FEIG ELECTRONIC

ADS AUTOMATIC DOOR SPECIALIST

Puertas & Portones Automaticos, S.A. de C.V.

¡Nuestra pasión es la Solución!....

CONTROLLER

Intelligent Door Management

Installation Manual

Mounting Instructions & Data Sheet

TST FU3F-AUx

TST FU3F-CUx

TST FU3F-DUx

TST FU3F-FUx

c UL US LISTED

c UL US

MANUAL DE INSTALACION

(229) 461-7028
portonesautomaticos@adsver.com.mx
ads.portonesautomaticos@outlook.com

RESIDENCIAL COMERCIAL INDUSTRIAL

MEMBER IDA International Door Association

V02.26

FEIG ELECTRONIC GmbH
Lange Straße 4
D-35781 Weilburg-Waldhausen
Tel.: +49 6471 3109-0
http://www.feig.de

TST FU3F-xUx UL Installation Manual 7.4 en.docx

Date of update: 2025-09-25
This edition replaces all earlier versions.
The specifications contained in this document may be changed without prior notice.

This manual is directed especially to persons involved with starting up / commissioning the TST FU3F door controller of FEIG ELECTRONIC GmbH. Starting up the door controller must be carried out only by officially trained electrical experts who are familiar with the safety standards of electrical drive and automation technology.
The entity which has placed the TST FU3F door controller in service is solely responsible for the completeness of the installation manual.
This manual shows only a small range of the door controller functions. Further functions and descriptions for individual door functions as well as more exact specifications for the door controller and hazard notes can be found in the main description.
The collecting of 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 following damages due to faulty or incomplete information.
Since mistakes can never be completely avoided in spite of our best efforts, we always welcome feedback.
The installation recommendations contained in this document presume favorable environmental conditions.
FEIG ELECTRONIC GmbH assumes no liability for perfect function in environments alien to the system.
FEIG ELECTRONIC GmbH provides no warranty that the information in this document is free of foreign copyrights. FEIG ELECTRONIC GmbH does not grant any licenses for its own or foreign patents or other copyrights in connection with this document. Warranty claims against FEIG ELECTRONIC GmbH are the right of the direct contractual partner only and are not transferable. Warranty is assumed only for the products supplied by FEIG ELECTRONIC GmbH. There is no warranty for the overall system.
The description of products, their use, capabilities and performance data are not to be taken as assured properties and are subject to technical changes.

General notes concerning this document

ATTENTION!
IMPORTANT SAFETY INFORMATION!
Follow the safety instructions in this manual.

The following symbols are used in this function description to alert the user to various hazards and useful tips.

⚠ WARNING

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

⚠ ATTENTION

Indicates that the door controller is at risk.

Points out information which is useful but not essential for the use of the door controller.

ATTENTION!
IMPORTANTES INDICATIONS DE SÉCURITÉ!
Les consignes de sécurité de cette notice de montage doivent être observées strictement.

Dans cette description fonctionnelle, les caractères suivants sont utilisés pour informer les lecteurs de certains aspects dangereux et leur fournir des idées utiles.

⚠ AVERTISSEMENT

Signifie un risque potentiel pour les personnes si la procédure n'est pas effectuée conformément à la description.

⚠ ATTENTION

Signifie un risque potentiel pour la commande de porte.

Met en exergue les informations utiles pour l'utilisation de la commande de porte mais pas absolument nécessaires.

Contents

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 UL 61800-5-1 and UL 325. A fully integrated frequency converter with power output stage can gently control the door with variable opening and closing speeds. The control system TST FU3F is designed to handle AC induction motors with a motor current of up to 12 A at 480 V supply for the variants FU3F-AU/-CU/-FU and 10 A at 240 V supply for FU3F-DU.
In addition to controlling the motor that drives the door, the door controller can be used for the following tasks:

- Positioning the door at and between its final positions (open, close and intermediate position)
- 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 controls
- Electronically protected 24 V low-voltage Class 2 power supply for sensors and control devices
- Safe 24 V brake
- 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 (see chapter 3 Accessories)

1.1 Validity

This manual is valid for the following door controller variants:

TST FU3F -AU(E)G
-AU(E)GG
-AU(E)XG
-AU(E)GN
-AU(E)GH
-AU(E)GNH

TST FU3F -CU(E)G
-CU(E)GN
-CU(E)GH
-CU(E)GNH

TST FU3F -FU(E)G
-FU(E)GN
-FU(E)GH
-FU(E)GNH

TST FU3F -AUPR
-CUPR
-DUPR
-FUPR

2 UL/CSA Guidelines

Guidelines to meet the UL/CSA requirements for the evaluation of a complete commercial / industrial door operator or system.

2.1 UL Certifications

Our door controllers have two separate UL approvals: A listing according to UL 61800-5-1 and CSA-C22.2 No. 274 (UL File E218753 as AC drive) and additionally a recognition according to UL 325 and CSA-C22.2 No. 247 (UL File E510925 as door control). Within the scope of the UL 325 and CSA-C22.2 No. 247 recognition, the safety edge inputs (43/44 and 63/65) have been tested for their suitability as "entrapment protection" according to UL 991. As follows we will explain all necessary measures including the Conditions of Acceptability of the Recognition according to UL 325. Any reference to a UL standard referenced below even refers to the associated CSA standard (as mentioned above).

UL - Listed		UL - Recognized	

Figures: UL Listing and Recognition Mark

2.2 Installation Requirements based on the UL 61800-5-1 Certification

The following ratings are based on **UL File E218753**.

No.	Installation Requirement
1.	Only for use in grounded WYE or Delta sources with a maximum voltage to ground of 300 V.
2.	Maximum Surrounding Air Temperature: 65 °C. These devices are intended for installation into enclosed panels without ventilation openings with minimum dimensions of 40 cm (Height) x 30 cm (Width) x 20 cm (Depth).
3.	Internal Overload Protection Operates prior to reaching the 115 % of the Motor Full Load Current.
4.	Models TST FU3F-DUPR: Suitable For Use On A Circuit Capable Of Delivering Not More Than 5000 rms Symmetrical Amperes, 208/240 Volts Maximum when protected by Class CC Fuses rated max. 20 A. Models TST FU3F-FUPR and TST FU3F-CUPR: 3 phase ratings: suitable For Use On A Circuit Capable Of Delivering Not More Than 5000 rms Symmetrical Amperes, 208/480 Volts Maximum when protected by Class CC Fuses rated max. 20 A. 2 phase ratings: Suitable For Use On A Circuit Capable Of Delivering Not More Than 5000 rms Symmetrical Amperes, 480 Volts Maximum when protected by Class CC Fuses rated max. 10 A. Models TST FU3F-AUPR: 3 phase ratings: suitable For Use On A Circuit Capable Of Delivering Not More Than 5000 rms Symmetrical Amperes, 208/480 Volts Maximum when protected by Class CC Fuses rated max. 10 A. 2 phase ratings: suitable For Use On A Circuit Capable Of Delivering Not More Than 5000 rms Symmetrical Amperes, 480 Volts Maximum when protected by Class CC Fuses rated max. 10 A. The Voltage Rating of the external Fuse(s) shall be at least equal to the input voltage of the Drives.

No.	Installation Requirement
5.	Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the Manufacturer Instructions, National Electrical Code, the Canadian Electrical code, part I", and any additional local codes. *Comment from FEIG: With installation of the fuses noted under 4. this requirement is full filled.*
6.	For Use in a Pollution Degree 2 environment only.
7.	Use 75° C Copper Conductors Only. Use AWG 14-12, solid wire for Grounding terminal (X100). The following tightening torque for field-wiring terminals shall be applied: Grounding Terminal X100: 0.79 Nm (7.0 lb-inch). Motor Terminal X13: 0.64 Nm (5.7 lb-inch). Terminals X17/X18: 0.45 Nm (4.0 lb-inch). X14/X15/X16: 0.45 Nm (4.0 lb-inch).
8.	During the UL evaluation, only Risk of Electrical Shock and Risk of Fire aspects were investigated. Functional Safety aspects were not evaluated. *Comment from FEIG: Since the UL 61800-5-1 does not incorporate functional safety requirements; the functional safety aspects have been evaluated according UL 325 (UL 991) as described hereinafter.*
9.	Interconnection of different Class 2 Outputs is prohibited. The Class 2 outputs are rated as follows: All drive models: 24 VDC Class 2, Max. 3.5 A in total (for both internal and external loads) If optional internal Accessories are connected: 24 VDC Class 2 Output power in total max. 3.5 A in any combination. Reduce the total Class 2 output power by the current rating of the accessories. Cat. Nos. TST FU3F-FUPR, TST FU3F-CUPR and TST FU3F-AUPR: Class 2 Outputs: if no optional internal Accessory is connected: Terminals X20 (pin 33) and X22 (pin 45):+11.3 VDC, in total max. 0.25 A. Terminals X17, X18, X20, X22–X27, X200: +24 VDC, in total max. 3.3 A. Cat. Nos. TST FU3F-DUPR: Class 2 Outputs: if no optional internal Accessory is connected: Terminals X20 (pin 33) and X22 (pin 45):+11.3 VDC, in total max. 0.25 A. Terminals X17, X18, X20, X22–X27, X200: +24 VDC, in total max. 3.3 A.
10.	In the field-wiring area, provisions for wiring for Class 2 and Class 3 circuits must meet the requirements for separation from Class 1 circuits in accordance with Section 725 of the National Electrical Code, ANSI/NFPA 70 and Section 16 of the Canadian Electrical Code. Separation from power and lighting circuits is required for Class 2 by means of one of the following means: a) A permanent barrier shall be provided to separate the field installed Class 2 conductors of secondary circuits from all other circuits or; b) Provisions need to be made to route the Class 1 or power circuit conductors in order to maintain a minimum 1/4-in (6.35 mm) separation from the conductors of the Class 2 circuits.
11.	Installation or replacement of the Lithium battery is restricted to trained technicians only. WARNING: Fire, Explosion And Severe Burn Hazard. Do Not Recharge, Crush, Disassemble, Heat Above (100° C / 212° F), Or Incinerate.

2.3 Additional Installation Requirements based on the UL 325 Certification

The following ratings are based on **UL File E510925** [#1].

No.	Installation Requirement
12.	Field wiring conductors shall be secured against loosening with adequate cable tie or similar means.
13.	To maintain satisfactory operation of the moving member the correct adjustment of the control mechanism and, if needed, the adjustment of the control mechanism shall be checked. *Comment from FEIG: This statement is required by UL. All Controller functions must be verified in the end use application of the complete door.*
14.	Field wiring of the unit shall only be done by trained electrician according to national and local codes. Pay attention to proper grounding.

#1: If not already noted above at 2.2.

2.4 Conditions Of Acceptability based on the UL 325 Certification

The following ratings are based on **UL File E510925**.

No.	**Conditions Of Acceptability** (including Feig Comments, if needed)
1.	The drive inverter units shall be installed in compliance with the enclosure, mounting, spacing, and segregation requirements of the ultimate application.
2.	The drive inverter units has been evaluated for indoor use only. For other than indoor use, during end-use investigation, considerations shall be given in providing a suitable enclosure for protection against ingress of water and UV light conditioning, and in performing additional testing, such as rain test.
3.	The units covered by this report must be provided in each end used application with adequate appropriate Enclosed Listed NMMS/7 electrical and fire enclosure described in File E218753 (Issued 2017-04-17 and 2017-07-19), depend on each model. The suitability of each other used electrical and fire enclosure must be evaluated for each end use application. *Comment from FEIG: This statement has at least the same meaning as 1. except, that the enclosures, already Listed by Feig, may also be used and does meet the enclosure requirements.*
4.	The units covered by this report are designed for use with commercial/industrial door operators or systems.
5.	The external entrapment control circuits of the mounted control boards, see table on page 6 and pages in this report, have been evaluated as protective controls in with acc. UL 991. The external entrapment control circuits are located in a class 2 power circuit. If an alternate type microprocessor is desired, the following tests may need to be repeated: Failure Mode and Effect Analysis (FMEA), Electromagnetic Susceptibility (Digital Equip. Modulation, Radiated EMI, Keying Interference and Electrical Fast Transient/Burst), Electric and Magnetic Field. *Comment from FEIG: Feig will not change the microprocessor without a new evaluation.*
6.	These devices incorporate internal solid-state motor overload protection and solid-state short circuit protection for the motor output but not evaluated to perform back-up o limiting functions to mitigate Locked Rotor or Running Overload conditions on the motor, which shall be evaluated in end-product evaluation. *Comment from FEIG: Locked Rotor or Running Overload conditions on the motor shall be tested in the end use application and the complete door construction to confirm, that the integrated solid-state overload protection does operate properly.*

No.	**Conditions Of Acceptability** (including Feig Comments, if needed)
7.	Protection Scheme of the control is based on maximum two safety edge sensors either of resistive type or optical type that in the end product are placed on the leading edge of the commercial / industrial door that detect the presence of a possible obstacle.
8.	All secondary outputs with max. 24 VDC, limited energy circuit less than 100 VA are evaluated in file E218753, dated 2011-06-01, to confirm that the power available is limited to Class 2 limits.
9.	Testing of input test, temperature test and dielectric test were conducted in file E218753, dated 2017-04-07. The suitability of each other construction must be evaluated for each end-use application. *Comment from FEIG: There is no difference of the construction.*
10.	Investigation for complete commercial/industrial door operators and systems must be evaluated for each end-use application.
11.	No trial installation test, operational verification, entrapment and external protection test acc. UL 325 was conducted and must be performed in each end use application. The suitability of this testing and need for additional testing shall be determined in each end use application. *Comment from FEIG: The tests mentioned are part of the complete door construction evaluation, not of the Feig Controllers.*
12.	No wiring or strain relief is provided together with the drive inverter units for making external connections. No conduit fittings are provided with the units. The suitability, mounting and routing of external wiring, including conduit fittings, should be evaluated in the end-use application.
13.	The electrical spacings between the drive inverter units described in page 1 and 2 of this report and the mounting surface of the optional listed industrial control panel described in File E218753 dated 2017-04-17 or other metal enclosure around used as mounting surface or enclosure, and for field wiring terminals not located in Class 2 equivalent circuits, spacings at these terminals and between these connections and surrounding metal parts/enclosure or other live parts have not been evaluated acc. UL 325 and CSA C22.2 No. and should be evaluated in the end use application. All other spacings required for Power boards and control boards are covered under File E218753, dated 2017-04-07. *Comment from FEIG: Based on the voltage ratings of these controllers the spacing requirements of UL 61800-5-1 does cover the UL 325 requirements.*
14.	The suitability for Field installed placard for a vertically moving commercial/industrial door operator (or system) in UL 325 is not part of this investigation and must be evaluated for each end installation of the complete system.

3 Accessories

USL, CNL – open type – Accessory boards for Power Conversion Equipment,
Family Name TST manufactured by FEIG ELECTRONIC GmbH.

The following accessory boards have been investigated by UL LLC in accordance with the Standards UL 61800-5-1 and CSA C22.2 No. 274. These accessory boards are generally acceptable for applications within the scope of a UL 325 certification, except for safety-related functions such as entrapment protection as defined by UL 325..

Model - Overview

• TST RFUxK2-A/-D/-E/-F/-H/-R	Universal display and input/output module
• TST RFUxIO-A/-B/-E	Universale input and output extension module
• TST SURA1/6	Safety edge evaluation board with 1/6 safety edges
• TST MNST1/2/3/4	Inductive loop detector 1-4 channel
• TST FSAM	Wireless safety system
• TST SFFE2-A/-B/-C/-D	2-channel radio receiver
• TST PE FSBS	Single turn absolute encoder
• TST PD ME	Multiturn absolute encoder
• TST PD FSAS	Multiturn absolute encoder with integrated wireless safety
• TST FSBM	Mobile radio unit 2.4 GHz
• TST FSBS04/-10/-25/-90-Antenna	Antenna for the multiturn absolute encoder
• TST SUVEK1/2	Plug-in module for inductive loop detection (1/2 channel)
• TST SFFE2-A/-B/-C/-D	Plug-in module wireless remote control (2 channel)
• TST RFUxFCom	Expansion board

In general: These devices are accessories with different functionality. These devices serve as additional input or output cards. They are only to be used together with listed door controller series manufactured by FEIG ELECTORNIC GmbH.

For detailed information about the different models please read the separate documentation of the respective accessory.

4 General Notes

- Any installation, startup and maintenance work must only be performed by qualified specialists.
- The control system is designed for variable voltage operation, one, two or three phase operation at a nominal voltage of 2~/440–480 VAC or 3~/208–480 VAC for TST FU3F-AU/-CU/-FU and 1-3~/208-240 VAC for FU3F-DU. The voltage to ground **must not** be higher than 300 VAC.
- The control voltage of 24 VDC for external devices, control circuits, all insert cards and for the electronic limit switch is protected by a Class 2 switching power supply. An overload or short circuit has to be removed so that the control voltage will operate again.
- For pin configuration of terminals, please refer to the enclosed wiring diagrams.
- Cable connections to the control system should be short and lead directly to the connecting terminal, if possible (no kinks or loops).
- All connections are to be made with copper wiring. Only use min 167 °F (75 °C) copper conductors for all power field wiring terminals. Use AWG 14-12 solid wire for grounding terminal X100.
- The keypad is only designed to be operated by human fingers.
- When using incremental transmitters and absolute value transmitters for position indication we also recommend connections by shielded cables.
- Make sure that the enclosure is still rated type 4X indoor after completing all installation work. This applies in particular to the user installed conduits on the bottom.
- Integral solid state short circuit protection does not provide branch circuit protection. Branch circuit protection must be provided in accordance with the manufacturer's instructions, National Electrical Code and the Canadian Electrical Code part I, and any additional local codes.
- Suitable for use on a cicuit capable of delivering not more than 5000 rms symmetrical amperes, 208/240/480 volts maximum when protected by Class CC fuses, rated max 10/20 A (see nameplate for value).
- The voltage rating of the external fuse(s) shall be at least equal to the input voltage of the door controllers.
- Programmable solid state motor overload Protection is provided at 115% of FLA.

⚠ATTENTION

Never leave shavings or cable offcuts in the enclosure of the control system.
Conductive elements on the printed board may lead to severe damages.

4 Indications générales

- Les travaux de montage, d'installation, de mise en service et d'entretien doivent tous être exclusivement effectués par du personnel spécialisé qualifié.
- Le système de commande de porte est conçu pour fonctionner sous des tensions variables, le fonctionnement en bi- ou tri-phasé se fait sous un voltage nominal de 2~/440–480 VAC ou 3~/208–480 VAC pour TST FU3F-AU/-CU/-FU et 1-3~/208-240 VAC pour FU3F-DU. Le voltage au sol **ne doit pas** excéder 300 VAC.
- La tension de contrôle de 24 VDC pour les appareils extérieurs, les circuits de contrôle, toutes les cartes insérées et l'interrupteur électronique de limitation est protégée par un alimentation à découpage de classe 2. En cas de déclenchement du fusible, la panne à l'origine du court-circuit ou de la surcharge doit être réparée avant réarmement du fusible.
- Pour la configuration des broches des terminaux, merci de vous reporter aux schémas de câblage ci-joints.
- Les connexions câblées vers le système de contrôle doivent être courtes et mener aussi directement que possible vers le terminal de connexion (pas de boucles ni de tortillons).
- Toutes les connexions câblées doivent être en cuivre. Utilisez au moins des conducteurs en cuivre 167 °F (75 °C) pour tous les terminaux de câblage de champ de puissance.
- Le clavier est uniquement conçu pour être actionné avec les doigts.
- En cas d'utilisation de transmetteurs incrémentiels et de transmetteurs en valeur absolue pour les indications de position, nous recommandons également le reours à des câbles blindés.
- Assurez-vous que l'enceinte est toujours cotée « 4X indoor » après achèvement complet du travail d'installation. Ceci concerne notamment les conduites installées par l'utilisateur sur le fond.
- Une protection intégrale état solide contre les court-circuits ne protège pas la totalité du circuit de dérivation. Cette protection doit être assurée conformément avec les instructions du fabricant, aux préconisations du Code National Electrique et du Code électrique canadien, et de toutes autres instructions applicables.
- Pour utilisation sur un circuit susceptible de délivrer au maximum 5000 rms ampères symétriques, sous 208/240/480 volts au maximum protégé par des fusibles Class CC de maximum 10/20 A (voir la plaque signalétique).
- La tension nominale du ou des fusibles externe(s) devra/devront être au moins égale à la tension d'entrée des contrôleurs de porte.
- Protection moteur programmable en état solide en cas de surcharge assurée à 115% de FLA.

⚠ATTENTION

Ne jamais laisser de copeaux ni de bouts de câbles dans l'enceinte du système de commande de porte. Les éléments conducteurs sur le circuit imprimé peuvent provoquer de graves dégâts.

5 Safety instructions

⚠ WARNING

When starting up and operating the door controller, the following important safety advisories as well as the installation and wiring notes must be strictly observed. Failure to observe the safety advisories can result in physical harm or damage to the door controller.

- All installation, startup and maintenance work must be performed only by qualified specialists.
- All electrical work must be performed in accordance with local and state building codes.
- 100 % accessibility to the door opening is required during installation. Traffic should not pass through the opening during installation.
- Any wiring, testing and maintenance work on an open controller shall only be performed when power has been turned off.
- If there is a power outage during non-operation of the door the door controller automatically restarts to its standard state, waiting to receive commands. If the power outage occurs while the door is moving the door will remain in the state it stopped until power returns. The door then has to be opened or closed manually. The door will not move automatically after return of power.
- The door controller can be configured to run in automatic mode. In this mode the controller provides automatic stop and restart functions. The door can move up or down unexpectedly!
- Do not disconnect the snap ferrite from the motor cable. Removing the ferrite core may degrade the EMC characteristics of the door controller.
- After turning off the mains supply, the switching power supply is still fed from the DC bus capacitors for several seconds and maintains the supply function for a certain time depending on the load on the power supply.
- The installation and operation of this equipment requires detailed knowledge which can be found in the corresponding Installation-/Operation manual for this product. This information is provided therein. A further hard copy of this information may be ordered at +49 (0)6471-3109 0.
- A device mark is applied by the manufacturer FEIG Electronic GmbH (nameplate with Listee's name or manufacturer's file number, catalog number, input and output electrical rating including: voltage, current, duty cycle, number of phases, input frequency and output frequency range). Further electrical ratings and specific details about duty cycles and ON/OFF times are provided in this instruction manual.

5 Consignes de sécurité

⚠AVERTISSEMENT

Lors de la mise en service et de l'utilisation de la commande de porte, il faut absolument respecter les consignes de sécurité ainsi que les consignes d'installation et de raccordement suivantes. Le non-respect des consignes de sécurité peut entraîner des risques sanitaires ou endommager la commande de porte.

- Les travaux de montage, d'installation, de mise en service et d'entretien doivent tous être exclusivement effectués par du personnel spécialisé qualifié.
- Tous les travaux électriques doivent être effectués selon les règles nationales et locales relatives à la construction.
- L'ouverture de la portière doit être accessible à 100% pendant l'installation. Aucun véhicule ne doit franchir l'ouverture pendant l'installation.
- Tout câblage, évaluation, travail d'entretien sur un contrôleur ouvert ne doit être effectué que lorsque l'alimentation est coupée.
- Si une coupure de courant intervient à un moment où la portière n'est pas active, la commande de porte redémarrera automatiquement à partir de sa configuration standard, dans l'attente de nouvelles instructions. Si la coupure se produit pendant que la portière est en mouvement, la portière reste dans la position où elle se trouvait lorsque le courant reviendra. Il convient alors de l'ouvrir ou de la fermer manuellement. Aucun mouvement automatique de la portière ne se produira lorsque le courant sera rétabli.
- Ne pas déconnecter les tore de ferrite situés aux sorties moteur. Le retrait du tore au de ferrite peut dégrader les caractéristiques CEM du contrôleur de porte.
- Les laisser ouverts pourrait entraîner des tensions dangereuses à l'occasion d'une éventuelle surtension sur l'alimentation principale ou sur les sorties.
- Une fois que l'alimentation a été coupée, le courant continuera de parvenir via le circuit intermédiaire des capaciteurs pendant quelques secondes, selon la charge de l'alimenb tation principale.
- L'installation et le fonctionnement de cet équipement nécessitent des connaissances détaillées qui peuvent être trouvées dans le manuel d'installation / d'utilisation correspondant pour ce produit. Cette information est fournie ici. Une copie papier supplémentaire de cette information peut être commandée au +49 (0) 6471-3109 0.
- Le marquage de l'appareil est apposée par le fabricant FEIG Electronic GmbH (plaque signalétique avec le nom de Listee ou le numéro de catalogue du fabricant, numéro de catalogue, entrée et sortie électrique: tension, courant, rapport cyclique, nombre de phases, fréquence d'entrée et fréquence de sortie). D'autres caractéristiques électriques et des détails spécifiques sur les cycles de service et les temps de marche / arrêt sont fournis dans ce manuel d'instructions.

6 Installation

6.1 Safety information

⚠ WARNING

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 enclosure 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. To prevent damage to the keypad, do not use pointed objects to operate the keys.
- 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 swarf can fall into the enclosure 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 UL type rating.
- Ensure that the cable entries are not subjected to mechanical stresses, in particular tensile stresses.
- A not rotating motor is no indication of the galvanic isolation from the power grid! The line supply connection terminals, motor terminals and terminals for the brake resistor can still carry dangerous voltages, e.g. under stop or emergency stops.
- When moving the door in jog 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.
- 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, remote control (e.g. wireless) cant not be used to issue commands.
- It is important to ensure that the door controller is installed with the included wall mounting brackets to ensure heat dissipation from the power stage and keep the wall temperature low.

6.1 Consignes de sécurité

⚠AVERTISSEMENT

CONSIGNES DE SÉCURITÉ IMPORTANTES!
Observer toutes les instructions. Une installation incorrecte peut engendrer des blessures graves.

- Le système doit être mis hors tension pendant le montage de la commande de porte.
- N'ouvrir la commande de porte que lorsque l'alimentation est coupée sur tous les pôles. Il est interdit de mettre en marche ou d'utiliser la commande de porte lorsque celle-ci est ouverte.
- Avant de toucher les bornes de raccordement, il faut couper tous les circuits d'alimentation en courant.
- Avant le montage, il faut vérifier que la commande de porte ne présente pas d'éventuels dommages dus au transport ou autre. Des endommagements de la partie intérieure de la commande de porte peuvent entraîner des dommages consécutifs importants sur la commande de porte, voire mettre en danger la santé de l'opérateur.
- Il est interdit d'installer une commande de porte dont le clavier à effleurement ou la fenêtre est endommagée. Les claviers et les fenêtres endommagés doivent être remplacés. Il est interdit d'actionner les touches à l'aide d'objets pointus car cela pourrait endommager le clavier.
- Il faut éviter tout contact avec les pièces électroniques, en particulier les pièces du circuit du processeur. Les pièces électroniques peuvent être endommagées ou détruites par une décharge électrostatique.
- Avant d'ouvrir le couvercle du boîtier, il faut s'assurer qu'aucun copeau d'alésage, ou similaire et qui se trouverait sur le couvercle, ne tombe dans le boîtier.
- Il faut s'assurer que la commande de porte est montée sans tensions mécaniques.
- Il faut fermer les entrées de câble non utilisées par des mesures appropriées pour garantir le type de protection Classification de type UL du boîtier.
- Les entrées de câble ne doivent pas être soumises à une charge mécanique en particulier à des charges de traction.
- Un moteur à l'arrêt n'est pas l'indice d'une séparation galvanique à partir du réseau! Les pinces de raccordement au réseau, les bornes moteur et les pinces pour la résistance frein peuvent par exemple en cas d'arrêt ou d'arrêt d'urgence provoquer des surtensions dangereuses.
- Lors des déplacements de la porte en mode homme-mort, il faut s'assurer que l'opérateur puisse voir la porte. Dans ce type de mode, il se peut que les dispositifs de sécurité, tels que la barre de sécurité et la barrière photoélectrique, ne soient pas actifs. Si cela n'est pas possible pour des raisons structurelles, il faut veiller à ce que ce type de mode ne puisse être utilisé que par du personnel formé à cet effet ou à ce que la fonction soit entièrement désactivée.
- En fonction du modèle de porte, il peut être nécessaire que cette dernière ne puisse être commandée que par contact visuel. Dans un tel cas, il n'est pas permis d'utiliser une commande de porte à distance (par exemple, radio) en tant que transmetteur d'impulsions.
- Il faut absolument veiller à monter la commande de porte à l'aide des supports d'espacement fournis pour garantir une évacuation suffisante de la chaleur de l'étage de sortie.

6.2 Installation of the controller

- All power connections on the mains supply side (L1, L2, L3, PE) and connections on the motor side (T1, T2, T3, PE) are made at the left-hand terminal blocks. These connections need to be routed in a metallic conduit entering from the bottom left corner of the enclosure.
- All low voltage connections (+24 VDC) should enter from the bottom right corner of the enclosure and terminate on both the top and bottom circuit boards.The position for installation has to be chosen in a way that direct exposure to the exterior as well as other atmospheric influences is avoided.
- To maintain the environmental type rating, all conduit fittings and other components installed in openings made in the (steel or stainless steel) enclosure must have its same ratings (4X indoor) and only wall fixing bracket kit model no. **NSYAEFPFXSC** may be used. Screw the enclosed wall mounting brackets to the enclosure according to the enclosed instructions for mounting brackets “version A”.
- This control system is intended to be mounted directly at the wall. Mounting must be done with the help of external mounting brackets, located at the top and bottom sides of the enclosure. The control system has to be installed in a way that the power connection entry points towards the bottom.
- The gland plate requires openings through which the conduits are routed. The power supply wires are routed through the conduits into the enclosure. Make sure that mechanical vibrations caused by operation (for example as would happen when mounting it on a brick wall) are not transmitted to the control system.
- With the fan less enclosure (steel or stainless steel) pollution degree 2 is achieved. Keep the enclosure closed and sealed at all times. Thus, conductive pollution and condensation or high humidity, which may occur during periods of inactivity when the equipment is not continuously energized, are avoided.
- Install the open type door controller (without enclosure) in environments of pollution degree 2 only. The open type devices are intended for installation into enclosed panels without ventilation openings with minimum dimensions of 40 cm (height) x 30 cm (width) x 20 cm (depth).
- The enclosed door controller must be installed in an environment having a maximum ambient temperature range of -4 to +104 °F (-20 to +40 °C). The open type door controller must be installed in an environment having a maximum surrounding air temperature range of -4 to +149 °F (-20 to +65 °C).
- Connection to a grounded mains supply is essential. A floating, ungrounded or corner grounded mains supply can permit dangerously high voltage between the chassis of the drive and internal components. In many cases, this voltage could cause catastrophic failure of the control system. In all cases, the input power to this door controller must be referenced to ground. If a service transformer cannot be grounded, an isolating transformer must be installed with the secondary of the transformer grounded.
- The supply lines (mains) have to be protected by external Class CC fuses, rated max 10/20 A (see nameplate for value).
- In case the control system is protected by an earth leakage device, it should be taken into consideration that the leakage current of the EMC-filters and the motor cable screen may be higher than 30 mA while the motor is running. The leakage current depends considerably on the length of the shielded cables and increases if the clock frequency of the PWM output is increased.
- Make sure that the motor wiring is routed separately from the mains supply and the control wiring inside of the control system.
- A maximum of 30 m / 100 ft motor cable length is allowed.
- Induction loop lines have to be routed separately from all other connecting lines and with the greatest possible distance towards the motor wiring and live lines in order to minimize potential interference. The loop lines have to be twisted in pairs up to the internal terminals of the control system.

7 Electrical connection

7.1 Safety information

⚠ATTENTION

- You must disconnect all supply circuits before opening the enclosure to access the terminals!
- 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".
- When the controller has been turned off, dangerous voltage levels can still be present for up to 5 minutes.
- During downtime, there is no isolation between the power stage and the motor terminal.
- Touching electronic components is dangerous due to residual voltages.
- Before switching on the door controller for the first time and after completion of the wiring, check whether all motor connections are tight on the door 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 door controller.
- Before turning on the controller's supply for the first time, make sure that the detector/sensor cards (plug-in modules) are inserted in the right places. Incorrect insertion of the cards may damage the controller, as well as the installation of non-approved third-party equipment.
- After completing the installation, check the correct configuration of the system and the proper functioning of the safety systems. Parameter settings and the speed as well as the operation of the safety devices must be checked.
- Switching on or operating the controller in case of condensation is not permitted. This can destroy the controller.
- The controller may only be opened if the supply voltage has been switched off on all poles.
- Never operate the controller without connecting the protective earth conductor. The absence of a protective earth conductor will result in hazardous voltages on the controller's enclosure due to high leakage capacitances.
- 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 50 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 50 VDC. In this case, discharge times of up to 10 minutes may be possible.
- Parts of the processor circuit are galvanically connected to the power lines.
  Important: when performing measurements on the processor circuit, do not use probes with PE reference.
- If the voltage of the 24 V regulator is short-circuited or overloaded, the switching power supply will not start up even though the DC bus capacitors are charged. The displays remain off. The power supply can only be restarted after eliminating the short circuit or overload condition.
- 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. The maximum cable length is 30 m (100 ft).
- Fast running plastic foil doors may produce very high electrostatic charges and voltages. A discharge of these voltages may damage the controller. Therefore, appropriate measures must be taken to prevent electrostatic discharge.
- Screw the cables to the terminals before placing the terminals on the pin connectors. This ensures safe contact between terminals and connectors.

7.1 **Consignes** de sécurité

⚠ATTENTION

- Avant de toucher les bornes de raccordement, il faut couper tous les circuits d'alimentation en courant.
- Les travaux de raccordement, de contrôle et de maintenance sur la commande de porte ouverte ne doivent être effectués que hors tension. Il faut tout particulièrement respecter les points énoncés dans la section "Consignes de sécurité".
- Une tension dangereuse peut encore subsister jusqu'à 5 minutes après la mise à l'arrêt de la commande de porte.
- Pas de séparation galvanique pendant l'arrêt entre le module final et la borne de raccordement du moteur.
- Pendant le temps d'arrêt, aucune isolation n'existe entre le module amplificateur et la borne du moteur.
- Il est dangereux de toucher les pièces électroniques en raison des tensions résiduelles.
- Avant la première mise en marche de la commande de porte et après avoir complété le câblage, il faut vérifier si tous les raccordements moteur, côté moteur et côté commande, sont serrés à bloc et si le moteur est correctement connecté en étoile ou en triangle. Des prises trop lâches endommagent en général le convertisseur de fréquences.
- Avant le premier fonctionnement de l'alimentation de la commande de porte, il faut s'assurer que les cartes d'évaluation (modules enfichables) sont correctement positionnées. Si les cartes enfichées sont décalées ou tordues, cela peut endommager la commande de porte. C'est aussi le cas si l'on installe des pièces tierces non habilitées.
- Une fois le montage terminé, il faut contrôler que l'installation soit bien réglée et que le système de sécurité fonctionne correctement.
- N'ouvrir la commande de porte que lorsque l'alimentation est coupée sur tous les pôles.
- Il est interdit d'utiliser la commande si le conducteur de protection n'est pas raccordé. Si le conducteur de protection n'est pas raccordé, des tensions dangereusement élevées apparaissent au niveau du boîtier de commande de porte du fait des capacités de fuite.
- Même après que l'alimentation a été coupée, il peut subsister des tensions dangereuses pendant 5 minutes sur les condensateurs du circuit intermédiaire. Le temps de décharge jusqu'à obtention de valeurs de tension inférieures à 50 VDC est de 5 minutes maximum. Un contact avec les parties internes de la commande de porte pendant ce temps de décharge est dangereux.
- En cas de bloc d'alimentation secteur défectueux, le temps de décharge des condensateurs du circuit intermédiaire peut augmenter considérablement avant d'arriver à une valeur de tension inférieure à 50 VDC. Les temps de décharge peuvent prendre jusqu'à 10 minutes.
- Parties du circuit du processeur sont directement rattachées par une liaison galvanique à l'alimentation réseau.
  Important: Lors d'éventuelles mesures de contrôle dans cette zone du circuit du processeur, il faut absolument faire attention à ne pas utiliser d'appareils de mesure avec isolation PE du circuit de mesure.
- Lors d'une tension de commande de porte de 24 V court-circuitée ou fortement surchargée, le bloc d'alimentation secteur ne démarre pas bien que les condensateurs de circuit intermédiaire soient chargés. Les affichages restent sombres. Un démarrage du bloc d'alimentation secteur n'est possible qu'après l'élimination du court-circuit ou de la surcharge excessive.
- Il ne faut utiliser que des conduites moteur blindées et séparées, le blindage devant être raccordé des deux côtés (côté moteur et commande de porte) et aucun autre raccordement ne devant être réalisé dans la conduite. Longueur de conduite maximale: 30 m (100 ft).
- De très fortes charges électrostatiques apparaissent en particulier avec les portes en film plastique à déplacement rapide. La décharge de cette tension peut endommager la commande de porte. C'est pourquoi, il faut prendre des mesures préventives appropriées pour empêcher une charge électrostatique.
- Il est interdit de mettre en marche ou de faire fonctionner une commande de porte embuée. Cela pourrait endommager irrémédiablement la commande de porte.
- Brancher d'abord les bornes de connexion et les raccorder sur le connecteur à broches ! C'est le seul moyen de garantir un contact fiable entre la borne de connexion et le connecteur.

7.2 Power supply connection

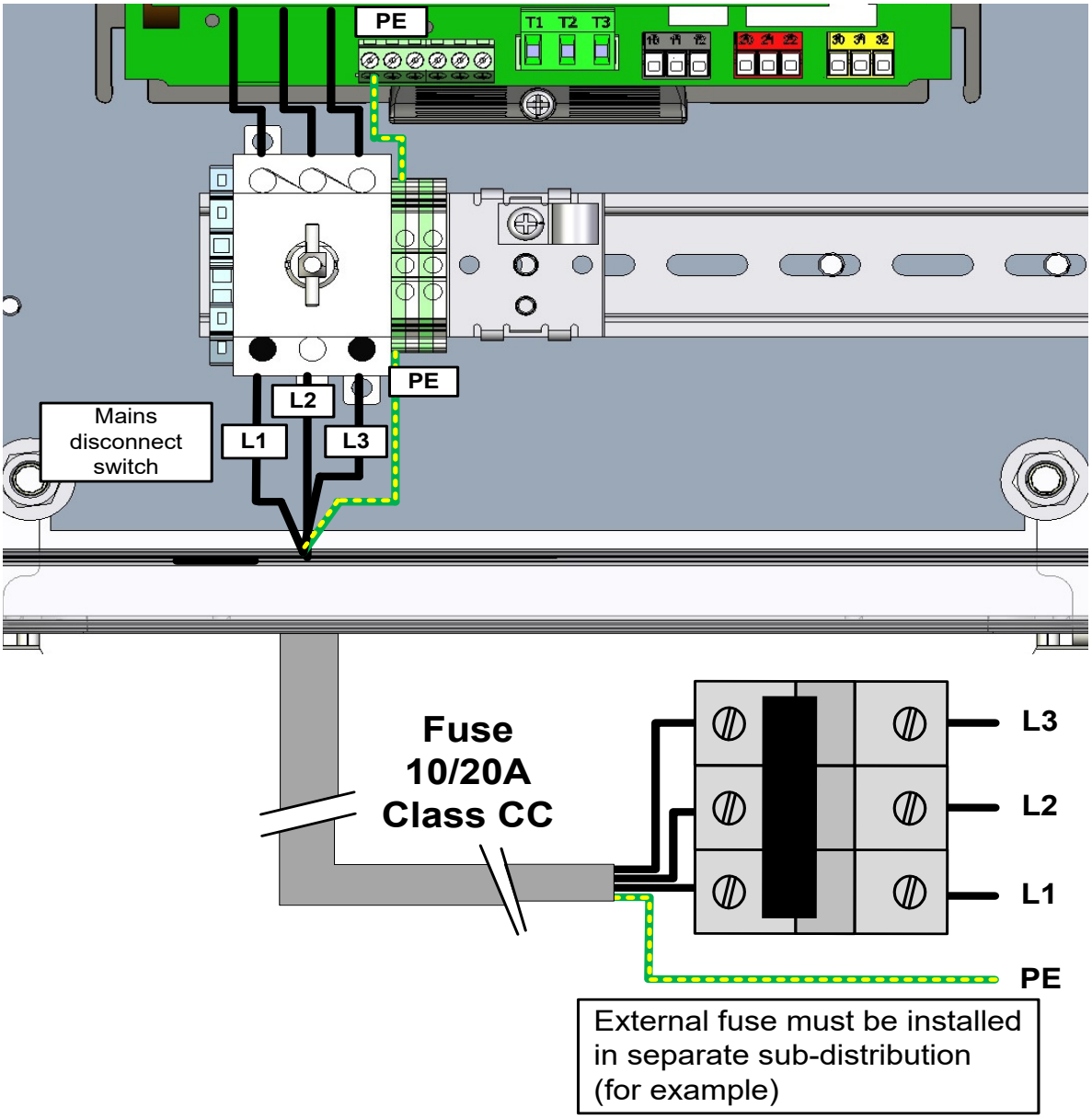


Figure 1: Door controller with internal mains disconnect switch and external fuses

The mains supply lines L1, L2, L3 and PE enter the steel enclosure from the bottom through a user mounted conduit and are connected to the mains disconnect switch and PE terminal (green/yellow) in the lower left part of the enclosure.

For a 2-phase power supply, connect the two wires L1 and L3 to the corresponding terminals L1 and L3 on the mains disconnect switch!

Table 1: Mains connectors

Connector	Wire size AWG	Wire type	Torque Lb-in	Torque Nm
L1, L2, L3 (mains disconnect switch)	14-8	CU	7.0	0.79
PE terminal	14-12	CU	7.0	0.79

7.3 Motor and DC brake connections

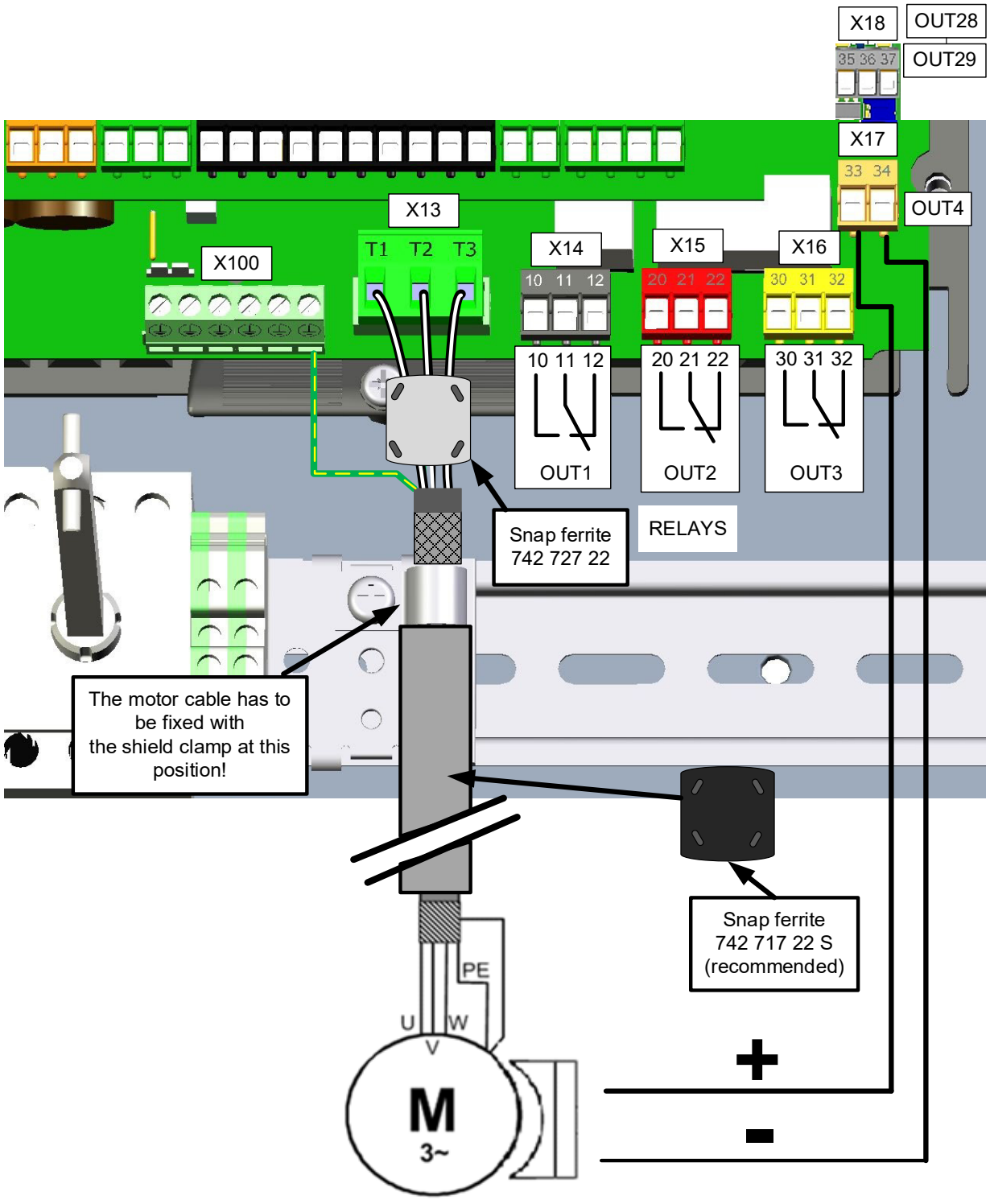


Figure 2: Connection diagram for Motor and 24 V DC brake

When connecting the motor cable to terminal block X13, the enclosed snap ferrite (gray, Würth number: 742 727 22) must be placed around the three motor wires (T1, T2, T3) inside the enclosure.

We recommend to place another snap ferrite (black, Würth number: 742 717 22 S) around the complete motor cable outside of the enclosure as close as possible to the door controller. The black snap ferrite is not included in the scope of delivery!

Nous recommandons de placer un ferrite à clipser (noir, numéro Würth: 742 717 22S) par-dessus tout le câble d'alimentation moteur aussi près que possible de la commande de porte. Ce ferrite à clipser noir n'est pas inclus dans le périmètre de livraison!

Table 2: Motor cable, PE, DC brake, relay and other connectors

Connector	Wire size AWG	Wire type	Torque Lb-in	Torque Nm
Motor (X13*)	14-12	CU	5.7	0.64
Grounding terminal (X100)	14-12	sol. CU	7.0	0.79
Relays (X14*, X15*, X16*)	26-12	CU	4.0	0.45
24 VDC (X17, X18)	26-12	CU	4.0	0.45

* Use Class 1 wiring only! The relay terminals X14, X15 and X16 are only intended to become a part of a Class 2 circuit when wired with Class 1 wires.

7.4 Motor and AC brake connections

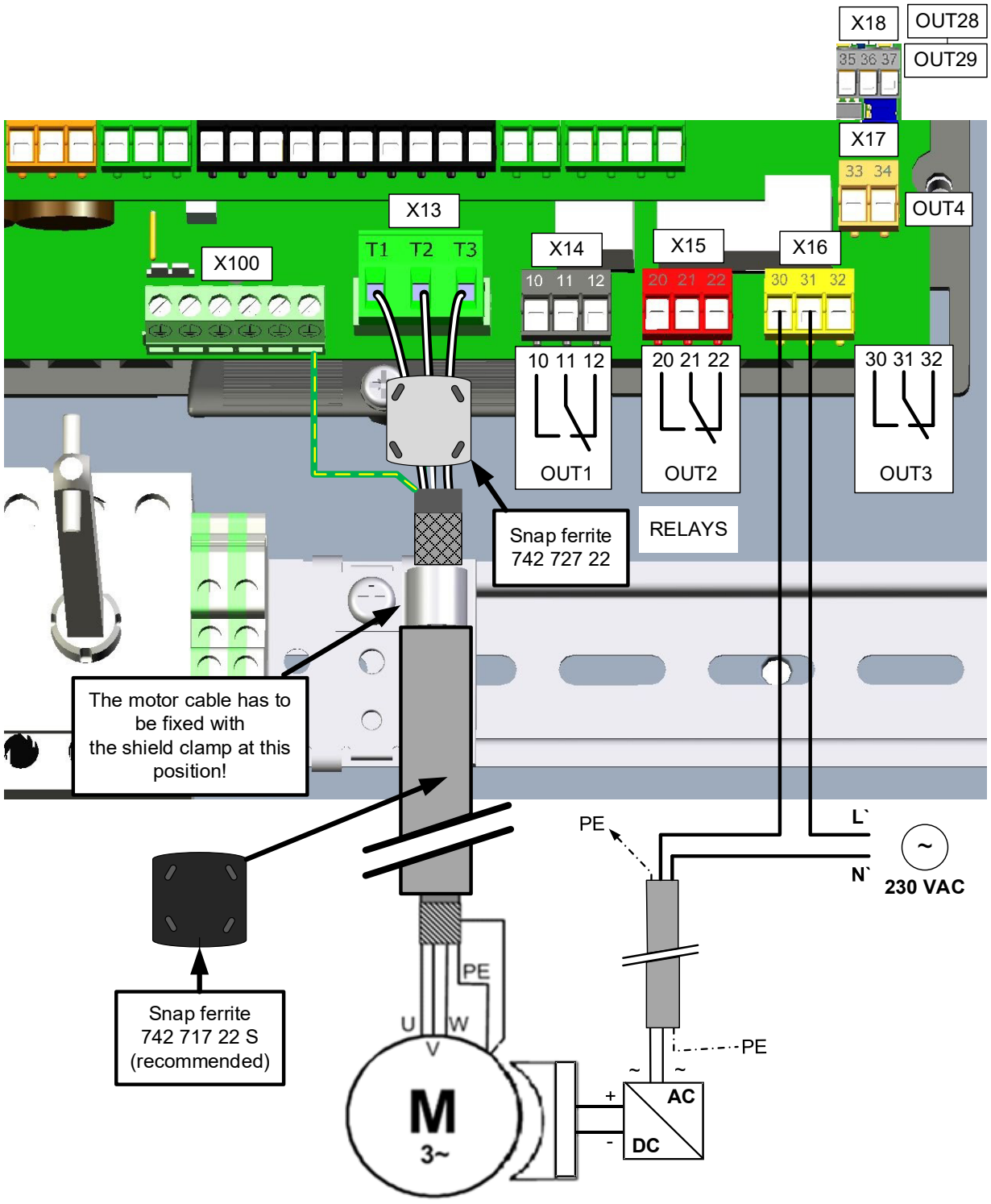


Figure 3: Motor and AC brake connection

Only use a fused, 1- or 2-phase AC mains supply for the AC brake!

When connecting the motor cable to terminal block X13, the enclosed snap ferrite (gray, Würth number: 742 727 22) must be placed around the three motor wires (T1, T2, T3) inside the enclosure.

We recommend to place another snap ferrite (black, Würth number: 742 717 22 S) around the complete motor cable as close as possible to the door controller. The black snap ferrite is not included in the scope of delivery!

Nous recommandons de placer un ferrite à clipser (noir, numéro Würth: 742 717 22S) par-dessus tout le câble d'alimentation moteur aussi près que possible de la commande de porte. Ce ferrite à clipser noir n'est pas inclus dans le périmètre de livraison!

Table 3: Motor cable, PE, DC brake, relay and other connectors

Connector	Wire size AWG	Wire type	Torque Lb-in	Torque Nm
Motor (X13*)	14-12	CU	5.7	0.64
Grounding terminal (X100)	14-12	sol. CU	7.0	0.79
Relays (X14*, X15*, X16*)	26-12	CU	4.0	0.45
24 VDC (X17, X18)	26-12	CU	4.0	0.45

* Use Class 1 wiring only! The relay terminals X14, X15 and X16 are only intended to become a part of a Class 2 circuit when wired with Class 1 wires.

7.5 Signal Inputs/Outputs

Terminals X20–X27 and X200 are only intended to become a part of a Class 2 circuit.

Table 4: Processor circuit board connectors

Connector	Wire size	Wire type	Torque Lb-In	Torque Nm
X20, X21, X22, X23, X24, X25, X26, X27	26-12	CU	4.0	0.45
X200	26-16	CU	2.2	0.25

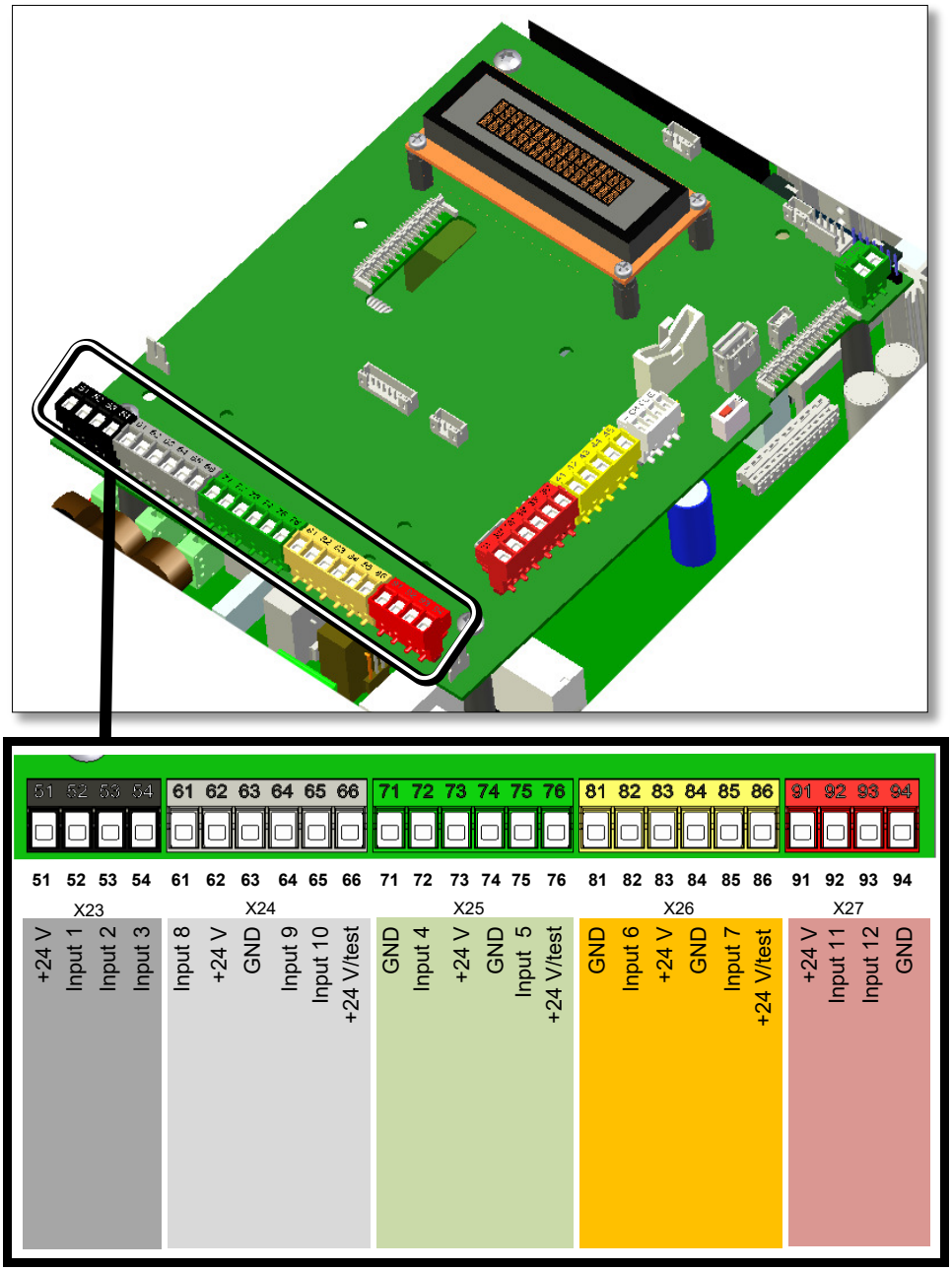


Figure 4: Connection diagram for processor circuit board (lower side)

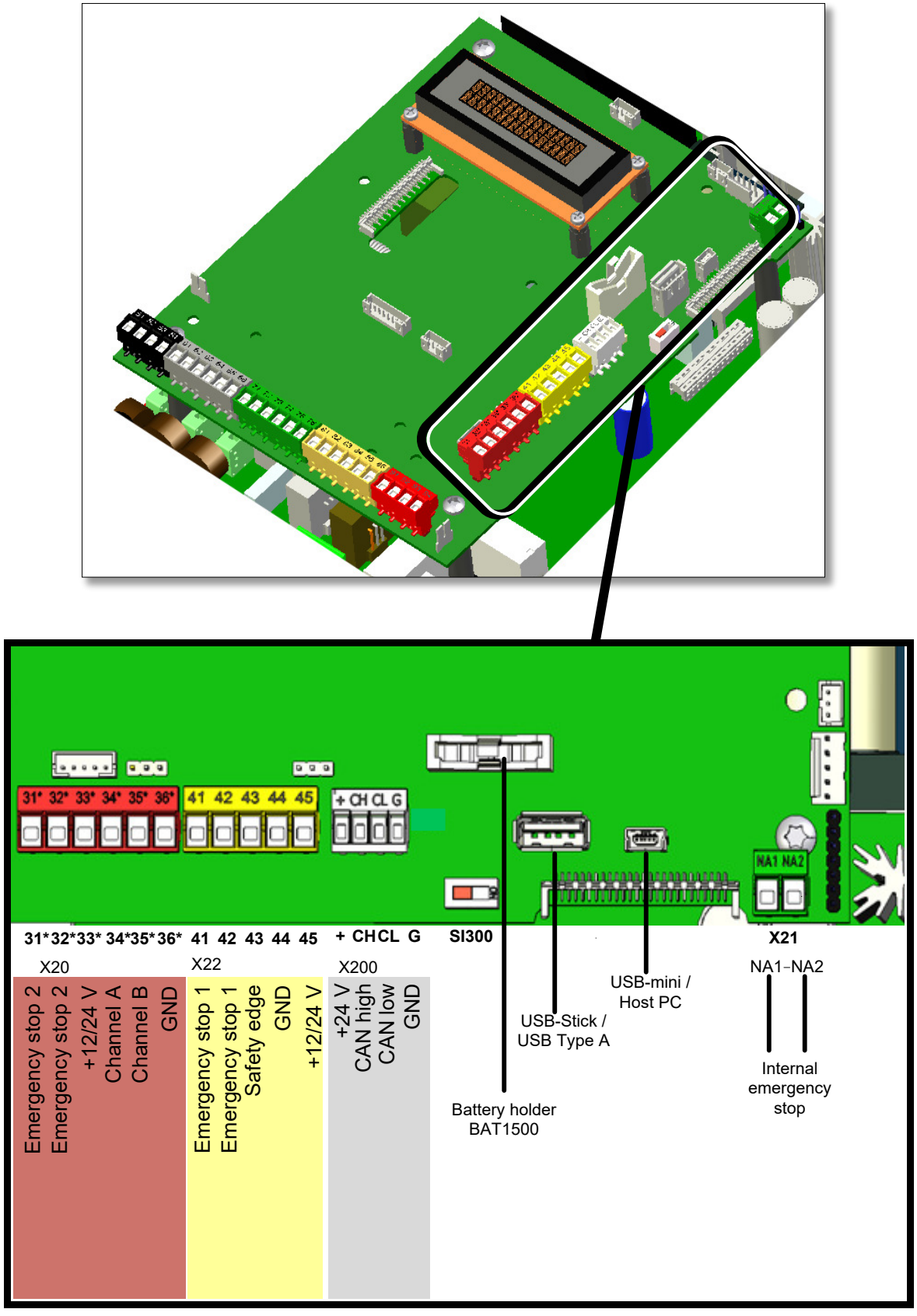


Figure 5: Connection diagram for processor circuit board (right side)

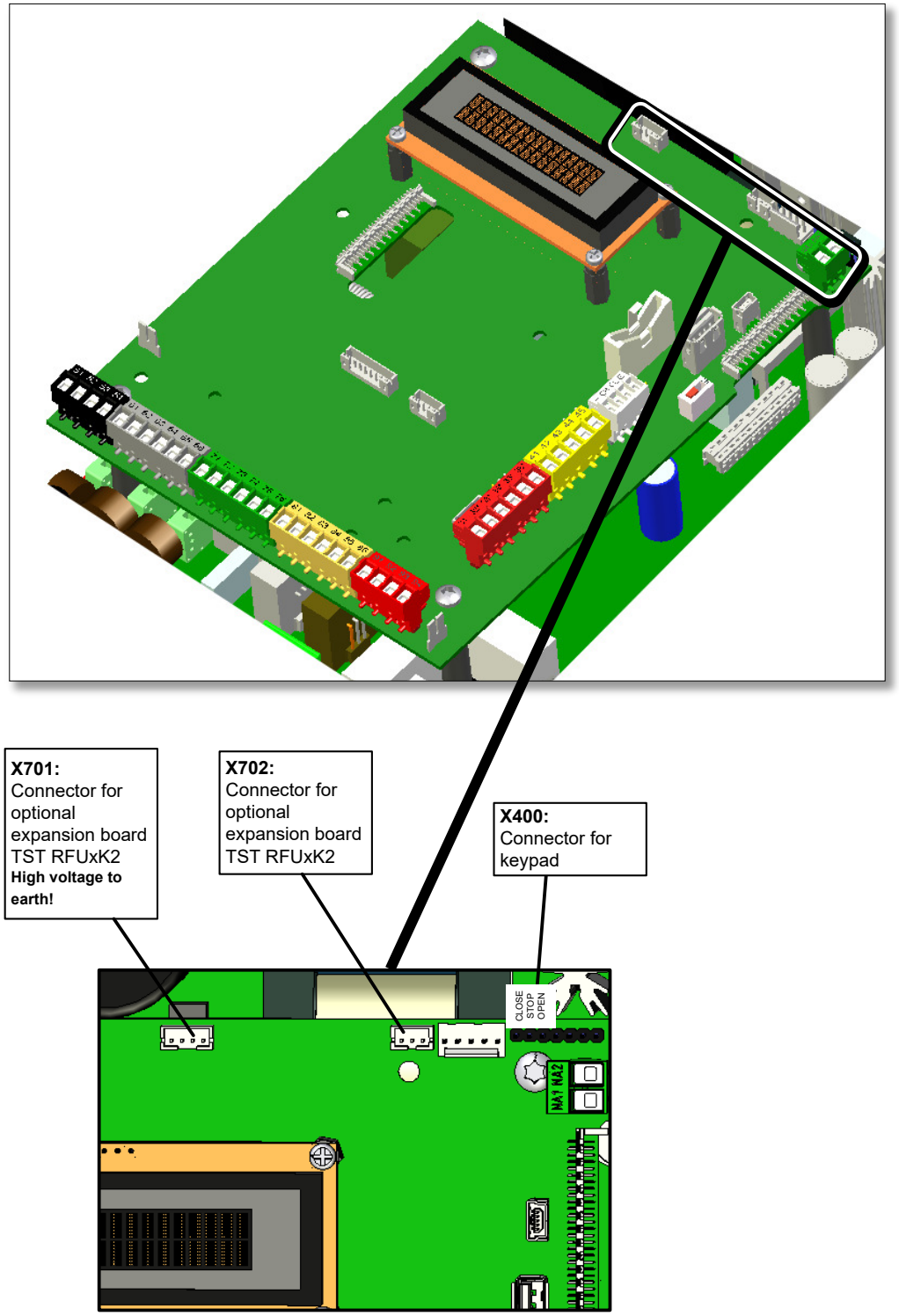


Figure 6: Connection diagram for processor circuit board (upper right side)

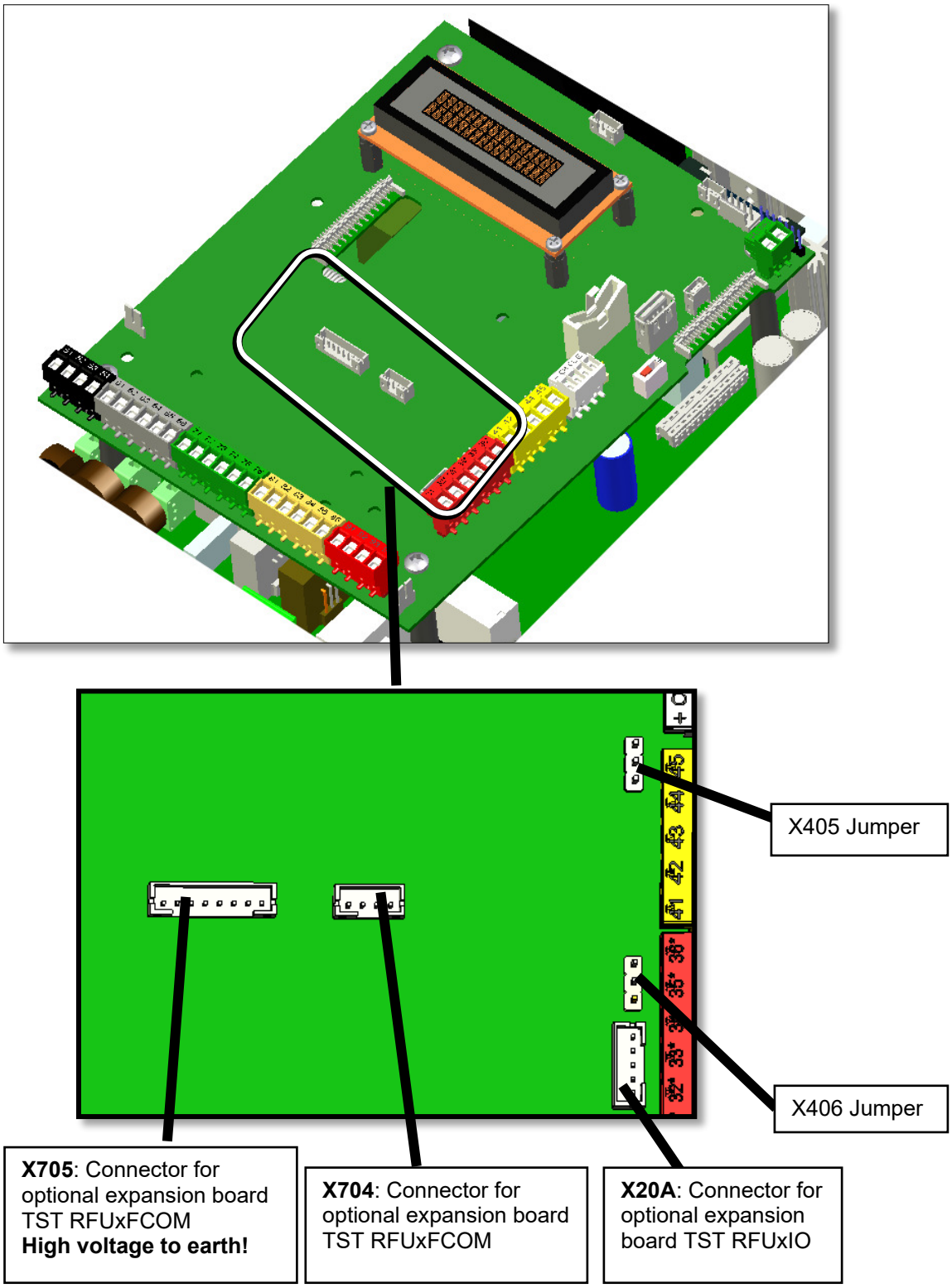


Figure 7: Connection diagram for accessories (TST RFUxFCOM, RFUxIO)

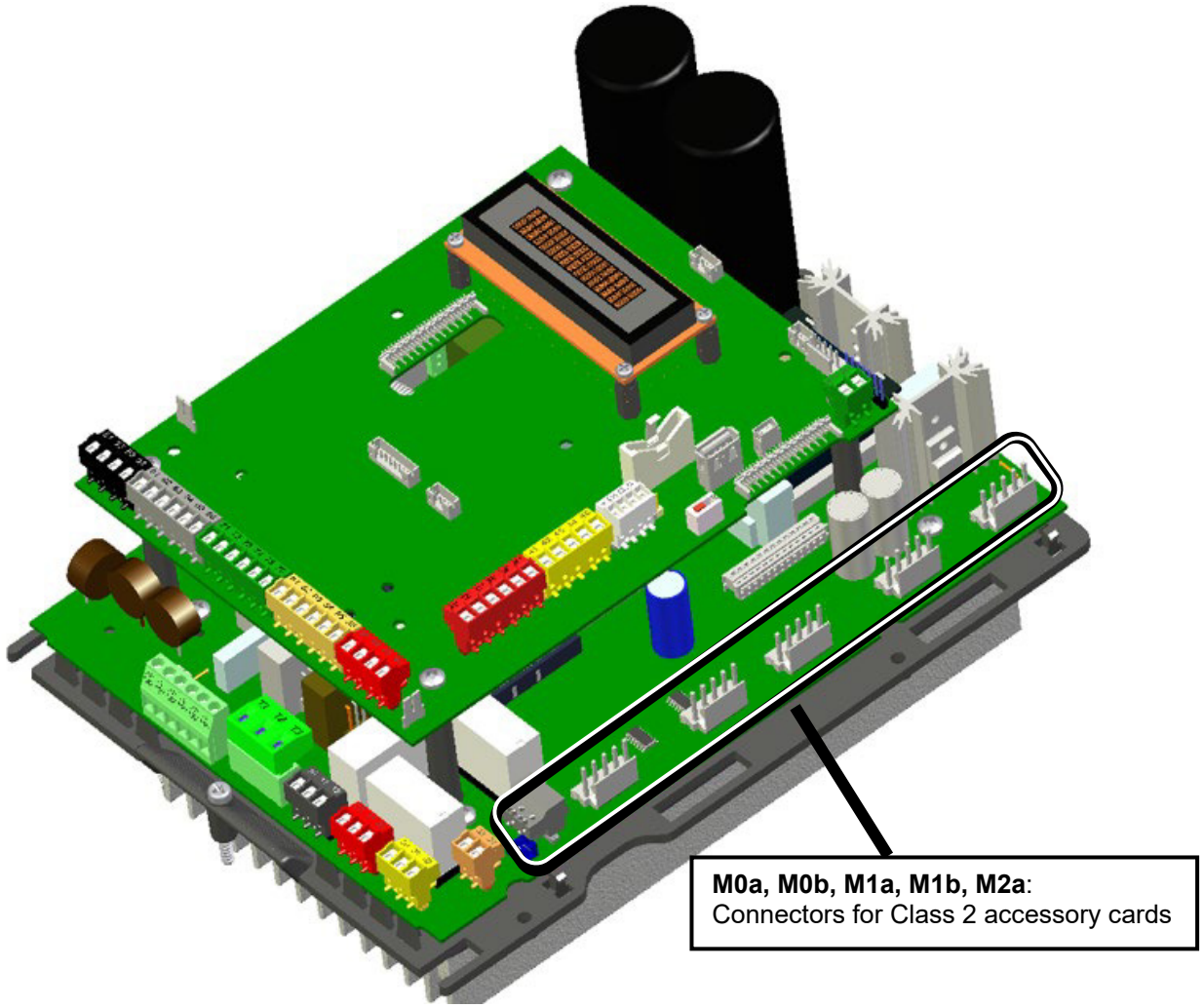


Figure 8: Connectors for Class 2 accessory cards

7.6 Integrated safety edge inputs

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 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.

For the connection of the safety edge to a TST FU3F we recommend to place a snap ferrite (black, Würth Number: 74271722S) around the wires of the safety edge (terminal 43 – 45) as close as possible to the door controller around the complete motor cable. The black snap ferrite is not included in the scope of delivery!

7.6.1 Connection of an optical safety edge

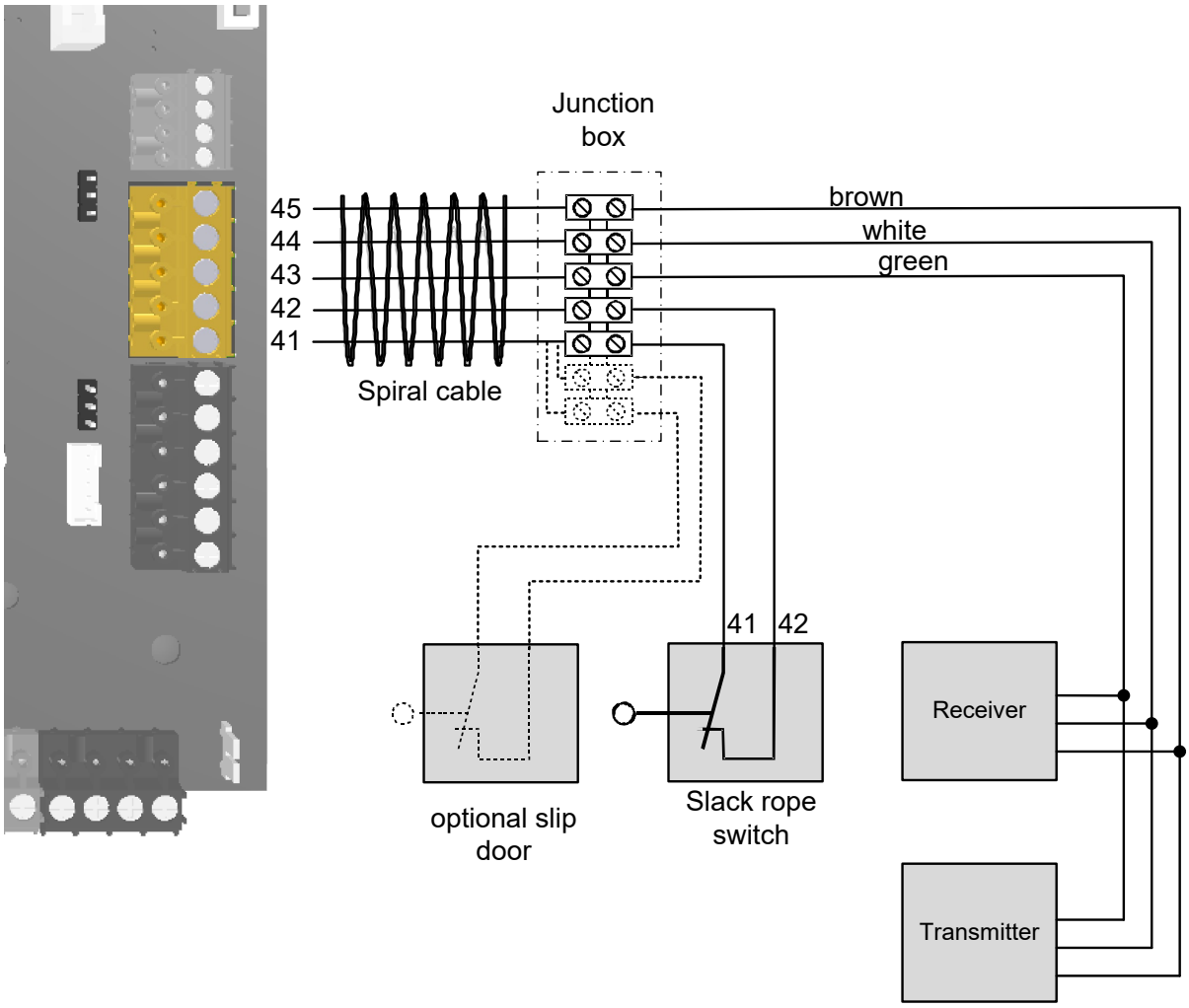


Figure 9: Connection of an optical safety edge

If the safety edge type was not automatically detected, the optical safety edge on this input can be activated via parameter P.460 = 5.

7.6.2 Connection of an electrical resistance safety edge

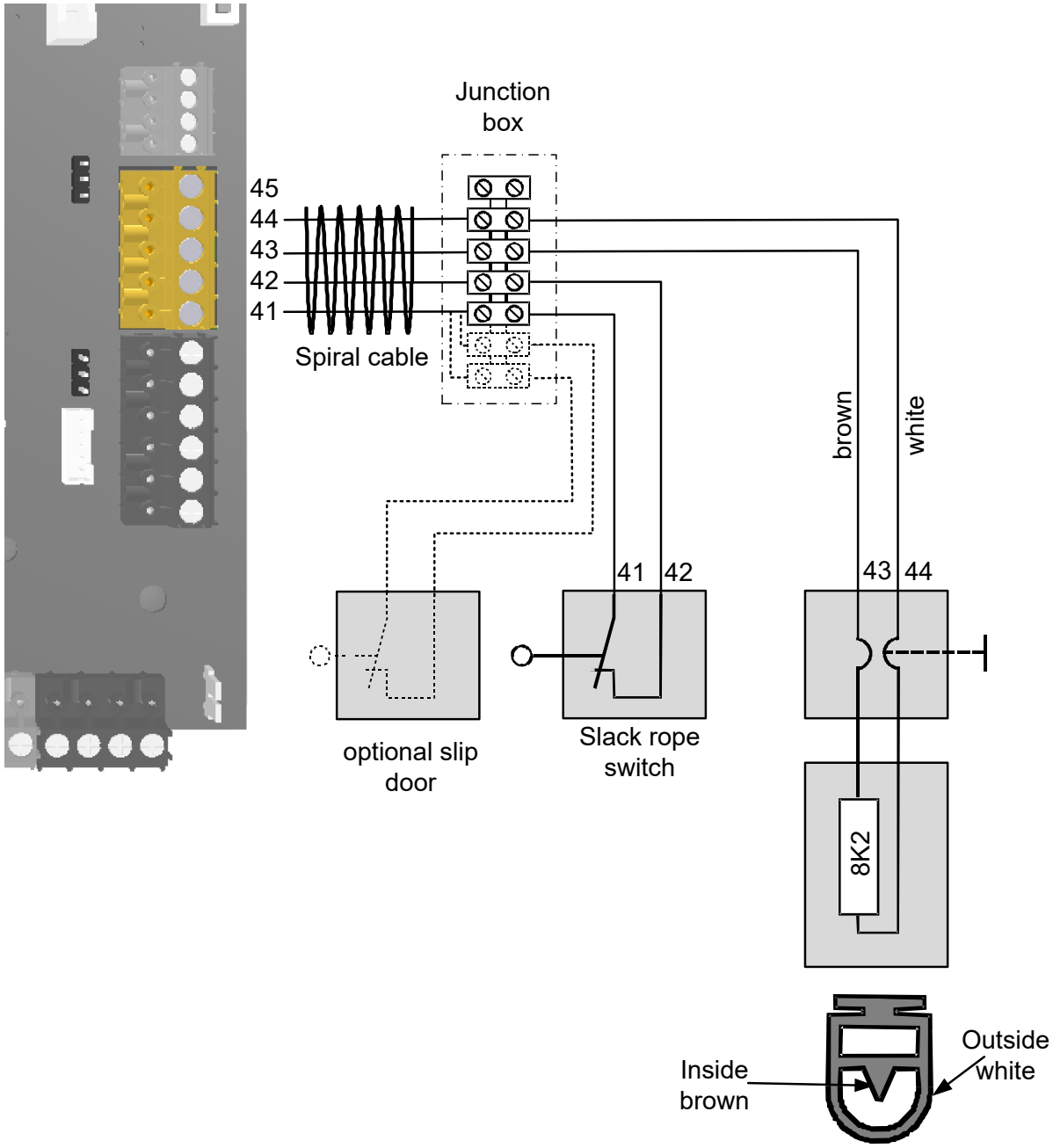


Figure 10: Connection of an electrical resistance safety edge

If the safety edge type was not automatically detected, the resistive safety edge on this input can be activated via parameter P.460 = 1.

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

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

This input is preset as digital input. 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

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

7.7.1 Connect the optical safety edge at input 10

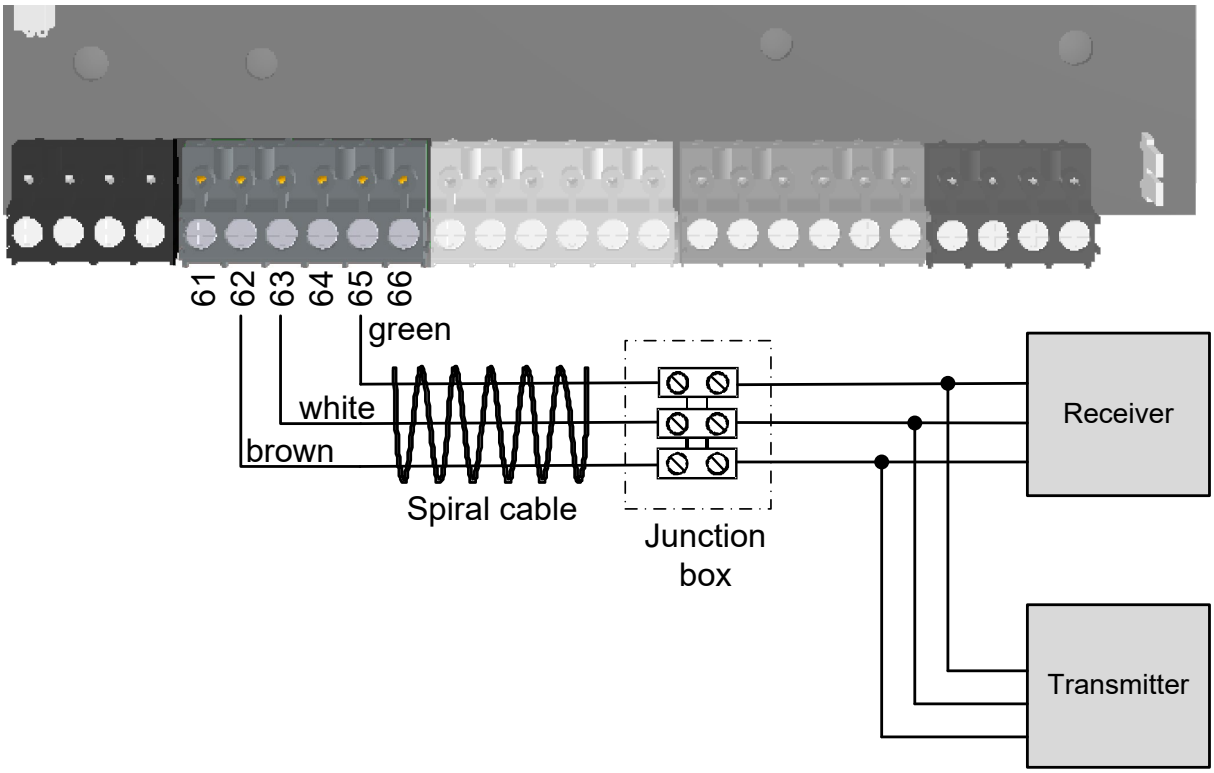


Figure 11: Connection of an optical safety edge

In order to use an optical safety edge on input 10, the function of this input must first be determined. For this purpose, parameters P.50A is used. For the setting, refer to the parameter list in chapter input profiles.
Typically, this input is used as safety input during opening movement. For this example, parameter P.50A = 1406 is set.
Then the edge type of parameter P.5A2 must be set = 4.

It is important to first set parameter P.50A and then only parameter P.5A2.

7.7.2 Connect the electrical resistance safety edge at input 10

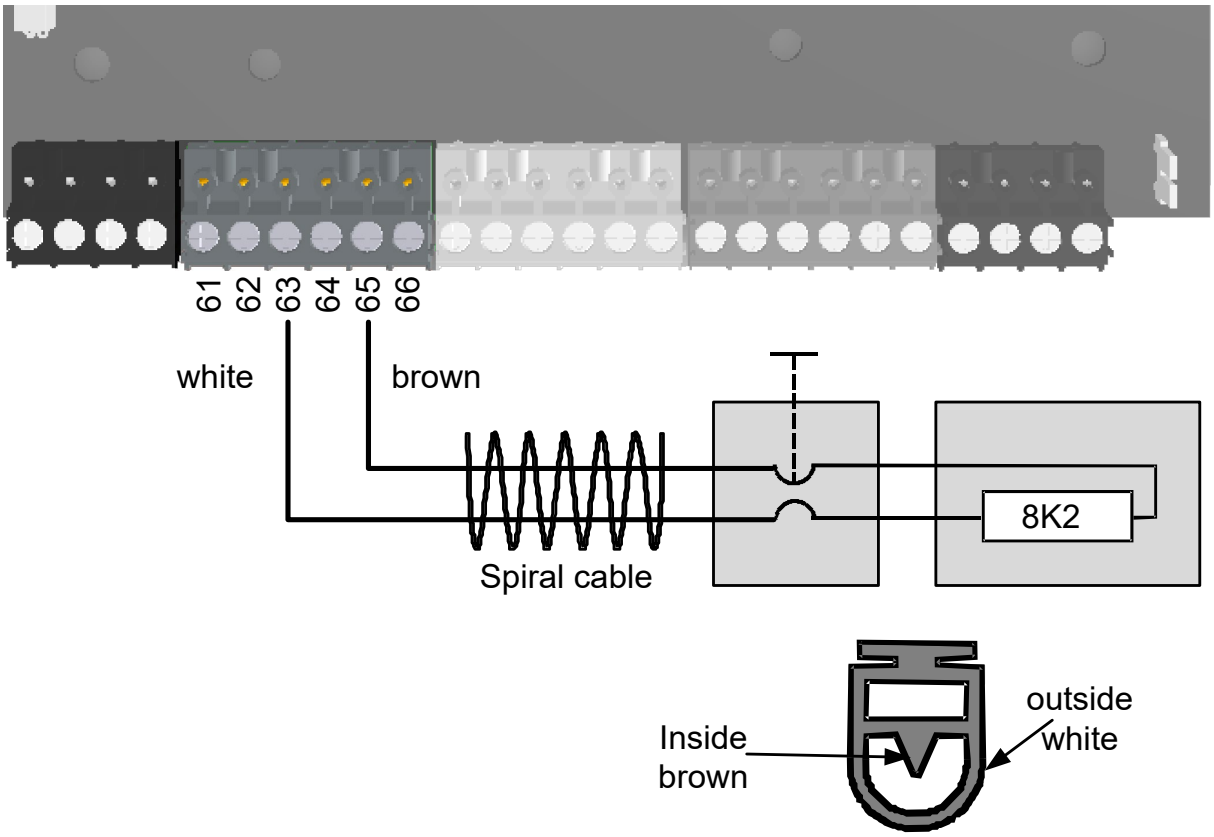


Figure 12: Connection of an electrical resistance safety edge

In order to use an optical safety edge on input 10, the function of this input must first be determined. For this purpose, parameters P.50A is used. For the setting, refer to the parameter list in chapter input profiles.
Typically, this input is used as safety input during opening movement. For this example, parameter P.50A = 1406 is set.
Then the edge type of parameter P.5A2 must be set. The following settings are available.

P.5A2 = 2: 8K2 Safety edge, NO (normally open)
P.5A2 = 3: 8K2 Safety edge, NC (normally closed)
P.5A2 = 6: 1K2 Safety edge, NO
P.5A2 = 7: 1K2 Safety edge, NC

It is important to first set parameter P.50A and then only parameter P.5A2.

7.7.3 Parameter Settings As Applied for the UL 325 / UL 991 Safety Edge Evaluation

Testing was conducted by use of 8.2 kOhm resistors connected to input terminals 43/44 and 63/65.
Please be aware, that the automatic reverse after safety edge activation does (of course) not work in Manual, Jog or “Deadman” mode.

Terminal No.	Param. No.	Setting	Description
General	P.980	0	Operating mode is set to OPEN and CLOSE move in self-holding (Automatic)
43/44	P.460	1	The profile of the internal safety edge is set to Electrical safety edge, redundantly processed, functioning as normally open
	P.467	0	The reaction after safety edge tripping is set to Safety during closing: Reversing during automatic closing, stop during jog closing, no reaction during opening
63/65 (Input 10)	P.50A	1406	The Function of input 10 is set to safety A, reversing when OPENING, NC contact, final position as before, hold open time as before, with clearance time
	P.5A2	2	Input 10 is set to 8K2 Safety edge, N.O.
	P.5A1	0	The Mode of Input 10 is set to Safety during closing: Reversing during automatic closing, stop during jog closing, no reaction during opening

7.7.4 Input 10 as digital Input

This is the factory setting for this input. If the setting has been changed, it can be reset with the following parameters.

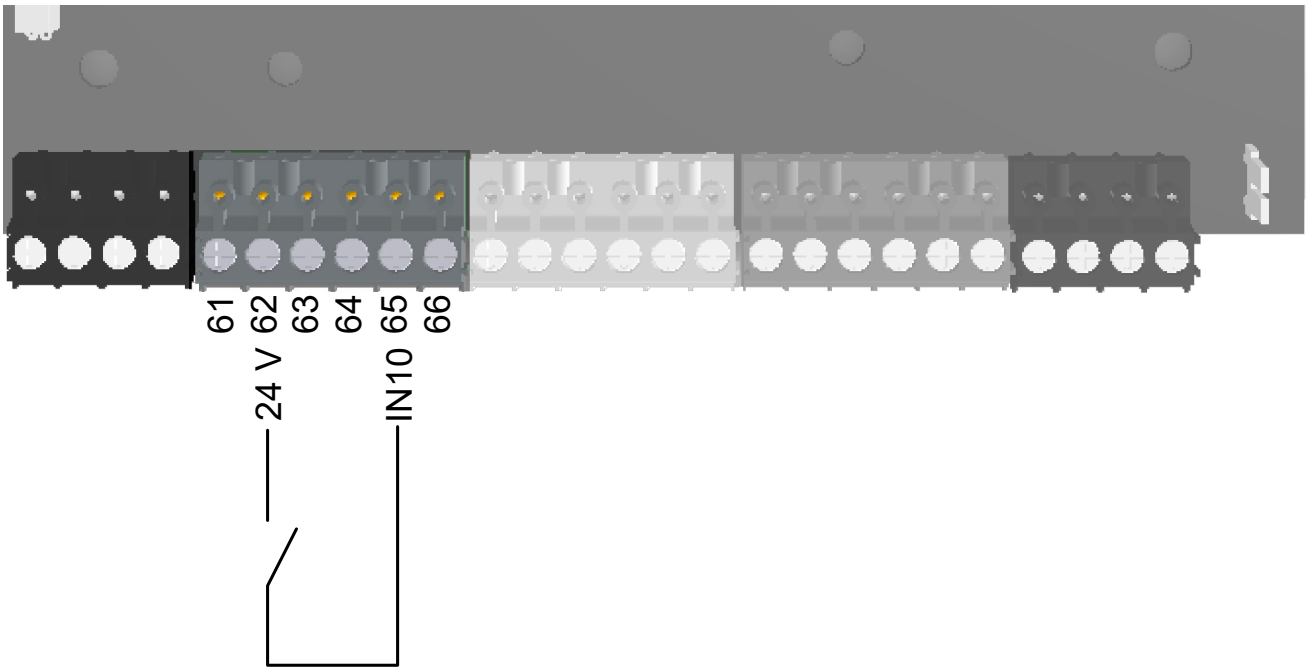


Figure 13: Input 10 as digital Input

In order to use input 10 as digital input, the function for this input must first be set. For this purpose, parameters P.50A is used. For the setting, refer to the parameter list in chapter input profiles.
In the factory, this input is set to "shut-down dwell time / forced closing time (P.50A = 1001).
Then the connected switch type must be defined with parameters P.5A2. The following settings are available.

P.5A2 = 0: N.O. Contact
P.5A2 = 1: N.C. Contact

It is important to first set parameter P.50A and then only parameter P.5A2.

8 Plug-in and expansion boards

8.1 Connecting interface card TST RFUxFCOM

The optional interface card TST RFUxFCOM provides an RS-485 and a CAN interface.
With these, for example, it is possible to establish connections with a partner controller or to a remote TST RFUxK2 board.

The interface card TST RFUxFCOM does not have to be activated by means of parameters.
In order to reach terminal block X25 (pins 71-76) and 81 – 82 (on the controller) easier, the green and yellow terminal blocks of the interface card TST RFUxFCOM should be removed first.

⚠ATTENTION

Connect connection terminals before connecting to the plug connectors! Only thus is it possible to ensure a safe contact of the connection terminals to the plug connectors.

⚠ATTENTION

Brancher d'abord les bornes de connexion et les raccorder sur le connecteur à broches ! C'est le seul moyen de garantir un contact fiable entre la borne de connexion et le connecteur.

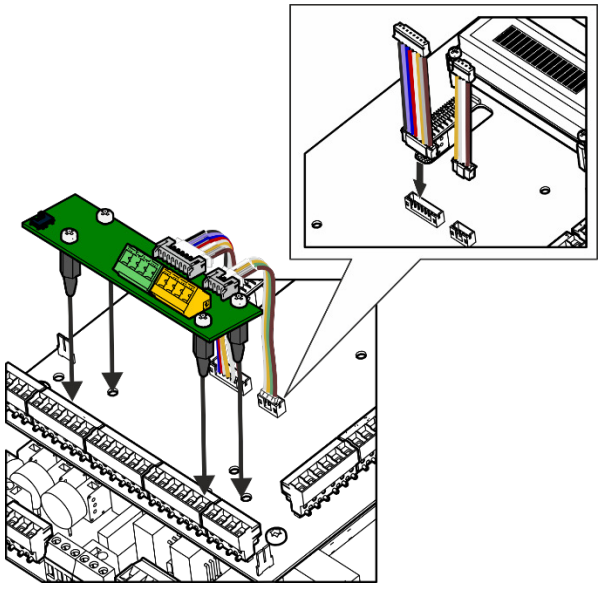


Figure 14: Mounting the TST RFUxFCOM

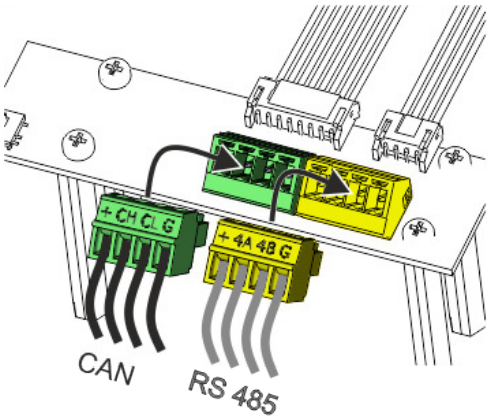
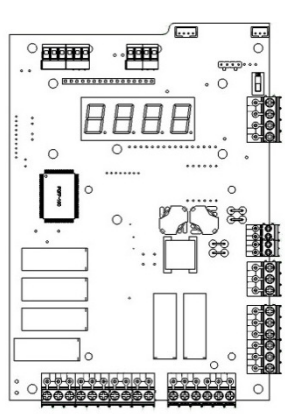


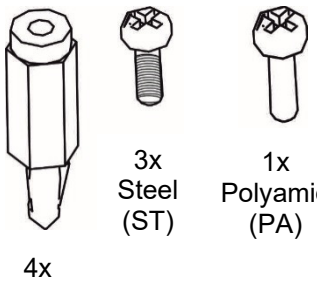
Figure 15: Attaching the plug-in terminal block

8.2 Expansion card RFUxK2

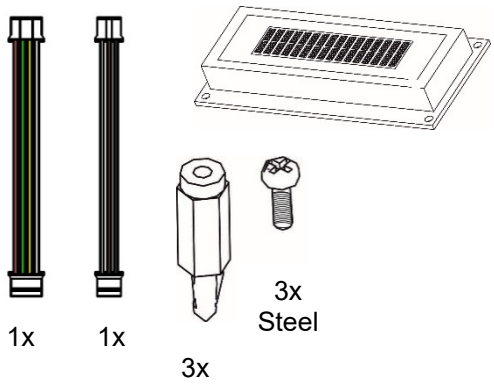
Expansion board TST RFUxK2 can optionally be plugged in and has additional 6 inputs and 6 relay outputs and one digital output, with freely programmable operation. In addition, a 2-channel inductive loop detector and an annual timer switch as well as an additional RS-485 interface are included, e.g. for connection to a partner controller.

8.2.1 Mounting and connecting the display and TST RFUxK2

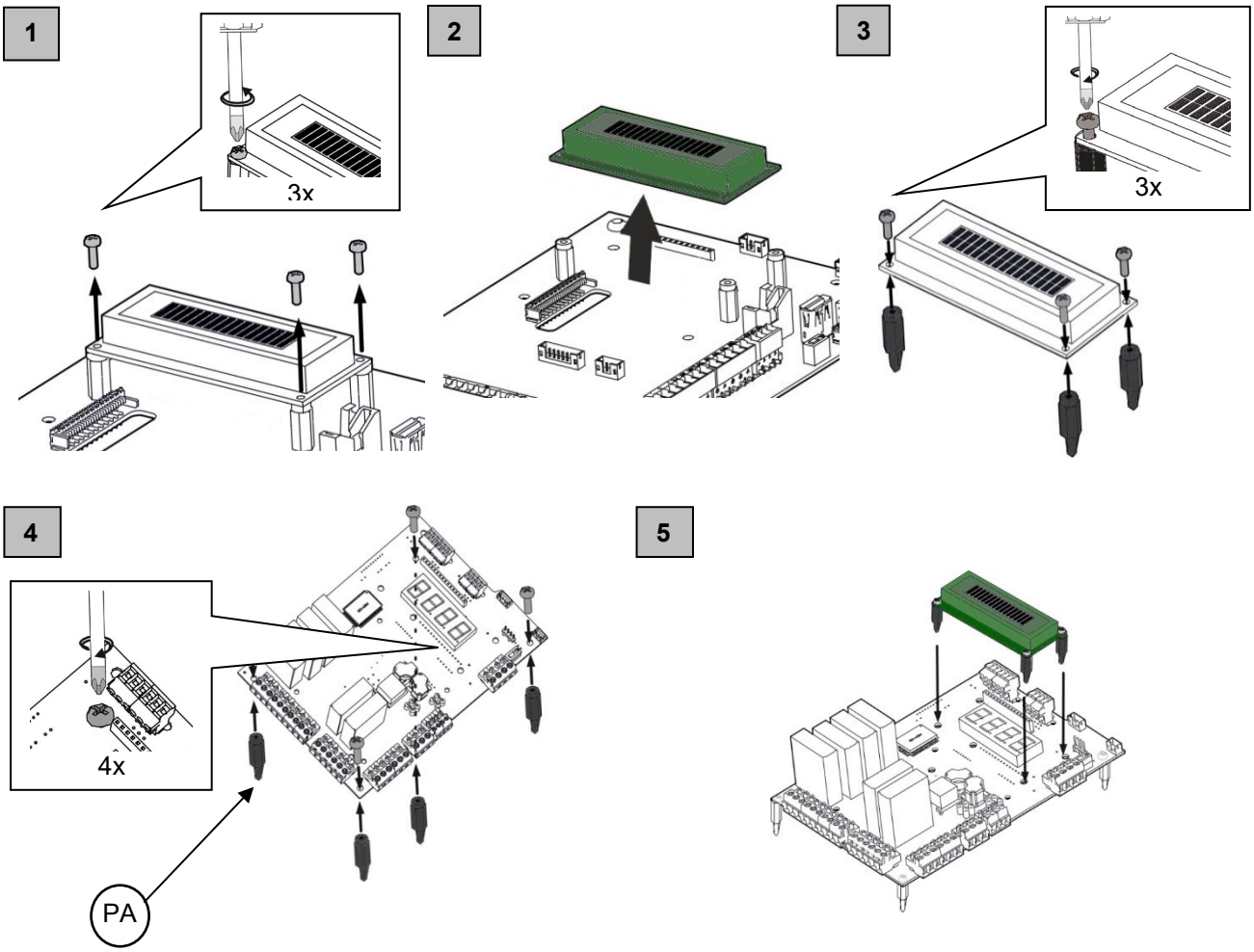




TST RFUxK2 → TST FUF2/FU3F



Display → TST RFUxK2



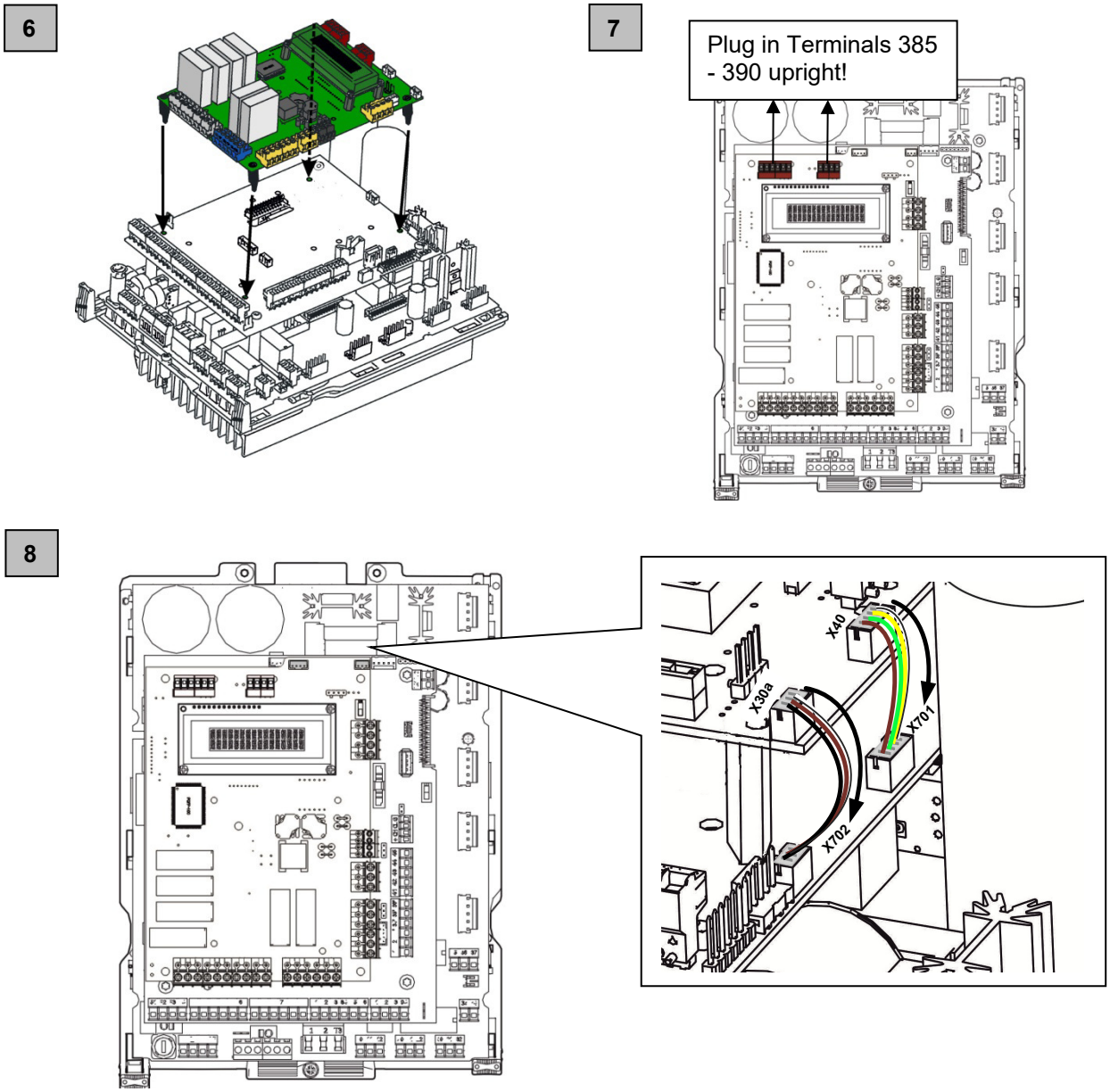


Figure 16: Changing the display and mounting the TST RFUxK2 expansion card using the TST FU3F as an example

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

8.3 Expansion boards RFUxIO-A/-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 Controllers (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 via the plug connector X30a.

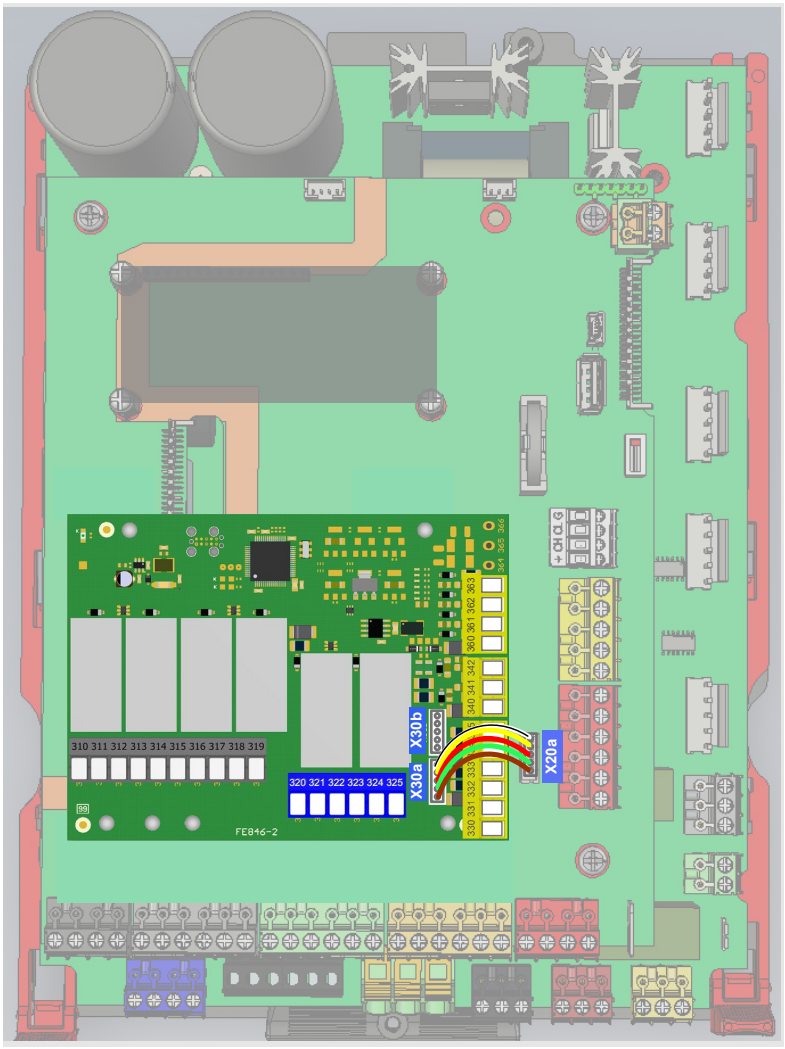


Figure 17: Connection example with the TST RFUxIO-E

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

8.3.1 Terminal assignment TST RFUxIO-B-E

TST RFUxIO-B - Inputs	
Terminal-No.	Function
366	GND
365	+24 V OUT 2E
364	+24 V OUT 2D
363	Input 26 deactivation airlock
362	Input 25 OPEN, not lockable
361	Input 24 OPEN, not lockable
360	+24 V OUT 2C
342	GND
341	Input 23 photo eye
340	+24 V OUT 2B
335	GND
334	Input 22 - cross traffic
333	+24 V OUT 11
332	GND
331	Input 21 OPEN, in intermediate stop
330	+24 V OUT 2F

TST RFUxIO-B - Inputs	
Terminal-No.	Function
366	--
365	--
364	--
363	Input 26 deactivation airlock
362	Input 25 OPEN, not lockable
361	Input 24 OPEN, not lockable
360	+24 V
342	GND
341	Input 23 photo eye
340	+24 V
335	GND
334	Input 22 - cross traffic
333	+24 V OUT 11
332	GND
331	Input 21 OPEN, in intermediate stop
330	+24 V OUT 2F

TST RFUxIO-B - Outputs	
Terminal-No.	Function
310	COM -L
311	COM -L
312	COM -N
313	COM -N
314	COM -N
315	COM -N
316	Output 5 Red traffic light inside
317	Output 6 Green traffic light inside
318	Output 7 Red traffic light outside
319	Output 8 Green traffic light outside

Terminal-No.	Function
320	NO - Normally closed
321	COM Output 9
322	NC - Normally open
323	NO.- Normally closed
324	COM Output 10
325	NC - Normally open

9 Dimensions

9.1 Stainless steel enclosure - xUEGNH

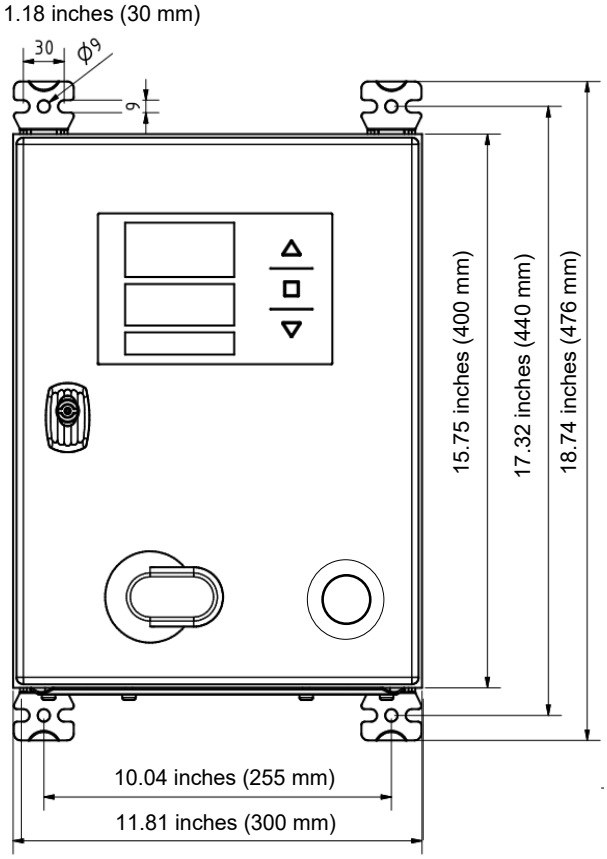


Figure 18: Front view

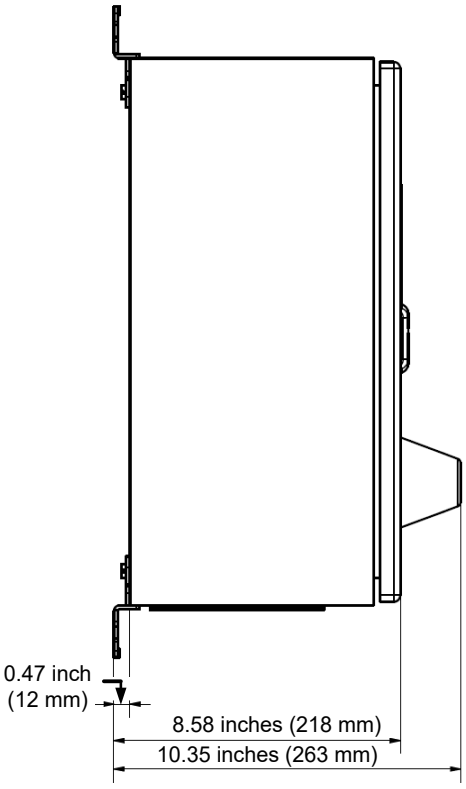


Figure 19: Side view

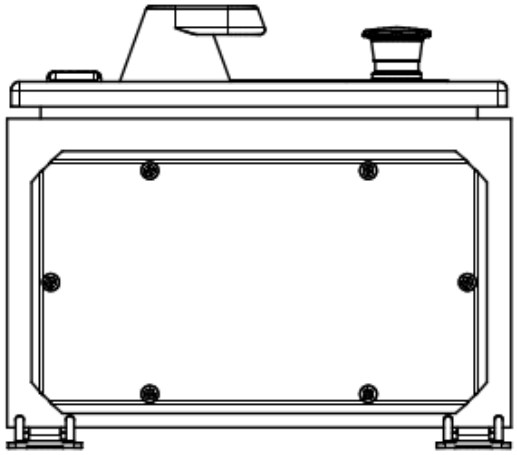


Figure 20: Bottom view

9.2 **Steel enclosure - xUGNH**

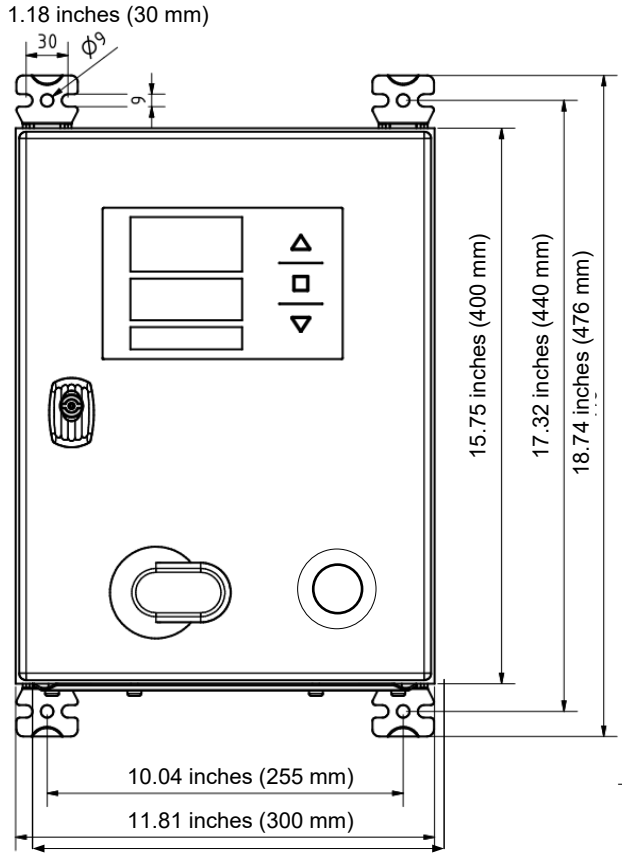


Figure 21: Front view

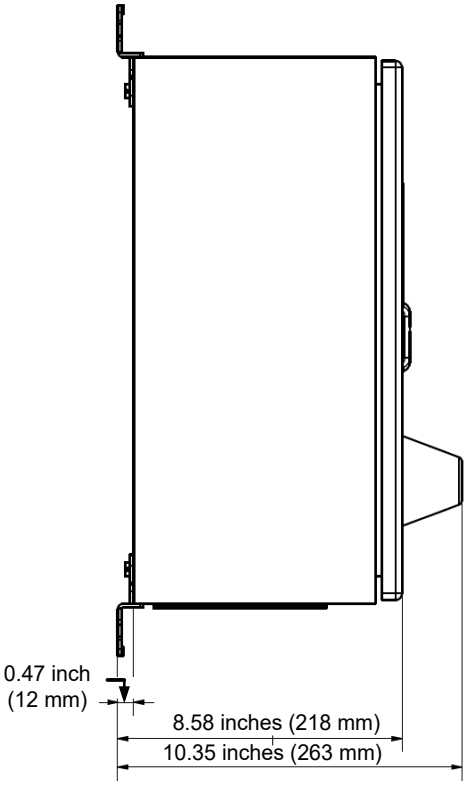


Figure 22: Side view

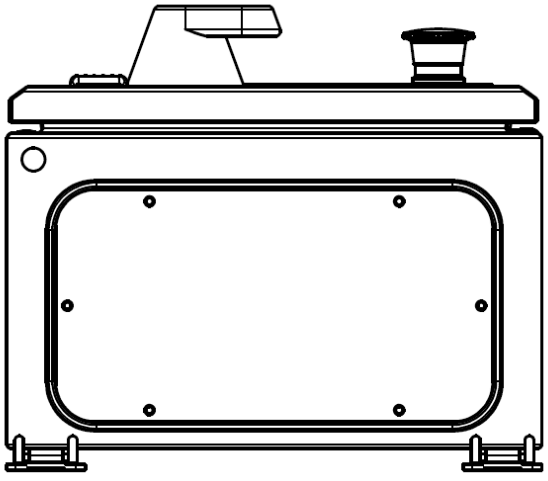


Figure 23: Bottom view

9.3 Open type – xUPR

⚠ATTENTION

The following dimensions are the required distances for installation in enclosures!
The outer dimensions represent the minimum dimensions for installation in an enclosure, including air gaps.
The inner dimensions represent the dimensions of the board.
The other dimensions refer to the mounting frame and the heat sink.

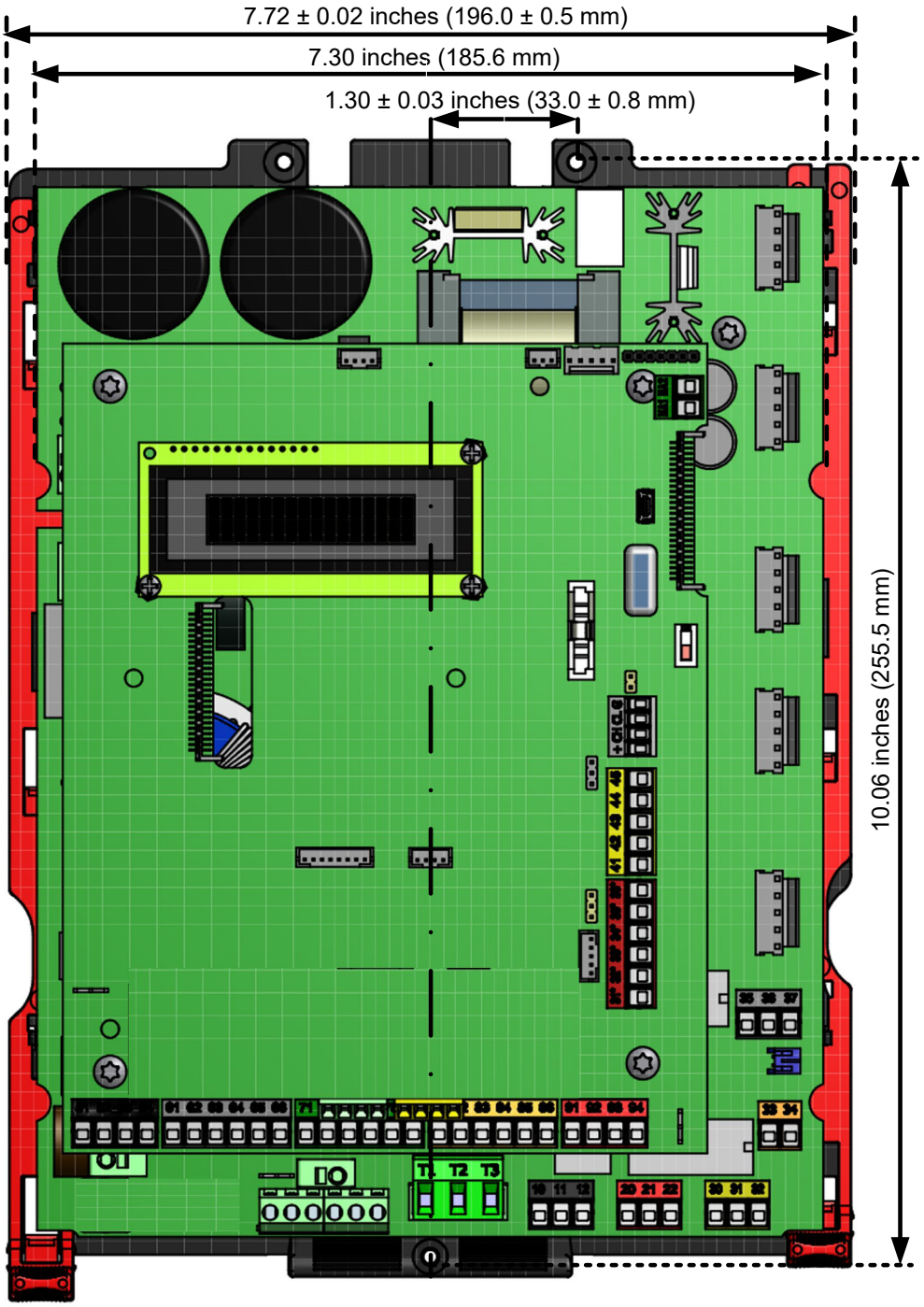


Figure 24: Front view (without TST RFUxK2)

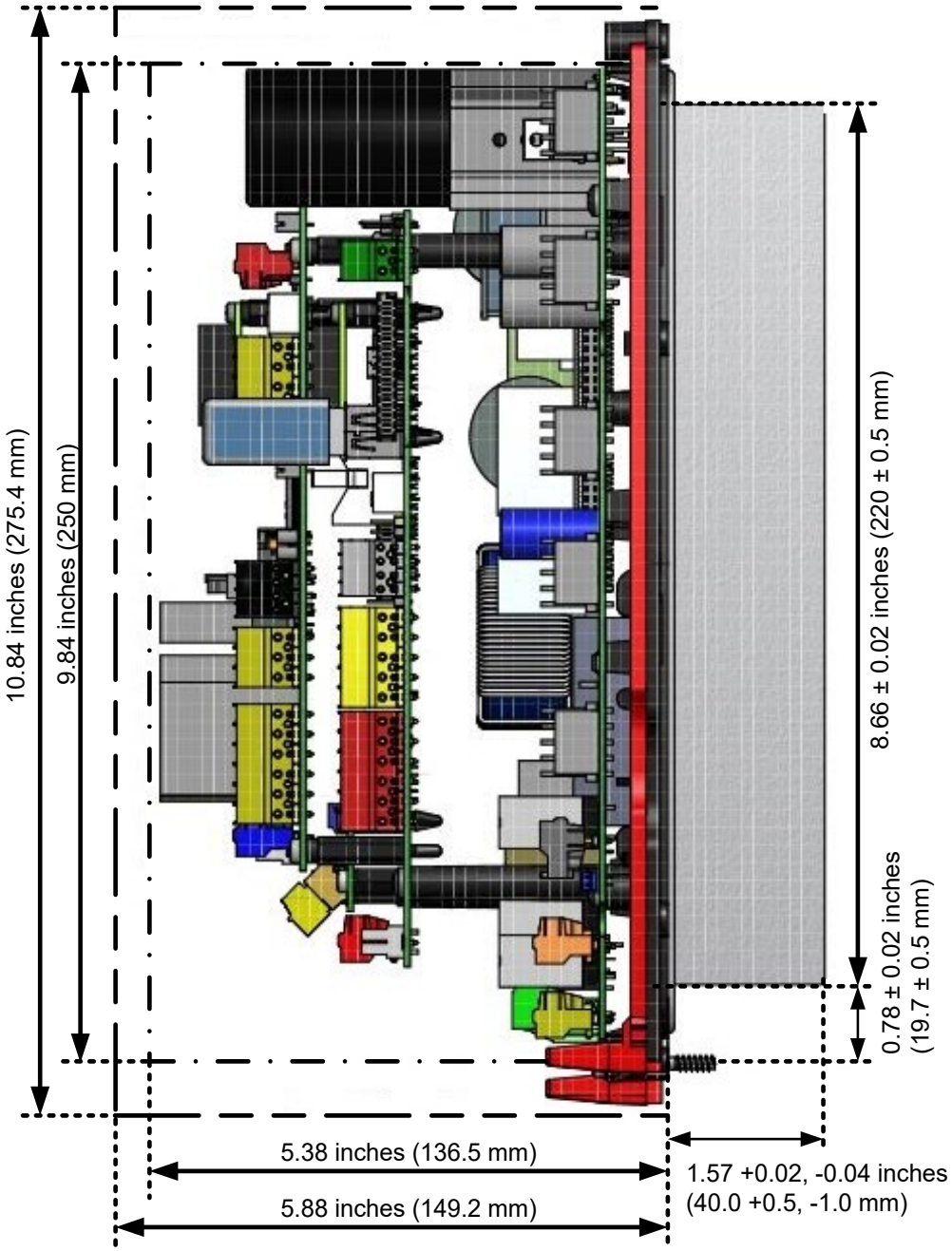


Figure 25: Side view

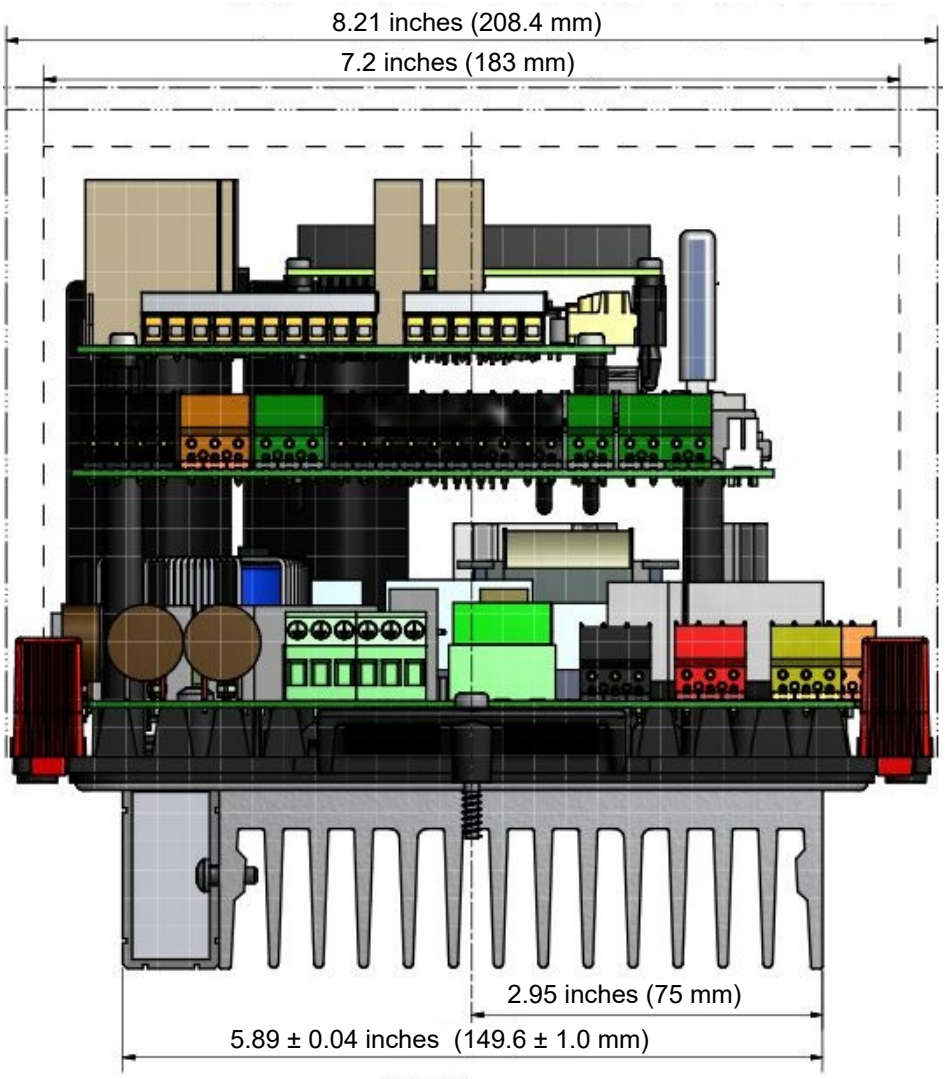


Figure 26: Bottom view (exemplary illustration)

10 Overall view of connections

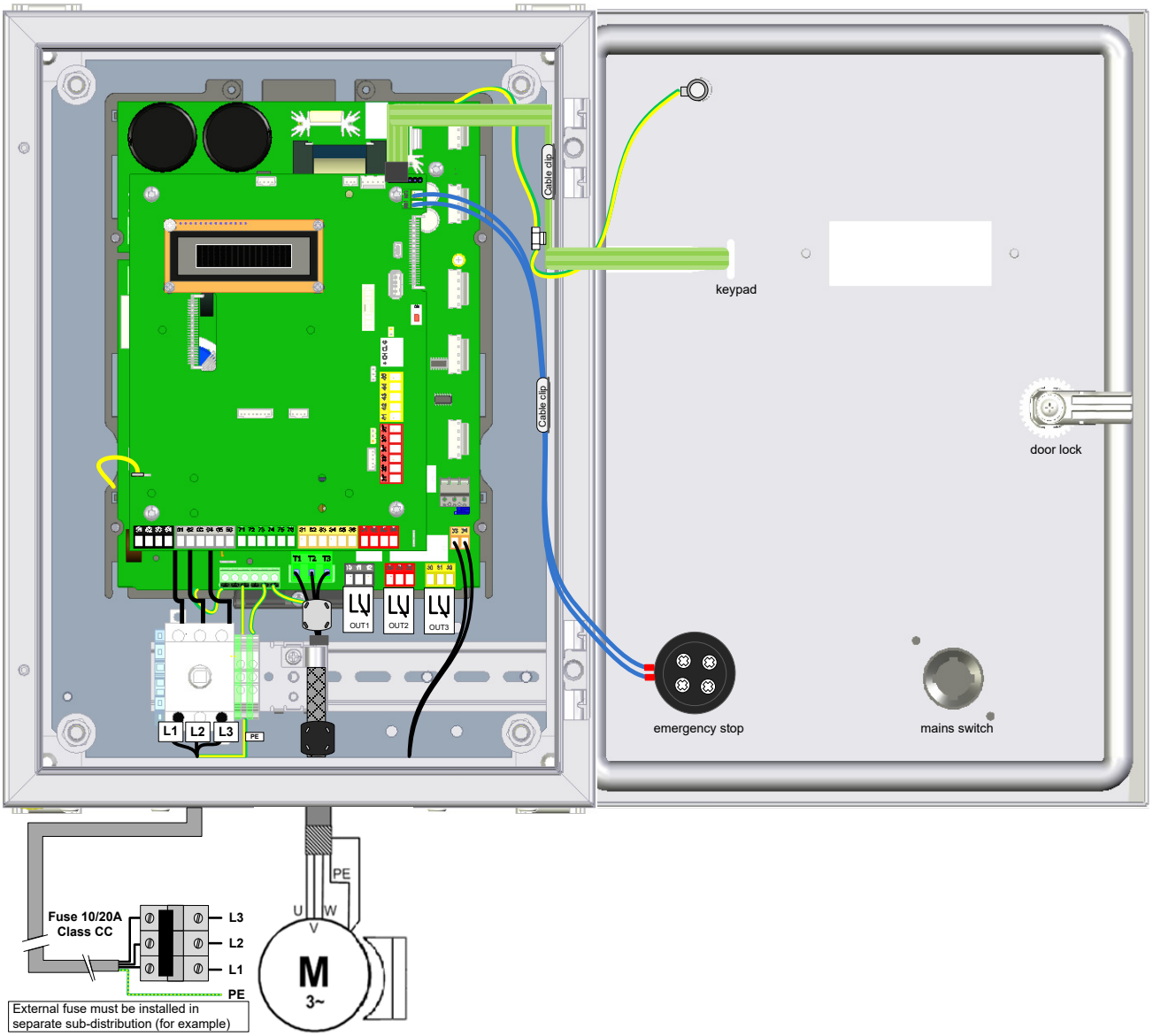


Figure 27: Overall connection view (exemplary illustration)

For details refer to chapter with technical data

10.1 Cable runs in the enclosure

⚠ATTENTION In the field wiring area, provisions for wiring for Class 2 and Class 3 circuits must meet the requirements for separation from Class 1 circuits in accordance with Section 725 of the National Electrical Code, ANSI/NFPA 70 and Section 16 of the Canadian Electrical Code.

- **Use class 1 wiring for terminal X13. Terminals X14, X15 and X16 are intended only to become a part of a Class 2 circuit when wired with Class 1 wires.**

⚠ATTENTION Dans la zone de câblage de champ, les précautions prises pour le câblage des circuits de Classe 2 et de Classe 3 doivent remplir les exigences posées à la séparation des circuits de Classe 1 en conformité avec la section 725 du Code Électrique National, ANSI/NFPA 70 et de la section 16 du Code Électrique Canadien.

- **Utiliser le câblage de Classe 1 pour les bornes X13. Les bornes X14, X15 et X16 sont destinées uniquement à faire partie d'un circuit de Classe 2 lorsqu'elles sont câblées avec des circuits de Classe 1.**

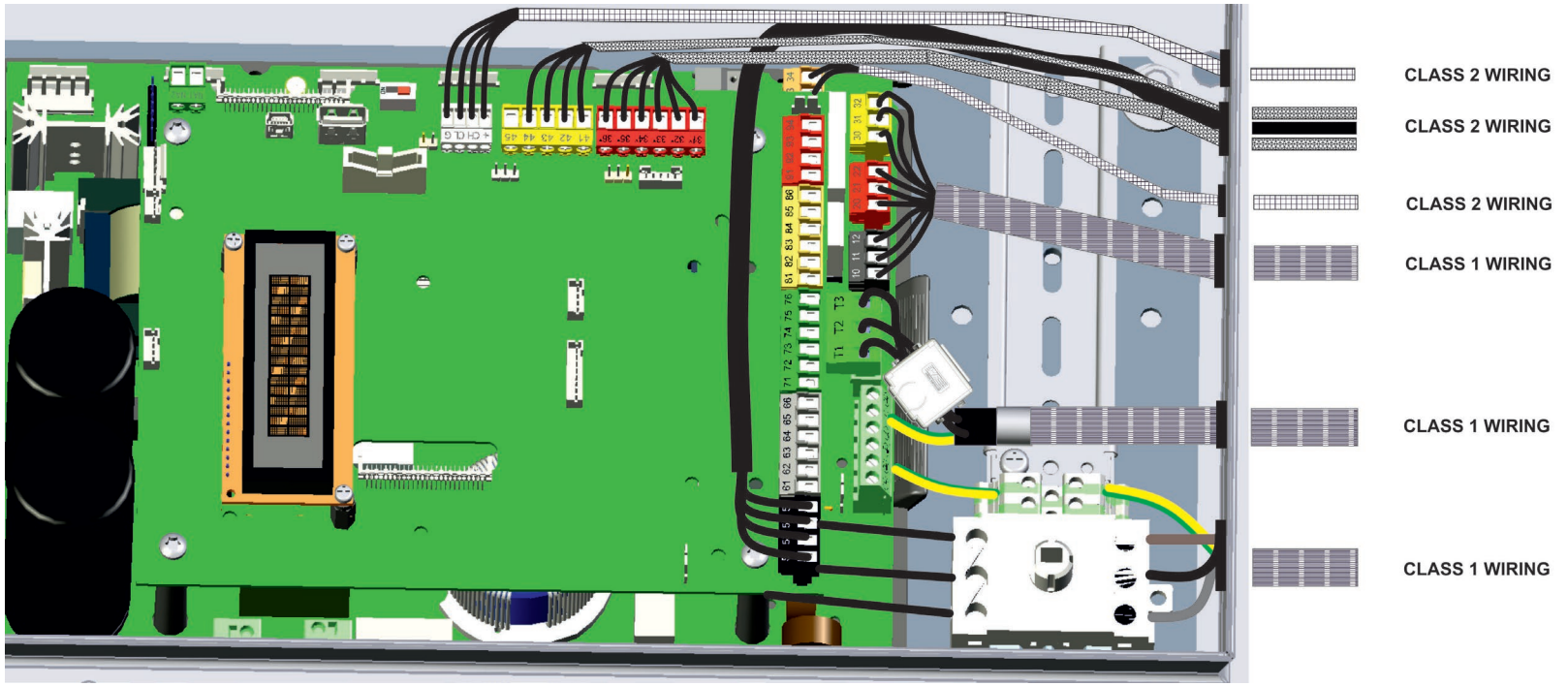


Figure 28: Cable runs inside the enclosure

11 Maintenance

The battery holder BAT1500 is prepared for a lithium coin cell BR2032 (3 V).

Installation or replacement of the lithium battery is restricted to trained technicians only.

Replace the battery with PANASONIC CORP or SPECTRUM BRANDS INC, part No. BR2032 only.
Use of another battery may present a risk of fire or explosion.

Please observe the polarity of the battery when replacing coin cell BR2032. When inserting the battery into the battery holder, the positive pole should point to the left.

⚠ WARNING

- **Fire, explosion and severe burn hazard. Do not recharge, crush, disassemble, heat above 100 °C (212 °F) or incinerate.**
- **Lithium batteries must be disposed of in a suitable manner (observe regional differences)!**

⚠ AVERTISSEMENT

- **Risque d'incendie, explosion ou de brûlure. Ne doivent pas être rechargées, écrase, démonter, chauffer à plus de 100 °C (212 °F) ni mettre au feu.**
- **Les batteries au lithium doivent être disposées exclusivement de manière appropriée (notez les différences régionales)!**

12 Technical data

12.1 Mechanical data

Variant	**xUEG**	**xUG**	**xUPR**
Enclosure	**Stainless steel**	**Steel**	**none (open type)**
Features	(cover with transparent window and membrane keypad)		(with heat sink block)
Dimensions (W x H x D):	11.81 x 15.75 x 8.11 inches (300 x 400 x 206 mm³)		7.72 x 10.67 x 5.99 inches (196 x 271 x 152 mm³)
	11.81 x 18.74 x 10.35 inches (300 x 476 x 263 mm³) (with handle and mounting brackets)		7.72 x 10.67 x 6.95 inches (196 x 271 x 176,5 mm³) (with expansion boards)
Protection type:	UL Type Rating 4X indoor		Open type (for use in a Pollution Degree 2 environment)
Weight:	23.6 lbs (10.7 kg)	24.3 lbs (11.0 kg)	8.0 lbs (3.6 kg)
Installation:	Fixing with 4 mounting brackets		---
Installation position:	Vertical use only		
Vibration:	Low vibration mounting, for example on concrete wall		
Cable entries:	With gland plate on bottom of enclosure Conduits have to be placed by customer		---
Temperature range: (ambient | surrounding air)	-4...104 °F (-20...+40 °C)		-4...149 °F (-20...+65 °C)
Storage and transport:	-13...158 °F (-25...+70 °C)		
Admissible humidity:	Up to 80 % relative humidity, non-condensing		
Altitude:	< 2000 m		

12.2 **Electrical data**

Mains supply (input): TST FU3F-AUx	480 VAC 2/3ph, 50/60 Hz, 5 A max (WYE 480/277 V only) 208 VAC 3ph, 50/60 Hz, 5 A max Only for use in grounded WYE or (high-leg) delta sources with a maximum voltage of 300 V to ground.
Mains supply (input): TST FU3F-CUx	480 VAC 2/3ph, 50/60 Hz, 10 A max (WYE 480/277 V only) 208 VAC 3ph, 50/60 Hz, 10 A max Only for use in grounded WYE or (high-leg) delta sources with a maximum voltage of 300 V to ground.
Mains supply (input): TST FU3F-FUx	480 VAC 2/3ph, 50/60 Hz, 12 A max (WYE 480/277 V only) 208 VAC 3ph, 50/60 Hz, 12 A max Only for use in grounded WYE or (high-leg) delta sources with a maximum voltage of 300 V to ground.
Mains supply (input): TST FU3F-DUx	240 VAC 1-3 ph, 50/60 Hz, 16 A max 208 VAC 1-3 ph, 50/60 Hz, 16 A max Only for use in grounded WYE or (high-leg) delta sources with a maximum voltage of 300 V to ground.
Short Circuit Current Rating (SCCR):	Suitable for use on a circuit capable of delivering not more than 5000 rms symmetrical amperes, max 208/240/480 volts, when protected by UL Listed Class CC fuses, rated max 10/20 A (see nameplate).The Voltage Rating of the external fuse(s) shall be at least equal to the input voltage of the door controller.
PE Grounding Terminal Block: (X100)	20 A, wire range AWG 14-12, solid CU wire only, torque 7 Lb In., 6-pole.
Emergency stop inputs: (X20, X21, X22)	Input has to be connected potential-free. Contact ratings: 0…26 VDC / 10…200 mA < 5 V: inactive ⇒ logical 0 > 7 V: active ⇒ logical 1 When the safety chain is interrupted, no movement of the drive is possible, not even in jog mode.
Inputs IN 1 to IN 12: (X23, X24, X25, X26, X27)	For potential-free contacts or 24 V active outputs, typ. 24 VDC, 15 mA; max 26 VDC, 20 mA, DC only. Input level > 7 V ⇒ input active Input level < 5 V ⇒ input passive Min signal duration > 100 ms
Input for 1 x safety edge: (X22)	Useable for N.C. or N.O. contacts of safety edge with 1.2 kΩ or 8.2 kΩ resistor (Evaluation on circuit board).
Input for 2 x accessory board: (M0a/M1a, M0b/M1b)	Useable with induction loop detector TST SUVEK or safety edge board TST SURA.
Input for radio receiver board: (M0a/M2a)	Only usable with 2 channel radio receiver TST SFFE2.

Class 2 power supply: (12/24 VDC)	+11.3 VDC, in total max 0.25 A, terminals X20 (pin 33), X22 (pin 45). +24 VDC, in total max 3.0 A, terminals X17, X18, X20, X22–X27, X200. Class 2 output power in total **max 3 A in any combination**. If optional internal accessories are connected, reduce the total Class 2 output power by the current rating of the accessories. The control voltage of 24 VDC for external devices is protected by a switching power supply. Short-circuit protected by central switching regulator (switches off the complete Class 2 power supply). **⚠ATTENTION** **Interconnection of Class 2 outputs is prohibited!**
Motor output (X13):	For connection of a 3-phase asynchronous motor.
• Ratings TST FU3F-FUx	6.7 hp motor @ 3ph. 480/277 V service voltage: 0…340 V / 12 A / 15 % Duty Cycle 0…480 V[1] / 7 A / 15 % Duty Cycle 3.0 hp motor @ 2ph. 480/277 V service voltage: 0…480 V[1] / 4.8 A / 15 % Duty Cycle 4.0 hp motor @ 3ph. 208 V service voltage: 0-208 V[1] / 12 A / 20 % Duty Cycle
• Ratings TST FU3F-CUx	5.0 hp motor @ 3ph. 480/277 V service voltage: 0…340 V / 10 A / 15 % Duty Cycle 0…480 V[1] / 5.8 A / 15 % Duty Cycle 2.0 hp motor @ 2ph. 480/277 V service voltage: 0…480 V[1] / 3.4 A / 15 % Duty Cycle 3.0 hp motor @ 3ph. 208 V service voltage: 0-208 V[1] / 10 A / 20 % Duty Cycle
• Ratings TST FU3F-AUx	2.0 hp motor @ 3ph. 480/277 V service voltage: 0…340 V / 5 A / 15 % Duty Cycle 0…480 V[1] / 3.8 A / 15 % Duty Cycle 1.0 hp motor @ 2ph. 480/277 V service voltage: 0…480 V[1] / 2.5 A / 15 % Duty Cycle 1.3 hp motor @ 3ph. 208 V service voltage: 0-208 V[1] / 5 A / 15 % Duty Cycle

[1] The stated output voltage is not fully reached under certain operating conditions.

Motor output (X13): (continued)	For connection of a 3-phase asynchronous motor.
• Ratings TST FU3F-DUx	3.0 hp motor @ 2ph/3ph. 240 V service voltage: 0…240 V[1] / 10 A / 20 % Duty Cycle 3.0 hp motor @ 2ph/3ph. 208 V service voltage: 0…208 V[1] / 10.6 A / 20 % Duty Cycle
• Rating for dynamic braking: (regenerative operation)	TST FU3F-AUx/CUx/FUx: Max 3000 W with a duty cycle of max 3 sec ON, 300 sec OFF. TST FU3F-DUx: Max 2500 W with a duty cycle of max 3 sec ON, 300 sec OFF.
Motor output (X13): (continued)	Output frequency: 0…200 Hz PWM frequency: 4…16 kHz Duty cycle 15 % = 6 seconds ON, 34 seconds OFF Duty cycle 20 % = 6 seconds ON, 24 seconds OFF Motor overload protection is provided prior to reaching 115% of the Motor Full Load Current. Degree of Overload Protection (for user adjustable motor current): - 600 % of FLA for 20 seconds max - 200 % of FLA for 8 minutes max Max length of motor cable: 100 ft (30 m). Shielded cable required. Motor lines have to be separated from any other wires! Normal operation up to 192 °F (89 °C) heat sink temperature, warning above 192 °F (89 °C), automatic thermal shutdown at 212 °F (100 °C). **⚠ATTENTION** **Voltage on output terminals can also be present in E-STOP-mode!** **La tension sur les bornes de sortie est également possible en mode E-STOP!**

Auxiliary relay outputs (Out1 / X14, Out2 / X15, Out3 / X16):	Switching rated load: - 250 VAC max, 3 A G.P. - 30 VDC, 3 A G.P. - C300, R150 (Pilot Duty) Change-over contact, potential-free, suitable for switching from 10 mA up to 3 A. 250 VAC permitted only when connecting the same phase as the supply voltage, max 300 V to ground. Contacts that have been used for switching high currents (> 100 mA) are not usable for small signal switching. If inductive loads are switched (other relays, or brakes) the outputs must be equipped with recovery diodes or appropriate noise suppression means (e.g. regenerate diodes, varistors, RC elements).
Alternative use as AC brake relay (Out 3 / X16):	Change-over contact for use with electromechanical AC brake. max 250 VAC / 3 A, max 300 V to ground. **⚠ATTENTION** **No safety function.** **Aucune fonction de sécurité.**
Transistor Output – Out 12..14 (keypad X400 - pins 1…3):	3 x const. current sink with 20 mA per output. Max load voltage drop 19 V. Open collector, switching GND! Recommended for driving LEDs; no inductive loads! Electronically protected, immune to short circuiting against +24 VDC and GND!
Transistor Output – Out 28/29 (X18 - pins 35…37):	24 VDC / max 2 x 800 mA Normally open, switching +24 VDC! Only ohmic loads! Electronically protected.
Brake 24 V – Out 4 (X17- pins 33/34):	24 VDC / min 100 mA / max 2500 mA Electronically protected! Switching monitored! If EMERGENCY STOP is activated, brake output becomes active immediately.

12.3 Communication Ports

Serial Port 1 RS485 (X20):	For electronic position encoder TST PD/PE or DES, light curtain TST LGB and other communication devices authorized by FEIG ELECTRONIC GmbH RS485 level (A, B), terminated with 120 Ω. Max length of cable: 100 ft (30 m). Recommended: Shielded twisted-pair cable in “noisy” surroundings, twisted-pair in „normal“ surroundings. Parallel use for future accessory I/O devices, together with FEIG ELECTRONIC GmbH positional decoders TST PD/PE.
Serial Port 2 CAN-2 (X200):	For external use of the expansion board TST RFUxK2, or other communication devices authorized by FEIG ELECTRONIC GmbH. CAN-Level (CH, CL), terminated with 120 Ω. Max length of cable: 100 ft (30 m). Recommended: shielded twisted-pair cable in noisy surroundings, „twisted-pair“ in „normal“ surroundings.
Serial Port 3 RS485 (M1a, M1b):	For use with accessory boards (TST SUVEK, TST SURA).
Serial Port 4 and 5 RS485 and CAN (X705):	For use of expansion board TST RFUxFCOM or other communication devices authorized by FEIG ELECTRONIC GmbH. Used typically for communication between two doors (interlocking doors, locks), TTL-Level (Tx, Rx, DDR). Max connection length: 4” (10 cm) for internal connection. **⚠ WARNING** **High Voltage to earth!** **⚠ AVERTISSEMENT** **Haute tension à la terre!**
Serial Port 6 CAN (X701):	For connection to TST RFUxK2 mounted inside the enclosure or other communication devices authorized by FEIG. TTL-Level (Tx, Rx, DDR). Max connection length: 4” (10 cm) for internal connection. **⚠ WARNING** **High Voltage to earth!** **⚠ AVERTISSEMENT** **Haute tension à la terre!**
Serial Port 7 RS485 (X20A):	For use of expansion board TST RFUxIO or other communication devices authorized by FEIG ELECTRONIC GmbH.

USB Host (X403):	For use with low-power USB memory stick with FAT32 file system. USB-Profile “Mass Storage Device” (8), Sub Class Code “SCSI transparent command set” (6), Interface Protocol “Bulk-only transfer” (0x50), Logical Unit Number (LUN 0), SCSI ‘Request Sense’ < 2.5 sec, USB-Request-Time < 2.5 sec, USB-NAK < 36684x, no Hubs/Compounds possible! Connector: USB-Type A Max current: 500 mA Max connection length: 7 ft (2 m) Typ. storage required for each door cycle (logging function): approx. 2 kByte We recommend an USB stick with up to 32 GB storage capacity. When a USB stick is used for logging for an extended period of time, its temperature rating must withstand the temperatures inside the enclosure. Recommended USB stick: “Industrial grade": typ. 32 to 158 °F (0 °C ... +70 °C) "Extended industrial grade": typ. -40 to 185 °F (-40 °C ... +85 °C)
USB Device (X401):	For communication with a PC using the FEIG ELECTRONIC GmbH service protocol (service only). Communication devices simulate a virtual serial port. Connector: USB-Type B (Mini-USB). Max connecting length: 7 ft (2 m). For use with one USB participant only!

FEIG ELECTRONIC

A·D·S AUTOMATIC DOOR SPECIALIST

Puertas & Portones Automaticos, S.A. de C.V.

¡Nuestra pasión es la Solución!....

FEIG ELECTRONIC

A·D·S AUTOMATIC DOOR SPECIALIST

Puertas & Portones Automaticos, S.A. de C.V.

¡Nuestra pasión es la Solución!....

RESIDENCIAL COMERCIAL INDUSTRIAL

MEMBER IDA International Door Association

V02.26

(229) 461-7028 portonesautomaticos@adsver.com.mx
ads.portonesautomaticos@outlook.com