


CERTIFICATE OF CONFORMITY



- HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
- Certificate No:** FM16US0137X
- Equipment:** Tank Side Monitor NRF8x
(Type Reference and Name)
- Name of Listing Company:** Endress+Hauser SE+Co KG
- Address of Listing Company:** Hauptstrasse 1
Postfach 1261
Maulburg, D79689
Germany
- The examination and test results are recorded in confidential report number:
3058798 dated 26th July 2016
- FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:
FM Class 3600:2018, FM Class 3610:2018, FM Class 3611: 2018, FM Class 3615:2018, FM Class 3810:2018, ANSI/UL 121201:2019, ANSI/ISA 61010-1:2012, ANSI/UL 60079-0:2020, ANSI/UL 60079-1:2015, ANSI/ISA 60079-11:2014, ANSI/NEMA 250:2008, ANSI/IEC 60529:2004
- 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 certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

Certificate issued by:



J.E. Marquedant
P, Manager - Electrical Systems

16 September 2020

Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

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US Certificate Of Conformity No: FM16US0137X

10. Equipment Ratings:

Explosionproof Class I, Division 1, Groups B, C, D; providing Intrinsically Safe Connections to Class I, II, III, Division 1, Groups A, B, C, D, E, F, G or Nonincendive Field Wiring Connections to Class I, Division 2, Groups A, B, C, D; Flameproof for Class I, Zone 1, Group IIC, providing Intrinsically Safe Connections to Class I, Zone 0, Group IIC Hazardous (Classified) Locations. Indoor and Outdoor Type 4X, Type 6P, IP66 & IP68. A temperature Class of T6 with an ambient temperature range of -40°C to +50°C, +55°C, or +60°C .

11. The marking of the equipment shall include:

CI I Div 1, GP B, C, D

AIS CL I, II, III DIV 1 GP ABCDEFG

ANI CL I DIV 2 GP ABCD

CL I Zn 1 AEx db [ia Ga] IIC Gb

T6 Ta = -40°C to +50°C, +55°C, or +60°C—refer to drawing XA01532G-B for temperature tables

Type 4X,6P, IP66/68

Entity and NIFW Parameters – refer to drawing XA01532G-B

12. **Description of Equipment:**

General - The Tank Side Monitor NRF8x is a robust gateway used for collecting and integrating tank gauging data in storage and process applications. The NRF8x Tank Side Monitors fulfill the exacting demands of tank inventory management, inventory control, custody transfer, and loss control to be used in conjunction with the Tank Gauging Platform products. The NRF8x Monitors come in two different types of transmitters, the NRF80 and NRF81 which differ only in the allowed options available.

The Tank Side Monitor NRF8x is comprised of certified Tank Gauge Platform Enclosures (FM16US0136U) and certified Tank Gauge Platform Electronic Modules (FM16US0007U). The following enclosures and electronic modules may be used:

Enclosures TRC[03-07-11] and TRC[04-08-12]

Module TRC[00] FP Front Plane Board

Module TRC[01] PS_HV Power Supply, High Voltage

Module TRC[02] PS_LV_AC Power Supply, Low Voltage, AC

Module TRC[03] PS_LV_DC Power Supply, Low Voltage, DC

Module TRC[10] MB Main Board,

Module TRC[20] IOM_A IO Module Analog

Module TRC[21] IOM_A IO Module Analog

Module TRC[31] IOM_D IO Module Digital

Module TRC[32] IOM_Mod_FF IO Module Modbus/FF

Module TRC[33] IOM_V1_WM550 IO Module V1/W550

Construction - The Tank Side Monitor NRF8x Series comprises a single compartment explosionproof/flameproof enclosure with a thread-on window cover —housing the display module and electronics assembly. NRF80 and NRF81 both share the same enclosure, display and electronics assembly. The enclosure for NRF80 and NRF81

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can be Aluminum or Stainless Steel, with 7 integral M20 sized field wiring entries. Integral threaded inserts allow for optional field wiring entry options including M25, ½ NPT or ¾ NPT.

Ratings - The Tank Side Monitor NRF8x operates at 85-264 Vac (28.8 Volt-Amperes), 52-75Vac (21.6 Volt-Amperes) and 19-64Vdc (13.4 Watts). It is rated for use in an ambient temperature range of -40°C to +50°C, +55°C, or +60°C. For further information regarding the Temperature Class and Ambient Temperature Ranges, refer to the temperature and configuration tables.

Tank Side Monitor NRF80-aabccdfgghiii + (options)

aa	Approval: FD - FM/CA XP-AIS Cl. I, Div. 1 Gr. B-D, AEx db [ia Ga] IIC, T6 Gb
b	Terminal Type: 1 - Spring Terminals 2 - Screw Terminals 9 - Special version, TSP (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: E1 - 4-20mA HART Exd
ee	Secondary I/O Analog: No options for the NRF80
ff	Secondary I/O Digital Ex d: No options for the NRF80
gg	Housing: AA - Transmitter Housing Aluminum coated. BA - Transmitter Housing 316/316L Y9 - Transmitter Housing 316/316L special coating for e.g. marine applications
h	Electrical Connection: A - Thread M20 B - Thread M25 E - Thread NPT1/2" F - Thread NPT3/4"
iii	Accuracy, Weight + Measure Approval: Any 3 characters combinations (not relevant for safety)
(options)	Options: not relevant for safety

Tank Side Monitor NRF81-aabcddeeffgghiii + (options)

aa	Approval: FD - FM/CA XP-AIS Cl. I, Div. 1 Gr. B-D, AEx d [ia] IIC, T6
b	Terminal Type: 1 - Spring Terminals 2 - Screw Terminals 9 - Special version, TSP (not relevant for safety)
c	Power Supply:

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	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 H1 - 4-20mA HART Ex i Y9 - Special Version (not relevant for safety)
ee	Secondary I/O Analog: A1 - Ex d/XP – 1 x 4-20mA HART; 1 x RTD Input A2 - Ex d/XP – 2 x 4-20mA HART; 2 x RTD Input B1 - Ex i/AIS – 1 x 4-20mA HART; 1 x RTD Input B2 - Ex i/AIS – 2 x 4-20mA HART; 2 x RTD Input C2 - Ex i/AIS – 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 (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 - Modusbus RS485 B2 - Modusbus RS485 + 2 x relay + 2 x module discrete B3 - Modusbus 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 E2 - W550 + 4 x relay + 4 x module discrete X0 - Prepared for I/O digital Ex d Y9 - Special Version (not relevant for safety)
gg	Housing: AA - Transmitter Housing Aluminum coated. BA - Transmitter Housng 316/316L Y9 - Transmitter Housng 316/316L special coating for e.g. marine applications
h	Electrical Connection: A - Thread M20 B - Thread M25 E - Thread NPT1/2" F - Thread NPT3/4"
iii	Accuracy, Weight + Measure Approval: Any 3 characters combinations (not relevant for safety)
(options)	Options: not relevant for safety

13. Specific Conditions of Use:

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1. Flamepath joints are not for repair. Contact the manufacturer.
2. Use heat resisting cables rated $\geq 85^{\circ}\text{C}$ for $T_a > 50^{\circ}\text{C}$.
3. Precautions shall be taken to minimize the risk from electrostatic discharge of non-metallic labels, varnishes/coatings on the stainless steel 316L, and isolated metal tags applied to the enclosure.
4. To maintain the ingress protection ratings (IP66/68), Teflon tape or pipe dope is required for blanking plugs.
5. Explosionproof certified seals are required within 450 mm (18") for Group B, C, D and within 50mm (2") for Group IIC on all used housing entries.

14. Test and Assessment Procedure and Conditions:

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. Schedule Drawings

A copy of the technical documentation has been kept by FM Approvals.

16. Certificate History

Details of the supplements to this certificate are described below:

Date	Description
26 th July 2016	Original Issue.
25 th August 2016	<u>Supplement 1:</u> Report Reference: RR206266 dated 25 th August 2016. Description of Change: Corrected typographical errors in the "Specific Conditions of Use" and option coding.
11 th September 2018	<u>Supplement 2:</u> Report Reference: PR450757 dated 11 th September 2018. Description of Change: 1) Addition of Stainless Steel Enclosure option. 2) Updated the year on FM Class 3600, FM Class 3615 and FM Class 3810 standards due to nontechnical changes in the latest editions of these standards.
16 th September 2020	<u>Supplement 3:</u> Report Reference: PR457796 dated 16 th September 2020. Description of Change: 1) FM3610, FM3611 updated to latest edition (2018) 2) ANSI/UL 60079-0 updated to Edition 7 (2020) 3) ANSI/UL 121201:2019 added to standards assessment list 4) Model code amendments due to Tank Gauge Platform electronic module updates and enclosure updates to add special coating for marine applications 5) Specific Condition of Use 3) revised due to updated enclosure option

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