

## Safety Light Curtains

### Point of Operation Control



#### Description

Point of Operation Control (POC) safety light curtains are active opto-electronic protection devices (AOPD) with resolutions of 14mm (0.55in) or 30mm (1.18in).

Allen-Bradley Guardmaster POC safety light curtains are self-checking and belong to Safety Category 4. They have been designed for industrial applications and are characterized by:

- High degree of reliability
- Maintenance-free components
- Practical size
- Sturdy modular construction
- Universal application possibilities
- Simple installation

#### Features

- Maintenance-free operation
- Control-reliable solid-state outputs
- State of the art microprocessor technology with custom-designed ASICs (Application Specific Integrated Circuits)
- Easy assembly and alignment
- Quick-disconnect mini style connectors
- Long scanning range and high resolution
- Small housing cross section: 52mm x 55mm (2.05in x 2.17in)
- Fast response time  $\leq 15\text{ms}$
- Large excess gain
- Possibility to daisy-chain two sensors (to prevent personnel from standing between protective field and the point of operation)
- Construction in compliance with EN 50100 Category 4 (self-checking)
- Tested and approved for USA, Europe, Canada and Japan

Maximum scanning range	6m/18m (19.69ft/59.06ft)
Resolution (object sensitivity)	14mm/30mm (0.55in/1.18in)
Maximum height of protective field	1814mm/1832mm (71.4in/72.1in)
Minimum height of protective field	314mm/332mm (12.36in/13.07in)
The optical axis (centre of window) is marked on the end cap.	

#### Specifications

Standards	EN 50100
Approvals	BG, cULus and CE marked for all applicable directives
Protected Height	314mm...1832mm (12.3in...72.1in)
Scanning Range	0.3m...6m (0.98ft...19.6ft)/0.3m...18m (0.98ft...59.0ft)
Resolution	14mm/30mm (0.55in/1.18in)
Enclosure Rating	IP 65
Connection Type	7-pin mini style quick-disconnect on transmitter and receiver
Supply Voltage $U_v$ Maximum Residual Ripple	24V DC $\pm 20\%$ 5 Vss
Power Consumption	0.9...1.5 Amps (no-load)
Synchronization	Optical, without separate synchronization channel
Outputs Minimum output voltage	2 x PNP, 0.5 A, short circuit protected $U_v - 2V$
Response Time	$\leq 15\text{ms}$
Protection	Short circuit and overload
Connection Maximum wire cross section Cable length	1.0mm <sup>2</sup> with jacket 1.5mm <sup>2</sup> without jacket 60m (196.8ft) Protection against over-voltage ( $\geq 1\text{kV}$ ) from Level 3 or higher (IEC 801 part 5; 2 kV) between PE and +V.
Mode of Operation <sup>1</sup>	Guard-only with automatic restart
Safety Category	Type 4 (self-checking)
Requirement	According to EN 50100
Operating Ambient Temp.	0°C to 55°C (32°F to 131°F)
Air Humidity	15%...95% (not condensing)
Storage Temperature	-25°C to 70°C (-13°F to 158°F)
Approximate Dimensions Height Housing cross section	Length dependent upon protected height; (see dimensional drawings) 52 mm x 55 mm (2.05in x 2.17in)

<sup>1</sup> The POC without using a separate control unit, will operate in a guard only mode with automatic restart.

## Product Selection

### 1. Safety Light Curtains

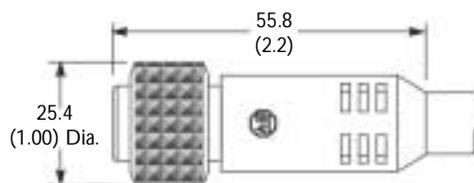
The Allen-Bradley Guardmaster POC safety light curtains are ordered as pairs—transmitter and receiver—and shipped under one part number. After selecting the appropriate light curtain pair, ensure that required interfaces and accessories are ordered as well.

Size mm (inches)	Resolution mm	Protected Height		Catalogue Number	Size mm (inches)	Resolution mm	Protected Height		Catalogue Number
		mm	in				mm	in	
300 (12)	14	314	12.3	440L-P4B0300-N	1200 (48)	14	1214	47.8	440L-P4B1200-N
	30	332	13.0	440L-P4D0300-N		30	1232	48.5	440L-P4D1200-N
450 (18)	14	464	18.2	440L-P4B0450-N	1350 (54)	14	1364	53.7	440L-P4B1350-N
	30	482	18.9	440L-P4D0450-N		30	1382	54.4	440L-P4D1350-N
600 (24)	14	614	24.1	440L-P4B0600-N	1500 (60)	14	1514	59.6	440L-P4B1500-N
	30	632	24.8	440L-P4D0600-N		30	1532	60.3	440L-P4D1500-N
750 (30)	14	764	30.0	440L-P4B0750-N	1650 (66)	14	1664	65.5	440L-P4B1650-N
	30	782	30.8	440L-P4D0750-N		30	1682	66.2	440L-P4D1650-N
900 (36)	14	914	36.0	440L-P4B0900-N	1800 (72)	14	1814	71.4	440L-P4B1800-N
	30	932	36.7	440L-P4D0900-N		30	1832	72.1	440L-P4D1800-N
1050 (42)	14	1064	41.9	440L-P4B1050-N					
	30	1082	42.6	440L-P4D1050-N					

Please order the devices intended for cascaded applications (host sensor/guest sensor) separately (see page 2-18).

### 2. Cordsets—2 Required (one for transmitter and one for receiver)

Female Connector (Sensor End)		Cable			Catalogue Number
Face View of Female	Connector Style	Pin Wire Colour	Wire Rating	Length—m (ft)	
	Straight	1 Black 2 White 3 Blue 4 Brown 5 Grey 6 Yellow 7 Green	(5)18AWG (2)20AWG 300V 3A	2 (6.5)	889N-F7AG-2
				5 (16.4)	889N-F7AG-5
				10 (32.8)	889N-F7AG-10
				15 (49.2)	889N-F7AG-15
				20 (65.6)	889N-F7AG-20
				30 (98.4)	889N-F7AG-30



*Straight Female*

Approximate Dimensions. Illustrations are not drawn to scale.

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#### Product Selection

#### 3. Programmable Interface—Optional

	Input Voltage	Reset	Floating Blanking	Fixed Blanking	PSDI	Muting	Outputs	More Details	Catalogue Number
	24V DC	Manual/ Automatic	yes	yes	yes	yes	2 PNP OSSD 1 Aux. PNP	2-60	440L-M8100

#### 4. Safety Relay Interfaces—Required

	Input Voltage	Reset	Floating Blanking	Fixed Blanking	PSDI	Muting	Outputs	More Details	Catalogue Number
	24V DC	Manual/ Automatic	no	no	no	no	4 amp 2 N.O. Safety 1 N.C. Aux.	2-58	440L-M8200

**Note:** For wiring refer to Safeguarding Applications section of this catalogue.

#### 5. Safety Relay Interfaces—Optional

Relay	Input	Safety Outputs	Auxiliary Outputs	Terminals	Power Supply	Reset	Catalogue Number
 MSR127RP	1NC, 2NC, or Light Curtain	3 N.O.	1 N.C.	Removable	24V AC/DC	Automatic/Manual	440R-N23132
						Monitored Manual	440R-N23135
					115V AC	Automatic/Manual	440R-N23131
						Monitored Manual	440R-N23134
					230V AC	Automatic/Manual	440R-N23130
						Monitored Manual	440R-N23133
 MSR126	Light Curtain or Single Channel (MSR126T)	2 N.O.	None	Fixed	24V AC/DC	Automatic/Manual	440R-N23117
					115V AC		440R-N23116
					230V AC		440R-N23115
					24V AC/DC		440R-N23114
					115V AC		440R-N23113
					230V AC		440R-N23112
	Light Curtain or Single Channel (MSR126R)				24V AC/DC	Monitored Manual	440R-N23123
					115V AC		440R-N23122
					230V AC		440R-N23121
					24V AC/DC		440R-N23120
					115V AC		440R-N23119
					230V AC		440R-N23118
 MSR131RTP	Light Curtain or Safety Mat	3 N.O.	2 N.C. 2 PNP Solid State	Removable	24V AC/DC	Automatic/Manual or Monitored Manual	440R-C23139
					115V AC		440R-C23137
					230V AC		440R-C23136

## Product Selection

### 6. Safety Relay Interface (used for muting applications)

	Input Voltage	Reset	Floating Blanking	Fixed Blanking	PSDI	Muting	Outputs	More Details	Catalogue Number
 MSR22LM	24V DC	Manual	no	no	yes	yes	2 N.O. Safety 1 N.C. Aux.	4-21	440R-P23071

### 7. Accessories—Optional

	Products	Catalogue Number
	Steel L-Mounting bracket, fixed (4 per package)	440L-AF6102 (1 package per system)
	Mounting bracket, adjustable (4 per package)	440L-AF6103 (1 package per system)
	Mounting bracket, adjustable with shock mount (4 per package)	440L-AF6104 (1 package per system)
	Power supply: Input—85...265V AC Output—24V DC, 3 Amps	1794-PS3
	Laser alignment aid	440L-ALAT
	POC adaptor for laser alignment aid	440L-ALBRK
	Sliding nuts (4 pieces supplied with POC system)	440L-AF6105

### Corner Mirror Selection Table

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

**Note:** Each mirror reduces maximum scan range by 10% per mirror.

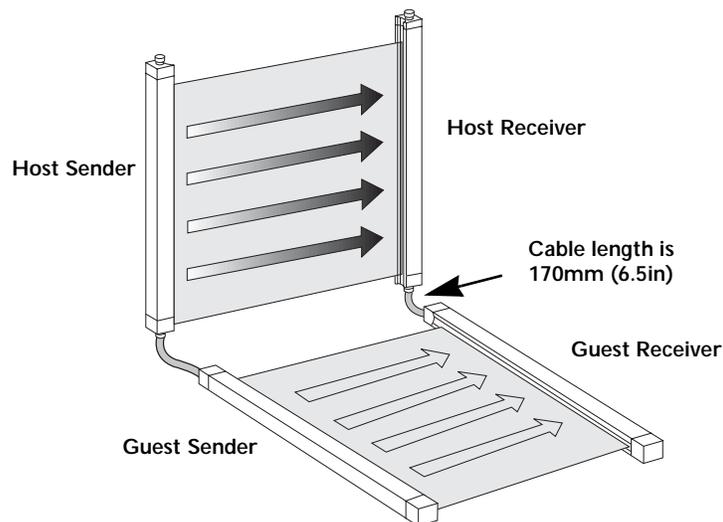
	For POC Models	Catalogue Number
	300	440L-AM1200300
	450	440L-AM1200450
	600	440L-AM1200600
	750	440L-AM1200750
	900	440L-AM1200900
	1050	440L-AM1201050
	1200	440L-AM1201200
	1350	440L-AM1201350
	1500	440L-AM1201500
	1650 or 1800	440L-AM1201800
Mounting kit for mirrors. Each kit contains 1 bracket with fasteners. Order 2 kits per mirror.		440L-AM120BRK
Mounting stand for mirror and POC (see page 2-21)		440L-AMSTD

**Note:** For Approximate Dimensions of mirror and mounting stands, see pages 2-20 and 2-21.

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### Product Selection



#### Safety Light Curtains—Host Guest

The Allen-Bradley Guardmaster POC host guest family of safety light curtains are ordered as pairs—transmitter and receiver—and is shipped under one part number. After selecting the appropriate light curtain pair, ensure that required interfaces and accessories are ordered as well.

Host—Pairs					Guest—Pairs				
Size mm (inches)	Resolution/ No. of Beams	Protected Height		Catalogue Number	Size mm (inches)	Resolution/ No. of Beams	Protected Height		Catalogue Number
		mm	in				mm	in	
900 (36)	14mm/120	914	36.0	440L-C4B0900-N	150 (6)	14mm/20	150	5.9	440L-B4B0150-N
	30mm/60	932	36.7	440L-C4D0900-N		30mm/10	150	5.9	440L-B4D0150-N
1050 (42)	14mm/140	1064	41.9	440L-C4B1050-N	300 (12)	14mm/40	314	12.3	440L-B4B0300-N
	30mm/70	1082	42.6	440L-C4D1050-N		30mm/20	332	13.0	440L-B4D0300-N
1200 (48)	14mm/160	1214	47.8	440L-C4B1200-N	450 (18)	14mm/60	464	18.2	440L-B4B0450-N
	30mm/80	1232	48.5	440L-C4D1200-N		30mm/30	482	18.9	440L-B4D0450-N
1350 (54)	14mm/180	1364	53.7	440L-C4B1350-N	600 (24)	14mm/80	614	24.1	440L-B4B0600-N
	30mm/90	1382	54.4	440L-C4D1350-N		30mm/40	632	24.8	440L-B4D0600-N
1500 (60)	14mm/200	1514	59.6	440L-C4B1500-N	750 (30)	14mm/100	764	30.0	440L-B4B0750-N
	30mm/100	1532	60.3	440L-C4D1500-N		30mm/50	782	30.8	440L-B4D0750-N
					900 (36)	14mm/120	914	36.0	440L-B4B0900-N
						30mm/60	932	36.7	440L-B4D0900-N

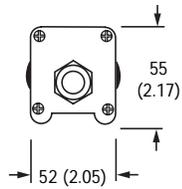
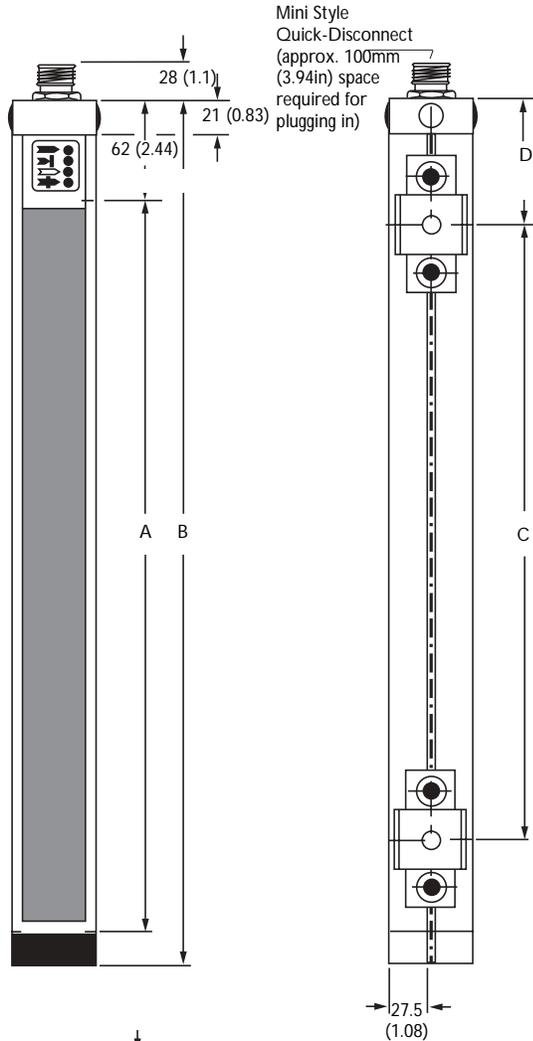
**Note:** The maximum number of allowable beams in any combination of host/guest is 240 beams.

**Note:** To order controllers, safety relays and accessories, refer to page 2-28.

**Approximate Dimensions—mm (inches)**

Approximate Dimensions are not intended to be used for installation purposes.

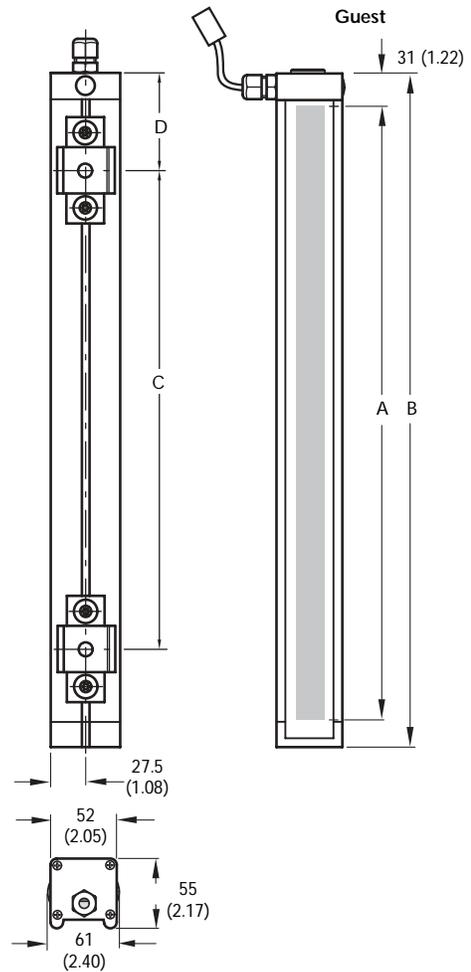
**Note:** Approximate Dimensions C & D represent the suggested distances of mounting brackets.



Optical Axis = Center of exit window

	Guest			
	A	B	C	D
150	150	200	*	*
300	300	350	190	80
450	450	500	340	80
600	600	650	490	80
750	750	800	640	80
900	900	950	790	80

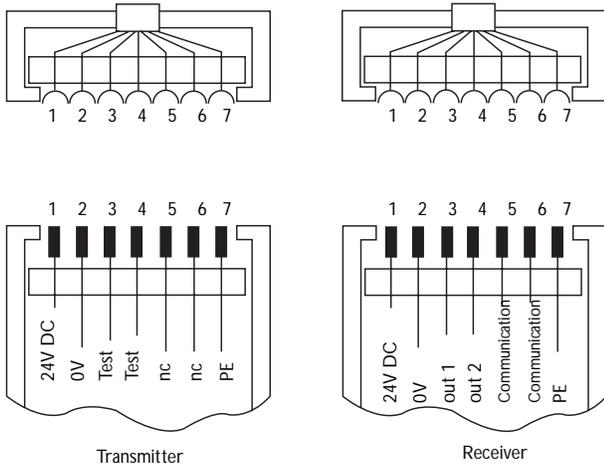
Protective Height	A	B	C	D
POC 300	300	384	224	80
POC 450	450	534	374	
POC 600	600	684	524	
POC 750	750	835	675	
POC 900	900	985	825	
POC 1050	1050	1135	975	
POC 1200	1200	1285	1125	
POC 1350	1350	1435	1275	
POC 1500	1500	1586	1426	
POC 1650	1650	1736	1576	
POC 1800	1800	1886	1726	



# Safety Light Curtains

## Point of Operation Control

### Typical Wiring Diagrams

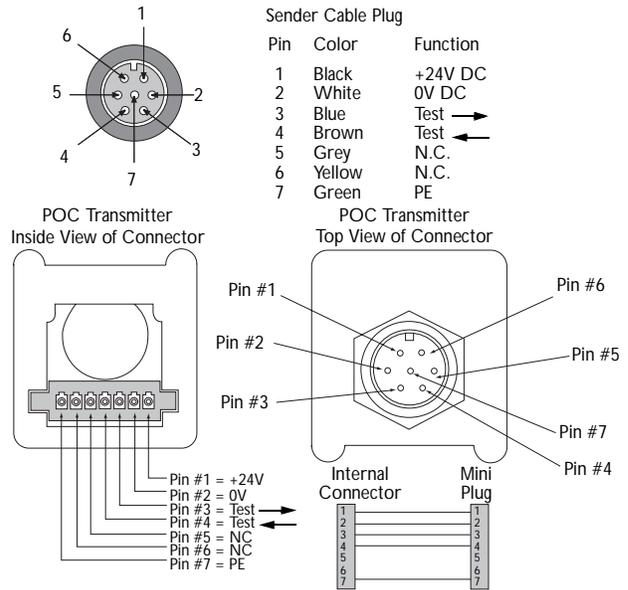
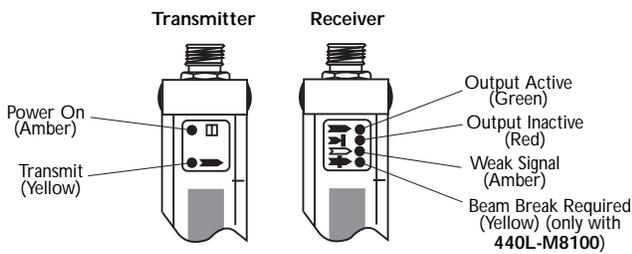


NC = No Connection

### Electrical Installation

Connecting the POC components is simple. Cable lengths up to 60m (196.8ft) are permitted (over-voltage protection for level 3 and higher (IEC 801), see Technical Data). The transmitter is connected to a 24V supply using a 7-conductor cable. The receiver is connected to the machine control and 24V supply using a 7-conductor cable. The maximum wire cross section is 1.5mm (0.06in) without jacket; 1mm (0.04in) with jacket. All light curtains come standard with pre-wired mini style quick-disconnect connectors in the end-caps. The POC requires +24V DC ( $\pm 20\%$ ) power supply, which is available from Allen-Bradley Guardmaster.

### LED Indicators



POC (transmitter) cable pin diagram

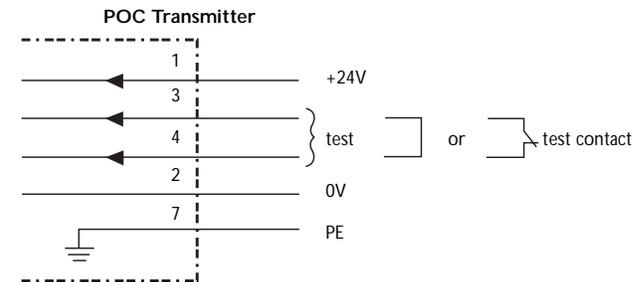
### Test Input (Transmitter)

The POC switches to the green condition after the supply voltage has been applied, and the automatic power-up test has been completed. If an external test is desired, a contact (normally closed) can be connected at the test input (MCC = Machine Control Contact). Minimum opening duration  $\geq 50$ ms.

Continuous current during closed test input: 12mA. In-rush current when closing: 150mA (20ms).

Test input open = Testing = Outputs on receiver inactive (red).

Test input closed = No test Outputs on receiver active (green).



POC connection diagram

**Typical Wiring Diagrams (continued)**

**Outputs (Receiver)**

The output voltage  $U_A$  of each channel depends on the supply voltage  $U_V$  and the switched load and is at least

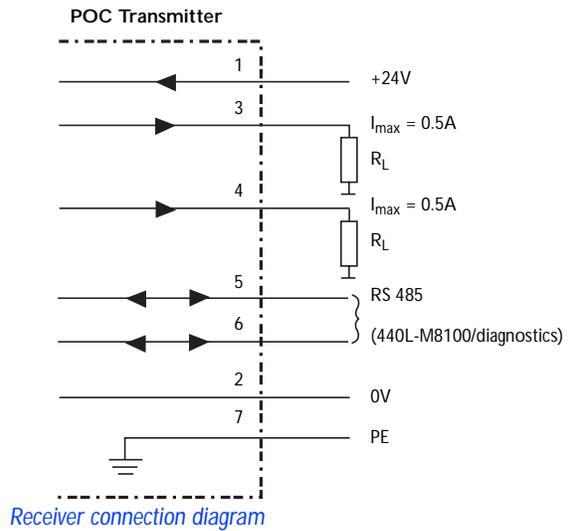
$$U_A = U_V - 2V$$

Both outputs OSSD1 and OSSD2 (OSSD = Output Signal Switching Device) are control reliable, actively monitored PNP solid state outputs. The outputs can carry a maximum of 0.5 Amps and are short circuit protected. If the protected field is clear, the two outputs are HIGH (active).

- An additional supply voltage must not be applied to the outputs.



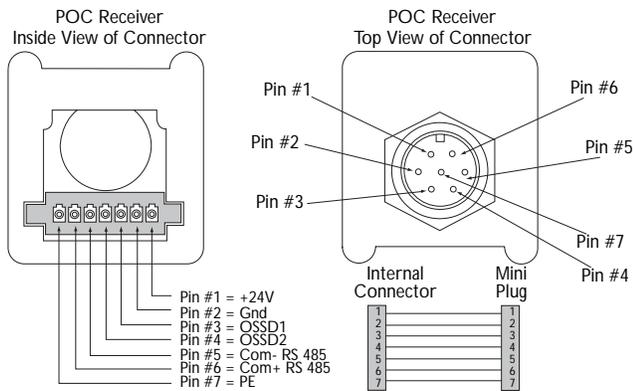
**ATTENTION:** Both output signals must be processed separately. They must not be connected in series or parallel.



**RS-485 Communication Interface**

This interface serves to communicate with the **440L-M8100** (optional). If the **440L-M8100** is not used, the connection is not used.

Pin	Color	Function
1	Black	+24V DC
2	White	0V DC
3	Blue	Out 1 OSSD 1
4	Brown	Out 2 OSSD 2
5	Grey	-RS 485 Communications
6	Yellow	+RS 485 Communications
7	Green	PE



Receiver cable pin diagram