

# 1 EU-TYPE EXAMINATION CERTIFICATE



2 Equipment or Protective systems intended for use in Potentially  
Explosive Atmospheres - Directive 2014/34/EU

3 EU-Type Examination Certificate No: FM19ATEX0177X

4 Equipment or protective system:  
(Type Reference and Name) FMT SensyMaster Thermal Mass Flowmeter  
with optional Hot Tap Device Accessory

5 Name of Applicant: ABB AG

6 Address of Applicant: Anna-Vandenhoeck-Ring 5  
Gottingen D37081  
Germany

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Europe Ltd, notified body number 2809 in accordance with Article 17 of Directive 2014/34/EU of 26<sup>th</sup> February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number:

3059713 dated 13<sup>th</sup> July 2020

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN IEC 60079-0:2018, EN 60079-1:2014, EN IEC 60079-7:2015+A1:2018, EN 60079-11:2012,  
EN IEC 60079-18:2015+A1:2017, EN 60079-26:2015, EN 60079-31:2014, EN ISO 80079-36:2016,  
EN ISO 80079-37:2016 and EN 60529:1991+A1:2000+A2:2013

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

11 This EU-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:

**FMT430A1/FMT450A1 – Integral flowmeter**

II 2 G Ex db eb ib mb IIC T6...T1 Gb

II 2 D Ex ia tb IIC T80°C...Tmedium Db / II 2 G Ex ia IIC T6...T1 Gb



Digitally signed  
by Richard A  
Zammit  
Location: Ireland  
Foxit  
PhantomPDF  
Version: 10.0.1

**Richard Zammit**  
Certification Manager, FM Approvals Europe Ltd.

Issue date: 23<sup>rd</sup> November 2022

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FM Approvals Europe Limited, One Georges Quay Plaza, Dublin, Ireland. D02 E440  
T: +353 (0) 1761 4200 E-mail: [atex@fmaprovals.com](mailto:atex@fmaprovals.com) [www.fmaprovals.com](http://www.fmaprovals.com)

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- 12 The marking of the equipment or protective system shall include (continued):

**FMT430A3/FMT450A3 – Integral flowmeter**

II 1/2 G Ex db eb ia mb IIC T6...T1 Gb/Ga  
II 2 D Ex ia tb IIIC T80°C...Tmedium Db / II 1 G Ex ia IIC T6...T1 Ga

**FMT430A1/FMT450A1 – Remote sensor**

II 2 G Ex eb ib mb IIC T6...T1 Gb  
II 2 D Ex tb IIIC T80°C...Tmedium Db / II 2 G Ex ia IIC T6...T1 Gb

**FMT430A3/FMT450A3 – Remote sensor**

II 1/2 G Ex eb ia ib mb IIC T6...T1 Gb/Ga  
II 2 D Ex tb IIIC T80°C...Tmedium Db / II 1 G Ex ia IIC T6...T1 Ga

**FMT432A1/FMT452A1 – Transmitter only**

II 2 G Ex db eb ia mb IIB + H2 T6 Gb  
II 2 D Ex ia tb IIIC T80°C Db

**FMT432A1/FMT452A1 – Transmitter only**

II 2 G Ex db ia IIB + H2 T6 Gb  
II 2 D Ex ia tb IIIC T80°C Db

Ta = -20°C to +70°C (p = TA3) or Ta = -40°C to +70°C (p = TA9)

**FMT230A1/FMT250A1 – MinT**

II 2 G Ex eb ia mb IIC T6...T2 Gb  
II 2 D Ex ia tb IIIC T85°C...Tmedium Db / II 2 G Ex ia IIC T6...T1 Gb

**FMT230A3/FMT250A3 – MinT**

II 1 / 2 G Ex eb ia mb IIC T6...T2 Ga / Gb  
II 2 D Ex ia tb IIIC T85°C...Tmedium Db / II 1 G Ex ia IIC T6...T1 Ga

Ta = -20°C to +70°C (I = TA3) or Ta = -40°C to +70°C (I = TA9)

**FMT09\***

II 2 G Ex h IIC T6...T3 Gb  
II 2 D Ex h IIIC T85°C...T150°C Db  
Ta = -20°C to +150°C

- 13 **Description of Equipment or Protective System:**

The FMT SensyMaster are a series of thermal mass flowmeters. The electronics enclosure is a cylindrical enclosure identified as a Type 3 or a single compartment rectangular housing identified as a Type 4. The remote sensor and the MinT design use an enclosure identified as a T-Box. The ambient temperature range for the transmitters and sensors is either -20°C to +70°C or -40°C to +70°C depending on the options chosen.

The FMT SensyMaster is available as integral and remote designs.

The FMT SensyMaster is used to convert the measurement signal of a gas flow into an electrical Signal. Depending on the version, the Flowmeter provides an analogue output Signal (4-20 mA) with digital communication (HART). Optional digital outputs and/or digital inputs are available. MODBUS and Profibus DP option cards can be fitted. The MinT version of the Flowmeter consists of an aluminum

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enclosure of which the terminal compartment and the electronics compartment are flameproof. The sensor is intrinsically safe. The terminal compartment contains terminal boards for connection of the supply and Signal Circuits. The electronics compartment contains the electronic circuits and a display. The sensor works with a heating element and temperature sensors that measure the temperature of the flowing gas and the cooling of the heater due to the flowing gas.

Enclosure rating IP65, IP67, or IP68 depending on the option selected.

The FMT SensyMaster includes an optional Hot Tap Device assembly models FMT09\*, with type of protection "h" for non-electrical equipment by constructional safety "c". The assembly is intended for integrated insertion and removal of the equipment probe, and is rated for process pressures up to 16 bar, with temperature ratings as detailed in the instructions.

## **Electrical parameters**

### **FMT2\***

24 V DC  $\pm$  20% (ripple:  $\leq$  5%)  $P_{max} \leq$  10 W

### **FMT4\***

Power Supply (Terminals L and N)

$U_{DC} = 24 \text{ V} \pm 20 \%$  power supply ( $=U_{Low}$ );  $P_{max} \leq 20\text{W}$ ; C, Ripple:  $< 5 \%$ .

$U_{AC} = 100\text{V}(-15\%)$  to  $240\text{V}(+10\%)$  power supply ( $=U_{High}$ );  $S_{max} \leq 20\text{VA}$

See ABB Instruction Manual for the parameters for the Current Output, Digital Output, and Digital Input connections.

**FMT430A1efghijkl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Integral**

**FMT450A1efghijkl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Integral**

e = Measuring medium. Any two digits.

f = Sensor element type/Temperature range of measuring medium: A, B, or E

g = Mounting length/Flowmeter sensor material: Any single digit

h = Sensor connection: D3, G2 or F1

i = Connection design, transmitter housing type, transmitter housing material, entry: D1, D2, D3, D4, D5, D6, D7 or D8.

j = Blank

k = Outputs: G0, G1, G2, G3, G4, G5, G6, G7, G8, G9, M1 or D1

l = Power supply: A or B

Additional information

m = Additional output 1: DRN, DRG, DRA, DRT, DRM or DRD

n = Additional output 2: DSN, DSG or DSA

p = Ambient temperature range: TA3 or TA9

**FMT430A3efghijkl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Integral**

**FMT450A3efghijkl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Integral**

e = Measuring medium. Any two digits.

f = Sensor element type/Temperature range of measuring medium: A, B, or E

g = Mounting length/Flowmeter sensor material: Any single digit

h = Sensor connection: D3, G2 or F1

i = Connection design, transmitter housing type, transmitter housing material, entry: D1, D2, D3, D4, D5, D6, D7 or D8.

j = Blank

k = Outputs: G0, G1, G2, G3, G4, G5, G6, G7, G8, G9, M1 or D1

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I = Power supply: A or B

Additional information

m = Additional output 1: DRN, DRG, DRA, DRT, DRM or DRD

n = Additional output 2: DSN, DSG or DSA

p = Ambient temperature range: TA3 or TA9

**FMT430A1efghY0jY0Y.p SensyMaster Thermal Mass Flowmeter – Remote sensor**

**FMT450A1efghY0jY0Y.p SensyMaster Thermal Mass Flowmeter – Remote sensor**

e = Measuring medium. Any two digits.

f = Sensor element type/Temperature range of measuring medium: A, B, or E

g = Mounting length/Flowmeter sensor material: Any single digit

h = Sensor connection: D3, G2 or F1

j = Connection design/Sensor housing material: A1, A2, U1 or U2

Additional information

p = Ambient temperature range: TA3 or TA9

**FMT430A3efghY0jY0Y.p SensyMaster Thermal Mass Flowmeter – Remote sensor**

**FMT450A3efghY0jY0Y.p SensyMaster Thermal Mass Flowmeter – Remote sensor**

e = Measuring medium. Any two digits.

f = Sensor element type/Temperature range of measuring medium: A, B, or E

g = Mounting length/Flowmeter sensor material: Any single digit

h = Sensor connection: D3, G2 or F1

j = Connection design/Sensor housing material: A1, A2, U1 or U2

Additional information

p = Ambient temperature range: TA3 or TA9

**FMT432A1ikl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Transmitter**

**FMT452A1ikl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Transmitter**

i = Connection design, transmitter housing type, transmitter housing material, entry: R1, R2, R3 or R4

k = Outputs: G0, G1, G2, G3, G4, G5, G6, G7, G8, G9, M1 or D1

I = Power supply: A or B

Additional information

m = Additional output 1: DRN, DRG, DRA, DRT, DRM or DRD

n = Additional output 2: DSN, DSG or DSA

p = Ambient temperature range: TA3 or TA9

**FMT432A1ikl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Transmitter**

**FMT452A1ikl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Transmitter**

i = Connection design, transmitter housing type, transmitter housing material, entry: R5, R6, R7 or R8

k = Outputs: G0, G1, G2, G3, G4, G5, G6, G7, G8, G9, M1 or D1

I = Power supply: A or B

Additional information

m = Additional output 1: DRN, DRG, DRA, DRT, DRM or DRD

n = Additional output 2: DSN, DSG or DSA

p = Ambient temperature range: TA3 or TA9

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**FMT230A1efghiM2B.I SensyMaster Thermal Mass Flowmeter - MinT**

**FMT250A1efghiM2B.I SensyMaster Thermal Mass Flowmeter - MinT**

e = Measuring medium. Any two digits.

f = Sensor element type/Temperature range of measuring medium: A, B, or E

g = Mounting length/Flowmeter sensor material: Any single digit

h = Sensor connection: D3, G2 or F1

i = Connection design, transmitter housing type, transmitter housing material, entry: B1, B2, T1 or T2

Additional information

I = Ambient temperature range: TA3 or TA9

**FMT230A3efghiM2B.I SensyMaster Thermal Mass Flowmeter - MinT**

**FMT250A3efghiM2B.I SensyMaster Thermal Mass Flowmeter - MinT**

e = Measuring medium. Any two digits.

f = Sensor element type/Temperature range of measuring medium: A, B, or E

g = Mounting length/Flowmeter sensor material: Any single digit

h = Sensor connection: D3, G2 or F1

i = Connection design, transmitter housing type, transmitter housing material, entry: B1, B2, T1 or T2

Additional information

I = Ambient temperature range: TA3 or TA9

**FMT09a(\*) SensyMaster Hot Tap Device Accessory**

a = Pipe Connections. 1, 2, or 4.

(\*) = additional optional model code characters not affecting safety.

## **14 Specific Conditions of Use:**

1. The screws used to connect the Type 3 enclosure to the sensor shall be M5 x 20 A2 DIN7964. These shall have a yield stress of at least 210 Nm<sup>2</sup>.
2. Contact the manufacturer for specific flamepath joint details during repair of flameproof Ex d apparatus.
3. When used for a Group III application, the painted surface of the enclosures may store electrostatic charge and become a source of ignition in applications with a low relative humidity <~30% relative humidity where the painted surface is relatively free of surface contamination such as dirt, dust, or oil. Guidance on protection against the risk of ignition due to electrostatic discharge can be found in IEC 60079-32-1. Cleaning of the painted surface should only be done with a damp cloth.
4. The ambient temperature range, process temperature and applicable temperature class of the FMT SensyMaster is detailed in the manufacturer's Instruction Manual.

## **15 Essential Health and Safety Requirements:**

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

## **16 Test and Assessment Procedure and Conditions:**

This EU-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

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Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Europe Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Europe Ltd's ATEX Certification Scheme.

## **17 Schedule Drawings**

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

## **18 Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
15 <sup>th</sup> July 2020	Original Issue.
21 <sup>st</sup> August 2020	<u>Supplement 1:</u> Report Reference: RR224557 dated 18 <sup>th</sup> August 2020. Description of the Change: Update to model code and electrical ratings.
23 <sup>rd</sup> August 2021	<u>Supplement 2:</u> Report Reference: RR229063 dated 23 <sup>rd</sup> August 2021. Description of the Change: Minor documentation update for addition of UKCA information.
11 <sup>th</sup> August 2022	<u>Supplement 3:</u> Report Reference: PR461155 dated 10 <sup>th</sup> August 2022. Description of the Change: Update made to Satand IEC 60079-26:2015. Addition of FKM O-ring material to a -40°C Temperature. Addition of Models FMT09* Hot Tap Device accessory and compliance with EN ISO 80079-36 and EN ISO 80079-37. Revised certificate Company Name and Address from ABB Automation Products GmbH Dransfelder Strasse 2 to ABB AG Anna-Vandenhoeck-Ring 5
23 <sup>rd</sup> November 2022	<u>Supplement 4:</u> Report Reference: RR234759 dated 21 <sup>st</sup> November 2022. Description of the Change: Minor documentation update to include addition of UKCA information.

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# Blueprint Report

**ABB AG (1000007035)**

**Class No 3610**

**Original Project I.D. 3059713**

**Certificate I.D. FM19ATEX0177X**

<u>Drawing No.</u>	<u>Revision Level</u>	<u>Drawing Title</u>	<u>Last Report</u>
3KQR000392U0209	1	Transformer U-high technical data	3059713
3KQR00246U0109	2	Transformer Modbus technical data	3059713
3KQR00247U0109	1	Transformer U-low technical data	3059713
3KQR065003U0409	1	Transformer active supply module technical data	3059713
3KQZ002535U0109	2	Memory module	3059713
3KQZ400007U0150	1	EMC_T3_PCB	3059713
3KQZ400034U0150	2	Option Card CO II	3059713
3KQZ402013U0121	1	CCL_T3-MB-Ulow	3059713
3KQZ402013U0150	1	Motherboard Type3 PCB	3059713
3KQZ402013U0221	1	CCL_T3-MB-Uhigh	3059713
3KQZ406010U0122	6	HMI-Size-C PCB	3059713
3KQZ407001G0009	2	Type3 Assembly	3059713
3KQZ407002U0122	10	Option Card DO digital out	3059713
3KQZ407003U0122	10	Option Card DI digital in	3059713
3KQZ407004U0150	1	Option Card AS active supply	3059713
3KQZ407005U0109	1	Power supply cover	3059713
3KQZ407006U0109	1	EMC Type3 Insulation sheet	3059713
3KQZ407007U0109	1	EMC-cover	3059713
3KQZ407009U0109	2	T3 EMC Zone 1 feed through	3059713
3KQZ407058U0009	1	FEED-THROUGH-4POL wallbracket	3059713
3KQZ407059U0109	1	Feed-Through-8pol Cumulus	3059713
3KQZ407128U0150	3	Option Card Modbus DP	3059713
3KXF000043G0009	1	PCB-specification	3059713
3KXF000048G0009	3	Type4 integral complete	3059713
3KXF000090G0009	05	Description for Approval	RR234759
3KXF000094G0009	3	Installation diagram FMT	3059713
3KXF000095G0009	07	Instruction manual FMT400_200	RR234759
3KXF000096G0009	05	Model Number	RR234759
3KXF000097G0009	08	Name Plate drawing	RR234759
3KXF000098G0009	1	Portfolio FMT	3059713
3KXF000099G0009	2	warning labels FMT	3059713
3KXF000100G0009	11	List of Controlled Documents	PR461155
3KXF000106G0009	1	dielectrical test FMT200	3059713
3KXF000107G0009	1	dielectrical test FMT400	3059713
3KXF000122G0009	02	warning labels FMT09 hot tap	PR461155
3KXF000123G0009	02	Hot-Tapping device	PR461155
3KXF000139G0009	01	O-ring FMT	PR461155
3KXF002029G0009	01	SensyMster Risk Analyse EN ISO 80079-37	PR461155
3KXF002128G0009	01	SensyMster Risk Analyse EN ISO 80079-36	PR461155
3KXF002564U0009	3	Front End Assembly	3059713
3KXF002627G0009	2	T3 remote wall mounted	3059713
3KXF002629G0009	1	T-Box remote Assembly	3059713
3KXF002630G0009	2	Slide In MINT Assembly	3059713
3KXF002631G0009	2	T-Box complete MINT	3059713
3KXF002632G0009	6	T-Box remote complete	3059713
3KXF002633G0009	1	dielectrical test FMT	3059713
3KXF002800U1150	2	Front End Board PCB	3059713
3KXF002801U1121	1	FEB_Cumulus_CCL-ZN1	3059713

3KXF002802U1150	1	FM-Connection-board-PCB	3059713
3KXF002803U0009	1	FM-Connection-Board-Assembly	3059713
3KXF002860G0009	1	temperature measurement points	3059713
3KXF002861G0009	03	SensyMaster_system overview	PR461155
3KXF002862G0009	1	SensyMaster_Sensor electrical wiring	3059713
3KXF002863G0009	1	SensyMaster complete	3059713
3KXF002953U0150	1	Terminal-board Remote PCB	3059713
3KXF003060G0109	4	Terminal-board MINT PCB	3059713
3KXF003071U0009	2	Slide In Remote pre assembled	3059713
IIG-AD-0012	1	RR-potting elastosil RT745S	3059713
IIG-AD-0015	1	varnishing instructions of PCBs	3059713
IIG-AD-0020	1	Potting material preparation FMT4 - FMT2	3059713