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: (Type Reference and Name)

Proservo NMS80, NMS81 and NMS83

5 Name of Applicant:

Endress+Hauser Yamanashi Co., Ltd.

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.
- FM Approvals Europe Ltd, notified body number 2809 in accordance with Article 17 of Directive 2014/34/EU of 26th 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 02nd August 2016

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.
- 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:

 $\langle \mathcal{E}_{x} \rangle$

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

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

Damien Mc Ardle

Daries Mchalle

Certification Manager, FM Approvals Europe Ltd.

Issue date: 23rd November 2020

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F ATEX 020 (Mar/2019) Page 1 of 8



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 explosion proof/flame proof 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 explosion proof/flame proof enclosure from the drum compartment and its thickness is equal to or greater than 3 mm. The separation wall has no throughbore.

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, 52-75Vac and 19-64Vdc (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°C ≤ Ta ≤ +60°C	-253°C ≤ T _{process} ≤ 450°C
T2	-40°C ≤ Ta ≤ +55°C	-253°C ≤ T _{process} ≤ 300°C
T3	-40°C ≤ Ta ≤ +50°C	-253°C ≤ T _{process} ≤ 200°C
T4		-253°C ≤ T _{process} ≤ 135°C
T5		-253°C ≤ T _{process} ≤ 100°C
Т6		-253°C ≤ T _{process} ≤ 85°C

Proservo NMS80-aabcddeeffgghijjkkkllmmmnnn + (options)

aa	Approval:		
	BC - ATEX II 1/2 G Ex db [ia] IIC T6T1 Ga/Gb		
b	Terminal Type:		
	1 - Spring Terminals		
	2 - Screw Terminals		
	9 - Special version, TSP-no. to be spec. (not relevant for safety)		
С	Power Supply:		

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F ATEX 020 (Mar/2019) Page 2 of 8



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to EU-Type Examination Certificate No. FM16ATEX0001X

	D 05 264VAC LCD , apparation
	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 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
	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:
, AAA	1AA - 316L; 30 mm cylindrical
	1AC - 316L; 30 mm cylindrical
1	0 10E, 00 mm 0ymanou

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	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.
II	Process Sealing;
	A1 - HNBR -30°C150°C/ -22°F302°F
	B1 - FKM GLT, -40°C200°C / -40°F392°F
	B2 - FFKM GLT -20°C200°C / -4°F392°F
	C1 - CR Chloropren -25°C100°C / -13°F212°F
	D1 - PTFE (wire drum FKM) -100°C200°C/ -148°F392°F
	E1 - VMQ Silicone -45°C200°C/ -49°F392°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-aabcddeeffgghiiikkkllmmmnnn + (options)

Proservo I	NMS81-aabcddeeffgghijjkkkllmmmnnn + (options)		
aa	Approval:		
	BC - ATEX II 1/2 G Ex db [ia] IIC T6T1 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 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		

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F ATEX 020 (Mar/2019) Page 4 of 8



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to EU-Type Examination Certificate No. FM16ATEX0001X

	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
	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.
11	Process Sealing;
11	A1 - HNBR -30°C150°C/ -22°F302°F
	B1 - FKM GLT, -40°C200°C / -40°F392°F
	B2 - FFKM GLT -20°C200°C / -4°F392°F
	C1 - CR Chloropren -25°C100°C / -13°F212°F
	D1 - PTFE (wire drum FKM) -100°C200°C/ -148°F392°F
	E1 - VMQ Silicone -45°C200°C/ -49°F392°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
(opaons)	Options. Not relevant for safety

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	IMS83-aabcddeeffgghijjkkkllmmmnnn + (options)			
aa	Approval: BC - ATEX II 1/2 G Ex db [ia] IIC T6T1 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				
Da	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)			
<i>E</i> e	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			
Es.	Y9 - Special version, TSP-no. to be spec. (not relevant for safety) Secondary I/O Digital Ex d:			
Ff	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			
	B3 - Modbus RS485 + 4 x relay + 4 x module discrete			
	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)			
Ga	Housing:			
Gg	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)			
Н	Process Pressure:			
"	2 - 0 6 bar/600 kPa/87 psi			
	9 - Special version, TSP-no. to be spec.			
1	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.			
	1 - 111 344 141 1 1/2 , 11 30/30 , 14E17// 1 / 1/90 7/401 E1101.			

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	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.			
LI	Process Sealing;			
	A1 - HNBR -30°C150°C/ -22°F302°F			
	B1 - FKM GLT -40°C200°C / -40°F392°F			
	B2 - FFKM GLT -20°C200°C / -4°F392°F			
	C1 - CR Chloropren -25°C100°C / -13°F212°F			
	D1 - PTFE (wire drum FKM) -100°C200°C/ -148°F392°F			
	E1 - VMQ Silicone -45°C200°C/ -49°F392°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 ≥ 85°C for Ta > 50°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.

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F ATEX 020 (Mar/2019) Page 7 of 8



to EU-Type Examination Certificate No. FM16ATEX0001X

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	IMA Approvala		
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		
11 th May 2018	Supplement 2: Report reference: RR213288 dated 01st May 2018. Description of change: Documentation update to include Stainless Steel Tube Housing for NMS83 and minor editorial corrections to the certificate.		
13 th March 2019	Supplement 3: 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	Supplement 4: 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	Supplement 5: Report Reference: –RR221788 dated 30 th January 2020. Description of the Change: Updated Label material and adhesive coating. Specific conditions of use updated.		
15 th July 2020	Supplement 6: Report Reference: –RR223893 dated 13 th July 2020. Description of the Change: 1) Update technical documentation 2) Model code amendments due to power supply updates		
23 rd November 2020	Supplement 7: Report Reference: RR225545 dated 20 th November 2020. Description of the Change:		

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F ATEX 020 (Mar/2019) Page 8 of 8

Blueprint Report

Endress+Hauser Yamanashi Co Ltd (1000004450)

Class No 3615

Original Project I.D. 3057749
Certificate I.D. FM16ATEX0001X
Revision

	Revision		
Drawing No.	<u>Level</u>	<u>Drawing Title</u>	Last Report
960018101	10/11/2015	PrintedCircuitBoard(APP) Proservo ESPSRV_ES_Magnetic_Rotary_Encoder	3057749
960018239	27/04/2016	Tank Gauging Proservo NMS8xuses Tank Gauging Platform (TGP)modules	3057749
960016426	Α	Tank Gauging Platform (TGP) Transmission Code Listing TRC	RR223893
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	E	Technical Description Proservo NMS80/81/83	RR225545
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
960018102	Α	AssemblyPlan(APP) A ProServo ESPSRV_ES_SMS	RR223893
960018103	Α	AssemblyPlan(APP) B ProServo ESPSRV_ES_SMS	RR223893
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	Α	Lettering frontplane cover	RR223893
960018220	D	Nameplate lettering ATEX/IECEx Proservo NMS8X	RR225545
960018221	20/01/2016	Nameplate "spare parts" (TG_Plate form)	3057749
960018224	В	TG-Proservo NMS8x device configuration	RR225545
XA01495G	03.20	Safety Instructions (ATEX/IECEx) Proservo NMS80, NMS81, NMS83	RR225545

23/11/2020 Page 1 of 1