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Safety Instructions
Levelflex FMP51-FMP55

PROFIBUS PA, FOUNDATION Fieldbus

ATEX, IECEx: Ex ia/db [ia Ga] IIC T6 Ga/Gb

Endress+Hauser
People for Process Automation

Levelflex FMP51-FMP55

PROFIBUS PA, FOUNDATION Fieldbus

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Associated documentation

All documentation is available on the Internet:
www.endress.com/Deviceviewer
(enter the serial number from the nameplate).

If not yet available, a translation into EU languages can be ordered.

To commission the device, please observe the Operating Instructions pertaining to the device:

PROFIBUS PA
- BA01006F (FMP51, FMP52, FMP54)
- BA01007F (FMP53)
- BA01008F (FMP55)

FOUNDATION Fieldbus
- BA01052F (FMP51, FMP52, FMP54)
- BA01053F (FMP53)
- BA01054F (FMP55)

Supplementary documentation

Explosion protection brochure: CP00021Z

The explosion protection brochure is available on the Internet:
www.endress.com/Downloads

Certificates and declarations

EU Declaration of Conformity

Declaration Number:
EU 01118

The EU Declaration of Conformity is available on the Internet:
www.endress.com/Downloads

EU type-examination certificate

Certificate number:
KEMA 10 ATEX 0093 X

List of applied standards: See EU Declaration of Conformity.

IEC Declaration of Conformity

Certificate number:
IECEx KEM 10.0043 X

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

- IEC 60079-0 : 2017
- IEC 60079-1 : 2014
- IEC 60079-11 : 2011
- IEC 60079-26 : 2021

Manufacturer address

Endress+Hauser SE+Co. KG
Hauptstraße 1
79689 Maulburg, Germany

Address of the manufacturing plant: See nameplate.

Other standards

Among other things, the following standards shall be observed in their current version for proper installation:

- IEC/EN 60079-14: "Explosive atmospheres - Part 14: Electrical installations design, selection and erection"
- EN 1127-1: "Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology"

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

FMP5x	–	**********	+	A*B*C*D*E*F*G*..
(Device type)		*(Basic specifications)*		*(Optional specifications)*

* = 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: Levelflex

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

FMP51, FMP52, FMP53, FMP54, FMP55

Basic specifications

Position 1, 2 (Approval)		
Selected option		**Description**
FMP5x	BC	ATEX II 1/2 G Ex ia/db [ia Ga] IIC T6...T1 Ga/Gb
	IC	IECEx Ex ia/db [ia Ga] IIC T6...T1 Ga/Gb

Position 3 (Power Supply, Output)		
Selected option		**Description**
FMP5x	E	2-wire, FOUNDATION Fieldbus, switch output (PFS)
	G	2-wire, PROFIBUS PA, switch output (PFS)

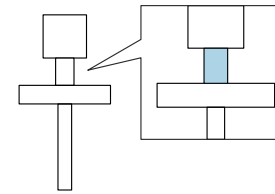
Position 4 (Display, Operation)		
Selected option		**Description**
FMP5x	A	Without, via communication
	C	SD02, 4-line, push buttons + data backup function
	E	SD03, 4-line, illum., touch control + data backup function
	L [1)]	Prepared for display FHX50 + M12 connection
	M [1)]	Prepared for display FHX50 + custom connection
	N [1)]	Prepared for display FHX50 + NPT1/2"

1) FHX50 is approved according to DEK12.0046X or DEKRA 12ATEX0151X.

Position 5 (Housing)		
Selected option		**Description**
FMP51 FMP52 FMP54 FMP55	B	GT18 dual compartment, 316L
FMP5x	C	GT20 dual compartment, Alu coated

Position 9, 10 (Seal)		
Selected option		**Description**
FMP51	A4	Viton, −30…150 °C
	B3	EPDM, −40…120 °C
	C3	Kalrez, −20…200 °C
	E1	FVMQ, −50…150 °C
FMP53	AD	FKM, FDA, USP Cl. VI, −10…150 °C
	B5	EPDM, FDA, USP Cl. VI, −20…130 °C
	C4	Kalrez, FDA, USP Cl. VI, −20…150 °C
FMP54	D1	Graphite, −196…280 °C (XT)
	D2	Graphite, −196…450 °C (HT)

Shown in the temperature tables exemplary as follows:



Optional specifications

ID Jx (Test, Certificate)		
Selected option		**Description**
FMP51 [1)] FMP54	JN	Ambient temperature transmitter −50 °C

1) Only in connection with Position 9, 10 = E1

ID Nx, Ox (Accessory Mounted)		
Selected option		**Description**
FMP51 FMP52 FMP55	NC	Gas-tight feed through

Safety instructions: General

- The device is intended to be used in explosive atmospheres as defined in the scope of IEC 60079-0 or equivalent national standards. If no potentially explosive atmospheres are present or if additional protective measures have been taken: The device may be operated according to the manufacturer's specifications.
- 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.
- Only use the device in media to which the wetted materials have sufficient durability.
- Avoid electrostatic charging:
  - Of plastic surfaces (e.g. enclosure, sensor element, special varnishing, attached additional plates, ...)
  - Of isolated capacities (e.g. isolated metallic plates)

- Alterations to the device can affect the explosion protection and must be carried out by staff authorized to perform such work by Endress+Hauser.
- Refer to the temperature tables for the relationship between the permitted ambient temperature for the sensor and/or transmitter, depending on the range of application and the temperature class.
- When replacing the probe electronics or opening the connection between the remote cable and the probe, a jumper plug must be used or a short-circuit must be established between the probe contact and the potential equalization conductor to avoid electrostatically charging the probe.

Safety instructions: Specific conditions of use

Permitted ambient temperature range at the electronics enclosure:
$-40\ °C \leq T_a \leq +80\ °C$

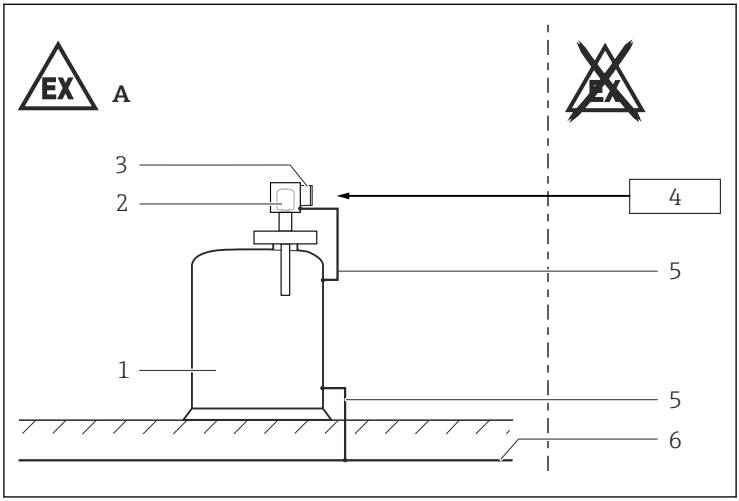
Optional specification, ID Jx = JN
Permitted ambient temperature range at the electronics enclosure:
$-50\ °C \leq T_a \leq +80\ °C$

- Observe the information in the temperature tables.
- In the case of process connections made of polymeric material or with polymeric coatings, avoid electrostatic charging of the plastic surfaces.
- To avoid electrostatic charging: Do not rub surfaces with a dry cloth.
- In the event of additional or alternative special varnishing on the enclosure or other metal parts or for adhesive plates:
  - Observe the danger of electrostatic charging and discharge.
  - Do not install in the vicinity of processes (≤ 0.5 m) generating strong electrostatic charges.
- Secure probes against swinging: e.g. by fixing them to the wall or floor or by installing them in the ground tube.
- The probe must not be subjected to abrasive or corrosive medium that may adversely affect the partition for the zone separation.
- The zone partition wall of the device is a gas-tight feed through made of stainless-steel adapter and glass conductor bushing.

Sensor	Zone partition wall material	Wall thickness	Diameter
FMP51-53 FMP55	Stainless-steel adapter	26 mm	54 mm
	Glass conductor bushing	11.2 mm	18.4 mm
	Welding seam	> 0.2 mm	-
FMP54	Stainless-steel adapter	21 mm	45 mm
	Glass conductor bushing	11.2 mm	18.4 mm
	Welding seam	> 0.2 mm	-

Device type FMP52, FMP55 and Device type FMP5x with non-conductive plastic coated probes
A probe coated with non-conductive material can be used if avoiding electrostatic charging (e.g. through friction, cleaning, maintenance, strong medium flow).

Safety instructions: Installation



A Zone 1
1 Tank; Zone 0, Zone 1
2 Electronics compartment Ex ia; Electronic insert
3 Connection compartment Ex db
4 Power supply
5 Potential equalization line
6 Potential equalization

- After aligning (rotating) the enclosure, retighten the fixing screw (see Operating Instructions).
- Install the device to exclude any mechanical damage or friction during the application. Pay particular attention to flow conditions and tank fittings.
- In potentially explosive atmospheres:
  - Do not disconnect the electrical connection of the power supply circuit when energized.
  - Do not open the connection compartment cover.
- Only use certified cable entries suitable for the application. Observe national regulations and standards. Accordingly, the connection terminal does not include any ignition sources.

- When operating the transmitter enclosure at an ambient temperature under −20 °C, use appropriate cables and cable entries permitted for this application.
- When connecting through a conduit entry approved for this purpose, mount the associated sealing unit directly at the enclosure.
- Seal unused entry glands with approved sealing plugs that correspond to the type of protection. The plastic transport sealing plug does not meet this requirement and must therefore be replaced during installation.
- Before operation:
  - Screw in the cover all the way.
  - Tighten the securing clamp on the cover.
- Continuous service temperature of the connecting cable: −40 °C to ≥ +85 °C; in accordance with the range of service temperature taking into account additional influences of the process conditions ($T_{a,min}$), ($T_{a,max}$ +20 K).

Optional specification, ID Jx = JN
Continuous service temperature of the connecting cable: −50 °C to ≥ +85 °C; in accordance with the range of service temperature taking into account additional influences of the process conditions ($T_{a,min}$), ($T_{a,max}$ +20 K).

Basic specification, Position 4 = N
Observe the requirements according to IEC/EN 60079-14 for conduit systems and the wiring and installation instructions of the suitable Safety Instructions (XA). In addition, observe national regulations and standards for conduit systems.

Explosion protection "Flameproof enclosure Ex db"

Flameproof equipment with G threaded holes is not intended for new installations, but only for replacing equipment in existing installations. Use of this equipment shall comply with the local installation requirements.

Intrinsic safety

The device can be connected to the Endress+Hauser FXA291 service tool: refer to the Operating Instructions.

Potential equalization

Integrate the device into the local potential equalization.

Safety instructions: Ex d joints

- If required or if in doubt: ask manufacturer for specifications.
- Flameproof joints are not intended to be repaired.

Temperature tables

→ Safety Instructions: XA02256F

The safety instructions for temperature tables are available on the Internet: www.endress.com/Downloads

Observe the permitted temperature range at the probe.

Deratings are based on a power consumption of 1 W (PFS); → 13.

Explanation of how to use the temperature tables

Unless otherwise indicated, the positions always refer to the basic specification.

1st column: Position 5 = A, B, ...

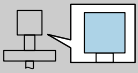
2nd column: Position 3 = A, B, ..
- (1): 1 channel used
- (2): 2 channels used

3rd column: Temperature classes T6 (85 °C) to T1 (450 °C)

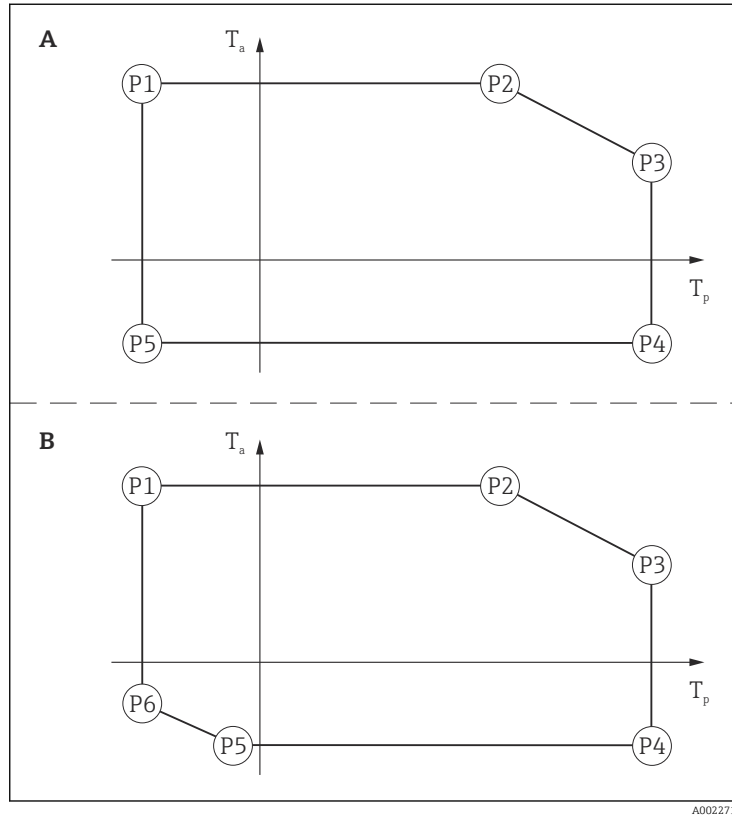
Column P1 to P6: Position (temperature value) on the axes of the derating
- T_a: Ambient temperature in °C
- T_p: Process temperature in °C

Column P6 is only relevant for version B of the derating.

Example table

 = C	(1)		P1		P2		P3		P4		P5		P6	
			T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a
	E, G	T6	–40	60	60	60	85	54	85	–40	–40	–40	–	–
		T5	–40	75	75	75	100	69	100	–40	–40	–40	–	–
		T4	–40	80	80	80	135	72	135	–40	–40	–40	–	–

Example diagrams of possible deratings



Connection data

Connection compartment Ex db

The power consumption of I/O modules with passive PFS output can be limited for certain applications.

- Recommended: Power consumption = 1 W. This is obtained for a supply voltage at the terminals of 27 V_{DC}.
- For higher supply voltages (U_{max}): Insert a serial resistance (R_V) in order to limit the power consumption, see table below.

Table for the PFS serial resistance (R_V):

Power consumption	1.0 W
Total power consumption	1.88 W
Internal resistance R_i	760 Ω

U_{max} [V]	R_V min
35	205 Ω
34	177 Ω
33	150 Ω
32	122 Ω
31	95 Ω
30	67 Ω
29	39 Ω
28	12 Ω
27	0 Ω

For values associated with a higher or lower internal power consumption please contact Endress+Hauser.

Terminal 1 (+), 2 (–)	Terminal 3 (+), 4 (–)
Power supply U_N = 32 V_{DC} U_m = 250 V	Switch output (PFS) U_N = 35 V_{DC} U_m = 250 V

Electronics compartment Ex ia

Service interface (CDI)

Taking the following values into consideration, the device can be connected to the certified Endress+Hauser FXA291 service tool or a similar interface:

Service interface													
U_i = 7.3 V effective inner inductance L_i = negligible effective inner capacitance C_i = negligible													
U_o = 7.3 V I_o = 100 mA P_o = 160 mW													
L_o (mH) =	5.00	2.00	1.00	0.50	0.20	0.15	0.10	0.05	0.02	0.01	0.005	0.002	0.001
C_o (µF) [1] =	0.73	1.20	1.60	2.00	2.60	-	3.20	4.00	5.50	7.30	10.00	12.70	12.70
C_o (µF) [2] =	-	0.49	0.90	1.40	-	2.00	-	-	-	-	-	-	-

1) Values according to PTB "ispark" program
2) Values according to IEC/EN 60079-25, Annex C or equivalent national standards

www.addresses.endress.com

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