

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:** FM16ATEX0001X

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 Europe Ltd, notified body number 2809 in accordance with Article 17 of Directive 2014/34/EU of 26 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:

3057749 dated 2nd August 2016

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 60079-0:2012+A11:2013, 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 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:



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

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



Richard Zammitt
Certification Manager, FM Approvals Europe Ltd.

Issue date: 04th February 2020

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to EU-Type Examination Certificate No. FM16ATEX0001X

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.

Ratings – The Proservo NMS8x operates at 85-264Vac (28.8Volt-Amperes). Entity Parameters – refer to drawing XA01495G. 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	$-40^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$	$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 450^{\circ}\text{C}$
T2	$-40^{\circ}\text{C} \leq T_a \leq +55^{\circ}\text{C}$	$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 300^{\circ}\text{C}$
T3	$-40^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$	$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 200^{\circ}\text{C}$
T4		$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 135^{\circ}\text{C}$
T5		$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 100^{\circ}\text{C}$
T6		$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 85^{\circ}\text{C}$

Proservo NMS80-aabcddeeffgghijkkllmmnnn + (options)

aa	Approval: BC - ATEX 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

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	D - 24-62VAC/DC, LCD + operation
dd	Primary Output: A1 - Modbus – RS485 B1 - V1 C1 - WM550 E1 - 4-20mA HART Exd 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 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 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

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	9YY - Special version, TSP-no. to be spec.
II	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 -30°C...80°C / -40°F...176°F D1 - PTFE (wire drum FKM) -100°C...150°C/ -148°F...302°F E1 - VMQ Silicone -40°C...200°C/ -40°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-aabcddeeffgghijklmmnnn + (options)

aa	Approval: BC - ATEX 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 - 24-62VAC/DC, LCD + operation
dd	Primary Output: A1 - Modbus – RS485 B1 - V1 C1 - WM550 E1 - 4-20mA HART Exd 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 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:

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	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
h	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.
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 G1 - 47 m; 316L; 0.15 mm H1 - 55 m; 316L; 0.15 mm Y9 - Special version, TSP-no. to be spec.
kkk	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.
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 -30°C...80°C / -40°F ...176°F D1 - PTFE (wire drum FKM) -100°C ...150°C/ -148°F...302°F E1 - VMQ Silicone -40°C...200°C/ -40°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 NMS83-aabcddeeffghijklmmnnn + (options)

aa	Approval: BC - ATEX 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

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	D - 24-62VAC/DC, LCD + operation
dd	Primary Output: A1 - Modbus – RS485 B1 - V1 C1 - WM550 E1 - 4-20mA HART Exd 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 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. 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 Y9 - Special version, TSP-no. to be spec.
kkk	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.
ll	Process Sealing; A1 - HNBR -30°C...150°C/ -22°F...302°F B1 - FKM GLT -40°C...200°C / -40°F...392°F

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	B2 - FFKM GLT -20°C...200°C / -4°F...392°F C1 - CR Chloropren -30°C...80°C / -40°F ...176°F D1 - PTFE (wire drum FKM) -100°C ...150°C/ -148°F...302°F E1 - VMQ Silicone -40°C...200°C/ -40°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

14 **Specific Conditions of Use:**

1. For Ambient and Process Temperature Range refer to drawing XA01495G.
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.
5. To maintain the ingress protection ratings (IP66/68), teflon tape or pipe dope is required for blanking plugs.
6. Ex d certified seals are required within 50mm (1.97inches) on all used housing entries.

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.

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
03 rd August 2016	Original Issue.
07 th September 2016	Supplement 1: Report reference: RR206287 dated 06 th September 2016. Description of change: Minor editorial corrections through the certificate

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Date	Description
11 th May 2018	<u>Supplement 2:</u> Report reference: RR213288 dated 01 st May 2018. Description of change: Documentaton update to include Stainless Steel Tube Housing for NMS83 and minor editorial corrections to the certificate.
13 th March 2019	<u>Supplement 3:</u> Description of the Change: Certificate transferred from FM Approvals Ltd., notified body no. 1725, to FM Approvals Europe Ltd., notified body no. 2809.
07 th October 2019	<u>Supplement 4:</u> Report reference: RR220154 dated 04 th October 2019. Description of change: Update technical documents and update Temperature Class Table in technical documentation and this Certificate.
04 th February 2020	<u>Supplement 5:</u> Report Reference: –RR221788 dated 30 th January 2020. Description of the Change: Updated Label material and adhesive coating. Specific conditions of use updated.

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Blueprint Report

Endress+Hauser Yamanashi Co Ltd (1000004450)

Class No 3615

Original Project I.D. 3057749

Certificate I.D. FM16ATEX0001X

<u>Drawing No.</u>	<u>Revision Level</u>	<u>Drawing Title</u>	<u>Last Report</u>
960018101	10/11/2015	PrintedCircuitBoard(APP) Proservo ES PSRV_ES_Magnetic_Rotary_Encoder	3057749
960018102	10/11/2015	AssemblyPlan(APP) A ProServo ES PSRV_ES_SMS	3057749
960018103	10/11/2015	AssemblyPlan(APP) B ProServo ES PSRV_ES_SMS	3057749
960018239	27/04/2016	Tank Gauging Proservo NMS8x uses Tank Gauging Platform (TGP) modules	3057749
960016426	13/01/2015	Tank Gauging Platform (TGP) Transmission Code Listing TRC	3057749
960017763	03/07/2015	Overview NRF81 and NMS89/81/83	3057749
960017776	01/03/2016	Overview Displacer NMS8X	3057749
960017777	03/07/2015	Overview electrostatics NMS8X	3057749
960017842	04/08/2015	NMS80 external dimensions	3057749
960017847	04/08/2015	NMS81 external dimensions	3057749
960017849	03/07/2015	Zone separation wall thicknesses NMS8X	3057749
960017854	C	Technical Description Proservo NMS80/81/83	RR220154
960017875	04/08/2015	NMS81/83 external dimensions	3057749
960018037	D	Overview approved laser printed adhesive nameplate materials	RR221788
960018097	10/11/2015	AssemblyPlan(APP) A Proservo ES SMR_RT / Rotary Transformer Board	3057749
960018098	10/11/2015	PrintedCircuitBoard (APP) Proservo ES SMS_RT / Rotary Transformer Board	3057749
960018099	10/11/2015	AssemblyPlan(APP) A Proservo ES PSRV_ES_Magnetic_Rotary_Encoder	3057749
960018100	10/11/2015	AssemblyPlan(APP) B Proservo ES PSRV_ES_Magnetic_Rotary_Encoder	3057749
960018104	10/11/2015	PrintedCircuitBoard (APP) ProServo ES PRV_ES_SMS	3057749
960018105	10/11/2015	AssemblyPlan (APP) A ProServo ES PSRV_ES_HALL	3057749
960018106	10/11/2015	AssemblyPlan (APP) B ProServo ES PSRV_ES_HALL	3057749
960018107	10/11/2015	PrintedCircuitBoard (APP) ProServo ES PSRV_ES_HALL	3057749
960018110	16/11/2015	Display with device configuration label	3057749
960018123	20/11/2015	Lettering frontplane cover	3057749
960018220	B	Nameplate lettering ATEX/IECEx Proservo NMS8X	RR220154
960018221	20/01/2016	Nameplate "spare parts" (TG_Plate form)	3057749
960018224	A	TG-Proservo NMS8x device configuration	RR220154
XA01495G	02.19	Safety Instructions (ATEX/IECEx) Proservo NMS80, NMS81, NMS83	RR220154