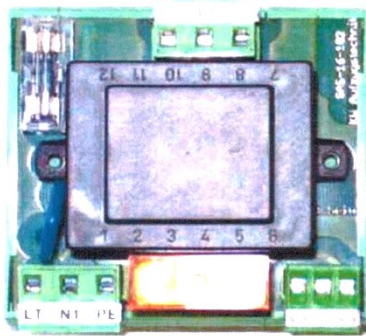


OPERATING INSTRUCTIONS

Safe Exit Lock SAS16-102



For use without contactors at GOLIATH-90
Frequency Inverter

EN81-20/50
Konform

KW Aufzugstechnik GmbH Safe Exit Lock SAS16-102 Version V1.11 E – 04.01.2026

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1.0 System description

1.1 Product liability and guarantee

All work on this protection circuit may be made only by qualified technical personnel (Electrical specialist or electrotechnically instructed person). Please consider the safety references in this guidance.

This manual is for elevator technicians, which installs and commissions the control as well as at controller constructor, which inserts the controller into the switchgear and makes necessary wiring.

We guarantee for the accuracy of the product in the sense of the product informations published by us and this manual. It does not become warranty, legal responsibility, still any adhesion for economy or error free function for another purpose, than in chapter 1.2 defined granted.

Terms of guarantee

On the function of the equipment in accordance with this manual a warranty is granted by 24 months. A condition for the free repair are the proven attention of the manual with storage, transport, installation, start-up and enterprise. The general trading conditions of the company KW Aufzugstechnik GmbH are valid.

1.2 Intended use

The protection circuit SAS16-102 is intended for the employment in lifts. Other application type are be coordinated with the company KW Aufzugstechnik GmbH. The following legal agreements are to be considered with the installation and enterprise:

- **Low-voltage guideline 73/23/EG**
- **DIN EN 81-1: 1998+A3:2009**
- **DIN EN 81-2: 1998+A3:2009**
- **DIN EN 81-20: 2020**
- **DIN EN 81-50: 2020**
- **Lift guideline 2014/33/EU**

1.3 Safety references

The manual of the protection circuit SAS16-102 must be freely accessible for the service personnel. It must be ensured that the operating personnel read the manual and in the handling of the safety assembly group is familiar.

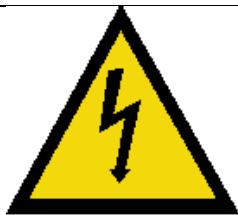
A condition is the intended enterprise of the protection circuit SIS16-101 according to chapter 1.2.

In the case of ignoring this regulation the danger exists of heavy damages to property and person. All work on the protection circuit SAS16-102 may be accomplished only by qualified technical personnel. The following safety regulations are to be considered:

DIN VDE0100, DIN VDE0110, IEC-364, IEC-664 and VBG 4.

Qualified technical personnel in the sence of this operating instructions are persons with

- Assembly
 - Start up
 - Maintenance
 - Attention of the national rules for the prevention of accidents
- are trusts and can show appropriate vocational qualifications.



Never work under mains voltage – Danger of life!

Before you begin work on the protection circuit SIS16-101, **interrupt voltage supply** by main switches and the appropriate safety devices and secure you against **erroneous restarting!**

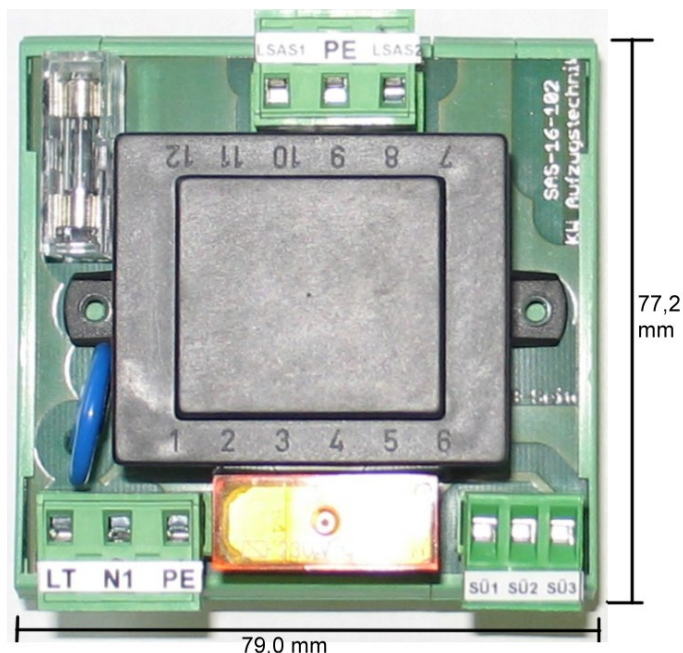
Survey the supply lines for **tension free!**

Neighbouring clamps and components, which could be energized must be covered!

✖

1.4 Technical data and measures

The component assembly SAS16-102 is equipped with transformer and belt relay.
 Insertion Terminals are located at top and bottom of the component assembly.
 SAS16-102 is preparatory for the DIN rail assembly.



Relay elements:	K6 = report relay
Dimensions (with basin):	(L x B x H) 79,0 mm x 77,2 mm x 60,0 mm
Weight:	Approx . 700 Gram
Voltage Supply:	Terminals LT - 250V AC / 4A Terminals N1 - 0V AC monitoring neutral wire Terminals PE - Ground Terminals LSAS1 - 400V AC / 0,2A Terminals LSAS2 - 400V AC / 0,2A Terminals PE - Ground Terminals SÜ1 - +24V DC / 50mA Terminals SÜ2 - +24V DC / 50mA Terminals SÜ3 - +24V DC / 50mA
Switching Cycles:	Ca. 1.000.000 Switching cycles
Protective Class	IP 43
Ambient Temperature:	0°C to +65 °C

1.5 Function description

With help of SAS function (safe exit lock) for frequency inverter GOLIATH90 can be abandon drive contactors, which are needed for interruption the energy flow between frequency inverter and motor.

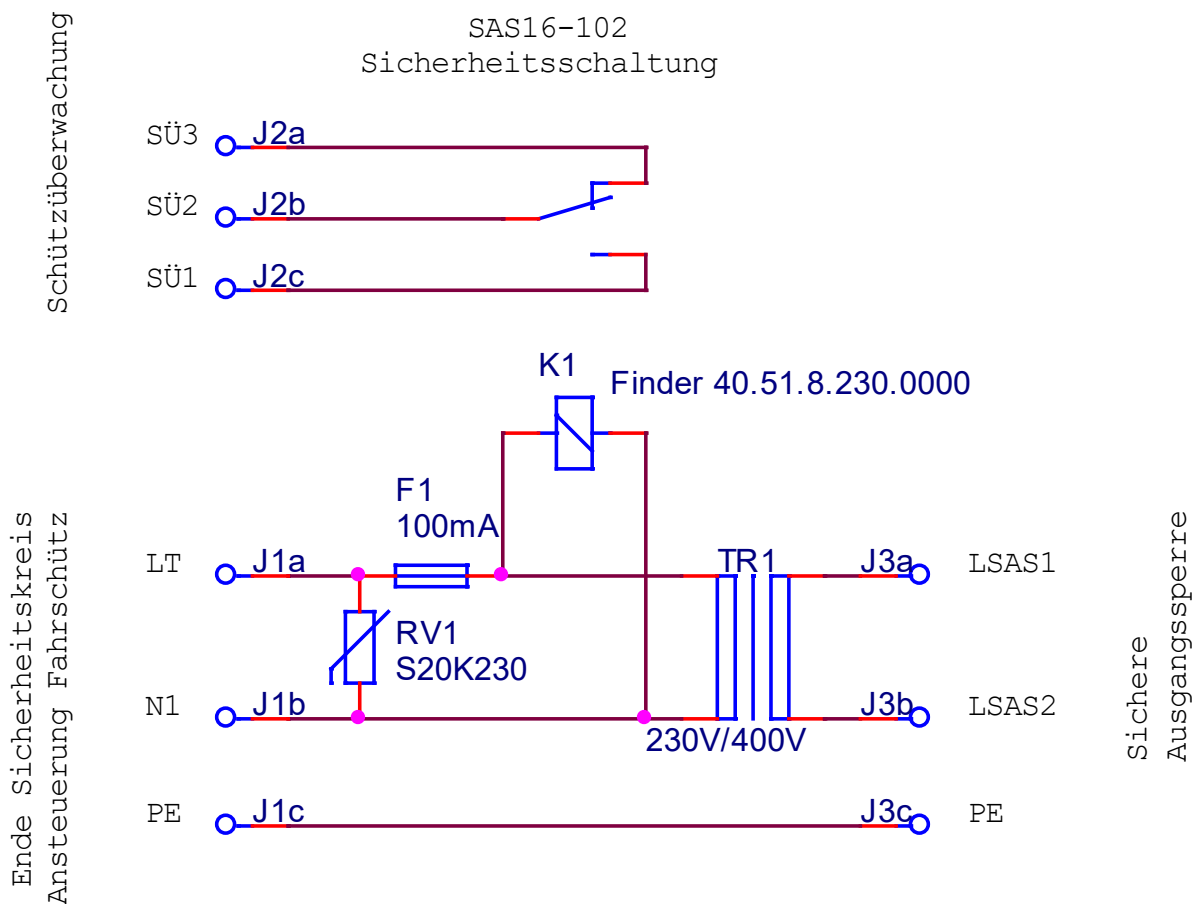
The protection circuit SAS16-102 replaces the driving contactor at the end of the safety circuit. If the safety circuit is opened, there are no apply voltage at primary coil of the transformer TRs (J1a, J1b).

Thereby no tension can be produced at the secondary winding of tehe TRs. (Terminal J3a, J3b).

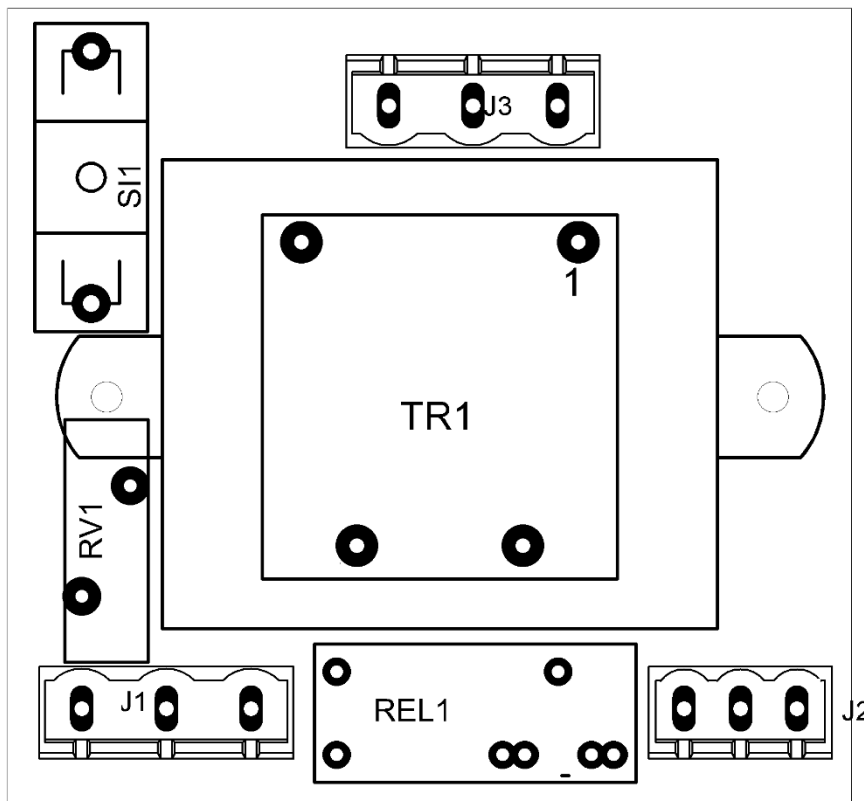
To head for the electrically isolated heading for stage with that alternating voltage of 400VAC at the clamps necessarily around the drivers of the IGBTs. From there it is ensured that voltage supply is switched off and cannot be headed for T1 / T2 / T3.

Thus no torque–producing alternating current can arrive the engine. The circuit consists only of a transformer, which transforms tension to tension of 400VAC at the end of the safety circuit. With the help of this high-transformed tension is the control circuit supplied with energy in the frequency inverter.

If the safety circuit is closed and if the release relay for the driving contactor is headed for by the elevator control , so terminals J1a and J2b have a tension of 230VAC. In consequence the terminals J3a and J3b have the tension of 400VAC. With this tension teh IGBT drives are supplied. If the safety circuit is opened, there ist no voltage on the terminals J1b and J1b. In consequence its cannot be a voltage at terminals J3a and J3b.



1.6 Component diagram and list of components



POS.	Designation	Description
1	REL 1	40.51.8.230.0000
2	RV1	S 20 K 250
3	Si1	Fuse holder 5 x 20mm with cover
4	F1	Fine wire fuse 200 mA mtr
5	TR1	K65-518A 230V/ 400V/ 8VA
6	J1, J3	STL960/3/7,62-V-G
7	J2	STL950/3/5,08-V-G
8	G2	PKB950/3/5,08
9	G1, G3	PKB960/3/7,62
10	Body shell	UMK-SE 11,25-1
11	Body shell	UMK-BE22,5
12	Body shell	UMK-BE45
13	Circuit board	SAS16-102

1.7 EU DECLARATION OF CONFORMITY

EU DECLARATION OF CONFORMITY FOR SAFETY COMPONENTS FOR LIFTS

Manufacturer:	KW Aufzugstechnik GmbH Zimmersmühlenweg 69 61440 Oberursel
Authorized Person:	Dipl.-Ing. (TU) Hans-Werner Walbert - CEO
Type:	Safety component GOLIATH-90
Description safety:	Function „Safe-Exit-Lock – SAS“ for frequency inverter GOLIATH 90 from KW-Aufzugstechnik with extern component „SAS16-102“ for usage as elevator drive without driving contactors
Production / Serial-number	2026-0001 bis 2026-3000
Year of manufacturing:	2026
Application scope:	Lifts Directive 2014/33/EU
Standard(s) unseed :	DIN EN 81-20: 2020 DIN EN 81-50: 2020 Safety rules fort he construction and installation of lifts.
Notified body for the EU type examtionation (Annex V.A)	TÜV SÜD Industrie Service GmbH Westendstr. 199 80686 Munich - Germany Identification No. 0036
EU type examination certificate no.:	EU-ESD061
Notified body for the random checks (Annex XI)	TÜV SÜD Industrie Service GmbH Westendstr. 199 80686 Munich - Germany Identification No. 0036

Hereby we explain the component assembly GOLIATH-90 due to conceiving and construction mentioned above which to general protection requirements corresponds to the EU Lift Directive 2014/33/EU. The manual is attached to the devices. The safety references are to be exactly read before employment of the equipment. Through with us this explanation their validity loses not coordinated changes.

Oberursel, den 4.01.2026



Hans-Werner Walbert
CEO

1.8 Construction inspection certificate, safety certificate Liftinstitut

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ CERTIFICADO ◆ CERTIFICAT



EU-TYPE EXAMINATION CERTIFICATE

according to Annex IV of Directive 2014/33/EU

Certificate No.: EU-ESD 061

Notified Body: TÜV SÜD Industrie Service GmbH
Westendstr. 199
80686 Munich - Germany
Identification No. 0036

Certificate Holder: KW Aufzugstechnik GmbH
Zimmersmühlenweg 69
61440 Oberursel - Germany

Manufacturer of the Test Sample: KW Aufzugstechnik GmbH
Zimmersmühlenweg 69
61440 Oberursel - Germany

Product: Frequency inverter for elevator drives without contactors

Type: SAS16 + GOLIATH-90

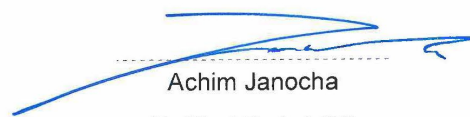
Directive: 2014/33/EU

Reference Standards: EN 81-20:2020
EN 81-50:2020

Report: No. EU-ESD 061 dated 2025-12-03

Outcome: The product conforms to the essential health and safety requirements of the mentioned Directive if the requirements of the annex to this certificate are kept.

Date of Issue: 2025-12-12


Achim Janocha
Notified Body LCC



TUV®

**Annex to the EU-Type Examination Certificate
No. EU-ESD 061 of 2025-12-12**



1 Scope of application

The frequency converter for use as an lift drive without contactors, type SAS16 + GOLIATH-90, consists of the electrical safety device in the form of a safety circuit, type SAS16 (Safe Output Lock) and the frequency converter with self-monitoring of the brake element as part of the protection against unintended movement of the car and/or uncontrolled upward movements of the car, type GOLIATH-90/921.

With the help of the SAS function, the GOLIATH-90 series frequency inverter can be used in lift applications without contactors. The device can drive synchronous and asynchronous motors with rated currents from 12 A to 162 A. The SAS function interrupts the control of the semiconductors that control the frequency generator for the AC power supply of the motor. The energy to power the IGBTs is provided by the lift's safety circuit. This allows for an inherently safe circuit. When the safety circuit of the lift is open, the IGBTs can no longer be powered.

The SAS16-102 safety circuit replaces the contactors at the end of the safety circuit. The safety circuit supplies the primary winding of the TR4 (J1a, J1b) transformer. The secondary winding supplies 400VAC to the control stages of the IGBTs in the frequency converter (J3a, J3b). Since the galvanically isolated drive stage of the inverter at the LSAS1 and LSAS2 terminals requires an AC voltage of 400VAC to drive the driver stages of the IGBTs, it is guaranteed that the power supply for gate control of the IGBT's T1/T2/T3 of the inverter is switched off and T1/T2/T3 cannot be controlled if the safety circuit is interrupted. Thus, no torque can be generated for the engine.

The inputs of the drive are monitored to check whether the energy is removed when the lift is at a standstill. On the SAS16 safety board, there is a monitoring output for the lift control.

The end of the safety circuit is connected to the SAS 16 safety board. There is a relay on the SAS16 board that monitors the condition of the safety circuit.

The safety circuit of the lift is connected to the J1a and J1b connectors of the SAS16 board. The maximum voltage is 230VAC.

The safety circuit (secondary output) of the lift is connected to the J3a and J3b connectors of the SAS16 board. The maximum voltage is 400VAC.

The safety circuit (secondary output) of the lift is connected to the LS1 and LS2 connectors of the GOLIATH-90 power board. The maximum voltage is 400VAC.

Other control circuits on the board related to STO functionality are on the board with a maximum voltage of 15VDC.

**Annex to the EU-Type Examination Certificate
No. EU-ESD 061 of 2025-12-12**

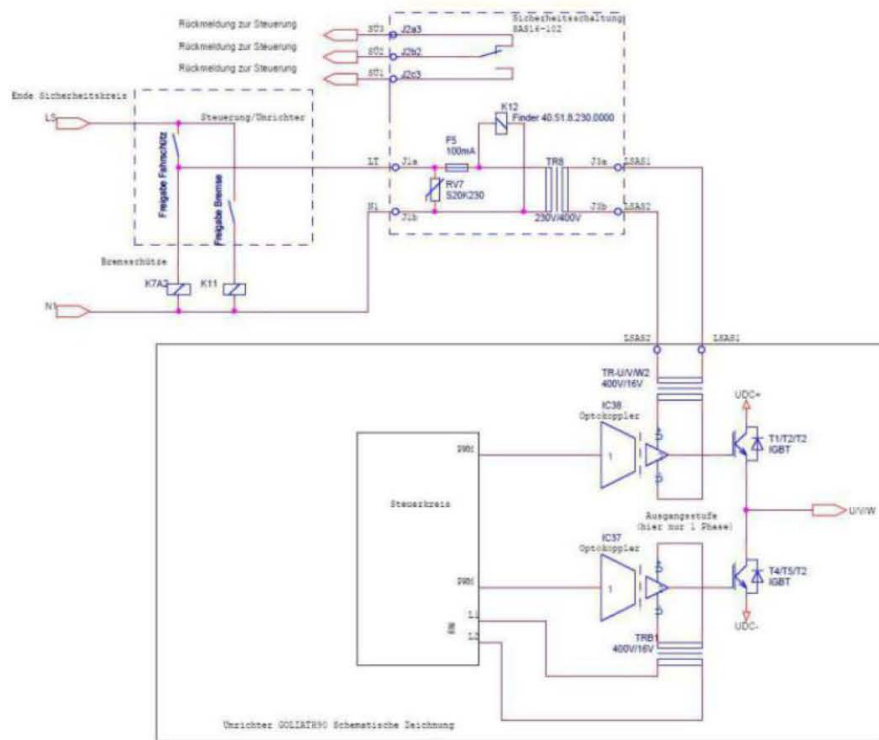


Figure 1: STO-Schematic

1.1 Technical Data

Operating temperature	0 ... + 45°C
Height	Up to 2000m above sea level
Degree of protection	IP20

2 Conditions

- 2.1 The correct functioning of the STO function must be checked during the test before putting into service.
- 2.2 The interruption of the current to the brake must be carried out separately by the lift controller in accordance with the relevant requirements of the standard.
- 2.3 If the motor torque must be taken into account for the UCMP function, a delay time of 220 ms must be taken into account for switching off the inverter after opening the safety circuit of the lift.
- 2.4 The frequency inverter must be installed, adjusted, commissioned and maintained in accordance with the manufacturer's instructions.
- 2.5 The specifications in the operating instructions for installation, commissioning, operation and operation of the assemblies must be observed. Furthermore, the relevant national regulations and EN 81-20 must be complied with during installation and EMC-compliant wiring must be ensured.
- 2.6 The connected brakes must be suitable for the respective scope of application.
- 2.7 By the selection of an appropriate installation place, it has to be ensured that environmental influences like water, conductive dust and condensation don't have a negative impact on the safety-related operation of the component.

**Annex to the EU-Type Examination Certificate
No. EU-ESD 061 of 2025-12-12**



- 2.8 In line with the initial operation and the periodic checks of the lift the following checks have to be performed:
- Check of the correct installation,
 - Check of the version (type identification plate),
 - Check of safety function and overvoltage-protection according to test instructions in the operating manual.
- 2.9 The EU-type examination certificate may only be used in combination with the corresponding annex and enclosure (List of authorized manufacturer of the serial production). The enclosure will be updated immediately after any change by the certification holder.

3 Remarks

- 3.1 This EU-type examination certificate has been issued in accordance with or on basis of the following standards:
- EN 81-20:2020 (D), 5.11.2.3.4
 - EN 81-50:2020 (D), 5.6
- A revision of this EU-type examination certificate is inevitable in case of changes or additions of the above-mentioned standards or of changes of state of the art.
- 3.2 On the object there shall be a label with information necessary for the component's identification with the name of the manufacturer, EU-type examination and type identification plate.
- 3.3 The test results refer only to the safety component "safety-related control with electronic components" and the associated EU-type examination.
- 3.4 The Certification Body LCC of the TÜV SÜD Industrie Service GmbH is a Certification Body accredited by DAkkS according to DIN EN ISO 17065. The accreditation is only valid for the scope of accreditation listed in the Annex of the certificate D-ZE-14153-03-00.

2.0 Transport / Assembly / Start up

2.1 Transport and storage, assembling instructions

The protection circuit SIS16-102 is to be protected before inadmissible demand in the case of transport and handling. The contact of electronic elements and contacts is to be avoided.

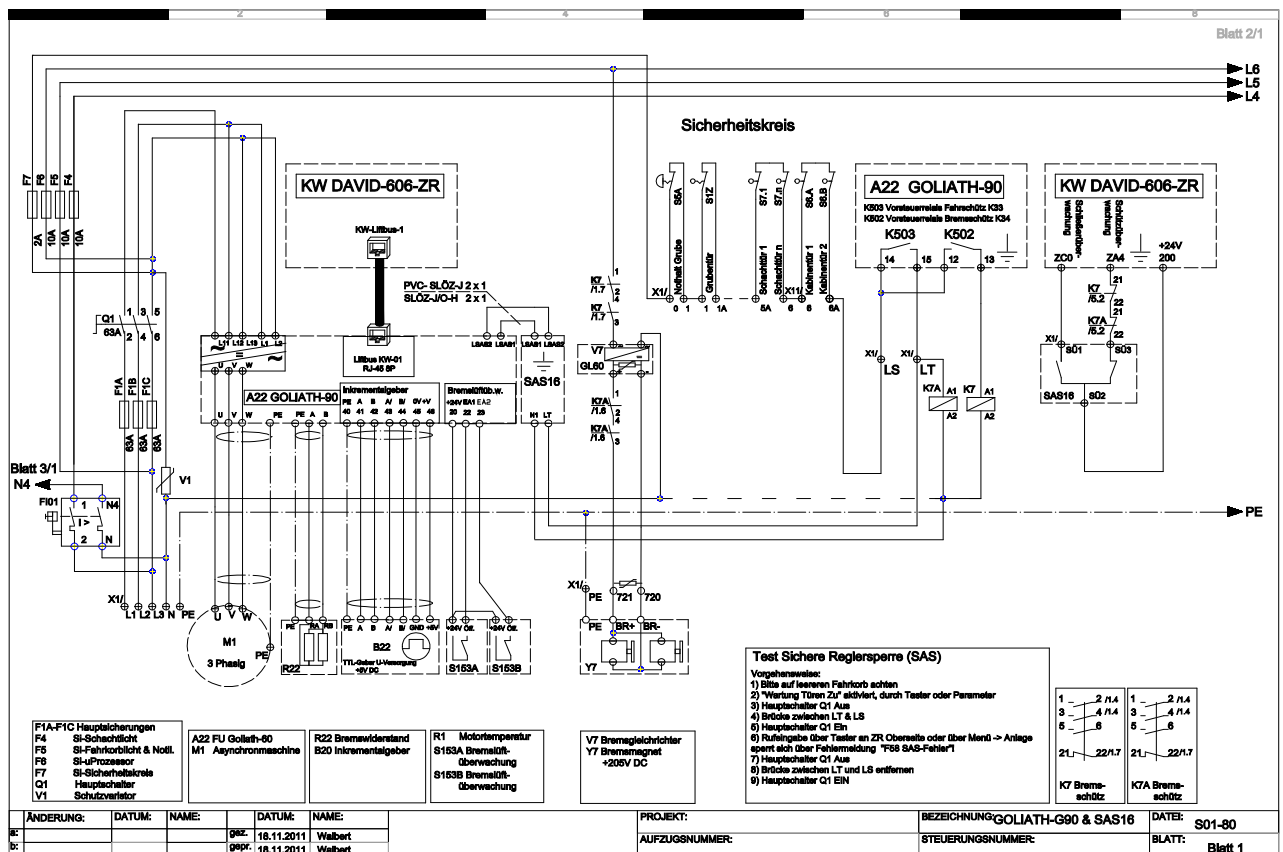
Electrical components may not be damaged or destroyed mechanically. Clamping procedures at the strips may be accomplished only with tension-free equipment.

All leading connections lead also after switching off still tension until the condensers unloaded themselves (approx. 5 min). Lager dusty condition, penetration of water , high concentration of chemically active pollutants, danger of fungus growth or penetration of parasits endanger safe enterprise of the complete system. Therefore the protection circuit SIS16-102 must be built into a switchgear cabinet. The ambient temperature must be in a range between 0°C and + 65°C.

2.2 Connection the assembly instructions

Principle is to prevent external voltages to prevent a drop in the up-and down-contactors and the braking element, despite safety circuit interruption.

An example is shown in the drawing below, the safety circuit of a hydraulic elevator system with control of up-and down-contactors, as well as controlling a one-way lock valve.



As previously mentioned, the control of the service section of the static frequency cahnger from the safety circuit is supplied with tension. As soon as the safety circuit is interrupted, the output stage of the static frequency changer is closed.

The wiring within switchgear cabinet takes place with H07Z-K and/or H07Z-K with 1mm²

Line in the color white or blue according to firm KW Aufzugstechnik GmbH. The cable routing takes place in wireway. The terminals configuration at the controller A22 GOLIATH-90 and the control compute unit DAVID D606-ZR is to be kept accurately.

According to the switching contacts of the contactors wiring leads to the terminals of the one-way lock valve.

When connecting PVC pipe SLÖZ-J 3 x 1mm² or SLÖZ-J/OH 3 x 1mm² is used. The valve must be grounded on the PE wire.

2.3 Function test – Safe controller lock (SAS)

Generally

Frequency inverter GOLOATH-90 supervises the terminals LSAS1 and LSAS2 in frequency inverter. Independently of the fact that with opened safety circuit there are no voltage at the terminals LSAS1 and LSAS2.

Frequency inverter close with the message "F58-SAS-fault" if in the stop voltage applied.

(this could be the case, if two clamps were not correct connected with 400VAC) A restart is only possible after a reset.

if it comes to an interruption while driving of the safety circuit leads this to a trip abort by missing release tension at the terminals LSAS1/2 with the message "F57-SAS blocked".

1.) Process of the external voltage simulation

- 1.) Please pay attention for a empty car!
- 2.) Operate the pushbutton „ Maintenance doors close“ at the top of DAVID-central unit -> Doors close!
- 3.) Frequency inverter Goliath Menü C4- TÜV- SAS test to ON and activate the yellow Pushbutton below
-> If present, push button S51 controller remote control to press
-> Lift is blocked with error message „**F58/F158 SAS-blocked**“ >Please unblock the lift.

Behavior

Frequency inverter GOLIATH-90 closed with message „F58/F158 - SAS-fault“.

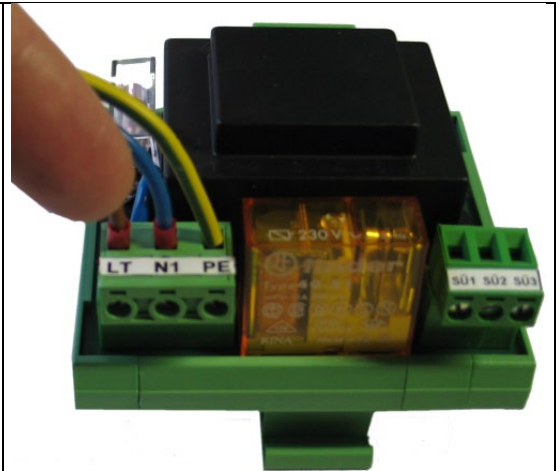
Unblocking

Activate the main switch, after the switch off the main switch and remove the jumper.

System is ready to start now.

2.) Process of the safety circuit interrupt simulation

- 1.) Please pay attention to an empty car!
- 2.) Operate the pushbutton „ Maintenance doors close“ at the top of DAVID-central unit -> Doors close!
- 3.) Attempts of the call input over pushbuttons at central processing unit.
- 4.) **Pull the plug LT- N1 in travel -> see picture!**
- 5.) Inverter closed with the message „**F57/F157 SAS blocked**“
- 6.) Main switch Q1 OFF.
- 7.) **Put the plug LT- N1 -> see picture!**
- 8.) Main switch Q1 ON.



Board SAS16-102 with plug LT-N1

Behavior

Frequency inverter GOLIATH-90 closed with message „F57/F157 - SAS-blocked“.

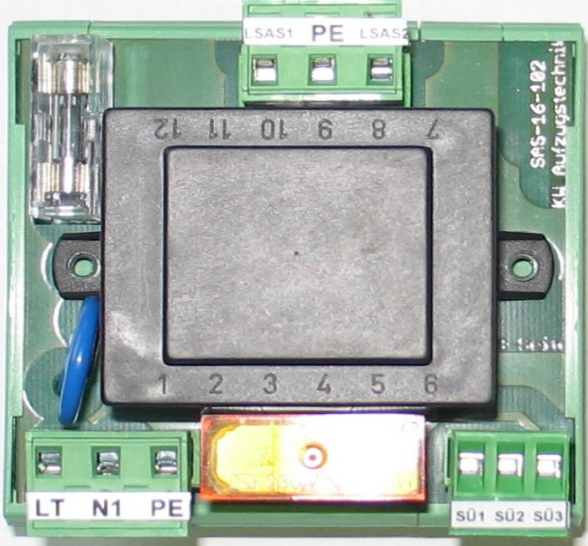
Unblocking

Main switch deactivate, then pull the plug and activate the main switch again.

System is ready to start now.

3.0 Fault clearance

3.1 Risk analysis

	<p>The following table shows possible switching status of the SAS16-102 with construction unit fails.</p> <p>As boundary condition it is accepted that the safety circuit is open an no voltage lies on. (Between Terminal LT and N1)</p>
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Unit	Interruption	Short circuit	Change in higher value (Change of the characteristic)	Change in lower value (Change of the characteristic)
F1	No current flow, no tension on J3a/J3b	There no tension on J1a/b, no tension on J3a/b	There no tension on J1a/b, keine Spannung an J3a/b	There no tension on J1a/b, keine Spannung an J3a/b
RV1	→ irrelevant	There no tension on J1a/b, no tesnion on J3a/b	See interruption	See short circuit
TR1	No current flow, no tension on J3a/J3b	There no tension on J1a/b, no tension on J3a/b	See interruption	See short circuit
F1	No current flow, no tension on J3a/J3b	There no tension on J1a/b, no tension on J3a/b	See interruption	See short circuit
K1	No current flow no tension on J3a/J3b	There no tension on J1a/b, no tension on J3a/b	See interruption	See short circuit

3.2 Fault clearance

In frequence inverter GOLIATH-90 and microprocessor systems DAVID-606 / 2005 / 912 exist error memory with a depth of 100 possible entries.

The error registrations find in the submenu C error memory at GOLIATH-90 controllers and DAVID-606/205/912 control computers.


The closer handling of the microprocessor system is to find in the appropriate technical manual on our internet side. Am exact fault tracing can be made on the basis entry in the error memory.

Fault	Error cause	Fault clearance
F57 SAS blocked	Interruption of the safety circuit while driving leads to a trip abord by missing tension.	Examine please the electrical and mechanical installation of the lift.
F58 SAS fault	In a stop is a tension on terminals on LSAS1 and LSAS2. → This may be the case, if the two terminals wrongly connected.	Control on the base the conection diagramm between GOLIATH-90 -> SAS16-102 -> Relay GOLIATH-90.

4. Maintenance/ Repair/ Disposal of the Component assembly


Maintenance

The cleaning of the protection circuit SIS16-101 is only with halogeneous-free and dry substances permissible. Examine with each maintenance the c-clamps for their fixity. With each maintenance you must drive through one „Functional test of the Component assembly“. You find the discription in chapter 2.3

	<p>Never work under mains voltage – Danger of life!</p> <p>Before you begin work on the protection circuit SIS16-101, interrupt voltage supply by main switches and the appropriate safety devices and secure you against erroneous restarting!</p> <p>Survey the supply lines for tension free!</p> <p>Neighbouring clamps and components, which could be energized must be covered!</p>
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Repair of the Component assembly

Defective protection circuits SAS16-101 can be repaired only by the manufacturer since it acts over safety components assembly. Therefore you return defective components assembly to the manufacture.

	<p>Never work under mains voltage – Danger of life!</p> <p>Before you remove and/or dismantle the protection circuit consider the safety and assembling instructions from chapters 1.3 and 2.2!</p>
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Waste management of the Component assembly

The company KW Aufzugstechnik GmbH takes old devices back when delivery to KW Aufzugstechnik-Werk Oberursel is free of charge.

With user disposal and with the exchange of components the regionally in each case valid waste treatment and disposal regulations for spezial refuse is to be considered.

The company KW Aufzugstechnik GmbH does not take over adhesion for duly not disposed of construction units and components.