XA356F-A
71031013
Code: en/07.06

IECEx PTB 04.0015X

Micropilot M
FMR 230, FMR 231, FMR 240

T12 housing
HART, PROFIBUS PA, FOUNDATION Fieldbus









(de) **Sicherheitshinweise für elektrische Betriebsmittel für explosionsgefährdete Bereiche.**

(en) **Safety instructions for electrical apparatus certified for use in explosion-hazardous areas.**

(fr) **Conseils de sécurité pour matériels électriques destinés aux zones explosibles.**

(es) **Instrucciones de seguridad de aparatos eléctricos homologados para su utilización en áreas expuestas a riesgos de deflagración. Si no entiende este manual, puede pedir un ejemplar en su idioma.**

(it) **Istruzioni di sicurezza per apparecchiature elettriche certificate per l'utilizzo in aree con pericolo di esplosione. Se il presente manuale non risulta comprensibile potete orninarcene una copia tradotta nella vostra lingua.**

(nl) **Veiligheidsinstructies voor elektrisch materieel in explosiegevaarlijke omgeving. Wanneer u deze handleiding niet kunt lezen, kunt u een in uw landstaal vertaalde handleiding bij ons bestellen.**

(fi) **Turvallisuusohjeita sähkölaitteille, jotka on vahvistettu käytettäväksi räjähdysvaarallisilla alueilla. Jos et ymmärrä tätä käsikirjaa, voit tilata meiltä käännöksen omalla kansallisella kielelläsi.**

(sv) **Säkerhetsföreskrifter för elektrisk utrustning certifierad för användning i explosionsfarliga områden. Om du inte förstår denna manual, kan en översatt kopia på ditt eget språk beställas från oss.**

(da) **Sikkerhedsforskrifter for elektriske apparater certificeret til brug i eksplosionsfarlige områder. Hvis du ikke forstår denne manual, kan en oversat kopi af den på dit eget sprog bestilles fra os.**

(pt) **Instruções de segurança para dispositivos eléctricos certificados para utilização em áreas de risco de incêndio. Se não compreender este manual, pode encomendar-nos directamente uma cópia na sua língua.**

(el) **Οδηγίες ασφαλείας για ηλεκτρικές συσκευές που εγκρίνονταιγια χρήση σε περιοχές με κίνδυνο εκρήξεων. Αν δεν μπορείτε να κατανοήσετε το περιεχόμενο του εγχειριδίου αυτού, μπορείτε να παραγγείλετε από την εταιρεία μας ένα αντίτυπομεταφρασμένο στη γλώσσα σας.**

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The Power of Know How

Operating Instructions
XA356F-A
71031013

IECEx PTB 04.0015X

Associated documentation
Operating Instructions
BA218F, BA219F,
BA220F, BA225F,
BA226F, BA227F,
BA228F, BA229F,
BA230F









Micropilot M
FMR230, FMR231, FMR240
T12 housing
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Safety instructions for electrical apparatus for explosion-hazardous areas

Labelling: **Zone 0/1**

– For atmospheres which are explosive due to gases, mist or vapour

– Sensor Zone 0, housing Zone 1

Allocation of the assembly point hazardous zones to the category of the explosion-protected devices or sensors:

Hazardous zone at the assembly point	
Danger due to gases, mist or vapour	Zone 0
Danger due to gases, mist or vapour	Zone 1
Danger due to gases, mist or vapour	Zone 2

Labelling the type of protection: **Ex d [ia] IIC T6...T1**

– Explosion-protected electrical apparatus as per IEC standard (Ex)

– Type of protection

– Explosion group

– Temperature class

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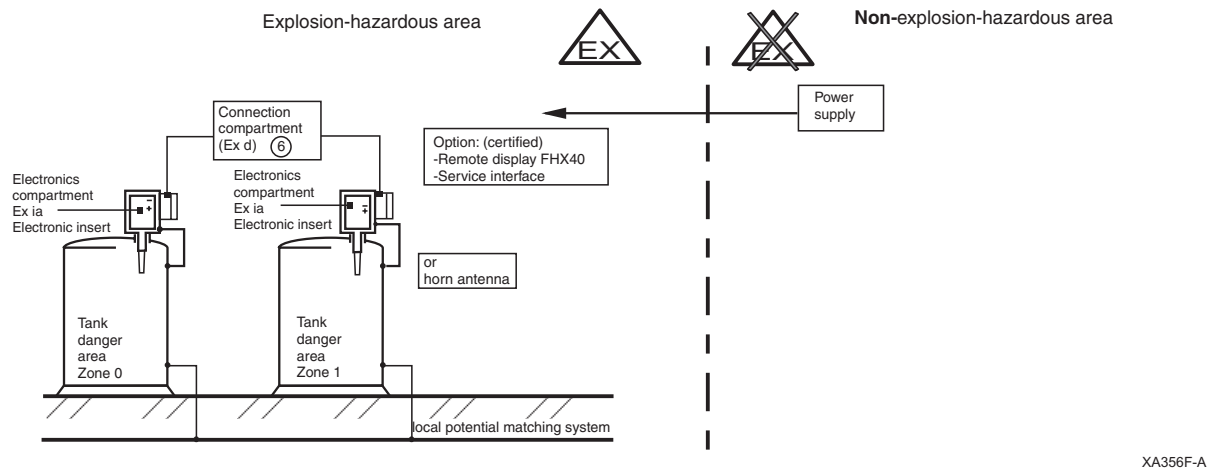

Power supply	Ue ≤ 30 V Um ≤ 250 V AC	Connection compartment (Ex d)	Observe instruction [6]

	Zone 0/1 or Zone 1	Housing Zone 1
Type of protection	Ex d [ia] IIC T6..T1	IECEx PTB 04.0015X
Max. operating pressure	dependent on the antenna	

Housing	**T12**	–40 °C ≤ Tu ≤ 70 °C	optionally with or without VU331 display and operating module

Option	**Remote display**	**e.g. FHX40**	KEMA 02 ATEX 1203 IECEx TUN 04.0011	observe associated Safety Instructions (XA...)
	Service interface	**Commubox with associated ToF cable**		observe associated Safety Instructions (XA...)

Version	FMR230-..E.....	Horn antenna	up to 150 °C
	FMR230-..V or K.....	Horn antenna	up to 200 °C
	FMR230-..D.....	Horn antenna	up to 250 °C
	FMR230-..F.....	Horn antenna	up to 350 °C
	FMR230-..G.....	Horn antenna	up to 400 °C
	FMR230-..L.....	Horn antenna	up to 280 °C
	FMR230-..M.....	Horn antenna	up to 400 °C
	FMR231-.A or B.....	PPS rod antenna	up to 120 °C
	FMR231-.H or J.....	Antistatic PTFE rod antenna	up to 150 °C
	FMR240-.....	Horn antenna	up to 150 °C
	FMR240-.....	Wave guide anntena	up to 200 °C

Safety-relevant instructions for installation in explosion-hazardous areas:

1.) Install the device according to the manufacturer's instructions and any other valid standards and regulations.

2.) The Micropilot must be integrated into the local potential matching line (PML).
The input circuit is galvanically connected to the housing.

3.) The relationship between the permitted ambient temperature for the electronics housing, dependent on the range of application, and the temperature classes is shown in the tables (Tab. 1a, 1b and Tab. 2a, 2b).

4.) After aligning (rotating) the housing, retighten the fixing screw (Allen screw on the threaded neck).

5.) We recommend that you urgently tie down antenna extensions over 3 m-long

6.) Connection compartment cover: *"Do not open under voltage in explosive atmospheres"*.

6.1 Only certified cable entries must be used for the intended cables.
Selection criteria as per IEC/EN 60079-14 must be observed.

6.2 For operating the transmitter housing at an ambient temperature under –20 °C, appropriate cables and cable entries permitted for this application must be used.

6.3 Continuous duty temperature of the cable ≥ Tamb +5 K.

6.4 When connecting the transmitter housing via piping entries permitted for this purpose, the associated seal mechanisms must be arranged directly at the housing.

6.5 If antenna extensions over 3 m-long are used, they should be fixed mechanically (using guy ropes).

6.6 FMR240 or FMR230 with shut-off mechanism: the entire arrangement must at least meet the requirements as per IP67 in accordance with IEC/EN 60529.
If the device needs to be disassembled for e.g. service purposes, we recommend securing the shut-off mechanism against opening or closing it with an additional blind flange.
The operator is entirely responsible for ensuring that the complete arrangement is permissible for the respective application.

Tab. 1a HART, PROFIBUS PA

Zone 1 - Application								
Temperature class with / without VU331 display	Maximum permitted medium temperature Antenna in Zone 1	Maximum permitted ambient temperature (at the electronics housing / electronics housing in Zone 1) dependent on the medium temperature						
		FMR230- ..E or V or K or D.....	**FMR230- ..L.....**	**FMR230- ..M.....**	**FMR230- ..F or G.....**	**FMR231- .....**	**FMR240- .....**	**FMR240 wave guide antenna**
T6	+70 °C +60 °C	+55 °C +60 °C	+60 °C +60 °C	+60 °C +60 °C	+60 °C +60 °C	+55 °C +60 °C	+55 °C +60 °C	+60 °C +60 °C
T5	+95 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C
T4	+130 °C +70 °C	+60 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+55 °C +70 °C	+60 °C +70 °C	+65 °C +70 °C
T3 (functional)	+150 °C +70 °C	+60 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+60 °C +70 °C	+55 °C +70 °C	+60 °C +70 °C	+65 °C +70 °C
T3	+195 °C +70 °C	+55 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+60 °C +70 °C	not permitted	not permitted	+65 °C +70 °C
T2 (functional)	+250 °C +70 °C	+50 °C +70 °C	+60 °C +70 °C	+65 °C +70 °C	+55 °C +70 °C	not permitted	not permitted	not permitted
T2 (functional)	+280 °C +80 °C	not permitted	+60 °C +70 °C	+65 °C +70 °C	+55 °C +70 °C	not permitted	not permitted	not permitted
T2	+290 °C +70 °C	not permitted	not permitted	+65 °C +70 °C	+55 °C +70 °C	not permitted	not permitted	not permitted
T1 (functional)	+350 °C +70 °C	not permitted	not permitted	+60 °C +70 °C	+50 °C +70 °C	not permitted	not permitted	not permitted
T1 (functional)	+400 °C +70 °C	not permitted	not permitted	+60 °C +70 °C	+45 °C +70 °C	not permitted	not permitted	not permitted

permitted antenna temperature range must be observed
functional = limited by maximum permitted antenna temperature

Tab. 1b FOUNDATION Fieldbus

Zone 1 - Application								
Temperature class with / without VU331 display	Maximum permitted medium temperature Antenna in Zone 1	Maximum permitted ambient temperature (at the electronics housing / electronics housing in Zone 1) dependent on the medium temperature						
		FMR230- ..E or V or K or D.....	**FMR230- ..L.....**	**FMR230- ..M.....**	**FMR230- ..F or G.....**	**FMR231- .....**	**FMR240- .....**	**FMR240 wave guide antenna**
T6	+70 °C +60 °C	+50 °C +55 °C	+55 °C +55 °C	**+55 °C** **+55 °C**	+55 °C +55 °C	+50 °C +55 °C	+50 °C +55 °C	+55 °C +55 °C
T5	+95 °C +70 °C	+60 °C +70 °C	+60 °C +70 °C	+60 °C +70 °C	+60 °C +70 °C	+60 °C +70 °C	+60 °C +70 °C	+60 °C +70 °C
T4	+130 °C +70 °C	+60 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+55 °C +70 °C	+60 °C +70 °C	+65 °C +70 °C
T3 (funktional)	+150 °C +70 °C	+60 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+60 °C +70 °C	+55 °C +70 °C	+60 °C +70 °C	+65 °C +70 °C
T3	+195 °C +70 °C	+55 °C +70 °C	+65 °C +70 °C	+65 °C +70 °C	+60 °C +70 °C	not permitted	not permitted	+65 °C +70 °C
T2 (funktional)	+250 °C +70 °C	+50 °C +70 °C	+60 °C +70 °C	+65 °C +70 °C	+55 °C +70 °C	not permitted	not permitted	not permitted
T2 (funktional)	+280 °C +80 °C	not permitted	+60 °C +70 °C	+65 °C +70 °C	+55 °C +70 °C	not permitted	not permitted	not permitted
T2	+290 °C +70 °C	not permitted	not permitted	+65 °C +70 °C	+55 °C +70 °C	not permitted	not permitted	not permitted
T1 (funktional)	+350 °C +70 °C	not permitted	not permitted	+60 °C +70 °C	+50 °C +70 °C	not permitted	not permitted	not permitted
T1 (funktional)	+400 °C +70 °C	not permitted	not permitted	+60 °C +70 °C	+45 °C +70 °C	not permitted	not permitted	not permitted

permitted antenna temperature range must be observed
functional = limited by maximum permitted antenna temperature

Option: **Power supply and signal circuit for remote display, e.g. FHX40, in protection type: intrinsic safety Ex ia IIC or IIB**						
Uo = 4.2 V Io = 34 mA Po = 36 mW	effective inner inductance Li = negligible effective inner capacitance Ci = negligible Characteristic curve: linear					
For connecting the Commubox service interface with the associated ToF cable:						
Commubox output + ToF cable: Uo = 3.74 V Io = 9.9 mA Po = 9.2 mW	effective inner inductance Li = negligible effective inner capacitance Ci = negligible Characteristic curve: linear					
	for material group IIC: permitted outer inductance Lo ≤ 340 mH permitted outer capacitance Co ≤ 100 µF					
When interconnected to a Micropilot M, the following results apply:						
For material group:	Lo =	0.15 mH	0.5 mH	1 mH	2 mH	5 mH
IIC	Co	≤ 8 µF	≤ 7 µF	≤ 5.5 µF	≤ 5 µF	≤ 4 µF
IIB	Co	10 µF				

Zone 0 Safety Instruction:

7.) Potentially explosive air/vapour mixtures must only occur under atmospheric conditions:
–20 °C ≤ T ≤ +60 °C
0.8 bar ≤ p ≤ 1.1 bar
If no potentially explosive mixtures are present, or if additional protective measures have been taken according to EN 1127-1, the transmitters may be operated under other atmospheric conditions in accordance with the manufacturer's specifications.

8.) The antennae must only be used in media, for which the materials used have sufficient durability.

9.) Thanks to the design of the measuring device, an additional overvoltage protector for systems, which have to be protected against ignition caused by dangerous potential differences (e.g. due to the occurrence of atmospheric overvoltage) in accordance with e.g. TRbF 100 No. 8 (German national guideline) or IEC/EN 60079-14, is not required.

Tab. 2a HART, PROFIBUS PA

Zone 0 - Application				
Temperature class with / without VU331 display	Maximum permitted medium temperature Antenna in Zone 0 (see point 7)	Maximum permitted ambient temperature (at the electronics housing / electronics housing in Zone 1) dependent on the medium temperature		
		FMR230	**FMR231**	**FMR240**
T6	+60 °C	+60 °C	+60 °C	+60 °C
T5, T4, T3, T2, T1	+60 °C	+70 °C	+70 °C	+70 °C

Tab. 2b FOUNDATION Fieldbus

Zone 0 - Application				
Temperature class with / without VU331 display	Maximum permitted medium temperature Antenna in Zone 0 (see point 7)	Maximum permitted ambient temperature (at the electronics housing / electronics housing in Zone 1) dependent on the medium temperature		
		FMR230	**FMR231**	**FMR240**
T6	+60 °C	+55 °C	+55 °C	+55 °C
T5, T4, T3, T2, T1	+60 °C	+70 °C	+70 °C	+70 °C

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