION

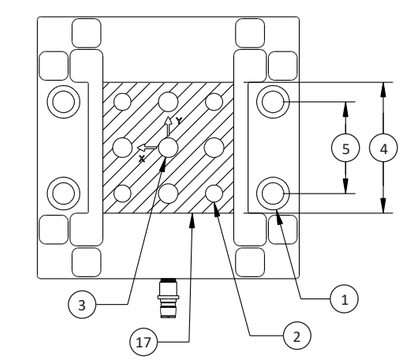


**Model 3A400** (Shown)

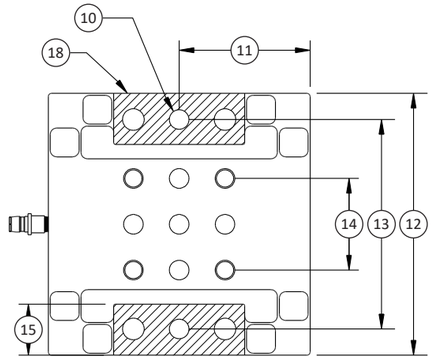
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 3A400 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

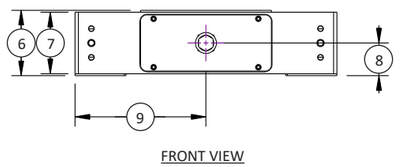
## DIMENSIONS



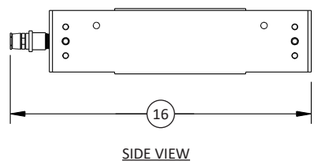

TOP VIEW




BOTTOM VIEW




FRONT VIEW




SIDE VIEW

| 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 | |

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 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 500K(112K)/20K(177K)
- Compact size
- Force and moment values MU.S.T be calculated U.S.ing supplied 36-term coefficient matrix
- Low crosstalk
- Temperature compensated
- Optional BX8 amplifier and software can be U.S.ed for force and moment value calculation

Interface's 6-axis load cell measures forces simultaneoU.S.ly in three mutually perpendicular axes and three simultaneoU.S. 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 indU.S.trial 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 U.S.B PC interface is also available which simplifies data analysis.

## STANDARD CONFIGURATION



**Model 6A154** (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 / °C MAX | | ± 0.01 |
| Effect on Output – % / °C MAX | | ± 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 |

**** Temperature compensation not available on Models 6A27 and 6A40***


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 LOAD CELLS (Fx Fy Fz Mx My Mz) (U.S. & METRIC)

## CHARACTERISTICS

| See Drawing | MODEL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6A27 | 6A40 | | 6A68 | | | | | 6A80 | | |
| | A | A | B | A | B | C | D | E | A | B | C |
| Fx (N) | 50 | 200 | 500 | 1K | 2K | 5K | 10K | 10K | 1K | 2K | 5K |
| Fy (N) | 50 | 200 | 500 | 1K | 2K | 5K | 10K | 10K | 1K | 2K | 5K |
| Fz (N) | 200 | 500 | 2K | 2K | 4K | 10K | 20K | 20K | 2.5K | 5K | 15K |
| Mx (Nm) | 1 | 5 | 20 | 20 | 50 | 50 | 100 | 500 | 50 | 100 | 250 |
| My (Nm) | 1 | 5 | 20 | 20 | 50 | 50 | 100 | 500 | 50 | 100 | 250 |
| Mz (Nm) | 1 | 10 | 40 | 20 | 50 | 50 | 100 | 500 | 50 | 100 | 250 |
| Diameter (mm) | 27 | 60 | | 83 | | | | | 80 | | |
| Height (mm) | 25 | 40 | | 64 | | | | | 50 | | |
| Weight (g) | 25 | 250 | 400 | 830 | | 1050 | | | 450 | | 1000 |
| Material | SS | AL | SS | AL | | SS | | | AL | | SS |
| Deflection (mm) | 0.01 | 0.1 | 0.03 | 0.04 | | | | | 0.02 | | |
| Deflection (rad) | 0.01 | 0.01 | 0.003 | 0.001 | | | | | 0.001 | | |
| Protection (IP) | 65 | 65 | | 65 | | | | | 65 | | |

| See Drawing | MODEL | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6A110 | | 6A130 | | 6A154 | | | | 6A175 | | 6A225 | | |
| | A | B | A | B | A | B | C | D | A | B | A | B | C |
| Fx (N) | 4K | 10K | 5K | 15K | 50 | 100 | 200 | 500 | 10K | 20K | 50K | 100K | 200K |
| Fy (N) | 4K | 10K | 5K | 15K | 50 | 100 | 200 | 500 | 10K | 20K | 50K | 100K | 200K |
| Fz (N) | 10K | 25K | 15K | 50K | 100 | 200 | 500 | 1K | 20K | 50K | 100K | 250K | 500K |
| Mx (Nm) | 250 | 750 | 500 | 1.2K | 5 | 10 | 20 | 50 | 1K | 2K | 10K | 15K | 20K |
| My (Nm) | 250 | 750 | 500 | 1.2K | 5 | 10 | 20 | 50 | 1K | 2K | 10K | 15K | 20K |
| Mz (Nm) | 250 | 750 | 500 | 1.2K | 5 | 10 | 20 | 50 | 1K | 2K | 10K | 15K | 20K |
| Diameter (mm) | 110 | | 130 | | 154 | | | | 175 | | 225 | | |
| Height (mm) | 60 | | 80 | | 120 | | | | 116 | | 140 | | |
| Weight (g) | 880 | 1800 | 1500 | 3200 | 800 | | | | 11,000 | | 24000 | | |
| Material | AL | SS | AL | SS | AL | | | | SS | | SS | | |
| Deflection (mm) | 0.03 | | 0.05 | | 0.08 | | | 0.1 | 0.1 | | 0.1 | | |
| Deflection (rad) | 0.001 | | 0.002 | | 0.001 | | | | 0.01 | | 0.01 | | |
| Protection (IP) | 65 | | 65 | | 65 | | | | 65 | | 65 | | |

***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.



# 6A27 6-AXIS 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 | |

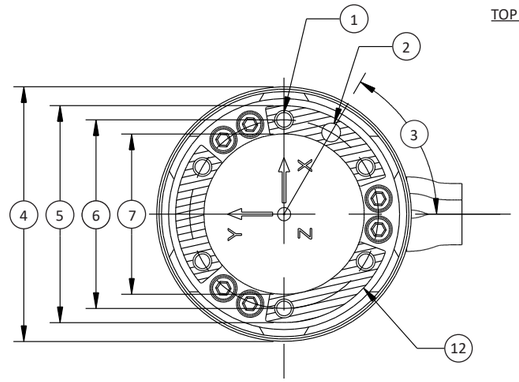
## APPLICATIONS

- Integration into wind tunnel models
- Integration into handles of medical tools
- Sports medicine
- Biomechanics
- Control of assembly and handling processes in micromechanics

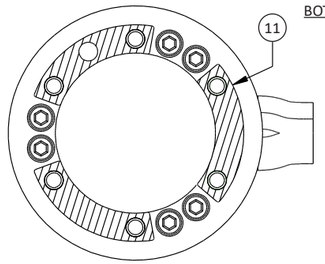
## CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

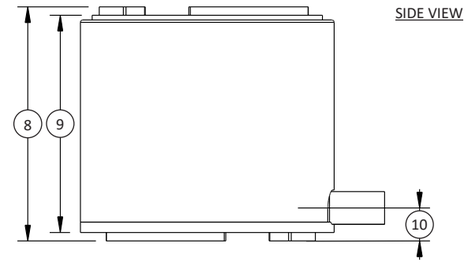
TOP VIEW




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.

# 6A40 6-AXIS LOAD CELL (U.S. & METRIC)

## STANDARD CONFIGURATION



**Model 6A40** (Shown)

## APPLICATIONS

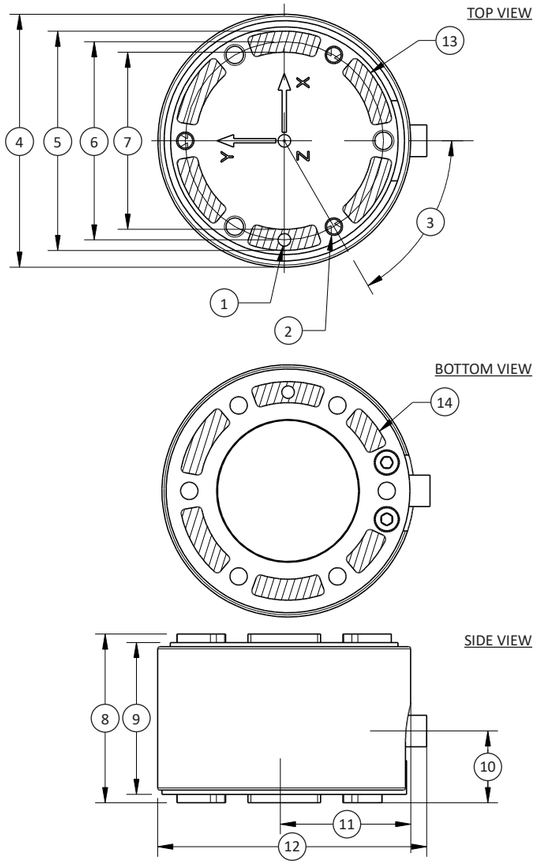
- Collision detection
- “Teach-In”
- Presence or error detection
- Medical / prosthetics / orthopedics
- Gait analysis
- Sports medicine
- Comfort / ergonomics

## CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

## 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.



# 6A68 6-AXIS LOAD CELL (U.S. & METRIC)

## STANDARD CONFIGURATION



**Model 6A68** (Shown)

## APPLICATIONS

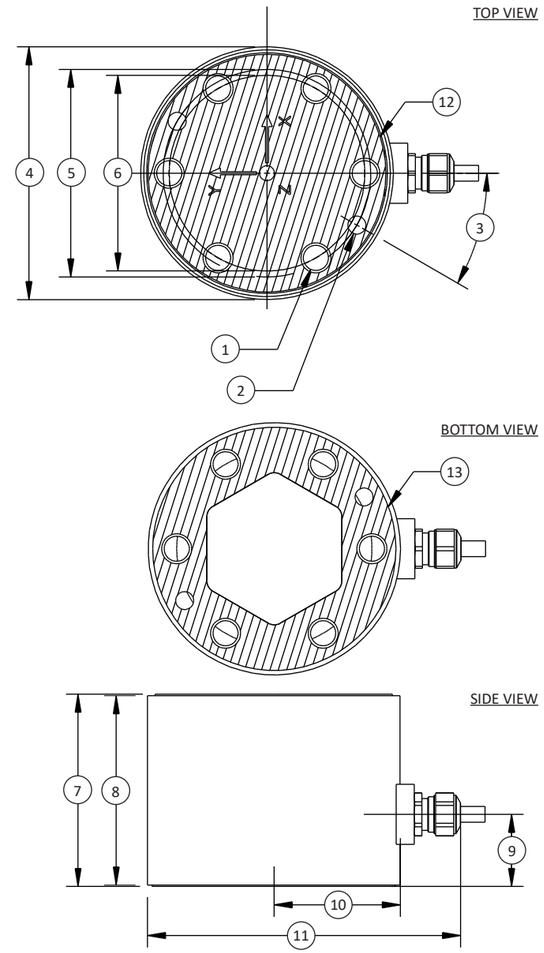
- Collision detection
- “Teach-In”
- Presence or error detection
- Medical / prosthetics / orthopedics
- Gait analysis
- Sports medicine
- Comfort / ergonomics

## CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

## 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 | |




***See adapter plates for 6A68 on the next page***

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.

# 6A68 6-AXIS LOAD CELL (U.S. & METRIC)

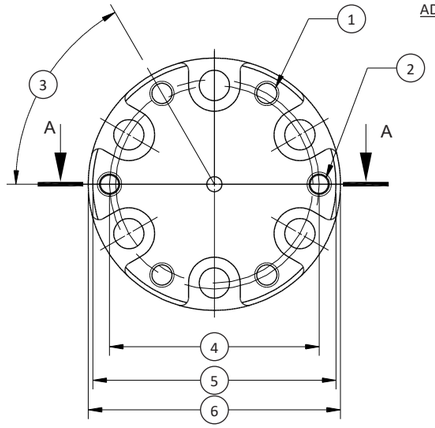
## ADAPTER PLATES

- Two required per sensor
- Aluminum or stainless steel depending on capacity
- 6A68 only

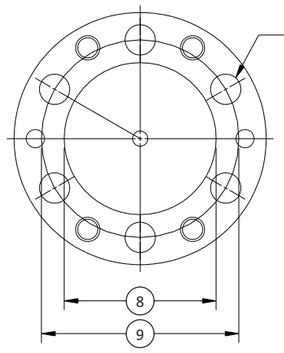
## DIMENSIONS

| 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 |

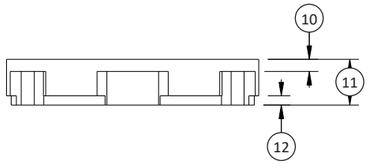
ADAPTER PLATES TOP VIEW



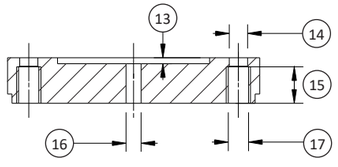

ADAPTER PLATES BOTTOM VIEW




ADAPTER PLATES SIDE VIEW




ADAPTER PLATES A-A SECTION VIEW




**Adapter Plates** (Shown)

Catalog 2019 06-15-2020

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.



# 6A80 6-AXIS LOAD CELL (U.S. & METRIC)

## STANDARD CONFIGURATION



**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 |

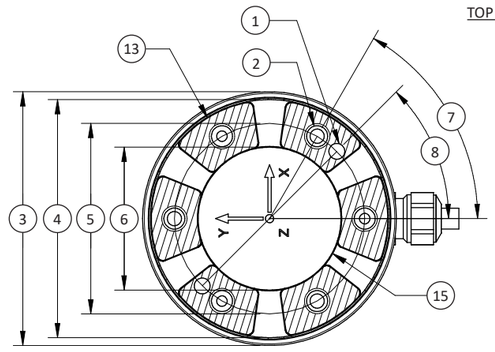
## APPLICATIONS

- Collision detection
- “Teach-In”
- Presence or error detection
- Medical / prosthetics / orthopedics
- Force or torque-controlled operation
- Sports medicine
- Comfort / ergonomics

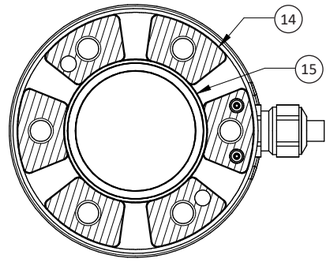
## CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

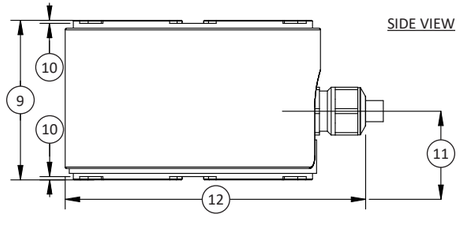
TOP VIEW




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.

# 6A110 6-AXIS LOAD CELL (U.S. & METRIC)

## STANDARD CONFIGURATION



**Model 6A110** (Shown)

## APPLICATIONS

- Collision detection
- “Teach-In”
- Presence or error detection
- Medical / prosthetics / orthopedics
- Force or torque-controlled operation
- Sports medicine
- Comfort / ergonomics

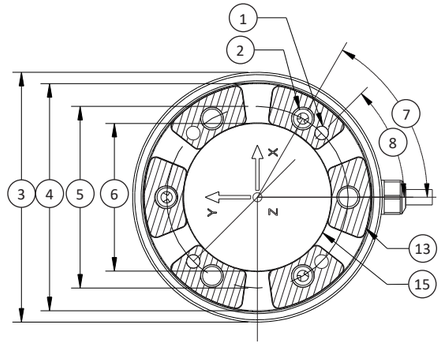
## CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

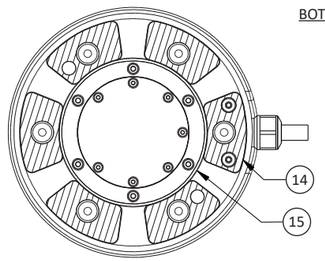
## DIMENSIONS

| 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 |

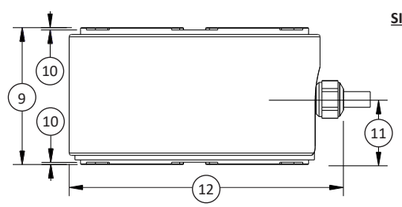
TOP VIEW




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 LOAD CELL (U.S. & METRIC)

## STANDARD CONFIGURATION



**Model 6A130** (Shown)

## APPLICATIONS

- Collision detection
- “Teach-In”
- Presence or error detection
- Medical / prosthetics / orthopedics
- Force or torque-controlled operation
- Sports medicine
- Comfort / ergonomics

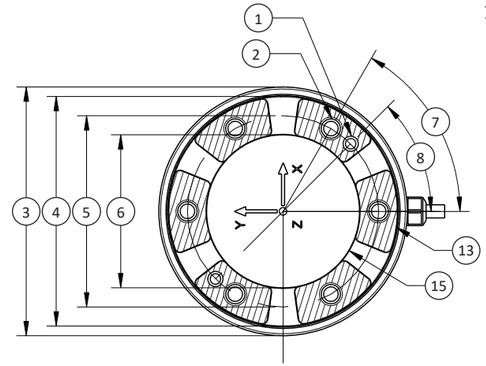
## CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

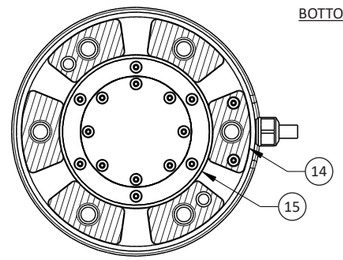
## DIMENSIONS

| 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 |

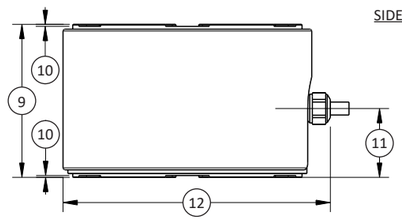
TOP VIEW




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.

# 6A154 6-AXIS LOAD CELL (U.S. & METRIC)

## STANDARD CONFIGURATION



**Model 6A154** (Shown)

## APPLICATIONS

- Wind tunnel balances
- Combines low force with high moment capacity

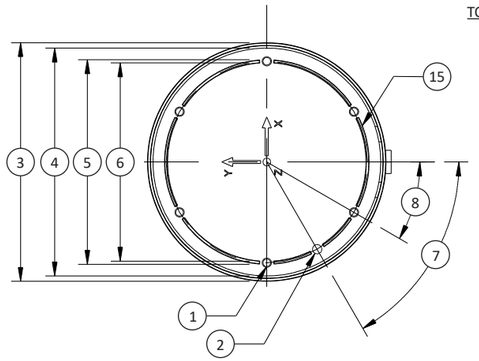
## CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

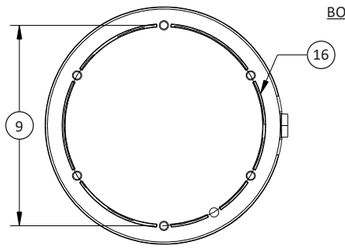
## DIMENSIONS

| 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 | |

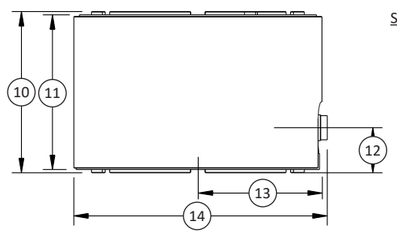
TOP VIEW




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.



# 6A175 6-AXIS LOAD CELL (U.S. & METRIC)

## STANDARD CONFIGURATION



**Model 6A175** (Shown)

## APPLICATIONS

- Automation and robotics
- Press force
- Seismic studies

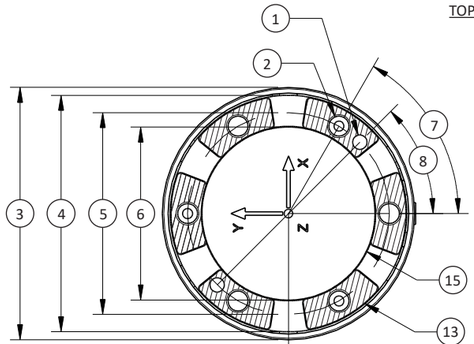
## CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

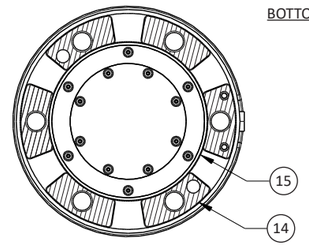
## DIMENSIONS

| 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 |

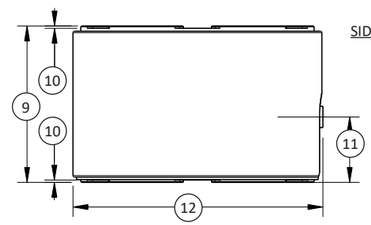
TOP VIEW




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.

# 6A225 6-AXIS LOAD CELL (U.S. & METRIC)

## STANDARD CONFIGURATION



**Model 6A225** (Shown)

## DIMENSIONS

| See Drawing | Metric | U.S. |
|---|---|---|
| | mm | in |
| (1) | 12 x ØM20x2.5 ↧ 25 ⌵ 118° | 12 x ØM20x2.5 ↧ 1.0 ⌵ 118° |
| (2) | 2 x Ø12 E7 ↧ 18 | 2 x Ø(0.4744/0.4737) |
| (3) | Ø225 | Ø8.9 |
| (4) | Ø215 | Ø8.5 |
| (5) | Ø180 | Ø7.1 |
| (6) | Ø145 H8 ↧ 4 | Ø(5.7111/5.7086) ↧ 0.2 |
| (7) | 45° | |
| (8) | 30° | |
| (9) | 140 | 5.5 |
| (10) | 5 | 0.2 |
| (11) | 69.48 | 2.735 |
| (12) | 225.5 (+3) | 8.88 (+0.1) |
| (13) | Bolting Surface / Measuring Platform | |
| (14) | Bolting Surface | |
| (15) | Centering ↧ 3.5 | Centering ↧ 0.14 |

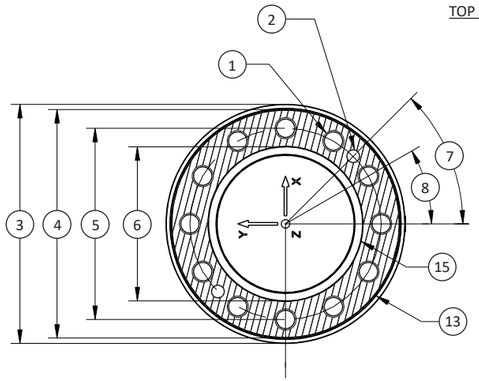
## APPLICATIONS

- Automation and robotics

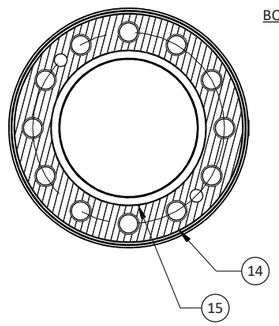
## CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

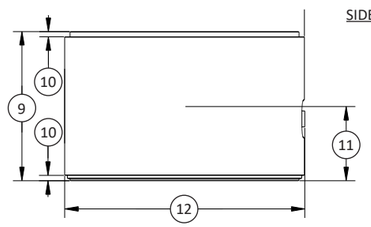
TOP VIEW




BOTTOM VIEW




SIDE VIEW




Catalog 2019 06-15-2020

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.



# 1216 AXIAL TORSION LOAD CELL (U.S. & METRIC)

## FEATURES & BENEFITS

- Measures load and torque
- Minimal crosstalk
- ExtraneoU.S. 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 / 100°F MAX | | ±0.08 | ±0.08 |
| Effect on Output – % / 100°F MAX | | ±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

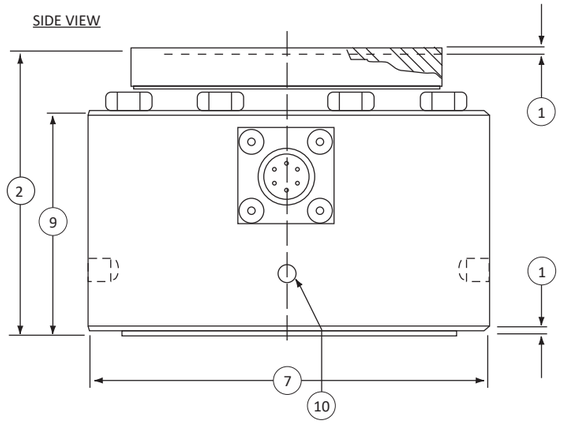
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Special Temperature range

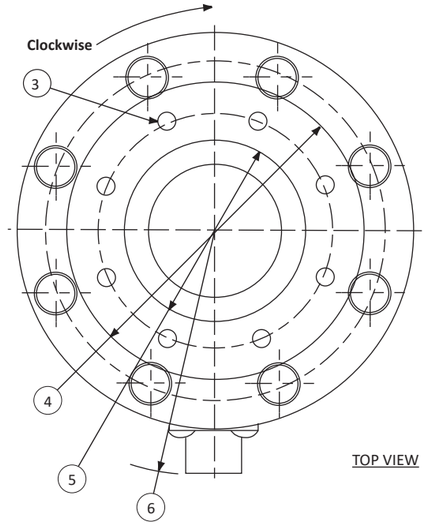
## ACCESSORIES

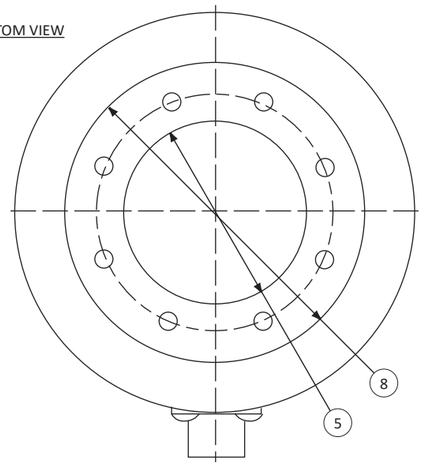
- Mating connector
- Instrumentation

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

# 1216 AXIAL TORSION LOAD CELL (U.S. & METRIC)




## 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) UNFx ↧ 0.43 on a 2.600 B.C. | (¼-28) UNF x ↧ 10.9 on a 66.04 B.C. |
| (4) | Ø3.20 | Ø81.3 |
| (5) | Ø2.000 (+0.002 / -0.000) | Ø50.80 (+0.51/-0.00) |
| (6) | 2.77 | 70.3 |
| (7) | Ø4.13 | Ø104.3 |
| (8) | Ø3.200 | Ø81.28 |
| (9) | 2.33 | 59.2 |
| (10) | Ø0.25 ↧ 0.25 | Ø6.4 ↧ 6.4 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



# 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 / 100°F – MAX | | ±0.15 | ±0.15 |
| Effect on Output – % / 100°F – MAX | | ±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)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Special Temperature range

## ACCESSORIES

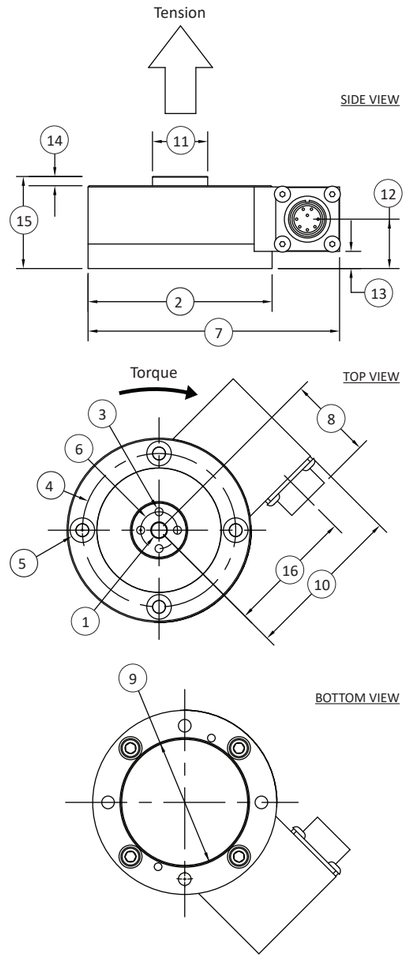
- Mating connector
- Instrumentation
- Loading hardware


* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric 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 |




* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

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# 2816 AXIAL TORSION LOAD CELL (U.S. & METRIC)

## FEATURES & BENEFITS

- Measures load and torque simultaneoU.S.ly
- ExtraneoU.S. load resistance
- Minimal crosstalk
- Fatigue rated

## Specifications

| | | Axial Bridge A | Axial 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 MAX | °F | ±0.0015 | ±0.0015 |
| | °C | ±0.0027 | ±0.0027 |
| Effect on Output – % MAX | °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)
- CU.S.tom 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

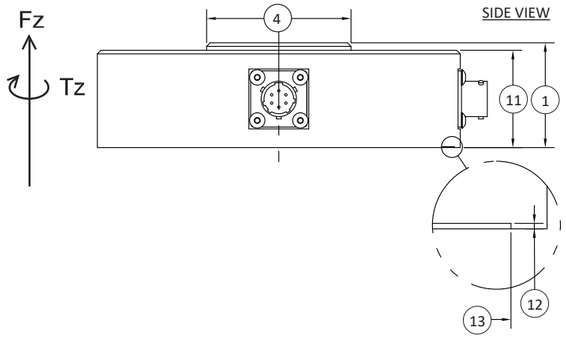
## ACCESSORIES

- Mating connector
- Instrumentation
- Loading hardware

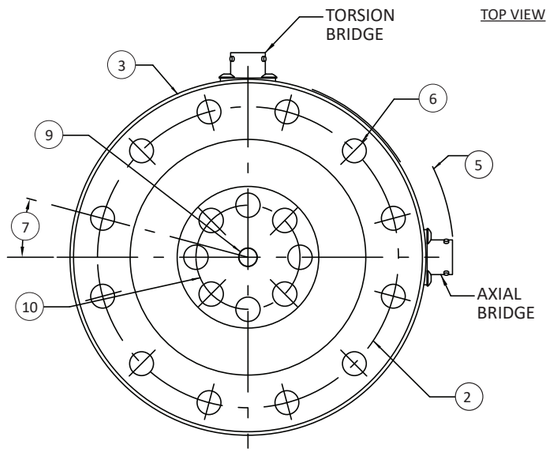
# 2816 AXIAL TORSION LOAD CELL (U.S. & METRIC)

## Dimensions

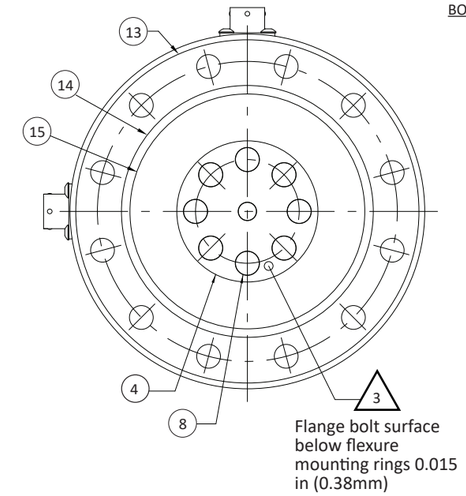
| See Drawing | CAPACITY | |
|---|---|---|
| | U.S. (lbf/lbf-in) | Metric (N/Nm) |
| | 3.3K/2K, 5K/3K<br>10K/6K, 15K/7.5K | 16K/220, 25K/340<br>45K/680, 63K/900 |
| | in | mm |
| 1 | 1.75 | 44.4 |
| 2 | 5.120 | 130.18 |
| 3 | 6.06 | 153.9 |
| 4 | 2.41 | 61.2 |
| 5 | 3.55 | 90.2 |
| 6 | 0.41 | 10.3 |
| 7 | 15° | |
| 8 | Ø0.41 THRU, ⌵ 90°, Ø0.46 | Ø10.5 THRU, ⌵ 90°, Ø11.7 |
| 9 | Ø0.31 THRU,<br>⌴ Ø0.3155–3166,<br>↧ 0.39 – This side only | Ø7.8 THRU,<br>⌴ Ø8.014–8.042,<br>↧ 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 |



SIDE VIEW



TOP VIEW



BOTTOM VIEW

Flange bolt surface below flexure mounting rings 0.015 in (0.38mm)

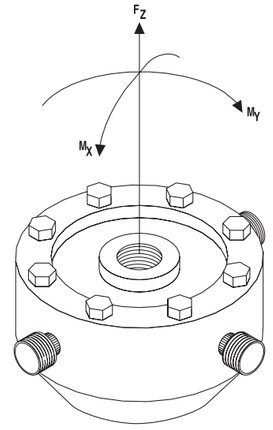
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# 5200 MULTI-AXIS LOAD CELL (U.S. & METRIC)

## FEATURES & BENEFITS

- SimultaneoU.S.ly measures thrU.S.t and moment perpendicular to the thrU.S.t axis
- ThrU.S.t axis functions to the same Specifications as a Model 1200
- ThrU.S.t stiffness and moment stiffness are both very high becaU.S.e of the low profile construction




## PERFORMANCE PARAMETERS

| Model 5200 | RATED THRU.S.T | | 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



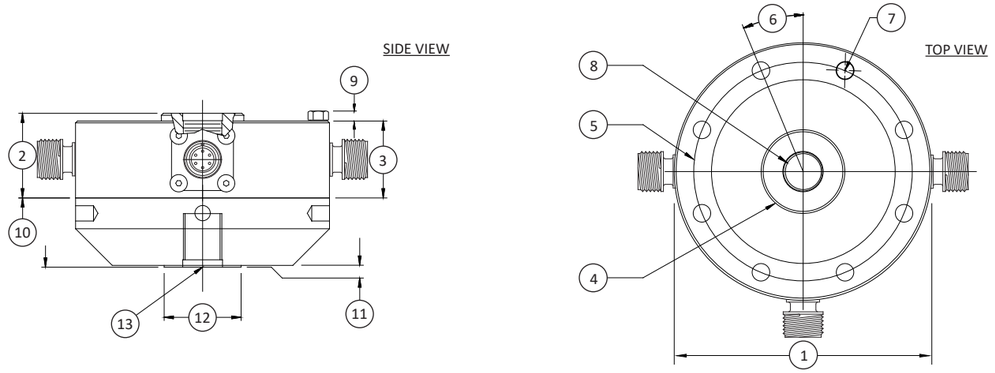

**Model 5200** (shown)

## Specifications

| | | |
|---|---|---|
| Static Error Band – ThrU.S.t | 1K-10K | ±0.04 |
| | 25K & 50K | ±0.05 |
| Deflection – ThrU.S.t – FS | in | 0.001 to 0.002 |
| | mm | 0.03 to 0.05 |
| Calibration – ThrU.S.t | | Same as 1200 Series Universal |
| Deflection – Moment – FS / sec | | From 20 (depending on range) |
| Output - Moment – mV/V | | Approx. ½ of rated thrU.S.t output |
| Cross-Talk - Moment – % | | 1 or less |
| Calibration Uncertainty – Moment – % | | ±1 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

# 5200 MULTI-AXIS LOAD CELL (U.S. & METRIC)




## 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 |

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

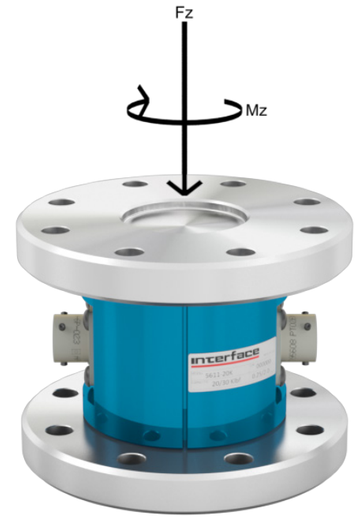


# 5600 AXIAL TORSION FORCE TRANSDUCER (U.S. & METRIC)

## 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
- ExtraneoU.S. load resistance

## STANDARD CONFIGURATION




**Model 5611-20K** (Shown)

# 5600 AXIAL TORSION FORCE TRANSDUCER (U.S. & METRIC)

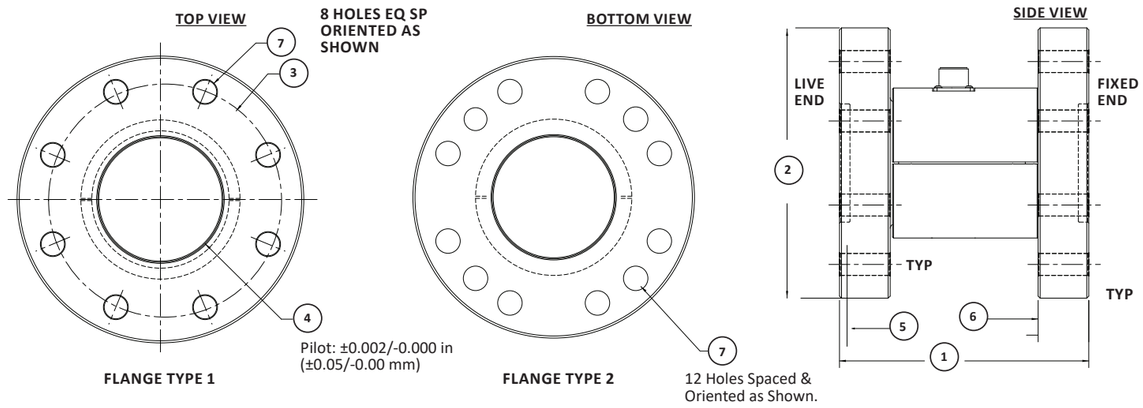
## Specifications

| MODEL | | | 5610-5K | 5611 - 20K | 5612 - 100K | 5613 - 200K | 5614 - 300K |
|---|---|---|---|---|---|---|---|
| **CAPACITY** | | | | | | | |
| 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** | | | | | | | |
| Temperature Effect on Zero – %RO MAX | °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 |
| Temperature Effect of Output – % MAX | °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 |



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FORCE MEASUREMENT SOLUTIONS

# 5600 AXIAL TORSION FORCE TRANSDUCER (U.S. & METRIC)




## DIMENSIONS

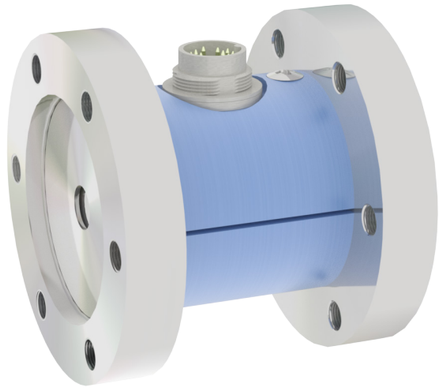
| SEE DRAWING | MODEL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 5610 | | 5611 | | 5612 | | 5613 | | 5614 | |
| | CAPACITY | | | | | | | | | |
| | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) | U.S. (lbf-in) | Metric (Nm) |
| | 5K | 550 | 20K | 2.2K | 100K | 11K | 200K | 22K | 300K | 33K |
| | in | mm | in | mm | in | mm | in | mm | in | mm |
| (1) | 3.00 | 76.2 | 3.50 | 88.9 | 7.38 | 187.5 | 8.50 | 215.9 | 10.50 | 266.7 |
| (2) | 4.00 | 101.6 | 5.00 | 127.0 | 8.00 | 203.2 | 9.75 | 247.7 | 14.00 | 355.6 |
| (3) | 3.25 | 82.6 | 4.25 | 108.0 | 6.50 | 165.1 | 8.00 | 203.2 | 11.0 | 279.4 |
| (4) | 1.500 | 38.10 | 2.000 | 50.80 | 3.500 | 88.90 | 4.000 | 101.60 | 6.000 | 152.40 |
| (5) | 0.13 | 3.3 | 0.25 | 6.4 | 0.31 | 7.9 | 0.31 | 7.9 | 0.31 | 7.9 |
| (6) | 0.50 | 12.7 | 0.75 | 19.1 | 1.50 | 38.1 | 1.50 | 38.1 | 2.00 | 50.8 |
| (7) | 0.328 | 8.33 | 0.390 | 10.41* | 0.650 | 16.51 | 0.781* | 20.65 | 1.031 | 24.64* |
| Flange Type | 1 | | 1 | | 2 | | 2 | | 1 | |
| Recommended mtg screw size – lbf-in/Nm | 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 |
| Recommended mtg torque – lbf-in/Nm | 300 | 34 | 600 | 68 | 2400 | 270 | 4400 | 500 | 9000 | 1000 |

**** Metric Model 5611, 5613, & 5614 have larger mounting holes than their equivalents to accommodate Standard Metric***

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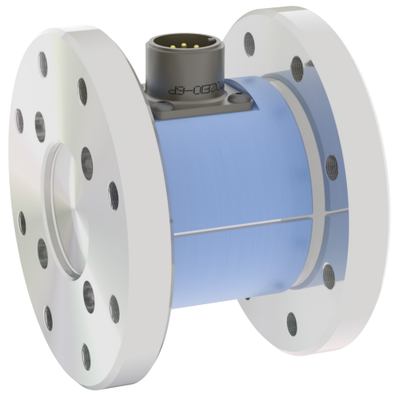
# AT101 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

## FLANGE TYPE 1



Model AT101-2/50

## FLANGE TYPE 2



Model AT101-20/20

## 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 / °C | | ± 0.02 |
| Effect on Output – % / °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 |

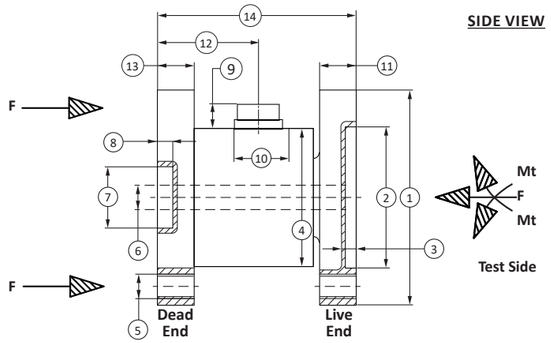
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

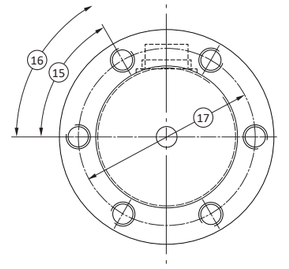


AT101 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

## Dimensions: FLANGE TYPE 1

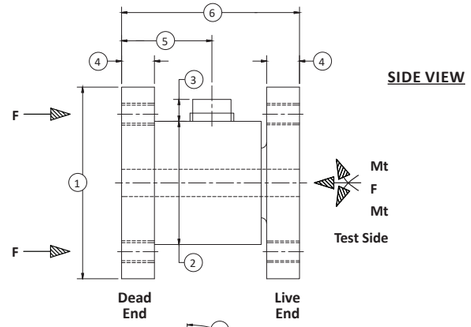
| Model | AT101 – 0.5/5, 1/10, 1/30, 0.5/50, 2/50 | | | |
|---|---|---|---|---|
| | Force (kN) | Torque (Nm) | Force (lbf) | Torque (lbf-in) |
| Capacity | 0.5 | 5 | 112 | 44.3 |
| | 1 | 10 | 225 | 88.5 |
| | 1 | 30 | 225 | 266 |
| | 0.5 | 50 | 112 | 443 |
| | 2 | 50 | 450 | 443 |
| See Drawing | Metric (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) | |

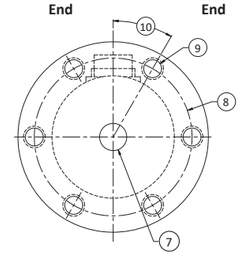



## Dimensions: FLANGE TYPE 2

| 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°) | | | |




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.

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# 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 / °C | | ± 0.02 |
| Effect on Output – % / °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)

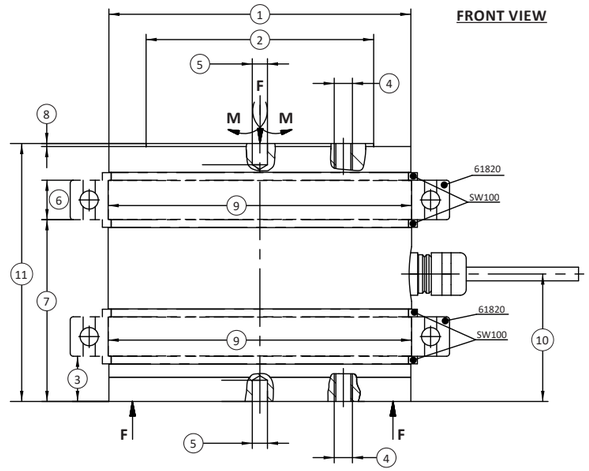


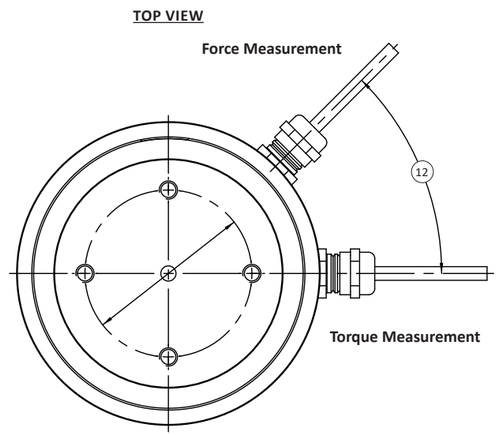
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



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# 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° | |

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.

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# 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

## STANDARD CONFIGURATION



**Model AT103** (Shown)

## 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 / °C | | ± 0.02 |
| Effect on Output – % / °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 |

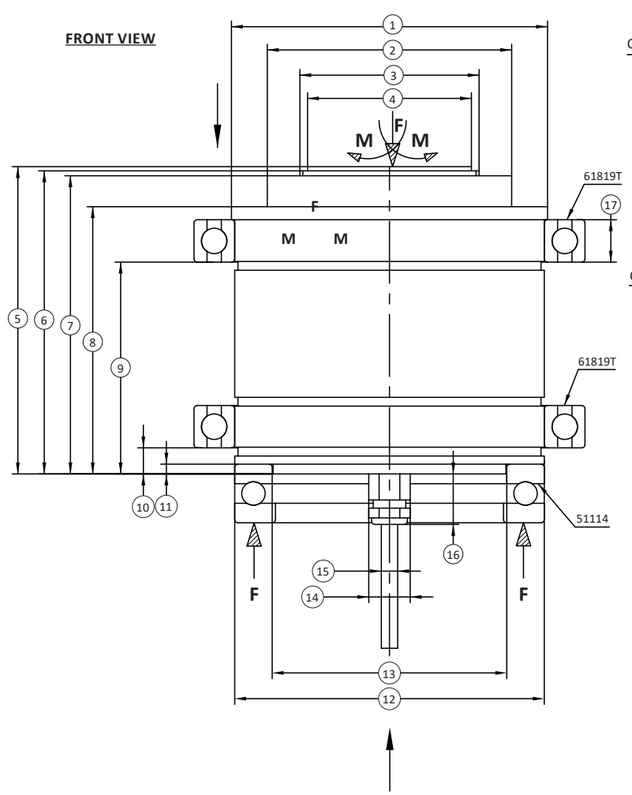


U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



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AT103 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

## Dimensions




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.

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# 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$^{+0.2}$ | Ø3.8$^{+0.008}$ |
| (2) | Ø 75$^{-0.1}$ | Ø 3.0$^{-0.004}$ |
| (3) | Ø55 | Ø2.2 |
| (4) | Ø50$^{-0.1}$ | Ø2.0$^{-0.004}$ |
| (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 Ø57$^{\pm0.1}$ | TK Ø2.2$^{\pm0.004}$ |
| (19) | TK Ø40$^{\pm0.1}$ | TK Ø1.6$^{\pm0.004}$ |
| (20) | TK Ø87$^{\pm0.1}$ | TK Ø3.4$^{\pm0.004}$ |
| (21) | M6 | |
| (22) | M5 | |
| (23) | M4 | |
| (24) | 45° | |



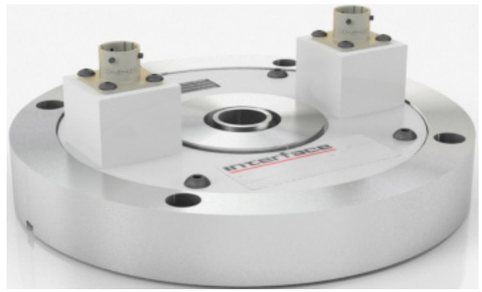


# TXY MULTI-AXIS LOAD CELL (U.S. & METRIC)

## 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** | | |
| Temperature Effect on Zero – %RO / °F | | ±0.002 |
| Temperature Effect of Output – % / °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 |

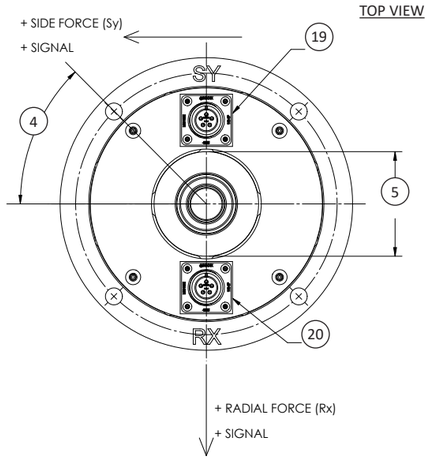
* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

# TXY LOAD CELL (U.S. & METRIC)

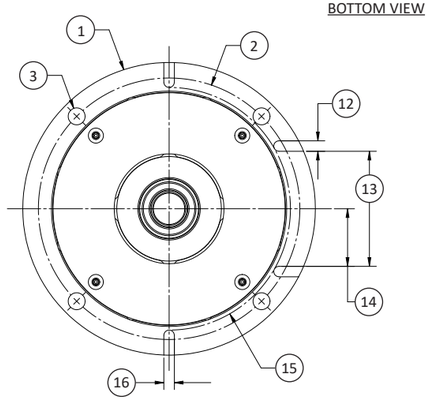
## Dimensions

| 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 | |

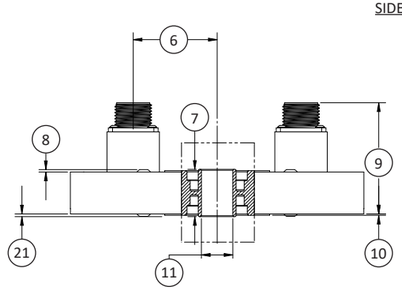
TOP VIEW



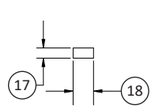

BOTTOM VIEW




SIDE VIEW




KEYS VIEW




* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.



# Notes:

# Notes:





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# WTSLP WIRELESS LOAD PINS (U.S. & METRIC)

## FEATURES & BENEFITS

- Capacities range up to 3,000K lbf (13.3K kN)
- Low power consumption for long battery life
- Wireless communication
- 1,969 ft (600 m) range
- Configured and calibrated via PC U.S.ing a base station and telemetry toolkit
- Compatible with Interface WTS Wireless Products
- RobU.S.t, lightweight hoU.S.ing
- 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**

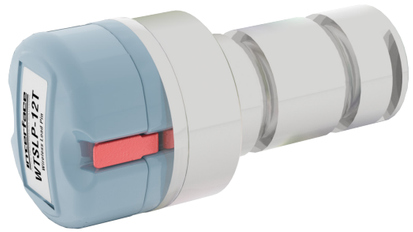
- 8 digit display
- Fully functional tare capability
- Power-off transmitter from receiver enabled
- IP65 waterproof enclosure 3.5 x 5.9 x 1.4 in (90 x 150 x 35 mm)

## COMPATIBLE WITH

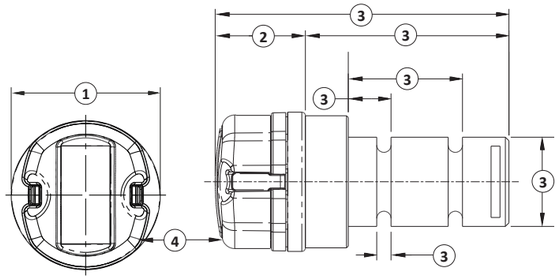


**Model WTS-BS-1-HA** (Shown)

## 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 HoU.S.ing | |

## 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 HoU.S.ing | | Polyamide resin |
| IP Ratng | | IP67 |
| Material | | Heat Treated Steel or Stainless Steel |

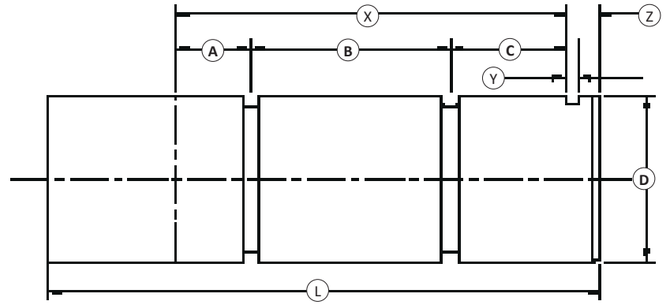
Catalog 2019 06-15-2020

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.



# 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 | | | |

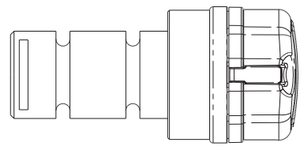
## SECTION TWO FEATURES & APPLICATION

| 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



VarioU.S. mounting configurations are available.

**Shown:** Typical mounting with anti-rotational slot near the end; connector output at hoU.S.ing base.

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.

## FEATURES & BENEFITS

- Capacities range up to 3,000K lbf (13.3K kN)
- Designed to replace pins or bolts that carry a load
- Stainless steel construction
- U.S.ed with clevises, or pulley shafts to monitor loads
- CU.S.tom designs

**IndU.S.try 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 |

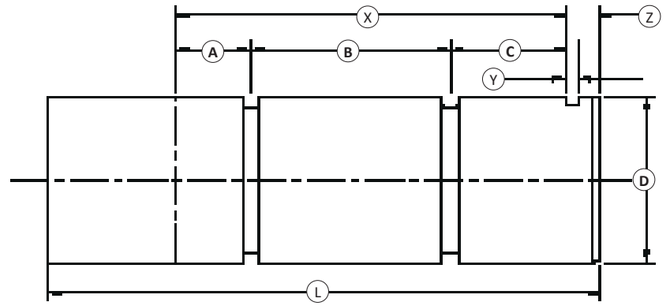
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# LP LOAD PIN (U.S. & METRIC)

## 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 | | | |

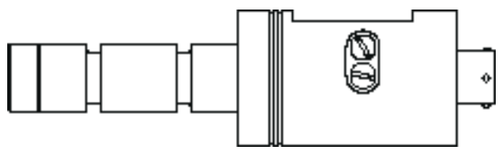
## SECTION TWO FEATURES & APPLICATION

| 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



VarioU.S. mounting configurations are available.

**Shown:** Typical mounting with anti-rotational slot near the end; connector output at hoU.S.ing base.

# Notes:

# Tension Links

## Standard

## Wireless

# 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 HoU.S.ing | | | Polyamide resin | | | | | |
| Load Cell Construction | | | Stainless steel | | | | | |
| Environmental Rating | | | IP67 | | | | | |

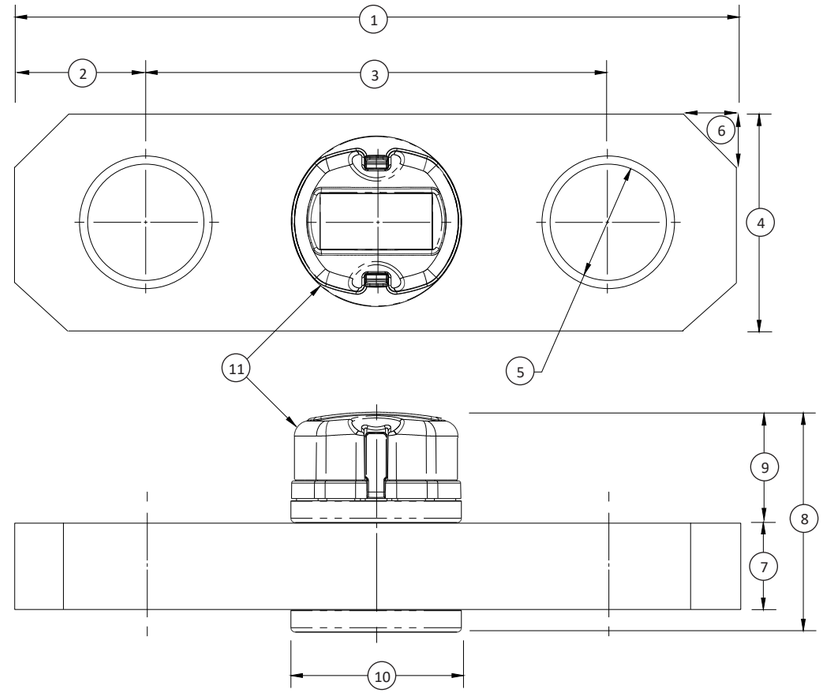
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in MT and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.





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# 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 | | | | | | | | | | | |

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.

7418 East Helm Drive • Scottsdale, Arizona 85260 • 480.948.5555 • www.interfaceforce.com

# 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.

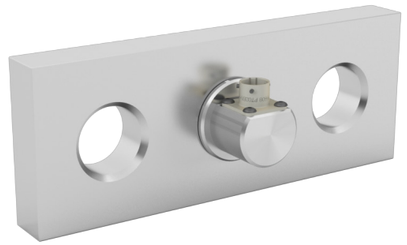
The ITL series can be supplied as shown in this data sheet, or can be modified to meet a particular application requirement. We are always pleased to discU.S.s any special requirements that can be accommodated.

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)<br>-ve supply: Blue (B)<br>+ve signal: Green (C)<br>-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)
- CU.S.tom 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

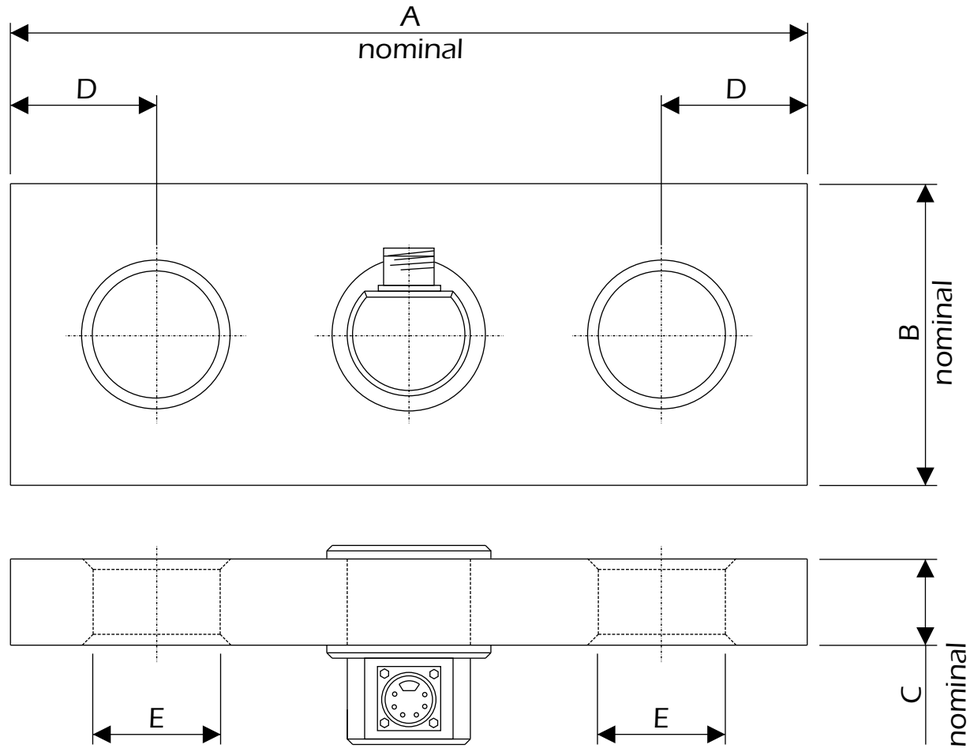
- Range: 11K to 220.4K lbf (5 to 100 mt)
- Stainless steel construction (17-4PH)
- Environmentally sealed to IP66 (IP67 available)

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.



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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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# Notes:

# Load Shackles

**Bow Type**

**'D' Type**

**Wireless**

# ATEX BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

## DESCRIPTION

The Interface range of ATEX/IECEx load shackles is designed for lifting and weighing in rugged or harsh environments, and also meet the requirements for operation in Zone 1 and 2 hazardoU.S. areas. The shackle pins are forged from high tensile stainless steel and are machined to an exacting specification. The basic shackle U.S.es the Crosby G2130 (1 to 25MT or 2.2K to 55.1K lbf) and G2140 (40 to 400MT or 88.2K to 882K lbf) series.

This range of ATEX load shackles is proof loaded to 150% of the normal rated load, and is available in a range from 3.25 to 400 MT (7.17K to 882K lbf). The ISHK-A is internally gauged 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 discU.S.s any special requirements that can be accommodated.

The ISHK-A ATEX series can be supplied on its own or combined with our extensive range of instrumentation to provide a complete load monitoring package. Larger shackle sizes up to 1500MT (3306K lbf) are also available U.S.ing GN Rope shackles.

## TYPICAL APPLICATIONS

- Under-hook hoist/crane weighing
- Cable tension monitoring
- Towing/mooring tension
- Crane safe load monitoring



**ISHK-A** (Shown)

## FEATURES & BENEFITS

- Ranges from 3.25 to 400 MT (7.17K to 882K lbf)
- High tensile carbon steel construction
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified
- Optional load centralizing bobbin
- Can be supplied with amplified output
- Many other Options available

## OPTIONS

- Special ranges and capacities up to 1.5K MT (3307K lbf)
- Displays and specially packaged electronics availabe on request
- Special Electrical connections
- Integral signal conditioning
- Centralizing load bobbin

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.



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ATEX BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

## SPECIFICATIONS

| | | |
|---|---|---|
| Rated Load | MT | 3.25, 4.75, 6.5, 9.5, 12, 17, 25, 40, 55, 85, 120, 200, 300, 400 |
| | lbf | 7.17K, 10.5K, 14.3K, 20.9K, 26.5K, 37.5K, 55.1K, 88.2K, 121K, 187K, 265K, 441K, 661K, 882K |
| Proof Load – % | | 150 of rated load |
| Ultimate Breaking Load – % | | 300 of rated load |
| Output – mV/V (NOM) | | 1.5 at rated load |
| Nonlinearity – % | | < ±1.0 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 +55 |
| | °F | -4 to +131 |
| 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-core screened PUR cable (glanded exit) |
| | ft | 32.8, 4-core screened PUR cable (glanded exit) |
| Wiring Connections | | +ve supply: Red, -ve supply: Blue,<br>+ve signal: Green, -ve signal: Yellow |
| Certification – (°C, °F) | | II 2 G EX d IIC T6 Gb IP6X Tamb (-20 to +55, -4 to +131)<br>II 2 D Ex tb IIIC T85°C Db IP6X Tamb (-20 to +55, -4 to +131) |
| Certification Numbers | | IECEx TRC 14.0011x, TRAC14ATEX0023x |

| 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) |
| | | 3.25 | 7.17K | 4.75 | 10.5K | 6.5 | 14.3K | 9.5 | 20.9K | 12 | 26.5K | 17 | 37.5K | 25 | 55.1K | 40 | 88.2K |
| Weight | kgs | 2.8 | | 3 | | 3.2 | | 5.2 | | 8 | | 12 | | 18 | | 18 | |
| | lbs | 6.2 | | 7 | | 7.1 | | 11.5 | | 18 | | 26 | | 40 | | 40 | |
| Resolution | MT | 0.005 | | 0.005 | | 0.005 | | 0.01 | | 0.01 | | 0.02 | | 0.02 | | 0.05 | |
| | lbf | 11.023 | | 11.023 | | 11.023 | | 22.05 | | 22.05 | | 44.09 | | 44.09 | | 110.23 | |

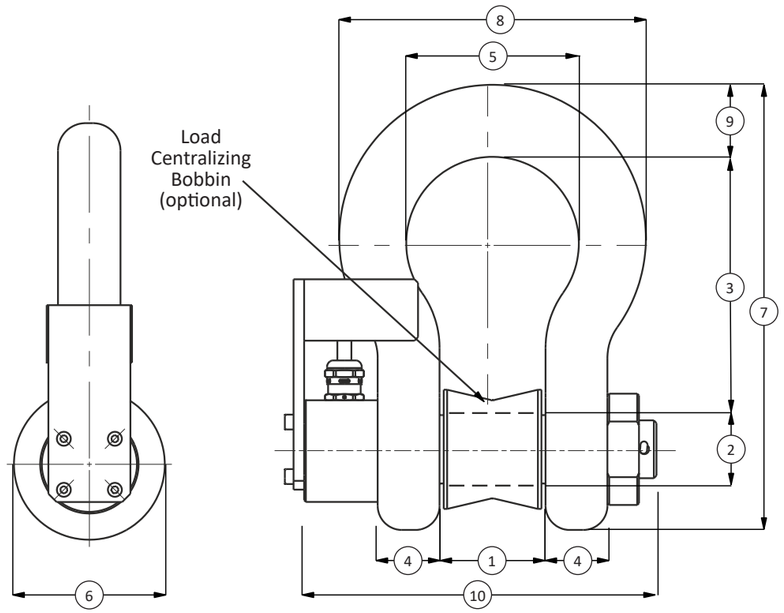
| Specifications CONTINUED | | CAPACITY | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Metric (MT) | U.S. (lbf) | Metric (MT) | U.S. (lbf) | Metric (MT) | U.S. (lbf) | Metric (MT) | U.S. (lbf) | Metric (MT) | U.S. (lbf) | Metric (MT) | U.S. (lbf) | Metric (MT) | U.S. (lbf) |
| | | 55 | 121K | 85 | 187K | 120 | 265K | 150 | 331K | 200 | 441K | 300 | 661K | 400 | 882K |
| Weight | kgs | 25 | | 45 | | 85 | | 125 | | 215 | | 364 | | 520 | |
| | lbs | 55 | | 99 | | 187 | | 276 | | 474 | | 802 | | 1,146 | |
| Resolution | MT | 0.05 | | 0.1 | | 0.1 | | 0.1 | | 0.2 | | 0.2 | | 0.5 | |
| | lbf | 110.23 | | 220.5 | | 220.5 | | 220.5 | | 440.9 | | 440.9 | | 1102.3 | |

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.

# ATEX BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

## SPECIAL OPTIONS

| | | | |
|---|---|---|---|
| Special Ranges | | | The ISHK-A can be supplied in any range, between 3.25 and 400 MT (7.17K to 882K lbf) and calibrated as required. U.S.ually we will choose the nearest Standard shackle size. We can also offer special design shackles up to 1.5K MT (3307K lbf). Please contact our sales team for more details. |
| Special Electrical | | | The Standard ISHK-A cable exits the shackle pin via a gland and is restrained U.S.ing the anti-rotation bracket. We can offer variations to the Electrical connection method. For example, integral connectors, special cable length etc. For more details contact our office. |
| 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 – varioU.S. protocols (5.4 to 18 supply) |
| | | | RS485 digital – varioU.S. 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. |






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.



interface
FORCE MEASUREMENT SOLUTIONS

# ATEX 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) |
| | 3.25 | 7.17K | 4.75 | 10.5K | 6.5 | 14.3K | 9.5 | 20.9K | 12 | 26.5K | 17 | 37.5K | 25 | 55.1K | 40 | 88.2K |
| | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in |
| (1) | 26.9 | 1.06 | 31.8 | 1.25 | 36.6 | 1.44 | 46 | 1.81 | 51.5 | 2.03 | 60.5 | 2.38 | 73 | 2.9 | 73 | 2.9 |
| (2) | 19.1 | 0.75 | 22.4 | 0.88 | 25.4 | 1.00 | 31.8 | 1.25 | 35.1 | 1.38 | 41.4 | 1.63 | 51 | 2.0 | 51 | 2.0 |
| (3) | 60.5 | 2.38 | 71.5 | 2.81 | 84 | 3.31 | 108 | 4.25 | 119 | 4.7 | 146 | 5.7 | 178 | 7.0 | 178 | 7.0 |
| (4) | 16 | 0.63 | 19.1 | 0.75 | 22.4 | 0.88 | 28.7 | 1.13 | 31.8 | 1.25 | 38.1 | 1.50 | 44.5 | 1.75 | 44.5 | 1.75 |
| (5) | 42.9 | 1.69 | 51 | 2.01 | 58 | 2.28 | 74 | 2.91 | 82.5 | 3.25 | 98.5 | 3.88 | 127 | 5.0 | 127 | 5.0 |
| (6) | 38.1 | 1.50 | 46 | 1.81 | 53 | 2.09 | 68.5 | 2.70 | 76 | 3.0 | 92 | 3.6 | 106 | 4.2 | 106 | 4.2 |
| (7) | 106 | 4.17 | 126 | 4.96 | 148 | 5.83 | 190 | 7.48 | 210 | 8.3 | 254 | 1.0 | 313 | 12.3 | 313 | 12.3 |
| (8) | 74.5 | 2.93 | 89 | 3.5 | 102 | 4.02 | 131 | 5.2 | 146 | 5.7 | 175 | 6.9 | 225 | 8.9 | 225 | 8.9 |
| (9) | 17.5 | 0.69 | 20.6 | 0.81 | 24.6 | 0.97 | 31.8 | 1.25 | 35.1 | 1.38 | 41.1 | 1.62 | 57 | 2.2 | 57 | 2.2 |
| (10) | 126.5 | 4.98 | 140 | 5.51 | 157 | 6.18 | 187 | 7.4 | 201 | 7.9 | 233 | 9.2 | 267 | 10.5 | 267 | 10.5 |

| 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) |
| | 55 | 121K | 85 | 187K | 120 | 265K | 150 | 331K | 200 | 441K | 300 | 661K | 400 | 882K |
| | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in |
| (1) | 82.5 | 3.25 | 105 | 4.1 | 127 | 5.0 | 133 | 5.2 | 184 | 7.2 | 213 | 8.4 | 210 | 8.3 |
| (2) | 57 | 2.2 | 70 | 2.8 | 82.5 | 3.25 | 95.5 | 3.76 | 121 | 4.8 | 152 | 6.0 | 178 | 7.0 |
| (3) | 197 | 7.8 | 267 | 10.5 | 330 | 13.0 | 372 | 14.6 | 397 | 15.6 | 495 | 19.5 | 572 | 22.5 |
| (4) | 51 | 2.0 | 66.5 | 2.62 | 76 | 3.0 | 95.5 | 3.76 | 95.5 | 3.76 | 121 | 4.8 | 165 | 6.5 |
| (5) | 146 | 5.7 | 184 | 7.2 | 200 | 7.9 | 229 | 9.0 | 279 | 11.0 | 330 | 13.0 | 330 | 13.0 |
| (6) | 122 | 4.8 | 145 | 5.7 | 165 | 6.5 | 203 | 8.0 | 267 | 10.5 | 305 | 12.0 | 356 | 14.0 |
| (7) | 348 | 13.7 | 453 | 17.8 | 546 | 21.5 | 625 | 24.6 | 743 | 29.3 | 895 | 35.2 | 1,022 | 40.2 |
| (8) | 253 | 10.0 | 327 | 12.9 | 365 | 14.4 | 419 | 16.5 | 533 | 21.0 | 635 | 25.0 | 660 | 26.0 |
| (9) | 61 | 2.4 | 79 | 3.1 | 92 | 3.6 | 105 | 4.1 | 152 | 6.0 | 172 | 6.8 | 184 | 7.2 |
| (10) | 284 | 11.2 | 364 | 14.3 | 439 | 17.3 | 503 | 19.8 | 541 | 21.3 | 638 | 25.1 | 728 | 28.7 |

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.

7418 East Helm Drive • Scottsdale, Arizona 85260 • 480.948.5555 • www.interfaceforce.com

# 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 U.S.es 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 discU.S.s 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
- ATEX version available
- Submersible
- Amplified output

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.



# 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 | |

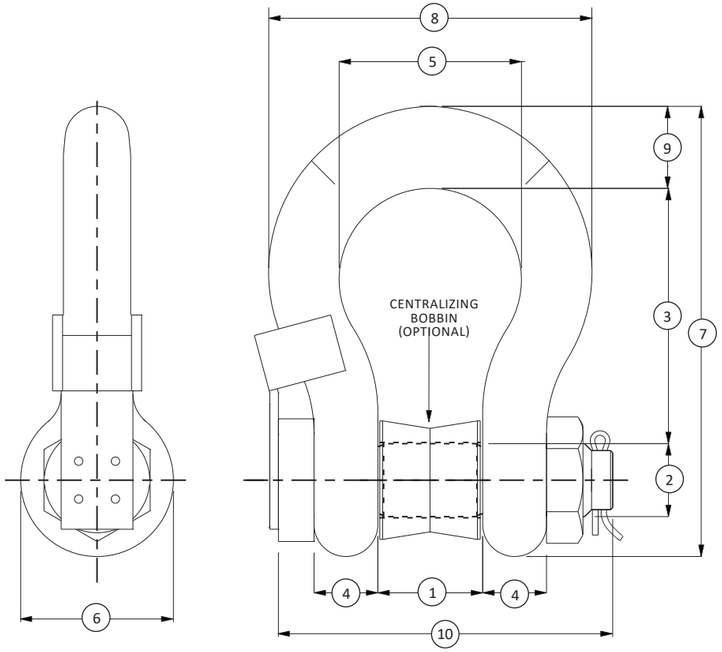
| Specifications CONTINUED | | CAPACITY | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Metric (MT) | U.S. (lbf) | Metric (MT) | U.S. (lbf) | Metric (MT) | U.S. (lbf) | Metric (MT) | U.S. (lbf) | Metric (MT) | U.S. (lbf) | Metric (MT) | 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 | |

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.

# 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. U.S.ually 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 – varioU.S. protocols (5.4 to 18 supply) |
| | | | RS485 digital – varioU.S. 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, U.S.ing 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 U.S.e in environmental pressures up to 10,000psi. See below for examples of our submersible load shackles. |




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.



interface
FORCE MEASUREMENT SOLUTIONS

# 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 |

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.

# 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 U.S.es 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 discU.S.s 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

Catalog 2019 06-15-2020

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.



# ISHK-D 'D' TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

## SPECIFICATIONS

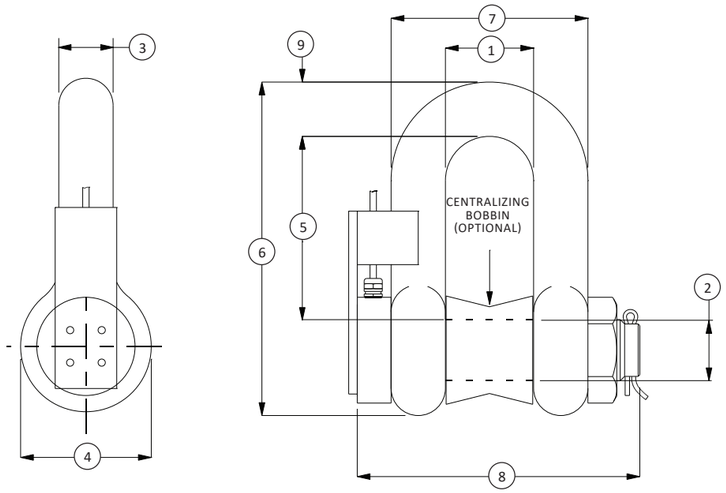
| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated Load (MT) | Metric (MT) | 1 | 2 | 3.25 | 4.75 | 6.5 | 9.5 | 12 | 17 | 25 | 35 |
| | U.S. (lbf) | 2.2K | 4.41K | 7.17K | 10.5K | 14.3K | 20.9K | 26.5K | 37.5K | 55.1K | 55.1K |
| Proof Load – % | | 150 of rated load | | | | | | | | | |
| 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,<br>+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. U.S.ually 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 U.S.ing 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 – varioU.S. protocols (5.4 to 18 supply) |
| | | | RS485 digital – varioU.S. 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, U.S.ing 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 U.S.e in environmental pressures up to 10,000psi. |

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.

# 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 |

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.



# WTSSHK-B WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & SHACKLE)

## DESCRIPTION

The WTSSHK-B range of telemetry load shackles are manufactured U.S.ing 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 U.S.e in a wide range of indU.S.trial and marine weighing applications, these load shackles are robU.S.t, reliable and easy to install.

The unique telemetry hoU.S.ing 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 hoU.S.ing 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 product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

# 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 (continuoU.S. U.S.e 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 HoU.S.ing | | 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. U.S.ually 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 U.S.e up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be U.S.ed to view individual load cells or summated load cells. These values can be sent to a printer or a PC. |

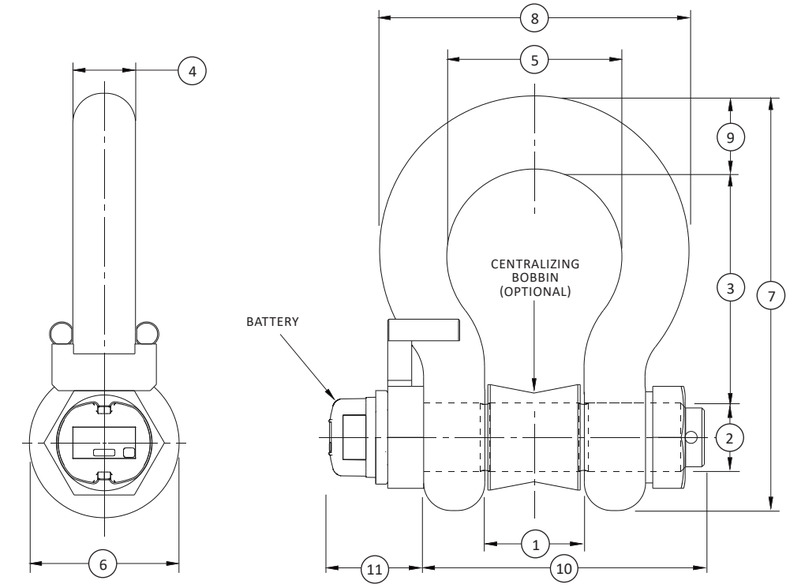


U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



interface
FORCE MEASUREMENT SOLUTIONS

# 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 |

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.

7418 East Helm Drive • Scottsdale, Arizona 85260 • 480.948.5555 • www.interfaceforce.com

# WTSSHK-B-HL WIRELESS BOW LOAD SHACKLE (U.S. & METRIC)

## DESCRIPTION

The WTSSHK-B-HL range of telemetry load shackles are manufactured U.S.ing the GN rope H10 shackle. Suitable for U.S.e in a wide range of indU.S.trial and marine heavy lift weighing applications, these load shackles provide a robU.S.t 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 hoU.S.ing 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 hoU.S.ing 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. U.S.ually 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 U.S.e up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be U.S.ed 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

Catalog 2019 06-15-2020

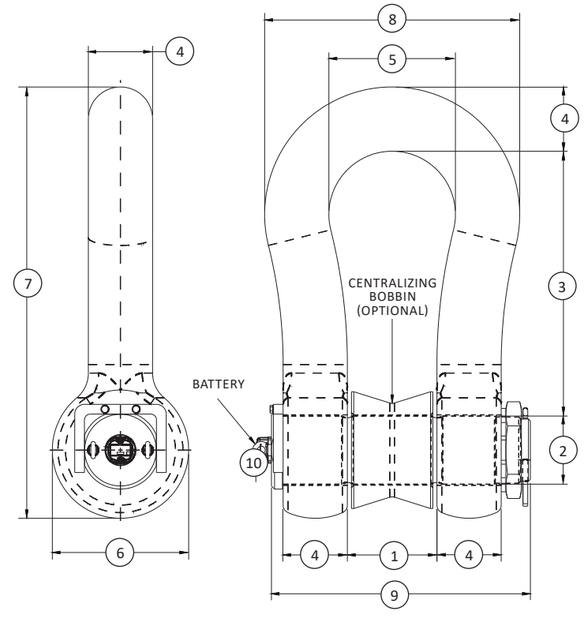
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.



# 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 (continuoU.S. U.S.e 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 HoU.S.ing | | Polyamide resin | | | | | | | | | | | |
| 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.

7418 East Helm Drive • Scottsdale, Arizona 85260 • 480.948.5555 • www.interfaceforce.com

# 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 |

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.



# WTSSHK-B-JR WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & METRIC)

## DESCRIPTION

The WTSSHK-B-JR range of telemetry load shackles are manufactured U.S.ing the Crosby™ G2130 shackle. Suitable for U.S.e in a wide range of lower capacity indU.S.trial 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 hoU.S.ing is manufactured from ABS plastic making it strong yet light, and the telemetry hoU.S.ing 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 (continuoU.S. U.S.e, 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 HoU.S.ing | | 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

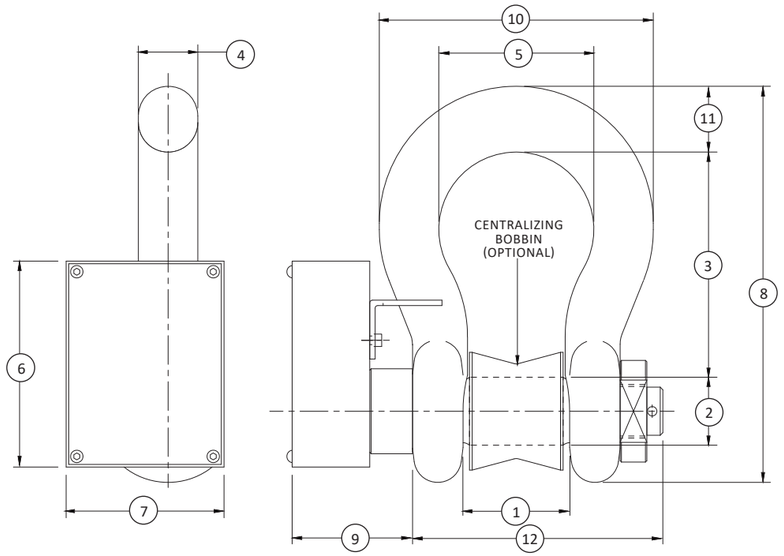
- Special ranges and capacities
- Integral signal conditioning
- Special telemetry systems available
- Longer battery life with different transmission rate settings (1 update per second extends battery life to 2000 hours)
- Multiple load cell systems
- Tablet PC option with data logging and other cU.S.tomized Features
- Centralizing bobbin
- Amplified output option

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.

# 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. U.S.ually we will choose the nearest Standard shackle size. |
| Multi-Shackle Systems | It is possible with the Standard handheld telemetry display to U.S.e up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be U.S.ed 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 |

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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.



# WTSSHK-D WIRELESS CROSBY™ LOAD SHACKLE (U.S. & METRIC)

## DESCRIPTION

The WTSSHK-D range of telemetry load shackles are manufactured U.S.ing the Crosby™ G2150 shackles. Versions are also available U.S.ing the popular GreenPin™ range of shackles. The built in radio telemetry electronics operates on the 2.4GHz license free frequency.

The unique telemetry hoU.S.ing 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 hoU.S.ing 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.



**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

## SPECIFICATIONS

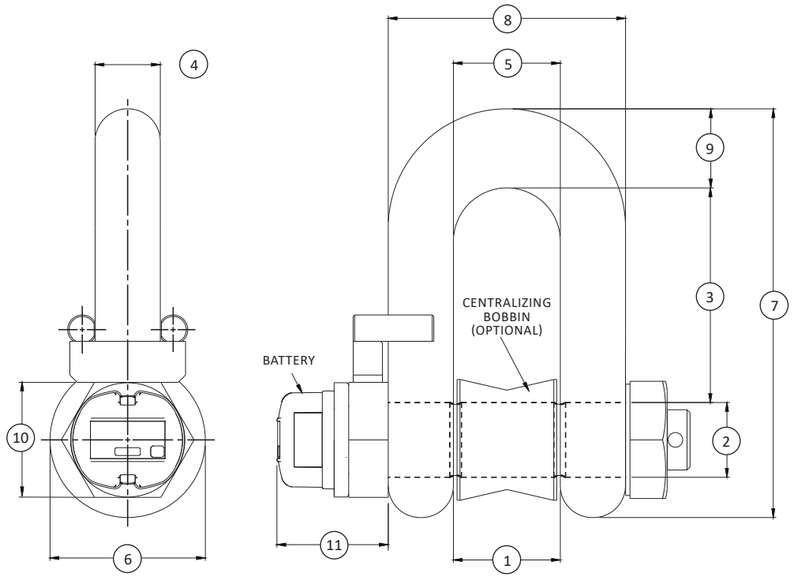
| | | | | | |
|---|---|---|---|---|---|
| Rated Load | MT | 12 | 17 | 25 | 35 |
| | lbf | 26.5K | 37.5K | 55.1K | 77.2K |
| Proof Load – % | | 150 of rated load | | | |
| Ultimate Breaking Load – % | | 300 of rated load | | | |
| Nonlinearity – % | | < ±1 of rated load (typically) | | | |
| Nonrepeatability – % | | < ±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 (continuoU.S. U.S.e, 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 HoU.S.ing | | 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 | | | |

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.

# 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. U.S.ually 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 U.S.e up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be U.S.ed 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 |

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:



# Instrumentation

Digital Indicators

Signal Conditioners

Digital Output Indicators

Analog Indicators

U.S.B Interface Modules

Data Acquisition

Junction Boxes

Acquisition Modules

Wireless

Repeater Modules

ModbU.S.

LED Displays

Remote Data Collection

# 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
- U.S.B 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 | | U.S.B 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 – VAC, Hz | | 115 or 230, 50–60 |
| DC Power (option) | | Available as a special |
| Power Consumption – watts | | 120VAC, 2A; 230VAC, 1A |
| **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 |

Catalog 2019 06-15-2020



# 9890 STRAIN GAGE, LOAD CELL, & mV/V INDICATOR

## FEATURES & BENEFITS

- Large Dual-Line 6-Digit Display, 0.60" & 0.46"
- 0.03% Accuracy
- Peak and valley monitoring
- 24-bit resolution
- U.S.B 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

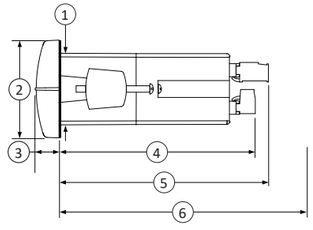
## OPTIONS

- 12-24 VDC Power
- 4-20mA Analog Output
- Internal relays (2 or 4)
- Sunbright display for outdoor U.S.e
- RS232 & RS485 serial communication
- Additional external relay module
- Digital I/O expansion module
- Scalable Analog Output 4-20mA

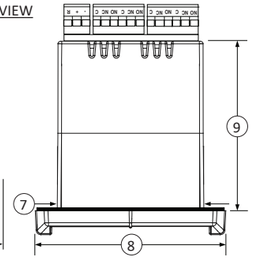
## ACCESSORIES

- 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) |

# 9894 ANALOG INPUT PROCESS INDICATOR

## 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
- U.S.B Port with programming and viewing software
- Large Dual-Line 6-Digit Display, 0.60" & 0.46"
- 32-point linearization

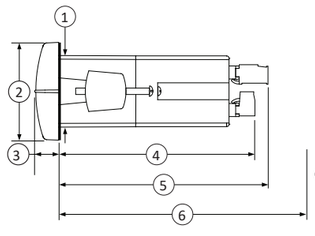
## OPTIONS

- 12-24 VDC Power
- 4-20mA Analog Output
- Internal relays (2 or 4)
- Sunbright display for outdoor U.S.e
- RS232 & RS485 serial communication
- Additional external relay module
- Digital I/O expansion module
- ModbU.S. RTU serial communications
- Scalable Analog Output 4-20mA

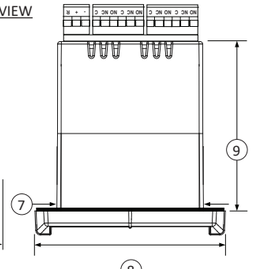
## ACCESSORIES

- 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 |
| **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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# 480 BIDIRECTIONAL DIGITAL WEIGHT INDICATOR

## 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<br>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<br>stainless steel washdown |
| **POWER** | | |
| AC Power | VAC | 115 - 230 |
| | Hz | 50 or 60 |
| **MECHANICAL** | | |
| Dimensions - W x H x D | mm | 241.3 x 152.4 x 69.85 |
| | in | 9.5 x 6 x 2.75 |
| Weight | kg | 2.9 |
| | lbs | 6.4 |
| Display | | 6 digit LED |
| Material | | Stainless Steel Enclosure |

## OPTIONS

- Analog output – 16-bit, 0-10V, 0-20mA, 4-20mA
- I/O Board – 4 digital outputs (dry contact, 2A)
  – 2 digital inputs (up to 24 VDC)
- Setpoints – 8 with batching (I/O Board option required)

CE

# 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
- Five softkeys with 10 U.S.er-defined, 14 preset functions per screen
- Ten 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
- Two slots for option cards
- 1,000-ID truck register for in/out weighing
- 64 K U.S.er on-board NV RAM
- U.S.er 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
- Inernal mV/V calibration
- U.S.B Interface
- Analog Output: 0-10V and 0-20mA
- Digital I/O, 24-Channel TTL Output
- Ethernet

## STANDARD CONFIGURATION



**Model 920i** (Shown)

CE



920i PROGRAMMABLE WEIGHT INDICATOR/CONTROLLER (U.S. & METRIC)

## SPECIFICATIONS

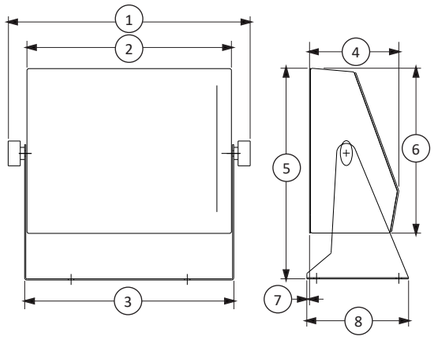
| ELECTRICAL | | | |
|---|---|---|---|
| Excitation Voltage – VDC | | | 10 ± 8x350Ω or 16x700Ω load cells per A/D card |
| Analog Signal Input Range – mV/V | | | -45 to +45 |
| Analog Signal Sensitivity – µV/GRAD – Hz | | | 0.3 minimum at 7.5<br>1.0 recommended |
| A/D Sample Rate – Hz | | | 7.5 to 960, 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 adjU.S.table 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 |

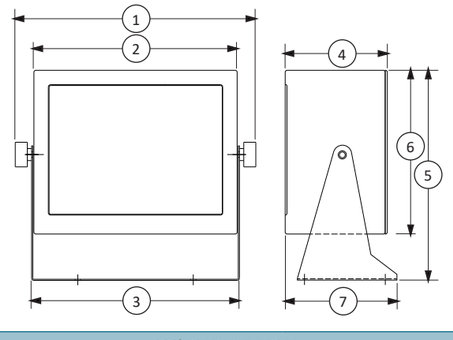
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# 920i PROGRAMMABLE WEIGHT INDICATOR/CONTROLLER (U.S. & METRIC)

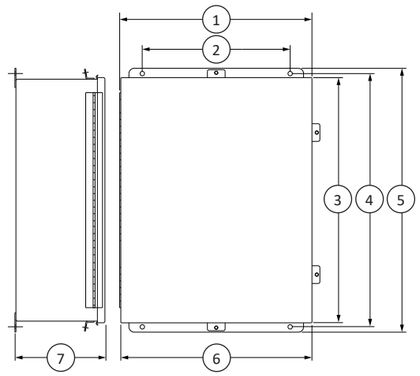
## DIMENSIONS



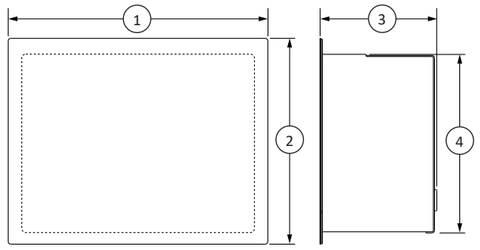

| 920i UNIVERSAL | | |
|---|---|---|
| See Drawing | U.S. (in) | Metric (mm) |
| (1) | 12.50 | 318 |
| (2) | 10.56 | 268 |
| (3) | 10.80 | 203 |
| (4) | 4.61 | 117 |
| (5) | 10.87 | 276 |
| (6) | 8.50 | 216 |
| (7) | 0.14 | 3.5 |




| 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 |




| 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 |




| 920i PANEL MOUNT | | |
|---|---|---|
| See Drawing | U.S. (in) | Metric (mm) |
| (1) | 11.56 | 294 |
| (2) | 9.16 | 233 |
| (3) | 5.20 | 132 |

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# 9320 HANDHELD BATTERY POWERED INDICATOR

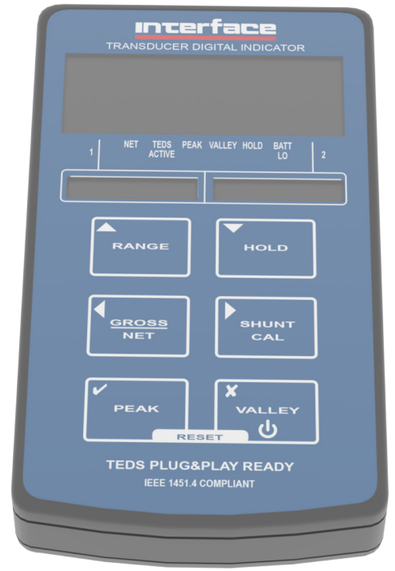
## FEATURES & BENEFITS

- 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

# 9330 HIGH SPEED PORTABLE DISPLAY & DATA LOGGER

## FEATURES & BENEFITS

- 24-bit resolution
- 3750 Hz update rate
- Peak and valley capture
- Log to SD card at 1000Hz
- U.S.B 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

CE

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# 9390 BATTERY POWERED INDICATOR

## FEATURES & BENEFITS

- Large 1 in (25.4 mm) high contrast LCD display
- 6 digits
- 100,000 graduations
- Powers up to 4 load cells
- Battery-powered
- 15 updates/second typical
- Configurable standby mode for extended battery life
- Full front-panel digital calibration & configuration
- Three-stage digital filtering
- Full duplex RS-232

## SPECIFICATIONS

| | | |
|---|---|---|
| **ELECTRICAL** | | |
| Excitation Voltage – VDC | | 5 ±0.5,<br>4 x 350Ω load cells or<br>8 x 700Ω load cells |
| **PERFORMANCE** | | |
| Maximum Display Counts | | 100,000 |
| Analog Signal Input Range – mV/V | | 4.5 |
| Sensitivity – µV | | 0.3/graduation min. |
| Measurement Rate – sec. | | 30, 15, 7.5, 3.75 |
| **ENVIRONMENTAL** | | |
| Operating Temperature | °C | -10 to 40 |
| | °F | +14 to +104 |
| **POWER** | | |
| Power – VDC | | 9 provided by 6 "C"<br>cells or included AC adaptor |
| **MECHANICAL** | | |
| Weight | | 4.6 lb with batteries |
| Enclosure | | NEMA 4X/IP66<br>stainless steel |
| Enclosure Dimensions - W x H x D | mm | 228.6 x 140.21 x 76.2 |
| | in | 9.0 x 5.52 x 3 |
| Display | mm | 6 digit LCD, 25.4 |
| | in | 6 digit LCD, 1 |

## STANDARD CONFIGURATION




**MODEL 9390-0** (Shown)

## OPTIONS

- Carrying case for portable U.S.e
- Please specify if CE mark is required

CE

# 9840 INTELLIGENT INDICATOR

## 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
- U.S.B port

## OPTIONS

- 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
- TEDS 40
- TEDS 41
- Read/Write

## 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 |

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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 plU.S. 4-pole digital filters
- Includes graphical logging software
- RS232, RS422, RS485
- Max/Min capture
- Two-line backlit LCD display
- Math channel for calculated values
- U.S.er 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 |

# 9860 TEDS HIGH SPEED SELF-CONFIGURING DIGITAL INDICATOR

## FEATURES & BENEFITS

- Bright-6 digit bipolar LED display (±32,768 counts)
- 0.01% accuracy
- Fast, direct, scaleable analog output with 1000 Hz bandwidth
- 230 readings per second
- Peak and valley monitoring
- 4 calibration modes: mV/V, applied load, shunt and TEDS plug & play
- Excitation sense
- 4 limit setpoints with open controller outputs
- Front panel shunt and tare
- Remote tare

## SPECIFICATIONS

| | | |
|---|---|---|
| **EXCITATION** | | |
| Excitation Voltage – VDC | | 5, 10 switch selectable (internal) |
| Current – mA | | 60, 120 (respectively) |
| **PERFORMANCE** | | |
| Maximum Display Counts | | ±999,999 |
| Display Update/sec | | 5 |
| Internal Resolution Counts | | ±32,768 |
| Signal Input Range – mV | | ±25, ±50 (switch selectable) |
| Sensitivity – µV/count | | 0.8 |
| Readings Per Second | | 230 |
| Maximum Error – % ±count | | 0.01 of reading ±1 |
| CMR – dB | | 120 |
| Scalable Analog Output– VDC & mA | | ±10 & 4-20 (self-calibrating) |
| RS232 Output | | |
| **ENVIRONMENTAL** | | |
| Operating Temperature | °C | -10 to +50 |
| | °F | +14 to +122 |
| Relative Humidity – % | °C | 90% at 40, non-condensing |
| | °F | 90% at 104, non-condensing |
| **POWER** | | |
| AC | VAC | 100 to 250 |
| | Hz | 50-60 |
| Power Consumption – w | | 6 |
| **MECHANICAL** | | |
| Dimensions - W x H x D | mm | 96 x 48 x 130 |
| | in | 3.78 x 1.89 x 5.1 |
| Weight | g | 589.79 |
| | lbs | 1.3 |
| Display | mm | LED 14 segment, 10 H |
| | in | LED 14 segment, 0.4 H |
| Panel Cutout - W x H | mm | 92 x 45 |
| | in | 3.62 x 1.77 |

## OPTIONS & ACCESSORIES

- Bench top enclosure
- Plexiglass bench top tilt stand
- Remote peak/valley reset
- Software kit for display, setup & logging

## STANDARD CONFIGURATION




**MODEL 9860-1 W/9800-STAND** (Shown)




**MODEL 9860-1 W/9860ASY-4T** (Shown)

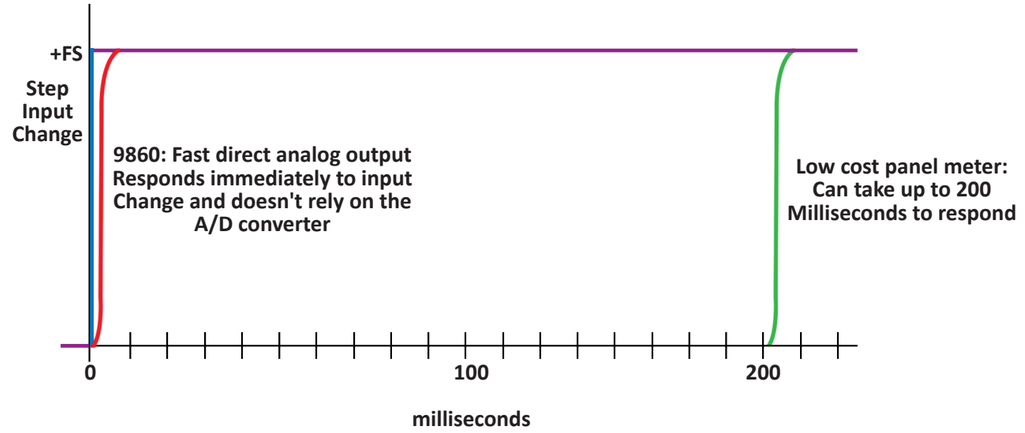
Catalog 2019 06-15-2020



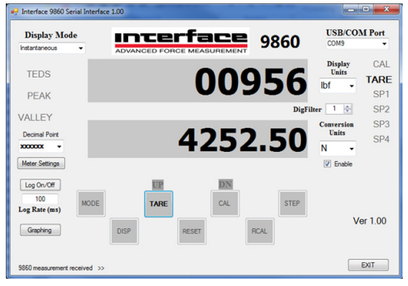
# 9860 TEDS HIGH SPEED SELF-CONFIGURING DIGITAL INDICATOR

## KEY FEATURE

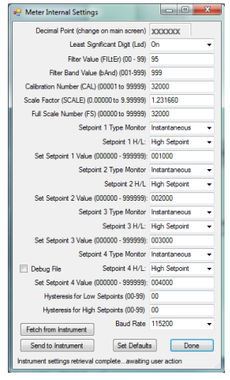
**High Speed Direct Analog Output -** *Allows accurate capture of quickly changing events*




## SOFTWARE




**Display**




**Set Up**

| | A | B | C |
|---|---|---|---|
| 1 | Date | Time | Reading |
| 2 | 4/14/2014 | 16:16:57.7161-07:00 | 956 |
| 3 | 4/14/2014 | 16:16:57.8781-07:00 | 956 |
| 4 | 4/14/2014 | 16:16:57.9711-07:00 | 956 |
| 5 | 4/14/2014 | 16:16:58.0771-07:00 | 956 |
| 6 | 4/14/2014 | 16:16:58.1891-07:00 | 956 |
| 7 | 4/14/2014 | 16:16:58.3001-07:00 | 956 |
| 8 | 4/14/2014 | 16:16:58.3941-07:00 | 956 |
| 9 | 4/14/2014 | 16:16:58.5041-07:00 | 956 |
| 10 | 4/14/2014 | 16:16:58.6201-07:00 | 956 |
| 11 | 4/14/2014 | 16:16:58.7241-07:00 | 956 |
| 12 | 4/14/2014 | 16:16:58.8211-07:00 | 956 |
| 13 | 4/14/2014 | 16:16:58.9322-07:00 | 956 |
| 14 | 4/14/2014 | 16:16:59.0372-07:00 | 956 |
| 15 | 4/14/2014 | 16:16:59.1492-07:00 | 956 |
| 16 | 4/14/2014 | 16:16:59.2512-07:00 | 956 |
| 17 | 4/14/2014 | 16:16:59.3492-07:00 | 956 |

**Logging**

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# BSC4 4-CHANNEL BRIDGE AMPLIFIER (U.S. & METRIC)

## FEATURES & BENEFITS

- ±10V and 4-20mA or U.S.B outputs
- 4 independent channels
- For U.S.e with model 3AXX series 3-axis load cells
- Can be U.S.ed with up to any 4 Standard load cells (with mV/V output)

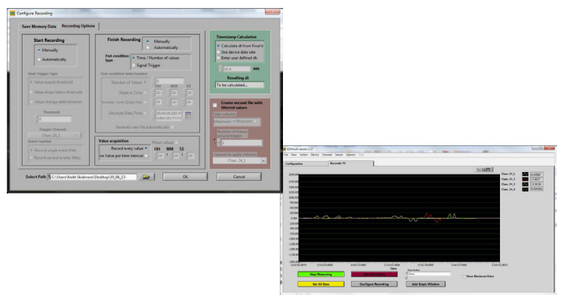
## SPECIFICATIONS

| 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 U.S.B |
| 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

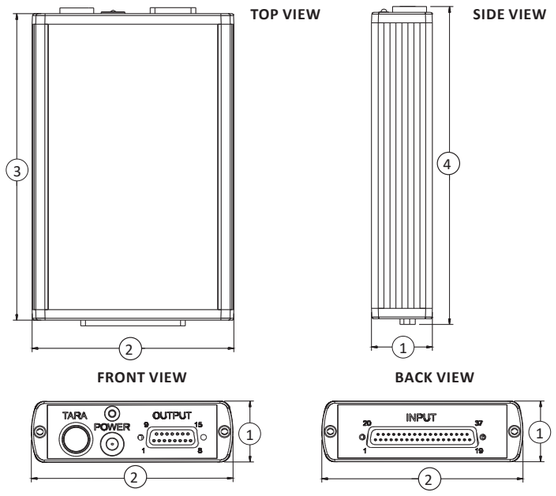



**BSC4A** (Shown)




**BSC4D** (Shown)

| MODEL | DESCRIPTION |
|---|---|
| BSC4A | ±10V and 4-20mA output, up to 10 mV/V input, 37-pin input connector. Includes power supply |
| BSC4D | U.S.B output, up to 10 mV/V input, 37-pin input connector, U.S.B 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 |



# 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
- U.S.B 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 simultaneoU.S. tare
- 16 digital I/O
- Galvanic isolation: Analog input, analog output, digital I/O, U.S.B

## OPTIONS

- EtherCat
- CANbU.S./CANopen

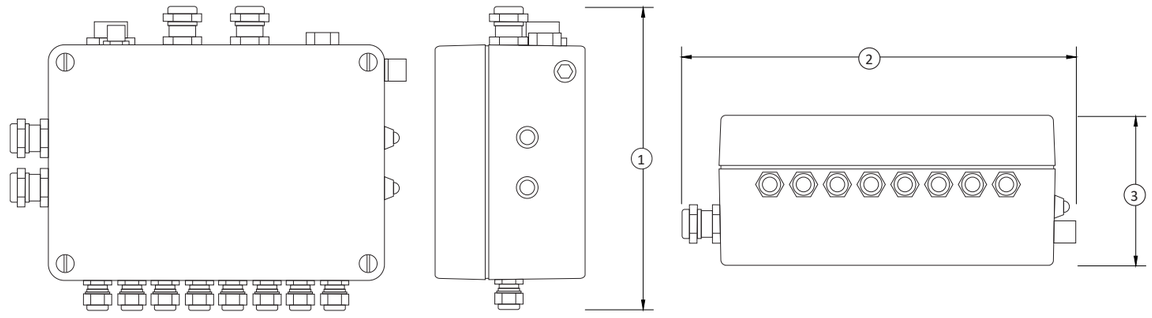
## STANDARD CONFIGURATION







**MODEL BX8-AS** (Shown)




## DIMENSIONS

| 1 | | 2 | | 3 | |
|---|---|---|---|---|---|
| mm | in | mm | in | mm | in |
| 180 | 7.1 | 225 | 8.87 | 89.5 | 3.5 |

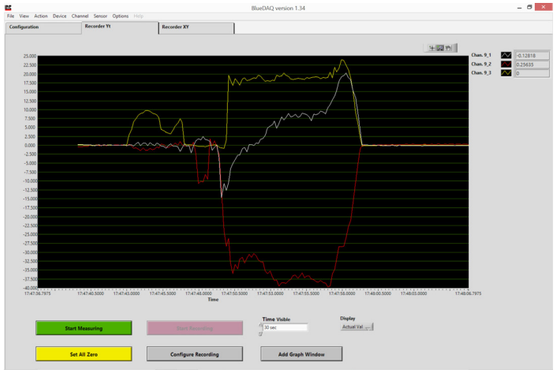
# BX8-AS INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

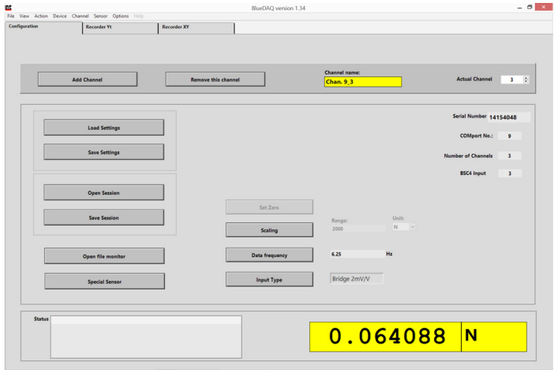
## SPECIFICATIONS

| PERFORMANCE | |
|---|---|
| Accuracy Class – % | 0.05 |
| Nonlinearity – % range | +/- 0.02 |
| Sample Rate - per channel – samples/sec | 48,000S synchronoU.S. |
| Digital Output Data Rate – values/sec | 0.75 to 48,000 |
| Resolution – bit | 24 |
| Resolution – noise limited | > 100,000 parts @ 10/s data rate<br>> 20,000 parts @ 2000/s data rate<br>> 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<br>*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<br>*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 |
| U.S.B - 8 channel packets – bit – /sec | | 16 integer, 48K, raw data<br>24 integer, 24K, raw data<br>32 floating point, 9.6K, scaled data<br>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




Catalog 2019 06-15-2020



# 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
- U.S.B 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 simultaneoU.S. tare
- 16 digital I/O
- Galvanic isolation: Analog input, analog output, digital I/O, U.S.B

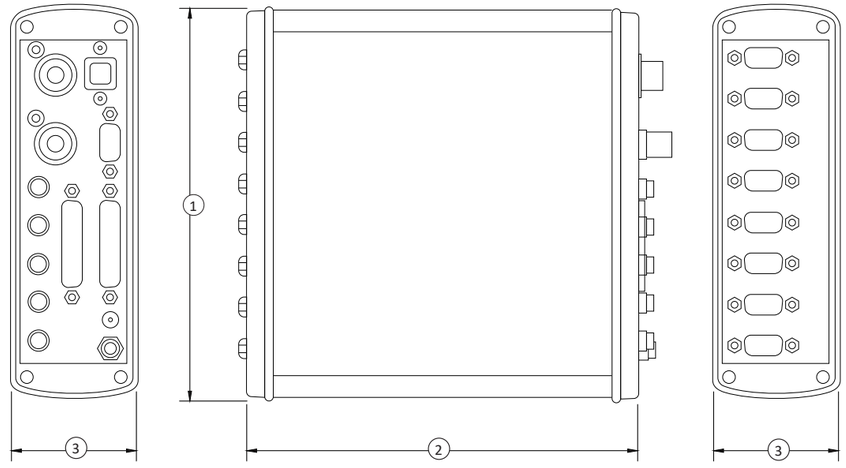
## OPTIONS

- EtherCat
- CANbU.S./CANopen

## STANDARD CONFIGURATION




**MODEL BX8-HD15** (Shown)




## 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)

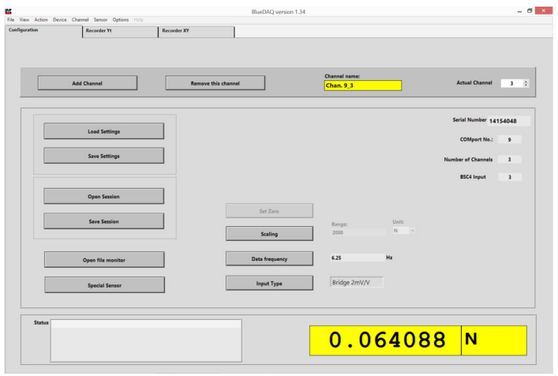
## SPECIFICATIONS

| PERFORMANCE | |
|---|---|
| Accuracy Class – % | 0.05 |
| Nonlinearity – % range | ±0.02 |
| Sample Rate – per channel – samples/sec | 48,000 synchronoU.S. |
| Digital Output Data Rate – values/sec | 0.75 to 48,000 |
| Resolution – bit | 24 |
| Resolution – noise limited | > 100,000 parts @ 10/s data rate<br>> 20,000 parts @ 2000/s data rate<br>> 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<br>*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<br>*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 |
| U.S.B – 8 channel packets – bit – /sec | | 16 integer, 48K, raw data<br>24 integer, 24K, raw data<br>32 floating point, 9.6K, scaled data<br>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






# 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
- U.S.B 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 simultaneoU.S. tare
- 16 digital I/O
- Galvanic isolation: Analog input, analog output, digital I/O, U.S.B

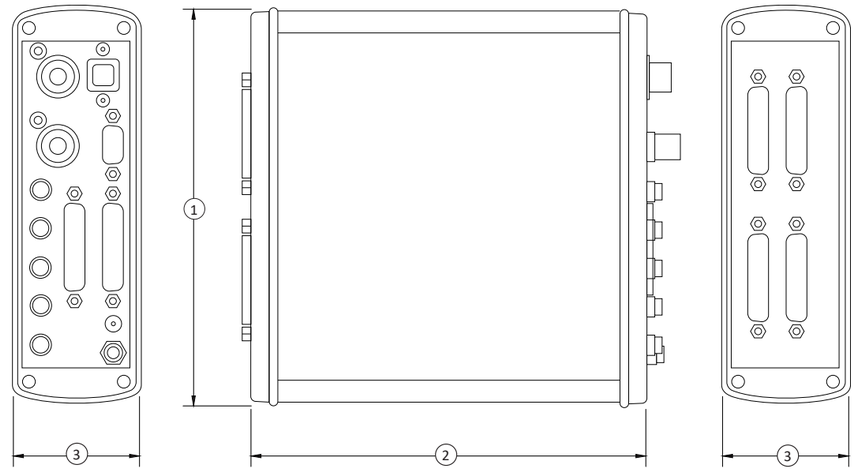
## OPTIONS

- EtherCat
- CANbU.S./CANopen

## STANDARD CONFIGURATION




**MODEL BX8-HD44** (Shown)




## DIMENSIONS

| 1 | | 2 | | 3 | |
|---|---|---|---|---|---|
| mm | in | mm | in | mm | in |
| 172 | 6.8 | 172 | 6.8 | 55 | 2.2 |

# 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 U.S.ers to deliver the same data to multiple receivers simultaneoU.S.ly and 2) low power paired connections which can be U.S.ed in a point to point system.



**One to One**



**Multiple to One**



**One to Multiple**



**Multiple to Multiple**

The BTS comes in two versions:

- HoU.S.ed 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

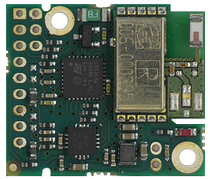
## FEATURES & BENEFITS

- **High Measurement Resolution:** BTS-AM-1 can produce a noise free resolution of 1 in 92000 counts (16.5 bit) when U.S.ed with a 3mV/V sensor and 1 in 184,000 counts (17.5 bit) when U.S.ed 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 cU.S.tom 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 U.S.ers 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 U.S.ers to create dashboards with varying degrees of detail based on application requirements. It enables BTS systems to be visualized on phones and tablets by U.S.ing 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.

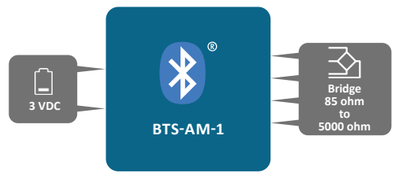
Catalog 2019 06-15-2020



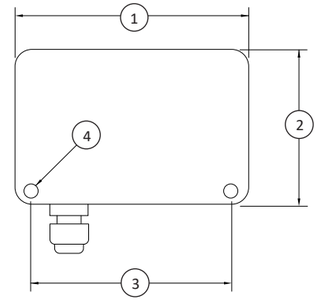
# BTS Bluetooth® TELEMETRY SYSTEM

## 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 |



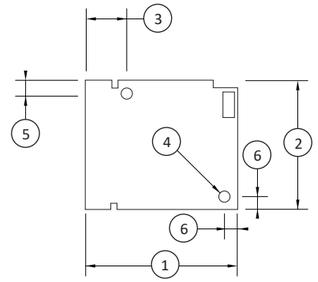

## ELECTRICAL




**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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# CSC & LCSC-OEM INTEGRAL INLINE SIGNAL CONDITIONER

## FEATURES & BENEFITS

- Outputs 4-20mA, 0-10V, 0-5V, ±10V, ±5V
- Zero and span adjU.S.tments
- 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 AdjU.S.tment Range – %FRO | | | ±8 |
| Zero AdjU.S.tment 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

- U.S.er-specified cable lengths
- U.S.er-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 Comp + (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.***



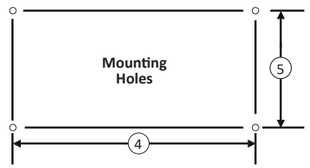
# DCA VEHICLE COMPATIBLE SIGNAL CONDITIONER (U.S. & METRIC)

## FEATURES & BENEFITS

- 10-28 VDC power
- U.S.er selectable analog output ±10V, ±5V or 4-20 mA
- Small size
- NEMA 4X enclosure
- DC to 100 Hz
- Ideal for battery powered appplications

## SPECIFICATIONS

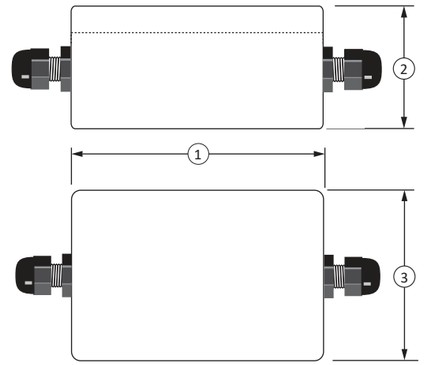
| | | |
|---|---|---|
| **EXCITATION** | | |
| Excitation Voltage – VDC | | 5 or 10 |
| Excitation Current – mA MAX | | 30 |
| **PERFORMANCE** | | |
| Output 1 | | ±5V or ±10V Full Scale |
| Output 2 | | 4-20 mA Full Scale Unipolar |
| Input Range – mV FS | | 5 to 50 |
| Dynamic Response – Hz | | DC to 100 |
| Zero Offset Range – % FS | | ±50 Output |
| Coarse and fine adjU.S.t Nonlinearity – %FS | | 0.01 |
| **ENVIRONMENTAL** | | |
| Operating Temperature | °C | 0 to +70 |
| | °F | +32 to +158 |
| **POWER** | | |
| DC – VDC | | 10-28 |




## STANDARD CONFIGURATION




**MODEL DCA** (Shown)




## DIMENSIONS

| 1 | | 2 | | 3 | | 4 | | 5 | |
|---|---|---|---|---|---|---|---|---|---|
| in | mm | in | mm | in | mm | in | mm | in | mm |
| 3.70 | 94.0 | 2.24 | 56.9 | 2.56 | 65.0 | 3.11 | 79 | 1.96 | 50 |

# 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

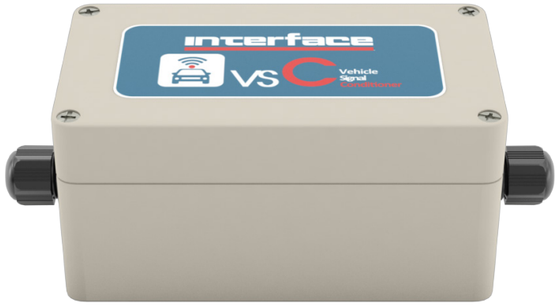
## OPTIONS

- Up to 10KHz bandwidth
- Special gain
- Remote shunt calibration

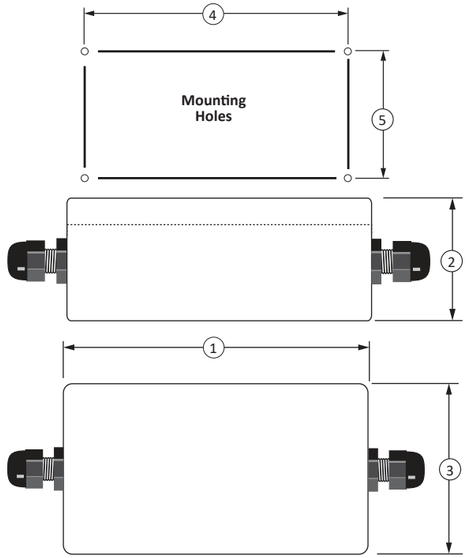
## SPECIFICATIONS

| | | |
|---|---|---|
| **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 AdjU.S.tment | | +/-30% typical |
| Nonlinearity - % | | 0.005 |
| Zero and Span Temp - %FS/°C | | <0.01 |
| **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 |
| Electrical Connections | | Screw terminals (through cable gland) |

## 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 |

Catalog 2019 06-15-2020



# DIG-U.S.B & DIG-U.S.B-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-U.S.B)
- 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
- U.S.B Interface – device appears as virtual com port

***Digital U.S.B output modules for load cells, torque transducers and other strain gaged devices***

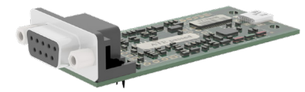
## SPECIFICATIONS

| | | |
|---|---|---|
| **POWER** | | |
| DIG-U.S.B (from U.S.B) – 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 U.S.er 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** | | |
| U.S.B to Micro U.S.B Cache | m | 1.5 |
| | ft | 5 |

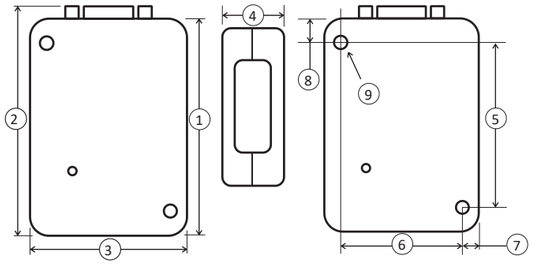
## STANDARD CONFIGURATION



**MODEL DIG-U.S.B** (Shown)



**MODEL DIG-U.S.B-OEM** (Shown)




## DIMENSIONS

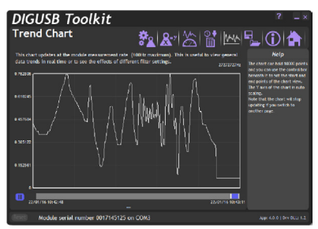
| See Drawing | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| mm | 70.5 | 74.5 | 51.0 | 20.0 | 54.5 | 40 | 4 | 8 | Ø4.2 |
| in | 2.78 | 2.93 | 2.01 | 0.79 | 2.15 | 1.57 | 0.16 | 0.31 | Ø0.17 |

## OPTIONS

- DIG-U.S.B (with case)
- DIG-U.S.B-OEM (without case)
- DIN Rail Mount Kit

## SOFTWARE

- XP, Vista, Win 7, 8, 10



# DIG-U.S.B-F & DIG-U.S.B-F-OEM (U.S. & METRIC)

## FEATURES & BENEFITS

- Up to 4,800 samples / second
- 13-bit noise-free resolution
- Extremely low Temperature drift
- Simple U.S.B '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-U.S.B)
- 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 U.S.B) – 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-U.S.B-F (Enclosure) | | IP50 |
| U.S.B to Micro U.S.B Cable Length | m | 1.5 |
| | ft | 5 |

## OPTIONS

- DIG-U.S.B-F (with case)
- DIG-U.S.B-F-OEM (without case)
- DIN Rail Mount Kit

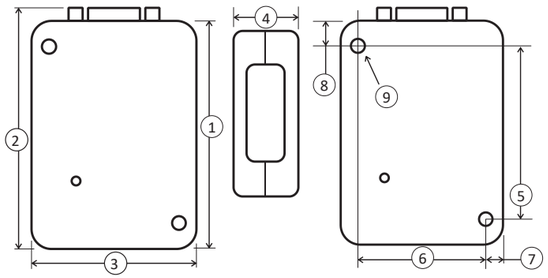
## STANDARD CONFIGURATION



**MODEL DIG-U.S.B-F** (Shown)



**MODEL DIG-U.S.B-F-OEM** (Shown)

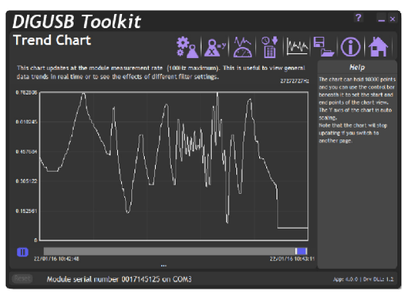



## DIMENSIONS

| 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






# DMA2 DIN RAIL MOUNT SIGNAL CONDITIONER (U.S. & METRIC)

## FEATURES & BENEFITS

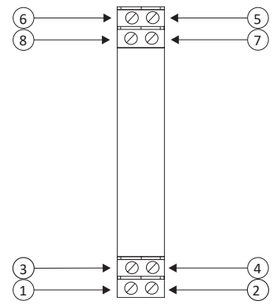
- 10-28 VDC power
- U.S.er selectable analog output ±10V, ±5V or 4-20 mA
- Selectable full scale input range 5-50mV
- DIN rail mountable

## SPECIFICATIONS

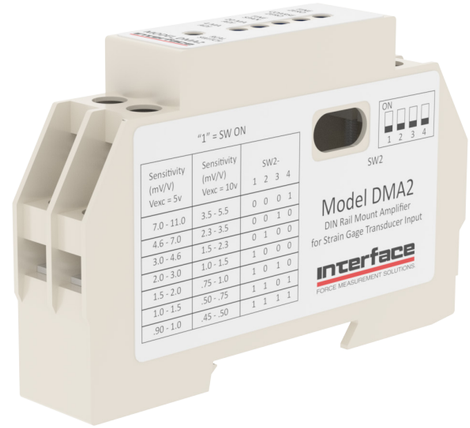
| EXCITATION | | |
|---|---|---|
| Excitation Voltage – VDC | | 5-10 |
| Excitation Current – mA MAX | | 30 |
| **PERFORMANCE** | | |
| Output 1 – VDC | | ±5 or ±10 Full Scale Bipolar Jumper Selectable |
| Output 2 – mA | | 4-20 Full Scale Unipolar |
| Input Range – mV FS | | 5 to 50 Coarse & Fine AdjU.S.t |
| Dynamic Response – Hz | | DC to 1000 |
| Zero Offset Range – % FS | | ±50 Output Coarse & Fine AdjU.S.t |
| 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

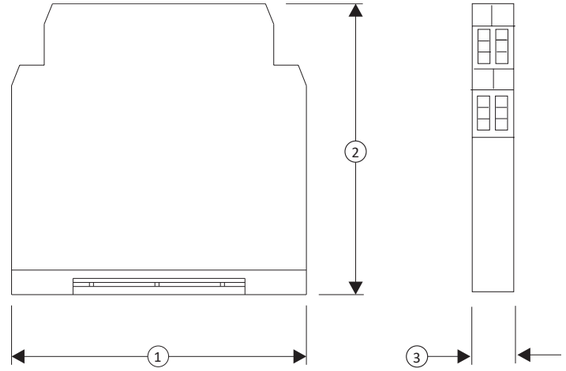
| | |
|---|---|
| 1 | Ground |
| 2 | Vsupply (10-28VDC) |
| 3 | Iout (4-20mA) |
| 4 | Vout (±5 or ±10V) |
| 5 | - Excitation |
| 6 | + Excitation |
| 7 | - Signal |
| 8 | + Signal |




## 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 |

# INF-U.S.B2 SINGLE CHANNEL U.S.B INTERFACE MODULE (U.S. &

## FEATURES & BENEFITS

- Easy U.S.B connection to load and torque transducers
- Up to 5000 sample/second
- Graphing and logging software included
- 16-bit resolution
- Up to 500 samples/seconds
- Data logged into MS Excel compatible CSV file format
- Shunt calibration trigger via software
- Works with mV/V, ±5VDC and 4-20mA output transducers
- Environmentally sealed to IP67 (SI-U.S.B IP40)

## SPECIFICATIONS

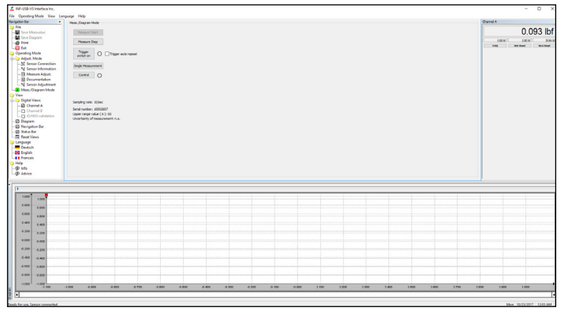
| POWER | | |
|---|---|---|
| From U.S.B – VDC, mA | | 5,350 |
| **PERFORMANCE** | | |
| Measuring Rate: | Internal Sample Rate/sec | 5000 |
| | Software Selectable/min – /sec | 1 to 2500 |
| Temperature Drift | °C | 4 counts/(+10) |
| | °F | 4 counts/(+50) |
| Nonlinearity – % | | 0.1 |
| Accuracy – % | | 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 |
| **ENVIRONMENTAL** | | |
| Material | | Alluminum |

## STANDARD CONFIGURATION

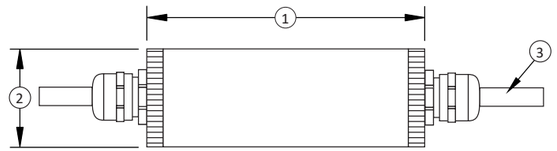


**INF-U.S.B2** (Shown)

## SOFTWARE



- Windows XP, Vista 7, 8 or 10
- System includes U.S.B 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 | 1.3 MΩ | INF-U.S.B2-A |
| B | 4-20 mA | 20,000 | 12V, 80 mA | 62 Ω | INF-U.S.B2-B |
| C | ±4.5 mV/V | ±30,000 | 4V, 20 mA | 200 GΩ | INF-U.S.B2-C |
| D | ±3 mV/V | ±30,000 | 4V, 20 mA | 200 GΩ | INF-U.S.B2-D |



# ISG ISOLATED DIN RAIL MOUNT SIGNAL CONDITIONER

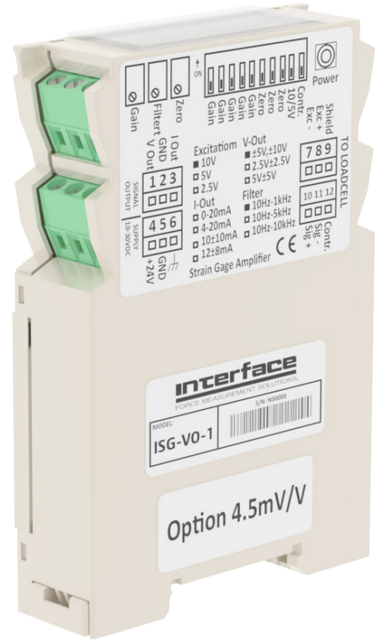
## FEATURES & BENEFITS

- 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 adjU.S.table filter (up to 10kHz optional)
- Space saving narrow hoU.S.ing per DIN EN 50022
- Isolated power supply

## SPECIFICATIONS

| POWER | | |
|---|---|---|
| DC – VDC | | 10-30 |
| Ripple – % | | <10 |
| Current – V < mA | | 10 <200 / 24 <120 |
| FU.S.e – mA | | Self Re-Setting 500 |
| Isolation | | Galvanic from Output and Measurement circuits |
| **EXCITIATION** | | |
| 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 | | 0.3 to 4.5 Switch Selectable |
| Input Resistance | | 1.00E+10 |
| Max Bandwidth – Hz | | 1000 |
| Filter – 3dB – Hz | | 10 to 1000 Potentiometer AdjU.S.table |
| Offset | | Up to 50% course and fine adjU.S.t |
| Nonlinearity – % | | < 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

# JUNCTION BOXES (U.S. & METRIC)

## FEATURES & BENEFITS

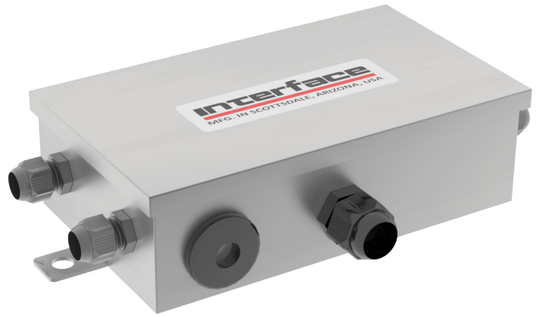
- A convenient method for Wiring multiple load cells to a single indicator
- Commonly U.S.ed in multi-load cell weighing applications
- Ability to coil excess cable inside the box

The JB104SS junction box model is designed to connect and trim up to four load cells per board. It may also be U.S.ed in combination with additional juction boxes through the U.S.e dof an expansion port on the main board to connect multiple junction boxes thU.S. allowing the summing of more than four load cells.

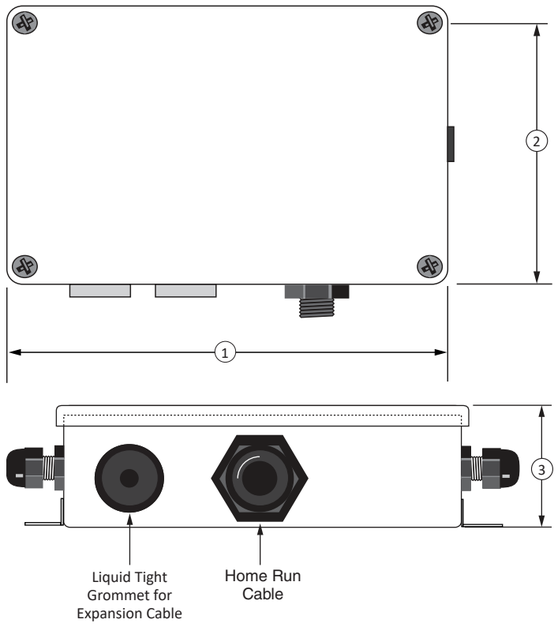
In its most basic form a junction box provides a convenient method for Wiring multiple load cells to a single indicator. Junction boxes are commonly U.S.ed in weighing applications where a tank or scale is supported by more than one load cell. The individual load cell cables are wired into the junction 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 U.S.ed 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 |



# LCT-1 ULTIMATE LOAD CELL TEST INSTRUMENT (U.S. & METRIC)

## FEATURES & BENEFITS

- ContinuoU.S. signal readout provides checking of linearity and repeatability
- U.S.er friendly: fully test the load cell without intervention
- Alphanumeric display: 16 x 2 lines
- Rugged ABS enclosure with rubberized over
- IndU.S.trial 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. U.S.ing 4-AA batteries, it's completely portable and the indU.S.trialized 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 adjU.S.tment – mv/V | 0.1 to 5 in steps of 0.01 |

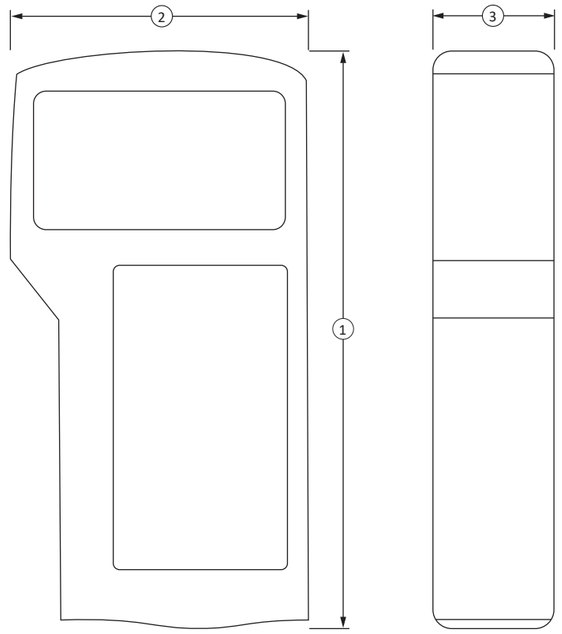
## DIMENSIONS

| 1 | | 2 | | 3 | |
|---|---|---|---|---|---|
| mm | in | mm | in | mm | in |
| 150 | 5.9 | 80 | 3.1 | 28 | 1.1 |

## STANDARD CONFIGURATION




**MODEL LCT-1** (Shown)



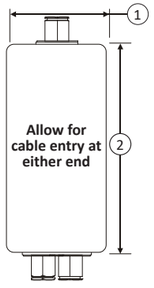
# SGA AC/DC POWERED SIGNAL CONDITIONER (U.S. & METRIC)

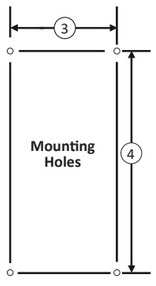
## FEATURES & BENEFITS

- U.S.er 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<br>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 |



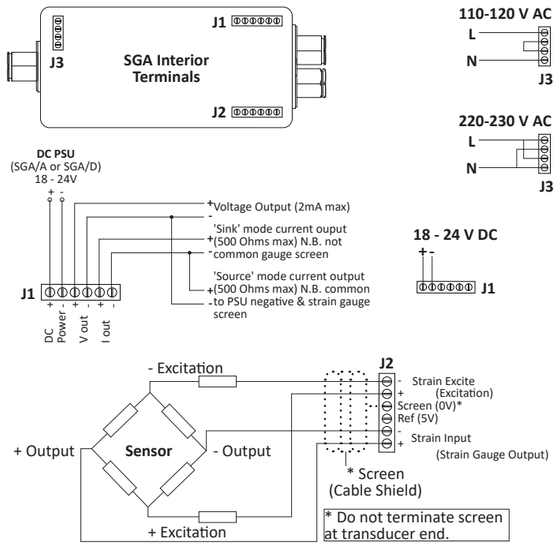




## STANDARD CONFIGURATION




**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 |



# SI-U.S.B DUAL CHANNEL U.S.B INTERFACE MODULE (U.S. &

## FEATURES & BENEFITS

- Easy U.S.B 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 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 | 1.3 MΩ | SI-U.S.B-AA |
| B | 4-20 mA | 20,000 | 12V, 200 mA | 62 Ω | SI-U.S.B-BB |
| C | ±4.5 mV/V | ±30,000 | 5V, 20 mA | 200 GΩ | SI-U.S.B-CC |
| D | ± 3 mV/V | ±30,000 | 5V, 20 mA | 200 GΩ | SI-U.S.B-DD |

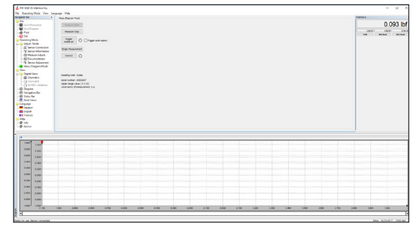
**Mixed ranges also available. Example:* ***SI-U.S.B-AD.***

## STANDARD CONFIGURATION

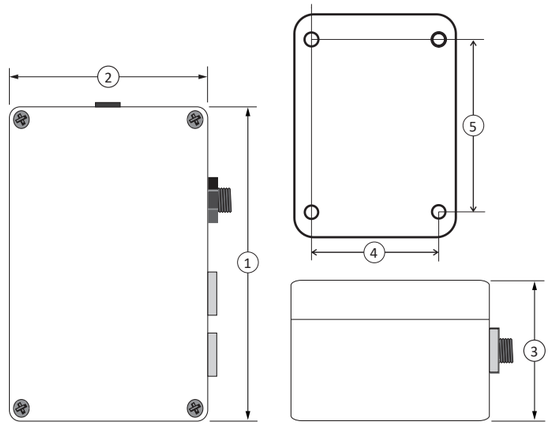



**SI-U.S.B** (Shown)

## SOFTWARE



- Windows XP, Vista 7, 8 or 10
- System includes U.S.B connection to computer and software
- SI-U.S.B 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 |

# Notes:

# Wireless Telemetry System

Wireless

Acquisition Module

Repeater Module

Telemetry Antenna

Base Station

ModbU.S.

ASCII Serial Output

LED Display

Wireless Telemetry Printer

Remote Data Collection

Relay Output Receiver Module

Wind Speed Transmitter Module

# 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 | ºC | -20 to 55 |
| | ºF | -4 to 131 |
| Storage Temperature Range (no batteries) | ºC | -40 to 85 |
| | ºF | -40 to 185 |
| Maximum Humidity – % | | 95 non-condensing |
| IP Rating (WTS-AM-1F & WTS-AM-1-D) | | IP67/Nema4 |

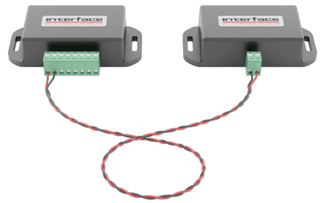
## STANDARD CONFIGURATION




**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

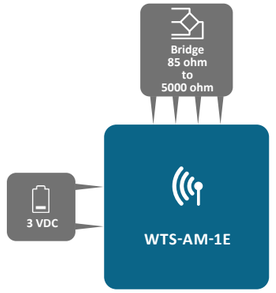
- **Construction**
  - Monitoring tension & compression on shoring struts
  - Crane/Under Hook Scales
- **Automotive & Vehicle**
  - Torque measurement on rotating shaft
  - Wheel balance in high performance cars

## OPTIONS

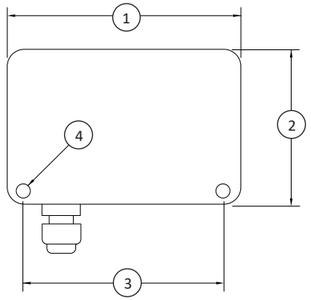
**WTS-AM-1E-D**
Wireless strain bridge transmitter module in IP67 enclosure supporting two D batteries or external power supply
**WTS-AM-1E**
Wireless strain bridge transmitter module in IP67 enclosure for two AA batteries
**WTS-AM-4**
Wireless strain bridge transmitter module in miniature IP50 enclosure




# WTS-AM-1E WIRELESS STRAIN BRIDGE TRANSMITTER MODULE

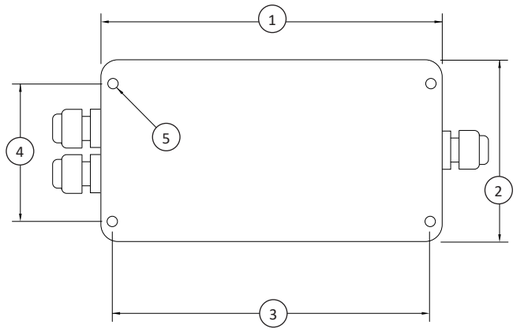

## ELECTRICAL




**WTS-AM-1E** (2) "AA" Size Batteries

## DIMENSIONS

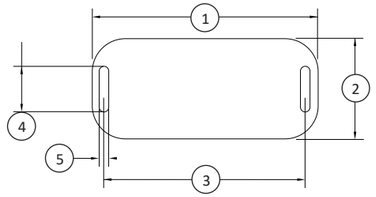
| See Drawing | Metric (mm) | U.S. (in) |
|---|---|---|
| (1) | 80 | 3.1 |
| (2) | 62 | 2.4 |
| (3) | 66.5 | 2.6 |
| (4) | Ø4.8 | Ø0.2 |
| Height | 34 | 1.3 |




**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 | 3 |
| (2) | 35 | 1.4 |
| (3) | 68 | 2.7 |
| (4) | 15 | 0.6 |
| (5) | 3.2 | 0.1 |
| Height | 20 | 0.8 |

# 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 |

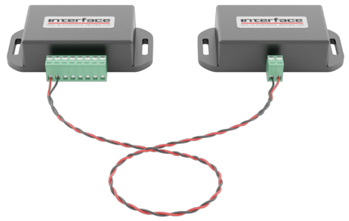
## STANDARD CONFIGURATION




**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

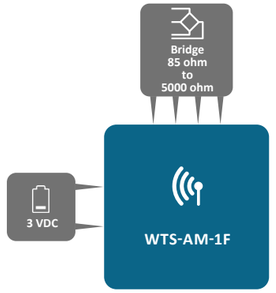
**WTS-AM-1F-D**
Wireless strain bridge fast transmitter module in IP67 enclosure supporting two D batteries or external power supply
**WTS-AM-1F**
Wireless strain bridge fast transmitter module in IP67 enclosure for two AA batteries
**WTS-AM-4F**
Wireless strain bridge fast transmitter module in miniature IP50 enclosure

Catalog 2019 06-15-2020

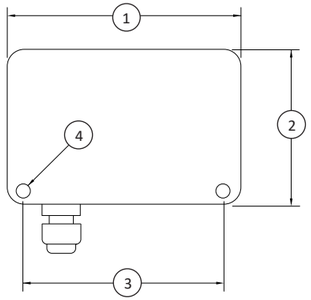


FORCE MEASUREMENT SOLUTIONS

WTS-AM-1F WIRELESS STRAIN BRIDGE TRANSMITTER MODULE FOR FAST MEASUREMENTS



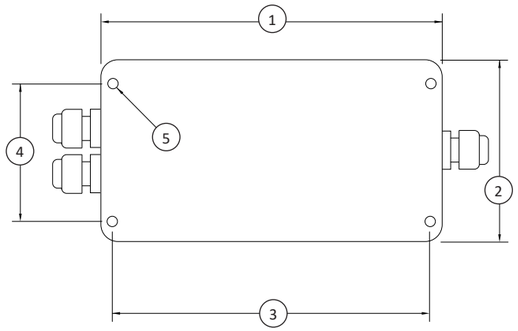

## ELECTRICAL




**WTS-AM-1F** (2) "AA" Size Batteries

## DIMENSIONS

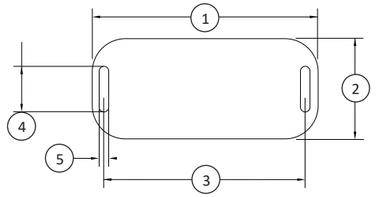
| See Drawing | Metric (mm) | U.S. (in) |
|---|---|---|
| (1) | 80 | 3.1 |
| (2) | 62 | 2.4 |
| (3) | 66.5 | 2.6 |
| (4) | Ø4.8 | Ø0.2 |
| Height | 34 | 1.3 |




**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 |

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# 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 |

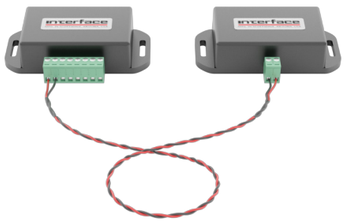
## STANDARD CONFIGURATION




**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

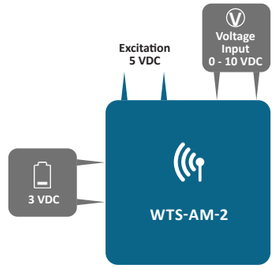
**WTS-AM-5**
Wireless 0-10 V transmitter module in miniature IP50 enclosure

Catalog 2019 06-15-2020

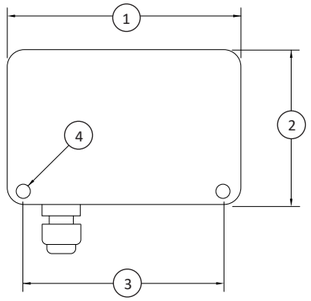


FORCE MEASUREMENT SOLUTIONS

WTS-AM-2 WIRELESS VOLTAGE SENSOR TRANSMITTER



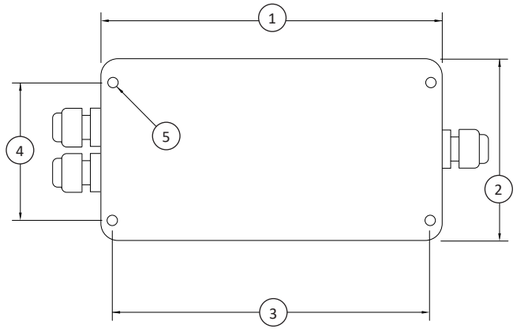

## ELECTRICAL




**WTS-AM-2** (2) "AA" Size Batteries

## DIMENSIONS

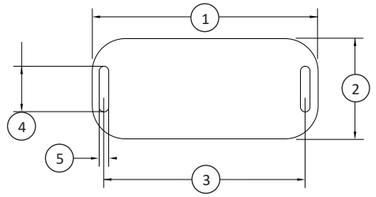
| See Drawing | Metric (mm) | U.S. (in) |
|---|---|---|
| (1) | 80 | 3.1 |
| (2) | 62 | 2.4 |
| (3) | 66.5 | 2.62 |
| (4) | Ø4.8 | Ø0.19 |
| Height | 34 | 1.3 |




**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 |

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# 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 |

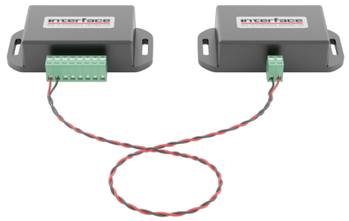
## STANDARD CONFIGURATION




**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

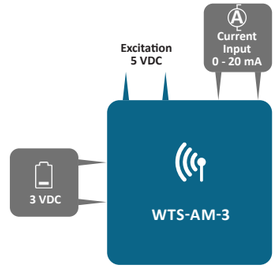
**WTS-AM-3-D**
Wireless 4-20 mA transmitter module in IP67 enclosure supporting two D batteries or external power supply

**WTS-AM-3**
Wireless 4-20 mA transmitter module in IP67 enclosure for two AA batteries

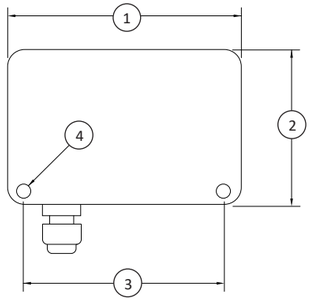
**WTS-AM-6**
Wireless 4-20 mA transmitter module in miniature IP50 enclosure




# WTS-AM-3 WIRELESS 4-20 mA TRANSMITTER MODULE

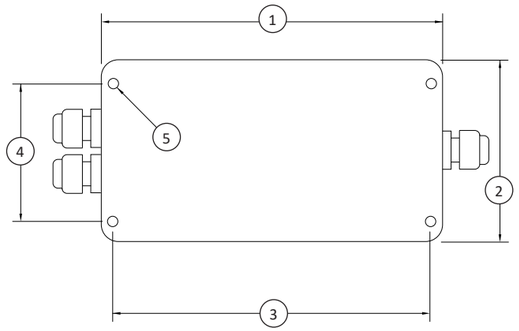

## ELECTRICAL




**WTS-AM-3** (2) "AA" Size Batteries

## DIMENSIONS

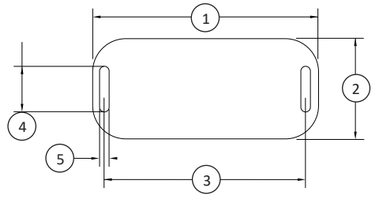
| See Drawing | Metric (mm) | U.S. (in) |
|---|---|---|
| (1) | 80 | 3.1 |
| (2) | 62 | 2.4 |
| (3) | 66.5 | 2.6 |
| (4) | Ø4.8 | Ø2.0 |
| Height | 34 | 1.3 |




**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-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 indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-AR is hoU.S.ed 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

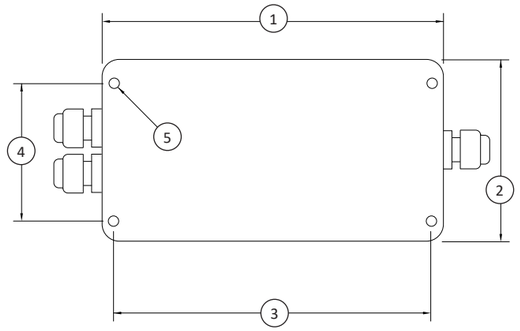
## SPECIFICATIONS

| | | |
|---|---|---|
| **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



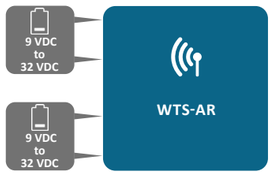

**WTS-AR** (Shown)




## 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




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# 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.

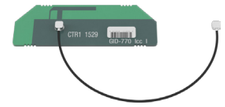
## FEATURES & BENEFITS

- 4 different versions (PCB, fixed, variable, puck)
- Offers flexibility to OEM installers
- Surface & bulkhead Options

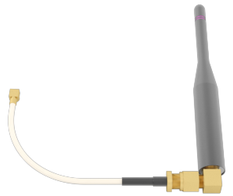
## SPECIFICATIONS

| | | |
|---|---|---|
| Approved telemetry antenna Options for varioU.S. 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)

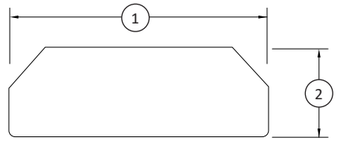


**WTS-ANTD** (Shown)



**WTS-ANTE** (Shown)

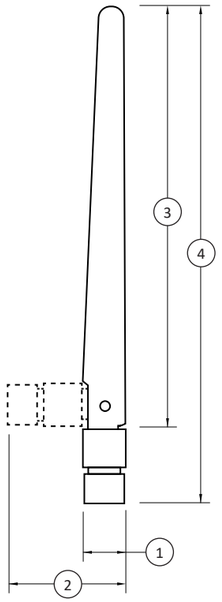
# WTS-ANTA / ANTB / ANTC TELEMETRY ANTENNA OPTIONS




WTS-ANTA

## DIMENSIONS

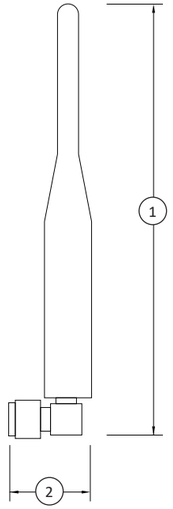
| See Drawing | Metric (mm) | U.S. (in) |
|---|---|---|
| (1) | 58 | 2.3 |
| (2) | 20 | 0.8 |
| Height | 4 | 0.2 |




WTS-ANTC

## DIMENSIONS

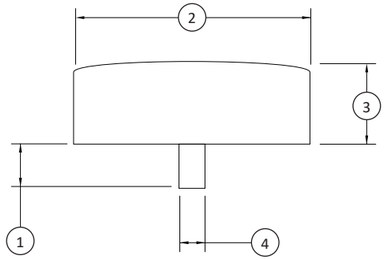
| See Drawing | Metric (mm) | U.S. (in) |
|---|---|---|
| (1) | 28 | 1.1 |
| (2) | Ø10 | 0.4 |
| (3) | 95 | 3.7 |
| (4) | 113 | 4.4 |




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-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 indU.S.trial power supplies and are available in robU.S.t 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 | | |
| ContinuoU.S. 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 |

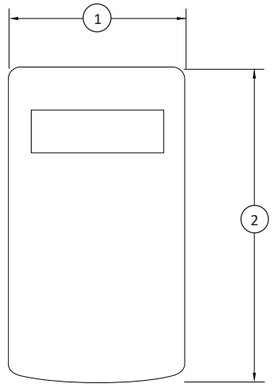
## ACCESSORIES

**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



# 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 indU.S.trial power supplies and are available in robU.S.t 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 adjU.S.tment 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 | | |
| ContinuoU.S. 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 |

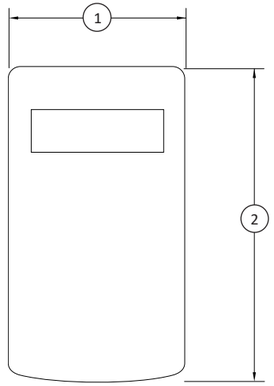
## ACCESSORIES

**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






# 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 indU.S.trial power supplies and are available in robU.S.t 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 adjU.S.tment 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 | | |
| ContinuoU.S. 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 |

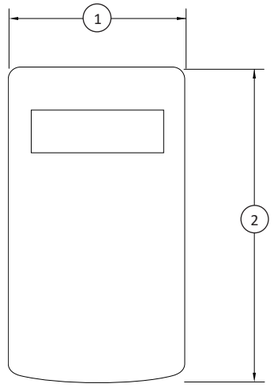
## ACCESSORIES

**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

# WTS-BS-3E WIRELESS BASE STATION WITH U.S.B

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 U.S.ed for data collection systems by making available the WTS wireless transmitter data over the U.S.B 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 indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-3E is hoU.S.ed in an IP50 enclosure. On Windows PCs the free WTS Toolkit is U.S.ed 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 U.S.B
- Configure & calibrate the WTS range
- Data collection for PC/PLC

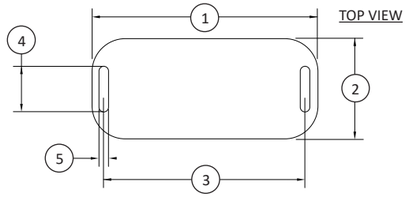
## SPECIFICATIONS

| POWER SUPPLY | | |
|---|---|---|
| Power Supply Voltage (U.S.B) – VDC | | 4.875 to 5.125* |
| * As defined by U.S.B 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



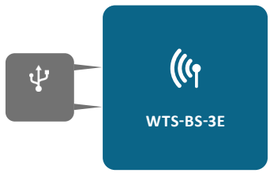
**WTS-BS-3E** (Shown)




## 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






# WTS-BS-4 WIRELESS BASE STATION WITH U.S.B INTERFACE IN INDU.S.TRIAL

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 U.S.ed for data collection systems by making available the WTS wireless transmitter data over the U.S.B 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 indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage. The WTS-BS-4 is hoU.S.ed in an IP67 enclosure and has better coverage than the WTS-BS-3E.

On Windows PCs the free WTS Toolkit is U.S.ed 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 U.S.B
- Configure & calibrate the WTS range
- IP67/NEMA 4 rated enclosure

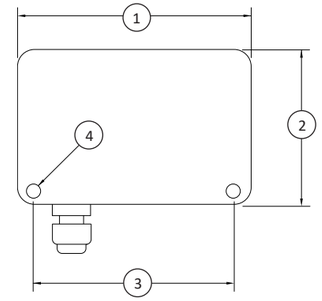
## SPECIFICATIONS

| POWER SUPPLY | | |
|---|---|---|
| Power Supply Voltage (U.S.B) – VDC | | 4.875 to 5.125* |
| * As defined by U.S.B 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



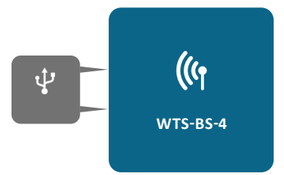

**WTS-BS-4** (Shown)




## 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



# 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 U.S.ed.

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 indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-5 offers, as Standard, a U.S.er 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

## 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)
- IndU.S.trial & desktop versions available

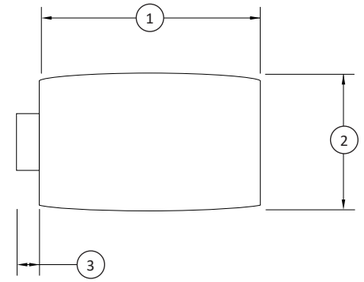
## ELECTRICAL




Catalog 2019 06-15-2020



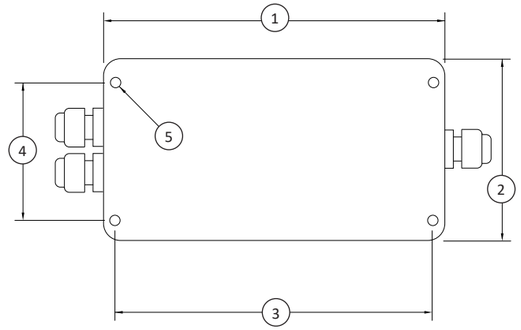
FORCE MEASUREMENT SOLUTIONS
WTS-BS-5/DT WIRELESS ANALOG OUTPUT RECEIVER MODULE




**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-BS-6 WIRELESS TELEMETRY DONGLE BASE STATION

The WTS wireless telemetry dongle base station (WTS-BS-6) is the smallest in our base station range and offers line of sight range of up to 500 m (1,640 ft) for all wireless telemetry modules.

It draws power from the U.S.B bU.S. and therefore no further components are required to configure and control remote devices from a PC.

This plug and play U.S.B base station provides a portable solution, with no cables, making it ideal for laptops, tablets that run a full version of Windows.

## FEATURES & BENEFITS

- **Compact & Portable:**
  Provides a small, portable solution with no cables making it ideal for laptops and tablets
- **Quick Setup:**
  Simple U.S.B "Plug and Measure" device connects directly to a PC
- **Fast Configuration:**
  Allowing quick configuration via the WTS Toolkit software
- **500 m Wireless Range:**
  Provides a line of sight range of up to 500 m (1640 ft)
- **Portable Logging:**
  Fast portable logging is available via the WTSLOG100 logging and visualization software

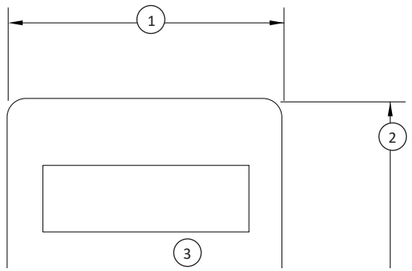
## SPECIFICATIONS

| POWER SUPPLY | | |
|---|---|---|
| Power Supply Voltage (U.S.B) – VDC | | 4.875 to 5.125* |
| *As defined by U.S.B 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



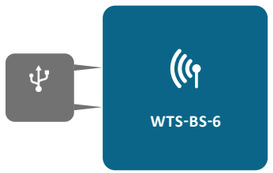

**WTS-BS-6** (Shown)




## DIMENSIONS

| See Drawing | Metric (mm) | U.S. (in) |
|---|---|---|
| (1) | 58 | 2.3 |
| (2) | 20.5 | 0.8 |
| (3) | 46 | 1.8 |
| Height | 11 | 0.4 |

## ELECTRICAL




Catalog 2019 06-15-2020



# WTS-GW1 WIRELESS GATEWAY WITH MODBU.S. AND ASCII SERIAL

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 U.S.ing either the ModbU.S. 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 indU.S.trial power supplies and are available in robU.S.t 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

## INDU.S.TRY SOLUTIONS

- Interface with indU.S.trial PLC's
- Simple connection to existing DAQ systems (i.e. LabVIEW or DASYLab)

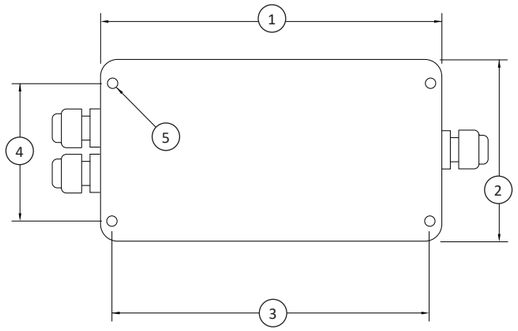
## SPECIFICATIONS

| 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 U.S.B 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



# WTS-LD1 WIRELESS LARGE LED DISPLAY

The WTS-LD1 provides the U.S.er 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 indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

U.S.ing the PC based WTS Toolkit software and a U.S.B base station the U.S.er 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 U.S.er to remotely control Tare and Net/Gross toggle

## FEATURES & BENEFITS

- Large screen with 4-digit, 100 mm (4 in) LED display
- Mounting Options: ceiling sU.S.pended or wall mounted
- Tare function

## 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 U.S.B connector) | | IP65 |

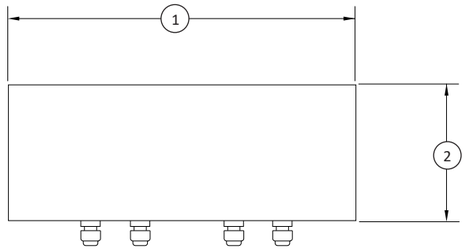
## POSSIBLE DISPLAY VALUES

| 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 |
| Height | 77 | 3.0 |

## ELECTRICAL






# WTS-LD2 WIRELESS LARGE LED DISPLAY


The WTS-LD1 provides the U.S.er 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 indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

U.S.ing the PC based WTS Toolkit software and a U.S.B base station the U.S.er 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 U.S.er to remotely control Tare and Net/Gross toggle

## FEATURES & BENEFITS

- Large screen with 4-digit, 100 mm (4 in) LED display
- Mounting Options: ceiling sU.S.pended or wall mounted
- Tare function

## 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 U.S.B connector) | | IP65 |

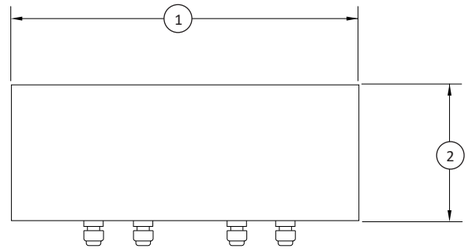
## POSSIBLE DISPLAY VALUES

| Negative Display Values | Positive Display Values |
|---|---|
| -1999 | 9999 |
| -199.9 | 999.9 |
| -19.99 | 99.99 |
| -1.999 | 9.999 |


## STANDARD CONFIGURATION



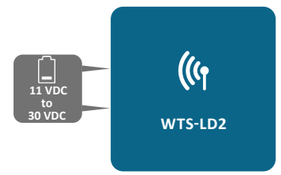
**WTS-LD2** (Shown)




## DIMENSIONS


| See Drawing | Metric (mm) | U.S. (in) |
|---|---|---|
| (1) | 435 | 17.1 |
| (2) | 195 | 7.7 |
| Height | 77 | 3.0 |


## ELECTRICAL



# WTS-PR1 WIRELESS TELEMETRY PRINTER

The WTS-PR1 is a thermal printer module that can generate a U.S.er 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 indU.S.trial 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

## FEATURES & BENEFITS

- Prints screen from the handheld WTS-BS-1-HA
- Simple design (F1 button)
- U.S.er definable reports/print outs
- Suitable for vehicle applications

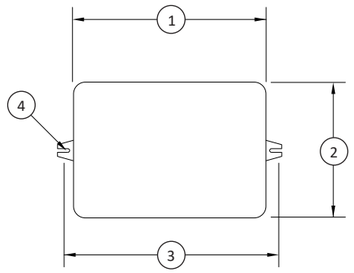
## SPECIFICATIONS

| 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 U.S.B 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




Catalog 2019 06-15-2020



# WTS-RDC WIRELESS REMOTE DATA COLLECTION

The WTS-RDC U.S.es a Quad Band GPRS modem to log and report data to multiple destinations including web services, email addresses and mobile phones, allowing for worldwide access to data.

WTS transmitter values are also compared to U.S.er defined limits which can trigger alert messages allowing real time monitoring of an entire system.

Data can be collected and delivered at predefined intervals in the form of a CSV file or cU.S.tomized data can be delivered to a wide range of cloud data collection and analysis services. SMS messages and email can also be sent as triggered alerts or at intervals.

Low power modes allow the WTS-RDC to operate from external battery packs or from solar panel systems.

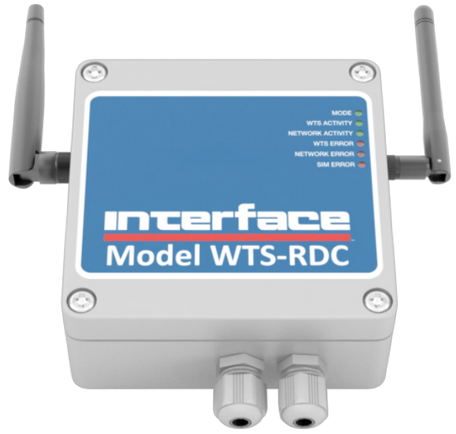
## FEATURES & BENEFITS

- Ideal for remote applications
- Wireless input range of up to 800 m (2,625 ft)
- Output data to anywhere in the world
- Collect data from up to 200 sensors
- Re-configure settings remotely U.S.ing SMS
- Alert functionality
- Free software

## SPECIFICATIONS

| POWER SUPPLY | | |
|---|---|---|
| Power Supply Voltage Range – VDC | | 9 to 32 |
| Average Operating Current When GSM Active - mA | | 350 |
| **GSM/GPRS RADIO** | | |
| Radio Type | | Quad-band EGSM |
| Radio Frequency – MHz | | 850/900/1800/1900 |
| Output Power Class 4 @ 850 / 900 MHz – W | | 12 |
| Output Power Class 1 @ 1800 / 1900 MHz – W | | 1 |
| **GSM/GPRS RADIO** | | |
| Radio Type | | Quad-band EGSM |
| Radio Frequency – MHz | | 850/900/1800/1900 |
| Transmit Power – mW | | 10 |
| Output Power Class 4 @ 850 / 900 MHz – W | | 12 |
| Output Power Class 1 @ 1800 / 1900 MHz – W | | 1 |
| **ENVIRONMENTAL** | | |
| Operating Temperature Range | °C | -20 to 55 |
| | °F | -4 to 131 |
| Storage Temperature Range | °C | -20 to 55 |
| | °F | -4 to 131 |
| Maximum Humidity – % | | 95 non-condensing |

## STANDARD CONFIGURATION




**WTS-RDC** (Shown)

## OPTIONS

**WTS-RDC-1**
Wireless remote data collection – 1 transmitter

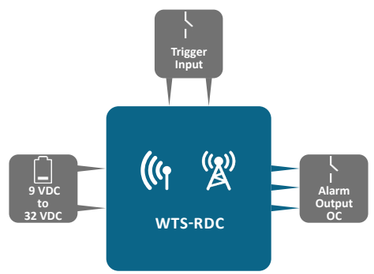
**WTS-RDC-2**
Wireless remote data collection – 2 transmitters

**WTS 4-RDC-5**
Wireless remote data collection – 5 transmitters

**WTS-RDC-10**
Wireless remote data collection – 10 transmitters

**WTS-RDC-200**
Wireless remote data collection – 200 transmitters

## ELECTRICAL



# 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 U.S.ed 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 indU.S.trial power supplies and are available in robU.S.t 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

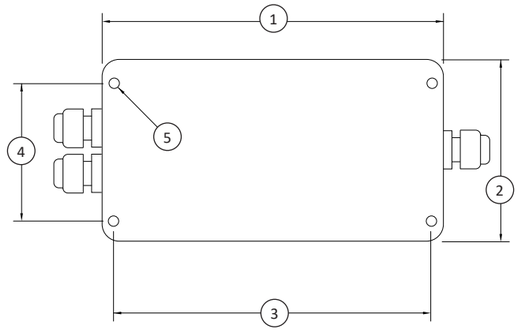
## SPECIFICATIONS

| | | |
|---|---|---|
| **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 U.S.B connector) | | IP67/Nema4 |

## STANDARD CONFIGURATION



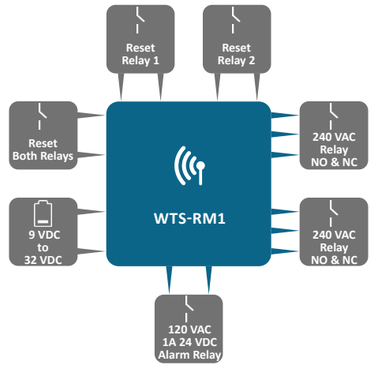

**WTS-RM1** (Shown)




## 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






# WTS-SO WIRELESS INTERFACE WITH ASCII SERIAL OUTPUT

The WTS-SO outputs a U.S.er 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 indU.S.trial power supplies and are available in robU.S.t 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 jU.S.t 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)

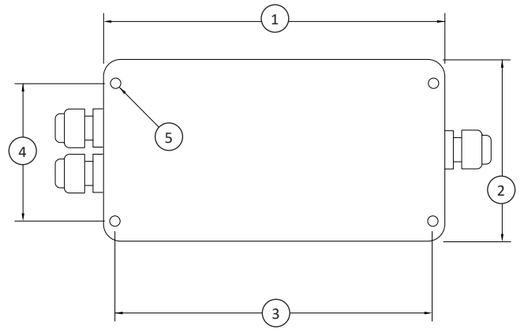
## SPECIFICATIONS

| | | |
|---|---|---|
| **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 U.S.B 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



# 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 indU.S.tries.

The WTS-WSS U.S.es 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 gU.S.ts at U.S.er defined periods of 1, 3, 5, or 10 sec. Wind speed measurement is available in m/s, fps, mph, km/h, or kn.

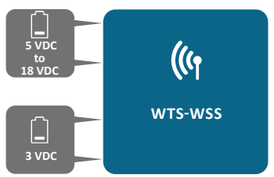
The device is powered either from internal batteries or an external supply. For applications which require high sampling rates for long periods, Interface's power pack (WTS-PP1) and solar panel (WTS-SP1) offer an ideal solution.

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 gU.S.ts at U.S.er 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

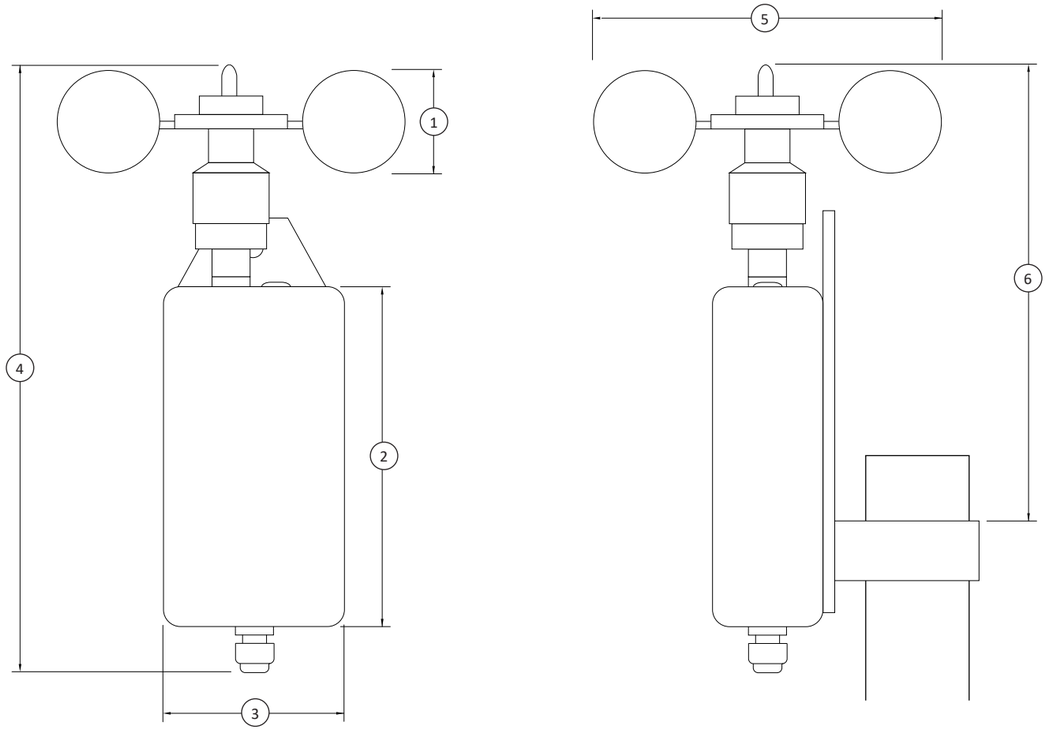
| PARAMETER | | |
|---|---|---|
| Measurement Range – mph | | 5 – 125 |
| Accuracy 5 to 10 mph – mph | | ±0.5 |
| Accuracy 10 to 125 mph – % | | ±4 |
| **ENVIRONMENTAL** | | |
| Operating Temperature Range | °C | -20 to 55 |
| | °F | -4 to 131 |
| Storage Temperature Range (no batteries) | °C | -40 to 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



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 |

# IAHD-1 ADVANCED WIRELESS HANDHELD DISPLAY

The IAHD-1 handheld is a rugged and versatile digital handheld display with a broad range of Features. At the heart of the ergonomically designed handheld is a powerful PCB providing indU.S.try leading Features, such as U.S.er selectable units of measure (MT, lbs, kg and kN), programmable audible overload alarm, peak hold, pre-set tare and a U.S.er resettable overload counter. This crucial overload alarm is a requirement for many safety and quality control departments, as it keeps track of overload events, allowing the load cell in question to be removed from service immediately following the calibration voiding overload event. The load cell in question can then be sent out for proper testing and, if necessary, recalibration before re-entering service.

## FEATURES AND BENEFITS

- Overload functionality
- U.S.er selectable 90db audible overload alarm
- Multiple display units – MT, lbs, kg and kN
- 100Hz peak hold
- Pre-set tare
- Wireless range of 610 m (2,000 ft)
- 60 hours battery life

## STANDARD CONFIGURATION




**MODEL IAHD-1** (Shown)

## SPECIFICATIONS

| | | |
|---|---|---|
| Transmission Distance | m | Up to 610 (clear line of sight) |
| | ft | Up to 2,000 (clear line of sight) |
| Battery | | AA Alkaline x 2 |
| Battery Life – hrs | | 60 continuoU.S. U.S.e |
| Display Type | mm | 6-digit, 25 |
| | in | 6-digit, 1 |
| Display Rate – Hz | | 3 |
| Max Resolution | | 1 part in 999,999 (normal mode) |
| Operating Temperature | °C | -10 to +50 |
| | °F | +14 to +122 |
| Connectivity – GHz | | Wireless 2.4 |
| Environmental Protection Level | | IP65 / NEMA 4X |



# Notes:

# Notes:

# GS-SYS GOLD STANDARD® CALIBRATION SYSTEM (U.S. & METRIC)

## Features AND BENEFITS

- Capacities from 25K, 55K, & 100K lbf (110, 250, & 450 kN)
- SCB1 signal conditioning board with very low nonlinearity specification (<0.003% FS)
- Less than 0.04% RDG uncertainty
- Fully automated system will reduce calibration time by 50% to 90%
- Automated tensions 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 cU.S.tomize reports and graphs
- Automatically archives data

The Interface Gold Standard® Calibration System U.S.ing the Interface Gold or Platinum Standard® Load Cells ensures a metrology system of the highest accuracy and lowest uncertainty available.

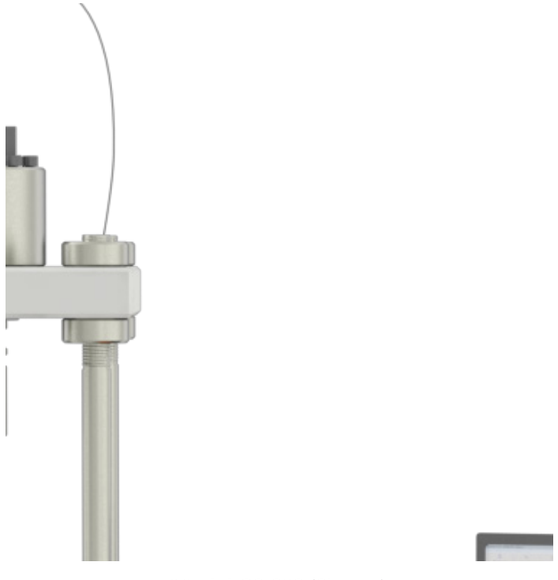
The Gold Standard® Calibration System includes:

- 25K, 55K, or 100K lbf (110, 250, or 450 kN) load frame
- Integrated control and measurement system
- Integrated computer system with Interface Gold Standard® Calibration Software
- One set of thread adapters for initial set-up and U.S.e

Additional Options include:

- Interface Gold or Platinum Standard® reference load cells
- Additional input channels for multiple bridge load cells or transducers with high level outputs
- HRBSC high performance resolution signal conditioning board with N/C <0.001% FS
- Special threads and calibration adapters
- CX Series Precision mV/V transfer Standard for system calibration
- On-site training
- GS E74 software for high level inputs
- GS E74 software for system calibrations (Transducer and display as a system)
- Hinged Safety Shield (Load cells accessible from front and left side)

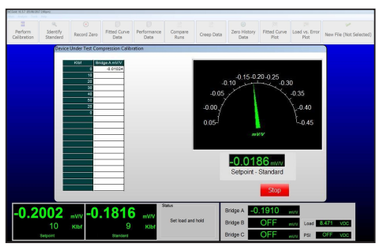
## STANDARD CONFIGURATION



**Model GS-SYS** (Shown)

## 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

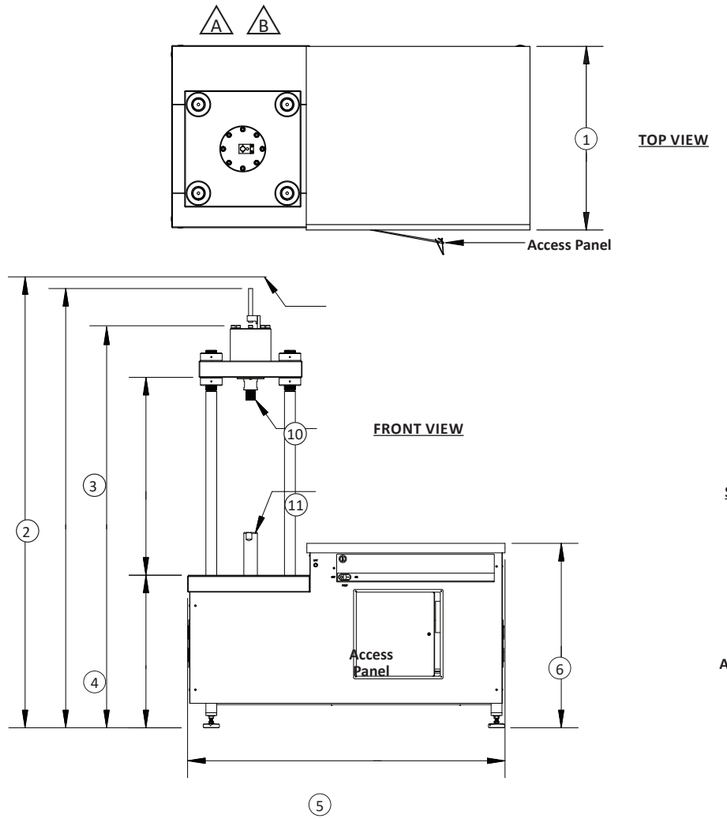



Catalog 2019 06-15-2020



interface
FORCE MEASUREMENT SOLUTIONS

# GS-SYS GOLD STANDARD® CALIBRATION SYSTEM (U.S. & METRIC)




## Dimensions

| See Drawing | CAPICITY | |
|---|---|---|
| | lbf | kN |
| | 25K, 55K, 100K | 110, 250, 450 |
| | in | mm |
| (1) | 30.0 | 762 |
| (2) | 81.0 | 2057 |
| (3) | 36.5 | 927 |
| (4) | 28.2 | 716 |
| (5) | 58.6 | 1488 |
| (6) | 34.0 | 864 |
| (7) | 19.0 | 483 |
| (8) | 12.5 | 318 |
| (9) | 24.4 MIN / 30.4 MAX | 620 MIN / 772 MAX |
| (10) | 1.75-12 UN 2A x 1.80 | 1.75-12 UN 2A x 45.7 |
| (11) | 1.75-12 UN 2B x 2.0 | 1.75-12 UN 2B x 51 |

7418 East Helm Drive • Scottsdale, Arizona 85260 • 480.948.5555 • www.interfaceforce.com

# GS-SYS GOLD STANDARD® CALIBRATION SYSTEM (U.S. & METRIC)

## Specifications

| LOAD FRAME | | |
|---|---|---|
| Capacity | lbf | 25K, 55K, 100K |
| | kN | 110, 250, 450 |
| Weight | lbs | 2200 |
| | kg | 997.9 |
| Type | | Four Column, Dual Action Hydraulic |
| Load Cell Test Type | | Compression or Tension |
| Horizontal Clearance | in | 12.5 |
| | mm | 317.5 |
| Vertical Clearance | in | 24.4 to 30.4 |
| | mm | 619.8 to 772.2 |
| Piston Stroke | in | 6.0 |
| | mm | 152.4 |
| Top Swivel Thread | | 1.75-12 Male |
| Bottom Actuator Thread | | 1.75-12 Female |
| Position Sensor | | LVDT |
| Zero Control | | Automatic Return |
| Slack Adaptor Range | in | ± 0.25 |
| | mm | ± 6.35 |
| Thread Adaptors | | Base Set Included |
| **HYDRAULIC SYSTEM** | | |
| Oil Capacity | U.S. gal | 10 |
| | L | 37.85 |
| Oil Type | | Mobile DTE25 or Equivalent |
| Oil Over-Temperature | | Automatic Cut-Off |
| Low Oil Level | | Automatic Cut-Off Indicator |

| CONTROLS | |
|---|---|
| Speed Control | Automatic |
| Speed Selection | Configurable |
| Controller | PID |
| **U.S.ER INTERFACE** | |
| Control Interface | IndU.S.trial Computer |
| Software | Interface Gold Standard® |
| Reports | U.S.er Configurable |
| Test Reports Available | ASTM E74, ISO 376 or CU.S.tom |
| Shunt Calibration | Automatic or Manual |
| Curve Fit | Least Square Method |
| Calibration History | Compare Data with Past Results |
| **CALIBRATION** | |
| Uncertainty - %RDG | Less than 0.04 Uncertainty |
| Ranges | Dependent on Gold Standard® Load Cell |
| Overload Protection | U.S.er Configurable |
| Automatic Load Points | U.S.er Configurable |
| Load Measurement Range - % | 1 to 100 of Load Frame Capacity |
| A/D Calibration Standard | Included |
| **REQUIREMENTS** | |
| Power Requirements - VAC Hz A CCT | 208/240, Single Phase, 50/60, 20 |

## SHIPPING INFORMATION

| Crate Dimensions and Weight | | |
|---|---|---|
| Dimensions - W x H x D | in | 72 x 90 x 48 |
| | mm | 1828.8 x 2286 x 1219.2 |
| Weight | lbs | 2500 |
| | kg | 1133.981 |
| Includes tilt/shock sensors | | |
| Fork lift access | | |

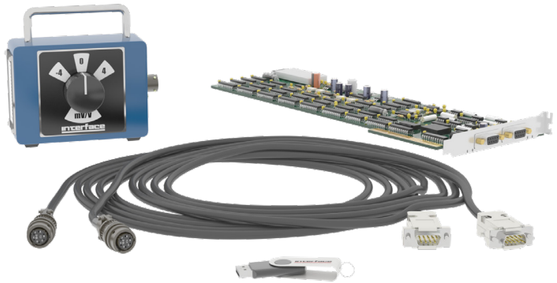




# GS-SYS01 GOLD STANDARD® DESKTOP LOAD CELL CALIBRATION SYSTEM

### Fully Integrated PC-Based Solution for Calibration of Load Cells or Torque Transducers

## STANDARD CONFIGURATION



**Model GS-SYS01** (Shown)

- Windows software provides flexibility and produces consistent calibration results
- Performs ASTM E74, ISO376 and EN100002-3 calibrations
- Nonlinearity less than 0.003% FS
- Automatically archives data
- Generates Standard reports, graphs, and performance parameter calculations
- Permits easy generation of cU.S.tomized reports and graphics

## GOLD Standard® LOAD CELL CALIBRATION SYSTEMS

Every new transducer or testing system mU.S.t be calibrated to determine its properties and accuracy. It is also necessary to recalibrate transducers periodically becaU.S.e 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 U.S.ed with a hydraulic load frame which can either be supplied by the U.S.er 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 for tens of thoU.S.ands of load cells, the system provides state-of-the-art accuracy. The system is U.S.er-friendly and calibrations can be conducted with minimal training. Pull-down menU.S. and step-by-step instructions are available to guide the operator through a complete calibration.

## SYSTEM INCLUDES

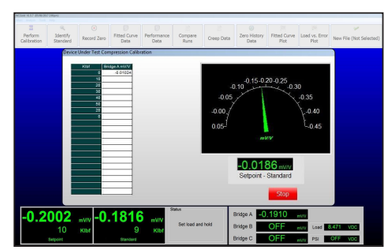
- SCB1 dual channel 20-bit signal conditioning board with 0.003% nonlinearity
- ICS-202 Gold Standard® Calibration Software
- Two Gold Standard® interconnect cable assemblies
- CX-0440 ±4mV/V transfer Standard
- SIS-104 system setup
- SIS-103 one-day training at Interface Inc.

## OPTIONS

- IndU.S.trial PC
- Additional channels for calibrating multiple bridge load cells
- CX-0610 or other multi-step mV/V transfer Standards
- DA-101 digital to analog board for frame control
- HL4IO high level 4-channel input board for transducers with high level outputs
- Gold or Platinum Standard® Calibration Grade Load Cells

## SOFTWARE

- Load points can be preset as required per your test Specifications
- The Gold Standard® Calibration Software will provide exact load output at specific load points
- Results from earlier runs can be compared, measured, and displayed with current run results



# 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 cU.S.tomized reports and graphics

## GOLD Standard® LOAD CELL CALIBRATION SYSTEMS

Every new transducer or testing system mU.S.t be calibrated to determine its properties and accuracy. It is also necessary to recalibrate transducers periodically becaU.S.e 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 U.S.ed with a hydraulic load frame which can either be supplied by the U.S.er 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 thoU.S.ands of load cells, the system provides state-of-the-art accuracy. The system is U.S.er-friendly and calibrations can be conducted with minimal training. Pull-down menU.S. 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





# 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 cU.S.tomized 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



# CX SERIES PRECISION mV/V TRANSFER STANDARD

## FEATURES & BENEFITS

- Most accurate load cell simulator
- Special low thermal EMF construction
- Each unit individually calibrated, aged and calibrated
- Strong, rugged design
- Instrument substitution testing

Models CX-0202, CX-0610, CX-0440, CS-0330, and CX-0220 are U.S.ed 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 U.S.er 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.

## STANDARD CONFIGURATION




**Model CX-0610** (Shown)




**Model CX-0440** (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 |

Catalog 2019 06-15-2020



# SCB1 SIGNAL CONDITIONING BOARD 1 OR 2 CHANNEL

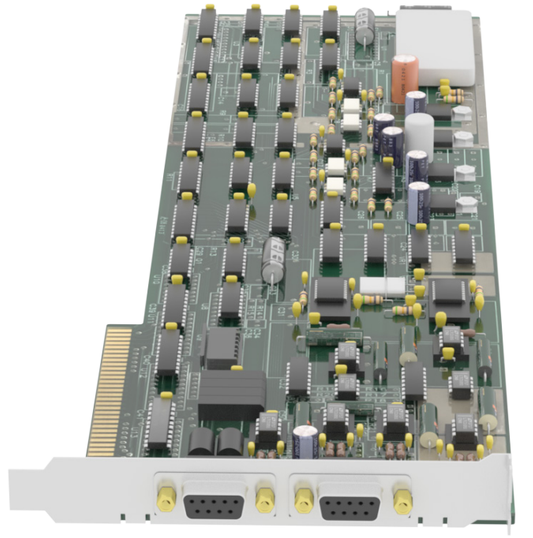
## FEATURES & BENEFITS

- Nonlinearity <0.003% full scale
- 20-bit resolution
- High thermal stability
- Shunt calibration, software selectable
- Single or dual channel versions
- Bipolar
- Isolated output

## SPECIFICATIONS

| | | |
|---|---|---|
| **EXCITATION** | | |
| Excitation Voltage – VDC | | 10 |
| Current – mA MAX | | 120 |
| **PERFORMANCE** | | |
| Resolution – bits | | 20 |
| Signal Input Range – mV/V | | ±2.5, ±5.0, ±7.5 |
| Conversion Rate | | 8 readings/second |
| Nonlinearity – % | | <0.003 full scale |
| Span Temperature Coefficient – ppm/°C | | <10 |
| Zero Temperature Coefficient – µV/°C | | <0.2 |
| Span Stability (after warm up) – % | | ±0.003 per 24 hrs, ±0.01 per year |
| Zero Stability (after warm up) – µV | | ±10 /per year |
| Settling Time – sec to % | | <0.25 to within 0.01 |
| Frequency Response – Hz (dB points) | | 5 (-3) |
| Input Resistance – megohm | | >100 |
| Common Mode Rejection – dB | | >90 |
| Common Mode Voltage re: signal – V | | ±8 without damage |
| Common Mode Voltage re: ground – V | | ±500 peak without damage (isolated version only) |
| Isolation Resistance – megohms | | >100 to ground |
| Noise – µV | | <0.3 typical, 0.6 max (digital filter ON) <0.7 typical, 1.5 max (digital filter OFF) |
| **ENVIRONMENTAL** | | |
| Operating Temperature | °F | +35 to +105 |
| | °C | +1.67 to +40.56 |
| Relative Humidity – MAX | | 80% |
| **POWER** | | |
| DC – VDC | | PC BU.S. +5 supply |
| Power Consumption – W MAX | | 10 |
| **MECHANICAL** | | |
| Dimensions | in | 3.75 x 14 x 0.75 Full Size Card |
| | mm | 95 x 356 x 19 Full Size Card |

## STANDARD CONFIGURATION



**Model SCB1** (Shown)

The SCB1 signal conditioning board comes in a one or two-channel configuration. The single-channel unit is U.S.ed with a dead weight system and/or for test machine verification, while the two-channel unit is U.S.ed for calibrations where a reference (Standard) load cell is being U.S.ed. One channel is connected to the reference Standard and one channel is connected to the unit under

## CONNECTOR

- DE-9 Socket (1 per channel)

## ACCESSORIES

- Gold Standard interconnect cable assemblies
- DA-101 Digital-Analog board, U.S.ed with automated systems (consult factory)
- IndU.S.trial Computer to hoU.S.e Signal Conditioning Boards

*Consult factory for more technical information*

# Notes:



# Accessories

Cable Assemblies

Calibration Adapters

Clevises

Jam Nuts

Load Buttons

Mating Connectors

Mounting Plates

RCAL Resistors

Rod End Bearings

Thread Adapters

TEDS

# CALIBRATION ADAPTORS (U.S. & METRIC)

## FEATURES & BENEFITS

- Improves accuracy
- Spherical end for compression loading
- Metric sizes available

***Contact U.S. today to discU.S.s the right Calibration Adaptor for your application.***

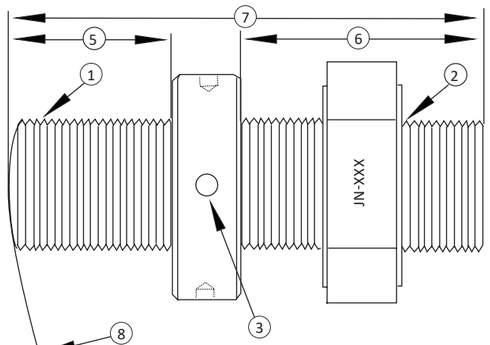
## Specifications

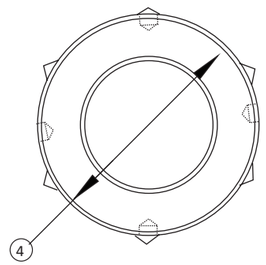
| MECHANICAL | |
|---|---|
| Material | Heat treated steel |

## STANDARD CONFIGURATION



**Models CA-102 w/JN-105 & CA-104 w/JN-107** (Shown)




## 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 | ⅜-18 to ⅜-18 | 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 U.S.ed with REBs
- Male threads

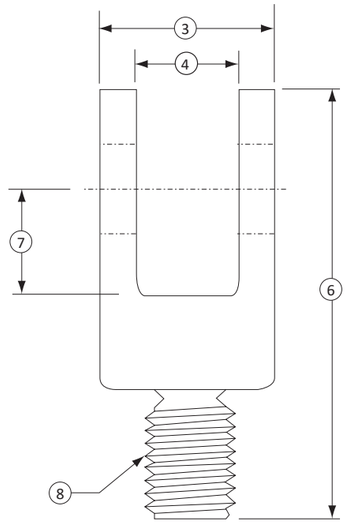
## Specifications

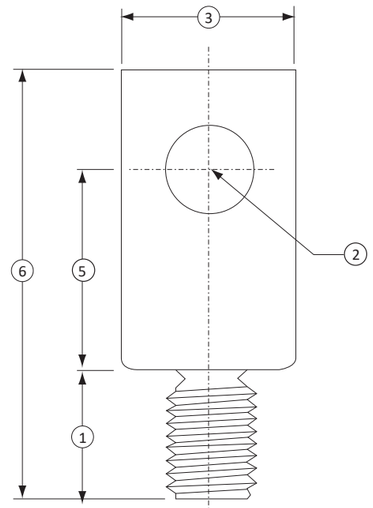
| MECHANICAL | | |
|---|---|---|
| **Model** | CLV-104<br>CLV-105 | CLV-101<br>CLV-102<br>CLV-106 |
| **Material** | Aluminum | Heat treated steel |

## STANDARD CONFIGURATION



**Models CLV-104 & CLV-102** (Shown)




## DIMENSIONS

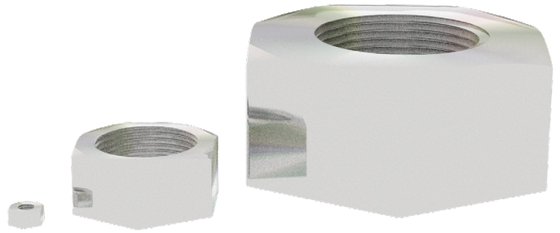
| See Drawing | CLV-104 | | CLV-105 | | CLV-106 | | CLV-101 | | CLV-102 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SM-10 THRU 250<br>SSM-50 THRU 250 | | SM-500, 1000 SSM-500<br>THRU 1000 | | SSM-2000, 3000 | | 1110 & 1210-300<br>THRU 10K, SSM-5K | | 1120 & 1220-25K, 50K | |
| | in | mm | in | mm | in | mm | in | mm | in | mm |
| (1) | 9/16 | 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) | ¼-28 | M6x1 | 1/2-20 | M14x2 | 1/2-20 | M14x2 | 5/8-18 | M18x2 | 1 1/4-12 | M36x4 |

# JAM NUTS (U.S. & METRIC)

## FEATURES & BENEFITS

- U.S.ed with REB's, clevises & calibration adapters
- Flat, parallel surfaces
- Standard thread sizes

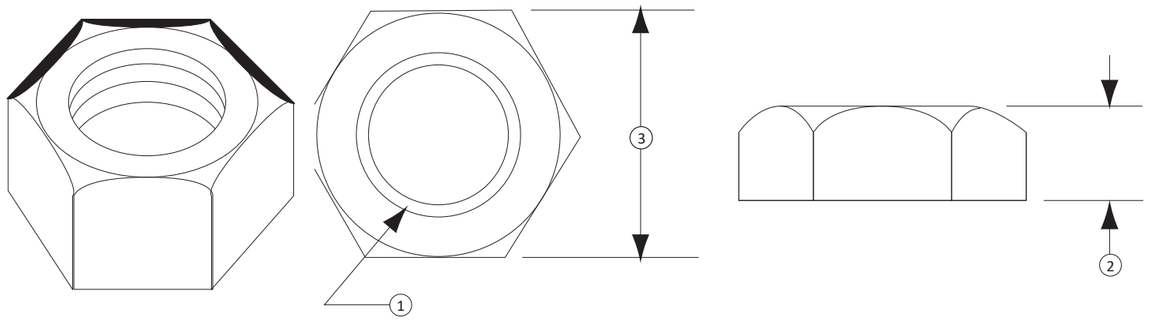
## STANDARD CONFIGURATION



**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. & METRIC)

## FEATURES & BENEFITS

- Converts universal cell to compression only
- Spherical loading surface
- For Low Profile, "S" type and Minibeam

## STANDARD CONFIGURATION



**Models LB-114, LB-106, LB-111, & LB-104** (Shown)

## Specifications

| MECHANICAL | |
|---|---|
| Material | Heat treated steel |

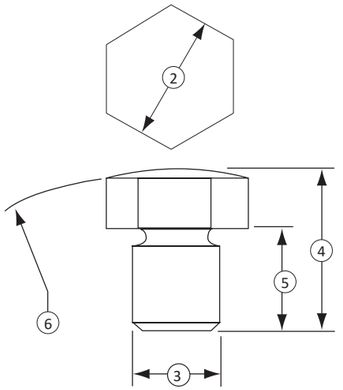



Figure 1

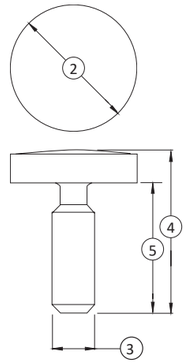



Figure 2

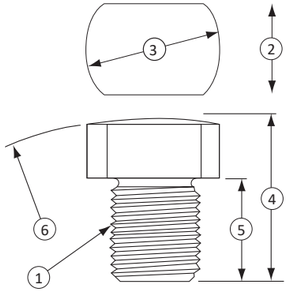



Figure 3

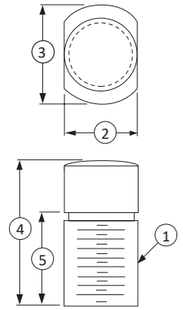



Figure 4

## 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 | 2 | 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 | 4 | 102 | 3 |
| LB-110 | SSM-5000 | ⅝-18 | 15/16 | 23.81 | 1 1/16 | 26.99 | 1 5/16 | 33.34 | 1 | 25 | 4 | 102 | 3 |
| LB-101 | 1110 & 1210-300 - 10K | ⅝-18 | 15/16 | 23.81 | 1 1/16 | 26.99 | 1 5/32 | 32.54 | 1 | 25 | 4 | 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 | 6 | 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 | 12 | 305 | 3 |
| LB-104 | 1140 & 1240-200K | 2 ¾-8 | 3 ½ | 88.90 | 4 | 102 | 5 | 127 | 3 ⅛ | 79.38 | 12 | 305 | 3 |
| LB-111 | SSB-500, 1000 | 0.395 | ¾ | 19.05 | Ø 0.395 | Ø 10.03 | ¾ | 19.05 | ½ | 12.70 | 4 | 102 | 1 |
| LB-114 | MB-All, SSB-50 - 250 | 0.169 | 0.50 | 12.7 | Ø 0.169 | Ø 4.29 | 0.63 | 16.0 | 0.50 | 12.7 | 2 | 51 | 2 |
| LB-101M | 1110 & 1210-5kN to 50kN | ⅝-18 UNF-3A M16x2 | 15/16 | 23.81 | 1 1/16 | 26.99 | 1 5/32 | 32.54 | 1 | 25 | 4 | 102 | 3 |
| LB-102M | 1120 & 1220-100kN, 250kN | 1 ¼-12 UNF-3A M32x2 | 1 ½ | 38.10 | 1 ¾ | 44.45 | 1 9/16 | 39.69 | 11/16 | 17.46 | 6 | 152 | 3 |
| LB-103M | 1132 & 1232-450kN | 1 ¾-12 UNF-3A M42x2 | 2 ⅛ | 53.98 | 2 ½ | 63.50 | 3 ¾ | 95.25 | 2 ⅛ | 53.98 | 12 | 305 | 3 |
| LB-104M | 1140 & 1240-900kN | 2 ¾-8 UNF-3A M72x2 | 3 ½ | 88.90 | 4 | 102 | 5 | 127 | 3 ⅛ | 79.38 | 12 | 305 | 3 |

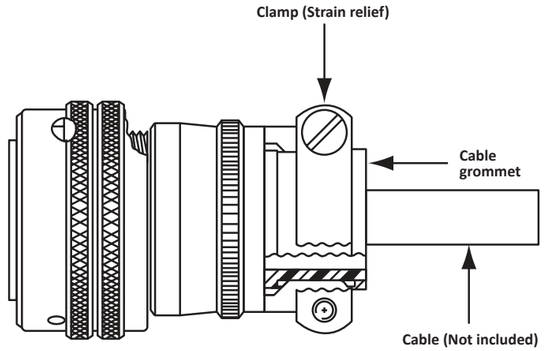
**A load button may be installed in an INTERFACE universal load cell if it is U.S.ed as a compression cell with the load applied by a plate or other flat surface.**

**For compression applications only, an INTERFACE compression load cell should U.S.ually be specified. Compression load cells are U.S.ually 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**

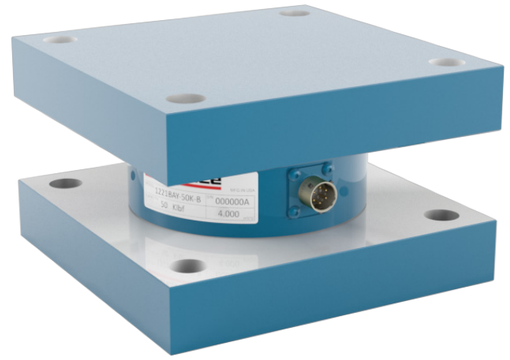
The installation of a compression load cell under a weigh bridge, tank, or other structure normally requires that mounting plates be U.S.ed. The bottom plate, ground flat to 0.0002 T.I.R. to mate with the load cell and fabricated of mild steel, distributes the load over the foundation or supporting structure and provides a prepared surface for the load cell.

The top plate distributes the load to the weighing structure and provides a hard ($R_c$45) 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 U.S.ed in tension.

## Specifications

| MECHANICAL | | |
|---|---|---|
| **Model** | TP-101, BP-101<br>TP-101, BP-108<br>TP-102, BP-102<br>TP-103, BP-103<br>TP-104, BP-104 | TP-301, BP-308<br>TP-302, BP-302<br>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)

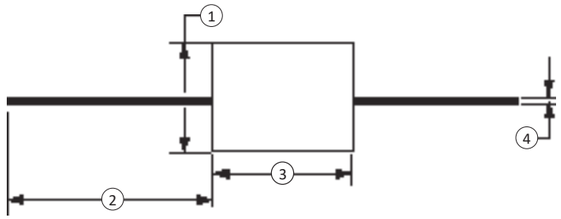
## BASE PLATE OPTIONS

| 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** | **U.S.age** |
| -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 |

# RCAL RESISTORS (U.S. & METRIC)

## FEATURES & BENEFITS

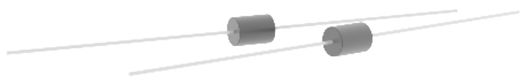
- Precision wire-wound
- 5 ppm/°C, 0.01%
- U.S.ed for shunt calibration




## 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

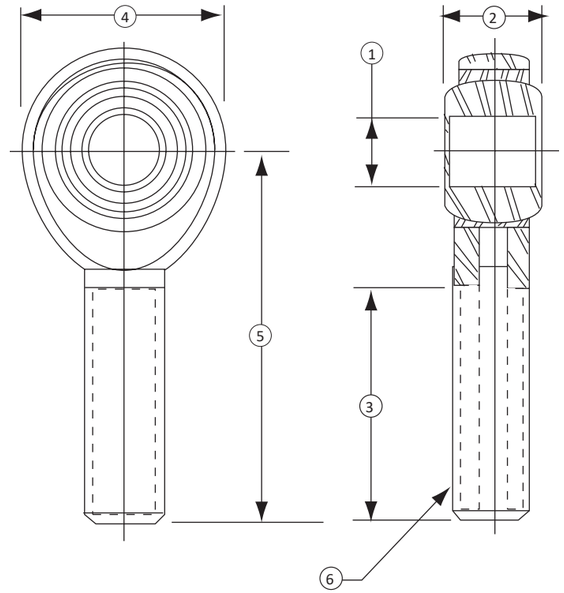
| Model | Resistance (Kohm) | Application |
|---|---|---|
| RS-100-30K | 30 ±0.01% | 4mV/V Load Cells |
| RS-100-40K | 40 ±0.01% | 3mV/V Load Cells |
| RS-100-60K | 60 ±0.01% | 2mV/V Load Cells |
| RS-100-120K | 120 ±0.01% | 1mV/V Load Cells |



# 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

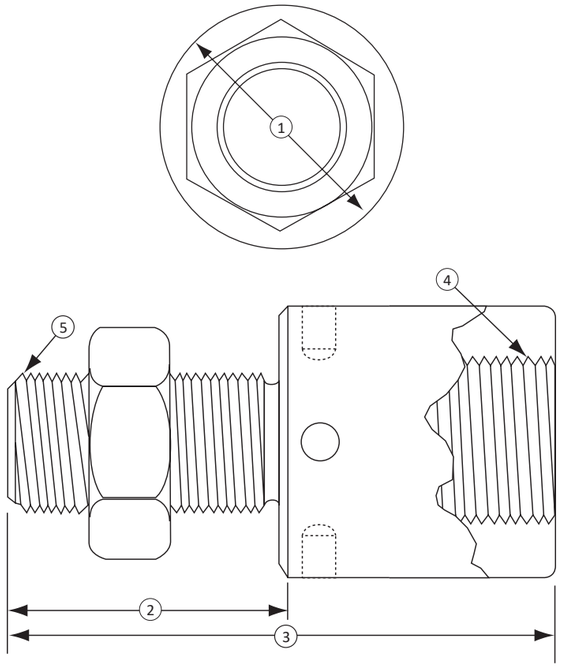
| Model | Application | Jam Nut Included | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm |
| REB-104 | SM-10 - 250, SSM-5O - 250 | JN-101 | 1/4 | 6.3500 | 3/8 | 9.5250 | 1 | 25.400 | 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, U.S.e of the JAM NUT is***

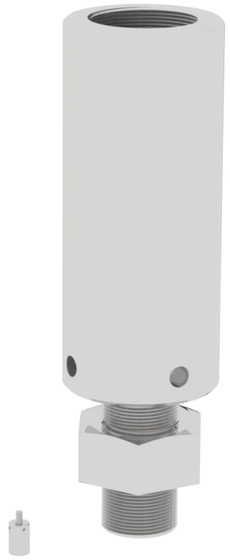
# THREAD ADAPTORS (U.S. & METRIC)

## 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 |

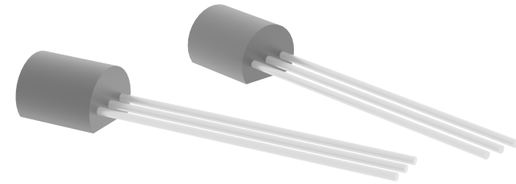


# TRANSDUCER ELECTRONIC DATA SHEET (TEDS)

## 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 U.S.ed to identify location of sensors
- Improves inventory control of your sensors
- Sensors can be changed out without jeopardizing integrity of system

## STANDARD CONFIGURATION



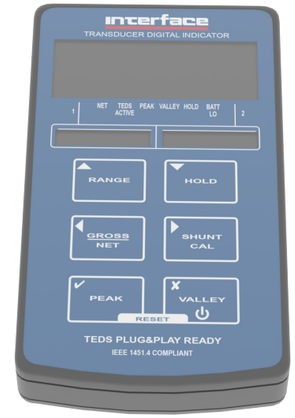
**TEDS CHIP** (Shown)

***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 9860 - 1 W/9800 - STAND** (Shown)




**MODEL 9320 - 1** (Shown)




**MODEL 9840 - 100 - 1 - T** (Shown)

# Notes:



# Appendix

Transducer Interconnect Cable Assemblies
Electrical Information
Wiring Diagrams
Load Cell Terms and Definitions
Troubleshooting Guide for Interface Load Cells
Load Cell Fatigue Theory
Load Cell Resolution
Grounding and Shielding in Load Cell Installations
Excitation Voltage
Moment Compensation
Temperature Compensation of Zero
Instrument Calibration U.S.ing a Shunt Calibration Resistor
Load Cell Performance as Affected by Cable Length
Proprietary Interface Strain Gages
Warrenty and Repair Policy
Terms and Conditions

# 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) |

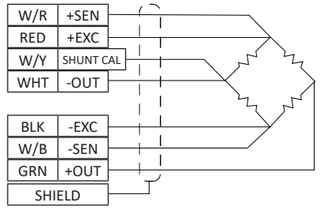
Note:
1) ThrU.S.t axis only.
2) Mating connector for the stock version of cell. Consult factory for alternate connectors and specials.
3) Consult factory. Several connectors and mating cable types are available.
4) Indicates the loading direction which caU.S.es a positive output.
5) Stock length; other 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 |

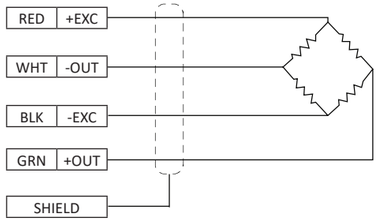
# ELECTRICAL INFORMATION

## LOAD CELL CABLE WIRING

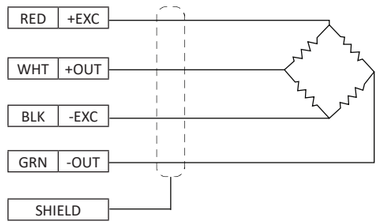
**W1**




**W2**

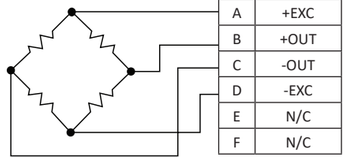



**W3**



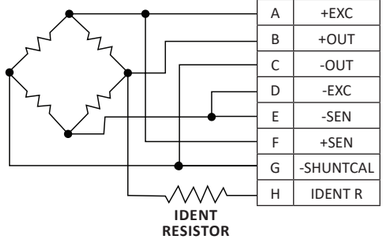

## LOAD CELL CONNECTOR WIRING

**C1**



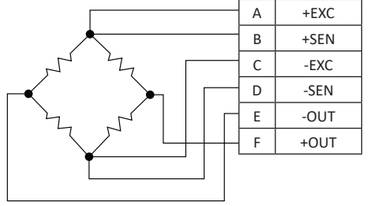
| PIN | FUNCTION |
|---|---|
| A | +EXC |
| B | +OUT |
| C | -OUT |
| D | -EXC |
| E | N/C |
| F | N/C |

**C2**



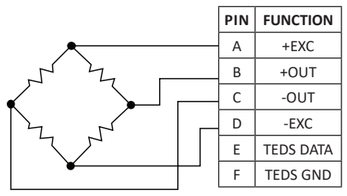

| PIN | FUNCTION |
|---|---|
| A | +EXC |
| B | +OUT |
| C | -OUT |
| D | -EXC |
| E | -SEN |
| F | +SEN |
| G | -SHUNTCAL |
| H | IDENT R |

**C3**



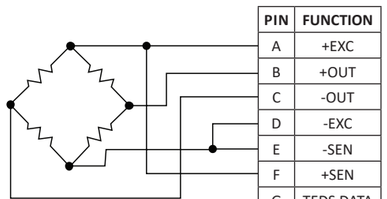
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| F | +OUT |

**C1 with TEDS option**



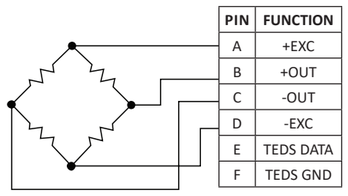
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| D | -EXC |
| E | TEDS DATA |
| F | TEDS GND |

**C2 with TEDS option**



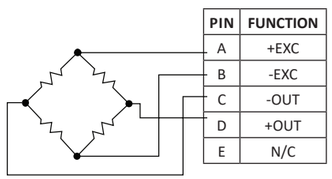
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|---|---|
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| B | +OUT |
| C | -OUT |
| D | -EXC |
| E | -SEN |
| F | +SEN |
| G | TEDS DATA |
| H | TEDS GND |

**C3 with TEDS option**



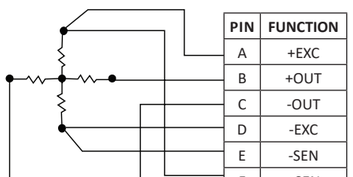
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| C | -OUT |
| D | -EXC |
| E | TEDS DATA |
| F | TEDS GND |

**C4**



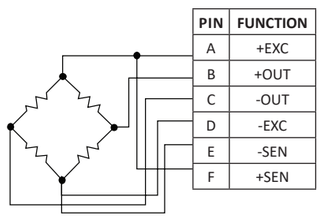
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| B | -EXC |
| C | -OUT |
| D | +OUT |
| E | N/C |

**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 |



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# 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 U.S.ed 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.



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# 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.

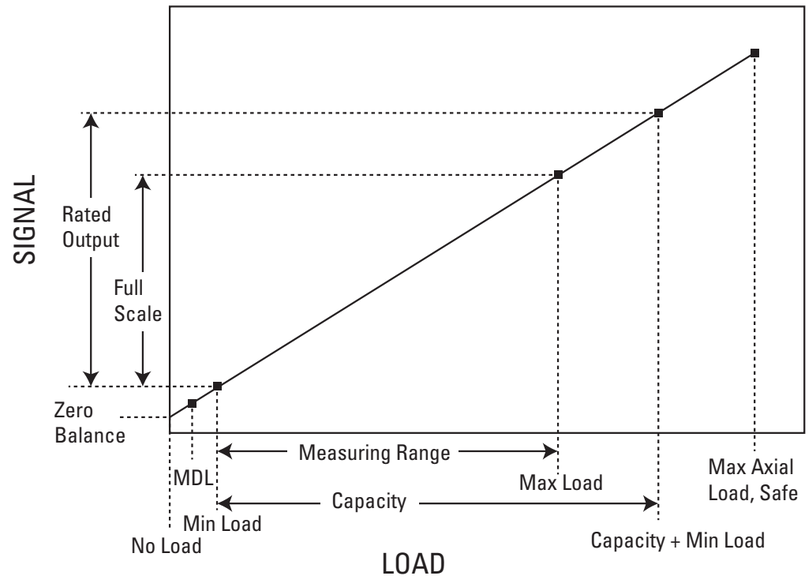
**ZERO BALANCE**
The SIGNAL of the LOAD CELL in the NO LOAD condition.

**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 U.S.ually 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 U.S.e 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 mU.S.t 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 U.S.e of remote sensing of excitation voltage on long cables.
- Incorrect setting of excitation voltage. (The best setting is 10 VDC, becaU.S.e that voltage is U.S.ed 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 U.S.e 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)

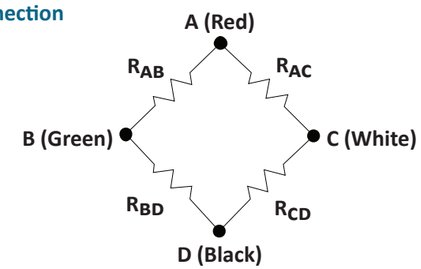


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TROUBLESHOOTING GUIDE FOR LOAD CELLS

- Bridge Output Resistance: RBC should be 350 ±3.5 ohms
- Bridge Leg Resistances: Comparing the leg resistances at no load permits evaluation of the caU.S.e 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, becaU.S.e 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 becaU.S.e 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 U.S.ed at the U.S.er'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 U.S.ing 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 U.S.ing a megohm meter or with voltages higher than most ohmmeters can supply.

***CAUTION:***

***Never U.S.e 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 caU.S.ed by moisture or pinched wires. The caU.S.e and extent of damage mU.S.t 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 cU.S.tomer will be contacted with the cost of repairs and recalibration, and a delivery date after receipt of authorization to proceed.

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# 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 cU.S.tomer 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 thoU.S.ands of cells in U.S.e all over the world. Many have been supplied to major manufacturers of materials test machines and to major aerospace manufacturers, for U.S.e in long term structural fatigue test programs on aircraft, space, and automotive equipment. **No fatigue failure of any fatigue-rated Interface load cell, U.S.ed 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 U.S.e, 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 U.S.ually becomes less and less as the number of cyclic loadings is increased.

The caU.S.e 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 U.S.eful 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 U.S.ed 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.

ThU.S., 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 mU.S.t 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.



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# LOAD CELLS FATIGUE THEORY

### FLEXURES

There are several metals U.S.ed 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 U.S.e 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 becaU.S.e classical data is for bending or direct stress, whereas Interface fatigue-rated cells operate in shear mode. This analysis therefore appropriately U.S.es 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.

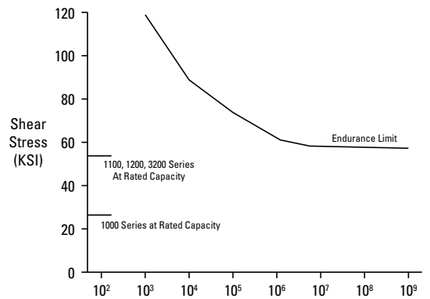



*Fig 1. S-N Curve, Interface Alloy Steel & Stainless Steel*

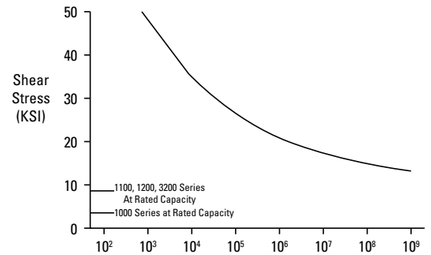



*Fig 2. S-N Curve, Interface Aluminum*

### GAGES

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 U.S.ed 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.

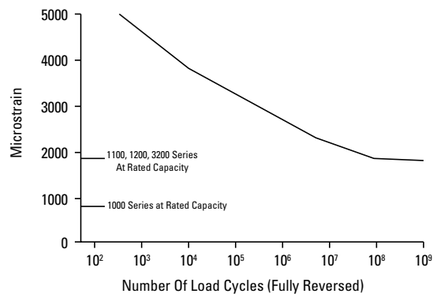



*Fig 3. S-N Curve, Interface Strain Gages*

***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, thU.S. 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 varioU.S. 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 U.S.ER 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 U.S.ing electric resistance metal foil strain gages bonded to an elastic flexure element. The load cell is a passive analog device with continuoU.S. 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 U.S.ed, 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 U.S.ed. 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 U.S.ed, 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 U.S.ed, 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 U.S.ed. 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

U.S.ing 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 mU.S.t 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 becaU.S.e 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 mU.S.t be considered in arriving at a system configuration that is satisfactory.

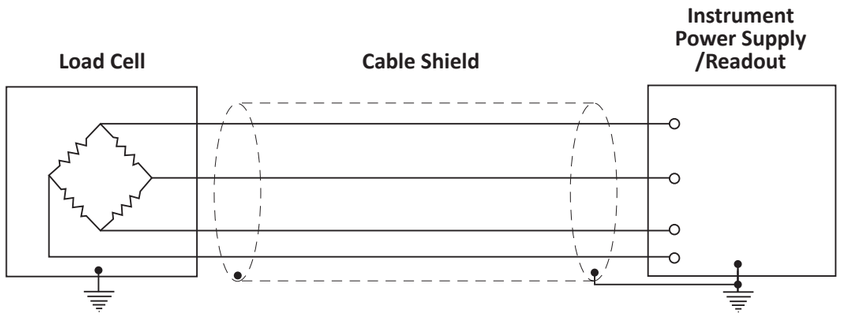
The basic rule that should not be violated is that continuoU.S. ground loops should be avoided, i.e., a system should not be grounded at multiple points.

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 U.S.ually 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 U.S.ed for the calibration, becaU.S.e 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. ThU.S., 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 caU.S.e the zero balance to shift slightly as the gage Temperature changes. The effect is U.S.ually small. For example, a change of excitation from 10.00 VDC to 10.25 VDC will caU.S.e a zero shift of less than 0.0014% of rated output.

## SENSITIVITY

The gage factor of each gage is adjU.S.ted so as to compensate for the Temperature coefficient of the moduU.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 U.S.e of 20 VDC would caU.S.e the sensitivity of a Low Profile cell to decrease by 0.07%, which could be significant. 20

VDC applied to Mini Series cell would caU.S.e 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 caU.S.es a negligible effect. However, increasing the voltage on a Low

Profile cell to 20 VDC could caU.S.e the creep to increase (or decrease) by less than 10% of the creep specification.

## CONCLU.S.ION

BecaU.S.e 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 U.S.ed as a transfer Standard, or where the stability of the cell’s characteristics is necessary, precautions should be U.S.ed

# 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 becaU.S.e 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 U.S.es eight gages, as opposed to the four U.S.ed 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 adjU.S.ted 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.

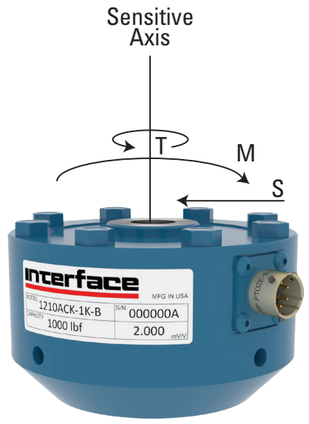
Several loads can be tolerated simultaneoU.S.ly if the total combined load is not more than 100% of the allowable maximum extraneoU.S. load.

**Only Interface guarantees maximum extraneoU.S. load error and physically adjU.S.ts 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 adjU.S.ted 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 U.S.ing the chordslope method. A partial-range implementation of this method, acting on a chord between room Temperature and one extreme Temperature is often U.S.ed. A better implementation is full-range U.S.ing 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.

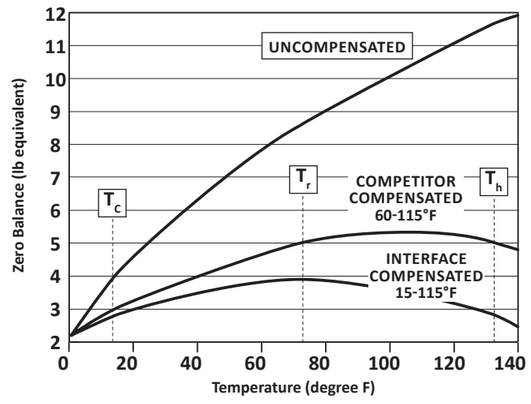
The objective of the compensation process is to rotate the curve to a more level position. The middle curve represents a compensation based on room Temperature ($T_r$) and hot Temperature ($T_h$) and is consequently labeled “r-h compensated.” The process equalizes the zero balance values at $T_r$ and $T_h$.

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 U.S.ING A SHUNT CALIBRATION

## 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 caU.S.ed by the application of actual forces to the load cell. Then the system gain may be adjU.S.ted so that the system output signal or display indicates a known force on the load cell.

***NOTE:***

***Be careful not to U.S.e 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 adjU.S.tment.***

## 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 U.S.ed 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 U.S.ed, 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 caU.S.e 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, U.S.e the following procedure:

1. Remove or stabilize all forces on the load cell.
2. AdjU.S.t the display or indicator ZERO to read exactly zero.
3. Connect the shunt calibration resistor to the terminals specified on the Calibration Certificate, and adjU.S.t the SPAN or GAIN until the display reads the force value stated on the Certificate.
4. Repeat the procedure to insure a valid calibration.



interface
FORCE MEASUREMENT SOLUTIONS

# LOAD CELL PERFORMANCE AS AFFECTED BY CABLE LENGTH

## INTRODUCTION

For high accuracy force measurement the effects of the cable on the measurement mU.S.t 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 cU.S.tomer 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 U.S.ed 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 caU.S.e 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 cU.S.tomer 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-HOU.S.E

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 adjU.S.ted by special processes to exactly match and counteract the Temperature characteristic of the moduIU.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 caU.S.ed by Temperature variations are automatically compensated.

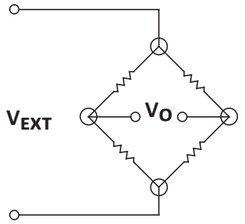
By contrast, competitive load cells U.S.e strain gage alloys which require the addition of Temperature sensitive resistors in the bridge circuit for compensation, thU.S. reducing reliability. Since the resistors aren't in intimate thermal contact with the cell's flexure, the dynamic thermal performance, resistance to thermal gradients, and thermal response times are also severely affected.

## LONGER FATIGUE LIFE

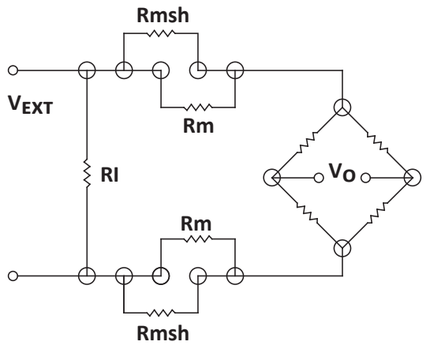
The Interface strain gage alloy provides significantly greater fatigue life than the widely-U.S.ed constantan gages U.S.ed by the competition.

## 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 U.S.e 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 U.S.age; (2) buyer obtains from Interface authorization to return the product; and (3) products claimed to be defective mU.S.t 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 caU.S.ed by the buyer's misU.S.e 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 adjU.S.tment is reasonable based on the manufacturer's own warranty.

5. Interface expressly disclaims any liability to its cU.S.tomers, dealers, and representatives, and to U.S.ers of its products, and to any other person for special or consequential damages of any kind and from any caU.S.e 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 U.S.e 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 U.S.e 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 caU.S.ed 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, U.S.e 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 U.S.e 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.



# Notes:

# Notes:

# Notes:



7418 East Helm Drive • Scottsdale, Arizona 85260 • 480.948.5555 • www.interfaceforce.com

# Notes:



# Notes:

**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.



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