UM Series

SpeedSPEC www.sti.com UM

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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

Rev. 12.13

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
- 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

A 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, STI offers trim to secure the mat to the floor so that it cannot be easily relocated and therefore become ineffective.

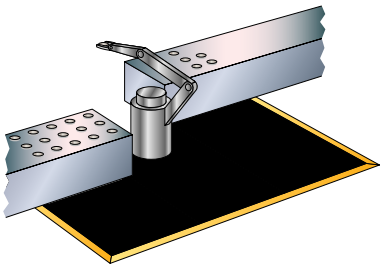
Applications

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.)
Maximum load:	Static load: 122.5 kg/sq. in. (270 lbs/sq. in.) Rolling load: 122.5 kg/sq. in. (270 lbs/sq. in.)
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 www.sti.com

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 STI's exclusive molded corners. (See illustrations on this page.)

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

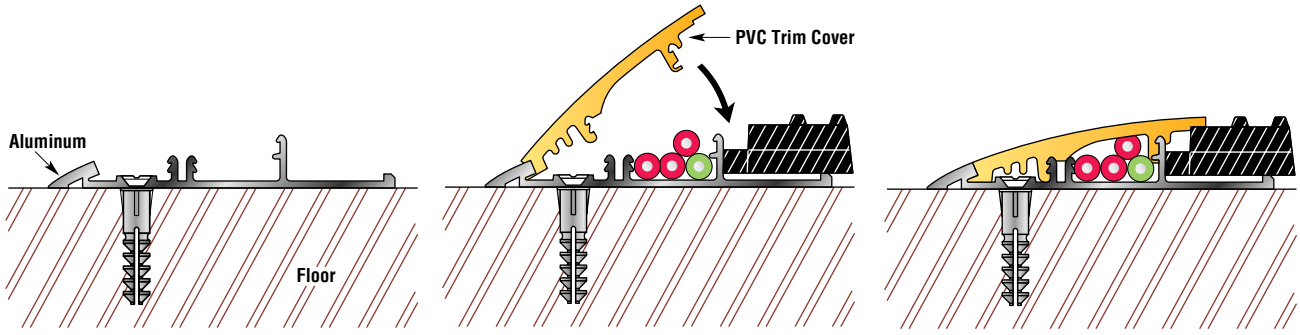
Used to finish off the edge of a mat installation near a wall or machine. Helps hold mats in place.

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 STI two-part ramp trim.

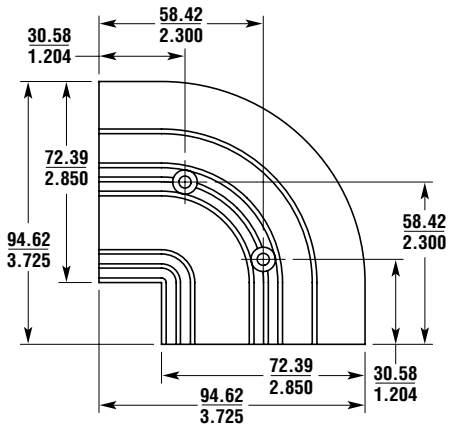


Trim Dimensions

(mm/in.)

Outside Molded Corner Trim

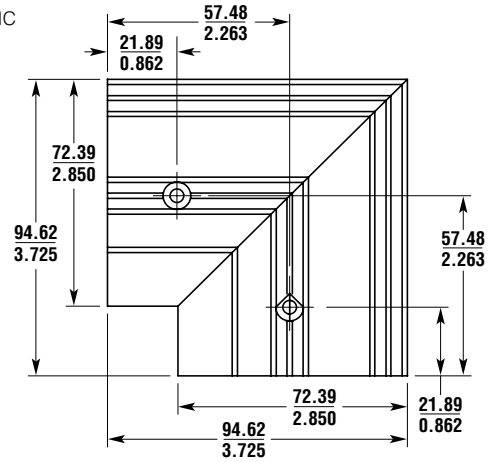
Model UMOC



Molded Outside Corner: PN 25836

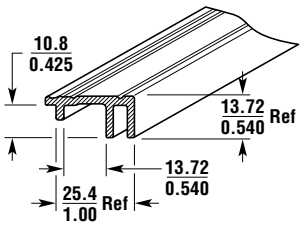
Inside Molded Corner Trim

Model UMIC



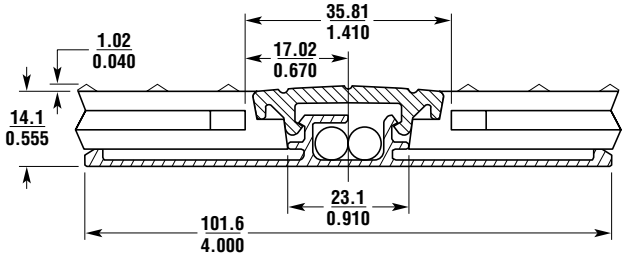
Molded Inside Corner: PN 25837

Blunt Trim



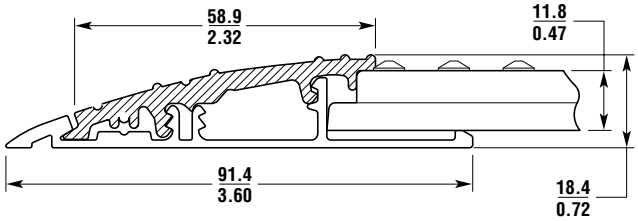
Blunt Trim: PN 43223-0096

2-Part Joining Trim (Base and Cover)



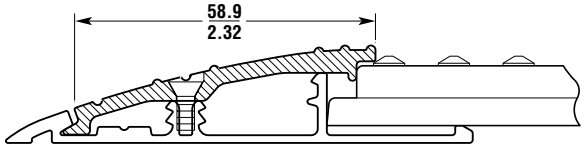
2-Part Joining Trim: PN 43222-0096
Joining Trim Aluminum Base: PN 32592
Joining Trim Cover Black: PN 32591
Joining Trim Cover Yellow: PN 32591-0010

2-Part Ramp Trim with PVC Cover (TKM)



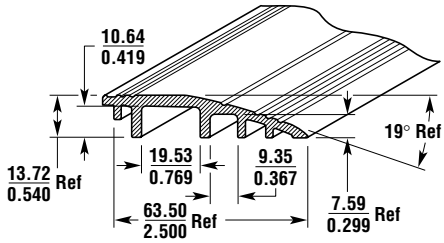
Aluminum Base & PVC Cover: PN 43123-0096
Aluminum Base: PN 32667
PVC Cover: PN 32668

2-Part Ramp Trim with Aluminum Cover (TKAT)



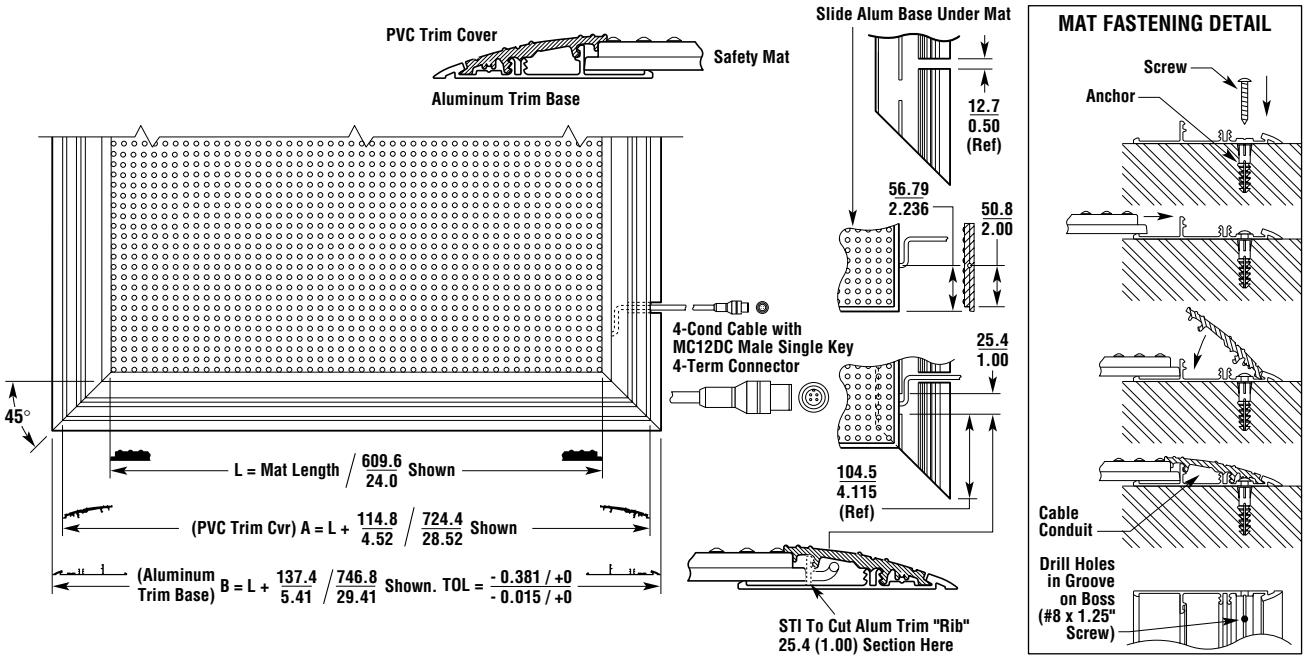
Aluminum Base & Aluminum Cover: PN 43123-1096
Aluminum Base: PN 32667
Aluminum Cover: PN 26441

Aluminum Single Part Ramp Trim (TKA)

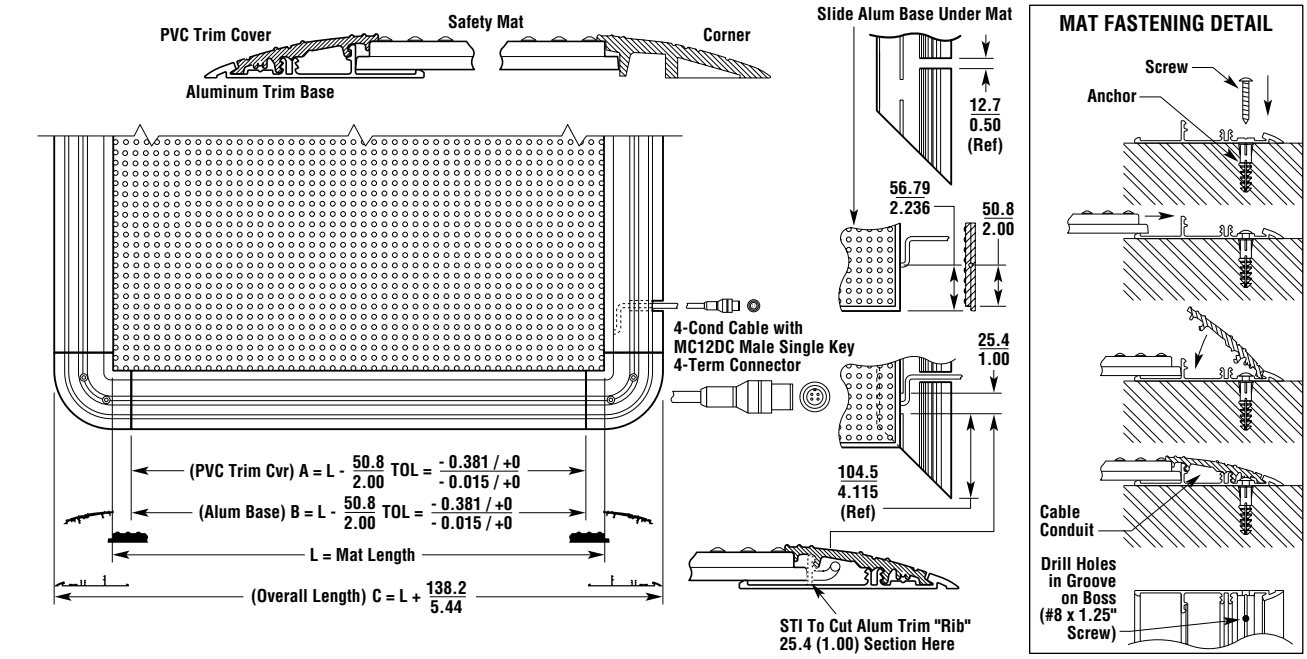


Aluminum Ramp Trim: PN 43224-0096

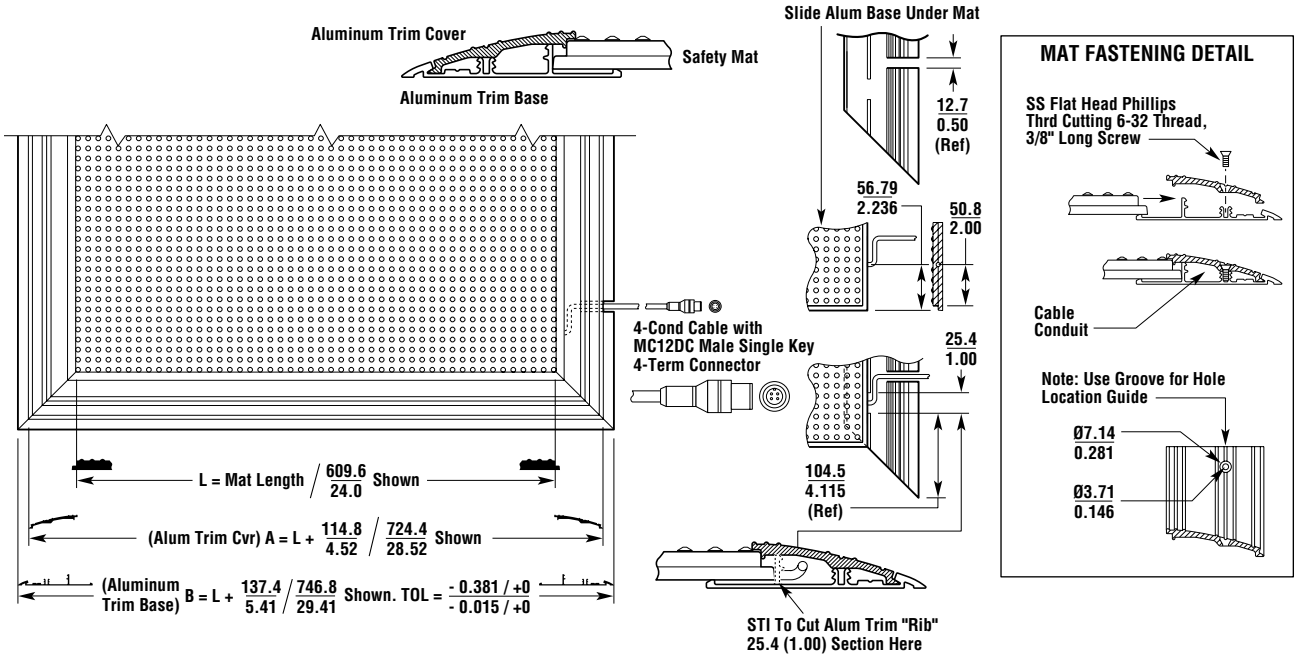
Two-Part Trim with PVC Cover and Mitered Corners (TKM)



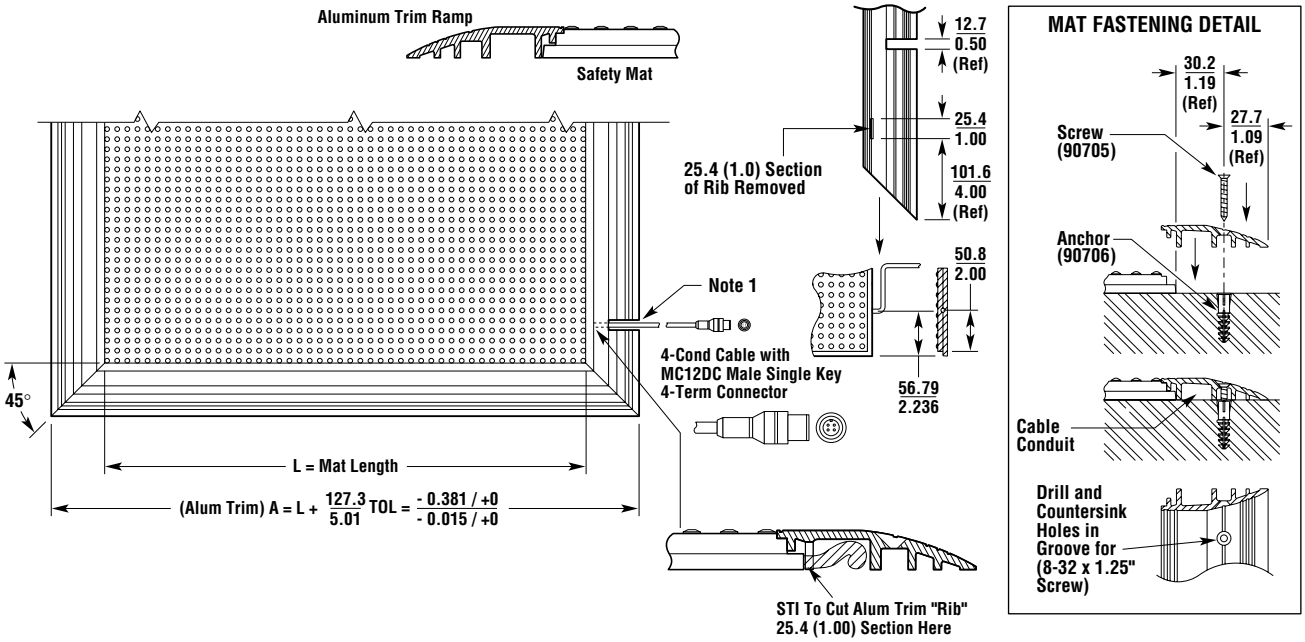
Two-Part Trim with PVC Cover and Molded Corners (TKC)



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

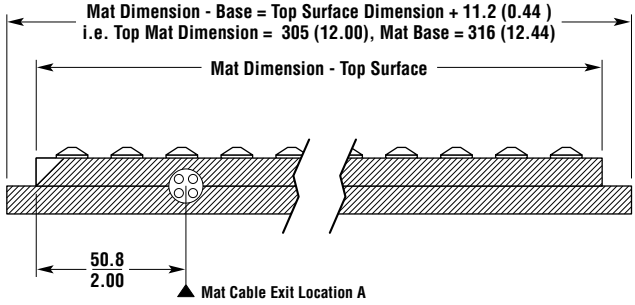


Single-Part Trim Aluminum Trim (TKA)



F

Mat Measurement

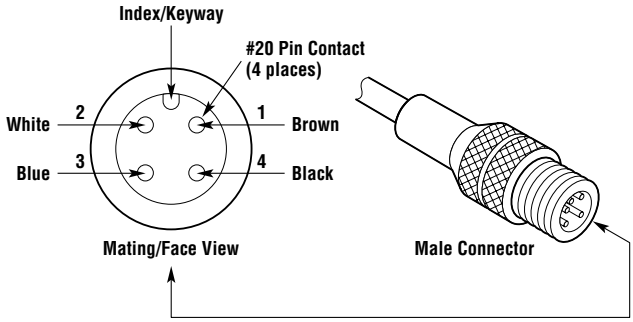


Mat Cable exits on the side indicated by the first dimension in the model number
i.e. UM5-1254, Cable exits 12" dimension
i.e. UM5-4824, Cable exits 48" dimension

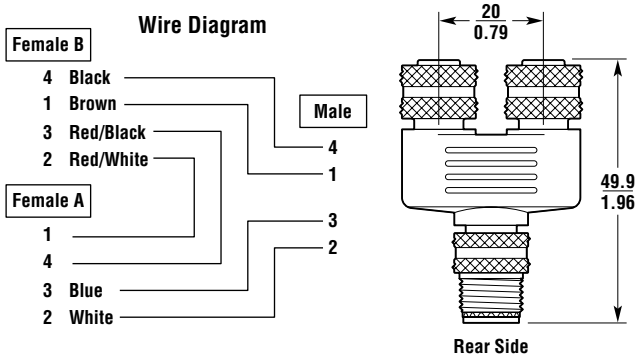
F

Pin Out Connector

UMQ5, UMQ10, Integral UM Mat Cables



UM-Y-2-1 "Y" Connector

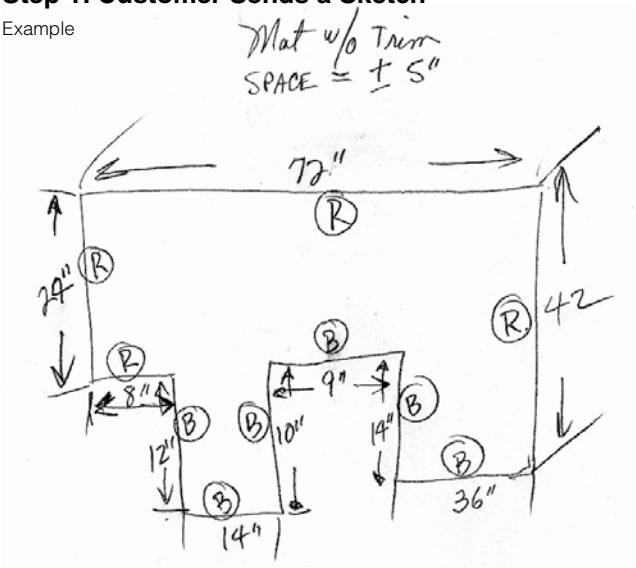


Custom Mats and Trims

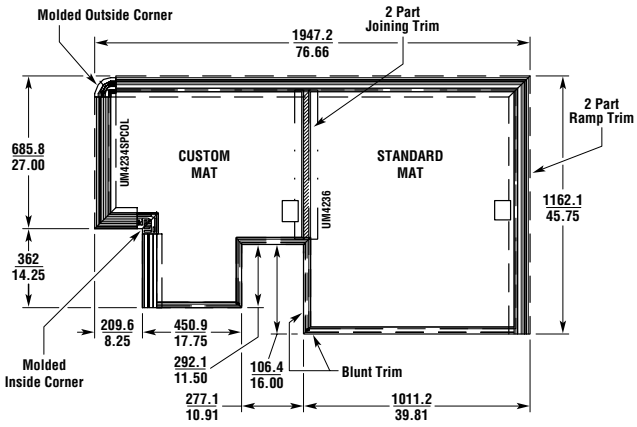
Omron makes ordering custom mats and trims easy. Simply send us a sketch of your layout including dimensions. Make note of where you want ramp trim or blunt trim. We'll work from your sketch to create a detailed drawing of your specifications.

Step 1: Customer Sends a Sketch

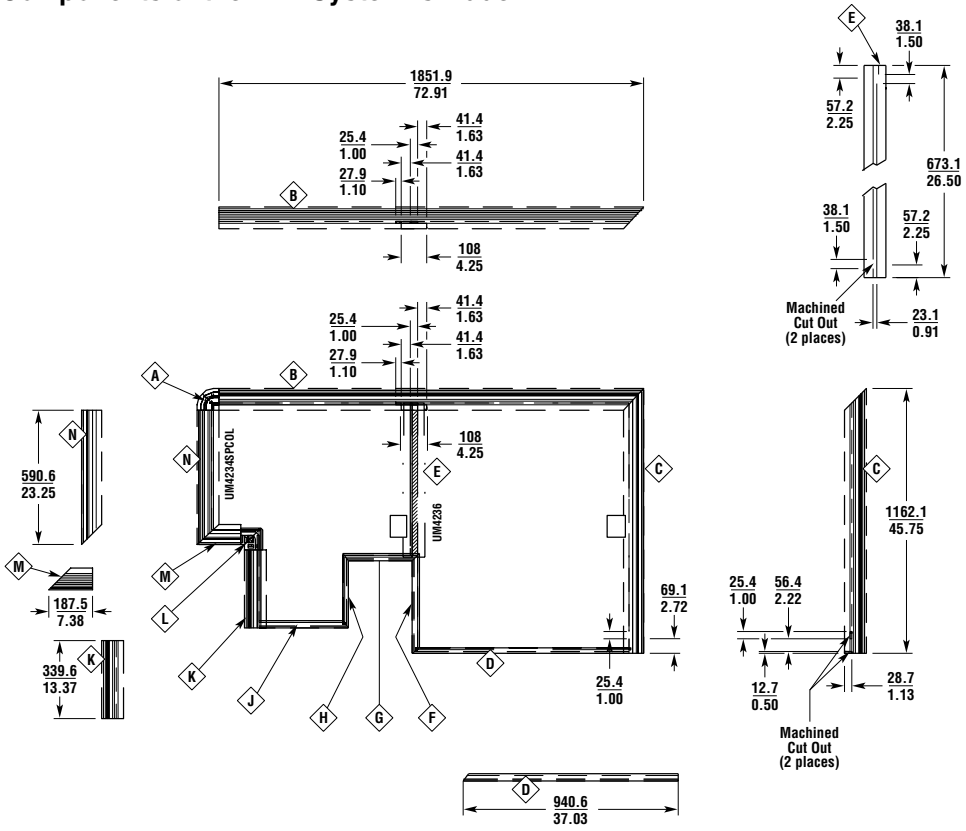
Example



Step 2: A Quote Drawing with Dimensions is Created



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



Ordering

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.

Standard Mat Ordering Code:

___ - ___ ___
❶ ❷ ❷

Example: UM10-1266
This example is a 12 x 66 in. standard black mat with 10 m cable.

F

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.

Designator	Standard Mat Size		Mat Ship Weight	
	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)

UM Mats vs. UMQ Mats

SpeedSPEC www.sti.com UMQ

After the success and the development of the UM Series Mat, the **UMQ Series Mat with Quick-Disconnect Connector** was developed by Omron. The UMQ Universal Mats are heavy-duty four-wire presence sensing mats with removable cable, Category 3 controllers and perimeter trim.

For detailed specifications and ordering information on the UMQ Mat System, please visit our website at www.sti.com and enter 'UMQ" in the SpeedSPEC search box.

Ordering (continued)

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.

Standard Mat Ordering Code:

___ - ___ - ___
❶ ❷ ❸

Example: UM10-0500-0500
This example is a 500 x 500 mm standard black 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.

Designator	Metric Mat Width	
	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.

Designator	Metric Mat Width	
	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

Ordering Perimeter Trim for a Single Standard Size 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 Automation and Safety.

Ordering Perimeter Trim for a Single Metric Size 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	Metric trim kit with mitered corners
MTKC	Metric trim kit with molded corners

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 Automation and Safety.

For specifications and dimensions on the MC Controllers, see www.sti.com

For details on ordering a custom safety mat, see page F9

For details on ordering a trim kit for a multiple configuation mat, please consult OMRON Automation and Safety.

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Ordering (continued)

Rapid Delivery Products

The following models are readily available for shipment today or at least within 3 days. Please consider these for all new applications.

Part Number	Description
74005-1212	UM1212 Universal Black Mat, 5 m Cable
74005-1254	UM1254 Universal Black Mat, 5 m Cable
74005-1260	UM1260 Universal Black Mat, 5 m Cable
74005-1866	UM1866 Universal Black Mat, 5 m Cable
74005-1872	UM1872 Universal Black Mat, 5 m Cable
74005-2412	UM2412 Universal Black Mat, 5 m Cable
74005-2418	UM2418 Universal Black Mat, 5 m Cable
74005-2424	UM2424 Universal Black Mat, 5 m Cable
74005-2454	UM2454 Universal Black Mat, 5 m Cable
74005-2460	UM2460 Universal Black Mat, 5 m Cable
74005-2472	UM2472 Universal Black Mat, 5 m Cable
74005-3018	UM3018 Universal Black Mat, 5 m Cable
74005-3024	UM3024 Universal Black Mat, 5 m Cable
74005-3030	UM3030 Universal Black Mat, 5 m Cable
74005-3054	UM3054 Universal Black Mat, 5 m Cable
74005-3060	UM3060 Universal Black Mat, 5 m Cable
74005-3072	UM3072 Universal Black Mat, 5 m Cable
74005-3612	UM3612 Universal Black Mat, 5 m Cable
74005-3618	UM3618 Universal Black Mat, 5 m Cable
74005-3624	UM3624 Universal Black Mat, 5 m Cable
74005-3630	UM3630 Universal Black Mat, 5 m Cable
74005-3636	UM3636 Universal Black Mat, 5 m Cable
74005-3654	UM3654 Universal Black Mat, 5 m Cable
74005-3660	UM3660 Universal Black Mat, 5 m Cable
74005-3672	UM3672 Universal Black Mat, 5 m Cable
74005-4224	UM4224 Universal Black Mat, 5 m Cable
74005-4230	UM4230 Universal Black Mat, 5 m Cable
74005-4236	UM4236 Universal Black Mat, 5 m Cable
74005-4242	UM4242 Universal Black Mat, 5 m Cable
74005-4254	UM4254 Universal Black Mat, 5 m Cable
74005-4260	UM4260 Universal Black Mat, 5 m Cable
74005-4272	UM4272 Universal Black Mat, 5 m Cable
74005-4812	UM4812 Universal Black Mat, 5 m Cable
74005-4824	UM4824 Universal Black Mat, 5 m Cable
74005-4830	UM4830 Universal Black Mat, 5 m Cable
74005-4836	UM4836 Universal Black Mat, 5 m Cable
74005-4842	UM4842 Universal Black Mat, 5 m Cable
74005-4848	UM4848 Universal Black Mat, 5 m Cable
74005-4860	UM4860 Universal Black Mat, 5 m Cable
74005-4866	UM4866 Universal Black Mat, 5 m Cable
74005-4872	UM4872 Universal Black Mat, 5 m Cable

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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 extension cable (distribution box to controller) for UMDB-8 or UMDB-10	
UMEC-03	3 m (9 ft.) extension cable for mat or UMDB-6	
UMEC-05	5 m (16 ft.) extension cable for mat or UMDB-6	
UMEC-10	10 m (32 ft.) extension cable for mat or UMDB-6	
UMEC-15	15 m (49 ft.) extension cable for mat or UMDB-6	
UMPMC	Panel-mount connector. Allows the controller to accept quick disconnect cable from UM series mats.	
UM4PRC	4-pin male QD field replacement connector for mat cables	
UM-Y-2-1	"Y" connector, internally connected to allow 2 mats to 1 input to controller or connector	
UMQ5	5 m quick-disconnect cable	
UMQ10	10 m quick-disconnect cable	