

FEIG

ELECTRONIC

CONTROLLER

Intelligent Door Management

Assembly instructions

Installation, commissioning, utilization and maintenance



TST FUZ2

Versionen:

-A/ -B/ -C/ -CX /
-CGH / -CXGH



Attention Important Safety Information

These instructions must be observed to ensure personal safety.

Store these instructions safely.

- DE ACHTUNG! WICHTIGE SICHERHEITSANWEISUNGEN!
Den Hinweisen auf Seite 3 dieser Montageanleitung ist Folge zu leisten.
- GB ATTENTION! IMPORTANT SAFETY INFORMATION!
Follow the instructions on page 3 of this manual.
- FR ATTENTION! IMPORTANTES INDICATIONS DE SÉCURITÉ!
Les instructions de la page 3 de cette notice de montage doivent être observées strictement.
- NL LET OP! BELANGRIJKE VEILIGHEIDSINSTRUCTIES!
Volg de instructies op pagina 3 van deze montagehandleiding op.
- IT ATTENZIONE! INDICAZIONI SULLA SICUREZZA IMPORTANTI!
Prestare attenzione alle note alla pagina 3 delle presenti istruzioni di montaggio.
- ES ATENCIÓN INDICACIONES IMPORTANTES DE SEGURIDAD!
Deben seguirse las indicaciones detalladas en página 3 de estas instrucciones de montaje.

Notes

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This edition replaces all earlier versions.

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This Manual is directed especially at persons involved with starting up / commissioning the **TST FUZ2** door controller of 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 installation instructions for the door controller that is installed by the manufacturer of the gate 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 controllers 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 compilation of the information in this document has been done to the best of our knowledge and with due diligence. FEIG ELECTRONIC GmbH does not warrant the correctness and completeness of the information in this document. In particular, FEIG ELECTRONIC GmbH cannot be held liable for consequential damages due to incorrect or incomplete information.

In spite of the 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 presume favorable general conditions. FEIG ELECTRONIC GmbH assumes no liability for the proper operation of the equipment in third-party environments.

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The description of the products, their utilization, capabilities and performance specifications shall not be considered as warranted properties and are subject to technical change.

General information about this document

Language of the **original operating instructions**: German

The functional description employs the following characters to indicate the different danger areas and useful tips.



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



indicates that the controller is at risk.



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



points out information which is useful but not essential for the use of the gate controller

DE ACHTUNG! WICHTIGE SICHERHEITSANWEISUNGEN!

Für die Sicherheit von Personen ist es wichtig diesen Anweisungen Folge zu leisten. Diese Anweisungen sind aufzubewahren.

Diese Montageanleitung finden Sie im Downloadbereich unter www.feig.de. Bitte loggen Sie sich mit folgenden Zugangsdaten ein: Username: Download / Password: feig

GB ATTENTION! IMPORTANT SAFETY INFORMATION!

These instructions must be observed to ensure personal safety. Store these instructions safely.

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FR ATTENTION! IMPORTANTES INDICATIONS DE SÉCURITÉ!

Pour la sécurité des personnes, il est important de respecter les consignes en question. Les présentes consignes doivent être conservées en lieu sûr.

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NL LET OP! BELANGRIJKE VEILIGHEIDSINSTRUCTIES!

Voor de veiligheid van personen is het belangrijk om deze aanwijzingen op te volgen. Deze aanwijzingen dienen bewaard te worden.

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IT ATTENZIONE! INDICAZIONI SULLA SICUREZZA IMPORTANTI!

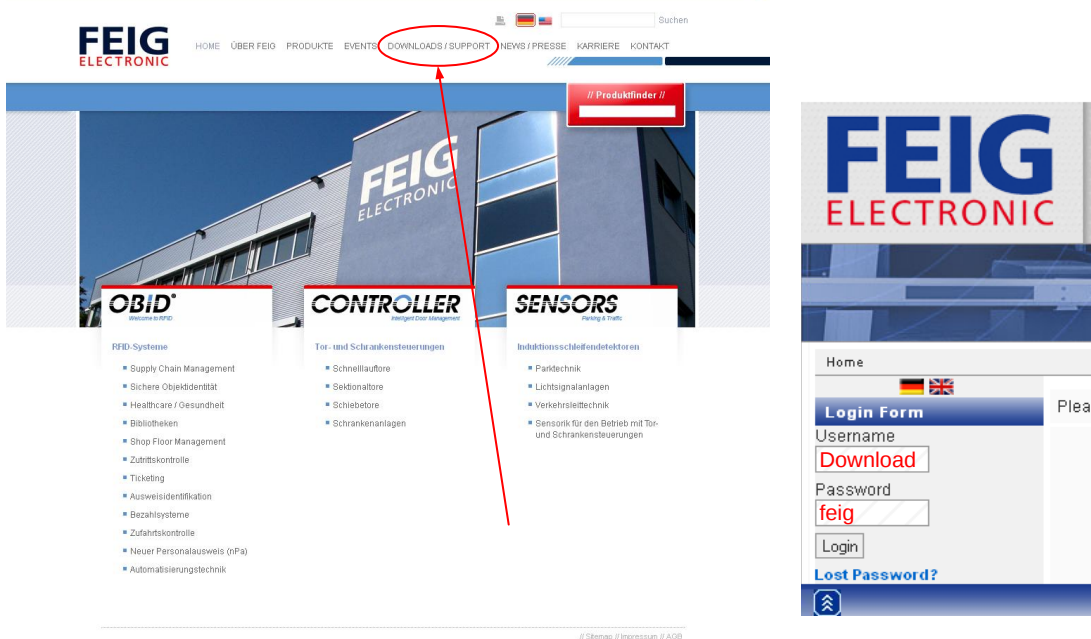
Per la sicurezza personale è importante attenersi scrupolosamente a queste indicazioni. Queste indicazioni vanno conservate.

Le presenti istruzioni di montaggio sono disponibili nell'area download del sito www.feig.de. Effettuare il login con i seguenti dati d'accesso: Nome utente: Download / Password: feig

ES ATENCIÓN INDICACIONES IMPORTANTES DE SEGURIDAD

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1 General description and intended use

The device described below is an electronic control system 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 control system **TST FUZ2** is designed to handle electrical induction motors with a power consumption of up to 1,2 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, induction loops, etc.)
- Evaluation of emergency stop controls
- 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 SUKS-A: safety edge evaluation board
 - TST SUVEK: plug-in module for inductive loop detection
 - TST RFUxK: universal display and input / output module
 - TST RFUF-Com: interface module for the lock-door applications, etc.
 - TST RFUxRel: connectable module auxiliary relay
 - TST LCD / clear text: clear text display with 2 x 16 characters
 - Evaluation of interface signals for remote control, diagnosis and configuration of the parameters of the door

2 Safety information

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.

The commissioning 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, startup and maintenance work must be performed only by qualified specialists. In particular the following regulations must be observed: VDE0100, EN 50110 (VDE0105), EN 60204 (VDE0113), EN 60335 (VDE0700), fire protection codes, accident prevention regulations as well as the relevant regulations for industrial doors (EN 12453, EN 12978) and machine safety standards EN ISO 13849, EN 62061

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.

A device mark (nameplate with name and address of the manufacturer, serial number, model number, supply voltage and temperature range) must be applied by the user.

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

Type label:



Warning notice label (example):



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

The manufacturer has carefully checked and inspected the device 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 Installation of the controller

ATTENTION!

IMPORTANT INSTRUCTIONS FOR SAFE INSTALLATION.

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

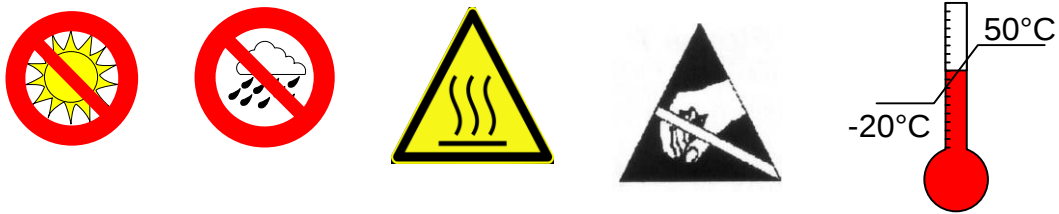
- When installing the controller, the system must be turned off.
- The controller may be opened only if all the poles of the supply voltage have been turned off. It is not permitted to turn on or to operate the controller when it is open.
- Disconnect all supply circuits before opening the housing for 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 sight glass. Damaged keypads and sight glasses 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 enclosure, ensure that no drilling chips 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.
- Ensure that the cable entries are not subjected to mechanical stresses, in particular tensile stresses.
- 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.
- 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 pulses.
- 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, care must be taken to provide a sufficient volume of air around the controller. This must be at least 0,02 m³.
- Should cooling not be sufficient, an additional heat sink may be inserted between the controllers housing and the additional housing to dissipate the heat to the outside

4 Housing options

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



4.1 Housing option 1 / small housing

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

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

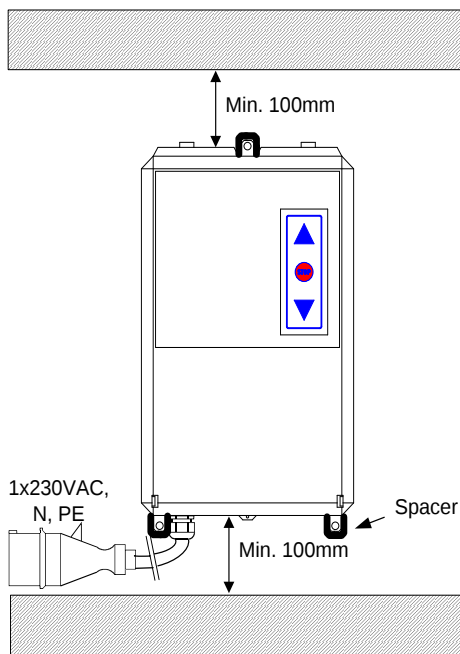


Figure 1: Installation in small housing

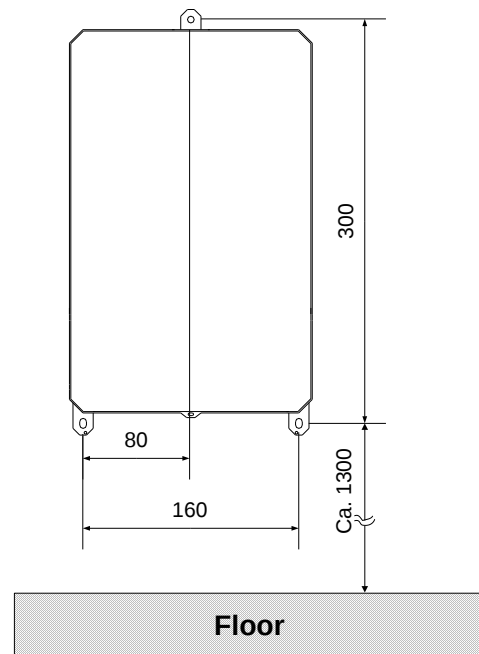


Figure 2: Drilling template small housing

4.1.1 Installation position of the cover

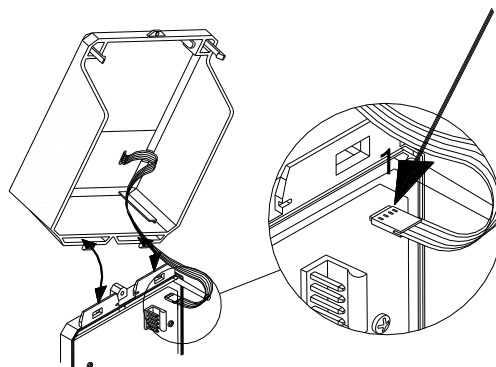


Figure 3: Installation position of the cover

4.2 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 controllers 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

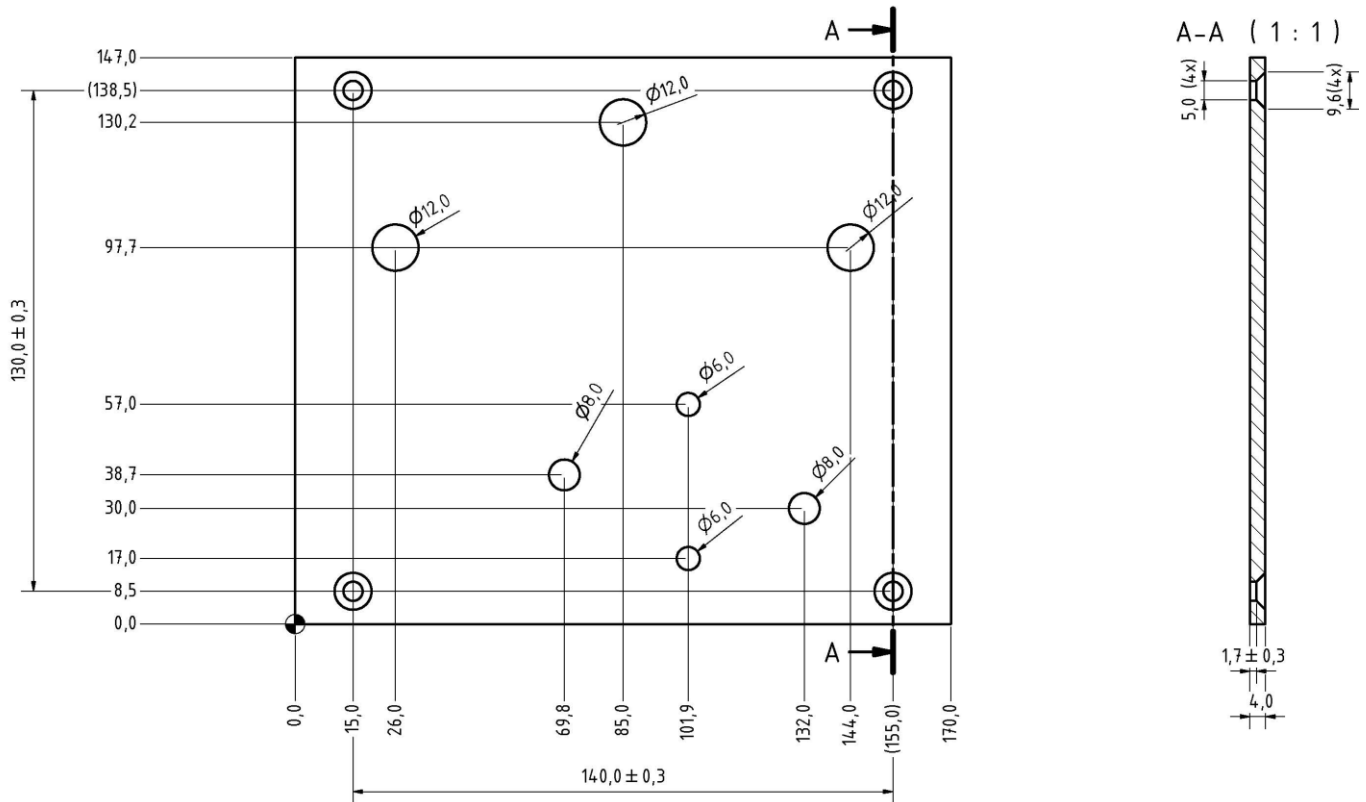


Figure 4: Additional heat sink

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

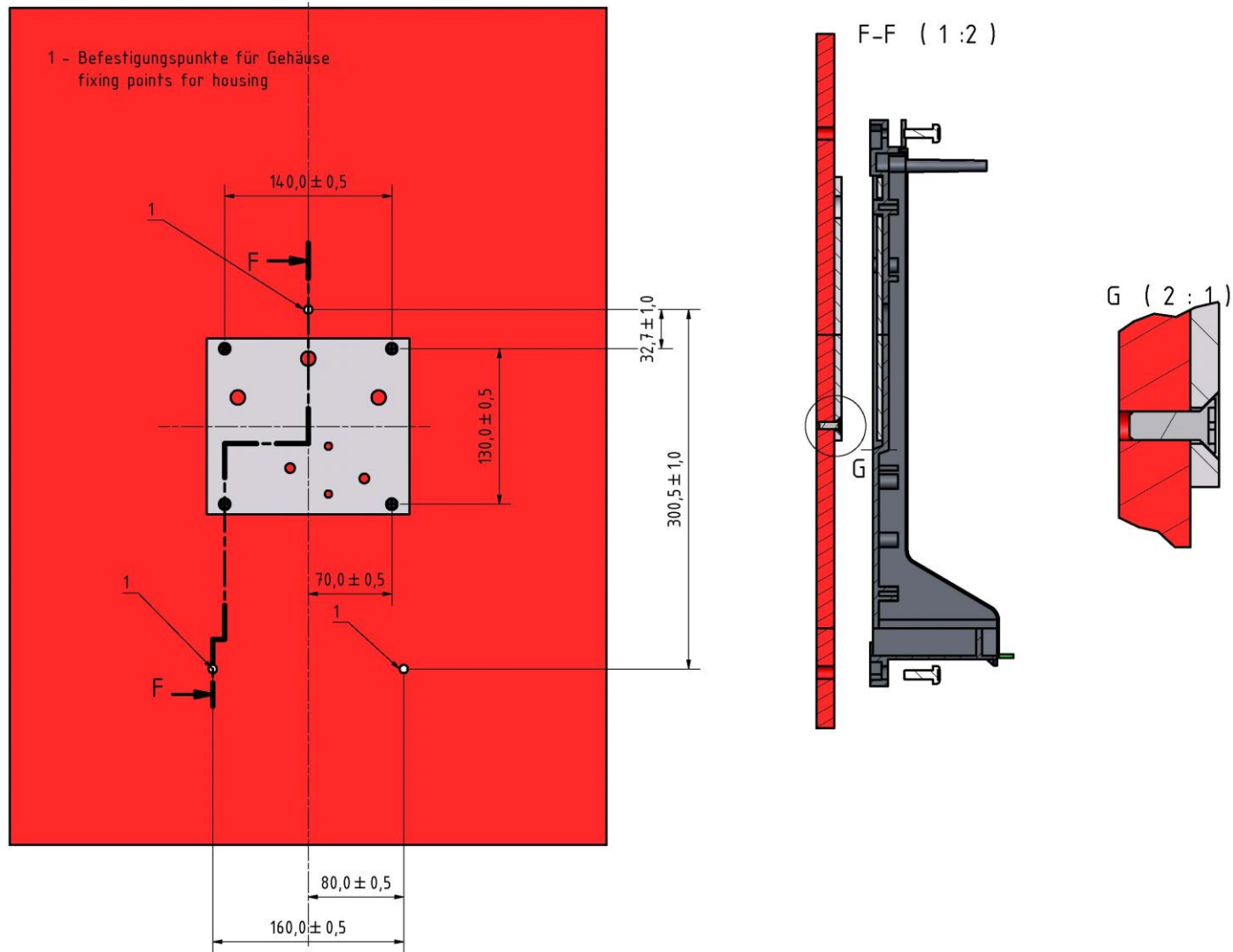
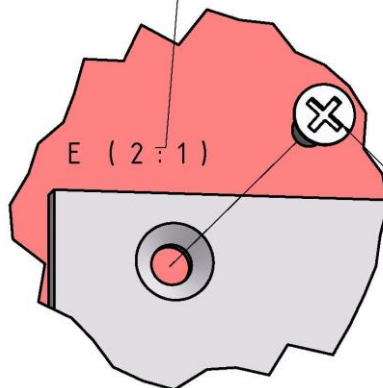
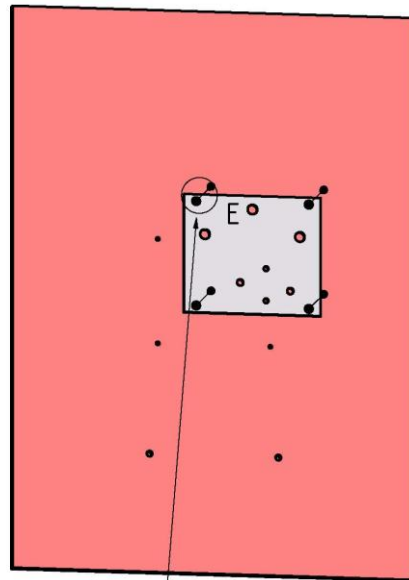


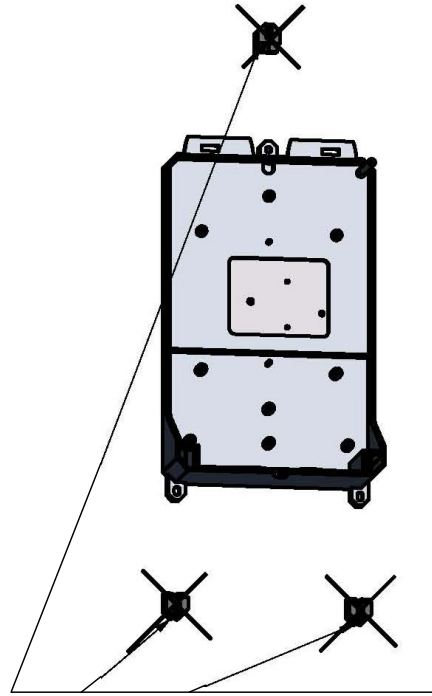
Figure 5: Drilling layout for additional heat sink and controller

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

Step 1: install additional heat sink



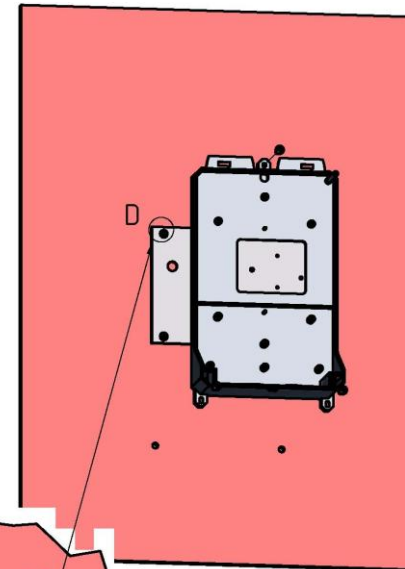
Step 2: remove the spacer



Do not use spacers!

Use the following screws:
Use countersunk screw M4 DIN 965

Step 3: install the controller



All four screws must be completely recessed!

4.3 Housing option 2 / large housing

Controller types TST FUZ2-CGH and TST FUZ2-CXGH are supplied in this housings.

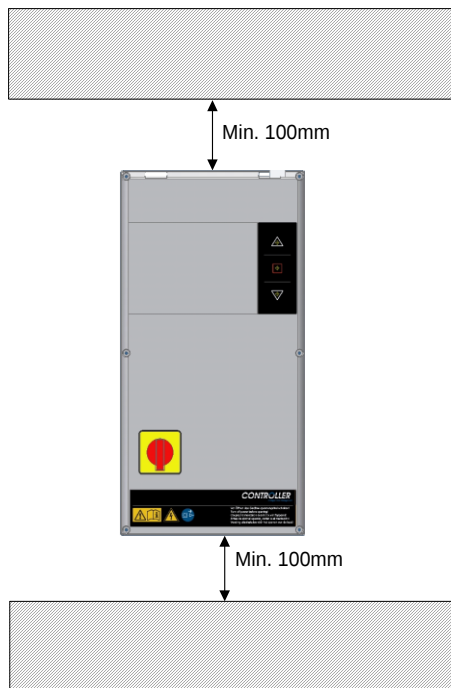


Figure 6: Installing large housing

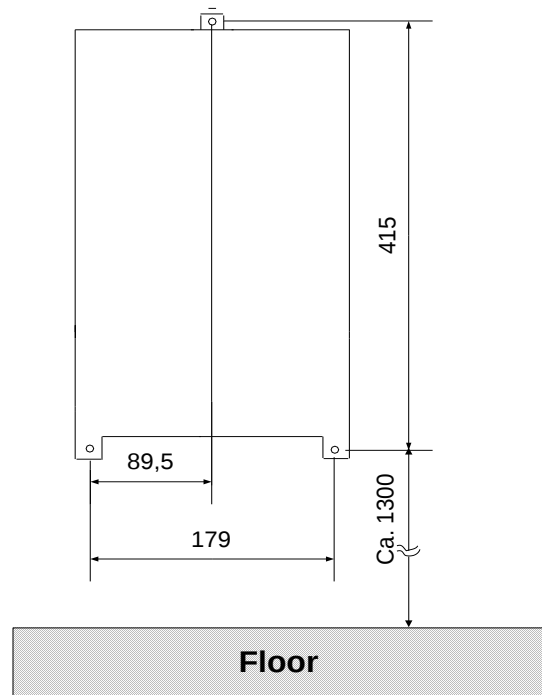


Figure 7: Drilling template large housing

5 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 motors 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 controllers 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). Prior to delivery, the manufacturer will test individual units in this respect
- 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 60VDC 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 sight glass. Damaged keypads and sight glasses 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! You must disconnect all supply circuits before opening the housing to access 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 and the speed as well as the operation of the safety devices must be checked. Parameter settings and insertion of jumpers shall only be performed by properly trained persons.

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 connections to the motor usually result in damage to the inverter.
- If the 24V 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. This can result in the destruction of the controller.
- Before turning on the controllers 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.
- Maximum connection diameters for the terminals on printed circuit boards:

	Single wire (rigid)	Fine wire (with/without wire end ferrule)	Max. tightening torque [Nm]
Motor terminals	2,5	2,5	0,5
Line supplies	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

5.1 Power supply connection

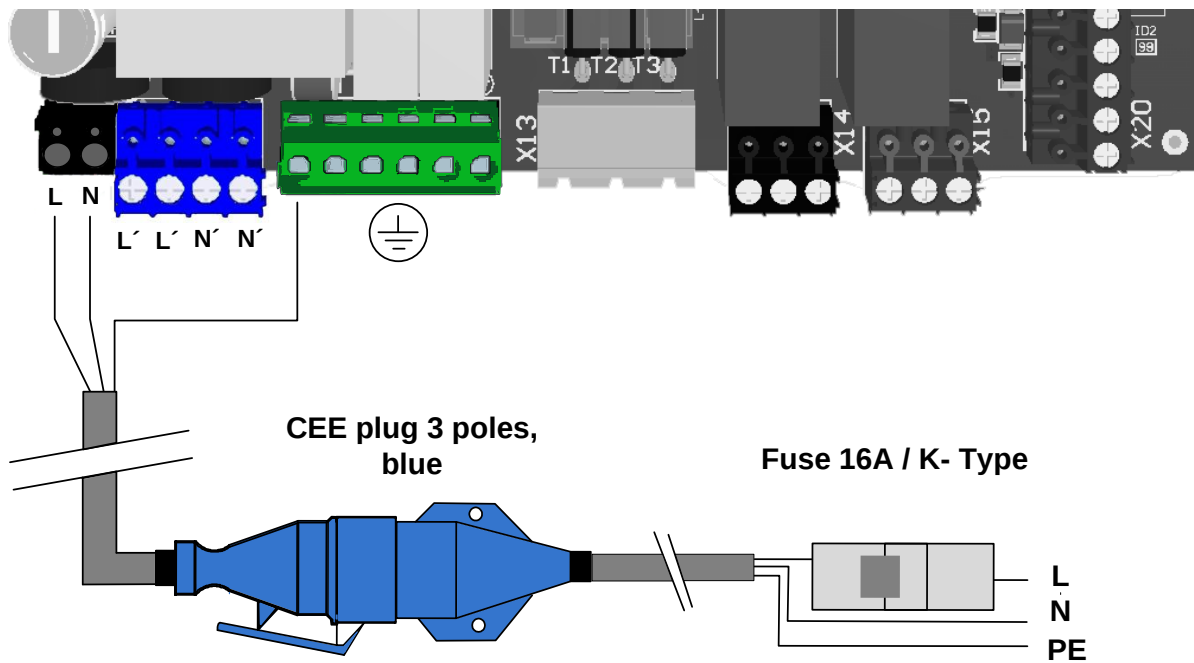


Figure 8: Connecting the power cable



The power plug must be visible and accessible from the control system.

5.2 Motor and brake connections

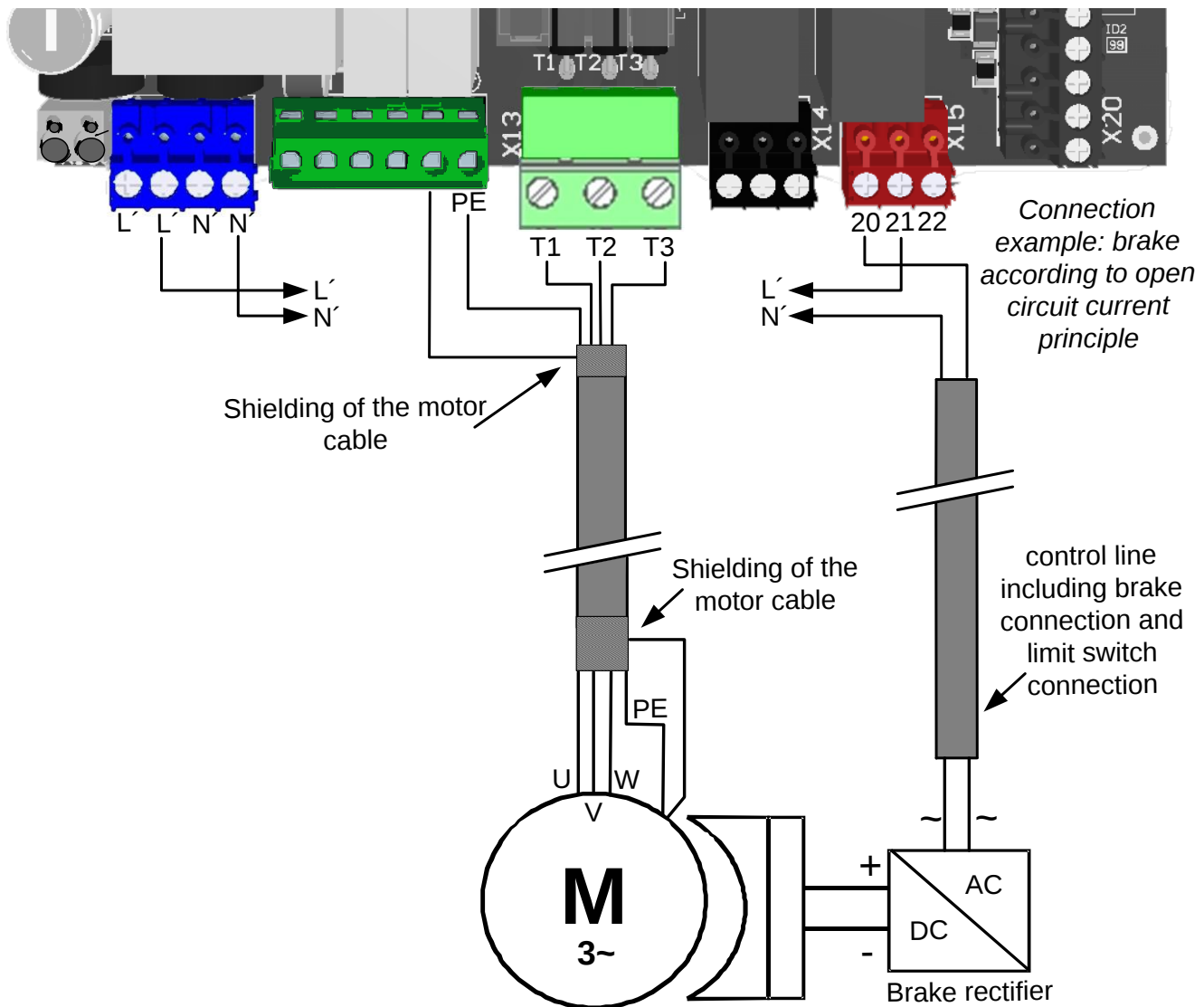


Figure 9: Motor connection

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.

5.3 Connection of safety edge

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 gate control system 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.

5.3.1 Connection of an optical safety edge

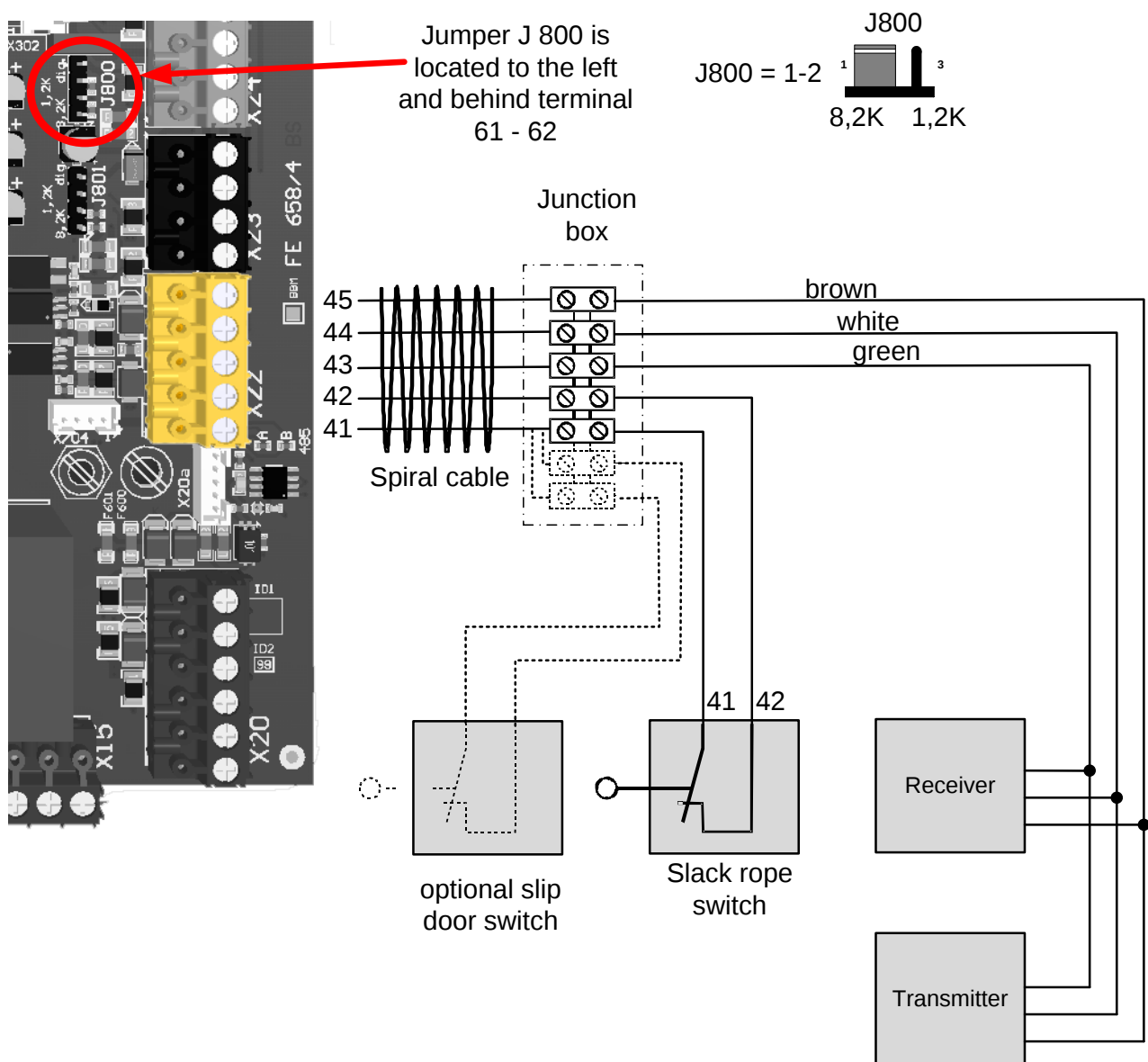


Figure 10: Connection of an optical safety edge

5.3.2 Connecting an electrical resistance - safety edge

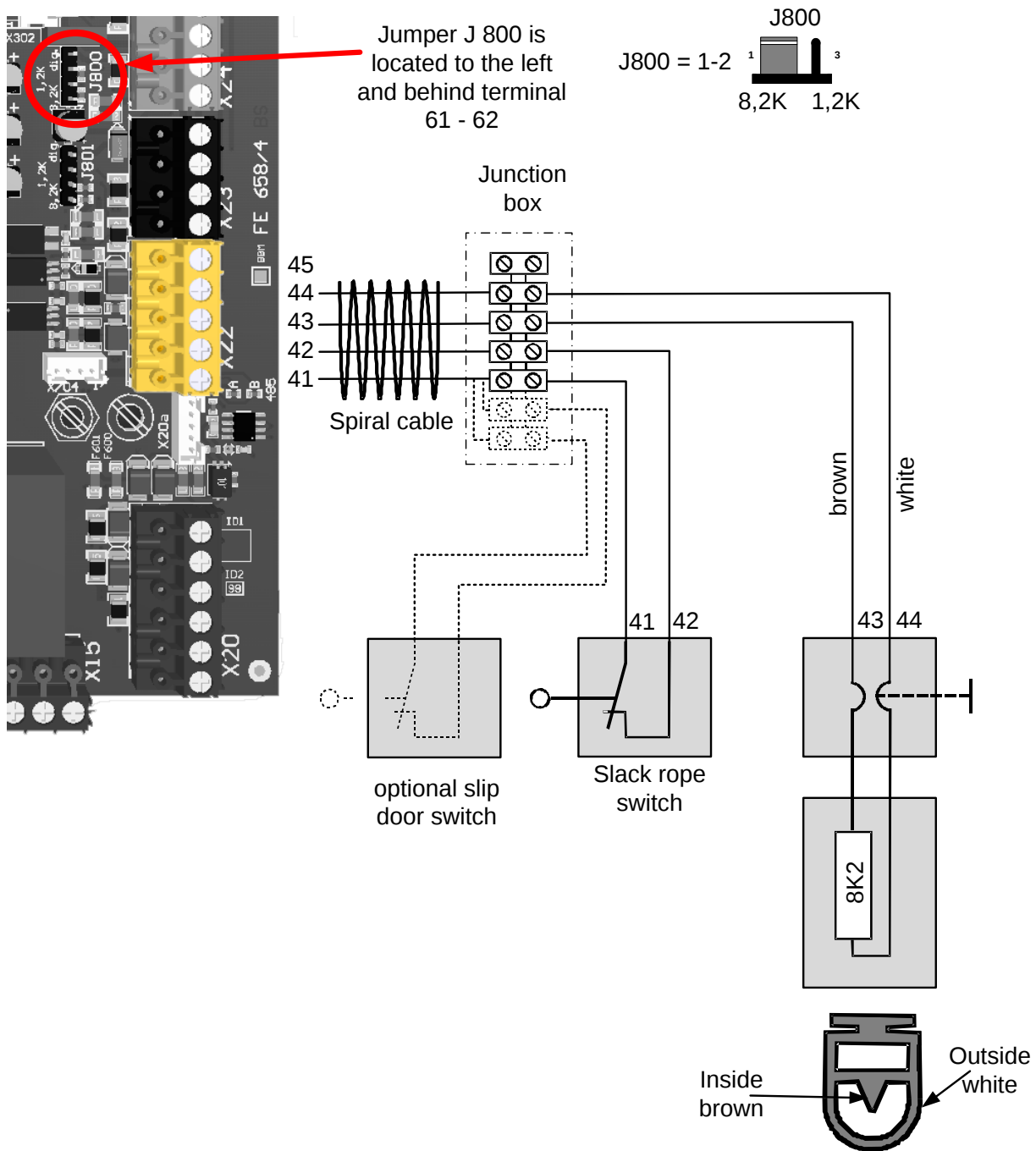


Figure 11: Connecting an electrical resistance - safety edge

5.4 Limit switch connection

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

5.4.1 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 gate.

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.

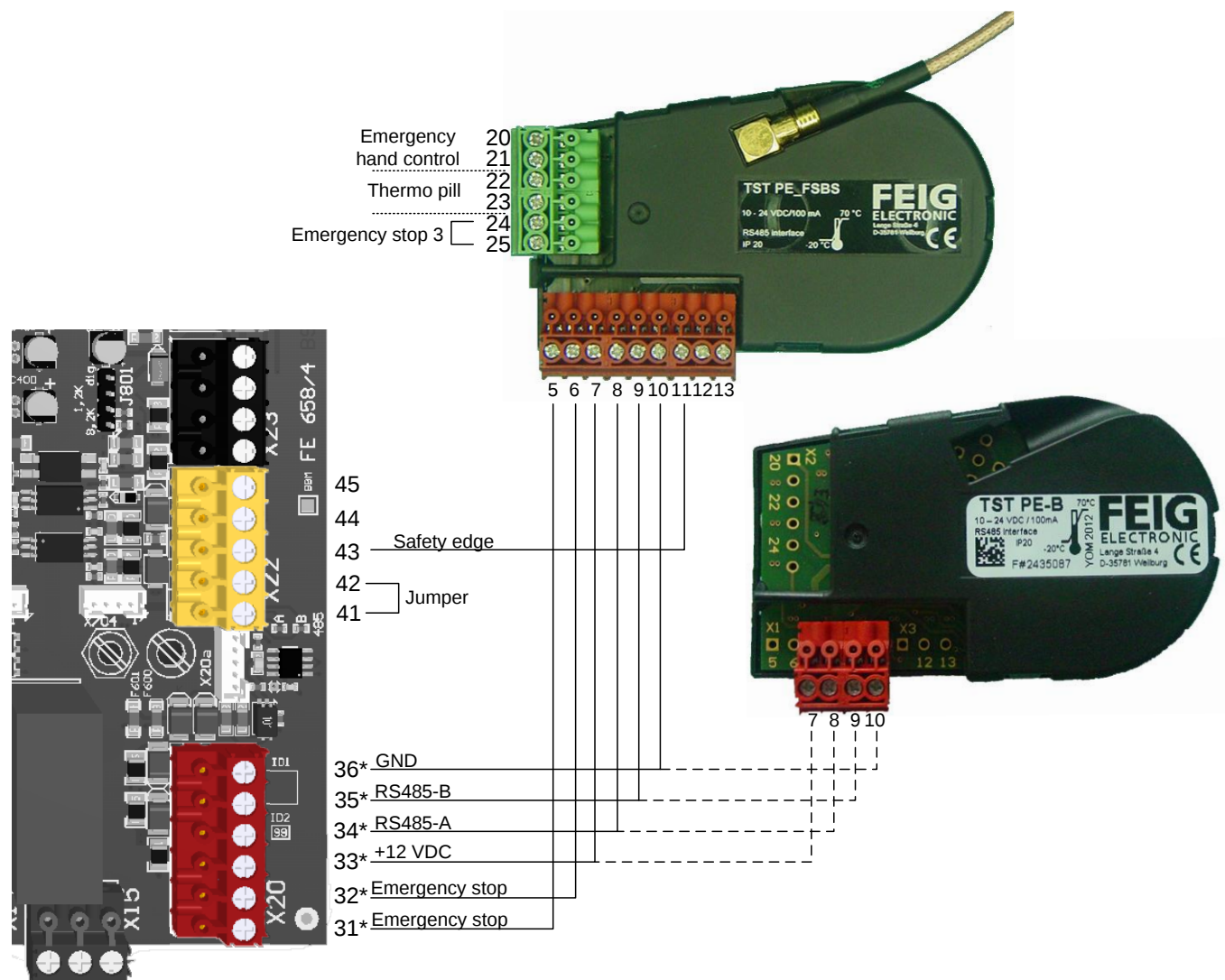


Figure 12: Absolute encoder TST PE / TST PE FSB

5.4.2 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.

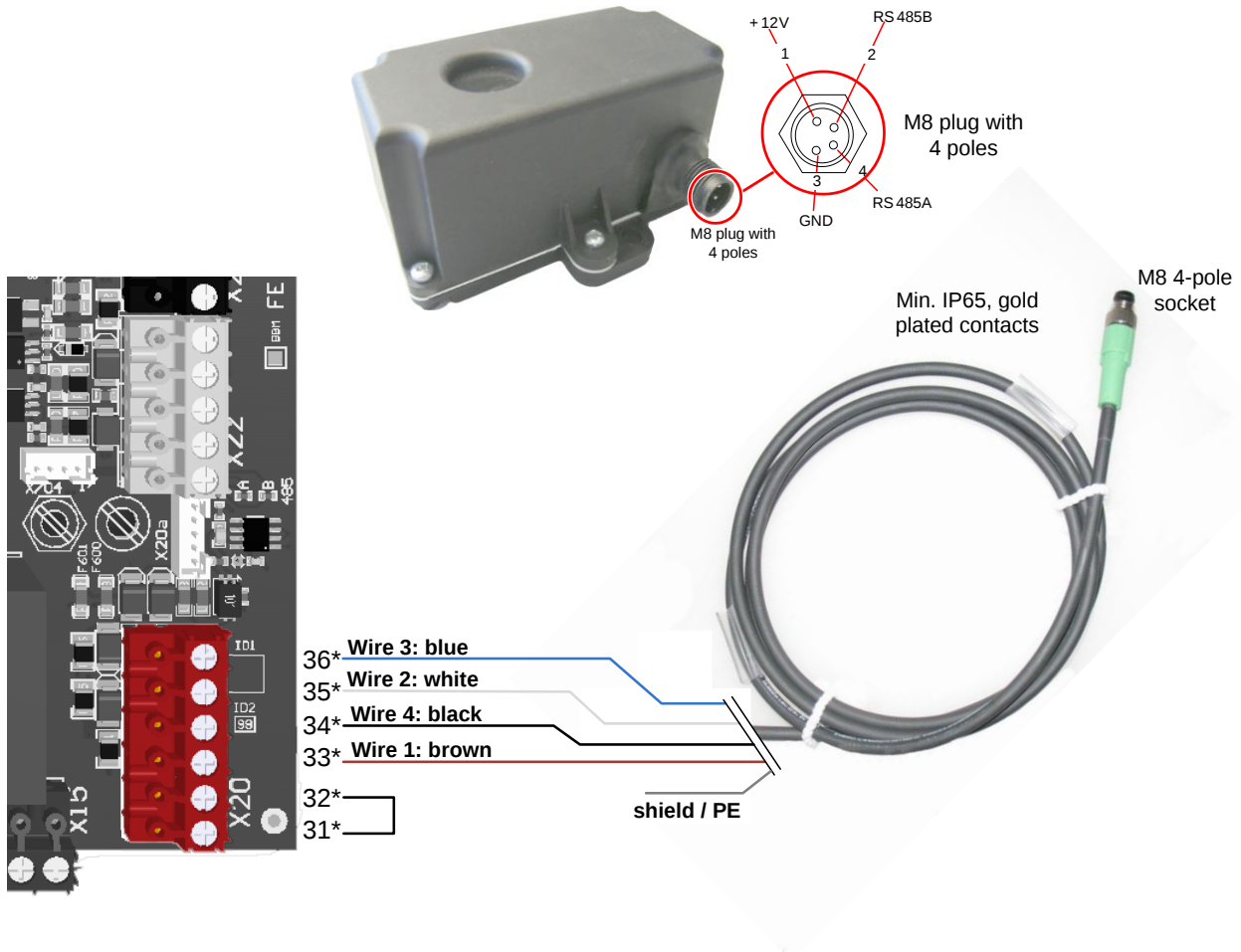


Figure 13: Absolute encoder TST PD

5.4.3 Absolute encoder DES

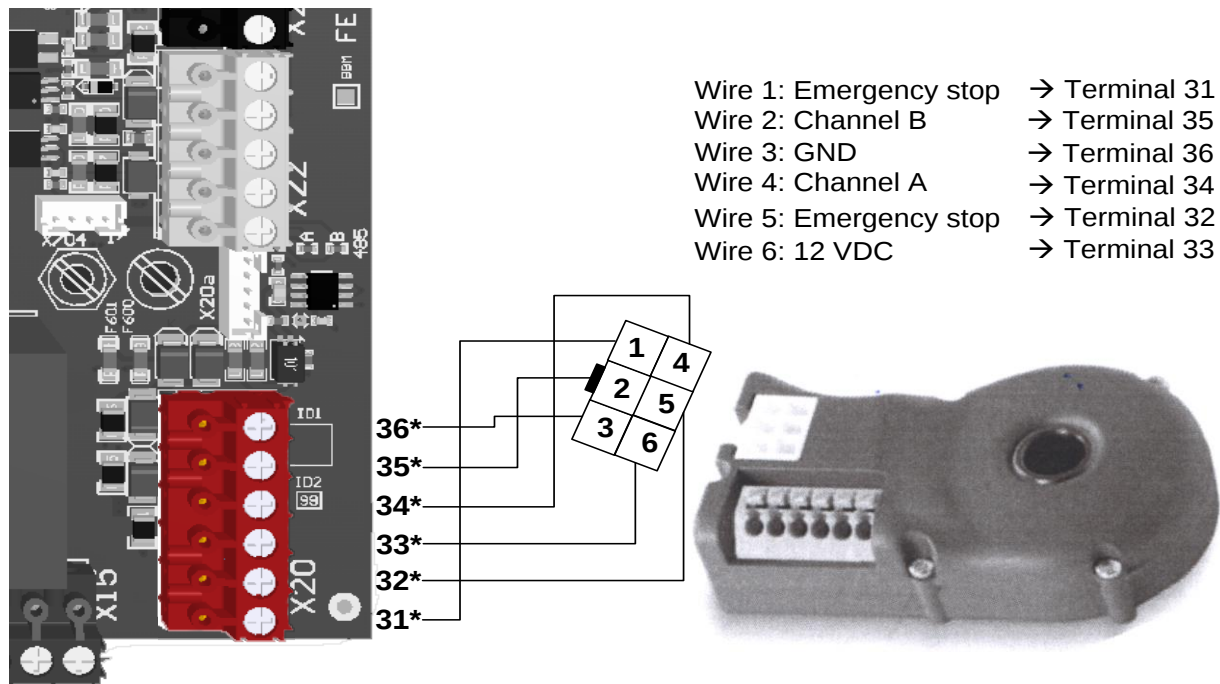


Figure 14: Connection absolute encoder DES

5.4.4 Mechanical limit switches

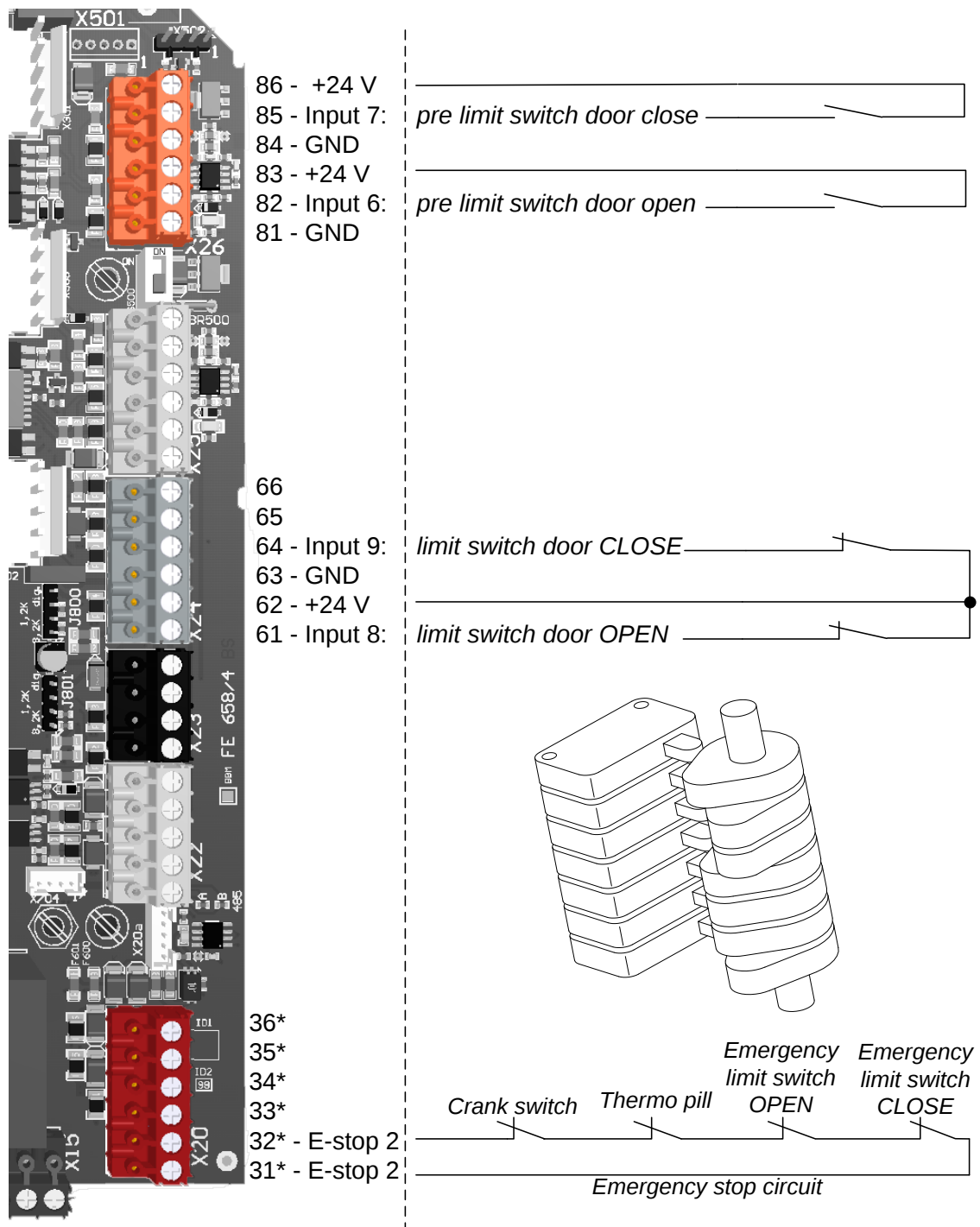


Figure 15: Cam switch



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

5.5 photo eye

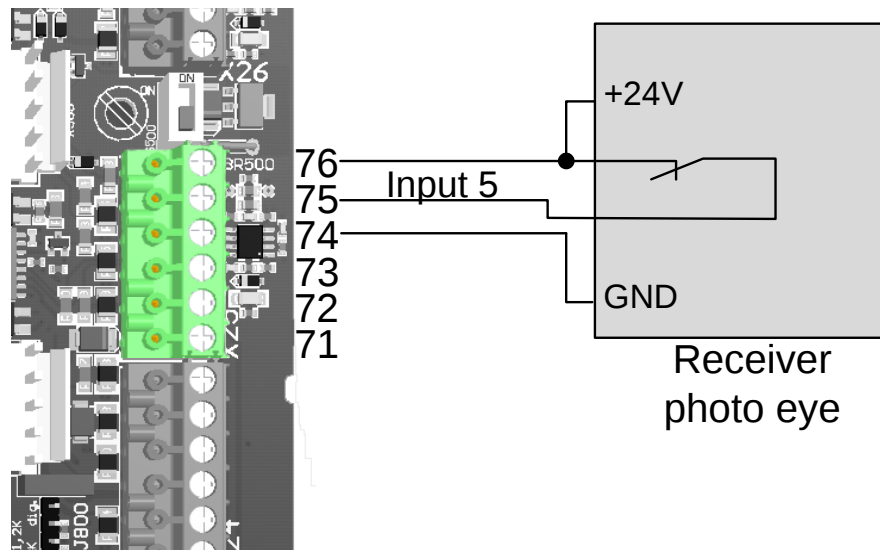


Figure 16: Photo eye connection

5.6 External triggering devices

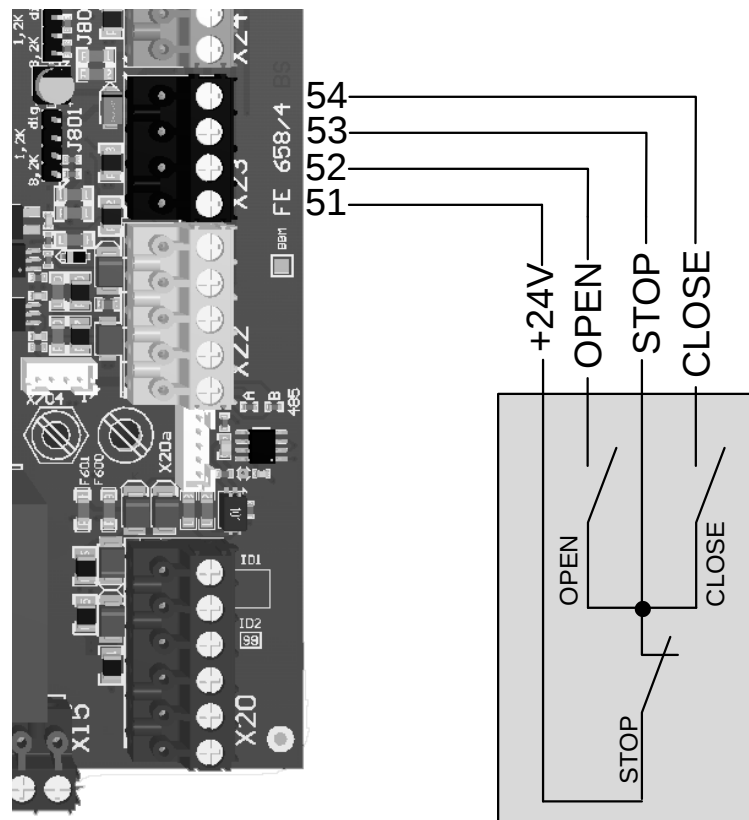


Figure 17: External triggering devices

5.7 Traffic light connector

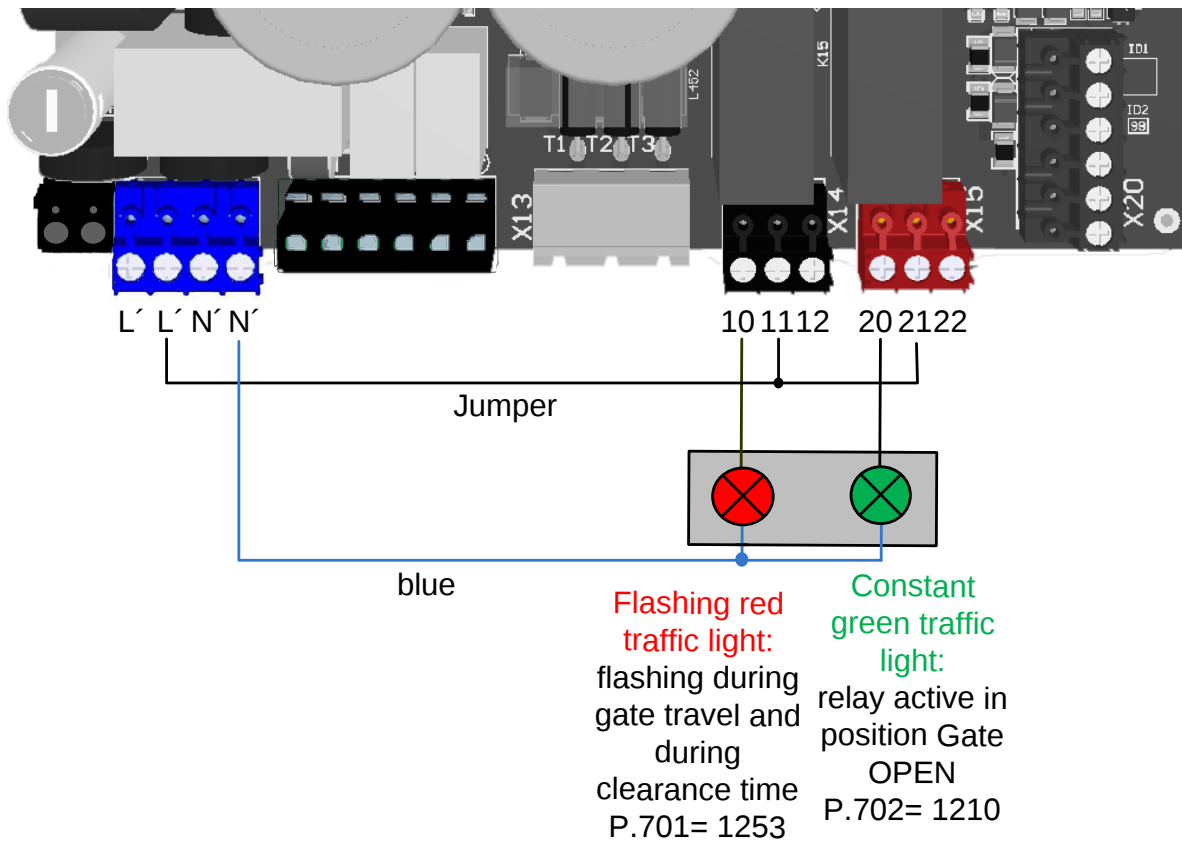


Figure 18: Traffic light connection



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

5.8 Overview of outputs

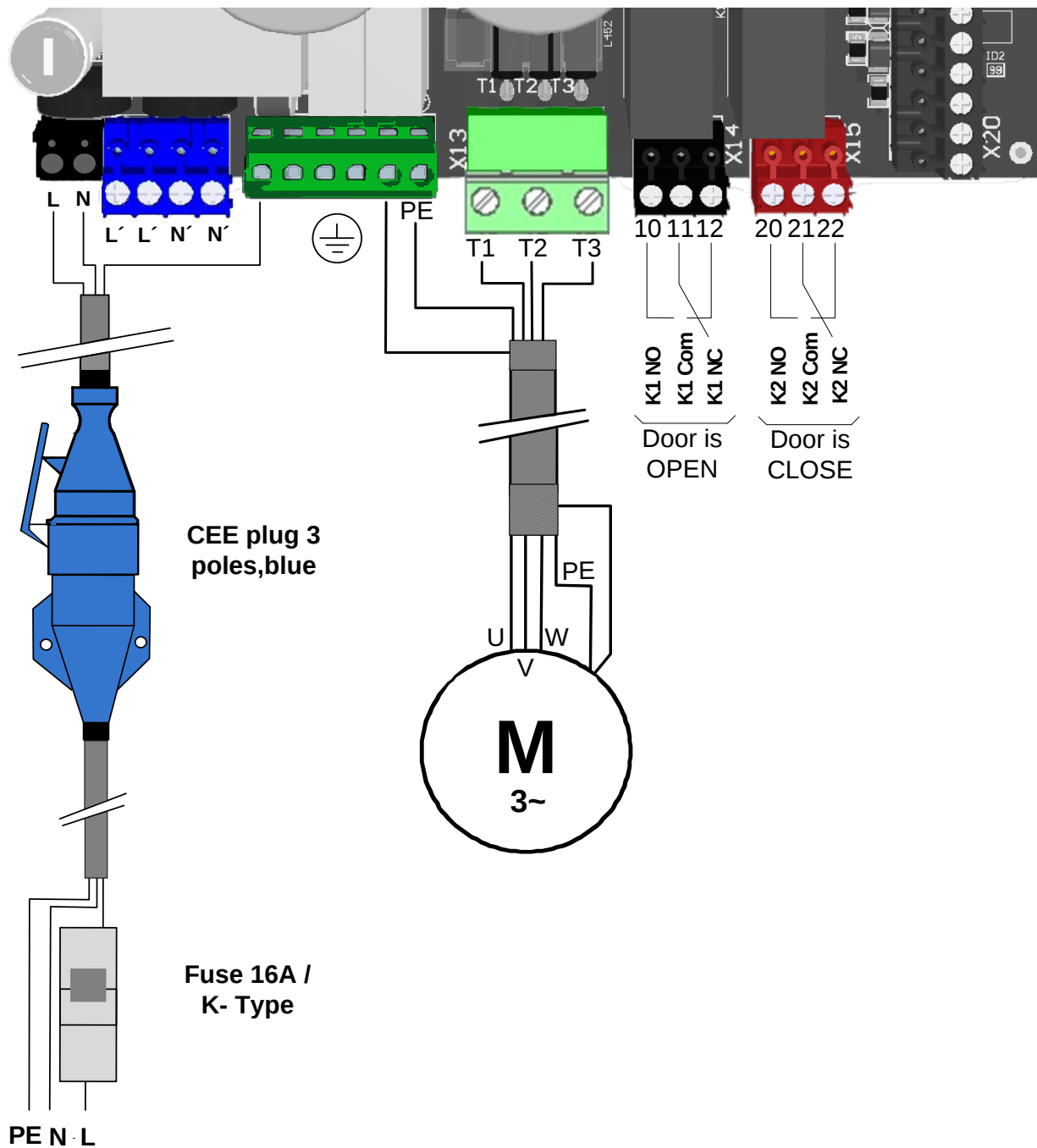


Figure 19: Overview of the relay outputs



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

5.9 Overview of inputs

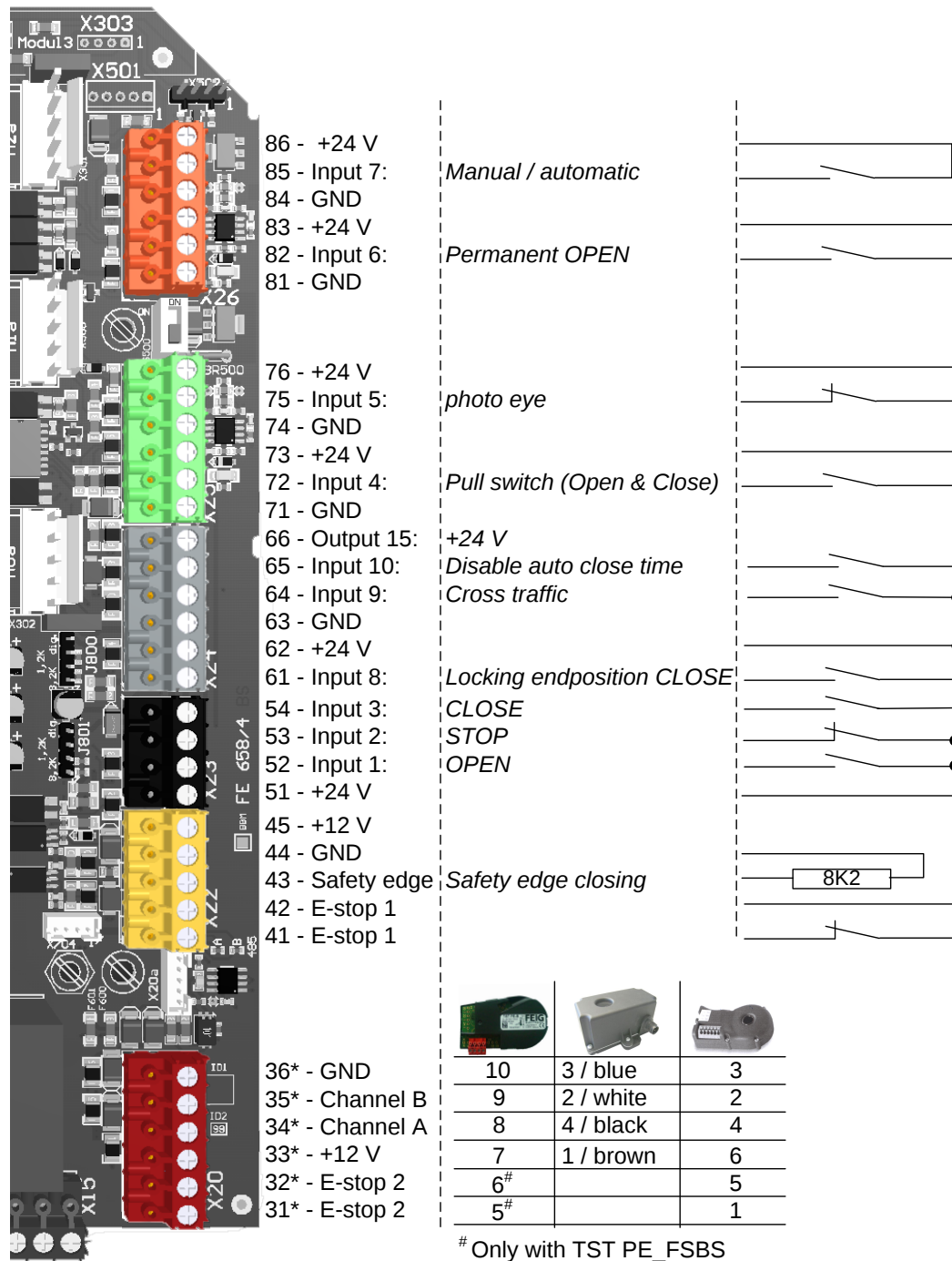


Figure 20: Overview of inputs



On the control option -B, input 10 is used as a second safety edge monitor.
For the connection of mech. limit switches, please refer to section 5.4.4 Mechanical limit switches.

IMPORTANT

Before you start the controller, check the electrical connection once more. Incorrect connections may damage the unit.

6 Optional plug-in and expansion cards

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

6.1 Wireless receiver TST FFE

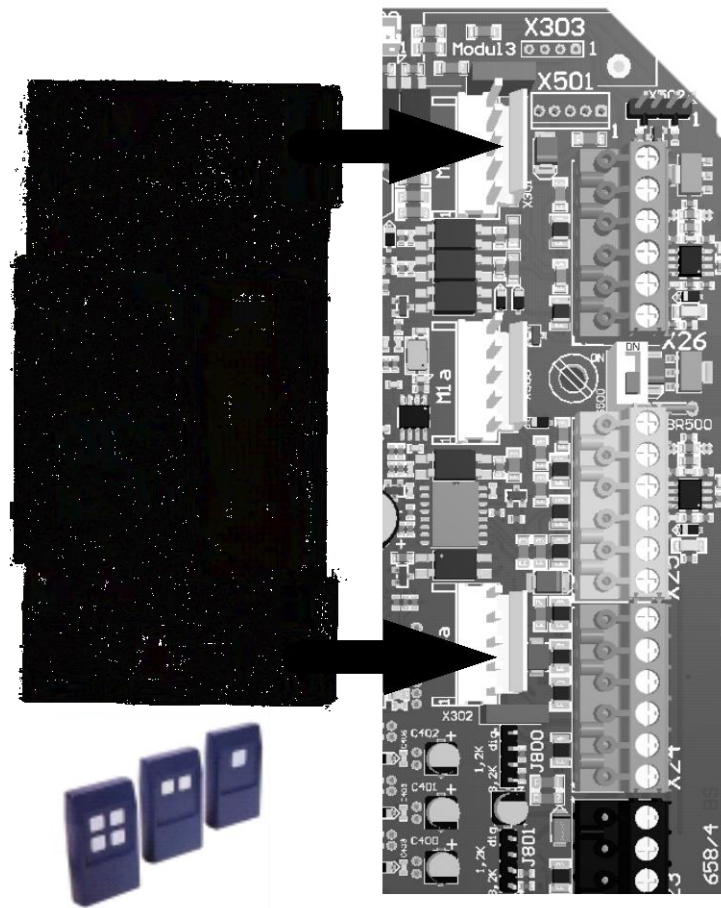


Figure 21: Wireless plug-in receiver



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

6.2 Induction loop monitor TST Suvek

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

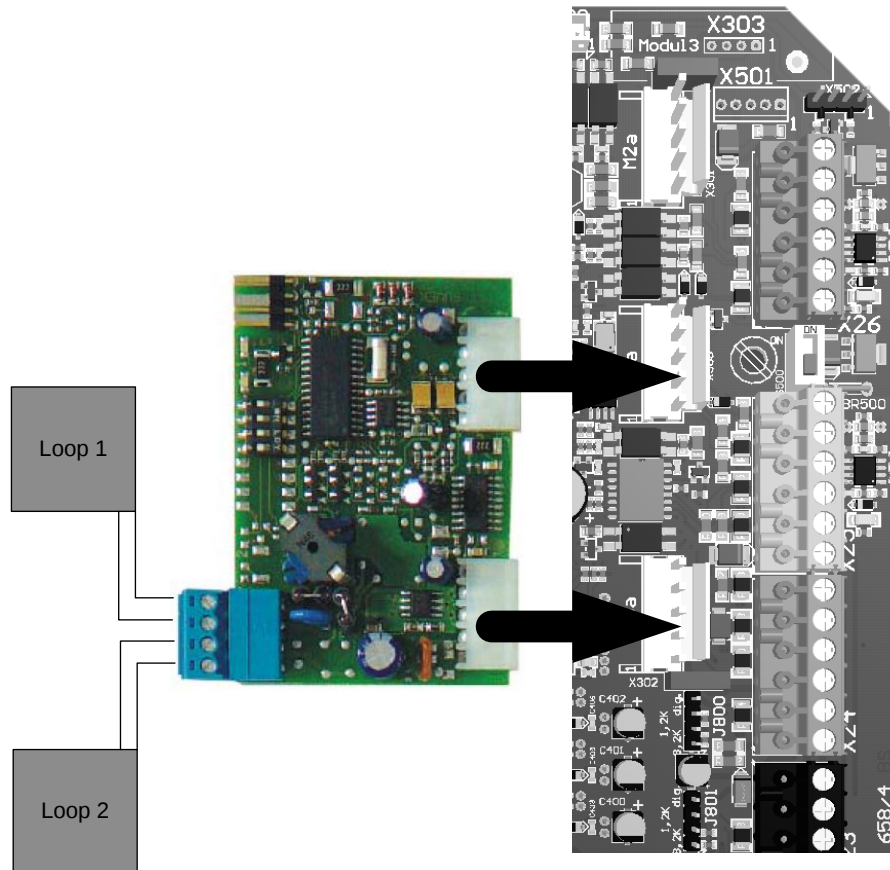


Figure 22: Detector card



To activate the slot for the detector, parameter P.802 must be set to 0302.
It is not possible to operate detector cards in version -A

6.3 Safety edge monitor TST SURA

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

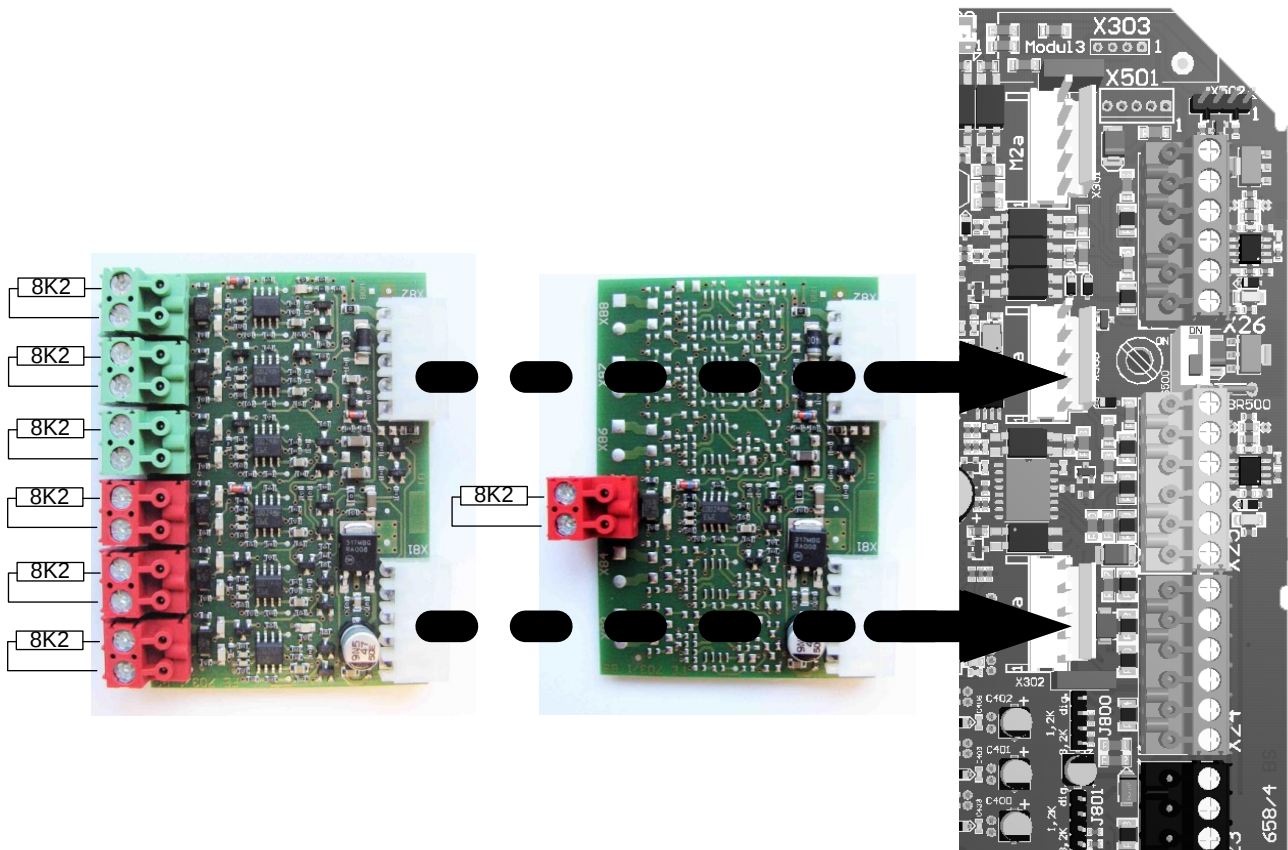


Figure 23: Safety edge monitor



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
The operation of safety edge monitors is not possible in version -A

6.4 Expansion card RFUxK

Expansion card TST RFUxK can optionally be plugged in and has an 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.

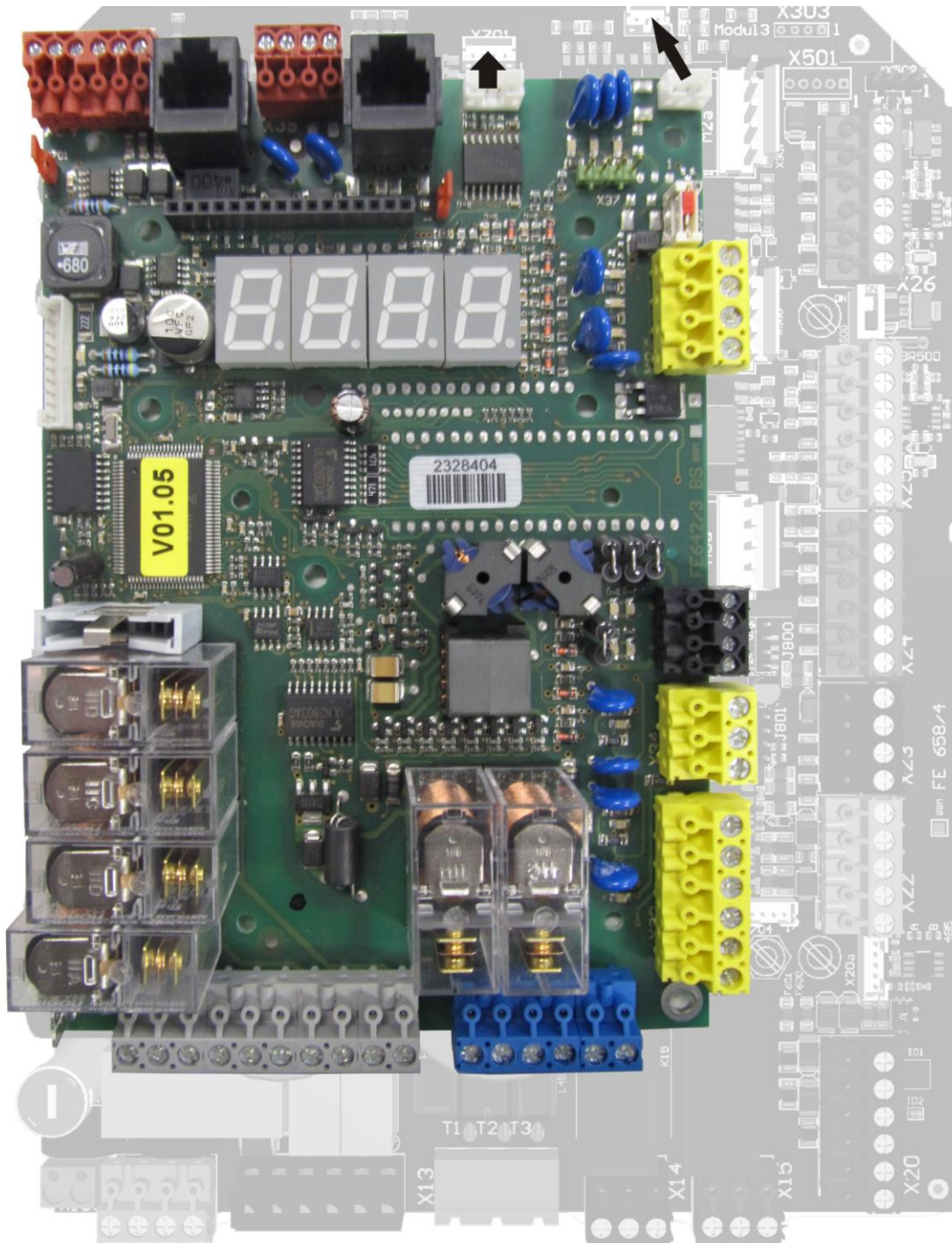


Figure 24: TST RFUxK expansion card



Activate the expansion card by setting the parameter P.800 to 5
The card can operate in versions-B,-CGH and CXGH

6.5 Interface card TST RFUF-COM

Optionally, the interface card TST RFUF-Com provides an RS-485 and a CAN interface. With these, for example, it is possible to establish connections with partner controller or to a remote TST RFUxK board.

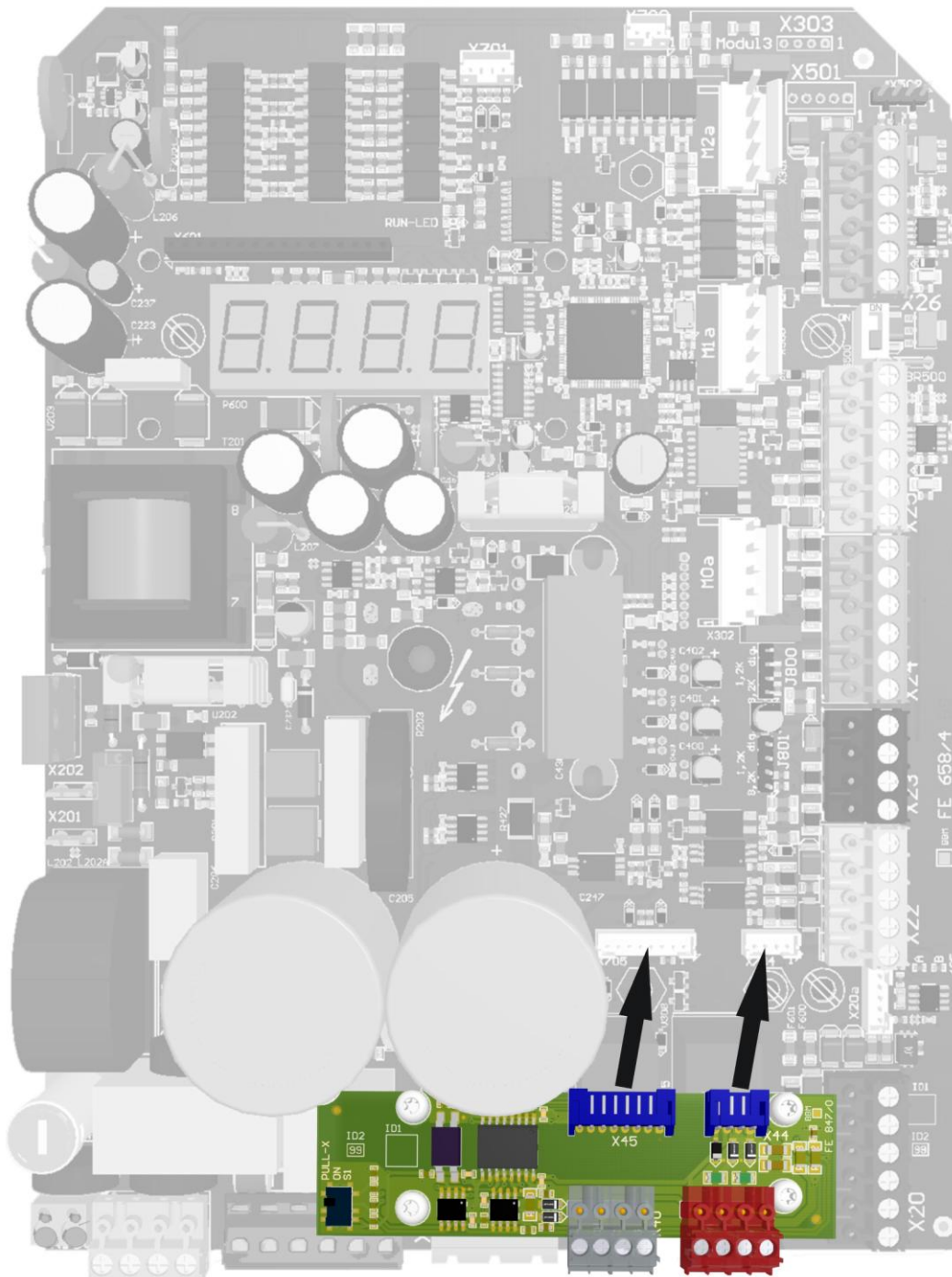


Figure 25: Interface card TST RFUF-Com



The interface card cannot be used in version -A

6.6 Auxiliary relay TST RFUxRel

Auxiliary relay TST RFUxRel 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.

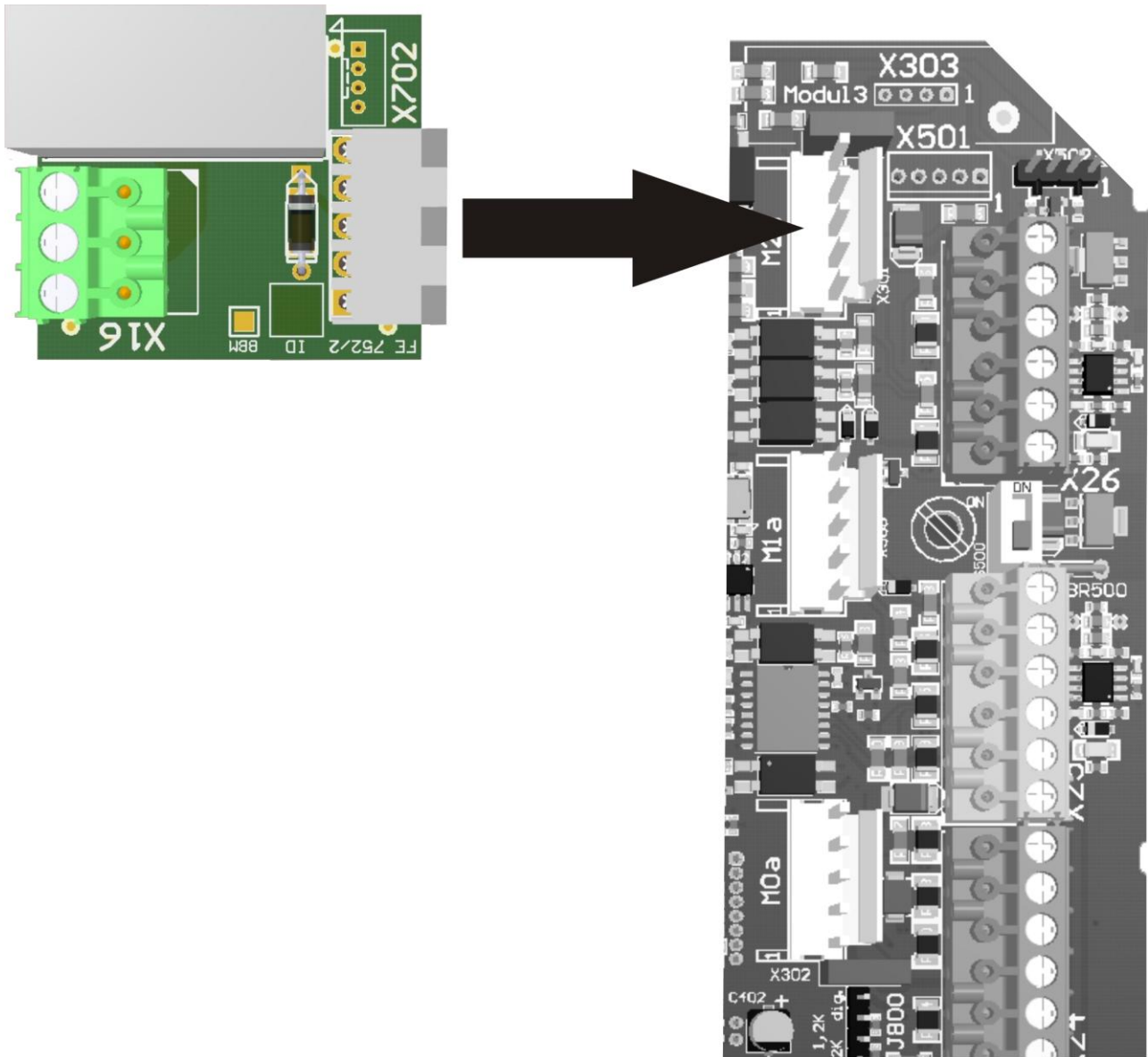


Figure 26: Auxiliary relay TST RFUxRel

6.7 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.

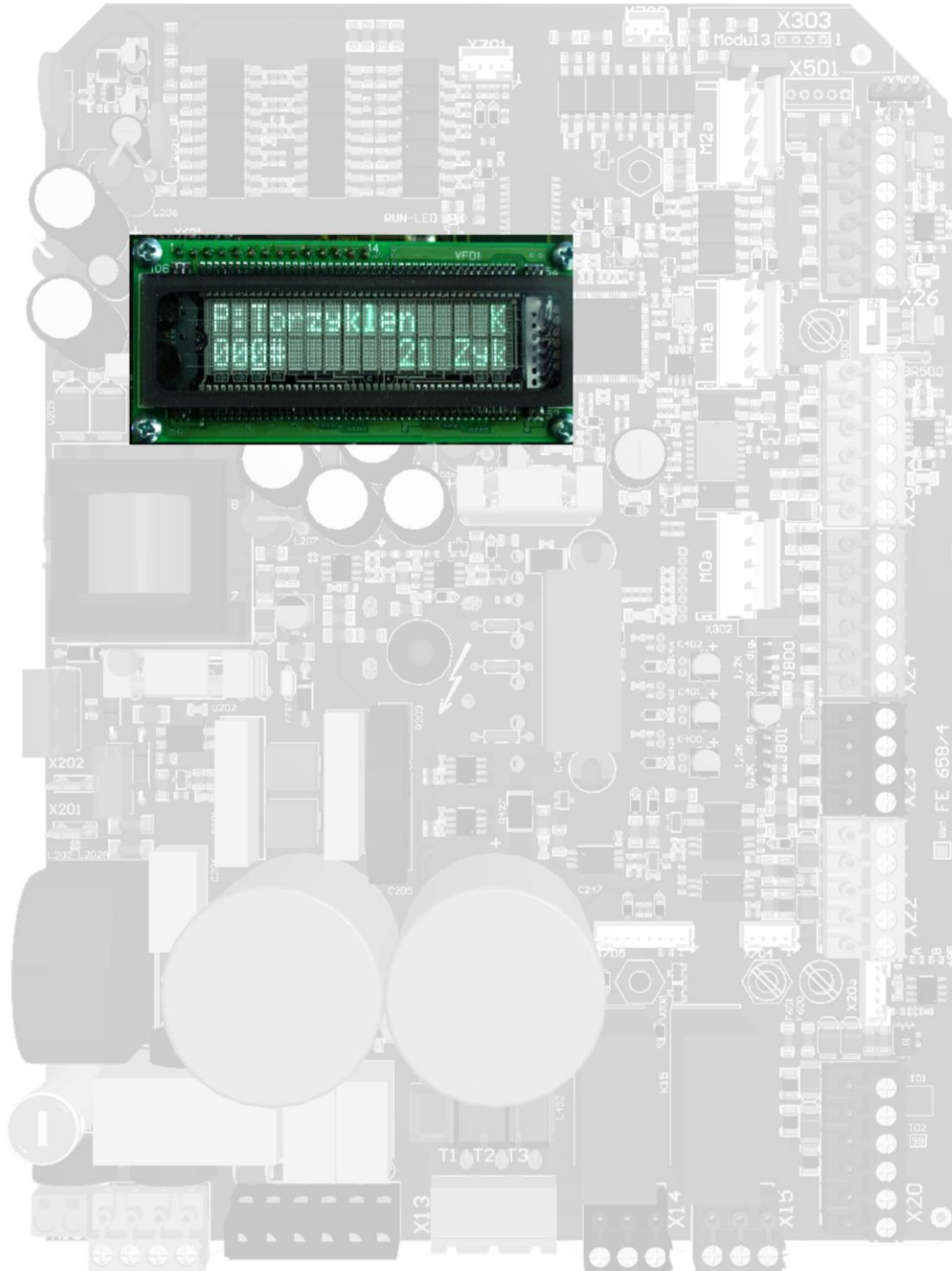


Figure 27: LCD text display



The text display cannot be used in version-A

7 General operating instructions to set parameters

7.1 Open the parameter operation mode

1.  Turn off the gate 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.

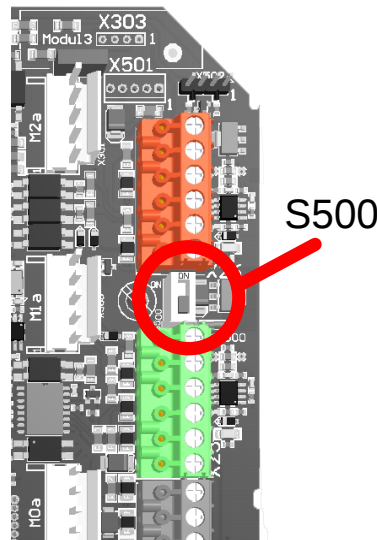
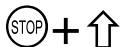
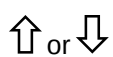


Figure 28: DIP switch position



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 these pressed simultaneously to reach the parameter selection. (the display will either show **1: real text display** or **2: 7-segment display**)
5.  Use the arrow keys to select the required parameter.



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

P: Torzyklen		P. 000
000#	1234Zyk	

P: Offenhalt1		P. 0 10
010=	10 s	

7.2 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		P. 0 10
010=	10 s	

P: Offenhalt1		10
010=	10✓s	
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		9*
010=	9?s	
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		10
010=	10✓s	

P: Offenhalt1		9
010=	9✓s	

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

P: Offenhalt1		P. 0 10
010=	9 s	

7.3 Exit parameter operation mode

-  Keep the STOP button pressed for approx. 3 seconds in order to leave the parameter mode and change to the gate mode:
- | | | |
|-----------------|--|----------|
| FEIG ELECTRONIC | | _* E u _ |
| xxxx Cycles | | |

7.4 Execute a reset

-  +  +  press simultaneously and keep pressed for approx. 3 seconds.

7.5 Entry into the extended parameter configuration mode

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

P.999 = 2 (extended commissioning mode)

P: Passwort		P. 9 9 9
999=	0001 #	

P: Passwort		0 0 0 1
999=	0001✓#	

P: Passwort		0_* 0_* 0_* 2_*
999=	0002?#	

P: Passwort		P. 9 9 9
999=	0002✓#	

8 Basic settings

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

8.1 Automatic query of basic data

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



The DIP switch S500 must have been turned on (see Figure 28: DIP switch position for DIP switch S500 position) so that the controller can query the parameters automatically.

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

The controller uses the 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. See chapter 6 (General operating instructions to set parameters).

For the operation of the controller, see chapter: 7 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 15: Connecting cam switches)

P.205: 0001 = Mechanical limit switches Version 2 (limit switches and pre-limit switches are normally closed)

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 Mode

- **Motordaten P.100 – P.103**

The gate 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.

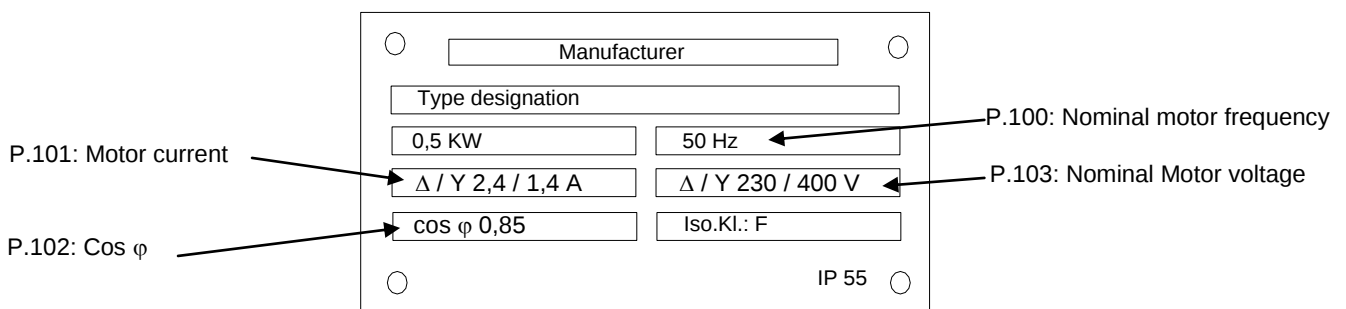


Figure 29: Typical motor nameplate (may vary)



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

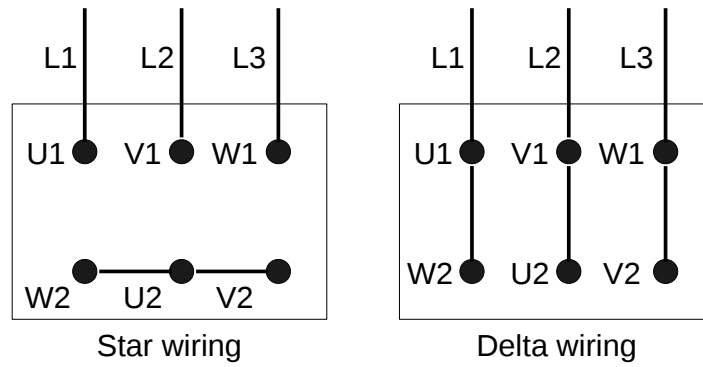


Figure 30: Star/Delta wiring



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.

9 Start up...

WARNING

Before starting the controller, check the electrical connections and the correct installation of the plug-in cards.

After start up, 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.

9.1 ... with absolute encoder or incremental encoder

1. Open CALIBRATE mode by briefly pressing the  STOP key.
2. Move the gate to the CLOSE position with the membrane keypad CLOSE and

!Eichen! 0 Start mit 	E I C H
---	---------



If the gate moves in the incorrect direction: incorrect motor rotary field, turn off controller and reverse the 2 motor connections. If the gate does not move, the motor lacks power. The power to the motor can be increased by using the Boost option (increased power at low speed) (see Chapter 9.4), if necessary, check that the brake was released.

3. save by pressing the  STOP key for approx. 3 seconds.

Zur Zupos. → 	E * * E * u *
0 Übern. mit 	

4. Move the gate to the OPEN position by means of membrane keypad  OPEN and by

Zur Aufpos. → 	E * * E * o *
xxx Übern. mit 	



If the gate does not move, the motor lacks power. The power to the motor can be increased by using the Boost option (see Chapter 9.4) if necessary, check that the brake was released.

5. Save by pressing the  STOP key for approx. 3 seconds.



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

6.  press briefly, the gate moves down and is now taught in its position.

Auf pos. OK	- * E o -
-------------	-----------

Tor schließt I.555 Lern Fahrt	I . 5 5 5
----------------------------------	-----------

Zu pos. OK	- * E u -
------------	-----------

7. Now press  , repeat the process until the correction travel has completed. (Display I.510 = OK)

Tor öffnet I.515 Korr. Fahrt	I . 5 1 5
---------------------------------	-----------

I.510 Korrek. OK	I . 5 1 0
------------------	-----------

Tor öffnet	o A U F
------------	---------

Tor schließt	2 * u F o
--------------	-----------

9.2 ... with mechanical limit switches

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

If the door does not move, the motor lacks power. The power to the motor can be increased by using the Boost option (see chapter 9.4), 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 gate moves in the incorrect direction: incorrect motor rotary field, turn off controller and reverse the 2 motor connections.

2. Set lower pre-limit switch so that it just trips
3. Press the CLOSE-key  to move the gate to a distance of approx. 10cm 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. Set lower limit switch so that it just trips



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

5. Press the OPEN-key  to move the gate to a distance of approx. 50cm from the opened position



If the gate does not move, the motor lacks power. The power to the motor can be increased by using the Boost option (see chapter 9.4), 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. Set upper pre-limit switch so that it just trips.

7. Press OPEN-key  to move the gate to approx. 10cm 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. Press  STOP and  OPEN to enter parameterization 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 the door from moving unintentionally, adjust the limit switches only when the Emergency-STOP is activated or with the controller turned off !

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

9.3 Renewed request for "learning" limit 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 = Renewed teaching of all limit positions

9.4 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%. Too much boost will result in an overcurrent fault (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 parameterizing mode by pressing  STOP and  OPEN buttons simultaneously.
2. Open Boost parameter by pressing the   arrow keys. Boost can be set separately for OPEN and CLOSE.
Boost for Open: 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 parameterization 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.

10 Movement optimization for the gate

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.

10.1 Opening of the door

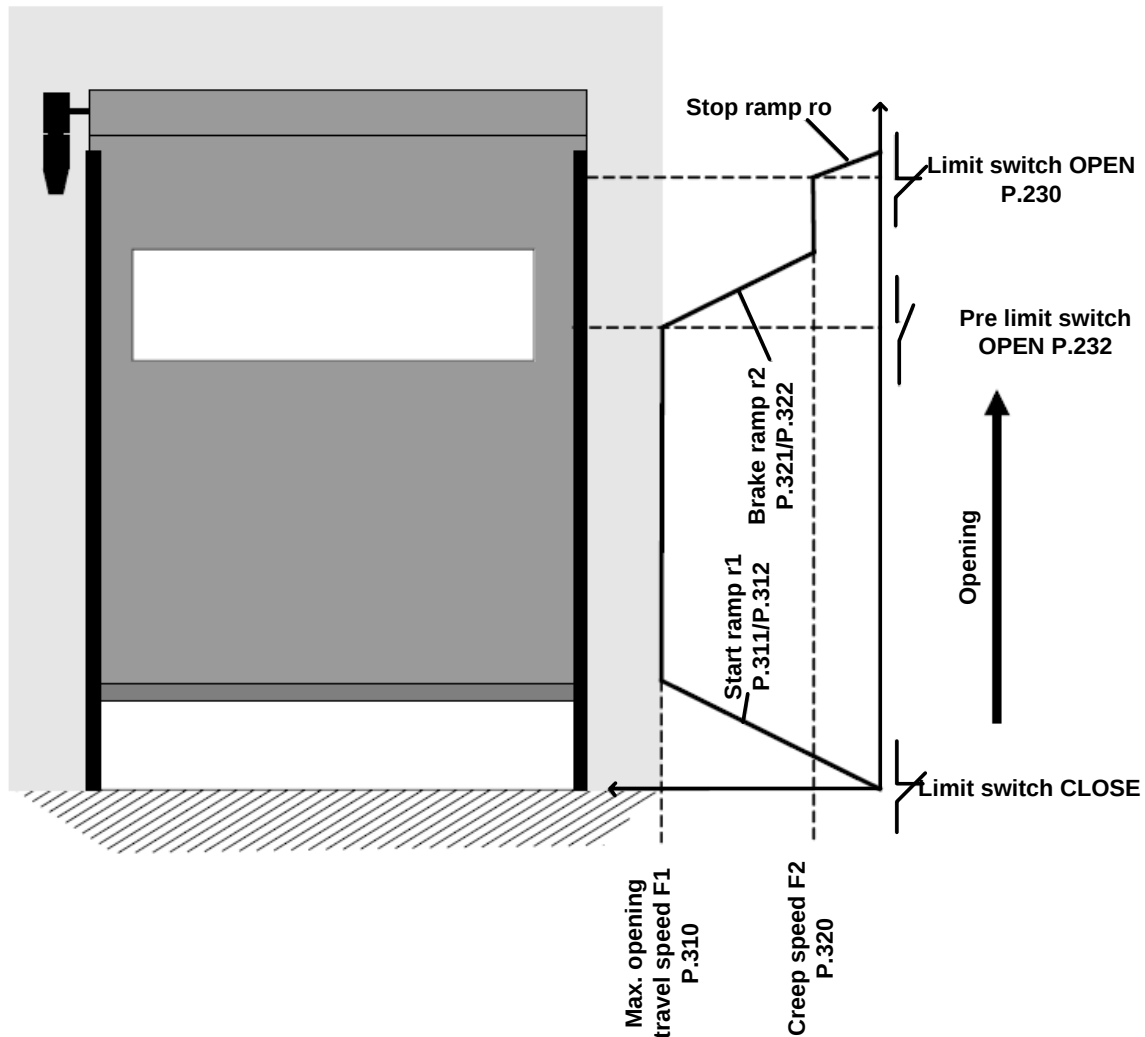


Figure 31: Opening using frequency converter

The frequency converter starts 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).

10.2 Closing of the door

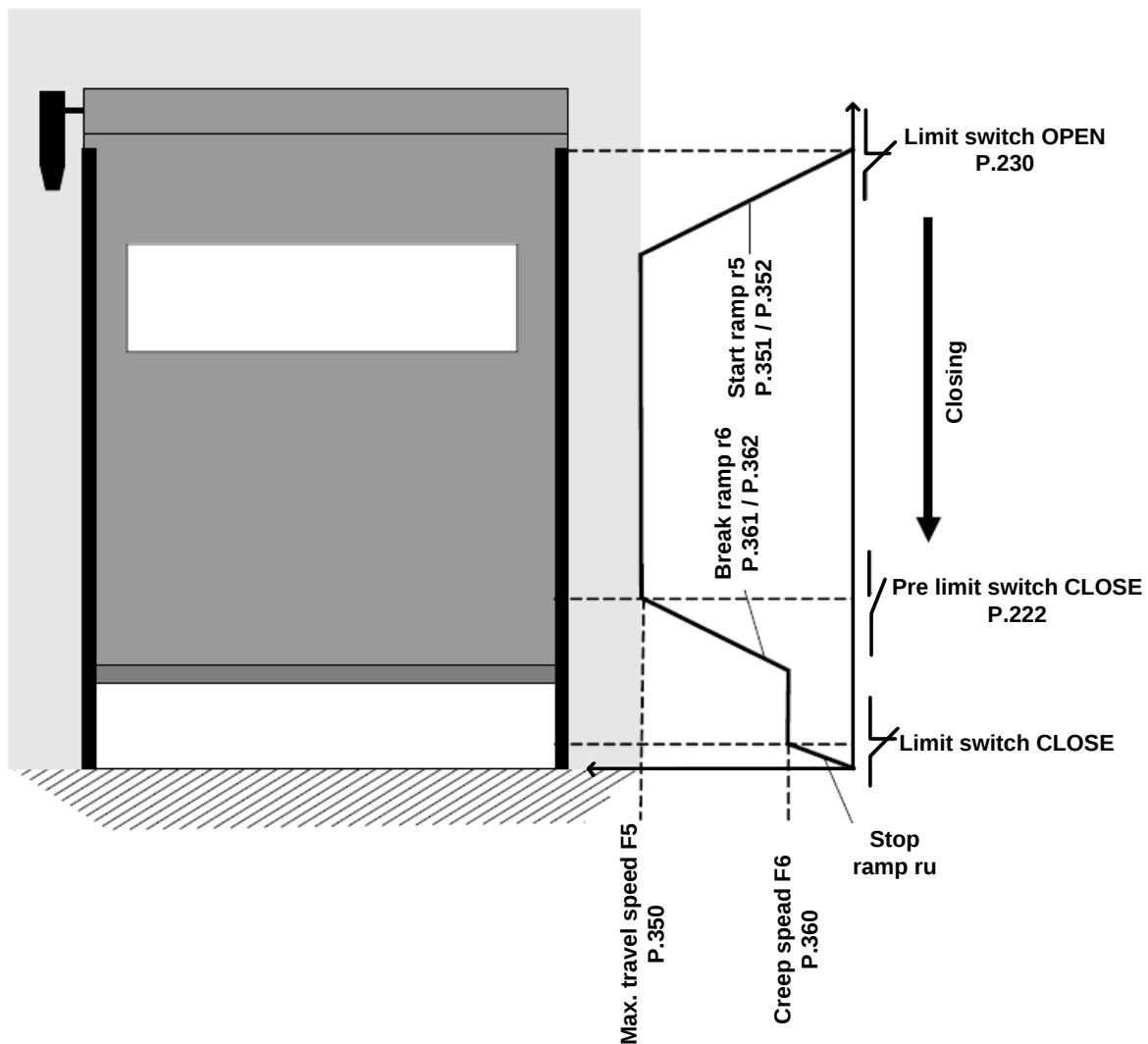


Figure 32: Closing using the frequency converter

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 the limit position CLOSE is reached. At this point the door is braked to the creep speed frequency 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).

10.3 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 states the distance to the gate CLOSED absolute limit switch. 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 end position Door OPEN: The parameter value states the distance to the gate OPEN absolute limit switch. The brake ramp "r2" is initiated with the prelimit switch. The slope of the ramp is set with parameter P.321 or P.322.



If the automatic setting of the prelimit 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!

10.4 Ramp configuration

The ramps are used by the gate 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 gate. If the ramp is flatter the gate 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 closing speed.

P.361 / P.362 = Brake 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 0Hz 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.

10.5 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.

11 Functions

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

12 Overview of messages

12.1 Error messages

Faults can be acknowledged provided they are not reset automatically.



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

Therefore keep the STOP button kept pressed for approx 5 seconds.

Error No.	Description	Possible reason for error
F.000	Door position too far up	• Too small a parameter value for upper emergency limit switch → enlarge P.239 • Upper limit switch range (limit switch band) too small → enlarge P.233 • Mechanical brake defective or improperly set
F.005	Door position too far down	• Too small a parameter value for lower emergency limit switch → enlarge P. 229 • Lower limit switch range (limit switch band) too small → enlarge P. 223 • Mechanical brake defective or improperly set
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
F.030	Lag error (position change of the door is less than expected)	• gate 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 limits new (P.210 = 5) • Too much „pancaking“ when starting, brake releases too soon, or too little torque, adjust boost (P.140 or P.145) as necessary.

Error No.	Description	Possible reason for error
F.033	Bad position transmitter protocol	• Fault on the bus of 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.061	Belt breakage	An input configured as belt breakage sensor (P.50x = 0416) was activated. As long as the display flashes quickly, movements are not permitted -> acknowledgment required. Brief foil keyboard stop permits deadman moves. When the belt break was repaired mechanically and the input is no longer active an automatic acknowledgment is issued when the deadman closing movement reaches the closed.
F.063	Balance error on loop 3	• disturbing surrounding • Loop out of tolerance range
F.064	Balance error on loop 4	• disturbing surrounding • Loop out of tolerance range
F.080	Fault: 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.201	Internal E-Stop „push-button“ tripped or Watchdog (computer monitor)	• E-Stop chain was interrupted starting at input „internal EStop“ without parameterizing mode having been selected • Internal parameter or EEPROM checks defective, pressing the STOP key provides additional information about the cause
F.211	External E-Stop 1 tripped	• E-Stop chain was interrupted starting at Input 1
F.212	External E-Stop 2 tripped	• E-Stop chain was interrupted starting at 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

Error No.	Description	Possible reason for error
F.361	Number of trips of the Safety input D, normally this is the integrated safety edge evaluation, has reached set limit	• Parameterized, maximum number of trips of the safety input D during a door cycle was exceeded → To reset close the door in deadman mode • Check the set number of 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 shown • Dynamical optical safety edge 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
F.365	Redundancy error with interruption	• One of the processing channels for interruption detection does not react identically with the second channel → Controller board defective, if no other error message F.3xx is shown • Dynamic optical system connected but not set in Parameter P.460
F.366	Too high a pulse frequency for optical safety edge	• Defective optical safety edge • Defective input for internal safety edge
F.369	Internal safety edge incorrectly parameterized	• An internal safety edge is connected but deactivated → set P.460 to the used edge type
F.36A	Redundancy error of the 8K2 slip door switch on the internal safety edge evaluation unit	• One of the contacts of the redundant 8k2-wicket door switch is defective • The slip door was not fully opened or closed
F.371	Number of trips of the Safety input E, normally this is the integrated safety edge evaluation, has reached set limit	• Parameterized, maximum number of trips of the safety input E during a door cycle was exceeded → To reset close the door in deadman mode • Check the set number of 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

Error No.	Description	Possible reason for error
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-wicket 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 edge	• Defective optical safety edge • Defective input for internal safety edge
F.389	Safety input incorrectly parameterized	• An safety edge is connected but deactivated • Safety input wrong jumper (as digital input jumpered but as safety edge set)
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

Error No.	Description	Possible reason for error
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.400	Controller hardware reset detected	• Excessive noise on supply voltage • Internal watchdog tripped • RAM error
F.401	Watchdog Error	• Internal Watchdog has released
F.40A	Software Exeption	• Internal Error
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 interference / defective / missing • Feed voltage much to high • Motor feeds back too much energy in generator mode, door motion energy cannot be sufficiently brought down
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 cooler outside of working range Limit 1	• Excessive load on final stages or brake chopper • Ambient temperature too low for controller operation • Clock frequency of final stage too high (Parameter P.160)
F.435	Housing temperature high	• The temperature inside the controller housing is to high

Error 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)
F.512	Offset motor current / DC-bus current faulty	• The controller hardware is broken
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 • Motor rated current setting extremely wrong (P.100) • Extremely too much boost (P.140 or P.145) • Motor incorrectly dimensioned • Motor winding defective • Momentary interruption of the E-Stop circuit.
F.520	Overvoltage in DC-bus Limit 2	• Brake chopper interference / defective / missing • Feed voltage much to high • Motor feeds back too much energy in generator mode, door motion energy cannot be sufficiently brought down.
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 line supply input	• The line supply for the Controller is to high • The line supply fluctuates very extremly
F.530	Heatsink temperature outside of working range Limit 2	• Excessive load on final stages or brake chopper • Ambient temperature too low for controller operation • Clock frequency of final stage too high (Parameter P.160)
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

Error No.	Description	Possible reason for error
F.601	Bad LGB reception qualität	Poor reception quality when the light curtain is started
F.610	LGB light line alignment	Light line alignment has not been done.
F.612	LGB RS485	RS485 communication failure -> Insufficient valid pos. data
F.615	LGB Int. transmitter	Internal transmitter error Includes .: - RAM test fail - ROM test fail - Program run error - Sync error - Addressing module defective - Dark test fail - DA converter defective Replace hardware!
F.621	LGB test error (transmitter)	test error for the internal transmitter system test
F.622	LGB test error (receiver)	test error for the internal receiver system test
F.626	LGB test error (Out 1)	Test / wiring error of output 1
F.627	LGB test error (Out 2)	Test / wiring error of output 2
F.700	Position sensing defective	For 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 too 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 too small (P.239)

Error No.	Description	Possible reason for error
F.752	Timeout with protocol transmission	• Interface cable defective / interrupted • Channel A and B connected over cross • Absolute encoder processor electronics defective • Defective hardware or electrically noisy environment • Take a control cable with shield • Adjust 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.801	Wrong Test of input 1 of the mobile unit TST FSx	• Input 1 of the mobile unit was tested wrong • The device which is connected to the input does not work correct • 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 correct • 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 wrong • The device which is connected to the input does not work correct • 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 wrong • The device which is connected to the input does not work correct • 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

Error No.	Description	Possible reason for error
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	Wrong Test of output 1 of the stationary unit TST FSx	• The output 1 of the stationary unit was tested wrong • The cable between stationary unit and controller is broken or not connected • The stationary unit is defective • Parameter P.5xb, P.47b or P.465 wrong adjusted
F.812	Wrong Test of output 2 of the stationary unit TST FSx	• The output 2 of the stationary unit was tested wrong • The cable between stationary unit and controller is broken or not connected • The stationary unit is defective • Parameter P.5xb, P.47b or P.465 wrong adjusted
F.813	Wrong Test of output 3 of the stationary unit TST FSx	• The output 3 of the stationary unit was tested wrong • The cable between stationary unit and controller is broken or not connected • The stationary unit is defective • Parameter P.5xb, P.47b or P.465 wrong adjusted
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
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

Error No.	Description	Possible reason for error
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 sdge is faulty
F.843	Frequency error on input 3 of mobile unit	• The connected optical safety sdge 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 is shown when the controller don't have RS485 communication for min. 1 second with the stationary unit of 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.856	Communication error between mobile and stationary unit	This error is shown when the stationary unit don't have communication for min. 1 second with the mobile unit of TST FSx. 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 connecteed or missing • Moile unit or stationary unit is 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.
F860	Internal fault stationary unit	Internal system fault on the stationary unit.

Error No.	Description	Possible reason for error
F.861	Internal fault mobile unit	Internal system fault on the mobile unit.
F.862	Internal positioning system error	Internal error of the positioning system. Presumably, the magnet is not attached properly.
F.867	Adresse of mobile unit not set	• The adresse of the mobile unit was not set so far • The adresse has to be set in Parameter P.F07 • The adresse 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	• Wrong EPROM code • Defective hardware or noise-saturated environment
F.912	RAM error	• 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	E-Stop chain not complete	• Not all E-STOP inputs are separately jumpered although the entire E-Stop chain is jumpered • Redundant checking of the E-Stop chain tripped
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.	• min. one of the motor cables is not or not good 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 noise-saturated environment

Error No.	Description	Possible reason for error
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 SystemStack overflowed • Possible software error due to recursive invocations (e.g. profile)
F.942	RAM Error des IO Prozessors	• RAM Error of IO Prozessors
F.960	Wrong 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
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 know the hardware version • The controller hardware is broken
F.968	Programming error with Real time clock	• The Clock is not programmed plausible
F.969	Internal error Real time clock	• The clock has an error → make a reset
F.970	Plausibility Param.block error	• New EPROM version • Controller not yet initialized • Some parameter is implausible

12.2 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 aktiv
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
I.211	Limit switch not plausible
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.510	Correction drive finished
I.515	Active correction drive
I.520	• Pre limit switch reached before full speed was reached --> adjust ramps • Current limiter prevents the driving in full speed --> Inverter or motor are working on their limits --> 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 sensor is too low to maintain robust light curtain operation. More increments are required per door move . (Message only occurs when DIP ON.)
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

13 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)
▢AUF	opening active
-E1-	middle limit position E1 (intermediate stop position)
≡E1≡	middle 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
≡ES≡	E-stop → Travel not possible, hardware safety chain interrupted
HdSA	E-travel → Deadman travel without regard for safety facilities, etc.
'Hd'	manual → Deadman mode
ParA	parameterization
SYNC	Synchronization (incremental encoder / limit switch à Pos.unknown)
'Au'	automatic → indicates change from "Manual" to "Automatic" status
'Hc'	semi-automatic → indicates change from "Manual" to "Semi-automatic"
FUZ	Initial display after power up (Power Up and self-test)
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 upper 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.u.	Synchronization of lower limit position requested (deadman or wait for starting condition)
S.y.E.o.	Synchronization of upper limit position requested (deadman or wait for starting condition)
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 
Status messages during dead man movement:	
Hd.cL	Deadman closing (membrane key: CLOSE)
Hd.oP	Deadman opening (membrane key: OPEN)
Hd.Ec	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 E-Stop "mushroom button" tripped
E.211	external E-Stop 1 tripped
E.212	external E-Stop 2 tripped
Safety edge in general	
E.360	activation of internal safety edge 1
E.363	internal safety edge 1 faulty
E.370	activation of 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 bar
E.383	Interruption of the 2nd internal safety bar
E.3F0	Triggering of the 2nd external safety bar
E.3F3	Interruption of the 2nd external safety bar
Wireless plug-in module	
E.401	Wireless Channel 1
E.402	Wireless Channel 2
Induction loop detector	
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

14 Specifications

Housing dimensions (W x H x D)	Version –A / -B: 182 x 328 x 102 mm (with spacers) Version –C / -CX: 182 x 328 x 121 mm Version –CGH / -CXGH: 210 x 420 x 200 mm	
Installation	Vertical using wall bracket on housing bottom	
Supply voltage over L, N, PE:	230 VAC $\pm 10\%$, 50...60 Hz permissible range: 110...240V $\pm 10\%$ / 50...60Hz. Fuse: 16A K characteristics	
Controller idling current:	max. 30W when fully configured (fused on the circuit board via F200: 250 mA fine-wire fuse 5 x 20 mm)	
External supply 1 (depending on supply): terminal L1:	corresponds to terminal voltage at terminal L ((fused on the circuit board: F200 / 4 AT)	
Controller voltage / external supply 2	24 VDC regulated ($\pm 10\%$ at nominal voltage 230 V) Version –A: max. 250 mA Version –B / -C / -CX / -CGH / -CXGH: max. 500 mA incl. optional plug-in modules. Fuse protected by means of self-resetting semiconductor fuse. Short circuit protected using central switching regulator.	
Control voltage / external supply 3	For electronic limit switches and safety edge Nominal value 11.3V / max. 130mA	
Controller inputs Inputs1-10 in version-C/-CX/-CGH/-CXGH Inputs 1 – 9 in version -A	24 VDC / typ.15 mA, max. 26VDC / 20mA all inputs must be connected potential-free or: < 2 V: inactive $\rightarrow$ logical 0 > 17 V: active $\rightarrow$ logical 1 min. signal duration for input controller commands: > 100 ms Galvanic isolation using on-board opto-couplers	
Input IN10 Version -B	Evaluation for slip door switch with 8,2 k Ω 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 / E-STOP terminals: emergency-stop ext.31/32 and 41/42:	all inputs must be connected potential-free Contact load capacity: ≤ 26 VDC / ≤ 120 mA When the safety chain is interrupted no movement of the drive is possible, not even in deadman mode Not jumpered from the factory	
Safety edge input:	or electrical safety edges with 1.2k Ω or 8.2k Ω termination resistor and for dynamic optical systems.	
Relay outputs	when inductive loads are being controlled (e.g. additional relays or brakes) they must be equipped with appropriate suppressors (free-wheeling diodes, varistors, RC elements)	
Relays K1 and K2:	Changeover contact, potential-free min. 10 mA max. 230 VAC / 3 A	 ATTENTION Contacts which have been used once for power switching can no longer switch extra-low voltage
Drive output Version –A / -B / -C / -CGH	for drives up to 0.75KW at 230 V Motor constant current at 100% duty factor and 40°C ambient temperature: 3A Motor constant current at 40% duty factor and 50°C ambient temperature: 5A Max. length of motor cable: 30m	

Drive output Version -CX / -CXGH	for drives up to 1,5KW at 230 V Motor constant current at 100% duty factor and 40°C ambient temperature: 5A Motor constant current at 40% duty factor and 50°C ambient temperature: 8A Max. length of motor cable: 30m
Brake chopper and resistor version C / CX / CGH / CXGH	max. 1.5 kW max. 0.5 sec repetition rate min. of every 20 sec  ATTENTION the heat sink and braking resistor on the rear of the enclosure can reach temperatures of up to 85°C. In case of failure this can reach 280 °C (<5 min.)!
Temperature range: Operating	-20...+50°C
Temperature range: Storage	-20...+70°C
Relative humidity	up to 95% non condensing
Noise Emission:	<20 dB (A)
Protection class	IP54 (only in respect of enclosure)
Weight	approx. 5 kg
Equipment mobility:	stationary
Equipment type:	motor appliance, external motor is not part of the delivery from FEIG ELECTRONIC GMBH
Protection class:	Protection class I

15 Directives und Standards

Type tested to:	Standards:
Machinery Directive	device complies with Annex IV categories of machinery - Section 21: "logic unit for safety functions" "EN ISO 13849-1:2008 Safety of machinery – safety-related parts of control systems – part 1: General design principles • Category: 2 • Performance Level (PL): d • Safe functions: - o Endpoint detection - o Contacting edge evaluation (8,2/1,2 kΩ or optical) - o photo eye incl. pull-in protection (comp. EN 12453 table 1: type D or type E with test) - o Slip door switch - o Slack rope switch - o Plug-in module TST SURAx - o Wireless safety system TST FSx EN 62061:2005 Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems (IEC 62061:2005) • Safety integrity levels (SIL): 1
Low-Voltage Directive: 2014/35/EU	EN 60335-1:2012 Safety of electrical appliances for household and similar use / Part 1: general requirements machines • Type: stationary motor-driven • Protection class 1 EN 60335-2-103:2003 Safety of household and similar electrical appliances - part 2-103: Special requirements for drives for industrial gates, doors and windows
EMC Directive: 2014/30/EU	Electromagnetic compatibility – basic technical standards: EN 61000-6-1:2007 interference immunity, living area EN 61000-6-2:2006 interference immunity, industrial area EN 61000-6-3:2011 Electromagnetic radiation, living area EN 61000-6-4:2011 Electromagnetic radiation, industrial area
Applied national specifications regarding the above directives:	EN 12453:2001 Safety in use of power operated doors - Requirements • Chapter 5.2 Drive Systems and Power Supply