FIESSLER ELEKTRONIK

Multi-beam safety light grids EPSE-Type 4

EU2k XXX/X

Operating instructions

Nicht mehr !Lieferbar!

no longer !available!

CONTENTS

TÜV Rheinland

ZERT DIN EN ISO 9001 Reg. Nr. 96007

Optional

Fiessler Elektronik Kastellstr. 9
D-73734 Esslingen

Telefon: 0711 / 91 96 97-0 Internet: http://www.fiessler.de
Telefax: 0711 / 91 96 97-50 eMail: info@fiessler.de

For 40 years

we have been specialists in the field of Opto-Electronics.

Our experience is your benefit.

Tell us your problems and we will be pleased to advise you.

Safe operation of the entire equipment is only ensured by compliance with these operating instructions and observation of the corresponding accident prevention regulations. These operating instructions are component of the light barrier and must be kept at the location where the light barrier is

Please observe absolutely

All safety instructions are marked with this symbol and must be observed especially.

These operating instructions furnish the user with important knowledge about the appropriate application of the safety light grid with the switching units LSUW N1 K, LSUW N1 Duo, LSUW N1 Muting and / or a discretely assembled sequential safety circuit with 4 contact breakers. They are component of delivery of every light barrier and must be kept at the location where the light barrier is installed.
All the information of these operating instructions must be observed absolutely.
Relevant provisions and regulations of employers insurance associations are to be complied with as well.

Read the operating instructions Before the initial operation of the safety light grid EU2k.../. the operating instructions must be read.

Qualified persons The mounting, initial operation and maintenance may only be performed by qualified persons.

Safety warnings When operating a machine equipped with the safety light grid EU2k.../. it must be ensured that nobody is within a danger zone. A corresponding danger sign is to be put on the machine.

Light barriers do not protect anybody from machine-caused flying objects.

When the switching units such as LSUW N1 K, LSUW N1 Duo and LSUW N1 Muting are used, the mains voltage must be switched off prior to removing the respective switching unit. In the base and terminal strip there are voltage conducting parts.

The connection cable of receiver and transmitter with 24 V DC version must be laying separated.

C a u t i o n, c h e c k d a i l y (at least every 24 hours):

Before every shift the light barrier has to be inspected as follows:
The light beam of the light barrier must be interrupted. During the interruption the "free" lamp should not light.

Electrosensitive protective equipment The safety light grid EU2k.../. is an electrosensitive protective device (EPSE). EPSE is characterised by the fact that when light beams generated between the receiver/transmitter unit and the deflection mirror are interrupted, a hazardous motion becomes interrupted or prevented.

Safety category 4 The safety light grids EU2k.../. belong to the safety category 4, in correspondence with pr EN 954. Devices of safety category 4 are self-monitoring contactless-acting safety devices (EPSE) and represent the highest safety class under the contactless-acting protective devices.

Self monitoring The contactless-acting protective device automatically switches itself into the "safe state" when the safety light grid is faulty.

Installation range Maximum 8m distance between receiver/transmitter unit and deflection mirror.

Safety clearance The minimum distance B is necessary between the safety light grid EU2k.../. and the nearest danger zone, for protection against injuries. To determine the minimum safety clearance, reference must be made to the formulas based on machine-specific C-standards or on the national guidelines.

Overrun The part of hazardous motion still taking place after penetrating the light beam.

Overrun traverse The distance covered during the overrun (stroke of a slide, path of a point on a roller surface).

Overrun period Time period of an overrun.

Response time The lapsed time after light beam interruption until the switching action occurs.

Valve or contactor monitor Prior to every enabling process of switching outputs, the contactor checking routine verifies whether the switching elements connected (relays, contactors or valves) have fallen or not. Only when this has occurred, is a renewed enabling of the switching outputs possible. A dangerous switching-elements failure (relays, contactors or valves) caused by the hazardous motion is thus prevented.

Start interlock After initial operation or after a mains interruption a renewed "enabling" is blocked by the start interlock.

Restart interlock The restart interlock prevents automatic enabling of the switching outputs after an interruption and re-enabling of the light beam (e.g. when penetrating the light beam).

Protective operation By interruption of the light beams the switching outputs become blocked, after re-enabling the light beams the switching outputs are automatically enabled.

Muting Short-time safe by-pass of the safety light grid EU2k.../. during material movement, e.g. into and out of a production cell or by with respect to high-lift storage. Thereby, certain differentiation is made between human movement and material flow.

- prEN 50100-1/ IEC 1496 (Appendix C , mounting , putting into operation and testing of a EPSE on a machine)

- The hazardous state of a machine must be ended using the sensor as much as possible.

- The safety clearance between the light beams and the danger zone must be long enough so that by penetration into the light beams the danger area cannot be reached before the hazardous motion is interrupted or ended.

- The access to the danger zone should be possible only through the light barrier. (Under-going, climbing over or circumventing should not be possible.)

- Striding through the light beams should not be possible.
When it is possible to stride across the light barrier, the restart lock should be activated in case of interruption, so that a new command for triggering the next hazardous machine motion can only initiated via an enabled button. This starting button must be located at a place, from where the passable area can be seen without obstruction.

- Inadvertent repetition of a hazardous motion must be appropriately and safely prevented.

- The safety level (class 4) of the safety light grid should at least correspond to the safety level of the machine control system.

- Acceptance test:
The installation acceptance test and inspections should be conducted by a competent person in possession of all the information supplied by the manufacturer of the machine and the EPSE.

- Annual test:
The operator should ensure that a competent person is assigned to check the light barrier annually. This person can be an employee either from the light-barrier manufacturer or from the operator.

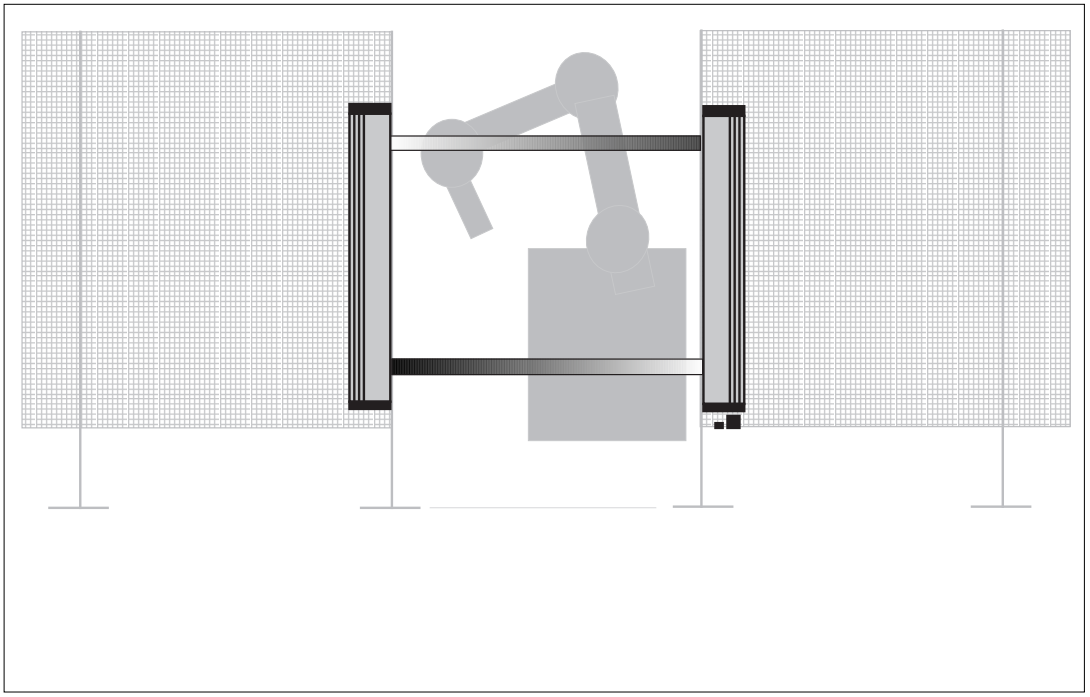
Fiessler Elektronik company will upon customer's request perform the initial acceptance and the annual test. Additionally, customer training seminars on how to execute annual tests will be conducted at regular intervals.

The safety light grid EU2k.../. is a contactless-acting protection and control device, whose purpose is to protect human beings from accidents.
This is realised such that the power-driven machine tool is screened so that access to the hazardous machine parts is only possible through the light barrier .
By penetration into the light beams the machine is timely and reliably brought to standstill.
Safety liht grids EU2k.../.

- are approved by TÜV, and accepted by the BG
- correspond to the prEN 50 100, type 4
- are self-monitoring without auxiliary circuitry
- are characterised by a compact design, easy mounting and adjustment.
- optional with EEx-P

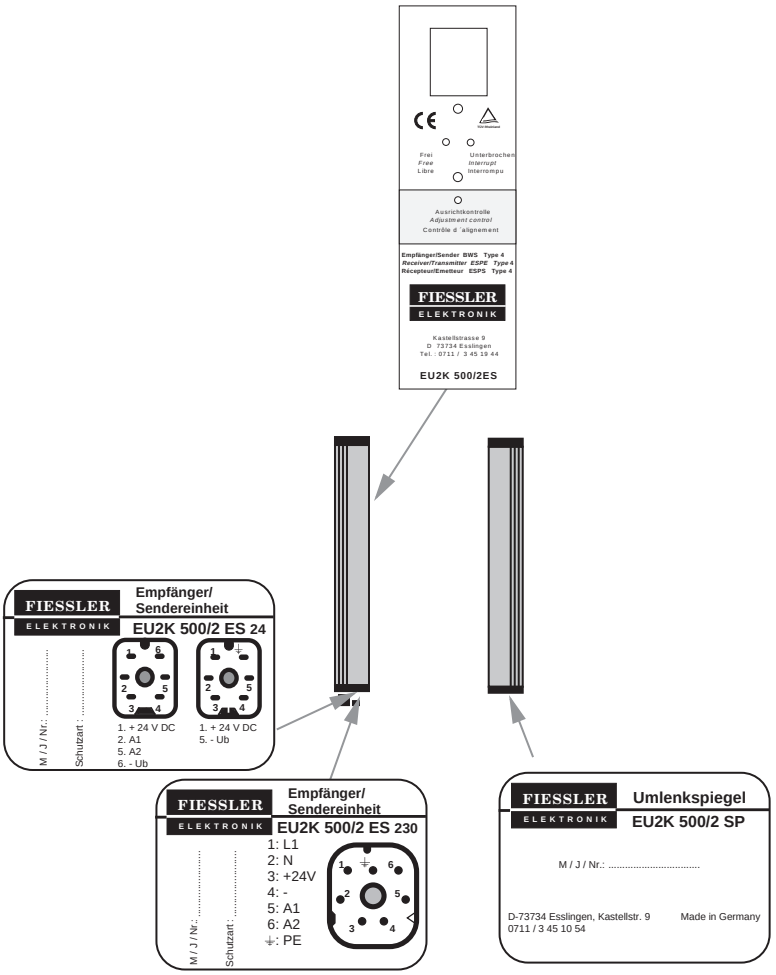
Application areas for the safety light grids EU2k.../. are the screening of access areas, e.g. for:

- metal presses, wood, plastic, rubber, leather, glass processing
- filter presses
- folding and bending machines
- machining centres and welding presses
- pick-and place machines
- robots
- palletising equipment
- protecting stores
- doors and gates
- etc.



Possibilities of protecting accessed areas (E.g. : EU2K 500/2)

Arrangement of the type plates



XXX/X:Height of protection/Number of beams

Serial number code for receiver/transmitter unit and deflection mirror

XX YY ZZZZ

Production month — Production year — Serial number , 4-digits

Equipment number code for switching units (front plate of the switching unit)

XX S ZZ YY

Production month — Equipment-type code — Serial number — Production year

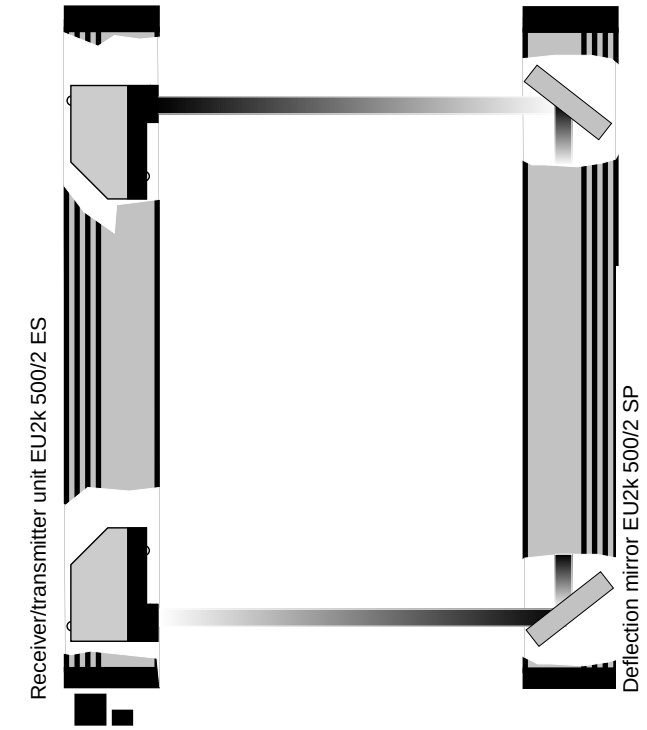
0..4	=	LSUW NSR 3-1
5..6	=	LSUW N 1
7	=	LSUW N1 Muting
8	=	LSUW N1 K
9	=	LSUW N 1 Duo

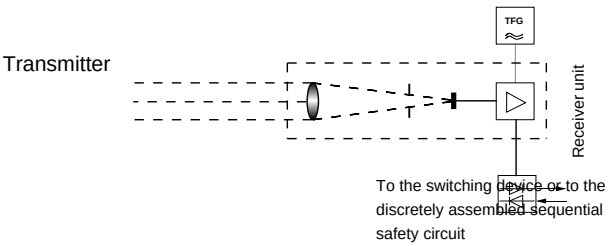
The safety light grid EU2k.../. consists of the two components - receiver/transmitter unit and deflection mirror, with which a range of 8m (10m) can be realised. For diverse protection measures, application-optimised switching units can be delivered.

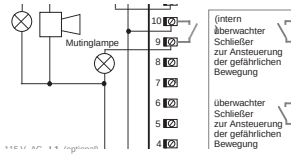
Transmitter The transmitter generates an invisible infrared pulsating light.

Receiver The receiver comprises a reception component and a carrier-frequency generator. By striding across the light beam the signal gets interrupted. The evaluation electronics then formulates two anti-valency signals which are fed to the switching unit or to the discretely built sequential safety circuitry.

Function diagram
(E.g. EU2K 500/2)



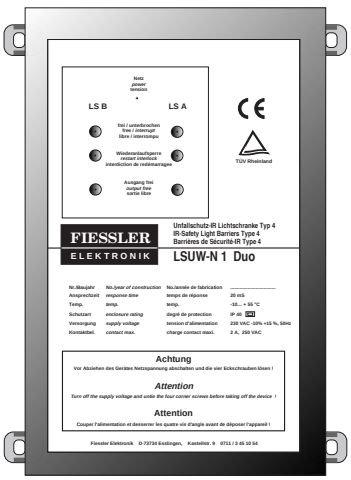




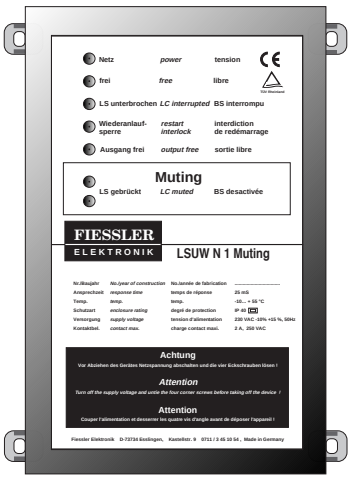
LSUW N1 K

switching unit / function	LSUW N1 LSUW N1 K	LSUW N1 Duo	LSUW N1 Muting	Discretely built sequential safety circuitry
Light beam-barrier monitoring	**X**	**X**	**X**	**X**
Start interlock	**X**	**X**	**X**	**X**
Restart interlock	**X**	**X**	**X**	**X**
Valve or contactors monitoring	**X**	**X**	**X**	**X**
Protective operation with restart lock during the whole cycle	**X**	**X**	**X**	
Two monitored closer devices for controlling the subsequent machine tool.	**X**	**X**	**X**	Depending on the type of the used contactors
Connector for two EPSE		**X**		
By-pass (muting)			**X**	

Functions which can be executed with the respective switching unit: **X**



LSUW N1 Duo for connecting two EPSE units



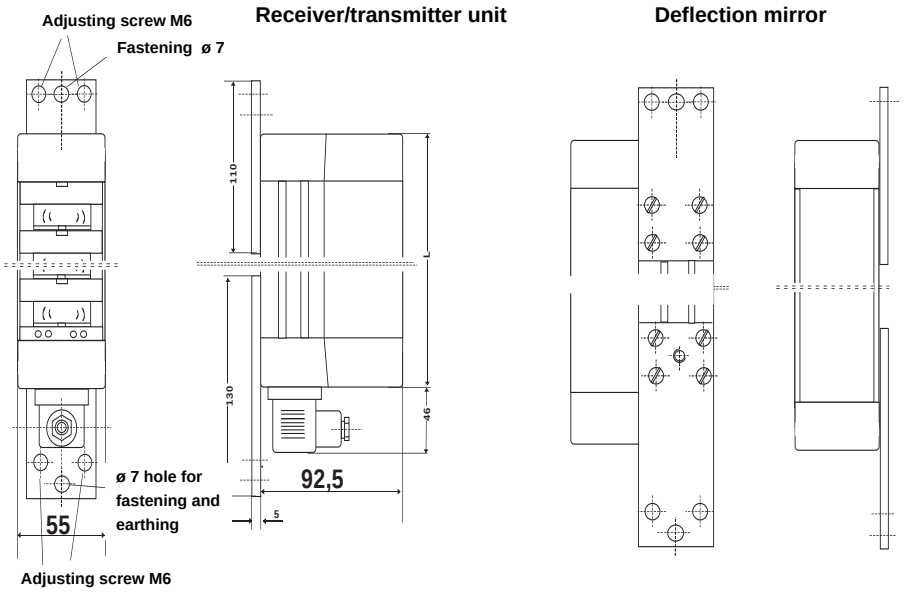
LSUW N1 Muting for by-pass functions

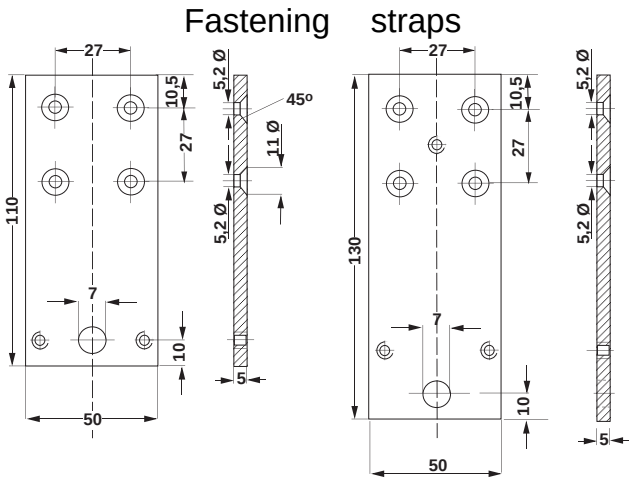
Housing execution Aluminium extrusion, plastic coated RAL 1020 yellow, end pieces of acid-resistant plastic (Polyamide). Light outlets and light inlets of acrylic resin

Fastening Moveable key blocks for fitting on any of three sides of the housing

Degree of protection IP 55, optionally IP 65

Dimensions





Sizes of construction savety light grid EU2k.../.

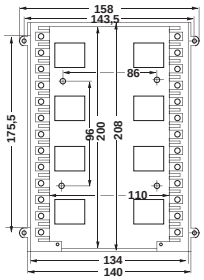
Height of protection	Number of beams	beam clearance	Receiver/transmitter unit overall length	Weight	Order description	Deflection mirror overall length	Weight	Order description
500 mm	2	500	665 mm	2050g	EU2K500/ES 230 *)	665	2150	EU2k 500/2 SP
500 mm	2	500	665 mm	2050g	EU2K500/ES 24 *)	665	2150	EU2k 500/2 SP

*) 230 for 230 V AC performance
24 for 24 V DC performance

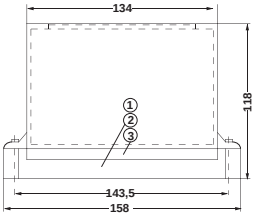
N1, N1 Duo, N1 Muting

Housing execution	ABS-plastic housing, yellow RAL 1020.
Fastening	Four bores in the plug-socket, see drawing. Optional snap-fastening on top hut rail according to DIN EN 50022-35
Protection system	IP 40, switch-cabinet version. Increased protection system IP 55 through mounting housing.
Electrical connection	Can be plugged in a terminal socket.
Weight	2550g

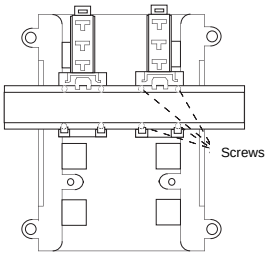
Socket



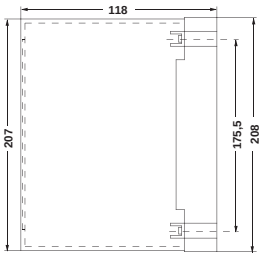
Housing with plugging frame and socket (side view)
1. Cap cover with opening and ribs
2. Shallow socket
3. Plugging frame



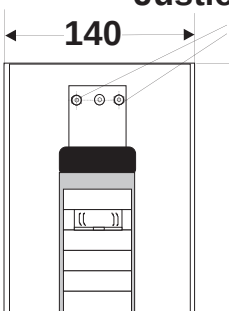
Top hat rail fastening vertical



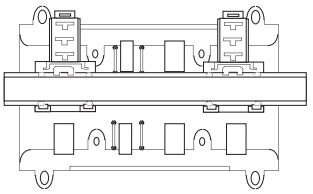
Housing with plugging frame and socket (front view)



Housing with plugging frame and socket (plan view)

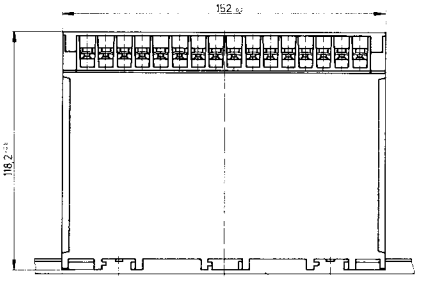


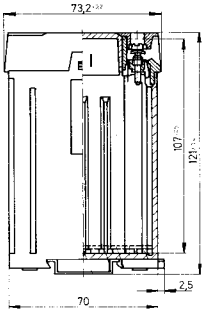
Top hat rail fastening horizontal

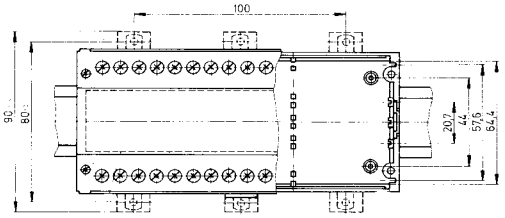


N1 K

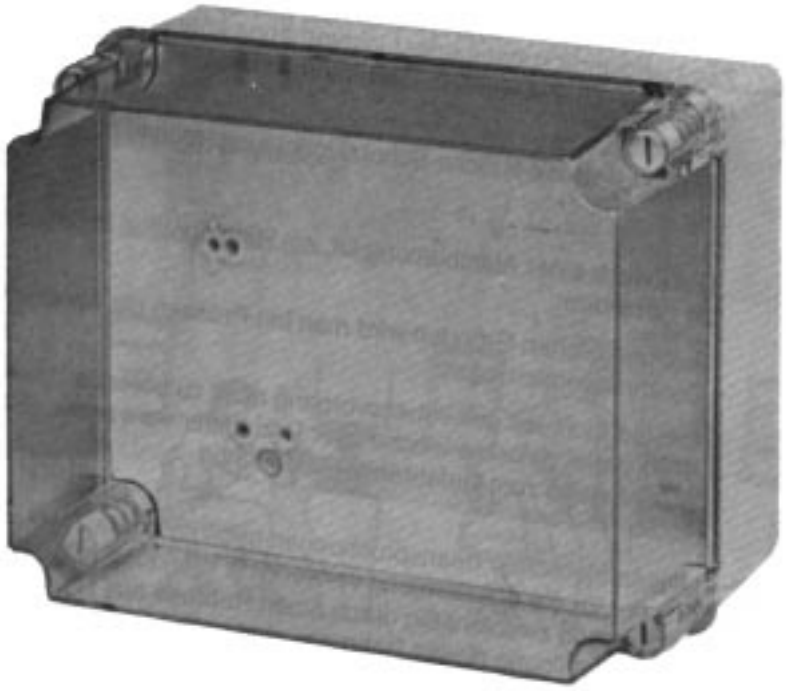
Housing execution	Insulation material black housing, cover beige
Fastening	Snap-fastener on top-hut rail according to DIN EN 50022-35 Screw fastener M4 with 80 mm grid
Protection system	IP 40
Electrical connection	Plugged on a terminal strip.
Weight	800g

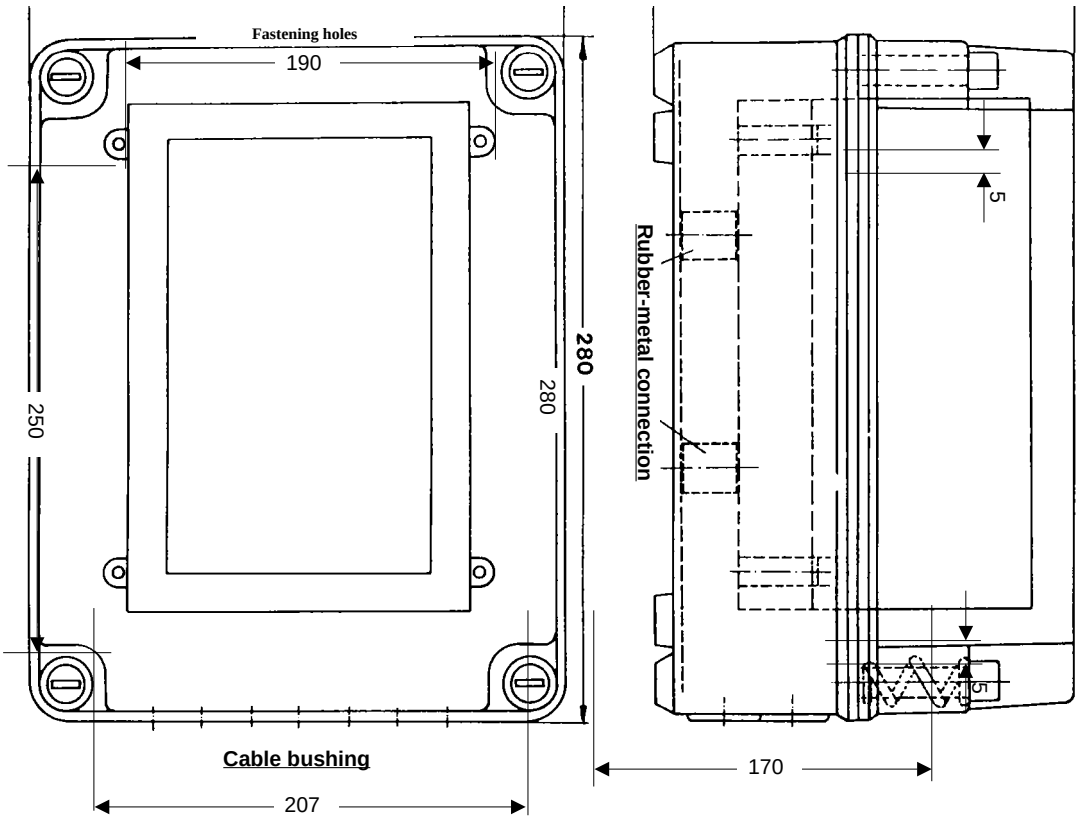






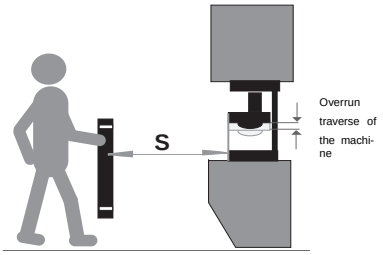
Housing execution	Grey plastic housing, transparent Makrolon cover
Fastening	Four holes in housing base
Protection system	IP 55
Electrical connection	Cable passage through PG-screw connector
Weight	800g





General mounting instructions

The safety clearance **S** between the accident preventing single-beam light barrier EU2K.../. and the danger zone must be so wide that when one penetrates into the light beam the danger zone cannot be reached before the hazardous motion is ended.
Thereby, also refer to prEN 999, C-regulations and further relevant national and international safety provisions.



Safety clearance

The safety clearance **S** (in mm) depends on:

Approach velocity	**v**
Response time of the protection device	**t1**
by savety light grid EU2k.../.without a switching unit, amounts to	12ms
with the switching units LSUW N1, LSUW N1 K and LSUW N1 Duo	20ms
with the switching unit LSUW N1 Muting	25ms
Overrun of the power-driven machine tool	**t2**

Formula for calculation the safety clearance for accident preventing light barriers with several single beams

For the approach velocity **v**, 1600 mm/s (1,6 m/s) is entered.

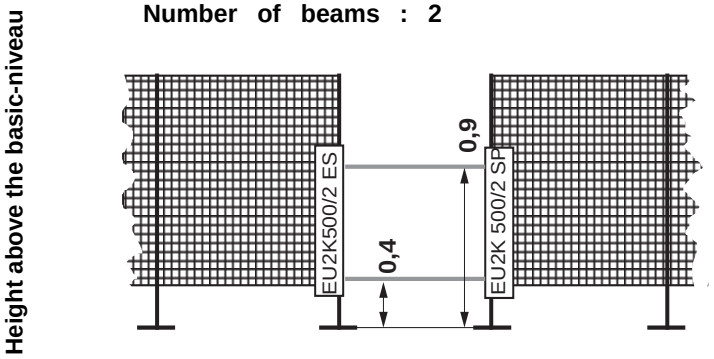
S = (V · (t1+t2)) + 850 mm

Example:
Overrun of the machine: 75 ms

The safety clearance for a accident preventing light grids LSUW...with 2 beams and switching unit LSUW N1K amounts:
S = (1600 mm /s · 0,095s) + 850 mm
S = 1002mm

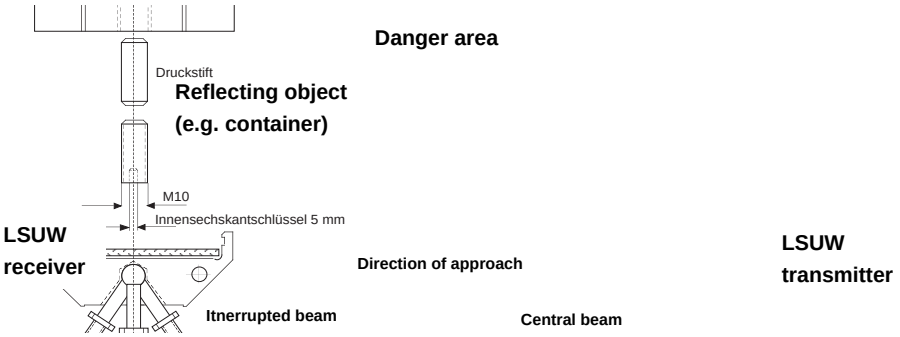
Arrangement of single beams

Number of beams : 2



Distance to mirror-reflection surfaces

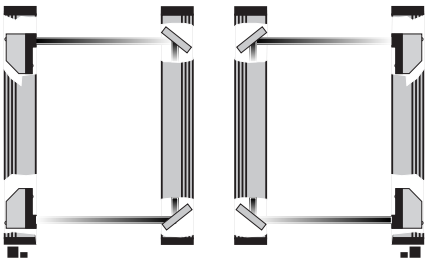
In order to avoid the reflection and non-recognition of an obstacle caused by reflective objects, the savety light grid EU2k.../. must be mounted with a minimum distance a from a reflective object. The minimum distance a can be derived from the following table:

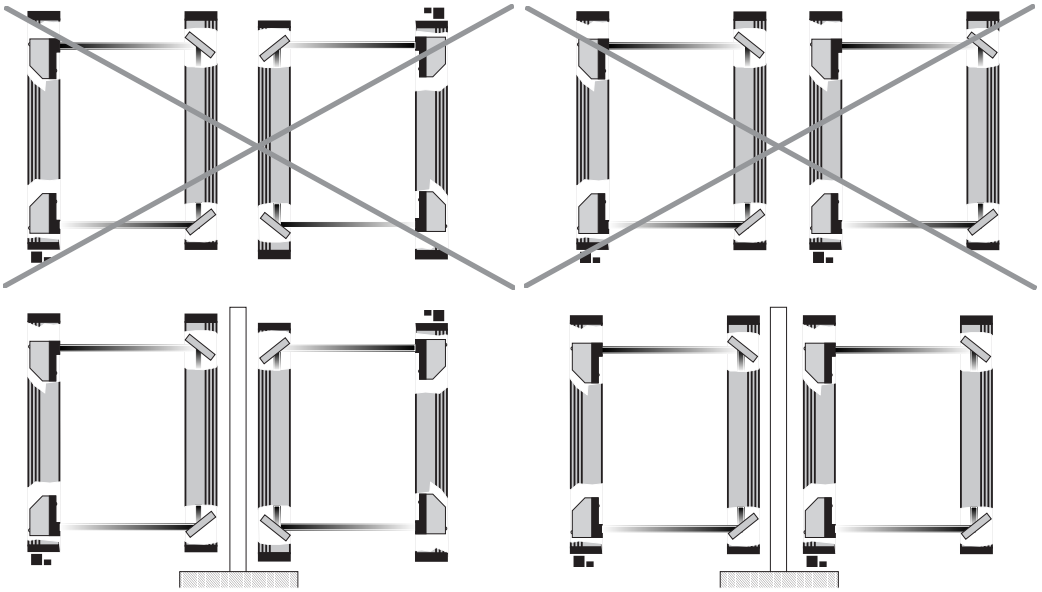


Installed range in m	2,5 - 3	4	5	6	7	8
Distance a in mm	105	140	180	210	250	280

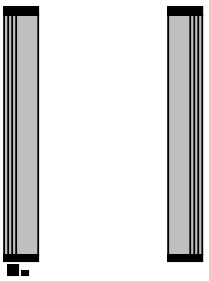
Arrangement of two safety light grids EU2k.../.

Amutual interference of two safety light grids must be ruled out. Therefore the fallowing instructions must be observed when using two safety light grids EU2k.../.:





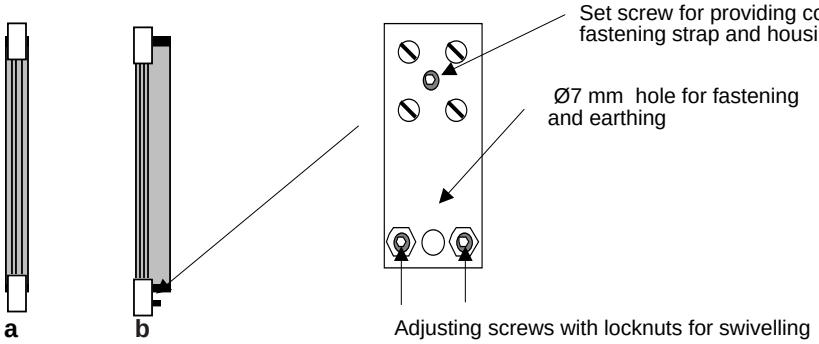
Mounting of the transmitter and the receiver



As both of the units are equally long, the plug side as well as the appliance top edge can be the reference edge for mounting.

Fastening straps

The fastening straps that are supplied with the units serve for securing and adjusting of the savety light grid EU2k.../. The straps, in cunjunction with the tenon blocks, provide an universal fastening.



Fastening as in fig. a is recommended

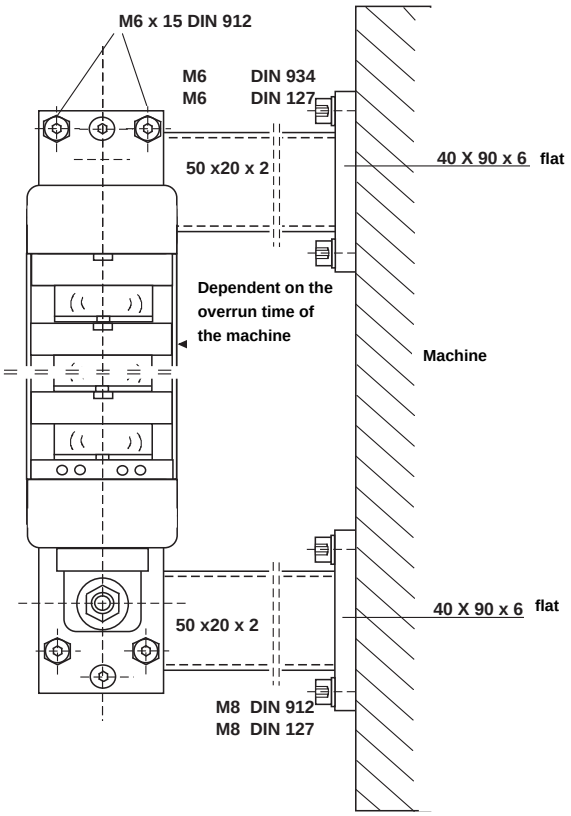
Anti-vibration mounts

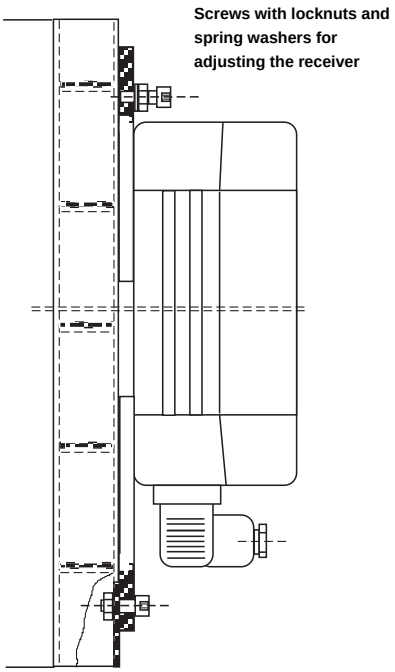
Where there is heavy vibration it is recommended to use metal swivel fasteners that are optionally available.

Important:

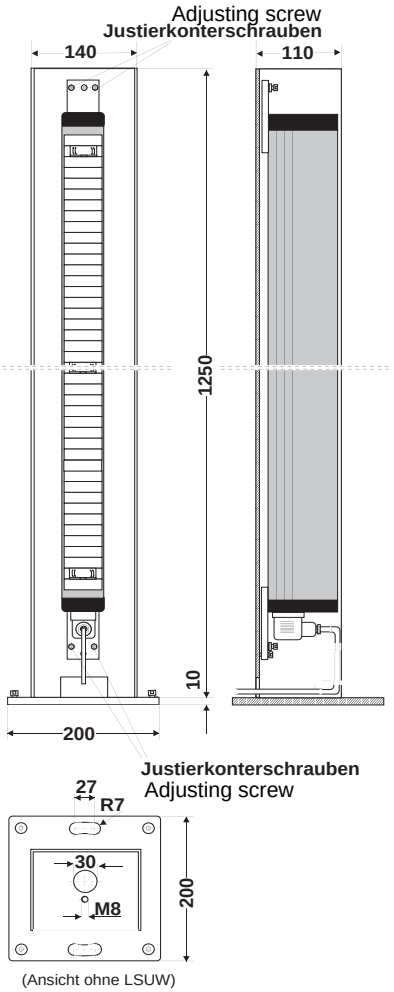
In order to ensure error-free operation, the receiver/transmitter unit as well as the deflection mirror have to be fastened on stabilised, distortion-free, plane-parallel structures.
The straps have to be fitted so that the adjustment screws remain accessible.
Care must be taken that the profile is not twisted. An unobjectionably optical adjustment is not possible otherwise. (The adjustment must be effected at one side, while at the other side the adjustment screws are released.)

Wall fastening

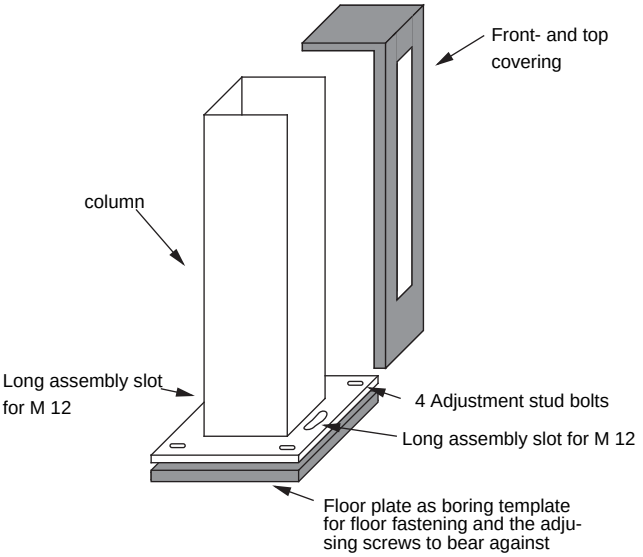




Column fastening When requested, the savety light grid EU2k.../. can be supplied ready mounted on support columns.



Column with light barrier safety light grid EU2k.../.



Electrical and environmental data

	EU2K.../.ES230
Connection type	common plug
Operation temperature	-10°C up to +55°C
Storage and transport temperature	-25°C up to +70°C

	Transmitter	Receiver
Operating voltage	230 V 50 Hz, - 15 %, + 10 %	24 V DC ± 15%,1.2 V ripple
Power consumption	1,7 VA	max.: 4,1 VA
Transmitted light	Mudulated IR-light	
Switching functions		2 anti-valency PNP outputs, short-circuit resistant
Max. switching current		500 mA
Reverse battery protection		Not protected against all possibilities of faulty connection

	EU2K.../.ES24
Connection type	two seperated plugs
Operation temperature	-10°C up to +55°C
Storage and transport temperature	-25°C up to +70°C

	Transmitter	Receiver
Operating voltage	24 V DC ± 15%, 1.2 V ripple	24 V DC ± 15%, 1.2 V ripple
Power consumption	1,7 VA	max.: 4,1 VA
Transmitted light	Mudulated IR-light	
Switching functions		2 anti-valency PNP outputs, short-circuit resistant
Max. switching current		500 mA
Reverse battery protection		Not protected against all possibilities of faulty connection

Electrical data

Connection type	Switching unit LSUW N1, N1 Duo and N1 Muting: Socket with screw terminals for 0.75 mm^2 230 V / 60 VA, Switching unit LSUW N1 K: Plugged terminal strip
Operation voltage	230 V 50 Hz, -15%, + 10% (optional 115V AC, optional 24V DC)
Max. current consumption	Max. 0.09 A
Reverse battery protection	Not protected against all possibilities of errors
Switching functions	2 Potential-free, monitored and guided make-contact paths
Switching voltage	250 V AC
Load current	Max. 2 A, induction-free
Load capacitance	Induction free. By an inductive load spark extinguishers must be used in parallel to the load. (e.g. 0,22 µF, 220 Ω).
Short circuit proof	Guided contacts shielded with 3.15 A.
Switching time	EU2K../.ES....: 12 ms between light beam interruption and the switching of the output. LSUW N1 K: 20 ms between light beam interruption and the opening of the output relays contacts. LSUW N1 Duo: 20 ms between light beam interruption and the opening of the output relays contacts. LSUW N1 Muting: 25 ms between light beam interruption and the opening of the output relays contacts.
Cross-sectional area of connecting cable	0.75 mm^2
Cable insulation	Cable insulation from all connected devices of 230 V - version must be dimensioned for the rated voltage of 250V.
Cable laying	Separate from mains-current conductors. When laying cables for contactor control, short-circuit of wires must be ruled out. (No short circuit permitted between the wires from the start button and terminal 22 and control contacts). **The connection cable of receiver and transmitter with 24 V DC version must be laying separated.**
Connection of other devices	According to prEN 50100 it is not permissible to connect other devices to the direct-current voltage output of the switching units.

Environmental data of the switching units

Operation ambient temperature	-10 up to 55°C
Storage and transport temperature	-25 up to 70°C
Protective system of installation type	LSUW N1 K: IP 20; other switching units IP40; optional IP 55 (mounting housing)
Moisture class	E
Protection class	Protective insulation

Only when the safety light grid EU2k.../. is connected according to one of the following circuit diagrams and the additionally relevant national and international accident prevention regulations are observed is a safe operation ensured!
Any diversion from these circuits can cause hazardous states and is as such not allowed.

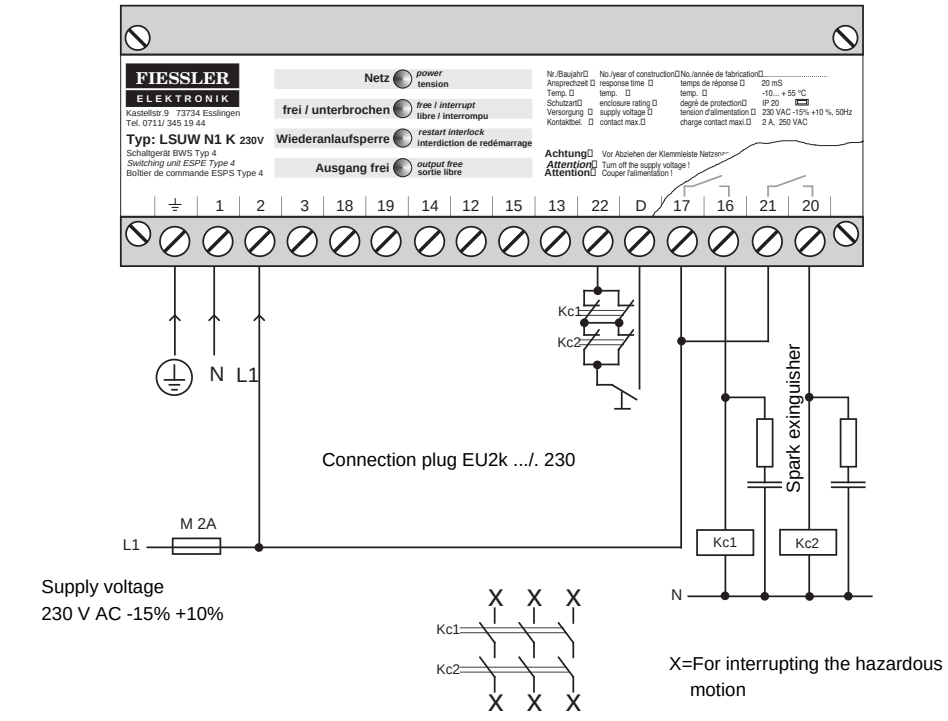
SPC-drive When driven by stored program controls (SPC) through a switching unit, an output channel must be used for switching off the hazardous motion directly behind the SPC, as long as the SPC is not approved to be failure-proof in the sense of an accident prevention regulation.

Function **Protective operation with a start and a restart lock, monitoring valves or contactors**

Application For the protection of accessible danger zones.

Example Protection of a robot

Connection circuit diagram



Description of functions

The transmitter is switched on by pressing the start button.

The LED on the transmitter is illuminated as control. Thus, by a free protective field the receiver is illuminated, whereby the latter switches over to "green." The "free" switching unit LED is illuminated.

If the start button is enabled, the outputs 16-17 and 20-21 are switched through, the drive for the transmitter switches as well into the self-sustaining state. The "output free" LED is illuminated.

If it is engaged in the protective field , the outputs 16-17 and 20-21 are switched off.

A restart occurs only after the protective field is released and the start button is pressed.

The open contacts of the contactors Kc 1 and Kc 2 in series with the start button serve for functional monitoring of the contactors.

Instruction:

<u>During adjustment the start button must either be permanently pressed or by-passed.</u>

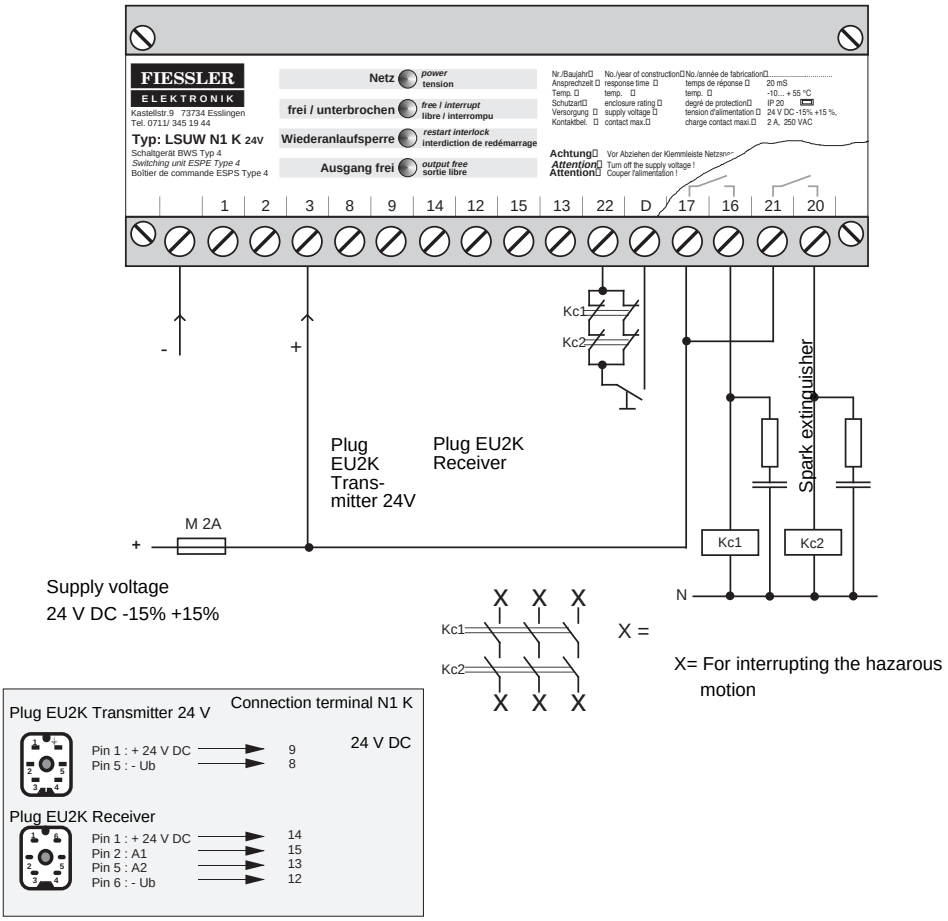
The start button is to be mounted such that the danger zone is well visible from the position of the button and that without interrupting a light barrier it cannot be pressed by someone within the danger zone.

Function **Protective operation with a start and a restart lock, monitoring valves or contactors**

Application For the protection of accessible danger zones.

Example Protection of a robot

Connection circuit diagram



Description of functions

The transmitter is switched on by pressing the start button.

The LED on the transmitter is illuminated as control. Thus, by a free protective field the receiver is illuminated, whereby the latter switches over to "green." The "free" switching unit LED is illuminated.

If the start button is enabled, the outputs 16-17 and 20-21 are switched through, the drive for the transmitter switches as well into the self-sustaining state. The "output free" LED is illuminated.

If it is engaged in the protective field, the outputs 16-17 and 20-21 are switched off.

A restart occurs only after the protective field is released and the start button is pressed.

The open contacts of the contactors Kc 1 and Kc 2 in series with the start button serve for functional monitoring of the contactors.

Instruction:

<u>During adjustment the start button must either be permanently pressed or by-passed.</u>

The start button is to be mounted such that the danger zone is well visible from the position of the button and that without interrupting a light barrier it cannot be pressed by someone within the danger zone.

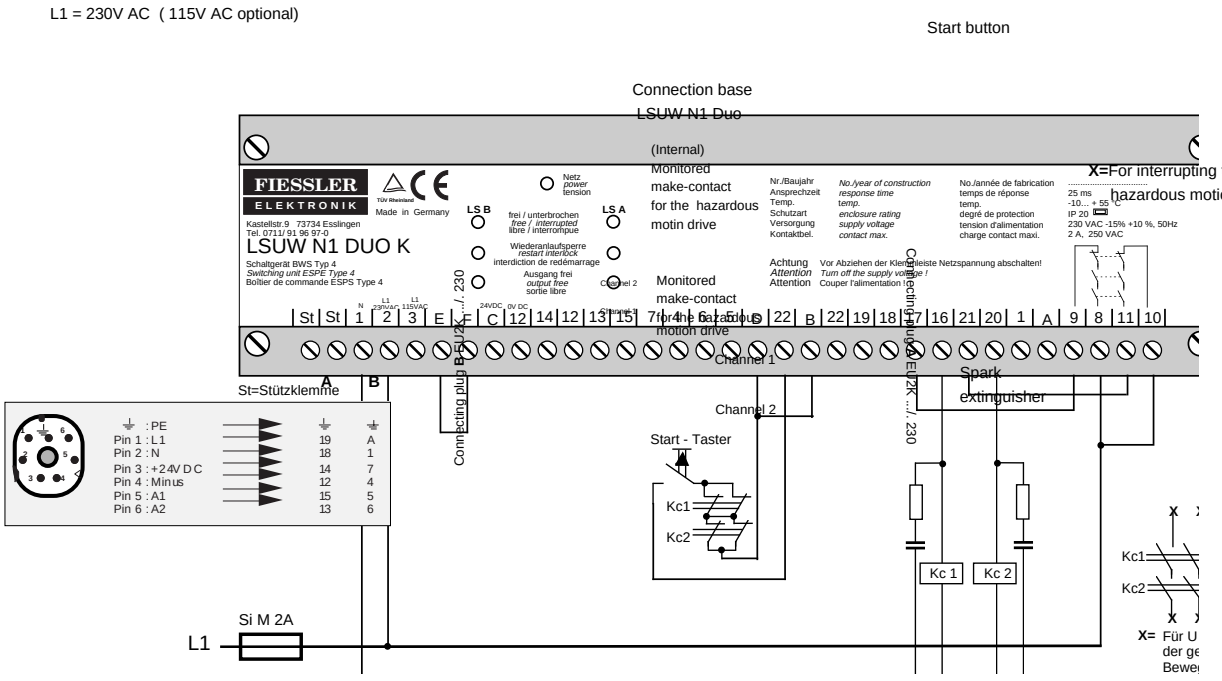
Connection diagram for the switching unit LSUW N1 Duo 230V / 115V AC 7.4

Protection of a danger zone with two light barriers 7.4.1

Application Protecting a danger zone that is accessible from one side, with two light barriers (1 Start button).

Observe chapter 6.2 !

Connection circuit diagram If the sum of the connected currents pass over 2A, the currents must be secured individually with 2,0A



Description of functions

The transmitters A and B are switched on by pressing the start button.

The LEDs on the transmitters are illuminated as control. Thus, by free protective fields the respective receivers are illuminated, whereby the latter are switched over to "green." The "free" LED on the switching unit is illuminated.

If the start button is enabled, the outputs "A" 16-17 and 20-21, as well as "B" 8-9 and 10-11 are switched through, the drive for the transmitter switches as well into the self-sustaining state. The "output free" LEDs are illuminated.

The function of both light barriers are connected in series. The circuit contactors Kc 1 and Kc 2 switch off the protective field in case of interference.

A restart occurs only after both of the protective fields are enabled and the start button is pressed.

The open contactors Kc 1 and Kc 2 in series with the start button serve for functional monitoring of respective contactors.

Instruction:

<u>During adjustment the start button must either be permanently pressed or by-passed.</u>

The start button is to be mounted such that the danger zone is well visible from the position of the button and that without interrupting a light barrier it cannot be pressed by someone within the danger zone.

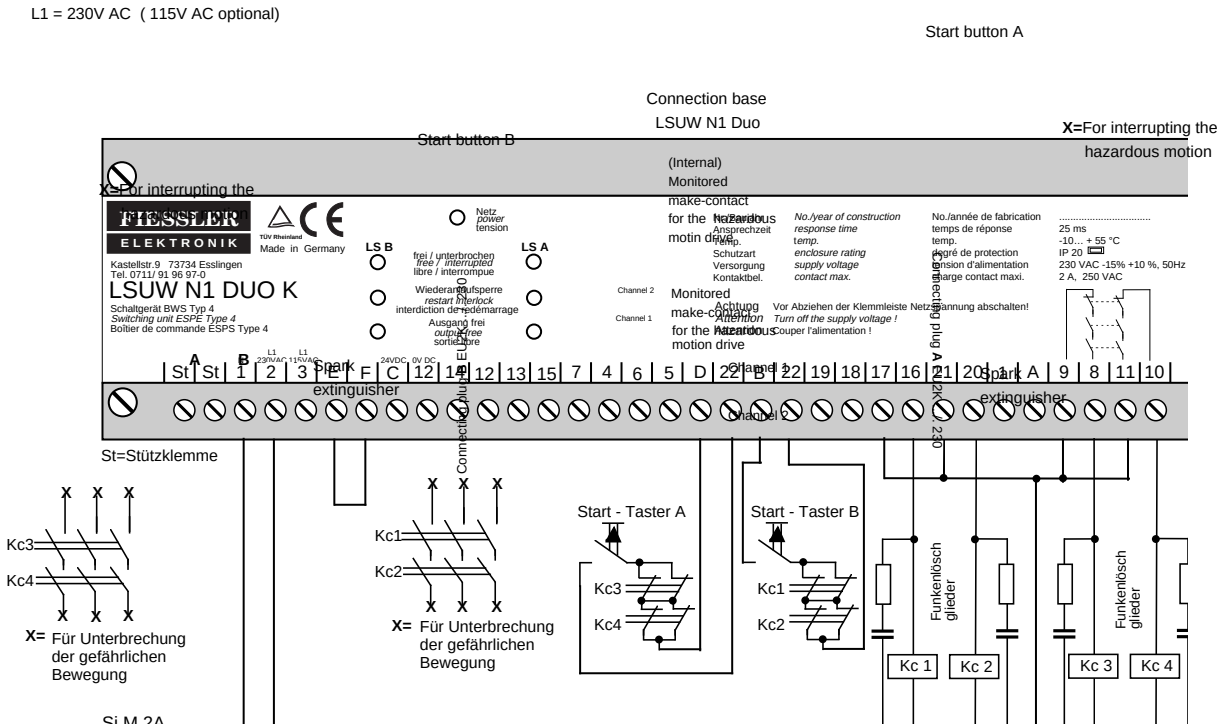
Application

Protecting two separate and independent danger zones or of one danger zone that is accessible from two sides (2 start buttons).

Observe chapter 6.2 !

Connection circuit diagramm

If the sum of the connected currents pass over 2 A , the currents must be secured individually with 2.0A



Description of functions

The transmitters A and B are switched on by pressing the start button A and B.

The LEDs on the transmitters are illuminated as control. Thus, by a free protective field the respective receivers are illuminated, whereby the latter switch over to "green." The "free" LED on the switching unit is illuminated.

If the start button is enabled, the outputs "A" 16-17 and 20-21, as well as "B" 8-9 and 10-11 are switched through, the drive for the transmitter switches as well into the self-sustaining state. The "output free" LED are illuminated.

The function of both light barriers are connected in series. The circuit contactors Kc 1 and Kc 2 switch off the protective field in case of interference.

A restart occurs only after both of the protective field have been enabled and the start button is pressed.

The open contactors Kc 1 and Kc 2 and Kc 3 and KC 4, each pair of which is connected in series with the associates start button contacts serve for functional monitoring of the contactors.

Instruction:

<u>During adjustment the start button must either be permanently pressed or by-passed.</u>

The start button is to be mounted such that the danger zone is well visible from the position of the button and that without interrupting a light barrier it cannot be pressed by someone within the danger zone.
Der jeweilige Start-Taster ist so zu montieren, daß vom Ort des Tasters der Gefahrenbereich gut eingesehen werden kann, und eine Betätigung aus dem Gefahrenbereich heraus, ohne Unterbrechen der Lichtschranke ausgeschlossen ist.

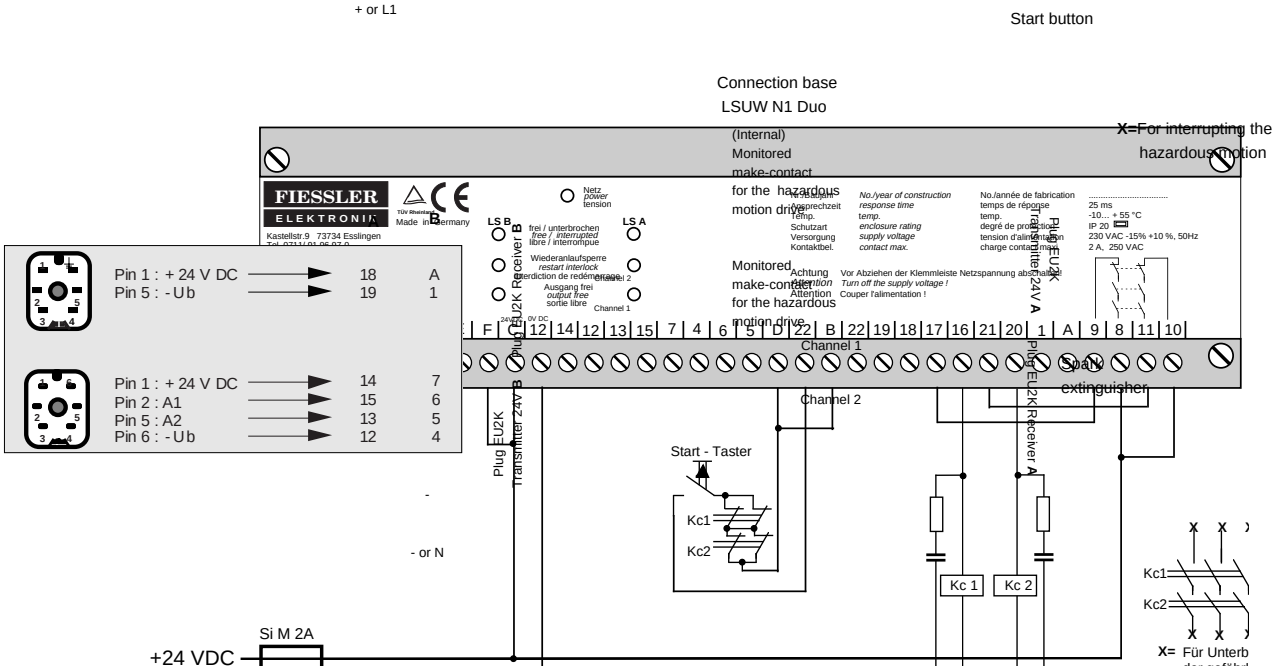
Application

Protecting a danger zone that is accessible from one side, with two light barriers (1 Start button).

Observe chapter 6.2 !

Connection circuit diagram

If the sum of the connected currents pass over 2A, the currents must be secured individually with 2,0A



Description of functions

The transmitters A and B are switched on by pressing the start button.

The LEDs on the transmitters are illuminated as control. Thus, by free protective fields the respective receivers are illuminated, whereby the latter are switched over to "green." The "free" LED on the switching unit is illuminated.

If the start button is enabled, the outputs "A" 16-17 and 20-21, as well as "B" 8-9 and 10-11 are switched through, the drive for the transmitter switches as well into the self-sustaining state. The "output free" LEDs are illuminated.

The function of both light barriers are connected in series. The circuit contactors Kc 1 and Kc 2 switch off the protective field in case of interference.

A restart occurs only after both of the protective fields are enabled and the start button is pressed.

The open contactors Kc 1 and Kc 2 in series with the start button serve for functional monitoring of respective contactors.

Instruction:

<u>During adjustment the start button must either be permanently pressed or by-passed.</u>

The start button is to be mounted such that the danger zone is well visible from the position of the button and that without interrupting a light barrier it cannot be pressed by someone within the danger zone.

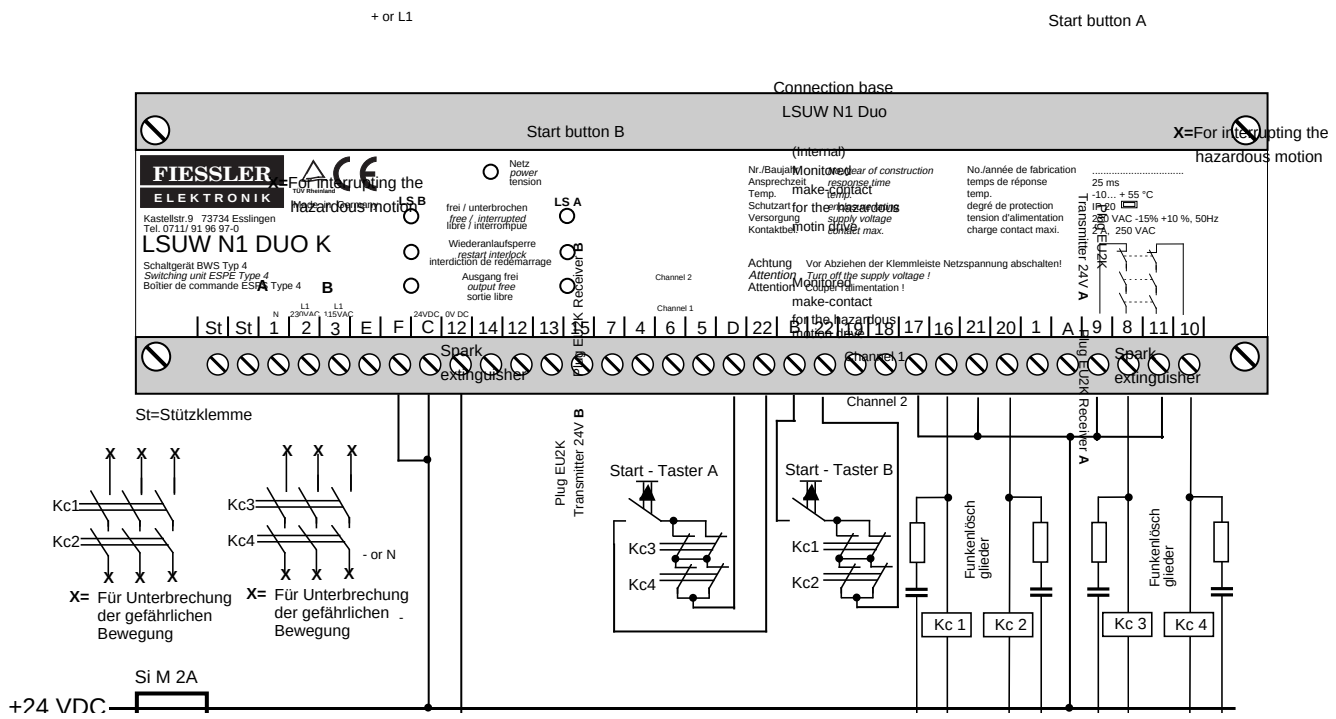
Application

Protecting two separate and independent danger zones or of one danger zone that is accessible from two sides (2 start buttons).

Observe chapter 6.2 !

Connection circuit diagramm

If the sum of the connected currents pass over 2 A , the currents must be secured individually with 2.0A



Description of functions

The transmitters A and B are switched on by pressing the start button A and B.

The LEDs on the transmitters are illuminated as control. Thus, by a free protective field the respective receivers are illuminated, whereby the latter switch over to "green." The "free" LED on the switching unit is illuminated.

If the start button is enabled, the outputs "A" 16-17 and 20-21, as well as "B" 8-9 and 10-11 are switched through, the drive for the transmitter switches as well into the self-sustaining state. The "output free" LED are illuminated.

The function of both light barriers are connected in series. The circuit contactors Kc 1 and Kc 2 switch off the protective field in case of interference.

A restart occurs only after both of the protective field have been enabled and the start button is pressed.

The open contactors Kc 1 and Kc 2 and Kc 3 and KC 4, each pair of which is connected in series with the associates start button contacts serve for functional monitoring of the contactors.

Instruction:

<u>During adjustment the start button must either be permanently pressed or by-passed.</u>

The start button is to be mounted such that the danger zone is well visible from the position of the button and that without interrupting a light barrier it cannot be pressed by someone within the danger zone.
Der jeweilige Start-Taster ist so zu montieren, daß vom Ort des Tasters der Gefahrenbereich gut eingesehen werden kann, und eine Betätigung aus dem Gefahrenbereich heraus, ohne Unterbrechen der Lichtschranke ausgeschlossen ist.

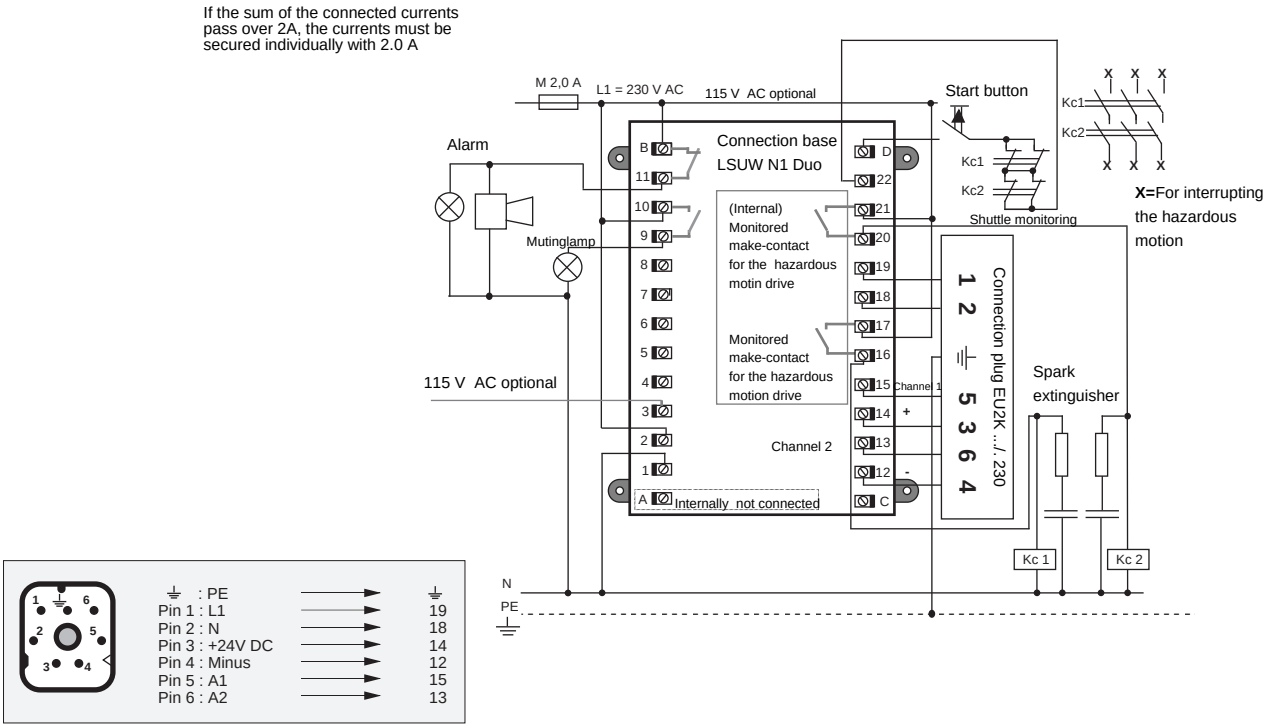
Connection diagram for the switching unit LSUW N1 Muting 230V / 115V AC 7.6

General instructions 7.6.1

Function **By-pass unit (Muting) for the short-time by-pass of a safety light barrier during material movement into and out of the production cell, or for safely distinguishing between human beings and a fork-lift truck.**

Application The switching unit LSUW N1 Muting is used for a certain period during the working cycle when the light barrier must be by-passed or when differentiation must be made between human beings and material flow. E.g. by the protection of bending machines, palletising machines, narrow corridor rack stores, by certain types of presses.

Connection circuit diagram



Description of functions

In combination with a vertical accident preventing light barrier EU2K 500/2 and four muting sensors, it is possible with the help of this switching unit to differentiate between human beings and material flow.

For the muting function the following components are essential:

1. Switching unit LSUW N1 Muting.
2. Accident prevention light barrier (transmitter, receiver) EU2K 500/2
3. Four muting sensors, e.g. light barriers, inductive sensors, camshaft controller
4. Muting lamp.

In order to prevent the accident prevention light barrier from being permanently pressed by intentional manipulation, a two-channel monitoring possibility is provided, which releases the muting function after a preset time of 3 - 90 sec. The time is set by Fiessler Elektronik, according to customer specifications. A switching possibility is available additionally, enabling operation without time monitoring.

Both muting sensor channels must be connected with separate cables in order to rule out a short circuit. If the muting sensors require voltage supply for both of the muting channels, the voltage supplies for both muting channels must also be laid with separate cables. The connection to the purported + supply terminals and - terminal strip must be executed separately.

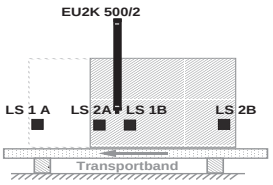
The muting lamp (max. 230 V 60 W min. 24V AC or DC max. 0.5A), which monitors the by-pass state is monitored.

Muting is not possible if the muting lamp is not connected or defective.

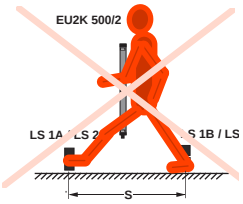
When the mains voltage is attached to the entire equipment the alarm is activated. Deactivation of the alarm is possible by pressing the key-operated start button.

For applications by which it is impossible to interrupt the hazardous motion, but rather only an alarm is signalled, a key-operated button must be used as a start button. The removal of the key must be possible only in the opened state.

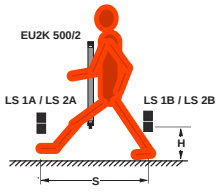
Prior to pressing the key-operated start button it must be checked whether a person is within the danger zone.



The start key button must be fitted such that the protected zone can be seen.



For the system to function correctly, the distance S must be less than or equal to the lenght of the pallet, the fork-lift truck or the reflective strip.



The distance S must be wide enough so that it is not possible for a person to concurrently interruption the muting sensors LS 1A/LS 2A and LS 1B/ LS 2B.

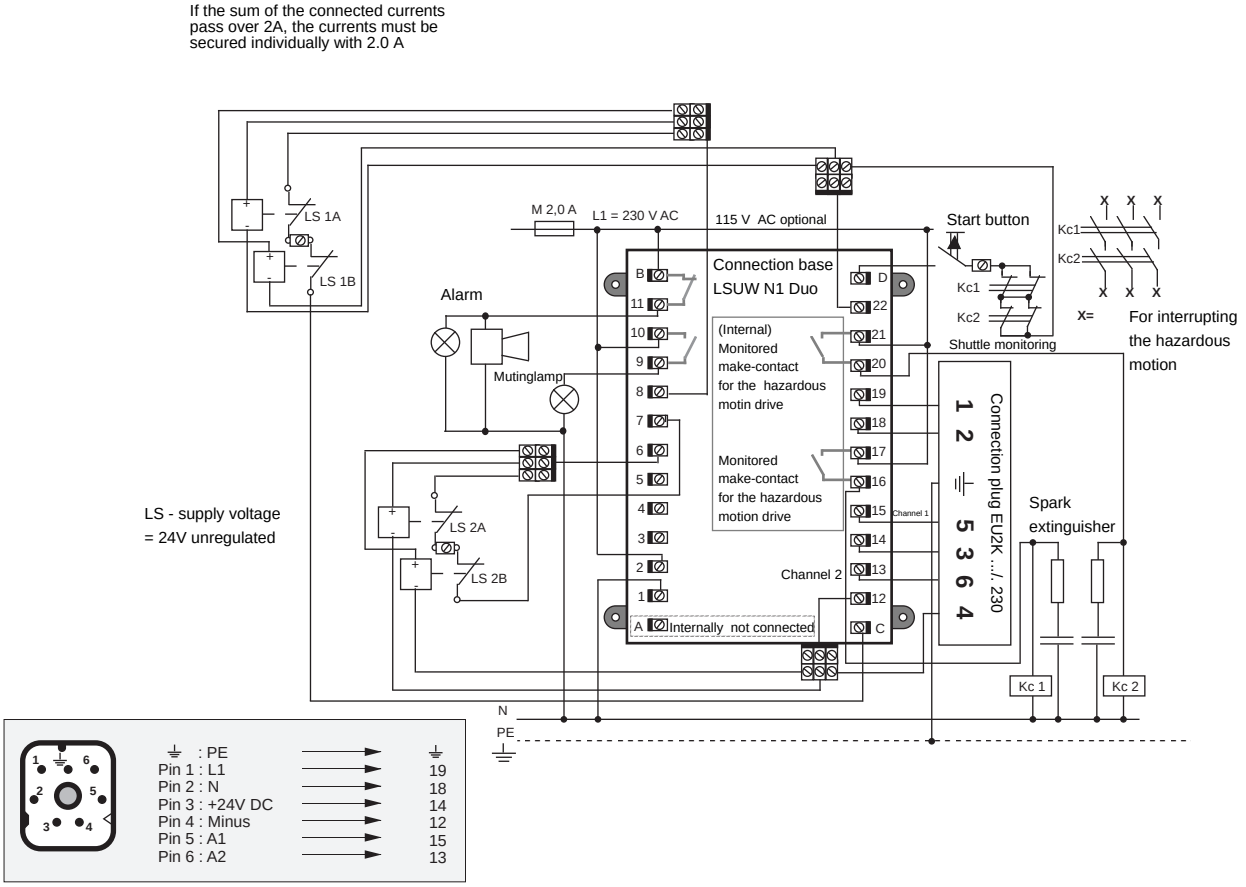
If necessary the distance H to theaccessible space or the distance S must be increased.

Connection diagram for the switching unit LSUW N1 Muting 230V / 115V AC 7.6

Muting function with four muting sensors and time monitoring 7.6.2

Application E.g. high-lift rack protection, pallets transport systems.

Connection circuit diagram



Description of functions

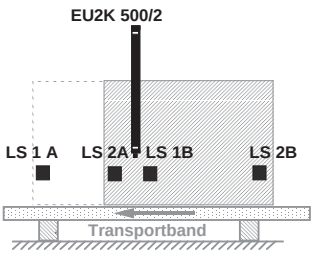
The by-pass takes place such that the contacts of the sensors LS 1A and LS 2A or LS 1B and LS 2B or all four are **open** though only as long as the maximum preset time. During this state the accident prevention light barrier EU2K 500/2 can be interrupted without the alarm being activated or without the whole equipment being switched off.

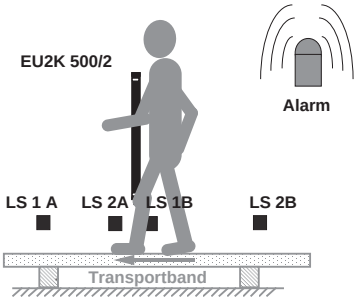
The alarm is activated and the equipment switched off when the accident prevention light barrier EU2K 500/2 is interrupted and not concurrently by-passed via the muting sensors. This interruption is not allowed. The contacts 20-21 and 16-17 switch off.

It is possible to start anew and to deactivate the alarm by pressing the key-operated start button when the accident prevention light barrier EU2K 500/2 is free.

It must bechecked whether a person is within the danger zone prior to pressing the key-operated start button.
Minus and plus conductors must be laid as specified in the connection diagram, due to safety reasons. The cable for the muting channels 1 (LS 1A/B) and 2 (LS 2A/B) must be laid separately.

The muting channels contacts LS can also be replaced with end switches.





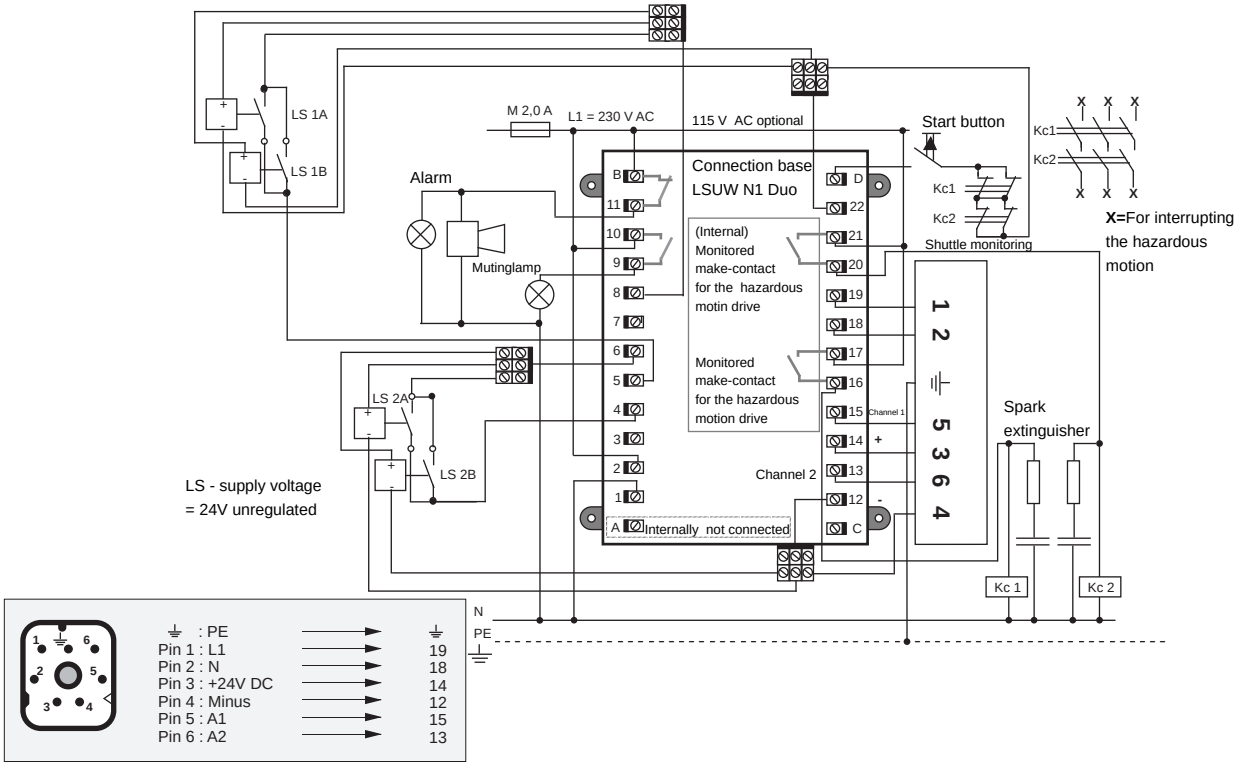
Connection diagram for the switching unit LSUW N1 Muting 230V / 115V AC 7.6

Muting function with four muting sensors without time monitoring 7.6.3

Application E.g. high-lift rack protection if the high-lift truck can be parked in the entrance area.

Connection circuit diagram

If the sum of the connected currents pass over 2A, the currents must be secured individually with 2.0A



Description of functions

The by-pass takes place such that the contacts of the sensors LS 1A and LS 2A or LS 1B and LS 2B or all four are **closed**. During this state the accident preventing light barrier EU2K 500/2 can be interrupted without the alarm being activated or the whole equipment being switched off.

The alarm is activated and the equipment switched off when the accident preventing light barrier EU2K 500/2 is interrupted and not concurrently by-passed via the muting sensors. This interruption is therefore not allowed. The contacts 20-21 and 16-17 are switched off.

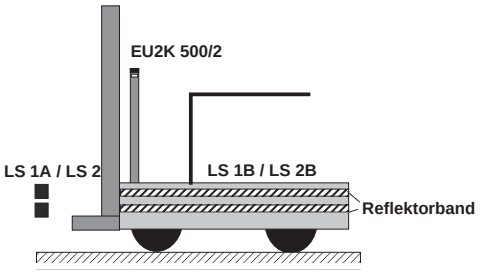
It is possible to start anew and deactivate the alarm by pressing the key-operated start button when the accident prevention light barrier EU2K 500/2 is free.

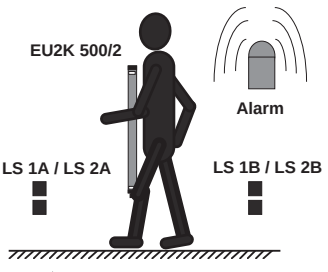
It must be checked whether a person is within the danger zone, prior to pressing the key-operated start button.

Minus and plus conductors must be laid as specified in the connection diagram, due to safety reasons. The cable for the muting channels 1 (LS 1A/B) and 2 (LS 2A/B) must be laid separately.

The muting channels contacts LS can also be replaced by end switches.

Electrical connection





Connection diagram for the switching unit LSUW N1 Muting 24V DC 7.7

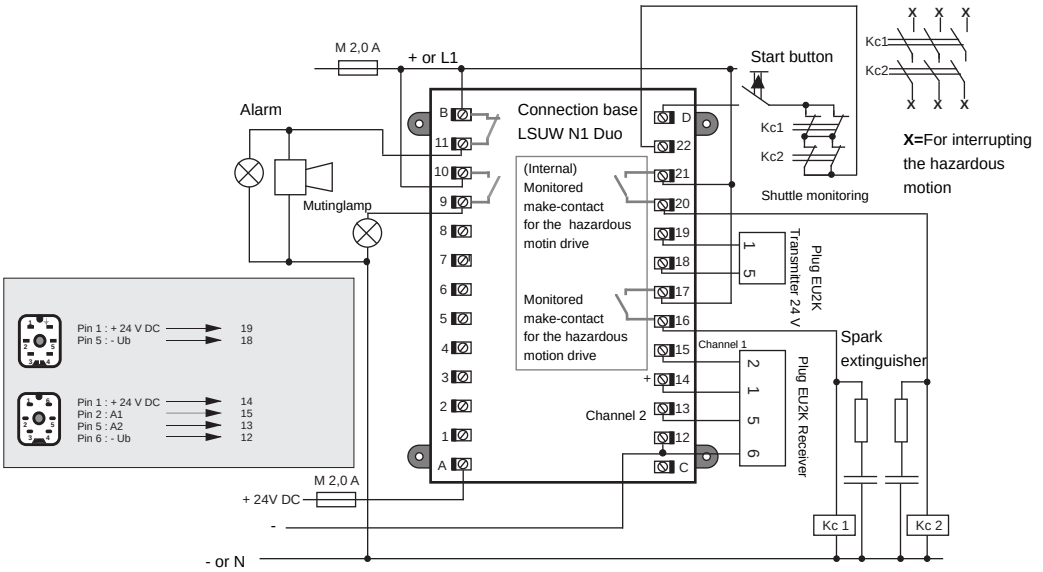
General instructions 7.7.1

Function **By-pass unit (Muting) for the short-time by-pass of a safety light barrier during material movement into and out of the production cell, or for safely distinguishing between human beings and a fork-lift truck.**

Application The switching unit LSUW N1 Muting is used for a certain period during the working cycle when the light barrier must be by-passed or when differentiation must be made between human beings and material flow. E.g. by the protection of bending machines, palletising machines, narrow corridor rack stores, by certain types of presses.

Connection circuit diagram

If the sum of the connected currents pass over 2A, the currents must be secured individually with 2.0 A



Description of functions

In combination with a vertical accident preventing light barrier EU2K 500/2 and four muting sensors, it is possible with the help of this switching unit to differentiate between human beings and material flow.

For the muting function the following components are essential:

1. Switching unit LSUW N1 Muting.
2. Accident prevention light barrier EU2K 500/2
3. Four muting sensors, e.g. light barriers, inductive sensors, camshaft controller
4. Muting lamp.

In order to prevent the accident prevention light barrier from being permanently pressed by intentional manipulation, a two-channel monitoring possibility is provided, which releases the muting function after a preset time of 3 - 90 sec. The time is set by Fiessler Elektronik, according to customer specifications. A switching possibility is available additionally, enabling operation without time monitoring.

Both muting sensor channels must be connected with separate cables in order to rule out a short circuit. If the muting sensors require voltage supply for both of the muting channels, the voltage supplies for both muting channels must also be laid with separate cables. The connection to the purported + supply terminals and - terminal strip must be executed separately.

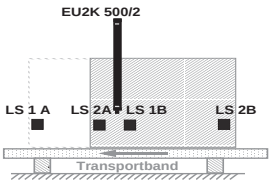
The muting lamp (max. 230 V 60 W min. 24V AC or DC max. 0.5A), which monitors the by-pass state is monitored.

<u>Muting is not possible if the muting lamp is not connected or defective.</u>

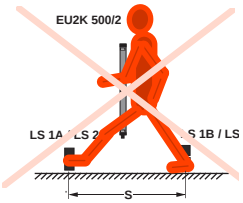
When the mains voltage is attached to the entire equipment the alarm is activated. Deactivation of the alarm is possible by pressing the key-operated start button.

For applications by which it is impossible to interrupt the hazardous motion, but rather only an alarm is signalled, a key-operated button must be used as a start button. The removal of the key must be possible only in the opened state.

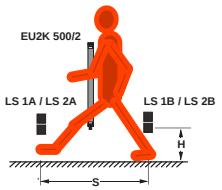
Prior to pressing the key-operated start button it must be checked whether a person is within the danger zone.



The start key button must be fitted such that the protected zone can be seen.



For the system to function correctly, the distance S must be less than or equal to the lenght of the pallet, the fork-lift truck or the reflective strip.



The distance S must be wide enough so that it is not possible for a person to concurrently interruption the muting sensors LS 1A/LS 2A and LS 1B/ LS 2B.

If necessary the distance H to theaccessible space or the distance S must be increased.

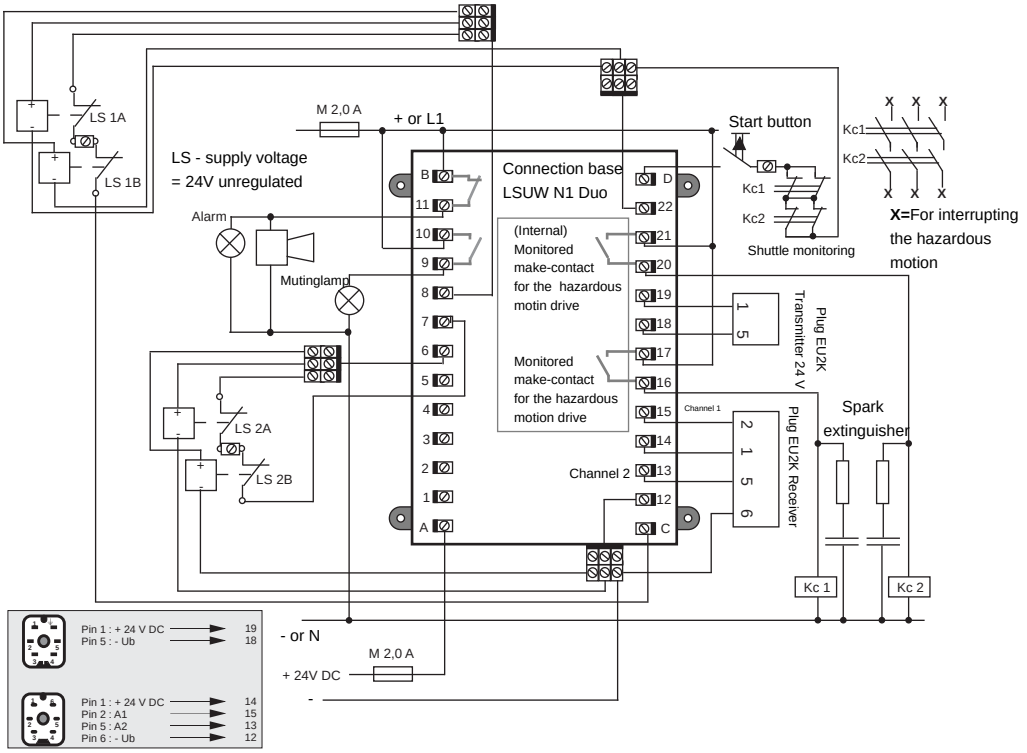
Connection diagram for the switching unit LSUW N1 Muting 24V DC 7.7

Muting function with four muting sensors and time monitoring 7.7.2

Application E.g. high-lift rack protection, pallets transport systems.

Connection circuit diagram

If the sum of the connected currents pass over 2A, the currents must be secured individually with 2.0 A



Description of functions

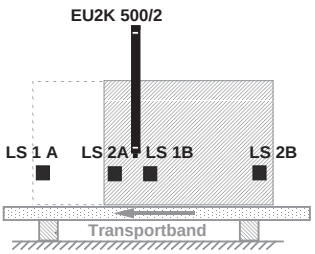
The by-pass takes place such that the contacts of the sensors LS 1A and LS 2A or LS 1B and LS 2B or all four are **open** though only as long as the maximum preset time. During this state the accident prevention light barrier EU2K 500/2 can be interrupted without the alarm being activated or without the whole equipment being switched off.

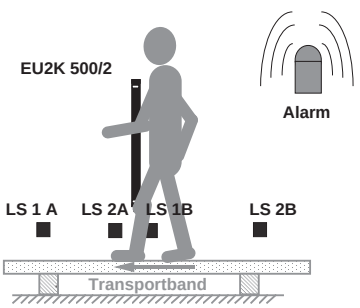
The alarm is activated and the equipment switched off when the accident prevention light barrier EU2K 500/2 is interrupted and not concurrently by-passed via the muting sensors. This interruption is not allowed. The contacts 20-21 and 16-17 switch off.

It is possible to start anew and to deactivate the alarm by pressing the key-operated start button when the accident prevention light barrier EU2K 500/2 is free.

It must bechecked whether a person is within the danger zone prior to pressing the key-operated start button.
Minus and plus conductors must be laid as specified in the connection diagram, due to safety reasons. The cable for the muting channels 1 (LS 1A/B) and 2 (LS 2A/B) must be laid separately.

The muting channels contacts LS can also be replaced with end switches.





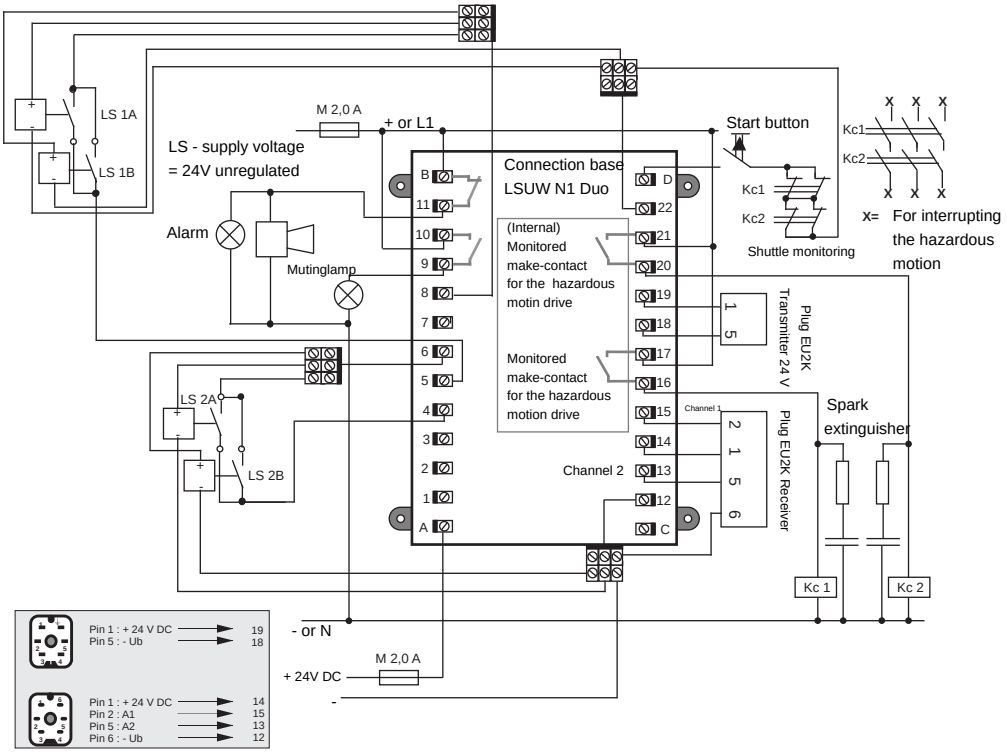
Connection diagram for the switching unitLSUW N1 Muting 24V DC 7.7

Muting function with four muting sensors without time monitoring 7.7.3

Application E.g. high-lift rack protection if the high-lift truck can be parked in the entrance area.

Connection circuit diagram

If the sum of the connected currents pass over 2A, the currents must be secured individually with 2.0A



Description of functions

The by-pass takes place such that the contacts of the sensors LS 1A and LS 2A or LS 1B and LS 2B or all four are **closed**. During this state the accident preventing light barrier EU2K 500/2 can be interrupted without the alarm being activated or the whole equipment being switched off.

The alarm is activated and the equipment switched off when the accident preventing light barrier EU2K 500/2 is interrupted and not concurrently by-passed via the muting sensors. This interruption is therefore not allowed. The contacts 20-21 and 16-17 are switched off.

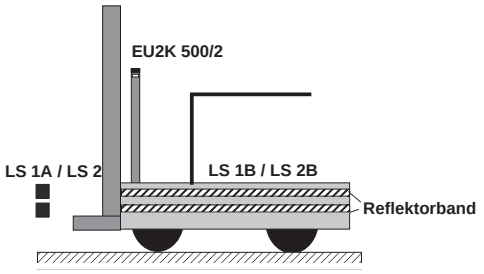
It is possible to start anew and deactivate the alarm by pressing the key-operated start button when the accident prevention light barrier EU2K 500/2 is free.

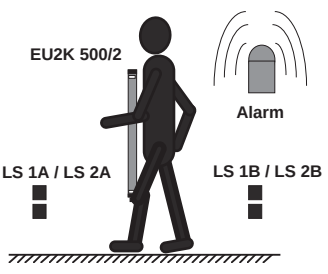
It must be checked whether a person is within the danger zone, prior to pressing the key-operated start button.

Minus and plus conductors must be laid as specified in the connection diagram, due to safety reasons. The cable for the muting channels 1 (LS 1A/B) and 2 (LS 2A/B) must be laid separately.

The muting channels contacts LS can also be replaced by end switches.

Electrical connection

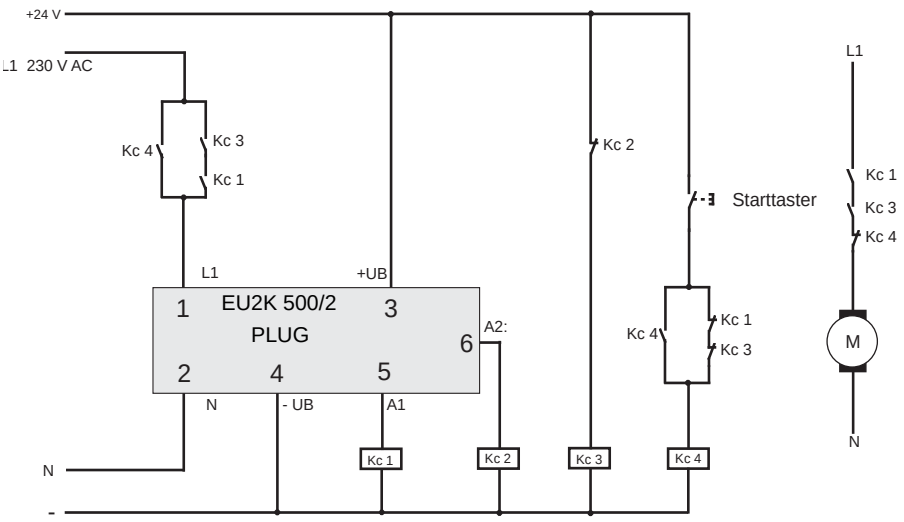




Connection diagram without a switching unit with 4 contactors 230V / 115V 7.8.1

Application E.g. for the protection of accessible danger zones.

Connection circuit diagram



Kc 1 + Kc 2 + Kc 3 + Kc 4 =

Description of functions

In the interrupted state KC1, KC3 and KC4 are disconnected, while KC2 is connected.

By pressing the start button, KC 4 connects and the transmitter is switched on via the contact KC 4.
The receiver recognises the transmitted signal and lets the contactor KC 1 to be connected via the output A1, while output A2 lets the contactor KC2 to be disconnected.

Disconnection of KC 2 connects contactor KC1 and contactor KC3.

Through the connection of contacts KC1 and KC3 the transmitter goes into self-sustaining state.
The light barrier is ready to function and the start button can be released. This causes KC4 to disconnect.

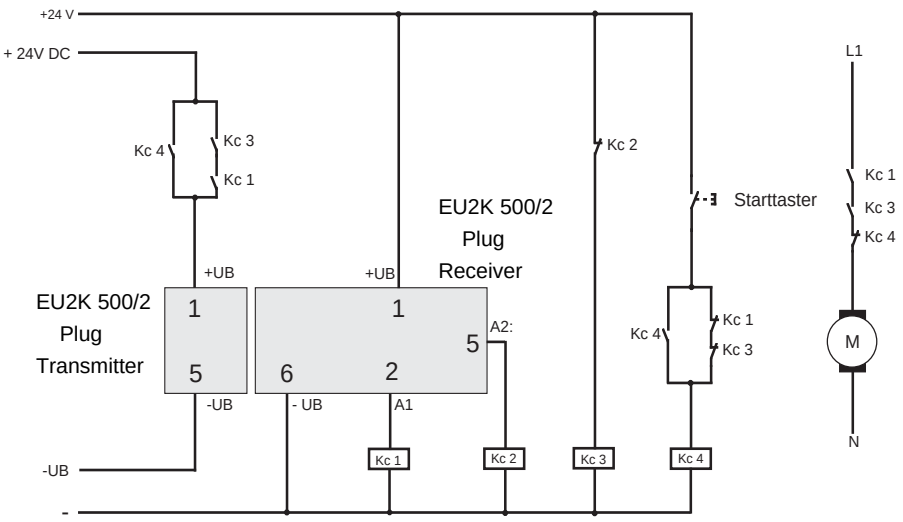
The closed make-contact of KC1 and KC3 as well as the closed opener of KC4 activate the power circuit of the machine, switching it on.

Instruction:
<u>During adjustment the start button must be permanently pressed or by-passed.</u>
The start button is to be mounted such that the danger zone is well visible from the position of the button and that without interrupting a light barrier it cannot be pressed by someone within the danger zone.

Connection diagram without a switching unit with 4 contactors 24V DC 7.8.2

Application E.g. for the protection of accessible danger zones.

Connection circuit diagram



Kc 1 + Kc 2 + Kc 3 + Kc 4 =

Description of functions

In the interrupted state KC1, KC3 and KC4 are disconnected, while KC2 is connected.

By pressing the start button, KC 4 connects and the transmitter is switched on via the contact KC 4.
The receiver recognises the transmitted signal and lets the contactor KC 1 to be connected via the output A1, while output A2 lets the contactor KC2 to be disconnected.

Disconnection of KC 2 connects contactor KC1 and contactor KC3.

Through the connection of contacts KC1 and KC3 the transmitter goes into self-sustaining state.
The light barrier is ready to function and the start button can be released. This causes KC4 to disconnect.

The closed make-contact of KC1 and KC3 as well as the closed opener of KC4 activate the power circuit of the machine, switching it on.

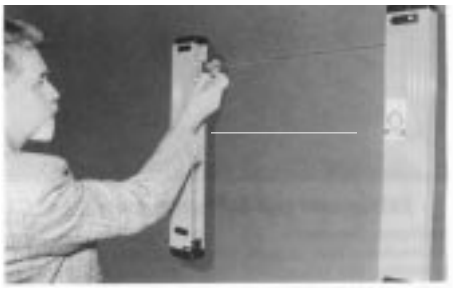
Instruction:
<u>During adjustment the start button must be permanently pressed or by-passed.</u>
The start button is to be mounted such that the danger zone is well visible from the position of the button and that without interrupting a light barrier it cannot be pressed by someone within the danger zone.

Alignment

Receiver/transmitter unit and deflection mirror must be fitted plane-parallel. The transmitter is switched on by pressing the start button and if well adjusted the receiver evaluates the transmitted signal.
The red LEDs "adjustment control" and "interrupted" are off and the green LED "free" is on. If this is not the case then the alignment must be checked.

Adjusting-aid laser

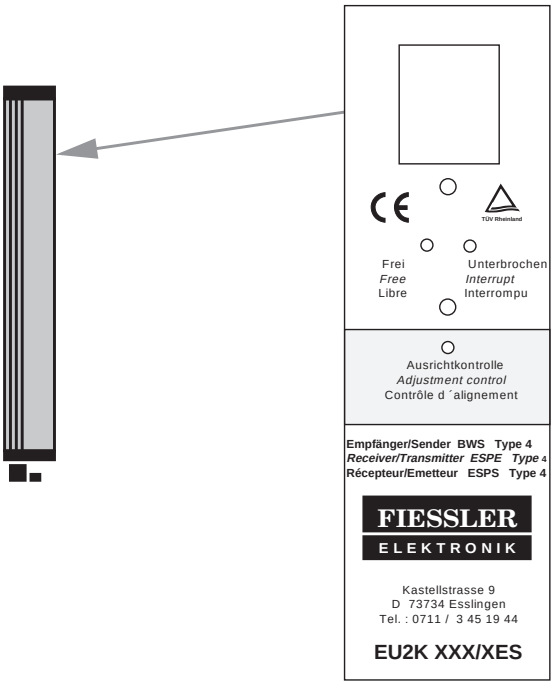
The laser light-spot must meet the opposite device in the mid-point.
The test should be done on the receiver/transmitter unit and deflection mirror respectively.
If necessary the adjustment is to be corrected.



Adjustment-aid luminous diodes

In order to recognise the adjustment state a red LED for adjustment control is provided respectively at the front side of the receiver/transmitter unit:

Light barrier - free, correctly aligned	"Free" LED on, "Adustment control" LED off
Light barrier - free, too little reserve	"Free" LED on, "Adjustment control" LED off
Light barrier - wrongly aligned or interrupted	"Free" LED off, "Adjustment control" LED on, "Interrupted" LED on



Trouble shooting **Prerequisite for trouble shooting is the rightly adjusted light barrier**

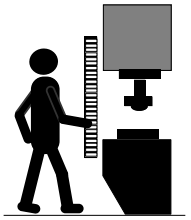
Fault	Remedy
Switching unit outputs do not provide continuity. Both red LED (Interrupt, Adustment control) on the receiver/transmitter unit light. Yellow LED on the transmitter element doesn't light.	receiver/transmitter unit wrong conneted or defective, Return unit for repair.
Switching unit outputs do not provide continuity. The LED on the receiver/transmitter unit and the associated LED on the switching unit do not both light or go out together	Check the cable connecting between receiver/transmitter unit and switching unit. If the connections are in order the receiver/transmitter unit is defective. Return unit for repair.
Light barrier functions correctly but the switching unit outputs do not provide continuity.	The outputs are protected by an internal 3.15 A fuse. Overload has probably caused this fuse to blow. Return unit for control.
Light barrier functioned correctly for some time but now the switching unit outputs do not always provide continuity.	Check whether a spark-quench element is connected parallel to the load. If this is not the case, the relay contacts may have burned. Return unit for control.
The entry restriction cannot be reset by pressing the Start pushbutton. The yellow LED lights.	a.Check whether the Start switch switches. b.Check whether there is continuity through the monitor circuit for the disconnecting contacts.
On connection of the receiver to the switching unit LSUW N1 or LSUW N1 DUO or LSUW N1 Muting and then obstructing and then freeing the light barrier, the green LED lights without the Start pushbutton having been pressed.	Transmitter is not connected or is wrongly connected. Refer to circuit diagram in the base of the switching unit.
The light barrier will not switch to "free" the LEDs do not light and extinguish as they should.	Clean lenses, check adjustment.
The switching on of some heavy consumer such as a large motor acts as an obstruction of the light barrier. The red LEDs light briefly.	It is probable that the cable connecting the receiver to the switching unit is laid parallel to the power supply cables. Lay the connecting cable separately. Fit the switching unit as near as possible to the receiver/transmitter unit.

Please observe The receiver/transmitter unit has to be used according to the protection system IP 65 and has to be mounted with the plugging-side downwards.

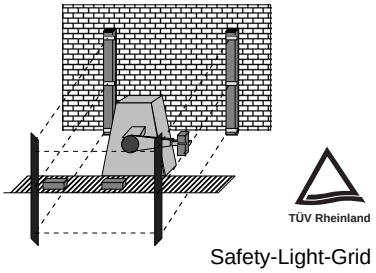
Maintenance Instructions The EU2K system is maintenance free, as far as the design is concerned. Only the discs of the receiver/transmitter unit and the deflection mirror should be regularly cleaned with a solvent-free cleaning agent. However, this does not exempt from the annual inspection requirement according to prEN 50100 or the national regulations.

Delivery Program:

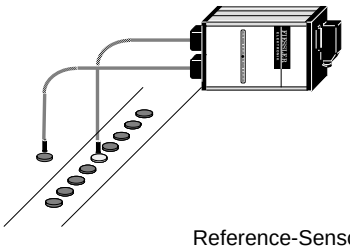
Fiessler Elektronik
Kastellstr. 9 D-73734 Esslingen
Telefon: 0711 / 91 96 97 - 0
Telefax: 0711 / 91 96 97 - 50
WWW.fiessler.de
E-Mail:info@fiessler.de



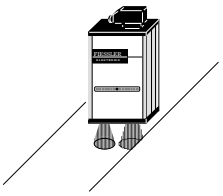
Savety- Light-Curtain



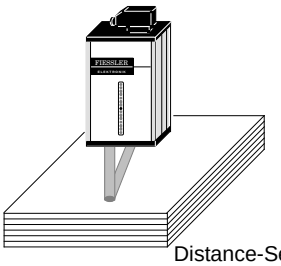
Safety-Light-Grid



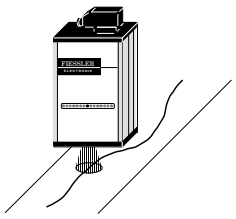
Reference-Sensor



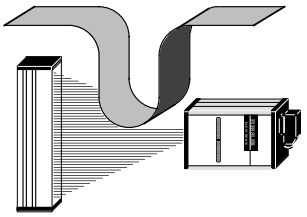
Edge-Sensor



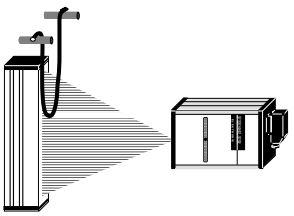
Distance-Sensor



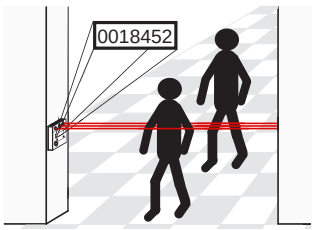
Line-Sensor



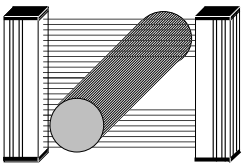
Analogue Loop-Detector



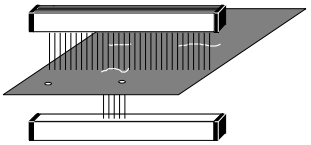
Loop-Detector For Tubes



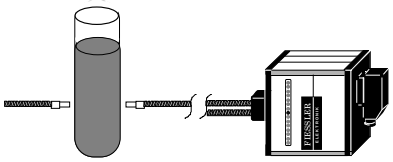
Photoelectric Controls For Counting Application



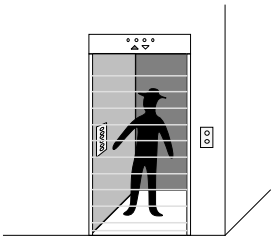
Switching And Analogue Light-Curtain



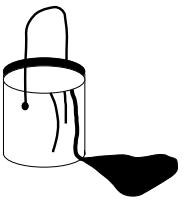
Hole-Detector



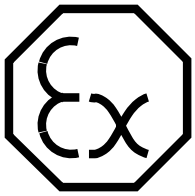
Cloudiness-Detector



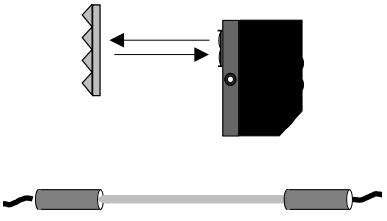
Lift Savety-Light-Curtain



Colour-Sensor



EX-Light-Barrier



Light-barrier For General Applications

Your Application

Doku Nr. 408 Stand 25.05.99 / EW