



# OPERATING SPECIFICATIONS SEM1401

## LOOP POWERED TRIP AMPLIFIER

### 1.0 DESCRIPTION

The SEM1401 is a loop powered trip alarm designed to accept a 4-20 mA signal from a transmitter and to provide a single trip output. By utilizing the loop power, no separate supply is required to power the trip alarm. In turn, wiring is simplified and costs are reduced.

Its small size and the line rated relay contacts make it the ideal choice for many trip alarm applications.

### 2.0 SPECIFICATION @ 20°C

#### 2.1 SEM1401

##### INPUT

TYPE	Two wire 4-20 mA, 50 mA Max
PROTECTION	Reverse connection protected
LOOP DROP	5 V max

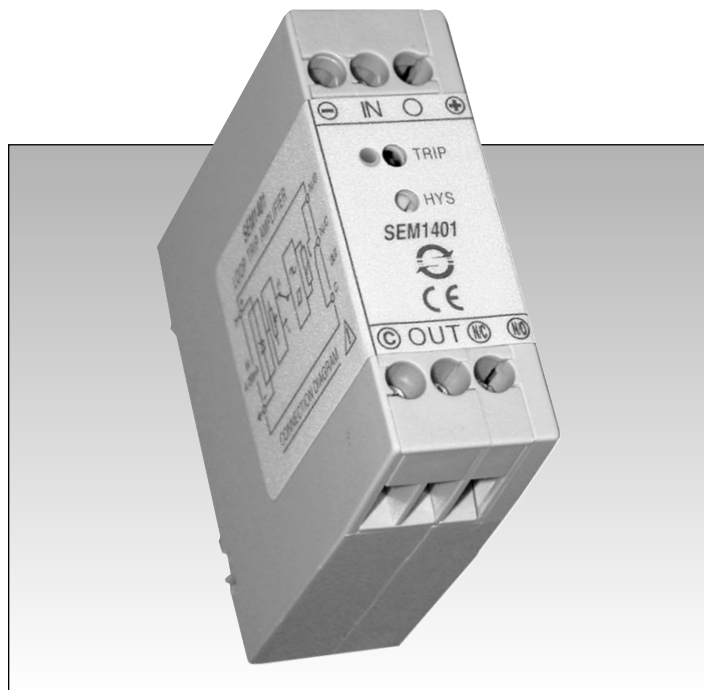
##### OUTPUT

ALARM	HIGH or LOW level, switch selected, side entry
CONTACT	Single Relay Changeover with N/O / N/C contacts available
RATING	Resistive Load 2A @ 250V AC/125V DC
INDICATION	Alarm LED on module front face
SETPOINT	0 - 100% multi turn potentiometer, access on module front face (Repeatability $\pm 0.2\%$ )
HYSTERESIS	0.1 - 5% Single turn trim pot on module front face
DELAY	0.5 second fixed delay
FAILURE MODE	On loss of signal: HIGH level No alarm condition LOW level alarm condition (i.e. Alarm operates as if signal has fallen to -25% or 0 mA)

MINIMUM CURRENT	3.5 mA
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#### 2.2 General Specifications

ISOLATION	3000V AC rms between contacts and input 1000V AC rms between contacts
AMBIENT	0-50°C; 10-95% RH non condensing
CONNECTION	Captive clamp screws
CABLE SIZE	4mm sq. solid / 2.5mm sq stranded
CASE MATERIAL	Grey Polyamide
CASE FLAMMABILITY	To UL94-V0 VDE 0304 pt3 level 111A
DIMENSIONS	60 x 60 x 21mm (67.5mm above rail)
MOUNTING	Snap on top hat (DIN EN 50022-35)
MAX VIBRATION	12G 10 to 55 Hz at double amplitude 2mm
SHOCK RES	12G
COMPLIANT WITH	EN50081-1, EN50082-1
WEIGHT	100 grams



### 3.0 INSTALLATION

#### WARNING:

Hazardous voltages may be present on the terminals - the equipment must be installed by suitably qualified personnel and mounted in a enclosure providing protection to at least IP20.

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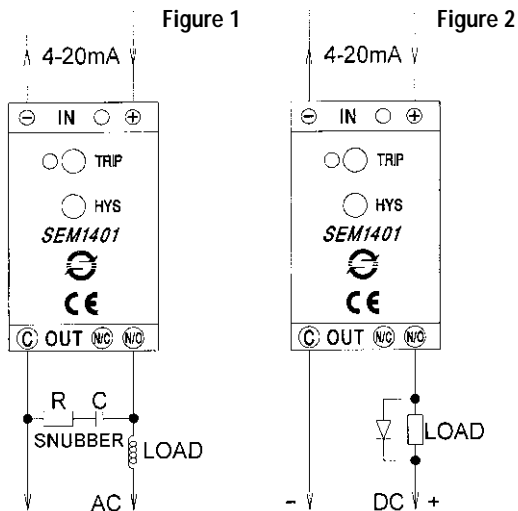
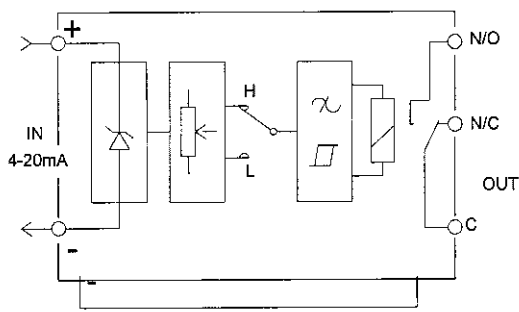
If not installed and used in accordance with these instructions, protection against hazards may be impaired.

(IMPORTANT NOTE: It may be preferred to set the user adjustment on the bench prior to installation. Please read Section 4 before installation).

#### 3.1 Mechanical

This trip must be housed within a suitable enclosure that will provide protection from the external environment, to ensure that the stated temperature and humidity operating ranges are maintained. As SEM1401 contains a high quality relay, care must be taken to ensure the trip is not subjected to strong shock or vibration, as this may result in momentary opening of the relay contacts. The SEM1401 must not be located near a strong magnetic field, such as a transformer, solenoid or electric motor.

The SEM1401 case is designed to snap fit onto a standard "TOP HAT" DIN rail. To remove from DIN rail, apply pressure at the bottom face of the back upwards towards the rail to release the spring clip and tip away from the top. The trip may be mounted in any orientation and stacked side by side along the rail.



### 3.2 Electrical

Connections to the trip are made via screw terminals, with wire protector provided inside each terminal. To maintain CE compliance, twisted pair (screened) cables are recommended for signal connections. It is also good practice to ensure that all 4-20 mA loops are grounded at a single point. Before installation ensure the 4-20 mA loop has enough voltage available to drive the trip. Refer to the previous specification for the loop voltage drop. The change over contacts provided by the SEM1401 are capable of switching 250V AC 125V DC @ 2 A resistive load, 150 Watts inductive load. Internal Varistors are connected across the contacts to protect against over voltage. It is advised that an external R/C snubber network is used when switching inductive AC loads (see Fig. 1). When switching DC inductive loads, a diode connected in parallel with the inductor must be used to protect the contacts from the energy stored in the inductor (see Fig. 2).

Installation overvoltage category 2 (as per BS EN61010-1)

- If this equipment is to be used in environments with overvoltage category 3, transient suppressors should be installed on wiring carrying greater than 50V AC or 75V DC.
- Any power supply to the equipment greater than 50V AC or 75V DC must be protected by a suitable fuse and a switch or circuit breaker which should be near the equipment.
- The equipment contains no user serviceable parts.

### 4.0 ALARM TRIP SETUP

#### NOTE:

Latching relay are used in the production conjunction with an advanced relay drive circuit. During commissioning, on initial power up, or after switch settings have been modified, one trip operation must be completed in order to synchronize the latching relay(s). Once this cycle has been completed the unit will function correctly during normal operation cycles. On power down the trip contacts will reset as for a -25% (0 mA) process value and take this state indefinitely until power up. The initial power up cycle will only be required again if the unit switch settings are changed, or the unit is removed from the installation and is subjected to shocks greater than 12G, i.e. during transit.

This section deals with the trip setup. Three adjustments are available to the user:

- High/Low alarm selection switch located on the side of the trip.
- Setpoint adjustment - 15 turn front panel potentiometer provides 0-100% setpoint range.
- Hysteresis adjustment - single turn potentiometer located on front panel provides 0.1 - 5% setpoint hysteresis. Hysteresis is provided to stop relay chatter at the trip point, the amount of hysteresis required will be dependent on the process signal noise.

A red LED indicates alarm state ON.

With care, the SEM1401 trip setpoint may be set up in the process but the task is greatly simplified by replacing the process signal with an adjustable 4-20 mA current source, to simulate the 4-20 mA process signal.

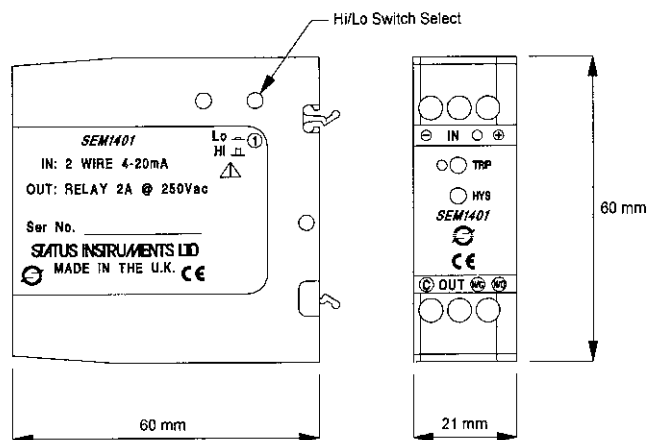
The set up process is as follows:

- First decide on the type of trip required, "High" for alarm ON state above setpoint, or "Low" for alarm ON state below setpoint. Set the High/Low alarm selection switch on the side of the enclosure to the desired setting by inserting a 3mm blade screwdriver into the hole and apply one press against the switch plunger. This will toggle the switch between the two alarm settings being:
  - High alarm state - plunger out (flush with the enclosure inside face)
  - Low alarm state - plunger in (depressed below inside face)
- Using a 3mm screwdriver, turn the Hysteresis control full anti-clockwise to set the hysteresis to 0.1%.
- Set the process current to the desired trip alarm setting, then using a 3mm screwdriver, adjust the setpoint until the alarm changes state. Clockwise to increase, anti-clockwise to decrease. Adjust the set point backwards and forwards until it is positioned at the point at which the alarm LED has just come on.
- Set the hysteresis control to the desired value, as a guide fully clockwise sets 5%, mid position 2.5%.
- Now raise and lower the process input signal about the trip setting and ensure the alarm trips at setpoint and trips off at setpoint plus (minus) hysteresis. If required, fine adjust settings.
- Now fully operate the system, it may be found necessary to adjust the hysteresis setting during operation depending upon the fluctuation or noise present on the process signal.

### 5.0 OPERATION

Once setup and operating satisfactorily, the trip amplifier requires no further user adjustments.

### 6.0 MECHANICAL DETAIL



Every effort has been taken to ensure the accuracy of this specification, however we do not accept responsibility for damage, injury, loss or expense resulting from errors and omissions, and we reserve the right of amendment without notice.

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