

APPROVAL REPORT

**TANK SIDE INDICATOR MODEL 977 FOR
TYPE 854 LEVEL GAUGES AND
TYPE 877 INDICATOR
for
HAZARDOUS (CLASSIFIED) LOCATIONS**

Prepared For:

**Enraf B.V.
Roentgenweg 1
2624 BD Delft
The Netherlands**

J.I. 3004639

**(Cross Ref. 3Q2A9.AX, 5Y2A9.AX, 2Q1A6.AE, 0T0A2.AX, 3004637)
(3610)**

February 1, 2000

FACTORY MUTUAL



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TANK SIDE INDICATOR MODEL 977 FOR
 TYPE 854 LEVEL GAUGES AND TYPE 877 INDICATOR
 FOR USE IN
 HAZARDOUS LOCATIONS

from

ENRAF B.V.
 ROENTGENWEG 1
 2624 BD DELFT
 THE NETHERLANDS

I INTRODUCTION

1.1 Enraf B.V. requested Approval of the apparatus listed in Section 1.2 to be in compliance with the applicable requirements of the following standards:

<u>Title</u>	<u>Class No.</u>	<u>Issue Date</u>
Electrical Equipment for Use in Hazardous (Classified) Locations, General Requirements	Class No. 3600	November 1998
Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II and III, Division 1, Hazardous (Classified) Locations <i>Note: 1.5 factor applied to voltage and current rather than energy.</i>	Class No. 3610	October 1988
Electrical and Electronic Test, Measuring, and Process Control Equipment	Class No. 3810 (Supplement No. 1)	March 1989 (1995)

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1.2 The following apparatus was evaluated as intrinsically safe for Class I, Division 1, Groups C and D in accordance with entity requirements and Control Document US1_591_0977.800-40, Rev.3 hazardous outdoor (Type 4) locations and will appear in the Approval Guide as follows:

a**b977cdF. Tank Side Indicator Model 977

IS / I / I / CD / T4 Ta = 65°C - US1_591_0977.800-40/3; Entity ; Type 4

Max. Entity Parameters: Vmax = 23V, Imax = 432mA, Pmax = 1.57W, Ci = 2nF, Li = 0

a = Sealing facilities U or X

b = Options A, B, C or D

c = Mounting Arrangements A, B, C or S

d = Cable entry G, N or S

* = Position not used.

1.3 The Model 977 serves to display level, temperature or other gauge data from the following Enraf equipment:

- 854ATG level gauges (FM Approved under 3Q2A9.AX)
- 854XTG level gauges (FM Approved under 5Y2A9.AX)
- 877 Series indicator (FM Approved under 2Q1A6.AE & 0T0A2.AX) which contains the XPU/2 Interface Unit currently being examined under J.I. 3004637.

II DESCRIPTION

2.1 The Tank Side Indicator is intended for connections to Approved equipment as mentioned in Section 1.3 above. The unit is a two wire indicator comprised of three printed wiring boards. The electronics are housed in an aluminum alloy enclosure having a NEMA Type 4 rating. The operating ambient temperature range is -40°C to +65°C.

III EXAMINATION AND TESTS

3.1 **General** - Representative samples of the TSI 977 were examined and tested by KEMA Certification Services, under their Project No. 99.3392-1, to determine their acceptability for use in the specified hazardous locations. Examination and testing by KEMA was conducted under the guidelines set forth within the Factory Mutual Research/KEMA Contracts Testing and Reports Agreement. Test results compiled by KEMA have been satisfactorily reviewed by Factory Mutual Research and are attached to this report.

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IV MARKING

Marking meets standard requirements as illustrated by the attachment.

V REMARKS

5.1 Installation shall be in accordance with the manufacturer's instructions and the National Electrical Code (ANSI/NFPA 70).

5.2 Tampering or replacement with nonfactory components may adversely affect the safe use of the system.

5.3 Control Room equipment connected to associated apparatus should not use or generate more than 250 Vrms.

5.4 For guidelines on installation, see ANSI/ISA RP12.6-1995, "Wiring Practices for Hazardous (Classified) Locations. Instrumentation, Part I: Intrinsic Safety"

VI FACILITIES AND PROCEDURES AUDIT

Enraf B.V. maintains a manufacturing facility in Delft, The Netherlands that is subject to follow-up audit inspections. The facilities and quality control procedures in place have been found satisfactory to manufacture product identical to that examined and tested as described herein.

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VII MANUFACTURER'S RESPONSIBILITIES

7.1 Documentation that is applicable to this Approval is on file at Factory Mutual Research and listed in Documentation File, Section VIII, of this report. No changes of any nature shall be made unless notice of the proposed change has been given and written authorization obtained from Factory Mutual Research. The Approved Product - Revision Report, Factory Mutual Research Form 797, shall be forwarded to Factory Mutual Research as notice of proposed changes.

7.2 The manufacturer is required to supply all users with Control Drawing US1_591_0977.800-40.

VIII DOCUMENTATION FILE

<u>Document No.</u>	<u>Title</u>	<u>Revision</u>
EN1-115-2075.500-4	Label	3
EN1-162-2075.500-4	Label	1
D-SPY-0058-1	Schematic, PCB1	1
D-SPY-0059-1	Schematic, PCB2	1
D-SPY-0060	Interconnection Diagram	0
P-97-3133	PWB Assembly, PCB1	0
P-97-3131	PWB, PCB1, solder side	0
P-97-3132	PWB, PCB1, component side	0
PCB-1, 2 shts	Parts List	2
P-97-3130-1	PWB Assembly, PCB2	1
P-97-3128-1	PWB, PCB2, solder side	1
P-97-3129-1	PWB, PCB2, component side	1
PCB-2, 2 shts	Parts List	2
D-SPY-0057	PWB, PCB3	0
PCB-3	Parts List	2
US1-115-0977.810-4	Enclosure of the unit	0
US1-591-0977.800-4	Control Drawing	3

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IX CONCLUSION

The apparatus described in Section 1.2 meets Factory Mutual Research requirements. Approval is granted when the Approval Agreement is signed and received by Factory Mutual Research.

EXAMINATION AND TESTS BY: Henk Zetzema, KEMA Certification Services


REVIEWED BY: Cheryl A. Gagliardi, Factory Mutual Research

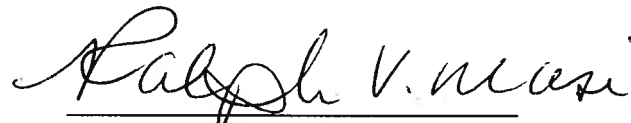
ORIGINAL DATA: Project Data Record 3004639
KEMA Report No. 99.3392-1
Attachment 1 to Assessment Report No. 99.3392-1, 2 Pages

ATTACHMENTS: KEMA Assessment Report No. 99.3392-1, 9 Pages
Attachment 1 to Assessment Report No. 99.3392-1, 2 Pages
Label Dwg., EN1-115-2075.500-4, Rev.3
Label Dwg. EN1-162-2075.500-4, Rev. 1
Control Drawing US1-591-0977.800-4, Rev. 3

WRITTEN BY:

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