



Controller FS 345 with FS 101 on basis of CS 320 for fire protection drives

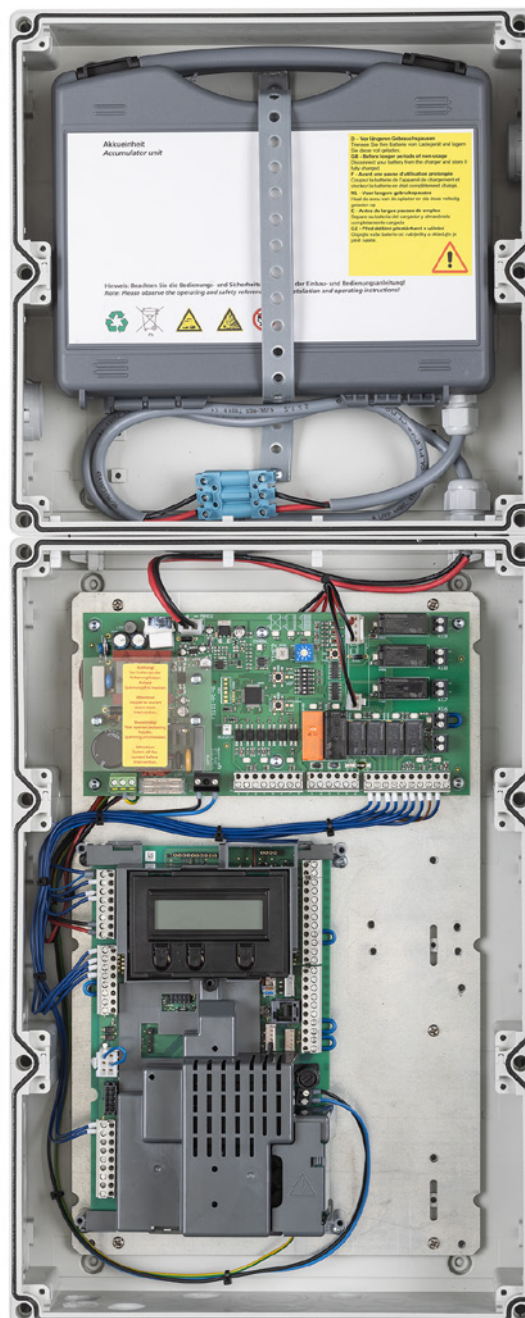


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About this document

- Original manual.
- Part of the product.
- Must be read and stored.
- Copyright protected.
- Reprinting, including extracts, only with our permission.
- Subject to change due to technical advancement.
- All dimensions in millimetres.
- Illustrations are not to scale.

Safety instructions

WARNING!

Safety note indicating a danger that may result in death or serious injuries.

CAUTION!

Safety note indicating a danger that may result in minor to moderate injuries.

ATTENTION!

Safety note indicating a danger that could lead to damage or the destruction of the product.

Explanation of symbols

- Action instruction
- ✓ Check
- List, bullet points
- Reference to a separate part of this document
- 📄 Reference to separate documents that must be observed
- 🏭 Factory setting

1. Safety information

WARNING!

Risk of fatal injuries due to non-observance of the operating instructions!

This manual contains important information for safe use of the product. Potential dangers are specifically highlighted.

- Read this manual through carefully.
- Follow the safety instructions in this manual.
- Store the manual in an accessible location.

1.1 Intended use

The FS 345 controller is intended exclusively for controlling gate systems with mechanical end position systems.

Use is only permissible:

- In a technically faultless condition.
- After correct installation.
- In accordance with the specifications in the technical data.

→ "2.4 Technical Specs Controller FS 345"

Any other use is deemed to be misuse.

1.2 Target groups

1.2.1 Operator

The operator is responsible for the building in which the product is used. The operator has the following tasks:

- Knowledge and safekeeping of the operating manual.
- Instruction of persons who use the door system.
- Ensuring that the door system is tested and maintained regularly by qualified specialist personnel in accordance with the manufacturer's instructions.
- Ensuring that testing and service are documented in the log book.
- Storage of the log book.

1.2.2 Technicians

Qualified technicians are responsible for assembly, maintenance, repairs, dismantling and disposal.

Requirements applicable to qualified specialist personnel:

- Knowledge of the general and specific safety and accident prevention regulations.
- Knowledge of the relevant electrical regulations.
- Training in the use and care of appropriate safety equipment.
- Knowledge of the relevant standards.

Electrical work must be performed by qualified electricians in accordance with DIN VDE 0100.

Requirements applicable to qualified electricians:

- Knowledge of the basics of electrical engineering.
- Knowledge of the country-specific provisions and standards.
- Knowledge of the relevant safety provisions.
- Knowledge of this operating manual.

1.2.3 Users

Instructed users operate and maintain the product.

Requirements applicable to instructed users:

- Users have been instructed on their work by the operator.
- Users have been instructed on safe use of the product.
- Knowledge of this operating manual.

Special requirements apply to the following users:

- Children aged 8 years and over.
- Persons with limited physical, sensory or mental capabilities.
- Persons with a lack of experience and expertise.

These users may only be involved in the operation of the product.

Special requirements:

- Users are supervised.
- Users have been instructed on safe use of the product.
- Users understand the dangers when handling the product.
- Children are not permitted to play with the product.

1.3 General safety instructions

Persons or objects must never be moved with the help of the door.

In the following cases, the manufacturer accepts no liability for damages. The guarantee provided on the product and accessory parts is voided with:

- A failure to observe this operating manual.
- Misuse and incorrect handling.
- Use of unqualified personnel.
- Modifications or changes to the product.
- Incorrect opening of charging device.
- Use of spare parts that have not been produced or approved by the manufacturer.

The product is manufactured in accordance with directives and standards listed in the declaration of incorporation. The product left the factory in a technically safe and faultless condition.

Any changes to the charger will void the device approval!

Excluded from the warranty are batteries, rechargeable batteries, fuses and bulbs.

Further safety instructions can be found in the relevant sections of the document.

→ "3.1 Safety instructions for commissioning"

2. Product overview

2.1 Product description

The FS 345 controller can be used in conjunction with the fire protection drives FDF, FT, FTA, FDS. Hydraulic drives can be used in the FS 345 HY version.

The FS 345 controller consists of the CS 320 FS gate controller, the FS 101 additional board and a battery for the emergency power supply, the magnetic couplings, the DC operating motors and for the 24 V motor brakes.

In the event of a fire or power failure, the emergency power battery supplies the energy for the secondary motor to close the door or for the motor brake to hold the door.

The fire is triggered by a continuous command from the fire detector contact or time-controlled in the event of a power failure. Access in the event of a fire is provided with an inactive or, as an option, an active safety contact strip.

2.2 Variants

The following delivery variants of the FS 345 controller are possible:

- FS 345 controller for dead man operation
- FS 345 controller for automatic operation
- FS 345 controller for automatic operation with activated closing edge system in the event of fire

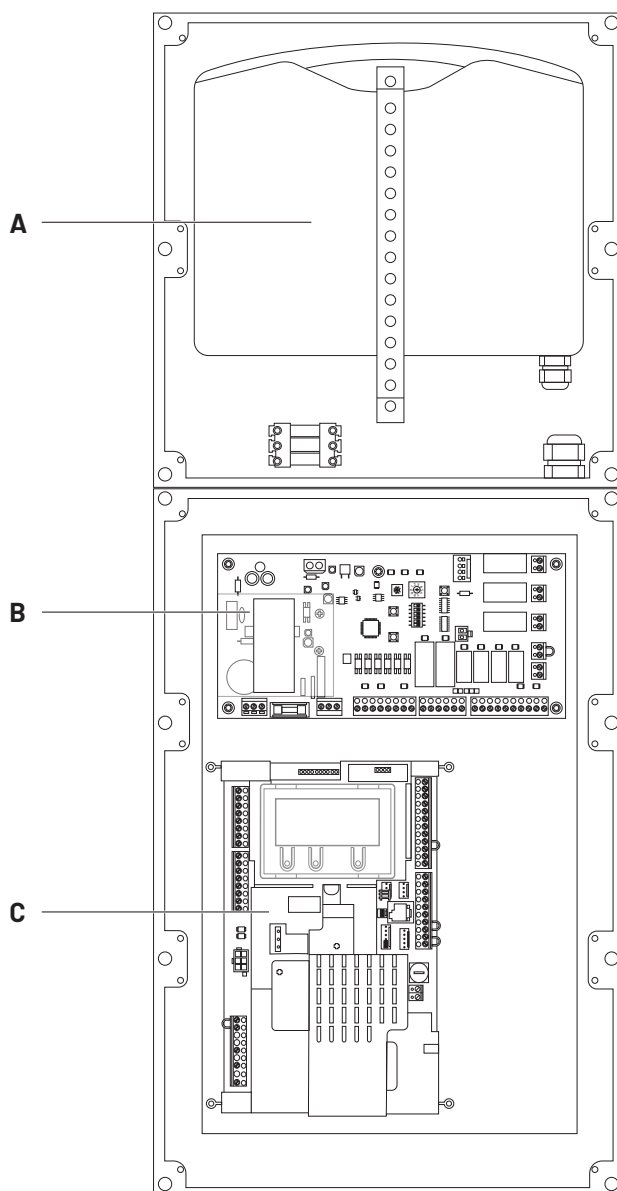
The following delivery variants of the housing are possible:

- Housing with OPEN - STOP - CLOSED buttons
- Housing with key switches ON / OFF
- Housing with main switch
- Housing with emergency stop

The operating instructions describe the connection options and variants of the FS 345 control.

2.3 Product drawing controller CS 320 FS with FS 101

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Explanation:

- A Battery
- B Circuit board FS 101
- C Circuit board CS 320 FS

2.4 Technical Specs Controller FS 345

Mechanical and electrical specs

Housing dimensions:	750 x 300 x 132 mm
Installation:	Upright on the wall; minimum height of 1,100 mm
Voltage supply	3~ 400 V AC, 50 Hz 3~ 230 V AC, 50 Hz Other voltages on request
Fuse protection:	10 A K-characteristic
Power intake:	Max. 2.2 kW
Internal power consumption of controller:	Internal consumption of the CS 320 FS controller max. 250 mA on the secondary side Internal consumption of the FS 101 controller max. 200 mA on the secondary side
Motor specs:	Max. 2.2 kW, 8 A
Control voltage:	24 V DC, all inputs must be connected potential-free. Min. signal duration for input controller command >100 ms
Controller outputs:	24 V DC, max. 500 mA.
Batteries:	VdS -recognised maintenance-free batteries
Relay output error:	If inductive loads are switched (e.g. additional relays or brakes), they must be equipped with appropriate interference suppression measures (e.g. freewheeling diode, varistors, RC elements). Working contact potential-free; min 10 mA; max. 230 V AC / 4A. Contacts that have been used for power switching can no longer be used for switching low currents.
Relay output emergency operation:	If inductive loads are switched (e.g. additional relays or brakes), they must be equipped with appropriate interference suppression measures (e.g. freewheeling diode, varistors, RC elements). Working contact potential-free; min. 10 mA; max. 230 V AC / 16 A. Contacts that have been used for power switching can no longer be used for switching low currents.

Mechanical and electrical specs

Temperature range:	Operation: +5 °C ... +40 °C Storage: +5 °C ... +55 °C
Humidity:	up to 80 % non-condensing.
Vibrations:	Low-vibration mounting, e.g. on a brick wall.
Protection grade:	IP 54
Weight:	approx. 10.5 kg

2.5 Category and performance level of the safe function according to EN ISO 13849-1

Function	Realisation	MTTF _D Electronics	MTTF _D Total with output contactor	DC _{avg}	Category	Performance Level
Emergency stop	Input terminal X3, X6, X7, X11 Interrupts the power supply to the output relay and main contactor, independent of the CPU. Feedback to the CPU available.	1175 years	191 years	84.7 %	3	d
Stop circuit	Input terminal X3, X7 Interrupts the supply to the main contactor. Message to CPU.	1175 years	191 years	-	B	b
End position detection through absolute value encoder	Input terminal X11 For position determination and end position detection. Testing through plausibility check of expected position values to received position values.	1062 years	188 years	83.7 %	2	c
End position detection through end position switch	Input terminal X15 Protection through runtime limiting. Inputs are evaluated by the CPU.	1248 years	193 years	63.1 %	2	c
Light barrier evaluation	Input terminal X4 Impulse evaluation through CPU. Faults are identified through plausibility evaluation in the CPU. The frequency must be between 130 Hz to 190 Hz. The function is monitored by switching the supply voltage (T117, IC111) of the light barrier each time before travel and every two minutes when idle. With activation in the CLOSED direction, a stop or reversal of the gate takes place.	1000 years	186 years	81.9 %	2	c
Evaluation of a pneumatic switching strip	Input terminal X4 Evaluation through CPU. Testing through plausibility evaluation. Switching signal must come shortly before reaching the lower end positions.	1123 years	190 years	85.6 %	2	c
Evaluating one or two 8k2 / one OSE SKS	Input terminal X4 Evaluation through CPU. The function is monitored by switching the supply voltage (IC110, T138) each time before travel.	1123 years	190 years	85.6 %	2	c

DC_{avg} Average diagnosis degree of coverage
 MTTF_D Mean time to hazardous failure

3. Commissioning

3.1 Safety instructions for commissioning



WARNING!

Danger due to non-observance of the commissioning instructions!

This chapter contains important information for the safe commissioning of the product.

- Carefully read this chapter before commissioning.
- Follow the safety instructions.
- Perform the commissioning as described.

Commissioning only be qualified by qualified technicians.

→ "1.2.2 Technicians"

Electrical work must be performed by qualified electricians exclusively.

→ "1.2.2 Technicians"

- Before performing wiring work, always disconnect the system from the power supply.
- Make sure that the power supply remains disconnected during wiring work.

The operators of the system or their representatives must be instructed in its operation after the system has been put into operation.

- Children must not play with the control or command devices.
- No persons or objects are permitted inside the danger zone of the system.
- It is necessary to check all available emergency command devices.
- Observe possible crushing and shearing points on the system.
- Never reach into a running system or moving parts.
- The line types and cross-sections must be selected in accordance with the valid specifications.
- With a fixed connection, an all-pole main switch must be used.
- Mains cables and control cables must be routed separately.
- The line types and cross-sections must be selected in accordance with the valid specifications.
- It is essential to observe the local protective regulations.
- Observe the specifications of the door manufacturer for installation.

The following points must be correct to ensure trouble-free operation:

- The door is installed, fully functional and designed for power-driven operation.
- The gear motor is installed and ready for operation.
- The command and safety devices are installed and ready for operation.
- The controller housing is mounted with controller FS 345.

Observe the valid standards and regulations!

- 📄 The instructions from the respective manufacturer must be observed for the installation of the door, the gear motor and the command and safety devices.

3.2 Power connection

Prerequisites

The following points must be correct to guarantee the function of the controller:

- The mains voltage must correspond to the information on the nameplate.
- The nominal motor data set must correspond to the information on the nameplate.
- In the case of three-phase power, this must have a clockwise rotating field.
- With a fixed connection, an all-pole main switch must be used.
- With a three-phase connection, only 3-block circuit breakers (max. 10 A) may be used.



ATTENTION!

Malfunctions due to improper installation of the controller!

- Before switching on the controller for the first time but after all of the wiring has been completed, it is necessary to check all motor connections on the motor and controller sides. All control voltage inputs are galvanically separated from the supply.
- The control and load lines of the connected motors must be double-insulated along their entire route.

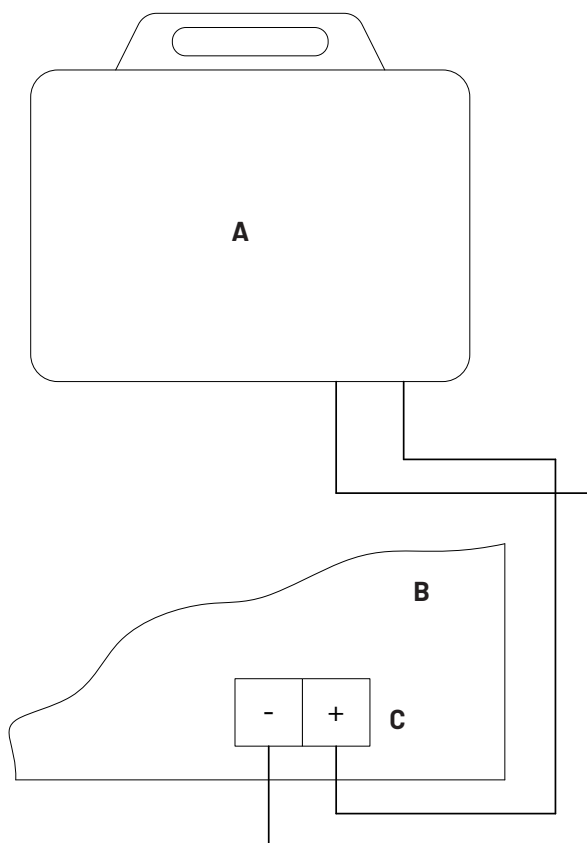
3.3 Commissioning emergency operating circuit board FS 101

General

The FS 101 circuit board contains a charger for the battery and a microprocessor to control the power take-off and the engine brake.

The circuit board is connected to the CS 320 FS gate controller ex works and is preset for the respective drive type when delivered with a drive.

3.3 / 1



Explanation:

- A Battery
- B Circuit board FS 101
- C Connection of battery

⚠ ATTENTION!

Malfunctions due to improper installation of the battery!

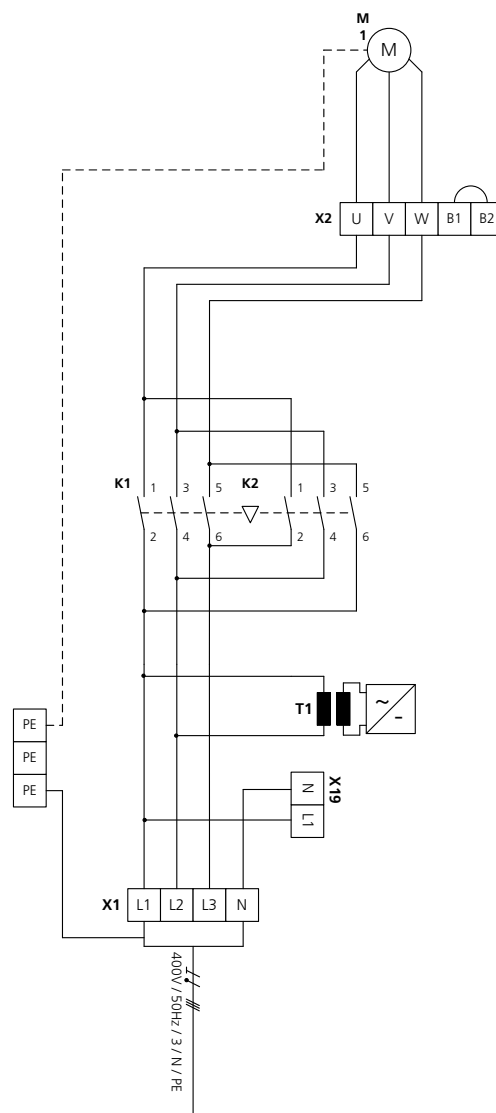
In order to avoid deep discharging of the battery, the connection between the battery and FS 101 may only be established when the gate is put into operation.

- Make sure that the battery is connected to the FS 101 board before connecting to the mains voltage.
- Connect the fire alarm.
- Connect the battery to the FS 101 board via a plug.

3.4 Power connection and motor

Circuit board CS 320 FS

3.4 / 1

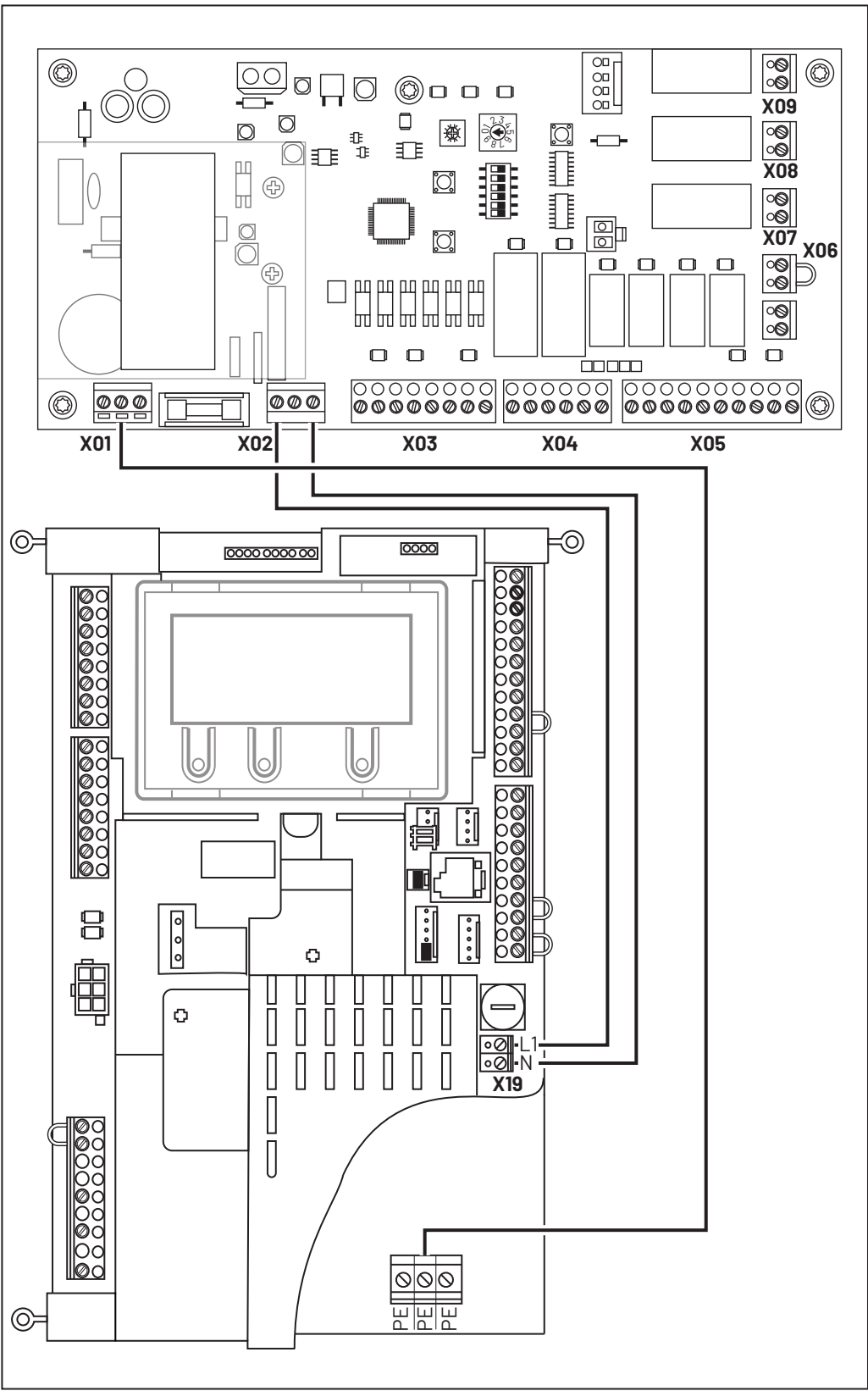


Explanation:

- K1 Contactor CLOSED
- K2 Contactor OPEN
- M1 Motor
- T1 Transformer
- X1 Terminal rail power connection
- X2 Terminal rail motor

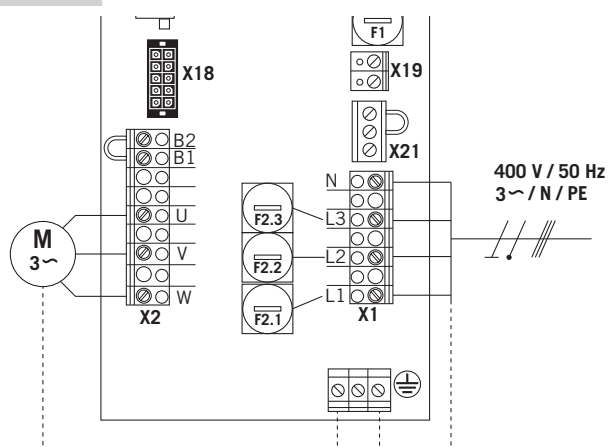
Connection:

- Connect controller to the motor.
- Connect controller to the mains power supply. Cable groups must be secured with a cable tie immediately in front of the respective terminal



Detail circuit plan power connection and motor connection (400 V / 3-phase)

3.4 / 3



Explanation:

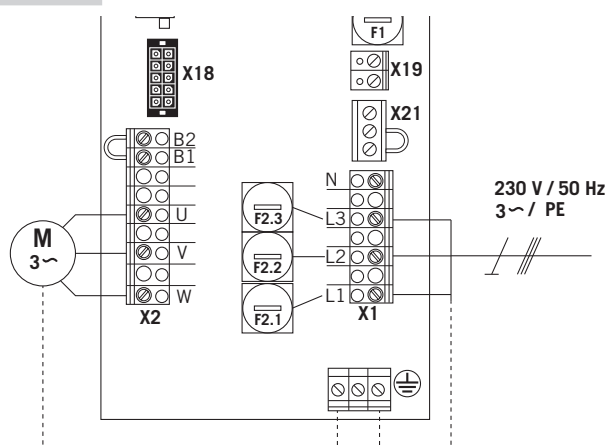
- M1: Motor
 X1 Terminal rail power connection
 X2: Terminal rail motor
 X15: Terminal rail for mechanical limit switches (MEC)
 (safety circuit on X2 / B1-B2)
 X19: Connection for supplying external devices

Connection:

- Connect mechanical limit switch (MEC) to the controller.
 - Connect controller to motor.
 - Connect the controller to the power supply.
Cable groups must be secured with a cable tie immediately in front of the respective terminal.
 - Check and harmonise technical data.
- "2.4 Technical Specs Controller FS 345"

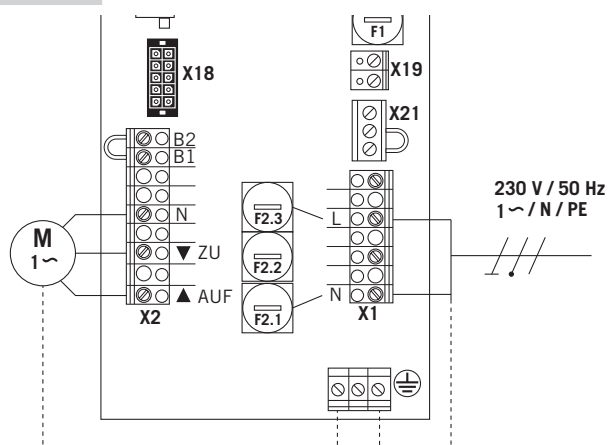
Detail circuit plan power connection and motor connection (230 V / 3-phase)

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Detail circuit plan power connection and motor connection (230 V / 1-phase)

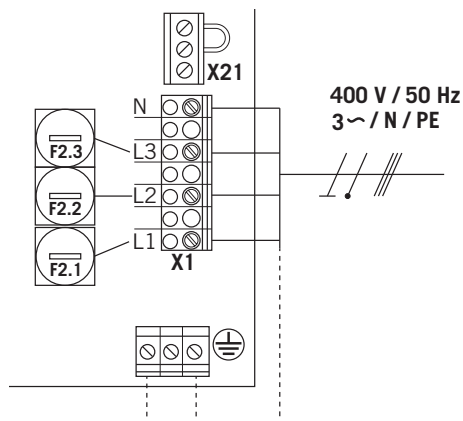
3.4 / 5



3.5 Internal fusing

The CS 320 controller has an internal fuse (F2) at the mains input. The fuse elements are fitted at factory with 8 A/T (5.2 x 20 mm) fine fuses.

3.5 / 1



⚠ ATTENTION!

Malfunctions due to improper protection of the control!

Internal fuse maximum 10 A/T!

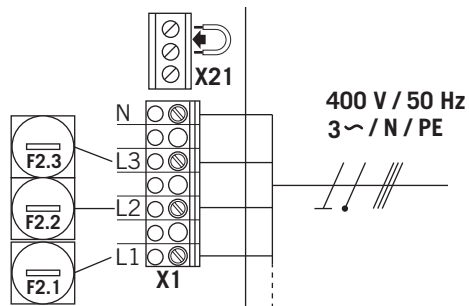
The internal fuses do not replace fuse protection of the supply cable. This may be carried out with a maximum of 16 A and must be designed as a 3-block type C circuit breaker.

→ "3.2 Power connection"

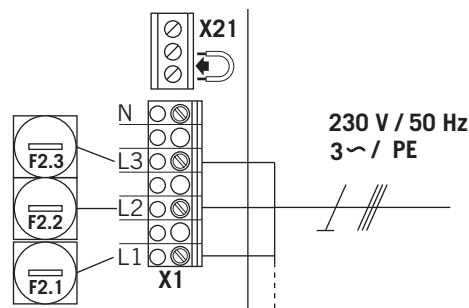
3.6 Selection of mains voltage

The position of the bridge connector to X21 must be adjusted to the supply voltage and motor voltage.

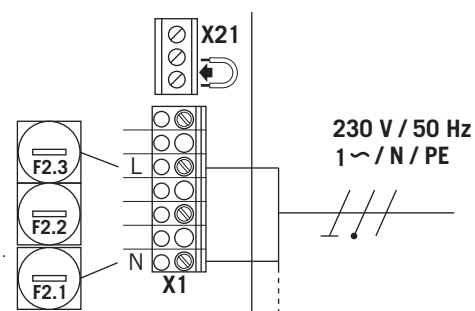
3.6 / 1



3.6 / 2



3.6 / 3



3.7 Connection of command devices

CAUTION!

Risk of injury due to uncontrolled gate movement!

A CLOSE command in dead-man operation without the gate being in direct line of sight is not permitted.

- Install command devices for dead man operation in direct view of the gate, but outside the danger area for the operator.

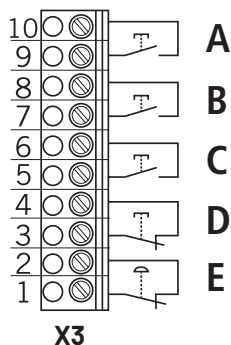
A CLOSED command without visibility of the gate may only be given via input 1 / MOD 32 (X4 / 9-10).

If the command device is not a key switch:

- Mount it at a height of at least 1.5m.
- Install it where it is inaccessible to the public.

Command devices (standard)

3.7 / 1

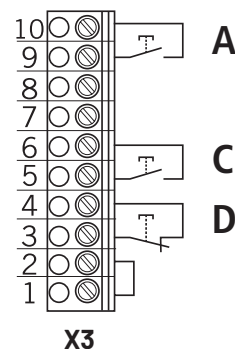


Legend:

- A Button / Input CLOSED
- B Button / Input impulse
- C Button / Input OPEN
(OPEN inside, when counter traffic controller active)
- D STOP button
- E Emergency stop command device

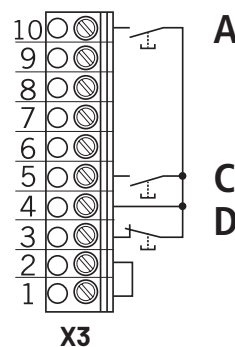
Button OPEN / STOP / CLOSED (6-wire solution)

3.7 / 2



Button OPEN / STOP / CLOSED (4-wire solution)

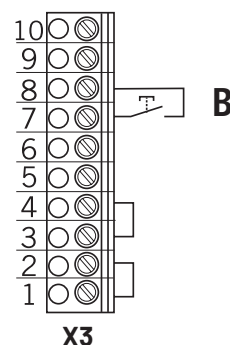
3.7 / 3



Impulse button

Selection of the function through IMPULSE parameter
→ "9.2 Operating mode INPUT"

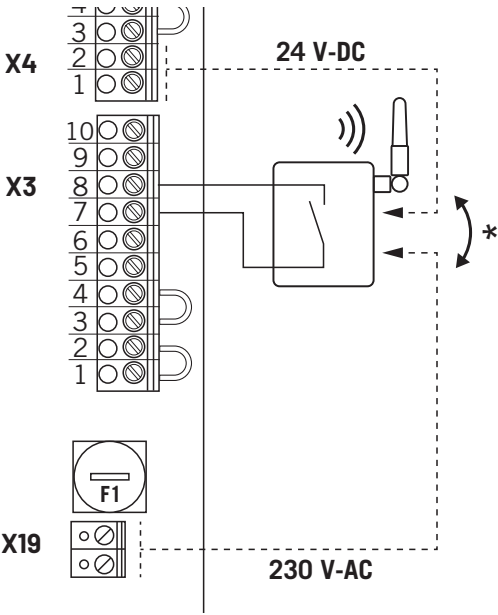
3.7 / 4



- UP switch
- STOP button

External radio receiver

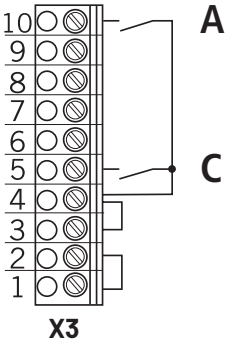
3.7 / 5



* optionally, depending on connection of the radio receiver

Key switch

3.7 / 6

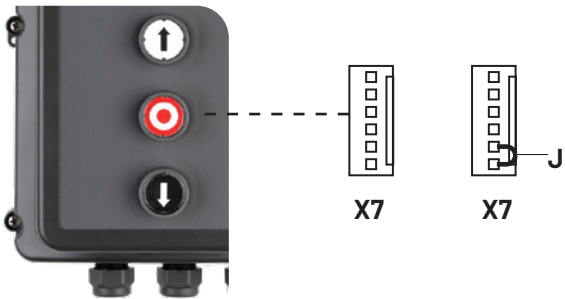


Legend:
A Button / Input CLOSED
C Button / Input OPEN
(OPEN inside, when counter traffic controller active)

KDT lid keypad

Touch keyboard with NO / NC contacts.
Up to year of manufacture 12 / 2009.

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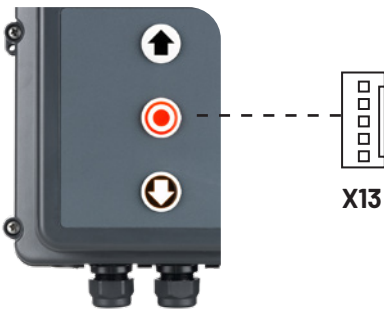
J Jumper (bridge)

The jumper must be connected if the KDT keypad is not connected.

CS lid keypad

Silicone button with NO contacts.
From year of manufacture 01 / 2010.

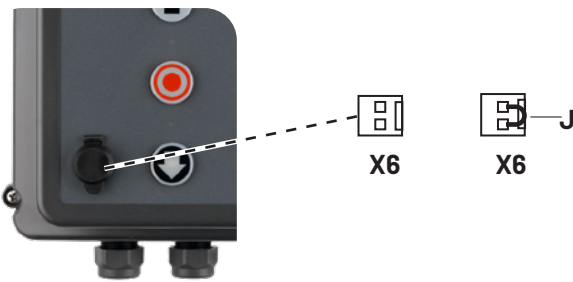
3.7 / 8



Key-operated switch ON / OFF

NC contact to interrupt of the gate function (optional).
This switch is part of the safety circuit.

3.7 / 9



J Jumper (bridge)

The jumper must be connected if the key switch is not connected.

3.8 Connection of light grid

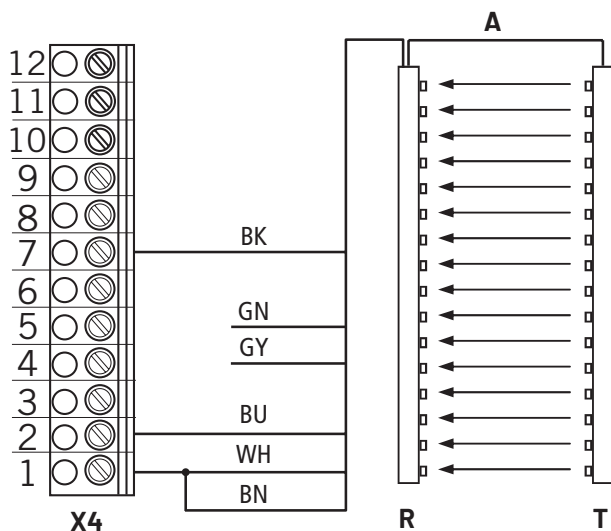
Up to 2 light grids can be connected to the CS 320 FS controller. Light grid 1 is connected to the input of the closing edge protective device. Light grid 2 is connected to programmable input 2.

Light grid 1

Parameter SKS = MOD 4

The connection cable (A) is pluggable.

3.8 / 1

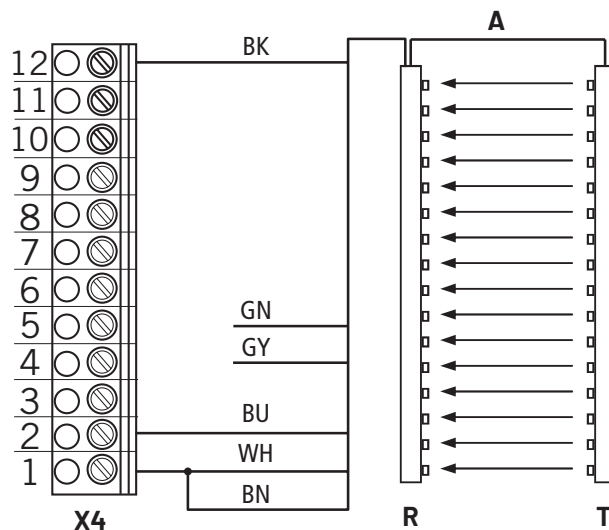


Light grid 2

Parameter INPUT 2 = MOD 12

The connection cable (A) is pluggable.

3.8 / 2



Legend:

BK Black
GN Green
GY Grey
BU Blue
WH White
BN Brown

R Receiver
T Transmitter

PLEASE NOTE:

In these instructions, the GridScan/Pro light grids from the company Cedes are shown as examples.

The GridScan/Pro light grids correspond to

- Performance level d, category 2 as per EN ISO 13849-1
- Protection level E as per EN 12453:2017

Diagrams from other manufacturers on inquiry.

For a precise description of the function and connection, refer to the separate documentation for the light grid.

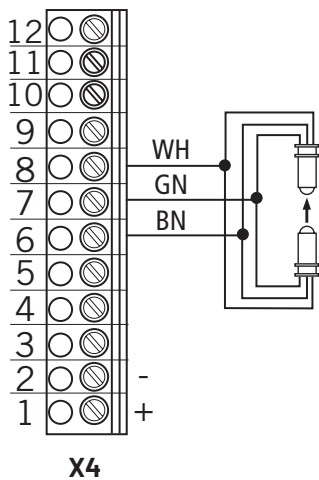
3.9 Connection closing edge protective device 1

When used for the first time and after a RESET, the closing edge protective device is automatically recognised and programmed. If no closing edge system is connected, the input is polled again each time the voltage is switched on until a closing edge system has been detected. With a subsequent change, the respective system must be selected through a parameter setting in the INPUT operating mode. For light barriers with a test function, this must be set manually.
→ "9.2 Operating mode INPUT"

Optoelectronic closing edge protective device (OSE)

Parameter SKS = MOD 1

3.9 / 1

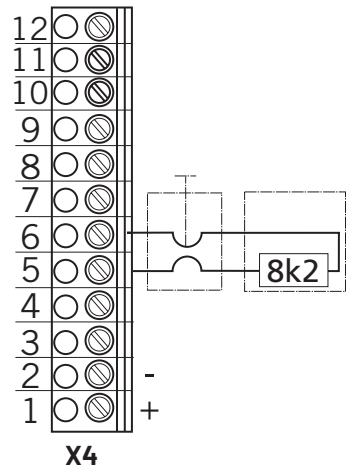


Legend:
WH White
GN Green
BN Brown

Electrical closing edge protection (8.2 kOhm)

Parameter SKS = MOD 2

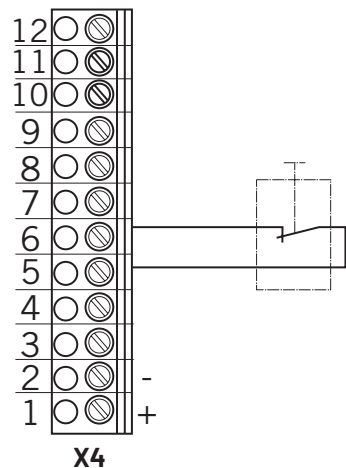
3.9 / 2



Pneumatic closing edge protection (DW)

Parameter SKS = MOD 3 / Automatic testing active

3.9 / 3



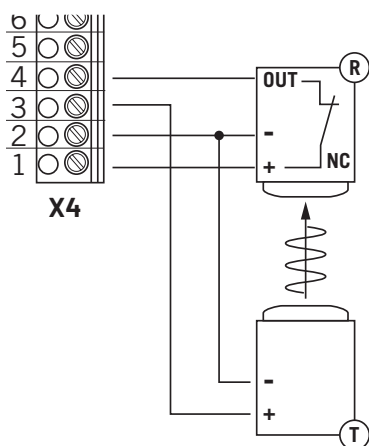
3.10 Connection of light barrier 1

With first commissioning and after a reset the light barrier is automatically detected and programmed. If no light barrier system is connected, the input is queried again each time the voltage is switched on until a light barrier system is detected. With a subsequent change, the respective system must be selected through a parameter setting in the INPUT operating mode. For light barriers with a test function, this must be set manually.
→ "9.2 Operating mode INPUT"

Light barrier 4-wire NC

Without testing Parameter DURCHF-LS 1 = MOD 3
With testing Parameter DURCHF-LS 1 = MOD 5

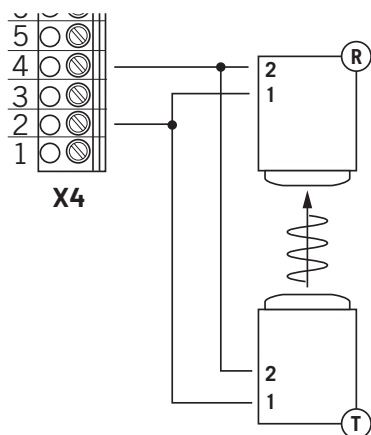
3.10 / 1



Marantec 2-wire light barrier

With testing Parameter DURCHF-LS 1 = MOD 1

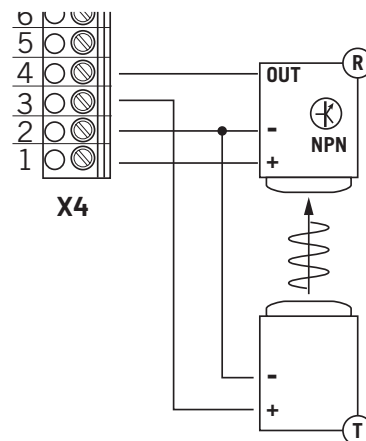
3.10 / 2



3-wire NPN light barrier

Without testing Parameter DURCHF-LS 1 = MOD 2
With testing Parameter DURCHF-LS 1 = MOD 4

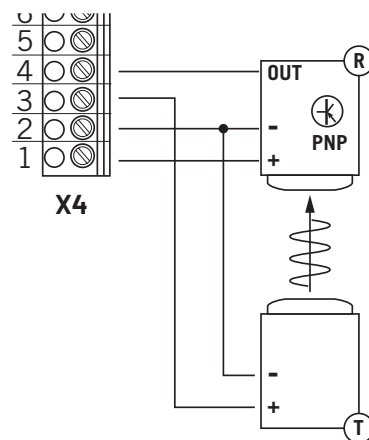
3.10 / 3



3-wire PNP light barrier

Without testing Parameter DURCHF-LS 1 = MOD 3
With testing Parameter DURCHF-LS 1 = MOD 5

3.10 / 4



Legend:

R Receiver
T Transmitter

PLEASE NOTE:

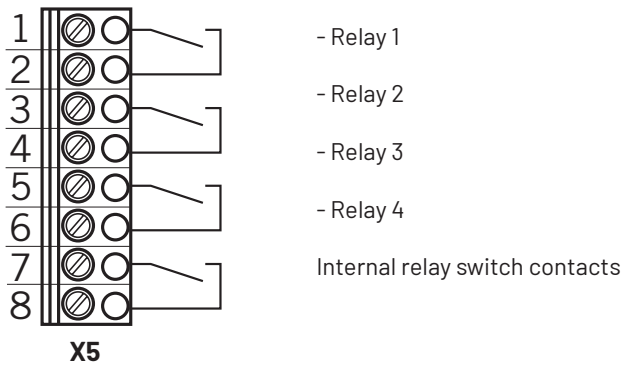
All light barriers are active in the UP or DOWN direction depending on the setting.

→ "9.2 Operating mode INPUT" (Parameter LB FUNC 1)

3.11 Pin assignment relay outputs

Four potential-free relay outputs are available, which can be programmed with a variety of types of function.
→ "9.2 Operating mode INPUT"

3.11 / 1



There are four potential-free relay outputs with a maximum load capacity of 4 A at 230 V / 1~.

The type of function depends on the parameter setting for the respective relay output in the INPUT operating mode.

3.12 Connection of programmable inputs

The CS 320 FS controller has 3 programmable inputs for which different functions can be selected.
The type of wiring is determined on the basis of the parameter settings for the individual inputs.
→ "9.2 Operating mode INPUT" (Parameter INPUT 1-3)

 ATTENTION!

Risk of material damage to the circuit board due to incorrect connection!

Inputs 1, 2 and 3 have different reference potentials and must not be operated from a common potential!

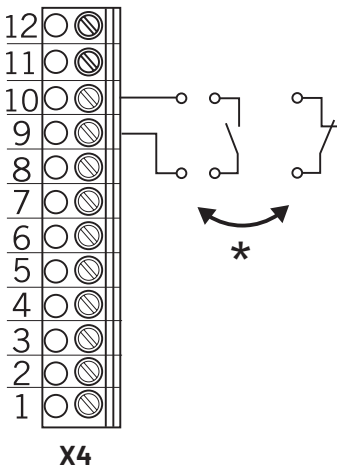
Input 1

Optional wiring with NO / NC contacts.

Reference potential 24 V DC

→ "9.2 Operating mode INPUT" (Parameter INPUT 1)

3.12 / 1



* optionally

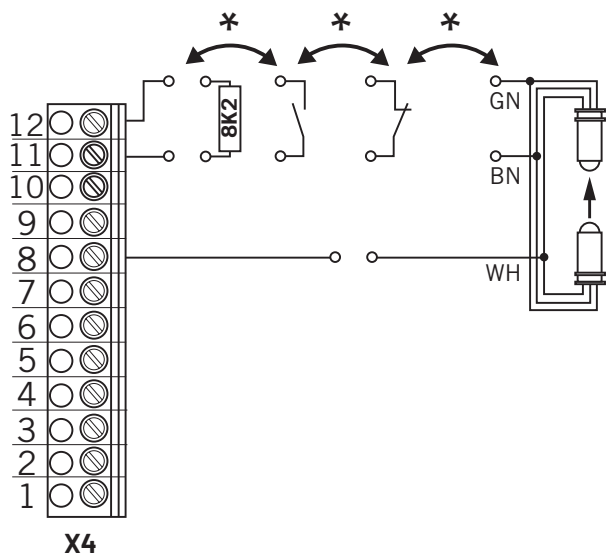
Input 2

Optional wiring with components based on 8.2 kOhm,
NO / NC contacts and optical sensors.

Reference potential 12 V DC

→ "9.2 Operating mode INPUT" (Parameter INPUT 2)

3.12 / 2



* optionally

Legend:

GN Green
BN Brown
WH White

PLEASE NOTE:

Programmable input 2 can also be used for connection
of a light grid.

→ "3.8 Connection of light grid"

Programmable input 2 is also used as a safety input according to
EN 12453:2017.

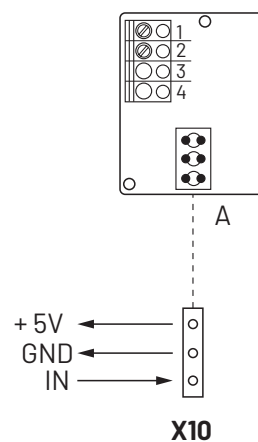
When a resistance value is detected during initial startup and after
a reset:

- MOD 2 (safety input) is activated automatically.
- Individually connected closing edge protective device 8.2 kOhm
must be activated manually in this case.

→ "3.13 Safety input after EN 12453"

Input 3

3.12 / 3



* optionally

A

Brake monitoring module BWM1

The brake monitoring module is required for drives with a switched
brake (relay 4 / MOD 14-16). The module monitors the brake
function.

B

Monitoring external load contactor and drive brake (optional)

The exact description of function and connection is described
in the separate documentation for the weekly timer and brake
monitoring module.

3.13 Safety input after EN 12453

Increased requirements for the fault safety of the slip door switch have been part of EN 12453 since 2001. EN 12453:2017 now also imposes increased safety requirements (PLC, Cat.2) on, among other things, slack rope switches and fall protection switches, including the transmission and processing of the signal.

The programmable INPUT 2 allows the MOD 2 setting to evaluate these components, all of which operate with an internal resistance value of 8.2 kOhm. If one of the components fails, the system can no longer be operated and the message ERROR STOP appears on the monitor.

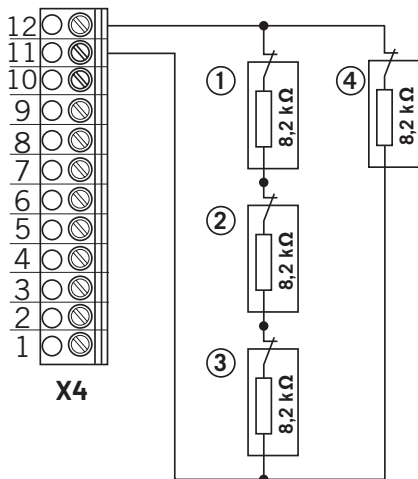
1-4 components on an 8.2 kOhm basis can be linked according to the following wiring diagrams. It does not matter which of the respective switches represents the components 1-4 here.

* optionally

- ✓ The tolerance of each resistance value must be a maximum of 1 %.

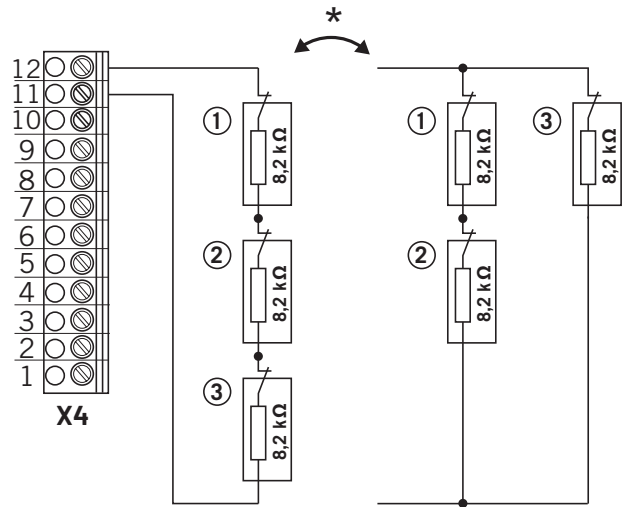
Connection 4 components

3.13 / 1



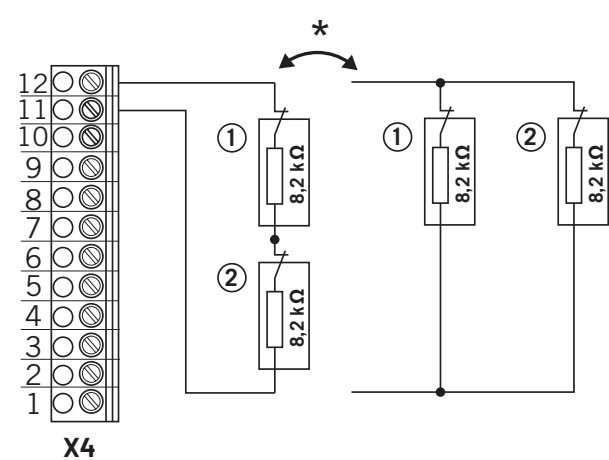
Connection 3 components

3.13 / 2



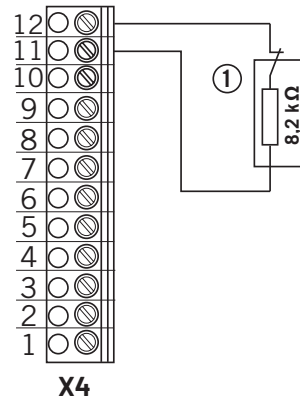
Connection 2 components

3.13 / 3



Connection 1 component

3.13 / 4



PLEASE NOTE:

If a resistance value is detected during initial startup and after a reset, input 2 is set once to A (self-teaching).

When a resistance value is detected:

- MOD 8 (safety input) is automatically set.
- The measured value is stored and monitored as a reference for the connected safety-related components.

Deviation of the measured value leads to an error message.

If a safety element is subsequently added or removed, the resistance measurement must be carried out again.

- Manually reset the INPUT 2 parameter to A (self-teaching).
- Switch the supply voltage must be switched off and on again.
- Perform the measurement again.

According to EN ISO 13849-1, the components used must either correspond to PLc/Cat.2 or be approved as a proven component in order to meet the requirements of EN 12453:2017.

Alternatively, the fall protection can also be equipped with an NC contact and integrated into the safety circuit of the controller (X3 / 1-2). This switch with NC contact must be approved as a proven component according to EN ISO 13849-1. To ensure cross-wire short monitoring, the connection cable must be laid in a protective tube.

3.14 Radio receiver, plug-in

2 different pluggable radio receivers can be connected to the controller directly.

CS radio 1-channel, multibit, 15 memory locations

- 868 MHz – Art. no. 76616
- 433 MHz – Art. no. 76614

Compatible hand-held transmitter:

- RT 52, 28, 29, 31
- Digital 382, 384, 313, 321, 323, 306, 318

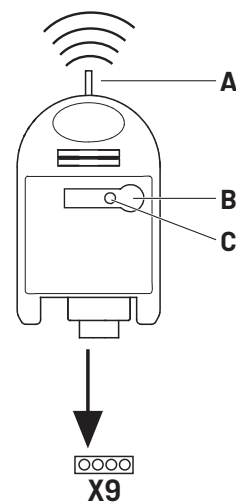
Digital 991 1-channel, AES 128 bit, 200 memory locations

- 868 MHz – Art. no. 118726
- 433 MHz – Art. no. 118727

Compatible hand-held transmitter:

- Digital 564, 663, 572, 633, 506, 517, 518

3.14 / 1



- A Antenna
- B Programming button
- C LED

 For a precise description of the function and connection, refer to the separate documentation for the radio receiver.

3.15 CS radio

Connecting

- Plug the radio receiver into connector strip X9.

Teaching-in sender codes

- Press and hold the programming button (B) for longer than 1.6 seconds.
The programming mode is activated.
The LED (C) flashes.
- Press the channel button of your transmitter.
If the radio controller has saved the transmitter code, the LED lights up for approx. 4 seconds.

A total of 15 transmitter codes (hand-held transmitter) can be taught in.

If all storage spaces are occupied, the LED flashes very rapidly. Furthermore, it is possible to integrate additional hand-held transmitters through duplication from one hand-held transmitter to the next.

Selective deletion of a transmitter code

- Press and hold the programming button (B) for longer than 1.6 seconds.
The programming mode is activated.
The LED (C) flashes.
- Continue to press and hold the programming button.
Erase mode is activated.
The LED flashes very quickly.
- Press the desired channel button of your transmitter.
The LED lights up for approximately 4 seconds.
The corresponding transmitter code has been deleted.

You can cancel the deletion process by briefly pressing the programming button.

RESET (delete complete memory)

- Press and hold the programming button (B) for longer than 1.6 seconds.
The programming mode is activated.
The LED (C) flashes.
- Continue to press and hold the programming button.
Erase mode is activated.
The LED flashes very quickly.
- Press the programming button again for more than 1.6 seconds.
The LED lights up for approximately 4 seconds.
The corresponding transmitter code has been deleted.

You can cancel the deletion process by briefly pressing the programming button.

3.16 Digital 991

Connecting

- Plug the radio receiver into connector strip X9.

Teaching-in sender codes

- Press and hold the programming button (B) for longer than 1.6 seconds.
The programming mode is activated.
The LED (C) flashes.
- Press the teach button and then the channel button of your transmitter.
The LED lights up for approximately 2 seconds.
The corresponding transmitter code has been saved.

A total of a maximum of 200 transmitter codes (handheld transmitters) can be taught. If all storage spaces are occupied, the LED flashes very rapidly.

Selective deletion of a transmitter code.

- Press and hold the programming button (B) for longer than 1.6 seconds. The programming mode is activated.
The LED (C) flashes.
- Continue to press and hold the programming button. Erase mode is activated. The LED flashes very quickly.
- Press the desired channel button of your transmitter.
The LED lights up for approximately 2 seconds.
The corresponding transmitter code has been deleted.

You can cancel the deletion process by briefly pressing the programming button.

RESET (delete complete memory)

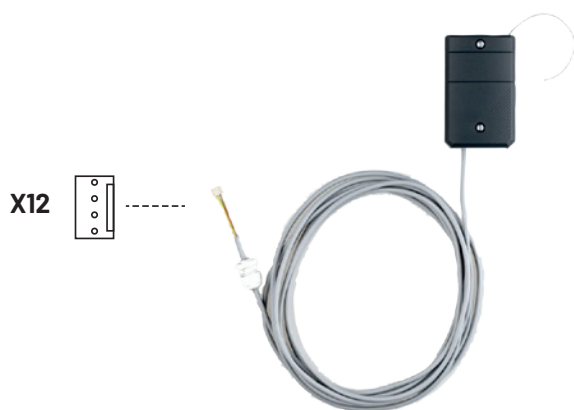
- Press and hold the programming button (B) for longer than 1.6 seconds. The programming mode is activated.
The LED (C) flashes.
- Continue to press and hold the programming button. Erase mode is activated. The LED flashes very quickly.
- Press and hold the programming button again for longer than 1.6 seconds.
The LED lights up for approximately 2 seconds.
The corresponding transmitter code has been deleted.

You can cancel the deletion process by briefly pressing the programming button.

3.17 Connection of external radio receiver

In addition to the standard connection for an external radio receiver ("3.7 / 5" external radio receiver), there is also an optional pre-wired, plug-in version.

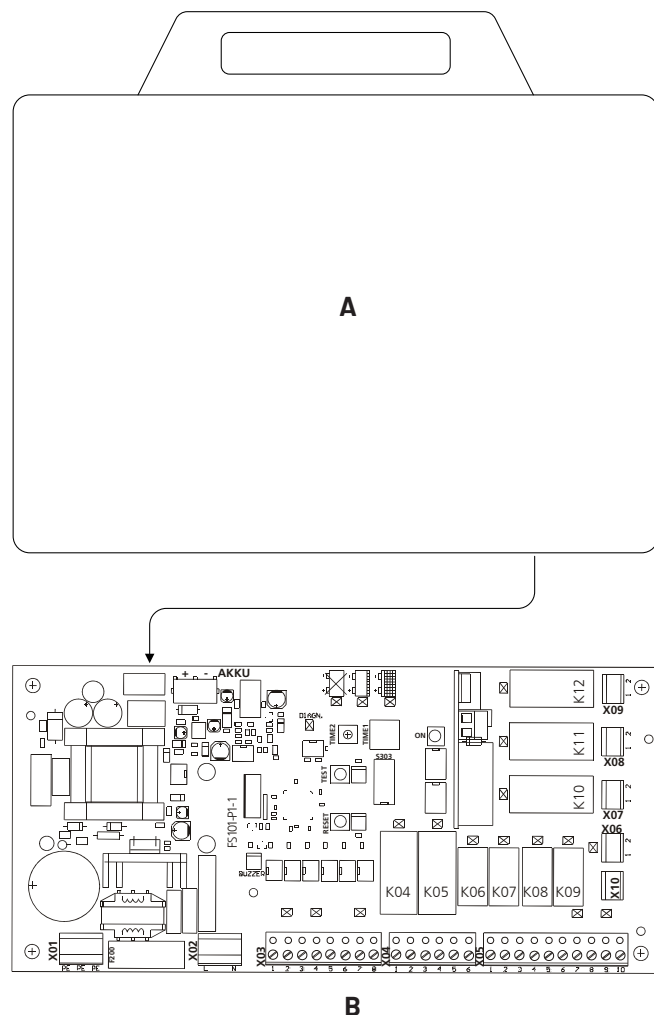
3.17 / 1



For a precise description of the function and connection, refer to the separate documentation for the BUS modules.

3.18 Product name circuit board FS 101 + battery

3.18 / 1



Legend:

X01 / X02	Voltage supply 230 V / PE
X03	Connection limit switch
X04	Outputs for auxiliary motor, brake, additional relay
X05	Control for circuit board CS 320 FS
X06	Connection fire detector
X07	Potential-free output error display
X08	Potential-free output fire alarm
X09	Potential-free output SKS
X10	Input external 24 V
+--AKKU	Terminal rail for battery pack
Time 1	Time-controlled closing in case of power outage
Time 2	Timer for gate sealed function
S303	DIP switch
Reset	Button - Switch off buzzer
Test	Button for testing emergency operation
F200	Fuse 3.15A for charger
ON	Button

K04	Relay auxiliary motor
K05	Relay motor brake
K06	Relay OPEN/CLOSED command
K07	Relay limit switch OPEN
K08	Relay limit switch CLOSED
K09	Relay stop
K10	Relay operation / error
K11	Relay emergency closing
K12	Relay SKS

3.19 DIP switch

1 ON	Drive types FT (+HY)*
1 OFF	Drive types FDF + FTA
2 ON	Fire alarm as NO switch
2 OFF	Fire alarm as NC switch
3 ON	Emergency closing with 400 V AC / 24 V DC
3 OFF	Emergency closing with 24 V DC
4 ON	With SKS in emergency operation
4 OFF	Without SKS in emergency operation
5 ON	Access to gate in case of error
5 OFF	Gate remains open in case of error
6 ON	(Drive type HY)*
6 OFF	Drive type FT

When changing the DIP switch settings, proceed as follows:

1. Switch off mains voltage
2. Switch off battery voltage
3. DIP switch change voltage
4. Switch on battery voltage
5. Switch on mains voltage

* on with version HY

3.20 Drive types

The FS 345 controller is designed for two different drive types.

FT drives

ON

OFF

DIP 1 ON and DIP 6 OFF

FT drives with 24 V DC motor brake.

The gate is closed in emergency operation by the gate's own weight.

The gate weight is held by the activated motor brake.

The power is supplied via the power supply unit on the FS 101 board; in the event of a power failure, the battery takes over the power supply.

(DIP 6 ON is required for version HY)

6

5

4

3

2

1

FD (FDF, FTA, FDS) drives

ON

OFF

DIP 1 OFF

FD (FDF, FTA, FDS) drives with 24 V DC auxiliary motor and 24 V DC motor brake (FDF 5).

The gate is closed in emergency mode by the 24 V DC auxiliary motor.

The power is supplied via the power supply unit on the FS 101 board; in the event of a power failure, the battery takes over the power supply.

6

5

4

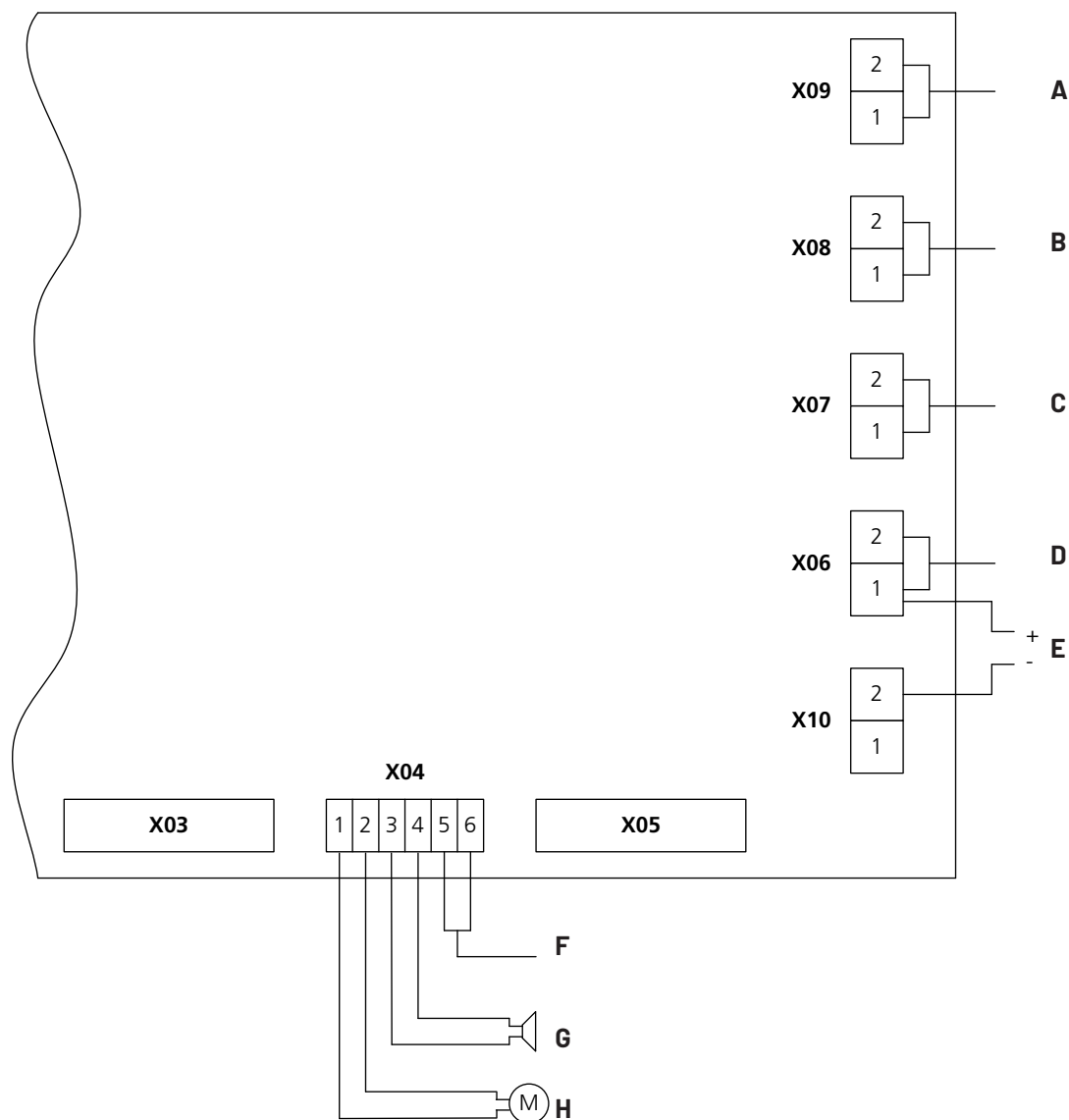
3

2

1

3.21 Connections for circuit board FS 101

3.21 / 1



Legend:

- A SKS, potential-free relay
- B EMERGENCY OPERATION, potential-free relay
- C OPERATION / FAULT, potential-free relay
- D INPUT FIRE ALARM
- E 24 V DC / 50 mA
- F Potential-free relay, OPEN / CLOSED command
- G Motor brake for FT / FDF drives*
- H Auxiliary motor*

* The connection of the FT 3 and FDF 60 drives can be found in the annex.

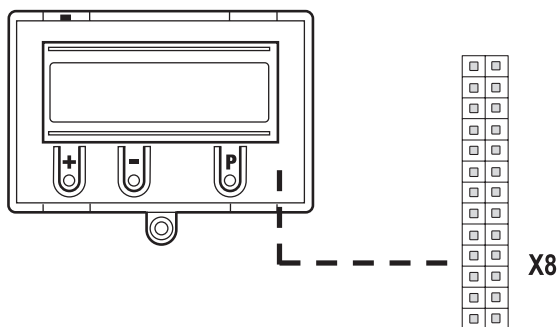
3.24 Connection of LCD monitor

The LCD monitor gives you full access to all menu settings and parameters of the control.

→ "7. Programming"

Socket base X8

3.24 / 1



! ATTENTION!

Property damage due to improper installation!

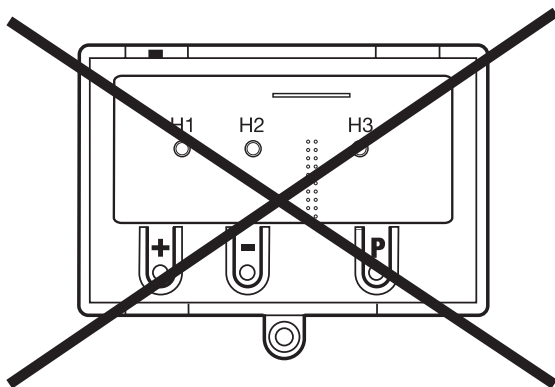
The LCD monitor must be plugged in while de-energised. Only an LCD monitor from Marantec (item no. 91447) may be used.

! ATTENTION!

Property damage due to improper installation!

The Marantec LED module (item no. 103239) cannot be combined with the CS 320 FS control. Use and commissioning can lead to the destruction of the CS 320 FS circuit board.

3.24 / 2



3.25 Connection of MS BUS components

Two BUS interfaces are present on the circuit board for connecting different components.

The MS-BUS LCD monitor (#121246) is supplied with a 3 m connection cable.

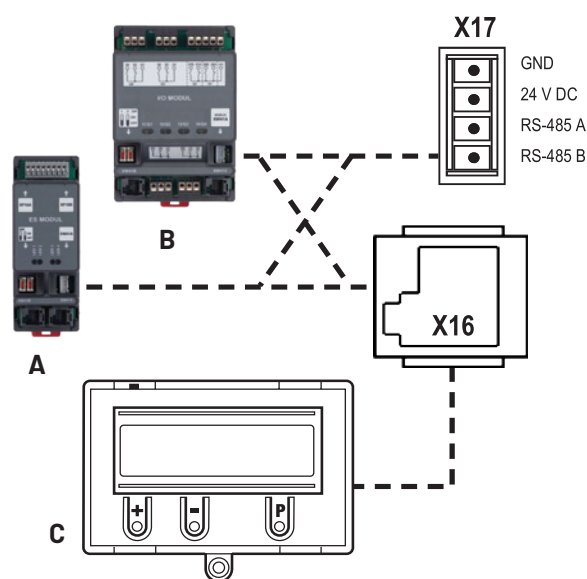
The MS-Bus LCD monitor (like the standard LCD monitor) permits full access to all parameter settings.

It is possible to expand functions or realise additional functions with the MS BUS function modules.

- ES module: Evaluation of entrapment protection systems
- I/O module: Input/output extension
- GV module: Contra-traffic rules

Terminal rail X16 / X17

3.25 / 1



- | | | |
|---|------------------------|--------------------------|
| A | ES module | Connection to X16 or X17 |
| B | I/O module / GV module | Connection to X16 or X17 |
| C | LCD monitor | Connection only to X16 |

For a precise description of the function and connection, refer to the separate documentation for the BUS modules.

PLEASE NOTE:

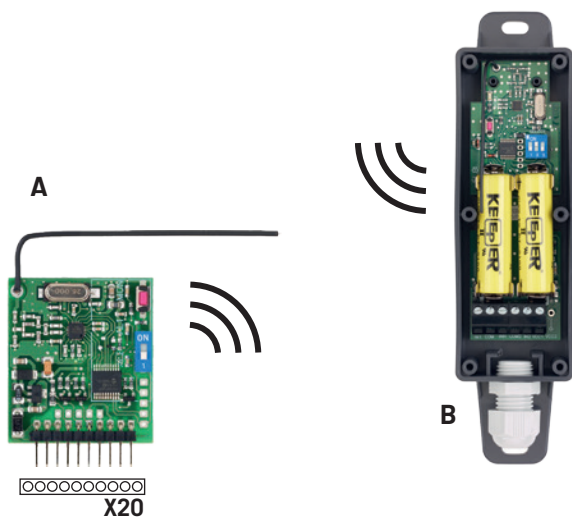
The connector strips X16 and X17 can only be assigned once. However, several BUS modules can be connected using special bridge cables.

The power consumption must be taken into account.

3.26 Radio transmission system

The radio transmission system is a radio system with bi-directional operation. The transmission system facilitates wireless signal transmission from safety equipment to door systems. The radio connection exists between an internal, pluggable component, which is connected to X20, and an external unit that is mounted on the door leaf. It is possible to transmit signals from different closing edge systems and/or a safety circuit. Transmission with spiral cable is thereby omitted.

3.26 / 1



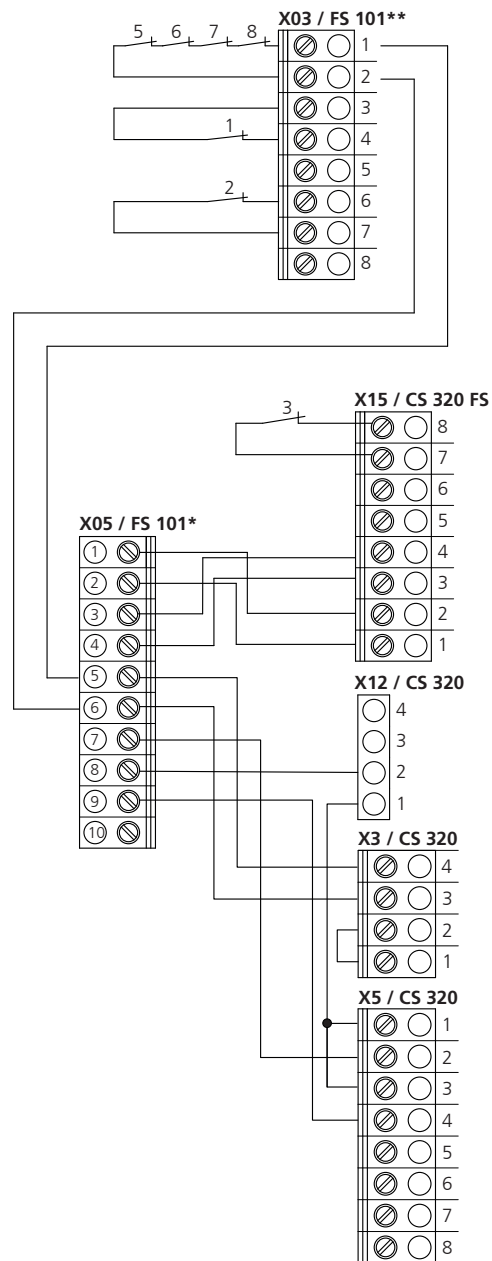
- A Pluggable components. Clipped onto connector strip X20 of the CS 320 FS circuit board.
- B External unit. Mounted on the door leaf. The safety strip and safety circuit are connected here.

For a precise description of the function and connection, refer to the separate documentation for the transmission system.

4. Limit switches

4.1 Pin assignment limit switch and connection CS 320 / FS 101

4.1 / 1

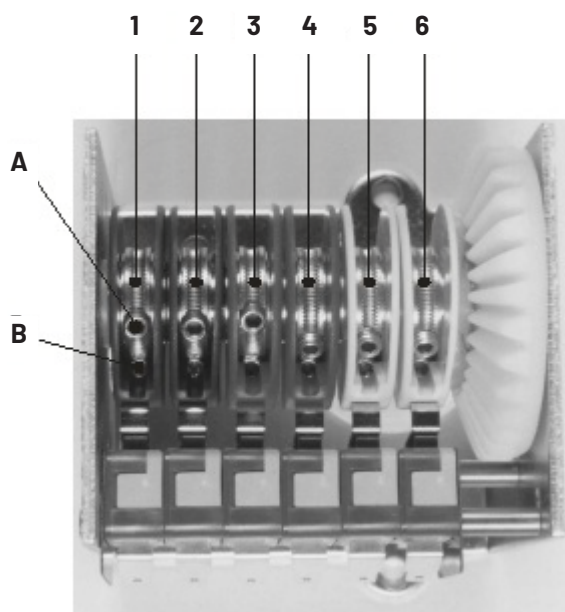


Legend CS 320 FS / X11

- 1 Limit switch OPEN
- 2 Limit switch CLOSED
- 3 Prelimit switch CLOSED
- 5 Thermo protection motor*
- 6 Emergency operation (NC switch)**
- 7 Safety limit switch CLOSED
- 8 Safety limit switch OPEN
- * Wired ex works
- ** Wired ex works when delivered with drive

4.2 Limit switch settings FDF / FTA / FDS

4.2 / 1



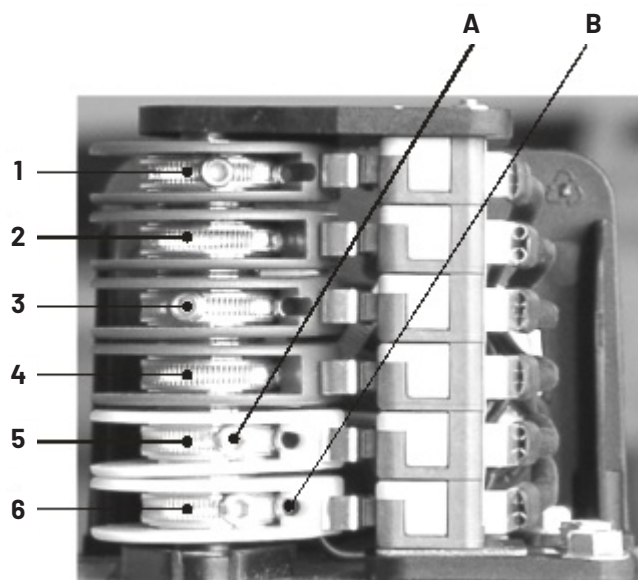
⚠ ATTENTION!

Material damage due to incorrect adjustment!

If the end position is overrun during the adjustment process, the gate can be damaged.

- Make sure that the end position is not overrun during the adjustment process.
- Select the ADJUSTMENT menu on the display.
- Move the gate to the desired CLOSED position using (+) and (-).
- Adjust the switching cam 5 (white) so that the limit switch is activated.
- Tighten the fixing screw A.
- Make the fine adjustment with screw B.
- Move the gate to the desired OPEN position using (+) and (-).
- Adjust the switching cam 2 (green) so that the limit switch is activated.
- Tighten the fixing screw A.
- Set the safety limit switches 3 and 4 (red) so that they respond immediately after the controller limit switches have been overrun.
- Check the seating of the fixing screws after the test run. The additional limit switches 1 and 6 have potential-free changeover contacts.

4.2 / 2



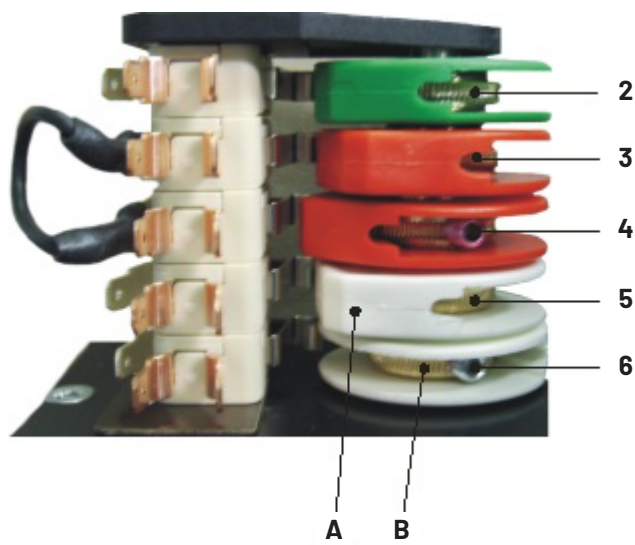
Legend

1	Additional limit switch OPEN	green
2	Limit switch OPEN	green
3	Safety limit switch OPEN	red
4	Safety limit switch CLOSED	red
5	Limit switch CLOSED	white
6	Additional limit switch CLOSED	white

The limit switches (with the exception of the pre-limit switch) are evaluated by the FS 101 board and passed on to the CS 320 FS circuit board.

4.3 Limit switch settings FT

4.3 / 1



Legend

- | | | |
|----|--------------------------------|-------|
| 2. | Limit switch OPEN | green |
| 3. | Safety limit switch OPEN | red |
| 4. | Safety limit switch CLOSED | red |
| 5. | Limit switch CLOSED | white |
| 6. | Additional limit switch CLOSED | white |



ATTENTION!

Material damage due to incorrect adjustment!

If the end position is overrun during the adjustment process, the gate can be damaged.

- Make sure that the end position is not overrun during the adjustment process.
- Select the ADJUSTMENT menu on the display.
- Move the gate to the desired CLOSED position using (+) and (-).
- Adjust the switching cam 5 (white) so that the limit switch is activated.
- Tighten the fixing screw A.
- Make the fine adjustment with screw B.
- Move the gate to the desired OPEN position using (+) and (-).
- Adjust the switching cam 2 (green) so that the limit switch is activated.
- Tighten the fixing screw A.
- Set the safety limit switches 3 and 4 (red) so that they respond immediately after the controller limit switches have been overrun.
- Check the seating of the fixing screws after the test run. The additional limit switches 1 and 6 have potential-free changeover contacts.

5. Initialisation

With first commissioning and after a RESET the following components are automatically detected and programmed:

- End position system
- Closing edge protective device
- Light barrier system
- Input 2 (safety input)

During this process (approximately 60 seconds), the green LED flashes and the monitor displays on the top line PLEASE WAIT. Operation of the system is not possible at this time.

The end position system must be installed before first commissioning.

Components can be retrospectively changed or added through the LCD monitor or renewed initialisation.

If a component is not yet connected:

- The display shows A.
- A search for this component takes place with every subsequent initialisation.

If a component is connected:

- The corresponding setting mode is set automatically.

Exception:

When no resistance value is detected with first initialisation:

- Input 2 remains inactive (OFF).

If a resistance is detected at input 2 during initial startup:

- The resistor is rated as a safety element.
- Input 2 is commissioned as a safety input.

→ "9.2 Operating mode INPUT" / Parameter INPUT 2

PLEASE NOTE:

Initialisation serves not only to teach the different system components, but also offers the option of changing the menu language directly.

The default menu language (ENGLISH) appears as a flashing text display on the monitor for 60 seconds. With the (+) and (-) buttons it is possible to select the desired language and save this with the (P) button. All text displays/messages will then be shown in the selected language.

6. Setting of the end positions

6.1 Checking the output direction of rotation/ travel direction

Change to ADJUSTMENT mode

- Press the (P) button until ADJUSTMENT appears.

Checking the drive direction

- Press the (+) button.
The door opens.
- Press the (-) button.
The door closes.
- ✓ If both conditions apply:
 - Set the end positions.
 - "6.2 Setting the mechanical limit switches"
- ✓ If both conditions do not apply:
 - Change the direction of travel.

Changing the direction of travel

- Press the (+) and (-) buttons at the same time for approx. 5 seconds.
The display shows ROT FIELD LEFT.
The direction of travel is changed.
Any saved end positions are deleted.
- Set the end positions.
→ "6.2 Setting the mechanical limit switches"

6.2 Setting the mechanical limit switches

Change to ADJUSTMENT mode

- Press the (P) button until ADJUSTMENT appears.

Setting of the end positions OPEN and CLOSED

Setting the end positions is described in the separate documentation for the mechanical limit switches.

- Exit ADJUSTMENT mode by pressing the (P) button.

Please note

The system does not exit ADJUSTMENT mode automatically. Exit ADJUSTMENT mode by pressing the (P) button in order to change to normal mode.

7. Programming

7.1 Layout of LCD monitor

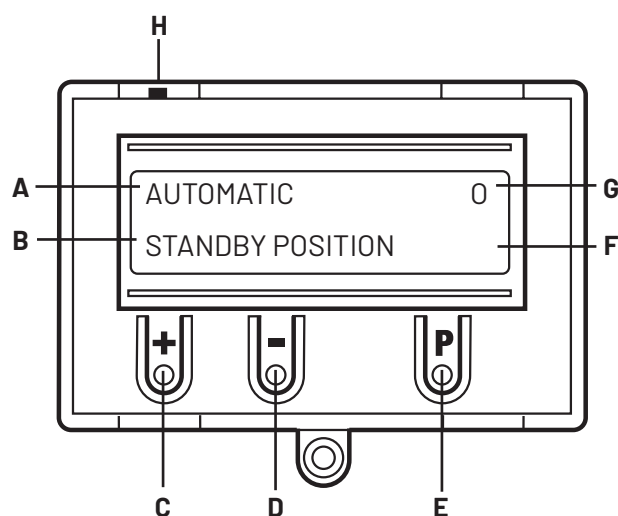


ATTENTION!

Property damage due to improper installation!

The monitor must be plugged in while de-energised. Only the LCD monitor standard (#91447) from the company Marantec may be used.

7.1 / 1



Explanation:

- A: Operating mode / diagnosis info
- B: Parameter / diagnosis info
- C: (+) button
- D: (-) button
- E: (P) button
- F: Value / status
- G: Value / status
- H: Jumper

If the jumper H is removed, the (+), (-) and (P) buttons no longer function.

The display continues to function.

After the controller has been switched on, it is in the initialisation phase. PLEASE WAIT ... appears in the display. The controller is not ready for operation. The initialisation phase takes approx. 60 seconds after switching on for the first time.

7.2 Operating modes of the LCD monitor

With the LCD monitor, the controller has four operating modes:

1. AUTOMATIC
2. ADJUSTMENT
3. INPUT
4. DIAGNOSIS

The operating modes ADJUSTMENT, INPUT and DIAGNOSIS are automatically exited 7 minutes after the last button was pressed. The controller switches to AUTOMATIC operating mode.

Operating mode 1: AUTOMATIC

The door system is driven in AUTOMATIC mode.

Display:

- Display of the function being carried out
- Display of possible faults

If the SELF LOCK parameter is set to MOD 2–7 or MOD 9 in the input menu, the display switches from AUTOMATIC mode to MANUAL.

Operating mode 2: ADJUSTMENT

In the operating mode ADJUSTMENT, the end positions OPEN and CLOSED are set.



ATTENTION!

Material damage due to improper operation of the controller!

When in ADJUSTMENT mode, there is no shutdown with the electronic end position system (AWG) upon reaching the end positions. The door can be damaged by running past the end positions.

Fine adjustment can be implemented in INPUT mode.

Display:

- Display of the end position value

Operating mode 3: INPUT

The values of various parameters can be changed in INPUT mode.

Display:

- Displays the selected parameter
- Display of the set value / status

Operating mode 4: DIAGNOSIS

Door-specific checks can be interrogated in DIAGNOSIS mode.

Display:

- Display of the check
- Display of the check status

7.3 Expert menu

Under factory settings (standard), only a few parameters appear in the INPUT operating mode, which can be adjusted by the operator. These setting parameters reflect the most frequently applied requirements for an industrial door system and are sufficient for commissioning in a standard situation.

The last item in this list is the parameter EXPERT MENU. This is always set to OFF.

OFF: Limited number of parameter settings:

- Menu language
- INT POS UP
- OPEN TIME
- FOREWARNING TIME
- FAST CLOSE
- REVERSE OFF
- INPUT 1
- SELF LOCK
- EXPERT MENU

Setting the EXPERT MENU parameter to ON activates the expert mode. It is now possible to call up and set all input menu parameters.

→ "9.2 Operating mode INPUT"

Please note

- The expert mode will exit automatically after approximately 7 minutes if no key is pressed. Now, only the limited selection of parameters is once again available until the EXPERT MENU parameter is set to ON again.
- The same applies to switching off the power. This once again sets the EXPERT MENU parameter to OFF.

7.4 RESET

The RESET function can be used to reset the control parameters to the pre-selected factory settings.

→ "9.2 Operating mode INPUT"

Parameter FACTORY SETTING

Selection of the parameter set that should be reset with a RESET.

It is possible to implement different types of reset whereby more or fewer settings are reset.

→ "9.2 Operating mode INPUT"

Parameter RESET

Part reset 1:

All parameter settings are reset, except for the settings for the frequency converter (on CS 320 FU only).

Part reset 2:

All parameter settings are reset, except for the settings for the end positions and the detected end position system.

Complete reset:

Everything is reset to factory settings.

→ "7.5 RESET of controller with LCD monitor"

→ "7.6 RESET of controller without LCD monitor"

7.5 RESET of controller with LCD monitor

Switch to operating mode INPUT

- Press the (P) button until INPUT appears.
- Press the (+) and (-) buttons for more than 2 seconds.
The INPUT mode is activated.

Resetting the controller

- Press the buttons (+/-) until the RESET parameter appears.
The value is set to "OFF".
- Press the (+) button until MOD 3 appears.
- Press the (P) button.
The reset starts.

The initialisation phase is completed and all connected safety components, as well as the end position system, are automatically taught in.

Change to ADJUSTMENT mode

→ "6.2 Setting the mechanical limit switches"

Switch to the operating mode AUTOMATIC

- Press the (P) button until AUTOMATIC appears.

7.6 RESET of controller without LCD monitor

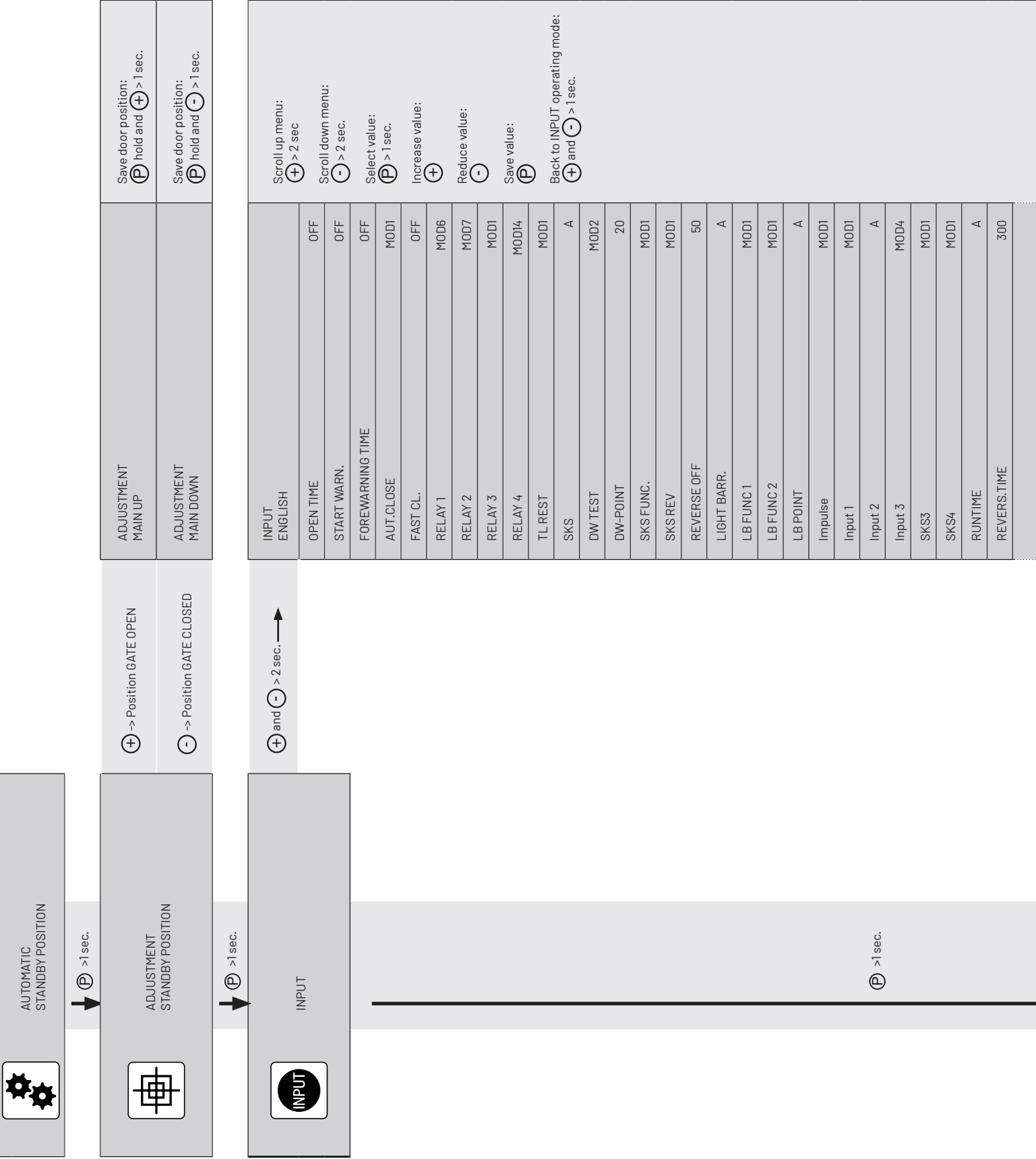
- Interrupt the supply voltage.
- Press and hold the circuit board buttons (P) and (-) at the same time.
- Switch the supply voltage back on.
- Press the circuit board buttons (P) and (-) at the same time and hold them down.
The red LED (H6) flashes quickly.
- Release the circuit board buttons (P) and (-).

The system then runs through the initialisation phase (approx. 60 seconds).

During initialisation, it is not possible to program or operate the system.

After initialisation, the end positions are deleted and all parameters are reset to factory settings.

8. Navigator (only LCD monitor)



LIMIT SWITCH	A
SELF LOCK.	MOD1
POWER	10
RESET MSBUS	OFF
RESTART	OFF
FACTORY SET.	99
RESET	OFF
PIN NO.2	1111
SERVICE	OFF
INVERTER	MOD1
BRAKE P OP	-250
EXPERT MENU	OFF

	DIAGNOSIS		Scroll up menu:  > 2 sec Scroll down menu:  > 2 sec. Back to AUTOMATIC operating mode:  Only interrogation possible
	UPPER SWITCH	ON	
	LOWER SWITCH	ON	
	UP-SWITCH	OFF	
	DOWN-SWITCH	OFF	
	INPUT 1	OFF	
	INPUT 2 / SKS OPEN 2 / SAFETY 2	- / ON / OFF	
	INPUT 3	- / OFF	
	SKS	ON	
	SKS 3 / SAFETY: 3	- / ON	
	SKS 4 / SAFETY: 4	- / ON	
	IMPULSE	OFF	
	TIMER	OFF	
	LIGHT BARR.	ON	
	LIGHT BARR. 2	ON	
	SAFETY CIRC.	ON	
	STOP	ON	
	ROT FIELD	Right	
	CYCLE	000000	
	SERVICE	OFF	
	AWG	0000	
	C.STOP	0000	
	C.OPENED	0000	
	C.O.BTN	0000	
	Error memory	Error ...	

9. Function overviews

9.1 Operating mode AUTOMATIC



Display	Description
AUTOMATIC TEACH IN RUN	The runtime is taught in automatically.
AUTOMATIC OPENING	The door is currently in the opening phase.
AUTOMATIC CLOSING	The door is currently in the closing phase.
AUTOMATIC STANDBY POSITION	The door is currently in an intermediate position.
AUTOMATIC STANDBY POSITION	0 The gate is in the end position OPEN.
AUTOMATIC STANDBY POSITION	o The gate is in the Sect. OPEN position ("intermediate position OPEN" parameter).
AUTOMATIC STANDBY POSITION	U The gate is in the end position CLOSED.
AUTOMATIC STANDBY POSITION	u The door is in the Sect. CLOSE position ("intermediate position CLOSE" parameter).
AUTOMATIC STANDBY POSITION	r The door is in the reverse shut-off position.
AUTOMATIC STOP	The command button STOP (cover keypad CS) was pressed for longer than 5 seconds.
AUTOMATIC PERMANENT INPUT	When the voltage is switched on, an active signal (NO) is detected at the OPEN, CLOSED, impulse or programmable input 1 (when using I/O BUS modules also the inputs 11-14 or 15-18). In any case, this represents an unacceptable situation. The cause is probably a defective component that must be replaced. Exception: The signal comes from the plug-in switch clock or via the programmed input 1 if this is set as a switch clock function (MOD 4) or fire alarm function (MOD 5-9, 13).
AUTOMATIC CRASH SENSOR	The crash sensor of the gate system has been activated (connection to X4 / 9-10, programmable input 1, MOD 18). A vehicle (e.g. forklift truck) may have driven into the closed door.
SERVICE STANDBY POSITION	The pre-selected service interval has been reached.

If the SELF LOCK parameter is set to MOD 2-7 or MOD 9 in the input menu, the display switches from AUTOMATIC mode to MANUAL.

Display	Description
MANUAL MAIN UP	The door is currently in the opening phase.
MANUAL MAIN DOWN	The door is currently in the closing phase.
MANUAL STANDBY POSITION	The door is currently in an intermediate position.

9.2 Operating mode INPUT



Function	Description	Setting options	Factory setting
ENGLISH	Selection of the menu language. Only with LCD monitor: The menu language can also be selected during the initialisation phase (during first commissioning or after a reset). The ex works default menu language (ENGLISH) appears as a flashing text display on the monitor for 60 seconds. At this time it is possible to change the menu language during the initialisation phase. You can scroll through the language selection by pressing the [+] or [-] buttons. Save the desired language with the [P] button. All text displays/messages will then be shown in the selected language.	DEUTSCH ENGLISH FRANCAIS NEDERLANDS DANSK ESPANOL POLSKI CESKY ITALIANO SUOMI SVENSKA TÜRKÇE NORSK MAGYARUL	DEUTSCH
OPEN TIME	After opening, the door automatically travels in the CLOSE direction after the set value has passed. Please note: Pressing the CLOSE button during the open time starts the closing operation immediately. Pressing the OPEN or STOP button during the open time restarts the time. If automatic access is interrupted by the closing edge protective device ("SKS"), the open time is added with each new attempt. After 3 attempts automatic closing will be cancelled.	OFF, 1 – 3600 seconds	OFF
START WARN.	The approach warning is carried out before every gate movement.	OFF, 1 – 10 seconds	OFF
FORE-WARNING TIME	The forewarning time is activated before automatic downward travel or closing through impulse operation. Please note: This time is added to the start-up warning	OFF, 1 – 300 seconds	OFF
AUT.CLOSE	Automatic closing after the open time has elapsed. MOD 1: AUT.CLOSE off End position OPEN MOD 2: AUT.CLOSE off End position Sect. OPEN MOD 3: AUT.CLOSE off End position OPEN and End position Sect. OPEN MOD 4: AUT.CLOSE off <i>all</i> gate positions	MOD 1 – MOD 4	MOD 1

Function	Description	Setting options	Factory setting
FAST CL.	Premature closing after passing through the light barrier. Prerequisite: Connection of a light barrier at pass through-height and setting of an open time > 0. With open time = 0 the door closes directly after passing through the light barrier. MOD 2: If the light barrier is crossed during the open time: – The open time is cancelled after passing through the light barrier (system shuts immediately). If passing through the light barrier occurs during opening: – The programmed open time is ignored and the door closes directly. MOD 3: If the light barrier is crossed during the open time: – The open time is cancelled after passing through the light barrier for a minimum duration of 2 seconds (personnel suppression). If passing through the light barrier occurs during opening: – The programmed open time is ignored and the door closes directly. MOD 4: If the light barrier is crossed during the open time: – The open time is cancelled after passing through the light barrier (system shuts immediately). If passing through the light barrier occurs during opening: – The light barrier does not function during the drive up.	OFF, MOD 2 – MOD 4	OFF
RELAY 1	All 4 relays can be assigned a relay mode of 1 – 13, 17 – 19, 21 – 46, 49 and 60 – 62. Relay 4 can also be programmed with MOD 14 – 16. Further explanations: → "9.3 Explanations of relay modes"	MOD 1 – MOD 13 MOD 17 – MOD 19 MOD 21 – MOD 46 MOD 49 MOD 60 – MOD 62	MOD 29
RELAY 2	MOD 1: (Red traffic light inside 1) Forewarning - flashing, gate run - Lights up MOD 2: (Red traffic light inside 2) Forewarning - flashing, gate run - flashing MOD 3: (Red traffic light inside 3) Forewarning - illuminated, gate run - Lights up MOD 4: Impulse signal for OPEN command from inside MOD 5: Fault message	MOD 1 – MOD 13 MOD 17 – MOD 19 MOD 21 – MOD 46 MOD 49 MOD 60 – MOD 62	MOD 30
RELAY 3	MOD 6: End position OPEN MOD 7: End position CLOSED MOD 8: End position OPEN negated MOD 9: End position CLOSED negated MOD 10: Intermediate position OPEN MOD 11: Intermediate position CLOSED MOD 12: Intermediate position CLOSED to end position CLOSED MOD 13: Magnetic lock function MOD 14: Brake (NC principle) MOD 15: Brake (NO principle) MOD 16: Brake (NC principle) switched to the end position OPEN MOD 17: SKS activated or test error MOD 18: (Red traffic light inside 4) Forewarning - flashing, gate run - off MOD 19: Intermediate position OPEN to end position OPEN MOD 21: Test of the entrapment protection before opening (additional module required)	MOD 1 – MOD 13 MOD 17 – MOD 19 MOD 21 – MOD 46 MOD 49 MOD 60 – MOD 62	MOD 1

Function	Description	Setting options	Factory setting
RELAY 4	MOD 22: Activation of radio transmission system 1 and 3, or testing of light grids MOD 23: (green light) End position OPEN - Illuminated, forewarning - OFF, gate run - OFF* MOD 24: Capacitor circuit for sectional door drives 230V/1~ MOD 25: Yard light function, lights up for 2 minutes after OPEN/impulse command MOD 26: Activation of radio transmission system 2 MOD 27: Impulse signal after reaching the OPEN end position MOD 28: Relay generally OFF MOD 29: Gate moves open MOD 30: Gate moves closed MOD 31: Service, permanent input after the set maintenance interval has been reached MOD 32: Battery mode MOD 33: No battery mode MOD 34: BMA signal ("BMA": brake message system active) MOD 35: Light barrier in function MOD 36: Locking cylinder slip door MOD 37: Testing stop signal transmission system radio 1 and 3 MOD 38: Testing light grid 2 (input 2) MOD 39: Error LED MOD 40: Impulse signal for OPEN command from outside MOD 41: Test transmission system radio 4 in the OPEN direction MOD 43: Drive in motion MOD 44: (red traffic light inside + outside) DOWN door movement from intermediate position DOWN - flashing UP door movement - off MOD 45: Closing edges in function MOD 46: Controller in operating mode ADJUSTMENT MOD 49: Testing presence and movement sensors (NC) MOD 60: (Red traffic light outside 1) Forewarning - flashing, gate run - Lights up MOD 61: (Red traffic light outside 2) Forewarning - flashing, gate run - Flashing MOD 62: (Green traffic light outside) End position OPEN - Illuminated, forewarning/gate run - Off	MOD 1 - MOD 19 MOD 21 - MOD 46 MOD 49 MOD 60 - MOD 62	MOD 45
TL REST	Switch traffic lights MOD 1: in standby mode off MOD 2: in standby mode on MOD 3: in standby mode after 5 minutes off	MOD 1 - MOD 3	MOD 1
SKS	MOD 1: OSE (Opto-Sensor) MOD 2: 8.2 kΩ (electrical contact strip) MOD 3: DW (pressure wave strip) as NC with testing MOD 4: Light grid OSE without testing MOD 5: Light grid SSR or PNP with testing MOD 6: Light grid SSR or PNP without testing MOD 7: 2-wire OSE (optical sensor with 2 connecting wires) PLEASE NOTE: MOD 4, MOD 5 and MOD 6 must be set manually when using a light grid. - Without addition of the open time (if programmed) after interruption of the light grid during the automatic closing. - Without switching off the AUTOMATIC CLOSING MOVEMENT function after 3 interruptions in a row.	A (teaching) MOD 1 - MOD 7	A

Function	Description	Setting options	Factory setting
DW TEST	Activation and deactivation of the test function for the connected pressure wave strip. Only appears when setting parameter SKS = MOD 3. MOD 1: Test OFF MOD 2: Test ON	MOD 1 – MOD 2	MOD 2
DW-POINT	Point at which the connected DW strip (X4 / 5+6) is tested. Only appears when setting parameter SKS = MOD 3. Setting in increments (only AWG), starting from bottom limit switch-off point. In the case of systems with mechanical limit switches, the supplementary limit switch DOWN serves as a DW-Point.	0 – 1000	20
SKS FUNC.	MOD 1: Stop + reversing MOD 2 Stop + free travel for 2 seconds	MOD 1 – MOD 2	MOD 1
SKS REV	MOD 1: Stop + reversal between end position OPEN and reversal point Stop between reversal point and end position CLOSED → for vertically closing gates MOD 2 Stop + reversal between end position OPEN and reversal point No action between reversal point and end position CLOSED → for vertically closing gates with leading light barrier MOD 3: Stop + reversal between end position OPEN and reversal point Stop between reversal point and end position CLOSED → for horizontally closing gates and systems with mechanical limit switches without pre-limit switches PLEASE NOTE: In the case of systems with mechanical limit switches the supplementary limit switch DOWN serves as reversing point.	MOD 1 – MOD 3	MOD 1
REVERSE OFF	Reversing point. Point at which the reversing of the door is switched off. Appears only on systems with an electronic end position system (AWG). Setting in increments, starting from bottom limit switch-off point. In the case of systems with mechanical limit switches, the supplementary limit switch DOWN serves as reversing point.	A (teaching) 1 – 1000	50
LIGHT BARR. 1	Light barrier 1, with or without testing, mounted in passage area of the door. Connection to X4 / 1-4. The respective system connected is automatically detected and taught. → "3.9 Connection closing edge protective device 1" on page 16 MOD 1: 2-wire system (Marantec) with testing MOD 2: 3-wire system NPN without testing MOD 3: 3-wire system PNP without testing 4-wire system NC contact without testing MOD 4: 3-wire system NPN with testing MOD 5: 3-wire system PNP with testing 4-wire system NC contact with testing PLEASE NOTE: If a 3- or 4-wire system is to be operated with testing, the respective MOD (4 or 5) must be set manually.	A (teaching) MOD 1 – MOD 5	A

Function	Description	Setting options	Factory setting																														
LB FUNC 1	Function of the light barrier 1 in passage area of the door. <table><thead><tr><th></th><th>Gate movement CLOSED</th><th>Gate movement OPEN</th></tr></thead><tbody><tr><td>MOD 1:</td><td>Stop + reversal</td><td>No action</td></tr><tr><td>MOD 2:</td><td>Stop + free travel</td><td>No action</td></tr><tr><td>MOD 3:</td><td>STOP</td><td>No action</td></tr><tr><td>MOD 4:</td><td>STOP</td><td>STOP</td></tr><tr><td>MOD 5:</td><td>Stop + reversal</td><td>Passenger suppression (gate movement OPEN only possible when the light barrier is free).</td></tr><tr><td>MOD 6:</td><td>No action</td><td>Stop + reversal</td></tr><tr><td>MOD 7:</td><td>No action</td><td>Stop + free travel</td></tr><tr><td>MOD 8:</td><td>No action</td><td>Stop</td></tr><tr><td>MOD 9:</td><td>Passenger suppression (Gate movement CLOSED is only possible when the light barrier is free).</td><td>Stop + reversal</td></tr></tbody></table>		Gate movement CLOSED	Gate movement OPEN	MOD 1:	Stop + reversal	No action	MOD 2:	Stop + free travel	No action	MOD 3:	STOP	No action	MOD 4:	STOP	STOP	MOD 5:	Stop + reversal	Passenger suppression (gate movement OPEN only possible when the light barrier is free).	MOD 6:	No action	Stop + reversal	MOD 7:	No action	Stop + free travel	MOD 8:	No action	Stop	MOD 9:	Passenger suppression (Gate movement CLOSED is only possible when the light barrier is free).	Stop + reversal	MOD 1 – MOD 9	MOD 1
	Gate movement CLOSED	Gate movement OPEN																															
MOD 1:	Stop + reversal	No action																															
MOD 2:	Stop + free travel	No action																															
MOD 3:	STOP	No action																															
MOD 4:	STOP	STOP																															
MOD 5:	Stop + reversal	Passenger suppression (gate movement OPEN only possible when the light barrier is free).																															
MOD 6:	No action	Stop + reversal																															
MOD 7:	No action	Stop + free travel																															
MOD 8:	No action	Stop																															
MOD 9:	Passenger suppression (Gate movement CLOSED is only possible when the light barrier is free).	Stop + reversal																															
LB FUNC 2	Function of the light barrier 2 in passage area of the door. Appears only when parameter INPUT 1 is set = MOD 15. Connection only as NC contact via programmable input 1 (X4 / 9+10). Selection mode analogous to the settings under LB FUNC. 1	MOD 1 – MOD 9	MOD 1																														
LB POINT	Between the end position CLOSED and the LB point, the light barrier 1 (X4 / 1-4) is not evaluated. Setting in increments, starting from bottom limit switch-off point. Only appears with systems with an electronic limit switch. Please note: During the first closing movement during ADJUSTMENT, this point is automatically recognised, provided that the light barrier 1 is installed in the gate frame and remains interrupted during the access from this point until the end position CLOSED.	A (teaching) 1 – UP SWITCH	A																														
Impulse	Selection of a function that should be assigned to the impulse button (X3 / 7+8). MOD 1: OPEN - STOP - CLOSE - STOP - OPEN ... (sequential control) MOD 2: OPEN when the gate is stationary / No action when the gate is OPEN. Stop and open during the CLOSE movement MOD 3: OPEN when the gate is stationary / STOP when the gate is moving MOD 4: OPEN when the gate is stationary / No action when the gate moves MOD 5: OPEN when the gate is stationary / CLOSED from End position OPEN	MOD 1 – MOD 5	MOD 1																														

Function	Description	Setting options	Factory setting
Input 1	Selection of a function to be assigned to input 1(X4 / 9+10). MOD 1: Button Sect. OPEN NO MOD 2: Switch Sect. OPEN NO MOD 3: Button auto-CLOSED NO MOD 4: External CLOCK (permanent OPEN) NO MOD 5: Switch BMA 3 (partial open) NO MOD 6: Switch BMA 1 (emergency closing) NO MOD 7: Switch BMA 1 (emergency closing) NC MOD 8: Switch BMA 2 (emergency opening) NO MOD 9: Switch BMA 2 (emergency opening) NC MOD 10: Button ventilation function (partial opening) NO MOD 11: Button automatic closing movement NO MOD 12: Laser scanner (height recognition) NO MOD 13: Switch BMA 3 (partial opening) NC MOD 14: Wicket door lock NO MOD 15: Light barrier 2 NC MOD 16: Switch forewarning NO MOD 17: Impulse button NO MOD 18: Crash sensor NC MOD 19: Block driving commands via LCD monitor NC MOD 22: Monitoring external load contactor NO MOD 30: OPEN button inside NO MOD 31: OPEN button outside NO MOD 32: CLOSED button NO (only active if the closing edge protective device and light barrier 1 are working. No function in dead-man's operation.)	MOD 1 – MOD 19 MOD 22 MOD 30 – MOD 32	MOD 6
Input 2	Selection of a function to be assigned to input 2 (X4 / 11+12). OFF: NOT active MOD 2: Safety circuit with resistance evaluation xx Ω MOD 3: Safety edge – active in the OPEN direction 8.2 kΩ Stop and reversal on actuation MOD 4: Safety edge – active in the OPEN direction 8.2 kΩ Stop and free travel when actuated MOD 5: Battery mode NO MOD 6: Radar motion detector (height detection) NO MOD 7: Light grid 2 (SSR / PNP) with testing NC MOD 9: Safety element – stop in case of deviation OSE MOD 10: Safety edge – Active in the OPEN direction OSE Stop and reversal on actuation MOD 11: Safety edge – Active in the OPEN direction OSE Stop and run clear (2 sec.) with actuation MOD 12: Light grid 2 without testing OSE If a resistance value is detected during initial startup and after a reset, input 2 is set once to A (self-teaching). When a resistance value is detected: – MOD 2 (safety input 5.14) is activated automatically. – The measured value is stored and monitored as a reference for the connected safety-related components. – Individually connected closing edge protective device 8.2 kΩhm (MOD 3/4) must be activated manually in this case. When no resistance value is detected: – The input deactivates automatically. – OFF appears in the display. – The input must be activated manually.	A (teaching) OFF MOD 2 – MOD 12	A

Function	Description	Setting options	Factory setting
INPUT 3	Selection of a function to be assigned to input 3 (X10/1-3). MOD 4: Weekly timer MOD 21: Brake actuation monitoring MOD 22: (analogous to input 1/MOD 22) PLEASE NOTE: If MOD 14 – 16 is set on relay 4: - MOD 21 (brake monitoring) is automatically set at input 3. - This setting cannot be changed if the brake mode is active.	MOD 4 / MOD 21 / MOD 22	MOD 4
SKS3	Setting for channel 1 of the pluggable signal transmission system (X20). OFF: Not active MOD 2: Activated as a closing edge protective device in the CLOSED direction. MOD 3: Activated as a closing edge protective device in the OPEN direction. MOD 4: Activated as a safety device (internal safety circuit) When starting up for the first time or after a reset If the plug-in component of the signal transmission system is plugged into X20: - The controller recognizes the component. - The parameter is automatically set to MOD 4.	A – (teaching) OFF MOD 2 – MOD 4	A
SKS4	Setting for channel 2 of the pluggable signal transmission system (X20). Selection modes analogous to the settings under SKS 3.	A – (teaching) OFF MOD 2 – MOD 4	A
RUNTIME	Monitoring the maximum runtime of an OPEN or CLOSE movement. During the teach-in run, the runtime of the door is learned automatically. If the deviation is 20 % (in either direction), a runtime error appears. After automatic teach-in, the runtime can be changed manually.	A (teaching) OFF 1 – 300 seconds	A
REVERS.TIME	Motor standstill time with each direct change of direction. The reversal time when the safety edge is activated during the closing movement is a quarter of the set time.	100 – 5000 milliseconds	300
LIMIT SW.	Only mechanical limit switches are possible with this model. MOD 2: Mechanical limit switch (MEC)	MOD 2	MOD 2

Function	Description	Setting options	Factory setting
SELF LOCK	Selection between impulse operation and manual operation (dead man) with or without evaluation of closing edge safety device (SKS) and light barrier system (LB). MOD 1: Impulse operation for OPEN + CLOSE with SKS and LS If safety devices are defective, switch to manual operation. MOD 2: Manual operation for OPEN + CLOSE with SKS and LS MOD 3: Manual operation for CLOSE, impulse operation for OPEN, with SKS and LS MOD 4: Manual operation for OPEN, impulse operation for CLOSE, with SKS and LS MOD 5: Manual operation for OPEN + CLOSE without SKS and LS MOD 6: Manual operation for CLOSE, impulse operation for OPEN, without SKS and LS MOD 7: Manual operation for OPEN + CLOSE with SKS and LS Stop when the intermediate position CLOSED is reached. By pressing the button again, travel can continue to the end position CLOSED. MOD 8: Impulse operation for OPEN + CLOSE with SKS and LS If safety devices are defective, switching to manual operation only via circuit board button MOD 9: Manual operation for OPEN + CLOSE with SKS and LS If safety devices are defective, operation only via circuit board button.	MOD 1 – MOD 9	MOD 1
POWER	Automatic force monitoring (Monitoring of the rotational speed) Fault message in the event of the door being difficult to move or blocked. Adjustment of the sensitivity for OPEN direction. A value for the power (rotational speed) will be displayed during opening. If force monitoring is activated, a smaller value must be set than the smallest value displayed during the door movement. The greater the difference to the lowest displayed value, the less sensitive the reaction of the power monitoring. Force monitoring is only activated if a numerical value is set.	OFF 1 – 999	10
RESET MSBUS	All assigned MSBUS addresses are reset. After a controller restart, re-addressing of all connected MSBUS devices takes place.  For detailed information refer to the manual for the MSBUS device.	ON OFF	OFF
RESTART	With activation of the function, the controller is restarted.	ON OFF	OFF
FACTORY SET.	Selection of the parameter set that should be reset with a RESET. PLEASE NOTE: For the FS 345 controller, only MOD 20 may be set. Other factory modes are not possible.	MOD 5 – MOD 99	MOD 20
RESET	Reset control parameters to the pre-selected factory settings. MOD 1: Partial reset 1 (everything except FC settings) MOD 2: Partial reset 2 (everything except end positions / recognised end position system) MOD 3: Complete reset (everything is reset to factory settings)	OFF, MOD 1 – MOD 3	OFF

Function	Description	Setting options	Factory setting
PIN no. 2	Input and selection of a PIN code for programming a service interval. After inputting the PIN code, the second programming level opens. Afterwards, a service interval can be entered via the SERVICE parameter. Input level 2 disappears again after the voltage is switched off, or automatically after 10 minutes. A change to the PIN code can only take place in the second programming level.	0 – 9999	1111
SERVICE	OFF: Maintenance display not active Setting a service interval. After the set load cycles have expired, a maintenance message (LED / LCD) is issued. If a relay output is programmed with MOD 31: – The respective relay switches (permanent input). Only appears after activation of input level 2 via the PIN number parameter. 2.	OFF 0 – 99950	OFF
INVERTER	Activates or deactivates a connected frequency converter. By connecting a frequency converter to interface X18 the controller becomes an CS 320 FU. MOD 1: Operation without FI MOD 2: Operation with FI MOD 3: Operation with FI (effective ramp times)	MOD 1 – MOD 3	MOD 1
EXPERT MENU	Activation and deactivation of the expert setting. In the factory setting OFF, only a limited selection of parameters appears in the INPUT. If this parameter is set to ON, all parameters of the input menu can be called up and set. OFF: Limited number of parameter settings: – Menu language – INT POS UP – OPEN TIME – FOREWARNING TIME – FAST CLOSE – REVERSE OFF – INPUT 1 – SELF LOCK – EXPERT MENU ON: Access to all parameters as listed in chapter 9.2.	ON – OFF	OFF

9.3 Explanations of relay modes

A. Traffic light functions

MOD	Name	End position CLOSED	End position OPEN	Forewarning	Gate run
MOD 1	Red traffic light inside 1	ON / OFF ¹	OFF ²	Flashing	Illuminated
MOD 2	Red traffic light inside 2	ON / OFF ¹	OFF ²	Flashing	Flashing
MOD 3	Red traffic light inside 3	ON / OFF ¹	OFF ²	Illuminated	Illuminated
MOD 18	Red traffic light inside 4	OFF	OFF	Flashing	OFF
MOD 23	Green traffic light inside	OFF	Illuminated ²	OFF	OFF
MOD 44	Red traffic light inside + outside	OFF	OFF	OFF	Flashing ³
MOD 60	Red traffic light outside 1	ON / OFF ¹	OFF ²	Flashing	Illuminated
MOD 61	Red traffic light outside 2	ON / OFF ¹	OFF ²	Flashing	Flashing
MOD 62	Green traffic light ⁴	OFF	Illuminated ²	OFF	OFF

¹ Depending on the TL REST parameter.

² With active oncoming traffic control: Depending on the OPEN command inside or outside.

³ From intermediate position CLOSED to end position CLOSED, even after a stop command. Only in CLOSE direction.

B. Position messages

MOD	Name	Comments
MOD 6	End position OPEN	The relay closes the contact when the gate is in the end position OPEN position.
MOD 7	End position CLOSED	The relay closes the contact when the gate is in the end position CLOSED position.
MOD 8	Not end position OPEN	The relay closes the contact when the gate is not in the end position OPEN position.
MOD 9	Not end position CLOSED	The relay closes the contact when the gate is not in the end position CLOSED position.
MOD 10	Intermediate OPEN position (Sect. OPEN)	The relay closes the contact when the door is in the intermediate OPEN position (Sect. OPEN).
MOD 11	Intermediate CLOSED position (Sect. CLOSED)	The relay closes the contact when the door is in the intermediate CLOSED position (Sect. CLOSED).
MOD 12	Intermediate position CLOSED to end position CLOSED	The relay closes the contact when the gate is in the area between end position CLOSED and intermediate position CLOSED (Sect. CLOSED).
MOD 19	Intermediate position OPEN to end position OPEN	The relay closes the contact when the gate is in the area between end position OPEN and intermediate position OPEN (Sect. OPEN).

C. Impulse signals

MOD	Name	Comments
MOD 4	Impulse with OPEN command from inside	The relay closes the contact for 1 second if the door receives an OPEN command from inside. It is possible to realise light actuation with this impulse for example.
MOD 27	Impulse after reaching the end position OPEN	The relay closes the contact for 2 seconds when the gate is in the end position OPEN position. It is possible to open a downstream cabinet with this impulse for example.
MOD 40	Impulse with OPEN command from outside	The relay closes the contact for 1 second if the door receives an OPEN command from outside. It is possible to realise light actuation with this impulse for example.

D. Braking functions (can only be set on relay 4)

MOD	Name	Comments
MOD 14	Brake (NC principle)	The switching contact of the brake rectifier is controlled via the relay in order to implement a faster braking function. As soon as the door moves, the contact is closed and the brake is vented (NC principle).
MOD 15	Brake (NO principle)	The switching contact of the brake rectifier is controlled via the relay in order to implement a faster braking function. As soon as the door moves, the contact is opened and the brake is vented (NO principle).
MOD 16	Brake (NC principle) switched to the end position OPEN	The switching contact of the brake rectifier is controlled via the relay in order to implement a faster braking function. As soon as the door moves, the contact is closed and the brake is vented (NC principle). In order to achieve a gentler stopping performance of the gate in the upper end position, the switching contact is not switched in the end position OPEN position.

E. Fault messages

MOD	Name	Comments
MOD 5	Fault message	The relay opens the contact if a STOP command or an error is present. All errors in chapter 10 lead to the relay being activated.
MOD 17	Closing edge protective device SKS 1-4 actuated	Monitoring of SKS1 (X4 / 5-8), SKS2 (X4 / 11-12) and SKS3 / SKS4 (transmission system). The relay opens the contact if one of the closing edge protective devices SKS 1-4 is actuated. A fault with one of the closing edge guards or a failed test is indicated via MOD 5.
MOD 35	Light barrier	Analogous to the light barrier input X4 (3/4), switches the applied signal on as a message. Relay ON: The light barrier signal is OK Relay OFF: Light beam interrupted or light barrier defective
MOD 39	Error LED	The relay always closes the contact if the internal error LED 2 (red) lights up.
MOD 45	Closing edge protective devices SKS 1-4 OK	Monitoring of SKS1 (X4 / 5-8), SKS2 (X4 / 11-12) and SKS3 / SKS4 (transmission system) Relay ON: All closing edge protective devices are OK Relay OFF: At least one closing edge protective device is activated or defective

F. Movement signal

MOD	Name	Comments
MOD 29	Gate moves open.	Active with movement in the OPEN direction.
MOD 30	Gate moves closed.	Active with movement in the CLOSE direction.
MOD 43	Door drives open or closed.	Active with all movement. The brake monitoring module BWM 1 is not active with this setting!

G. Functions for external accessories

MOD	Name	Comments
MOD 13	Magnetic lock function	The relay closes before every door movement. The relay is opened in the standby position. A delay time of 0.5 seconds is set before each gate movement.
MOD 21	Test of the entrapment protection	The relay generates a test signal when the end position CLOSED is reached and expects the stop circuit to be actuated in response to the test signal.
MOD 22	Activation of transmission system radio 1 and radio 4, test of light grid 1	The relay generates a test signal when the end position OPEN is reached and expects the safety edge input to be actuated in response to the test signal.
MOD 24	Capacitor switching	With each move command, the relay is closed for approx. 1 second. This relay is used to add an additional start capacitor required for alternating current applications to ensure safe starting of the motor. For series STAW with increased switch-on duration.
MOD 25	Courtyard light function	With each OPEN command, the relay is closed for 2 minutes and can therefore be used to control a lighting system.
MOD 26	Activation of transmission system radio 2 and radio 4	Before every DOWN command, the transmission system radio is activated with an impulse. The duration of activation must be set on the transmission system. With each move command, the relay is closed for approx. 0.5 seconds.
MOD 28	Relay OFF	The relay is switched off as a general rule, the contact is always open.
MOD 36	Pneumatic cylinder for locking the slip door (threshold-free door system)	With every OPEN command the relay is activated and controls a pneumatic cylinder that mechanically locks the slip door of the door. The locking position of the cylinder is queried via a limit switch. Only after this limit switch is released does the door start to move. The relay remains active until the lower end point is reached again.
MOD 37	Testing the stop signal via the transmission system radio 1 and radio 3	The relay generates a test signal in the end position OPEN and expects an interruption of the stop circuit in response to the test signal.
MOD 38	Testing the light grid 2 (8.2 kΩ), connection via input 2 (X4 / 11+12)	The relay generates a test signal in the end position OPEN and expects an interruption at input 2 in response to the test signal.

MOD	Name	Comments
MOD 41	Activation of the radio 4 transmission system in the OPEN direction	The relay generates a test signal when the end position CLOSED is reached and expects an interruption at input 2 in response to the test signal.
MOD 49	Testing presence and movement sensors (NC)	The relay generates a test signal each time before closing travel and awaits an interruption of the closing edge input as a response to the test signal.

H. Input-dependent messages

MOD	Name	Comments
MOD 32	Battery mode	Active in battery mode. Input 2 is bridged (MOD 5 setting).
MOD 33	No battery mode	Active with mains operation. Input 2 is open (MOD 5 setting). When programmed with MOD 32/33, the relays work as a delayed changeover contact and follow the signal at input 2 when set to MOD 5. In this case, input 2 is fed with a controller signal from the UPS system, which ensures switching between mains supply and UPS supply.
MOD 34	BMA signal	Switches with an active fire alarm system. Follows the signal at input 1 when setting MOD 5-9 / 13. In this case, input 1 is fed with a controller signal from the fire alarm system and, depending on the setting, the gate opens or closes to an end or intermediate position.

I. System messages

MOD	Name	Comments
MOD 31	Service	The relay is active after reaching the programmed service interval. Only after the service interval is reset or redefined does the relay drop out again. → "9.2 Operating mode INPUT"
MOD 46	ADJUSTMENT operating mode	The relay is active when the controller is in ADJUSTMENT mode.

9.4 Explanations of inputs

A. Functions input 1

MOD	Name	Comments
MOD 1	SECT. OPEN button	By pressing the button (input 1), the gate opens to the intermediate position OPEN (SECT. OPEN).
MOD 2	SECT. OPEN switch	Closed: All OPEN commands lead to the intermediate position OPEN (SECT. OPEN). Open: All OPEN commands lead to the end position OPEN position.

MOD	Name	Comments
MOD 3	AUT.CLOSE switch	Closed: No automatic closing movements. (opening time stops when open time > 0). Open: Automatic closing movement is active (when opening time > 0).
MOD 4	External CLOCK (permanent OPEN)	The door opens as soon as the contact closes and remains in the OPEN position (maintain open time) until the contact opens. Then the door drives closed automatically (only with open time > 0). This function can be cancelled by actuating the CLOSE button. The door drives CLOSED.
MOD 5	Switch BMA 3 (partial opening) NO	Control function with an active fire alarm system. Open: Normal function. Closed: Partial opening of gate. The intermediate OPEN position (Sect. OPEN) is approached from both directions, irrespective of the current door position. BUTTON: No function. LS / SKS: Gate stops and moves freely (only in the CLOSE direction), closing again after 5 seconds. STOP: Interruption of the emergency closing for the duration of the operation.
MOD 6	Switch BMA 1 (emergency closing) NO	Control function with an active fire alarm system. Open: Normal function. Closed: Emergency closure of the gate. BUTTON: No function. LS / SKS: Gate stops and moves freely, emergency closing again after 5 seconds. STOP: Interruption of the emergency closing for the duration of the operation.
MOD 7	Switch BMA 1 (emergency closing) NC	Control function with an active fire alarm system. Closed: Normal function. Open: Emergency closure of the gate. BUTTON: No function. LS / SKS: Gate stops and moves freely, emergency closing again after 5 seconds. STOP: Interruption of the emergency closing for the duration of the operation.
MOD 8	Switch BMA 2 (emergency opening) NO	Control function with an active fire alarm system. Open: Normal function. Closed: Emergency opening of the gate. BUTTON: No function. LS / SKS: No function. STOP: Interruption of the emergency opening for the duration of the operation. No automatic closure after deactivation of BMA signal.
MOD 9	Switch BMA 2 (emergency opening) NC	Control function with an active fire alarm system. Closed: Normal function. Open: Emergency opening of the gate. BUTTON: No function. LS / SKS: No function. STOP: Interruption of the emergency opening for the duration of the operation. No automatic closure after deactivation of BMA signal.

MOD	Name	Comments
MOD 10	Button ventilation function NO	Partial opening of gate. By pressing an additional button at input 1, the intermediate position CLOSED (part CLOSED) is approached from both directions, regardless of the current gate position.
MOD 11	Button Automatic closing movement	1. Actuation: No automatic access, the opening time is stopped. 2. Actuation: Automatic access is active again when the open time > 0. 3. Actuation: No automatic access, the opening time is stopped. ...
MOD 12	Laser scanner (height detection)	Only in conjunction with input 2 (MOD 6). → See explanations input 2.
MOD 13	Switch BMA 3 (partial opening) NC	Control function with an active fire alarm system. Closed: Normal function. Open: Partial opening of gate. The intermediate OPEN position (SECT. OPEN) is approached from both directions, irrespective of the current door position. BUTTON: No function. LS / SKS: Gate stops and moves freely (only in the CLOSE direction), closing again after 5 seconds. STOP: Interruption of the emergency closing for the duration of the operation.
MOD 14	Slip door locking	Monitoring limit switch for the pneumatic locking system of slip doors. The limit switch must have confirmed correct locking within 10 seconds of an OPEN command, otherwise an error message will appear and the gate will stop. This function acts on relay mode 36.
MOD 15	Light barrier 2 NC	If a second light barrier is connected in the passage area of the gate, this system can be programmed using the LB FUNC 2 parameter in the INPUT. Only connection of light barriers with potential-free NC contact.
MOD 16	Forewarning switch	Closed: Start-up warning and forewarning are inactive (even if both times > 0). Open: Start-up warning and forewarning are active (only if both times > 0). → "9.2 Operating mode INPUT"
MOD 17	Impulse button outside	Pressing the button moves or stops the door. - Function and direction of the movement depend on the IMPULSE INPUT parameter setting in the input menu. → "9.2 Operating mode INPUT" / Parameter IMPULSE - With active two-way control, this impulse command is treated as an external signal.
MOD 18	Crash sensor NC	Query of a crash sensor as NC contact. If the crash sensor was actuated once, only renewed door travel is possible. - After pressing the STOP button for longer than 5 seconds or - switching the supply voltage off and back on.
MOD 19	Switch block operation commands NC	Closed: No restrictions. Open: In AUTOMATIC operating mode, travel commands can no longer be given using the (+) and (-) buttons on the LCD monitor and on the motherboard.
MOD 22	Monitoring an external load contactor	In a controller variant with an external load contactor (motor power > 2.2 kW / 8 A), the auxiliary contacts of the load contactor (NO) are connected and monitored here.

MOD	Name	Comments
MOD 30	UP switch inside	By pressing the button, the gate opens to the end position OPEN. The t-light switches to green.
MOD 31	UP switch outside	By pressing the button, the gate opens to the end position OPEN. The t-light outside turns green.
MOD 32	DOWN switch	By pressing the button, the gate closes to the end position CLOSED. Only active if the closing edge protective device and light barrier 1 are working. No function in dead-man's operation.

B. Functions input 2

MOD	Name	Comments
OFF		Not active.
MOD 2	Safety switching with resistance evaluation	If a resistance value is detected during initial startup and after a reset, input 2 is set once to A (self-teaching). When a resistance value is detected: - MOD 2 (safety input) is activated automatically. - The measured value is stored and monitored as a reference for the connected safety-related components. → "3.13 Safety input after EN 12453" on page 20 Deviation of the measured value leads to an error message. If a safety element is subsequently added or removed, the resistance measurement must be carried out again. To do this, the INPUT 2 parameter must be manually set back to A (self-learning) and the supply voltage must be switched off and on again. Renewed measurement then takes place. When no resistance value is detected with first commissioning or after a reset: - The input deactivates automatically. - OFF appears in the display. - The input must be activated manually.
MOD 3	Safety strip OPEN (8.2 kΩ)	Switching strip active in OPEN direction. Stop and reversal to the end position CLOSED when the safety edge is actuated.
MOD 4	Safety strip OPEN (8.2 kΩ)	Switching strip active in OPEN direction. Stop and close for 2 seconds (rev) with actuation of the switching strip.
MOD 5	Battery mode (MDFU-special) NO	Active with supply via battery. Relay switching MOD 32 / MOD 33.

MOD	Name	Comments
MOD 6	Radar movement detector (height recognition) NO	The function is linked to input 1 (MOD 12 – laser scanner). The upstream laser scanner detects the height of the vehicle. The connected radar motion detector generates an OPEN command when activated. – A tall vehicle (HGV) is detected by the laser scanner. The laser scanner switches input 1 (MOD 12) to ON. The radar motion detector detects the vehicle and triggers the gate movement. The gate is moved to the end position OPEN. – A low vehicle (car) is detected by the laser scanner. The laser scanner switches input 1 (MOD 12) to OFF. The radar motion detector detects the vehicle and triggers the gate movement. The gate is moved to the intermediate OPEN position (partial OPEN). emotional. All other OPEN commands (via X3, X7, X9, X13) always move the gate to the end position OPEN. The function of input 1 (MOD 12) is then irrelevant.
MOD 7	Light barrier 2 (SSR / PNP) with testing	Performance as with light barrier 1 (SKS MOD 4 – 6). – Light grid active in CLOSE direction. – Stops and reverses with actuation of the light grid. The type of reversal (reversal / free travel) is adopted.
MOD 9	Safety element (OSE)	STOP the system with actuation.
MOD 10	Switching strip OPEN (OSE)	Switching strip active in OPEN direction. Stop and reversal to the end position CLOSED when the safety edge is actuated.
MOD 11	Switching strip OPEN (OSE)	Switching strip active in OPEN direction. Stop and close for 2 seconds (rev) with actuation of the switching strip.
MOD 12	Light grid 2 (OSE) without testing	Performance as with light barrier 1 (SKS MOD 4 – 6). – Light grid active in CLOSE direction. – Stops and reverses with actuation of the light grid. The type of reversal (reversal / free travel) is adopted.

9.5 Operating mode DIAGNOSIS / error memory



Display	Meaning	Status
UPPER SWITCH	End position OPEN	OFF: End position is reached. ON: End position is not reached.
LOWER SWITCH	End position CLOSED	OFF: End position is reached. ON: End position is not reached.
UP-SWITCH	Command button / input OPEN	ON: Button pressed / input is active. OFF: Button not pressed / input not active.
DOWN-SWITCH	Command button / input CLOSED	ON: Button pressed / input is active. OFF: Button not pressed / input not active.
INPUT 1	Programmable INPUT 1 (X4 / 9 + 10)	ON: Input 1 is active. OFF: Input 1 is not active.
INPUT 2 / SKS OPEN 2 / SAFE. 2 (optionally)	Programmable INPUT 2 (X4 / 11 + 12) Input dependent on MOD selected at the programmable input. INPUT 2 at MOD 5-7 SKS OPEN 2 at MOD 3-4 SAFE. 2 at MOD 2	ON: Input 2 is active. OFF: Input 2 is not active. —: Not activated.
INPUT 3	Programmable INPUT 3 (X10 / 1 – 3)	ON: Input 3 is active. OFF: Input 3 is not active. —: Not activated.
SKS	Closing edge protective device 1 (DW, 8.2 kΩ or optical sensor) or light curtain 1 (PNP or optical sensor) (X4 / 5-8) CLOSE direction	ON: System is closed. OFF: System is interrupted (fault).
SKS 3 / SAFE. 3 (optionally)	Closing edge protective device 3 (8.2 kΩ or optical sensor) Radio transmission system channel 1 OPEN or CLOSE direction Display dependent on MOD selected at parameter SKS 3. SKS 3 at MOD 2-3 SAFE. 3 at MOD 4	ON: System is closed. OFF: System is interrupted (fault). —: Not activated.

Display	Meaning	Status
SKS 4 / SAFE. 4 (optionally)	Closing edge protective device 4 (8.2 kΩ or optical sensor) Radio transmission system channel 2 OPEN or CLOSE direction Display dependent on MOD selected at parameter SKS 4. SKS 4 at MOD 2-3 SAFE. 4 at MOD 4	ON: System is closed. OFF: System is interrupted (fault). —: Not activated.
IMPULSE	Command key / input IMPULSE INPUT (X3 / 7+8)	ON: Button pressed / input is active. OFF: Button not pressed / input not active.
SWITCH CLOCK	Week timer (pluggable)	ON: Time switch clock is active. OFF: Time switch clock not active.
LIGHT BARR.	Light barrier 1 (X4 / 1-4)	ON: The light barrier signal is OK. OFF: Light beam interrupted or light barrier defective.
LIGHT BARR. 2	Transit light barrier 2 Connection to input 1 (X4 / 9+10)	ON: The light barrier signal is OK. OFF: Light beam interrupted or light barrier defective.
SAFETY CIRC.	Safety circuit 1 Emergency stop systems of door system	ON: Safety circuit is closed. OFF: Safety circuit is interrupted.
STOP	Command button STOP (cover keypad)	ON: Button not pressed. OFF: Button is pressed.
ROT FIELD	Shows the currently set rolling direction of the drive	RIGHT: Setting for clockwise field. LEFT: Setting for anti-clockwise field.
CYCLE	Door cycle counter	Display of the door cycles that have run through: 1 x open + 1 x CLOSE = 1 cycle Counting only takes place when the end switch-off points have each been reached.
SERVICE	Service alarm function Setting via parameter SERVICE and PIN no. 2	OFF: Maintenance display not active. 0 – 99999: Maintenance display is active. Display of the remaining door cycles until the maintenance message.
AWG	Position information of the absolute value encoder	Display of the currently transferred value.
C.STOP	HALT/STOP counter	Shows how often the door was stopped. Either through activation of a safety device, in case of direct direction reversal by a run command or by a direct STOP/HALT command.
C.OPENED	Counter upper end position	Shows how often the upper end position was approached.
C.O.BTN	Counter for OPEN commands	Number of all incoming OPEN commands through command devices, sensors and Safety devices (e.g. light barrier).

Display	Meaning	Status
ERROR ... COUNT CYCLE	Controller error memory. The error messages of the controller can be read out here with information about frequency and cycle. Use the [+] and [-] keys on the LCD monitor to scroll through the list of various error messages. → "10.1 Error display on the LCD monitor" Deletion of the error memory: Press the [+] and [-] buttons simultaneously for approx. 2 seconds. Each error message must be deleted individually.	The display changes every 2 seconds between - the error name, - the frequency of occurrence and - the information on which cycle the error last occurred. Only errors that have already occurred appear in the list.

The following messages can be read from the error memory, but are not displayed in the AUTOMATIC operating mode:

Display	Meaning	Status
POWER ON	Counter for switching the supply voltage off and back on again.	Counts up by actively switching the supply on and off, or with power failures.
ERROR SUPP. VOLT.	Counter for the occurrence of deviations in the supply voltage.	Overvoltage and undervoltage are detected and counted.
RESTART	Restart counter	Display of the restarts executed. Caused by detecting undervoltage, changing the end position system, changing the motor parameters or after a RESET of the controller.

9.6 Setting options TIME 1 (gate closes with power outage)

With Timer 1, the controller has various time delays for closing the gate in the event of a power failure.

- In position 0, there is no automatic closing movement in the event of a power failure.
- If the timer is set to 0 and there is a longer power failure, the controller's deep discharge protection is used.
→ "11.2 Protection against deep discharge"

9.6 / 1



Setting options:

- | | |
|---|--|
| 0 | No automatic closing in the event of a power failure |
| 1 | In event of power failure: Closing after 5 seconds |
| 2 | In event of power failure: Closing after 15 seconds |
| 3 | In event of power failure: Closing after 30 seconds |
| 4 | In event of power failure: Closing after 1 minute |
| 5 | In event of power failure: Closing after 2 minutes |
| 6 | In event of power failure: Closing after 5 minutes |
| 7 | In event of power failure: Closing after 15 minutes |
| 8 | In event of power failure: Closing after 30 minutes |
| 9 | In event of power failure: Closing after 60 minutes |

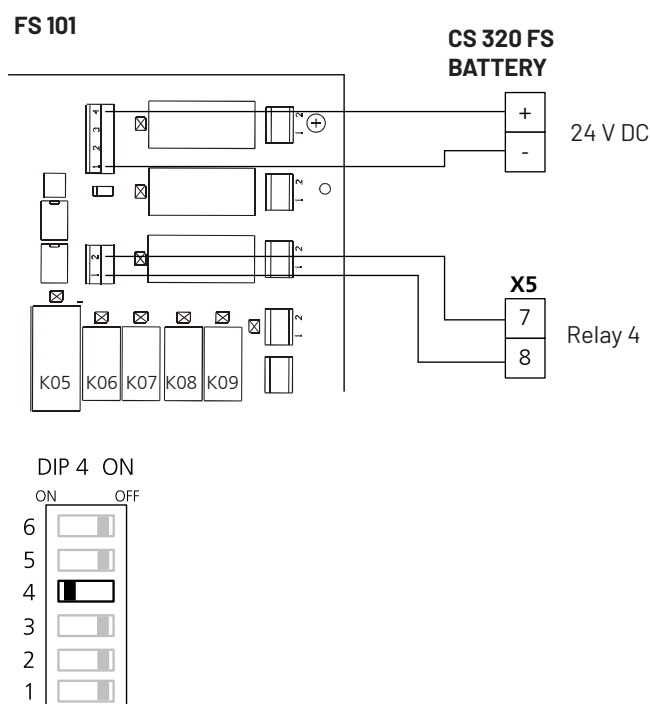
9.7 Automatic mode with active closing edge in emergency mode

The emergency closing can be monitored with a contact strip.

- If the strip is activated, the gate stops in emergency operation.
- After the strip is cleared and after a 2 second delay, the emergency closure will continue. There is no reversal.
- The function of the SKS is checked in the upper end position.
- If there is a recognisable defect, emergency operation takes place without evaluating the SKS.

Connection of board CS 320 FS and board FS 101

9.7 / 1



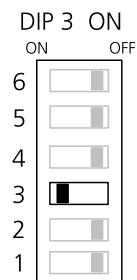
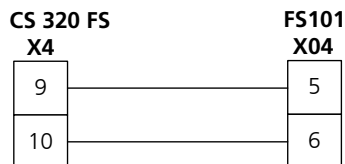
- Connect board CS 320 FS with board FS 101.
- Set relay 4 to relay mode 45.
- Set dip switch 4 on the board FS 101 to ON.
- Switch off the mains voltage and the battery voltage.
- Connect the SKS to the X4 terminal of the CS 320 FS board.

9.8 Emergency closing with 400 V gate drive

It is possible to close the gate with the gate drive in the event of a fire alarm.

Connection of board CS 320 FS and board FS 101

9.8 / 1



- Connect the board CS 320 FS (X4 / 9+10) to the board FS 101 (X04 / 5+6).
- Set dip switch 3 on the board CS 320 FS to ON. Switch off the mains voltage and the battery voltage.

If there is a message from the fire detector and the mains voltage is available, the board FS 101 sends a fire alarm signal via the connection X06 / X4 to the board CS 320 FS.

- The gate moves to the end position CLOSED in impulse mode.
- The installed safety devices are active.
- After reaching the CLOSED end position, opening movement is no longer possible.

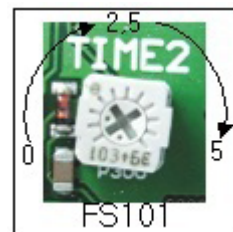
If the SKS is activated during the closing phase:

- The gate reverses for 2 seconds.
- A new AB impulse occurs after 5 seconds or when the SKS or the transit light barrier are OK again.
- If the closing process is interrupted again by the SKS, the process is repeated a total of 3 times.
- If the CLOSED end position is not reached after a maximum of 90 seconds, access takes place via emergency mode, without an active closing edge.

9.9 Gate function – close to FT motors

In order to achieve a tight movement of the gate slats in emergency operation, the CLOSED limit switch must be overrun. This function is time-controlled on the FS 345 controller and is set with TIMER 2. A value of 0...5 seconds can be selected.

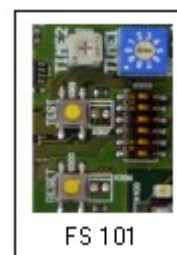
9.9 / 1



Prerequisite:

- The motor is of type FT.
- DIP 1 is ON.
- The limit switches are set.
- Commissioning is completed.

9.9 / 2



Settings:

- Make sure the OPEN and CLOSED limit switches are set for normal gate operation.
- Set Time 2 to the average value of 2.5 seconds.
- Move the gate to the OPEN end position.
- Switch off the mains voltage.
- Press the TEST button.
In emergency mode, the gate moves runs to the CLOSED end position.
The operating limit switch CLOSED is exceeded for 2.5 seconds. Only then is the motor brake activated again and the gate is stopped.
- Repeat the setting with changed values for Timer 2 until an optimum result is achieved.
- Set the CLOSED safety limit switch accordingly.

9.10 Built-in buzzer + RESET button

The FS 345 controller has a built-in buzzer for acoustic notification of emergency operation and the battery status.

- The buzzer sounds during an emergency closing and goes silent when the gate is in its final position.
- If a defective battery is detected during operation or during a test, the buzzer also sounds.
- The acoustic warning signal can be switched off using the RESET button in the gate end position CLOSED.
The battery must be changed.

9.10 / 1



Buzzer

1x tone every 5 seconds	No mains voltage
1x tone every 1/2 second	BATTERY defective
4x short tones	Forewarning for emergency closing
1x tone every second	Emergency closing

10. Error messages and rectification

10.1 Error display on the LCD monitor

Fault / message	Cause	Rectification
System does not react.	No voltage present.	Check power supply for the drive and controller.
When the OPEN button is pressed, the door moves to the end position CLOSED. When the CLOSED button is pressed, the door moves to the end position OPEN.	Rotating field has been incorrectly connected.	Check the rotating field and, if necessary, set rotating field to clockwise.
FAULT – X	internal software or hardware error.	RESET with circuit board button: → “7.6 RESET of controller without LCD monitor”
SAFETY CIRC.	The safety circuit is broken. X3 / 1+2 Safety circuit controller EMERGENCY STOP, slack cable switch X6 / 1+2 ON / OFF internal X11 / 4+8 Safety circuit motor AWG X2 / B1+B2 Safety circuit motor MEC X3 / 3+4 Stop button external X7 / 1+2 Stop button internal	Check safety circuit, locate interruption and eliminate problem.
ERROR STOP	An error has occurred at the safety input (X4 / 11-12 - MOD 2).	Check all components at the safety input and replace if necessary.
ERROR RUNTIME	The programed runtime has been exceeded.	- Check the path of the door and runtime. - If necessary, reprogram the runtime.
ERROR AWG	Signal transmission between absolute value encoder and controller is interrupted or faulty.	Check cable and connector and replace if necessary.
TERM SWITCH FAIL	- The gate is outside the programmed end position range. - The end positions have not yet been programmed.	- Reset the door in the programmed range through the emergency operation. - First program the end positions.
ERROR REVOLUTION	The power monitoring has triggered.	Check door for mechanical impairments.
ERROR DIRECTION	The present rotating field is not clockwise rotating.	Check rotating field and change if necessary. → “6.1 Checking the output direction of rotation/travel direction”
ERROR SKS CLS.	Closing edge protective device 1 faulty in the CLOSED direction → (X4 / 5-8).	Check closing edge protective devices and spiral cable.

Fault / message	Cause	Rectification
ERROR SKS OPEN 2	- Closing edge protective device 2 faulty in the OPEN direction -> (X4 / 11+12) input 2.	- Check closing edge protective devices and spiral cable.
ERROR STOP. 2	- Safety circuit 2 is interrupted. Wicket door switch 8.2 kΩ -> (X4 / 11+12) input 2.	- Check slip door switch.
ERROR SKS CLOSE 3	- Closing edge protective device 3 faulty in CLOSED direction -> (X20) Pluggable transmission system RADIO channel 1.	- Check closing edge protective device. - Check transmission system RADIO. - Check setting of parameter SKS 3.
ERROR SKS OPEN 3	- Closing edge protective device 3 faulty in OPEN direction -> (X20) Pluggable transmission system RADIO channel 1.	- Check closing edge protective device. - Check transmission system RADIO. - Check setting of parameter SKS 3.
ERROR STOP. 3	- Safety circuit 3 is interrupted. -> (X20) Pluggable transmission system RADIO channel 1.	- Check safety circuit. - Check transmission system RADIO.
ERROR SKS CLOSE 4	- Closing edge protective device 4 faulty in CLOSED direction -> (X20) Pluggable transmission system RADIO channel 2.	- Check closing edge protective device. - Check transmission system RADIO. - Check setting of parameter SKS 4.
ERROR SKS OPEN 4	- Closing edge protective device 4 faulty in OPEN direction -> (X20) Pluggable transmission system RADIO channel 2.	- Check closing edge protective device. - Check transmission system RADIO. - Check setting of parameter SKS 4.
ERROR STOP. 4	- Safety circuit 4 is interrupted. -> (X20) Pluggable transmission system RADIO channel 2.	- Check safety circuit. - Check transmission system RADIO.
ERROR SKS-TEST	- The test of the connected pressure wave strip was unsuccessful.	- Check DW switch, spiral cable and rubber profile. - Check DW-POINT setting.
	- Testing of the transmission systems RADIO 1 - 4 failed.	- Check transmission system radio. - Check relay MOD setting for transmission system. ➔ "G. Functions for external accessories" on page 48
ERROR LIGHT BAR.	- The connected light barrier has a permanent fault. -> (X4 / 1-4)	- Check light barrier (function and alignment). - Check cabling.
ERROR LIGHT BAR. 2	- The connected light barrier has a permanent fault. -> (X4 / 9+10) Input 1	- Check light barrier (function and alignment). - Check cabling.
ERROR LB TEST	- The test of the 2-wire light barrier failed.	- Check light barrier (function and alignment). - Check cabling.
ERROR STOP-TEST	- Testing of the slip door switch (8.2 kΩ) failed. -> Input 2	- Check slip door switch.

Fault / message	Cause	Rectification
ERROR TRAPIN	The entrapment protection test (additional module) failed. → Relay MOD 21	- Check light barrier (function and alignment). - Check cabling.
ERROR CYLINDER	The monitoring limit switch of the locking system for threshold-free slip doors has not switched within 10 seconds of the input of an OPEN command.	Check limit switch of the cylinder.
ERROR MSBUS	The communication between the controller and connected MS-BUS module is interrupted.	Check cable and connectors and replace if necessary.
ERROR 24 V	The 24V DC power supply (X4 / 1-2) was switched off due to excessive load from external consumers.	- Reduce the number of connected consumers. - Limit current draw to max. 500 mA through the selection of other components.
ERROR POWERSEGM.	The load contactor or a relay is defective.	The circuit board must be replaced.
ERROR BRAKE	Monitoring module BWM1 has identified a defect at relay 4.	The circuit board must be replaced.

After the cause of the fault has been eliminated, the controller must be switched off or restarted if the following errors occur (> INPUT menu > RESTART parameter > ON):

- ERROR DIRECTION
- ERROR REVOLUTION
- ERROR RUNTIME
- TERM SWITCH FAIL

10.2 Error display via LED

LED H1 (green, motherboard)

Fault / message	LED display	Comments
Operating voltage missing.	Off	No supply voltage available.

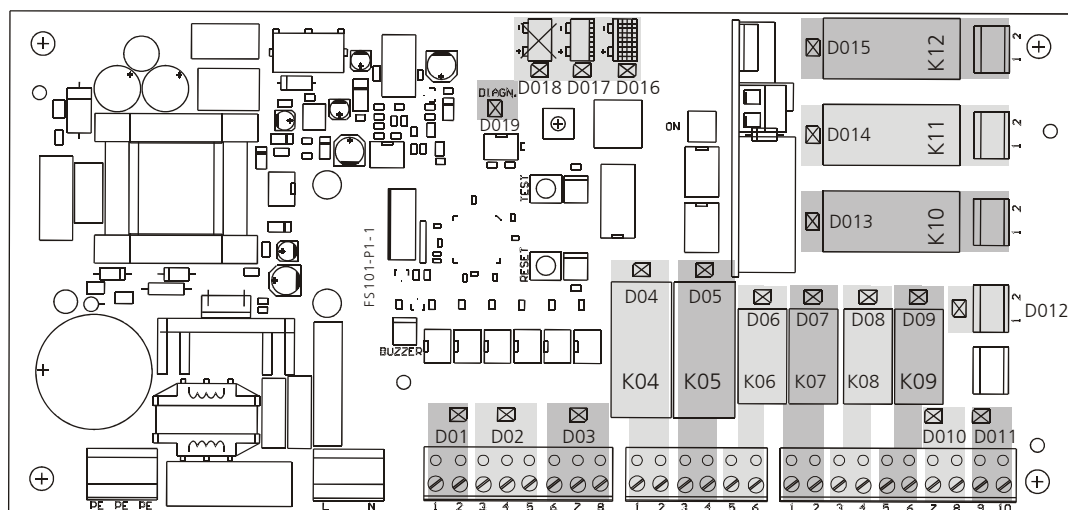
LED H2 (red, motherboard)

Fault / message	LED display	Comments
SAFETY CIRC.	1x flashing	Safety circuit is interrupted. Check safety circuit, locate interruption and eliminate problem.
ERROR AWG	2x flashing	Signal transmission between absolute value encoder and controller is interrupted or faulty. Check cable and connector and replace if necessary.

Fault / message	LED display	Comments
TERM SWITCH FAIL	3x flashing	The system is outside the programmed end position range or the end positions have not yet been programmed. – First program the end positions. – Reset the gate to the programmed range using the emergency control.
ERROR DIRECTION	4x flashing	The present rotating field is not clockwise rotating. – Check rotating field and change if necessary. → "6.1 Checking the output direction of rotation/travel direction"
ERROR REVOLUTION	5x flashing	The power monitoring has triggered. – Check door for mechanical impairments.
ERROR RUNTIME	6x flashing	The programed runtime has been exceeded. – Check the path of the door and runtime. – If necessary, reprogram the runtime.
ERROR MSBUS	9x flashing	Communication error between the controller and connected MS-BUS end device. – Check cable and connector and replace if necessary.
SERVICE	10 x flashing	The programmed service interval has been reached. – Reset or redefine service interval. → "9.2 Operating mode INPUT" / SERVICE parameter
ERROR POWERSEGM.	11 x flashing	The load contactor or a relay is defective. – The circuit board must be replaced.
ERROR STOP	Continuous illumination, travel no longer possible.	– An error has occurred at the safety input (X4 / 11-12 - MOD 2). – Check all components at the safety input and replace if necessary.
ERROR SKS	Continuous illumination, travel only in dead man's function.	Closing edge protective device faulty in OPEN or CLOSE direction. – Check the closing edge protective device and spiral cable, if necessary check RADIO transmission system.
ERROR LIGHT BAR.	Continuous illumination, Travel in CLOSE direction only in dead man's function.	The connected light barrier exhibits a permanent fault. – Check light barrier (function and alignment). – Check cabling.

10.3 LED displays of the FS 101

10.3 / 1



The FS 345 controller has a series of LEDs to signal possible errors and operating statuses. The following tables provide an overview of the statuses and errors.

10.4 LED diagnoses FS 101

Abbreviation	Colour	Name		Error diagnosis
D01	yellow	LED Safety chain (input X03/1,2)	LED ON LED OFF	OK - No mains voltage/battery voltage - Stop circuit on motor interrupted
D02	yellow	LED limit switch OPEN (input X03/3,4,5)	LED ON LED OFF	Limit switch OPEN not confirmed Limit switch OPEN confirmed
D03	yellow	LED limit switch CLOSED (input X03/6,7,8)	LED ON LED OFF	Limit switch CLOSED not confirmed Limit switch CLOSED confirmed
D04	yellow	LED auxiliary motor (output X04/1,2)	LED ON LED OFF	Auxiliary motor 24V DC is active Auxiliary motor 24V DC not active
D05	yellow	LED motor brake (output X04/3,4)	LED ON LED OFF	Motor brake is switched on Motor brake not switched on
D06	yellow	LED travel command open/close (output X04/ 5,6)	LED ON LED OFF	Travel command open/closed on CS 320 FS active Travel command open/closed on CS 320 FS not active
D07	yellow	LED limit switch OPEN (output X05/1,2)	LED ON LED OFF	Limit switch OPEN not confirmed - Limit switch OPEN confirmed - Emergency operation is active
D08	yellow	LED limit switch CLOSED (output X05/3,4)	LED ON LED OFF	Limit switch CLOSED not confirmed Limit switch CLOSED confirmed

Abbreviation	Colour	Name	Error diagnosis	
D09	yellow	LED stop chain (output X05 / 5,6)	LED ON LED OFF	OK - No mains voltage/battery voltage - Stop circuit on motor interrupted - Emergency operation is active
D010	yellow	LED CS 300 FS OPEN (input X05 / 7,8)	LED ON LED OFF	Gate moves in 400V operation OPEN Gate does not move in 400V operation OPEN
D011	yellow	LED CS 300 FS CLOSED (input X05 / 9,10)	LED ON LED OFF	Gate moves in 400V operation CLOSED Gate does not move in 400V operation CLOSED
D012	yellow	LED fire alarm (input X06 / 1,2)	LED ON LED OFF	Fire alarm is closed Fire alarm is open (Note DIP 2)
D013	yellow	LED operation / error (output X07 / 3,4)	LED ON LED OFF	Operation / no fault Fault in BATTERY, mains
D014	yellow	LED emergency operation (output X08 / 1,2)	LED ON LED OFF	Emergency operation is active Emergency operation is not active
D015	yellow	LED SKS (output X09 / 1,2)	LED ON LED OFF	SKS is OK SKS is interrupted
D016	green	LED charging maintenance	LED ON LED OFF	Battery is charged, maintenance phase Battery is charged
D017	yellow	LED charging status	LED ON LED OFF	Charging phase No charging phase, battery is charged
D018	red	LED BATTERY fault	LED ON LED OFF	Battery defective, change battery! Battery OK

10.5 Diagnosis LED D019 F101

Code D 019, colour red

Diagnosis LED (red)	Error / Status / Info	Action
1 x flashing	Battery fault	Battery defective, change
2 x flashing	Power outage	Charger defective; Fuse F2 FS 101 defective
3 x flashing	Command from BM or T1 is received, the gate closes	
4 x flashing	Gate was closed by BM or T1	
5 x flashing	Input stop X03/1+2 is interrupted	Check the stop circuit of drive
6 x flashing	HY leak (only version FS345 HY)	Check hydraulic system
7 x flashing	SKS in end position Open defective	Check SKS
8 x flashing	Gate was closed due to error	

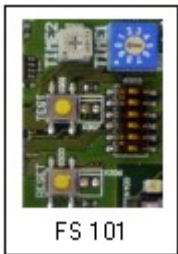
11. Battery and charger

The FS 345 controller has protection against deep battery discharge.
Regular automatic tests check the condition of the battery.

11.1 Functional test of battery and emergency mode

To ensure the functionality of the system, the fire alarm function must be checked every 4 weeks.
For this test, the controller must be switched off in order to also check the function of the battery.
The emergency function only works when the controller is switched off and automatic access takes place via the additional motor.

11.1 / 1

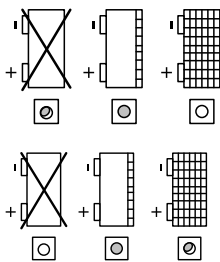


Procedure:

- Move the gate to the OPEN end position.
 - Switch off the mains voltage.
 - Press the TEST button.
- After a delay of 2 seconds, emergency operation is started.
The battery test is initiated.

Battery test

- The LED display flashes.
 - The built-in buzzer sounds.
 - The gate moves to the end position CLOSED after 2 seconds
-
- The buzzer falls silent.
 - The LED display goes out.
 - The buzzer sounds 1x.
 - The test is ended.



11.2 Protection against deep discharge

If the controller is operated without external voltage for a longer period of time after commissioning:

- The controller switches off after a defined time to prevent the battery from being completely discharged.
- The duration is determined by the type of drive and therefore by the external consumers.

DIP 1 ON	Switch-off time after 8 hours without external supply voltage
DIP 1 OFF	Switch-off time after 48 hours without external supply voltage

The switching off of the battery and therefore the controller is indicated by a 60 second buzzer signal.

If timer 1 is at zero (no access in the event of a power failure):

- Depending on DIP switch 5, the gate is closed in a controlled manner or alternatively left open.
- Controlled keeping gate in open state is only possible with DIP 1 OFF.

DIP 5 ON	Gate closes after the signal tone, battery/controller switches off
DIP 5 OFF	Gate remains open, battery/controller switches off

The controller can only be put back into operation with the help of the external power supply.

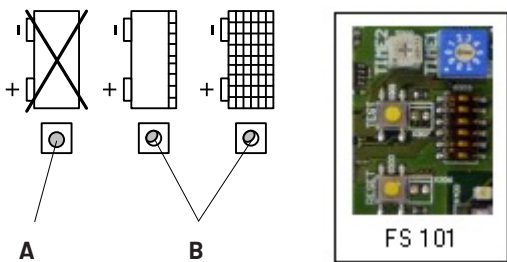
PLEASE NOTE:

For drive types FT (DIP 1 ON), when the mains voltage is switched on after a power failure of at least 8 hours, the battery is first charged for 30 minutes.

The gate controller is not functional during this time.

This status is displayed via the charging LED and can be cancelled using the RESET button.

11.2 / 1



- A lights up
- B flashes alternately

11.3 Cyclical test of battery

The FS 345 controller is able to automatically test the condition of the battery. In normal operation, the battery is disconnected from the controller every 60 minutes and the voltage of the battery is checked.

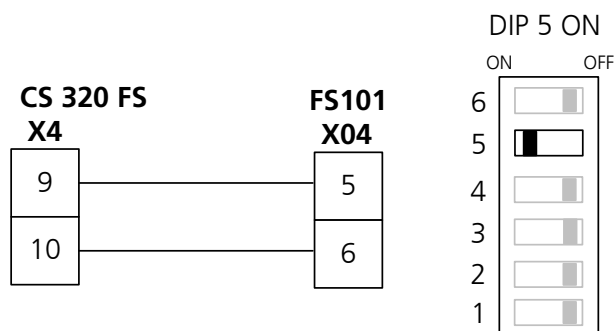
If the battery voltage is below a defined value (19 V), this is recognised as an error and this is signalled via the error relay, the buzzer and the diagnostic LED. The emergency mode may no longer function properly.

DIP switch 5 can be used to determine how the gate should be handled in this case.

DIP 5 ON gates closes, battery switches off
DIP 5 OFF gate remains open, battery switches off

Connection of board CS 320 FS and board FS 101

11.3 / 1



11.4 Charging the battery

CAUTION!

Risk of injury due to improper operation of the chargers!

The formation of explosive gases when charging lead batteries can result in a risk of explosion.

Electric flashovers under wet conditions can pose a risk of fire and short circuit.

- Ensure adequate ventilation.
- Avoid fire and naked lights.
- Only operate the charger in dry rooms.
- Protect the device from moisture.

ATTENTION!

Risk of material damage due to improper handling of the charger!

The charger of the FS 101 board is only suitable for charging maintenance-free lead batteries.

The charger can be damaged if opened incorrectly.

- Make sure that the charger is only opened by qualified personnel.
- Make sure that the device is only operated when closed!

ATTENTION!

Risk of material damage due to improper charging of maintenance-free lead batteries!

Improper charging of lead batteries can lead to malfunctions or property damage.

- Make sure that the following instructions are followed.

High temperatures

The charger must not be operated at ambient temperatures above 30°C. The charger is set ex works with a charging voltage designed for an ambient temperature of 20°C.

Low temperatures

The charger must not be operated at ambient temperatures below 10°C. At low temperatures the storage capacity is lower.

Deep discharge

Deep or complete discharge must be prevented. If a deep discharge does occur, the battery must be replaced immediately.

Storage of the battery for longer breaks in use

- Fully charge the battery.
For breaks in use of more than three months, the charging time must be at least 36 hours.
- Disconnect the battery from the charger.
- Store the battery in a cool and dry place.

PLEASE NOTE:

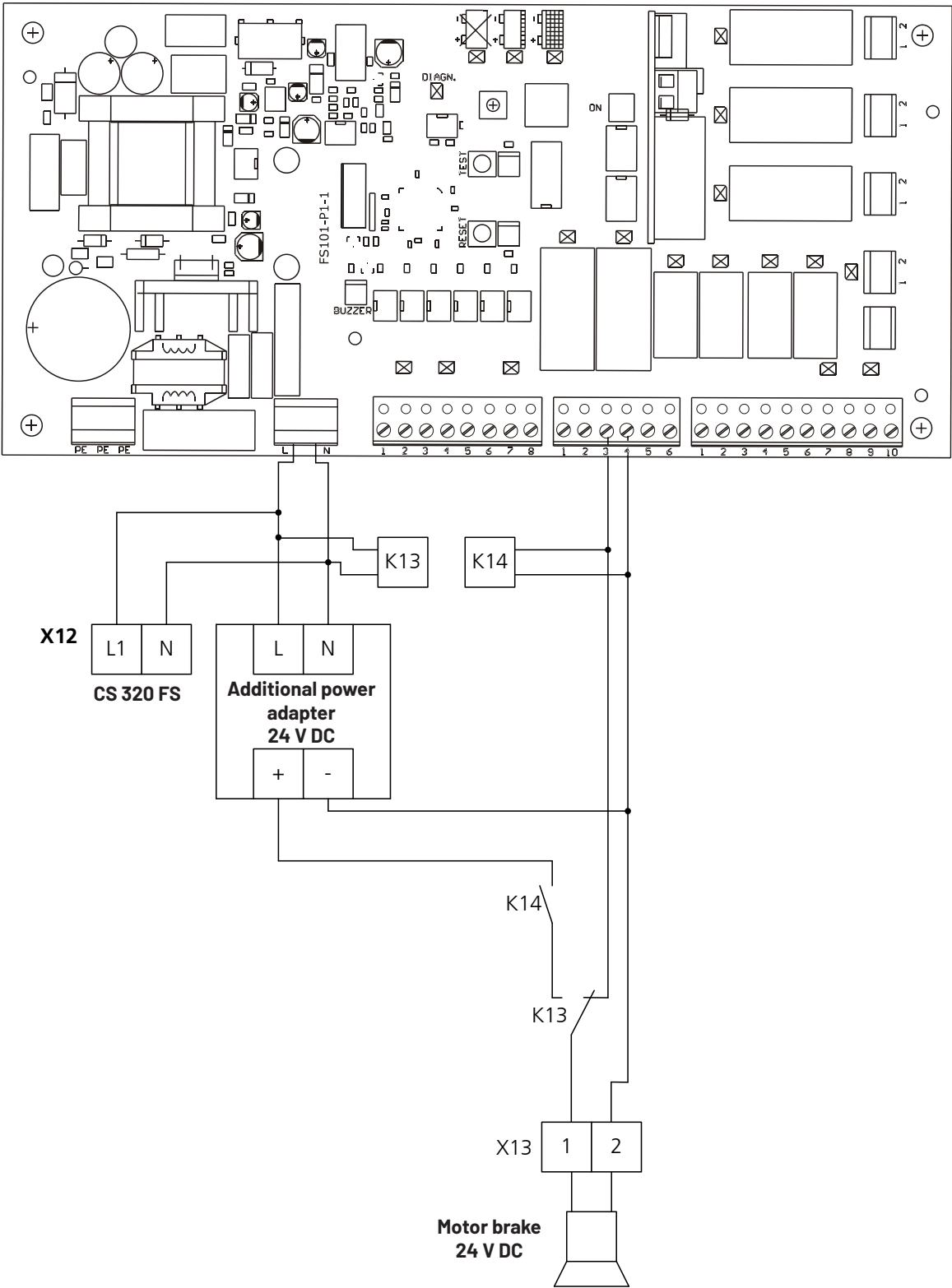
The battery can be charged indefinitely with the charger switched on (trickle charge).

Hereto, the battery and charger must be stored in a cool room.

12. Motor brake and auxiliary motor

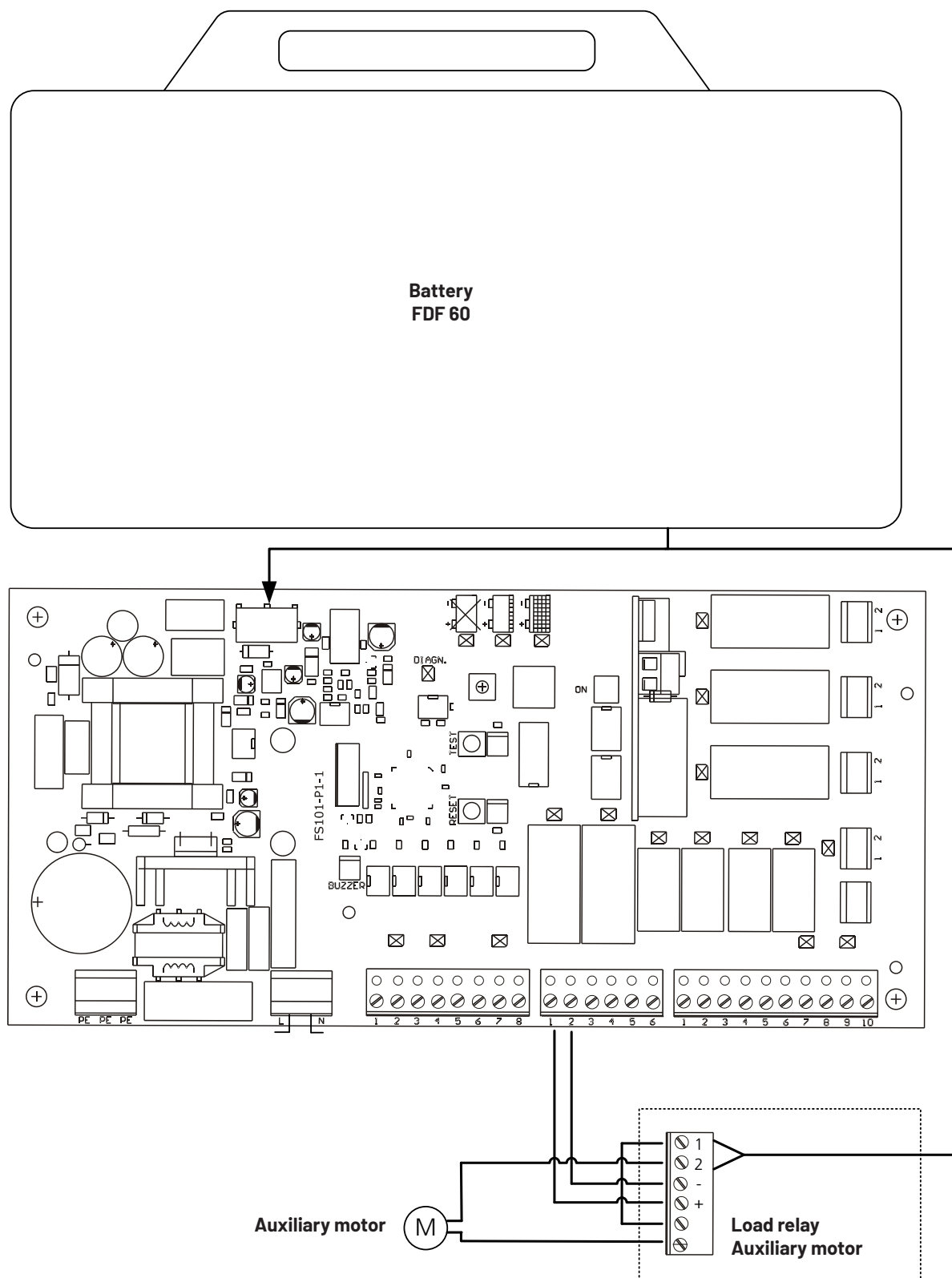
12.1 Connection plan motor brake for drive FT 3 / FT 4 / FT 5

12.1 / 1



12.2 Connection plan auxiliary motor for drive FDF 60

12.2 / 1



13. Service



WARNING!

Life-threatening danger due to electric shock!

- The control **MUST** be disconnected from the power supply before carrying out any service work on the control unit or door system. Take measures to ensure that the power supply remains disconnected for the duration of the work.

The FS 345 controller is maintenance-free.

The FS 345 controller must be checked at least once a year.



ATTENTION!

Material damage due to improper checking of the controller!

In order to avoid damage to the controller, motor and door, observe the following points:

- Testing must only be carried out by trained, qualified and authorised persons.
 - Worn or faulty parts must be replaced or disposed of correctly.
 - Only approved original parts may be installed.
 - The test results must be documented in the log book for the door system.
- Check all electrical cables and the housing for damage. A defective cable must be replaced immediately.

14. Declaration of incorporation

in accordance with Directive 2006/42/EC (Machinery) for the incorporation of an incomplete machine per Annex II, Part 1B

Declaration of conformity

in accordance with Directive 2014/30/EU (EMC)
in accordance with Directive 2011/65/EU (RoHS)

Marantec Legden GmbH & Co.KG,
Neue Mühle 4,
D - 48739 Legden

We hereby declare that the product cited below

Product designation: **Controller for fire protection industrial gates**
Type designation: **FS 345**

is intended exclusively for incorporation in a door system and has been developed, designed and produced in accordance with the following directives:

Machinery Directive 2006/42/EC

Annex 1: 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, 1.6.3, 1.6.4, 1.7.1.1, 1.7.1.2, 1.7.2, 1.7.3, 1.7.4.3.

EMC Directive 2014/30/EU - Electromagnetic Compatibility

RoHS Directive 2011/65/EU - Hazardous substances in electrical appliances

LV Directive 2014/35/EU - Low voltage, per Annex I part 1.5.1 of 2006/42/EC

Applied standards:

EN 12453:2001	Gates - Safety of use of power-operated gates: Requirements and test methods
EN 12978:2009	Doors and gates - protective devices for power-operated doors and gates: Requirements and test methods
EN ISO 13849-1:2008	Safety of machines - Safety-related parts of controls - Part 1: General principles for design
EN 60335-1:2012	Safety of electrical appliances for domestic and similar purposes - Part 1: General requirements
EN 60335-2-103:2010	Safety of electrical appliances for domestic and similar purposes - Part 2-103: Particular requirements for drives for gates, doors and windows
EN 61000-6-2:2011	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-3:2011	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

The relevant technical documentation has been compiled in accordance with Annex VII, part B of the Machinery Directive (2006/42/EC).

We shall transmit this information in electronic form, in response to a justified request by the market surveillance authorities, in a timely manner.

Person authorised to compile the technical documentation is the undersigned.

Incomplete machines in accordance with Directive 2006/42/EC are only intended for incorporation in other machines or incomplete machines or systems or for combination with them, in order to form a machine with them in accordance with the aforementioned directive. This product must therefore not be put into service until the complete machine/system into which it is incorporated is compliant with the provisions of the aforementioned directives. Any change to this product that we have not approved will void this regulation.

Legden, 01/01/2019



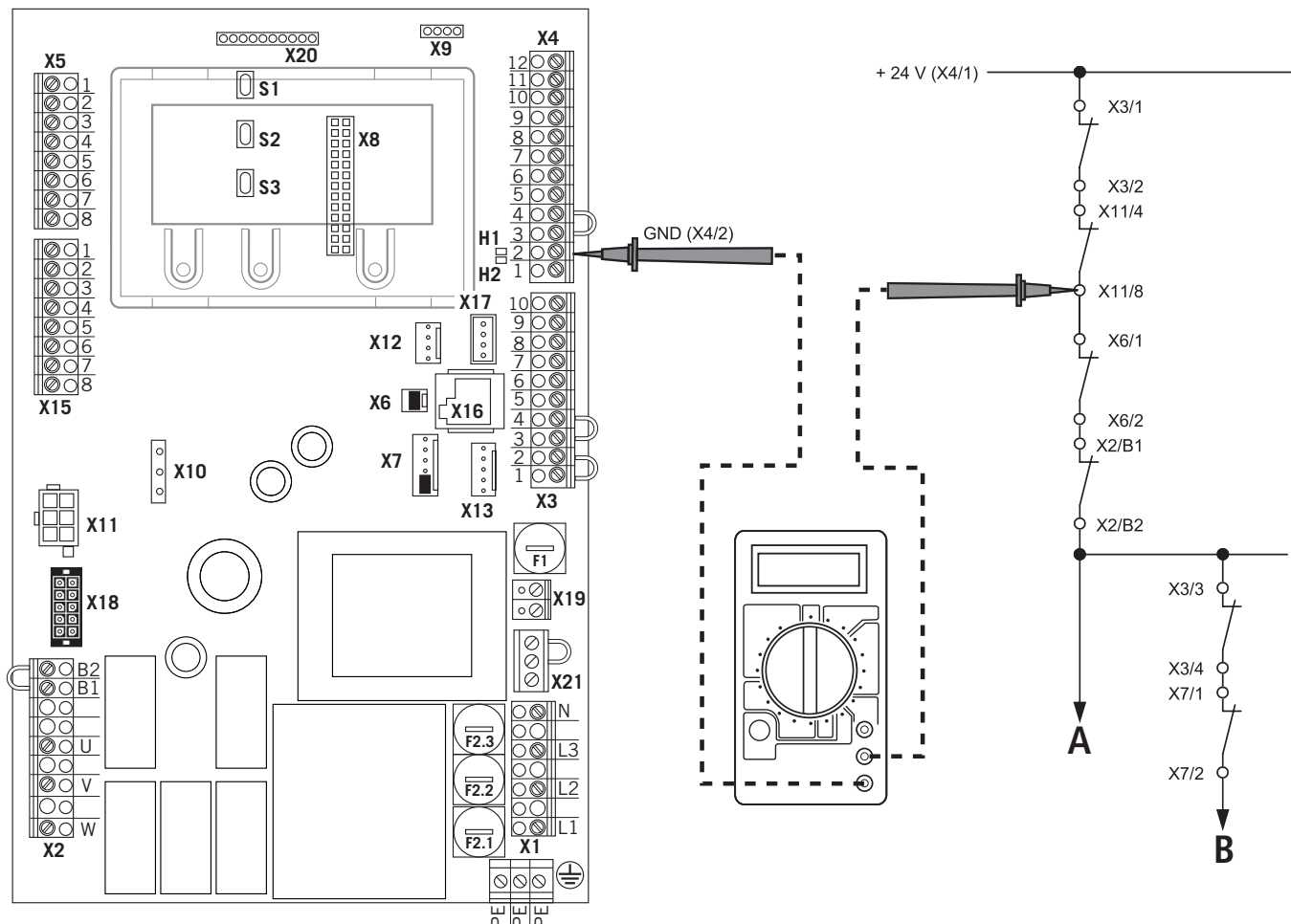
Michael Hörmann, Managing Director



15. Annex

15.1 Measuring points safety circuit

15.1 / 1



PLEASE NOTE:

The measuring range must be set for 24 V DC.

- A Emergency stop
- B Stop

- Measure at all measuring points on the diagram, to locate the interruption.

