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

Ex ia IIC T6...T1 Ga

Endress+Hauser
People for Process Automation

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

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About this document

This document has been translated into several languages. Legally determined is solely the English source text.

Associated documentation

This document is an integral part of the following Operating Instructions:

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)

Supplementary documentation

Explosion protection brochure: CP00021Z

The Explosion-protection brochure is available:
- In the download area of the Endress+Hauser website: www.endress.com -> Downloads -> Brochures and Catalogs -> Text Search: CP00021Z
- On the CD for devices with CD-based documentation

Manufacturer's certificates

Certificate of Conformity

Certificate number:
CML 23JPN2055X

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

- JNIOSH-TR-46-1 : 2020
- JNIOSH-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*..
(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	JA	JPN Ex ia IIC T6...T1 Ga

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	L	Prepared for display FHX50B + M12 connection
	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

Position 8 (Application)		
Selected option		**Description**
FMR60B FMR62B FMR63B FMR67B	B	Process temperature -20...+150°C
	D	Process temperature -20...+200°C
FMR60B FMR66B FMR67B	F	Process temperature -40...+80°C
FMR60B FMR66B	H	Process temperature -40...+130°C
FMR6xB	J	Process temperature -40...+150°C
	L	Process temperature -40...+200°C
FMR62B FMR67B	N	Process temperature -40...+280°C
	P	Process temperature -40...+450°C
FMR62B	R	Process temperature -60...+200°C
	T	Process temperature -196...+200°C
FMR62B FMR63B	V	Process temperature -20...+150°C, Steam application
	W	Process temperature -20...+200°C, Steam application

Position 9, 10 (Antenna)		
Selected option		**Description**
FMR60B FMR66B	BS	Encapsulated, PVDF, 40mm/1-1/2"
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**
FMR60B FMR66B	A	PVDF encapsulated
FMR62B FMR63B	B	PTFE cladded
FMR63B	C	PEEK cladded
FMR6xB	D	VKM Viton GLT
	G	EPDM
FMR60B FMR62B FMR63B FMR67B	J	HNBR
	P	FFKM Kalrez
FMR62B FMR67B	U	Graphite

Optional specifications

ID Jx, Kx (Test, Certificate, Declaration)		
Selected option		**Description**
FMR6xB	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]
	PB	Weather protection cover, plastic [2]

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

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: Special conditions

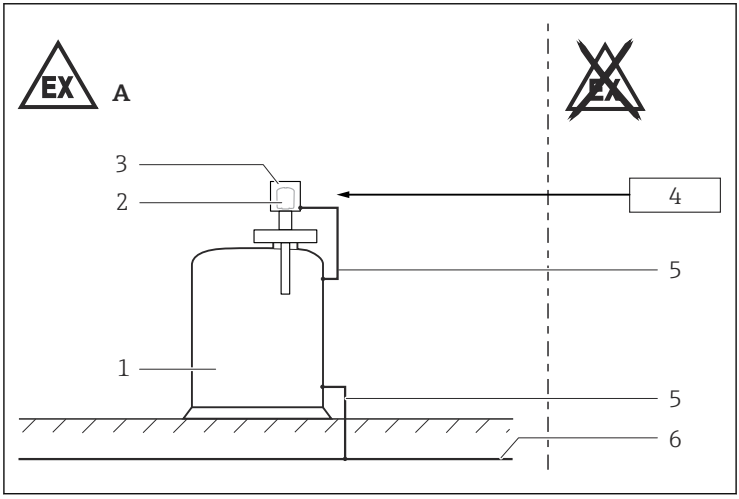
- To avoid electrostatic charging: Do not rub surfaces with a dry cloth.
- In the event of additional or alternative special varnishing on the enclosure or other metal parts or for adhesive plates:
  - Observe the danger of electrostatic charging and discharge.
  - Do not install in the vicinity of processes (≤ 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.
- 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

- 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.

Safety instructions: Installation



A Zone 0
1 Tank; Zone 0
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: ≥ 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.

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.

Intrinsic safety

- The device is only suitable for connection to certified, intrinsically safe equipment with explosion protection Ex ia.
- 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}.

Potential equalization

Integrate the device into the local potential equalization.

Temperature tables

- 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.

Optional specification, ID Px, Rx = PB
When using the weather protection cover: Reduce the admissible ambient temperature by 10 K.

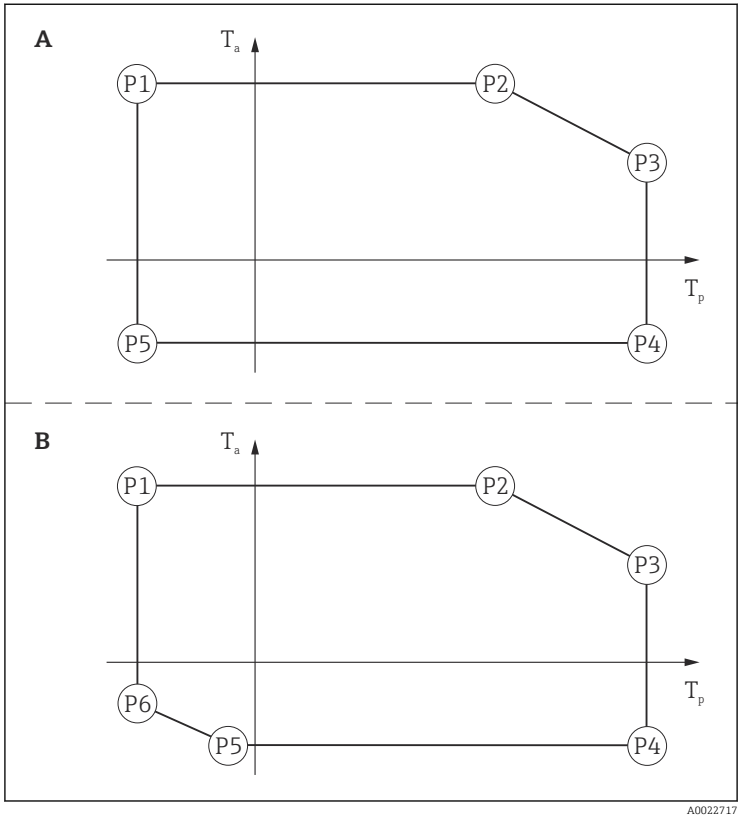
Description notes

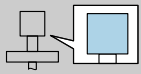
Unless otherwise indicated, the positions always refer to the basic specification.

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



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

FMR60B, FMR66B

Position 8 (Application)
H

Position 9, 10 (Antenna)
BS

	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	28	80	–40	–40	–40	–	–
T5	–40	61	61	61	95	43	95	–40	–40	–40	–	–
T4…T1	–40	65	65	65	130	55	130	–40	–40	–40	–	–

FMR60B, FMR62B, FMR63B, FMR66B, FMR67B

Position 8 (Application)
B, J, V

Position 9, 10 (Antenna)
GA, GE, GF, 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)]	46	46	46	80	32	80	–40 [2)]	–40 [1)]	–40 [2)]	–	–
T5	–40 [1)]	61	61	61	95	47	95	–40 [2)]	–40 [1)]	–40 [2)]	–	–
T4	–40 [1)]	65	65	65	130	54	130	–40 [2)]	–40 [1)]	–40 [2)]	–	–
T3…T1	–40 [1)]	65	65	65	150	51	150	–40 [2)]	–40 [1)]	–40 [2)]	–	–

1) Position 16 = J, P: –20 °C
2) Optional specification, ID Jx, Kx = JL: –50 °C

FMR62B, FMR63B, FMR67B

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

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

	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	−6
T5	−196 [1) 2) 3)]	61	61	61	95	52	95	−40 [4)]	−50 [1) 2) 3)]	−40 [4)]	−196	−6
T4	−196 [1) 2) 3)]	65	65	65	130	56	130	−40 [4)]	−50 [1) 2) 3)]	−40 [4)]	−196	−6
T3	−196 [1) 2) 3)]	65	65	65	195	47	195	−40 [4)]	−50 [1) 2) 3)]	−40 [4)]	−196	−6
T2...T1	−196 [1) 2) 3)]	65	65	65	200	46	200	−40 [4)]	−50 [1) 2) 3)]	−40 [4)]	−196	−6

1) Position 8 = D, W: −20 °C; P6 not relevant
2) Position 8 = L: −40 °C; P6 not relevant
3) Position 8 = R: −60 °C; P6 not relevant
4) Optional specification, ID Jx, Kx = JL: −50 °C

FMR62B, FMR67B

Position 8 (Application)
N, R, 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) 2)]	46	46	46	80	43	80	−40 [3)]	−50 [1) 2)]	−40 [3)]	−196	−32
T5	−196 [1) 2)]	61	61	61	95	58	95	−40 [3)]	−50 [1) 2)]	−40 [3)]	−196	−32
T4	−196 [1) 2)]	65	65	65	130	61	130	−40 [3)]	−50 [1) 2)]	−40 [3)]	−196	−32
T3	−196 [1) 2)]	65	65	65	195	57	195	−40 [3)]	−50 [1) 2)]	−40 [3)]	−196	−32
T2...T1	−196 [1) 2)]	65	65	65	280 [4)]	52	280 [4)]	−40 [3)]	−50 [1) 2)]	−40 [3)]	−196	−32

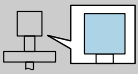
1) Position 8 = N: −40 °C; P6 not relevant
2) Position 8 = R: −60 °C; P6 not relevant
3) Optional specification, ID Jx, Kx = JL: −50 °C
4) Position 8 = R, T: 200 °C

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, FMR66B

Position 8 (Application)
H

Position 9, 10 (Antenna)
BS

	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	29	80	–40	–40	–40	–	–
T5	–40	61	61	61	95	44	95	–40	–40	–40	–	–
T4...T1	–40	65	65	65	130	54	130	–40	–40	–40	–	–

FMR60B, FMR62B, FMR63B, FMR66B, FMR67B

Position 8 (Application)
B, J, V

Position 9, 10 (Antenna)
GA, GE, GF, 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]	46	46	46	80	28	80	–40 [2]	–40 [1]	–40 [2]	–	–
T5	–40 [1]	61	61	61	95	43	95	–40 [2]	–40 [1]	–40 [2]	–	–
T4	–40 [1]	65	65	65	130	53	130	–40 [2]	–40 [1]	–40 [2]	–	–
T3...T1	–40 [1]	65	65	65	150	42	150	–40 [2]	–40 [1]	–40 [2]	–	–

1) Position 16 = J, P: –20 °C
2) Optional specification, ID Jx, Kx = JL: –50 °C

FMR62B, FMR63B, FMR67B

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

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

	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	−2
T5	−196 [1) 2) 3)]	61	61	61	95	49	95	−40 [4)]	−50 [1) 2) 3)]	−40 [4)]	−196	−2
T4	−196 [1) 2) 3)]	65	65	65	130	56	130	−40 [4)]	−50 [1) 2) 3)]	−40 [4)]	−196	−2
T3	−196 [1) 2) 3)]	65	65	65	195	39	195	−40 [4)]	−50 [1) 2) 3)]	−40 [4)]	−196	−2
T2...T1	−196 [1) 2) 3)]	65	65	65	200	37	200	−40 [4)]	−50 [1) 2) 3)]	−40 [4)]	−196	−2

1) Position 8 = D, W: −20 °C; P6 not relevant
2) Position 8 = L: −40 °C; P6 not relevant
3) Position 8 = R: −60 °C; P6 not relevant
4) Optional specification, ID Jx, Kx = JL: −50 °C

FMR62B, FMR67B

Position 8 (Application)
N, R, 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) 2)]	46	46	46	80	42	80	−40 [3)]	−50 [1) 2)]	−40 [3)]	−196	−30
T5	−196 [1) 2)]	61	61	61	95	57	95	−40 [3)]	−50 [1) 2)]	−40 [3)]	−196	−30
T4	−196 [1) 2)]	65	65	65	130	61	130	−40 [3)]	−50 [1) 2)]	−40 [3)]	−196	−30
T3	−196 [1) 2)]	65	65	65	195	57	195	−40 [3)]	−50 [1) 2)]	−40 [3)]	−196	−30
T2...T1	−196 [1) 2)]	65	65	65	280 [4)]	52	280 [4)]	−40 [3)]	−50 [1) 2)]	−40 [3)]	−196	−30

1) Position 8 = N: −40 °C; P6 not relevant
2) Position 8 = R: −60 °C; P6 not relevant
3) Optional specification, ID Jx, Kx = JL: −50 °C
4) Position 8 = R, 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

Connection data

Basic specification, Position 3 = BA

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

Basic specification, Position 3 = DA

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

Basic specification, Position 3 = FA

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

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

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

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