

Multi-Axis

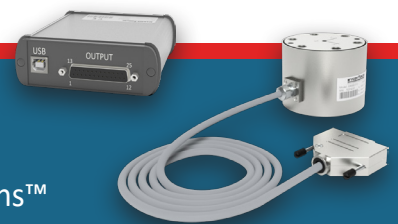
Instrumentation



Multi-Axis Instrumentation v1.2 10-23-2025

interface
FORCE MEASUREMENT SOLUTIONS

The World Leader in Force Measurement Solutions™



Multi-axis instrumentation paired with multi-axis sensors are measurement systems that can capture data across multiple axes or dimensions simultaneously.

These multi-axis instruments are often used in various fields such as engineering, robotics, aerospace, and materials testing to monitor and analyze the behavior of objects or systems under a variety of different conditions. Multi-axis instrumentation can significantly improve the understanding of complex systems and enhance the accuracy of measurements in research and industrial applications.

Multi-axis sensors are devices designed to measure physical quantities across multiple axes simultaneously. These sensors are essential in various applications where understanding multi-dimensional dynamics is crucial. Interface offers a variety of 2, 4, 6, and 8 channel multi-axis instruments for data acquisition and data logging with both analog and digital outputs. They are portable with Bluetooth options as well as handheld, bench top, and flange type enclosures all compatible with Interface 3-axis and 6-axis sensors.

Data Acquisition

Data acquisition for multi-axis sensors involves the process of measuring and recording forces and loads applied along multiple axes which is crucial for accurately measuring and analyzing forces in diverse engineering and scientific applications. Multi-axis sensors are specialized sensors designed to capture force data in three-dimensional space, typically measuring forces along the x, y, and z axes simultaneously.

Key Components

1. **The Load Cell:** This is the sensor that converts force into an electrical signal. Multi-axis load cells are built with multiple sensing elements to detect forces in different directions.
2. **The Signal Conditioner:** The raw signals from the load cell need to be amplified and filtered to ensure accurate readings. Signal conditioning may involve converting the analog signals to digital format.
3. **The Data Acquisition System:** This system collects the conditioned signals from the load cells. It typically includes:
 - **Analog to Digital Converters** to convert the analog signals into digital data.
 - **Microcontrollers or Computers** to process and store the data.
 - **Software** for visualization, scale input/output, force and moment value calculation, graphing, and logging of the data.
4. **The Communication Interface:** Data may be transmitted to a computer or network for real-time monitoring or further analysis, often using protocols like USB, Ethernet, or wireless connections.

Applications

- **Robotics:** Monitoring forces in robotic arms or grippers.
- **Structural Testing:** Evaluating the loads on bridges or buildings.
- **Manufacturing:** Ensuring proper force application in assembly processes.
- **Biomechanics:** Analyzing forces on the human body during activities.

Benefits

- **Precision:** Enables accurate measurement of forces in multiple dimensions.
- **Real-time Monitoring:** Allows for immediate feedback and adjustments.
- **Comprehensive Analysis:** Facilitates complex assessments in various applications.

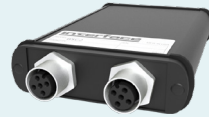
Multi-Axis Instrumentation



BSC1A Strain Gage Amplifier
Strain Gage Amplifier



BSC1-HD Single Channel PC Interface Module with Analog Output
1 Channel
PC Interface Module



BSC2 Dual Channel PC Interface Module
2 Channel
USB Output



BSC4A Bridge Amplifier & PC Interface Module
4 Channel
Analog Output



BSC6A-HD44 6-Channel Strain Gage Amplifier
6 Channel
Analog Output



BX6-ETH/CAN 6-Channel CANbus & Ethernet Strain Gage Amplifier
6 Channel



BX6-HD44-ECPC Strain Gage Amplifier with EtherCat Protocol
6 Channel



BX8-AS Data Acquisition System & Amplifier
8 Channel



BX8-HD15 Data Acquisition System & Amplifier
8 Channel
Analog Output

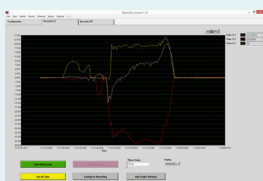


BX8-HD44 Data Acquisition System & Amplifier
8 Channel
 $\pm 5V$, $\pm 10V$, 4-20mA, & 0-20 mA Outputs

Compatible Software

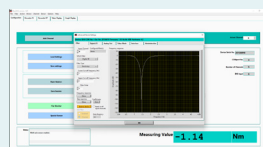
BlueDAQ Software

The BlueDAQ software is suitable for live viewing, recording, and analysis of stored measuring data. The multiple channels can be recorded over the time axis (y-t diagram) or via an "X-axis" (X-Y diagram). The BlueDAQ software is available for models BSC1, BSC2, BX6, BX8, and the 9330. The measuring data is stored in binary "TDMS" by recording and can be opened, displayed, and exported in text or Excel format with the integrated "File Monitor".



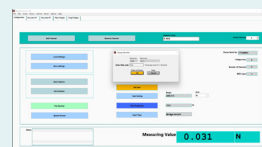
Online Monitor

In the Y-t recorder the measuring values of all channels are displayed graphically.



Digital Filters

Display of the frequency response.



Measuring Frequency

There is a various range of values depending on the device type (BSC1, BSC2, BSC4D, BX6, and BX8) and interface.

ForceX	ForceY
2.6 N	-9.8 N
ForceZ	TorqueX
43.5 N	-2.22 Nm
TorqueY	TorqueZ
-1.96 Nm	-0.05 Nm

Measuring Values

The "Value Display" index card allows a large display of all the opened channels. The scaling and arrangement of the displays are automatically full screen.

3A 3-Axis Force Series Sensors



3A40 3-Axis Force
Force: 0.45 lbf to 11.2 lbf
Force: 2 N to 50 N



3A60A 3-Axis Force
Force: 2.25 lbf to 112K lbf
Force: 10 N to 500 kN

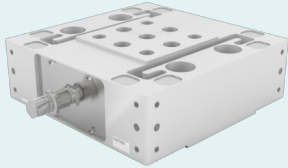


3A120 3-Axis Force
Force: 11.2 lbf to 1.12K lbf
Force: 50 N to 5 kN

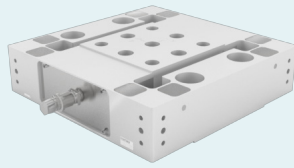


3A160 3-Axis Force
Force: 450 lbf to 11.2K lbf
Force: 2 kN to 50 kN

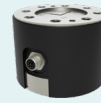
3AR 3-Axis Force Round Series Sensors



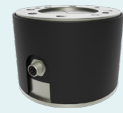
3A300 3-Axis Force
Force: 11.2 lbf to 45K lbf
Force: 50 N to 200 kN



3A400 3-Axis Force
Force: 112K lbf
Force: 500 kN

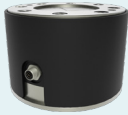


3AR100 Series Round 3-Axis Force
Force: 2.2K lbf to 13.5K lbf
Force: 10 kN to 60 kN

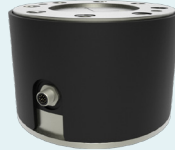


3AR125 Series Round 3-Axis Force
Force: 6.7K lbf to 27K lbf
Force: 30 kN to 120 kN

6A 6-Axis Force & Torque Series Sensors



3AR155 Series Round 3-Axis Force
Force: 11.2K lbf to 56.2K lbf
Force: 50 kN to 250 kN



3AR225 Series Round 3-Axis Force
Force: 22.5K lbf to 112K lbf
Force: 100 kN to 500 kN



6A27 6-Axis Force Torque
Force: 11.2 to 44.7K lbf
Torque: 8.85 lbf-in
Force: 50 N to 200 N
Torque: 1 Nm



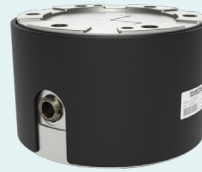
6A40 6-Axis Force Torque
Force: 1.2 to 112.4 lbf
Torque: 44.3 lbf-in to 177 lbf-in
Force: 5 N to 500 N
Torque: 5 Nm to 20 Nm



6A150 6-Axis Force Torque
Force: 449 to 6.7K lbf
Torque: 1.77K lbf-in to 26.5K lbf-in
Force: 2 kN to 30 kN
Torque: 200 Nm to 3 kNm



6A154 6-Axis Force Torque
Force: 11.2 to 112.4 lbf
Torque: 44.3 lbf-in to 442 lbf-in
Force: 50 N to 500 N
Torque: 5 Nm to 50 Nm



6A175 6-Axis Force Torque
Force: 89.9K lbf
Torque: 354K lbf-in
Force: 100 kN
Torque: 10 kNm



6A225 6-Axis Force Torque
Force: 112.4K lbf
Torque: 177K lbf-in
Force: 500 kN
Torque: 20 kNm



6A68 6-Axis Force Torque
Force: 224.8 to 2.25K lbf
Torque: 177 lbf-in to 4.43K lbf-in
Force: 1 kN to 10 kN
Torque: 20 Nm to 500 Nm



6A80 6-Axis Force Torque
Force: 112.4 to 1.12K lbf
Torque: 177 lbf-in to 2.21K lbf-in
Force: 500 N to 5 kN
Torque: 20 Nm to 250 Nm



6A110 6-Axis Force Torque
Force: 224.8 to 2.25K lbf
Torque: 885 lbf-in to 6.64K lbf-in
Force: 1 kN to 10 kN
Torque: 100 Nm to 750 Nm



6A130 6-Axis Force Torque
Force: 224.8 to 3.37K lbf
Torque: 1.77K lbf-in to 10.6K lbf-in
Force: 1 kN to 15 kN
Torque: 200 Nm to 1.2 kNm

6ADF 6-Axis Force & Torque DIN Flange-Type Series



6A300 6-Axis Force Torque
Force: 89.9K lbf
Torque: 354K lbf-in
Force: 400 kN
Torque: 40 kNm



6ADF45 6-Axis Force Torque DIN Flange-Type
Force: 20 N to 50 N
Torque: 1 Nm



6ADF80 6-Axis Force Torque DIN Flange-Type
Force: 100 N to 600 N
Torque: 10 Nm to 30 Nm



6ADF100 6-Axis Force Torque DIN Flange-Type
Force: 400 N to 1.2 kN
Torque: 20 Nm to 60 Nm

BlueDAQ Software

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Features:

- Setting the Measuring Frequency
- Setting the display (unit and scaling factor)
- Calculate the Scaling Factor for sensors (force, displacement, torque, and active sensors with voltage or current output)
- Online Monitor (graphical live display)
- Setting the Digital Filter
- Simulation of the Digital Filter (represent frequency response and step response)
- Configuration of Analog Outputs (BX8)
- Configuration of the Digital I/O Ports (BSC4D and BX8)
- Configuration of the CAN Bus parameters (BX8)
- Loading and saving of the complete settings (Sessions) to file
- Loading and saving of configurations (Settings) in the amplifier memory
- Loading and exporting (Excel and CSV) of stored data (File-Monitor)
- Integrating of the calibration matrix for 3-axis sensor (5AR) and 6-axis sensor (6AXX and 6ADF)
- Stress analysis with strain gages rosettes
- Hardware triggered data recording via digital input (BSC4D / BX8)
- Software Triggered data recording via threshold value over, undershoot, or timed
- Call Parameters for inclusion in scripts and batch files or Windows Task Scheduler
- Context help
- Opening multiple graphical live displays
- Setting the axis scaling "autoscale" or fixed
- Assigning of the Channel Names
- Live display of the spectral power density (frequency analysis)
- Useful keyboard "Shortcuts", like F12, Ctrl-Z, and Ctrl-A
- Reading and writing of TEDS with BX8
- Large Display of measuring values
- Configuration of Data Format
- Administration Settings: Lock (write protection against unauthorized configuration), Operating hours counter, and error memory

BlueDAQ-PRO Software

Product Description:

- License to activate the "Professional Functions of the BlueDAQ software.
- Free update for 3 following revisions.
- Scope of delivery: License file in zip format.
- Installation of the license with "Help->.Apply license".

Functions:

- MathScript, virtual channels based on formula links with measurement channels.
- Integration of a GPE receiver and reading of GPS coordinates.
- Insert notes while recording a measurement.

Interface Multi-Axis Instrumentation

- 2 Channel
- 4 Channel
- 6 Channel
- 8 Channel
- Data Acquisition
- Data Logging
- Portable
- Strain Gage Amplifier

Interface force measurement multi-axis instruments are available in many design configurations for project designs requiring the highest performance.

To learn more about the Interface products or force measurement solutions call 480-948-5555.

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.