

Safety Instructions

Micropilot

FMR60B/62B/63B/66B/67B

Control Drawing IS, XP
for devices with combined approval



Micropilot FMR60B/62B/63B/66B/67B

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General notes:**Combined approval**

The device is suitable for installation as intrinsically safe, explosionproof/flameproof, suitable for Class II, III, Div. 1 or suitable for Class I, Div. 2.

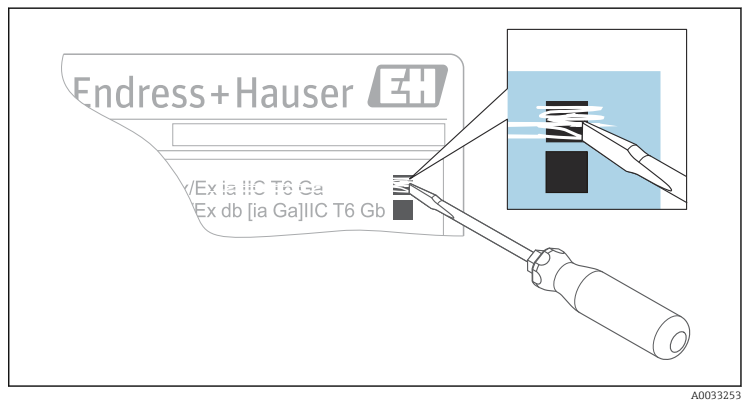
- Before initial commissioning, specify the type of protection.
- It is not permitted to change the type of protection after initial commissioning as this can jeopardize the explosion protection.

For aluminum enclosures:

Void out the explosion protection that is not used on the nameplate.

For stainless steel enclosures:

Using a striking tool, mark the explosion protection used, or void out the explosion protection that is not used.



A0033253



Depending on the type of protection used: Observe the appropriate safety instructions included in this document.

**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:

HART

- BA02247F (FMR60B)
- BA02248F (FMR62B)
- BA02249F (FMR63B)
- BA02250F (FMR66B)
- BA02251F (FMR67B)

- PROFIBUS PA
- BA02261F (FMR60B)
 - BA02262F (FMR62B)
 - BA02263F (FMR63B)
 - BA02264F (FMR66B)
 - BA02265F (FMR67B)

- PROFINET
- BA02266F (FMR60B)
 - BA02267F (FMR62B)
 - BA02268F (FMR63B)
 - BA02269F (FMR66B)
 - BA02270F (FMR67B)

Certificates and declarations **CSA C/US certificate**

Certificate number:
CSA23CA80159823

Certificate holder 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*..
(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: 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

FMR60B, FMR62B, FMR63B, FMR66B, FMR67B

Basic specifications

Position 1, 2 (Approval)		
Selected option		Description
FMR6xB	C1	CSA C/US XP Cl. I, II, III, Div. 1, Gr. A-G, Cl. I, Zone 0/1, AEx/Ex db IIC T6 Ga/Gb Cl. II, III, Div. 1, Gr. E-G IS Cl. I, II, III, Div. 1, Gr. A-G, Cl. I, Zone 0, AEx/Ex ia IIC T6 Ga Cl. I, Div. 2, Gr. A-D

Position 3, 4 (Output)		
Selected option		Description
FMR6xB	BA	2-wire, 4-20 mA HART
	DA	2-wire, PROFIBUS PA
	FA	2-wire, PROFINET, 10Mbit/s (APL)

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

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

Position 7 (Electrical Connection)		
Selected option		Description
FMR6xB	H	Thread NPT1/2, IP66/68 NEMA Type 4X/6P

Position 8 (Application)		
Selected option		Description
FMR60B	B	Process temperature -20...+150°C
FMR62B	D	Process temperature -20...+200°C
FMR63B		
FMR60B	H	Process temperature -40...+130°C
FMR66B		
FMR60B	J	Process temperature -40...+150°C
FMR62B	L	Process temperature -40...+200°C
FMR63B		
FMR67B		
FMR62B	N	Process temperature -40...+280°C
FMR67B	P	Process temperature -40...+450°C
FMR62B	R	Process temperature -60...+150°C
	T	Process temperature -196...+200°C
FMR62B	V	Process temperature -20...+150°C, Steam application
FMR63B	W	Process temperature -20...+200°C, Steam application

Position 9, 10 (Antenna)		
Selected option		Description
FMR60B FMR62B FMR66B FMR67B	GA	Drip-off, PTFE 50mm/2"
FMR60B FMR63B	GE	Integrated, PEEK, 20mm/3/4"
FMR60B	GF	Integrated, PEEK, 40mm/1-1/2"
FMR62B FMR63B	GM	Cladded flush mount, PTFE, 50mm/2"
	GN	Cladded flush mount, PTFE, 80mm/3"
FMR67B	GP	Flush mount, PTFE, 80mm/3"
FMR63B	GQ	Cladded, flush mount, PEEK, 20mm/3/4"
	GR	Cladded, flush mount, PEEK, 40mm/1-1/2"
FMR62B FMR67B	GT	Horn, 316L, 65mm/2.6"

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

Position 16 (Seal)		
Selected option		Description
FMR62B FMR63B	B	PTFE cladded
FMR63B	C	PEEK cladded
FMR6xB	D	VKM Viton GLT
	G	EPDM
FMR60B FMR62B	J	HNBR
FMR63B FMR67B	P	FFKM Kalrez
FMR62B FMR67B	U	Graphite

Position 17 (Air Purge Connection)		
Selected option		Description
FMR67B	2	NPT1/4

Optional specifications

ID Jx, Kx (Test, Certificate, Declaration)		
Selected option		Description
FMR62B FMR67B	JL	Ambient temp. transmitter -50°C/-58°F, sensor see specification

ID Nx, Ox (Accessory Mounted)		
Selected option		Description
FMR6xB	NA	Overvoltage protection

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

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

Safety instructions:
General

- 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:
Special conditions**

- 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.
- For light metal flanges or flange faces (e.g. titanium, zirconium), avoid sparks caused by impact and friction.
- 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

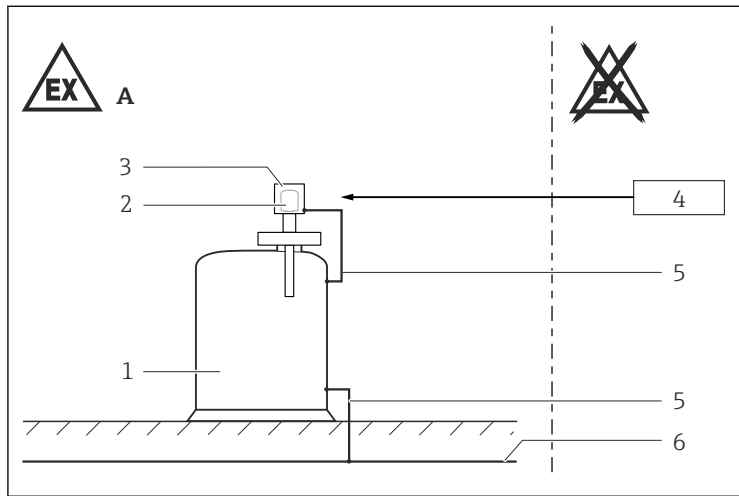
- Avoid sparks caused by impact and friction.
- Changing the position of the alignment device must be impossible:
 - After the alignment of the antenna via the pivot bracket
 - After tightening of the clamping flange
 - After setting the damping ring (torque 10 to 11 Nm)
- Degree of protection IP67 must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

Device type FMR67B and Basic specification, Position 17 = 2

- 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.

IS; Class I, II, III, Div. 1, Groups A-G

Safety instructions: Installation



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- A Zone 0; Class I, II, III, Div. 1, Groups A-G
- 1 Tank; Zone 0; Class I, II, III, Div. 1, Groups A-G
- 2 Electronic insert
- 3 Enclosure
- 4 Associated intrinsically safe power supply units
- 5 Potential equalization line
- 6 Local potential equalization

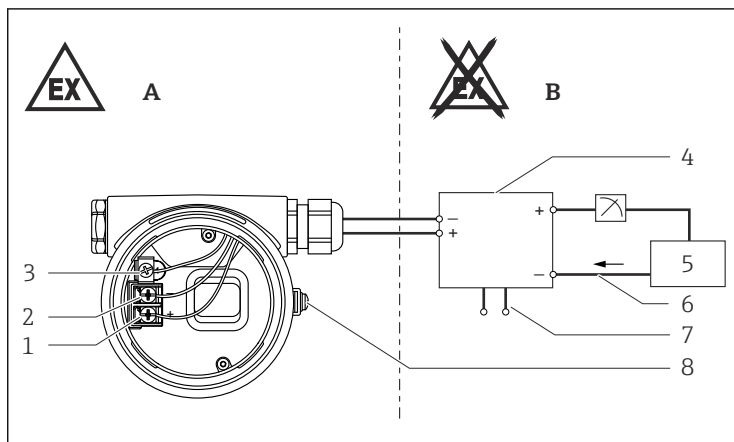
- After aligning (rotating) the enclosure, retighten the fixing screw.
- Continuous service temperature of the connecting cable: $\geq T_a + 20\text{ K}$.
- Observe the pertinent guidelines when interconnecting intrinsically safe circuits.
- Observe the maximum process conditions according to the manufacturer's 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 IP66/67:
 - 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.

Potential equalization

Integrate the device into the local potential equalization.

Intrinsic safety

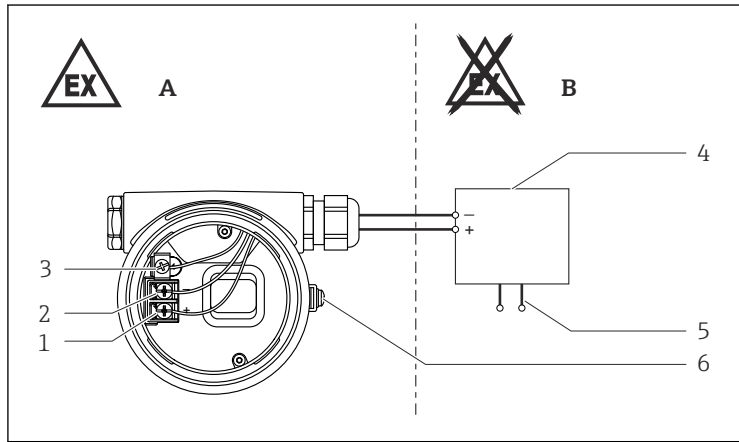
Basic specification, Position 3, 4 = BA



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- A** Hazardous Location:
 Class I, Div. 1, Groups A-D; Class II, Div. 1, Groups E-G; Class III;
 Class I, Zone 0, AEx/Ex ia IIC T6 Ga
- B** Non-hazardous location
- 1 Positive terminal
 - 2 Negative terminal
 - 3 Internal ground terminal
 - 4 Barrier / Associated equipment
 - 5 External load
 - 6 4 to 20 mA loop
 - 7 Supply
 - 8 External ground terminal

Basic specification, Position 3, 4 = DA, FA



A0052100

- A** Hazardous Location:
 Class I, Div. 1, Groups A-D; Class II, Div. 1, Groups E-G; Class III;
 Class I, Zone 0, AEx/Ex ia IIC T6 Ga
- B** Non-hazardous location
- 1** Positive terminal
- 2** Negative terminal
- 3** Internal ground terminal
- 4** PROFIBUS PA, FISCO / Associated equipment or
 2-WISE Port / Associated equipment (PROFINET APL)
- 5** Supply
- 6** External ground terminal

Entity installation

- 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:
 $U_o (V_{oc}) \leq U_i (V_{max}), I_o (I_{sc}) \leq I_i (I_{max}), C_o (C_a) \geq C_i + C_{cable},$
 $L_o (L_a) \geq L_i + L_{cable}$ 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}.

Optional specification, ID Nx, OX = NA

The intrinsically safe input power circuit of the device is isolated from ground. The dielectric strength is at least 290 V_{rms}.

Process seals

- The device is rated Single Seal in accordance with UL122701 and does not require the use of an external secondary process seal.
 - The sensor is rated for a Maximum Working Pressure (MWP) of up to 100 bar and a maximum process temperature (T_p) up to 450 °C, depending on the antenna.
-  ■ Limitation of the Maximum Working Pressure (MWP) for each device is marked on the nameplate and must not be exceeded! This value may be less than the Single Seal rating.
- Limitation of the maximum process temperature (T_p) with regards to the device options, temperature code rating and maximum ambient temperature as specified in the "Temperature tables" section of this document must be considered!
- Verify the chemical compatibility of the process fluid with the process seal material (see field "Mat." on the nameplate)!

Temperature tables

Class I, Div. 1 / Zone 0

-  ■ 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.
-  *Optional specification, ID Jx, Kx = JL*
Lower limit of the ambient temperature for explosion protection changes to -50 °C.

Description notes

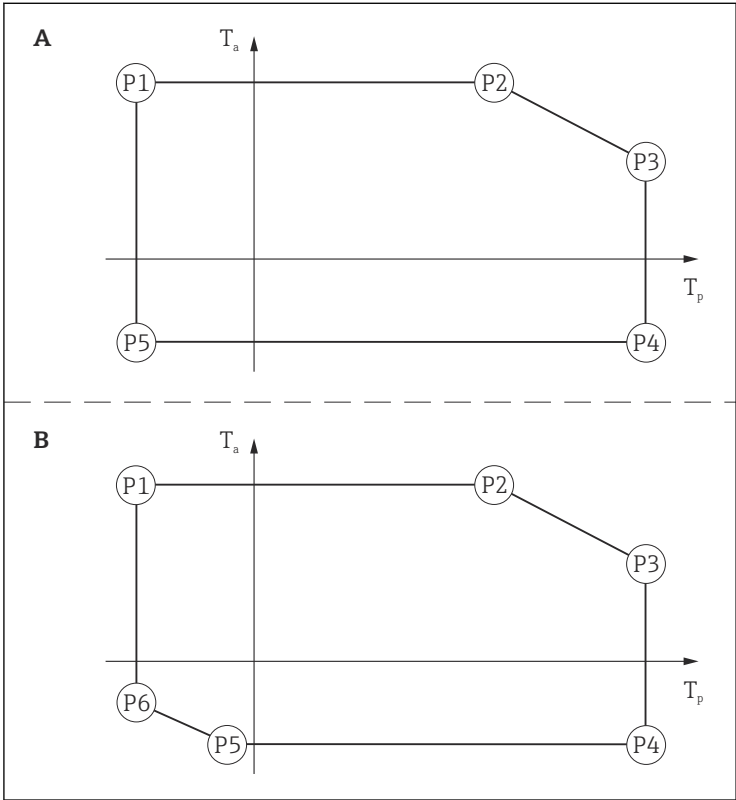
 Unless otherwise indicated, the positions always refer to the basic specification.

1st column: Temperature classes T6 (85 °C) to T1 (450 °C)

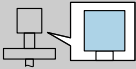
Column P1 to P5: Position (temperature value) on the axes of the derating

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

Example diagrams of possible deratings



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	Position 6 (Housing, Material)
	B, J, M

FMR60B, FMR62B, FMR63B, FMR66B, FMR67B

Position 8 (Application)
B, H, J, R, V

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-40 ^{1) 2) 3)}	46	46	46	80	32	80	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T5	-40 ^{1) 2) 3)}	61	61	61	95	47	95	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T4	-40 ^{1) 2) 3)}	65	65	65	130	54	130	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T3	-40 ^{1) 2) 3)}	65	65	65	150	51	150	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-

- 1) Position 8 = B, V: -20 °C
- 2) Position 8 = R: -60 °C
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C

FMR60B, FMR62B, FMR63B, FMR67B

Position 8 (Application)
D, L, T, W

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-196 ^{1) 2) 3)}	46	46	46	80	37	80	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-6
T5	-196 ^{1) 2) 3)}	61	61	61	95	52	95	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-6
T4	-196 ^{1) 2) 3)}	65	65	65	130	56	130	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-6
T3	-196 ^{1) 2) 3)}	65	65	65	195	47	195	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-6
T2	-196 ^{1) 2) 3)}	65	65	65	200	46	200	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-6

- 1) Position 8 = D, W: -20 °C; P6 not relevant
- 2) Position 8 = L: -40 °C; P6 not relevant
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C

FMR62B, FMR67B

Position 8 (Application)
N, T

Position 9, 10 (Antenna)
GT

	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
T6	-196 ¹⁾	46	46	46	80	43	80	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-32
T5	-196 ¹⁾	61	61	61	95	58	95	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-32
T4	-196 ¹⁾	65	65	65	130	61	130	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-32
T3	-196 ¹⁾	65	65	65	195	57	195	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-32
T2	-196 ¹⁾	65	65	65	280 ³⁾	52	280 ³⁾	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-32

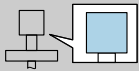
- 1) Position 8 = N: -40 °C; P6 not relevant
- 2) Optional specification, ID Jx, Kx = JL: -50 °C
- 3) Position 8 = T: 200 °C

Position 8 (Application)
P

Position 9, 10 (Antenna)
GT

	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
T6	-40	46	46	46	80	43	80	-40 ¹⁾	-40	-40 ¹⁾	-	-
T5	-40	61	61	61	95	58	95	-40 ¹⁾	-40	-40 ¹⁾	-	-
T4	-40	65	65	65	130	61	130	-40 ¹⁾	-40	-40 ¹⁾	-	-
T3	-40	65	65	65	195	57	195	-40 ¹⁾	-40	-40 ¹⁾	-	-
T2	-40	65	65	65	290	51	290	-40 ¹⁾	-40	-40 ¹⁾	-	-
T1	-40	65	65	65	440	39	440	-40 ¹⁾	-40	-40 ¹⁾	-	-

- 1) Optional specification, ID Jx, Kx = JL: -50 °C

	Position 6 (Housing, Material)
	K, N

FMR60B, FMR62B, FMR63B, FMR66B, FMR67B

Position 8 (Application)
B, H, J, R, V

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-40 ^{1) 2) 3)}	46	46	46	80	28	80	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T5	-40 ^{1) 2) 3)}	61	61	61	95	43	95	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T4	-40 ^{1) 2) 3)}	65	65	65	130	53	130	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T3	-40 ^{1) 2) 3)}	65	65	65	150	42	150	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-

- 1) Position 8 = B, V: -20 °C
- 2) Position 8 = R: -60 °C
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C

FMR60B, FMR62B, FMR63B, FMR67B

Position 8 (Application)
D, L, T, W

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-196 ^{1) 2) 3)}	46	46	46	80	34	80	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-2
T5	-196 ^{1) 2) 3)}	61	61	61	95	49	95	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-2
T4	-196 ^{1) 2) 3)}	65	65	65	130	56	130	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-2
T3	-196 ^{1) 2) 3)}	65	65	65	195	39	195	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-2
T2	-196 ^{1) 2) 3)}	65	65	65	200	37	200	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-2

- 1) Position 8 = D, W: -20 °C; P6 not relevant
- 2) Position 8 = L: -40 °C; P6 not relevant
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JxL: -50 °C

FMR62B, FMR67B

Position 8 (Application)
N, T

Position 9, 10 (Antenna)
GT

	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
T6	-196 ¹⁾	46	46	46	80	42	80	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-30
T5	-196 ¹⁾	61	61	61	95	57	95	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-30
T4	-196 ¹⁾	65	65	65	130	61	130	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-30
T3	-196 ¹⁾	65	65	65	195	57	195	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-30
T2	-196 ¹⁾	65	65	65	280 ³⁾	52	280 ³⁾	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-30

- 1) Position 8 = N: -40 °C; P6 not relevant
- 2) Optional specification, ID Jx, Kx = JL: -50 °C
- 3) Position 8 = T: 200 °C

Position 8 (Application)
P

Position 9, 10 (Antenna)
GT

	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
T6	-40	46	46	46	80	42	80	-40 ¹⁾	-40	-40 ¹⁾	-	-
T5	-40	61	61	61	95	57	95	-40 ¹⁾	-40	-40 ¹⁾	-	-
T4	-40	65	65	65	130	61	130	-40 ¹⁾	-40	-40 ¹⁾	-	-
T3	-40	65	65	65	195	57	195	-40 ¹⁾	-40	-40 ¹⁾	-	-
T2	-40	65	65	65	290	51	290	-40 ¹⁾	-40	-40 ¹⁾	-	-
T1	-40	65	65	65	440	32	440	-40 ¹⁾	-40	-40 ¹⁾	-	-

- 1) Optional specification, ID Jx, Kx = JL: -50 °C

Class II, III, Div. 1

-  ■ 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.

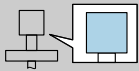
For detailed information see Technical Information.

 Protection type of enclosure: IP66/67

 *Optional specification, ID Jx, Kx = JL*
Lower limit of the ambient temperature for explosion protection changes to -50 °C.

Description notes

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

	Position 6 (Housing, Material)
	B, J, K, M, N

FMR60B, FMR62B, FMR63B, FMR66B, FMR67B

Position 8 (Application)
B, H, J, R, V

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

Maximum surface temperature	Process temperature range	Ambient temperature range
T 80 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +60\text{ °C}$
T 100 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +100\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +55\text{ °C}$
T 130 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +50\text{ °C}$
T 150 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +150\text{ °C}^{5)}$	$-40\text{ °C}^{4)} \leq T_a \leq +45\text{ °C}$

- 1) Position 8 = B, V: -20 °C
- 2) Position 8 = R: -60 °C
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C
- 5) Position 8 = H: 130 °C

FMR60B, FMR62B, FMR63B, FMR67B

Position 8 (Application)
D, L, T, W

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

Maximum surface temperature	Process temperature range	Ambient temperature range
T 100 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +100\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +60\text{ °C}$
T 150 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +150\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +55\text{ °C}$
T 200 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +200\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +50\text{ °C}$

- 1) Position 8 = D, W: -20 °C
- 2) Position 8 = T: -196 °C
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C

FMR62B, FMR67B

Position 8 (Application)
N, T

Position 9, 10 (Antenna)
GT

Maximum surface temperature	Process temperature range	Ambient temperature range
T 150 °C	$-40\text{ °C}^{1)} \leq T_p \leq +150\text{ °C}$	$-40\text{ °C}^{2)} \leq T_a \leq +65\text{ °C}$
T 200 °C	$-40\text{ °C}^{1)} \leq T_p \leq +200\text{ °C}$	$-40\text{ °C}^{2)} \leq T_a \leq +60\text{ °C}$
T 280 °C	$-40\text{ °C}^{1)} \leq T_p \leq +280\text{ °C}^{3)}$	$-40\text{ °C}^{2)} \leq T_a \leq +50\text{ °C}$

- 1) Position 8 = T: -196 °C
- 2) Optional specification, ID Jx, Kx = JL: -50 °C
- 3) Position 8 = T: 200 °C

Position 8 (Application)
P

Position 9, 10 (Antenna)
GT

Maximum surface temperature	Process temperature range	Ambient temperature range
T 150 °C	$-40\text{ °C} \leq T_p \leq +150\text{ °C}$	$-40\text{ °C}^{1)} \leq T_a \leq +65\text{ °C}$
T 200 °C	$-40\text{ °C} \leq T_p \leq +200\text{ °C}$	$-40\text{ °C}^{1)} \leq T_a \leq +60\text{ °C}$
T 450 °C	$-40\text{ °C} \leq T_p \leq +450\text{ °C}$	$-40\text{ °C}^{1)} \leq T_a \leq +30\text{ °C}$

- 1) Optional specification, ID Jx, Kx = JL: -50 °C

Connection data *Basic specification, Position 3 = BA*

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

Basic specification, Position 3 = DA

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

Basic specification, Position 3 = FA

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

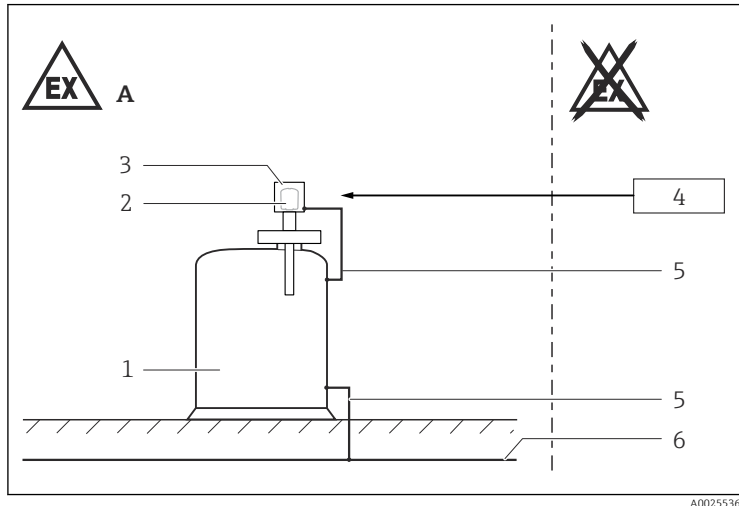
In connection with: *Basic specification, Position 5 = N*
Installation according to the specifications of FHX50B.



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

Class I, Div. 2, Groups A-D

Safety instructions: Installation



A0025536

- A Class I, Div. 2, Groups A-D
 1 Tank; Class I, Div. 2, Groups A-D
 2 Electronic insert
 3 Enclosure
 4 Power supply
 5 Potential equalization line
 6 Local potential equalization

- After aligning (rotating) the enclosure, retighten the fixing screw.
- In potentially explosive atmospheres: Do not open the connection compartment cover and the electronics compartment cover when energized.
- Before operation:
 - Screw in the cover all the way.
 - Tighten the securing screw on the cover.
- Continuous service temperature of the connecting cable: $\geq T_a + 20 \text{ K}$.
- 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.
- 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.
- Only use certified cable entries or sealing plugs. The metal sealing plugs supplied meet this requirement.
- Only use genuine spare parts from Endress+Hauser which are specified for the device.

Class I, Div. 2, Groups A, B, C, D

- Install per National Electrical Code (NFPA70) or Canadian Electrical Code, Part I (C22.1), as applicable.
- Use wiring and sealing methods appropriate for the location.
- Enclosure is not required to be explosionproof/flameproof.
- WARNINGS: Substitution of components may impair suitability for hazardous locations. Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Process seals

- The device is rated Single Seal in accordance with UL122701 and does not require the use of an external secondary process seal.
- The sensor is rated for a Maximum Working Pressure (MWP) of up to 100 bar and a maximum process temperature (T_p) up to 450 °C, depending on the antenna.



- Limitation of the Maximum Working Pressure (MWP) for each device is marked on the nameplate and must not be exceeded! This value may be less than the Single Seal rating.
- Limitation of the maximum process temperature (T_p) with regards to the device options, temperature code rating and maximum ambient temperature as specified in the "Temperature tables" section of this document must be considered!
- Verify the chemical compatibility of the process fluid with the process seal material (see field "Mat." on the nameplate)!

Temperature tables

Class I, Div. 2



- 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.



Optional specification, ID Jx, Kx = JL

Lower limit of the ambient temperature for explosion protection changes to -50 °C.

Description notes

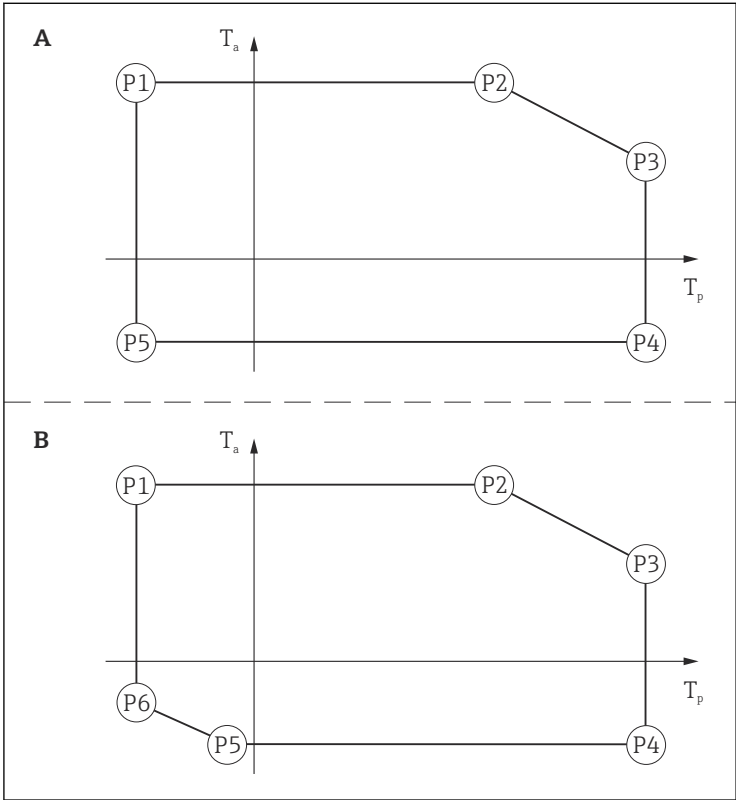
i Unless otherwise indicated, the positions always refer to the basic specification.

1st column: Temperature classes T6 (85 °C) to T1 (450 °C)

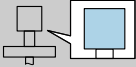
Column P1 to P5: Position (temperature value) on the axes of the derating

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

Example diagrams of possible deratings



A0022717

	Position 6 (Housing, Material)
	B, J, M

FMR60B, FMR62B, FMR63B, FMR66B, FMR67B

Position 8 (Application)
B, H, J, R, V

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-40 ^{1) 2) 3)}	74	74	74	80	73	80	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T5	-40 ^{1) 2) 3)}	79	79	79	95	76	95	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T4	-40 ^{1) 2) 3)}	79	79	79	130	61	130	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T3	-40 ^{1) 2) 3)}	79	79	79	150	52	150	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-

- 1) Position 8 = B, V: -20 °C
- 2) Position 8 = R: -60 °C
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C

FMR60B, FMR62B, FMR63B, FMR67B

Position 8 (Application)
D, L, T, W

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-196 ^{1) 2) 3)}	74	74	74	80	73	80	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-19
T5	-196 ^{1) 2) 3)}	79	79	79	95	76	95	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-19
T4	-196 ^{1) 2) 3)}	79	79	79	130	67	130	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-19
T3	-196 ^{1) 2) 3)}	79	79	79	195	48	195	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-19
T2	-196 ^{1) 2) 3)}	79	79	79	200	46	200	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-19

- 1) Position 8 = D, W: -20 °C; P6 not relevant
- 2) Position 8 = L: -40 °C; P6 not relevant
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C

FMR62B, FMR67B

Position 8 (Application)
N, T

Position 9, 10 (Antenna)
GT

	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
T6	-196 ¹⁾	74	74	74	80	73	80	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-43
T5	-196 ¹⁾	79	79	79	95	78	95	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-43
T4	-196 ¹⁾	79	79	79	130	75	130	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-43
T3	-196 ¹⁾	79	79	79	195	68	195	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-43
T2	-196 ¹⁾	79	79	79	280 ³⁾	58	280 ³⁾	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-43

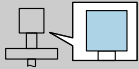
- 1) Position 8 = N: -40 °C; P6 not relevant
- 2) Optional specification, ID Jx, Kx = JL: -50 °C
- 3) Position 8 = T: 200 °C

Position 8 (Application)
P

Position 9, 10 (Antenna)
GT

	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
T6	-40	74	74	74	80	73	80	-40 ¹⁾	-40	-40 ¹⁾	-	-
T5	-40	79	79	79	95	78	95	-40 ¹⁾	-40	-40 ¹⁾	-	-
T4	-40	79	79	79	130	75	130	-40 ¹⁾	-40	-40 ¹⁾	-	-
T3	-40	79	79	79	195	68	195	-40 ¹⁾	-40	-40 ¹⁾	-	-
T2	-40	79	79	79	290	57	290	-40 ¹⁾	-40	-40 ¹⁾	-	-
T1	-40	79	79	79	440	39	440	-40 ¹⁾	-40	-40 ¹⁾	-	-

- 1) Optional specification, ID Jx, Kx = JL: -50 °C

	Position 6 (Housing, Material)
	K, N

FMR60B, FMR62B, FMR63B, FMR66B, FMR67B

Position 8 (Application)
B, H, J, R, V

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-40 ^{1) 2) 3)}	72	72	72	80	70	80	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T5	-40 ^{1) 2) 3)}	77	77	77	95	73	95	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T4	-40 ^{1) 2) 3)}	77	77	77	130	53	130	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T3	-40 ^{1) 2) 3)}	77	77	77	150	42	150	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-

- 1) Position 8 = B, V: -20 °C
- 2) Position 8 = R: -60 °C
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C

FMR60B, FMR62B, FMR63B, FMR67B

Position 8 (Application)
D, L, T, W

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-196 ^{1) 2) 3)}	72	72	72	80	70	80	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-10
T5	-196 ^{1) 2) 3)}	77	77	77	95	74	95	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-10
T4	-196 ^{1) 2) 3)}	77	77	77	130	63	130	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-10
T3	-196 ^{1) 2) 3)}	77	77	77	195	39	195	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-10
T2	-196 ^{1) 2) 3)}	77	77	77	200	37	200	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-10

- 1) Position 8 = D, W: -20 °C; P6 not relevant
- 2) Position 8 = L: -40 °C; P6 not relevant
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JxL: -50 °C

FMR62B, FMR67B

Position 8 (Application)
N, T

Position 9, 10 (Antenna)
GT

	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
T6	-196 ¹⁾	72	72	72	80	71	80	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-41
T5	-196 ¹⁾	77	77	77	95	75	95	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-41
T4	-196 ¹⁾	77	77	77	130	73	130	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-41
T3	-196 ¹⁾	77	77	77	195	65	195	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-41
T2	-196 ¹⁾	77	77	77	280 ³⁾	54	280 ³⁾	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-41

- 1) Position 8 = N: -40 °C; P6 not relevant
- 2) Optional specification, ID Jx, Kx = JL: -50 °C
- 3) Position 8 = T: 200 °C

Position 8 (Application)
P

Position 9, 10 (Antenna)
GT

	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
T6	-40	72	72	72	80	71	80	-40 ¹⁾	-40	-40 ¹⁾	-	-
T5	-40	77	77	77	95	75	95	-40 ¹⁾	-40	-40 ¹⁾	-	-
T4	-40	77	77	77	130	73	130	-40 ¹⁾	-40	-40 ¹⁾	-	-
T3	-40	77	77	77	195	65	195	-40 ¹⁾	-40	-40 ¹⁾	-	-
T2	-40	77	77	77	290	52	290	-40 ¹⁾	-40	-40 ¹⁾	-	-
T1	-40	77	77	77	440	32	440	-40 ¹⁾	-40	-40 ¹⁾	-	-

- 1) Optional specification, ID Jx, Kx = JL: -50 °C

Connection data*Basic specification, Position 3 = BA***Power supply**

$$U \leq 35 \text{ V}_{\text{DC}}$$

*Basic specification, Position 3 = DA***Power supply**

$$U \leq 32 \text{ V}_{\text{DC}}$$

*Basic specification, Position 3 = FA***Power supply**

$$U \leq 15 \text{ V}_{\text{DC}}$$

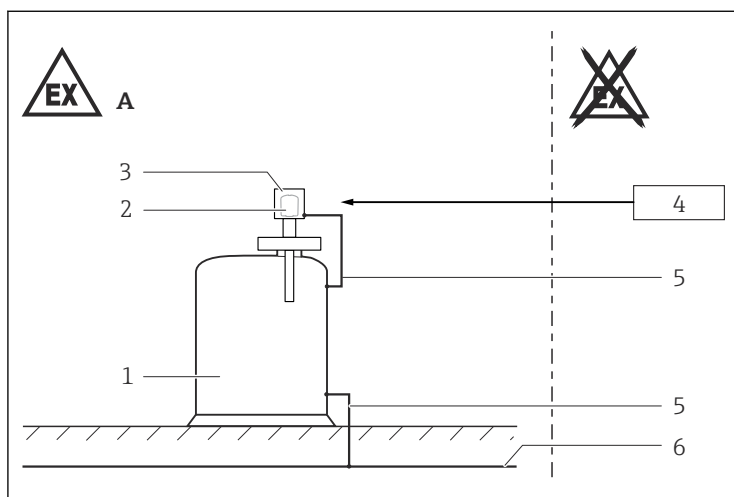
In connection with: *Basic specification, Position 5 = N*
Installation according to the specifications of FHX50B.



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

XP; Class I, II, III, Div. 1, Groups A-G; Class I, Div. 2, Groups A-D

Safety instructions: Installation



A0025536

- A Zone 1; Class I, II, III, Div. 1, Groups A-G; Class I, Div. 2, Groups A-D
- 1 Tank; Zone 0 or Zone 1; Class I, II, III, Div. 1, Groups A-G;
Class I, Div. 2, Groups A-D
- 2 Electronic insert
- 3 Enclosure
- 4 Power supply
- 5 Potential equalization line
- 6 Local potential equalization

- After aligning (rotating) the enclosure, retighten the fixing screw.
- In potentially explosive atmospheres: Do not open the connection compartment cover and the electronics compartment cover when energized.
- Seal the cable entry or piping tight (see protection type of enclosure in the "Temperature tables" chapter).
- Before operation:
 - Screw in the cover all the way.
 - Tighten the securing screw on the cover.
- When connecting through a conduit entry approved for this purpose, mount the associated sealing unit directly at the enclosure.
- Only use certified cable entries or sealing plugs. The metal sealing plugs supplied meet this requirement.
- Only use genuine spare parts from Endress+Hauser which are specified for the device.

- Continuous service temperature of the connecting cable: $\geq T_a + 20\text{ K}$.
- 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.

**Safety
instructions: Ex d
joints**

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

**Explosionproof /
Flameproof**

**Class I, Div. 1, Groups A, B, C, D;
Class I, Zone 0/1, AEx/Ex db IIC T6 Ga/Gb**

- Install per National Electrical Code (NFPA70) or Canadian Electrical Code, Part I (C22.1), as applicable.
- XP conduit seal required within 450 mm (18 in) of the enclosure.
- For the maximum supply voltage: See "Connection data" section.
- Seal unused entries with approved 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.
- The transmitter enclosure is to be connected to ground via internal or external ground terminals.
- WARNINGS: Keep covers tight when explosive atmosphere is present.

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

- Install per National Electrical Code (NFPA70) or Canadian Electrical Code, Part I (C22.1), as applicable.
- Use wiring and sealing methods appropriate for the location.
- Use a dust-tight seal for wiring at the conduit/cable entry.
- Seal unused entries with approved 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.
- WARNINGS: Keep covers tight when explosive atmosphere is present.

**Class I, Div. 2,
Groups A, B, C, D**

- Install per National Electrical Code (NFPA70) or Canadian Electrical Code, Part I (C22.1), as applicable.
- Use wiring and sealing methods appropriate for the location.
- Enclosure is not required to be explosionproof/flameproof.
- WARNINGS: Substitution of components may impair suitability for hazardous locations. Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Process seals

- The device is rated Single Seal in accordance with UL122701 and does not require the use of an external secondary process seal.
- The sensor is rated for a Maximum Working Pressure (MWP) of up to 100 bar and a maximum process temperature (T_p) up to 450 °C, depending on the antenna.
- 
 - Limitation of the Maximum Working Pressure (MWP) for each device is marked on the nameplate and must not be exceeded! This value may be less than the Single Seal rating.
 - Limitation of the maximum process temperature (T_p) with regards to the device options, temperature code rating and maximum ambient temperature as specified in the "Temperature tables" section of this document must be considered!
 - Verify the chemical compatibility of the process fluid with the process seal material (see field "Mat." on the nameplate)!

Temperature tables

Class I, Div. 1 and Div. 2 / Zone 0 and Zone 1

- 
 - 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.
- 
 - *Optional specification, ID Jx, Kx = JL*
Lower limit of the ambient temperature for explosion protection changes to -50 °C.

Description notes

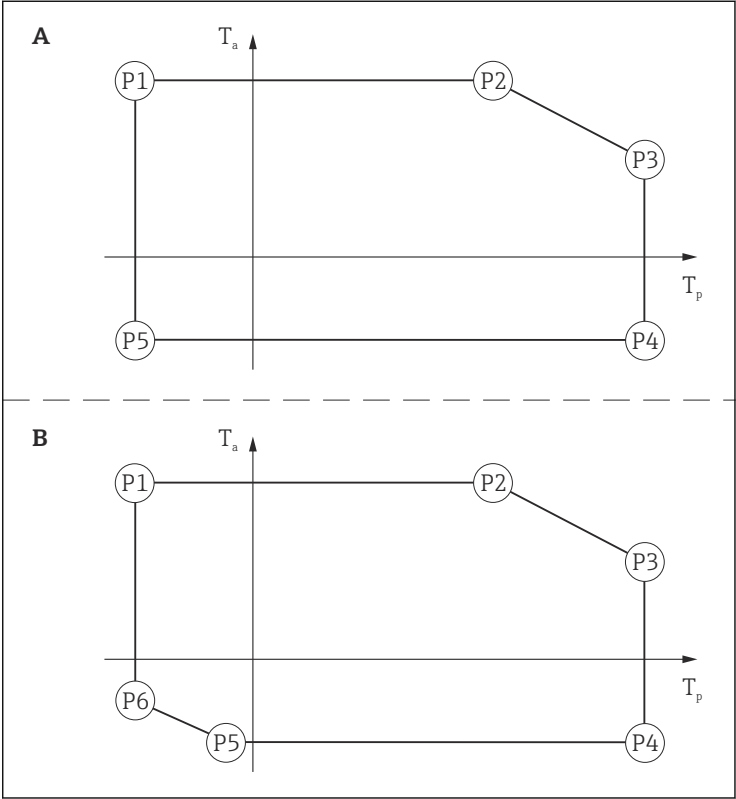
- 
 - Unless otherwise indicated, the positions always refer to the basic specification.

1st column: Temperature classes T6 (85 °C) to T1 (450 °C)

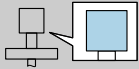
Column P1 to P5: Position (temperature value) on the axes of the derating

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

Example diagrams of possible deratings



A0022717

	Position 6 (Housing, Material)
	B, J, M

FMR60B, FMR62B, FMR63B, FMR66B, FMR67B

Position 8 (Application)
B, H, J, R, V

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-40 ^{1) 2) 3)}	74	74	74	80	73	80	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T5	-40 ^{1) 2) 3)}	79	79	79	95	76	95	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T4	-40 ^{1) 2) 3)}	79	79	79	130	61	130	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T3	-40 ^{1) 2) 3)}	79	79	79	150	52	150	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-

- 1) Position 8 = B, V: -20 °C
- 2) Position 8 = R: -60 °C
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C

FMR60B, FMR62B, FMR63B, FMR67B

Position 8 (Application)
D, L, T, W

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-196 ^{1) 2) 3)}	74	74	74	80	73	80	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-19
T5	-196 ^{1) 2) 3)}	79	79	79	95	76	95	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-19
T4	-196 ^{1) 2) 3)}	79	79	79	130	67	130	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-19
T3	-196 ^{1) 2) 3)}	79	79	79	195	48	195	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-19
T2	-196 ^{1) 2) 3)}	79	79	79	200	46	200	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-19

- 1) Position 8 = D, W: -20 °C; P6 not relevant
- 2) Position 8 = L: -40 °C; P6 not relevant
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JxL: -50 °C

FMR62B, FMR67B

Position 8 (Application)
N, T

Position 9, 10 (Antenna)
GT

	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
T6	-196 ¹⁾	74	74	74	80	73	80	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-43
T5	-196 ¹⁾	79	79	79	95	78	95	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-43
T4	-196 ¹⁾	79	79	79	130	75	130	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-43
T3	-196 ¹⁾	79	79	79	195	68	195	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-43
T2	-196 ¹⁾	79	79	79	280 ³⁾	58	280 ³⁾	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-43

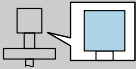
- 1) Position 8 = N: -40 °C; P6 not relevant
- 2) Optional specification, ID Jx, Kx = JL: -50 °C
- 3) Position 8 = T: 200 °C

Position 8 (Application)
P

Position 9, 10 (Antenna)
GT

	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
T6	-40	74	74	74	80	73	80	-40 ¹⁾	-40	-40 ¹⁾	-	-
T5	-40	79	79	79	95	78	95	-40 ¹⁾	-40	-40 ¹⁾	-	-
T4	-40	79	79	79	130	75	130	-40 ¹⁾	-40	-40 ¹⁾	-	-
T3	-40	79	79	79	195	68	195	-40 ¹⁾	-40	-40 ¹⁾	-	-
T2	-40	79	79	79	290	57	290	-40 ¹⁾	-40	-40 ¹⁾	-	-
T1	-40	79	79	79	440	39	440	-40 ¹⁾	-40	-40 ¹⁾	-	-

- 1) Optional specification, ID Jx, Kx = JL: -50 °C

	Position 6 (Housing, Material)
	K, N

FMR60B, FMR62B, FMR63B, FMR66B, FMR67B

Position 8 (Application)
B, H, J, R, V

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-40 ^{1) 2) 3)}	72	72	72	80	70	80	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T5	-40 ^{1) 2) 3)}	77	77	77	95	73	95	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T4	-40 ^{1) 2) 3)}	77	77	77	130	53	130	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-
T3	-40 ^{1) 2) 3)}	77	77	77	150	42	150	-40 ⁴⁾	-40 ^{1) 2) 3)}	-40 ⁴⁾	-	-

- 1) Position 8 = B, V: -20 °C
- 2) Position 8 = R: -60 °C
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C

FMR60B, FMR62B, FMR63B, FMR67B

Position 8 (Application)
D, L, T, W

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

	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
T6	-196 ^{1) 2) 3)}	72	72	72	80	70	80	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-10
T5	-196 ^{1) 2) 3)}	77	77	77	95	74	95	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-10
T4	-196 ^{1) 2) 3)}	77	77	77	130	63	130	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-10
T3	-196 ^{1) 2) 3)}	77	77	77	195	39	195	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-10
T2	-196 ^{1) 2) 3)}	77	77	77	200	37	200	-40 ⁴⁾	-50 ^{1) 2) 3)}	-40 ⁴⁾	-196 ^{1) 2) 3)}	-10

- 1) Position 8 = D, W: -20 °C; P6 not relevant
- 2) Position 8 = L: -40 °C; P6 not relevant
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C

FMR62B, FMR67B

Position 8 (Application)
N, T

Position 9, 10 (Antenna)
GT

	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
T6	-196 ¹⁾	72	72	72	80	71	80	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-41
T5	-196 ¹⁾	77	77	77	95	75	95	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-41
T4	-196 ¹⁾	77	77	77	130	73	130	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-41
T3	-196 ¹⁾	77	77	77	195	65	195	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-41
T2	-196 ¹⁾	77	77	77	280 ³⁾	54	280 ³⁾	-40 ²⁾	-50 ¹⁾	-40 ²⁾	-196 ¹⁾	-41

- 1) Position 8 = N: -40 °C; P6 not relevant
- 2) Optional specification, ID Jx, Kx = JL: -50 °C
- 3) Position 8 = T: 200 °C

Position 8 (Application)
P

Position 9, 10 (Antenna)
GT

	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
T6	-40	72	72	72	80	71	80	-40 ¹⁾	-40	-40 ¹⁾	-	-
T5	-40	77	77	77	95	75	95	-40 ¹⁾	-40	-40 ¹⁾	-	-
T4	-40	77	77	77	130	73	130	-40 ¹⁾	-40	-40 ¹⁾	-	-
T3	-40	77	77	77	195	65	195	-40 ¹⁾	-40	-40 ¹⁾	-	-
T2	-40	77	77	77	290	52	290	-40 ¹⁾	-40	-40 ¹⁾	-	-
T1	-40	77	77	77	440	32	440	-40 ¹⁾	-40	-40 ¹⁾	-	-

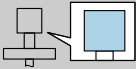
- 1) Optional specification, ID Jx, Kx = JL: -50 °C

Class II, III, Div. 1

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

Description notes

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

	Position 6 (Housing, Material)
	B, J, K, M, N

FMR60B, FMR62B, FMR63B, FMR66B, FMR67B

Position 8 (Application)
B, H, J, R, V

Position 9, 10 (Antenna)
GA, GE, GF, GP, GQ, GR

Maximum surface temperature	Process temperature range	Ambient temperature range
T 80 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +65\text{ °C}$
T 100 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +100\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +60\text{ °C}$
T 130 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +55\text{ °C}$
T 150 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +150\text{ °C}^{5)}$	$-40\text{ °C}^{4)} \leq T_a \leq +50\text{ °C}$

- 1) Position 8 = B, V: -20 °C
- 2) Position 8 = R: -60 °C
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C
- 5) Position 8 = H: 130 °C

FMR60B, FMR62B, FMR63B, FMR67B

Position 8 (Application)
D, L, T, W

Position 9, 10 (Antenna)
GA, GE, GF, GM, GN, GP, GQ, GR

Maximum surface temperature	Process temperature range	Ambient temperature range
T 100 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +100\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +65\text{ °C}$
T 150 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +150\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +60\text{ °C}$
T 200 °C	$-40\text{ °C}^{1) 2) 3)} \leq T_p \leq +200\text{ °C}$	$-40\text{ °C}^{4)} \leq T_a \leq +55\text{ °C}$

- 1) Position 8 = D, W: -20 °C
- 2) Position 8 = T: -196 °C
- 3) Position 16 = J, P: -20 °C
- 4) Optional specification, ID Jx, Kx = JL: -50 °C

FMR62B, FMR67B

Position 8 (Application)
N, T

Position 9, 10 (Antenna)
GT

Maximum surface temperature	Process temperature range	Ambient temperature range
T 150 °C	$-40\text{ °C}^{1)} \leq T_p \leq +150\text{ °C}$	$-40\text{ °C}^{2)} \leq T_a \leq +70\text{ °C}$
T 200 °C	$-40\text{ °C}^{1)} \leq T_p \leq +200\text{ °C}$	$-40\text{ °C}^{2)} \leq T_a \leq +65\text{ °C}$
T 280 °C	$-40\text{ °C}^{1)} \leq T_p \leq +280\text{ °C}^{3)}$	$-40\text{ °C}^{2)} \leq T_a \leq +55\text{ °C}$

- 1) Position 8 = T: -196 °C
- 2) Optional specification, ID Jx, Kx = JL: -50 °C
- 3) Position 8 = T: 200 °C

Position 8 (Application)
P

Position 9, 10 (Antenna)
GT

Maximum surface temperature	Process temperature range	Ambient temperature range
T 150 °C	$-40\text{ °C} \leq T_p \leq +150\text{ °C}$	$-40\text{ °C}^{1)} \leq T_a \leq +70\text{ °C}$
T 200 °C	$-40\text{ °C} \leq T_p \leq +200\text{ °C}$	$-40\text{ °C}^{1)} \leq T_a \leq +65\text{ °C}$
T 450 °C	$-40\text{ °C} \leq T_p \leq +450\text{ °C}$	$-40\text{ °C}^{1)} \leq T_a \leq +30\text{ °C}$

- 1) Optional specification, ID Jx, Kx = JL: -50 °C

Connection data *Basic specification, Position 3 = BA*

Power supply
$U \leq 35 \text{ V}_{\text{DC}}$

Basic specification, Position 3 = DA

Power supply
$U \leq 32 \text{ V}_{\text{DC}}$

Basic specification, Position 3 = FA

Power supply
$U \leq 15 \text{ V}_{\text{DC}}$

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

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



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