Technical
Information
TI 117F/00/en

Operating Instructions
017187-1000

Capacitance Level Measurement
High Temperature Probe TSP 012656

Partially insulated rod and rope probes with ceramic part-insulation and screening. Heavy duty version.









Applications with Hot Bulk Materials
Especially for use with materials which tend to form condensation or build-up on silo roof and walls.

The probes are designed for extremely rugged conditions and withstand high loads caused by the movement of bulk solids. They are ideal both for minimum and maximum detection and for continuous measurement of dense bulk materials.

One particular advantage is their resistance to high pressures and temperatures as well as sudden changes in temperature. They are also insensitive to condensation.
The reason for this?
The steel pipe on the basic element acts as a screen and forms an inactive zone to prevent condensation or material build-up close to the threaded boss from affecting the measurement.

① Basic element comprising the probe head housing, flange, screening, ceramic insulation, connector for probes:
② Sword probe
③ Rope probe with tensioning weight

2 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 both versions. The following probes can be connected to it:

- A »sword« - for limit detection.
  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
  a) for limit detection
  b) for continuous level measurement with non-conductive bulk materials.

Endress+Hauser
Nothing beats know-how

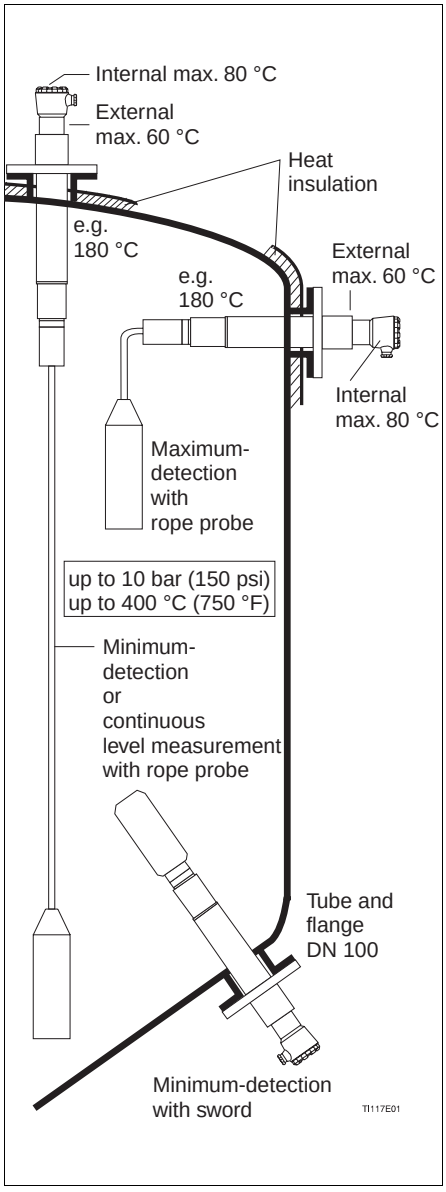
Mounting

The rope and rod (sword) probes can be mounted in the silo either 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 on the outside on the flange.

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 rope probe can be mounted laterally in the vessel if maximum detection is required.

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 showing installation and temperature guidelines

x °C = (1.8x+32) °F

Shortening the Probe

Sword Probes
A section can be simply sawn off.
Note: The longer the sword is, then the greater the change in capacitance between the covered or uncovered probe. This ensures easier calibration and greater reliability with limit detection.

Rope Probes
Rope probes can be shortened at the upper end (where they connect to the basic element):

- separate the two welding spots joining the two parts of the connector;
- unscrew the two parts of the connector;
- with a hammer, hit the end of the rope downwards (towards the tensioning weight);
- remove the conical pin from the rope end;
- shorten the rope with a cut-off disc;
- hammer in the conical pin again in the lower part of the connector;
- screw the connector together and secure with 2 welding spots.

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 … .

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 200 mm screening: approx. 60 pF
Capacitance for each extra 100 mm screening: approx. 4 pF
Insulation: ceramic, resistant to steam and hot water
Connecting thread for sword or rope probe: M16 (steel)
Maximum lateral load: 800 N (80 kg) at connecting thread

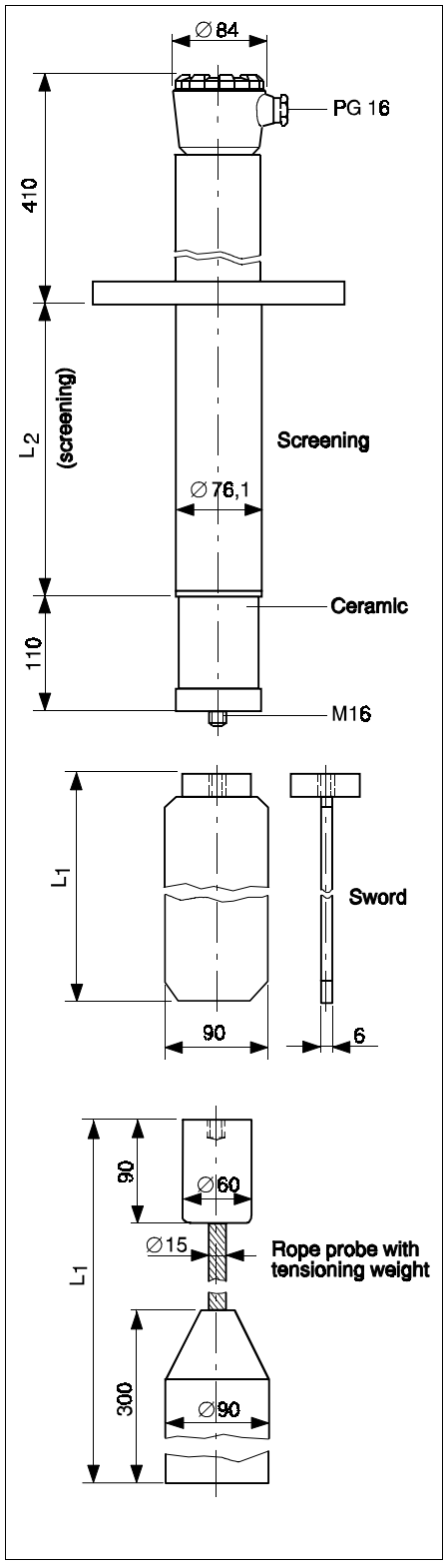
Sword
Connecting thread M16 and sword: steel, primed
Standard length: 200 mm, can be shortened

Rope probe with Rigid Weight
Rigid weight and rope are electrically connected.
Connecting thread M16: steel
Maximum permissible tensile load: 19900 N (not pressurized)

Probe Length Tolerances

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

Subject to modification.



Dimensions in mm

100 mm = 3.94 in
1 in = 25.4 mm

Specifications Required When Ordering

☐ Length L2 of screening in mm

☐ Length L1 of sword or rope in mm

Assembled delivery where the connection of the probe to the basic element is secured with 2 welding spots.

Product Structure

High Temperature Probe TSP 012656

Weight

Process Connection / Material
- P1 DIN flange DN 100 PN 16 in steel, primed
- P2 DIN flange DN 100 PN 16 in 1.4571
- Y9 Others on request

Material of screening
- A Steel, primed
- Y Others on request

Length of screening L2
- 1 200 mm Standard — appr. 12.0 kg
- 2 ... mm (freely selectable 200 ... 1000 mm)
- 9 Others on request

Varioelement, basic fitting
- A Sword in steel — appr. 0.4 kg
- B Sword in 1.4571
- C Rope in steel, rigid weight in cast iron — appr. 9.5 kg
- D Rope in 1.4571, rigid weight in 1.4571
- Y Others on request

Varioelement, length-dependent section
- 1 Sword in steel, primed — appr. 0.4 kg/ 100 mm
- 2 Sword in 1.4571
- 3 Rope in steel — appr. 0.9 kg/1000 mm
- 4 Rope in 1.4571
- 9 Others on request

Length of Varioelement L1
- A Sword 200 mm ... 1000 mm
Rope 550 mm ... 22000 mm
freely selectable
- B Sword 200 mm (steel)
- Y Others on request

Housing
- K PBTP synthetic housing IP 66, PG 16 (IP 66)
- L PBTP synthetic housing IP 66, NPT ½"
- M PBTP synthetic housing IP 66, G ½
- O PBTP synthetic housing IP 66, M20 × 1.5
- Y Others on request

Electronic Insert
- A None
- C EC 17 Z integrated
- D EC 27 Z integrated
- B EC 61 Z integrated
- Y Others on request

T12656-	complete specification code
	mm, Length L2 of screening
	mm, Length L1 of sword or rope

The most important technical data have been summarised in this product structure

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

Tel. (07621) 975-02
Tx 773926
Fax (07621) 975345
http://www.endress.com

Endress+Hauser
Nothing beats know-how

10.97/MTM

TI 117F/00/en/12.96a
017187-1000
EHF/CV4.2

017187- 1000