D

safety light curtains

MiniSafe®
MS4600

- Resolution: 14 mm (0.55 in.), 19 mm (0.75 in.) or 30 mm (1.18 in.) resolution

- Range: 7.5 m (25 ft.) range for the 14 mm resolution 20 m (65 ft.) range for the 19 and 30 mm resolutions

- Protected Heights: 14 mm and 19 mm protected heights from 263 to 1393 mm (10 to 55 in.); or 30 mm protected heights from 351 to 2095 mm (14 to 83 in.)

- Compact size — 35 x 50 mm (1.4 x 2 in.)

- Simple "two-box" design — no separate control box required

- No cable required between transmitter and receiver

- Two PNP safety outputs designed to directly switch ma-
chine primary control elements

- Available with one NPN or one PNP auxiliary output

- Individual Beam Indicators

- Exact Channel Select

- Floating Blanking

- Choice of operating modes

- MPCE monitoring

- Choice of in-line cable with QD connector or QD connector only

- Adjustable mounting brackets

Options

- DeviceNet™ Interface

- Machine Test Signal (MTS)

- Auxiliary Outputs Alarm/Follow Mode

- Versions for darkroom applications (940 nm), consult factory

- Muting through RM-3 module

File No. LR90200

■ Description

A MiniSafe MS4600 system consists of a transmitter and receiver of equal height. Since the control reliable circuitry is contained in the receiver and transmitter, no separate control box is required.

Despite its compact dimensions, the MS4600 comes with a complete feature set. Individual Beam Indicators are included to simplify alignment. When an infrared beam is out of alignment, the corresponding Individual Beam Indicator will glow red.

Two solid-state safety outputs provide 500 mA of current at 24 VDC.

The ability to select Automatic Start and Start/Restart Interlock modes means that the MS4600 can be configured for either point-of-operation or perimeter guarding.

Exact Channel Select allows the MS4600 detection zone to have permanently blocked beams. This is valuable if tooling or other machine parts must permanently obstruct a portion of the zone. Exact Channel Select programming is as easy as pushing a button.

Floating Blanking is useful when process material or parts must transit through the detection zone. Floating Blanking allows up to two beams to be blocked anywhere in the zone.

Machine primary control element monitoring is required for control reliable safety. MPCE

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

STI

D46

OMRON SCIENTIFIC TECHNOLOGIES, INC.
USA Tel. 1/888/510-4357   **Canada** Tel. 1/866/986-6766

For the Latest Information
On the Internet: **www.sti.com** or **www.omron.ca**

OMRON

monitoring is built into the MS4600 rather than being required externally.

In-line connector cables and adjustable mounting brackets allow the MS4600 to fit in space-constrained locations and simplify installation.

DeviceNet Option

This optional interface allows an MS4600 system to communicate non-safety related data across this popular fieldbus. As the de facto standard for fieldbus communications, DeviceNet is widely employed in the automotive, semiconductor and other industries.

Monitoring of a DeviceNet equipped light curtain provides the process control system with the following non-safety information: manufacturer; product name; operating mode; detection zone status; solid-state safety output status; signal strength; number of beams installed; number of beams selected; MPCE monitoring enabled/disabled; floating blanking active/inactive; exact channel select active/inactive; blanking pattern for exact channel select; receiver diagnostic codes; error codes and descriptions.

DeviceNet and the MiniSafe MS4600 provide a powerful automation solution.

MTS Option

Machine Test Signal (MTS) is an optional feature on the MS4600 series light curtain. MTS allows the machine control system to check for the proper operation of the light curtain safety outputs by simulating a beam blocked state on the transmitter.

Alarm/Follow Mode Option

The non-safety output can be configured to have either "alarm" or "follow" functionality. "Alarm" mode means that the non-safety outputs will be de-energized if the system is behaving normally and energized if the system is in a faulted/interlocked state and will remain this way until the condition is cleared. "Follow" mode mimics the state of the solid-state safety outputs, meaning they will be active when the system is in the machine run state and inactive when the system is in the machine stopped state.
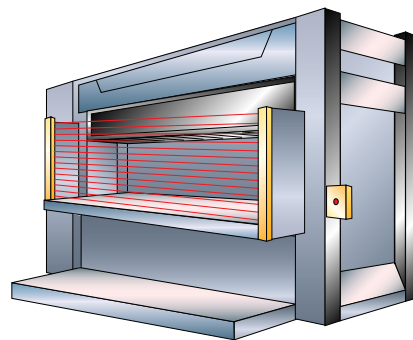
■ Applications

Application ❶

With a range of 20 m a MiniSafe MS4600 system could be used to guard the perimeter of a large filter press. In this application the small 19 mm (0.75 in.) minimum object resolution would allow the curtain to be mounted closer than many perimeter guarding systems and since there is no separate control box, long cable runs are not required.
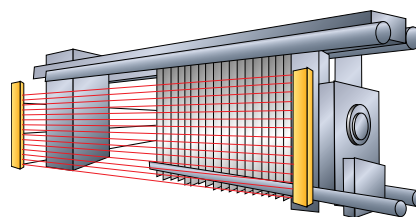
Application ❷

The small minimum object resolution, quick response time, and feature set of the MS4600 make it perfect for guarding metal forming equipment. In this application, floating blanking allows the material to bend up through the detection zone without sending a stop signal to the guarded machine.


D

safety light curtains

OMRON SCIENTIFIC TECHNOLOGIES, INC.
USA Tel. 1/888/510-4357   **Canada** Tel. 1/866/986-6766

For the Latest Information
On the Internet: **www.sti.com** or **www.omron.ca**

OMRON

D47

■ *Using Solid-state Outputs*

Extreme versatility is a feature of the solid-state outputs from the MiniSafe MS4600. These outputs can be connected to an Omron STI RM-series resource module, a safety monitoring and control device, or in many cases, directly to the primary control element of the guarded machine.

Connecting Via an RM-1 Module

The Omron STI RM-1 module provides force-guided relay outputs for machine control. OSSD (safety) outputs 1 and 2 are connected to the RM-1 and provide the power necessary to energize its relays.
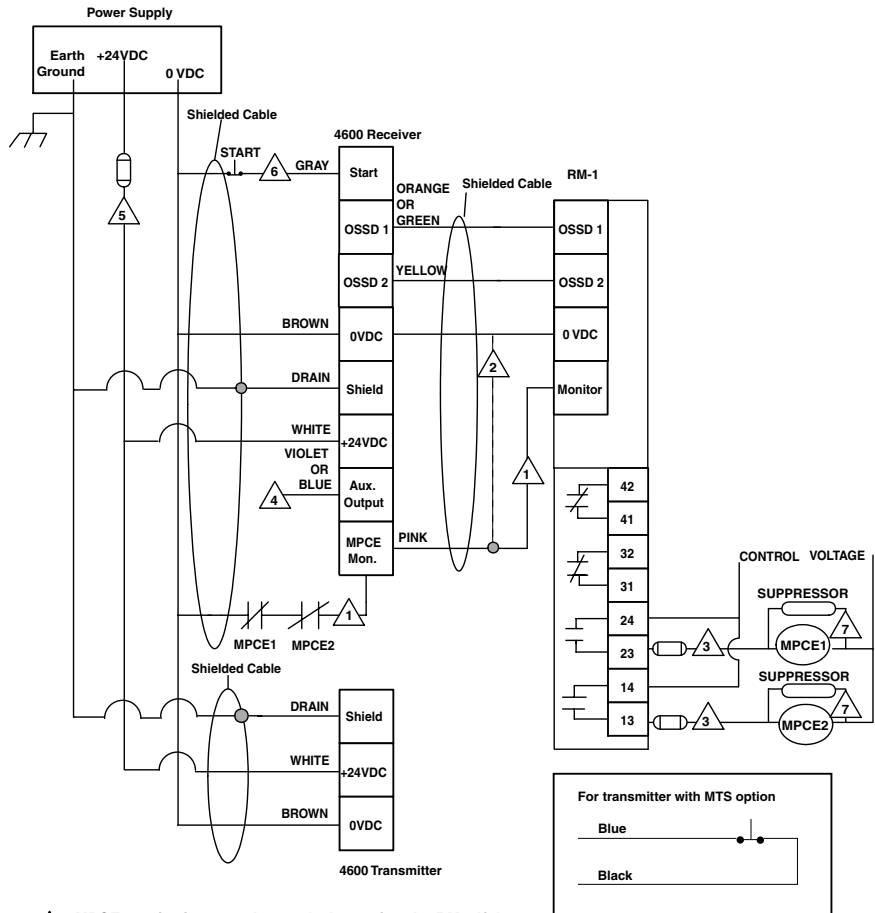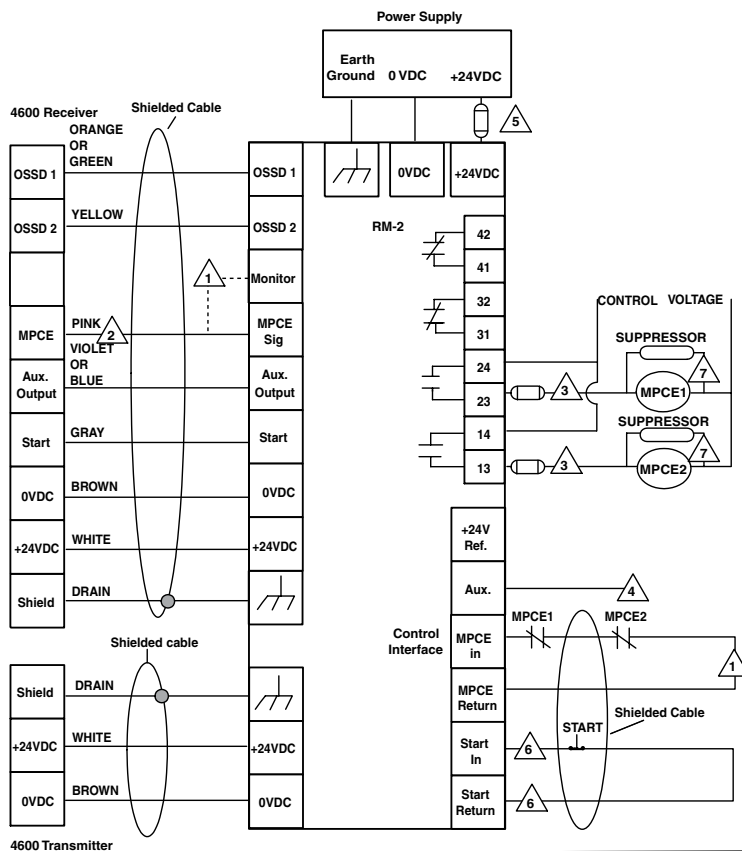

△1 MPCE monitoring must be used when using the RM1. If the RM1 is the Final Switching Device connect the Pink wire to the MONITOR terminal of the RM1. If force-guided control relays are used as Final Switching Devices they must be monitored, connect the Pink wire though N/C contacts to 0 VDC. (Do not connect both.)

△2 For testing prior to installation, the user may select MPCE OFF(default factory setting). In this case the MPCE line (pink wire) must be connected to the system 0 VDC line.

△3 User supplied over current protection, 6 A max.

△4 Auxilary Output connect to PLC (optional)

△5 User-supplied fuse.

△6 If remote start is not used, connect the start line (grey wire) to 0 VDC.

△7 Verify that the final switching devices are properly suppresed.

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

Connecting Via an RM-2 Module

The Omron STI RM-2 module provides force-guided relay outputs for machine control as well as a convenient location to terminate all outputs and inputs from the MS4600.

⚠1 **MPCE monitoring must be used when using the RM2. If the RM2 is the Final Switching Device connect the Pink wire to the MONITOR terminal of the RM2. If force-guided control relays are used as Final Switching Devices connect the Pink wire to the MPCE Sig. terminal. Then connect a set of N.C. contacts from MPCE1 and MPCE2 to the MPCE in and MPCE return terminals. (Do not connect both.)**

⚠2 **For testing prior to installation, the user may select MPCE OFF (default factory setting). In this case the MPCE line (pink wire) must be connected to the system 0 VDC line.**
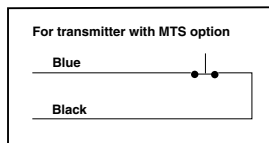
⚠3 **User-supplied over current protection, 6 A max.**

⚠4 **Auxilary output-connect to PLC (optional).**

⚠5 **User-supplied fuse.**

⚠6 **If remote start is not used, install a jumper across the Start connections at the Control Interface terminals.**

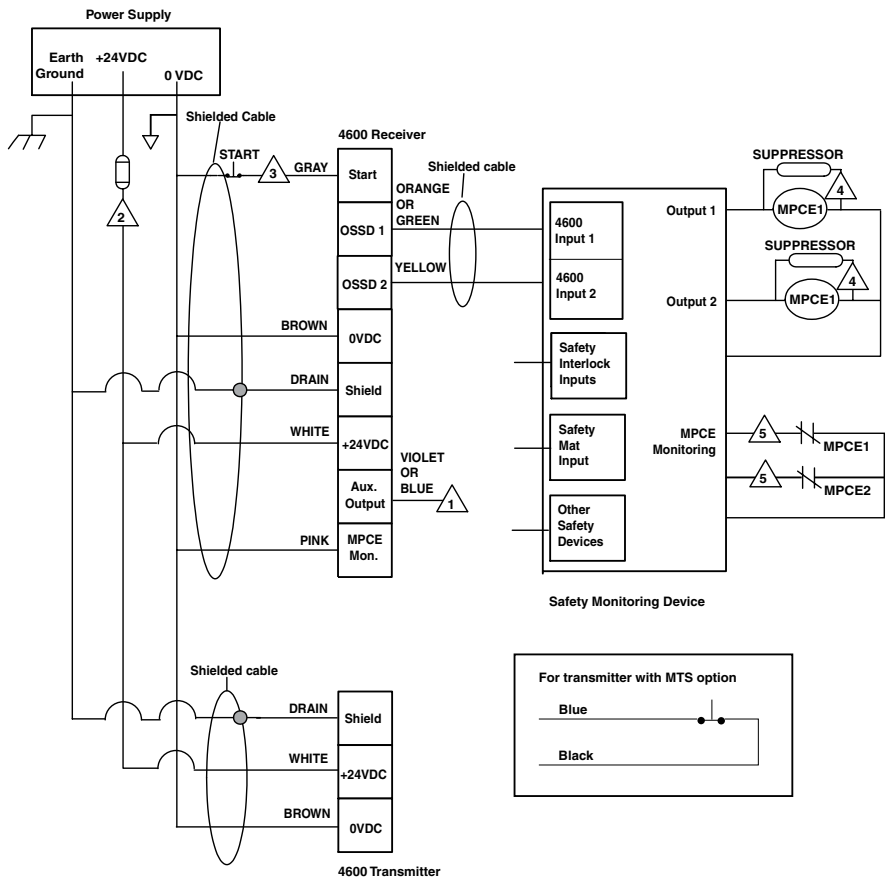⚠7 **Verify that the final switching devices are properly suppressed.**

OMRON SCIENTIFIC TECHNOLOGIES, INC.
USA Tel. 1/888/510-4357   **Canada** Tel. 1/866/986-6766

For the Latest Information
On the Internet: **www.sti.com** or **www.omron.ca**

OMRON

D49

D

safety light curtains

■ *Using Solid-state Outputs (continued)*

Connecting to a Safety Monitoring Device

The wiring from the MS4600 to the machine control circuit must be control reliable. Safety devices, such as the MS4600 should not depend on a PLC to stop a guarded machine. However, safety related monitoring devices are now available. Note that all safety inputs are directed to the monitoring device which also performs the MPCE monitoring function.

Power Supply

Earth Ground +24VDC 0 VDC

Shielded Cable

4600 Receiver

START /3\ GRAY Start Shielded cable SUPPRESSOR /4\

/2\

ORANGE OR GREEN OSSD 1 4600 Input 1 Output 1 MPCE1

YELLOW OSSD 2 4600 Input 2 Output 2 SUPPRESSOR /4\ MPCE1

BROWN 0VDC Safety Interlock Inputs

DRAIN Shield

WHITE +24VDC Safety Mat Input MPCE Monitoring /5\ MPCE1

VIOLET OR BLUE Aux. Output /1\ Other Safety Devices /5\ MPCE2

PINK MPCE Mon.

Safety Monitoring Device

Shielded cable

DRAIN Shield

WHITE +24VDC

BROWN 0VDC

4600 Transmitter

For transmitter with MTS option

Blue

Black

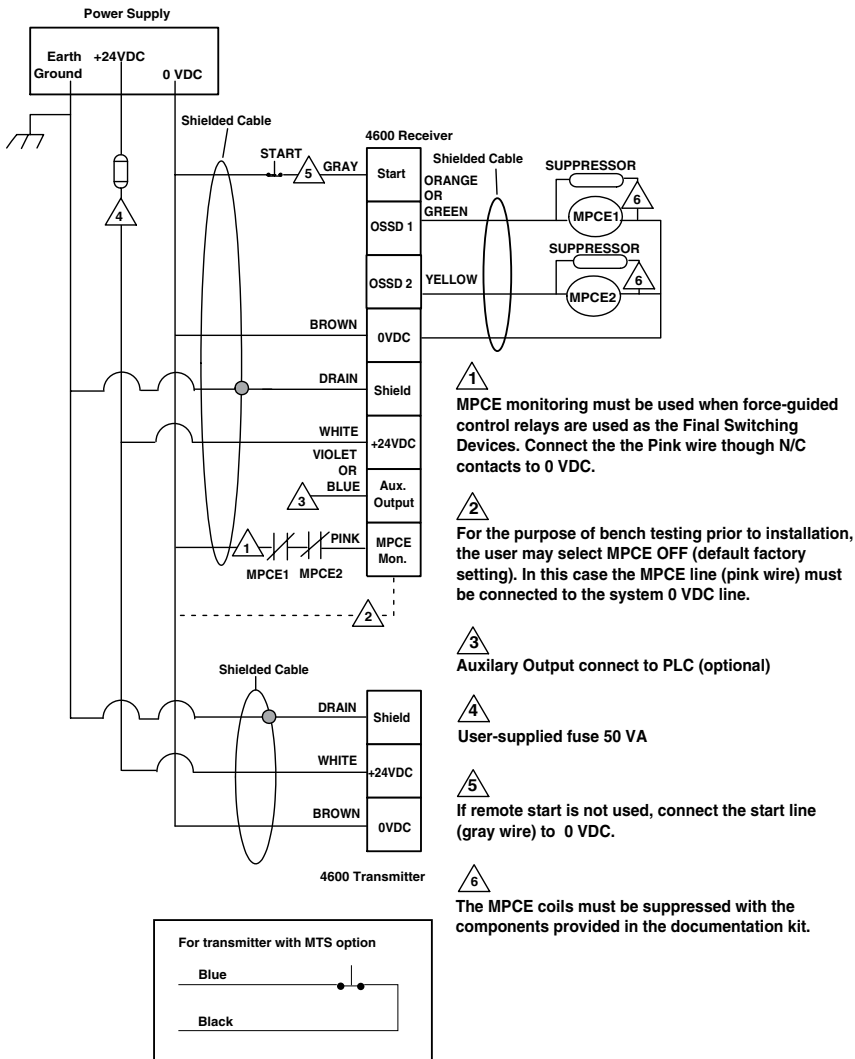/1\ Auxilary Output connect to PLC (optional)

/2\ User-supplied fuse.

/3\ If remote start is not used, connect the start line (grey wire) to 0 VDC.

/4\ Verify that the final switching devices are properly suppressed.

/5\ The Safety Monitoring Device must monitor the MPCE's Normally Closed Contacts.

sti D50

OMRON SCIENTIFIC TECHNOLOGIES, INC.
USA Tel. 1/888/510-4357   **Canada** Tel. 1/866/986-6766

For the Latest Information
On the Internet: **www.sti.com** or **www.omron.ca**

OMRON

Connecting Via Two Force-Guided Relays

FGR series relays provide force-guided outputs for machine control.

1 MPCE monitoring must be used when force-guided control relays are used as the Final Switching Devices. Connect the the Pink wire though N/C contacts to 0 VDC.

2 For the purpose of bench testing prior to installation, the user may select MPCE OFF (default factory setting). In this case the MPCE line (pink wire) must be connected to the system 0 VDC line.

3 Auxilary Output connect to PLC (optional)

4 User-supplied fuse 50 VA

5 If remote start is not used, connect the start line (gray wire) to 0 VDC.

6 The MPCE coils must be suppressed with the components provided in the documentation kit.

Module Dimensions—mm/in.

RM-1

RM-2

RM-3

RM-4

Available Modules

The following relay modules are available to extend the function of the MS4600 series:

RM-1: Provides force-guided safety relay outputs using input from MS4600 system. Receives required 24 VDC power direct from MS4600 solid-state safety outputs. DIN rail mount. Removable terminal blocks.

RM-2: Provides a single location to terminate all inputs and outputs to MS4600 system. Also provides force-guided safety relay outputs using input from MS4600 system. Requires external 24 VDC power supply which also provides power to the MS4600. DIN rail mount. Removable terminal blocks.
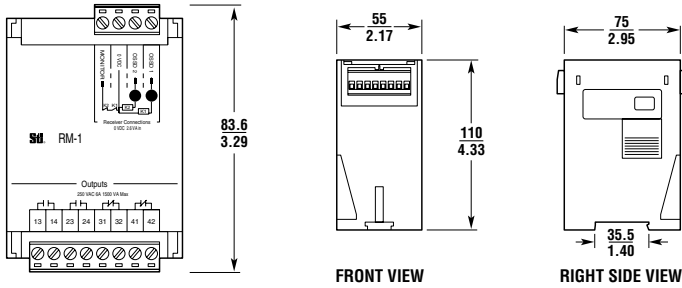
RM-3: Provides muting, the temporary automatic suspension of the safety function, for up to two safety light curtains. Requires external 24 VDC power supply. It has DIN-rail mount and removable terminal blocks.

RM-4: Up to four MS4600 systems can be connected to the RM-4. It provides two PNP safety outputs and one user selectable NPN or PNP non-safety, auxiliary output. Additionally, connections are provided for the auxiliary output of each safety device. It requires external 24 VDC power supply which also provides power to the MS4600.
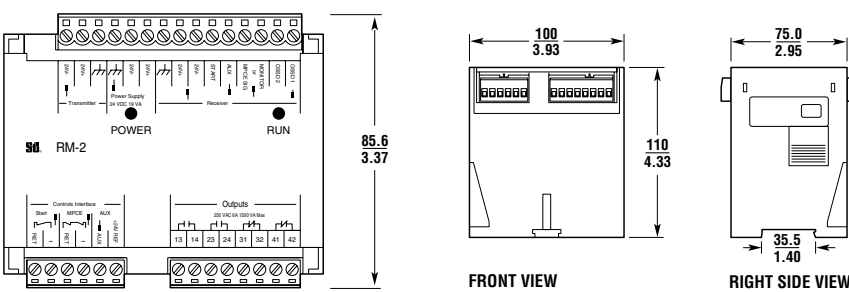
In addition to the above modules, the **RM-X, RM2-AC** and **RM2-AC-IP** are also compatible with the MS4600.
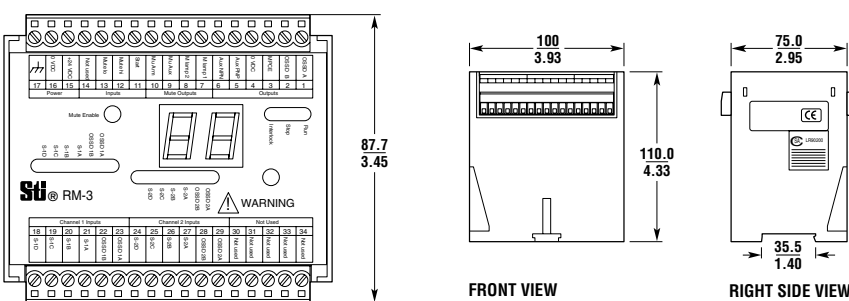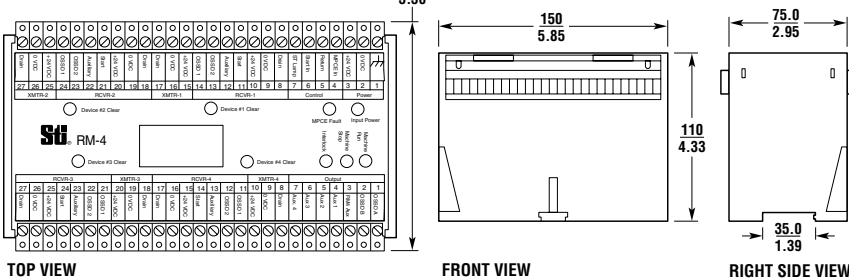
For information on Resource Modules, see page D138

■ *Specifications for Transmitter and Receiver*

Performance	
Protected Height: 14 and 19 mm — 263 to 1393 mm in 86 mm increments	
(10.3 to 54.5 inches in 3.4 inch increments)	
30 mm — 350 to 2090 mm (13.8 to 82.6 in.)	

Operating Range	
MS46SR: 0.3 to 7.5 m (1 to 25 ft.) for 14 mm resolution	
0.3 to 9 m (1 to 30 ft.) for 19 mm and 30 mm resolutions	
MS46LR: 0.3 to 20 m (1 to 65 ft.)/Not available with 14 mm resolution	

Resolution: 14 mm (0.55 in.), 19 mm (0.75 in.) or 30 mm (1.18 in.). Use of Exact Channel Select and/or Floating Blanking may increase this value.

Response Time (varies by protected height): See tables at right

Input Voltage (V_{in}): 24 VDC ± 20%

Input Power: 14 watts (without load on the outputs)

Safety Output Ratings: Two PNP outputs sourcing 500 mA max @ V_{in} (see note 1). Short circuit protected.

Auxiliary (Non-Safety) Output Ratings: One NPN output sinking 100 mA max @ V_{in} or one PNP output sourcing 100 mA @ V_{in} (see notes 1 and 2)

Power Supply: 24 VDC ± 20%. The rating depends on the current requirements of the loads attached to the outputs (see note 3). The power supply must meet the requirements of IEC 60204-1 and 61496-1. Omron STI part number 42992 or equivalent.

MPCE Monitoring Circuit: 50 mA steady state @ 24 VDC

Start/Restart Input: N.C. or N.O. momentary contact (20 mA consumption)

Effective Aperture Angle: ±2.5° maximum, transmitter and receiver at operating range greater than 3 m (9.8 ft.).

Light Source: GaAlAs Light Emitting Diode, 850 nm

Indicators	
Transmitter: power applied	
Receiver: machine run, machine stop, interlock/fault; channel select/floating blanking, individual beam	

Mechanical	
Enclosure: Polyurethane powder-painted aluminum	
Cable Length: Optional cables are available in 10, 15, 30 and 50 m lengths	

Cable Connections	
Receiver: 8-pin	
Transmitter: 3-pin standard, 5-pin with MTS	

Environmental	
Protection Rating: NEMA 4, 12; IP65	
Operating Temperature: 0 to 55°C (32 to 131°F)	
Relative Humidity: 95% maximum, non-condensing	
Vibration: 5-60 Hz maximum on all three axes	
Shock: 10 g for 0.016 seconds, 1,000 shocks for each axes on two axes	

Conformity/Approvals	
Conforming to Standards: ANSI/RIA R15.06-1999, ANSI B11.19-2003, OSHA 1910.217(c), OSHA 1910.212	
Other Approvals: All MS4600 systems have been EC type examined to the requirements of IEC 61496-1, -2 for a Type 4 ESPE. TUV Registration No: BB991007101. UL1998	

Response Times for Systems With 14 mm and 20 mm Resolutions

Protected Height (mm/in.)	No. of Beams	Response Time (seconds)
263/10.4	24	<0.016
350/13.8	32	<0.017
437/17.2	40	<0.019
524/20.6	48	<0.021
611/24.1	56	<0.023
698/27.5	64	<0.025
785/30.9	72	<0.027
872/34.3	80	<0.031
959/37.7	88	<0.033
1046/41.2	96	<0.035
1133/44.6	104	<0.035
1220/48.0	112	<0.037
1306/51.4	120	<0.039
1393/54.9	128	<0.040

Response Times for Systems With 30 mm Resolutions

Protected Height (mm/in.)	No. of Beams	Response Time (seconds)
350/13.8	16	<0.014
524/20.6	24	<0.016
698/27.5	32	<0.017
872/34.3	40	<0.019
1046/41.2	48	<0.021
1220/48.0	56	<0.023
1393/54.9	64	<0.025
1570/61.8	72	<0.027
1741/68.6	80	<0.029
1915/75.4	88	<0.031
2090/82.3	96	<0.033

Specifications are subject to change without notice.

Note 1: Voltage available at the outputs is equal to V_{in} - 2.0 VDC.

Note 2: Total current required by the two solid-state outputs and the aux. output should not exceed 1.1 A.
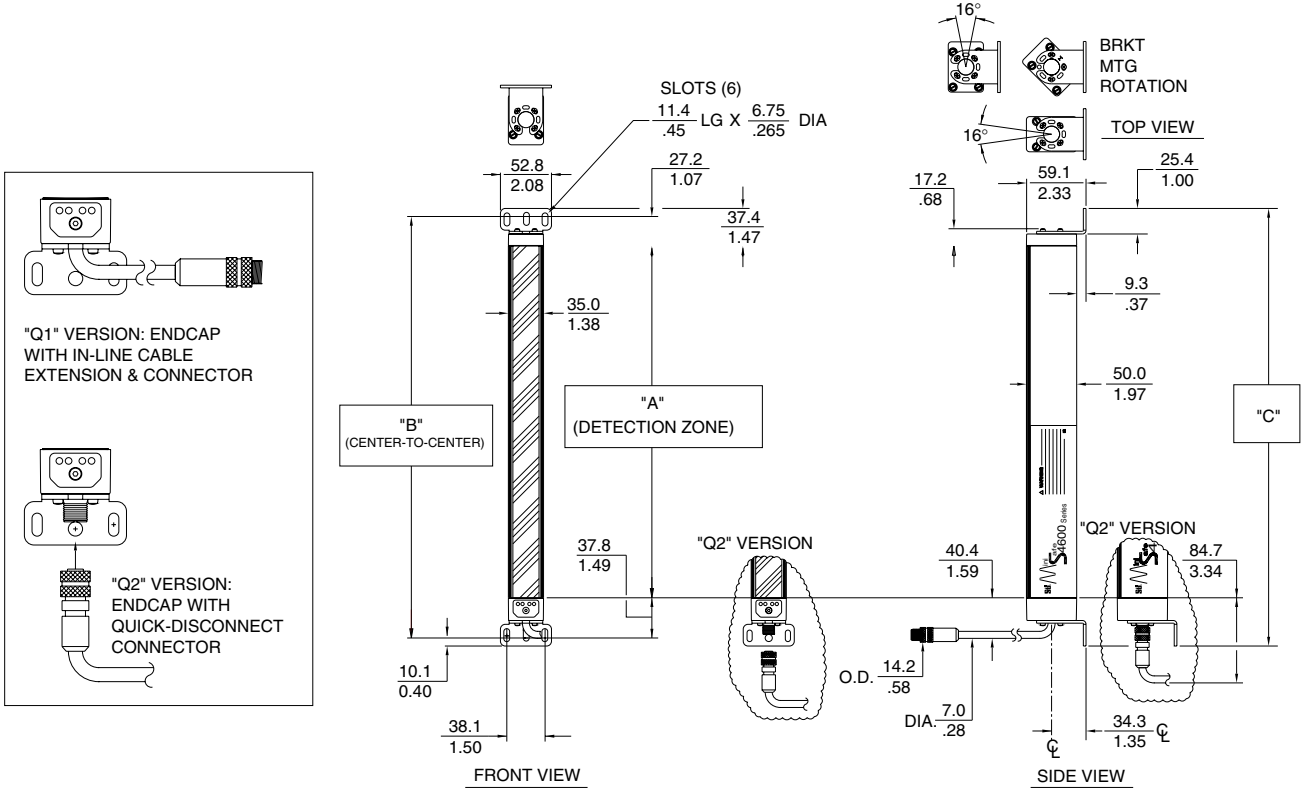
Note 3: Total system current requirement is the sum of the transmitter 285 mA and receiver 1.4 A max. (Receiver 300 mA + OSSD1 load + OSSD2 load + Aux. output load)

D

safety light curtains

OMRON SCIENTIFIC TECHNOLOGIES, INC.
USA Tel. 1/888/510-4357   **Canada** Tel. 1/866/986-6766

For the Latest Information
On the Internet: **www.sti.com** or **www.omron.ca**

OMRON

D53

safety light curtains

D

■ *MS4600-14 and -20 Dimensions—mm/in.*

"Q1" VERSION: ENDCAP WITH IN-LINE CABLE EXTENSION & CONNECTOR

"Q2" VERSION: ENDCAP WITH QUICK-DISCONNECT CONNECTOR

SLOTS (6)
$\frac{11.4}{.45}$ LG X $\frac{6.75}{.265}$ DIA

FRONT VIEW

"B" (CENTER-TO-CENTER)

"A" (DETECTION ZONE)

"Q2" VERSION

SIDE VIEW

"C"

"Q2" VERSION

BRKT MTG ROTATION

TOP VIEW

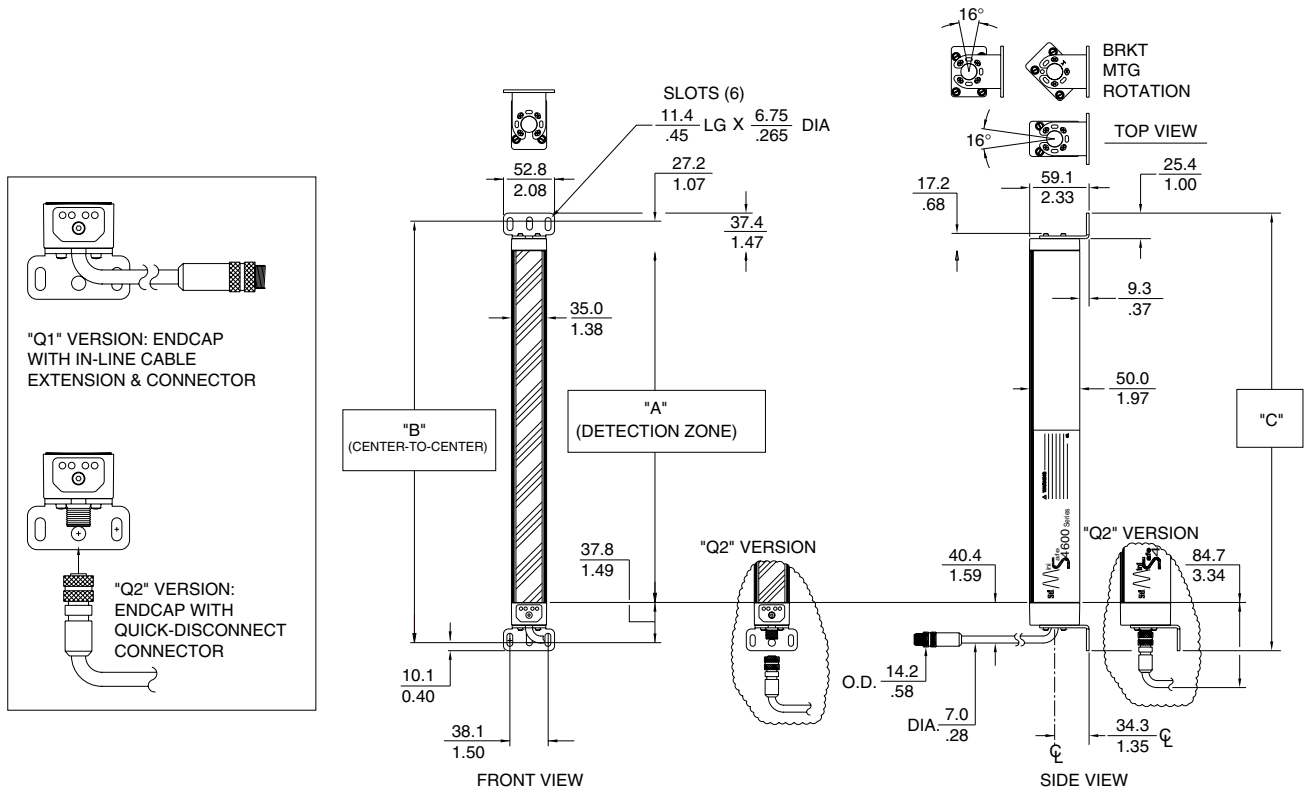DIMENSIONS: $\frac{mm\ (+\backslash-.3)}{INCHES\ (+\backslash-.01)}$

A = DETECTION ZONE

B = A + $\frac{65.0}{2.56}$

C = A + $\frac{85.4}{3.36}$

MiniSafe MS4600-14 and MS4600-20 Dimensions

	MS46-X-260-14 MS46-R-260-14 MS46-X-260-20 MS46-R-260-20	MS46-X-350-14 MS46-R-350-14 MS46-X-350-20 MS46-R-350-20	MS46-X-435-14 MS46-R-435-14 MS46-X-435-20 MS46-R-435-20	MS46-X-520-14 MS46-R-520-14 MS46-X-520-20 MS46-R-520-20	MS46-X-610-14 MS46-R-610-14 MS46-X-610-20 MS46-R-610-20	MS46-X-700-14 MS46-R-700-14 MS46-X-700-20 MS46-R-700-20	MS46-X-785-14 MS46-R-785-14 MS46-X-785-20 MS46-R-785-20
A mm/in.	263/10.4	350/13.8	437/17.2	524/20.6	611/24.1	698/27.5	785/30.9
B mm/in.	328/12.9	415/16.3	502/19.8	589/23.1	676/26.6	763/30.0	851/33.5
C mm/in.	348/13.7	435/17.1	522/20.6	609/24.0	696/27.4	783/30.8	870/34.3
System Shipping Weight							
kg/lb.	4.5/10	4.8/11	5.2/11	5.6/12	5.9/13	6.2/14	6.6/15

	MS46-X-870-14 MS46-R-870-14 MS46-X-870-20 MS46-R-870-20	MS46-X-955-14 MS46-R-955-14 MS46-X-955-20 MS46-R-955-20	MS46-X-1045-14 MS46-R-1045-14 MS46-X-1045-20 MS46-R-1045-20	MS46-X-1130-14 MS46-R-1130-14 MS46-X-1130-20 MS46-R-1130-20	MS46-X-1215-14 MS46-R-1215-14 MS46-X-1215-20 MS46-R-1215-20	MS46-X-1305-14 MS46-R-1305-14 MS46-X-1305-20 MS46-R-1305-20	MS46-X-1390-14 MS46-R-1390-14 MS46-X-1390-20 MS46-R-1390-20
A mm/in.	872/34.3	959/37.7	1046/41.2	1133/44.6	1220/48.0	1306/51.4	1393/54.9
B mm/in.	937/36.9	1024/40.3	1111/43.7	1198/47.2	1285/50.6	1372/54.0	1459/57.4
C mm/in.	957/37.7	1044/41.1	1131/44.5	1218/48.0	1305/51.4	1392/54.8	1479/58.2
System Shipping Weight							
kg/lb.	6.9/15	7.3/16	8.2/18	8.5/19	8.9/20	9.2/20	9.6/21

sti

D54

OMRON SCIENTIFIC TECHNOLOGIES, INC.
USA Tel. 1/888/510-4357   **Canada** Tel. 1/866/986-6766

For the Latest Information
On the Internet: **www.sti.com** or **www.omron.ca**

OMRON

■ MS4600-30 Dimensions—mm/in.

"Q1" VERSION: ENDCAP WITH IN-LINE CABLE EXTENSION & CONNECTOR

"Q2" VERSION: ENDCAP WITH QUICK-DISCONNECT CONNECTOR

SLOTS (6) $\frac{11.4}{.45}$ LG X $\frac{6.75}{.265}$ DIA

$\frac{52.8}{2.08}$ $\frac{27.2}{1.07}$ $\frac{37.4}{1.47}$

$\frac{35.0}{1.38}$

"B" (CENTER-TO-CENTER)

"A" (DETECTION ZONE)

$\frac{37.8}{1.49}$

$\frac{10.1}{0.40}$

$\frac{38.1}{1.50}$

FRONT VIEW

16° BRKT MTG ROTATION

16° TOP VIEW

$\frac{17.2}{.68}$ $\frac{59.1}{2.33}$ $\frac{25.4}{1.00}$

$\frac{9.3}{.37}$

$\frac{50.0}{1.97}$

"C"

"Q2" VERSION

$\frac{40.4}{1.59}$

"Q2" VERSION

$\frac{84.7}{3.34}$

O.D. $\frac{14.2}{.58}$

DIA. $\frac{7.0}{.28}$

$\frac{34.3}{1.35}$ ℄

SIDE VIEW

DIMENSIONS: $\frac{\text{mm (+\-.3)}}{\text{INCHES (+\-.01)}}$

A = DETECTION ZONE   B = A + $\frac{65.0}{2.56}$ C = A + $\frac{85.4}{3.36}$

MiniSafe MS4600-30 Dimensions

	MS46-X-350-30 MS46-R-350-30	MS46-X-520-30 MS46-R-520-30	MS46-X-700-30 MS46-R-700-30	MS46-X-870-30 MS46-R-870-30	MS46-X-1045-30 MS46-R-1045-30	MS46-X-1215-30 MS46-R-1215-30
A mm/in.	350/13.8	524/20.6	698/27.5	872/34.3	1046/41.2	1220/48.0
B mm/in.	415/16.3	589/23.2	763/30.0	938/36.9	1111/43.7	1285/50.6
C mm/in.	435/17.1	609/24.0	783/30.8	957/37.7	1131/44.5	1305/51.4
System Shipping Weight						
kg/lb.	4.8/11	5.6/12	6.2/14	6.9/15	8.2/18	8.9/20

	MX46-X-1390-30 MX46-R-1390-30	MS46-X-1570-30 MS46-R-1570-30	MS46-X-1745-30 MS46-R-1745-30	MS46-X-1920-30 MS46-R-1920-30	MS46-X-2095-30 MS46-R-2095-30
A mm/in.	1393/54.9	1570/61.8	1741/68.6	1915/75.4	2090/82.3
B mm/in.	1459/57.4	1635/64.4	1807/71.1	1981/78.0	2155/84.8
C mm/in.	1479/58.2	1655/65.2	1827/71.9	2001/78.8	2175/85.6
System Shipping Weight					
kg/lb.	9.6/21	10.0/22	10.4/23	10.9/24	11.8/26

safety light curtains

D

OMRON SCIENTIFIC TECHNOLOGIES, INC.
USA Tel. 1/888/510-4357   **Canada** Tel. 1/866/986-6766

For the Latest Information
On the Internet: **www.sti.com** or **www.omron.ca**

OMRON

D55

MS4600

■ *Ordering*

To order a MiniSafe MS4600 system, simply fill in these fields.

__ - ___ - ___ - __ - ___X - ___R - ___ - ___ - ___ - ___ - ___ - ___

❶   ❷   ❸   ❹   ❺   ❺   ❻   ❼   ❽   ❾   ❿   ⓫

❶ **Information required.** Represents the system operating range. *For applications where the transmitter and receiver will be mounted less than 7.5 m (25 ft.) or 9 m (30 ft.) apart (depending on resolution), please select the SR version.*

Designator	Description
MS46SR	0.3 to 7.5 m (1 to 25 ft.) for 14 mm resolutions
	0.3 to 9 m (1 to 30 ft.) for 20 and 30 mm resolutions
MS46LR	0.3 to 20 m (1 to 65 ft.) for 20 and 30 mm resolutions (Not available for 14 mm)

❷ **Information required.** Represents the minimum object resolution of the system.

Designator	Minimum Object Resolution
14	14 mm (0.55 in.)
20	19 mm (0.75 in.)
30	30 mm (1.18 in.)

❸ **Information required.** Represents the coverage height of the detection zone.

Designator	Description
260*	263 mm (10.4 in.)
350	351 mm (13.8 in.)
435*	437 mm (17.2 in.)
520	524 mm (20.6 in.)
610*	611 mm (24.1 in.)
700	698 mm (27.5 in.)
785*	785 mm (30.9 in.)
870	872 mm (34.3 in.)
955*	959 mm (37.7 in.)
1045	1046 mm (41.2 in.)
1130*	1133 mm (44.6 in.)
1215	1220 mm (48.0 in.)
1305*	1306 mm (51.4 in.)
1390	1393 mm (54.9 in.)
1570**	1567 mm (61.8 in.)
1745**	1741 mm (68.6 in.)
1920**	1915 mm (75.4 in.)
2095**	2090 mm (82.3 in.)

* Not available in 30 mm resolutions
** Only available in 30 mm resolutions

❹ **Information required.** Represents the connector type for transmitter and receiver.

Designator	Description
Q1	In-line cable with quick disconnect (QD) connector (pig tail)
Q2	QD connector

❺ **Information required.** Represents transmitter (X) and receiver (R) cable length. Cables can be shortened in the field.

Designator	Description
10	10 m (33 ft.)
15	15 m (49 ft.)
30	30 m (99 ft.)
50	50 m (164 ft.)

❻ **Information required.** Represents the start/restart input type.

Designator	Description
NC	Normally closed
NO	Normally open

❼ **Information required.** Indicate the Auxiliary output configuration.

Designator	Description
FN	NPN output follow solid-state safety outputs
FP	PNP output follow solid-state safety outputs
AN	NPN output operate only in Alarm status
AP	PNP output operate only in Alarm status

❽ **Information optional.** Indicate optional MTS on transmitter.

Designator	Description
M	Include MTS
(Blank)	No MTS

❾ **Information optional.** Indicate optional DeviceNet interface.

Designator	Description
RV	DeviceNet Installed
(Blank)	No DeviceNet

❿ **Information optional.** Indicate optional DeviceNet cable.

Designator	Description
D	6 m (20 ft.) Cable
(Blank)	No DeviceNet Cable

⓫ **Information optional.** Indicate optional RM relay module.

Designator	Description
RM1	Include RM-1 Resource Module
RM2	Include RM-2 Resource Module
RM2A	Include RM-2AC Resource Module
RM2AP	Include RM-2AC-IP Resource Module, IP65
RM3	Include RM-3 Resource Module
RM4	Include RM-4 Resource Module
RMX	Include RM-X Resource Module
(Blank)	Do not include Resource Module

For information on Resource Modules, see page D138

For information on safety light curtain accessories, see page D184

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

Safety Standards and Precautions

All models of the MiniSafe MS4600 meet ANSI/RIA R15.06-1999 and ANSI B11.19-2003. When used with mechanical power presses, OSHA industrial safety standards apply as stated in 1910.217(c). For other applications, the machine guarding requirements found in section 1910.212 apply. The MiniSafe MS4600 series meets ANSI control reliability requirements for point-of-operation presence sensing devices.

MS4600 systems have been EC type examined to the requirements of IEC 61496-1, -2 for a Type 4 ESPE.

The MiniSafe MS4600 should only be used on machinery that can consistently and immediately stop anywhere in its cycle or stroke. Never use a MiniSafe MS4600 on a full revolution clutched power press or machine. If the light curtain does not protect all access to the point of operation, the unprotected access must be guarded by other appropriate devices such as mechanical guards.

The purchaser, installer and employer have the responsibility to meet 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 the Installation and Operation Manual for additional information.

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