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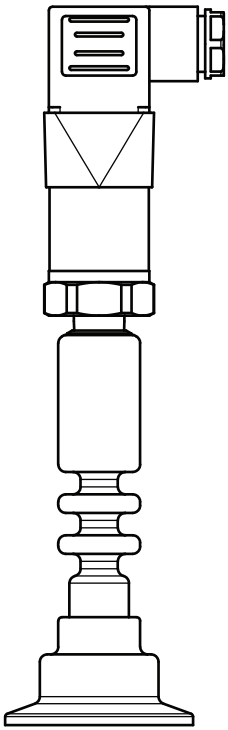
CTLS Issue 1

# EL3600
# Pressure transmitter
Installation and Maintenance Instructions



# 1. Safety information

**Safe operation of this product can only be guaranteed if it is properly installed, commissioned, used and maintained by qualified personnel (see Section 1.13) 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.**

**If the instrument is handled improperly or not used as specified, the resultant may:**

- **cause danger of the life and limb of the third party,**
- **damage the instrument and other assets belonging to the owner,**
- **hinder the performance of the instrument.**

## 1.1 Wiring notes

**Every effort has been made during the design of the instrument to ensure the safety of the user, but the following precautions must be followed:**

i) **Maintenance personnel must be suitably qualified in working with equipment containing hazardous live voltages.**

ii) **Ensure correct installation. Safety may be compromised if the installation of the product is not carried out as specified in this manual.**

iii) **Isolate the instrument from the mains supply before opening the unit.**

iv) **The instrument is designed as an installation category II product, and is reliant on the building installation for overcurrent protection and primary isolation.**

v) **Wiring should be carried out in accordance with IEC 60364 or equivalent.**

vi) **Fuses should not be fitted in the protective earth conductor. The integrity of the installation protective earth system must not be compromised by the disconnection or removal of other equipment.**

## 1.2 Safety requirements and electromagnetic compatibility

**This product is CE marked. It complies with the requirements of 73/23/EEC as amended by 93/68/EEC on the harmonisation of the law of Member States relating to electrical equipment designed for use within certain voltage limits (LVD), by meeting the standard for safety of electrical equipment for measurement control and laboratory use. This product complies with the requirement of 89/336/EEC as amended by 92/31/EEC and 93/68/EEC on the approximation of laws of the Member States relating to Electromagnetic Compatibility, by meeting the generic standard of emissions for an industrial environment and the generic standard of immunity for an industrial environment.**

**The product may be exposed to interference above the limits of industrial immunity if:**

- **The product or its wiring is located near to a radio transmitter.**
- **Excessive electrical noise occurs on the mains supply.**
- **Cellular telephones and mobile radios may cause interference if used within approximately one metre of the product or its wiring. The actual separation necessary will vary according to the power of the transmitter.**
- **Protectors can combine filtering, suppression, surge and spike arrestors.**

## 1.3 Intended use

**Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application.**

**i)** Check that instrument is suitable for the operating environment and insure adequate protection is implemented when required

**ii)** Determine the correct installation situation.

**iii)** 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.

## 1.4 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.**

## 1.5 Lighting

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

## 1.6 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.**

## 1.7 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.**

## 1.8 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.**

## 1.9 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.**

## 1.10 Temperature

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

**The instrument must not be insulated. When coupled to a valve operating on high temperature media, if there is a risk of burning through handling (intentional or accidental), it is recommended that suitable methods of prevention are implemented e.g. machine or a visual warning.**

## 1.11 Tools and consumables

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

## 1.12 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.**

## 1.13 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.**

## 1.14 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.**

## 1.15 Residual hazards

**In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of some products may exceed temperatures of 90 °C (194 °F).**

## 1.16 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.**

### REACH.

**Should any substances of very high concern be found within a product, details of the location will be identified within installation and maintenance instructions Section 2.4 : Materials.**

**Further information about product compliance is be available at www.spiraxsarco.com/product-compliance**

## 1.17 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.**

## 1.18 Responsibilities of the operator and operating (including maintenance) personnel.

**The operator is responsible for ensuring that safe systems of operation and practice are implemented and maintained. Only competent persons must be allowed to be able to operate and maintain these devices, and these persons must be familiar with, and comply with the applicable health and safety standards or guidelines.**

**The installation and maintenance instructions should form part of the standard operating procedures for maintenance and must therefore be kept in an accessible location and in a legible condition. Product identification and safety related labels must also be kept in a clean and legible condition. Identification and safety labels must be replaced if they become damaged or obscured in operation.**

# 2. General product information

## 2.1 Introduction

The EL3600 is a combined pressure sensor and transmitter, designed for general industrial use. It has a 2-wire 4-20 mA current loop, and a 1 1/2" ASME BSP sanitary clamp for use on clean steam and food+ applications

This product is intended to be connected into a system that can operate an EC1935 compliant process.

To minimise the risk of non-intentionally added substances in the system, it is essential that an appropriate CIP (cleaning in place) cycle is carried out by the end user prior to first use in a food contact application.

A list of the materials that could come directly or indirectly into contact with foodstuffs can be found in the Declaration of Compliance available for this product.

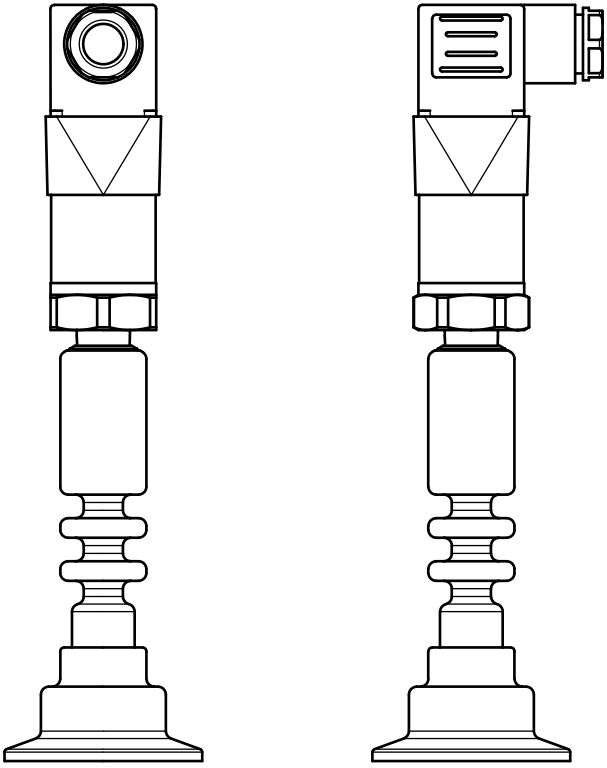


**Fig. 1 - EL3600 General arrangement**

## 2.2 Product range

| Calibrated pressure range (Bar gauge) | Maximum allowable pressure * (Bar gauge) | Maximum operating pressure (Bar gauge) | Maximum allowable temperature (°C) | Maximum operating temperature (Saturated steam) (°C) | Medium temperature range (Saturated steam) (°C) |
|---|---|---|---|---|---|
| 0-0.6 | 1.8 | 0.6 | 204 | 113.6 | 0-113.6 |
| 0-1 | 3 | 1 | 204 | 120.4 | 0-120.4 |
| 0-1.6 | 4.8 | 1.6 | 204 | 129 | 0-129 |
| 0-2.5 | 7.5 | 2.5 | 204 | 139 | 0-139 |
| 0-4 | 12 | 4 | 204 | 152 | 0-152 |
| 0-6 | 13.79 | 6 | 204 | 165 | 0-165 |
| 0-10 | 13.79 | 10 | 204 | 184 | 0-184 |

*Maximum allowable pressure is determined by either the rating of the ASME BPE flange or the over pressurisation limit of the pressure transmitter

## 2.3 Operating principle

The prevaliling pressure is measured at the sensor element through the deformation of a diaphragm. By supplying power, this deformation of the diaphragm is converted into an electrical signal. The output signal from the pressure transmitter is amplified and standardised. The output signal is proportional to the messured pressure.

## 2.4 Specifications

| | |
|---|---|
| **CE Conformity** | Pressure equiptment directive<br>EMC directive, EN61326 emission (Group 1, class B) and interference immunity (Industrial application)<br>RoHS directive |
| **EM Field** | 30 V/m (80 ... 1,000 Mhz) |
| **Performance level (Per EN ISO 13849-1:2008)** | Performance level: PL = b<br>Catagory: Cat.= B<br>Diagnostic coverage: DC = None<br>MTTF: >100 Years |
| **Approvals** | See product label |

## 2.5 Electrical connections

### Angular connector DIN EN 175301-803 A

| Electrical connection | Ingress protection (2) | Wire cross section | Cable diameter | Cable material | Permissible temperature |
|---|---|---|---|---|---|
| With mating connector | IP65 | Maximum 1.5 mm² | 6 ... 8mm | - | -30 ... +100 °C |
| With mating connector (Conduit) | IP65 | Maximum 1.5 mm² | - | - | -30 ... +100 °C |
| With mating connector with moulded cable | IP65 | 3 x 0.75 mm² | 6 mm | PUR | -30 ... +100 °C (cULus -25 ... +85 °C) |
| With mating connector with moulded cable, shielded | IP65 | 6 x 0.5 mm² | 6.8 mm | PUR | -25 ... +85 °C |

| | 2 wire | 3 wire |
|---|---|---|
| **U+** | **1** | **1** |
| **U-** | **2** | **2** |
| **S+** | **-** | **3** |
| **Shield (option)** | **4** | **4** |

# 3. Installation

**Before considering installation of an EL3600 pressure transmitter please read to Section 1 "Safety Information" on page 4.**

## 3.1 Mounting the instrument

Only use the pressure transmitter if it is perfect condition with respect to safety.
Prior to installation and commissioning the pressure transmitter must be subjected to a visual inspection

**Note** - Leaking fluid is indicative of damage.

Requirements for the mounting point:

- Sealing faces are clean and undamaged
- Sufficient space for a safe electrical installation
- Enviroment corresponds to max. pollution degree of 2
- For information on tapped holes and welding sockets see technical information IN 00.14 at www.wika.com
- Permissible ambient and medium temperatures remain with the performance limits. Consider possible restrictions on ambient temperature range caused by mating connector used.

**Note** - for performance limits see section 2.2

## 3.2 Electrical mounting

### Caution

The insturment shield does not act as a protective conductor for protection of personel, rather as a functional ground in order to shield the instument from electromagnetic fields.

### 3.2.1 Connection assembly

For instruments with ratiometric output signals, a shielded cable must be used. The cable shield must be grounded, if the cable is longer than 30 m or leaves the building.

Use a cable with suitable characteristics for the particular operating conditions.

For cable variants, strain relief must be employed.

Cable with ventilation tubes must be vented to atmosphere.

The instrument must be earthed via the process connection!

Select a cable diameter that matches the cable gland of the plug. Make sure that the cable gland of the mounted plug has a tight fit and that the seals are present and undamaged. Tighten the threaded connection and check that the seal is correctly seated, in order to ensure a tight seal.

For cable outlets, make sure that no moisture enters at the cable end.

## 3.2.2 Requirements for voltage supply

For supply voltage please refer to product label.

### For instruments without UL approval:

This equipment is intended for operation with low voltages which are separated from the AC 230 V (50 Hz) mains voltage or voltages greater than AC 50 V or DC 120 V for dry environments. A connection to an SELV circuit is recommended, or alternatively to circuits with a different protective measure in accordance with IC 60364-4-41 installation standard.

### For instruments with UL approval and for use in North America:

The power supply for the pressure switch must be made via an energy-limited electric circuit in accordance with section 9.4 of UL/EN/EC 61010-1, or an LPS per UL/EN/EC 60950-1/CSA C22.2 no. 60950-1, or class 2 in accordance with UL1310/UL1585 (NEC or CEC).

# 4. Maintenance

## 4.1 Maintenance

This pressure transmitter is maintenance free. All repairs must be carried out by the manufacturer

## 4.2 Maintaining the product

**Caution**

Before cleaning the product correctly disconnect the pressure transmitter from the pressure supply, switch it off and disconnect it from the voltage supply

Clean the instrument with a moist cloth.

Wash or clean the dismounted instrument before returning it, in order to protect persons and the environment from exposure to residual media.

Residual media in dismounted instruments can result in a risk to persons, the environment and equipment. Take sufficient precautionary measures.

Do not use any pointed or hard objects for cleaning, as they may damage the diaphragm of the process connection.

# 5. Faults

**Note** - In the event of any faults, first check whether the pressure transmitter is mounted correctly, mechanically and electrically

| Fault | Causes | Measures |
|---|---|---|
| **Plastic has faded** | UV radiation | No measures required<br>Discolouration is harmless |
| **No output signal** | Cable break | Check the continuity and if necessary exchange the cable |
| | No/Wrong power supply | Correct the power supply |
| **No/wrong output signal** | Wiring error | Rectify the wiring |
| **Constant output signal upon change in pressure** | Mechanical overload caused by overpressure | Replace instrument; if it fails repeatedly contact the manufacturer |
| **Signal span too small/ drops** | Mechanical overload caused by overpressure | Replace instrument; if it fails repeatedly contact the manufacturer |
| | Diaphragm damaged, e.g. due to impacts abrasive/ aggresive medium; corrosion at diaphragm or process connection; transmission medium missing | Replace instrument; if it fails repeatedly contact the manufacturer |
| | Sealing face damaged/soiled, sealing does not have a tight fit | Clean the sealing face, replace sealing if applicable |
| **Signal span varies/ inaccurate** | EMC Interferance sources in the enviroment | Shield instrument; cable shield; remove source of interferance |
| | Operating temperature too high or low | Lower/Increase the temperature |
| | Instrument not grounded | Ground the instrument |
| | Strongly varying pressure of the process medium | Damping; consulting by the manufacturer |
| **Deviating zero point signal** | Operating temperature too low or high | Lower/increase the temperature |
| | Other mounting position | Adjust the zero point |
| | Overpressure limit exceeded | Reduce the pressure |

### Caution

If faults cannot be eliminated by means of the measures listed above, shut down the pressure transmitter immediately, and ensure that pressure and/or signal are no longer present, and secure the instrument from being put back into operation inadvertently. In this case, contact the manufacturer. If a return is needed, please follow the instructions given in section 7.2.

# 6. Returns and disposal

**Caution**

Residual media in dismounted pressure transmitters can result in a risk to persons, the environment and equiptment. Take sufficient safety measures.

## 6.1 Dismounting

**Warning**

RISK OF BURNS

Let the instrument cool down sufficiently before dismounting. During dismounting there is a risk of dangerously hot pressure media escaping

When removing the instrument, the force required to do this must not be applied through the case or the cap ring, but only through the spanner flats provided for this purpose and using a suitable tool (see section 4.2.1).

When there is a cooling element, the lower hexagon should be used for unscrewing (see section 4.2.1)

Only disconnect the pressure transmitter once the system has been depressurised!

## 6.2 Returns

**Caution**

All pressure transmitters must be absolutely free from any kind of hazardous substances when returned

When returning the instrument, please use the origional packaging or a suitable transport package.

Label the shipment as transport of highly-sensitive measuring instrument in order to avoid any damage.

## 6.3 Disposal

Please visit the Spirax Sarco product compliance web pages for up to date information on any substances of concern that may be contained within this product. Where no additional information is provided on the Spirax Sarco product compliance web page, this product may be safely recycled and/or disposed providing due care is taken. Always check your local recycling and disposal regulations.

Visit - https://www.spiraxsarco.com/product-compliance