ACTIVE OPTOELECTRONIC PROTECTIVE DEVICE "AOPD" AT LASER EMISSION

SERIES

"RED-RL"

2006/42

Designed and produced in accordance with EEC directives

USER MANUAL

PREFACE

This manual provides the user and/or installer with the information required for correct use of the "RED-RL" device in the application for which it was designed, and in safety and risk-prevention.
The manual must be kept carefully in such a way as to be immediately available should it be required.
Contact the manufacturer for clarification, explanations or additional copies or updates of the manual itself.

The manufacturer reserves the right to vary products and the manual without being obliged to update previous products and manuals.

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TX

RX

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3 WARRANTY - ATTENDANCE - MATERIAL SUPPLIED AS STANDARD

The warranty is valid for a period of 12 months from the consignment date and expires at the end of this period, irrespective of whether the appliance has in fact been used. The guarantee covers all parts of the device if the materials or assembly of said parts are shown to be faulty and in respect of the following conditions:

1) The warranty covers replacement of all those parts shown to be of faulty manufacture under normal conditions of use.
The warranty is not valid unless accompanied by a copy of the invoice proving purchase.
The warranty is not valid in the following cases:

   a - if the device has been tampered with in any way;
   b - use of the device in ways not conforming to the instructions and warnings given in this manual;
   c - damage caused by an unsuitable working environment or phenomena not dependent on normal operation (e.g. an unsuitable mains voltage and/or frequency values);
   d - repairs carried out by persons or technical assistance centres not authorised by the manufacturer.

2) The resulting costs and risks associated with transport, packing and labour are the responsibility of the purchaser.

3) The replacement of the device and/or extension of the period of guarantee validity following a fault are excluded.

4) Compensation will not be paid for damages occurring as a result of the device being inoperative while repairs are carried out.

5) Where not explicitly specified, reference should be made to 85/374/EEC on the responsibility for faulty products as incorporated in Italian Decree D.P.R. 224 of 1998.

ATTENDANCE

The servicing, meant like informative support of answer to any type of relating clarification the device in object, and the repairs are supplied directly from the manufacturer.

MATERIAL SUPPLIED AS STANDARD

The "RED-RL" optoelectronic active laser light curtain, consists of the following elements supplied suitably packed:

- Transmitter (TX) complete with M12 - 5 pole output connector with 5 m long cable
- Receiver (RX) complete with M12 - 8 pole output connector with 5 m long cable
- Copy of the present manual including the "CE DECLARATION OF CONFORMITY"
- Cylindrical Test Piece to verify the integrity of the declared detection capability

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4 LEGEND - NORMATIVE REFERENCES - VERIFICATIONS

RED4RL	= name of the device covered by this manual
ESPE	= Elettro Sensitive Protective Equipment
OSSD	= Output Signal Switching Device
TX	= Transmitter (section of the "RED-RL" light guard emitting LASER radiation with a wavelength of $\lambda = 650\ nm$)
RX	= Receiver (section of the "RED-RL" light guard acting as a sensor and command and control device and incorporating the two OSSDs).
MUTING	= state of temporary neutralization of the protecting action of the device
BLANKING	= state of temporary neutralization of a part of the protecting action of the device
EDM	= component monitoring the contacts efficiency of devices connected externally to the outputs of the light guard (External Device Monitor).
PROTECTED AREA	= zone inside of which the specific test piece is intercepted from the device
DETECTION CAPABILITY	= minimal dimension of the test cylinder that is anywhere intercepted from the device within the survey zone
RESPONSE TIME	= the maximum time that elapses between the occlusion of the laser bundle and the switching OFF of the Output Signal Switching Devices OSSDs
ON STATE	= state in which the Output Signal Switching Devices OSSDs are open
OFF STATE	= state in which the Output Signal Switching Devices are closed

NORMATIVE REFERENCES

The intangible Barrier with Laser emission *"RED-RL"* has been designed and manufactured following the indications supplied from **CEI-EN 61496-1** "ESPE Elettro Sensitive Protective Equipment" and **CEI-EN 61496-2** "AOPD Active Opto Electronic Protective Devices" normes, and is classifiable as ESPE of TYPE 2 or TYPE 4. The device is also in compliance with the paragraph 5.3.2. - f) and 5.3.12 of the **UNI-EN 12622** norm "Hydraulic Press Brakes". The visible and modulated Laser light source, emitted from the Transmitter (TX) section, having an intensity so much limited (approximately 1mW) is classified as safety CLASS 2 as the **IEC EN 60825**.

VERIFYING THE PROTECTED AREA

This should be performed using a cylindrical Test Piece with a diameter corresponding to the detection capability of the device concerned. This must be intercepted anywhere within the protected area, causing the green ***RUN*** LED to light-off and the red ***ALT*** LED to light-on.
The Output Signal Switching Devices (OSSDs) should also open, disabling operation of the machine. A Test Piece, suitable for the device in use, should always be available near the work station, to allow the every day verification.

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5 INTRODUCTION - INSTALLATION

The safety device “RED-RL” is an intangible Barrier with a visible light laser emission that in coupling to the machine control system supplies protection from accidents to the operator uses in it of the same one. It is composed by a Transmitter (TX) and a Receiver (RX) units. The Control Logic of the Receiver drives the two outputs to the active state ON when all the sensing elements are illuminated from the red light laser emitted from the Transmitter, while the outputs are drived to the inactive state OFF in the event in which the intrusion of any opaque element inside of the survey area it prevents that just one of the sensing elements can be illuminated from the laser light beam. The function of the device is therefore that to inhibit to the command elements of the machine the consent to the operation in the moment in which there are not the safety conditions to operate. Any improper use of the device must be thought thus prohibited cause the consequent loss of any form of explicit and implicit warranty, like every responsibility from the manufacturer for eventual damages and accidents that could be taken place.
The "RED-RL" device has been designed and manufactured with the aim of eliminating or reducing as far as possible all risks for the user. However, *improper use* could result in unforeseen conditions with some degree of danger which cannot be completely eliminated. Installation, testing and maintenance of the "RED-RL” device must be performed exclusively by qualified personnel following the instructions in this manual faithfully and meticulously.

INSTALLATION

In order that the laser guard “RED-RL” can work in the more appropriate way it is fundamental that it is correctly installed, tested and used as it follows.
Ensure the two units, Transmitter (TX) and Receiver (RX), are perfectly parallel, and fixed, using the supplied means, at the working distance specified when ordering and reported on the rating plate under the heading "Working Distance". Keep the Receiver out of direct sunlight. The equipment is turned on by powering the transmitter TX and receiver RX according to the information given on the rating plate. After about one second the device should be ready for operation. From the frontal head of TX section a visible light laser beam has to come out and has to illuminate the frontal head of RX section with references for the correct alignment in correspondence of the four light incoming holes to the sensors (Pag.9 - Fig.9). Eventually improve the alignment of the two sections in the event the laser beam did not have to perfectly illuminate the zone of the references.
The meaning of the light indicators is described and illustrated in detail in paragraph 8 "*Light indicators and setting controls - RX*". After turning power to the two units on, and aligning them correctly, make sure that the green ***RUN*** indicator on the Receiver is on. The red ***ALT*** indicator, on the RX, lights on in the presence of an obstacle inside the protected area or if the units are not perfectly aligned. To prolong the connections, use shielded cable to avoid any kind of interference. If there are shiny reflectant surfaces near the light curtain, they should ideally be coated with matt black paint to reduce the risk of undesirable reflections.
At the end of the installation, also verify correct operation of the devise using the test piece to ensure it is intercepted at all points of the area to be protected. The minimum diameter of the test piece unequivocally intercepted at all points of the protected area is known as the Maximum Detection Capability (from CEI-EN 61496 standard) of the light curtain. For example, for the “RED-RL” series this is greater or equal to14 mm.

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6 CHOSEN OF THE DEVICE - PRECAUTIONS

RED2-RL - RED4-RL

The choice between the two models must be made on the basis of the risk category attributed to the machine, assessed in accordance with European standard **UNI/EN/ISO 13849-1**. The *RED4-RL* model is suitable for all applications with maximum accident risk, both in terms of the frequency with which the operator is exposed to said risk and the gravity of the danger (machines listed in annex IV of Directive 2006/42/EEC). The *RED2-RL* model is suitable for all other applications where the severity and frequency of exposure to the risk of accident is less.

MECHANICAL WARNINGS

To prevent shift of the laser light guard and consequently also of the protected area, it must be fixed solidly and precisely respecting the instructions given in paragraph 13 "Mechanical Data". It has to be adopted every precaution in order to reduce at the minimum the vibrations of the machine, protect the device and its supports with mechanical shelters so as to avoid direct collisions. Connection cables must be arranged so as to avoid accidental contact with, for example, abrasive, hot or sharp objects which could cause dangerous damage to the cables themselves. In the event of damage to the connection cables, do not use the device and disconnect immediately from the power supply. Avoid the connection cables coming into contact with water or damp surfaces. In addition, prevent access to the danger zone with other fixed material barriers where this is not possible by the use of electro sensitive protective devices.

ELECTRICAL WARNINGS

Verify that the available power supply source corresponds to that operating one of the device in use that must be verified from the data plate of both sections Transmitter (TX) and Receiver (RX).
The **TX** and **RX** housings are electrically connected to the ground of the internal circuit, thus to the **GND** conductor of the connector. Contact between the housing and the chassis of the machine (unless free of potential) must therefore be avoided. Failure to observe this precaution could lead to damage of the units. This danger is totally avoided if the sensor units are correctly fixed using special supports in electrically insulating material. Connection of other equipment to the power source used to power the "RED-RL" device is not recommended. This could generate electrical disturbance, jeopardising correct operation of the various parts of the device itself. If liquid or foreign bodies of any kind penetrate into the device, stop using it immediately and disconnect it from the power supply. The “RED-RL” device has been designed and produced in such a way that the housing does not have to be opened for the device to be used. Given the particular function of the device itself, removal of the heads of the aluminium housings of the transmitter TX and receiver RX is prohibited. No attempt should be made to repair them. Always contact the manufacturer only.

OPTICAL WARNINGS

The presence of a visible light laser emission, even if of low power as established by the enforced european norms, could cause the use of the device dangerous. The protection of the person eye from accidental flash turns out however assured, also without particular precautions, by the own reactions defense like as an example the palpebral glare. It is however advised to avoid itself to frontally fix or to direct the visible light laser source emitted from the Transmitter (TX).

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7 AVAILABLE FUNCTIONS

START RESTART INTRLOCK

RED-RL safety devices can be easily setted, without making any internal modifications, to switch from the automatic restart to the manual restart operation with start-restart interlock by a remote push-button (Pag.13 - Fig.15/16).
In automatic restart operation the Receiver control logic, without consents from the outside, automatically drives the two output signal switching devices to the active ON state every time that the laser beam emitted from the Transmitter catches up the four sensing elements of the Receiver after that the same one has been interrupted from an obstacle. Instead, in the event in which the device comes setted for manual restart operation, every time that the laser light beam comes interrupted is necessary to supply, for example by a push-button or a safety-pedal, an external input signal on the respective dedicated YELLOW color conductor (see paragraph 12.1 "Electrical connections - RX") that it qualifies the control logic of the Receiver to bring back to the active ON state the output signal switching devices after a switching OFF of the same ones as a result of an interruption of the laser light beam.

EXTERNAL DEVICE MONITOR

An External Device Monitor (EDM) control loop circuit allows, the safety RED-RL guard, to control the state of the correct operation of the devices (eg. relé, contactors, etc) externally connected to the two outputs as a load, thus extending the safety level up to the machine primary control elements. To such scope the Receiver, of the laser guard, is provided of the YELLOW color input conductor who make head to the inside EDM circuit.
Between this conductor and ground, "0V" of power supply, has to be in series connected the normally open switches of the external output load devices thus from being able to test their own efficiency as a consequence of every actuation (passage from ON to the OFF state) of the barrier for the interruption of the laser beam. In the event in which such function it does not used, it is necessary to connect the conductor YELLOW to the ground "0V" of power supply.

MUTING

For the "RED4-RL" Laser guard model, the "Neutralization" or "Muting" function is also previded, that is the possibility of being able to suspend in temporary way its own protecting function. That it means that when the two dedicated inputs are simultaneously activated (within a maximum time of 0,8 second) putting separately in short-circuit the PINK and GRAY conductors to the "0V" of power supply (RED conductor and Shield), the Laser Guard surveillance action comes temporarely neutralized, allowing that the Laser beam can be darkened without that the output signal switching devices (OSSDs) switch to the inactive OFF state. A red color blinking signaler, situated on the top head of the "RX" section (Pag.8), shows the activation of the Muting function. In the event of the two dedicated muting inputs are not simultaneously activated, or however with a time delay more than 0,8 second, the RED4RL switches into the block state opening the output signal switching devices (OSSDs) and signaling it as the "D" case of the diagnostic table of Pag 8. **Make attention using this function as it could generate potentially dangerous situations**. Adopt a visual and/or acoustic **additional external signaler** to indicate in unequivocal way the inactivity state of the Barrier to activated Muting.

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8 LIGHT INDICATORS and SETTING CONTROLS - RX

RX - FRONT PANEL

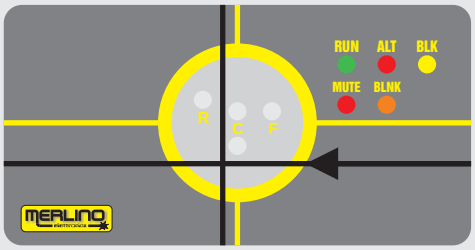

Fig.1

BLNK orange colored setting indicator of the operation mode with "Blanking", then with the exclusion of two sensors "Front" (F) and "Rear" (R). It lights by disconnecting from the "0V" of the power supply the green colored wire.

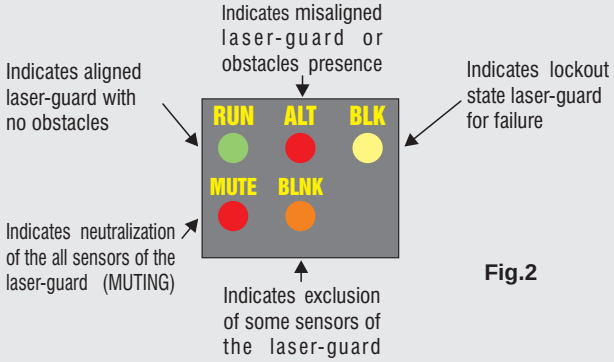

Fig.2

TROUBLESHOOTING

CASE	LEDs STATUS	DEVICE STATUS	CHECK AND SOLUTION
A	RUN ON ALT OFF BLK OFF MUTE OFF	Optical alignment O.K., no obstacles No failures	Check if the OSSDs are in the ON state
B	RUN OFF ALT ON BLK OFF MUTE OFF	No optical alignment or obstacles presence Possible internal fault	Improve the alignment, remove probable obstacles. If persist send to factory
C	RUN ON ALT OFF BLK OFF MUTE BLINKING	MUTING activated, protective action temporarely neutralized (RED4-RL model only)	Warning, possible unsafe situation
D	RUN OFF ALT ON BLK BLINKING MUTE BLINKING	Disparity state between the MUTING inputs, or inputs activated with obstacles presence	Check MUTING sources, remove probable obstacles. If persist send to factory
E	RUN OFF ALT ON BLK BLINKING MUTE OFF	Disparity between the inside driving channels	Block briefly the protective curtain, if persist send to factory
F	RUN OFF ALT } FAST SIMULTANEOUS BLINKING BLK } MUTE OFF	OSSD1 or OSSD2 connected to the +24Vcc or OSSD1 short-circuited with OSSD2 (RED4-RL model only)	Remove the factor and block briefly the protective curtain
G	RUN OFF ALT } SLOW ALTERNATE BLINKING BLK } MUTE OFF	Load sinking current connected to the OSSD1 or OSSD2 higher than 0,7A, OSSD1 or OSSD2 short-circuited to GND (RED4-RL model only)	Remove the factor and block briefly the protective curtain
H	RUN OFF ALT ON BLK ON MUTE OFF	OSSD1 or OSSD2 connected to the +24V during power-on (RED4-RL model only)	Switch-off power supply, remove the factor, switch-on power supply

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9 RATING PLATE - INDICATIONS

On both Transmitter (TX) and Receiver (RX) units there is a label showing all the technical data typical of the device according to the Machinery Directive 2006/42/EEC Annex I° § 1.7.3 concerning safety components.
Following with reference to a specific model of active optoelectronic protective device with visible light laser emission called "RED-RL" there is an example of rating plate

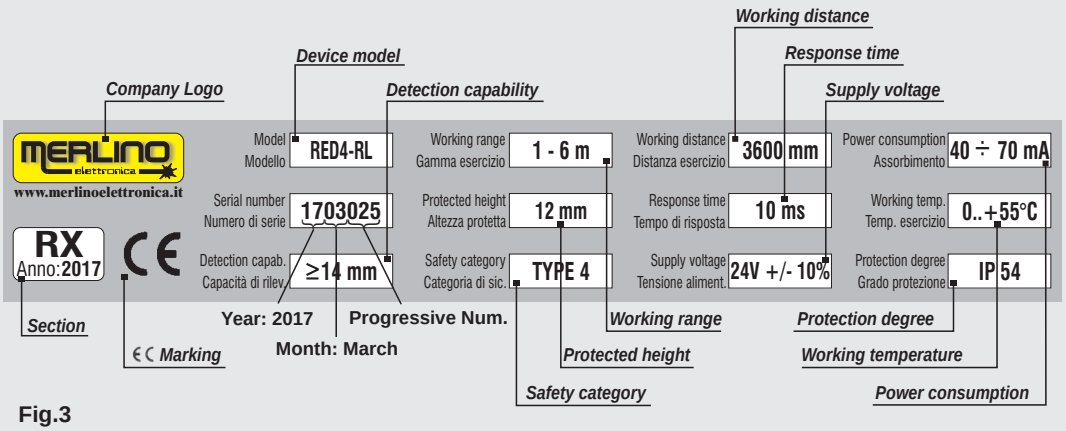

Fig.3

A second label, located on the aluminium housing, shows on how to carry out electrical connections useful for a correct use of the device. It identified all the conductors with reference to their colouring and to the corresponding function.

TX RED-RL

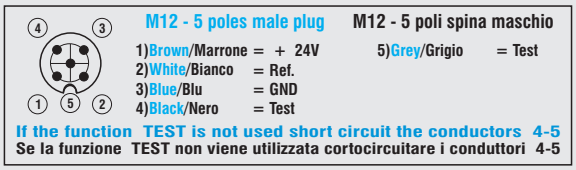

Fig.4

Label located on the housing of the "TX" section. The output connector for the electric connections is a standard type M12 - 5pole

TX RED-RL

Fig.7

Label located on the housing of the "TX" section. It shows the features of the light emitted and alert the user not to look directly the outgoing Laser beam

RX RED2-RL

Fig.5

Label located on the housing of the "RX" Type 2 section. The output connector for electric connections is a standard type M12 - 8pole

TX RED-RL

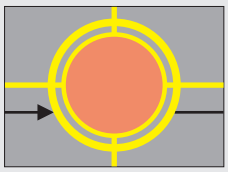

Fig.8

Label located on the frontal head of the "TX" section. It shows the references for a correct optic alignment and the hole of the outgoing Laser beam

RX RED4-RL

Fig.6

Label located on the housing of the "RX" Type 4 section. The output connector for electric connections is a standard type M12 - 8pole

RX RED-RL

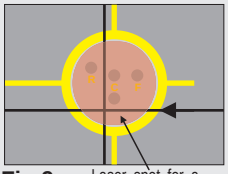

Fig.9

Label located on the frontal head of the "RX" section. It shows the references for a correct optic alignment and the four ingoing holes to the sensors

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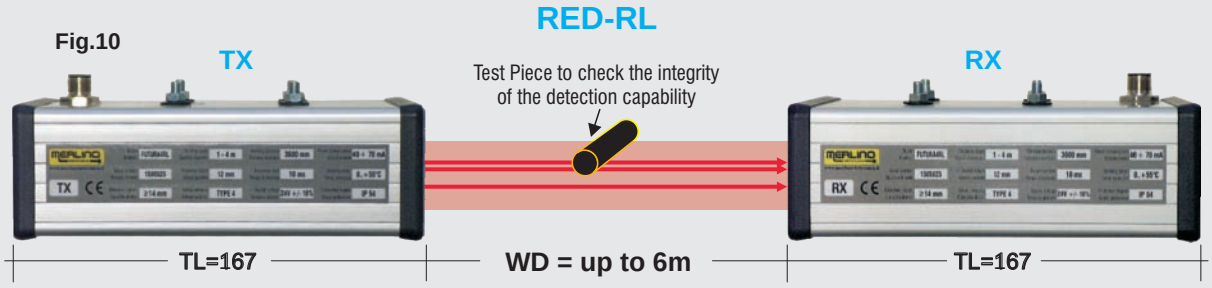
10 DETERMINING THE SAFE DISTANCE

Fig.10



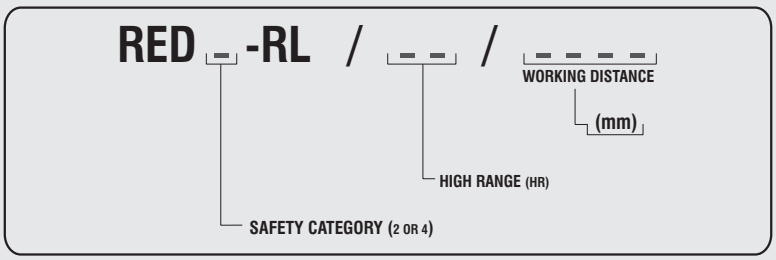
To ensure the device fulfils its accident prevention functions correctly, it must be installed at a safe distance from the point actually dangerous for the operator of the machine in such a way as to stop the dangerous movement before that point is actually reached.
The procedure for calculating this distance is established in the harmonised European standard UNI EN13857, which gives a number of formulas using parameters dependent on various factors discussed below (for more detail see the standard itself).
For information only, a number of examples to calculate the installation distance from the danger point for vertically-installed light curtains with a detection capability of no more than 40 mm are given below:

$$S = K \times T + C \quad \text{where} \quad T = t1 + t2 \quad \text{while} \quad C = 8 \times (d - 14)$$

- **S** is the safe distance to be respected when installing the device
- **K** is a constant establishing the speed at which the operator approaches the danger point, established at 2 meters per second (if S > 500mm then reduce K = 1,6 mt/sec)
- **T** is the time in milliseconds deriving from the sum of the time t1 taken by the machine to stop its dangerous movement after an ALT command and the time t2 taken by the light curtain to open the OSSDs after an obstacle has been introduced into the protected area.
- **d** is the detection capability of the light curtain in millimetres

REFERENCE CODE FOR ORDERING

Fig.11



All models of the "RED-RL" active optoelectronic at Laser emission are calibrated during factory testing according to the *working distance* specified by the customer in the last part of the order code. Should it be necessary to modify this distance at a later date, you should contact the manufacturer who will modify the calibration for the new working distance. Alternatively, contact the factory telephonically for instructions on how to proceed.

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11 TECHNICAL CHARACTERISTICS

RED2-RL TYPE2 - SIL1 - SILCL1 - PLc	
PROTECTED HEIGHT (PH)	12mm
TOTAL LENGHT (TL)	TX=167mm - RX=167mm
NUMBER OF BEAMS	4
DETECTION CAPABILITY (DC)	>14mm
WORKING RANGE	1 ÷ 6 meters
RESPONSE TIME	8msec
TX INDICATOR	RED LASER BEAM = ACTIVE EMISSION
RX INDICATOR	GREEN=ALERT RED=ALARM YELLOW=BLOCK ORANGE=BLANKING F/R
OSSDs TYPES	2 VOLTAGE FREE SWITCHES 0,7A @ 40Vdc/ac
SUPPLY VOLTAGE	24Vdc ±10% 12Vdc on request
CURRENT CONSUMPTION	TX 70mA RX 50mA
PROTECTION FEATURES	POLARITY INVERSION
WORKING TEMPERATURE	0 to + 50°C
UMIDITY	25 ÷ 85%
EMISSION	RED LASER λ = 650 nm / P=1mW
FASTENING MEANS	4 x M5 THREADED STUDS
OUTPUT CONNECTION	5 METERS CABLE LENGHT M12 CONNECTOR TX = 5 POLE - RX = 8 POLE
HOUSING	ANODIZED ALUMINIUM - CROSS SECTION 53 x 103 mm
AVAILABLE FUNCTIONS	EXTERNAL DEVICE MONITOR - START/RESTART INTERLOCK - BLANKING
PROTECTION DEGREE	IP54

RED4-RL TIPO4 - SIL3 - SILCL3 - PLe	
PROTECTED HEIGHT (PH)	12mm
TOTAL LENGHT (TH)	TX=167mm - RX=167mm
DETECTION CAPABILITY (DC)	>14mm
WORKING RANGE	1 ÷ 6 meters
RESPONSE TIME	8msec
TX INDICATOR	RED LASER BEAM = ACTIVE EMISSION
RX INDICATOR	GREEN=ALERT RED=ALARM YELLOW=BLOCK BLK. RED= MUTING ORANGE=BLANKING F/R
OSSDs TYPES	2 PNP OPEN COLLECTORS 0,7A @ 40Vdc/ac
MAX. LOAD CAPACITY	0,1 uF
SUPPLY VOLTAGE	24Vdc ±10% 12Vdc on request
CURRENT CONSUMPTION	TX 70mA RX 50mA
PROTECTION FEATURES	POLARITY INVERSION - OUTPUT SHORT CIRCUIT - CURRENT THRESHOLD
WORKING TEMPERATURE	0 to + 50°C
UMIDITY	25 ÷ 85%
EMISSION	RED LASER λ = 650 nm / P=1mW
FASTENING MEANS	4 x M5 THREADED STUDS
OUTPUT CONNECTION	5 METERS CABLE LENGHT M12 CONNECTOR TX = 5 POLE - RX = 8 POLE
HOUSING	ANODIZED ALUMINIUM - CROSS SECTION 53 x 103 mm
AVAILABLE FUNCTIONS	EXTERNAL DEVICE MONITOR - START/RESTART INTERLOCK - MUTING - BLANKING
PROTECTION DEGREE	IP54

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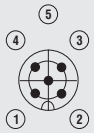
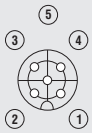
12 ELECTRICAL CONNECTIONS - TX

5 CONDUCTORS M12 FEMALE CONNECTOR

TX





1) Brown = + 24V
2) White = GND
3) Blue = GND
4) Black = Test
5) Grey = Test

If the function TEST is not used, short circuit the conductors 4-5 and connect them to the "0V" of power supply *blue (3)*

Fig.12

8 CONDUCTORS M12 FEMALE CONNECTOR

RX

RED2-RL

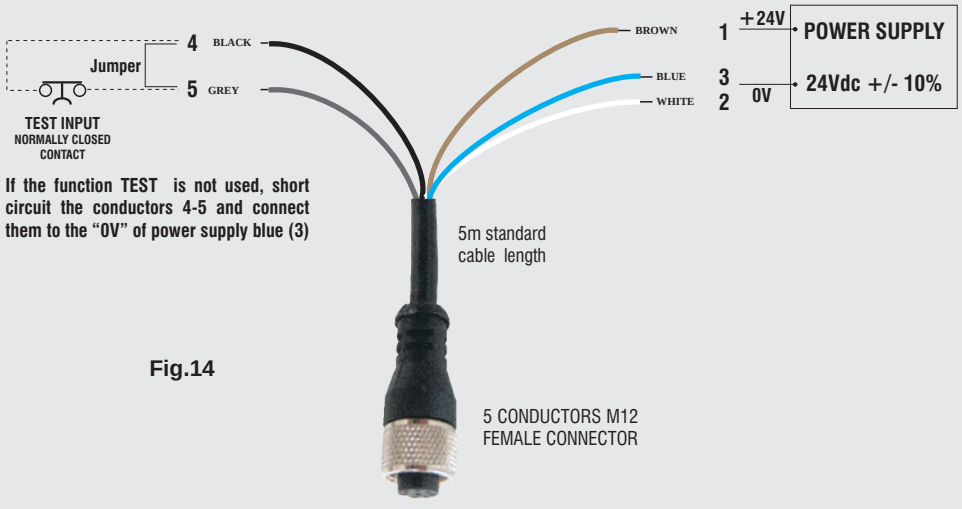
1) White = OSSD1..... SW1
2) Brown = OSSD2 ..... SW1
3) Green = BLANKING
4) Yellow = EDM/STR-RSTR
5) Grey = MUTE1..... SW2
6) Pink = MUTE2..... SW2
7) Blue = + 24V
8) Red = GND
Shield = GND

If the functions E.D.M. and START-RESTART are not used, connect the conductor yellow (4) to the "0V" of the power supply *red/shield (8)*

Fig.13

TX RED-RL

5 conductors cable



If the function TEST is not used, short circuit the conductors 4-5 and connect them to the "0V" of power supply blue (3)

Fig.14

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DESIGN AND MANUFACTURE OF ELECTRONIC EQUIPMENT

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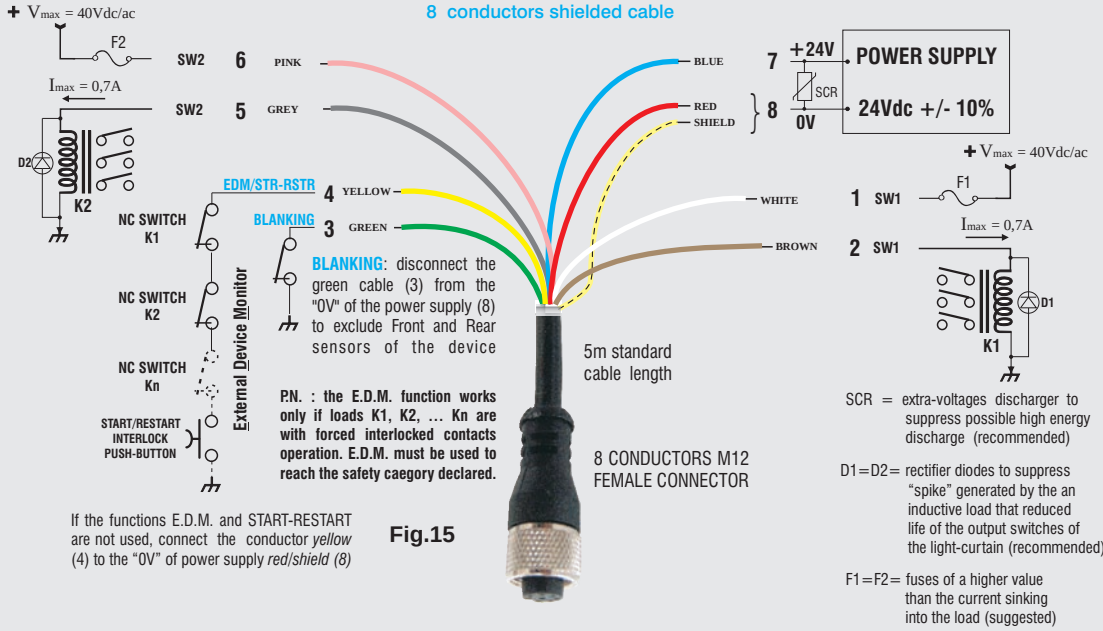
12.1 ELECTRICAL CONNECTIONS - RX

RX RED2-RL

8 conductors shielded cable



BLANKING: disconnect the green cable (3) from the "0V" of the power supply (8) to exclude Front and Rear sensors of the device

P.N. : the E.D.M. function works only if loads K1, K2, ... Kn are with forced interlocked contacts operation. E.D.M. must be used to reach the safety caegory declared.

If the functions E.D.M. and START-RESTART are not used, connect the conductor *yellow* (4) to the "0V" of power supply *red/shield (8)*

SCR = extra-voltages discharger to suppress possible high energy discharge (recommended)

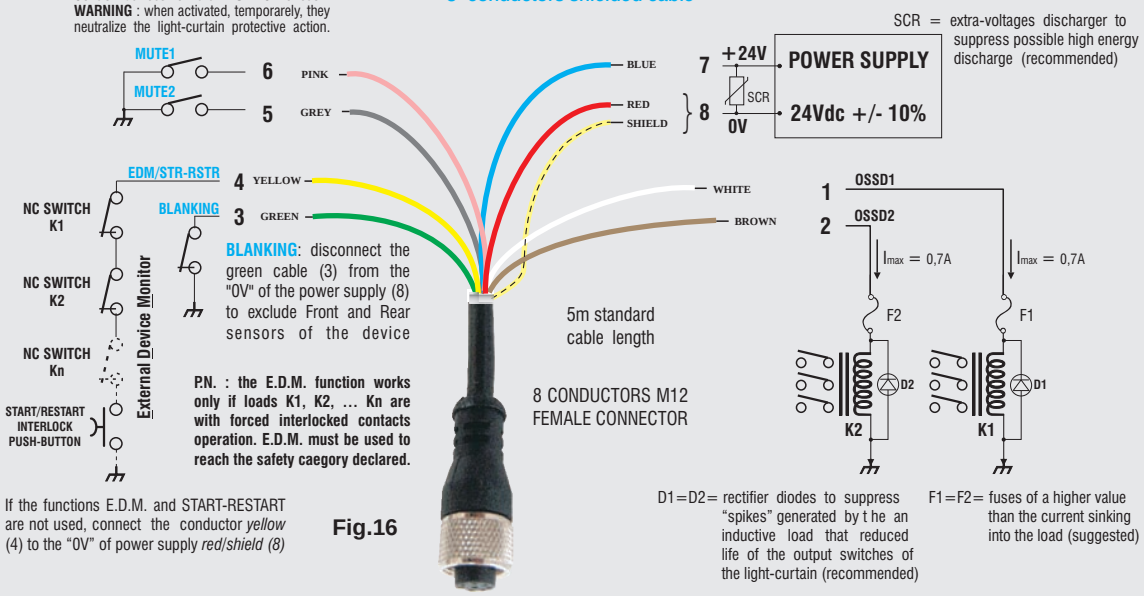
D1=D2= rectifier diodes to suppress "spike" generated by the an inductive load that reduced life of the output switches of the light-curtain (recommended)

F1=F2= fuses of a higher value than the current sinking into the load (suggested)

Fig.15

RX RED4-RL

8 conductors shielded cable



Control devices of the **MUTING** function. **WARNING** : when activated, temporarely, they neutralize the light-curtain protective action.

SCR = extra-voltages discharger to suppress possible high energy discharge (recommended)

BLANKING: disconnect the green cable (3) from the "0V" of the power supply (8) to exclude Front and Rear sensors of the device

P.N. : the E.D.M. function works only if loads K1, K2, ... Kn are with forced interlocked contacts operation. E.D.M. must be used to reach the safety caegory declared.

If the functions E.D.M. and START-RESTART are not used, connect the conductor *yellow* (4) to the "0V" of power supply *red/shield (8)*

D1=D2= rectifier diodes to suppress "spikes" generated by t he an inductive load that reduced life of the output switches of the light-curtain (recommended)

F1=F2= fuses of a higher value than the current sinking into the load (suggested)

Fig.16

MUTING :

For the **"RED4-RL"** Laser guard model, the "Neutralization" or "Muting" function is also previded, that is the possibility of being able to suspend in temporary way its own protecting function. That it means that when the two dedicated inputs are simultaneously activated (within a maximum time of 0,8 second) putting separately in short-circuit the PINK and GRAY conductors to the "0V" of power supply (RED conductor and Shield), the Laser Guard surveillance action comes temporarely neutralized, allowing that the Laser beam can be darkened without that the output signal switching devices (OSSDs) switch to the inactive OFF state. A red color blinking signaler, situated on the top head of the "RX" section (Pag.8), shows the activation of the Muting function. In the event of the two dedicated muting inputs are not simultaneously activated, or however with a time delay more than 0,8 second, the RED4-RL switches into the block state opening the output signal switching devices (OSSDs) and signaling it as the "D" case of the diagnostic table of Pag 8. Make attention using this function as it could generate potentially dangerous situations. Adopt a visual and/or acoustic additional external signaler to indicate in unequivocal way the inactivity state of the Barrier to activated Muting.

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13 MECHANICAL DATA

RED-RL - TX

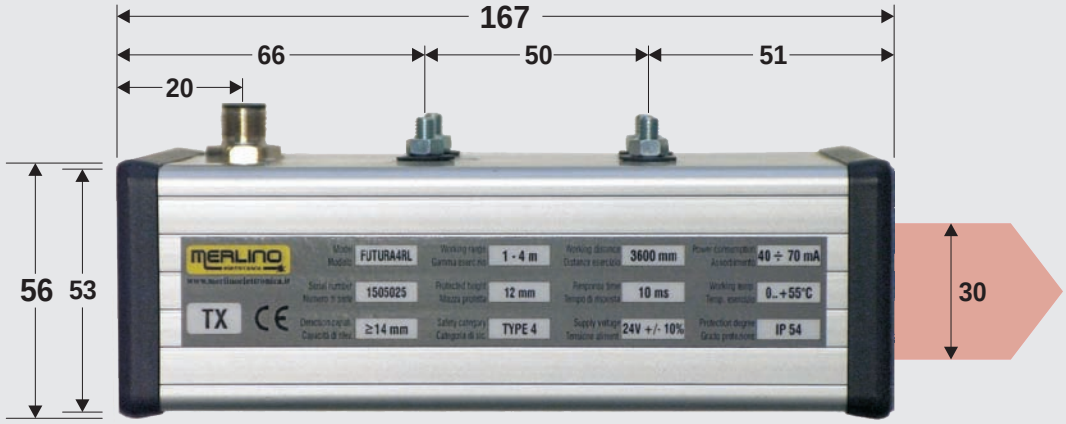

Fig.17

RED-RL - RX

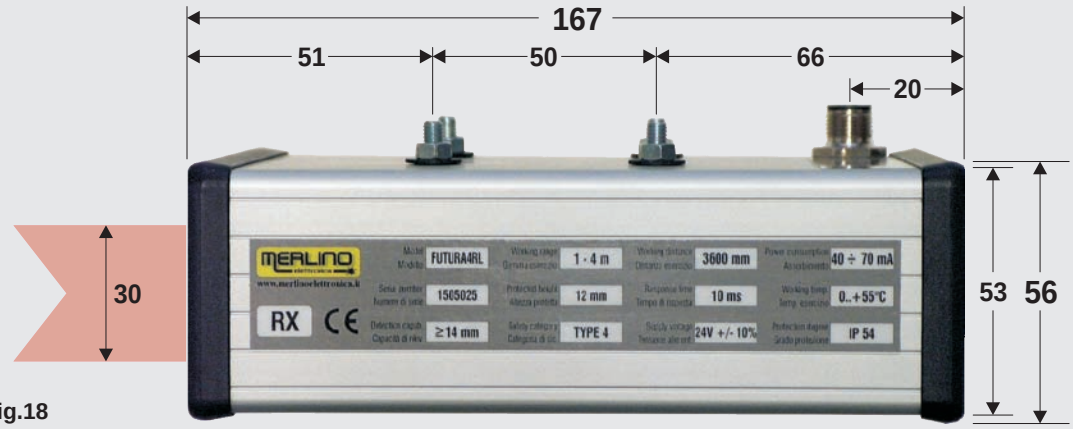

Fig.18

INTER-AXIS FIXING HOLES

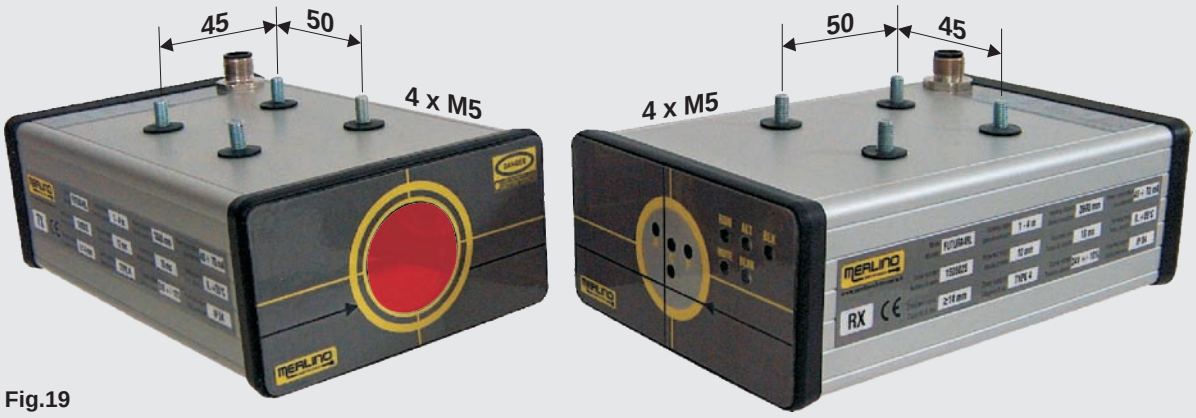

Fig.19

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14 MAINTENANCE AND CONTROLS

The Transmitter and Receiver units do not require particular maintenance. However, the frontal heads of the two sections protective of the optics, with the holes for exit and entrance of the laser light beam, should be cleaned daily to remove large quantities of dust.
Avoid rubbing the screens with abrasive cloths as rubbing causes static electricity and attracts dust. To clean, use alcohol. Avoid plastic solvents.

DAILY CONTROLS AND PERIODICAL TESTS

When the device is used for the first time, to guarantee safe conditions, the correct setting of the functions must be controlled. When using the device for the first time, operation of the device in the particular application must first be verified. This must be done by specialist personnel. Accident prevention legislation specifies that this control should be performed daily.

Before beginning any form of work, it is good practice to verify that:

a) with the machine stationary and power to the laser guard on (no obstacle in the protected area), the green **RUN** indicator is lit.

b) with the machine stationary and power to the laser guard on in the presence of an obstacle in the protected area, the red **ALT** indicator is lit.

c) with the machine running, introduction of the test piece at any point in the protected area switches the green indicator to the red **ALT** indicator, shutting down the machine within the specified time.

d) moving parts are not accessible to personnel. Any extraordinary maintenance must therefore be carried out under the strict supervision of the safety manager. All accesses not protected by electro sensitive protective devices must be equipped with fixed material barriers or other.

A sheet indicating the daily checks must be compiled by the operator of the machine and must be clearly visible near the workstation.

MATERIAL SUPPLIED AS SPARE PARTS

The "RED-RL" active optoelectronic visible light laser emission intangible guard consists of the following elements, provided on request as spare parts:

Description	Code
- M12 - 5 poles output connector for TX with 5 m long cable	CON-M12-5P-5M
- M12 - 8 poles output connector for RX with 5 m long cable	CON-M12-8P-5M
- Manual with duplicate of the "CE DECLARATION OF CONFORMITY"	MISU-RED
- Cylinder for testing the integrity of the detection capability	TEST-PIECE