



Installation instructions

Door control

TS 981

Control panel with traffic management

Version: 51171314

-en-

Version: t / 07.2019



0000000 0000 51171314 XXXXX

OPERATING INSTRUCTIONS

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SAFETY DIRECTIONS

Specified use

The door control is intended for a power-operated door with a drive unit (GfA limit switch systems).

The safe operation is only guaranteed with specified normal use. The drive unit is to be protected from rain, moisture and aggressive ambient conditions. No liability for damage caused by other applications or non-observance of the information in the manual.

Modifications are only permitted with the agreement of the manufacturer. Otherwise the Declaration of Incorporation shall be rendered null and void.

Safety information



WARNING! Failure to follow these installation instructions may result in severe injury or death.

- Please read these instructions before using the product
- Keep these instructions handy
- Please include these instructions when you pass on the product

Installation and commissioning are to be performed by skilled personnel only.

Only trained electrical craftsmen are permitted to work on electrical equipment. They must assess the tasks assigned to them, recognise potential danger zones and be able to take appropriate safety measures.

Installation work is only to be carried out with the supply off.

Observe the applicable regulations and standards.

Coverings and protective devices

Only operate with corresponding coverings and protective devices.

Ensure that gaskets are fitted correctly and that cable glands are correctly tightened.

Spare parts

Only use original spare parts.

SAFETY DIRECTIONS

Explanation of warnings

These operating instructions contain directions which are important for using the ELEKTROMATEN® appropriately and safely.

The individual directions have the following meaning:



DANGER

This indicates danger to the life and health of the user if the appropriate precautions are not taken.



CAUTION

This warns that the ELEKTROMATEN® or other materials may be damaged if the appropriate precautions are not taken.

General warnings and safety precautions

The following warnings are to be understood as a general guideline for working with the ELEKTROMATEN® in conjunction with other devices. These directions must be observed strictly during installation and operation.



Check that all screw connections are secure before operating the control and adjusting the limit switches.



- Please observe the safety and accident prevention regulations valid for the specific application.
- The ELEKTROMATEN® must be installed with the authorised coverings and protective devices. Care should be taken that any seals are fitted correctly and screw couplings are tightened correctly.
- In the case of ELEKTROMATEN® with a permanent mains connection, an all-pole main switch with appropriate back-up fuse must be provided.
- Check live cables and conductors regularly for insulation faults or breakages. When a fault is detected in the cabling, the defective cabling should be replaced after immediately switching off the mains supply.
- Before starting operation, check whether the permissible mains voltage range of the devices corresponds to the local mains voltage.
- With three – phase motor connection it must have right phase rotation

INSTALLATION ADVICE

After the ELEKTROMATEN® is fitted we recommend the following procedure to rapidly reach a fully functioning door.

- Installation **Enclosure installation** page 8
- Installation **Wiring the Drive to the Control** page 8
- Check **Mains supply** page 9
- Check **Phase rotation** page 10
- Programming **Rapid limit adjustment** page 11

The door is ready to work in Hold-to-run mode.

- Installation **Safety devices** page 14, 27
- Programming **Door functions** page 18

The door is ready to work in automatic mode.

Check connection of external devices e.g. push button etc.
Overview to connect external devices see diagram (page 14-17).
After the devices are connected the programming of the control panel must be finalised.
(page 18).

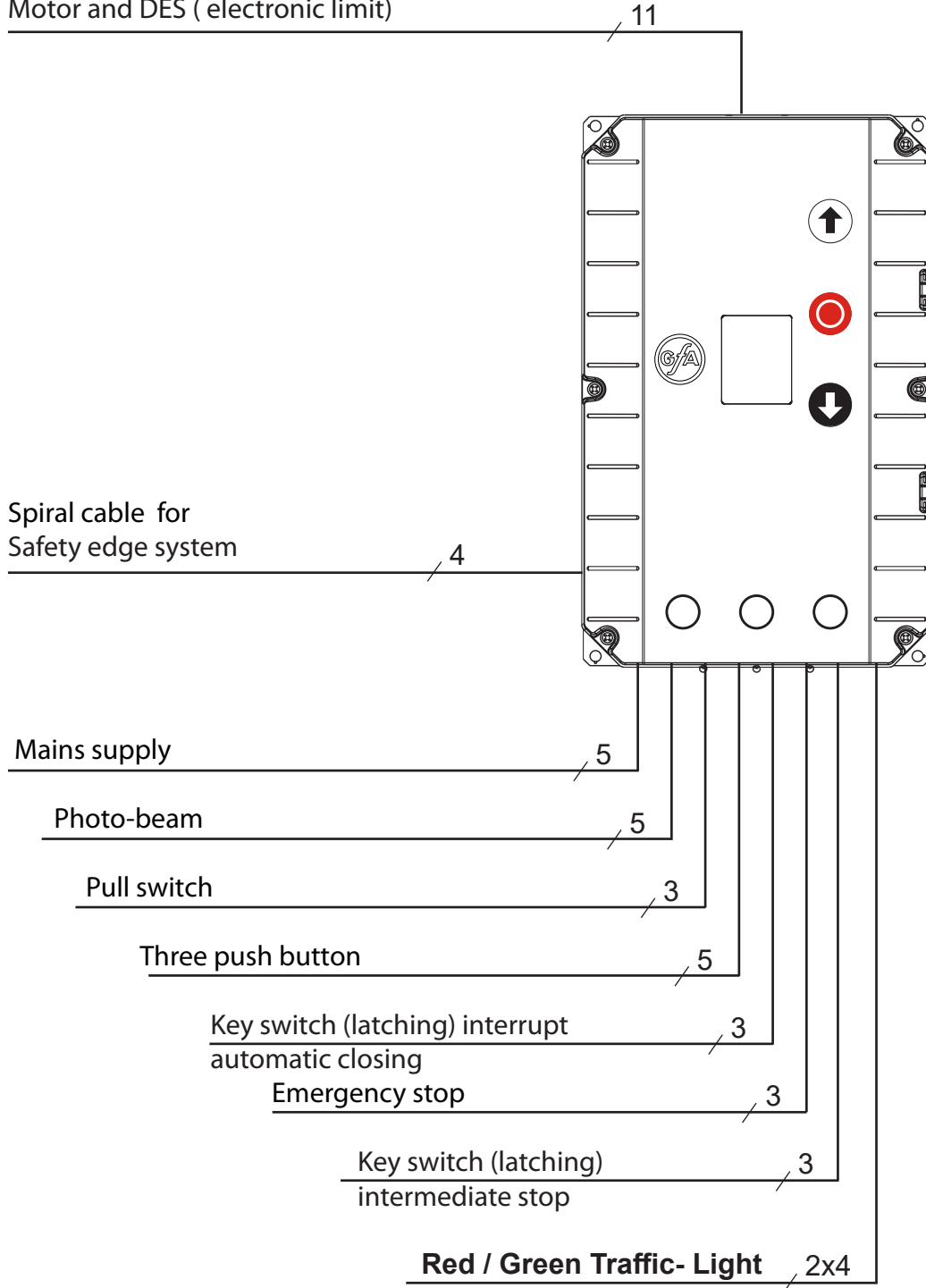
INSTALLATION OVERVIEW



Important!

Using the connection cable out side the building is not permitted.

Connection cable ELEKTROMAT® for Motor and DES (electronic limit)



 () Number of cores in the cable

ENCLOSURE INSTALLATION

Before mounting the enclosure, the surface has to be checked for flatness, slope and freedom from vibrations. Mounting must be vertical. It is important that the door can be clearly seen from the position of the control through-out its travel.

CONNECTING THE CONTROL AND THE ELEKTROMATEN®

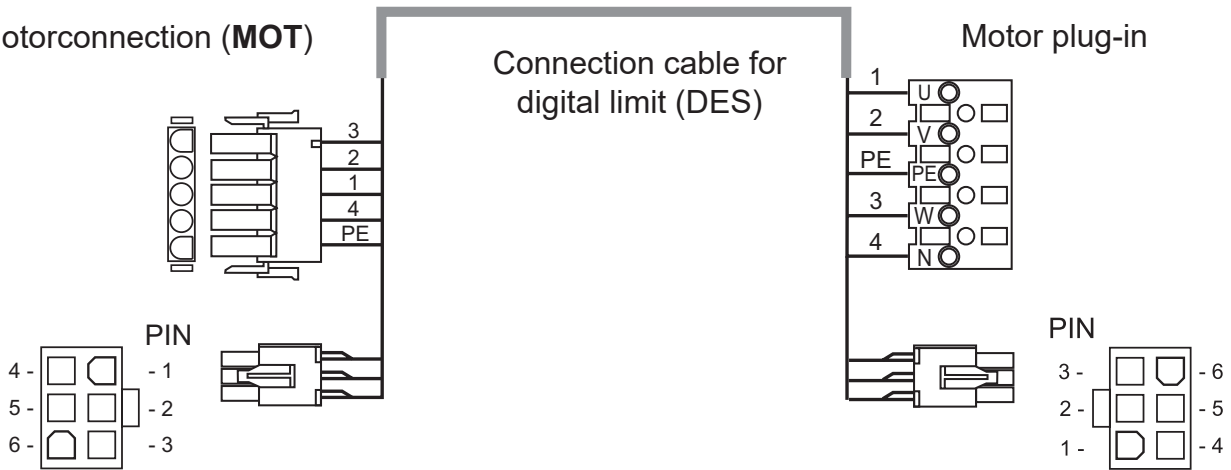
After the drive and control are fitted they can be connected with a plug-in cable. The cable has plugs on each end and for easy fitting. The plugs for motor and control panel are different and cannot be interchanged.

Control panel TS 981

ELEKTROMAT®

Motorconnection (MOT)

Motor plug-in



Cable identification

Motor plug to control unit

PIN	- Wire-No.	Excution:
1	- 3	Phase W
2	- 2	Phase V
3	- 1	Phase U
4	- 4	Neutral (N)
5	- PE	Earth

Limit plug-in to control panel TS 981 (DES)

PIN	- Wire-No.	Excution:
1	- 5	Safety chain 24 V DC
2	- 6	RS485 B
3	- 7	GND
4	- 8	RS485 A
5	- 9	Safety chain
6	- 10	8 V DC

MAINS SUPPLY



DANGER! To the life and health through electric shock.

If a GfA frequency drive FI is installed, it must be used a class B earth-leakage circuit breaker in the mains supply. Other switches can fail and switching unintentionally.



External fuse!

Control must be saved against short circuit and overload by an external fuse, max. 10 A delayed, in the mains supply. An automatic cut off switch is required, regarding the supply for three-phase or single-phase.

When connecting control to mains supply a mains isolator switch or (16 A CEE – plug) according EN 12453 is required. The control panel has an integrated auto controlled power unit for voltages from 230 V up to 400 V +/- 10 %.

The supply disconnect device (Main switch or CEE plug) must be installed between 1,2 m and 1,7 m above floor level.

The Control panel TS 981 has a universal electric supply and works with the following supplies. (See diagram Fig.1-5)

Mains supply terminal

Fig.: 1

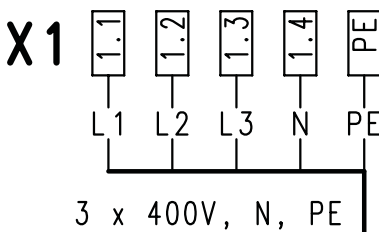
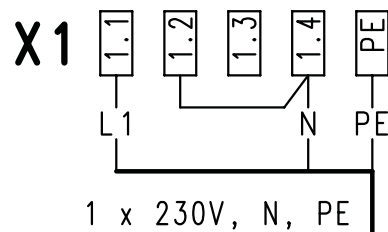


Fig.: 4



symmetric winding

Fig.: 2

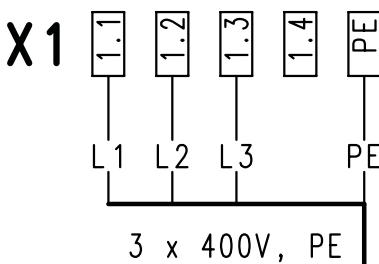
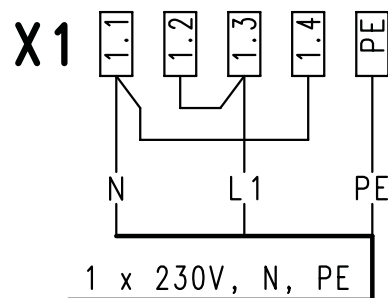
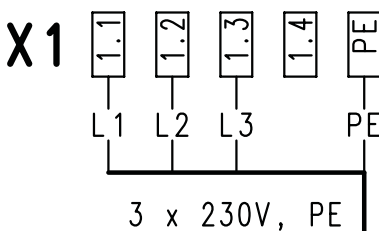


Fig.: 5



asymmetric winding

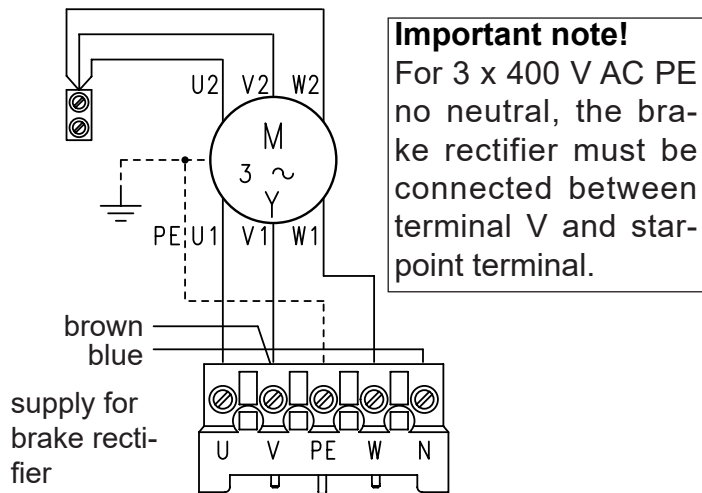
Fig.: 3



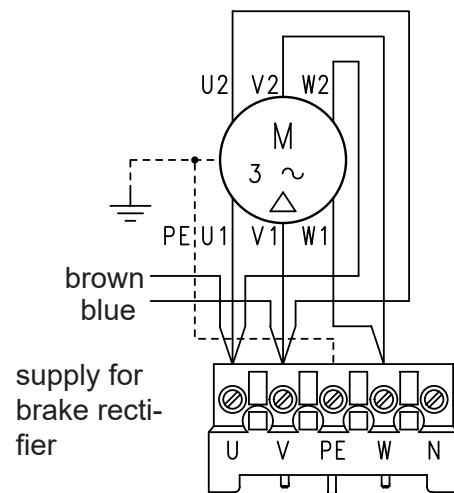
DI = 3 x 400 V
 FI 1,5 kW = 1 x 230 V/N/PE or 3 x 400 V/N/PE
 FI 4,5 kW = 3 x 400 V/PE or 3 x 400 V/N/PE

MOTOR CONNECTION (internal wiring)

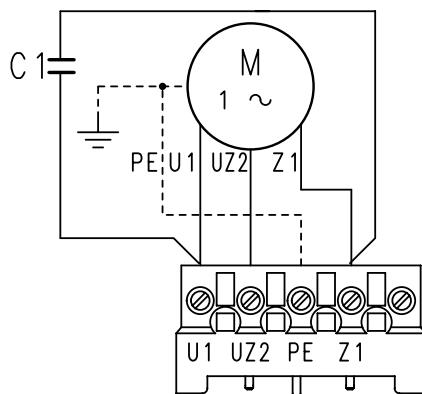
Three-phase 3 x 400 V AC, N, PE
Star connection



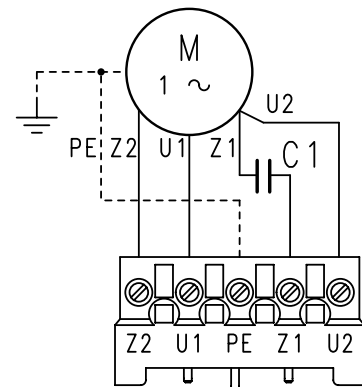
Three-phase 3 x 230 V AC, PE
Delta connection



Single-phase 1 x 230 V AC, N, PE
symmetrical winding



Single-phase 1 x 230 V AC, N, PE
asymmetrical winding



On several ELEKTROMATEN® the connection U1 und V1 on the motor-plug are interchanged.

PHASE ROTATION



Important Notice!

After the mains supply has been connected: To confirm that the phase rotation of the electrical motor is correct the door shall move UPWARDS if the OPEN push button is operated. If the door does not OPEN change first phase rotation.

For all three phase ELEKTROMATEN® even DI: Change wiring at terminal X1: 1.1 – 1.2. For inverter drives FI-ELEKTROMATEN® see page 11.

For all single phase ELEKTROMATEN®: Change wiring at the connection cable plug, change core no. 1+3 reciprocal. For inverter drives FI-ELEKTROMATEN® see page 11.

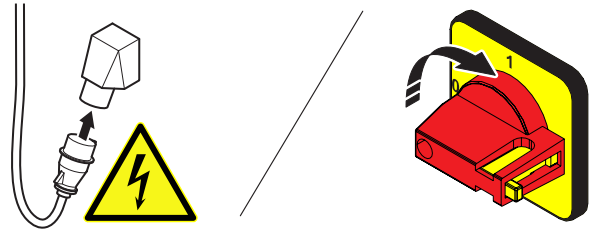


DANGER! To the life and health through electric shock.

Before changing phase rotation the mains supply must be switched OFF.

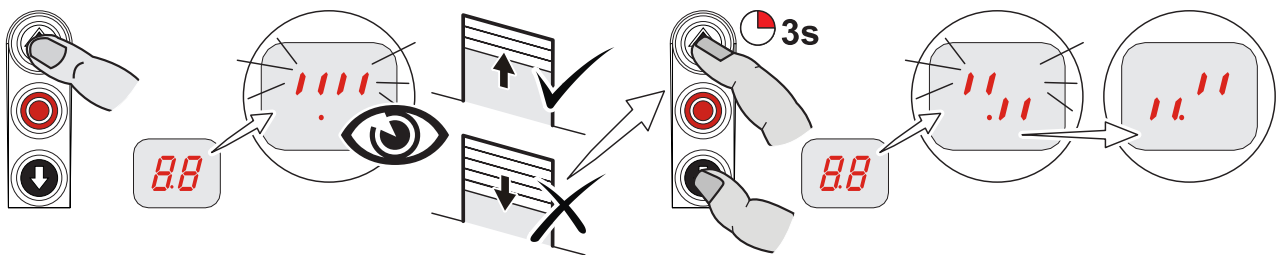
RAPID ADJUSTMENT OF THE LIMITS

Supply cables insert / switch on

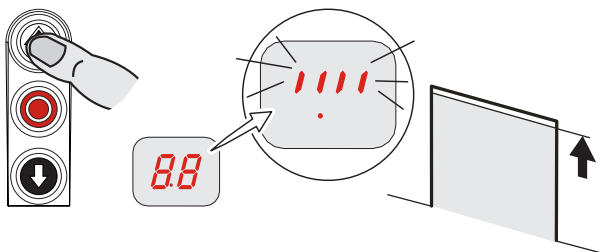


When using a light curtain with OSE signal output (connection to terminal X2), please note **Menu item 0.3** first.

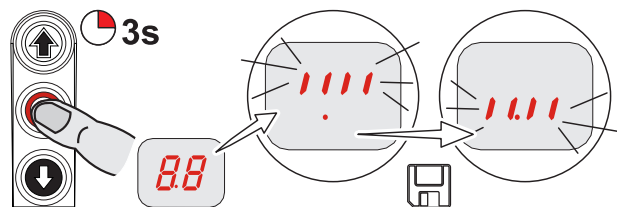
1. Check output rotating direction



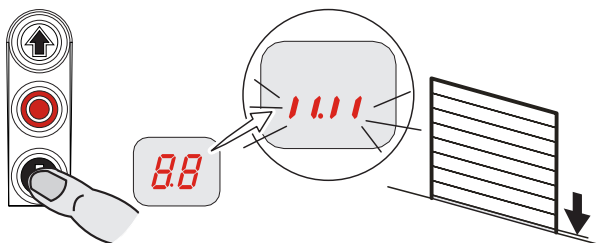
2. Move to OPEN final limit position



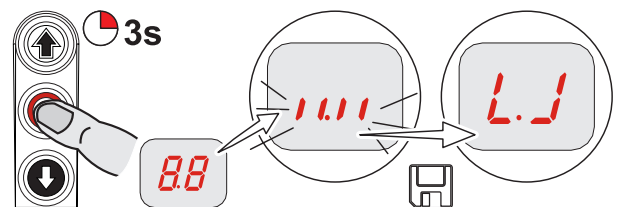
3. Save OPEN final limit position



4. Move to CLOSE final limit position

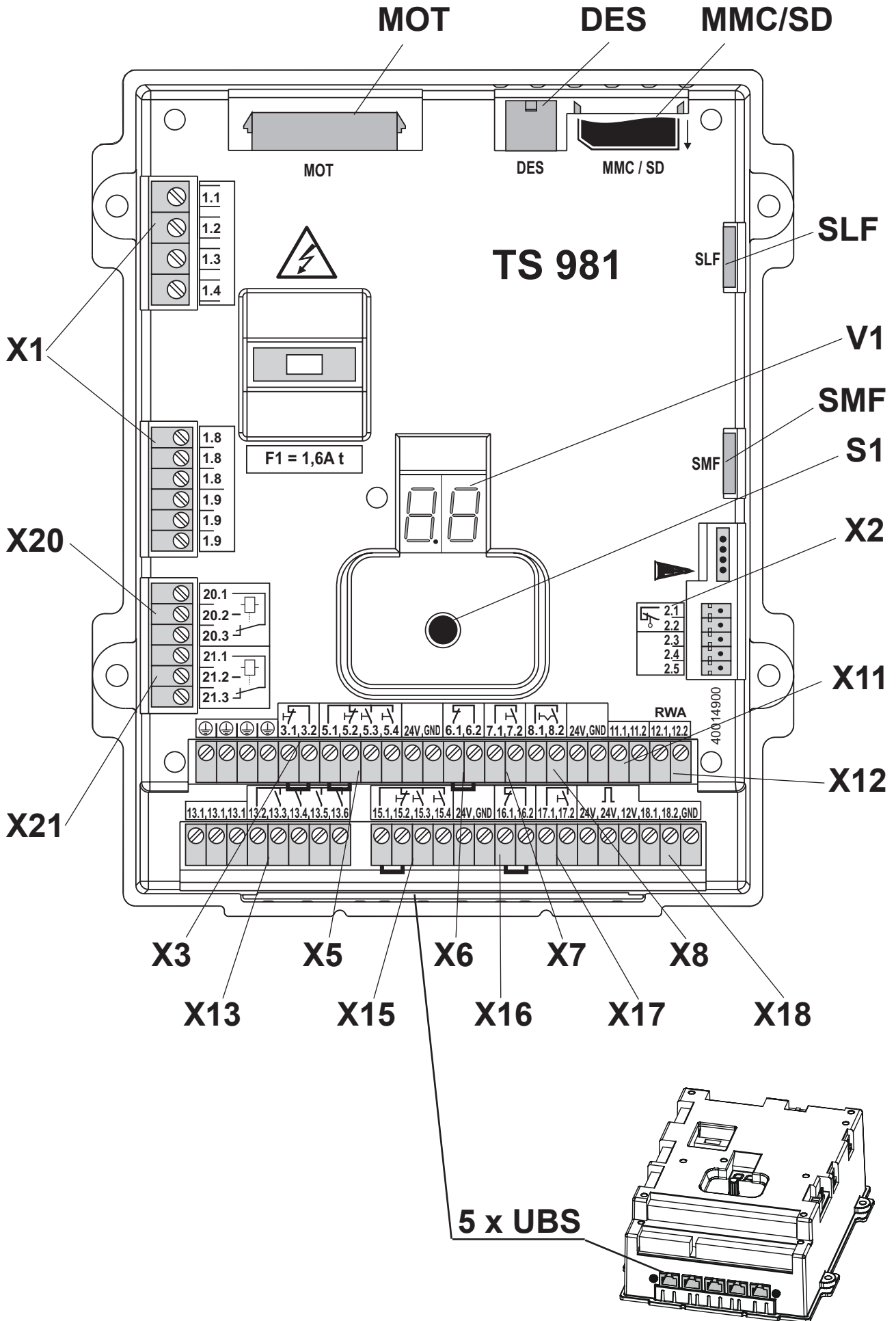


5. Save CLOSE final limit position



After rapid adjustment of the final limit positions, the door operating mode “Hold-to-run” is active. The final limit positions can be corrected later with **Menu item 1.1** to **1.4**. The pre-limit is set automatically with safety edge connected. A correction is possible using **Menu item 1.5**.

HARDWARE OVERVIEW



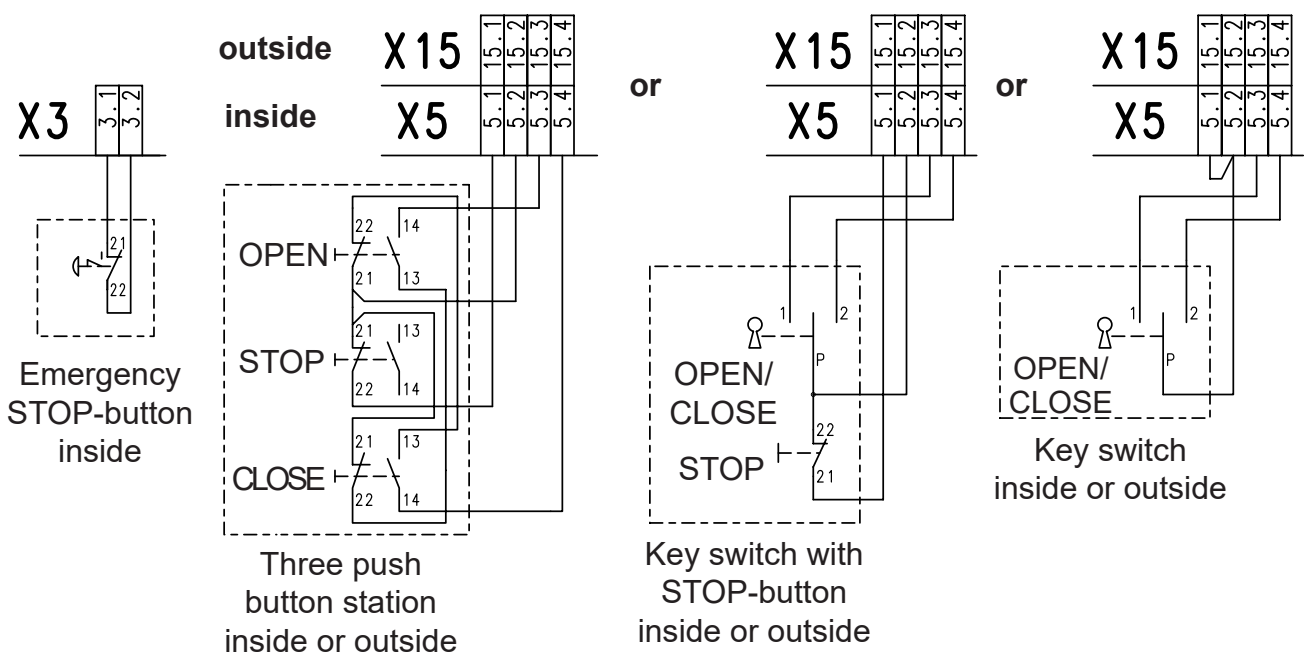
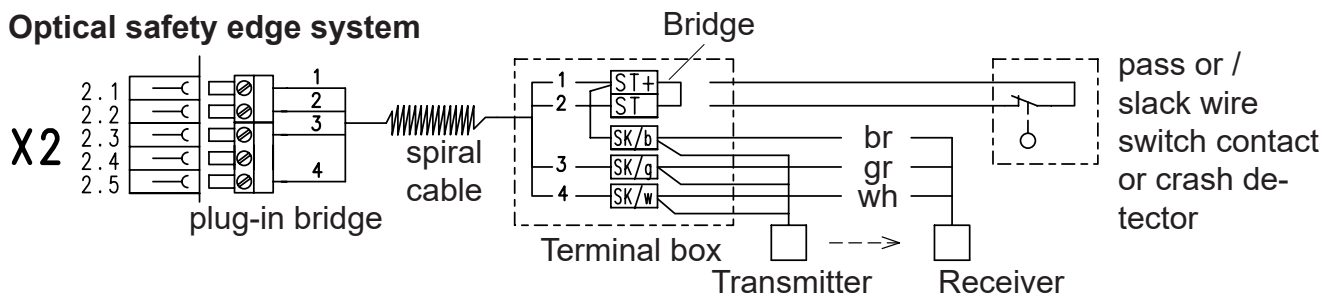
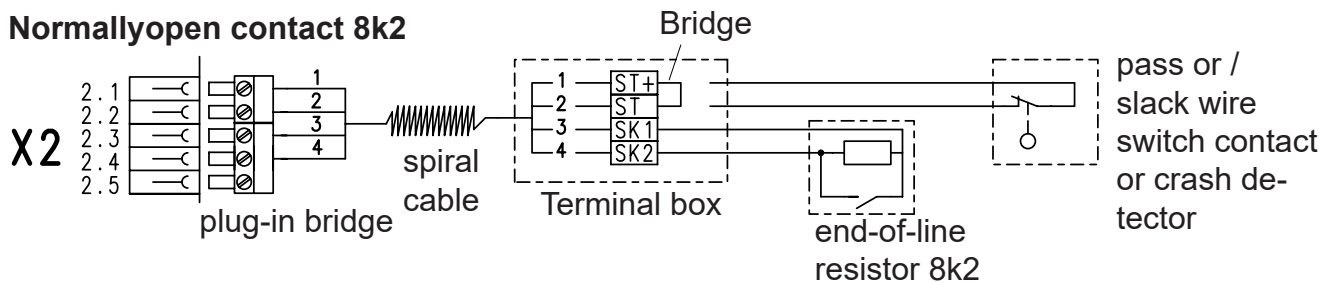
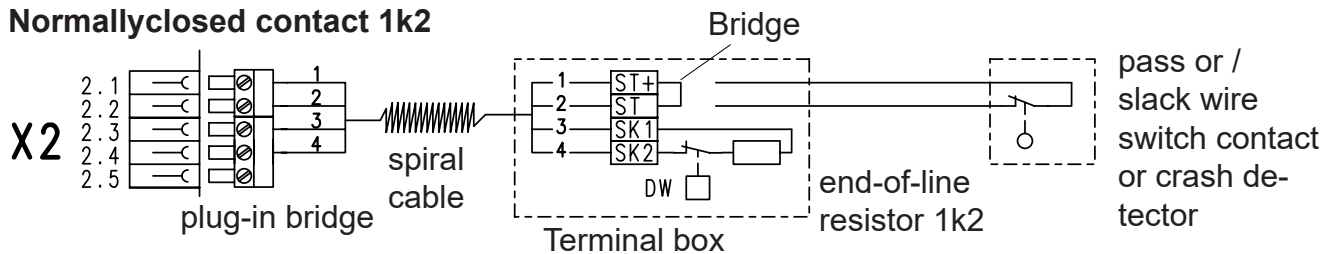
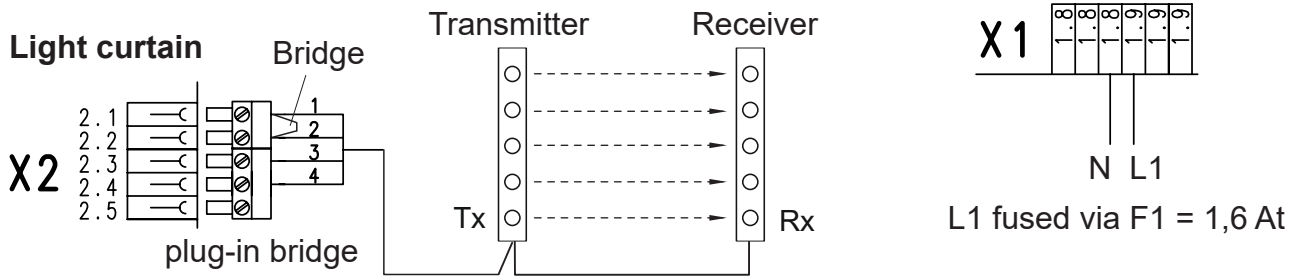
HARDWARE OVERVIEW

Description Print:

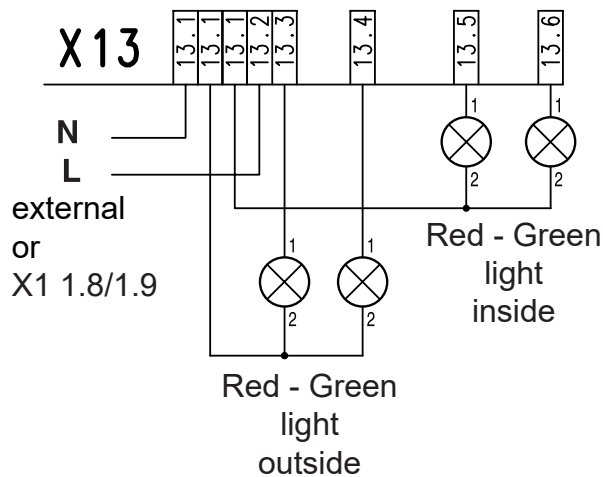
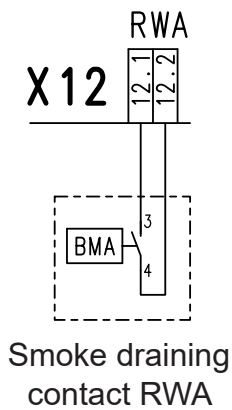
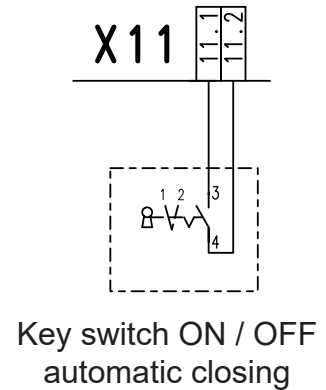
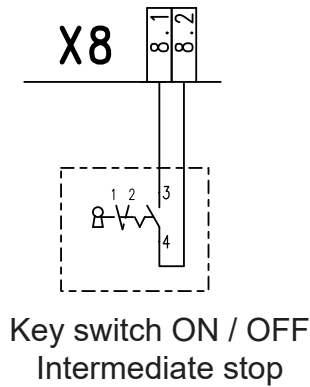
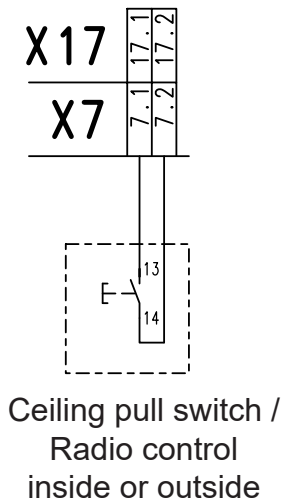
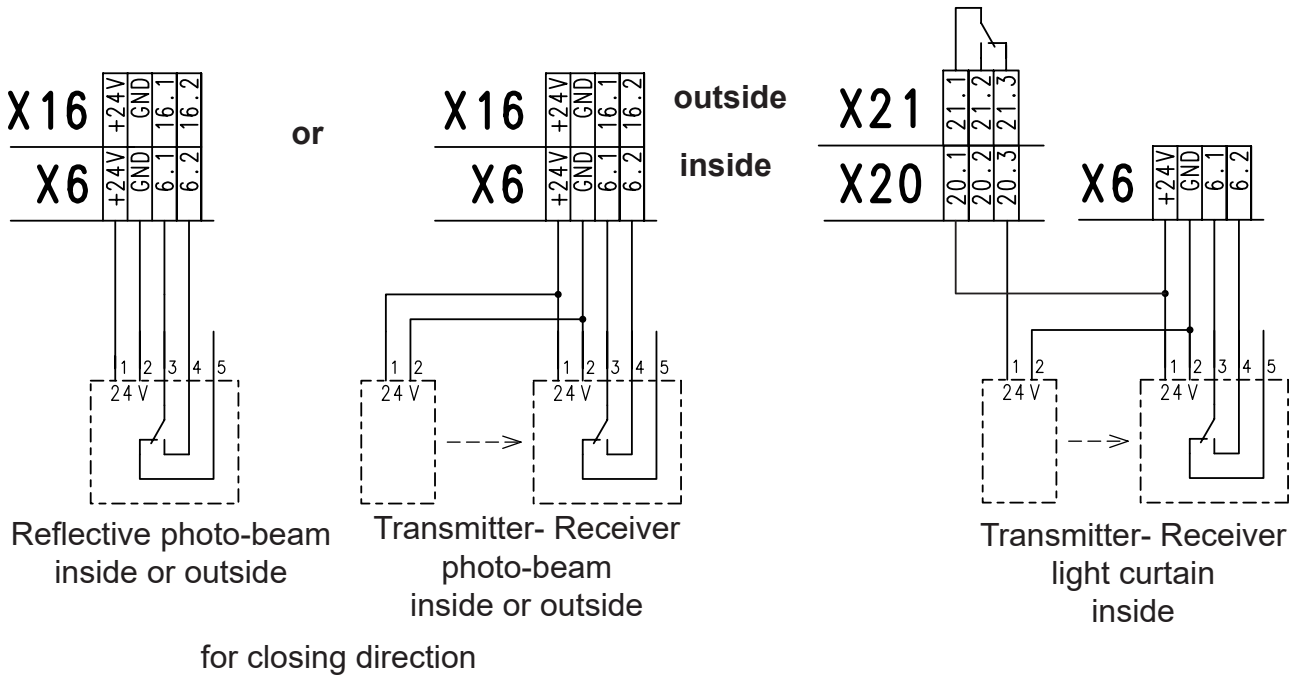
- X1** Mains supply
external supply 230 V
1.9 = L1 L1 fused with F1 = 1,6 A
1.8 = N
(only with 3 x 400 V, N, PE und 1 x 230 V, N, PE symmetric winding)
- X2** Safety edge system and pass-door plug
- X3** Emergency push button
- X8** Key switch for intermediate stop
- X11** Key switch ON / OFF for automatic closing
- X12** Smoke draining
- X13** Traffic lights 2 x Red / Green
- X18** Entrapment safety evaluation
- X20** Potential free relay contact 1
- X21** Potential free relay contact 2
- DES** Limit connection
- MOT** Motor connection
- MMC/SD** Slot for memory cards
- SLF** Slot for Air-lock control function
- SMF** Slot for Status / Information function
- S1** Selector switch
- UBS** Socket for universal command sensor system (5x)
The UBS system is a simple plug-in connection technology from GfA. The control devices are connected to the control by a commercially available patch cable and detected automatically. The UBS devices function in the same way as wired control devices.
- V1** 7-segment display
- ▶** Internal push button

Command from inside	Command from outside
X5 Three push button / Key switch	X15 Three push button / Key switch
X6 Reflective photo-beam / photo-beam	X16 Reflective photo-beam / photo-beam
X7 Ceiling pull switch / Radio control	X17 Ceiling pull switch / Radio control

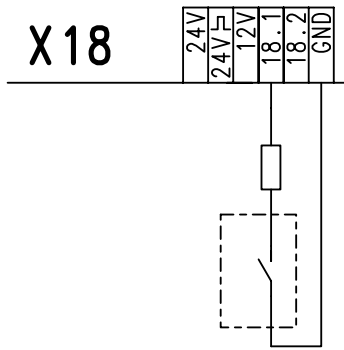
WIRING DIAGRAM



WIRING DIAGRAM

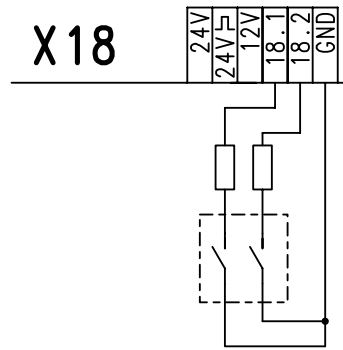


WIRING DIAGRAM

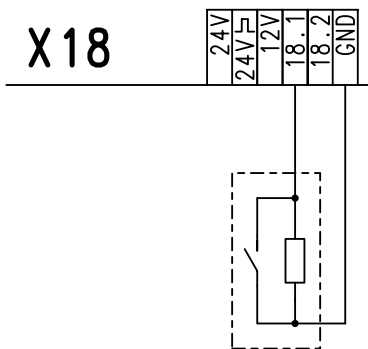


Input for external entrapment safety device 1k2 single

or

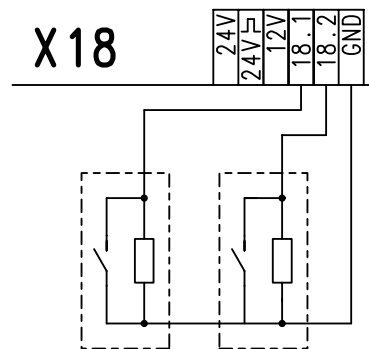


Input for external entrapment safety device 1k2 double

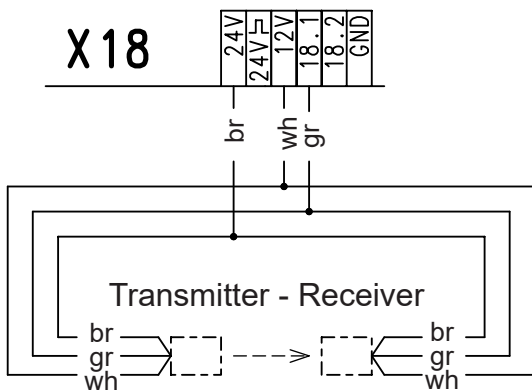


Input for safety edge 8k2 against entrapment single

or

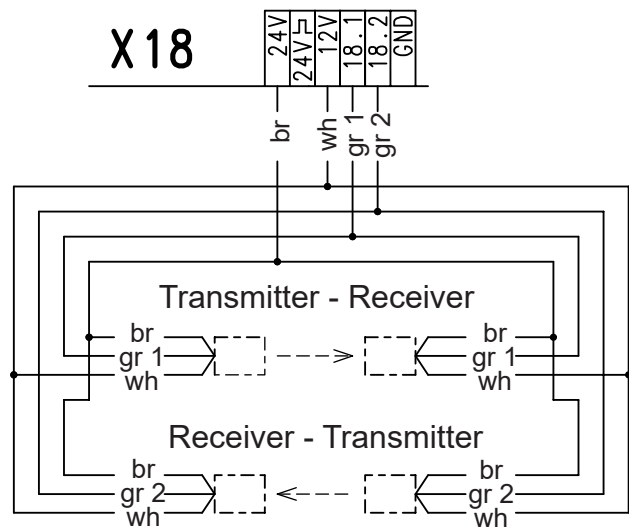


Input for safety edge 8k2 against entrapment double



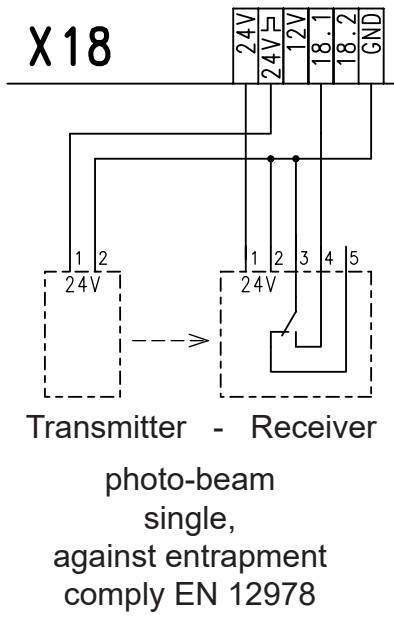
Raytector photo-beam or Optical safety edge against entrapment single

or

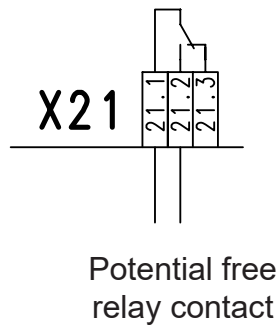
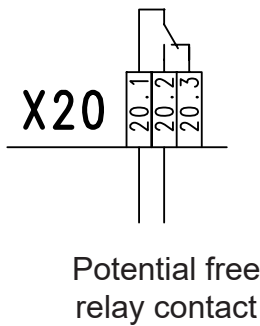
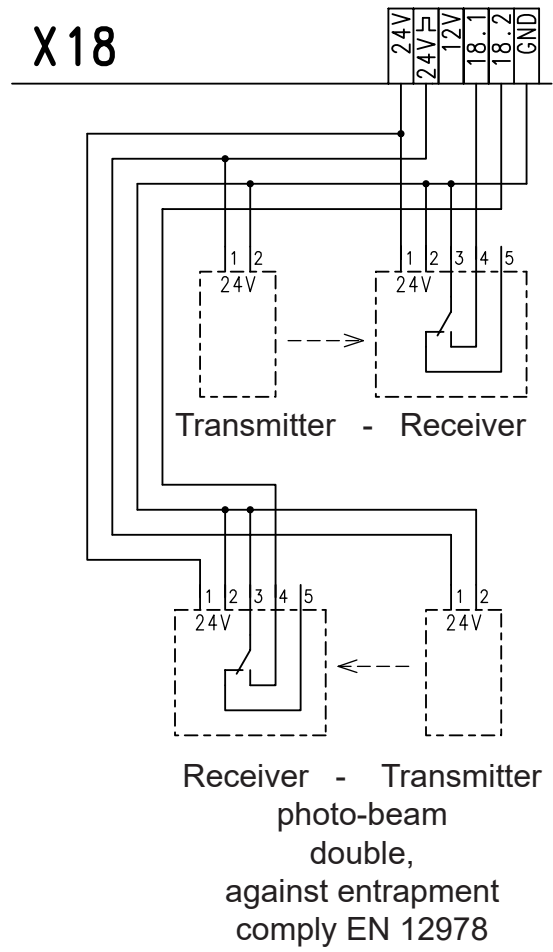


Raytector photo-beam or Optical safety edge against entrapment double (inside - outside)

WIRING DIAGRAM

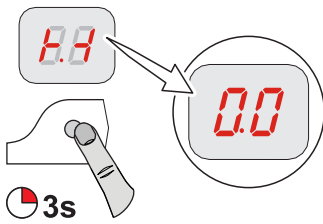


or



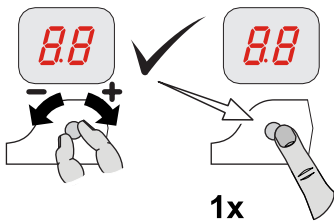
CONTROL PROGRAMMING

1. Start programming

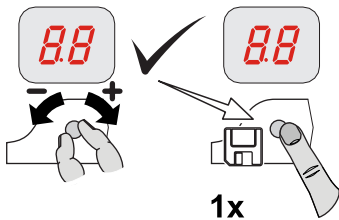


Complete programming is only possible after setting the final limit positions!

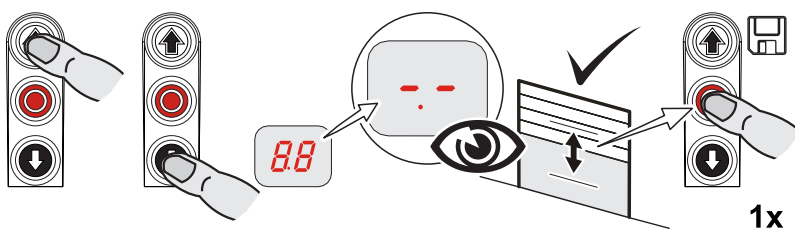
2. Select Menu item and confirm



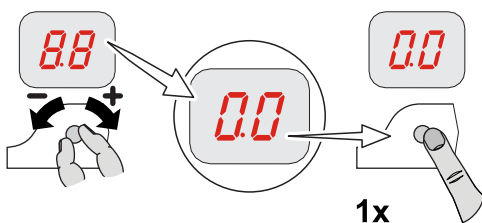
3.a) Set and store functions























3.b) Set and store positions (DES)










4. Exit programming






CONTROL PROGRAMMING

2. Choose program and confirm	3. Adjustment	4. Memorise
Operating mode		
0.1 Door function	 <ul style="list-style-type: none"> .1 Hold-to-run OPEN Hold-to-run CLOSE .2 Self-hold OPEN Hold-to-run CLOSE .3 Self-hold OPEN Self-hold CLOSE .4 Self-hold OPEN, CLOSE (X5/X15) release for external push-button function only hold-to-run close .6 Hold-to-run OPEN Hold-to-run CLOSE with active safety edge 	 Press selector
0.3 Special function NOTE! This Menu item is only enabled at initial operation or after a complete reset. The selection must be made before setting the final limit positions.	 <ul style="list-style-type: none"> .1 Spiral cable or Radio-Safe .2 Light curtain NOTE! The selection is retained even after a reset but can then be changed.	 Press selector
Door position		
1.1 Final limit open coarse adjustment	 <ul style="list-style-type: none"> -- Move door upwards or downwards 	 Press STOP-button
1.2 Final limit close coarse adjustment	 <ul style="list-style-type: none"> -- Move door upwards or downwards 	 Press STOP-button
1.3 Final limit open fine adjustment	 <ul style="list-style-type: none"> -.0 Final limit open can change without door movement using +/- 	 Press selector
1.4 Final limit close fine adjustment	 <ul style="list-style-type: none"> -.0 Final limit close can change without door movement using +/- 	 Press selector
1.5 Pre-limit safety edge fine adjustment	 <ul style="list-style-type: none"> -.0 Pre-limit safety edge can change using +/- 	 Press selector
1.6 Intermediate stop	 <ul style="list-style-type: none"> -. Move to intermediate stop 	 Press STOP-button
1.7 Switching position Relay 1	 <ul style="list-style-type: none"> -. Move to switching position relay 1 	 Press STOP-button
1.8 Switching position Relay 2	 <ul style="list-style-type: none"> -. Move to switching position relay 2 	 Press STOP-button











CONTROL PROGRAMMING

2. Choose program and confirm	3. Adjustment	4. Memorise
Functions		
2.1 Safety edge function in Pre - limit area	 <ul style="list-style-type: none"> .1 Safety edge is activated .2 Safety edge is deactivated .3 Safety edge is activated + automatic ground adjustment .4 Active safety edge + re-open 	<input type="radio"/> Press selector
2.2 Overrun correction	 <ul style="list-style-type: none"> .0 OFF .1 ON 	<input type="radio"/> Press selector
2.3 Automatic closing	 0.0 Time can be set between 1 s - 240 s 0 = OFF	<input type="radio"/> Press selector
2.4 Reaction of automatic closing to photo cell / light curtain	 <ul style="list-style-type: none"> .0 OFF .1 Stopping of automatic closing and CLOSE command .2 Vessel recognition Stopping of automatic closing and CLOSE command when actuated for >1.5 seconds 	<input type="radio"/> Press selector
2.5 Reverse in case of obstacle	 <ul style="list-style-type: none"> .0 OFF .1  1.0 Adjustable from 1 to 10 Number of safety device actuations 	<input type="radio"/> Press selector
2.6 Step by Step function (X7 / X17): Only Ceiling pull switch / Radio remote control	 <ul style="list-style-type: none"> .1 X7 / X17 = Command 1 .2 X7 = Command 1, X17 = Command 2 .3 X7 = Command 2, X17 = Command 1 .4 X7 / X17 = Command 2 .5 X7 / X17 = Command 3 	<input type="radio"/> Press selector










CONTROL PROGRAMMING

2. Choose program and confirm	3. Adjustment	4. Memorise
Functions		
<p>2.7 Function Relay 1 only available with Menu item 1.7</p> <p>2.8 Function Relay 2 only available with Menu item 1.8</p>	<p> .0 OFF</p> <p>.1 Switch contact impulse: 1s</p> <p>.2 Switch contact continuous</p> <p>.3 Switch contact impulse: 1s by open - commands</p> <p>.4 Extended switch contact similar NES cam</p> <p>.5 Light curtain testing at final Open position before closing</p> <p>.7 External brake supply</p> <p>.8 Smoke and heat extraction</p>	<p><input type="radio"/> Press selector</p>
<p>2.9 Functions Intermediate Position</p> <p>ATTENTION! .2 and .3 not applicable with traffic light function and inerlocking function. Menu item 6.1 to .0 Menu item 7.1 to .0</p>	<p> .1 Intermediate position terminal input via X7 / X17 and Three Push Button X5 / X15</p> <p>.2 Intermediate position terminal input via X7 / X17; and fully open via Three Push Button X5 / X15</p> <p>.3 Intermediate position terminal input via X7 / X17; and fully open via Three Push Button X5 / X15</p>	<p><input type="radio"/> Press selector</p>
Safety functions		
<p>3.1 Door overload monitor</p>	<p> .0 OFF</p> <p>.1 Sensitive</p> <p>.2 Insensitive</p>	<p><input type="radio"/> Press selector</p>

CONTROL PROGRAMMING

2. Chose program and confirm	3. Adjustment	4. Memorise
Safety functions		
3.2 Photo beam interrupt function	 .0 OFF .1 ON	 Press selector
3.4 Function: Door safety switch	 .1 Slake rope / Pass door .2 Crash detector via NC Contact .3 Crash detector via NO Contact	 Press selector
3.5 RWA smoke draining position	 -. Move to RWA position, up to a minimum height of 2,5 m	 Press STOP-button
3.7 Selection of external safety against entrapment devices	 .0 OFF .1 NC contact evaluation 1k2 without testing single .2 NC contact evaluation 1k2 without testing double .3 NO contact evaluation 8k2 single .4 NO contact evaluation 8k2 double .5 Impulse-evaluation 1 kHz (Raytector or OSE) single .6 Impulse-evaluation 1 kHz (Raytector or OSE) double .7 Impulse-evaluation testing signal (Transmitter – Receiver photo-beam) single .8 Impulse-evaluation testing signal (Transmitter – Receiver photo-beam) double .9 Impulse-evaluation 1 kHz (optical safety devices) single; → only STOPP ← 1.0 Impulse-evaluation 1 kHz (optical safety devices) double; → only STOPP ←	 Press selector
3.8 This is the reaction time actuation of the safety edge up to the moment that the door re-opens	 -.0 Normal re - open time -.1 Re - open time reduction -.1 Re - open time extension .1 Three adjustment levels available	 Press selector

CONTROL PROGRAMMING

















2. Choose program and confirm	3. Adjustment	4. Memorise
Settings only for ELEKTROMATEN® with direct / frequency converter DI/FI		
4.1 OPEN output speed	 0.0 Output speed rpm	<input type="radio"/> Press selector
4.2 CLOSE output speed	 0.0 Output speed rpm When a safety device is triggered, the door moves at reduced speed.	<input type="radio"/> Press selector
4.3 Increased CLOSE output speed	 0.0 Output speed in rpm Up to an opening height of 2.5 m 0 = OFF When a safety device is triggered, the door moves at reduced speed.	<input type="radio"/> Press selector
4.4 Changeover position to CLOSE output speed	 - - Approach and store desired door position (With adherence to minimum opening height requirement of 2.5 m!)	<input checked="" type="radio"/> Press STOP-button
4.5 OPEN acceleration	 0.0 Setting for DI in 1.0 s steps FI in 0.1 s steps	<input type="radio"/> Press selector
4.6 CLOSE acceleration	 0.0 Setting for DI in 1.0 s steps FI in 0.1 s steps	<input type="radio"/> Press selector
4.7 OPEN deceleration	 0.0 Setting for DI in 1.0 s steps FI in 0.1 s steps	<input type="radio"/> Press selector
4.8 CLOSE deceleration	 0.0 Setting for DI in 1.0 s steps FI in 0.1 s steps	<input type="radio"/> Press selector
4.9 OPEN/CLOSE crawling speed	 0.0 Output speed rpm	<input type="radio"/> Press selector



The appeared numbers for output speed OPEN and CLOSE corresponding to the real RPM of the drive unit. The speed has a direct influence into operating forces of the door. The maximum and minimum speed will be delivered by the drive unit in use and can not be raised or reduced.

Check again the adjustment and drive unit's speed.

CONTROL PROGRAMMING

2. Choose program and confirm	3. Adjustment		4. Memorise
Extended door functions			
6.1 Traffic light management selection Attention! Menu item 2.9 .2 and .3 not applicable		.0 OFF .1 One-way traffic .2 Two-way traffic - priority OFF .3 Two-way traffic - priority inside .4 Two-way traffic - priority outside	 Press selector
6.2 Extended green light period		.0 Adjustment 0 s - 90 s	 Press selector
6.3 Fore-warning period		.0 Adjustment 0 s - 10 s	 Press selector
6.4 Gateway evacuation period		.0 Adjustment 0 s - 90 s	 Press selector
6.7 Red light function if the door is CLOSED		.0 OFF .1 Red light inside ON .2 Red light outside ON .3 Red light inside/outside ON	 Press selector
7.1 Air-lock function Attention! Menu item 2.9 .2 and .3 not applicable		.0 OFF .1 ON	 Press selector
7.2 Door OPEN command transmission if the Air-lock function is ON		0.0 Time adjustment between 0 s – 10 s. Delayed opening door 2 starts if door 1 is closed	 Press selector
7.5 Status message function SMF ON / OFF		.0 OFF .1 SMF for message module .2 SMF for unidirectional RS 232 interface module	 Press selector




CONTROL PROGRAMMING

2. Chose program and confirm		3. Adjustment		4. Memorise	
Maintenance cycle counter					
8.5 Counter adjustment		0.0	01-99 correspond from 1.000 up to 99.000 Count down cycles		Press selector
8.6 Reaction when reaching 0		. 1	Display appears „CS“ and adjusted number of cycles		Press selector
		. 2	Changing to Hold-to-run display appears „CS“ and adjusted number of cycles		
		. 3	Changing to Hold-to-run same as „.2“ reset to about 500 cycles possible, press 3 s Stop – Button		
		. 4	Display appears „CS“ and adjusted number of cycles and Relay contact is activated		




MEMORY CHECK


2. Chose program and confirm		Displayed	
9.1 Info Cycle counter 7- digit		 M HT ZT T H Z E	<p>The cycles would be displayed as follow.</p> <p>M = 1.000.000 H = 100</p> <p>HT = 100.000 Z = 10</p> <p>ZT = 10.000 E = 1</p> <p>T = 1.000</p>
9.2 Info last 2 faults			Last 2 faults would be alternately displayed.
9.3 Info Program changes 7- digit		 M HT ZT T H Z E	<p>The Number of program changes would be displayed as follow.</p> <p>M = 1.000.000 H = 100</p> <p>HT = 100.000 Z = 10</p> <p>ZT = 10.000 E = 1</p> <p>T = 1.000</p>
9.4 Info Program version			Program version will be displayed

RESET

2. Chose program and confirm	3. Adjustment		4. Memorise
9.5 RESET except cycle- and Program change counter	 	. 1 Reset	 Press STOP-button 3 s

SOFTWARE

2. Chose program and confirm	3. Adjustment		4. Loading
9.7 Software loading	 	Select required software version from S-D card 1. 1	 Press STOP-button 3 s

2. Chose program and confirm	
9.8 Software saving	 Press selector

SAFETY DEVICES

Door safety switch X2

This switch could be fitted on to the surface of the door and will be connected with the spiral cable into the control panel. This door safety switch can used and programmed in two functions.

Menu item 3.4 a change of function can be realised.

Function	Reaction following the activation	
Slake rope / Pass door	Contact interrupted:	No reaction door stops
	Contact closed:	Door ready to run.
Crash detector	Contact interrupted:	Door will stop immediately out of the movement.
	Contact closed:	Switches the door function into Hold-to-run Mode. (If a GfA frequency inverter drive would be in use, the function changes to very slow speed). A reset is available and made when pushing the built-in STOP-button for a minimum of three seconds.

Input for safety devices X2

The control recognizes and works with 3 different safety edges.

Alternatively, a light curtain can be connected.

Each one needs a special 4 core spiral cable and includes an optional shutter pass - door or slack wire switch contact.

The spiral cable connection must be made on the print with the plug provided. The opposite side of the cable is connected to a terminal box or a signal (pressure switch) emitter.



Important note!

Connect safety edge systems in accordance with EN 12978.

"Hold-to-run" door operating mode can always be used should the safety edge be defective.

Electrical safety edge

The input is meant for an electrical safety edge (NO) with a terminal resistance of 8k2 (+/-5 % and 0,25 W).

If there is a short circuit, fault indication F2.4 is displayed.

If there is an open circuit, the F2.5 fault indication appears.

Pneumatic safety edge

The input is meant for a pressure wave switch system (NC) with a terminal resistance of 1k2 (+/-5 % and 0,25 W). Upon activation or permanent disconnection of the current circuit, the F2.6 fault indication appears.

If there is a short circuit, fault indication F2.7 is displayed.

The pressure wave switch system needs to be tested with CLOSE final limit position. The test phase is initiated automatically by the pre-limit for DES. If no switching signal is generated on the pressure wave switch within 2 seconds, the test is negative and the fault indication F2.8 is displayed.

SAFETY DEVICES

Optical safety edge system

The input is meant for an infrared safety beam sensor with transmitter and receiver in a rubber profile. By pressing the rubber profile, the light beam is interrupted.

The F2.9 fault indication appears upon activation or a faulty safety edge system.

Light curtain

The light curtain detects people and obstacles without contact. If a light beam from the light curtain is interrupted, the door moves to final limit position OPEN. When the light beam is interrupted, fault indication F4.6 appears. When using a light curtain, **Menu item 0.3** must be set to function ".2".

Installation of the spiral cable

The spiral cable should enter the door control panel from the left- or right-hand side. The spiral cable should be fixed in place with a cable gland. The safety edge system is connected via the 3-pole plug, and the slack-rope or the pass door via the 2-pole plug.



Important note!

When using a safety edge system the automatic pre-limit adjustment (5 cm) must be checked. When the safety edge is activated the door should stop and reverse to the open position.

SAFETY DEVICES

Function of the safety edge system

With **Menu item 2.1** the function of the safety edge system can be chosen.

Function	Reaction following the activation
Active safety edge	Stop
De-activated safety edge	No reaction, door moves until final limit close only for folding doors
Active safety edge+ downward automatic floor adjustment	Stops and automatically re-adjusts the final limit with the next movement
Active safety edge + re-open	Re-opens the door up to the half way of the overrun way

The function 'Auto ground adjustment' is used for doors with a cable e.g. Sectional doors or vertical lift-gate. An automatic correction of slackness or change of ground height up to 2 cm - 5 cm is possible. The slack wire switch is still recognised.



Important note!

To use the automatic floor adjustment, the safety edge must be operated in the door closed position by an auxiliary puffer switch.



Important !

The automatic ground adjustment works only when the following safety edge systems are connected:
Electrical safety edge 8k2 or optical safety edge system.


The active safety edge function with re-open function shall be used only if the overrun way of the door will be more than 5 cm.



Important note!

When the safety edge has been operated twice the automatic closing feature will be interrupted and fault F2.2 will be displayed.

With **Menu item 2.5** (reversing in case of obstacle) you can set the number of closing attempts.

To reset the fault press the internal push button  so that the door travels down until the final limit is reached.

SAFETY DEVICES

Pass door / slack rope switch input X2

The pass door switch Entrysense features a protective function complying with safety category 2 under EN 954-1. The electrical contact is monitored by the control panel that outputs fault F1.7 when it malfunctions.

The electronic pass door switch Entrysense: Function and test

The pass door switch Entrysense is fitted with two reed contacts that are switched by a permanent magnet. The control panel evaluates the switching states and the contact resistance independently of each other.

At the lower limit position F1.2 is displayed when an OPEN command is given and at the same time the pass door / slack rope switch circuit is open. The door can be moved only after the pass door has closed or when the pass door / slack rope switch circuit signals OK. If the circuit will be opened when the door is moving the door is stopped immediately.

F1.7 is displayed when an OPEN command is given after the door controller has detected beforehand asymmetrical pass door switch positions (see below for reasons). This fault can be reset when the door is reopened. This ensures that contact misalignments caused by vibrations from the moving door do not trigger door shutdown.

Possible reasons for fault F1 .7

Decription	Measures to solve the problem
Door was not fully closed for longer than 2 s so that only one reed contact was switched during this time.	Reopen and close the door.
The control voltage was less than 21.6 V for longer than 2 s (by 10 %).	Measure the control voltage at the terminals 24 V-GND. After troubleshooting reopen and close the door.
Contact resistances too high in the pass door / slack rope switch circuit	With the pass door closed: Measure resistance and if necessary replace the contact resistances in the pass door / slack rope switch circuit.
Electronic pass door switch is not installed correctly: <ul style="list-style-type: none">• Distance between switch and magnet too large• Switch and magnet not attached at the same height• Switch installed at wrong position	Check that the shutter pass door switch is installed correctly. After troubleshooting reopen and close the door.

FUNCTION DESCRIPTION

Emergency stop X3

Connection of an emergency stop control device as per EN 13850 or an evaluation unit for an anti-trap safety device. The F1.4 fault indication appears upon activation.



Important note!

Frequency inverter drive unit: The emergency stop switches the supply off. The door control can only be operated again 30 seconds after unlocking the emergency stop. (Display rotates during this time)

Internal push button / Three push button / Key switch X5 / X15

Internal and external push button

Internal and external push button working separately from each other. Pushing at the same time, the internal push button has priority.



Important note!

Hold-to-run mode UP and DOWN with internal push button.
Hold-to-run mode DOWN with external push button.

(Menu item 0.1 Adjustment „4“)

In Hold-to-run mode the user shall be in full view of the door throughout its travel.

Automatic closing

Menu item 2.3 the timer works between 1 s - 240 s If the automatic closing is active, the shutter will close, from each limit position after the pre-adjusted time.



Important note!

The timer can be interrupted by pressing the internal pushbutton stop when the shutter has reached a limit position. With a new command UP / DOWN the timer is re-set.

Reaction of automatic closing to photo cell / light curtain

Menu item 2.4 can be used if the timer operation is required after interrupting and re-making the photo-beam / Light curtain. The door closes after 3 seconds.

FUNCTION DESCRIPTION

Through / Reflective photo cell **X6 / X16** or Light curtain **X6**

Photo cell **X6 / X16**

A photo cell is used for presence detection. It is only active in door operating mode „.3“ and „.4“, in the OPEN limit position or during the closing operation.

If the photo cell is interrupted, fault indication F2.1 appears.

Light curtain **X6**

The light curtain must be self-testing and correspond at least to safety category 2. If the light curtain corresponds to these requirements, the door can close into self-hold without safety edge system.



Important note!

- Operation without safety edge system, connect 8k2 resistor via terminals X2/3 and X2/4
- Photo cells must not be used via the UBS system
- Do not use **Menu item 3.2** for the light curtain

To test the light curtain, activate relay contact X20 or X21. Description of the relay functions see **Menu item 2.7 or 2.8**.

If the photo cell is interrupted, fault indication F4.6 appears.

Testing is carried out at each CLOSE command, the contact of the light curtain must switch off within 100 ms. If the test is positive, the contact must switch back on within 300 ms. If the test fails, fault indication F4.7 appears.

Reset fault indication F4.7: Switch control off and on.



Important note!

Only photo cells or light curtains with „Light switching“ mode

Effect of obstructing the photo cell

Door position	Effect of obstructing photo cell
CLOSE limit position	No function
Upwards travel	No function
OPEN limit position Without automatic closing	No function
OPEN limit position With automatic closing delay timer 2.3	Reset automatic closing
OPEN limit position With automatic closing delay timer 2.3 and photo cell interrupt function 2.4	The door close 3 seconds after the photo cell is re-made
Downwards travel	The door stops and re-opens

FUNCTION DESCRIPTION

Reaction of automatic closing to photo cell / light curtain: Menu item 2.4:

Function	Reaction of automatic closing to photo cell / light curtain
„.0“	No function
„.1“ Stopping automatic closing	The door closes 3 seconds after the photo cell is re-made
„.2“ Vehicle recognition	As above „.1“ but the photo cell must be obstructed for more than 1.5 seconds.No function if the photo cell is obstructed for less than 1.5 seconds

Photo cell ignore function: Menu item 3.2:

Function	Photo cell function disabled
„.0“	Off
„.1“	On

Set **Menu item 3.2** = „.1“ and then exit programming to activate the „photo cell ignore“ teach-in mode.



Warning!

Presence detection „stop and re-open“ is disabled in the Teach-in mode

In the Teach-in mode, the door must be fully opened and closed twice. The photo cell must be interrupted twice at the same door position. The Teach-in mode then terminates. The photo cell does not function below this stored door position.

Teach-in mode display	
Upon exiting the programming	2.4
When the light beam is interrupted for the first time (1 st open / close cycle)	1.4
After the second interruption of the light beam, 2 nd open / close cycle and must be at the same door position as the interruption in the 1 st cycle, at the final limit CLOSE position	L.J



Important note!

If the teaching-in is not successful, open and close the door again until the photo cell has been interrupted at the same door position twice.

FUNCTION DESCRIPTION

Ceiling pull switch / Radio control X7 / X17

It is possible to connect a ceiling pull switch or a radio receiver.

The radio receiver's switching contact must be potential free. **Menu item 2.6: Several types of commands can be adjusted.** With each command (impulse) the shutter operates in the following sequences.

With each command (contact) the shutter operates in the following sequence:

Command 1: Without STOP

Shutter position	Shutter operation
Shutter closed	Shutter travels to fully OPEN*-position
Shutter moving upwards	No reaction
Shutter open	Shutter moves to fully closed position
Shutter intermediate position open	Shutter moves to fully closed position
Shutter moving downwards	Shutter will STOP and moves BACK UP to final open Position*)

*) or to the intermediate stop position when the key switch is in the ON position

Command 2: With STOP

Shutter position	Shutter operation
Shutter closed	Shutter moves to fully open* or intermediate position
Shutter moving upwards	Door closed
Shutter open	Shutter moves to fully closed position
Shutter intermediate position open	Shutter moves to fully closed position
Shutter somewhere in between position	Shutter moves in opposite direction
Shutter moving downwards	Door closed

*) or to the intermediate stop position when the key switch is in the ON position

Command 3: OPEN

With each impulse the door travels to the final open position

Key switch – intermediate stop X8

Intermediate stop can be activated / de-activated by connecting a key switch (latching ON-OFF). The intermediate shutter position „PART OPEN“ is only in effect in the upwards direction and is the new open position.

In **Menu item 1.6** the position can be adjusted. This is the new final position.

By turning the key switch to the OFF position, the shutter works in standard mode.

Menu item 2.9 Adjustment of these several functions.

To get adjusted function working the terminals X8.1 / X8.2 need to be bypassed.



Important note!

To ensure error free function of the panel, the terminal X8 must not be used without intermediate stop adjustment.

FUNCTION DESCRIPTION

Key switch (latching) interrupt automatic closing X11

The automatic closing time can be interrupted with a normally open switch (latching)

Smoke draining (RWA) X12

With this special function the door may be used for smoke and heat draining (RWA) according to an industrial buildings directive for buildings up to 1600 sqm.

Menu item 3.5 here the height may be adjusted, to where the shutter shall move when Alarm is given. Under **Menu item 2.7 / 2.8**, a relay contact with the setting „8“ indicates the approached door position for smoke and heat exhaust.



Attention!

The adjusted height for this RWA- requirement must be a minimum height of 2,5 m and works only if adjusted.

If the contact which is related to X12.1 / 12.2 will be triggered (closed) by a signal supplied by the central fire detector (BMA) the shutter will travel up to the adjusted height (RWA position). The contact must be kept continuously close at all the time when the shutter travels. When the door travels in RWA function the control sets all safety devices (safety edge, photo-beam, etc.) and pushbutton signals (OPEN-STOP-CLOSE) out of order. External safety switches as emergency stop, further in function. If the contact related to X12.1 / 12.2 would be interrupted (opened) all shutter and control functions going back in work.



Attention!

If Display appears indication as follows , RWA-function activated.

Light indicator for traffic control X13

TS 981 control have a complete one-way and two-way traffic light management integrated. Two pairs of red/green light indicators may be connected on terminal X13. Supply voltage for these light indicators is selectable and could be provided from external or directly from internal terminals X1 1.8 / 1.9. A neutral is always required.



Attention !

Light indicators with 230 V LED-bulbs are recommended. They have a big luminosity, low requirement of energy, and they are maintenance free. If conventional bulbs in use the maximum power for each indicator light shall not exceed 40 W.

FUNCTION DESCRIPTION

Menu item 6.1 Traffic light management

The integrated traffic light management of TS 981 supplies two traffic modes

One-Way

Two-Way

One-Way mode: This could be selected if the shutter width delivers enough space for two cars driving through the door. The lights indicating only when the shutter is fully OPEN. Additionally the lights supplying fore - warning signal when the shutter travels downwards.

Two-way mode: This could be selected if the shutter gateway does not deliver enough space for two cars and sequence must be controlled. Priority for inside or outside could be adjusted.

Menu item 6.2 Extended green light period

Timer could be selected from 3 seconds up to 90 seconds. This works only if the shutter is OPEN and the green light is illuminated. Timer counts down after a CLOSE command or if two-way traffic mode is selected, and a command from opposite side is given. The indicator keeps green light during the whole time. This function could be used for green light activation only, and without automatic closing function.

Menu item 6.3 Fore – warning period

Fore - warning supplies an additional signal before the shutter closes; red lights flashing hereby with a frequency of 1 Hz. Selectable time is 10 seconds and the function starts when green light period has finished.

Menu item 6.4 Doorway evacuation period

The selected mode supplies the possibility to keep the gateway free from present car, before a new car drives into the doorway.

Timer counts down if green period has finished, respectively after adjuster pre-warning time; during this time the red light is indicated.

Menu item 6.7 Red light function if door closed

On requirement continuous red light function ON or OFF may be selected.



Attention!

Traffic light management works independent of automatic closing or continuously Open command.

FUNCTION DESCRIPTION

Safety against entrapment X18

At terminals X18/ 18.1 and 18.2 two of safety devices against entrapment could be connected. This function works only when the shutter moves upwards.

With **Menu item 3.7** can be selected whether one or two entrees shall be activated.

Adjustment	Description
.1 - .8	If safety devices would be activated the shutter stops and reverses to downwards direction for 2 seconds.
.9 - 1.0	These inputs affect the OPEN and CLOSE operation of the door. If safety devices would be activated the shutter stops.

The TS 981 works with four several evaluating principles.

Principle	To be used
NC contact 1k2 with out testing	NC contact for one external evaluator
NO contact 8k2	Electrical safety edge with 8k2 resistor
Impulse evaluation 1 kHz	Raytector optical safety edge impulse signal 1 kHz 12 / 24 V supply
NC contact with testing each	Photo beams, with a separate testing before Upwards movement.



Attention!

All safety devices in use respectively their directly connected sensors must comply with EN 12978 safety devices entrapment protective.

Potential free changeover contact X20 / X21

In **Menu item 2.7 / 2.8** this contact is able to work for several functions.



Important note!

It is only possible to work with one adjusted function.

When activating the switching point the shutter must be moved to the point. **Menu item 1.7 / 1.8** must be activated.

FUNCTION DESCRIPTION

Overrun correction

The stopping position of the door can be influenced by various factors e.g. temperature, cable extension etc.

To always have the same door stopping position the overrun correction can be activated. Using **Menu item 2.2** the overrun correction can be switched ON or OFF.



Important!

Great variations of temperature during a time when the door is not in use, could cause a position variation of about 1 cm. This will be reset automatically after reaching the final close limit.

Door overload monitor

The door overload monitor recognises that a person is being lifted by the door (hanging on a handle, etc.) and could be adjusted within **Menu item 3.1** with a possibility of two steps of sensitivity. Adjustment „1“ sensitive reaction and adjustment „2“ insensitive reaction



Important!

After programming the force monitoring the door must perform a complete opening and closing cycle in automatic mode, during which the system reads the increments to calculate the way.



Important Note!

To have a trouble-free service the following points must be checked:

- The door must be correctly balanced
- The cable drum diameter should not be less than 160 mm

Environmental influences e.g. temperature or wind load can cause the overload monitor to be activated.

The overload monitor is a self-learning system, and checks the system from 5 cm up to ca. 2 m, slow-occurring changes e.g. spring tension will be automatically recognised and equalized.



Important Note!

The overload monitor does not take place against other safety devices e.g. (safety against entrapment)

When an overload is detected the door works only Hold-to-run Mode in the UP and DOWN direction.

The control unit automatically resets to impulse control when a final limit position has been reached.

FUNCTION DESCRIPTION

AIR look SLF

Air-lock management could be realised by means an easy electrical cable connection between two shutters with TS 981.

The required module with cable should be connected into SLF plug-in. This module would be delivered complete within a manual.

When cable connection is finalized select **AIR-LOCK ON** in **Menu item 7.1** in **both control panels**.

Automatic OPEN - Transmission

To realise Air-lock operation a push button is not required. An automatic open impulse about timer adjustment could be selected in **Menu item 7.2**, thereafter the present closed shutter OPENS when acting shutter has CLOSED.

Status monitoring function SMF

When in use a port supplies status or error information's to a central monitoring unit. To realise a lot of different uses the control has a socket to be used with external modules that supplies relay contacts or BUS-gateway.

Users manual would be delivered with the module.

Maintenance cycle counter

Free adjustable maintenance cycle counter **Menu item 8.5** makes it possible to pre-adjust a max. No of cycles until a maintenance is agreed.

The no of cycles can be adjusted from 1.000 up to 99.000; the adjustment is possible in steps of 1.000 cycles.

Three different reactions can be chosen if the point of pre- adjusted maintenance cycles has been reached, see **Menu item 8.6**

Whenever the final open limit has been contacted the pre-adjusted number will be reduced with 1 until 0 is reached.

When maintenance was done the cycle counter could be re-adjusted to a new maintenance period and count down starts again.

FUNCTION DESCRIPTION

Software Update

For software updates TS 981 have a MMC/SD card slot available. With this function the software can be updated respectively in external places saved. For that purpose the new program can be taken from a PC with special card reader function for GfA cards, following the card could be guided into the control panel existing slot.



Attention!

Before loading the new program check the existing program is saved.

Menu item 9.7 MMC/SD card program can be uploaded. If this function is selected the display appears 0.

When pushing the integrated open and close button the display appears all existing software versions on MMC/SD card. To start the uploading mode the stop-button shall be pushed for three seconds. As long the loading has not started the mode may be interrupted if pushing the selector switch.

With **Menu item 9.8** present up to date programs could be saved onto MMC/SD card.

Down load initialising: Insert MMC/CD card, select **Menu item 9.8** and push selector switch.

Short circuit / overload monitor

The TS 981 control panel delivers 2 supplies for external devices.

230 V AC; max. 1,6 A
24 V DC; max. 1000 mA

At a short circuit or overload at the 24 V DC supply, the display is off.

OPERATING STATUS DISPLAY

The control TS 981 can display up to three different status conditions one after another. Each status is displayed with a letter and a number. The letter and the number are flashing alternately, thereby the control differentiates between a FAULT = **F** and a command = **E**.

Report	Description	Measure to solve the problem
F. 1.2	Door safety switch Pass door contact open X 2.1- X 2.2	Check the proper operation of pass door contact, or whether the supply cable is broken
1.3	Emergency operator or motor-winding thermal protection operated	Check emergency manual operation. Check door and door drive unit for stalling. Warning! Danger of the door dropping! Stalling may indicate the anti fall back device (if incorporated) has activated. Take appropriate measures.
1.4	Emergency stop activated	Check the emergency stop is activated, or whether the supply cable is broken
1.5	Error AIR-LOCK function	Check, whether opposite control panel is ON and Air-lock function is adjusted or possibly the cable connection is interrupted
1.7	Failure pass door contact X 2.1- X 2.2 or control voltage circuit less than 24 V	Check pass door circuit's transition resistance and whether pass door switch works; verify the voltage is OK at 24V terminal to GND. Fault acknowledgement: Open and close the pass door switch or switch OFF and ON the main switch or disconnect and reconnect the mains plug.
1.8	Failure input pass door X 2.1- X 2.2	Fault acknowledgement: switch OFF and ON the main switch or disconnect and reconnect the mains plug. If necessary replace the control panel.
2.0	No safety edge detected	Check the wiring of the safety edge
2.1	Light barrier activated	Check the light barrier has been fitted properly, or whether the connecting cable is broken
2.2	Safety edge operated in two consecutive cycles	Check if there is an obstacle in the shutter area, or the connecting cable is broken or there is a short circuit in the cable
2.4	Safety edge 8k2 activated	Check the safety edge is activated or there is a short circuit in the connecting cable

OPERATING STATUS DISPLAY

Report Description	Measure to solve the problem
F. 2.5 Safety edge 8k2 defect	Check safety edge and connecting cable are not broken
2.6 Safety edge 1k2 activated	Check safety edge and connecting cable are not broken
2.7 Safety edge 1k2 defect	Check safety edge and connecting cable do not have a short circuit
2.8 Safety edge 1k2 pneumatic system TESTING negative	Check the proper safety edge function and that testing in the lower door position is correct
2.9 Optical safety edge activated or defect	Check the proper safety edge function or whether the supply cable is interrupted
3.0 Limits not adjusted	Adjust limits
3.1 Safety open limit operated	Turn mains supply OFF and move the shutter downwards - with the manual operator- until the safety limit is free or the open limit should be re-adjusted
3.2 Safety close limit operated	Turn mains supply OFF and move the shutter upwards - with the manual operator- until the safety limit is free or the close limit should be re-adjusted
4.1 Door load monitor has activated	Check the door mechanism for tightness
4.2 Entrapment safety device actuated	Check all connected sensors (e.g. re-adjust photo-beam)
4.3 Entrapment safety device defective	Check all connected sensors
4.5 Door safety switch: function Crash detector interrupted X2.1-X2.2	Check the switch is proper fitted or activated. After fault repair: Press STOP-button for a minimum of 3 s
4.6 Light curtain actuated at terminals X2.3 - X2.5 / X6.1 - X6.2	Check light curtain Check the connection cable is in order
4.7 Light curtain defective	Read the light curtain manufacturer specification instructions. Check connection cable

OPERATING STATUS DISPLAY


Report Description	Measure to solve the problem
F. 5.1 ROM - Fault	Fault acknowledgement: open and close the pass door switch or switch OFF and ON the main switch or disconnect and reconnect the mains plug.
5.2 Internal fault report	Fault acknowledgement: open and close the pass door switch or switch OFF and ON the main switch or disconnect and reconnect the mains plug.
5.3 RAM - Fault	Fault acknowledgement: open and close the pass door switch or switch OFF and ON the main switch or disconnect and reconnect the mains plug.
5.4 Internal control fault	Fault acknowledgement: open and close the pass door switch or switch OFF and ON the main switch or disconnect and reconnect the mains plug.
5.5 DES – no response	Check electronic limit DES connection. To acknowledge the fault switch off and on the main switch or disconnect and reconnect the mains plug. If necessary replace the control panel or digital limit DES).
5.6 Drive unit does not work	Check the limit switches for correct rotational movement. Check door and door drive unit for stalling. Warning! Danger of the door dropping! Stalling may indicate the anti fall back device (if incorporated) has activated. Take appropriate measures.
5.7 Phase rotation failure	Check main supply phase rotation turns right
5.8 Inadmissible door movement when stopped, e.g. owing to worn brake or by a failure delivered from the inverter.	Fault acknowledgement: with next command being given. Check function of the brake and replace if necessary. If the brake works correct and if the fault reappears replace the frequency inverter.
5.9 The drive does not follow the given command e.g. torque overload or a failure at the frequency inverter.	Fault acknowledgement: with next command being given. Check drives load and mains voltage. If this is correct and if the fault reappears replace the frequency inverter.

OPERATING STATUS DISPLAY

Report	Description	Measure to solve the problem
F. 6.1	Closing rpm over speeded at DI / FI	Fault acknowledgement: switch OFF/ON on the mains or disconnect and reconnect the mains plug and if the fault reappears replace the frequency inverter.
6.2	Internal FI communication fault at FI	Fault acknowledgement: switch OFF/ON on the mains or disconnect and reconnect the mains plug and if the fault reappears replace the frequency inverter.
6.3	Insufficient mains supply or by a fault delivered from FI	Fault acknowledgement: with next command being given. Braking time must be increased, see Menu item.
6.4	Intermediate circuit overload, e.g. braking time too short	Fault acknowledgement: with next command being given. Braking time must be increased, see Menu item.
6.5	Exceeding of the admissible temperature of the FI e.g. delivered by exceeded no cycles, heat accumulation, heat transmission etc.	Fault acknowledgement: with next command being given.
6.6	Exceeded motor current by overload of the drive unit or failure at the frequency inverter.	Check the door mechanism and weight. Fault acknowledgement: with next command being given and if the fault reappears replace the frequency inverter.
6.7	Fault brake / FI	Check brake, replace if required. If the fault reappears replace frequency inverter.
6.9	FI Group status	Fault acknowledgement: with next command being given and if the fault reappears replace the frequency inverter.
8.1	At initial operation minimum travel distance was not completed	Move the door for at least 1 second

Report	Command description
E. 1.1	An OPEN-command is present. Inputs X5.3, X7.2, UBS control device or UBS radio receiver
1.2	A STOP-command is present. Inputs X5.2, X7.2, UBS control device or UBS radio receiver or simultaneous OPEN and CLOSE commands
1.3	A CLOSE-command is present. Inputs X5.4, X7.2, UBS control device or UBS radio receiver

OPERATING STATUS DISPLAY

Report	Status
8.8 flashing	Programming option is blocked
11 .11	Function for changing the rotating direction is activated, only possible during initial operation
11 11.	Change of rotating direction has been carried out, only possible during initial operation
1111 flashing	Teach in OPEN final limit position
11.11 flashing	Teach in CLOSE final limit position
1.1 flashing	UPWARDS travel active
1.1 flashing	CLOSING operation active
1.1	Stop between the set final limit positions
1.1	Stop at the OPEN final limit position
1.1	Stop at the intermediate stop position
1.1	Stop at the CLOSE final limit position
0.3	Blocking of programming option confirmed. Flashing display: Unblocking of programming option active.
1.4	Interruption of the photo cell function: At first interruption of the light beam.
2.4	Interruption of the photo cell function: When exiting the programming.
0.5	Adjusted cycles for maintenance reached
	Display off = Short circuit or overload at the 24 V DC supply

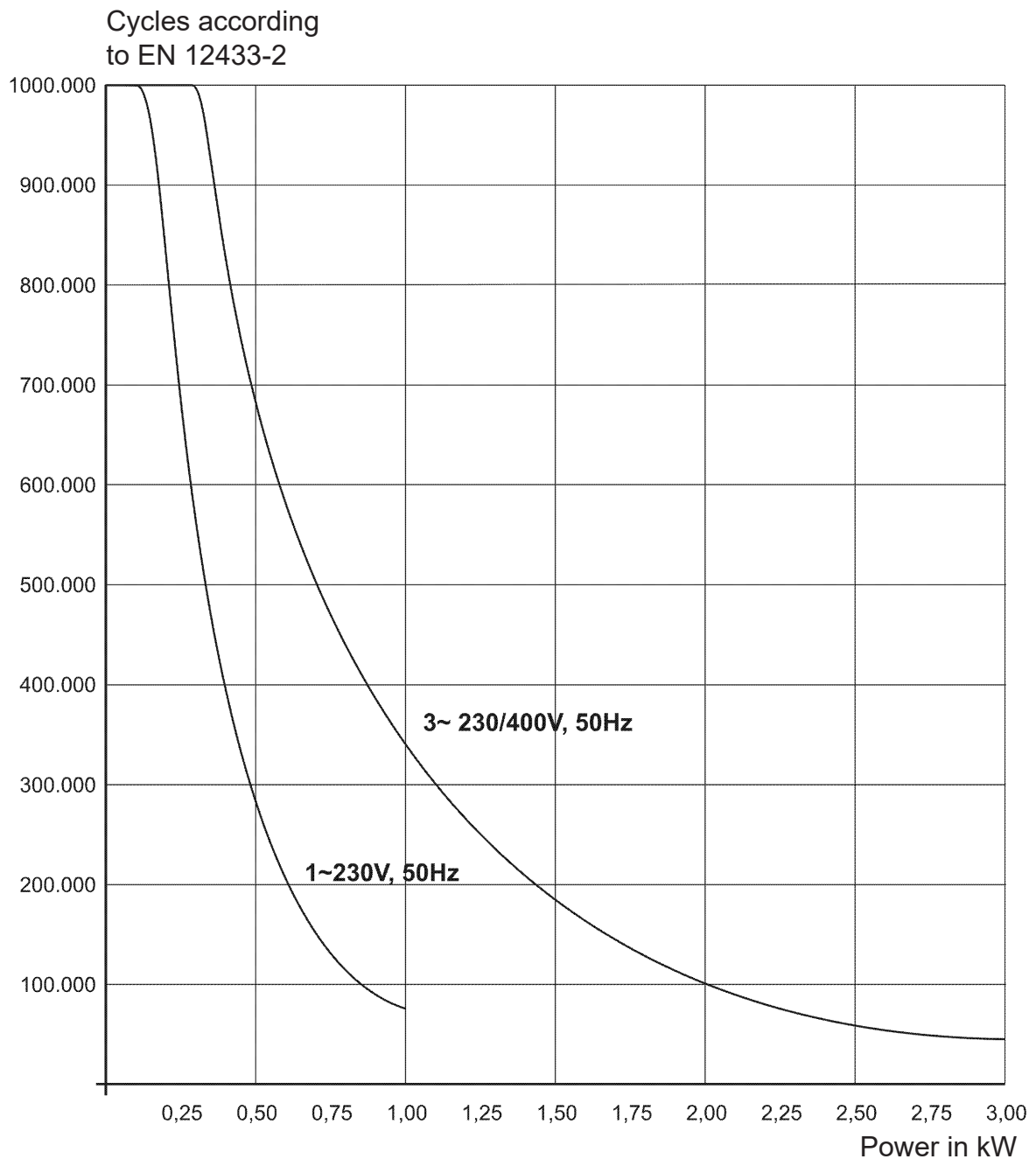
TECHNICAL DATA

Housing Dimensions	190 mm x 300 mm x 115 mm (W x H x D)
Mounting	vertical
ELEKTROMATEN® Supply	Three-phase 3 x 230 / 400 V AC \pm 5 %, 50 Hz...60 Hz Single-phase 1 x 230 V \pm 5%, 50 Hz...60 Hz Power max. at 3 x 400 V AC, max. 3 kW
Control supply via L1, L2	400 V AC or 230 V AC + - 10 %, 50 Hz...60 Hz, voltage changing with bridge to 3- pole terminal, safety fuse F1 (1,6 A t)
External supply fuse	10 A delayed
Permitted Load	ca. 40 V A (without motor and ext. 230 V)
External supply 1	230 V via L1 and N, safety fuse F1 (1,6 A t)
External supply 2	24 V DC uncontrolled, max. Load 1000 mA, Protected via electronic fuse
Inputs	24 V DC / typ. 10 mA signal length must be more than 100 ms
Relay output	If inductive loads are to be switched (e.g. other relays) those have to be protected with free-wheeling Diodes contact load at 230 V max. 1 A
Traffic light contacts	LED - bulb 230 V or Normal bulb 230V shock resistant max. 40 W
Temperature	Working: -10 °C..... +50 °C Storage: +0 °C.....+50 °C
Humidity:	To 93 % not condensing
Vibration:	Vibration free mounting, e.g. on flat built wall
Protection class	IP 54 (CEE Plug), IP 65 available

LIFETIME / DOORCYKLES

The GfA control panels working with electro mechanical contactor boards.

Contactors boards having generally a limited life time; this depends on the switched power of ELEKTROMATEN® in use and the amount of switching cycles. Therefore we recommend a replacement for control boards in use after doors having reached their confirmed lifetime cycles. Coherence between power and amount of cycles for ELEKTROMATEN® describes diagram below.



DECLARATION OF INCORPORATION

within the meaning of Machinery Directive 2006/42/EC
for partly completed machinery, Appendix II Part B



Declaration of conformity

within the meaning of EMC Directive 2014/30/EU
within the meaning of RoHS Directive 2011/65/EU

GfA ELEKTROMATEN GmbH & Co. KG
Wiesenstraße 81 · 40549 Düsseldorf
Germany

We, the
GfA ELEKTROMATEN GmbH & Co. KG
declare under our sole responsibility that the
following product complies with the above
directives and is only intended for installation
in a door system.

Door control

TS 981

(Part no.: 20098100)

We undertake to transmit in response to a re-
asoned request by the appropriate regulatory
authorities the special documents on the partly
completed machinery.

This product must only be put into operation
when it has been determined that the com-
plete machine/system in which it has been
installed complies with the provisions of the
above-mentioned directives.

Authorised representative to compile the tech-
nical documents is the undersigned.

Düsseldorf, 10.08.2018

Stephan Kleine
CEO

Signature

The following requirements from Appendix I of
the Machinery Directive 2006/42/EC are met:

1.1.2, 1.1.3, 1.1.5, 1.2.1, 1.2.2, 1.2.3, 1.2.4.2,
1.2.5, 1.2.6, 1.3.1, 1.3.2, 1.3.3, 1.3.4, 1.3.9,
1.5.1, 1.5.2, 1.5.4, 1.5.5, 1.5.6, 1.5.7, 1.5.8,
1.5.9, 1.5.10, 1.5.11, 1.5.13, 1.6.1, 1.6.2,
1.6.4, 1.7.1.1, 1.7.1.2, 1.7.2, 1.7.3, 1.7.4.3.

Standards applied:

EN 12453:2001

Industrial, commercial and garage doors and
gates - Safety in use of power operated doors -
Requirements and test methods

EN 12978:2003+A1:2009

Industrial, commercial and garage doors and
gates - Safety devices for power operated doors
and gates - Requirements and test methods

EN 60335-1:2012

Household and similar electrical appliances -
Safety - Part 1: General requirements

EN 61000-6-2:2005

Electromagnetic compatibility (EMC) -
Part 6-2: Generic standards - Immunity
standard for industrial environments

EN 61000-6-3:2007

Electromagnetic compatibility (EMC) -
Part 6-3: Generic standards - Emission
standard for residential, commercial and light-
industrial environments

FUNCTION OVERVIEW

- **Control panel for ELEKTROMATEN®** up to. 3 kW at 400 V / 3~ with electronic limit **DES** designed for only low-level adjustment
- **7- Segment led display showing**
 - Programming the control panel
 - Displays Command - / Info- / Fault
- **Software release loading and saving**
- **Mains supply**
 - 400 V / 3~ with and without Neutral
 - 230 V / 3~
 - 230 V / 1~ (for single-phase motors)
- **Door operating modes**
 - Hold-to-run open- and close
 - Self-hold open- and hold-to-run mode close (without safety edge)
 - Automatic open- and close (with safety edge connected)
- **Integrated safety edge systems**
 - Electrical safety edge
 - Pneumatic safety edge
 - Optical safety edge system
- **Automatic close feature**
 - Free programmable from 1 s up to max. 240 s
 - On interrupting and re-making light barrier closing after 3 s
 - Can be interrupted by a separate switch
- **Supply for external devices**
 - 230 V (at 400 V / 3~ with N), up to 1,6 A load
 - 24 V DC, up to 1000 mA load
- **Plug for 5 pole motor connector 6 pole for electronic limit DES**
- **Plug for spiral cable (safety edge and pass-door contact)**
- **Integrated internal pushbutton OPEN / STOP / CLOSE**
- **Additional terminals for different control equipment**
 - Emergency stop (LATCHING)
 - Additional safety stops
 - External three push button OPEN / STOP / CLOSE
 - Light barrier activated Stop and Reverse function, time reset, time interruption 3 s
 - One channel - impulse functions e. g. Ceiling pull switch for OPEN / CLOSE / STOP
 - sequencing or radio control
 - Key switch (latching) for intermediate Stop
 - 2x potential free relay output (NC / NO), output signal from aux. limit
If a signal lamp is in use, the potential free limit is not available
- **Integrated traffic light management**
 - One-way
 - Two-way
