

Specifications

Inputs:

- Voltage Input:
 Range: 10mV to 200V
 Impedance: >100Kohms
 Overvoltage: 400V, max
- Current Input:
 Range: 1mA to 100mA
 Impedance: 20ohms, typical
 Overcurrent: 200mA, max
 Overvoltage: 60VDC
- Common Mode (Input to Ground):
 1000VDC, max

LED Indications:

- Input Range (Green)
 >100% input: 8Hz flash
 <0% input: 4Hz flash
- Setpoint (Red)
 Tripped: Solid red
 Safe: Off

Limit Differential (Deadband):

- >50mV/5mA: 0.25% to 50% of span
 <50mV/5mA: 1% to 50% of span

Response Time:

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

Setpoint:

- Effectivity:
 Setpoints are adjustable over 100% of the selected input span.
- Repeatability (constant temp):
 >50mV/5mA: 0.1% of full scale
 <50mV/5mA: 0.2% of full scale

Stability:

- Line Voltage: $\pm 0.01\%$, max.
 Temperature: $\pm 0.05\%$ of full scale/ $^{\circ}$ C, max.

Common Mode Rejection:

- DC to 60Hz: 120dB

Isolation:

- 1000VDC between contacts, input & power

ESD Susceptibility:

- Meets IEC 801-2, Level 2 (4KV)

Humidity:

- Operating: 15 to 95% (@45 $^{\circ}$ C)
 Soak: 90% for 24 hours (@65 $^{\circ}$ C)

Temperature Range:

- Operating: 0 to 60 $^{\circ}$ C (32 to 140 $^{\circ}$ F)
 Storage: -15 to 70 $^{\circ}$ C (5 to 158 $^{\circ}$ F)

Power:

- Consumption: 2W typical, 5W max.
 Standard:
 Selectable 120/ 240VAC ($\pm 10\%$, 50-60Hz)
 Optional:
 9 to 30VDC, Inverter-Isolated

Relay Contacts:

- SMSL-1: DPDT (2 Form C)
 SMSL-2: 1 SPDT (1 Form C) per setpoint
 Current Rating (resistive)
 120VAC: 5A; 240VAC: 2A; 28VDC: 5A
 Material: Silver-Cadmium Oxide
 Electrical Life: 10⁵ operations at rated load
 Note: External relay contact protection is required for use with inductive loads. See relay protection section (Fig 2 & 3).
 Mechanical Life: 10⁷ operations

Latch Reset Time:

- 5 seconds

Weight:

- AP1080: 0.46lbs; AP1090: 0.62lbs

Agency Approvals:

- UL recognized per standard UL508, (File No. E99775)

Pin Connections

- 1 AC Power (Hot)
- 2 No Connection
- 3 AC Power (Neu)
- 4 Input (+)
- 5 Input (-)
- 6 (A) N.O.
- 7 (A) C
- 8 (A) N.C.
- 9 (B) N.O.
- 10 (B) C
- 11 (B) N.C.

Key:

- N.O. = Normally Open
 C = Common
 N.C. = Normally Closed
 DC Power: Pin 1 = (+)
 Pin 3 = (-)

*Contacts are in the "normal" state when the relay is de-energized.



SMLA Series DC Input, Field Configurable Limit Alarms

INSTRUCTION SHEET

M5484/0715

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 For latest product manuals: www.omegamanual.info

Provides Relay Contact Closures
 at a Preset DC Input Level

- Field Configurable Input Ranges for DC Voltage and Current
- Exclusive "Dynamic Deadband" Prevents False Trips
- Setpoints Programmable HI or LO
- Selectable Failsafe/Latching Operation
- Selectable 120/240VAC Input Power (9 to 30 VDC Available)

Description

Models SMLA-1 single setpoint and SMLA-2 dual setpoint limit alarms offer flexible, wide-ranging DC input capability. Voltage spans from 10mV to 200 volts and current spans from 1mA to 100mA can be field configured. Bipolar inputs are also accepted. Both models offer configurable latching, failsafe and HI/LO operation. The SMLA-1 and SMLA-2 also include 0.25%-50% adjustable deadbands and selectable 120/240VAC input power.

Diagnostic LED

Models SMLA-1 and SMLA-2 are equipped with a dual function diagnostic LED. The green center LED indicates line power and input signal status. Active line power is indicated by an illuminated LED. If the center LED is off, check line power and the wiring connection. If the input signal is above 100% full scale, the LED will flash at approximately 8Hz. Below 0%, the flash rate is approximately 4Hz.

Output Selection

The single setpoint SMLA-1 and the dual setpoint SMLA-2 provide the following relay outputs:

- SMLA-1 Single Trip (DPDT, 5A)
 SMLA-2 Single/Dual Trip (2 SPDT, 5A)

Setpoints are top accessed multi-turn potentiometers or option "P" provides top mounted ten-turn dials.

Operation

The field configurable SMLA-1 and SMLA-2 limit alarm setpoints can be configured for HI, LO, latching or failsafe trip operation. Non-latching HI and LO setpoints have respective HI and LO deadbands. In a tripped condition, the setpoint is exceeded and the appropriate red LED will illuminate. The trip will reset only when the process falls below the HI deadband or rises above the LO deadband (see figure 1). To reset a latched setpoint the signal must be in the safe region and the line power turned off for at least 5 seconds. For proper deadband operation, a HI setpoint must always be set above a 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, the relays go to the tripped condition when the power fails.

Dynamic Deadband

The input must remain 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 effectively results in a "dynamic deadband" - based on time - in addition to the normal deadband.

Options

- U Urethane coating of internal circuitry for protection from corrosive atmospheres.
 P Top Mounted, Ten-Turn Dial(s) for setpoint adjustment.

C620 Factory calibration to input range, setpoints and output relays. Not available with option P.

Configuration

The factory presets models SMLA-1 and SMLA-2 as follows:

	SMLA-1	SMLA-2
Input	0-20mA	0-20mA
Output	Single, DPDT	Dual, SPDT
Trip	HI	A: HI, B: LO
Latching	No	No
Failsafe	Yes	No
Deadband	0.25%	A/B: 0.25%
Power	120VAC	120VAC

For other I/O ranges, remove the four base screws and case to access the configuration switches.

Replace the cover before applying power.

Refer to Figure 5 for switch locations.



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The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY RETURNS**, please have the following information available BEFORE contacting OMEGA.
 1. Purchase order number which the product was PURCHASED,
 2. Model and serial number of the product under warranty, and
 3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY RETURNS**, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA.
 1. Purchase Order number to cover the COST of the repair,
 2. Model and serial number of the product and
 3. Repair instructions and/or specific problems relative to the product.

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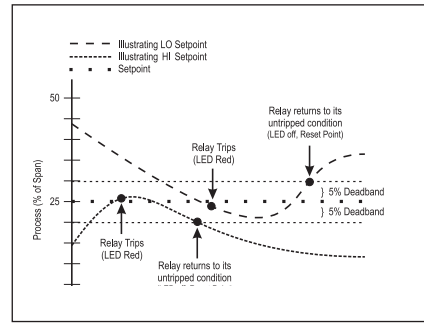


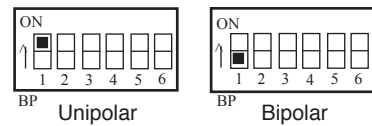
Figure 1: Limit alarm operation and effect of deadband.

Input

1. Position input jumper "W2" for Current or Voltage inputs.



2. Set position 1 of the Mode Selector for Unipolar or Bipolar operation. Unipolar is the default.



Note: A bipolar span selection will double any span from Table 1 (e.g., 10V unipolar span = ±10V bipolar span)

3. Using Table 1, configure positions 1 through 4 of the Input Range Selector for the desired maximum setpoint input. Round desired maximum input values to the next highest range (e.g., 0-120V = 200V range).

Output

Configure the Mode Selector for the required function. See Figure 6.

Power

Configure the AC jumpers for either 120 or 240 VAC operation. See Figure 4.

Calibration

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

Setpoint: Set deadband at its minimum (factory default - 20 turns Counter Clockwise) before adjusting the setpoint. With the specified trip voltage or current input applied, adjust setpoint until the relay trips. For HI trip calibration, start with the setpoint above the desired trip. For LO trip calibration, start below the desired trip.

Deadband: Set deadband to its minimum (factory default - fully CCW). Set setpoint to desired trip. Adjust voltage/current input until relay trips. Readjust deadband to 50% (20 turns CW). Set voltage/current input to desired deadband position. Slowly adjust deadband until relay untrips.

Note that Custom Calibration (option C620) is available from the factory (settings **MUST** be within specifications):

a) Setpoint A: Type (HI/LO); Units (mA, mV, V); Deadband (%)

b) Setpoint B (SMLA-2 only): Type (HI/LO); Units (mA, mV, V); Deadband (%)

c) Latching (ON/OFF)

d) Failsafe (ON/OFF)

Note that if a deadband entry is not specified, the default entry will be used.

Relay Protection and EMI Suppression

When switching inductive loads, maximum relay life and transient EMI suppression is achieved using external protection (see Figures 2 & 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 47ohm, 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).

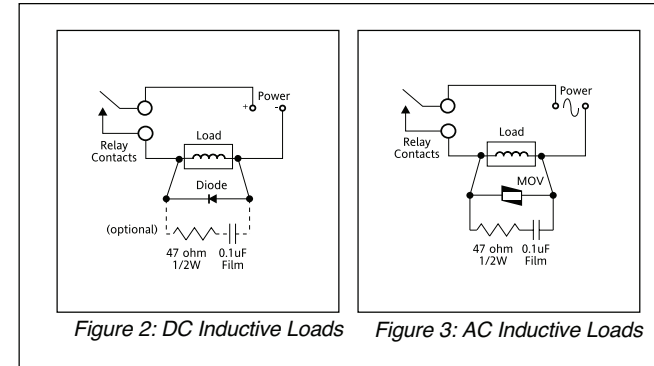


Figure 2: DC Inductive Loads Figure 3: AC Inductive Loads

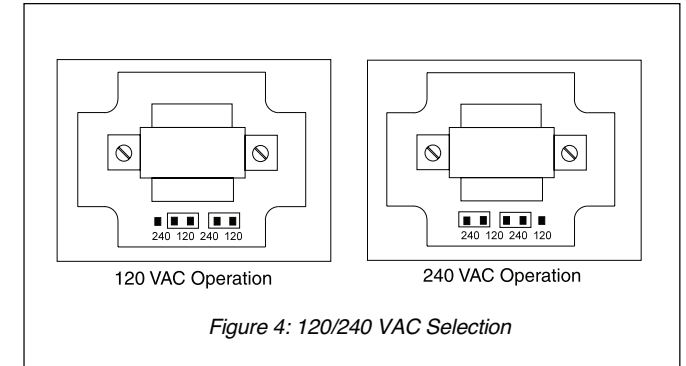


Figure 4: 120/240 VAC Selection

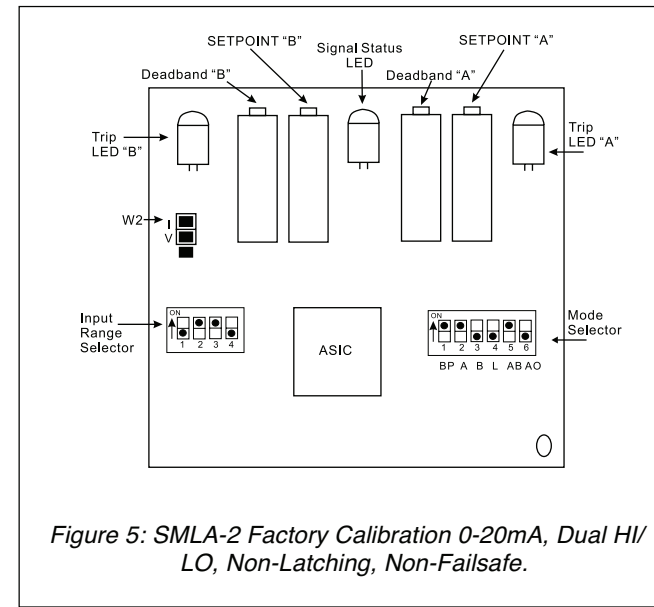


Figure 5: SMLA-2 Factory Calibration 0-20mA, Dual HI/LO, Non-Latching, Non-Failsafe.

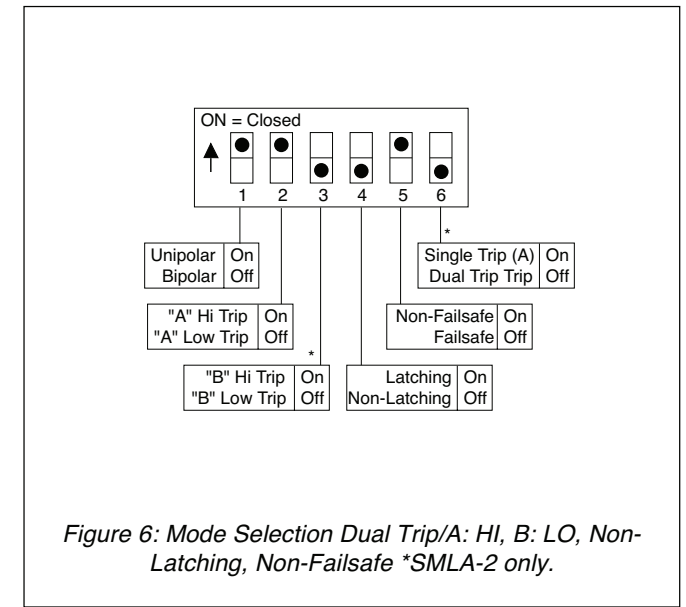


Figure 6: Mode Selection Dual Trip/A: HI, B: LO, Non-Latching, Non-Failsafe *SMLA-2 only.

Table 1: SMLA-1 and SMLA-2 Input Ranges

TC Type	Temperature Range	SW1	SW2
E	0 to 150°C (32 to 302°F)	[Switch Icon]	[Switch Icon]
E	0 to 290°C (32 to 554°F)	[Switch Icon]	[Switch Icon]
E	0 to 660°C (32 to 1220°F)	[Switch Icon]	[Switch Icon]
E	0 to 1000°C (32 to 1832°F)	[Switch Icon]	[Switch Icon]
E	-270 to 150°C (-454 to 302°F)	[Switch Icon]	[Switch Icon]
E	-270 to 290°C (-454 to 554°F)	[Switch Icon]	[Switch Icon]
J	0 to 190°C (32 to 374°F)	[Switch Icon]	[Switch Icon]
J	0 to 360°C (32 to 680°F)	[Switch Icon]	[Switch Icon]
J	0 to 760°C (32 to 1400°F)	[Switch Icon]	[Switch Icon]
J	-210 to 190°C (-346 to 374°F)	[Switch Icon]	[Switch Icon]
J	-210 to 360°C (-346 to 680°F)	[Switch Icon]	[Switch Icon]
K	0 to 250°C (32 to 482°F)	[Switch Icon]	[Switch Icon]
K	0 to 480°C (32 to 896°F)	[Switch Icon]	[Switch Icon]
K	0 to 1230°C (32 to 2246°F)	[Switch Icon]	[Switch Icon]
K	0 to 1372°C (32 to 2501°F)	[Switch Icon]	[Switch Icon]
K	-270 to 250°C (-454 to 482°F)	[Switch Icon]	[Switch Icon]
K	-270 to 480°C (-454 to 896°F)	[Switch Icon]	[Switch Icon]
R	0 to 970°C (32 to 1778°F)	[Switch Icon]	[Switch Icon]
R	0 to 1690°C (32 to 3074°F)	[Switch Icon]	[Switch Icon]
R	0 to 1760°C (32 to 3200°F)	[Switch Icon]	[Switch Icon]
S	0 to 1050°C (32 to 1922°F)	[Switch Icon]	[Switch Icon]
S	0 to 1760°C (32 to 3200°F)	[Switch Icon]	[Switch Icon]
T	0 to 210°C (32 to 410°F)	[Switch Icon]	[Switch Icon]
T	0 to 390°C (32 to 734°F)	[Switch Icon]	[Switch Icon]
T	-270 to 210°C (-454 to 410°F)	[Switch Icon]	[Switch Icon]
T	-270 to 390°C (-454 to 734°F)	[Switch Icon]	[Switch Icon]

*Note: Use Jumper (W2) to configure either voltage or current input. All unipolar input ranges are zero based.

