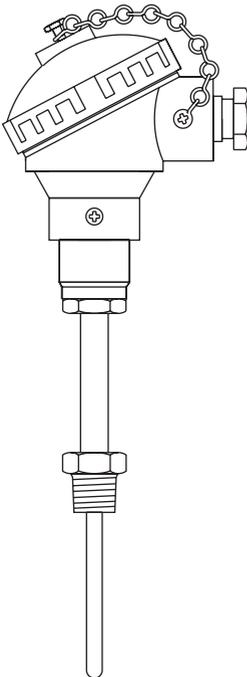


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**EL2270 and EL2271**  
**Temperature Probes**  
Installation and Maintenance Instructions

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1. Safety information
2. General product information
3. Mechanical installation
4. Electrical installation
5. Maintenance



# 1. Safety information

Pressure equipment not bearing the  mark is classified 'Sound Engineering Practice' in accordance with the Pressure Equipment Directive (PED). It is the responsibility of the user to ensure that the product is installed and operated safely.

Note: By law, SEP products cannot be marked with the  symbol.

## 1.1 Intended use

- i) Check that the product is suitable for use with the intended fluid.
- ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- iii) Determine the correct installation situation and direction of fluid flow.
- iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- v) Remove protection covers from all connections before installation and protective film from all name-plates, where appropriate, on steam or other high temperature applications.

Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

## 1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

## 1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

## 1.4 Hazardous liquids or gases in the pipeline

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

## 1.5 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

## 1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk? Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

## 1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

## 1.8 Temperature

Allow time for temperature to normalise after isolation to avoid danger of burns.

## 1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

## 1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

## 1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.

Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety. Post 'warning notices' if necessary.

## 1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

## 1.13 Residual hazards

In normal use the external surface of the product may be very hot.

Many products are not self-draining. Take due care when dismantling or removing the product from an installation.

## **1.14 Freezing**

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

## **1.15 Disposal**

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.

## **1.16 Returning products**

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

## 2. General product information

### 2.1 Product description

#### EL2270

The EL2270 is a Pt100 platinum resistance temperature sensor for general industrial use. The sensing device is an RTD 3 wire device that meets EN 60751: Class A. This sensor can be connected directly to any temperature indicator or controller that has a 3 wire Pt100 input. A quick response version (40 mm insertion length only) is also available for applications such as plate heat exchanger control. A miniature version of the EL2270 may also be ordered. This has a 1/4" BSP taper thread, and a tip length of 39 mm.

#### EL2271

The EL2271 is a combined Pt100 sensor and transmitter assembly. The sensing element is a 3 wire device that meets EN 60751: Class A and the transmitter has a 4 - 20 mA output. A comprehensive standard range is normally available from stock. Non-standard ranges can be obtained to special order, subject to a low limit of -50 °C, and a maximum of +500 °C. The 4 - 20 mA output can be connected directly to any temperature indicator, controller or flow computer that has a 4 - 20 mA input. Contact Spirax Sarco for further details. Transmitters with 3 point calibration are available to special order.

#### Pockets (thermowells)

##### General

Three types of pockets are available:

1. Thin wall with a 1/2" NPT process connection for non-flow applications only.
2. Drilled taper with a 1/2" NPT process connection.
3. Sanitary pocket, with a 1 1/2" sanitary clamp connection electropolished to 0.4 µm.

This pocket is available with certification to EN10204 3.1.

**Note:** All certification/inspection requirements must be stated at the time of order placement.

**Note:** No pocket is available for the miniature EL2270.

Material	316 stainless steel
Maximum temperature	500 °C

##### Selection

Pockets are sized to suit the probe tip length 'D', and are specified as 'pocket to suit a \_\_ mm probe'.

##### Notes:

- The pocket dimension 'F' is 25 mm shorter than the probe length 'D', which appears to be incorrect. The reason is that the threaded body of the pocket acts as a stand-off, and therefore allows adequate clearance between the probe tip and the end of the pocket.
- Pockets to suit 225 mm and 725 mm probes **are for non-flow applications only** (maximum flow velocity 0.65 m/s).

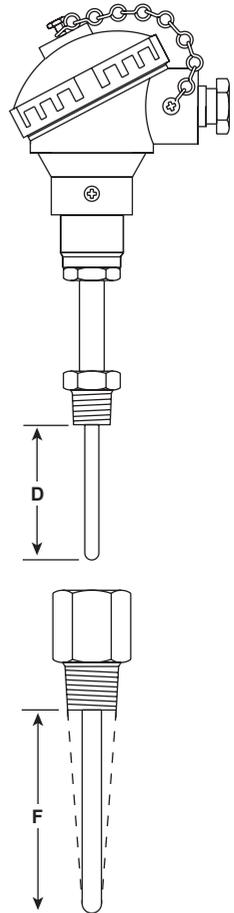


Fig. 1

## 2.2 Mechanical data

Product range	EL2270* Note: A quick response version of the EL2270 is also available to order	EL2271
Enclosure	KNE - aluminium alloy - epoxy coated	KNE - aluminium alloy - epoxy coated
Probe	316 stainless steel	316 stainless steel
Process connection	½" NPT	½" NPT
Electrical connection	M20 with cable gland fitted	M20 with cable gland fitted
Enclosure rating	IP65	IP65
Ambient temperature	Minimum	-50 °C
	Maximum	+70 °C

\* The EL2270 quick response sensor has a time constant of 1.7 seconds.

## 2.3 Electrical data

Available ranges	-50 °C to +500 °C	-50 °C to +50 °C
		0 °C to +100 °C
		100 °C to +250 °C
Output	Pt100 to EN 60751: Class A	Loop powered 4 - 20 mA
Output on sensor failure	-	23 mA typical
Supply	-	10 to 30 Vdc
Maximum loop resistance	-	636 Ω at 24 Vdc
		909 Ω at 30 Vdc
Transmitter - Thermal drift measuring deviation	-	± 0.1% / 10 K <sub>TAMB</sub> per EN 60770 ± 0.2%
Maximum values for connection of the current loop circuit (connections + and -)	-	U <sub>o</sub> = 30 Vdc      I <sub>o</sub> = 120 mA P <sub>i</sub> = 800 mW      C <sub>i</sub> = 6.2 μF L <sub>i</sub> = 110 μH
Maximum values for connection of the sensor circuit (connections 1 up to 3)	-	U <sub>o</sub> = 6.4 Vdc      I <sub>o</sub> = 42.6 mA P <sub>o</sub> = 37.1 mW <b>Group II B:</b> C <sub>o</sub> = 500 μF      L <sub>o</sub> = 50 mH <b>Group II C:</b> C <sub>o</sub> = 20 μF      L <sub>o</sub> = 10 mH
EMC emissions and susceptibility	-	Electromagnetic compatibility EMC 2014/30/EU EN61326:2013 EN61326-2-3:2013

EL2270 and EL2271 Temperature Probes

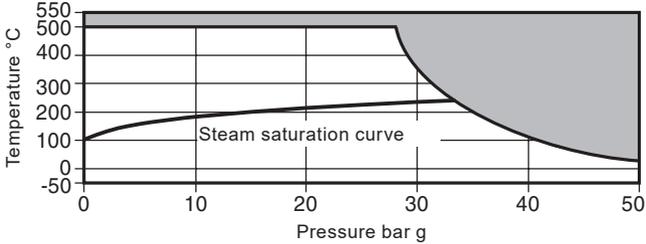
## 2.4 Pressure/temperature limits

The **EL2270** and **EL2271** temperature probes can be used in applications where the process temperature is within the following limits. Where greater temperatures and pressures are present, the temperature probe should be fitted with a pocket.

For air and steam applications, flow velocities must be below 45 m/s (32 m/s for fabricated pockets).

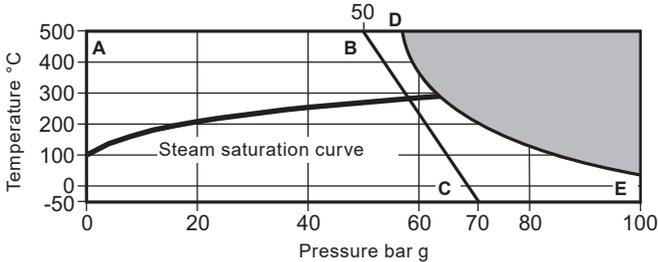
For liquids a recommended velocity is 5 m/s (**700 mm and 200 mm** non-flow applications only).

### Pressure and temperature limits of temperature probe. (ANSI 300 rated)



The product **must not** be used in this region.

### Pressure and temperature limits of standard pockets. (ANSI 600 rated)



The product **must not** be used in this region.

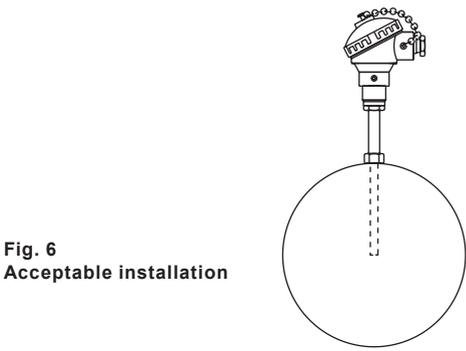
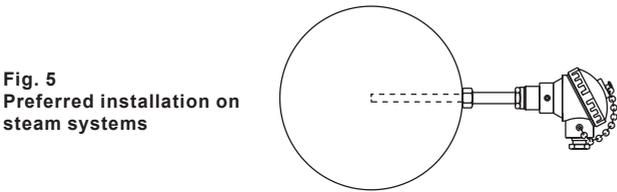
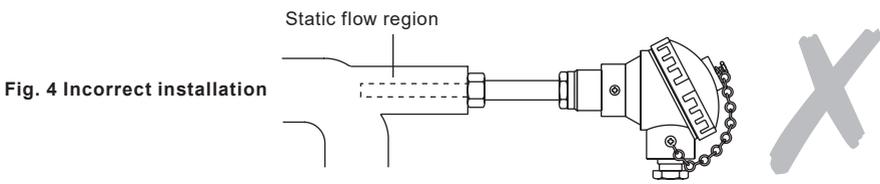
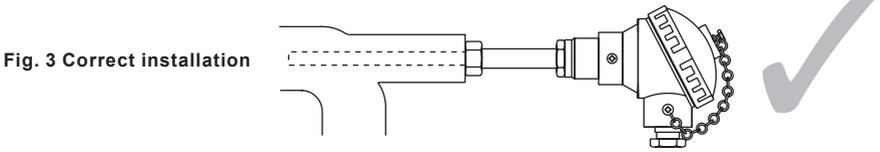
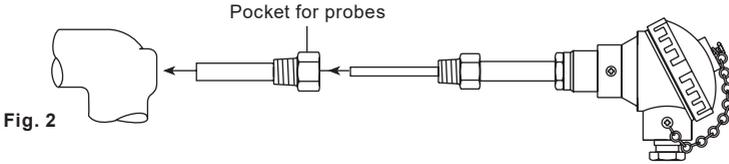
**A-B-C** Fabricated pocket

**A-D-E** Solid drilled pocket

# 3. Mechanical installation

Process connection: 1/2" NPT (1/4" NPT for the miniature version).

Install the probe as shown:-



- Notes:**
- Do not install a probe in a static region of the pipeline.
  - If a pocket is required, use a proprietary heat transfer paste.
  - On steam systems, preferred probe installation is horizontal if possible. This helps keep the electronics cool. Vertical installation is permissible as long as the ambient temperature limit is not exceeded.

# 4. Electrical installation

Install wiring in accordance with EN 50014 / EN 50020 Instrumentation in Process Control Systems: Installation design and practice or local equivalent.

Unscrew the enclosure cover for access to electrical connections.

The EL2270 and EL2271 are fitted with cable glands.

These comply with the IP rating of the enclosure.

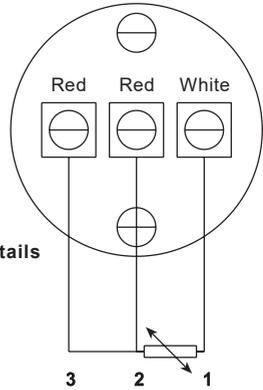


Fig. 7  
EL2270 wiring details

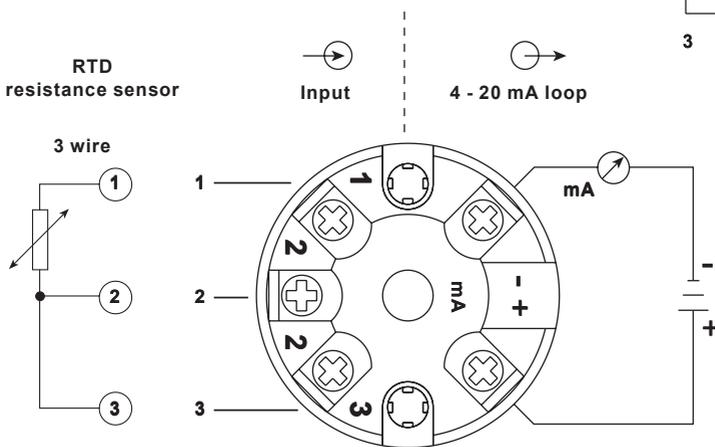


Fig. 8 EL2271 wiring details

## Cable requirements

To protect against signal noise, screened cable is strongly recommended.

**Note:** Ensure that any screen is connected to the local earth/ground at one end only, with a connection resistance of less than 1  $\Omega$ .

### EL2270

Use 3 core 7/0.2 cable.

The device that is receiving the signal governs the maximum cable length.

### EL2271

Use 2 core 7/0.2 cable.

The maximum cable length is dependent on the supply voltage and cable resistance.

For distances greater than 200 m, contact Spirax Sarco.

## 5. Maintenance

The EL2270 and EL2271 are non-serviceable items.

