Instructions

TSG car door restrictor mechanism

FKTZ

Documentation history

Nr.	Ver.	Stand	Bearbeiter
1	1.0	20/08/27	FH
2	1.1	20/09/01	FH
3	1.2	20/09/23	FH
4	1.3	20/10/07	FH
5	1.4	21/01/18	FH
6	1.5	21/02/19	FH
7	1.6	21/11/19	FH
8	1.7	22/03/23	FH
9	1.8	22/05/05	FH
10	1.9	22/11/08	FH
11	1.10	23/11/13	FH
12	1.12	24/10/08	FH

Fordern Sie die Umbauanleitung auf **Deutsch** an, indem Sie den QR Code einscannen.

Demandez les instructions d´instruction de montage en **français**, en scannant le code QR.

Langer & Laumann Ing.-Büro GmbH
Wilmsberger Weg 8
48565 Steinfurt
Germany

Tel.: +49 (2552) 92791 0

www.lul-ing.de
info@lul-ing.de

Contents

1 Basic information

1.1 *Copyright*

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1.2 *Notes in the manual*

All notes in the instructions must be observed.

1.3 *Informal measures by the installer*

The installer of the system must ensure that he himself attends a training course. He must immediately inform the manufacturer/supplier of missing or defective parts.

1.4 *Requirements for installation personnel*

Persons responsible for installation and maintenance should be informed about the generally applicable safety and occupational hygiene regulations. They should be familiar with Langer&Laumann products. The installation tools should be functional and the measuring instruments should be checked continuously.

1.5 *Explanation of symbols*

WARNING:
You are advised of a possible impending danger that can lead to serious physical injuries or death.

CAUTION:
You are warned of a possible impending danger that can lead to minor physical injuries. You will also find this signal for warnings of property damage.

NOTE:
You will be informed about applications and other useful information.

2 General

The TSG car door restrictor mechanism is an extension of the TSG door drive that locks a car door outside the unlocking zone, so that the car door cannot be opened from inside the car.

By using the TSG car door restrictor mechanism, the TSG door drive can be used as a **car door restrictor mechanism according to DIN EN 81-20 (see 5.3. 15.2 b)** with the addition of mechanical components.

The TSG car door restrictor mechanism consists of an expansion board, one or two restrictor switches and a sensor kit for detecting the unlocking zone.

NOTE:
The English text is a translation of the German original. In case of any discrepancy, the German version is valid only.

3 Functional description

The TSG car door locking module (FKTZ module) is an expansion board that is screwed onto the main board of the TSG V4 electronics by the manufacturer.

The FKTZ module ensures that the unlocking zone and optionally the bolt signal are retrieved and the restrictor switch(es) are activated. Up to two restrictor switches can be connected to the FKTZ module, for example to separately lock the door leaves of a centrally opening car door.

The FKTZ module releases the car door in the unlocking zone of the floor, then the TSG door drive can move the car door.

The unlocking zone is recognised by using the sensor kit.

The unlocking of the car door is disabled when the car exceeds a selected speed through the unlocking zone.

The existing safety circuit for the lift control is routed through the door contact provided by the site and additionally via the contact of the restrictor switch(es).

In the event of a power failure, the main board of the TSG V4 electronics is supplied by the batteries so that an emergency evacuation can be carried out.

4 Scope of delivery

The package contains:

Table 1: Scope of delivery

Item number	Name	Note	Illustration
8.20.00301.04	TSG V4 Lift Door Operator - Electronic extern - 230[VAC]/50-60[Hz] + NSV + FKTx		
8.20.00302.04[1]	TSG V4 Lift Door Operator - Electronic extern - 230[VAC]/50-60[Hz] + NSV + FKTx + extension for TSG Sinus Drive		
8.20.34010	Basic kit car door restrictor mechanism with restrictor switch and actuator suitable for FKTV, with holder		
8.20.34011[1]	Basic kit car door restrictor mechanism with restrictor switch and actuator suitable for FKTV		
8.20.34200[2]	Installation kit for FKTx on TSG drive (see also: 1.20.92650 Installation instructions for FKTx)		
8.20.34210[2]	Installation kit for FKTx lateral to door machine (see also: 1.20.92650 Installation instructions for FKTx)		
8.20.34110[2]	Emergency release kit with bowden cable 2.0m		
8.20.34050[2]	Sensors technology kit for FKTx, construction on cabin (see also 1.20.92640 Installation instructions for sensors technology kit and mounting kit for zone per floor for FKTx)		
8.20.34310[2]	Extension kit for zone per floor, for FKTx (see also 1.20.92640 Installation instructions for sensor kit and mounting kit for zone per floor for FKTZ)	1x kit per floor	
8.20.34060[2]	Relay set for FKTZ, connection of external zone detection to TSG (signals 24VDC)		

[1] alternative
[2] optional

8.20.34060[2]	Relay set for FKTZ, connection of external zone detection to TSG (signals 12-240VAC, 50-60Hz, 3VA 12-240VDC, 1,5W)		

5 System design

The system TSG car door restrictor mechanism is divided into two parts.

The first part consists of installing the restrictor switch on the car door and connecting it to the FKTZ module of the TSG V4 electronics.

The second part consists of determining the unlocking zone. There are two ways to do this:

a. The installation of the sensor sets for the detection of the unlocking zones in the shaft.

b. Determination of the unlocking zone by means of signals from the elevator control system and connection to the FKTZ module of the door control unit.

CAUTION:
The signals for determining the unlocking zone from the elevator control must be generated in two channels, simultaneously (<0.5s) and independently of each other.

5.1 *Mechanical assembly of the restrictor switch*

The restrictor switch must be installed in such a way that the car door can be opened max. 50mm from the closed position when the power is off. It must not be possible to open the car door any further. When the restrictor switch(es) is/are activated by the TSG V4 electronics, the car door is released and the car door can be moved freely.

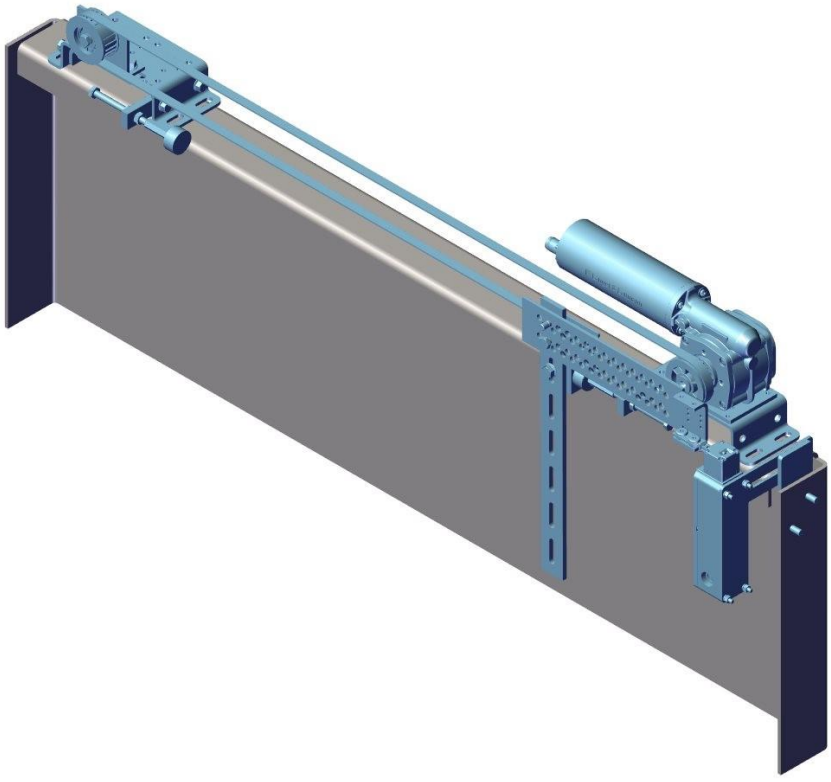

Fig. 1: Assembly example

NOTE:
For installation of the restrictor switch, see instructions:
1.20.92650 Installation instructions for car door locking

NOTE:
The attached warning notice **1.20.11030 Sticker warning TSG with NSV "Unexpected movement"** must be attached to the door machine in a clearly visible way.

5.1.1 Installation with a centrally opening car door

When installing the restrictor switch on a centrally opening car door, make sure that both door leaves (the fast door leaf in each case) are locked in the closed position. It must not be possible to slide the slow door leaf open without actuating the restrictor switch.

1. Mount restrictor switch.
2. Close the car door.
3. Insert the actuator into the restrictor switches so that they are blocked.
4. Fasten the actuator to the car door.

NOTE:
In the locked state, the two lugs of the actuator must rest on the insertion funnel of the restrictor switch.
Buffers for the end stop must be set appropriately.

5.1.2 Assembly with telescopic car door

With a telescopic car door, the fast door leaf must be locked in the closed position using the restrictor switch. It must not be possible to slide the slow door leaf open without actuating the restrictor switch.

5.1.3 Emergency release via Bowden cable

The emergency release set is optionally available and is attached to the restrictor switch. It enables simple handling in the event of an emergency evacuation. For this purpose, the Bowden cable must be attached to the cabin or cabin door in such a way that it is easily accessible for the installer in the emergency evacuation zone.

1. Unlocking:
   Pull the Bowden cable as far as it will go.
   The restrictor switch is unlocked. The cabin door can be pushed open.

2. Locking:
   Self-resetting by internal spring.
   The restrictor switch is locked. As soon as the door is in the closed position, it is locked.

NOTE:
An unlocking stroke of 17mm is required.
The reset function must not be obstructed by improper installation. It is essential to **check** the **function after installation**.

NOTE:
When installing the Bowden cable, the **minimum bending radius** of the hose line **of 100mm** must be observed. The Bowden cable is **not suitable for drag chains**.

5.2 *Electrical connection*

5.2.1 Overview of cabling

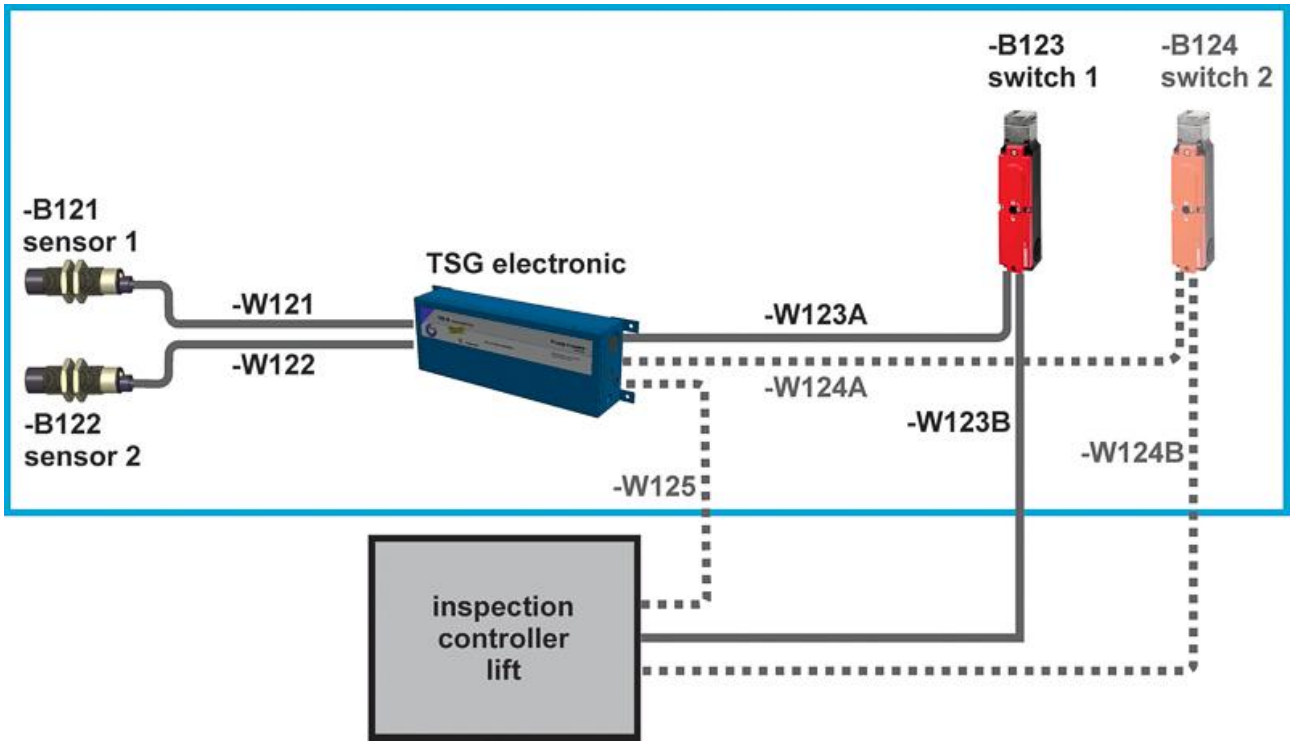

Fig. 2: Overview wiring

Table 2: Names of components

Name	Description	Comment
B121	Sensor 1 for detecting the unlocking zone (see chap. 5.3.2 Unlocking zone via sensor kit / page 15)	
W121	Connection cable sensor 1 and TSG V4 electronics	
B122	Sensor 2 for detecting the unlocking zone (see chap. 5.3.2 Unlocking zone via sensor kit / page 15)	
W122	Connection cable sensor 2 and TSG V4 electronics	
B123	Restrictor switch 1 (see chap. 5.2.2 Restrictor switch connection / page 11)	
W123A	Connection cable restrictor switch 1 and TSG V4 electronics	
W123B	Connection cable restrictor switch 1 and inspection control	
B124	Restrictor switch 2 (see chap. 5.2.2 Restrictor switch connection / page 11)	used optionally
W124A	Connection cable restrictor switch 2 and TSG V4 electronics	used optionally
W124B	Connection cable restrictor switch 2 and inspection control	used optionally
W125	Connection cable TSG V4 electronics and inspection control for bolt signal (see chap. 5.4 / page 20)	used optionally, provided by customer

5.2.2 Restrictor switch connection

Up to two restrictor switches (B123, B124) can be connected to plugs X123 and X124 on the FKTZ module.

Table 3: Connection designation - restrictor switch

Slot	Pin number	Cable	Sensor	Sensor connection	Signal	Description
X123	1	W123A	B123	E1	U_FKTV1	Control
	2			E2	GND_FKTV1	Ground
	3			33	In_H1_FKTV1	Voltage auxiliary contact
	4			34	OUT_H1_FKTV1	Out auxiliary contact
	5					
X124	1	W124A	B124	E1	U_FKTV2	Control
	2			E2	GND_FKTV2	Ground
	3			33	In_H1_FKTV2	Voltage auxiliary contact
	4			34	OUT_H1_FKTV2	Out auxiliary contact
	5					

Fig. 3: Plug connection restrictor switch

NOTE:
When the restrictor switch is activated, LED123 and LED124 are active.

NOTE:
The connection cables W123A and W124A (ÖLFLEX CLASSIC FD810 5GX0,5) and W123B and W124B (ÖLFLEX CLASSIC FD810 3GX1.5) of the restrictor switches **are drag chain compatible**. In compliance with the minimum bending radius of at least 12.5*6.8mm = 85mm (for W123A, W124A) and 12.5*7.4mm=92.5mm (for W123B, W124B)
and a maximum travel of 10m, 7 million bending cycles are possible

5.2.2.1 Use of one restrictor switch

When only one car door restrictor mechanism is used, it can be connected to X123 **or** X124. It is important that one **bridge** is set between the contacts **X123.5 and X124.5.**

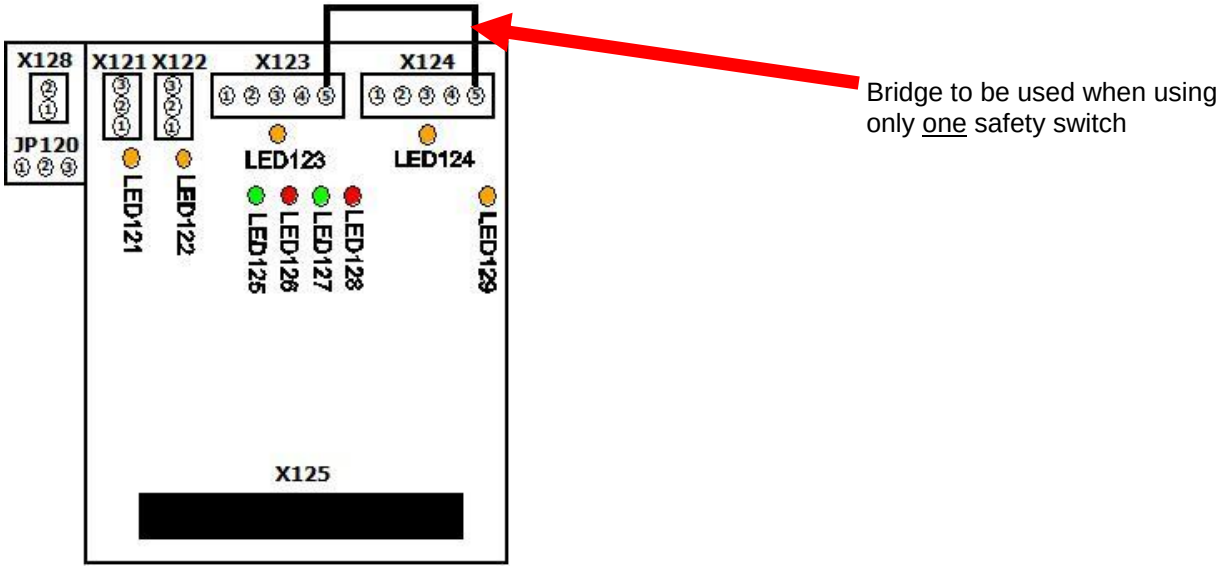

Fig. 4: Connection when constructing with one restrictor switch: Bridge must be used.

5.2.2.2 Use of two restrictor switches

If two restrictor switches are installed, these must be connected to X123 and X124. The connection terminals **X123.5 and X124.5 must remain free**.

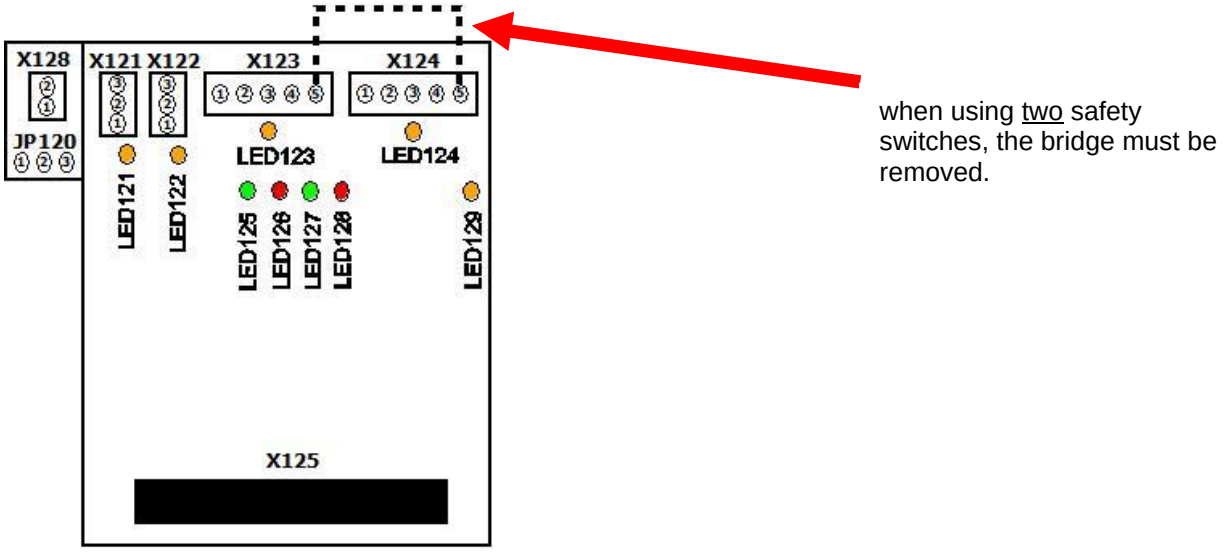

Fig. 5: Connection when using two restrictor switches: Bridge must be removed.

5.2.2.3 Integration of the restrictor switch in the safety circuit

The restrictor switch must be integrated into the safety circuit of the lift system in addition to the door contact for "monitoring the closed position".

Table 4: Connection of the restrictor switch to the safety circuit

Cable	Restrictor switch	Switch connection	Description
W123B	B123	21	Opener contact
		22	
W124B	B124	21	Opener contact
		22	

WARNING:
The door contact for "monitoring the closed position" **must be retained**. **Under no circumstances** may this be **replaced** or **bridged** by the contact of the restrictor switch!

NOTE:
The connection cables W123B and W124B (ÖLFLEX CLASSIC 108 3G1.0) of the restrictor switches are **not drag chain compatible**.

5.3 *Determination of the unlocking zone*

The TSG V4 electronics must ensure that the car is in the unlocking zone so that the car door is opened at the floor in response to the signal from the lift control.

The L&L sensors are used to determine the unlocking zone. Assembly is described in 5.3.2 Unlocking zone via sensor kit / page 15.

If the elevator control has a detection of the unlocking zone, this can be used optionally. The integration is described in 5.3.3 Unlocking zone via elevator control, page 16.

5.3.1 Unlocking zone description

A detector for the unlocking zone must be set up[3] at each floor so that the FKTZ module can release the car door in this area as soon as there is a door-open command on the TSG V4 electronics. The unlocking zone may not be more than 0.2 m below to 0.2 m above floor level.

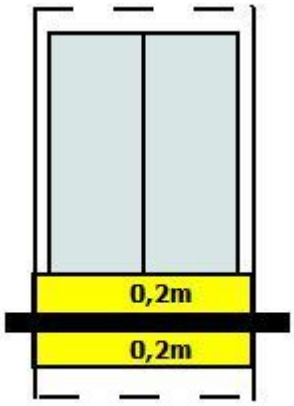

Fig. 6: Schematic representation of the unlocking zone

[3] An already existing unlocking zone can be used if necessary, see chapter 5.3.3

5.3.2 Unlocking zone via sensor kit

The sensor kit for detecting the unlocking zone consists of two sensors (B121, B122), which are attached to the car with a bracket. The corresponding release plates are installed in the respective unlocking zones of the floors.

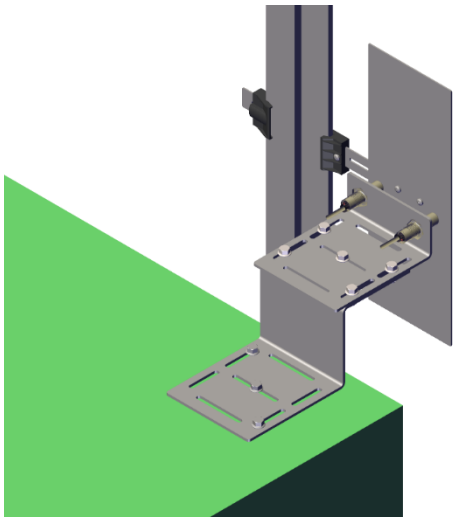

Fig. 7: Sensor kit and release plate when installed on the car

5.3.2.1 Sensor kit bracket

The bracket for the sensor kit with the two sensors is attached to the car near the guide rail. The sensors are designed with an external thread so that they can be positioned as close as possible to the release plate (distance between sensor and release plate <= 15mm). It is imperative that both sensors in the unlocking zone detect the release plate at the same time.

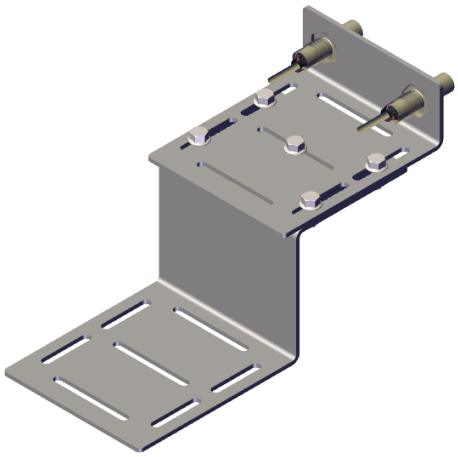

Fig. 8: Sensor kit

NOTE:
For installation of the sensor kit see instructions:
1.20.92640 Installation instructions for sensor kit, mounting kit

NOTE:
After installing the sensor kit, check that there is no interfering metal in the path of the sensors.

5.3.2.2 Release plates (per floor)

The release plates are 400mm long and indicate the unlocking zone at the respective floor. They are attached to the guide rail of the car with the bracket, so that both sensors detect the release plate at the same time.

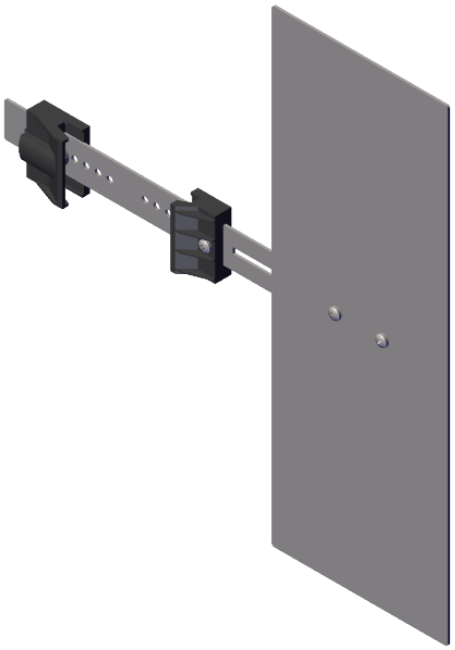

Fig. 9: Release plate

NOTE:
To assemble the release plate, see instructions:
1.20.92640 Installation instructions for sensor kit, mounting kit

NOTE:
After installing the release plate, check that there is no interfering metal in the path of the sensors.

5.3.2.3 Electrical connection sensors

The two sensors (B121, B122) are connected to the FKTZ module to detect the unlocking zone.

Table 5: Connection designation - Sensors

Slot	Pin number	Cable	Sensor	Wire colour	Signal	Description
X121	1	W121	B121	Brown	B121_VDD	Power supply
	2			Blue	B121_GND	Ground
	3			Black	B121_Output	Output
X122	1	W122	B122	Brown	B122_VDD	Power supply
	2			Blue	B122_GND	Ground
	3			Black	B122_Output	Output

Fig. 10: Plug connection - Sensor (B121, B122)

NOTE:
LED121 and LED122 light up in yellow when the sensors B121 and B122 are active and the car is in the unlocking zone (see Table 13: Plug and LED designations / page 24).

5.3.3 Unlocking zone via elevator control

The signal for the unlocking zone can alternatively be transferred from the elevator controller to the FKTZ module instead of from the sensor kit.
The signals are decoupled with the relay set and plugged into the FKTZ module.

Fig. 3: 8.20.34060 relay set 24VDC

Fig. 4: 8.20.34061 relay set 12...230V

The first signal of the unlocking zone from the elevator controller is connected to the relay K121 and the second signal of the unlocking zone is connected to the relay K122. The connectors of the relay set are connected to X121 and X122 of the FKTZ module.

NOTE:
It is absolutely necessary that both channels are switched on and off **at the same time** (<=0.5sec). If the signals are switched on and off at different times (>0.5sec), an error message is generated and the locking switch remains locked.

Table 6: Connection designation - Relay

Relay	Pin number	Cable	Cable wire	Slot	Pin number	Signal	Description
K121	A1	-	-	-	-	TZ1_VDD	Doorzone CH1 +
	A2	-	-	-	-	TZ1_GND	Doorzone CH1 -
	15 (11)	W121	2	X121	1	B121_VDD	Connection1 to FKTZ +
	18 (14)		1		3	B121_GND	Connection1 to FKTZ -
K122	A1	-	-	-	-	TZ2_VDD	Doorzone CH2 +
	A2	-	-	-	-	TZ2_GND	Doorzone CH2 -
	15 (11)	W121	4	X122	1	B122_VDD	Connection2 to FKTZ +
	18 (14)		3		3	B122_GND	Connection2 to FKTZ -

HINWEIS:
LED121 and LED122 light up yellow when relays K121 and K122 are active and the car is in the unlocking zone (see Table 13: Plug and LED designations / page 24).

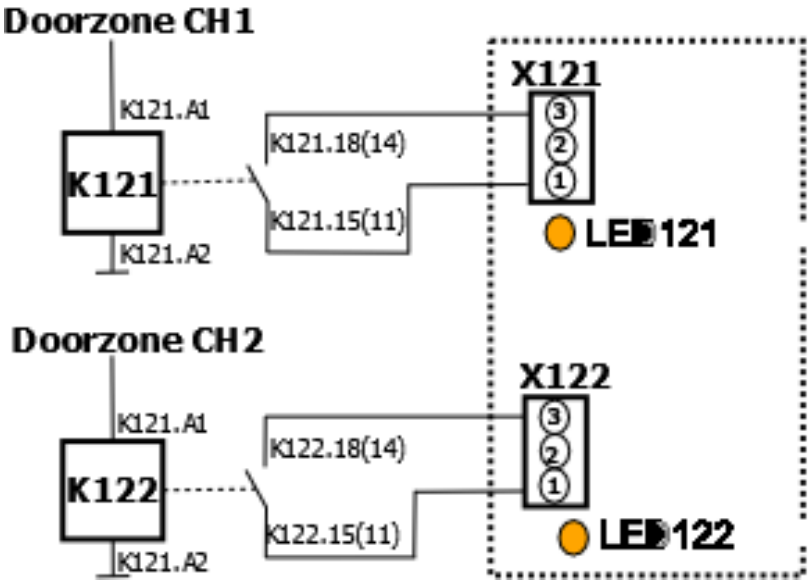

Fig. 5: Connection of the existing unlocking zone signals to the FKTZ module

If the existing sensors are integrated to detect the unlocking zone, their mechanical arrangement is decisive (see Fig. 14: horizontal arrangement of the sensors: correct and Fig. 15: horizontal arrangement of the sensors: incorrect).
It must be ensured that the two sensors switch simultaneously (switching difference <=0.5s). If the switching difference is greater than 0.5s, an error message is generated, and the restrictor mechanism remains locked.

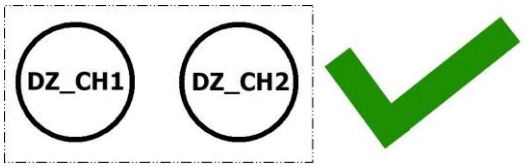

Fig. 6: horizontal arrangement of the sensors: correct

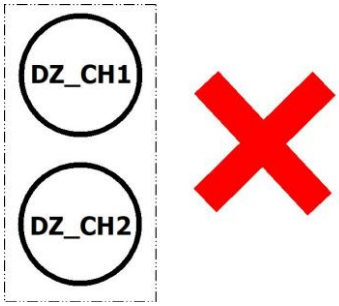

Abb. 7: vertical arrangement of the sensors: incorrect

5.4 *Bolt signal connection*

The bolt signal of the lift control can be connected to the FKTZ module. If there is a bolt signal and the car is in the unlocking zone, the restrictor switch is automatically unlocked, and the car door remains closed.

An external voltage (24VDC) is connected to terminal X128 on the FKTZ module via the bolt contact.
As soon as the bolt signal is applied, the 24VDC are switched through, LED 129 is switched off.

NOTE:
The connection cable W125 between TSG V4 electronics and inspection control for the bolt signal must be provided by the customer.

There are three options for control:

Table 7: Control options by bolt signal

Possibility		Description	Jumper JP120
1.	The bolt signal is applied while the car is moving through the shaft[4] .	1. The car door is unlocked, and the safety circuit is interrupted as soon as the bolt signal has dropped out or there is a door-open command, and the car is in the unlocking zone. 2. The car door is locked, and the safety circuit is closed as soon as the car door is closed and there is a bolt signal.	Pin1 and Pin2
2.	There is a bolt signal when the car is in the un-bolt zone and the car door is to be opened[4].	1. The car door is unlocked, and the safety circuit is interrupted as soon as the bolt signal or there is a door-open command. 2. The car door is locked, and the safety circuit is closed as soon as the car door is closed, and the bolt signal drops out.	Pin2 and Pin3
3.	The bolt signal is not available.	1. The car door is unlocked, and the safety circuit is interrupted as soon as there is a door-open command, and the car is in the unlocking zone. 2. The car door is locked, and the safety circuit is closed as soon as the car door is closed.	Pin2 and Pin3

[4] Opening the car door according to EN81-20, Chapter 5.3.15.1b

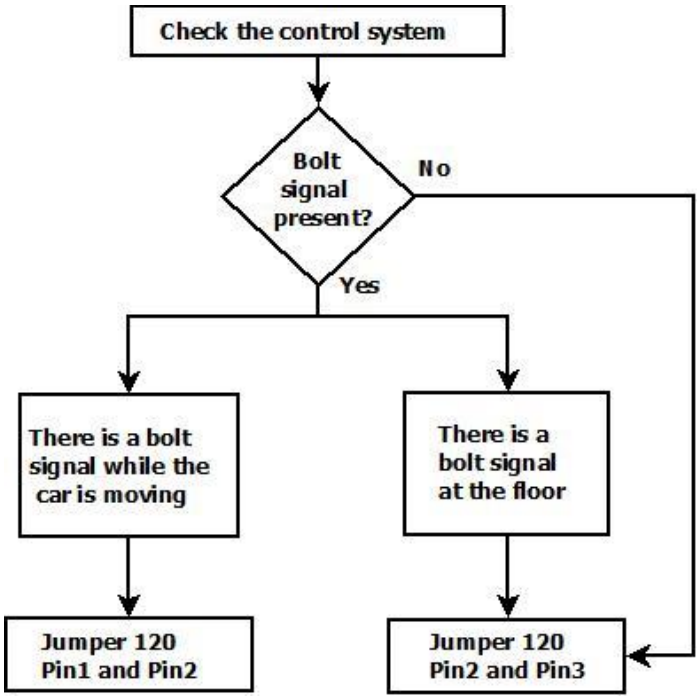

Fig. 16: Flow chart for checking the bolt signal and setting jumper 120

NOTE:
If the bolt signal is not to be integrated, terminals X128.1 and X128.2 must remain free. **Jumper JP120** must be set between **Pin2 and Pin3**. LED 129 lights up continuously.

Table 8: Bolt contact connection

Slot	Pin number	Cable	Signal	Description
X128	1	W125	Bolt Anode/cathode	Bolt signal 24VDC / 0VDC (external voltage)
	2		Bolt Cathode/anode	Bolt signal 0VDC / 24VDC (external voltage)

Table 9: Bolt connection – connection data

X128 bolt signal (2-pin push-in spring-connection connector)	
Conductor cross-section rigid/flexible (min./max.) (Insulation stripping length: 10[mm])	0.2 / 1.5 [mm²]
Flexible conductor cross-section with end sleeve with/without plastic sleeve (min./max.)	0.25 / 1.5 [mm²]
Conductor cross-section AWG (min./max.)	24 / 16
Flexible conductor cross-section with end sleeve without plastic sleeve (min./max.)	0.25 / 1.5 [mm²]
Flexible conductor cross-section with end sleeve with plastic sleeve (min./max.)	0.25 / 0.75 [mm²]

6 Configuration of the FKTZ module

During commissioning, parameters must be set in the TSG V4 electronics.

6.1 *Additional modules*

In order for the FKTZ module to be recognised by the TSG V4 electronics, the parameter must be set depending on the application.

Table 10: Parameter hA, for setting the TSG extensions used.

Parameter setting hA	Function
19	Control of the **FKTZ module**.
20	Control of the **FKTZ module** **and** **TSG Sinus drive.**
21	Control of the **FKTZ module** **and** **TSG Sinus drive for the shaft swing door.**
22	Control of the **FKTZ module** **and** Control of the TSG V4 electronics via **CANopenLift**.
23	Control of the **FKTZ module** **and** **TSG sine drive** **and** control of the TSG V4 electronics via **CANopenLift**.
24	Control of the TSG **FKTZ module** **and** **TSG sine drive for the shaft swing door** **and** control of the TSG V4 electronics via **CANopenLift**.
22	Control of the **FKTZ module** **and** Control of the TSG V4 electronics via **Otis extension cards**.

6.2 *Holding time in the unlocking zone*

The relationship between the speed of the car and the holding time is described here, as well as the parameters required for this in the door control unit.

As soon as the car moves through the shaft, the unlocking zones within the individual floors are recognised by the sensors or the lift control. Here it is important that the car door restrictor mechanism may **only** be unlocked in the unlocking zone in which the car door is also to be opened. It must not be possible to unlock the car door while the car is moving.

The holding time in the unlocking zone in which the car door is not unlocked is set in the TSG V4 electronics via parameter A2. The setting of parameter A2 therefore depends on the speed of the car when travelling through the shaft. If the speed of the car is known in normal operation, the value to be set can be taken from the table:

Table 11: Speed and holding time A2

Speed of car through the shaft **[m/s]**	**Holding timeA2** **[second]**
>= 0.80	0.5
0.40	1.0
0.27	1.5
0.20	2.0
0.13	3.0
0.10	4.0
0.08	5.0
0.07	6.0
0.06	7.0
0.05	8.0
0.04	9.0
0.04	10.0

If the speed of the car is greater than 0.8m/s, a minimum holding time of 0.5s is selected.

Table 12: Parameter A2 for setting the holding time

Parameters	**Meaning**	**Value**
A2	Setting the minimum time in the unlocking zone	Standard: **4.0 (= 4.0s)** Range of values adjustable in 0.1s steps: Min: Max: **0.5 (= 0.5s)** 9.**9 (= 9.9s)**

NOTE:
If the value is not known, the time to be set must be measured and set during initial commissioning.
The correct setting is important so that the car opens the car door immediately after reaching the destination level.

7 Schematic representation

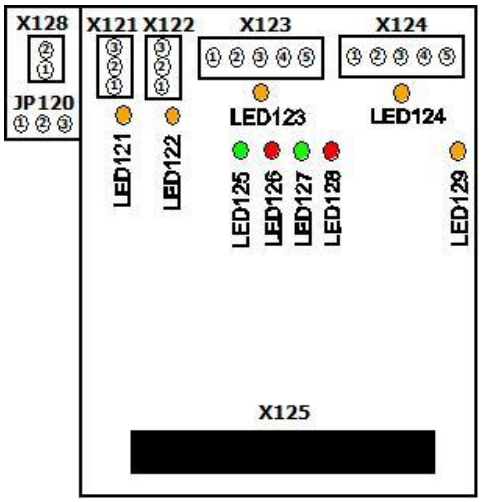

Fig. 17: FKTZ module

Table 13: Plug and LED designations

Name	Symbol	Description
X121		Connection - sensor B121 or relay K121
X122		Connection - sensor B122 or relay K122
X123		Connection - restrictor switch K123
X124		Connection - restrictor switch K124 (optional)
X125		Connection - TSG web interface
X128		Connection – bolt signal
LED121		Status - sensor B121 or relay K121
LED122		Status - sensor B122 or relay K122
LED123		Status - restrictor switch K123
LED124		Status - restrictor switch K124
LED125		K2 check
LED126		K2 error
LED127		K1 check
LED128		K1 error
LED129		Status - bolt signal

8 Behaviour and functions

This chapter describes the possible errors, their causes and remedial actions, as well as the behaviour of the car door restrictor mechanism in the unlocking zone. Furthermore, emergency rescue according to EN81-20 is explained and additional instructions for the documentation are given.

8.1 *Description of the display in the event of an error*

Table 14: Description of the display in the event of an error

Display - TSG	Description of condition	Possible causes	Actions
----	No errors present	----	----
Eu	Communication failure	- Flat cable connection FKTZ to TSG V4 electronics faulty. - incorrect parametrisation of TSG V4 electronics - FKTZ module defective	- Check the flat cable connection - Adjust parameter hA (See chapter 6.1 Additional modules / page 20). - Restart TSG V4 electronics - Exchange of the TSG V4 electronics
F1, F2, F3, F7	Internal errors	- FKTZ module defective	- Restart TSG V4 electronics - Exchange of the TSG V4 electronics
F4, F5	Power failure	- Flat cable connection from FKTZ module to TSG V4 electronics faulty. - FKTZ module defective.	- Check the flat cable connection - Restart TSG V4 electronics - Exchange of the TSG V4 electronics
F6	Power failure	- 24V not available, connection to/from the DCDC converter faulty.	- Check the connection to the DCDC converter - Exchange of the TSG V4 electronics
F8	Sensors do not switch at the same time Relays for unlocking zone detection do not switch simultaneously	- Sensors do not reach the release plate at the same time. - The distance between the sensors and the release plate is different. - At least one sensor is defective. - Unlocking zone is not detected by the existing sensors at the same time.	- Realign the bracket or plate. - Realign the sensors - Replace sensor(s) - Realign the sensors
F9	Sensor cross-circuit	- FKTZ module is dirty. - Sensor cables damaged. - FKTZ module defective.	- Clean the FKTZ module - Replace the sensor cable - Exchange of the TSG V4 electronics
FA	Restrictor switch remains locked	- The car door cannot be opened by the TSG door drive because the restrictor switch does not unlock mechanically. - The car door does not open directly because the hold time in the unlocking zone is set too long	- The car is outside the unlocking zone. - Check mechanics (actuator). - Check terminals X123 and X124. - Check the contacts of the car door restrictor mechanism. - Check cable connection between FKTZ and restrictor switch - Adjusting the parameter A2 (view chapter 6.2 Holding time in the unlocking zone / page 23 **Fehler! Textmarke nicht definiert.**)
Fb	It is not possible to lock the restrictor switch.	- The car door was closed by the TSG door drive but could not be locked.	- Check mechanics (actuator). - Check terminals X123 and X124 - Check the contacts of the restrictor switch. - Check cable connection between FKTZ and restrictor switch

8.2 *Automatic opening of the car door in the event of a power failure*

In the event of a power failure, the car door is automatically unlocked after 5 seconds as soon as the car is in the unlocking zone.
In addition, the TSG door drive can automatically open the car door by an adjustable distance after unlocking.

8.2.1 Setting of parameter A3

If parameter A3=00, the automatic door opening function is deactivated.

If the parameter A3 is set to >00, the automatic door opening function is activated. The set value corresponds to the opening width in cm.

Table 15: Parameter A3 for setting the opening width of the car door in the unlocking zone in the event of a power failure

Parameters	Meaning	Value in cm
A3	Setting the opening width of the car door in the unlocking zone in the event of a power failure	Range of values adjustable in 1cm steps: Minimum: **00**= Car door remains closed Standard: **05**= Car door opens 5cm wide Maximum: **99**= Car door opens completely

NOTE:
If the measured door width (see also parameters r6, r7, r8) is smaller than the value set in parameter A3, the car door opens completely.

8.2.2 Behaviour when parameter A3 is activated

If the car is **within the unlocking zone** if there is a mains voltage failure, the restrictor switch is unlocked after 5 seconds, and the car door opens directly by the value set in parameter A3.

If the car is outside the unlocking zone when there is a power failure, the restrictor switch remains locked and the car door remains closed.

If the car is moved into the unlocking zone, the restrictor switch is unlocked, and the car door opens automatically after another **30 seconds** by the value set in parameter A3.

The car door can be pushed open manually beyond the set opening width. If the car door is closed, it opens automatically by the value set in parameter A3.

NOTE:
If there is an “Open door” control signal, the car door opens completely.
If there is a “Close door” control signal, the car door will not move.

NOTE:
If the unlocking zone signal fails briefly in the event of a power failure, the car door only opens after 30 seconds, even if the car is within the unlocking zone.

8.3 *Behaviour of the car door restrictor mechanism in the unlocking zone*

The behaviour of the car door locking system is described below, considering the connection options for controlling the bolt signal explained in chapter 5.4 / page 18.

8.3.1 Behaviour in normal operation

Requirement: There is mains voltage.

8.3.1.1 The bolt signal is activated while the car is moving through the shaft (high).

1. When the car has reached its target level, the bolt signal is set inactive (LED129 OFF).
2. When the unlocking zone has been detected, the restrictor switch is unlocked. The safety circuit is interrupted (LED123 and LED124 are ON).
3. When there is an “Open door” control signal, the car door opens.
4. When there is a “Close door” control signal, the car door closes.
5. If the car door is in the closed position, the restrictor switch remains unlocked[5] until the bolt signal becomes active (LED129 lights up). The car door is locked (LED123 and LED124 do not light up).
6. The car can be moved.

8.3.1.2 The bolt signal is deactivated while the car is moving through the shaft (low).

1. When the car has reached its target floor, the bolt signal is activated (LED129 is OFF).
2. When the unlocking zone is detected, the restrictor switch is directly unlocked. The safety circuit is interrupted (LED123 and LED124 are ON).
3. When there is an “Open door” control signal, the car door opens.
4. When there is a “Close door” control signal, the car door closes.
5. When the car door is in the closed position, the restrictor switch remains unlocked[4] until the bolt signal is deactivated (LED129 is ON). The car door is locked (LED123 and LED124 are OFF).
6. The car can be moved.

8.3.1.3 The bolt signal is not available.

1. LED129 lights up continuously (ON).
2. When the car has reached its target floor and the unlocking zone has been detected, the restrictor switch remains locked.
3. When there is an “Open door” control signal, the restrictor switch is unlocked, and the car door is opened. The safety circuit is interrupted (LED123 and LED124 are ON).
4. When there is a “Close door” control signal, the car door closes.
5. When the car door is in the closed position, the restrictor switch is locked (LED123 and LED124 are OFF), the car door is locked.
6. The car can be moved.

5 Opening the car door according to EN81-20, Chapter 5.3.15.1b

8.3.2 Behaviour in case of power failure

The behaviour of the car door restrictor mechanism in the event of a power failure depends on the position of the car.

1. **Car in the unlocking zone (LED121 and LED122 are ON)**
   - For this see chap. 8.2 Automatic opening of the car door in the event of a power failure / page 24

2. **Car outside the unlocking zone (LED121 and LED122 are OFF)**
   - The restrictor switch remains locked (LED123 and LED124 are OFF).
   - The "Open door" control signal is not executed.
   - It is not possible to push the car door open by hand.

8.4 *Emergency rescue according to EN81-20*

At the beginning of each emergency rescue, the position of the car must be determined.

1. **Car is more than 1.2m above / below the floor.**[6]
   a. Car door remains locked.
      - Car must be lowered/raised slowly until a floor is reached.
      - Continue with point 2. or 3.

2. **Car is > 0.2m and <1.2m above / below the floor**[5]
   a. Car door remains locked.
      - Unlock the car door:
        1. using a slotted screwdriver directly at the restrictor switch
           or
        2. Unlock using a Bowden cable (if this was installed as an option)

3. **Car is in the unlocking zone**
   a. There is mains voltage:
      - The car door can be opened using the "Open door" control signal.
      - When the bolt signal is used, the car door can be pushed open by hand.
   b. Mains voltage not available (battery operation active):
      - The car door is automatically unlocked after 5 seconds and
        1. is opened by the value set in parameter A3 (see chapter 8.2.1 Setting of parameter A3 / page 26)
           Note: If the unlocking zone is only reached after the mains voltage failure, point 3.b.1. is carried out with a delay of 30 seconds.
           or
        2. can be pushed open by hand.

NOTE:
For lifts without a machine room an emergency rescue at the top floor is to be avoided.
In the event of a power failure, it must be possible to access the car roof or at least to slide open the door on the top floor, since the car door is not automatically unlocked if the battery pack malfunctions and must be unlocked manually (using a flat-head screwdriver or Bowden cable).

NOTE:
After each emergency release, **the entire system must be checked for function**. It must be ensured that the restrictor mechanism still functions properly.
Emergency release can cause damage that is not visible from the outside.

[6] Specified distances according to EN81-20, chapter 5.6.7.5

8.5 *Additional instructions for the system documentation*

The respective protocols and instructions of the lift system must be extended by the following additions.

8.5.1 Supplement for emergency evacuation

A distinction must be made whether parameter A3 is active or inactive (see chapter 8.2.1 Setting of parameter A3 / page 24).

8.5.1.1 Parameter A3 active

1. Car is located within the unlocking zone.

   In the event of a power failure, the car door is automatically unlocked and opened by the value set in parameter A3.
   - The car door can then be opened completely by hand.

2. Car is located outside the unlocking zone.
   - In the event of a power failure, the car door remains locked.
     - The car must be brought to the nearest floor.

     CAUTION: Emergency evacuation is only permitted at the nearest floor!
   - When the unlocking zone is reached, the car door automatically unlocks.
     - The car door opens automatically after 30 seconds by the value set in parameter A3.
     - The car door can then be opened completely by hand.

8.5.1.2 Parameter A3 not active

1. Car is located within the unlocking zone.

   In the event of a power failure, the car door is automatically unlocked.
   - The car door can be opened completely by hand.

2. Car is located outside the unlocking zone.
   - In the event of a power failure, the car door remains locked.
     - The car must be brought to the nearest floor.

     CAUTION: Emergency evacuation is only permitted at the nearest floor!
   - When the unlocking zone is reached, the car door automatically unlocks.
     - The car door can then be opened completely by hand.

8.5.2 Supplement for commissioning the system

1. Clamp both batteries onto the TSG V4 electronics.
2. Switch system on

8.5.3 Supplement for decommissioning the system

1. Disconnect both batteries from the TSG V4 electronics.
2. Disconnect the system from the power supply.

9 LED statuses and meanings

There are nine LEDs on the TSG FKTZ module (see Fig. 17: FKTZ module / page 22)

9.1 *LED status - sensor B121 and B122 resp. K121 and K122*

The status of sensor B121 is shown via **LED121** and the status of sensor B122 is displayed via **LED122**.

Table 16: LED status - sensor B121 and B122

Status	Description of condition	Possible causes	Actions
OFF	- There is no voltage	- Connector not connected	- Check the plug connections: 1. Flat cable connection to TSG V4 electronics (X126) 2. Check mains voltage supply on TSG V4 electronics.
	- Sensor/Relay not active	- Connector not connected	- Check the plug connections Sensors/relays (X121, X122)
		- The car is outside the unlocking zone	- Drive the car into the unlocking zone
		- Faulty sensor/relay	- Replace sensor/relay
ON	- Sensor/Relay active	- Unlocking zone was recognised.	- No actions required

9.2 *LED status - restrictor switches B123 and B124*

The status of the restrictor switch B123 is displayed via LED123 and the status of restrictor switch B124 is displayed via LED124 (if only one restrictor switch is installed, LED123 and LED124 indicate the status of restrictor switch B123).

Table17: LED status - restrictor switches B123 and B124

Status LED	Description of condition	Possible causes	Actions
OFF	Restrictor switch is not activated	- Connector not connected	- Check the plug connections: 1. Restrictor switch (X123, X124) 2. Flat cable connection to TSG V4 electronics (X126) 3. Mains power supply for the TSG V4 electronics
		- The car is outside the unlocking zone	- Drive the car into the unlocking zone
		- The car door is in the Closed position.	- The restrictor switch can remain activated if the bolt contact is used (see chapter 0 Bolt signal connection / page 18)
ON	Restrictor switch is activated	- The restrictor switch is activated in the unlocking zone.	- No actions required

9.3 *Status - bolt signal*

Table 18: 8.2 Status - LED129 bolt signal

Status	Description of condition	Possible causes	Actions
OFF	There is a bolt signal	There is a bolt signal	- No actions required
ON	There is no bolt signal	There is no bolt signal	- No actions required

9.4 *Flashing behaviour of check and error LEDs*

9.4.1 Description - blink code

The check LED and error LED can not only be switched on and off, but they can also show a defined flashing behaviour:

Table 19: Description - blink code

	ON	OFF	Flickering (10Hz)	Blink /! Blink (1Hz)	Short /! Short	Long /! Long
ON	100%	0	50%	50%	20%	80%
OFF	0	0	50%	50%	80%	20%

NOTE:
If the status description has an “!” (exclamation mark), the behaviour of the LED is inverted.
Example: K1_Error = Blink, K2_Error = !Blink
➔The two LEDs light up inverted to each other.

9.4.2 Blinking behaviour in the event of errors

Table 20: Blinking behaviour in the event of errors

Display TSG	K1_Run LED127	K2_Run LED125	K1_Error LED128	K2_Error LED126	Meaning
----	Blinks	Blinks	OFF	OFF	No errors present
Eu	OFF	OFF	ON	ON	Communication failure
	OFF	OFF	ON	OFF	
	OFF	ON	ON	OFF	
	OFF	OFF	OFF	ON	
	ON	OFF	OFF	ON	
F1	Blinks	OFF	ON	ON	Internal error
F2	OFF	OFF	Flickers	Flickers	Internal error
F3	OFF	OFF	Short	Short	Internal error
F3	OFF	OFF	Long	!Long	Internal error
F4	ON	ON	OFF	Blinks	Voltage error 3.3V
F5	ON	ON	Blinks	Blinks	Voltage error 12V
F6	ON	ON	Blinks	!Blinks	Voltage error 24V
F7	Blinks	OFF	Blinks	Blinks	Internal error
F8	Blinks	OFF	Blinks	!Blinks	Sensors do not switch at the same time
F9	Blinks	OFF	Blinks	ON	Sensor cross-circuit

10 Maintenance and repair

Maintenance of the TSG car door restrictor mechanism is limited to a minimum due to its structural design. Components that are subject to operational wear and tear are to be included in regular maintenance and repair activities.

WARNING:
During maintenance work, it is essential to ensure that the drive cannot be switched on and that no exposed parts can inadvertently be subject to electrical power. After completing these measures, the existing protective and safety devices must be reinstalled on the drive.

Regular checks are essential for the operation of the TSG car door restrictor mechanism, but at least every 12 months. At a minimum the following points must be checked:

- Check the functions of the system (safety devices, inputs, outputs, etc.)
- Check the mechanical function of the restrictor mechanism
- The TSG battery pack must be checked for operation.
- The TSG battery pack must be replaced within a maximum 2 years (see also the note on the TSG V4 electronics housing cover).

CAUTION:
If damage and/or defects are found on the system, it must be shut down immediately. The damage and/or defects must be remedied before starting up again.

NOTE:
The TSG battery pack can be ordered from Langer & Laumann Ingenieurbüro GmbH:
8.20.10109 TSG battery set for TSG V4 electronics

10.1 *Checking the battery pack*

An emergency rescue is required so that the function of the battery pack can be checked (see chapter 8.4 Emergency rescue according to EN81-20 / page 27, paragraph 3.b Mains voltage not available (battery operation active): / page 29). If the car door can be slid open, the battery pack is operational.

10.2 *Exchanging the battery pack*

1. Close the car door.
2. Disconnect the TSG V4 electronics from the mains
3. Disconnect each battery plugs from TSG V4 electronics
4. Remove the old battery pack
5. Install new battery pack
6. Connect the battery plug to the TSG V4 electronics
7. Switch on TSG V4 electronics
8. Replace the sticker on the housing cover.

11 Technical data

Table 21: Technical data

Technical data for the FKTZ module	
Bolt signal connection X128	12-32[VDC] / 3-9[mA]
Permissible storage/transport temperature	0 [°C]...60[°C]; maximum change: 20[K/h]
Permissible mean ambient operating temperature	5 [°C]...40[°C] at rated values, no direct sunlight.
Installation height	Up to 1,000[m] above sea level without restriction; 1,000 to 2,000[m] above sea level with service reduction
Protection class	Splash-proof housing: IP54
Environment	Overvoltage category III, contamination level 2
Atmospheric humidity	Relative humidity 10% to 90%, not condensing

12 Contact

Langer & Laumann Ing.-Büro GmbH
Wilmsberger Weg 8
48565 Steinfurt
Germany

Tel.: +49 (2552) 92791 0

www.lul-ing.de
info@lul-ing.de