

ARGOLUX

AU S-TWIN

CONTROL
UNIT

**INSTALLATION
AND USE**

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GENERAL DESCRIPTION

The **AU S-TWIN** control unit is a safety device that can be used to interface the REER type 2 optoelectronic sensors with the machine control system, thus achieving a type 2 electrosensitive safety system conforming to IEC 61496-1/2.

Preservation of the protective function is guaranteed by means of a functional test.

When the TEST command is actuated, a test routine is executed on all the AU S-TWIN internal circuits and associated sensors.

Only a positive test result will enable closing of the AU S-TWIN control unit internal safety relays, while detection of a dangerous fault will result in the immediate opening of these.

This manual provides detailed instructions as regards operation and configuration of the AU S-TWIN and the electric connections towards the sensors and the machine control system. For correct installation and connection of the REER type 2 sensors, please refer to the specific manuals.

Before installing the AU S-TWIN control unit make sure that:

- ☞ the machine danger rating allows for the use of type 2 electrosensitive safety devices;
- ☞ the machine control can be actuated electrically;
- ☞ all dangerous machine movements can be interrupted immediately. In particular 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 this is not the case, additional mechanical protections must be installed.

The work cycle and any dangerous movements must only be actuated by means of a control button. In particular:


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

OPERATING MODES.

The AU S-TWIN control unit is capable of three different operating modes: manual, manual with conditional test and automatic.

Manual Operation.

When the machine is turned on and the danger zone is clear, the unit is set to CLEAR with the internal relays A and B open.

 **To close relays A and B and set the unit to GUARD status, actuate the test command.**

During normal operation, each time the danger zone is intercepted the unit moves from GUARD status to BREAK and automatically tests the opening time of the internal relays A and B; when the danger zone is cleared the unit moves to CLEAR status (danger zone clear and internal relays A and B open).


Actuate the test command in order to close relays A and B and reset the unit to GUARD status.

The test command is always enabled at all points of the machine cycle provided that the danger zone is clear.

Manual Operation – Conditional Test.


The test function is only enabled following the interception and subsequent clearing of the danger zone. This function is therefore only active in CLEAR status (danger zone clear and internal relays A and B open).

This option proves useful when a test command must be sent simultaneously to more than one control unit, by means of a single centralised command, and must only affect those units that are in CLEAR status, while remaining transparent for units that are in GUARD status.

 **Since in this case the test command is only secure (for all the units) when the machine is first turned on and before the first dangerous movement, this option can only be used if the operator is certain that it is compatible with the risk level of the application.**

Automatic Operation.

When the system is turned on, it automatically generates the test function without any external command.

 **If, when the system is turned on, the zone is engaged, the system is set to the locked condition. In this case, it can be reset by clearing the zone and then stopping and restarting the system.**

During normal operation, each time the danger zone is intercepted the unit moves from GUARD status to BREAK status and automatically tests the opening time of the internal relays A and B; when the danger zone is cleared the unit automatically moves from BREAK status to GUARD status without executing any further system controls.

In any case the test command is always active, and it is therefore always possible to execute a complete test routine at any point of the machine cycle, if necessary (with the danger zone clear).

☞ This option cannot be used to control access to danger zones, since this application requires manual operation of the unit.

CONFIGURATION OF THE UNIT

To select the AU S-TWIN operating mode, unscrew and remove the terminal strip of inputs 11 – 20 in order to access the two dip-switches, as illustrated in the figure below.

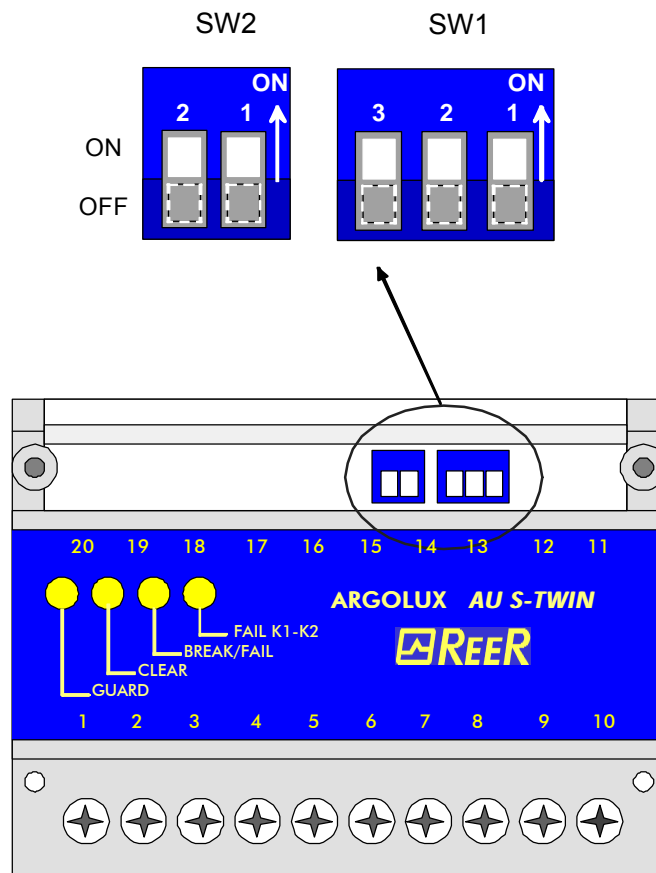


Figure 1
Position of dip-switches

	SW2		SW1		
	2	1	3	2	1
Manual (*)	OFF	OFF		OFF	OFF
Manual (Conditional test)	ON	OFF		ON	OFF
Automatic	OFF	ON		OFF	ON
Inactive position	ON	ON		ON	ON
1 Sensor (*)			OFF		
2 Sensors			ON		

(*) Default configuration

STATUS OF CONTACTS

		Status of control unit				
		GUARD	CLEAR	BREAK	FAIL	FAIL (FAIL K1-K2)
AU S-TWIN outputs	8-13					
	9-12					
	10-11					
Relay K1	K1-1					
	K1-2					
Relay K2	K2-1					
	K2-2					

INDICATOR LIGHTS

UNIT	LED No.	COLOUR	STATUS	INDICATION	AU S-TWIN STATUS
AU S-TWIN CONTROL UNIT	1	Green	On	Danger zone clear, AU S-TWIN output relays closed	GUARD
	2	Yellow	On	Danger zone clear, AU S-TWIN output relays open	CLEAR
	3	Red	On	Danger zone intercepted, AU S-TWIN output relays open	BREAK
	3	Red	Flashing	System malfunction, AU S-TWIN output relays open	FAIL
	4	Red	Flashing	External relays K1 and K2 fault, AU S-TWIN output relays open	FAIL (FAIL K1-K2)

(*) With AU S-TWIN in normal operating condition

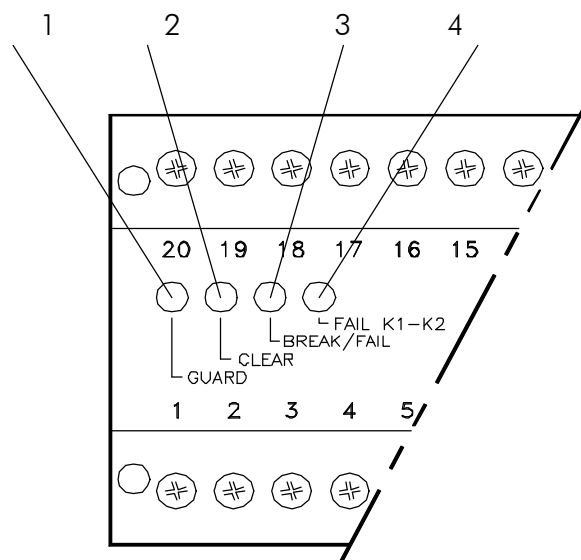


Figure 2
Indicator lights on the control unit

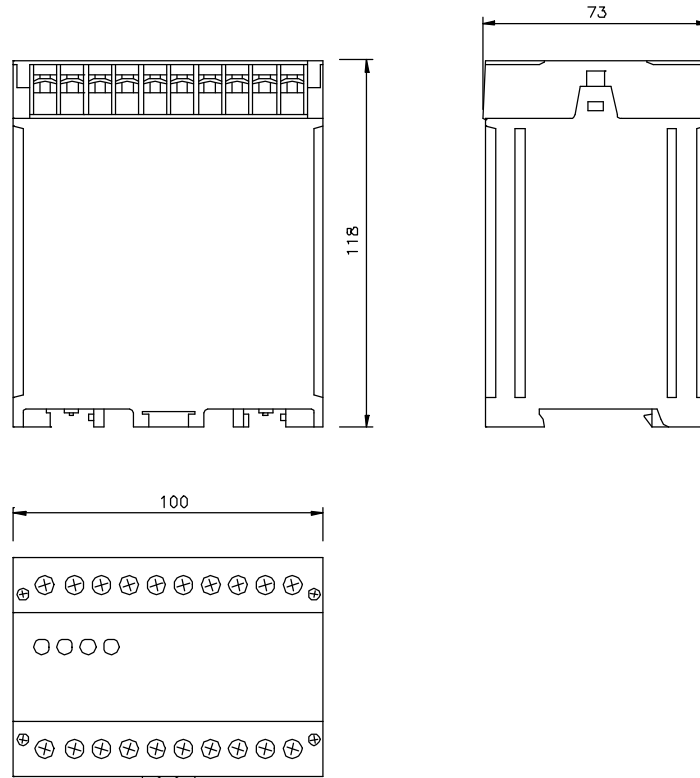
SPECIFICATIONS

Power supply	Vdc	24±20%
Power consumption	W	5,5
Output (*)		2 N/O contacts 2A 125 Vac 1 N/C contact 2A 125 Vac
Response time	ms	≤15
Minimum duration of test command	ms	10
Reset time from test actuation	ms	100
Connections		Terminal block
Length of connections (**)	m	100 max
Operating temperature	°C	0-55
Container protection rating		IP 40
Terminal strip protection rating		IP 2X
Fastening		Rapid attachment to bar according to EN 50022-35
Dimensions	mm	100 x 73 x 120
Weight	g	450

(*) See "Characteristics of the output circuit"

(**) The use of screened cables is recommended in case of electromagnetic disturbance exceeding that provided for by standard EN 61000-4-4 severity factor 4.

DIMENSIONS (distances in mm)



INSTALLATION AND ELECTRIC CONNECTIONS

- ! The AU S-TWIN control unit must be installed in an environment with at least IP54 protection.

☞ The control unit must be supplied with PELV type 24Vdc $\pm 20\%$ power supply (e.g. through an isolating transformer conforming to EN 60742).

Connection of photoelectric safety sensors.

Two type 2 photoelectric safety barriers or up to 4 single beam sensors can be connected to the AU S-TWIN control unit.

A barrier and one or two single beam sensors can also be connected.

In case of only one safety barrier being required, this must be connected to terminals 17, 18, 19 and 20. Terminals 3 and 4 for the second barrier are not connected.

If one or two single beam sensors are used, these can both be connected to terminals 17 and 20 (cascade connection) or one to terminals 17 and 20 and the other to terminals 3 and 4.

Four single beam sensors are connected in pairs to terminals 17, 20 and 3, 4 respectively (cascade connection).

If a safety barrier and one or two single beam sensors are used, the barrier must be connected to terminals 17, 18, 19 and 20, the sensors to terminals 3 and 4.

Test command.

- The test command must be sent to the control unit by short-circuiting terminals 15 and 16. An N/O external control button which, when temporarily closed, generates the test cycle command, can be used for this purpose.
- The contact closing time must not be less than 10ms. This is especially important if the test command is to be sent automatically, by means of a PLC, for instance.
- Once the test cycle has been actuated, the system will be reset within 100 ms. This means that, in the event of a successful test, the output circuit cannot be made before this time.
- The contact used for the test must be capable of switching 24V_{dc} and 20mA.
- In case of manual test command actuation, the control must be located outside the danger zone in a place from which the operating area is clearly visible.
- The control must not be accessible from inside the danger zone.

Characteristics of the output circuit.

The output circuit of the AU S-TWIN control unit utilises two safety relays with force guided contacts.

The manufacturer's rating for these relays exceeds the voltage and current indicated in the specifications; however, in order to ensure their correct insulation and prevent early damaging or ageing, it is necessary to protect every output line with a delayed 3.15A fuse and to make sure that the characteristics of the load correspond with the indications contained in the following table.

Minimum switching voltage	15 Vdc
Minimum switching current	20mA
Maximum switching voltage	125Vac
Maximum switching current	2A

Use of auxiliary contactors K1 and K2.

For loads with higher voltage and current characteristics than those indicated in the previous table, we recommend the use of external auxiliary contactors or relays that are suitable for the load to be tested.

- The auxiliary relays or contactors K1 and K2 must be of the safety type with force guided contacts.
- With reference to the following table, please note the configuration of the test contacts on terminals 5 and 6 and that of the operating contacts.

	Relay K1	Relay K2
Test contacts	K1-1 normally open	K2-1 normally closed
Operating contacts	K1-2 normally closed	K2-2 normally open

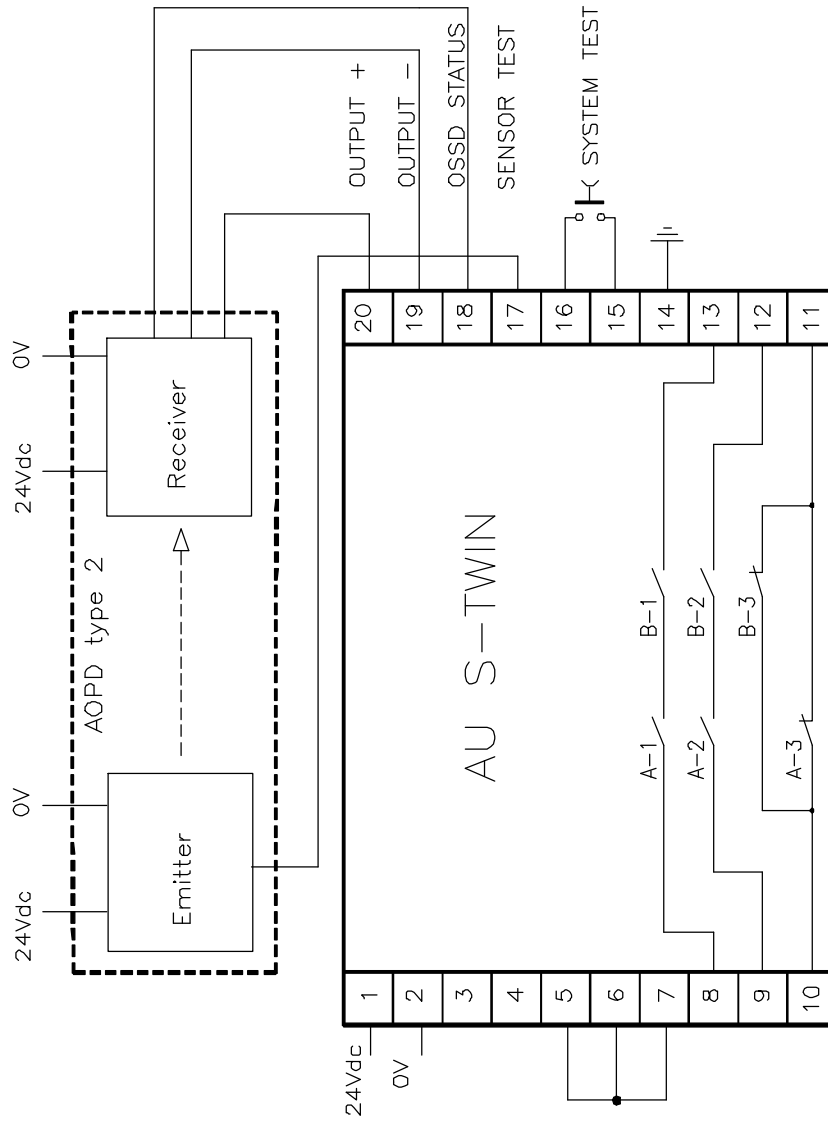
- The test contacts K1-1 and K2-1 on terminals 5 and 6 must be capable of switching 20mA and 24V_{dc}.
- To increase the electric life of the internal relays A and B, suitable anti-disturbance devices should be used. These must be connected to the ends of the K1 and K2 coils.

Warnings regarding the connection cables.

- For connections over 50m long between the photoelectric sensors and control units, use cables with a cross section area of at least 1 mm².
- The control unit power supply should be kept separate from that of the other electric power equipment (electric motors, inverters, frequency changers) and other sources of disturbance.
- The connection cables between the control unit and sensors, the connection of the test command and feedback contacts connected to terminals 5 and 6 must follow a different route to that of the other power cables.

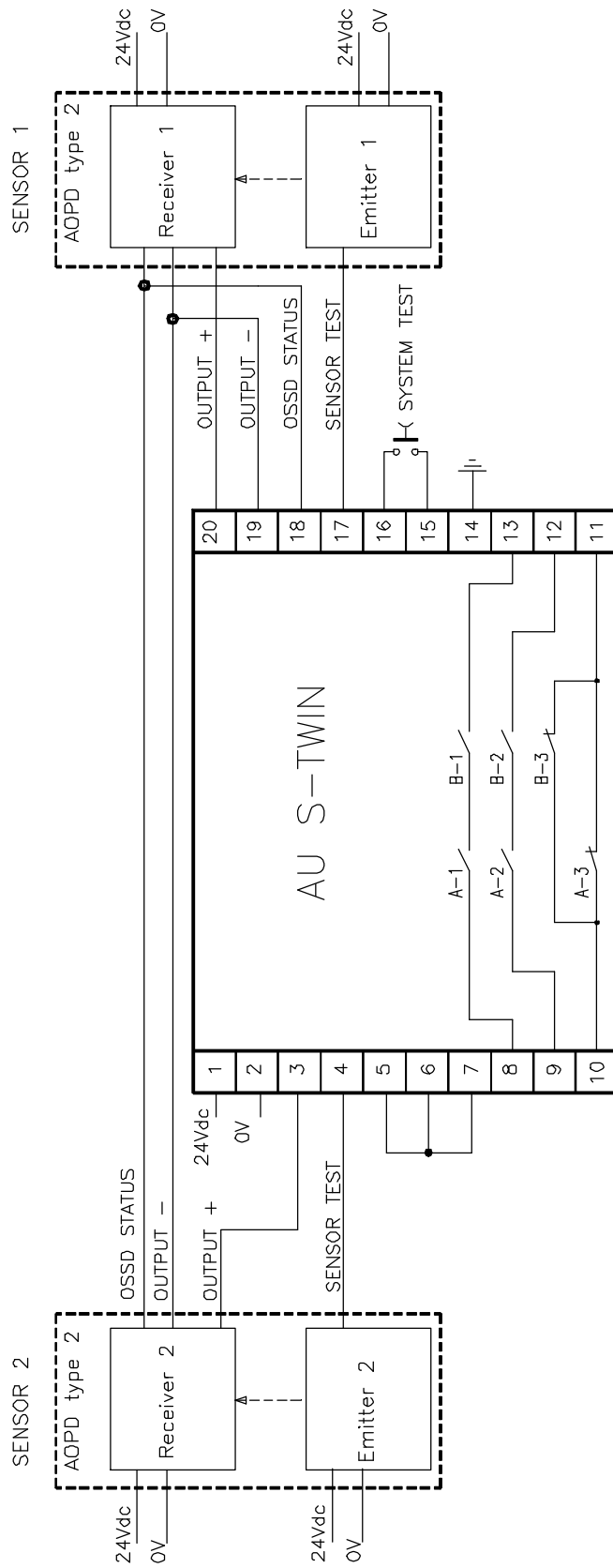
CONNECTION DIAGRAMS

**Example of connection
of 1 pair of the type 2 safety sensors to the AU S-TWIN control unit**



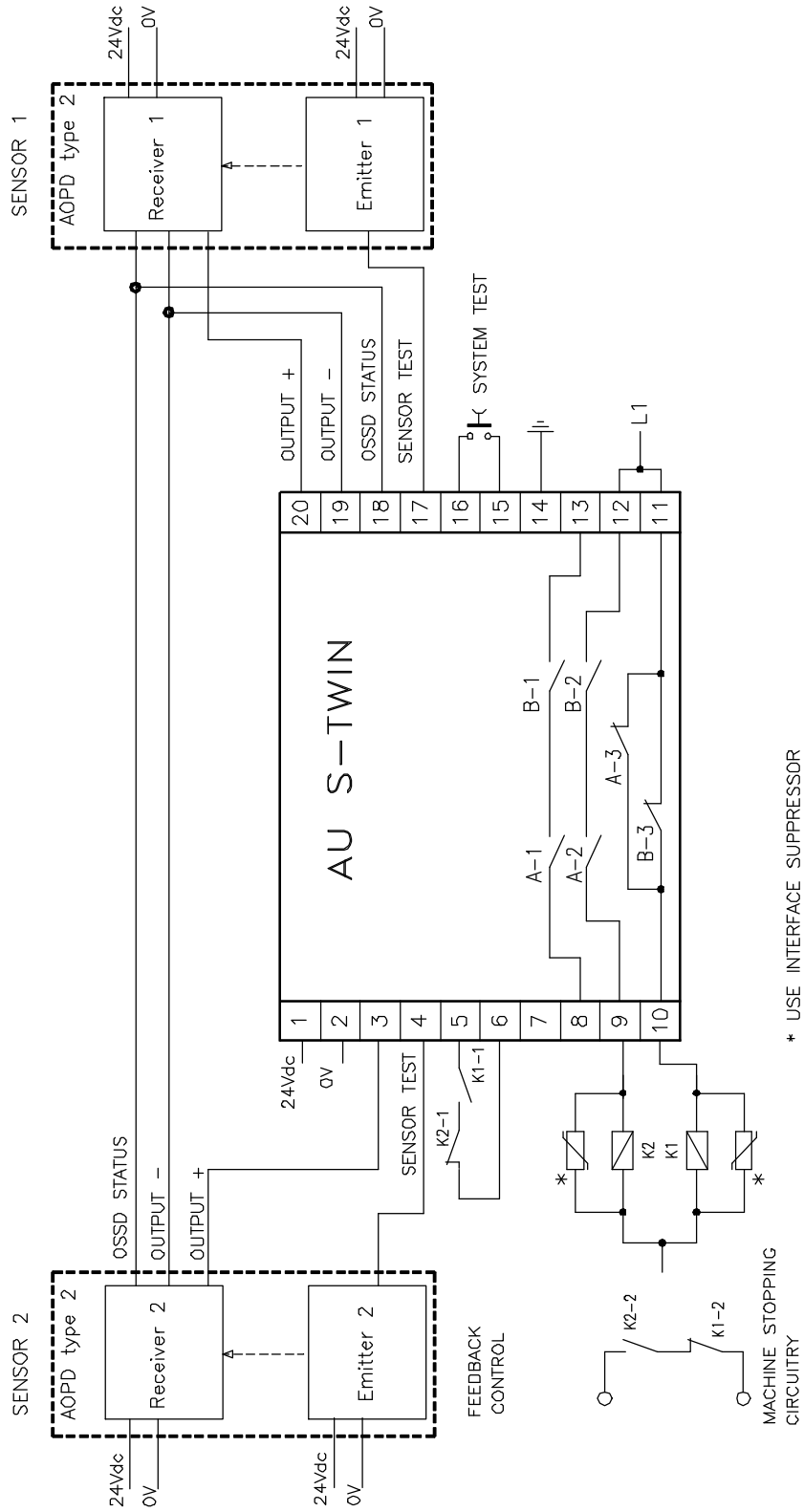
REFER TO THE RELATIVE INSTRUCTION MANUALS FOR CONNECTION OF SAFETY SENSORS

**Example of connection
of 2 pairs of the type 2 safety sensors to the AU S-TWIN control unit**



REFER TO THE RELATIVE INSTRUCTION MANUALS FOR CONNECTION OF SAFETY SENSORS

Example of connection of 2 pairs of the type 2 safety sensors to the AU S-TWIN control unit using external safety relays or contactors K1 and K2.



REFER TO THE RELATIVE INSTRUCTION MANUALS FOR CONNECTION OF SAFETY SENSORS

TROUBLESHOOTING

The indicator lights on the control unit enable the majority of system faults to be diagnosed.

In any case, when faced with a system stoppage, the test commands should be sent in order to exclude any casual electromagnetic disturbance as the cause of the fault.

If malfunctioning persists, even after test commands have been sent and following the subsequent stopping and restarting of the system, proceed as follows:

- verify the integrity of electric connections and check that these have been made correctly;
- check that power supply voltage levels comply with those indicated in the specifications;
- verify the correct utilisation of the external relays or contactors and compliance with the manufacturer's recommendations as regards the use of anti-disturbance modules;
- verify the correct alignment of the sensors and that the optics are perfectly clean.

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

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

GUARANTEE

All new AU S-TWIN controls units 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 repair or 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 conditions in which they were supplied by REER.
- The serial numbers must be clearly legible.
- The defect or malfunction must not arise directly from:
 - Improper use;
 - Non-observance of instructions for use;
 - Negligence, inexperience, improper maintenance;
 - Repairs, modifications 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 delivered: transport costs and any damage or loss of material during shipment will be charged to the user.

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 connected in any way with 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.*

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