

APPROVAL REPORT

PROSERVO TANK GAUGE AND PROMONITOR TANK SIDE MONITOR FOR HAZARDOUS (CLASSIFIED) LOCATIONS

Prepared For:

Sakura Endress Co. Ltd.
Yamanashi Operation Center
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Higashi Yatsushiro gun
Yamanashi 406 Japan

J.I. 3002536
(3615)
May 25, 1999

FACTORY MUTUAL



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I INTRODUCTION

1.1 Sakura Endress Co. Ltd. (manufacturer) requested Factory Mutual Research Corporation (FMRC) Approval of their PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor as explosionproof for use in Class I, Division 1, Groups A, B, C and D (Groups C and D for the PROSERVO Tank Gauge); dust-ignitionproof for Class II/III, Division 1, Groups E, F and G hazardous (classified) locations, indoors and outdoors (NEMA 4X). CSA International performed the examination and testing for possible FMRC Approval based on the inter-laboratory agreement between FMRC and CSA.

1.2 Approval of the PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor is based on the applicable requirements of the following standards.

TITLE	AUTHOR-NUMBER	DATE
Electrical Equipment for Use in Hazardous (Classified) Locations: General Requirements	FM-3600 *	1989
Explosionproof Electrical Equipment General Requirements	FM-3615 *	1989
Electrical and Electronic Test, Measuring, and Process Control Equipment	FM-3810 *	1989
Enclosures For Electrical Equipment	ANSI/NEMA 250	1991

* These standards are based in large part on standards recognized by the American National Standards Institute.

1.3 The FMRC listing for the PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor will appear in the FMRC Approval Guide as follows:

NMS 53a5bcdefghijkl PROSERVO Tank Gauge.

XP/I/1/CD/T4 Ta=60°C; DIP/II,III/1/EFG/T4 Ta=60°C; Type 4X

- a = Pressure ratings 1, 2, 4, 5 or 6.
- b = Measuring function A, B, C, D, E or F.
- c = Primary (digital) output A, B, C, D, E, F, G, H or J.
- d = Secondary output 0, 1, 2, 3 or 4.
- e = Signal input from field units 0, 1, 2 or 3.
- f = Measuring range, wire material A, B, C, G, H, J or K.
- g = Cable entry G or H.
- h = Process connection A, C, E, G, J, L, N, Q or S.
- i = Power supply 3 or 4.
- j = Displacer shape/diameter/material B, D, K, N, R, S or T.
- k = O-ring, chamber finishing 1, 2, 3, 4 or 5.
- l = Options A, C, D, E, F, G or H.

NRF 5604Bab1 PROMONITOR Tank Side Monitor.

XP/I/1/ABCD/T4 Ta=60°C; DIP/II,III/1/EFG/T4 Ta=60°C; Type 4X

- a = Power supply 3 or 4.
- b = Mounting bracket 1 or 2.

1.4 As described by this report, the design and construction of the PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor provide for the required degree of protection against electrical shock, fire, and injury required for hazardous (classified) locations. Installation shall be in accordance with the manufacturer's instructions and applicable code requirements.

II DESCRIPTION

For a description on the PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor, refer to the attached CSA findings reports LR 112761-1 and LR 112761-2. FMRC Approval of the PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor for Whessoe Varc as described in Sections 1.2 of the CSA findings reports will be the subject of a separate FMRC Approval report.

III MARKING

The PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor are each provided with an aluminum data plate that is permanently attached. The data plate markings are reproduced from drawing numbers Ex17-142 and Ex22-140, which are included as attachments to this report.

IV EXAMINATION AND TESTS

The attached CSA findings reports, LR 112761-1 and LR 112761-2, describe the examination and testing that CSA performed towards FMRC Approval of the PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor. A review of the CSA reports found that examination and testing of the PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor to be satisfactory for FMRC Approval. All data is on file at FMRC along with other documents and correspondence applicable to this program. The following satisfactory examination and tests for the PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor were abstracted from the attached CSA reports and from the manufacturer's design documentation that FMRC controls.

- Explosionproof examination and testing for Class I, Division 1, Groups A, B, C and D (Groups C and D for the PROSERVO Tank Gauge) hazardous (classified) locations for a 60°C maximum ambient temperature rating.
- Dust-ignitionproof examination and testing for Class II/III, Division 1, Groups E, F and G hazardous (classified) locations.
- Temperature examination and testing for a T4 temperature code marking.
- Process pressure testing on the PROSERVO Tank Gauge for a maximum working pressure rating of 25 bar (363 psi).
- Environmental NEMA 4X examination and testing.
- Examination and testing to verify protection against injury and shock.

V REMARKS

Installation shall be in accordance with the manufacturer's instructions and the National Electric Code, ANSI/NFPA-70.

VI FACILITIES AND PROCEDURES AUDIT

The design and manufacturing of the PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor are controlled by Sakura Endress Co. Ltd., Yamanashi 406 Japan. This facility is subject to follow-up audit inspections. The facility and quality control procedures were examined as part of this program and were found to be satisfactory to manufacture the product identical to that described herein.

VII MANUFACTURER'S RESPONSIBILITIES

7.1 The manufacturer shall advise FMRC of all proposed changes to the documents listed in Section IX via form 797, Approved Product Revision Report.

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7.2 On 100% of production, the PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor shall be dielectric tested. A test voltage potential of 1000 Vac or 1400 Vdc shall be applied between the supply input terminals and the protective ground terminal for one minute with no occurrence of insulation breakdown. Alternatively, test voltage potentials 20% higher may be applied for at least one second.

WARNING: The dielectric test required may present a hazard of injury to personnel and/or property and should only be performed under controlled conditions, and by persons knowledgeable of the potential hazards of such testing to minimize the likelihood of shock and/or fire.

7.3 On 100% of production, the manufacturer shall conduct a visual inspection for the presence of the protective ground terminal on the PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor.

VIII CONCLUSION

Sakura Endress Co. Ltd. PROSERVO Tank Gauge and PROMONITOR Tank Side Monitor, as herein described, meet FMRC Approval requirements. Approval is effective when the Approval Agreement is signed and received by FMRC.

IX CRITICAL DOCUMENT LIST

The following documentation is applicable to this equipment and is on file at FMRC. No changes of any nature shall be made unless notice of the proposed change has been submitted and written authorization obtained from FMRC. The Approved Product Revision Report, FMRC Form 797, shall be forwarded to FMRC as notice of proposed changes.

Document	Title	Revision
318519-0X18B00	CLOSED COVER	A
318520-001XBCB	PRO-LINE MAIN BODY MACHINED	B
318524-0018B0A	COVER WITH WINDOW	A
318579-X0XXB00	REDUCTION RING	12.12.94
4-50407-1	NMS RFI FILTER LNF-2 PRINT LAYOUT	1
4-50414	LNF-2A CD-L410 Ex PARTS LAYOUT	1
960326-3055 A	COVER F5	A
960339-1022 A	VENT PLUG ASSEMBLY	A
Ex17-102	NMS530 DETAIL DRAWING	97/9/04
Ex17-102-1	NMS530 DETAIL DRAWING	98/10/27
Ex17-103	NMS530 ASSEMBLY DRAWING	97/9/04
Ex17-103-1	NMS530 ASSEMBLY DRAWING	98/10/27
Ex17-104	EXPLODED DRAWING (1)	97/9/04
Ex17-105	EXPLODED DRAWING (2)	97/9/04

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Ex17-107	REDUCTION RING	97/9/04
Ex17-108	NMS 531/534 CALIBRATION WINDOW	97/9/04
Ex17-109	NMS 532/535/536 CALIBRATION WINDOW	97/9/04
Ex17-110	NMS 53X OUTLINE DRAWING	97/9/04
Ex17-110-1	NMS 53X OUTLINE DRAWING	98/10/27
Ex17-112	NMS 53X DRUM ASSEMBLY	97/9/04
Ex17-119	NMS 53* SERIES TERMINAL CONNECTION	3
Ex17-142	TAG PLATE FM (PROSERVO)	97/09/08
Ex17-261	DIMENSIONAL DWG, CYLINDRICAL GAP	1
Ex17-45	POW-4A PARTS LIST POWER SUPPLY	97/08/20
Ex17-49	POW-4C PARTS LIST POWER SUPPLY	97/08/25
Ex22-140	TAG PLATE FM (PROMONITOR)	97/09/08
Ex22-25	PARTS LIST RFI FILTER	97/07/31
Ex22-26	CIRCUIT DIAGRAM RFI FILTER	95/10/27
Ex22-27	COMP. LAYOUT RFI FILTER	95/10/27
Ex22-28	PARTS LIST TERMINALS	97/07/31
Ex22-29	CIRCUIT DIAGRAM TERMINALS	1
Ex22-30	CIRCUIT LAYOUT TERMINALS	1
Ex22-92	3D DRAWING, PROMNITOR	97/08/28
Ex22-97	NRF 560 THREADED PLUG	97/9/04
L4-3597-3	Ex d[ia] TYPE TERMINAL, PCB ASSY DWG	3
L4-3642-2	LNF-2 CD-L410 Ex PARTS LAYOUT	2
L4-3848-1	NOISE FILTER LNF-2 CIRCUIT DIAGRAM	1
L4-386-4	P.C.B. CIRCUIT DIAGRAM	4
L4-4006	NMS RFI FILTER LNF-2 PRINT LAYOUT	98/10/26
L4-4007	NMS TERMINALS CCM-3 PRINT LAYOUT	98/10/26
L4-4008	NRF TERMINALS CD-L397 LAYOUT	98/10/26
L4-4009	PARTS LIST RFI FILTER	98/10/26
SAE01.1030-AZ	POW-4 SCHALTNETZTEIL HIGH/LOW VOLT.	04
SAE01.1030-ES	POW-4 SCHALTNETZTEIL HIGH/LOW VOLT.	5
SAE01.1030-KZ	POW-4 SCHALTNETZTEIL HIGH/LOW VOLT.	03
TI 005N/08/en	TECHNICAL INFORMATION, PROMONITOR	03.99
TI 006N/08/en	TECHNICAL INFORMATION, PROSERVO	03.99

TESTS AND EXAMINATION BY: CSA - R. Wildish
EXAMINATION BY: FMRC - A. Lozinski

ATTACHMENTS: PROMONITOR Tag Plate Drawing Ex22-140.
PROSERVO Tag Plate Drawing Ex17-142.
PROMONITOR Technical Information Document TI 005N/08/en.
PROSERVO Technical Information Document TI 006N/08/en.
CSA Reports LR 112761-1 (Pages 1 - 14, 19) and and LR 112761-2
(Pages 1 - 6, 9), dated April 9, 1999.

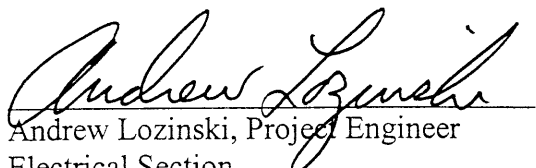
FACTORY MUTUAL RESEARCH CORPORATION

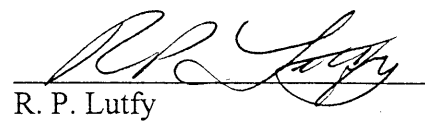
Job Identification 3002536

ORIGINAL DATA: CSA International.

REPORT BY:

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