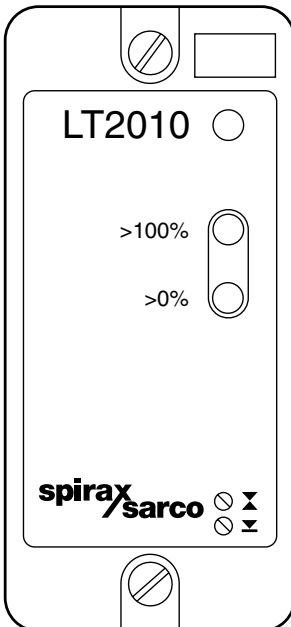


LT2010

Level Transmitter

Installation and Maintenance Instructions



1. *General safety information*
2. *General product information*
3. *Installation*
4. *Setting up the transmitter*
5. *Wiring diagrams*
6. *Commissioning*
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1. General safety information

Your attention is drawn to Safety Information Leaflet IM-GCM-10 as well as to any National or local regulations.

Safe operation of the product depends on it being properly installed, commissioned and maintained by a qualified person in compliance with the operating instructions. It is essential to comply with general installation and safety instructions for pipeline and plant construction, as well as to make proper use of tools and safety equipment. The product is designed and constructed to withstand the forces encountered during normal use. Use of the product for any other purpose, or failure to install the product in accordance with these Installation and Maintenance Instructions, could cause damage to the product, will invalidate the CE marking, and may cause injury or fatality to personnel.

Warning

Isolate the mains supply before unplugging the transmitter since hazardous voltages will be exposed on the transmitter base. This product complies with the requirements of Electromagnetic Compatibility Directive 89/336/EEC by meeting the standards of:

- BS EN 50081-1 (Emissions) and
- BS EN 61000-6-2 (Immunity).

The following conditions should be avoided as they may create interference above the limits specified in BS EN 61000-6-2 if:

- The product or its wiring is located near a radio transmitter.
- Excessive electrical noise occurs on the mains supply. Power line protectors (ac) should be installed if mains supply noise is likely. Protectors can combine filtering, suppression, surge and spike arrestors.
- Cellular telephones and mobile radios may cause interference if used within approximately 1 metre (39") of the product or its wiring. The actual separation distance necessary will vary according to the surroundings of the installation and the power of the transmitter.

If this product is not used in the manner specified by this IMI, then the protection provided may be impaired.

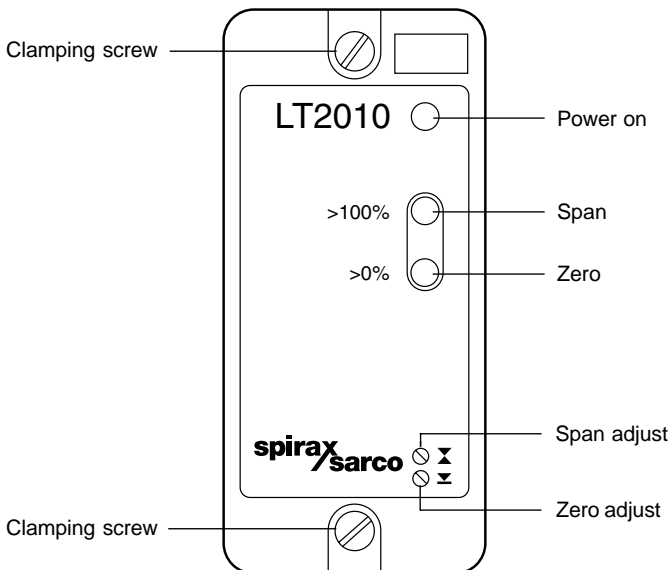


Fig. 1

— 2. General product information —

The LT2010 is a level transmitter which converts the voltage output from a Spirax Sarco capacitance probe into an isolated 0 - 20 or 4 - 20 mA signal proportional to water level. The output can be scaled to represent any desired water level range, the gauge glass for example. Two or more transmitters may be used with a single capacitance probe if required.

The LT2010 can also power and be used with any 2 wire 0 - 20 or 4 - 20 mA transmitter, for example for pressure, temperature, or level transmission using a pressure or differential pressure transmitter. An inverse output can be selected for level monitoring with a differential pressure transmitter. The transmitter has LED indication of mains on, zero point, and span settings, and a wave filter function which gives an averaged output, maintaining a stable signal under the very different turbulence conditions found in tanks and high output boilers.

The LT2010 is set up before installation to suit the mains supply voltage and to provide the required functions, using internal switches. See 'Setting up the transmitter', Section 4. Calibration can be altered without removing or dismantling the unit, using the zero point and full scale/span potentiometers on the front panel.

Maximum ambient temperature	55°C	(131°F)
Minimum ambient temperature	0°C	(32°F)
Pollution degree	2	
Overvoltage category	II	
Indoor use only		
Altitude	2 000 m	(6 561 ft)
Humidity	Maximum relative humidity 80% for temperature up to 31°C (87.8°F) decreasing linearly to 50% relative humidity at 40°C (104°F).	
Protection rating	IP40	
Mains supply voltage	230 V setting	198 V - 264 V
	115 V setting	99 V - 132 V
Frequency	50 - 60 Hz	
Fuse type	20 mm Cartridge, 100 mA anti-surge (T). For the UL version, replacement fuses must be UL recognised to maintain the integrity of the approval.	
Maximum power consumption	6 VA	
Maximum cable length (transmitter to probe)	100 m	(328 ft)
Terminal torque rating	1 N m	(9 lbf ft)

3. Installation

WARNING:

Isolate the mains supply before unplugging the transmitter since hazardous voltages will be exposed on the transmitter base.

To unplug the transmitter from its base, undo the two retaining screws and pull the transmitter straight forwards. Rocking the transmitter in the vertical plane will ease removal.

The transmitter must be installed in an enclosure or control panel to provide environmental protection (Pollution Degree 2). Spirax Sarco can provide suitable metal or plastic enclosures.

The transmitter may be mounted on a 'top hat' DIN rail using the clip provided or the clip can be removed and the transmitter base screwed directly to a chassis plate.

Caution: Allow 15 mm spacing between multiple units for air circulation.

The transmitter is for installation Category II (Overvoltage category) and must be installed in accordance with IEC 60364 or equivalent. The transmitter and all connected circuits must have a common isolation system which meets the relevant requirements of IEC 60947-1 and IEC 60947-3 or equivalent. This must be positioned close to the transmitter and clearly identified as the disconnect device.

A quick blow 3 amp external fuse must be fitted in all phases of the transmitter supply.

For the US and Canadian markets the transmitter must be wired in accordance with the National and Local Electrical Code (NEC) or Canadian Electrical Code (CEC).

Screened high temperature, 3 core, 1 mm² (18 - 16 AWG) copper cable is required for the probe wiring. The maximum permitted length is 100 metres (328 ft). Use cable with a suitable temperature rating for the installation. Pirelli FP200 or Delta Crompton Firetuf OHLS are suitable cables for the standard version. Use NEC Class 1 wiring for the UL version.

Cabling should be installed in accordance with BS 6739 - Instrumentation in Process Control Systems: Installation design and practice or local equivalent.

Connect the screens as shown in the wiring diagrams (Section 5).

If the product is not used in the manner specified by this IMI, then the protection provided may be impaired.

4. Setting up the transmitter

4.1 Setting up the transmitter

The transmitter is set up as follows:

- 230 V mains supply.
- Wave filter off.
- 4-20 mA.
- Normal (non-inverse) output.
- Capacitance probe input (voltage).

4.2 To change the mains supply voltage:

- Unplug the transmitter from its base.
- Remove the rear cover panel.
- Slide out the printed circuit board.
- Slide the voltage selector switch to the 115 V setting.
- Replace the printed circuit board.
- Ensure that the LED's engage with the holes in the front panel.
- Replace the rear cover panel.

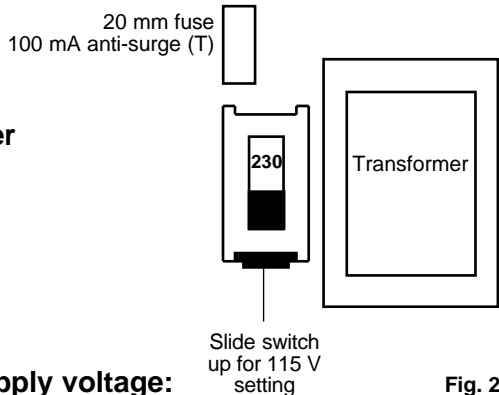


Fig. 2

4.3 To change the function settings

- Unplug the transmitter from its base.
- Remove the rear cover panel.
- Slide out the printed circuit board.
- An 8-way switch on the printed circuit board determines the transmitter functions.
- Set the switches to the positions shown in the diagram for the chosen functions.
- Replace the printed circuit board.
- Ensure that the LED's engage with the holes in the front panel.
- Replace the rear cover panel.

Note that Switches 4, 5 and 7 are not used.

4.4 Current/voltage input - Switches 1 and 2

The transmitter is supplied set for use with a capacitance probe, (voltage input).

If a current input is required, for use with a temperature transmitter for example, set switch 1 and 2 to ON.

4.5 Inverse output - Switch 3

The transmitter is supplied set so that a rising level at the probe will give a rising output from the transmitter.

If a falling transmitter output is required with a rising input, as when using a differential pressure transmitter for level monitoring, set Switch 3 to OFF.

4.6. Wave filter - Switch 8

This feature averages the signal over a longer period for high output boilers where waves and high turbulence may otherwise cause continuous oscillation of the output signal.

If the wave filter is required, set Switch 8 to ON.

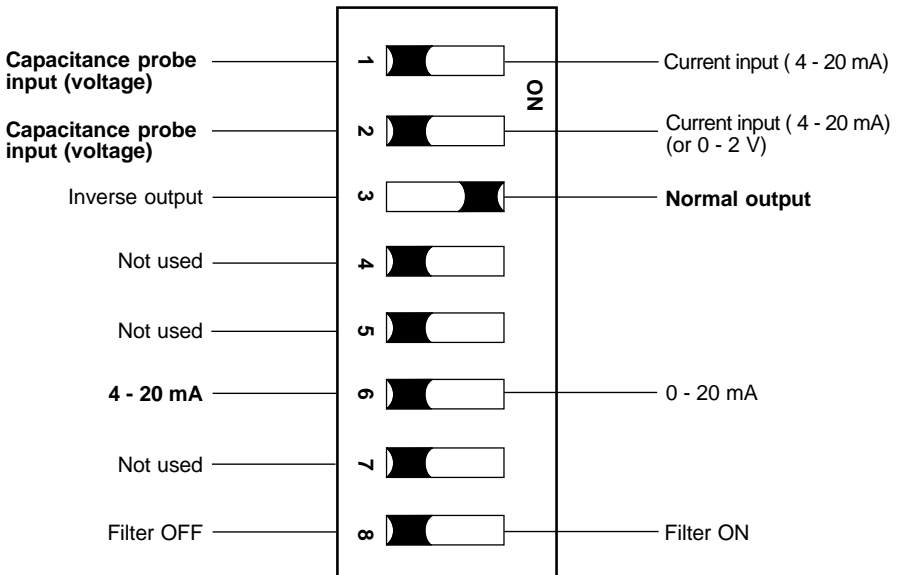


Fig. 3

5. Wiring diagrams

Screen connection

An earth current loop is created if a wire or screen is connected between two earth points, which are at different potential (voltage). If the instructions are followed correctly, then the preamplifier and transmitter screen will only be connected to earth at one end.

Note: The PA20 earth terminal is a functional earth rather than a protective earth.

A protective earth provides protection from electric shock under a single fault condition. This product has double insulation and therefore does not require a protective earth.

A functional earth is used in order for the product to operate. In this application, the earth (tank/boiler shell) is used as the common of the probe/preamplifier. It also provides a sink/drain for any electrical interference.

Ensure that the screen is connected to the earth terminal of the PA20 and to the common terminal of the transmitter.

Ensure the common terminal of the transmitter is not internally earthed. (All Spirax Sarco boiler controls are internally isolated from earth).

The common terminal of the transmitter must only be earthed via the PA20.

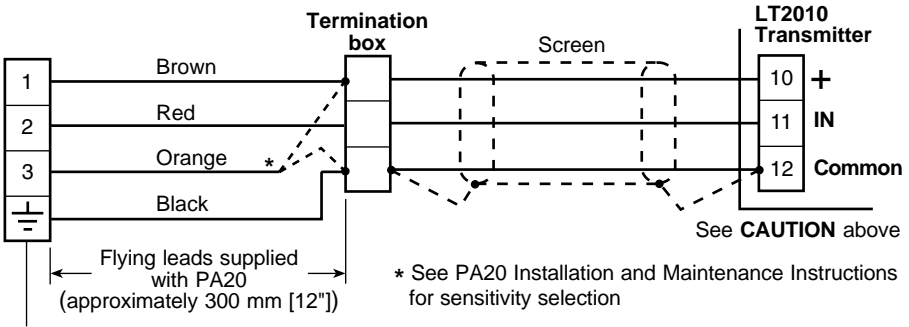
CAUTION:

Do not connect the common terminal to an earth local to the transmitter. To do so may induce an earth current loop, which may reduce the performance or damage the product.

Wiring diagram UL version

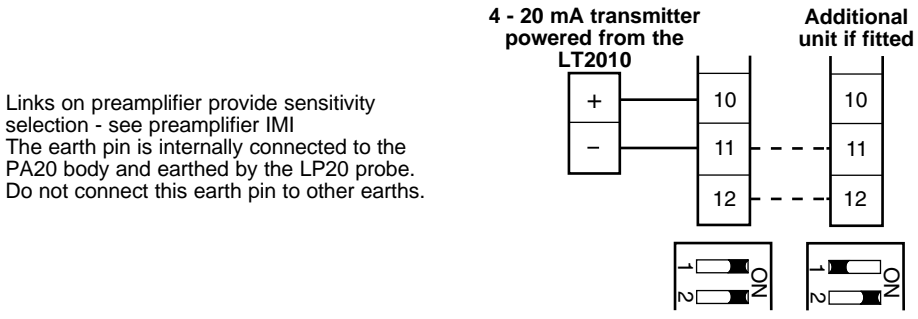
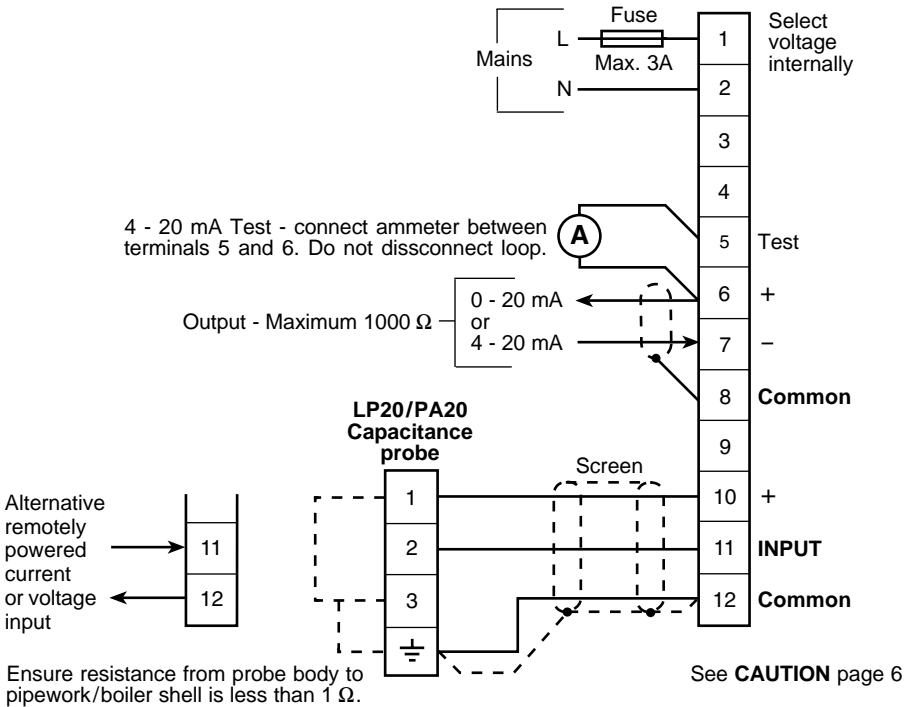
PA20 preamplifier and LP20 capacitance probe

(see PA20 and LP20 Installation and Maintenance Instructions)



Ensure resistance from probe body to pipework/boiler shell is less than 1 Ω .

Fig. 4



Multiple transmitters

Several transmitters can be connected to a single probe if required. Connect wiring as shown in the diagram. Ensure resistance from probe body to pipework/boiler shell is less than 1 Ω .

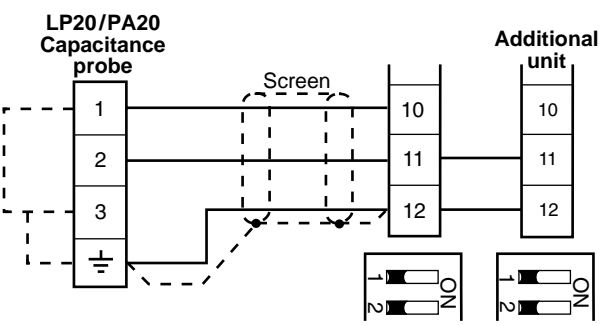


Fig. 5

6. Commissioning

To commission the transmitter proceed as follows:-

1. Ensure the transmitter is set up for the correct functions and mains supply voltage.
2. Alter the water level in the tank or boiler to the required low level, or zero point. This is the point at which you require the 4 mA, (or 0 mA) to be transmitted.
3. Adjust the zero adjust potentiometer (bottom) until the > 0% LED just lights.
4. Alter the water level to the required high level. This is the level at which the 20 mA signal is to be transmitted. (**Note:** that these output signals will be reversed if 'reverse action' as been selected on switch 3).
5. Adjust the span adjust potentiometer (top) until the > 100% LED just lights.
6. As an aid to commissioning, an ammeter may be connected across the test output pins (5 and 6), to indicate transmitted current.

7. Maintenance

No special servicing or maintenance of the transmitter is necessary. Boiler water level controls and level alarms, however, do require testing and inspection. General guidance is given in Health and Safety Executive Guidance Note PM5.

For specific instructions for the Spirax Sarco system please see separate literature.

Available spares

Spare fuses	Stock No. 4033380	Set of 3
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8. Fault finding

Most faults which occur on commissioning are due to incorrect wiring or setting up. In the case of problems the following checklist may be helpful:-

Mains on LED not lit:

- No live supply
- Neutral not connected
- Transmitter internal fuse blown.

Transmitter internal fuse blown:

- Check the mains supply voltage is lower than 264 V, and that the ambient temperature inside the control panel is less than 55°C (131°F). If either of these limits has been exceeded, it is possible that the transformer internal thermal fuse has blown, and that the transformer will need to be replaced.
- Ensure that the probe supply voltage is between 24 Vdc and 35 Vdc between terminals 10 and 12 of the transmitter, or terminals 1 and earth of the probe.
- The probe output voltage should be 1 Vdc to 6 Vdc between terminals 11 and 12 of the transmitter, or terminals 2 and earth of the probe, depending on the level.
- The voltage increases with the level, even when inverse output has been selected.