REER

Installation use and maintenance



(Original instructions)

SR T

Two-hand Safety Relay Module for Type III C

SR T
TWO-HAND SAFETY RELAY MODULE FOR TYPE III C

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This symbol indicates an important personal safety warning. Failure to comply with the warning may result in very high risk for exposed personnel.

➔ This symbol indicates an important warning.

OVERVIEW

The Two-hand-control-relay SR T module can be used for:

- Two-hand-control type III C according to :
  - **EN ISO 13851** up to demands grade III C.

MAIN FEATURES

SR T module main features are the following:

- Two hands control safety function
- 2 N.O. outputs with guided contact safety relays
- 1 External contactors feedback input (EDM)
- 1 System Status PNP output
- The outputs of the safety relay follow the status of the input.

OPERATION

The outputs of the SR T safety module follow the status of the two-hand-control (changeover contacts):

- <u>with the commands S1/S2 of two-hand control contacts pressed:</u>
  INPUT1 is connected to OUT TEST2 and INPUT2 is connected to OUT TEST1
  - the relay outputs of the safety module are active.
- <u>with the commands S1/S2 of two-hand control contacts released:</u>
  INPUT1 is connected to OUT TEST1 and INPUT2 is connected to OUT TEST2
  - the relay outputs of the safety module are de-activated.

➔ It is mandatory that simultaneous activation of the two-hand control contacts S1 and S2 must be smaller than 500 msec.

➔ If the simultaneity is not respected, the system remains in OFF with an alternate flashing of the LEDs IN1 - IN2/FAIL. To reactivate the outputs, it is necessary to re-open and close INPUT1 and INPUT2 (respecting the simultaneity).

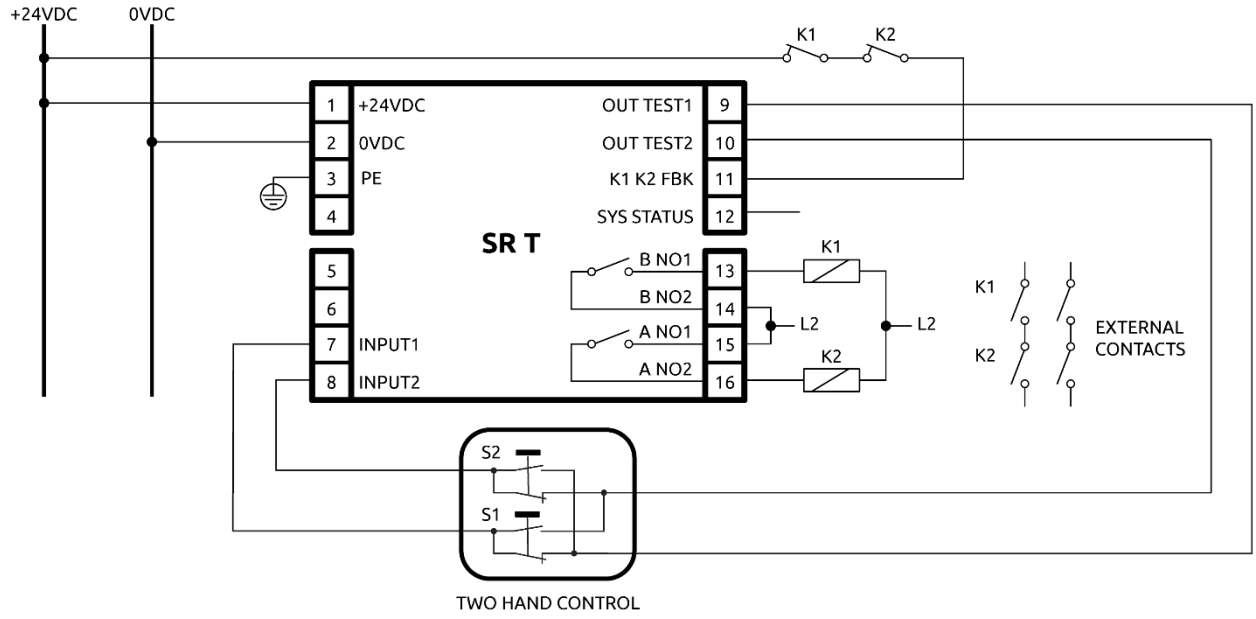


Figure 1 – Automatic mode with K1 K2 FBK control

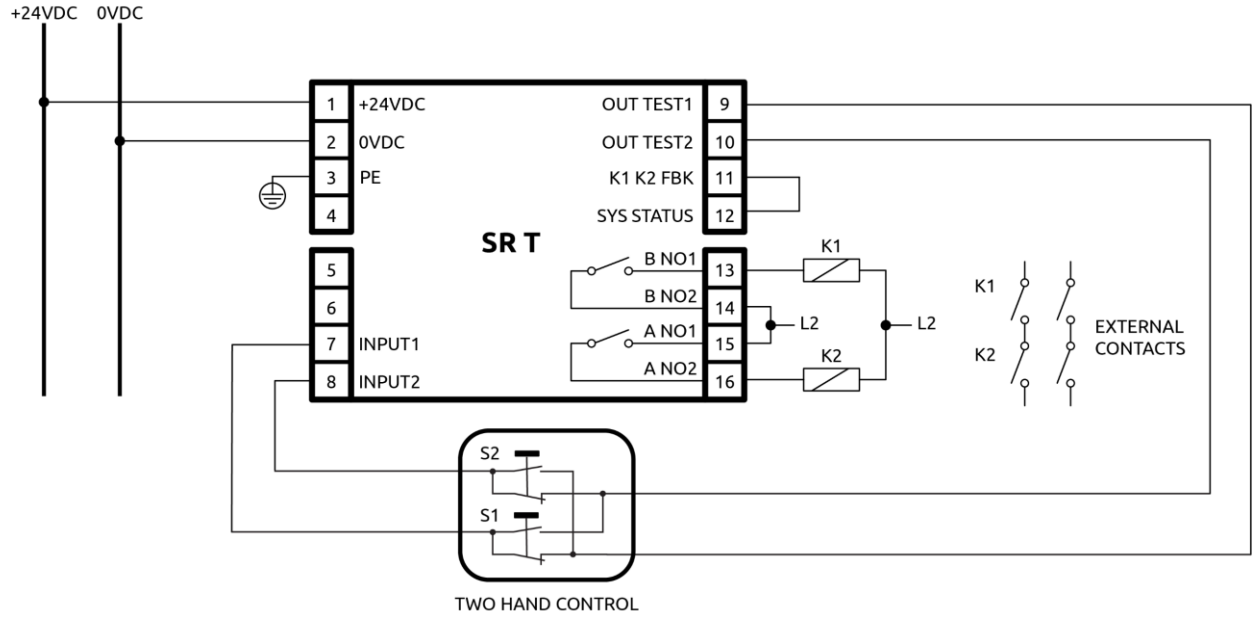


Figure 2 – Automatic mode without K1 K2 FBK control

ELECTRICAL CONNECTIONS

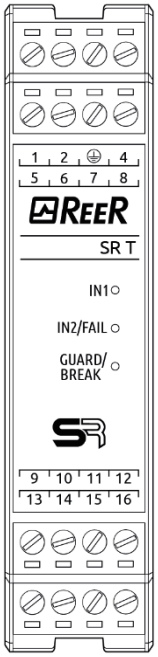


Figure 3

SR T is provided with terminal blocks for the electrical connections.
The unit provides 16 terminals.

➔ Terminal tightening torque: 5...7lb-in (0,6...0,7 Nm).

- Install SR T in an enclosure with a protection class of at least IP54.
- Connect the module when it is not powered.
- The supply voltage to the units must be 24 ± 20% VDC; PELV (in compliance with the standard EN 60204-1 (Chapter 6.4)).
- Do not use the SR T to supply external devices.
- The same ground connection (0VDC) must be used for all system components.

INSTRUCTIONS CONCERNING CONNECTION CABLES

➔ Wire size range: AWG 12...30, (solid/stranded) (UL).

➔ Use 60/75°C copper (Cu) conductor only.

➔ We recommend the use of separate power supplies for the safety controller and for other electrical power equipment (electric motors, inverters, frequency converters) or other sources of disturbance.

➔ Cables used for connections longer than 50m must have a cross-section of at least 1mm^2 (AWG16).

PINOUT

TERMINAL NUMBER	SIGNAL NAME	TYPE OF SIGNAL	DESCRIPTION
1	**24VDC**	-	Power supply 24VDC
2	**0VDC**	-	Power supply 0VDC
3	**PE**	-	Ground connection
4	**-**	-	-
5	**-**	-	-
6	**-**	-	-
7	**INPUT1**	Input	Safety Input 1
8	**INPUT2**	Input	Safety Input 2
9	**OUT TEST1**	Output	Test output 1 for mechanical switch
10	**OUT TEST2**	Output	Test output 2 for mechanical switch
11	**K1 K2 FBK**	Input	Feedback external contactors K1K2
12	**SYS STATUS**	Output	Output status
13	**B NO1**	Output	Safety relay B, contact 1 (N.O.)
14	**B NO2**	Output	Safety relay B, contact 2 (N.O.)
15	**A NO1**	Output	Safety relay A, contact 1 (N.O.)
16	**A NO2**	Output	Safety relay A, contact 2 (N.O.)

Table 1

CHECKLIST AFTER INSTALLATION

The SR T Safety Relay Module is able to detect in real time the faults.

To guarantee the system perfect operation perform the following checks at start up and at least every year:

OPERATION / CONTROL	COMPLETE
1. *Verify the correct fixing of SR T to the Omega rail.*	❒
2. *Verify that all the cables are correctly inserted and the terminal blocks well screwed.*	❒
3. *Verify the correct operation of the two-hand control connected to SR T.*	❒

Table 2

INPUTS AND OUTPUTS

SYSTEM STATUS OUTPUT

The SYSTEM STATUS output reports exactly the output safety relays condition:

- When the output relays are opened, the SYSTEM STATUS reports 0VDC.
- When the output relays are closed, the SYSTEM STATUS reports +24VDC.

OUT TEST OUTPUT

Short circuit between the two channels or between the channels and 24VDC are detected by means of the OUT TEST1, OUT TEST 2 signals generated by the safety relay.

CHARACTERISTICS OF THE OUTPUT CIRCUIT

For the output circuit, the safety relay module uses two guided contact safety relays.

These relays are rated by the manufacturer for voltage and current values above those indicated in the technical data; however, to assure correct insulation and to avoid damage or premature aging, protect each output line with an appropriate fuse (depending on the load). Check that load characteristics comply with the indications given in the table below.

Minimum switching voltage	18 VDC
Minimum switching current	20 mA
Maximum switching voltage	250 VAC
Maximum switching current	6A(AC) / 6A(DC)

USE OF K1 AND K2 AUXILIARY CONTACT ELEMENTS.

For loads with higher voltage and current characteristics than those indicated in the table above, use of auxiliary external relays or contactors suitable for the load to be controlled is recommended.

- The K1 and K2 auxiliary contactors or relays must be of the guided contact safety type.
- Referring to the table below, pay particular attention to the configuration of the control contacts on terminal 11 and that of the contacts of use.

	Auxiliary Relay K1	**Auxiliary Relay K2**
Control contacts	K1-1 normally closed	K2-1 normally closed
Use contacts	K1-2 normally open	K2-2 normally open

- Control contacts K1-1 and K2-1 (terminal 11) must be able to switch a current of 10mA and a voltage of 24VDC.

K1 K2 FEEDBACK INPUT (EDM)

Using the K1 and K2 auxiliary safety contactors with guided contact safety type, it is necessary to connect the +24VDC to the **K1 K2 FBK** through the series of the K1-1 and K2-1 N.C. control contacts.

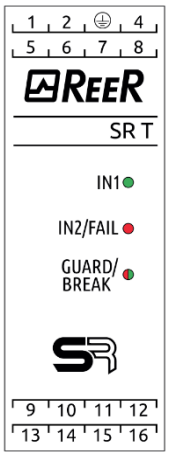
➔ The control of the correct switching of K1 and K2 is performed with a delay of 300ms.

✸ If the application requires it, the response time of the external contactors must be verified by an additional device.

✸ When the K1-1 and K2-1 N.C. control contacts are not used (or no control is provided) it is mandatory to connect the terminal 11 (K1 K2 FBK) to terminal 12 (SYS STATUS).

STATUS INDICATORS / FAULT DIAGNOSIS

NORMAL OPERATION

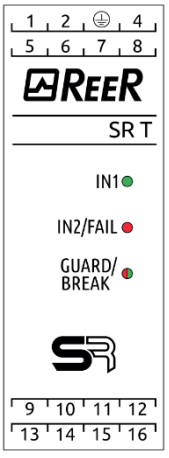


LED	COLOR	STATUS	CONDITION
IN1	*Green*	**GREEN**	Two-hand control pressed
		OFF	Two-hand control released
IN2 FAIL	*Green Red*	**GREEN**	Two-hand control pressed
		RED	Fault detected
		OFF	Two-hand control released
GUARD BREAK	*Green/ Red*	**RED**	Output relays opened
		RED blinking	The number of blinkings shows the kind of FAIL (only with FAIL is ON)
		GREEN	Output relays closed
IN1/IN2	*Green*	**Blinking alternately**	Wrong simultaneity check detected

Table 3

➔ The simultaneity check value is **500 msec.**
Please refer to the “OPERATION” section for a detailed explanation of the simultaneity check.
➔ Please refer to the "FAULT DIAGNOSIS" section for a detailed explanation of the detected fault.

FAULT DIAGNOSIS



LED			MEANING
IN1	**IN2/FAIL**	**GUARD/BREAK (RED led pulses)**	
OFF	**RED**	*(2 pulses)*	▪ Possible fault of Microcontroller board
OFF	**RED**	*(3 pulses)*	▪ Internal relays fault
OFF	**RED**	*(4 pulses)*	▪ K1K2 external relays fault
OFF	**RED**	*(5 pulses)*	▪ User configuration failure
OFF	**RED**	*(6 pulses)*	▪ User configuration changed without system restart
OFF	**RED**	*(7 pulses)*	▪ Possible overload or ▪ SYSTEM STATUS connection error

Table 4

TECHNICAL DATA

SAFETY DATA	VALUE	STANDARD
Safety level	Type 4	EN 61496-1: 2020
	SIL 3	EN 61508:2010
	SILCL 3	EN 62061:2005 / A2:2015
	Cat.4	EN ISO 13849-1: 2015
Performance level	PL e	EN ISO 13849-1: 2015
PFH_d	5,20E-09	EN 61508:2010
$MTTF_d$ (Refer to next table)		EN ISO 13849-1: 2015
DCavg	99%	
Device lifetime	20 years	
Certifications	cULus, TÜV	

Load	B10d	Number of Commutations	PFHd *	DCavg #	MTTFd # (years)	PL #	CCF #
2A@230Vac	400.000	1 every 30s	1,73E-07	99,00%	25,05	d	80%
		1 every min	8,90E-08	99,00%	46,65	e	80%
		1 every hour	6,60E-09	98,98%	306,21	e	80%
		1 every day	5,29E-09	98,97%	335,91	e	80%
0,5A@24VDC	200.000	1 every 30s	3,41E-07	99,00%	13,01	d	80%
		1 every min	1,73E-07	99,00%	25,05	d	80%
		1 every hour	7,99E-09	98,98%	279,82	e	80%
		1 every day	5,38E-09	98,97%	333,75	e	80%

*** EN 61508:2010, EN 62061:2005/A2:2015; # EN ISO 13849-1: 2015**

ELECTRICAL PARAMETERS	VALUE
Power supply	24 ± 20% VDC; PELV
Rated impulse between PELV and relay contacts	6 kV
Power requirement	3W max
Protection	Overload protected STATUS output
INPUT DATA	
Input number/data (type 3)	2 / according to standard EN61131-2, type 3
Input current	Typical 4.3mA
Input voltage	0VDC…30VDC
Input number/data (type 2)	1 / according to standard EN61131-2, type 2
Input current	Typical 10mA
Input voltage	0VDC…30VDC
Number of EDM input	1 N.C. contact
EDM Response time	300ms
OUTPUT DATA	
Output test (number/data)	2 / 100mA@24VDC
System Status (number/data)	1 / 100mA@24VDC
Number of safety output	2 N.O. contacts
Type	Relays with forced guided contacts
Max switching voltage	250VAC, 125 VDC, Overvoltage Category III
Max switching current	6A (AC), 6A (DC)
Max switching power	1500VA, 180W (85W if load voltage >30Vdc)
Max Response time	20ms
Mechanical service life	10 x 10E6
Electrical service life AC1 at 360 switchings/h	> 10E5

CONNECTIONS / OPERATION	
Operating modes	Automatic
Connections	16 Terminal blocks with protection against reversal of polarity
Status indicators	Led: Input status – Output status – Fail
Max. length of connections	100m
Operating temperature	-30...55°C
Max surrounding air temperature	55°C
Storage temperature	-30...70°C
Relative humidity	10%...95%
Maximum operating altitude	2000m
Vibration resistance (CEI EN 60068-2-6:2009)	+/- 1.5 mm 9...200 Hz
Bump resistance (CEI EN 60068-2-27:2012)	15 g (6 ms half-sine)
ENCLOSURE DATA	**VALUE**
Description	Electronic housing 16 pole, with locking latch mounting
Enclosure protection rating	IP 20
Terminal block protection rating	IP 2X
Fastening	Fast attachment to rail according to CEI EN 60715
Dimensions (h x w x d)	99mm x 22,5mm x 113,5mm
Weight	150g

DIMENSIONS

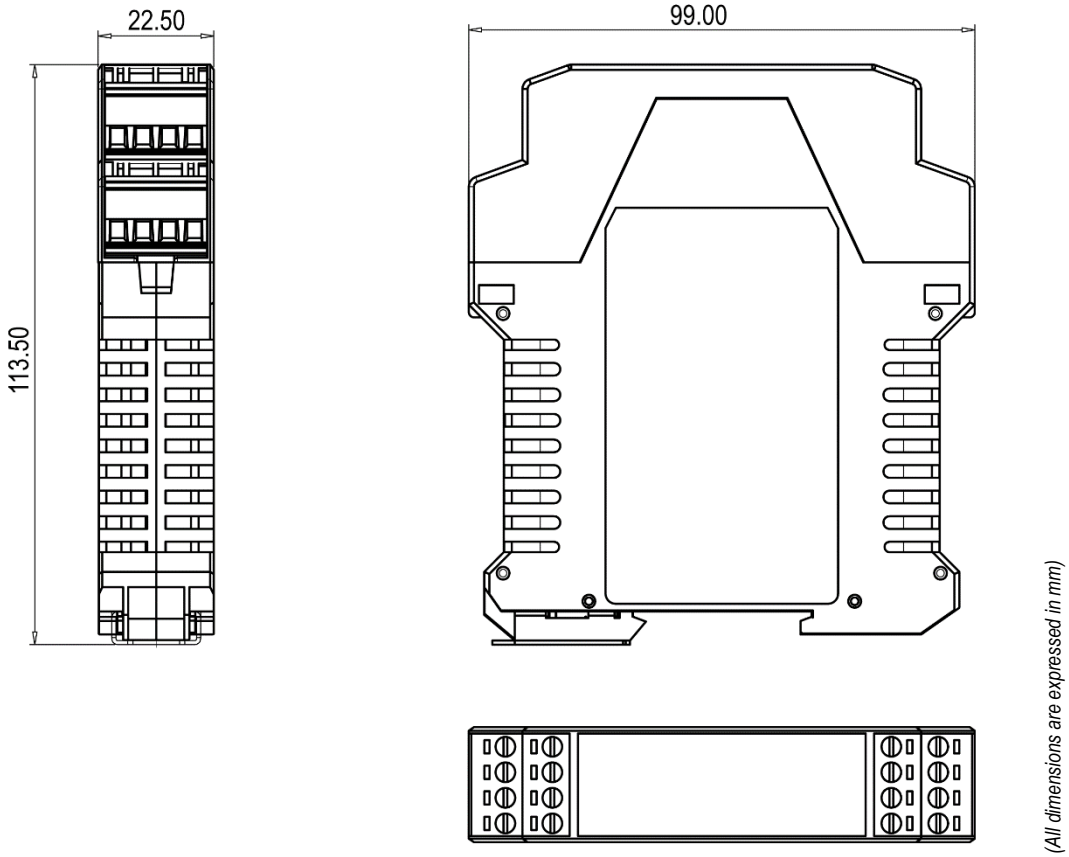
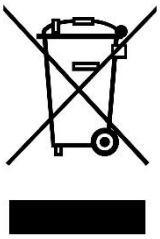


Figure 4

INDICATIONS AND INFORMATION FOR ENVIRONMENTAL PROTECTION

Dispose of the product in an eco-compatible manner and in accordance with national legislation.



For Countries in the European Union:

Pursuant to the Directive no. 2012/19/EU on waste electrical and electronic equipment (WEEE).

The crossed out wheelie-bin symbol on the equipment or its packaging means that when the product reaches the end of its useful life it must be collected separately from other waste.

Proper separate collection of the discarded equipment for later environment-friendly recycling, processing, and disposal, helps to avoid any negative impact on the environment and health and encourages re-use and recycling of the materials the equipment is made of.

In each individual Member State of the European Union this product is required to be disposed of in accordance with Directive 2012/19/EU as implemented in the Member State where the product is disposed of.

For further information please contact ReeR or your local dealer.

WARRANTY

ReeR warrants that each SR T unit in new ex-factory condition, in conditions of normal use, is free of defects in the materials and of manufacturing defects for a period of 12 (twelve) months.

In this period, ReeR undertakes to eliminate any faults in the product through repair or replacement of the faulty parts, completely free of charge as regards material and labour. However, ReeR reserves the right to replace the entire faulty appliance with another equivalent appliance or with the same characteristics instead of repairing this.

Validity of this warranty is regulated by the following conditions:

- The user must inform ReeR of the fault within twelve months from the date of delivery of the product.
- The appliance 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 defect has not been caused directly or indirectly by:
  - Improper use;
  - Non-compliance with instructions for use;
  - Carelessness, inexperience, incorrect maintenance;
  - Repairs, modifications, adaptations not carried out by ReeR personnel, tampering, etc.;
  - Accidents or impacts (also due to transportation or causes of force majeure);
  - Other causes not to be ascribed to ReeR.

Repairs will be carried out at the ReeR laboratories to which the material must be delivered or dispatched: transport risks and the risks of any damage or loss of the material during shipment are the responsibility of the user.

All products and components replaced become the property of ReeR.

ReeR does not recognize any other warranties or rights except for those specifically described above; therefore, no claims for damages may be submitted for expenses, interruption of business 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 the rules, instructions and prohibitions indicated in this handbook is an essential requirement for correct functioning of the device.

ReeR s.p.a. therefore declines any responsibility for all and anything resulting from failure to comply, even partially, with such indications.

Characteristics subject to change without notice. • Total or partial reproduction is forbidden without the prior authorization of ReeR.

EC DECLARATION OF CONFORMITY

Dichiarazione CE di conformità
EC declaration of conformity

Torino, 19/09/2022

REER SpA
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10153 – Torino
Italy

dichiara che i moduli di sicurezza **SR SELECT / SR ONE / SR ONE M / SR T / SR E4 / SR E4C** sono Dispositivi Elettrosensibili di Sicurezza (ESPE) di :

- **Tipo 4** *(secondo la Norma **EN IEC 61496-1:2020**)*
- **SIL 3** *(secondo la Norma **EN 61508: 2010**)*
- **SILCL 3** *(secondo la Norma **EN 62061 + A2:2015**)*
- **PL e** *(secondo la Norma **EN ISO 13849-1:2015**)*

declares that the safety interface **SR SELECT / SR ONE / SR ONE M / SR T / SR E4 / SR E4C** are Electro-Sensitive Safety Devices (ESPE) of:

- **Type 4** *(according the Standard **EN IEC 61496-1:2020**)*
- **SIL 3** *(according the Standard **EN 61508:2010**)*
- **SILCL 3** *(according the Standard **EN 62061 + A2:2015**)*
- **PL e** *(according the Standard **EN ISO 13849-1:2015**)*

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

- **2006/42/EC** "Direttiva Macchine"
  "Machine Directive"
- **2011/65/EU** "RoHS – Linea Guida"
  "RoHS – Guideline "
- **2014/30/EU** "Direttiva Compatibilità Elettromagnetica"
  "Electromagnetic Compatibility Directive"

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

- **EN 55032: 2015**
- **EN IEC 63000: 2018**

e sono identici 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 number: Z10 024820 0085 Rev. 01

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Direttore Tecnico
Technical Director

Simone Scaravelli
Amministratore Delegato
Managing Director

UKCA DECLARATION OF CONFORMITY

ReeR declares that SR T Safety Relay module complies with following UK legislation:

- S.I. 2008 No. 1597 - The Supply of Machinery (Safety) Regulations
- S.I. 2016 No. 1101 - Electrical Equipment (Safety) Regulations
- S.I. 2016 No. 1091 - Electromagnetic Compatibility Regulations
- S.I. 2012 No. 3032 - The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations

➔ Please refer to the link https://www.reersafety.com/certifications to download the complete UKCA Declaration of Conformity.

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All REER product manuals are available at URL https://www.reersafety.com/it/en/download/manuals