

Certification of

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

Certificate of Conformity

Certificate No: AUS Ex 02.3752X **Issue 0:** Original Issue: 17/4/2002

Date of Expiry: 17/4/2012

Certificate Holder: Endress+Hauser GmbH
Hauptstrasse 1
D-79689 Maulburg
Germany

Electrical Equipment: Micropilot M FMR 2xx Radar Level Sensor

Type of Protection: Ex ib

Marking Code: Ex ib IIC
T6 - T1 ($T_{amb} = 60 - 80 \text{ }^{\circ}\text{C}$)
AUS Ex 02.3752X

Manufactured By: Endress+Hauser GmbH
Hauptstrasse 1
D-79689 Maulburg
Germany

Issued by:



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Australia (TestSafe)**

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This certificate is granted subject to the conditions as set out in Standards Australia Miscellaneous Publication MP 69 and the Procedures (Doc Q7134) of the scheme.

The electrical equipment and any acceptable variation to it specified in the schedule to this certificate and the identified documents, was found to comply with the following standards:

- AS/NZS 60079.0:2000 Electrical equipment for explosive atmospheres – Part 0 – General requirements (including Amendment 1 : 4/2000)
- AS/NZS 60079.11:2000 Electrical apparatus for explosive gas atmospheres – Part 11 – Intrinsic safety 'i' (including Amendment 1 : 2/2001)

This certificate does not ensure compliance with electrical safety requirements and performance other than those included in the Standards listed above.

The equipment listed has successfully met the examination and test requirements as recorded in

Test Report No: TestSafe 19784

File Reference: 99/9161/TSA



Signed for and on behalf of issuing authority

Acting Director
TestSafe Australia

Position

17/4/2002

Date of issue

Ex 02.3752X

This certificate and schedule may not be reproduced except in full.

This certificate is not transferable and remains the property of Standards Australia Quality Assurance Services and must be returned in the event of its being revoked or not renewed.

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Schedule

Certificate No: AUS Ex 02.3752X **Issue:** 0 **Date of Issue:** 17/04/2002

Certified Equipment: The Micropilot M FMR 2xx Radar Level Sensor is a 4..20 mA 2-wire instrument, mainly used for continuous non-contact measurement of liquids and solids. Short microwave pulses are sent from the antenna towards the process material. The microwaves are reflected from the surface of the material and are detected by the antenna, which now acts as a receiver. The time between transmitting and receiving is used to calculate the level of the material.

The Micropilot M consists of an enclosure containing the electronics, an antenna, and a process connection. The enclosure for the electronics is installed in a Zone 1 hazardous area. The antenna does not contain any electronics and is installed in a Zone 0 hazardous area. The process connection is mounted into the partition that separates Zone 0 from Zone 1.

The electronics is supplied by an intrinsically safe circuit, and communications may be via HART, Profibus PA or Foundation Fieldbus protocols. The antennas for the equipment types are:

- FMR230 - horn antenna
- FMR231 - rod antenna
- FMR232 - planar antenna
- FMR233 - parabolic antenna
- FMR240 - horn antenna > 20 GHz

Conditions of Certification:

1. It is a condition of manufacture that each unit must be capable of withstanding a test voltage of not less than 500 Volts 50 Hz applied between input terminals and enclosure for a period not less than 1 minute.

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Addendum to Certificate NEx.02.3752X...

Conditions of Certification: continued

2. It is a condition of manufacture that the following capacitors must be capable of withstanding a test voltage of not less than 500 Volts 50 Hz for a period not less than 1 minute:
- EP_2W_HART Electronics Insert C160 and C161
 - μ P II.1 Radar Module C6, C12, C40, C41, C42, C43
 - μ P II.2 Radar Module C20, C21, C40, C41, C42, C43
 - μ P III.1 Radar Module C8, C9, C30, C1, C2, C3, C4
 - μ P III.2 Radar Module C8, C9, C30
3. It is a condition of safe use that the following parameters are not to be exceeded:

Input Parameters	Communication protocol and Electronic Insert part number		
	HART EP-2D-HART	Profibus PA (FISCO) or EP-PA	Foundation Fieldbus EP-FF
Maximum Input Voltage U_i	30 V	17.5 V	24 V
Maximum Input Current I_i	300 mA	500 mA	250 mA
Maximum Input Power P_i	1 W	5.5 W	1.2 W
Maximum Internal Capacitance C_i	13 nF	5 nF	
Maximum Internal Inductance L_i	negligible	10 μ H	

Input Parameter	Display Output X300/ 1, 2, 3, 4
Maximum Input Voltage U_i	4.2 V

4. It is a condition of safe use that the enamel horn antenna (FMR230-H), the antennas without horns (FMR230-E/V/K/D), the planar antennas (FMR232) and the parabolic antennas (FMR233) must carry a warning label about the risk of electrostatic ignition.

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Addendum to Certificate No Ex.02.3752X...

Conditions of Certification: continued

5. It is a condition of safe use that the maximum product temperature must not exceed the values for the Temperature Class, Antenna Type and ambient temperature specified in the following table:

Temperature Class with/without Display VU 331	Permissible maximum product temperature at the antenna (process connection)		Permissible maximum ambient of electronic compartment (enclosure F12) in zone 1					
	in atmosphere of: zone 0	in atmosphere of: zone 1	FMR230- ..E/V/K/D/H	FMR230- ..F/G.....	FMR231- .abb.....	FMR232	FMR233	FMR240
T6	+60 °C	+80 °C +60 °C	+55 °C +60 °C	+60 °C +60 °C	+55 °C +60 °C	+55 °C +60 °C	+55 °C +60 °C	+60 °C +60 °C
T5	+60 °C	+95 °C +75 °C	+70 °C +75 °C	+75 °C +75 °C	+70 °C +75 °C	+70 °C +75 °C	+70 °C +75 °C	+75 °C +75 °C
T4	+60 °C	+130 °C +80 °C	+70 °C +80 °C	+75 °C +80 °C	+65 °C +80 °C	+70 °C +80 °C	+70 °C +80 °C	+70 °C +80 °C
T3 (functional)	+60 °C	+150 °C +80 °C	+70 °C +80 °C		+55 °C +80 °C	+65 °C +80 °C		+65 °C +80 °C
T3	+60 °C	+195 °C +80 °C	+60 °C +80 °C	+70 °C +80 °C	not allowed	not allowed	+60 °C +80 °C	not allowed
T2 (functional)	+60 °C	+250 °C +80 °C	+55 °C +80 °C		not allowed	not allowed	not allowed	not allowed
T2	+60 °C	+295 °C +80 °C	not allowed	+65 °C +80 °C	not allowed	not allowed	not allowed	not allowed
T1 (functional)	+60 °C	+350 °C +80 °C	not allowed	+60 °C +80 °C	not allowed	not allowed	not allowed	not allowed
T1	+60 °C	+400 °C +80 °C	not allowed	+55 °C +80 °C	not allowed	not allowed	not allowed	not allowed

note: the antennas must only be used in temperatures within their specified limits.

Antenna for use in maximum ambient:	E: up to 150 °C V/K/H: up to 200 °C D: up to 250 °C	F: up to 350 °C G: up to 400 °C	a: A/B: up to 120 °C E/F/H/J: up to 150 °C bb: GN: up to 80 °C	up to 150 °C	up to 200 °C	up to 150 °C
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Addendum to Certificate No. Ex.02.3752X...

Drawing Schedule

Drawing No	Drawing Title	Issue	Date
960402-8060	Nameplate Micropilot M AUS	A	20/09/01
960402-8061	Warning label	A	24/09/01
960402-0000	Micropilot M FMR 2xx	A	17/02/00
960402-0001	Block diagram Micropilot M FMR2XX	B	18/10/00
960402-0002	Enclosure F12	A	20/4/00
960402-0006	Horn antenna > 20 GHz	A	20/4/00
960402-0007	Horn antenna 5.8 / 6.3 GHz	A	20/4/00
960402-0008	Parabolic antenna	A	27/4/00
960402-0009	Planar antenna	A	20/4/00
960402-0011	Cathodic corrosion protection	A	5/4/00
960402-0012	'Electronic insert' EP-2D-HART	A	20/4/00
960402-0013	Electronic insert EP-PA	A	20/4/00
960402-0014	'Terminal Module' Ex-EMV-Filter-2D	B	18/10/00
960402-0015	RADAR-module assy.	A	5/4/00
960402-0016	Display module VU 331	A	20/4/00
960402-0017	Wave guide compl > 20 GHz	B	20/10/00
960402-0018	SMP - Glass feed through	B	25/10/00
960402-0019	Wave guide assy.	A	20/4/00
960402-0020	Trace layout Radar module III.2	B	5/10/00
960402-0021	Component diagram Radar module III.2	B	6/10/00
960402-0022	Circuit diagram Radar module III.2 frequency excitation	B	6/10/00
960402-0023	Circuit diagram Radar module III.2	B	5/10/00
960402-0024	Trace layout Radar module III.1	A	5/4/00
960402-0025	Component diagram Radar module III.1	A	5/4/00
960402-0026	Circuit diagram Radar module III.1	A	5/4/00
960402-0027	Circuit diagram Radar module III.1 frequency excitation	A	5/4/00
960402-0030	FMx 2xx EP_2W_HART Power supply	B	17/8/00
960402-0031	FMx 2xx EP_2W_HART Modem	A	14/4/00
960402-0032	FMx 2xx EP_2W_HART Main-CPU	A	14/4/00
960402-0033	FMx 2xx EP_2W_HART Application-CPU	B	17/8/00
960402-0034	FMx 2xx EP_2D_HART Analog	B	17/8/00
960402-0035	Assembly plan ss FMx 2xx EP_2W_HART	B	17/8/00

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Drawing Schedule

Drawing No	Drawing Title	Issue	Date
960402-0036	Assembly plan cs FMx 2xx EP_2W_HART	B	17/8/00
960402-0037	Conductive pattern ss FMx 2xx EP_2W_HART	B	17/8/00
960402-0038	Conductive pattern cs FMx 2xx EP_2W_HART	B	17/8/00
960402-0039	Conductive pattern inner layer ss FMx 2xx EP_2W_HART	B	17/8/00
960402-0040	Conductive pattern inner layer cs FMx 2xx EP_2W_HART	B	17/8/00
960402-0041	Ex/EMC-Filter 2-Wire	A	14/4/00
960402-0042	Assembly plan cs Ex/EMC 2-Wire	A	14/4/00
960402-0043	Conductive pattern ss Ex/EMC 2-Wire	A	14/4/00
960402-0044	Conductive pattern cs Ex/EMC 2-Wire	A	14/4/00
960402-0045	FMx 2xx EP_PA Power supply	B	6/10/00
960402-0046	FMx 2xx EP_PA Main-CPU	A	20/4/00
960402-0047	FMx 2xx EP_PA Application-CPU	B	6/10/00
960402-0048	FMx 2xx EP_PA Analog	B	6/10/00
960402-0049	Assembly plan ss FMx 2xx EP_PA	B	6/10/00
960402-0050	Assembly plan cs FMx 2xx EP_PA	B	6/10/00
960402-0051	Conductive pattern ss FMx 2xx EP_PA	B	1/10/00
960402-0052	Conductive pattern cs FMx 2xx EP_PA	B	6/10/00
960402-0053	Conductive pattern inner layer 1 ss FMx 2xx EP_PA	B	6/10/00
960402-0054	Conductive pattern inner layer 1 cs FMx 2xx EP_PA	B	6/10/00
960402-0070	Electronic insert EP_FF	A	18/10/00
960402-0071	FMx 2xx EP_FF Power supply	A	20/10/00
960402-0072	FMx 2xx EP_2W_FF Main-CPU	A	20/10/00
960402-0073	FMx 2xx EP_FF Application-CPU	A	20/10/00
960402-0074	FMx 2xx EP_FF Analog	A	20/10/00
960402-0075	Assembly plan ss FMx 2xx EP_FF	A	27/10/00
960402-0076	Assembly plan cs FMx 2xx EP_FF	A	27/10/00
960402-0077	Conductive pattern ss FMx 2xx EP_FF	A	27/10/00
960402-0078	Conductive pattern cs FMx 2xx EP_FF	A	27/10/00
960402-0079	Conductive pattern inner layer 1 ss FMx 2xx EP_FF	A	27/10/00
960402-0080	Conductive pattern inner layer 1 cs FMx 2xx EP_FF	A	27/10/00
960402-0081	FMx 2xx EP-FF Communication CPU	A	30/10/00
960402-0082	FMx 2xx EP-FF Communication MAU	A	30/10/00

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Drawing No	Drawing Title	Issue	Date
960402-0083	Assembly plan ss/cs FMx 2xx_Communication	A	30/10/00
960402-0084	Conductive pattern ss/cs FMx 2xx_Communication	A	30/10/00
960402-0085	Conductive pattern inner layer 1 ss/cs FMx 2xx Communication	A	30/10/00
960402-0088	Flange w. scavenge connect	A	25/10/00
960384-0006	Rod antenna PPS	C	18/4/00
960384-0007	Rod antenna PTFE	C	18/4/00
960384-0008	Cladding PTFE	C	26/10/98
960384-0035	Connecting cable	A	2/10/97
960384-0036	Modul cable	B	8/5/00
960384-0037	Trip line	A	2/10/97
960384-0061	Circuit diagram Radar module 2	D	13/4/00
960384-0062	Circuit diagram Radar module 2 Standard	C	13/4/00
960384-0063	Radar module 2 FCC	B	5/5/98
960384-0064	Trace layout HF module 2	C	5/5/98
960384-0065	Trace layout HF mod 2 FCC	C	5/5/98
960384-0066	Component diagram HF-module 2	D	13/4/00
960384-0067	Component diagram HF-mod 2 FCC	C	5/5/98
960390-0013	ex/emc - PA	A	24/9/98
960390-0015	Conductive pattern cs ex/emc 2-wire	A	24/9/98
960390-0016	Conductive pattern ss ex/emc 2-wire	A	24/9/98
960391-0000	Glass feed through	B	25/4/00
960391-0001	Rod antenna gastight PPS	B	18/4/00
960391-0002	'Rod antenna conductive and gastight' PTFE	B	18/4/00
960391-0003	Rod antenna PTFE conductive	B	18/4/00
960391-0005	Cladding conductive	A	21/10/98
960391-0007	High Temperature Antenna	A	19/7/99
960397-0003	Planar antenna assy.	C	17/11/00
960397-0040	Display VU 331	A	20/10/99
960397-0041	Assembly plan cs Display VU 331	A	7/9/99
960397-0042	Conductive pattern cs, ss Display VU 331	A	7/9/99

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