

# Safety Instructions

## **Micropilot FMR66B/67B**

Ex ia IIIC Txxx°C Da





# Micropilot FMR66B/67B

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**About this document**

The document number of these Safety Instructions (XA) must match the information on the nameplate.

**Associated documentation**

All documentation is available on the Internet:

[www.endress.com/Deviceviewer](http://www.endress.com/Deviceviewer)

(enter the serial number from the nameplate).

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

HART

- BA02250F (FMR66B)
- BA02251F (FMR67B)

PROFIBUS PA

- BA02264F (FMR66B)
- BA02265F (FMR67B)

PROFINET

- BA02269F (FMR66B)
- BA02270F (FMR67B)

**Supplementary documentation**

Explosion protection brochure: CP00021Z

The explosion protection brochure is available on the Internet:

[www.endress.com/Downloads](http://www.endress.com/Downloads)

**Certificates and declarations****Certificate of Conformity**

Certificate number:

CML 23JPN2055X

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

- JNIO SH-TR-46-1 : 2020
- JNIO SH-TR-46-6 : 2015

**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

FMR6xB	–	*****	+	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: Micropilot



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*

FMR66B, FMR67B

*Basic specifications*

Position 1, 2 (Approval)		
Selected option	Description	
FMR6xB	JJ	JPN Ex ia IIIC Txxx°C Da

Position 3, 4 (Output)		
Selected option	Description	
FMR6xB	BA	2-wire, 4-20 mA HART
	BC	2-wire, 4-20 mA HART + 4 to 20 mA analog <sup>1)</sup>
	DA	2-wire, PROFIBUS PA
	FA	PROFINET over Ethernet-APL, 10Mbit/s

1) Only in connection with Position 6 = J, K, M, N

Position 5 (Display, Operation)		
Selected option	Description	
FMR6xB	M	Prepared for display FHX50B + Gland M20
	N	Prepared for display FHX50B + Thread NPT1/2
	O	Prepared for display FHX50B + Thread M20

Position 6 (Housing, Material)		
Selected option	Description	
FMR6xB	B	Single compartment; Alu, coated
	J	Dual compartment; Alu, coated
	K	Dual compartment; 316L
	M	Dual compartment L-shape; Alu, coated
	N	Dual compartment L-shape; 316L, coated

<b>Position 7 (Electrical Connection)</b>		
<b>Selected option</b>		<b>Description</b>
FMR6xB	B	Gland M20, brass nickel plated, IP66/68 NEMA Type 4X/6P
	C	Gland M20, 316L, IP66/68 NEMA Type 4X/6P
	F	Thread M20, IP66/68 NEMA Type 4X/6P
	G	Thread G1/2, IP66/68 NEMA Type 4X/6P
	H	Thread NPT1/2, IP66/68 NEMA Type 4X/6P

<b>Position 8 (Application)</b>		
<b>Selected option</b>		<b>Description</b>
FMR6xB	F	Process temperature -40...+80°C
FMR66B	H	Process temperature -40...+130°C
FMR67B	J	Process temperature -40...+150°C
	L	Process temperature -40...+200°C
	N	Process temperature -40...+280°C
	P	Process temperature -40...+450°C

<b>Position 9, 10 (Antenna)</b>		
<b>Selected option</b>		<b>Description</b>
FMR66B	BS	Encapsulated, PVDF, 40mm/1-1/2"
FMR6xB	GA	Drip-off, PTFE 50mm/2"
FMR67B	GP	Flush mount, PTFE, 80mm/3"
	GT	Horn, 316L, 65mm/2.6"

<b>Position 11, 12 (Process Connection, Sealing Surface)</b>		
<b>Selected option</b>		<b>Description</b>
FMR67B	JD	Alignment device, UNI flange

<b>Position 16 (Seal)</b>		
<b>Selected option</b>		<b>Description</b>
FMR66B	A	PVDF encapsulated
FMR6xB	D	VKM Viton GLT
FMR67B	U	Graphite

Position 17 (Air Purge Connection)		
Selected option		Description
FMR67B	1	G1/4
	2	NPT1/4
	3	Adapter G1/4
	4	Adapter NPT1/4

### Optional specifications

ID Jx, Kx (Test, Certificate, Declaration)		
Selected option		Description
FMR67B	JL	Ambient temp. transmitter -50°C/-58°F, sensor see specification

ID Nx, Ox (Accessory Mounted)		
Selected option		Description
FMR6xB	NA	Overvoltage protection <sup>1)</sup>

1) Only in connection with Position 6 = J, K, M, N

ID Px, Rx (Accessory Enclosed)		
Selected option		Description
FMR6xB	PA	Weather protection cover, 316L <sup>1)</sup>

1) Only in connection with Position 6 = J, K, M, N

## 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.
- Comply with the installation and safety instructions in the Operating Instructions.
- 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.

**Safety instructions:**  
**Specific conditions of use**

- 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 ( $\leq 0.5$  m) generating strong electrostatic charges.
- Avoid sparks caused by impact and friction.
- In the case of process connections made of polymeric material or with polymeric coatings, avoid electrostatic charging of the plastic surfaces.
- Avoid electrostatic charging of the sensor (e.g. do not rub dry and install outside the filling flow).

*Optional specification, ID Px, Rx = PA*

Connect the weather protection cover to the local potential equalization.

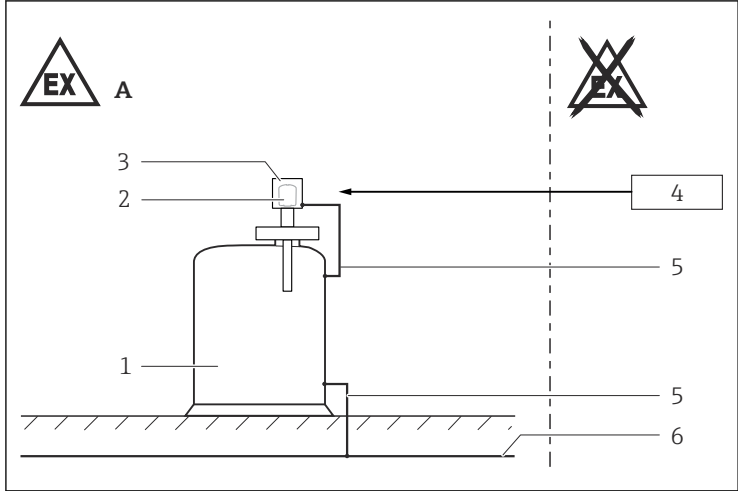
*Device type FMR67B and Basic specification, Position 11, 12 = JD*

- Avoid sparks caused by impact and friction.
- Changing the position of the alignment device must be impossible:
  - After the alignment of the antenna via the pivot bracket
  - After tightening of the clamping flange
  - After setting the damping ring (torque 10 to 11 Nm)
- Degree of protection IP67 must be fulfilled.

*Device type FMR67B and Basic specification, Position 17 = 1, 2, 3, 4*

- Avoid sparks caused by impact and friction.
- After removing the air purge connection: Lock the opening with a suitable plug.  
Torque: 6-7 Nm
- Degree of protection IP67 must be fulfilled.

## Safety instructions: Installation



A0025536

- A Zone 20
- 1 Tank; Zone 20
- 2 Electronic insert
- 3 Enclosure
- 4 Associated intrinsically safe power supply units
- 5 Potential equalization line
- 6 Local potential equalization

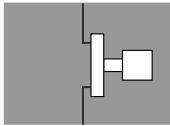
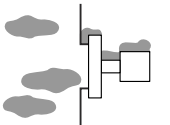
- After aligning (rotating) the enclosure, retighten the fixing screw.
- Continuous service temperature of the connecting cable:  $\geq T_a + 20 \text{ K}$ .
- Perform the following to achieve the degree of protection IP66/67:
  - Screw the cover tight.
  - Mount the cable entry correctly.
- Seal unused entry glands with suitable sealing plugs that correspond to the type of protection.
- Supplied cable glands and metallic sealing plugs comply with the requirements of type of protection marked on the nameplate.
- The plastic sealing plug is used only as transport protection.
- Observe the pertinent guidelines when interconnecting intrinsically safe circuits.
- Observe the maximum process conditions according to the manufacturer's Operating Instructions.
- Install the device to exclude any mechanical damage or friction during the application. Pay particular attention to flow conditions and tank fittings.

Basic specification, Position 5 = N, O

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.

*Permitted ambient conditions*

Process Zone 20	Enclosure Zone 20
Continuous dust submersion	 Continuous dust submersion
Continuous explosive dust atmosphere and deposits	 Continuous explosive dust atmosphere and deposits

**Intrinsic safety**

- The device is only suitable for connection to certified, intrinsically safe equipment with explosion protection Ex ia / Ex ib.
- The intrinsically safe input power circuit of the device is isolated from ground. The dielectric strength is at least 500 V<sub>rms</sub>.


**Potential equalization**

Integrate the device into the local potential equalization.


**Safety instructions:  
Zone 20**


Only use the device in media to which the material of the enclosure, the sensor and the associated seals have sufficient durability.

**Temperature tables**

- 
 ▪ The specified surface temperature takes into account all direct heat influences from process heat and self-heating at the enclosure.
- The specified ambient and process temperature ranges exclusively refer to the explosion protection and must not be exceeded. Operationally permitted ambient temperature ranges can be restricted depending on the version: See Operating Instructions.
- Do not exceed the max. ambient temperature at the enclosure.

For detailed information see Technical Information.

 Protection type of enclosure: IP66/67

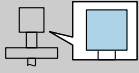
 *Optional specification, ID Jx, Kx = JL*  
Lower limit of the ambient temperature for explosion protection changes to  $-50\text{ }^{\circ}\text{C}$ .

Specific conditions of use:

The surface temperature for equipment protection level (EPL) Da is:  
 $T_{200} \text{ xxx }^{\circ}\text{C}$  (with 200 mm dust deposit)

### Description notes

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

	<b>Position 6 (Housing, Material)</b>
	B, J, K, M, N

### FMR66B

<b>Position 8 (Application)</b>
H

<b>Position 9, 10 (Antenna)</b>
BS

Position 3, 4 (Output)	Maximum surface temperature	Process temperature range	Ambient temperature range
BA	$T_{200} 90\text{ }^{\circ}\text{C}$ ( $P_i = 1\text{ W}$ )	$-20\text{ }^{\circ}\text{C} \leq T_p \leq +60\text{ }^{\circ}\text{C}$	$-20\text{ }^{\circ}\text{C} \leq T_a \leq +60\text{ }^{\circ}\text{C}$
	$T_{200} 135\text{ }^{\circ}\text{C}$ ( $P_i = 650\text{ mW}$ )	$-20\text{ }^{\circ}\text{C} \leq T_p \leq +65\text{ }^{\circ}\text{C}$	$-20\text{ }^{\circ}\text{C} \leq T_a \leq +65\text{ }^{\circ}\text{C}$
BC	$T_{200} 100\text{ }^{\circ}\text{C}$	$-20\text{ }^{\circ}\text{C} \leq T_p \leq +40\text{ }^{\circ}\text{C}$	$-20\text{ }^{\circ}\text{C} \leq T_a \leq +40\text{ }^{\circ}\text{C}$
DA, FA	$T_{200} 100\text{ }^{\circ}\text{C}$	$-20\text{ }^{\circ}\text{C} \leq T_p \leq +65\text{ }^{\circ}\text{C}$	$-20\text{ }^{\circ}\text{C} \leq T_a \leq +65\text{ }^{\circ}\text{C}$

*FMR66B, FMR67B***Position 8 (Application)**

F, J, L, N, P

**Position 9, 10 (Antenna)**

GA, GP, GT

Position 3, 4 (Output)	Maximum surface temperature	Process temperature range	Ambient temperature range
BA	$T_{200} 90\text{ °C}$ ( $P_i = 1\text{ W}$ )	$-40\text{ °C} \leq T_p \leq +60\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
	$T_{200} 135\text{ °C}$ ( $P_i = 650\text{ mW}$ )	$-40\text{ °C} \leq T_p \leq +65\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
BC	$T_{200} 100\text{ °C}$	$-40\text{ °C} \leq T_p \leq +40\text{ °C}$	$-40\text{ °C} \leq T_a \leq +40\text{ °C}$
DA, FA	$T_{200} 100\text{ °C}$	$-40\text{ °C} \leq T_p \leq +65\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$

**Connection data***Basic specification, Position 3 = BA***Power supply**
 $U_i \leq 30\text{ V}_{DC}$   
 $I_i \leq 300\text{ mA}$   
 $P_i \leq 1\text{ W}$   
 $C_i \leq 10\text{ nF}$   
 $L_i = 0$ 

or

 $U_i \leq 28\text{ V}$   
 $I_i \leq 250\text{ mA}$   
 $P_i \leq 650\text{ mW}$   
 $C_i \leq 10\text{ nF}$   
 $L_i = 0$ 
*Basic specification, Position 3 = BC***Power supply**

## Channel 1

 $U_i \leq 30\text{ V}_{DC}$   
 $I_i \leq 300\text{ mA}$   
 $P_i \leq 1\text{ W}$   
 $C_i \leq 10\text{ nF}$   
 $L_i = 0$ 

## Channel 2 (analog)

 $U_i \leq 30\text{ V}_{DC}$   
 $I_i \leq 300\text{ mA}$   
 $P_i \leq 1\text{ W}$   
 $C_i \leq 10\text{ nF}$   
 $L_i = 0$

*Basic specification, Position 3 = DA*

Power supply	
FISCO	Entity
$U_i \leq 17.5 V_{DC}$	$U_i \leq 24 V_{DC}$
$I_i \leq 380 \text{ mA}$	$I_i \leq 300 \text{ mA}$
$P_i \leq 5.32 \text{ W}$	$P_i \leq 1.2 \text{ W}$
$C_i \leq 5 \text{ nF}$	$C_i \leq 5 \text{ nF}$
$L_i = 0$	$L_i = 0$

*Basic specification, Position 3 = FA*

Power supply	
2-WISE	Entity
$U_i \leq 17.5 V_{DC}$	$U_i \leq 17.5 V_{DC}$
$I_i \leq 380 \text{ mA}$	$I_i \leq 300 \text{ mA}$
$P_i \leq 5.32 \text{ W}$	$P_i \leq 1.2 \text{ W}$
$C_i \leq 5 \text{ nF}$	$C_i \leq 5 \text{ nF}$
$L_i = 0$	$L_i = 0$

In connection with: *Basic specification, Position 5 = M, N, O*  
 Installation according to the specifications of FHX50B.



Only the type of protection suitable for the device shall be connected!

**Cable entry: Connection compartment**

Cable gland: *Basic specification, Position 7 = B*

Thread	Clamping range	Material	Sealing insert	O-ring
M20x1,5	ø 8 to 10.5 mm	Ms, nickel-plated	Silicone	EPDM (ø 17x2)

Cable gland: *Basic specification, Position 7 = C*

Thread	Clamping range	Material	Sealing insert	O-ring
M20x1,5	ø 7 to 12 mm	1.4404	NBR	EPDM (ø 17x2)



- The tightening torque refers to cable glands installed by the manufacturer:
  - Recommended: 3.5 Nm
  - Maximum: 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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