APPROVAL REPORT

FTE 31 LEVEL LIMIT SWITCH

for

HAZARDOUS (CLASSIFIED) LOCATIONS

Prepared For:

Endress + Hauser Wetzer GmbH + Co. KG
Obere Wank 1
D-87484 Nesselwang
Germany

J.I. 3006821
(3616)

July 10, 2000

FACTORY MUTUAL | Factory Mutual System

1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, Massachusetts 02062

FACTORY MUTUAL

Factory Mutual Research Corporation
1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, Massachusetts 02062

3006821
(3616)

July 10, 2000

FTE 31 LEVEL LIMIT SWITCH
for
HAZARDOUS (CLASSIFIED) LOCATIONS
from
ENDRESS + HAUSER WETZER GmbH + Co. KG
OBERE WANK 1
D-87484 NESSELWANG
GERMANY

I INTRODUCTION

1.1 **Standards** - Endress + Hauser Wetzer GmbH + Co. KG requested Approval of the apparatus listed in Section 1.2 to be in compliance with the applicable requirements of the following standards:

Title	Class No.	Issue Date
Electrical Equipment for Use in Hazardous (Classified) Locations, General Requirements	3600	November1998
Electrical and Electronic Test, Measuring, and Process Control Equipment	3810 (Supplement #1)	March 1989 1995
Enclosures for Electrical Equipment (1000V max)	NEMA Pub. 250	1991

1.2 **Listing** - The following was examined as dust-ignitionproof for Class II and III, Division 1, Group E, F and G hazardous (classified) outdoor (NEMA 4X) locations and will appear in the Approval Guide as follows:

FTE 31-Bbcde. Level Limit Switch.
DIP/II,III/1/EFG/T5 Ta=60°C; Type 4X

b = Power supply A (230 Vac), B (115 Vac), C (24 Vdc).
c = Process connection A (plastic) or B (stainless steel).
d = Shaft type and length 1, 2, 3, A, B, C, D, E or F.
e = Paddle options 1 (standard) or 2 (hinged).

II DESCRIPTION

2.1 **General** - The FTE 31 is a level limit switch for solids. It operates on the principle of a rotating paddle that when in contact with the process will stop rotating and operate a switch contact. The unit operates from nominal power supply voltages of 24 Vdc, 115Vac or 230Vac. Power requirements are 4.5 VA or 66mA dc. The FTE 31 has an operating ambient temperature range of -20°C to 60°C.

2.2 **Enclosure** - The enclosure is constructed of polymeric material, GE VALOX 553. This material is UL Recognized, and has been ultraviolet (UV) tested. It has a flammability rating of 94-V0. The enclosure has a threaded cover that engages the base housing with a minimum three full threads, and is fitted with a 1/8 in. dia. O-ring around the top of the threads. An opening in the bottom of the housing is fitted with a plastic (VALOX 553) or stainless steel process connection, secured with four screws and sealed with a 4mm dia. O-ring. The drive axle is fitted through two bearings, each ½ in. length with maximum gap of 0.004 in. and secured with two c-clips. The axle is also fitted with a "Simrit" BAU2 12-28-7 seal. The body has an integral entry fitted with a stainless steel ½" NPT conduit adapter and a second entry fitted with a plug, both secured in place with "Loctite".

The enclosure houses the field wiring terminal, motor/drive axle assembly and control switches. Devices with a DC input also contain an electronic Printed Wiring Assembly (PWA) used to drive the motor. The PWA is completely encapsulated within its own potting shell.

III EXAMINATION AND TESTS

3.1 **General** - The FTE 31 Level Limit Switch was examined and tested by the Canadian Standards Association (CSA) under their File No. 200600-250008324 to determine acceptability for use in the specified hazardous locations. Examination and testing was conducted in accordance with the Factory Mutual Research/CSA inter-laboratory agreement for mutual recognition of test results. CSA test results were reviewed by Factory Mutual Research and found to be satisfactory. The CSA examination results are contained in the attachment to this report.

3.2 **Surface Temperature** - Temperature testing determined that the surface temperature rise is not more than 34C°. The FTE 31 maximum surface temperature is 94°C referred to its maximum operating temperature of 60°C and requires a Temperature Identification Number marking of T5. This surface temperature is less than the 165°C maximum temperature allowed for Group G dusts.

Ta=60°C Temperature Identification Number = T5

IV MARKING

The marking meets standard requirements as illustrated by the attachment.

V REMARKS

5.1 Manufacturers Instructions and the National Electrical Code (ANSI/NFPA 70) shall be followed when installing this equipment.

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

VI FACILITIES AND PROCEDURES AUDIT

The manufacturing site in Nesselwang, Germany are examined on a periodic basis with regard to facilities and quality control procedures. Results are satisfactory in that the level of performance assures continued product quality as originally Approved herein.

VII MANUFACTURER'S RESPONSIBILITIES

7.1 The documentation listed in Section VIII is applicable to this Approval and is on file at Factory Mutual Research. 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.

VIII DOCUMENTATION

The following documentation is applicable to this Approval and is on file at Factory Mutual Research Corporation.

Document No.	Title	Rev
03 17 05 050	Nameplate, FTE 31	A
03 17 05 000	Assembly, FTE 31	11.02.99
03 17 05 010	Cover, Complete	22.02.99
03 17 05 040	Cover, Complete, 316L	22.02.99
03 17 05 030	Engine with driving Axle, FTE 31	11.02.99
03 17 05 035	Driving Axle, FTE 31	11.02.99
03 17 02 020	Assembly, Plate	11.02.99
03 17 01 010	Schematic, Power Supply	17.02.97
51000917	FTE 31 Instruction Manual, KA 094R/09/a3/04.00	04.00

IX CONCLUSION

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

EXAMINATION AND TESTS BY: Grant Lewis, Canadian Standards Association

ATTACHMENTS: Nameplate Drawing 03 17 05 050, Rev. A
CSA Report, 7 Pages

COPY OF TEST DATA: Project Data Record 3006821

WRITTEN BY:

Ralph V. Masi, P.E.
Instrumentation Section
Approvals Division

REVIEWED BY:

R. H. Lelievre, Assistant Manager
Instrumentation Section
Approvals Division