



Level



Pressure



Flow



Temperature



Liquid  
Analysis



Registration



Systems  
Components



Services



Solutions

Safety Instructions

# Levelflex M

# FMP41C

## HART, PROFIBUS PA, FOUNDATION Fieldbus

Ex d ia [ia Ga] IIC T6...T1 Ga/Gb

NEPSI GYJ12.1261X



**en** - Document: XA00387F-B  
Safety instructions for electrical apparatus for explosion-hazardous areas  
→ 3

**zh** - 文件: XA00387F-B  
爆炸环境中电气仪表的安全指南  
→ 7



# Levelflex M FMP41C

english

## HART, PROFIBUS PA, FOUNDATION Fieldbus

### Associated Documentation

This document is an integral part of the following Operating Instructions:  
HART: BA00276F/00  
PROFIBUS PA: BA00277F/00  
FOUNDATION Fieldbus: BA00278F/00

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

### Designation

Explanation of the labelling and type of protection can be found in the explosion protection brochure.

### Designation of explosion protection

Ex d ia [ia Ga] IIC T6...T1 Ga/Gb

### Applied standards

GB 3836.1-2010  
GB 3836.2-2010  
GB 3836.4-2010  
GB 3836.20-2010

**Safety instructions:  
Special conditions**

Permitted ambient temperature range at the electronics housing:  $-40\text{ °C} \leq T_a \leq +60\text{ °C}$ .  
Observe the information in the temperature tables.

- The probes (rod and rope version) have plastic surfaces, which can become electrostatically charged.  
For hazardous locations (classified) of Zone 0 resp. Zone 1, the electrostatic limits have to be observed.

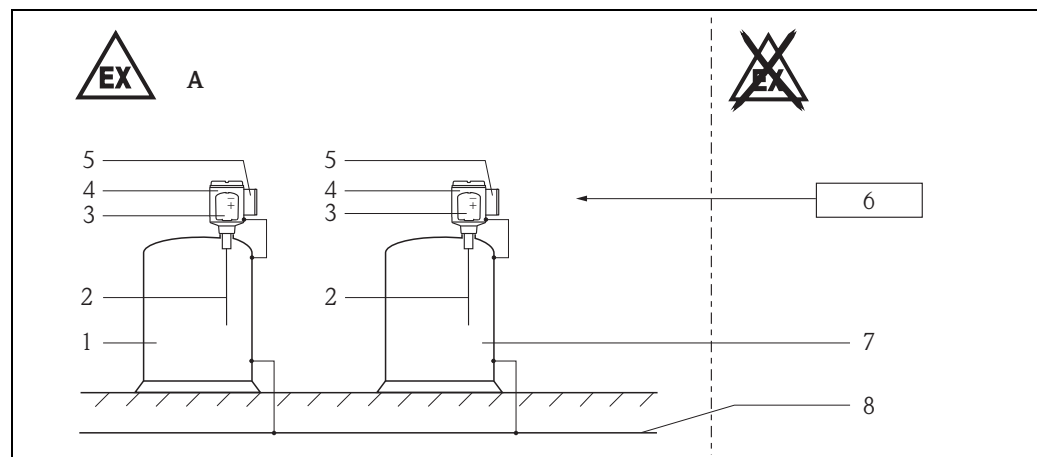
| Category | Admissible transmitted charge Q in nC |     |     |
|----------|---------------------------------------|-----|-----|
|          | IIA                                   | IIB | IIC |
| 1        | 60                                    | 30  | 10  |
| 2        | 60                                    | 30  | 10  |
| 3        | No limit                              |     |     |

For the device this results in the following relationship:

| Area/Components with plastic surfaces | Measured transmitted charge Q in nC (Test Report) | Special conditions required for the following material groups |     |     |
|---------------------------------------|---|---|-----|-----|
|                                       |   | IIA   | IIB | IIC |
| Flange cladding                       | < 75  | IIA   | IIB | IIC |
| Rod                                   | < 30  | –   | –   | IIC |
| Rope                                  | < 10  | –   | –   | –   |
| Rope weight                           | < 30  | –   | –   | IIC |

**Measures:**

Instruments with flange cladding (plastic) may be installed in hazardous locations (classified) of Zone 0 or Zone 1 without further protective measures, if charging of the flange cladding is prevented by the installation (e.g. no exposed plastic surfaces or installation in metallic connection parts/nozzles).

**Safety instructions:  
Installation**

1

**A Zone 1**

- 1 Tank; hazardous area Zone 0
- 2 Probe; Rod or rope probe (→ 4, "Special conditions")
- 3 Electronic insert
- 4 Housing; optionally with or without VU331 display and operating module;  
Electronics compartment Ex ia
- 5 Connection compartment (Ex d) \*1
- 6 Supply voltage
- 7 Tank; hazardous area Zone 1
- 8 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 housing of transmitter is equipped with a ground terminal; users must ensure that it is reliably connected to ground during installation and use.
- 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).
- Do not open the connection compartments under voltage in an explosive atmosphere.
- Connection compartment cover: "Do not open under voltage in explosive atmospheres" \*1.
- Only M20x1.5, G ½ or ½ NPT cable entry can be used for installation, which also should be in accordance with GB3836.1-2000 and GB3836.2-2000. Close unused entry glands with sealing plugs.
- For operating the transmitter housing at an ambient temperature under -20 °C, appropriate cables and cable entries permitted for this application must be used.
- Continuous duty temperature of the cable  $\geq T_a + 5 K$ .
- When connecting the transmitter housing via piping entries permitted for this purpose, the associated seal mechanisms must be arranged directly at the housing.
- Install the device to exclude any mechanical damage or friction during the application.  
Pay particular attention to flow conditions and fittings.
- Changes in electrical and mechanical parts of the equipment could harm the type of explosion protection and are not allowed for the user.

**Safety instructions:**  
**Zone 0**

- Only operate devices in potentially explosive vapour/air mixtures under atmospheric conditions (→ 6, "Zone 0 - Application"):  
-20 °C  $\leq T \leq$  +60 °C  
0.8 bar  $\leq p \leq$  1.1 bar
- If no potentially explosive mixtures are present, the transmitters may be operated under other atmospheric conditions in accordance with the manufacturer's specifications.
- Only install the devices in media for which the wetted materials have sufficient durability.
- 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)".

## Temperature tables

## Zone 1 - Application

| Temperature class | Max. permitted medium temperature (process connection) Probe in Zone 1 | Max. permitted ambient temperature at the electronics housing (in Zone 1) dependent on the medium temperature |  |  |
|-------------------|--|---|--|--|
|                   |  | FMP41C  | .. with remote electronics / spacer tube | .. with remote electronics / spacer hose |
| T6                | + 80 °C<br>+ 60 °C   | 57 °C<br>60 °C  | 59 °C<br>60 °C                           | 60 °C<br>60 °C                           |
| T5                | + 95 °C<br>+ 60 °C   | 56 °C<br>60 °C  | 59 °C<br>60 °C                           | 60 °C<br>60 °C                           |
| T4                | +130 °C<br>+ 60 °C   | 52 °C<br>60 °C  | 58 °C<br>60 °C                           | 60 °C<br>60 °C                           |
| T3 *2             | +150 °C<br>+ 60 °C   | 49 °C<br>60 °C  | 57 °C<br>60 °C                           | 60 °C<br>60 °C                           |
| T3, T2, T1        | +195 °C<br>+ 60 °C   | 44 °C<br>60 °C  | 57 °C<br>60 °C                           | 60 °C<br>60 °C                           |

Note: permitted probe temperature range must be observed

\*2: functional = limited by maximum permitted probe temperature

## Zone 0 - Application

| Temperature class | Max. permitted medium temperature (process connection) Probe in Zone 0 | Max. permitted ambient temperature at the electronics housing (in Zone 1) dependent on the medium temperature |  |  |
|-------------------|--|---|--|--|
|                   |  | FMP41C  | .. with remote electronics / spacer tube | .. with remote electronics / spacer hose |
| T6...T1           | +60 °C   | 60 °C   | 60 °C                                    | 60 °C                                    |

## Connection data

| Power supply  |
|---|
| U <sub>e</sub> ≤ 32 V DC<br>U <sub>m</sub> ≤ 250 V AC |

| Signal circuit  |
|---|
| U <sub>o</sub> = 4.2 V<br>I <sub>o</sub> = 34 mA<br>P <sub>o</sub> = 36 mW<br><br>effective outer inductance L <sub>o</sub> = 5 mH<br>effective outer capacitance C <sub>o</sub> = 4 μF |

# Levelflex M FMP41C

中文

## 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：BA00276F/00

PROFIBUS PA：BA00277F/00

FOUNDATION Fieldbus (基金会现场总线)：BA00278F/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

防爆标志和防护类型说明请查询防爆手册。

防爆代号

Ex d ia [ia Ga] IIC T6...T1 Ga/Gb

### 适用标准

GB 3836.1-2010

GB 3836.2-2010

GB 3836.4-2010

GB 3836.20-2010

**安全指南：  
特殊条件**

电子部件外壳处的允许环境温度范围： $-40\text{ °C} \leq T_a \leq +60\text{ °C}$ 。  
遵守温度表中的信息。

- 探针 ( 探针棒和探针索 ) 具有塑料表面，可能会带有静电。  
对于区域 0 及区域 1 的危险场所 ( 分类 )，必须遵守静电限制。

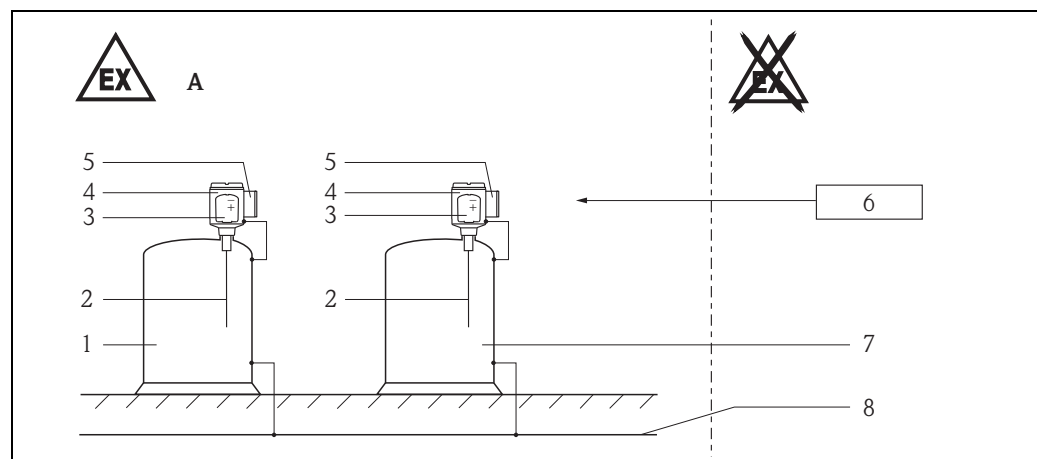
| 类别 | 允许的传输电荷 Q，单位 nC |     |     |
|----|-----------------|-----|-----|
|    | IIA             | IIB | IIC |
| 1  | 60              | 30  | 10  |
| 2  | 60              | 30  | 10  |
| 3  | 无限制             |     |     |

对于设备，这会导致下列关系：

| 带有塑料表面的区域 / 部件 | 测量的传输电荷 Q，单位 nC ( 测试报告 ) | 下列材料组所需要的特殊条件 |     |     |
|----------------|--------------------------|---------------|-----|-----|
| 法兰覆层           | < 75                     | IIA           | IIB | IIC |
| 探针棒            | < 30                     | -             | -   | IIC |
| 探针索            | < 10                     | -             | -   | -   |
| 探针索重量          | < 30                     | -             | -   | IIC |

**措施：**

带有法兰覆层 ( 塑料 ) 的仪器，如果在安装时通过采取适当措施 ( 例如，使塑料表面不暴露在外，或者安装在金属连接部件 / 管口中 ) 来防止法兰覆层产生静电充电的话，可以在无需附加防护措施的情况下，安装在区域 0 或区域 1 的危险区域 ( 分类 ) 中。

**安全指南：  
安装**

1

**A 区域 1**

- 1 液罐：危险区区域 0
- 2 探针：棒型或索型探针 (→ 目 4，“特殊条件”)
- 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：  
电子接线柜 Ex ia
- 5 接线柜 (Ex d) \*1
- 6 供电电压
- 7 液罐：危险区区域 1
- 8 本地电位均衡



- 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。
- 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。
- 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（→ 表6）。
- 在对齐（旋转）外壳后，重新拧紧固定螺丝（参见操作说明）。
- 在爆炸性空气环境中使用仪表时，请勿带电压开启接线柜。
- 接线柜盖：“请勿在爆炸性空气中带电压打开盖子”\*1。
- 仅可使用 M20x1.5，G ½ 或 ½ NPT 电缆入口进行安装，同时还必须遵守 GB3836.1-2000 和 GB3836.2-2000 标准。用密封塞堵塞未使用的电缆入口。
- 要使变送器外壳在低于 -20 °C 的环境温度下工作，必须使用适合的电缆和电缆入口来满足此应用。
- 电缆持续工作温度  $\geq T_a + 5 \text{ K}$ 。
- 当使用允许用于此用途的管路入口连接变送器外壳时，则必须直接在外壳处配置相关的密封机械装置。
- 仪表的安装方式应避免在应用期间遭受任何机械损坏或磨损。请尤其注意流量状况和液罐装置。
- 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。

#### 安全指南： 区域 0

- 只有在下列大气条件下才能在有爆炸可能的蒸汽 / 空气混合物中操作设备（→ 表6，“区域 0 - 应用”）：  
-20 °C  $\leq T \leq$  +60 °C  
0.8 bar  $\leq p \leq$  1.1 bar
- 如果不存在可能爆炸的混合物，则变送器可在符合制造商技术规范的其他大气条件下运行。
- 当仪表的接触部件具有足够耐久度时，才可将仪表安装于介质中。
- 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）”。

## 温度表

## 区域 1 - 应用

| 温度组别       | 最大允许的输入温度<br>(工艺连接件)<br>探针在区域 1 中 | 电子部件外壳 (区域 1) 处的最大允许温度取决于输入温度 |                      |                       |
|------------|-----------------------------------|-------------------------------|----------------------|-----------------------|
|            |                                   | FMP41C                        | .. 带有远程电子部件 /<br>隔离管 | .. 带有远程电子部件 /<br>隔离软管 |
| T6         | + 80 °C<br>+ 60 °C                | 57 °C<br>60 °C                | 59 °C<br>60 °C       | 60 °C<br>60 °C        |
| T5         | + 95 °C<br>+ 60 °C                | 56 °C<br>60 °C                | 59 °C<br>60 °C       | 60 °C<br>60 °C        |
| T4         | +130 °C<br>+ 60 °C                | 52 °C<br>60 °C                | 58 °C<br>60 °C       | 60 °C<br>60 °C        |
| T3 *2      | +150 °C<br>+ 60 °C                | 49 °C<br>60 °C                | 57 °C<br>60 °C       | 60 °C<br>60 °C        |
| T3, T2, T1 | +195 °C<br>+ 60 °C                | 44 °C<br>60 °C                | 57 °C<br>60 °C       | 60 °C<br>60 °C        |

提示：必须遵守允许的探针温度范围

\*2: 功能型 = 受限于最大允许的探针温度

## 区域 0 - 应用

| 温度组别    | 最大允许的输入温度<br>(工艺连接件)<br>探针在区域 0 中 | 电子部件外壳 (区域 1) 处的最大允许温度取决于输入温度 |                      |                       |
|---------|-----------------------------------|-------------------------------|----------------------|-----------------------|
|         |                                   | FMP41C                        | .. 带有远程电子部件 /<br>隔离管 | .. 带有远程电子部件 /<br>隔离软管 |
| T6...T1 | +60 °C                            | 60 °C                         | 60 °C                | 60 °C                 |

## 连接数据

| 电源  |
|---|
| U <sub>e</sub> ≤ 32 V DC<br>U <sub>m</sub> ≤ 250 V AC |

| 信号电路   |
|--|
| U <sub>o</sub> = 4.2 V<br>I <sub>o</sub> = 34 mA<br>P <sub>o</sub> = 36 mW<br><br>有效外部电感 L <sub>o</sub> = 5 mH<br>有效外部电容 C <sub>o</sub> = 4 μF |



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