

# **ARGOLUX AU S3M2**

## **CONTROL UNIT**

### **WITH INTEGRATED MUTING FUNCTION**

#### **INSTALLATION, USE AND MAINTENANCE**

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The informations and the remarks given in this instruction manual may be subject to change due to further development of the Argolux AS System.

Since the knowledge of this manual is fundamental for the appropriate fitting and use, always refer the one included in the shipping box of the product.

## OVERVIEW

The AU S3M2 control unit is a complete system for control of type 2 electro-sensitive safety equipment (ESPE) in compliance with the European standard prEN 50100 project for accident prevention on hazardous machines and plants.

When correctly connected to a safety barrier or to a safety device that performs the sensing function, the AU S3M2 control unit checks safe functioning of the sensing device by sending a test signal and assessing its reply time.

With its integrated intrinsic safety circuit, the AU S3M2 control unit is able to detect any hardware faults in its internal circuits and also checks correct functioning of its own output circuit consisting of two guided contact safety relays.

Correct functioning of external auxiliary relays or contact blocks is also checked at each test cycle, with also permanent automatic monitoring of the muting and override function circuits.

If a system malfunction is detected, the AU S3M2 unit promptly de-energizes its output circuit and switches to fail condition.

Control unit status is output continuously by leds while the self-test output permits remote management of information regarding correct functioning of the device.

## APPLICATIONS

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The AU S3M2 control unit (combined with Argolux AS series light barriers) can be used effectively in all sectors of industrial automation requiring control and protection of access points to danger areas.

The device, with its own internal circuit able to assure safe management of the muting function, is particularly suited for protection of access points to the load and unload areas of:

- automatic palletizing/depalletizing systems;
- materials handling and storage systems;
- packaging and wrapping machines;
- assembly lines;
- industrial automatic warehouses.

When combined with an Argolux AS light barrier and connected to specific muting sensors that complete the system for this type of application, the AU S3M2 control unit provides an efficient solution to the problem of man/material discrimination at dangerous access points characterized by transit of pallets.

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## CONTROL UNIT THEORY OF OPERATION AND STATES

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### Test function.

A type 2 safety system maintains its protective function by checking correct response to an external test command. The system must stop if the test detects a fault that could impair safety.

At power-on or each time the light barrier is interrupted, if the area controlled is free, the AU S3M2 unit switches to clear status with output relays A and B de-energized. The test contact must be closed in order to enable the next work cycle.

- ☞ The test command must precede the start command of the machine that initiates the next work cycle.
- ☞ The output relays of the AU S3M2 control unit are energized only if the test is positive.

The test function is always enabled at any point of the machine cycle provided the light barrier is free. This means that correct system functioning can be checked at any time without necessarily occupying the protected area.

The first part of the test checks correct functioning of the light barrier. Occupation of the sensitive area is simulated in this phase, checking the response time and correct functioning of the output circuit.

Subsequently, the AU S3M2 checks the response time of its own output circuit consisting of **two guided contact safety relays**.

The output chain is kept open during the entire test phase and this condition is maintained also during checks on the response times of internal relays A and B which are energized and checked in two separate phases.

If the test is positive, the control unit causes energization of its output relays A and B and, using a feedback circuit, checks the switching times of any external auxiliary relays or contact blocks (K1 and K2). If this test is also positive, the control unit switches to **guard status** and enables the next operating machine start command.

If no fault is detected, guard status is maintained until the area controlled by the light barrier is intercepted.

Occupation of the area controlled causes immediate drop-out of output relays A and B and the control unit switches to **break status**. The test command is not operative in this condition and the area controlled must be freed in order to carry out a new test cycle.

If a test fails, the control unit switches to **fail status** preventing energizing of the output relays.

This error condition, characterized by blocking of the unit with the output relays de-energized, is also sent towards the outside through switching of the self-diagnosis output on the unit.

### **Muting function.**

The muting function (temporary bypassing of the light barrier) is indispensable when transit of material to the danger area through the access protected by the light barrier must not cause stoppage of the machine and consequent restart preceded by the test command.

According to safety regulations, the muting function can be activated only if two signals are present, at least one of which must be of the hardware type, i.e. coming from a field sensor.

An additional sensing system (**muting sensors**) is therefore required which, if configured correctly, provides the control unit with information (**muting signals**) regarding transit of the material "authorized" to access the danger area.

The control unit activates and de-activates the muting function only with the correct muting sequence, characterized by a specific signal timing, at its inputs.

During the period in which the function is active, the AU S3M2 control unit is in muting status and, although it detects occupation of the light barrier, does not generate the signal which, in any other condition, would cause stopping of the machine. The presence of material at the access point controlled must prevent operator access to the danger area.

As contemplated by safety regulations, muting status is indicated externally by an indicator light located close to the dangerous access point. The AU S3M2 control unit is complete with an output for connection of this light and is able to check that this is present and working correctly.

When the control unit receives an incorrect muting sequence, to be ascribed for example to a sensor or light barrier malfunction, or if it detects a malfunction of the muting indicator device, it promptly de-energizes its internal relays A and B and switches to **fail muting status**, indicated by a specific light.

The AU S3M2 control unit manages the muting function using 2 or 3 inputs to which sensors with relay output or sensors with PNP static type output can be connected (table 1, page 6). In particular, switching must be of the **DARK ON** type.

To activate the muting function, the material that passes through the dangerous access point must be detected by both sensor 1 and sensor 2. After detecting a change of state of a sensor, if the other sensor changes state **within 4 seconds**, the control unit activates the muting function.

The control unit de-activates the muting function as soon as one of the sensors is cleared. Muting sensors 1 and 2 must therefore be **constantly** engaged by the material during the entire period in which the muting function is to remain active because the light barrier is occupied by the material.

	Relay output N.A. contact	PNP static output	Output voltage
Material sensed (Beam occupied)	ON 	HIGH	
Material not sensed (Raggio libero)	OFF 	LOW	

Table 1  
Muting sensors output.

Using photoelectric sensors, this condition is assured using the crossed beam technique. An example in which two photoelectric reflex switches are used as muting sensors is shown in figure 1 below.

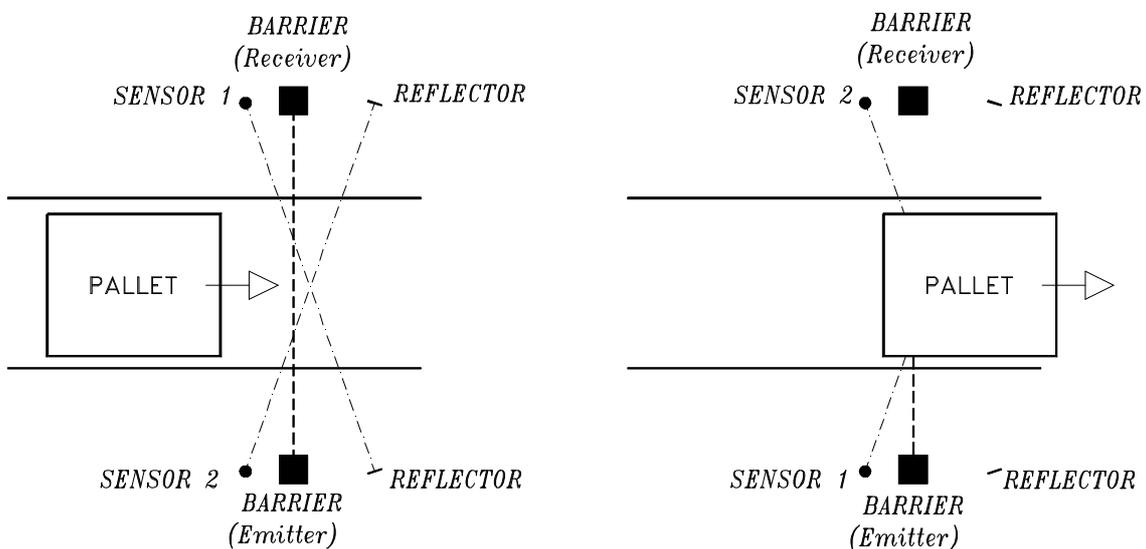


Figure 1  
Positioning of the safety barrier and of the muting sensors.

For correct functioning of the system:

- ☞ The material must obscure the two muting beams at the same time (within 4 seconds) before intercepting the light barrier;
- ☞ An operator must NOT obscure the two muting beams at the same time (within 4 seconds) before intercepting the light barrier.

These conditions are guaranteed only in the case of correct reciprocal positioning of the sensors and light barrier, taking into account the dimensions and feed speed of the pallet and the response times of the sensing devices (fig. 2, page 7).

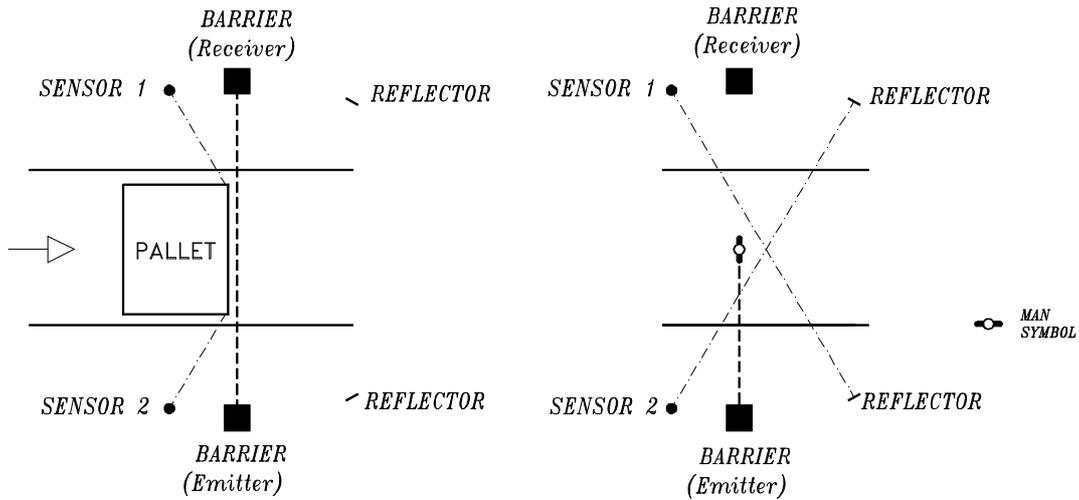


Figure 2  
Positioning of the muting sensors.

☞ The position at which the two muting beams intercept each other must be beyond the barrier in the danger area.

To de-activate the muting function and therefore restore guard status, the AU S3M2 control unit must detect not only switching of at least one sensor but also previous occupation and freeing of the light barrier.

If one of the sensors (1 or 2) is free but the control unit does not detect correct switching of the output of the light barrier, it de-energizes relays A and B and indicates an error in the muting sequence.

A third sensor (sensor 3) can be used to add a further functional check to the system. In this case, after de-activation of the muting function, sensor 3 must be freed before re-enabling the muting function (fig. 3).

Therefore, sensor 3 makes it possible to check the distance between two consecutive pallets. For correct application, refer to the muting sensor positioning section (page 18).

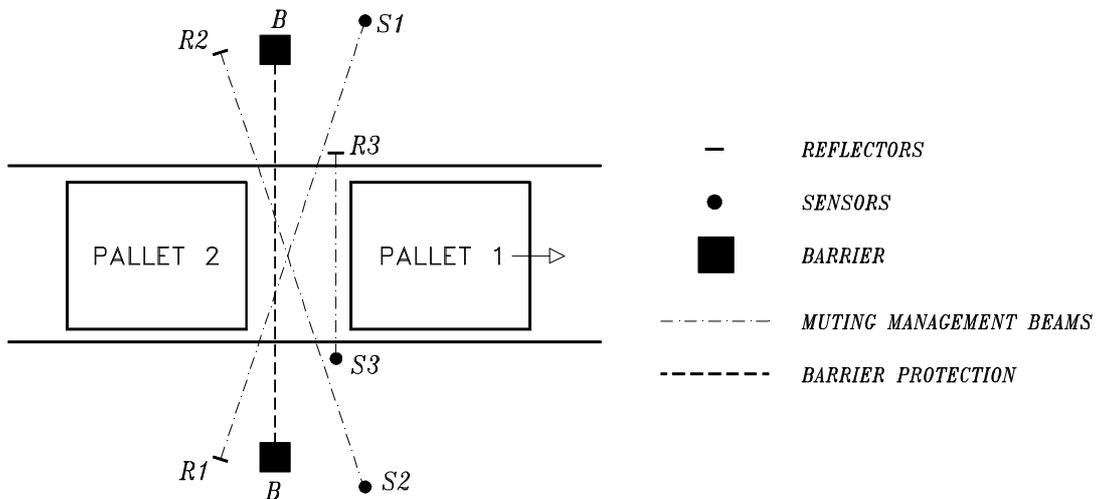


Figure 3  
Sensor 3 and pallet separation.

In some applications, sensor 3, if correctly positioned, also creates an additional protective barrier in that if sensor 3 is not engaged correctly, the control unit causes immediate stopping of the machine (fig. 4).

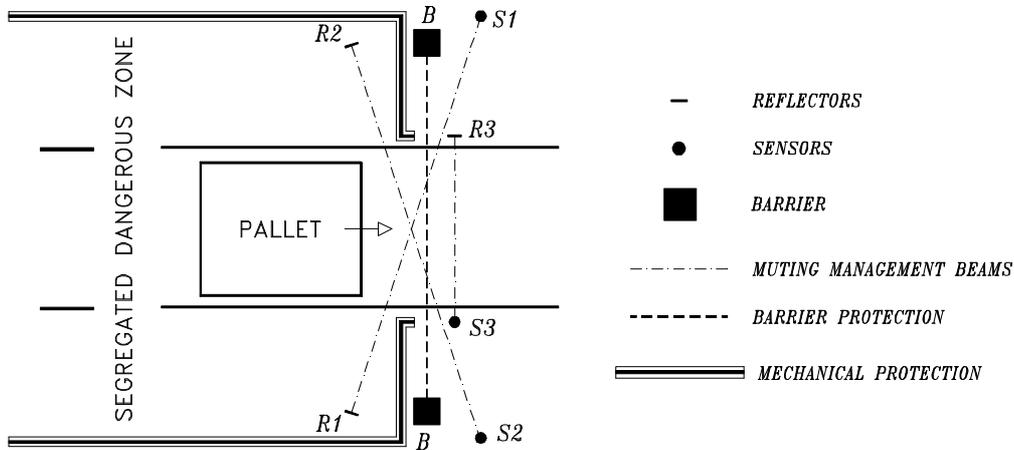


Figure 4  
Positioning of sensor 3 in a typical application.

The muting cycle ends successfully if, once sensor 3 has been freed, all the elements have switched according to the correct muting sequence.

The configuration of muting sensors 1 and 2 in the case in which proximity type sensors (capacitive, inductive or photoelectric diffuse switches) are used is shown in fig. 5 below. To perform the correct muting sequence, sensors 1 and 2 must be replaced by two pairs of sensors (1a/1b and 2a/2b).

In this case, the outputs of the single pairs of sensors must still be connected in parallel.

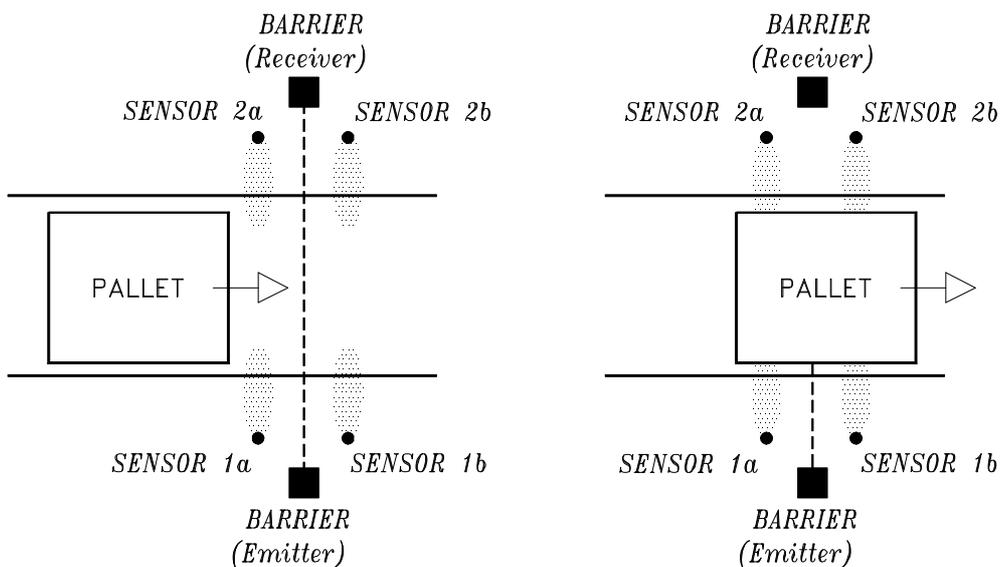
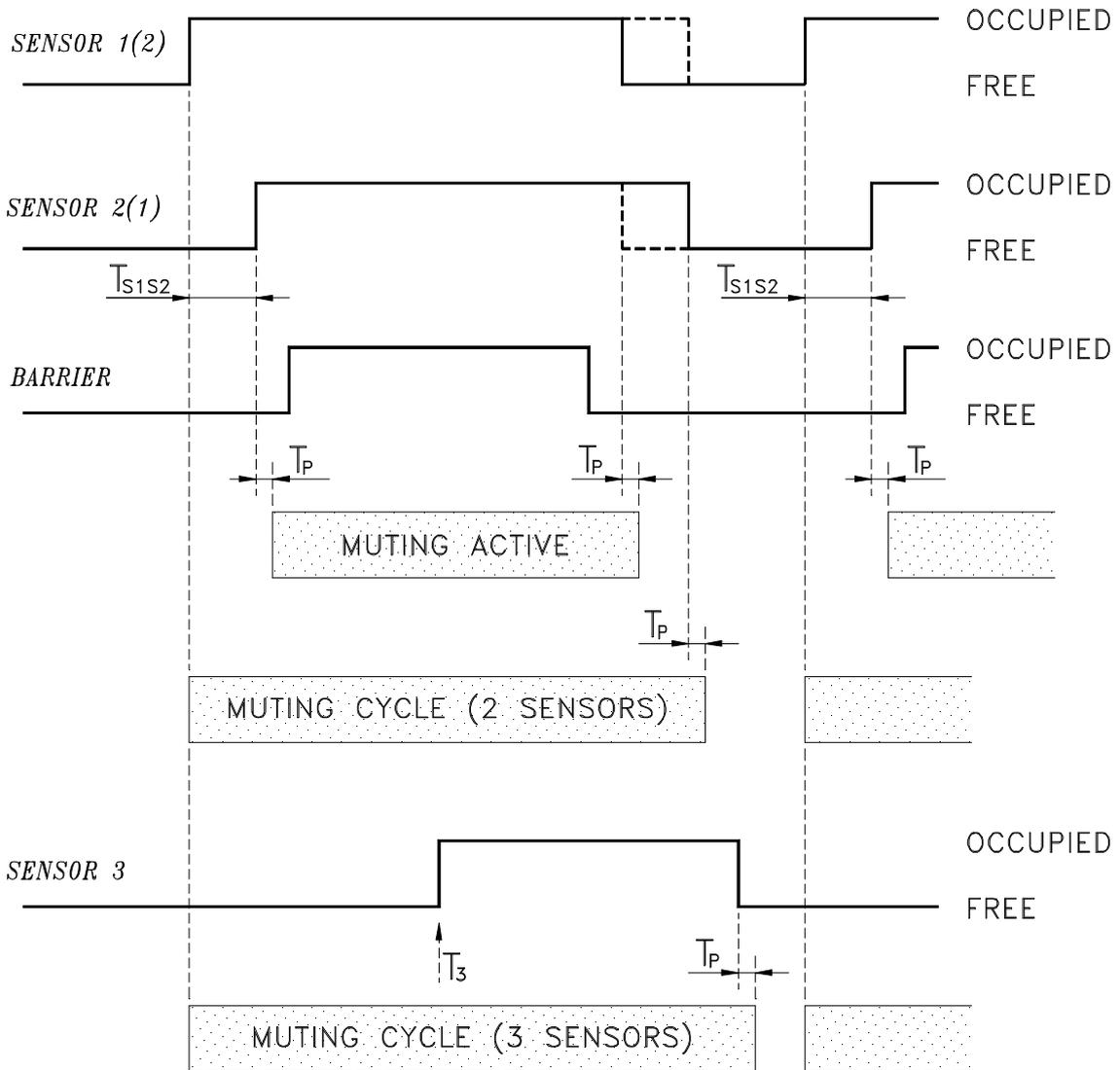


Figure 5  
Use of proximity sensors.

Figure 6 shows the correct muting sequence and highlights how the muting cycle differs according to whether 2 or 3 sensors are used.



Note: The signals represent the voltage logical levels at the inputs of the control unit.

$T_{S1S2}$  is the time between detection of the material in transit by sensor 1 (or 2) and detection by sensor 2 (or 1). If  $T_{S1S2}$  is less than 4 seconds, the AU S3M2 activates muting.

$T_P = 300ms$  is the response time of the control unit on switching of the muting signals. Delay time introduced by the unit to filter switching bounce-back.

$T_3$  is the moment of occupation of sensor 3. Interception may take place when the muting function is active or after de-activation of this.

Figure 6  
Correct muting signal sequence.

### Muting override.

If the machine stops with the material in the area controlled by the light barrier, an **emergency** operation is required to restart the system in that the test cannot be performed.

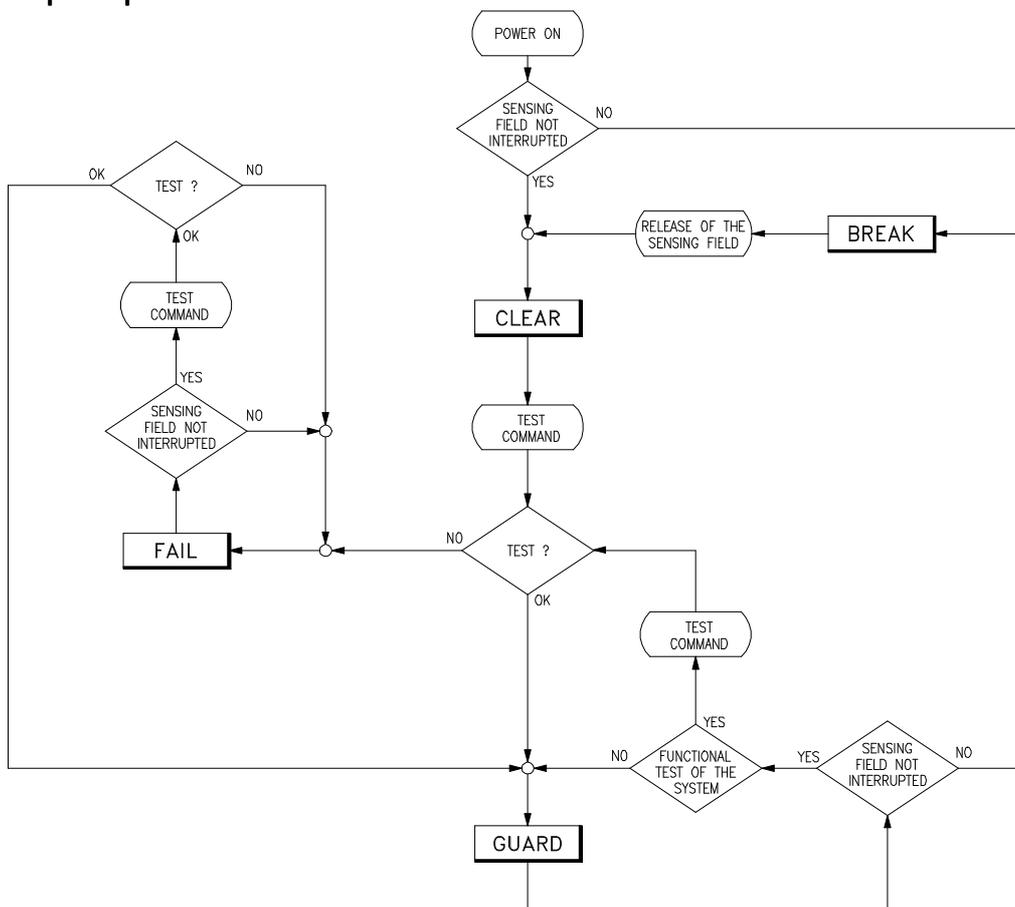
Using the override function, the AU S3M2 control unit enables temporary energization of its internal relays A and B, thus permitting controlled starting of the system by an authorized operator.

This function, which sets the control unit to **override status**, must be carried out through simultaneous activation of two manual controls which must be of the latching type, such as for example push-buttons or key selectors with spring return. These must also be positioned in such a way that the operator authorized to carry out the operation has complete visibility of the area controlled by the light barrier and of the danger area.

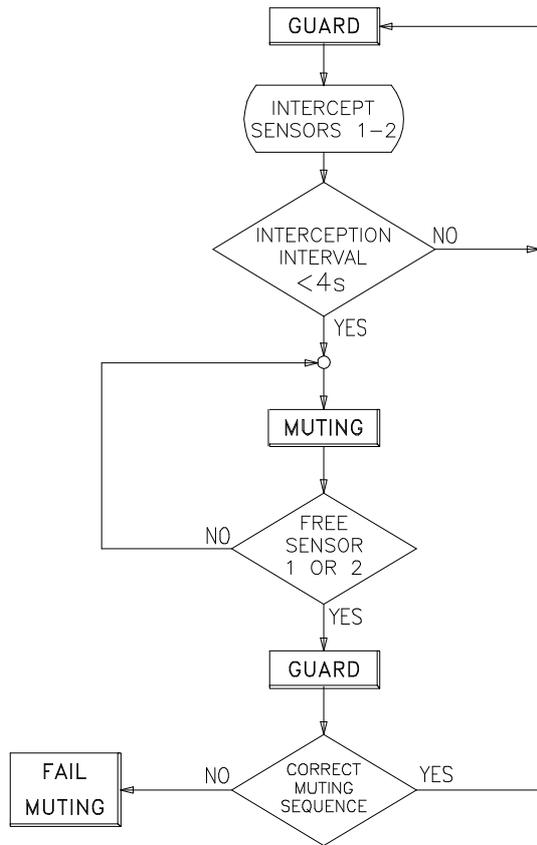
After removing the material from the area controlled by the light barrier and muting sensors, the operator completes the operation releasing the manual controls and the control unit promptly de-energizes its own output circuit with consequent stopping of the plant. The next test will allow the AU S3M2 to make the necessary functional check-out required at the start of a new work phase.

## AU S3M2 FUNCTIONING DIAGRAMS

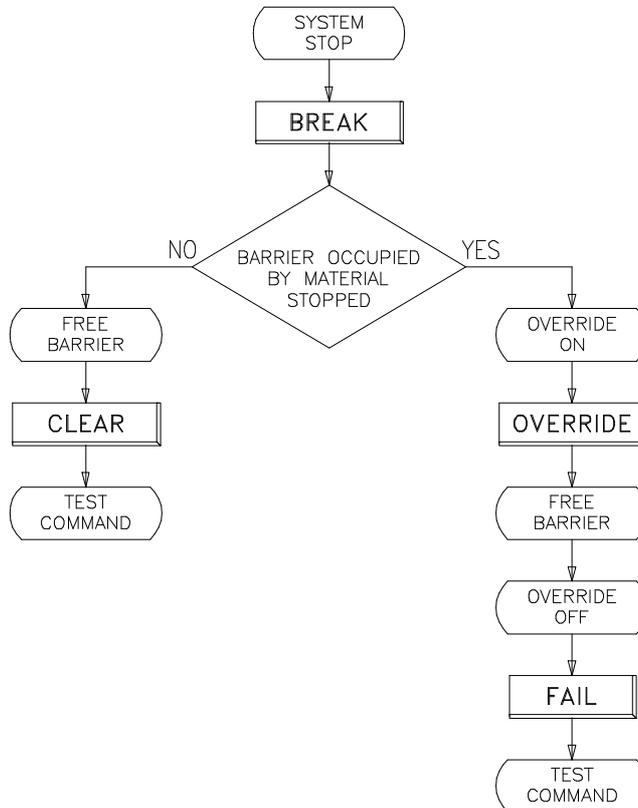
### Access point protection.



**Muting function.**



**Override function.**



**CONTACT STATUS** (ref.: Electrical connections page 22)

		AU S3M2 control unit status							
		GUARD	CLEAR	BREAK	FAIL		FAIL (FAIL K1-K2)		
Barrier output					area free	area occupied	area free	area occupied	
									
AU S3M2 output	14-19								
	15-18								
	16-17								
Self-diagnosis output									
Relay K1	K1-1								
	K1-2								
Relay K2	K2-1								
	K2-2								

**Muting function.**

		Object present	Object not present
Sensor 1			
Sensor 2			
Sensor 3			
		Control unit in MUTING status	
		area controlled free	area controlled occupied
Barrier output			
AU S3M2 outputs	14-19		
	15-18		
	16-17		
Relay K1	K1-1		
	K1-2		
Relay K2	K2-1		
	K2-2		

## LED STATUS INDICATIONS

LED N°	COLOUR	STATE	INDICATIONS	AU S3M2 STATUS
1	Green	On	Barrier free, AU S3M2 output relays energized	GUARD
2	Yellow	On	Barrier free, AU S3M2 output relays de-energized	CLEAR
3	Red	On	Barrier occupied, AU S3M2 output relays de-energized	BREAK
3	Red	Flickering	System in failure, AU S3M2 output relays de-energized	FAIL
3	Red	Alternative Flickering	Failure of the external relays K1 and K2, AU S3M2 output relays de-energized	FAIL (FAIL K1-K2)
4	Red			
5	Yellow	On	Muting function Sensor 1 occupied	
6	Yellow	On	Muting function Sensor 2 occupied	
7	Yellow	On	Muting function Sensor 3 occupied	
3	Red	Flickering	Incorrect muting sequence AU S3M2 output relays de-energized	FAIL MUTING
8	Red	On		
1	Green	On	Muting function active, AU S3M2 output relays energized	MUTING
External indicator		On		

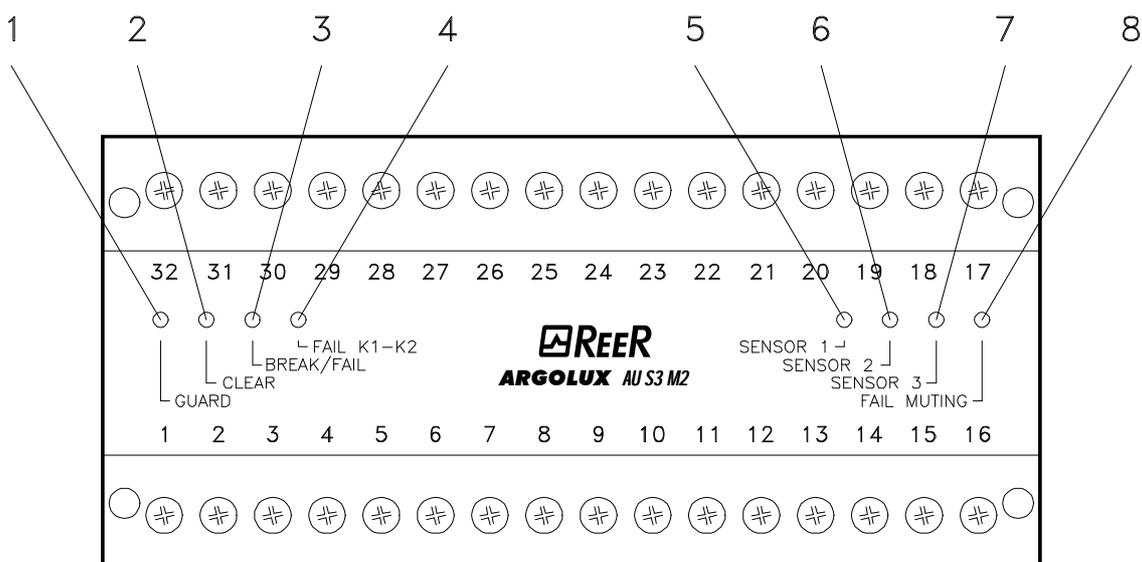


Figure 7  
Led status indicators.

## TECHNICAL DATA

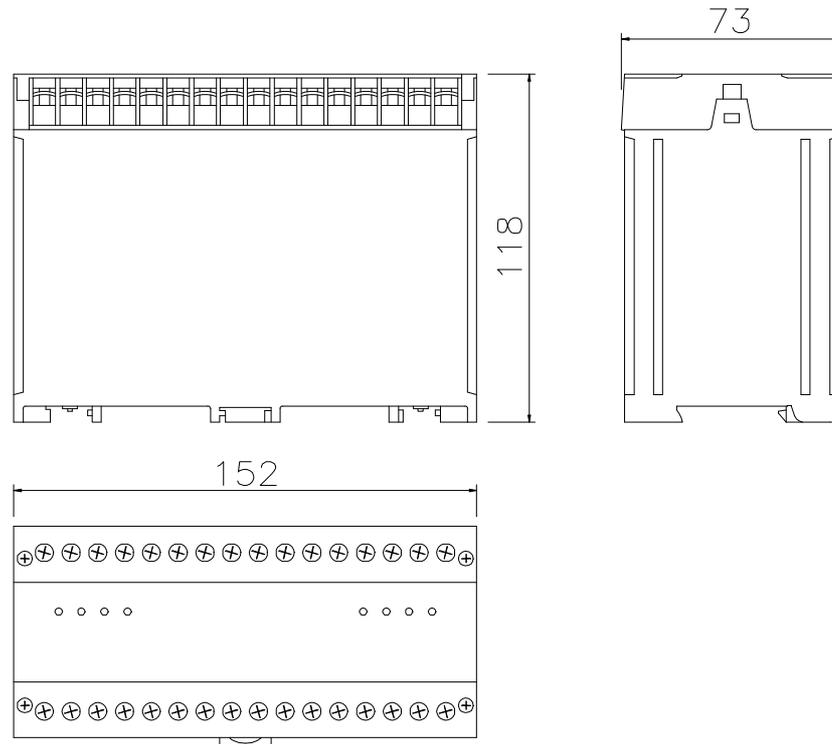
Power supply	Vdc	24 ± 20%
Power consumption	W	8
Output relays (*)		2 N.O. contacts 2A 125Vac 1N.C. contact 2A 125Vac
Self-test output		1 N.O. contact 0,5A 25Vac - 60Vdc contact open in case of unusual operation
Muting sensors		DARK ON Relay output 1 N.O. contact or PNP static output
Muting sensors output feature		100mA 24Vdc
Muting signaling device		24Vdc 0,5 ÷ 5W
Response time (**)	ms	≤ 15
Minimum duration of the test command	ms	10
Reset time from start of the test	ms	150
Muting signals response time	ms	300
Electrical connections (***)		Terminal blocks
Cable lenght (****)	m	100 max
Working temperature	°C	0÷55
Sealing (housing)		IP 40
Sealing (terminal blocks)		IP 2X
Mechanical mounting		Quick mounting on rail according to EN 50022-35
Dimensions	mm	152 x 73 x 118
Weight	g	800
ORDERING CODE		1201707

(\*) Refer to "Load features" in the Electrical connections chapter (page 21).

(\*\*) Output circuit de-energization delay in case of field interrupted.

(\*\*\*) Use isolated lugs.

(\*\*\*\*) We recommend shielded cable where the level of electrical disturbances is higher than the specified IEC 801/4 level IV.

**DIMENSIONS** (measurements in mm)**INSTALLATION**

The AU S3M2 control unit used with the ARGOLUX AS series safety barriers is a type 2 electro-sensitive protection system.

As envisaged by the prEN 50100 standard project, in a type 2 safety device, faults or malfunctions must be detected during the test phase.

Before installing the ARGOLUX AS series safety system, make sure that:

- ☞ the danger level of the machine is such as to permit use of type 2 electro-sensitive safety devices.

In a type 2 safety device, the test is mandatory, i.e. the relays are energized only after the test command has been sent and only if the test is passed.

Before installing the ARGOLUX AS series safety system, make sure that:

- ☞ the machine or the processing cycle are compatible with functioning of a type 2 safety device.

The work cycle or the start of the dangerous movement must begin only using the control device. In particular:

- ☞ the safety system must be used only as stopping device and not as machine control device.

The test control must be located outside the danger area and in such a way as to assure unobstructed visibility of the operating area.

Before installing the ARGOLUX AS series safety system, also check that:

- The machine can be controlled electrically.
- It is possible to interrupt any dangerous action of the machine promptly. In particular, the stopping time of the machine must be known, measuring this where necessary.

Also:

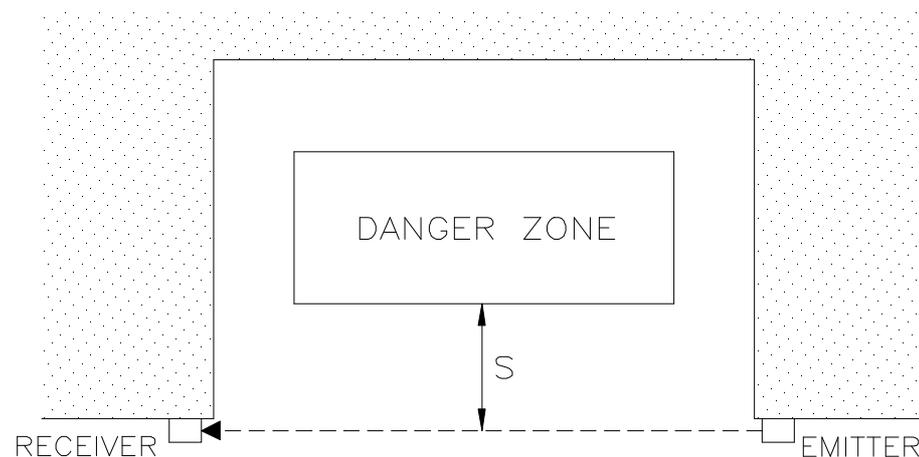
- Site the AU S3M2 control unit in an environment with at least IP54 protection rating.
- Check that the temperature where the system is installed is compatible with the temperature parameters indicated in the technical data.
- For applications in the food and beverage industry consult the factory to check the compliance with the materials and chemical agents involved.

If necessary, in the case of technical safety questions, consult the safety authorities of your country or the competent industry association.

## POSITIONING

### Safety distance.

The light barrier must be positioned at a distance that is greater than or equal to the minimum safety distance  $S$  so that hazardous points can be reached only after stopping the dangerous action of the machine (fig. 8).



*Figure 8*  
*Comply with the minimum safety distance.*

Referring to European standard prEN999 project, the minimum safety distance  $S$  must be calculated using the following formula:

$$S = K(t1 + t2) = C$$

where:

$S$  is the minimum safety distance in millimeters.

$K$  is the penetration velocity of the body in the danger area in millimeters per second.

$t1$  is the total response time in seconds of the safety system, i.e. the response time of the control unit added to the response time of the light barrier.

$t2$  is the response time of the machine in seconds, i.e. the time taken by the machine to interrupt the dangerous action from the moment in which the stop signal is transmitted through drop-out of the output relay of the AU S3M2 control unit.

$C$  is the additional distance in millimeters.

☞ If positioning of the light barrier does not exclude the possibility of the operator entering the danger area without being intercepted, the system must be integrated with further mechanical protections.

Refer to the light barrier installation handbook for further details of how to calculate the minimum safety distance and correct positioning of the light barrier in relation to the danger area.

### **Muting sensor positioning.**

To assure correct positioning of sensors 1 and 2, i.e. those that manage enabling and disabling of the muting function, the following must be taken into account:

- the two beams must cross over and pass diagonally through the area controlled by the light barrier;
- the point at which the two beams intercept each other must be in the danger area beyond the light barrier;
- the angle between the two muting beams must be calculated according to the size of the pallet and its speed, taking into account that the muting function is activated only if the interception delay of the two sensors is less than 4 seconds;
- the pallet must obscure the two beams before intercepting the light barrier;
- the two beams must be obscured continuously by the pallet for the entire period during which the pallet passes between the sensors and light barrier;
- make sure that the two beams are intercepted by the pallet and not by the material on this. This avoids the possibility of empty pallets or pallets with incorrectly arranged material or material of irregular shape passing through the light barrier without correctly intercepting the muting beams;

- the area delimited by the points of interception and freeing of the beams of sensors 1 and 2 by the pallet must be as small as possible (or be suitably protected) so as to avoid accidental passing through the light barrier with muting activated (fig. 9).

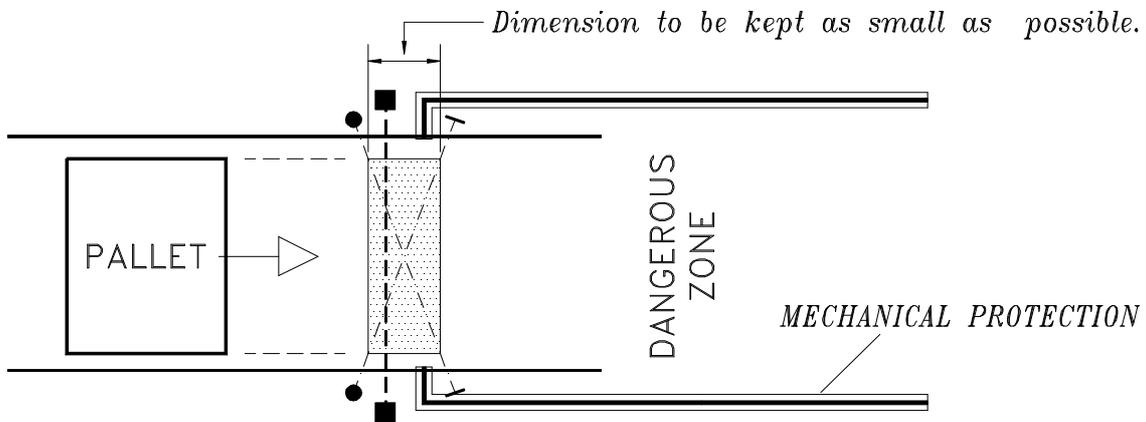


Figure 9

Keep the dimensions of the muting activation and de-activation areas as small as possible.

If sensor 3 is to be used, particular attention must be paid when positioning this.

- ☞ When it is freed, sensor 3 causes ending of the muting cycle and the possibility of starting a new muting cycle.
- ☞ Sensor 3 must be freed when the light barrier and muting sensors 1 and 2 have been freed by the pallet.

Usually, the sensor is positioned so that the beam is crosswise to the direction of feed of the pallet. The beam may be parallel to the ground or slightly sloping so as to extend the sensing range (fig. 10).

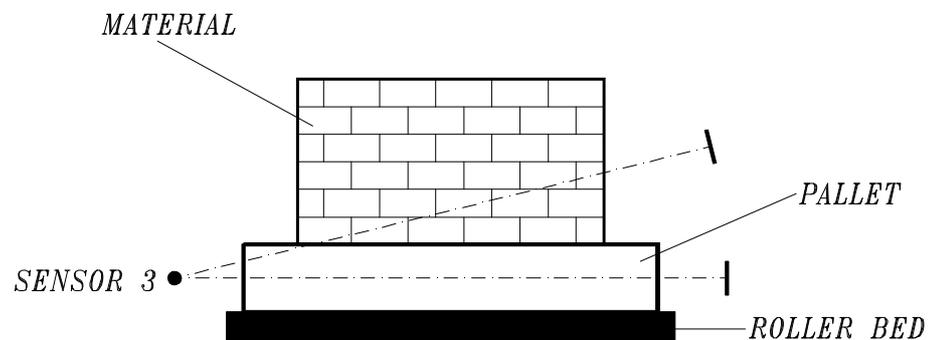


Figure 10

Pallet that advances in a frontwise direction towards sensor 3.

Sloping of the beam is recommended when the pallet has empty areas to the side so that detection of the pallet by sensor 3 may not be continuous. However, in some applications, sensor 3 must be rotated on a plane parallel to the ground. In this case, the beam will no longer be in a plane orthogonal to the direction of feed of the pallet.

This configuration is very useful when a set of pallets separated by a few centimeters is to be made continuous (as regards sensing) (fig. 11).

Fig. 11 also shows a typical application in which the pallets are fed in groups; a set of pallets can start a new muting cycle when the last pallet of the previous set has freed sensor 3.

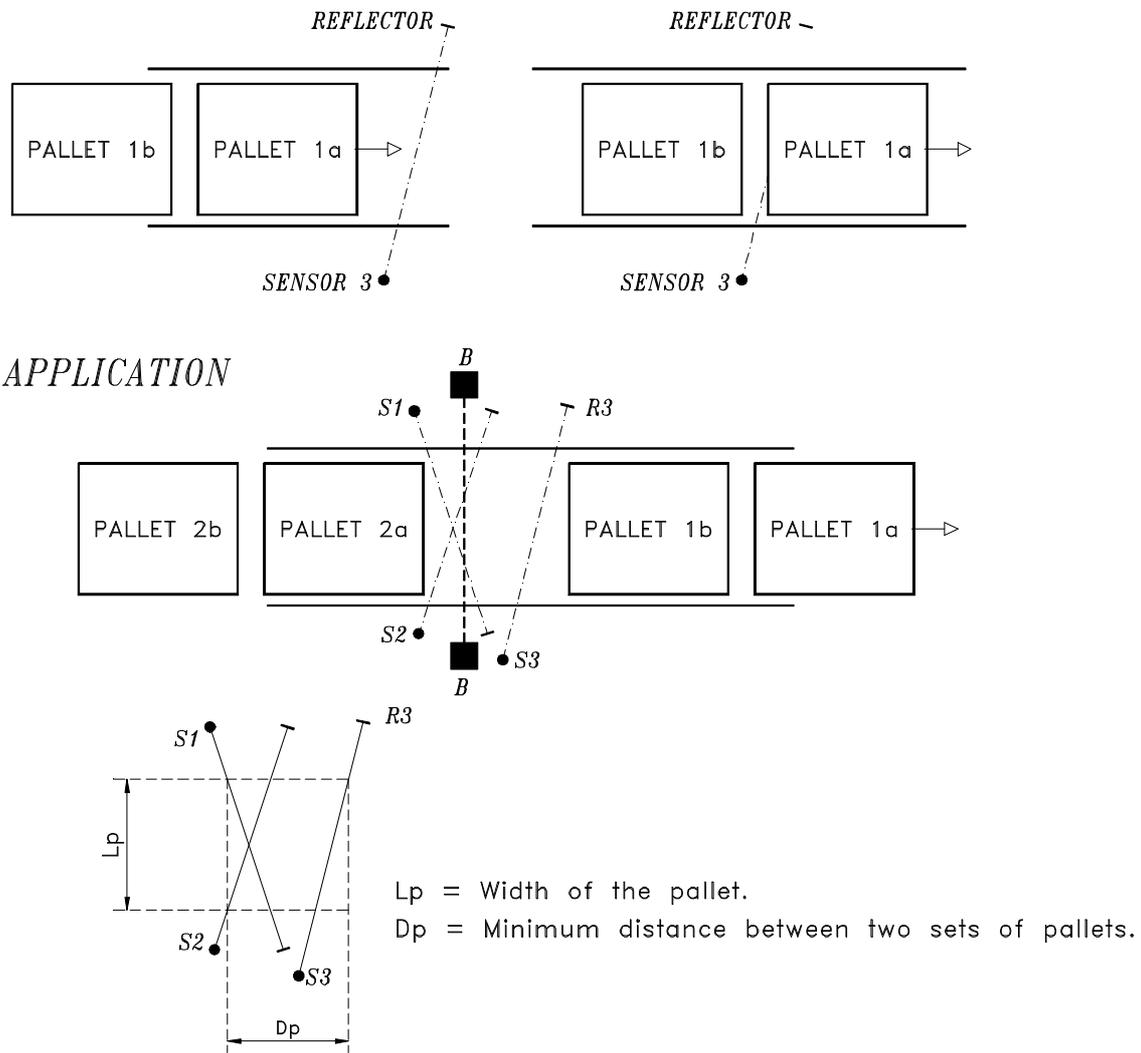


Figure 11  
 How to keep sensor 3 occupied with very close pallets.

As foreseen by the correct muting sequence, occupation and subsequent freeing of sensor 3 determines the end of the muting cycle. Each time sensor 3 is involved other than in the way envisaged, fail muting status is generated. For this reason:

- ☞ muting sensor 3 cannot be used in bi-directional systems in which the pallet enters and leaves the danger area through a single controlled access (fig. 12).

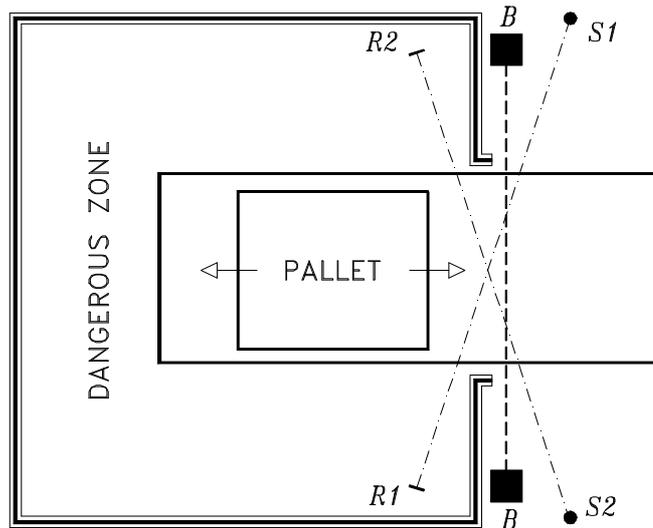


Figure 12

Entry/exit type bi-directional system: sensor 3 cannot be used.

To avoid interference between the light barrier and the muting sensors, the light barrier must be assembled so that the synchronism beam is on the part opposite the muting beams.

In ARGOLUX AS safety barriers, the synchronism beam is generated by the ASR receiver and is the first beam starting from the output connector part:

- ☞ assemble the light barrier so that the output connectors are on the part opposite the muting sensors (fig. 13).

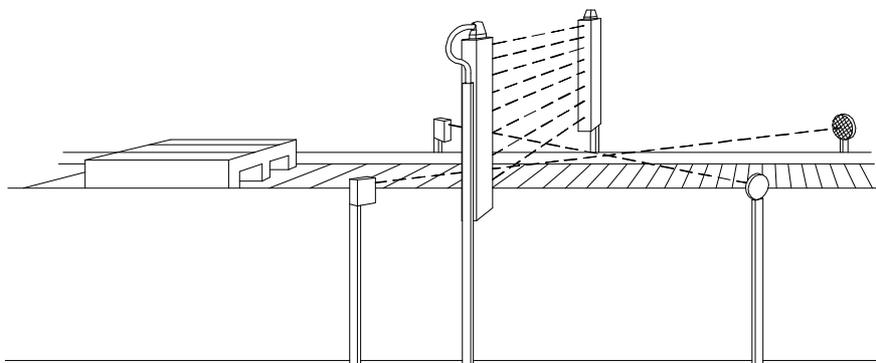


Figure 13

Assemble the barrier with the connectors to the top.

**External muting indicator.**

According to safety regulations, activation of the muting function must be highlighted by switching on of an external indicator; this is therefore mandatory.

The indicator device should be positioned in the immediate vicinity of the access point to be protected by the light barrier so that it is clearly visible and unmistakably associated with the light barrier to which it refers.

**Override command.**

The override command, which is generated using a latching two-handed control (push-buttons or key selectors with spring return), can be used by authorized personnel only.

This emergency operation must be carried out guaranteeing personnel safety. The control device must be located in an enclosure accessible to authorized personnel only and be in a position that assures complete visibility of the work area.

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**ELECTRICAL CONNECTIONS**

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Before making the electrical connections, make sure that the voltage available matches that indicated in the technical data.

- ☞ The AU S3M2 control unit must be powered at a 24Vdc  $\pm$ 20%.
- ☞ The jump connecting terminals 2 and 3 can improve the device life duration and reliability by avoiding inefficient grounding. In case the user does not want OVDC to be connected with ground, the jump should be removed.

The electrical connections must be made according to the wiring diagrams given on pages 24, 25, 26 and 27.

Do not connect other devices to the connectors of the emitter and receiver.

**Output circuit characteristics.**

For the output circuit, the AU S3M2 control unit uses two guided contact safety relays.

These relays are rated by the manufacturer for higher voltage and current values than those indicated in the technical data on page 14. However, check that load characteristics comply with the indications given in table 2 overleaf to avoid damage or premature aging of the relays.

**Use of auxiliary contact elements K1 and K2.**

For loads with higher voltage and current characteristics than those indicated in the previous table, it is advisable to use auxiliary external contact blocks or relays aligned to the load to be controlled; in this case, comply with the type B wiring diagram given on page 25.

Minimum switching voltage	15 Vdc
Minimum switching current	20mA
Maximum switched voltage	125Vac
Maximum switched current	2A
<i>NOTE: Protect the contacts with fuse 2A/250V, Ø 5x20mm o Ø 6,3x32mm</i>	

Table 2  
Internal relays A and B electrical features.

- The auxiliary relays or contacts K1 and K2 must be of the guided contact safety type.
- Referring to table 3, pay particular attention to the configuration of the control contacts on terminals 6 and 7 and to that of the use contacts.

	Relay K1	Relay K2
Feedback control	K1-1 normally open	K2-1 normally closed
Machine stopping circuitry	K1-2 normally closed	K2-2 normally open

Table 3  
K1 e K2 contacts configuration.

- Control contacts K1-1 and K2-1 on terminals 6-7 switch a current of approximately 20mA and a voltage of approximately 24Vdc.
- To increase the electric service life of the use contacts, it is advisable to use specific anti-disturbance devices which, as indicated in the type B connection diagram on page 25, must be connected to the ends of the coil.

### Warnings regarding the connection cables.

For connections with a distance of more than 50m, use cables with a cross-section of 1mm<sup>2</sup>.

It is advisable to keep the power supply of the light barrier and control unit separate from that of other electrical power equipment (electric motors, inverters, frequency variators) or other sources of disturbance.

Connect the emitter, receiver and the control unit to the ground socket.

The connection cables between the control unit and all other devices of the system must follow a different path from that of other power cables.

### The test command.

- The test command must be sent to the control unit shorting terminals 27 and 28. A normally open external push-button, temporary closing of which generates the command that starts the test, can be used for this purpose.

- The closing of the contact used to send the test command must not be less than 10ms. This value is particularly important when sending of the test command is to be managed automatically, for example using a PLC.
- System reset from the start of a test cycle takes place within 150ms. This means that the output circuit, if the test has ended successfully, cannot be energized before this time.
- If a test command is sent before the current test command has been completed, this is interrupted and a new test phase is initiated. However, this operation is not recommended.
- The contact used for the test must be able to switch a voltage of approximately 24Vdc and a current of around 20mA.

### **Muting sensors.**

The connections of the control unit to the muting sensors are shown in the diagrams on pages 26 and 27 which specify the possible connections on the terminals dedicated to the muting function (from 20 to 26).

The sensors used must comply with those specified in the technical data on page 14. In particular, they must be of the DARK ON type.

Refer to table 1 on page 6 for configuration of the output of the muting sensors.

With relay output:

 contact open with beam not intercepted and with sensor not powered

With PNP static output:

 output active +24Vdc 100mA with the beam intercepted.

When proximity sensors are used, connect the outputs of each pair in parallel. The diagram given in fig. 14 shows how the two pairs of sensors must be connected to the terminals of the control unit.

### **Characteristics of the external indicator device.**

The control unit checks that the muting indicator device is present and working correctly.

This device, which must comply with the electrical characteristics specified in the technical data, must be an open circuit in the case of a fault.

Therefore, use of electronic lamps or those equipped with devices that generate flashing is to be avoided in that, even if they do not emit, they absorb current.

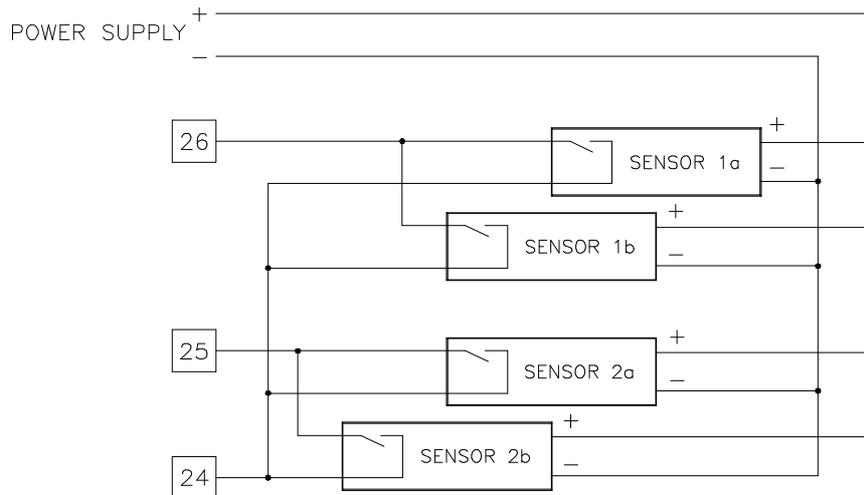
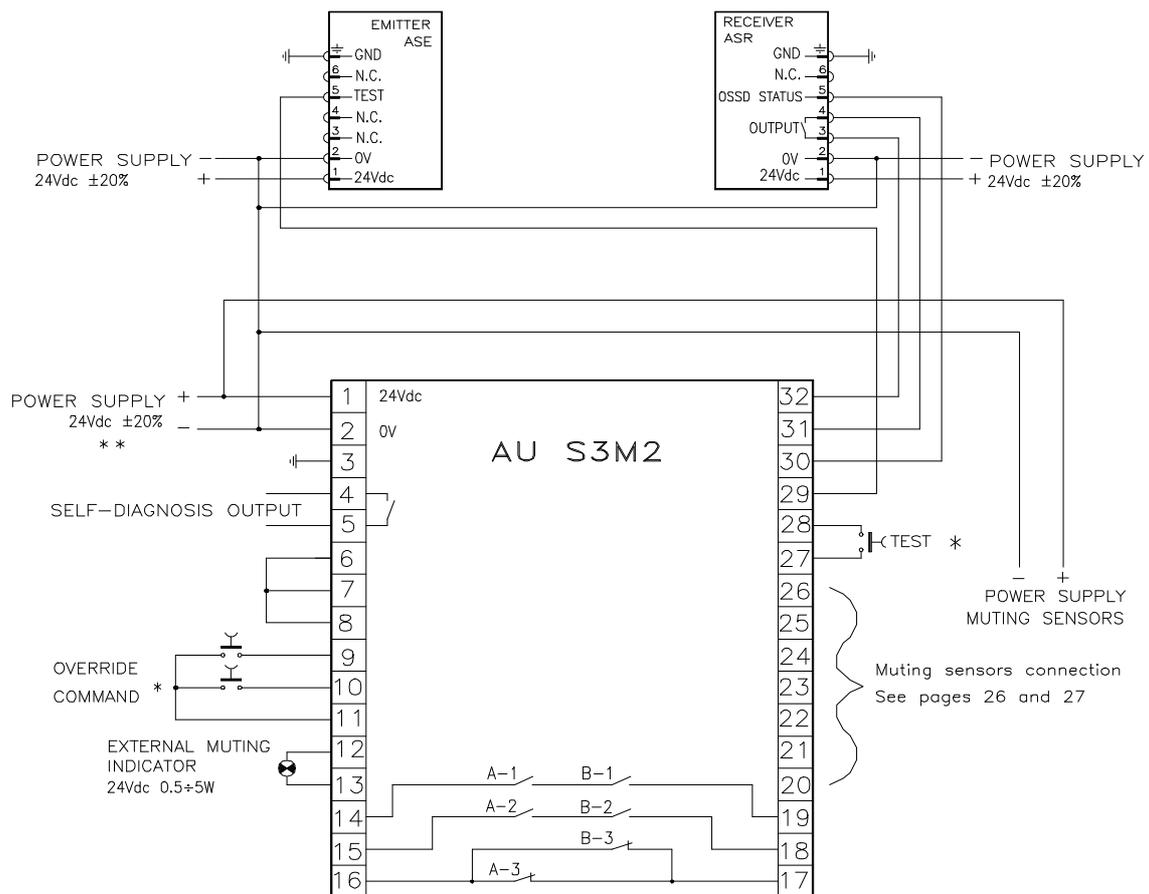


Figure 14  
Parallel connection of proximity type muting sensors.

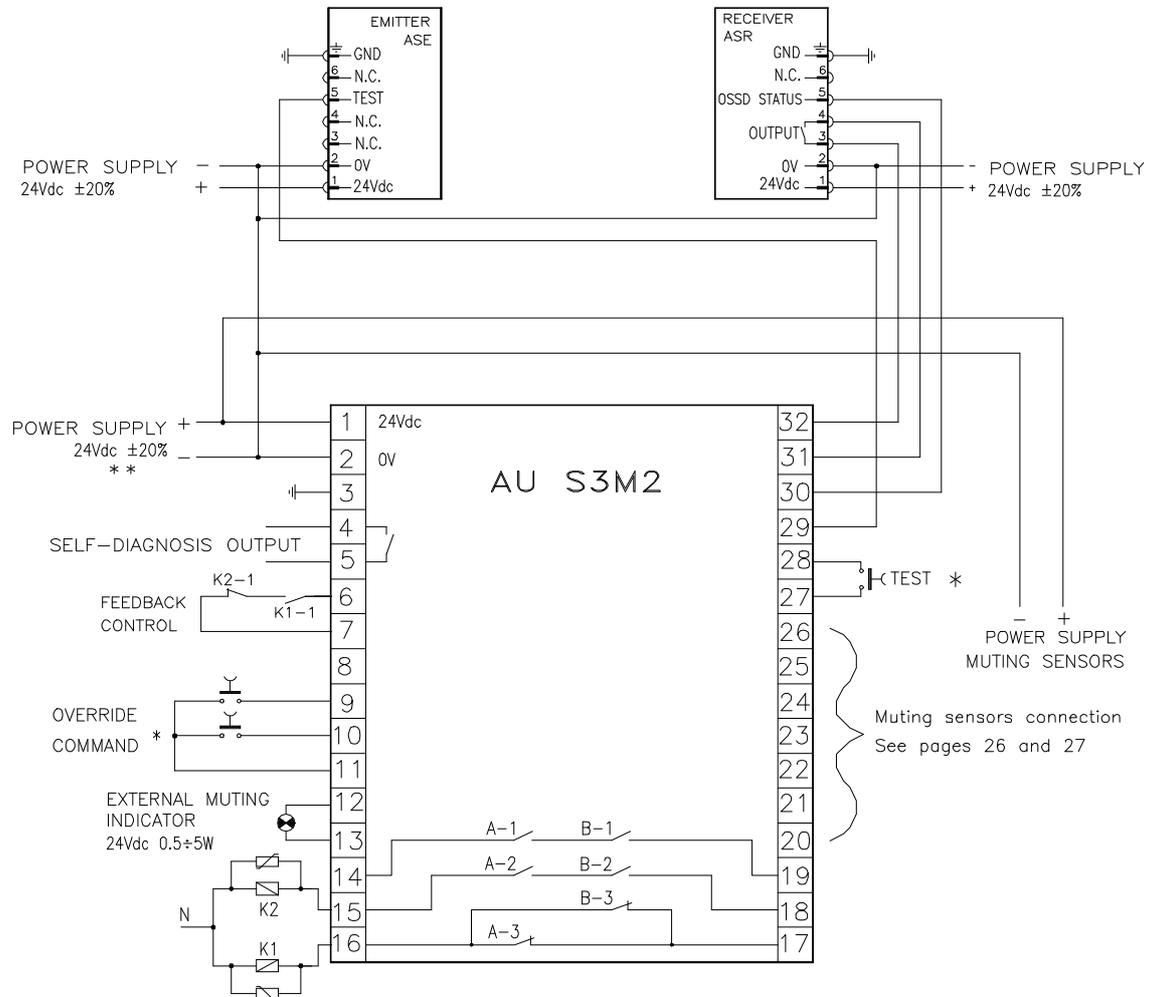
**Type A connection diagram.**



\* Use 230Vac electrically insulated Push-buttons.  
 \*\* When wiring between 0Vdc and  $\perp$  is foreseen, jumper the control unit terminals 2 and 3.

**Type B connection diagram:**

**use of relays or external safety contactors K1 and K2.**

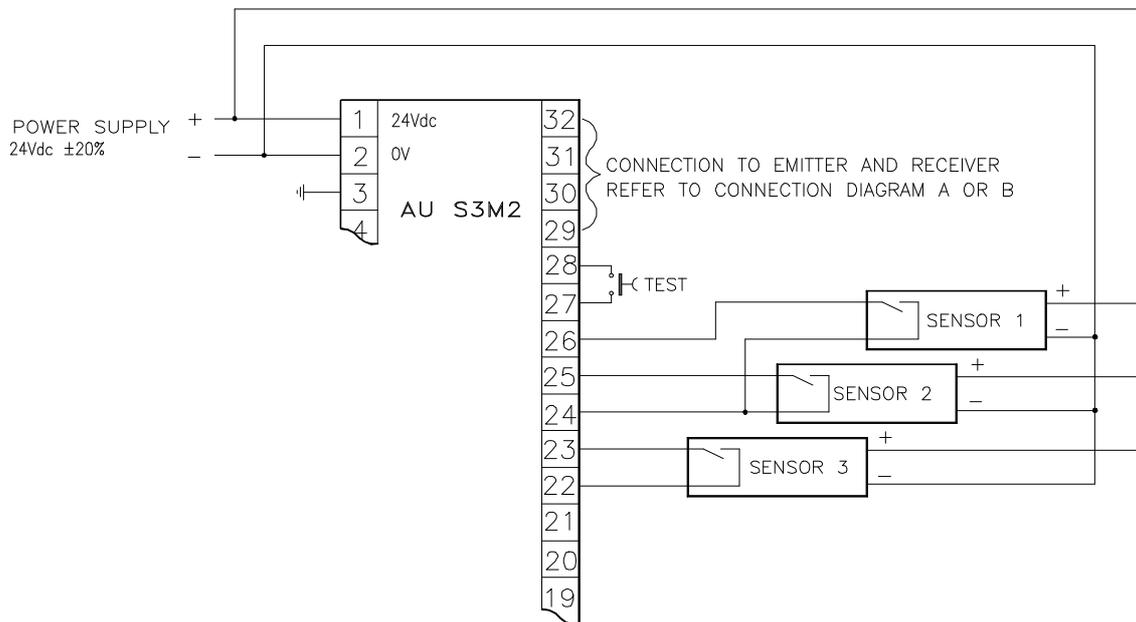


\* Use 230Vac electrically insulated Push-buttons.

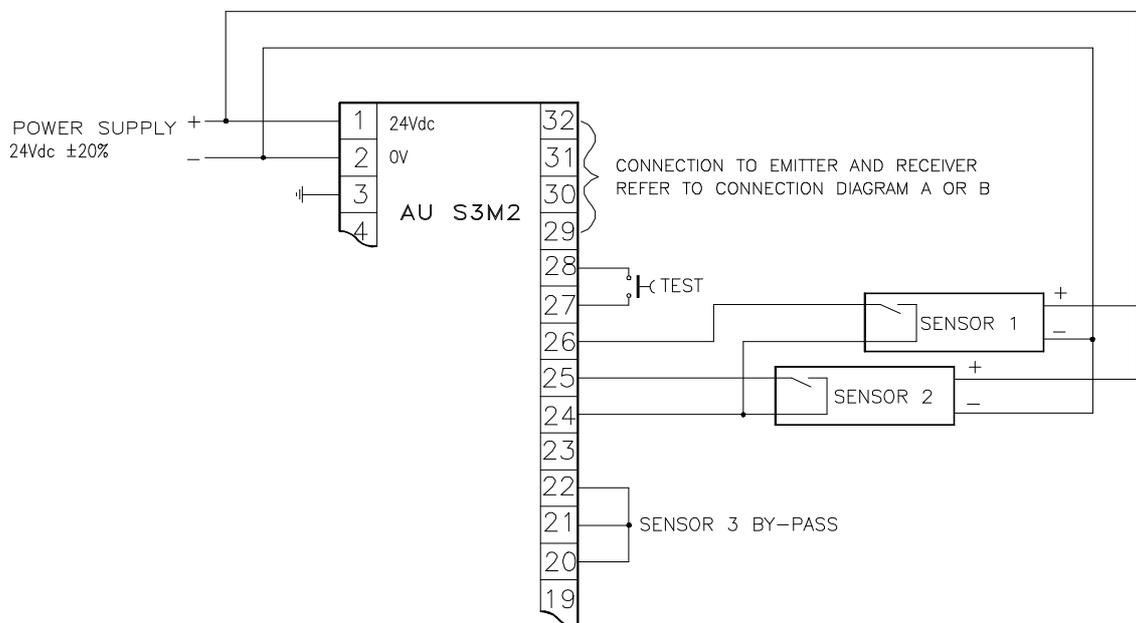
\*\* When wiring between 0Vdc and  $\perp$  is foreseen, jumper the control unit terminals 2 and 3.



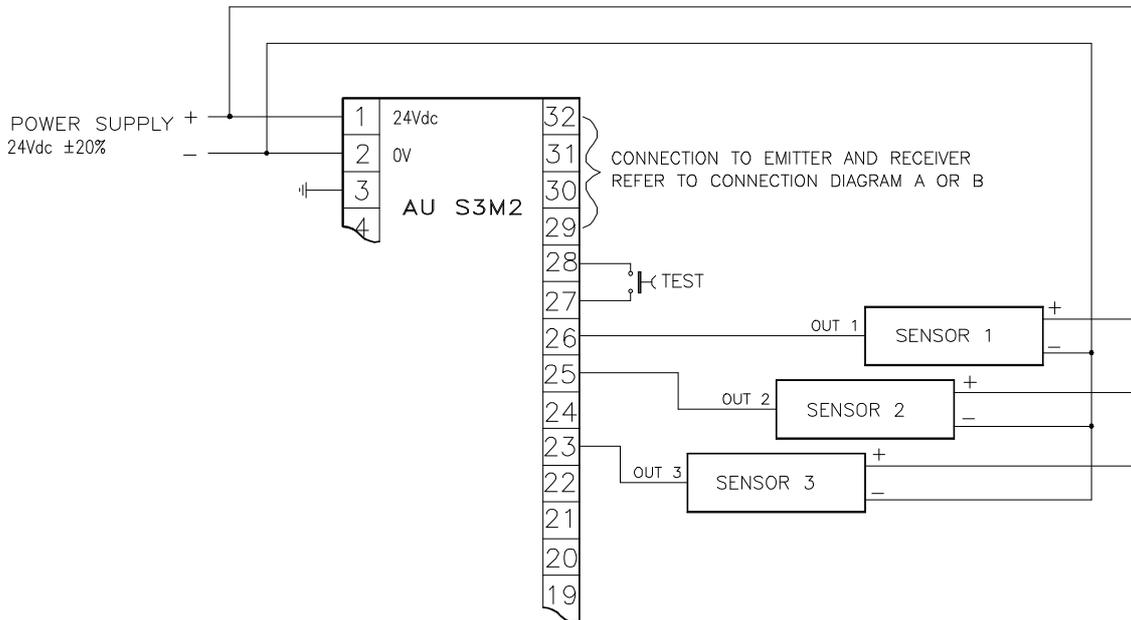
**Connection to muting sensors with relay output: use of sensor 3.**



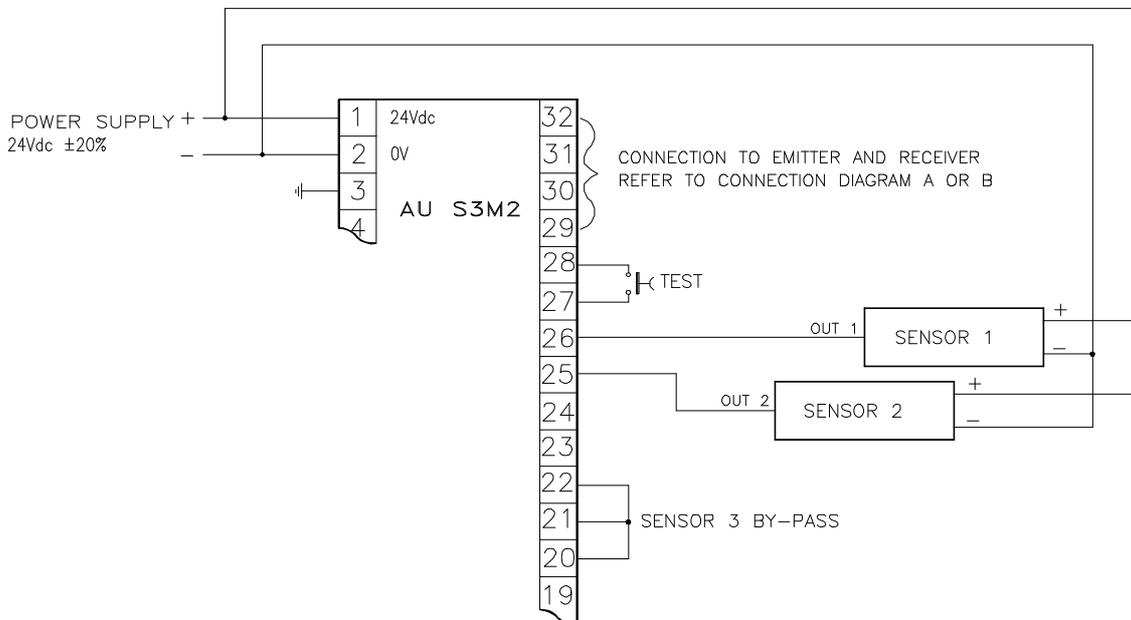
**Connection to muting sensors with relay output: sensor 3 bypassed.**



**Connection to muting sensors with PNP static output: use of sensor 3.**



**Connection to muting sensors with PNP static output: sensor 3 bypassed.**



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## CHECKS AND MAINTENANCE

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Before the start of each shift or at power-on, check that the light barrier and muting sensors are working correctly.

To do this, follow the procedure described in the light barrier installation handbook which includes occupation of the area controlled by the light barrier by the test object. Also check switching of the sensor output intercepting the beam.

The transparent caps that protect the optics of the emitter and receiver and of the muting sensors should be cleaned regularly to avoid accumulation of dust which, as it disturbs transmission and reception of the optical beams, may cause blocking of the equipment and of any machine connected.

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## MALFUNCTIONS

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An incorrect muting sequence causes blocking of the system in fail muting status. This situation is usually to be ascribed to:

- incorrect configuration of the system, usually during installation;
- misalignment of the sensors or light barrier during operation of the plant;
- entrance of a person or of material other than that envisaged in the area controlled by the sensors and light barrier;
- sensor, light barrier or indicator device alarms or malfunctions.

The muting sensors and light barrier must therefore be carefully positioned according to the specific type of plant so that incorrect functioning of the system in the installation phase is not interpreted as a fault in the control unit.

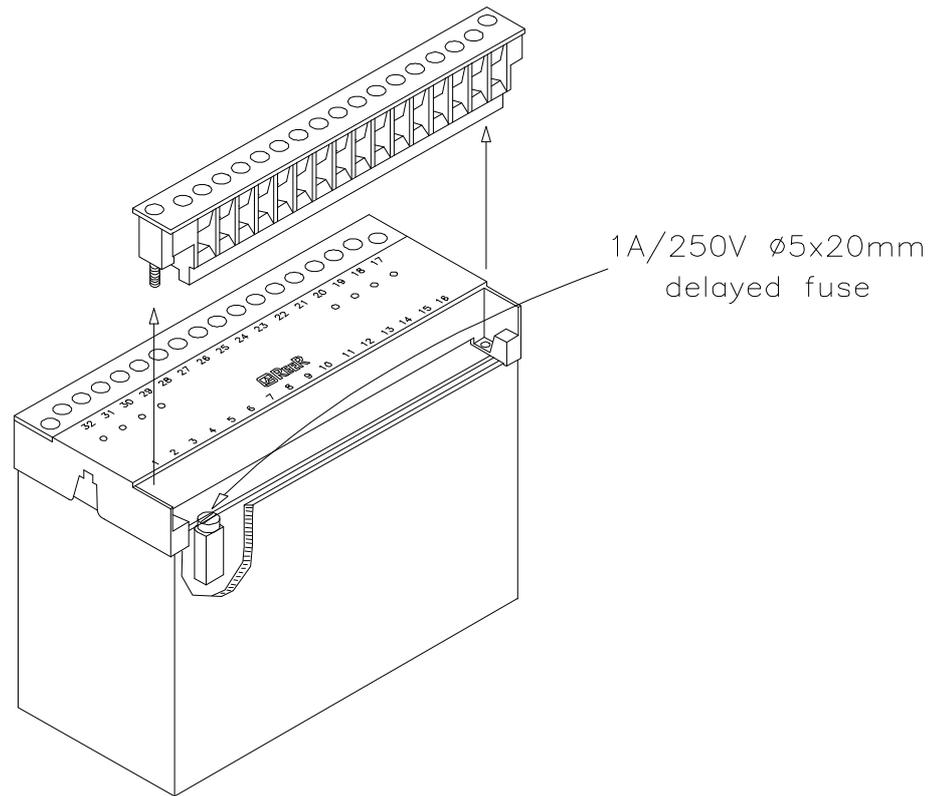
In most cases, the cause of a system malfunction can be identified according to the indications provided by the lights on the control unit and those present on the light barrier.

However, in the case of a system drop-out, it is advisable to send the test command so as to check that the fault is not to be ascribed to any random electromagnetic disturbances.

If the malfunction persists after the test command has been sent and subsequently after switching the system off and then on, proceed as follows:

- check that the electrical connections of the control unit with other system elements are incorrect and undamaged;
- check that the power supply voltage values comply with the indications given in the technical data;

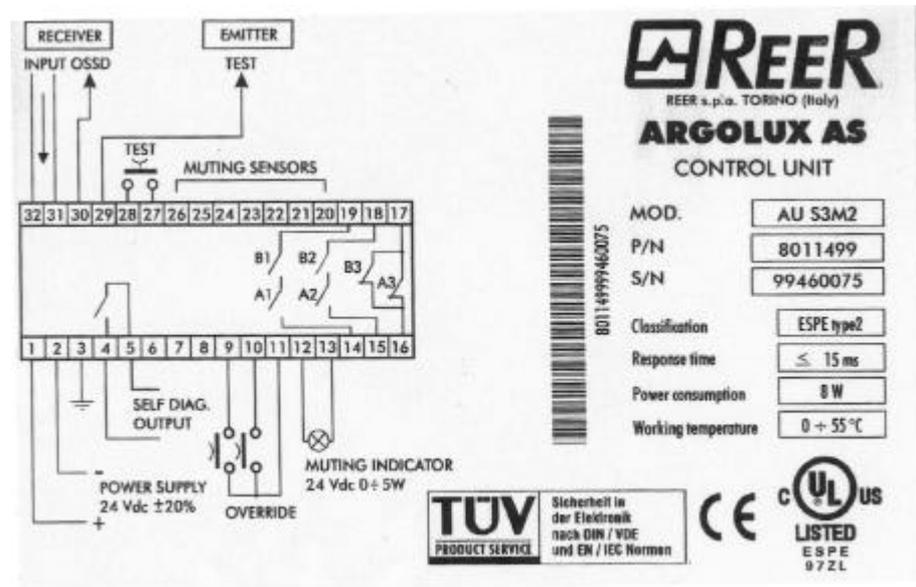
- check that the external relays or contact blocks are used correctly and with suitable anti-disturbance modules indicated by the manufacturer;
- check the fuse of the control unit for any damage and if necessary replace it following the instructions given in fig. 15 (use a 1A/250V  $\varnothing$  5x20mm delayed fuse);
- check that the emitter and receiver of the light barrier and the muting sensors are correctly aligned and that the lenses are clean.



If the checks suggested above are not sufficient to restore correct functioning of the system, return the equipment to our laboratories complete with all its parts clearly indicating:

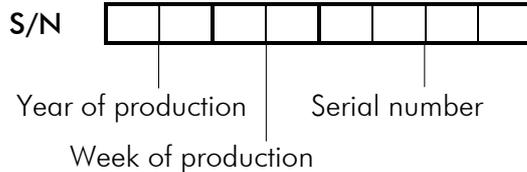
- period of operation;
- type of installation;
- fault encountered.

## IDENTIFICATION LABEL



Note:

Coding of the S/N field:



## WARRANTY

REER warrants that each brand new ARGOLUX AS series system is free of defects in the material and workmanship for a period of 12 (twelve) months.

In this period, REER undertakes to eliminate any faults in the product, repairing or replacing the fault parts free of charge both as regards material and labor.

However, REER S.p.A. reserves the right to replace the entire faulty equipment with one of the same type or with identical characteristics instead of repairing it.

Validity of the warranty is tied to compliance with the following conditions:

- The user must inform REER of the fault within twelve months from the date of delivery of the product.

- The equipment and its components must be in the conditions in which they were delivered by REER.
- The serial numbers must be clearly legible.
- The fault or malfunction has not been caused either directly or indirectly by:
  - Unsuitable use;
  - Failure to comply with rules of use;
  - Negligence, misuse, incorrect maintenance;
  - Repairs, modifications, adaptations not performed by REER personnel, tampering etc.;
  - Accidents or impacts (also due to transport and force majeure);
  - Other causes beyond the control of REER.

The repairs are made at REER laboratories to which the material must be delivered or dispatched: transport expenses, the risks of any damage or loss of the material during dispatch are the responsibility of the user.

All products and components replaced become the property of REER.

REER does not acknowledge any other warranty or rights except for those expressly indicated above. In no case therefore may claims be presented for reimbursement of damages for expenses, interruption of work or other factors or circumstances in any way related to failure of the product or of one of its parts.

Precise, complete compliance with all standards, indications and warnings given in this handbook is an essential requirement for correct functioning of the light barrier.

REER therefore declines any responsibility for all and anything resulting from failure, even partial, to comply with the aforesaid instructions.