

Safety light curtains with infrared beams SC2 type

Quick start guide

Sense



ORIGINAL INSTRUCTIONS (ref. 2006/42/EC)

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**SC2 Quick Start Guide
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CARLO GAVAZZI
Automation Components

DECLARATION OF CONFORMITY



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declares that the

SC2
SAFETY LIGHT CURTAINS - ELECTRO-SENSITIVE PROTECTIVE EQUIPMENT
(Type 2 ESPE)

and all its models are in conformity with the requirements of the European Council Directives listed below:

2006 / 42 / EC Machinery Directive
2004 / 108 / EC EMC Directive
2006 / 95 / EC Low Voltage Directive

This Declaration is based upon compliance of the products to the following standards:

EN 61496-1: 2004	Safety of machinery - Electro-Sensitive protective equipment. Part 1: General requirements and tests.
IEC 61496-2: 2006	Safety of machinery - Electro-Sensitive protective equipment. Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs).
IEC 61508-1/3/4: 1998	Functional safety of electrical/electronic/programmable electronic.
IEC 61508-2: 2000	Safety-related systems.
EN 954-1: 1996	Safety of machinery - Safety related parts of control system.
EN ISO 13849-1: 2008	Safety of machinery - Safety related parts of control system. Part 1: General principles for design.
EN 62061: 2005	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control system.
EN 50178: 1997	Electronic equipment for use in power installations.
EN 61000-6-2: 2005	Electromagnetic standards - Immunity for industrial environments.
EN 55022 (Class A ITE): 2010	Limits and methods of measurements of radio disturbance of information technology equipment.

Conformity as been certified by the following Notified/Competent body (identification N° 0123): TÜV SÜD Rail GmbH, Ridlerstrasse, 57 - D80339 München.

Carlo Gavazzi Logistics have a quality system certified by the EQA, Nr. QA130463, as per ISO 9001 and have therefore observed the regulations foreseen during development and manufacturing.



Lainate / September 30th 2013

Vittorio Rossi
Carlo Gavazzi Logistics S.p.A.
Managing director



Safety Information

The following points must be observed for a correct and safe use of the safety light curtains of the SC2 series:

- The stopping system of the machine must be electrically controlled.
- This control system must be able to stop the dangerous movement of the machine within the total machine stopping time T as per section 1.1.3 of the manual included in the CD supplied and during all working cycle phases.
- Mounting and connection of the safety light curtain must be carried out only by qualified personnel, according to the indications included in the special section (refer to section 2; 3; 4; 5) and the applicable standards.
- The safety light curtain must be securely installed so that access to the dangerous zone is not possible without interrupting the beams (see section 2 “Installation mode”).
- The personnel operating in the dangerous area must be well trained and must have adequate knowledge of all the operating procedures of the safety light curtains.
- The TEST/RESET button must be located outside the protected area as the operator must check the protected area during all Test and Reset operations.
- Please carefully read the instructions for the correct functioning before powering the light curtain.

Precautions to be Observed for the Choice and Installation of the Device

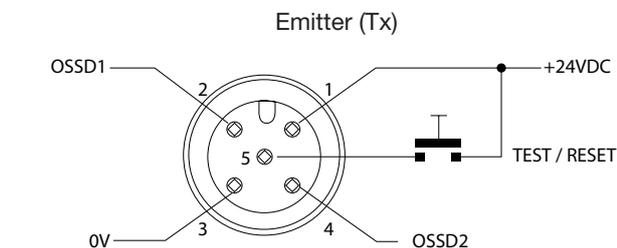
Make sure that the protection level assured by the SC2 device (Type 2) is compatible with the real danger level of the machine to be controlled, according to EN 954-1 and EN 13849-1

- The outputs (OSSD) of the ESPE (Electro Sensitive Protective Equipment) must be used as machine stopping devices and not as command devices. The machine must have its own START command.
- The dimension of the smallest object to be detected must be larger than the resolution level of the device.
- The ESPE must be installed in a room complying with the technical characteristics indicated in chapter 10 “Technical data” of the manual included in the CD supplied.
- Do not place the device near intense standard/or flashing light source and, in particular, close to receiving unit front surface. This condition has to be carefully evaluated with the support of Carlo Gavazzi Technical service.
- The operating distance of the device can be reduced in presence of smog, fog or airborne dust.
- A sudden change in environment temperature, with very low minimum peaks, can generate a small condensation layer on the lenses and so jeopardise functioning.

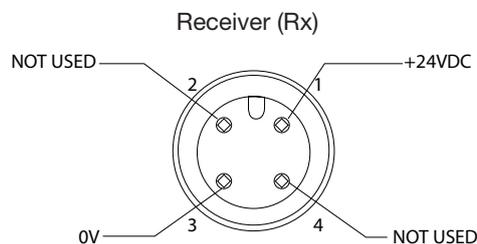
Failure to respect the safety distance reduces or cancels ESPE the protection function. For more detailed information about calculation of safety distance, please refer to the complete manual contained in the CD supplied.



Connections



- 1** = brown = +24VDC
- 2** = white = OSSD 1
- 3** = blue = 0V
- 4** = black = OSSD 2
- 5** = grey = TEST/RESET



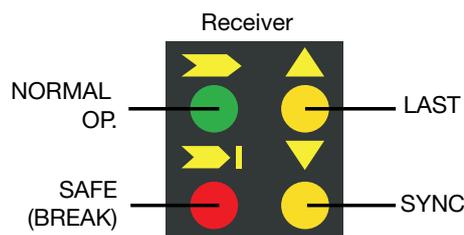
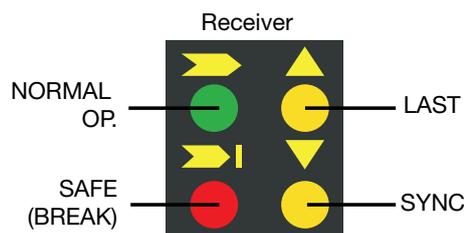
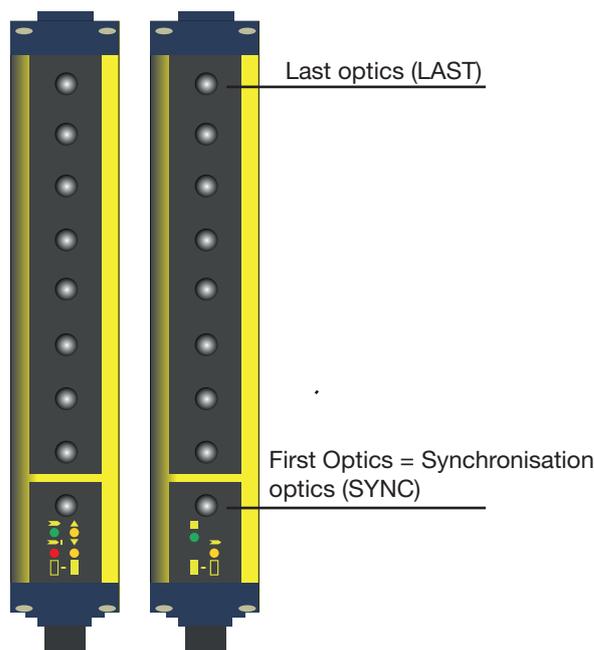
- 1** = brown = +24VDC
- 2** = white = NOT USED
- 3** = blue = 0V
- 4** = black = NOT USED

Alignment Procedure

The alignment between the emitting and the receiving units is necessary to obtain the correct functioning of the light curtain. A good alignment prevents output instability caused by dust or vibrations.

The alignment is perfect if the optical axes of the first and the last emitting unit beams coincide with the optical axes of the corresponding elements of the receiving unit.

The beam used to synchronise the two units is the first after the connector. SYNC is the optics connected with this beam and LAST is the optics connected to the last beam after the SYNC unit.





Signals are clearly identified through symbols allowing immediate reading, independent of bars directions. A short description of the signalling LEDs is necessary to avoid misunderstandings.

Two yellow LEDs (▲ LAST, ▼ SYNC) on SC2 receiver, facilitates the alignment procedure. During standard operation, the LEDs indicate the safety light curtain status, as shown in the table.

Correct alignment procedure

The light curtain alignment can be affected only after having completed the mechanical installation and the electrical connections. The following procedure has to be followed:

- Check the green LED (■) and the yellow LED (►) on the TX unit. If ON, the emitter is running correctly;
- Verify that the sensitive area from the safety light curtain is free;
- Verify that one of the following conditions is present on the RX unit:

STANDARD CONDITION - NORMAL OP.

- Green LED (►) ON and red LED (►|) OFF. Both yellow LEDs (▲ , ▼) are OFF. Units are aligned.

STOP CONDITION - SAFE (BREAK)

- Green LED (►) OFF and red LED (►) ON.
- The status of both yellow LEDs (▲ , ▼) does not matter. Units are not aligned.
- Continue with the following steps to pass from condition 2 to condition 1:
 - A Keep the receiver in a steady position and set the emitter until the yellow LED (▲ SYNC) is OFF. This condition shows the effective alignment of the first synchronisation beam.
 - B Rotate the emitter, pivoting on the lower optics axis, until the yellow LED (▼ LAST) is OFF. Under these conditions, the SAFE LED shall turn ON.

NOTE: Ensure that the green LED (►) is steady ON.

- C Delimit the area in which the green LED (►) is steady through some micro adjustments - for the first and then for the second unit - then place both units in the centre of this area.
- Fix the two units firmly using brackets.
 - Verify that the green LED (►) on the RX unit is ON and beams are not interrupted, then verify that the red LED (►|) turns ON if even one single beam is interrupted (condition where an object has been detected).
 - This verification shall be made with the special cylindrical “Test Piece” having a size suitable to the resolution of the device used.

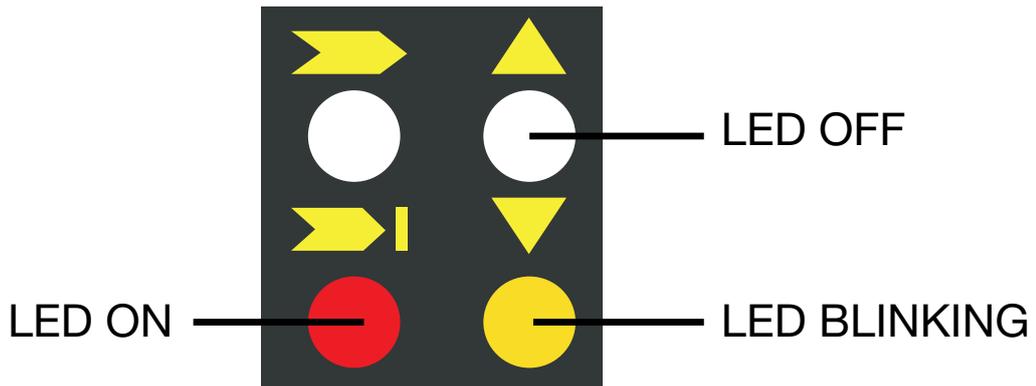
NOTE: Passing the Test Piece along the whole sensitive area and at any distance from the two units, the red LED (►|) shall be always ON and never change status.

A daily test is recommended.

Diagnostic Function

The operator can visualise the operating condition of the light curtains through the four LEDs positioned on the receiver unit and two LEDs on the emitter unit.

The figure below shows all signalling LEDs modes: OFF, ON and BLINKING.



The operator is able to check the main causes of the system stop and failure, using the same LEDs used for visualising the functions.

For Receiver:

Function	Status	Meaning	LED
Normal operation	TEST (red ON)	Light curtain being tested, the OSSD status shall be OFF	
	Emission (OSSD ON) (green ON)	Light curtain working and in normal operating conditions	
	Interruption (OSSD OFF) (red ON)	Light curtain working and in safety block conditions.	
Function	Type	Check and repair	LED
Error Status	OSSD error (yellow and red BLINKING)	Check OSSD connections; make sure that they are not in contact with one another or with the supply cables, then Reset. If the failure continues contact Carlo Gavazzi	
	Internal error (red ON yellow BLINKING)	Switch OFF and switch ON the supply circuit; if the failure continues contact Carlo Gavazzi	
	Optical error (red ON yellow BLINKING)	Reset. If the failure continues contact Carlo Gavazzi	
	No power supply (LEDs OFF)	Check connections and input voltage correct value. If the failure continues contact Carlo Gavazzi	



For emitter:

Function	Status	Meaning	LED
Normal operation	Test (green ON)	Light curtain being tested, the OSSD status shall be OFF	
	Emission (green ON yellow ON)	Light curtain working and in normal operating conditions	
Function	Type	Check and repair	LED
Error Status	Internal error (green ON yellow BLINKING)	Switch OFF and switch ON the supply circuit; if the failure continues contact Carlo Gavazzi	
	Optical error (green ON yellow blinking)	Switch OFF and switch ON the power supply circuit. If the failure continues contact Carlo Gavazzi	
	No power supply (LEDs OFF)	Check connections and input voltage correct value. If the failure continues contact Carlo Gavazzi	

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