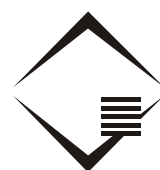
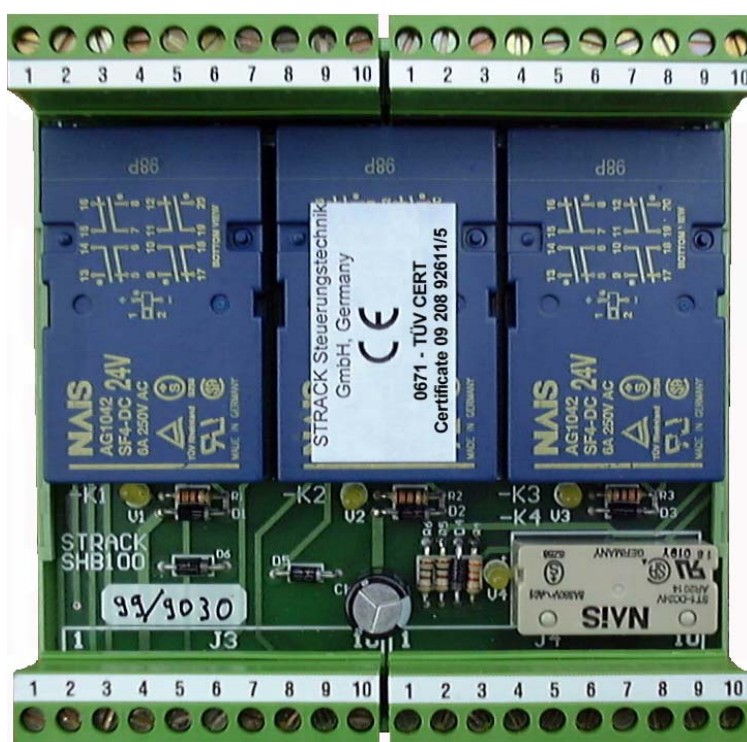


Safety circuit

SHB 100

Operating instruction

Status: August 19, 1999



STRACK
LIFT AUTOMATION

Important notice:

The data and information in this documentation have been made up with the utmost care. Although everything was done to keep the information included in this volume up-to-date and correct at the date of publishing, we cannot guarantee that it is absolutely free of faults.

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I SAFETY INSTRUCTIONS

1. REMARKS ON THIS DOCUMENTATION

This documentation includes some instructions that are to be strictly followed in order to protect life or health. The awareness of the safety instructions included in this documentation and their observance in technical practice, as well as the accidental regulations applicable for the place of installation of the lift are a prerequisite for safe installation and putting into operation. The documentation does not contain each and any detail regarding any possible type of lift, nor could be considered any possible and imaginable case of installation, operation, repair, maintenance or putting into operation.



This warning label indicates hazardous situations. There is the risk of an accident resulting in bodily injury or material damage in the case that the respective precautions are not taken.



By this instruction label information is marked that – according to the author's opinion – need special attention.

2. PRODUCT LIABILITY AND WARRANTY

STRACK LIFT AUTOMATION GmbH reserves the right, to rework this product from time to time without prior notice and to make any changes on the product that will support the technical progress. Otherwise, the General Terms of Business and Delivery of STRACK LIFT AUTOMATION GmbH shall apply.

3. INTENDED USAGE

The safety circuit SHB100 is exclusively intended for the monitoring of the door unlocking zone in case of lift controls being in accordance with lift directive 95/16/EG, the TRA200, TRA1300, EN81-1/2 or other standards specified in the respective order contract. The contract (order forms, acknowledgement of order, electrical diagrams etc.) is an essential constituent for the definition of the intended usage.

All chapters of this operating instruction contain important information regarding the intended usage of the product. These chapters apply exclusively to technically qualified personnel that has been specially trained and educated for installation, putting into service, maintenance and repair of lifts being erected in accordance with the relevant lift standards. The described product may be installed, put into service, maintained and repaired by this category of personnel only. Attention is to be paid that all activities are carried out in observance of the respective legal regulations for work safety. For installation observe your national directives for installation and maintenance of lifts (e.g. ZH1/312 for the Federal Republic of Germany).

Putting into operation should be performed by a technician or fitter that has been trained on the product described in this instruction.

4. EMC CIRCUITING AND INSTALLATION INSTRUCTION



To be able to adhere to the relevant protective requirements in the meaning of the "Law on Electro-Magnetic Compatibility of Devices", the following proposals for circuiting and installation should be observed:

1. Connect the control as described in the respective circuit diagrams supplied along with the control. In that cases where RC-, Varistor- or Semiconductor elements (e.g. freewheeling diodes) are shown in the diagram, these must in fact be installed.

2. In order to minimize inductive voltages caused by parallel lines, cables should be assigned in such a way that for different voltage ranges separate cables are used. For example, feeder line for door motor (400V3P50Hz) in cable 1 and door limit switch, photocell output and zone switch (24VDC) in cable 2.
3. Item 2 to be observed especially in connection with travelling cables.
4. Observe the installation instructions of the manufacturer of magnet switches etc.
5. In case of subsequent modifications of the lift, the above mentioned measures are to be observed also for newly added components.

5. STORAGE / INSTALLATION AND WIRING INSTRUCTIONS

1. Store the safety circuit device only within a temperature range of -25°C to $+65^{\circ}\text{C}$, under normal further storage conditions for electrical devices.
2. Check the condition of the electronic card upon taking from the store. It shall not show severe soiling or similar affects.
3. The 24VDC – control circuits are to be separated from the feeder line of the lift by means of a transformer, secondary to be single-side connected to operational earth, and to be provided with a suitable fuse.
4. The SHB100-element must be installed in a fully enclosed cabinet with protection class of at least IP33. If the control is located in an unusually dusty, damp or similarly critical ambience, a higher protection class may be required.
5. Magnets for magnet switches possibly supplied along with the device shall not - as a matter of precaution - be brought near cardiac pacemakers or similar medical equipment (distance $< 30\text{ cm}$), as these may be affected in their functioning.
6. The magnets must remain in place, that means for example, permanent fixing by a suitable glue, by bolts or by clamps. It is not enough to fix them only by their own magnetic force to - for example - the guide rail. They may change their position or fall off in case of a safety gear catching test, thus creating a hazardous situation.
7. Prior to the first putting into operation, all magnets must be positioned at their correct place. If e.g. some magnets are left out, a hazardous situation may occur owing to undue bridging of doors.
8. Magnet switches may activate one another, or one magnet probably may operate two independent switches at the same time (magnetic stray field). Ensure that both encoders (magnet switches) of channels 1 and 2 cannot influence each other. Observe the instructions of the switch manufacturer. Magnet switches supplied by STRACK are correct in any case and it is strongly recommend using them.
9. Ensure that neither firmly installed nor loose parts may come too close to the upper side of the PCB (distance $> 4\text{mm}$ must be observed).
10. Work cautiously. Parts like magnets, bolts and handtools falling down the shaft may cause serious injuries.
11. Never try to treat a magnet mechanically (hammering, sawing, filing, drilling ...). The material is very brittle. Splinters may cause serious injuries.
12. Fix the magnets only with screws of unmagnetic material, like brass. Screws of magnetic material like zinc coated iron will weaken the magnetic field seriously. The functions will be affected.



6. INSTRUCTIONS ON OPERATIONAL RELIABILITY

1. In order to ensure fault-free operation of the lift, the instructions included in the documentation supplied along with the lift (circuit and connecting diagrams, manuals of external components, this manual, etc.) are to be strictly observed.
2. The correct functioning of the safety circuit in connection with the control unit must be ensured by an examination of the completed lift control and of the completely installed lift as well. Respective instructions see chapter "7. Working Instruction for the functional Test"
3. Free-wheeling diodes on component SHB100 that have become ineffective owing to - for example - overvoltage or a general failure of components, may under certain circumstances disturb other electronic devices of the lift control, depending on the control-setup. Operational malfunctions may possibly occur as a result.
4. After tripping of a protective element of the 24V-current supply or of upstream circuits - in case that a lightning stroke has been suspected as the cause - the correct functioning of the safety circuit in connection with the master control must be ensured. Respective instructions see chapter "7. Working Instruction for the functional Test"



7. INSTRUCTIONS ON MAINTENANCE AND PERIODICAL EXAMINATIONS

The correct functioning of the safety circuit in connection with the master control must at least be checked within the scope of the periodical examinations of the lift. Respective instructions see chapter "7. Working Instruction for the functional Test". We recommend however, to carry out this check also in the course of a control software exchange or on maintenance.

II TECHNICAL DESCRIPTION

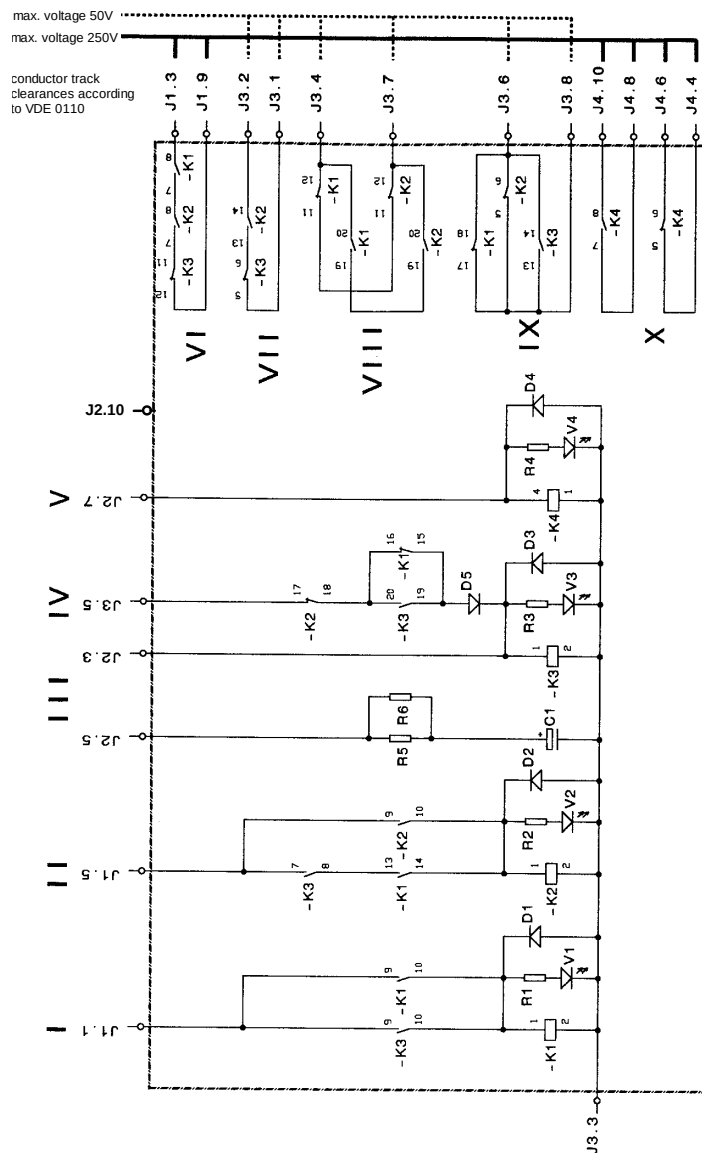
1. GENERAL DESCRIPTION

The safety circuit SHB100 is for the monitoring of the door unlocking zone. It evaluates two independent signals (channel 1 and channel 2) for uniform switching. The two signals may be generated by e.g. magnet switches or initiators. As soon as both channels are activated, and the circuit does not show a fault internally, an output will be activated by which safety devices (e.g. door contacts) may be bridged. The other outputs of the circuit SHB100 are for the identification of erratic behaviour and for connection to the master control.

Mechanical set-up

The component is built-in in a semi-shell housing of polyamide 6.6 and it can be snapped on to all common mounting rails. All connections are plugged and are suitable for the connection of conductors up to 2,5 mm².

2. DESCRIPTION OF THE INPUTS/OUTPUTS



The circuit is laid out for 24VDC. 0V(24) will be connected to terminal J3.3. The external signal generators connect +24V to those inputs that are indicated in the circuit diagram as I, II, III and V. The output circuits are working potential-free (in the diagram indicated as VI to X).

I

The first channel to be connected to terminal J1.1.

II

The second channel to be connected to terminal J1.5.

III

Terminal J2.3 is provided for time-delayed dropping of relay K3 (e.g. with a capacitance against mass). This input however - by which already on the PCB a capacitor with series resistor will be connected to - is normally bridged by terminal J2.5.

IV

Terminal J3.5 is the "preparatory input". Upon approaching the destination landing and during relevelling process, voltage must be available here. Only when voltage is available here, the element will be able to operate the output circuits VI, VII and IX when channels 1 and 2 are activated.

V

Via terminal J2.7 relay -K4 can be operated. The relay can be used for various purposes e.g. for the monitoring of the max. approaching ($v < 0,5$ m/s) or relevelling speed ($v < 0,3$ m/s).

VI

Output circuit between terminals J1.3 and J1.9. Via this output door contacts of the lift can be bridged.

VII

Output circuit between terminals J3.1 and J3.2. This one is used for the purpose of information for the master control. The contact will be closed when output circuit VI has connected through.

VIII

Output circuit between terminals J3.4 and J3.7. This output is for shutting down the lift in case of irregular switching conditions of channels 1 and 2 (prevention of the next start of lift).

IX

Output circuit between terminals J3.6 and J3.8. This output is switching inverted to output circuit VI and can be used for a - e.g. - malfunction indicator.

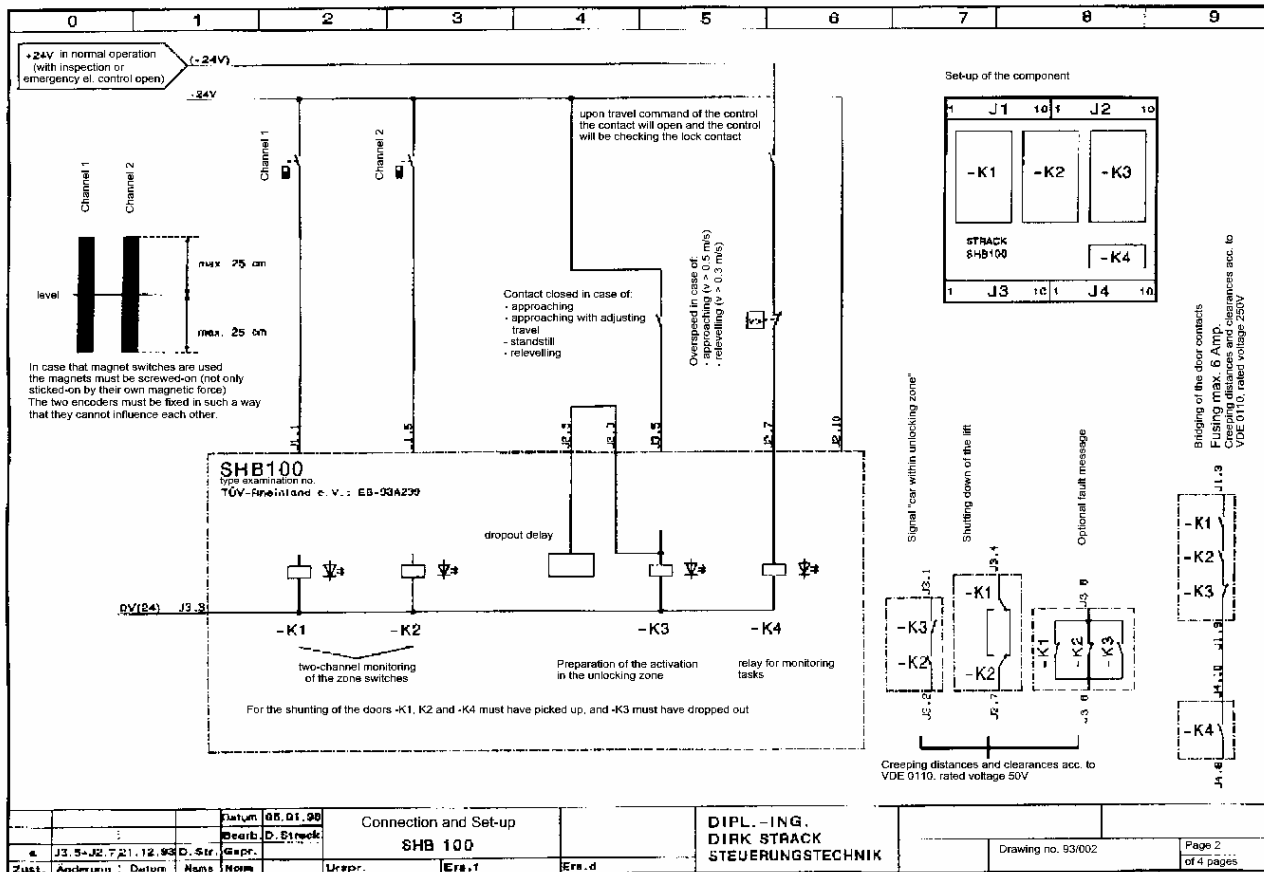
X

Potential-free make-contact of relay -K4 between terminals J4.8 and J4.10, potential-free break-contact between terminals J4.4 and J4.6. The outputs can be freely assigned. In combination with output circuit VI, the contacts of -K4 can also be connected into the protective circuit of the lift.

ADDITIONALLY

For the purpose of testing +24V shall be connected to J2.10.

3. CONNECTION DIAGRAM



4. MODE OF FUNCTIONING

4.1. Fault-free operation

When the preparatory input IV has got a signal and channels 1 and 2 do not generate a signal, relay -K3 will be energized. As a result, relay -K1 can pick-up upon switching of channel 1 and relay -K2 upon switching of channel 2. Relay -K1 goes to self-holding status via contact -K1-9/10 and also closes its contact 13/14 in current path II, so that relay -K2 also can pick-up. Relay -K2 goes also in self-holding status. Via make-contact 17/18 of -K2 is -K3 getting de-excited. Now the output circuits VI and VII are closed and IX is open. Resetting of the circuit is effected by disconnection of channel 1 and channel 2.

4.2. Maloperation of a channel

If channel 1 will be connecting but channel 2 will not, -K2 cannot get energized. Outputs VI and VII are not connecting through, IX is connecting through (IX can be used by the master control for fault identification). In this case, output VIII is disconnected in order to prevent starting of the lift.

If channel 1 releases, but channel 2 does not, then -K2 remains attracted while -K1 drops out. Output VI is disconnecting and IX is connecting through (IX can be used by the master control for fault identification). In this case output VIII is disconnected in order to prevent starting of the lift. Nevertheless, in this state of operation output VII remains closed, i.e. this output may be used for signalling only, not as a safety output.

If channel 2 is connecting but channel 1 is not, then -K1 can not pick up. The outputs VI and VII do not connect through, IX will be connected through (IX can be used by the master control for fault identification). In this case output VIII is disconnected in order to prevent starting of the lift.

If channel 2 releases, but channel 1 does not, then -K1 remains attracted while -K2 drops out. The outputs VI and VII are disconnecting and IX will be connecting through (IX can be used for fault identification by the master control). In this case output VIII is disconnected in order to prevent starting of the lift.

5. RELAY - STATUSES

Relays -K1 to -K3				Operational status of lift	Safety output J1.3 - J1.9 connected
Nr.	-K1	-K2	-K3		
1	0	0	0	out of unlocking zone, on fast travel	no
2	0	0	1	decelerating (or tries erroneously to relevel) although not being within door unlocking zone	no
3	0	1	0	fault	no
4	0	1	1	fault	no
5	1	0	0	fault	no
6	1	0	1	fault	no
7	1	1	0	within door unlocking zone	yes
8	1	1	1	fault	no

6. TECHNICAL DATA

	Unit	
Operational voltage	V DC	24 ±10%
Current consumption, total	mA	max. 122
Current consumption, individual input	mA	34
Fusing of the protective circuit of the lift	A	6
admissible operational load on outputs	W / VA	150 / 1000 (ohmic)
Protection class of relays	IP	67
Creeping distance and clearance		VDE 0110, operat. voltage 50 V
Creeping distance and clearance of the outputs for connection to the protective circuit of the lift		VDE 0110, operat. voltage 250 V
Ambient temperature	°C	-25 to +65

7. WORKING INSTRUCTION FOR THE FUNCTIONAL TEST

Checking of channel 1

1. lift standing level on landing, channel 1 and 2 are closed
2. put bridge between terminals J1.1 and J2.10 (fault simulation of the switch on channel 1)
3. send lift to next landing
4. on approach to the landing and in standstill position of the lift, element SHB100 shall not bridge the protective circuit
5. the control will be signalling fault „F06-SHB“ (depending on control). Next travel remains locked.
6. remove bridge
7. acknowledge fault message by switching the control off/on
8. the next travel will be normal

Checking of channel 2

1. lift standing level on landing, channel 1 and 2 are closed
2. put bridge between terminals J1.5 and J2.10 (fault simulation of the switch on channel 2)
3. send lift to next landing
4. on approach to the landing and in standstill position of the lift, element SHB100 shall not bridge the protective circuit
5. the control will be signalling fault „F06-SHB“ (depending on control). Next travel remains locked.
6. remove bridge
7. acknowledge fault message by switching the control off/on
8. the next travel will be normal

8. EC-DECLARATION OF CONFORMITY

We herewith declare that - owing to concept and design, in the version placed on the market by us, in observance of the relevant protective requirements stated in the operation instructions supplied - the product described as follows complies

with the directives as stated below. The product corresponding with this declaration has been provided with the CE Conformity Marking. In case of a modification of the product not being approved by us, this declaration will cease to be valid.

Type designation:	SHB 100
Year of manufacture:	starting from 1995
Brief description:	Safety circuit for the monitoring of the door unlocking zone in case of lift controls in the meaning of lift directive 95/16/EC, of TRA200, TRA1300, EN81-1/2 or other standards stated in the respective contract
Underlying directives:	Lift directive 95/16/EC EMC-directive 89/336/EEC
Standards applied:	EN 81-1; EN 81-2; DIN EN 1050
Further standards applied:	TRA101; TRA200; TRA300; TRA1300
Draft standards applied:	prEN 12015; prEN 12016
Name of the notified body of the EC, that carried out the type-examination and production checks of the model acc.to. directive 95/16/EC Article 8 (1) (a) (i) and (ii):	TÜV CERT-Body of certification for lifts and safety components of the TÜV Anlagentechnik GmbH 51105 Köln (Identification no. 0671)
No. of the EC type-examination certificate	09 208 92611/5



This declaration will be submitted - on behalf of the manufacturer
STRACK LIFT AUTOMATION GmbH
on
January 1, 1999
by
Dipl.-Ing. Dirk Strack, Managing Director

Note:

The Strack-products specified above are exclusively destined for the installation into lifts resp. for the assembly with other lift components. Putting into service resp. placing on the market within the European Community is admissible only, if the final product also is in conformity with the respective directives of the EC.

III EXAMINATION CERTIFICATES



EG-Baumusterprüfbescheinigung

nach Anhang V (A) der Richtlinie 95/16/EG

Zertifikat-Nr. 09 208 92611/5

Die TÜV CERT-Zertifizierungsstelle für Aufzüge und Sicherheitsbauteile
der TÜV Anlagentechnik GmbH,
benannte Stelle der Europäischen Gemeinschaft, Kenn-Nr. 0671,
bescheinigt dem Unternehmen

Strack Steuerungstechnik GmbH

Lieversfeld 8

D-42551 Velbert

die Übereinstimmung des Sicherheitsbauteiles

Sicherheitsschaltung mit elektronischen Bauelementen

Typ: SHB 100

Verwendung: Sicherheitsschaltung zum Einfahren und Nachstellen bei
offenen Türen gem.:

- EN 81-1/2:1998, Nr. 14.2.1.2
- Betriebsanleitung „Sicherheitsschaltung SHB 100“ -
Stand: 19.08.1999

mit den Anforderungen der Richtlinie 95/16/EG.

Der Nachweis wurde durch eine EG-Baumusterprüfung

Bericht-Nr. 945/EZ 124/99

erbracht.

Köln, den 19.08.1999



TÜV Rheinland /
Berlin-Brandenburg




TÜV CERT-Zertifizierungsstelle
für Aufzüge und
Sicherheitsbauteile

Translation**EC Type-Examination Certificate**

as per annex V (A) of directive 95/16/EC

Certificate No. 09 208 92611/5

The TÜV CERT-Body of certification for lifts and safety components
of the TÜV Anlagentechnik GmbH,
notified body of the European Community, Identification No. 0671,
certifies to

Strack Steuerungstechnik GmbH

Lieversfeld 8

D-42551 Velbert

the compliance of the safety component

Safety circuit with electronic elements

Type: **SHB 100**

Purpose: **Safety circuit for approaching and for releveling with
open doors as per:**

- **EN 81-1/2:1998, No. 14.2.1.2**
- **Operation instruction "Safety circuit SHB 100" –
Status: August 8, 1999**

with the requirements of directive 95/16/EC.

Evidence has been provided by an EC type-examination

Report No. 945/EZ 124/99

Cologne, August 19, 1999

TÜV CERT-certifying body
for lifts and safety components