Technical
Information
TI 118F/00/en

Operating Instructions
017188-1000

Capacitance Level Measurement
High Temperature Probe TSP 012892

Partially insulated rod and rope probes with ceramic part-insulation and screening









Applications with Hot Bulk Materials
Especially for use with materials which tend to form build-up on the silo roof or walls.
These probes are designed for very rugged conditions and withstand high pressures and temperatures as well as sudden changes in temperature.
They are also insensitive to abrasive bulk materials.

One particular advantage is their insensitivity to build-up.
The reason for this?
The steel pipe on the basic element acts as a screen and forms an inactive zone preventing material build-up close to the threaded boss from affecting the measurement.

3 Versions ...
...are available.

The basic element, which is mounted in the vessel and contains the electronic insert on the outside, is exactly the same for all three versions.
The following probes can be connected to it:

- A »sword« – for limit detection with the probe installed laterally in the vessel wall.
  The sword has a large surface area to give large changes in capacitance while presenting only a small resistive surface to the discharging material.
- A rope probe with rigid weight – for limit detection (maximum or minimum) with the probe mounted in the vessel roof.
- A rope probe with tensioning weight – for continuous level measurement in electrically non-conducting bulk materials.
  The tension ensures that the rope is always the same distance away from the vessel wall and that it is not affected by the movement of the bulk material. This is of crucial importance to continuous measurement.

Components of the probe TSP 012892
1) Basic element with probe housing for the electronic insert, tapered threaded boss R 1 ½, screening, ceramic insulation and connector for probes
2) Sword
3) Rope probe with tensioning weight
4) Rope probe with rigid weight

Endress+Hauser
The Power of Know How

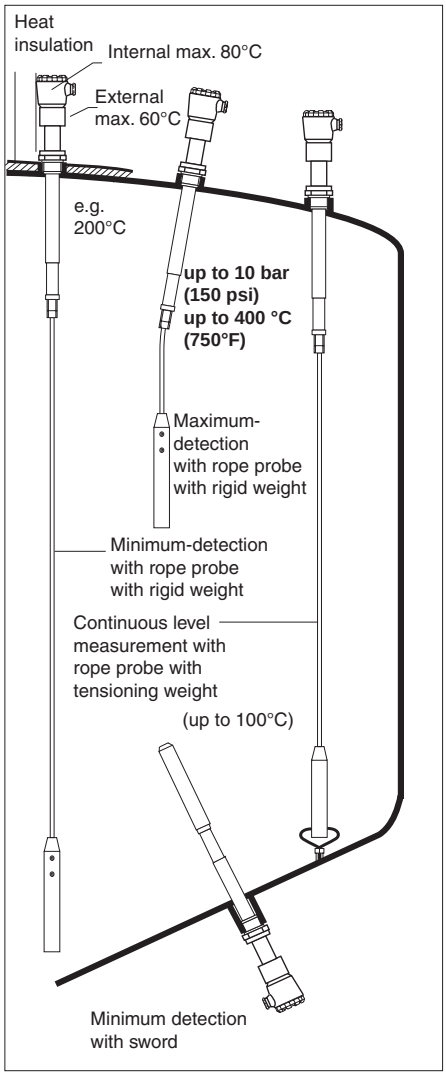
Mounting

The rope and rod (sword) probes can be mounted from above or from the side.

Sword Probe
For a probe with a sword fitting mounted from the side, the lateral load can be minimised if the narrow edge of the sword is pointing upwards. This orientation should first be marked externally on the hexagonal screw.

Rope Probe
Rope probes should not be mounted in the middle of the silo as the force of the material discharge is greatest at this point.
Install the probe far enough away from the wall so that when the silo is empty the rigid weight does not swing and hit the silo wall.
A probe with tensioning weight can be mounted near to the silo wall.

Make sure that the probes are not subjected to excessive strain by collapsing mounds of material when used for minimum detection or continuous measurement.



Examples.
With minimum detection, check that the probes are not overloaded by collapsing mounds of material

Shortening the Probe

Sword Probes
A section can be simply sawn off.

Rope Probes
Remove the rigid weight by unscrewing the 3 Allen screws (AF 5), shorten the cable with a cut-off disc, slide on the weight again and then screw the 3 Allen screws back on tightly.

Probes with tensioning weights cannot be shortened. These probes must be ordered stating the exact length.

Electronic Insert

The electronic insert EC ... can be mounted directly in the probe housing if the temperature is not too high. Please refer to Technical Data EC... .
The temperature in the probe housing is, for instance, only 80 °C (180°F), when the ambient temperature is 60 °C (140°F) and the temperature in the silo is 400 °C (750°F).
For higher temperatures the electronic insert should be mounted in a separate housing.

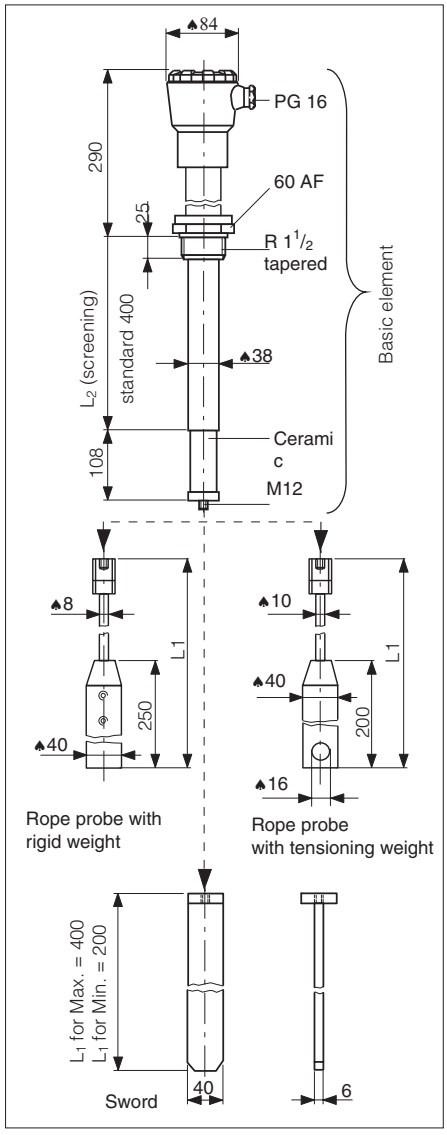
Technical Data

Basic Element
Operating pressure p_e: max. 10 bar (150 psi)
Operating temperature: max. 400 °C (750°F)
Resistance to thermal shock: up to 180 °C (350°F)
Capacitance of connector with 400 mm screening: approx. 42 pF
Insulation: ceramic, resistant to steam and hot water
Connecting thread M12 for sword or rope probes: SS 316 TI
Max. lateral load on connecting thread: max. 235 Nm at 400 °C (750°F)

Special versions with a by-pass circuit to prevent electrostatic charging are available on request.

Sword
Connecting thread M12: steel, primed, or SS 316 TI
Standard length:
L1 for min. detection: 200 mm
L1 for max. detection: 400 mm

Rope probe with Rigid Weight
Rigid weight and rope are electrically connected.
Connecting thread M12: steel or SS 316 TI
Rope: steel or SS 316
Maximum permissible tensile load: not under pressure 7300 N



Dimensions in mm
100 mm = 3.94 in
1 in = 25.4 mm

Rope Probe with Tensioning Weight
The tensioning weight attached to the rope is insulated.
Connecting thread M12: steel
Rope: steel
Rope insulation: 1 mm polyamide
Maximum permissible operating temperature: 100 °C (210°F)
Maximum permissible tensile load: 7300 N
Capacitance of connector in tensioning weight: approx. 10 pF
Capacitance per m rope at 0.5 m from a metal wall: approx. 10 pF

Subject to modification

Probe length tolerances

Length:	Tolerances:
to 1 m	+0/– 5 mm
to 3 m	+0/–10 mm
to 6 m	+0/–20 mm
from 6 m	+0/–30 mm

Specifications Required When Ordering

❑ Length L2 of screening in mm.

❑ Length L1 of varioelement (sword or rope) in mm.

Delivery already assembled with the probe connected to the basic element and secured by 2 welding spots.

Product Structure

Process connection, material — Weight

- A1 Thread DIN 2999, R 1 ½, steel, ATEX II 1/2 D
- A2 Thread DIN 2999, R 1 ½, 316Ti, ATEX II 1/2 D
- G1 Thread DIN 2999, R 1 ½, steel
- G2 Thread DIN 2999, R 1 ½, 316Ti
- Y9 Special version

Inactive section material

- A Steel
- B 316Ti
- Y Special version

Length of screening L2

1	400 mm (standard)	appr. 3.7 kg
2	... mm (100 mm...1000 mm)	
9	Special version	

Detection element, basic equipment

A	Sword in steel	
B	Sword in 316Ti	
C	Rope in steel, cast iron tension weight	appr. 2.3 kg
D	Rope in 316Ti, 316Ti tensioning weight	appr. 2.8 kg
E	Rope in steel, steel anchor weight with anchoring hole (max. 100 °C)	appr. 2.3 kg
Y	Special version	

Detection element, length dependent

1	Sword in steel	appr. 0.2 kg/ 100 mm
2	Sword in 316Ti	appr. 0.2 kg/ 100 mm
3	Rope in steel	appr. 0.4 kg/1000 mm
4	Rope in 316Ti	appr. 0.4 kg/1000 mm
9	Special version	

Detection element, length L1

- A ... mm (100 mm...20 000 mm)
- B 200 mm, sword
- C 400 mm, sword
- Y Special version

Housing, cable gland

- C Aluminium, E-Housing IP66, NPT ½"
- D Aluminium, E-Housing IP66, G ½"
- E Aluminium, E-Housing IP66, M20x1.5
- F Aluminium, E-Housing IP66, HNA24x1.5
- L Polyester, E-Housing IP66, NPT ½"
- M Polyester, E-Housing IP66, G ½"
- O Polyester, E-Housing IP66, M20x1.5
- P Polyester, E-Housing IP66, HNA24x1.5
- T Ctd. aluminium, E-Housing IP66, NPT ½"
- U Ctd. aluminium, E-Housing IP66, G ½"
- V Ctd. aluminium, E-Housing IP66, M20x1.5
- W Ctd. aluminium, E-Housing IP66, HNA24x1.5
- Y Special version

Electronic Insert

- A Electronic insert not selected
- B with EC 61 Z, 3-wire insert
- C with EC 17 Z, 2-wire PFM
- D with EC 27 Z, 2-wire PFM
- E with EC 11 Z, 3-wire Tx, 33 kHz
- F with EC 72 Z, 3-wire Tx, 1 MHz
- G with EC 37 Z, 2-wire PFM, 33 kHz
- H with EC 47 Z, 2-wire PFM, 1 MHz
- Y Special version

T12892- [ ][ ][ ][ ][ ][ ][ ][ ] Complete product designation

The most important technical data have been summarised in this Product Structure

Endress+Hauser
GmbH+Co. KG
Instruments
International
P.O. Box 2222
D-79574 Weil am Rhein
Germany

Tel. (0 76 21) 9 75-02
Fax (0 76 21) 9 75-3 45
http://www.endress.com
info@ii.endress.com

Endress+Hauser
The Power of Know How

05.02/PT1

TI 118F/00/en/05.03
017188-1000
SL/CV8

017188- 1000