Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Safety Instructions

Levelflex M
FMP40, FMP45
4-20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus

Ex nA IIC T6...T1 Gc

NEPSI GYJ12.1453X

XA00386F-B/00/B2/13.12
71204544

Endress+Hauser
People for Process Automation

Levelflex M
FMP40, FMP45

english

4-20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus

Associated Documentation

This document is an integral part of the following Operating Instructions:
HART: BA00242F/00 (FMP40), BA00279F/00 (FMP45)
PROFIBUS PA: BA00243F/00 (FMP40), BA00280F/00 (FMP45)
FOUNDATION Fieldbus: BA00244F/00 (FMP40), BA00281F/00 (FMP45)

The Operating Instructions which are supplied and correspond to the device type apply.

Designation

Designation of explosion protection	**Ex nA IIC T6...T1 Gc**

Applied standards

GB 3836.1-2010
GB 3836.8-2003

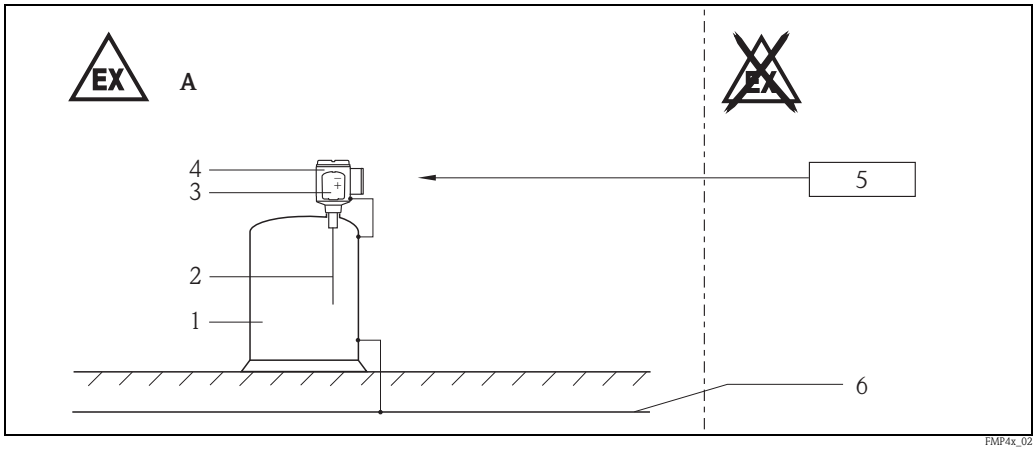
Safety instructions: Special conditions

Permitted ambient temperature range at the electronics housing: –40 °C ≤ T_a ≤ +80 °C.
Observe the information in the temperature tables.

- For all non-metallic surfaces: Avoid electrostatic charging (do not rub dry).
- Cover with viewing window corresponds to the "low" mechanical strain level.

Devices with plug connectors (e.g. PROFIBUS PA or FOUNDATION Fieldbus):
- The connectors have to be protected against mechanical load.
- Plug connector may not be disconnected in the energised state.

Safety instructions: Installation



1

A *Zone 2*

1 *Tank; Hazardous area Zone 2*
2 *Rod, rope or coax probe*
3 *Electronic insert*
4 *Housing, optionally with or without VU331 display and operating module:*
- *F12, aluminium coated*
- *F23, stainless steel*
- *T12-OVP, aluminium coated; with integrated overvoltage protector*
- *T12, aluminium coated; with separate connection compartment*

5 *Supply depending upon equipment version*
6 *Local potential equalization*

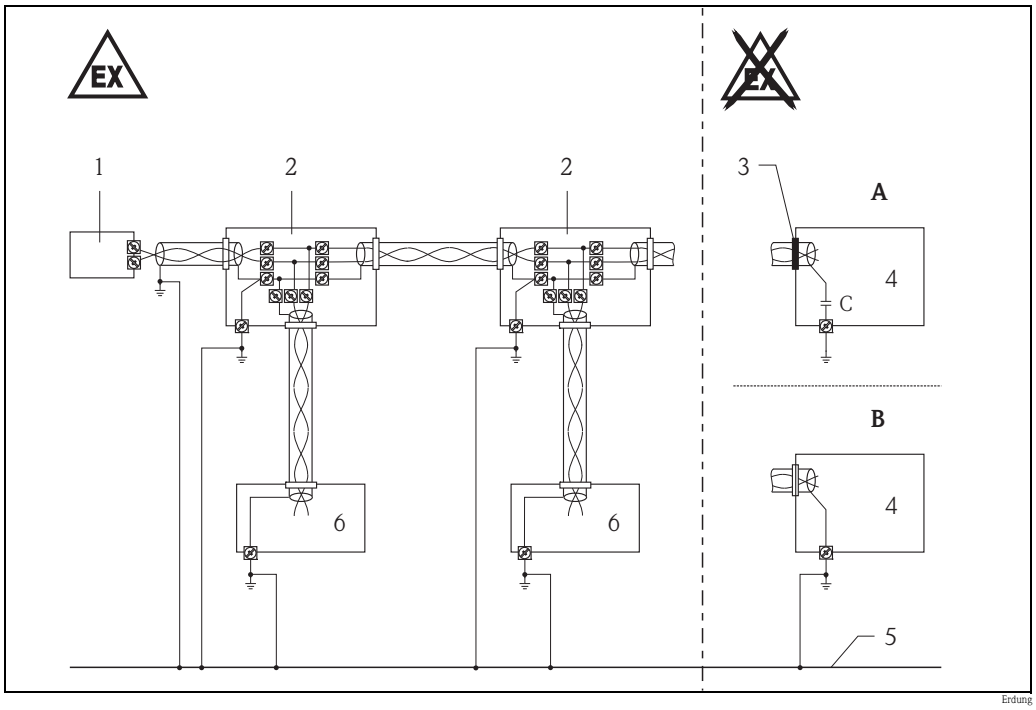
- Install the device according to the manufacturer's instructions and any other valid standards and regulations.
- Do not operate the device outside the specified electrical, thermal and mechanical parameters.
- The relationship between the permitted ambient temperature for the electronics housing, dependent on the range of application, and the temperature classes is shown in the tables (→ 🖹 6).
- After aligning (rotating) the housing, retighten the fixing screw (see Operating Instructions).
- Continuous duty temperature of the cable ≥ Ta +5 K.
- Cover of terminal compartment or cover of electronics compartment: Torque ≥ 40 Nm.
- Changes in electrical and mechanical parts of the equipment could harm the type of explosion protection and are not allowed for the user.
- The housing of transmitter is equipped with a ground terminal; users must ensure that it is reliably connected to ground during installation and use.
- For installation, use and maintenance of the device, users must also observe the requirements stated in the Operating Instructions and the standards:
  - GB50257-1996: "Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering".
  - GB3836.13-1997: "Electrical apparatus for explosive gas atmospheres, Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres".
  - GB3836.15-2000: "Electrical apparatus for explosive gas atmospheres, Part 15: Electrical installations in hazardous area (other than mines)".
  - GB3836.16-2006: "Electrical apparatus for for explosive gas atmospheres, Part 16: Inspection and maintenance of electrical installation (other than mines)".

F12, F23
- The input power circuit of the device is isolated from ground potential and has a dielectric strength of at least 500 V_{rms} with respect to it.
- Do not open while circuit is alive where explosive gas exists.
  Electronic compartment may be opened, when area is known to be non-hazard.

T12-OVP
- The input power circuit of the device is isolated from ground potential. The dielectric strength to earth is limited by 600 V electrode arresters.
- Do not open while circuit is alive where explosive gas exists.
  Electronic compartment may be opened, when area is known to be non-hazard.

T12
- The electrical apparatus must be integrated into the local potential equalisation line. The input circuit is galvanically connected to the housing.
- Terminal compartment: Do not open while circuit is alive where explosive gas exists.
  Electronic compartment may always be opened.

Fieldbus system: PROFIBUS PA, FOUNDATION Fieldbus



2

A *Version 1*
Use small capacitors (e.g. 1 nF, 1500 V, dielectric strength, ceramic).
Total capacitance connected to the screen may not exceed 10 nF.

B *Version 2*

1 *Terminating resistor*
2 *Distributor/T box*
3 *Screen insulated*
4 *Supply unit/Segment coupler*
5 *Potential equalization (secured in high degree)*
6 *Field device*

Temperature tables

Observe the permitted probe temperature range!

*1 = Functional
limited by maximum permitted probe temperature

FMP40

F12, T12-OVP, T12

Temperature class	Maximum permitted medium temperature (process connection)	Max. permitted ambient temperature at the electronics housing dependent on the medium temperature				
		with ¾" probe, compact	with ¾" probe and remote electronics / spacer tube	with 1½" probe, compact	with 1½" probe and remote electronics / spacer tube	with remote electronics / spacer hose
T6	+ 85 °C + 70 °C	67 °C 70 °C	69 °C 70 °C	68 °C 70 °C	69 °C 70 °C	70 °C 70 °C
T5	+100 °C + 80 °C	76 °C 80 °C	79 °C 80 °C	77 °C 80 °C	79 °C 80 °C	80 °C 80 °C
T4	+135 °C + 80 °C	70 °C 80 °C	77 °C 80 °C	73 °C 80 °C	78 °C 80 °C	80 °C 80 °C
T3 (functional) *1	+150 °C + 80 °C	67 °C 80 °C	77 °C 80 °C	71 °C 80 °C	77 °C 80 °C	80 °C 80 °C
T3, T2, T1 (functional) *1	+150 °C + 80 °C	67 °C 80 °C	77 °C 80 °C	71 °C 80 °C	77 °C 80 °C	80 °C 80 °C

F23

Temperature class	Maximum permitted medium temperature (process connection)	Max. permitted ambient temperature at the electronics housing dependent on the medium temperature				
		with ¾" probe, compact	with ¾" probe and remote electronics / spacer tube	with 1½" probe, compact	with 1½" probe and remote electronics / spacer tube	with remote electronics / spacer hose
T6	+ 85 °C + 70 °C	66 °C 70 °C	69 °C 70 °C	66 °C 70 °C	–	–
T5	+100 °C + 80 °C	74 °C 80 °C	78 °C 80 °C	74 °C 80 °C	–	–
T4	+135 °C + 80 °C	63 °C 80 °C	76 °C 80 °C	63 °C 80 °C	–	–
T3 (functional) *1	+150 °C + 80 °C	59 °C 80 °C	75 °C 80 °C	59 °C 80 °C	–	–

FMP45

F12, T12-OVP, T12

Temperature class	Maximum permitted medium temperature (process connection)	Max. permitted ambient temperature at the electronics housing dependent on the medium temperature		
		Type A, (XT version)	Type B or C (HT version)	with remote electronics / spacer hose
T6	+ 85 °C + 70 °C	69 °C 70 °C	69 °C 70 °C	70 °C 70 °C
T5	+100 °C + 75 °C	78 °C 80 °C	79 °C 80 °C	80 °C 80 °C
T4	+135 °C + 80 °C	76 °C 80 °C	77 °C 80 °C	80 °C 80 °C
T3	+200 °C + 80 °C	71 °C 80 °C	74 °C 80 °C	80 °C 80 °C
T2 (functional) *1	+300 °C + 80 °C	280 °C: 66 °C 80 °C	70 °C 80 °C	80 °C 80 °C
T1 (functional) *1	+400 °C + 80 °C	not allowed	66 °C 80 °C	80 °C 80 °C

F23

Temperature class	Maximum permitted mediumtemperature (process connection)	Max. permitted ambient temperature at the electronics housing dependent on the medium temperature		
		Type A, (XT version)	Type B or C (HT version)	with remote electronics / spacer hose
T6	+ 85 °C + 70 °C	68 °C 70 °C	68 °C 70 °C	70 °C 70 °C
T5	+100 °C + 75 °C	77 °C 80 °C	78 °C 80 °C	80 °C 80 °C
T4	+135 °C + 80 °C	73 °C 80 °C	75 °C 80 °C	80 °C 80 °C
T3	+200 °C + 80 °C	65 °C 80 °C	70 °C 80 °C	80 °C 80 °C
T2 (functional) *1	+300 °C + 80 °C	280 °C: 56 °C 80 °C	62 °C 80 °C	80 °C 80 °C
T1 (functional) *1	+400 °C + 80 °C	not allowed	54 °C 80 °C	80 °C 80 °C

Connection data

Electronic insert	Power supply
4-20 mA HART	U = 30 V DC
PROFIBUS PA, FOUNDATION Fieldbus	Specified in the respective standard (U = 32 V DC)

Levelflex M
FMP40, FMP45

中文

4-20 mA HART, PROFIBUS PA, FOUNDATION Fieldbus
(基金会现场总线)

相关资料

本文档是下列操作手册的组成部分：
HART：BA00242F/00 (FMP40), BA00279F/00 (FMP45)
PROFIBUS PA：BA00243F/00 (FMP40), BA00280F/00 (FMP45)
FOUNDATION Fieldbus (基金会现场总线)：BA00244F/00 (FMP40), BA00281F/00 (FMP45)

根据用户订购仪表的具体型号所提供的相应操作手册。

名称

防爆代号	**Ex nA IIC T6...T1 Gc**

适用标准

GB 3836.1-2010
GB 3836.8-2003

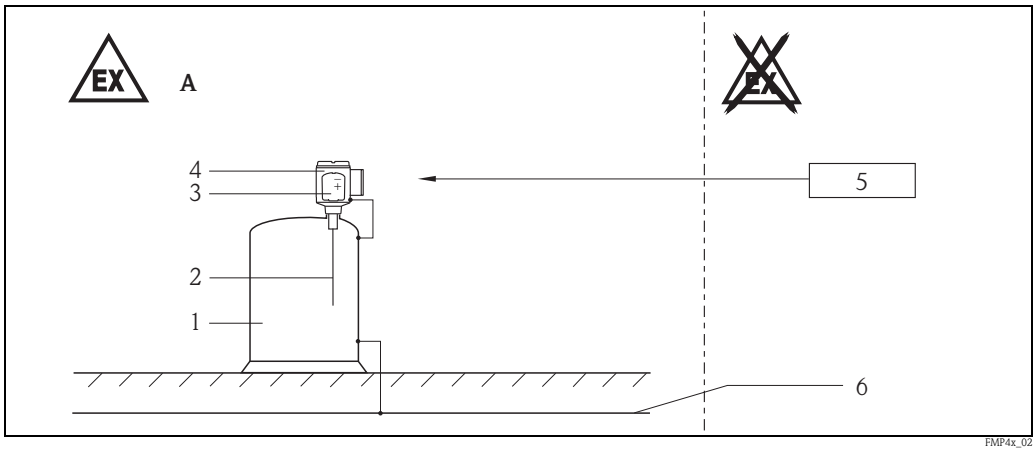
安全指南：
特殊条件

电子部件外壳处的允许环境温度范围：–40 °C ≤ Ta ≤ +80 °C。
遵守温度表中的信息。

- 用于所有非金属表面：避免产生静电 (不要干擦)。
- 符合“低”机械应变水平的带观察孔的盖罩。

带插头连接器的设备 (如 PROFIBUS PA 或 FOUNDATION Fieldbus (基金会现场总线))：
- 必须防止连接器承受机械负载。
- 插头连接器不可在加电情况下断开。

安全指南：
安装



1

A *区域 2*

1 *液罐：危险区 区域 2*
2 *杆型、绳型或同轴电缆探针*
3 *电子插件*
4 *外壳，可选带有或不带有 VU331 显示屏和操作模块：*
- *F12，铝涂层*
- *F23，不锈钢*
- *T12-OVP，铝涂层：带有集成过电压保护装置*
- *T12，铝涂层：带独立接线室*

5 *根据设备型号供电*
6 *本地电势平衡*

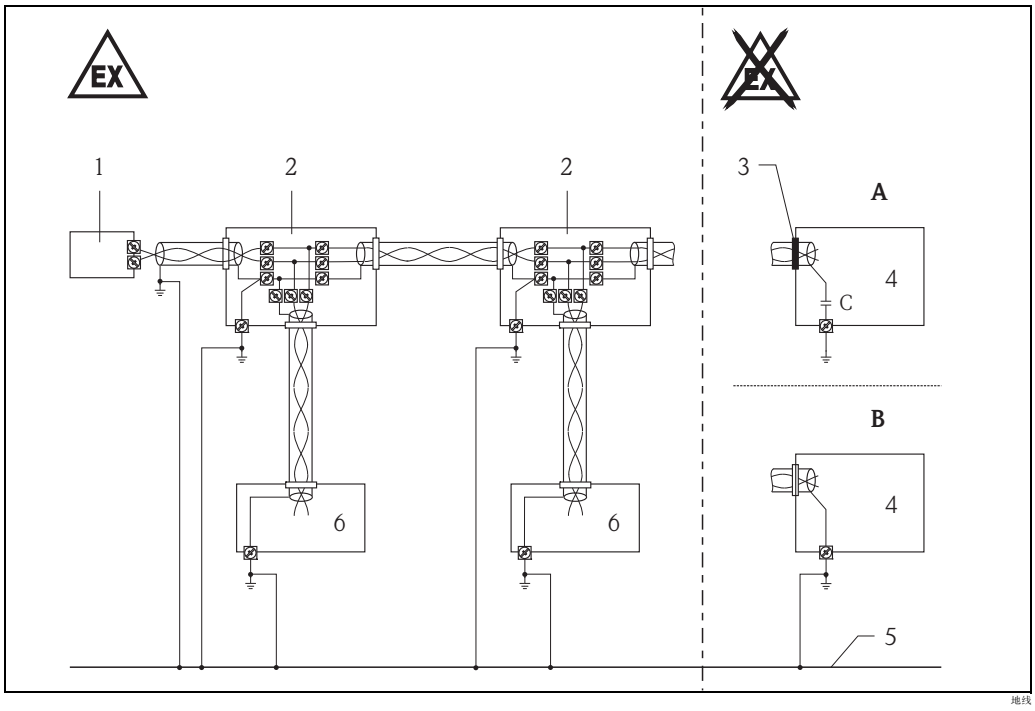
- 按照制造商的说明及其它有效标准和规定来安装设备。
- 使用设备时请勿超出指定的电、热和机械参数。
- 电子部件外壳的允许环境温度 (取决于应用范围) 与温度组别之间的关系如下表所示 (→ 6)。
- 在对齐 (旋转) 外壳后，重新拧紧固定螺丝 (参见操作说明)。
- 电缆持续工作温度 ≥ Ta +5 K。
- 接线柜的盖罩或电子部件柜的盖罩：扭矩 ≥ 40 Nm。
- 改动设备的电气和机械部件会降低防爆保护的类型，用户请勿擅自改动。
- 变送器的外壳装备有接地端子；在安装和使用的过程中，用户应确保该端子可靠接地。
- 在安装、使用和维护设备时，用户还必须遵守操作手册和下列标准中的规定：
  - GB50257-1996：“电气装置安装工程 爆炸和火灾危险环境电气装置施工及验收规范”。
  - GB3836.13-1997：“爆炸性气体环境用电气设备 第 13 部分：爆炸性气体环境用电气设备的检修”。
  - GB3836.15-2000：“爆炸性气体环境用电气设备 第 15 部分：危险场所电气安装 (煤矿除外)”。
  - GB3836.16-2006：“爆炸性气体环境用电气设备 第 16 部分：电气装置的检查和维护 (煤矿除外)”。

F12, F23
- 设备的输入电源电路与地电势绝缘，它相对地电势至少有 500 V_{rms} 绝缘强度。
- 在存在爆炸性气体的环境下，如果电路带电，切勿打开。
  当确定区域没有危险时，可打开电子部件柜。

T12 - OVP
- 设备的输入电源电路与地电势绝缘。对地绝缘强度限制为 600 V 电气放电装置。
- 在存在爆炸性气体的环境下，如果电路带电，切勿打开。
  当确定区域没有危险时，可打开电子部件柜。

T12
- 必须将电气仪器集成连接于本地等电势线上。输入电路与外壳进行电气连接。
- 接线柜：在存在爆炸性气体的环境下，如果电路带电，切勿打开。
  电子部件柜随时都可打开。

现场总线系统：PROFIBUS PA, FOUNDATION Fieldbus (基金会现场总线)



2

A *版本 1*
使用小型电容器 (例如 1 nF，1500 V，绝缘强度，陶瓷)。
连接到屏蔽的总电容不得超过 10 nF。
B *版本 2*

1 *端电阻*
2 *配电盘 / 接线盒*
3 *屏蔽层绝缘*
4 *电源单元 / 分段耦合器*
5 *电势平衡 (保持在高等级)*
6 *现场设备*

温度表

遵循允许的探针温度范围！

*[1] = 功能型
受限于最大允许的探针温度

FMP40

F12, T12 - OVP, T12

温度组别	最大允许输入温度 (过程连接)	电子部件外壳处的最大允许环境温度取决于输入温度				
		带有 ¾" 探针，紧凑型	带有 ¾" 探针和远程电子部件 / 隔离管	带有 1½" 探针，紧凑型	带有 1½" 探针和远程电子部件 / 隔离管	带有远程电子部件 / 隔离软管
T6	+ 85 °C + 70 °C	67 °C 70 °C	69 °C 70 °C	68 °C 70 °C	69 °C 70 °C	70 °C 70 °C
T5	+100 °C + 80 °C	76 °C 80 °C	79 °C 80 °C	77 °C 80 °C	79 °C 80 °C	80 °C 80 °C
T4	+135 °C + 80 °C	70 °C 80 °C	77 °C 80 °C	73 °C 80 °C	78 °C 80 °C	80 °C 80 °C
T3 (功能型) *[1]	+150 °C + 80 °C	67 °C 80 °C	77 °C 80 °C	71 °C 80 °C	77 °C 80 °C	80 °C 80 °C
T3, T2, T1 (功能型) *[1]	+150 °C + 80 °C	67 °C 80 °C	77 °C 80 °C	71 °C 80 °C	77 °C 80 °C	80 °C 80 °C

F23

温度组别	最大允许输入温度 (过程连接)	电子部件外壳处的最大允许环境温度取决于输入温度				
		带有 ¾" 探针，紧凑型	带有 ¾" 探针和远程电子部件 / 隔离管	带有 1½" 探针，紧凑型	带有 1½" 探针和远程电子部件 / 隔离管	带有远程电子部件 / 隔离软管
T6	+ 85 °C + 70 °C	66 °C 70 °C	69 °C 70 °C	66 °C 70 °C	–	–
T5	+100 °C + 80 °C	74 °C 80 °C	78 °C 80 °C	74 °C 80 °C	–	–
T4	+135 °C + 80 °C	63 °C 80 °C	76 °C 80 °C	63 °C 80 °C	–	–
T3 (功能型) *[1]	+150 °C + 80 °C	59 °C 80 °C	75 °C 80 °C	59 °C 80 °C	–	–

FMP45

F12, T12 - OVP, T12

温度组别	最大允许输入温度 (过程连接)	电子部件外壳处的最大允许环境温度取决于输入温度		
		类型 A，(XT 版本)	类型 B 或 C (HT 版本)	带有远程电子部件 / 隔离软管
T6	+ 85 °C + 70 °C	69 °C 70 °C	69 °C 70 °C	70 °C 70 °C
T5	+100 °C + 75 °C	78 °C 80 °C	79 °C 80 °C	80 °C 80 °C
T4	+135 °C + 80 °C	76 °C 80 °C	77 °C 80 °C	80 °C 80 °C
T3	+200 °C + 80 °C	71 °C 80 °C	74 °C 80 °C	80 °C 80 °C
T2 (功能型) *1	+300 °C + 80 °C	280 °C： 66 °C 80 °C	70 °C 80 °C	80 °C 80 °C
T1 (功能型) *1	+400 °C + 80 °C	不允许	66 °C 80 °C	80 °C 80 °C

F23

温度组别	最大允许输入温度 (过程连接)	电子部件外壳处的最大允许环境温度取决于输入温度		
		类型 A，(XT 版本)	类型 B 或 C (HT 版本)	带有远程电子部件 / 隔离软管
T6	+ 85 °C + 70 °C	68 °C 70 °C	68 °C 70 °C	70 °C 70 °C
T5	+100 °C + 75 °C	77 °C 80 °C	78 °C 80 °C	80 °C 80 °C
T4	+135 °C + 80 °C	73 °C 80 °C	75 °C 80 °C	80 °C 80 °C
T3	+200 °C + 80 °C	65 °C 80 °C	70 °C 80 °C	80 °C 80 °C
T2 (功能型) *1	+300 °C + 80 °C	280 °C： 56 °C 80 °C	62 °C 80 °C	80 °C 80 °C
T1 (功能型) *1	+400 °C + 80 °C	不允许	54 °C 80 °C	80 °C 80 °C

连接数据

电子插件	电源
4-20 mA HART	U = 30 V DC
PROFIBUS PA, FOUNDATION Fieldbus (基金会现场总线)	在相应标准中指定 (U = 32 V DC)

www.endress.com/worldwide

Endress+Hauser

People for Process Automation

XA00386F-B/00/B2/13.12
71204544
CCS/FM 9.0

71204544