LCM Series Controllers

File No. LR90200

MCF4700 Series

- Segmented lengths from 100 to 1800 mm (3.9 to 70.9 in.). Segments are connected by interconnect cables.

MCJ4700 Series

- Segmented lengths from 75 mm (3.0 in.) to 1800 mm (71.0 in.). **Electro/mechanical joints** link the segments at a 90° angle.

Options

- DeviceNet™ Interface
- Low ESD models. Consult factory.
- Muting through RM-3 module

MicroSafe®

MC4700, MCF4700 and MCJ4700

- Ultra-compact 26 x 28 mm (1.0 x 1.1 in.) transmitter and receiver;
- Excellent resolutions of 12, 14, 20 and 30 mm
- Protected heights from 100 to 1800 mm (3.9 to 70.9 in.)
- Two-digit diagnostics display visible on controller
- Choice of operating modes
  - Automatic Start
  - Restart Interlock
  - Start/Restart Interlock
- Available enclosures:
  - 100 mm DIN enclosure with removable terminal blocks
  - IP65-rated lockable metal enclosure
- Available outputs:
  - 2 PNP safety outputs
  - 1 N.O. and 1 N.O./N.C. safety relay output
  - 2 auxiliary outputs (1 NPN, 1 PNP), follow or alarm mode
- Individual Beam Indicators
- Exact channel select and floating blanking
- MPCE monitoring
- In-line connector cables
- Adjustable mounting brackets

Description

The MicroSafe 4700 series is unique due to superior response time – as fast as 6.69 msec – and excellent resolution of 12 mm. This combination of speed and resolution allow this ultra-compact light curtain to be mounted closer to the point of hazardous operation.

The MicroSafe MC4700 series consists of an identical length transmitter and receiver, combined with an LCM series controller and appropriate cables. The ultra-compact transmitter and receiver dimensions allow the MicroSafe to be mounted on small automatic assembly machines and in other applications where space is at a premium. The in-line connector cables allow the mounting of the transmitter and receiver in crowded locations where a standard connector would not fit. The controller end of the cable is

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not terminated, which allows the length to be easily shortened in the field.

The MCF4700 consists of at least two transmitter and receiver segments, combined with an LCM series controller and appropriate interconnecting cables.

The MicroSafe MCJ4700 also consists of at least two transmitter and receiver segments, mechanically linked at a 90° angle. Interconnect cables are not required.

For easy alignment, the MicroSafe series features Omron STI's patented Individual Beam Indicator lights.

DeviceNet Option

The LCM series controller is available with an optional DeviceNet™ interface. DeviceNet™ allows the LCM series controller to communicate non-safety-related data across this popular fieldbus. As the de facto standard for factory 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, safety output status, MPCE monitoring enabled/disabled, floating blanking active/inactive, exact channel select active/inactive, transmitter, receiver, controller, and relay faults, error codes and descriptions.

DeviceNet™ and the LCM series controller provide a powerful automation solution.

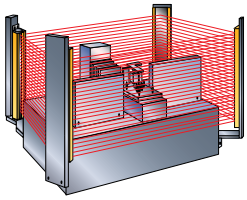
■ Applicable Controllers

The LCM controller includes virtually every desirable safety light curtain feature. There are two options available: DeviceNet™ interface, and a multi-channel select (not CE marked) version capable of storing up to eight selected patterns.

■ Applications

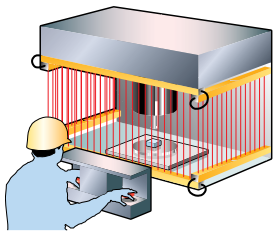
MC4700 Application

Due to its small dimensions, the MicroSafe can be elegantly integrated into table-top automated production equipment. Its in-line connector cables allow it to be mounted in tight, confined spaces. Since cable length can be shortened in the field, it is easy for OEM equipment builders to achieve a custom, built-in look.



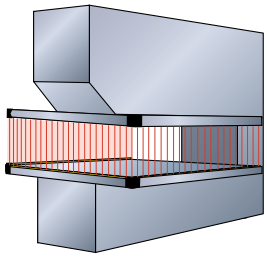
MCF4700 Application

Here, a three-segment MicroSafe Flexible series system forms a "U-shaped" guard zone to protect all unguarded sides of a small machine. Without the MicroSafe Flexible, mirrors or three conventional safety light curtains would have to be used.



MCJ4700 Application

In this application the light curtain is not visible. With the creation of a jointed-segmented MCJ4700, an OEM has the ability to truly build the light curtain into their product. The OEM or integrator is able to apply a CE marked safety solution that meets world-wide standards. With a small size housing of 26 mm x 28 mm (1.0 x 1.1 in.), the ability to mount on a single plane, and segment increments as small as 75 mm (2.95 in.), the MCJ4700 provides the cleanest, most elegant safety solution.



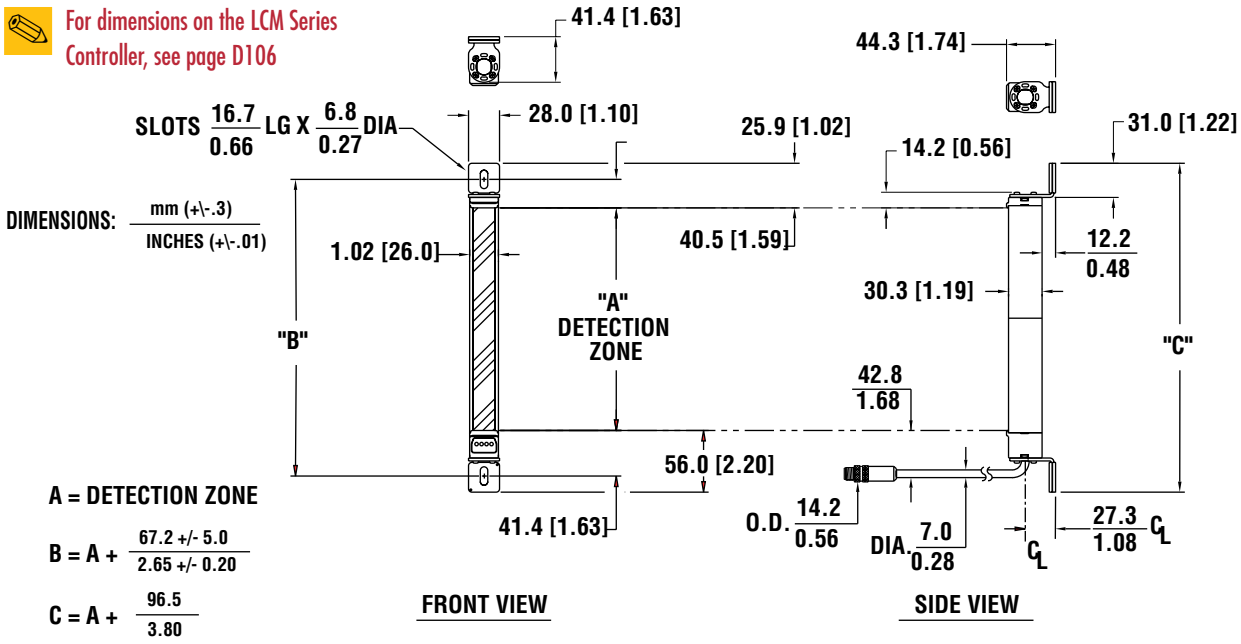
■ *Specifications for Transmitter and Receiver*

Performance	
Protected Height:	12 mm — 100 to 1200 mm (3.9 to 62.9 in.) in 100 mm increments 14 mm — 150 to 1800 mm (5.9 to 71.2 in.) in 75 mm increments 20 mm — 150 to 1800 mm (5.9 to 71.2 in.) in 75 mm increments 30 mm — 150 to 1800 mm (5.9 to 71.2 in.) in 150 mm increments
Operating Range:	**MC47SR and MC47SRS; MCF47 and MCF47S; MCJ47 and MCJ47S** 12 mm — 0.2 to 3 m (0.7 to 10 ft.) 14 mm — 0.3 to 5 m (1 to 17 ft.) for MC4700 and MCJ4700; 14 mm — 0.3 to 3 m (1 to 10 ft.) for MCF4700 20 mm — 0.3 to 7 m (1 to 23 ft.) 30 mm — 0.3 to 7 m (1 to 23 ft.) **MC47LR and MC47LRS** 12 mm — 0.2 to 5 m (0.7 to 17 ft.) 20 mm — 0.3 to 12 m (1 to 39 ft.) 30 mm — 0.3 to 12 m (1 to 39 ft.)
Resolution:	12 mm — 0.47 in.* 14 mm — 0.55 in.* 20 mm — 0.79 in.* 30 mm — 1.2 in.* * Use of exact channel select and/or floating blanking may increase this value.
Effective Aperture Angle: ±2.5° transmitter and receiver	
Light Source: 850 nm LED	
Light Source Life: 100,000 hours	
Indicators: Channel Select or Floating blanking – amber; Interlock or Fault – yellow; Machine Stop – red, Individual Beam Indicators – red; Machine Run – green.	
Mechanical	
Enclosure: IP65 transmitter and receiver enclosure. Polyurethane powder-painted aluminum yellow.	
Cable Length:	
Transmitter – maximum 30 m (100 ft.); standard 3 m (10 ft.)	
Receiver – maximum 30 m (100 ft.); standard 3 m (10 ft.)	
*For MCF4700 Series: Interconnect cables are available from 0.3 m (12 in.) to 10 m (33 ft.). Maximum total length of a system is 15 m (49 ft.). Consult factory for longer lengths.	
Cable Connections: Circular style, 5-conductor for transmitter, 8-conductor for receiver	
Environmental	
Protection Rating: Transmitter and receiver – IP65; Available controllers: 35 mm DIN mount - IP20, Metal Chassis - IP65 (for more information see the LCM Series section)	
Operating Temperature: 0 to 55°C (32 to 133°F)	
Storage Temperature: -25 to 75°C (-13 to 167°F)	
Relative Humidity: 95% maximum, non-condensing	
Vibration: 5–60 Hz maximum on all 3 axes	
Shock: 10 g for 0.016 seconds; 1,000 shocks for each axis on two axis	
Conformity Tested To/Approvals	
Approvals: IEC61496, CE Mark	
Conforming to Standards: ANSI/RIA R15.06-1999, ANSI B11.19-2003, OSHA 1910.27(c), OSHA 1910.212	
Other Approvals: All MC4700 systems have been EC type examined to the requirements of IEC 61496-1, -2 for a Type 4 ESPE. TUV Registration Number: BB201132801, BB211167401, BB221006201. CSA Certificate 1289466. UL listed.	

Specifications are subject to change without notice.

■ *Dimensions for MC4700 Series—mm/in.*

For dimensions on the LCM Series Controller, see page D106



MicroSafe MC4700 Dimensions

MC4700-12		
A mm/in.	**B mm/in.**	**C mm/in.**
102/4.0	169/6.7	198/7.8
202/8.0	269/10.6	298/11.7
302/11.9	369/14.5	398/15.7
402/15.8	469/18.5	498/19.6
502/19.8	569/22.4	598/23.5
602/23.7	669/26.3	698/27.5
702/27.6	769/30.3	798/31.4
802/31.6	869/34.2	898/35.4
902/35.5	969/38.1	998/39.3
1002/39.5	1069/42.1	1098/43.2
1102/43.4	1169/46.0	1198/47.2
1202/47.3	1269/50.0	1298/51.1

MC4700-14 and MC4700-20		
A mm/in.	**B mm/in.**	**C mm/in.**
159/6.3	226/8.9	255/10.0
235/9.3	302/11.9	331/13.0
309/12.2	376/14.8	405/15.9
385/15.2	452/17.8	481/18.9
459/18.1	526/20.7	555/21.9
535/21.1	602/23.7	631/24.8
609/24.0	676/26.6	705/27.8
685/27.0	752/29.6	781/30.7
759/29.9	826/32.5	855/33.6
835/32.9	902/35.5	931/36.7
909/35.8	976/38.4	1005/39.6
985/38.9	1052/41.4	1081/42.6
1059/41.7	1126/44.3	1155/45.5
1135/44.7	1202/47.3	1231/48.5
1209/47.6	1276/50.2	1305/51.4
1285/50.6	1352/53.2	1381/54.4
1359/53.5	1426/56.1	1455/57.3
1435/56.5	1502/59.1	1531/60.3
1509/59.4	1576/62.0	1605/63.2
1585/62.4	1652/65.0	1681/66.2
1659/65.3	1726/68.0	1755/69.1
1735/68.3	1802/70.9	1831/72.1
1809/71.2	1876/73.9	1905/75.0

MC4700-30		
A mm/in.	**B mm/in.**	**C mm/in.**
159/6.3	226/8.9	255/10.0
309/12.2	376/14.8	405/15.9
459/18.0	526/20.7	555/21.9
609/24.0	676/26.6	705/27.8
759/29.9	826/32.5	855/33.7
909/35.8	976/38.4	1005/39.6
1059/41.7	1126/44.3	1155/45.5
1209/47.6	1276/50.2	1305/51.4
1359/53.5	1426/56.1	1455/57.3
1509/59.4	1576/62.0	1605/63.2
1659/65.3	1726/68.0	1755/69.1
1809/71.2	1876/73.9	1905/75.0

■ *Ordering for MC4700 Series*

To order a MicroSafe MC4700 system, simply fill in the fields in the model number sequence given below. Each field is numbered and information on completing a specific field can be found in the sections which follow.

For specifications and dimensions on the LCM Series Controller, see page D106

____ - ____ - ____ - ____ - ____X - ____R - ____
❶ ❷ ❸ ❹ ❺ ❺ ❻

Example: MC47SR-12-300-LCM1-10X-10R-RM1

This MicroSafe system is short range has 12 mm (0.47 in.) minimum object resolution, a 300 mm (11.8 in.) protection height, an LCM1 controller, 10 m (33 ft.) transmitter and receiver cables, and an RM-1 relay output module.

❶ Information required. Indicates operating range of the light curtain and if the MicroSafe system is manufactured to low ESD requirements. ESD systems are used where the build-up of an electrostatic charge on the light curtain and its subsequent discharge may harm the product being produced by the guarded machine (i.e. integrated circuits, disk drives, electronic components, etc.).

Designator	Description
MC47SR	Range based on minimum object resolution of the system. 12 mm—0.2 to 3 m (0.7 to 10 ft.). *For applications where the transmitter and receiver will be mounted less than 3 m (9.9 ft.) apart.* 14 mm—0.3 to 5 m (1 to 17 ft.). 20 mm—0.3 to 7 m (1 to 23 ft.). *For applications where the transmitter and receiver will be mounted less than 7 m (23 ft.) apart.* 30 mm—0.3 to 7 m (1 to 23 ft.). *For applications where the transmitter and receiver will be mounted less than 7 m (23 ft.) apart.*
MC47LR	Range based on minimum object resolution of the system. 12 mm—0.2 to 5 m (0.7 to 17 ft.). *For applications where the transmitter and receiver will be mounted less than 3 m (9.9 ft.) apart, please select the SR version above.* 20 mm—0.3 to 12 m (1 to 39 ft.). *For applications where the transmitter and receiver will be mounted less than 7 m (23 ft.) apart, please select the SR version above.* 30 mm—0.3 to 12 m (1 to 39 ft.). *For applications where the transmitter and receiver will be mounted less than 7 m (23 ft.) apart, please select the SR version above.*
MC47SRS	Low ESD MicroSafe System. Range based on minimum object resolution of the system. 12 mm—0.2 to 3 m (0.7 to 10 ft.). *For applications where the transmitter and receiver will be mounted less than 3 m (9.9 ft.) apart.* 14 mm—0.3 to 5 m (1 to 17 ft.). 20 mm—0.3 to 7 m (1 to 23 ft.). *For applications where the transmitter and receiver will be mounted less than 7 m (23 ft.) apart.* 30 mm—0.3 to 7 m (1 to 23 ft.). *For applications where the transmitter and receiver will be mounted less than 7 m (23 ft.) apart.*
MC47LRS	Low ESD MicroSafe System. Range based on minimum object resolution of the system. 12 mm—0.2 to 5 m (0.7 to 17 ft.). *For applications where the transmitter and receiver will be mounted less than 3 m (9.9 ft.) apart, please select the SRS version above.* 20 mm—0.3 to 12 m (1 to 39 ft.). *For applications where the transmitter and receiver will be mounted less than 7 m (23 ft.) apart, please select the SRS version above.* 30 mm—0.3 to 12 m (1 to 39 ft.). *For applications where the transmitter and receiver will be mounted less than 7 m (23 ft.) apart, please select the SRS version above.*

❷ Information required. Represents the minimum object resolution of the light curtain in millimeters. Designators are described below.

Designator	Minimum Object Resolution
12	12 mm (0.47 in.)
14	14 mm (0.55 in.)
20	20 mm (0.79 in.)
30	30 mm (1.18 in.)

❸ Information required. Represents protective heights of the light curtain in millimeters. Protection heights available are a function of minimum object resolution. Designators are described below and divided into three sections, those for 12 mm resolutions, those for 14/20 mm and those for 30 mm resolutions.

12 mm Minimum Object Resolution Systems

Designator	# Beams	Protection Height
100	16	102 mm (4.0 in.)
200	32	202 mm (8.0 in.)
300	48	302 mm (11.9 in.)
400	64	402 mm (15.8 in.)
500	80	502 mm (19.8 in.)
600	96	602 mm (23.7 in.)
700	112	702 mm (27.6 in.)
800	128	802 mm (31.6 in.)
900	144	902 mm (35.5 in.)
1000	160	1002 mm (39.5 in.)
1100	176	1102 mm (43.4 in.)
1200	192	1202 mm (47.3 in.)

14 mm and 20 mm Minimum Object Resolution Systems

Designator	# Beams	Protection Height
150	14	159 mm (6.3 in.)
225	21	235 mm (9.3 in.)
300	28	309 mm (12.2 in.)
375	35	385 mm (15.2 in.)
450	42	459 mm (18.1 in.)
525	49	535 mm (21.1 in.)
600	56	609 mm (24.0 in.)
675	63	685 mm (27.0 in.)
750	70	759 mm (29.9 in.)
825	77	835 mm (32.9 in.)
900	84	909 mm (35.8 in.)
975	91	985 mm (38.8 in.)
1050	98	1059 mm (41.7 in.)
1125	105	1135 mm (44.7 in.)
1200	112	1209 mm (47.6 in.)
1275	119	1285 mm (50.6 in.)
1350	126	1359 mm (53.3 in.)
1425	133	1435 mm (56.5 in.)
1500	140	1509 mm (59.4 in.)
1575	147	1585 mm (62.4 in.)
1650	154	1659 mm (65.3 in.)
1725	161	1735 mm (68.3 in.)
1800	168	1809 mm (71.2 in.)

30 mm Minimum Object Resolution Systems

Designator	# Beams	Protection Height
150	7	159 mm (6.3 in.)
300	14	309 mm (12.2 in.)
450	21	459 mm (18.1 in.)
600	28	609 mm (24.0 in.)
750	35	759 mm (29.9 in.)
900	42	909 mm (35.8 in.)
1050	49	1059 mm (41.7 in.)
1200	56	1209 mm (47.6 in.)
1350	63	1359 mm (53.3 in.)
1500	70	1509 mm (59.4 in.)
1650	77	1659 mm (65.3 in.)
1800	84	1809 mm (71.2 in.)

❹ Information required. Represents controller version. Designators and descriptions are given below.

Designator	Description
LCM1	DIN-mount, IP20, solid-state safety output, 24 VDC
LCM2	DIN-mount, IP20, solid-state safety output, 24 VDC, DeviceNet interface
LCM3	DIN-mount, IP20, solid-state safety output, 24 VDC, non-CE-marked, multiple stored channel select patterns
LCM100	Metal enclosure, IP65, relay safety output, 100-230 VAC
LCM200	Metal enclosure, IP65, relay safety output, 100-230 VAC, DeviceNet interface
LCM300	Metal enclosure, IP65, relay safety output, 100-230 VAC, non-CE-marked, multiple stored channel select patterns
LCM110	Metal enclosure, IP65, relay safety output, 100-230 VAC, lid-mounted reset switch
LCM210	Metal enclosure, IP65, relay safety output, 100-230 VAC, lid-mounted reset switch, DeviceNet interface
LCM310	Metal enclosure, IP65, relay safety output, 100-230 VAC, lid-mounted reset switch, non-CE marked, multiple stored channel select patterns
LCM120	Metal enclosure, IP65, solid-state safety output, 24 VDC
LCM220	Metal enclosure, IP65, solid-state safety output, 24 VDC, DeviceNet interface

(continued on next page)

■ Ordering for MC4700 Series (continued)

LCM320	Metal enclosure, IP65, solid-state safety output, 24 VDC, non-CE-marked, multiple stored channel select patterns
LCM130	Metal enclosure, IP65, solid-state safety output, 24 VDC, lid-mounted reset switch
LCM230	Metal enclosure, IP65, solid-state safety output, 24 VDC, lid-mounted reset switch, DeviceNet interface
LCM330	Metal enclosure, IP65, solid-state safety output, 24 VDC, lid-mounted reset switch, non-CE marked, multiple stored channel select patterns
LCM140	Metal enclosure, IP65, relay safety output, 24 VDC
LCM240	Metal enclosure, IP65, relay safety output, 24 VDC, DeviceNet interface
LCM340	Metal enclosure, IP65, relay safety output, 24 VDC, non-CE-marked, multiple stored channel select patterns
LCM150	Metal enclosure, IP65, relay safety output, 24 VDC, lid-mounted reset switch
LCM250	Metal enclosure, IP65, relay safety output, 24 VDC, lid-mounted reset switch, DeviceNet interface
LCM350	Metal enclosure, IP65, relay safety output, 24 VDC, lid-mounted reset switch, non-CE marked, multiple stored channel select patterns

Note: For more configurations with quick-disconnect connectors refer to the LCM controller section.

❺ Information required. Represents transmitter (X) and receiver (R) cable length. Designators and descriptions are given below.

Designator	Description
3	3 m (10 ft.)
10	10 m (33 ft.)
30	30 m (99 ft.)

❻ Information optional. Indicate if you would like an Omron STI RM series resource module.

Designator	Description
RM1	Include RM-1 resource module, force-guided relay output
RM3	Include RM-3 resource module, mute module
RM4	Include RM-4 resource module, allow for wiring up to four MC4700 systems
RMX	Include RM-X resource module
(Blank)	No RM series resource module

For information on Resource Modules, see page D138

For information on safety light curtain accessories, see page D184

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

Safety Standards and Precautions

All models of the MicroSafe meet ANSI/RIA R15.06-1999, 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 MicroSafe meets ANSI control reliability requirements for point-of-operation presence sensing devices. All controllers have CSA-CUS acceptance and are designed to meet UL508.

MicroSafe systems employing LCM controllers (except those with the ability to store multiple channel select patterns) have been EC type examined to the requirements of category 4, EN 954-1 (type 4, IEC 61496).

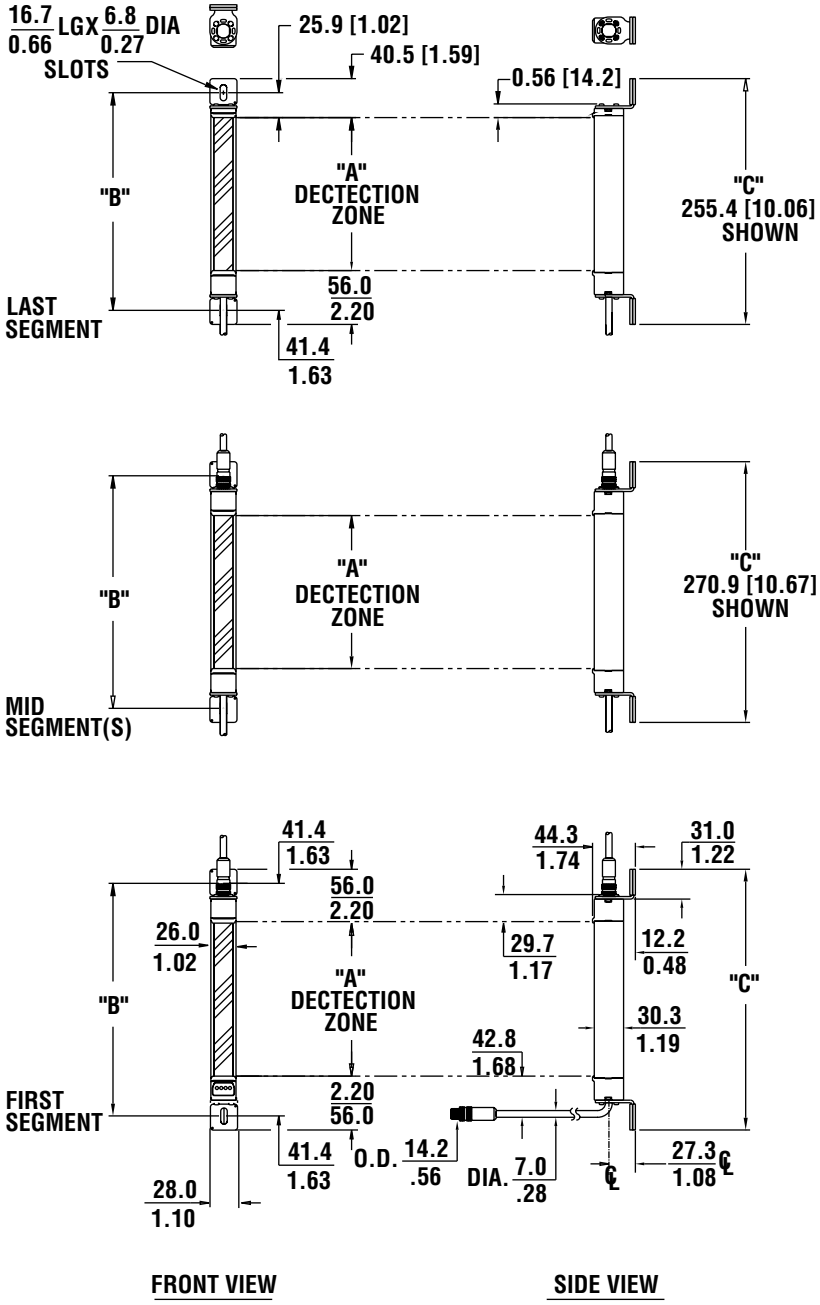
The MicroSafe should only be used on machinery that can consistently and immediately stop anywhere in its cycle or stroke. Never use a MicroSafe on a full revolution clutched power press or machine. If the light curtain does not protect all access to the point of operation, the unprotected access must 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.

■ *Dimensions for MCF4700 Series—mm/in.*

For dimensions on the LCM Series Controller, see page D106



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

MicroSafe Flexible MCF4700 Dimensions

MCF4700-12		
A mm/in.	**B mm/in.**	**C mm/in.**
FIRST, MIDDLE SEGMENT		
102/4.0	185/7.3	214/8.4
202/8.0	285/11.2	314/12.4
302/11.9	385/15.2	414/16.3
402/15.8	485/19.1	514/20.2
502/19.8	585/23.0	614/24.2
602/23.7	685/27.0	714/28.1
702/27.6	785/30.9	814/32.0
802/31.6	885/34.8	914/36.0
902/35.5	985/38.8	1014/39.9
1002/39.5	1085/42.7	1114/43.9
1102/43.4	1185/46.7	1214/47.8
LAST SEGMENT		
102/4.0	169/6.7	198/7.8
202/8.0	269/10.6	298/11.7
302/11.9	369/14.5	398/15.7
402/15.8	469/18.5	498/19.6
502/19.8	569/22.4	598/23.5
602/23.7	669/26.3	698/27.5
702/27.6	769/30.3	798/31.4
802/31.6	869/34.2	898/35.4
902/35.5	969/38.1	998/39.3
1002/39.5	1069/42.1	1098/43.2
1102/43.4	1169/46.0	1198/47.2

MCF4700-14, MCF4700-20 and MCF4700-30					
A mm/in.	**B mm/in.**	**C mm/in.**	**A mm/in.**	**B mm/in.**	**C mm/in.**
FIRST, MIDDLE SEGMENT			**LAST SEGMENT**		
159/6.3	242/9.5	271/10.7	159/6.3	226/8.9	255/10.0
*235/9.3	318/12.5	347/13.7	*235/9.3	302/11.9	331/13.0
309/12.2	392/15.4	421/16.6	309/12.2	376/14.8	405/15.9
*385/15.2	468/18.4	497/19.6	*385/15.2	452/17.8	481/18.9
459/18.1	542/21.3	571/22.5	459/18.1	526/20.7	555/21.9
*535/21.1	618/24.3	647/25.5	*535/21.1	602/23.7	631/24.8
609/24.0	692/27.2	721/28.4	609/24.0	676/26.6	705/27.8
*685/27.0	768/30.2	797/31.4	*685/27.0	752/29.6	781/30.7
759/29.9	842/33.1	871/34.3	759/29.9	826/32.5	855/33.7
*835/32.9	918/36.1	947/37.3	*835/32.9	902/35.5	931/36.7
909/35.8	992/39.1	1021/40.2	909/35.8	976/38.4	1005/39.6
*985/38.9	1068/42.0	1097/43.2	*985/38.9	1052/41.4	1081/42.6
1059/41.7	1142/45.0	1171/46.1	1059/41.7	1126/44.3	1155/45.5
*1135/44.7	1218/48.0	1247/49.1	*1135/44.7	1202/47.3	1231/48.5
1209/47.6	1292/50.9	1321/52.0	1209/47.6	1276/50.2	1305/51.4
*1285/50.6	1368/53.9	1397/55.0	*1285/50.6	1352/53.2	1381/54.4
1359/53.5	1442/56.8	1471/57.9	1359/53.5	1426/56.1	1455/57.3
*1435/56.5	1518/59.8	1547/60.9	*1435/56.5	1502/59.1	1531/60.3
1509/59.4	1592/62.7	1621/63.8	1509/59.4	1576/62.0	1605/63.2
*1585/62.4	1668/65.7	1697/66.8	*1585/62.4	1652/65.0	1681/66.2
1659/65.3	1742/68.6	1771/69.7	1659/65.3	1726/68.0	1755/69.1
*1735/68.3	1818/71.6	1847/72.7	*1735/68.3	1802/70.9	1831/72.1
1809/71.2	1892/74.5	1921/75.6	1809/71.2	1876/73.9	1905/75.0

* Not available in 30 mm resolution

■ Ordering for MCF4700 Series

To order a MicroSafe Flexible system, simply fill in the fields in the model number sequence given below. Each field is numbered and information on completing a specific field can be found in the sections which follow.

For specifications and dimensions on the LCM Series Controller, see page D106

___ - __ __ - __ __ - __ __ - ___ - ___X - ___R - ___XI - ___RI - ___

❶ ❷❸ ❷❸ ❷❸ ❹ ❺ ❺ ❻ ❻ ❼

Example:
MCF47-12300-30900-20300-LCM1-10X-10R-030100XI-030100RI-RM1

This system has a 12 mm minimum object resolution and 302 mm long first segment, 30 mm minimum object resolution and 909 mm long middle segment and a 20 mm minimum object resolution and 309 mm long last segment, an LCM1 controller, 10 m transmitter and receiver cables, a 3 m and a 10 m interconnect transmitter and receiver cables, and an RM-1 relay output module.

❶ Information required. Indicates if the MCF4700 is used in ESD sensitive applications may require manufacturing to low ESD requirements. This option is typically required where the build-up of an electrostatic charge on the light curtain and its subsequent discharge could harm the product being produced by the guarded machine (i.e. integrated circuits, disk drives, electronic components, etc.). On low ESD systems, transmitters and receivers are nickel plated and other modifications are incorporated.

Designator	Description
MCF47	MicroSafe Flexible system
MCF47S	Low ESD MicroSafe Flexible system

❷ Information required. Represents the minimum object resolution of each transmitter and receiver pair in millimeters. Designators are described below. It is possible to order different object resolutions for each pair of segments.

Designator	Minimum Object Resolution
12	12 mm (0.47 in.)
14	14 mm (0.55 in.)
20	20 mm (0.79 in.)
30	30 mm (1.18 in.)

❸ Information required. Represents the protection height of each transmitter and receiver pair in a system. The MCF4700 series must have a minimum of two segments: one first and one end. It is possible to order a different object resolution for each pair of segments. Up to two middle segments can be added.

The total protected height of a system cannot exceed 256 beams or 3450 mm (135.8 in.).

Combine the designators given here to complete fields ❷ and ❸ in the model sequence.

12 mm Minimum Object Resolution Systems

Designator	# Beams	Protection Height
100	16	102 mm (4.0 in.)
200	32	202 mm (8.0 in.)
300	48	302 mm (11.9 in.)
400	64	402 mm (15.8 in.)
500	80	502 mm (19.8 in.)
600	96	602 mm (23.7 in.)
700	112	702 mm (27.6 in.)
800	128	802 mm (31.6 in.)
900	144	902 mm (35.5 in.)
1000	160	1002 mm (39.5 in.)
1100	176	1102 mm (43.4 in.)

14 mm, 20 mm or 30 mm Minimum Object Resolution Systems

Designator	# Beams	Protection Height
150	14/7	159 mm (6.3 in.)
225***	21	235 mm (9.3 in.)
300	28/14	309 mm (12.2 in.)
375***	35	385 mm (15.2 in.)
450	42/21	459 mm (18.1 in.)
525***	49	535 mm (21.1 in.)
600	56/28	609 mm (24.0 in.)
675***	63	685 mm (27.0 in.)
750	70/35	759 mm (29.9 in.)
825***	77	835 mm (32.9 in.)
900	84/42	909 mm (35.8 in.)
975***	91	985 mm (38.8 in.)
1050	98/49	1059 mm (41.7 in.)
1125***	105	1135 mm (44.7 in.)
1200	112/56	1209 mm (47.6 in.)
1275***	119	1285 mm (50.6 in.)
1350	126/63	1359 mm (53.3 in.)
1425***	133	1435 mm (56.5 in.)
1500	140/70	1509 mm (59.4 in.)
1575***	147	1585 mm (62.4 in.)
1650	154/77	1659 mm (65.3 in.)
1725***	161	1735 mm (68.3 in.)
1800	168/84	1809 mm (71.2 in.)

*** Not available in 30 mm resolution

❹ Information required. Represents controller version. Designators and descriptions are given below.

Designator	Description
LCM1	DIN-mount, IP20, solid-state safety output, 24 VDC
LCM2	DIN-mount, IP20, solid-state safety output, 24 VDC, DeviceNet interface
LCM3	DIN-mount, IP20, solid-state safety output, 24 VDC, non-CE-marked, multiple stored channel select patterns
LCM100	Metal enclosure, IP65, relay safety output, 100-230 VAC
LCM200	Metal enclosure, IP65, relay safety output, 100-230 VAC, DeviceNet interface
LCM300	Metal enclosure, IP65, relay safety output, 100-230 VAC, non-CE-marked, multiple stored channel select patterns
LCM110	Metal enclosure, IP65, relay safety output, 100-230 VAC, lid-mounted reset switch
LCM210	Metal enclosure, IP65, relay safety output, 100-230 VAC, lid-mounted reset switch, DeviceNet interface
LCM310	Metal enclosure, IP65, relay safety output, 100-230 VAC, lid-mounted reset switch, non-CE marked, multiple stored channel select patterns
LCM120	Metal enclosure, IP65, solid-state safety output, 24 VDC
LCM220	Metal enclosure, IP65, solid-state safety output, 24 VDC, DeviceNet interface
LCM320	Metal enclosure, IP65, solid-state safety output, 24 VDC, non-CE-marked, multiple stored channel select patterns
LCM130	Metal enclosure, IP65, solid-state safety output, 24 VDC, lid-mounted reset switch
LCM230	Metal enclosure, IP65, solid-state safety output, 24 VDC, lid-mounted reset switch, DeviceNet interface
LCM330	Metal enclosure, IP65, solid-state safety output, 24 VDC, lid-mounted reset switch, non-CE marked, multiple stored channel select patterns
LCM140	Metal enclosure, IP65, relay safety output, 24 VDC
LCM240	Metal enclosure, IP65, relay safety output, 24 VDC, DeviceNet interface
LCM340	Metal enclosure, IP65, relay safety output, 24 VDC, non-CE-marked, multiple stored channel select patterns
LCM150	Metal enclosure, IP65, relay safety output, 24 VDC, lid-mounted reset switch
LCM250	Metal enclosure, IP65, relay safety output, 24 VDC, lid-mounted reset switch, DeviceNet interface
LCM350	Metal enclosure, IP65, relay safety output, 24 VDC, lid-mounted reset switch, non--CE marked, multiple stored channel select patterns

Note: For more configurations with quick-disconnect connectors refer to the LCM controller section.

❺ Information required. Represents transmitter (X) and receiver (R) cable lengths. Designators and descriptions are given below.

Designator	Description
3	3 m (10 ft.)
10	10 m (33 ft.)
30	30 m (99 ft.)

❻ Information required. Represents transmitter and receiver interconnect cable lengths. The MCF4700 series segments feature an in-line connector cable design. A flexible 150 mm (6 in.) cable is always supplied between each segment. Length of interconnect cables given below are in addition to this standard cable. The maximum cumulative system length, including the cables is 15 m (49 ft.) for the transmitter and 15 m (49 ft.) for the receiver. The transmitter and receiver interconnect cable lengths do not need to match.

Combine the designators listed below to complete both fields numbered ❻ in the example.

The combination for a three-segment system might look like 030. This means that the system uses only the standard 150 mm (6 in.) cables between two of the segments and a 3 m (10 ft.) interconnect cable between the other segments.

Designator	Interconnect Cable
(Blank)	Standard 150 mm (6 in.)
003	0.3 m (12 in.)
005	0.5 m (20 in.)
010	1 m (3.3 ft.)
020	2 m (6.6 ft.)
030	3 m (10 ft.)
050	5 m (16 ft.)
100	10 m (33 ft.)

Ordering for MCF4700 Series (cont.)

❼ Information optional. Indicate if you would like an Omron STI RM Series resource module.

Designator	Description
RM1	Include RM-1 resource module, force-guided relay output
RM3	Include RM-3 resource module, mute module
RM4	Include RM-4 resource module, allow for wiring up to four MC4700 systems
RMX	Include RM-X resource module
(Blank)	No RM series resource module

For information on Resource Modules, see page D138

For information on safety light curtain accessories, see page D184

Safety Standards and Precautions

All models of the MicroSafe meet ANSI/RIA R15.06-1999, 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 MicroSafe meets ANSI control reliability requirements for point-of-operation presence sensing devices. All controllers have CSA-CUS acceptance and are designed to meet UL508.

MicroSafe systems employing LCM controllers (except those with the ability to store multiple channel select patterns) have been EC type examined to the requirements of category 4, EN 954-1 (type 4, IEC 61496).

The MicroSafe should only be used on machinery that can consistently and immediately stop anywhere in its cycle or stroke. Never use a MicroSafe 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.

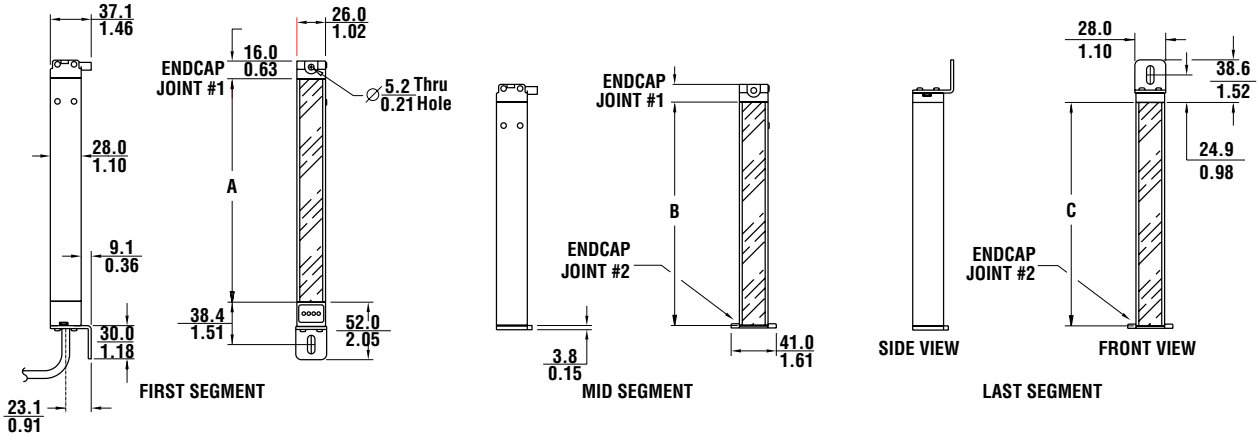
The purchaser, installer and employer have the responsibility to meet all local, state and federal government laws, rules, codes or regulations relating to the proper use, installation, operation and maintenance of this control and the guarded machine. See the Installation and Operation Manual for additional information.

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

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

■ Dimensions for MCJ4700 Series—mm/in.

For dimensions on the LCM Series Controller, see page D106



MicroSafe Jointed MCJ4700 Dimensions

MCJ4700-12 A, B & C mm/in. FIRST, MIDDLE & LAST SEGMENTS
102/4.0
202/8.0
302/11.9
402/15.8
502/19.8
602/23.7
702/27.6
802/31.6
902/35.5
1002/39.5
1102/43.4

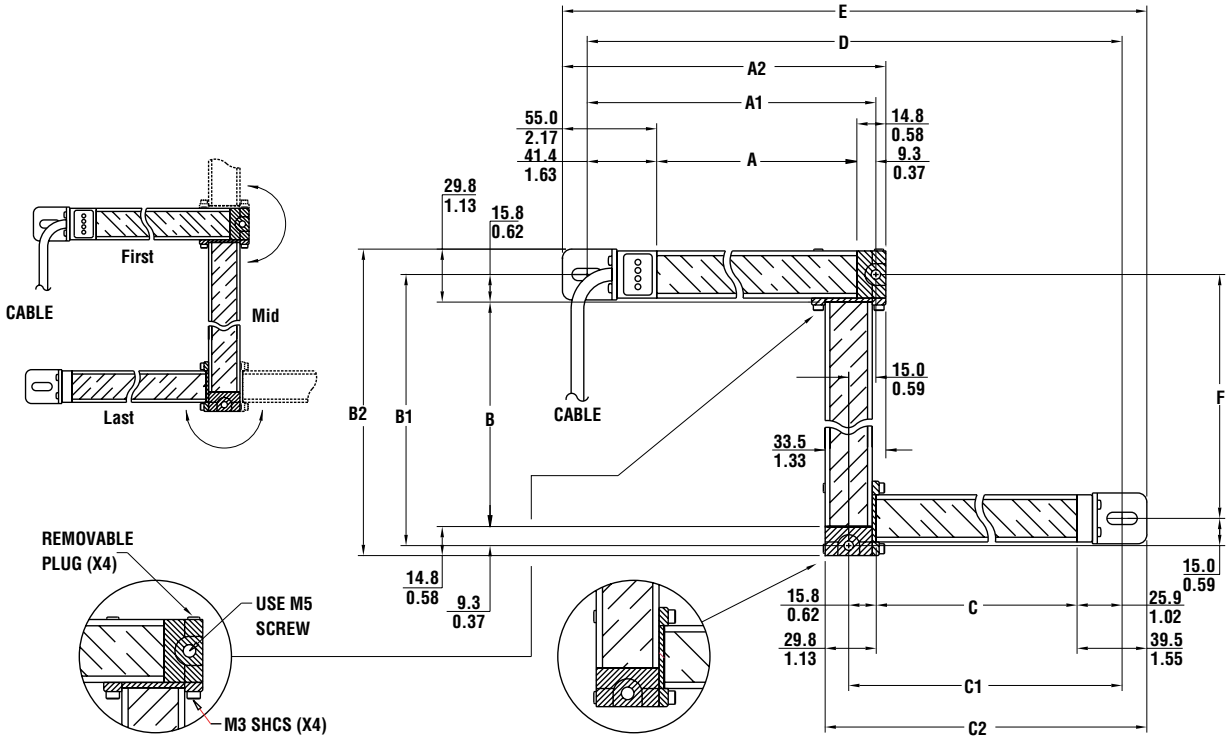
MCJ4700-14, MCJ4700-20 and MCJ4700-30 A mm/in. FIRST SEGMENT ONLY
159/6.3
*235/9.3
309/12.2
*385/15.2
459/18.1
*535/21.1
609/24.0
*685/27.0
759/29.9
*835/32.9
909/35.8
*985/38.8
1059/41.7
*1135/44.7
1209/47.6
*1285/50.6
1359/53.5
*1435/56.5
1509/59.4
*1585/62.4
1659/65.3
*1735/68.3
1809/71.2

*Not available in 30 mm resolution.

MCJ4700-14, MCJ4700-20 and MCJ4700-30 B & C mm/in. MIDDLE AND LAST SEGMENTS
*78/3.0
152/6.0
*228/9.0
302/11.9
*378/14.9
452/17.8
*528/20.8
602/23.7
*678/26.7
752/29.6
*828/32.6
902/35.5
*978/38.5
1052/41.4
*1128/44.4
1202/47.3
*1278/50.3
1352/53.2
*1428.0/56.2
1502/59.1
*1578/62.1
1652/65.0
*1728/68.0
1802/70.9

*Not available in 30 mm resolution.

90° Jointed MicroSafe MCJ4700 Dimensions—mm/in.



Mounting dimension formulas based on detection zones A, B, C

A = Detection Zone (First Segment)

A1 = A + 50.7 mm (1.99 in.) (mtg holes)

A2 = A + 69.8 mm (2.75 in.)

B = Detection Zone (Middle Segment)

B1 = B + 25.1 mm (0.99 in.) (mtg holes)

B2 = B + 44.6 mm (1.76 in.)

C = Detection Zone (Last Segment)

C1 = C + 41.7 mm (1.64 in.) (mtg holes)

C2 = C + 68.9 mm (2.72 in.)

D = A1 + C1 – 15.0 mm (0.59 in.) (mtg holes)

E = A2 + C2 – 33.5 mm (1.32 in.)

F = B1 – 15.0 mm (0.59 in.) (mtg holes)

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

■ Ordering for MCJ4700 Series

To order a 90° Jointed MicroSafe system, simply fill in the fields in the model number sequence given below. Each field is numbered and information on completing a specific field can be found in the sections which follow. It is possible to order a different object resolution for each pair of segments.

For specifications and dimensions on the LCM Series Controller, see page D106

MCJ47-___ ___ - ___ ___ -___ ___ - ___ - ___X - ___R - ___
❶ ❷ ❸ ❷ ❸ ❷ ❸ ❹ ❺ ❺ ❻

Example: MCJ47-12200-20450-301650-LCM1-10X-30R-RM1

This system has a 12 mm minimum object resolution and 202 mm long first segment, a 20 mm minimum object resolution and 459 mm long middle segment, a 30 mm minumum object resolution and 1959 mm long last segment, an LCM1 controller, a 10 m transmitter and 30 m receiver cable and an RM-1 relay output module.

❶ Information required. Indicates if the MicroSafe system is manufactured to low ESD requirements. This option is typically required where the build-up of an electrostatic charge on the light curtain and its subsequent discharge could harm the product being produced by the guarded machine (i.e. integrated circuits, disk drives, electronic components, etc.). On low ESD systems, transmitters and receivers are nickel plated and other modifications are incorporated. Designators are described below.

Designator	Description
MCJ47	Standard MicroSafe system
MCJ47S	Low ESD MicroSafe system

❷ Information required. Represents the minimum object resolution of each transmitter and receiver pair. Designators are described below.

Designator	Minimum Object Resolution
12	12 mm (0.47 in.)
14	14 mm (0.55 in.)
20	20 mm (0.79 in.)
30	30 mm (1.18 in.)

❸ Information required. Represents the protection height of all transmitter and receiver segments in a system. MicroSafe MCJ4700 Series light curtains must have a minimum of two segments one first and one last.

The total protected height of a system cannot exceed 256 beams or 3450 mm (135.8 in.).

12 mm Minimum Object Resolution Systems

Designator	# Beams	Protection Height
100	16	102 mm (4.0 in.)
200	32	202 mm (8.0 in.)
300	48	302 mm (11.9 in.)
400	64	402 mm (15.8 in.)
500	80	502 mm (19.8 in.)
600	96	602 mm (23.7 in.)
700	112	702 mm (27.6 in.)
800	128	802 mm (31.6 in.)
900	144	902 mm (35.5 in.)
1000	160	1002 mm (39.5 in.)
1100	176	1102 mm (43.4 in.)

First Segment ONLY of 14, 20 or 30 mm Minimum Object Resolution Systems

Desig.	# Beams (14&20/30 mm)	Protection Height
150	14/7	159 mm (6.3 in.)
225*	21/*	235 mm (9.3 in.)
300	28/14	309 mm (12.2 in.)
375*	35/*	385 mm (15.2 in.)
450	42/21	459 mm (18.1 in.)
525*	49/*	535 mm (21.1 in.)
600	56/28	609 mm (24.0 in.)
675*	63/*	685 mm (27.0 in.)
750	70/35	759 mm (29.9 in.)
825*	77/*	835 mm (32.9 in.)
900	84/42	909 mm (35.8 in.)
975*	91/*	985 mm (38.8 in.)
1050	98/49	1059 mm (41.7 in.)
1125*	105/*	1135 mm (44.7 in.)
1200	112/56	1209 mm (47.6 in.)
1275*	119/*	1285 mm (50.6 in.)
1350	126/63	1359 mm (53.3 in.)
1425*	133/*	1435 mm (56.5 in.)
1500	140/70	1509 mm (59.4 in.)
1575*	147/*	1585 mm (62.4 in.)
1650	154/77	1659 mm (65.3 in.)
1725*	161/*	1735 mm (68.3 in.)
1800	168/84	1809 mm (71.2 in.)

* Not available in 30 mm resolution

■ *Ordering for MCJ4700 Series (continued)*

Mid and Last Segment of 14, 20 or 30 mm Minimum Object Resolution Systems

Designator	# Beams (20/30 mm)	Protection Height
075*	7/*	78 mm (3.1 in.)
150	14/7	152 mm (6.0 in.)
225*	21/*	228 mm (9.0 in.)
300	28/14	302 mm (11.9 in)
375*	35/*	378 mm (14.9 in.)
450	42/21	452 mm (17.8 in.)
525*	49/*	528 mm (20.8 in.)
600	56/28	602 mm (23.7 in.)
675*	63/*	678 mm (26.7 in.)
750	70/35	752 mm (29.6 in.)
825*	77/*	828 mm (32.6 in.)
900	84/42	902 mm (35.5 in.)
975*	91/*	978 mm (38.5 in.)
1050	98/49	1052 mm (41.4 in.)
1125*	105/*	1128 mm (44.4 in.)
1200	112/56	1202 mm (47.3 in.)
1275*	119/*	1278 mm (50.3 in.)
1350	126/63	1352 mm (53.2 in.)
1425*	133/*	1428 mm (56.2 in.)
1500	140/70*	1502 mm (59.1 in.)
1575*	147/*	1578 mm (62.1 in.)
1650	154/77*	1652 mm (65.0 in.)
1725*	161/*	1728 mm (68.0 in.)
1800	168/84	1802 mm (70.9 in.)

* Not available in 30 mm resolution

❹ Information required. Represents controller version. Designators and descriptions are given below.

Designator	Description
LCM1	DIN-mount, IP20, solid-state safety output, 24 VDC
LCM2	DIN-mount, IP20, solid-state safety output, 24 VDC, DeviceNet interface
LCM3	DIN-mount, IP20, solid-state safety output, 24 VDC, non-CE-marked, multiple stored channel select patterns
LCM100	Metal enclosure, IP65, relay safety output, 100-230 VAC
LCM200	Metal enclosure, IP65, relay safety output, 100-230 VAC, DeviceNet interface
LCM300	Metal enclosure, IP65, relay safety output, 100-230 VAC, non-CE-marked, multiple stored channel select patterns
LCM110	Metal enclosure, IP65, relay safety output, 100-230 VAC, lid-mounted reset switch
LCM210	Metal enclosure, IP65, relay safety output, 100-230 VAC, lid-mounted reset switch, DeviceNet interface
LCM310	Metal enclosure, IP65, relay safety output, 100-230 VAC, lid-mounted reset switch, non-CE marked, multiple stored channel select patterns
LCM120	Metal enclosure, IP65, solid-state safety output, 24 VDC
LCM220	Metal enclosure, IP65, solid-state safety output, 24 VDC, DeviceNet interface
LCM320	Metal enclosure, IP65, solid-state safety output, 24 VDC, non-CE-marked, multiple stored channel select patterns
LCM130	Metal enclosure, IP65, solid-state safety output, 24 VDC, lid-mounted reset switch
LCM230	Metal enclosure, IP65, solid-state safety output, 24 VDC, lid-mounted reset switch, DeviceNet interface
LCM330	Metal enclosure, IP65, solid-state safety output, 24 VDC, lid-mounted reset switch, non-CE marked, multiple stored channel select patterns
LCM140	Metal enclosure, IP65, relay safety output, 24 VDC
LCM240	Metal enclosure, IP65, relay safety output, 24 VDC, DeviceNet interface
LCM340	Metal enclosure, IP65, relay safety output, 24 VDC, non-CE-marked, multiple stored channel select patterns
LCM150	Metal enclosure, IP65, relay safety output, 24 VDC, lid-mounted reset switch
LCM250	Metal enclosure, IP65, relay safety output, 24 VDC, lid-mounted reset switch, DeviceNet interface
LCM350	Metal enclosure, IP65, relay safety output, 24 VDC, lid-mounted reset switch, non--CE marked, multiple stored channel select patterns

Note: For more configurations with quick-disconnect connectors refer to the LCM controller section.

❺ Information required. Represents transmitter (X) and receiver (R) cable lengths. Designators and descriptions are given below.

Designator	Description
3	3 m (10 ft.)
10	10 m (33 ft.)
30	30 m (99 ft.)

❻ Information optional. Indicate if you would like an Omron STI RM Series resource module.

Designator	Description
RM1	Include RM-1 resource module, force-guided relay output
RM3	Include RM-3 resource module, mute module
RM4	Include RM-4 resource module, allow for wiring up to four MC4700 systems
RMX	Include RM-X resource module
(Blank)	No RM series resource module

For information on Resource Modules, see page D138

For information on safety light curtain accessories, see page D184

Safety Standards and Precautions

All models of the MicroSafe meet ANSI/RIA R15.06-1999, 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 MicroSafe meets ANSI control reliability requirements for point-of-operation presence sensing devices. All controllers have CSA-CUS acceptance and are designed to meet UL508.

MicroSafe systems employing LCM controllers (except those with the ability to store multiple channel select patterns) have been EC type examined to the requirements of category 4, EN 954-1 (type 4, IEC 61496).

The MicroSafe should only be used on machinery that can consistently and immediately stop anywhere in its cycle or stroke. Never use a MicroSafe 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.