SENSORTECH

TX600
Circular Transmitter Board for Infrared Gas Sensors

FEATURES

- Configured for the SGX Sensortech IR600 Series Infrared Gas Sensor Heads for Hazardous Areas.
- Configurable ranges and gas types.
- Linear output 4 - 20 mA, with gas concentration.
- Designed for fixed head systems in explosion-proof enclosures.
- Wide input voltage supply range.
- Low power.
- Internal fault monitoring.
- Small size.
- Simple calibration.
- Switchable temperature compensation.
- Compatible with the SGX Sensortech DX600 display/calibration board.

INTRODUCTION

The SGX Sensortech TX600 linear transmitter is designed for use with a fixed head gas detection system which incorporates an IR600 Series Infrared Gas Sensor.

The response of active and reference wavelength detectors within the sensor are monitored by the TX600 transmitter and the data analysed to improve accuracy and stability. This means that errors caused by any optical obscuration or changes in the sensor's infrared source intensity over time are substantially reduced.

All sensor driving is internal to the TX600 transmitter and full fault monitoring of the sensor and TX600 transmitter is continuous.

Linearisation of the TX600 output is performed on-board without the need for user adjustment. The TX600 transmitter must be calibrated to give full-scale output when the sensor is exposed to default full-scale gas concentration. The sensitivity may then be adjusted to enable an alternate full-scale gas concentration to be set without compromising linearity.

The use of no moving parts enhances the reliability of the sensor.

Connection to the IR600 sensor is via a 4 x 2-way HE 14 crimp pin connector. Connections for the input power supply and output are via screw terminals. The TX600 transmitter is calibrated for 4 - 20mA output assuming a 100 Ω load resistance across current output and GND terminals.

IR600 Series sensor and TX600 transmitter pairs are referred to as TX600 Series sensor assemblies. All TX600 Series sensor assemblies are supplied with default calibration unless requested otherwise.

IMPORTANT - A TX600 Series sensor assembly cannot be calibrated on its own; it must be linked to a DX600 display and calibration board. The calibration procedure is described on the A1A-DX600 data sheet.

A DX600 display and calibration board may be mounted onto and driven by the TX600 transmitter using an 8 x 2-way inter-PCB connector (combined height 38 mm). The DX600 has LEDs to display status, push-buttons to facilitate calibration and an LCD character display to give a visual indication of the sensor response.

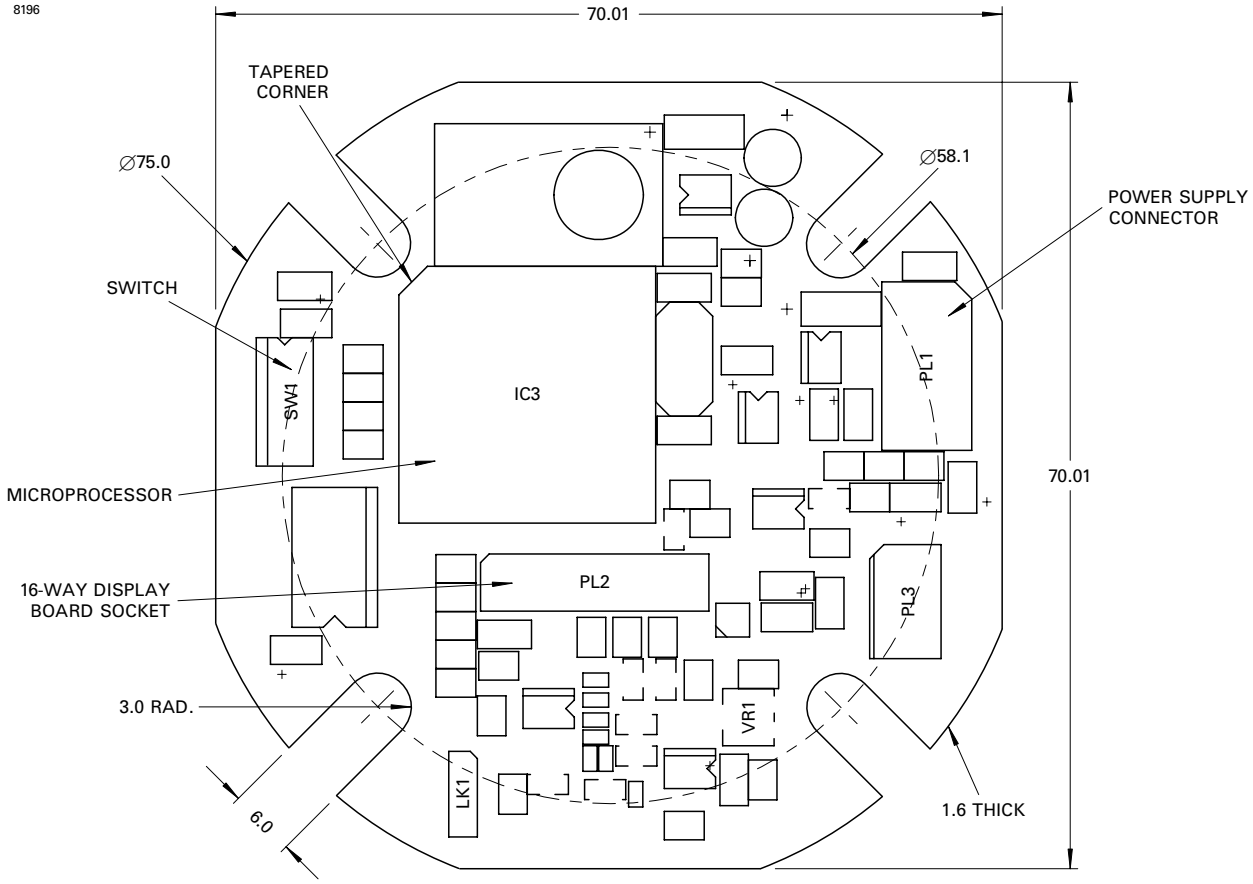
GENERAL DATA

Dimensions:	
length	70 mm
width	70 mm
height	25 mm
location slots	11.5 x 6 mm
Weight	40 g
Power input	12 to 36 Vdc at 65 mA max polarity protected
Current consumption (12 Vdc supply, maximum output load)	250 mA max
Power consumption	<750 mW at 20 mA output
4 - 20 mA source output:	
maximum loop resistance	250 Ω
output resolution	0.02 mA
maximum offset drift	±20 µA
overrange output	21.3 mA typ.

Note: Do not apply more than +6 V or less than 0 V to the current output terminal.

Resolution	0.13% full scale/0.02 mA
Fault indication	2 mA output (−12.5% full scale) LED fault indicator drive outputs
Zero drift over temperature	<0.002% full scale/°C
Span drift over temperature	<0.05% full scale/°C
Temperature range:	
operating	−10 to +50 °C
storage	−20 to +60 °C
Humidity	15 to 95% RH, non-condensing
Wiring requirement	3-wire, ⩽1.5 mm diameter cable
LED indicators:	
green	system health
yellow (Z and S)	calibration
red (F)	fault

TRANSMITTER BOARD LAYOUT (Dimensions in millimetres)



TX600 OVERVIEW

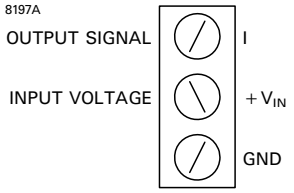
The general transmitter circuit layout is shown above. The transmitter board provides a dedicated connector to the IR600 series sensor head. All sensor types will be attached to a common preamplifier board, which is potted into the IR600 sensor head. The common preamplifier board plugs directly into the transmitter board via connector PL3.

The transmitter board also contains the following:

- The microprocessor for complete control over the IR600 sensor (IC3).
- A 3-way terminal strip for external connections (PL1).
- An 8-way double socket for connection to the display board (PL2).
- Set-up switches, used to select the sensor type and range (SW1).
- A link to produce the full-scale output of 20 mA (LK1).
- An output trim potentiometer, used to adjust the output to 20 mA when the full-scale link is set (VR1).
- The automatic temperature compensation uses the on-board temperature sensor located in the IR600 sensor head.

WIRING AND SIGNALS

The transmitter circuit has a 4 - 20 mA source output. The external connections to the single terminal strip are as follows:



Terminal Identification:

$+V_{IN}$	Input supply voltage
GND	Input ground
I	4 - 20 mA source output (Do not apply more than +6 V or less than 0 V to this terminal).

SENSOR SELECT SWITCHES

The sensor select switches are used to select the sensor type coefficients:

SW1	SW2	SW3	SW4	Sensor Selected	Code
ON	ON	ON	ON		
OFF	ON	ON	ON		
ON	OFF	ON	ON		
OFF	OFF	ON	ON		
ON	ON	OFF	ON		
OFF	ON	OFF	ON		
ON	OFF	OFF	ON		
OFF	OFF	OFF	ON		
ON	ON	ON	OFF		
OFF	ON	ON	OFF	Acetylene 100% LEL	IR604
ON	OFF	ON	OFF	Hydrocarbons 100% LEL	IR603
OFF	OFF	ON	OFF		
ON	ON	OFF	OFF	CH_4 default 100% LEL range	IR602, IR603
OFF	ON	OFF	OFF	CO_2 default 2% range	IR601
ON	OFF	OFF	OFF		
OFF	OFF	OFF	OFF		

ELECTRICAL CONNECTIONS

Sensor Connections

A mini sensor containing the preamplifier circuit is enclosed in the IR600 sensor housing. Screw this housing into the bulk of the unit and insert the 4 x 2-way socket into the sensor connector on the transmitter board.

External Electrical Connections

Input Power

Connect a power source to the terminals designated GND and $+V_{IN}$ on the terminal strip. The power source should be capable of delivering a voltage between +12 and +35 Vdc with a peak current capacity of 250 mA. The transmitter circuit is polarity protected and will not function with incorrect polarity.

Output Signals

A current loop is available for the output measurement. Connect the required load across the I and GND terminals, then measure the output. Do not apply more than +6 V or less than 0 V to the current output terminal.

Display/Calibration Board

The display calibration board is connected to the transmitter board via the 8 x 2-way display connector. The orientation is such that the display/calibration board is located in the centre of the transmitter board. Refer also to the DX600 data sheet.

HANDLING PRECAUTIONS

Electrostatic Sensitive Devices

SGX Sensortech's infrared gas sensors and associated electronics contain electrostatic sensitive components. Anti-static handling precautions should be employed when handling these devices.

ORDERING INFORMATION

IR600 Series Sensors, TX600 Transmitter Boards and DX600 Display Boards may be ordered as individual items or as combinations.

The thread code must be included with a sensor order, e.g. IR601/1 for a carbon dioxide sensor with metric 20 x 1.5 mm mounting thread.

TX600 Transmitter Boards should be calibrated to specific IR600 Series Sensors.

When an IR600 Series Sensor is ordered with a factory calibrated TX600 Transmitter Board, the combination is referred to as a TX600 Series assembly.

For example, a customer requiring a TX600 Transmitter Board calibrated with an IR601/1 sensor should order:

TX601/1 (i.e. IR601/1 + TX600 = TX601/1).