



SB4 series (F3S-TGR-SB4 series)

Level 4 infrared safety barriers

SB2 series (F3S-TGR-SB2 series)

Level 2 infrared safety barriers

USER'S MANUAL



This appliance complies with CE provisions according to the following directives:

- 98/37/EC Machinery Directive
- 73/23/EEC Low-Voltage directive resp. 93/68/EEC
- EN 61496-1:1997
- prEN 61496-2:1997
- DIN V VDE 0801:1990 and amendment A1:1994
- EN 50081-2:1993
- EN 55022:1998
- EN 60204-1:1997 (as applicable)

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USER'S MANUAL:

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1 BEFORE USE

- **GENERAL INFORMATION**

The instructions in this manual must be followed in order to safeguard correct installation.

The barrier does not contain any parts that are subject to maintenance; the power supply must be disconnected before proceeding with any external intervention.

In case of malfunction, it must be sent to our laboratories with a description of the anomaly found and its period of operation.

Any deterioration in the protective covers does not compromise the system's safety in any way but may cause it to stop operating.

- **REGULAR MAINTENANCE**

No regular maintenance of any kind is required except for the **cleaning of the front covers in polycarbonate that protect the optical units.**

Do not use woollen cloths.

Do not use solvents.

The interval between cleaning depends on conditions in the environment.

Techno-GR declines any liability for damage or injury due to incorrect use of the appliance.

2 GENERAL DATA AND MAIN APPLICATIONS

SB units are safety barriers used for the protection of persons in environments where it is essential to safeguard the safety of the operator using machinery, robots or dangerous automated systems in general or where casual and/or unauthorised access may be gained to hazardous parts.

These appliances provide coverage of the protected area and generate a beam of infrared rays, which are able to detect an object located inside their field of operation.

They comply with the requisites for level 2 (SB2 series), and level 4 (SB4 series) safety appliances according to the provisions of the latest international regulations and IEC 61496 1-2 in particular.

Models are available that provide an area of protection with heights approximately between 150 mm and 1650mm.

All the control and command functions are contained inside the profile; connections are made using a connector underneath the barrier. There are no connections between the transmitter and the receiver, as synchronism between the two parts is guaranteed optically. Control and management of the rays issued and received is guaranteed by two microprocessors that also provide information on the status of the barrier by means of several leds. There are two alignment leds to aid installation.

The *muting and override* function is available for all the SB barrier models and is enabled by simply connecting the LMS luminous warning light, supplied separately.

Versions are also available with the *floating blanking* function: this function offers the possibility to partially exclude a predetermined floating portion of the barrier.

Muting, override and *floating blanking* all effectively override the system and therefore certain precautions have been put in place to limit the deterioration of the level of safety when these functions are operational.

3 OPERATION

The barrier is made up of one bar with transmitting optical elements and one with receiving optical elements. The photosensitive elements are regularly scanned in sequence along all its length so that any objects placed between the projector and the receiver are detected and the operation of the equipment being controlled is interrupted by means of the opening of the outputs, with response times from 14 to 45ms according to the model. It is complete with leds that display the operating status of the machinery as well as any anomalies in the reset, *test* and *muting* inputs for the models with this option.

The operator has a multifunction pushbutton, which is used for the following:

- TEST: if pressed during normal operation, it checks if all the system, comprising the barrier and the machinery, is efficient. Pressing the button (opening the contact) basically simulates the interruption of one or more safety rays and it is possible to check that the machinery stops in the time and way set.
 - RESTART: if pressed after an intervention by the barrier, (manual reset condition) the system will be reset.
 - ALIGNMENT: if the button is pressed when there is no power supply to the barrier and then power is restored, whilst the button is being pressed, it enters alignment mode, i.e. it provides an indication of the centring of the top and bottom optical unit by means of two yellow leds.
 - OVERRIDE: (only present if the *muting* function is operational) if the button is pressed within 5 seconds of switching on and it is kept pressed for at least 5 seconds, the barrier will force the closure of the outputs only if the rays are interrupted. This condition stops as soon as the button is released or automatically after 120 seconds.
1. *Automatic reset*: after the barrier has intervened due to the detection of an object, it returns to normal operation as soon as the object is removed.
 2. *Manual reset*: normal operating mode is only restored after the object has been removed and the reset button has been pressed.

To enable the *muting* function, the LMS muting indicator must be connected **when the barrier is not connected to the power supply**, as shown in section 6, and then the barrier's power supply must be restored. To disenable the muting function, the LMS muting indicator must be disconnected **when the barrier is not connected to the power supply**, and then the barrier's power supply restored.

Please remember that by enabling/disabling the *muting* function the *override* function is automatically enabled/disabled.

The outputs are PNP type.

Should the load to be controlled have alternating current or require more than 500mA consumption, the **TGR-SB** relay module is available: this converts the static outputs into relay outputs whose operation is directly tested and controlled by the barrier itself.

4 PRECAUTIONS AND CRITERIA FOR INSTALLATION

The area where the barrier is to be installed must be compatible with the appliance's technical specifications. The temperature of the environment, interference caused by electromagnetic disturbance and sources of light and such like, should be assessed *a priori*; please contact the manufacturer for any information not contained in this manual.

4.1 CALCULATION OF THE MINIMUM DISTANCE FOR INSTALLATION

The safety distance 'S' must guarantee that the operator cannot reach the danger zone before the machinery with the moving parts has stopped. The formula to calculate the safety distance for multi-ray barriers is as follows:

$$S = (K * T) + C$$

S = safety distance.

T = T1 + T2

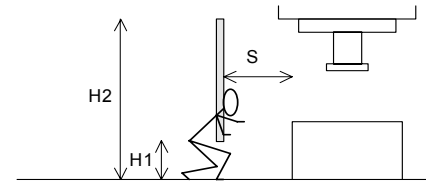
where T1 = machinery's response time in seconds.

T2 = barrier's response time in seconds.

K = approach speed of the body to the danger zone:

2000 mm/s for SBx models, 1600mm/s for SBx-K models

C = 8*(d-14)mm for SBx models, 850 mm for SBx-K models where d is the minimum object that can be detected (35mm for SBx and 14mm for SBx-HR)



S = safety distance.

H1 = the bottom optical ray must not have a height above 300 mm .

H2 = the top optical ray must not be below 900 mm .

In the SBx-K series please note the following table regarding some limitations on rays height due to the standards.

	4 rays	3 rays	2 rays
1 st ray height	300 mm	300 mm	400 mm
2 nd ray height	600 mm	700 mm	900 mm
3 rd ray height	800 mm	1100 mm	
4 th ray height	1200 mm		

If the barriers are installed in a horizontal position, the optical bars must be installed so that the distance that exists between the danger zone and the furthest optical ray is equal to the result of the calculation using the previous formula, but with the following parameters:

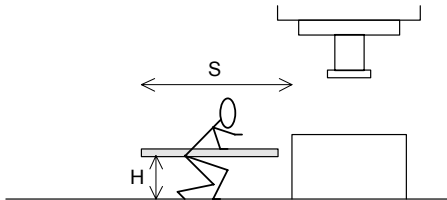
$$T = T1 + T2$$

where T1 = machinery's response time in seconds.
 T2 = barrier's response time in seconds.

K = 1600 mm/s (approach speed of the body to the danger zone).

C = 1200 - 0.4 * H.

H = height of the optical rays compared to the floor.



S = safety distance.

H = the optical beam must have a height between 225 mm and 1m.

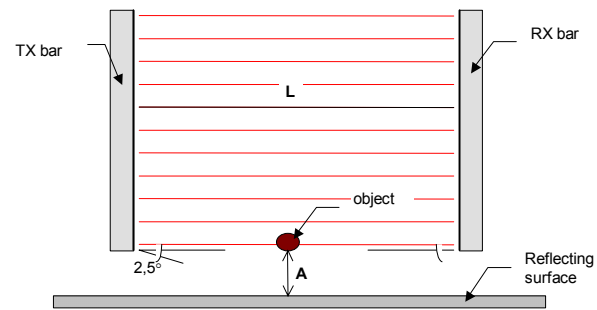
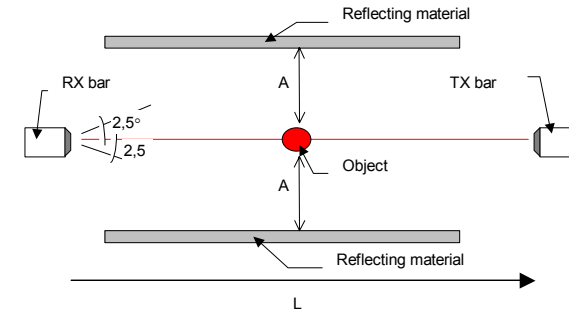
4.2 REFLECTING SURFACES

Should there be any reflecting surfaces, the distance must be sufficient to safeguard against passive reflections.

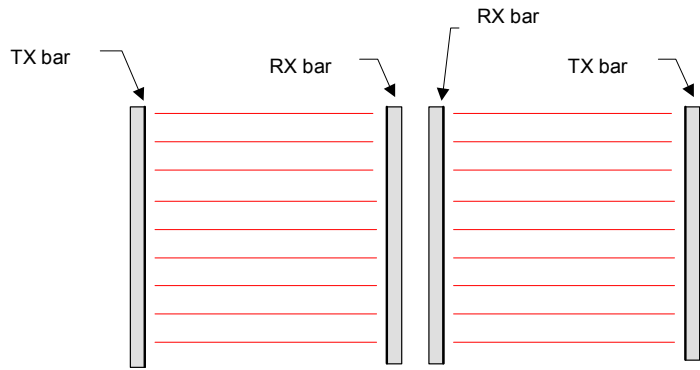
The distance can be calculated with the formula:

$$A = 0.04366 * L$$

where 'A' and 'L' are expressed in mm



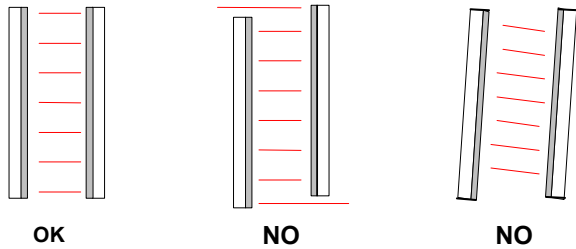
If several barriers are used, care must be taken that each transmitter does not interfere with the receiver of a nearby barrier; install as follows:



5 MECHANICAL ASSEMBLY

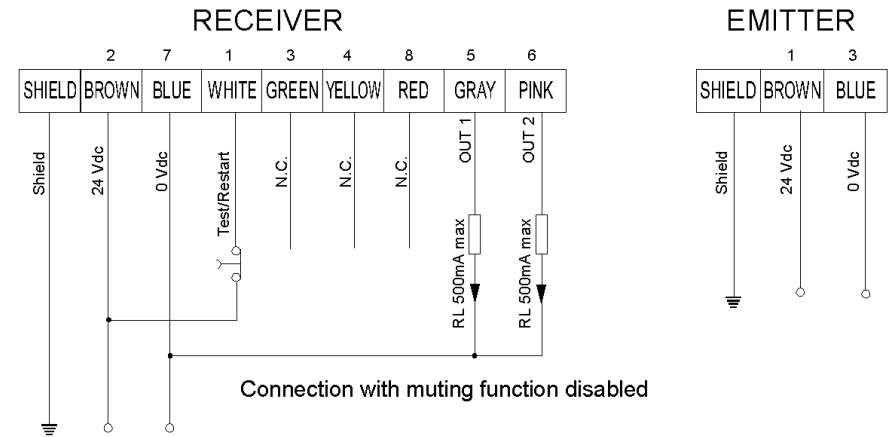
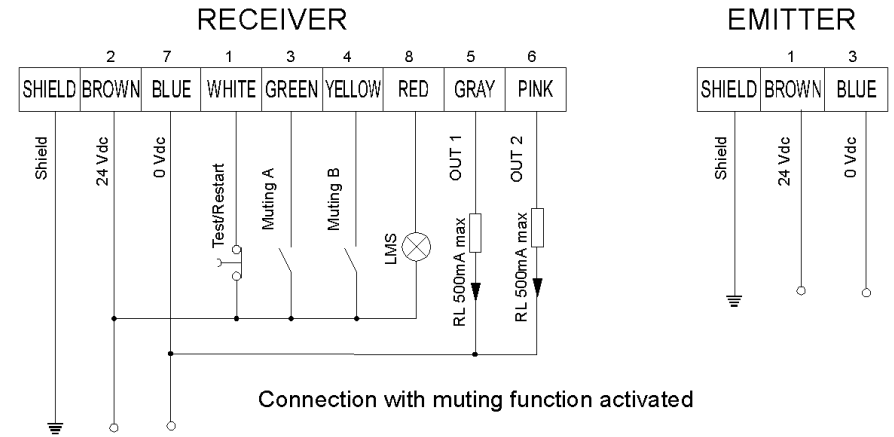
Use the appropriate brackets provided to complete the mechanical assembly.

The securing brackets for the bars slide in the container's grooves so that their ends can be placed at an equal distance from each other.



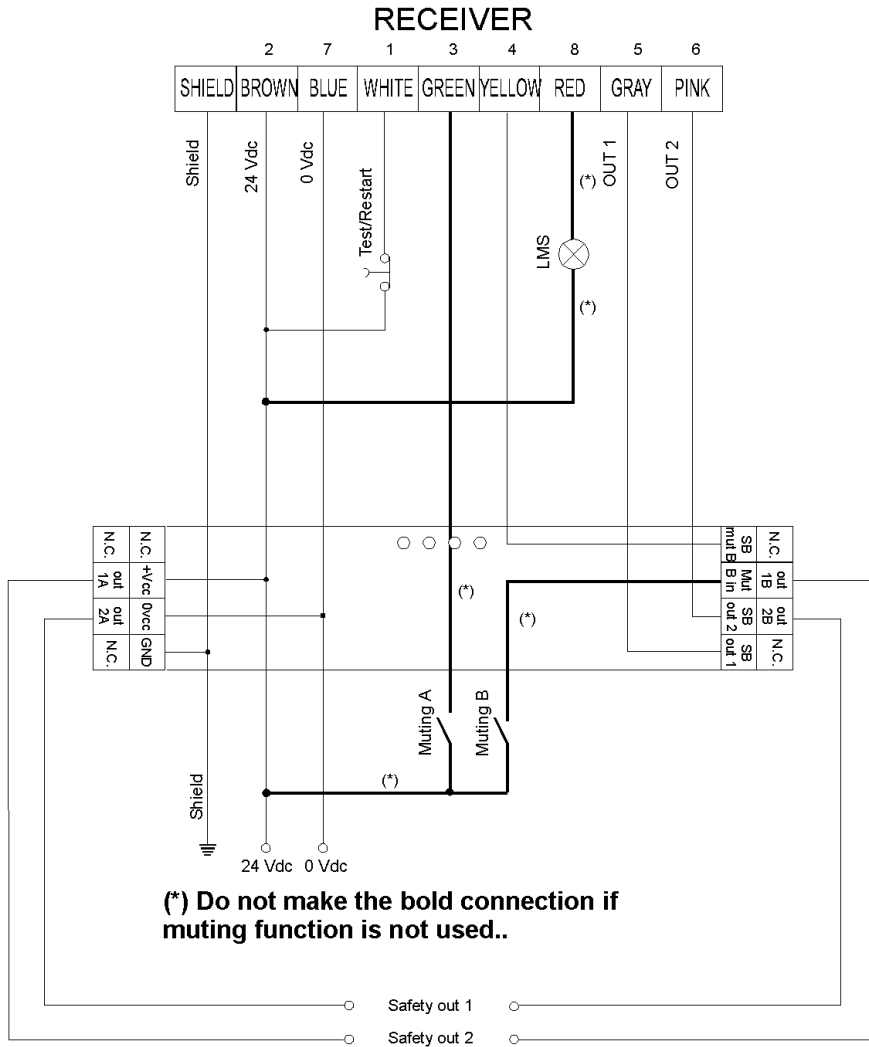
6 CONNECTIONS

6.1 REFERENCES FOR CABLES:

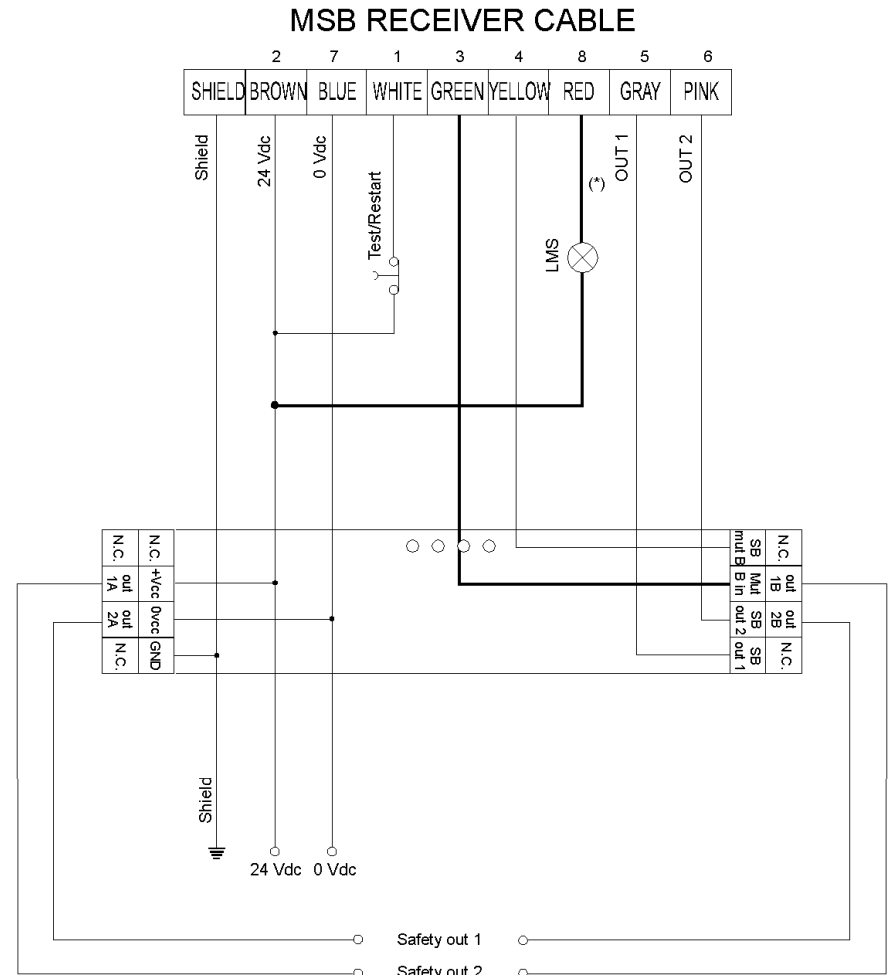


The test connection must always be executed with a N.C. button or connected to an automatic device, such as a PLC.







6.2 CONNECTIONS WITH TGR-SB RELAY MODULE:



Following the connection scheme if TGR-SB is connected in presence of muting activator MSB-L or MSB-T.



6.3 NOTES ON CONNECTIONS

-  • The transformer needed to power the system must comply with standard EN 60742 (dual isolation), or with equivalent isolation, e.g. VDE 0551.
-  • The control unit must be protected with an external fuse, whose rated breaking current must be 1A.
-  • The TEST/RESTART button must be located so that the operator can see the protected area when restarting, testing or overriding.
-  • The external illuminated indicator for *muting override* enabled must be located so that it can be seen from all sides of operation.
-  • Read the section on the *muting* function and its use before locating the sensors for the activation of this function.
-  • Check that the load does not absorb current in excess of 500 mA; in this case a protection device will intervene to limit the maximum current. If loads with currents in excess of 500mA and up to 6A alternating current are to be controlled, the **TGR-SB** relay module must be connected to the outputs as shown below.

The test connection must always be executed with a N.C. button or connected to an automatic device, such as a PLC.

6.4 CODES AND SPECIFICATIONS OF AVAILABLE MODELS

The columns with “Number of modules” and “Number of optical units per module” refer to operating management with *muting* (see section 9.3).

The following table shows the standard models available in the SBx series, based on the length of the bars and their operating features:
All models in the SB series guarantee 35 mm resolution.

Models	Height controlled mm	Total height mm	Total number of optical units	Response time ms	Number of modules	Number of optical units per module
SBx-150	150	286	8	14	4	2
SBx-300	300	389	16	14	4	4
SBx-450	450	536	24	16	4	6
SBx-600	600	683	32	16	4	8
SBx-750	750	830	40	18	5	8
SBx-900	900	977	48	20	6	8
SBx-1200	1200	1271	64	22	4	16
SBx-1500	1500	1565	80	24	5	16
SBx-1650	1650	1712	88	26	4	22

The following table shows the standard ⁽¹⁾ models available in the SBx-K series with variable resolution:

Models	Height controlled mm	Total height mm	Total number of optical units	Response time ms	Number of modules	Number of optical units per module
SBx-K-2-500	500	530	2	14	2	1
SBx-K-3-800	800	830	3	14	3	1
SBx-K-4-900	900	930	4	14	4	1
SBx-K-4-1200	1200	1230	4	14	4	1

(1) Protected heights not included in the list of standard models can be supplied on request.

The following table shows the standard models available in the SBx-HR series, based on the length of bars and their operating features.

All the models in the SBx-HR series guarantee 14 mm resolution.

Models	Height controlled mm	Total height mm	Total number of optical units	Response time ms	Number of modules	Number of optical units per module
SBx-HR-150	150	286	21	15	7	3
SBx-HR-300	300	389	42	18	7	6
SBx-HR-450	450	536	63	22	7	9
SBx-HR-600	600	683	84	24	6	14
SBx-HR-750	750	830	105	27	7	15
SBx-HR-900	900	977	126	30	6	21
SBx-HR-1200	1200	1271	168	36	8	21
SBx-HR-1500	1500	1565	210	42	10	21
SBx-HR-1650	1650	1712	231	45	11	21

7 ALIGNMENT PROCEDURE

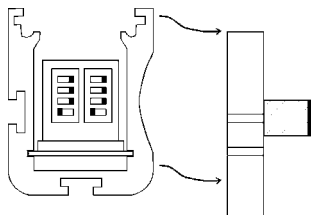
After completing correct mechanical assembly and connections, as described in the previous sections, the barrier should be aligned as follows:

- Disconnect the barrier's power supply.
- Open the *test/restart* contact.
- Restore the barrier's power supply.
- Adjust the direction of the barrier by moving the receiver or transmitter. The 2 yellow leds located on the receiver will both be lit when the barrier is aligned correctly.
- After aligning the barrier, secure the bolts firmly.
- Disconnect the power supply.
- Restore the barrier's power supply (with the *test* contact closed); it will enter operating mode.
- Complete all the checks described in the final controls and those required for routine maintenance.

8 OPERATING PROCEDURES

8.1 SETTING THE INTERNAL DIP-SWITCHES

- Disconnect the barrier's power supply and remove the side on the connector side of the receiver, so that you can reach the two banks four-way dip-switches located there.
- Use a suitably sized screwdriver to set the dip-switches as per the required configuration according to the following tables.



8.1.1 SELECTION OF RESET MODE

Single switch number 4	Reset
OFF	Manual
ON	Automatic

8.1.2 RELAY MODULE MANAGEMENT

Single switch number 3	Function
OFF	Disabled
ON	Enabled

VERY IMPORTANT WARNING!!!

In every unit are present two different dip-switch banks and that two banks must be set in the same way.

The two dip-switches on the receiver side must have the same configuration.

The configuration of the two, number 3 dip-switches (relay module management) on the transmitter side must be the same as the configuration of the two, number 3 dip-switches on the receiver side, therefore, if you alter these dip-switches on the receiver you must also alter those on the transmitter by removing the side panel on the connector side.

If the number "3" dip-switches are not identical, the RX-TX system will not work.

9 MUTING, OVERRIDE AND FLOATING BLANKING FUNCTIONS

9.1 GENERAL INFORMATION ON THE THREE FUNCTIONS

The *muting*, *override* and *floating blanking* functions enable the barrier (or a part of it) to be bypassed when it is working for operational requirements. As required by current standards, the barrier is provided with inputs for the activation of these functions. It should however be remembered that these functions basically override the system and they should therefore be used with due care.

9.2 MUTING FUNCTION

As mentioned in the introduction, the *muting* function can be enabled with any barrier by simply connecting the LMS muting indicator when the barrier is switched off, as described in section 6.

The presence of this indicator is recognised when the barrier is switched on. If its presence is detected, the barrier will enable the *muting* function and if its presence is not detected the barrier will ignore any request for *muting*. **It is important to note that if the *muting* indicator is connected when the barrier is already connected to the power supply, it will not be recognised and the *muting* function will not be enabled.** Once enabled, if the indicator develops a fault or is removed without first disconnecting the barrier's power supply, it will signal an error with the *muting* light, as described in section 10.

To disable the *muting* function, therefore, the barrier's power supply must be turned on without the LMS muting indicator connected.

In brief: this function, present on all barriers, is enabled and disabled by means of the following simple procedure:

- Disconnect the barrier's power supply.
- Connect the appropriate LMS and the muting sensors (see sec. 6)
- Restore the barrier's power supply.

Bypass the muting function as follows.

- Disconnect the barrier's power supply.
- Disconnect the LMS device and the muting sensors (see sec. 6)
- Restore the barrier's power supply.

9.3 DESCRIPTION OF SINGLE MODULE MUTING AND MODULAR MUTING

With this series of barriers it is possible to specify *single module muting* or *modular muting function* at the moment of purchase.

There follows a brief description of these two types of *muting*.

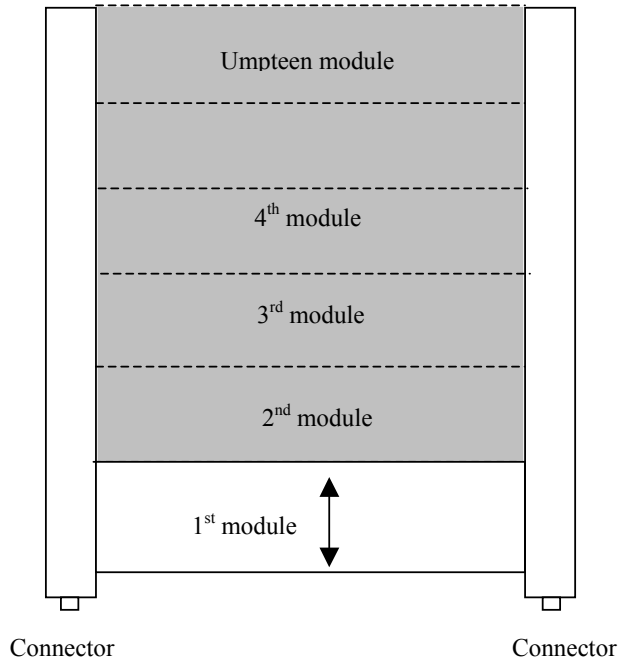
9.3.1 DEFINITION OF MODULE.

Module means a portion of barrier whose size can contain the amount of optical units per module defined in the table in section 6.

For example, a SBx-600 should be considered as 4 adjacent modules, each containing 8 optical units for a total of 32 optical units, whereas a SBx-HR-300 should be considered as 7 adjacent modules, each containing 6 optical units for a total of 42 optical units.

Various configurations can be achieved on request, according to requirements.

The layout of the modules is illustrated below:



9.3.2 SINGLE MODULE MUTING AND MODULAR MUTING

Single module muting enables only one module at a time to be made transparent according to requirements, whereas *modular muting* makes it possible to make the sum of two or more modules transparent, until even the whole barrier has been bypassed.

Should a muting request be made for modules that are not managed when in *single module muting* mode (for example bypassing of the 4th module with a barrier that manages only three), the barrier will remain operational.

Please note that in *single module muting* is not possible to select the module containing the optic ray placed in the opposite side of connector. In that case the muting function will not work properly.

Should a *modular muting* request also involve modules that are not managed (for example muting of modules 1+2+3 with a barrier that manages only two), the barrier will enter total *muting* mode

There follow the settings for the various *muting* modes.

9.3.3 SELECTION OF MODULAR MUTING MODE (STANDARD)

Single switch		Modular muting
1°	2°	
OFF	OFF	Muting of all modules (standard total muting)
OFF	ON	Muting of modules 1+2+3
ON	OFF	Muting of modules 1+2
ON	ON	Muting of modules 1

9.3.4 SELECTION OF SINGLE MODULE MUTING

Single switch		Muting of single module
1°	2°	
OFF	OFF	Muting of module 1
OFF	ON	Muting of module 2
ON	OFF	Muting of module 3
ON	ON	Muting of module 4

WARNING

In every unit are present two different dip-switch banks and that two banks must be set in the same way.

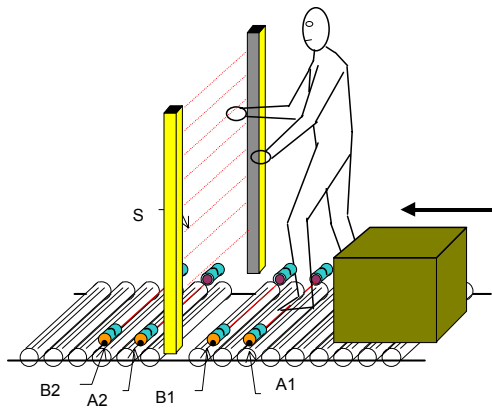
- **The *modular muting* function with all modules activated is setted by factory as default.**

- The **single module muting** function must be requested in the purchase order.
- The **single module muting** function excludes the **modular muting** function.

9.4 CRITERIA FOR INSTALLATION

All the *muting* sensors must be connected correctly in order to prevent their incorrect placement from causing undesired requests for *muting*.

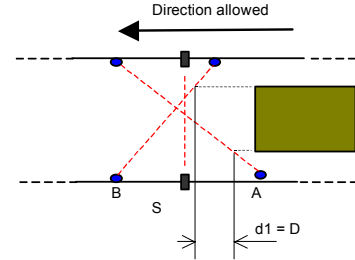
1. The *muting* sensors must recognise the whole length of the material (i.e. pallets, vehicles...).
2. The sensors must be arranged so that the material is also recognised if it has to be lifted for processing.
3. The effect of various transportation speeds in the field of *muting* on the overall duration of muting must be taken into account, if any.
4. All the safety photocells and *muting* sensors must be arranged so that the previous material clears the last *muting* sensor before the new material reaches the first sensors.



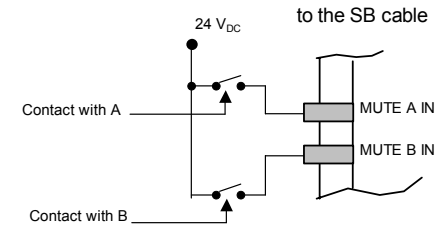
Example of installation of protection on a conveyor, which must allow a box to pass through but not a person. The protection barrier **S** is connected to the control panel, and **A1**, **A2**, **B1** and **B2** are temporarily excluded for the passage of the box via sensors that enable *muting*. The contacts for these sensors are controlled on the receiver unit. Sensors **A** and **B** can be optical, mechanical, proximity sensors, etc., with closed contact in the presence of the object to be detected.

The following pages show several examples of configurations with the use of the *muting* function:

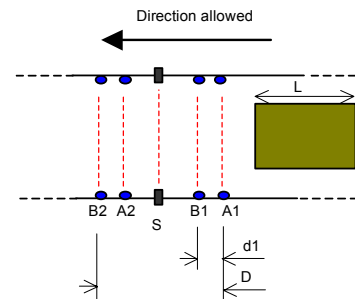
Application with two sensors:



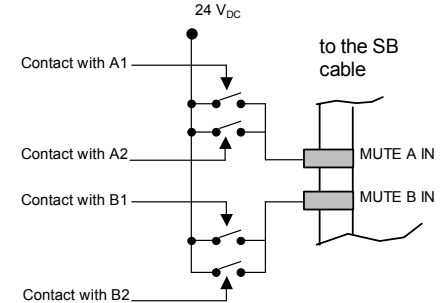
Connection of the muting sensors:



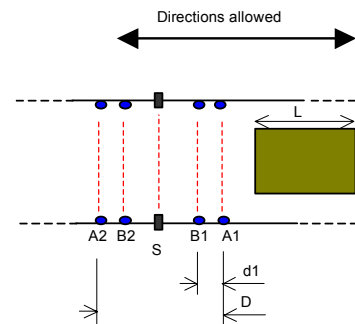
Application with four sensors and single direction for introduction of material:



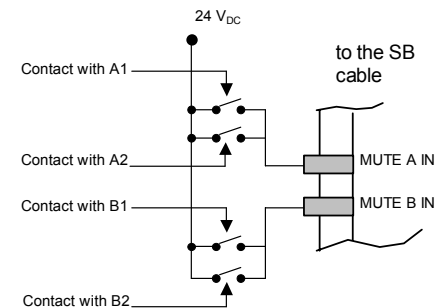
Connection of the muting sensors:



Application with four sensors and dual direction for introduction of material:



Connection of the muting sensors:



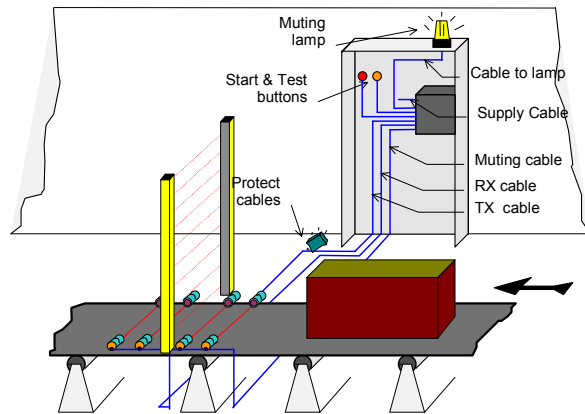
Where:

D: minimum distance for the *muting* sensors to keep the request operational; depends on the length of the box:
 $D < L$.

d_1 : maximum distance required for the *muting* request to be accepted; depends on the speed of the box:

$$d_{max} [cm] = v[m/s] * 3[s] * 100$$

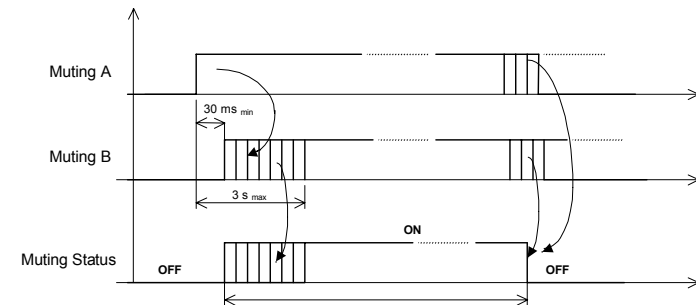
It is necessary that this distance does not allow both sensors to be activated and thus *muting* if a person goes through by accident.



- The TEST/RESTART button must be located so that the operator can see the protected area when restarting, testing or overriding.
- The external illuminated indicator for *muting override* enabled must be located so that it can be seen from all sides of operation.
- If the *muting* sensors are installed very close to the barrier, care must be taken that the receivers of the sensors are mounted on the transmitter side of the barrier in order to avoid interference.
- The system is protected against the possibility of faults due to damage to the wires; however we recommend laying the cables for all connections in order to avoid damage to the connection cables.

9.5 TIMING CONSTRAINTS (muting function)

- The *muting* request must take place with the correct timing sequence: the Muting A input must be enabled first and then the Muting B input. The request for the latter must be made within a maximum of 3 seconds and not before 30 ms after the enabling of the Muting A input. Otherwise the *muting* function will not be enabled. An incorrect sequence on the *muting* inputs will have no result.
- Muting* status can be maintained for an unlimited time according to requirements, provided the request is maintained.



A *muting* request cannot be made if the barrier outputs are open, that is to say when the rays have been interrupted.

9.6 OVERRIDE

This function makes it possible to procure a condition of total bypass, should it be necessary to start up the machinery even if one or more rays have been interrupted by the material. The objective is to free the protected area from any material that has accumulated in front of the barrier, for example further to a fault in the machinery's cycle.

If we imagine a *pallet* has stopped in front of the protected area, it will not be possible to restart the conveyor belt because the barrier detects one or more rays have been interrupted and therefore will not close the outputs; therefore the area controlled cannot be liberated.

However, it can be liberated if the *override* function is enabled.

This function is active for all barriers with the LMS connected, as described in section 3.

9.6.1 ENABLING THE OVERRIDE FUNCTION

- Switch the appliance off.
- Switch it on again and press the *test/restart* button within 5 seconds, keeping it pressed for at least 5 seconds.
- The *override* function is now enabled. The LMS flashes to signal the exclusion of the barrier.
- The maximum duration of the *override* function is 120 seconds, after which the barrier is restored, even if the button is kept pressed. Naturally, if the button is released before this, the *override* function will terminate immediately.

9.7 FLOATING BLANKING

9.7.1 DEFINITION OF *FLOATING BLANKING*

Floating Blanking means the permanent masking of a certain number of optical units in a set part of the sensitive area of the barrier. The maximum quantity of optical units that can be masked depends on the total number of the optical units in the system.

This cannot be more than 30% of the total number of optical units; however if 30% corresponds to more than 20 optical units, the system will cap the number of optical units at its maximum number of 20.

The following examples can help to understand:

Example 1: total optic rays: = 102
 optic useful for blanking = 31

The zone can be higher than 20ray, but the unit can only mask 20 rays!!!

Example 2: total optic rays: =24
 Optic useful for blanking = 7

The maximum maskable zone is 7 rays.

9.7.2 MEMORISATION PROCEDURE FOR *FLOATING BLANKING*

The object is memorised as follows:

1. Switch the barrier off.
2. Put the object for *floating-blanking* into place.
3. Connect the MUTING A input to 24Vdc. The TEST/RESTART contact must be closed.
4. Restore the barrier's power supply.
5. Now supply the MUTING B input with 24Vdc.
6. The barrier signals successful memorisation of the object by the flashing of the LOWER led which thus confirms acceptance of *floating-blanking*. If the led does not flash at this point, it means that the object takes up an amount of optical units which is above 30% of those physically present; it should however be remembered that the maximum limit is 20 optical units.
7. Now disconnect the two MUTING A and MUTING B wires from +24Vdc.
8. The barrier works normally and signals the *floating-blanking* operation by the flashing of the yellow LOWER led on the receiver.

PLEASE NOTE:

The last optical unit opposite to the connector side **cannot be used** with the *floating-blanking* function, as it is the optical unit for the synchronism between the two barriers.

If *floating-blanking* memorisation was completed without the object, and thus with the rays free, the LOWER led will not flash at the end of the process as the entire bar is operational: this is a simple way to reset the *floating-blanking* function.

If the object memorised, for any reason, is removed or occupies a lesser number of optical units than in the memorisation process, the barrier will signal the anomaly and the outputs will be de-energized. The LOWER (yellow) led and BREAK (red) leds will flash to indicate this particular status. It is possible to exit this error status by pressing the TEST/RESTART button provided the object has been restored.

10 LED DIAGNOSTICS

10.1 WHAT THE LEDS MEAN

The operator is able to recognise the operating status of the barrier by means of five leds located on the receiver and two leds on the transmitter.

The status of the leds on the receiver indicates the following:
(looking at the front of the receiver from right to left)

- UP. ALIGN (Yellow):
when lit, this indicates the alignment of the optical unit located towards the top section of the barrier. (When the barrier is in alignment mode; in normal working conditions it is not lit and will only light up after the barrier has intervened with free rays in manual reset mode)
- BREAK (Red):
when lit, this indicates that the barrier has intercepted an object; the outputs are open in this condition.
- GUARD (Green):
when lit, this indicates that there are no objects placed between the barriers.
- LO. ALIGN (Yellow):
when lit, this indicates alignment of the optical unit positioned towards the bottom of the barrier (connector side) with the barrier in alignment mode. If this led lights up in normal working conditions, this indicates that dust is present on the front of the barrier. If it flashes, there is a short circuit on the outputs.
- POWER (Green):
when lit, this indicates that the receiver is powered.

The leds placed on the transmitter indicate the following:

- POWER (Green):
when lit, this indicates that the projector is powered
- STATUS OK (Yellow):
when lit but not flashing, this indicates that the projector is working;
if it flashes or if it is off, this indicates a projector fault.

10.2 ERRORS SIGNALLED BY LED

If critical errors are detected during hw/sw tests, the leds present indicate the fault found. The errors signalled are as follows:

RECEIVER

- Only the green power led is lit: system power supply is too low.
- POWER(green) led lit and LO.ALIGN (yellow) led flashing: optical system fault.
- POWER(green) led lit and UP. and LO.ALIGN (yellow) leds flashing: micro controller fault.
- POWER (green) led, UP. and LO.ALIGN (yellow) leds and BREAK (red) led flashing: output system fault.
- POWER (green) led, UP. and LO. ALIGN (yellow) leds and GUARD (green) led flashing: muting lamp connection fault.
- POWER (green) led, UP. and LO.ALIGN (yellow) leds, GUARD (green) led BREAK (red) led flashing: relay module connection fault.

TRANSMITTER

- Only the POWER(green) led is lit: system power supply is too low.
- POWER(green) led lit and STATUS OK (yellow) led flashing: optical system fault or micro controller fault.

11 FINAL CONTROLS

Control that the area protected by the barrier is free of obstacles; check that the safety outputs open correctly by interrupting the protection rays (BREAK led lit, machinery under control stops).

12 ROUTINE CONTROLS AND MAINTENANCE

There follows the list of recommended controls that should be carried out on a regular basis by qualified personnel:

- Check that the barrier remains blocked by inserting an object that intercepts the rays along the entire length of the protected area.
- Check via the opening of the *TEST/RESTART* contact, that the safety relays open (red led lit and controller machinery stopped).
- Check that it is not possible to access the danger areas of the machinery from any area that is not protected and that the minimum distance between the dangerous areas and the barrier is no less than that calculated as per formulas 4.1 and 4.2.)
- Check that it is not possible for a person to get between the barrier and the dangerous parts of the machinery.
- Check that there is no external damage to the barrier and/or to the external electrical connections.

The interval between the above actions depends on the individual application and the conditions in the environment where the barrier is used.

13 GENERAL INFORMATION AND USEFUL DATA

Everyone **MUST** be aware of issues regarding safety.

Safety devices are only useful if they are installed correctly according to the recommendations set down by regulations.

If you are not sure that you are able to install safety devices correctly, you should contact our service department or have them installed by a professional.

This appliance is covered by a total warranty for 12 months from the date of its delivery.

Faults that were clearly caused by damage due to incorrect use, accidental circumstances or catastrophic events are not covered by the guarantee.

In case of faults, please send the barrier to:

TECHNO-GR
via Torino, 13/15
10046 Poirino (TO) - ITALY
Tel. +39 011 9452041
FAX. +39 011 9452090
E-Mail technogr@technogr.com

A description of the fault found and the period of use must always accompany the appliance.

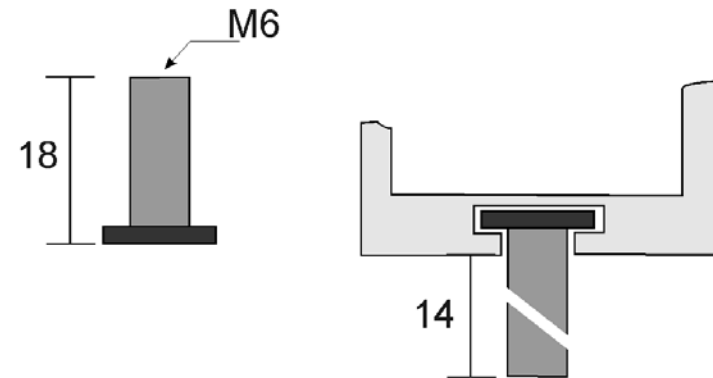
14 TECHNICAL SPECIFICATIONS

- Power supply: 24 Vdc \pm 20%.
- Consumption: 10W max (with both TX and RX connected).
- Emission: infrared Leds.
- Reception: Photodiode.
- Number of emitters/receivers: according to model (see table in section 6.4).
- Wavelength of emitters: 950 nm.
- RX indicators:
 - 2 green leds
 - 2 yellow leds
 - 1 red led
- TX indicators:
 - 1 green led
 - 1 yellow led
- Response time: according to model (see table in section 6.4).
- Resolution:
 - 35 mm for SBx models.
 - 14 mm for SBx-HR.
 - Variable for SBx-K models according to amount of rays and height protected.
- Operating temperature: -10 to + 55 °C.
- Humidity: 15% to 95% (non condensing).
- Safety outputs: Two 500mA PNP outputs protected against short circuit.
- Operating distance: SBx: 0.2-15m SBxHR 0.2-6m SBx-K 0.5-40 m
- External controls: *start/test/override* button, muting inputs
- RX connector: M12 8-pin + insulation
- TX connector: M12 5-pin + insulation
- Metal housing (aluminium) painted yellow (Ral 1303 F14).
- Grade of protection: IP 65.
- *Muting* indicator: LMS

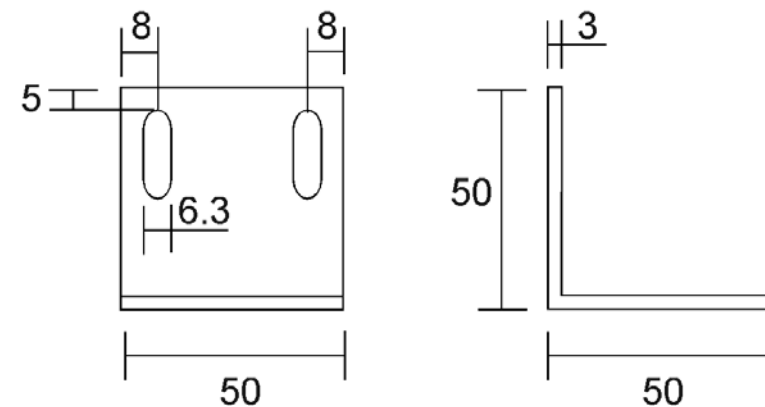
15 DIMENSIONS

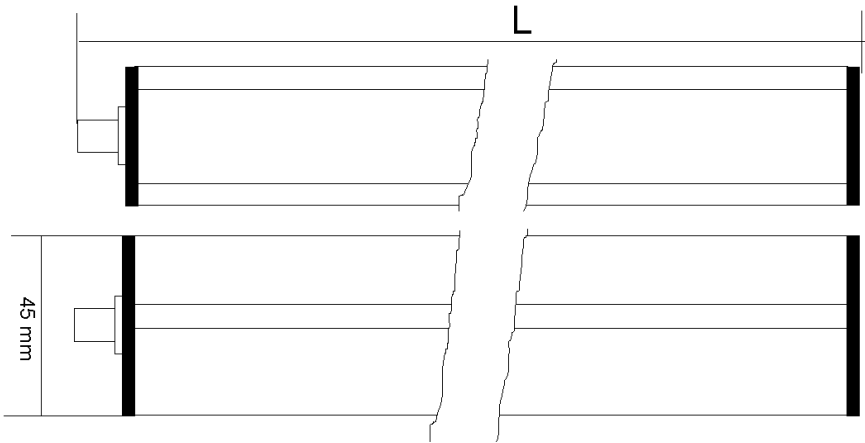
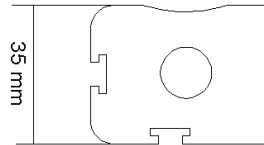
All dimensions are shown in millimeters

Fixing screw:



Fixing bracket:



**16 NOTE:**

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