

Oxygen Sensing Solutions

Oxygen Sensor Catalogue



Oxygen Sensing

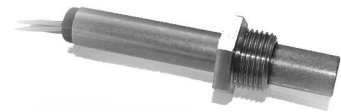
SST Sensing are experts in the field of oxygen and fluid measurement.

We have a comprehensive range of innovative products at competitive prices to help you solve your gas and fluid sensing needs.

We are a flexible, highly responsive company and work with our customers to provide the right solutions.

We have a strong technical team and have considerable expertise in a wide range of technologies including ; Speed and Direction, Position Sensing, Oxygen Sensing, Push Button Switches, Liquid Level Sensing, Current Sensing and Electro Mechanical Switches.

We are also a sales agent for some of the world's key sensor manufacturers so we are able to support all your sensing needs.



A wide range of high accuracy oxygen sensors with proven performance

Standard Series Sensors



Supplied in a probe style or flange mounted housing, suitable for many types of application, with external control electronics available

Sensors with integrated support circuitry



Include all control and output electronics required to give an 0-10V or 4-20mA outputs

Custom Sensors



A flexible range of oxygen sensors that can be developed to your application requirements

Oxygen sensor interface boards



A range of interface and control boards for use with standard oxygen sensors

Standard Series Sensors.....4

- Highly accurate
- Linear
- Integral heating element
- Operates with external electronics including all SST interface boards
- Gas temperature -100 °C + 400 °C
- Oxygen pressure range 2 mbar – 3 bar
- Sensor probe with leadwires
- Suited for many applications including boilers, oxygen monitoring on aircraft, exhaust gas testing and medical test equipment.

Sensors with integrated5 support circuitry

- Integrated control electronics
- 1mBar to 250mbar or 1000mbar Oxygen Partial Pressure
- Gas temperature -100°C to +250°C or + 400 °C
- Sensor probe and sealed housing
- Applications including combustion and environmental control.

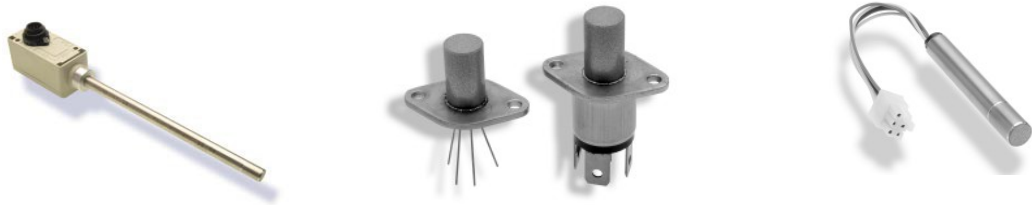
Custom Sensors.....6

- A range of housings, termination and outputs with customer specific capabilities
- Operates with external electronics including all SST interface boards
- Suited for many applications including boilers, oxygen monitoring on aircraft, exhaust gas testing and medical test equipment.

Oxygen sensor interface boards.....7

- Provides the necessary circuits to control standard oxygen sensors
- Functional testing and calibration in ambient air
- PCB board format
- Linear output of measured oxygen content in voltage or current format
- Low power consumption

Our technology



SST Sensing Ltd manufactures and supplies a wide range of High Precision Oxygen Sensors employing Zirconium Dioxide technology. These small rugged sensors do not require temperature stabilisation or a reference gas.

At temperatures above 650°C Zirconium Dioxide (ZrO_2) exhibits two mechanisms: Firstly, it partly dissociates, producing mobile oxygen ions within the material. These ions can be transported through the piece of ZrO_2 when a DC voltage is applied across the material. This liberates an amount of oxygen at the anode proportional to the charge transported (electrochemical pumping action). Secondly, when there is an oxygen pressure difference across a piece of ZrO_2 a voltage (the Nernst voltage) is generated across it. This voltage is proportional to the natural logarithm of the ratio of the oxygen pressure on each side of the material.

These mechanisms are used in a number of oxygen sensors but our sensor makes use of both simultaneously. This removes the need for a reference pressure which simplifies the sensor operation.

Our sensor contains 2 pieces of ZrO_2 with a small hermetically sealed chamber between them. One of the discs functions as a reversible oxygen pump, which is used to successively fill and empty the chamber. The second disc measures the ratio of the oxygen partial pressure difference and generates a corresponding sense voltage. A heater surrounding the sensing element produces the 700°C required for the ZrO_2 to act as a pump.

The time taken for the pump to achieve specific minimum and maximum pressures within the chamber is a measure of the partial pressure of oxygen in the environment. Al_2O_3 discs filter particulate matter and neutralize un-burnt gasses to avoid contamination, which might lead to unstable readings.

Features

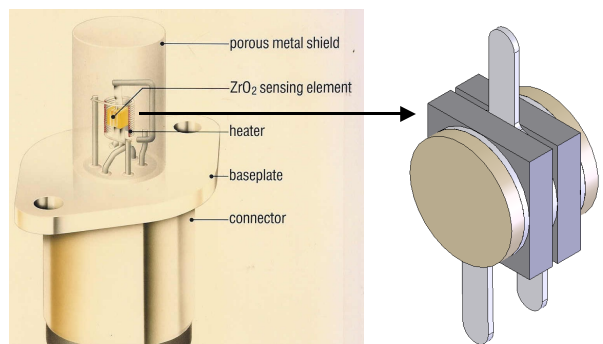
- High accuracy
- Rugged yet physically small construction
- Low power consumption
- Integrated or external control electronics
- Functional testing and calibration in ambient air
- Variants suitable for use in gases up to 300C

Benefits

- Unaffected by other gases
- Remote electronics allow sensor operation in harsh environments
- No reference gas needed
- Ease of assembly and maintenance
- Can be fitted into small area if space is limited

Function

ZrO_2 sensing element that Includes a combined O_2 concentration cell and electrochemical pump that eliminates the need for a reference gas.



Standard Series Oxygen Sensors

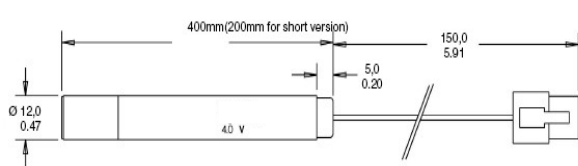
Supplied in a probe style housing, suitable for many types of application, with external control electronics available.



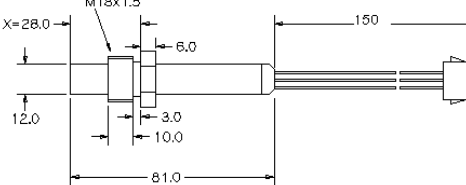
Specifications	O2S-FR-T4	O2S-FR-T4-4P O2S-FR-T4-5P	O2S-FR-T2	O2S-FR-T2-18A O2S-FR-T2-18B O2S-FR-T2-18C	O2S-FR-T3	O2S-T6	O2S-T6-SH	O2S-T2	O2S-T3
Electrical Characteristics									
Terminals	5								
Description	Pump, Sense and Common, Heater (2)								
Heater supply V(A)	4.35V(1.85A)					4.0 V (1.7A)			
Heater supply (stand by)	2.0 V								
Pump resistance at 700 °C,	dc 1 kOhm (typ.) ac 1 kHz 120 Ohm (typ.)								
Operational specifications									
Oxygen pressure range	2 mbar – 3 bar								
Operational temperature	700 °C								
Stand by temperature	500 °C (typ.)								
Accuracy	< 5 mbar								
Response time	< 4 s					< 15 s			
Warm up time	< 100 s								
Warm up time (from stand by)	< 20 s								
Permissible gas temperature	-100°C min								
Gas flow rate	0-20 m/s								
Mechanical characteristics									
Repetitive permissible acceleration	5 g								
Incidental permissible acceleration	30 g								
Housing Style	Flange Mounted	Flange Mounted	80mm probe	screw fit probe A, X=55mm B, X=45mm C, X=28mm	12mm dia short cylinder	400mm probe	220mm probe	80mm probe	12mm dia short cylinder
Termination	4 Spade terminals (8 x 0.7mm)	4 or 5 Ø0.6mm steel wires	leadwires + connector	leadwires + connector	5 Ø0.6mm Stainless steel wires	leadwires + connector	leadwires + connector	leadwires + connector	5 Ø0.6mm Stainless steel wires

Dimensions

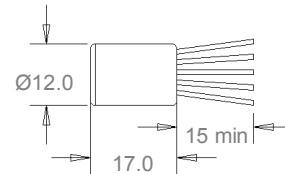
O2S-T6 & O2S-T6-SH



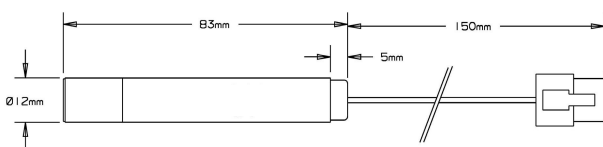
O2S-T2-18 Series



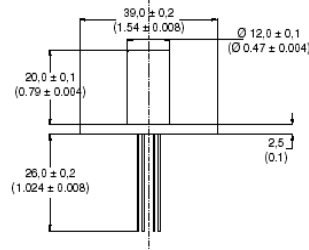
O2S-T3 Series



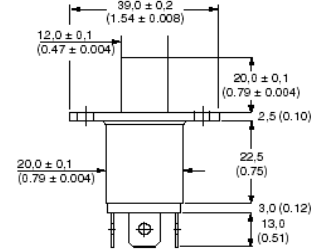
O2S-T2 Series



O2S-FR-T4-4P & 5P



O2S-FR-T4



For wiring diagrams refer to sensor datasheets and installation guides

The Standard Series have to be operated by an electronic measuring circuit that controls the sensor operation and signal processing. This circuit can either be incorporated into the customer's own electronics, or be purchased separate from SST. Page 8 gives details.

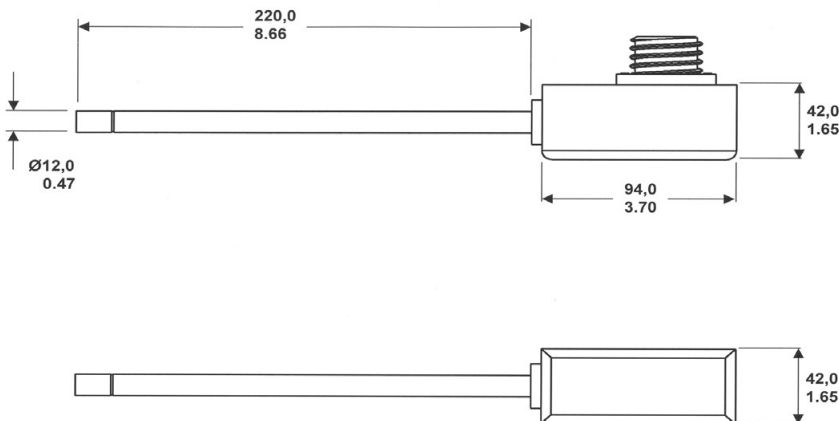
Oxygen Sensors with integrated support circuitry

Supplied in a probe style sensing element attached to a sealed metal housing containing all control and output electronics required to give a 0-10V or 4-20mA output. These transducers are ideal for measuring oxygen partial pressure in flue gases of industrial gas and oil fired heating systems or in environmental control systems.



Specifications	O2A-0-V25	O2A-0-V100	O2A-0-A25	O2A-0-A100	O2A-0-V25-H	O2A-0-V100-H	O2A-0-A25-H	O2A-0-A100-H
	O2A-1-V25	O2A-1-V100	O2A-1-A25	O2A-1-A100	O2A-1-V25-H	O2A-1-V100-H	O2A-1-A25-H	O2A-1-A100-H
	O2A-2-V25	O2A-2-V100	O2A-2-A25	O2A-2-A100	O2A-2-V25-H	O2A-2-V100-H	O2A-2-A25-H	O2A-2-A100-H
Electrical Characteristics								
Supply Voltage	24 Vdc ± 5 %							
Supply Current	500 mA							
Output Signal	0 Vdc to 10 Vdc		4 mA to 20 mA		0 Vdc to 10 Vdc		4 mA to 20 mA	
Operational specifications								
Oxygen range (oxygen partial pressure)	1mbar to 250mbar (1)	1mbar to 1000mbar (2)	1mbar to 250mbar (1)	1mbar to 1000mbar (2)	1mbar to 250mbar (1)	1mbar to 1000mbar (2)	1mbar to 250mbar (1)	1mbar to 1000mbar (2)
Ambient temperature	-10 °C to 50 °C							
Resolution	12 bit							
Accuracy	± 2 % of fs							
Reproducibility	± 1 % of fs							
Warm up time	10 min (approx.)							
Permissible gas temperature (probe tip)	-100°C to +250°C				-100°C to +400°C			
Gas flow rate	0-10 m/s							
Mechanical characteristics								
Repetitive permissible acceleration	5 g							
Incidental permissible acceleration	30 g							
Protection level, housing	IP65							
Housing Style	Probe length -0- L=220mm -1- L=400mm -2- L=600mm							
Termination	Integral connector Type Binder 693 series							
	Mating part number 99-4226-14-07							
Notes	1. The sensor measures oxygen partial pressure, so in a 1bar atmosphere the equivalent output is 0.1% to 25% oxygen 2. The sensor measures oxygen partial pressure, so in a 1bar atmosphere the equivalent output is 0.1% to 100% oxygen							

Dimensions (220mm probe shown)

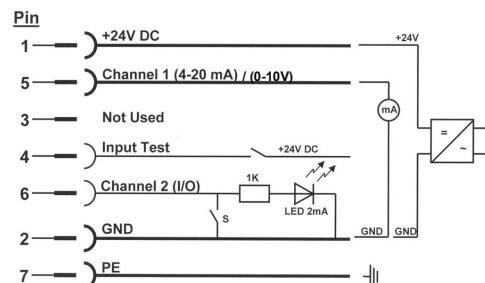


Mounting

The preferred method of mounting is with the top of the probe angled approximately 15° downwards.

For detailed wiring diagrams refer to datasheets and installation sheets

Wiring diagram



Custom Series Oxygen Sensors

A flexible range of oxygen sensors that can be developed to your application requirements. SST can manufacture sensors with a range of features that can be customised to your application requirements. These include a range of housings, termination via leadwires, connectors or terminals and output format. These can operate with external electronics including all SST interface boards. Suited for many applications including boilers, oxygen monitoring on aircraft, exhaust gas testing and medical test equipment.



Typical Specifications	
Electrical Characteristics	
Terminals	5
Description	Pump, Sense and Common, Heater (2)
Heater supply V(A)	4.0 V (1.7A) typ
Heater supply (stand by)	2.0 V
Pump resistance at 700 °C,	dc 1 kOhm (typ.) ac 1 kHz 120 Ohm (typ.)
Operational specifications	
Oxygen pressure range	2 mbar – 3 bar
Operational temperature	700 °C
Stand by temperature	500 °C (typ.)
Accuracy	< 5 mbar
Response time (1)	< 15 s or < 4s
Warm up time	< 100 s
Warm up time (from stand by)	< 20 s
Permissible gas temperature	-100°C to +400°C
Gas flow rate	20m/s maximum
Mechanical characteristics	
Repetitive permissible acceleration	5 g
Sensor format options	
Probe length	35mm to 500mm long, min 12mm diameter
Mounting	>12mm cylinder >M18 threaded or flange mount
Termination	Terminals, leadwires up to 5m, basic or sealed connectors

Notes.

1. The sensor can be fitted with a porous end cap to allow faster response times

Oxygen Sensor Interface Boards

A range of sensor interface boards developed to provide control and signal processing for SST's range of highly accurate and versatile oxygen sensors.

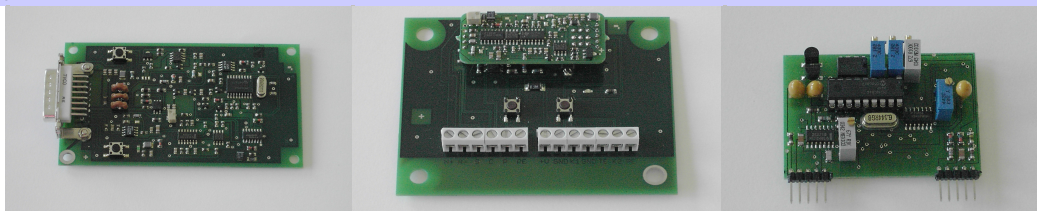
Specifications	Oxymac50	DE800	Elecdit
Measuring ranges	1mbar to 250mbar or 1mbar to 1000mbar oxygen partial pressure (1)		
Power source	+24 Vdc ±20 %	+24 Vdc ±20 %	±15 Vdc ±10 %
Other inputs	Ext Calibration, Sensor Pump,	Ext Calibration, Sensor Pump,	Ext Calibration, Sensor Pump,
	Sense and Common, Test	Sense, Common, Heater, Test	Sense and Common
Calibration status	Held on power down	Versions with cal. lost on power down or retained on power down (2)	Factory calibrated with on board adjustment
Power consumption (interface)	<250 mW	<500 mW	<250 mW
Outputs	0 V to 10 V, 4 mA to 20 mA (3)	0 V to 10 V, 4 mA to 20 mA (3), Pulse	0 V to 10 V, LED drive
Accuracy	2 % full scale		
Resolution	0.04 V		
Operating temperature	-10 °C to 60 °C		
Storage temperature	-10 °C to 50 °C		
Dimensions	63 mm x 108 mm 4 mm Ø mounting holes	80 mm x 100 mm 6.5 mm Ø mounting holes	60 mm x 42 mm x 17 mm
Connector	15 pin male D connector	Screw connector block	2 x 5 pin 2.5 mm x 2.5mm
Mates with type	Standard series oxygen sensors, custom oxygen sensors		
Order guide	Oxymac50	DE800	Elecdit
0V to 10V output			
1 to 250 mbar measuring range	Oxymac 50.V.1	DE800.V.1 / DE800.V.1.NF	Elecdit.V.1
1 to 1000 mbar measuring range	Oxymac 50.V.2	DE800.V.2	Elecdit.V.2
4-20mA output			
1 to 250 mbar measuring range	Oxymac 50.A.1	DE800.A.1 / DE800.A.1.NF	
1 to 1000 mbar measuring range	Oxymac 50.A.2	DE800.A.2	

Notes: For warm up time and other sensor characteristics refer to sensor datasheets.

(1) The sensor measures oxygen partial pressure, so in a 1bar atmosphere the equivalent output is 0.1% to 25% or 0.1% to 100% oxygen.

(2) Standard version loses calibration on power down, NF versions retain calibration after loss of power.

(3) Factory set to voltage or current output.



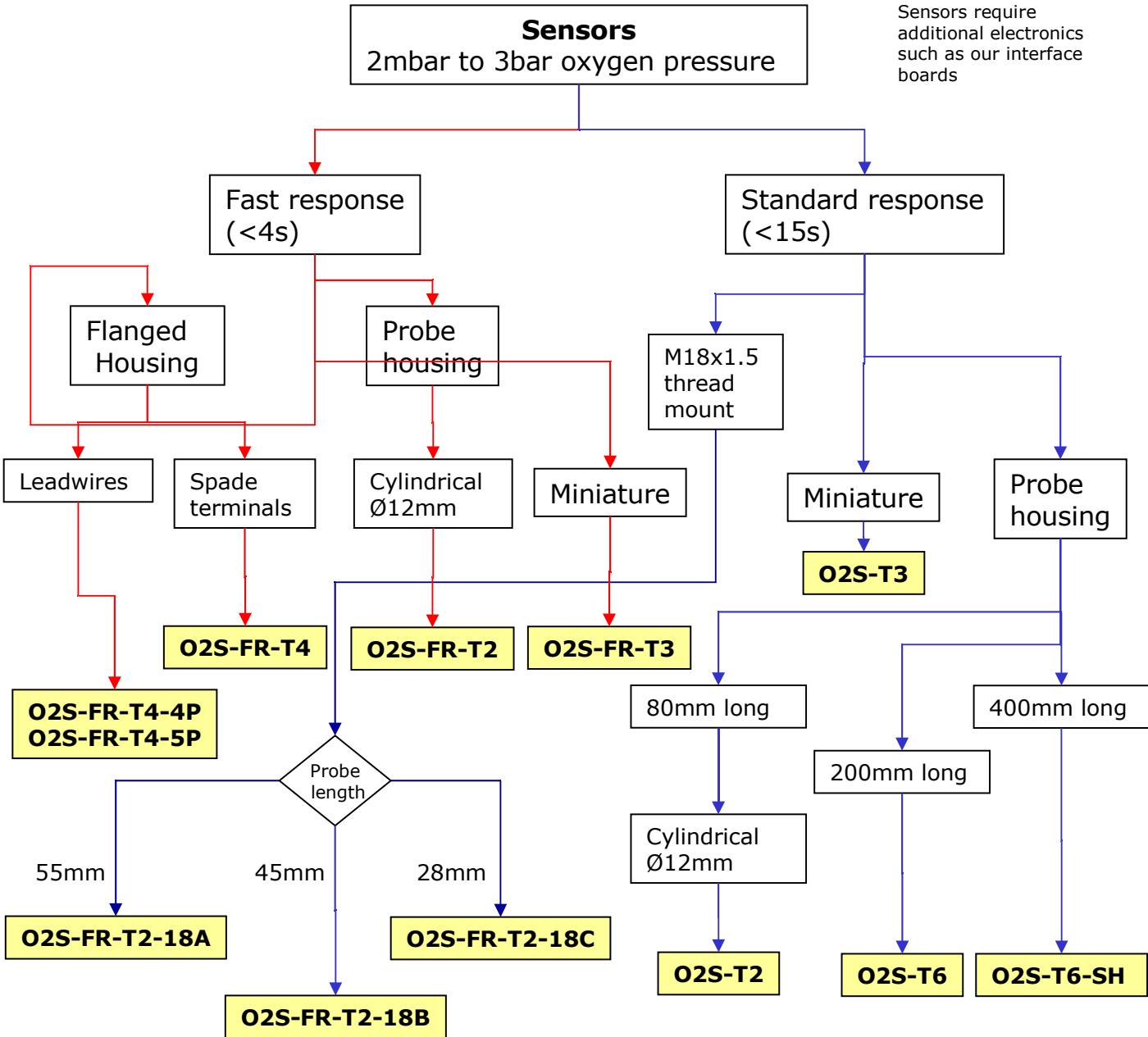
SST oxygen sensors require external connection to an electronic measuring circuit to control sensor operation and signal processing. A heating element on the sensor produces the 700°C required for the ZrO₂ to achieve its operational temperature. These interface boards supply the sensor with the necessary circuits to provide this control and processing, while also providing sensor calibration.

- Oxymac50 and Elecdit require an external heater power supply. The DE800 interface includes the heater element power supply and offers all the features of the Oxymac50.
- Oxymac50 is an upgraded interface that offers similar performance to the Elecdit board but operates from a 24 Vdc power supply. The Elecdit interface was developed for Industrial applications and offers a level of noise protection.
- Oxymac50 and DE800 are the recommended interfaces for new applications.

The interfaces are supplied ready for mounting into customers' enclosures.

Selection Guide Oxygen Sensors

Sensors require additional electronics such as our interface boards



Contact SST if your application needs are not shown

Our capabilities

Design

We have a strong design team and can offer product modifications to all of our product range. Our Design engineers are all Design for Six Sigma (DfSS) qualified and we pride ourselves on the speed and quality of our engineering capability. We have expertise in:

Electronic Design

PCB layout

Product packaging

Device Physics

Analog and digital electronics

Manufacturers' Representatives

In the UK and Ireland SST are also sales representatives for Honeywell, Hamlin, Schneider and ASG. In this capacity we can supply you with a wide range of sensing solutions tailored to suit your needs.

Approvals

ISO9001

Contact details

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Visit us on our website at www.sstsensing.com to see the full range of sensor and switch products from SST.



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