



Instructions in accordance with directive 2014/34/EU

TÜV 00 ATEX 1641 X

Measuring Transducer type LS 500 ...

Edition: 06.2017

I Range of application

The measuring transducer LS 500 ... is an associated apparatus and is used to supply intrinsically safe sensors that can be used in potentially explosive atmospheres. Furthermore, the measuring transducer is used to transmit electrical signals between the non-intrinsically safe and intrinsically safe area. Mainly the measuring transducer is used as part of an overfill protection or dry running protection.

II Standards

The measuring transducer is designed in accordance with the following European standards

EN 60079-0:2012 + A11:2013	Equipment – General requirements
EN 60079-11:2012	Equipment protection by intrinsic safety "i"

III Instructions for safe ...

III.a ... use

The measuring transducer serves as associated apparatus and is not for use in potentially explosive areas. The intrinsically safe sensor circuit of the measuring transducer can be lead in zone 0 and is suitable for all gas groups (IIA, IIB and IIC).

The approval applies to the equipment types LS 500 ...

III.b ... assembling and dismantling

The assembling and dismantling must solely be carried out with the power disconnected!

Measuring transducer type LS 500 ... in the plug-in enclosure

For wall mounting the measuring transducer the upper part of the enclosure must be removed from the lower part. For this, loosen the two screws from the upper part of the enclosure and pull apart both parts. After the installation, the upper part of the enclosure is remounted onto the lower part and tightened by using the two enclosure screws.

Measuring transducer type LS 500 19" ... in Euroboard format

The slide-in module is produced without an enclosure.

Measuring transducer type LS 500 H ... in mounting rail enclosure

To press the test button, the upper cover must be turned up. Further disassembly should not be attempted and would probably damage the measuring transducer and therefore invalidate the approval.

III.c ... installation

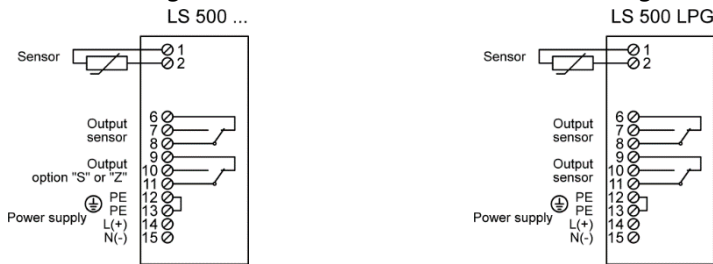
All wiring operations must solely be carried out with the power disconnected. Special rules and regulations, including EN 60079-14 and local installation regulations, must be observed.

The measuring transducer must be installed outside potentially explosive atmospheres/areas. The wiring from the sensor to the measuring transducer (preferably blue coloured cable) must not exceed the permissible inductance and capacitance according to section V.



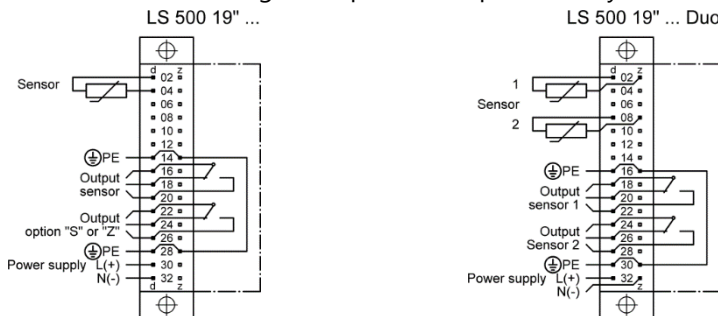
Measuring transducer type LS 500 ... in the plug-in enclosure

The measuring transducer is suitable for wall mounting.



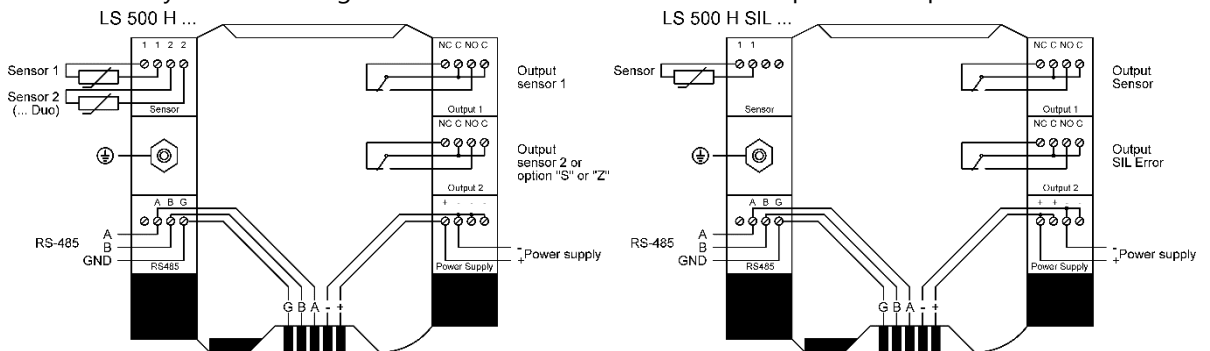
Measuring transducer type LS 500 19" ... in Euroboard format

The measuring transducer is provided installation in a 19" enclosure. The measuring transducer must be installed with a degree of protection provided by enclosure of at least IP20.



Measuring transducer type LS 500 H ... in mounting rail enclosure

The measuring transducer is provided for installation on a mounting rail. It must be ensured that the distance of the intrinsically safe electric circuits to other equipment is observed. For compliance to the intrinsic safety the measuring transducer must be bonded into the potential equalization.



III.d ... adjustment

To operate the measuring transducer Ex relevant safety adjustments are not necessary.

III.e ... putting into service

Before putting into service, all equipment must be checked to ensure it is properly connected and installed. The power supply, as well of connected equipment, must be checked.

III.f ... maintenance (servicing and emergency repair)

Generally, the measuring transducer is maintenance-free. In case of a defect it must be send back to FAFNIR or one of his representations.

When performing the insulation test of the intrinsic safe sensor circuit - under well-controlled conditions - the measuring transducer type LS 500 H ... (mounting rail enclosure) must be disconnected since there is no conformity with the requirements for dielectric strength according to EN 60079-11, clause 6.3.13. Conformity exists for all other measuring transducers.



IV Equipment marking

- 1 Manufacturer: FAFNIR GmbH, 22525 Hamburg
- 2 Type designation: LS 500 ...
- 3 Certificate number: TÜV 00 ATEX 1641 X
- 4 Ex marking: II (1) G [Ex ia Ga] IIC
- 5 CE marking: 0044
- 6 Technical data: See instruction manual for technical data

V Technical data

The **power supply** for the measuring transducer, depending on model

Type LS 500 ...

- U = 24 V_{AC}/115 V_{AC}/230 V_{AC} ± 10 %, 40 Hz ... 60 Hz, < 4 VA resp. < 8 VA@LS 500 19" ... Duo, or
- U = 24 V_{DC} ± 20 %, < 5 W resp. < 10 W@LS 500 19" ... Duo

The power supply is safely galvanically isolated from the intrinsically safe sensor circuit up to a peak crest value of 375 V.

Type LS 500 H ...

- U = 23 V_{DC} ... 30 V_{DC}, < 8 W

The safety-related maximum voltage is

	LS 500 ...	LS 500 19" Duo	LS 500 H ...
24 V_{DC}	U _m = 33 V	U _m = 33 V	U _m = 253 V
24 V_{AC}	U _m = 33 V	U _m = 33 V	-
115 V_{AC}	U _m = 130 V	U _m = 130 V	-
230 V_{AC}	U _m = 253 V	U _m = 253 V	-

Table V: Maximum safety-related voltage of the power supply

The **sensor circuits** are in protection intrinsic safety "ia" designed with a trapezoidal output characteristic. Output values per electric circuit are

Measuring transducer type LS 500 ... for level detectors with PTC thermistor, e.g. type LS 300 ...

- U_o ≤ 15.8 V
- I_o ≤ 154 mA
- P_o ≤ 930 mW
- R_q ≥ 156.8 Ω
- C_i ≤ 1.2 nF

	Gas group IIC		Gas group IIB	
L _o ≤	440 μH	200 μH	5.1 mH	5 mH
C _o ≤	230 nF	260 nF	940 nF	950 nF

The maximum values of the parameter pairings may simultaneously be used as concentrated capacitances (minus C_i) and concentrated inductances.



Measuring transducer type LS 500 ...L... for level detectors with switch-point, e.g. type LOF 1.1... Ex ...

$$\begin{aligned}U_o &\leq 15.8 \text{ V} \\I_o &\leq 25 \text{ mA} \\P_o &\leq 150 \text{ mW} \\R_q &\geq 950 \Omega \\C_i &\leq 1.2 \text{ nF}\end{aligned}$$

	Gas group IIC		Gas group IIB	
$L_o \leq$	5 mH	2 mH	10 mH	5 mH
$C_o \leq$	310 nF	400 nF	1.5 μ F	1.8 μ F

The maximum values of the parameter pairings may simultaneously be used as concentrated capacitances (minus C_i) and concentrated inductances.

Potential-free contacts are available as **output circuits**.

Type LS 500 ...

$$\begin{aligned}\text{AC} & \quad U \leq 250 \text{ V}; I \leq 5 \text{ A}; P \leq 100 \text{ VA}; \cos \varphi \geq 0,7 \\ \text{DC} & \quad U \leq 250 \text{ V}; I \leq 5 \text{ A}; P \leq 100 \text{ W}\end{aligned}$$

The output circuits are safely galvanically isolated from the intrinsically safe sensor circuits up to a peak crest value of 375 V.

Type LS 500 H SIL ...

The following values apply only to the sensor relay. For the SIL error relay, values for LS 500 ... are valid

$$\begin{aligned}\text{AC} & \quad U \leq 42 \text{ V}; I \leq 5 \text{ A}; P \leq 100 \text{ VA}; \cos \varphi \geq 0,7 \\ \text{DC} & \quad U \leq 60 \text{ V}; I \leq 5 \text{ A}; P \leq 50 \text{ W}\end{aligned}$$

The signal voltage of **communication interface** RS-485 of the measuring transducer LS 500 H ... amounts to

$$\begin{aligned}U &< 12 \text{ V} \\U_m &= 253 \text{ V}\end{aligned}$$

The sensor can be used in the following **ambient temperature range**:

$$T_a = -25 \text{ }^\circ\text{C} \dots +50 \text{ }^\circ\text{C}$$

The measuring transducer achieves a **degree of protection provided by enclosure** of

LS 500 ...	IP40
LS 500 19" ...	IP00
LS 500 H ...	IP30

VI Special conditions of use

1. The degree of protection provided by enclosure of measuring transducer LS 500 19" ... amounts to IP00. The measuring transducer is to be installed in such a way that a degree of protection of IP20 is achieved.
2. Measuring transducers LS 500 19" ... and LS 500 H ... are to be installed in such a way that the connecting terminals for intrinsically safe circuits are isolated from other circuits (e.g. by means of distance, thread measure ≥ 50 mm), to comply to the requirements of EN 60079-11, clause 6.2.
3. The potential equalization terminal of measuring transducer LS 500 H ... must be connected with the potential equalization of the potentially explosive area. This connects the intrinsically safe circuit with the earth potential and potential equalization must exist in the entire area in which the intrinsically safe circuit is installed.