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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: FM21UKEX0078X**

4 **Equipment or protective system: Proservo NMS80, NMS81 and NMS83
(Type Reference and Name)**

5 **Name of Applicant: Endress+Hauser Yamanashi Co., Ltd.**

6 **Address of Applicant: 862-1 Mitsukunugi Sakaigawa-cho
Fuefuki-shi Yamanashi-Ken
406-0846
Japan**

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:

3057749revRR228058 dated 8th July 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 60079-11:2012,
EN 60079-26:2015 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.

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



II 1/2 G Ex db [ia Ga] IIC T6...T1 Ga/Gb Ta*

Ta* - See Description Section below for Ambient Temperature Ranges.



Digitally signed by Victor Aluko-Oginni
DN: O=FM Approvals Limited, CN=Victor Aluko-Oginni,
E=victor.aluko-oginni@fmapprovals.com
Foxit PhantomPDF Version: 10.1.4

**Victor Aluko-Oginni
Certification Manager, FM Approvals Ltd.**

Issue date: 14th July 2021

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F UKEX 020 (Jan/21)



0259
Page 1 of 8

SCHEDULE



to UK-Type Examination Certificate No. FM21UKEX0078X

13 Description of Equipment or Protective System:

General - The intelligent tank gauge Proservo NMS8x is designed for high accuracy liquid level measurement in storage and process applications. It is installed on a liquid storage tank which contains liquids such as petroleum, liquefied gases and other liquids used in the chemical industry.

The Proservo NMS8x is designed for the purpose of single or multi-task installations, covering a wide range of measurement functions. It is based on the principle of displaced measurement. A displacer is accurately positioned in the liquid medium using a stepper motor. The displacer is suspended on a measuring wire which is wound onto a finely grooved drum housing within the instrument. The drum is driven via coupling magnets which are completely separated by the drum housing.

Construction - The NMS8x assembly comprises a cover, display, electronics assembly, sensor assembly unit, tube housing, lock washer, drum housing, displacer, wire drum, bracket and a drum cover. The enclosure compartments, one being the electronics compartment and the other being the drum compartment. The electronics compartment is an explosionproof/flameproof enclosure which consists of a main body (Housing NMS), a cover with window (window cover) and a separation wall towards the drum housing. It is the separation wall which separates the explosionproof/flameproof enclosure from the drum compartment and its thickness is equal to or greater than 3 mm. The separation wall has no through-bore.

The wire drum is driven by magnet coupling. The power for the rotating electronics (detector circuit with inner magnet) is transmitted through a rotary transformer. NMS8x has no rotary mechanical contacts for power and signal, therefore no sparking by moving mechanical contacts.

The drum housing and tube housings are available in Aluminum and Stainless Steel. Seven cable entries [M20 X 1.5 6H] with an axial length greater than 15 mm are provided on the NMS housing. Terminals for protective earth connection and for potential equilibrium bonding are provided in both terminal compartments as well as outside the enclosure.

The enclosure ingress protection rating is IP66/IP68 (IPX8: 2 meters, 24 hours) per EN 60529.

Ratings – The Proservo NMS8x operates at 85-264Vac, 52-75Vac and 19-64Vdc (28.8Volt-Amperes). Entity Parameters – refer to drawing XA02540G. The Temperature rating and ambient operating temperature range of the NMS8x with respect to the process temperature range is below:

Temperature Class	Ambient Temperature	Process Temperature (temperature of the displacer)
T1	-40°C ≤ Ta ≤ +60°C -40°C ≤ Ta ≤ +55°C -40°C ≤ Ta ≤ +50°C	-253°C ≤ T _{process} ≤ 450°C
T2		-253°C ≤ T _{process} ≤ 300°C
T3		-253°C ≤ T _{process} ≤ 200°C
T4		-253°C ≤ T _{process} ≤ 135°C
T5		-253°C ≤ T _{process} ≤ 100°C
T6		-253°C ≤ T _{process} ≤ 85°C

Proservo NMS80-aabcddeeffghijklmmnnn + (options)

aa	Approval: UC - UKEX II 1/2 G Ex db [ia] IIC T6...T1 Ga/Gb
b	Terminal Type: 1 - Spring Terminals 2 - Screw Terminals 9 - Special version, TSP-no. to be spec. (not relevant for safety)

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SCHEDULE

to UK-Type Examination Certificate No. FM21UKEX0078X

c	Power Supply: B - 85-264VAC, LCD + operation D - 52-75VAC, LCD + operation E - 19-64VDC, LCD + operation
dd	Primary Output: A1 - Modbus – RS485 B1 - V1 C1 - WM550 E1 - 4-20mA HART Ex d G1 - Wireless H1 - 4-20mA HART Ex i Y9 - Special version, TSP-no. to be spec. (not relevant for safety)
ee	Secondary I/O Analog: A1 - Ex d – 1 x 4-20mA HART; 1 x RTD Input A2 - Ex d – 2 x 4-20mA HART; 2 x RTD Input B1 - Ex i – 1 x 4-20mA HART; 1 x RTD Input B2 - Ex i – 2 x 4-20mA HART; 2 x RTD Input C2 - Ex i – 1 x 4-20mA HART; 2 x RTD Input + 1 x Ex d 4-20mA HART X0 - Prepared for I/O Analog RTD input Y9 - Special version, TSP-no. to be spec. (not relevant for safety)
ff	Secondary I/O Digital Ex d: A1 - 2 x relay + 2 x module discrete A2 - 4 x relay + 4 x module discrete A3 - 6 x relay + 6 x module discrete B1 - Modbus RS485 B2 - Modbus RS485 + 2 x relay + 2 x module discrete B3 - Modbus RS485 + 4 x relay + 4 x module discrete C1 - V1 C2 - V1 + 2 x relay + 2 x module discrete C3 - V1 + 4 x relay + 4 x module discrete E1 - W550 E2 - W550 + 2 x relay + 2 x module discrete E3 - W550 + 4 x relay + 4 x module discrete X0 - Prepared for I/O digital Ex d Y9 - Special version, TSP-no. to be spec. (not relevant for safety)
gg	Housing: AB - Transmitter + process Alu, coated
h	Process Pressure: 1 - 0... 0.2 bar/20 kPa/2.9 psi 2 - 0... 6 bar/600 kPa/87 psi 9 - Special version, TSP-no. to be spec.
i	Electrical Connection: A - Thread M20, IP66/68, NEMA Type 4X/6P Encl. B - Thread M25, IP66/68, NEMA Type 4X/6P Encl. E - Thread NPT1/2", IP66/68, NEMA Type 4X/6P Encl. F - Thread NPT3/4", IP66/68, NEMA Type 4X/6P Encl.
jj	Measuring range; Wire; Diameter: A3 - 16 m; PFA>316L; 0.4 mm C2 - 22 m; Alloy C276; 0.2 mm D1 - 28 m; 316L; 0.15 mm F1 - 36 m; 316L; 0.15 mm Y9 - Special version, TSP-no. to be spec.
kkk	Displacer Material; Type: 1AA - 316L; 30 mm cylindrical

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SCHEDULE

to UK-Type Examination Certificate No. FM21UKEX0078X

	1AC - 316L; 30 mm cylindrical 1BE - 316L; 70 mm conical 1BJ - 316L; 110 mm conical 2AA - PTFE; 30 mm cylindrical 2AC - PTFE; 50 mm cylindrical 3AC - Alloy C276; 50 mm cylindrical 9YY - Special version, TSP-no. to be spec.
ll	Process Sealing; A1 - HNBR -30°C...150°C/ -22°F...302°F B1 - FKM GLT, -40°C...200°C / -40°F...392°F B2 - FFKM GLT -20°C...200°C / -4°F...392°F C1 - CR Chloropren -25°C...100°C / -13°F ...212°F D1 - PTFE (wire drum FKM) -100°C ...200°C/ -148°F...392°F E1 - VMQ Silicone -45°C...200°C/ -49°F...392°F YY - Special version, TSP-no. to be spec.
mmm	Process Connection: Any 3 characters combinations (not relevant for safety)
nnn	Accuracy, Weight + Measure Approval: Any 3 characters combinations (not relevant for safety)
(options)	Options: not relevant for safety

Proservo NMS81-aabcddeeffghijklmmnnn + (options)

aa	Approval: UC - UKEX II 1/2 G Ex db [ia] IIC T6...T1 Ga/Gb
b	Terminal Type: 1 - Spring Terminals 2 - Screw Terminals 9 - Special version, TSP-no. to be spec. (not relevant for safety)
c	Power Supply: B - 85-264VAC, LCD + operation D - 52-75VAC, LCD + operation E - 19-64VDC, LCD + operation
dd	Primary Output: A1 - Modbus – RS485 B1 - V1 C1 - WM550 E1 - 4-20mA HART Ex d G1 - Wireless H1 - 4-20mA HART Ex i Y9 - Special version, TSP-no. to be spec. (not relevant for safety)
ee	Secondary I/O Analog: A1 - Ex d – 1 x 4-20mA HART; 1 x RTD Input A2 - Ex d – 2 x 4-20mA HART; 2 x RTD Input B1 - Ex i – 1 x 4-20mA HART; 1 x RTD Input B2 - Ex i – 2 x 4-20mA HART; 2 x RTD Input C2 - Ex i – 1 x 4-20mA HART; 2 x RTD Input + 1 x Ex d 4-20mA HART X0 - Prepared for I/O Analog RTD input Y9 - Special version, TSP-no. to be spec. (not relevant for safety)
ff	Secondary I/O Digital Ex d: A1 - 2 x relay + 2 x module discrete A2 - 4 x relay + 4 x module discrete A3 - 6 x relay + 6 x module discrete B1 - Modbus RS485 B2 - Modbus RS485 + 2 x relay + 2 x module discrete

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SCHEDULE

to UK-Type Examination Certificate No. FM21UKEX0078X

	<p>B3 - Modbus RS485 + 4 x relay + 4 x module discrete C1 - V1 C2 - V1 + 2 x relay + 2 x module discrete C3 - V1 + 4 x relay + 4 x module discrete E1 - W550 E2 - W550 + 2 x relay + 2 x module discrete E3 - W550 + 4 x relay + 4 x module discrete X0 - Prepared for I/O digital Ex d Y9 - Special version, TSP-no. to be spec. (not relevant for safety)</p>
gg	<p>Housing: AC - Transmitter Alu coated + process 316/316L AD - Transmitter Alu coated, process 316/316L internal FEP coated BC - Transmitter + process 316/316L BD - Transmitter 316/316L, Process 316/316L internal FEP coated</p>
h	<p>Process Pressure: 1 - 0... 0.2 bar/20 kPa/2.9 psi 2 - 0... 6 bar/600 kPa/87 psi 3 - 0... 25 bar/2.5 MPa/362 psi 9 - Special version, TSP-no. to be spec.</p>
i	<p>Electrical Connection: A - Thread M20, IP66/68, NEMA Type 4X/6P Encl. B - Thread M25, IP66/68, NEMA Type 4X/6P Encl. E - Thread NPT1/2", IP66/68, NEMA Type 4X/6P Encl. F - Thread NPT3/4", IP66/68, NEMA Type 4X/6P Encl.</p>
jj	<p>Measuring range; Wire; Diameter: A3 - 16 m; PFA>316L; 0.4 mm C2 - 22 m; Alloy C276; 0.2 mm D1 - 28 m; 316L; 0.15 mm F1 - 36 m; 316L; 0.15 mm G1 - 47 m; 316L; 0.15 mm H1 - 55 m; 316L; 0.15 mm Y9 - Special version, TSP-no. to be spec.</p>
kkk	<p>Displacer Material; Type: 1AA - 316L; 30 mm cylindrical 1AC - 316L; 30 mm cylindrical 1BE - 316L; 70 mm conical 1BJ - 316L; 110 mm conical 2AA - PTFE; 30 mm cylindrical 2AC - PTFE; 50 mm cylindrical 3AC - Alloy C276; 50 mm cylindrical 9YY - Special version, TSP-no. to be spec.</p>
ll	<p>Process Sealing; A1 - HNBR -30°C...150°C/ -22°F...302°F B1 - FKM GLT, -40°C...200°C / -40°F...392°F B2 - FFKM GLT -20°C...200°C / -4°F...392°F C1 - CR Chloropren -25°C...100°C / -13°F ...212°F D1 - PTFE (wire drum FKM) -100°C ...200°C/ -148°F...392°F E1 - VMQ Silicone -45°C...200°C/ -49°F...392°F YY - Special version, TSP-no. to be spec.</p>
mmm	<p>Process Connection: Any 3 characters combinations (not relevant for safety)</p>
nnn	<p>Accuracy, Weight + Measure Approval: Any 3 characters combinations (not relevant for safety)</p>
(options)	<p>Options: not relevant for safety</p>

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SCHEDULE

to UK-Type Examination Certificate No. FM21UKEX0078X

Proservo NMS83-aabcddeeffghijklmmnnn + (options)

aa	Approval: UC - UKEX II 1/2 G Ex db [ia] IIC T6...T1 Ga/Gb
b	Terminal Type: 1 - Spring Terminals 2 - Screw Terminals 9 - Special version, TSP-no. to be spec. (not relevant for safety)
c	Power Supply: B - 85-264VAC, LCD + operation D - 52-75VAC, LCD + operation E - 19-64VDC, LCD + operation
dd	Primary Output: A1 - Modbus – RS485 B1 - V1 C1 - WM550 E1 - 4-20mA HART Ex d G1 - Wireless H1 - 4-20mA HART Ex i Y9 - Special version, TSP-no. to be spec. (not relevant for safety)
ee	Secondary I/O Analog: A1 - Ex d – 1 x 4-20mA HART; 1 x RTD Input A2 - Ex d – 2 x 4-20mA HART; 2 x RTD Input B1 - Ex i – 1 x 4-20mA HART; 1 x RTD Input B2 - Ex i – 2 x 4-20mA HART; 2 x RTD Input C2 - Ex i – 1 x 4-20mA HART; 2 x RTD Input + 1 x Ex d 4-20mA HART X0 - Prepared for I/O Analog RTD input Y9 - Special version, TSP-no. to be spec. (not relevant for safety)
ff	Secondary I/O Digital Ex d: A1 - 2 x relay + 2 x module discrete A2 - 4 x relay + 4 x module discrete A3 - 6 x relay + 6 x module discrete B1 - Modbus RS485 B2 - Modbus RS485 + 2 x relay + 2 x module discrete B3 - Modbus RS485 + 4 x relay + 4 x module discrete C1 - V1 C2 - V1 + 2 x relay + 2 x module discrete C3 - V1 + 4 x relay + 4 x module discrete E1 - W550 E2 - W550 + 2 x relay + 2 x module discrete E3 - W550 + 4 x relay + 4 x module discrete X0 - Prepared for I/O digital Ex d Y9 - Special version, TSP-no. to be spec. (not relevant for safety)
gg	Housing: AC - Transmitter Alu, coated + process 316/316L BC - Transmitter + process 316/316L BD - Transmitter 316/316L, Process 316/316L internal FEP coated Y9 - Special version, TSP-no. to be spec. (not relevant for safety)
h	Process Pressure: 2 - 0... 6 bar/600 kPa/87 psi 9 - Special version, TSP-no. to be spec.
i	Electrical Connection: A - Thread M20, IP66/68, NEMA Type 4X/6P Encl. B - Thread M25, IP66/68, NEMA Type 4X/6P Encl.

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SCHEDULE

to UK-Type Examination Certificate No. FM21UKEX0078X

	E - Thread NPT1/2", IP66/68, NEMA Type 4X/6P Encl. F - Thread NPT3/4", IP66/68, NEMA Type 4X/6P Encl.
<i>jj</i>	Measuring range; Wire; Diameter: A3 - 16 m; PFA>316L; 0.4 mm C2 - 22 m; Alloy C276; 0.2 mm Y9 - Special version, TSP-no. to be spec.
<i>kkk</i>	Displacer Material; Type: 4AC - 316L polished; 50 mm cylindrical 4AE - 316L polished; 70 mm cylindrical 5AC - PTFE; 50 mm cylindrical, hygienic white 9YY - Special version, TSP-no. to be spec.
<i>ll</i>	Process Sealing; A1 - HNBR -30°C...150°C / -22°F...302°F B1 - FKM GLT -40°C...200°C / -40°F...392°F B2 - FFKM GLT -20°C...200°C / -4°F...392°F C1 - CR Chloropren -25°C...100°C / -13°F ...212°F D1 - PTFE (wire drum FKM) -100°C ...200°C / -148°F...392°F E1 - VMQ Silicone -45°C...200°C / -49°F...392°F YY - Special version, TSP-no. to be spec.
<i>mmm</i>	Process Connection: Any 3 characters combinations (not relevant for safety)
<i>nnn</i>	Accuracy, Weight + Measure Approval: Any 3 characters combinations (not relevant for safety)
<i>(options)</i>	Options: not relevant for safety

14 Specific Conditions of Use:

1. For Ambient and Process Temperature Range refer to drawing XA02540G.
2. Flamepath joints are not for repair. Contact the manufacturer.
3. Use heat resisting cables rated $\geq 85^{\circ}\text{C}$ for $T_a > 50^{\circ}\text{C}$.
4. Precautions shall be taken to minimize the risk from electrostatic discharge of non-metallic labels and isolated metal tags applied to the enclosure.

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.

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.

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SCHEDULE

to UK-Type Examination Certificate No. FM21UKEX0078X

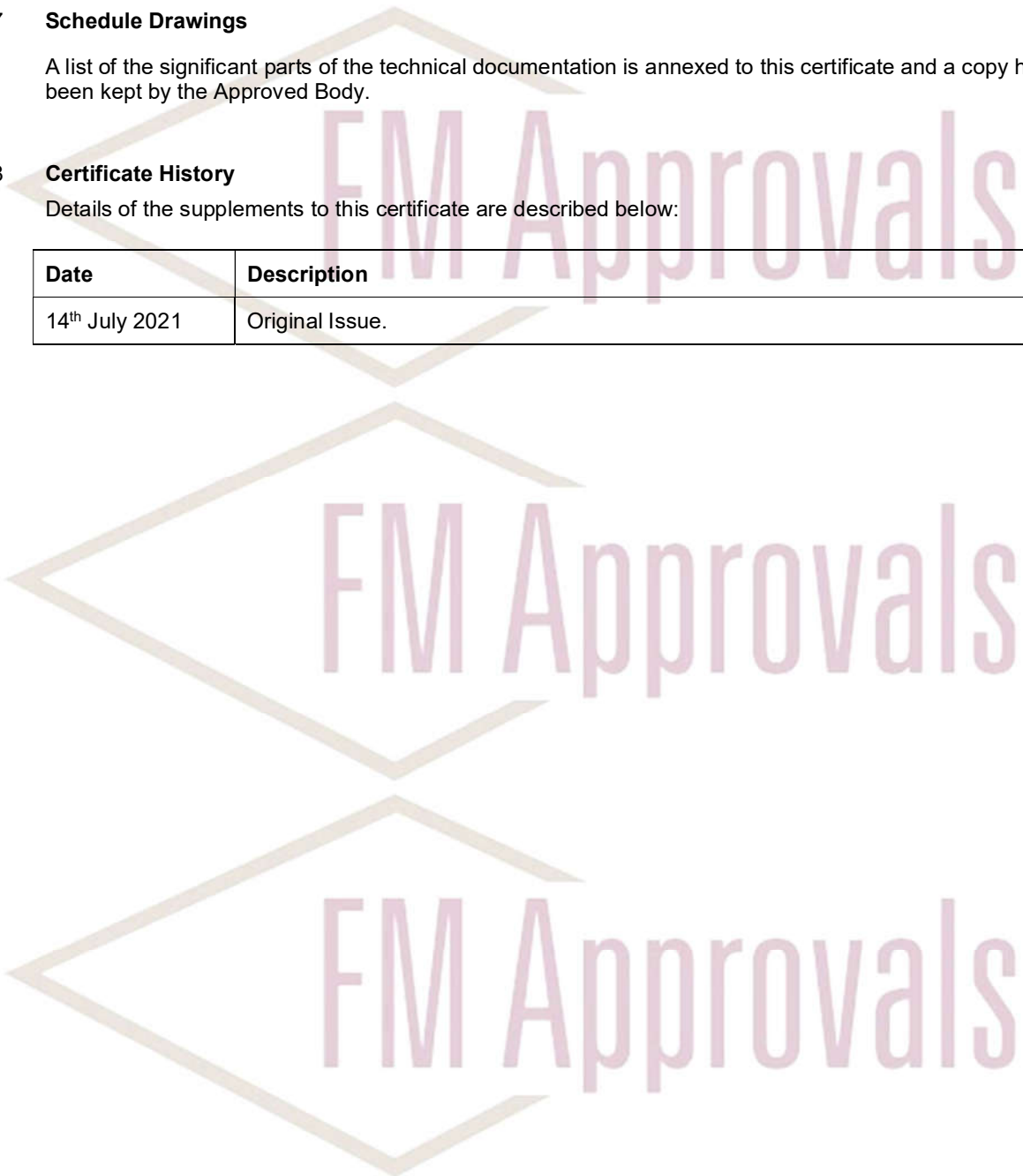
17 **Schedule Drawings**

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
14 th July 2021	Original Issue.



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Blueprint Report

Endress+Hauser Yamanashi Co Ltd (1000004450)

Class No 3615

Original Project I.D. 3057749

Certificate I.D. FM21UKEX0078X

<u>Drawing No.</u>	<u>Revision Level</u>	<u>Drawing Title</u>	<u>Last Report</u>	<u>Electronic</u>
960016426	A	Tank Gauging Platform (TGP) Transmission Code Listing TRC	RR228058	Yes (pdf)
960017763	03/07/2015	Overview NRF81 and NMS89/81/83	RR228058	Yes (pdf)
960017776	01/03/2016	Overview Displacer NMS8X	RR228058	Yes (pdf)
960017777	03/07/2015	Overview electrostatics NMS8X	RR228058	Yes (pdf)
960017842	04/08/2015	NMS80 external dimensions	RR228058	Yes (pdf)
960017847	04/08/2015	NMS81 external dimensions	RR228058	Yes (pdf)
960017849	03/07/2015	Zone separation wall thicknesses NMS8X	RR228058	Yes (pdf)
960017875	04/08/2015	NMS81/83 external dimensions	RR228058	Yes (pdf)
960018037	D	Overview approved laser printed adhesive nameplate materials	RR228058	Yes (pdf)
960018097	10/11/2015	AssemblyPlan(APP) A Proservo ES SMR_RT / Rotary Transformer Board	RR228058	Yes (pdf)
960018098	10/11/2015	PrintedCircuitBoard (APP) Proservo ES SMS_RT / Rotary Transformer Board	RR228058	Yes (pdf)
960018099	10/11/2015	AssemblyPlan(APP) A Proservo ES PSRV_ES_Magnetic_Rotary_Encoder	RR228058	Yes (pdf)
960018100	10/11/2015	AssemblyPlan(APP) B Proservo ES PSRV_ES_Magnetic_Rotary_Encoder	RR228058	Yes (pdf)
960018101	10/11/2015	PrintedCircuitBoard(APP) Proservo ESPSRV_ES_Magnetic_Rotary_Encoder	RR228058	Yes (pdf)
960018102	A	AssemblyPlan(APP) A ProServo ESPSRV_ES_SMS	RR228058	Yes (pdf)
960018103	A	AssemblyPlan(APP) B ProServo ESPSRV_ES_SMS	RR228058	Yes (pdf)
960018104	10/11/2015	PrintedCircuitBoard (APP) ProServo ES PRV_ES_SMS	RR228058	Yes (pdf)
960018105	10/11/2015	AssemblyPlan (APP) A ProServo ES PSRV_ES_HALL	RR228058	Yes (pdf)
960018106	10/11/2015	AssemblyPlan (APP) B ProServo ES PSRV_ES_HALL	RR228058	Yes (pdf)
960018107	10/11/2015	PrintedCircuitBoard (APP) ProServo ES PSRV_ES_HALL	RR228058	Yes (pdf)
960018110	16/11/2015	Display with device configuration label	RR228058	Yes (pdf)
960018123	A	Lettering frontplane cover	RR228058	Yes (pdf)
960018221	20/01/2016	Nameplate "spare parts" (TG_Plate form)	RR228058	Yes (pdf)
960018224	B	TG-Proservo NMS8x device configuration	RR228058	Yes (pdf)
960018239	27/04/2016	Tank Gauging Proservo NMS8xuses Tank Gauging Platform (TGP)modules	RR228058	Yes (pdf)
961005174	A	Nameplate lettering (UKCA) Proservo NMS8X	RR228058	Yes (pdf)
961005175	A	Technical Description (UKEX) Proservo NMS80/81/83	RR228058	Yes (pdf)
XA02540G	01.21	Safety Instructions (UKCA) Proservo NMS80, NMS81, NMS83	RR228058	Yes (pdf)