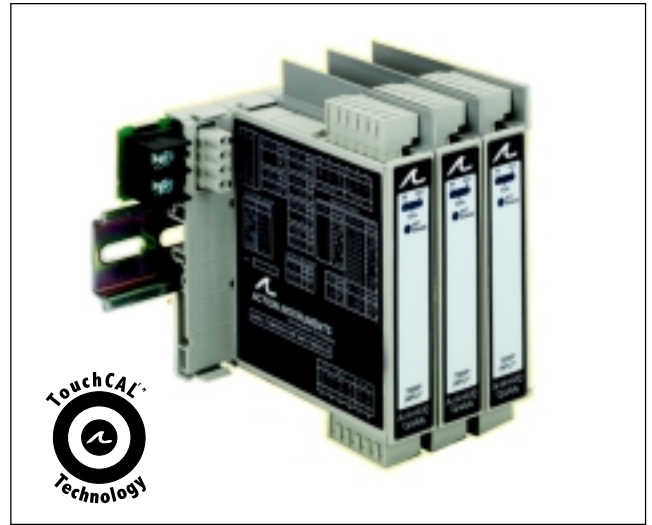


# ACTION I/Q<sup>®</sup> Q466

## AC Input Field Configurable Isolator

Provides an Isolated DC Output  
in Proportion to an AC Input



### Benefits

- Eliminates Ground Loops
- Field Configurable Input Ranges
- Field Configurable Output Ranges
- TouchCAL™ Technology
- SnapLoc™ Plug-In Terminals
- Universal AC Power  
100 to 240 VAC
- ASIC Technology

### Description

The Q466 is a DIN rail mount, AC input signal conditioner with 1800VDC isolation between input, output and power. The field configurable input and output offers flexible, wide ranging capability for scaling, converting or buffering AC inputs ranging from 5mA to 100mA AC or 50mV to 300VAC.

For current inputs above 100mA, it is recommended that an input shunt resistor be used and the Q466 be configured for the proper input range. For example, a 5A current transformer output can use the C006 shunt resistor (0.1 ohm, 5W) with the input of the Q466 set for 0-500mVAC.

The DC output of the Q466 is proportional to the average of the fully-rectified AC input signal, and is calibrated for sine waves between 40-400Hz.

### TouchCAL™ Technology

The Q466 utilizes TouchCAL technology which greatly simplifies calibration. The thermal drift and mechanical variability of the potentiometers has been removed and replaced with a digitally stable circuit. Once the unit is configured via DIP switches for voltage or current, the pushbutton is used to precisely calibrate the minimum and maximum levels.

To set the input level within the dip switch configured range, simply apply the high input signal (voltage or current) and push the CAL button. The low input signal is then applied and pushing the CAL button again stores the low input signal. The high and low input levels are stored in nonvolatile memory and correspond to the high and low output levels. These output levels are precisely adjusted using the input signal.

TouchCAL technology enables precise calibration and provides more than 90% offset of the zero value and adjustment down to 10% of the full scale input span for most of the 16 switch selectable input ranges. For example, the dipswitch configured 0-200V input range could be calibrated via pushbutton for 0-80V (i.e. 60% span reduction) or offset to a range of 120-200V (i.e. 60% offset and 60% span reduction). If the output was configured for 0-10V, then 120-200V input would correspond to the 0-10V full scale output. Input ranges such as 180-200V or 0-20V are possible using the 0-200V range.

Advanced digital technology combined with Action's exclusive ASIC technology allows the Q466 to be field configured for virtually any AC input to DC output within the limits specified.

## Application

The Q466 is useful in applications requiring an isolated, conditioned DC output from an AC signal. Typical applications include energy management, load shedding, motor current/load monitoring, locked rotor detection, isolation and data acquisition. The output of the Q466 can drive a digital meter for direct display or can interface with alarm or control devices including PLCs and computers.

## Diagnostic LEDs

The Q466 has three diagnostic LEDs. The green (RUN) LED is used for diagnostics to indicate that power is on. It will flash quickly if the input signal is above the calibrated range or slowly if the input signal is below range. It is on continuously when the unit is functioning within the calibrated range.

The yellow (INPUT) LED is on while calibrating the input level. The red (OUTPUT) LED is on while calibrating the output level.

## Configuration

The Q466 can be configured for input ranges from 50mV to 300V or 5mA to 100mA, with >90% input offset or it will adjust down to <10% of full scale input span (except on the 100mV/10mA range in which maximum offset or gain adjustment is 50%).

Unless a specific custom calibration is specified, the factory presets the Q466 as follows:

Input Range: 0 -500mV  
 Calibrated Output: 4-20mA

For other I/O ranges, refer to the tables below.

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

1. With power off, snap off the faceplate by lifting the right edge away from the heatsink. Slide the heatsink forward and off the module.

2. Choose the desired range from Tables 1-3. Return the heatsink to its original position and attach the faceplate before beginning calibration.

## Calibration

For best results, calibration should be performed in the operating installation, allowing at least one hour for thermal stability of the system. If pre-calibration on a test bench is preferred, then an output load equal to the input impedance of the device connected to the Q466 output is recommended, along with a 1 hour warm up period.

1. For best results install the module on to a piece of DIN rail or the I/Q Rail mounting accessories if desired. See the I/Q Rail Data sheet for details.

*Note: An I/Q Rail is required to power the modules. See ordering information.*

2. Connect the input to a calibrated AC source and the output to a voltage or current meter. Apply power and allow the system to reach thermal equilibrium (approx. 1 hour).

3. Adjust the input signal to the desired maximum and observe that the green LED is on or flashing. Push the CAL button and hold it down for more than 5 seconds (until the yellow and Green LEDs are flashing), then release the button.

*Note: To quit the calibration mode and reset the unit, push and hold the CAL button for more than 5 seconds. Or, wait for more than two minutes and the unit will timeout and automatically reset to the previously stored calibration.*

4. When the yellow and green LEDs stop flashing, the yellow and red LEDs will be on. Push the CAL button momentarily (the yellow and green LEDs will now be on).

5. Apply the maximum input signal level desired and push the CAL button to store. The yellow LED will now be on.

6. Apply the minimum input signal level desired and push the CAL button to store. The green and red LED will now be on.

7. Increase the input signal until the output is at the desired maximum level (e.g. 20.00mA), then push the CAL button to store. The red LED will now be on.

8. Decrease the input signal until the output is at the desired minimum level (e.g. 4.00mA), then push the CAL button to store. The yellow, green and red LEDs will now be on.

9. To finish calibration, push the CAL button once again. The green LED will be on if the input is within the calibrated range.

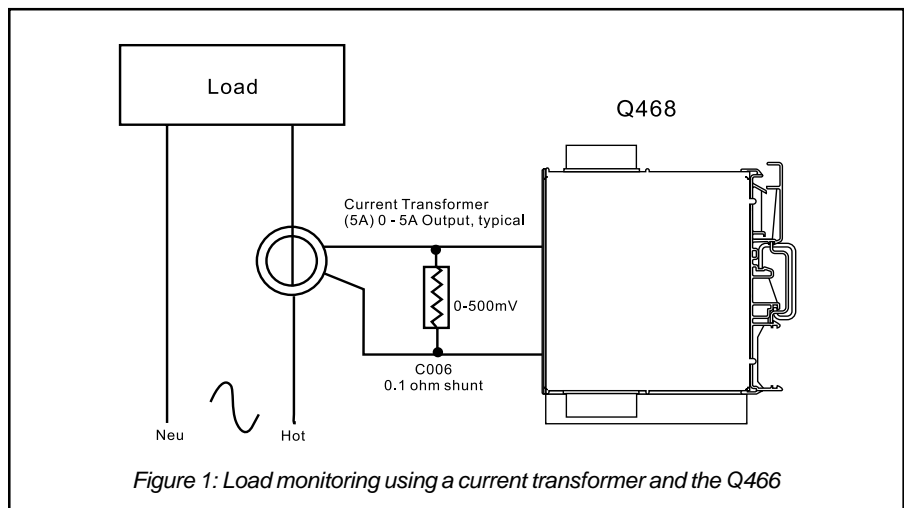


Figure 1: Load monitoring using a current transformer and the Q466

Table 1: Input Range Settings

Ranges		Selector SW1						
AC Voltage	AC Current	1	2	3	4	5	6	7
100mV	10mA				■			
200mV	20mA					■		
500mV	50mA			■		■	■	
1V	100mA			■	■			
2V				■	■		■	
5V		■		■		■	■	
10V		■		■	■			
20V		■		■	■		■	
50V			■	■		■	■	
100V			■	■	■			
200V			■	■	■		■	
300V				■	■		■	■

Key: ■ = 1 = ON or Closed

Table 2: Output Range Settings

Ranges	Selector SW2							
Output	1	2	3	4	5	6	7	8
0 to 5V	■	■	■	■				
0 to 10V	■							
0 to 1mA	■	■	■					
4 to 20mA						■	■	■
0 to 20mA	■	■				■	■	■

Key: ■ = 1 = ON or Closed

Table 3: Input Type Settings

Input Type	SW1
	8
Current	■
Voltage	

Key: ■ = 1 = On or Closed

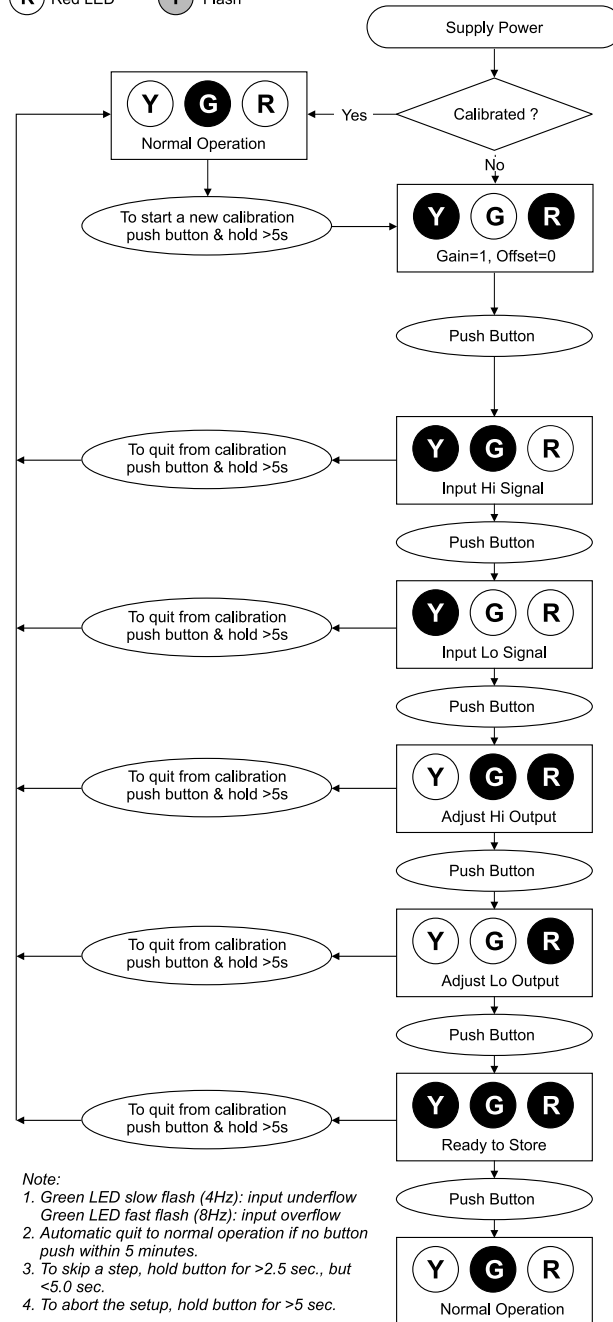
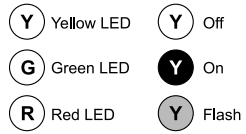


Figure 2: Q466 Calibration Flow Chart

## SPECIFICATIONS

### Inputs

#### Voltage

Ranges: 100mVAC to 300VAC  
Impedance: >100K ohms  
Overvoltage: 330VAC

#### Current

Ranges: 10mAAC to 100mAAC  
Impedance: 20 ohms, typical  
Overcurrent: 170mAAC  
Overvoltage: 60V peak

#### Frequency Range:

40Hz to 400Hz, factory calibrated at 60Hz

#### Common Mode (Input to Ground):

1800VDC, max.

#### Pushbutton Adjustment

Max. zero offset and span turn down is 50%

### Output

#### Voltage

Output: 0-5V, 0-10V  
Source Impedance: <10 ohms  
Drive: 10mA, max. (1K ohms, min. @ 10V)

#### Current

Output: 0-1mA, 0-20mA, 4-20mA

Source Impedance: >100K ohms

#### Compliance:

0-1mA; 7.5V, max. (7.5K ohms, max.)  
0-20mA; 12V, max. (600 ohms, max.)  
4-20mA; 12V, max. (600 ohms, max.)

### LED Indication

#### RUN (green):

On when unit is powered  
flashes at 8Hz when input is 7% above max.

#### INPUT (yellow):

On while calibrating the input level

#### OUTPUT (red):

On while calibrating the output level

### Accuracy (Including Linearity & Hysteresis)

±0.1% of span, typical, ±0.2% max.  
±0.5% of span, maximum (100mV range)

### Stability

±0.025%/°C of selected input span, typical.

### Response Time (10 to 90%)

250mSec., typical.

### Common Mode Rejection

DC to 60Hz: 90dB

### Isolation

1800VDC between input, output and power.

### EMC Compliance (CE Mark)

Emmissions: EN50081-1

Immunity: EN50082-2

Safety: EN50178

### Humidity (Non-Condensing)

Operating: 15 to 95% @ 45°C  
Soak: 90% for 24 hours @ 65°C

### Temperature Range

Operating: 0 to 55°C (32 to 131°F)  
Storage: -25 to 70°C (-13 to 158°F)

### Power

Consumption: 1.5W typical, 2.5W max.  
Range: 100 to 240 VAC ±10%,  
50 to 400 Hz

### Wire Terminations

Screw terminals for 12-22 AWG

### Shipping Weight

0.48 lbs.

### Agency Approvals

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 89/336  
EEC and Low Voltage 73/23/EEC.

## Models And Accessories

### Ordering Information

#### Specify:

1. Model: **Q466-0000**; one input, two output AC Isolator
2. Specify I/QRail type and quantity
3. Accessories: (see Accessories)
4. Optional Custom Factory Calibration: specify **C620** with desired input and output range

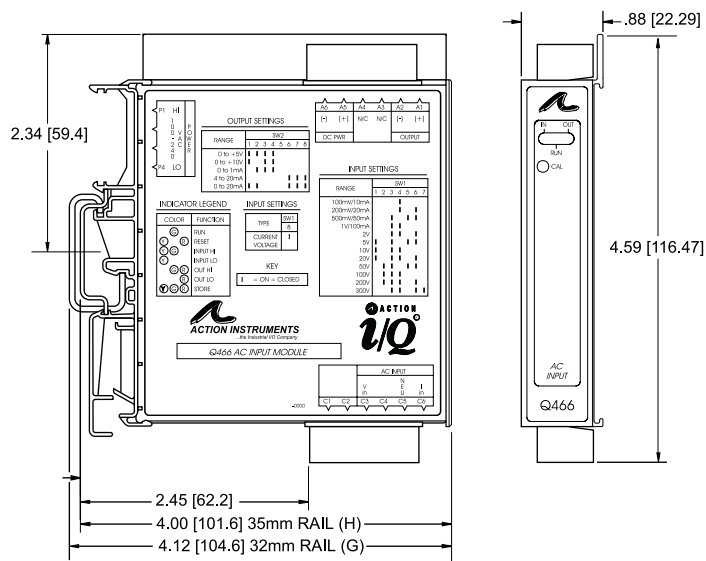
### Accessories

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

<b>MD02</b>	TS32 DIN rail
<b>MD03</b>	TS35 x 7.5 DIN rail
<b>IQRL-2002</b>	2 Position I/QRail & DIN rail
<b>IQRL-2004</b>	4 Position I/QRail & DIN rail
<b>IQRL-2008</b>	8 Position I/QRail & DIN rail

Terminal	Connection	Terminal	Connection
A1	Output (+)	C3	Input Voltage (Line)
A2	Output (-)	C4	Not Used
A3	Not Used	C5	Input (Neutral)
A4	Not Used	C6	Input Current (Line)
A5	Not Used	P1	AC Power (Hot)
A6	Not Used	P2	Not Used
C1	Not Used	P3	Not Used
C2	Not Used	P4	AC Power (Neutral)

## Dimensions



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