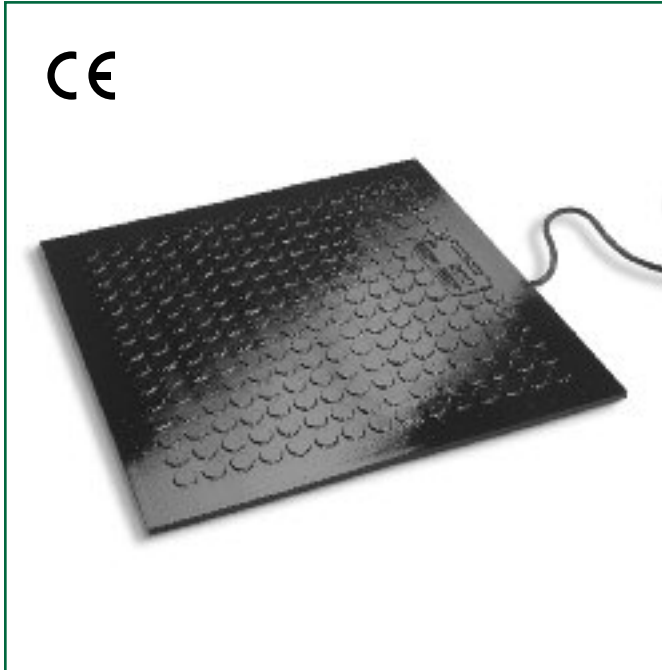


SAFETY CATEGORY 3 PRESSURE MATS



GENERAL PRODUCT FEATURES

SCHMERSAL's Series SMS Safety Pressure Mats feature a 100% active area, low actuating force, rugged cable termination, durable “unibody construction” cable entry, IP67 submersible rating, highly chemical resistant mat material, CE-compliance, and a 3-year warranty. When properly installed with a compatible safety controller (described herein) they meet the stringent requirements of EN954-1 safety category 3.



Features & Benefits

- **100% active mat area** ... ramp edge trim and insulating strip-contact design ensure actuation over entire mat surface
- **High chemical resistance** ... mat material is tolerant to most acids, alcohols, aldehydes, caustics, solvents and oils found in an industrial environment
- **Non-slip surface profile** ... unique surface geometry designed to enhance traction and minimize slippage
- **Meets safety category 3 requirements of EN 954-1** ... suitable for most industrial applications
- **Modular design** ... permits protection over a diversity of hazardous area shapes/sizes
- **Easy-to-install** ... simple 4-wire connection (without need of a terminal resistor or additional base plate)
- **Integral 6m cable** ... satisfies wiring requirements for a wide variety of applications
- **Rugged IP67 design** ... with mechanical life expectancy of more than 5 million actuations
- **Fully CE-compliant** ... third-party certified to EN1760-1
- **Extended warranty** ... mats are warranted for 3 years from date of shipment

Description

The maintenance-free series SMS 3 safety mat system is designed to safeguard personnel when entering a hazardous area around dangerous machinery. A person's presence is detected upon their stepping/walking on the mat. The interconnected safety controller (such as the SRB 301 HC/R or SRB 301 HC/T) continuously monitors the integrity of the safety mat system, sending a "stop" signal to the machinery in the event of a system fault or pressure mat actuation.

When properly installed with the ramp edge profiles, a 100% mat actuation area is achieved... thus complying with the stringent requirements of EN 954-1 safety category 3

Operation

The series SMS 3 safety mat consists of two electrodes (steel plates) separated by an internal layer of compressible elastomeric insulating strips. The insulating strips are capped by a conductive u-shaped strip whose edges overhang the compressible insulator.

Upon the application of pressure (e.g. walking/stepping on the mat), the insulating strips compress allowing the conductive strip to close the normally-open circuit between the steel electrodes. This closure signal is detected by the system's safety controller whose safety output(s) sends a "stop" signal to the machinery being approached.

AVAILABLE STANDARD MODELS

Model	Length x Width of Mat without Trim Kit	"Ramp Edge" Trim Kit (Must be ordered separately)*
SMS 3 25-25	250 mm x 250 mm	SMS PF 100-25-25
SMS 3 25-50	250 mm x 500 mm	SMS PF 100-25-50
SMS 3 25-100	250 mm x 1000 mm	SMS PF 100-25-100
SMS 3 50-50	500 mm x 500 mm	SMS PF 100-50-50
SMS 3 50-100	500 mm x 1000 mm	SMS PF 100-50-100
SMS 3 50-150	500 mm x 1500 mm	SMS PF 100-50-150
SMS 3 75-75	750 mm x 750 mm	SMS PF 100-75-75
SMS 3 75-100	750 mm x 1000 mm	SMS PF 100-75-100
SMS 3 75-150	750 mm x 1500 mm	SMS PF 100-75-150
SMS 3 100-100	1000 mm x 1000 mm	SMS PF 100-100-100
SMS 3 100-150	1000 mm x 1500 mm	SMS PF 100-100-150
SMS 3 120-120	1200 mm x 1200 mm	SMS PF 100-120-120
SMS 3 120-150	1200 mm x 1500 mm	SMS PF 100-120-150

Other sizes and non-rectangular shapes available. Please consult factory.

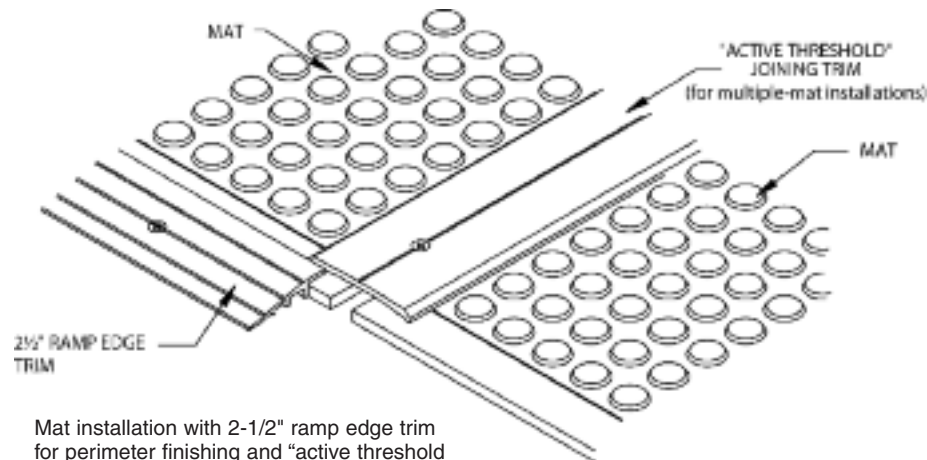
*SMS 3 Safety Mats and Trim Kits must be ordered with a compatible safety controller module. "Active Edge" trim is also available. Please consult factory.

SERIES SMS 3 SAFETY PRESSURE MAT

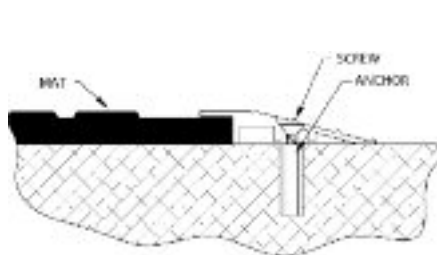
TECHNICAL SPECIFICATIONS

Conformance to Standards	EN 1760-1
Degree of Ingress Protection	IP67 per IEC 60529
Response Time	≤ 30ms (single mat only)
Mechanical Life Expectancy	> 5 million operations
Maximum Load	2000 N/cm ² (2,900 lbs/sq. in)
Material	Mat: Plastisol; Ramp Edge: Aluminum
Mat Thickness	12mm (.47 in.)
Mat Weight	18 kg/m ² (3.7 lbs/sq. ft)
Standard Cable Length	6 meters (19.7 ft) (Other lengths available. Please consult factory.)
Ambient Operating Temperature Range	-30°C to +50°C (-23°F to +122°F)
Warranty Period	3 Years (from date of shipment)
Agency Approvals	CE-Compliant
Chemical Resistance	Water: Excellent Mineral Acids: Good – Excellent Organic Acids: Good – Excellent Alcohols: Good Aldehydes: Good – Excellent Caustics: Good – Excellent Petroleum Solvents: Fair – Good Oils: Good

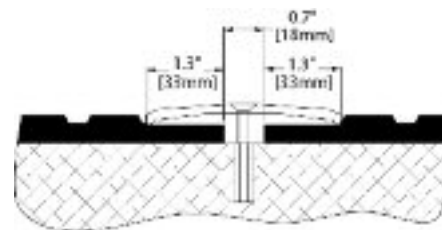
TRIM KIT DETAILS



Mat installation with 2-1/2" ramp edge trim for perimeter finishing and "active threshold joining trim" for interior multiple-mat bridging.



Ramp edge trim installation detail. Place ramp edge trim flush against edge of mat as shown.



"Active Threshold" joiner trim installation detail.

SERIES SMS 3 COMPATIBLE SAFETY CONTROLLERS

The SMS 3 safety mat system includes a choice of two compatible safety controllers ... one of which is required for each installation.



These choices are summarized in the chart below with complete technical specifications shown at the right.

Model Number	Type Reset (See Note 1)	Number of Safety Outputs	Available Signaling Output	Safety Controller Input Voltage
SRB 301 HC/T-24V	Automatic	3	1 N.C. (Voltage-free)	24V AC/DC
SRB 301 HC/T-230V	Automatic	3	1 N.C. (Voltage-free)	48-240V AC
SRB 301 HC/R-24V*	Manual	3	1 N.C. (Voltage-free)	24V AC/DC
SRB 301 HC/R-230V*	Manual	3	1 N.C. (Voltage-free)	48-240V AC

Note 1: Manual reset units require the presence of a discrete “trailing edge” signal (24V to 0V) to activate (reset) the safety outputs. A reset button must be provided.

Automatic reset units do not require a reset signal. These units automatically re-activate (reset) the safety outputs when pressure is removed from the mat and no other safety circuit faults exist. A discrete reset button may be used for increased safety.

Each of these DIN-rail mountable safety controllers are designed to monitor the integrity of the SMS 3 safety mat circuit. In the event of mat actuation or the occurrence of a fault in the circuit, the safety output(s) will be activated to stop the hazardous machinery. Detectable faults include:

- Open circuit in interconnection wiring
- Short in the interconnection wiring
- Fault in one or more of the controller’s safety relays
- Welded contact in the controlled positive-guided motor contactor or control relay

In addition, each unit features LED system status indicators to aid in installation and trouble shooting.

*May also be used to monitor two-hand control units.

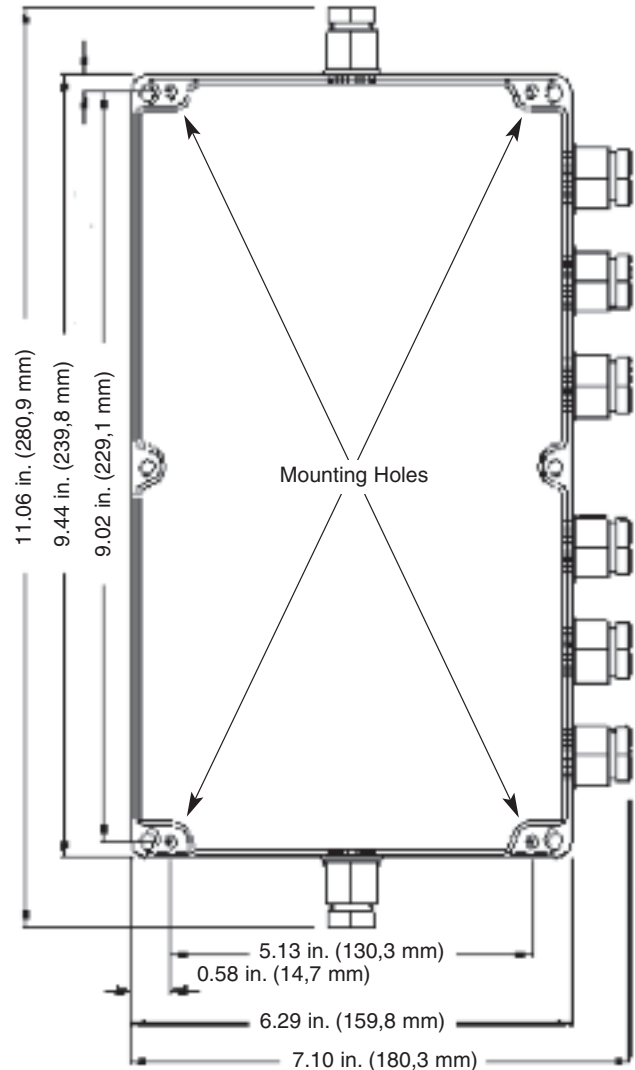
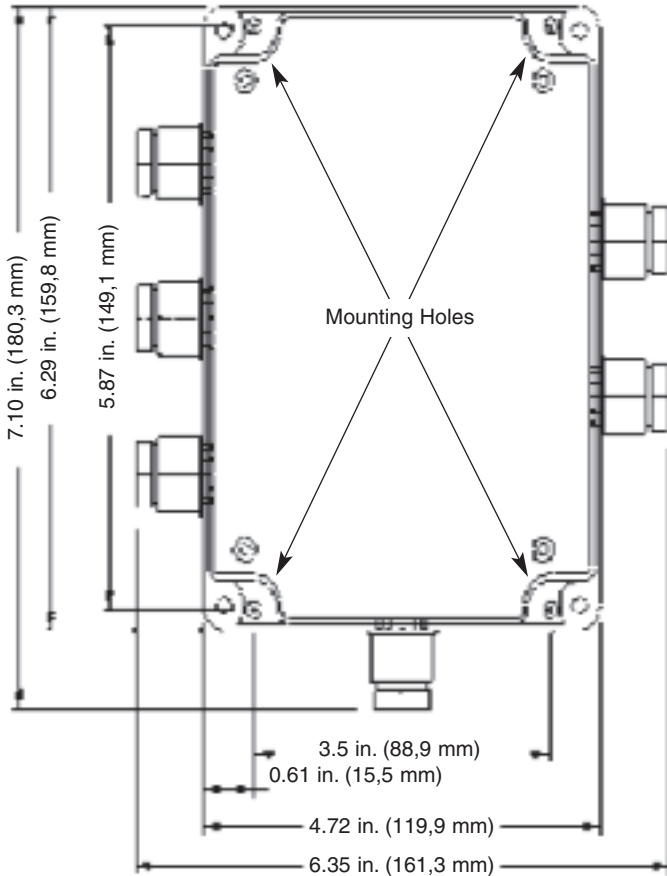
SERIES SMS 3 COMPATIBLE SAFETY CONTROLLERS

TECHNICAL SPECIFICATIONS

Conformance to Standards	UL, CSA, BG (CE-Compliant)
Housing Material	Polycarbonate
Mounting Arrangement	DIN-rail mounting according to DIN EN 50022
Housing Dimensions	100mm/45mm/121mm
Degree of Ingress Protection	Terminals: IP20 Housing: IP40 (per IEC 60529)
Operating Voltage	24V DC version: 24V DC -15%/+20%; residual ripple max. 10% 24V AC version: 24V AC -15%/+10% 230V AC version: 48-240V AC
Power Consumption	24V version: max. 1.6W; 3.7 VA 230V version: max. 2.0W; 5.1 VA
Inputs	Channel A, B: Voltage-free contacts
Output Signals	3 enabling (safety) outputs (Two N.O. relay contacts in series) 1 signaling contact (Two N.C. relay contacts in parallel)
Switching Voltage/ Switching Power	250V, 8A ohmic (inductive with suitable suppressor)
Response Time	≤ 20 ms
Signalling	Green LEDs for control voltage, Channel A, channel B, Output
Ambient Operating Temperature Range	-25°C to +60°C (-13°F to +140°F)
Storage Temperature Range	-40°C to +85°C (-40°F to +185°F)
Weight	HC/R: 320 gm (24V version); 340 gm (230V version) HC/T: 290 gm (24V version); 300 gm (230V version)
Agency Approvals	UL, CSA, CE-Compliant

OPTIONAL JUNCTION BOX FOR MULTIPLE MATS

SPECIFICATIONS



Up to 5 Mats		Up to 10 Mats	
Part Number	SMS JB 5	Part Number	SMS JB 10
Weight	1.9 lbs	Weight	2.7 lbs
Material	Acrylonitrile Butadiene Styrene (ABS)	Material	Acrylonitrile Butadiene Styrene (ABS)
Temp. Range	-40 F to +180 F with standard Neoprene gasket (-4 C to +82 C) -40 F to +266 F with optional silicone gasket (-4 C to +130 C)	Temp. Range	-40 F to +180 F with standard Neoprene gasket (-4 C to +82 C) -40 F to +266 F with optional silicone gasket (-4 C to +130 C)
Protection Class	NEMA Types 1, 2, 3, 3R, 4, 4X, 5, 12 and 13 IP65 DIN 40050	Protection Class	NEMA Types 1, 2, 3, 3R, 4, 4X, 5, 12 and 13 IP65 DIN 40050
Capacity	6 integral cable grips will accept up to 5 Safety mat cables. 4 plugs provided to seal unused positions	Capacity	12 integral cable grips will accept up to 10 Safety mat cables. 9 plugs provided to seal unused positions
Control Cable	18/4 SVT Black 20' cable .245" OD Wires are designated as black-#1, white-#2, black-#3 and white-#4. (Maximum cable length: 300')	Control Cable	18/4 SVT Black 20' cable .245" OD Wires are designated as black-#1, white-#2, black-#3 and white-#4. (Maximum cable length: 300')
Terminal Strips	24-position tubular contacts. (No wire lugs required.) Captive screws and "dead front" construction eliminate short circuits.	Terminal Strips	48-position tubular contacts. (No wire lugs required.) Captive screws and "dead front" construction eliminate short circuits.

GENERAL SAFETY INSTRUCTIONS

Proper Use

The series SMS 3 safety mat system is a pressure sensitive safety device used for the safeguarding of hazardous areas around machines. The tactile mat should be placed on a flat smooth surface around the machine. When designing machine safeguarding, approach speed, safety distance and the possibility of stepping behind or bypassing of the safety device must be considered.

The operator must not be able to reach the nearest danger point before the machine has stopped. This is accomplished by the proper calculation of the safety distance and installation of the tactile mat(s). When choosing the safety device, the appropriate regulations have to be considered. Safety categories in accordance with EN 954-1 for pressure sensitive mats (safety mats) on machines are stated in type C standards.

We recommend the operator be given a general introduction to the features and function of the safety mat and the protected zone. Correct installation, inspecting, testing and periodic inspection are required for proper use of the device.

IMPORTANT INSTALLATION NOTE:

When designing a machine or installing a safety mat system, the safety requirements of the machinery directive (98/37/EC) and their appendices and amendments, as well as the relevant safety standards, must be respected.

Safety Distance Calculations

The correct positioning of the tactile mats with regard to the nearest danger point is mainly dependent on the stopping performance of the machine and the assumed approach speed of the operator. The standard EN 999 (Safety of Machinery, Hand/Arm-Speed) provides a formula for calculating the appropriate safety distance.

Safety distance formula:

$$S = K \times (T1 + T2) + (1200 - 0.4 H)$$

- S** is the minimum distance in millimeters, from the danger zone to the detection point, line, plane or zone
- K** is a parameter in millimeters per second, derived from data on approach speeds of the body or parts of the body
- H** distance above the floor (i.e., platform) in mm (for safety mats this term is usually 0 mm)
- T1** is the maximum time between the actuation of the sensing function (tactile mat) and the switching off of the safety enabling outputs (e.g., the output signal switching device OSSD of the safety module) (response time see "Technical specifications", Section 9)
- T2** is the response time of the machine, i.e., the time required to stop the machine or remove the risks after receiving the signal from the SRB safety controller

The safety distance can generally be calculated as follows:

$$S = 1600 \text{ mm/s} \times (T1 + T2) + 1200 \text{ mm}$$

Safety Distance Calculation Example

Calculate the safety distance for a machine for which the stop time is 117.5 ms, the response time of the tactile mat and safety module is 70 ms; the tactile mats are at floor level.

$$S = 1600 \text{ mm/s} \times (0,07 \text{ s} + 0,1175 \text{ s}) + 1200 \text{ mm}$$

$$S = 1600 \text{ mm/s} \times (0,1875 \text{ s}) + 1200 \text{ mm}$$

$$S = 300 \text{ mm} + 1200 \text{ mm}$$

$$S = 1500 \text{ mm}$$