Factory Mutual System

Factory Mutual Research

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0R6A2.AE
(3615)

August 8, 1989

PULSE POINT LP-100
ULTRASONIC LEVEL CONTROL
FOR
HAZARDOUS LOCATIONS

from

BINDICATOR COMPANY
1915 DOVE STREET
P.O. BOX 9
PORT HURON, MI 48060

I INTRODUCTION

1.1 Bindicator Company requested Approval of their Pulse Point LP-100 Ultrasonic Level Control for process control applications in Class I, Division 1, Groups C & D and Class II, Division 1, Groups E, F, & G, indoors.

1.2 The equipment described by this report was determined to comply with the applicable requirements of the following standards.

Explosionproof Electrical Equipment	FMRC-3615
Electrical Equipment for use in Hazardous Locations	FMRC-3600
Dust-Ignitionproof Electrical Equipment	FMRC-3616
Enclosures for Electrical Equipment	NEMA-250

1.3 The Model Pulse Point LP-100 Ultrasonic Level Control will be listed in the Factory Mutual Approval Guide as follows:

EXP/I/1/CD; DI/II/1/EFG

Pulse Point Ultrasonic Level Control. Model LP-100-a-A-b-X-A-10-0.

a = Tuning Fork 1, 2, 3, or 4.

b - Voltage 1,2

1.4 This report supplements Report J. I. No. 2J3A4.AX which originally described another version of the manufacturer's level control that utilized the same enclosure as the new Model Pulse Point LP-100, but with a different electronics and probe assembly. The Pulse Point LP-100 Ultrasonic Level Controls with pipe extensions, and general purpose enclosure, are not included in this program as requested by the manufacturer.

1.5 As described by this report, the construction of the subject equipment provides the 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 the National Electrical Code.

II DESCRIPTION

2.1 The Pulse Point LP-100 Ultrasonic Level Control utilizes a freely oscillating tuning fork to detect high and low levels in bins, tanks and silos. It uses two piezoelectric crystals, one to resonate the fork and the other to sense the loss of resonance. The sensor can be used to detect the presence or absence of granular, solid or powder materials.

2.2 The Pulse Point LP-100 Ultrasonic Level Control consists of an electronics assembly, explosionproof enclosure, and level sensing probe assembly.

2.2.1 The electronics assembly and level sensing probe assembly are manufactured by Endress + Hauser, Inc., Greenwood, IN. The assemblies are Approved having an enclosure of their own design as described by Factory Mutual Research Corporation Report J. I. No. 0H6A2.AE. The probe assembly is constructed of 316 stainless steel with Rilsan® or Teflon® coating.

2.2.2 The electronics assembly is installed in an explosionproof enclosure manufactured by Bindicator Company. This enclosure was part of another level control model which is currently Approved as described by Factory Mutual Research Corporation Report J. I. No. 2J3A4.AX. The housing is constructed of polyester coated aluminum with overall dimensions approximately 6 in. x 7 in. x 7 in. A 3/4 in. Conduit entry is provided on the side of the enclosure.

2.3 Additional description of the Pulse Point LP-100 can be found in the attached literature.

III MARKINGS

The manufacturer's metallic label is permanently attached to the Pulse point LP-100 housing. The label drawings, LVP130028 and LVP130035 are included as attachments to this report.

IV EXAMINATION AND TEST

4.1 The Pulse Point LP-100 Level Control was examined and tested. The major emphasis of the test program was to verify the required degree of protection against electrical shock and injury. The enclosure, electronics and probe assemblies have been tested as part of other product assemblies (see paragraph 1.4). Explosionproof and dust-ignitionproof examination and test results originally obtained are considered appropriate for the new assembly without further testing.

4.2 Protection Against Electrical Shock and Injury

4.2.1 Dielectric Tests - The insulation of all power circuits of the sensor were tested at 1480 Vrms, 60 Hz. During the test, the potential was held for one minute without dielectric breakdown of the insulation. This is satisfactory.

4.2.2 Protective Grounding - A terminal is provided within the equipment enclosure as the protective ground terminal. It has been verified that all accessible conductive components of the level sensor that would become live in the event of a fault are bonded to this point with a resistance of less than 0.1 ohms. This is satisfactory.

4.2.3 Excessive Temperature - Recorded temperatures of accessible parts resulted in a maximum recorded temperature rise of 13°F (7°C) on the top surface of the housing. The ambient temperature at the time of the test was 75°F (24°C). This increase is well within the acceptable maximum rise limit of 63°F (35°C) on enclosure surfaces.

4.2.4 Protection From Accessible Live Parts - There are no live parts accessible on the level sensor when tested with the IEC rigid and articulated finger probes. This is satisfactory.

V MANUFACTURER'S RESPONSIBILITIES

5.1 The manufacturer shall advise Factory Mutual Research Corporation of all proposed changes to the documentation file in Section VIII.

5.2 On 100% of production, the Pulse Point Model LP-100 shall be dielectric tested. The power input connections and associated circuitry shall withstand for one minute, with no insulation breakdown, the application of 1000 Vac or 1400 Vdc with respect to the protective ground terminal. Alternatively, test 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.

5.3 On 100% of production, the manufacturer shall conduct routine continuity tests of the protective grounding system.

VI FACILITIES AND PROCEDURES AUDIT

The manufacturer's design and manufacturing facilities in Port Huron, Michigan are subject to follow-up audit inspections by Factory Mutual Research Corporation. The facilities and quality control procedures in place have been found to be satisfactory to manufacture the product identical to that tested and Approved.

VII CONCLUSION

The Model Pulse Point LP-100 Level Control, as described in this report, meets Factory Mutual Research Corporation Approval requirements. Approval is effective when the Approval Agreement is signed and received by Factory Mutual Research Corporation.

VIII DOCUMENTATION FILE

The following documentation is applicable to this equipment and is on file at Factory Mutual Research Corporation. 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 Corporation. The Approved Product - Revision Report, FMRC From 797, shall be forwarded to Factory Mutual Research Corporation as notice of proposed changes.

Document No.	Description	Rev.	Date
LVP180001	LP-100 INST AND OPER MANUAL	ORIG	10/88
LVP1E0000	COSTOMER OUTLINE DRAWING	ORIG	06/29/88
LVP1E0004	COSTOMER HOOKUP	ORIG	08/22/88
LVP110011-C	PCB ASSEMBLY	A	09/06/88
LVP130044	HOOK-UP LABEL	ORIG	02/13/89
LVP120011	ALUM COVER MACHINED XP	ORIG	09/19/89
LVP120003	HOUSING CONNECTOR	ORIG	07/21/88
LVP130040	CAUTION LABEL	ORIG	09/19/88
LVP120018	ISO CONVERSION FITTING	ORIG	10/04/88
LVP120000	FRAME MACHINED EX/P	A	09/30/88
LVP110005-C	POWER BOARD PCB ASSEMBLY	C	11/22/88
LVP1S0001	PLUS SCHEMATIC	ORIG	09/19/88
LVP110004	AMPLIFIER PCB ASSEMBLY	B	10/11/88
LUB041840	COVER, CAST	ORIG	01/14/76
LVP100116-C	EX/P INTEGRAL FINAL ASSY	ORIG	09/19/88
LVP130028	NAMEPLATE EX/P 120VAC	ORIG	08/12/88
LVP 130029	NAMEPLATE EX/P 240VAC	ORIG	08/12/88

EXAMINATION AND TESTING BY: D. C. Anderson

ORIGINAL DATA: Test notebook No. 89-347

ATTACHMENTS: Sales Brochure - LVP180000 (10/88)
Nameplate 120 Vac - LVP130028
Nameplate 240 Vac - LVP130029

REPORT BY:

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