

# Safety Instructions

## Solicap S FTI77

Ex ia IIIC T80°C T<sub>500</sub>130°C Da

Ex ia/tb IIIC T90°C Da/Db

Ex ia/tc IIIC T90°C Da/Dc





# Solicap S FTI77

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**About this document**

This document has been translated into several languages. Legally determined is solely the English source text.

**Associated documentation**

This document is an integral part of the following Operating Instructions:

BA00381F/00

**Supplementary documentation**

Explosion-protection brochure: CP00021Z/11

The Explosion-protection brochure is available:

- In the download area of the Endress+Hauser website:  
[www.endress.com](http://www.endress.com) -> Downloads -> Brochures and Catalogs -> Text Search: CP00021Z
- On the CD for devices with CD-based documentation

**Manufacturer's certificates****Certificate of Conformity TP TC 012/2011**

Inspection authority:

LLC NANIO CCVE (ООО «НАНИО ЦСВЭ»)

Certificate number:

EAЭС RU C-DE.AA87.B.00961/22

Affixing the certificate number certifies conformity with the following standards (depending on the device version):

- GOST 31610.0-2014 (IEC 60079-0:2011)
- GOST 31610.11-2014 (IEC 60079-11:2011)
- GOST IEC 60079-31-2013

**Manufacturer address**

Endress+Hauser SE+Co. KG

Hauptstraße 1

79689 Maulburg, Germany

Address of the manufacturing plant: See nameplate.

**Extended order code**

The extended order code is indicated on the nameplate, which is affixed to the device in such a way that it is clearly visible. Additional information about the nameplate is provided in the associated Operating Instructions.

## Structure of the extended order code

FTI77	–	*****	+	A*B*C*D*E*F*G*..
<i>(Device type)</i>		<i>(Basic specifications)</i>		<i>(Optional specifications)</i>

\* = Placeholder

At this position, an option (number or letter) selected from the specification is displayed instead of the placeholders.

### *Basic specifications*

The features that are absolutely essential for the device (mandatory features) are specified in the basic specifications. The number of positions depends on the number of features available.

The selected option of a feature can consist of several positions.

### *Optional specifications*

The optional specifications describe additional features for the device (optional features). The number of positions depends on the number of features available. The features have a 2-digit structure to aid identification (e.g. JA). The first digit (ID) stands for the feature group and consists of a number or a letter (e.g. J = Test, Certificate). The second digit constitutes the value that stands for the feature within the group (e.g. A = 3.1 material (wetted parts), inspection certificate).

More detailed information about the device is provided in the following tables. These tables describe the individual positions and IDs in the extended order code which are relevant to hazardous locations.

## Extended order code: Solicap S



The following specifications reproduce an extract from the product structure and are used to assign:

- This documentation to the device (using the extended order code on the nameplate).
- The device options cited in the document.

### *Device type*

FTI77

*Basic specifications*

Position 1 (Approval)		
Selected option		Description
FTI77	V	EAC Ex ia/tc IIIC T90°C Da/Dc
	W	EAC Ex ia/tb IIIC T90°C Da/Db
	X	EAC Ex ia IIIC T80°C T <sub>500</sub> 130°C Da

Position 2 (Application)		
Selected option		Description
FTI77	1	Solid, fine-grained
	2	Solid, coarse-solids

Position 3 (Inactive Length L3)		
Selected option		Description
FTI77	A	Not selected
	B, C, L, M	..... mm/in, steel
	E, F, G, N, P, R	..... mm/in, 316L
	H, S	..... mm/in, 316L+125mm/5in active build-up protection, 316L

Position 4, 5 (Active Probe Length L1)		
Selected option		Description
FTI77	Ax, Ex	..... mm/in, sword, steel
	Bx, Fx	..... mm/in, sword, 316L
	Cx, Gx	..... mm/in, ..... mm/in rope, steel zinc coated, tension weight steel
	Dx, Hx	..... mm/in, ..... mm/in rope, 316, tension weight 316L

Position 9 (Electronics, Output)		
Selected option		Description
FTI77	Y	Special version: FEI50H
	1 <sup>1)</sup>	FEI51; 2-wire 19-253VAC
	2 <sup>1)</sup>	FEI52; 3-wire PNP 10-55VDC
	4 <sup>1)</sup>	FEI54; relay DPDT, 19-253VAC, 19-55VDC
	5	FEI55; 8/16mA, 11-35VDC
	7 <sup>2)</sup>	FEI57S; 2-wire PFM
	8 <sup>2)</sup>	FEI58; NAMUR+test button (H-L signal)

- 1) Only in connection with supply circuit "Non-intrinsically safe"  
 2) Only in connection with supply circuit "Intrinsically safe Ex ia"

Position 10 (Housing)		
Selected option		Description
FTI77	1	F15 316L hygiene IP66/67 NEMA4X
	3	F17 Alu IP66/67 NEMA4X
	4	F13 Alu IP66 NEMA4X + gas-tight probe seal
	5	T13 Alu IP66 NEMA4X + gas-tight probe seal + separate conn. compartment
	6	F27 316L IP66/67 NEMA6P + gas-tight probe seal

Position 12 (Type of probe)		
Selected option		Description
FTI77	1	Compact
	2, 3, 4, 5	..... mm/in L4 cable > separate enclosure

### Optional specifications

No options specific to hazardous locations are available.

**Safety  
instructions:  
General**

- Staff must meet the following conditions for mounting, electrical installation, commissioning and maintenance of the device:
  - Be suitably qualified for their role and the tasks they perform
  - Be trained in explosion protection
  - Be familiar with national regulations
- Install the device according to the manufacturer's instructions and national regulations.
- Do not operate the device outside the specified electrical, thermal and mechanical parameters.
- Avoid electrostatic charging:
  - Of plastic surfaces (e.g. enclosure, sensor element, special varnishing, attached additional plates, ..)
  - Of isolated capacities (e.g. isolated metallic plates)

**Safety  
instructions:  
Special conditions**

Permitted ambient temperature range at the electronics enclosure, permitted process temperature:  
 $-50\text{ °C} \leq T_a \leq +70\text{ °C}$

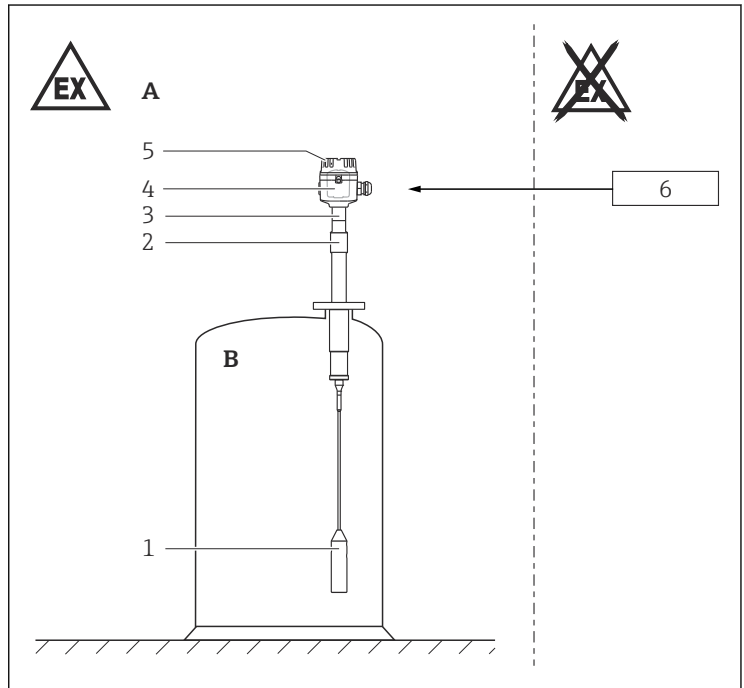
- Observe the information in the temperature tables.
- In the event of additional or alternative special varnishing on the enclosure or other metal parts:
  - Observe the danger of electrostatic charging and discharge.
  - Do not rub surfaces with a dry cloth.

*Basic specification, Position 10 = 4, 5 and covers with glass window*  
 Restriction to  $-40\text{ °C} \leq T_a \leq +70\text{ °C}$ .



**Safety  
instructions:  
Installation**

Supply circuit "Intrinsically safe Ex ia"

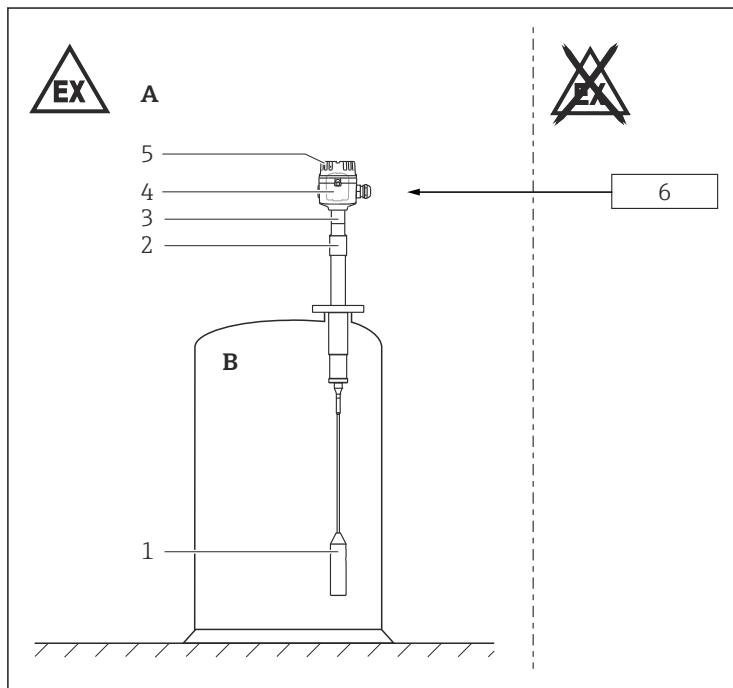


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 1

- A Zone 20, Zone 21, Zone 22
- B Zone 20
- 1 Strut or rope with tensioning weight
- 2 Probe
- 3 Adapter
- 4 Electronic insert
- 5 Enclosure
- 6 Certified associated apparatus

## Supply circuit "Non-intrinsically safe"



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- A Zone 21, Zone 22  
 B Zone 20  
 1 Strut or rope with tensioning weight  
 2 Probe  
 3 Adapter  
 4 Electronic insert  
 5 Enclosure  
 6 Power supply

- Do not open in a potentially explosive dust atmosphere.
- Observe the maximum process conditions according to the manufacturer's Operating Instructions.
- At high medium temperatures, note flange pressure load capacity as a factor of temperature.
- To maintain the ingress protection of the enclosure:
  - Screw the cover tight.
  - Mount the cable entry correctly.
- After aligning (rotating) the enclosure, retighten the fixing screw (see Operating Instructions).

- Connect the device using suitable cable and wire entries of protection type "Equipment dust ignition protection by enclosure (Ex t)" or "Increased safety (Ex e)" (ingress protection of at least IP65). Lay connecting cable and secure.
- Seal unused entry glands with approved sealing plugs that correspond to the type of protection.
- Install the device to exclude any mechanical damage or friction during the application. Pay particular attention to flow conditions and tank fittings.
- Mechanically fix probes which are more than 3 m (e.g. using guy ropes).
- Maximum rope tensile load:
  - Fine-grained bulk solids: 7.5 kN
  - Coarse-grained bulk solids: 20 kN
- Maximum lateral load including strut:
  - Fine-grained bulk solids: 250 Nm
  - Coarse-grained bulk solids: 800 Nm

*Basic specification, Position 10 = 1*

Before operation:

- Screw in the cover all the way.
- Tighten the securing clamp on the cover.

*Basic specification, Position 10 = 3, 4, 5, 6*

Tighten the cover with torque 12 Nm.

### **Intrinsic safety**

Observe the pertinent guidelines when interconnecting intrinsically safe circuits.

### **Potential equalization**

Install potential equalization between the certified associated apparatus (non-hazardous area,  $\text{X}$ ) and the device (explosion-hazardous area,  $\text{Ex}$ ).

### **Safety instructions: Zone 20**

- In the event of potentially explosive dust/air mixtures, only operate the device under atmospheric conditions.
  - Temperature: -20 to +60 °C
  - Pressure: 80 to 110 kPa (0.8 to 1.1 bar)
  - Air with normal oxygen content, usually 21 % (V/V)
- If no potentially explosive mixtures are present, or if additional protective measures have been taken, the device may also be operated under non-atmospheric conditions in accordance with the manufacturer's specifications.

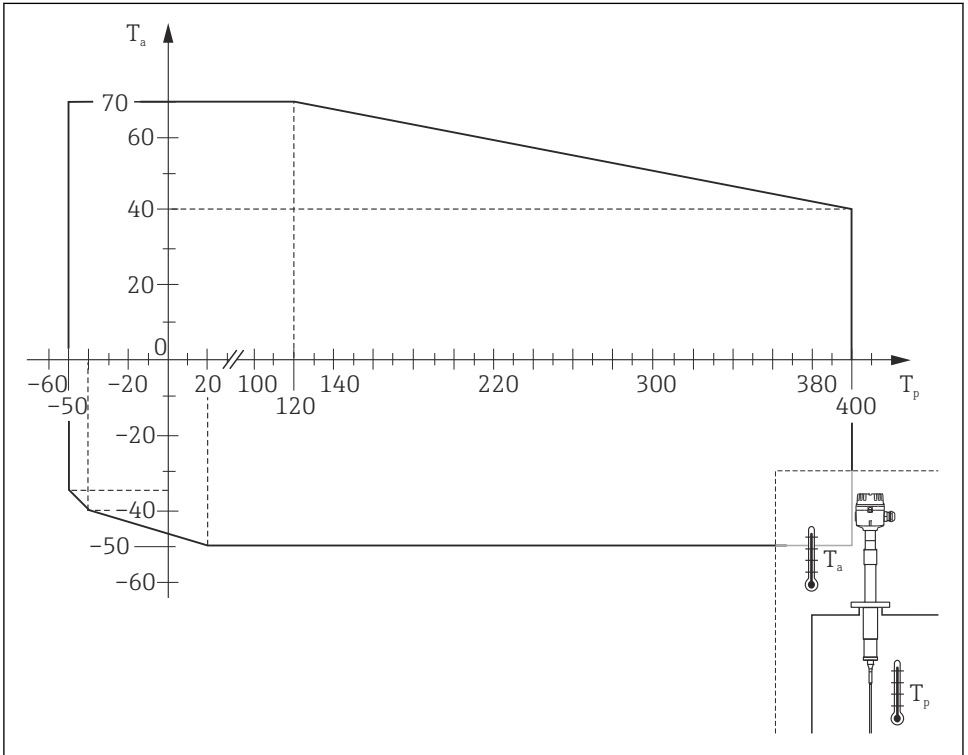
## Temperature tables

	Probe and electronics enclosure in Zone 20
	Connection to certified intrinsically safe power circuits
Max. surface temperature at an ambient temperature of 70 °C	80 °C  Deposited material with a layer of 500 mm T <sub>500</sub> 130 °C

	Probe in Zone 20	Electronics enclosure in Zone 21, Zone 22	
		Connection to certified intrinsically safe power circuits	Connection to non-intrinsically safe power circuits
Max. surface temperature at an ambient temperature of 70 °C	70 °C	80 °C	90 °C
The compact version can also be used for process temperatures between +70 to +400 °C if it can also be ensured that the ambient temperature at the electronics enclosure does not exceed the values as indicated in the temperature graphic.	400 °C	40 °C	40 °C

### Compact version

Strut and rope version, partially insulated



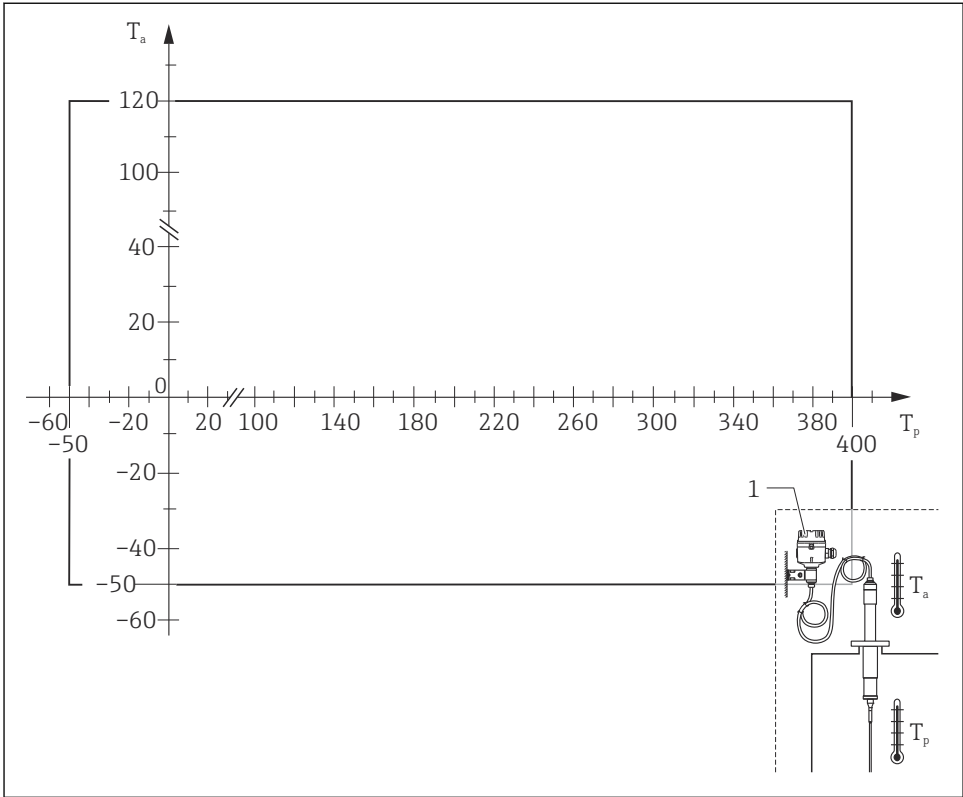
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$T_a$  Ambient temperature in °C

$T_p$  Process temperature in °C

Version with separate enclosure



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4

$T_a$  Ambient temperature in °C

$T_p$  Process temperature in °C

1 Temperature at the separate enclosure:  $-40\text{ °C} \leq T_a \leq +70\text{ °C}$

**Connection data** Connection to certified intrinsically safe circuits Ex ia (Zone 20)

<i>Basic specification, Position 9</i>	<b>Electrical data</b>
Y	$U_i \leq 30 \text{ V}$ $I_i \leq 120 \text{ mA}$ $P_i \leq 1 \text{ W}$ $C_i \leq 2.4 \text{ nF}$ $L_i \leq 0$
5	$U_i \leq 35 \text{ V}$ $I_i \leq 100 \text{ mA}$ $P_i \leq 1 \text{ W}$ $C_i \leq 2.4 \text{ nF}$ $L_i \leq 0$
7	$U_i \leq 16.1 \text{ V}$ $I_i \leq 100 \text{ mA}$ $P_i \leq 1 \text{ W}$ $C_i \leq 2.4 \text{ nF}$ $L_i \leq 0$
8	$U_i \leq 18 \text{ V}$ $I_i \leq 52 \text{ mA}$ $P_i \leq 170 \text{ mW}$ $C_i/L_i \leq 0$

## Connection to non-intrinsically safe circuits (Zone 20/21 or Zone 20/22)

<i>Basic specification, Position 9</i>	<b>Electrical data</b>
Y <sup>1)</sup>	$U \leq 35 \text{ V}_{\text{DC}}$
5 <sup>1)</sup>	$U \leq 35 \text{ V}_{\text{DC}}$

1) With Basic specification, Position 10 = 5 only with limiting module

<i>Basic specification, Position 9</i>	<b>Power supply</b>	<b>Relay circuit</b>
1	19 to 253 V <sub>AC</sub>	–
2	10 to 55 V <sub>DC</sub>	–
4	19 to 253 V <sub>AC</sub>	$253 \text{ V}_{\text{AC}} / 6 \text{ A}$ $1500 \text{ VA} / \cos \varphi = 1$ $750 \text{ VA} / \cos \varphi > 0.7$
	19 to 55 V <sub>DC</sub>	$30 \text{ V}_{\text{DC}} / 4 \text{ A}$ $125 \text{ V}_{\text{DC}} / 0.2 \text{ A}$

## Cable entry parameters

Thread	Clamping range	Material	Sealing insert	O-ring
M20x1,5	$\varnothing$ 8 to 10.5 mm <sup>1)</sup> $\varnothing$ 6.5 to 13 mm <sup>2)</sup>	Ms, nickel-plated	Silicone	EPDM ( $\varnothing$ 17x2)

- 1) Standard  
 2) Separate clamping inserts available



- The tightening torque refers to cable glands installed by the manufacturer:
  - Recommended torque to connect the cable gland into the enclosure: 3.75 Nm
  - Recommended torque to tighten the cable into the cable gland: 3.5 Nm
  - Maximum torque to tighten the cable into the cable gland: 10 Nm
  - This value may be different depending on the type of cable. However, the maximum value must not be exceeded.
- Only suitable for fixed installation. The operator must pay attention to a suitable strain relief of the cable.
- To maintain the ingress protection of the enclosure: Install the enclosure cover, cable glands and blind plugs correctly.











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