QM30VT3 High-Performance 3-Axis Vibration and Temperature Sensor

Features

Unlock insights into machine health with the QM30VT3 High-Performance 3-Axis Vibration and Temperature Sensor. Engineered to continuously monitor and predict failures in rotating machinery, this advanced sensor enables proactive maintenance strategies.

- **Precision Monitoring**—Ultra-low noise 3-axis vibration sensing up to 5.3 kHz captures subtle anomalies, from early bearing wear to misalignment.
- **Actionable Intelligence**—Delivers RMS Velocity, RMS High-Frequency Acceleration, and Peak Velocity data, pre-processed for immediate diagnostics and decision-making.
- **Enhanced Fault Detection**—High-frequency enveloping mode identifies bearing faults with exceptional accuracy, even in challenging industrial environments.
- **Adaptable and Robust**—Adjustable FMax settings optimize diagnostic capabilities, while its compact 30mm form factor fits snugly into any machine setup.
- **Built to Last**—Industrial-grade stainless steel or aluminum housing ensures durability in the harshest conditions, from factory floors to remote installations.
- **VIBE-IQ® Integration**—Use Banner's machine learning algorithm for baselining an asset and automatically generating threshold levels and alert feedback
- **Seamless Integration**—Connects effortlessly to MultiHop Modbus radio or any Modbus network via RS-485, simplifying Warning and Alarm threshold levels and alert feedback setup and enabling real-time data access from remote and rugged locations. Transform your maintenance approach with the QM30VT3 Sensor and Sure Cross wireless technology for cost-effective machine health management.

For additional information, updated documentation, and a list of accessories, refer to Banner Engineering's website, www.bannerengineering.com.

Models

Models	Housing Type	Connections and Cable	Inputs and Outputs
QM30VT3-SS-MQP	316L stainless steel	RS-485 interface for Modbus RTU communications; 150 mm (6 in) cable with a 5-pin M12 male quick disconnect (QD)	Vibration and temperature
QM30VT3-MQP	Aluminum		

The SNAP SIGNAL Sensor Configuration Software offers an easy way to manage sensor configuration, retrieve data, and visually show sensor data from many sensors. The Sensor Configuration Software runs on any Windows machine and uses an adapter cable to connect the sensor to your computer. Download the most recent version of the software from Banner Engineering's website: www.bannerengineering.com and select **Software** from the **Products** drop-down list.

Configure this sensor using the Snap Signal Sensor Configuration Software and USB to RS-485 adapter cable model **BWA-UCT-900** (datasheet p/n 140377).

Overview

High-Performance Third Axis

Banner's QM30VT3 uses a digital MEMS sensor for collecting vibration data. The ultra-low noise density on all three axes ensures accurate data no matter the sensor orientation to prevent maintenance decisions from being made because of the bad trending of false data. Most 3-axis MEMS sensors only offer a low noise profile on two axes with the third axis (typically the Z or Vertical Radial Axis) having two to three times the noise density, causing that third axis to have inaccurate data. This inaccurate data leads to maintenance decisions made without a true fault present.

Configuring High-Frequency Enveloping (HFE) or Demodulation Mode

High-frequency enveloping (HFE), or demodulation, is a separate measurement type and signal processing technique that is very sensitive to high-frequency impacts and friction.

HFE can be useful for diagnosing bearing defects, lubrication issues, cavitation, and gear faults. These types of faults produce very low energy impacts/forces that can make them difficult to detect in their early stages with standard vibration measurements because they can be drowned out by the machine's fundamental forces. HFE mode trends the values to detect early faults so maintenance can occur before a downtime event occurs. When paired with a lower FMax setting, the sample frequency still remains at maximum but the sensor takes a much longer sample. This data is used to trend early defects on slow-speed assets that would normally require a special ultrasound accelerometer. When using HFE mode, set Fmax to 3 or 4 for the longer 2.4-second or 4.8-second sample times. To enable HFE mode, set register 42059 value to 0 for OFF or 1 for ON.

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p/n: 244688 Rev. B

Adjustable FMax Settings

The QM30VT3 has optional settings to increase the frequency resolution of the measurement through the adjustable FMax settings.

Adjusting the FMax setting allows users to control the trade-off between frequency resolution, bandwidth, and measurement duration. Lower FMax settings provide finer frequency resolution but reduce the total bandwidth and increase the measurement time, whereas higher FMax settings broaden the frequency range but may sacrifice resolution. FMax is critical in vibration analysis because it determines the sensor's capability to detect and characterize different vibration frequencies, which is essential for diagnosing machinery health, identifying faults, and optimizing maintenance strategies. High-frequency measurements are only available at the default FMax of 5300 Hz. These options are changed in register 42058. FMax Options include:

- 1 = 5300 Hz (3.29Hz resolution, 300 ms sample duration)
- 2 = 2650 Hz (1.65Hz resolution, 610 ms sample duration)
- 3 = 1300 Hz (0.82Hz resolution, 1.215 seconds sample duration)
- 4 = 650 Hz (0.41Hz resolution, 2.43 seconds sample duration)
- 5 = 325 Hz (0.21Hz resolution, 4.86 seconds sample duration)

VIBE-IQ Integration

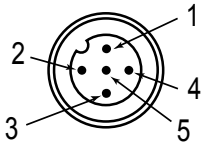
The QM30VT3 server uses Banner's VIBE-IQ® machine learning algorithm to make vibration data analysis much easier.

VIBE-IQ automatically generates a baseline of an asset, generates warning and alarm thresholds, and sets alert flags to get immediate feedback of potential issues. This greatly simplifies the process of gaining valuable insight into the health of an asset. More details about the register map and configuration of VIBE-IQ within the QM30VT3 can be found in the QM30VT3 VIBE-IQ Technical Note found on our website at www.bannerengineering.com.

Wire the QM30VT3 for Power and IO

The QM30VT3-MQ models are designed for use as a Modbus server and can be plugged into any Modbus RS-485 network, including compatible MultiHop Data Radios. Flying lead models use the listed wire colors and sensor connections.

QM30VT3 Modbus sensors

5-pin M12 Male Connector	Pin	Wire Color	Sensor Connection
	1	Brown (bn)	Power IN (+); 10-30 V DC
	2	White (wh)	RS-485/D1/B/+
	3	Blue (bu)	Ground (-)
	4	Black (bk)	RS-485/D0/A/-
	5	Gray (gy)	No connection/not used

Modbus Registers

Vibration Characteristics

Modbus Address	Description	IO Range Min	IO Range Max	Holding Register Min	Holding Register Max	Default Value	Scale (exp)
40001	X-Axis RMS Velocity (in/sec) (6-1000Hz)	0	6.5535	0	65535		-4
40002	X-Axis High-Frequency RMS Acceleration (G) (1000-5300 Hz)	0	65.535	0	65535		-3
40003	Y-Axis RMS Velocity (in/sec)(6-1000Hz)	0	6.5535	0	65535		-4
40004	Y-Axis High-Frequency RMS Acceleration (G) (1000-5300 Hz)	0	65.535	0	65535		-3
40005	Z-Axis RMS Velocity (in/sec) (6-1000Hz)	0	6.5535	0	65535		-4
40006	Z-Axis High-Frequency RMS Acceleration (G) (1000-5300 Hz)	0	65.535	0	65535		-3
40007	Temperature (°F)	-327.68	327.67	-32768	32767		-2
40008	X-Axis Full Band Pk to Pk Acceleration (G) (6-5300 Hz)	0	65.535	0	65535		-3
40009	Y-Axis Full Band Pk to Pk Acceleration (G) (6-5300 Hz)	0	65.535	0	65535		-3
40010	Z-Axis Full Band Pk to Pk Acceleration (G) (6-5300 Hz)	0	65.535	0	65535		-3
40011	X-Axis High-Frequency Pk Acceleration (G) (1000-5300 Hz)	0	65.535	0	65535		-3
40012	Y-Axis High-Frequency Pk Acceleration (G) (1000-5300 Hz)	0	65.535	0	65535		-3
40013	Z-Axis High-Frequency Pk Acceleration (G) (1000-5300 Hz)	0	65.535	0	65535		-3
40014	X-Axis High-Frequency Crest Factor (1000-5300 Hz)	0	65.535	0	65535		-3

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Modbus Address	Description	IO Range Min	IO Range Max	Holding Register Min	Holding Register Max	Default Value	Scale (exp)
40015	Y-Axis High-Frequency Crest Factor (1000-5300 Hz)	0	65.535	0	65535		-3
40016	Z-Axis High-Frequency Crest Factor (1000-5300 Hz)	0	65.535	0	65535		-3
40017	X-Axis High-Frequency Kurtosis (1000-5300 Hz)	0	65.535	0	65535		-3
40018	Y-Axis High-Frequency Kurtosis (1000-5300 Hz)	0	65.535	0	65535		-3
40019	Z-Axis High-Frequency Kurtosis (1000-5300 Hz)	0	65.535	0	65535		-3
40020	X-Axis Full Band Crest Factor (6-5300 Hz)	0	65.535	0	65535		-3
40021	Y-Axis Full Band Crest Factor (6-5300 Hz)	0	65.535	0	65535		-3
40022	Z-Axis Full Band Crest Factor (6-5300 Hz)	0	65.535	0	65535		-3
40023	X-Axis Full Band Kurtosis (6-5300 Hz)	0	65.535	0	65535		-3
40024	Y-Axis Full Band Kurtosis (6-5300 Hz)	0	65.535	0	65535		-3
40025	Z-Axis Full Band Kurtosis (6-5300 Hz)	0	65.535	0	65535		-3
40026	X-Axis Peak Velocity Component Frequency (Hz) (6-1000 Hz)	0	6553.5	0	65535		-1
40027	Y-Axis Peak Velocity Component Frequency (Hz) (6-1000 Hz)	0	6553.5	0	65535		-1
40028	Z-Axis Peak Velocity Component Frequency (Hz) (6-1000 Hz)	0	6553.5	0	65535		-1
40029	Motor Run Flag	0	1	0	1		
40030	X-Axis Full Band Peak Acceleration Frequency (Hz) (6-5300 Hz)	0	6553.5	0	65535		-1
40031	Y-Axis Full Band Peak Acceleration Frequency (Hz) (6-5300 Hz)	0	6553.5	0	65535		-1
40032	Z-Axis Full Band Peak Acceleration Frequency (Hz) (6-5300 Hz)	0	6553.5	0	65535		-1
40033	Magnitude (XYZ) High-Frequency RMS Acceleration* (G) (1000-5300 Hz)	0	65.535	0	65535		-3
40034	X-Axis Full Band RMS Acceleration (G) (6-5300 Hz)	0	65.535	0	65535		-3
40035	Y-Axis Full Band RMS Acceleration (G) (6-5300 Hz)	0	65.535	0	65535		-3
40036	Z-Axis Full Band RMS Acceleration (G)(6-5300 Hz)	0	65.535	0	65535		-3
40037	X-Axis RMS Velocity (mm/sec)(6-1000 Hz)	0	65.535	0	65535		-3
40038	X-Axis High-Frequency RMS Acceleration (G) (1000-5300 Hz)	0	65.535	0	65535		-3
40039	Y-Axis RMS Velocity (mm/sec) (6-1000 Hz)	0	65.535	0	65535		-3
40040	Y-Axis High-Frequency RMS Acceleration (G) (1000-5300 Hz)	0	65.535	0	65535		-3
40041	Z-Axis RMS Velocity (mm/sec) (6-1000 Hz)	0	65.535	0	65535		-3
40042	Z-Axis High-Frequency RMS Acceleration (G) (1000-5300 Hz)	0	65.535	0	65535		-3
40043	Temperature (°C)	-327.68	327.67	-32768	32767		-2

Communication Settings

Modbus Address	Description	IO Range Min	IO Range Max	Holding Register Min	Holding Register Max	Default Value	Scale (exp)
40601	Baud Rate (0 = 9.6k, 1 = 19.2k, 2 = 38.4k)	0	2	0	2	1	
40602	Parity (0 = None, 1 = Odd, 2 = Even)	0	2	0	2	0	
40603	Address	1	247	1	247	1	

Vibration Sampling Settings

Modbus Address	Description	IO Range Min	IO Range Max	Holding Register Min	Holding Register Max	Default Value	Scale (exp)
42002	Vibration Measurement Delay (time between measurements in ms)	500	65535	500	65535	500	-3

FMax Settings

Modbus Address	Description	IO Range Min	IO Range Max	Holding Register Min	Holding Register Max	Default Value	Scale (exp)
42058	FMax Setting (1 = 5300 Hz, 2 = 2650 Hz, 3 = 1300 Hz, 4 = 650 Hz, 5 = 325 Hz)	0	5	0	5	1	

VIBE-IQ® Settings

Modbus Address	Description	IO Range Min	IO Range Max	Holding Register Min	Holding Register Max	Default Value	Scale (exp)
46001	Start Baseline	0	1	0	1		
46002	Baseline Acquisition Status (0 = Idle, 1 = Start, 2 = Samples Acquiring, 3 = Processing, 4 = Active)	0	4	0	4		
46003	Baseline Samples remaining	0	65535	0	65535		
46004	Velocity Threshold Compare (0 = "or", 1 = "and" comparison with axis)	0	1	0	1		
46005	Accel Threshold for Compare (0 = "or", 1 = "and" comparison with axis)	0	1	0	1		
46006	Accel Velocity or and Threshold Exceed for Baseline (0 = No, 1 = Yes)	0	1	0	1		
46007	Number of Samples for baseline	0	300	0	300	300	
46008	Sample Rate in seconds for baseline	0	65535	0	65535	300	
46009	Acute Fault Settings (# of consecutive samples)	0	65535	0	65535	5	
46010	Chronic Fault Settings (# of samples used for rolling average)	0	65535	0	65535	100	
46011	Units (0 = Imperial, 1 = Metric)	0	1	0	1	0	
46012	X RMS Velocity Running Threshold (Scale dependent on units)	-1	32767	0	32767	-1	
46013	Y RMS Velocity Running Threshold (Scale dependent on units)	-1	32767	0	32767	-1	
46014	Z RMS Velocity Running Threshold (Scale dependent on units)	-1	32767	0	32767	-1	
46015	X RMS HF Acceleration Running Threshold	-1	32767	0	32767	-1	-3
46016	Y RMS HF Acceleration Running Threshold	-1	32767	0	32767	-1	-3
46017	Z RMS HF Acceleration Running Threshold	-1	32767	0	32767	-1	-3
46018	X RMS Velocity Threshold for Baseline Value (Scale dependent on units)			0	65535		
46019	Y RMS Velocity Threshold for Baseline Value (Scale dependent on units)			0	65535		
46020	Z RMS Velocity Threshold for Baseline Value (Scale dependent on units)			0	65535		
46021	X RMS HF Acceleration Threshold for Baseline Value	0	65.535	0	65535		-3
46022	Y RMS HF Acceleration Threshold for Baseline Value	0	65.535	0	65535		-3
46023	Z RMS HF Acceleration Threshold for Baseline Value	0	65.535	0	65535		-3
46024	X RMS Velocity Warning Threshold Value			0	65535		
46025	Y RMS Velocity Warning Threshold Value			0	65535		
46026	Z RMS Velocity Warning Threshold Value			0	65535		
46027	X RMS HF Acceleration Warning Threshold Value	0	65.535	0	65535		-3
46028	Y RMS HF Acceleration Warning Threshold Value	0	65.535	0	65535		-3
46029	Z RMS HF Acceleration Warning Threshold Value	0	65.535	0	65535		-3
46030	X RMS Velocity Alarm Threshold Value			0	65535		
46031	Y RMS Velocity Alarm Threshold Value			0	65535		
46032	Z RMS Velocity Alarm Threshold Value			0	65535		
46033	X RMS HF Acceleration Alarm Threshold Value	0	65.535	0	65535		-3
46034	Y RMS HF Acceleration Alarm Threshold Value	0	65.535	0	65535		-3
46035	Z RMS HF Acceleration Alarm Threshold Value	0	65.535	0	65535		-3
46036	Temperature Warning Threshold	-327.68	327.67	-32768	32767		-2
46037	Temperature Alarm Threshold	-327.68	327.67	-32768	32767		-2

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Modbus Address	Description	IO Range Min	IO Range Max	Holding Register Min	Holding Register Max	Default Value	Scale (exp)
46038	Vibe IQ Runtime Flags Low Word (Bitwise Warning/ Alarm)	0	65535	0	65535		
46038.0	X-Axis Velocity Acute Warning	0	1				
46038.1	X-Axis Velocity Acute Alarm	0	1				
46038.2	X-Axis Velocity Chronic Warning	0	1				
46038.3	X-Axis Velocity Chronic Alarm	0	1				
46038.4	X-Axis High-Frequency Acceleration Acute Warning	0	1				
46038.5	X-Axis High-Frequency Acceleration Acute Alarm	0	1				
46038.6	X-Axis High-Frequency Acceleration Chronic Warning	0	1				
46038.7	X-Axis High-Frequency Acceleration Chronic Alarm	0	1				
46038.8	Y-Axis Velocity Acute Warning	0	1				
46038.9	Y-Axis Velocity Acute Alarm	0	1				
46038.A	Y-Axis Velocity Chronic Warning	0	1				
46038.B	Y-Axis Velocity Chronic Alarm	0	1				
46038.C	Y-Axis High-Frequency Acceleration Acute Warning	0	1				
46038.D	Y-Axis High-Frequency Acceleration Acute Alarm	0	1				
46038.E	Y-Axis High-Frequency Acceleration Chronic Warning	0	1				
46038.F	Y-Axis High-Frequency Acceleration Chronic Alarm	0	1				
46039	Vibe IQ Runtime Flags High Word (Bitwise Warning/ Alarm)	0	65535	0	65535		
46039.0	Z-Axis Velocity Acute Warning	0	1				
46039.1	Z-Axis Velocity Acute Alarm	0	1				
46039.2	Z-Axis Velocity Chronic Warning	0	1				
46039.3	Z-Axis Velocity Chronic Alarm	0	1				
46039.4	Z-Axis High-Frequency Acceleration Acute Warning	0	1				
46039.5	Z-Axis High-Frequency Acceleration Acute Alarm	0	1				
46039.6	Z-Axis High-Frequency Acceleration Chronic Warning	0	1				
46039.7	Z-Axis High-Frequency Acceleration Chronic Alarm	0	1				
46039.8	Temperature Warning	0	1				
46039.9	Temperature Alarm	0	1				

Scalar Data Glossary

The following list defines many of the available parameters on the Banner QM30VT3 Vibration and Temperature Sensor.

Velocity

Measures a moving or vibrating mass's speed.

Velocity is used in the lower frequency part of the vibration measurement to indicate many types of vibration faults, such as unbalance, misalignment, soft foot, looseness, eccentricity, etc. Trending velocity over time with continuous monitoring can indicate these faults early.

High-Frequency Acceleration

Useful metric for early high-frequency fault detection when trended for bearing faults, cavitation, gear mesh, rotor rubs, lubrication issues, etc.

Crest Factor

Peak Acceleration / RMS Acceleration. This unitless ratio defines how a signal peaks and is used to predict an impact. Increasing crest factor tends to be an early indicator of bearing faults.

Kurtosis

Unitless statistical measure of the tailedness of a normal distribution of the data.

Kurtosis represents the probability or frequency of values that are extremely high or low compared to the mean. Values around three (3) indicate moderate outlier frequency (normal distribution); less than three (3) indicates lower outlier frequency, and above three (3) indicates higher outlier frequency.

Peak Velocity/Acceleration Frequency Component

Provides the frequency where the highest peak of either velocity or acceleration occurred within the specified bandwidth. Can be useful for detecting motor fundamental frequencies or fault frequencies as they appear.

Asset Run Flag

Uses the measured acceleration data to determine if the asset is running or is offline.

Magnitude

$\sqrt{(X^2 + Y^2 + Z^2)}$; Provides the magnitude of all three vectors and is specifically used for high-frequency acceleration measurement where the direction is less important and the trend of the overall value of the data can be used in a single point.

Installing the QM30VT3 Sensor

The vibration sensors have an X, Y, and Z axis indicated on the face of the sensor. Typically, in vibration analysis, the three axes are referred to as Axial (in line with the shaft of the asset), Horizontal Radial (parallel to the ground), Vertical Radial (perpendicular to the ground).

Not every application is identical so not every orientation will be the same. It is important to document the direction in which each axis is installed for labeling and diagnostic purposes.

An example install is to mount the sensor at the top center of a horizontally mounted motor with the X axis (parallel with the sensor cable) in line with the motor shaft or to mount the sensor with the Y axis (perpendicular to the sensor cable) perpendicular to the shaft in the horizontal radial axis and the Z axis (through plane of the sensor) going into or through the motor in the vertical radial axis.

For the best results, install the sensor as close to the motor bearing as possible. If this is not possible, install the sensor on a surface that is in rigid connection with the vibration characteristics of the motor.

Using a cover shroud or other flexible mounting location may result in a reduced accuracy or reduced ability to detect certain vibration characteristics. After determining the sensor direction and location, mount the sensor for the best possible vibration sensing accuracy.

Mounting Options	QM30 Housing Type	Description
BWA-QM30-FTAL (included with the aluminum housing model)	Aluminum	When available, directly mounting the bracket to the motor using an 1/4-28 × 1/2-inch screw provides a rigid surface with the highest sensor accuracy and frequency response. This mounting option offers flexibility for future sensor and bracket movement. Another mounting option is to use an epoxy to adhere the bracket to the motor. Banner recommends using an epoxy designed for accelerometer mounting, such as Loctite Depend 330 and 7388 activator. Epoxying a bracket to a motor provides a permanent installation of the bracket to which the sensor can be attached. This more rigid mounting solution ensures some of the best sensor accuracy and frequency response, but is not flexible for future adjustments. A third option is to use the included thermally conductive adhesive tape. This often provides a more than sufficient mounting type but does introduce some additional flex that reduces accuracy.
BWA-QM30-FTSS (included with the stainless steel housing model)	Stainless steel	
BWA-QM30-CEAL (curved bracket epoxied to the motor)	Aluminum	This lightweight aluminum bracket provides a close connection to the motor with ridges to sit on curved surfaces and ensure a tight fit. The bracket is epoxied to the motor and the sensor is screwed into the bracket.
BWA-QM30-FMSS (flat magnet bracket)	Aluminum and stainless steel	Gives a solid, strong, and adjustable mount to a motor, but with a motor's curved surface it may not provide the best connection if the motor is too small for the magnet to get a full connection with the motor housing. Magnet mounts are susceptible to accident rotation or a change in the sensor location if an outside force bumps or moves the sensor. This can lead to a change in sensor information that differs from the time-trended data from the previous location. The bracket is stainless steel and the magnet insert is neodymium.
BWA-QM30-CMAL (curved surface magnet bracket)	Aluminum and stainless steel	Gives a solid, strong, and adjustable mount to a motor, intended for use when the flat magnetic bracket does not make a good connection with the motor's surface. Magnet mounts are susceptible to accidental rotation or change in the sensor location if an outside force bumps or moves the sensor. This can lead to a change in the sensor information that differs from the time-trended data from the previous location. The bracket is aluminum and the magnet insert is samarium-cobalt.
BWA-QM30-FSALR (robust quick-release bracket)	Aluminum	This larger aluminum bracket mounts to the motor with a 1/4-28 × 1/2-inch screw to provide a rigid connection to the motor. On the right or left side, a setscrew is hand-tightened to secure the sensor to the bracket, allowing for rapid release and installation of a sensor compared to other mounting options.
BWA-QM30-FSSSR (robust quick-release bracket)	Stainless steel	This larger stainless steel bracket mounts to the motor with a 1/4-28 × 1/2-inch screw to provide a rigid connection to the motor. A set-screw is hand-tightened to secure the sensor to the bracket, allowing for rapid release and installation of a sensor compared to other mounting options.

Specifications

Supply Voltage

3.6 V DC to 5.5 V DC or 10 V DC to 30 V DC

Current

Active comms: 9 mA at 30 V DC

Communication

Interface: RS-485 serial

Protocol: Modbus RTU

Baud rates: 9.6k, 19.2k (default), or 38.4k

Data format: 8 data bits, no parity (default), 1 stop bit (even or odd parity available)

Mounting Options

The sensor can be mounted using a variety of methods, including M4 × 0.7 hex screw, epoxy, thermal tape, or magnetic mount.

Mechanical Shock

MIL-STD-202G, Method 213B, Condition I (100G 6x along X, Y, and Z axes, 18 shocks), with device operating

Certifications

CE

Vibration Sensor

Sensor Type: Ultralow noise Digital MEMS

Number of axes: 3

Measuring Range: ±16G, 0 to 65.5 mm/s or 0 to 6.5 in/s RMS

Frequency Range: 6 Hz to 5.3 kHz

Accuracy: ±5% at 25 °C

Sampling Frequency: 26.80 kHz (default)

Time Waveform Record Length: 4096 points

FFT Lines of Resolution: 1600

FMax Settings (sample duration): 5300 Hz (default 300 ms), 2650 Hz (610 ms), 1300 Hz (1.215 s), 650 Hz (2.43 s), or 325 Hz (4.865 s)

Temperature Sensor

Measuring Range: –40 °C to +105 °C (–40 °F to +221 °F)

Resolution: ±1 °C (±1.8 °F)

Accuracy: ±3 °C (±5.4 °F)

Operating the sensor at higher voltages and faster sampling rates can induce internal heating that can reduce accuracy.

Environmental Rating

Aluminum housing: IP67

Stainless steel housing: IP69K per DIN 40050-9

Operating Temperature

–40 °C to +105 °C (–40 °F to +221 °F) (1)

(1) Operating the devices at the maximum operating conditions for extended periods can shorten the life of the device.

WARNING:

- **Do not use this device for personnel protection**
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.

FCC Part 15 Class A for Unintentional Radiators

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Industry Canada ICES-003(A)

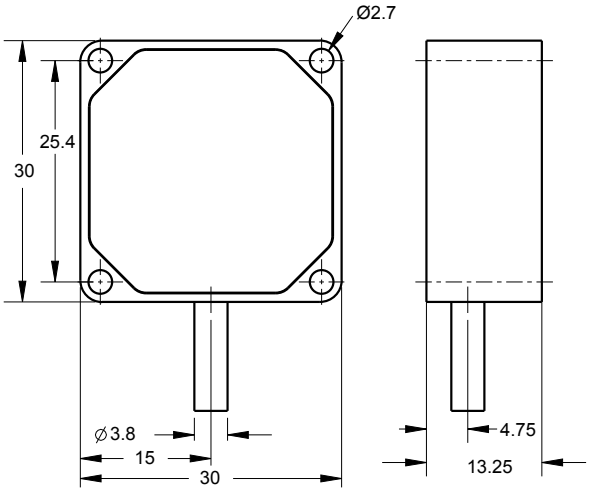
This device complies with CAN ICES-3 (A)/NMB-3(A). Operation is subject to the following two conditions: 1) This device may not cause harmful interference; and 2) This device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme à la norme NMB-3(A). Le fonctionnement est soumis aux deux conditions suivantes : (1) ce dispositif ne peut pas occasionner d'interférences, et (2) il doit tolérer toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité du dispositif.

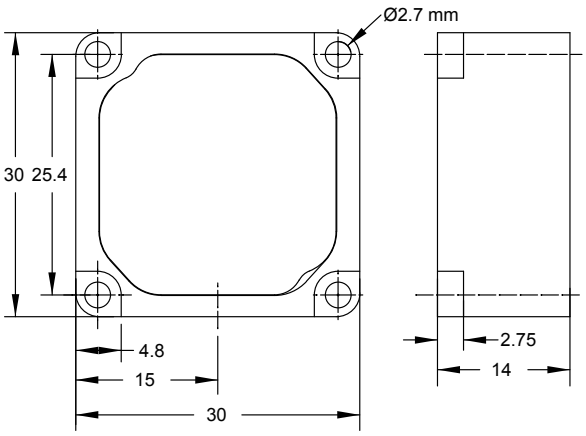
Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.

Aluminium model



Stainless steel models



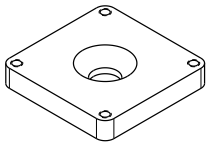
Accessories

Brackets

Bracket **BWA-QM30-FTAL** is included with the aluminium sensor models. Bracket **BWA-QM30-FTSS** is included with the stainless steel models. All other brackets are available for order, but are not included with the sensor.

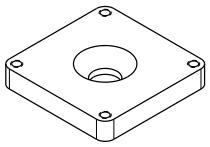
BWA-QM30-FTSS

- Use when measuring high-frequency vibrations or when mounting the sensor to curved surfaces
- Includes stainless steel bracket, four mounting screws, and one ¼-28 ×1/2 screw mount
- 30 mm × 30 mm
- **Refer to the Bracket Assembly Quick Start Guide for installation instructions (p/n 213323)**



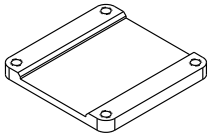
BWA-QM30-FTAL

- Use when measuring high-frequency vibrations or when mounting the sensor to curved surfaces
- Includes aluminum bracket, four mounting screws, one ¼-28 × 1/2 screw mount, and one piece of 3M™ thermally conductive adhesive transfer tape
- 30 mm × 30 mm
- **Refer to the Bracket Assembly Quick Start Guide for installation instructions (p/n 213323)**



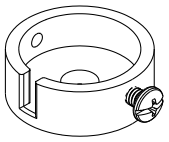
BWA-QM30-CEAL

- Epoxy-mount for curved surfaces
- Aluminum
- Set of five brackets

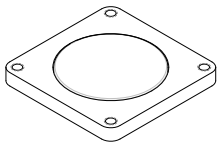


BWA-QM30-FSSSR Flat Surface Rapid Release Bracket (Stainless Steel)

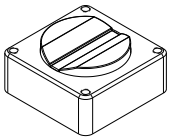
- Circular bracket with center screw for mounting the bracket to the motor
- Side set-screw for quick-release mounting of the sensor to the bracket
- Stainless steel



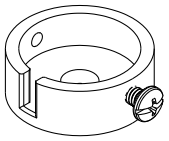
BWA-QM30-FMSS
- Includes magnetic mounting bracket and four mounting screws (two sets of mounting screws for both the aluminum and stainless steel models)
- 30 mm × 30 mm
- **Refer to the Bracket Assembly Quick Start Guide for installation instructions (p/n 213323)**



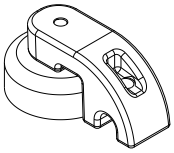
BWA-QM30-CMAL
- Magnet mount for curved surfaces
- 30 mm × 30 mm, 14.4 mm thick
- Includes four M2.5 × 16 mm socket head cap screws
- **Refer to the Bracket Assembly Quick Start Guide for installation instructions (p/n 213323)**



BWA-QM30-FSALR Flat Surface Rapid Release Bracket (Aluminum)
- Circular bracket with center screw for mounting the bracket to the motor
- Side set-screw for quick-release mounting of the sensor to the bracket
- Aluminum

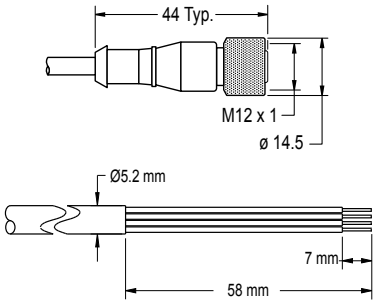
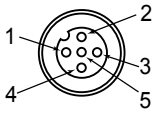


BWA-QM30CAB-MAG
- QM30 Magnet Cable Placement Bracket **BWA-BK-027**
- Snap clip polypropylene bracket with magnetic backing for securing QM30 cables
- Set of ten brackets in each container

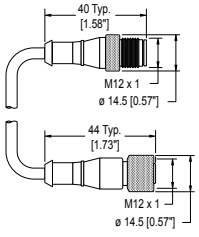
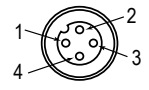
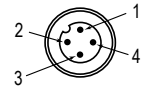


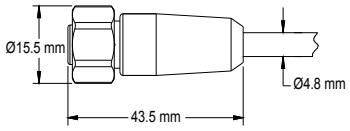
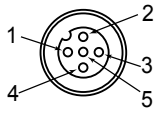
Cordsets

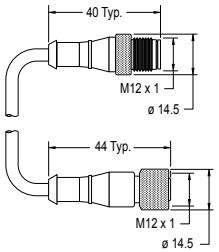
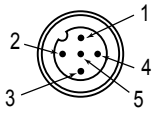
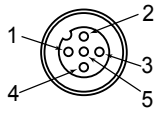
4-pin Single-Ended M12 Female Cordsets

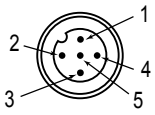
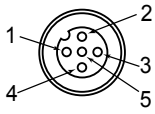
Model	Length	Dimensions (mm)	Pinout (Female)	
BC-M12F4-22-1	1 m (3.28 ft)			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Unused
BC-M12F4-22-2	2 m (6.56 ft)			
BC-M12F4-22-5	5 m (16.4 ft)			
BC-M12F4-22-8	8 m (26.25 ft)			
BC-M12F4-22-10	10 m (30.81 ft)			
BC-M12F4-22-15	15 m (49.2 ft)			
BC-M12F4-22-20	20 m (65.61 ft)			
BC-M12F4-22-25	25 m (82.02 ft)			
BC-M12F4-22-30	30 m (98.42 ft)			

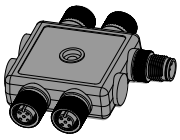
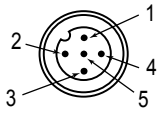
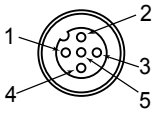
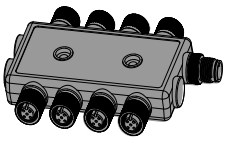
4-pin A-Code Double-Ended M12 Female to M12 Male Cordsets

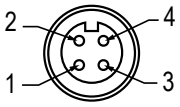
Model	Length	Dimensions (mm)	Pinouts	
BC-M12F4-M12M4-22-1	1 m (3.28 ft)		Female  Male 	1 = Brown 2 = White 3 = Blue 4 = Black
BC-M12F4-M12M4-22-2	2 m (6.56 ft)			
BC-M12F4-M12M4-22-3	3 m (9.84 ft)			
BC-M12F4-M12M4-22-4	4 m (13.12 ft)			
BC-M12F4-M12M4-22-5	5 m (16.4 ft)			
BC-M12F4-M12M4-22-10	10 m (30.81 ft)			
BC-M12F4-M12M4-22-15	15 m (49.2 ft)			

5-Pin Single-Ended M12 Female Stainless Steel Washdown Cordsets				
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**
MQDC-WDSS-0506	2 m (6.56 ft)	Straight		 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray
MQDC-WDSS-0515	5 m (16.4 ft)			
MQDC-WDSS-0530	9 m (29.5 ft)			

5-Pin Double-Ended M12 Female to M12 Male Stainless Steel Washdown Cordsets					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Male)**	**Pinout (Female)**
MQDEC-WDSS-505SS	1.52 m (4.99 ft)	Male Straight/Female Straight			
MQDEC-WDSS-510SS	3.05 m (10 ft)			1 = Brown 2 = White 3 = Blue	4 = Black 5 = Gray
MQDEC-WDSS-515SS	4.57 m (15 ft)				

5-Pin M12 Female to M12 Male Splitter Tee			
Model		**Pinout (Male)**	**Pinout (Female)**
CSB-M1250M1250-T • Two 5-pin M12 female quick-disconnect connectors • One 5-pin M12 male quick-disconnect connector • Parallel wiring		 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray	 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray

Model		Pinout (Male)	Pinout (Female)
R50-4M125-M125Q-P Molded Junction Block • Four integral 5-pin M12 female quick-disconnect connectors • One integral 5-pin M12 male quick-disconnect connector • Parallel wiring • Product documentation (p/n 227974)		 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray	 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray
R95-8M125-M125Q-P Molded Junction Block • Eight integral 5-pin M12 female quick-disconnect connectors • One integral 5-pin M12 male quick-disconnect connector • Parallel wiring • Product documentation (p/n 227974)			

4-Pin M12 Female RS-485 to USB Adapter Cordset, with Wall Plug				
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**
BWA-UCT-900	1 m (3.28 ft)	Straight		 1 = Brown 2 = White 3 = Blue 4 = Black

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