



Q126-0000



# ACTIONI/Q<sup>®</sup> Q126 AC Powered T/C Input Limit Alarm

Provides Relay Contact Closures  
at a Preset Temperature Input Level



- Field Configurable Input Ranges
- TouchCAL™ Technology
- Setpoints Programmable HI or LO and Failsafe or Non-Failsafe

- DIN Rail Mounting with IQRL
- Universal AC Power 85 to 265 VAC
- SnapLoc™ Plug-in Terminals
- ASIC Technology

### Description

The ActionI/Q model Q126 is a DIN rail mount, thermocouple input limit alarm with input terminal cold junction compensation (cjc), dual setpoints and two contact closure outputs. The field configurable input and alarm functions offer flexible setpoint capability. There are up to six temperature ranges available for each thermocouple type to ensure accuracy and maximize setpoint resolution. A bipolar input switch is provided for temperature ranges below 0°C.

The Q126 is configurable as a single or dual setpoint alarm, with HI or LO trips, upscale or downscale thermocouple burnout detection and failsafe or non-failsafe operation. Also included are adjustable deadbands (up to 100% of full scale input) for each setpoint and a universal AC power supply which accepts any voltage between 85 and 265VAC.

### TouchCAL Technology

Action has simplified setpoint calibration. Using a pushbutton instead of potentiometers, improvements in calibration resolution and reliability are realized due to the elimination of the potentiometer's mechanical variability. For calibration, the user simply inputs the signal level of the desired trip, then presses the push-button to store it in non-volatile memory. The deadband, or hysteresis, level is input next and is stored with another press of the button.

### Diagnostic LEDs

The Q126 is equipped with three front panel LEDs. The green LED is a dual function LED labeled IN, which indicates line power and input signal status. Active AC power is indicated by the illuminated LED. If this LED is off, check AC power and wiring connections. If the input signal is 7% above or below the configured input range the green LED will flash at 8Hz or 4Hz, respectively. The two red LEDs indicate the relay state of each setpoint. An illuminated red LED indicates the tripped condition for the respective setpoint.

### Output

The Q126 is equipped with two SPDT (form C) relays, rated at 120VAC or 28VDC at 5 amperes. Each of these relays is independently controlled by the field configurable setpoint and deadband.

### Operation

The Q106 limit alarm setpoints can be configured for HI or LO, failsafe or non-failsafe operation. Each of the setpoints has a respective HI or LO deadband. In a tripped condition, the setpoint is exceeded and the appropriate red LED will illuminate. The trip will reset only after the process falls below the HI deadband or rises above the low deadband (see Figure 1). For proper deadband operation, the HI setpoint must be set above the LO setpoint. In failsafe operation, the relay is energized when the process is below the HI setpoint or above the LO setpoint (opposite for non-failsafe). In the failsafe mode, a power failure results in an alarm state output.

### Dynamic Deadband

Circuitry in the Q106 prevents false trips by repeatedly sampling the input. The input must be beyond the setpoint for 100 milliseconds, uninterrupted, to qualify as a valid trip condition. Likewise, the input must fall outside the deadband and remain there for 100 milliseconds to return the alarm to an untripped condition. This results in a “dynamic deadband” —based on time— in addition to the normal deadband.

### Configuration

Unless otherwise specified, the factory presets the Model Q126 as follows:

Input:	Type J
Range:	0 to 350°C
Output:	Dual, SPDT
Trip:	A: HI, B: LO
Failsafe:	No
Deadband:	A, B: 0.25%

The AC power input accepts any AC source between 85 and 265VAC.

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

For other I/O ranges, refer to Table 1 and reconfigure switches SW1 and SW2 for the desired input type, range and function.

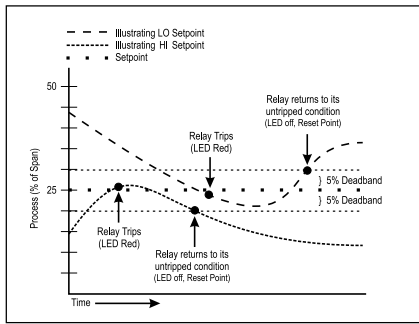


Figure 1: Limit alarm operation and effect of deadband.

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

1. With the module removed from the rail and not powered, snap off the faceplate by lifting the right edge away from the heatsink. Note the input switches (SW1 & SW2) are located under the faceplate. Set positions 1 through 3 on "SW1" and positions 1 through 8 on "SW2" for the desired input and range (see Table 1).
2. Set positions 4 and 5 of "SW1" to ON (closed) for a HI trip setpoint or OFF (open) for a LO trip setpoint (Figure 5).
3. Set position 6 of "SW1" to ON for non-failsafe operation or OFF for failsafe operation (e.g., alarm trips upon power failure).
4. Set positions 7 and 8 of "SW1" to upscale or downscale burnout.

### Calibration

1. After configuring the DIP switches, connect the input to a calibrated t/c source and apply power.

Note: For best results, calibration should be performed in the operating environment, mounted on a DIN rail, allowing at least one hour for thermal equilibrium of the system.

2. After applying power to the unit all three LEDs will flash for approximately 10 seconds. Adjust the input signal level for the Relay "A" setpoint. The green LED will be on. Press and hold the CAL button for 4 seconds (until the red LED starts flashing) to enter the calibration mode. The green LED will be on and the red Relay "A" LED will be flashing.

**Note:** If the green LED is flashing, the input is out of range (i.e. 7% above or below the configured range). Check to make sure the input signal is within the DIP switch configuration range. Double check dip switch settings.

3. Setpoint "A": Input the desired trip level for Relay "A" and push the CAL button. The green and the red Relay "A" LED will be flashing. Note that the green LED will stop flashing when the input drops below a high setpoint or rises above a low setpoint.

4. Deadband "A": For minimum deadband (approximately 0.25%), press and hold the CAL button for 4 seconds. For high setpoints lower the input level to the desired deadband point and push the CAL button. For low setpoints increase the input level to the desired deadband level and push the CAL button. The green LED will be on and the red Relay "B" LED will be flashing.

5. Setpoint "B": Input the desired trip level for Relay "B", and push the CAL button. The green and the red Relay "B" LED will be flashing.

6. Deadband "B": For minimum deadband (approximately 0.25%), press and hold the CAL button for 4 seconds. For high setpoints lower the input level to the desired deadband point and push the CAL button. For low setpoints increase the input level to the desired deadband level and push the CAL button. The green LED will be on and both the red LEDs will be flashing.

7. Press the CAL button once again to exit the calibration mode. Check the setpoint and deadband to validate calibration.

**Note:** Pressing and holding the CAL button for >8s or no action for more the 2 min will quit the calibration process without saving changes anywhere within the calibration process.

### Relay Protection and EMI Suppression

When switching inductive loads, maximum relay life and transient EMI suppression is achieved using external protection (see Figures 2 and 3). Place all protection devices directly across the load and minimize all lead lengths. For AC inductive loads, place a properly-rated MOV across the load in parallel with a series RC snubber. Use a 0.01 to 0.1mF pulse film capacitor (foil polypropylene recommended) of sufficient voltage, and a 47 ohm, 1/2W carbon resistor. For DC inductive loads, place a diode across the load (PRV > DC supply, 1N4006 recommended) with (+) to cathode and (-) to anode (the RC snubber is an optional enhancement).

Table 1: Input Range

TC	Input Range	Selector SW2								SW1			
		1	2	3	4	5	6	7	8	1	2	3	
B	0 to 1490; C (32 to 2714); F	■									■	■	
B	0 to 1820; C (32 to 3308); F	■									■	■	■
C	0 to 550; C (32 to 1022); F							■			■	■	■
C	0 to 1000; C (32 to 1832); F							■			■	■	■
C	0 to 2320; C (32 to 4208); F							■			■	■	
E	0 to 150; C (32 to 302); F		■								■	■	
E	0 to 290; C (32 to 554); F		■								■	■	■
E	0 to 660; C (32 to 1220); F		■								■	■	■
E	0 to 1000; C (32 to 1832); F		■								■	■	■
E	-270 to 150; C (-454 to 302); F		■								■	■	
E	-270 to 290; C (-454 to 554); F		■								■	■	■
J	0 to 190; C (32 to 374); F					■					■	■	■
J	0 to 350; C (32 to 662); F					■					■	■	■
J	0 to 760; C (32 to 1400); F					■					■	■	
J	-210 to 190; C (-364 to 374); F					■					■	■	
J	-210 to 350; C (-364 to 662); F					■					■	■	■
K	0 to 250; C (32 to 482); F			■							■	■	
K	0 to 480; C (32 to 896); F			■							■	■	■
K	0 to 1280; C (32 to 2336); F			■							■	■	
K	0 to 1372; C (32 to 2502); F			■							■	■	■
K	-270 to 250; C (-454 to 482); F			■							■	■	■
K	-270 to 480; C (-454 to 896); F			■							■	■	■
N	-200 to 300; C (-328 to 572); F									■		■	
N	0 to 300; C (32 to 572); F									■	■	■	
N	0 to 550; C (32 to 1022); F									■	■	■	■
N	0 to 1300; C (32 to 2372); F									■	■	■	
R	0 to 970; C (32 to 1778); F		■								■	■	■
R	0 to 1690; C (32 to 3000); F		■								■	■	■
R	0 to 1760; C (32 to 3200); F		■								■	■	
S	0 to 1050; C (32 to 1922); F		■								■	■	■
S	0 to 1750; C (32 to 3182); F		■								■	■	■
T	0 to 210; C (32 to 410); F			■							■	■	■
T	0 to 390; C (32 to 734); F			■							■	■	■
T	-270 to 210; C (-454 to 410); F			■							■	■	
T	-270 to 390; C (-454 to 734); F			■							■	■	■

Key: ■ = 1 = ON or Closed

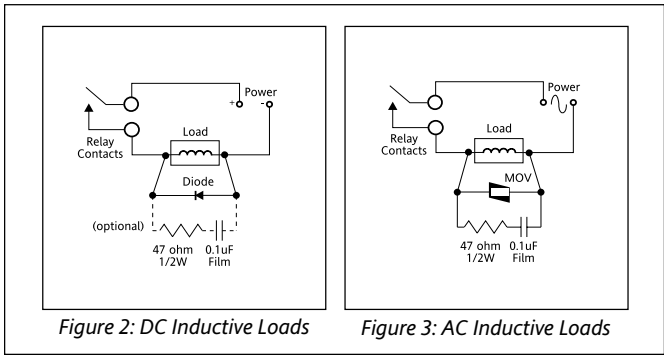


Figure 2: DC Inductive Loads

Figure 3: AC Inductive Loads

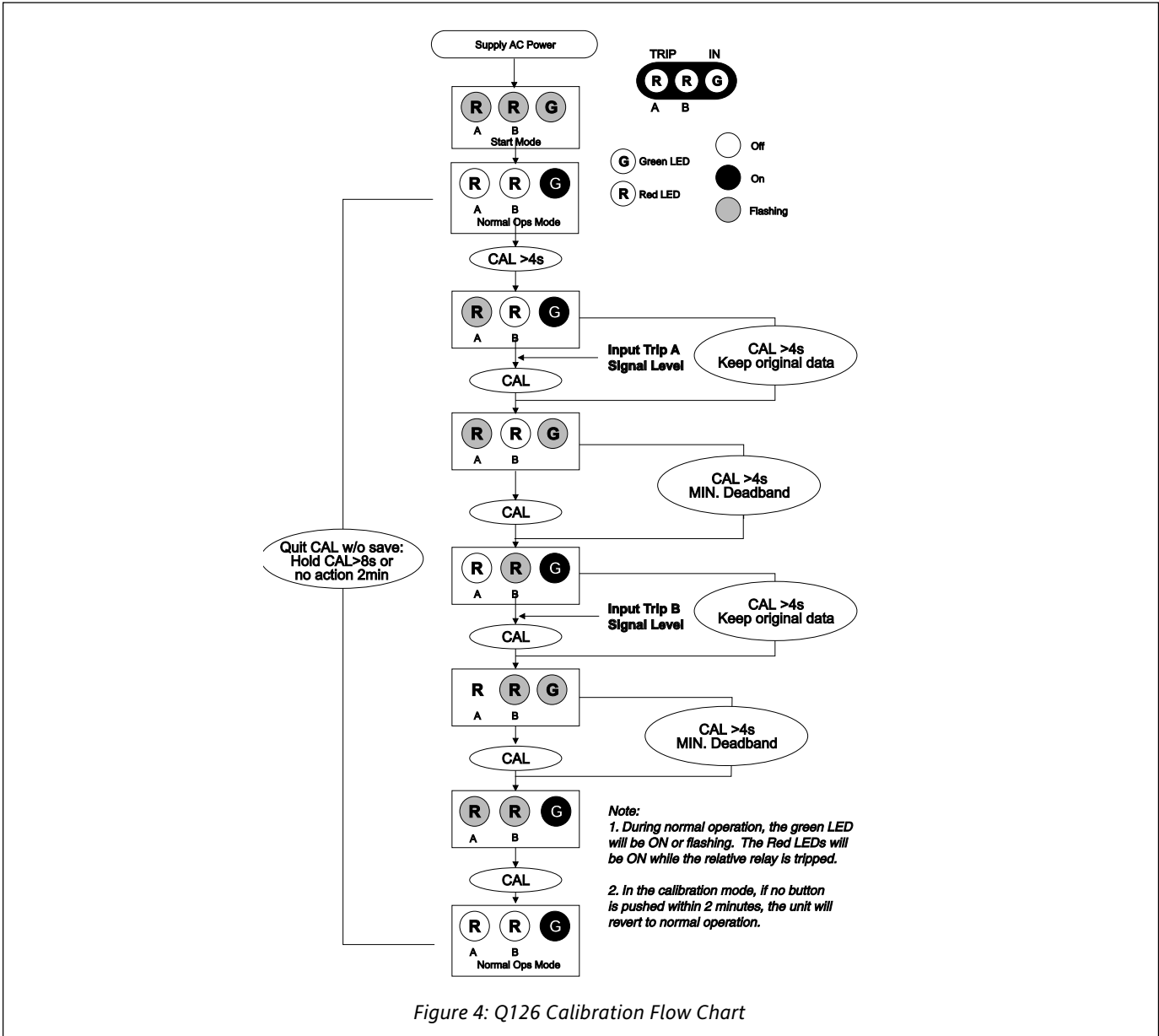


Figure 4: Q126 Calibration Flow Chart

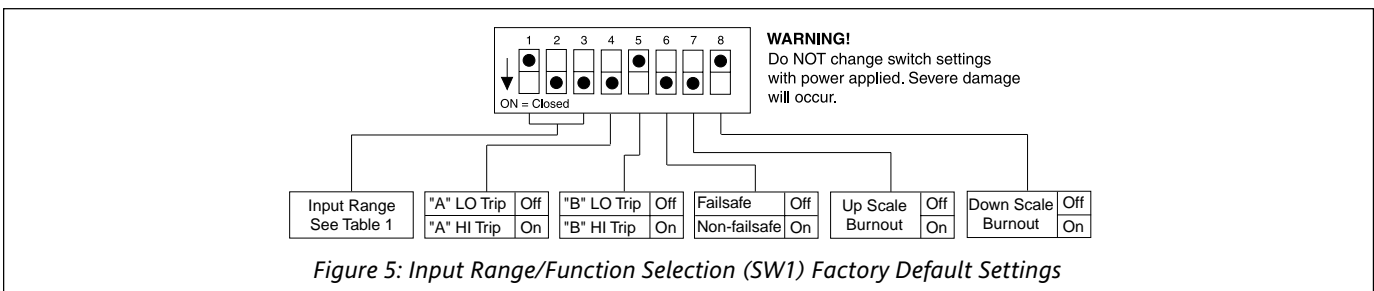


Figure 5: Input Range/Function Selection (SW1) Factory Default Settings

## Specifications

### Inputs:

- Range: See Table 1
- Impedance: >1 Megohm
- Input Bias Current (burnout detect): <1.5 microamp
- Overvoltage: ±10V differential
- Common Mode (Input to Ground): 1800VDC, max.

### LED Indicators:

- Input Range (Green)
  - >110% input: 8Hz flash
  - <-10% input: 4Hz flash
- Setpoint (Red):
  - Tripped: Solid red
  - Safe: off

### Limit Differential (Deadband):

0.25% to 100% of span

### Response Time:

- Dynamic Deadband:
  - Relay status will change when proper setpoint/process condition exists for 100msec
- Normal Mode (analog filtering):
  - <250msec, (10-90%)

### Setpoint:

- Effectivity: Setpoints adjustable over 100% of the selected input span.
- Repeatability (constant temp.):
  - 0.2% for temp > 0°C
  - 0.3% for temp < 0°C

### Stability:

Temperature: ±0.05% of full scale/°C, max.

## Ordering Information

### Models & Accessories

#### Specify (model number)

- 1) **Q126-0000**
- 2) Specify I/QRail type and quantity (required)
- 3) Accessories: (see Accessories)
- 4) Optional Custom Factory Calibration: Specify **C620** with desired input, setpoint and deadband.

### Accessories

Action/Q series 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
- IQRL-2002** 2 Position I/QRail & DIN rail
- IQRL-2004** 4 Position I/QRail & DIN rail
- IQRL-2008** 8 Position I/QRail & DIN rail

Terminal	Connection	Terminal	Connection
A1	Relay A, N.O.	C3	Not Used
A2	Relay A, Common	C4	Not Used
A3	Relay A, N.C.	C5	Thermocouple Input (-)
A4	Relay B, N.O.	C6	Thermocouple Input (+)
A5	Relay B, Common	P1	AC Power (Hot)
A6	Relay B, N.C.	P2	Not Used
C1	Not Used	P3	Not Used
C2	Not Used	P4	AC Power (Neutral)

### Common Mode Rejection:

DC to 60Hz: 120dB

### Isolation:

1800VDC between contacts, input and power

### ESD Susceptibility:

Capable of meeting IEC 801-2 level 3 (8kV)

### 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: -15 to 70°C (5 to 158°F)

### Power:

2.5W max. 100 to 240VAC ±10%, 50 to 400Hz

### Relay Contacts:

2 SPDT (2 Form C) Relays, 1 Relay per setpoint

Current Rating (resistive):

120VAC: 5A; 240VAC: 2A; 28VDC: 5A

Material: Gold flash over Silver alloy

Electrical Life: 10<sup>5</sup> operations at rated load

*Note: External relay contact protection is required for use with inductive loads.*

Mechanical Life: 10<sup>7</sup> operations

### Wire Termination:

Screw terminations for 12-22 AWG

### Weight:

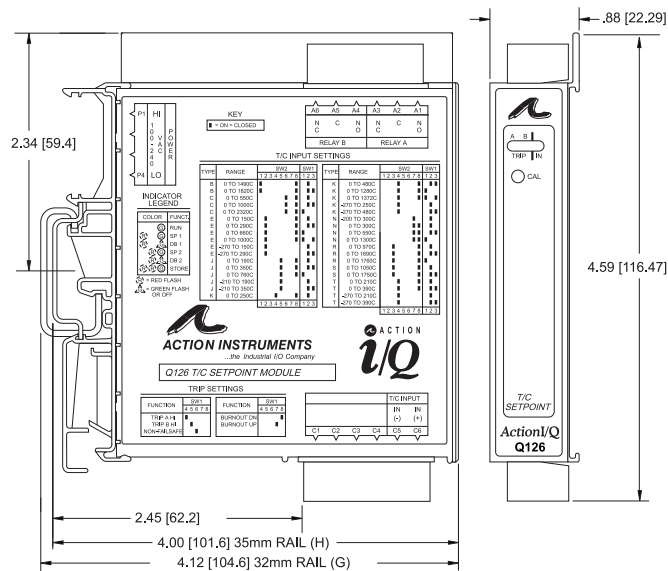
0.56lbs.

### Agency Approvals:

CSA certified per standard C22.2 (File No LR 42272).

UL recognized per standard UL 508 (File No E99775).

## Dimensions



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## Factory Assistance

For additional information on calibration, operation and installation contact our Technical Services Group:

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