

POC Type 2 GuardShield Type 2

Overview

The Allen-Bradley Guardmaster GuardShield Type 2 safety light curtain is a new addition to the ABGM portfolio of Opto-Electronic safety devices. The “Type 2” designation means that this particular safety light curtain meets a lesser requirement for performance under fault conditions than the GuardShield Type 4. As a result, the GuardShield Type 2 safety light curtain can only be applied in applications where a formal risk assessment has determined that a Type 2 device is sufficient to meet the level of risk posed by the hazard.

There are a number of regulations that discuss risk assessment. The US based methods of conducting risk assessments which provide guidance for the determination of the level of risk to personnel can be found as follows:

- ANSI TR3—for machinery
- ANSI/RIA 15.05—for the Robotics industry
- ANSI/ISO 12100-1 Safety of Machinery

Typically in North America the use of Type 2 light curtains is not allowed for machinery or equipment covered by ANSI/OSHA regulations and standards whose requirement for performance under fault conditions is “control reliability.” Type 2 light curtains do not meet the requirements of “control reliability.”

The European Union requires the Risk Assessment be performed per EN ISO 14121 “Principles for Risk Assessment.”

Safeguarding of the machine must be appropriate to the foreseeable risks and identified hazards. The level(s) of risk determined from the completion of a formal risk assessment indicate the level of the safety device required. In many instances it is necessary to use a combination of safety devices for adequate protection of personnel from hazards based on the risk assessment.

What Is “Type 2” and “Type 4”

Three types of safety ESPes (Electro-Sensitive Protective Equipment) are defined within International and European standard IEC/EN 61496 Parts 1 and 2. This standard specifies the requirements for the design, construction, testing and performance of ESPes—designed specifically to detect persons as part of a safety related system. The three types differ in their performance in the presence of faults and under influences from environmental conditions.

A Type 2 safety light curtain requires:

- A single fault resulting in the loss of detection capability,
- Failure of the OSSDs to go to the OFF state,
- Shall cause the light curtain to lock out as a result of the cycling of power, the next periodic test, or the interruption of the sensing function.

A Type 2 device requires the need for a periodic test of the system prior to a demand on the system, i.e., interruption of the light curtain's sensing field. This periodic test may be initiated by a simple manually operated switch (e.g., pushbutton) or by a more complex automatically controlled PLC.

Ideally the periodic test will be twice the operator interface frequency of exposure to the hazard.

The Type 4 device is required to detect a fault in its safety circuitry and immediately switch to a lock-out condition when the fault occurs. The fault detection is assured through diverse redundancy and cross monitoring of the internal circuit. A Type 4 device will fail to a safe state in the presence of an accumulation of undetected faults.

IMPORTANT

Type 2 safety light curtains do not meet OSHA regulations nor ANSI published standards, which define the requirements of “Control Reliability,” therefore it is not allowable to use a Type 2 safety light curtain device on equipment or machinery that requires “Control Reliability.”

Description

The Allen-Bradley Guardmaster GuardShield Type 2 safety light curtain is a self contained “two box,” Type 2 safety light curtain. Designed for use on or around machinery in which a formal risk assessment has determined that a Type 2 safety device is of a sufficient level of safety to meet the guarding application, the GuardShield Type 2 is the ideal solution. GuardShield Type 2 is offered in either a “Guard Only” operating mode or in a factory configured operating mode of restart interlock with external device monitoring. In either operating mode, the GuardShield Type 2 safety light curtain will provide the appropriate level of protection to personnel.

The GuardShield Type 2 is designed to protect personnel from equipment or machinery hazards where the risk of injury are low. A formal risk assessment should be performed prior to selecting the proper safeguarding device. In many instances it is necessary to use a combination of safety devices to assure complete protection of personnel from hazards.



ATTENTION



Safety light curtains of a Type 2 level of safety typically do not meet OSHA or ANSI requirements of “Control Reliability,” therefore it is not allowable to use a safety device of a Type 2 level on or around equipment or machinery that requires “Control Reliability.”

Applications

- Conveyors
- Packaging machinery (excluding palletizers)
- Textile machinery
- Automated assembly lines
- Automatic storage and retrieval machinery

Specifications

Safety Ratings	
Standards	IEC/EN 61496 Parts 1 & 2, UL 61496 Parts 1 & 2, UL 1998
Safety Classification	Type 2 per IEC/EN61496. Category 2 device per EN 954-1, SIL 2 per IEC 61508, PLd per EN/ISO 13849
Certifications	CE Marked for all applicable directives, UL 1998 Listed, cULus Listed, and TÜV
Power Supply	
Input Power, Max.	24V DC ±20%
Maximum Residual Ripple	0.05 Vss
Power Consumption	400 mA max (no load)
Outputs	
Safety Outputs	2 OSSDs, 0.5 A, short-circuit protected
Non-Safety Outputs	1 auxiliary output, 0.5 A max.
Output Voltage, Min.	U _v - 2V
Switching Current @ Voltage, Min.	500 mA @ 24V DC
Operating Characteristics	
Response Time	20 ms
Status Indicators	On state, off state, alignment, interlock
Protected Height—mm (in)	160...1760 (6.3...69.36) in 160 (6.3) increments
Resolution [mm (in.)]	30 (1.18)
Scanning Range	16 m (52.5 ft)
Synchronization	Optical, without separate synchronization channel
Wavelength	870 nm
Environmental	
Enclosure Type Rating	IP65
Relative Humidity	15...95% (noncondensing)
Operating Temperature [C (F)]	-10...55° (14...131°)
Vibration	IEC 60068-2-6, frequency, 10...55 Hz Amplitude: 0.35 mm (0.01 in.)
Shock	IEC 60068-2-29 acceleration 10 g, pulse duration 16 ms
Physical Characteristics	
Mounting	End-cap mounting brackets
Weight	Varies by protective height
Housing Cross Section	40 x 50 mm (1.57 x 1.96 in.)
Connection Type	Transmitter: 4-pin micro QD Receiver: 8-pin micro QD
Cable Length	30 m (100 ft) max.

Product Selection

Standard System

The Allen-Bradley Guardmaster GuardShield safety light curtains are ordered as pairs—transmitter and receiver—and are shipped under one part number. Each GuardShield Type 2 transmitter and receiver is packaged with two right angle mounting brackets. After selecting the appropriate light curtain pair, ensure that required interfaces and accessories are ordered.

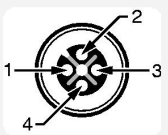
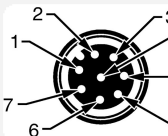
Resolution [mm (in.)]	Number of Beams	Protective Height—mm (in)	Pair Weight [kg (lb)]	Cat. No.	
				Guard Only	Restart Interlock with EDM
30 (1.18)	8	160 (6.3)	0.9 (1.9)	440L-P2KA0160YD	440L-P2KD0160YD
30 (1.18)	16	320 (12.6)	1.1 (2.4)	440L-P2KA0320YD	440L-P2KD0320YD
30 (1.18)	24	480 (18.9)	1.6 (3.5)	440L-P2KA0480YD	440L-P2KD0480YD
30 (1.18)	32	640 (25.2)	2.0 (4.4)	440L-P2KA0640YD	440L-P2KD0640YD
30 (1.18)	40	800 (31.5)	2.5 (5.5)	440L-P2KA0800YD	440L-P2KD0800YD
30 (1.18)	48	960 (37.8)	2.9 (6.4)	440L-P2KA0960YD	440L-P2KD0960YD
30 (1.18)	56	1120 (44.1)	3.4 (7.5)	440L-P2KA1120YD	440L-P2KD1120YD
30 (1.18)	64	1280 (50.4)	3.8 (8.4)	440L-P2KA1280YD	440L-P2KD1280YD
30 (1.18)	72	1440 (56.7)	4.3 (9.5)	440L-P2KA1440YD	440L-P2KD1440YD
30 (1.18)	80	1600 (63.0)	4.7 (10.4)	440L-P2KA1600YD	440L-P2KD1600YD
30 (1.18)	88	1760 (69.1)	5.2 (11.5)	440L-P2KA1760YD	440L-P2KD1760YD

Note: The GuardShield transmitter requires a 4-pin cable and the receiver requires an 8-pin cable.

Recommended Logic Interfaces

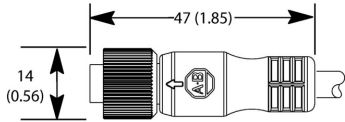
Description	Safety Outputs	Auxiliary Outputs	Terminals	Reset Type	Power Supply	Cat. Page No.	Cat. No.
Single-Function Safety Relays for 2 N.C. Contact Switch							
MSR127RP	3 N.O.	1 N.C.	Removable (Screw)	Monitored Manual	24V AC/DC	MSR127RP/TP	440R-N23135
MSR127TP	3 N.O.	1 N.C.	Removable (Screw)	Auto./Manual	24V AC/DC	MSR127RP/TP	440R-N23132
MSR126	2 N.O.	None	Fixed	Auto./Manual	24V AC/DC	MSR126R/T	440R-N23117
Modular Safety Relays							
MSR210P Base 2 N.C. only	2 N.O.	1 N.C. and 2 PNP Solid State	Removable	Auto./Manual or Monitored Manual	24V DC from the base unit	MSR210P	440R-H23176
MSR220 Input Module	—	—	Removable	—	24V DC	MSR220P	440R-H23178
MSR310P Base	MSR300 Series Output Modules	3 PNP Solid State	Removable	Auto./Manual Monitored Manual	24V DC	MSR310P	440R-W23219
MSR320P Input Module	—	2 PNP Solid State	Removable	—	24V DC from the base unit	MSR320P	440R-W23218
Muting Modules							
MSR22LM	2 N.O.	1 N.C.	Removable	Auto./Manual	24V DC	MSR22LM	440R-P23071
MSR42 (requires optical interface to configure 445L-AF6150)	2 PNP	2 PNP, configurable	Removable	Auto./manual or manual monitored	24V DC	MSR42 Micro 400 Controller/Muting Module	440R-P226AGS-NNR

Cordsets—Two Required (one for transmitter and one for receiver)

Female Connector (Sensor End)		Cable			Cat. No.
Face View of Female	Connector Style	Pin/Wire Color	Wire Rating	Length [m (ft)]	
Transmitter					
	Straight Female	1 Brown 2 White 3 Blue 4 Black	22 AWG 300V 4 A	2 (6.56)	889D-F4AC-2
				5 (16.4)	889D-F4AC-5
				10 (32.8)	889D-F4AC-10
				15 (49.2)	889D-F4AC-15
				20 (65.6)	889D-F4AC-20
				30 (98.4)	889D-F4AC-30
Receiver					
	Straight Female	1 White 2 Brown 3 Green 4 Yellow 5 Grey 6 Pink 7 Blue 8 Red	24 AWG 30V AC/36V DC 1.5 A	2 (6.56)	889D-F8AB-2
				5 (16.4)	889D-F8AB-5
				10 (32.8)	889D-F8AB-10
				15 (49.2)	889D-F8AB-15
				20 (65.6)	889D-F8AB-20
				30 (98.4)	889D-F8AB-30


Cordsets Approximate Dimensions [mm (in.)]

Dimensions are not intended to be used for installation purposes.



Straight Female



Optional Accessories

Description	Cat. No.
 <p>Steel L-shaped end cap mounting bracket (4 per package) Note: 4 brackets supplied with each GuardShield pair.</p>	440L-AF6101 (1 package per system)
 <p>Aluminum middle mounting bracket for vibratory applications</p>	440L-AF6108 (1 package per system)
 <p>Power Supply: Output 24V DC, 3 Amps, 72 W</p>	1606-XLP72E
 <p>Laser alignment tool (standard GuardShield)</p>	440L-ALAT
 <p>GuardShield laser alignment tool bracket</p>	440L-AF6109
 <p>Mounting stand</p>	440L-AMSTD
 <p>GuardShield weld shield (cat. no. is for a pair of light curtains)</p>	440L-AGWS0160 440L-AGWS0320 440L-AGWS0480 440L-AGWS0640 440L-AGWS0800 440L-AGWS960 440L-AGWS1120 440L-AGWS1280 440L-AGWS1440 440L-AGWS1600 440L-AGWS1760
 <p>Vertical shock mount kit</p>	440L-AF6120
 <p>Horizontal shock mount kit</p>	440L-AF6121
 <p>Middle vertical mount kit</p>	440L-AF6122
 <p>Middle horizontal mount kit</p>	440L-AF6123

Corner Mirror for Multi-Sided Guarding

Specially constructed glass mirrors for 2- and 3-sided safeguarding applications.

Note: Each mirror reduces maximum scan range by approximately 15% per mirror.

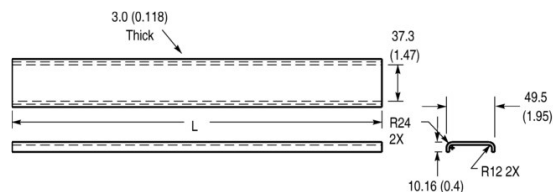
GuardShield Light Curtain Cat. No.	Narrow Mirror Short-Range 0...4 m	Cat. No.	Wide Mirror Long-Range 4...15 m	Cat. No.
440L-P2K\$ 0160YD		440L-AM0750300		440L-AM1250300
440L-P2K\$ 0320YD		440L-AM0750450		440L-AM1250450
440L-P2K\$ 0480YD		440L-AM0750600		440L-AM1250600
440L-P2K\$ 0640YD		440L-AM0750750		440L-AM1250750
440L-P2K\$ 0800YD		440L-AM0750900		440L-AM1250900
440L-P2K\$ 0960YD		440L-AM0751050		440L-AM1251050
440L-P2K\$ 1120YD		440L-AM0751200		440L-AM1251200
440L-P2K\$ 1280YD		440L-AM0751350		440L-AM1251350
440L-P2K\$ 1440YD		440L-AM0751500		440L-AM1251500
440L-P2K\$ 1600YD		440L-AM0751650		440L-AM1251650
440L-P2K\$ 1760YD		440L-AM0751800		440L-AM1251800

S = A or D

Weld Shields

The GuardShield weld shields are sold as pairs in the same lengths as the protective heights of the GuardShield safety light curtain.

These polycarbonate weld shields are designed as disposable devices whose purpose is to protect the front window of the GuardShield from damage.

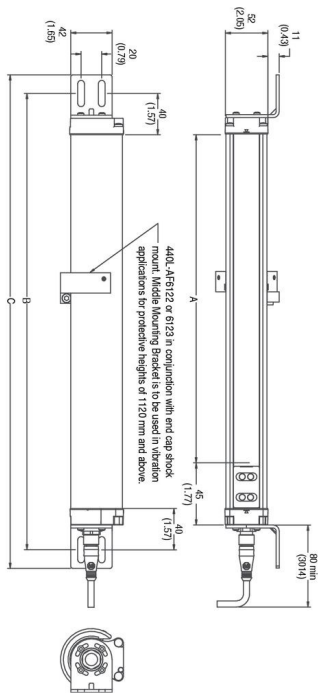


Dimensions "L"—mm (in)	Cat. No.
175.3 (6.9)	440L-AGWS0160
335.3 (13.2)	440L-AGWS0320
495.3 (19.5)	440L-AGWS0480
655.3 (25.8)	440L-AGWS0640
815.3 (32.1)	440L-AGWS0800
975.4 (38.4)	440L-AGWS960
1135.4 (44.7)	440L-AGWS1120
1295.4 (51.0)	440L-AGWS1280
1455.4 (57.3)	440L-AGWS1440
1615.4 (63.6)	440L-AGWS1600
1778 (70.0)	440L-AGWS1760

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.

Safety Light Curtain

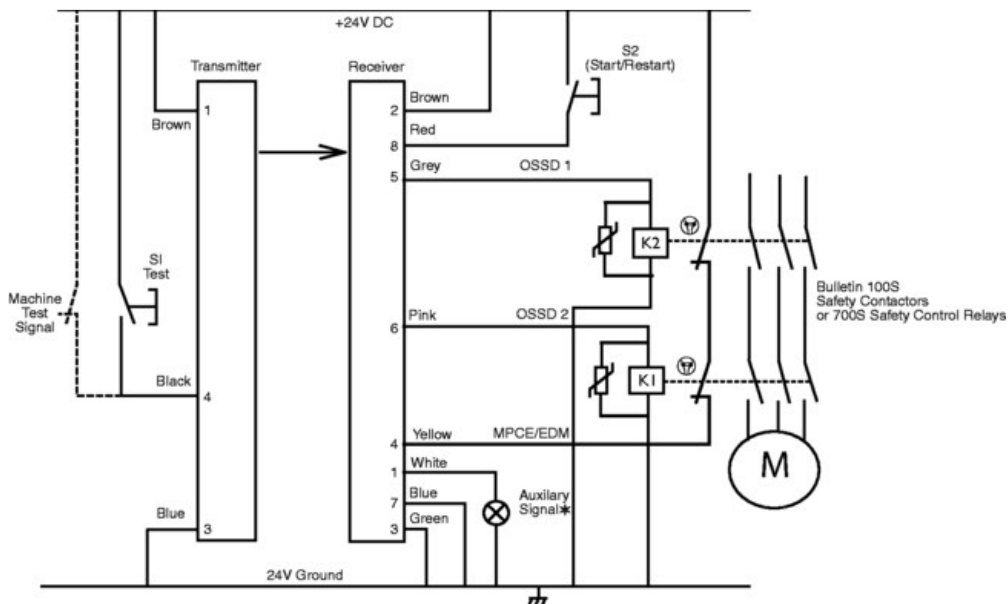


Type	A Protective Height [mm]	B Mounting Value [mm]	C Total Length [mm]
440L-P2K* 0160YD	160 ±0.5	285	321 ±1.5
440L-P2K* 0320YD	320 ±0.5	445	481 ±1.5
440L-P2K* 0480YD	480 ±0.5	605	641 ±1.5
440L-P2K* 0640YD	640 ±0.5	765	801 ±1.5
440L-P2K* 0800YD	800 ±0.5	925	961 ±1.5
440L-P2K* 0960YD	960 ±0.5	1085	1121 ±1.5
440L-P2K* 1120YD	1120 ±0.5	1245	1281 ±1.8
440L-P2K* 1280YD	1280 ±0.5	1405	1441 ±1.8
440L-P2K* 1440YD	1440 ±0.5	1565	1601 ±1.8
440L-P2K* 1600YD	1600 ±0.5	1725	1636 ±2.0
440L-P2K* 1760YD	1760 ±0.5	1885	1112 ±1.5

* A for Guard Only or D for Restart Interlock with EDM.

Wiring Diagram for Connection of OSSDs Directly to Contactors (FSDs) for GuardShield Type with EDM and Restart Interlock

Wiring diagram is not intended to be used for installation purposes.



* Auxiliary output is nonsafety. Can be connected to a lamp, motor or status to a PLC.

K1, K2 Safety relay or safety contactor for OSSD 1 and OSSD 2 connection

S1 Switch for external system test (optional)

S2 Switch for reset of light curtain from start/restart interlock

Wiring Diagram for Connection of OSSDs Directly to a Safety Relay Module

