Датчики уровня
Solicap M FTC51, FTC52, FTC53

Техническая информация

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Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

Solicap M FTC51, FTC52, FTC53

Capacitance Limit Detection
Level limit switches for bulk solids

Applications
The Solicap M FTC.. is used for limit detection in silos containing bulk solids (for minimum or maximum level indication).
Three versions cover almost any measuring application:

FTC51 with rod probe ø25 mm,
for mounting laterally or from above.
Mainly for maximum detection of fine-grained or powdery bulk solids.
For minimum detection in small silos with light bulk solids.
For use in the food processing industry.

FTC52 with rope probe ø10 mm,
for mounting from above.
Mainly for maximum detection.
For minimum detection with light bulk solids.

FTC53 with rope probe ø14 mm,
for mounting from above.
For maximum and minimum detection with heavy bulk solids.

Your Benefits

- Complete unit consisting of probe with plug-in electronic insert:
  - simple mounting, low installation costs
  - for automation and control systems (PLC, PCS, PC, relays, contactors, etc.)
- High functional safety thanks to cable monitoring up to sensor with EC27Z
- No moving parts in silo:
  - no wear, long operating life
  - no maintenance
- Simple calibration:
  - variable switchpoint with probes mounted from above
- Rope version can be easily shortened:
  - can be used for various limit values
  - short delivery time

Endress+Hauser
People for Process Automation

Contents

Function and System Design

Application Examples

Sand, Glass aggregate, Gravel, Moulding sand, Lime, Ore (crushed), Plaster, Aluminium shavings, Cement, Grain, Pumice, Flour, Dolomite, Sugar beet chips, Kaolin, Fodder and similar bulk solids

Note:
Bulk solids should have dielectric constants $\varepsilon_r \geq 2.5$.

Measuring System

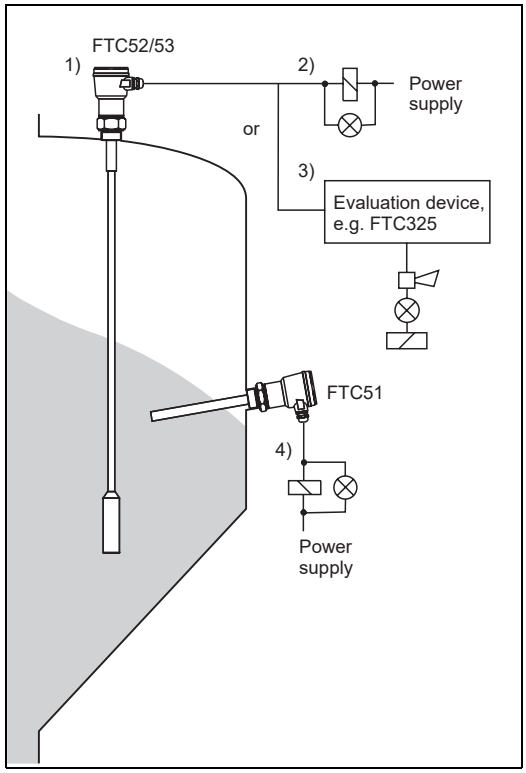
The Solicap M are switches for limit detection in solids.

The compact instrumentation consists of:

- Solicap M FTC.. with EC2xZ
- power supply and
- connected control systems, switches, signal transmitters (e.g. process control systems, PLC, relays, microcontactors, lamps, sirens etc.)

The separate instrumentation consists of:

- Solicap M FTC.. with EC17Z/EC27Z/EC61Z
- a separate transmitter, e.g. FTC325, FTC625 for installation in cabinets and
- connected control systems, switches, signal transmitters (e.g. process control systems, PLC, relays, microcontactors, lamps, sirens etc.) on the evaluation device



The capacitance level limit switches Solicap M FTC51…FTC53 in practice

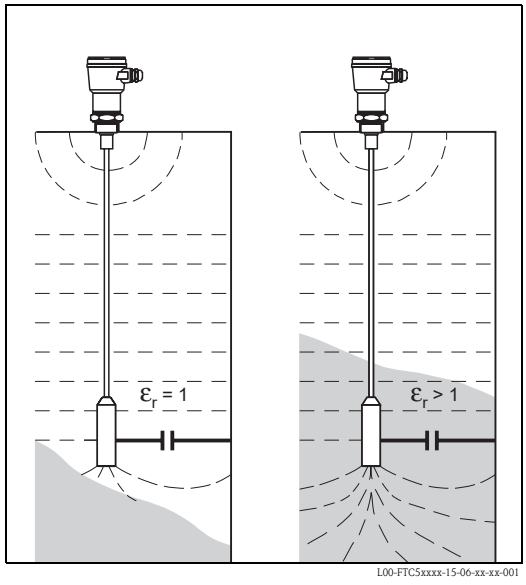
1) Electronic insert in probe head
2) 2- or 3-wire connecting cable
3) Transmitter
4) Compact instrumentation

Operation

The probe (rod or rope) and the silo wall form the two electrodes of a capacitor, with a high frequency voltage between them.

The limit value is based on the principle of a discharge circuit:
As long as the probe is in air with a dielectric constant of $\varepsilon_r = 1$ then the discharge time constant is $\tau = R \times C_A$ where R is the resistance of the circuit and C_A the capacitance of the capacitor formed by the probe and silo wall.
If bulk material with a high dielectric constant moves into the electrical field between the probe and silo wall, then C_A increases and with it the time constant τ.
The change in the time constant is evaluated and the Solicap M is activated according to its switching mode.

The Solicap M is extremely insensitive to low build-up on the probe and silo wall as long as the material does not form a bridge between the probe and wall (e.g. on the threaded boss).



The capacitor consisting of the silo wall and probe

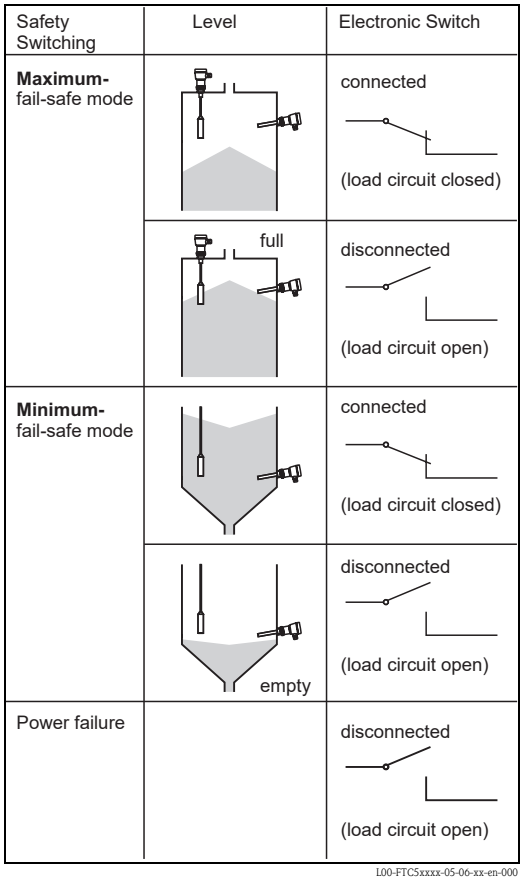
Fail-Safe Mode

Compact instrumentation with EC20Z, EC22Z, EC24Z

The built-in feature for minimum/maximum fail-safe switching allows the Solicap M to be used in all applications requiring high operational safety:

- Maximum Fail-Safe:
  The current circuit is blocked if the probe is covered or the power supply fails.
- Minimum Fail-Safe:
  The current circuit is blocked if the probe is uncovered or the power supply fails.

A red LED on the electronic insert indicates switching status.



The electronic switch operates according to the fail-safe switching and the level

Main Features of the Different Electronic Inserts

Electronic Insert EC20Z

Two-wire AC connection 21 V…250 V
Electronic switch, max. 350 mA

Electronic Insert EC22Z

Three-wire DC connection 10 V…55 V
Transistor circuit,
load connection PNP, max. 350 mA

Electronic Insert EC24Z

with potential-free relay output,
AC voltage operation 21 V…250 V or
DC voltage operation 20 V…125 V

PFM Electronic Insert EC17Z

300 kHz for connection to separate evaluation devices
FTC520Z, FTC521Z, FTC470Z, FTC471Z, FTC325 PFM, FTC625

PFM Electronic Insert EC27Z

120 kHz ... 380 kHz (depending on the probe capacitance)
for connection to a capacitance sensor FTC625

3-wire Electronic Insert EC61Z

500 kHz for connection to separate evaluation
FTC420, FTC421, FTC422, FTC325 3-WIRE

Mechanical Construction

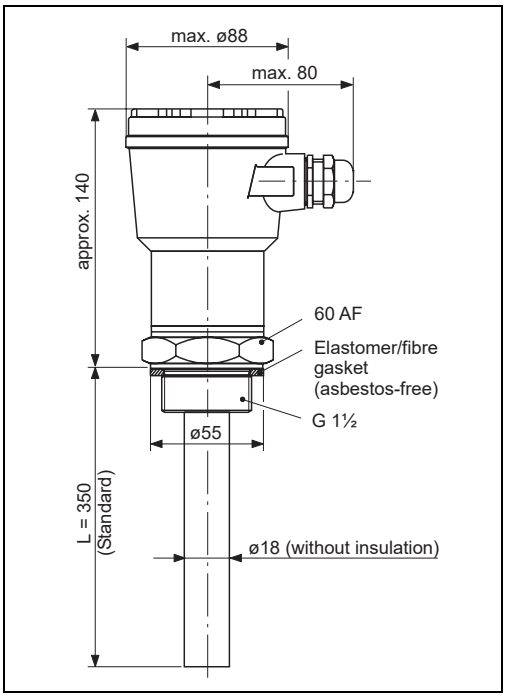
Probe Characteristics, Dimensions

✎ Note!
All dimensions in mm.

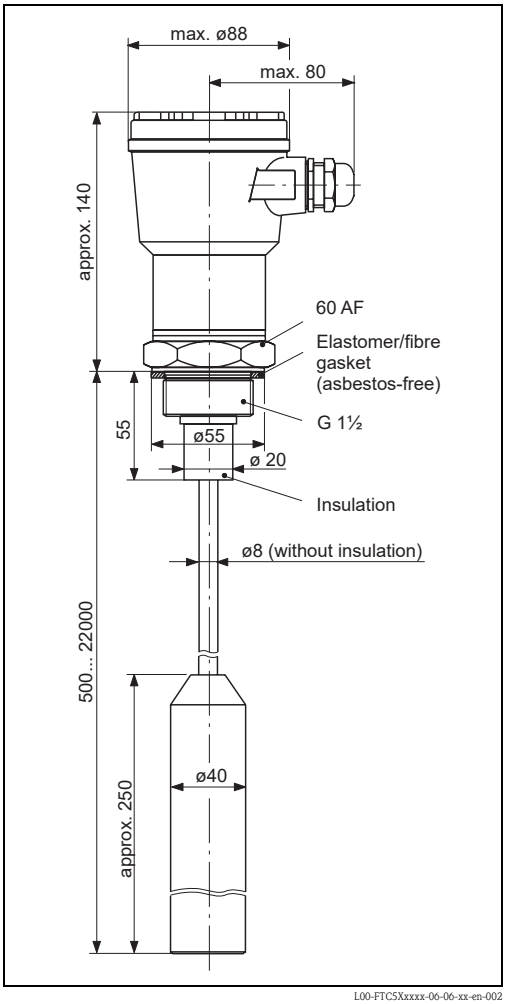
Solicap M FTC51
Rod probe, ø25 mm
Insulation PE
Probe length max. 4 m

Solicap M FTC52
Seilsonde, ø10 mm
Insulation PA
Probe length max. 22 m
Tensile load max. 3 t

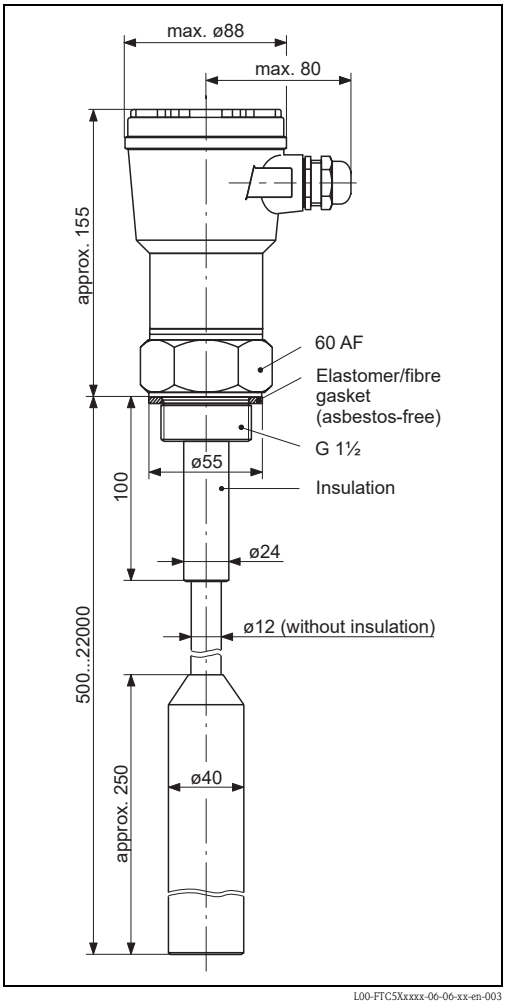
Solicap M FTC53
Seilsonde, ø14 mm
Insulation PVC, PA
Probe length max. 22 m
Tensile load max. 6 t



Dimensions FTC51



Dimensions FTC52



Dimensions FTC53

Installation

General Information

Filling the Silo
The filling stream should not be directed onto the probe.

Angle of Material Flow
Note the angle of material flow or the outlet funnel when determining the measuring point or probe length.

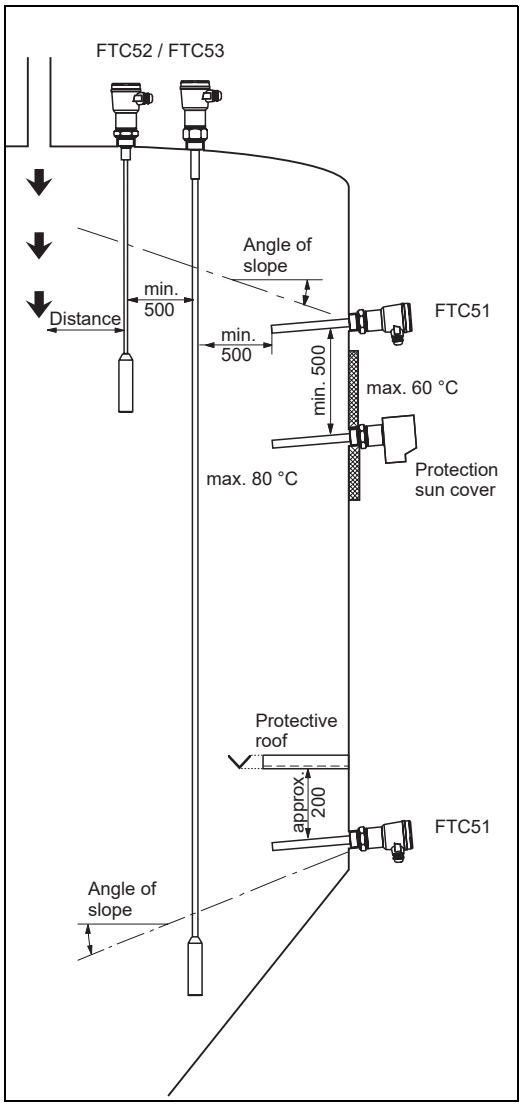
Distance Between Probes
If more than one probe is mounted in a silo, then a minimum distance of 0.5 m must be allowed for in order to avoid mutual interference.

Threaded Socket for Mounting
Use the shortest possible threaded socket when mounting the Solicap M FTC51…FTC53. Condensation and build-up can be formed in long threaded sockets and interfere with correct operation of the probe.

Heat Insulation
With high silo temperatures:
Insulate the outside silo wall to avoid exceeding the max. permissible temperature of the Solicap M housing.
This insulation also prevents condensation near the threaded boss and so reduces build-up and the danger of error switching.

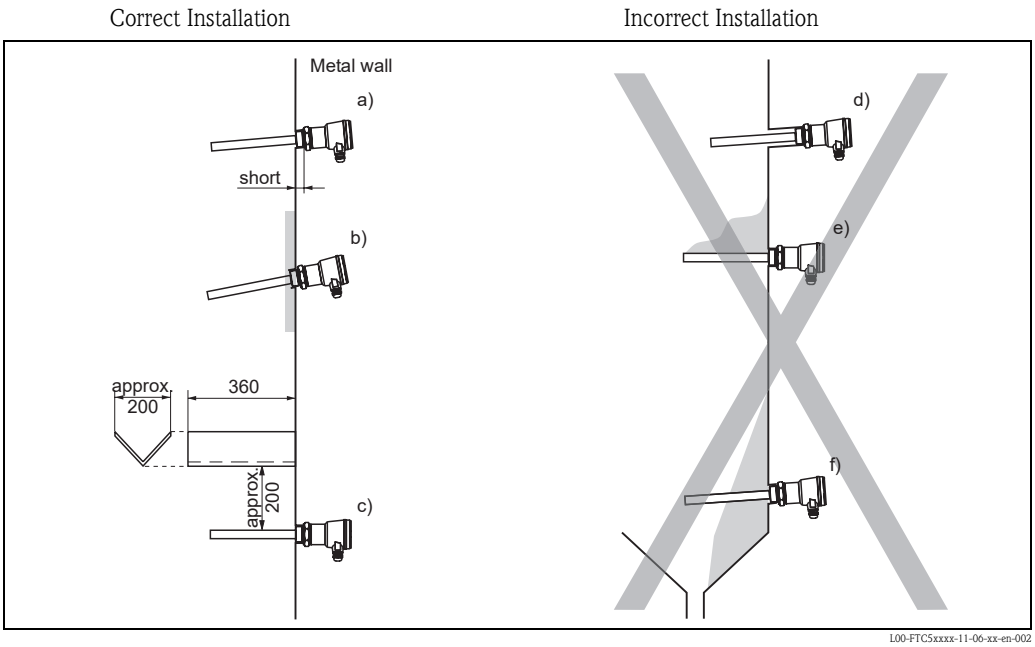
Installation in the Open
A protective sun cover as an accessory protects the Solicap M with the aluminium housing from excessive temperatures and from condensation which may form in the housing due to large temperature variations.

Installation in a Building
Install an easily accessible power switch in the proximity of the device.
Mark the power switch as a disconnector for the device.



General information for installing the capacitance Solicap M FTC.. level limit switch

Project Planning FTC51



Silo with metal walls

Correct Installation:

a. Maximum level detection; Short threaded socket (ideally 25 mm = half standard length socket).

b. Light build-up on silo wall: threaded socket welded internally.
The probe tip points slightly downwards so that material falls off more easily.

c. Protective roof to protect against collapsing mounds or high strain on the rod probe caused by the material filling curtain with the Solicap M FTC51 used for minimum detection.

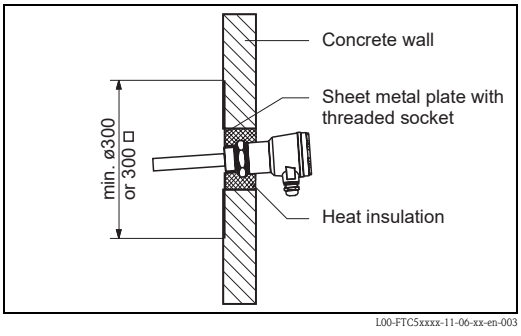
Incorrect Installation:

d. Threaded socket too long. Material can settle and lead to error.

e. Error switching caused by high build-up on the silo wall is best avoided by mounting the Solicap M FTC52 or FTC53 with rope probe in the roof of the silo.

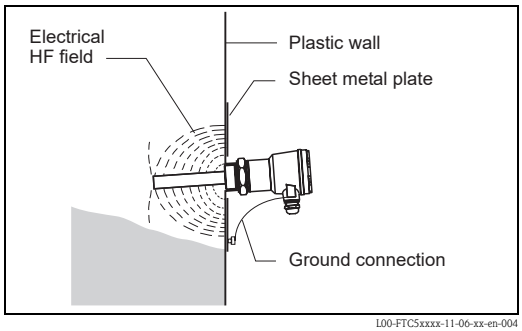
f. In areas where material can settle, the instrument cannot recognise an “empty” silo. The FTC52 or FTC53 is recommended.

This mounting example shows a steel plate as counter electrode.
Heat insulation prevents condensation and build-up on the steel plate.



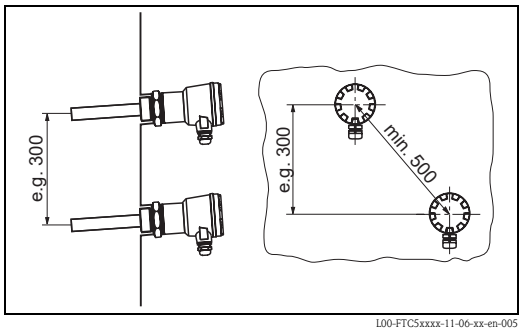
Silo with concrete walls

When mounting in a silo made of plastic material, a sheet metal plate should be attached to the outside of the silo as a counter electrode.
This plate can be either square or round.
The dimensions with thin silo walls and low dielectric constant should be 0.5 m on each side or ø0.5 m. This should be 0.7 m along each side or ø0.7 m for silos with thicker walls or for materials with higher dielectric constants.



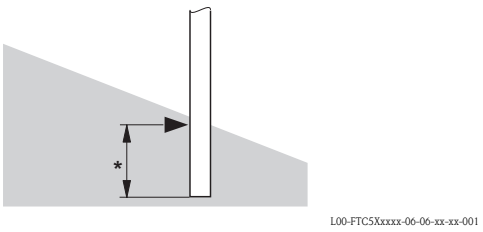
Silo with plastic walls

The minimum distance required can be maintained by staggered mounting.



For small differences in level

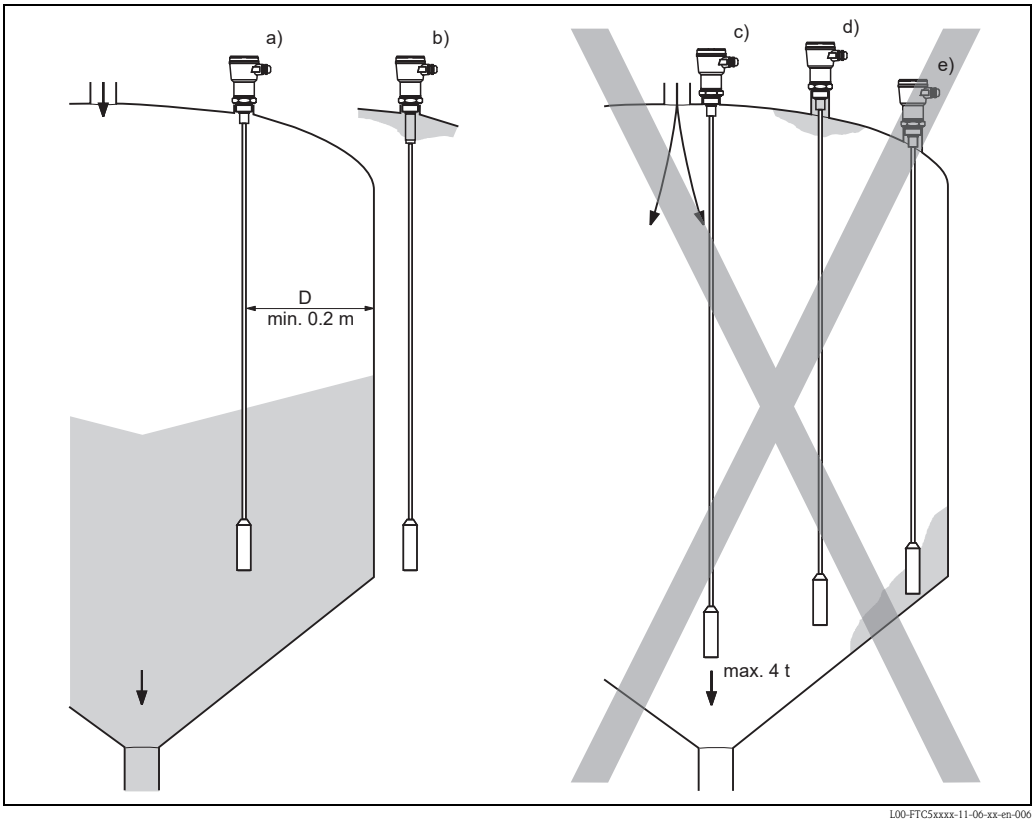
Probe Length

Type of material, relative dielectric constant ε_r	 L00-FTC5Xxxxx-06-06-xx-xx-001 ** additional length to be immersed*
electrically conductive	10 mm
non conductive	
$\varepsilon_r > 10$	100 mm
$\varepsilon_r > 5...10$	200 mm
$\varepsilon_r > 2...5$	500 mm

The lengths given are minimum lengths to be added to that from the seal of the flange or thread to the limit level required. Probe length tolerances – see Page 21.

It is important for safe operation that the difference in capacitance between the covered and uncovered parts of the probe is at least 10 pF.
Contact us for advice in cases where the dielectric constant of the material is unknown.

Project Planning FTC52, FTC53



Silo with metal walls

Distance D between the probe and the wall is approx. 10 % and 25 % of the diameter of the silo

Correct Installation:

a. The correct distance from the silo wall, the material filling curtain and the material outlet.
For reliable switching with products having low dielectric constants, mount the probe very close to the wall (not for use with pneumatic filling systems).
For pneumatic filling systems, the distance of the probe from the wall should not be too small as the probe may swing against it.

b. Solicap M FTC52, FTC53 with screening against condensation and material build-up on the silo roof.

Incorrect Installation:

c. The probe can be damaged by the inflowing material if mounted too near the inlet.
When mounted near the centre of the outlet, the high tensile forces present at this point may damage the probe or subject the silo roof to excessive strain

d. Threaded socket too long; Condensation and dust may penetrate and cause errors.

e. Too near silo wall; When swinging gently the probe can hit the wall or touch any build-up which may have formed. This can result in error switching

Silo Roof

Ensure that the silo roof is strong enough!
Very high tensile forces, up to 100.000 N (10 t) may occur at the material outlet especially with heavy, powdery bulk materials which tend to form build-up.

Coarse Grained Materials

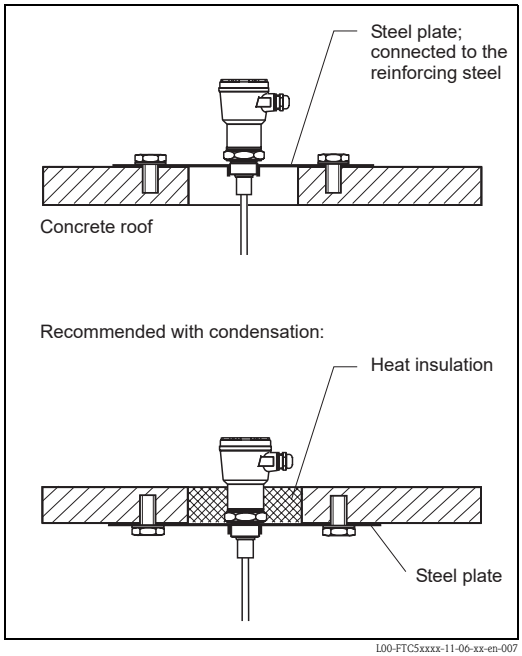
The Solicap M FTC52 or FTC53 should only be used for maximum detection in silos with very coarse or abrasive material.

Distance between Probes

A minimum distance of 0.5 m between probes must be maintained to ensure that there is no mutual interference; this also applies to all Solicap M units which are mounted next to one another in silos with non-conducting walls.

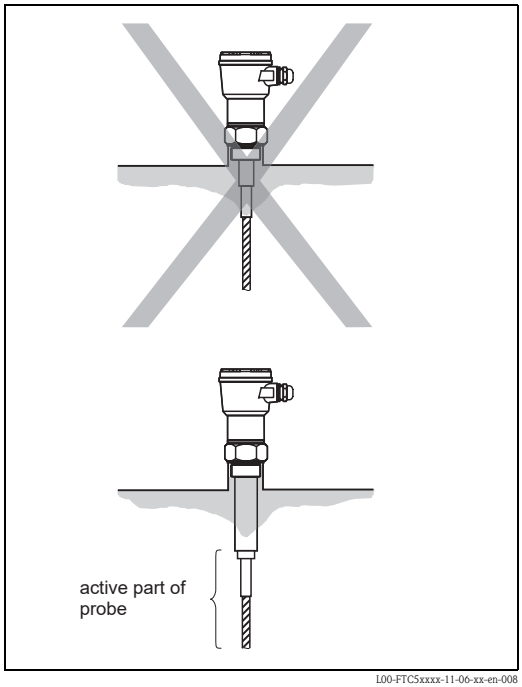
The 25 mm long threaded socket should project into the silo so as to minimise effects due to condensation and material build-up.

Heat insulation prevents condensation and build-up on the steel plate.



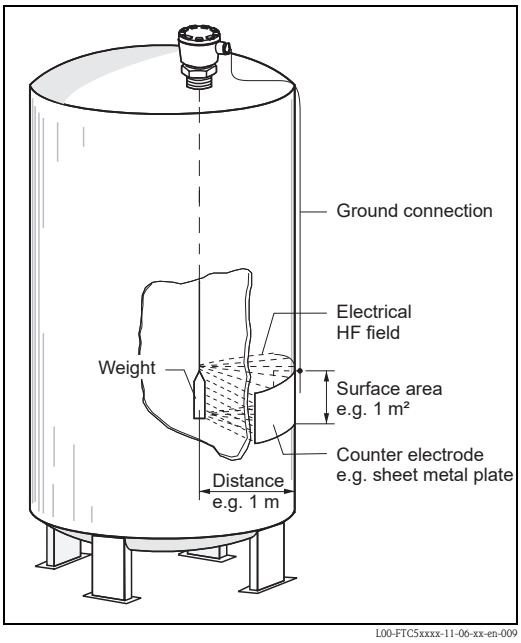
Silo with concrete walls

Recommended:
Use the FTC52, FTC53 with screening.



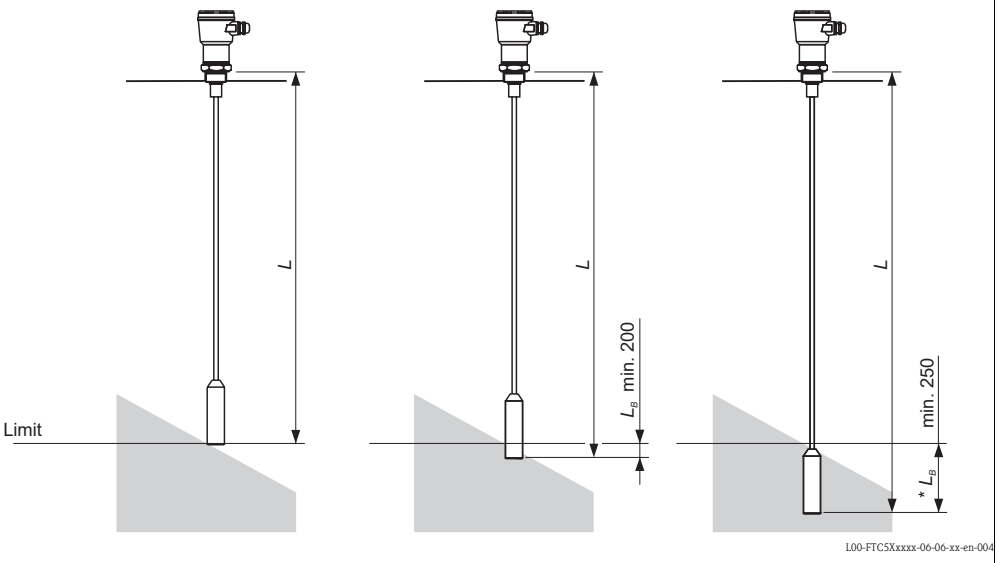
Screening prevents the effects of moisture and build-up between the active part of the probe and the silo roof

When mounting in a silo made of plastic, a counter electrode must be mounted on the outside and at the same height as the weight.
The length of the edge of the counter electrode should be roughly the same length as the distance of the weight to the silo wall.



Silo with plastic walls

Different probe lengths



Electrically conductive bulk solid (e.g. coal)

Bulk solid with high dielectric constant (e.g. meal)

Bulk solid with low dielectric constant (e.g. dried grain)

* L_B (covered length):
With non-conductive materials having low dielectric constants, the rope probe must be approx. 5 % (or minimum 250 mm) longer than the distance from the roof of the vessel to the switch point.
If it is not possible to select the correct L_B for minimum detection with very long probes then a special version with “butterfly weight” can be supplied as an accessory. The increased surface area of this weight ensures that there is a large enough change in capacitance when the probe is covered by material. An L_B of 250 mm is normally sufficient.

Wiring Connections

General Information

Load Limit Values

Note the limit values of the loads to which you want to connect the Solicap M.
Exceeding the load can destroy the electronic insert (or the relay contact in the EC24Z).

Fuse

Ensure that the rating of the fine-wire fuse corresponds to the maximum load to be connected;
the fine-wire fuse does not protect the electronic insert of the Solicap M.

Diameter of Wiring

Because of the small currents used, only small diameter cabling is required.
Low-cost cabling with diameters of 0.5 mm^2 to max. 1.5 mm^2 is recommended.

Grounding

The Solicap M must be grounded to give reliable operation free from interference. This is done by either connecting it to a grounded silo with metal or reinforced concrete walls or else to the earth conductor PE. If a counter electrode is connected to a silo made of plastic material then there must be a short ground connection from the Solicap M to the counter electrode.

Explosion Protection

All local regulations and instructions given in certificates must be observed especially in regard to the creation of an equipotential plane (earth bonding).

Cable Gland

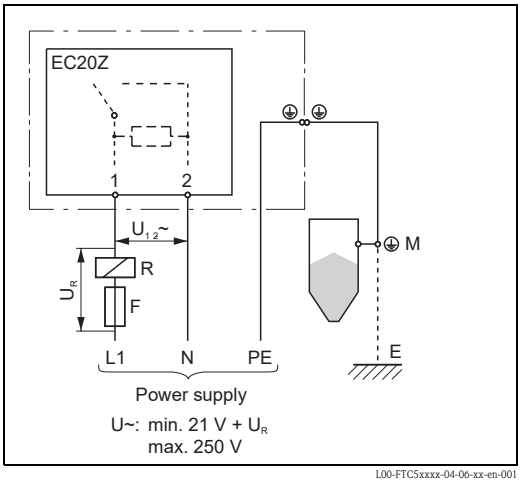
Housing IP66: Cable gland in PA with Neoprene seal for cable diameter 5…9 mm.

Electronic Inserts

- Terminal connections: for max. 2.5 mm^2
- Measuring frequency: approx. 750 kHz for short probes, up to 4 m, switchable to approx. 450 kHz for long probes
- Initial capacitance, adjustable: to approx. 400 pF
- Switching delay: approx. 0.5 s
- Minimum/Maximum Fail-Safe Switching: selectable with rotary switch
- Switching indication: red LED

Connecting the EC20Z

U_{1-2}~: 21 V...250 V
across Terminals 1 and 2 of the EC20Z
R: Connected (external) load; e.g. relay
F: Fine-wire fuse, load-dependent
M: Ground connection to silo or to counter electrode
E: Grounding
U_R: Voltage drop between the load R and the fine-wire fuse



Connecting the Solicap M with EC20Z electronic insert

Connecting in series to a load

The level limit switch Solicap M with electronic insert EC20Z must – like all switches – be connected in series with the load (e.g. relays, microcontactors, lamps) to the power supply.

Connection voltage

The voltage across Terminal 1 and 2 of the electronic insert must be at least 21 V.
The power voltage must be correspondingly higher to compensate for the voltage drop across the connected load.

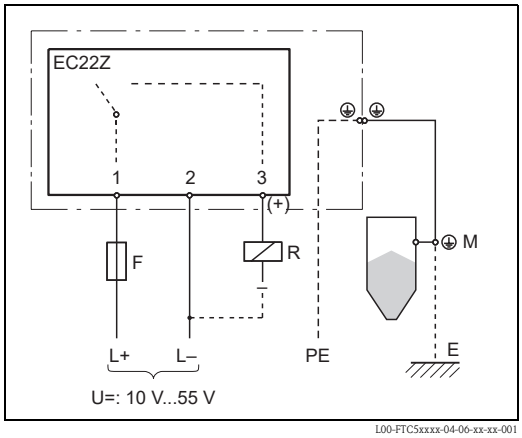
Load cutoff

Note that loads connected in series are not completely disconnected from the power supply if the electronic switch in the electronic insert of the Solicap M "cuts off" (blocks) with the level alarm.
Because of the current requirements of the electronics, a small "residual current" still flows through the external load.
When the load is a relay with a very small retaining current, then the relay may not de-energise. In this case connect an additional load in parallel to the relay, e.g. a resistor or signal lamp.

- Power supply U~: 21 V…250 V, 50/60 Hz
- Connected loads, short-term (max. 40 ms):
  max. 1.5 A;
  max. 375 VA with 250 V;
  max. 36 VA with 24 V
- Maximum voltage drop: 11 V
- Connected loads, continuous:
  max. 350 mA;
  max. 87 VA with 250 V;
  max. 8.4 VA with 24 V
- Minimum load current with 250 V: 10 mA (2.5 VA)
- Minimum load current with 24 V: 20 mA (0.5 VA)
- Residual current (eff.): < 5 mA

Connecting the EC22Z

PNP connection
F: Fine-wire fuse, load-dependent
R: Connected load, e.g. PLC, PCS, relay
M: Ground connection to silo or to counter electrode
E: Grounding



Connecting the Solicap M with EC22Z electronic insert

Transistor circuit for load

The load connected to Terminal 3 is switched by a transistor, contactless and therefore without bouncing. Terminal 3 has a positive signal with normal switching.
The transistor is blocked on level alarm or with a power failure.

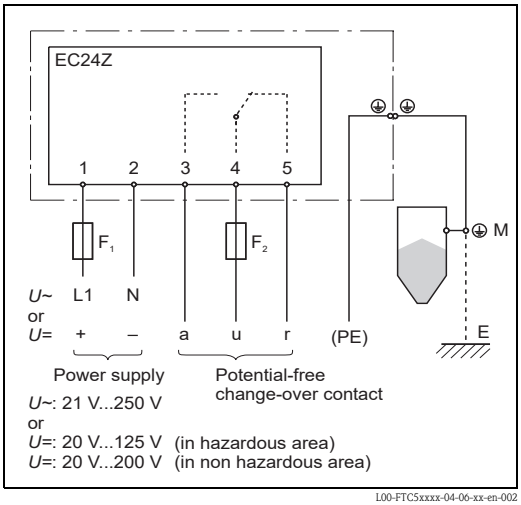
Protection against voltage peaks

Connecting to an instrument with a high inductance: a voltage limiter should be connected.

- Power supply U=: 10 V…55 V
- Superimposed AC voltage Upp: max. 5 V
- Current consumption: max. 15 mA
- Load connection: Open Collector; PNP
- Switching voltage: max. 55 V
- Connected load, short-term (max. 1 s): max. 1 A
- Connected load, continuous: max. 350 mA
- Protected against reverse polarity

Connecting the EC24Z

Relay output
F1: Fine-wire fuse
200 mA, semi-time lag recommended
F2: Fine-wire fuse to protect the relay contact, load-dependent
M: Ground connection to silo or to counter electrode
E: Grounding



Connecting the Solicap M with EC24Z electronic insert

Relay contact for load

The load is connected over a potential-free relay contact (change-over contact).
The relay contact breaks the connection between Terminal 3 and Terminal 4 on level alarm or with a power failure.

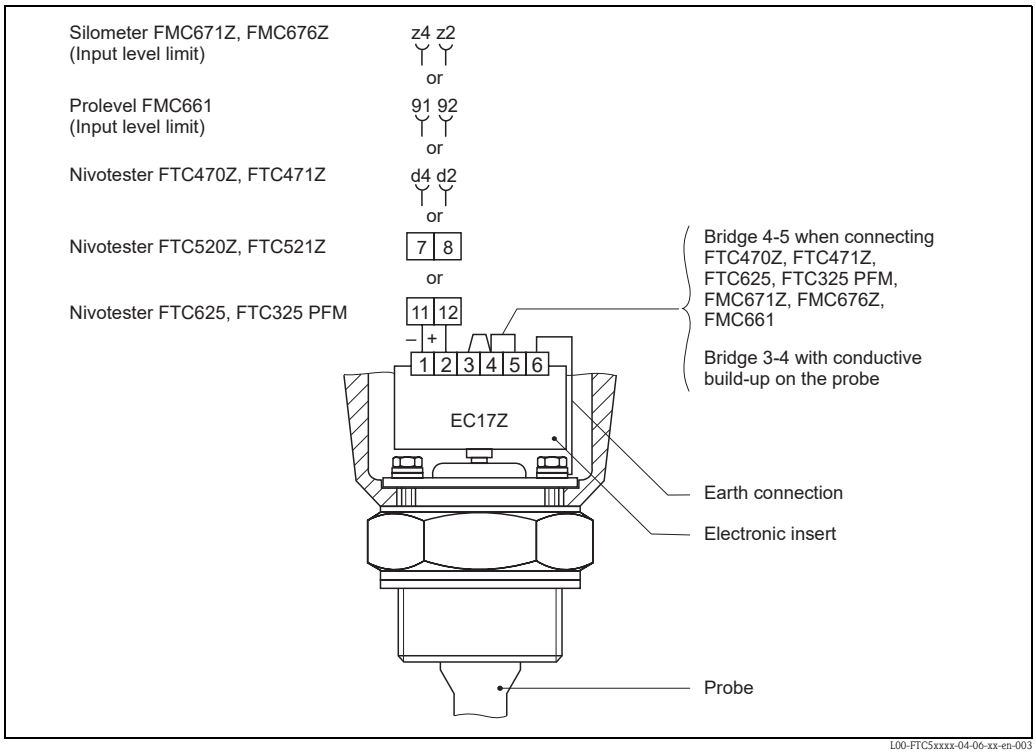
Protection against voltage peaks and short-circuiting

Protect the relay contact by connecting a spark barrier to instruments with high inductance.
A fine-wire fuse (load-dependent) can protect the relay contact if a short-circuit occurs.

- Power supply:
  U=: 20 V…125 V (in hazardous area)
  U=: 20 V…200 V (in non hazardous area)
  or
  U~: 21 V…250 V, 50/60 Hz
- Current consumption (eff.): max. 5 mA
- Peak inrush current: max. 200 mA, max. 5 ms
- Pulse current: max. 50 mA, max. 5 ms
- Pulse frequency: approx. 1.5 s
- Output: potential-free change-over contact
- Contact load capacity:
  U~ max. 250 V, I~ max. 4 A,
  P~ max. 1000 VA (cos φ = 1) or P~ max. 500 VA, cos φ = 0.7
  U= max. 100 V, I= max. 4 A,
  P= max. 100 W
- Operating life: min. 10^5 switchings at max. contact load
- Additional switching delay: max. 1.5 s

Connecting the EC17Z

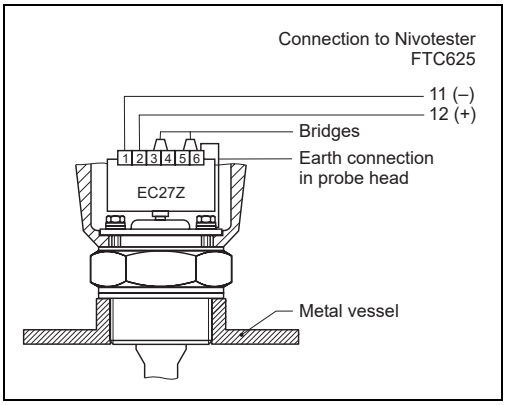
Normally the white electronic insert EC17Z is fitted in the probe head and screwed tight.
Before fitting, connect the earth connection between terminal 6 and the probe head housing. It is important to select the correct bridge to terminals 3 to 5:
Bridge 4–5 is standard for connecting to Nivotester FTC470Z, FTC471Z, FTC520Z, FTC521Z, Silometer FMC671Z, FMC676Z and Prolevel FMC661.
Bridge 3–4 should be connected if the probe projects into conductive material that forms a build-up.
Use a two-wire screened installation cable for wiring up the Nivotester, Silometer or Prolevel.
Ground the screen at both ends; if this is not possible, ground the screen to the sensor housing at one end.
Comply with explosion protection regulations.
Screw the housing lid and the cable entries tight to prevent the ingress of moisture into the probe head housing.
For the greatest possible accuracy, recalibrate after replacing the electronic insert.



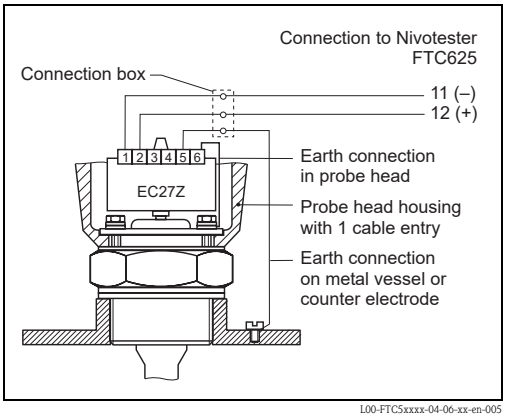
Connection to the Nivotester, Silometer or Prolevel

Connecting the EC27Z

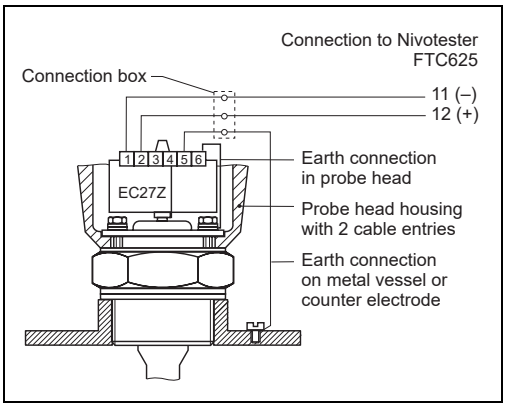
Connect the probe in accordance with the following figures. Connect the probe in accordance with the following figures.
If the electronic insert is used in the protection housing, then the cable to the probe should be as short as possible because the capacitance of the coaxial cable is approx. 50 pF/m.
If the equipment is connected to monitor the probe, then ensure that the metal vessel or the counter electrode has a galvanic connection with the boss of the probe.
In place of the small round probe head housing with one cable entry, a large square probe head housing with two cable entries may also be fitted. In this case a separate connection box is no longer necessary.
Standard two-core installation cable or two cores of a multi-core cable can be used for connecting the Nivotester, provided nothing else is specified for explosion-hazardous area operation.
Screw the housing lid and the cable entries tight to prevent the ingress of moisture into the probe head housing.
For the greatest possible accuracy, recalibrate after replacing the electronic insert.



Any sensor with monitoring of the electronic insert and the cable to the Nivotester



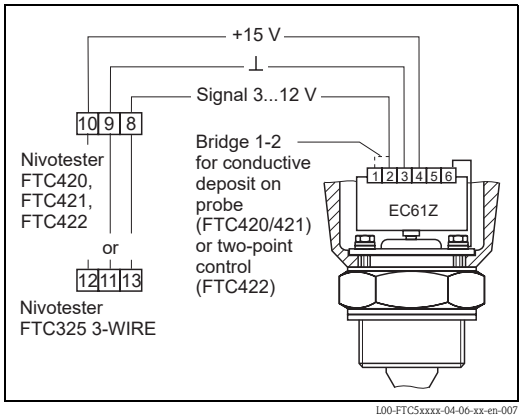
Any sensor with monitoring of the electronic insert, the cable to the Nivotester and the earth connection to the metal vessel or the counter electrode



Any fully insulated sensor with monitoring of the electronic insert, the cable to the Nivotester, the probe insulation and the earth connection to the metal vessel or the counter electrode

Connecting the EC61Z

- Connect EC61Z and Nivotester with 3-wire instrument cable with resistance of up to 25 Ω per wire.
- When routing through strong electromagnetic fields, use a screened cable, if possible with twisted wires.
  Only earth the screening on one side.
- Earth the probe at terminal 6 of the electronic insert.



Connection to Nivotester

Adjustment and Calibration Features

Adjustment and Calibration Features at EC2xZ

For calibrating, the Solicap M should be adjusted to the capacitance value of the capacitor formed by the probe and wall of the silo.
The rotary switches and adjusting elements for calibration are on the electronic insert in the housing.
Directly beside these calibration elements are the power connections with voltages up to 250 V.
Only use a screwdriver which has insulation as far as the blade or else tape over the terminals with insulating tape before calibration.

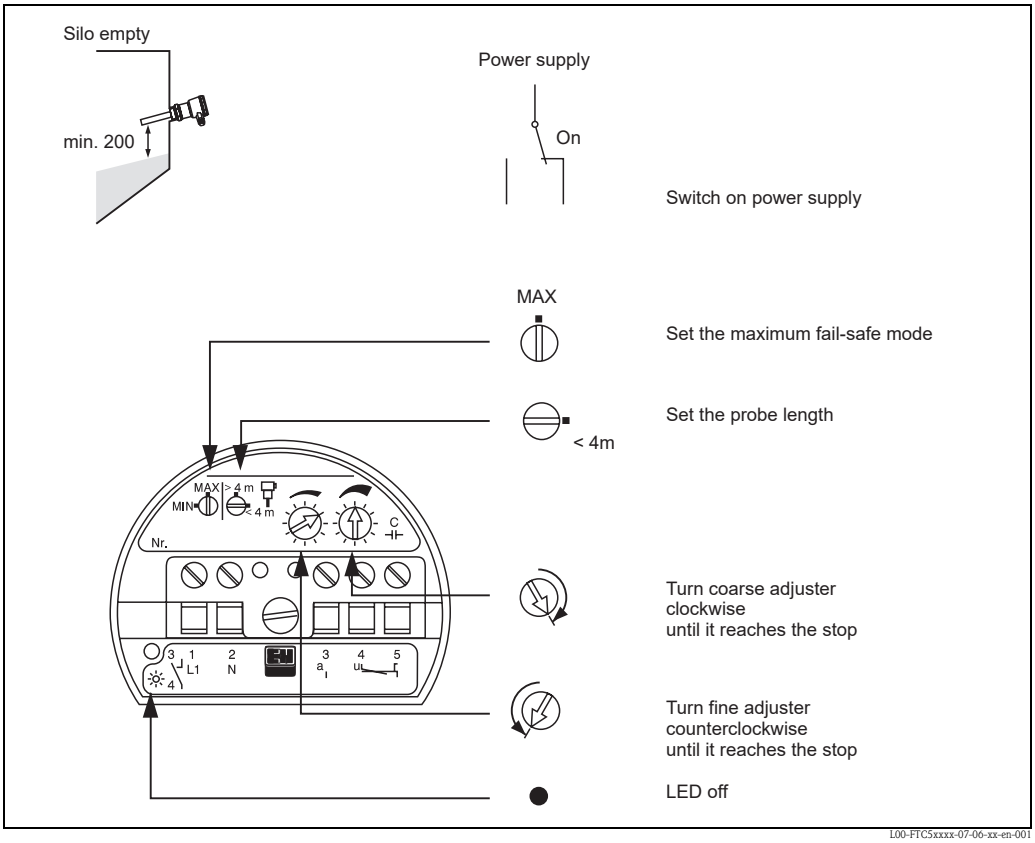
Operating elements on the electronic insert

Capacitance Calibration

For capacitance calibration, the silo must be empty or the level of material must be at least 200 mm below the probe.

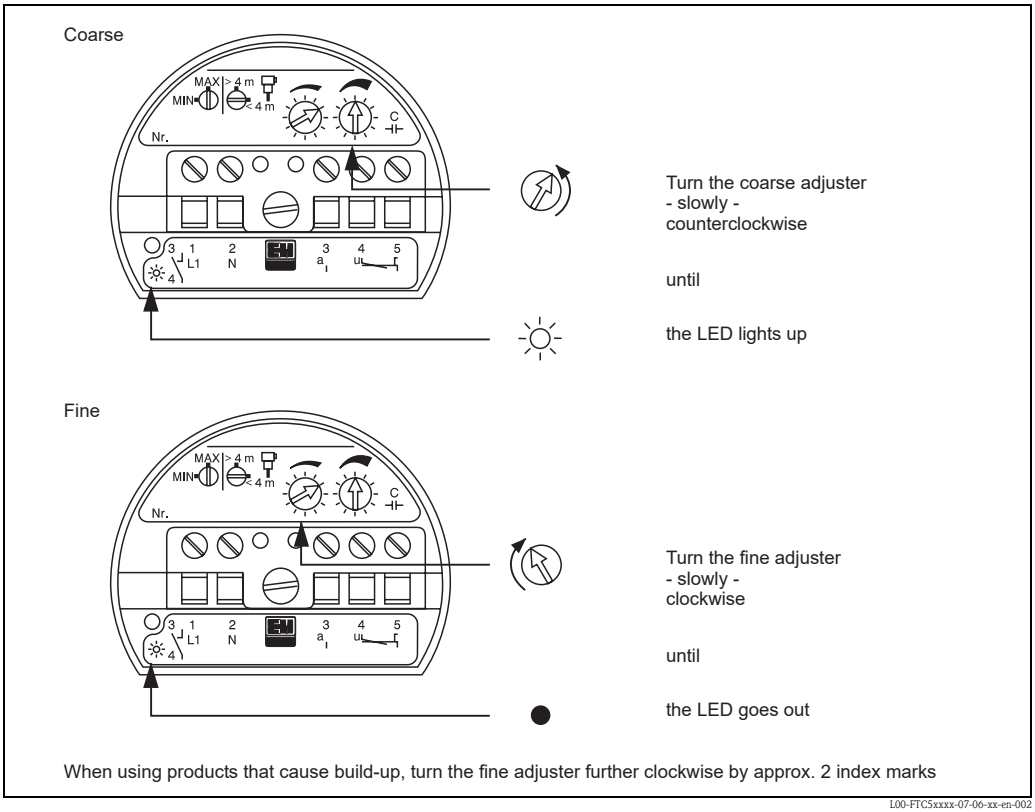
- Turn on the power supply.
- Carry out the calibration according to the next three diagrams (Page 19/20).
- Ensure that no water gets into the housing while calibrating.

Capacitance Calibration, Initial Settings



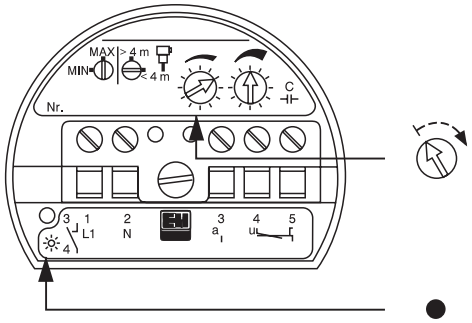
These initial settings must be done before the capacitance calibration

Capacitance Calibration



Capacitance calibration must be carried out both slowly and carefully

Adjusting for Material Characteristics



Material characteristics (Bulk solid)		
Low dielectric constant, low conductivity	no build-up	approx. 1 division
	with build-up	approx. 1 to 2 divisions
High dielectric constant, high conductivity	no build-up	approx. 2 to 4 divisions
	with build-up	approx. 4 to 6 divisions

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Accurate adjustment ensures high switching reliability

When the probe is covered with non-conductive bulk solid having a low dielectric constant, then the Solicap M only switches when the probe is completely covered with the material.
The degree of covering depends on the calibration.
Turning the fine calibrating element clockwise causes the Solicap M to become less sensitive.

Function Control

With the probe uncovered, touch the central retaining screw of the electronic insert with a screwdriver, holding it by the insulated handle. This simulates the bulk solid covering the probe.
The LED indicates a change of status.
This is only a function control test of the instrument.
Please also check for the correct operation for limit detection by filling and emptying the silo at the installation point!

Technical Data

Operating Data

Solicap M	FTC51	FTC52	FTC53
Process temperature in silo compact instrumentation with EC20Z, EC22Z, EC24Z	–20...+70 °C	–20...+ 80 °C	–20...+ 60 °C
separate instrumentation with EC17Z, EC61Z, EC27Z	–20...+80 °C	–20...+120 °C	–20...+120 °C
Process pressure p_e, acc. to process temperature	up to10 bar/60 °C up to 5 bar/80 °C	pressureless	pressureless
Max. permissible load on probe	30 Nm lateral	30 kN vertical *	60 kN vertical *
		20 kN vertical	40 kN vertical
Min. dielectric constant ε_r of material	≥ 2.5		
Ambient temperature for housing	–20...+60 °C		
Storage temperature	–40...+85 °C		
Protection class	IP65/IP66 according to EN 60529		

* non-Ex with steel rope

Probes

Solicap M	FTC51		FTC52	FTC53	
Material Rod or Rope	Steel / 1.4571		Steel / 1.4401	Steel / 1.4401	
Probe diameter (without insulation)	18 mm		8 mm	12 mm	
Insulation / Dimensions fully insulated	PE / ø25 mm		PA / ø10 mm	PVC / ø16 mm EC2xZ	PA / ø14 mm EC17Z/61Z EC27Z
partial insulated	PE / ø25 mm EC17Z/61Z EC27Z	POM / ø25 mm EC2xZ	Polyolefin / ø12 mm	Polyolefin / ø15 mm	
Electrical connection to bulk solid	fully / partial insulated		Steel rope connected to weight		

Process connections

- Parallel thread: G 1 ½ A acc. to DIN ISO228/I
- Material: steel or stainless steel 1.4571
- Probe length tolerances:

Probe length	Tolerance
to 1 m	+0 mm, – 5 mm
to 3 m	+0 mm, –10 mm
to 6 m	+0 mm, –20 mm
to 22 m	+0 mm, –30 mm

Ordering Information

Solicap M FTC51

10	Approval
A	Non-hazardous area
D	ATEX 1/3 D
E	ATEX 1/2 D
Y	Special version

20	Process connection		
G1	Thread ISO228	G 1½,	steel
G2	Thread ISO228	G 1½,	316Ti
Y9	Special version		

30	Inactive section
A	Not selected
Y	Special version

40	Rod material
A	Steel
B	316Ti
Y	Special version

50	Probe insulation	
1		fully insulated
5	100 mm L2,	partial insulated
9	Special version	

60	Probe length, L=200-4000 mm	
1	..... mm L,	
2	350 mm L,	
9	Special version	

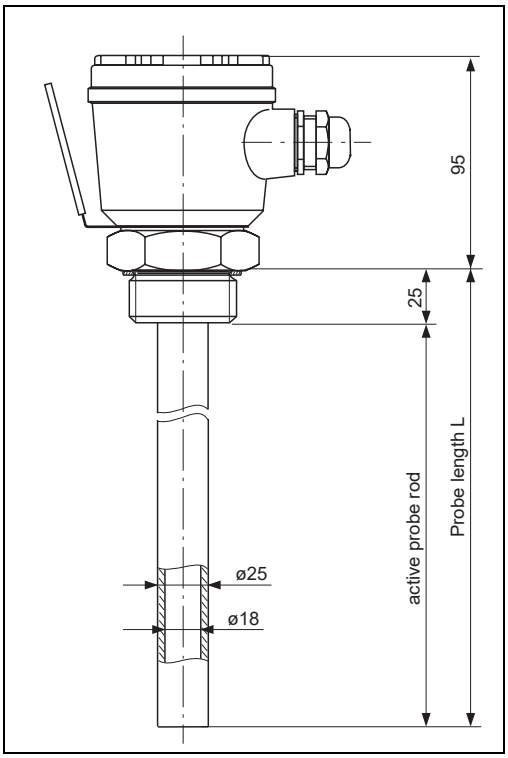
70	Housing, Cable entry			
C	Aluminium	IP66,	Thread	NPT ½
D	Aluminium	IP66,	Thread	G ½
E	Aluminium	IP66,	Gland	M20
L	Polyester	IP66,	Thread	NPT ½
M	Polyester	IP66,	Thread	G ½
O	Polyester	IP66,	Gland	M20
Y	Special version			

80	Electronics, Output			
0	Not selected (for EC2xZ)			
A	Not selected (for EC61Z/17Z/27Z)			
C	EC17Z,	PFM		limit switch
D	EC27Z,	PFM		limit switch
B	EC61Z,	3-wire		limit switch
1	EC20Z,	2-wire	21...250 V AC,	limit switch
2	EC22Z,	3-wire PNP	10... 55 V DC,	limit switch
4	EC24Z,	Relay	21...250 V AC / 125 V DC,	limit switch
Y	Special version			

FTC51-									Product designation

The Solicap M FTC51 is designed using these basic modules:

with EC17Z, EC27Z, EC61Z



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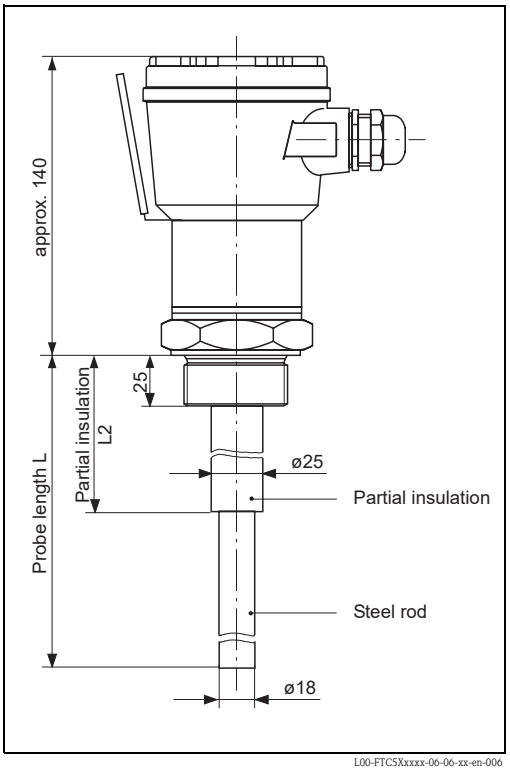
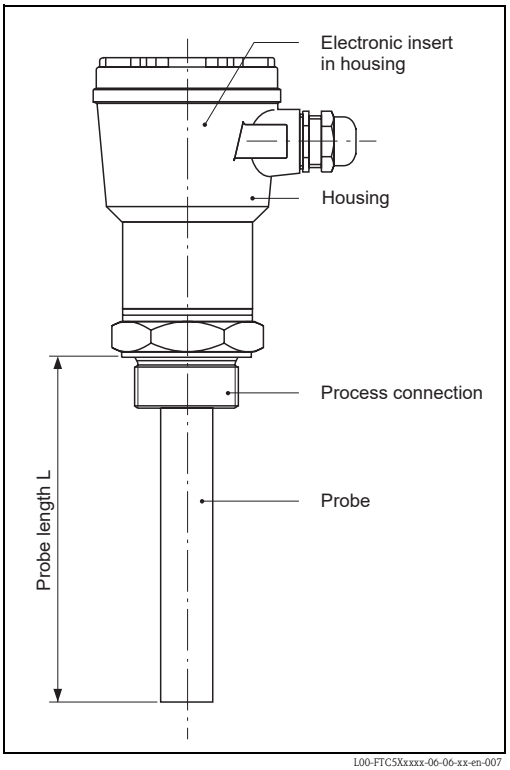
with EC2xZ



L00-FTC5Xxxxx-06-06-xx-en-006

with EC2xZ



L00-FTC5Xxxxx-06-06-xx-en-007

Solicap M FTC52

10	Approval								
	A	Non-hazardous area							
	D	ATEX 1/3 D							
	E	ATEX 1/2 D							
	Y	Special version							

20		Process connection							
		G1	Thread ISO228	G 1½,	steel				
		G2	Thread ISO228	G 1½,	316Ti				
		Y9	Special version						

30			Inactive section, L3=100-2000 mm						
		A	Not selected						
		B	..... mm L3,	steel					
		C	..... mm L3,	316Ti					
		Y	Special version						

40				Rope, Tension weight					
			C	Steel,	Cast iron,	blank			
			D	316,	316Ti,	blank			
			Y	Special version					

50					Probe insulation, L2=250-500 mm				
				1	Rope,	fully insulated			
				2	..... mm L2,	partial insulated			
				3	500 mm L2,	partial insulated			
				9	Special version				

60						Probe length, L=500-22000 mm			
					1	..... mm L			
					2	2500 mm L			
					3	6000 mm L			
					9	Special version			

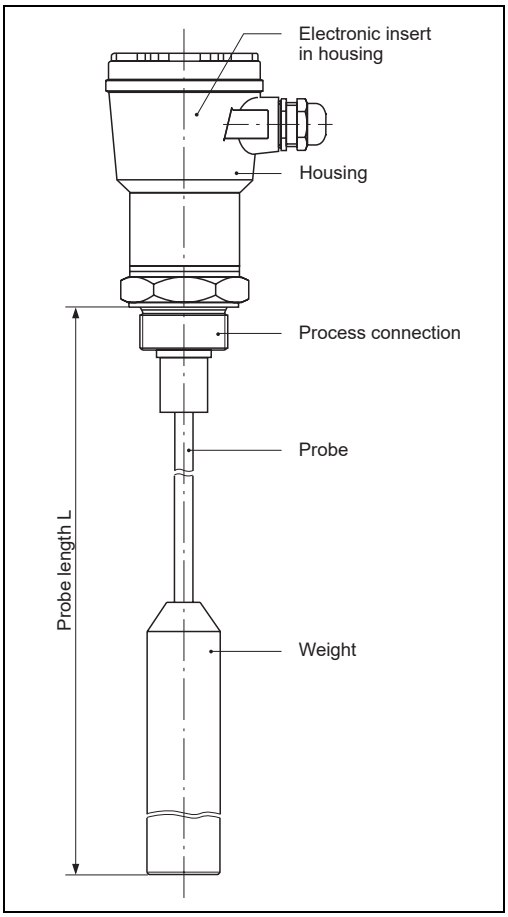
70							Housing, Cable entry				
						C	Aluminium	IP66,	Thread	NPT ½	
						D	Aluminium	IP66,	Thread	G ½	
						E	Aluminium	IP66,	Gland	M20	
						L	Polyester	IP66,	Thread	NPT ½	
						M	Polyester	IP66,	Thread	G ½	
						O	Polyester	IP66,	Gland	M20	
						Y	Special version				

80								Electronics, Output				
							0	Not selected (for EC2xZ)				
							A	Not selected (for EC61Z/17Z/27Z)				
							C	EC17Z,	PFM			limit switch
							D	EC27Z,	PFM			limit switch
							B	EC61Z,	3-wire			limit switch
							1	EC20Z,	2-wire	21...250 V AC,		limit switch
							2	EC22Z,	3-wire PNP	10... 55 V DC,		limit switch
							4	EC24Z,	Relay	21...250 V AC / 125 V DC,		limit switch
							Y	Special version				

FTC52-									Product designation

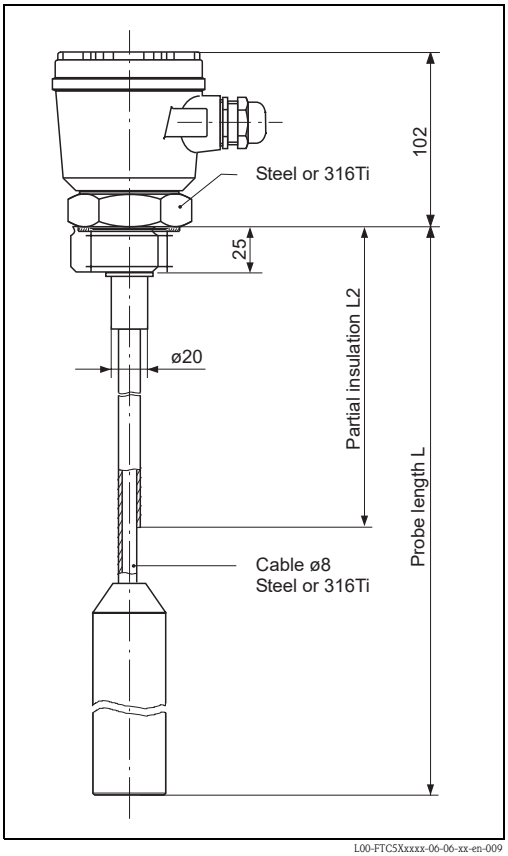
The Solicap M FTC52 is designed using these basic modules:

with EC2xZ



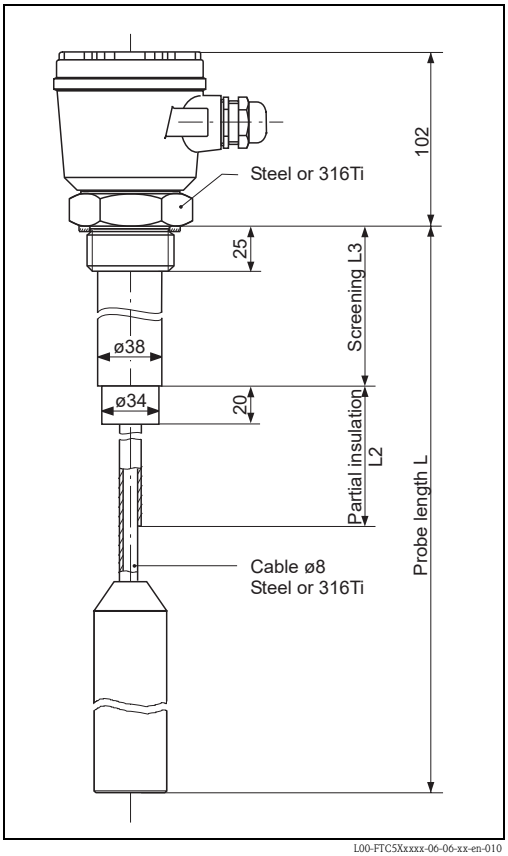
L00-FTC5Xxxxx-06-06-xx-en-008

with EC17Z, EC27Z, EC61Z



L00-FTC5Xxxxx-06-06-xx-en-009

with EC17Z, EC27Z, EC61Z



L00-FTC5Xxxxx-06-06-xx-en-010

Solicap M FTC53

10	Approval	
	A	Non-hazardous area
	D	ATEX 1/3 D
	E	ATEX 1/2 D
	Y	Special version

20	Process connection			
	G1	Thread ISO228	G 1½,	steel
	G2	Thread ISO228	G 1½,	316Ti
	Y9	Special version		

30	Inactive section, L3=100-2000 mm		
	A	Not selected	
	B	..... mm L3,	steel
	C	..... mm L3,	316Ti
	Y	Special version	

40	Rope, Tension weight		
	E	Steel,	Cast iron, blank
	G	316,	316Ti, blank
	Y	Special version	

50	Probe insulation, L2=250-500 mm	
	1	Rope, fully insulated
	2	..... mm L2, partial insulated
	3	500 mm L2, partial insulated
	9	Special version

60	Probe length, L=500-22000 mm	
	1	..... mm L
	2	2500 mm L
	3	6000 mm L
	9	Special version

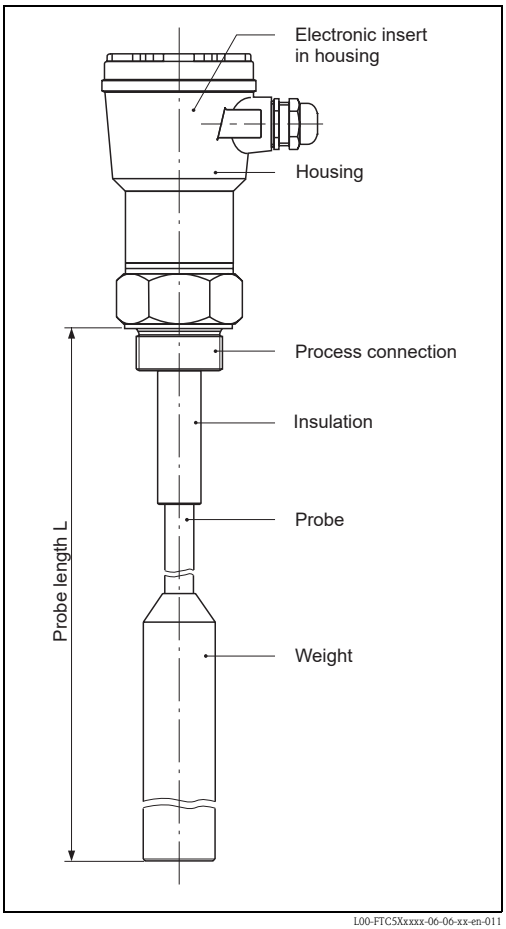
70	Housing, Cable entry				
	C	Aluminium	IP66,	Thread	NPT ½
	D	Aluminium	IP66,	Thread	G ½
	E	Aluminium	IP66,	Gland	M20
	L	Polyester	IP66,	Thread	NPT ½
	M	Polyester	IP66,	Thread	G ½
	O	Polyester	IP66,	Gland	M20
	Y	Special version			

80	Electronics, Output			
	0	Not selected (for EC2xZ)		
	A	Not selected (for EC61Z/17Z/27Z)		
	C	EC17Z,	PFM	limit switch
	D	EC27Z,	PFM	limit switch
	B	EC61Z,	3-wire	limit switch
	1	EC20Z,	2-wire 21...250 V AC,	limit switch
	2	EC22Z,	3-wire PNP 10... 55 V DC,	limit switch
	4	EC24Z,	Relay 21...250 V AC / 125 V DC,	limit switch
	Y	Special version		

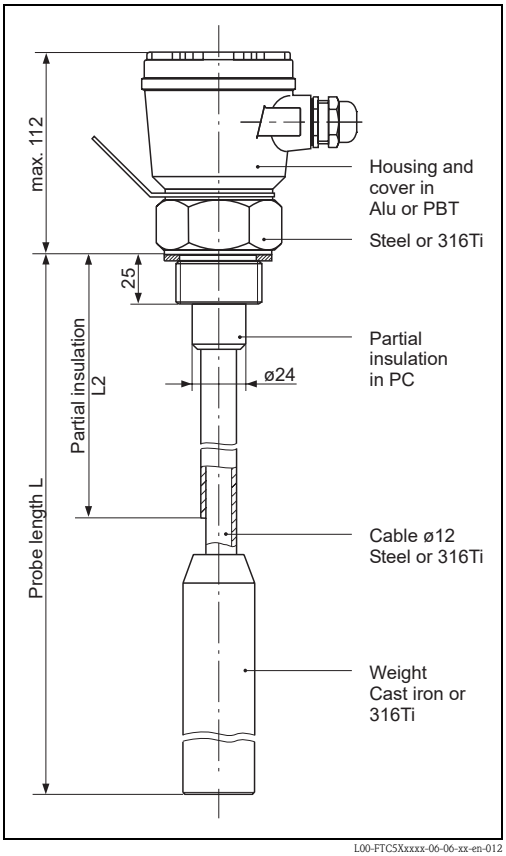
FTC53-									Product designation

The Solicap M FTC53 is designed using these basic modules:

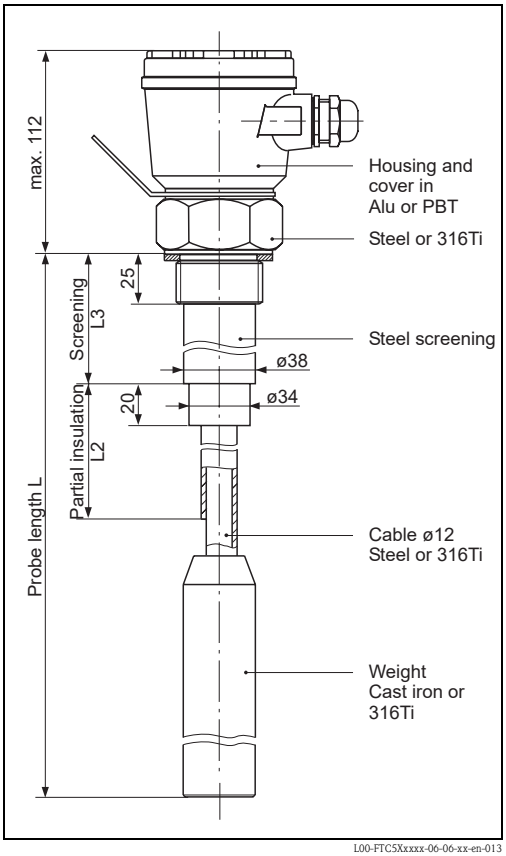
with EC2xZ



with EC17Z, EC27Z, EC61Z



with EC17Z, EC27Z, EC61Z



Accessories

Seal

for thread G 1½ A

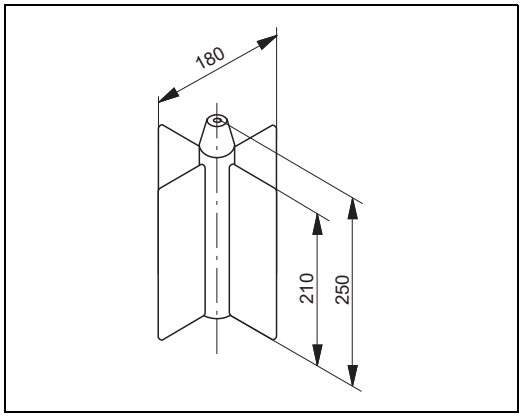
- in elastomer/fibre (asbestos-free) supplied

Butterfly Weight

for FTC52 or FTC53

- Material: steel
- Weight: approx. 3.2 kg

Dimensions of butterfly weight (accessory).
This weight provides a larger capacitance difference for rope probes.



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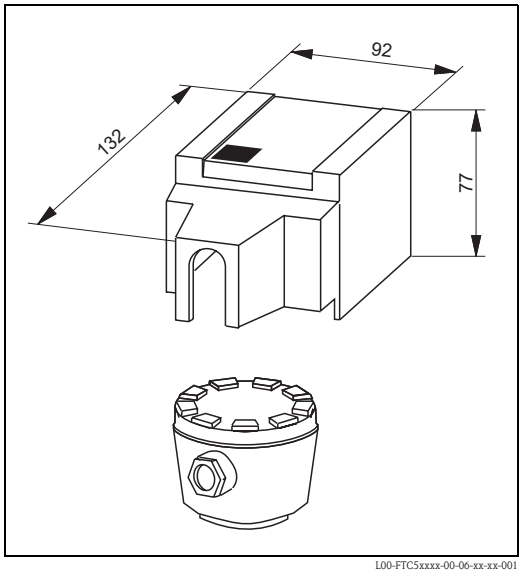
Protective sun cover

for aluminium housing

- Material: polyamide

Dimensions of protective sun cover (accessory).
This cover prevents condensation in the housing.



L00-FTC5xxxx-00-06-xx-xx-001

По вопросам продаж и поддержки обращайтесь:

Алматы (7273)495-231
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
Воронеж (473)204-51-73
Екатеринбург (343)384-55-89
Иваново (4932)77-34-06
Ижевск (3412)26-03-58
Иркутск (395)279-98-46
Казань (843)206-01-48
Калининград (4012)72-03-81
Калуга (4842)92-23-67
Кемерово (3842)65-04-62
Киров (8332)68-02-04
Коломна (4966)23-41-49
Кострома (4942)77-07-48
Краснодар (861)203-40-90
Красноярск (391)204-63-61
Курск (4712)77-13-04
Курган (3522)50-90-47
Липецк (4742)52-20-81
Магнитогорск (3519)55-03-13
Москва (495)268-04-70
Мурманск (8152)59-64-93
Набережные Челны (8552)20-53-41
Нижний Новгород (831)429-08-12
Новокузнецк (3843)20-46-81
Ноябрьск (3496)41-32-12
Новосибирск (383)227-86-73
Омск (3812)21-46-40
Орел (4862)44-53-42
Оренбург (3532)37-68-04
Пенза (8412)22-31-16
Петрозаводск (8142)55-98-37
Псков (8112)59-10-37
Пермь (342)205-81-47
Ростов-на-Дону (863)308-18-15
Рязань (4912)46-61-64
Самара (846)206-03-16
Санкт-Петербург (812)309-46-40
Саратов (845)249-38-78
Севастополь (8692)22-31-93
Саранск (8342)22-96-24
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Сургут (3462)77-98-35
Сыктывкар (8212)25-95-17
Тамбов (4752)50-40-97
Тверь (4822)63-31-35
Тольятти (8482)63-91-07
Томск (3822)98-41-53
Тула (4872)33-79-87
Тюмень (3452)66-21-18
Ульяновск (8422)24-23-59
Улан-Удэ (3012)59-97-51
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