N 510
28.01.04 MZ

ULTRASONIC PROBES FOR MEASURING LIQUID LEVELS

C ←BUS

LGU 420 C2 - LGU 820 Eng.

- **Measurement level of a liquid**
- **Signalling of two alarm levels**
- **Output signal: 4...20mA**
- **Communication system: C-Bus for telemanagement**
- **Power supply 24V~ ; Protection: IP68 (LGU 420), IP65 (LGU 820**

CE

1. APPLICATION

LGU probes are for use in all installations where it is necessary to measure the level of a fluid inside a tank or cistern e.g. level of a fuel (gas oil or diesel) or of water..

2. FUNCTIONS

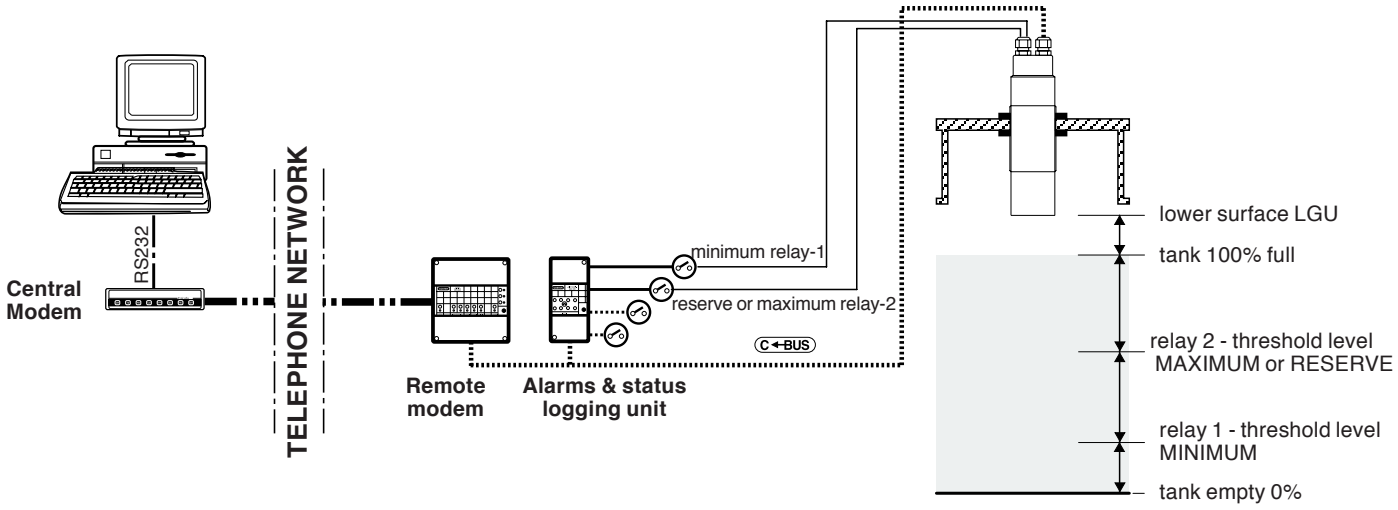
The principal functions of LGU probes are:
- measurement of level 0...100% expressed as 4...20 mA,
- measurement of level in millimetres via telemanagement,
- two relays for two alarm thresholds: MINIMUM threshold level and MAXIMUM or RESERVE threshold level (can be selected at calibration stage); in tanks for combustible fluids the MINIMUM threshold level (combustible level "almost exhausted") and the RESERVE threshold (level of start of "reserve quantity of fuel") are normally use.
- measurement of internal operating temperature of probe,
- calibration via telemanagement using remote PC connected to telephone landline or by means of local PC.

LGU probes are supplied ex works with the telemanagement address = 2 pre-set.
If a different address should be required, or if several probes are to be installed in a plant and accordingly require different addresses, it is INDISPENSABLE, when ordering, to inform COSTER T.E. S.p.A. specifying the addresses required. The same applies if a probe with a number other than 2 has to be replaced.

3. MODELS

Model	Power supply V~ (VA)	Measurement range	Accuracy over distance measured	Resolution	Tank connection
LGU 420	24 (3.0)	0.3…5 m	1 %	1 mm	2" flanged male gas
LGU 820	24 (3.5)	0.7…15 m	1 %	3 mm	DN150 PN6

4. OPERATING DIAGRAM



5. TECHNICAL DATA

• Electrical

Power supply	24 V ~ ± 10%
Frequency	50…60 Hz
Consumption :	
LGU 420	3.0 VA
LGU 820	3.5 VA
Voltage-free output contacts:	
Maximum switched voltage	250 V ~
Maximum switched current	2 (1) A
Construction standards	Italian Electrotech. Committee (CEI)
Analogue output	4…20 mA
Measurement range :	
LGU 420	0.3…5 meters
LGU 820	0.7…15 meters
Accuracy	±1% of distance measured
Resolution :	
LGU 420	1 mm
LGU 820	3 mm

• Mechanical

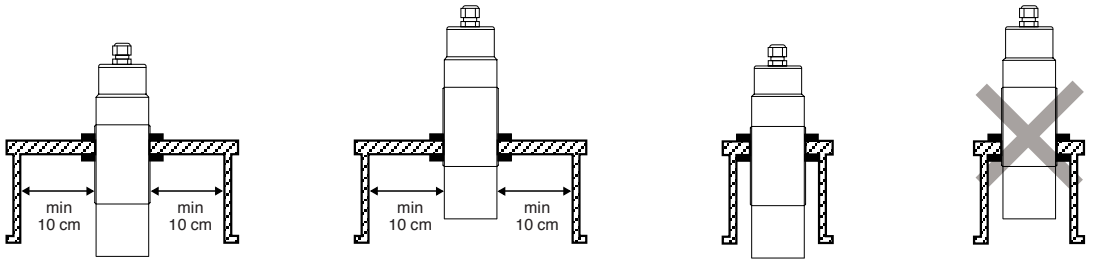
Enclosure construction material:	PP
LGU 420 :	
Protection	IP 68
Connection to tank	2" threaded male gas
Probe working temperature	–30…+70 °C
LGU 820 :	
Protection	IP65
Enclosure construction material	fixed flanged DN 150 PN6
Probe working temperature:	–20…+50 °C

• Telemanagement

Default address	2
Parallel output	C-Bus

6. MECHANICAL INSTALLATION

LGU 420 probe is provided with a 2" male gas thread and two securing nuts for installation on the tank manhole cover. LGU 820 probe has a DN 150 - PN6 fixing flange.
The sensor must be mounted perpendicularly to the surface from which measurement is to be made.



a - Correct installation b - Correct installation c - Correct installation d - Incorrect installation

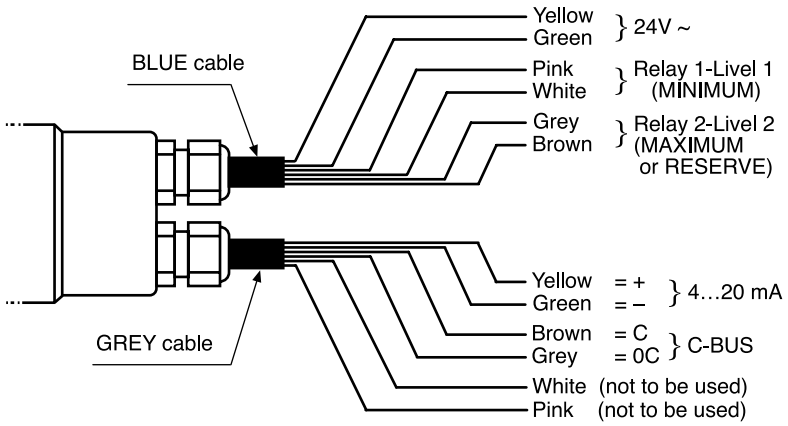
Between the lower part of the probe and the surface of the liquid there must be no large obstacles (e.g. tie rods) which could cause measurement errors.
For correct installation it is important to respect the minimum distances shown in the diagrams:
- with a large manhole, allow at least 10 cm space around the pbobe; the latter can be projecting or not (diagrams "a" and "b")
- with a narrow stub pipe the sensor must project when installed (diagram "c").

The distance between the lower surface of the probe and the surface to be measured from must never be less than 30 cm for probe LGU 420 and 70 cm for probe LGU 820.

7. ELECTRICAL INSTALLATION

LGU probes are supplied with pre-wired cables. To wire up, proceed as follows:

- Bring the cables supplied to a connector block ready to make the connections.
- Connect the Yellow and Green wires of the BLUE cable to a 24V~ transformer.
- Connect the White and Pink wires of the BLUE cable, deriving from relay 1, to a voltage-free input of an external device (e.g. an alarm data logger) to forward the "MINIMUM level" alarm.
- Connect the Brown and Grey wires of the BLUE cable deriving from relay 2 to a voltage-free input of an external device (e.g. an alarm data logger) to forward the "MAXIMUM or RESERVE level" alarm.



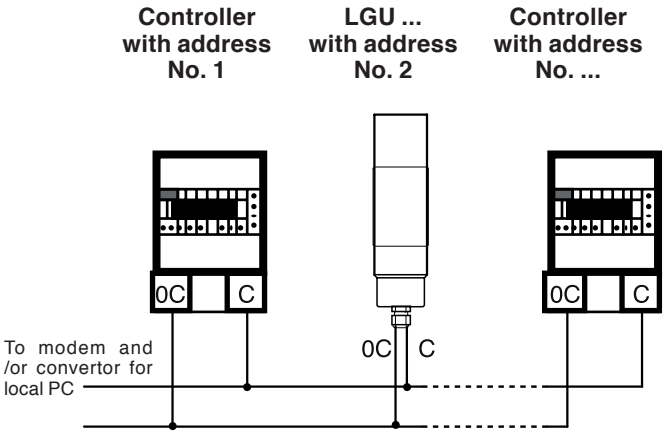
N.B.: The GREY cable may not have the White and Pin wires (not to be used) and therefore only 4 wires will be seen.

- If necessary, connect the Yellow and Green wires of the GREY cable to a 4…20 mA signal reader, respecting the polarities and using 1mm² cables.
- Connect the Brown and Grey wires of the GREY cable to C-Bus using 0.5 mm² cables and paying particular attention to the polarity.

8. COMMUNICATION

8.1 C-Bus communication for telemanagement (for detailed information see Data Sheet T 021)

Via the C-Bus output LGU probes can be telemanaged (two-way transmission of data) using one or more local PCs and/or a central PC via telephone landlines.
From the PC(s) you can see and/or modify:
– the configuration data,
– the alarm levels,
– the measurements of level and the internal operating temperature of the probe.



8.2 Address for telemanagement

The LGU probe has the telemanagement address factory setting = 2.

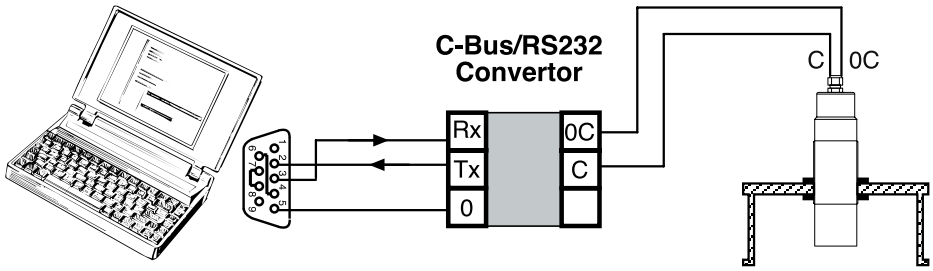
If a different address should be necessary, or if more than one sensor is to be installed in the same plant, see note to section 2. FUNCTIONS.

9. CALIBRATION

The calibration of LGU probes can be carried out :
– by connecting the probe directly to a computer using a C-Bus/RS232 signals convertor.
– by connecting the probe to a remote computer via a COSTER modem.
– by asking COSTER T.E. S.p.A. to calibrate the probe before delivery.

9.1 Calibration by local PC

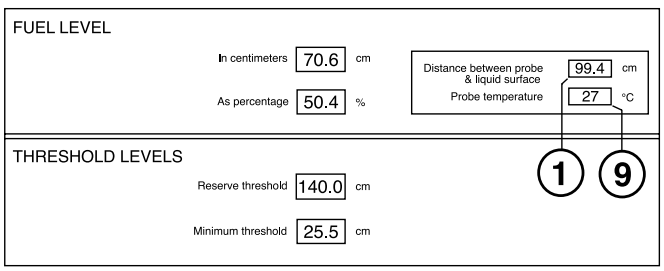
– Connect the C-Bus output of the probe to be calibrated (one at a time) to a PC with an SWC 701 program, using a C-Bus/RS232 signal convertor.
– Using a dip-stick marked in millimetres measure the level of the liquid in the tank.
– After having opened the SWC 701 telemanagement program read the data contained in the probe.
– Choose the "Normal use" menu, read the value "Distance between probe and liquid level" (point 1).
– Choose the "Calibration" menu, enter, at point 2, the total of the measurements made with the dip-stick and the value read by the PC at point 1. According to the type of probe used, enter the value of 30 cm or 70 cm (minimum distance between probe and liquid level) at point 3.
– Choose the MAXIMUM or RESERVE threshold control (point 4).
– Then enter the thresholds of the two levels MAXIMUM or RESERVE and MINIMUM (points 5 and 6):
  • MAXIMUM or RESERVE threshold: alarm on reaching maximum level or reserve level of fuel.
  • MINIMUM threshold: alarm on reaching minimum level ("almost exhausted").
– Choose the output relay status for signalling the threshold reached (points 7 and 8) :
  • with relay CLOSED: the relays close when the respective threshold is reached.
  • with relay OPEN: the relays open when the respective threshold is reached.
– Send the settings to the probe. Calibration terminated.



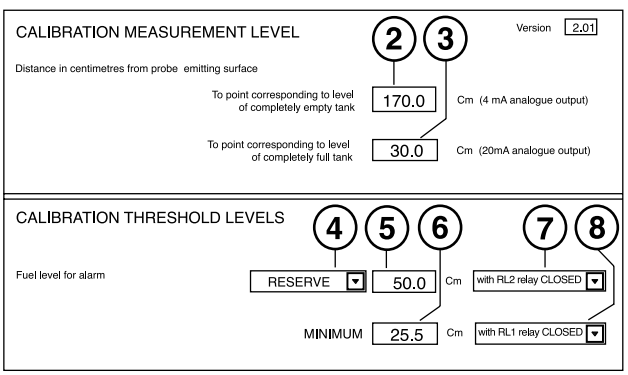
9.2 Calibration with remote computer via modem

Connect the C-Bus output of the probe to be calibrated to the COSTER modem (this operation must be carried out with one detector at a time) as shown in schematic diagram 4.1. Proceed as described in section 9.1.

"Normal use" window



"Calibration" window

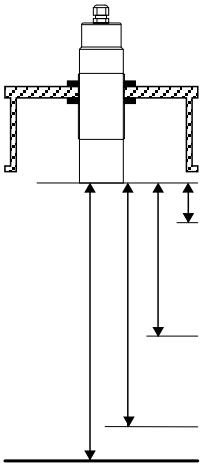


9.3 Calibration for use of probe with 4,,,20 mA output

To calibrate LGU probes so they can measure via the 4...20 mA output please contact COSTER T.E. S.p.A. Technical Assistance.

9.4 Factory calibration

At the time of placing the order you can ask COSTER T.E. S.p.A. to calibrate the probe. If you do this it will be necessary to provide the following details of the tank and of the probe installation.



Minimum distance between probe and liquid surface
(LGU 420 min 30 cm, LGU 820 min 70 cm) : .....

MAXIMUM or RESERVE alarm threshold - Relay 2.....relay : open ☐ closed ☐

MINIMUM alarm threshold - Relay 1 : ..... relay : open ☐ closed ☐

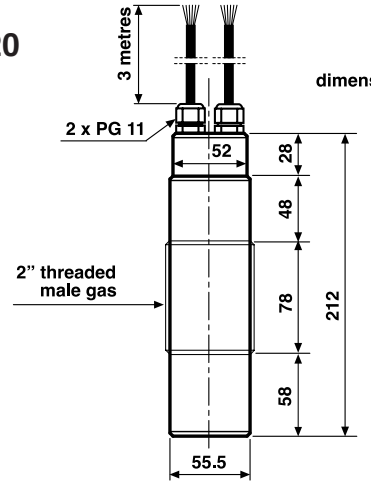
Distance between probe and bottom of tank : .....

10. OPERATION

LGU probe emits ultrasound waves towards the surface to be measured from; the waves reflected are read by the LGU which traduces them into the measurement of the distance between the probe and the reflecting surface.
The measurement can be read by a local computer or, via modem, by a remote computer.
It is also possible to read the distance measurement using the 4...20 mA analogue output.
When the value measured reaches the thresholds set, the probe closes the relative relays which, if connected to the appropriate devices, can be used to send alarm signals to a remote site or to activate electrically-controlled devices (e.g. pumps).
A sensor is installed inside the LGU for measuring the internal working temperature of the probe itself (window “Normal use”, point 9.2).

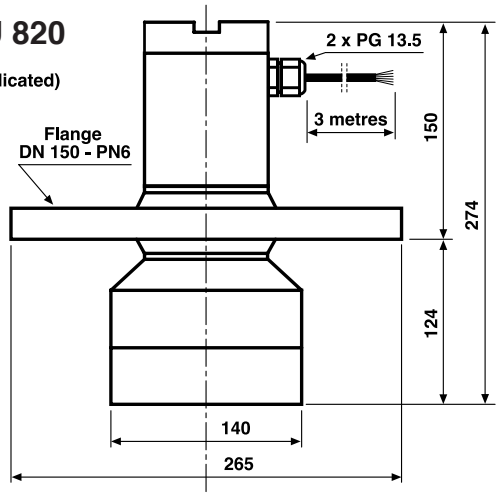
11. OVERALL DIMENSIONS

LGU 420



dimensions in mm (if not indicated)

LGU 820



Amendments to version dated 28.10.03 (data added for model LGU 820)

Page	Section	Description amendment
1 4	3. MODELS 11. DIMENSIONS	Addition section with table describing both models. Addition overall dimensions model LGU 820

LB 29.07.98 Rev. : MZ 28.10.03, MZ 28.01.04

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