

# SEM1100

## POWERED ISOLATING CONVERTOR

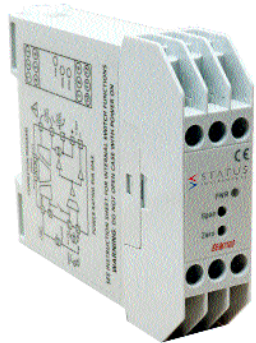
Designed, manufactured and supported by:



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Stock code 51-214-2167-02



### 2.0 SPECIFICATION

**WARNING!** Operation outside the stated maximum values may result in the failure of the transmitter.

**SUPPLY**  
Range Option S1 (90 to 253) VAC (50 to 60) Hz  
Option S2 (20 to 35) VDC  
(22 to 28) VAC (50 to 60) Hz

Power Consumption 4 Watts maximum  
Protection Internal Fuse Rating 500 mA (T)

INPUT		
Current	(0 to 20) mA	(4 to 20) mA (40 mA max)
Voltage	(0 to 100) mV	(20 to 100) mV 20 V max
	(0 to 1) V	(2 to 1) V 20 V max
	(0 to 5) V	(1 to 5) V 20 V max
	(0 to 10) V	(2 to 10) V 20 V max

Selection Internal switches  
Input Impedance Current <50 Ω  
Voltage >1 M Ω  
Protection Reverse connection, over voltage  
Loop Supply 25 V DC @ 25 mA maximum (27 V maximum)

**OUTPUT**  
Type Current\*1 (0 to 20) mA / (4 to 20) mA  
Powered externally, Vloop 30 V max  
Voltage\*1(0 to 1) V\*2; (0.2 to 1) V\*3  
(0 to 5) V\*2; (1 to 5) V\*3  
(0 to 10) V\*2; (2 to 10) V\*3  
Load (0 to 1) kW Current output  
5 mA max current drive Voltage output  
Linearity 0.05 %  
Stability 0.015%/°C  
Response time <100 mS to reach 70 % of final value

Notes  
\*1 Current and voltage outputs are not isolated from each other  
\*2 Available simultaneously with (0 to 20) mA output  
\*3 Available simultaneously with (4 to 20) mA output

**GENERAL**  
Isolation/Input/ Output 500 V DC (flash tested@1 kV) input to output  
Isolation/Supply 3 kV DC to input or output  
Mounting DIN- EN 50022-35 or surface mount  
Ambient (0 to 50) °C; (10 to 95)% RH non condensing  
Connection Captive terminal screws  
Cable size 1 mm<sup>2</sup> diameter wire  
Flammability UL94: V-0 ; VDE0304 STEP 11b  
Dimensions (82 x 22.5 x 99) mm  
EMC BSEN 61326  
Electrical Safety BSEN 61010-1  
Installation over voltage category II  
Pollution Degree II

### 3.0 INSTALLATION

#### THIS SECTION FOR USE BY COMPETENT PERSONNEL ONLY

#### **WARNING READ SAFETY INFORMATION BELOW BEFORE WIRING**

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

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

- The mains power supply to the equipment must be protected by a suitable fuse and switch (or circuit breaker) which should be near the equipment.
- The equipment contains no user serviceable parts.

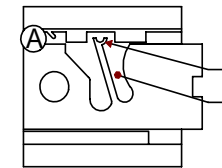
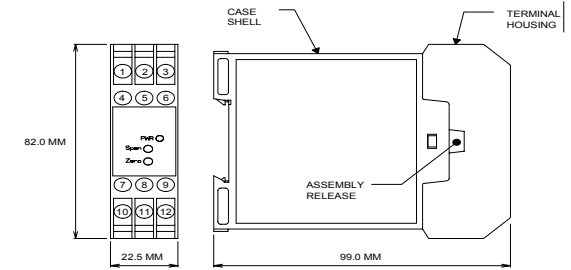
### ISOLATION

The power supply terminals and associated internal circuitry are isolated from all other parts of the equipment in accordance with BS EN61010-1 for connection to a Category II supply.

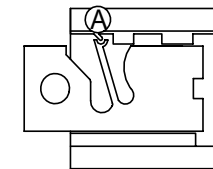
Functional isolation (500 VDC max) is provided between input and output circuits.

Any terminals or wiring connected to the input or output terminals which are accessible in normal operation must **ONLY** be connected to signals complying with the requirements for safety extra low voltage (SELV) circuits.

#### 3.1 MECHANICAL



Non Din rail attachment Latch to locate slide out mounting feet. Insert screwdriver and twist anticlockwise to allow latch to pass mounting and rest at position (A), repeat for other foot.



This view shows feet in screw mounting position.

Figure 2

This transmitter must be housed within an enclosure that will provide suitable protection against the external environment, ensuring that the stated operational ambient temperature, humidity and pollution levels are not exceeded. It is good practice to mount the transmitter away from sources of electrical noise, such as switch gear and large transformers. Although the transmitter has an excellent temperature stability, best performance will be maintained with a stable ambient temperature. The transmitter can be mounted in any orientation and stacked side by side. (Note. Each transmitter can dissipate up to 4 watts of power in the form of heat, dependent on external loading. If a number of transmitter are to be mounted inside an enclosure, adequate ventilation must be provided).

#### 3.2 Electrical

Connections to the transmitter are made via screw terminals, with wire protection plates provided on each terminal. To maintain CE compliance twisted pair (screened) cables are recommended for the signal connections. It is good practice to ensure all signal loops are grounded at one point. Care must be taken when designing a (4 to 20) mA circuit to ensure that the total burden of the loop (that is the total voltage requirement of all the

equipment connected in the loop at 20 mA) does not exceed the loop power supply voltage. The transmitter is protected against reverse connection and over voltage.

#### 4.0 CONFIGURATION

The Isolator leaves the factory calibrated for the input output ranges specified at time of order, if no ranges have been specified then the isolator range will be (4 to 20) mA in and out. If required the isolator ranges may be changed by the installer, provided access is available to suitable calibration equipment in order to simulate the required input/output signals. Configuration and calibration are best carried out prior to installation. The isolator is configured by means of internal switches.

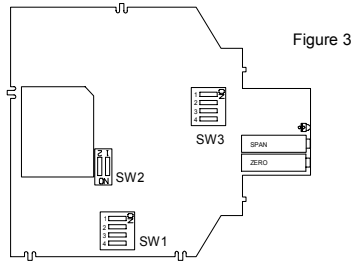
- WARNING!** Extreme caution must be exercised when replacing the terminal housing. Align holes in front panel with trim pots and LED within. Failure to do so may cause the installer to wire the unit incorrectly.
- WARNING!** Incorrect connection of mains will result in total destruction of circuit board, making warranty void. Refer to Section 4.1

#### 4.1 Configuration

**WARNING!** Mains power may be present. NEVER open the isolator case when powered. Follow steps 1-4 to gain access to the internal configuration switches.

Refer to Section 5.0 diagram.

1. Disconnect from all power sources.
2. Insert screwdriver to release clips either side of case.
3. Slide terminal housing assembly forward to reveal circuit board and configuration switches.
4. To identify switches read PCB copper text for SW1, SW2 and SW3
5. To reassemble push circuit card back into shell (using clips provided) and clip into place.



The tables listed below show the required switch positions for the desired input and output. Re-assemble case ready for calibration.

#### 4.1.1 VOLTAGE INPUT (Using input connections 11 & 12)

INPUT	SW1				SW2	
	1	2	3	4	1	2
(0 to 100) mV	off	off	off	off	off	off
(20 to 100) mV	off	off	off	on	off	off
(0 to 1) V	on	off	off	off	off	off
(0.2 to 1) V	on	off	off	on	off	off
(0 to 5) V	off	on	off	off	off	off
(1 to 5) V	off	on	off	on	off	off
(0 to 10) V	off	off	on	off	off	off
(2 to 10) V	off	off	on	on	off	off

#### 4.1.2 CURRENT INPUT, POWERED BY ISOLATING CONVERTOR (Using input connections 7 & 12)

INPUT	SW1				SW2	
	1	2	3	4	1	2
(4 to 20) mA	on	off	off	on	on	on
(0 to 20) mA	on	off	off	off	on	on

#### 4.1.3 CURRENT INPUT, POWERED EXTERNALLY (Using input connections 11 & 12)

INPUT	SW1				SW2	
	1	2	3	4	1	2
(4 to 20) mA	on	off	off	on	on	off
(0 to 20) mA	on	off	off	off	on	off

#### 4.1.4 ALL OUTPUTS

OUTPUT	SW3			
	1	2	3	4
(0 to 1) V & (0 to 20) mA	x	off	off	off
(0.2 to 1) V & (4 to 20) mA	x	off	off	on
(0 to 5) V & (0 to 20) mA	x	on	off	off
(1 to 5) V & (4 to 20) mA	x	on	off	on
(0 to 10) V & (0 to 20) mA	x	on	on	off
(2 to 10) V & (4 to 20) mA	x	on	on	on

X= Doesn't Matter

#### 4.2 CALIBRATION

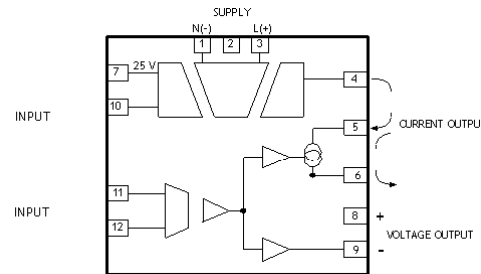
**WARNING!** For safety reasons NEVER calibrate with the case open. Mains power may be present

- Refer to section 5.0 for connection details. Connect a suitable calibrator to the input to simulate the input signal. Monitor the output with either a digital volt or mA meter. Connect the isolator to a suitable supply. Turn power on and allow 2 minute warm-up period.

Note. Due to the current output stage not being capable of drawing negative currents, (0 to 20) mA output must be calibrated at 1 mA and 20 mA scale points. This will ensure the correct setting of VR1.

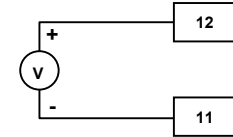
- Set input to low scale, adjust ZERO potentiometer for correct low scale output  $\pm 0.02\%$ .
- Set input to high scale, adjust SPAN potentiometer for correct high scale output  $\pm 0.02\%$ .
- Repeat steps b. and c. until both points are in scale.
- If transmitter will not calibrate correctly, turn off power, open case and check internal switches
- End of calibration, turn off power and remove calibration equipment.

#### 5.0 CONNECTIONS

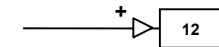


#### 5.1 INPUT CONNECTIONS

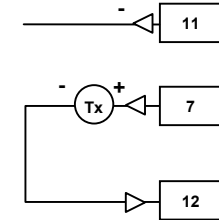
5.1.1 VOLTAGE



5.1.2 CURRENT (Existing Current Loop)

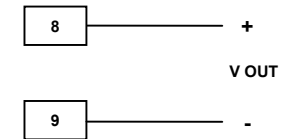


5.1.3 CURRENT (SEM1100 supplies loop power)

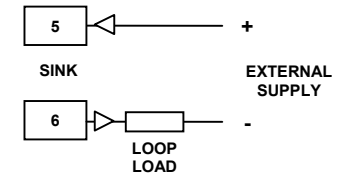


#### 5.2 OUTPUT CONNECTIONS

5.2.1 VOLTAGE



5.2.2 CURRENT SINK (External loop supply)



5.2.3 CURRENT OUTPUT (SEM1100 drives loop)

