SM-419B

Installation, Operation and Maintenance Instructions

MAGNET LOAD MONITOR

SERIES FS MICROPROCESSOR

ERIEZ WORLD HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506–1402 U.S.A.
WORLD AUTHORITY IN SEPARATION TECHNOLOGIES

Description

Magnet Load Monitor Series FS Microprocessor-based sensor for monitoring changes in magnetic fields.

Introduction

The Magnet Load Monitor (MLM) was designed to provide a means of monitoring a suspended electromagnet as it is loaded with ferrous metal. After adjustment to the magnet field at the probe location, a relative change in magnetic field is displayed on an LED bar indicator.

Features

The MLM is designed around a microprocessor and high-sensitivity magnetic sensor. It is packaged in an impact-resistant NEMA 4X polycarbonate housing.

The magnetic-sensor probe is provided with 25' (7.6 m) of cable. (Longer cables are optional.) The probe holds the sensor inside a stainless-steel sleeve. This sleeve is mounted in a fixture, which is attached to the side of the magnet. This fixture, constructed of aluminum, allows two-axis rotation of the probe.

The sensor is linear in response to magnetic fields up to 600 gauss. An internal temperature- monitoring function maintains the linearity of the magnetic sensor as the probe changes temperature.

A series of LED's provides a display showing the relative change in magnetic field.

A relay (SPDT 8 amps, 250VAC) is provided to drive an optional or customer-provided alarm device. Stepped-sensitivity adjustment allows gauss sensitivity per LED to vary. This adjustment also allows the user to vary the magnetic-field magnitude that will cause the relay to trigger. The relay trip will occur when the field either increases or decreases.

The auto-zero function helps in setting up the MLM for operation. Pressing the button located on the face of the control will bring the MLM to a zero state within a few seconds.

The unit is easily adjustable for international operation by a front-panel switch. Operation at either 115 VAC or 220 VAC is selected during initial installation.

Applications

The MLM is intended specifically for use with any suspended electromagnet (SE). It is successful because of the nature of the design of an SE. The probe is to be mounted on the vertical side of an SE. It is not intended for operation on or below the face of the magnet. The intention is to measure fringe fields generated by the reluctance of the magnet circuit. As a magnet is loaded with tramp iron, the reluctance of the circuit is reduced with a corresponding change in the fringe-magnetic fields. Every magnetic circuit is unique in response to loading. In general, smaller circuits have greater response. This reluctance effect does not occur with permanent-magnet circuits, therefore the MLM is not suitable for permanent magnet applications.

A typical application is an over-belt installation of a manual-cleaning SE. The MLM can be installed and set up to trigger an alarm beacon before the magnet has picked up enough tramp iron to cause a problem. At this time, the MLM can trigger an alarm or beacon that is audible or visible to the loader operator or the control room.

Installation/Operation

The MLM needs to be located within 25' (7.6 m) (or as limited by the supplied probe-cable length) of the magnet. With the cover properly attached, the NEMA 4X box is suitable for installation in most outdoor locations. It should not be attached to the magnet itself. If it is necessary to move the magnet for cleaning, consider this before permanently mounting the MLM.

The probe must be mounted on the side of the magnet box using the two-axis probe mount. Normally it is located on the centerline of the magnet near the face or pickup surface. The probe mount may be affixed using double-coated tape, epoxy adhesive, or short self-tapping or drive screws. **NOTE:** if using screws to attach the probe mount, be sure they are short enough not to penetrate the magnet coil cavity.

If the relay is being used to drive a beacon or alarm, install the wiring to the appropriate relay terminal. Wire the control unit and set the appropriate voltage.

Control Set-Up

1. Install the probe into its mount.
2. Place the magnet in position, energized, at normal operating temperature, and with no tramp iron on the magnet face.
3. The probe and control must now be properly zeroed. Two people best accomplish this. One person reports on the LED display and resets the zero position on the MLM. The other rotates, holds, and locks in place the probe.
   a. Set sensitivity at 0, 1, or 2.
   b. Rotate the probe in two axes to allow the sensor to be perpendicular to the lines of magnetic flux.
   c. As the probe is rotated, the LED display indicates higher field strengths. When the display “maxes out,” push the zero-reset button to bring the display back to the center position. The zero reset should be made without movement of the probe. Zero reset normally takes place in five to 15 seconds. A slow flashing of the ‘ON’ LED indicates a zero has been reached.
   d. Continue rotation of the probe until the LED bar display indicates a drop in magnetic field when the probe is rotated in any direction from the present position.
   e. Repeat steps (b) through (d) at higher sensitivity of 3 or 4. Lock the probe in place and press zero a final time.
4. Load the magnet with a typical amount of tramp metal desired to cause an alarm relay trigger. As the magnet is loaded, the LED bar should move to the left indicating less leakage field. If the load does not cause an alarm relay trigger, repeat step 3, increasing the sensitivity to a maximum level of 7. Settings 8 and 9 provide the same sensitivity as 7.

Part Numbers

PART #	DESCRIPTION
435591	MLM
436334	Probe
436335	Mount

TABLE 1

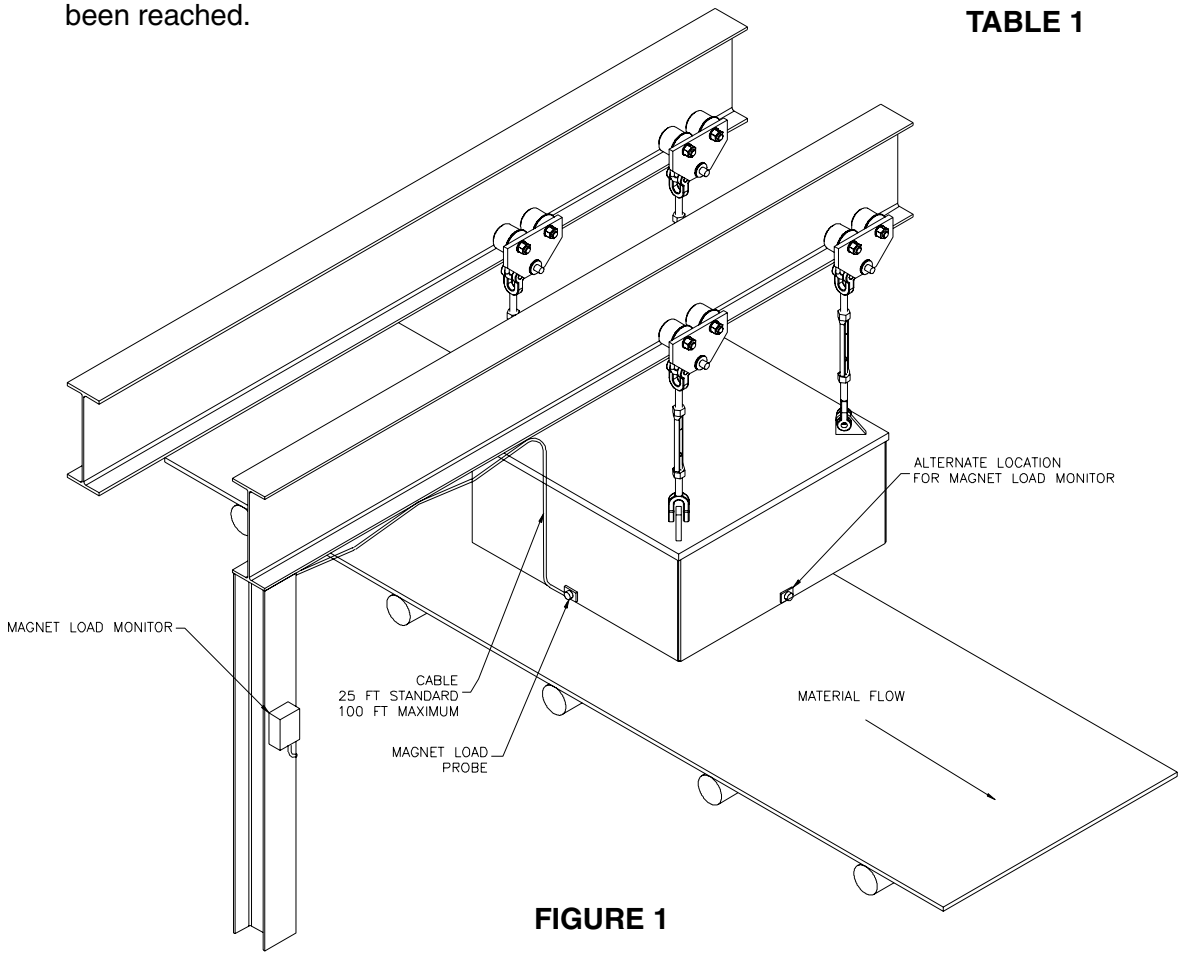
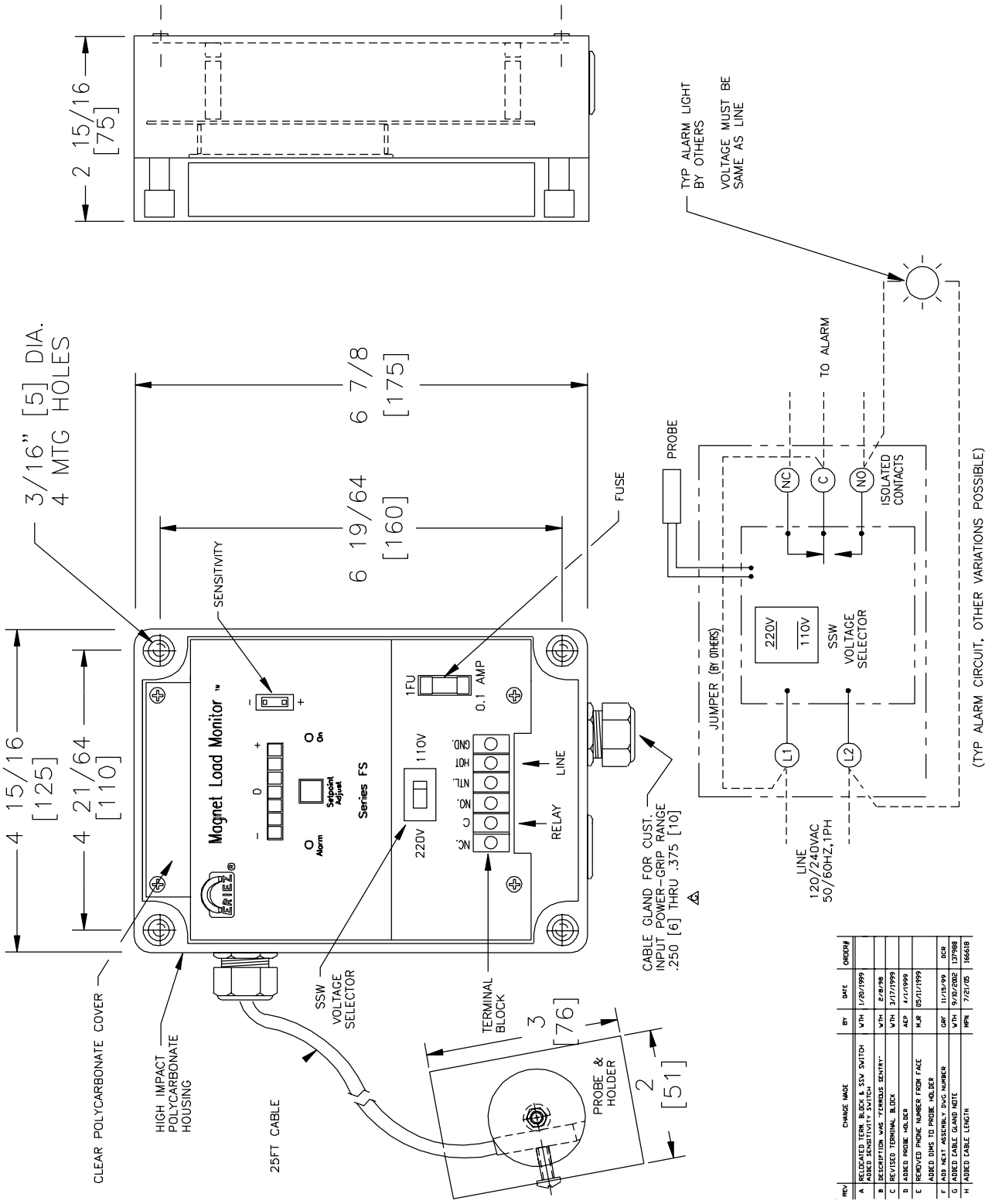


FIGURE 1



REV	CHANGE MADE	BY	DATE	ORDER#
A	RELOCATED TERM. BLOCK & SSW SWITCH ADDED SENSITIVITY SWITCH	WTH	1/20/1999	
B	DESCRIPTION WAS "FERROUS SENTRY"	WTH	2/8/99	
C	REVISED TERMINAL BLOCK	WTH	3/17/1999	
D	ADDED PROBE HOLDER	AEP	4/1/1999	
E	REMOVED PHONE NUMBER FROM FACE ADDED DIMS TO PROBE HOLDER	MJK	05/11/1999	
F	ADD NEXT ASSEMBLY DWG NUMBER	GAF	11/15/99	DCR
G	ADDED CABLE GLAND NOTE	WTH	9/10/2002	137988
H	ADDED CABLE LENGTH	MPA	7/21/05	146618

FIGURE 2

World Authority in Separation Technologies
Headquarters: 2200 Asbury Road, Erie, PA 16506-1402 U.S.A.
Telephone: 814-835-6000 • Fax: 814-838-4960
Web Site: http://www.eriez.com e-mail: eriez@eriez.com
Manufacturing Facilities: AUSTRALIA • BRAZIL • CANADA • CHINA • INDIA • JAPAN • MEXICO • SOUTH AFRICA • UNITED KINGDOM • UNITED STATES