PURPOSE

This document will help determine the type of Q.series module to select based on the type of sensor being used. It is possible to use a particular sensor on multiple types of modules. In this situation, channel count, sensor specifications, and data rate will be taken into consideration.

HOUSING TYPE

The Q.series modules can take on different form factors depending on the application and final installation location. Mostly all of the modules are available in each form, but check with your sales representative or Gantner personnel for verification.

Q.bloxx – These are DIN rail mounted modules intended for stationary test benches. In some locations, these need to be installed in industrial enclosures. This type of system is best suited for distributed systems or applications where vibration and portability is not an issue.

Q.brixx – These are portable systems constructed of durable aluminum housings where the controller and measurement modules are all interlocked together. This type of system is best suited for moving applications or when the DAQ system needs to move around a testing facility.

Q.raxx / Q.raxx slimline – These are 19" rack units designed to fit into 19" rack cabinets. This type of system is best suited for locations that require high density of channels (a lot of channels in limited amount of space). The Q.raxx are 3U high and provide similar connections as Q.bloxx and Q.brixx units vs. the Q.raxx slimline which are 1U high and provide industrial or customer specific connectors.

SENSORS

Analog Output

To output standard voltage (±10 V) and/or current (0-20 mA) signals.

A102 – 1 analog output, ±10 V and 0-20 mA (100 kHz)
A106 – 2 analog outputs, ±10 V (10 kHz)
A109 – 4 analog outputs, ±10 V and 0-20 mA (100 kHz)

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Bridge

Also known as a Wheatstone bridge is an electrical circuit used to measure an unknown resistance by balancing the other components of the bridge. Typically used as strain gauge and is the fundamental sensing element for pressure sensors, load cells, torque sensors, position sensors, etc. It can take several forms depending on how many active gauges are in the circuit: full bridge (4 active), half bridge (2 active), and quarter bridge (1 active). To measure half and quarter bridge circuits, Gantner provides completion resistors internally (A116) or externally (A101, A102, A106, and A107); either 120Ω or 350Ω.

A101 – 2 bridge inputs (100 kHz, DC)
A102 – 1 bridge input (100 kHz, DC)
A106 – 2 bridge inputs (10 kHz, AC or DC)
A107 – 4 bridge inputs (10 kHz, DC)
A116 – 8 bridge inputs (10 kHz, DC)

Current

To measure standard (0)4-20 mA signals. The A103 and A108 modules requires an external shunt to measure currents.

A101 – 2 current inputs (100 kHz)
A103 – 8 current inputs (100 Hz)
A107 – 4 current inputs (10 kHz)
A108 – 8 current inputs (10 kHz)
A127 – 4 channels (2 current / 2 voltage), (100 kHz, 1.2 kV isolation)

DC Accelerometers

Better known as DC response accelerometers, a mV output is monitored depending on the amount of G's applied to the sensor. The measurement module will measure the mV output and provide a conversion to G's.

A101 – 2 channels (±60V, 100 kHz)
A103 – 8 channels (±10V, 100 Hz)
A107 – 4 channels (±10V, 10 kHz)
A108 – 8 channels (±10V, 10 kHz)

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Digital Inputs

Depending on the module these inputs can be configurable as counters, frequency, PWM, time, state, tare, or reset. The digitals have a max input voltage of 30VDC and max input current of 0.5 mA.

A101 – 2 digital inputs max (state, tare, reset)
A102 – 4 digital inputs (state, tare, reset)
A103 – 2 digital inputs (state, tare, reset)
A106 – 2 digital inputs max (state, tare, reset)
A108 – 2 digital inputs (state, tare, reset)
A109 – 4 digital inputs (2 counter, 2 frequency, or 2 PWM, state)
D101 – 8 digital inputs (counter, frequency, PWM, time, state)
D104 – 16 digital inputs (state, single or bit set, host controlled)
D107 – 6 digital inputs configurable (adjustable threshold in 256 steps)
(2 x 3 differential or single ended, frequency, counter, PWM, state)

Digital Outputs

Depending on the module these inputs can be configurable as frequency, PWM, state, or alarm. The digitals have an output voltage range of 10 to 30VDC.

A101 – 2 digital outputs max (state, alarm)
A102 – 2 digital outputs (state, alarm)

A103 – 2 digital outputs (state, alarm)
A106 – 2 digital outputs max (state, alarm, limit switch)
A108 – 2 digital outputs (state, alarm)
A109 – 4 digital outputs (2 frequency, 2 PWM, state)
D101 – 8 digital outputs (frequency, PWM, state)
D105 – 16 digital outputs (state, single or bit set, host controlled)

Encoders

Typically used to measure speed, direction, angular position, etc. by measuring pulses on a rotary shaft. Depending on the type of input and the # of wires required:

D101 – standard digital input and output module
D107 – digital input module with zero crossing built-in

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ICP/IEPE

An integrated circuit piezoelectric sensor is mostly used to measure dynamic pressures, forces, strain, or acceleration. IEPE is a similar non-proprietary standard that achieves the same results.

A101 – 2 channels (100 kHz)
A111 – 4 channels (100 kHz)

LVDT & RVDT

A linear variable differential transformer is used to measure linear displacement (position).
A rotary variable differential transformer is used to measure angular displacement.

A106 – 2 channels (10 kHz, 4.8 kHz Carrier Mode AC)

Piezoelectric Transducers

These types of sensors will need an external amplifier/signal conditioner to convert to a voltage signal. Depending on the channel count and voltage range, these modules can be used:

A101 – 2 channels (±60V, 100 kHz)
A103 – 8 channels (±10V, 100 Hz)
A107 – 4 channels (±10V, 10 kHz)
A108 – 8 channels (±10V, 10 kHz)

RTD (Pt100/Pt1000)

These resistance temperature detectors are used to measure temperature due to the predictable change in resistance of metals (typically platinum, nickel, or cooper). RTDs are slowly replacing the use of thermocouples in applications below 500-600 °C due to increased accuracy and repeatability. The following modules can all be used:

A101 – 2 channels (2 or 4 wire, 100 kHz)
A105 – 4 channels (2, 3, or 4 wire, 10 Hz)
A107 – 4 channels (2, 3, or 4 wire, 10 kHz)

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Thermocouples

The A104 is the designated module to measure thermocouples of all types (Type B, E, J, K, L, N, R, S, T, U), but the universal analog modules can be used also. These modules require an external CJC terminal block. The A124 is for high isolation thermocouple measurements where the CJC is built-in the module for each channel.

A101 – 2 thermocouple channels (100 kHz)
A104 – 8 thermocouple channels (100 Hz)
A107 – 4 thermocouple channels (10 kHz)
A124 – 4 thermocouple channels (20 kHz, 1.2 kV isolation)

Vibrating Wire

These sensors are used to monitor the condition and loads of pre-stressed concrete constructions. It measures forces using a wire that vibrates at a high frequency. The applied forces changes the tension of the wire and thus its frequency. The data acquisition acquires the data as a micro strain measurement. The VibWire module communicates to the Q.station over RS485.

VibWire 108 RS485 – 8 vibrating 4-wire channels, 100Hz to 10kHz (100 kHz)

Voltage

Different ranges of voltage measurement are possible depending on the module. High isolation and high voltages can be measured as well.

A101 – 2 voltage inputs (±100 mV, ±1 V, ±10 V, ±60 V), (100 kHz)
A103 – 8 voltage inputs (±10 V), (100 Hz)
A107 – 4 voltage inputs (±100 mV, ±1 V, ±10 V), (10 kHz)
A108 – 8 voltage inputs (±10 V), (10 kHz)
A108 100V – 8 voltage inputs (±100 V), (10 kHz)
A123 – 4 voltage inputs (±100 mV, ±1.25 V, ±10 V), (100 kHz, 1.2 kV isolation)
A127 – 4 channels (2 voltage / 2 current)
(±40 V, ±120 V, ±400 V, ±1200 V), (100 kHz, 1.2 kV isolation)
A128 – 4 voltage inputs (±40 V, ±120 V, ±400 V, ±1200 V), (100 kHz, 1.2 kV isolation)

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