FEIG

CONTROLLER

Intelligent Door Management

Assembly instructions

Installation, commissioning, utilization and maintenance

TST FUZ2

Variants

-A / -B / -C / -CX / -G / -L

DE ACHTUNG! WICHTIGE SICHERHEITSANWEISUNGEN!
Den Hinweisen auf Seite 2 dieser Montageanleitung ist Folge zu leisten.

EN ATTENTION! IMPORTANT SAFETY INFORMATION!
Follow the instructions on page 2 of this manual.

FR ATTENTION! IMPORTANTES INDICATIONS DE SÉCURITÉ!
Les instructions de la page 2 de cette notice de montage doivent être observées strictement,

NL LET OP! BELANGRIJKE VEILIGHEIDSINSTRUCTIES!
Volg de instructies op pagina 2 van deze montagehandleiding op.

IT ATTENZIONE! INDICAZIONI SULLA SICUREZZA IMPORTANTI!
Prestare attenzione alle note alla pagina 2 delle presenti istruzioni di montaggio.

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Deben seguirse las indicaciones detalladas en página 2 de estas instrucciones de montaje.

DA PAS PÅ! VIGTIGE SIKKERHEDSANVISNINGER
Oplysningerne på side 2 i denne monteringsvejledning skal følges.

ATTENTION!

IMPORTANT SAFETY INFORMATION

The specifications of these instructions require compliance to ensure personal safety.

Store these instructions safely.

Original operating instructions

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Für die Sicherheit von Personen ist es wichtig diesen Anweisungen Folge zu leisten. Diese Anweisungen sind aufzubewahren.
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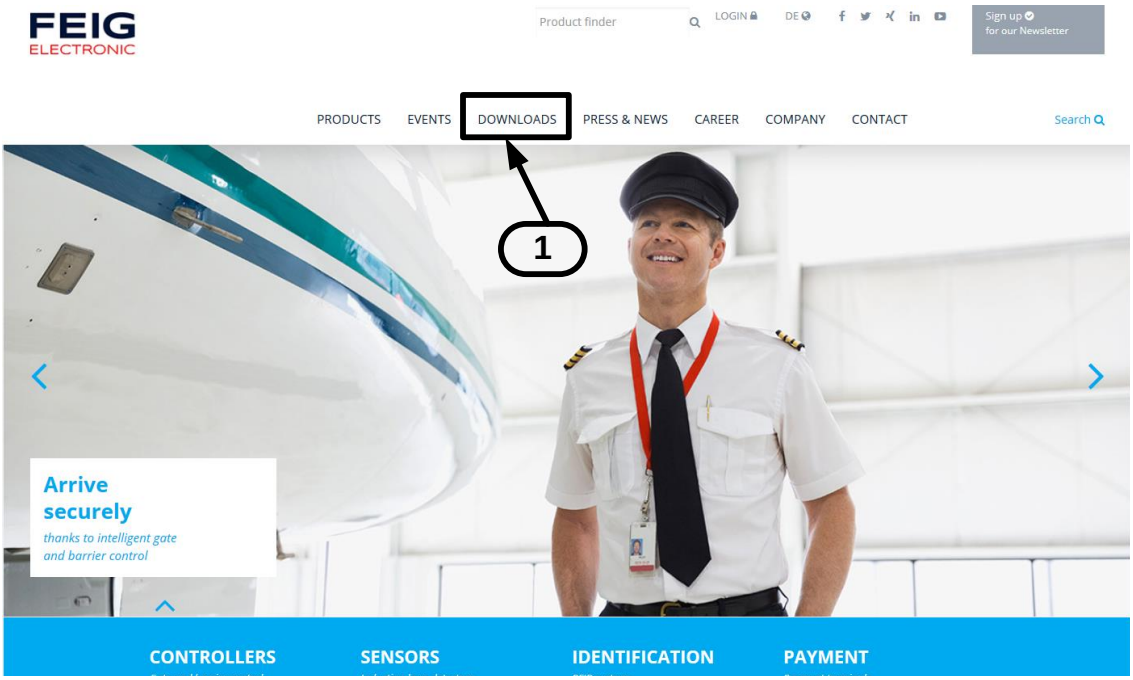
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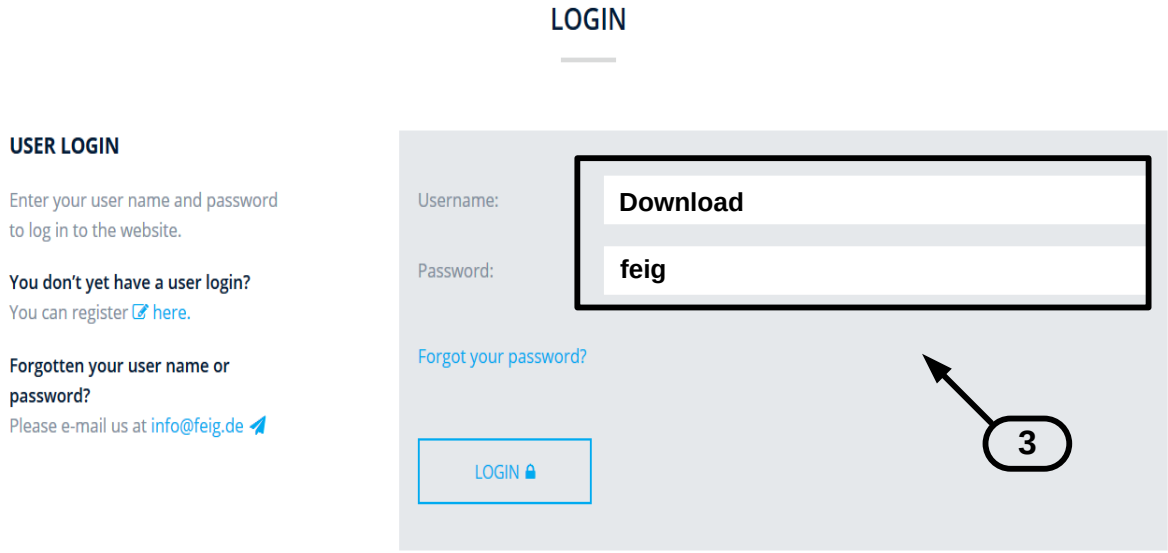
EU DECLARATION OF CONFORMITY
The EU Declaration of Conformity confirms that the device complies with the Radio Equipment Directive
2014/53/EU (RED) and the RoHS Directive 2011/65/EU.
For the following products declarations are avialable for Download:
Identification (LF, HF, UHF)
ID ISCMRU102-DoC-RED RoHS-2016-06-14.pdf (254 K)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3

Notes

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Version: 2022-07-13

This edition replaces all earlier versions.
The specifications in this document are subject to change without notice.

These assembly instructions are especially directed to the commissioning engineer of the **TST FUZ2** door controller from FEIG ELECTRONIC GmbH. The installation and commissioning of the controller shall only be carried out by officially trained electrical experts who are familiar with the safety standards of electrical drive and automation technology.

The distributor of the machine is solely responsible for the completeness of the operating instructions for the machine (in this case the door). The operating instructions for the door controller that is installed by the manufacturer of the door shall be supplied in one of the languages of the European Community that is accepted by the manufacturer of the machine.

This manual shows only a small range of the controller functions and provides no warranty of properties. Additional functions and descriptions for individual door functions as well as more precise specifications for the controller and hazard warnings are available in the main description.

The information in this document has been compiled according to the best of our knowledge and belief. FEIG ELECTRONIC GmbH does not warrant the correctness and completeness of the information in this document. In particular, FEIG ELECTRONIC GmbH cannot be made liable damage resulting from erroneous or incomplete information.

In spite of our best efforts, mistakes cannot be avoided completely and we will always gratefully accept any information in this respect.

The installation recommendations contained in this document assume favourable general conditions. FEIG ELECTRONIC GmbH assumes no liability for the proper operation of the equipment in third-party environments.

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Only the direct contracting parties shall be entitled to warranty claims against FEIG ELECTRONIC GmbH; warranty claims are non-transferable. Warranty is only given for the products delivered by FEIG ELECTRONIC GmbH. We do not accept any liability for the complete system.

The description of the products, their deployment, capabilities and performance specifications will not be considered as assured properties and are subject to technical changes.

General information about this document

Language of the original operating instructions

German

Validity and product names

These operating instructions describe the following door controller and are only valid for them:

TST FUZ2 series with variants -A / -APR / -B / -BPR / -C / -CGH / -CPR / -CX / -CXGH / -CXPR / -G / -GP / -GPR / -GKBGH / -L / -LP / -LGH / -LPR / -LKBGH / -LKBGH_OP

The abbreviations used in these operating instructions (e.g. -A, -C) refer to the variants of the door controller!

Information on the operating instructions

This functional description employs the following characters to indicate various danger areas and useful tips.

ATTENTION
indicates a risk to persons if the procedure is not carried out as described.

WARNING
indicates that the controller is at risk.

points out information which is IMPORTANT to the operation of the door controller and/or the door.

points out information which is useful but not essential for the use of the door controller TST FUZ2.

Contents

1 General description and intended use

The device described below is an electronic controller for motor-driven industrial or commercial doors in accordance with *EN 13241*. A fully integrated frequency converter with power output stage can gently control the door with variable opening and closing speeds. The **TST FUZ2** controller is designed to handle electrical induction motors with a power consumption of up to 1.5 kW and a 230 V supply
In addition to controlling the motor that drives the door, the controller can be used for the following tasks:

- Positioning the door at and between its final positions (open, close and intermediate positions)
- To control the drive to run at different speeds (integrated frequency converter)
- Evaluation of the security sensors on the door (e.g. safety edge monitoring, pull-in protection, etc.)
- Evaluation of additional safety equipment on the door (e.g. photo eyes, light curtains, etc.)
- Evaluation of control circuits at the door (e.g. pull switch, radio, inductive loops, etc.)
- Evaluation of emergency stop control circuits
- Electronically protected 24V low-voltage power supply for sensors and control devices
- 230 V power supply to external units
- Control of application-specific outputs (such as relays for door position reporting)
- Generation and output of diagnostic messages
- Configuration of application-specific parameters for different levels of access of the different user groups
- Control of input/output expansion modules
    - TST SFFE: Plug-in module wireless remote control
    - TST FSx: Wireless security system
    - TST SURA: Safety edge evaluation board
    - TST SUVEK: plug-in module for inductive loop detection
    - TST RFUxK: universal display and input/output module
    - TST RFUxFCOM: interface module for the lock-door applications, etc.
    - TST SRA: connectable module auxiliary relay
    - TST RFUxIO-A/-B/-E: universal input / output extension module
    - VEK MNST1/2/3/4: 1 - 4 channel induction loop detector loop detector
    - TST LCD / clear text: Clear text display with 2x16 signs.
    - Evaluation of interface signals for remote control, diagnosis and configuration of the parameters of the door

1.1 Intended use

- The TST FUZ2 controller is designed for operation with an electrical induction motor with a power consumption of up to 1.5 kW supply. It may only be used for the operation of motor-driven doors and gates used in an industrial or commercial context, as defined by the door product standard DIN EN 13241.
- Intended use includes compliance with all the specifications made in this assembly manual pertaining to assembly, installation and start up, the applicable safety instructions and consideration of the technical data.
- The controller may only be operated with accessories authorized by FEIG ELECTRONIC GmbH.
- All assembly, installation, commissioning and maintenance work performed on doors or gates or on the drive units intended for the doors or gates are to be performed exclusively by qualified specialist personnel as defined by the EC Machinery Directive. In particular, the following regulations require compliance: VDE 0100, EN 50110, EN 60204, EN 60335 inc. part 103, the fire protection regulations, accident prevention regulations and the applicable regulations for industrial doors (EN12453, EN12978) and machine safety (EN ISO 13849, EN 62061).

1.2 Incorrect use

Incorrect use includes all use of the controller which is classed as non-intended use. .

This device is not intended for use by persons (including children) with limited physical, sensory or mental abilities or with a lack of experience and / or knowledge, unless they are supervised by a person responsible for their safety or if they have received instructions on the use of the device. Children should be supervised to ensure that they do not play with the device. Keep remote controls away from such persons.

Should the controller be subject to any use other than that described, the operating company will be liable for the resulting damage. This applies to unauthorised alterations, modifications or programming to the controller and its components as well as ignoring of warnings and safety instructions.

The following points in particular are classified as incorrect:

- Use outside the specified assembly conditions and safety distances to the surroundings (place and temperature).
- Use in an explosive or easily flammable environment.
- Use with defective parts.
- Use with spare parts and extension boards, which have not been approved by FEIG ELECTRONIC GmbH.
- Use without safety devices.

1.3 Target group

These assembly instructions are especially directed to the commissioning engineer of the TST FUZ2 controller from FEIG ELECTRONIC GmbH.

The assembly and commissioning of the controller may only be carried out by officially qualified electricians familiar with the safety standards of electrical drive and automation technology.

1.3.1 Personnel qualification

The TST FUZ2 controller from FEIG ELECTRONIC GmbH may only be operated and maintained by persons who comply with the requirements outlined here and are familiar with the safety standards of electrical drive and automation technology.

All the person groups specified here must have read and understood this assembly manual before using the controller.

Persons under the influence of drugs or alcohol or who have taken medicines which restrict their reactive ability are not permitted to perform work on the controller.

The assembly manual differentiates between the following groups:

Person group	Requirement	Authorisation/task
Operating company	The operating company is in possession of the controller and is responsible for ensuring its intended use. It is to ensure that all persons performing tasks on the controller have been given professional training and fulfil the requisite bodily and mental requirements for dealing with the controller.	▪ *Deploy authorised personnel* ▪ *Deploy the product in accordance with its intended use* ▪ *Training*
Operator	The operator was informed of the function of the controller and is able to operate the assembled and installed controller. Operators include all persons who deal with the machine over its various life phases. This can be specialist personnel with or without special training or laypersons.	▪ *Operation*
Qualified specialist personnel	The qualified specialist personnel has been provided with training pertaining to working with electrical equipment and informed about possible dangers resulting from improper behaviour. The qualified specialist is familiar with the necessary protective measures and devices. Furthermore, through the specialists professional training and experience as well as its contemporary professional activity, the specialist has the necessary knowledge for testing work equipment.	▪ *Unpacking* ▪ *Assembly* ▪ *Installation* ▪ *Commissioning* ▪ *Repair* ▪ *Operation* ▪ *Programming* ▪ *Disposal* ▪ *Checking*

Person group	Requirement	Authorisation/task
Electrician	An electrician is qualified to work in the working environment of electrical systems; their knowledge and experience enable them to perform and monitor electro-technical work without danger. The electrician is familiar with the relevant standards and specifications and knows the specifications of the valid legal regulations pertaining to accident prevention. They take part in regular measures of further training. Electricians currently undergoing training (also minors) are only permitted to perform work under the supervision of an experienced electrician; this requires the express permission of the operating company.	▪ *Unpacking* ▪ *Assembly* ▪ *Installation* ▪ *Commissioning* ▪ *Repair* ▪ *Operation* ▪ *Programming* ▪ *Disposal* ▪ *Instruction*
Manufacturer	The manufacturer is involved in the design and production of a partly completed machine and accepts responsibility for conformity of the machine part with the directive.	▪ *Design* ▪ *Production* ▪ *Disposal*
Distributor	The distributor provides a complete machine to the market in terms of its distribution or use.	▪ *Distribution*

1.4 Duty of care of the operating company

FEIG ELECTRONIC GmbH maintains a certified quality management system in accordance with DIN EN ISO 9001.

The faultless safety condition of the controller and its function are checked in accordance with valid regulations before it leaves our factory. The operating company is to check this state after transport and before assembly of the controller.

The operating company is responsible for maintaining this state by ensuring that

- The controller is installed in accordance with the assembly, installation and safety regulations outlined here.
- Damage is rectified immediately by qualified specialist personnel.
- The controller is operated in a faultless state.
- The controller is assembled, installed and commissioned by qualified specialist personnel only.

2 Safety instructions

⚠ATTENTION

Failure to observe the safety advisories can result in physical harm or damage to the controller.

When starting up and operating the controller, the following important safety advisories as well as the installation and wiring notes must be strictly observed:

In accordance with the EC Machinery Directive only qualified personnel shall install the device on the doors or at the drive units for doors or bring them together. The respective safety requirements for the entire door (machine) must be aligned with the possibilities to meeting these safety requirements on the controller.

Improper integration of the controller into the door complex – e.g. missing sensors, incorrect parameters, speed set excessively high, etc. – presents the risk that the door is operated without adequate safety precautions.

A position encoder certified for PL "c" must be used to comply with the safety function according to EN 13849.

The start up of this controller is prohibited until it has been properly attached to the door that conforms with the EC Machinery Directive and for which an EC declaration of conformity according to Annex II of the Directive was obtained.

The following information describes standard applications that may not necessarily match the actual application. The actual application is provided by the manufacturer of the door as part of the overall documentation or as part of the **operating instructions** of the door.

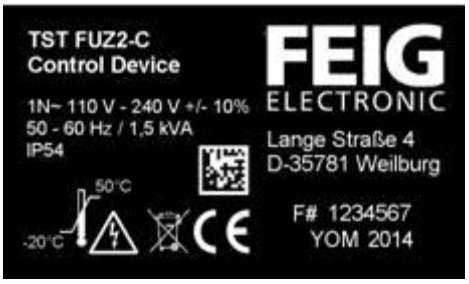
Any installation, commissioning and maintenance work must only be performed by qualified specialists. In particular, the following regulations must be observed: VDE0100, EN 50110 (VDE0105), EN 60204 (VDE0113), EN 50178 (VDE0160), EN 60335 (VDE0700), fire protection codes, accident prevention regulations as well as the relevant regulations for industrial doors and machine safety standards (EN ISO 13849, EN 62061)(ZH1/494, EN12453, EN12978)

This device is not intended for use by persons (including children) with limited physical, sensory or mental abilities or with a lack of experience and / or knowledge, unless they are supervised by a person responsible for their safety or if they have received instructions on the use of the device. Children should be supervised to ensure that they do not play with the device. Keep remote controls away from such persons.

Device identification (nameplate with information on name and address of manufacturer, serial number, year of construction, type designation, supply voltage and temperature range) must be carried out at the latest after installation.

The example of the warning label must be attached to the motor near the motor terminal board.

Type label (example):



Warning notice label (example):

The safety advisories mentioned in this document make no claim to completeness. If you have any questions about the product, please contact your supplier.

The manufacturer has carefully checked and inspected the hardware and software, but no warranty is given for a complete absence of errors.

Dispose of the product at the end of its life cycle in accordance with the applicable statutory provisions.

3 Safety functions in accordance with EN 12453:2017

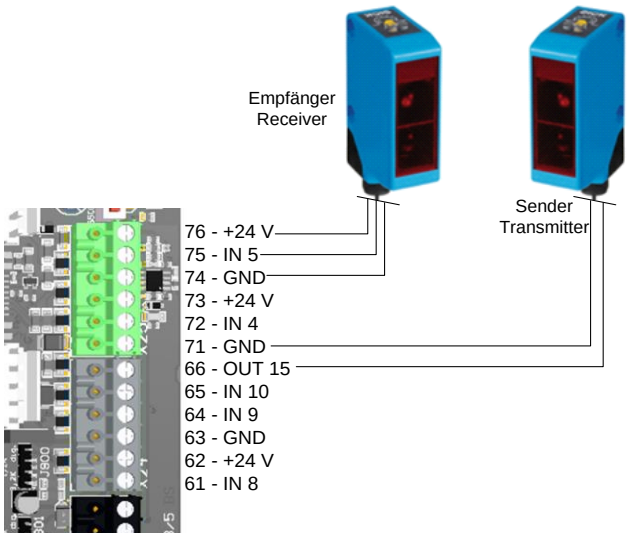
EN 12453:2017 places special requirements on safety-related signals. These signals must comply with a minimum of PL “c”, cat. 2 in accordance with EN 13849-1. To guarantee these safety requirements, the complete chain of sensors, actors and if necessary, the wiring must be taken into account accordingly. This affects (amongst others):

- Path restriction units (limit switch)
- Actuators with automatic reset
- Slack rope switch
- Slip door switch

To comply with these standard requirements, these signals can be connected via the Emergency-Stop inputs of the controller (terminal no. 31-32 and 41-42).
Alternatively, standard digital inputs can be used. In this case, an additional output must be configured as a test output and integrated in the signal chain.

3.1 Connection example testing

In this example, the testing is described using a transmitter-receiver light barrier.
The transmitter is supplied with 24 V via a test output.
In a test case, the output is switched off so that the transmitter is voltage-free.
The receiver now switches the input.
The controller checks whether the input really switches and switches back.
If YES, the test was successful, if NO, error F.928 is set.



Both digital outputs and relays can use used as a test output.

3.2 Parametrization

To activate the function testing, inputs and a relay must be configured for testing.

1. **Input configuration P.5xA:**
   P.5xA = 0: No testing activated
   P.5xA = 1: Testing the input upon reaching the end position OPEN and after activation
   P.5xA = 2: Testing the input upon reaching the end position CLOSE and after activation

   X = Number of the input to be configured

2. **Configuring the output P.7x0:**
   P.7x0 = 17: Testing in end position CLOSE
   P.7x0 = 25: Testing in end position OPEN

   The relay is energized when the test is inactive
   X = Number of the input to be configured

4 Installation of the controller

⚠ATTENTION

IMPORTANT INSTRUCTIONS FOR SAFE INSTALLATION!

Observe all instructions; incorrect installation can result in serious injuries!

- When installing the controller, the system must be turned off.
- The controller may be opened only if all the poles of the supply voltage have been turned off. It is not permitted to turn on or to operate the controller when it is open.
- Disconnect all supply circuits before opening the housing for access to the terminals.
- Before the installation, check the controller for transport or other damages. Under some conditions a damaged controller may result in significant consequential damage to the controller as well as hazards to the user.
- The controller must never be operated with a damaged membrane keypad or Display window. Damaged keypads and Display windows must be replaced.

⚠WARNING

- Do not touch any electronic parts, in particular the components of the processor circuit. Electronic components can be damaged or destroyed by electrostatic discharge.
- Before opening the cover of the housing, ensure that no drilling swarf can fall into the housing from the cover.
- When installing the controller it is important to ensure that it is not subject to mechanical stresses.
- Unused cable entries must be sealed to maintain the requirements of IP54.
- In large housings (controller variants -CGH, -CXGH, -LGH) , the screw on the frame near the motor connection must be tightened to ensure the IP65 protection rating of the housing (tightness).
- The cable entries must not be exposed to any mechanical stress, such as tensile loads.
- The controller must never be operated without the CEE-plug except when the supply voltage can be cut all poles by an installed main switch. The main switch and the CEE-plug must be within easy reach.
- A not rotating motor is no indication of the galvanic isolation from the power grid! The mains connection terminals, motor terminals and terminals for the brake resistor can still carry dangerous voltages, e.g. under stop or emergency stops.
- If the supply cable is damaged, it must be replaced by the manufacturer or another qualified person in order to avoid danger (like connection type Y EN 60335-1)
- When moving the door in deadman mode, ensure that the operator has an unobstructed view of the door area. In this mode, safety equipment such as safety edge and photo eye may have been defeated. If this is not possible for structural reasons, you must ensure that this mode is only accessible to appropriately trained personnel or that the feature is disabled altogether.
- To prevent damage to the keypad, do not use pointed objects to operate the keys. The keypad is only designed to be operated by human fingers.
- Depending on the type of the door it may be necessary that the door can only be operated when it is within visual range. In these cases, no remote control (e.g. wireless) may be used to issue commands.
- It is important to ensure that the controller is installed with the wall spacers that are supplied to guarantee that the power stage can dissipate heat as necessary.
- The control unit should not be mounted on flammable surfaces (e.g. wood ≤ 2 mm thickness) or in environments with highly flammable substances (e.g. carpentry).
- When the controller is installed in an additional housing, e.g. in a barrier housing, a sufficient air volume of at least 0.02 m^3 around the controller must be ensured.
- Should cooling not be sufficient, an additional heat sink may be inserted between the controller housing and the additional housing to dissipate the heat to the outside (see chapter 5.2 Additional heat sink for small housing).

4.1 Version without housing

Observe technical data and required clearances

The board set is mounted on a mounting frame and can be installed in another housing together with the attached expansion cards. To do this, consider the space required between the board set and the housing wall.

The following accessories are included with the board variants:

- Two safety clips for transport security in the housing
- Two sliders as quick release fasteners for the mounting adapter
- An EMC bracket as spacer and grounding of the motor shield in steel / stainless steel housings

Depending on the installation, additional spacers are required. These are not included in the scope of delivery!

4.1.1 Dimensions of the drillings in the mounting frame

Table 1: Drill hole dimensions of the mounting frame

Pos.	Measurement	Description
a	185.6 mm	Total width
b	36.0 mm	Height mounting hole bottom
c	181.2 mm	Height mounting hole top
d	255.5 mm	Total height

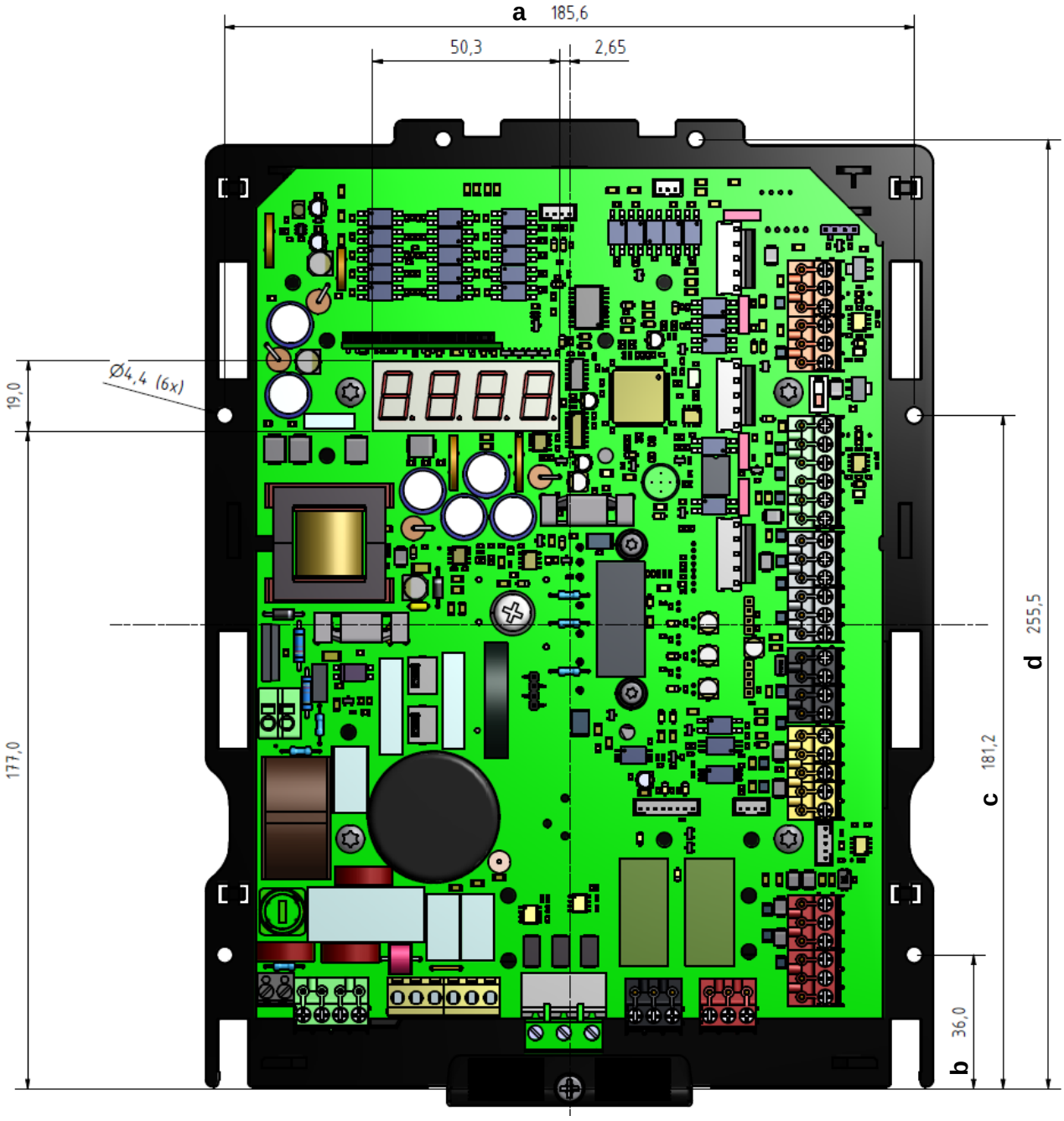


Figure 1: Mounting holes in mounting frame without quick-release fastener

4.1.2 Required free space in plastic and steel enclosure

The dimensions for the internal distances include all expansion boards.

Table 2: Minimum distances to housing walls

Pos.	Steel housing	Plastic housing	Description
a	194.4 mm	185.0 mm	Width
b	102.7 mm	98.0 mm	Depth without heat sink
c	40.0 mm	40.0 mm	Depth heat sink
d	254.4 mm	245.0 mm	Height

a

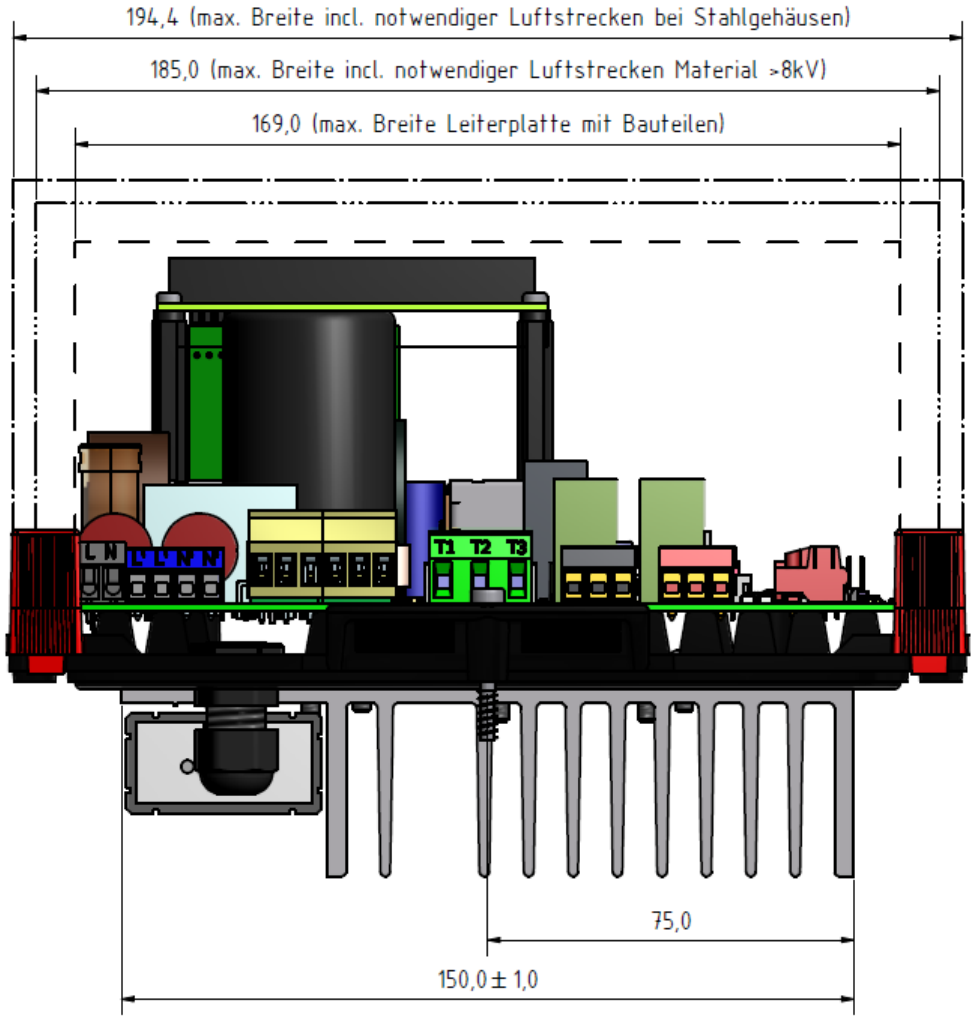


Figure 2: Bottom view

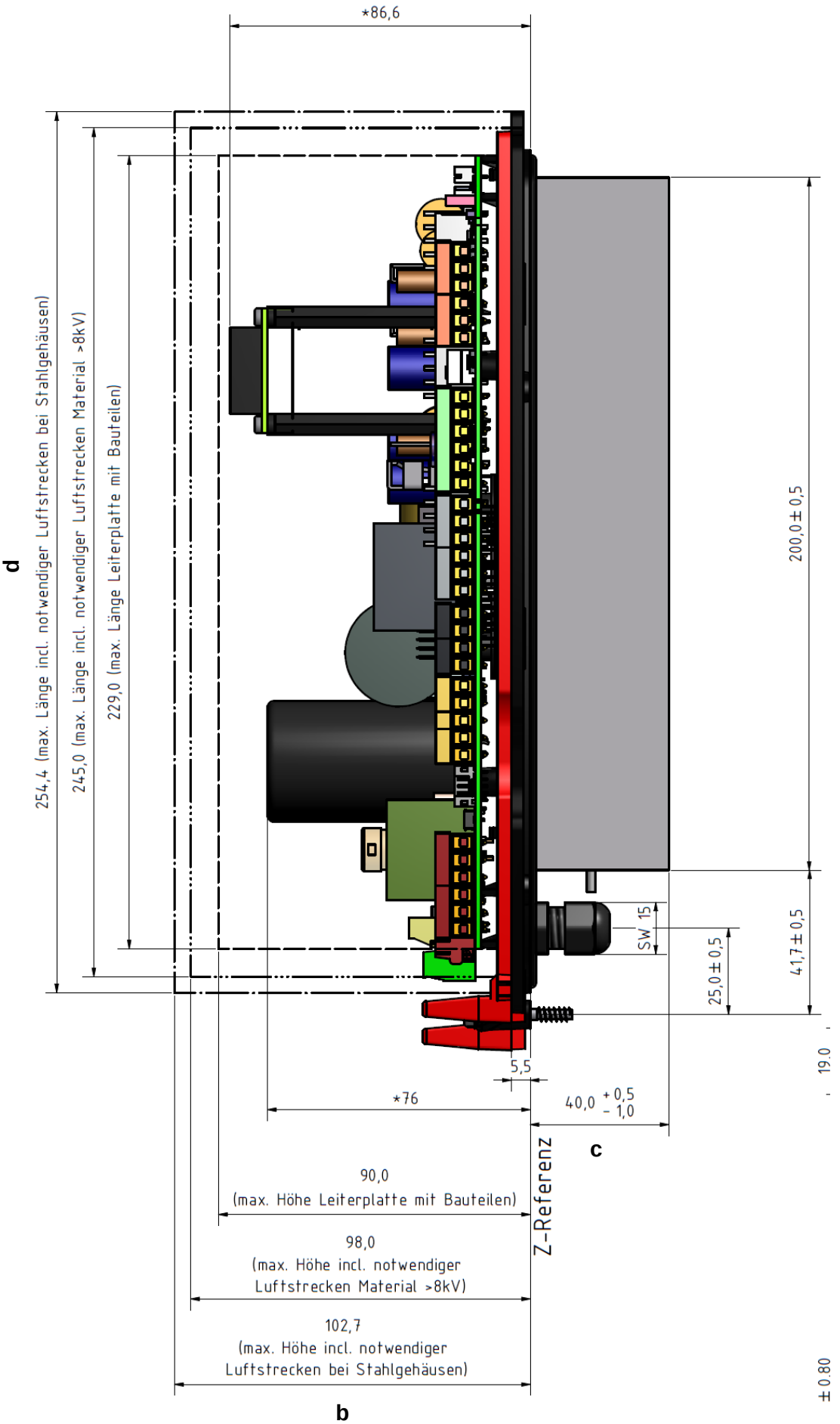
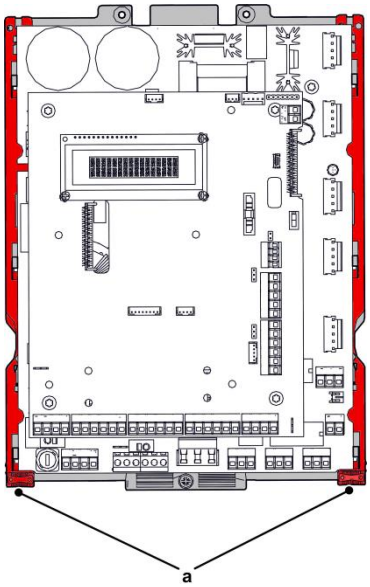


Figure 3: Side view

4.1.3 Mounting the control electronics with mounting holes

⚠ Before mounting the circuit board with the mounting holes, the quick fastener (a) must be removed from the mounting frame.



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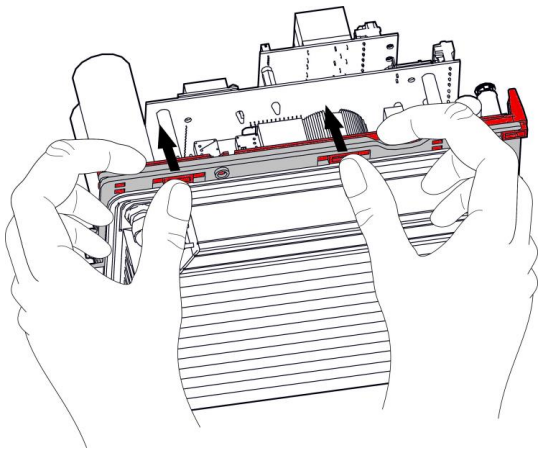

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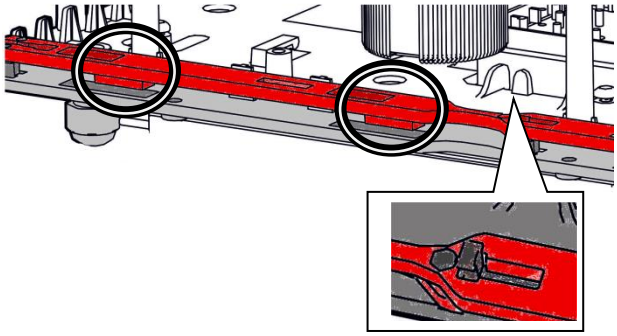

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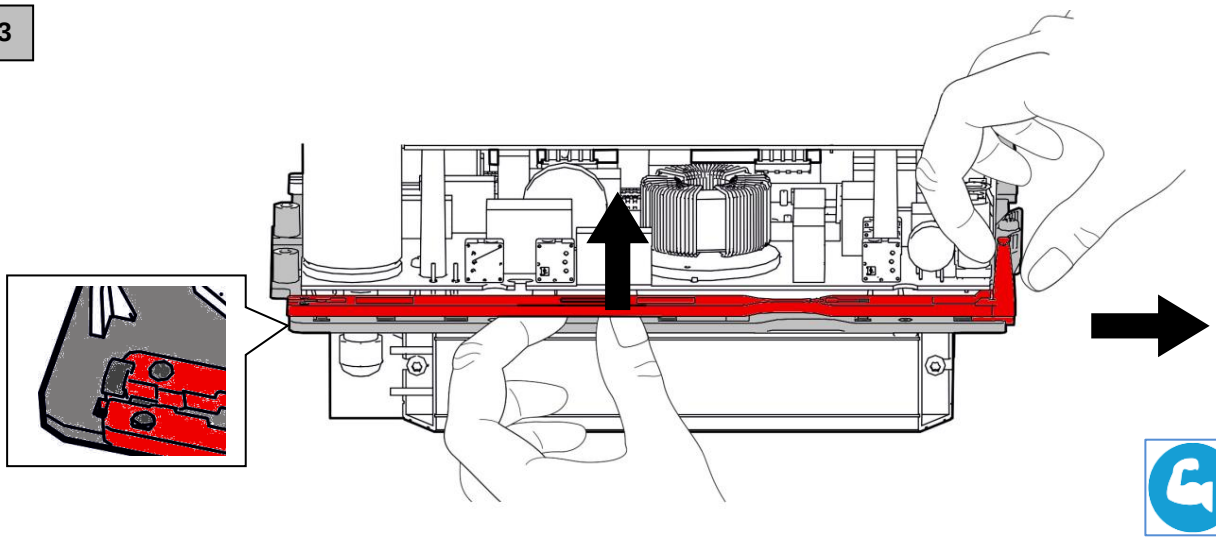


5 Housing variants

There are two different housing options available for different device options.

5.1 Housing variant 1 / small housing

This type of housing is used for controller types TST FUZ2-A, TST FUZ2-B, and -CX.

The expansion card TST RFUxK can be used in this housing only in combination with controller type TST FUZ2-B.

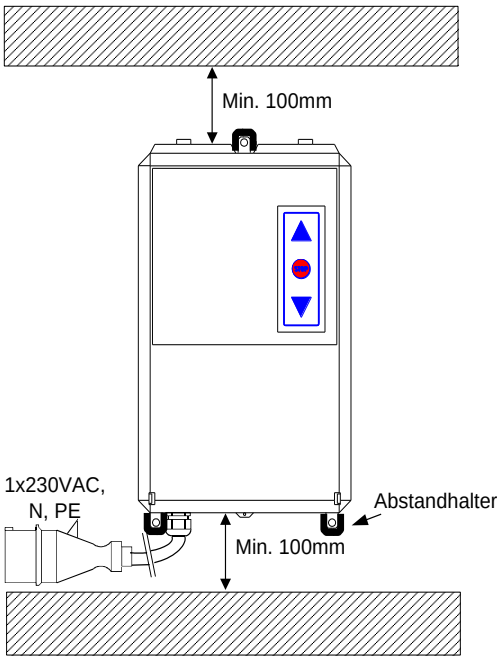


Figure 4: Installation in small housing

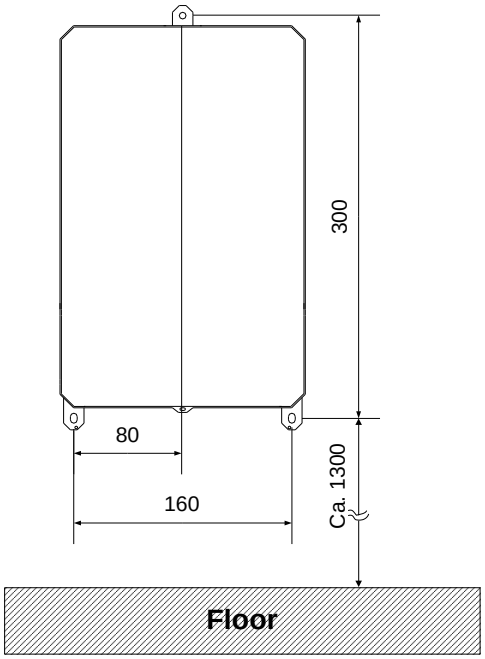


Figure 5: Drilling template small housing

5.1.1 Installation position of the cover

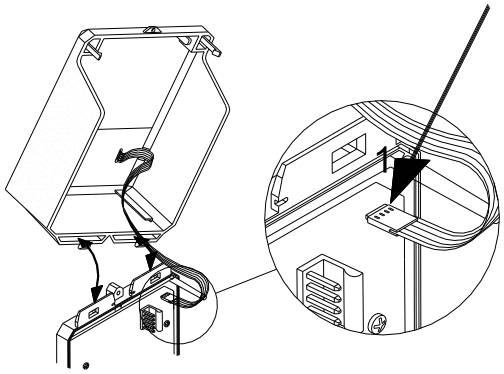


Figure 6: Installation position of the cover

5.2 Additional heat sink for small housing

If the controller is installed in an additional housing so that the cold air supplied to the heat sink is not sufficient, for example, in barrier housings, an additional heat sink must be inserted between the controller housing and the additional housing to dissipate heat to the outside. This additional heat sink is mounted, for example, on the barrier housing and the controller is mounted above it without the spacers, so that the additional heat sink is clamped between the controller and the cabinet.

The additional heat sink must have the following design:

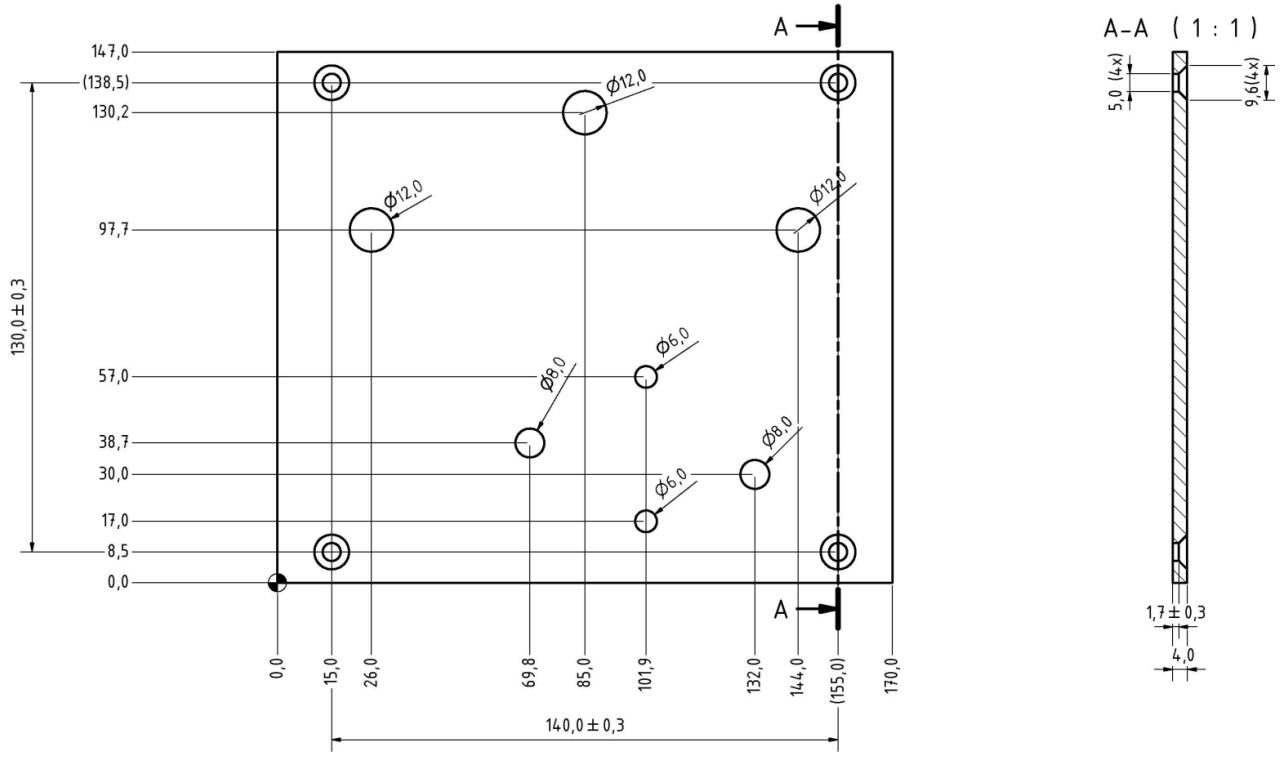


Figure 7: Additional heat sink

The additional heat sink must be bolted to the housing and then controller can be installed:

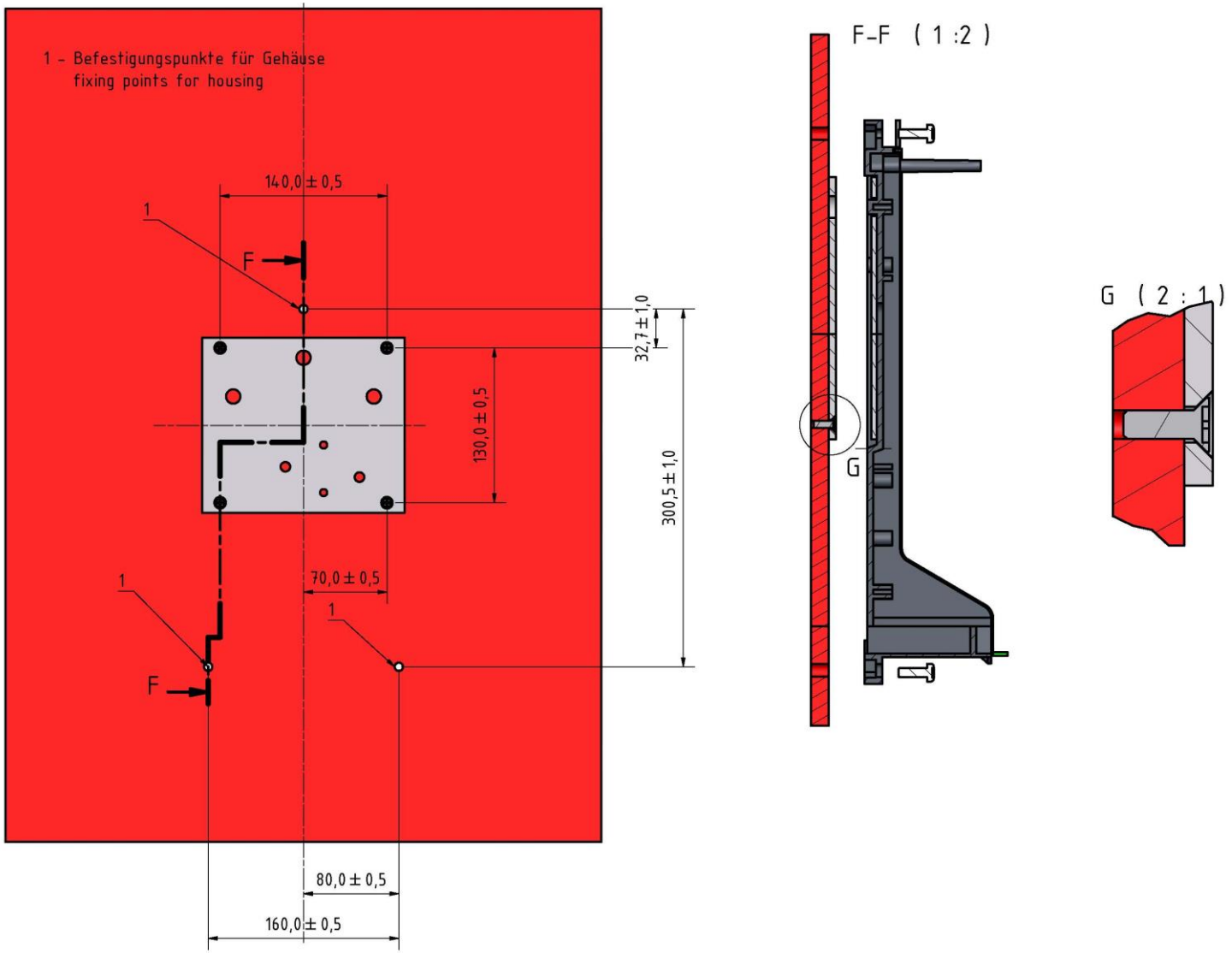
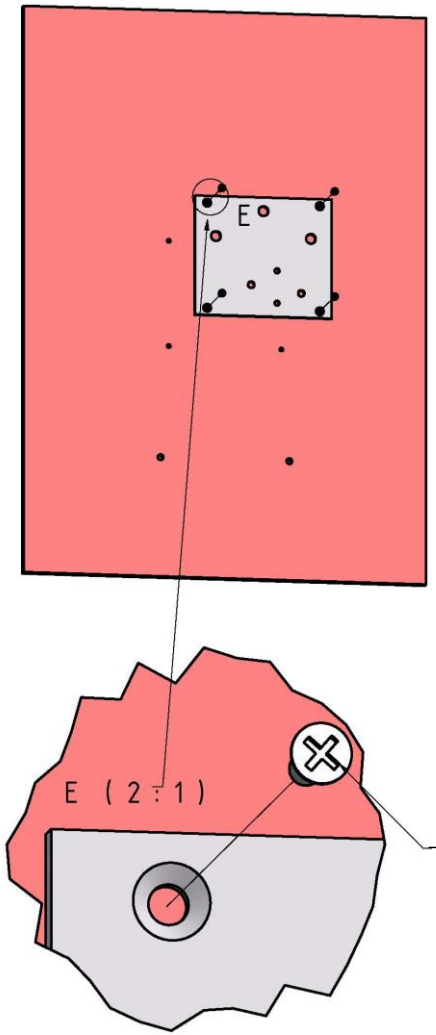


Figure 8: Drilling layout for additional heat sink and controller

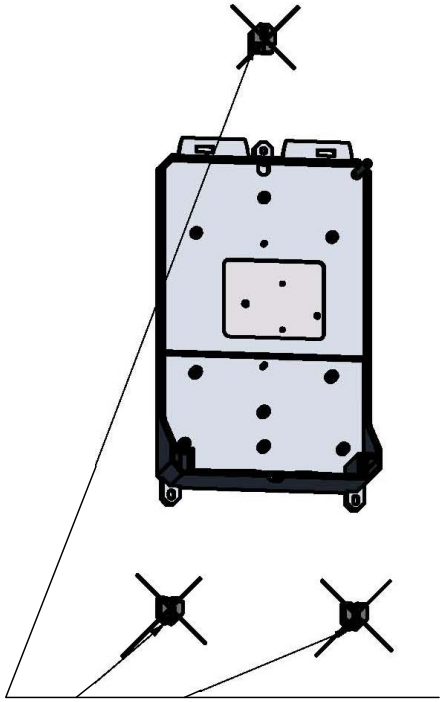
The following images show the installation of the heat sink with the controller:

Step 1: install additional heat sink



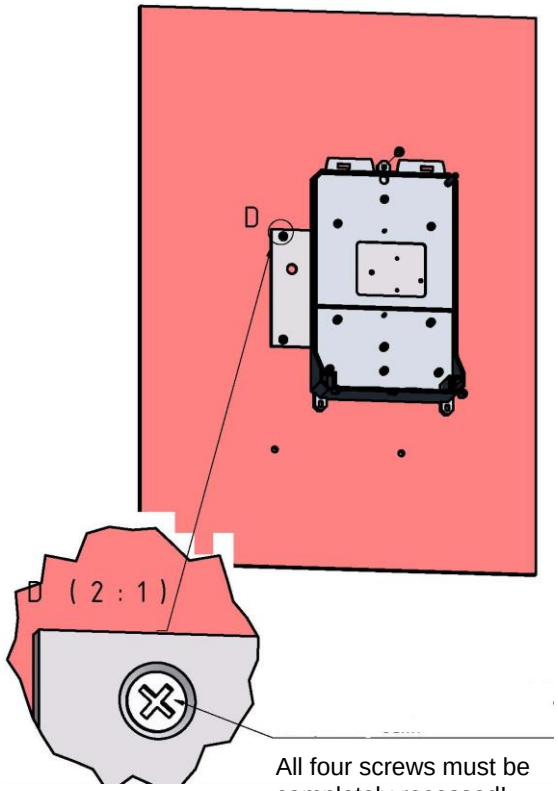
Use the following screws:
Use countersunk screw M4 DIN 965

Step 2: remove the spacer



Do not use spacers!

Step 3: install the controller



All four screws must be completely recessed!

5.3 Housing variant 2 / large housing

This type of housing is used for controller types TST FUZ2-CGH, TST FUZ2-B, and -LGH.

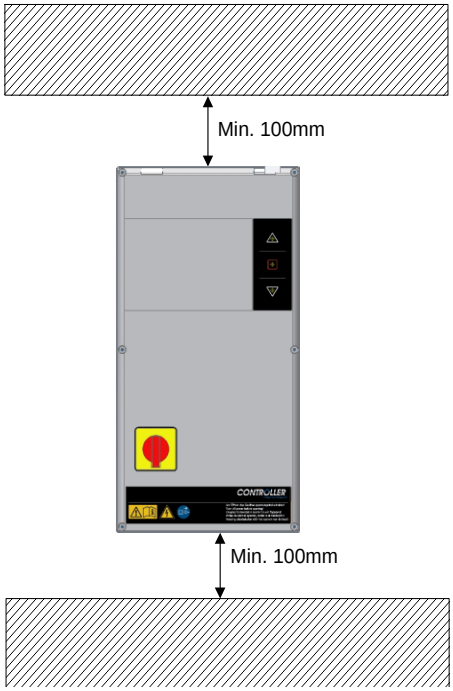


Figure 9: Installation in large housing

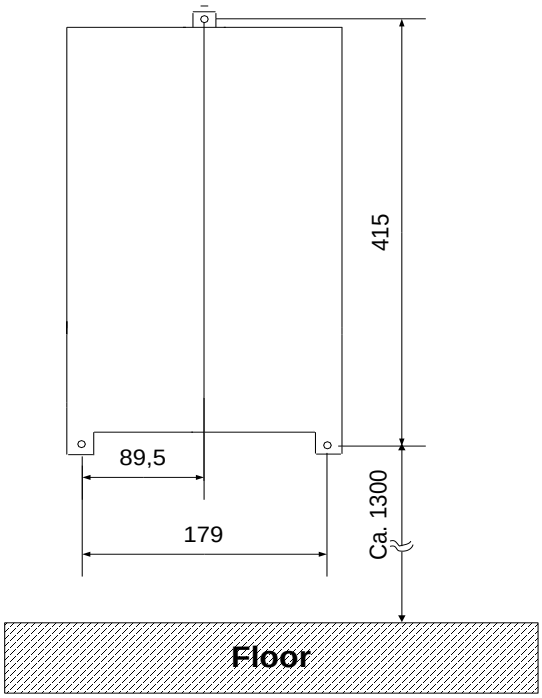


Figure 10: Drilling template large housing

5.4 Variants in steel or stainless steel housings

Steel and stainless steel housing variants are also available.
The housing has the following dimensions:

5.4.1 300 x 400 mm

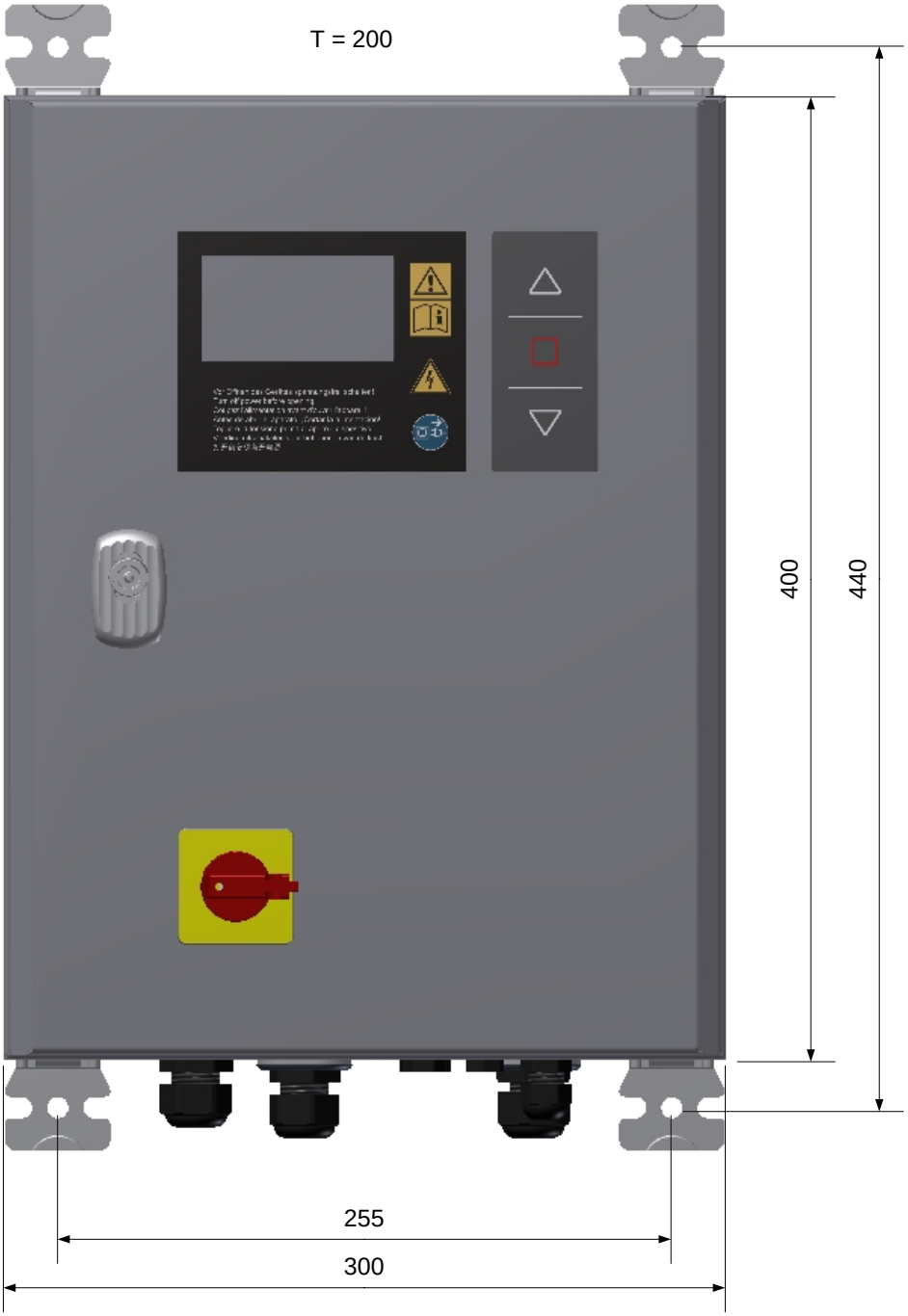


Figure 11: 300 x 400 housing

5.4.2 400 x 600 mm

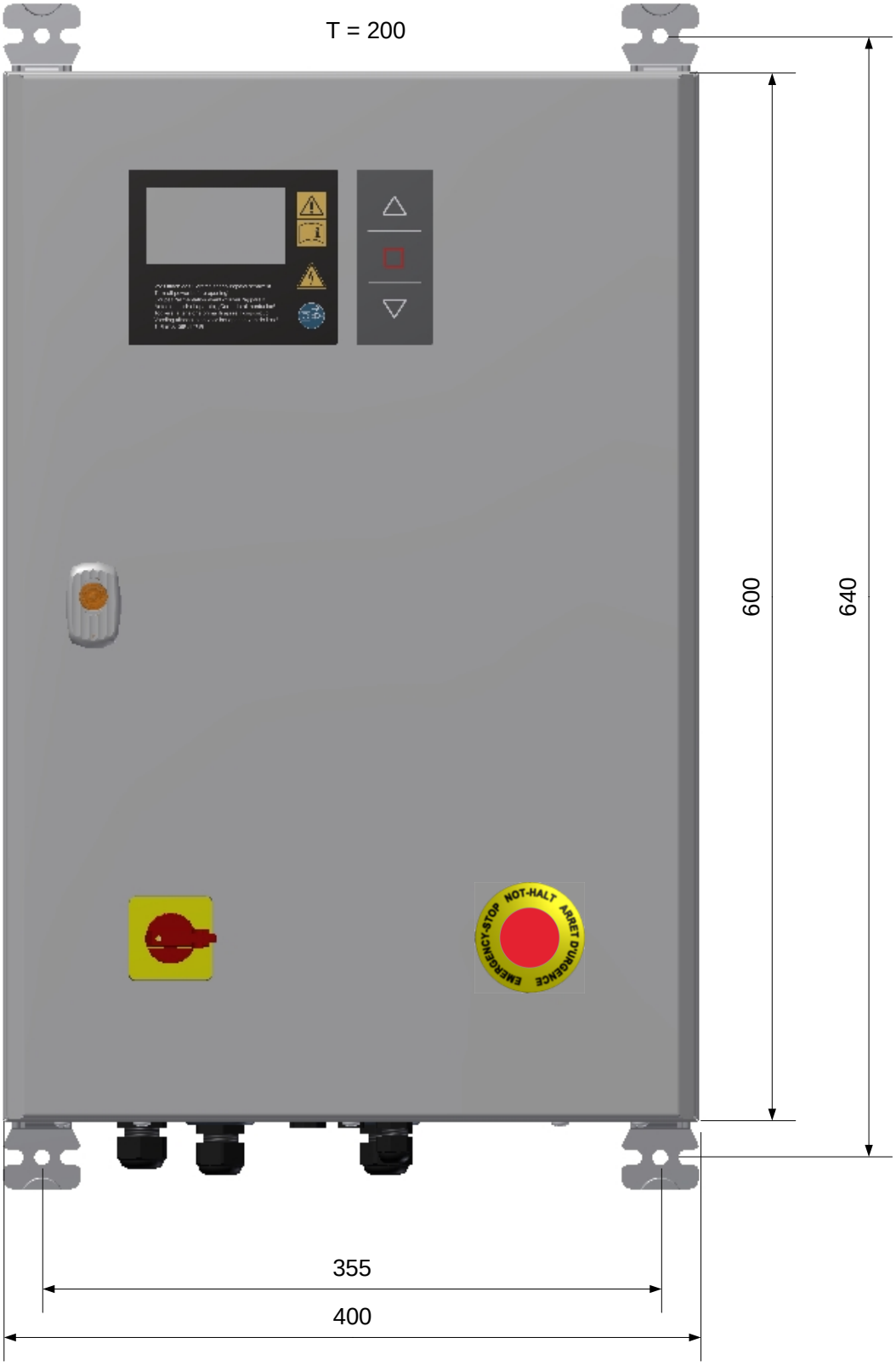


Figure 12: 400 x 600 housing

5.4.3 600 x 600 mm

Figure 13: 600 x 600 housing

5.5 Hygiene housing variant

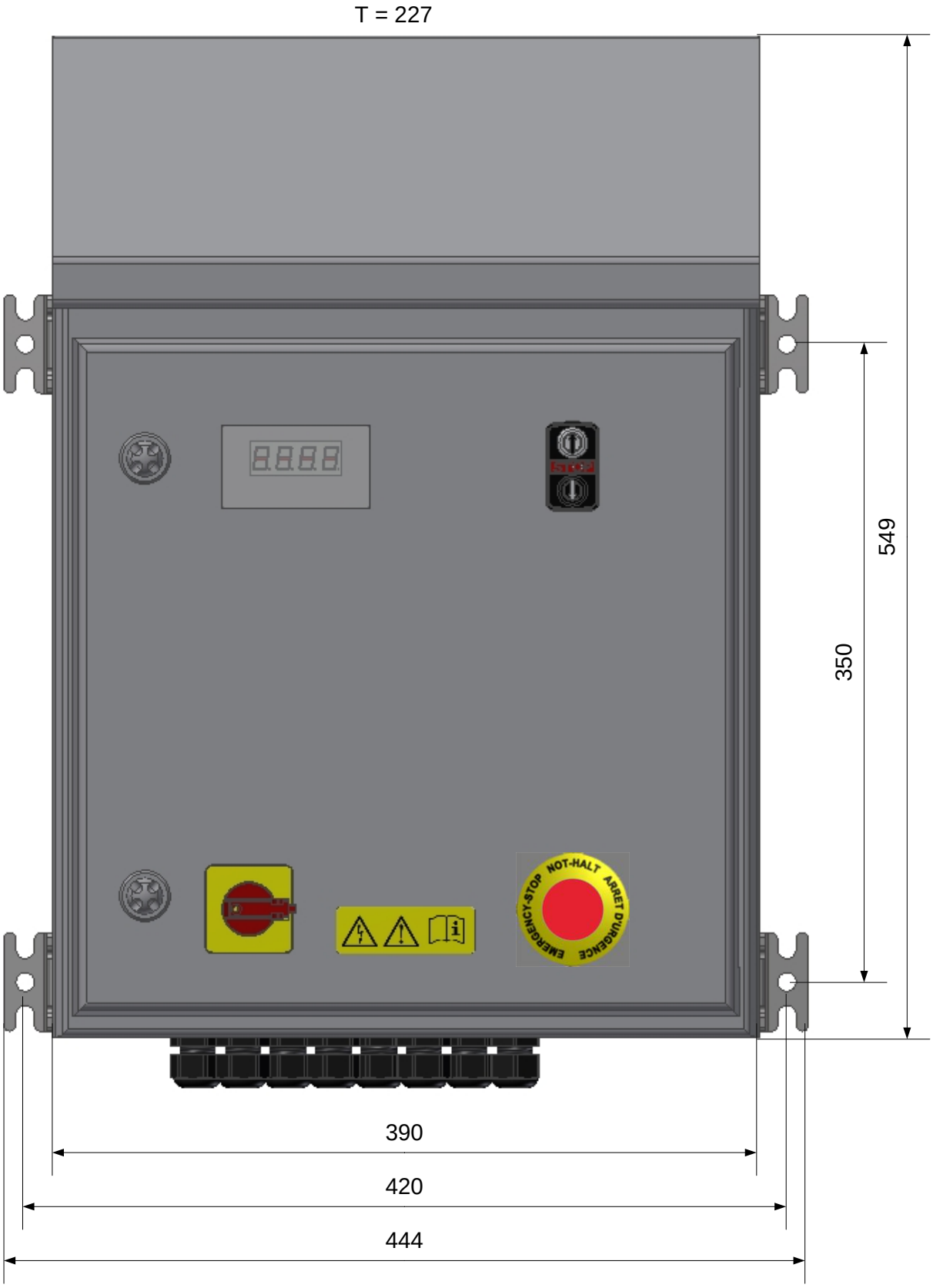


Figure 14: Hygiene housing

5.6 Mount the board variant in a steel housing

The illustrations are exemplary. Other housing variants may differ.

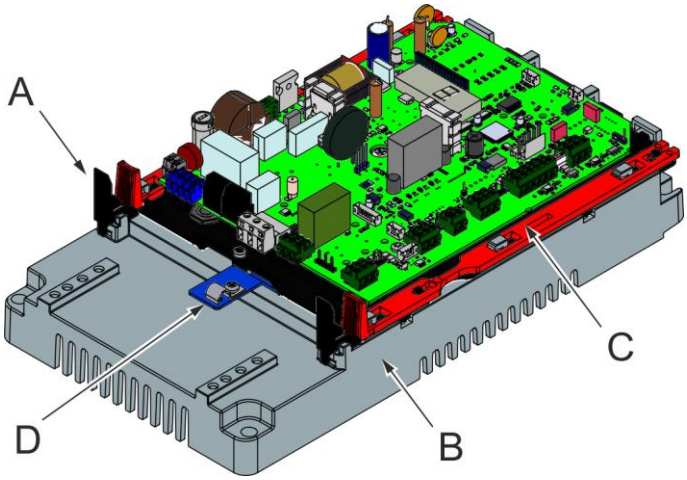
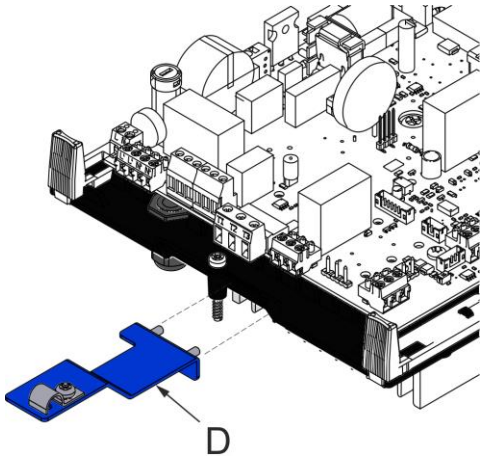


Fig. 1: Board variant on the mounting adapter

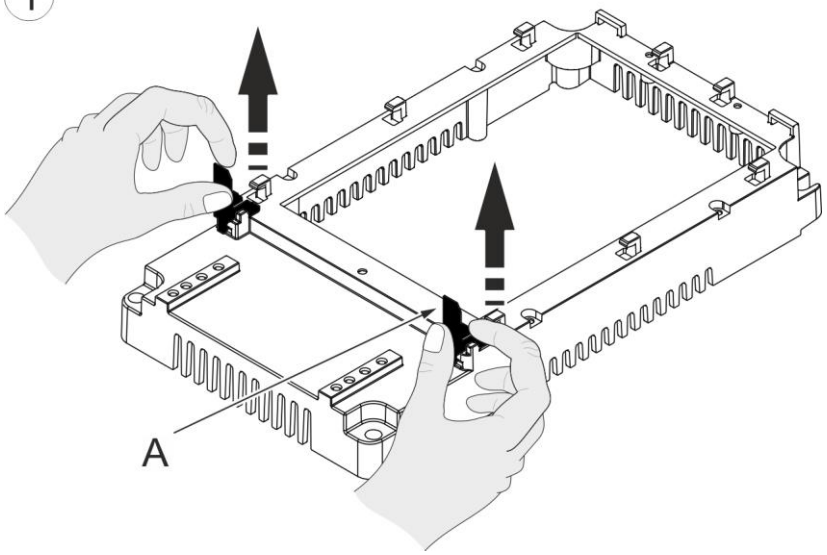
Position	Description
A	Safety clips for transport
B	Mounting adapter for the board variant
C	Slider for fixing the board variant
D	EMC bracket for steel and stainless steel housing

Requirements for mounting in steel and stainless steel housing

Attach the EMC bracket to the heat sink of the board variant!

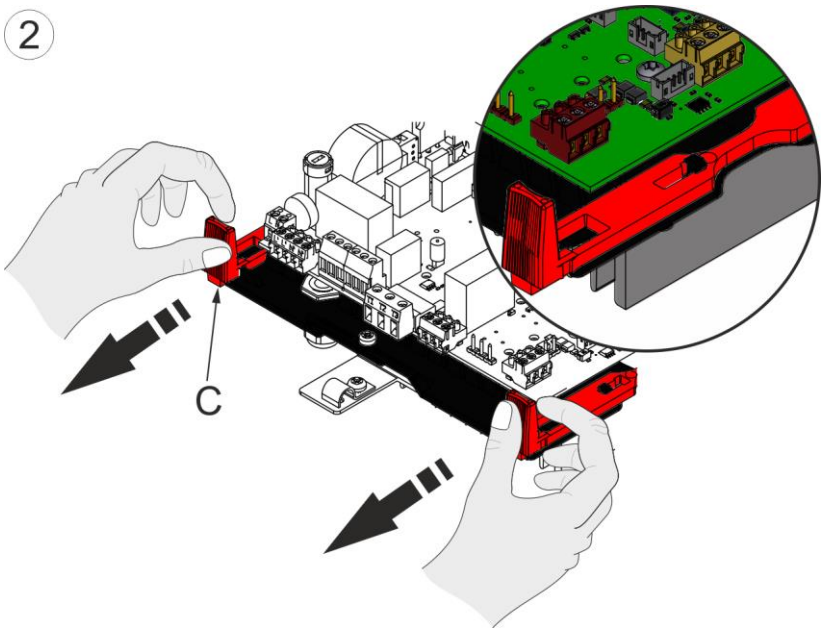


1



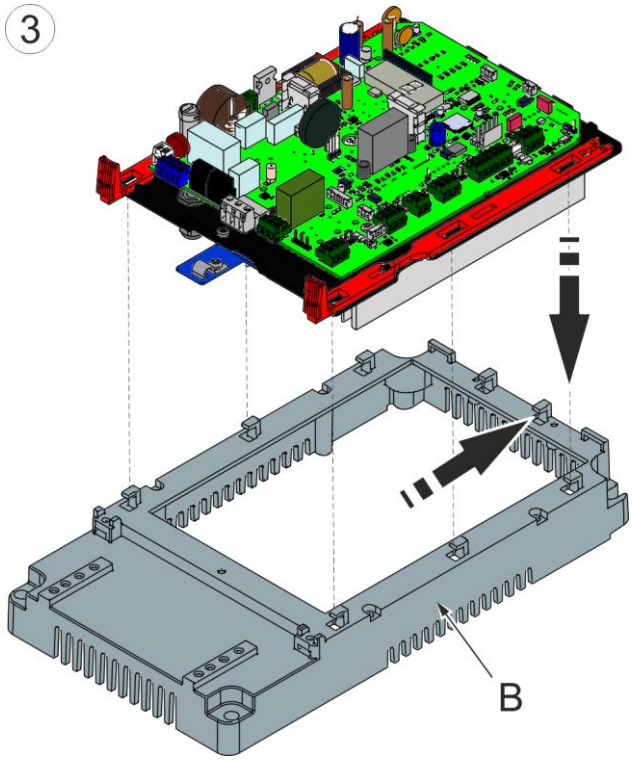
Remove safety clips **A** from mounting adapter **B**.

2



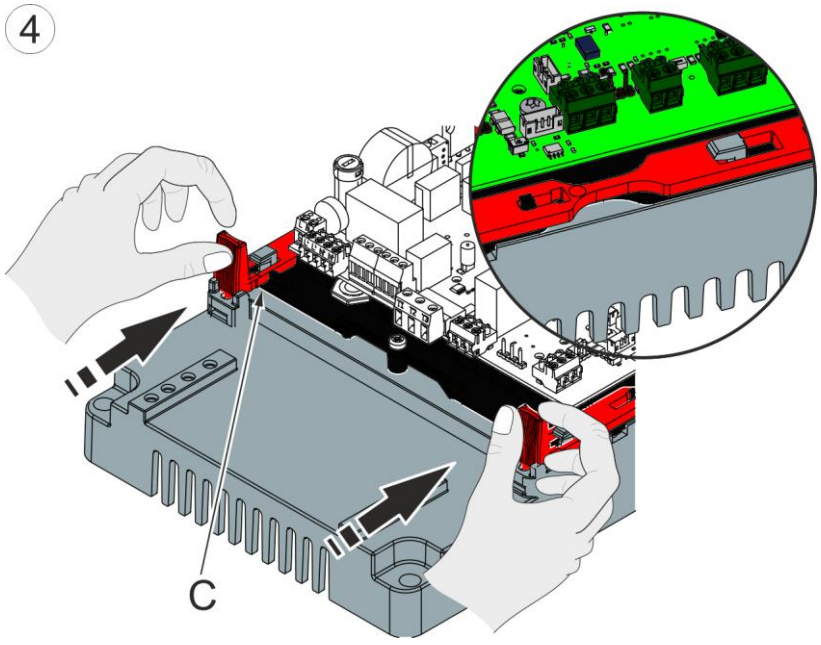
Unlock slider **C** on the boad variant.

3



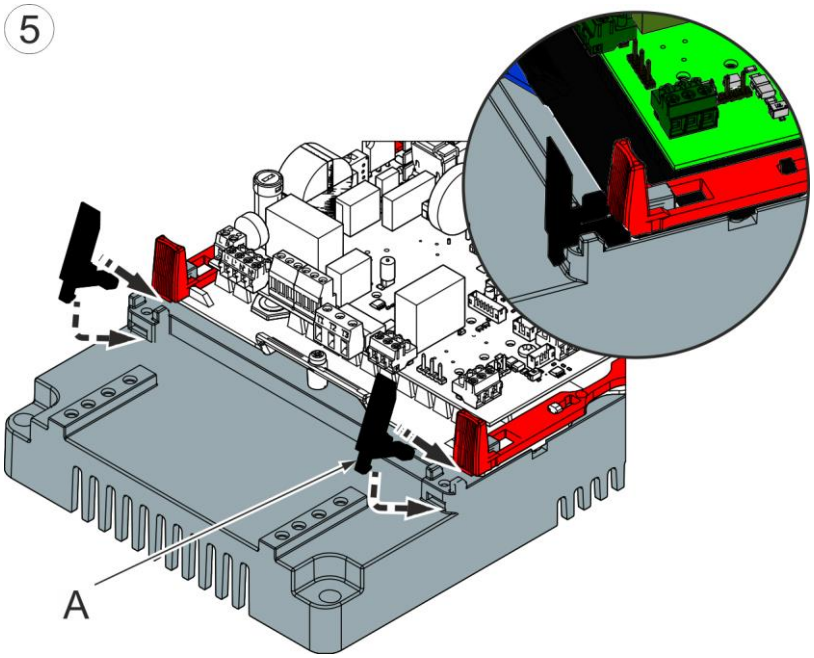
Insert the board variant into the mounting adapter **B**.
Insert the top side first into the retaining brackets and then press it in.

4



Lock slider **C** on the mounting adapter **B**.

5



Press safety clips **A** under the sliders **C**. Then press them into the holder of mounting adapter **B** until they snap into place.

6 Electrical connection

⚠ATTENTION

- Any wiring, testing and maintenance work on an open controller shall only be performed when power has been turned off. Pay particular attention to the points shown under "Safety information".
- The controller must never be operated while it is open.
- When the controller has been turned off, dangerous voltage levels are still present for up to 5 minutes.
- During the downtime, no isolation exists between the amplifier module and the motor terminal.
- Touching electronic components is dangerous due to residual voltages.
- Never operate the controller while the cover is removed.
- When the installation was completed, check that the system was configured correctly and that the safety system works properly.
- The controller may be opened only if all the poles of the supply voltage have been turned off. It is not permitted to turn on or to operate the controller when it is open.
- Never operate the controller without having connected the protective earth conductor. The absence of a protective earth conductor will result in hazardous voltages on the controller housing caused by terminal capacitances. The RFI filters integrated into the controller may increase the leakage current up to a max. of 7 mA (see DIN EN 60335-1 section 16.2). A corresponding routine test was carried out by the manufacturer before delivery of the device.
- Hazardous voltages remain stored in the DC-bus capacitors for up to five minutes after power has been turned off. The discharge time until voltages fall below 60 VDC is a maximum of 5 minutes. Touching internal controller components within this discharge time is hazardous.
- A defective switching power supply can considerably increase the discharge time of the DC-bus capacitors before reaching a voltage less than 60VDC. In this case, discharge times of up to 10 minutes may be possible.
- The processor circuit is galvanically connected to the power line. Important: when taking measurements on the processor circuit, do not use test equipment with PE reference to the measuring circuit.
- The controller must never be operated with a damaged membrane keypad or Display window. Damaged keypads and Display windows must be replaced. To prevent damage to the keypad, do not use pointed objects to operate the keys. The keypad is only designed to be operated by human fingers.
- If the potential free contacts of the output relays or other terminals are supplied by an external voltage, i.e. dangerous voltages that are still present after switching off the controller or disconnecting power, you must attach a suitable warning sign to the housing.

⚠ATTENTION

Disconnect all supply circuits before opening the housing for access to the terminals.

- When moving the door in deadman mode, ensure that the operator has an unobstructed view of the door area, since in this mode safety equipment such as safety edge and photo eyes are defeated.
- Parameter settings inclusive the speed as well as all operations of the safety devices must be checked. The setting of parameters, bridges and other operating elements may only be carried out by qualified specialists.

⚠WARNING

- Before turning on the controller for the first time and after completion of the wiring, check whether all motor connections are tight on the controller and the motor side and whether the motor is correctly wired in star or delta configuration. Loose motor connections usually damage the inverter.
- If the 24 V controller voltage is short circuited or overloaded, the switching power supply will not start up even though the intermediate circuit capacitors are charged. The displays remain turned off. The power supply can only be restarted after eliminating the short circuit or the overload condition.
- To fulfill the conditions of the EMC Directives, only shielded and separate motor conductors must be used, with the shield connected on both ends (motor and controller side) and without any additional connections in the line. Maximum cable length: 30 m
- Fast running plastic foil doors may produce very high electrostatic charges. A discharge of these voltages may damage the controller. Therefore suitable measures must be taken to prevent electrostatic discharge.
- Turning on or operating the controller in the presence of condensation is not permitted. It can lead to the damage of the controller.
- Before turning on the controller supply for the first time, ensure that the detector/sensor cards (plug-in modules) have been inserted in the correct locations. Incorrect insertion of the cards can result in damage to the controller, likewise the installation of non-approved third-party equipment.
- First connect the cables to the connection terminals and then attach them to the connectors! Only thus is it possible to ensure a safe contact of the connection terminals to the plug connectors.

- Maximum connection diameters for the terminals on printed circuit boards:

	Single wire (rigid)	Fine-stranded (with/without	Max. tightening torque [NM]
Motor terminals	2.5	2.5	0.5
Mains connection	2.5	1.5	0.5
screw terminals (catch 5 mm)	2.5	1.5	0.5
plug in terminals (catch 5 mm)	1.5	1.0	0.4
plug in terminals (catch 3.5 mm)	1.5	1.0	0.25

- Check the electrical connection again before starting the controller. Incorrect connections may damage the unit.

The illustrations are exemplary. Steel and stainless steel housings may differ.

6.1 Power supply voltage without main switch

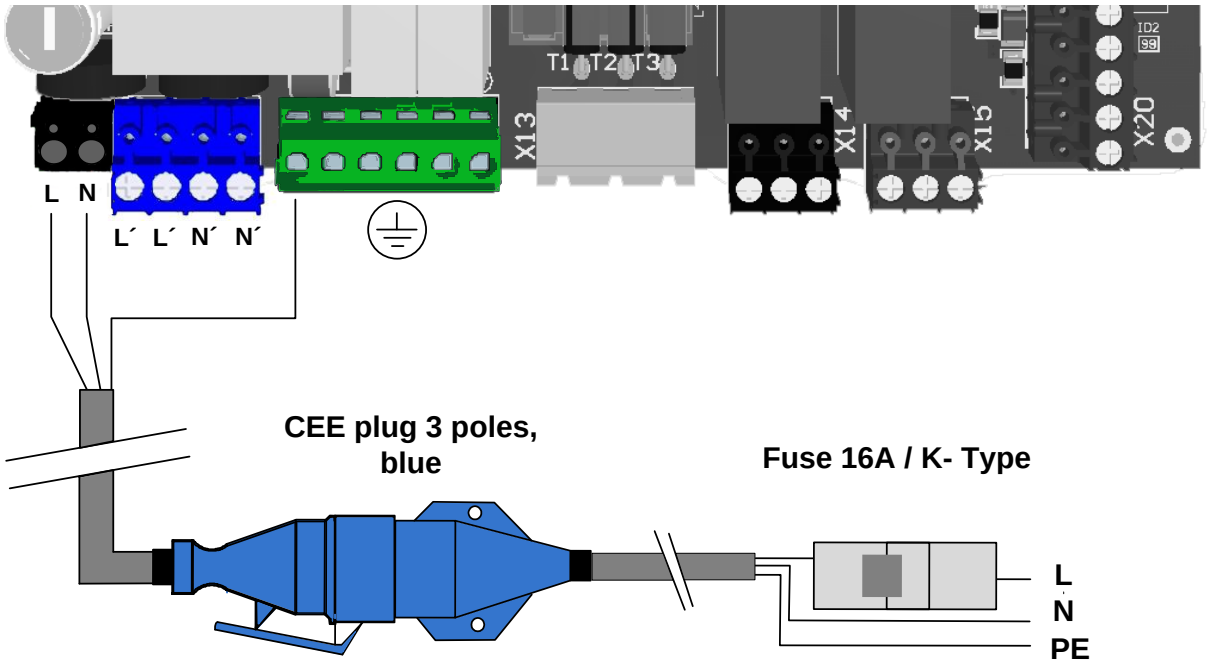


Figure 15: Connecting the power cable

The power plug must be visible and accessible from the controller.

6.2 Power supply voltage with main switch

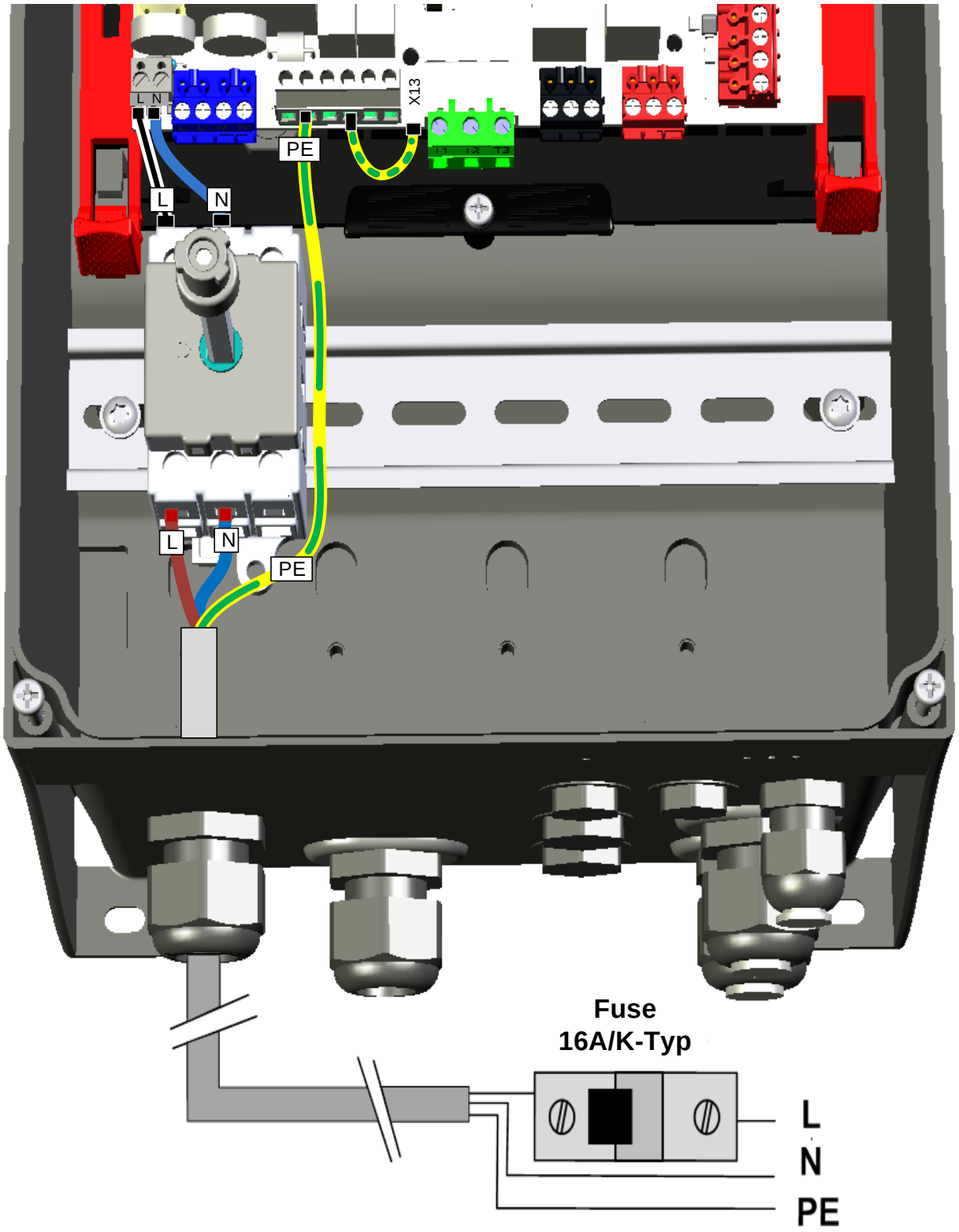


Figure 16: Connecting the power cable

6.3 Motor and brake

Connect the shielding of the motor cable to the EMC bracket (for steel housings)!
Connect the shielding of the motor cable to the PE terminal.
For steel housings, also make direct contact between the shielding and the EMC bracket.
To do this, remove a piece of the insulation of the motor cable and fix the shielding with the clamp on the EMC bracket.

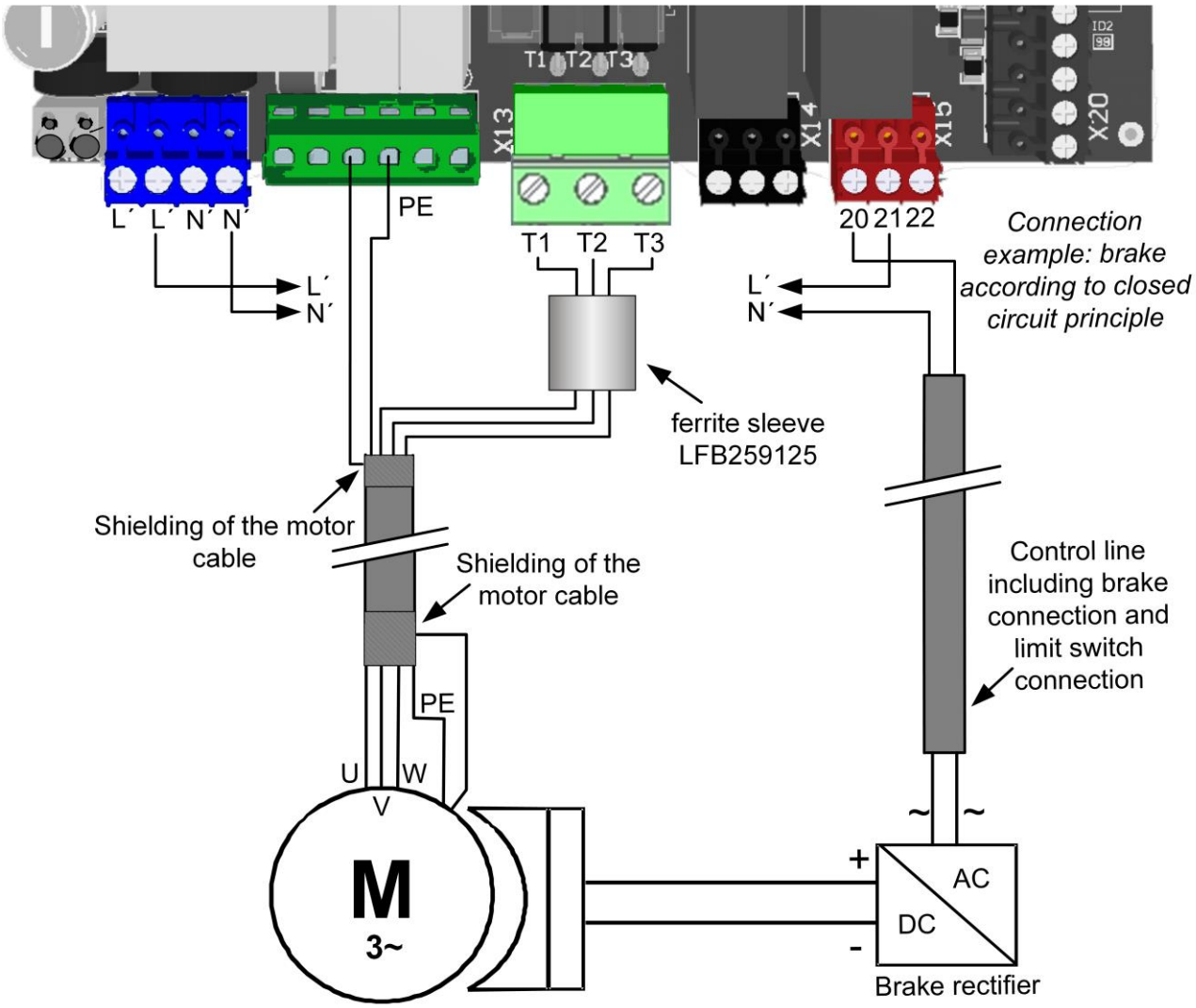


Figure 17: Motor connection

When connecting the motor cable, the enclosed ferrite sleeve (grey, Laird number: LFB259125) must be placed around the three wires (T1/T2/T3).

We recommend to place another split ferrite (black, Würth number: 74271722S) as close as possible to the door controller around the complete motor cable. The black split ferrite is not included in the scope of delivery!

Use a shielded motor cable in order to guarantee error-free operation of the controller. In addition, no other conductors except the motor connection may be included in this line.

In the case of drive units with an electronic brake, ensure that the brake is equipped with adequate suppression. We recommend the use of RC-elements for interference suppression purposes.

For the relay K2 to work as a brake relay, set parameter P.702 = 3201.

6.4 Safety edge on the integrated evaluation

Various types of safety edges can be connected, for example:

- Electrical safety edge with 1.2 kΩ or 8.2 kΩ terminating resistor.
- Dynamical optical system

If one of these types of safety edges is connected when the door controller is switched on it will be recognized automatically.

If no safety edge is connected, automatic closing of the door is not possible.

Use of additional types of safety edges is possible. Please contact the door manufacturer in this respect.

6.4.1 Optical safety edge

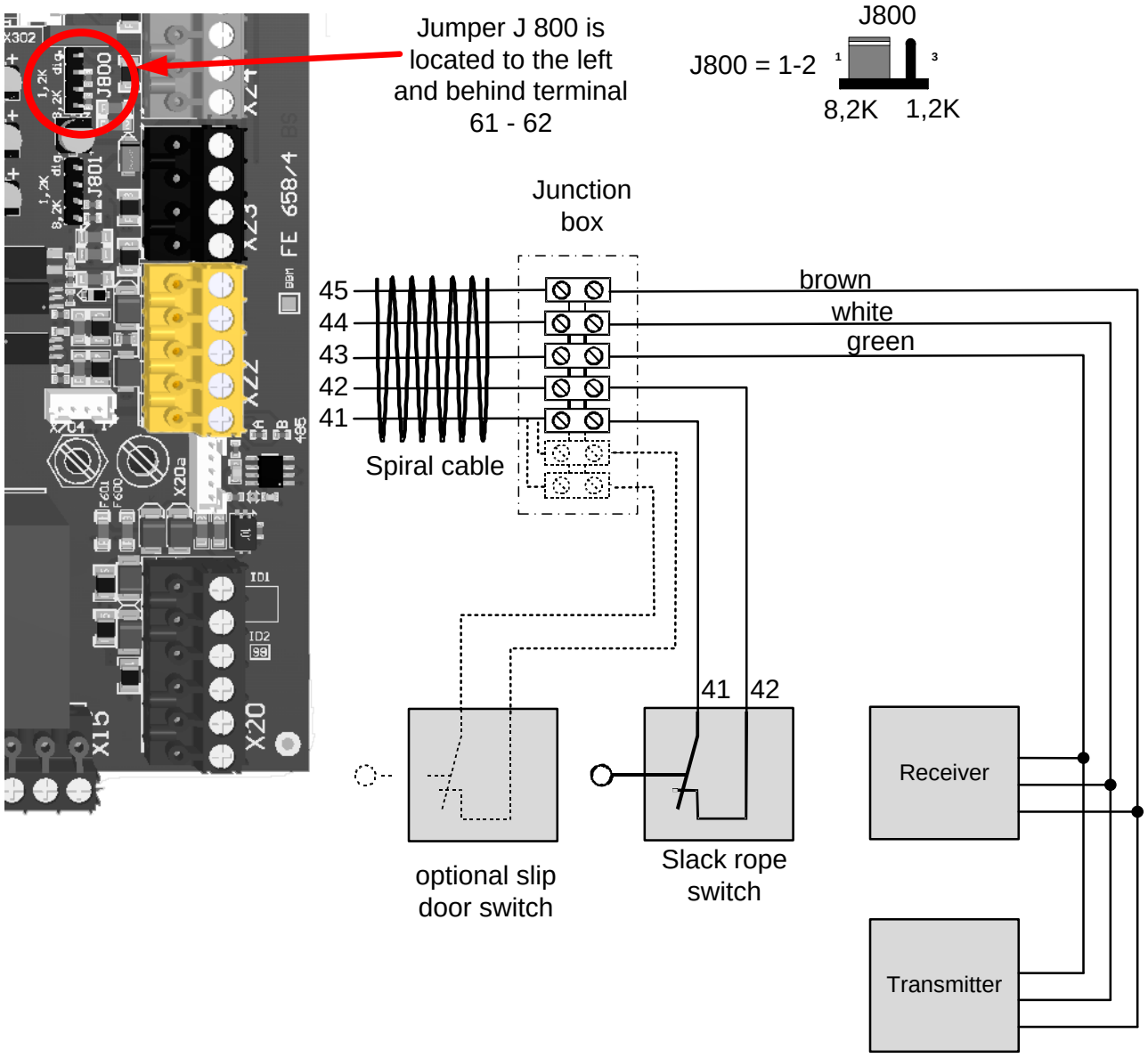


Figure 18: Connection of an optical safety edge

6.4.2 Electrical resistance safety edge

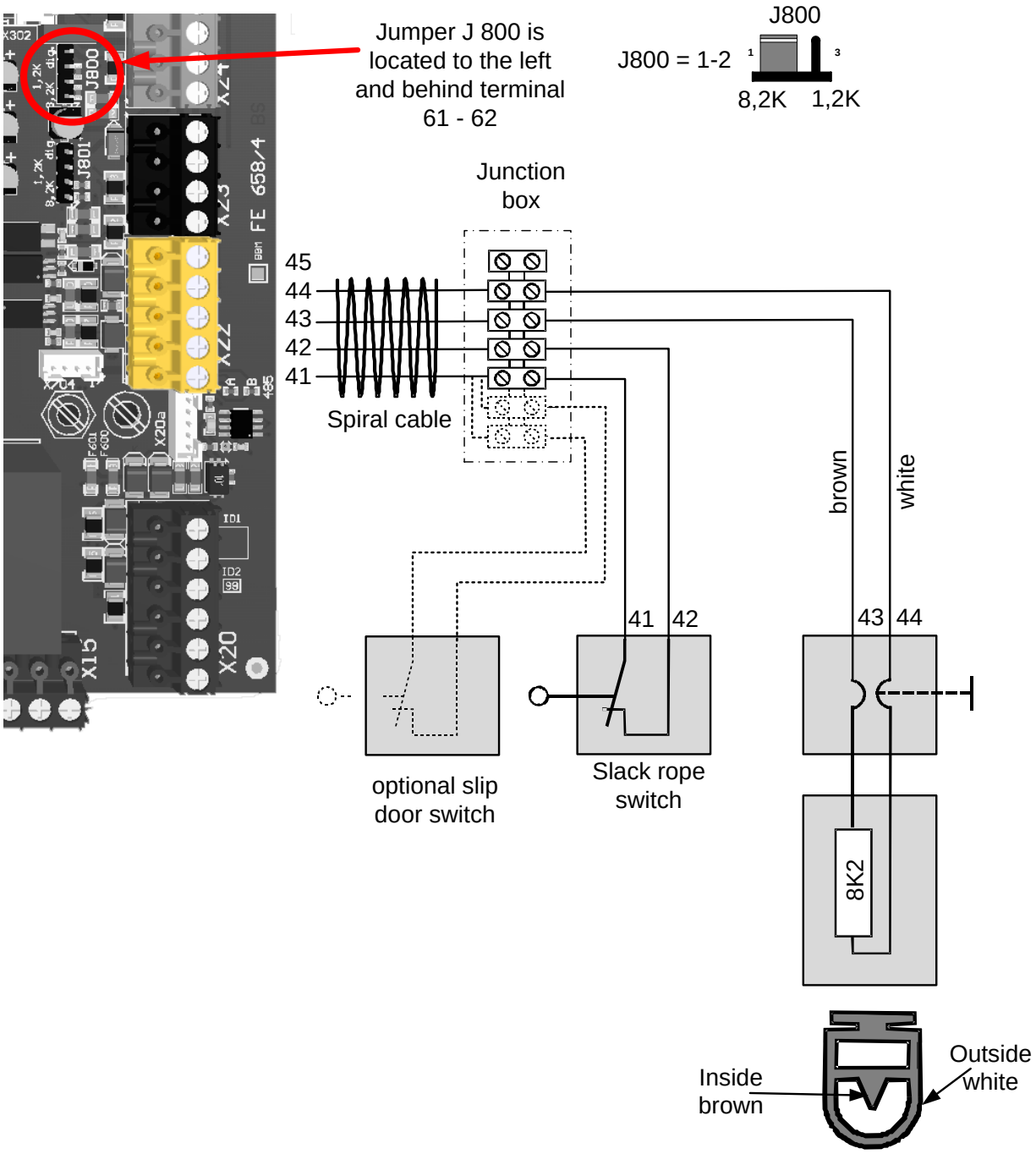


Figure 19: Connection of an electrical resistance safety edge

6.5 Safety edge at the 2nd integrated evaluation (input 10)

The evaluation / input is not available for Control variants TST FUZ2-A!

Various types of safety edges can be connected, for example:

- Dynamical optical system
- Electrical safety edge with 1.2 kΩ or 8.2 kΩ terminating resistor.
- Digital input

Use of additional types of safety edges is possible. Please contact the door manufacturer in this respect.

6.5.1 Optical safety edge

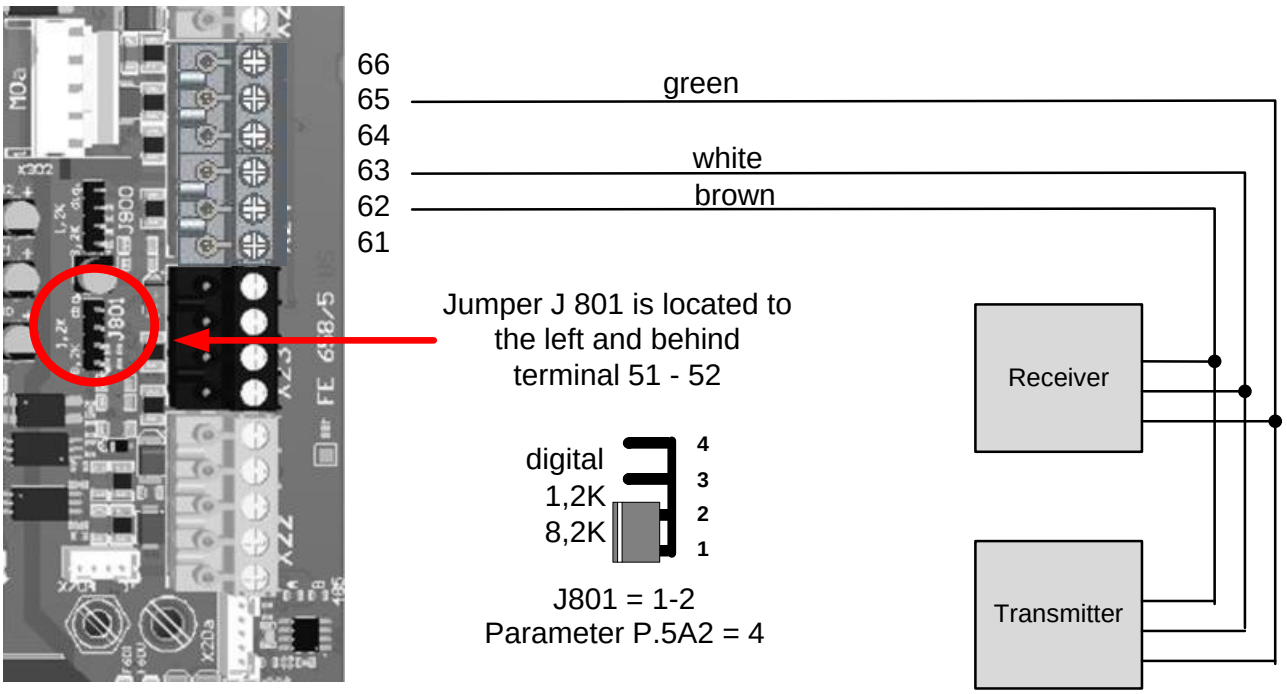


Figure 20: Connection of an optical safety edge

6.5.2 Electrical resistance safety edge

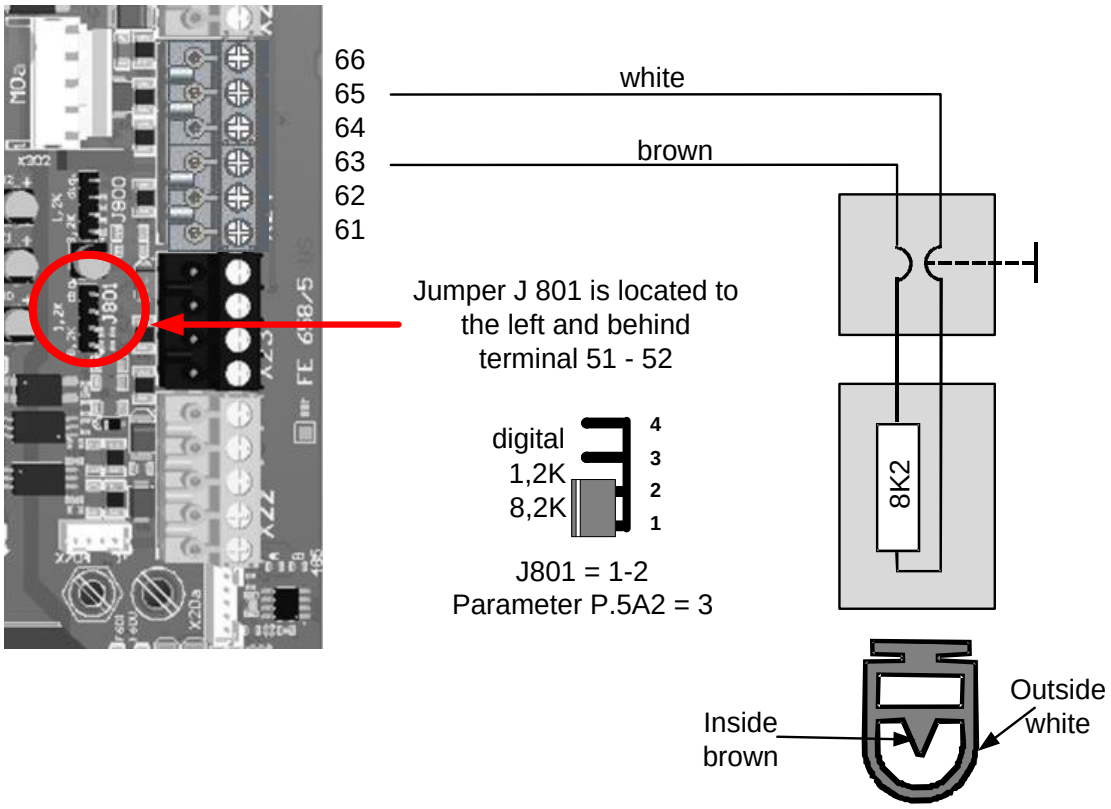


Figure 21: Connection of an electrical resistance safety edge

6.5.3 Digital input

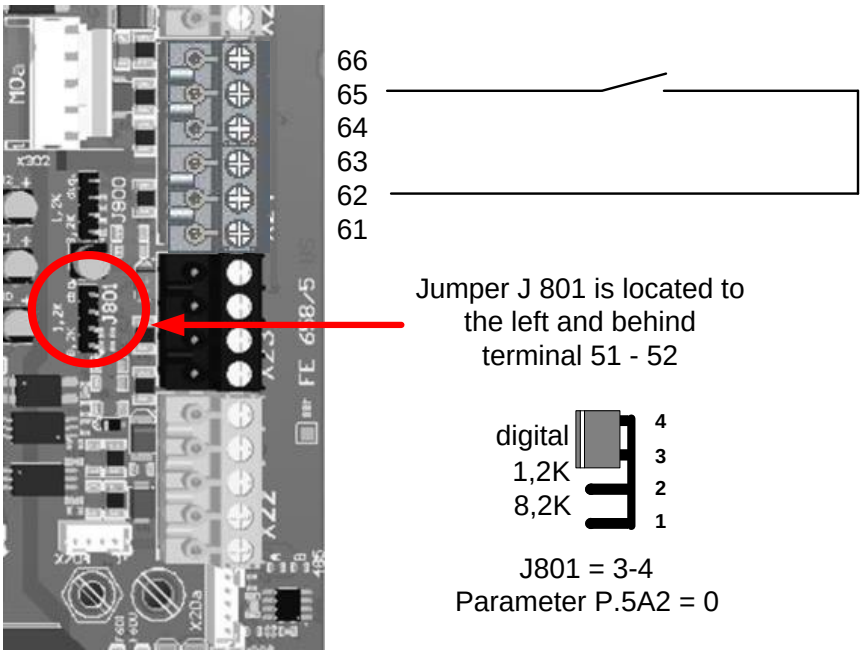


Figure 22: Connection of an electrical resistance safety edge

6.6 Light curtain TST LGB

The light curtain TST LGB can be used as the sole safety device. Please make sure that the door blade completely covers the light lines of the light curtain.
The TST LGB also permits the automatic teach-in of the end position CLOSED.

Optionally, the TST LGB can assume other functions. In these cases, additional safety devices must be attached to the door.

6.6.1 Installation of the TST LGB

Mount the light curtain in accordance with the assembly instructions TST LGB!

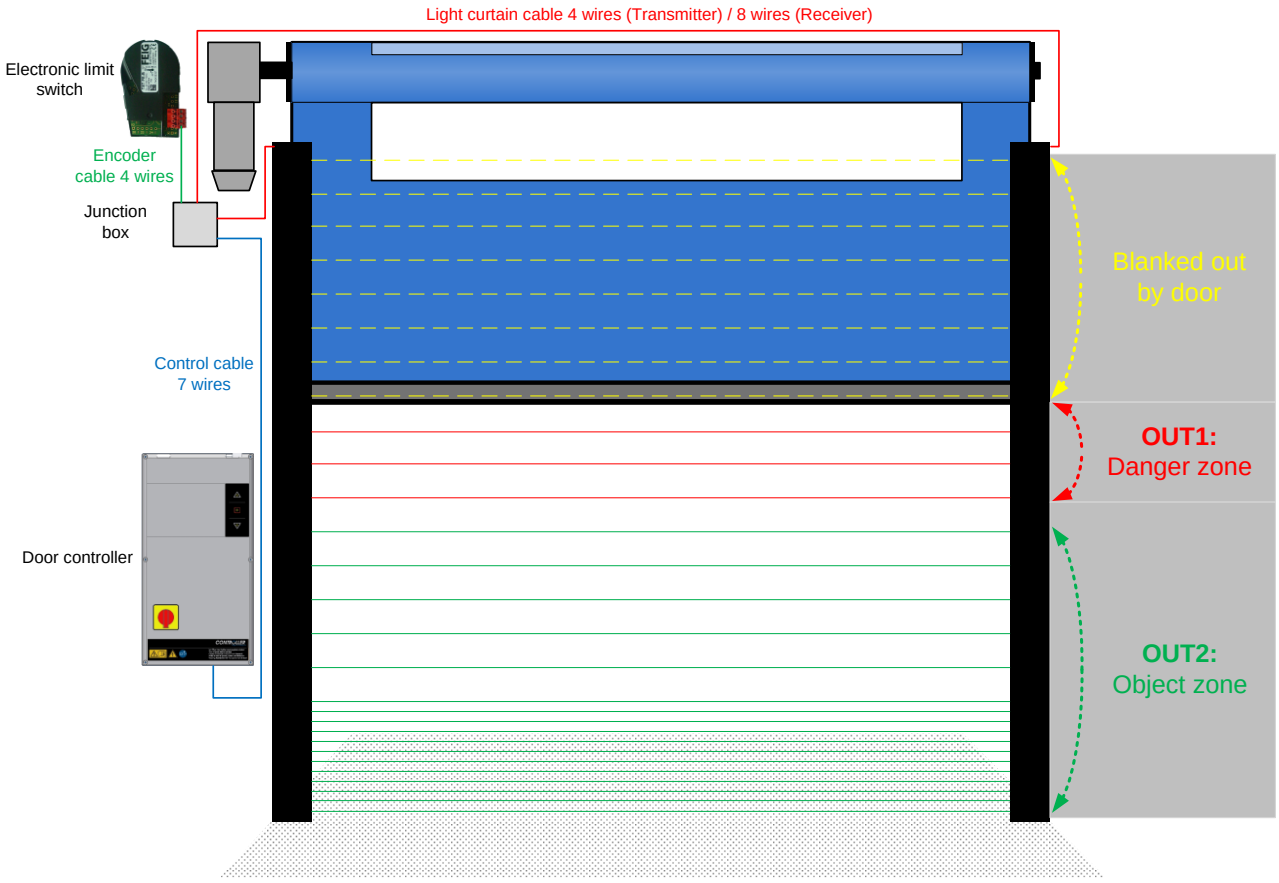


Figure 23: Installation of the TST LGB

6.6.2 Connection of the TST LGB

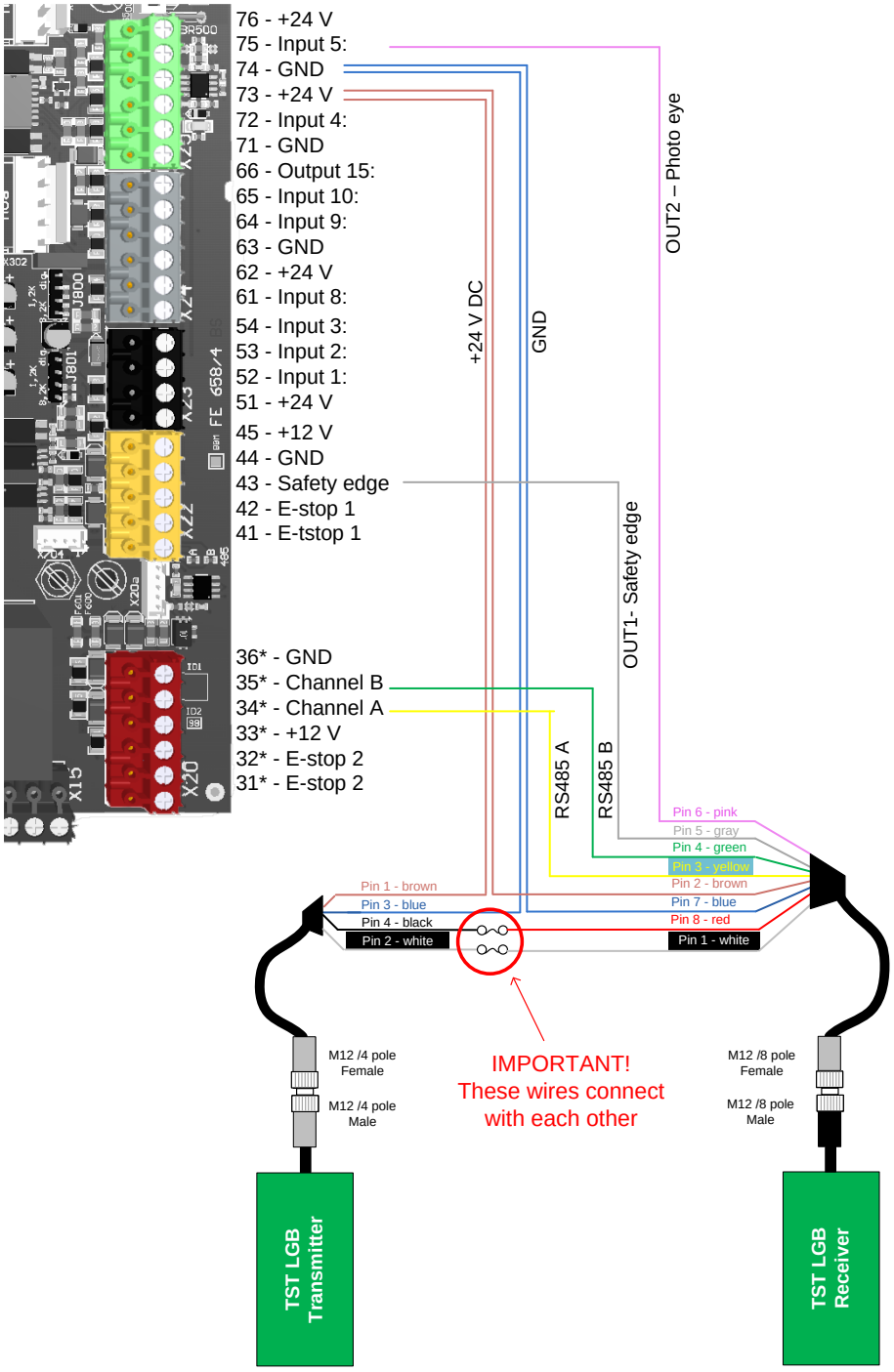


Figure 24: Connection of the TST LGB

6.7 Limit switch connection

Different limit switch systems can be used with the TST FUZ2 door controller. The default setting uses an absolute encoder as the limit switch. In addition, mechanical cam limit switches may be used.

ATTENTION

Compliance with the safety function in accordance with EN 12453:2017 requires the use of a position encoder with PL "c", minimum cat. 2 in accordance with EN 13849-1.

6.7.1 Absolute encoder TST PE or TST PE FSB with WICAB system

Absolute encoder TST PE is a single turn encoder. The driving shaft must not execute more than a single revolution over the entire path of the door.

Absolute encoder TST PE FSB is equipped with the WICAB radio system. The WICAB system can be employed to replace the spiral cable with a wireless link. For this purpose, a mobile unit TST FSBM or TST FSAM must be mounted on the door leaf.

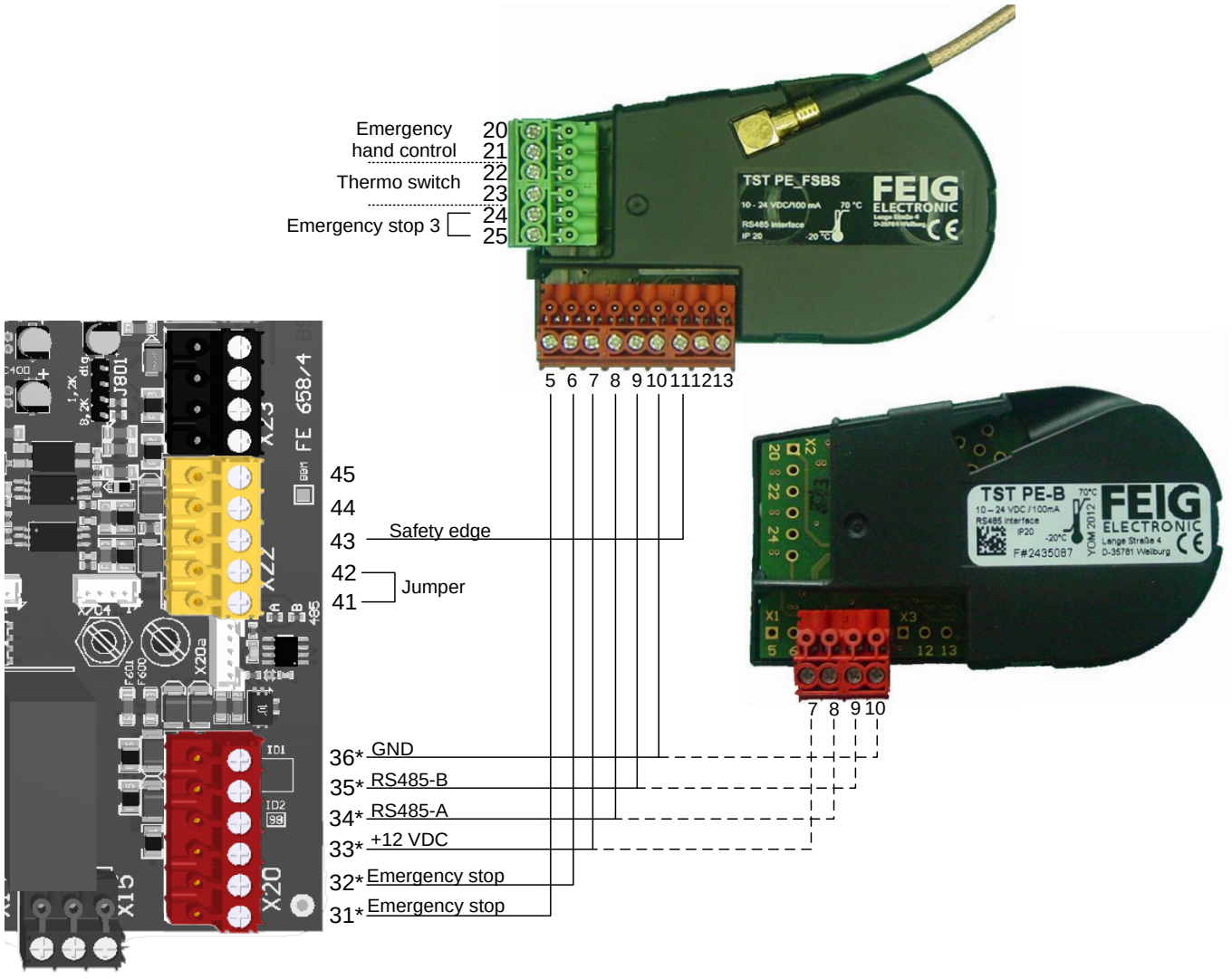


Figure 25: Absolute encoder TST PE / TST PE FSB

6.7.2 Absolute encoder TST PD

Absolute encoder TST PD is a multi-turn encoder. Due to a selectable transmission ratio, this encoder can be used for both very fast (e.g. motor shaft) as well as very slow shafts (e.g. door shaft). The driving shaft may execute more than a single revolution.

This encoder may also be equipped with the WICAB radio system to transfer the status of the safety edge without a spiral cable. For this purpose, the stationary unit TST PD FSAS and the mobile unit TST FSAM or TST FSBM are required.

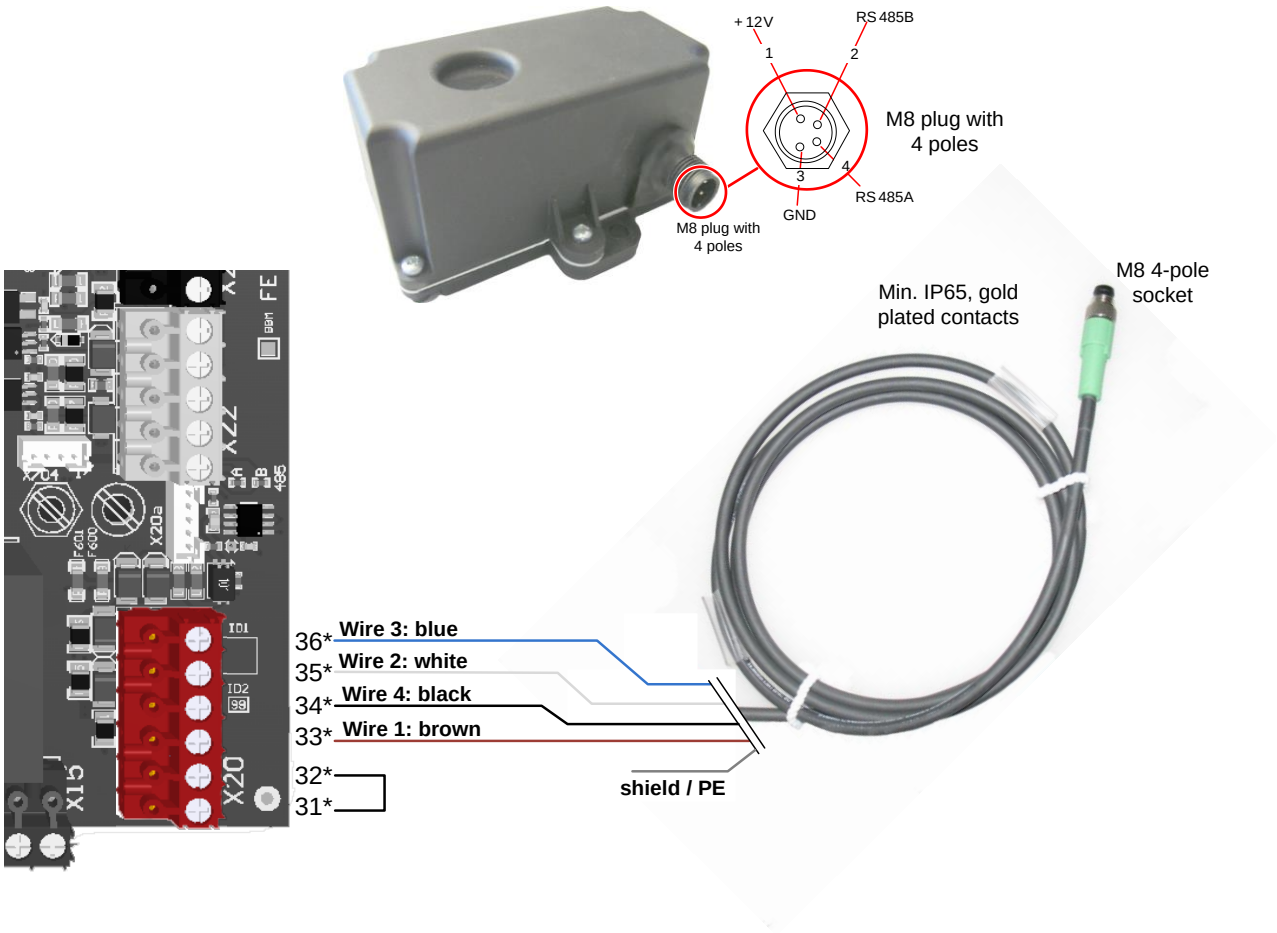


Figure 26: Absolute encoder TST PD

6.7.3 Absolute encoder DES

Example of use!
Please also observe the information in chapter 3 Safety functions in accordance with EN 12453:2017 on page 14.

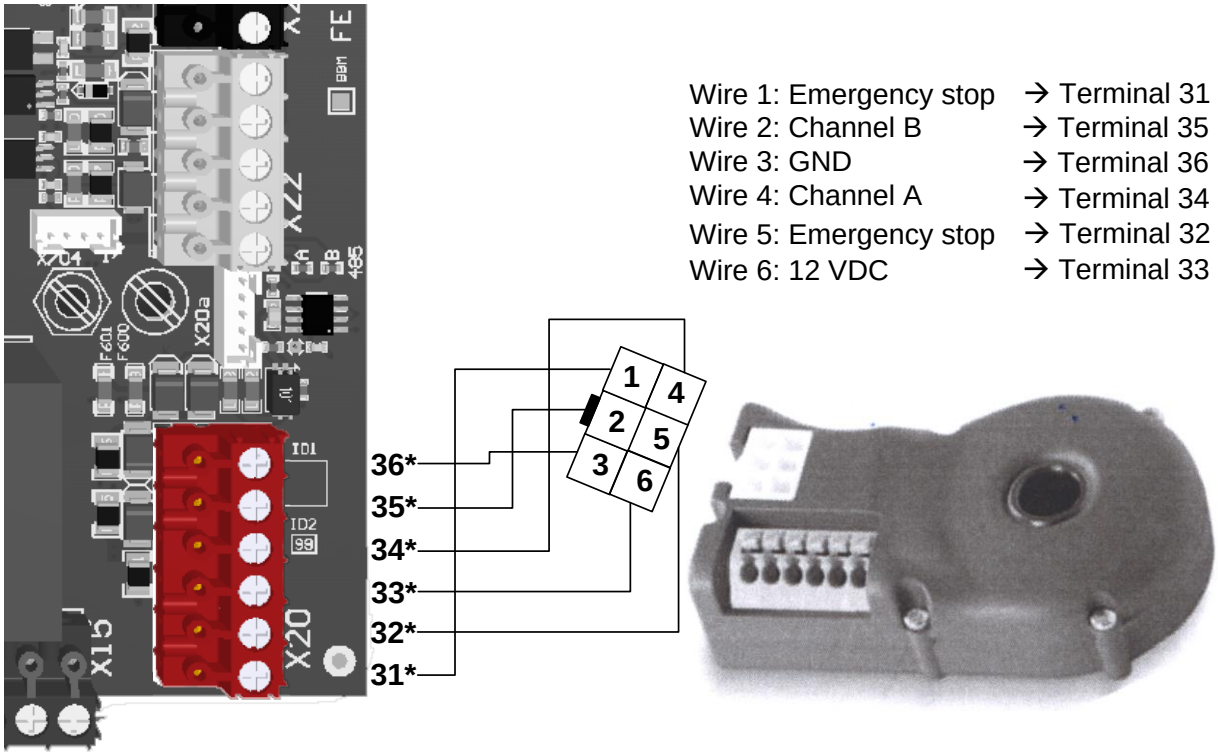


Figure 27: Connection of absolute encoder DES

6.7.4 Mechanical limit switches

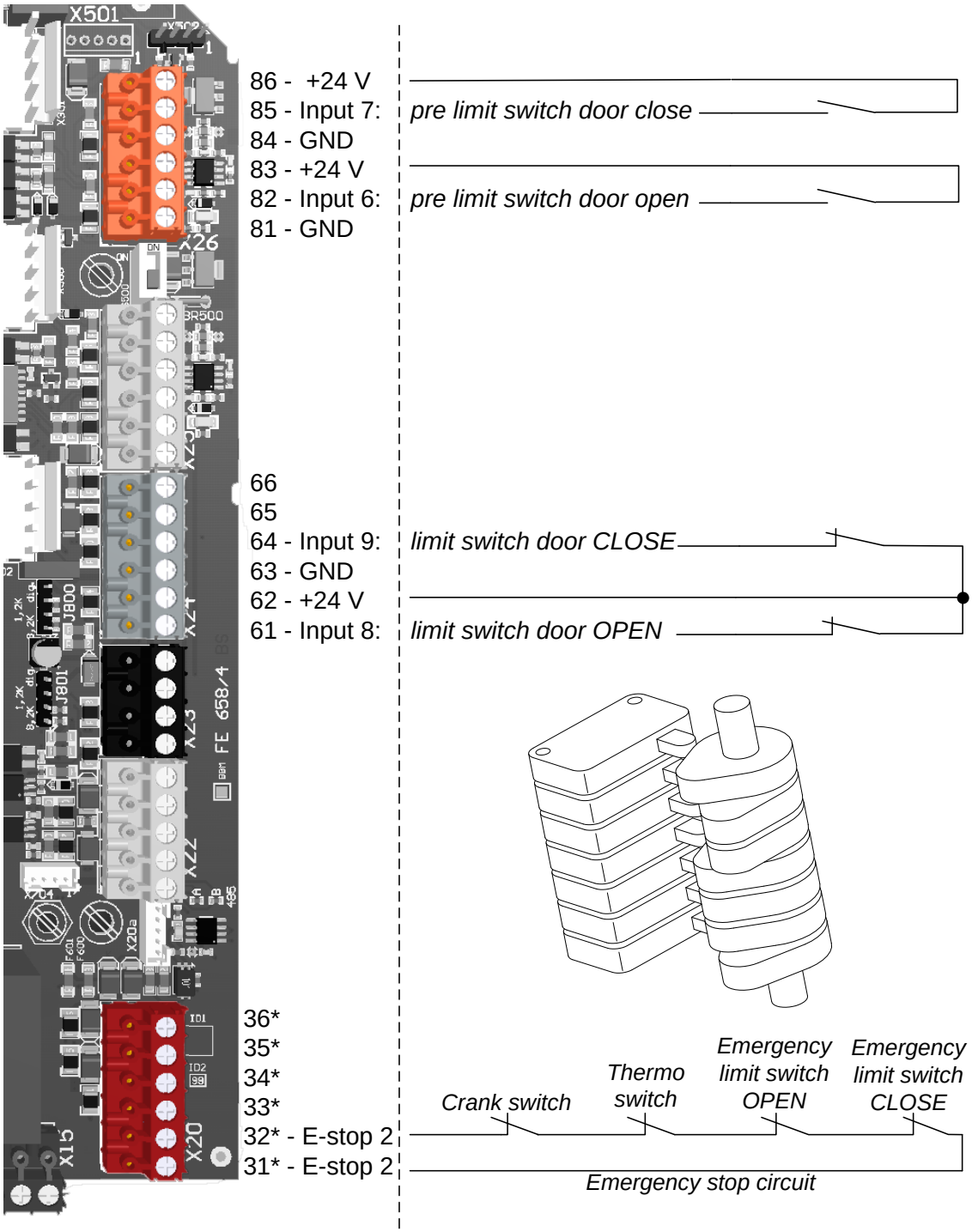


Figure 28: Connecting cam switches

Alternately, the pre-limit switches can also be connected as normally closed contacts.

6.8 Photo eye

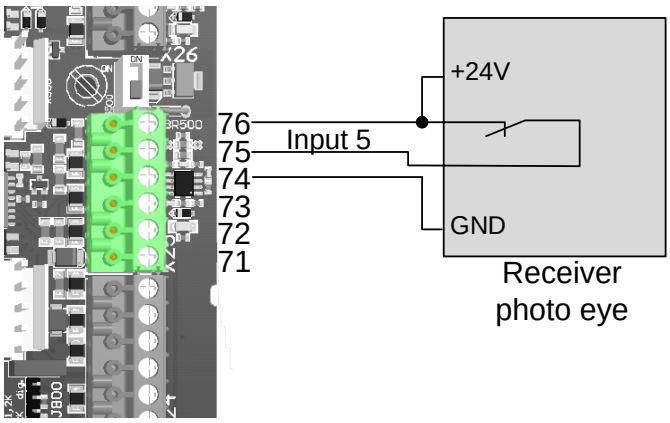


Figure 29: Phot eye connection

6.9 External triggering devices

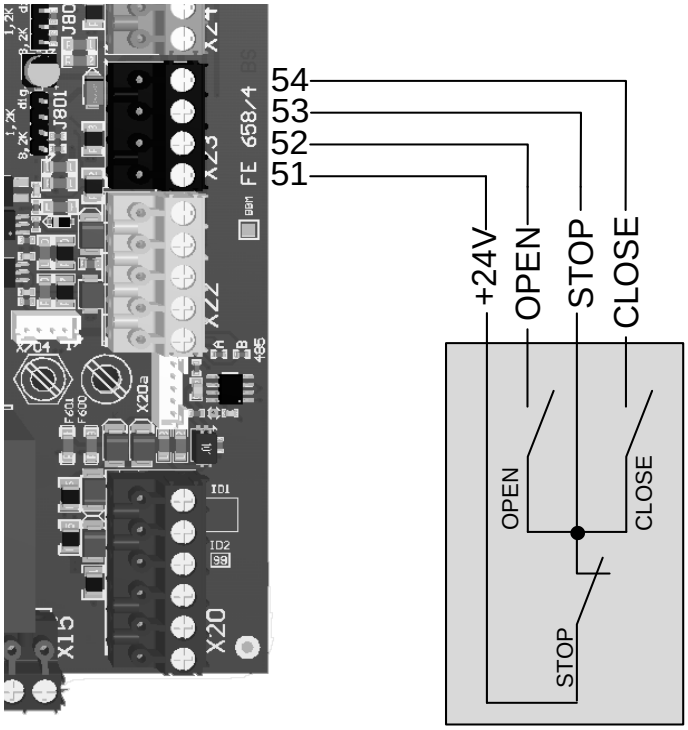


Figure 30: Connection of external triggering devices

6.10 Traffic light connection

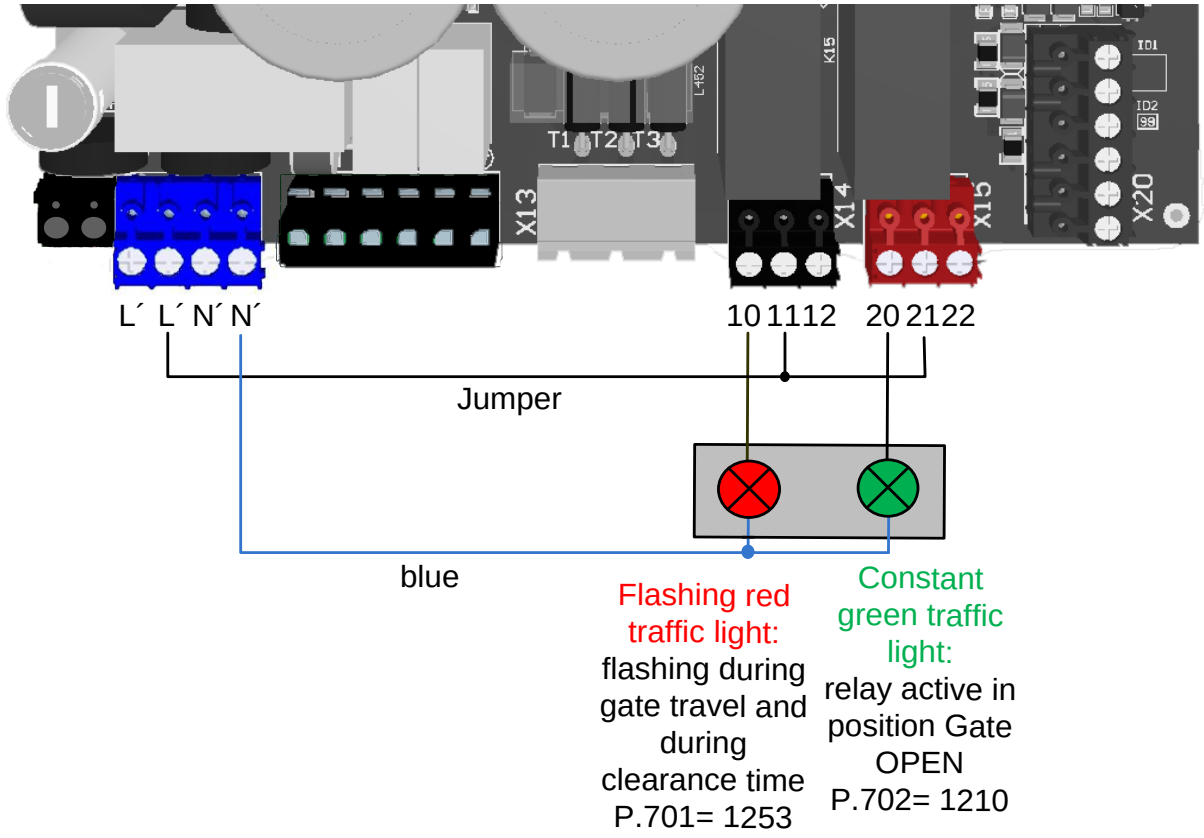


Figure 31: Traffic light connection

When a motor brake is being used, relay K2 is already occupied and it can not be used to control a traffic light.

6.11 Overview of outputs

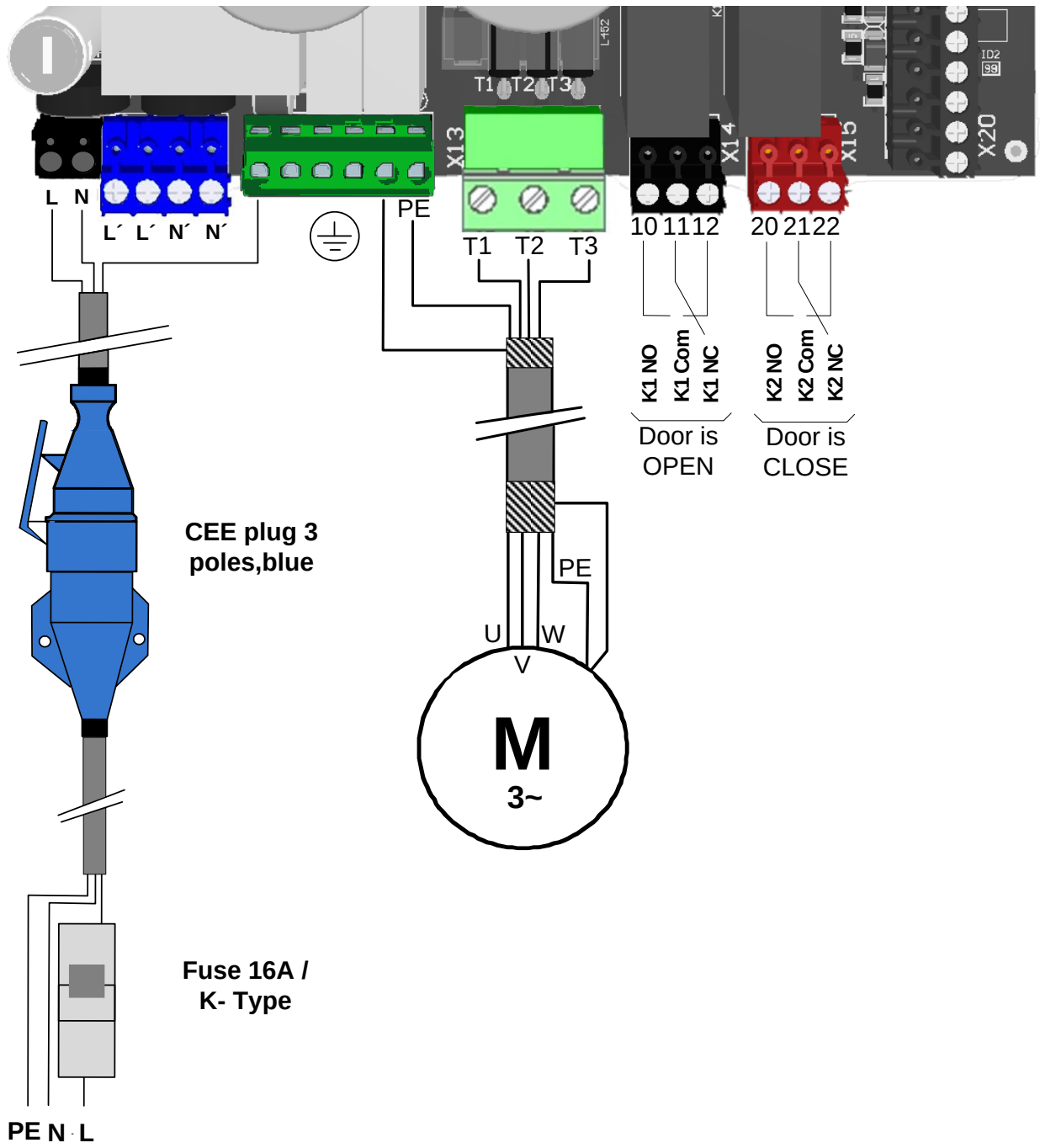
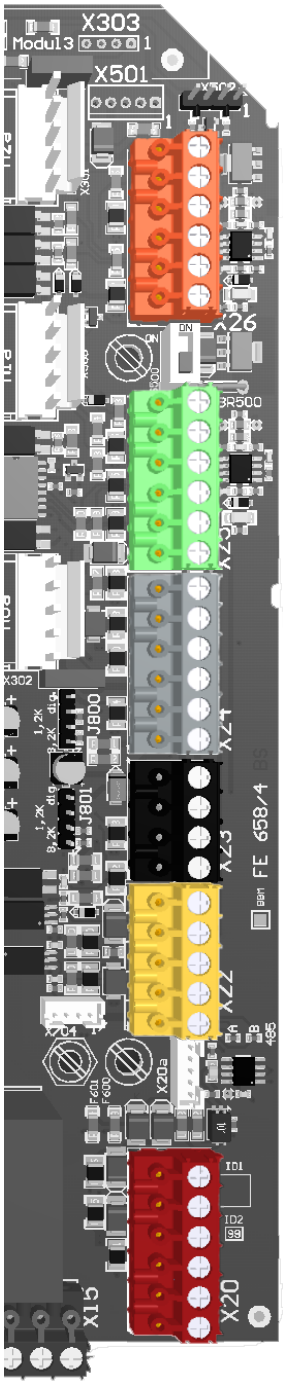


Figure 32: Overview of outputs

Contrary to the mentioned standard settings, the relay function is selectable.

6.12 Overview of inputs



86 - +24 V	
85 - Input 7:	*Manual / automatic*
84 - GND	
83 - +24 V	
82 - Input 6:	*Permanent OPEN*
81 - GND	
76 - +24 V	
75 - Input 5:	*photo eye*
74 - GND	
73 - +24 V	
72 - Input 4:	*Pull switch (Open & Close)*
71 - GND	
66 - Output 15:	*+24 V*
65 - Input 10:	*Disable auto close time*
64 - Input 9:	Deactivating intermediate stop
63 - GND	
62 - +24 V	
61 - Input 8:	*Locking endposition CLOSE*
54 - Input 3:	*CLOSE*
53 - Input 2:	*STOP*
52 - Input 1:	*OPEN*
51 - +24 V	
45 - +12 V	
44 - GND	
43 - Safety edge	*Safety edge closing*
42 - E-stop 1	
41 - E-stop 1	

8K2

36* - GND	10	3 / blue	3
35* - Channel B	9	2 / white	2
34* - Channel A	8	4 / black	4
33* - +12 V	7	1 / brown	6
32* - E-stop 2	6#		5
31* - E-stop 2	5#		1

Only with TST PE_FSBS

Figure 33: Overview of inputs

Input 10 is used in controller variant -B as a second safety edge monitor.

Remove the connection of mechanical limit switches (6.7.4 Mechanical limit switches*).*

7 Optional plug-in and expansion cards

Several slots are available to expand the operation of the controller with optional plug-in and expansion cards.

7.1 Wireless receiver TST SFFE

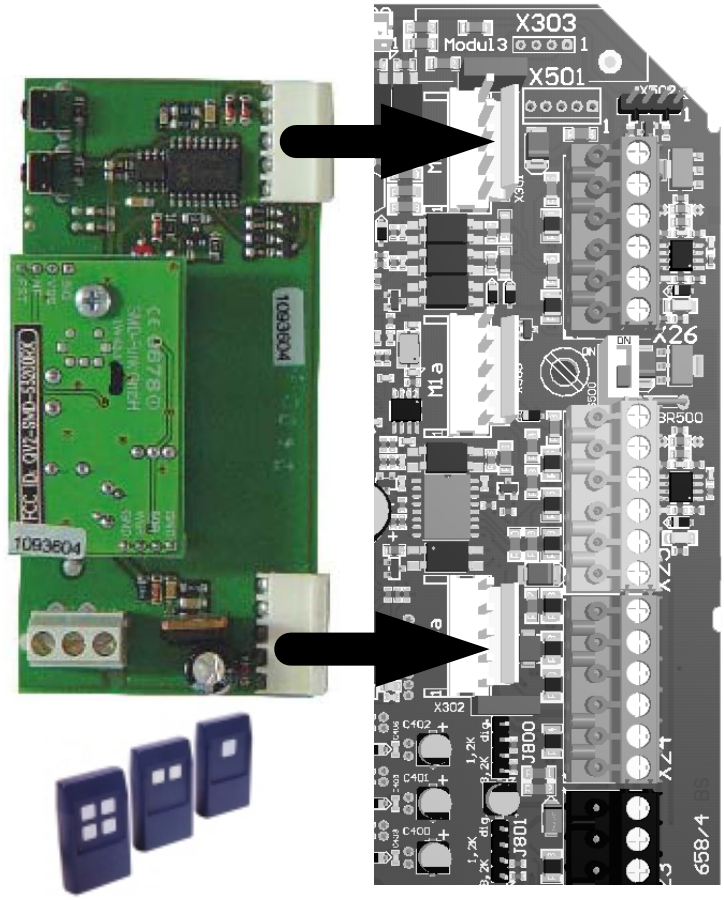


Figure 34: Wireless plug-in receiver

To enable the slot for the wireless receiver, parameter P.802 must be set to 0202.

7.2 Induction loop detector TST SUVEK

The Induction loop monitor is available in the variants TST SUVEK-1 and TST SUVEK-2.
Depending on the type, 1 or 2 loops may be monitored.

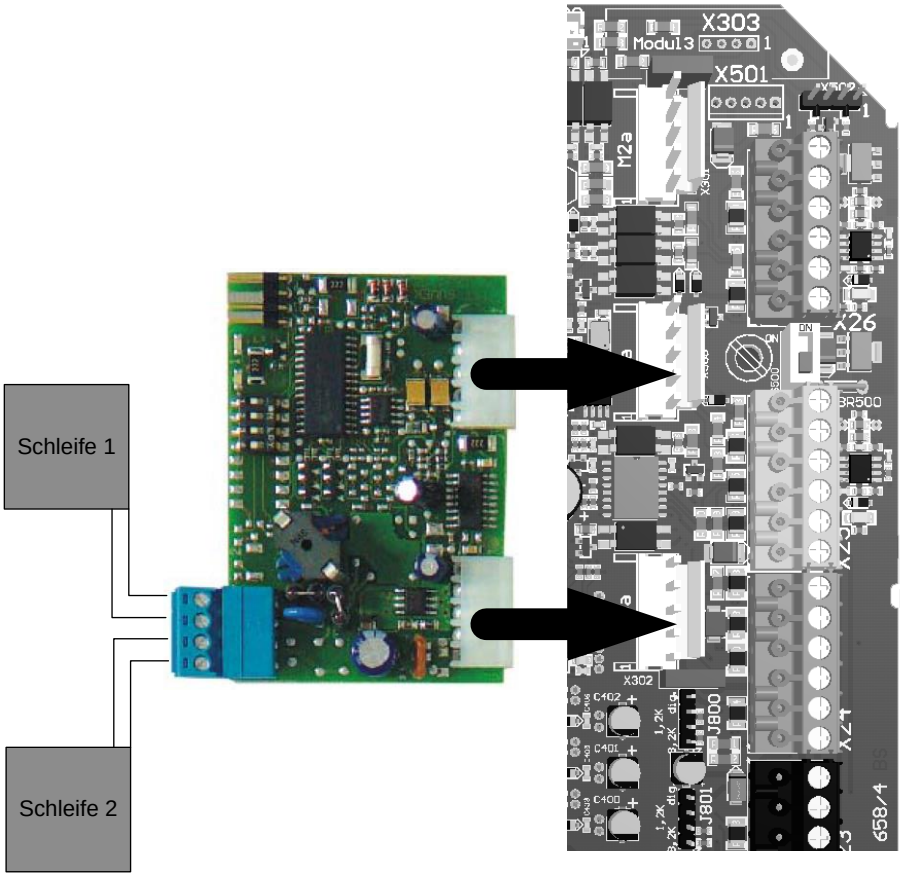


Figure 35: Detector card

To activate the slot for the detector, parameter P.802 must be set to 0302.

It is not possible to operate detector boards in controller variants -A.

7.3 Induction loop detector VEK MNST1/2/3/4

The induction loop detector VEK MNST1/2/3/4 is a system for the inductive detection of vehicles. It can evaluate up to 4 inductive loops:

Table 3: Pin assignment VEK MNST1/2/3/4

Induction loop detector	VEK MNST1	VEK MNST2	VEK MNST3	VEK MNST4
Loop/channel	1	2	3	4
Connection X3/Pin	1.1-1.2	2.1-2.2	-	-
Connection X4/Pin	-	-	3.1-3.2	4.1-4.2

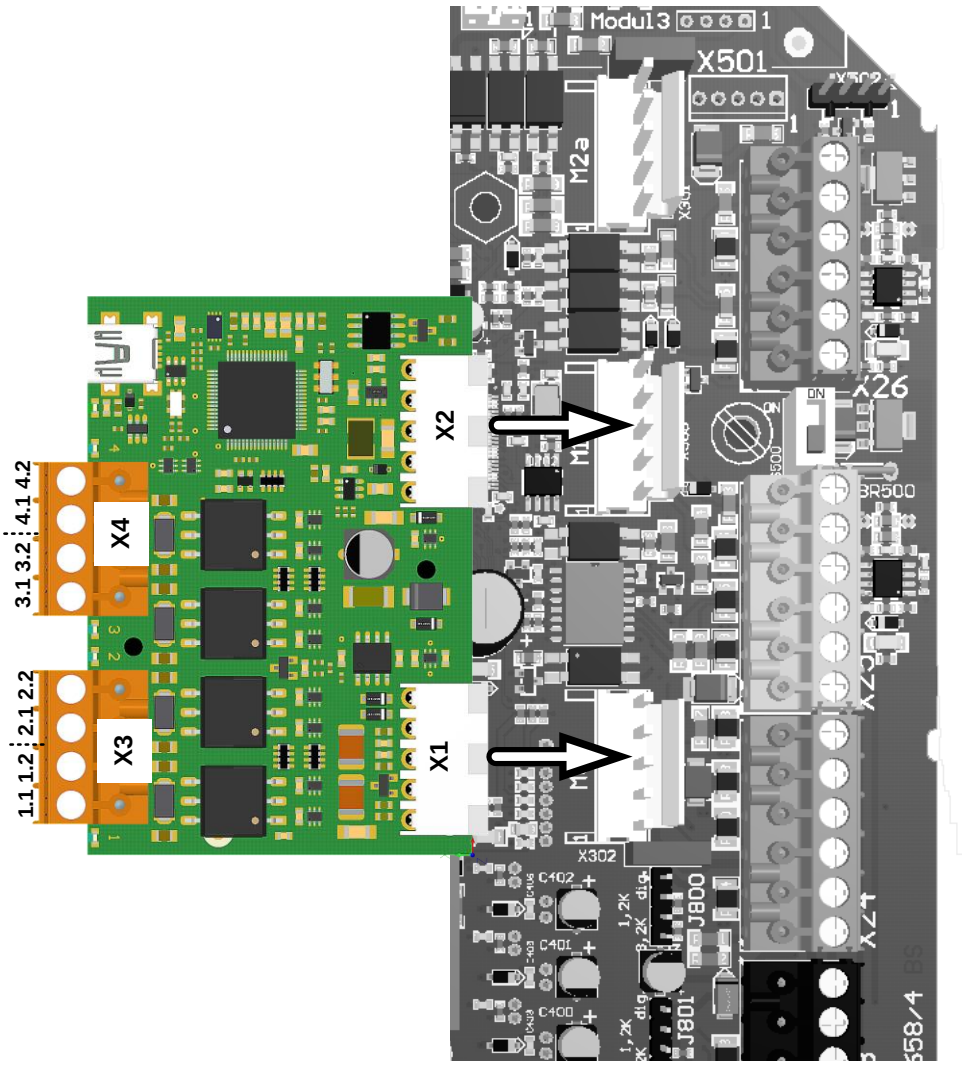


Figure 36: Sample connection to VEK MNST4

To activate the slot for the induction loop detector, parameter P.802 must be set to 0400.

It is not possible to operate detector boards in controller variants -A.

7.4 Safety edge monitor TST SURA

The safety edge monitor is available in the variants TST SURA-1 and TST SURA-6.
Depending on the type, 1 or 6 safety edge may be monitored.

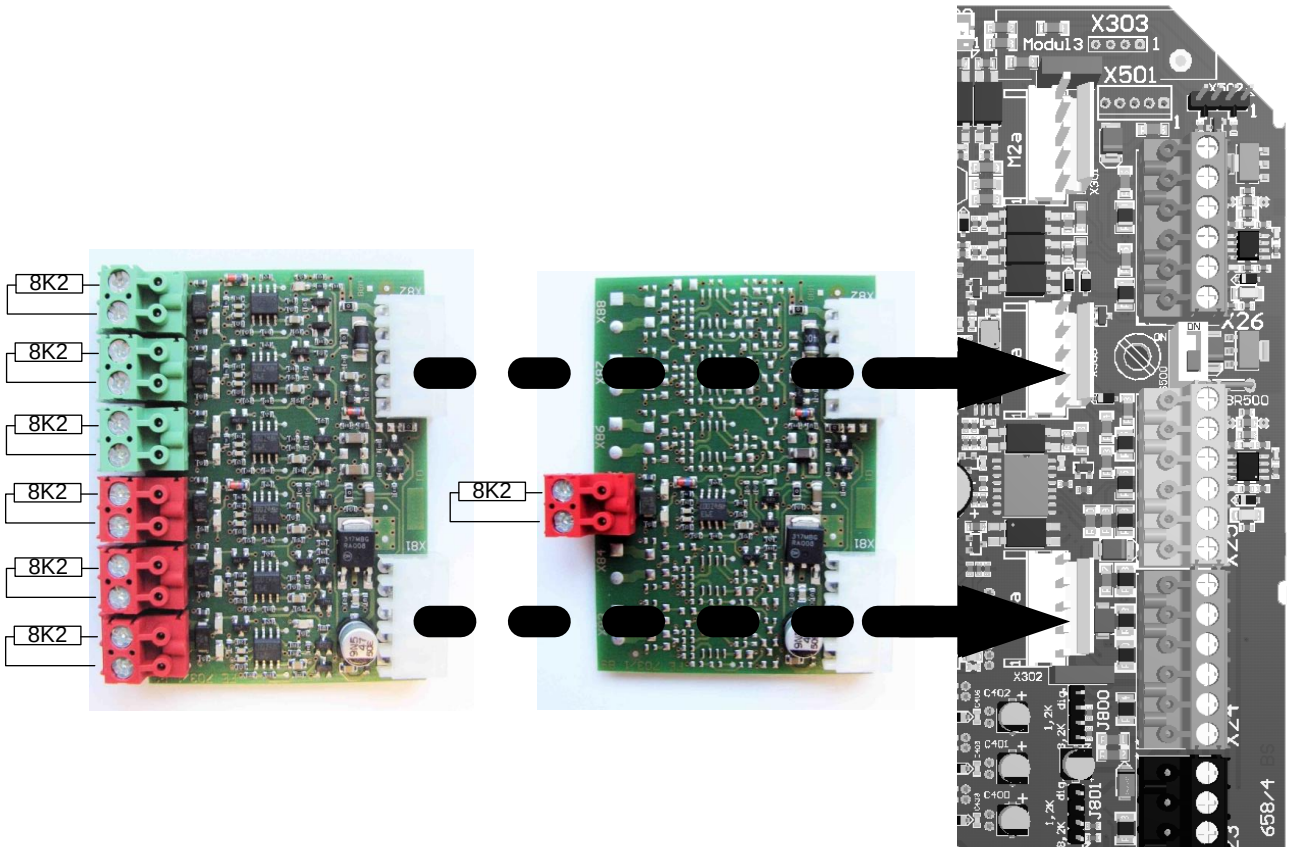


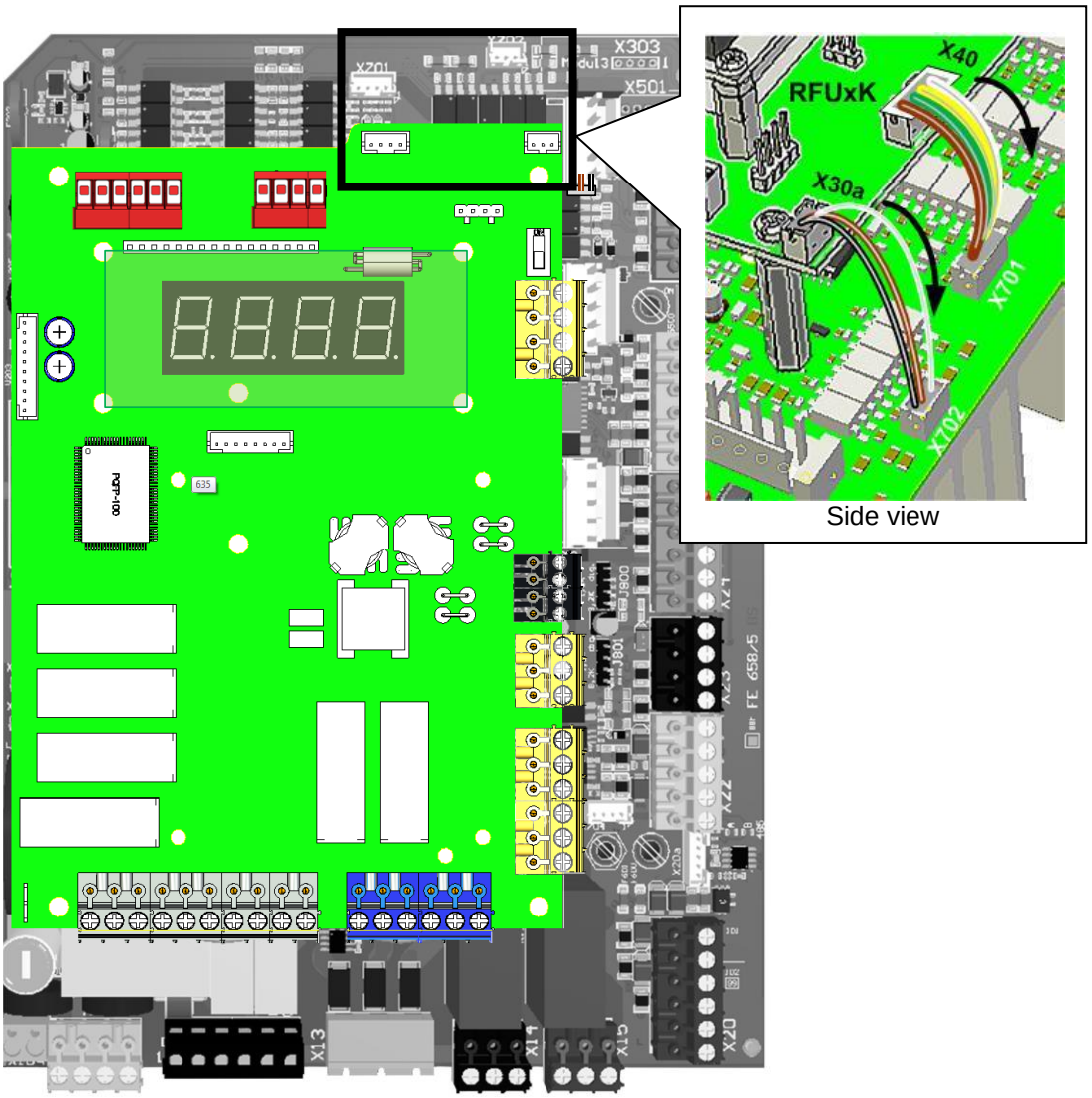
Figure 37: Safety edge monitor

To activate the slot for the safety edge monitor, parameter P.802 must be set to 0101 for TST SURA-1 or 0106 for TST SURA-6.

It is not possible to operate safety edge monitors in controller variants -A.

7.5 Expansion card RFUxK

Expansion board TST RFUxK can optionally be plugged in and has additional 6 inputs and 6 relay outputs and one digital output, with freely programmable operation. In addition, a 2-channel inductive loop detector and an annual timer switch as well as an additional RS-485 interface are included, e.g. for connection to a partner controller



Figur 38: TST RFUxK expansion card

Activate the expansion board by setting the parameter P.800 to 5.

The card can only be operated in controller variants -B, -CGH, -CXGH and -LGH.

7.6 Interface card TST RFUxFCOM

Optionally, the interface card TST RFUxFCOM provides an RS-485 and a CAN interface.
This allows connections to partner controller or to an external TST RFUxK board, for example.

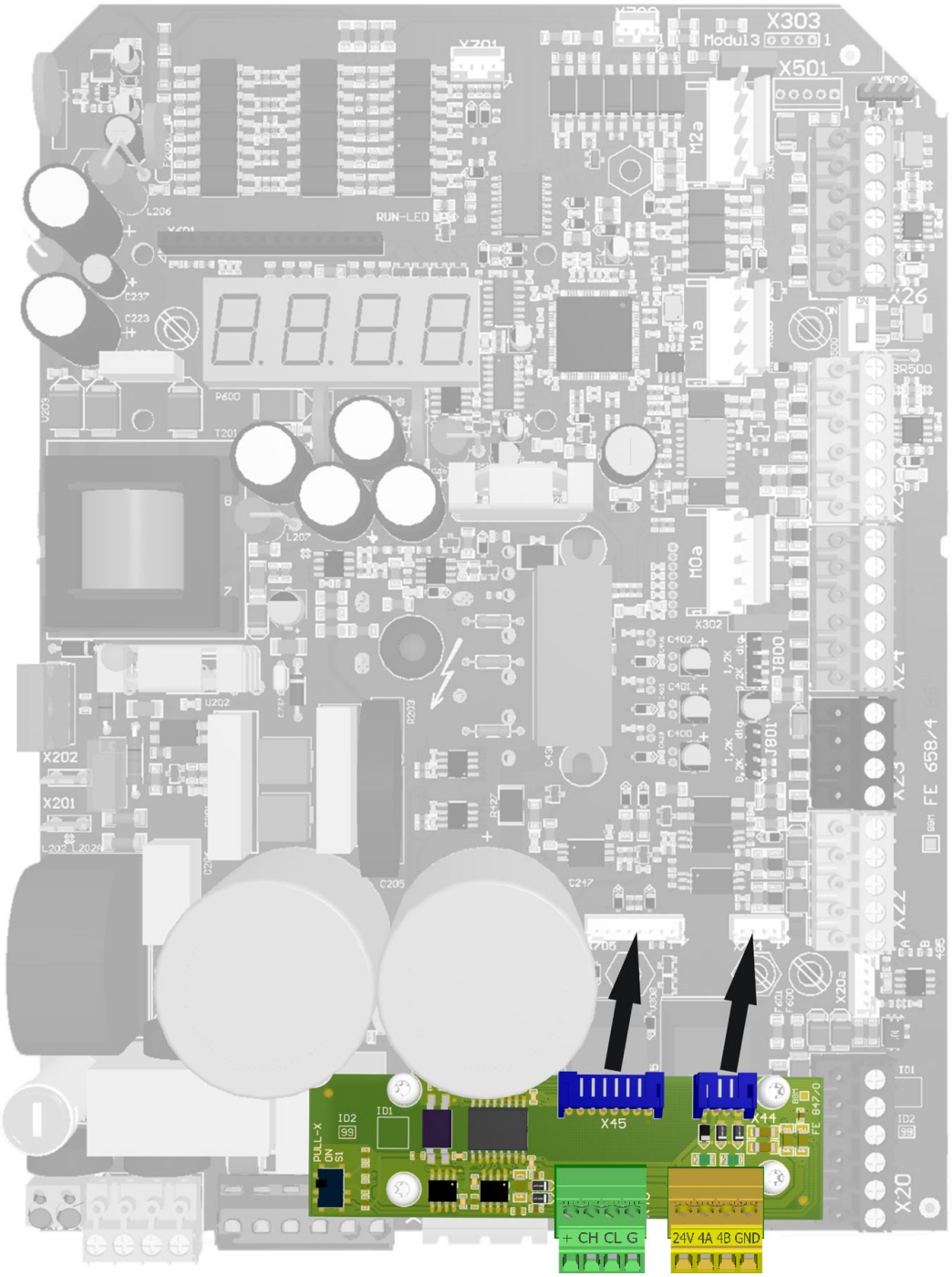


Figure 39: Interface card TST RFUxFCOM

It is not possible to operate the interface card in controller variants -A.

7.7 Auxiliary relay TST SRA

Auxiliary relay TST SRA can optionally be attached to the base M2a of the slot for the wireless module, providing a potential-free changeover contact. The function of the associated output 2A may be adjusted by the parameter P.D0A.

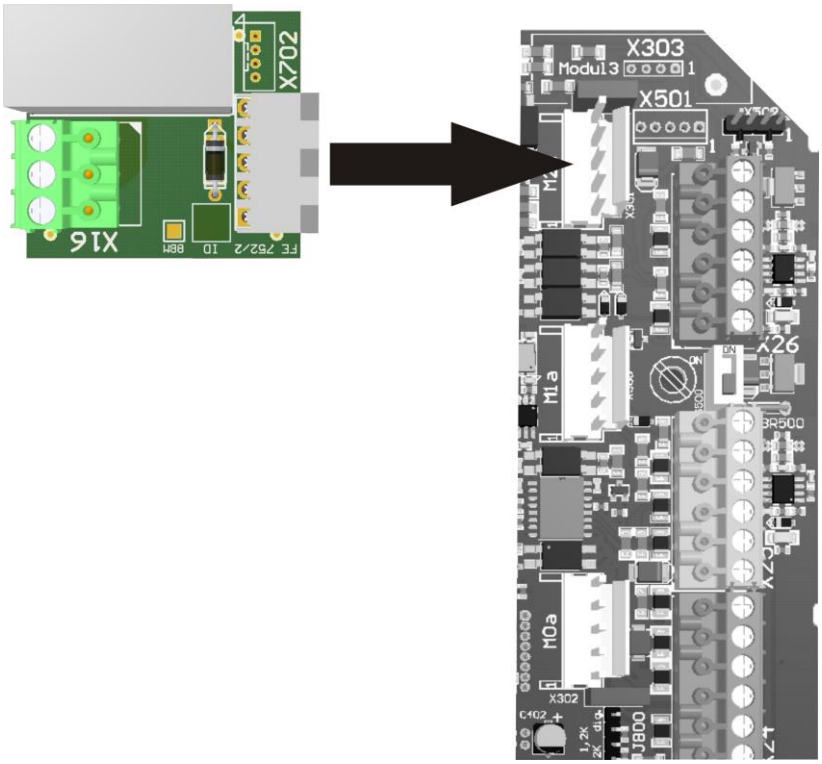


Figure 40: Auxiliary relay TST SRA

It is not possible to operate the additional relay TST SRA in controller variants -A.

7.8 Expansion board TST RFUxIO-B/-E

The expansion boards RFUxIO-A/-B/-E provide an extension to the input / output. They brings the following applications:

TST RFUxIO-B: for connection to superordinate electronic units such as host computer or Programmable Logic Controller (PLC).

TST RFUxIO-E: for the output of power signals (e.g. for oncoming traffic sample control).

The expansion board RFUxIO-B/-E has 6 additional inputs and up to 6 relay outputs (TST RFUxIO-E), which are freely programmable in their function.

The expansion board is fitted on spacers and are connected with the door controller (X20a) via the plug connector X30a.

Attach the clamps in an upright position only!

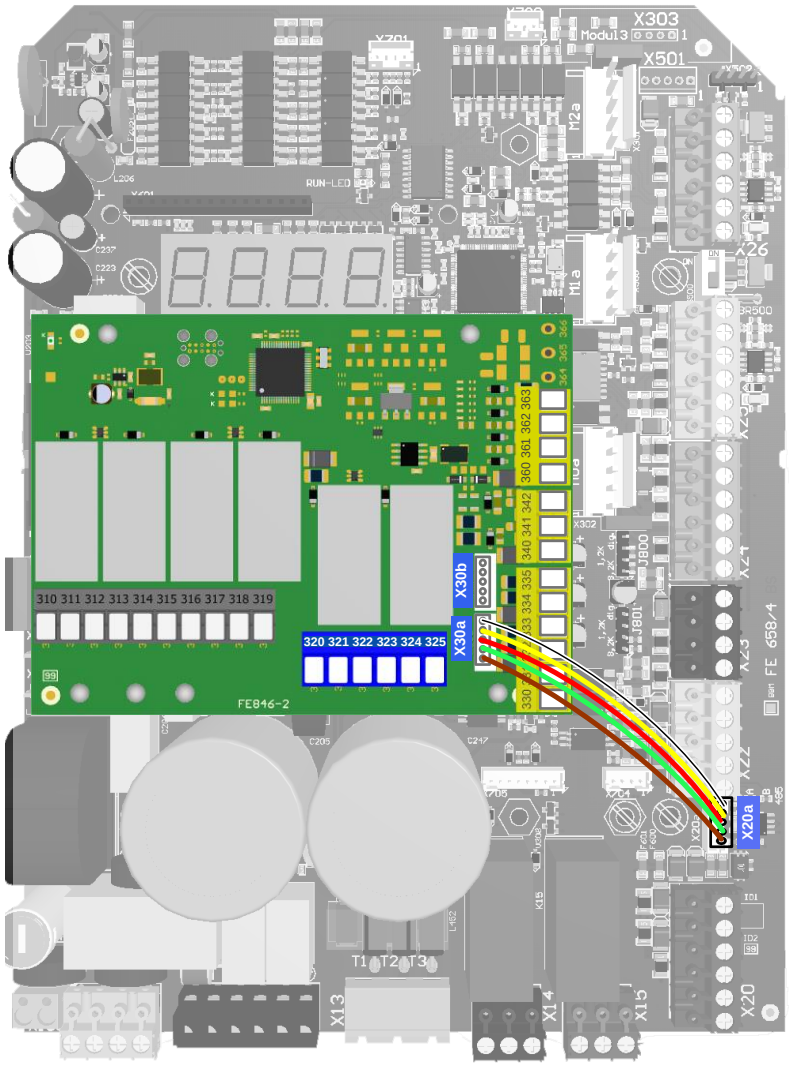


Figure 41: Connection example with the TST RFUxIO-E

Activate the expansion board by setting the parameter P.800 to 8.

7.9 LCD text display

Alternatively, controller TST FUZ2 may be expanded by a LCD text display. This provides more information at a glance. The display must not be enabled via a parameter.

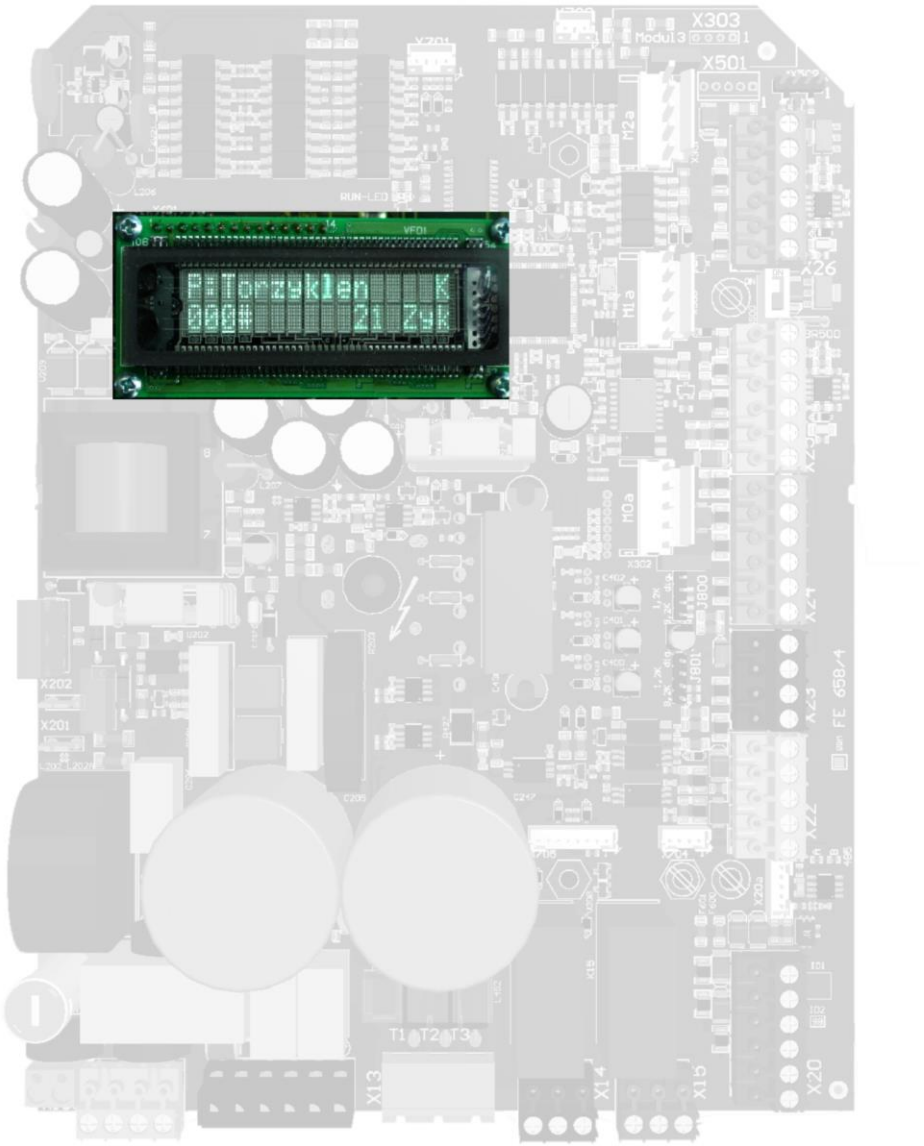


Figure 42: LCD text display

It is not possible to operate the LCD display in controller variants -A.

8 General operating instructions to set parameters

8.1 Open the parameter operation mode

1. Turn off the door controller and wait until the display has been completely extinguished.

2. Open the cover of the enclosure and switch the DIP switch S500 (see illustration) to ON. The service mode is activated and you can close the cover.

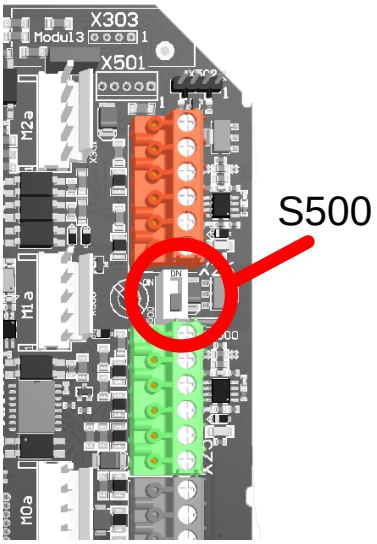


Figure 43: DIP switch position

The service mode is automatically reset after approx. 1 hour. In order to reach service mode again, the controller must be turned off for a short period and then turned on again or a reset must be performed.

3. Close the cover of the enclosure and turn on the controller.

4. Keep the keys pressed simultaneously to access the parameter selection. (either appears **1: Clear text display** or **2: 7-Segment display**)

P: Torzyklen | 000# 1234Zyk	P.000

5. Use the arrow keys to select the required parameter.

P: Offenhalt1 | 010= 10 s	P.010

ATTENTION

Not all the parameters are visible or may be changed immediately; this always depends on the password and the type of position set.

8.2 Editing a selected parameter

1. By briefly pressing the STOP key on the membrane keypad, the cursor moves to the right to the stored value (the parameter is opened) or the preset value is displayed.

P: Offenhalt1 | 010= 10 s	P.010
P: Offenhalt1 | 010= 10✓s	10

2. The parameter value is increased with the OPEN button and reduced with the CLOSE button.

If the value has not yet been saved, a question mark is displayed after the number or the decimal point flashes.

P: Offenhalt1 | 010= 9?s	9∗

3. If the STOP key is only pressed briefly, the set value is not saved and the value is changed to the originally stored value, i.e. the original value is displayed.

P: Offenhalt1 | 010= 10✓s	10

If you keep the STOP key pressed until the check mark is displayed or the decimal point no longer flashes, the changed value is saved.

P: Offenhalt1 | 010= 9✓s	9

4. If you now press the STOP key briefly, you change to the display of the parameter name or the cursor jumps back to the parametrization.

P: Offenhalt1 | 010= 9 s	P.010

8.3 Exit parameter operation mode

Keep the STOP button pressed for approx. 3 seconds in order to leave the parameter mode and change to the door mode. The door operation is active when the display shows for example:

FEIG ELECTRONIC xxxx Zyklen	_∗Eu_

8.4 Execute a reset

+ + press for approx. 3 seconds.

8.5 Entry into the extended parameter configuration mode

In order to reach the extended parametrization mode, a password must be entered in advance. The following parameter must be set for this:

P.999 = 2 (extended start up mode)

P: Passwort | 999= 0001 #	P.999
P: Passwort | 999= 0001✓#	0001
P: Passwort | 999= 0002?#	0∗0∗0∗2∗
P: Passwort | 999= 0002✓#	P.999

9 Basic settings

To put the controller into operation, please follow the steps outlined in these instructions.

9.1 Automatic query of basic data

If the controller is not already preconfigured by the door manufacturer, the following parameters are queried automatically:

The DIP switch must have been turned on (see position DIP-switch figure Figure 43: DIP switch position) so that the controller can query parameters automatically.

If DIP switch is not turned on and the basic parameters not set, error code F.090 is displayed.

The controller uses indicator "-1" or "-" in the display as a flag that the acquisition of this parameter must be queried.

The basic data does not require changes when they were previously retrieved and set automatically.

For help on operating the control, see Chapter 8 General operating instructions to set parameters.

- **Positioning system P.205**
  The limit switch system in use must be set using Parameter P.205.

  P.205: 0000 = Mechanical limit switches Version 1 (Figure 28:: Connecting cam switches)
  P.205: 0001 = Mechanical limit switches Version 2 (limit switches and pre-limit switches are normally closed contacts)
  P.205: 0300 = Absolute encoder DES-A (GfA)
  P.205: 0700 = Absolute encoder DES-B (Kostal)
  P.205: 0800 = Absolute encoder TST PD / TST PE (FEIG)
  P.205: 0900 = Timer limit switches

- **Motor data P.100 – P.103**
  The door controller uses the following parameter setting to learn about the type of motor being used. Read the data from the nameplate and enter them into the corresponding parameters.

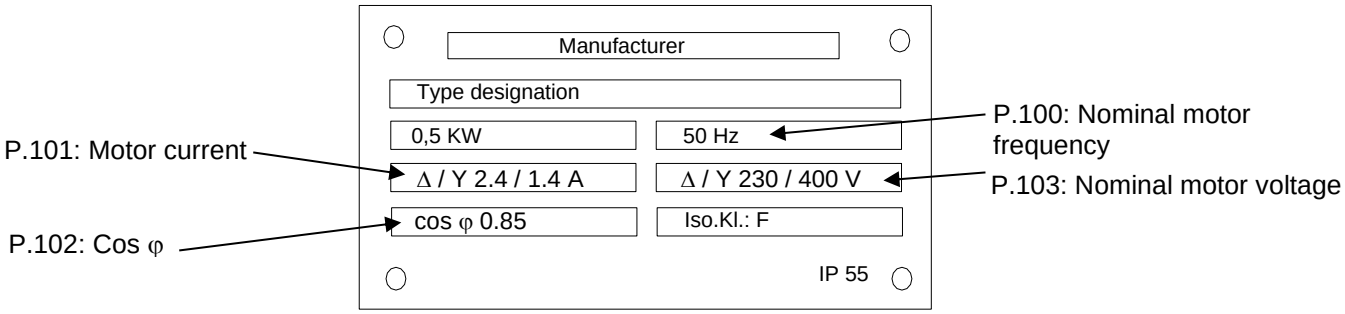


Figure 44: Typical motor nameplate (may vary)

Be sure to note the Y/Δ wiring of the motor. The motor data must be entered in accordance with the motor wiring. 400 V setting is not applicable, since the controller can source a maximum motor voltage of 230 V.

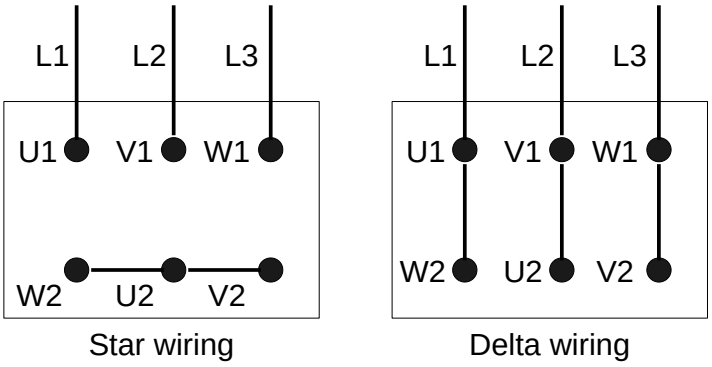


Figure 45: Star/Delta wiring

The automatic query of basic data can be interrupted by pressing the △ OPEN button when the controller is being turned ON. This causes a direct jump to the parameter configuration mode.

10 Commissioning

⚠WARNING

Before starting the controller, check the electrical connections and the correct installation of the plug-in cards. After commissioning, the operation of all the safety devices must be checked.

The settings are performed in dead man mode, i.e. press and hold the corresponding arrow key in the corresponding direction until the desired position is reached.

10.1 … with absolute encoder or incremental encoder

1. Open CALIBRATE mode by briefly pressing the □ STOP key.

!Eichen! 0 Start mit ⊖	"CALI:

2. Approach door position CLOSED with the ▽ CLOSE key and save by pressing the □ STOP key for approx. 3 seconds.

Zur Zupos. → ▲▽ 0 Übern. mit ⊖	E∗i∗E∗u∗

If the door moves in the incorrect direction: incorrect motor rotary field! Switch off the controller and swap the 2 motor connections. If the door does not move, the motor lacks power. With the aid of the boost (performance increase at low speeds) the motor can be supplied with an increase in power (refer to chapter 10.5). Check the brake release.

Zur Zupos. → ▲▽ 0 Übern. mit ⊖	E∗i∗E∗u∗

3. Move the door to the OPEN position by pressing the △ OPEN key and press the □ STOP key for approx. 3 seconds.

Zur Aufpos. → ▲▽ xxx Übern. mit ⊖	E∗i∗E∗o∗

If the door does not move, the motor lacks power. With the aid of the boost (performance increase at low speeds) the motor can be supplied with an increase in power. (see Chapter 10.5), if necessary, check that the brake was released.

The pre-limit switches and ramps are automatically adjusted by the subsequent travel of the door in automatic mode.

Aufpos. OK	~∗Eo~

4. Press ▽ briefly, the door moves down and is now taught in its position.

Tor schließt I.555 Lernfahrt	I.555
Zupos. OK	_∗Eu_

5. Now press △, repeat the process until the correction travel has been completed. (Message I.510 = OK).

Tor öffnet I.515 Korr. Fahrt	I.515
I.510 Korrek. OK	I.510
Tor öffnet	@AUF
Tor schließt	2∗UF@

10.2 … with mechanical limit switches

1. Press the ▽ CLOSE key to move the door to a distance of approx. 50 cm from the closed position.

If the door does not move, the motor lacks power. With the aid of the boost (performance increase at low speeds) the motor can be supplied with an increase in power. (see Chapter 10.5), if necessary, check that the brake was released.

The distance depends to a large extent on the door type and the speed; increase this value for fast moving doors.
If the door moves in the incorrect direction: incorrect motor rotary field, turn off controller and reverse the 2 motor connections.

2. Adjust the lower pre-limit switch so that it just trips.

3. Press the ▽ CLOSE key to move the door to a distance of approx. 10 cm from the closed position.

The distance depends to a large extent on the door type and the speed; increase this value for fast moving doors.

4. Adjust the lower pre-limit switch so that it just trips.

Do not travel past the limit switch at the limit positions!

5. Press △ OPEN key to move the door to approx. 50 cm from the opened position.

If the door does not move, the motor lacks power. With the aid of the boost (performance increase at low speeds) the motor can be supplied with an increase in power. (see Chapter 10.5), if necessary, check that the brake was released.

The distance depends to a large extent on the door type and the speed; increase this value for fast moving doors.

6. Adjust the upper pre-limit switch so that it just trips.

7. Press △ OPEN key to move the door to approx. 10 cm from the opened position.

The distance depends to a large extent on the door type and the speed; increase this value for fast moving doors.

8. Set upper limit switch so that it just trips.

Do not travel past the limit switch at the limit positions!

9. If required by the door type: adjust upper and lower EMERGENCY limit switches. *Connect the NC contacts, e.g. the safety circuit, in series with thermo pill.*

10. By pressing the □ STOP key and △ OPEN key to enter parametrization mode and select Parameter P.980 "Service Mode", open and set parameter value "2" to "0" (Automatic mode)..
11. Correct limit switch positions for door OPEN and door CLOSE as needed by fine adjustment of the limit positions in automatic mode.

⚠WARNING
To prevent unintentional movement of the door, only adjust the limit switches when the emergency stop is activated or the controller is switched off!

12. The door may now be operated in automatic mode.

10.3 … with light curtain TST LGB

Activating the TST LGB application

The application automatically sets several of the necessary function dependent parameters.

1. **Set application parameter A.480** to "1".
2. **Automatic range query:** Set the real light curtain distance per parameter P.44A in steps of 0.5 m.

   ⚠ **The range must be adjusted according to the door width.**

   ⚠ **Open the door completely!**
   If the light curtain is covered, the adjacent error message will appear and the teach-in of all end positions must be restarted.

Zur Aufpos. → Hindernis T75	E∗1∗0∗5∗

3. Start the synchronisation by briefly pressing the □ STOP-key.

! Synchron. ! I615 LL angef.	I∗615 SYNC:

4. Open the door completely by pressing the △ OPEN-key.

Zur Aufpos. → I615 LL angef.	SYE∗o∗

   ⚠ **If the door moves in the wrong direction: wrong motor rotary field, change parameter P.130 from 1 to 0 (change direction of rotation). If the door does not move, the motor lacks power. With the aid of the boost (performance increase at low speeds) the motor can be supplied with an increase in power. (see Chapter 10.5) if necessary, check that the brake is released.**

Zur Aufpos. → Folie STOP ⬬	E∗05o∗ SYNC:

5. Pressing the □ STOP-key for approx. 3 seconds to save the OPEN position.

Zur Aufpos. → 0 Übernahme mit ⬬	S∗Y∗E∗o∗

6. Press □ STOP-key.

Zur Aufpos. → Folie STOP ⬬	S∗Y∗E∗o∗ E∗050
Zur Aufpos. OK 0	S∗Y∗E∗o∗
LGx Qual. Test	S∗Y∗E∗o∗
! Synchron. ! 0 Start mit ▽	S∗Y∗E∗u∗

   Light line alignment is being requested.

7. Start automatic teach-in of ▽ CLOSE-position by pressing the CLOSE-key.

   Automatic teach-in of the CLOSE position.
   Door closes.

   ⚠ **The detection zone of the light curtain must remain free otherwise the correction drive will be terminated and the synchronisation of the light curtain starts from the beginning.**

Suche Si-Leiste xxx Auto zu	S∗Y∗c∗L∗

The display shows the messages in alternation: The door was recognized in the CLOSE position and the light rays were taught-in correctly.

!Korrekturfahrt! xxx Start mit △	I.515
!Korrekturfahrt! I615 LL Abgl. ok	I.610

The subsequent OPENING and CLOSING of the door in automatic mode adjusts the pre-limit switches and limit switch tapes are taught-in automatically.

8. Start correction drive by pressing the △ OPEN-key.

!Korrekturfahrt! xxx Start mit △	I.515
Tor öffnet I.555 Lernfahrt	I.555
Offenh = xxs I.515 Korr. Fahrt	I.515

Door opens and is taught-in into the position.

Display in end position OPEN.

The door will close automatically after the auto close time has count down and moves up and down by itself until the correction drive has finished.
The Display shows the following messages:

Tor schließt I.515 Korr. Fahrt	I.515
Offenhalt = xxs I.515 Korrekt. Fahrt	I.515
Offenh 1 = xxs I.510 Korrek. OK	T.5
Offenh 1 = xxs Automatik	T.5
Tor öffnet	I.515 `AUF`
Offenh 1 = xxs	T10
Tor schließt	2∗UF`
FEIG ELECTRONIC xxxx Zyklen	_EU_

Display that correction was completed.

The door closes and remains in the end position CLOSE.

The start up of the light curtain has been successfully completed.

Usually the lower end position CLOSED has to be corrected afterwards. This can be defined using the following parameters:

P.221: Correction value end position door CLOSE -> this parameter must be reset after every new teach-in of all end positions (P.210=5).

P.275: Correction of increments after conclusion of the synchronization -> recommended as fine setting for the end position BELOW. The value set here must NOT be re-set after the new teach-in of all end positions.

10.4 New request for teach-in of the end positions

If the limit positions have been pre-taught when using electronic limit switches, but these are not suitable for the respective door, the learning process for limit positions can be requested again

The following parameter must be set for this:

- P.210: 5 = Reteaching of all limit positions

10.5 Boost / increase in performance for low speeds

Boost is used to increase the power of the drives at low speed. Too much or too little boost can result in improper door operation. The boost adjustment range is 0-30%. If the boost is set too high, it will lead to an overcurrent error (F.510/F.410). In this case the boost must be reduced.
If the boost is low or 0 and the motor still does not have sufficient force to move the door, the boost must be increased.
Due to the large number of door types, the correct setting for boost must be determined empirically.

1. Open parametrization mode by pressing the □ STOP and △ OPEN keys simultaneously.
2. Open Boost parameter by pressing the △ ▽ arrow keys. Boost can be set separately for OPEN and CLOSE.

   - Boost for opening: P.140
   - Boost for closing: P.145

3. Open the parameter by momentarily pressing □ STOP and use the △ ▽ arrow keys to change it in small steps of max. 5, then save by pressing □ STOP (longer).
4. After changing the boost, exit parametrization mode by pressing the □ STOP button for a long time and test the setting in run mode.

You can use diagnostic parameter P.910 = 2 to display the actual motor current. The boost should be set so that the motor current remains as low as possible.

11 Movement optimisation for the door

Adjusting the pre-limit switch positions and the ramps can optimize or improve the movement of the door.
The following illustrations for OPEN and CLOSE moves show the operation of the frequency converter.

11.1 Opening of the door

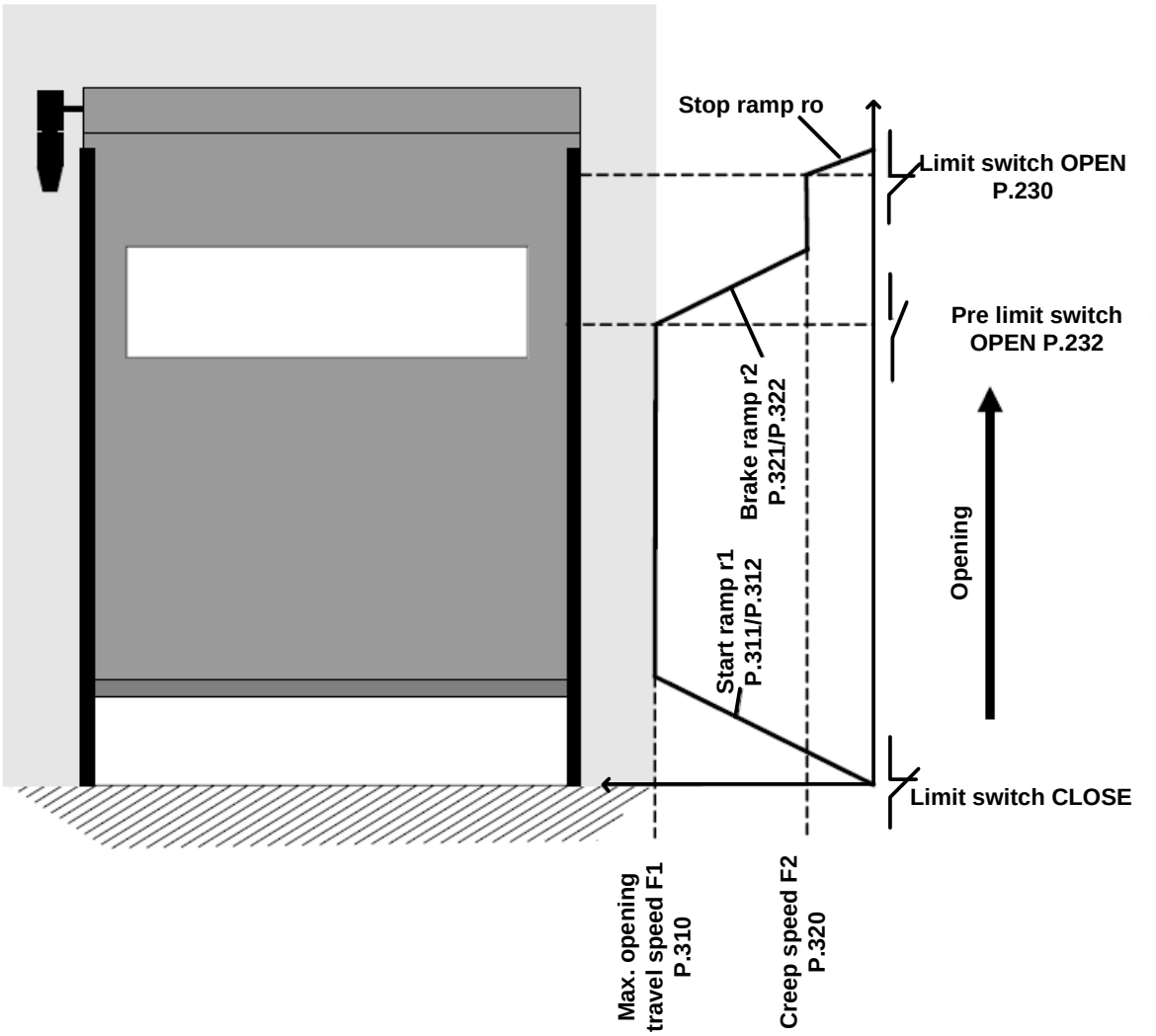


Figure 46: Opening using frequency converter

The frequency converter starts the door movement with start ramp "r1". It accelerates from 0 Hz to the max. travel speed.
The door is moved at the max. travel speed until the pre-limit switch for the limit position OPEN is reached.
At this point it reduces the speed of the door to creep speed using ramp "r2". The door now moves at creep speed until the limit switch OPEN is reached.
At this point the door is stopped (ro).

11.2 Closing of the door

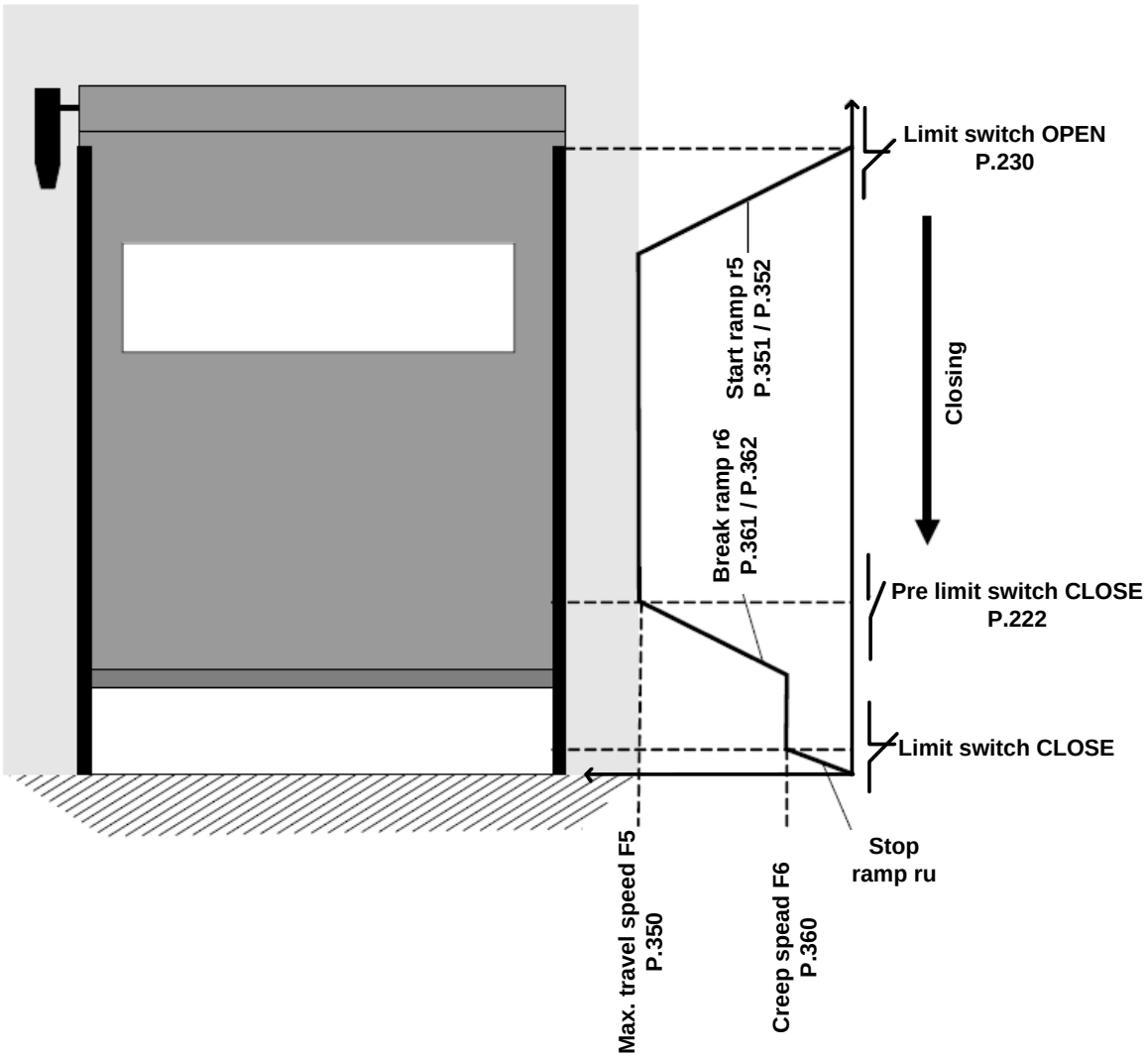


Figure 47: Closing using the frequency converter

The frequency converter starts door movement with start ramp "r5". It accelerates from 0 Hz to the max. travel speed.
The door is moved at the max. travel speed until the pre-limit switch for limit position CLOSE is reached. At this point it reduces the speed of the door to creep speed using ramp "r6". The door now moves at creep speed until the limit switch CLOSE is reached.
At this point the door is stopped (ru).

11.3 Pre-limit switch setting

Setting the pre-limit switch can prevent premature or late braking of the door from max. travel speed to creep speed.
The position of the pre-limit switch is given in increments. The number of increments refers to the distance between the limit switch and the pre-limit switch.

Creep too long -> reduce pre-limit switch
Creep too short -> increase pre-limit switch

P.222 = Pre-limit switch for limit position Door CLOSE The parameter value specifies the distance to the absolute limit switch Door CLOSE in increments. The brake ramp "r6" is initiated with the pre-limit switch. The slope of the ramp is set with parameter P.361 or P.362.

P.232 = Pre-limit switch for limit position Door OPEN: The parameter value specifies the distance to the absolute limit switch Door OPEN in increments. The pre-limit switch is used to initiate the brake ramp "r2". The slope of the ramp is set with parameter P.321 or P.322.

If the automatic setting of the pre-limit switch is used (P.216 = 2), the parameters P.222 and P.232 are changed automatically.
The parameters are also changed if the travel speed or the slope of a ramp is changed as this results in a restart of the automatic limit switch correction. If these ramps are adjusted manually, P.216 must be set to less than 2!

11.4 Ramp configuration

The ramps are used by the door controller to change speed, i.e. to accelerate or decelerate.
The ramps are set in milliseconds (ms) or in Hz per second (speed change per second), i.e. the steeper the ramp, the higher the braking force or acceleration applied to the door. If the ramp is flatter the door is braked or accelerated more gently.

P.311 / P.312 = start ramp „r1“: acceleration of the door from 0 Hz to opening speed.
P.321 / P.322 = brake ramp „r2“: deceleration of the door from opening speed to creep speed

P.351 / P.352 = start ramp „r5“: acceleration of the door from 0 Hz to opening speed.
P.361 / P.362 = break ramp „r2“: deceleration of the door from closing speed to creep speed

P.340 / P.342 = Ramp "r-STOP" for opening: deceleration of the door from opening speed to 0 Hz after pressing a STOP key.
P.380 / P.382 = Ramp "r-STOP" for closing: deceleration of the door from closing speed to 0Hz after pressing a STOP key.

11.5 Correction of the final positions

Parameters P.221 and P.231 can be used to shift the limit positions together with the pre-limit switches. Changing these parameters in the positive direction results in the limit position being shifted upward. Changing in the negative direction causes a shift towards the bottom.

12 Functions

You will find an overview of Parameters of this assembly instruction and there description in the added document "Parameter list TST FUZ2"

13 Messages

13.1 Error messages

Faults can be acknowledged provided they are not reset automatically.

ATTENTION

The cause of the fault must be resolved first before the corresponding message is acknowledged.

Alternatively the the STOP button can also be kept pressed for approx. 5 seconds.

No.	Description	Possible reason for error
F.000	Door position too far up	• Too small a parameter value for upper emergency limit switch → increase P.239 • Upper limit switch range (limit switch band) too small → increase P.233 • Mechanical brake defective or improperly set
F.005	Outside door position too far down	• Too small a parameter value for lower emergency limit switch → increase P. 229 • Lower limit switch range (limit switch band) too small → increase P. 223 • Mechanical brake defective or improperly set
F.010	Foilkeypad short circuit	Foilkey Open or CLOSE has a short circuit
F.020	Run time exceeded (during opening, closing or deadman)	• Current motor run time has exceeded set maximum run time (P.410 (Opening), P.415 (Closing), P.419 (Deadman move)), door may be sticking or is blocked. • Door is blocked • If using mechanical limit switches, one may not have tripped
F.021	Emergency opening wrong testing	• The max. allowed run time (P.490) during testing has exceeded • Call service hotline
F.030	Lag error (position change of the door is less than expected)	• door or motor is blocked • insufficient power for providing necessary torque • too little speed • mechanical limit switch was not left or is defective • Incremental or absolute encoder shaft is slipping • wrong positioning system selected (P.205) • one motor phase is missing • the brake does not release • Settings of the failure detecting time are not correct (P.430 or P.450)
F.031	Detected rotational direction deviates from expected	• When using incremental encoders: Channel A and B reversed • Motor rotation direction reversed compared with calibration setting → teach-in the limit positions (P.210 = 5) • Too much " slackening " when starting, brake releases too early or too little torque, possibly adjust boost (P.140 or P.145).

No.	Description	Possible reason for error
F.033	Bad position transmitter protocol	• Fault on the position transmitter • No position data available over an extended period
F.043	Pre-limit switch fault (light barrier)	• The pre-limit switch for the light barrier remains activated even in the middle end position or upper end position.
F.060	Breakaway recognized	• Breakaway was detected but not fixed • The automatic lead in after breakaway has failed
F.063	Balance error on loop 3	• Disturbed environment • Loop outside the tolerance range
F.064	Balance error on loop 4	• Disturbed environment • Loop outside the tolerance range
F.067	Error on loop 3	• Shortcut or intermitted loop connection wirering
F.068	Error on loop 4	• Shortcut or intermitted loop connection wirering
F.080	Maintenance is required	• Service counter has expired
F.090	Controller not parameterized	• The min. necessary basic parameters for the controller have not yet been set → Activate DIP-switch and put in the asked parameters.
F.101	Message from sensor-actor-interface: An unknown or incompatible device was detected on the CAN or RS485 bus. The controller is not able to identify it and assign it to a device class (detector, light curtain, etc.).	• The serial number of the connected device is not known --> Replace device. • The software version or protocol version is incompatible --> Update the control software.
F.102	Faulty CAN bus due to faulty telegrams.	• Poor CAN wiring • Missing ferrites on the motor cable • Missing terminating resistors for CAN bus termination • CAN lines too long (180m) • Faults on the CAN line when the door operator is moving
F.103	CAN BUS is faulty. The error acknowledges itself automatically if the CAN BUS is not faulty.	•Short circuit of The CAN Low and CAN High lines •A device on The CAN bus interferes with The bus due to faulty telegrams. •non terminated CAN bus
F.104	The maximum number of permitted devices (16) on the CAN bus has been exceeded.	There are too many devices on the CAN bus

No.	Description	Possible reason for error
F.105	A CAN bus or RS485 bus participant is in bootloader mode when the controller is switched on	•Power failure during the update •After a failed update, a controller reset is performed.
F.106	The parameterization of sensors regarding the mounting position or the operating mode is implausible The parameterization of sensors regarding the mounting position or the operating mode is implausible	• At least more than 1 light curtain in the encoder mode. • One light curtain as comfort light curtain, but no light curtain in encoder or autark mode
F.108	Protocol version of a sensor/actuator is higher than the highest known version of the door controller.	Software version of the door control system is too old for the sensor/actuator used
F.109	There is a new safety device connected to the CAN bus that could not be assigned to an SAI slot.	Another light curtain was connected to the CAN bus, but there is no free SAI slot available. Or the SAI slot was preset incorrectly. Remedy: Set corresponding application profile A.480.
F.10A	A sensor/actuator component was not detected or is not present	It was detected that only one component of a sensor/actuator is present on the CAN bus (e.g. for a light curtain only the transmitter) Remedy: - Connect missing component to the CAN bus - Check CAN cabling to see if there is a broken wire.
F.110	Defective hardware VEK MNST	The VEK MNST detector is defective and must be replaced.
F.111	Disturbed detector VEK MNST	The VEK MNST detector is faulty. The system must be restarted.
F.112	Detector VEK MNST not plugged in	The VEK MNST detector slot was activated with parameter P.802 or P.803 = 0400, but no detector is plugged in.
F.113	Detector VEK MNST Slot not activated	The VEK MNST detector is plugged in but the slot was not activated with parameter P.802 or P.803 = 0400.
F.114	Detector VEK MNST incompatible with control unit	The VEK MNST detector is not compatible with the controller software version used --> Update of the controller software
F.116	Pairing VEK MNST not possible	The pairing, with the customer coding from the controller for the VEK MNST failed --> Replace Detecor with not yet paired version.
F.117	The VEK MNST has restarted unexpectedly	The processor of the VEK MNST has hung up, crashed or the internal watchdog has triggered, causing the processor to perform a warm start. --> If this occurs repeatedly, the device must be replaced.

No.	Description	Possible reason for error
F.118	The VEK MNST has received an invalid customer code from the door controller.	The already paired VEK MNST has detected that its customer code does not match the one in the controller and is therefore incompatible --> use not yet paired detector.
F.120	TST LGD 1 receiver is defect	•An exchange of the receiver is necessary.
F.121	TST LGD 1 transmitter is defect	•An exchange of the transmitter is necessary.
F.122	TST LGD 1 teach in failed	•The teach in process was not completed •restart the controller •repeat the teach in process
F.123	TST LGD 1 communication internal	•TST LGD 1 not supplied with voltage •The TST LGD 1 cabling is interrupted. •TST LGD 1 no longer responds to requests from the controler •Restart TST LGD 1
F.124	TST LGD 1 transmitter and receiver have different software versions	•non compatible Software versions of LGD 1 transmitter and receiver •Update suitable software
F.125	TST LGD 1 Overvoltage or undervoltage at TST LGC transmitter or receiver	- Incorrect cabling - Power supply unit Overloaded Acknowledgement necessary
F.126	Restart TST LGD 1	•TST LGD 1 is unexpectedly restarted •error must be acknowledged •If repeated, replace TST LGD 1
F.127	TST LGD 1 Controller communication to the receiver interrupted	•TST LGD 1 Receiver not supplied with voltage •Wiring of the TST LGD 1 receiver is interrupted •TST LGD 1 receiver no longer responds to requests from the controller unit •TST LGD 1 Restart receiver
F.128	TST LGD 1 Controler communication to the transmitter interrupted	•TST LGD1 Transmitter not supplied with voltage •Wiring of the TST LGD 1 transmitter is interrupted •TST LGD 1 transmitter no longer responds to requests from the control unit •TST LGD 1 Restart transmitter
F.129	TST LGD 1 testing failed	• Fault CAN Bus • TST LGD 1 no communication
F.12A	The quality test of the LGD 1 light curtain failed.	• Optimize alignment between transmitter and receiver. • The error will reset itself if the test is successful. • To skip the error and continue teaching, press and hold the stop button.
F.12B	TST LGD 1 Customer coding receiver	TST LGD 1 receiver and control unit are not compatible

No.	Description	Possible reason for error
F.12C	TST LGD 1 Customer coding transmitter	TST LGD 1 transmitter and control unit are not compatible
F.12D	TST LGD 1 break-in / illegal door movement	The door was moved from the end position bottom without any movement command by the contol unit.
F.160	Motion detector 1 MWD BPC is defective	An exchange of the device is necessary
F.162	Motion detector 1 Communication of the control unit with the MWD BPC motion detector was interrupted.	•Check the wiring of motion detector 1. •Restart the control unit or the motion detector
F.166	Motion detector 1 MWD BPC customer coding failed	•customer coding of the MWD BPC is not compatible with the control unit. •MWD BPC may already be encoded. Replace with an unpaired device
F.168	Motion detector 1 MWD BPC wrong customer coding	•customer coding of the MWD BPC is not compatible with the control unit. •Replace MWD BPC with unpaired or correctly paired
F.16E	Motion detector 1 MWD BPC software update failed.	• If the error occurs at 0% the update file might be incompatible to the MWD BPC. • If the error occurs during the transfer of the update, perform the update again, if it occurs several times, replace the device
F.170	Motion detector 2 MWD BPC is defective	An exchange of the device is necessary
F.172	Motion detector 2 Communication of the control unit with the MWD BPC motion detector was interrupted.	•Check the wiring of motion detector 2 •Restart the control unit or the motion detector
F.176	Motion detector 2 MWD BPC customer coding failed	•customer coding of the MWD BPC is not compatible with the control unit. •MWD BPC may already be encoded. Replace with an unpaired device
F.178	Motion detector 2 MWD BPC wrong customer coding	•customer coding of the MWD BPC is not compatible with the control unit. •Replace MWD BPC with unpaired or correctly paired
F.17E	Motion detector 2 MWD BPC software update failed.	• If the error occurs at 0% the update file might be incompatible to the MWD BPC. • If the error occurs during the transfer of the update, perform the update again, if it occurs several times, replace the device
F.1B0	Defective hardware TST UTA 1	The TST UTA 1 is defective and must be replaced.
F.1B2	TST UTA 1 Communication error to the control box	TST UTA 1 is parameterised but not connected

No.	Description	Possible reason for error
F.1B3	TST UTA 1 Bluetooth communication error	The Bluetooth communication of the TST UTA 1 is disturbed
F.1B4	TST UTA 1 is incompatible with the control box	The TST UTA 1 is not compatible with used controller version --> Update the control box software
F.1B6	Pairing of the TST UTA 1 not possible	The pairing with the customer coding of the controller for the TST UTA 1 has failed --> replace UTA 1 with a not yet paired version.
F.1B8	TST UTA 1 Customer coding	TST UTA 1 and the door controller are not compatible
F.1BE	TST UTA 1 Software Update Failed	An error occurred during the update. --> Start update again.
F.201	Internal emergency Stop "mushroom button" triggered or watchdog (monitoring)	• Stop chain was interrupted starting at input „internal--Stop“ without parametrizing mode having been selected • Internal parameter or EEPROM checks defective, pressing the STOP button provides additional information about the cause.
F.211	External emergency stop 1 triggered	• Emergency stop chain was interrupted from emergency stop input 1
F.212	External emergency stop 2 triggered	• Emergency stop chain was interrupted from emergency stop input 2
F.320	Obstacle during opening	• During opening an obstacle has recognized
F.325	Obstacle during closing	• During closing an obstacle has recognized
F.360	Short circuit detected on edge input	• Short circuit detected on edges with normally closed contact • The light beam of the optical edge is interrupted • Jumper for 1K2 / 8K2 is wrong set
F.361	Number of trips of the Safety input D, normally this is the integrated safety edge evaluation, has reached set limit (configurable in P.46E)	• Parametrized, maximum number of trips of the safety input D during a door cycle was exceeded → To reset close the door in jog mode • Check the set number of reversing trips in P.46E
F.362	Redundancy error with short circuit	• One of the processing channels for short circuit detection does not react identically with the second channel → Controller board defective, if no other error message F.3xx is present • Dynamic optical system connected but not set in parameter P.460
F.363	Interruption on edge input	• Connection cable defective or not connected • Termination resistor incorrect or missing • Jumper 1K2 / 8K2 incorrectly set
F.364	Safety edge testing failed	• Safety edge was not activated as expected when requesting a test. • The time between request for testing and actual testing not in agreement • The pre-limit switch is set incorrectly
F.366	Too high a pulse frequency for optical safety edge	• Faulty optical safety edge • Defective input for internal safety edge

No.	Description	Possible reason for error
F.369	Internal safety edge incorrectly parameterized	• An internal safety edge is connected but deactivated → set P.460 to the used edge type
F.371	Number of trips of the Safety input E, normally this is the integrated safety edge evaluation, has reached set limit (configurable in P.47E)	• Parametrized, maximum number of trips of the safety input E during a door cycle was exceeded → To reset close the door in jog mode • Check the set number of reversing trips in P.47E.
F.372	Redundancy error with short circuit	• One of the processing channels for short circuit detection does not react identically with the second channel. • Controller board defective
F.373	Fault in the safety edge (message comes from module)	• Cable break to safety edge, no edge connected, edge termination resistor incorrect or defective • Jumper for termination resistor definition in wrong position. • Safety edge processing selected with Parameter P.470, but module not plugged in or wrong module.
F.374	Safety edge testing failed	• Pre-limit switch for safety edge incorrectly set or defective • Processing module defective • Safety edge defective
F.379	Safety edge detection defective (coding pin or parameter setting)	• No module plugged in but was reported as present by a parameter • The controller was started up with another module than the one currently plugged in
F.37A	Redundancy error of the 8K2 slip door switch on the internal safety edge evaluation unit channel 1	• One of the contacts of the redundant 8k2 slip door switch is defective • The slip door was not fully opened or closed
F.380	Short circuit detected on safety input	• Short circuit detected on edges with normally closed contact
F.383	Interruption on safety input	• Connection cable defective or not connected • Termination resistor incorrect or missing • Jumper incorrectly set
F.384	Safety input testing failed	• Safety edge was not activated as expected when requesting a test. • The time between request for testing and actual testing not in agreement
F.385	Fault in pre-limit switch for safety edge	• Pre-limit switch for turning off the safety edge or reversing after safety edge tripping remains tripped even in the upper end position.
F.386	Too high a pulse frequency for optical safety edge	• Faulty optical safety edge • Defective input for internal safety edge
F.389	Safety input incorrectly parametrized	• A safety edge is connected but deactivated Safety input Jumper incorrectly set (as digital input jumpered but as safety edge set)

No.	Description	Possible reason for error
F.38A	Redundancy error of the 8K2 slip door switch on the second internal safety edge evaluation unit	• One of the contacts of the redundant 8k2 slip door switch is defective • The slip door was not fully opened or closed
F.3A1	Number of trips for safety input A has reached set limit	• Parameterized, maximum number of safety input trips during a door cycle was exceeded
F.3B1	Number of trips for safety input B has reached set limit	• Parameterized, maximum number of safety input trips during a door cycle was exceeded
F.3C1	Number of trips for safety input C has reached set limit	• Parameterized, maximum number of safety input trips during a door cycle was exceeded
F.3F4	2. external safety edge - testing failed	• Pre-limit switch for safety edge incorrectly set or defective
F.400	Controller hardware reset detected	• Strong interferences on the supply voltage • Internal watchdog has triggered • RAM error
F.401	Watchdog Error	• Internal Watchdog has released
F.409	RFUxK software incompatible	Only the expansion board RFUxK-F with the software version from V1. 11 can be operated in parallel with other expansion boards on a CAN-bus.
F.40A	Software Exception	• Internal error detected
F.40B	Communication error expansion board	• The communication between main board and expansion board is disturbed
F.40C	Unknown extension board (CAN connection)	• Incorrect hardware coding of the extension board • Control software does not support the expansion card • Expansion card defective
F.410	Over-current (motor current or DC-bus)	• Wrong motor data set (P.100 – P.103) • Non-adjusted voltage increase / boost set (P.140 or P.145) • Motor not properly dimensioned for door • Door sticks
F.420	Overvoltage in DC-bus Limit 1	• Brake chopper disturbed / defective / missing • Mains voltage considerably too high • Motor feeds back too much energy in generator mode. Not enough kinetic energy can be generated for the door.
F.425	Overvoltage line supply	• The supply voltage for the controller is to high
F.426	Undervoltage line supply	• The supply voltage for the controller is to low
F.430	Temperature heat sink outside of working range Limit 1	• Too high load on the power amplifiers or the brake chopper • Surrounding temperature too low for operation of the controller • Clock frequency of the power amplifier too high (Parameter P.160)
F.435	Housing temperature high	• The temperature inside the controller housing is to high

No.	Description	Possible reason for error
F.440	Overcurrent in DC-bus Limit 1	• Boost not adjusted • Motor incorrectly dimensioned for door • Door sticks
F.510	Motor / DC-bus overcurrent Limit 2	• Wrong motor data set (P.100 – P.103) • Non-adjusted voltage increase / boost set (P.140 or P.145) • Motor not properly dimensioned for door • Door sticks
F.511	No DC supply	• The DC voltage can not given to the motor (overcurrent error, IGBT error F.519, 24 V error or over temperature) • The emergency stop is activated
F.512	Offset motor current / link current incorrect	• Hardware faulty
F.515	Motor protection function detected overcurrent	• Incorrect motor curve (motor rated current) set (P.101) • Too much boost (P.140 or P.145) • Motor incorrectly dimensioned
F.519	IGBT driver chip detected overcurrent	• Short circuit or ground fault on motor terminals • Extremely incorrect rated nominal motor frequency set (P.100) • Extremely high voltage / too much boost (P.140 or P.145) • Motor incorrectly dimensioned • Motor winding defective • Brief interruption of the emergency stop circuit.
F.520	Overvoltage in DC-bus Limit 2	• Brake chopper interference / defective / missing • Incoming mains voltage much to high • Motor is generating excessive voltage - brake chopper cannot dissipate the re-generated energy
F.521	Low voltage in DC-bus	• Input voltage supply too low, usually at load • Load too great / final stage or brake chopper fault
F.524	ext. 24 V supply missing or too low	• Overload but no short circuit • When 24V is shorted the controller voltage does not ramp up and glow lamp V306 comes on.
F.525	Overvoltage at the incoming mains supply	• The incoming mains supply for the Controller is to high • The incoming mains supply fluctuates very extremly
F.530	Heatsink temperature outside of working range Limit 2	• Too high load on the power amplifiers or the brake chopper • Clock frequency of the power amplifier too high (Parameter P.160) • Surrounding temperature too low for operation of the controller
F.535	Housing temperature high	• The temperature inside the controller housing is to high
F.540	Overcurrent in DC-bus Limit 2	• Boost not adjusted • Motor incorrectly dimensioned for door • Door sticks
F.601	Bad light curtain reception quality	Reception quality is too bad during start up of the light curtain

No.	Description	Possible reason for error
F.610	LGB Light line alignment	Light line alignment has not been done
F.611	Light curtain light line position values not plausible	Position values stored by the light curtain do not match door movement
F.612	LGB RS485	RS485 communication error -> not enough valid position data
F.613	Internal RS-485	RS-485 communication error between Transmitter and Receiver
F.615	LGB internal transmitter	Internal error transmitter Indicates: - RAM test fail - ROM test fail - Program run error - Sync error - Address module defective - dark test fail - DA converter defective exchange hardware!
F.616	Internel error Light curtain Receiver	Internal receiver error • RAM test fail • ROM test fail • Program run error • Sync error • Addressing module defective • Dark test fail • D/A converter defective • Watchdog not triggered or hangs • Replace hardware!
F.617	Light curtain incompatibility	Transmitter and receiver are not compatible. • modified Transmitter serial number • incompatible Hardware version / revision level • incompatible Software version
F.621	Light curtain test error (transmitter)	test error for the internal transmitter system test
F.622	Light curtain test error (receiver)	test error for the internal receiver system test
F.626	Light curtain test error (Out 1)	Test / wiring error of output 1
F.627	Light curtain test error (Out 2)	Test / wiring error of output 2
F.628	Light curtain LGB dark test error	Dark test error

No.	Description	Possible reason for error
F.700	Position sensing defective	With mechanical limit switches: • At least one limit switch does not correspond to the configured active status. • An implausible combination of at least 2 active limit switches. For electronic limit switches: • After invoking activation of the factory parameters (Parameter P.990) the corresponding positioning system was not parameterized. • Calibration not completed or is incorrect and must be repeated. • When activating the intermediate stop the intermediate stop is implausible. • Synchronization not finished or reference switch defective.
F.701	CLOSE Position not found in timer mode	• The simulated end switch CLOSE was not reached at the expected position • The tolerance band for the recognition time is to small (P.229)
F.702	OPEN Position not found in timer mode	• The simulated end switch OPEN was not reached at the expected position • The tolerance band for the recognition time is to small (P.239)
F.752	Loss of communication with encoder	• Interface cable defective / interrupted • Channel A and B connected over cross • Absolute encoder processor electronics defective • Defective hardware or electrically noisy environment • Use a shielded control cable • Install a RC element (100Ω+100nF) at the brake
F.760	Position outside of window	• Position encoder drive defective • Absolute encoder processing electronics defective • Defective hardware or electrically noisy environment
F.763	DES-B Error	• Position encoder drive defective -> make a reset
F.766	Internal error TST PD/PE	• The position encoder TST PD / PE is disturbed -> make a reset
F.767	Overtemperature TST PD	• The temperature in the encoder housing is to high
F.768	Battery voltage	• The voltage of the buffer battery is to low → change battery
F.769	Rotation speed of PD shaft to high	• The rotation speed of the shaft where the encoder is mounted is to high → mount the encoder on another shaft
F.770	Door way is to high for the parameter set Encoder resolution	• The Value of the Parameter P.202 (set Encoder resolution) is to high for the combination encoder and door.
F.782	The expansion card cannot communicate via the encoder's bus	• Communication with expansion board is not possible • No expansion board pluged in • CAN Connection interrupted (Broken cable or no supply voltage for extension board) • Check that the RUN LED flashes
F.783	Software version incompatible	The software version of the RFUxIO expansion board is not up-to-date or incompatible with the software of the door controller.
F.784	RFUxIO not activated.	RFUxIO is plugged in but not activated. Set Parameter P.800 = 8

No.	Description	Possible reason for error
F.801	Wrong Test of input 1 of the mobile unit TST FSx	• Input 1 of the mobile unit was tested as faulty • The device connected to the input does not work • The mobile unit is defective
F.802	Wrong Test of input 2 of the mobile unit TST FSx	• Input 2 of the mobile unit was tested wrong • The device which is connected to the input does not work correctly • The mobile unit is defective
F.803	Wrong Test of input 3 of the mobile unit TST FSx	• Input 3 of the mobile unit was tested as faulty • The device connected to the input does not work • The mobile unit is defective
F.804	Wrong Test of input 4 of the mobile unit TST FSx	• Input 4 of the mobile unit was tested as faulty • The device connected to the input does not work • The mobile unit is defective
F.80A	Wrong Test of input A of the stationary unit TST FSx	• Input A of the stationary unit was tested wrong • The device which is connected to the input does not work correct • The stationary unit is defective
F.80B	Wrong Test of input B of the stationary unit TST FSx	• Input B of the stationary unit was tested wrong • The device which is connected to the input does not work correct • The stationary unit is defective
F.80C	Wrong Test of input C of the stationary unit TST FSx	• Input C of the stationary unit was tested wrong • The device which is connected to the input does not work correct • The stationary unit is defective
F.811	Testing incorrect for output 1 of the stationary unit	• Output 1 of the stationary unit was tested as faulty • The cable between the stationary unit and the controller is damaged or not connected • The stationary unit is defective • Incorrect settings for parameter P.5xF, P.47b or P.465
F.812	Testing incorrect for output 2 of stationary unit	• Output 2 of the stationary unit was tested incorrectly • The cable between stationary unit and controller is damaged or not connected • The stationary unit is defective • Incorrect settings for parameter P.5xF, P.47b or P.465
F.813	Testing incorrect for output 3 of the stationary unit	• Output 3 of the stationary unit was tested incorrectly • The cable between the stationary unit and the controller is damaged or not connected • The stationary unit is defective • Incorrect settings of parameter P.5xF, P.47b or P.465
F.821	Wrong parameter setting input 1 of mobile unit	• The device which is connected to input 1 of the mobile unit does not fit to the settings • Check Parameter P.F1F
F.822	Wrong parameter setting input 2 of mobile unit	• The device which is connected to input 2 of the mobile unit does not fit to the settings • Check Parameter P.F2F

No.	Description	Possible reason for error
F.823	Wrong parameter setting input 3 of mobile unit	• The device which is connected to input 3 of the mobile unit does not fit to the settings • Check Parameter P.F3F
F.824	Wrong parameter setting input 4 of mobile unit	• The device which is connected to input 4 of the mobile unit does not fit to the settings • Check Parameter P.F4F
F.831	Disturbed input 1 of mobile unit TST FSx	• The input 1 of the mobile unit is disturbed • The connection to the device is interrupted
F.832	Disturbed input 2 of mobile unit TST FSx	• The input 2 of the mobile unit is disturbed • The connection to the device is interrupted
F.833	Disturbed input 3 of mobile unit TST FSx	• The input 3 of the mobile unit is disturbed • The connection to the device is interrupted
F.834	Disturbed input 4 of mobile unit TST FSx	• The input 4 of the mobile unit is disturbed • The connection to the device is interrupted
F.841	Frequency error on input 1 of mobile unit	• The connected optical safety edge is faulty
F.843	Frequency error on input 3 of mobile unit	• The connected optical safety edge is faulty
F.851	Max. Number of allowed Reversings, because of bad WiCAB radio, exceeded.	The radio connection interrupts during door drive for a short time
F.852	Communication error between TST FSx and controller	This error occurs when the controller looses RS485 communication for min. 1 second with the stationary unit of the radio strip TST FSx. Possible causes are: • The stationary unit is broken • The stationary unit is not or wrong connected
F.853	TST PE_FSBS operating voltage too low	The operating voltage of encoder TST PE_FSBS is too low (less than 8V) As a result, the calculation of the position must be terminated.
F.854	Faulty wiring between stationary unit and controller	Number of trips permitted (P.F02) due to breakage or short circuit on a line between stationary unit and door controller.
F.856	Communication error between mobile and stationary unit	This error occurs if the mobile unit and the stationary unit of the radio control unit could not establish radio communication for at least 1 second. Possible causes are: • No mobile unit in radio range • The battery of the mobile unit is empty or not connected • The antenna of the stationary unit is not connected or missing • Mobile unit or stationary unit are defective
F.857	Battery empty	• The battery voltage is under the limit set with Parameter P.F0B • The battery voltage of the mobile unit is to low • Use new battery and set back battery capacity to 100% by pressing the stop key for long time in P.F09. • To deactivate this error message you can set P.F09 and P.F0B to 0
F.859	Software Version	The software versions of the stationary and the mobile unit are not compatible. No safe trip possible.

No.	Description	Possible reason for error
F.860	Internal stationary unit error	Internal system fault on the stationary unit.
F.861	Internal mobile unit error	Internal system fault on the stationary unit.
F.862	Internal positioning error	Internal error of the positioning system. Presumably, the magnet is not attached properly.
F.867	Address of mobile unit not set	• The address of the mobile unit was not set so far • The address has to be set in Parameter P.F07 • The address is written on a sticker on the mobile unit
F.910	No communication to expansion board possible	• The communication to the expansion board is not possible • No expansion board plugged in • CAN Connection interrupted (Broken cable or no supply voltage for extension board)
F.911	ROM error on extension board	• Wrong Flash-Code • Defective hardware or noise-saturated environment
F.912	RAM error on extension board	• Defective hardware or noise-saturated environment
F.920	Internal 2.5 V reference voltage incorrect	• Hardware defect
F.921	Internal 15 V voltage incorrect	• Hardware defect
F.922	Emergency stop chain not complete	Not all emergency STOP inputs are jumpered separately, although the entire emergency stop chain is jumpered • Redundant check of the emergency stop chain triggered
F.925	Testing of the third shutdown method failed	• defective hardware
F.928	Faulty input testing	• The testing of an cyclic tested input was not successful • The connected device is not working • The cable connection between the connected device and the controller is broken
F.92A	If the motor wiring test is activated by P.112 the wiring will be tested during system tests.	• at least one motor cable is not or incorrectly connected • Motor cable damaged • Motor damaged
F.930	External watchdog incorrect	• Defective hardware or noise-saturated environment
F.931	ROM error	• Wrong EPROM-Code • Defective hardware or strongly disturbed environment
F.932	RAM error	• Defective hardware or noise-saturated environment
F.933	Wrong frequency of CPU	• The clock frequency of the processor is wrong
F.935	Stack error	• User-Stack or System-Stack overflowed • Possible software error due to recursive invocations (e.g. profile)
F.960	Faulty parameter checksum	• New EPROM version with different parameters • Controller not yet initialized
F.961	Checksum from calibration values etc.	• New EPROM version with different EEPROM structure • Controller not yet initialized

No.	Description	Possible reason for error
F.962	Converter parameters not plausible	• New EPROM version • Controller not yet initialized
F.964	Program version / manufacturer code	• New EPROM version • Controller not yet initialized
F.965	Faulty door cycle counter with active emergency opening	• The door cycle counter does not count or is faulty. Because of this no emergency opening testing can be done.
F.966	Hardware unknown	• A wrong software was programmed to the controller • The programmed software does not recognize the hardware version • The controller hardware is defective
F.967	Incompatible TST LGB software version	TST LGB with software version V3.21 or earlier in combination with DES-A connected and activated.
F.968	Programming error with Real time clock	• The clock is not programmed plausible
F.969	Internal real time clock error	• The clock has an error → make a reset
F.970	Plausibility parameter block error	• New EPROM version • Controller not yet initialized • Some parameter is implausible

13.2 Information messages

No.	Description
I.021	Emergency open test is running
I.080	Service counter will run off
I.100	Speed in open position to high
I.150	Speed in close position to high
I.160	Permanent open comand still active
I.161	Priority still active
I.170	Forced opening active
I.180	Wait for foil key command
I.185	Wait for reset by stop foil key
I.199	Door counter wrong
I.200	New reference position taken over
I.201	Reference position new initialized
I.205	Synchronisation done
I.210	Limit switch not plausible (pre limit open)
I.211	Limit switch not plausible (pre limit close)
I.310	Open command to door 2
I.320	Obstacle during opening
I.325	Obstacle during closing
I.360	Disturbed N.C. safety edge
I.363	Disturbed N.O. safety edge
I.380	Faulty 2nd internal N.C. safety bar
I.383	Faulty 2nd internal N.O. safety bar
I.510	Correction drive finished
I.515	Active correction drive
I.520	Target speed for opening or closing move not reached • Pre-limit switch reached before full speed was reached --> adjust ramps • Current limiter prevents movement at full speed --> Inverter or motor working at performance limit --> adjust ramps or limiter
I.555	Measuring rotation factor not ready
I.610	Light line alignment completed successfully.
I.615	Light line alignment requested.
I.620	Door in PU when syncing but some rays of light are still masked. Adjust P.446 door masking in PU!
I.621	The resolution of the installed position encoder is too low to maintain robust light curtain operation. More increments are required per door move. (Message only occurs when DIP-Switch is ON.)

No.	Description
I.700	In timer limit switch operating mode (typ. after power on) the door position is not available. Deadman speed is maintained until the actual position becomes available again.
I.856	The internal safety edge is tripped because of an WiCab radio problem The radio connection interrupts during door drive for a short time. Possible causes are: • The Distance between mobile and stationary unit is larger than specified • No perfect Orientation of stationary and mobile antenna • The radio link is disturbed by external noise

14 General messages

General messages	
STOP	**Stop** / reset state, wait for next incoming command
_Eu_	**Lower limit position**
≡Eu≡	lower limit position locked → raising not possible (e.g., lock-door)
ZUF@	**Closing active**
-Eo-	**Upper limit position**
≡Eo≡	upper limit position locked → closing not possible (e.g., safety edge)
@OPE	**Opening active**
-E1-	**middle limit position E1 (intermediate stop position)**
≡E1≡	**upper limit position locked** → closing not possible (e.g., safety edge)
FAIL	**Fault** → only deadman travel is possible, automatic opening may also be possible
"CALI:	calibration → setting the limit positions in deadman travel mode (for absolute encoder) → Start procedure using STOP key
≡NA≡	**E-STOP** → Movement not possible, hardware safety chain interrupted
HdSA:	**E-travel** → Deadman travel without regard for safety facilities, etc.
'Hd'	**Manual** → Deadman mode
ParA	**Parametrization**
SYNC:	**Synchronization** (incremental encoder / limit switch → Pos.unknown)
'Au'	Automatic → indicates change from "Manual" to "Automatic" status
'Hc'	Semi-automatic → indicates change from "Manual" to "Semi-automatic"
FUZ.	first display after switching on (Power Up and Self-test)
LOCK	**Locked** -> Display after the end of the set time for the virtual key switch
Status messages during calibration	
E.i.E.c.:	calibration of the lower limit position requested (in deadman travel)
E.i.E.o.:	calibration of the lower limit position requested (in deadman travel)
E.i.E.1	calibration of intermediate position E1 (in deadman travel)
Status messages during synchronization	
S.y.E.c.:	Synchronization of lower limit position requested (Jog Mode or wait for start command)
S.y.E.o.	Synchronization of lower upper position requested (Jog Mode or wait for start command)
S.y.E.1.	Synchronization of intermediate stop position E1 (in deadman mode)
S.y.op:	Automatic opening up to mechanical stop, then automatic synchronization of upper limit position
S.y.cL	Automatic closing taking into account safeties up to mechanical stop, followed by automatic synchronization of lower limit position
S.y.c≡	Automatic closing is locked due to request Å
Status messages during dead man movement:	
Hd.cL	Deadman closing (membrane key: CLOSE)
Hd.oP	Deadman closing (membrane key: OPEN)
Hd.Eu	Lower limit position reached, no further deadman closing possible
Hd.Eo	Upper limit position reached, no further deadman opening possible
Hd.Ao	Outside of permitted Eo position (no deadman opening possible)
Information messages during the parameter configuration:	
noEr	Error memory: no error saved
Er--	Error memory: if error but without associated message being found
Prog	Programming message while carrying out original parameter or default set

General inputs	
E.000	OPEN key on membrane keypad
E.050	STOP key on membrane keypad
E.090	CLOSE key on membrane keypad
E.101	Input 1
E.102	Input 2
E.103	Input 3
E.104	Input 4
E.105	Input 5
E.106	Input 6
E.107	Input 7
E.108	Input 8
E.109	Input 9
E.110	Input 10
E.111	Input 11
E.112	Input 12
E.113	Input 13
E.114	Input 14
E.115	Input 15
E.121	Input 21
E.122	Input 22
E.123	Input 23
E.124	Input 24
E.125	Input 25
E.126	Input 26
E.127	Input 27
E.128	Input 28
E.13A	Input 3A
E.13B	Input 3B
E.13C	Input 3C
E.13D	Input 3D
E.13E	Input 3E
E.13F	Input 3F
Safety- / emergency stop chain	
E.201	Internal emergency STOP “mushroom buttom” triggered
E.211	External emergency stop 1 triggered
E.212	External emergency stop 2 triggered
Safety edge in general	
E.360	E.380: Triggering of the 2nd **internal** safety edge
E.363	**Internal** safety edge 1 faulty
E.370	Triggering of the 2nd **external** safety edge
E.373	**External** safety edge fault
E.379	**External** safety edge activated but not yet plugged in
E.380	Triggering of the 2nd **internal** safety edge
E.383	Interruption of the 2nd **internal** safety edge
E.3F0	Triggering of the 2nd **external** safety edge
E.3F3	Interruption of the 2nd **internal** safety edge
Wireless plug-in module	
E.401	Wireless Channel 1
E.402	Wireless Channel 2
Inductive loop	
E.501	Detector channel 1
E.502	Detector channel 2
E.503	Detector channel 3
E.504	Detector channel 4
Internal-Inputs	
E.900	Controller chip fault signal

WiCab-Inputs	
E.F01	Input 1 of mobile unit
E.F02	Input 2 of mobile unit
E.F03	Input 3 of mobile unit
E.F04	Input 4 of mobile unit
E.F0A	Input A of stationary unit
E.F0B	Input B of stationary unit
E.F0C	Input C of stationary unit

15 Specifications

Dimensions (W x H x D)	
Dimensions board set (L x W x H):	approx. 270 x 195 x 150 mm to frame with quick release incl. heatsink excl. extension boards as TST RFUxK or TST RFUxCom
Controller variants -A / B	182 x 328 x 102 mm (with spacers)
Controller variants -C / -CX	182 x 328 x 121 mm
Controller variants -CGH / -CXGH / -LGH	210 x 430 x 200 mm incl. heatsink, brake resistor & wall mounts excl. cable entries (L +20 mm) and main switch (H +35 mm)
Dimensions plastic housing (H x W x D)	approx. 430 x 210 x 200 mm incl. heatsink, brake resistor & wall mounts excl. cable entries (L +20 mm) and main switch (H+ 35 mm)
Dimension steel or stainless steel housing	approx. 300 x 476 x 218 mm approx. 400 x 676 x 218 mm approx. 600 x 676 x 218 mm excl. cable entries (L +20 mm) , main switch and emergency stop button (H+ 35 mm)
Hygiene housing dimensions	approx. 444 x 549 x 210 mm excl. cable entries (L +20 mm) , main switch and emergency stop button (H+ 35 mm)
Installation	vertically via the wall bracket on the housing bottom
Supply voltage over L, N, PE	230 V_{AC} ±10%, 50...60 Hz permissible range: 110...240 V ± 10% / 50...60 Hz Protection: 16 A K-characteristic
Controller idling current	max. 30 W when fully configured
External power supply (depending on network): Terminal L1	According to supply voltage to terminal L (secured on the circuit board: F200 / 4AT)
Control voltage / external supply 2	24 V_{DC} regulated (±10% at nominal voltage 230 V) **Controller variant -A:** max. 250 mA **Controller variants -B/-C/-CX/-CGH/-CXGH/-LGH:** max. 500 mA ncl. optional plug-in modules. Fuse protected by means of self-resetting semiconductor fuse. Short-circuit protected by central switching regulator.
Control voltage / external supply 3	for electronic limit switches and Safety edge Nominal value 11.3V / max. 130mA
Controller inputs Inputs 1 – 10 in Controller variants -C / -CX / -CGH / -CXGH / -LGH Inputs 1 – 9 in Controller variant -A	24 VDC / typ.15 mA, max 26 VDC / 20 mA. all inputs are potential free to join or: < 2 V: inactive → logical 0 >10.5 V: active → logical 1 min. Duration of input control commands: > *100 ms* Galvanic isolation using on-board opto-couplers
Input IN10 Controller variant -B	Evaluation for slip door switch with 8.2 kΩ termination resistor or is used as a second safety edge monitor.
Serial interface RS485 A and B	only for electronic limit switches RS485 level, terminated in 100 Ω
Safety chain / Emergency STOP Terminals: *E-Stop ext.31/32* and *41/42*	all inputs must be connect free of potential Contact rating: ≤ 26 V_{DC} / ≤ 120 mA in case the safety chain is interrupted, the drive cannot be moved, not even under Deadman conditions Not jumpered from the factory
Safety edge input:	For electrical safety edges with 1.2 or 8.2 kΩ terminating resistor and for dynamic optical systems

Relay outputs	If inductive loads are connected (for example, additional relays or brakes), these must be quipped with the appropriate suppression measures (freewheeling diode, varistors, RC elements)	
Relay K1 and K2	Changeover contact free of potential min. 10 mA max. 230 VAC / 3 A	**⚠ATTENTION** **Contacts used once for circuit breakers cannot switch further low currents.**
Digital Output OUT15 Controller variants -B / -C / -CX / -CGH / -CXGH / -LGH	24 VDC / min. 10 mA / max. 120 mA General application: All types of resistive, iinductive and capacitive loads in industrial applications	
Drive output Controller variants -A / -B / -C/ -CGH Controller variant -CS	for drives up to 0.75 KW at 230 V Constant motor current at 100% duty cycle and 40 °C surrounding temperature: 3 A Motor current at 40% duty factor and 50°C ambient temperature: 5 A Max. length of motor cable: 30 m Overload for 0.5 s: 10 A 29 minutes for continuous operation at 40 °C 10 % duty cycle at 40 °C	
Drive output Controller variants -CX / -CXGH Controller variant -CXS	for drives up to 1.2 kW at 230 V Constant motor current at 100% duty cycle and 40 °C surrounding temperature: 5 A Motor current at 40% duty factor and 50°C ambient temperature: 8 A Max. length of motor cable: 30 m Overload for 0.5 s: 16 A 29 minutes for continuous operation at 40 °C 10 % duty cycle at 40 °C	
Drive output Controller variant -LGH Controller variant -LS	for drives up to 1.5 kW at 230 V Constant motor current at 100% duty cycle and 40 °C surrounding temperature: 8 A Motor current at 40% duty factor and 50°C ambient temperature: 10 A Max. length of motor cable: 30 m Overload for 0.5 s: 20 A 29 minutes for continuous operation at 40 °C 10 % duty cycle at 40 °C	
Brake chopper and resistor Controller variants -C / -CX / -CGH / -CXGH / -LGH	Max. 1.5 kW for max. 0.5 seconds repetition rate min. all 20 seconds **⚠ATTENTION** **The heatsink / brake resistor on the back of the housing can reach temperatures up to 85° C. In case of failure this may briefly reach 280 ° C (< 5 Min.)!**	
Temperature operating range	-20…+50°C **⚠ATTENTION** **Maximum 40 °C in steel and stainless steel housing!**	
Temperature storage range	-20…+70°C	
Humidity	up to 95% non condensing	
Noise Emission	<20 dB (A)	

Protection type	IP54 **⚠ATTENTION** **Only in combination with small plastic housing (TST FUZ2 -A, -B, -C, -CX) and with closed cable glands!**
	IP65 **⚠ATTENTION** **In plastic, steel and stainless steel housings with closed cable glands.** **Tighten the screw on the frame near the motor connection!** **Board variants meet IP 00.**
Weight	approx. 5 kg (plastic housing) max. 24 kg (steel housing 600x600 including controller)
Device mobility	stationary
Equipment type:	Motor type external motor is not part of the delivery from FEIG ELECTRONIC GMBH
Protection class:	Protection class I