

Control Unit for Light Curtains

BASIS
CONTROL UNIT



**Connecting and
Operating
Instructions**

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1 Foreword

These connecting and operating instructions are intended to provide the user with the basic knowledge required for correct and safe operation.

This does not affect safety requirements based on applicable regulations, standards, provisions etc.

1.1 Introduction

Electro-sensitive protective devices (ESPDs) are protective devices with proximity response.

If a person enters the sensing zone produced by the sensor unit, a switching command is generated to interrupt or prevent a dangerous machine movement.

Together with LUMIFLEX's DIALOG or REFLEX safety light curtain, the BASIS control unit constitutes such an electro-sensitive protective device with internal self-checking (ESPD). It meets the requirements of VBG 5 and the safety rules ZH 1/281 and ZH 1/597 (Figure 1-1).

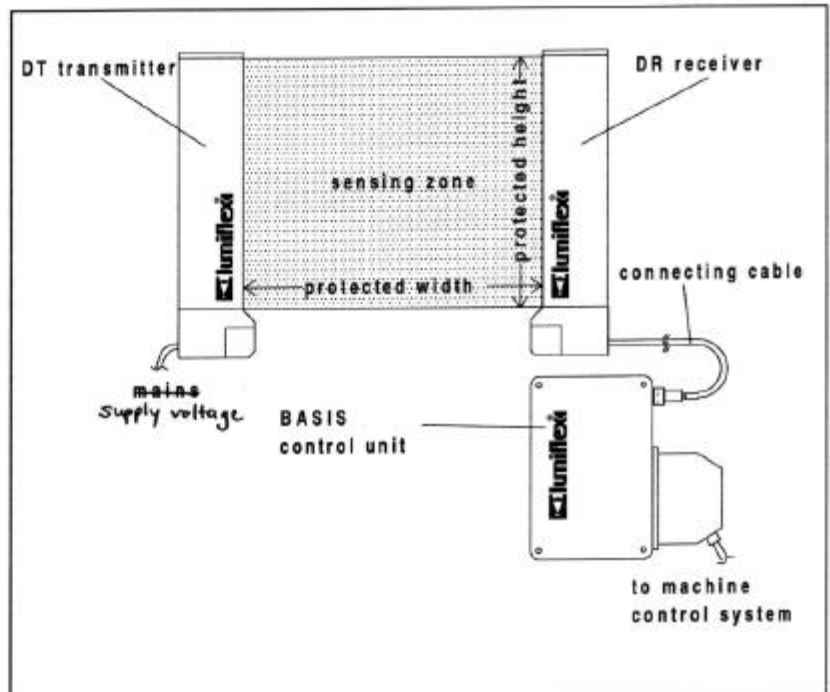


Figure 1-1 Electro-sensitive Protective Device (ESPD) consisting of DIALOG safety light curtain with BASIS control unit

The safety light curtain forms the sensor unit. BASIS essentially contains the safety light curtain's power supply, control functions for the manual insertion and removal of work pieces and the safety-related interface to the machine control system.

This interface contains a monitoring function for the downstream contactors or relays and thus ensures a simple and reliable connection to the machine control system.

1.2 Features of BASIS

- Classification: ESPD, internal self-checking
- Dynamic contactor monitoring system
- Choice between type of operation "Guard only", "Single break" and "Double break" via selector switch or bridges
- Operating modes "Start interlock" and "Restart interlock" selectable
- Plug-in relay module and therefore simple, trouble-free servicing
- 30-second time-out selectable for cyclical operation

2. Description of Unit

2.1 Design and Functions

The receiver of the safety light curtain, in other words either the REFLEX optical component or the DIALOG DT receiver, is connected to BASIS via a plug-in connecting lead.

When an object enters the sensing zone, the light curtain receiver produces an electrical signal "Sensing zone not free!" The BASIS switching output turns this signal into the switching command "Machine Stop!". A dangerous machine movement can be interrupted or prevented by this switching command (Figure 2-1).

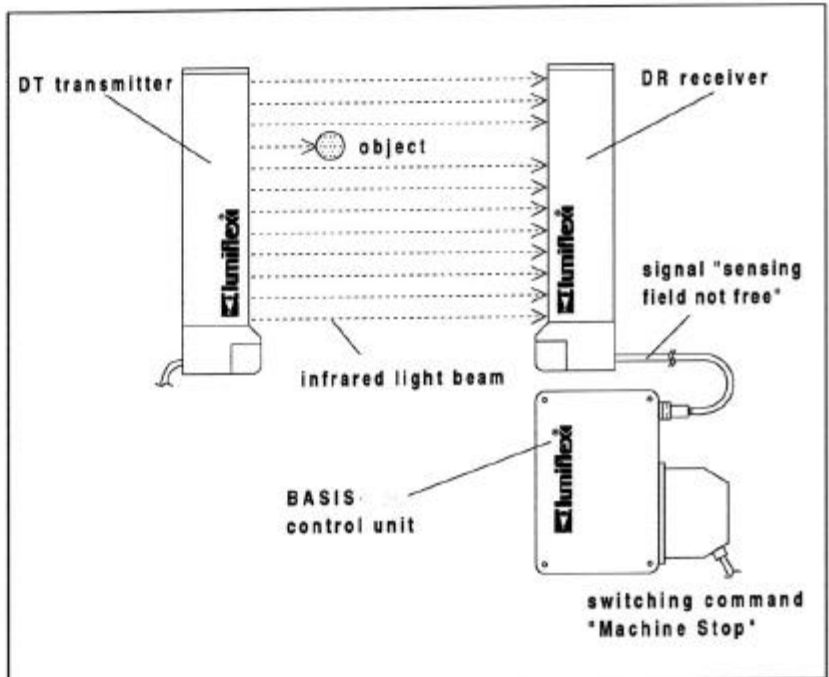


Figure 2-1 BASIS turns the signal "Sensing zone not free!" into the switching command "Machine Stop!"

Depending on the particular application, there is a choice between two operating modes A and B.

The essential difference between the two operating modes is that in operating mode A the switching command "Release!" is automatically produced once the object has left the sensing zone again.

In operating mode B, the switching command "Release!" is produced only when the operator gives an acknowledgement once the sensing zone is free.

In both operating modes, the control functions for directing production sequences through the manual insertion and removal of work pieces and the monitoring function for the downstream contactors are available if required.

The operating elements required can be connected directly to the BASIS control unit (Figure 2-2).

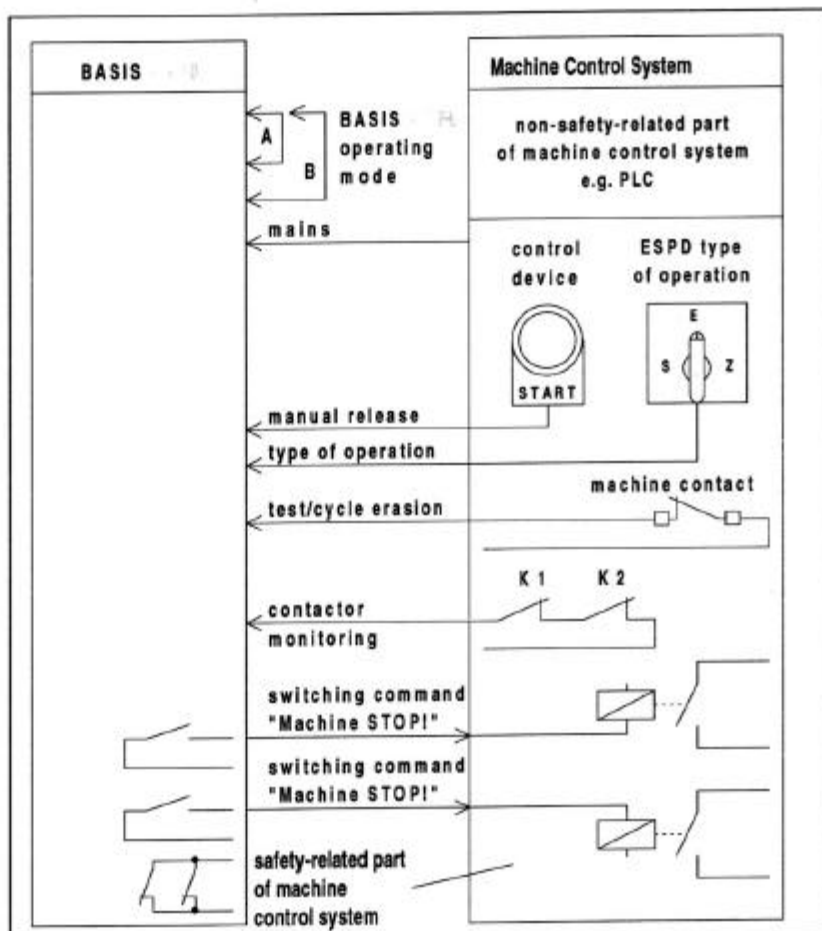


Figure 2-2 Diagrammatic view of interface between BASIS and machine control system.

2.2 Description of Control and Monitoring Functions

2.2.1 Start Interlock

The start interlock blocks the switching command "Release" after start-up of the BASIS control unit or a mains failure.

The start interlock is cancelled in operating mode A either by manual intervention in the sensing zone of the safety light curtain or by opening and closing the electric circuit connected to the test/cycle input (remote start function).

2.2.2 Restart Interlock

The restart interlock is available in operating mode B and prevents the automatic release of the switching output after the following events:

- Interruption of sensing zone in type of operation "Guard only"
- Interruption of sensing zone due to intervention by finger or hand in types of operation "Single break" and "Double break"
- Start-up
- Mains failure
- Change of type of operation
- Response of time monitoring system
- Response of contactor monitoring system given misoperation of downstream contactors.

The restart interlock is cancelled by actuating an external control device (press and release a button). The button is active only when the sensing zone is free. The restart interlock function cannot be bypassed by immobilizing the button.

The start interlock and restart interlock functions contain the start-up tests in accordance with ZH 1/281.

Note: The start interlock or the restart interlock is only affected by interruptions of the BASIS power supply. Mains failures of the transmitter power supply did not lock the start/restart interlock.

2.2.3 Extern Relay Monitoring

The extern relay monitoring system checks via a feedback circuit the contactors connected externally to BASIS. The switching output is released only when both connected contactors are in the neutral or "Machine Stop" position. The feedback circuit at terminal 6 and 8 is closed in this case (Figure 2-3).

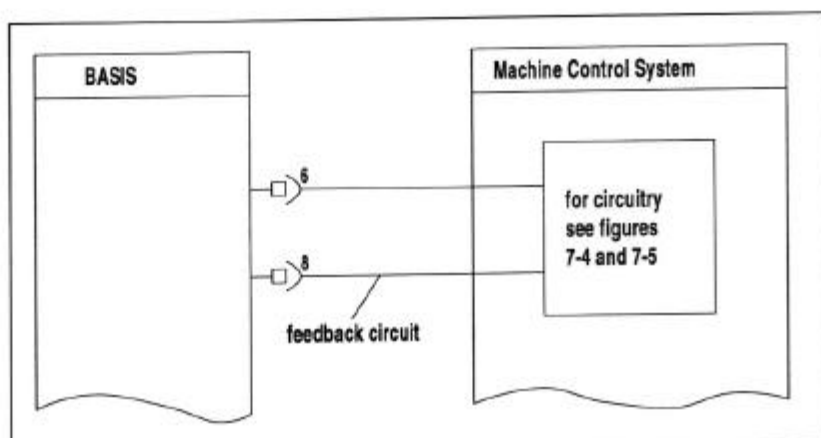


Figure 2-3 The extern relay monitoring system checks the external contactors connected to BASIS

To ensure that this monitoring function is not cancelled by a short circuit in the connecting lead or by an external bridge connection, a check is carried out with each release command to determine whether the feedback circuit did indeed open within approx. 100 ms.

The extern relay monitoring system can be activated via bridge Br1 on the printed board inside BASIS . If the bridge is plugged in position 2-3, the contactor monitoring system is activated. If BASIS is to be operated in operating mode A without the extern relay monitoring system, the bridge must be plugged into position 1-2 (Figure 2-4).

Caution: If the bridge is plugged in position 1-2, the monitoring function of the external connected relays and their connection leads is not activated! In this case, the relay monitoring function must be carried out by an other self-checking part of the machine control system (the inputs 6, 8 must be unconnected if Br 1 is in position 1-2).

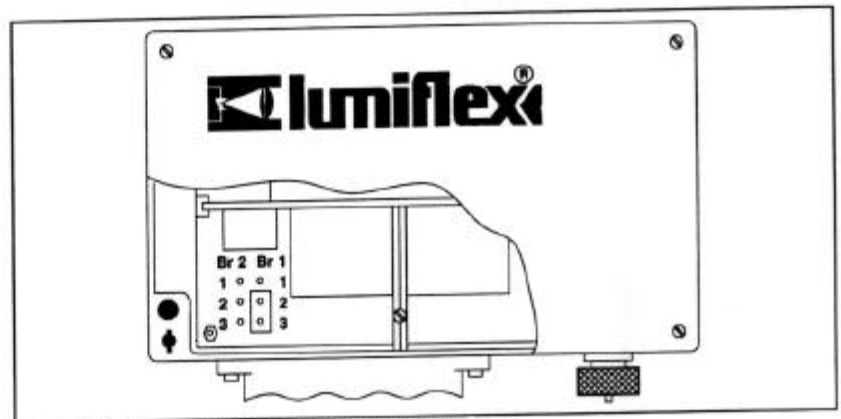


Figure 2-4 Bridge Br1 inside BASIS

As an additional function, in type of operation "Guard only", the switching command "Machine Stop" can be triggered by closing an external contact at terminals 6 and 8 even when the sensing field is free. The contact must be closed for at least 100 ms. The switching output changes from "Release" to "Machine Stop" and the restart interlock is activated.

2.2.4 Cyclical Testing

If testing is prescribed in such equipment-specific regulations as "Safety rules for contactless protective devices on powered metal-working presses, ZH 1/281", BASIS has an input for the acceptance of the external test request.

If the test function is not required (type of operation "Guard only" without cyclical testing), terminals 3 and 4 must be connected to a bridge.

Opening the machine control system's contact connected to the test/cycle input of BASIS **3** simulates an intervention in the sensing zone of the safety light curtain. At the switching output of BASIS **3** the switching command "Machine Stop" is present during the test request. At the end of the test phase, the switching output of BASIS **3** takes up its previous state again. The restart interlock is not activated by this simulated intervention (Figure 2-5).

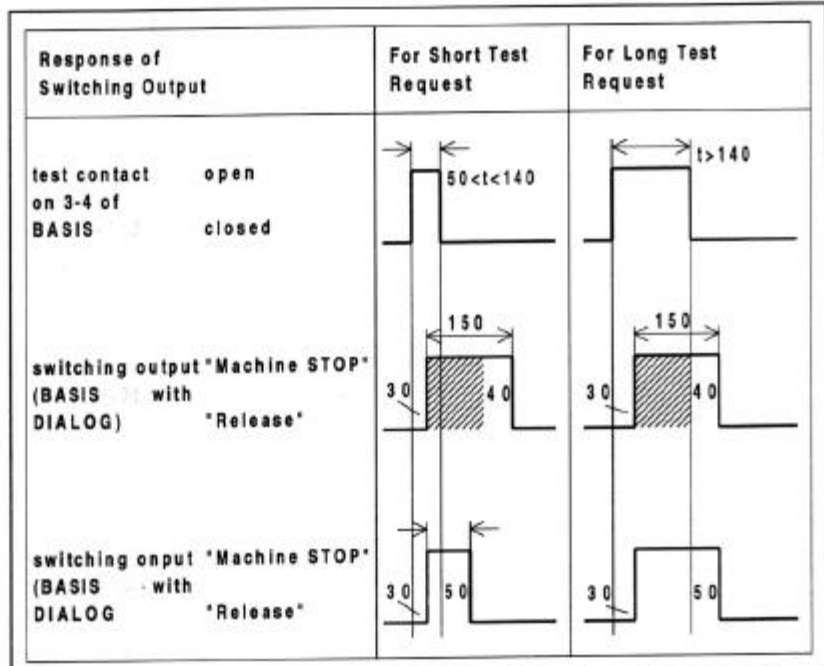


Figure 2-5 Switching output of BASIS **3** for external test request (In ms)

If this contact is actuated in the machine cycle, this is called cyclical testing.

- 2.2.5 Type of Operation "Guard Only"** The type of operation "Guard only" is set when the safety light curtain is being used solely as a protective device.

After switching on and unlocking the start interlock and restart interlock, the switching command "Release" is produced at the switching output of BASIS if the sensing zone is free. Each interruption of the sensing zone produces the switching command "Machine Stop!". Once the sensing zone becomes free, depending on the operating mode set (A or B), the release comes either immediately or only after the external control device has been actuated (Figure 2-6).

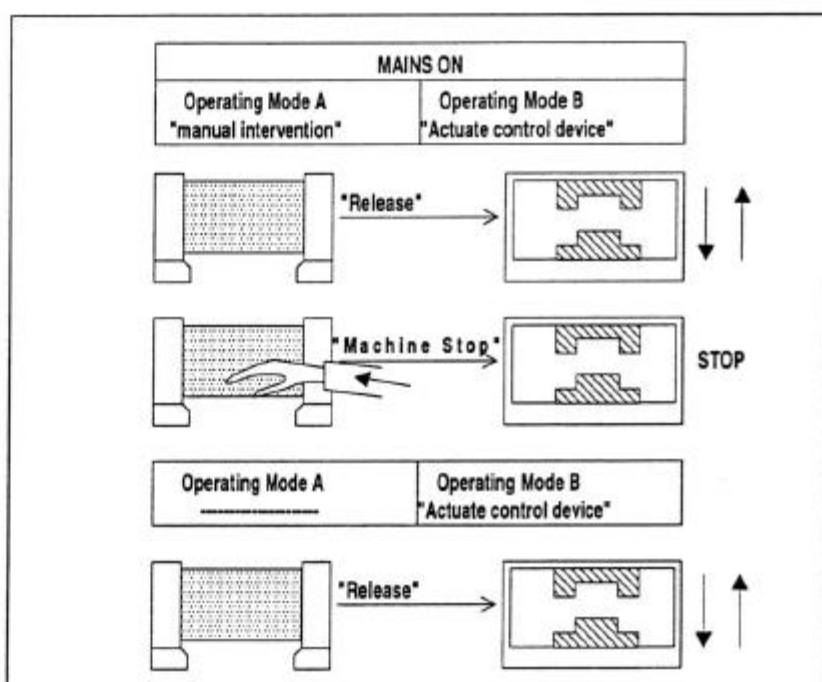


Figure 2-6 Functional sequence in type of operation "Guard only"

- 2.2.6 Type of Operation "Single Break" and "Double Break"** The types of operation "Single break" and "Double break" are set when the safety light curtain is being used as a protective and machine initiation device.

In this case the production sequence is started automatically by BASIS after the operator has inserted or removed the work pieces to be machined.

The safety light curtain's sensing zone is interrupted and then released again through the manual insertion or removal of work pieces. Interruption and release of the sensing zone is stored in BASIS as a "cycle".

The BASIS switching output remains in the "Machine Stop!" state until the cycle number required for the respective production sequence has been stored. When this condition has been fulfilled, the machine is released by the BASIS control unit.

Figures 2-7 and 2-8 show the functional sequence of the types of operation "Single break" and "Double break".

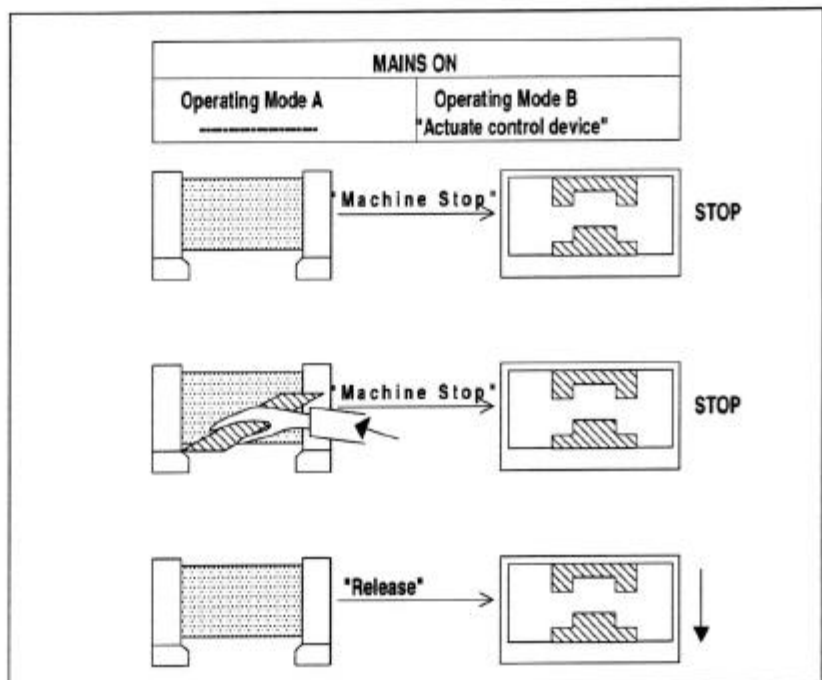


Figure 2-7 Functional sequence in type of operation "Single break"

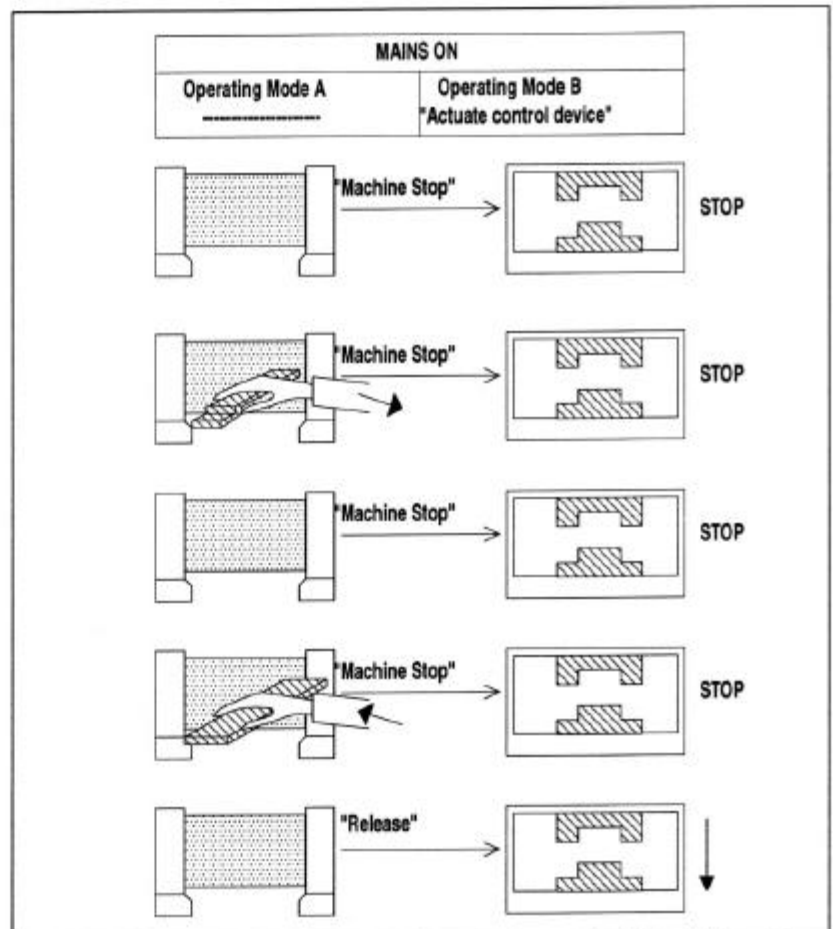





Figure 2-8 Functional sequence in type of operation "Double break"

Before initiating the next production sequence, the cycle memory in BASIS  must be erased. A potential-free contact from the machine control system, which is to be connected to the test/cycle input at terminals 3 and 4 of BASIS , is required for this purpose.

This contact must be closed throughout the dangerous movement. During the non-dangerous movement it can be opened either for a short period or continuously. Opening this contact erases the cycles stored in BASIS .

Storage of cycles is only possible when the cycle-erasing contact has closed before the sensing zone becomes free. A cycle cannot be stored when the cycle-erasing contact is open.

2.2.7 Time Monitoring System

The time monitoring system is intended to provide job safety and prevents the uncontrolled triggering of a machine cycle through an unintentional intervention in the sensing zone of the controlling safety light curtain.

Only those sensing zone interruptions which come within no more than 30 seconds of the closing of the cycle-erasing contact will be accepted as cycles. If this does not occur within this period, a sensing zone interruption can be stored as a cycle again only after the external control device has been actuated.

The time monitoring system can be cut in by means of bridge Br2 on the printed board inside BASIS . If the bridge is plugged in position 2-3, the time monitoring function is activated and in position 1-2 it is switched off (Figure 2-9).

The time monitoring function is only available in operating mode B.

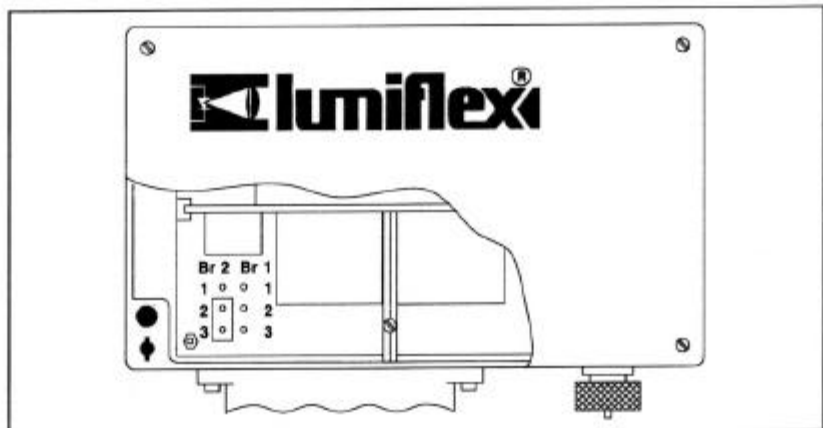


Figure 2-9 Time monitoring system

3. Operating Modes A and B

As already mentioned in Chapter 2, the essential difference between the two operating modes is that in operating mode A the switching command "Release!" is produced automatically as soon as the safety light curtain's sensing zone is released, whilst in operating mode B the machine is released only when a control device has been actuated.

Which of the two operating modes is to be used depends on the equipment-specific regulations and the relevant machine control system.

If the regulations require a restart interlock function as, for example, with the guarding of danger points on presses or with use as a safeguard against access to danger zones which people can enter, the restart interlock must either be part of the safety-related section of the machine control system or part of the electro-sensitive protective device (ESPD) (Figures 3-1 and 3-2).

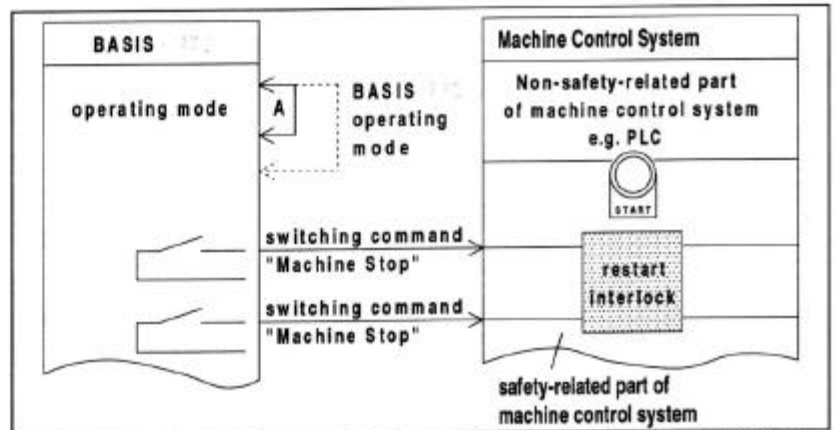


Figure 3-1 Operating mode A, the restart interlock is integrated into the safety-related part of the machine control system

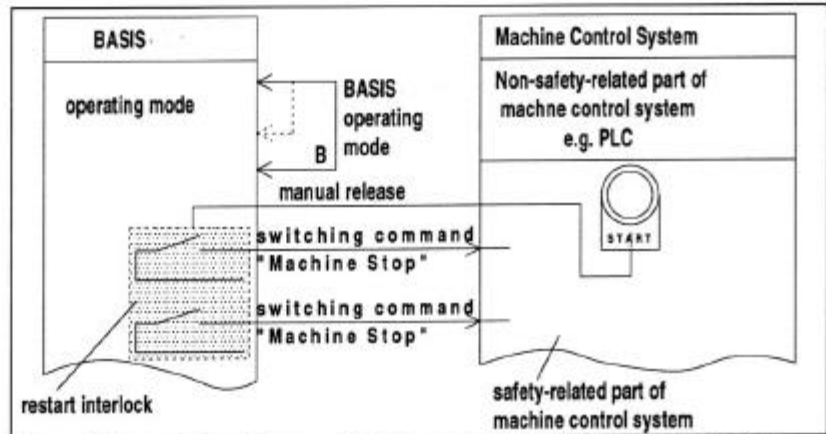


Figure 3-2 Operating mode B, the restart interlock is integrated into the ESPD

3.1 Available System Functions in Operating Modes A and B

The following table gives an overview of the control and monitoring control functions made available in operating modes A and B.

Available functions	Operating mode	
	A	B
Start interlock	yes	yes
Cancel start interlock	Manual intervention or via testing (remote start)	Only via control device
Restart interlock	no	yes
Cancel restart interlock	no	Via control device
Extern relay monitoring	yes (Br1 at 2-3)	yes (Br1 t 2-3)
	no (Br1 at 1-2) see page 2-5	
Testing/cycle erasion	yes	yes
Types of operation:		
"Guard only"	yes	yes
"Single break"	yes	yes
"Double break"	yes	yes
Cancelling start interlock or restart interlock after changing type of operation	Manual intervention or testing	Only via control device

Table 3-1 (page 1 of 2)

Available functions	Operating mode A	Operating mode B
30 s time monitoring	no (Br2 at 1-2)	yes (Br2 at 2-3)
		no (Br2 at 1-2)
Break contact of switching output when used as signal output for sensing zone state	yes (S1 inside BASIS 270 open)	yes (S1 inside BASIS 270 open)

Table 3-1 (page 2 of 2)

3.2 Functional Sequence in Operating Modes A and B

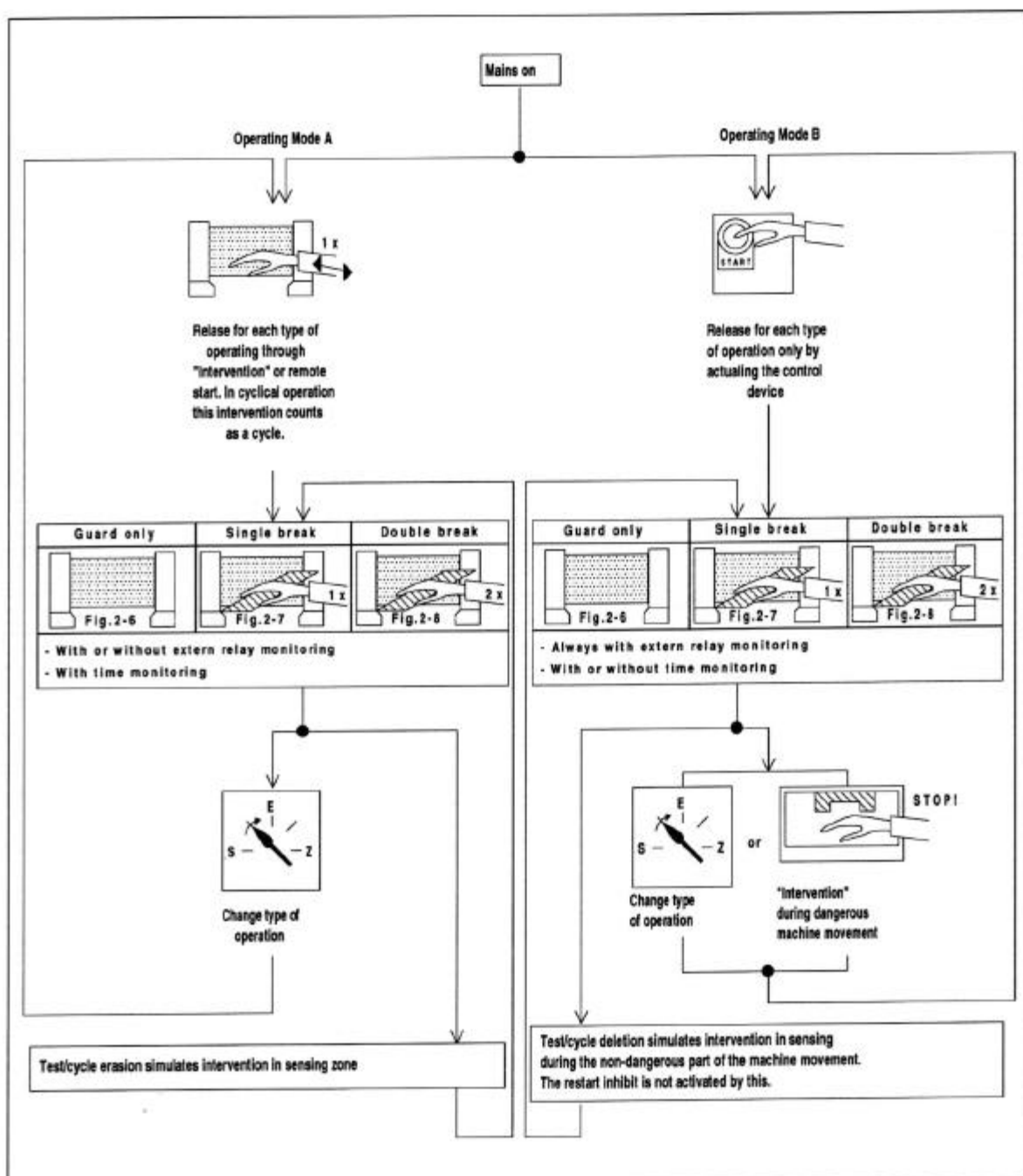


Figure 3-3 Sequence diagram for operating modes A and B

4. Safety Information

The BASIS control unit is internally self-checking. Malfunctions which could affect safety are detected and lead to a cut-out command. That the switching command "machine stop" is reaching the corresponding circuits of the machine control system failsafe, the external connected relays and their connection leads must be included in the internal self-checking system of the BASIS (extern relay monitoring is activated, Br 1 on 2-3).

The development and manufacture of BASIS control units follow universally recognised technical rules. Users are thus sufficiently protected as long as the equipment is used as prescribed.

BASIS may be operated only with one LUMIFLEX safety light curtain. Either the REFLEX safety light curtain or the DIALOG safety light curtain is to be connected to the socket provided for this purpose. Connecting two devices at the same time is not permitted and is prevented by the small distance between the sockets.

Persons outside the sensing zone of the safety light curtain cannot be detected! Therefore, it must be ensured that a machine or unit is operated only when there is no-one in the danger area. For relevant information see Chapter 4 of the "DIALOG safety light curtain fitting and operating instructions" or the "REFLEX safety light curtain fitting and operating instructions".

5. Application Regulations

The relevant statutory and official provisions apply with regard to the use of electro-sensitive protective devices.

These regulations are divided into two groups: regulations for electro-sensitive protective devices (ESPDs), such as

- ZH 1/281 Safety rules for CPDs on powered metal-working presses
- ZH 1/597 Safety rules for CPDs on powered equipment
- EN 50100 T1+T2 (being prepared)

and equipment-specific regulations, such as

- UVV 11.062 "On eccentric and related presses"
- UVV 11.064 "On hydraulic presses"
- UVV 13.6 "On injection moulding machines"

* UVV = Accident Prevention Regulation (in Germany)

6. Requirements for the Safeguarded Machine

Safety light curtains do not protect against machine failure! Control of the downstream machine must be so designed that the safety light curtain control unit's switching command is processed appropriately and reliably. The following requirements must be fulfilled:

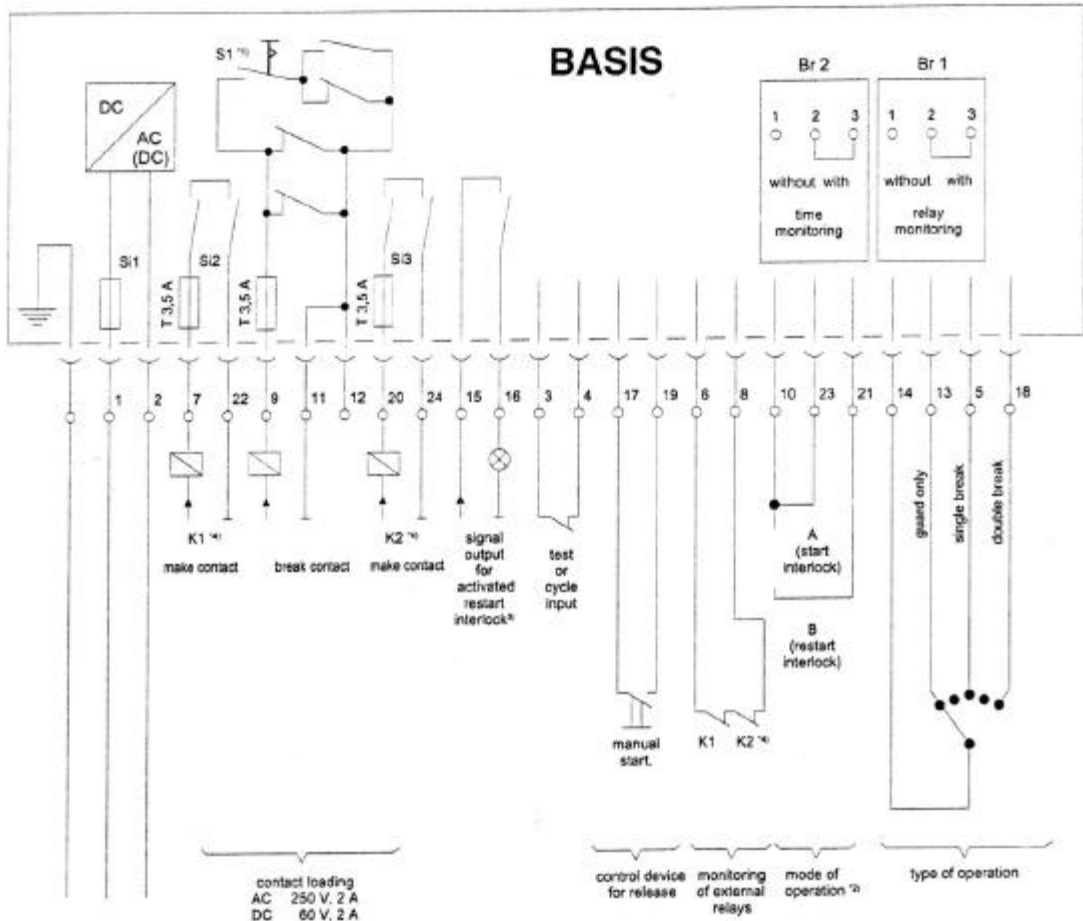
- The machine control system must be electrically controllable.
- The machine's control system and drive must in each operating phase permit an immediate and stepless interruption of the dangerous movement.
- The machine control system must be reliable. If the control system fails, there must be no further dangerous machine movement.
- After switching on the machine, changing the control mode or after shutdown due to a switching command from the ESPD, the dangerous movement may be initiated only via a control device.
- The BASIS switching output must be connected to the machine control system via at least two electromagnetic contact elements (contactors or relays). For relevant information see Chapter 7.

In addition, the equipment-specific safety rules apply.

When mounted on metal-working presses, the control system must meet the requirements of the "Safety rules for control systems on powered metal-working presses, ZH 1/457".

7. Reliable Connection to Machine Controls

- 7.1 **The User Interface of Basis** Figure 7-1 shows the assignment of the user interface of BASIS. All operating elements required can be connected directly to BASIS.



BASIS-270 PE L1 N 100 - 240 V AC $\pm 10\%$, 48 - 62 Hz, Si1 T1A

BASIS-50 PE + - 21 - 45 V DC $\pm 10\%$ or
20 - 35 V AC $\pm 10\%$, 48 - 62 Hz, Si1 T3,5A

¹⁾ S1 open if break contact is used as signal for sensing field status indication

²⁾ Bridge only allowed in connector plug

³⁾ Normally closed contact available

⁴⁾ K1 and K2: downstream relays or contactors

Type of operation selector switch (terminals 14, 13, 5, 18)

A five-stage rotary switch with non-overlapping contacts must be used as the type of operation selector switch. The free switching stages between the switch positions "Guard only" and "Single break" or "Single break" and "Double break" are intended to produce interruptions when changing the type of operation. The interruption must last at least 20 ms.

Test or cycle input (terminals 3, 4)

When operating in the type of operation "Guard only" without cyclical testing, a bridge must be connected to this input.

When operating in the types of operation "Guard only" with cyclical testing for "single break" and "double break", a machine contact designed as a break contact must be connected (see 2.2.4 "Cyclical testing" and 2.2.6 "Types of operation "Single break" and "Double break").

In operating mode A (restart interlock is part of the machine control system) and with types of operation "Single break" and "Double break", it is essential that there is a BASIS cycle erasion at the same time that the control device is actuated for release.

This ensures that the cycles stored in BASIS are erased even when a machine movement sequence is interrupted by an "intervention" (Figure 7-2).

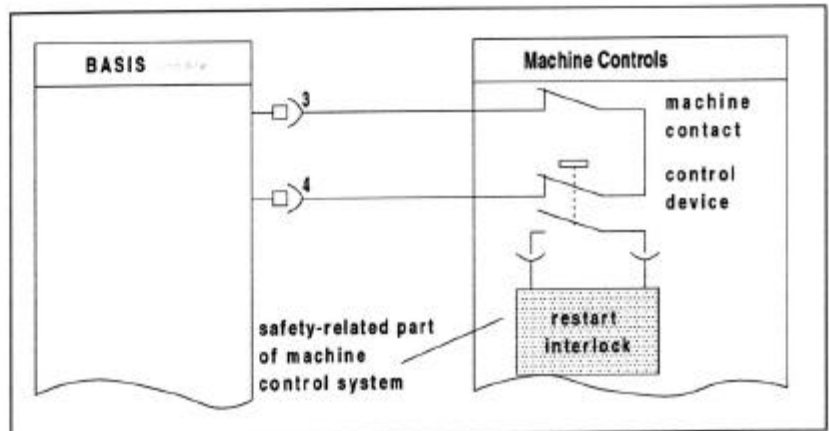


Figure 7-2 Basic circuit of test input in operating mode A and types of operation "Single break" and "Double break".

Switch S1 inside BASIS

In order to signal the sensing zone state to the non-safety-related part of the machine controls (e.g. PLC), when required, regardless of the state of the switching output, switch S1 must be opened.

Caution: To transfer the switching command "Machine Stop", both make contact outputs must be used in this case. The connection example in Figure 7-4 should be used.

Switch S1 is closed at the factory. It is located on the printed board inside BASIS . To open the switch, unscrew the three fastening screws and remove the relay module (Figure 7-3).

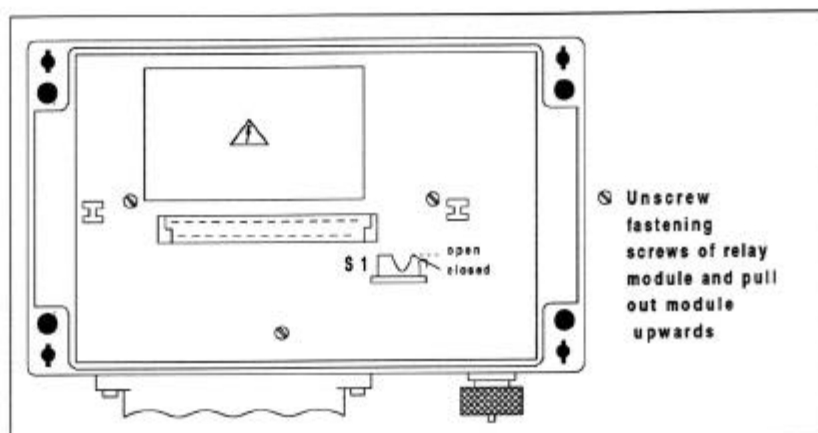


Figure 7-3 S1 switch inside BASIS

Switching output (terminals 7, 22, 9, 11, 12, 20, 24)

The BASIS switching output consists of three potential-free contacts (2 make contacts and 1 break contact). The break and make contacts are positively driven and therefore behave inversely.

Both make contacts are open for the switching command "Machine Stop" (and the break contact is closed).

7.2 Connecting between Switching Output and Machine Controls

At least two contact elements (contactors or relays) must be connected to the switching output in accordance with the connection examples in Figures 7-4 and 7-5 to ensure a reliable connection to the machine controls.

Which connection example should be used depends on the response characteristic of the contact elements used.

If contact elements are used which already pick up at half the maximum permitted operating voltage (primarily contactors and relays with DC operation), the circuit in Figure 7-5 must be used for reasons of reliability.

However, if the possibility of the contact elements already picking up at half the maximum operating voltage is ruled out (primarily contactors and relays with DC operation), the circuit in Figure 7-4 can also be used.

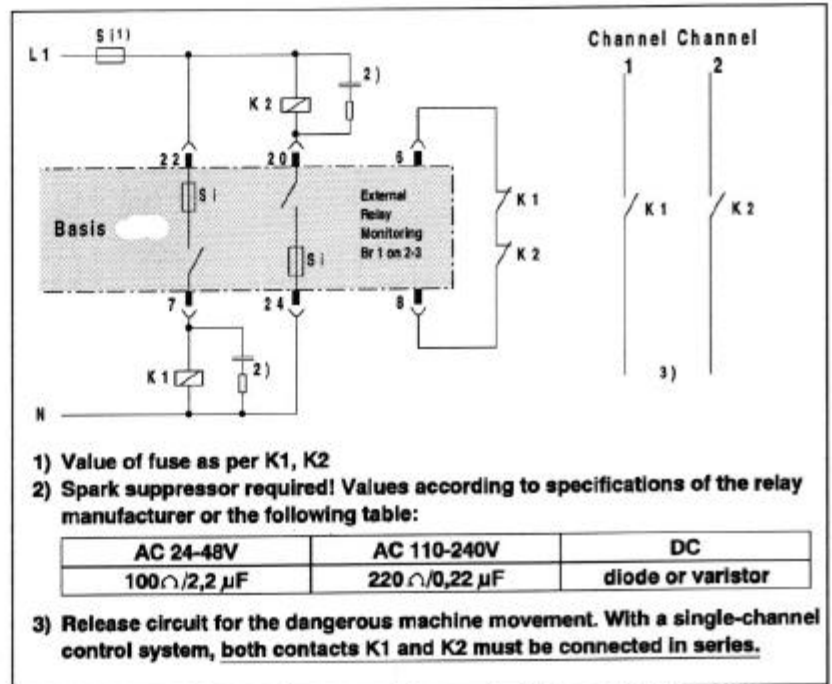


Figure 7-4 Connection example for contact elements with a relay

operate voltage of $> \frac{U_{operation-max}}{2}$

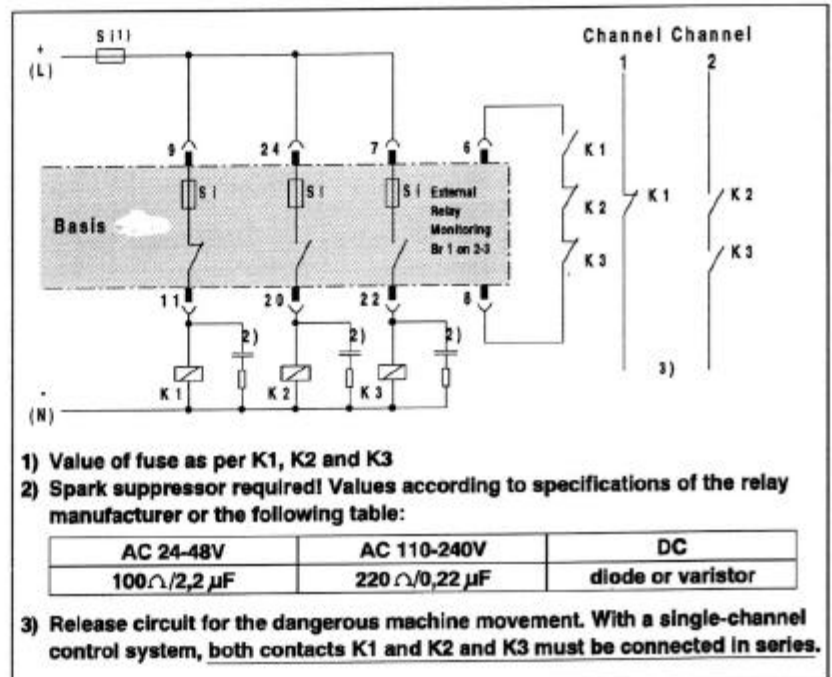


Figure 7-5 Connection example for contact elements with a relay

operate voltage of $< \frac{U_{operation-max}}{2}$

- 7.3 Assignment of User Interface for Operating Mode B**
- Power supply at terminals PE1 and 2
 - Bridge for operating mode B between terminals 10 and 21
 - Control device (pushbutton with make contact) at terminals 17 and 19.
 - For operation with extern relay monitoring system, Br1 inside BASIS- at 2-3 (Figure 2-4). Assignment of terminals 6 and 8 as per Figures 7-4 and 7-5.
 - Type of operation selector switch to terminals 14, 13, 5 and 18 (see information in Chapter 7.1 and Figure 7-1).
 - For operation with time monitoring system, Br2 at 2-3 (Figure 2-9). For operation without time monitoring system, Br2 at 1-2.
 - Connect the test or cycle input (terminals 3 and 4) for the types of operation "Single break" and "Double break":
To a break contact of the machine controls (for information see Chapters 2.2.4 and 2.2.6).
For the type of operation "Guard only" (without cyclical testing):
To a bridge between 3 and 4.
 - Switching output, terminals 7, 22, 9, 11, 12, 20 and 24, connection as per Figures 7-4 and 7-5.
 - The terminals 15, 16 and 23 remain unconnected.

7.4 Assignment of User Interface for Operating Mode A

Caution: When operating in control mode A, the restart interlock must be part of the machine's safety controls.

- Power supply at terminals PE, 1 and 2
- Bridge for operating mode A between terminals 10 and 23
- For operation with extern relay monitoring system, Br1 inside BASIS- at 2-3 (Figure 2-4). Assignment of terminals 6 and 8 as per Figures 7-4 and 7-5. For operation without extern relay monitoring system, Br1 inside BASIS- at 1-2.
- Connect type of operation selector switch to terminals 14, 13, 5 and 18 (for information see Chapter 7.1 and Figure 7-1).
- The time monitoring function is not available in A. Br2 inside BASIS- at 1-2 (Figure 2-9).
- If required, connect test or cycle input to a contact of the machine controls (for information see Chapters 2.2.4 and 2.2.6 and Chapter 7.1, Figure 7-2).
- Switching output, terminals 7, 22, 9, 11, 12, 20 and 24, connect as per connection diagram of external safety control system. In each case, connect at least two switching output contacts to the control system separately.
- The terminals 15, 16, 17, 19 and 21 remain unconnected.

8. Fitting

The BASIS control unit can be fitted anywhere suitable. Depending on the connecting cable provided (0.5 m, 1.5 m or 3 m), BASIS can be fitted either directly under or next to the receiver of the safety light curtain (REFLEX or DIALOG DR) or at another point on the machine (Figure 8-1).

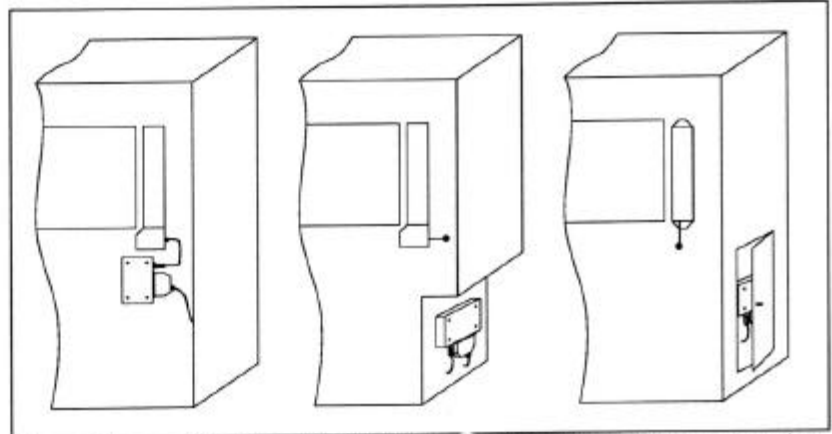


Figure 8-1 The place where BASIS is fitted can be selected on the basis of the space available on the machine.

When selecting where the unit should be fitted, good accessibility should be allowed for, so that in the event of natural wear the relay module can be replaced easily.

Figure 8-2 shows a dimension drawing of BASIS which reveals the dimensions and location of the mounting drill holes.

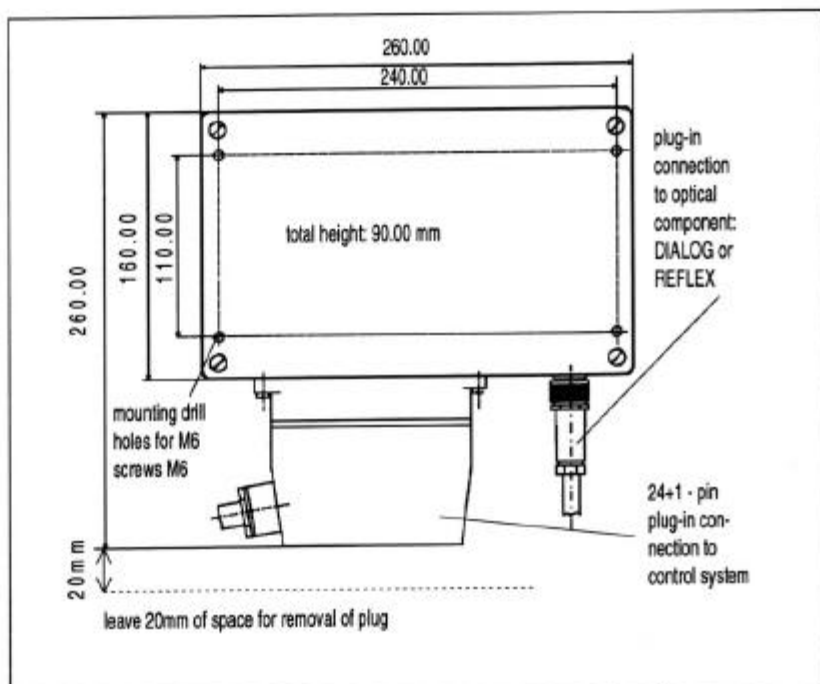


Figure 8-2 Dimension drawing of BASIS control unit

9. Electrical Connection

9.1 Connection to DIALOG and REFLEX Safety Light Curtains

A connection option is provided for each safety light curtain type (Figure 9-1). The connection of two safety light curtains at the same time is not permitted and is prevented by the design.

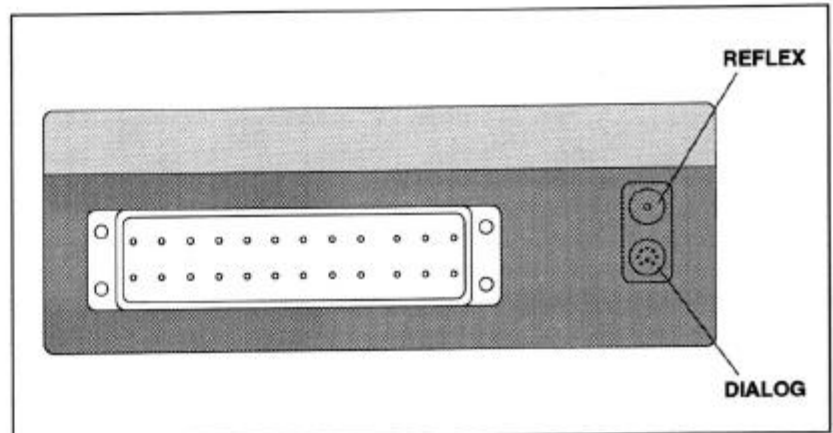


Figure 9-1 Attaching connecting lead to safety light curtain

The connections are sealed by caps. Before plugging in the connecting lead, unscrew the relevant cap.

After inserting the plug, tighten the coupling ring.

Caution: The type of enclosure is guaranteed only if the connection not used is sealed with the cap.

9.2 Connection to Machine Controls

Before connection check whether the local supply voltage corresponds with the details given on the type plate.

The connecting lead:

The PG 21 lead bushing of the connector plug permits the connection of cables with an outside diameter of (17-19 mm).

The socket insert has threaded terminal ends which are suitable for a core cross-section of 0.5 to 2.5 mm².

The connector plug:

A heavy 24-pin PE plug-in connector is provided for connecting the connecting lead to the machine control system.

Connection tips:

- Chapter 7 "Reliable connection to machine controls" contains important information about connecting the BASIS 1000 control unit in accordance with specifications and it must be complied with when making the connection.
- Remove socket insert.
- Guide connecting lead through PG gland fitting and strip the insulation.
- Crimp connector sleeves and connect in accordance with details in Chapter 7.

Caution: Protection class 1 is only guaranteed when PE is connected in accordance with specifications to the terminal marked with the relevant symbol.

- Insert socket insert, screw tight and tighten PG gland fitting.
- Plug in connecting plug and close interlock.
- Attach connecting cable to machine end in accordance with the details in Chapter 7. Connect spark suppressors in accordance with the relevant connection diagram (Figure 7-4 and 7-5) via short leads.

10. Start-Up

For start-up, comply with the Chapter "Initial operation" in the fitting and operating instructions manual of the relevant safety light curtain.

Caution: For applications with an external test request (cyclical testing) or when using the types of control "Single break" and "Double break", remove the bridge between terminals 3 and 4 of BASIS after start-up.

11. Troubleshooting and Fault Rectification

Malfunctions can often have relatively simple causes. The display elements in LUMIFLEX safety curtains are very helpful during troubleshooting.

11.1 Meaning of Display Elements

The display element (LEDs) in LUMIFLEX safety light curtains indicate not only the switching output state of BASIS 11-1 but also internal states in the safety light curtain (Figure 11-1).

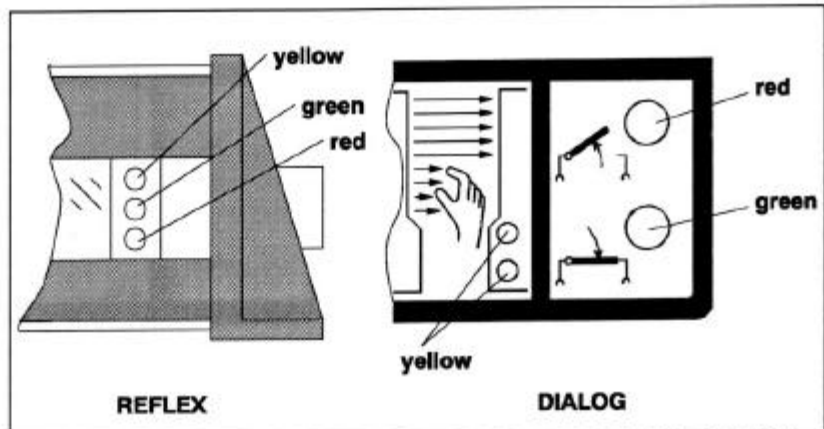


Figure 11-1 The display elements in DIALOG and REFLEX safety light curtains.

Colour	State	Meaning
red	ON	Switching command "Machine Stop" at switching output of BASIS 11-1.
green	ON	Switching command "Release" at switching output of BASIS 11-1.
yellow	ON	At one point in the sensing zone the optical path is interrupted by an object, an external test request is simulating an object in the sensing zone or the quantity of light received is too small (soiled, maladjusted).
	OFF	The safety light curtain's receiver does not detect an object in the sensing zone. The electrical signal "Sensing zone free" is transferred to BASIS 11-1.

Table 11-1

11.2 Necessary Conditions for Releasing the Switching Output

Condition	Check	
<ul style="list-style-type: none"> The main precondition for releasing the switching output is the signal "Sensing zone free" from the safety light curtain. The yellow light is not lit. 	<ul style="list-style-type: none"> The yellow LED must be out when the sensing zone is free and light during an intervention in the sensing zone. If this is the case, the reason for the control state "Machine Stop" is operator input or the BASIS control unit. If the yellow LED does not go out, this indicates either an external test request or a malfunction in the safety light curtain. To find the fault follow the advice given in the fitting and operating instructions of the relevant safety light curtain. 	
<ul style="list-style-type: none"> All the signals required for release must be present at BASIS- <p>The switching command "Release" and thus the signal change of the control state display from "RED" to "GREEN" is however only produced when the electrical signals required for release in the respective operating mode are present at the BASIS interface.</p>	Operating Mode A	Operating Mode B
	<ul style="list-style-type: none"> Cancel start interlock (manual intervention) 	<ul style="list-style-type: none"> Cancel restart interlock (actuate control device)
	<ul style="list-style-type: none"> Circuit at 6-8 closed (extern relay monitoring, the downstream contactors are in the neutral position) 	<ul style="list-style-type: none"> See A
	<ul style="list-style-type: none"> The number of sensing zone interruptions required for the control mode set not yet been reached. 	<ul style="list-style-type: none"> See A
<ul style="list-style-type: none"> Time monitoring has responded (deactivate Br2 at 1-2) 	<ul style="list-style-type: none"> Time monitoring has responded (actuate control device) 	

Table 11-2

The fitting and operating instructions for the relevant safety light curtain contain in the chapter "Troubleshooting and Fault Rectification" detailed instructions in which the symptoms (LED states), possible causes, checks and remedies are clarified.

12. Checks

The BASIS control unit is part of the electro-sensitive protective device as is the connected safety light curtain.

Protective devices are effective only when used correctly and when they are not damaged or manipulated improperly.

Regular checks increase the operating safety and reliability of the protective device.

12.1 Check before Initial Operation

Caution: The BASIS control unit fulfils its protective function only when installed in accordance with these connecting and fitting instructions. Before the safeguarded machine is started up for the first time, check for correct interaction with the machine control system.

For this reason, we recommend (not only as required for metal-working presses in ZH 1/281) that the equipment be inspected before initial operation by an expert from LUMIFLEX.

For the daily inspection and annual check, comply with the information in the chapter "Checks" of the fitting and operating instructions for the connected safety light curtain.

12.2 Annual Check

During the annual check, perfect functioning, the state of the components and the interaction between the safety light curtain with control unit and the machine control system are checked.

The results of the check are confirmed in a report and on a test certificate.

This check must be carried out by an expert from LUMIFLEX or by an employee of the machine operator who has been trained by LUMIFLEX.

For this purpose, LUMIFLEX offers a maintenance contract and training on LUMIFLEX's or the customer's premises.

13. Maintenance

13.1 Replacing the Fuses for the Mains and Switching Outputs

The following tools are required:

- 1 screw driver with flat blade approx. 8 mm wide
- 1 screw driver with flat blade approx. 5 to 6 mm

Caution: Before opening casing, disconnect equipment from mains.

1. Unscrew four cover interlocks. To do so, insert the large screw driver into the groove of the interlock, press downwards firmly and unscrew the interlock with a 90° anti-clockwise turn.
2. Remove cover.
3. Insert the smaller screw driver into the groove of the safety cap. press downwards and unscrew interlock with a 90° anti-clockwise turn (Figure 13-1).

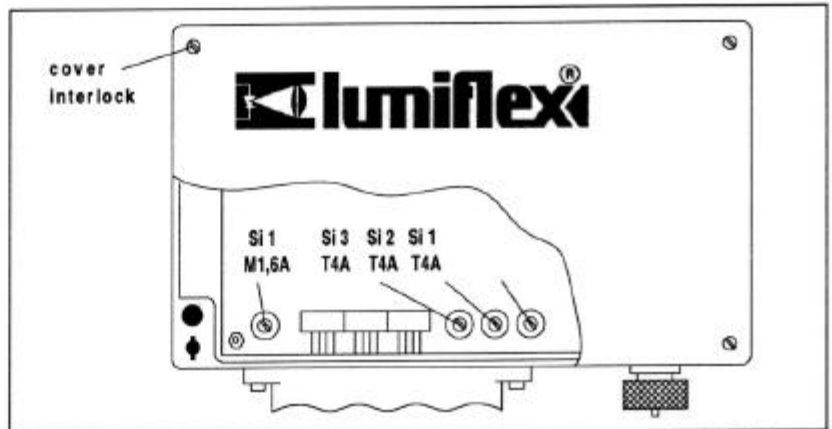


Figure 13-1 The fuses for the mains and switching output in BASIS

4. Remove faulty fuse from cover and insert new fuse applying slight pressure.

13.2 Replacing the Relay Module

The following tools are required:

- 1 screw driver with flat blade approx. 8 mm wide
- 1 screw driver with flat blade approx. 3 to 4 mm wide

Caution: Before opening casing, disconnect equipment from mains.

1. Open casing (see 13.1)
2. Unscrew the three fastening screws of the relay module (Figure 13-2).

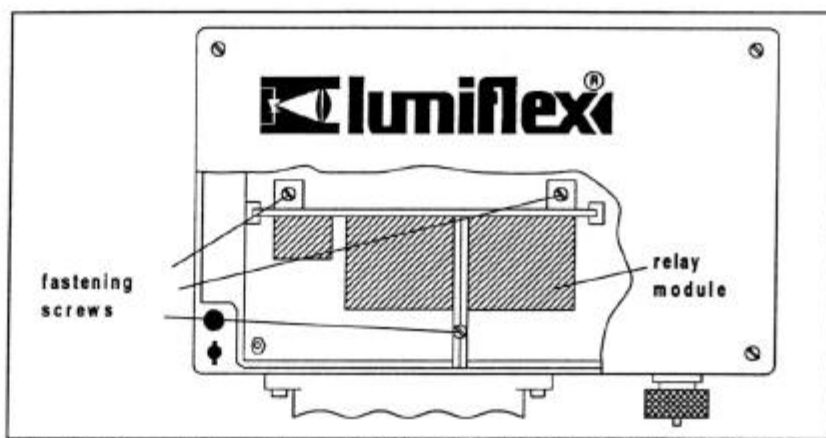


Figure 13-2 To remove the relay module, unscrew the three fastening screws.

3. Take hold of relay module with both hands and pull out upwards.

14. Servicing

Our technical after-sales service offers the following services:

- Checking and inspection of unit before initial operation
- Maintenance contract for annual maintenance in Germany
- Maintenance contract for annual maintenance outside Germany
- After-sales service in Germany
- After-sales service outside Germany
- Training either on LUMIFLEX's or the customer's premises
- Fast delivery of spare parts and quick repairs

15. Appendix

15.1 Technical Data

Design, Type	BASIS
Classification	ESPD internal self checking
Operating mode	Either "Start interlock" or "Start interlock and Restart interlock"
Available functions	Either "Guard only", "Single break" and "Double break" operation, or "extern relay monitoring" or "30 s time monitoring"
Connectable LUMIFLEX safety light curtains	DIALOG (all types) or REFLEX (all types)
Response time	See technical data of connected safety light curtain
Supply voltage	BASIS-270: 100-240 V AC +/- 10 % BASIS-50: 21-45 V DC +/- 10 %, 20-35 % AC +/- 10 %
Mains buffering at rpm	10 ms
Frequency	48 ... 62 Hz
Max. power input	41 VA
Fuse	BASIS-270: Miniature fuse T 1 A BASIS-50: Miniature fuse T 3.5 A
Class of protection	1
Connector plug	24-pin + PE as per DIN Type Contact
Cable bushing	PG 21 (Cable diameter 17 to 19 mm)
Type of connection	Screw terminal 0.5...2.5 mm ²
Switching output	2 potential-free make contacts, 1 potential-free break contact, each positively driven
Fuses	Fuse T 3.5 A per contact circuit
Max. voltage switched	60 V DC, 250 V AC
Max. current switched	2 A
Min. current switched	20 mA
Spark suppressor needed	yes
Control inputs	Test/ cycle input, control device, extern relay monitoring, type of operation, selector switch, operating modes (A/B)
Control voltage at open input	24 V DC
Min. opening period of contact at test/ cycle input	50 ms

Table 15-1 (page 1 of 2)

Test duration (from opening of contact)	max. 200 ms
Response time of downstream contractors	max. 100 ms
Min. opening time of type of operation selector switch during changeover	20 ms
Min. duration of manual intervention in sensing zone during cyclical operation	100 ms
Type of enclosure	IP 65
Weight	4 kg
Colour	yellow RAL 1021 und antracite RAL 7016
Ambient operating temperature	0 ... 50 Grad C
Storage temperature	-25 ... +70 Grad C*
Interference immunity	Interference suppressed as per VDE 843, IEC 801 Intensity IV

Table 15-1 (page 2 of 2)

There are no volatile materials with a silicon-contact in the equipment.

15.2 Dimension Drawing of BASIS Control Unit

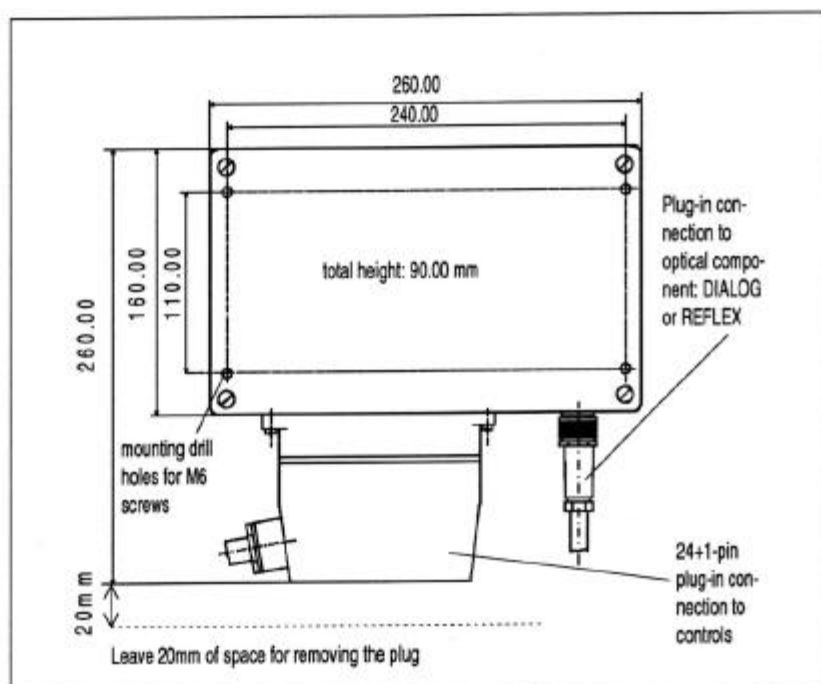


Figure 15-1 Dimension drawing of BASIS Control Unit

15.3 Accessories

15.3.1 Connector Plug

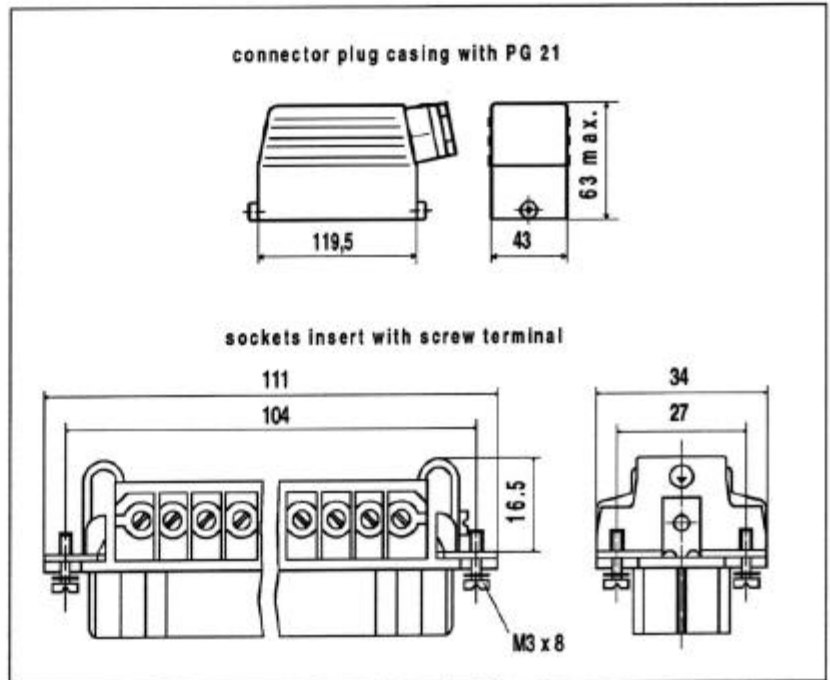


Figure 15-2 Connector plug with socket insert

Designation	Order No.
Connector plug casing with PG 21	150530
Socket insert with screw terminal	150510

Table 15-2

15.3.2 Connecting Cable to DIALOG or REFLEX Safety Light Curtains

To avoid any mix-up, the connection cables have differing plug-in connections.

A connecting cable is included in the scope of supply of the safety light curtain. The cable length must be stated when the order is placed.

DIALOG Connecting Cable (8-pin connector)

Length	Order No.
0,5 m	529061
1,5 m	529065
3 m	529063

Table 15-3**REFLEX Connecting Cable (6-pin connector)**

Length	Order No.
0,5 m	528161
1,5 m	528165
3 m	528163

Table 15-4

15.4 Spare Parts

Designation	Order No.
Relay module	505800
Replacement fuses (1 x M1,6 A, 3 x T4 A)	409020

Table 15-5

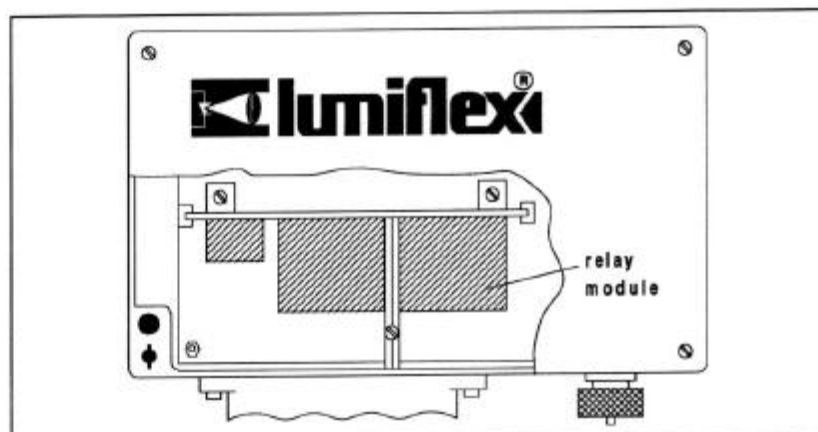


Figure 15-3 Relay module order no. 505800

EC Declaration of Conformity

according to EC Machinery Directive 89/392/EEC, Annex II C

We herewith declare,

LUMIFLEX ELEKTRONIK GmbH & Co KG
Ehrenbreitsteiner Straße 44
80993 München

that the following described safety components in our delivered version complies with the appropriate basic safety and health requirements of the EC Machinery Directive 89/392/EEC based on its design and type, as brought into circulation by us. In case of alteration of the safety components, not agreed upon by us, this declaration will lose its validity.

Description of the Safety Component: Safety Light Curtain

Safety Component Type: **DIALOG with control unit BASIS-270/BASIS-50**

Serial Number: see type plate

Safety Function: Electro Sensitive Protective Device

Applicable

EC Directives:

EC Machinery Directive (89/392/EEC)
EC Low Voltage Directive (73/23/EEC)
EC Directive of Electromagnetic Compability (89/336/EEC)

Applicable

Harmonized Standards

especially:

EN 292-1, EN 292-2, EN 60204-1

Applicable National Standards
and other Technical Specifications,
especially:

prEN 50100-1, prEN 50100-2, prEN 999
DIN V VDE 0801

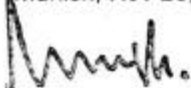
Notified Body according to
annex VII

SAQ Inspection Ltd
Notified body No 409
Inspection North - Machine Technology
Täby, Sweden

Responsible for:

- keeping documents according to annex VI, or
- checking for correct application of the appropriate harmonized standards and confirming the proper documents according to annex VI, or
- **EC type-examination (EC type-examination certificate no. M511-95)**

Munich, Nov 28, 1995



Greißl
Managing Director

Archives

.....
Safety Component-No.