Rev. 2.08

FACTORY CONTROLS
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Universal Safety Mat System

Heavy-Duty Four-Wire Presence Sensing Mats with Integrated (Non-Removable) Cable, Category 3 Controllers, and Perimeter Trim

System

- When UM series mats are combined with an MC3, MC4 or MC6 controller (with complete diagnostics), the result is a system that meets the standard EN 1760-1:1998 and is entitled to display the CE mark. See below for an overview of the various components.

Mat

- Activation force: 30 kg (66 lb.) per ANSI/RIA 15.06-1999, ISO 13856-1:2001, ANSI B11.19-2003, and CSA Z432-04
- Conductive plates: 24 gauge galvanealed sheet steel
- Contact yield strength in excess of 20,000 lb./sq. in.; Fork lift traffic of 12,000 lb.
- Mat housing cross section: 13.5 mm (0.54 in.)
- PVC black or yellow covering materials (other colors available on request)
- Durometer of 80 (±3) shore A
- Single-piece molded construction
- Mat flammability self extinguishing, meets UL94VO
- IP67 rated
- Operating temperature -37 to 66°C (-35 to 150°F)
- Mat cable: 18-gauge, 4-conductor, 16-strand, 300 VAC
- Cable length: Standard 5 m (16 ft.), Optional 10 m (32 ft.)

Controllers

- Safety category 3 device
- DIN-rail mount (MC3)
- NEMA controllers (MC4, MC6)
- 24 VDC or with universal power supply 100 to 240 VAC

Trim

- Two-part perimeter and joining trim simplifies installation and provides a custom appearance
- Aluminum base surrounds mat, the safety yellow PVC cover secures mat in place, an aluminum cover that is installed in place of the PVC cover is also available
- Two-part active joining trim joins multiple mats together
- Molded inside and outside corners available as an option

■ Description

An Omron STI Universal Mat system (UM series mat combined with an MC3, MC4 or MC6) offers a simple method for guarding personnel around hazardous machines. A Universal Mat system offers freedom, flexibility, and reduced operator fatigue when compared with traditional guarding methods such as interlocked fences, pullback restraints or perimeter barriers.

Full visibility of and access to the work area is maintained. There is no need to worry about personnel forgetting to replace mechanical barriers or close gates.

How the System Works

The operation of a Universal Mat system is easy to understand. The mat is a simple, normally open switch. When a specified minimum weight is applied to the mat the "switch" closes. This sends a signal to the controller which, in turn, sends a stop signal to the guarded machine.

Each mat presents four wires to the controller. This provides the redundancy required to monitor the wiring for open circuits due to incorrect wiring or physical damage to the wires.

In order to meet many national safety regulations, Omron STI offers trim to secure the mat to the floor so that it cannot be easily relocated and therefore become ineffective.

■ Applications

Presence sensing safety mats are used to monitor an entire hazardous area. They offer flexibility, quick access and may frequently be the most economic choice. Other options for perimeter guarding include interlocked barrier guards and safety light curtains. However, personnel can become trapped inside a barrier guard and safety light curtains only monitor the perimeter, not the hazardous area inside.

Additionally, mats can also simplify routine tasks such as machine setup, maintenance and repair.

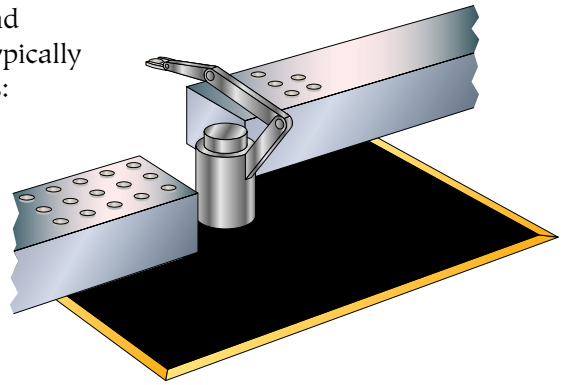
Applications can be found throughout industry and typically include the following areas:

- Welding Robots
- Assembly Machinery
- Material Handling
- Packaging Machinery
- Punches
- Presses
- Robotic Work Cells

Mat Chemical Resistance*

Water	Excellent
Mineral Acids	Good/Excellent
Organic Acids	Good/Excellent
Alcohols	Good
Aldehydes	Good/Excellent
Caustics	Good/Excellent
Petroleum Solvents	Good
Organic Solvents	Poor
Chlorinated Solvents	Poor

*40 minute exposure @ 23°C (74°F)



Mat Specifications

Mat Type: Normally open SPST, four-wire
Mode: Pressure Sensitive
Mat Size: Standard sizes from 12 x 12 in. (305 x 305 mm) to 48 x 72 in. (1219.2 x 1829.8 mm) Metric sizes from 300 x 300 mm (11.8 x 11.8 in.) to 1200 x 1800 mm (47.2 x 70.9 in.)
Activation Force: Detects adults > 30 kg. (66 lbs.)
Mat Flammability: Self extinguishing. Meets UL94VO
Mat Housing Cross Section: 13.5 mm (0.54 in.)
Mat Cover Material: PVC
Durometer: 80 (±3) shore A
Mat Cable: 18-gauge, 4-conductor, 16-strand, 300 VAC, with MC12DC male single key connector. 5 m (16 ft.) long.
Operating Temperature: -37 to 66°C (-35 to 150° F)
Environmental: IP67
Conforming to Standards: ANSI/RIA 15.06-1999, ANSI B11.19-2003, OSHA 1910.217(b), CSA Z432-04
Approvals: When used with an MC3, MC4 or MC6 controller the UM series safety mats comprise a system which has been EC type examined to the requirements of category 3, EN 954-1 and EN1760-1:1998.

Specifications are subject to change without notice.

For specifications and dimensions on the MC Controllers, see page F17

A Go to the Engineering Guide
For in-depth information on safety standards and use.

■ Mat Selection

Multiple UM series mat sizes are offered. A system can easily be configured to meet almost any guarding requirement.

Standard Mat Sizes	
Widths	12 to 48 in. (6 in. increments)
Lengths	12 to 72 in. (6 in. increments)
Metric Mat Sizes	
Widths	500 to 1200 mm
Lengths	500 to 1800 mm
Custom Mat Sizes	
Widths	up to 48 in.
Lengths	up to 72 in.

■ Trim Selection

Several choices are available in trim selection and can be customized to a specific application.

Two-Part Ramp Trim with Yellow PVC Cover

This trim simplifies routing of cables and replacement of damaged mats. To position the mats correctly, place all of the mats in the approximate position, place the joining trim between the mats, then temporarily place the cover on the joining trim. Square the mats by sliding the ramp trim under the mats. When all of the mats are correctly positioned, anchor the perimeter trim to the floor. After the wires have been routed, a rugged cover of highly visible, safety yellow PVC is snapped into place. Corners can either be mitered or be Omron STI's exclusive molded corners.

Two-Part Ramp Trim with Aluminum Cover

This trim is the same as above except that the PVC cover is replaced with an aluminum cover that is attached by screws to the base. (See the Dimensions Section of this datasheet for details.)

Two-Part Active Joining Trim

Similar in concept to the two-part ramp trim, this trim provides an "active" joint where the perimeters of two mats adjoin each other. When a person steps on the surface cover of the active joining trim, the Universal Mat system will detect their presence and send a stop signal to the guarded machine.

Aluminum Blunt Trim

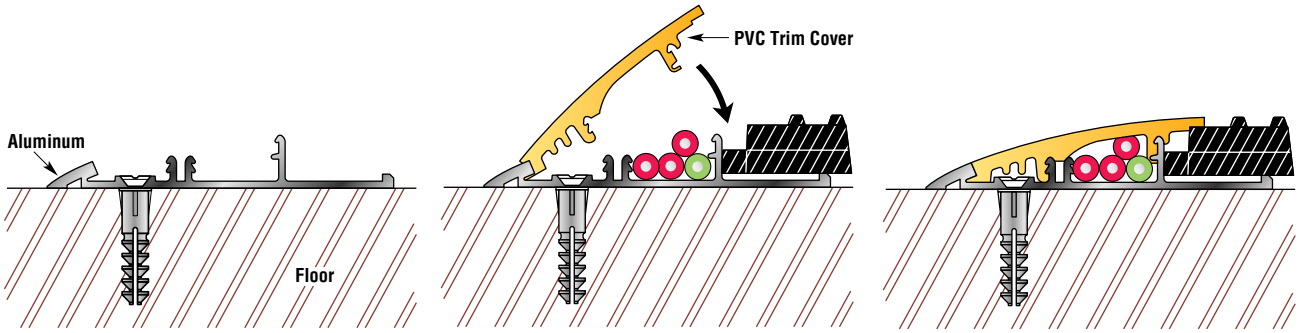
Used to finish off the edge of a mat installation near a wall or machine. Helps hold mats in place.

Aluminum Ramp Trim

This single part aluminum ramp trim is available for areas where the two part ramp trim may not be suitable.

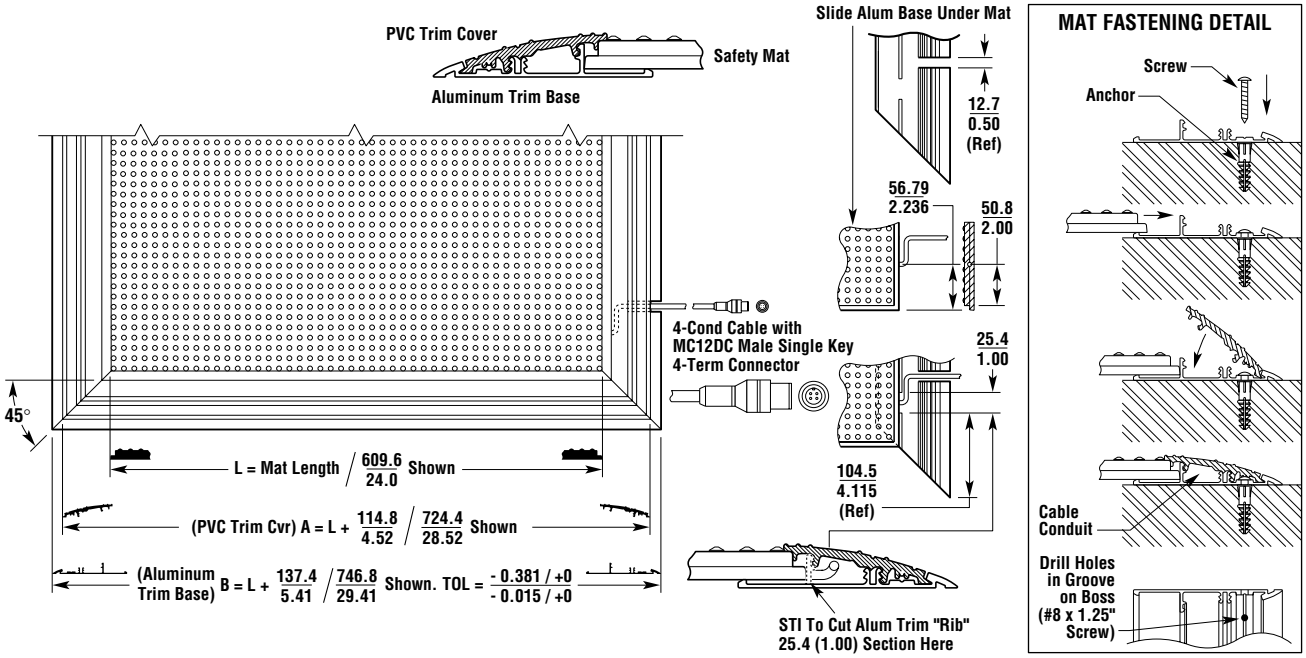
Molded Corners

Eliminates the need to miter the corners of perimeter trim. Designed to mate with Omron STI two-part ramp trim.

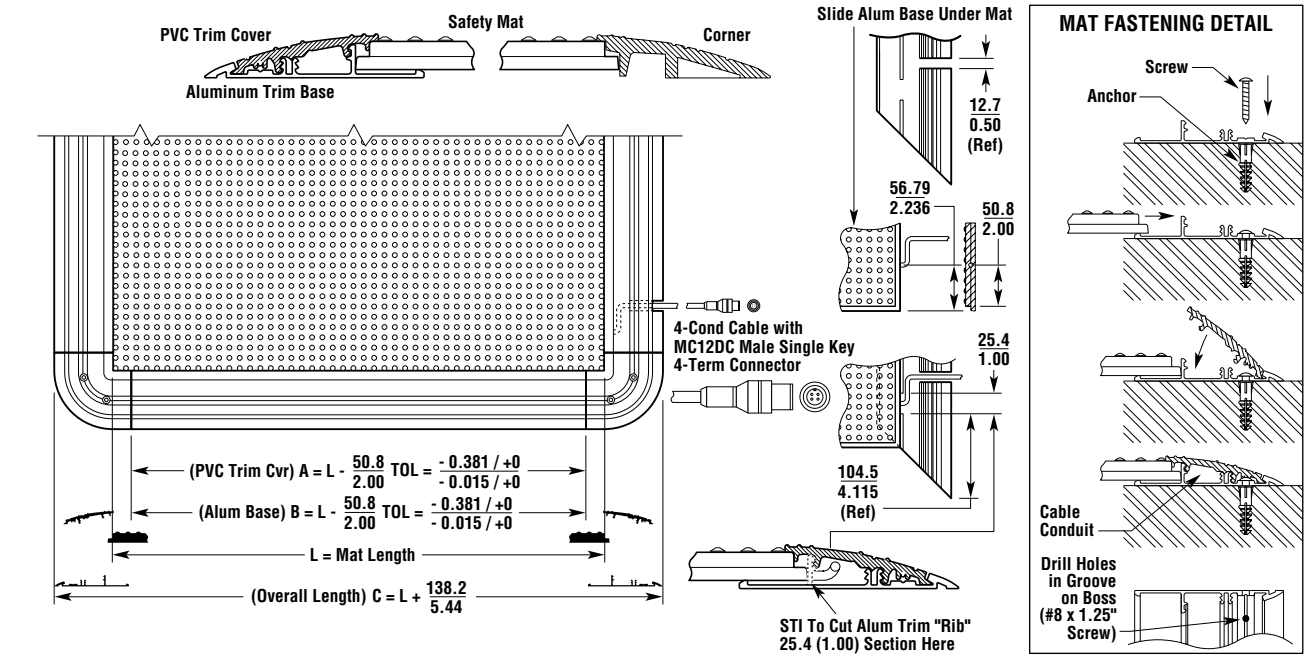


■ Mat Dimensions—mm/in.

Two-Part Trim with PVC Cover and Mitered Corners (TKM)

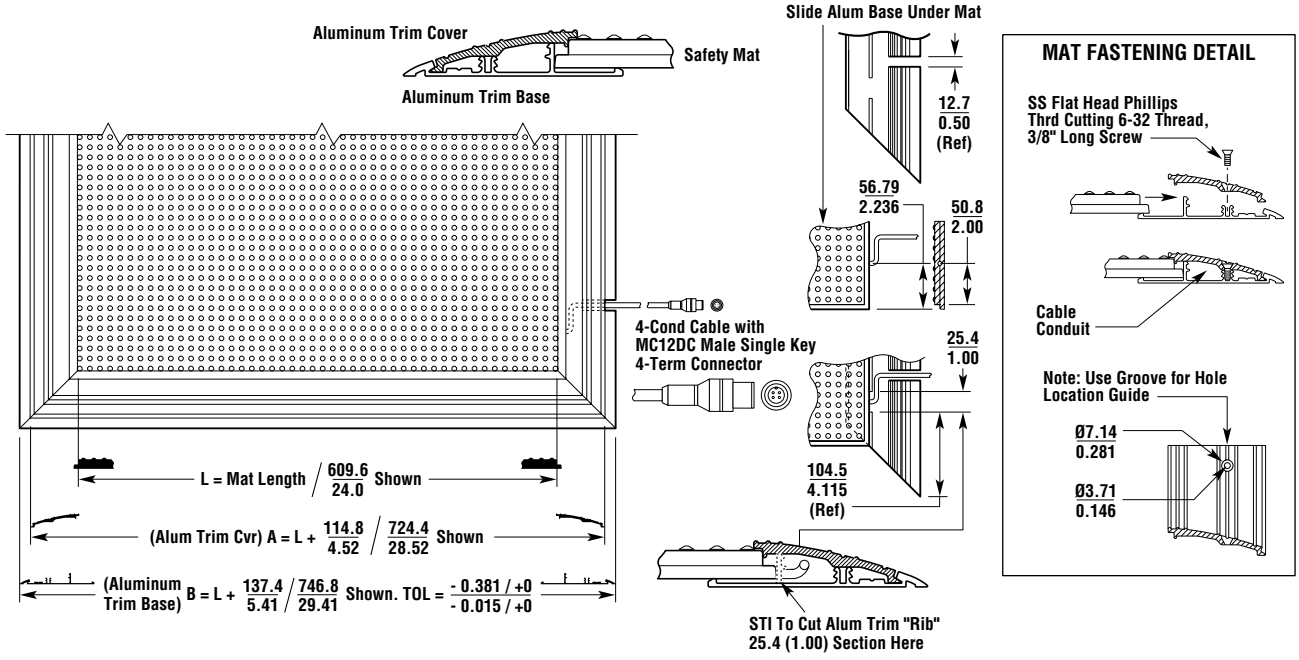


Two-Part Trim with PVC Cover and Molded Corners (TKC)

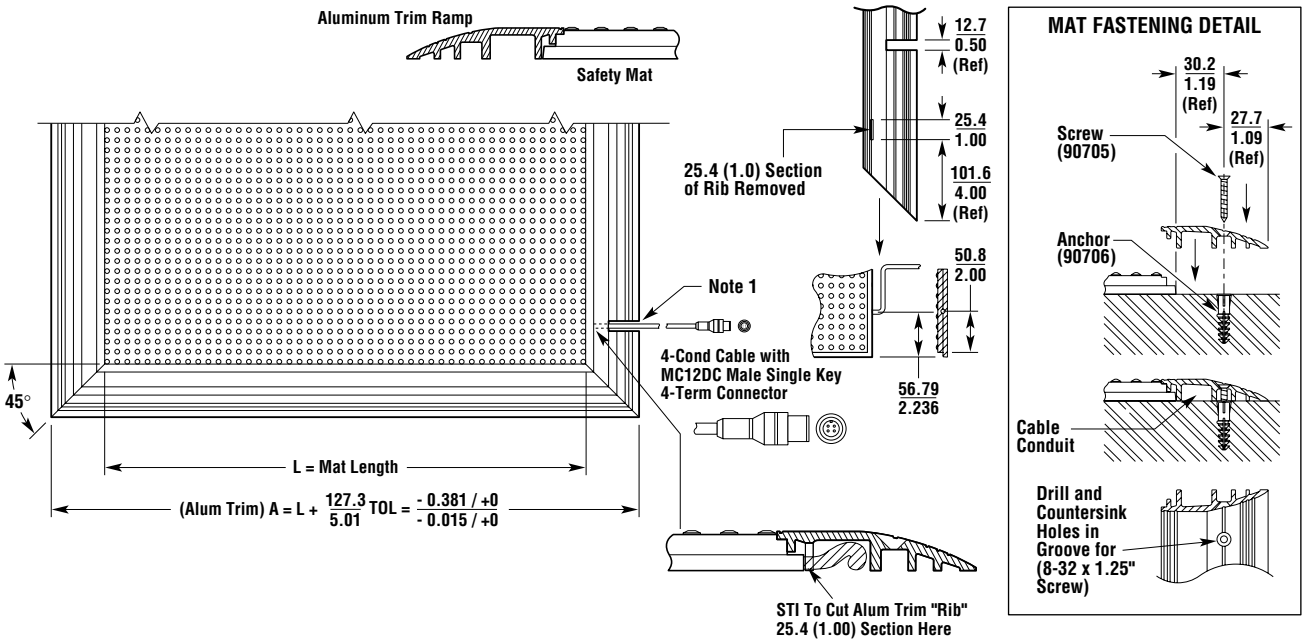


A Go to the Engineering Guide
For in-depth information on safety standards and use.

Two-Part Trim with Aluminum Cover and Mitered Corners (TKAT)



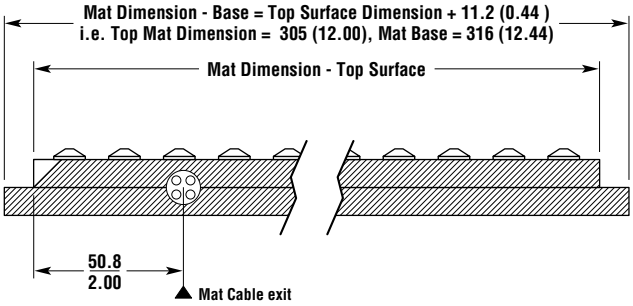
Single-Part Trim Aluminum Trim (TKA)



F

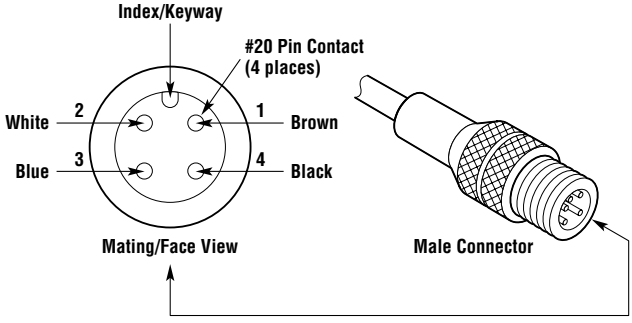
safety mats and area guarding

■ Mat Measurement

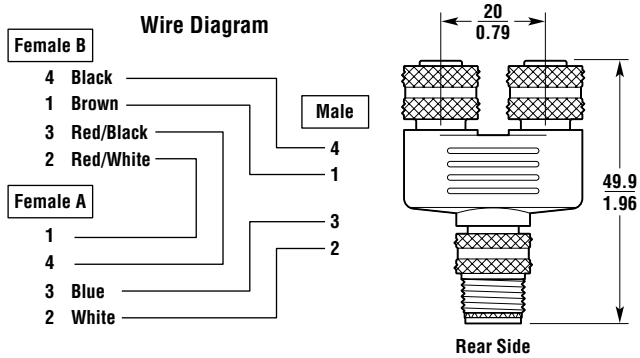


Mat Cable exits on the side indicated by the first dimension in the model number
i.e. UM5-1254, Cable exits 12" dimension
i.e. UM5-4824, Cable exits 48" dimension

■ Pin Out Connector



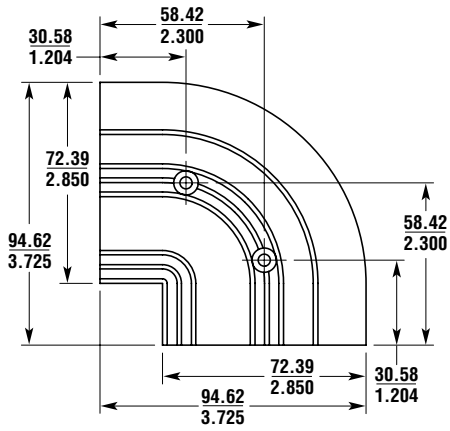
UM-Y-2-1



■ Trim Dimensions—mm/in.

Outside Molded Corner Trim

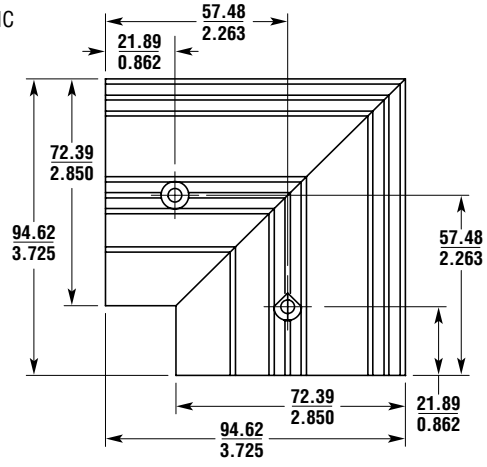
Model UMOC



Molded Outside Corner: PN 25836

Inside Molded Corner Trim

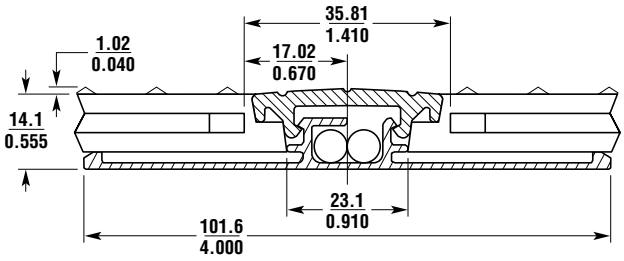
Model UMIC



Molded Inside Corner: PN 25837

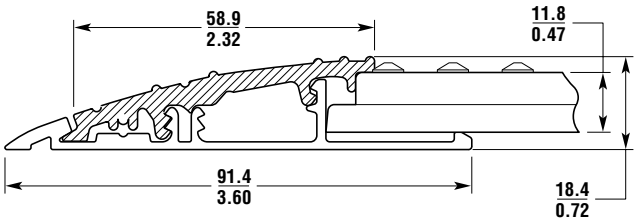
A Go to the Engineering Guide
For in-depth information on safety standards and use.

2-Part Joining Trim (Base and Cover)



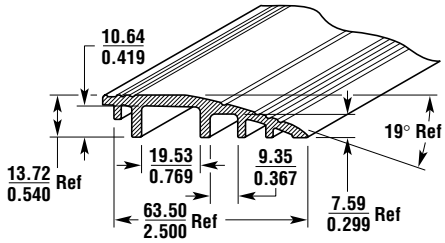
2-Part Joining Trim: PN 43222-0096
Joining Trim Aluminum Base: PN 32592
Joining Trim Cover Black: PN 32591
Joining Trim Cover Yellow: PN 32591-0010

2-Part Ramp Trim with PVC Cover (TKM)



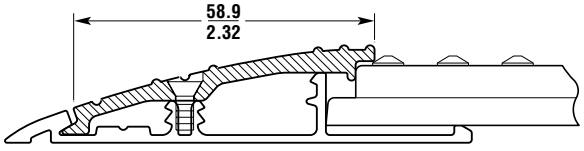
Aluminum Base & PVC Cover: PN 43123-0096
Aluminum Base: PN 32667
PVC Cover: PN 32668

Aluminum Single Part Ramp Trim (TKA)



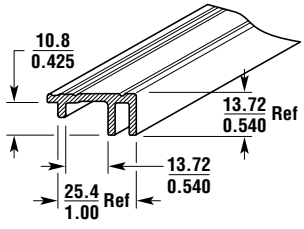
Aluminum Ramp Trim: PN 43224-0096

2-Part Ramp Trim with Aluminum Cover (TKAT)



Aluminum Base & Aluminum Cover: PN 43123-1096
Aluminum Base: PN 32667
Aluminum Cover: PN 26441

Blunt Trim



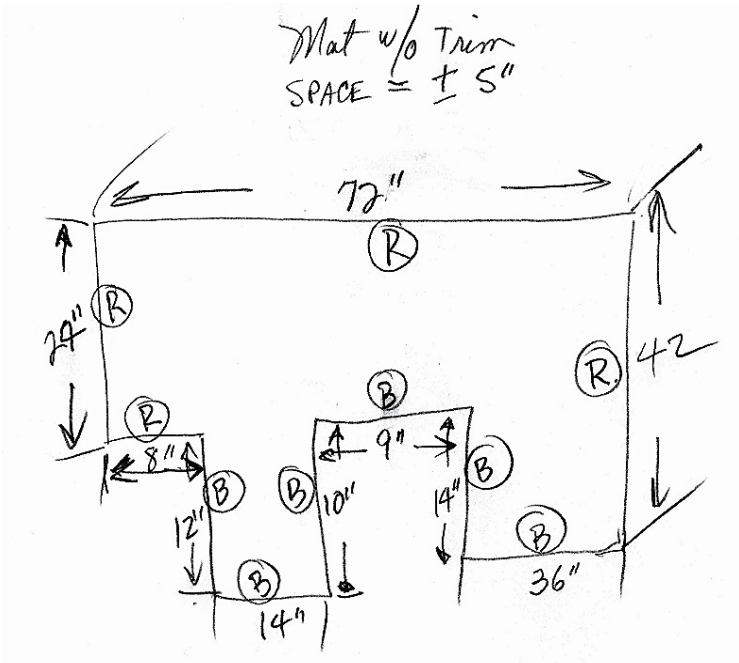
Blunt Trim: PN 43223-0096

■ Custom Mats and Trims

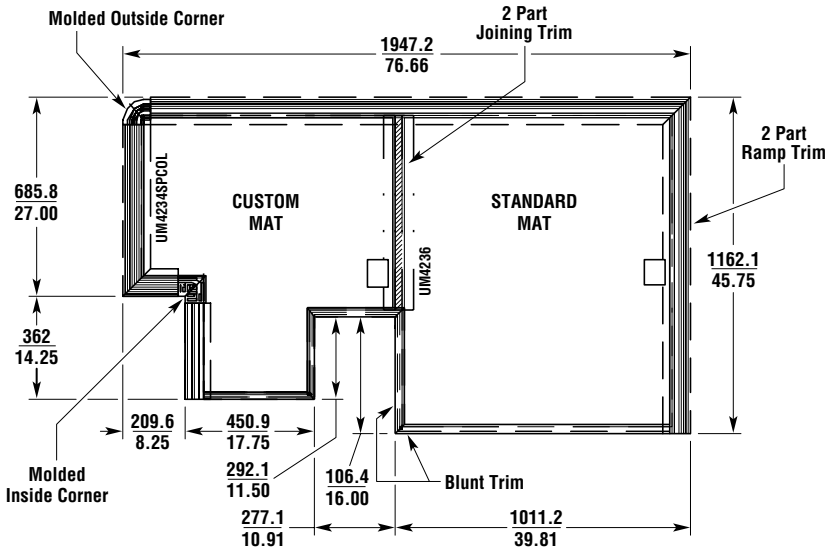
Omron STI makes ordering custom mats and trims easy. Simply send us a sketch of your layout including dimensions. Make note of where you want ramp trim or blunt trim. We'll work from your sketch to create a detailed drawing of your specifications.

Step 1: Customer Sends a Sketch

Example

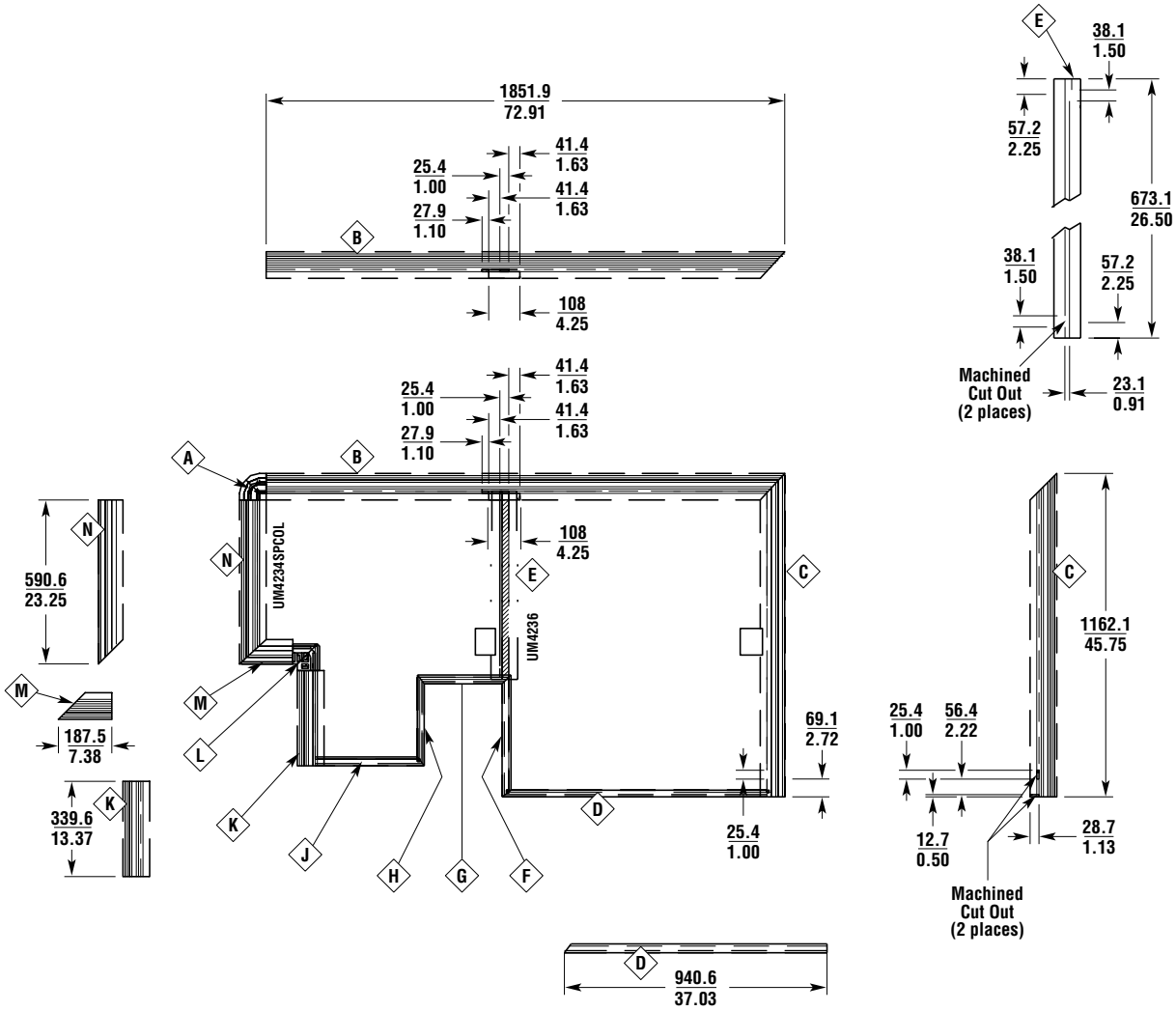


Step 2: A Quote Drawing with Dimensions is Created



A Go to the Engineering Guide
For in-depth information on safety standards and use.

Step 3: When the Order is Placed, A Detailed Layout Showing all Components of the Trim System is Made



■ Ordering - Standard Size

A Universal Mat System contains at least one mat, sufficient perimeter and joining trim and a controller. For multiple mat installations using the MC3 controller, the mats are connected in series to the controller. This may be done using the UMDB6 wiring accessory. When using the MC4 or MC6 controllers, six mats may be connected directly to the controller.

Each component of a Universal Mat system must be ordered individually.

Ordering Mats

___ - ___
❶ ❷

Example: UM10-1266

This example is a 12 x 66 in. black standard mat with 10 m cable

❶ Information required. Represents color and cable length of the mat.

Designator	Description
UM5	Black mat with 5 m cable
UM10	Black mat with 10 m cable
UMY5	Yellow mat with 5 m cable
UMY10	Yellow mat with 10 m cable

Note: All standard mats are stocked in black with 5 m cable.

❷ Information required. Represents mat size. Dimensions are for active mat area. Mats are an additional 0.5 in. (12 mm) in each dimension. Cables exit by the first dimension in the model number.

	Standard Mat Size		Mat Ship Weight	
Designator	in.	(mm)	lbs.	(Kg)
1212	12 x 12	(304.8 x 304.8)	5.8	(2.6)
1254	12 x 54	(304.8 x 1371.6)	25.9	(11.8)
1260	12 x 60	(304.8 x 1524.0)	28.8	(13.1)
1266	12 x 66	(304.8 x 1676.4)	31.7	(14.4)
1272	12 x 72	(304.8 x 1828.8)	34.6	(15.7)
1812	18 x 12	(457.2 x 304.8)	8.6	(3.9)
1818	18 x 18	(457.2 x 457.2)	13.0	(5.9)
1854	18 x 54	(457.2 x 1371.6)	38.9	(17.6)
1860	18 x 60	(457.2 x 1524.0)	43.2	(19.6)
1866	18 x 66	(457.2 x 1676.4)	47.5	(21.6)
1872	18 x 72	(457.2 x 1828.8)	51.8	(23.5)
2412	24 x 12	(609.6 x 304.8)	11.5	(5.2)
2418	24 x 18	(609.6 x 457.2)	17.3	(7.8)
2424	24 x 24	(609.6 x 609.6)	23.0	(10.5)
2454	24 x 54	(609.6 x 1371.6)	51.8	(23.5)
2460	24 x 60	(609.6 x 1524.0)	57.6	(26.1)
2466	24 x 66	(609.6 x 1676.4)	63.4	(28.7)
2472	24 x 72	(609.6 x 1828.8)	69.1	(31.4)
3012	30 x 12	(762.0 x 304.8)	14.4	(6.5)
3018	30 x 18	(762.0 x 457.2)	21.6	(9.8)
3024	30 x 24	(762.0 x 609.6)	28.8	(13.1)
3030	30 x 30	(762.0 x 762.0)	36.0	(16.3)
3054	30 x 54	(762.0 x 1371.6)	64.8	(29.4)
3060	30 x 60	(762.0 x 1524.0)	72.0	(32.7)
3066	30 x 66	(762.0 x 1676.4)	79.2	(35.9)
3072	30 x 72	(762.0 x 1828.8)	86.4	(39.2)
3612	36 x 12	(914.4 x 304.8)	17.3	(7.8)
3618	36 x 18	(914.4 x 457.2)	25.9	(11.8)
3624	36 x 24	(914.4 x 609.6)	34.6	(15.7)
3630	36 x 30	(914.4 x 762.0)	43.2	(19.6)
3636	36 x 36	(914.4 x 914.4)	51.8	(23.5)
3654	36 x 54	(914.4 x 1371.6)	77.8	(35.3)
3660	36 x 60	(914.4 x 1524.0)	86.4	(39.2)
3666	36 x 66	(914.4 x 1676.4)	95.0	(43.1)
3672	36 x 72	(914.4 x 1828.8)	103.7	(47.0)
4212	42 x 12	(1066.8 x 304.8)	20.2	(9.1)
4218	42 x 18	(1066.8 x 457.2)	30.2	(13.7)
4224	42 x 24	(1066.8 x 609.6)	40.3	(18.3)
4230	42 x 30	(1066.8 x 762.0)	50.4	(22.9)
4236	42 x 36	(1066.8 x 914.4)	60.5	(27.4)
4242	42 x 42	(1066.8 x 1066.8)	70.6	(32.0)
4254	42 x 54	(1066.8 x 1371.6)	90.7	(41.2)
4260	42 x 60	(1066.8 x 1524.0)	100.8	(45.7)
4266	42 x 66	(1066.8 x 1676.4)	110.9	(50.3)
4272	42 x 72	(1066.8 x 1828.8)	121.0	(54.9)
4812	48 x 12	(1219.2 x 304.8)	23.0	(10.5)
4818	48 x 18	(1219.2 x 457.2)	34.6	(15.7)
4824	48 x 24	(1219.2 x 609.6)	46.1	(20.9)
4830	48 x 30	(1219.2 x 762.0)	57.6	(26.1)
4836	48 x 36	(1219.2 x 914.4)	69.1	(31.4)
4842	48 x 42	(1219.2 x 1066.8)	80.6	(36.6)
4848	48 x 48	(1219.2 x 1219.2)	92.2	(41.8)
4854	48 x 54	(1219.2 x 1371.6)	103.7	(47.0)
4860	48 x 60	(1219.2 x 1524.0)	115.2	(52.3)
4866	48 x 66	(1219.2 x 1676.4)	126.7	(57.5)
4872	48 x 72	(1219.2 x 1828.8)	138.2	(62.7)

Ordering Perimeter Trim for a Single Mat**

___ - ___
❸ ❹

Example: TKM-1266
This example is a trim kit with mitered corners to fit a 12 x 66 in. standard mat.

❸ Information required. Represents the corner style used on the trim kits.

Designator	Description
TKM	Trim kit, 2-part mitered corners with PVC top cover
TKAT	Trim kit, 2-part mitered corners with aluminum top cover
TKC	Trim kit, 2-part with molded corners
TKA	Trim kit, single part aluminum ramp trim (mitered only)

❹ Information required. Represents trim kit size. Use the designator located in ❷ corresponding to the mat size.

**To order perimeter and joining trim for a multiple mat or custom order configuation, please consult Omron STI.

For specifications and dimensions on the MC Controllers, see page F17

For details on ordering a trim kit for a multiple configuation mat, please consult Omron STI.

For details on ordering a custom safety mat, see page F10

For information on safety mat accessories, see below.

Accessories for Standard and Metric Sized Mats

Model Number	Description	Weight
UMRT4	Bulk two-part ramp trim with yellow PVC cover 1.22 m (48 in.) length	1.5 kg (3.3 lb.)
UMRT8	Bulk two-part ramp trim with yellow PVC cover 2.44 m (96 in.) length	3.0 kg (6.6 lb.)
UMRT8A	Bulk two-part ramp trim with aluminum top 2.44 m (96 in.) length	3.2 kg (7.0 lb.)
UMJS4	Bulk two-part active joining trim 1.22 m (48 in.) length	1.4 kg (3.0 lb.)
UMJS8	Bulk two-part active joining trim 2.44 m (96 in.) length	2.7 kg (6.0 lb.)
UMJTC8Y	Bulk joining trim cover yellow 2.44 m (96 in.)	0.5 kg (1.0 lb.)
UMBT4	Bulk blunt trim 1.22 m (48 in.) length	1.1 kg (2.5 lb.)
UMBT8	Bulk blunt trim 2.44 m (96 in.) length	2.3 kg (5.0 lb.)
UMAL	Bulk aluminum ramp trim 2.44 m (96 in.)	2.9 kg (6.5 lb.)
UMOC	Molded outside corner	
UMIC	Molded inside corner	
UMDB-6	Universal Safety Mat distribution box with 6 mat input connectors and one output connection to the controller	
UMDB-8	Universal Safety Mat distribution box with 8 mat input connectors and one output connection to the controller	
UMDB-10	Universal Safety Mat distribution box with 10 mat input connectors and one output connection to the controller	
UMEC-DB6	15 m UMDB6 extension cable (distribution box to controller)	
UMEC-03	3 m (9 ft.) extension cable	
UMEC-05	5 m (16 ft.) extension cable	
UMEC-10	10 m (32 ft.) extension cable	
UMEC-15	15 m (49 ft.) extension cable	
UMPMC	Panel-mount connector. Allows the controller to accept quick disconnect cable from UM series mats.	
UM4PMC	Replacement connector for UM series mats	
UM4PRC	4-pin replacement connector for mat QD connector	
UM-Y-2-1	"Y" connector, internally connected to allow 2 mats to 1 input to controller or connector	

■ Ordering - Metric Size

A Universal Mat System contains at least one mat, sufficient perimeter and joining trim and a controller. For multiple mat installations using the MC3 controller, the mats are connected in series to the controller. This may be done using the UMDB6 wiring accessory. When using the MC4 or MC6 controllers, six mats may be connected directly to the controller.

Each component of a Universal Mat system must be ordered individually.

Ordering Mats

___ - ___ - ___
❶ ❷ ❸

Example: UMM10-0500-0500
This example is a 500 x 500 mm black metric mat with 10 m cable

❶ Information required. Represents color and cable length of the mat.

Designator	Description
UMM5	Black mat with 5 m cable
UMM10	Black mat with 10 m cable
UMYM5	Yellow mat with 5 m cable
UMYM10	Yellow mat with 10 m cable

❷ Information required. Represents mat width. Dimensions are for active mat area. Mats are an additional 0.5 in. (12 mm) in each dimension. Cables exit by the first dimension in the model number.

	Metric Mat Width	
Designator	mm	(in.)
0500	500	(19.7)
0750	750	(29.5)
1000	1000	(39.4)
1200	1200	(47.2)

❸ Information required. Represents mat length. Dimensions are for active mat area. Mats are an additional 0.5 in. (12 mm) in each dimension. Cables exit by the first dimension in the model number.

	Metric Mat Length	
Designator	mm	(in.)
0500	500	(19.7)
0750	750	(29.5)
1000	1000	(39.4)
1250	1250	(49.2)
1500	1500	(59.1)
1750	1750	(68.9)
1800	1800	(70.9)

Note: To calculate the approximate shipping weight in pounds, please use the following formula: L x W ÷ 1000 x 0.0625.

Example: A 500 mm x 500 mm mat would weigh approximately 15.62 lbs. (500 x 500 ÷ 1000 x 0.0625 = 15.62)

Ordering Perimeter Trim for a Single Mat**

___ - ___
❸ ❹

Example: MTKM-0500-0500
This example is a trim kit with mitered corners to fit a 500 x 500 mm metric mat.

❸ Information required. Represents the corner style used on the trim kits.

Designator	Description
MTKM corners	Metric trim kit with mitered
MTKC corners	Metric trim kit with molded

TKAT is available upon request.

❹ Information required. Represents trim kit size. Use the designator located in ❷ corresponding to the mat size.

**To order perimeter and joining trim for a multiple mat or custom order configuation, please consult Omron STI.

For specifications and dimensions on the MC Controllers, see page F17
For details on ordering a custom safety mat, see page F10
For information on safety mat accessories, see page F13
For details on ordering a trim kit for a multiple configuation mat, please consult Omron STI.
A Go to the Engineering Guide
For in-depth information on safety standards and use.


MC3


MC4


MC6

MC3, MC4 and MC6 Series

Safety Mat Controllers

MC6

- Control reliable
- Dual microprocessor circuitry monitors mat and wiring integrity
- 2-digit numeric display for fault diagnostics
- Universal power input
- Select from Automatic Start, Start/Restart Interlock or Start Interlock operating modes
- Up to 6 mat zone inputs
- MPCE monitoring
- Field replaceable safety output relay module or solid-state output module
- Selectable auxiliary output mode
- Six mat zone status indicator LEDs
- Surface mount, lockable metal enclosure
- Remote access to reset functions

Options

- Lid-mounted reset key switch
- Quick disconnect for incoming power and relay outputs
- Quick disconnects up to 6 mat zone inputs
- Solid-state safety output module
- Safety relay output module

Description

MC3

The MC3 DIN mount controller may be used in applications that do not require the feature set of the MC6 controller. The MC3 single zone mat controller has removable terminal blocks and operates only on 24 VDC.

MC4

The MC4 is a NEMA 4, 12 rated single zone mat controller. This controller may be used in applications when the diagnostic features of the MC6 may not be required. The MC4 may be ordered in either 24 VDC or the universal auto-selecting power supply for 100-240 VAC.

MC6

The MC6 is a NEMA 4, 12 controller with six individual mat zone indicators and is designed to be backward compatible with the MC4. Both units are dimensionally identical. This is where the similarities stop: The MC6 has full featured diagnostics with a 24 VDC and an optional universal power supply (100-240 VAC auto-selecting). It is a controller that can be use anywhere in the world.

The MC Series safety mat controllers are used in conjunction with a four-wire, normally open, safety mat where perimeter guarding is required. These control reliable controllers send a stop signal to the guarded

machine when an object of sufficient weight is detected on the active mat area.

The MC Series controllers, when combined with a four-wire UM series mat, provide access guarding and improved productivity. The work area is fully visible and accessible.

The controller meets the requirement of EN 1760-1:1998, EN 954, ANSI/RIA 15.06-1999, ANSI B11.19-2003, OSHA 1910-217C. CSA and UL508.

■ Additional Guarding Requirements

A safety mat system is often only one part of a machine guarding solution. If the safety mat does not protect all access to the point of operation, additional guarding must be used. Safety mat systems should only be used to detect the presence, not the absence, of a force.

Perimeter Guarding Requirements

For perimeter guarding installations, the guarded machine or robot controller must be wired such that any stop signal generated by the safety mat system will cause an immediate stop of the hazardous motion. The machine or robot must only be restarted by the actuation of a manual reset switch. This reset switch must be located outside the area of hazardous motion and positioned such that the hazardous area can be observed by the switch operator. The purpose of this arrangement is to prevent a machine or robot from automatically restarting once the sensing weight is no longer detected by the safety mat sensing area.

■ Specifications

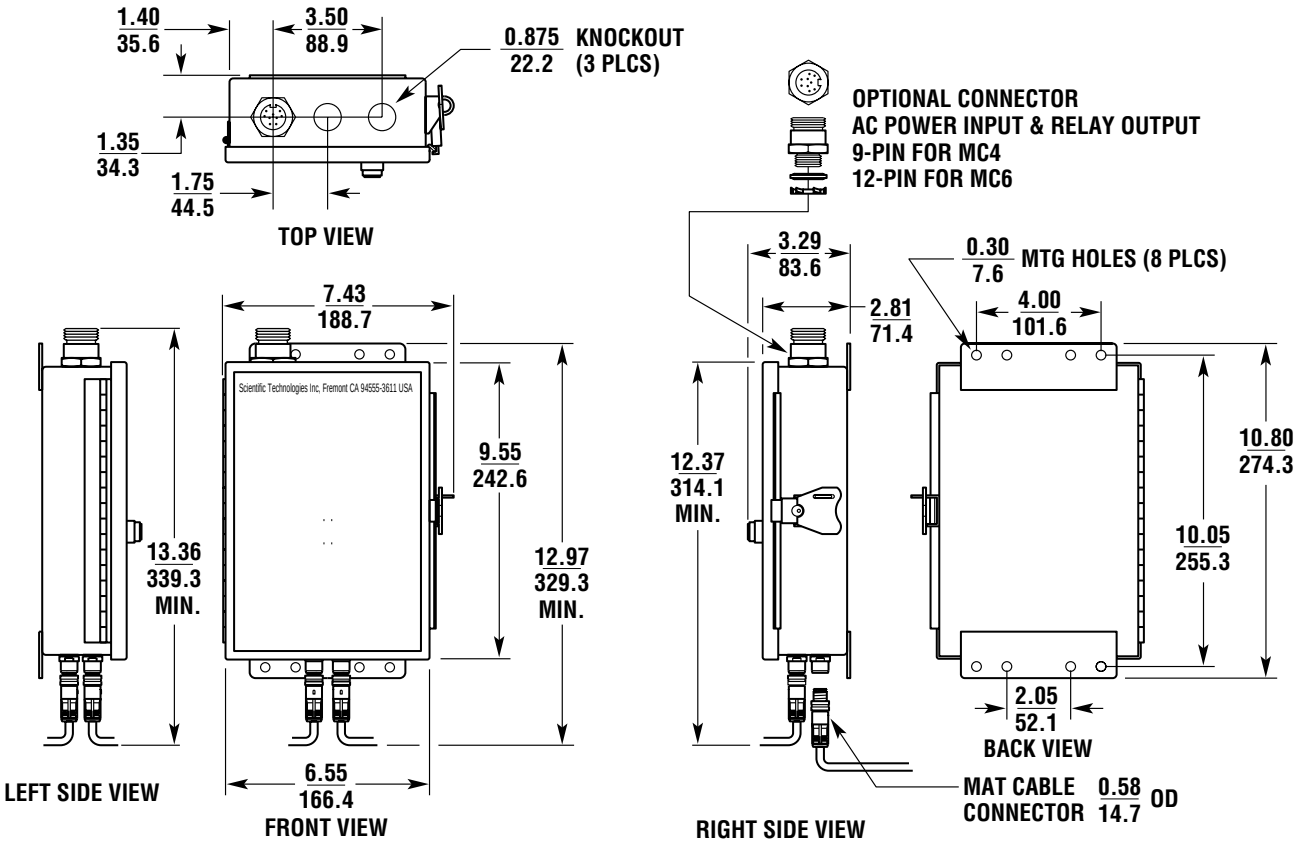
Controller Specifications	MC3	MC4	MC6
Performance			
Category 3 Safety Device:	Yes	Yes	Yes
Operating Area:	Up to 27.9 sq. m (300 sq. ft.) mat area per controller	Up to 27.9 sq. m (300 sq. ft.) mat area per controller	Up to 27.9 sq. m (300 sq. ft.) mat area per controller
Response Time:	< 30 msec	< 30 msec	< 30 msec
Indications:	1 - Green = Run 1 - Red = Stop 1 - Green = Mat Clear	1 - Green = Run 1 - Red = Stop 1 - Green = Mat Clear	1 - 2 Digit Diagnostic Display 1 - Green = Run 1 - Red = Stop 1 - Green = Mat Clear 1 - Yellow = Interlock 6 - Red = Mat Zones
Operational Modes: (Selectable)	Automatic Start Start/Restart Interlock	Automatic Start Start/Restart Interlock	DIP Switch Selected, Automatic Start, Start/Restart Interlock Start Interlock

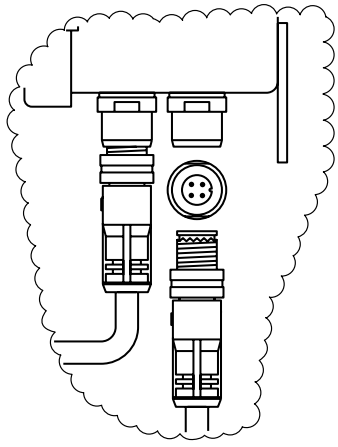
A Go to the Engineering Guide
For in-depth information on safety standards and use.

Controller Specifications	MC3	MC4	MC6
Electrical			
Power Input:	24 VDC ± 15% < 3 watts	24 VDC ± 10% < 3 watts or Autoselecting 100 - 240 VAC ± 10%, 20 watts	24 VDC ± 10% 10 watts (Relay) 24 VDC ± 10% 50 watts (Solid-State) or Autoselecting 100 - 240 VAC ± 10%, 20 watts
Safety Inputs:	One - 4-wire UM Safety Mat, or group series as one input. Multiple mats may be connected to a single zone in series	Connections for up to six, - 4-wire UM Safety Mats Multiple mats may be connected to a single zone in series	Connections for up to six, - 4-wire UM Safety Mats Multiple mats may be connected to a single zone in series
Safety Output Relays:	2 NO and 2 NC	2 NO and 2 NC	2 NO and 1 NC
Maximum Switched Current:	230 VAC, 6 A, 1500 watts 24 VDC - 2 A Inductive, 6 A Resistive	230 VAC, 6 A, 1500 watts 24 VDC - 2 A Inductive, 6 A Resistive	230 VAC, 7 A, 1600 watts 24 VDC - 2 A Inductive, 6 A Resistive
MPCE:	n/a	n/a	DIP Switch Selected
Aux. Output Relay:	None (NC may be used as Aux)	None (NC may be used as Aux)	1 NO and 1 NC
Maximum Switched Current:	230 VAC, 6 A, 1500 watts 30 VDC, 1.0 A	230 VAC, 6 A, 1500 watts	125 VAC, 0.5 A
Relay Life:	Mechanical = 10M operations	Mechanical = 10M operations	Mechanical = 10M operations
Terminal Blocks:	Removable Pressure point screw	Cage clamp terminal strip	Cage clamp terminal strip & 2-part terminal blocks
Options			
Solid-State Outputs			
Solid-State Safety Outputs:	n/a	n/a	2 Current Sourcing 24 VDC (PNP)
Maximum Switched Current:	n/a	n/a	0.625 A @ 24 VDC
Solid-State Aux. Outputs:	n/a	n/a	1 Current Sourcing (PNP) and 1 Current Sinking (NPN)
Maximum Switched Current:	n/a	n/a	Current Sourcing Max: 0.5 A @ 24 VDC Current Sinking Max: 0.1 A @ 24 VDC
Reset Function			
Key-switch (factory installed):	n/a	yes	yes
Remote:	user supplied, Key-switch, or Pushbutton	user supplied, Key-switch, or Pushbutton	user supplied, Key-switch, or Pushbutton
Mat Input Connectors:	n/a	Up to six quick-disconnect connectors	Up to six quick-disconnect connectors
Power Input and **Safety Output Connector:**	n/a	Yes	Yes
Enclosure:	Polycarbonate	Polyurethane-painted 14 ga. steel	Polyurethane-painted 14 ga. steel
Mounting:	35 mm DIN rail	Surface Mount	Surface Mount
Environmental			
Protection Rating:	IP20	IP65/NEMA 4, 12	IP65/NEMA 4, 12
Operating Temperature:	-10 to 55°C (14 to 131° F)	0 to 55°C (32 to 131° F)	0 to 55°C (32 to 131° F)
Relative Humidity:	90%	90%	90%
Vibration:	5-60 Hz at 5 g max on three axis	10-55 Hz at 5 g max on three axis	10-55 Hz at 5 g max on three axis
Shock:	10 g for 0.016 sec. 1000 shocks for each axis on 3 axis	10 g for 0.016 sec. 1000 shocks for each axis on 3 axis	10 g for 0.016 sec. 1000 shocks for each axis on 3 axis
Electromagnetic Compatibility (EMC)			
Electrostatic Discharge (ESD):	±8 kV (air discharge) ±6 kV (contact discharge)	±8 kV (air discharge) ±6 kV (contact discharge)	±8 kV (air discharge) ±6 kV (contact discharge)
Radiated RF Field:	10 V/m, 80 to 1,000 MHz	10 Vs/m, 80 to 1,000 MHz	10 V/m, 80 to 1,000 MHz
Electrical Fast Transients (EFT):	±2 kV (all power and I/O ports)	±2 kV (all power and I/O ports)	±2 kV (all power and I/O ports)
Surge:	± 2 kV (all power and I/O ports)	± 2 kV (all power and I/O ports)	±2 kV (all power and I/O ports)
Shipping Wt.:	(0.22 kg (0.8 lbs.)	Approx 4 kg (9.0 lbs.)	Approx 4 kg (9.0 lbs.)
Standards of Conformity:	TUV, CE, CSA-CUL CE Certificate # BB9910347 01 CSA-CUL Certificate # LR90200-14	TUV, CE, CSA-CUL CE Certificate # BB9910347 02 CUL Certificate # LR90200-14	TUV, CE, CSA-CUL CE Certificate # BB2110242 01 CSA-CUL Certificate # LR90200-14
Designed to meet or exceed: EN1760-1998, EN954, ANSI/RIA15.06-1999, ANSI B11.19-2003, OSHA 1910-217C, CSA AND UL508			

■ *Dimensions—in./mm*

MC4, MC6

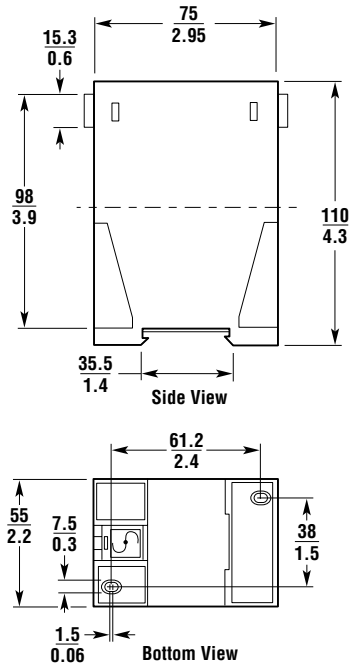




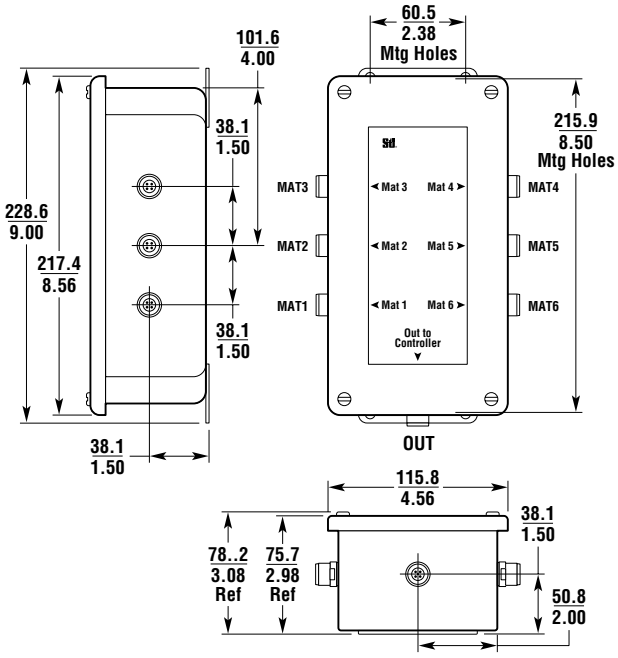
A Go to the Engineering Guide
For in-depth information on safety standards and use.

■ Dimensions—mm/in. (continued)

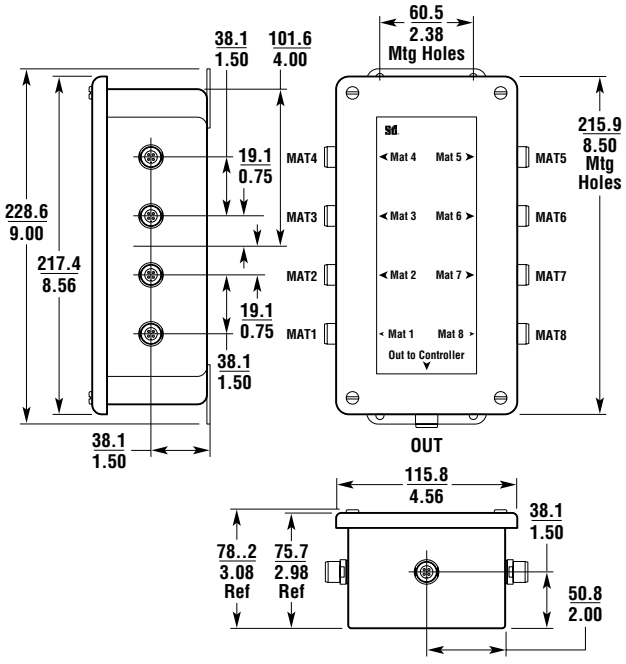
MC3



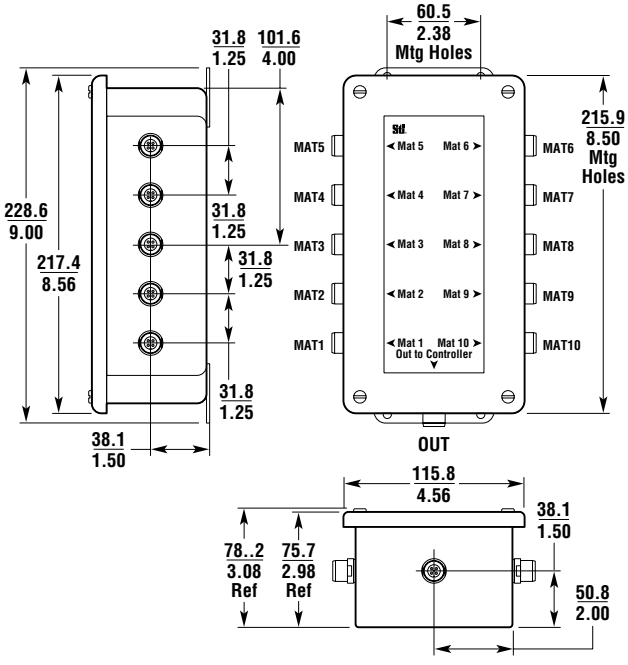
UMDB-6



UMDB-8



UMDB-10

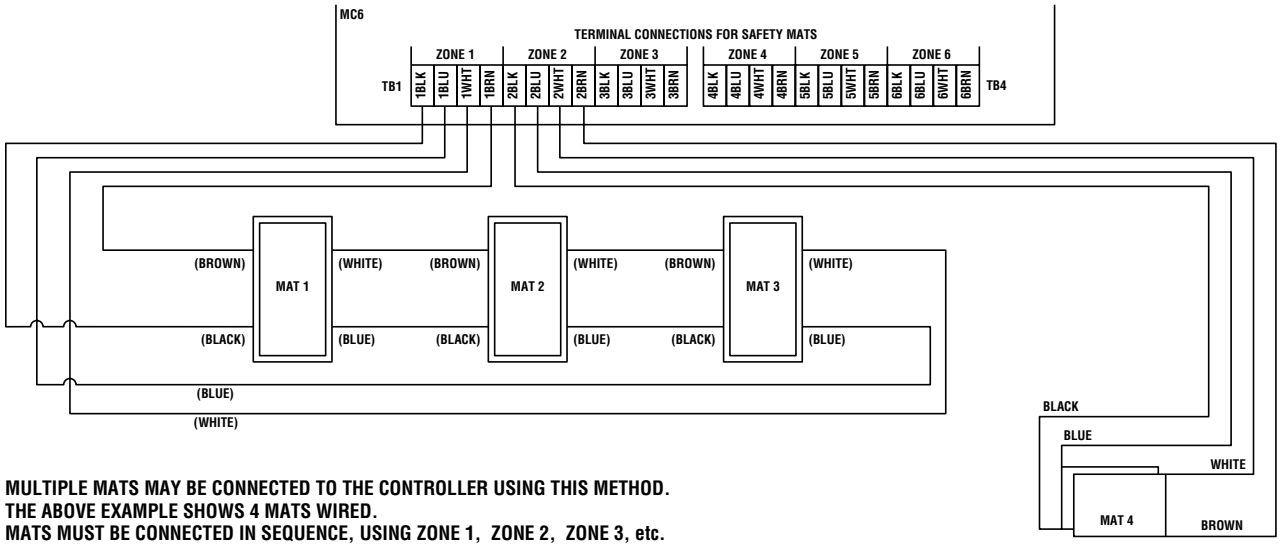


F

safety mats and area guarding

■ Wiring

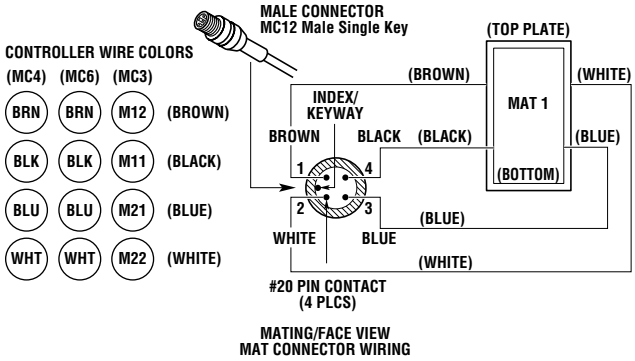
MC6 with Multiple Mats Connected to One Zone



MULTIPLE MATS MAY BE CONNECTED TO THE CONTROLLER USING THIS METHOD.
THE ABOVE EXAMPLE SHOWS 4 MATS WIRED.
MATS MUST BE CONNECTED IN SEQUENCE, USING ZONE 1, ZONE 2, ZONE 3, etc.
DIP SWITCHES MUST BE SET TO THE NUMBER OF ZONES BEING USED.

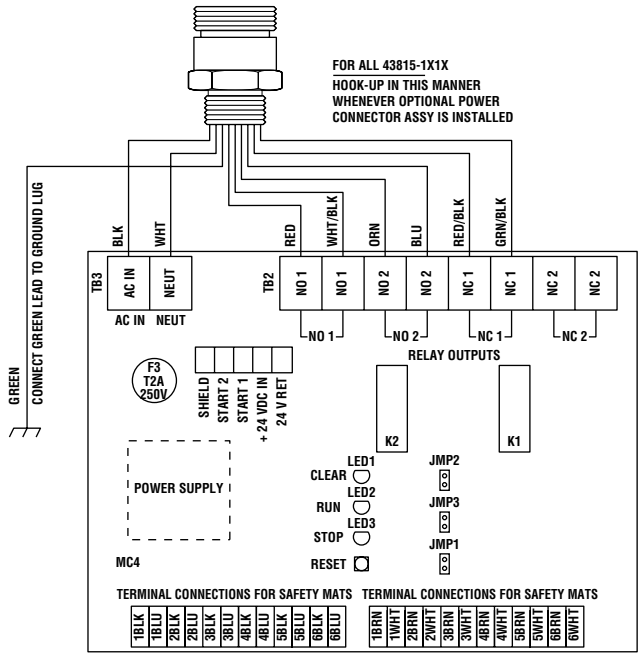
Mat Connections for Listed Controllers

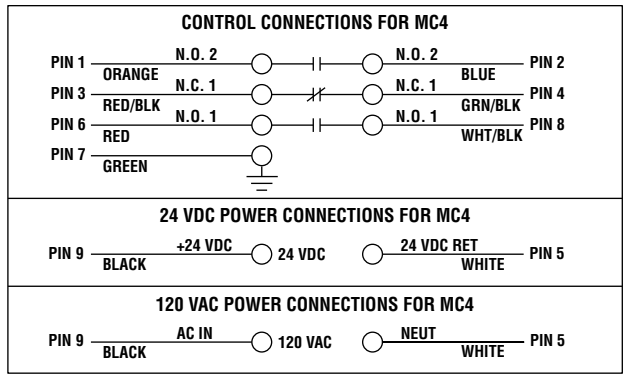
- The MC4 and MC6 controllers may be ordered with up to 6 mat connectors (part #60477) installed.
- When using the MC3 controller, part #60477 may be ordered for mounting in customer enclosure.

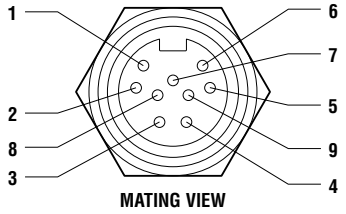


A Go to the Engineering Guide
For in-depth information on safety standards and use.

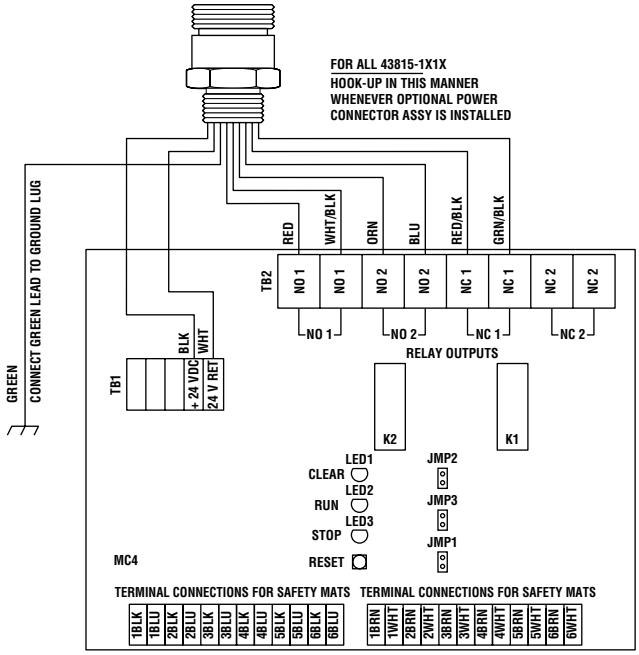
MC4 AC Power, 9-Pin Connector

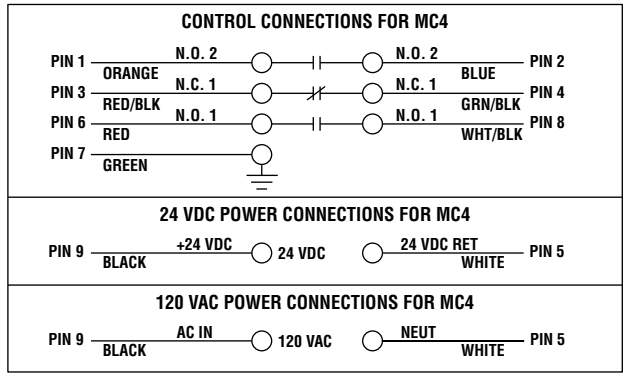


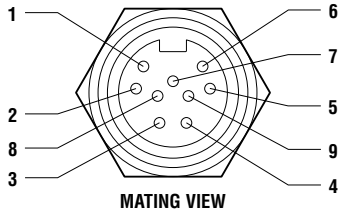




MC4 DC Power, 9-Pin Connector





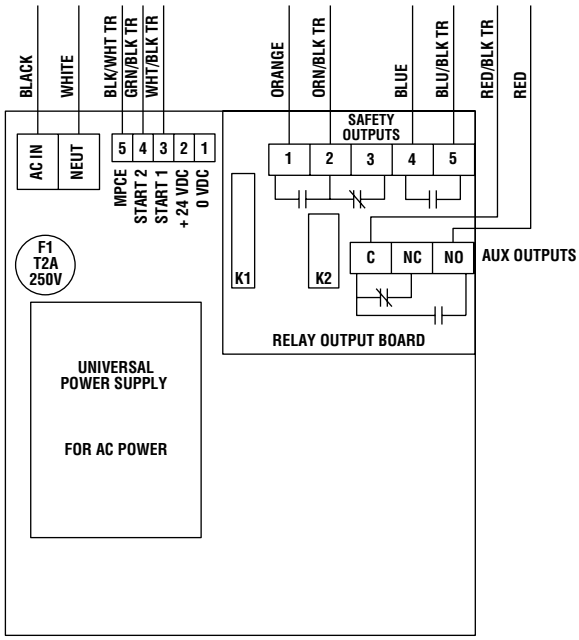


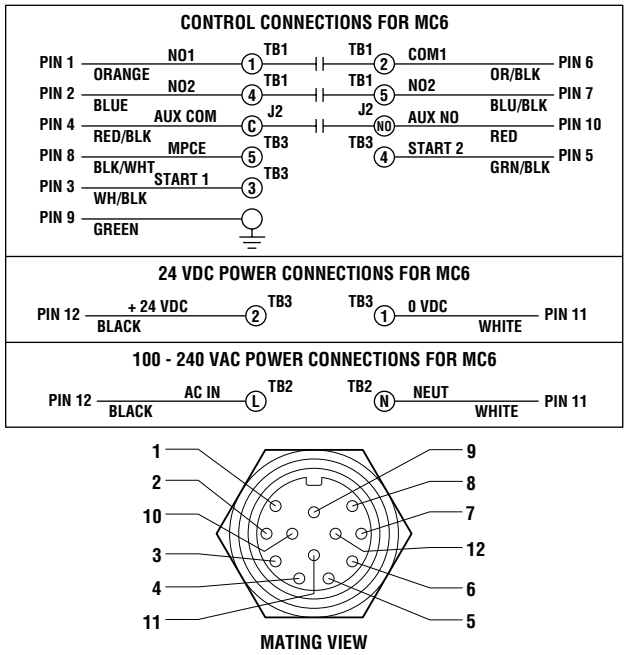
F

safety mats and area guarding

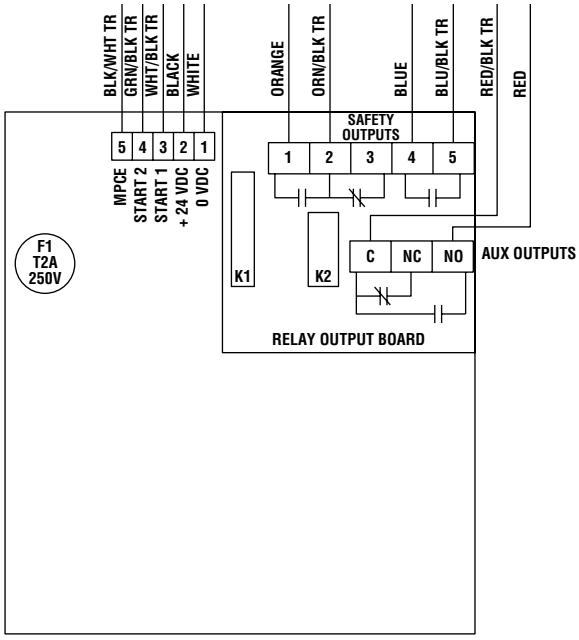
■ Wiring (continued)

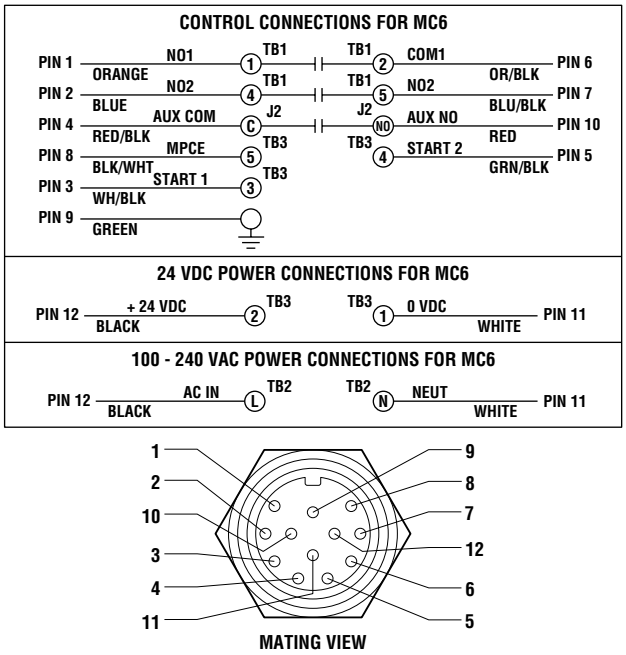
MC6 AC Power, 12-Pin Connector





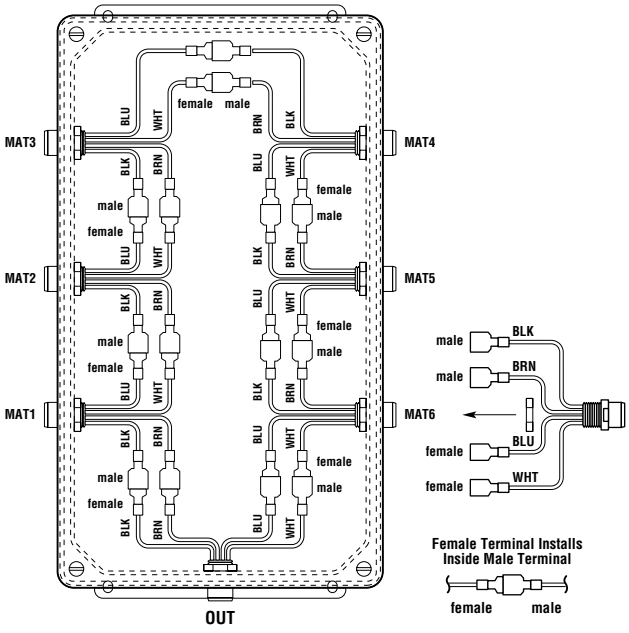
MC6 DC Power, 12-Pin Connector



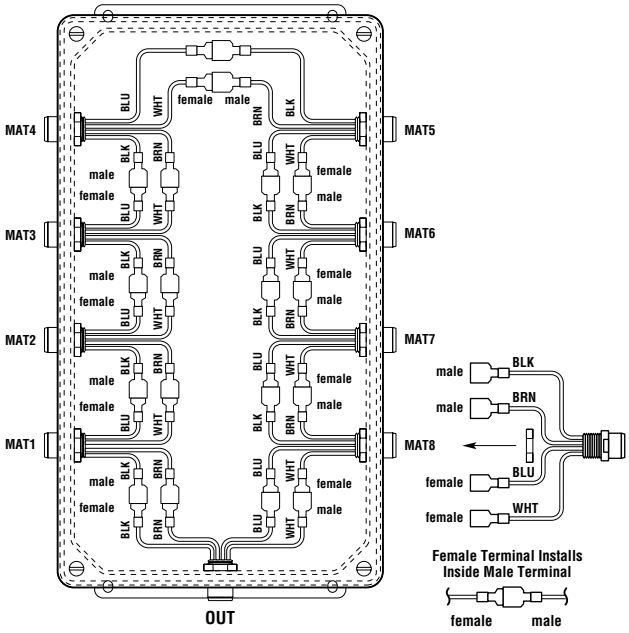


A Go to the Engineering Guide
For in-depth information on safety standards and use.

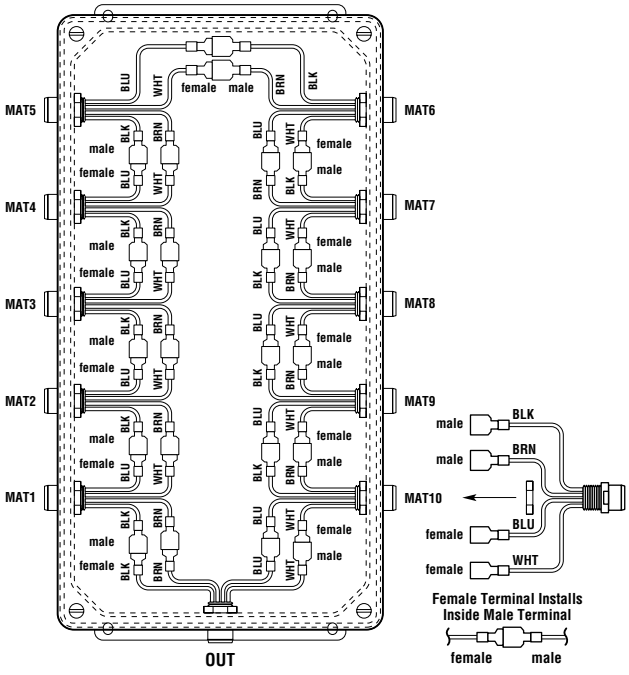
UMDB-6



UMDB-8

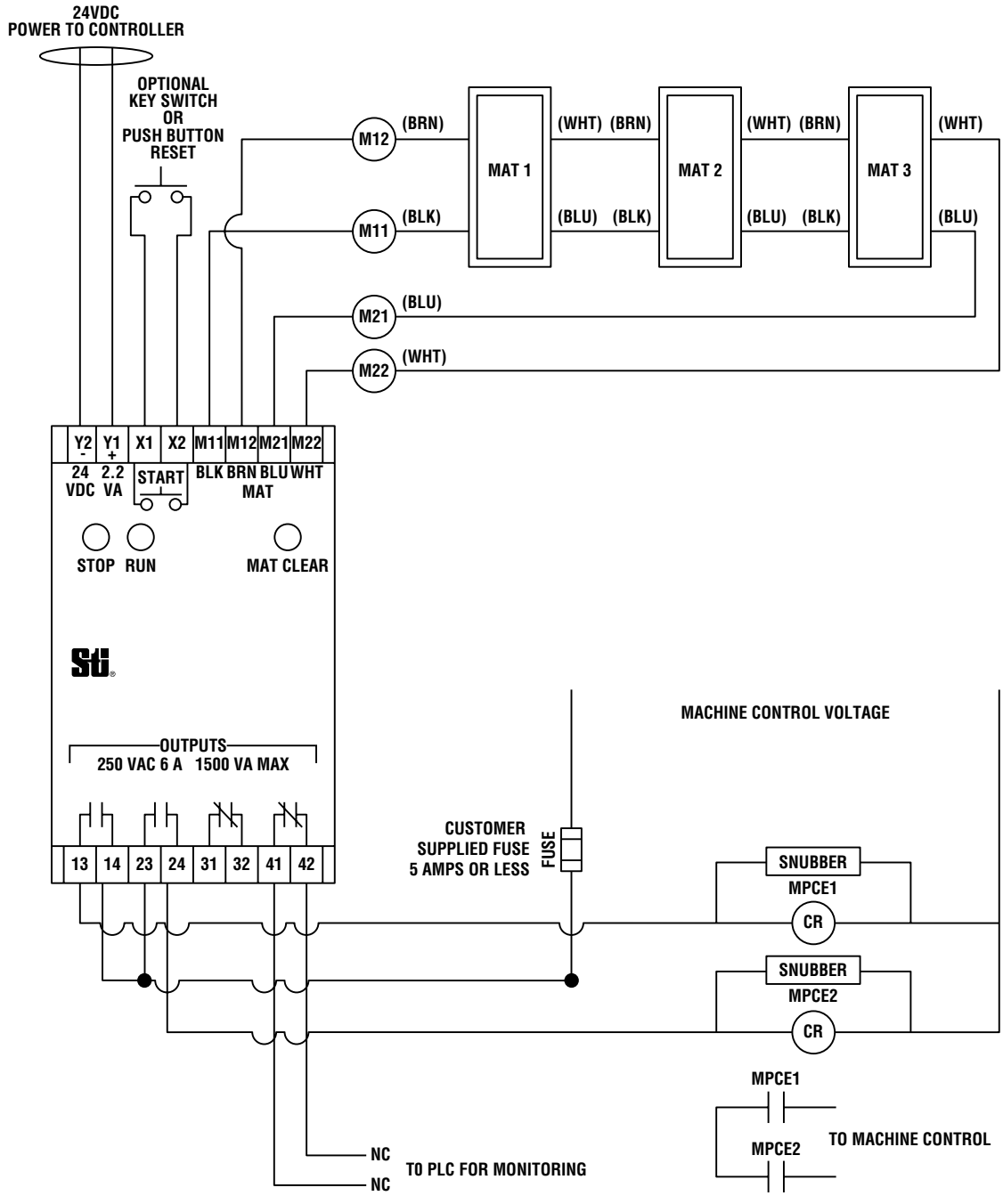


UMDB-10



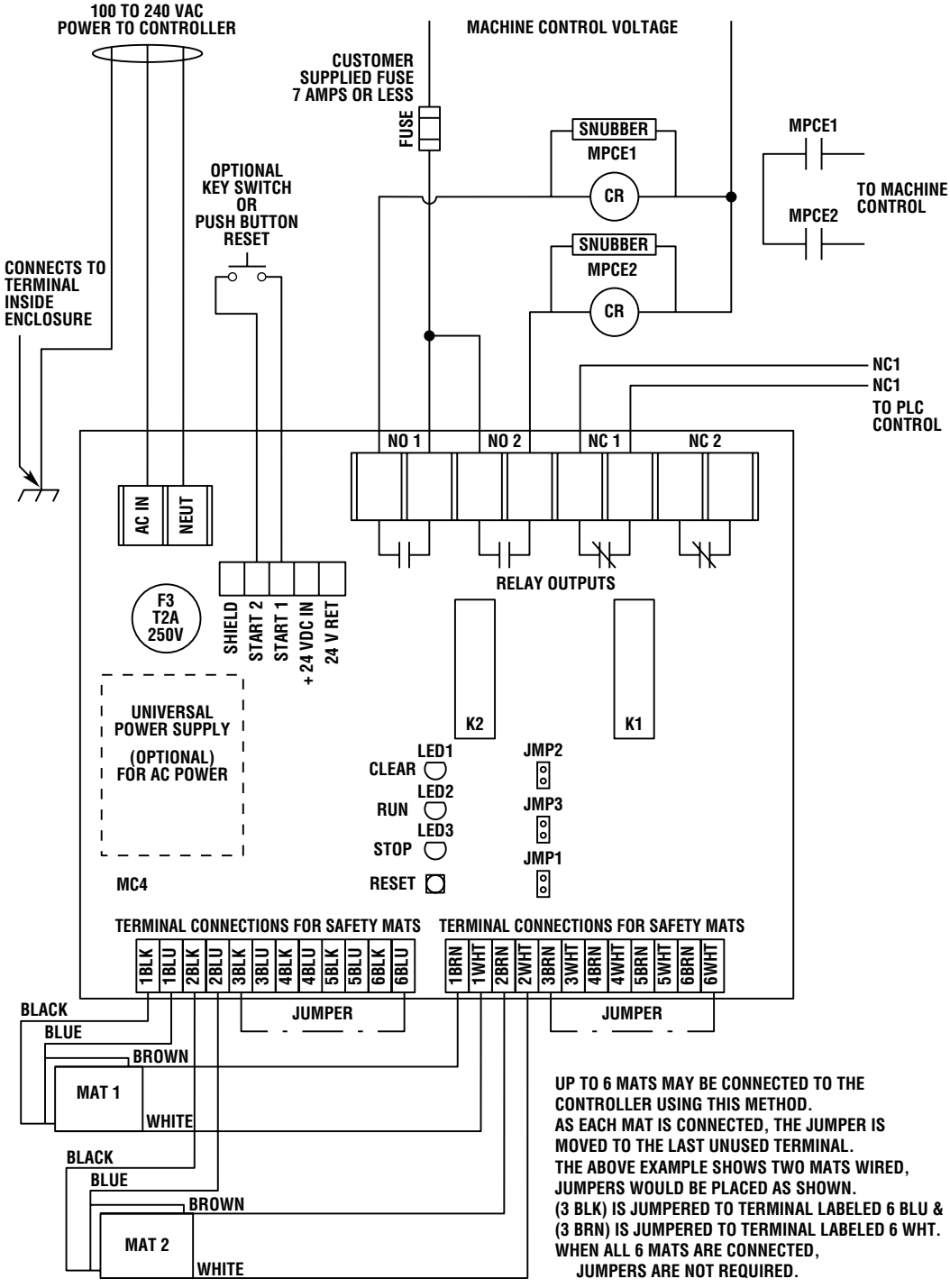
■ *Suggested Machine and PLC Connections*

MC3, Two Normally Open Safety Relay Outputs



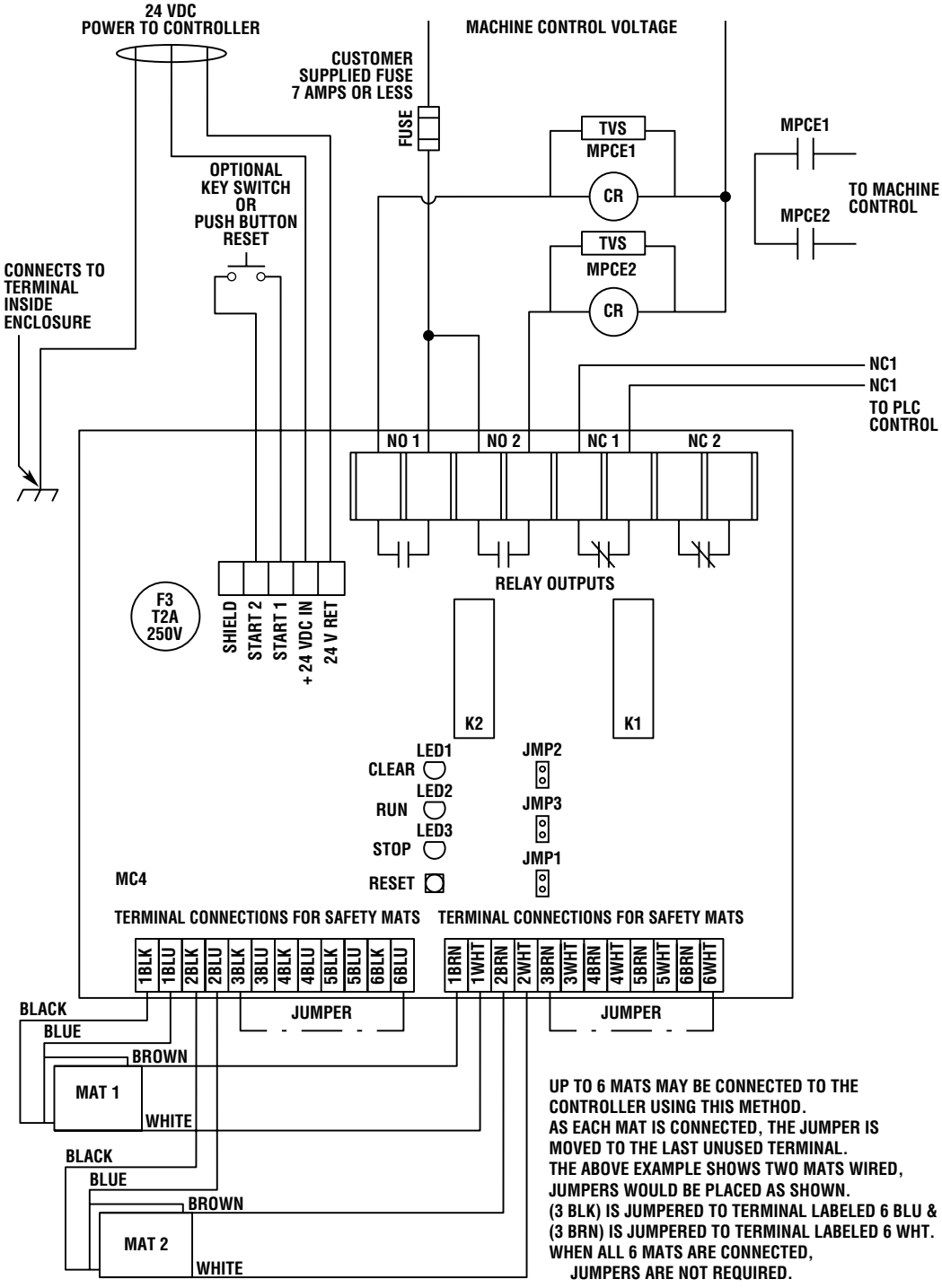
A Go to the Engineering Guide
For in-depth information on safety standards and use.

MC4, Two Normally Open Safety Relay Outputs, 100 to 240 VAC Power



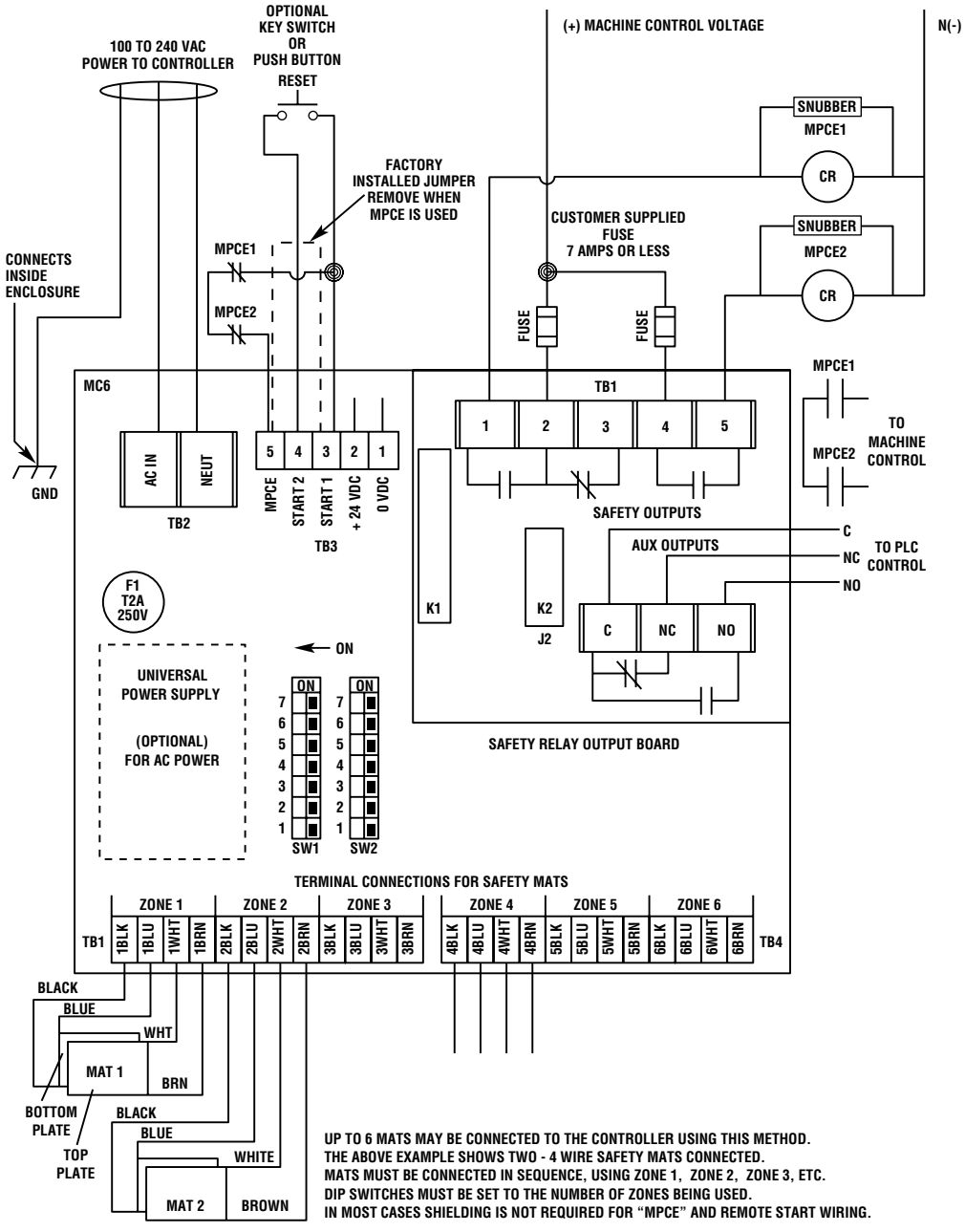
■ *Suggested Machine and PLC Connections (continued)*

MC4, Two Normally Open Safety Relay Outputs, 24 VDC Power



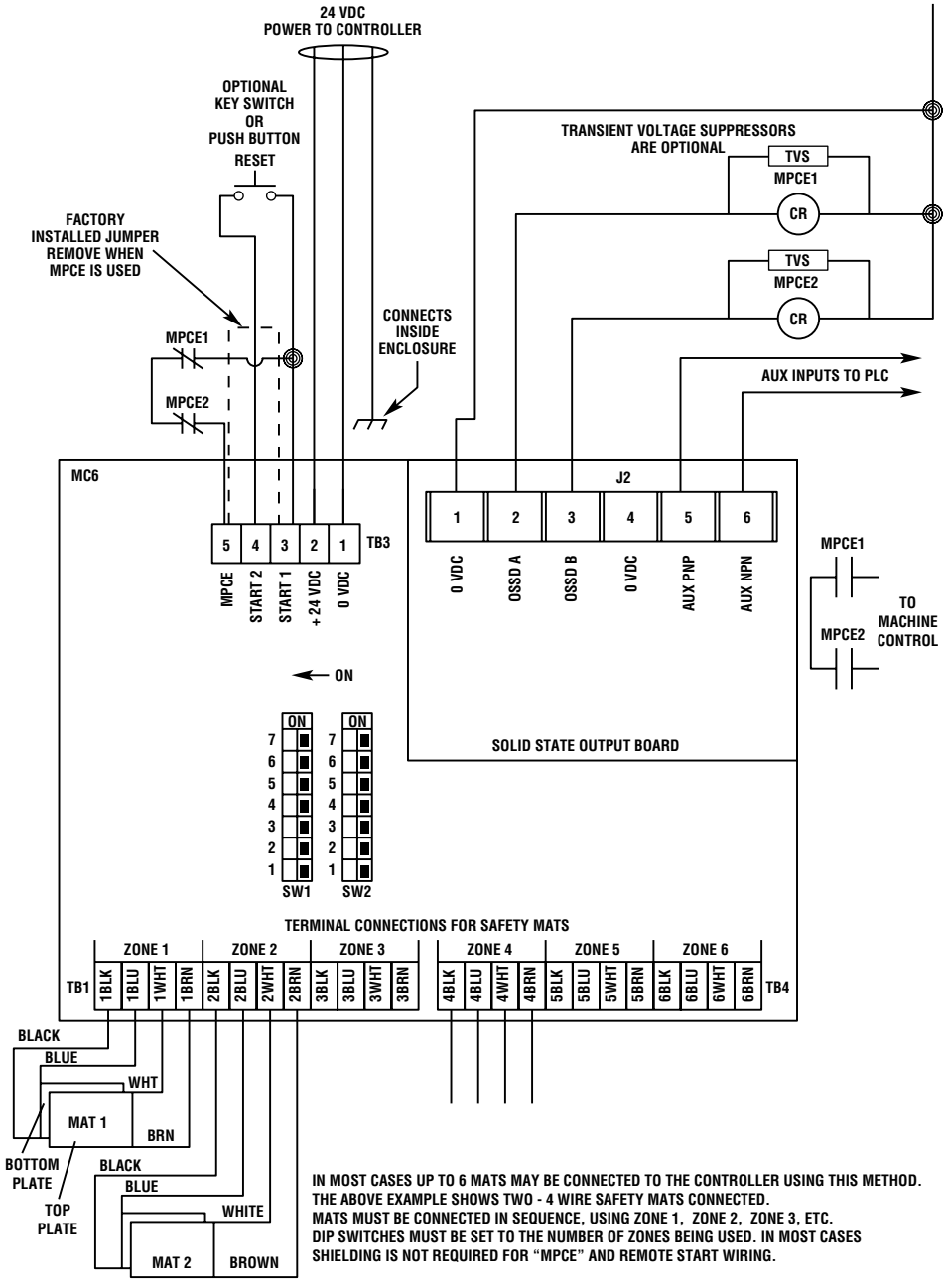
A Go to the Engineering Guide
For in-depth information on safety standards and use.

MC6, Two Normally Open Safety Relay Outputs, 100 to 240 VAC Power



■ *Suggested Machine and PLC Connections (continued)*

MC6, Two Solid-State Safety Outputs, 24 VDC Power



IN MOST CASES UP TO 6 MATS MAY BE CONNECTED TO THE CONTROLLER USING THIS METHOD.
THE ABOVE EXAMPLE SHOWS TWO - 4 WIRE SAFETY MATS CONNECTED.
MATS MUST BE CONNECTED IN SEQUENCE, USING ZONE 1, ZONE 2, ZONE 3, ETC.
DIP SWITCHES MUST BE SET TO THE NUMBER OF ZONES BEING USED. IN MOST CASES
SHIELDING IS NOT REQUIRED FOR "MPCE" AND REMOTE START WIRING.

A Go to the Engineering Guide
For in-depth information on safety standards and use.

■ Ordering Information

MC3

MC3

MC3 Series Safety Mat Controller
No options are available

MC4

MC4 – □ □ □ □

Power Input Connector
0 No power input & safety output connector
1 Power input & safety output connector

Lid Mounted Key-switch
0 No key-switch
1 Factory installed lid mounted key-switch

Power Input Voltage
0 24 VDC
1 100-240 VAC auto-selecting

Mat Input Connectors
0 No mat connectors
__ Please specify a number between 1 & 6

MC6

MC6 □ – □ □ □ □

Input Voltage
AC AC power
DC DC power

Power Input Connector
0 No power input & safety output connector
1 Power input & safety output connector

Lid Mounted Reset Keyswitch
0 No reset keyswitch
1 Factory installed lid mounted reset keyswitch

Safety Output Module
1 Safety relay
2 Solid-state (not available with AC input)

Mat Input Connectors
0 No mat connectors
__ Please specify a number between 1 & 6

For information on Omron STI safety mats, see page F2

Safety Standards and Precautions

A Safety Mat controller is a general purpose, safety mat control device and is not designed for any specific type, model or brand of machine. All safety-related functions of the guarded machine controls including pneumatic, electric, logic or hydraulic controls must be control reliable.

A Safety Mat controller when combined with a four-wire safety mat meets ANSI/RIA R15.06-1999, ANSI B11.19-2003 and the following applicable OSHA standards. When used with mechanical power presses, OSHA standard 1910.217(c) applies. For other applications the requirements of section 1910.212 apply.

Only use a Safety Mat controller and four-wire safety mat system on machinery that stops consistently and immediately anywhere in its cycle or stroke. Never use a Safety Mat controller and four-wire safety mat system on a full-revolution clutched press or machine. Access to the point of operation or hazardous machine area not protected by the Safety Mat controller and four-wire safety mat system must be guarded by fencing, barriers or other appropriate methods.

The purchaser, installer and employer are responsible for meeting all local state and federal government laws, rules, codes or regulations relating to the proper use, installation, operation and maintenance of this control and the guarded machine. See Installation and Operation Manual for details.

All application examples described are for illustration purposes only. Actual installations will differ from those indicated.