

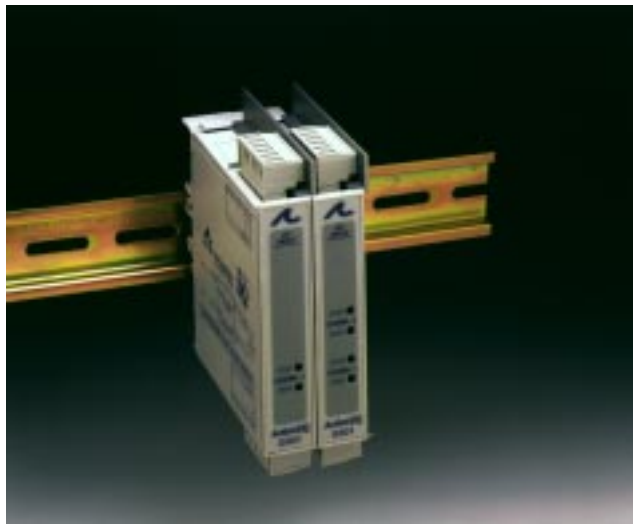
ACTIONI/Q[®] Q509

MODEL



Benefits

- Multi-Channel Design Provides One or Two Two-wire Transmitters in One Package
- Protects Equipment and Prevents Ground Loops with 1800VDC Isolation
- Excitation Powers Input Loop
- SnapLoc, Plug-In Screw Terminals for Low MTTR
- Standard Input Ranges for the Most Popular Applications
- Output Loop Powered from 24 to 48VDC
- Three Year Warranty



Multi-Channel, Isolating Current Repeater

Provides Excitation and Isolation for One or Two 4-20mA Current Loops

DESCRIPTION

The ActionI/Q model Q509 is a DIN rail mount, DC current input, single(1) or dual (2) channel, two-wire transmitter. Each channel accepts a DC current input and provides excitation and an isolated 4-20mA output. Each channel is fully isolated (1800VDC) from input to output and channel to channel.

All ActionI/Q modules feature SnapLoc, plug-in, screw terminals for easy installation and low Mean-Time-To-Repair (MTTR). If desired, two or more modules can slide together and interlock for solid, high density mounting. This is accomplished by removing either the foot, or the adjacent unit's face plate, for right-hand side or left-hand side mounting, respectively. The module to be attached will easily slide on to the side of the mounted unit.

APPLICATION

The Q509 is used to isolate a 4-20mA current signal and will provide loop power to the device connected on it's input. This two wire transmitter regulates a 4-20mA signal on the output and utilizes power from the output loop to power the input loop.

Two-wire transmitters are primarily used in remote locations near the sensor. They reduce the probability of signal errors and save wiring costs by utilizing the two power wires to send the 4-20mA signal. The current signal is usually monitored by a control system or displayed for an operator.

The 1800VDC isolation capability of the Q509 prevents ground loops from causing errors in DC current signals and may reduce susceptibility to Radio Frequency Interference (RFI). Isolation also provides protection from high voltages and current spikes which may damage expensive Supervisory Control And Data Acquisition (SCADA) equipment, such as a PLC or DCS.



*Protecting the
Integrity of
Industrial
Process Signals*



OPERATION

The ActionI/Q model Q509 operates as a two-wire transmitter; each channel derives its power from a (24-48VDC) source connected in series with the 4-20mA output loop.

This power supply level (V_s) determines input loop excitation (V_e). The input loop excitation level (V_e) is defined as a function of the output power supply level (V_s) in the following equation $V_e \geq [V_s(I_o - 1.1) - I_o^2(R_L + 0.02)] / 1.32(I_{IN} + 0.8)$, where I = current input in mA and R_L = load resistor in KW. From a specific excitation level (V_e), the supply voltage requirements is defined as $V_s \geq [1.32V_e(I_{IN} + 0.8) + I_o^2(R_L + 0.02)] / (I_o - 1.1)$. For example if the device on the input requires $V_e = 12V$ of excitation, then $V_s \geq 26.3V$ when $R_L = 0$. Note, this equation must be solved for both minimum (4mA) and maximum (20mA) and V_s must be greater than or equal to the greater (V_s) value. Also any other loads (R_L) must be accounted for in the total loop voltage drop.

Figure 1: Q509 Input Connections for Sensor Types



The outputs of the Q509 are isolated from the inputs and protected from reverse polarity. Zero and span pots are provided for each channel to calibrate the output to the input source (+/-3%).

The Q509 provides a single or dual channel, DC current input, isolating, two-wire transmitter in one package and is calibrated to rated accuracy.

CALIBRATION

1. Connect the input to a calibrated DC current source. Connect the output in series to a voltage source capable of supplying at least 20mA and a milliamp current meter.

Note: The voltage source (V_s) connected to the output must be sufficient to accommodate all other device loads (R_L) in the current loop.
 $V_e \geq [V_s(I_o - 1.1) - I_o^2(R_L + 0.02)] / 1.32(I_{IN} + 0.8)$

2. Set the calibrator to the specified minimum (4mA) input value and adjust the zero potentiometer for 4mA output.

3. Set the calibrator to the specified maximum (20mA) input value and adjust the span potentiometer for 20mA output.

4. Repeat steps 2 and 3, as necessary, to validate calibration.

Input	Range: 4-20mA Impedance: $\leq 20\Omega$ Protection: Input withstands up to 24VDC	Adjustability	Front accessed 25 turn, $\pm 3\%$ typical for zero and span
Output Range	4-20mA	Stability	$\leq 0.025\%/^{\circ}C$ of full-scale maximum
Supply Voltage Range (V_s)	Two-Wire XMTR Inputs: 24 to 48VDC, each channel, for $V_e \geq 11VDC$. $V_s \geq [1.32V_e(I_{IN} + 0.8) + I_o^2(R_L + 0.02)] / (I_o - 1.1)$ I = current in mA, R_L = load in K Ω Four-Wire XMTR Inputs: 12 to 48VDC, each channel, $V_s \geq 12 + IR_L$.	ESD Susceptibility	Capable of meeting IEC 801-2 level 2 (4kV)
Excitation Voltage Range (V_e)	$V_e \geq [V_s(I_o - 1.1) - I_o^2(R_L + 0.02)] / 1.32(I_{IN} + 0.8)$ I = current in mA, R_L = Load in K Ω	Isolation	1800VDC or peak AC between input and output and channel to channel
Output Accuracy	$\leq 0.1\%$ of full-scale input typical, $\leq 0.2\%$ maximum @ 23°C including linearity, repeatability and hysteresis	Response Time	150mSec typical (10 to 90%)
		Temperature	Operating: -40 to 80°C (-40 to 176°F) Storage: -40 to 80°C (-40 to 176°F)
		Humidity (non-condensing)	Operating: 15 to 90% (@45°C)
		Wire Terminal	Socketed screw terminals for 12-22 AWG
		Agency Approvals	CSA certified per standard C22.2 (File No. LR42272). UL recognized per standard UL508 (File No. E99775). CE conformance per EMC directive 89/336/EEC and Low voltage 73/23/EEC.

ASSISTANCE

For additional information on calibration, operation and installation please contact our Technical Services Group. Call toll-free:

800-783-6664

MODELS AND ACCESSORIES

Accessories

All ActionI/Q modules mount on standard TS32 (model MD02) or TS35 (model MD03) DIN rail. In addition the following accessories are available:

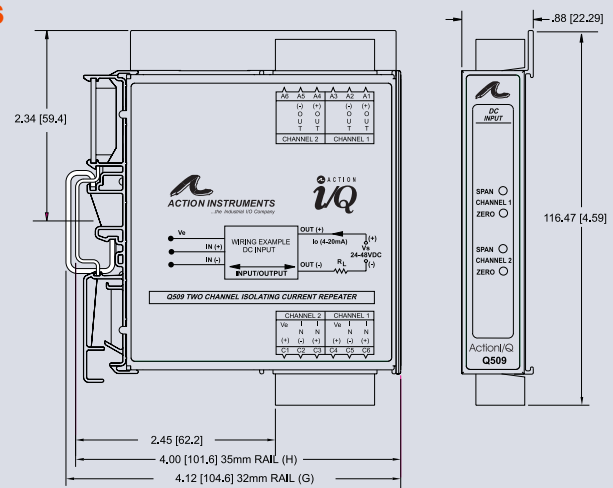
MD02	TS32 DIN rail
MD03	TS35 x 7.5 DIN rail
H902	24VDC Power Supply (200mA)
H910	24VDC Power Supply (1 Amp)
H915	24VDC Power Supply (2.1 Amp)

Ordering Information

Specify:

- Model: **Q509-1000** (one channel)
or **Q509-2000** (two channel)
- Accessories: (see Accessories)

DIMENSIONS



Terminal Connections

Pin A1: Channel 1, Power & Output (+)	Pin A6: Not Internally Connected	Pin C5: Channel 1, DC Input (-)
Pin A2: Channel 1, Power & Output (-)	Pin C1: Channel 2, Excitation (+)*	Pin C6: Channel 1, DC Input (+)
Pin A3: Not Internally Connected	Pin C2: Channel 2, DC Input (-)*	Pin C5: Channel 1, DC Input (-)
Pin A4: Channel 2, Power & Output (+)*	Pin C3: Channel 2, DC Input (+)*	Pin C6: Channel 1, DC Input (+)
Pin A5: Channel 2, Power & Output (-)*	Pin C4: Channel 1, Excitation (+)	