SENSOR PARTNERS SG 17 Space Guard User Manual

SG 17 Solid State – USER MANUAL
Space Guard Series
Photoelectric light curtains for automatic doors

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Product Data

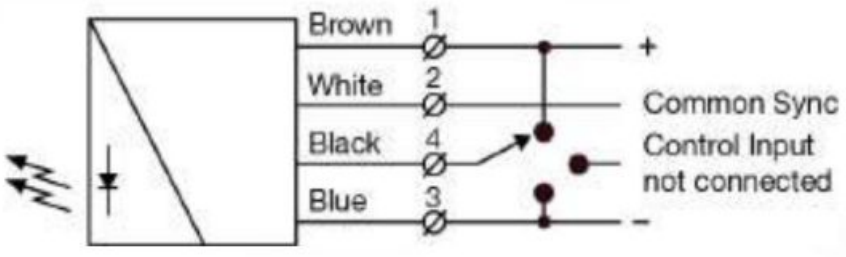
Technical Data		
	SGT (Transmitter)	SGR (Receiver)
Supply voltage	10-30 Vdc	
Max. Voltage ripple	15% (within supply range)	
Reverse polarity protected	Yes	
Max. current consumption	70 mA (RMS)	40 mA
Max. output load	–	100 mA
Max. output ON resistance	–	40 Ω
Max. leakage current	–	1 uA
Short circuit protected	–	Yes
Inductive load protection	–	Yes
Output type	–	Opto coupled solid state relay
Sensing range	1 m – 12 m	
Response time (max.) (*)	40 ms	

(*) Independent on model

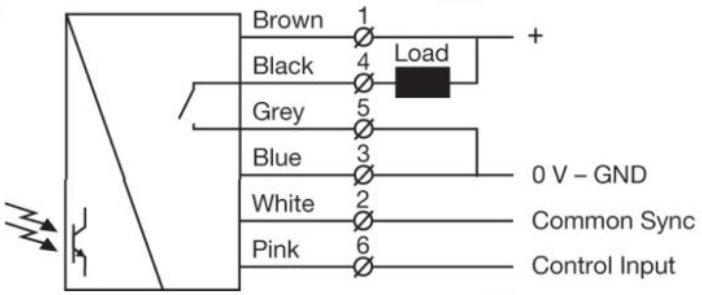
Environmental Data	
Light immunity @ 5º incidence	> 100.000 lux
Temperature, operation	-25 to + 55 ºC
Temperature, storage	-40 to + 80 ºC
Sealing class	IP67
Marking	UK CA CE

Connection

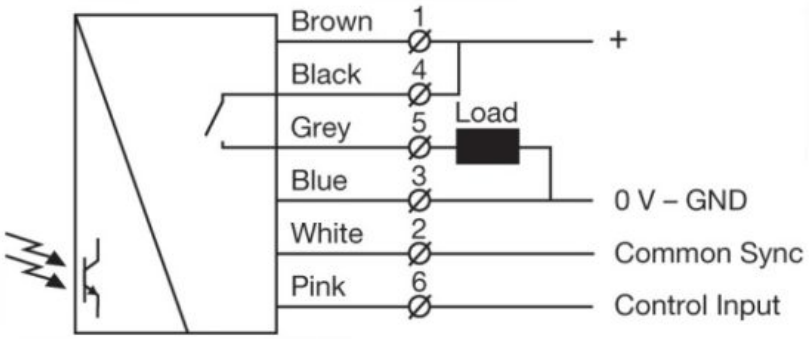
Wiring Diagrams



Transmitter SGT 17

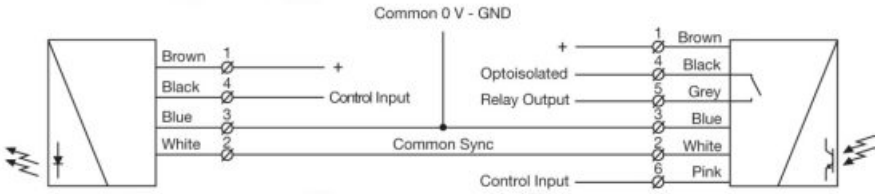


Receiver SGR 17 as NPN output



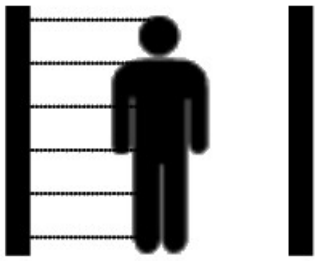
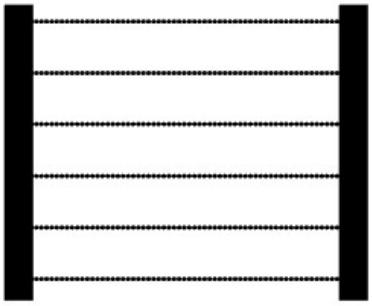
Receiver SGR 17 as PNP output

Receiver SGR 17 Solid State Relay output



SGT 17 and SGR 17 with common 0V – GND and synchronization wire.

SGR Output Logic

Output Logic		
Detection	Output status	Output indicator (yellow led)
Present 	Open	Off
Absent 	Closed	On

Installation & Adjustment

General Instructions and Precautions

Even though the light curtain has a high degree of immunity to ambient light sources, it is recommended to avoid direct exposure to sunlight and interference from flashlights or other infrared light sources (such as other photoelectric sensors).

If the front cover or the opto components of the light curtain become contaminated, then they have to be cleaned with a slightly damp cloth. Do not use organic solvents or detergents.

Ensure that the light curtain is mounted so that it is mechanically stable during operation.

Severe rain and snow may be detected due to the high sensitivity of the system.

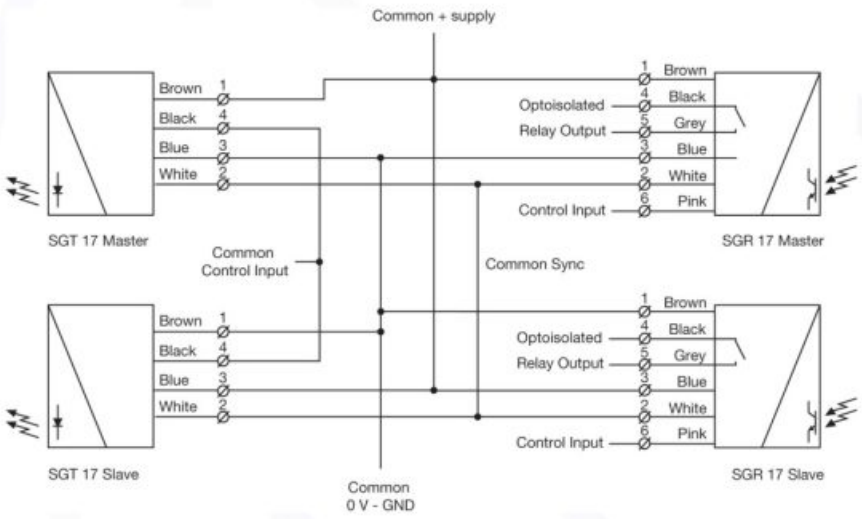
SG 17 Master/Slave Configuration (installation of double light curtains)

It is possible to mount 2 light curtains in line with thick and heavy doors.

The two light curtains sets must then have a common 0V – GND, + supply, SGT control input and synchronisation connection as shown below.

The polarity's connection defines the Master set and the Slave set. The set connected with the standard polarity will act as Master set. And the set connected with the reversed polarity will act as Slave. A SG 17 set connected as a slave (reversed polarity) will not run without connection to a SG 17 Master set.

Note: Please check the polarity of the load when connecting it as PNP or NPN on the receiver in slave mode (SGR slave). The SG 17 slave set is powered with the connections inverted (+ blue and – brown).



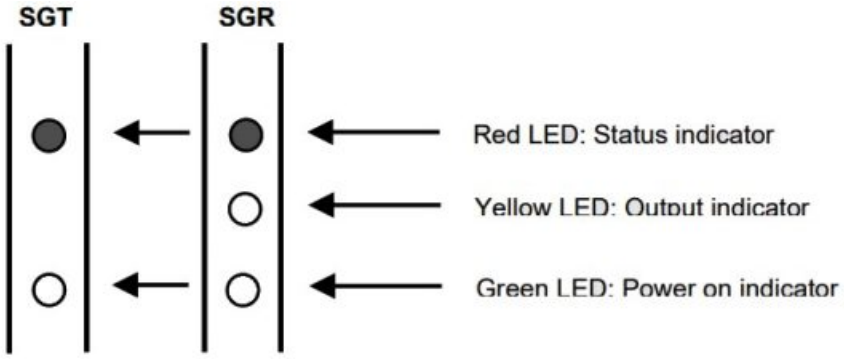
SG 17 Master/Slave wiring

Installation and Adjustment	
No initial set up or adjustments are required, due to the automatic signal-tracking (AST) feature, which automati cally adjust each individual channel on the system.	
1	Mount the transmitter (SGT) and receiver (SGR) facing each other and correctly aligned. The bottom beam is 35 mm above ground if the rails stand on the ground on the pin. The pin can pa rtially or completely be cut off if the light curtain needs to be lowered relative to support structure.
2	Fix the mounting clips in line and parallel. The maximum distance between the points of fixture should not exceed 135 cm.
3	Wire transmitter and receiver according to the wiring diagram. Make sure the load does not exceed 100 mA.
4	Check for correct wiring.
5	Turn power on.
6	When the power on indicators (green LEDs) is on, the system is operating. No initial set up or adjustments are required.

⚠ Warning

This device is not to be used for Personnel Protection in Machine Guarding Safety applications. This device does not include the selfchecking redundant circuitry necessary to allow its use in personnel machine guarding stand-alone safety applications.

Indicators

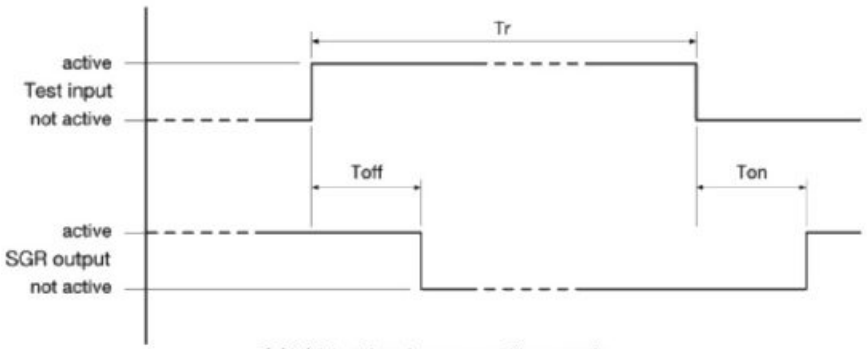


SGT Control/Test input

Control/test input operation depends on digit 0X in the model code of the transmitter (SGT);
SGT 17-xxx-0xx-X1-x-0X-xx
The test is enabled and disabled via the black SGT control wire. (See “Wiring Diagrams” above and table below).
Make sure no object is present in the detection area when test is done.
In a Master/slave configuration connect the two SGT control wires together so the tests are activated simultaneously on the SGT master and SGT slave.

Model Transmitter SGT	Control/Test input connected to 0V – GND	Control/Test input not connected	Control/Test input connected to + supply
00	Testing activated	No testing	No testing
01	Testing activated	No testing	Testing activated
02	No testing	Testing activated	No testing
03	No testing	No testing	Testing activated
04	Testing activated	Testing activated	No testing

SGT/R Test Input Response Time		
Ton (max./min.)	Toff (max./min.)	Tr (max./min.)
150 ms / 20 ms	60 ms / 1 ms	500 ms/ 100 ms



SGT/R test input response time graph

SGR Control input/High excess gain on SGR

The control input on the SGR allows the user to switch between constant max gain and regulated, but high excess gain. The constant max gain is used whenever the maximum immunity to snow, rain and contamination is needed and beams can’t be bypassed by mirror reflections in the surroundings. The setting with regulated gain ensures that the excess gain is about a factor of 7, which is also a very robust setting.
The pink SGR control wire is used to switch between the two settings. (See “Wiring Diagrams” and table below). The control wire is only read during power-up, which means that the correct setting of the control wire must be present at that time and the setting cannot be changed during operation. Notice that regulated gain setting is used when the control input is not connected (left floating).

Receiver SGR	Control input connected to 0V-GND	Control input not connected (floating)	Control input connected to + supply
Excess gain level	High & not regulated	Normal & regulated	Normal & regulated

Housing Length and Number of Channels

Housing Length and Number of Channels			
Housing length	**Beam Placement**	**Active Height**	**Number of channels**
1970 mm	C1	1800 mm	41
	D1	1800 mm	29
	F1	1800 mm	20
2150 mm	C1	1980 mm	45
	D1	1980 mm	30
	F1	1980 mm	21
2330 mm	C1	2160 mm	49
	D1	2160 mm	31
	F1	2160 mm	22
2510 mm	C1	2340 mm	53
	D1	2340 mm	32
	F1	2340 mm	23

Dynamic Blanking Function

Dynamic Blanking Function

All the infrared light beams can be blanked out (made inactive) without changing state of the output of the receiver by moving a non-transparent object between the SGR and SGT from top of the rails to the lowest beam.
In order for the blanking process to function correctly, it is recommended that the blanking object has a minimum vertical height of 50 mm and enough width to ensure that the front window of the light curtain is fully covered during the closing process. Beams are blanked in (activated) when the door motion is reversed.
The light curtain supports partial opening of the door for energy saving or ventilation. However, notice that the stop either has to be in the zone with 45 mm beam spacing or then the bottom part of the door leaf has to obstruct the beams over 200 mm, keeping the lowest beam obstructed when stopped. This limitation exists for safety reasons; the light curtain shall not respond to permanent blanking of beams for objects just passing through the beams and thereafter taken out of the active zone.
All beams will stay blanked as long as the lowest beam at the bottom of the rails, is obstructed.
Make sure that the lowest beam is kept well obstructed when door has finished closing. The blanked beams are ignored by the output logic.

Maximum door closing speed	1.6 m/s

There is no restriction on maximum speed when the door is opening.

When a blanking object of 50 mm vertical height is passing areas with 180 mm beam spacing, the minimum speed of the blanking object is 0.18 m/s. There is no minimum blanking speed if the blanking object has a size so that at least one beam is always obstructed.
If the door leaf is stopped between the rails before the bottom (lowest) beam is reached and 3 or more beams above the door edge are not obstructed, the output will switch to a safe state after 2 seconds for a SG 17 with C1 beam placement and 4 seconds for D1 and F1 beam placement.

Notice that the actual speed of the bottom door edge can fluctuate for a non-rigid door construction and it is advised that the door speed has to be set below 1.6 m/s in order not to exceed the maximum speed limit of the light curtain while the door is closing.
Be aware that side to side movements of a round bottom door edge will also contribute to the fluctuation of the obstruction speed. It is therefore best to have a horizontal straight edge for obstruction of the light beams.

Static Blanking Function

Static Blanking Function C1 beam placement only

The static blanking function allows the user to make a number of beams permanently inactive.
Notice this is only possible for a light curtain with beam placement C1, where all beams have 45 mm distance between them. Static blanking can not be done in a master/slave configuration setup with two light curtain sets. If this is needed then do static blanking on each separate set (only one SGR and SGT rail connected) an afterwards connect the two sets in master/slave configuration.
The beams can be blanked out statically both in the top and/or in the bottom of the light curtain. However, the statically blanked area will have to go from the top beam and down in a coherent area, and/or from the bottom beam and up in a coherent area. There can be no active beams inside these areas.
Total number of beams that can be statically blanked out is maximum 2/3 of the total number of beams.

Static blanking requires a special blanking procedure. Any deviation from this procedure will lead to lack of static blanking and previous function will resume.

1	Obstruct all beams in the areas that needs to be statically blanked.
2	Remove power from the light curtain.
3	Activate the test-input on SGT (how to do, depends on model)
4	Power the light curtain up. Green LED on SGR will flash for 4 s.
5	De-activate test-input, when Green LED stops flashing. This has to be done within 2 s.
6	If de-activation done correctly, red, yellow and green LED on SGR will flash simultaneously 3 times showing that static blanking is done correctly.
7	Check that the desired beams are made inactive and all other beams are functioning as int ended.

The beams are permanently made inactive also after power down. Only a new static blanking procedure will change the number of active beams.
If the number of beams obstructed are more than 2/3 of all beams or if the obstructed areas are not as specified or if the light curtain has a free beam in the obstructed areas or if the test procedure is not done exactly in accordance with point 1 – 7, then there will be no static blanking.
In that case the light curtain will resume function with the latest legal static blanking.

Troubleshooting

Troubleshooting

Probable Reason	Corrective Action
1. Symptom: Red LED on SGT is constant on	
Hardware failure	Replace the SGT rail.
2. Symptom: Red LED on SGR is constant on.	
Hardware failure.	Replace the SGR rail.
3. Symptom: Yellow LED on SGR is flashing.	
Cross talk from another light curtain or other powerful light sources. SGR and SGT rails are not aligned.	Change position of the SGT and SGR rails. Align the SGR and SGT rails
4. Symptom: Yellow LED on SGR is constant off. Red LED is off.	
Control/test input on SGT is constant activated, or beam is obstructed, or light curtain out of range, or transmitter is off , or lack of sync connection.	Deactivate the control/test input on SGT, remove o bstruction, bring light curtains closer or improve ali gnment, turn on transmitter, connect white sync wi re.
5. Symptom: After power-up red LED on SGR keep blinking. Yellow and red LED on SGR is off.	
Control/test input on SGT is constant activated, or beam is obstructed, or light curtain out of range, or transmitter is off , or lack of sync connection.	Deactivate the control/test input on SGT, remove o bstruction, bring light curtains closer or improve ali gnment, turn on transmitter, connect white sync wi re.

Disposal

Disposal

Disposal should be done using the most up-to-date recycling technology according to local rules and laws.

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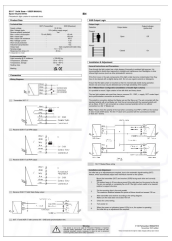
Documents / Resources

	**SENSOR PARTNERS SG 17 Space Guard** [pdf] User Manual SG17, SGT 17, SGR 17, SG 17 Space Guard, SG 17, Space Guard, Guard

References

- **User Manual**