

# Safety Mats & Area Guarding

# UMQ Series



Rev. 4.11

## Quick-Disconnect Universal Safety Mat System

### Heavy-Duty Four-Wire Presence Sensing Mats with Removable Cable, Category 3 Controllers and Perimeter Trim

#### System

- When UMQ 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.

#### UMQ Series Mat

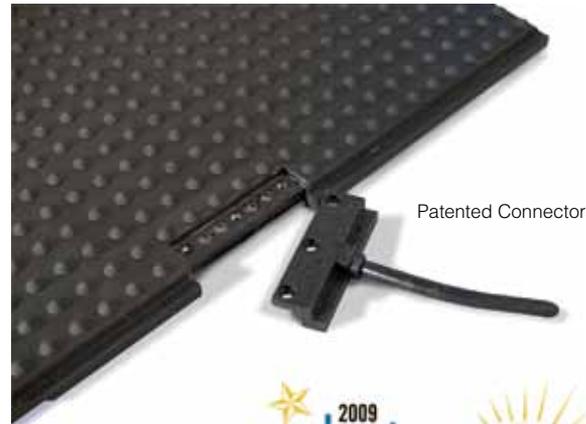
- Fork lift traffic of 270 lbs. per square inch
- IP67 rated
- Mat flammability self extinguishing, meets UL94VO
- Single-piece molded construction
- Black or yellow color
- Damage to cables during installation is eliminated by installing cables after mat installation
- Easy cable replacement
- Six cable location options offer the ability to configure where cable exits

#### Controllers

- Safety category 3 devices
- 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
- Two options for trim kit corners: Mitered and molded



Patented Connector



## Description

An Omron STI Quick-Disconnect Universal Mat system (UMQ series mat combined with an MC3, MC4 or MC6) offers a simple method for guarding personnel around hazardous machines. A Quick-Disconnect 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 and access to the work area is maintained. There is no need to worry about personnel forgetting to replace mechanical barriers or close gates.

Omron STI UMQ Series safety mat incorporates a design that features a cable quick disconnect located on the mat. This allows the cable to be attached after the mat is installed in order to minimize damage to the cable during installation. The new patented connector is designed and tested to meet IP67 requirements.

## How the System Works

The operation of a Quick-Disconnect 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.

F

## Mat Specifications

Mechanical	
Mat Cover Material:	PVC
Mat Type:	Normally open SPST, four-wire
Mode:	Pressure Sensitive
Activation Force:	Detects adults > 30 kg (66 lbs) (8.5 lbs/in. <sup>2</sup> )
Maximum Load:	Static Load: 122.5 kg/in. <sup>2</sup> (270 lbs/in. <sup>2</sup> )
	Rolling Load: 122.5 kg/in. <sup>2</sup> (270 lbs/in. <sup>2</sup> )
Mechanical Life:	1 x 10 <sup>6</sup> operations
Mat Cable:	18-gauge, 4-conductor, 16-strand, 300 VAC, with MC12DC male single key connector; 5 m or 10 m long
Mat Weight:	Approx. 24.4 kg/m <sup>2</sup> (5 lbs/ft. <sup>2</sup> )
Environmental	
Protection:	IP67
Operating Temperature:	-37 to 66°C (-35 to 150° F)
Mat Flammability:	Self extinguishing, meets UL 94VO
Operating Humidity:	0-100% RH
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 at 23°C (74°F)	
Compliance	
Conforming to Standards:	ANSI/RIA 15.06-1999 (R2009), ANSI B11.19-2010, OSHA 1910.21(b), CSA Z432-04
Approvals:	When used with an MC3, MC4 or MC6 controller the UMQ 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.



For specifications and dimensions on the MC Controllers, see page F13

F

Specifications are subject to change without notice.

## Mat Selection

Multiple UMQ 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.
Lengths	12 to 72 in.
Metric Mat Sizes	
Widths	500 to 1200 mm
Lengths	500 to 1800 mm
Custom Mat Sizes	
Widths	From 8 in. up to 48 in. (0.5 in. increments)
Lengths	From 8 in. up to 72 in. (0.5 in. increments)



For specific mat sizes, see page F10

## 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. (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 Omron STI two-part ramp trim.

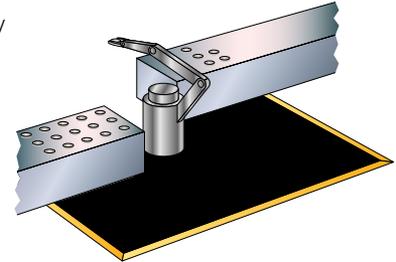
## Applications

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.

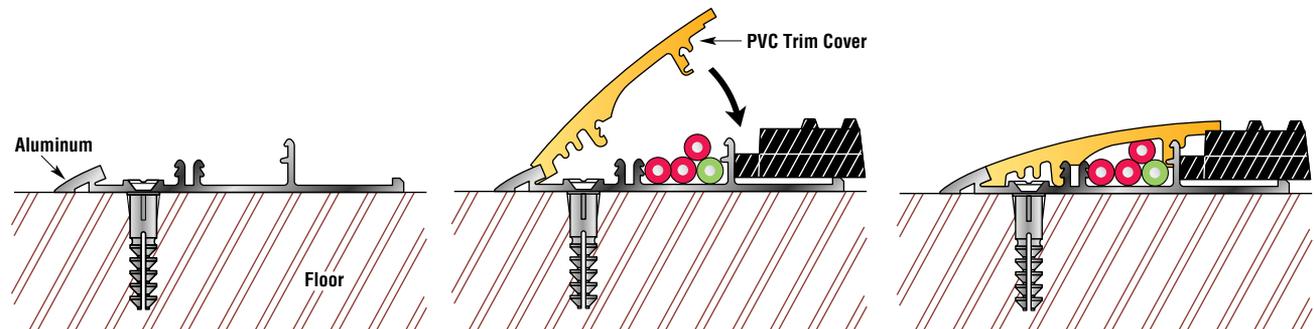
Additionally, mats can also simplify routine tasks such as machine setup, maintenance and repair.

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



F

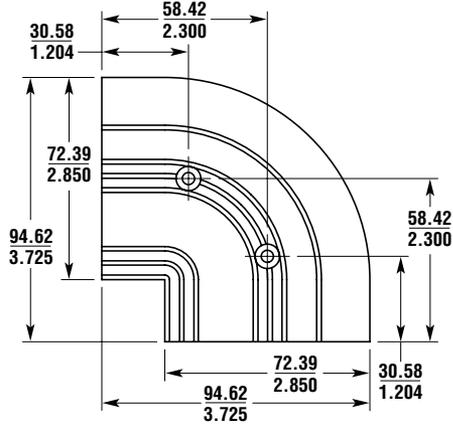


## Trim Dimensions

(mm/in.)

### Outside Molded Corner Trim

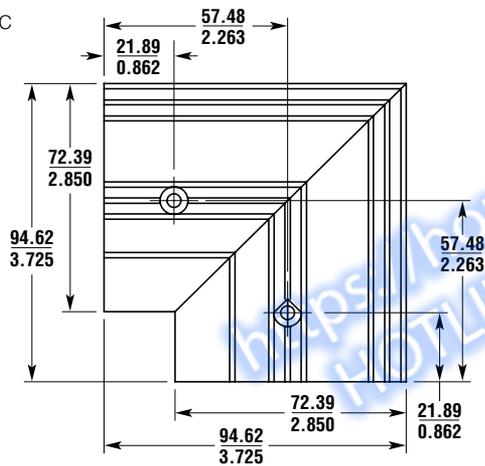
Model UMOG



Molded Outside Corner: PN 25836

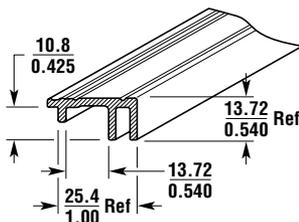
### Inside Molded Corner Trim

Model UMIC



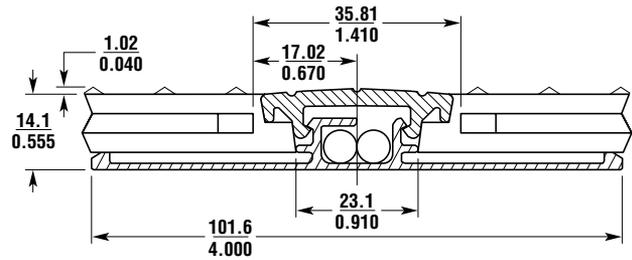
Molded Inside Corner: PN 25837

### Blunt Trim



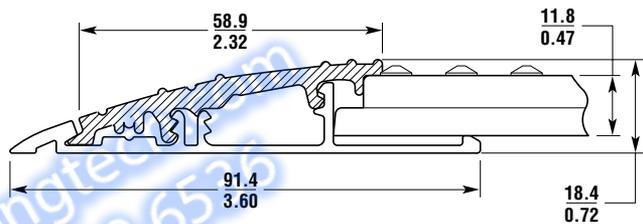
Blunt Trim: PN 43223-0096

### 2-Part Joining Trim (Base and Cover)



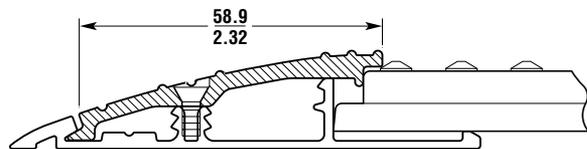
2-Part Joining Trim: PN 43222-0096  
 Joining Trim Aluminum Base: PN 32592  
 Joining Trim Cover Black: PN 32591  
 Joining Trim Cover Yellow: PN 32591-0010

### 2-Part Ramp Trim with PVC Cover (TKM)



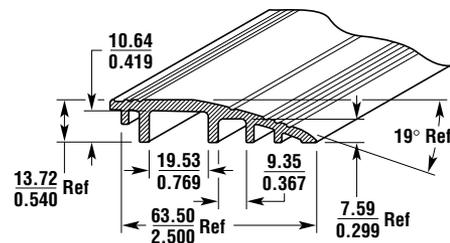
Aluminum Base & PVC Cover: PN 43123-0096  
 Aluminum Base: PN 32667  
 PVC Cover: PN 32668

### 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)

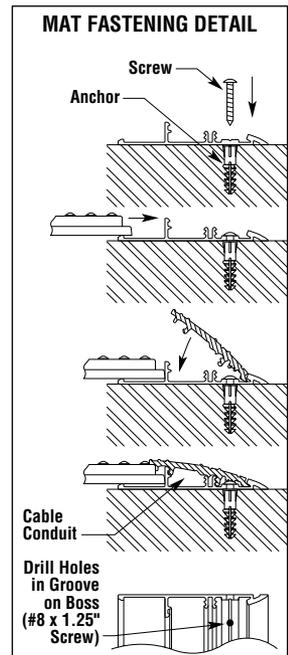
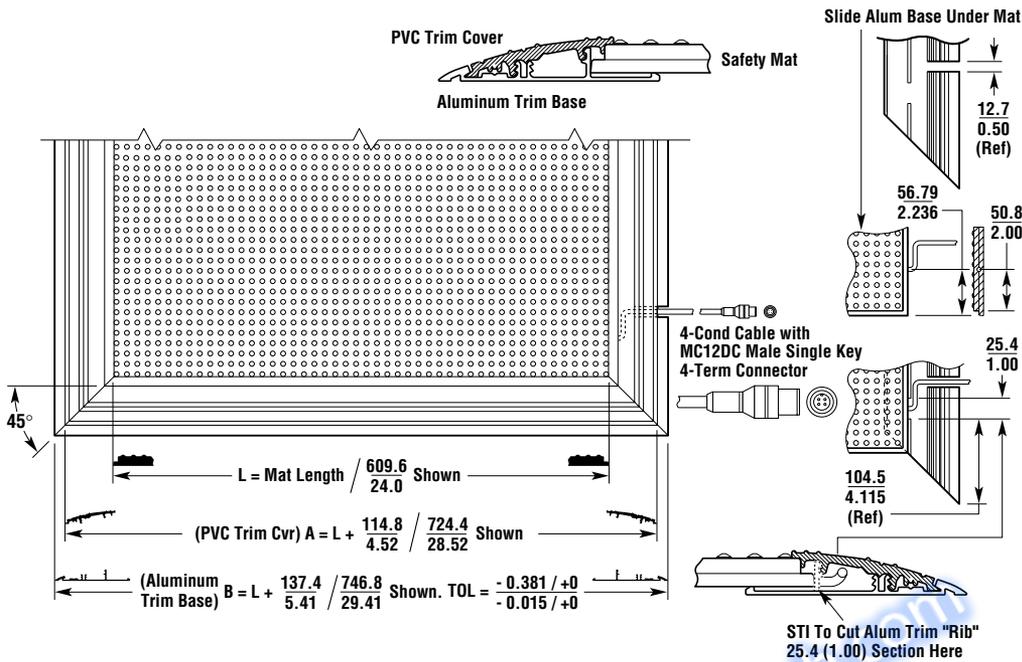


Aluminum Ramp Trim: PN 43224-0096

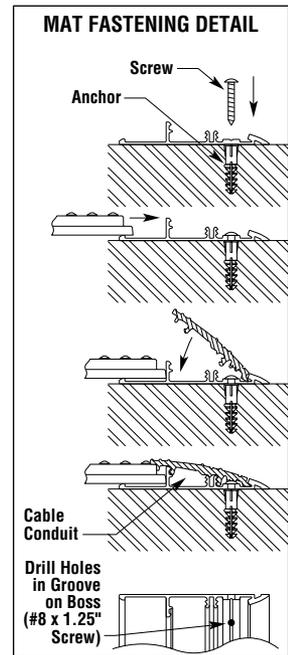
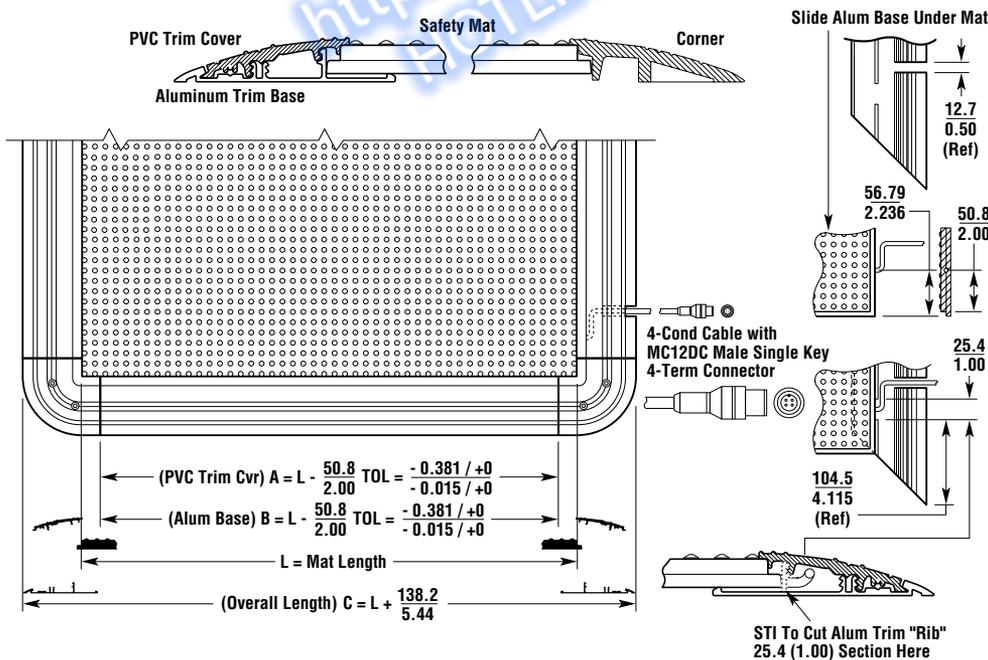
Mat Dimensions

(mm/in.)

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



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

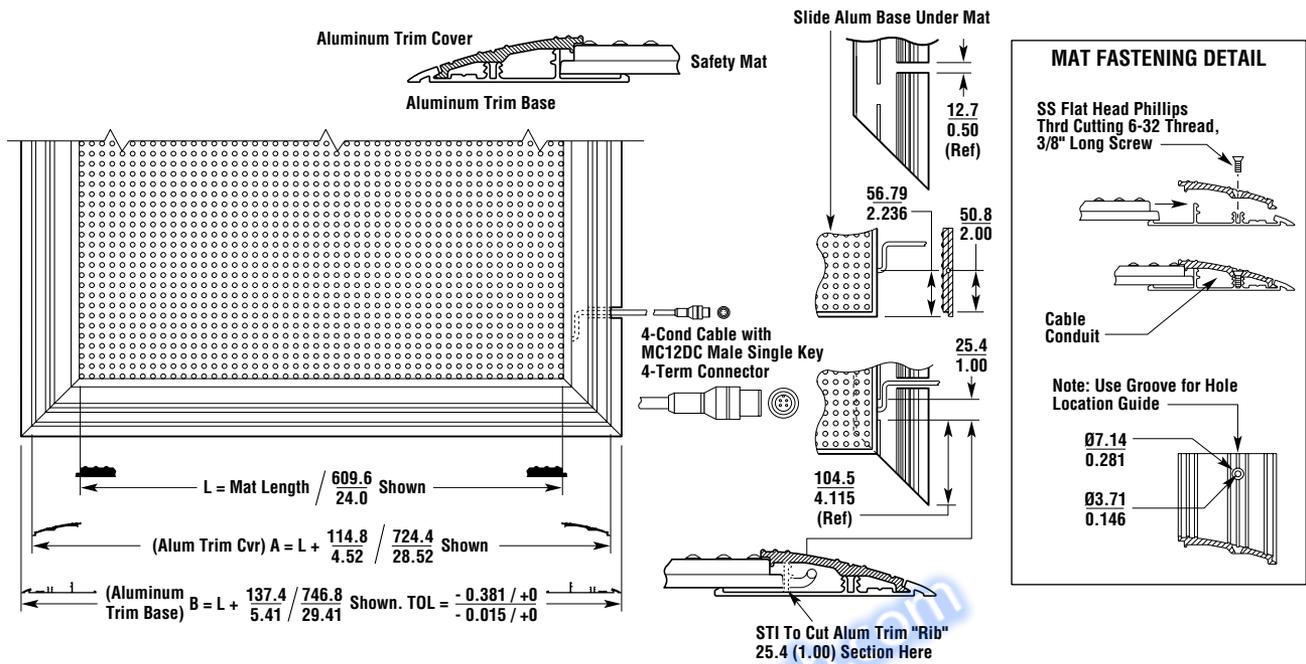


F

Mat Dimensions (continued)

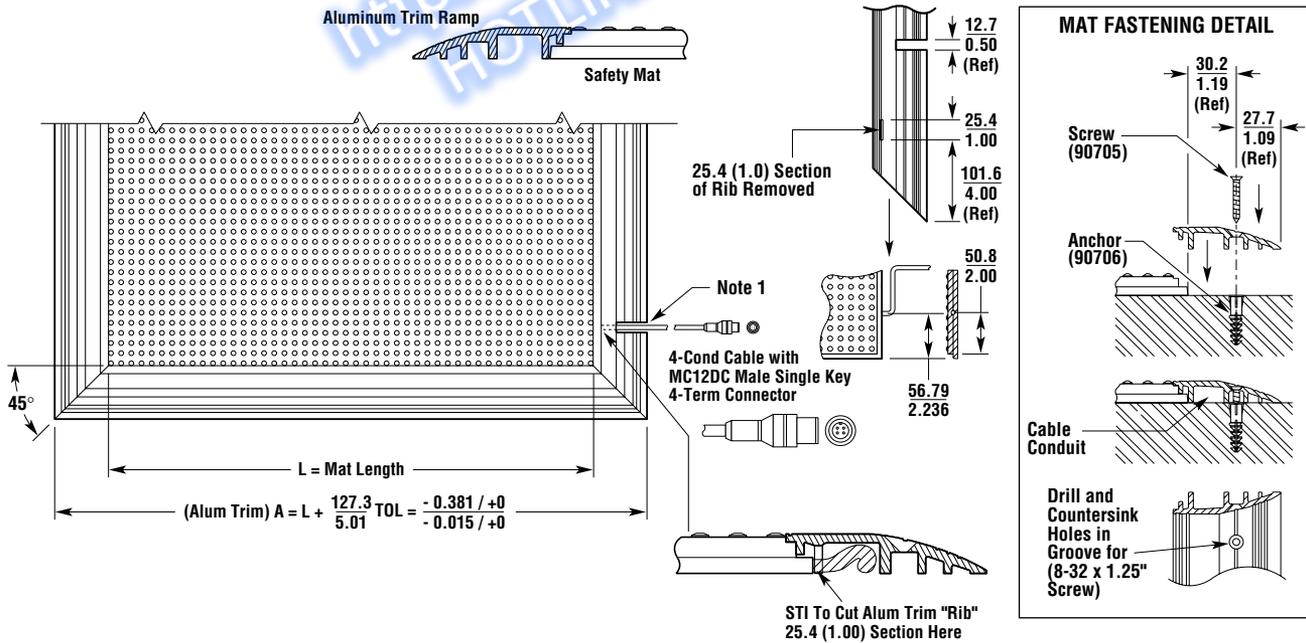
(mm/in.)

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

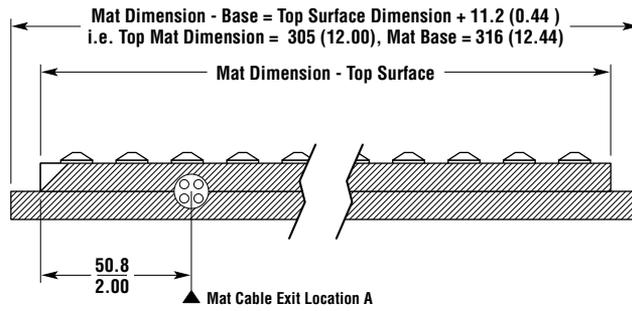


F

Single-Part Trim Aluminum Trim (TKA)



## Mat Measurement

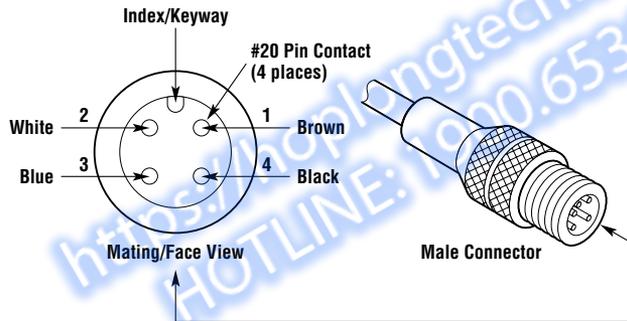


Mat Cable exits on the side indicated by the first dimension in the model number  
 i.e. UM5-1254, Cable exits 12" dimension  
 i.e. UM5-4824, Cable exits 48" dimension

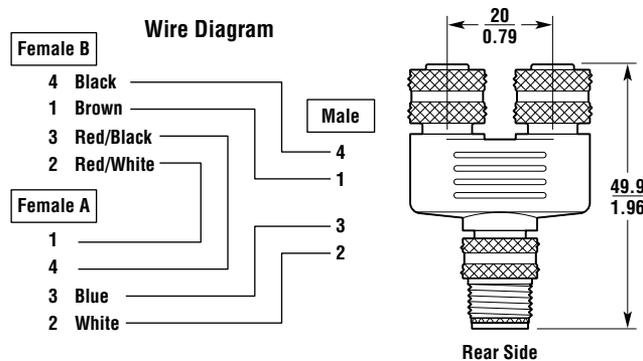
F

## Pin Out Connector

### UMQ5, UMQ10, Integral UM Mat Cables



### UM-Y-2-1 "Y" Connector

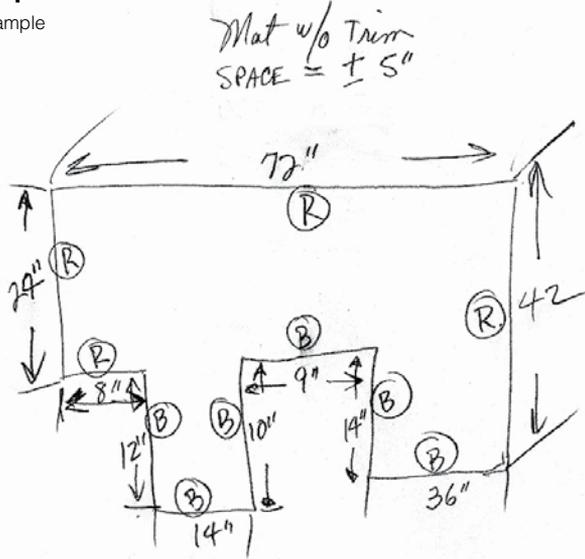


## Custom Mats and Trims

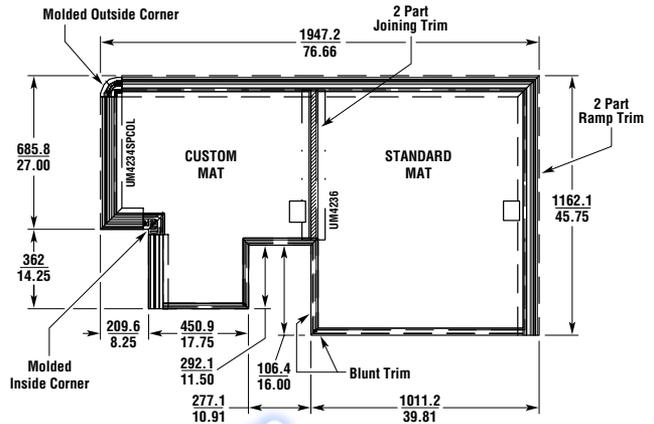
Omron STI makes ordering custom mats and trims easy. Simply send us a sketch of your layout including dimensions. Make note of where you want ramp trim or blunt trim. We'll work from your sketch to create a detailed drawing of your specifications.

### Step 1: Customer Sends a Sketch

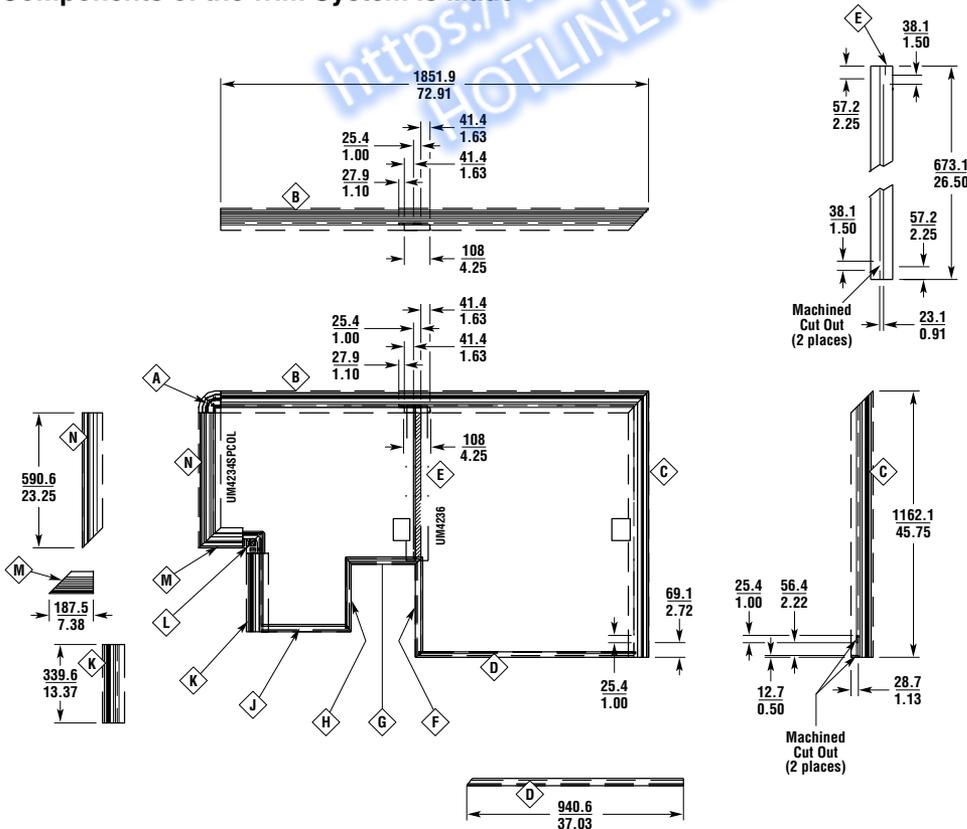
Example



### Step 2: A Quote Drawing with Dimensions is Created



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



## Ordering

### Ordering a UMQ Mat System

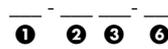
A Quick Disconnect Universal Mat System contains at least one mat, a 5 m or 10 m cable, sufficient perimeter and joining trim and a controller. For multiple mat installations using the MC3 controller, the mats are connected in series to the controller. This may be done using the UMDB6 wiring accessory. When using the MC4 or MC6 controllers, six mats may be connected directly to the controller.

Each component of Quick Disconnect Universal Mat system must be ordered individually

Mats are available in black or yellow. Yellow mats are denoted by placing a "Y" in the ordering code. The cable location is specified by letter code at the end of the ordering number. Cables must be ordered separately.

To order a Quick-Disconnect Universal Mat System, simply fill in the fields in the model number sequence given.

### Standard Mat Ordering Code:



Example: UMQ-2460-A  
This example is a 24 x 60 in. standard black mat with cable location A.

### Metric Mat Ordering Code:



Example: UMMQ-0500-0500-B  
This example is a 24 x 60 in. standard black metric quick disconnect mat with cable coming out at location B.

1 Information required. Represents mat type and color.

Designator	Description
UMQ	Standard black mat
UMYQ	Standard yellow mat*
UMMQ	Metric black mat
UMMYQ	Metric yellow mat*

Notes: \*Mats will take the largest dimension as the first dimension up to the 48 in. width (i.e. a mat ordered as 36 x 48 will be made as 48 x 36).

2345 Information required. Represents the mat size. Dimensions are for active mat area. Mats are an additional 0.5 in. (12 mm) in each dimension. Choose one value from each column.

2 Standard Mat Widths in Inches Designator	3 Standard Mat Lengths in Inches Designator
12	12
18	18
24	24
30	30
36	36
42	42
48	48
	54
	60
	66
	72
Special Standard Sizes*	
Special inch sizes are available in increments of 0.5 in., with a minimum width or length of 8 in.	

4 Metric Mat Widths in mm Designator	5 Metric Mat Lengths in mm Designator
0500 (500 mm/19.7 in.)	0500 (500 mm/19.7 in.)
0750 (750 mm/29.5 in.)	0750 (750 mm/29.5 in.)
1000 (1000 mm/39.4 in.)	1000 (1000 mm/39.4 in.)
1200 (1200 mm/47.2 in.)	1250 (1250 mm/49.2 in.)
	1500 (1500 mm/59.1 in.)
	1750 (1750 mm/68.9 in.)
	1800 (1800 mm/70.9 in.)

\*Please consult Omron STI for mat sizes not listed in the above tables.

= Highlighted **Rapid Delivery** products are available for shipment today or within **THREE** days.

F

### UM Mats vs. UMQ Mats



Prior to the development of the UMQ Mat with Quick-Disconnect cable, the **UM Series Mat** was the standard mat supplied by Omron STI. The UM Mats are available with integral cables in 5 m or 10 m lengths. These integral cables are not removable. UM mats are still available and can be ordered in black or yellow with required perimeter and joining trim.



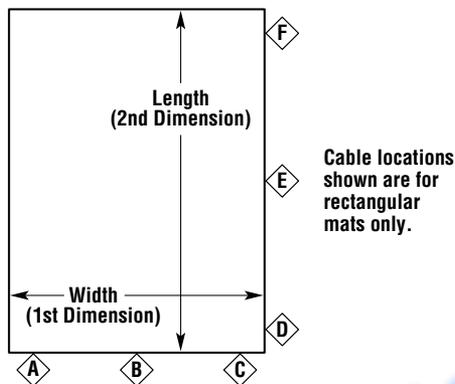
For detailed specifications and ordering information on the Universal Mat System, please visit our website at [www.sti.com](http://www.sti.com) and enter 'UM' in the SpeedSPEC search box.

## Ordering (continued)

⑥ Information required. Represents cable location. See diagram below.

Cable Location	Description
A	Bottom left corner of first mat dimension, 2 in. from top surface of the left edge to center of cable exit
B	Bottom center of first mat dimension
C	Bottom right corner of first mat dimension, 2 in. from top surface of the right edge to center of cable exit
D	Bottom right corner of second mat dimension, 2 in. from top surface of the bottom edge to center of cable exit
E	Center of second mat dimension
F	Top right corner of second mat dimension, 2 in. from top surface of the top edge to center of cable exit

Notes: Mats with both dimensions equal will only have "A", "B", and "C" cable locations available.



### 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.

Model Number	Part Number	Description
UMQ-1260-A	70220-1002	12 x 60 in. Universal Black Mat
UMQ-1872-A	70220-1010	18 x 72 in. Universal Black Mat
UMQ-2412-A	70220-1011	24 x 12 in. Universal Black Mat
UMQ-2418-A	70220-1012	24 x 18 in. Universal Black Mat
UMQ-2424-A	70220-1013	24 x 24 in. Universal Black Mat
UMQ-2460-A	70220-1015	24 x 60 in. Universal Black Mat
UMQ-2472-A	70220-1017	24 x 72 in. Universal Black Mat
UMQ-3030-A	70220-1021	30 x 30 in. Universal Black Mat
UMQ-3060-A	70220-1023	30 x 60 in. Universal Black Mat
UMQ-3072-A	70220-1025	30 x 72 in. Universal Black Mat
UMQ-3612-A	70220-1026	36 x 12 in. Universal Black Mat
UMQ-3624-A	70220-1028	36 x 24 in. Universal Black Mat
UMQ-3636-A	70220-1030	36 x 36 in. Universal Black Mat
UMQ-3654-A	70220-1031	36 x 54 in. Universal Black Mat
UMQ-3660-A	70220-1032	36 x 60 in. Universal Black Mat
UMQ-3672-A	70220-1034	36 x 72 in. Universal Black Mat
UMQ-4224-A	70220-1037	42 x 24 in. Universal Black Mat
UMQ-4236-A	70220-1039	42 x 36 in. Universal Black Mat
UMQ-4254-A	70220-1041	42 x 54 in. Universal Black Mat
UMQ-4260-A	70220-1042	42 x 60 in. Universal Black Mat
UMQ-4824-A	70220-1047	48 x 24 in. Universal Black Mat
UMQ-4836-A	70220-1049	48 x 36 in. Universal Black Mat
UMQ-4848-A	70220-1051	48 x 48 in. Universal Black Mat
UMQ-4866-A	70220-1054	48 x 66 in. Universal Black Mat
UMQ-4872-A	70220-1055	48 x 72 in. Universal Black Mat

 = Highlighted **Rapid Delivery** products are available for shipment today or within **THREE** days.

F

## Ordering (continued)

### Ordering Perimeter Trim for a Single Mat\*\*

To order Perimeter Trim for a single mat, simply fill in the fields in the model number sequence given below.

#### Standard Perimeter Trim Ordering Code:

     -      -      -       
**7**    **2**    **3**    **6**

Example: TKM-1266-E  
 This example is a trim kit with mitered corners to fit a 12 x 66 in. standard mat with cable coming out at location E.

#### Metric Perimeter Trim Ordering Code:

     -      -      -      -       
**7**    **4**    **5**    **6**

Example: MTKM-0500-0500-E  
 This example is a trim kit with mitered corners to fit a 500 x 500 mm metric quick disconnect mat with cable coming out at location E.

**7** Information required. Represents the corner style used on the trim kits.

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

MTKAT is available upon request.

### Ordering Cables

Cables should be ordered separately.

Model No.	Description
UMQ5 Cable	5 m quick disconnect cable
UMQ10 Cable	10 m quick disconnect cable



F

-  For specifications and dimensions on the MC Controllers, see page F13
-  For details on ordering a custom safety mat, see page F9
-  For details on ordering a trim kit for a multiple configuration mat, please consult Omron STI.

## 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	