

# ACTIONI/Q<sup>®</sup> Q438

MODEL



## Benefits

- Potentiometers from 100W to 100KW
- Wide Ranging Zero and Span with 80% Adjustability
- Five Field Configurable Output Ranges: 0-5V, 0-10V, 0-1mA, 0-20mA and 4-20mA
- SnapLoc Plug-In Terminal for Low MTTR
- Flexible Power Supply Accepts 9 to 30VDC
- ASIC Technology for High Reliability
- Lifetime Warranty



## Potentiometer Input, Field Configurable Signal Conditioner

Provides a DC Output in Proportion to a Potentiometer Input

### DESCRIPTION

The ActionI/Q Q438 is a DIN rail mount, potentiometer input signal conditioner with 1800VDC isolation between DC power and the input/output circuitry. The input provides a constant voltage and is designed to accept any three-wire potentiometer from 100W to 100KW. The field configurable output is switch selectable providing either 0-5V, 0-10V, 0-1mA, 0-20mA or 4-20mA DC signal.

Wide ranging, precision zero and span pots, used in conjunction with DIP switches, allow 80% adjustability of offset and gain to transmit a full scale output from any 20% portion of the potentiometer input.

### APPLICATION

The ActionI/Q Q438 field configurable, potentiometer input signal conditioner is useful in transmitting process control setpoints to remote PID controllers or interfacing position sensors to data acquisition and control systems.

The Q438's high density DIN rail mounting offers an extremely compact solution for saving valuable panel space.

### CONFIGURATION

A major advantage of the Q438 is its wide ranging capabilities and ease of configuration.

For example, in a valve positioning application a potentiometer is sometimes used as a feedback signal. Quite often a wide open valve is only a 25% turn of the feedback potentiometer. In this case the Q438 can easily be adjusted with the zero and span to provide a full scale output signal (e.g. 4-20mA) representing 0-25% or even 50-75% of the potentiometer input.

Unless otherwise specified, the factory presets the Model Q438 as follows:

Input Range: 0 to 100%

Output: 4 to 20mA



*Protecting the  
Integrity of  
Industrial  
Process Signals*



The DC power input accepts any DC source between 9 and 30V; typically a 12V or 24VDC source is used (see Accessories). For other output ranges, refer to Tables 1 and 2 to reconfigure switches SW1 and SW2 for the desired input and output ranges.

**WARNING:** Do not attempt to change any switch settings with power applied. Severe damage will result!

## CALIBRATION

1. With power disconnected, set the output and input switch selectors (SW1 and SW2) to the desired ranges (Tables 1 and 2).

*Note: An I/Q Rail is an optional accessory to deliver power to the module(s). A two, four or eight position rail is available. See ordering Information.*

2. Connect the input to a potentiometer. Connect the output to the actual device load (or a load approximately equivalent to the actual device load value) and apply power.

*Note: To maximize thermal stability, final calibration should be performed in the operating installation, allowing approximately 1 to 2 hours for warm up and thermal equilibrium of the system.*

3. Set the input potentiometer to the desired minimum and adjust the zero potentiometer for the desired minimum output.

4. Set the input potentiometer to the desired maximum and adjust the span potentiometer for the desired maximum output.

5. Repeat steps 3 and 4, if necessary, for best accuracy.

Table 1: Input Range Switch Selector (SW2)

Span	SW2*					
	1	2	3	4	5	6
20-100%						
45-100%	■					
85-100%		■				
Offset	1	2	3	4	5	6
0-20%						
20-45%				■		
45-65%					■	
65-80%						■

Table 2: Output Range Switch Selector (SW1)

Output Range	SW1							
	1	2	3	4	5	6	7	8
0 to +5V	■	■	■	■	■	■	■	■
0 to +10V	■	■	■	■	■	■	■	■
0 to 1mA	■	■	■	■	■	■	■	■
4 to 20mA	■	■	■	■	■	■	■	■
0 to 20mA	■	■	■	■	■	■	■	■

KEY ■ = ON

\*SW2-5, 6 not used

## ASSISTANCE

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

800-783-6664

## SPECIFICATIONS

<b>Potentiometer Input</b>	Resistance (End to End): 100w up to 100Kw Input Impedance: >1Mw Input Excitation: 500mV, 5mA maximum drive. Zero Turn-Up: 80% of full scale input Span Turn-Down: 80% of full scale input (Table 1)
<b>Output</b>	<b>Voltage Output</b> Output: 0-5V, 0-10V Source Impedance: <10w Drive: 10mA, max. (1Kw min. @ 10V) <b>Current Output</b> Output: 0-1mA, 0-20mA, 4-20mA Source Impedance: >100Kw Compliance: 0-1mA; 7.5V, max. (7.5Kw, max.) 0-20mA; 12V, max. (600w, max.) 4-20mA; 12V, max. (600w, max.)
<b>Accuracy (Including Linearity, Hysteresis)</b>	±0.1% maximum at 25°C.
<b>Stability</b>	Temperature: <±0.05%/°C maximum of full scale range.

<b>Response Time (10 to 90%)</b>	<200mSec., typical.
<b>Common Mode Rejection</b>	120dB @ DC, >100dB @ 60Hz
<b>Isolation</b>	1800VDC between line power and input, output
<b>EMC Compliance (CE Mark)</b>	Emissions: EN50081-1 Immunity: EN50082-2 Safety: EN50178
<b>LED Indication (green)</b>	Active DC power
<b>Humidity (Non-Condensing)</b>	Operating: 15 to 95% (@ 45°C) Soak: 90% for 24 hours (@ 65°C)
<b>Temperature Range</b>	Operating: 0 to 55°C (32 to 131°F) Storage: -25 to 70°C (-13 to 158°F)
<b>Power</b>	Consumption: 1.5W typical, 2.5W max Range: 9 to 30VDC
<b>Weight</b>	0.48 lbs
<b>Agency Approvals</b>	UL recognized per standard UL508 (File No. E99775). CSA certified per standard C22.2 No. 0-M91 and 142-M1987 (File No. LR42272-84). CE Compliance per EMC directive 89/3/36 EEC and Low Voltage 73/23/EEC.

## MODELS AND ACCESSORIES

### Accessories

All Action/I/Q modules will 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
IQRL-D002	2 Position I/Q Rail & DIN rail
IQRL-D004	4 Position I/Q Rail & DIN rail
IQRL-D008	8 Position I/Q Rail & DIN rail
G905	24VDC Power Supply (0.5Amp)
H910	24VDC Power Supply (1Amp)
H915	24VDC Power Supply (2.1Amp)

## ORDERING INFORMATION

Specify:

- Model: Q438-0000
- Specify optional I/Q Rail, type and quantity.

- Optional Custom Factory Calibration; specify C620 with desired input and output range
- Accessories: (see Accessories)

### Terminal Connections

A1	DC Output (+)	
A2	DC Output (-)	
A3	Not Used	Potentiometer clockwise
A4	Not Used	
A5	DC Power (+)	Potentiometer wiper
A6	DC Power (-)	
C1	Not Used	Potentiometer counter-clockwise
C2	Not Used	
C3	Pot Case Ground	
C4	Pot. Input (full counter clockwise)	
C5	Pot. Input Wiper	
C6	Pot. Input (full clockwise)	

## DIMENSIONS