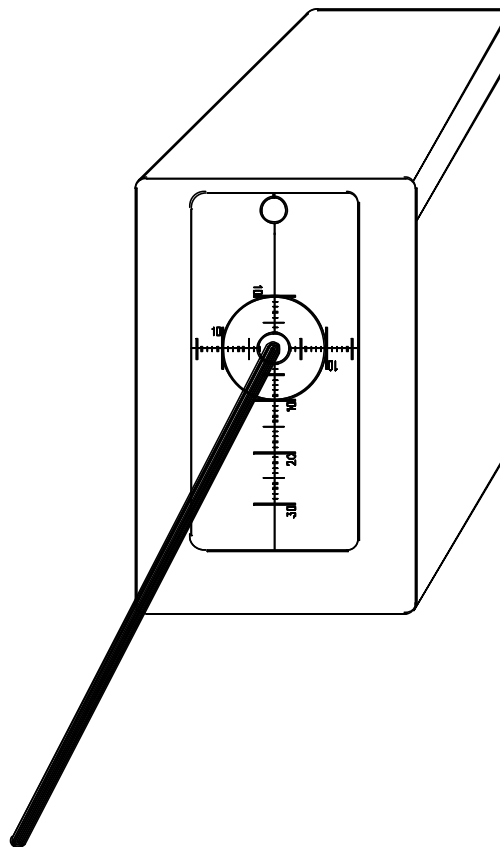

SAFETY DEVICE TYPE 4 WITH VISIBLE LASER EMISSION DFS LASER



INSTRUCTION MANUAL

Review 2.0 dated 1997-03-01

1. Introduction

This manual gives the necessary information to the user and/or to the person who installs it in order either to properly use this device DFS LASER, regarding functionalities for which it has been projected, or regarding safety and risks prevention.

The manual has to be kept with care and in a place so that it can be immediately at disposal whenever it is necessary.

Please contact the MANUFACTURER for any clarification, explanation or to ask for eventual additional copies or revisions of the manual itself.

The manufacturer reserves the right to modify the production and the manual without having the obligation to review the production and the previous manuals.

2. Guarantee

The manufacturer guarantees his own products for a period of 12 months from the date of selling. The guarantee covers the parts of the device in case it is demonstrated they are faulty in material or assembling, at the following conditions:

1) Under guarantee means the replacement of all the parts resulting faulty, during normal use owing to manufacturing defects

The guarantee is not valid if not accompanied by the copy of the invoice certifying the purchase.

Furthermore guarantee is not valid in the following cases:

- a) any kind of tampering of the device;
- b) use of the device in a way that is not conform with the instruction contained in this manual;
- c) damages caused by the non-adequacy of the place where the device works and by phenomena not depending on the normal use (for example irregularity of the tension values or frequency of the grid system);
- d) repairing works made by people or Technical Assistance Centres not authorized by the manufacturer.

2) Expenses and transport risks, packing and eventual maintenance necessary for this purpose are completely at the buyer's charge.

3) Either the replacement of the device or the extension of the guarantee period are excluded after a repairing to eliminate a damage.

4) Compensation for damages are not foreseen for a period of inactivity of the device during the necessary time for repairing.

5) For what not specified, it's valid the rule 85/374/CEE regarding responsibility for a faulty product, involved as law by D.P.R. n°224 dated 1988.

Manufacturer

NUOVA ELETTRONICA s.n.c. di Pasqui F. & C.

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4. Safety precautions

4.1. *Signalling of the remaining risks*

- The device DFS LASER has been projected with the purposes to eliminate or reduce the more as possible any risk for the user; in case of improper use it is possible anyway that conditions of limited danger may occur , which are not completely eliminable. In this manual , if necessary, these situations will be shown as **Warnings**.

4.2. *Precautions*

- The operations of installation, first start up and maintenance of the device DFS LASER have to be carried out only by skilled operators and following carefully the instructions contained in this manual.

4.3. *Dangers of electrical nature*

- Position connection cables in order to avoid accidental contacts with objects that can damage them (hot , sharp, abrasive objects).
- Do not use the device in case connecting cables are damaged.
- Avoid the contact of connecting cables with water or humid surfaces.

4.4. *Prohibitions*

- **It's forbidden to connect other equipment to the supply of the del DFS LASER.**
This operation may cause an overload for the transformer , thus compromising the correct working of the device itself and of the emission and reception circuits of the laser and consequently the check functions of the device.
- **Opening of the device**
Owing to the particular function of the device , it is strictly forbidden to open containers of TX and RX and least of all to try some reparings. The laser ray used by this device can be dangerous for the sight , if uncovered.
For reparings apply only to the MANUFACTURER.

4.5. *Checks*

- **Check the working tension of the device before the use.**
The working tension must correspond to the one of the grid system of the local supply. working tension is indicated on the rating plate placed on the transformer.
The device is not disconnected from the supply grid till the transformer is phisically connected to the electrical cabinet , even if the device seems off.
- **Interrupt immediately the use of the device in case of penetration of some liquids or object inside it.**
Disconnect the device and let it checked by skilled operators.
In order to disconnect the device refer to the procedure described in chapter regarding removing of the device.

4.6. **Spare parts**

- Connection cables can be replaced only with other ones supplied as spare parts by the MANUFACTURER.

4.7. **Out of order**

- When You decide not to use anylonger the device DFS LASER because it is obsolete, irreparably damaged , proceed with making out of order the device by making it no more operating and without any danger. Seal the device inside a strong packing and get rid of it operating in conformity with existing rules , by applying to the local organisms , predisposed for these operations.

5. **Legend**

DFS LASER	=	Abbreviation of this device
ESPE	=	Electro-Sensitive Protective Equipment.
OSSD	=	Output signal Switching Devices.
TX	=	Transmitter (part of the DFS LASER that creates and emits the luminous beam).
RX	=	Receiver (part of the DFS LASER that involves the sensitive function, the check and control function and the two OSSD).

6. **Assistance**

- The Assistance and Repairing service , as well as the answers to the request for specific information or clarifications , are given directly by the MANUFACTURER.

7. **Main referring rules**

- The device DFS LASER has been projected following the indications given by the rules IEC 1496-1 and IEC 1496-2 ex prEN 50100-1 and ex prEN 50100-2. It is classifiable as ESPE type 4;
- The laser contained in the DFS LASER is classified as of 2° CLASS according to the rule EN 60825, since the transmitter generates the emission of a visible modulated laser light, whose intensity is not higher than 1 mW;
- The device DFS LASER is conform with the rule “ EMC” or the rule "electro-magnetic compatibility ” (Dir.89/336/CEE, modified by the rule 92/31/CEE, by the Dir. 93/68/CEE, and involved by the L.D. n°476 dated 4-12-1992 and by the L.D. n°615 dated 12-11-1996) and meets all the requirements indicated in the rules EN 50081-1 and EN 50082-2;

- The feeding transformer supplied with the device has been projected according to the rules CEI 96-2, CEI EN 60742 FASC. 2607, and CEI 62-5 FASC. 1445, and results in conformity with the rule "B.T." or rule "low tension" (Dir.73/23/CEE dated 19-2-1973, modified by the rule Dir.93/68/CEE dated 22-7-1993, involed by the Law n°791 dated 18-10-1977, and come into force with the Legislative Decree n°626 dated 25-11-1996);
- The device DFS LASER is in conformity also with the dispositions of the " Machine Rules" (Dir.89/392/CEE, modified by the Dir.91/368/CEE, by the Dir.93/44/CEE, by the Dir.93/68/ CEE, and then involved by the Legislative Decree n°459 dated 24-7-1996);
- The device is manufactured and sold according to the Rule regarding " Responsibility for damage caused by a faulty product" (Dir.85/374/CEE) involved and come into force by the Decree of the President of the Republic n. 224 dated 24-5-1988 and according to the rule 92/59/CEE regarding "General product safety";
- This product is not in contrast with the dispositions of the rule 89/655/CEE regarding " Minimal Safety and Health Qualifications for the use of the working equipments by the operators during work " and of the rule 89/686/CEE dated 21/12/1989 regarding "Individual protecting devices ", as well as the rule 92/58/CEE concerning "Minimal prescriptions for security signaling and /or health on working place ";
- It also applies where the Decree of the President of the Republic n°547 dated 27-4-1955 is still in force;

8. Introduction

The safety photoelectric device DFS LASER is a mono-ray barrier with visible laser emission that, integrated in a more general check system, contributes to the operator's protection when using machines having movable dangerous parts, controlled by electrical or electromechanical devices.

Main task of the "DFS LASER" is to survey , within the limits of the survey capacity of the instrument, the intrusion of any opaque phisical element in a area defined as "survey zone" , which is delimited by the point of emission of the laser beam generated by the transmitter to the point of reception of the receiver of the device .

The instrument has been thus projected to disconnect, in danger conditions, the feeding of the controls devices of the machine and /or to activate stop functions of the movement of the dangerous parts.

These functions are made by giving in exit , by means of the contacts of the two OSSD, two different electrical signals type ON/OFF; the condition ON corresponds to the condition when the transmitter ray reaches the receiver , whereas the condition OFF corresponds to the lacking coincidence of the two components (caused for example by the intrusion of an element on the survey zone) or by a lack of feeding to the DFS LASER.

The exits OSSD, properly inserted in the electrical control circuit on the dangerous side of the machine, operating in ON condition, the possibility to control the movement of the machine and viceversa to stop or interrupt it in OFF condition.

Please note that the control of the stop and suspension procedures, as well as the re-start of the machine itself , is entrusted to the general control panel of the machine.

8.1. *Planned safety measures*

- The device DFS LASER has been projected in conformity with the indications given by the rules IEC 1496-1 and IEC1496-2 ex prEN50100-1 and ex prEN50100-2.
- The DFS LASER is made up by a transmitter and a receiver , each one contained in its wrapper and by a transformer for their feeding.
- The activation of the receiver is possible only by the emission generated by the transmitter to which it is electrically connected. An emission generated by a transmitter which is identical but not electrically connected to the receiver , is not able to activate it.
- The laser ray, with limited power and visible light , is classifiable as belonging to CLASS 2, it means it is defined as safe for man by the rule EN 60285-1, since the protection of the eye is assured by the defense reactions of the eye itself , included the eyelid closure.

The transformer has been projected in conformity with the rules CEI 96-2, CEI EN 60742 FASC. 2607, and CEI 62-5 FASC. 1445, and results in conformity with the " LOW TENSION RULE B.T. 73/23 + 93/68." It generates a tension on the secondary lower than 40 Volt, thus making it possible to consider the device DFL LASER as a low tension equipment (PELV), that limitates the risks of electric shocks for the user.

8.2. *Foreseen use of the device DFS LASER*

The device DFS LASER has been projected to create, by means of the laser ray emitted by the transmitter and intercepted by the receiver, an immaterial barrier which delimitates a zone (volume) to protect from the intrusion of any physical element having features of opacity.

The zone (volume) to protect from the intrusion of any physical element having features of opacity , has to be of fix type in space ; consequently, applications in which the supports of the device DFS LASER are movable, are not included.

Shortly, the use for which this safety device has be projected regards fix machines and/or installations , in which parts and /or components eventually movable, do not determine a changement of the position in the space of the different components of the device itself.

The survey of continuity or interruption of the ray determines the condition ON/OFF of two electric signals , at disposal of the DFS LASER and used in order to check all the dangerous parts of machines and /or installations.

The use of the device foreseens the installation of the transmitter and of the receiver near the dangerous area to check , according to the technical dispositions which apply to the machine to protect and that are contained in the following documents:

- **EN 294:** Safety of machine. Safety distances to prevent dangerous zones being reaches by the lower limbs.
- **EN 349:** Safety of machine . Minimal spaces to avoid the squashing of some parts of the body
- **prEN 811:** Safety of machinery - Safety distances to prevent danger zones being reached by the lower limbs.
- **prEN 999:** Safety of machinery - Hand-arm speed - Approach speed of parts of the body for the positioning of safety devices.
- **prEN 1005-2:** Safety of machinery - Human physical performance - Manual handling of objects associated to machinery.

The connection of the foreseen supports for this purpose has to be carried out in a rigid and integral way by means of screws assured against unscrew (self-blocking screws with elastic washers).

The feeding transformer of DFS LASER has to be inserted in the electrical panel of the machine, on the bottom of the main switch of the machine, with feeding value at its primary winding, as

shown by the rating plate of the transformer in conformity with the dispositions contained in the following documents:

- **EN 60204-1**: Safety of machinery. Electrical equipment of machines - General requirements.
- **EN 60947 (parts 1, 2, 3, 4, 5, 6)**: Low-voltage switchgear and controlgear.
- **EN 60439 (parti 1, 2, 3, 4)**: Protection and transition equipment for low tension (panels "B.T.")
- **IEV 441-11-03**: Transition equipment and their combination with control, measure, protection and adjustment equipment, and assemblage of these devices with electrical connections, accessories, packings and associated support structures, mainly for the control of equipment using electrical energy.
- **EN 1037**: Safety of machinery - Prevention of unexpected start-up.

Obviously the DFS LASER must be connected in such a way to activate and/or deactivate the consent for the starting of the dangerous movement, since it is assembled to prevent these risks and in order not to inhibit the activation of an eventual emergency brake, conceived for this purpose.

8.3. ***Improper uses of the device***

Any different use than the ones clearly allowed and indicated in the instruction and maintenance manual of the DFS LASER is and must be considered as forbidden; for these uses not allowed and/or not estimated by the Manufacturer NUOVA ELETTRONICA s.n.c. di Pasqui F. & C. any form of explicit and implicit guarantee declines, as well as any responsibility for accidents that may occur.

The presence of a laser beam, even if with very little power, may cause directly or indirectly a danger owing to an improper use of the device.

Anyway the protection of the eye is always assured, even when lacking "D.P.I.", by the defense reactions of the eye itself, as the eyelid closure.

8.4 Definitions and description of working

The following definitions are provided:

Survey zone	=	The zone in which the specified test piece will be surveyed;
Survey capacity	=	Minimal dimension of the test piece capable to be surveyed;
Reception zone	=	The zone in which the beam lased by the transmitter is surveyed by the receiver;
Reaction time	=	Time elapsing from the moment when the test piece comes into the survey zone till the moment when the two OSSD reach the OFF condition;
Operating time	=	Minimal time that the test piece has to remain in the survey zone in order to be surveyed;
OFF Condition	=	Condition in which the exit circuit is open and interrupts the current flux;
ON Condition	=	Condition in which the exit circuit is closed and allows the current flux;
Collimation	=	Procedure that allows the alignment of the laser beam generated by TX to the reception zone of RX;

The transmitter generates the emission of a visible modulated laser light , with an intensity not higher than 1 mW, that when surveyed by the receiver , creates a survey zone and makes the receiver activate the changement on the ON condition of the exits of the two OSSD , present in it. It is underlined that the activation of the receiver is possible only by the emission generated by the transmitter , which it is electrically connected to. An emission generated by a transmitter which is identical but not electrically connected to the receiver , is not able to activate it.

TX

RX

LASER EMISSION

LASER RAY

Drawing 1

In “**ON condition**” the device DFS LASER in in the phase of the active control of the machine during working , instead in “**OFF condition**” the DFS LASER has already acted on the machine by deactivating the control mechanisms owing to the happening of a potential danger condition, the intrusion of an element on the survey zone .

The receiver is schematically made up by:

- a circuit that works as sensitive function;
- a circuit made up by two independent microprocessors, which has the function to check and monitor the system .
- two safety commutation devices OSSD with controlled opening of contacts.

This type of circuits present an high level of redundancy , with double circuits , as guarantee of what requets by the rule IEC 1496-1e2 for a device ESPE type 4; in partucular way , during a normal working, the two OSSD reach OFF condition (according to reaction times) when one of the following conditions occurs:

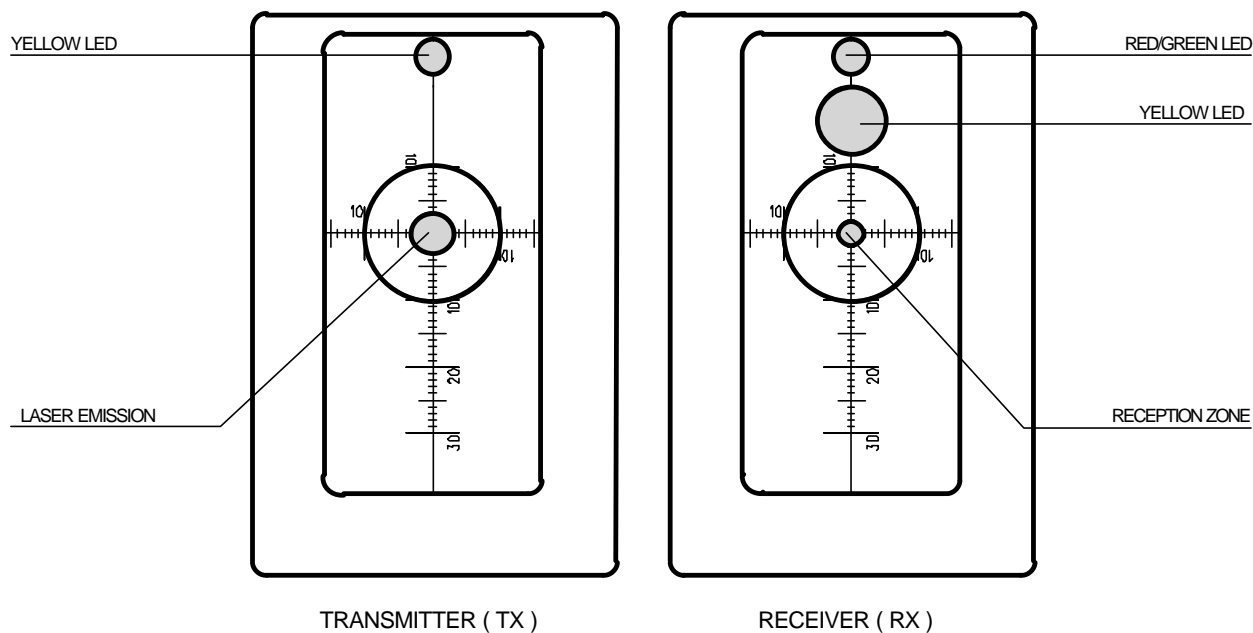
- an intrusion in the survey zone
- a lack of feeding
- the electric disconnection of the black wire of TX from the black wire of RX

In any condition of dangerous damage of the device DFS LASER itself, at least one of the two OSSD reaches the OFF condition (according to reaction times) and remains in this condition till the defect is removed, when one of the following conditions occurs:

- immediately
- an intrusion into the survey zone
- a lack of feeding
- the disconnection of the black wire of TX from the black wire of RX

8.5. Luminous indicators: scheme and functions

The device DFS LASER has some luminous indicators which allow the fast identification of its condition of working . In particular way it is possible to find two leds on the receiver and one led on the transmitter (Drawing 2.)



Drawing 2.

Yellow Led on the transmitter

- The condition of led switched on shows that the feeding is connected to the transmitter.
- the condition of led switched off shows that the transmitter is not feded.

Yellow led on the receiver

- the condition of led switched on shows that the beam emitted by the transmitter , when striking the survey zone, is able to activate the two commutating devices OSSD by letting them stay in ON condition, except in case of anomalies surveyed by the control and monitor system
- the condition of the led switched off shows that the transmitter ray does not strike the reception zone.

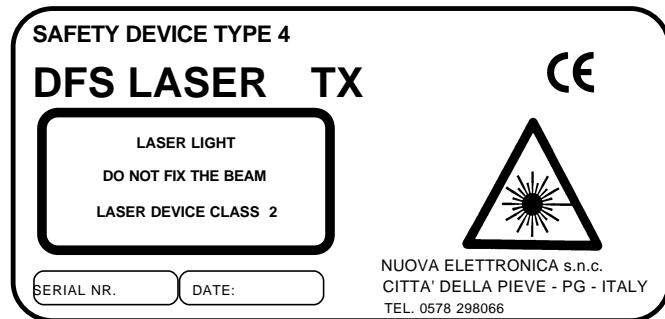
Red/green led on the receiver

- the lighting of the led on the colour red shows that the feeding is connected to the receiver and the two commutation devices are in OFF condition.
- the lighting of the led on the colour green shows that the feeding is connected to the receiver and the two commutation devices are in ON condition.
- If the flashing of the green led shows that the feeding is connected to the receiver and a damage in the device DFS LASER has occured. In this condition , at least one commutation device OSSD is in OFF condition , so it is necessary the overhauling of the device.

8.6. Identification rating plate

On the identification rating plate of TX the following data are indicated:

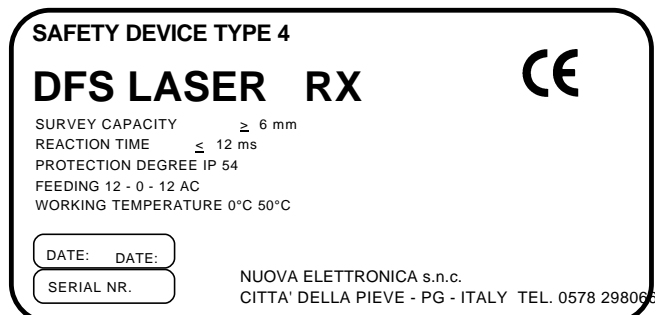
- Manufacturer's name and address
- Device model
- Safety category
- Indication of the symbol TX showing the transmitter
- CE MARKS
- Indication of presence of laser light
- Class of the laser equipment
- Warning with indication not to fix the laser beam
- Serial number
- Building date



Drawing 3

On the identification rating plate of RX are indicated the following data:

- Manufacturer's name and address
- Device model
- Safety category
- Indication of the symbol RX showing the transmitter
- CE MARKS
- Serial number
- Building date
- Feeding tension
- Protection degree
- Reaction time
- Survey capacity
- Working temperature



Drawing 4

On the identification rating plate of the transformer the following data are shown:

- Feeding primary winding (380V or 220V or 24V)
- Exit tension secondary winding (12 V - 0 - 12 V or 15 V - 0 - 15 V)

8.7. **Standard equipment**

The device DFS LASER is made up by the following elements:

- Transmitter (TX) complete with connection cable
- Receiver (RX) complete with connection cable
- Transformer
- Test piece
- Copy of the present instruction manual

8.8. **Transport and unpacking**

The DFS LASER is supplied in a proper package made in rigid carton with dimensions of mm 250x300x250 and weight of about 4 Kg. Limited weight and dimensions do not create neither particular problems nor risks either for transport nor for unpacking operations.

Warnings

- The elements that made up the package have not to be dispersed in the environment ; please apply to the specialized collection and equipped centres to eliminate them in respect to the nature and laws.
- Check by sight the presence and integrity of all the components that made up the device, being sure that evident damages have not occurred during transport. In case this does not happen , do not use the device and contact directly the MANUFACTURER.

8.9 **Technical features**

ELECTRICAL DATA

- Supply 380 V ac by means of the transformer supplied with the device;
- Upon request we can supply a transformer for feeding 220 V ac or 24 V ac;
- Transmitter feeding : standard 12 V ac; upon request 15 V ac;
- (balanced) receiver feeding: standard 12-0-12 V ac; upon request 15-0-15 V ac;
- Consumption: 10 W;
- Exits OSSD realized by means of relays with controlled contacts;
- Max. commutation load 1,5 A for 30 V cc/ac;

OPTICAL DATA

- Visible laser luminous source 670 nm;
- Optical emitted power not higher than 1 mW;
- Beam divergence about 0,35 mrad;

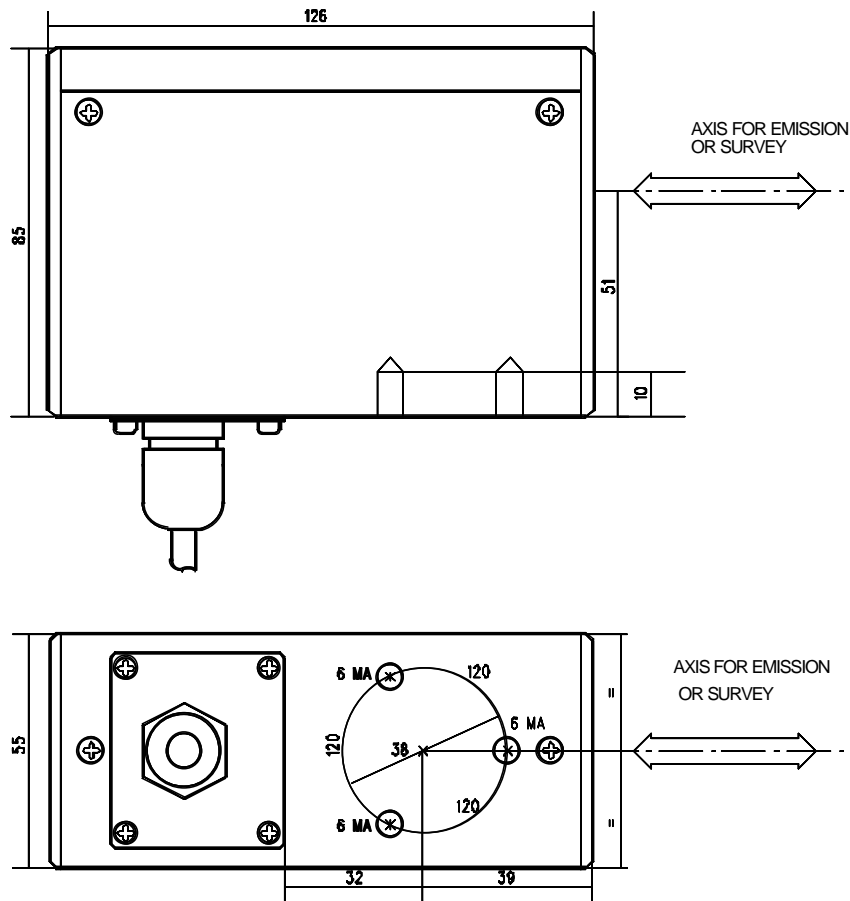
-
- Accepting angle of receiver ### 4° total;
 - Diameter of the laser beam in exit of TX = 6 mm; upon request = 3 mm
 - Max. Working distance in standard atmosphere 10 m;

GENERAL DATA

- Reaction time ### 12 ms;
- Time for coming into operation ### 2 ms;
- Survey capacity ### 6 mm; upon request ### 3 mm
- Protection grade of package: IP 54;
- Autotest period: 800 μ s;
- Working temperature 0°C 50°C;
- Measures of TX (excluded fairlead and cable): 126 mm X 55 mm X 88 mm
- Measures of RX (excluded fairlead and cable) : 126 mm X 55 mm X 88 mm
- Measures of transformer: 76 mm X 67 mm X 78 mm
- Mass of TX (with fairlead but excluded external cable.): about 695 g \pm 5 g
- Mass of RX (with fairlead but excluded ext. cable): about 720 g \pm 5 g
- Mass of transformer : about 805 g \pm 2.

9. Installation

The DFS LASER is a device with a very high security grade ; anyway it is necessary that it is properly installed and used according to the following instructions.



Drawing 5

9.1. Definitions of the survey zone and installation of the device

Warning: wrappers of FTx and Rx are similar ; anyway it is immediately easy to recognize Rx and Tx thanks to the identification rating plates fixed on their wrappers.

- Define the survey zone , it means the area that will be delimited (and consequently controlled) by DFS LASER; then position Tx and Rx so that the survey zone makes the dangerous part of the machine inaccessible , unless to interrupt the optical connection between TX and RX , thus causing the coming into operation of the mechanism of control.

Warning: a particular care should be given for this operation , since this area delimits the operation limits of DFS LASER , to protect the operator.

-
- Fix TX and RX to the machine by means of three screws with screw thread 6MA, screwing them in the proper housings placed on the equipment .

Warning: be sure that the screws are tightened , so that they cannot be loosen by the vibrations of the machine. Torsion power of the screws must not be lower than 1.96 N*m (20 kg*cm).

9.2. *Electric connection*

Warning: be sure that the features of the electrical plant, which the primary winding of the feeding transformer of the DFS LASER is connected to, correspond to the ones indicated on the identification rating plate of the transformer itself.

For the realization of connections to the electrical grid system and for interconnections between the components of the device DFS LASER , please refer to chapter “**Schema of electrical connections**” and to the scheme represented in this chapter , thus avoiding to connect first of all the exits of the two OSSD (green and red wires and white and yellow wires of the receiver cable) to the general control panel of the machine.

Insert the transformer of the DFS LASER in the electrical panel of the machine on the bottom of the main switch and connect the feeding exit to TX and RX. Then feed the DFS LASER by supplying tension to the electrical panel which it has been connected to.

It will cause:

on TX: the lighting of the yellow led

onl RX collimated with TX: the lighting of the green colour of the red/green led and the switching on of the yellow led.

on RX not collimated with TX: the lighting on red colour of the red/green led

Warning: be sure that the feed transformer of DFS LASER is connected on the bottom of the main switch , otherwise the device can be feeded even in case of disconnection of the switch itself.

Warning: please note that the general control panel of the machines controls all the stop procedures, suspension and re-starting of the machine itself and for these reasons the manufacturer of the machine has to respect the prescriptions and indications contained in the following technical rules, which are known by everyone. (main security rules for machine equipped with safety device DFS LASER).

- **EN 60204-1:** Safety of machinery. Electrical equipment of machines - General requirements.
- **EN 60947 (parts 1, 2, 3, 4, 5, 6):** Low-voltage switchgear and controlgear.
- **EN 60439 (parts 1, 2, 3, 4):** Protection and control equipment for low tension (panels "B.T.")
- **EN 954-1:** Safety of machinery – Safety related parts of control systems - General principles for design.
- **EN 292-1:** Safety of machinery – Basic concepts, general principles for design - Basic terminology, methodology.
- **EN 292-2:** Safety of machinery – Basic concepts, general principles for design - Technical principles and specifications.
- **EN 418:** Safety of machinery – Emergency stop equipment, functional aspects - Principles for design.
- **IEV 441-11-03:** Control equipment and their combination with control, measure, protection and adjustment equipment and collection of these devices with electric interconnections, accessories, packings and the associated support structures, mainly for the control of equipment using electric energy.
- **prEN 999:** Safety of machinery - Hand-arm speed - Approach speed of parts of the body for the positioning of safety devices.
- **prEN 1005-2:** Safety of machinery - Human physical performance - Manual handling of objects associated to machinery.
- **EN 1037:** Safety of machinery – Prevention of unsuspected start-up.

10. First Start-up

10.1. Feeding of the device

- After having feeded RX and TX it is possible that RX is already collimated with TX; in this case interrupt collimation (for example by putting an opaque body between TX and RX in the survey zone or lightly moving the axis of RX or TX).
- Be sure that the two OSSD are in OFF condition. This check is possible assuring the lack of electric continuity between the green and red wire and between the white and yellow wires (use for example an ohmmeter: this instrument has to show a value of infinite resistance corresponding to a condition of open circuit).
- After that, collimate TX with RX, acting in such a way that the luminous beam emitted by TX strikes the reception zone of RX, thus causing the lighting of the yellow led on RX and the passage to the green colour of the red/green led.
- Be sure that the two OSSD are in ON condition. This is possible by checking that there is electric continuity between the green and red wires and between the white and yellow wires (use for example an ohmmeter: this instrument has to show a value of resistance = zero corresponding to a condition of short circuit).
- Connect the exits of the two OSSD in the foreseen points of the electric circuit of the machine.

10.2. Testing

- Check that the feeding of the test piece in the survey zone causes the passage to the OFF condition of the OSSD; repeat this test in different points of the survey zone.

Warning: check that the survey zone generated by the laser ray of DFS LASER is big enough to grant operator's safety into the working zone.

11. Maintenance

- **Cleaning of the device DFS LASER**

Check that no foulings , impurities or humidity drops deposit themselves on the emission and survey surfaces of the transmitter and receiver. In this case use a soft and damp cloth.

Warnings:

- Do not use toxic material or inflammables to clean the device
- Do not direct jets of water on the device.

12. Guide for identification /solution of problems

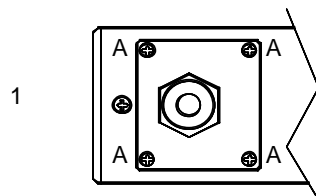
Description of the problem	Causes	Remedies
No led is switched on	Lack of electric feeding	Check the presence of tension in the feeding grid , it means the possible disconnection of the feeding line of transformer .
The device does not commutate and remain on OFF.	The feeding tension of the receiver is too low.	Check the efficiency of the transformer and, in case it is inefficient , replace it with another one identical to the original one.
The device does not commutate and remain on ON.	A tampering of the safety device has been made by making a by-pass.	Stop immediately the work and make sure that no other tampering have been made ; reset the correct situation by replacing and taking proper precautions since this kind of tampering does not occur again .
The green led on the receiver is lighted.	A damage in the DFS LASER device has occurred. In this condition at least one commutation device is in OFF condition.	The device has to be overhauled ; contact the Manufacturer.

13. Removing of the device and re-installation after repairing

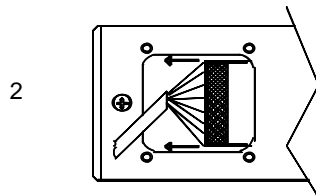
In case the DFS LASER is faulty or bad working and consequently it is necessary to disconnect it from the machine for repairing , proceed as described here below (this procedure allows to avoid the disconnection of the cables thus limiting the operation only to the disassembling of the component of the device to repair):

- disconnect the machine from the electric grid ; if the transformer of the DFS LASER has been properly assembled on the bottom of the main switch (as described in the procedure regarding electric connection), the device will be automatically without feeding .
In case this operation has not been previously made , disconnect the transformer ; furthermore, when installing it again , it will be necessary to modify the connection according what indicated in the relative chapter.
- disconnect mechanically TX and RX from the machine.

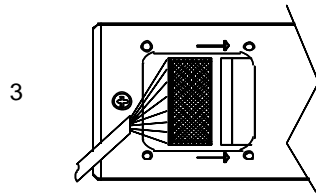
Then follow the instruction referring to the scheme here below:



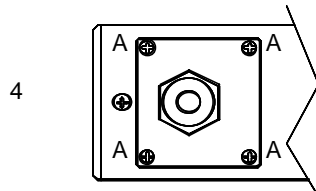
Unscrew the four screws (A) either on TX or RX



Extract the marked connector with delicay in the direction indicated by the arrows either on Tx or n RX.
Send the two parts for repairing



When the two devices are come back from repairing , insert the female connector into the respective male one in the direction indicated by the arrows either on Tx or on RX.



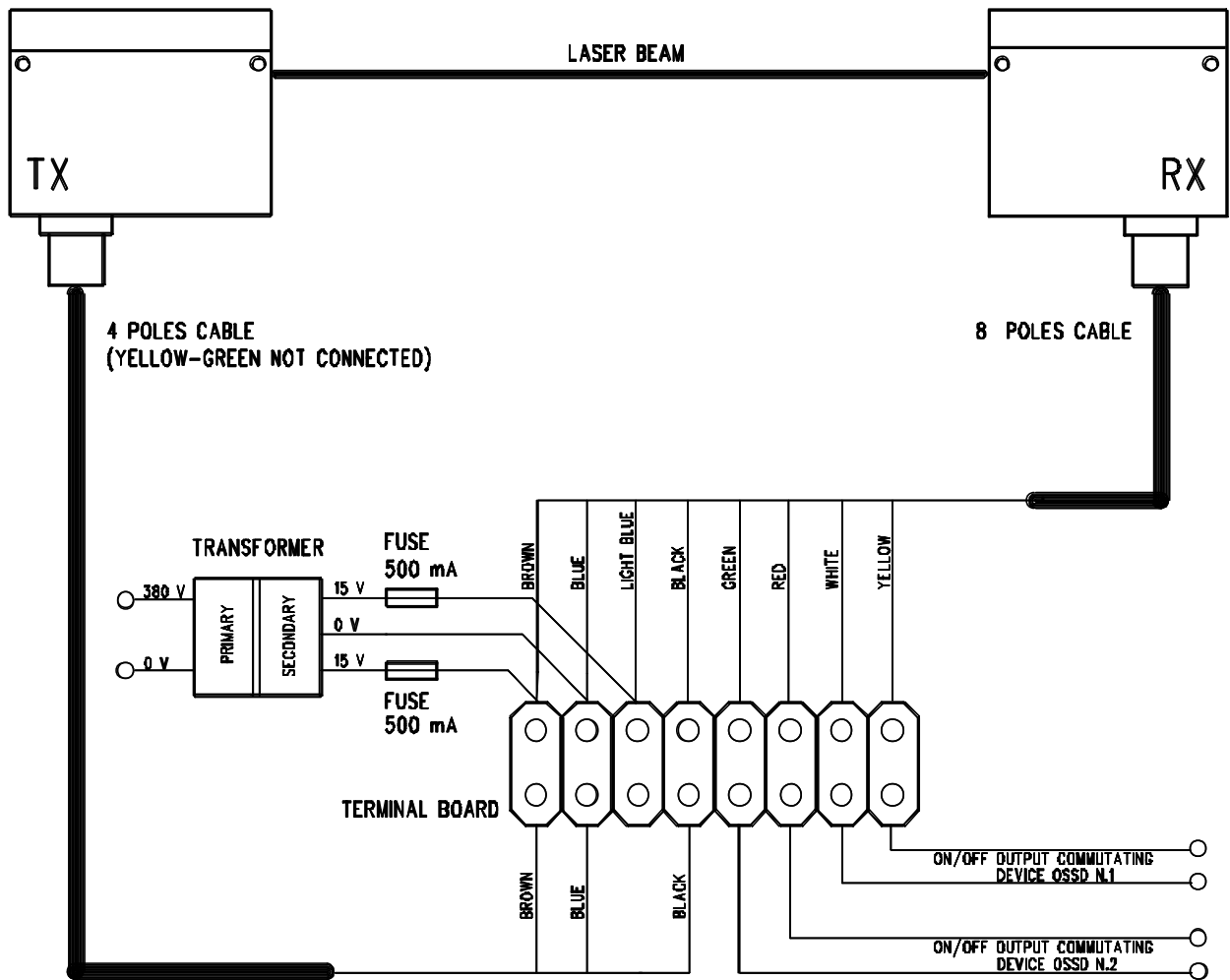
Fix the cover by means of the four screws (A)either on TX or on RX.

Drawing 6

- Connect again mechanically the DFS LASER to the machine
- Follow again the procedures of start-up and testing described in the relative chapter.

14. Scheme of electric connections

Here below it's represented the scheme of electric connections to the electric grid system and the components of the device DFS LASER.



Drawing 7