

GESTRA Steam Systems

Conductivity Monitoring

LRGT 16-1
LRGT 16-2
LRGT 17-1

Description

The compact-design **conductivity transmitter LRGT 16-1, LRGT 16-2, LRGT 17-1** consists of a conductivity electrode, a temperature sensor for detecting the fluid temperature and a conductivity transmitting unit incorporated in the terminal box.

The conductivity transmitters LRGT 16-1 and LRGT 17-1 work according to the conductometric measuring method using **two** measuring electrodes and the conductivity transmitter LRGT 16-2 works according to the conductometric measuring method using **four** measuring electrodes. The equipment measures the conductivity of electrically conductive fluids (TDS content) and provides a 4-20 mA measuring current as a function of the detected conductivity value.

The conductivity transmitters are designed for use with the **industrial controller KS 90** for conductivity limiting and continuous boiler blowdown in steam boilers or for conductivity monitoring in condensate and feedwater systems.

The conductivity transmitters LRGT 16-1, LRGT 17-1 are mainly used in steam boilers with low TDS content, e.g. steam regenerators, high-pressure boilers or condensate tanks.

The conductivity transmitter LRGT 16-1 is also approved for feedwater monitoring on ships.

The conductivity transmitter LRGT 16-2 is mainly used in industrial boiler plants operating with pressures up to PN 40 and max. admissible conductivities acc. to TRD/EN of 8000/6000 $\mu\text{S}/\text{cm}$.

Function

LRGT 16-1, LRGT 17-1

A measuring current of variable frequency passes through the fluid, creating a potential gradient between the measuring electrode and the reference tube which is then used as measuring voltage U_U .

LRGT 16-2

The conductivity electrode consists of two current and two voltage electrodes. The current electrodes direct the measuring current I_I with a fixed frequency into the fluid, thereby creating a potential gradient between these electrodes. This potential difference is then picked up by the voltage electrodes and evaluated as measuring voltage U_U .

LRGT 16-1, LRGT 17-1 und LRGT 16-2

The electrical conductivity is a function of temperature. A resistance thermometer integrated in the electrode measures the fluid temperatures so as to relate the measured values to the reference temperature.

The electrical conductivity is calculated from the measuring voltages U_U and U_T and – as a function of the adjusted temperature coefficient T_k – linearly based on the reference temperature of 25 °C. Once converted into a conductivity-dependent current signal, an output current of 4 – 20 mA is available for external use.

The cables leading to the measuring electrode, the reference tube and the resistance thermometer are monitored and checked for interruptions and short circuits. In addition, the circuit board is protected against excess temperatures in the terminal box. In the event of a malfunction, the LEDs on the circuit board will light up or flash and the current signal is set to 0 or 0.5 mA. As a consequence the controller KS 90 will signal sensor break.

Function – continued –

A ten-pole code switch enables the parameterisation of the transmitter, the adaptation of the cell constant and the activation of a performance test. The electrical conductivity is measured in $\mu\text{S}/\text{cm}$. In some countries the unit ppm (parts per million) is used (conversion: 1 $\mu\text{S}/\text{cm}$ = 0.5 ppm).

Technical Data

Type approval

TÜV.WÜL.xx-003
 GL 33254-06 HH

Service pressure

LRGT 16-1: 32 bar at 238 °C
 LRGT 16-2: 32 bar at 238 °C
 LRGT 17-1: 60 bar at 275 °C

Connection

Screwed 1" BSP (ISO 228-1)

Materials

Electrode screw-in housing: 1.4571, X6CrNiMoTi17-12-2
 Measuring electrode(s): 1.4571, X6CrNiMoTi17-12-2

Electrode insulation: PTFE

Terminal box: 3.2161 G AISi8Cu3

LRGT 16-1, LRGT 17-1: measuring tube/screw: 1.4571, X6CrNiMoTi17-12-2

LRGT 16-1, LRGT 16-2: spacer disk: PEEK

LRGT 17-1: spacer disk: PEEK HT

Measuring length and length of installation

(do not cut electrode tips!)

200, 300, 400, 500, 600, 800, 1000 mm
 (max. 400 mm for marine applications)

Adjustable measuring ranges *) ($\mu\text{S}/\text{cm}$ at 25 °C)

LRGT 16-1, LRGT 17-1	LRGT 16-2
0.5 to 20	100 to 3000
0.5 to 100	100 to 5000
0.5 to 200	100 to 7000
0.5 to 500	100 to 10000
Preferred measuring ranges (control ranges)	
0.5 to 1000	
0.5 to 2000	
0.5 to 6000	
0.5 to 12000	
*) Conversion $\mu\text{S}/\text{cm}$ in ppm (parts per million): 1 $\mu\text{S}/\text{cm}$ = 0.5 ppm	

Temperature sensor

Resistance thermometer Pt 1000

Measuring cycle

1 sec.

Temperature compensation

Linear, T_k adjustable via code switch

■ 0 % per °C

■ 1.6 – 3.0 % per °C in steps of 0.1

Time constant (measured according to two-bath process)

Temperature: 9 sec.

Conductivity: 14 sec.

Indicators and adjustors

Two LEDs for status messages

One 10-pole code switch for setting:

■ measuring range

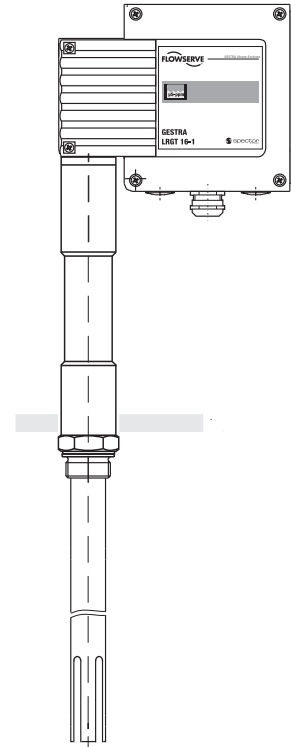
■ temperature coefficient

■ cell constant

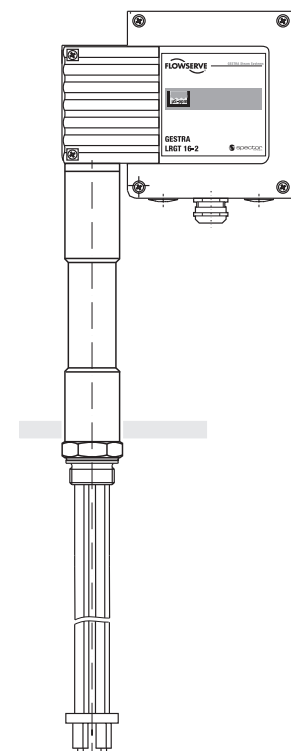
■ functional test

Product Range B1

LRGT 16-1
LRGT 16-2
LRGT 17-1



LRGT 16-1, LRGT 17-1



LRGT 16-2

Conductivity Monitoring

LRGT 16-1 LRGT 16-2 LRGT 17-1

Technical Data – continued –

Voltage supply

24 V DC (18-36 V DC)

Power consumption

4.5 watt

Fuse

Electronic thermal fuse $T_{max} = 85\text{ °C}$, hysteresis – 2 K

Cable entry

EMC cable gland with integrated cable clamp, M 20 x 1.5
5-pole screw-type terminal strip, detachable, conductor size 1.5 mm²

Protection

IP 65 to EN 60529

Admissible ambient temperature

Max. 70 °C

Storage and transport temperature

–40 to +80 °C

Weight

Approx. 2.5 kg

Important Notes

To supply the conductivity transmitter with 24VDC, a safety power supply unit (PSU), e.g. Siemens SITOP power 05, must be used; this must provide a level of isolation against voltages that at least meets the requirements for double or reinforced insulation as per DIN EN 50178 or DIN EN 61010-1 or DIN EN 60730-1 or DIN EN 60950 (electrically protective separation). The PSU must be equipped with a protective device to DIN EN 61010-1.

Cable required for wiring: Flexible, screened control cable, min. conductor size 0.75 mm².
Max. cable length: 250 m

Order & Enquiry Specification

GESTRA Conductivity Transmitter LRGT 16-1
PN 40, end connection 1"
Two-electrodes measuring system
Length of installation / measurement.....mm

GESTRA Conductivity Transmitter LRGT 17-1
PN 63, end connection 1"
Two-electrodes measuring system
Length of installation / measurement.....mm

GESTRA Conductivity Transmitter LRGT 16-2
PN 40, end connection 1"
Four-electrodes measuring system
Length of installation / measurement.....mm

Associated Controller and PSU

- GESTRA control unit KS 90
- Power supply unit SITOP power 05

ATEX (Atmosphère Explosible)

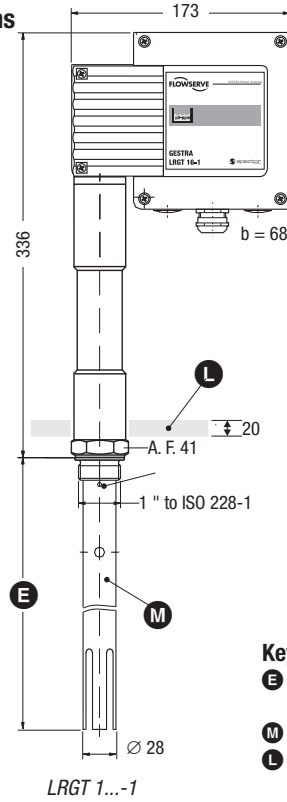
According to the European Directive 94/9/EC the equipment must **not** be used in explosion risk areas.

Supply in accordance with our general terms of business.

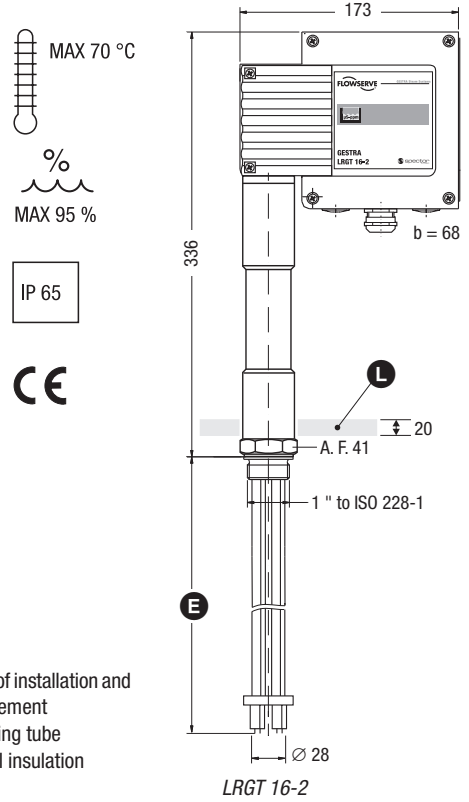
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Dimensions



LRGT 1...-1

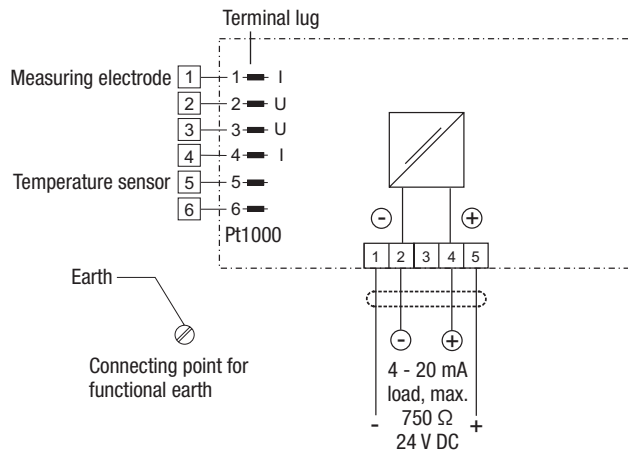


LRGT 16-2

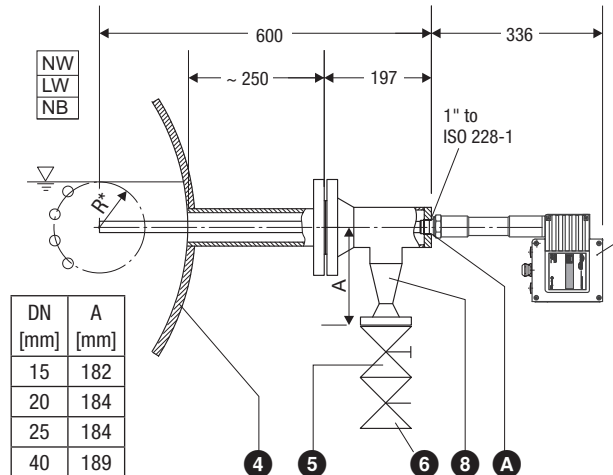
Key

- Ⓔ Length of installation and measurement
- Ⓜ Measuring tube
- Ⓛ Thermal insulation

Wiring Diagram



Example of Installation: LRGT 16-1, LRGT 16-2, LRGT 17-1 used for continuous boiler blowdown control



R*: LRGT 16-1, LRGT 17-1 R = 30 mm
LRGT 16-2 R = 60 mm

LRGT 16-1
LRGT 16-2
LRGT 17-1

Key

- Ⓐ Ring joint 33 x 39, form D, DIN 7603, 1.4301, bright annealed
- Ⓓ Boiler drum
- Ⓔ Shut-off valve GAV
- Ⓖ Continuous blowdown valve BAE
- Ⓒ T-type connector

DN [mm]	A [mm]
15	182
20	184
25	184
40	189