Guardian Mat® Model ME151-4

INSTALLATION INSTRUCTIONS
IMPORTANT: THINK SAFETY!

CAUTION: Read, understand and follow all directions before beginning installation or maintenance.

Description:

The **ME151 Guardian Mat®** is a pressure sensitive mat designed to provide a stop signal when a person weighing more than 35kg (77lbs.) steps down on the mat. When a down force is applied to the surface of the mat, the two **Alumaglas®** contact elements meet sending a stop signal to a controller. A separate reset button should be located in a safe area. The **ME151 Guardian Mat®** is not intended to continuously detect the presence of an individual. The **ME151 Guardian Mat®** is safe when used for its intended purpose. They are often used to stop the dangerous motion of hazardous machinery. If applied incorrectly serious injury or death can occur. The **ME151 Guardian Mat®** is suitable to detect walking aids with a diameter of 7/16"(11mm) to 3 1/8"(80mm) and an actuating force higher than 300N (67.5lbs.). **Categories in accordance with EN954-1 for pressure sensitive mats and pressure sensitive floors on machines are stated in Type C Standards.**

Inner Switching Function:

Alumaglas® Contact Elements, completely flexible blanketed contact elements cover the entire surface; virtually eliminating any dead zones in the active surface. **Alumaglas®** will not Rust or Dent.

Guardian Mat® Cross-Section

For an overview of ME151 Guardian Mat® with Retainer (see Fig. C)

Construction:

- Flame Resistant
- Environmentally friendly: CFC Free
- No Silicone
- Resistant to Common Oils and Chemicals
  (For specific chemical resistance - contact factory)
- Water Resistant

- Hermetically Sealed
- Ability to custom manufacture to user spec for:
  Size • Shape • Sensitivity • Wire Outlet Location
- Electrical Diagram: 4 wire, N.O. self-monitoring
- Electrical Requirements: 24 volt, 1 amp
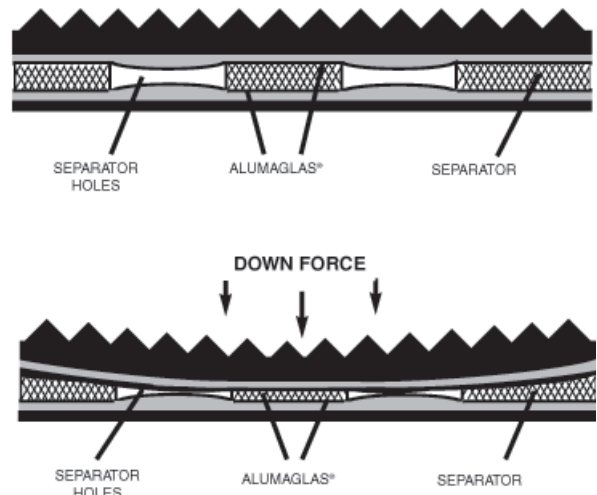 AC or DC maximum

Specification:

Outer Material: PVC
Finish: Ribbed Non-Skid surface
Color: Black or Yellow
Assembled Mat Thickness: 1/2" (12.7mm)
Weight : 3 lbs. per sq. ft. (14.6 kg per sq.m)
Max. Size: Black: 59" wide x 96" long (150cm x 244cm)
(For larger sizes contact factory)
Lead Wire: 16 AWG, 10ft. long
Lead Wire Location: Anywhere on the side of the mat except the first 3" (75mm) in from any corner.
Operating Temperature Range: -25°C to +70°C
(-20°F to +158°F)
Storage Temperature Range: -25°C to +70°C
(-20°F to +158°F)
Min. Actuating Force: 300N (67.5lbs./30.6kg)
per 3 1/8"(80mm) dia.

Min. Object Size: 0.118" (3mm) diameter
Certified Safety Category: See attached controller
Sensor Enclosure: Meets IP54 requirements
Sensitivity Adjustment: Not available after mat has been manufactured.
Max. Response Time of Mat: 10 msec.
Response Time Adjustment: Not available after mat has been manufactured.
Effective Sensing Areas: The effective sensing area is the entire area of the mat with the exception of 1/2" (1.27cm) around the perimeter and 1" (2.54cm) at the wire outlet.
Number of mats to be used with one controller: 4
Critical Length of Connections: distance between mat and control panel is 100 ft.(30m) max.

INSTALLATION INSTRUCTIONS

IMPORTANT: All installations, repairs and tests should be performed by a trained, responsible individual.

Determining Safety Distances

Safety standards recommend using the following safety distance calculation when determining proper dimensions.

$$Ds = K (Ts + Tc + Tr) + Dpf$$

Ds = Minimum safety distance between the safety mat and the hazard.

K = Hand speed constant. For reach-in applications or aggressive walking use 63"/sec. (1.6m/sec.) per OSHA, ANSI, and European Norm standards.

Ts = Worst Stopping time of the robot, automated machines or equipment.

Tc = Worst stopping time of the control system.

Tr = Worst stopping time of the safeguarding device including its interface.

Dpf = Depth penetration factor is used to compensate for stride. A depth penetration factor of 48" (1.2m) should be used for the **ME151 Guardian Mat®**.

Calculating Required Safety Mat Sizes

The following formula must be followed in order to meet the full safety requirements of the installation.

1) Determine safety distance as outlined above.
2) Take physical measurement of safety distance (L & W).
3) Use the length and width from above in this formula [L + 1 1/2" (3.81cm) / W + 1 1/2" (3.81 cm) = Required size of safety mat.]

Recommended Tools

The following tools are recommended to make installation easier: broom, tape measure, marker or pencil, hole starter, hammer, drill, drill bits, file, screw-driver, and circular saw. Alternative tools may be used as desired.

Area Preparation

Plan in advance. The ground mounting surface should be suitable for the **ME151 Guardian Mat®** to be used.Irregularities can reduce the effective life of a mat and so should be kept to a minimum. Large irregularities which cause a mat to warp should also be avoided. The mounting surface should be prepared to withstand the duty without deterioration.

The **ME151 Guardian Mat®** should be fitted so that it is not possible to walk along a dead zone to reach the hazard without actuating the sensor. For example, a dead zone along the side of a mat in the direction of access to a machine could be wide enough to walk on without actuating the sensor. It is necessary to fit other means to prevent access.

Cleaning Mat

Sweep the **ME151 Guardian Mat®** with a dry broom. When needed, wipe clean with soap and water or with mild cleaning detergent and dry surface immediately. (Wet mat material is slippery!)

Installation

CAUTION: • **Be sure power is disconnected prior to installation!**
• **Check that the category of the device according to EN954 is appropriate.**

1- Clean floor

2- Mark location of the mat according to the safe distance formula.

3- Place mat in the marked location.

4- Drill holes in the mounting retainer no more than 18" apart.

For installation with lead wires on the floor

5 (A) - Mark location of lead wires on the retainer. Cut out a groove in the retainer 1" wide and .185" deep. (25mm x 4mm) *(See Fig. A)*

For installation with lead wires under the floor

5 (B) - Remove mat from the floor and cut a groove in the floor for the lead wires measuring 0.5" wide and .25" deep (12mm x 6mm) minimum.Cut a groove in the supporting rib of the retainer 1" wide and .185" deep. (25mm x 4mm) *(See Fig. B)*

6- Place retainer around the mat, mark the hole locations on the floor and remove the retainers.

7- Drill holes in the floor at marked locations and insert anchors *(not supplied)* into the holes.

8- Position the retainers in place and mount them to the floor with mounting screws (not supplied). Be sure mounting screws are inserted deep enough to avoid a trip hazard.

9- Cover lead wires and or lead wire groove to protect them and prevent a tripping hazard.

10- Connect lead wires to the controller according to the controllers instructions.The controller must have fuses that protect mat lead wires against electric current higher than 1 A.

11- Check to see that the mat is up to operating temperature prior to activating it.

12- For Control Reliable Conditions, the mat should only be connected to a controller such as the MillerEdge FSC-37. *(See Fig. D)*

13- The controller must be wired to the machine **Emergency Stop** circuit in accordance with manufacturers instructions.

14- Install control panel *(Reset Button)* outside the hazardous area, and in such a position as to offer the individual who is resetting the system, full view of the hazardous area, thus assuring that all personnel are clear of the protected area before reset is initiated.

15- To reset equipment after an **Emergency Stop** - Inspect the area carefully to make sure it is clear of all personnel and obstructions.

16- Press Mat Controller **RESET** button on control panel and reset machinery to resume operation.

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Precautions:

DO NOT... use this product with an Auto Reset

DO NOT... use this product to initiate operation of equipment or machinery

DO NOT... use this equipment as an automatic on/off switch. Always wire it to a remote reset button which is located in a safe place.

DO NOT... use this product to maintain continuous operation of machinery or equipment.

DO NOT... wire into a programmable controller or any software.

DO NOT... put holes in active portion of mat. Holes or cuts in the mats will decrease the life of the mat and could cause permanent failure.

DO NOT... attempt to reduce your weight while on the mat. (ie: Don't lean on machine or railings)

DO NOT... paint the mat

DO NOT... pull on the lead wires

DO NOT... fold the **ME151 Guardian Mat®**. Always transport and store flat.

DO NOT...allow dirt and spills to build up - Keep area Clean and Dry.

DO NOT... run lead wires under the Mat

NOT... suggested for wheeled vehicle use during hard braking or turning on surface of mat. (OK for normal wheeled traffic)

NEVER... operate unguarded equipment.

ME151 Guardian Mat®

Testing:

Regular tests should be performed at the beginning of each shift, to assure detection of personnel by the mat and subsequent immediate shutdown of the machine and correct restart sequence. A malfunction detected during these tests will require the shut down of the process until repairs can be completed. These tests and any repairs should be conducted by a trained, responsible individual in such a manner that the failure in the mat or controller does not endanger personnel.
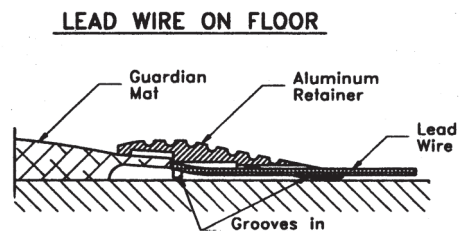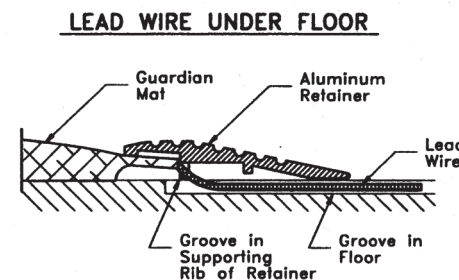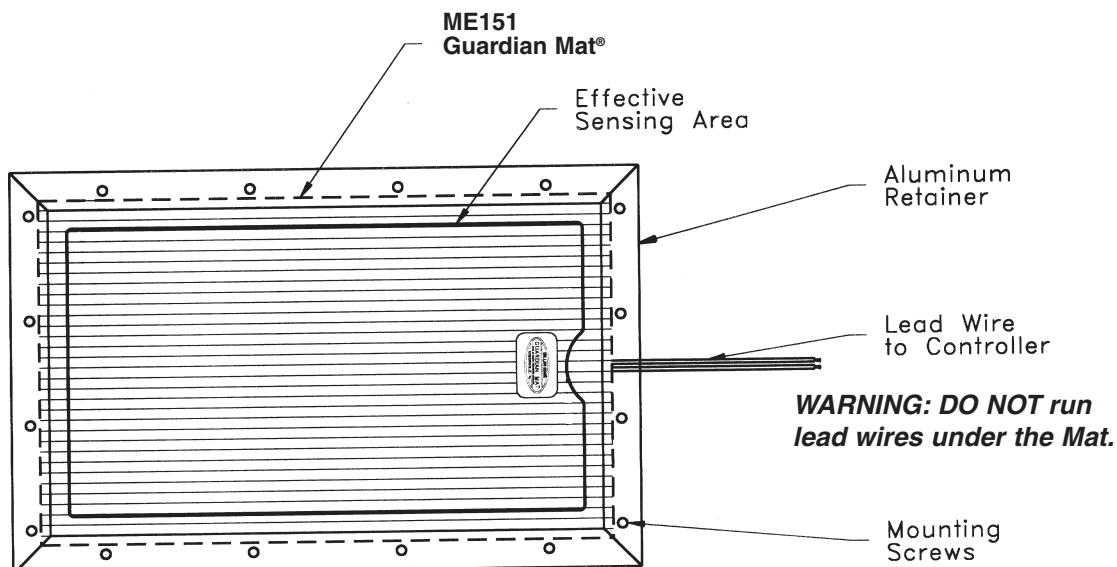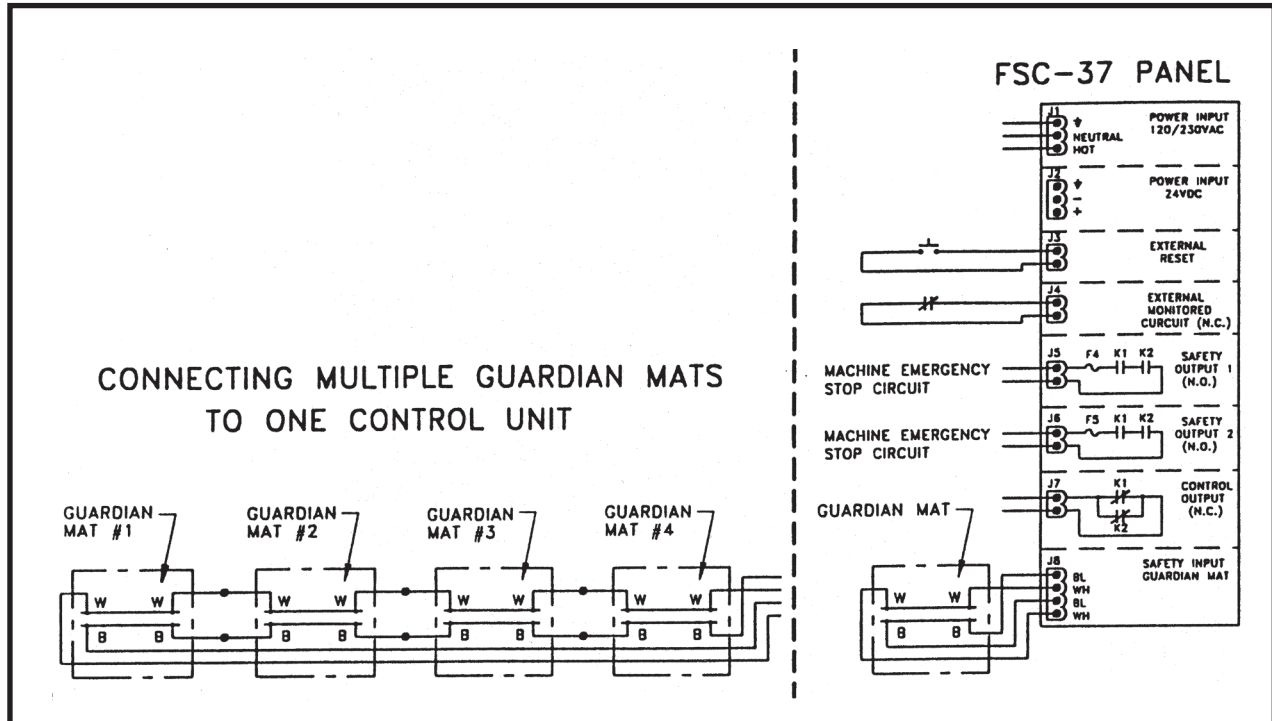
Fig.A

LEAD WIRE ON FLOOR

Fig.B

LEAD WIRE UNDER FLOOR

Fig.C

ME151 Guardian Mat®

Effective Sensing Area

Aluminum Retainer

Lead Wire to Controller

WARNING: DO NOT run lead wires under the Mat.

Mounting Screws

FSC-37 PANEL

CONNECTING MULTIPLE GUARDIAN MATS TO ONE CONTROL UNIT

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Size: _____in (L) x _____in (W) **Qty:** _____

Finish: ____ Ribbed Non-Skid

Color: ____ Blk ____ Ylw

Wire Outlet Location: _____

Note: must be a minimum of 3" from any cormer

Aluminum Retainer: ____Yes _____No

Controller: ____ **FSC-47** in NEMA13 enclosure
____ **RT6-24vdc** din rail mountable
____ **RT6-115vac** din rail mountable

MillerEdge®

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