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Safety Instructions
Micropilot FMR43

Control Drawing IS
Class I, II, III, Div. 1, Groups A-D, F, G
Zone 0, AEx/Ex ia IIC Ga
Zone 20, AEx/Ex ia IIIB Da
Class I, Div. 2, Groups A-D
Zone 2, AEx/Ex ic IIC Gc
Zone 22, AEx/Ex ic IIIB Dc

C US

Endress+Hauser
People for Process Automation

Micropilot FMR43

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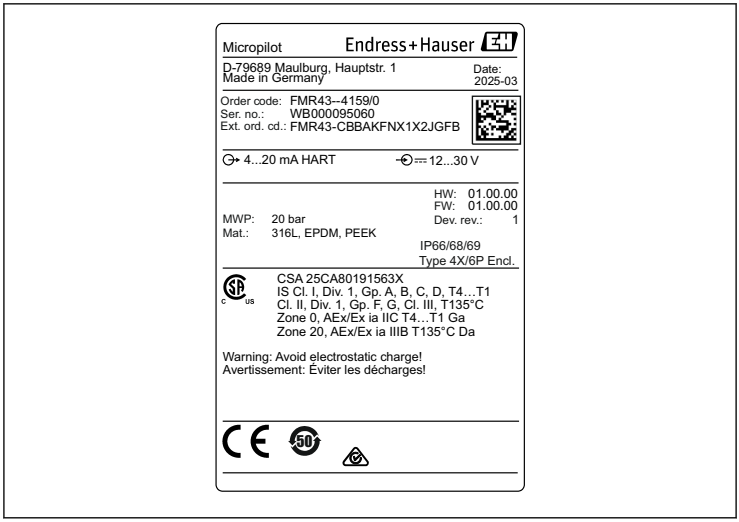
About this document

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



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Associated documentation

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

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

BA02310F

Certificates and declarations

CSA C/US certificate

Certificate number:

CSA 25CA80191563X

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

FMR43	–	**********	+	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: Cerabar

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

FMR43

Basic specifications

Position 1, 2 (Approval)		
Selected option		**Description**
FMR43	CB	CSA C/US IS Cl. I, Div. 1, Gr. A-D, T4...T1 CSA C/US IS Cl. II, III, Div. 1, Gr. F, G, T135 °C Zone 0, AEx/Ex ia IIC T4...T1 Ga Zone 20, AEx/Ex ia IIIB T135 °C Da
	CE	CSA C/US Cl. I, Div. 2, Gr. A-D, T4...T1 (NIFW) Zone 2, AEx/Ex ic IIC T4...T1 Gc Zone 22, AEx/Ex ic IIIB T135 °C Dc

Position 3, 4 (Output)		
Selected option		**Description**
FMR43	BA	2-wire, 4-20 mA HART

Position 10-12 (Process Connection)			
Selected option			**Description**
FMR43	VGJ		MNPT1/2, 316L, flush mount
	VHJ		MNPT3/4, 316L, flush mount
	VLJ		MNPT1-1/2, 316L, flush mount
	WJJ		G1/2, 316L, flush mount
	WKJ		G3/4, 316L, flush mount
	WLJ		G1, 316L, flush mount
	WNJ		G1-1/2, 316L, flush mount
	X2J		M24, 316L, install > accessory, process adapter
	3CK		Tri-Clamp ISO2852 DN38 (1-1/2"), PTFE>316L, NA-CONNECT compatible
	3EK		Tri-Clamp ISO2852 DN51 (2"), PTFE>316L, NA-CONNECT compatible
	5DK		NEUMO BioControl D50 PN16, PEEK>316L
	9YY	(VJJ)	MNPT1, 316L, flush mount
		(3FK)	Tri-Clamp ISO2852 DN76.1 (3"), PTFE>316L, NA-CONNECT compatible
		(3HK)	Tri-Clamp ISO2852 DN101.6 (4"), PTFE>316L, NA-CONNECT compatible
		(5AK)	NEUMO BioControl D25 PN16, PEEK>316L
		(5FK)	NEUMO BioControl D80 PN16, PEEK>316L

Optional specifications

No options specific to hazardous locations are available.

Safety instructions: General

- The device is intended to be used in hazardous locations as defined in the Canadian Electrical Code, Part I or the National Electrical Code (NFPA70). 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 (≤ 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.
- The process connection of the device must be installed in such a way that guarantees a sufficiently tight joint (IP66/67).

- Applications in which the process temperature exceeds the maximum surface temperature limits of the required maximum surface temperature: The ignition hazard posed by hot surfaces on the process connecting parts of the device must be taken into account.
- It is essential for the device to use a power supply that is galvanically isolated from earth.
- When using an intrinsically safe barrier, the barrier must be connected to the same earth as the device.
- Refer to the temperature tables for various ambient and process temperature ranges.

In accordance with CSA/UL/EN/IEC 61010-1:2010 or
Class II, CSA 223/UL 1310:
The device may only be powered by a power supply unit with an energy-limited electric circuit.

Application in dust
Ambient and process temperature range: –40 to +70 °C.

Electrostatics

Class I, Groups A-D; IIC

Sensor

Basic specification, Position 10-12 = 3CK, 5AK
- When used in gas applications, the sensor must be used in conjunction with a metallic frame provided by the user. This can be a metal tank wall, a metal nozzle or a pipe.
- If there is no risk of dangerous electrostatic charging of the plastic surfaces, the sensor can be used without restrictions.

Basic specification, Position 10-12 = 3EK, 3FK, 3HK, 5DK, 5FK
- The sensor must not be used in applications with explosive gases.
- If there is no risk of dangerous electrostatic charging of the plastic surfaces, the sensor can be used without restrictions.

Class II, III, Groups F, G; IIIB

Electronics enclosure with display (LCD or LED)

Do not use in areas with a moving dust atmosphere.

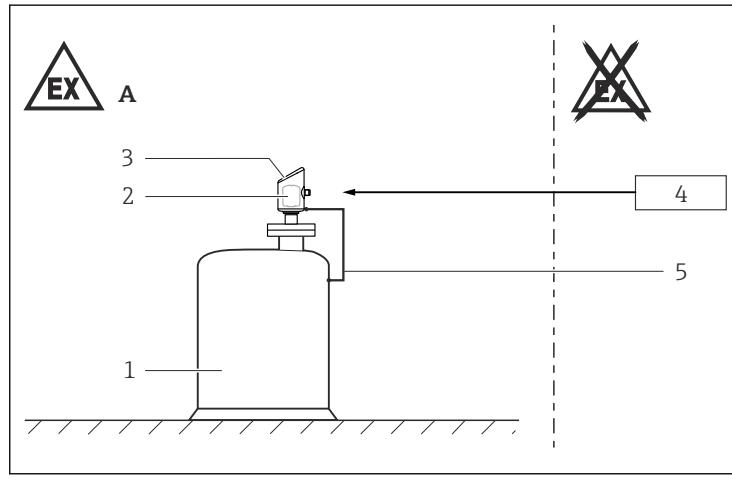
Sensor

Basic specification, Position 10-12 = 3CK, 3EK, 5xK
- The sensor may only be used in dust applications if it is mounted in a metal tube or nozzle.
- If there is no risk of dangerous electrostatic charging of the plastic surfaces, the sensor can be used without restrictions.

Basic specification, Position 10-12 = 3FK, 3HK

- The sensor must not be used in applications with explosive dusts.
- If there is no risk of dangerous electrostatic charging of the plastic surfaces, the sensor can be used without restrictions.

Safety instructions: Installation

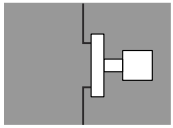


A See Basic specifications, Position 1, 2 = CB, CE
1 Tank; see Basic specifications, Position 1, 2 = CB, CE
2 Electronic insert
3 Enclosure
4 Power supply
5 Local earthing

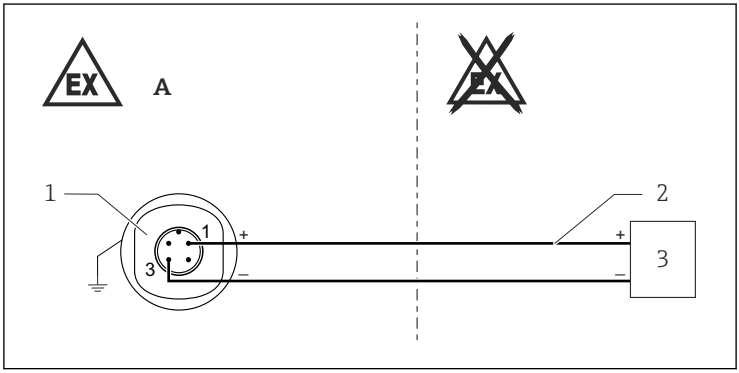
- Continuous service temperature of the connecting cable: $\geq T_a+20$ K.
- Observe the pertinent guidelines when interconnecting intrinsically safe circuits.
- Observe the maximum process conditions according to the manufacturer's Operating Instructions.
- Install the device to exclude any mechanical damage or friction during the application. Pay particular attention to flow conditions and tank fittings.
- Perform the following to achieve the degree of protection IP66/68:
  - Select a suitable cable / connector.
  - Mount the cable / connector correctly.
- Supplied cables / connectors comply with the requirements of the type of protection marked on the nameplate.

Permitted ambient conditions

Class II, III, Div. 1, Groups F, G

Process Zone 20		Enclosure Zone 20
Continuous dust submersion		Continuous dust submersion

Intrinsic safety



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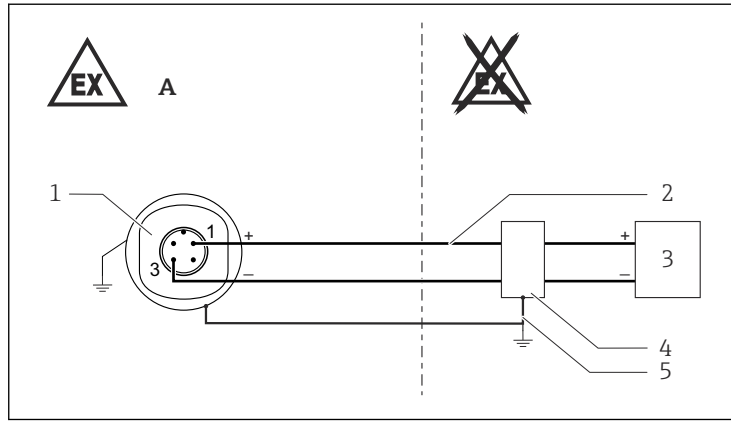
A See Basic specifications, Position 1, 2 = CB, CE
1 FMR43
2 Field wiring
3 Intrinsically safe galvanic isolator



A See Basic specifications, Position 1, 2 = CB, CE
1 FMR43
2 Field wiring
3 Power supply
4 Barrier
5 Potential equalization line (4 mm²)

- Install per National Electrical Code (NFPA70) or Canadian Electrical Code, Part I (C22.1), as applicable.
- Use an intrinsic safety barrier or other associated equipment that is approved for the country in use and satisfies the following conditions: $U_o \leq U_i$, $I_o \leq I_i$, $C_o \geq C_i + C_{cable}$, $L_o \geq L_i + L_{cable}$ and $P_o \leq P_i$.
- For transmitter parameters: See "Connection data" section.
- Associated devices with galvanic isolation between the intrinsically safe and non-intrinsically safe circuits are preferred.
- Control room equipment may not use or generate over 250 V_{rms}.
- Always follow the installation instructions provided by the intrinsic safety barrier manufacturer when installing this equipment.
- WARNINGS: Substitution of components may impair intrinsic safety.
- The transmitter enclosure is to be connected to ground via internal or external ground terminals.
- The intrinsically safe input power circuit of the device is isolated from ground. The dielectric strength is at least 500 V_{rms}.
- The potential equalization connection must comply with the requirements in the specific conditions of use.

Temperature tables

Class I, Groups A-D

- 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.

Description notes

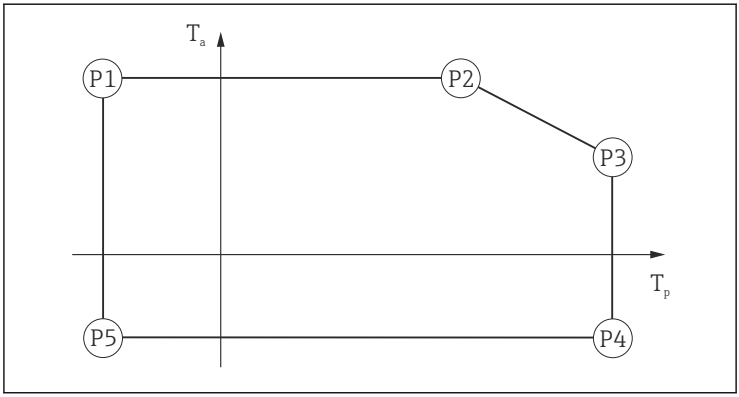
Unless otherwise indicated, the positions always refer to the basic specification.

1st column: Temperature classes T4 (135 °C) to T1 (450 °C)

Column P1 to P5: Position (temperature value) on the axes of the derating

- T_a: Ambient temperature in °C
- T_p: Process temperature in °C

Example diagrams of possible deratings



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Basic specification, Position 10-12 = VGJ, WJJ, X2J, 3xK, 5DK, 5FK

	P1		P2		P3		P4		P5	
	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a
T4	–40	70	70	70	135	47	135	–40	–40	–40
T3...T1	–40	70	70	70	150	40	150	–40	–40	–40

Basic specification, Position 10-12 = VHJ, VJJ, VLJ, WKJ, WLJ, WNJ, 5AK

	P1		P2		P3		P4		P5	
	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a	T_p	T_a
T4...T1	–40	70	70	70	130	40	130	–40	–40	–40

Class II, III, Groups F, G

- 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: IP66/68

Maximum surface temperature	Process temperature range	Ambient temperature range
T135 °C	–40 °C ≤ T_p ≤ +70 °C	–40 °C ≤ T_a ≤ +70 °C

Connection data

Class I, Groups A-D; Zone 0, Zone 2, IIC

Entity parameter
U_i = 30 V I_i = 100 mA P_i = 700 mW C_i = 15 nF L_i = 0.69 mH

Class II, III, Groups F, G; Zone 20, Zone 22, IIIB

Entity parameter
U_i = 30 V I_i = 100 mA P_i = 650 mW C_i = 15 nF L_i = 0.69 mH

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