1 UNITED KINGDOM CONFORMITY ASSESSMENT

UK-TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres – UKSI 2016:1107 (as amended) – Schedule 3A, Part 1**

3 **UK-Type Examination Certificate No:** **FM21UKEX0135X**

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 Ltd, Approved Body number 1725, in accordance with Regulation 42 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended), certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Schedule 1 of the Regulations.
The examination and test results are recorded in confidential report number:

3059713 RR229063 dated 23rd August 2021

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 UK-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance with the Regulations. Further requirements of the Regulations apply to the manufacturing process and supply of this product. These are not covered by this certificate.

Digitally signed by Victor Aluko-Oginni
DN: O=FM Approvals Limited, CN=Victor Aluko-Oginni, E=victor.aluko-oginni@fmapprovals.com

Victor Aluko-Oginni
Certification Manager, FM Approvals Ltd.

Issue date: 30th January 2023

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

FMT430U1/FMT450U1 – Integral flowmeter
II 2 G Ex db eb ib mb IIC T6…T1 Gb
II 2 D Ex ia tb IIIC T80°C…Tmedium Db / II 2 G Ex ia IIC T6...T1 Gb

FMT430U4/FMT450U4 – 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

FMT430U1/FMT450U1 – 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

FMT430U4/FMT450U4 – 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

FMT432U1/FMT452U1 – Transmitter only
II 2 G Ex db eb ia mb IIB + H2 T6 Gb
II 2 D Ex ia tb IIIC T80°C Db

FMT432U1/FMT452U1 – 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)

FMT230U1/FMT250U1 – 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

FMT230U4/FMT250U4 – 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 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 ± 20% (ripple: ≤ 5%) Pmax ≤ 10 W

FMT4*
Power Supply (Terminals L and N)

U_{DC} = 24 V ± 20 % power supply (=U_{Low}); P_{max} ≤ 20W; C, Ripple: < 5 %.
U_{AC} = 100V(-15%) to 240V (+10%) power supply (=U_{High}); S_{max} ≤ 20VA

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

FMT430U1efghijkl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Integral
FMT450U1efghijkl.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

FMT430U4efghijkl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Integral
FMT450U4efghijkl.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

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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

FMT430U1efghY0jY0Y.p SensyMaster Thermal Mass Flowmeter – Remote sensor
FMT450U1efghY0jY0Y.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

FMT430U4efghY0jY0Y.p SensyMaster Thermal Mass Flowmeter – Remote sensor
FMT450U4efghY0jY0Y.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

FMT432U1ikl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Transmitter
FMT452U1ikl.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
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

FMT432U1ikl.m.n.L2.p SensyMaster Thermal Mass Flowmeter - Transmitter
FMT452U1ikl.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
l = Power supply: A or B

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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

FMT230U1efghiM2B.I SensyMaster Thermal Mass Flowmeter - MinT
FMT250U1efghiM2B.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
l = Ambient temperature range: TA3 or TA9

FMT230U4efghiM2B.I SensyMaster Thermal Mass Flowmeter - MinT
FMT250U4efghiM2B.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
l = 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^2.
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:**

In addition to the Essential Health and Safety Requirements covered by the standards listed at item 9, all other requirements are demonstrated in the confidential report identified in item 8.

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

This UK-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.

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

This Certificate has been issued in accordance with FM Approvals Ltd's UKCA 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 Approved Body.

18 **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
8th September 2021	Original Issue.
11th August 2022	Supplement 1: Report Reference: PR461155 dated 10th August 2022. Description of the Change: Update made to Standard EN 60079-26; Update made to FKM O-ring material to allow -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
25th November 2022	Supplement 2: Report Reference: RR234759 dated 21st November 2022. Description of the Change: Update to Model number.
30th January 2023	Supplement 3: Report Reference: RR235789 dated 25th January 2023. Description of the Change: Correction of typographical errors. No change to the CDL.