Level Pressure Flow Temperature Liquid Analysis Registration Systems Components Services Solutions

Safety Instructions

Micropilot M
FMR230/231/240/244/245

HART, PROFIBUS PA, FOUNDATION Fieldbus

Ex nAL IIC T1...T6
NEPSI GYJ091302X

XC007F-B

en - Safety instructions for electrical apparatus for explosion-hazardous areas.

zh - 爆炸环境中电气仪表的安全指南。

XC007F-B/00/B2/12.09
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Micropilot M
FMR230/231/240/244/245

HART, PROFIBUS PA, FOUNDATION Fieldbus

Associated Documentation

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

– HART: BA218F/00, BA219F/00, BA220F/00, BA248F/00, BA251F/00
– PROFIBUS PA: BA225F/00, BA226F/00, BA249F/00, BA252F/00
– FOUNDATION Fieldbus: BA228F/00, BA229F/00, BA250F/00, BA253F/00

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

Designation

Designation of explosion protection	**Ex nAL IIC T1...T6**

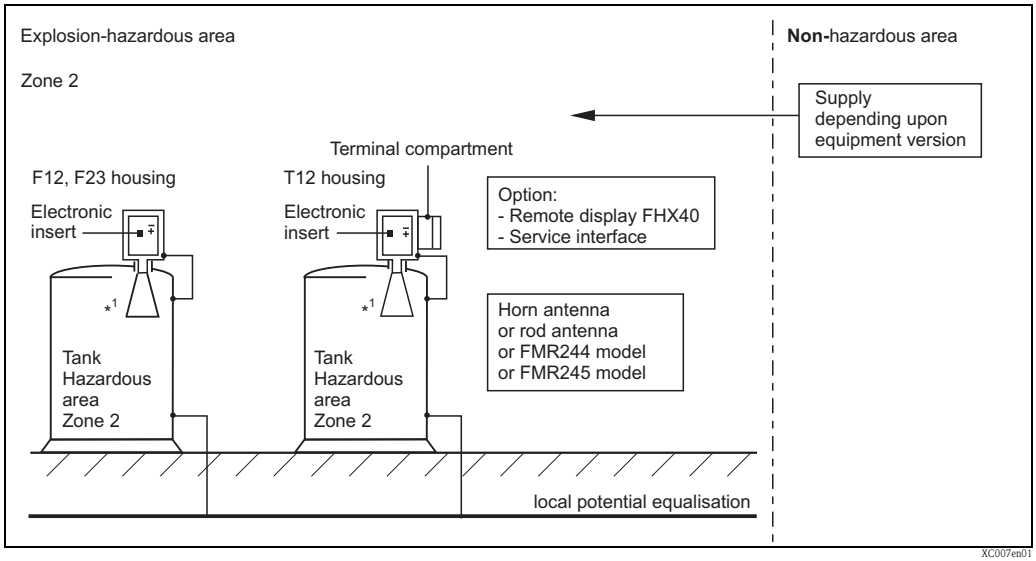
Explosion-hazardous area
Zone 2
Non-hazardous area
Supply
depending upon
equipment version
Terminal compartment
F12, F23 housing
T12 housing
Electronic
insert
Electronic
insert
Option:
- Remote display FHX40
- Service interface
*1
*1
Horn antenna
or rod antenna
or FMR244 model
or FMR245 model
Tank
Hazardous
area
Zone 2
Tank
Hazardous
area
Zone 2
local potential equalisation
XC007en01

Fig. 1

Installation of fieldbus system: PROFIBUS PA, FOUNDATION Fieldbus

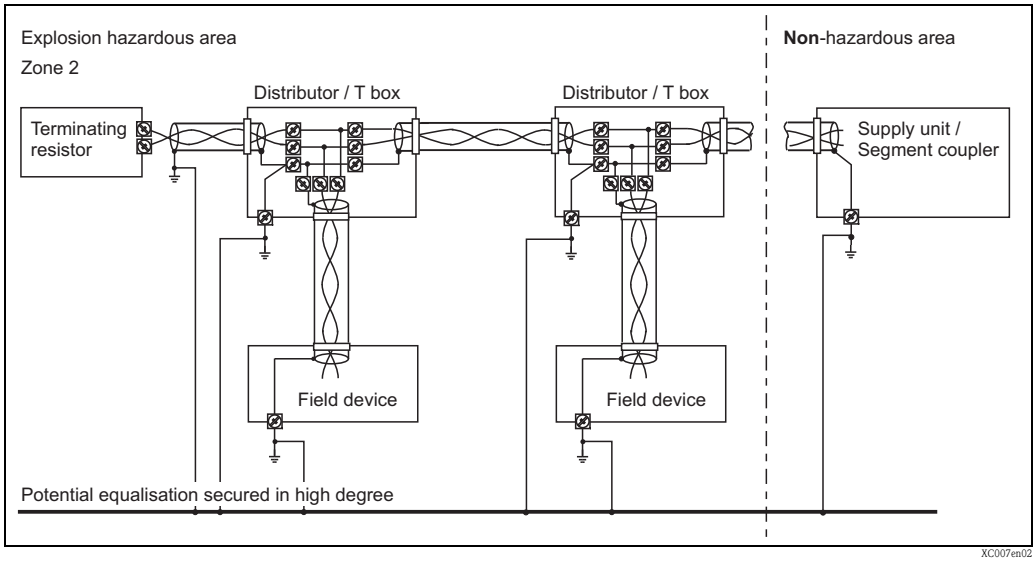

Fig. 2

Version 1

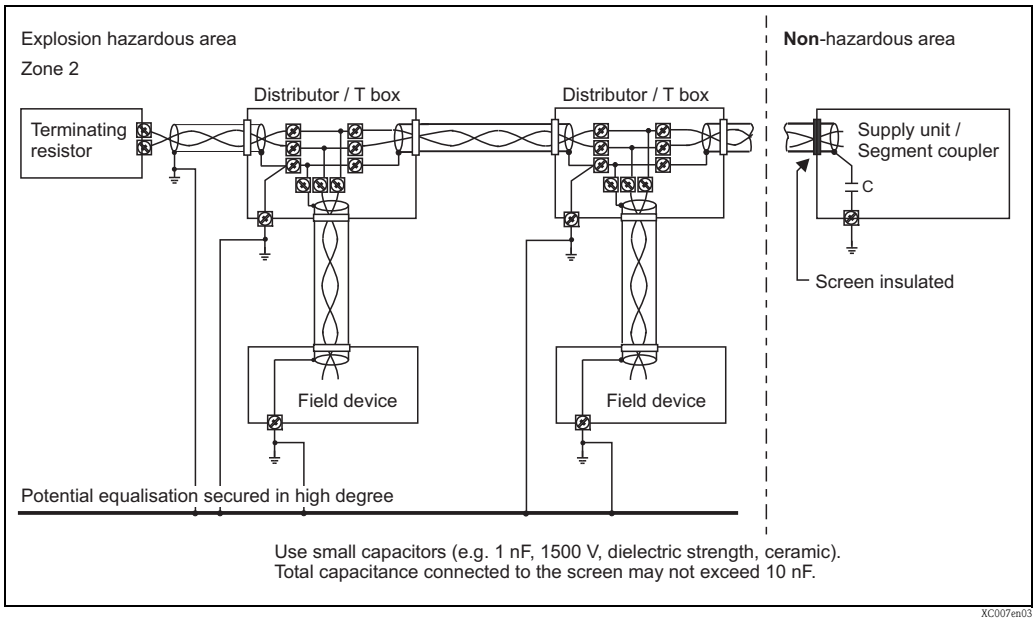

Fig. 3

Version 2

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

Type of protection	Ex nAL IIC T6...T1	For antistatic antennas
		For electrostatically chargeable antennas and/or options. See *[1]
Max. working pressure	Dependent on type of antenna or device	Refer to the respective operating instructions
Max. temperature at process connection	Dependent on type of antenna or device	Refer to the respective operating instructions
Electrostatic charging	Dependent on type of antenna	Marking on device

Housing	**F12** aluminium coated	–40 °C ≤ Ta ≤ +80 °C	Optionally with or without VU331 display and operating module
	F23 stainless steel	–40 °C ≤ Ta ≤ +80 °C	Optionally with or without VU331 display and operating module
	T12-OVP aluminium coated with integrated overvoltage protector	–40 °C ≤ Ta ≤ +80 °C	Optionally with or without VU331 display and operating module

Safety instructions: Installation

- Install the device according to the manufacturer's instructions and any other valid standards and regulations.
- 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 (Tab. 1...Tab. 3).
- After aligning (rotating) the housing, retighten the fixing screw (Allen screw on the threaded neck).
- Continuous duty temperature of the cable ≥ Ta +5 K.
- If antenna extensions over 3 m-long are used, they should be fixed mechanically (e.g. using guy ropes).
- Electronics compartment may be opened for configuration via display VU331 or via the address switches at fieldbus PA/FF instruments.
- Except of the display plug connector no other connections may be disconnected in the energised state.
- After configuration close the housing by the cover.
- Cover of terminal compartment or cover of electronics compartment: Torque ≥ 40 Nm.
- 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 explosive gas atmospheres, Part 16: Inspection and maintenance of electrical installation (other than mines)".
- The housing of transmitter is equipped with a ground terminal; users must ensure that it is reliably connected to ground during installation and use.

- FMR2xx with shut-off mechanism:
  - The entire arrangement must at least meet the requirements as per IP67 in accordance with IEC/EN 60529.
  - If the device needs to be disassembled for e.g. service purposes, we recommend securing the shut-off mechanism against opening or closing it with an additional blind flange.
  - The operator is entirely responsible for ensuring that the complete arrangement is permissible for the respective application.

- Electrostatic charging (X marking) *[1]:
  - The antenna on the Micropilot M FMR231 with white PTFE, FMR244/245 contain surfaces, which can become electrostatically charged. For this reason, these antenna must not be arranged such that they can become dangerously charged from a flowing medium (e.g. filling curtain).
  - Avoid electrostatic charging when cleaning the antenna (e.g. do not rub dry).

- Special condition (X marking) *[1]:
  Option:
  - Cover with viewing window corresponds to the "low" mechanical strain level (glass window 2 Joule).
  - For devices with plug connectors (e.g. PROFIBUS PA or FOUNDATION Fieldbus) the connectors have to be protected against mechanical load.
  - Instruments with plug connector e.g. PROFIBUS PA or FOUNDATION Fieldbus: plug connector may not be disconnected in the energised state.

F12, F23

- The input power circuit of the device is isolated from ground potential and has a dielectric strength of at least 500 Vrms with respect to it.

T12-OVP

- The input power circuit of the device is isolated from ground potential and has a dielectric strength of at least 410 V DC with respect to it.
- Do not open the connection compartment under voltage in an explosive atmosphere.

F12 housing, Tab. 1

Temperature class	Maximum permitted medium temperature at the antenna	Maximum permitted ambient temperature at the electronics housing				
		FMR230	FMR231	FMR240	FMR244	FMR245
T6	+ 80 °C + 60 °C	+60 °C +60 °C	+55 °C +60 °C	+60 °C +60 °C	+60 °C +60 °C	+60 °C +60 °C
T5	+ 95 °C + 75 °C	+75 °C +75 °C	+70 °C +75 °C	+75 °C +75 °C	+75 °C +75 °C	+75 °C +75 °C
T4	+130 °C + 80 °C	+75 °C +80 °C	+65 °C +80 °C	+75 °C +80 °C	+70 °C +80 °C	+70 °C +80 °C
T3	+195 °C + 80 °C	+70 °C +80 °C	–	+75 °C +80 °C	–	–
T2	+295 °C + 80 °C	+65 °C +80 °C	–	–	–	–
T1	+400 °C + 80 °C	+55 °C +80 °C	–	–	–	–

F23 housing, Tab. 2

Temperature class	Maximum permitted medium temperature at the antenna	Maximum permitted ambient temperature at the electronics housing				
		FMR230	FMR231	FMR240	FMR244	FMR245
T6	+ 80 °C + 60 °C	+55 °C +60 °C	+50 °C +60 °C	+60 °C +60 °C	+55 °C +60 °C	+55 °C +60 °C
T5	+ 95 °C + 75 °C	+70 °C +75 °C	+65 °C +75 °C	+75 °C +75 °C	+70 °C +75 °C	+70 °C +75 °C
T4	+130 °C + 80 °C	+70 °C +80 °C	+55 °C +80 °C	+70 °C +80 °C	+65 °C +80 °C	+65 °C +80 °C
T3	+195 °C + 80 °C	+65 °C +80 °C	–	+65 °C +80 °C	–	–
T2	+295 °C + 80 °C	+55 °C +80 °C	–	–	–	–
T1	+400 °C + 80 °C	+45 °C +80 °C	–	–	–	–

T12-OVP housing, Tab. 3

Temperature class	Maximum permitted medium temperature at the antenna	Maximum permitted ambient temperature at the electronics housing				
		FMR230	FMR231	FMR240	FMR244	FMR245
T6	+ 80 °C + 60 °C	+55 °C +60 °C	+50 °C +60 °C	+60 °C +60 °C	+55 °C +60 °C	+55 °C +60 °C
T5	+ 95 °C + 75 °C	+70 °C +75 °C	+65 °C +75 °C	+75 °C +75 °C	+70 °C +75 °C	+70 °C +75 °C
T4	+130 °C + 80 °C	+75 °C +80 °C	+65 °C +80 °C	+75 °C +80 °C	+75 °C +80 °C	+70 °C +80 °C
T3	+195 °C + 80 °C	+70 °C +80 °C	–	+75 °C +80 °C	–	–
T2	+295 °C + 80 °C	+65 °C +80 °C	–	–	–	–
T1	+400 °C + 80 °C	+55 °C +80 °C	–	–	–	–

Micropilot M
FMR230/231/240/244/245

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：BA218F/00, BA219F/00, BA220F/00, BA248F/00, BA251F/00
– PROFIBUS PA：BA225F/00, BA226F/00, BA249F/00, BA252F/00
– FOUNDATION Fieldbus (基金会现场总线)：BA228F/00, BA229F/00, BA250F/00, BA253F/00

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 nAL IIC T1...T6**

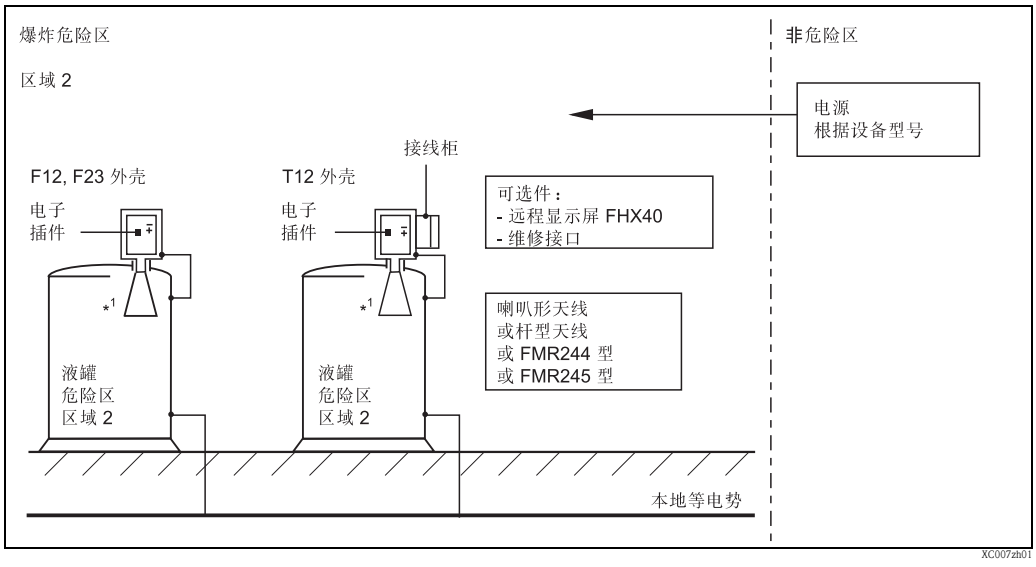
爆炸危险区
区域 2
非危险区
电源
根据设备型号
接线柜
F12, F23 外壳
T12 外壳
电子
插件
电子
插件
可选件：
- 远程显示屏 FHX40
- 维修接口
喇叭形天线
或杆型天线
或 FMR244 型
或 FMR245 型
液罐
危险区
区域 2
液罐
危险区
区域 2
本地等电势
XC007zh01

图 1

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

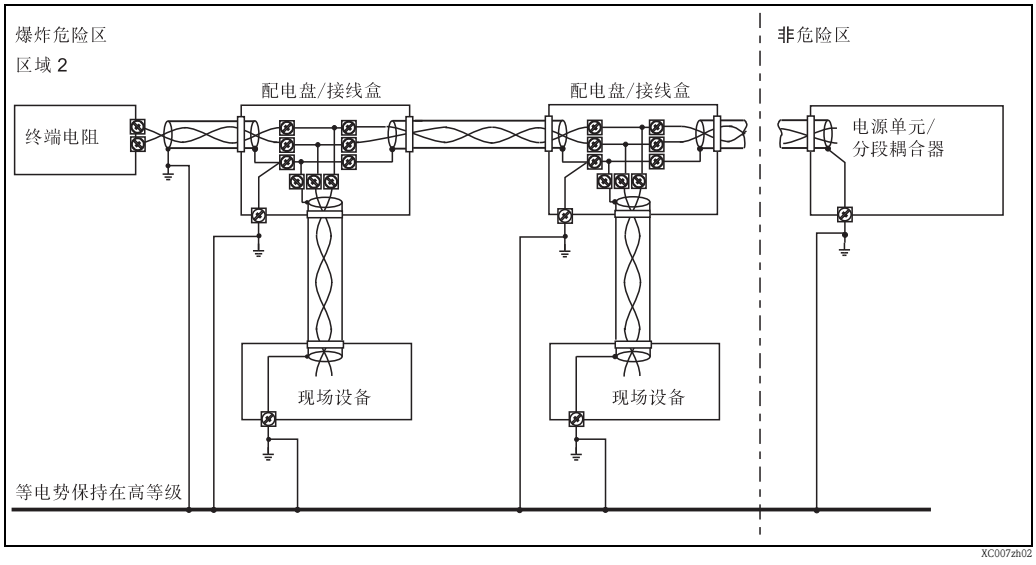

图 2

版本 1

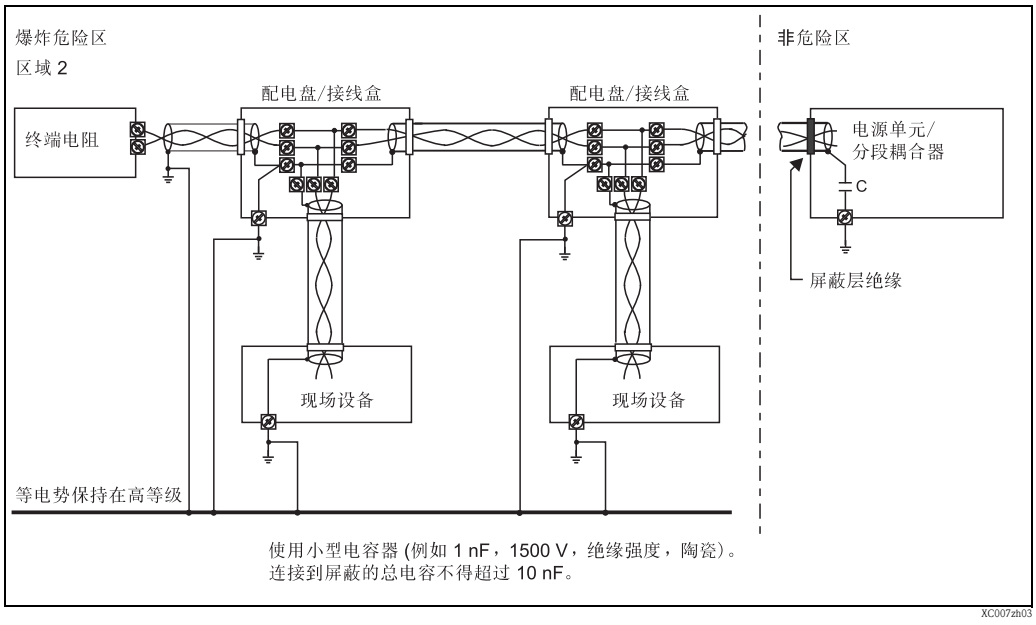

图 3

版本 2

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

防护类型	Ex nAL IIC T6...T1	用于防静电天线
		用于会积聚静电的天线和 / 或选件。参见 *[1]
最大工作压力	根据天线或设备类型	参考相应操作说明
工艺连接件处的最大温度	根据天线或设备类型	参考相应操作说明
静电积聚	根据天线类型	设备上有标记

外壳	**F12** 铝涂层	–40 °C ≤ Ta ≤ +80 °C	可选带有或不带有 VU331 显示屏和操作模块
	F23 不锈钢	–40 °C ≤ Ta ≤ +80 °C	可选带有或不带有 VU331 显示屏和操作模块
	T12-OVP 铝涂层，带有集成过压保护器	–40 °C ≤ Ta ≤ +80 °C	可选带有或不带有 VU331 显示屏和操作模块

安全指南：
安装

- 按照制造商的说明及其它有效标准和规定来安装设备。
- 电子部件外壳的允许环境温度 (取决于应用范围) 与温度等级之间的关系如下表所示 (表 1... 表 3)。
- 在对齐 (旋转) 外壳后，重新拧紧固定螺丝 (带螺纹螺栓颈上的内六角螺丝)。
- 电缆持续工作温度 ≥ Ta +5 K。
- 如果使用超过 3 米长的天线延伸件，则必须使用机械方式固定 (例如使用牵索)。
- 电子接线柜可被打开，以便通过显示屏 VU331 或通过现场总线 PA/FF 仪器的地址开关进行配置。
- 在加电状态下，除了显示屏插头连接器，不得断开其它连接。
- 在配置后，关闭外壳盖板。
- 接线柜的盖罩或电子部件柜的盖罩：扭矩 ≥ 40 Nm。
- 在安装、使用和维护设备时，用户必须遵守操作手册和下列标准中规定的要求：
  - GB50257-1996：“电气设备安装工程 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)”。
- 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。
- 带有断路装置的 FMR2xx：
  - 根据 IEC/EN60529，整个装置必须至少满足 IP67 的要求。
  - 如果设备需要拆卸，如出于维护目的等，则建议固定闭锁机械装置以避免打开，或者用附加的盲板将其闭合。
  - 操作员应确保整个装置可用于各种应用，并对此负全责。
- 静电 (X 标记)*[1]：
  - Micropilot M FMR231(有白色 PTFE)、FMR244/245 的天线带有可积聚静电的表面。因此，布置天线时应避免天线因流体介质 (例如填料板) 而积聚电荷，这会带来危险。
  - 在清洁天线时请避免静电积聚 (如不要干擦)。
- 特殊情况 (X 标记)*[1]：
  可选件：
  - 符合 “低”机械应变水平的带观察孔的盖罩 (玻璃窗， 2 焦耳)。
  - 对于带有插头连接器的设备 (例如 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。
  - 带有插头连接器的仪器，如 PROFIBUS PA 或 FOUNDATION Fieldbus (基金会现场总线): 插头连接器不可在加电情况下断开。

F12, F23

- 设备的输入电源电路与地电势是绝缘的，它相对地电势至少有 500 Vrms 绝缘强度。

T12 - OVP

- 设备的输入电源电路与地电势绝缘，相对地电势至少有 410 V DC 绝缘强度。
- 在爆炸性空气环境中使用仪表时，请勿带电压开启接线柜。

F12 外壳，表 1

温度组别	天线处的最大允许输入温度	电子部件外壳处的最大允许环境温度				
		FMR230	FMR231	FMR240	FMR244	FMR245
T6	+ 80 °C + 60 °C	+60 °C +60 °C	+55 °C +60 °C	+60 °C +60 °C	+60 °C +60 °C	+60 °C +60 °C
T5	+ 95 °C + 75 °C	+75 °C +75 °C	+70 °C +75 °C	+75 °C +75 °C	+75 °C +75 °C	+75 °C +75 °C
T4	+130 °C + 80 °C	+75 °C +80 °C	+65 °C +80 °C	+75 °C +80 °C	+70 °C +80 °C	+70 °C +80 °C
T3	+195 °C + 80 °C	+70 °C +80 °C	–	+75 °C +80 °C	–	–
T2	+295 °C + 80 °C	+65 °C +80 °C	–	–	–	–
T1	+400 °C + 80 °C	+55 °C +80 °C	–	–	–	–

F23 外壳，表 2

温度组别	天线处的最大允许输入温度	电子部件外壳处的最大允许环境温度				
		FMR230	FMR231	FMR240	FMR244	FMR245
T6	+ 80 °C + 60 °C	+55 °C +60 °C	+50 °C +60 °C	+60 °C +60 °C	+55 °C +60 °C	+55 °C +60 °C
T5	+ 95 °C + 75 °C	+70 °C +75 °C	+65 °C +75 °C	+75 °C +75 °C	+70 °C +75 °C	+70 °C +75 °C
T4	+130 °C + 80 °C	+70 °C +80 °C	+55 °C +80 °C	+70 °C +80 °C	+65 °C +80 °C	+65 °C +80 °C
T3	+195 °C + 80 °C	+65 °C +80 °C	–	+65 °C +80 °C	–	–
T2	+295 °C + 80 °C	+55 °C +80 °C	–	–	–	–
T1	+400 °C + 80 °C	+45 °C +80 °C	–	–	–	–

T12-OVP 外壳，表 3

温度组别	天线处的最大允许输入温度	电子部件外壳处的最大允许环境温度				
		FMR230	FMR231	FMR240	FMR244	FMR245
T6	+ 80 °C + 60 °C	+55 °C +60 °C	+50 °C +60 °C	+60 °C +60 °C	+55 °C +60 °C	+55 °C +60 °C
T5	+ 95 °C + 75 °C	+70 °C +75 °C	+65 °C +75 °C	+75 °C +75 °C	+70 °C +75 °C	+70 °C +75 °C
T4	+130 °C + 80 °C	+75 °C +80 °C	+65 °C +80 °C	+75 °C +80 °C	+75 °C +80 °C	+70 °C +80 °C
T3	+195 °C + 80 °C	+70 °C +80 °C	–	+75 °C +80 °C	–	–
T2	+295 °C + 80 °C	+65 °C +80 °C	–	–	–	–
T1	+400 °C + 80 °C	+55 °C +80 °C	–	–	–	–

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