

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 Ltd, notified body number 1725 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, EN 60529: 1991 +A1: 2000

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*; IP66, IP68

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

Entity Parameters – refer to drawing XA01495G



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Mick Gower
Certification Manager, FM Approvals Ltd.

Issue date: 07th September 2016

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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 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 - he 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.

Ratings – The Proservo NMS8x operates at 85-264Vac (28.8Volt-Amperes). 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	$-40^{\circ}\text{C} \leq T_a \leq 80^{\circ}\text{C}$	$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 450^{\circ}\text{C}$
T2		$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 300^{\circ}\text{C}$
T3		$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 200^{\circ}\text{C}$
T4		$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 135^{\circ}\text{C}$
T5	$-40^{\circ}\text{C} \leq T_a \leq 70^{\circ}\text{C}$	$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 100^{\circ}\text{C}$
T6	$-40^{\circ}\text{C} \leq T_a \leq 60^{\circ}\text{C}$	$-253^{\circ}\text{C} \leq T_{\text{process}} \leq 85^{\circ}\text{C}$

Proservo NMS80-aabcddeeffghijklmmnnn + (options)

aa	Approval: BD - ATEX IIC 1/2 G Ex db[ia] IIC T6
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

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	<p>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)</p>
ee	<p>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)</p>
ff	<p>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)</p>
gg	<p>Housing: AB - Transmitter + process Alu, coated BD - Transmitter 316/316L, Process 316/316L internal FEP coated</p>
h	<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>
i	<p>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.</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 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. 1AA - 316L; 30 mm cylindrical</p>

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	1AC - 316L; 50 mm cylindrical
II	Process Sealing; A1 - HNBR -30°C...150°C/ -22°F...302°F B1 - FKM GLT -40°C...200°C / -40°F...302°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-aabcddeeffghijklmmnnn + (options)

aa	Approval: BD - ATEX IIC 1/2 G Ex db[ia] IIC T6
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 + process 316/316L AD - Transmitter Alu coated, process 316/316L internal FEP coated BD - Transmitter 316/316L, Process 316/316L internal FEP coated
h	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.
i	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.
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. 1AA - 316L; 30 mm cylindrical 1AC - 316L; 50 mm cylindrical
ll	Process Sealing; A1 - HNBR -30°C...150°C/ -22°F...302°F B1 - FKM GLT -40°C...200°C / -40°F...302°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-aabcddeeffghijkkllmmnnn + (options)

aa	Approval: BD - ATEX IIC 1/2 G Ex db[ia] IIC T6
b	Terminal Type: 1 - Spring Terminals 2 - Screw Terminals 9 - Special version, TSP-no. to be spec. (not relevant for safety)
c	Power Supply:

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	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: AC - 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	Electrical Connection: A - Thread M20 B - Thread M25 E - Thread NPT1/2" F - Thread NPT3/4"
i	Process Pressure: 2 - 0... 6 bar/600 kPa/87 psi 9 - Special version, TSP-no. to be spec.
jj	Measuring range; Wire; Diameter: A3 - 16 m; PFA>316L; 0.4 mm C1 - 22 m; 316; 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...302°F

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	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.

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 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 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 6 th September 2016 Description of change: Minor editorial corrections through the certificate

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