

PHOTOELECTRIC
SAFETY BARRIER
ADMIRAL AX BK



INSTALLATION, USE AND MAINTENANCE



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SAFETY
BARRIER*

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INSTALLATION USE AND MAINTENANCE

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This symbol stands by a very important warning concerning the safety of persons. Its non-observance can cause a very serious risk for the exposed personnel.

INTRODUCTION

The ADMIRAL AX BK photoelectric barrier is a multi-beam optoelectronic safety system. It belongs to the family of Type 4 electrosensitive devices for the protection of personnel exposed to risks arising from the use of hazardous machinery or plant, according to standards IEC 61496-1,2 and EN 61496-1.

ADMIRAL AX BK is available in two different versions :

The ADMIRAL AX BK is a type 4 light curtain, consisting of an Emitter plus Receiver, that integrates the floating blanking function.

The ADMIRAL AX BK is also available in a Master-Slave configuration.

A diagnostic display available on Emitter and Receiver provides the necessary information for a correct use of the device and the evaluation of the possible operation defects.

ADMIRAL AX BK is ideal for the protection of :

Bending presses, presses, die cutting machines, punching machines, cutting and shearing machines, assembly lines, palletization lines, etc.



If necessary, for any safety-related problems contact the competent safety authorities or industrial associations in the country of use.



For applications in the food industry, please contact the manufacturer to ensure that the barrier contains materials that are compatible with the chemical agents utilized.

The protective function of the optoelectronic devices is not effective in the following cases:



If the machine stopping control cannot be actuated electrically and it is not possible to stop all dangerous machine movements immediately and at any time during the operating cycle.



If the machine generates dangerous situations due to material being expelled or falling from overhead.

OPERATION

If the protected area is clear, the two outputs on the Receiver are active and enable the machine to which they are connected to operate normally.

Each time that an object bigger than or equal in size to the resolution of the system intercepts the optical path of one or more beams, the Receiver deactivates the outputs.

This condition enables hazardous machine movements to be stopped (by means of an adequate machine emergency stop circuit).



The resolution is the minimum dimensions that an object must have so that, on crossing the protected area, it will certainly intercept at least one of the optical beams generated by the barrier (Figure 1).

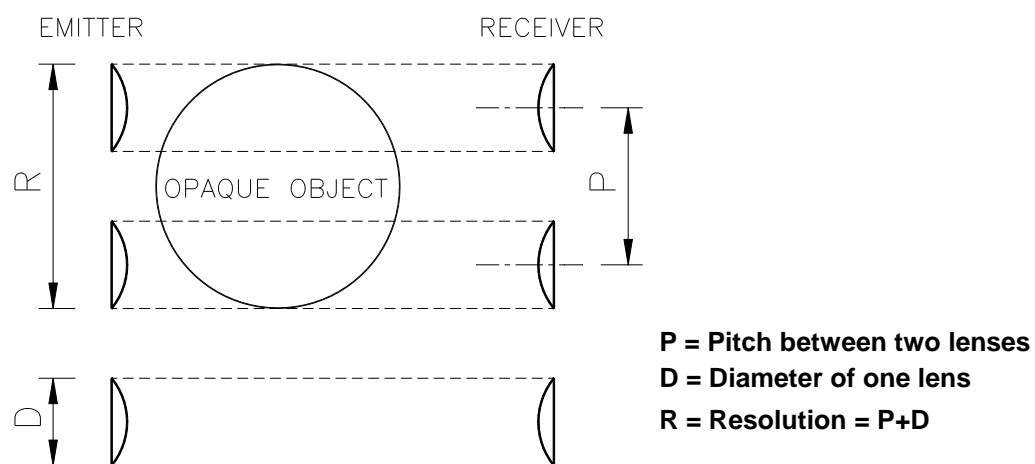


Figure 1

The resolution is constant irrespectively of work conditions, as it only depends on the geometric characteristics of the lenses and the distance between the centres of two adjacent lenses.

The **height of the protected area** is the height that is actually protected by the safety barrier. If the latter is placed horizontally, this value refers to the depth of the protected area.






The **working range** is the maximum operative distance that can exist between the Emitter and the Receiver.

ADMIRAL AX BK is available with the following resolutions:


- 14 mm, 20 mm (protected height from 150 mm to 1800 mm)
PROTECTION OF FINGERS
- 40 mm (protected height from 310 mm to 1800 mm)
PROTECTION OF HANDS
- 90 mm (protected height from 610 mm to 1800 mm)
PROTECTION OF BODY

INSTALLATION




Before installing the ADMIRAL AX BK safety system, make sure that:

-  ***The safety system is only used as a stopping device and not as a machine control device.***
-  ***The machine control can be actuated electrically.***
-  ***All dangerous machine movements can be interrupted immediately. In particular, the machine stopping times must be known and, if necessary, measured.***
-  ***The machine does not generate dangerous situations due to materials projecting or falling from overhead; if that is not the case, additional mechanical guards must be installed.***
-  ***The minimum dimensions of the object that must be intercepted are greater than or equal to the resolution of the specific model.***

Knowledge of the shape and dimensions of the dangerous area enables the width and height of the relative access area to be calculated.

-  ***Compare these dimensions with the maximum working range and the height of the protected area in relation to the specific model.***

The general instructions set out below must be taken into consideration before placing the safety device in position.

-  ***Make sure that the temperature of the environment in which the system is to be installed is compatible with the temperature parameters contained in the technical data sheet.***
-  ***Do not install the Emitter and Receiver close to bright or high-intensity flashing light sources.***
-  ***Certain environmental conditions may affect the monitoring capacity of the photoelectric devices. In order to assure correct operation of equipment in places that may be subject to fog, rain, smoke or dust, the appropriate correction factors C_f should be applied to the maximum working range values. In these cases:***

$$P_u = P_m \times C_f$$

where P_u and P_m are, respectively, the working and maximum range in meters.

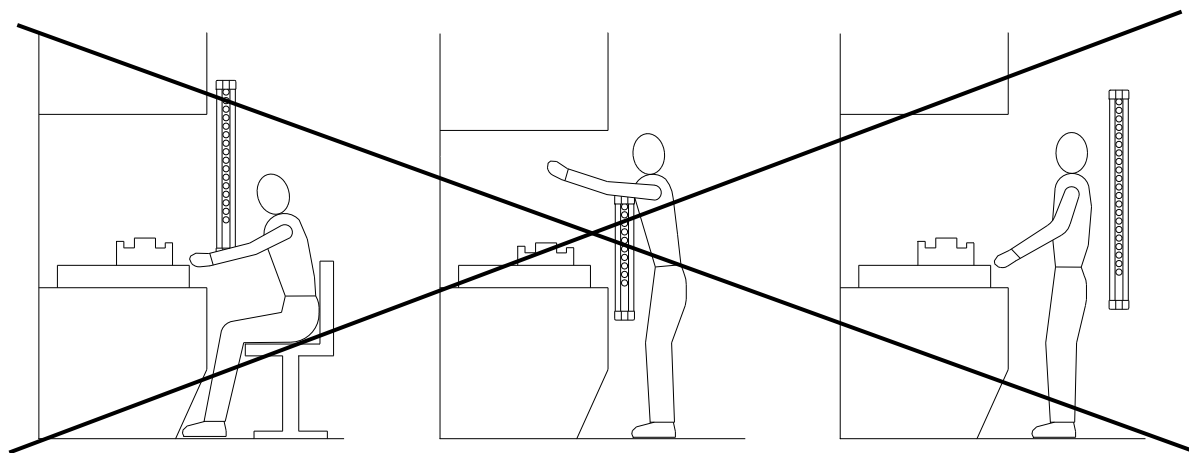
The recommended Cf factors are shown in the table below:

| ENVIRONMENTAL CONDITION | CORRECTION FACTOR Cf |
|-------------------------|----------------------|
| Fog | 0.25 |
| Steam | 0.50 |
| Dust | 0.50 |
| Dense fumes | 0.25 |

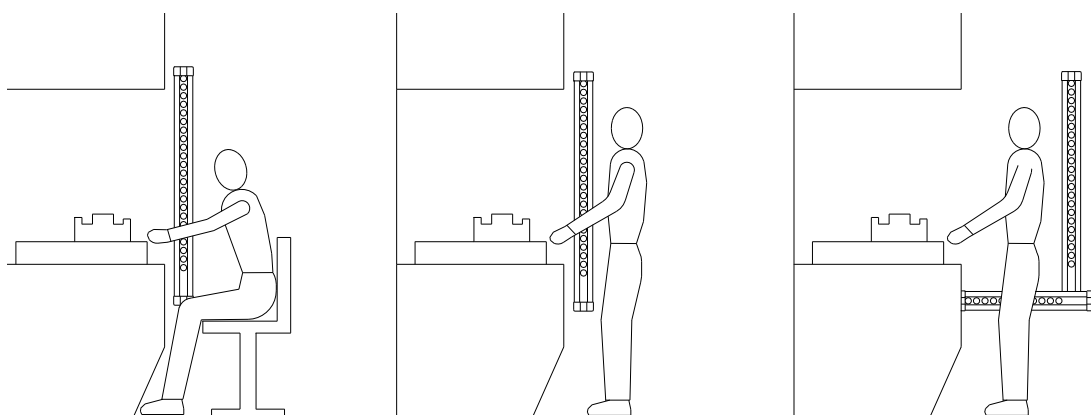
If the device is installed in places that are subject to sudden changes in temperature, the appropriate precautions must be taken in order to prevent the formation of condensation on the lenses, which could have an adverse effect on monitoring.

POSITION

The position of the *AXE BK* Emitter and the *AXR BK* Receiver must prevent access to the danger zone from above, below and from the sides, unless at least one of the optical beams has been intercepted. Some useful information regarding the correct position of the barrier is shown in the figure below.



Incorrect positioning of barrier



Correct positioning of barrier

Figure 2

MASTER/SLAVE POSITIONING

In addition to the standard ADMIRAL models, ADMIRAL AX BK is available in the MASTER/SLAVE configuration. Such configuration is made of two pairs of light curtains, where the two emitters and the two receivers are respectively connected in series.

In master/slave models the blanking function is available only on the MASTER barrier.

The most common application is shown in Figure 3: the horizontal light curtain (A) has been installed to detect the presence of a person between the vertical light curtain (B) and the dangerous machine at system power-up or restart.

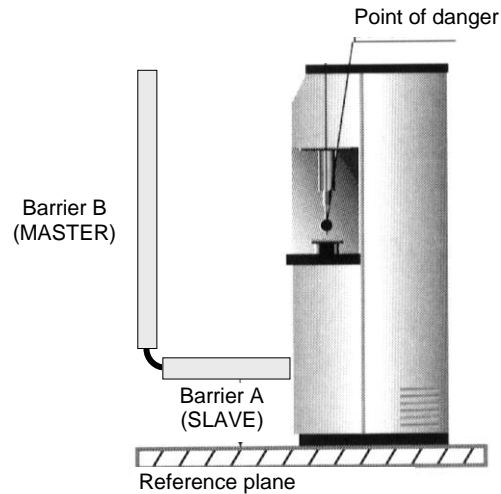


Figure 3

The length of the connection cable between the master and the slave can be up to 50 m. This makes it possible to install two light curtains - one at the front and the other at the rear of the machine – with just one connection to the power and control circuits of the machine.

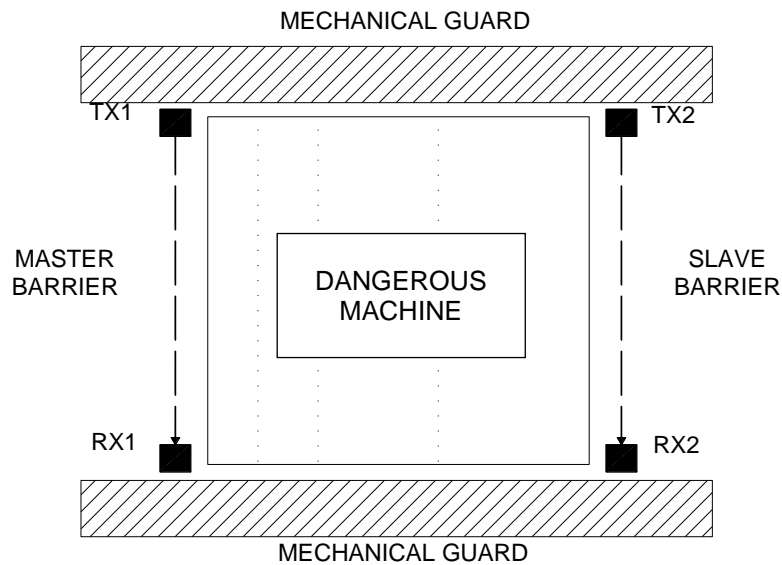


Figure 4

SAFETY DISTANCE CALCULATION

The barrier must be installed at a distance that is greater than or equal to the **minimum safety distance S**, so that a dangerous point can only be reached after all hazardous machine movements have stopped (Figure 5).

According to European standard EN999, the minimum safety distance **S** must be calculated using the following formula:

$$S = K (t_1 + t_2) + C$$

where:

| | | |
|----------------------|---|--------|
| S | <i>minimum safety distance</i> | mm |
| K | <i>approach speed of object to the dangerous area</i> | mm/sec |
| t₁ | <i>response time of the safety barrier in seconds</i> | sec |
| t₂ | <i>machine response time, in seconds, meaning the time required for the machine to interrupt the dangerous movement following transmission of the stop signal</i> | sec |
| c | <i>additional distance</i> | mm |



The non-observance of the correct safety distance reduces or cancels the protective action of the light curtain.



If the position of the barrier does not prevent the operator from having access to the dangerous area without being detected, additional mechanical guards must be installed to complete the system.

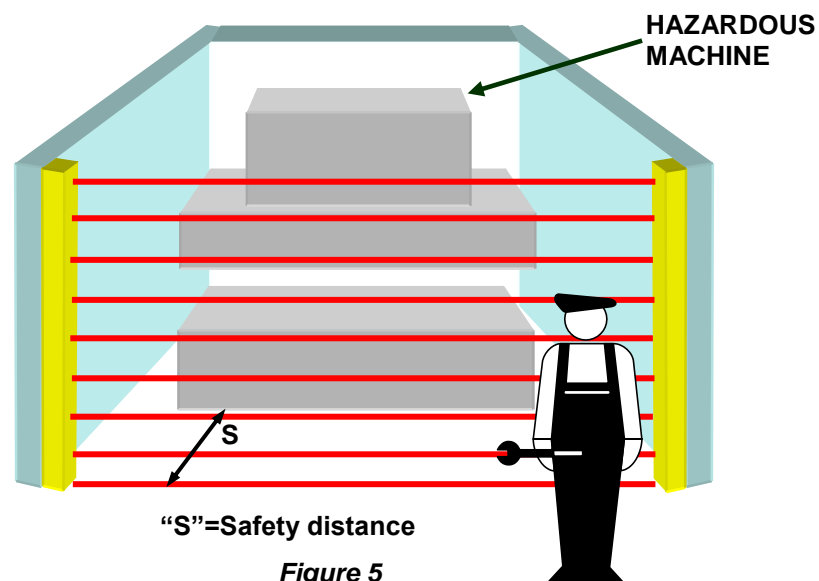


Figure 5

VERTICAL POSITION OF THE BARRIER

14 mm, 20 mm resolution models.



These models are suitable for the protection of fingers.

40mm resolution models.



These models are suitable for the protection of hands.

The minimum safety distance **S** is calculated according to the following formula:

$$S = 2000(t_1 + t_2) + 8(D-14)$$

(D=resolution)

This formula is valid for distances **S** between 100 and 500 mm. If this formula results in **S** being greater than 500 mm, the distance can be reduced to a minimum of 500 mm by means of the following formula:

$$S = 1600(t_1 + t_2) + 8(D-14)$$

If, due to the specific configuration of the machine, the dangerous area can be accessed from above, the highest beam of the barrier must be at a height **H** of at least 1800 mm from the base **G** of the machine.

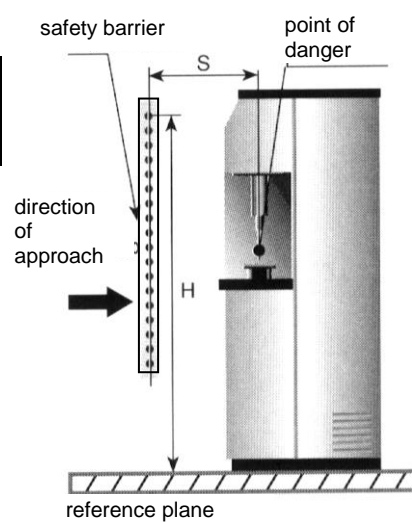


Figure 6

90 mm resolution models.



These models are suitable for the protection of arms or legs and must not be used to protect fingers or hands.

The minimum safety distance **S** is calculated according to the following formula:

$$S = 1600(t_1 + t_2) + 850$$



The height **H** of the highest beam from the base **G** must never be less than 900 mm, while the height of the lowest beam **P** must never be more than 300 mm.

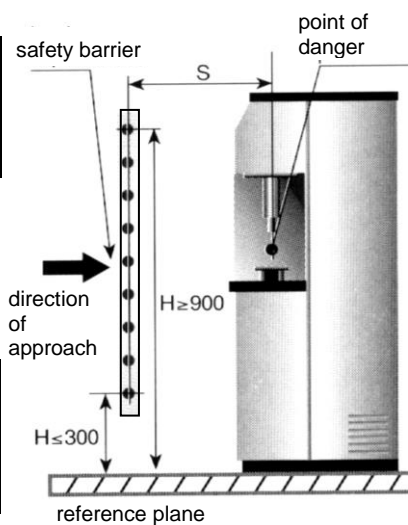


Figure 7

HORIZONTAL POSITION OF THE BARRIER

When the object's direction of approach is parallel to the floor of the protected area, the barrier must be installed so that the distance between the outer limit of the dangerous area and the most external optical beam is greater than or equal to the minimum safety distance S calculated as follows:

$$S = 1600(t_1 + t_2) + 1200 - 0.4H$$

where H is the height of the protected surface from the base of the machine;

$$H = 15(D-50)$$

(D =resolution)

In this case, H must always be less than 1 meter.

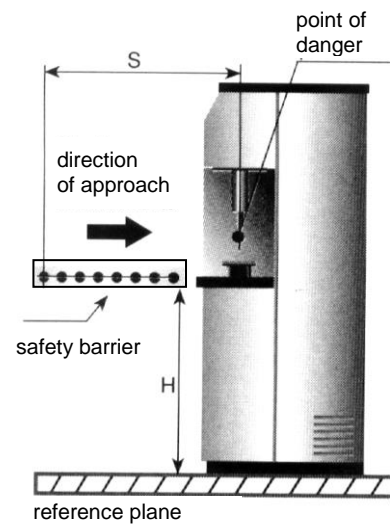


Figure 8

ELECTRICAL CONNECTIONS

WARNINGS

Before making the electrical connections, make sure that the supply voltage complies with that specified in the technical data sheet.



Emitter and Receiver units must be supplied with 24Vdc±20% power.



The external power supply must comply with the standard EN 60204-1.

The electrical connections must be made according to the diagrams in this manual. In particular, do not connect other devices to the connectors of the Emitter and Receiver.

For reliability of operation, when a diode jumper supply unit is used, its output capacity must be at least 2000µF for each absorbed A.

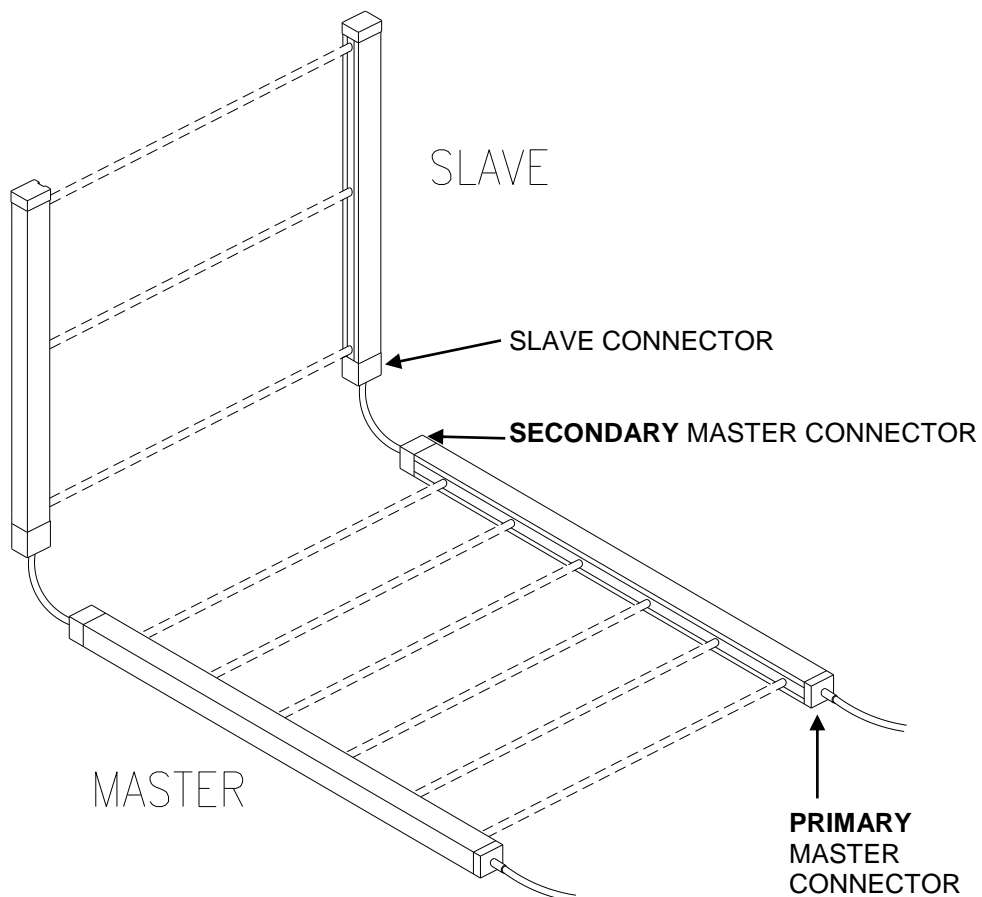
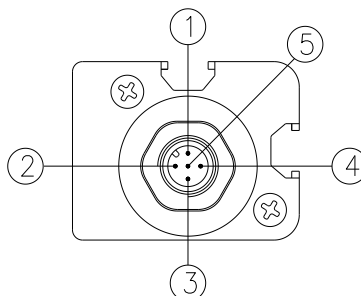
MASTER/SLAVE CONNECTORS LOCATION

Figure 9

EMITTER CONNECTIONS



MASTER MODELS (PRIMARY CONNECTOR), SLAVE and STANDARD M12, 5-pin connector.

| PIN | COLOR | NAME | TYPE | DESCRIPTION | FUNCTIONING |
|-----|-------|--------|--------|-----------------------|---|
| 1 | Brown | 24VDC | INPUT | +24 VDC power supply | - |
| 3 | Blue | 0VDC | | 0 VDC power supply | - |
| 5 | Grey | PE | | Ground connection | - |
| 2 | White | RANGE0 | OUTPUT | Barrier configuration | According the standard EN61131-2 (ref. Table 3) |
| 4 | Black | RANGE1 | | | |

Table 1

MASTER MODELS (SECONDARY CONNECTOR) - M12, 5-pin connector.

| PIN | COLOR | NAME | TYPE | DESCRIPTION | FUNCTIONING |
|-----|-------|--------|--------|-----------------------|---|
| 1 | Brown | 24VDC | INPUT | +24 VDC power supply | - |
| 3 | Blue | 0VDC | | 0 VDC power supply | - |
| 5 | Grey | PE | | Ground connection | - |
| 2 | White | RANGE0 | OUTPUT | Barrier configuration | According the standard EN61131-2 (ref. Table 3) |
| 4 | Black | RANGE1 | | | |

Table 2

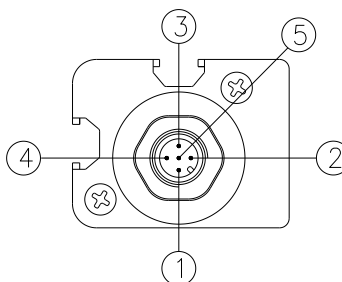
| TEST and RANGE SELECTION (MASTER ONLY) | | |
|--|-------|----------------------|
| PIN 4 | PIN 2 | FUNCTIONING |
| 24VDC | 0VDC | HIGH range |
| 0VDC | 24VDC | LOW range |
| 0VDC | 0VDC | Emitter in test mode |
| 24VDC | 24VDC | Selection error |

Table 3

RECEIVER CONNECTIONS

RECEIVER

SLAVE MODELS MASTER MODELS (SECONDARY CONNECTOR)



SLAVE MODELS - M12, 5-pin connector

| PIN | COLOR | NAME | TYPE | DESCRIPTION | FUNCTIONING |
|-----|-------|-------|--------|-----------------------|-----------------|
| 1 | Brown | 24VDC | - | +24 VDC power supply | - |
| 3 | Blue | 0VDC | - | 0 VDC power supply | - |
| 5 | Grey | PE | - | Ground connection | - |
| 2 | White | OSSD1 | OUTPUT | Safety static outputs | PNP active high |
| 4 | Black | OSSD2 | OUTPUT | | |

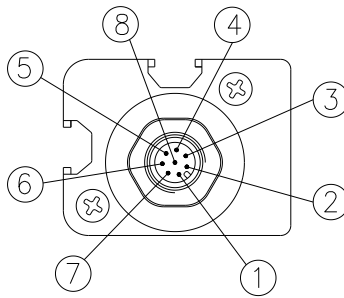
Table 4

MASTER MODELS (SECONDARY CONNECTOR) - 5 poles M12.

| PIN | COLOR | NAME | TYPE | DESCRIPTION | FUNCTIONING |
|-----|-------|--------|-------|----------------------------|--|
| 1 | Brown | 24VDC | - | +24 VDC power supply | - |
| 3 | Blue | 0VDC | - | 0 VDC power supply | - |
| 5 | Grey | PE | - | Ground connection | - |
| 2 | White | SLAVE1 | INPUT | Slave OSSD outputs readout | According the standard EN61131-2 (PNP active high) |
| 4 | Black | SLAVE2 | INPUT | | |

Table 5

**RECEIVER
MASTER MODELS (PRIMARY CONNECTOR) - STANDARD MODELS**



MASTER MODELS (PRIMARY CONNECTOR) - 8 poles M12.
STANDARD MODELS - 8 poles M12 connector.

| PIN | COLOR | NAME | TYPE | DESCRIPTION | FUNCTIONING |
|-----|--------|-------|--------|-----------------------|--|
| 2 | Brown | 24VDC | - | +24 VDC power supply | - |
| 7 | Blue | 0VDC | - | 0 VDC power supply | - |
| 8 | Red | PE | - | Ground connection | - |
| 1 | White | OSSD1 | OUTPUT | Safety static outputs | PNP active high |
| 3 | Green | OSSD2 | OUTPUT | | |
| 5 | Grey | SEL_A | INPUT | Barrier configuration | According the standard EN61131-2 (ref. Par. "Configuration and operation modes") |
| 6 | Pink | SEL_B | INPUT | | |
| 4 | Yellow | SEL_C | INPUT | | |

Table 6

WARNINGS REGARDING THE CONNECTION CABLES

- For connections over 50 m long, use cables with a cross-section area of 1 mm².
- The power supply to the barrier should be kept separate from that to other electric power equipment (electric motors, inverters, frequency converters) or other sources of disturbance.
- Connect the Emitter and the Receiver to the ground outlet.
- The connection cables must follow a different route to that of the other power cables.

AUTOMATIC FUNCTIONING

The ADMIRAL AX BK light curtain features only one Automatic operating mode (without re-start interlock).



The ADMIRAL AX BK light curtain is not equipped with a start/restart interlock circuit. This safety function is compulsory in most applications. The safety modules of the AD SR series permit safe implementation of this function according to IEC 61496-1. Carefully assess the related risks analysis of own application.

In this functioning mode, the OSSD1 and OSSD2 safety outputs comply with the status of the light curtain :

- with the area protected free, the outputs are active.
- with the area protected occupied, they are de-activated.

BLANKING FUNCTION

The ADMIRAL AX BK opto-electronic light curtain features a floating blanking function according to which the user can inhibit the detection function **from a minimum of 1 beam to a maximum of 3 adjacent beams** with two different types of functioning according to the selected method of configuration.

The blanking function is useful in applications in which, in specific safety conditions, opaque objects must be introduced in the area protected by the light curtain without stopping the controlled machine.

This function is particularly useful when the area protected by the light curtain may be intercepted by the material being processed or by a fixed or mobile part of the machine.



Note that this function cannot be activated on the synchronism beam (1st beam starting from the signalling label with display).

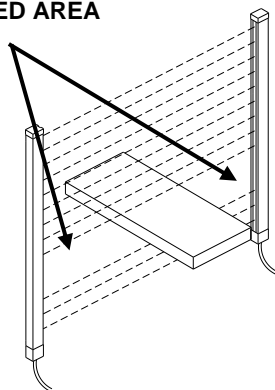


Using the blanking function, the resolution of the light curtain is modified according to Table 7 and Table 8.



When the width of the mobile object is less than that of the protected area (range), suitable mechanical guards must be provided to the sides in order to prevent accidents due to the unprotected areas. If the object is moved vertically, the safety guards must move so that they remain adjacent with this. (Figure 10)

UNPROTECTED AREA



MECHANICAL GUARDS

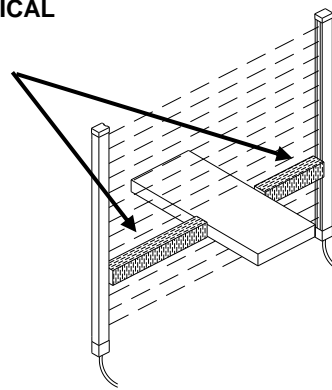


Figure 10

ADMIRAL AX BK features two different types of blanking:

- Blanking **Without Object Presence Obligation (Mode A)**
- Blanking **With Object Presence Obligation (Mode B)**

Blanking Without Object Presence Obligation (Mode A)

With this function, an object can be introduced in the dangerous area without de-activating the outputs of the light curtain. The resolution is modified for the entire height of the protected area.

When the mobile object is removed, the outputs remain active. For this type of blanking, it is possible to choose between three different methods of operation:

1. Mode A1: (Figure 11)

- With all the beams free, the protected area is free.
- With one beam occupied (except for the synchronism beam), the area is considered free.
- With two or more beams occupied, the area is considered occupied.

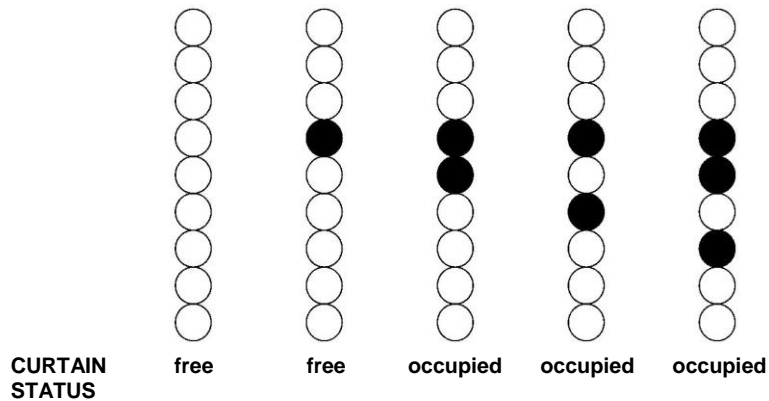


Figure 11

2. Mode A2: (Figure 12)

- With all the beams free, the protected area is free.
- With one or two **adjacent** beams occupied (except for the synchronism beam), the area is considered free.
- With two or more **non-adjacent** beams occupied, the area is considered occupied.

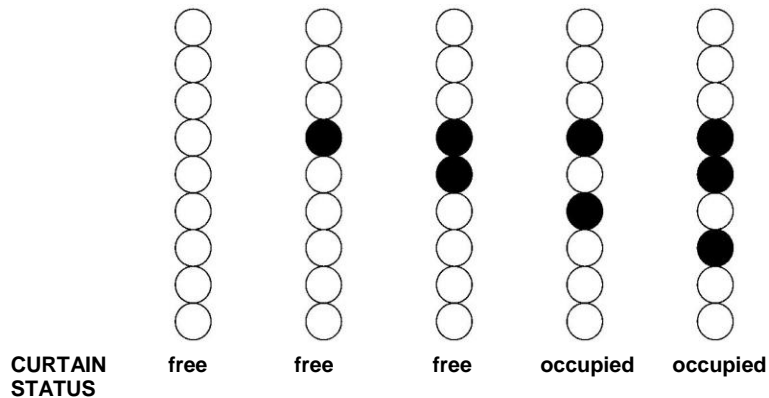


Figure 12

3. Mode A3: (Figure 13)

- With all the beams free, the protected area is free.
- With one, two or three **adjacent** beams occupied (except for the synchronism beam) the area is considered free.
- With two or more **non-adjacent** beams occupied, the area is considered occupied.

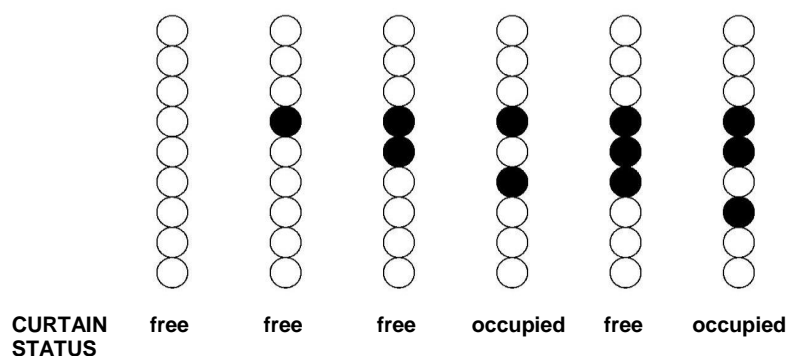


Figure 13

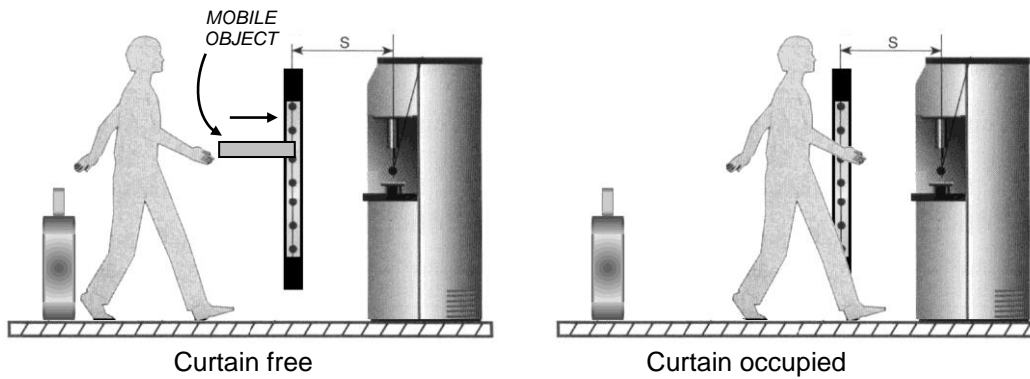
| Nominal resolution | Type of Blanking | Effective resolution | Maximum size of mobile object * |
|--------------------|----------------------|----------------------|---------------------------------|
| 14 mm | No blanking | 14 mm | 0 |
| | Floating blanking A1 | 24 mm | 8 |
| | Floating blanking A2 | 34 mm | 18 |
| | Floating blanking A3 | 44 mm | 28 |
| 20 mm | No blanking | 20 mm | 0 |
| | Floating blanking A1 | 30 mm | 10 |
| | Floating blanking A2 | 40 mm | 20 |
| | Floating blanking A3 | 50 mm | 30 |
| 40 mm | No blanking | 40 mm | 0 |
| | Floating blanking A1 | 70 mm | 30 |
| | Floating blanking A2 | 100 mm | 60 |
| | Floating blanking A3 | 130 mm | 90 |

| Nominal resolution | Type of Blanking | Distance between beams | Maximum size of mobile object * |
|--------------------|----------------------|------------------------|---------------------------------|
| 90 mm | No blanking | 80 mm | 0 |
| | Floating blanking A1 | 150 mm | 60 |
| | Floating blanking A2 | 230 mm | 140 |
| | Floating blanking A3 | 300 mm | 210 |

Table 7 - Blanking Without Object Presence Obligation

* Data obtained with optimal alignment between Emitter and Receiver

Calculate the safety distance S according to the formula provided on page 8 applying the effective value taken from Table 7 to D (resolution).



Blanking With Object Presence Obligation (Mode B)

With this function, an object (mobile or fixed) can be maintained inside the danger zone without de-activation of the light curtain outputs.

The size of the introduced object must not be less than the initial resolution of the light curtain or than the distance between the beams (in 90mm case). The object must be inside the protected area during each phase of the process in which the light curtain is active.

The width of the introduced object must be equal to that of the entire area protected by the light curtain (range); if this condition is not complied with, the effective resolution obtained from Table 8 cannot be considered valid inside and at the margins of the blanking area and a resolution corresponding to that obtained with Mode A for a corresponding number of beams must be considered (B1 is equivalent to A2 and B2 to A3).

If the object introduced has the above-mentioned characteristics, a resolution equal to the initial resolution (without blanking) can be considered for the light curtain for the entire protected area except at the margins of the blanking area where the effective resolution obtained from table 8 must be considered.

This method of blanking is available with two configurations:

1. Mode B1: (Figure 14)

- With all the beams free, the mobile object is absent, therefore the outputs are de-activated. The letter “b” is shown on the display of the receiver, indicating that the outputs are de-activated due to absence of the mobile object.
- With one beam occupied (except for the synchronism beam), the mobile object is present (blanking active and outputs ON).
- With two **adjacent** beams occupied (except for the synchronism beam), the area is considered free (tolerance of 1 beam).
- With two or more **non-adjacent** beams occupied, the area is considered occupied.

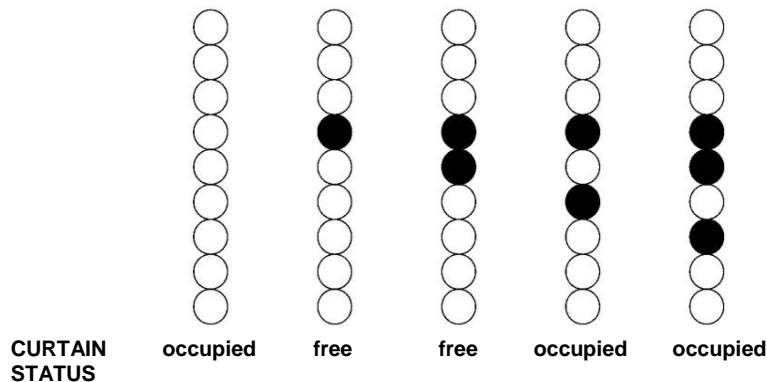


Figure 14

2. **Mode B2: (Figure 15)**

- With all the beams free, the mobile object is missing, therefore the outputs are de-activated. The letter “b” indicating that the outputs are de-activated due to the absence of the mobile object is shown on the display of the receiver.
- With one beam occupied, the mobile object is present (blanking active and outputs ON).
- With two or three **adjacent** beams occupied (except for the synchronism beam), the area is considered free (tolerance of ± 1 beam).
- With two or more **non-adjacent** beams occupied, the area is considered occupied.

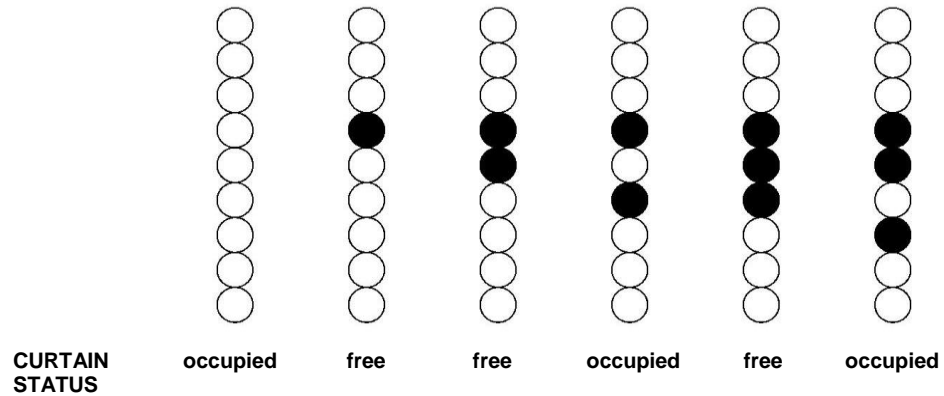


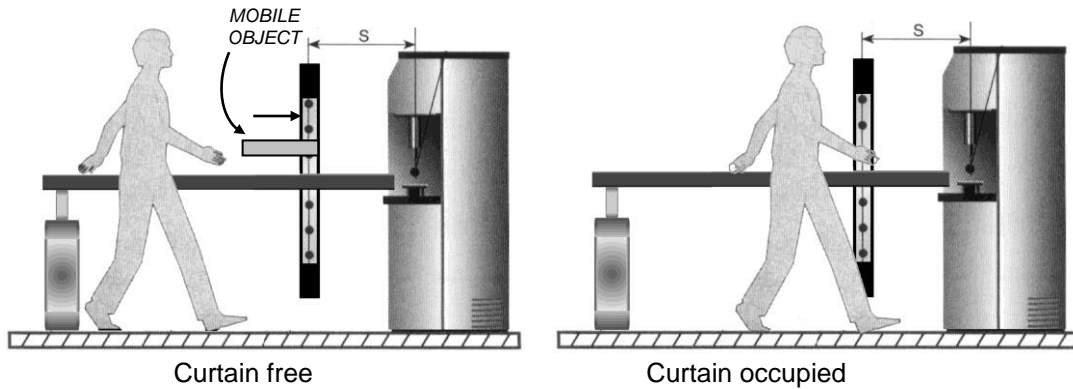
Figure 15

| Nominal resolution | Type of Blanking | Effective resolution at the edges of the blanking area |
|--------------------|----------------------|--|
| 14 mm | No blanking | 14 mm |
| | Floating blanking B1 | 16 mm |
| | Floating blanking B2 | 26 mm |
| 20 mm | No blanking | 20 mm |
| | Floating blanking B1 | 20 mm |
| | Floating blanking B2 | 30 mm |
| 40 mm | No blanking | 40 mm |
| | Floating blanking B1 | 60 mm |
| | Floating blanking B2 | 90 mm |

| Nominal resolution | Type of Blanking | Minimum detectable object |
|--------------------|----------------------|---------------------------|
| 90 mm | No blanking | 90 mm |
| | Floating blanking B1 | 140 mm |
| | Floating blanking B2 | 210 mm |

Table 8 - Blanking With Object Presence Obligation

 Calculate the safety distance *S* following the formula of page 8 using the *D* value obtained from table 8.



CONFIGURATION OF THE TYPE OF BLANKING

The Type of Blanking of the ADMIRAL AX BK light curtain is set with suitable connections on the M12 8-pin connector of the Receiver (Table 9).

| CONNECTIONS | | | FUNCTIONING MODE |
|--|--|--|--|
| SEL_A (pin 5) connected to: 0VDC | SEL_B (pin 6) connected to: 0VDC | SEL_C (pin 4) connected to: 0VDC | No blanking |
| SEL_A (pin 5) connected to: 0VDC | SEL_B (pin 6) connected to: 24VDC | SEL_C (pin 4) connected to: 24VDC | Blanking Without Object Presence Obligation – Mode A1 |
| SEL_A (pin 5) connected to: 24VDC | SEL_B (pin 6) connected to: 0VDC | SEL_C (pin 4) connected to: 24VDC | Blanking Without Object Presence Obligation - Mode A2 |
| SEL_A (pin 5) connected to: 24VDC | SEL_B (pin 6) connected to: 24VDC | SEL_C (pin 4) connected to: 0VDC | Blanking Without Object Presence Obligation - Mode A3 |
| SEL_A (pin 5) connected to: OSSD1 (pin 1) | SEL_B (pin 6) connected to: OSSD2 (pin 3) | SEL_C (pin 4) connected to: 24VDC | Blanking With Object Presence Obligation - Mode B1 |
| SEL_A (pin 5) connected to: OSSD2 (pin 3) | SEL_B (pin 6) connected to: OSSD1 (pin 1) | SEL_C (pin 4) connected to: 0VDC | Blanking With Object Presence Obligation - Mode B2 |

Table 9



It is not possible to modify the configuration of the type of Blanking with the light curtain operating. The system must first of all be switched off and then on again.

Example of MASTER-SLAVE connection in AUTOMATIC operating mode with Blanking Without Object Presence Obligation (Mode A1)

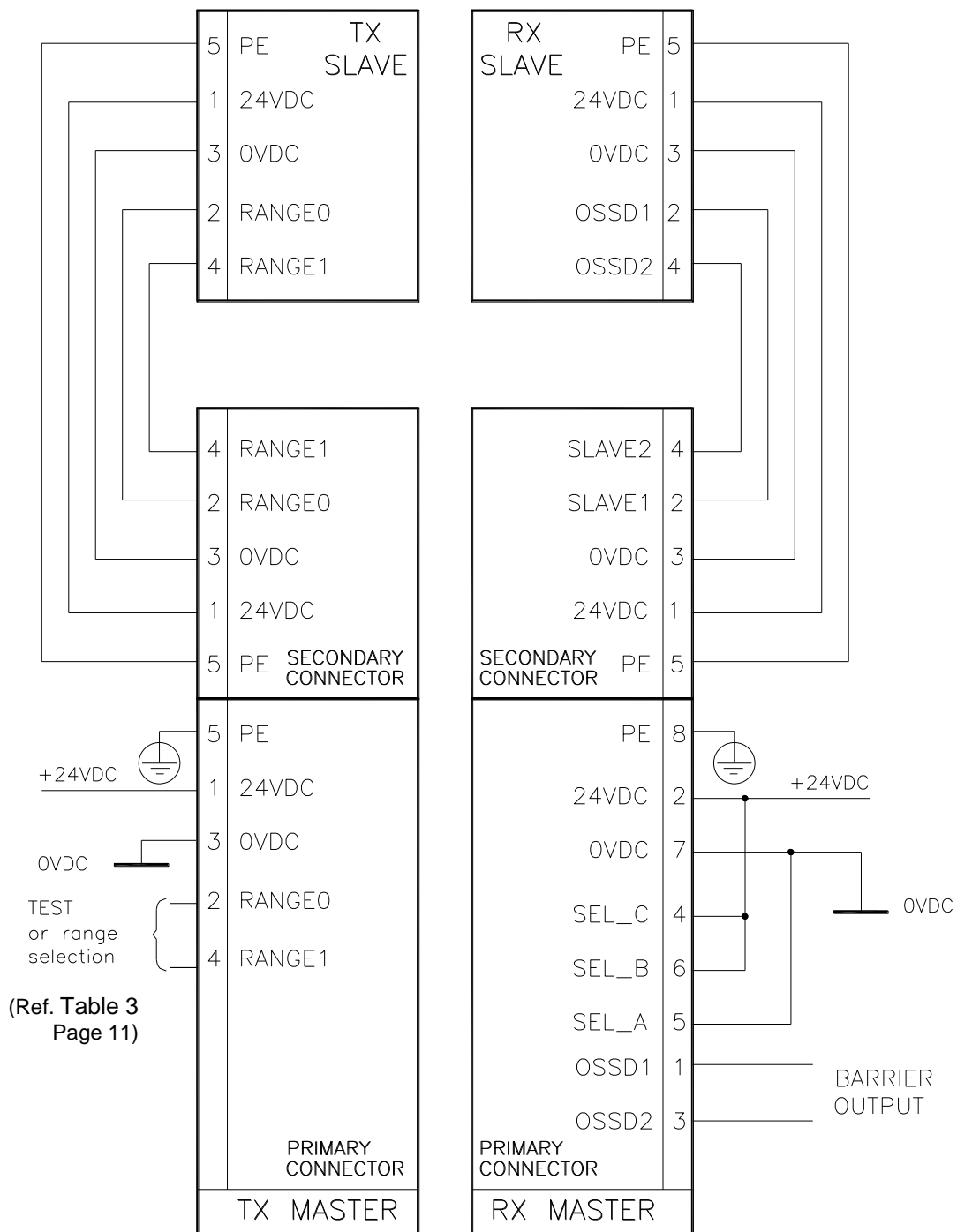


Figure 16

➔ In order to assure a correct barrier operation, it is necessary to connect the pins 2 and 4 of the Emitter according to table 3 (page 11) and to the "TEST FUNCTION" paragraph of page 31.

Example of MASTER-SLAVE connection in AUTOMATIC operating mode with Blanking Without Object Presence Obligation (Mode A2)

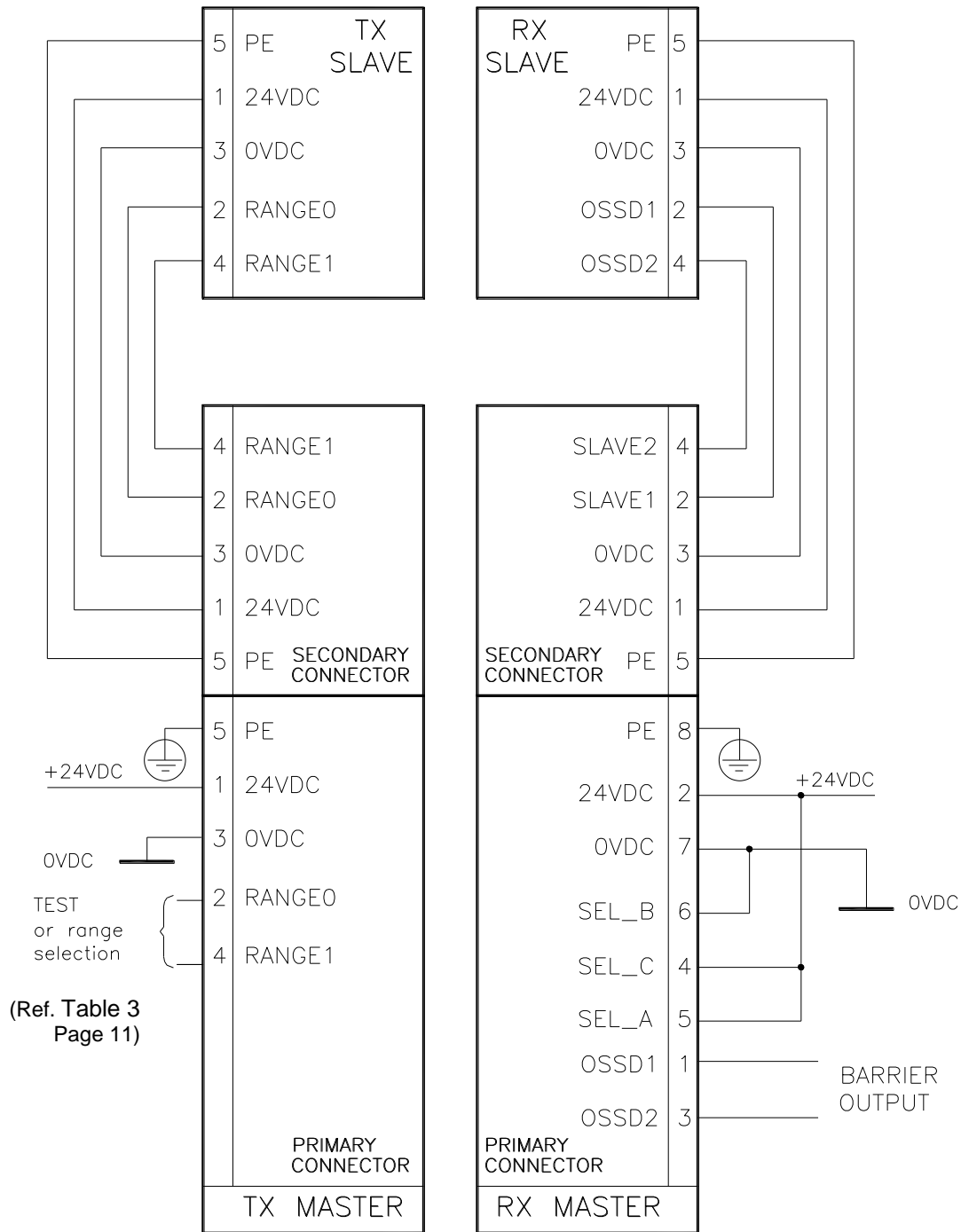


Figure 17

➔ In order to assure a correct barrier operation, it is necessary to connect the pins 2 and 4 of the Emitter according to table 3 (page 11) and to the "TEST FUNCTION" paragraph of page 31.

Example of MASTER-SLAVE connection in AUTOMATIC operating mode with Blanking Without Object Presence Obligation (Mode A3)

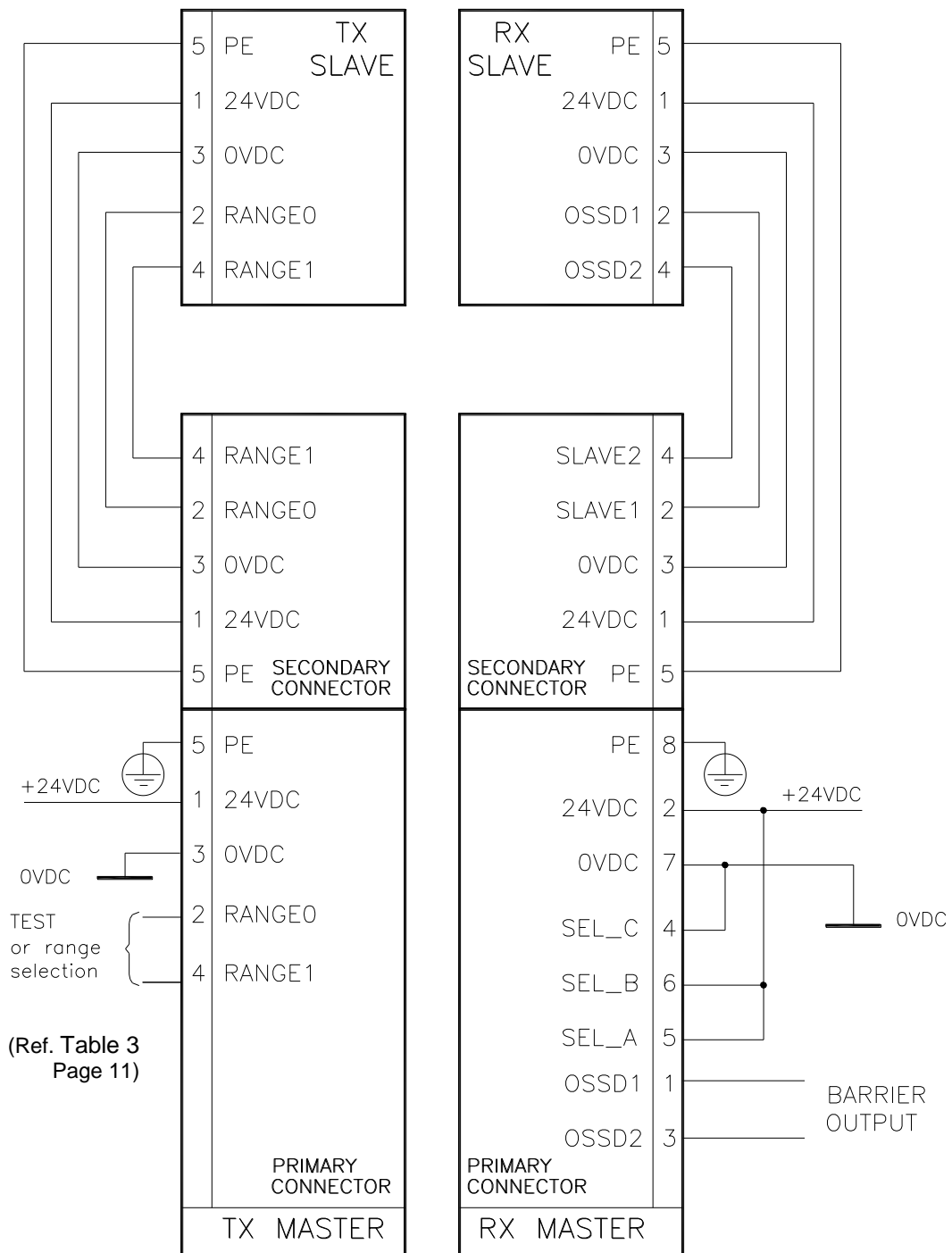


Figure 18

➔ In order to assure a correct barrier operation, it is necessary to connect the pins 2 and 4 of the Emitter according to table 3 (page 11) and to the "TEST FUNCTION" paragraph of page 31.

Example of MASTER-SLAVE connection in AUTOMATIC operating mode with Blanking With Object Presence Obligation (Mode B1)

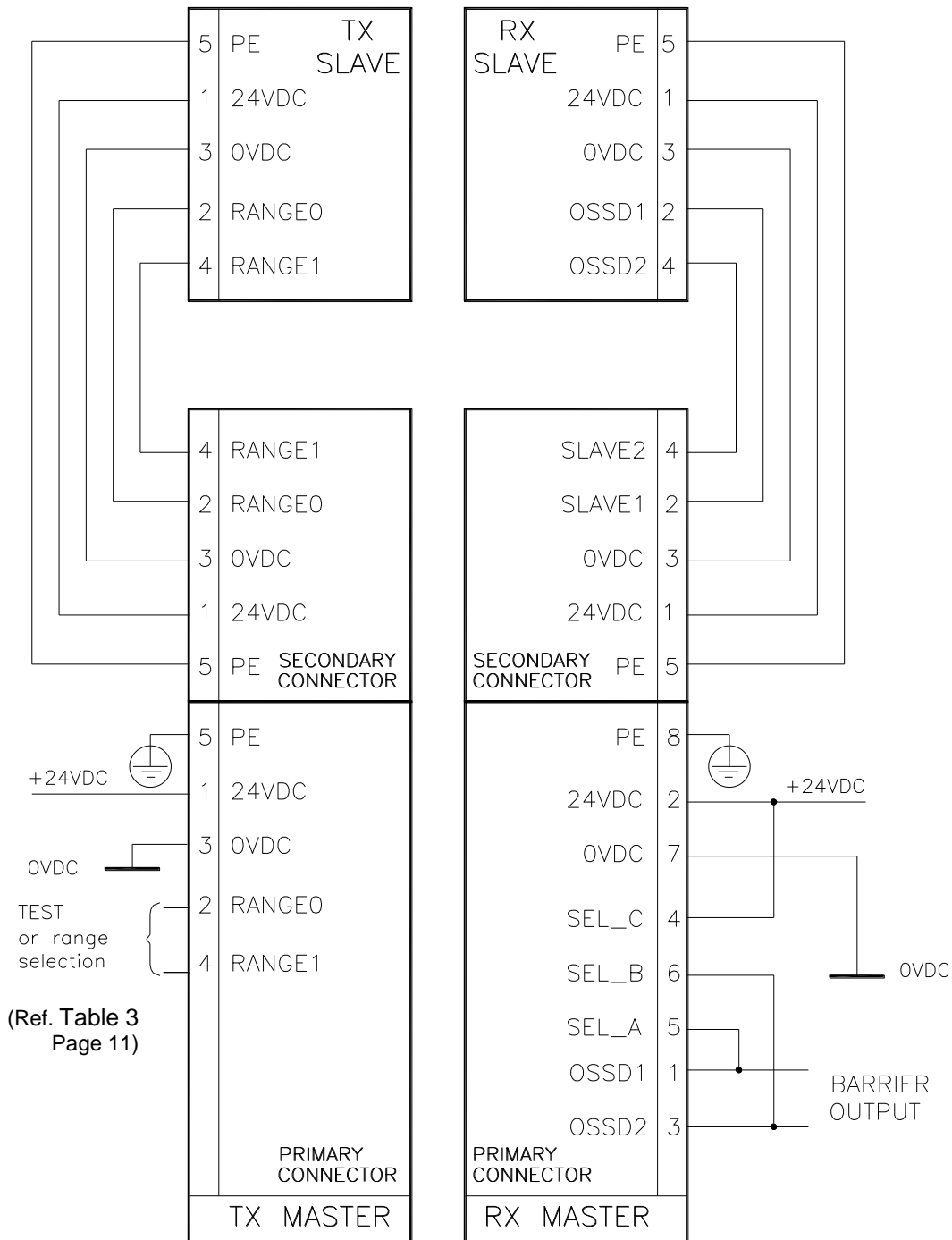


Figure 19

➔ In order to assure a correct barrier operation, it is necessary to connect the pins 2 and 4 of the Emitter according to table 3 (page 11) and to the "TEST FUNCTION" paragraph of page 31.

Example of MASTER-SLAVE connection in AUTOMATIC operating mode with Blanking With Object Presence Obligation (Mode B2)

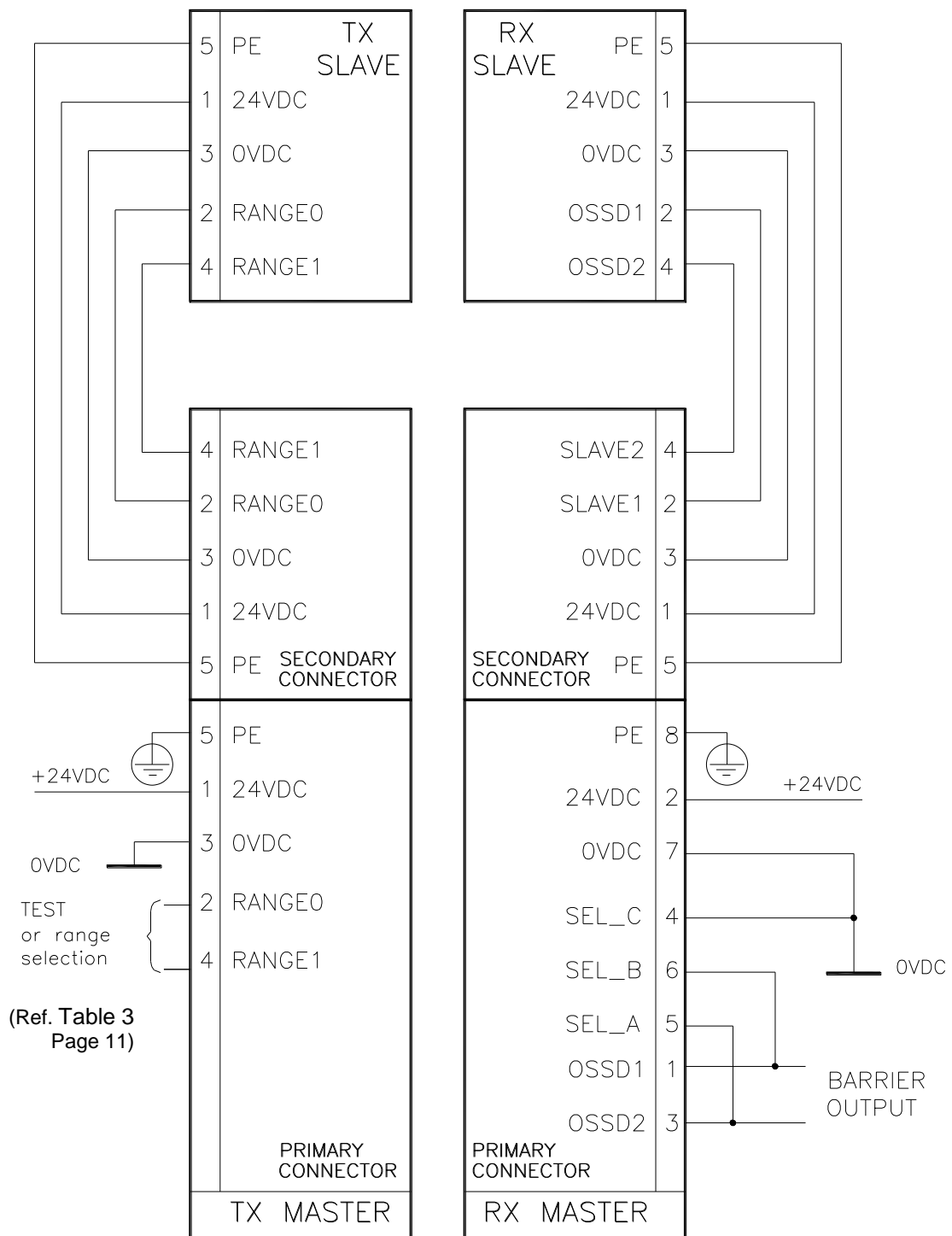


Figure 20

➔ In order to assure a correct barrier operation, it is necessary to connect the pins 2 and 4 of the Emitter according to table 3 (page 11) and to the "TEST FUNCTION" paragraph of page 31.

**Example of connection in AUTOMATIC operating mode
with Blanking Without Object Presence Obligation (Mode A1)**

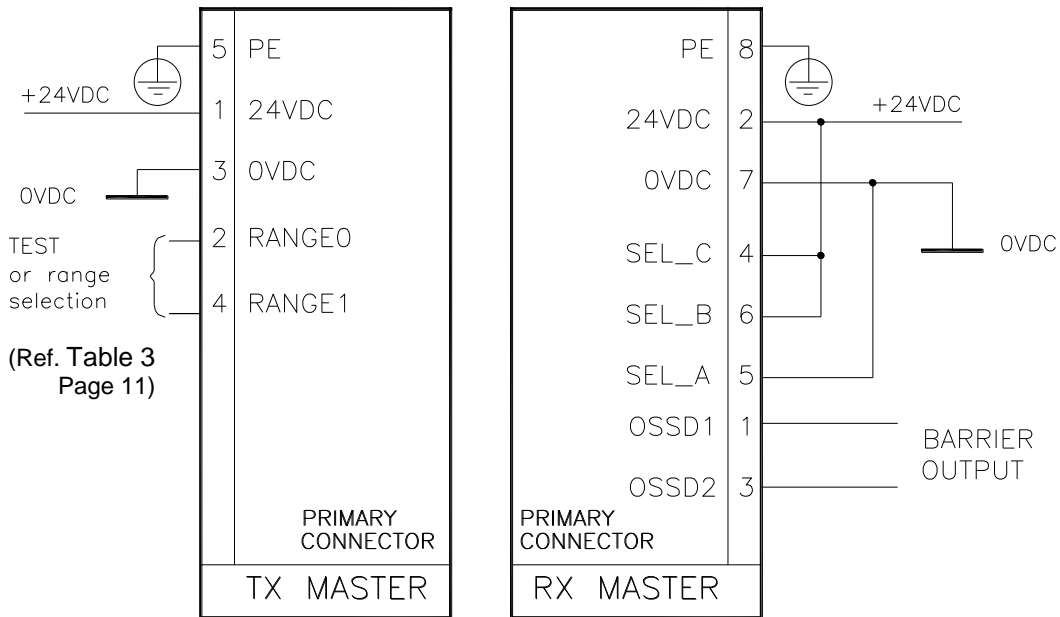


Figure 21

**Example of connection in AUTOMATIC operating mode
with Blanking With Object Presence Obligation (Mode B1)**

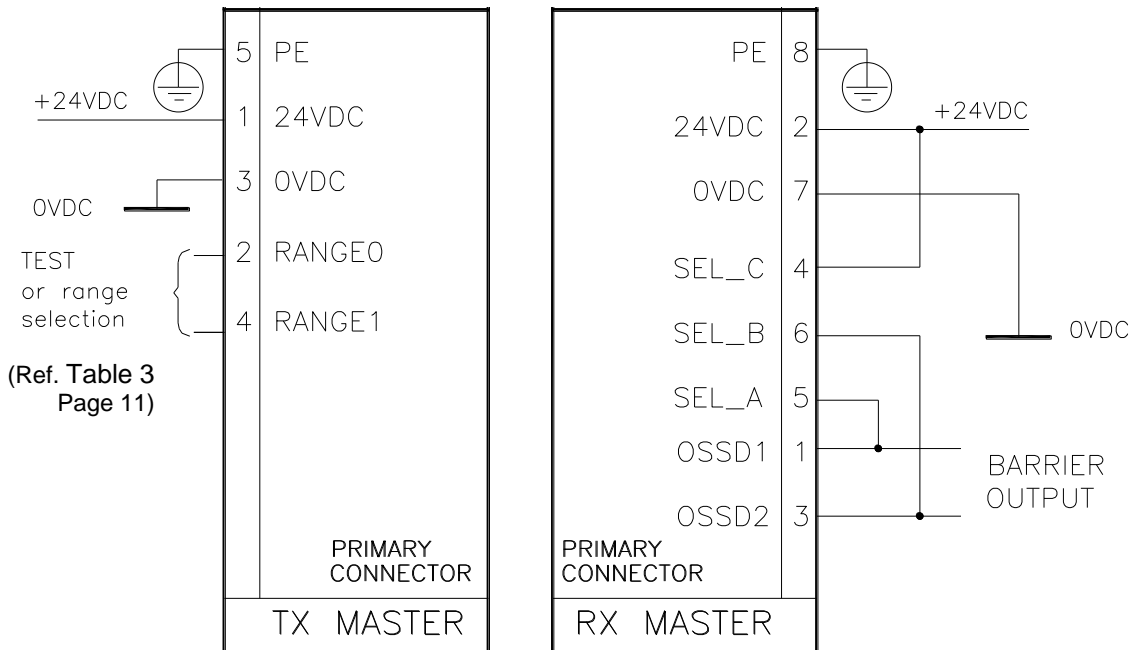


Figure 22

➔ In order to assure a correct barrier operation, it is necessary to connect the pins 2 and 4 of the Emitter according to table 3 (page 11) and to the "TEST FUNCTION" paragraph of page 31.

MULTIPLE SYSTEMS

When more than one ADMIRAL AX BK system is used, precautions must be taken to avoid optical interference between them: install the units so that the beam emitted by the Emitter of one system can only be received by the relative Receiver.

Figure 23 illustrates some examples of correct positioning when two photoelectric systems are installed. Incorrect positioning could generate interference, and may result in malfunctioning.

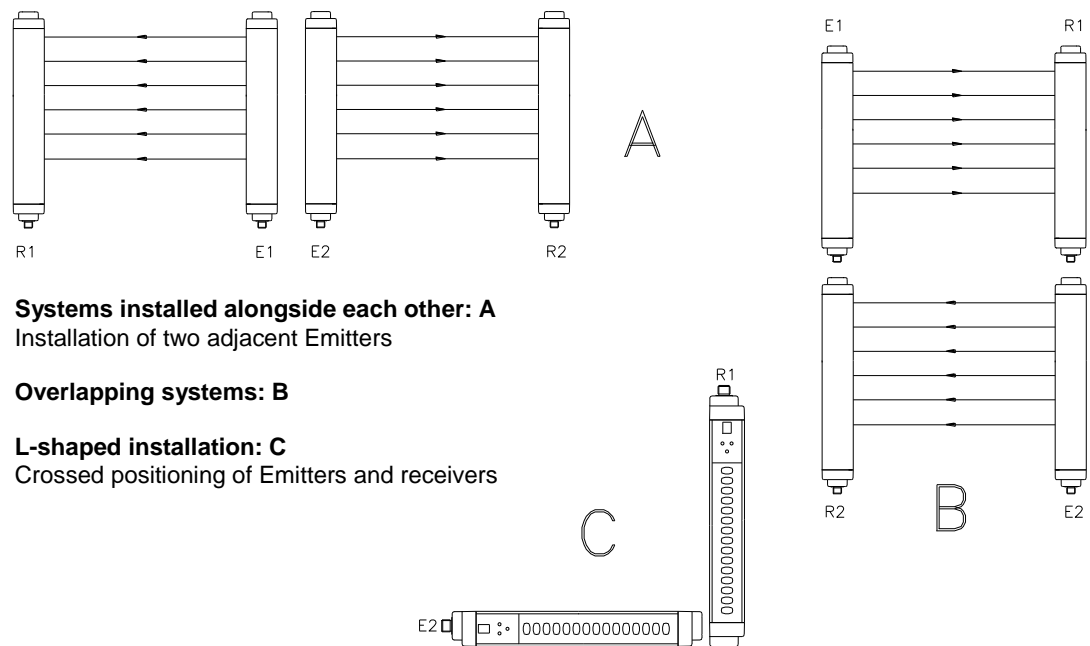


Figure 23



This operation is not necessary in case of coexistence of a MASTER and a SLAVE.

USE OF DEFLECTION MIRRORS

In order to protect or control areas that can be accessed from more than one side, in addition to the Emitter and Receiver, one or more deflection mirrors can be installed.

These mirrors enable the optical beams generated by the Emitter to be deviated on one or more sides.

If the beams emitted by the Emitter must be deviated by 90°, the perpendicular to the surface of the mirror must form an angle of 45° with the direction of the beams.

The following figure illustrates an application in which two deviation mirrors are used to provide a U-shaped protection.

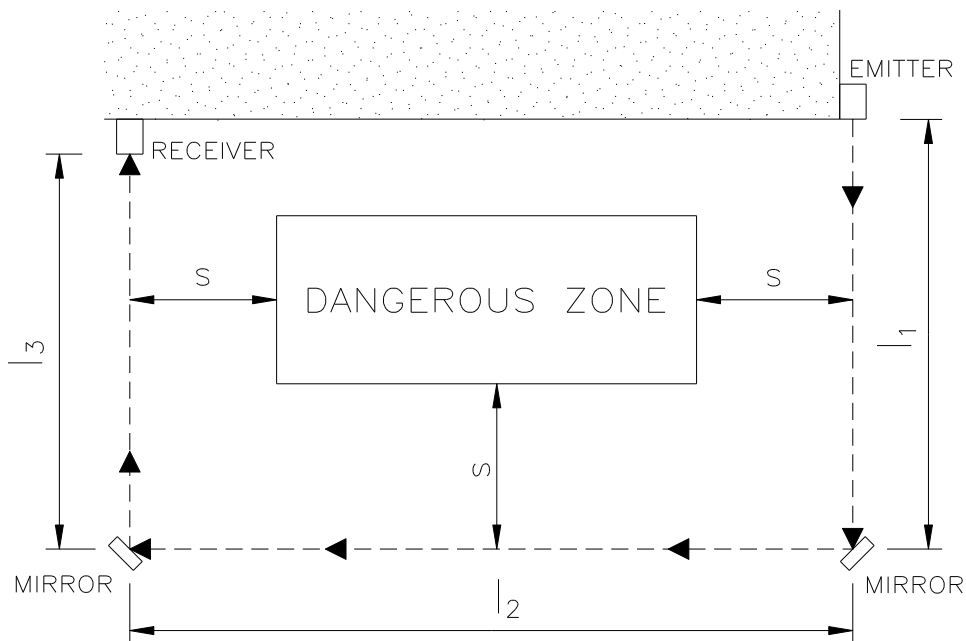


Figure 24

The following rules should be taken into consideration when using deviation mirrors:

- Place the mirrors so as to ensure compliance with the minimum safety distance **S** (Figure 24) on each side from which the danger zone can be accessed.
- The working distance (range) is given by the sum of the lengths of all the sides that give access to the protected area. (Remember that for each mirror used the maximum working range between the Emitter and the Receiver is reduced by 15%).
- During installation, take great care to avoid twisting along the longitudinal axis of the mirror.
- Make sure, by standing near to and on the axis of the Receiver, that the **entire outline** of the Emitter is visible on the first mirror.
- The use of more than three deviation mirrors is not recommended.

DISTANCE BETWEEN REFLECTING SURFACES

The presence of reflecting surfaces in proximity of the photoelectric barrier may generate spurious reflections that prevent monitoring. With reference to Figure 25, object **A** is not detected because surface **S** reflects the beam and closes the optical path between the Emitter and Receiver. A minimum distance **d** must therefore be maintained between any reflecting surfaces and the protected area. The minimum distance **d** must be calculated according to the distance **l** between the Emitter and the Receiver, considering that the angle of projection and reception is 4°.

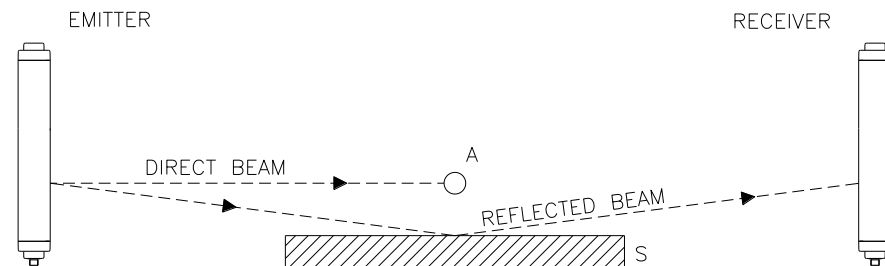


Figure 25

Figure 26 illustrates the values for the minimum distance **d** that must be maintained when the distance **l** between the Emitter and Receiver is changed.

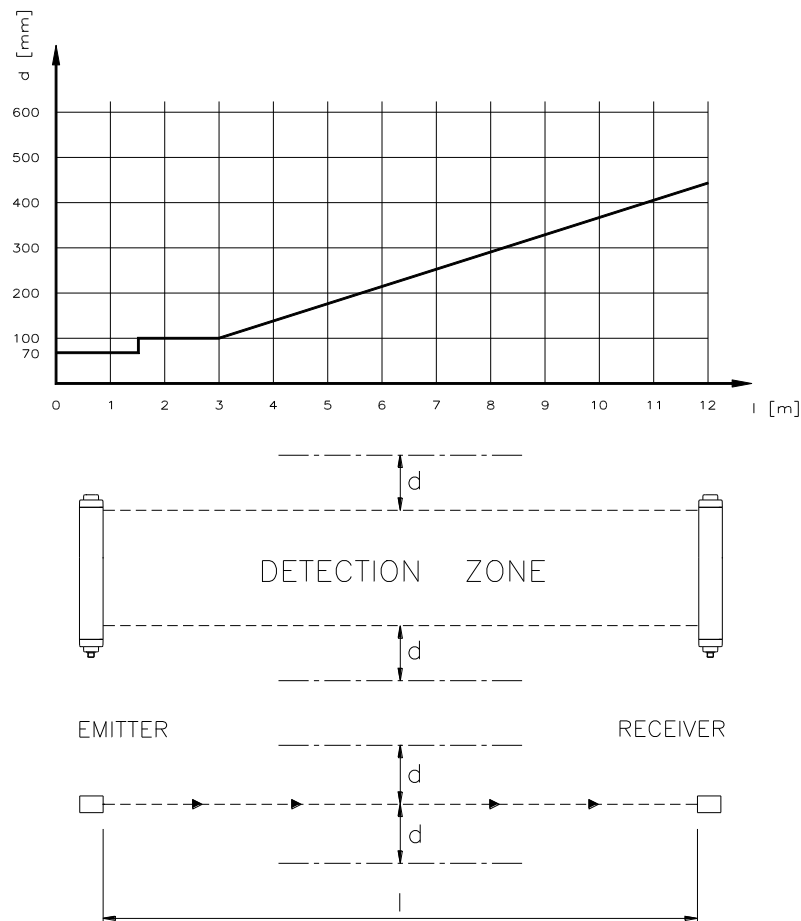


Figure 26

After installing the system, check whether any reflecting surfaces intercept the beams, first in the centre and then in the vicinity of the Emitter and Receiver. During these operations, the red LED on the Receiver should never, for any reason, switch off.

MECHANICAL ASSEMBLY AND OPTICAL ALIGNMENT

The Emitter and the Receiver must be assembled opposite each other (at a distance specified in the technical data sheet). Use the **fastening brackets and inserts** supplied with the system to place the Emitter and the Receiver so that these are aligned and parallel to each other and with the connectors facing the same way.

Depending on the dimensions and the shape of the support on which they are to be installed, the Emitter and Receiver must be assembled with the fastening inserts at the back, or else by fitting these in the side groove (Figure 27).

Perfect alignment of the Emitter and Receiver is essential in order to assure correct barrier operation. The indicator LEDs on the Emitter and Receiver facilitate this operation.



To perform an easier alignment the use of SFB circular brackets is necessary. These are available on request (ordering code 1330974).

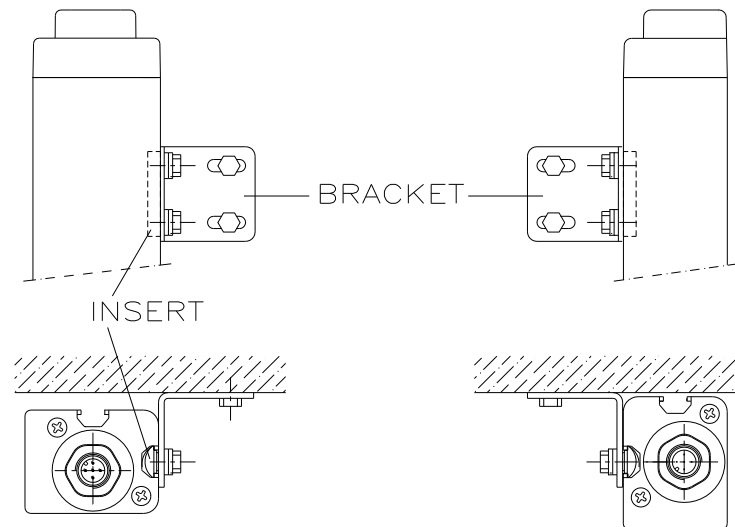


Figure 27

- Position the optical axis of the first and last beam of the Emitter on the same axis as that of the corresponding beams on the Receiver.
- Move the Emitter in order to find the area within which the green LED on the Receiver stays on, then position the first beam of the Emitter (the one close to the indicator LEDs) in the centre of this area.
- Using this beam as a pivot, effect small sideways movements of the opposite end to move to the protected area clear condition. The green LED on the Receiver will indicate this condition.
- Lock the Emitter and Receiver in place.

During these operations it may be useful to check the presence of the **yellow LED weak signal ("d" letter for the slave models) on the receiver**. Upon completion of alignment, this LED/letter must be off.



In the case of MASTER/SLAVE models, first of all align the SLAVE pair and then the MASTER pair.



If the Emitter and the Receiver are assembled in areas that are subject to strong vibrations, **the use of vibration-damping supports is necessary**, in order to prevent circuit malfunctions (code SAV-3 1200088, code SAV-4 1200089).

OPERATION AND TECHNICAL DATA

SIGNALS

The symbols showed on the 7 segments display and the leds of emitter and receiver units are visualized depending on the system operation phase. The tables below shows the different signals (ref. Figure 28).

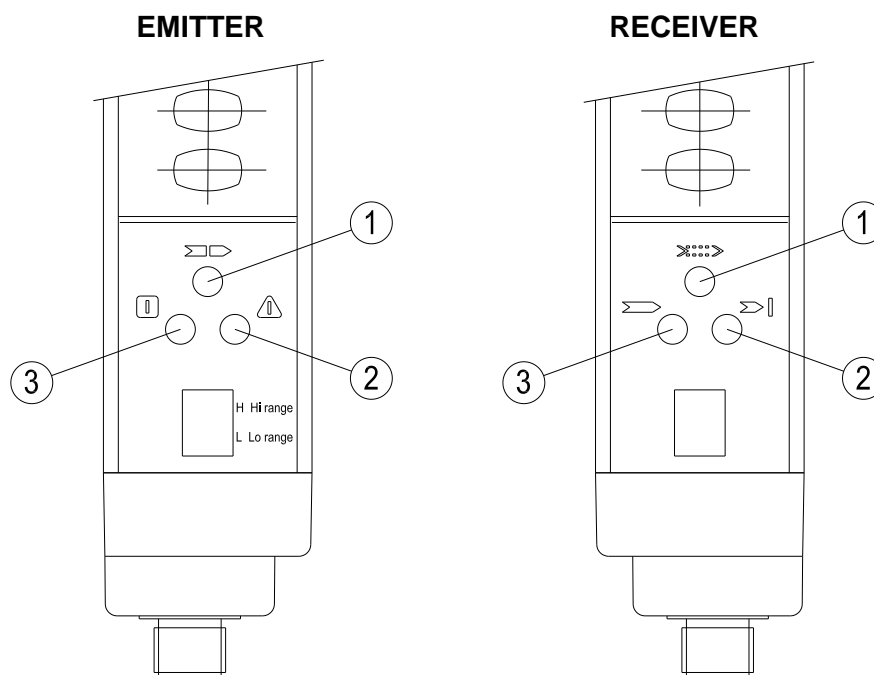


Figure 28

EMITTER SIGNALS

Normal operation (FIXED SYMBOLS)

| 7 SEGMENTS DISPLAY | | LED | | |
|--------------------|------------------------------|---------|-----------|------------|
| SYMBOL | MEANING | RED (2) | GREEN (3) | YELLOW (1) |
| 8 | Power on. Initial test | ON | OFF | ON |
| L | Normal operation. LOW range | OFF | ON | OFF |
| H | Normal operation. HIGH range | OFF | ON | OFF |
| L | TEST | OFF | ON | ON |
| H | | OFF | ON | ON |

MASTER OF NORMAL RECEIVER MESSAGES

Normal functioning (FIXED SYMBOLS)

| 7-SEGMENT DISPLAY | | LED | | |
|-------------------|---|---------|-----------|------------|
| SYMBOL | MEANING | RED (2) | GREEN (3) | YELLOW (1) |
| 8 | System power-on. Initial TEST. | ON | OFF | ON |
| C | ON for 10sec: Blanking S.O.P.O. (A) Mode A1 | ON | OFF | OFF |
| C | ON for 10sec: Blanking S.O.P.O. (A) Mode A2 | ON | OFF | ON |
| C | ON for 10sec: Blanking S.O.P.O. (A) Mode A3 | ON | OFF | Flashing |
| C | ON for 10sec: Blanking C.O.P.O. (B) Mode B1 | OFF | ON | OFF |
| C | ON for 10sec: Blanking C.O.P.O. (B) Mode B2 | OFF | ON | ON |
| None | BREAK condition (C) | ON | OFF | OFF |
| None | BREAK condition with weak signal | ON | OFF | ON |
| b | BREAK condition (no mobile object) (D) | ON | OFF | OFF |
| b | BREAK condition with weak signal (no mobile object) (D) | ON | OFF | ON |
| J | Master in Clear, Slave in BREAK (E) | ON | OFF | OFF |
| J | Master in Clear, Slave in BREAK with weak signal (E) | ON | OFF | ON |
| None | GUARD condition (F) – no blanking | OFF | ON | OFF |
| None | GUARD condition (F), no blanking with weak signal | OFF | ON | ON |
| Γ | BLANKING condition active | OFF | ON | OFF |
| | BLANKING condition active with weak signal | OFF | ON | ON |
| - | Receiver initialization | ON | OFF | OFF |

(A) S.O.P.O. = Without Object Presence Obligation (Mode A)

(B) C.O.P.O. = With Object Presence Obligation (Mode B)

(C) Curtain occupied - outputs de-activated

(D) Applicable only to Blanking With Object Presence Obligation

(E) Valid only in MASTER/SLAVE configuration

(F) Curtain free - outputs active

SLAVE RECEIVER SIGNALS

Normal operation (FIXED SYMBOLS)

| 7 SEGMENTS DISPLAY | | LED | | |
|--------------------|---|---------|-----------|------------|
| SYMBOL | MEANING | RED (2) | GREEN (3) | YELLOW (1) |
| 8 | System power on. Initial TEST | ON | OFF | ON |
| Nessuno | BREAK condition | ON | OFF | OFF |
| Nessuno | GUARD Condition | OFF | ON | OFF |
| d | BREAK condition with weak signal | ON | OFF | OFF |
| d | GUARD condition with weak signal | OFF | ON | OFF |
| - | Receiver initialization | ON | OFF | OFF |

N.B.: For the meaning of the number that is displayed in case of a malfunction, please refer to the “TROUBLESHOOTING” paragraph in this manual.

TEST FUNCTION

By means of the test function, which simulates occupation of the protected area, it is possible to verify the operation of the entire system by means of an external supervisor (e.g. PLC, control module, etc.).

The ADMIRAL AX BK barrier system features an automatic self-diagnosis function that enables it to detect response time malfunctions (this time is declared for each model).

This safety system is permanently active and does not require any interventions from the outside. The TEST function is available should the user wish to check equipment connected downstream of the barrier (without physically entering the protected area).

By means of this function the OSSDs can be switched from ON to OFF as long as the function remains active. Please see table 3 (page 11) for details about the use of the test function.

The minimum duration of the TEST function must be 40 msec.

OUTPUT STATUS

The ADMIRAL features two static PNP outputs on the Receiver, the status of which depends on the condition of the protected area.

The maximum load allowed is 500mA at 24VDC, which corresponds to a resistive load of 48Ω. Maximum load capacity corresponds to 2μF. The meaning of the status of outputs is defined in the table below. Any short circuit between outputs or between outputs and 24VDC or 0VDC power supplies is detected by the barrier.

| NAME OF SIGNAL | CONDITION | MEANING |
|----------------|-----------|---|
| OSSD1 | 24VDC | Barrier clear condition |
| OSSD2 | | |
| OSSD1 | 0VDC | Barrier engaged condition or failure detected |
| OSSD2 | | |

Table 10



In the protected area clear condition, the Receiver supplies a voltage of 24 VDC on both outputs. The required load must therefore be connected between the output terminals and the 0VDC (Figure 29).

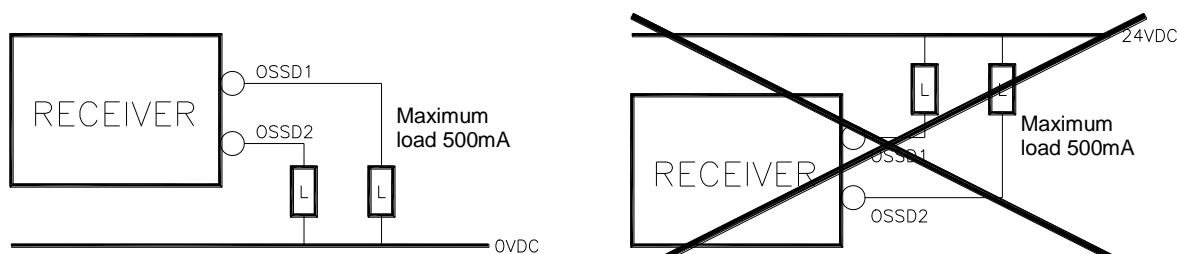


Figure 29

TECHNICAL SPECIFICATIONS

| TECHNICAL SPECIFICATIONS OF ADMIRAL BARRIERS AX | | |
|---|-------------------|---|
| Protected height | mm | 160 – 1810 |
| Resolutions | mm | 14 - 20 - 40 - 90 |
| Working range (selectable) 14mm models | m | 0 ÷ 2 (low) |
| | | 0 ÷ 5 (high) |
| Working range (selectable) 20mm, 40mm, 90mm | m | 0 ÷ 6 (low) |
| | | 3 ÷ 18 (high) |
| Safety outputs | | 2 PNP – 500mA @ 24VDC |
| Response time ** | ms | 6 ÷ 27 (see tables for specific models) |
| Power supply | VDC | 24 ± 20% |
| Connections | | Connectors M12 5/8-poles |
| Max. conn. length | m | 100 (50 between Master and Slave) |
| Operating temperature | °C | 0 ÷ 55°C |
| Protection rating | | IP 65 |
| Dimensions of section | mm | 35 x 45 |
| Max. consumption | W | 2 (Emitter) 3 (Receiver) |
| Light curtain lifetime | | 20 years |
| Safety level | Type 4 | IEC 61496-1:2004 IEC 61496-2:2006 |
| | SILCL 3 | IEC 62061:2005 |
| | PL e - Category 4 | ISO 13849-1:2006 |

** In case of operation of ADMIRAL AX BK in Master-Slave configuration, the correct total SLAVE response time must be calculated according the following formula:

$$t_{tot_slave} = t_{slave} + t_{master} + 1,8 \text{ ms}$$

LEGENDA

Admiral (with additional functions)= AX

Admiral Master = AXM

Admiral Slave = AXS

| 14 mm Resolution Models | 151 | 301 | 451 | 601 | 751 | 901 | 1051 | 1201 | 1351 | 1501 | 1651 | 1801 |
|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Number of beams | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 |
| Response time (AX) | 6 | 7,5 | 9,5 | 11,5 | 13,5 | 15,5 | 17 | 19 | 21 | 23 | 25 | 27 |
| Response time (AXM or AXS) | - | 11 | 13,5 | 16,5 | 19,5 | 22,5 | 25,5 | 28,5 | - | 34,5 | - | - |
| Overall barrier ht. mm | 261 | 411 | 561 | 711 | 861 | 1011 | 1161 | 1311 | 1461 | 1611 | 1761 | 1911 |
| PFHd * | 1,02E-8 | 1,17E-8 | 1,33E-8 | 1,48E-8 | 1,63E-8 | 1,79E-8 | 1,94E-8 | 2,10E-8 | 2,25E-8 | 2,40E-8 | 2,56E-8 | 2,71E-8 |
| DCavg # | 97,77% | 98,07% | 98,25% | 98,38% | 98,47% | 98,53% | 98,58% | 98,63% | 98,66% | 98,69% | 98,71% | 98,73% |
| MTTFd # years | 100 | | | | | 92,14 | 81,96 | 73,80 | 67,12 | 61,55 | 56,83 | 52,79 |
| CCF # | 80% | | | | | | | | | | | |

| 20 mm Resolution Models | 152 | 302 | 452 | 602 | 752 | 902 | 1052 | 1202 | 1352 | 1502 | 1652 | 1802 |
|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Number of beams | 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 | 165 | 180 |
| Response time (AX) | 6 | 7,5 | 9,5 | 11,5 | 13,5 | 15,5 | 17 | 19 | 21 | 23 | 25 | 27 |
| Response time (AXM or AXS) | - | 11 | 13,5 | 16,5 | 19,5 | 22,5 | 25,5 | 28,5 | - | 34,5 | - | - |
| Overall barrier ht. mm | 261 | 411 | 561 | 711 | 861 | 1011 | 1161 | 1311 | 1461 | 1611 | 1761 | 1911 |
| PFHd * | 1,02E-8 | 1,17E-8 | 1,33E-8 | 1,48E-8 | 1,63E-8 | 1,79E-8 | 1,94E-8 | 2,10E-8 | 2,25E-8 | 2,40E-8 | 2,56E-8 | 2,71E-8 |
| DCavg # | 97,77% | 98,07% | 98,25% | 98,38% | 98,47% | 98,53% | 98,58% | 98,63% | 98,66% | 98,69% | 98,71% | 98,73% |
| MTTFd # years | 100 | | | | | 92,14 | 81,96 | 73,80 | 67,12 | 61,55 | 56,83 | 52,79 |
| CCF # | 80% | | | | | | | | | | | |

* IEC 62061

ISO 13849-1

| 40 mm Resolution Models | 304 | 454 | 604 | 754 | 904 | 1054 | 1204 | 1354 | 1504 | 1654 | 1804 |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Number of beams | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| Response time | 6,5 | 7,5 | 8,5 | 9,5 | 10,5 | 11,5 | 12,5 | 13,5 | 14,5 | 15,5 | 16,5 |
| Overall barrier ht. mm | 411 | 561 | 711 | 861 | 1011 | 1161 | 1311 | 1461 | 1611 | 1761 | 1911 |
| PFHd * | 1,01E-8 | 1,09E-8 | 1,17E-8 | 1,24E-8 | 1,32E-8 | 1,39E-8 | 1,47E-8 | 1,54E-8 | 1,62E-8 | 1,69E-8 | 1,77E-8 |
| DCavg # | 97,76% | 97,93% | 98,06% | 98,16% | 98,24% | 98,31% | 98,37% | 98,42% | 98,46% | 98,49% | 98,52% |
| MTTFd # years | 100 | | | | | | | | | | 93,89 |
| CCF # | 80% | | | | | | | | | | |

| 90 mm Resolution Models | 609 | 759 | 909 | 1059 | 1209 | 1359 | 1509 | 1659 | 1809 |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Number of beams | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 |
| Response time | 6 | 6 | 6 | 6 | 6 | 6 | 6,5 | 7 | 7 |
| Overall barrier ht. mm | 711 | 861 | 1011 | 1161 | 1311 | 1461 | 1611 | 1761 | 1911 |
| PFHd * | 1,09E-8 | 1,15E-8 | 1,21E-8 | 1,27E-8 | 1,32E-8 | 1,38E-8 | 1,44E-8 | 1,50E-8 | 1,55E-8 |
| DCavg # | 97,93% | 98,04% | 98,12% | 98,19% | 98,25% | 98,30% | 98,35% | 98,39% | 98,42% |
| MTTFd # years | 100 | | | | | | | | |
| CCF # | 80% | | | | | | | | |

* IEC 62061

ISO 13849-1

DIMENSIONS

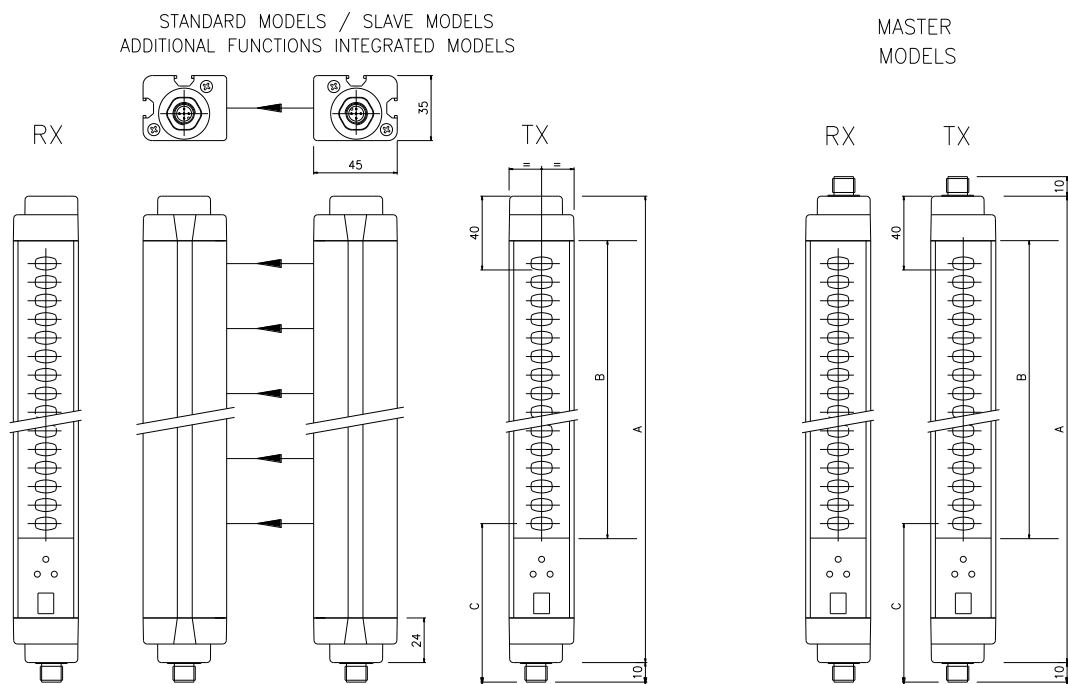


Figure 30
Emitter and Receiver

| Model | 150 | 300 | 450 | 600 | 750 | 900 | 1050 | 1200 | 1350 | 1500 | 1650 | 1800 |
|---------------------------|---------------------------------------|-----|-----|-----|-----|------|---------------------------------------|------|------|------|------|------|
| A | 251 | 401 | 551 | 701 | 851 | 1001 | 1151 | 1301 | 1451 | 1601 | 1751 | 1901 |
| B (PROTECTED AREA) | 160 | 310 | 460 | 610 | 760 | 910 | 1060 | 1210 | 1360 | 1510 | 1660 | 1810 |
| C | 85 | | | | | | | | | | | |
| Mounting | 2 LS Brackets with 2 mounting inserts | | | | | | 3 LS Brackets with 3 mounting inserts | | | | | |

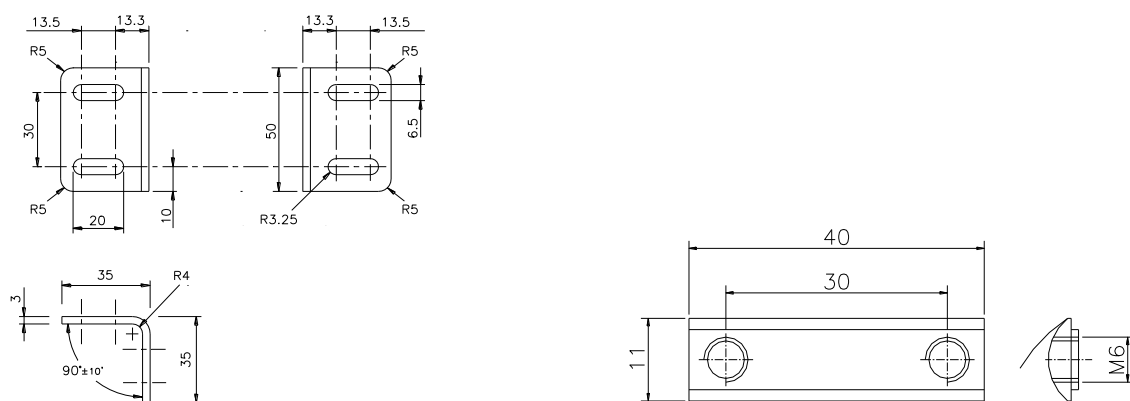


Figure 31
Fastening LS type brackets and inserts (included)

CHECKOUTS AND MAINTENANCE

Verification of barrier efficiency.



Before each work shift or before switching on, check the correct operation of the photoelectric barrier.

Proceed as follows, intercepting the beams using the appropriate test object (available free of charge on request).



The correct test object must be used for testing, depending on the barrier resolution. Please see page 38 for the correct ordering code.

Refer to Figure 32:

- Introduce the test object into the protected area and move it slowly, starting from the top and moving down (or vice versa), first in the centre and then in the vicinity of both the Emitter and the Receiver.
- **Multibeam models:**
Intercept each beam with an opaque object, first in the center of the detection zone and then close to the emitter and the receiver.
- Make sure that during each stage of the test object's movements the red LED on the Receiver is always on.

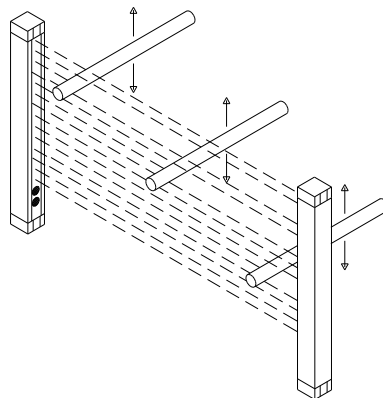


Figure 32

The ADMIRAL AX BK barrier does not require any specific maintenance operations; however, periodic cleaning of the front protective surfaces of the Emitter and Receiver optics is recommended.

Wipe using a clean, damp cloth; in particularly dusty environments, after cleaning the front surface, the use of an anti-static spray is recommended.

Never use abrasive or corrosive products, solvents or alcohol, which could damage parts. Do not use woollen cloths, that could electrify the front surface.



Grooving or fine scratching of the front plastic surfaces can increase the amplitude of the emission angle of the light curtain, jeopardising detection efficiency in the presence of lateral reflecting surfaces.



It is therefore fundamental to pay particular attention during the cleaning phases of the curtain front window, especially in environments where abrasive dusts are present. (E.g. cement factories, etc).

If the **yellow LED weak signal ("d" letter for the slave models)** on the receiver is on, check that:

- the front surfaces are clean;
- the Emitter and Receiver are aligned correctly.

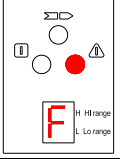
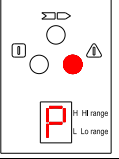
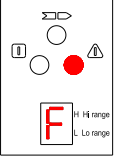
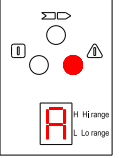
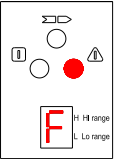
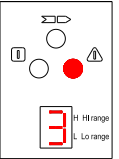
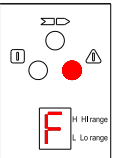
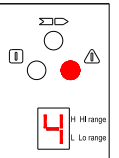
If the LED stays on, contact the ReeR service department.

TROUBLESHOOTING

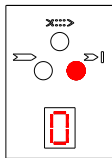
The indications provided on the displays of Emitter and Receiver make it possible to trace the cause of a system malfunction.

As indicated in the “**INDICATIONS**” chapter of this manual, in the case of a fault, the system is blocked and a “**F**” letter followed by a numeric code identifying the type of fault is shown on the display of the receiver. (See the tables below).

EMITTER (BLINKING SYMBOLS)

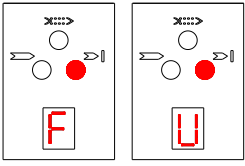
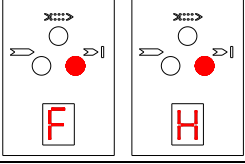
| 7 SEGMENTS DISPLAY | | LED | | | REMEDY |
|---|---------------------------------------|-----|-------|--------|---|
| SYMBOL | MEANING | RED | GREEN | YELLOW | |
|   | Range selection incorrect or modified | ON | OFF | OFF | Carefully check the connection of terminals 2 and 4 (EXT_RANGE0/1) on the connector |
|   | Internal error (add-on board) | ON | OFF | OFF | Send the equipment for repair to the ReeR laboratories. |
|   | Internal error (master board) | ON | OFF | OFF | |
|   | Internal error | ON | OFF | OFF | |

RECEIVER (FIX SYMBOLS)

| 7 SEGMENTS DISPLAY | | LED | | | REMEDY |
|---|-------------------------------------|-----|-------|--------|---|
| SYMBOL | MEANING | RED | GREEN | YELLOW | |
|  | Overload of the OSSD static outputs | ON | OFF | OFF | Take action in one of the following ways: <ul style="list-style-type: none"> • (STANDARD and MASTER MODELS) Carefully check the connection of terminals 1 and 3 (OSSD) on the connector. If necessary, adjust load reducing the current required to max 500 mA (2μF) • (SLAVE MODELS) Send the equipment for repair to the ReeR laboratories. |

RECEIVER (BLINKING SYMBOLS)

| 7 SEGMENTS DISPLAY | | LED | | | REMEDY |
|--------------------|---|-----|-------|--------|---|
| SYMBOL | MEANING | RED | GREEN | YELLOW | |
| | <p>Customer configuration rejected</p> <p>WARNING "F" symbol remains fix on the display after the blinking</p> | ON | OFF | OFF | Carefully check the connections |
| | OSSD erroneously connected o 24VDC | ON | OFF | OFF | |
| | Internal error | ON | OFF | OFF | Send the equipment for repair to the Reer laboratories. |
| | | ON | OFF | OFF | |
| | | ON | OFF | OFF | |
| | OSSD1 - OSSD2 short-circuit | ON | OFF | OFF | <p>Take action in one of the following ways:</p> <ul style="list-style-type: none"> • (STANDARD and MASTER MODELS) Carefully check the connection of terminals 1 and 3 (OSSD) on the connector. • (SLAVE MODELS) Send the equipment for repair to the Reer laboratories. |
| | <p>(only for MASTER and STANDARD models) Overload of the OSSD static outputs</p> | ON | OFF | OFF | Carefully check the connection of terminals 1 and 3 (OSSD) on the connector. |
| | OSSD static outputs error | ON | OFF | OFF | <p>Take action in one of the following ways:</p> <ul style="list-style-type: none"> • (STANDARD and MASTER MODELS) Carefully check the connection of terminals 1 and 3 (OSSD) on the connector. If necessary, adjust load reducing the current required to max 500 mA (2μF) • (SLAVE MODELS) Send the equipment for repair to the Reer laboratories. |
| | <p>Interfering dangerous Emitter detected.</p> <p>The receiver is able to receive simultaneously the beams from two different Emitters (30 sec)</p> | ON | OFF | OFF | <p>Carefully locate the interfering Emitter and take action in one of the following ways:</p> <ul style="list-style-type: none"> • Reduce the emitter range from high to low. • Switch the position of the Emitter and Receiver. • Move the interfering Emitter to avoid this illuminating the Receiver. • Shield the beams coming from the interfering Emitter using opaque protections. |

| 7 SEGMENTS DISPLAY | | LED | | | REMEDY |
|---|--|-----|-------|--------|--|
| SYMBOL | MEANING | RED | GREEN | YELLOW | |
|  | (only for MASTER models) SLAVE connections incorrect | ON | OFF | OFF | Carefully check the MASTER-SLAVE connections |
|  | (only for MASTER and STANDARD models) User configuration changed without system restart | ON | OFF | OFF | Operate a system restart |

In any case, when faced with a system stoppage, switch the system off and then on again, to exclude any occasional electromagnetic disturbances.

Should the problem persist, contact ReeR's service department. In case of continued malfunctioning:

- verify the integrity of electrical connections and check that these have been made correctly;
- check that the supply voltage levels comply with those specified in the technical data sheet;
- the barrier power supply should be kept separate from that of the other electric power equipment (electric motors, inverters, frequency converters) or other sources of disturbance.
- make sure that the Emitter and the Receiver are correctly aligned and that the front surfaces are perfectly clean.



If it is not possible to clearly identify the malfunction and to remedy it, stop the machine and contact ReeR's Assistance Service.

If correct system operation cannot be restored after carrying out the above procedures, send the equipment to ReeR's laboratories, complete with all parts, stating clearly:

- the product code number (the **P/N** field is shown on the product label)
- serial number (the **S/N** field is shown on the product label)
- date of purchase;
- period of operation;
- type of application;
- fault.

SPARE PARTS

| MODEL | ARTICLE | CODE |
|---------|---|---------|
| AD SR1 | ADMIRAL AD SR1 Safety Relay | 1330900 |
| AD SR0 | ADMIRAL AD SR0 Safety Relay | 1330902 |
| AD SR0A | ADMIRAL AD SR0A Safety Relay | 1330903 |
| CD5 | Straight 5-pin M12 female connector, 5 m cable | 1330950 |
| CD95 | 90° 5-pin M12 female connector, 5 m cable | 1330951 |
| CD15 | Straight 5-pin M12 female connector, 15 m cable | 1330952 |
| CD915 | 90° 5-pin M12 female connector, 15 m cable | 1330953 |
| CDM9 | Straight 5-pin M12 female connector PG9 | 1330954 |
| CDM99 | 90° 5-pin M12 female connector PG9 | 1330955 |
| C8D5 | Straight 8-pin M12 female connector, 5 m cable | 1330980 |
| C8D10 | Straight 8-pin M12 female connector, 10 m cable | 1330981 |
| C8D15 | Straight 8-pin M12 female connector, 15 m cable | 1330982 |
| C8D95 | 90° 8-pin M12 female connector, 5 m cable | 1330983 |
| C8D910 | 90° 8-pin M12 female connector, 10 m cable | 1330984 |
| C8D915 | 90° 8-pin M12 female connector, 15 m cable | 1330985 |
| C8DM9 | Straight 8-pin M12 female connector PG9 | 1330986 |
| C8DM99 | 90° 8-pin M12 female connector PG9 | 1330987 |
| CDS03 | 2 connectors female M12 5-pin straight 0,3m cable | 1330990 |
| TR14 | 14mm diameter test rod | 1330960 |
| TR20 | 20mm diameter test rod | 1330961 |
| TR30 | 30mm diameter test rod | 1330962 |
| TR40 | 40mm diameter test rod | 1330963 |
| TR50 | 50mm diameter test rod | 1330964 |
| FB 4 | Set of 4 fastening brackets | 1330970 |
| FB 6 | Set of 6 fastening brackets | 1330971 |
| LL | Set of 4 fastening brackets LL type | 7200037 |
| LH | Set of 4 fastening brackets LH type | 7200081 |
| FI 4 | Set of 4 fastening inserts | 1330972 |
| FI 6 | Set of 6 fastening inserts | 1330973 |
| SFB | Set of 4 swivel fastening brackets | 1330974 |
| SAV-3 | Set of 2 anti-vibration supports | 1200088 |
| SAV-4 | Set of 3 anti-vibration supports | 1200089 |

GUARANTEE

All new ADMIRAL AX BK systems are guaranteed by ReeR for a period of 12 (twelve) months under normal working conditions, against defects due to faulty materials and workmanship. During the aforesaid period, ReeR promises to replace faulty parts free of charge. This guarantee covers both material and labour.

ReeR reserves the right to decide whether to repair equipment or replace it with equipment of the same type or having the same characteristics.

The validity of this guarantee is subject to the following conditions:

- The user must notify ReeR of the fault within twelve months following the date of delivery of the product.
- The equipment and all parts thereof must be in the condition in which they were supplied by ReeR.
- The defect or malfunction must not arise directly or indirectly from:
 - Improper use
 - Non-observance of the instructions for use;
 - Negligence, inexperience, improper maintenance;
 - Repairs, modifications and adjustments carried out by personnel not authorised by ReeR, tampering, etc.;
 - Accidents or collisions (also during transportation or due to acts of God);
 - Other reasons for which ReeR cannot be held responsible.

Repairs will be carried out at ReeR's laboratories, to which the material must be consigned or forwarded: transport costs and any damage or loss of material during transportation will be charged to the Customer.

All replaced products and parts are property of ReeR.

ReeR does not recognise any other form of guarantee or rights other than those expressly stated above; no requests for compensation for damages incurred for costs, suspension of activities or any other events or circumstances related in any way to malfunctioning of the product or any parts thereof will be taken into consideration.

In order to ensure the correct operation of the photoelectric barrier, careful and full compliance with all the rules, instructions and warnings stated in this manual is essential.

ReeR s.p.a. declines all responsibility for events arising from non-compliance with all or part of the aforesaid instructions.

Specifications subject to change without warning. • No part of this manual may be reproduced without the prior consent of ReeR.



Dichiarazione CE di conformità
EC declaration of conformity

Torino, 11/07/2016

REER SpA
via Carcano 32
10153 – Torino
Italy

dichiara che le barriere fotoelettriche **ADMIRAL** sono Dispositivi Elettrosensibili di Sicurezza (ESPE) di :

- **Tipo 4** (secondo la Norma **CEI EN 61496-1:2005; CEI EN 61496-2:2007**)
- **SILCL 3** (secondo la Norma **IEC 62061:2005 + A1:2012**)
- **PL e** (secondo la Norma **UNI EN ISO 13849-1:2008**)

declares that the **ADMIRAL** photoelectric safety barriers are :

- **Type 4** (according the Standard **IEC 61496-1:2004; IEC 61496-2:2006**)
- **SILCL 3** (according the Standard **IEC 62061:2005 + A1:2012**)
- **PL e** (according the Standard **ISO 13849-1:2006**)

Electro-sensitive Protective Equipments (ESPE)

realizzati in conformità alle seguenti Direttive Europee:
complying with the following European Directives:

- **2006/42/EC** "Direttiva Macchine"
"Machine Directive"
- **2014/30/EU** "Direttiva Compatibilità Elettromagnetica"
"Electromagnetic Compatibility Directive"
- **2014/35/EU** "Direttiva Bassa Tensione"
"Low Voltage Directive"

e alle seguenti Norme: /and to the following Standards:

- **EN 50178: 1997**
- **EN 55022: 2006**
- **EN 61000-6-2: 2005**

e sono identiche all'esemplare esaminato ed approvato con esame di tipo CE da:
and are identical to the specimen examined and approved with a CE - type approval by:

TÜV SÜD Product Service GmbH – Zertifizierstelle – Ridlerstraße 65 – 80339 – München – Germany
N.B. number: 0123 – Certificate No. Z10 15 06 24820 062

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