

MDM45 Digital Loop Monitor SWICHGAGE® Instructions for Installation and Operation

MDM-9114N
Revised 06-97
Section 05
(00-02-0160)



Please read the following information before installing. A visual inspection for any damage which may have occurred during shipping is recommended. It is your responsibility to have a qualified person install the unit, and make sure it conforms with NEC and local codes.

GENERAL INFORMATION

WARNING

BEFORE BEGINNING INSTALLATION OF THIS MURPHY PRODUCT

- ✓ Disconnect all electrical power to the machine.
- ✓ Make sure the machine cannot operate during installation.
- ✓ Follow all safety warnings of the machine manufacturer.
- ✓ Read and follow all installation instructions.

Description

The MDM45 is a 4-1/2 in. (114 mm) dial digital loop monitor with low and high trip points which are adjustable over the full range of the monitor. A toggle switch and a push button are provided in the face of the monitor for easy access to the trip point adjustments. The MDM45 accepts one 4-20 mA transmitter input. It is designed to operate from 12 or 24 VDC systems.

Specifications

Accuracy: $\pm 1.0\%$ of full scale.

Operating Temperature Range: 32 to 155°F (0 to 70°C).

Storage Temperature: -40 to 300°F (-40 to 150°C).

Case Material: Aluminum.

Display Range: -10,000 to 19,999.

Signal Input: 4-20 mA.

Input Resistance: 250 Ohms.

Display Update Time: 0.5 seconds.

Power Input: 1.8 watts @ 12 VDC; 3.6 watts @ 24 VDC.

Trip Point Output: A power FET switch turns on when signal reaches the trip point. Trip points can be selected to open or close, (0.5 A @ 250 VDC).

* **Laboratory Approvals:** MDM45 is CSA approved for Class I, Division 2, Group D, hazardous areas. Digital loop monitor input 10-30 VDC, 4-20 mA.

NOTE: MDM45 is for use with *Electromechanical TATTLETALE®* annunciators or *SELECTRONIC®* or similar solid-state annunciators.

About Trip Points

During normal operation, both trip points are always active and are independent of the trip point selector switch. When the transmitter signal meets the high or low trip point, that trip point is triggered: the trip point output "turns on", and an LED light to indicate the output is ON.

Open Transmitter Input

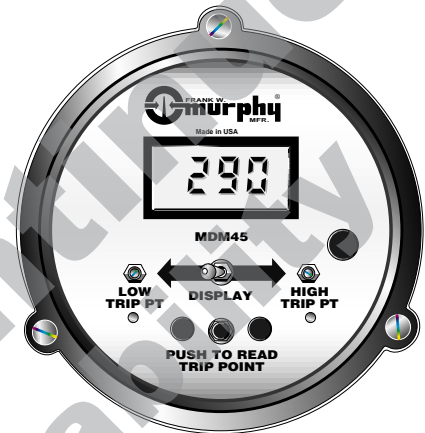
An open transmitter input causes the SWICHGAGE® to go negative, triggering the low trip point if the trip point is being used.

Warranty

A two year limited warranty on materials and workmanship is provided with this Murphy product. Details are available on request and are packed with each unit.



Approved* for
Class I, Division 2,
Group D Hazardous
Locations



Mounting



WARNING: Disable the engine (motor) so it can **NOT** start.
Remove the battery ground cable (when applicable).

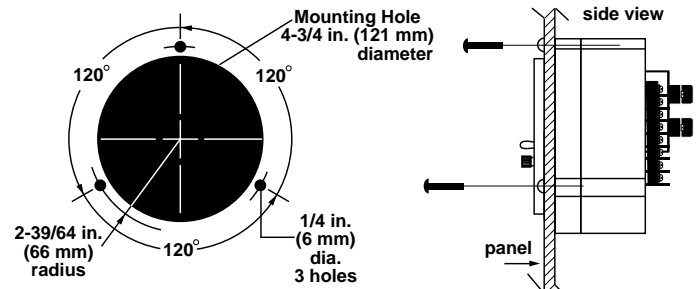
The MDM45 has a flush mount case for installation in a panel from 1/32 in. (1 mm) to 1/8 in. (3 mm) thick. We recommend to install the MDM45 within a weatherproof enclosure to protect it from rain, dust, etc.

A round mounting hole size 4-3/4 in. (121 mm) diameter is needed for the mounting. Three (3) screw holes 1/4 in. (6 mm) are also needed to secure the unit to the panel (See mounting diagram).

With a straight edge screwdriver remove the three (3) screws located in the front of the unit and install the unit from the back of the panel; secure firmly in place by tightening the screws.

NOTE: A minimum distance of 12 in. (305 mm) from any ignition coil or coil leads should be maintained.

Mounting Dimensions



Installation Accessories

- Straight edge screw driver (medium).
- Wire cutters, wire stripping and terminal crimping tool.
- Potentiometer trimmer or small screwdriver with plastic handle.
- 4-20 mA simulator.
- DC power supply (10-30 VDC, 150 mA minimum).

Typical Wiring

WARNING: Perform this operation with the power source OFF.

1. Connect a ground wire to the NEG terminal of the MDM45 (Fig. 1).
2. Connect a wire from the NEG terminal to the TP1 negative (-) terminal.
3. Connect a wire from the TP1 negative (-) to the TP2 negative (-) terminal.
4. Connect DC power source positive (+) to the 12/24 positive (+) terminal.
5. Connect TP1 and TP2 positive terminals (+) to the annunciator, shutdown device, or DC load such as a relay coil.
6. Using shielded cable, connect the 4-20 mA input signal negative terminal (-) to the transmitter input positive terminal (+) of the MDM45. For separate transmitter power source (Fig. 2), connect the 4-20 mA input signal negative (-) to the transmitter input negative terminal (-).
7. Connect the transmitter input negative terminal (-) to NEG terminal. For separate transmitter power source, using shielded cable connect the transmitter input negative terminal (-) to 4-20 mA input negative terminal (-).
8. Using shielded cable connect 4-20 mA input signal positive (+) to the 12/24 positive terminal (+). For a separate transmitter source, connect the 4-20 mA input signal positive (+) to the transmitter input positive terminal (+).

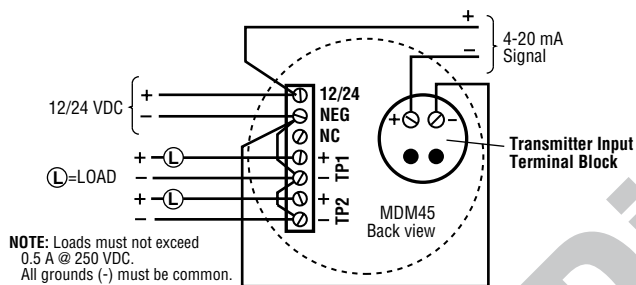


Figure 1: Common Transmitter Power Source

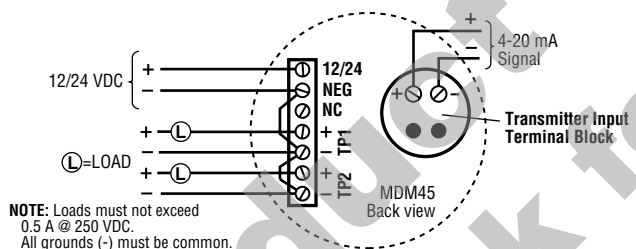


Figure 2: Separate Transmitter Power Source

Calibration Procedures

1. Connect 10 VDC to 30 VDC power to power input terminal 10-30 Vdc and negative as shown in wiring diagrams. (Observe polarity).
2. Remove the plugs from front panel for access to decimal point selector switch, zero and span potentiometers (Items B, G and H, Figure 3).
3. Set decimal point by closing rocker switch that corresponds to the desired

decimal point position, (Item B, Figure 3).

Switch "1" on = Four (4) decimal digits (.0000 - 1.9999)

Switch "2" on = Three (3) decimal digits (0.000 - 19.999)

Switch "3" on = Two (2) decimal digits (00.00 - 199.99)

Switch "4" on = One (1) decimal digit (000.0 - 1999.9)

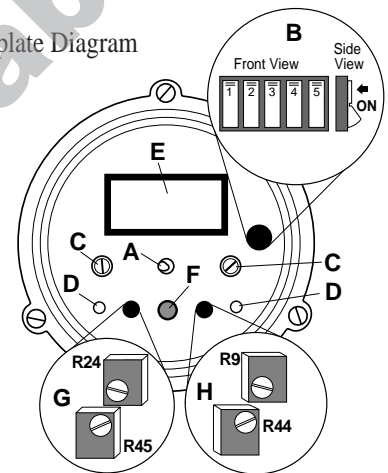
Switch "5" on = No decimal digit (0000 - 19999)

4. Connect the 4-20 mA source to the transmitter input terminal as shown in Figure 2 below, left.
5. Set current source to 20 mA and rotate coarse span potentiometer R9 (Item H, Figure 3) clockwise until display indicates approximately the maximum range.
6. Fine tune the setting with R44 fine span potentiometer (clockwise to increase).
7. Set current source to 4 mA and rotate coarse zero potentiometer R24 (Item G, Figure 3) clockwise until display reads near zero.
8. Fine tune the setting with R45 fine zero potentiometer (clockwise to increase).
9. Switch current source back to 20 mA. Observe display and adjust coarse span or fine span potentiometer until display indicates the desired value.
10. Set current source to 4 mA observe display and adjust coarse zero or fine zero potentiometer until zero is displayed. Repeat steps 5 thru 10 if necessary.

NOTE: Transmitter may not be perfectly calibrated to provide 4 mA at zero input or 20 mA at maximum input. If this is the case it may be desirable to adjust the monitor to match the transmitter or recalibrate transmitter.

Figure 3: Faceplate Diagram

- A. Trip point display toggle switch.
- B. Decimal point adjustments.
- C. Trip point potentiometers.
- D. LED trip point indication lights.
- E. Readout digital display.
- F. Push to read trip point button.
- G. Low limit range coarse and fine zero adjustments.
- H. High limit range coarse and fine span adjustment.



Trip Point Adjustments

1. Start engine or power up the monitor.
2. Set trip point display toggle switch to "Low Trip PT" potentiometer.
3. Press "Push To Read" trip point button to read the low trip point.
4. While depressing the "Push To Read" button, rotate the "Low Trip PT" potentiometer until the LCD display indicates the desired low trip point (rotate clockwise to increase value).
5. Set trip point display toggle switch to "High Trip PT" potentiometer.
6. Press "Push To Read" trip point button to read the high trip point.
7. While depressing the "Push To Read" button, rotate the "High Trip PT" potentiometer until the LCD display indicates the desired high trip point (rotate clockwise to increase value).

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.



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