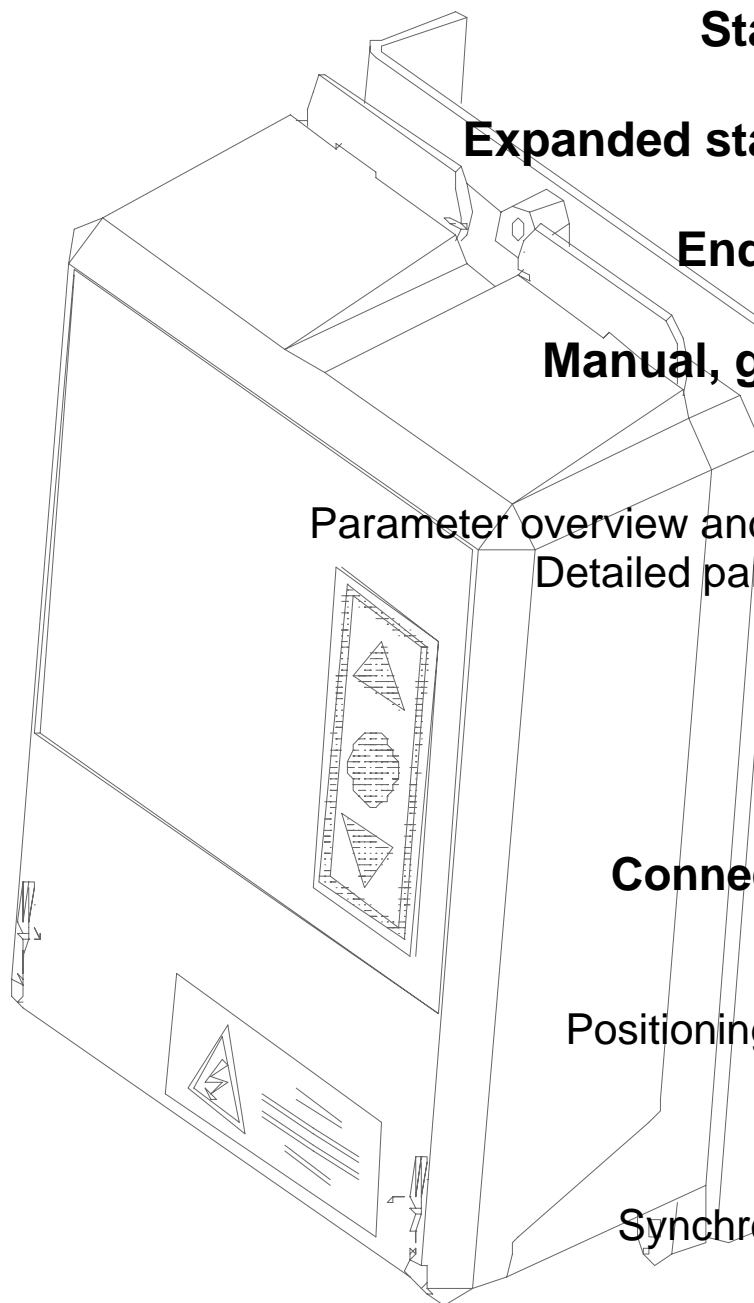


TST FUE

System manual



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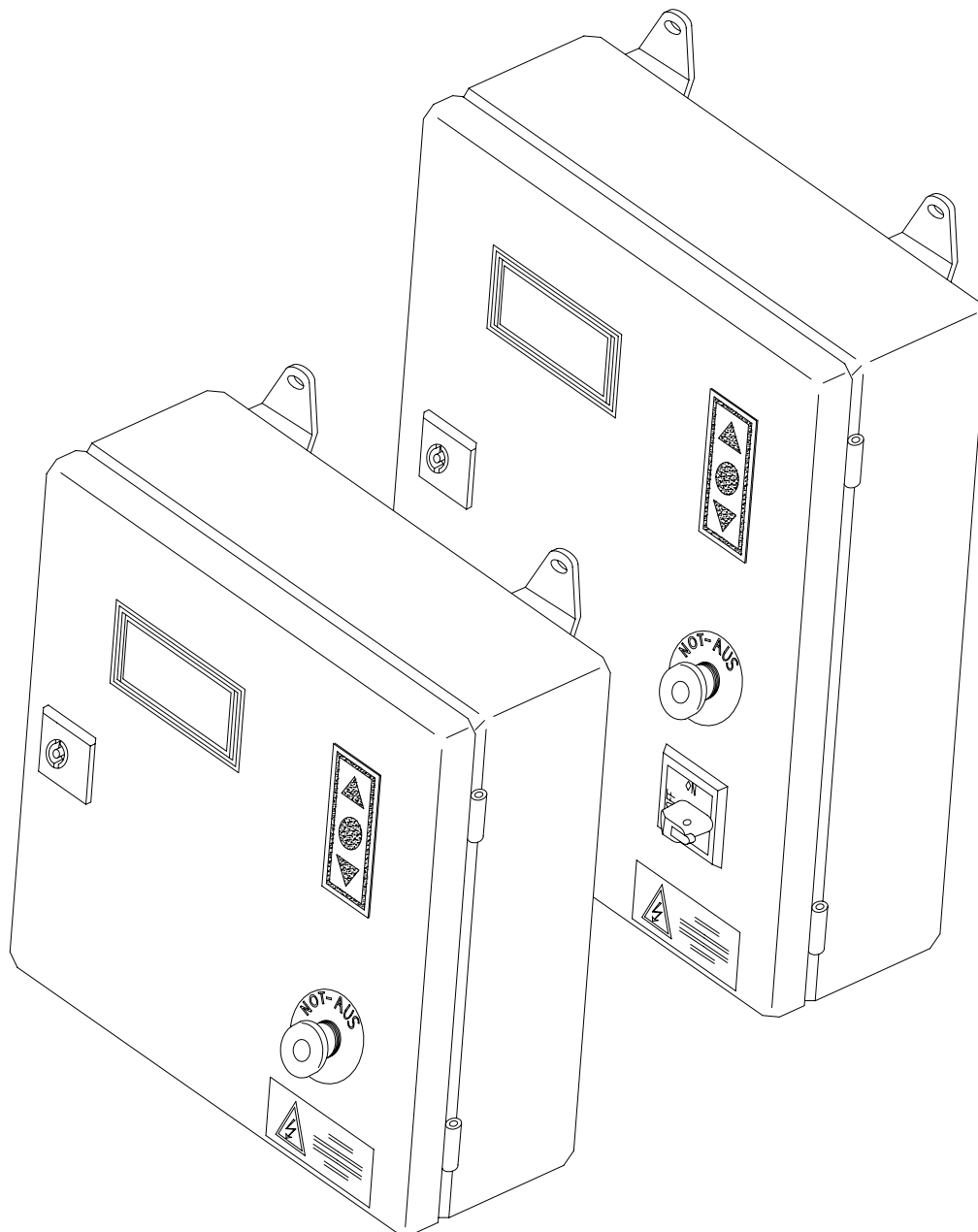
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Important !

**You must read the function description before operating,
connecting or starting up the door controller**

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 FUE door controller of FEIG ELECTRONIC GmbH. Starting up the 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 FUE door controller in service is solely responsible for the completeness of the startup manual.

This Manual shows only a small range of the controller functions. Further functions and descriptions for individual door functions as well as more exact specifications for the 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 surrounding 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, possibilities and performance data are not to be taken as assured properties and are subject to technical changes.

General notes concerning this document

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

⚠ WARNING alerts to a possible hazard to persons if the procedure is not performed as described.

⚠ ATTENTION alerts to possible damage to the controller.

IMPORTANT alerts to information which is important to the function of the door controller or door.

☞ refers to useful information which is useful but not absolutely necessary for using the TST FUE door controller

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1 Safety advisories

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

- All 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 50178 (VDE0160), EN 60335 (VDE0700), fire protection codes, accident prevention regulations as well as the relevant regulations for industrial doors (ZH1/494, EN12453, EN12978)
- The controller may be opened only if the supply voltage has been switched off completely.
- The Powersupply interrupt facility included the connector, must be saved for unintentional and unauthorized automatically switching on the Powersupply
- If the potential free contacts of the output relays or other terminals are supplied by a foreign voltage witch are still present after switching off the controller, you must install a sign on the housing that says: "ATTENTION! You must disconnect all supply circuits before opening the housing".
- The controller must never be operated while open.
- The controller must never be operated without the CEE-plug except that a main switch is installed. The main switch and the CEE-plug must be within easy reach.
- If the connecting lead is damaged, it must be changed by the manufacturer or another qualified person.
- Hazardous voltages remain stored in the intermediate circuit 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 intermediate circuit capacitors down to a voltage of less than 60VDC. Here discharge times of up to 10 minutes may be possible.
- In case 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 display and LED's remain off. The power supply can be restarted only after eliminating the short circuit or extreme overload.
- After turning off the supply, the power supply is still fed from the intermediate circuit capacitors for several seconds and maintains the supply function for a certain time depending on the power supply load.
- The processor circuit with 7-segment display, EPROM and multiplexers is galvanically directly connected to the mains supply. Note this when making any checking measurements (for measurements in the processor circuit, do not use test equipment with PE reference to the measuring circuit).
- It is not permitted to operate the controller without a connected protection earth. The absence of a protection earth will result in hazardous voltages on the controller housing caused by drain capacitors. The protection earth should be connected in compliance with EN50178 Section 5.2.11.1 for drain currents >3.5mA.
- Turning on or operating the controller in the presence of condensation is not permitted and may result in permanent damage.
- If controllers are used outside the specified temperature range, a regulated and monitored climate controller system must be in place to ensure that the specified working temperature range is maintained when turning on the supply and when operating the controller.
- The controller must never be operated with a damaged membrane keypad or sight glass. Damaged keypads and windows must be replaced. To prevent damage to the keypad, do not use pointed objects to actuate the keys. The keypad is designed for finger operation only.
- Before tuning on the controller voltage for the first time, ensure that the processor cards (plug-in modules) are in the correct position. Incorrect fit of the cards can result in damage to the controller, likewise the installation of non-approved third-party equipment.
- When moving the door in deadman mode, ensure that the door area can be inspected by the operator, since in this mode safety equipment such as safety bar and light barrier are defeated.
- Parameter settings and the function of the safety devices have to be checked before operating the door. Parameter settings and wire bridges are only allowed to set by an instructed person.

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

These safety advisories 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.

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.

2 Technical Data for TST FUE-2

Housing dimensions (W x H x D):	FUE2: 300x400x120mm (excl. wall bracket) or : 300x300x120mm (excl. wall bracket)	
Installation:	Vertical using wall bracket on housing bottom	
Supply voltage through L, N, PE:	230 V _{AC} ±10%, 50...60 Hz Permissible range: 180...240V ± 10% / 50...60Hz. Fuse: 16A K-type	
Controller internal power consumption:	max. 40W fully assembled and with motor not running	
External supply voltage 1 (230 V):	230 V _{AC} ±10%, 50...60 Hz (fused on the circuit board: F202 / 3,15AT)	
Control voltage / external supply 2:	24 V _{DC} regulated (±5% at nominal voltage 230 V) max. 500 mA incl. optional plug-in modules. With circuit breaker, short-circuit protected by central switching regulator.	
Control voltage / external supply 3:	For electronic limit switches and safety edge Nominal value 11.5V / max. 130mA	
Control inputs:	24 VDC / typ. 15 mA, max. 26VDC / 20mA all inputs are to be connected potential-free or: < 5 V: inactive → logical 0 < 7 V: active → logical 1 min. signal duration for input control commands: > 100 ms galvanically isolated via optocouplers on the circuit board	
Inputs INK 1 and INK 2:	For two 24V active 90° offset pulse inputs, max. 20mA load. < 5V: inactive → logical 0, > 16V active → logical 1 Limit frequency: 1kHz	
RS485 A and B:	For electronic limit switches only. RS485 level, terminated with 100Ω.	
Safety chain / Emergency-Stop	all inputs are to be connected potential-free Contact load capacity ≤ 26 VDC / ≤ 120 mA When safety chain is interrupted, no movement of the drive is possible, not even in deadman mode Factory setting unjumpered	
Safety edge input:	For electrical safety edges with 1.2kΩ or 8.2kΩ termination resistor and for dynamic optical systems..	
Relay outputs	If inductive loads are switched (e.g., additional relays or brakes), these must be equipped with recovery diodes and appropriate noise suppression means (regenerative diodes, varistors, RC elements)	
Relay K3: Standard brake relay:	Changeover contact for enabling electromechanical brakes with interposed brake rectifier. 230VAC / 3A. When the Emergency-STOP is tripped, the brake output immediately becomes active.	
Relays K4 and K5 "Fault / Door position messages / Lamp functions	Changeover contact potential-free min. 10mA max. 230VAC / 3A	230V permitted only when connecting the same phase as the supply voltage. Contacts used once for power switching can no longer switch low currents.
Drive output:	For drives up to 0.75kW (Version –A) resp. 1,5KW (Version –C) at 230V Motor constant current at 100% duty factor and 40°C ambient temperature: 5A Motor constant current at 60% duty factor and 50°C ambient temperature: 5A Version –A: 5A; Version –C: 10A Short-time overload capacity up to 15A resp. 22A for 0.5s Max. length of motor cable: 30m	
Brake resistance load (optional):	max. 1.5KW for max. 0.5 seconds. Repetition rate min. every 20 seconds.	
Temperature range	Operating:	-10...+50°C
	Storage:	-25...+70°C
Relative humidity	up to 80% non-condensing	
Vibration	low-vibration installation, e.g. on a concrete wall	
Enclosure rating	IP54 (only combined with the housing)	
Weight	approx. 6,5 kg	
Directives	Standards:	
EMC Directive: superceded by:	89/336/EWG 91/263/EWG 92/031/EWG 93/068/EWG	EN 50081-1 / 03.93: Noise emission, residential EN 50081-2 / 03.94: Noise emission, industrial EN 61000-6-2 / 2001: Noise immunity, industrial
Low-Voltage Directive: superceded by:	73/023/EWG 93/068/EWG	EN 60335-1 / 2003: Safety of Household and similar electrical appliances / Part 1
Type-tested according to:	EN12453 / 2001: EN12445 / 2001:	Industrial, commercial and garage doors and gates. Safety in use of power operated doors and gates. Requirements Industrial, commercial and garage doors and gates—Test procedures
Applied national technical specifications related to the above Directives	EN12978 / 2003:	Doors and gates - Protection devices – Requirements and testing procedures

3 Installing the Controller

WARNING

The system must be switched off while installing the controller

ATTENTION

- Before installing, check the controller for any transport or other damage. Damage inside the controller may under some conditions result in significant following damage to the controller including hazards to the user.

- Do not touch any electronic parts, especially parts of the processor circuit. Electronic components can be damaged or destroyed by electrostatic discharge.
- Before opening the housing cover, be sure that no drilling chips on the cover can fall into the housing.
- You have to make sure that the housing is installed without tension.
- Not used cable entries must be closed in order to get IP54.
- The cable entries are not allowed to have mech. stress.

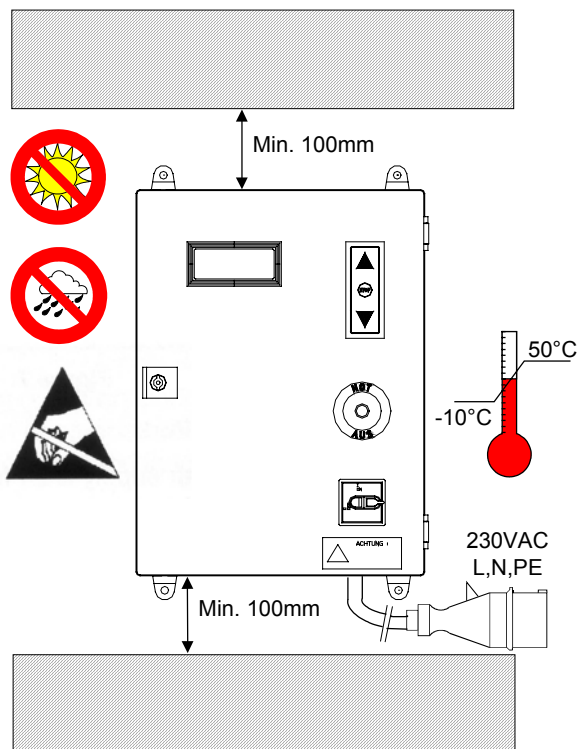


Fig. 1: Installing the controller

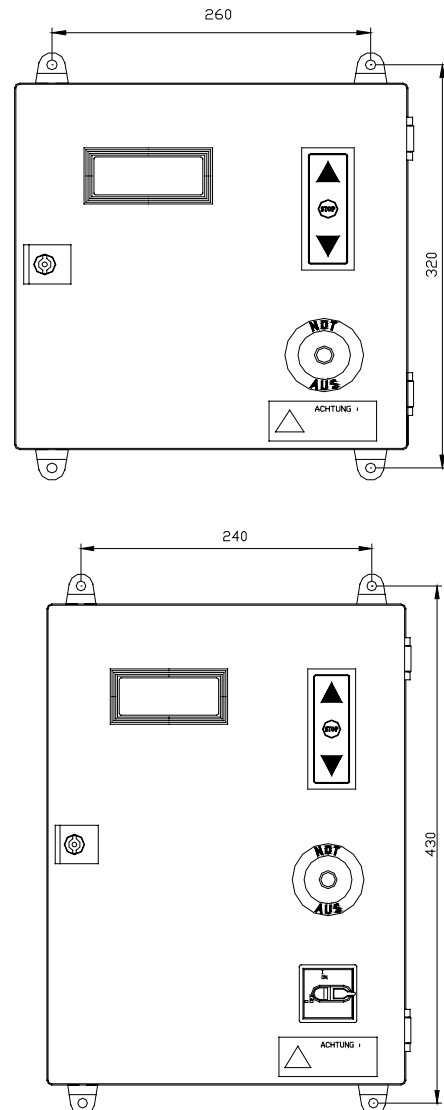


Fig. 2: Hole pattern

4 Electrical Connection

WARNING

- Wiring, testing and maintenance work on an open controller may be performed only without power. Observe in particular the points listed under Safety Advisories.
- After turning off the controller, dangerous voltage levels remain present for up to 5 minutes.
- Touching electronic components is dangerous due to residual voltages.
- Never operate the controller while the cover is removed.

ATTENTION

- Before turning on the controller for the first time and after finishing the wiring, check whether all motor connections are tight on the controller and motor side and whether the motor is correctly wired in star or delta configuration. Loose motor connections will often damage the converter.
- All controller voltage inputs are galvanically isolated from the supply by means of base isolation. All components connected to the controller must have additional isolation with a rated voltage of > 230 V

- To maintain the EMC Directives, only shielded, separate motor lines may be used, with the shield connected on both ends (motor and controller side) and no additional connections in the line. Maximum cable length: 30 m.
- Fast running sectional doors may create very high electrostatic discharge levels. The discharging of this voltage may damage the controller. Therefore suitable measures must be taken to prevent electrostatic discharge.
- Observe the cable conductor gauges specified in the data sheets.
- Maximum connection diameters of the printed card terminals used

	single wire (rigid)	fine wire (with/without wire end ferrule)
screw terminals	4	2,5
plug in terminals	2,5	2,5
motor terminals	6	4
line supply	6	4

4.1 Connecting the supply voltage

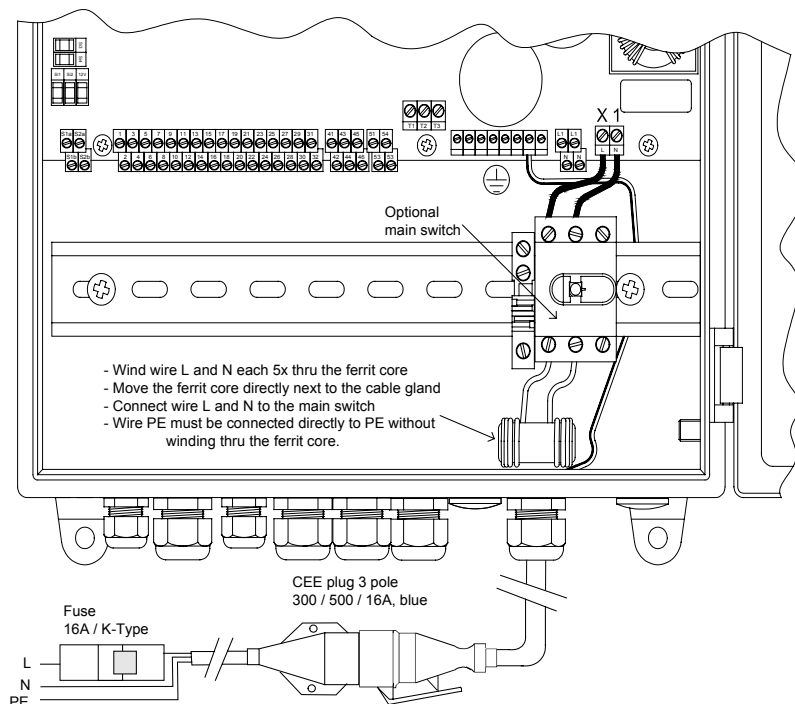


Fig. 3: Connecting the mains cable

4.2 Motor connections

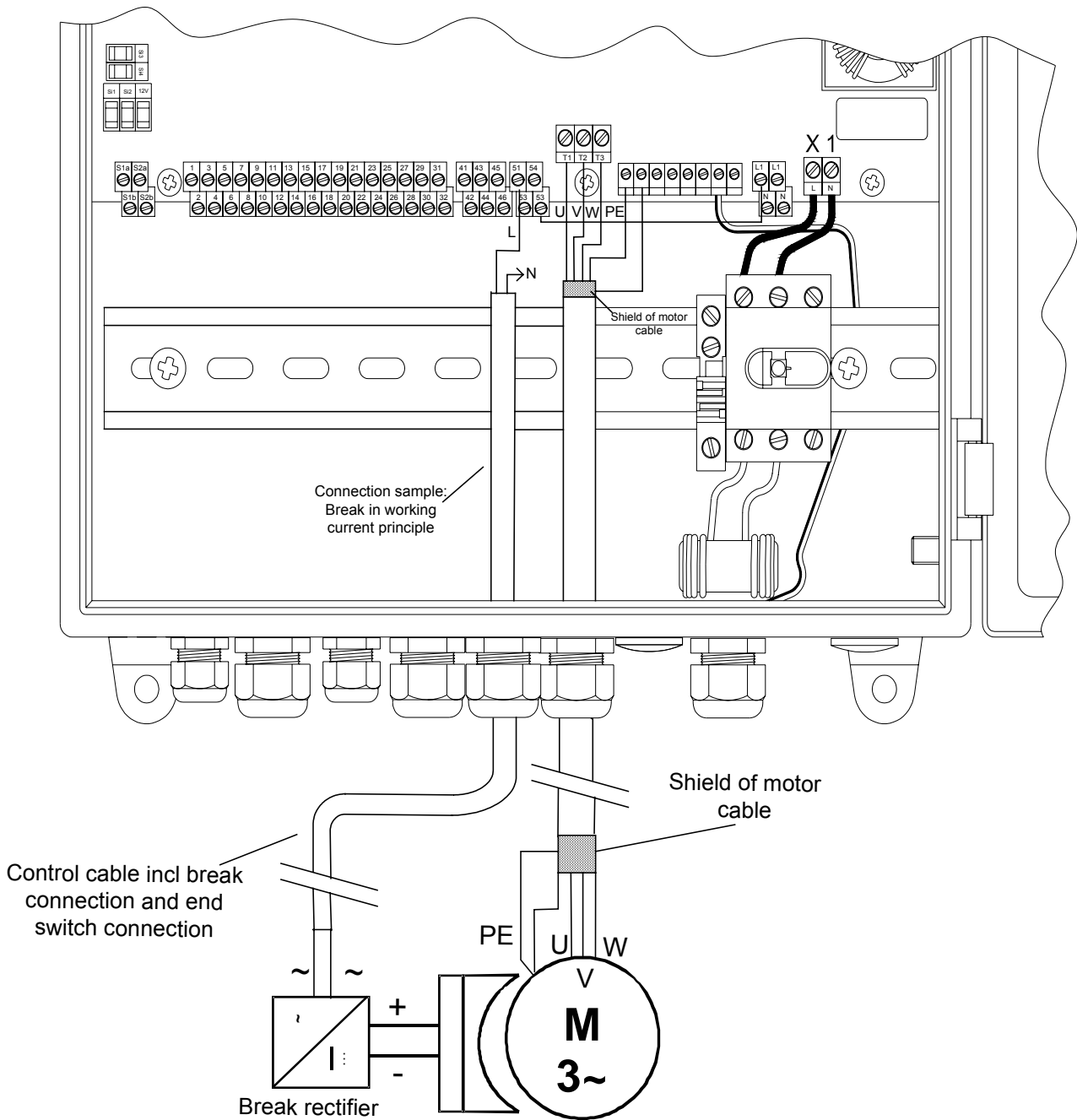


Fig. 4: Motor connections

IMPORTANT

To ensure flawless function of the TST FUE door controller, a shielded motor cable must be used. In addition, no other wires may be routed except for those connecting the motor.

If a motor with electro mechanical break is used you have to observe that the break is noise-suppressed. We recommend to suppress noise with RC-devices.

4.3 Connecting the safety edge

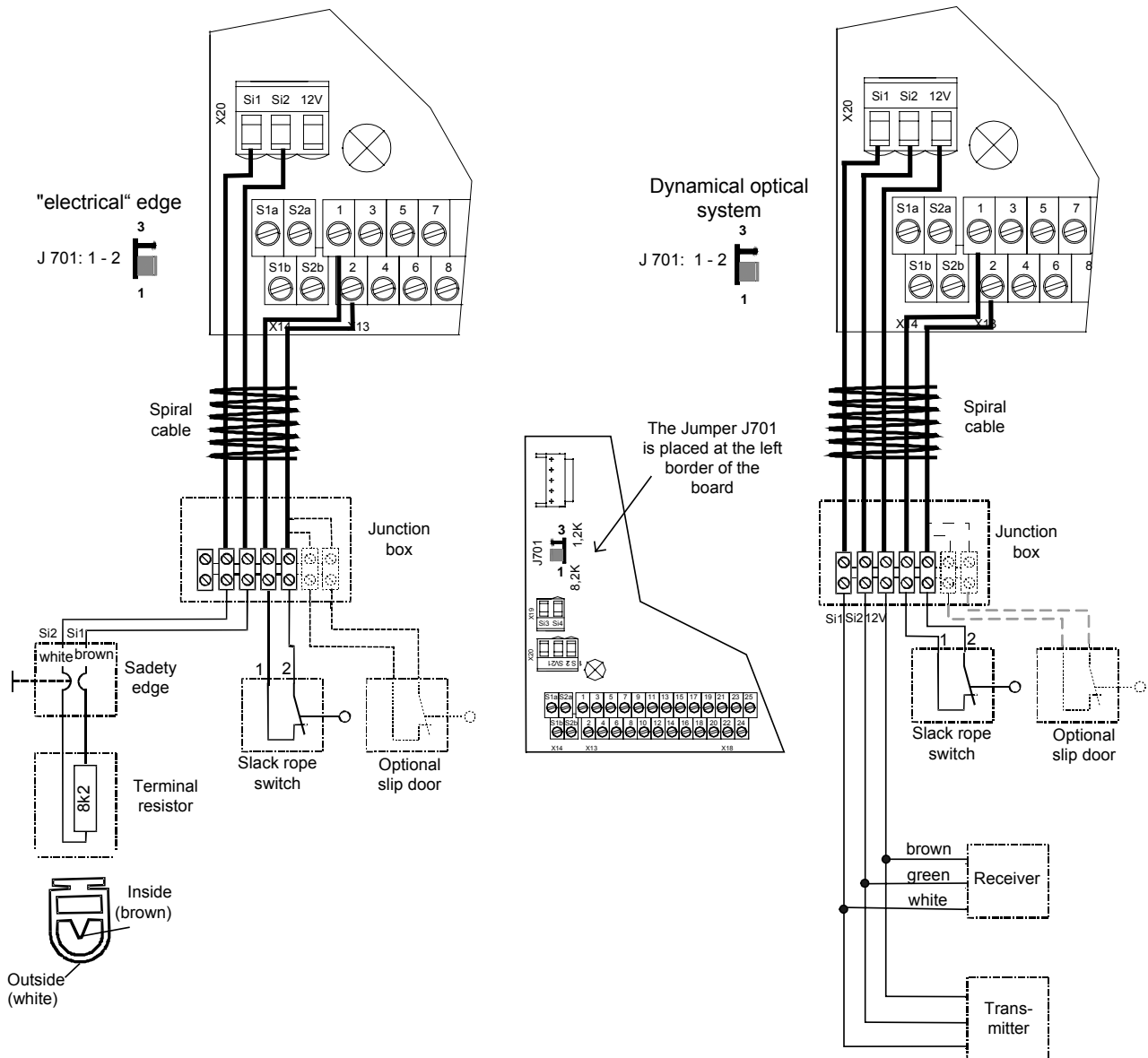


Fig. 5: Connecting the safety edge

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

- Electrical safety edge with 1.2kΩ or 8.2kΩ terminating resistor.
- Dynamic optical systems.

If one of these safety edges is connected when the TST FUE door controller is turned on, the edge is automatically detected.

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

Use of other safety edge types is possible. Please contact the door manufacturer.

4.4 Connecting limit switches

Three various limit switch systems can be used with the TST FUE door controller. In the standard setting an absolute encoder is used as the limit switch. In addition, mechanical cam limit switches or incremental encoders may be used.

4.4.1 Absolute encoder

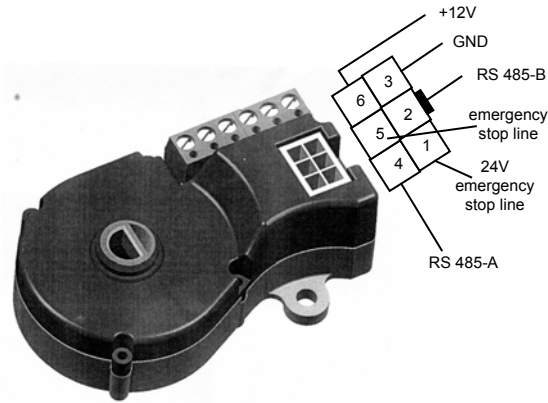


Fig. 6: Absolute encoder

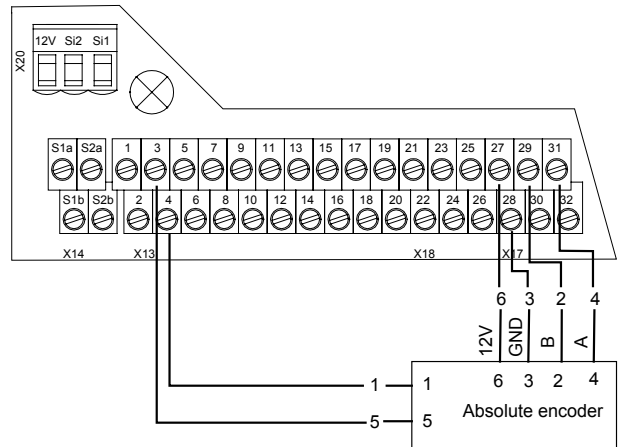


Fig. 7: Connecting the absolute encoder

4.4.2 Mechanical limit switches

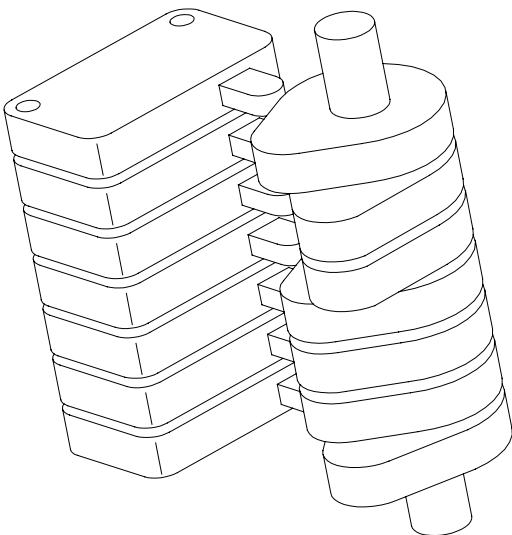


Fig. 8: Cam switch

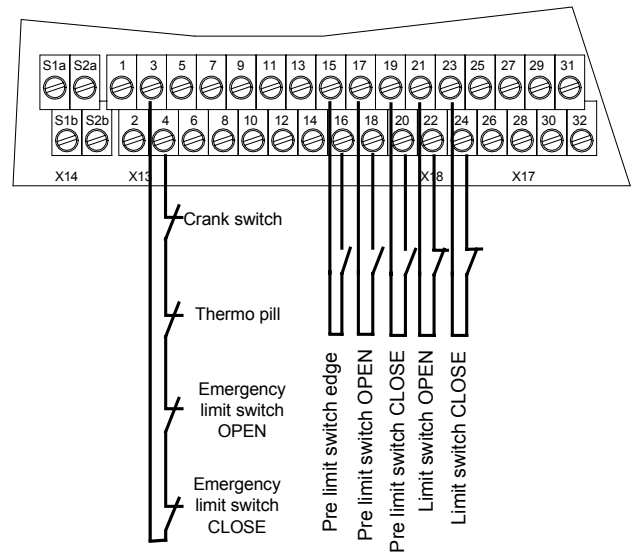


Fig. 9: Connecting cam switches

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

4.4.3 Incremental encoders



Fig. 10: Typical incremental encoder

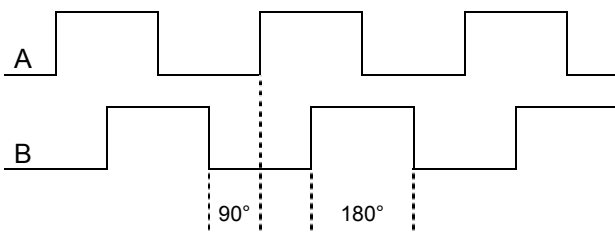


Fig. 11: Function of an incremental encoder

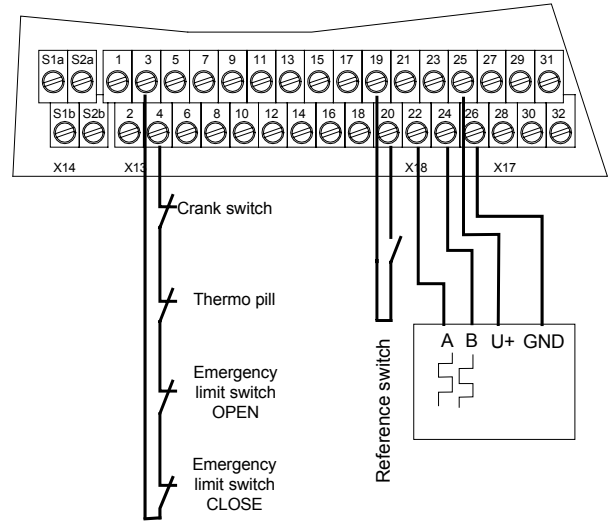






Fig. 12: Connecting incremental encoders

IMPORTANT



Recheck the electrical connections before starting up the controller. Improper connections may damage the device.

5 General Operating Notes for Parameterizing






Opening parameterizing mode

1.	 Turn off door controller	Completely disconnect power supply (refer to safety notes)	7-segment display goes out after a delay of several seconds	
2.	 Turn DIP-Switch S1 ON	Service mode is activated, close control cabinet. (position S1 look to chapter 6.2)		
3.	 Turn on door controller	Turn on controller	When service mode is active, the leading decimal point flashes Contents of the display depends on controller status	. * . . .
4.	 Emergency STOP	shift directly from the working mode to the parameterizing mode	The parameterizing mode will activated directly after pressing the emergency stop button	P * 0 0 0


Parameter selection with parameterizing mode open

 UP or  DOWN	Select desired parameter CAUTION: Not all parameters are directly viewable or changeable, depending on password and set positioning type	The parameter value can be viewed or modified (see below) Display varies with the selection	P
--	---	--	-----------




Parameter processing with selected parameter

1.		Controller in parameterizing mode	Displays the desired parameter name	P . 0 1 0
2.	 STOP (short)	Opening the parameter	The current parameter value is displayed:	5
3.	 Up	Up button for incrementing parameter value	If the currently valid parameter value is changed, the decimal points will flash	6 *
or	 Down	Down button for decrementing parameter value		4 *
4.	 STOP (long)	Save set parameter value	The parameter is considered to be saved when no decimal points flash	6
or	STOP (short)	Cancel set parameter value	Cancel, the original parameter value is again displayed	5
5.	 STOP (short)	Switch to display of the parameter name	Displays the parameter name	P . 0 1 0

Exiting parameterizing mode

 Emergency STOP release (pull)	Immediately quits parameterizing mode, door operation is again active	The last stored value is automatically retained
---	---	---	---------

Resetting the controller

Press  +  +  simultaneously and hold down for approx. 3 seconds.

IMPORTANT

After approx. 1h service mode is automatically reset. To return to service mode, you must reset the controller or turn it OFF and then ON again.


6 Basic Settings


To set the TST FUE door controller into service, please follow the steps below.

6.1 Automatic querying of the basic data

If the TST FUE door controller has not been preconfigured by the door manufacturer, the following parameters are automatically queried:

IMPORTANT For the TST FUE door controller to automatically query the parameters, DIP switch must be turned on (DIP switch location see Fig. 15: Position DIP switch).

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

 A „-1“ in the display is used by the controller as an indication that querying of this parameter is being forced.

- **Positioning system P.205**

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

- P.205: 0 = Mechanical limit switches Version 1 (Fig. 9: Connecting cam switches)
- P.205: 1 = Mechanical limit switches Version 2 (limit switches and pre-limit switches are normally closed)
- P.205: 2 = Incremental encoder as limit switch
- P.205: 3 = Absolute encoder DES-A (GfA)
- P.205: 4 = Absolute encoder TST PB-A
- P.205: 5 = SSI encoder (only with UL-Version)
- P.205: 6 = reserved
- P.205: 7 = Absolute encoder DES-B (Kostal)
- P.205: 8 = Absolute encoder TST PB

- **Reference switch profile P.25F**

If an incremental encoder is used as a limit switch, you must use Parameter P.25F to define a reference switch type and the behavior of the controller after power-up.

- P.25F: 0 = In deadman the lower end position must be moved to and saved.
- P.25F: 1 = After power-up the system automatically synchronizes to a lower reference switch.
- P.25F: 2 = After power-up the system automatically synchronizes to the safety edge.
- P.25F: 3 = After power-up the system automatically synchronizes to an upper reference switch.
- P.25F: 4 = After power-up the system automatically synchronizes to an upper mechanical stop.
- P.25F: 5 = After power-up the system automatically synchronizes to the safety edge and then to an upper mechanical stop.
- P.25F: 6 = After power-up the system automatically synchronizes to the safety edge and then to an upper reference switch.
- P.25F: 7 = After power-up the system automatically synchronizes to an upper reference switch and then to an upper mechanical stop.
- P.25F: 8 = synchronization upper and lower mechanical stop
- P.25F: 9 = manual synchronization upper and lower mechanical stop

- **Motor data P.100 – P.103**

The following parameter setting is used to teach the TST FUE door controller the motor type being used. Read the data from the nameplate and enter in the corresponding parameters.

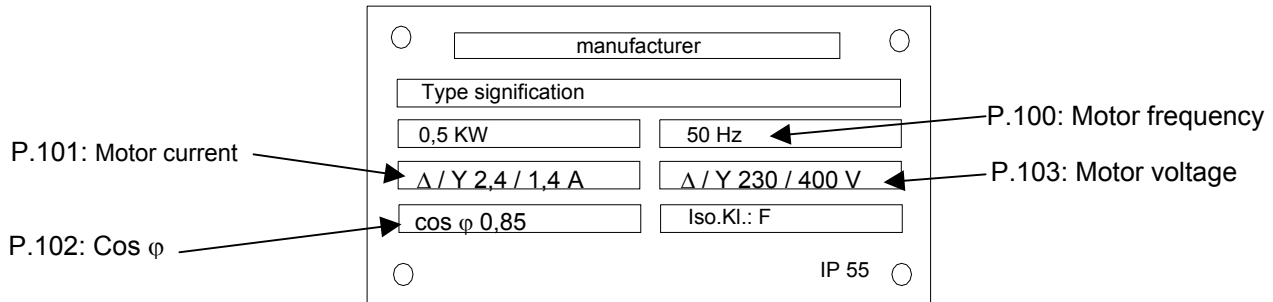


Fig. 13: Typical motor nameplate (may vary)

IMPORTANT Be sure to note the Y/Δ wiring of the motor. The motor data must be entered according to the motor wiring.

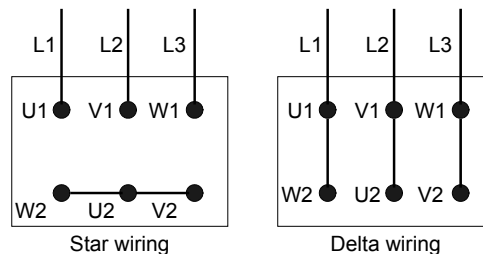


Fig. 14: Star / Delta wiring

☞ Automatic querying of the basic data can be cancelled by pressing the \blacktriangle OPEN key while the controller is being turned ON. This takes you directly to the parameterizing level.

6.2 Changing parameters

☞ Changing the basic data is not necessary if they were previously automatically queried and set.

To modify the preset parameters, proceed as follows:

- Disconnect the mains plug
- **⚠ WARNING**
After turning off the controller, dangerous voltage levels remain present for up to 5 minutes.
- Set the DIP switch to on.
- Connect the mains plug.
- Press STOP and \blacktriangle OPEN at the same time for approx. 3 sec. to open parameterizing mode for the door controller.
- Change the desired parameter.
- After making your settings, exit parameterizing mode by pressing the STOP key for approx. 3 sec.

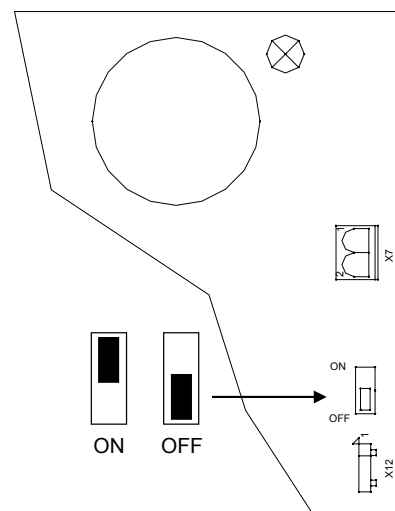





Fig. 15: Position DIP switch

7 Startup...



WARNING

Before you start up the controller you have to check the electrical connections and the correct position of the plug in cards.
After the start up you must check all the safety devices and their functions.


7.1 ... using absolute or incremental encoders

1. Open CALIBRATE mode by briefly pressing the  STOP key.
2. Go to Door-CLOSE position by pressing the  CLOSE key and save by pressing the  STOP-key for approx. 3 sec.


IMPORTANT If the door does not move, the motor does not have enough power. Use Boost (increases power at slow speeds) to give the motor more power. (see Section 7.4)

3. Go to Door-OPEN position by pressing the  OPEN key and save by pressing the  STOP-key for approx. 3 sec.

IMPORTANT If the door does not move, the motor does not have enough power. Use Boost (increases power at slow speeds) to give the motor more power. (see Section 7.4)

 When the door then moves in automatic mode, the pre-limit switches and ramps are automatically set. Is this function not active the pre limit switches and limit switch bands have to set manually, if they are not pre set. See "Expanded Startup" for this.


7.2 ... using mechanical limit switches

1. Go to approx. 50cm before the closed position by pressing the  CLOSE-key.

IMPORTANT If the door does not move, the motor does not have enough power. Use Boost (increases power at slow speeds) to give the motor more power. (see Section 7.4)

IMPORTANT The distance depends greatly on the door type and the speed; increase this value for fast moving doors.


If the door moves in the wrong direction: wrong motor rotary field, turn off controller and reverse the 2 motor wires.

2. Set lower pre-limit switch so that it just trips
3. Press  CLOSE-key to bring door to approx. 10cm from the closed position.

IMPORTANT The distance depends greatly on the door type and the speed; increase this value for fast moving doors.

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

IMPORTANT Do not travel past the limit switch in the end positions!

5. Press  OPEN-key to bring door to approx. 50cm from the opened position

IMPORTANT If the door does not move, the motor does not have enough power. Use Boost (increases power at slow speeds) to give the motor more power. (see Section 7.4)

IMPORTANT The distance depends greatly 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 \blacktriangle OPEN-key to bring door to approx. 10cm from the opened position.

IMPORTANT The distance depends greatly on the door type and the speed; increase this value for fast moving doors.

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

IMPORTANT Do not travel past the limit switch in the end positions!

9. If necessitated by door type: set upper and lower EMERGENCY limit switches
Connect normally closed contacts, e.g., in the safety circuit, in series with thermopile detector.
10. Press STOP and \blacktriangle OPEN to enter parameterizing 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 end positions in automatic mode.

WARNING To prevent unintended moving of the door, 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.

7.3 New request for teaching end positions

If the end positions have been pre-taught (using electronic limit switches) but these are not appropriate for the door in question, teaching the end positions can be newly requested.

Here the following parameter must be set:

P.210: 5 = New teaching of all end positions

7.4 Boost / Increasing power at slow speeds

Boost is used to increase the power of the drives in the lower speed range. Too much or too little boost can result in improper door operation. The adjustment range for boost is 0-30%. If too much boost is already set, this 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 possible door types, the correct setting for boost should be empirically determined.

1. Open parameterizing mode by pressing STOP and \blacktriangle OPEN at the same time.
2. Open Boost parameter by pressing the \blacktriangle ∇ arrow keys. Boost can be set separately for OPEN and CLOSE.
Boost for Open: P.140.
Boost for Close: P.145
3. Open parameter by pressing STOP and use the \blacktriangle ∇ arrow keys to change it in small steps of max. 5, then save by pressing STOP (long).
4. After changing the boost, exit parameterizing mode by long pressing of the STOP key and test the setting in run mode.



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

8 Additional connection possibilities

8.1 Photo eye

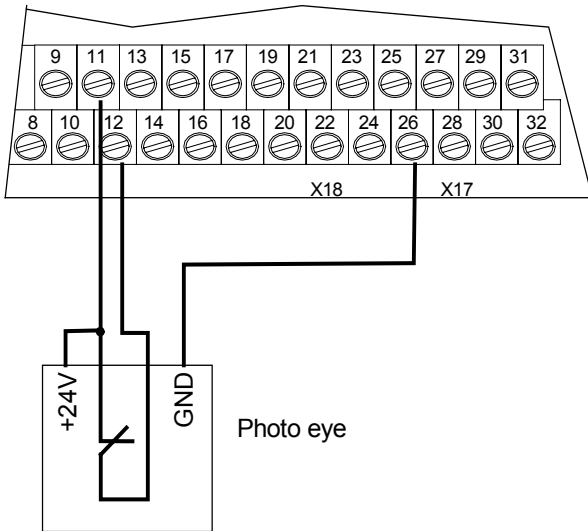


Fig. 16: Photo eye connection

8.2 External triggering devices

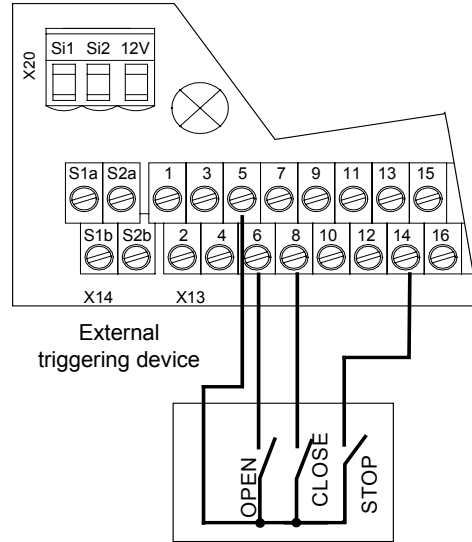
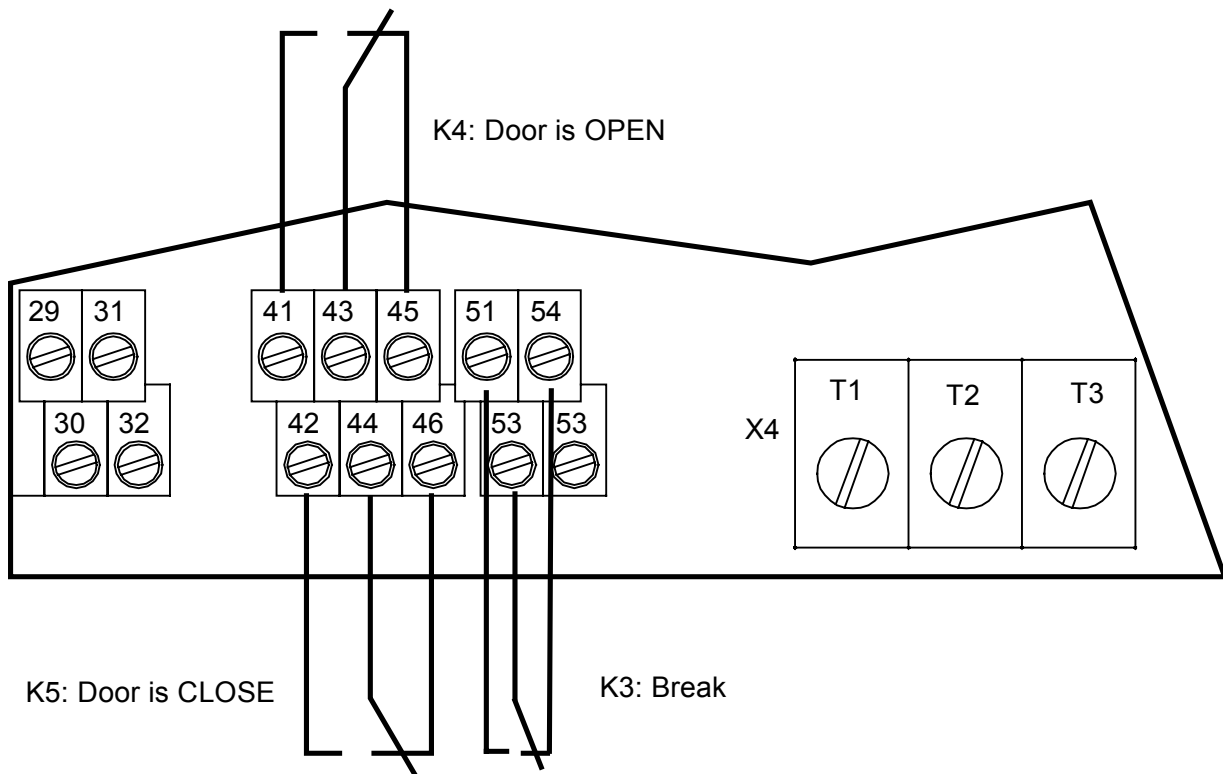
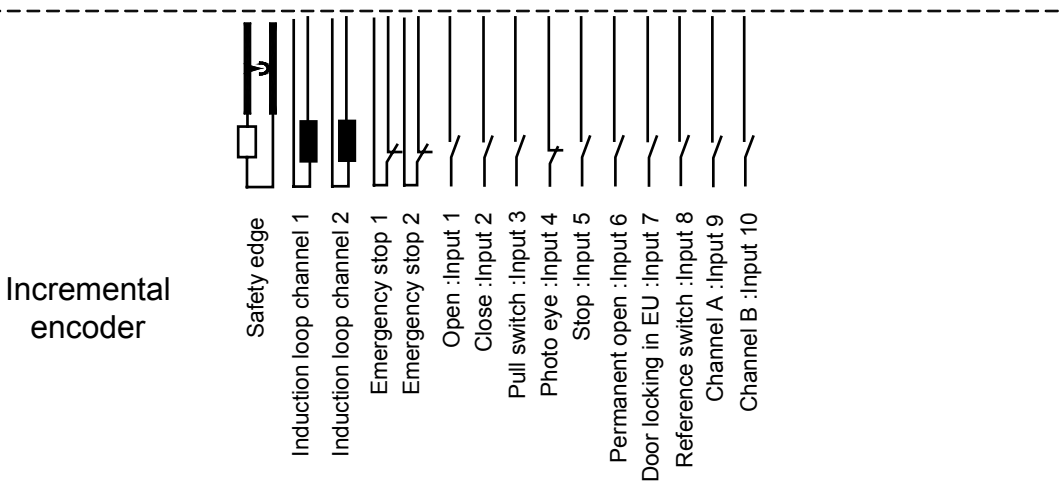
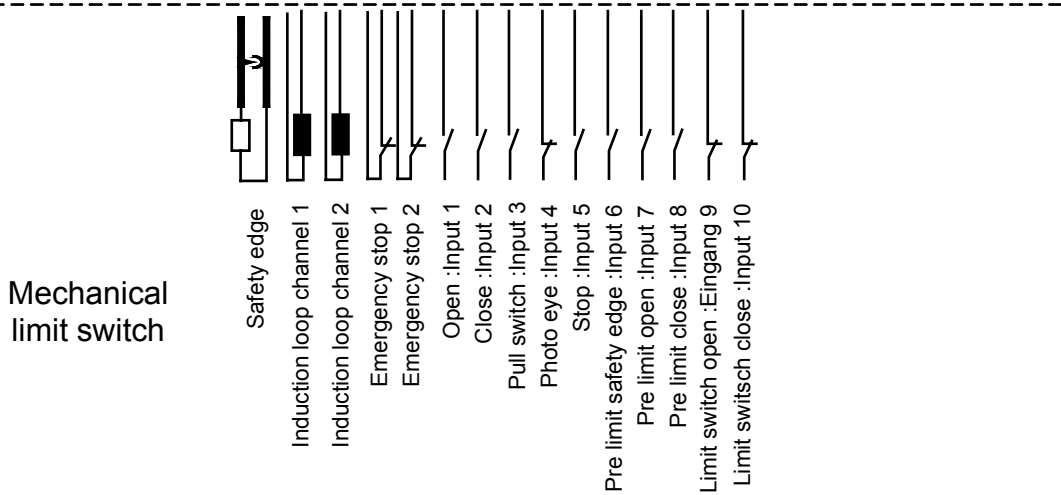
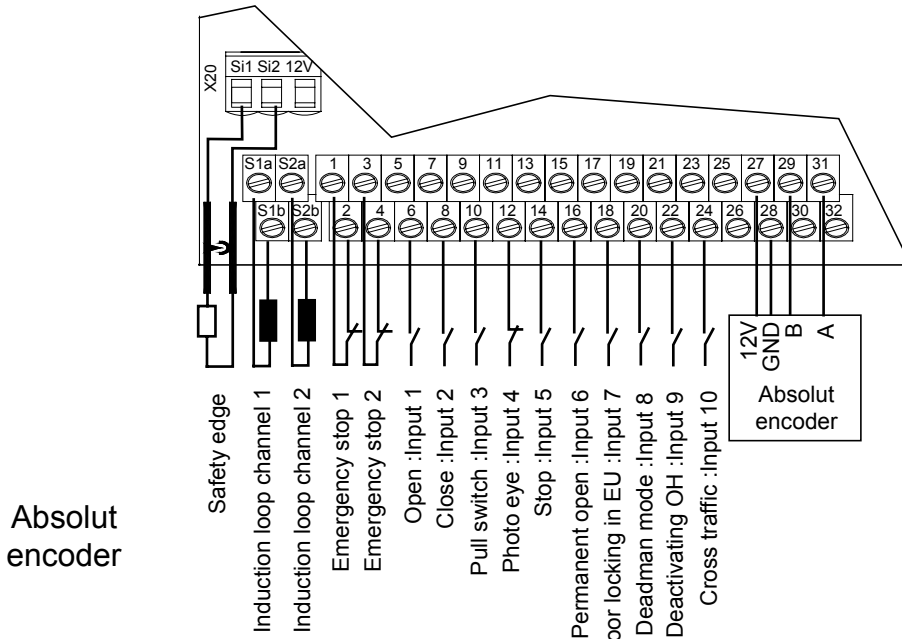


Fig. 17: External triggering devices

9 Overview of outputs



10 Overview of inputs



11 Functions

P.	[unit] Range	Door Functions	Default
000	[Cycles]	Door cycle counter display Display: 1234567 ⇒ 1234. ▼-key .567 Display: 67 ⇒ 67	
005	[Cycles]	Displays number of door cycles until maintenance is required. Display: 1234567 ⇒ 1234. ▼-key .567 Display: 67 ⇒ 67	
010	[s] 0 .. 200	Open hold time 1 (End position Upper - Eo) 0: Automatic closing deactivated	10
011	[s] 0 .. 200	Open hold time 2 (Intermediate hold position - E1) 0 = turned off	10
025	[s] 0 .. 20	Pre-warning time before close 0 = Pre-warning time turned off	0

P.	[unit] Range	Motor rated data	Default
100	[Hz] 30 .. 200	Motor rated frequency (see nameplate, note Y/Δ)	-1
101	[A] 0 .. 9.9	Motor rated current (see nameplate, note Y/Δ)	-1
102	[%] 40 .. 100	Power factor cos φ (see nameplate: cos φ : 0.63 → 63)	-1
103	[V] 100 .. 500	Motor rated voltage (see nameplate, note Y/Δ) The motor characteristic curve is automatically calculated based on the rated frequency and nominal voltage. ATTENTION: 230V drives have 1.7x the rated power when supplied with 400 V! The maximum data published by the motor and drive manufacturers must be observed!	-1
130	0 .. 1	Motor rotational field 0 = Right rotating 1 = Left rotating	0

P.	[Unit] Range	Boost	Default
140	[%] 0 .. 30	Voltage increase of the U/f characteristic curve (Boost) in % of rated voltage for opening → Boost in the lower speed range	0
145	[%] 0 .. 30	Voltage increase of the U/f characteristic curve (Boost) in % of rated voltage for closing → Boost in the lower speed range	0

P.	[Unit] Range	Selecting the limit switch system	Default
205	0 .. 8	Selecting the positioning system: 0. Limit switch 1 (limit switch as normally closed, pre-limit switch normally open) 1. Limit switch 2 (limit switch and pre-limit switch normally closed) 2. Incremental encoder (reference switch in lower end position) 3. Absolute encoder DES-A 4. Absolute encoder TST PB-A 5. SSI encoder (only with UL-Version) 6. Reserved 7. Absolute encoder DES-B 8. Absolute encoder TST PD	-1

P.	[Unit] Range	Teaching the end positions with electronic limit switches	Default
210	0 .. 5	Selecting the position calibrated by a deadman move ("teach in"): 0: None/Cancel 1: Lower and Upper limit switch (intermediate stop: see P244) 2: Upper limit switch (intermediate stop: see P244) 3: Upper and Lower limit switch 4: Intermediate stop limit switch (P244 is ignored) 5: (all) Lower, Upper and Intermediate Stop limit switch (per P244)	0

P.	[Unit] Range	Correcting end positions with electronic limit switches	Default
215	0 .. 1	Request a new calculation of the pre-end switch positions and limit switch bands 0: Do not correct 1: Request correction of limit switch bands and pre-limit switches Parameter only active if automatic correction Default is set.	0
221	[Inc] ± 125	Correction value for Lower end position (set to 0 after new calibration !)	0
231	[Inc] ± 60	Correction value for Upper end position (set to 0 after new calibration !)	0

P.	[Unit] Range	Reference switch profile	Default
25F	0 .. 9	0: The lower end position must be positioned at in deadman mode and saved. 1: After power-up the system automatically synchronizes to a Lower reference switch. 2: After power-up the system automatically synchronizes to the safety edge. 3: After power-up the system automatically synchronizes to an Upper reference switch. 4: After power-up the system automatically synchronizes to an Upper mechanical stop. 5: After power-up the system automatically synchronizes to the safety edge and then to an Upper mechanical stop. 6: After power-up the system automatically synchronizes to the safety edge and then to an Upper reference switch. 7: After power-up the system automatically synchronizes to an upper reference switch and then to the Upper mechanical stop. 8: Synchronisation to the upper and lower mechanical stop 9: Manual Synchronisation to the upper and lower mechanical stop	-1

P.	[Unit] Range	Speeds	Default
310	[Hz] 6 .. 200	Frequency for fast open (travel frequency until Upper pre-limit switch) → adjust pre-limit switch as necessary	60
350	[Hz] 6 .. 200	Frequency for fast close (travel frequency until Lower pre-limit switch) → adjust pre-limit switch as necessary ATTENTION: Note closing forces on safety edge!	40



P.	[Unit] Range	Diagnostics	Default
910	0 .. 20	Selecting display mode (request by STOP button or during motor movement) 0: Controller sequence (Automatic mode) 1: [Hz] current rotary field frequency 2: [A] current motor current (> 1A) 3: [V] current motor voltage 4: [A] current link current (effective current) 5: [V] link voltage 6: [°C] final stage temperature in °C 7: [°F] final stage temperature in °F 8: last measured run time (1/10 to 99.9s, 1/1 starting at 100s) For electronic limit switches only: 9: [Inc] current position progress 10:[Inc] current reference position 11:[dig] current channel 1 value of absolute encoder 12:[dig] current channel 2 value of absolute encoder 13:[dig] current reference voltage (2.5V) 14:Temperature in housing in [°C] 15:Temperature in housing in [°F] 16: Reserved 17: Reserved 18:Speed of the TST PD shaft ☞ only by using the TST PD 19: Reserved 20: Reserved 21: Numbers of positions commands without validity answeers of absolute encoder 22: Numbers of defective arrived sign`s at the TST PD (activate also the output at P.955) ☞ The adjustments 9 to 15 are only used by electronic limit switches ☞ The adjustments 14 and 15 are only used with TST FUS .	0
920	Eb 1 Eb 2 Eb 3 Eb 4 Eb 5 Eb 6 Eb 7 Eb 8 Ebcl Eb -	Display error memory / Faults ⇒ Open by pressing Stop key again, ⇒ Change by pressing Open/Close key ⇒ Quit by pressing Stop key. ⇒ Exit using cancel "EB-". <ul style="list-style-type: none"> • Eb 1 → Error messages 1 (most current) or Er-- • Eb 2 → Error message 2 or Er-- • Eb 3 → Error message 3 or Er-- • Eb 4 → Error message 4 or Er— • Eb 5 → Error message 5 • Eb 6 → Error message 6 • Eb 7 → Error message 7 • Eb 8 → Error message 8 • Ebcl → Clear entire error memory • Eb - → Cancel (Display noEr: no error)	Eb 1
925		Software version display	
930	[s] 0 .. 120.0	Motor run-time during last door move	
940	[V]	Line supply voltage display	

P.	[Unit] Range	Service Modes	Default
973	0 .. 1	Reset service counter: Reset (1) / Cancel (0)	0
980	0 .. 3	Service mode 0: Automatic (open and close in hold function) 1: Deadman Close (manual mode close / automatic mode open) 2: Deadman (manual mode for open and close) 3: Emergency (deadman open and close, all errors and securities are ignored).	0
999	0 .. FFFF	Password entry	1

12 Message Overview

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.

For this, you press the  STOP button and keep it pressed and press the EMERGENCY STOP button afterwards. Alternatively, the  STOP button can also be kept pressed for approx. 5 seconds.

Improper end positions		
F.000	Door position too far up	<ul style="list-style-type: none"> • Too small a parameter value for upper emergency limit switch • Upper limit switch range (limit switch band) too small • Mechanical brake defective or improperly set
F.005	Door position too far down	<ul style="list-style-type: none"> • Too small a parameter value for lower emergency limit switch • Lower limit switch range (limit switch band) too small • Mechanical brake defective or improperly set

Implausibilities in door movement		
F.020	Run time exceeded (during opening, closing or deadman)	<ul style="list-style-type: none"> • current motor run time has exceeded set maximum run time, door may be sticking or is blocked • If using mechanical limit switches, one may not have tripped
F.030	Lag error (position change of the door is less than expected)	<ul style="list-style-type: none"> • Door or motor is blocked • Too little power for lift torque • Too little speed • Mechanical limit switch was not left or is defective • Absolute or incremental encoder not tightened sufficiently in its mounting • Wrong positioning system selected (P.205)
F.031	Detected rotational direction deviates from expected	<ul style="list-style-type: none"> • When using incremental encoders: Channel A and B reversed • Motor rotation direction reversed compared with calibration setting • Too much „pancaking“ when starting, brake releases too soon, or too little torque, adjust boost as necessary.
F.043	Pre-limit switch fault (light barrier)	<ul style="list-style-type: none"> • The pre-limit switch for the light barrier remains activated even in the middle end position or upper end position.

Error messages for incremental encoder		
F.050	Reference switch position deviates from permissible range. During cyclical synchronization	<ul style="list-style-type: none"> • Reference switch constantly tripped (defective) • Reference switch trips too far from the selected reference. • Reference switch trips in the limit switch band • P270 and P280 are both at the reference switch
F.051	Reference switch position deviates from permissible range.	<ul style="list-style-type: none"> • Reference switch lies in the limit switch band • Reference switch is beyond 15% EO • Reference switch defective
F.052	Reference switch not recognized	<ul style="list-style-type: none"> • The reference switch is not recognized within 20% EO during automatic synchronization after power-on • The reference switch is not recognized in the associated end position.

Maintenance counter exceeded		
F.080	Fault: Maintenance is required	<ul style="list-style-type: none"> • Service counter has expired

Parameters not set		
F.090	Controller not parameterized	<ul style="list-style-type: none"> The basic parameters (P.205, P.100 to P.103) for the TST FUE controller have not yet been set.

Safety chain faults		
F.201	Internal E-Stop „push-button“ tripped or Watchdog (computer monitor)	<ul style="list-style-type: none"> E-Stop chain was interrupted starting at input „internal E-Stop“ 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	<ul style="list-style-type: none"> E-Stop chain was interrupted starting at Input 1
F.212	External E-Stop 2 tripped	<ul style="list-style-type: none"> E-Stop chain was interrupted starting at Input 2

Faults in the safety chain		
F.360	Short circuit detected on edge input	<ul style="list-style-type: none"> Short circuit detected on edges with normally closed contact
F.361	Number of edge trips for closing has reached set limit	<ul style="list-style-type: none"> Parameterized, maximum number of safety edge trips during a door cycle was exceeded
F.362	Redundancy error with short circuit	<ul style="list-style-type: none"> One of the processing channels for short circuit detection does not react identically with the second channel. → Controller board defective Dynamic optical system connected but not set in Parameter P.460
F.363	Interruption on edge input	<ul style="list-style-type: none"> Connection cable defective or not connected Termination resistor incorrect or missing Jumper incorrectly set
F.364	Safety edge testing failed	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> One of the processing channels for interruption detection does not react identically with the second channel. → Controller board defective Dynamic optical system connected but not set in Parameter P.460
F.366	Too high a pulse frequency for optical safety edge	<ul style="list-style-type: none"> Defective optical safety edge Defective input for internal safety edge
F.369	Internal safety edge incorrectly parameterized	<ul style="list-style-type: none"> An internal safety edge is connected but deactivated
F.373	Fault in the safety edge (message comes from module)	<ul style="list-style-type: none"> 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 bar testing failed	<ul style="list-style-type: none"> Pre-limit switch for safety edge incorrectly set or defective Processing module defective Safety edge defective

Faults in the safety chain		
F.379	Safety edge detection defective (coding pin or parameter setting)	<ul style="list-style-type: none"> 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.385	Fault in pre-limit switch for safety edge	<ul style="list-style-type: none"> Pre-limit switch for turning off the safety edge or reversing after safety edge tripping remains tripped even in the upper end position.

General hardware faults		
F.400	Controller hardware reset detected	<ul style="list-style-type: none"> Excessive noise on supply voltage Internal watchdog tripped RAM error
F.410	Over-current (motor current or intermediate circuit)	<ul style="list-style-type: none"> Wrong motor data set (P100 – P103) Non-adjusted voltage increase / boost set (P140 or P145) Motor not properly dimensioned for door Door sticks
F.420	Overvoltage in intermediate circuit Limit 1	<ul style="list-style-type: none"> Brake chopper interference / defective / missing Feed voltage much too high Motor feeds back too much energy in generator mode, door motion energy cannot be sufficiently brought down
F.430	Temperature cooler outside of working range Limit 1	<ul style="list-style-type: none"> 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.440	Overcurrent in intermediate circuit Limit 1	<ul style="list-style-type: none"> Boost not adjusted Motor incorrectly dimensioned for door Door sticks
F.510	Motor / intermediate circuit overcurrent Limit 2	<ul style="list-style-type: none"> Wrong motor data set (P100 – P103) Non-adjusted voltage increase / boost set (P140 or P145) Motor not properly dimensioned for door Door sticks
F.515	Motor protection function detected overcurrent	<ul style="list-style-type: none"> Incorrect motor curve (motor rated current) set (P101) Too much boost (P140 or P145) Motor incorrectly dimensioned
F.519	IGBT driver chip detected overcurrent	<ul style="list-style-type: none"> Short circuit or ground fault on motor terminals Motor rated current setting extremely wrong (P100) Extremely too much boost (P140 or P145) Motor incorrectly dimensioned Motor winding defective Momentary interruption of the E-Stop circuit.
F.520	Overvoltage in intermediate circuit Limit 2	<ul style="list-style-type: none"> Brake chopper interference / defective / missing Feed voltage much too high Motor feeds back too much energy in generator mode, door motion energy cannot be sufficiently brought down.
F.521	Overvoltage in intermediate circuit	<ul style="list-style-type: none"> Input voltage supply too low, usually at load Load too great / final stage or brake chopper fault

General hardware faults		
F.524	Ext. 24 V supply missing or too low	<ul style="list-style-type: none"> • Overload but no short circuit • When 24V is shorted the controller voltage does not ramp up and glow lamp V306 comes on.
F.530	Temperature cooler outside of working range Limit 1	<ul style="list-style-type: none"> • 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.540	Overcurrent in intermediate circuit Limit 2	<ul style="list-style-type: none"> • Boost not adjusted • Motor incorrectly dimensioned for door • Door sticks

Positioning system faults		
F.700	Position sensing defective	<p>For mechanical limit switches:</p> <ul style="list-style-type: none"> • At least one limit switch does not correspond to the configured active status. • An implausible combination of at least 2 active limit switches <p>For electronic limit switches:</p> <ul style="list-style-type: none"> • 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.720	Synchronization error in position sensing with incremental encoder	<ul style="list-style-type: none"> • Intermediate stop position is less than the minimum incremental value (25). • Synchronization was not finished. • The selected reference switch was not reached or is outside its tolerance • The incremental encoder is not counting or the door is blocked (also F.030, lag error) • Incremental inputs IN 9 and IN 10 are reversed (also F.031 rotation error)
F.750	Protocol Transmission error	<ul style="list-style-type: none"> • Defective hardware or electrically noisy environment
F.751	Synchronization FU <-> absolute encoder	<ul style="list-style-type: none"> • Defective hardware or electrically noisy environment • Absolute encoder processor electronics defective
F.752	Timeout with protocol transmission	<ul style="list-style-type: none"> • Interface cable defective / interrupted • Absolute encoder processor electronics defective • Defective hardware or electrically noisy environment • Use a shielded control cable • resistance-capacitance element (100Ω+100nF) put on the brake
F.760	Position outside of window	<ul style="list-style-type: none"> • Position encoder drive defective • Absolute encoder processing electronics defective • Defective hardware or electrically noisy environment
F.761	Distance Channel 1 <-> Channel 2 outside allowed window	<ul style="list-style-type: none"> • Position encoder drive defective • Defective hardware or electrically noisy environment

Positioning system faults		
F.762	Electronic limit switch positions incorrect	<ul style="list-style-type: none">• Upper limit switch Eo or intermediate limit switch E1 has exceeded the valid limit range• Controller not yet initialized• Position values during calibration not correct or values are no longer plausible

12.1 Internal system-related errors F.9xx

These are internal errors which cannot be eliminated by the user.
If such an error occurs, call customer service immediately.

12.2 Information messages


General messages

STOP	Stop / Reset state, wait for next incoming command
Eu	End position Lower Eu
≡Eu≡	End position Lower locked → no raising possible (e.g., lock-door)
ZUF □	Closing active
˘Eo˘	End position Upper Eo
≡Eo≡	End position Upper locked → no closing possible (e.g., safety edge)
□AUF	Opening active
-E1-	End position middle E1 (intermediate stop position)
≡E1≡	End position middle locked → no closing possible (e.g., safety edge)
FAIL	Fault → only deadman travel is possible, possibly automatic opening
EICH	Calibration → Setting the end positions in deadman travel (for absolute encoder) → Start procedure using STOP key
≡NA≡	E-Stop → No travel possible, hardware safety chain interrupted
NOTF	E-travel → Deadman travel without taking into account safeties, etc.
'Hd'	Manual → Deadman mode
ParA	Parameterizing
SYNC	Synchronization (incremental encoder / limit switch → Pos.unknown)
'Au'	Automatic → indicates change from „Manual“ to „Automatic“ status
'Hc'	Semi-automatic → indicates change from „Manual“ to „Semi-automatic“
FUE	Initial display after power up (Power Up and self-test)

Status messages during calibration

E.i.E.u.	Calibration of the End position Lower requested (in deadman travel)
E.i.E.o.	Calibration of the End position Upper requested (in deadman travel)
E.i.E.1.	Calibration of the intermediate position E1 (in deadman travel)

Status messages during synchronization

S.y.E.u.	Synchronization of End position Lower requested (Deadman or wait for start condition)
S.y.E.o.	Synchronization of End position Upper requested (Deadman or wait for start condition)
S.y.E.1.	Synchronization of intermediate stop position E1 (in deadman)
S.y.op	Automatic open until mechanical stop, then automatic synchronization of End position Upper
S.y.cL	Automatic close taking into account safeties until mechanical stop, then automatic synchronization of End position Lower
S.y.c≡	Automatic close is locked due to request 

Status messages during deadman

Hd.cL	Deadman close (membrane key: CLOSE)
Hd.oP	Deadman open (membrane key: OPEN)
Hd.Eu	End position Lower reached, no further deadman close possible
Hd.Eo	End position Upper reached, no further deadman open possible
Hd.Ao	Outside of permitted Eo position (no deadman open possible)

Information messages during Automatic mode

I.080	Maintenance required soon / service counter nearly expired
I.100	Speed when reaching upper end position too high
I.150	Speed when reaching lower end position too high
I.160	Continuous CLOSED still active
I.170	Forced opening being performed
I.185	Wait for acknowledgement (operator call), display flashes
I.199	Door cycle not plausible (re-initialize → Parameters)
I.200	Reference position corrected or recognized (after calibration)
I.201	Reference position re-initialized

I.202	Reference position missing
I.203	Reference position incorrect
I.205	Synchronization
I.210	Pre-limit switch Upper not plausible
I.211	Pre-limit switch Lower not possible
I.310	Open-command on Door2 being issued
I.500	Correction of upper limit switch running
I.501	Upper pre-limit switch corrected
I.502	Upper limit switch band corrected
I.505	Correction of lower limit switch running
I.506	Lower pre-limit switch corrected
I.507	Lower limit switch band corrected
I.510	Limit switch correction finished
I.515	Controller is preparing automatic teach-in of the limit switches
I.520	Maximum speed during automatic limit switch correction is not reached
I.555	Limit switches being corrected

Information messages while parameterizing

noEr	Error memory: no error saved
Er--	Error memory: if error but no associated message 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.121	Input 21
E.128	Input 28

Safety/Emergency stop chain

E.201	Internal E-Stop „pushbutton“ tripped
E.211	External E-Stop 1 tripped
E.212	External E-Stop 2 tripped

Safety edge, general

E.360	Activation of internal safety edge
E.363	Fault in internal safety edge
E.370	Activation of external safety edge
E.373	Fault in external safety edge
E.379	External safety edge activated but not yet plugged in

RC plug-in module

E.401	RC Channel 1
E.402	RC Channel 2

Induction loop processor plug-in module

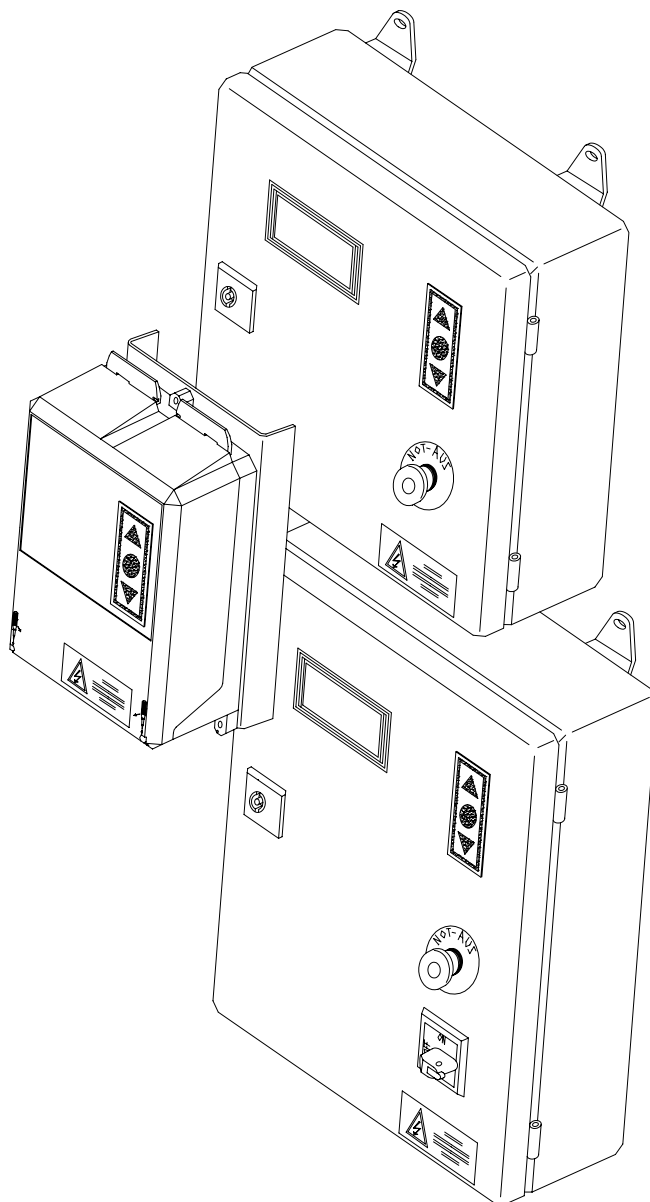
E.501	Detector Channel 1
E.502	Detector Channel 2

Internal inputs

E.900	Controller chip fault signal
-------	------------------------------

Expanded startup manual

TST FUS / FUxE



Important !

**You must read the Function Description before operating,
connecting or starting up the door controller.**

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 gate control of FEIG ELECTRONIC GmbH. Starting up the control 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 gate control in service is solely responsible for the completeness of the startup manual.

This Manual shows only a small range of the control functions. Further functions and descriptions for individual gate functions as well as more exact specifications for the control 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.

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General notes concerning this document

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

 **WARNING** alerts to a possible hazard to persons if the procedure is not performed as described.

 **ATTENTION** alerts to possible damage to the control.

IMPORTANT alerts to information which is important to the function of the gate control or gate.

 refers to useful information which is useful but not absolutely necessary for using the TST FUS gate control

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1 Other Applicable Documents

This function description is an addition to the Startup manual.
It describes only additional setting and functions which are not already contained in the Startup manual.

WARNING

The contents of the Startup manual and in particular the safety advisories must be strictly observed.

2 Entering expanded parameterizing mode

To enter expanded mode a password must be entered.
For this the following parameter must be set:

P.999: 2 = expanded startup mode

3 Functions

Expanded startup mode offers the user additional functions and parameters which are described below.

3.1 Increasing drive power

3.1.1 Boost P.140/145

Boost increases the power of the drive at lower travel frequencies up to the rated frequency. The voltage increase is reduced until the motor rated frequency is reached. Boost can increase the motor voltage by up to 30% of the rated voltage.

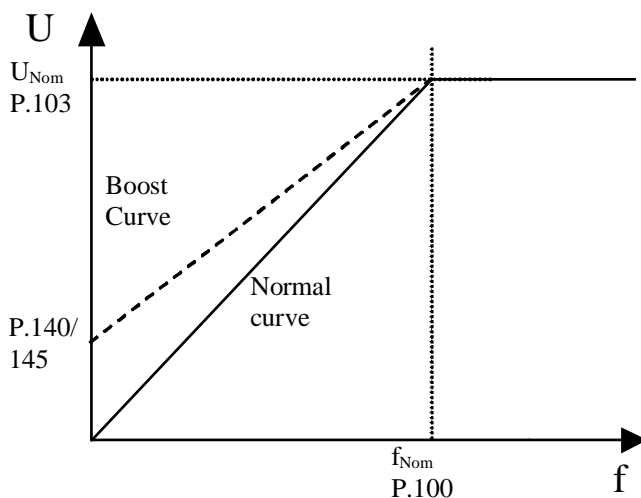


Fig. 1: Effect of boost on voltage-frequency curve

3.1.2 IxR Compensation P.142/147

IxR compensation has the effect of increasing the drive power only up to a travel frequency of max. 15 Hz. It does not work like boost, which decreases with increasing gate speed, but rather remains constant up to the set frequency.

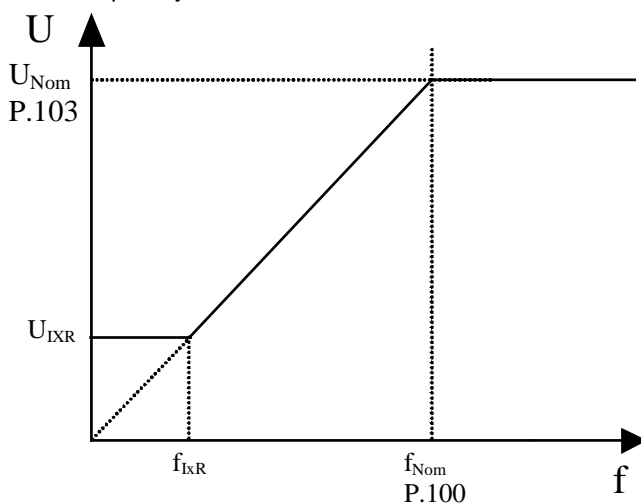


Fig. 2: Effect of IxR compensation on voltage-frequency curve

3.1.3 Frequency ramp stop function P.141/146

The frequency ramp function allows moving of heavy doors.

The function monitors the current during gate acceleration. The current is allowed to be max. 2x the rated current (P.101).

If the current is too high, the converter stops gate acceleration so that the current falls again since energy no longer needs to be consumed for accelerating the gate.

The starting point for this function is set using Parameter P.141 / P.146.

Below the set frequency the function will not work and it is possible that the motor goes into saturation and draws a high current level.

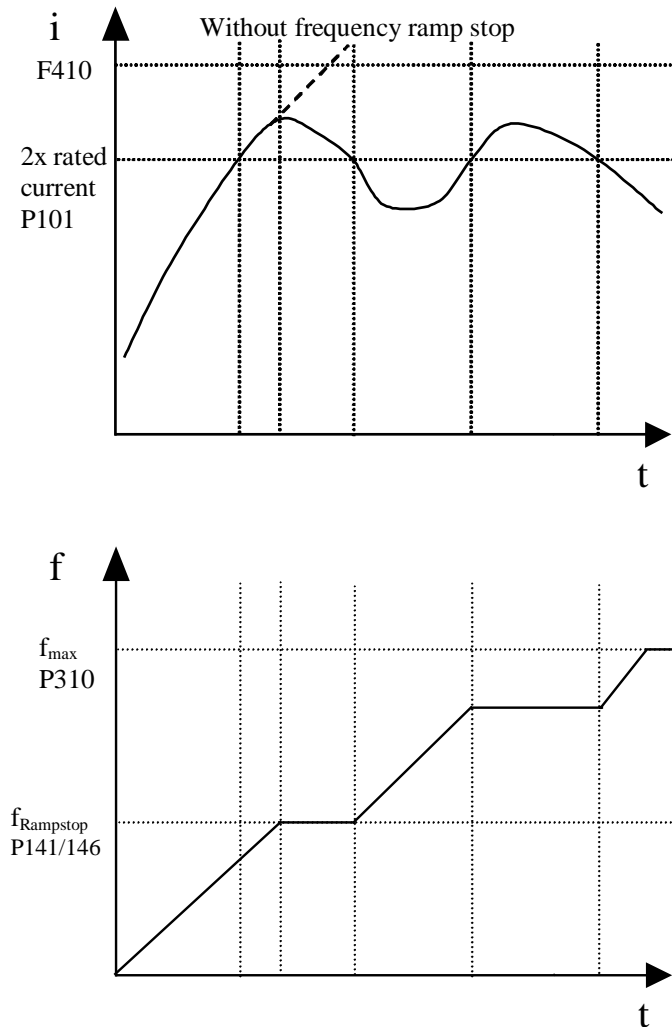


Fig. 3: Frequency ramp stop function

3.1.4 Voltage reduction P.143/148

The voltage reduction is set in % of motor rated voltage.

This function reduces the voltage which is output.

This prevents for example too high a motor current in generating mode or reduces hum.

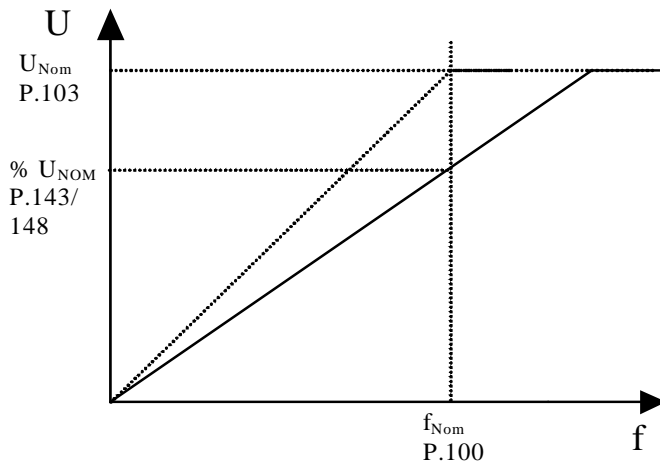


Fig. 4: Effect of voltage reduction on the voltage-frequency curve

3.2 Optimizing door operation

Adjusting the pre-limit switch positions and the ramps can optimize or improve door running. The function of the frequency converter is shown in the following illustrations for OPEN and CLOSE moves.

3.2.1 Opening the door

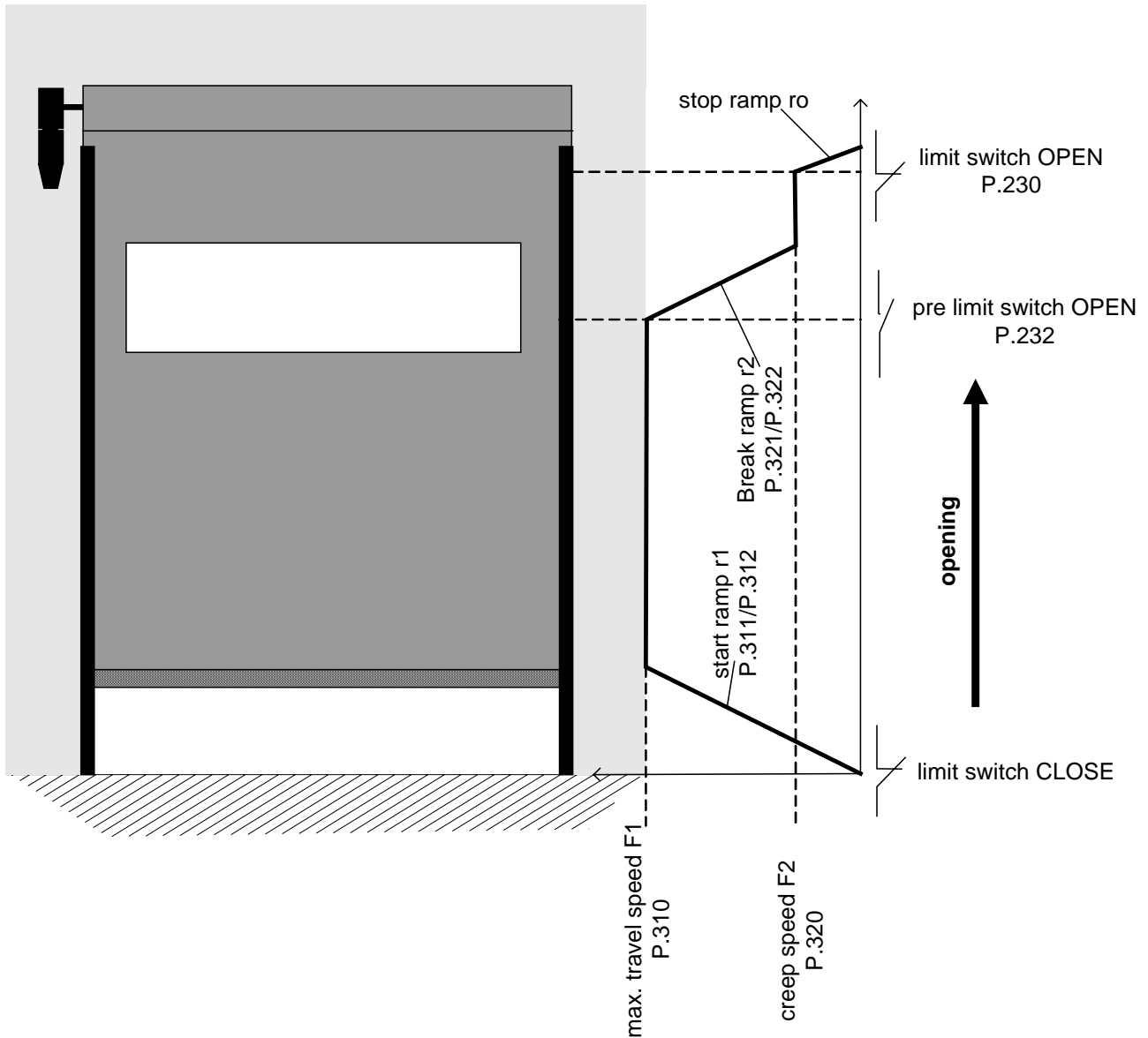


Fig. 5: Opening using frequency converter

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 end position OPEN is reached. At this point the door is braked to the creep speed frequency using ramp “r2”.

The door now moves at creep speed until the limit switch OPEN is reached.

At this point the door is stopped.

3.2.2 Closing the door

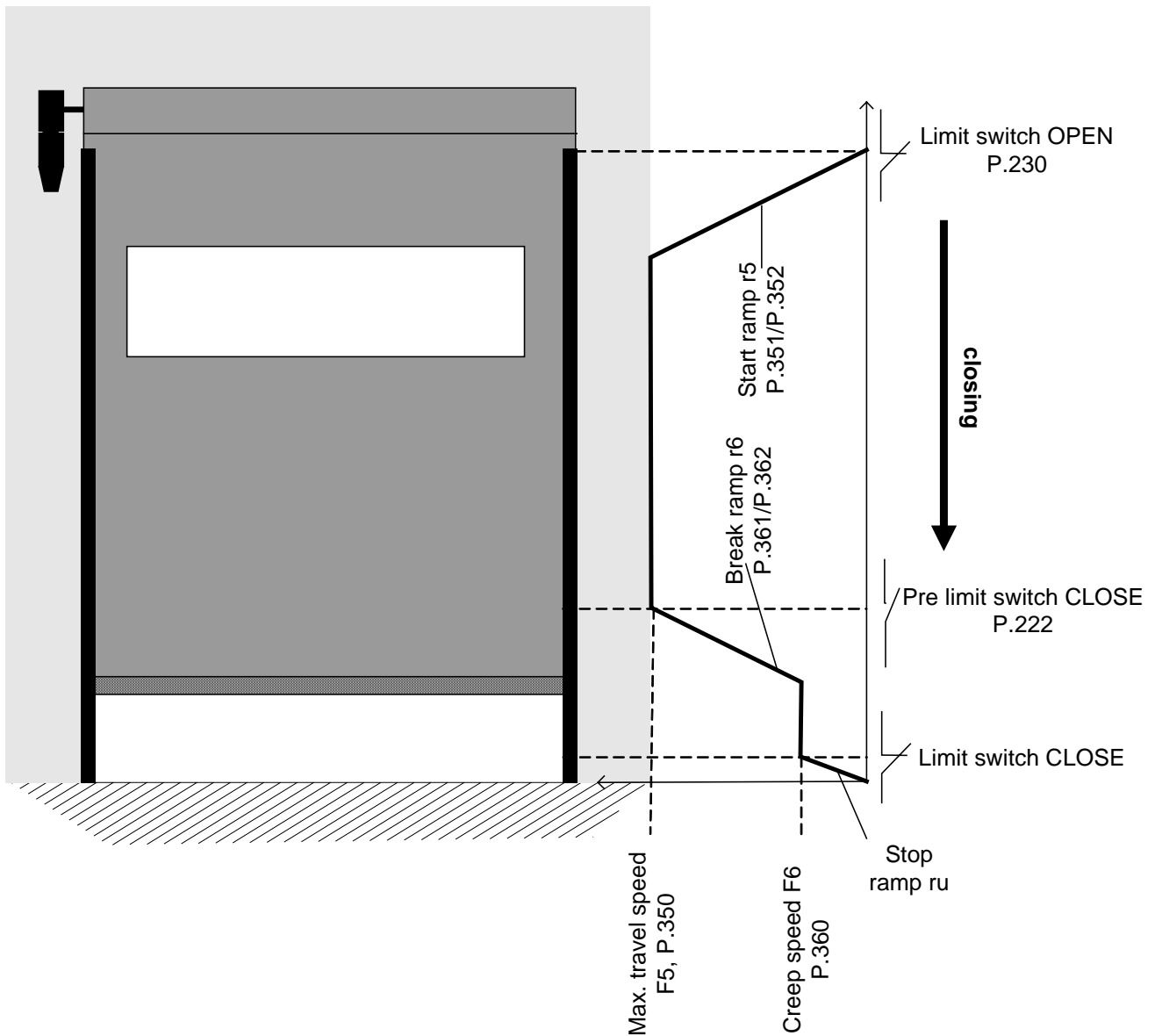


Fig. 6: Closing using the frequency converter

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 end 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.

3.2.3 New request for automatic pre-limit switch and limit switch calculation

If automatic calculation of the pre-limit and limit switch bands with parameter P.216 = 2 is factory set, the door movement is automatically optimized.

Here acceleration parameters for the ramps are used to get the optimum pre-limit switch setting and optimum limit switch band setting.

If these settings are not appropriate for the door, they can be manually changed as described below.

You can also make a request for a new calculation. To do this, set P.215 to 1 and save it.

IMPORTANT

Calculation of the pre-limit switches and limit switch bands is also newly requested if the travel speed or the acceleration of a ramp are manually changed.

3.2.4 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 end position Door CLOSE
P.232 = Pre-limit switch for end position Door OPEN

3.2.5 Ramp setting

The ramps are used by the TST FUS to change speeds, 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 more strongly the gate is braked or accelerated.

If the ramp is more shallow the gate is braked or accelerated more gently.

P.311 / P.312 = Start ramp „r1“: Acceleration of the door from 0Hz to open speed.
P.321 / P.322 = Brake ramp „r2“: Deceleration of the door from open speed to creep speed.

P.351 / P.352 = Start ramp „r5“: Acceleration of the door from 0Hz to close speed.
P.361 / P.362 = Brake ramp „r2“: Deceleration of the door from close speed to creep speed.

P.340 / P.342 = Ramp „r-STOP“ for opening: Deceleration of the door from open speed to 0Hz after pressing a STOP key.

P.380 / P.382 = Ramp „r-STOP“ for closing: Deceleration of the door from close speed to 0Hz after pressing a STOP key.

3.2.6 Correcting the end positions

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

3.2.7 Speed-distance profile

Parameter P.39F can be used to select profiles that pre-set the acceleration of the door. The parameter sets both the acceleration of the start ramp and of the brake ramp.

P.39F = 0: deactivated
P.39F = 1: slow acceleration of the door
P.39F = 2: medium acceleration of the door
P.39F = 3: fast acceleration of the door

3.3 Input parameterizing

The door controller is able to change the function of the inputs. This is done with the aid of input profiles. The input profiles can be used to assign pre-programmable functions to the inputs.

Settings are possible for inputs 1 to 10 and 21 to 28 (TST FUxE only).

P.501 = Input 1
....
P.509 = Input 9
P.50A = Input 10
P.A01 = Input 21
....
P.A08 = Input 28

The possible input functions for inputs can be found in the following table in the parameter list of this description:

Table 1: Input profiles

3.4 Output parameterizing

The door controller is able to change the function of relay outputs. This is done with the aid of output profiles. The output profiles can be used to assign pre-programmable functions to the outputs.

Output relays K1 and K2 on the TST FUS door controller can be set as well as K4 and K5 on the TST FUxE controller and K6 to K9 when used with TST RFUxE.

P.701 = Output K1
P.702 = Output K2
P.704 = Output K4
P.705 = Output K5
....
P.709 = Output K9

The possible functions for outputs can be found in the parameter list of this description

3.5 Maintenance counter

The door controller has a maintenance counter.

Parameter P.005 is used to show the possible open and close cycles until maintenance is due.

Setting Parameter P.973 to 1 resets the maintenance counter.

There are various ways for the maintenance notification to be displayed to the user:

After the maintenance counter has expired

1: Warning I.080 is displayed

2: Only automatic opening and deadman closing are possible and error F.080 is output.

3: Only deadman travel is possible and error F.080 is output

This setting is made at the factory and cannot be changed here.

4 Parameter list

P.	[unit] Range	Door Functions	Default
000	[Cycles]	Door cycle counter display Display: 1234567 ⇒ 1234. ▼-key .567 Display: 67 ⇒ 67	
005	[Cycles]	Displays number of door cycles until maintenance is required. Display: 1234567 ⇒ 1234. ▼-key .567 Display: 67 ⇒ 67	
010	[s] 0 ... 200	Open hold time 1 (End position Upper - Eo) The door is held in the end position Door OPEN for the set time. The door is then automatically closed. 0: Automatic closing deactivated	10
011	[s] 0 ... 200	Open hold time 2 (Intermediate hold position - E1) The door is held in the end position Intermediate Stop / Partial open for the set time. The door is then automatically closed. 0 = turned off	10
025	[s] 0 ... 20	Pre-warning time before close The closing move is delayed following receipt of a CLOSE command or after expiration of the auto close time (forced close) by the time specified in this parameter. 0 = Pre-warning time turned off	0
026	0 ... 1	By activating this parameter the pre-warning time is always running, undependend from the input. The used time is set by P.025. 0: Pre-warning time set by input Pre-warning time always active	0

P.	[unit] Range	Motor rated data	Default
100	[Hz] 30 ... 200	Motor rated frequency (see nameplate, note Y/Δ)	-1
101	[A] 0 ... 9.9	Motor rated current (see nameplate, note Y/Δ) IMPORTANT Note Y/Δ switching of the motor !	-1
102	[%] 40 ... 100	Power factor $\cos \varphi$ (see nameplate: $\cos \varphi : 0.63 \rightarrow 63$) IMPORTANT The entry is made without the leading "0". 63 thus means $\cos \varphi 0.63$.	-1
103	[V] 100 ... 500	Motor rated voltage (see nameplate, note Y/Δ) The motor characteristic curve is automatically calculated based on the rated frequency and nominal voltage. IMPORTANT Note Y/Δ switching of the motor ! IMPORTANT Switching the motor windings to 400V operation makes no sense with the TST FUS and TST FUE door controllers, since they can output a maximum of 230V !	-1
130	0 ... 1	Motor rotational field 0: Right-rotating 1: Left-rotating	

P.	[Unit] Range	Boost	Default
140	[%] 0 ... 30	Voltage increase of the U/f characteristic curve (Boost) in % of rated voltage for opening → Boost in the lower speed range	0
141	[Hz] 10 ... 200	Starting frequency of frequency ramp stop for opening The current may then rise above the limit of 2x the motor rated current (P.101). This is possible for a short time, but for longer travel will result in an overcurrent error (F.410 or F.510) (200: deactivated)	20
142	[Hz] 0 ... 15	I x R compensation for opening In this parameter you specify the frequency up to which I x R compensation is in effect. The voltage is held to the same value below this frequency. The voltage value is derived from the voltage which is normally output for the frequency set here.	0
143	[%] 35 ... 100	Voltage reduction during opening → Reduces over-controlling of the motor to reduce noise and power loss	100
145	[%] 0 ... 30	Voltage increase of the U/f characteristic curve (Boost) in % of rated voltage for closing . (see P140) → Boost in the lower speed range	0
146	[Hz] 10 ... 200	Starting frequency of frequency ramp stop for closing . (see P 141) (200: deactivated)	20
147	[Hz] 0 ... 15	I x R compensation for closing . (see P142) → Boost only in the lower speed range up to specified frequency	0
148	[%] 35 ... 100	Voltage reduction during closing → Reduces over-controlling of the motor to reduce noise and power loss	100

P.	[Einheit] Stellbereich	Teaching in the end positions for electronic limit switches	Default
205	0 ... 8	Selecting the positioning system. IMPORTANT In addition, the standard functions of the controller inputs are matched to the limit switch type in use. Select from the following settings: 0. Limit switch 1 (limit switch as normally closed, pre-limit switch normally open) 1. Limit switch 2 (limit switch and pre-limit switch normally closed) 2. Incremental encoder (reference switch in lower end position) 3. Absolute encoder DES-A 4. Absolute encoder TST PB-A 5. SSI encoder (only with UL-Version) 6. Reserved 7. Absolute encoder DES-B 8. Absolute encoder TST PD	0

P.	[Einheit] Stellbereich	Teaching in the end positions for electronic limit switches	Default
210	0 ... 5	<p>This parameter is used to start a new teaching of the end positions. The corresponding end positions are moved to in deadman mode after activating the procedure and saved by holding down the Stop key. Select from the following settings:</p> <p>0: Cancel, no end positions are taught. 1: Limit switch Lower, limit switch Upper and if appropriate limit switch Intermediate Stop are taught. 2: Limit switch Upper and if appropriate limit switch Intermediate Stop are taught. 3: Limit switch Lower and limit switch Upper are taught. 4: Limit switch Intermediate Stop is taught. 5: All limit switches are taught.</p> <p><i>☞ Teaching the Intermediate Stop limit switch depends on the setting in Parameter P.244 (see section Partial Opening / Intermediate Stop).</i></p>	0

P.	[Unit] Range	Correcting the end positions for electronic limit switches	Default
215	0 ... 1	<p>If automatic calculation of the pre-limit switch and limit switch bands (P.216) is activated, this parameter can be used to start a new teaching of the pre-limit switch and limit switch bands.</p> <p>0: Make no correction. 1: Start correction of the pre-limit switch and limit switch bands.</p> <p><i>☞ Correction of the pre-limit switch and limit switch bands is only possible if P.216 = 2.</i></p>	0
216	0 ... 2	<p>There are two basic ways to set the steepness of a ramp. The ramp time can be set in milliseconds, or the ramp acceleration can be set in Hz per second. In addition, the limit switch bands are automatically set when Automatic is activated.</p> <p>0: Ramp times have to be set manually (as in earlier door controllers from FEIG ELECTRONIC GmbH). 1: Ramp acceleration has to be set manually. 2: Ramp acceleration and limit switches are automatically set.</p> <p>IMPORTANT In case of changing the speed of the door or one of the ramp accelerations the automatically setting of the pre limit switches and limit switch bands will start again. The values set in the corresponding parameters are then overwritten.</p> <p><i>☞ Automatic teaching of the limit switches and ramp times only functions if accelerations for ramps are set. You cannot use ramp times as they were defined in earlier versions of the controllers.</i></p>	2

P.	[Unit] Range	Correcting the end positions for electronic limit switches	Default
217	[%] 0 ... 250	Tolerance band for automatic limit switch correction. With this parameter an offset is set to the end position find out by the automatic end switch correction. Because of that the door is not able to overrun the end switch position of the door by the first move. The end switch position will move by the value (in percent) adjusted with this parameter.	50
221	[Inc] ± 125	This parameter is used to shift the entire lower end position, i.e., the end position is shifted together with the associated pre-limit switches. A change in the parameter value in the positive direction causes the end position to shift up. A change in the parameter value in the negative direction causes the end position to shift down. (set to 0 for new calibration !)	0
222	[Inc] 0 ... 2100	The parameter value specifies the distance to the absolute limit switch Door CLOSE in increments. The pre-limit switch is used to initiate the brake ramp "r6". The steepness of the ramp is set with Parameter P.361 or P.362.	400
231	[Inc] ± 60	This parameter is used to shift the entire Door OPEN end position, i.e., the end position is shifted together with the associated pre-limit switches. A change in the parameter value in a positive direction causes the end position to shift up. A change in the parameter value in the negative direction causes the end position to shift down.	0
232	[Inc] 0 ... 2100	The parameter value specifies the distance to the Door OPEN absolute limit switch in increments. The pre-limit switch is used to initiate the brake ramp "r2". The steepness of the ramp is set with Parameter P.321 or P.322.	500

P.	[Unit] Range	Reference switch profile	Default
25F	0 ... 9	This profile is used to set the reference switches and automatic synchronization mode. 0: Deactivated 1: Synchronization to reference switch in Door CLOSE End position 2: Synchronization to safety edge 3: Synchronization to reference switch in Door OPEN End position 4: Synchronization to mechanical stop in Door OPEN end position 5: Synchronization to safety edge and then to mechanical stop in End position Door OPEN 6: Synchronization to safety edge and then to reference switch in Door OPEN End position 7: Synchronization to reference switch in Door CLOSE End position and then to mechanical stop in End position Door OPEN 8: Synchronization to mechanical stop in Door OPEN and CLOSE position 9: Manually synchronisation to Door OPEN and CLOSE position <i>☞ The exact settings which this profile involves can be found in Appendix: Synchronization Type.</i>	-1

P.	[Unit] Range	Speeds / Ramps	Default
310	[Hz] 6 ... 200	Here you specify the maximum open speed in Hz. Start ramp "r1" is used to accelerate to this speed. The steepness of the ramp is set with Parameter P.311 or P.312.	60
312	[Hz/s] 20 ... 300	Acceleration during start ramp "r1" in Hertz per second. Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i>	100
320	[Hz] 6 ... 200	Brake ramp "r2" is used to slow to creep speed frequency, and is initiated after activation of the pre-limit switch Door OPEN. The steepness of the brake ramp "r2" is set with Parameter P321 or P.322.	20
322	[Hz/s] 20 ... 300	This parameter specifies the acceleration of the door during brake ramp "r2" in Hertz per second. Smaller values result in diminished deceleration of the door. Larger values result in greater deceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i>	80
342	[Hz/s] 20 ... 300	Acceleration during stop ramp "r _{STOP-A} " in Hertz per second. The door is decelerated from maximum open speed to 0 Hz after a stop command is given. Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i>	40
350	[Hz] 6 ... 200	Here you specify the maximum close speed in Hz. Start ramp "r5" is used to accelerate to this speed. The steepness of the ramp is set with Parameter P.351 or P.352.	40
352	[Hz/s] 20 ... 300	Acceleration during start ramp "r5" in Hertz per second. Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i>	80
360	[Hz] 6 ... 200	Brake ramp "r6" is used to slow to creep speed frequency, and is initiated after activation of the pre-limit switch Door CLOSE. The steepness of the brake ramp "r6" is set with Parameter P361 or P.362	20
362	[Hz/s] 20 ... 300	This parameter specifies the acceleration of the door during brake ramp "r6" in Hertz per second. Smaller values result in diminished deceleration of the door. Larger values result in greater deceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i>	40

P.	[Unit] Range	Speeds / Ramps	Default
382	[Hz/s] 20 ... 300	<p>Acceleration during stop ramp "r_{STOP-Z}" in Hertz per second. The door is decelerated from maximum close speed to 0 Hz after a stop command is given.</p> <p>Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i></p> <p><i>☞ This ramp also takes effect after the photo eye is interrupted</i></p>	40

P.	[Unit] Range	Safety Edge	Default
460	0 ... 5	<p>This parameter is used to specify which safety edge type is connected.</p> <p>0: Safety edge inactive IMPORTANT This setting is only possible if no safety edge is connected.</p> <p>1: Electrical safety edge, redundantly processed, functioning as normally open, i.e., short circuit indicates tripping.</p> <p>2: Electrical safety edge, redundantly processed, functioning as normally closed, i.e., interruption indicates tripping.</p> <p>3: Safety edge with testing in Door CLOSE end position, functioning as normally open, i.e. there must be a tripping of the safety edge for checking its proper function in the Door CLOSE end position.</p> <p>4: Safety edge with testing in Door CLOSE end position, functioning as normally closed, i.e. there must be a tripping of the safety edge for checking its proper function in the Door CLOSE end position.</p> <p>5: Dynamic optical system</p> <p><i>☞ A setting of -1 means that the connected safety edge type is automatically detected.</i></p>	-1

P.	[Unit] Range	Inputs	Default
P.501	0000 .. 1408	<p>This profile can be used to specify the function of the input 1. All parameters needed for the function of the input are changed in one step.</p> <p>The profiles are divided into function groups as follows:</p> <ul style="list-style-type: none"> 01xx = External OPEN commands 02xx = Pull switch / Single-channel inputs 03xx = Permanent OPEN commands 04xx = External STOP commands 05xx = Safety inputs type B 06xx = Manual / Automatic toggling 07xx = External CLOSE commands 08xx = Door locking in Door CLOSE end position 09xx = Cross-traffic functions 10xx = Turn-off functions 11xx = Limit switch inputs 14xx = Safety inputs type A <p>For settings, see Table 1: Input profiles</p> <p>☞ <i>The exact settings which this profile involves can be found in Appendix: Input Profile.</i></p>	
P.502	0000 .. 1408	Function input 2 see P.501	
P.503	0000 .. 1408	Function input 3 see P.501	
P.504	0000 .. 1408	Function input 4 see P.501	
P.505	0000 .. 1408	Function input 5 see P.501	
P.506	0000 .. 1408	Function input 6 see P.501	
P.507	0000 .. 1408	Function input 7 see P.501	
P.508	0000 .. 1408	Function input 8 see P.501	
P.509	0000 .. 1408	Function input 9 see P.501	
P.50A	0000 .. 1408	Function input 10 see P.501	

With TST RFUXE

P.	[Unit] Range	Inputs	Default
A01	0000 .. 1408	Function input 21 see P.501	
A02	0000 .. 1408	Function input 22 see P.501	
A03	0000 .. 1408	Function input 23 see P.501	
A04	0000 .. 1408	Function input 24 see P.501	
A05	0000 .. 1408	Function input 25 see P.501	
A06	0000 .. 1408	Function input 26 see P.501	
A07	0000 .. 1408	Function input 27 see P.501	
A08	0000 .. 1408	Function input 28 see P.501	

Table 1: Input profiles

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
0000	Input deactivated									
0101	OPEN 1	N.O. ¹	Upper	With	With	Both	Without	Without	OPEN	No
0102	OPEN 1	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0103	OPEN airlock	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0104	OPEN 1	N.O.	Intermediate stop	With	With	from outside	Without	Without	OPEN	No
0105	OPEN 2	N.O.	Upper	With	With	Both	Without	Without	OPEN	No
0106	OPEN 2	N.O.	Upper	With	With	from inside	Without	Without	OPEN	No
0107	OPEN 4 ²	N.O.	Upper	With	With	Both	Without	Without	OPEN	No
0108	OPEN 2	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0109	OPEN 3	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0110	OPEN 1	N.O.	Upper	With	With	from outside	Without	Without	OPEN	No
0111	OPEN 1	N.C.	Upper	With	Without	Both	Without	Without	OPEN	No
0112	OPEN 1	N.O. ³	Upper	Without	With	Both	Without	Without	OPEN	No
0114	OPEN airlock	N.O.	Intermediate stop	With	With	from inside	Without	Without	OPEN	No
0116	OPEN 1	N.O.	Upper	Without	With	from outside	Without	Without	OPEN	No
0117	OPEN 1	N.O.	Upper	Without	With	from inside	Without	Without	OPEN	No
0120	OPEN 2	N.O.	Upper	With	Without	from inside	Without	Without	OPEN	No
0121	OPEN 1	N.O.	Upper	With	Without	from outside	Without	Without	OPEN	No
0124	OPEN 2	N.O.	Intermediate stop	With	With	from inside	Without	Without	OPEN intern	No
0125	OPEN 2	N.O.	Upper	With	With	from inside	Without	Without	OPEN intern	No
0129	OPEN 2	N.O.	Intermediate stop	With	With	from outside	Without	Without	OPEN extern	No
0201	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper	With	With	Both	Without	Without	Pull switch	No
0202	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper	Without	With	Both	Without	Without	Pull switch	No

¹ N.C. = normally closed, N.O. = normally open

² OPEN 3 and OPEN 4 cannot be locked out.

³ N.C. = normally closed, N.O. = normally open

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
0203	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper 3. Pull straight up 2x	Without	With	Both	Without	Without	Pull switch	No
0204	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	Upper	Without	With	Both	Without	Without	Pull switch	No
0207	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	Intermediate stop	With	With	From inside	Without	Without	Pull Swit.int	No
0208	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper	With	With	From outside	Without	Without	Pull Swit.ext	No
0209	Pull switch OPEN -> STOP -> CLOSE -> STOP	N.O.	1. Intermediate stop 2. Upper	Without	With	Both	Without	Without	Pull switch	No
0301	Permanent OPEN	N.O.	1. Intermediate stop 2. Upper	Without	Without	Both	Without	Without	Perm. Open	No
0304	Permanent OPEN	N.O.	Upper	Without	Without	No	Without	Without	Perm. Open	No
0401	Stop	N.C.	-	-	-	-	Without	Without	Stop	No
0402	Stop	N.O.	-	-	-	-	Without	Without	Stop	No
0403	Stop, Reset possible	N.C.	-	-	-	-	Without	Without	Stop	No
0404	Stop. Reset possible	N.O.	-	-	-	-	Without	Without	Stop	No
0501	Photoeye	N.C.	as before	as before	With	Both	Without	Without	Photoeye	No
0502	Photoeye with through-travel sensing 1	N.C.	as before	as before	With	Both	Without	Without	Photo-eye	No
0504	Photoeye	N.C.	as before	Min. hold- open time	With	Both	Without	Without	Photo-eye	No




Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
0505	Photoeye with through-travel sensing 1	N.O.	as before	as before	With	Both	Without	Without	Photo-eye	No
0506	Photoeye with through-travel sensing 2	N.C.	as before	Min. hold-open time	With	Both	Without	Without	Photo-eye	No
0507	Photoeye	N.O.	as before	as before	With	Both	Without	Without	Photo-eye	No
0601	Auto / Manual	N.O.	-	-	-	-	Without	Without	Dead-man	No
0602	Auto / semi automatic	N.O.	-	-	-	-	Without	Without	Dead-man	No
0701	CLOSE	N.O.	-	-	-	With	Without	Without	Close	No
0801	Locking in lower end position, deadman not possible	N.O.	-	-	-	-	Without	Without	Locked Closed	No
0802	Locking in lower end position, deadman possible	N.O.	-	-	-	-	Without	Without	Locked Closed	No
0803	Locking in position	N.O.	Locking in Door Open position	-	-	-	Without	Without	Locked Interm	No
0804	Locking in position	N.O.	Locking in Door Close position	-	-	-	Without	Without	Locked Interm	No
0901	Cross-traffic, OPEN1 and DET1	N.O.	-	-	-	-	Without	Without	Cross Traffic	No
0902	Cross-traffic, OPEN2 and DET2	N.O.	-	-	-	-	Without	Without	Cross Traffic	No
0903	Cross-traffic, OPEN1+2 and DET1+2	N.O.	-	-	-	-	Without	Without	Cross Traffic	No
1001	Deactivate hold-open time	N.O.	-	-	-	-	Without	Without	Deacti-vation	No
1002	Deactivate airlock	N.O.	-	-	-	-	Without	Without	Deacti-vation	No

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
1003	Deactivate intermediate stop	N.O.	-	-	-	-	Without	Without	Deacti-vation	No
1004	Deactivate detector commands from outside	N.O.	-	-	-	-	Without	Without	Deacti-vation	No
1101	Photeye pre-limit switch	N.O.	-	-	-	-	Without	Without	Pre-Limit Photo	No
1102	Intermediate stop limit switch	N.O.	-	-	-	-	Without	Without	Limit Intermed.	No
1103	Intermediate stop pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLim Intern.	No
1104	Safety edge pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLimit Edge	No
1105	Safety edge pre-limit switch	N.C.	-	-	-	-	Without	Without	PreLimit Edge	No
1106	Upper pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLimit Open	No
1107	Upper pre-limit switch	N.C.	-	-	-	-	Without	Without	PreLimit Open	No
1108	Lower pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLimit Close	No
1109	Lower pre-limit switch	N.C.	-	-	-	-	Without	Without	PreLimit Close	No
1110	Endswitch Open	N.C.	-	-	-	-	Without	Without	Limit Open	No
1111	Endswitch Close	N.C.	-	-	-	-	Without	Without	Limit Close	No
1112	Reference switch	N.O.	-	-	-	-	Without	Without	Reference -	No
1113	Reference switch	N.C.	-	-	-	-	Without	Without	Reference	No
1114	reserved	-	-	-	-	-	Without	Without	-	No

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
1401	Safety input stop during closing (not switch off able)	N.C.	-	-			Without	Without	Stop -	No
1402	Safety input reversing during closing (not switch off able)	N.C.	As before	As before	With	Both	Without	Without	Photo eye	No
1403	Safety input Stop during closing with move on after releasing th input	N.C.	As before	As before	With	Both	Without	Without	Photo eye	No
1404	Safety input A Stop during opening and closing	N.C.	Upper	Without	With	No	Without	Without	Photo eye	No
1405	Safety input A Stop during opening and closing, after releasing in closing the door drives to the close position.	N.C.	Upper	Without	With	No	Without	Without	Photo eye	No
1406	Safety input A Reversing during opening	N.C.	As before	As before	With	Both	Without	Without	Photo eye	No
1407	Safety input A Stop during opening	N.C.	As before	As before	With	Both	Without	Without	STOP	No
1408	Safety input A Draw in safety	N.C.	As before	As before	With	Both	Without	Without	Feed Retent.	In Door close position

P.	[Unit] Range	Outputs	Default
<p>701 and 702</p> <p>resp.</p> <p>704 up to 709</p>	0000 ... 2601	<p>The function of the output relay can be specified using this profile. All parameters needed for the function of the output are changed in one step. The output can be set under the following conditions:</p> <p>0000: Output relay deactivated 0001: Door is OPEN 0201: Door is CLOSED 0401: No fault 0501: Courtyard light function: Turned on during every OPEN and CLOSE move with 10s turn-off delay after opening. 0502: Courtyard light function: Turned on for 120 seconds 0701: Flashing during OPEN and CLOSE move and in intermediate stop / partial open position 0801: On during OPEN and CLOSE move and during active clear time / pre-warning time 1001: Locking of other door 1201: Green traffic light on inside of door 1210: Green traffic light on outside of door 1220: Red traffic light on inside of Door 1 1221: Flashing red traffic light on inside of Door 1 1222: Red traffic light on inside of Door 2 1223: Flashing red traffic light on inside of Door 2 1224: Red traffic light on inside, flashing during pre warning time 1250: Red traffic light on outside of Door 1 1251: Flashing red traffic light on outside of Door 1 1252: Red traffic light on outside of Door 2 1253: Flashing red traffic light on outside of Door 2 1254: Not flashing red traffic light 1255: Red traffic light on outside, flashing during pre warning time 1281: Direction independent green traffic light 1601: Airlock OPEN 1701: Test output in end position door CLOSE 2501: Test output in end position door OPEN 2601: Always flashing, but not in end position OPEN, CLOSE or intermediate stop / partial open.</p> <p><i>☞ The flashing red traffic light flashes during OPEN and CLOSE movement and during active clear time. All red traffic lights type 1 are turned off in the Door CLOSED end position.</i></p> <p><i>☞ The exact settings which this profile involves can be found in Appendix: Output Profile</i></p>	0

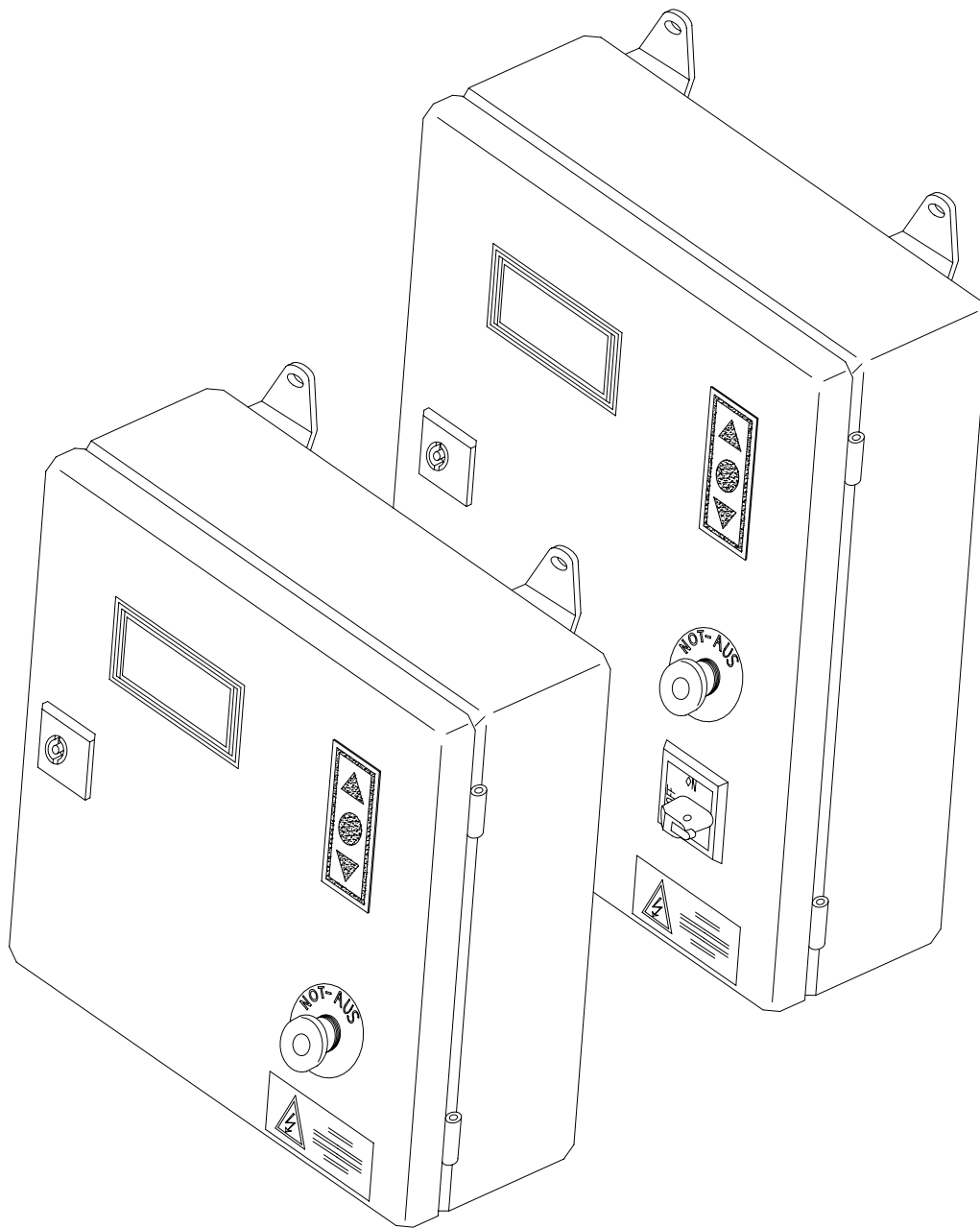
P.	[Unit] Range	Diagnostics	Default
910	0 ... 22	<p>With the aid of this parameter you can show the variables listed below in the display of the door controller.</p> <p>The following variables are displayed:</p> <ul style="list-style-type: none"> 0: The control sequence is displayed (Automatic) 1: [Hz] The current travel speed 2: [A] The current motor current 3: [V] The current motor voltage 4: [A] The current DC-Bus current 5: [V] The current DC-Bus voltage 6: [°C] The power stage temperature in °Celsius 7: [°C] The power stage temperature in °Fahrenheit 8: [s] The run-time of the motor during the last door operation 9: [Increments] The current position 10: [Increments] The position of the reference 11: [Dig] Channel 1 value of the absolute encoder 12: [Dig] Channel 2 value of the absolute encoder 13: [V] Current reference voltage 14: [°C] Temperature inside the housing in °Celsius 15: [°C] Temperature inside the housing in °Fahrenheit 16: Reserved 17: Reserved 18: Rotation speed of the TST PD shaft <i>☞ only with TST PD</i> 19: Reserved 20: Reserved 21: Number of position requisition without answer 22: Number of wrong received signs in TST PD encoder (activates also the output in P.955) <p><i>☞ Settings 9 to 15 only have meaning when using an electronic limit switch.</i></p> <p><i>☞ Settings 14 and 15 are only possible when using TST FUS.</i></p>	0

P.	[Unit] Range	Diagnostics	Default
920	Eb 1 Eb 2 Eb 3 Eb 4 Eb 5 Eb 6 Eb 7 Eb 8 Ebcl Eb -	The controller stores the last eight errors in the error memory. After opening Parameter P.920: <ul style="list-style-type: none"> • Change level using OPEN and CLOSE keys • Opening the error memory with  STOP • Closing the error memory with  STOP • Exiting Parameter P.920 with Eb - Eb1: Error message 1 (most recent error) EB2: Error message 2 EB3: Error message 3 EB4: Error message 4 EB5: Error message 5 EB6: Error message 6 EB7: Error message 7 EB8: Error message 8 Ebcl: Clear the complete error memory EB--: Exit the error memory, jump back to Parameter P.920  Er—in the display means that no error was entered.	Eb 1
925		Display software version	
930	[s] 0 ... 120.0	Run-time of motor during last door operation	
940	[V]	Mains input voltage display	

P.	[Unit] Range	Service Modes	Default
973	0 ... 1	Reset service counter: Reset (1) / Cancel (0)	0
980	0 ... 3	<p>This parameter is used to set the operating mode for the controller.</p> <p>The following modes are possible:</p> <p>0: OPEN and CLOSE move in self-holding (Automatic)</p> <p>1: OPEN move in self-holding, CLOSE move in manual mode (partial automatic)</p> <p>2: OPEN and CLOSE move in Manual mode (deadman)</p> <p>3: Deadman emergency operation</p> <p>⚠ WARNING All safety devices and limit switches are ignored.</p> <p>4: Endurance test with safety devices Automatic OPEN and CLOSE operation. Before each new operation the hold-open time P.010 is in effect.</p> <p>5: Endurance test without safety devices</p> <p>⚠ WARNING All safety devices are ignored.</p> <p><i>☞ The endurance test setting is lost after turning off the controller. The controller then reverts to manual mode.</i></p>	0
999	0 ... FFFF	<p>The password provides access to the various parameter levels.</p> <p>1: Start-up (commissioning) level</p> <p>2: Expanded start-up (commissioning) level</p> <p>xxxx: Manufacturer level</p> <p>IMPORTANT There are different parameters visible depending on the password level. A changing of parameters without to know there functionality is forbidden. In order to avoid failure and endangering because of unauthorized access passwords are only allowed to give to trained staff.</p>	1

Enduser manual

TST FUxE



Important !

Read the function description before operating, connecting or placing the gate controller in service.

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 FUxE gate control of FEIG ELECTRONIC GmbH. Starting up the control 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 FUxE gate control in service is solely responsible for the completeness of the startup manual.

This Manual shows only a small range of the control functions. Further functions and descriptions for individual gate functions as well as more exact specifications for the control 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.

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The description of products, their use, possibilities and performance data are not to be taken as assured properties and are subject to technical changes.


General notes concerning this document

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

 **WARNING** alerts to a possible hazard to persons if the procedure is not performed as described.

 **ATTENTION** alerts to possible damage to the control.

 **IMPORTANT** alerts to information which is important to the function of the gate control or gate.

 refers to useful information which is useful but not absolutely necessary for using the TST FUxE door controller

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1 Safety Notes

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

- All 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 50178 (VDE0160), EN 60335 (VDE0700), fire protection codes, accident prevention regulations as well as the relevant regulations for industrial doors (ZH1/494, EN12453, EN12978)
- The controller may be opened only if the supply voltage has been switched off completely.
- If the potential free contacts of the output relays or other terminals are supplied by a foreign voltage witch are still present after switching off the controller, you must install a sign on the housing that says: "ATTENTION! You must disconnect all supply circuits before opening the housing".
- The controller must never be operated while open.
- The controller must never be operated without the CEE-plug except that a main switch is installed. The main switch and the CEE-plug must be within easy reach.
- If the connecting lead is damaged, it must be changed by the manufacturer or another qualified person.
- Hazardous voltages remain stored in the intermediate circuit 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 intermediate circuit capacitors down to a voltage of less than 60VDC. Here discharge times of up to 10 minutes may be possible.
- In case 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 display and LED's remain off. The power supply can be restarted only after eliminating the short circuit or extreme overload.
- After turning off the supply, the power supply is still fed from the intermediate circuit capacitors for several seconds and maintains the supply function for a certain time depending on the power supply load.
- The processor circuit with 7-segment display, EPROM and multiplexers is galvanically directly connected to the mains supply. Note this when making any checking measurements (for measurements in the processor circuit, do not use test equipment with PE reference to the measuring circuit).
- It is not permitted to operate the controller without a connected protection earth. The absence of a protection earth will result in hazardous voltages on the controller housing caused by drain capacitors. The protection earth should be connected in compliance with EN50178 Section 5.2.11.1 for drain currents >3.5mA.
- Turning on or operating the controller in the presence of condensation is not permitted and may result in permanent damage.
- If controllers are used outside the specified temperature range, a regulated and monitored climate controller system must be in place to ensure that the specified working temperature range is maintained when turning on the supply and when operating the controller.
- The controller must never be operated with a damaged membrane keypad or sight glass. Damaged keypads and windows must be replaced. To prevent damage to the keypad, do not use pointed objects to actuate the keys. The keypad is designed for finger operation only.
- Before tuning on the controller voltage for the first time, ensure that the processor cards (plug-in modules) are in the correct position. Incorrect fit of the cards can result in damage to the controller, likewise the installation of non-approved third-party equipment.
- When moving the door in deadman mode, ensure that the door area can be inspected by the operator, since in this mode safety equipment such as safety bar and light barrier are defeated.
- Parameter settings and the function of the safety devices have to be checked before operating the door. Parameter settings and wire bridges are only allowed to set by an instructed person.

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

These safety advisories 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.

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.

2 Technical Data for TST FUE-2




Housing dimensions (W x H x D):	FUE2: 300x400x120mm (excl. wall bracket) or : 300x300x120mm (excl. wall bracket)	
Installation:	Vertical using wall bracket on housing bottom	
Supply voltage through L, N, PE:	230 V _{AC} ±10%, 50...60 Hz Permissible range: 180...240V ± 10% / 50...60Hz. Fuse: 16A K-type	
Controller internal power consumption:	max. 40W fully assembled and with motor not running	
External supply voltage 1 (230 V):	230 V _{AC} ±10%, 50...60 Hz (fused on the circuit board: F202 / 1 AT)	
Control voltage / external supply 2:	24 V _{DC} regulated (±5% at nominal voltage 230 V) max. 500 mA incl. optional plug-in modules. With circuit breaker, short-circuit protected by central switching regulator.	
Control voltage / external supply 3:	For electronic limit switches and safety edge Nominal value 11.5V / max. 130mA	
Control inputs:	24 VDC / typ. 15 mA, max. 26VDC / 20mA all inputs are to be connected potential-free or: < 5 V: inactive → logical 0 < 7 V: active → logical 1 min. signal duration for input control commands: > 100 ms galvanically isolated via optocouplers on the circuit board	
Inputs INK 1 and INK 2:	For two 24V active 90° offset pulse inputs, max. 20mA load. < 5V: inactive → logical 0, > 16V active → logical 1 Limit frequency: 1kHz	
RS485 A and B:	For electronic limit switches only. RS485 level, terminated with 100Ω.	
Safety chain / Emergency-Stop	all inputs are to be connected potential-free Contact load capacity ≥ 26 VDC / ≥ 120 mA When safety chain is interrupted, no movement of the drive is possible, not even in deadman mode Factory setting unjumpered	
Safety edge input:	For electrical safety edges with 1.2kΩ or 8.2kΩ termination resistor and for dynamic optical systems..	
Relay outputs	If inductive loads are switched (e.g., additional relays), these must be equipped with recovery diodes and appropriate noise suppression means (regenerative diodes, varistors, RC elements)	
Relay K3: Standard brake relay:	Changeover contact for enabling electromechanical brakes with interposed brake rectifier. 230VAC / 3A. When the Emergency-STOP is tripped, the brake output immediately becomes active.	
Relays K4 and K5 "Fault / Door position messages / Lamp functions"	Changeover contact potential-free min. 10mA max. 230VAC / 3A	230V permitted only when connecting the same phase as the supply voltage. Contacts used once for power switching can no longer switch low currents.
Drive output:	For drives up to 0.75kW (Version –A) resp. 1,5KW (Version –C) at 230V Motor constant current at 100% duty factor and 40°C ambient temperature: 5A Motor constant current at 60% duty factor and 50°C ambient temperature: 5A Version –A: 5A; Version –C: 10A Short-time overload capacity up to 15A resp. 22A for 0.5s Max. length of motor cable: 30m	
Brake resistance load (optional):	max. 1.5KW for max. 0.5 seconds. Repetition rate min. every 20 seconds.	
Temperature range	Operating: Storage:	-10...+50°C -25...+70°C
Relative humidity	up to 80% non-condensing	
Vibration	low-vibration installation, e.g. on a concrete wall	
Enclosure rating	IP54	
Weight	approx. 5 kg	
Directives	Standards:	
EMC Directive: superceded by:	89/336/EWG 91/263/EWG 92/031/EWG 93/068/EWG	EN 50081-1 / 03.93: Noise emission, residential EN 50081-2 / 03.94: Noise emission, industrial EN 61000-6-2 / 2001: Noise immunity, industrial
Low-Voltage Directive: superceded by:	73/023/EWG 93/068/EWG	EN 60335-1 / 2003: Safety of Household and similar electrical appliances / Part 1
Type-tested according to:	EN12453 / 2001: EN12445 / 2001:	Industrial, commercial and garage doors and gates. Safety in use of power operated doors and gates. Requirements Industrial, commercial and garage doors and gates—Test procedures
Applied national technical specifications related to the above Directives	EN12978 / 2003:	Doors and gates - Protection devices – Requirements and testing procedures

3 Technical Data for TST FU3E



Abmessungen Gehäuse (B x H x T):	FU3E: 300x400x120mm (excl. wall bracket)	
Installation:	Vertical using wall bracket on housing bottom	
Supply voltage through L, N, PE:	400 V _{AC} ±10%, 50...60 Hz Permissible range: 200...480V ± 10% / 50...60Hz. Fuse: 16A K-type	
Controller internal power consumption:	max. 50W fully assembled and with motor not running	
External supply voltage 1 (230 V):	230 V _{AC} ±10%, 50...60 Hz (fused on the circuit board: F202 / 1 AT)	
Control voltage / external supply 2:	24 V _{DC} regulated (±5% at nominal voltage 230 V) max. 500 mA incl. optional plug-in modules. With circuit breaker, short-circuit protected by central switching regulator.	
Control voltage / external supply 3:	For electronic limit switches and safety edge Nominal value 11.5V / max. 130mA	
Control inputs:	24 VDC / typ. 15 mA, max. 26VDC / 20mA all inputs are to be connected potential-free or: < 5 V: inactive → logical 0 < 7 V: active → logical 1 min. signal duration for input control commands: > 100 ms galvanically isolated via optocouplers on the circuit board	
Inputs INK 1 and INK 2:	For two 24V active 90° offset pulse inputs, max. 20mA load. < 5V: inactive → logical 0, > 16V active → logical 1 Limit frequency: 1kHz	
RS485 A and B:	For electronic limit switches only. RS485 level, terminated with 100Ω.	
Safety chain / Emergency-Stop	all inputs are to be connected potential-free Contact load capacity ≥ 26 VDC / ≥ 120 mA When safety chain is interrupted, no movement of the drive is possible, not even in deadman mode Factory setting unjumpered	
Safety edge input:	For electrical safety edges with 1.2kΩ or 8.2kΩ termination resistor and for dynamic optical systems..	
Relay outputs	If inductive loads are switched (e.g., additional relays), these must be equipped with recovery diodes and appropriate noise suppression means (regenerative diodes, varistors, RC elements)	
Relay K3: Standard brake relay:	Changeover contact for enabling electromechanical brakes with interposed brake rectifier. 230VAC / 3A. When the E-STOP is tripped, the brake output immediately becomes active.	
Relays K4 and K5 "Fault / Door position messages / Lamp functions	Changeover contact potential-free min. 10mA max. 230VAC / 3A	230V permitted only when connecting the same phase as the supply voltage. Contacts used once for power switching can no longer switch low currents.
Drive output:	For drives up to 2.2kW (Version –A) resp. 4KW (Version –C) at 230V Motor constant current at 100% duty factor and 40°C ambient temperature: 5A Motor constant current at 60% duty factor and 50°C ambient temperature: 5A Version –A: 5A, Version –C: 10A Short-time overload capacity up to 15A resp. 22A for 0.5s Max. length of motor cable: 30m	
Brake resistance load (optional):	max. 1.5KW for max. 0.5 seconds. Repetition rate min. every 20 seconds.	
Temperature range	Operating: Storage:	-10...+50°C -25...+70°C
Relative humidity	up to 80% non-condensing	
Vibration	low-vibration installation, e.g. on a concrete wall	
Enclosure rating	IP54	
Weight	approx. 5 kg	
Directives	Standards:	
EMC Directive: superceded by:	89/336/EWG 91/263/EWG 92/031/EWG 93/068/EWG	EN 50081-1 / 03.93: Noise emission, residential EN 50081-2 / 03.94: Noise emission, industrial EN 61000-6-2 / 2001: Noise immunity, industrial
Low-Voltage Directive: superceded by:	73/023/EWG 93/068/EWG	EN 60335-1 / 2003: Safety of Household and similar electrical appliances / Part 1
Type-tested according to:	EN12453 / 2001: EN12445 / 2001:	Industrial, commercial and garage doors and gates. Safety in use of power operated doors and gates. Requirements Industrial, commercial and garage doors and gates—Test procedures
Applied national technical specifications related to the above Directives	EN12978 / 2003:	Doors and gates - Protection devices – Requirements and testing procedures

4 General Operating Notes for Parameterizing






Opening parameterizing mode

1.	 Turn on door controller	Turn on controller	When service mode is active, the leading decimal point flashes Contents of the display depends on controller status	. * . . .
2.	 STOP (permanent)	Press Stop button and hold down	Waiting messages are displayed, e.g.:	E. 2 0 1
3.	 Up (permanent)	Also press Up button and hold down	after approx. 2 seconds wait: In parameterizing mode	P. 0 0 0


Parameter selection with parameterizing mode open

 UP or  DOWN	Select desired parameter CAUTION: Not all parameters are directly viewable or changeable, depending on password and set positioning type	The parameter value can be viewed or modified (see below) Display varies with the selection	P. . . .
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


Parameter processing with selected parameter

1.		Controller in parameterizing mode	Displays the desired parameter name	P. 0 1 0
2.	 STOP (short)	Opening the parameter	The current parameter value is displayed:	5
3.	 Up	Up button for incrementing parameter value	If the currently valid parameter value is changed, the decimal points will flash	6*
or	 Down	Down button for decrementing parameter value		4*
4.	 STOP (long)	Save set parameter value	The parameter is considered to be saved when no decimal points flash	6
or	STOP (short)	Cancel set parameter value	Cancel, the original parameter value is again displayed	4
5.	 STOP (short)	Switch to display of the parameter name	Displays the parameter name	P. 0 1 0

Exiting parameterizing mode

 STOP (long)	Immediately quits parameterizing mode, door operation is again active	The last stored value is automatically retained
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Resetting the controller

Press  +  +  simultaneously and hold down for approx. 3 seconds.

5 Functions

P.	[Unit] Range	Door Functions	Default
000	[Cycles]	Door cycle counter display Display: 1234567 ⇒ 1234. ▼-key .567 Display: 67 ⇒ 67	
005	[Cycles]	Displays number of door cycles until maintenance is required. Display: 1234567 ⇒ 1234. ▼-key .567 Display: 67 ⇒ 67	
010	[s] 0..200	Open hold time 1 (End position Upper - Eo) 0: Automatic closing deactivated	10
011	[s] 0..200	Open hold time 2 (Intermediate hold position - E1) 0 = turned off	10



P.	[Unit] Range	Correcting end positions with electronic limit switches	Default
221	[Inc] ± 125	Correction value for Lower end position (set to 0 after new calibration !)	0
231	[Inc] ± 60	Correction value for Upper end position (set to 0 after new calibration !)	0

P.	[Unit] Range	Diagnostics	Default
920	Eb 1 Eb 2 Eb 3 Eb 4 Eb 5 Eb 6 Eb 7 Eb 8 Ebcl Eb -	Display error memory / Faults ⇒ Open by pressing Stop key again, ⇒ Change by pressing Open/Close key ⇒ Quit by pressing Stop key. ⇒ Exit using cancel "EB-". • Eb 1 → Error message 1 (most current) or Er-- • Eb 2 → Error message 2 or Er-- • Eb 3 → Error message 3 or Er-- • Eb 4 → Error message 4 or Er-- • Eb 5 → Error message 5 or Er-- • Eb 6 → Error message 6 or Er-- • Eb 7 → Error message 7 or Er-- • Eb 8 → Error message 7 or Er-- • Fehler! Textmarke nicht definiert. Ebcl → Clear entire error memory • Eb - → Cancel (Display noEr: no error)	Eb 1
925		Software version display	

6 Message Overview

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.

For this, you press the  STOP button and keep it pressed and press the EMERGENCY STOP button afterwards. Alternatively, the  STOP button can also be kept pressed for approx. 5 seconds.

Improper end positions		
F.000	Door position too far up	<ul style="list-style-type: none"> • Too small a parameter value for upper emergency limit switch • Upper limit switch range (limit switch band) too small • Mechanical brake defective or improperly set
F.005	Door position too far down	<ul style="list-style-type: none"> • Too small a parameter value for lower emergency limit switch • Lower limit switch range (limit switch band) too small • Mechanical brake defective or improperly set

Implausibilities in door movement		
F.020	Run time exceeded (during opening, closing or deadman)	<ul style="list-style-type: none"> • current motor run time has exceeded set maximum run time, door may be sticking or is blocked • If using mechanical limit switches, one may not have tripped
F.030	Lag error (position change of the door is less than expected)	<ul style="list-style-type: none"> • Door or motor is blocked • Too little power for lift torque • Too little speed • Mechanical limit switch was not left or is defective • Absolute or incremental encoder not tightened sufficiently in its mounting • Wrong positioning system selected (P.205)
F.031	Detected rotational direction deviates from expected	<ul style="list-style-type: none"> • When using incremental encoders: Channel A and B reversed • Motor rotation direction reversed compared with calibration setting • Too much „pancaking“ when starting, brake releases too soon, or too little torque, adjust boost as necessary.
F.043	Pre-limit switch fault (light barrier)	<ul style="list-style-type: none"> • The pre-limit switch for the light barrier remains activated even in the middle end position or upper end position.

Error messages for incremental encoder		
F.050	Reference switch position deviates from permissible range. During cyclical synchronization	<ul style="list-style-type: none"> • Reference switch constantly tripped (defective) • Reference switch trips too far from the selected reference. • Reference switch trips in the limit switch band • P270 and P280 are both at the reference switch
F.051	Reference switch position deviates from permissible range.	<ul style="list-style-type: none"> • Reference switch lies in the limit switch band • Reference switch is beyond 15% EO • Reference switch defective
F.052	Reference switch not recognized	<ul style="list-style-type: none"> • The reference switch is not recognized within 20% EO during automatic synchronization after power-on • The reference switch is not recognized in the associated end position.

Maintenance counter exceeded		
F.080	Fault: Maintenance is required	<ul style="list-style-type: none"> • Service counter has expired

Parameters not set		
F.090	Controller not parameterized	<ul style="list-style-type: none"> The basic parameters (P.205, P.100 to P.103) for the TST FUxE controller have not yet been set.

Safety chain faults		
F.201	Internal E-Stop „push-button“ tripped or Watchdog (computer monitor)	<ul style="list-style-type: none"> E-Stop chain was interrupted starting at input „internal E-Stop“ 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	<ul style="list-style-type: none"> E-Stop chain was interrupted starting at Input 1
F.212	External E-Stop 2 tripped	<ul style="list-style-type: none"> E-Stop chain was interrupted starting at Input 2

Faults in the safety chain		
F.360	Short circuit detected on edge input	<ul style="list-style-type: none"> Short circuit detected on edges with normally closed contact
F.361	Number of edge trips for closing has reached set limit	<ul style="list-style-type: none"> Parameterized, maximum number of safety edge trips during a door cycle was exceeded
F.362	Redundancy error with short circuit	<ul style="list-style-type: none"> One of the processing channels for short circuit detection does not react identically with the second channel. → Controller board defective
F.363	Interruption on edge input	<ul style="list-style-type: none"> Connection cable defective or not connected Termination resistor incorrect or missing Jumper J600 incorrectly set
F.364	Safety edge testing failed	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> One of the processing channels for interruption detection does not react identically with the second channel. → Controller board defective Dynamic optical system connected but not set in Parameter P.460
F.366	Too high a pulse frequency for optical safety edge	<ul style="list-style-type: none"> Defective optical safety edge Defective input for internal safety edge
F.369	Internal safety edge incorrectly parameterized	<ul style="list-style-type: none"> An internal safety edge is connected but deactivated
F.373	Fault in the safety edge (message comes from module)	<ul style="list-style-type: none"> 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 bar testing failed	<ul style="list-style-type: none"> Pre-limit switch for safety edge incorrectly set or defective Processing module defective Safety edge defective

Faults in the safety chain		
F.379	Safety edge detection defective (coding pin or parameter setting)	<ul style="list-style-type: none"> 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.385	Fault in pre-limit switch for safety edge	<ul style="list-style-type: none"> Pre-limit switch for turning off the safety edge or reversing after safety edge tripping remains tripped even in the upper end position.

General hardware faults		
F.400	Controller hardware reset detected	<ul style="list-style-type: none"> Excessive noise on supply voltage Internal watchdog tripped RAM error
F.410	Over-current (motor current or intermediate circuit)	<ul style="list-style-type: none"> Wrong motor data set (P100 – P103) Non-adjusted voltage increase / boost set (P140 or P145) Motor not properly dimensioned for door Door sticks
F.420	Overvoltage in intermediate circuit Limit 1	<ul style="list-style-type: none"> Brake chopper interference / defective / missing Feed voltage much too high Motor feeds back too much energy in generator mode, door motion energy cannot be sufficiently brought down
F.430	Temperature cooler outside of working range Limit 1	<ul style="list-style-type: none"> 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.440	Overcurrent in intermediate circuit Limit 1	<ul style="list-style-type: none"> Boost not adjusted Motor incorrectly dimensioned for door Door sticks
F.510	Motor / intermediate circuit overcurrent Limit 2	<ul style="list-style-type: none"> Wrong motor data set (P100 – P103) Non-adjusted voltage increase / boost set (P140 or P145) Motor not properly dimensioned for door Door sticks
F.515	Motor protection function detected overcurrent	<ul style="list-style-type: none"> Incorrect motor curve (motor rated current) set (P101) Too much boost (P140 or P145) Motor incorrectly dimensioned
F.519	IGBT driver chip detected overcurrent	<ul style="list-style-type: none"> Short circuit or ground fault on motor terminals Motor rated current setting extremely wrong (P100) Extremely too much boost (P140 or P145) Motor incorrectly dimensioned Motor winding defective Momentary interruption of the E-Stop circuit.
F.520	Overvoltage in intermediate circuit Limit 2	<ul style="list-style-type: none"> Brake chopper interference / defective / missing Feed voltage much too high Motor feeds back too much energy in generator mode, door motion energy cannot be sufficiently brought down.
F.521	Overvoltage in intermediate circuit	<ul style="list-style-type: none"> Input voltage supply too low, usually at load Load too great / final stage or brake chopper fault

General hardware faults		
F.524	Ext. 24 V supply missing or too low	<ul style="list-style-type: none"> • Overload but no short circuit • When 24V is shorted the controller voltage does not ramp up and glow lamp V306 comes on.
F.530	Temperature cooler outside of working range Limit 1	<ul style="list-style-type: none"> • 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.540	Overcurrent in intermediate circuit Limit 2	<ul style="list-style-type: none"> • Boost not adjusted • Motor incorrectly dimensioned for door • Door sticks

Positioning system faults		
F.700	Position sensing defective	<p>For mechanical limit switches:</p> <ul style="list-style-type: none"> • At least one limit switch does not correspond to the configured active status. • An implausible combination of at least 2 active limit switches <p>For electronic limit switches:</p> <ul style="list-style-type: none"> • 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.720	Synchronization error in position sensing with incremental encoder	<ul style="list-style-type: none"> • Intermediate stop position is less than the minimum incremental value (25). • Synchronization was not finished. • The selected reference switch was not reached or is outside its tolerance • The incremental encoder is not counting or the door is blocked (also F.030, lag error) • Incremental inputs IN 9 and IN 10 are reversed (also F.031 rotation error)
F.750	Protocol Transmission error	<ul style="list-style-type: none"> • Defective hardware or electrically noisy environment
F.751	Synchronization FU <-> absolute encoder	<ul style="list-style-type: none"> • Defective hardware or electrically noisy environment • Absolute encoder processor electronics defective
F.752	Timeout with protocol transmission	<ul style="list-style-type: none"> • Interface cable defective / interrupted • Absolute encoder processor electronics defective • Defective hardware or electrically noisy environment
F.760	Position outside of window	<ul style="list-style-type: none"> • Position encoder drive defective • Absolute encoder processing electronics defective • Defective hardware or electrically noisy environment
F.761	Distance Channel 1 <-> Channel 2 outside allowed window	<ul style="list-style-type: none"> • Position encoder drive defective • Defective hardware or electrically noisy environment

Positioning system faults		
F.762	Electronic limit switch positions incorrect	<ul style="list-style-type: none">• Upper limit switch Eo or intermediate limit switch E1 has exceeded the valid limit range• Controller not yet initialized• Position values during calibration not correct or values are no longer plausible

6.1 Internal system-related errors F.9xx

These are internal errors which cannot be eliminated by the user.
If such an error occurs, call customer service immediately.

6.2 Information messages


General messages

STOP	Stop / Reset state, wait for next incoming command
Eu	End position Lower Eu
≡Eu≡	End position Lower locked → no raising possible (e.g., lock-door)
ZUF [□]	Closing active
˘Eo˘	End position Upper Eo
≡Eo≡	End position Upper locked → no closing possible (e.g., safety edge)
□AUF	Opening active
-E1-	End position middle E1 (intermediate stop position)
≡E1≡	End position middle locked → no closing possible (e.g., safety edge)
FAIL	Fault → only deadman travel is possible, possibly automatic opening
EICH	Calibration → Setting the end positions in deadman travel (for absolute encoder) → Start procedure using STOP key
≡NA≡	E-Stop → No travel possible, hardware safety chain interrupted
NOTF	E-travel → Deadman travel without taking into account safeties, etc.
'Hd'	Manual → Deadman mode
ParA	Parameterizing
SYNC	Synchronization (incremental encoder / limit switch → Pos.unknown)
'Au'	Automatic → indicates change from „Manual“ to „Automatic“ status
'Hc'	Semi-automatic → indicates change from „Manual“ to „Semi-automatic“
FUXE	Initial display after power up (Power Up and self-test)

Status messages during calibration

E.i.E.u.	Calibration of the End position Lower requested (in deadman travel)
E.i.E.o.	Calibration of the End position Upper requested (in deadman travel)
E.i.E.1.	Calibration of the intermediate position E1 (in deadman travel)

Status messages during synchronization

S.y.E.u.	Synchronization of End position Lower requested (Deadman or wait for start condition)
S.y.E.o.	Synchronization of End position Upper requested (Deadman or wait for start condition)
S.y.E.1.	Synchronization of intermediate stop position E1 (in deadman)
S.y.op	Automatic open until mechanical stop, then automatic synchronization of End position Upper
S.y.cL	Automatic close taking into account safeties until mechanical stop, then automatic synchronization of End position Lower
S.y.c≡	Automatic close is locked due to request 

Status messages during deadman

Hd.cL	Deadman close (membrane key: CLOSE)
Hd.oP	Deadman open (membrane key: OPEN)
Hd.Eu	End position Lower reached, no further deadman close possible
Hd.Eo	End position Upper reached, no further deadman open possible
Hd.Ao	Outside of permitted Eo position (no deadman open possible)

Information messages during Automatic mode

I.080	Maintenance required soon / service counter nearly expired
I.100	Speed when reaching upper end position too high
I.150	Speed when reaching lower end position too high
I.160	Continuous CLOSED still active
I.170	Forced opening being performed
I.185	Wait for acknowledgement (operator call), display flashes
I.199	Door cycle not plausible (re-initialize → Parameters)
I.200	Reference position corrected or recognized (after calibration)
I.201	Reference position re-initialized
I.202	Reference position missing

I.203	Reference position incorrect
I.205	Synchronization
I.210	Pre-limit switch Upper not plausible
I.211	Pre-limit switch Lower not possible
I.310	Open-command on Door2 being issued
I.500	Correction of upper limit switch running
I.501	Upper pre-limit switch corrected
I.502	Upper limit switch band corrected
I.505	Correction of lower limit switch running
I.506	Lower pre-limit switch corrected
I.507	Lower limit switch band corrected
I.510	Limit switch correction finished
I.515	Controller is preparing automatic teach-in of the limit switches
I.520	Maximum speed during automatic limit switch correction is not reached
I.555	Limit switches being corrected

Information messages while parameterizing

noEr	Error memory: no error saved
Er--	Error memory: if error but no associated message 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.121	Input 21
E.128	Input 28

Safety/Emergency stop chain

E.201	Internal E-Stop „pushbutton“ tripped
E.211	External E-Stop 1 tripped
E.212	External E-Stop 2 tripped

Safety edge, general

E.360	Activation of internal safety edge
E.363	Fault in internal safety edge
E.370	Activation of external safety edge
E.373	Fault in external safety edge
E.379	External safety edge activated but not yet plugged in

RC plug-in module

E.401	RC Channel 1
E.402	RC Channel 2

Induction loop processor plug-in module

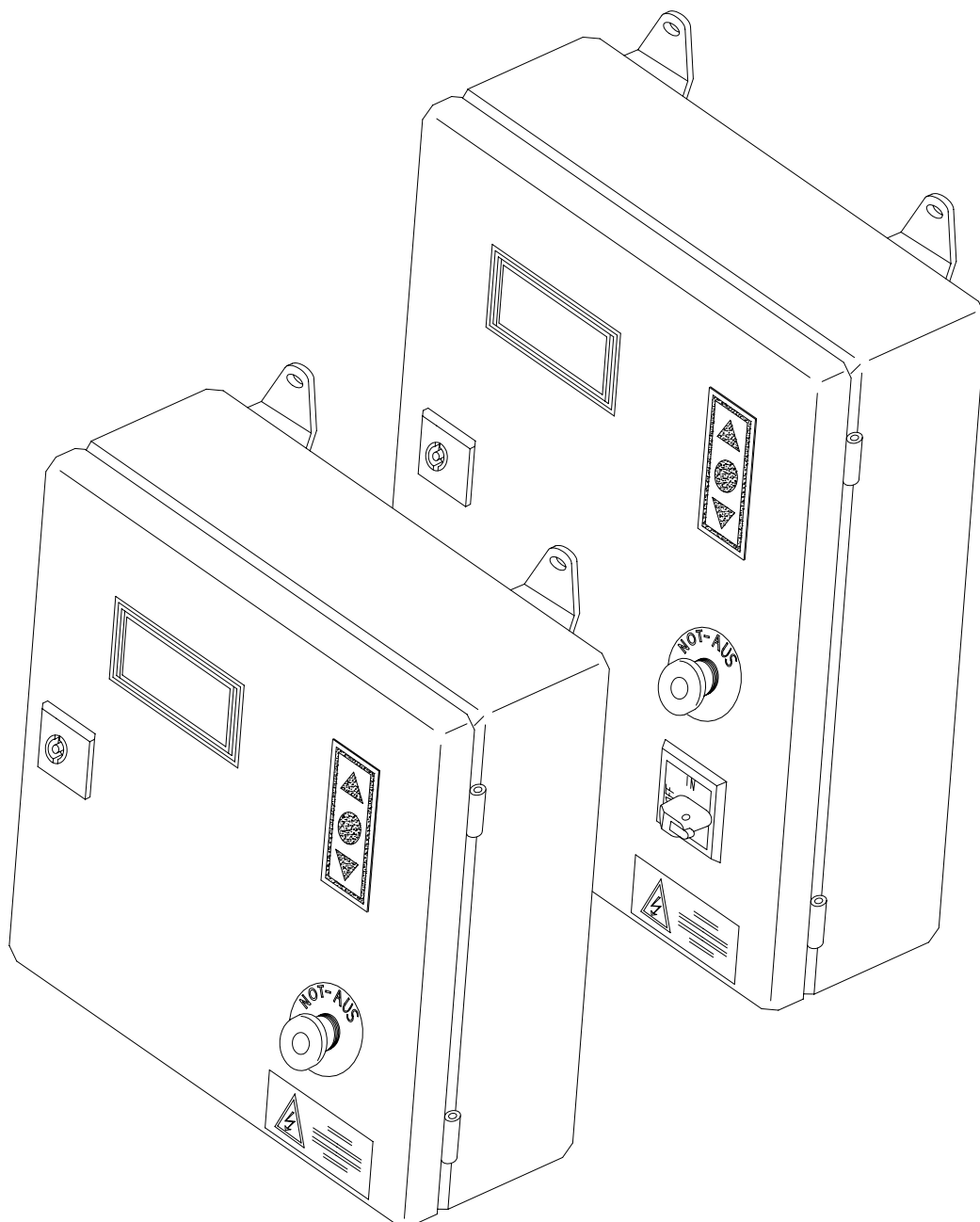
E.501	Detector Channel 1
E.502	Detector Channel 2

Internal inputs

E.900	Controller chip fault signal
-------	------------------------------

Manual, generally part

TST FUxE



Important !

Read the function description before operating, connecting or placing the gate controller in service.

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 FUxE gate control of FEIG ELECTRONIC GmbH. Starting up the control 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 FUxE gate control in service is solely responsible for the completeness of the startup manual.

This Manual shows only a small range of the control functions. Further functions and descriptions for individual gate functions as well as more exact specifications for the control and hazard notes can be found in the main description.


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General notes concerning this document

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

 **WARNING** alerts to a possible hazard to persons if the procedure is not performed as described.

 **ATTENTION** alerts to possible damage to the control.

 **IMPORTANT** alerts to information which is important to the function of the gate control or gate.

 refers to useful information which is useful but not absolutely necessary for using the TST FUxE door controller

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1 General Controller Information

- The controller has been designed exclusively for use with **AC asynchronous drives** up to 4kW (2.2kW) operating with 400V supply (TST FU3E) or 1.5 kW (0.75kW) at 230V (TST FUE-2). The main area of application is in door and gate technology, with an emphasis on fast-running sectional doors with variable opening and closing speed. The doors are well mechanically protected by means of no-slip starting and stopping, and can be raised and lowered faster than would be possible when using reversing contactor controls or Dahlander circuits.
- This controller incorporates the **function components of a convenient door controller**, combined with a frequency converter final stage which has been streamlined down to what is absolutely necessary. The combination of driving the converter final stage and processing the door control-specific in- and outputs by a microcontroller provides the advantage in this controller that **all functions are centrally processed and monitored**. Setting of the gate controller and converter function modules can therefore be done easily in a single unit. The necessity for communication and wiring between the device units, which is required for conventional approaches using separate converters and door controllers, has been eliminated in this design.
- By setting the parameters, the controller is able to work with **absolute encoders, mechanical limit switches or incremental encoders**.
- All controller inputs for command switches or external devices are configured for an unregulated 24V, whereby the inputs can be wired with potential-free contacts or under some circumstances with 24V active outputs (Exception: NA1 and NA2, which must be potential-free).
- The available **inputs can be adapted variously in their function from the default standard function**. Which functionalities can be assigned to the individual inputs is defined in the description for the parameter group P.501 (to P.5A9).
- The controller has a pre-configured processor for various safety edge types. Edges with normally open or normally closed function and 1.2k or 8.2k termination resistor can be connected. Safety edge processing can be parameterized for function. Parameters can be used to turn off processing when no termination resistor or safety edge is connected. When a termination resistor is present, the processing is automatically activated when power is turned on.
- The controller allows for **retrofitting of various plug-in modules**. The following modules can be used:

Function	Card type	Remark
Redundant safety edge processing (electrical safety edge)	TST SUKSA-A (for electrical edge)	For edges with normally open function and 1.2k or 8.2k Ohm termination resistor
Redundant safety edge processing (pneumatic safety edge)	TST SSKS-A	For edges with normally closed function and 1.2k or 8.2k Ohm termination resistor
Induction loop detector (1-channel) (Det. 1)	TST SVEK1	Processor for one induction loop with open collector output (option)
Induction loop detector, 2-channel (Det. 1/2)	TST SVEK2	Processor for two induction loops with open collector output (option)
RF receiver, 2-channel (Funk/Radio 1/2)	TST SFPE2-A 2-channel	FM 433 MHz
LCD-Display		2x16 characters, illuminated Optional plug-in (For use at very low temperatures, another display type may be used)

- The function of the plugged-in modules can be adapted in the parameter range P.6xx to change it from the standard default setting.
- The available output relays can be adapted variously in their function from the default standard function. The possible settings can be found in parameter group P.7xx.
- The output contacts (1x change-over each) are available as a potential-free contact.
- The 24VDC power supply for external devices is equipped internally with a self-resetting polyswitch semiconductor fuse and powers both the plug-in modules and the controller inputs at the same time.
- The integrated, primary switching power supply permits a **supply voltage range having a high tolerance**.
- All parameter settings can be changed after activating expanded parameter mode (P.999).

2 Overview

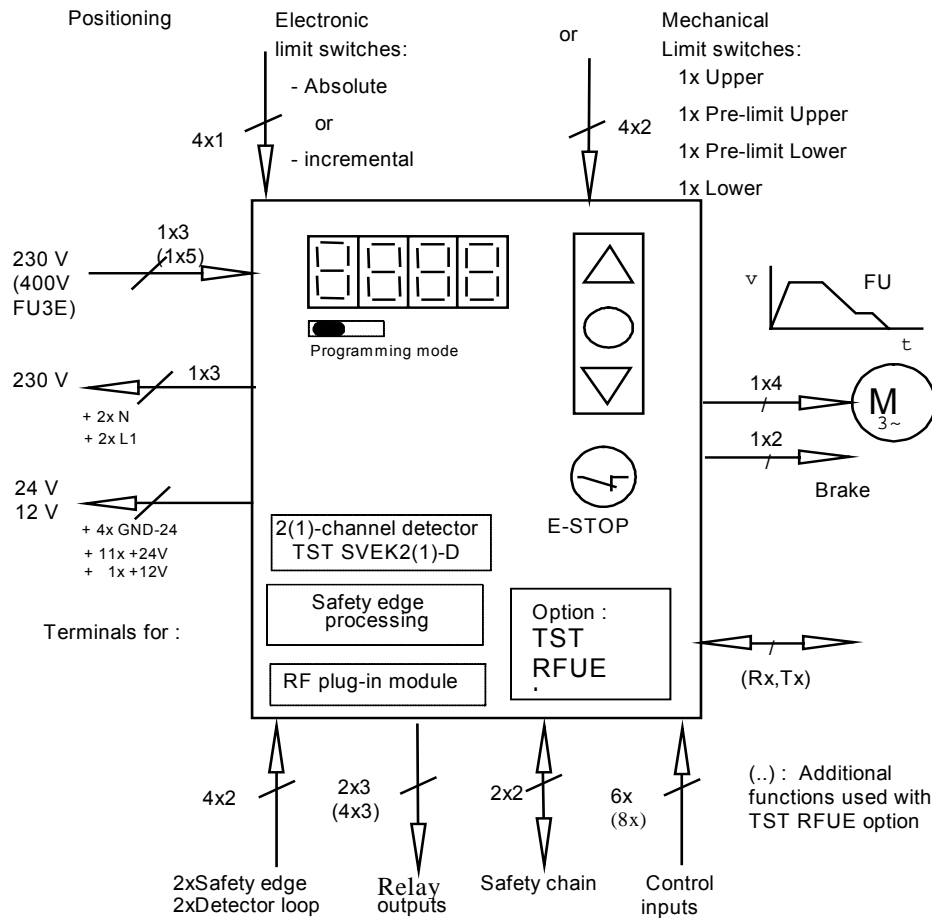


Fig. 1: Overview

- Supply voltage:**
- TST FUE-2: 230V 50/60Hz nominal voltage
 - TST FU3E: 400V 50/60 Hz nominal voltage
- Controls:**
- 1x Emergency-STOP button switch built into front panel
 - 1x membrane keypad OPEN, STOP, CLOSE built into front panel.
- Inputs:**
- 2x Emergency-Stop external (for safety circuit such as thermopiles, hand cranks, etc.)
 - 8x inputs, parameterizable
 - 2x limit switch inputs upper and lower, also usable as incremental input.
 - 1x interface input for position sensing using absolute encoder.
 - 8x input expander with TST RFUE option, inputs parameterizable.
 - 1x input expander with TST RFUE option, (Tx – Rx)
- Plug space for:**
- 1x safety edge processor for various edge types (1.2 / 8.2kOhm)
 - 1x induction loop detector in 1- or 2-channel version (open collector)
 - 1x RF (radio) plug-in module, 1- or 2-channel
 - 1x LCD Display
- Outputs:**
- 1x potential-free relay contact for triggering the brake.
 - 1x potential-free relay contact for triggering the brake.
 - 4x relay expander with TST RFUE, changeover contacts, parameterizable.
- Motoranschluß:**
- 1x AC asynchronous motor with power isolation relay between motor connection and final stage.
TST FUE-2 up to 1.5KW, 10A at 230 VAC
TST FU3E up to 4KW, 10A at 400VAC
- Brake chopper:**
- 1x integrated brake chopper

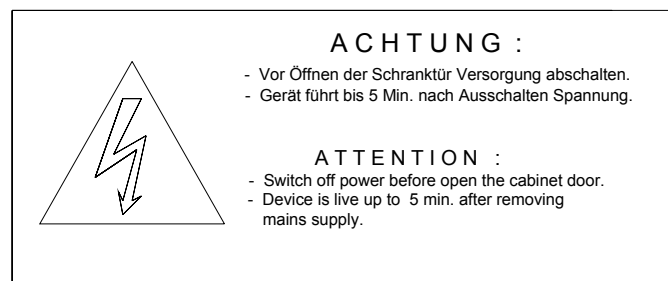
3 Installing the controller

WARNING

- During installation of the controller the system must be powered down.

ATTENTION

- Before installation, check the controller for any transport or other damage. Damage inside the controller may result in serious consequential damage to the controller including personal injury to the user.
- The controller is configured for direct wall mount. The unit is attached using the spacers located on the bottom.
- Always install the controller so that the cable entries face down.
- Ensure that no transmission of mechanical vibration through the door to the controller is possible (when installed for example on a concrete wall).
- Ensure that the housing is mounted without mechanical strain.
- To ensure air circulation around the heat sink located on the back of the controller, no objects are permitted within a distance of ten centimeters above and below the controller housing.
- Select the mounting location so that the controller does not receive direct sun exposure, and other weather effects cannot have a direct effect on the controller. The controller must be within sight of the door to allow deadman operation from the keypad.
- Avoid any contact with electronic components, especially parts of the processor circuit, since it contains sensitive components that could be damaged or destroyed by static discharge.
- Not used cable entries have to shut in order to ensure IP 54.
- Ensure that the cable entries are not strained mechanically particularly tension stress.
- For all board versions of the controllers, note the following when installing the housing:
The protection class must be at least IP54.
The enclosure must require tools in order to open it.
The minimum separations from live components and the housing must be maintained.
Provide sufficient thermal dissipation using an appropriate heat sink.
A from outside visible danger sign with the content as follows has to add on the housing.



3.1 Hole pattern

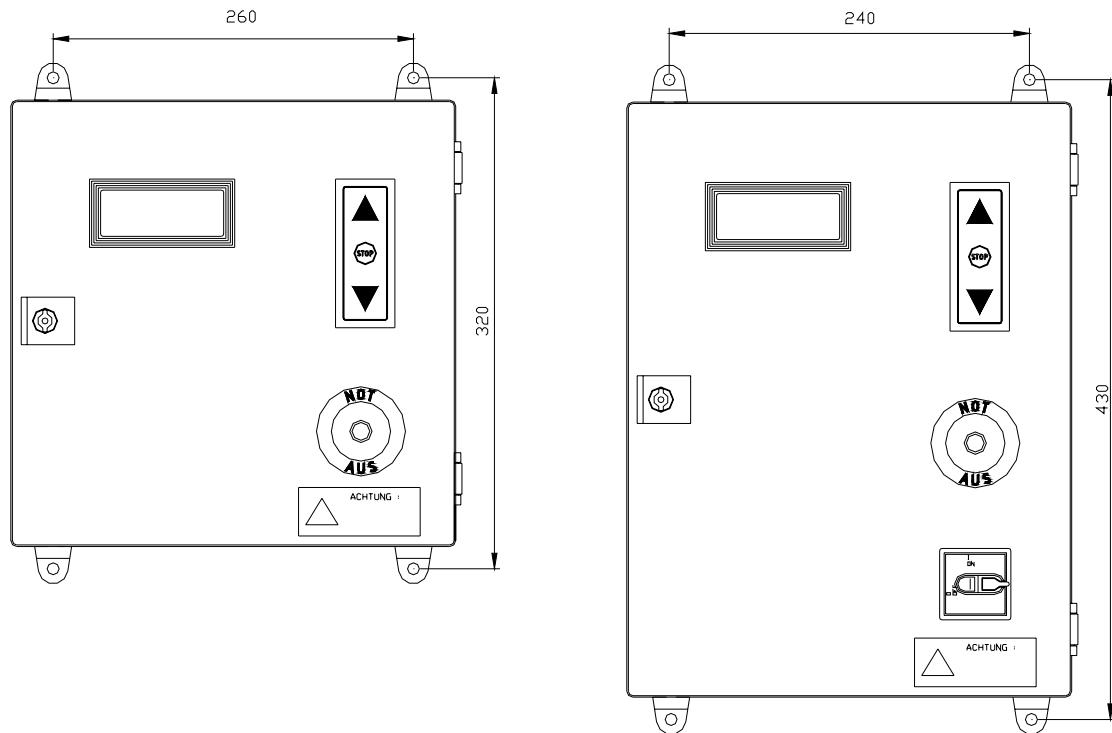


Fig. 2: Hole pattern

4 Electrical wiring

WARNING

- Make sure power is turned off before performing wiring, inspection or maintenance work on an open controller. Pay particular attention to the points listed in the section "Safety Notes".
- Hazardous voltages remain for up to 5 minutes after the controller is turned off.
- Touching the electronic components is hazardous due to residual voltages.
- Never operate the controller with the cover left open.

ATTENTION

- Before turning on the controller for the first time, check to be sure all the motor connections on the controller and motor side and all PE lines are firmly attached and whether the motor is properly set to star or delta switching. Loose motor connections and PE cables will usually damage the converter.
- Fast-running sectional doors often experience high electrostatic discharge on the panels. Such a discharge takes place at the closest point to a protection ground reference. If as a result of poor wiring a discharge to the control inputs which are at ground reference, this can damage the controller. The safety edge connections are particularly susceptible. A discharge device on the door panel is recommended here as a countermeasure. We recommend a ferrit core over the motor cable right next to the housing as an additional protection against ESD.
- By drive units with electrical break pay attention to sufficient fault clearance of the break. We recommend to carry out the fault clearance with RC-elements.

- Never leave left-over installation or wiring parts inside the controller housing. Electrically conducting debris can severely damage the circuit board.

IMPORTANT

- The TST FUE-2 controller is configured for a nominal voltage of 230 V, 50...60Hz. The permissible input voltage range is 180 ... 240 V_{AC} ± 10% (160 ... 265 V_{AC}). Input voltages above 270 V_{AC} may result in severe damage to the controller.
- The TST FU3E controller is configured for a nominal voltage of 400 V, 50...60Hz. The permissible input voltage range is 200 ... 480 V_{AC} ± 10% (180 ... 528 V_{AC}). Input voltages above 540 V_{AC} may result in severe damage to the controller
- The supply voltage line must be fused on the customer end with a 16A tripping fuse, K type.
- Observe the cable conductor gauges specified in the data sheets. Maximum connection diameters of the printed card terminals used

	single wire (rigid)	fine wire (with/without wire end ferrule)
Screw terminals	4	2,5
Plug in terminals	2,5	2,5
Motor terminals	6	4
Line supply	6	4


- If the controller is operated through a residual current circuit breaker, then when calculating the break current you must take into account that leakage currents from the EMC filter and shielding of the connection cable can total significantly more than 30 mA when the motor is running. The leakage current depends significantly on the shielded cable length and increases with the clock frequency of the final stage. The leakage current is 3.5 mA when the motor is not running.
- The 24V control voltage for external devices, your own external control circuits, all plug-in cards and for the electronic limit switch is protected by an electronic circuit breaker. After the circuit breaker has tripped, it resets after eliminating the overload or short circuit and turning off the supply voltage for a minimum of five seconds.
- All control voltage inputs are galvanically isolated from the supply by additional isolation (safety extra-low voltage). For all components connected to the controller we recommend additional isolation with a rated voltage of > 230 V (per EN 60335-1).
- Keep the connection short for all cables brought into the controller and make the connection directly to the terminal when possible. Unused wires should be tied to the PE on both ends.
- To conform with EMC Directives use only shielded, separate motor cables with the shield connected on both ends (motor and controller side) and with no additional connections in the cable. Maximum cable length: 30 m.
- Within the controller be sure that the motor cable is not bundled together with power or control lines.
- Induction loop connections must be routed separately from all other lines, with as much distance as possible from the motor cable and cables carrying AC supply voltage. Loop connections must be twisted-pair up to the terminal inside the controller.
- To use incremental and absolute encoders for position sensing, we recommend using shielded cable.

5 Safety Notes

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

- All 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 50178 (VDE0160), EN 60335 (VDE0700), fire protection codes, accident prevention regulations as well as the relevant regulations for industrial doors (ZH1/494, EN12453, EN12978)
- The controller may be opened only if the supply voltage has been switched off completely.
- If the potential free contacts of the output relays or other terminals are supplied by a foreign voltage witch are still present after switching off the controller, you must install a sign on the housing that says: "ATTENTION! You must disconnect all supply circuits before opening the housing".
- The controller must never be operated while open.
- The controller must never be operated without the CEE-plug except that a main switch is installed.
The main switch and the CEE-plug must be within easy reach.
- If the connecting lead is damaged, it must be changed by the manufacturer or another qualified person.
- Hazardous voltages remain stored in the intermediate circuit 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 intermediate circuit capacitors down to a voltage of less than 60VDC. Here discharge times of up to 10 minutes may be possible.
- In case 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 display and LED's remain off. The power supply can be restarted only after eliminating the short circuit or extreme overload.
- After turning off the supply, the power supply is still fed from the intermediate circuit capacitors for several seconds and maintains the supply function for a certain time depending on the power supply load.
- The processor circuit with 7-segment display, EPROM and multiplexers is galvanically directly connected to the mains supply. Note this when making any checking measurements (for measurements in the processor circuit, do not use test equipment with PE reference to the measuring circuit).
- It is not permitted to operate the controller without a connected protection earth. The absence of a protection earth will result in hazardous voltages on the controller housing caused by drain capacitors. The protection earth should be connected in compliance with EN50178 Section 5.2.11.1 for drain currents >3.5mA.
- Turning on or operating the controller in the presence of condensation is not permitted and may result in permanent damage.
- If controllers are used outside the specified temperature range, a regulated and monitored climate controller system must be in place to ensure that the specified working temperature range is maintained when turning on the supply and when operating the controller.
- The controller must never be operated with a damaged membrane keypad or sight glass. Damaged keypads and windows must be replaced. To prevent damage to the keypad, do not use pointed objects to actuate the keys. The keypad is designed for finger operation only.

- Before tuning on the controller voltage for the first time, ensure that the processor cards (plug-in modules) are in the correct position. Incorrect fit of the cards can result in damage to the controller, likewise the installation of non-approved third-party equipment.
- When moving the door in deadman mode, ensure that the door area can be inspected by the operator, since in this mode safety equipment such as safety bar and light barrier are defeated.
- Parameter settings and the function of the safety devices have to be checked before operating the door.
Parameter settings and wire bridges are only allowed to set by an instructed person.

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

These safety advisories 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.

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.

6 Technical Data for TST FUE-2






Housing dimensions (W x H x D):	FUE2: 300x400x120mm (excl. wall bracket) or : 300x300x120mm (excl. wall bracket)	
Installation:	Vertical using wall bracket on housing bottom	
Supply voltage through L, N, PE:	230 V _{AC} ±10%, 50...60 Hz Permissible range: 180...240V ± 10% / 50...60Hz. Fuse: 16A K-type	
Controller internal power consumption:	max. 40W fully assembled and with motor not running	
External supply voltage 1 (230 V):	230 V _{AC} ±10%, 50...60 Hz (fused on the circuit board: F202 / 1 AT)	
Control voltage / external supply 2:	24 V _{DC} regulated (±5% at nominal voltage 230 V) max. 500 mA incl. optional plug-in modules. With circuit breaker, short-circuit protected by central switching regulator.	
Control voltage / external supply 3:	For electronic limit switches and safety edge Nominal value 11.5V / max. 130mA	
Control inputs:	24 VDC / typ.15 mA, max. 26VDC / 20mA all inputs are to be connected potential-free or: < 5 V: inactive → logical 0 < 7 V: active → logical 1 min. signal duration for input control commands: > 100 ms galvanically isolated via optocouplers on the circuit board	
Inputs INK 1 and INK 2:	For two 24V active 90° offset pulse inputs, max. 20mA load. < 5V: inactive → logical 0, > 16V active → logical 1 Limit frequency: 1kHz	
RS485 A and B:	For electronic limit switches only. RS485 level, terminated with 100Ω.	
Safety chain / Emergency-Stop	all inputs are to be connected potential-free Contact load capacity ≥ 26 VDC / ≥ 120 mA When safety chain is interrupted, no movement of the drive is possible, not even in deadman mode Factory setting unjumpered	
Safety edge input:	For electrical safety edges with 1.2kΩ or 8.2kΩ termination resistor and for dynamic optical systems..	
Relay outputs	If inductive loads are switched (e.g., additional relays), these must be equipped with recovery diodes and appropriate noise suppression means (regenerative diodes, varistors, RC elements)	
Relay K3: Standard brake relay:	Changeover contact for enabling electromechanical brakes with interposed brake rectifier. 230VAC / 3A. When the Emergency-STOP is tripped, the brake output immediately becomes active.	
Relays K4 and K5 "Fault / Door position messages / Lamp functions	Changeover contact potential-free min. 10mA max. 230VAC / 3A	230V permitted only when connecting the same phase as the supply voltage. Contacts used once for power switching can no longer switch low currents.
Drive output:	For drives up to 0.75kW (Version –A) resp. 1,5KW (Version –C) at 230V Motor constant current at 100% duty factor and 40°C ambient temperature: 5A Motor constant current at 60% duty factor and 50°C ambient temperature: 5A Version –A: 5A.; Version –C: 10A Short-time overload capacity up to 15A resp. 22A for 0.5s Max. length of motor cable: 30m	
Brake resistance load (optional):	max. 1.5KW for max. 0.5 seconds. Repetition rate min. every 20 seconds.	
Temperature range	Operating:	-10...+50°C
	Storage:	-25...+70°C
Relative humidity	up to 80% non-condensing	
Vibration	low-vibration installation, e.g. on a concrete wall	
Enclosure rating	IP54	
Weight	approx. 5 kg	
Directives	Standards:	
EMC Directive: superceded by:	89/336/EWG 91/263/EWG 92/031/EWG 93/068/EWG	EN 50081-1 / 03.93: Noise emission, residential EN 50081-2 / 03.94: Noise emission, industrial EN 61000-6-2 / 2001: Noise immunity, industrial
Low-Voltage Directive: superceded by:	73/023/EWG 93/068/EWG	EN 60335-1 / 2003: Safety of Household and similar electrical appliances / Part 1
Type-tested according to:	EN12453 / 2001: EN12445 / 2001:	Industrial, commercial and garage doors and gates. Safety in use of power operated doors and gates. Requirements Industrial, commercial and garage doors and gates—Test procedures
Applied national technical specifications related to the above Directives	EN12978 / 2003:	Doors and gates - Protection devices – Requirements and testing procedures

7 Technical Data for TST FU3E



Abmessungen Gehäuse (B x H x T):	FU3E: 300x400x120mm (excl. wall bracket)	
Installation:	Vertical using wall bracket on housing bottom	
Supply voltage through L, N, PE:	400 V _{AC} ±10%, 50...60 Hz Permissible range: 200...480V ± 10% / 50...60Hz. Fuse: 16A K-type	
Controller internal power consumption:	max. 50W fully assembled and with motor not running	
External supply voltage 1 (230 V):	230 V _{AC} ±10%, 50...60 Hz (fused on the circuit board: F202 / 1 AT)	
Control voltage / external supply 2:	24 V _{DC} regulated (±5% at nominal voltage 230 V) max. 500 mA incl. optional plug-in modules. With circuit breaker, short-circuit protected by central switching regulator.	
Control voltage / external supply 3:	For electronic limit switches and safety edge Nominal value 11.5V / max. 130mA	
Control inputs:	24 VDC / typ. 15 mA, max. 26VDC / 20mA all inputs are to be connected potential-free or: < 5 V: inactive → logical 0 < 7 V: active → logical 1 min. signal duration for input control commands: > 100 ms galvanically isolated via optocouplers on the circuit board	
Inputs INK 1 and INK 2:	For two 24V active 90° offset pulse inputs, max. 20mA load. < 5V: inactive → logical 0, > 16V active → logical 1 Limit frequency: 1kHz	
RS485 A and B:	For electronic limit switches only. RS485 level, terminated with 100Ω.	
Safety chain / Emergency-Stop	all inputs are to be connected potential-free Contact load capacity ≥ 26 VDC / ≥ 120 mA When safety chain is interrupted, no movement of the drive is possible, not even in deadman mode Factory setting unjumpered	
Safety edge input:	For electrical safety edges with 1.2kΩ or 8.2kΩ termination resistor and for dynamic optical systems..	
Relay outputs	If inductive loads are switched (e.g., additional relays), these must be equipped with recovery diodes and appropriate noise suppression means (regenerative diodes, varistors, RC elements)	
Relay K3: Standard brake relay:	Changeover contact for enabling electromechanical brakes with interposed brake rectifier. 230VAC / 3A. When the E-STOP is tripped, the brake output immediately becomes active.	
Relays K4 and K5 "Fault / Door position messages / Lamp functions	Changeover contact potential-free min. 10mA max. 230VAC / 3A	230V permitted only when connecting the same phase as the supply voltage. Contacts used once for power switching can no longer switch low currents.
Drive output:	For drives up to 2.2kW (Version –A) resp. 4KW (Version –C) at 230V Motor constant current at 100% duty factor and 40°C ambient temperature: 5A Motor constant current at 60% duty factor and 50°C ambient temperature: 5A Version –A: 5A, Version –C: 10A Short-time overload capacity up to 15A resp. 22A for 0.5s Max. length of motor cable: 30m	
Brake resistance load (optional):	max. 1.5KW for max. 0.5 seconds. Repetition rate min. every 20 seconds.	
Temperature range	Operating:	-10...+50°C
	Storage:	-25...+70°C
Relative humidity	up to 80% non-condensing	
Vibration	low-vibration installation, e.g. on a concrete wall	
Enclosure rating	IP54	
Weight	approx. 5 kg	
Directives	Standards:	
EMC Directive: superceded by:	89/336/EWG 91/263/EWG 92/031/EWG 93/068/EWG	EN 50081-1 / 03.93: Noise emission, residential EN 50081-2 / 03.94: Noise emission, industrial EN 61000-6-2 / 2001: Noise immunity, industrial
Low-Voltage Directive: superceded by:	73/023/EWG 93/068/EWG	EN 60335-1 / 2003: Safety of Household and similar electrical appliances / Part 1
Type-tested according to:	EN12453 / 2001: EN12445 / 2001:	Industrial, commercial and garage doors and gates. Safety in use of power operated doors and gates. Requirements Industrial, commercial and garage doors and gates—Test procedures
Applied national technical specifications related to the above Directives	EN12978 / 2003:	Doors and gates - Protection devices – Requirements and testing procedures

8 General Operating Notes for Parameterizing







Opening parameterizing mode

1.	 Turn off door controller	Completely disconnect power supply (refer to safety notes)	7-segment display goes out after a delay of several seconds	
2.	 Turn Switch S200 ON	Service mode is activated, close control cabinet.		
3.	 Turn on door controller	Turn on controller	When service mode is active, the leading decimal point flashes Contents of the display depends on controller status	. * . . .
4.	 STOP (permanent)	Press Stop button and hold down	Waiting messages are displayed, e.g.:	E. 2 0 1
5.	 Up (permanent)	Also press Up button and hold down	after approx. 2 seconds wait: In parameterizing mode	P. 0 0 0


Parameter selection with parameterizing mode open

 UP or  DOWN	Select desired parameter CAUTION: Not all parameters are directly viewable or changeable, depending on password and set positioning type	The parameter value can be viewed or modified (see below) Display varies with the selection	P. . . .
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Parameter processing with selected parameter

1.		Controller in parameterizing mode	Displays the desired parameter name	P. 0 1 0
2.	 STOP (short)	Opening the parameter	The current parameter value is displayed:	5
3.	 Up	Up button for incrementing parameter value	If the currently valid parameter value is changed, the decimal points will flash	6*
or	 Down	Down button for decrementing parameter value		4*
4.	 STOP (long)	Save set parameter value	The parameter is considered to be saved when no decimal points flash	6
or	 STOP (short)	Cancel set parameter value	Cancel, the original parameter value is again displayed	4
5.	 STOP (short)	Switch to display of the parameter name	Displays the parameter name	P. 0 1 0

Exiting parameterizing mode

 STOP (long)	Immediately quits parameterizing mode, door operation is again active	The last stored value is automatically retained
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Resetting the controller

Press  +  +  simultaneously and hold down for approx. 3 seconds.

IMPORTANT

After approx. 1h service mode is automatically reset. To return to service mode, you must reset the controller or turn it OFF and then ON again.

Parameter

Parameter overview and factory setting
Detailed parameter manual

Standard parametrizing and modification list

For a better overview the standard adjustment of the parameters are listed in this table, sorted by parameter number

The installer of the system has the opportunity to write down the changes he did.

P.	Function	Chapter number in parameter summary	ex work	Changed at: from:	Changed at: from:
P.000	Door cycle counter	1	-	-	-
P.005	Maintenance counter	2	-	-	-
P.010	Auto close time 1	3	10		
P.011	Auto close time 2	3	10		
P.015	Minimum auto close time	3	10		
P.016	Min. green time for traffic lights	5	0		
P.018	Forced opening time	6	0		
P.020	Pre-warning time before open	4	0		
P.025	Pre-warning time before close	4	0		
P.100	Motor rated frequency	7	-1		
P.101	Motor rated current	7	-1		
P.102	Power factor cos φ	7	-1		
P.103	Motor rated voltage	7	-1		
P.110	Drive profile	7	0		
P.130	Motor rotary field	7	0		
P.140	Boost for OPEN	8	0		
P.141	Start frequency of the frequency ramp stop for OPEN	9	20		
P.142	IxR compensation for OPEN	10	0		
P.143	Voltage reduction for OPEN	11	100		
P.145	Boost for CLOSE	8	0		
P.146	Start frequency of the frequency ramp stop for CLOSE	9	20		
P.147	IxR compensation for CLOSE	10	0		
P.148	Voltage reduction for CLOSE	11	100		
P.160	PWM pulse frequency	12	0		
P.161	Max. Frequency for OPEN	13	120		
P.162	Max. Frequency for CLOSE	13	120		
P.165	Monitoring the mains input voltage	14	2		
P.17F	Converter Profile	58	0		
P.180	Activating the brake	15	10		
P.181	Activating the brake	15	60000		
P.185	Deactivating the brake	15	7		
P.186	Deactivating the brake	15	60000		
P.189	Brake for lifting anchor motors	15	0		
P.18F	Brake profile	15	0		
P.200	Selecting the positioning system	16	0		
P.201	Baud rate	16	1		
P.202	Transmission ratio	16	8		
P.205	Selecting the positioning system profile	16	-1		
P.210	New teaching of the end positions	17	0		
P.215	Requesting correction of the pre-limit switch and limit switch bands	17	0		
P.216	Selecting the ramp setting mode	17	2		
P.217	Tolerance band for automatic end switch correction	17	50		
P.221	Correction value End position door CLOSE	18	0		

P.	Function	Chapter number in parameter summary	ex work	Changed at: from:	Changed at: from:
P.222	Pre-limit switch position Door CLOSE	18	400		
P.223	Limit switch band Door CLOSE	18	60		
P.225	Second pre-limit switch position Door close	19	0		
P.226	Position of third pre-limit switch End position Door CLOSE	18	0		
P.229	Emergency limit switch band Door CLOSE	18	50		
P.230	End position Door OPEN	19	50		
P.231	Correction value End position Door OPEN	19	0		
P.232	Pre-limit switch position Door OPEN	19	500		
P.233	Limit switch band Door OPEN	19	70		
P.235	Second pre-limit switch position End position Door OPEN	18	0		
P.236	Position of third pre-limit switch Door OPEN	19	0		
P.239	Emergency limit switch band Door OPEN	19	50		
P.240	Intermediate stop position E1	20	25		
P.242	Middle pre-limit switch position	20	0		
P.244	Select intermediate stop position	20	0		
P.245	Intermediate stop position E2	35.8	25		
P.250	Incremental counting	21	0		
P.251	Mode for automatic synchronization after power-up	21	3		
P.252	Synchronization time	21	5		
P.253	Automatic first synchronisation	21	0		
P.25F	Synchronization type profile	22	0		
P.270	Select reference in Door close end position	23	1		
P.271	Start condition for automatic synchronization	23	1		
P.272	Cyclical synchronization	23	0		
P.275	Increment correction after synchronization is finished	23	0		
P.280	Select reference in End position Door OPEN	24	0		
P.281	Start condition for automatic synchronization	24	0		
P.282	Cyclical synchronization	24	0		
P.285	Increment correction after synchronization is finished	24	0		
P.310	Travel frequency for rapid OPEN	19	60		
P.311	Duration of start ramp "r1"	19	600		
P.312	Acceleration of start ramp "r1"	19	100		
P.315	Average open speed during acceleration phase	19	20		
P.316	Duration of start ramp "r3"	19	500		
P.317	Acceleration of start ramp "r3"	19	40		
P.320	Creep speed frequency for OPEN	19	20		
P.321	Duration of brake ramp "r2"	19	500		
P.322	Acceleration of brake ramp "r2"	19	80		
P.325	Specify frequency for second open speed during braking phase	19	40		
P.326	Duration of brake ramp "r4"	19	500		
P.327	Acceleration of start ramp "r4"	19	40		
P.331	Duration of stop ramp "r _{Si-A} " after safety edge is tripped	19	150		
P.332	Acceleration of stop ramp "r _{Si-A} " after triggering of the safety edge	19	400		

P.	Function	Chapter number in parameter summary	ex work	Changed at: from:	Changed at: from:
P.340	Duration of stop ramp "r _{STOP-A} " after stop is triggered	19	750		
P.341	Duration of stop ramp "ro"	19	500		
P.342	Acceleration of stop ramp "r _{STOP-A} " after stop is triggered	19	150		
P.343	Acceleration of stop ramp "ro"	19	40		
P.348	Acceleration of stop ramp after Emergency-STOP is triggered	19	300		
P.349	Duration of stop ramp after Emergency-STOP is triggered	19	200		
P.350	Travel frequency for rapid CLOSE	18	40		
P.351	Duration of start ramp "r5"	18	500		
P.352	Acceleration of start ramp "r5"	18	80		
P.355	Average close speed during acceleration phase	18	20		
P.356	Duration of start ramp "r7"	18	500		
P.357	Acceleration of start ramp "r7"	18	40		
P.360	Creep speed frequency for CLOSE	18	20		
P.361	Duration of brake ramp "r6"	18	500		
P.362	Acceleration of brake ramp "r6"	18	40		
P.365	Specify frequency for second close speed during braking phase	18	30		
P.366	Duration of brake ramp "r8"	18	500		
P.367	Acceleration of brake ramp "r8"	18	20		
P.371	Duration of stop ramp "r _n " after triggering of the safety edge	18	100		
P.372	Acceleration of stop ramp „r _n “ after triggering of the safety edge	18	400		
P.380	Duration of stop ramp "r _{STOP-Z} " after stop is triggered	18	800		
P.381	Duration of stop ramp "ru"	18	500		
P.382	Acceleration of stop ramp "r _{STOP-Z} " after stop is triggered	18	150		
P.383	Acceleration of stop ramp "ru"	18	40		
P.388	Acceleration of stop ramp after Emergency-STOP is triggered	18	200		
P.389	Duration of stop ramp after Emergency-STOP is triggered	18	200		
P.390	Move frequency Deadman OPEN move	25	20		
P.391	Duration of start ramp for deadman OPEN move	25	300		
P.392	Acceleration of start ramp for deadman OPEN move	25	66		
P.395	Move frequency Deadman CLOSE move	25	20		
P.396	Duration of start ramp for deadman CLOSE move	25	300		
P.397	Acceleration of start ramp for deadman CLOSE move	25	66		
P.398	Acceleration of stop ramp after deadman move	25	200		
P.399	Duration of stop ramp after deadman move	25	300		
P.39F	Speed profile	26	0		
P.403	Photoeye function	27	0		

P.	Function	Chapter number in parameter summary	ex work	Changed at: from:	Changed at: from:
P.404	Safety edge turn-off during synchronizing	32	0		
P.408	Acknowledgement	28	0		
P.410	Runtime monitoring OPEN	29	15,0		
P.415	Runtime monitoring CLOSE	29	15,0		
P.419	Runtime monitoring Deadman move	29	60,0		
P.420	Reversing time when safety edge is tripped during closing	32	200		
P.421	Reversing time when safety edge is tripped during opening	32.2	200		
P.426	Low temperature monitoring in °C	30	-10		
P.427	Low temperature monitoring in °F	30	14		
P.430	Lag error when using mechanical limit switches	31	2.0		
P.440	Safety edge pre-limit switch position	32	10		
P.441	Position for turning off the optosensor	27	20		
P.450	Lag error when using electronic limit switches	31	2000		
P.460	Safety edge type	32.1	-1		
P.461	Max. number of reversals	32.1	3		
P.462	Safety edge functions	32.1	0		
P.469	LCD message for safety edge tripping	32.1	0		
P.470	External safety edge mode	32.2	0		
P.471	Max. number of reversals	32.2	3		
P.472	Safety edge function for CLOSE move	32.2	0		
P.475	Safety edge function for OPEN move	32.2	0		
P.476	Response after tripping during OPEN move	32.2	0		
P.479	LCD message for safety edge tripping	32.2	0		
P.4A0	Deactivation Safety during OPENING	35.12	0		
P.4A5	Time for deactivating safety	35.12	0		
P.4A7	CLOSE command after deactivating safety input	35.12	0		
P.501	Function of Input 1	34	0110		
P.502	Function of Input 2	34	0701		
P.503	Function of Input 3	34	0202		
P.504	Function of Input 4	34	0501		
P.505	Function of Input 5	34	0402		
P.506	Function of Input 6	34	1104		
P.507	Function of Input 7	34	1106		
P.508	Function of Input 8	34	1108		
P.509	Function of Input 9	34	1110		
P.50A	Function of Input 10	34	1111		
P.510	Basic function Input 1	35	1		
P.511	Mode Input 1	35	0		
P.512	Contact type Input 1	35	0		
P.513	End position to move to Input 1	35	0		
P.514	Hold-open time Input 1	35	1		
P.515	Clear time Input 1	35	1		
P.516	Direction Input 1	35	1		
P.517	Switch on delay of input 1	35	0		
P.519	LCD-Text Input 1	35	1		
P.520	Basic function Input 2	35	7		
P.521	Mode Input 2	35	0		
P.522	Contact type Input 2	35	0		
P.523	End position to move to Input 2	35	0		

P.	Function	Chapter number in parameter summary	ex work	Changed at: from:	Changed at: from:
P.524	Hold-open time Input 2	35	0		
P.525	Clear time Input 2	35	1		
P.526	Direction Input 2	35	0		
P.527	Switch on delay of input 2	35	0		
P.529	LCD-Text Input 2	35	9		
P.530	Basic function Input 3	35	2		
P.531	Mode Input 3	35	2		
P.532	Contact type Input 3	35	0		
P.533	End position to move to Input 3	35	3		
P.534	Hold-open time Input 3	35	0		
P.535	Clear time Input 3	35	1		
P.536	Direction Input 3	35	3		
P.537	Switch on delay of input 3	35	0		
P.539	LCD-Text Input 3	35	4		
P.540	Basic function Input 4	35	5		
P.541	Mode Input 4	35	0		
P.542	Contact type Input 4	35	1		
P.543	End position to move to Input 4	35	1		
P.544	Hold-open time Input 4	35	1		
P.545	Clear time Input 4	35	1		
P.546	Direction Input 4	35	3		
P.547	Switch on delay of input 4	35	0		
P.549	LCD-Text Input 4	35	7		
P.550	Basic function Input 5	35	4		
P.551	Mode Input 5	35	0		
P.552	Contact type Input 5	35	0		
P.553	End position to move to Input 5	35	0		
P.554	Hold-open time Input 5	35	0		
P.555	Clear time Input 5	35	0		
P.556	Direction Input 5	35	0		
P.557	Switch on delay of input 5	35	0		
P.559	LCD-Text Input 5	35	6		
P.560	Basic function Input 6	35	11		
P.561	Mode Input 6	35	0		
P.562	Contact type Input 6	35	0		
P.563	End position to move to Input 6	35	0		
P.564	Hold-open time Input 6	35	0		
P.565	Clear time Input 6	35	0		
P.566	Direction Input 6	35	0		
P.567	Switch on delay of input 6	35	0		
P.569	LCD-Text Input 6	35	13		
P.570	Basic function Input 7	35	11		
P.571	Mode Input 7	35	4		
P.572	Contact type Input 7	35	0		
P.573	End position to move to Input 7	35	0		
P.574	Hold-open time Input 7	35	0		
P.575	Clear time Input 7	35	0		
P.576	Direction Input 7	35	0		
P.577	Switch on delay of input 7	35	0		
P.579	LCD-Text Input 7	35	13		
P.580	Basic function Input 8	35	11		
P.581	Mode Input 8	35	5		
P.582	Contact type Input 8	35	0		

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P.584	Hold-open time Input 8	35	0		
P.585	Clear time Input 8	35	0		
P.586	Direction Input 8	35	0		
P.587	Switch on delay of input 8	35	0		
P.589	LCD-Text Input 8	35	13		
P.590	Basic function Input 9	35	0		
P.591	Mode Input 9	35	0		
P.592	Contact type Input 9	35	1		
P.593	End position to move to Input 9	35	0		
P.594	Hold-open time Input 9	35	0		
P.595	Clear time Input 9	35	0		
P.596	Direction Input 9	35	0		
P.597	Switch on delay of input 9	35	0		
P.599	LCD-Text Input 9	35	0		
P.5A0	Basic function Input 10	35	0		
P.5A1	Mode Input 10	35	0		
P.5A2	Contact type Input 10	35	1		
P.5A3	End position to move to Input 10	35	0		
P.5A4	Hold-open time Input 10	35	0		
P.5A5	Clear time Input 10	35	0		
P.5A6	Direction Input 10	35	0		
P.5A7	Switch on delay of input 10	35	0		
P.5A9	LCD-Text Input 10	35	0		
P.A10	Basic function Input 21	35	1		
P.A11	Mode Input 21	35	0		
P.A12	Contact type Input 21	35	0		
P.A13	End position to move to Input21	35	1		
P.A14	Hold-open time Input 21	35	1		
P.A15	Clear time 21	35	1		
P.A16	Direction Input 21	35	1		
P.A17	Switch on delay of input 21	35	0		
P.A19	LCD-Text Input 21	35	1		
P.A20	Basic function Input 22	35	9		
P.A21	Mode Input 22	35	1		
P.A22	Contact type Input 22	35	0		
P.A23	End position to move to Input22	35	0		
P.A24	Hold-open time Input 22	35	0		
P.A25	Clear time 22	35	0		
P.A26	Direction Input 22	35	0		
P.A27	Switch on delay of input 22	35	0		
P.A29	LCD-Text Input 22	35	11		
P.A30	Basic function Input 23	35	5		
P.A31	Mode Input 23	35	1		
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P.A33	End position to move to Input23	35	1		
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P.A35	Clear time 23	35	1		
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P.A37	Switch on delay of input 23	35	0		
P.A39	LCD-Text Input 23	35	7		
P.A40	Basic function Input 24	35	1		
P.A41	Mode Input 24	35	3		

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P.A43	End position to move to Input24	35	0		
P.A44	Hold-open time Input 24	35	1		
P.A45	Clear time 24	35	1		
P.A46	Direction Input 24	35	3		
P.A47	Switch on delay of input 24	35	0		
P.A49	LCD-Text Input 24	35	1		
P.A50	Basic function Input 25	35	1		
P.A51	Mode Input 25	35	2		
P.A52	Contact type Input 25	35	0		
P.A53	End position to move to Input25	35	1		
P.A54	Hold-open time Input 25	35	1		
P.A55	Clear time 25	35	1		
P.A56	Direction Input 25	35	3		
P.A57	Switch on delay of input 25	35	0		
P.A59	LCD-Text Input 25	35	1		
P.A60	Basic function Input 26	35	10		
P.A61	Mode Input 26	35	4		
P.A62	Contact type Input 26	35	0		
P.A63	End position to move to Input26	35	0		
P.A64	Hold-open time Input 26	35	0		
P.A65	Clear time 26	35	0		
P.A66	Direction Input 26	35	0		
P.A67	Switch on delay of input 26	35	0		
P.A69	LCD-Text Input 26	35	12		
P.A70	Basic function Input 27	35	1		
P.A71	Mode Input 27	35	1		
P.A72	Contact type Input 27	35	0		
P.A73	End position to move to Input27	35	0		
P.A74	Hold-open time Input 27	35	1		
P.A75	Clear time 27	35	1		
P.A76	Direction Input 27	35	2		
P.A77	Switch on delay of input 27	35	0		
P.A79	LCD-Text Input 27	35	1		
P.A80	Basic function Input 28	35	8		
P.A81	Mode Input 28	35	1		
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P.A83	End position to move to Input28	35	0		
P.A84	Hold-open time Input 28	35	0		
P.A85	Clear time 28	35	0		
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P.A07	Function of Input 27	34	0106		
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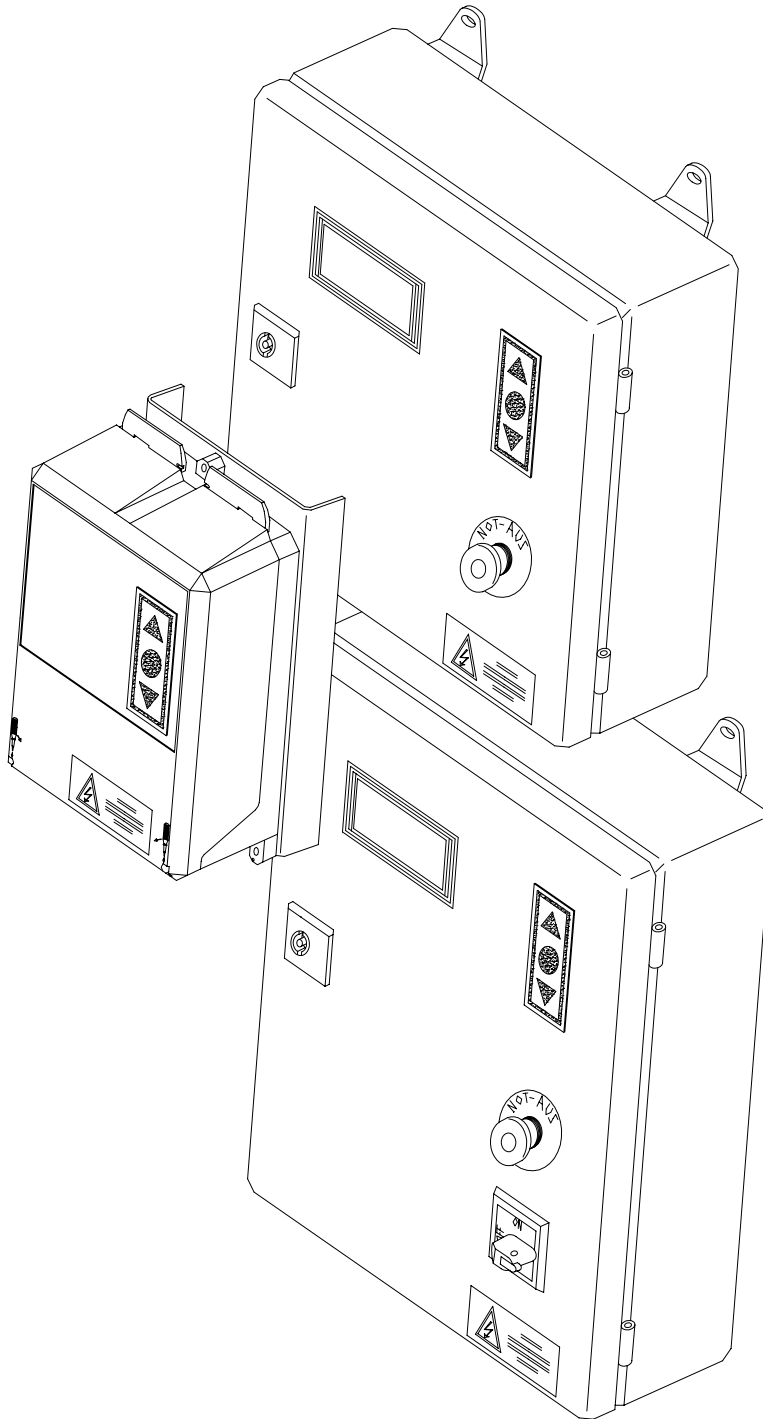
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P.612	LCD message for external Emergency-STOP 2	33	0		
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P.649	LCD-Message foil keypad STOP	37	0		
P.650	Function foil foil keypad CLOSE	38	2		
P.655	Clear time foil keypad CLOSE	38	1		
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P.664	Hold-open time Detector Channel 1	39.1	1		
P.665	Clear time Detector Channel 1	39.1	1		
P.666	Direction Detector Channel 1	39.1	1		
P.667	Locking Detector Channel 1	39.1	0		
P.668	Lock-out time Detector Channel 1	39.1	0		
P.669	LCD-Message Detector Channel 1	39.1	0		
P.66A	Turn-on delay Detector Channel 1	39.2	0		
P.66C	CLOSE-Command after leaving loop detector 1	39.2	0		
P.670	Detector function Channel 2	39.2	1		
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P.674	Hold-open time Detector Channel 2	39.2	1		
P.675	Clear time Detector Channel 2	39.2	1		
P.676	Direction Detector Channel 2	39.2	2		
P.677	Locking Detector Channel 2	39.2	0		
P.678	Lock-out time Detector Channel 2	39.2	0		
P.679	LCD- Message Detector Channel 2	39.2	0		
P.67A	Turn-on delay Detector Channel 2	39.2	0		
P.67C	CLOSE-Command after leaving loop detector 2	39.2	0		
P.681	Radio Channel 1	40.1	4		
P.683	End position to move to Radio Channel1	40.1	0		
P.684	Hold-open time Radio Channel1	40.1	1		
P.685	Clear time Radio Channel1	40.1	1		
P.686	Direction Radio Channel1	40.1	3		
P.689	LCD- Message Radio Channel1	40.1	0		
P.691	Radio Channel 2	40.2	4		
P.693	End position to move to Radio Channel2	40.2	0		
P.694	Hold-open time Radio Channel2	40.2	1		
P.695	Clear time Radio Channel2	40.2	1		
P.696	Direction Radio Channel2	40.2	3		
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P.706	Function of Output 6	43	9		
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P.708	Function of Output 8	43	6		

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P.709	Function of Output 9	43	8		
P.740	Switching condition Relay 4	44	0		
P.741	Switching behavior Relay 4	44	1000		
P.742	Turn-on delay Relay 4	44	0		
P.743	Turn-off delay Relay 4	44	0		
P.744	Switch on logic Relay 4	44	0		
P.745	Position forwarding Relay 4	44	0		
P.746	Ampel Mode Select traffic light type Relay 4	44	0		
P.747	Behavior in Door close end position Relay 4	44	0		
P.748	Behavior during opening Relay 4	44	0		
P.749	Behavior in Door open end position Relay 4	44	0		
P.74A	Behavior during the clearing phase Relay 4	44	0		
P.74B	Behavior during closing Relay 4	44	0		
P.74C	Behavior at stop Relay 4	44	0		
P.74D	Behavior when there is no automatic function Relay 4	44	0		
P.74F	Command forwarding Relay 4	44	0		
P.750	Switching condition Relay 5	44	2		
P.751	Switching behavior Relay 5	44	1000		
P.752	Turn-on delay Relay 5	44	0		
P.753	Turn-off delay Relay 5	44	0		
P.754	Switch on logic Relay 5	44	0		
P.755	Position forwarding Relay 5	44	0		
P.756	Ampel Mode Select traffic light type Relay 5	44	0		
P.757	Behavior in Door close end position Relay 5	44	0		
P.758	Behavior during opening Relay 5	44	0		
P.759	Behavior in Door open end position Relay 5	44	0		
P.75A	Behavior during the clearing phase Relay 5	44	0		
P.75B	Behavior during closing Relay 5	44	0		
P.75C	Behavior at stop Relay 5	44	0		
P.75D	Behavior when there is no automatic function Relay 5	44	0		
P.75F	Command forwarding Relay 5	44	0		
P.760	Switching condition Relay 6	44	12		
P.761	Switching behavior Relay 6	44	1000		
P.766	Turn-on delay Relay 6	44	0		
P.763	Turn-off delay Relay 6	44	0		
P.764	Switch on logic Relay 6	44	0		
P.765	Position forwarding Relay 6	44	0		
P.766	Ampel Mode Select traffic light type Relay 6	44	1		
P.767	Behavior in Door close end position Relay 6	44	1		
P.766	Behavior during opening Relay 6	44	1		
P.769	Behavior in Door open end position Relay 6	44	0		
P.76A	Behavior during the clearing phase Relay 6	44	3		
P.76B	Behavior during closing Relay 6	44	1		
P.76C	Behavior at stop Relay 6	44	1		
P.76D	Behavior when there is no automatic function Relay 6	44	1		
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P.771	Switching behavior Relay 7	44	1000		
P.772	Turn-on delay Relay 7	44	0		
P.773	Turn-off delay Relay 7	44	0		
P.774	Switch on logic Relay 7	44	0		

P.	Function	Chapter number in parameter summary	ex work	Changed at: from:	Changed at: from:
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P.776	Ampel Mode Select traffic light type Relay 7	44	0		
P.777	Behavior in Door close end position Relay 7	44	0		
P.778	Behavior during opening Relay 7	44	0		
P.779	Behavior in Door open end position Relay 7	44	1		
P.77A	Behavior during the clearing phase Relay 7	44	0		
P.77B	Behavior during closing Relay 7	44	0		
P.77C	Behavior at stop Relay 7	44	0		
P.77D	Behavior when there is no automatic function Relay 7	44	0		
P.77F	Command forwarding Relay 7	44	0		
P.780	Switching condition Relay 8	44	12		
P.781	Switching behavior Relay 8	44	1000		
P.782	Turn-on delay Relay 8	44	0		
P.783	Turn-off delay Relay 8	44	0		
P.784	Switch on logic Relay 8	44	0		
P.785	Position forwarding Relay 8	44	0		
P.786	Ampel Mode Select traffic light type Relay 8	44	3		
P.787	Behavior in Door close end position Relay 8	44	1		
P.788	Behavior during opening Relay 8	44	1		
P.789	Behavior in Door open end position Relay 8	44	0		
P.78A	Behavior during the clearing phase Relay 8	44	3		
P.78B	Behavior during closing Relay 8	44	1		
P.78C	Behavior at stop Relay 8	44	1		
P.78D	Behavior when there is no automatic function Relay 8	44	1		
P.78F	Command forwarding Relay 8	44	0		
P.790	Switching condition Relay 9	44	12		
P.791	Switching behavior Relay 9	44	1000		
P.792	Turn-on delay Relay 9	44	0		
P.793	Turn-off delay Relay 9	44	0		
P.794	Switch on logic Relay 9	44	0		
P.795	Position forwarding Relay 9	44	0		
P.796	Ampel Mode Select traffic light type Relay 9	44	2		
P.797	Behavior in Door close end position Relay 9	44	0		
P.798	Behavior during opening Relay 9	44	0		
P.799	Behavior in Door open end position Relay 9	44	1		
P.79A	Behavior during the clearing phase Relay 9	44	0		
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P.940	Input voltage	50	-		
P.950	Current position	51	-		
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P.961	Channel 1 value Absolute encoder	51	-		
P.962	Channel 2 value Absolute encoder	51	-		
P.963	SSI position	51	-		
P.970	Response to due maintenance	2	0		
P.971	Number of door cycles after resetting	2	1000000		
P.972	Warning before expiration of the maintenance counter	2	1000		
P.973	Resetting the maintenance counter	2	0		
P.980	Operating mode	53	-		
P.981	Door cycle counter mode	1	2		
P.985	Text language	54	1		
P.990	Factory setting	56	0		
P.991	Door Profile	57	0		
P.992	Speed-Distance Profile	26	0		
P.998	Reset the Door cycle counter	1	0		
P.999	Password	55	0000		

TST FUS / FUxE



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The TST FUS and TST FUxE door controllers offer a variety of functions which can be set by adjusting parameters.

The parameters are described below, grouped into functions.

IMPORTANT

Not all parameters are always available and visible. This depends on parameter setting and the used software version.

Changes of the software and of the parameter function can be done without previous announcement.

1 Door cycle counter

P.	[Unit] Range	Function	Description / Note
P.000	[Cycles]	Door cycle counter	The content of this parameter indicates the number of previously counted door cycles.
P.981	0 ... 3	Door cycle counter mode	Depending on the setting, the cycle counter counts using various conditions. 0: Each time the end position door CLOSED is reached, the count is incremented by 1. 1: Each time one of the upper end positions (end position door OPEN or intermediate stop / partial open), the count is incremented by 1. 2: With each full door cycle the count is incremented by 1, i.e., the door must from the end position Door CLOSED reach the end position Door OPEN and then again move to the end position Door CLOSED. 3: With every drive command the count is incremented by 1, independent from the end positions.
P.998	0 ... 1	Reset the Door cycle counter	After setting this parameter to 1 the current door cycle counter is cleared.

2 Maintenance counter

P.	[Unit] Range	Function	Description / Note
P.005	[Cycles]	Maintenance counter	The content of this parameter indicates the number of cycles remaining until maintenance is due. <i>☞ The setting -1 means that the maintenance counter has not yet been activated.</i>
P.970	0 ... 3	Response to due maintenance	There are various ways to respond to a due maintenance. Messages or errors will be output: 0: Service counter is deactivated 1: Warning I.080 is output 2: Error F.080 is output and the CLOSE move of the door is only possible in deadman mode. 3: Error F.080 is output and CLOSE and OPEN move is only possible in deadman mode.

P.	[Unit] Range	Function	Description / Note
P.971	[1000 cycles] 1 ... 9999	Number of door cycles after resetting	This parameter specifies the number of door cycles that are possible after resetting the maintenance counter until the next warning is issued.
P.972	[Cycles] 0 ... 9999	Warning before expiration of the maintenance counter	This parameter specifies the number of door cycles before the maintenance counter expires during which the warning I.080 is issued. <i>☞ Function only active if P.970 = 2 or 3.</i>
P.973	0 ... 1	Resetting the maintenance counter	By setting this parameter to 1 the maintenance counter is reset.

3 Auto close times / Forced closing

P.	[Unit] Range	Function	Description / Note
P.010	[s] 0 ... 200	Auto close time 1	The door is held in the end position Door OPEN for the set time. The door is then automatically closed.
P.011	[s] 0 ... 200	Auto close time 2	The door is held in the end position Intermediate Stop / Partial open for the set time. The door is then automatically closed.
P.015	[s] 0 ... 200	Minimum auto close time	The door is held open for the set time rather than for the hold open time 1 or 2. The door is then automatically closed.

☞ Which Auto close time runs depends on the arrived end position and on the OPEN command used. For each OPEN command you can use Parameter P.5x4 to set separately whether and which Auto close time runs (X = Number of used input).

4 Pre-warning time before door movement / Clearance time

P.	[Unit] Range	Function	Description / Note
P.020	[10ms] 0 ... 1000	Pre-warning time before open	The opening move is delayed following receipt of an OPEN command by the time specified in this parameter.
P.025	[s] 0 ... 20	Pre-warning time before close	The closing move is delayed following receipt of a CLOSE command or after expiration of the auto close time (forced close) by the time specified in this parameter.
P.026	0 ... 1	Pre-warning time before close	By activating this parameter the pre-warning time is always running, undependent from the input. The used time is set by P.025. 0: Pre-warning time set by input 1: Pre-warning time always active

5 min. green time for traffic lights

P.	[Unit] Range	Function	Description / Note
P.016	[s] 0 ... 60	Min. green time for traffic lights	The pass-through OK for vehicles can be controlled by traffic lights. If OPEN commands are given from both directions at the same time, only one direction becomes green. The door remains open and after a time the first direction becomes red and the other direction green. To ensure perfect operation, it is necessary to specify the minimum required green time for a direction. The time is entered in this parameter.

6 Forced opening of the door

P.	[Unit] Range	Function	Description / Note
P.018	[min] 0 ... 255	Forced opening time	If the door remains closed for a longer period, it can be forced open after the time entered here, without needing an OPEN command. This function is typically used in freezer areas in order to prevent freezing of the door to the ground.

7 Motor settings

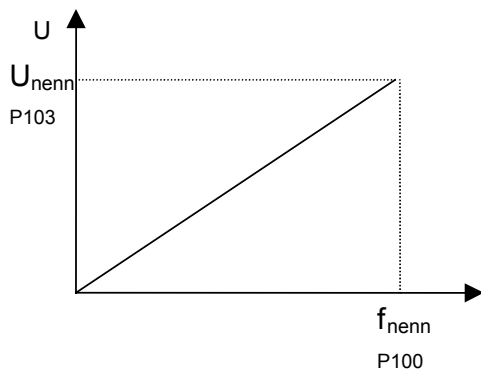
The motor ratings are used to teach the door controller what it needs to know about the motor used.

☞ *The setting -1 means that this parameter is automatically queried during start-up of the door controller.*

P.	[Unit] Range	Function	Description / Note
P.100	[Hz] 30 ... 200	Motor rated frequency	The motor rated frequency indicated on the nameplate is entered here.
P.101	[A] 0 ... 9,9	Motor rated current	The motor rated current indicated on the nameplate is entered here. IMPORTANT Note Y/Δ switching of the motor ! (see Fig. 2: Typical star / delta switching)
P.102	[%] 40 ... 100	Power factor cos φ	The power factor indicated on the nameplate is entered here. IMPORTANT The entry is made without the leading "0". 63 thus means cos φ 0.63.

P.	[Unit] Range	Function	Description / Note
P.103	[V] 100 ... 500	Motor rated voltage	The motor rated voltage indicated on the nameplate is entered here. IMPORTANT Note Y/Δ switching of the motor ! (see Fig. 2: Typical Star / Delta wiring) IMPORTANT Switching the motor windings to 400V operation makes no sense with the TST FUS and TST FUE door controllers, since they can output a maximum of 230V !
P.110		Drive profile	This profile is used to set the motor rated data for a known motor. <i>☞ The exact settings which this profile involves can be found in Appendix: Drive Profile.</i>
P.130	0 ... 1	Motor rotary field	This parameter specifies the rotary field of the motor for OPEN move. 0: Right rotating 1: Left rotating

7.1 Voltage / Frequency curve



Input of the voltage frequency curve on the basis of the motor nameplate

Fig. 1: Voltage / Frequency curve

7.2 Star / Delta wiring

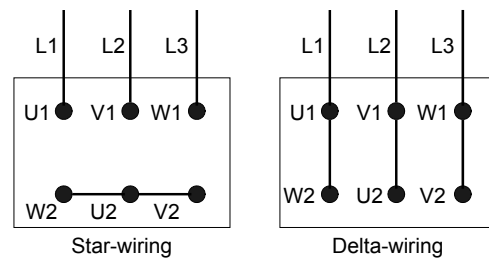


Fig. 2: Typical Star / Delta wiring

8 Boost

Boost is used to increase the power of drives in the lower speed range.

Either a too little or a too high boost setting can result in improper door movement. If too much boost is already set, this will result in an overcurrent error (F.510/F.410). In this case you must reduce the boost. If the boost is low or 0 and the motor still has insufficient force to move the door, you must increase the boost.

Due to the large number of possible door/gate types, the correct boost setting should be determined experimentally. The diagnostic function for motor current (see Parameter P.910) can be helpful here. By using the current indicator you can easily determine whether the changed setting has achieved the desired results.

☞ The boost should always be set as low as possible, but high enough to do the job.

P.	[Unit] Range	Function	Description / Note
P.140	[%] 0 ... 30	Boost for OPEN	The boost increases the output voltage and thus the power in the lower speed range until the cutoff frequency (P.100) is reached.

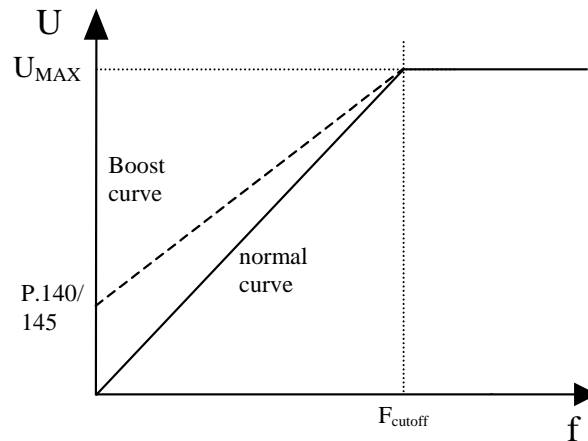


Fig. 3: Boost characteristic curve

The voltage is increased by the value in percent of the motor rated voltage (P.103) entered in the parameter.

P.145	[%] 0 ... 30	Boost for CLOSE	see Parameter P.140
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9 Frequency ramp stop function

The frequency ramp stop function makes it possible to move heavy doors.

The function monitors the current during door acceleration. The motor current is allowed to be max. double the rated current (P.101).

If the current is too high, the converter stops the door acceleration and continues to move at an even speed, so that the current drops, since energy for accelerating the door no longer needs to be provided.

If the current drops below the limit, the door continues accelerating.

P.	[Unit] Range	Function	Description / Note
P.141	[Hz] 10 ... 200	Start frequency of the frequency ramp stop for OPEN	Here the starting point for the frequency ramp stop function is set. Below the set frequency the function is deactivated. The current may then rise above the limit of 2x the motor rated current (P.101). This is possible for a short time, but for longer travel will result in an overcurrent error (F.410 or F.510).

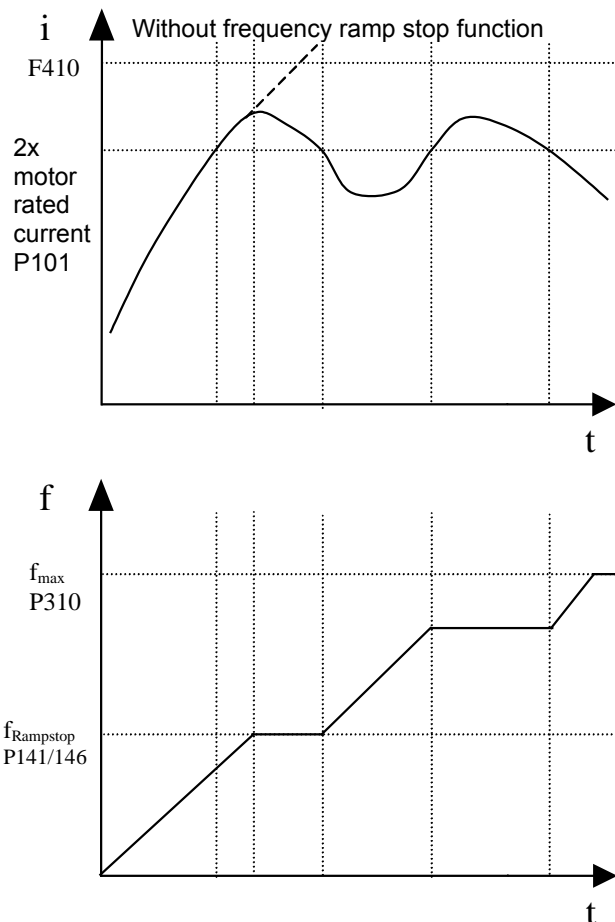


Fig. 4: Frequency ramp stop characteristic curve
 ☞ A setting of 200 deactivates the function

P.146	[Hz] 10 ... 200	Start frequency of the frequency ramp stop for CLOSE	see Parameter P.141
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10 I x R compensation

I x R compensation increases the voltage and with it the motor power only in the lower speed range.

P.	[Unit] Range	Function	Description / Note
P.142	[Hz] 0 ... 15	IxR compensation for OPEN	In this parameter you specify the frequency up to which I x R compensation is in effect. The voltage is held to the same value below this frequency. The voltage value is derived from the voltage which is normally output for the frequency set here.

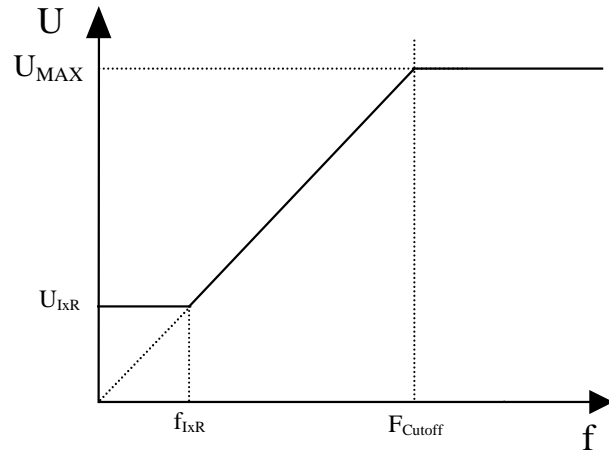


Fig. 5: IxR compensation characteristic curve

P.147	[Hz] 0 ... 15	IxR compensation for CLOSE	see Parameter P.142
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11 Voltage reduction

Reducing the motor voltage which is output prevents over-excitation of the motor. This reduces power dissipation and noise.

P.	[Unit] Range	Function	Description / Note
P.143	[%] 35 ... 100	Voltage reduction for OPEN	The indicated value specifies what percent of the output voltage is output.

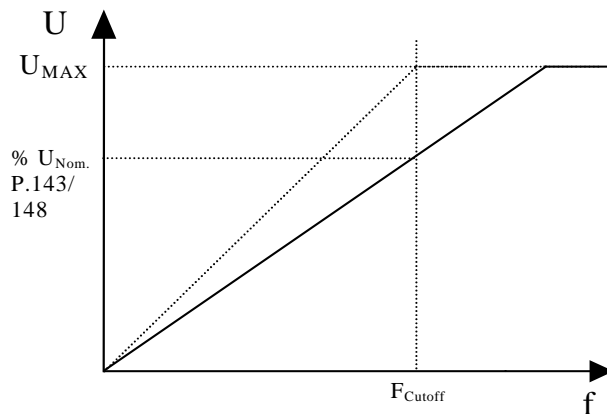


Fig. 6: Voltage reduction characteristic curve

P.148	[%] 35 ... 100	Voltage reduction for CLOSE	see Parameter P.143
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12 Switching frequency of the output voltage

P.	[Unit] Range	Function	Description / Note
P.160	0 ... 4	PWM pulse frequency	<p>The switching frequency of the output voltage can be adjusted with this parameter. The rule of thumb is: The faster the clock frequency the more heat is generated.</p> <p>0: The clock frequency is temperature-controlled. 1: 4 kHz 2: 8 kHz 3: 12 kHz 4: 16 kHz</p>

13 Maximum permissible travel frequency

P.	[Unit] Range	Function	Description / Note
P.161	[Hz] 15 ... 200	Max. Frequency for OPEN	<p>The maximum permissible travel speed is limited by the value entered in this parameter.</p> <p><i>☞ This parameter can only be changed by someone having a password for the plant level.</i></p>
P.162	[Hz]	Max. Frequency for	see Parameter P.161

P.	[Unit] Range	Function	Description / Note
	15 ... 200	CLOSE	

14 Monitoring the mains voltage

P.	[Unit] Range	Function	Description / Note
P.165	0 ... 3	Monitoring the mains input voltage	<p>The mains input voltage is monitored by the door controller.</p> <p>⚠ ATTENTION If the mains input voltage is too high, this may damage the controller.</p> <p>There are various ways to respond to excessive voltage.</p> <p>0: Function deactivated 1: Warning F.425 is issued for overvoltage. 2: Fault F.525 is issued for overvoltage and the door can only be operated in deadman mode. 3: Fault F.525 is issued for overvoltage and it is no operation possible.</p>

15 Brake settings

P.	[Unit] Range	Function	Description / Note
P.180	[Hz] 0 ... 20	Activating the brake	The brake is activated when the travel frequency specified in the parameter falls short while the door is slowing down.
P.181	[10ms] 0 ... 6000	Activating the brake	<p>The brake is activated after reaching the limit switch bands after the time set in the parameter.</p> <p><i>☞ Parameters P.180 and P.181 work in parallel. The function whose condition is first met is executed.</i></p>
P.185	[Hz] 0 ... 20	Deactivating the brake	The brake is deactivated when the travel frequency specified in the parameter is exceeded while the door is accelerating.
P.186	[10ms] 0 ... 6000	Deactivating the brake	<p>The brake is deactivated after the time specified in the parameter during acceleration of the door.</p> <p><i>☞ Parameters P.185 and P.186 work in parallel. The function whose condition is first met is executed.</i></p>

P.	[Unit] Range	Function	Description / Note
P.187	0 ... 1	Contact type of brake relay	The contact type of the relay can be chosen by the help of this parameter. This is important if the relay does not have a change over contact. 0: N.O. contact 1: N.C. contact
P.18F		Brake profile	This profile is used to set the behavior of the brake. <i>☞ The exact settings which this profile involves can be found in Appendix: Brake Profile.</i>
P.189	[%] 0 ... 50	Brake for lifting anchor motors	Lifting anchor motors require a voltage in order to lift the rotor. Only then is the motor able to turn. Since frequency converters increase the voltage at the beginning of travel only slowly, this does not result in releasing of the brake or raising of the rotor. Therefore this parameter is used to set a voltage increase similar to IxR compensation but depends on the parameters P180 and P 185. The value of this parameter is expressed in percent of motor rated voltage. The amount of voltage required varies with the motor model, so that the best setting is determined experimentally. In general this parameter should be set as low as possible.

16 Selecting the positioning system

P.	[Unit] Range	Function	Description / Note
P.200	0 ... 8	Selecting the positioning system	With this parameter you teach the door controller which limit switch system is being used. Select from the following systems: 0: Mechanical limit switches 1: Absolute encoder TST PB-A 2: Incremental encoders 3: Absolute encoder DES-A using 19200 baud communication speed 4: Absolute encoder DES-A using 9600 baud communication speed 5: SSI encoder (only with UL-Version) 6: Reserved 7: Absolute encoder DES-B 8: Absolute encoder TST PD

P.	[Unit] Range	Function	Description / Note
P.201	0 ... 5	Baud rate	<p>With this parameter the communication speed (baud rate) of the connected encoder is set:</p> <p>With absolute encoder DES-B: 0: 9600 baud 1: 19200 baud</p> <p>With SSI encoder (only with UL-Version): 0: 100 kbps 1: 150 kbps 2: 200 kbps 3: 250 kbps 4: 300 kbps 5: 400 kbps</p>
P.202	0 ... 20	Transmission ratio	<p>With this parameter the transmission ratio of the encoder to the motor is set. As faster the drive shaft is as bigger has the parameter value to be.</p>
P.205	0 ... 8	Selecting the positioning system profile	<p>This profile sets the limit switch system.</p> <p>IMPORTANT In addition, the standard functions of the controller inputs are matched to the limit switch type in use.</p> <p>Select from the following settings:</p> <ul style="list-style-type: none"> 0: Mechanical limit switches 1. The absolute limit switches are processed as normally closed and the pre-limit switches as normally open. 1: Mechanical limit switches 2. All limit switches are processed as normally closed. 2: Incremental encoders with reference switch in lower end position. 3: Absolute encoder DES-A 4: Absolute encoder TST PB-A 5: SSI encoder (only with UL-Version) 6: Reserved 7: Absolute encoder DES-B 8: Absolute Encoder TST PD <p><i>☞ The exact settings which this profile involves can be found in Appendix: Position Sensor Profile.</i></p>

17 End position correction

P.	[Unit] Range	Function	Description / Note
P.210	0 ... 5	New teaching of the end positions	<p>This parameter is used to start a new teaching of the end positions. The corresponding end positions are moved to in deadman mode after activating the procedure and saved by holding down the Stop key. Select from the following settings:</p> <ul style="list-style-type: none"> 0: Cancel, no end positions are taught. 1: Limit switch Lower, limit switch Upper and if appropriate limit switch Intermediate Stop are taught. 2: Limit switch Upper and if appropriate limit switch Intermediate Stop are taught. 3: Limit switch Lower and limit switch Upper are taught. 4: Limit switch Intermediate Stop is taught. 5: All limit switches are taught. <p><i>☞ Teaching the Intermediate Stop limit switch depends on the setting in Parameter P.244 (see section Partial Opening / Intermediate Stop).</i></p>
P.215	0 ... 1	Requesting correction of the pre-limit switch and limit switch bands	<p>If automatic calculation of the pre-limit switch and limit switch bands (P.216) is activated, this parameter can be used to start a new teaching of the pre-limit switch and limit switch bands.</p> <ul style="list-style-type: none"> 0: Make no correction. 1: Start correction of the pre-limit switch and limit switch bands. <p><i>☞ Correction of the pre-limit switch and limit switch bands is only possible if P.216 = 2.</i></p>

P.	[Unit] Range	Function	Description / Note
P.216	0 ... 2	Selecting the ramp setting mode	<p>There are two basic ways to set the steepness of a ramp. The ramp time can be set in milliseconds, or the ramp acceleration can be set in Hz per second. In addition, the limit switch bands are automatically set when Automatic is activated.</p> <p>0: Ramp times have to be set manually (as in earlier door controllers from FEIG ELECTRONIC GmbH). 1: Ramp acceleration has to be set manually. 2: Ramp acceleration and limit switches are automatically set.</p> <p>IMPORTANT In case of changing the speed of the door or one of the ramp accelerations the automatically setting of the pre limit switches and limit switch bands will start again. The values set in the corresponding parameters are then overwritten.</p> <p><i>☞ Automatic teaching of the limit switches and ramp times only functions if accelerations for ramps are set. You cannot use ramp times as they were defined in earlier versions of the controllers.</i></p>
P.217	[%] 0 ... 250	Tolerance band of automatic end switch correction	<p>With this parameter an offset is set to the end position find out by the automatic end switch correction. Because of that the door is not able to overrun the end switch position of the door by the first move. The end switch position will move by the value (in percent) adjusted with this parameter.</p>

18 CLOSE

IMPORTANT

If automatic setting of the pre-limit switches and limit switch bands is used (P.216 = 2), Parameters P.222 and P.223 are automatically changed.

The parameters are even changed if the speed of the door or the steepness of a ramp is changed, since this results in a new start of automatic limit switch correction.

If you want to set these ramps manually, P.216 must be < 2.

18.1 End position door close modify

P.	[Unit] Range	Function	Description / Note
P.221	[Increments] ± 125	Correction value End position door CLOSE	<p>This parameter is used to shift the entire lower end position, i.e., the end position is shifted together with the associated pre-limit switches.</p> <p>A change in the parameter value in the positive direction causes the end position to shift up.</p> <p>A change in the parameter value in the negative direction causes the end position to shift down.</p>

18.2 Start of Door Closing

P.	[Unit] Range	Function	Description / Note
P.350	[Hz] 6 ... 200	Travel frequency for rapid CLOSE	<p>Here you specify the maximum close speed in Hz. Start ramp "r5" is used to accelerate to this speed. The steepness of the ramp is set with Parameter P.351 or P.352.</p>

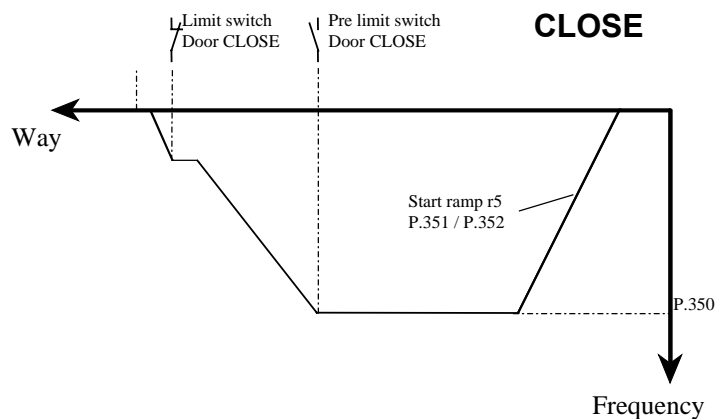


Fig. 7: Start ramp, CLOSE

P.	[Unit] Range	Function	Description / Note
P.351	[10ms] 20 ... 500	Duration of start ramp "r5"	Time of start ramp "r5" in milliseconds. The door is accelerated within the specified time from 0Hz to the maximum close speed (P.350). Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i>
P.352	[Hz/s] 20 ... 300	Acceleration of start ramp "r5"	Acceleration during start ramp "r5" in Hertz per second. Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i>

18.3 Slow down after Pre-limit switch during Door CLOSE

P.	[Unit] Range	Function	Description / Note
P.222	[Increments] 0 ... 2100	Pre-limit switch position Door CLOSE	The parameter value specifies the distance to the absolute limit switch Door CLOSE in increments. The pre-limit switch is used to initiate the brake ramp "r6". The steepness of the ramp is set with Parameter P.361 or P.362.

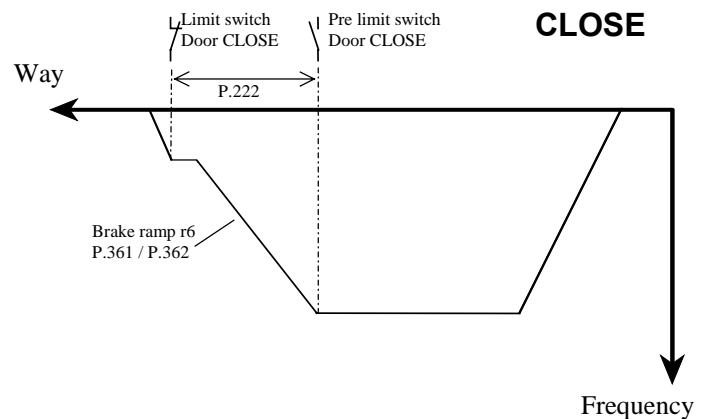


Fig. 8: Pre-limit switch position Door CLOSE

P.	[Unit] Range	Function	Description / Note
P.360	[Hz] 6 ... 200	Creep speed frequency for CLOSE	Brake ramp "r6" is used to slow to creep speed frequency, and is initiated after activation of the pre-limit switch Door CLOSE. The steepness of the brake ramp "r6" is set with Parameter P.361 or P.362.

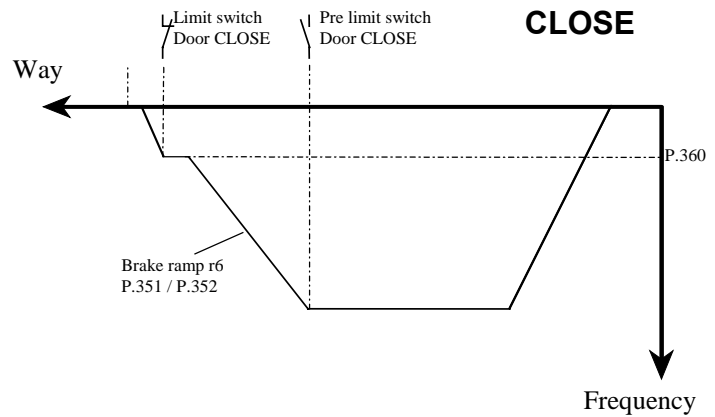


Fig. 9: Creep move for CLOSE

P.361	[10ms] 15 ... 500	Duration of brake ramp "r6"	This parameter specifies the time of brake ramp "r6" in milliseconds. The door is decelerated from maximum close frequency (P.350) to creep frequency (P.360) within this time. Smaller values result in greater deceleration of the door. Larger values result in diminished deceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i>
P.362	[Hz/s] 5 ... 300	Acceleration of brake ramp "r6"	This parameter specifies the acceleration of the door during brake ramp "r6" in Hertz per second. Smaller values result in diminished deceleration of the door. Larger values result in greater deceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i>

18.4 Stop in end position Door CLOSE

P.	[Unit] Range	Function	Description / Note
P.223	[Increments] 0 ... 200	Limit switch band Door CLOSE	The limit switch band specifies the range by recognizing the position as end position for door CLOSE. This is comparable with the range in which a mechanical cam switch is tripped. When the limit switch band is reached, the stop ramp "ru" is run. The steepness of the ramp is set with Parameter P.381 or P.383.

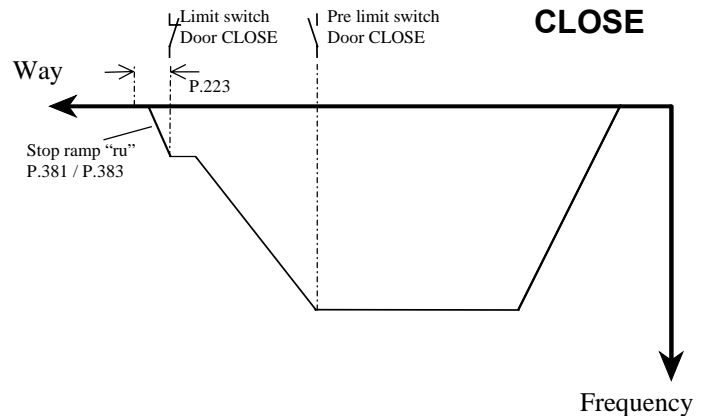


Fig. 10: Limit switch band Door CLOSE

P.381	[10ms] 15 ... 250	Duration of stop ramp "ru"	Time of stop ramp „ru“ in milliseconds. The door is decelerated in the specified time from creep speed to 0 Hz after reaching the limit switch.
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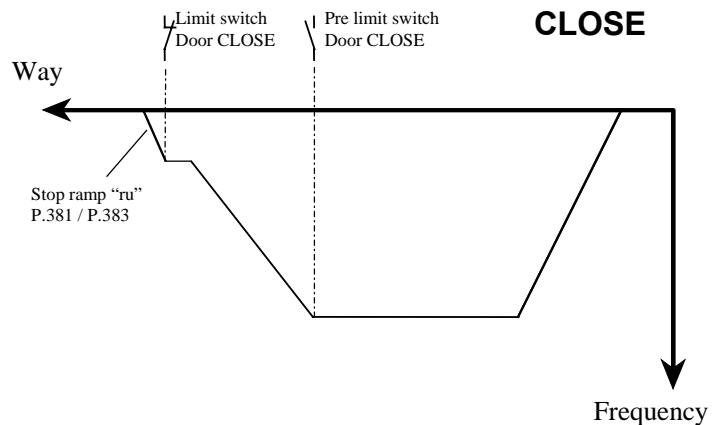


Fig. 11: Stop ramp for CLOSE move

Smaller values result in greater acceleration of the door.
Larger values result in diminished acceleration of the door.

☞ This parameter is only visible and settable if Parameter P.216 is set to 0.

P.	[Unit] Range	Function	Description / Note
P.383	[Hz/s] 5 ... 300	Acceleration of stop ramp "ru"	<p>Acceleration during stop ramp "ru" in Hertz per second. The door is decelerated from creep speed to 0 Hz after reaching the limit switch.</p> <p>Smaller values result in diminished acceleration of the door.</p> <p>Larger values result in greater acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i></p>

18.5 Emergency limit switch band Door CLOSE

P.	[Unit] Range	Function	Description / Note
P.229	[Increments] 0 ... 100	Emergency limit switch band Door CLOSE	<p>The emergency limit switch band lies behind the limit switch band (P.223). If the limit switch band is passed and the emergency limit switch band reached, the frequency converter runs a fast stop ramp. At the same time the information message I.150 (End position Door CLOSE reached at excessively high speed) is issued.</p> <p><i>☞ This function is comparable with a mechanical cam-operated limit switch, which generates an E-STOP when the end position is crossed.</i></p>

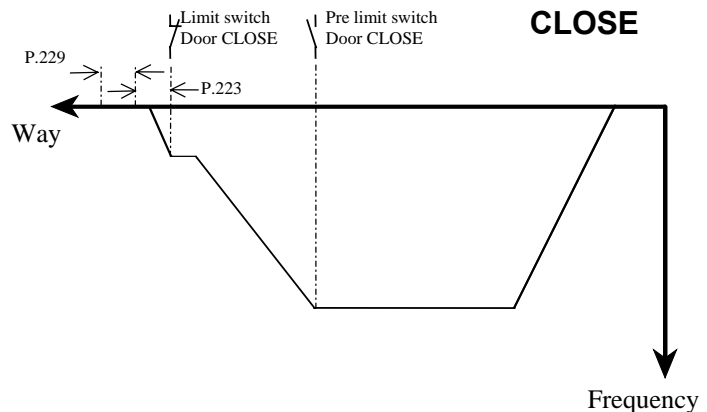


Fig. 12: Emergency limit switch band Door CLOSE

18.6 Second Door CLOSE Speed

P.	[Unit] Range	Function	Description / Note
P.226	[Increments] 0 ... 9999	Position of third pre-limit switch End position Door CLOSE	With this pre-limit switch an additional brake ramp for braking the door is activated. The entered value specifies the distance of the pre-limit switch to the end position Door CLOSE in increments. The pre-limit switch 3 initiates brake ramp "r8". The steepness of this ramp is set with Parameter P.366 or P.367. After reaching the pre-limit switch Door CLOSE, the ramp "r6" is run.

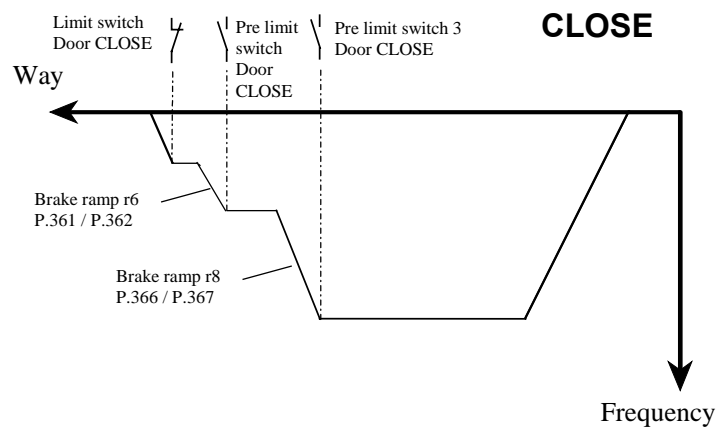


Fig. 13: Pre-limit switch 3 Door CLOSE

P.365	[Hz] 6 ... 200	Specify frequency for second close speed during braking phase	If Parameter P.226 was used to activate the additional acceleration ramp "r8", this parameter is used to specify the second close speed. After reaching pre-limit switch 3, ramp "r8" is used to decelerate to this speed. The steepness of the ramp is set with Parameter P.366 or P.367.
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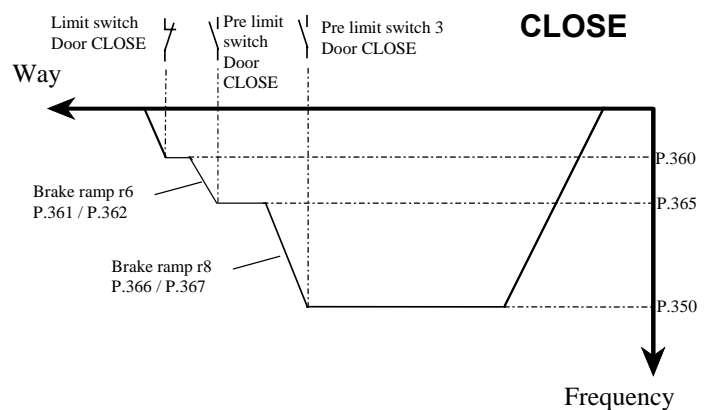


Fig. 14: Second close speed

P.	[Unit] Range	Function	Description / Note
P.366	[10ms] 15 ... 500	Duration of brake ramp "r8"	<p>Time of brake ramp "r8" in milliseconds. The door is decelerated from maximum close speed (P.350) to the second close speed after reaching pre-limit switch 3 in the specified time.</p> <p>Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i></p>
P.367	[Hz/s] 5 ... 300	Acceleration of brake ramp "r8"	<p>Acceleration during brake ramp "r8" in Hertz per second. After reaching pre-limit switch 3, the door is decelerated from maximum close speed (P.350) down to the 2nd close speed (P.365).</p> <p>Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i></p>

18.7 Second Startspeed for Door CLOSE

P.	[Unit] Range	Function	Description / Note
P.235	[Increments] 0 ... 4200	Second pre-limit switch position End position Door OPEN	<p>This pre-limit switch is used to obtain an additional acceleration ramp during the travel start of the door. The incremental value entered in the parameter specifies the distance of the pre-limit switch 2 to the end position Door OPEN.</p> <p>At the begin of travel start ramp "r7" is run. After activating the pre-limit switch 2, start ramp "r5" begins.</p> <p><i>Without activating pre-limit switch 2 the move begins directly with start ramp "r5".</i></p> <p>The steepness of ramp "r5" is set with Parameter P.351 or P.352, and that of start ramp "r7" with Parameter P.356 or P.357.</p>

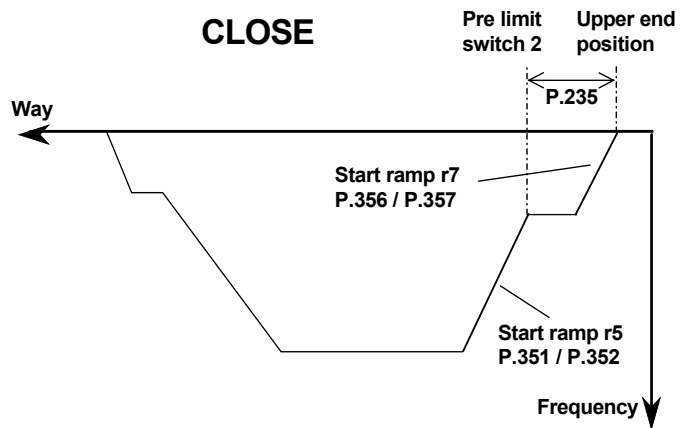


Fig. 15: Pre-limit switch 2 Door OPEN

P.355	[Hz] 6 ... 200	Average close speed during acceleration phase	If Parameter P.235 was used to activate the additional acceleration ramp "r7", this parameter is used to determine the average close speed.
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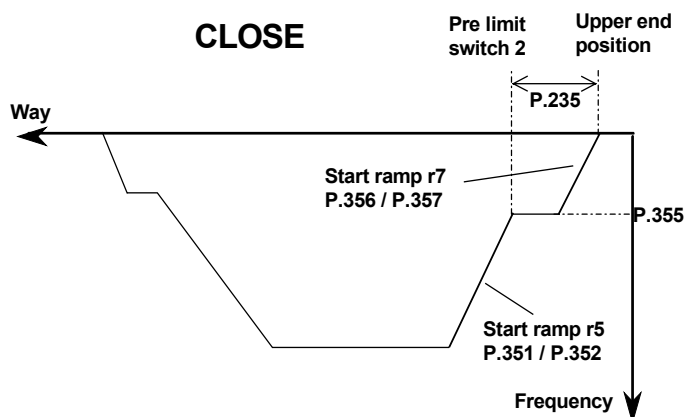


Fig. 16: Average close speed

P.	[Unit] Range	Function	Description / Note
P.356	[10ms] 15 ... 500	Duration of start ramp "r7"	<p>Time of start ramp "r7" in milliseconds.</p> <p>The door is accelerated within the specified time from 0Hz to the average close speed (P.355).</p> <p>After reaching the pre-limit switch 2, the door is accelerated up to the maximum close speed (P.350).</p> <p>Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i></p>
P.357	[Hz/s] 5 ... 300	Acceleration of start ramp "r7"	<p>Acceleration during start ramp "r7" in Hertz per second.</p> <p>After reaching the pre-limit switch 2, the door is accelerated up to the maximum close speed (P.350).</p> <p>Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i></p>

18.8 Stopramp after triggering of the safety edge

P.	[Unit] Range	Function	Description / Note
P.371	[10ms] 3 ... 250	Duration of stop ramp "r _n " after triggering of the safety edge	<p>Time of stop ramp „r_n“ in milliseconds.</p> <p>The door is decelerated from maximum close speed (P.350) to 0 Hz after triggering of the safety edge.</p>

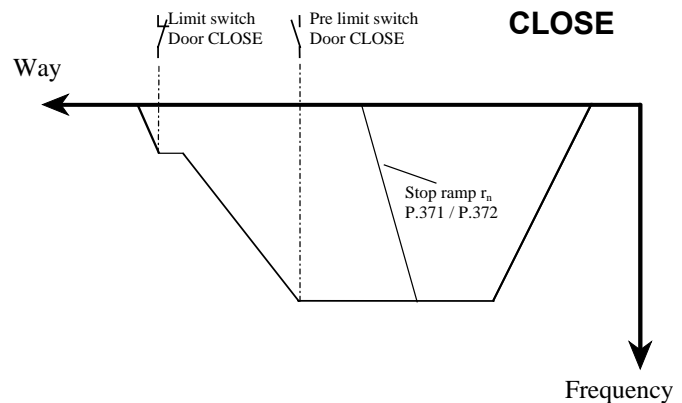


Fig. 17: Safety edge triggered, CLOSE move

Smaller values result in greater acceleration of the door.
Larger values result in diminished acceleration of the door.

☞ This parameter is only visible and settable if Parameter P.216 is set to 0.

P.	[Unit] Range	Function	Description / Note
P.372	[Hz/s] 50 ... 600	Acceleration of stop ramp „r _n “ after triggering of the safety edge	<p>Acceleration during stop ramp "r_n" in Hertz per second. The door is decelerated from maximum close speed to 0 Hz after triggering of the safety edge.</p> <p>Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.</p> <p>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</p>

18.9 Stopramp after stop is triggered

P.	[Unit] Range	Function	Description / Note
P.380	[10ms] 15 ... 250	Duration of stop ramp "r _{STOP-Z} " after stop is triggered	<p>Time of stop ramp „r_{STOP-Z}“ in milliseconds. The door is decelerated in the specified time from maximum close speed to 0 Hz after triggering of a stop command.</p>

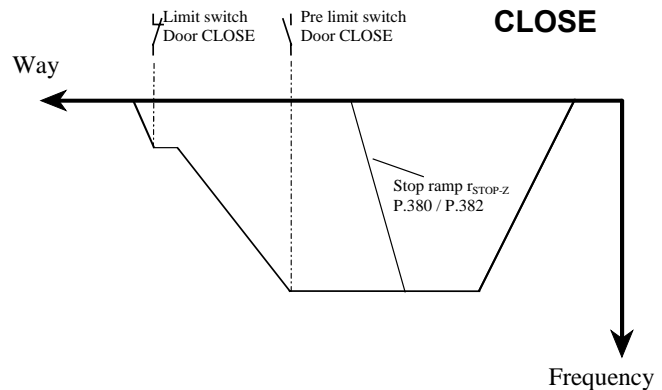


Fig. 18: Triggering of Stop for CLOSE move

Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door.

☞ This parameter is only visible and settable if Parameter P.216 is set to 0.

☞ This ramp also takes effect after the photo eye is interrupted

P.	[Unit] Range	Function	Description / Note
P.382	[Hz/s] 5 ... 300	Acceleration of stop ramp "r _{STOP-Z} " after stop is triggered	<p>Acceleration during stop ramp "r_{STOP-Z}" in Hertz per second. The door is decelerated from maximum close speed to 0 Hz after a stop command is given.</p> <p>Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.</p> <p>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</p> <p>☞ This ramp also takes effect after the photo eye is interrupted.</p>

18.10 Stopramp after Emergency-Stop is triggered

P.388	[Hz/s] 0 ... 600	Acceleration of stop ramp after Emergency-STOP is triggered	<p>Acceleration during stop ramp in Hertz per second. The door is decelerated from maximum close speed to 0 Hz after triggering of the Emergency-STOP.</p>
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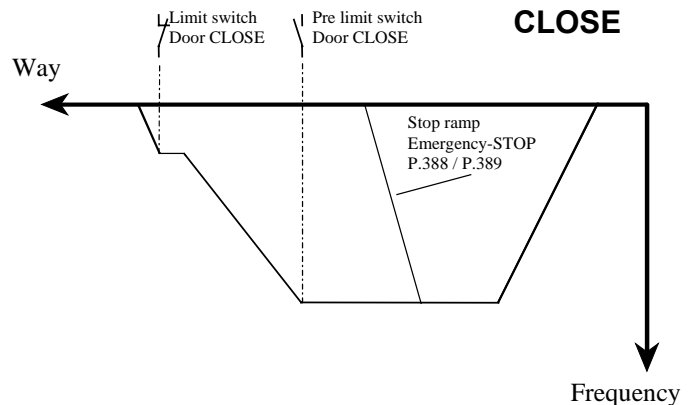


Fig. 19: E-Stop ramp

Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.

☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.

P.389	[10ms] 0 ... 50	Duration of stop ramp after Emergency-STOP is triggered	<p>Time of stop ramp in milliseconds. The door is decelerated within the specified time from maximum close speed to 0 Hz after triggering of the Emergency-STOP.</p> <p>Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door.</p> <p>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</p>
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19 Open

IMPORTANT

If automatic setting of the pre-limit switch and limit switch bands is used (P.216 = 2), Parameters P.232 and P.233 are automatically changed.

The parameters are even changed if the speed of the door or the steepness of a ramp is changed, since this results in a new start of automatic limit switch correction.

If you want to set these ramps manually, P.216 must be < 2.

19.1 Adjust the end position Door open

P.	[Unit] Range	Function	Description / Note
P.230	[Increments] 50 ... 9999	End position Door OPEN	<p>This parameter displays the number of increments that were taught during calibration or synchronization of the door.</p> <p><i>☞ The end position Door OPEN can be manually shifted by changing this value.</i></p> <p>IMPORTANT A maximum of 3700 increments are possible when using absolute encoders for position sensing.</p>
P.231	[increments] ± 60	Correction value End position Door OPEN	<p>This parameter is used to shift the entire Door OPEN end position, i.e., the end position is shifted together with the associated pre-limit switches.</p> <p>A change in the parameter value in a positive direction causes the end position to shift up.</p> <p>A change in the parameter value in the negative direction causes the end position to shift down.</p>

19.2 Start Door Opening

P.	[Unit] Range	Function	Description / Note
P.310	[Hz] 6 ... 200	Travel frequency for rapid OPEN	Here you specify the maximum open speed in Hz. Start ramp "r1" is used to accelerate to this speed. The steepness of the ramp is set with Parameter P.311 or P.312.

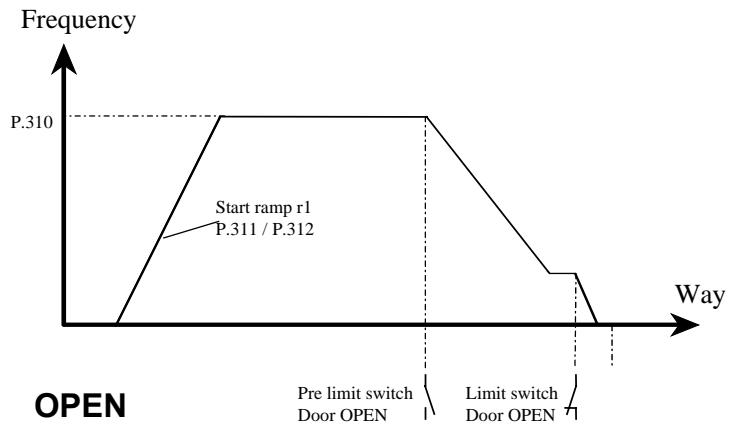


Fig. 20: Start ramp, OPEN move

P.311	[10ms] 20 ... 500	Duration of start ramp "r1"	<p>Time of start ramp "r1" in milliseconds. The door is accelerated within the specified time from 0Hz to the maximum open speed (P.310).</p> <p>Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i></p>
P.312	[Hz/s] 5 ... 300	Acceleration of start ramp "r1"	<p>Acceleration during start ramp "r1" in Hertz per second. Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i></p>

19.3 Slow down after pre-limit switch is triggered during Door OPEN

P.	[Unit] Range	Function	Description / Note
P.232	[Increments] 0 ... 2100	Pre-limit switch position Door OPEN	The parameter value specifies the distance to the Door OPEN absolute limit switch in increments. The pre-limit switch is used to initiate the brake ramp "r2". The steepness of the ramp is set with Parameter P.321 or P.322.

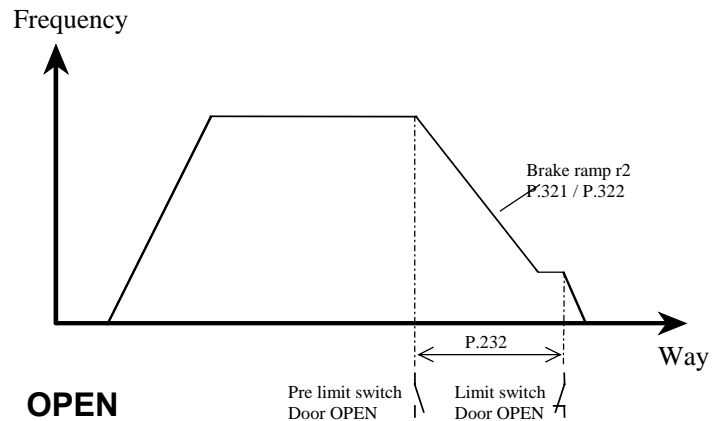


Fig. 21: Pre-limit switch position Door OPEN

P.320	[Hz] 6 ... 200	Creep speed frequency for OPEN	Brake ramp "r2" is used to slow to creep speed frequency, and is initiated after activation of the pre-limit switch Door OPEN. The steepness of the brake ramp "r2" is set with Parameter P321 or P.322.
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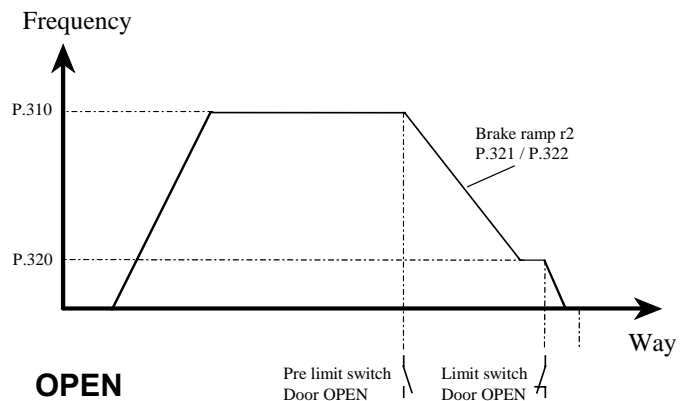


Fig. 22: Creep move for OPEN

P.	[Unit] Range	Function	Description / Note
P.321	[10ms] 15 ... 500	Duration of brake ramp "r2"	<p>This parameter specifies the time of brake ramp "r2" in milliseconds.</p> <p>The door is decelerated from maximum Open frequency (P.310) to creep frequency (P.320) within this time.</p> <p>Smaller values result in greater deceleration of the door. Larger values result in diminished deceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i></p>
P.322	[Hz/s] 5 ... 300	Acceleration of brake ramp "r2"	<p>This parameter specifies the acceleration of the door during brake ramp "r2" in Hertz per second.</p> <p>Smaller values result in diminished deceleration of the door. Larger values result in greater deceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i></p>

19.4 Stop in End position Door OPEN

P.	[Unit] Range	Function	Description / Note
P.233	[Increments] 0 ... 200	Limit switch band Door OPEN	<p>The limit switch band specifies the range by recognizing the position as the Upper end position. This is comparable with the range in which a mechanical cam switch is tripped.</p> <p>When the limit switch band is reached, the stop ramp "ro" is run. The steepness of the ramp is set with Parameter P.341 or P.343.</p>

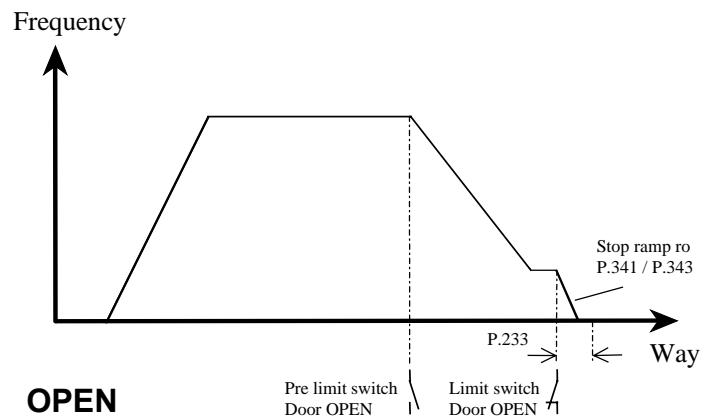


Fig. 23: Limit switch band Door OPEN

P.	[Unit] Range	Function	Description / Note
P.341	[10ms] 3 ... 250	Duration of stop ramp "ro"	Time of stop ramp "ro" in milliseconds. The door is decelerated in the specified time from creep speed to 0 Hz after reaching the limit switch.

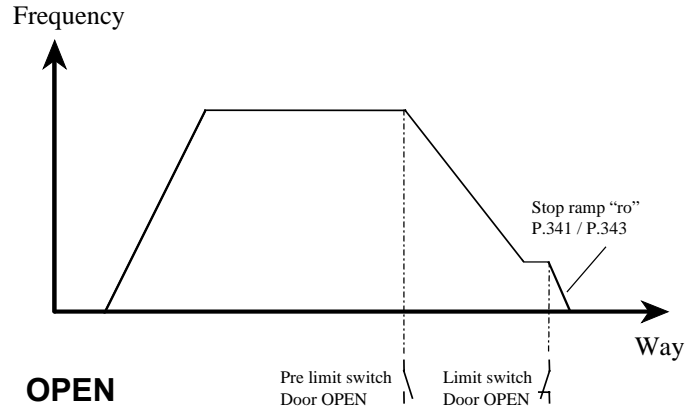


Fig. 24: Stop ramp for OPEN move

Smaller values result in greater acceleration of the door.
Larger values result in diminished acceleration of the door.

☞ This parameter is only visible and settable if Parameter P.216 is set to 0.

P.343	[Hz/s] 5 ... 300	Acceleration of stop ramp "ro"	Acceleration during stop ramp "ro" in Hertz per second. The door is decelerated from creep speed to 0 Hz after reaching the limit switch. Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i>
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19.5 Emergency limit switch band Door OPEN

P.	[Unit] Range	Function	Description / Note
P.239	[Increments] 0 ... 100	Emergency limit switch band Door OPEN	<p>The emergency limit switch band lies behind the limit switch band (P.233). If the limit switch band is passed and the emergency limit switch band reached, the frequency converter runs a fast stop ramp. At the same time the information message I.100 (End position Door OPEN reached at excessively high speed) is issued.</p> <p><i>☞ This function is comparable with a mechanical cam-operated limit switch, which generates an Emergency-STOP when the end position is crossed.</i></p>

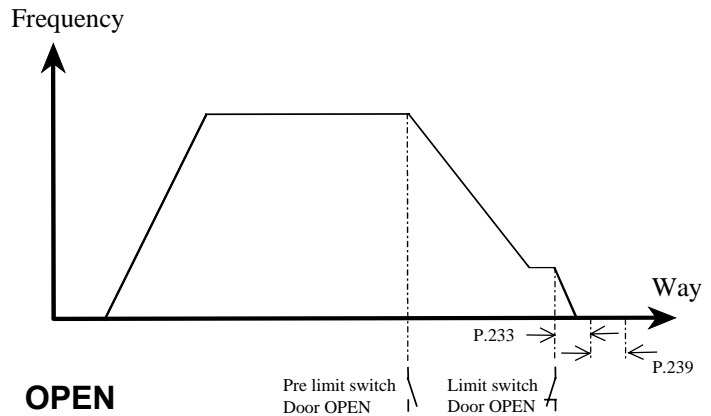


Fig. 25: Emergency limit switch band Door OPEN

19.6 Second Door OPEN Speed

P.	[Unit] Range	Function	Description / Note
P.236	[Increments] 0 ... 2100	Position of third pre-limit switch Door OPEN	With this pre-limit switch an additional brake ramp for braking the door is activated. The entered value specifies the distance of the pre-limit switch to the end position Door OPEN in increments. The pre-limit switch 3 initiates brake ramp "r4". The steepness of this ramp is set with Parameter P.326 or P.327. After reaching the pre-limit switch Door OPEN, the ramp "r2" is run.

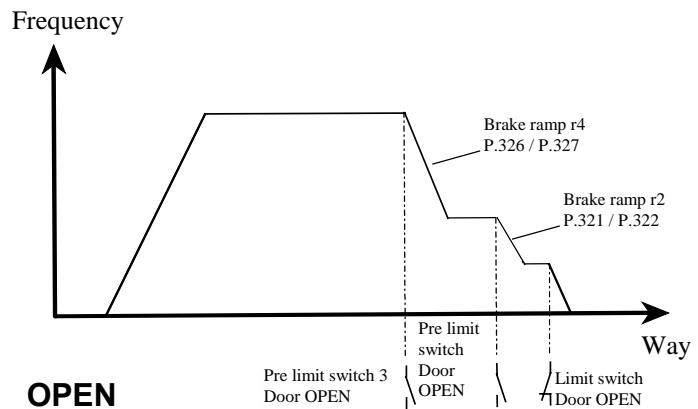


Fig. 26: Pre-limit switch 3 Door OPEN

P.325	[Hz] 6 ... 200	Specify frequency for second open speed during braking phase	If Parameter P.236 was used to activate the additional acceleration ramp "r4", this parameter is used to specify the second open speed. After reaching pre-limit switch 3, ramp "r4" is used to decelerate to this speed. The steepness of the ramp is set with Parameter P.326 or P.327.
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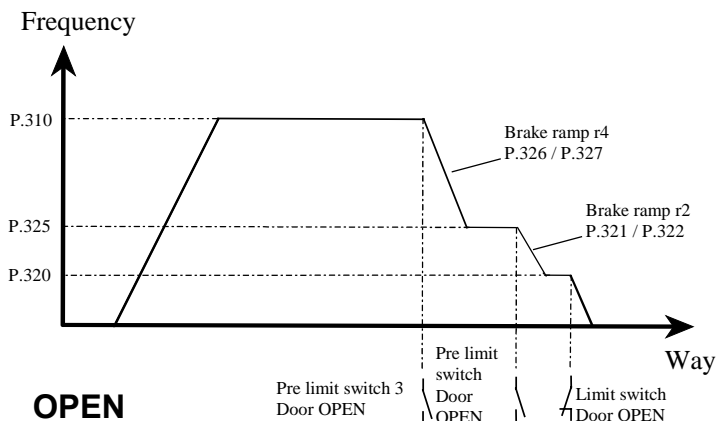


Fig. 27: Second Open speed

P.	[Unit] Range	Function	Description / Note
P.326	[10ms] 15 ... 500	Duration of brake ramp "r4"	<p>Time of brake ramp "r4" in milliseconds. The door is braked within the specified time from maximum Open speed (P.310) to the second Open speed (P.325).</p> <p>Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i></p>
P.327	[Hz/s] 5 ... 300	Acceleration of start ramp "r4"	<p>Acceleration during start ramp "r4" in Hertz per second. After reaching the pre-limit switch 3, the door is accelerated up to the maximum Open speed (P.325).</p> <p>Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i></p>

19.7 Second Startspeed Door OPEN

P.	[Unit] Range	Function	Description / Note
P.225	[Increments] 0 ... 4200	Second pre-limit switch position Door CLOSE	<p>This pre-limit switch is used to obtain an additional acceleration ramp during the travel start of the door. The incremental value entered in the parameter specifies the distance of the pre-limit switch 2 to the Lower end position. At the begin of travel start ramp "r3" is run. After activating the pre-limit switch 2, start ramp "r1" begins.</p> <p><i>Without activating pre-limit switch 2 the move begins directly with start ramp "r1".</i></p> <p>The steepness of start ramp "r1" is set with Parameter P.311 or P.312, and that of start ramp "r3" with Parameter P.316 or P.317.</p>

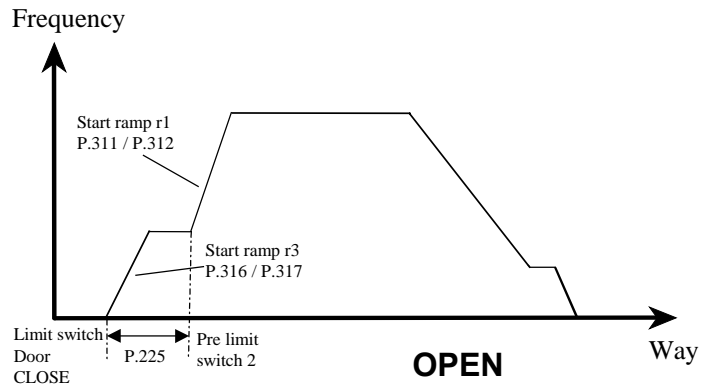


Fig. 28: Pre-limit switch 2 Door CLOSE

P.315	[Hz] 6 ... 200	Average open speed during acceleration phase	If Parameter P.225 was used to activate the additional acceleration ramp "r3", this parameter is used to determine the average open speed.
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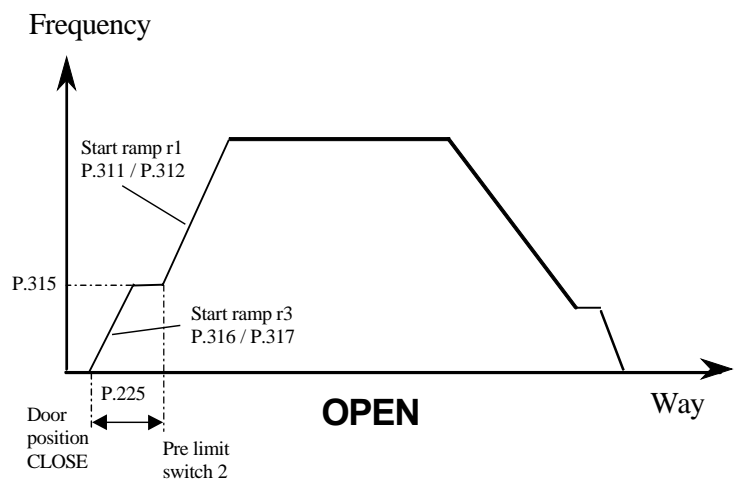


Fig. 29: Average Open speed

P.	[Unit] Range	Function	Description / Note
P.316	[10ms] 15 ... 500	Duration of start ramp "r3"	<p>Time of start ramp "r3" in milliseconds.</p> <p>The door is accelerated within the specified time from 0Hz to the average Open speed (P.315). After reaching the pre-limit switch 2, the door is accelerated up to the maximum Open speed (P.310).</p> <p>Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i></p>
P.317	[Hz/s] 5 ... 300	Acceleration of start ramp "r3"	<p>Acceleration during start ramp "r3" in Hertz per second.</p> <p>After reaching the pre-limit switch 2, the door is accelerated up to the maximum Open speed (P.310).</p> <p>Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i></p>

19.8 Stopramp after triggering of the safety edge.

P.	[Unit] Range	Function	Description / Note
P.331	[10ms] 0 ... 250	Duration of stop ramp „r _{Si-A} “ after triggering safety edge is tripped	Time of stop ramp „r _{Si-A} “ in milliseconds. The door is decelerated within the specified time from maximum open speed to 0 Hz after triggering of the safety edge.

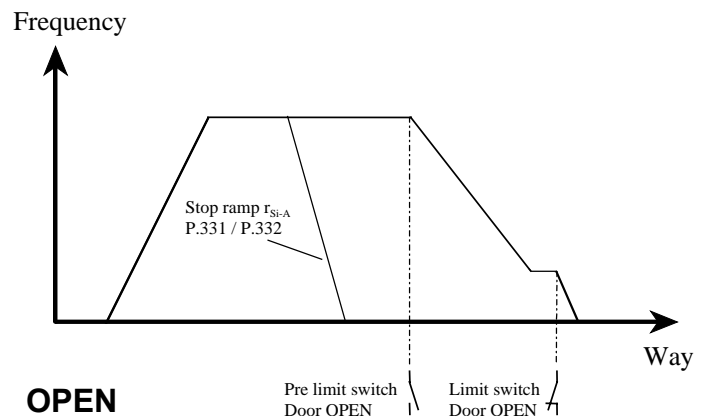


Fig. 30: Safety edge triggering OPEN move

Smaller values result in greater acceleration of the door.
Larger values result in diminished acceleration of the door.

☞ This parameter is only visible and settable if Parameter P.216 is set to 0.

P.332	[Hz/s] 50 ... 600	Acceleration of stop ramp „r _{Si-A} “ after triggering of the safety edge	Acceleration during stop ramp „r _{Si-A} “ in Hertz per second. The door is decelerated from maximum open speed to 0 Hz after triggering of the safety edge. Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door. ☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.
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19.9 Stop ramp after stop is triggered

P.	[Unit] Range	Function	Description / Note
P.340	[10ms] 15 ... 250	Duration of stop ramp " r_{STOP-A} " after stop is triggered	Time of stop ramp " r_{STOP-A} " in milliseconds. The door is decelerated in the specified time from maximum open speed to 0 Hz after triggering of a stop command.

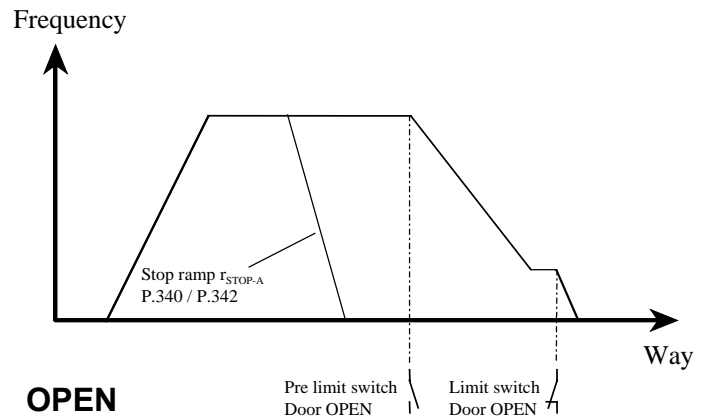


Fig. 31: Triggering of Stop for OPEN move

Smaller values result in greater acceleration of the door.
Larger values result in diminished acceleration of the door.

☞ This parameter is only visible and settable if Parameter P.216 is set to 0.

P.342	[Hz/s] 5 ... 300	Acceleration of stop ramp " r_{STOP-A} " after stop is triggered	Acceleration during stop ramp " r_{STOP-A} " in Hertz per second. The door is decelerated from maximum open speed to 0 Hz after a stop command is given. Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door. ☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.
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19.10 Stop ramp after Emergency – Stop is triggered

P.	[Unit] Range	Function	Description / Note
P.348	[Hz/s] 50 ... 600	Acceleration of stop ramp after Emergency-STOP is triggered	Acceleration during stop ramp in Hertz per second. The door is decelerated from maximum open speed to 0 Hz after triggering of the Emergency-STOP.

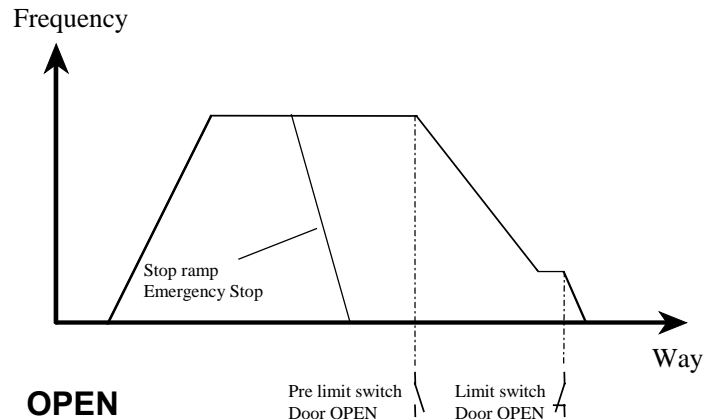


Fig. 32: Emergency-Stop ramp

Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.

☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.

P.349	[10ms] 0 ... 50	Duration of stop ramp after Emergency-STOP is triggered	Time of stop ramp in milliseconds. The door is decelerated within the specified time from maximum open speed to 0 Hz after triggering of the Emergency-STOP. Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door. ☞ This parameter is only visible and settable if Parameter P.216 is set to 0.
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19.11 Stop ramp after safety input

P.	[Unit] Range	Function	Description / Note
P.333	[10ms] 0 ... 250	Duration of stop ramp after triggering an safety input	<p>Time of stop ramp in milliseconds. The door is decelerated within the specified time from maximum open speed to 0 Hz after triggering of an safety Input</p> <p>Smaller values result in greater deceleration of the door</p> <p>Larger values result in diminished deceleration of the door</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i></p>
P.334	[Hz/s] 50 ... 600	Acceleration of stop ramp after triggering an safety input	<p>Acceleration during stop ramp in Hertz per second After triggering an safety Input the Door is decelerated from the maximum open speed to 0 Hz</p>

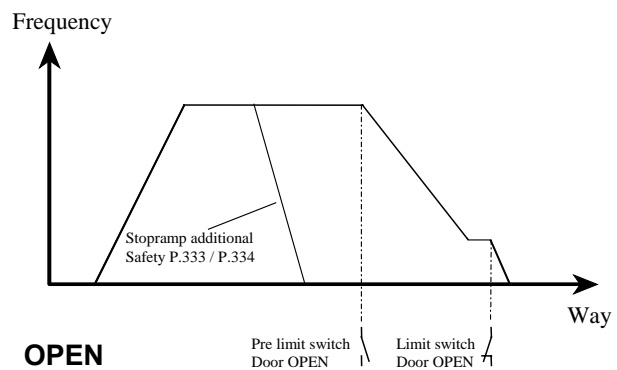


Fig. 33: Stopramp Additional Safety

Smaller values result in diminished acceleration of the door

Larger values result in greater acceleration of the door

☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.

20 Partial opening / Intermediate stop

P.	[Unit] Range	Function	Description / Note
P.240	[Increments] 25 ... 9999	Intermediate stop position E1	The entered value specifies the distance of the intermediate stop position to the end position Door CLOSE in increments. <i>☞ If an absolute encoder is used as the limit switch, a max. of 3700 increments are possible.</i>

P.242	[Increments] 0 ... 2100	Middle pre-limit switch position	The parameter value specifies the distance to the middle limit switch in increments. The pre-limit switch is used to initiate the brake ramp "r2". The steepness of the ramp is set with Parameter P.321 or P.322.
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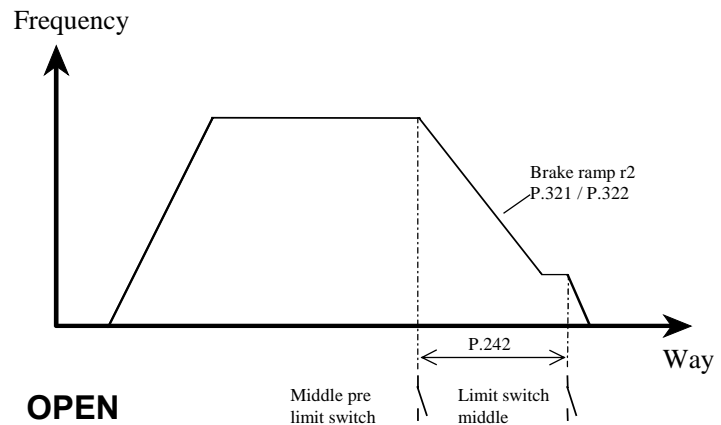
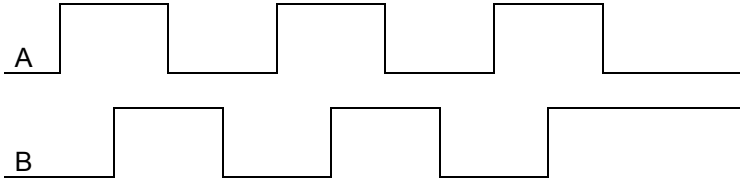








Fig. 34: Intermediate stop pre-limit switch

P.244	0 ... 3	Select intermediate stop position	The position of the intermediate stop can be set directly to typical values using this parameter. 0: No intermediate stop permitted, intermediate stop is same as end position for Door OPEN 1: Half-open door (1/2 of the value in P.230). 2: 2/3 door opening (2/3 of the value in P.230) 3: Intermediate stop position is taught in deadman mode.
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21 Incremental encoder function

21.1 Incremental encoder mode

P.	[Unit] Range	Function	Description / Note
P.250	0 ... 1	Incremental counting	<p>The pulses from the incremental encoder can be processed in two ways.</p> <p>Either the edges (rising and falling edge) of the signal or the states (High or Low level) are evaluated.</p> <p>By counting edges, four increments per signal pair result. Counting states results in one increment per signal pair.</p>  <p>0. Quadrature method (edges are processed) 1. Single method (states are processed)</p>
P.251	0 ... 5	Mode for automatic synchronization after power-up	<p>The door position is lost after turning off the controller when using incremental encoders. To find a valid position again, the door must be resynchronized (homed) to a reference point.</p> <p>This parameter specifies how the door controller is to behave after power-up.</p> <p>0: Manual deadman move to Door CLOSE end position, then save Position with  STOP.</p> <p>1: Manual deadman move to Door OPEN end position, then save Position with  STOP.</p> <p>2: Manual deadman move to Door CLOSE end position, then deadman move to Door OPEN end position and save position with  STOP</p> <p>3: Automatic CLOSE move to reference point in Door CLOSE end position</p> <p>4: Automatic OPEN move to reference point in Door OPEN end position</p> <p>5: Automatic CLOSE move to reference point in Door CLOSE end position, then automatic OPEN move to reference point in Door OPEN end position.</p> <p>IMPORTANT Automatic opening is only possible if P.280 ≥ 1.</p>

P.	[Unit] Range	Function	Description / Note
P.253	0 ... 4	Automatic first synchronisation	<p>By activating this parameter a automatic first synchronisation is carried out. The end positions have not to be taught in before.</p> <p>0: Manual deadman move to Door CLOSE end position and after this deadman move to Door OPEN end position. After that saving with  STOP.</p> <p>1: Manual deadman move to Door CLOSE end position and after that saving the position with  STOP. After that automatic opening to reference in Door OPEN position.</p> <p>2: Manual deadman move to Door OPEN end position and after that saving the position with  STOP. After that automatic closing to reference in Door CLOSE position.</p> <p>3: Automatic closing to reference in Door CLOSE position and then automatic opening to reference in Door OPEN position.</p> <p>4: Automatic opening to reference in Door OPEN position and then automatic opening to reference in Door OPEN position.</p> <p><i>☞ The automatic first synchronisation modes P.253 > 0 are not able to use with the manual teach in of the intermediate stop position P.244 = 3. In this case the intermediate stop position will not taught in.</i></p> <p><i>☞ The references for both end position have to be adjusted with P.270 and P.280. References which are allowing the automatic first synchronisation are only the safety edge and the mechanical stop.</i></p>
P.256	0 ... 1	Synchronisation after emergency stop	<p>If the emergency stop was active a new synchronisation is started.</p> <p>0: Deactivated 1: Activated</p>

21.2 Select synchronization type

P.	[Unit] Range	Function	Description / Note
P.25F	0 ... 9	Synchronization type profile	<p>This profile is used to set the reference switches and automatic synchronization mode.</p> <ul style="list-style-type: none"> 0: Deactivated 1: Synchronization to reference switch in Door CLOSE End position 2: Synchronization to safety edge 3: Synchronization to reference switch in Door OPEN End position 4: Synchronization to mechanical stop in Door OPEN end position 5: Synchronization to safety edge and then to mechanical stop in End position Door OPEN 6: Synchronization to safety edge and then to reference switch in Door OPEN End position 7: Synchronization to reference switch in Door CLOSE End position and then to mechanical stop in End position Door OPEN 8: Synchronization to machanical stop in Door OPEN and CLOSE position 9: Manually synchronisation to Door OPEN and CLOSE position <p><i>☞ The exact settings which this profile involves can be found in Appendix: Synchronization Type.</i></p>

21.3 Reference in End position Door CLOSE

P.	[Unit] Range	Function	Description / Note
P.270	0 ... 3	Select reference in Door CLOSE end position	<p>Here you specify the type of reference which is activated in the Door CLOSE end position.</p> <ul style="list-style-type: none"> 0: no reference 1: Reference switch 2: Mechanical stop 3: Safety edge <p>IMPORTANT Automatic synchronization to reference switches only functions if the switch was previously detected during an automatic move. In this case Message I.200 is issued.</p>
P.271	0 ... 1	Start condition for automatic synchronization	<p>Automatic synchronization to the Door CLOSE end position starts under the following conditions:</p> <ul style="list-style-type: none"> 0: After briefly pressing the foil key ▼ CLOSE 1: Automatically after the synchronization time entered in Parameter P.273 has elapsed.

P.	[Unit] Range	Function	Description / Note
P.272	0 ... 1	Cyclical synchronization	When cyclical synchronization is enabled, the reference position is checked each time a close move is made. If this deviates too greatly from the learned position, a fault is generated. 0: Synchronization only after turning on the controller 1: A recalibration is performed after each Automatic close move
P.273	[s] 0 ... 200	Time before automatic synchronisation	After this time expires automatic synchronization to reference in Door CLOSE position begins, if in Parameter P.271 parameter P.273 as start condition is adjusted.
P.275	[Increments] ±125	Increment correction after synchronization is finished	The turn-off position of the door is shifted by the value entered in this parameter. If for example synchronization is to a mechanical stop, you do not want the door to strike it each time. To prevent this, you correct the stop position using this parameter.

21.4 Reference in End position Door OPEN

P.	[Unit] Range	Function	Description / Note
P.280	0 ... 2	Select reference in End position Door OPEN	Here you specify the type of reference which is generated in the Door OPEN end position. 0: no reference 1: Reference switch 2: mechanical stop IMPORTANT Automatic synchronization to reference switches only functions if the switch was previously detected during an automatic move. In this case Message I.200 is issued.
P.281	0 ... 1	Start condition for automatic synchronization	Automatic synchronization to the Door OPEN end position starts under the following conditions: 0: After briefly pressing the foil key \blacktriangle OPEN 1: Automatically after the synchronization time entered in Parameter P.283 has elapsed.
P.282	0 ... 1	Cyclical synchronization	When cyclical synchronization is enabled, the reference position is checked each time an open move is made. If this deviates too greatly from the learned position, a fault is generated. 0: Synchronization only after turning on the controller 1: A recalibration is performed after each Automatic open move

P.	[Unit] Range	Function	Description / Note
P.283	[s] 1 ... 200	Time before automatic synchronisation	After this time expires automatic synchronization to reference in Door OPEN position begins, if in Parameter P.281 parameter P.283 as start condition is adjusted.
P.285	[Increments] ±125	Increment correction after synchronization is finished	The turn-off position of the door is shifted by the value entered in this parameter. If for example synchronization is to a mechanical stop, you do not want the door to strike it each time. To prevent this, you correct the stop position using this parameter.

21.5 Time to recognize the mechanical stop

P.	[Unit] Range	Function	Description / Note
P.407	[10ms] 5 ... 300	Time to recognize the mechanical stop	This parameter defines the min. time without changing of increments in order to recognize the mechanical stop.

22 Deadman move


P.	[Unit] Range	Function	Description / Note
P.390	[Hz] 6 ... 100	Move frequency Deadman OPEN move	This parameter specifies the travel speed in Hertz for opening in deadman mode.
P.391	[10ms] 10 ... 500	Duration of start ramp for deadman OPEN move	Time of start ramp deadman OPEN move in milliseconds. The door is accelerated from 0Hz to deadman speed (P.390) in the specified time. Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i>
P.392	[Hz/s] 5 ... 300	Acceleration of start ramp for deadman OPEN move	Acceleration during start ramp for deadman OPEN move in Hertz per second. The door is accelerated from 0Hz to deadman speed (P.390) at the specified max. permissible acceleration. Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door. <i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i>

P.	[Unit] Range	Function	Description / Note
P.395	[Hz] 6 ... 100	Move frequency Deadman CLOSE move	This parameter specifies the travel speed in Hertz for closing in deadman mode.
P.396	[10ms] 10 ... 500	Duration of start ramp for deadman CLOSE move	<p>Time of start ramp for deadman CLOSE move in milliseconds.</p> <p>The door is accelerated from 0Hz to deadman speed (P.395) in the specified time.</p> <p>Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i></p>
P.397	[Hz/s] 5 ... 300	Acceleration of start ramp for deadman CLOSE move	<p>Acceleration during start ramp for deadman CLOSE move in Hertz per second.</p> <p>The door is accelerated from 0Hz to deadman speed (P.395) at the specified max. permissible acceleration.</p> <p>Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i></p>
P.398	[Hz/s] 5 ... 300	Acceleration of stop ramp after deadman move	<p>Acceleration during stop ramp for deadman move in Hertz per second.</p> <p>The door is braked at the specified max. permissible acceleration from deadman speed (P.395 or P.390) to 0Hz.</p> <p>Smaller values result in diminished acceleration of the door. Larger values result in greater acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is greater than 0.</i></p> <p><i>☞ This ramp applies both to deadman OPEN and to deadman CLOSE.</i></p>
P.399	[10ms] 3 ... 100	Duration of stop ramp after deadman move	<p>Time of stop ramp for deadman move in milliseconds.</p> <p>The door is decelerated from deadman speed (P.395 or P.390) to 0Hz within the specified time.</p> <p>Smaller values result in greater acceleration of the door. Larger values result in diminished acceleration of the door.</p> <p><i>☞ This parameter is only visible and settable if Parameter P.216 is set to 0.</i></p>

23 Speed-Distance Profile

P.	[Unit] Range	Function	Description / Note
P.39F	0 ... 3	Speed profile	This profile is used to set the acceleration of the door. <i>☞ The exact settings which this profile involves can be found in Appendix: Ramp Profile.</i>

24 Operator call

P.	[Unit] Range	Function	Description / Note
P.408	0 ... 3	Acknowledgement	The controller allows you to require an acknowledgement after certain controller events, i.e., the operator must intervene. Without this acknowledgement the door can no longer be operated. The  STOP key is used for acknowledgement. 0: no acknowledgement 1: Acknowledgement required after turning on the controller 2: Acknowledgement required after turning on the controller and after Emergency-STOP is triggered 3: Acknowledgement required after turning on the controller, after Emergency-STOP is triggered and after error messages

25 Runtime monitoring

P.	[Unit] Range	Function	Description / Note
P.410	[s] 0 ... 990,0	Runtime monitoring OPEN	The time set here is the max. permissible door runtime for the OPEN direction. If the move takes longer than specified, this results in fault F.020. <i>☞ A setting of 0 means that runtime monitoring is deactivated.</i>
P.415	[s] 0 ... 990,0	Runtime monitoring CLOSE	The time set here is the max. permissible door runtime for the CLOSE direction. If the move takes longer than specified, this results in fault F.020. <i>☞ A setting of 0 means that runtime monitoring is deactivated.</i>

P.	[Unit] Range	Function	Description / Note
P.419	[s] 0 ... 990,0	Runtime monitoring Deadman move	The time set here is the max. permissible door runtime for the OPEN and CLOSE direction in deadman mode. If the move takes longer than specified, this results in fault F.020. <i>☞ A setting of 0 means that runtime monitoring is deactivated.</i>

26 Low temperature monitoring

P.	[Unit] Range	Function	Description / Note
P.426	[°C] -11 ... +10	Low temperature monitoring	To protect the electronic components of the door controller, the temperature is monitored. The temperature is not permitted to drop below –10°C. If this lower limit is exceeded, fault F.530 or F.540 is issued and the door can no longer be operated. -11. Low temperature monitoring deactivated +10°C ... –10°C. Limit value for turning off the controller <i>☞ After the set temperature is exceeded, the fault and the controller are automatically reset. The hysteresis is approx.. 4°C.</i>
P.427	[°F] 12 ... 50	Low temperature monitoring	To protect the electronic components of the door controller, the temperature is monitored. The temperature is not permitted to drop below 11°F. If this lower limit is exceeded, fault F.530 or F.540 is issued and the door can no longer be operated. 11. Low temperature monitoring deactivated 12°F ... 50°F. Limit value for turning off the controller <i>☞ After the set temperature is exceeded, the fault and the controller are automatically reset. The hysteresis is approx.. 4°F.</i>

27 Lag error detection

P.	[Unit] Range	Function	Description / Note
P.430	[s] 0 ... 5.0	Lag error when using mechanical limit switches	If after initiating a move command the limit switch is not left within a time specified by this parameter, it is assumed that the door is not moving. This results in fault F.030 and the door is stopped. <i>☞ A setting of 0 means that monitoring is deactivated.</i>
P.450	[10ms] 25 ... 300	Lag error when using electronic limit switches	With electronic limit switches a change in distance is constantly monitored during active moving. If there is no change, after the time specified here fault F.030 is issued and the door is stopped.

28 Time to detect rotation direction error

P.	[Unit] Range	Function	Description / Note
P.438	[10ms] 1 ... 50	Rotation direction error with electrical limit switches	This function controls every time if the door is moving in the right direction. If the door is in the wrong direction, for the time which is adjusted by the help of this parameter, the error F.031 will be given out.

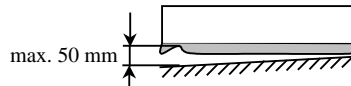
29 Safety Edges

The following parameters can be set both for integrated safety edge processing as well as for external safety edge processing (optional with TST FUxE) .

P.	[Unit] Range	Function	Description / Note
P.420	[10ms] 3 ... 200	Reversing time when the internal safety edge is tripped	If the safety edge is tripped during door movement, the door is stopped and after a short pause it moved in the other direction. The time of the pause between stop and reversing is set by this parameter.
P.440	[Increments] -60 ... 999	Safety edge pre-limit switch position	The entered value specifies the distance of the safety edge pre-limit switch to the Door CLOSE end position in increments.

⚠ WARNING

The max. permissible distance of the safety edge pre-limit switch to the ground is 50mm at the worst point.



29.1 Integrated safety edge processing

The TST FUS, TST FUE2 and TST FU3E door controllers have a safety edge processor already on the motherboard.

No additional plug-in cards are necessary.

P.	[Unit] Range	Function	Description / Note
P.460	-1 ... 5	Safety edge type	<p>This parameter is used to specify which safety edge type is connected.</p> <p>0: Safety edge inactive IMPORTANT This setting is only possible if no safety edge is connected.</p> <p>1: Electrical safety edge, redundantly processed, functioning as normally open, i.e., short circuit indicates tripping.</p> <p>2: Electrical safety edge, redundantly processed, functioning as normally closed, i.e., interruption indicates tripping.</p> <p>3: Safety edge with testing in Door CLOSE end position, functioning as normally open, i.e. there must be a tripping of the safety edge for checking its proper function in the Door CLOSE end position.</p> <p>4: Safety edge with testing in Door CLOSE end position, functioning as normally closed, i.e. there must be a tripping of the safety edge for checking its proper function in the Door CLOSE end position.</p> <p>5: Dynamic optical system</p> <p><i>A setting of -1 means that the connected safety edge type is automatically detected.</i></p>
P.461	0 ... 5	Max. number of reversals	<p>In case of an obstacle in the door area the safety edge is used to reverse the movement.</p> <p>If the obstacle is still present and automatic closing is activated, the door would continuously open and close. To prevent this the door remains stopped at the Door OPEN end position after the number of reversals set here is reached.</p> <p>This also causes fault F.361 to be issued.</p> <p>IMPORTANT To acknowledge this fault, the door must be moved once in deadman mode to the Door CLOSE end position.</p> <p><i>A setting of 0 means that monitoring is deactivated.</i></p>

P.	[Unit] Range	Function	Description / Note
P.462	0 ... 2	Safety edge functions	<p>This parameter specifies how the safety edge processing responds to the safety edge pre-limit switch.</p> <p>0: After the safety edge pre-limit switch is tripped, the safety edge is tripped only to stop the door. 1: After the safety edge pre-limit switch is tripped, the safety edge function is ignored. 2: The safety edge function is ignored after the Door CLOSE end position regardless of the safety edge pre-limit switch.</p> <p><i>☞ For electronic limit switches, the position of the pre-limit switch is defined with Parameter P.440. For mechanical limit switches a corresponding input must be parameterized (P.5x0=11 and P.5x1=0)</i></p>
P.468	0 ... 1	Deactivation during automatic synchronisation	<p>The safety edge can be deactivated during automatic synchronisation.</p> <p>0: Safety edge is active during automatic synchronisation 1: Safety edge is inactive during automatic synchronisation</p>
P.469	0 ... 39	LCD message for safety edge tripping	<p>For each input you can select an LCD message from a list which is displayed when the corresponding input is activated.</p> <p>The list of messages can be found in the Appendix LCD Messages</p>

29.2 External safety edge processing

IMPORTANT

External safety edge processing is only possible when using TST FUE2 and TST FU3E door controllers.

P.	[Unit] Range	Function	Description / Note
P.421	[10ms] 0; 3 ... 200	Reversing time when the external safety edge is tripped	<p>If the safety edge is tripped during door movement, the door is stopped and after a short pause it moved in the other direction. The time of the pause between stop and reversing is set by this parameter.</p> <p>0: The time of P.420 is used >0: Time between stop an reversing.</p>

P.	[Unit] Range	Function	Description / Note
P.470	0 ... 4	External safety edge mode	<p>The plug-in card defines the safety edge type used: TST SUKS-A = Normally open TST SSKS-A = Normally closed</p> <p>This parameter specifies how external safety edge processing works.</p> <p>0: Safety edge inactive IMPORTANT This setting is only possible if no optional plug-in card is used. Cards are automatically detected at power-on and the parameter is automatically set to 1.</p> <p>1: Redundant processing of the safety edge during closing 2: Safety edge processing with test at Door CLOSE end position for monitoring the CLOSE move 3: Safety edge processing with test at Door OPEN end position for monitoring the CLOSE move 4: Redundant processing of the safety edge during opening</p>
P.471	0 ... 5	Max. number of reversals	<p>In case of an obstacle in the door area the safety edge is used to reverse the movement. If the obstacle is still present and automatic closing is activated, the door would continuously open and close. To prevent this, the door remains stopped at the Door OPEN end position after the number of reversals set here is reached. This also causes fault F.361 to be issued.</p> <p>To acknowledge this fault, the door must be moved once in deadman mode to the Door CLOSE end position.</p> <p><i>☞ A setting of 0 means that monitoring is deactivated.</i></p>
P.472	0 ... 2	Safety edge function for CLOSE move	<p>This parameter specifies how the safety edge processing responds to the safety edge pre-limit switch.</p> <p>0: After the safety edge pre-limit switch is tripped, the safety edge is tripped only to stop the door. 1: After the safety edge pre-limit switch is tripped, the safety edge function is ignored. 2: The safety edge function is ignored after the Door CLOSE end position regardless of the safety edge pre-limit switch.</p> <p><i>☞ For electronic limit switches, the position of the pre-limit switch is defined with Parameter P.440. For mechanical limit switches a corresponding input must be parameterized (P.5x0=11 and P.5x1=0)</i></p>

P.	[Unit] Range	Function	Description / Note
P.475	0 ... 1	Safety edge function for OPEN move	Specifies the response to a safety edge trip during the OPEN move starting at Door OPEN limit switch. 0: The door is stopped 1: The safety edge tripping is ignored and the door continues to Door OPEN end position
P.476	0 ... 1	Response after tripping during OPEN move	Specifies the behavior of the door after the safety edge is tripped during the OPEN move. 0: Door is stopped and then closed as far as the Door CLOSE end position 1: Door is stopped and then closes until the safety edge is no longer tripped.
P.479	0 ... 39	LCD message for safety edge tripping	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages

30 Other Reversing times

P.	[Unit] Range	Function	Description / Note
P.422	[10ms] 0; 5 ... 200	Reversing time during closing	If an open command is given during door closing, the door is stopped and after a short pause it moved in the open direction. The time of the pause between stop and reversing is set by this parameter. 0: Immediate reversing; the brake does not work (only for inverter controller) >0: Time between stop and reversing. IMPORTANT The reversing times for tripping of safety edges is set with Parameters P.420 and P.421 separately.

P.	[Unit] Range	Function	Description / Note
P.424	[10ms] 0; 5 ... 200	Reversing time during closing by tripping a safety input	<p>If an safety input (e.g. a photo eye) is given, which is able to reverse the door, during door closing, the door is stopped and after a short pause it moved in the open direction. The time of the pause between stop and reversing is set by this parameter.</p> <p>1: Time of P.422 is used >0: Time between stop and reversing.</p> <p>IMPORTANT The reversing times for tripping of safety edges is set with Parameters P.420 and P.421 separatly.</p>

31 Emergency-STOP circuit

P.	[Unit] Range	Function	Description / Note
P.610	0 ... 39	LCD message for internal Emergency-STOP	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages
P.611	0 ... 39	LCD message for external Emergency-STOP 1	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages
P.612	0 ... 39	LCD message for external Emergency-STOP 2	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages

32 Input profiles

P.	[Unit] Range	Function	Description / Note
P.501	0000 .. 1408	Function of Input 1	<p>This profile can be used to specify the function of the input. All parameters needed for the function of the input are changed in one step.</p> <p>The profiles are divided into function groups as follows:</p> <ul style="list-style-type: none"> 01xx = External OPEN commands 02xx = Pull switch / Single-channel inputs 03xx = Permanent OPEN commands 04xx = External STOP commands 05xx = Safety inputs type B 06xx = Manual / Automatic toggling 07xx = External CLOSE commands 08xx = Door locking in Door CLOSE end position 09xx = Cross-traffic functions 10xx = Turn-off functions 11xx = Limit switch inputs 14xx = Safety inputs type A <p>For settings, see Table 1: Input profiles</p> <p><i>☞ The exact settings which this profile involves can be found in Appendix: Input Profile.</i></p>
P.502	0000 .. 1408	Function of Input 2	see P.501
P.503	0000 .. 1408	Function of Input 3	see P.501
P.504	0000 .. 1408	Function of Input 4	see P.501
P.505	0000 .. 1408	Function of Input 5	see P.501
P.506	0000 .. 1408	Function of Input 6	see P.501
P.507	0000 .. 1408	Function of Input 7	see P.501
P.508	0000 .. 1408	Function of Input 8	see P.501
P.509	0000 .. 1408	Function of Input 9	see P.501
P.50A	0000 .. 1408	Function of Input 10	see P.501

32.1 Input profiles with TST RFUE

IMPORTANT

The expansion board TST RFUE can only be used in conjunction with TST FUE and TST FU3E door controllers.

IMPORTANT

The expansion board TST RFUE must be activated with P.800 = 1 .

P.	[Unit] Range	Function	Description / Note
P.A01	0000 .. 1408	Function of Input 21	see P.501
P.A02	0000 .. 1408	Function of Input 22	see P.501
P.A03	0000 .. 1408	Function of Input 23	see P.501
P.A04	0000 .. 1408	Function of Input 24	see P.501
P.A05	0000 .. 1408	Function of Input 25	see P.501
P.A06	0000 .. 1408	Function of Input 26	see P.501
P.A07	0000 .. 1408	Function of Input 27	see P.501
P.A08	0000 .. 1408	Function of Input 28	see P.501

Table 1: Input profiles

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
0000	Input deactivated									
0101	OPEN 1	N.O. ¹	Upper	With	With	Both	Without	Without	OPEN	No
0102	OPEN 1	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0103	OPEN airlock	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0104	OPEN 1	N.O.	Intermediate stop	With	With	from outside	Without	Without	OPEN	No
0105	OPEN 2	N.O.	Upper	With	With	Both	Without	Without	OPEN	No
0106	OPEN 2	N.O.	Upper	With	With	from inside	Without	Without	OPEN	No
0107	OPEN 4 ²	N.O.	Upper	With	With	Both	Without	Without	OPEN	No
0108	OPEN 2	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0109	OPEN 3	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0110	OPEN 1	N.O.	Upper	With	With	from outside	Without	Without	OPEN	No
0111	OPEN 1	N.C.	Upper	With	Without	Both	Without	Without	OPEN	No
0112	OPEN 1	N.O. ³	Upper	Without	With	Both	Without	Without	OPEN	No
0114	OPEN airlock	N.O.	Intermediate stop	With	With	from inside	Without	Without	OPEN	No
0116	OPEN 1	N.O.	Upper	Without	With	from outside	Without	Without	OPEN	No
0117	OPEN 1	N.O.	Upper	Without	With	from inside	Without	Without	OPEN	No
0120	OPEN 2	N.O.	Upper	With	Without	from inside	Without	Without	OPEN	No
0121	OPEN 1	N.O.	Upper	With	Without	from outside	Without	Without	OPEN	No
0124	OPEN 2	N.O.	Intermediate stop	With	With	from inside	Without	Without	OPEN intern	No
0125	OPEN 2	N.O.	Upper	With	With	from inside	Without	Without	OPEN intern	No
0129	OPEN 2	N.O.	Intermediate stop	With	With	from outside	Without	Without	OPEN extern	No
0201	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper	With	With	Both	Without	Without	Pull switch	No
0202	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper	Without	With	Both	Without	Without	Pull switch	No

¹ N.C. = normally closed, N.O. = normally open² OPEN 3 and OPEN 4 cannot be locked out.³ N.C. = normally closed, N.O. = normally open

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
0203	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper 3. Pull straight up 2x	Without	With	Both	Without	Without	Pull switch	No
0204	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	Upper	Without	With	Both	Without	Without	Pull switch	No
0207	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	Intermediate stop	With	With	From inside	Without	Without	Pull Swit.int	No
0208	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper	With	With	From outside	Without	Without	Pull Swit.ext	No
0209	Pull switch OPEN -> STOP -> CLOSE -> STOP	N.O.	1. Intermediate stop 2. Upper	Without	With	Both	Without	Without	Pull switch	No
0301	Permanent OPEN	N.O.	1. Intermediate stop 2. Upper	Without	Without	Both	Without	Without	Perm. Open	No
0304	Permanent OPEN	N.O.	Upper	Without	Without	No	Without	Without	Perm. Open	No
0401	Stop	N.C.	-	-	-	-	Without	Without	Stop	No
0402	Stop	N.O.	-	-	-	-	Without	Without	Stop	No
0403	Stop, Reset possible	N.C.	-	-	-	-	Without	Without	Stop	No
0404	Stop, Reset possible	N.O.	-	-	-	-	Without	Without	Stop	No
0501	Photoeye	N.C.	as before	as before	With	Both	Without	Without	Photoeye	No
0502	Photoeye with through-travel sensing 1	N.C.	as before	as before	With	Both	Without	Without	Photo-eye	No
0504	Photoeye	N.C.	as before	Min. hold- open time	With	Both	Without	Without	Photo-eye	No

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
0505	Photoeye with through-travel sensing 1	N.O.	as before	as before	With	Both	Without	Without	Photo-eye	No
0506	Photoeye with through-travel sensing 2	N.C.	as before	Min. hold-open time	With	Both	Without	Without	Photo-eye	No
0507	Photoeye	N.O.	as before	as before	With	Both	Without	Without	Photo-eye	No
0601	Auto / Manual	N.O.	-	-	-	-	Without	Without	Dead-man	No
0602	Auto / semi automatic	N.O.	-	-	-	-	Without	Without	Dead-man	No
0701	CLOSE	N.O.	-	-	-	with	Without	Without	Close	No
0801	Locking in lower end position, deadman not possible	N.O.	-	-	-	-	Without	Without	Locked Closed	No
0802	Locking in lower end position, deadman possible	N.O.	-	-	-	-	Without	Without	Locked Closed	No
0803	Locking in position	N.O.	Locking in Door Open position	-	-	-	Without	Without	Locked Interm	No
0804	Locking in position	N.O.	Locking in Door Close position	-	-	-	Without	Without	Locked Interm	No
0901	Cross-traffic, OPEN1 and DET1	N.O.	-	-	-	-	Without	Without	Cross Traffic	No
0902	Cross-traffic, OPEN2 and DET2	N.O.	-	-	-	-	Without	Without	Cross Traffic	No
0903	Cross-traffic, OPEN1+2 and DET1+2	N.O.	-	-	-	-	Without	Without	Cross Traffic	No
1001	Deactivate hold-open time	N.O.	-	-	-	-	Without	Without	Deacti-vation	No
1002	Deactivate airlock	N.O.	-	-	-	-	Without	Without	Deacti-vation	No

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
1003	Deactivate intermediate stop	N.O.	-	-	-	-	Without	Without	Deacti-vation	No
1004	Deactivate detector commands from outside	N.O.	-	-	-	-	Without	Without	Deacti-vation	No
1101	Photeye pre-limit switch	N.O.	-	-	-	-	Without	Without	Pre-Limit Photo	No
1102	Intermediate stop limit switch	N.O.	-	-	-	-	Without	Without	Limit Intermed.	No
1103	Intermediate stop pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLim Intern.	No
1104	Safety edge pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLimit Edge	No
1105	Safety edge pre-limit switch	N.C.	-	-	-	-	Without	Without	PreLimit Edge	No
1106	Upper pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLimit Open	No
1107	Upper pre-limit switch	N.C.	-	-	-	-	Without	Without	PreLimit Open	No
1108	Lower pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLimit Close	No
1109	Lower pre-limit switch	N.C.	-	-	-	-	Without	Without	PreLimit Close	No
1110	Endswitch Open	-	-	-	-	-	Without	Without	Limit Open	No
1111	Endswitch Close	N.C.	-	-	-	-	Without	Without	Limit Close	No
1112	Reference switch	N.O.	-	-	-	-	Without	Without	Reference -	No
1113	Reference switch	N.C.	-	-	-	-	Without	Without	Reference	No
1114	reserved	-	-	-	-	-	Without	Without	-	No

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
1401	Safety input stop during closing (not switch off able)	N.C.	-	-			Without	Without	Stop -	No
1402	Safety input reversing during closing (not switch off able)	N.C.	As before	As before	With	Both	Without	Without	Photo eye	No
1403	Safety input Stop during closing with move on after releasing th input	N.C.	As before	As before	With	Both	Without	Without	Photo eye	No
1404	Safety input A Stop during opening and closing	N.C.	Upper	Without	With	No	Without	Without	Photo eye	No
1405	Safety input A Stop during opening and closing, after releasing in closing the door drives to the close position.	N.C.	Upper	Without	With	No	Without	Without	Photo eye	No
1406	Safety input A Reversing during opening	N.C.	As before	As before	With	Both	Without	Without	Photo eye	No
1407	Safety input A Stop during opening	N.C.	As before	As before	With	Both	Without	Without	STOP	No
1408	Safety input A Draw in safety	N.C.	As before	As before	With	Both	Without	Without	Feed Retent.	In Door close position

33 Input Parameterizing

Any desired function can be set for each input on the door controller.

You can set the function either by selecting an input profile (P.501 to P.50A / P.A01 to P.A08) or individually using Parameters P.5x0 / P.Ax0 to P.5xA / P.AxA.

X = number of the input you wish to configure

Parameter group P.5xx

X = Input No.	TST FUS terminal	TST FUxE terminal
1	41	6
2	42	8
3	43	10
4	45	12
5	48	14
6	58	16
7	56	18
8	54	20
9	52	22
10	51	24

Only with TST RFUE

Parameter group P.Axx

X = Input No.	TST FUxE terminal
21	62
22	64
23	66
24	68
25	70
26	72
27	74
28	73

P.5x0 / P.Ax0 = basic function of the input

P.5x1 / P.Ax1 = mode of the basic function that was set under P.5x0

P.5x2 / P.Ax2 = Connected contact type: N.O. / normally open or N.C. / normally closed

P.5x3 / P.Ax3 = end position to move to

P.5x4 / P.Ax4 = type of hold-open time / forced closing which runs after activating the input
(P.010 to P.015)

P.5x5 / P.Ax5 = specifies whether the clear time runs after activating the input (P.020 and P.025)

P.5x6 / P.Ax6 = logical direction of the input

P.5x7 / P.Ax7 = Switch on delay of input

P.5x8 / P.Ax8 = Switch off delay of input

P.5x9 / P.Ax9 = LCD-Text, to be displayed when activating the input

P.5xA / P.AxA = Test of the input

IMPORTANT

Setting under P.5x0 / P.Ax0 also involves various settings for Parameters P.5x1 / P.Ax1 to P.5xA / P.AxA.

33.1 OPEN commands P.5x0 / P.Ax0 = 1

Parameter **P.5x0** must be set to **1** in order to activate the basic function **OPEN command** for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 5	Mode	<p>This parameter specifies the mode of the OPEN command.</p> <p>0: OPEN 1, lockable 1: OPEN 2, lockable 2: OPEN 3, not lockable 3: OPEN 4, not lockable 4: OPEN 5, not lockable and deadman travel possible <i>☞ Deadman opening using external command switches is only possible using this setting.</i> 5: OPEN airlock move, not lockable <i>☞ This OPEN command can only be used with an active airlock system</i></p> <p><i>☞ OPEN 1 and OPEN 2 are lockable by means of cross-traffic inputs or induction loop inputs, i.e., the command cannot then be executed.</i></p> <p><i>☞ OPEN 1 and OPEN 2 as well as OPEN 3 and OPEN 4 are identical in their function. You must assign these to the respective directions when using different directions (P.5x6).</i></p>
P.5x2 P.Ax2	0 ... 1	Contact type	<p>Specifies the contact type of the switch which is connected to the input.</p> <p>0: Normally open 1: Normally closed</p>
P.5x3 P.Ax3	0 ... 4	End position to move to	<p>This parameter specifies which end position is traveled to after activating the input.</p> <p>0: End position Door OPEN 1: End position intermediate stop / partial opening 2: When activating Door CLOSE end position, the door travels up to the intermediate stop / partial opening end position, and when activating intermediate stop the door travels up to the Door OPEN end position. 3: like 2., but the door travels directly to the Door OPEN end position if activation takes place 2x in quick succession in the Lower end position. 4: The door travels to the end position which was driven to before.</p>

P.	[Unit] Range	Function	Description / Note
P.5x4 P.Ax4	0 ... 4	Hold-open time	<p>This parameter specifies if and which hold-open time / forced closing time runs after activating the input.</p> <p>0: Without hold-open time 1: With hold-open time (P.010 or P.011) 2: With minimum hold-open time (P.015) 3: No hold-open time until a CLOSE command is issued. 4: Hold -open time as used before with the last open command.</p>
P.5x5 P.Ax5	0 ... 1	Clear time	<p>Activates the clear time which is effective before the next closing.</p> <p>0: No clear time 1: With clear time (P.025)</p>
P.5x6 P.Ax6	0 ... 3	Direction	<p>Specifies which logical direction the input has. Specifying the direction is necessary for opposing traffic controllers. The controller uses this information to decide which direction is clear, which traffic light is switched or which airlock gate is opened.</p> <p>0: No direction specified 1: From outside to inside 2: From inside to outside 3: Both directions are cleared</p>
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	<p>The recognize of the input is delayed for the value put in with this parameter.</p>
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	<p>The recognize of the input is extended for the value put in with this parameter.</p>
P.5x9 P.Ax9	0 ... 39	LCD-Text	<p>For each input you can select an LCD message from a list which is displayed when the corresponding input is activated.</p> <p>The list of messages can be found in the Appendix LCD Messages</p>
P.5xA P.AxA	0 ... 2	Test	<p>Each input can be tested. With this parameter you can select in which End position the Input will be tested.</p> <p>0: No test 1: Test in the endpostion Door Open and after start up of the controller 2: Test in the endpostion Door Close and after start up of the controller</p>

33.2 Single-channel pull switch commands P.5x0 = 2

Parameter **P.5x0** must be set to 2 in order to activate the basic function **single-channel / pull switch** for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 7	Mode	<p>This parameter specifies the mode of the single-channel command.</p> <p>By repeatedly activating the input the various commands are run in the sequence shown below.</p> <p>0: OPEN→STOP→OPEN→End position 1: OPEN→STOP→OPEN→End position→CLOSE→OPEN 2: OPEN→End position→CLOSE→OPEN 3: OPEN→STOP→CLOSE→OPEN 4: OPEN→STOP→CLOSE→STOP 5: OPEN→End position 6: CLOSE 7: OPEN only in End position Door CLOSE</p> <p><i>☞ The end position reached is specified using Parameter P.5x3.</i></p>
P.5x2 P.Ax2	0 ... 1	Contact type	<p>Specifies the contact type of the switch which is connected to the input.</p> <p>0: Normally open 1: Normally closed</p>
P.5x3 P.Ax3	0 ... 4	End position to move to	<p>This parameter specifies which end position is traveled to after activating the input.</p> <p>0: End position Door OPEN 1: End position intermediate stop / partial opening 2: When activating Door CLOSE end position, the door travels up to the intermediate stop / partial opening end position, and when activating intermediate stop the door travels up to the Door OPEN end position. 3: like 2., but the door travels directly to the Door OPEN end position if activation takes place 2x in quick succession in the Lower end position. 4: The door travels to the end position which was driven to before.</p>
P.5x4 P.Ax4	0 ... 4	Hold-open time	<p>This parameter specifies if and which hold-open time / forced closing time runs after activating the input.</p> <p>0: Without hold-open time 1: With hold-open time (P.010 or P.011) 2: With minimum hold-open time (P.015) 3: No hold-open time until a CLOSE command is issued. 4: Hold -open time as used before with the last open command.</p>

P.	[Unit] Range	Function	Description / Note
P.5x5 P.Ax5	0 ... 1	Clear time	Activates the clear time which is effective before the next closing. 0: No clear time 1: With clear time (P.025)
P.5x6 P.Ax6	0 ... 3	Direction	Specifies which logical direction the input has. Specifying the direction is necessary for opposing traffic controllers. The controller uses this information to decide which direction is clear, which traffic light is switched or which airlock gate is opened. 0: No direction specified 1: From outside to inside 2: From inside to outside 3: Both directions are cleared
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages
P.5xA P.AxA	0 ... 2	Test	Each input can be tested. With this parameter you can select in which End position the Input will be tested. 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller

33.3 Permanent OPEN commands P.5x0 / P.Ax0 = 3

Parameter **P.5x0** must be set to **3** in order to activate the basic function **Permanent OPEN** for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1		Mode	This parameter is not evaluated when using this function.
P.5x2 P.Ax2	0 ... 1	Contact type	Specifies the contact type of the switch which is connected to the input. 0: Normally open 1: Normally closed
P.5x3 P.Ax3	0 ... 4	End position to move to	This parameter specifies which end position is traveled to after activating the input. 5: End position Door OPEN 6: End position intermediate stop / partial opening 7: When activating Door CLOSE end position, the door travels up to the intermediate stop / partial opening end position, and when activating intermediate stop the door travels up to the Door OPEN end position. 8: like 2., but the door travels directly to the Door OPEN end position if activation takes place 2x in quick succession in the Lower end position. 9: The door travels to the end position which was driven to before.
P.5x4 P.Ax4		Hold-open time	This parameter is not evaluated when using this function.
P.5x5 P.Ax5		Clear time	This parameter is not evaluated when using this function.
P.5x6 P.Ax6	0 ... 3	Direction	Specifies which logical direction the input has. Specifying the direction is necessary for opposing traffic controllers. The controller uses this information to decide which direction is clear, which traffic light is switched or which airlock gate is opened. 0: No direction specified 1: From outside to inside 2: From inside to outside 3: Both directions are cleared
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.

P.	[Unit] Range	Function	Description / Note
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages
P.5xA P.AxA	0 ... 2	Test	Each input can be tested. With this parameter you can select in which End position the Input will be tested. 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller

IMPORTANT If the door was opened using a Permanent OPEN command, it can only closed then using an external CLOSE command. It is not possible to close using a hold-open time / forced closing.

33.4 External STOP commands P.5x0 / P.Ax0 = 4

Parameter **P.5x0** must be set to 4 in order to activate the basic function **STOP** for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 1	Mode	This parameter specifies the mode of the STOP command. 0: Stop function 1: Stop function and also acknowledgement function, i.e. this input is used for an acknowledgement. An acknowledgement must be performed under the conditions defined in P.408
P.5x2 P.Ax2	0 ... 1	Contact type	Specifies the contact type of the switch which is connected to the input. 0: Normally open 1: Normally closed
P.5x3 P.Ax3		End position to move to	This parameter is not evaluated when using this function.
P.5x4 P.Ax4		Hold-open time	This parameter is not evaluated when using this function.
P.5x5 P.Ax5		Clear time	This parameter is not evaluated when using this function.
P.5x6 P.Ax6		Direction	This parameter is not evaluated when using this function.
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages
P.5xA P.AxA	0 ... 2	Test	Each input can be tested. With this parameter you can select in which End position the Input will be tested. 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller

33.5 Safety input B P.5x0 / P.Ax0 = 5

Parameter **P.5x0** must be set to **5** in order to activate the basic function **Safety input B** command for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 9	Mode	<p>This parameter says how to react resp. which function is done after activating an safety input.</p> <p>0: Reversing during CLOSING 1: Stop during CLOSING 2: Reversing during CLOSING and Stop during OPENING 3: Stop during OPENING 4: Draw in safety device 5: Stop during OPENING with automatic reopening after deactivating the input. 6: Stop during OPENING and CLOSING 7: Stop during OPENING and CLOSING, after releasing in close travel the door moves on to end position CLOSE 8: Stop during CLOSING, after releasing in close travel the door moves on to end position CLOSE 9: Reversing during OPENING</p>
P.5x2 P.Ax2	0 ... 1	Contact type	<p>Specifies the contact type of the switch which is connected to the input.</p> <p>0: Normally open 1: Normally closed</p>
P.5x3 P.Ax3	0 ... 4	End position to move to	<p>This parameter specifies which end position is traveled to after activating the input.</p> <p>0: End position Door OPEN 1: End position intermediate stop / partial opening 2: When activating Door CLOSE end position, the door travels up to the intermediate stop / partial opening end position, and when activating intermediate stop the door travels up to the Door OPEN end position. 3: like 2., but the door travels directly to the Door OPEN end position if activation takes place 2x in quick succession in the Lower end position. 4: The door travels to the end position which was driven to before.</p>
P.5x4 P.Ax4	0 ... 4	Hold-open time	<p>This parameter specifies if and which hold-open time / forced closing time runs after activating the input.</p> <p>0: Without hold-open time 1: With hold-open time (P.010 or P.011) 2: With minimum hold-open time (P.015) 3: No hold-open time until a CLOSE command is issued. 4: Hold -open time as used before with the last open command.</p>

P.	[Unit] Range	Function	Description / Note
P.5x5 P.Ax5	0 ... 1	Clear time	Activates the clear time which is effective before the next closing. 0: No clear time 1: With clear time (P.025)
P.5x6 P.Ax6		Direction	This parameter is not evaluated when using this function.
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages
P.5xA P.AxA	0 ... 2	Test	Each input can be tested. With this parameter you can select in which End position the Input will be tested. 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller
P.4B0	0 ... 4	Deactivation Safety input B during OPENING	Selection of different possibilities to deactivate the safety input for OPENING 0: No deactivation 1: Deactivation after reaching end position OPEN 2: Deactivation after reaching the pre limit switch OPEN 3: Deactivation after reaching the pre limit switch OPEN for Safety input B (P.4B5) (only possible with electrical limit switches) 4: Deactivation after reaching the end position OPEN and run off time (P.4B5) which starts after reaching the end position OPEN
P.4B1	0 ... 4	Deactivation Safety input B during CLOSING	Selection of different possibilities to deactivate the safety input for OPENING 0: No deactivation 1: Deactivation after reaching end position CLOSE 2: Deactivation after reaching the pre limit switch CLOSE 3: Deactivation after reaching a pre adjusted position 4: Reserved
P.4B2	0 ... 9999	Position to deactivate Safety input B during OPENING	The Safety input B is deactivated at the adjusted position

P.	[Unit] Range	Function	Description / Note
P.4B3	0 ... 9999	Position to deactivate Safety input B during CLOSING	The Safety input B is deactivated at the adjusted position
P.4B7	0 ... 3	CLOSE command after deactivating safety input	<p>After releasing the safety input different Close commands can be generated:</p> <p>0: No CLOSE-Command 1: CLOSE-Command after deactivating safety input 2: CLOSE-Command after deactivating safety input and additionally the CLOSE-Command is stored during OPENING. 3: Reserved</p>
P.4B8	0 ... 1	Deactivation of triggering of the hold open time	<p>If this function is active a command to this input will not start the hold open time again.</p> <p>0: Input will recognised during opening 1: Input will not recognised during opening</p>
P.4B9	0 ... 1	Deactivation during automatic synchronisation	<p>The safety input is deactivated during automatic synchronisation:</p> <p>0: Input active 1: Input not active</p>

33.6 Manual / Automatic toggling P.5x0 / P.Ax0 = 6

Parameter **P.5x0** must be set to **6** in order to activate the basic function **Manual / Automatic toggle** for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 1	Mode	This parameter specifies how Manual / Automatic toggling is used. When activated, the controller switches over to manual mode. 0: Manual permits closing only 1: Manual permits opening and closing <i>☞ Switching over to manual operation functions only if P.980 = 0.</i>
P.5x2 P.Ax2	0 ... 1	Contact type	Specifies the contact type of the switch which is connected to the input. 0: Normally open 1: Normally closed
P.5x3 P.Ax3		End position to move to	This parameter is not evaluated when using this function.
P.5x4 P.Ax4		Hold-open time	This parameter is not evaluated when using this function.
P.5x5 P.Ax5		Clear time	This parameter is not evaluated when using this function.
P.5x6 P.Ax6		Direction	This parameter is not evaluated when using this function.
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages
P.5xA P.AxA	0 ... 2	Test	Each input can be tested. With this parameter you can select in which End position the Input will be tested. 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller

33.7 CLOSE commands P.5x0 / P.Ax0= 7

Parameter **P.5x0 must be set to 7** in order to activate the basic function **CLOSE command** command for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 2	Mode	This parameter specifies the mode of the CLOSE command. 0: Closing in automatic mode only 1: Closing in manual and automatic mode 2: Closing from Door OPEN end position to Intermediate Stop / Partial Opening end position
P.5x2 P.Ax2	0 ... 1	Contact type	Specifies the contact type of the switch which is connected to the input. 0: Normally open 1: Normally closed
P.5x3 P.Ax3		End position to move to	This parameter is not evaluated when using this function.
P.5x4 P.Ax4		Hold-open time	This parameter is not evaluated when using this function.
P.5x5 P.Ax5	0 ... 1	Clear time	Activates the clear time which is effective before the next closing. 0: No clear time 1: With clear time (P.025) for CLOSE command in end position
P.5x6 P.Ax6		Direction	This parameter is not evaluated when using this function.
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages
P.5xA P.AxA	0 ... 2	Test	Each input can be tested. With this parameter you can select in which End position the Input will be tested. 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller

33.8 Door locking P.5x0 / P.Ax0 =8

Parameter **P.5x0 must be set to 8** in order to activate the basic function **Door locking** for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 2	Mode	This parameter specifies the behavior of the door when locking is activated. 0: Door locking in end position Door-CLOSE, no deadman move permitted 1: Door locking in end position Door-CLOSE, Deadman move permitted 2: Door locking in position which is set by parameter P.5x3. Also a drive command is given so that the door moves automatically in deadman speed to the adjusted position.
P.5x2 P.Ax2	0 ... 1	Contact type	Specifies the contact type of the switch which is connected to the input. 0: Normally open 1: Normally closed
P.5x3 P.Ax3	0 ... 3	Door locking position	With this parameter you set in which position the door will be locked. 0: Locking in end position Door-OPEN 1: Locking in intermediate stop 1 (P.240) 2: Locking in intermediate stop 2 (P.245) (only by using electrical limit switches) 3: Locking in end position Door-CLOSE
P.5x4 P.Ax4		Hold-open time	This parameter is not evaluated when using this function.
P.5x5 P.Ax5		Clear time	This parameter is not evaluated when using this function.
P.5x6 P.Ax6		Direction	This parameter is not evaluated when using this function.
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages

P.	[Unit] Range	Function	Description / Note
P.5xA P.AxA	0 ... 2	Test	Each input can be tested. With this parameter you can select in which End position the Input will be tested. 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller
P.245	[increments] 25 ... 9999	Intermediate stop E2	The entered value specifies the distance of the intermediate stop position to the end position Door CLOSE in increments. <i>☞ If an absolute encoder is used as the limit switch, a max. of 4200 increments are possible.</i>

33.9 Cross-traffic input P.5x0 / P.Ax0 = 9

Parameter **P.5x0** must be set to **9** in order to activate the basic function **Cross-traffic** for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 7	Mode	This parameter specifies the mode of the cross-traffic input. If this input is activated, the following commands are locked or suppressed for the time set under Parameters P.810 and P.820. 0: Detector Channels 1 and 2 as well as OPEN 1 and 2 commands 1: Detector channel 1 2: Detector channel 2 3: Detector channels 1 and 2 4: OPEN 1 commands 5: Detector channel1 and OPEN 1 commands 6: OPEN 2 commands 7: Detector channel 2 and OPEN 2 commands
P.5x2 P.Ax2	0 ... 1	Contact type	Specifies the contact type of the switch which is connected to the input. 0: Normally open 1: Normally closed
P.5x3 P.Ax3		End position to move to	This parameter is not evaluated when using this function.
P.5x4 P.Ax4		Hold-open time	This parameter is not evaluated when using this function.
P.5x5 P.Ax5		Clear time	This parameter is not evaluated when using this function.

P.	[Unit] Range	Function	Description / Note
P.5x6 P.Ax6		Direction	This parameter is not evaluated when using this function.
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages
P.5xA P.AxA	0 ... 2	Test	Each input can be tested. With this parameter you can select in which End position the Input will be tested. 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller
P.810	[s] 0 ... 30	Block time Detector Channel 1 and OPEN 1	Detector channel 1 and OPEN 1 commands are locked out for the time specified in this parameter after activating a cross-traffic input.
P.820	[s] 0 ... 30	Block time Detector Channel 2 and OPEN 2	Detector channel 2 and OPEN 2 commands are locked out for the time specified in this parameter after activating a cross-traffic input.

33.10 Turn-off / Deactivating P.5x0 / P.Ax0 = 10

Parameter **P.5x0** must be set to **10** in order to activate the basic function **Turn-off / Deactivating** for this input.

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X = number of the input you wish to configure

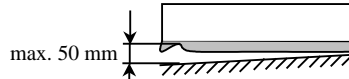
P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 10	Mode	This parameter specifies which function or which input is deactivated. 0: Hold-open time / Forced closing 1: OPEN commands from the outside (P.5.6 = 1) 2: Detector commands from the outside (P.666 or P.676) 3: Intermediate stop / partial opening 4: Airlock function 5: Foil keypad for door function, for parameterizing the keypad is still activated. 6: Reserved 7: Reserved 8: Deactivating Deadman move, e.g. to prevent unauthorized door move in public areas. 9: Deactivating of all external drive commands (out of foil key pad, external foil key pad and locking in intermediate stop). 10: Deactivating of high speed drive. Only driving in jog mode speed is possible.
P.5x2 P.Ax2	0 ... 1	Contact type	Specifies the contact type of the switch which is connected to the input. 0: Normally open 1: Normally closed
P.5x3 P.Ax3		End position to move to	This parameter is not evaluated when using this function.
P.5x4 P.Ax4		Hold-open time	This parameter is not evaluated when using this function.
P.5x5 P.Ax5		Clear time	This parameter is not evaluated when using this function.
P.5x6 P.Ax6		Direction	This parameter is not evaluated when using this function.
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages

P.	[Unit] Range	Function	Description / Note
P.5xA P.AxA	0 ... 2	Test	Each input can be tested. With this parameter you can select in which End position the Input will be tested. 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller

33.11 Limit switch functions P.5x0 / P.Ax0= 11

Parameter **P.5x0** must be set to 11 in order to activate the basic function **Limit switch functions** for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 7	Mode	Specifies which limit switch type is connected to the input. 0: Safety edge pre-limit switch ⚠ WARNING The max. permissible distance of the safety edge pre-limit switch to the floor is 50mm at the lowest point.  1: Photoeye pre-limit switch 2: Intermediate stop / partial opening limit switch 3: Reference switch IMPORTANT Only one reference switch can be used. Either in Door OPEN end positoin or in Door CLOSE end position. 4: Pre-limit switch Door OPEN 5: Pre-limit switch Door CLOSE 6: Pre-limit switch Intermediate stop / partial opening 7: reserved
P.5x2 P.Ax2	0 ... 1	Contact type	Specifies the contact type of the switch which is connected to the input. 0: Normally open 1: Normally closed
P.5x3 P.Ax3		End position to move to	This parameter is not evaluated when using this function.
P.5x4 P.Ax4		Hold-open time	This parameter is not evaluated when using this function.

P.	[Unit] Range	Function	Description / Note
P.5x5 P.Ax5		Clear time	This parameter is not evaluated when using this function.
P.5x6 P.Ax6		Direction	This parameter is not evaluated when using this function.
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages
P.5xA P.AxA	0 ... 2	Test	Each input can be tested. With this parameter you can select in which End position the Input will be tested. 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller

33.12 Safety inputs A P.5x0 / P.Ax0 = 14

Parameter **P.5x0 must be set to 14** in order to activate the basic function **Safety input A** for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 9	Mode	This parameter says how to react resp. which function is done after activating an safety input. 0: Reversing during CLOSING 1: Stop during CLOSING 2: Reversing during CLOSING and Stop during OPENING 3: Stop during OPENING 4: Draw in safety device 5: Stop during OPENING with automatic reopening after deactivating the input. 6: Stop during OPENING and CLOSING 7: Stop during OPENING and CLOSING, after releasing in close travel the door moves on to end position CLOSE 8: Stop during CLOSING, after releasing in close travel the door moves on to end position CLOSE 9: Reversing during OPENING

P.	[Unit] Range	Function	Description / Note
P.5x2 P.Ax2	0 ... 1	Contact type	Specifies the contact type of the switch which is connected to the input. 0: Normally open 1: Normally closed
P.5x3 P.Ax3	0 ... 4	End position to move to	This parameter specifies which end position is traveled to after activating the input. 0: End position Door OPEN 1: End position intermediate stop / partial opening 2: When activating Door CLOSE end position, the door travels up to the intermediate stop / partial opening end position, and when activating intermediate stop the door travels up to the Door OPEN end position. 3: like 2., but the door travels directly to the Door OPEN end position if activation takes place 2x in quick succession in the Lower end position. 4: The door travels to the end position which was driven to before.
P.5x4 P.Ax4	0 ... 4	Hold-open time	This parameter specifies if and which hold-open time / forced closing time runs after activating the input. 0: Without hold-open time 1: With hold-open time (P.010 or P.011) 2: With minimum hold-open time (P.015) 3: No hold-open time until a CLOSE command is issued. 4: Hold -open time as used before with the last open command.
P.5x5 P.Ax5	0 ... 1	Clear time	Activates the clear time which is effective before the next closing. 0: No clear time 1: With clear time (P.025)
P.5x6 P.Ax6		Direction	This parameter is not evaluated when using this function.
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages

P.	[Unit] Range	Function	Description / Note
P.5xA P.AxA	0 ... 2	Test	<p>Each input can be tested. With this parameter you can select in which End position the Input will be tested.</p> <p>0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller</p>
P.4A0	0 ... 4	Deactivation Safety input A during OPENING	<p>Selection of different possibilities to deactivate the safety input for OPENING</p> <p>0: No deactivation 1: Deactivation after reaching end position OPEN 2: Deactivation after reaching the pre limit switch OPEN 3: Deactivation after reaching the pre limit switch OPEN for Safety input B (P.4A5) (only possible with electrical limit switches) 4: Deactivation after reaching the end position OPEN and run off time (P.4A5) which starts after reaching the end position OPEN</p>
P.4A1	0 ... 4	Deactivation Safety input A during CLOSING	<p>Selection of different possibilities to deactivate the safety input for OPENING</p> <p>0: No deactivation 1: Deactivation after reaching end position CLOSE 2: Deactivation after reaching the pre limit switch CLOSE 3: Deactivation after reaching a pre adjusted position 4: Reserved</p>
P.4A2	0 ... 9999	Position to deactivate Safety input A during OPENING	The Safety input A is deactivated at the adjusted position
P.4A3	0 ... 9999	Position to deactivate Safety input A during CLOSING	The Safety input A is deactivated at the adjusted position
P.4A7	0 ... 3	CLOSE command after deactivating safety input	<p>After releasing the safety input different Close commands can be generated:</p> <p>0: No CLOSE-Command 1: CLOSE-Command after deactivating safety input 2: CLOSE-Command after deactivating safety input and additionally the CLOSE-Command is stored during OPENING. 3: Reserved</p>
P.4A8	0 ... 1	Deactivation of triggering of the hold open time	<p>If this function is active a command to this input will not start the hold open time again.</p> <p>0: Input will recognised during opening 1: Input will not recognised during opening</p>

P.	[Unit] Range	Function	Description / Note
P.4A9	0 ... 1	Deactivation during automatic synchronisation	The safety input is deactivated during automatic synchronisation: 0: Input active 1: Input not active

33.13 Simulation of the foil key pad P.5x0 / P.Ax0= 15

Parameter **P.5x0** must be set to **15** in order to activate the basic function **Simulation of the foil key pad** for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 2	Mode	This parameters says which foil key is simulated. 0: OPEN foil key 1: STOP foil key 2: CLOSE foil key
IMPORTANT The external foil key pad is not useable to parametrise the controller. The functionality depends on the settings for the foil key pad (P.630 up tp P.659)			
P.5x2 P.Ax2	0 ... 1	Contact type	Specifies the contact type of the switch which is connected to the input. 0: Normally open 1: Normally closed
P.5x3 P.Ax3		End position to move to	This parameter is not evaluated when using this function. The settings are done for the respective foil key are taken over (see P.630 up to P.659)
P.5x4 P.Ax4		Hold-open time	This parameter is not evaluated when using this function. The settings are done for the respective foil key are taken over (see P.630 up to P.659)
P.5x5 P.Ax5		Clear time	This parameter is not evaluated when using this function. The settings are done for the respective foil key are taken over (see P.630 up to P.659)

P.	[Unit] Range	Function	Description / Note
P.5x6 P.Ax6		Direction	This parameter is not evaluated when using this function. The settings are done for the respective foil key are taken over (see P.630 up to P.659)
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	This parameter is not evaluated when using this function. The settings are done for the respective foil key are taken over (see P.630 up to P.659)
P.5xA P.AxA	0 ... 2	Test	<p>Each input can be tested. With this parameter you can select in which End position the Input will be tested.</p> <ul style="list-style-type: none"> 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller

33.14 Safety inputs C P.5x0 / P.Ax0 = 16

Parameter **P.5x0 must be set to 16** in order to activate the basic function **Safety input C** for this input.

X = number of the input you wish to configure

P.	[Unit] Range	Function	Description / Note
P.5x1 P.Ax1	0 ... 9	Mode	<p>This parameter says how to react resp. which function is done after activating an safety input.</p> <p>0: Reversing during CLOSING 1: Stop during CLOSING 2: Reversing during CLOSING and Stop during OPENING 3: Stop during OPENING 4: Draw in safety device 5: Stop during OPENING with automatic reopening after deactivating the input. 6: Stop during OPENING and CLOSING 7: Stop during OPENING and CLOSING, after releasing in close travel the door moves on to end position CLOSE 8: Stop during CLOSING, after releasing in close travel the door moves on to end position CLOSE 9: Reversing during OPENING</p>
P.5x2 P.Ax2	0 ... 1	Contact type	<p>Specifies the contact type of the switch which is connected to the input.</p> <p>0: Normally open 1: Normally closed</p>
P.5x3 P.Ax3	0 ... 4	End position to move to	<p>This parameter specifies which end position is traveled to after activating the input.</p> <p>0: End position Door OPEN 1: End position intermediate stop / partial opening 2: When activating Door CLOSE end position, the door travels up to the intermediate stop / partial opening end position, and when activating intermediate stop the door travels up to the Door OPEN end position. 3: like 2., but the door travels directly to the Door OPEN end position if activation takes place 2x in quick succession in the Lower end position. 4: The door travels to the end position which was driven to before.</p>
P.5x4 P.Ax4	0 ... 4	Hold-open time	<p>This parameter specifies if and which hold-open time / forced closing time runs after activating the input.</p> <p>0: Without hold-open time 1: With hold-open time (P.010 or P.011) 2: With minimum hold-open time (P.015) 3: No hold-open time until a CLOSE command is issued. 4: Hold -open time as used before with the last open command.</p>

P.	[Unit] Range	Function	Description / Note
P.5x5 P.Ax5	0 ... 1	Clear time	Activates the clear time which is effective before the next closing. 0: No clear time 1: With clear time (P.025)
P.5x6 P.Ax6		Direction	This parameter is not evaluated when using this function.
P.5x7 P.Ax7	[s] 0 ... 9999	Switch on delay of input	The recognize of the input is delayed for the value put in with this parameter.
P.5x8 P.Ax8	[s] 0 ... 9999	Switch off delay of input	The recognize of the input is extended for the value put in with this parameter.
P.5x9 P.Ax9	0 ... 39	LCD-Text	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages
P.5xA P.AxA	0 ... 2	Test	Each input can be tested. With this parameter you can select in which End position the Input will be tested. 0: No test 1: Test in the endposition Door Open and after start up of the controller 2: Test in the endposition Door Close and after start up of the controller
P.4C0	0 ... 4	Deactivation Safety input C during OPENING	Selection of different possibilities to deactivate the safety input for OPENING 0: No deactivation 1: Deactivation after reaching end position OPEN 2: Deactivation after reaching the pre limit switch OPEN 3: Deactivation after reaching the pre limit switch OPEN for Safety input B (P.4C5) (only possible with electrical limit switches) 4: Deactivation after reaching the end position OPEN and run off time (P.4C5) which starts after reaching the end position OPEN
P.4C1	0 ... 4	Deactivation Safety input C during CLOSING	Selection of different possibilities to deactivate the safety input for OPENING 0: No deactivation 1: Deactivation after reaching end position CLOSE 2: Deactivation after reaching the pre limit switch CLOSE 3: Deactivation after reaching a pre adjusted position 4: Reserved
P.4C2	0 ... 9999	Position to deactivate Safety input C during OPENING	The Safety input C is deactivated at the adjusted position

P.	[Unit] Range	Function	Description / Note
P.4C3	0 ... 9999	Position to deactivate Safety input C during CLOSING	The Safety input C is deactivated at the adjusted position
P.4C7	0 ... 3	CLOSE command after deactivating safety input	After releasing the safety input different Close commands can be generated: 0: No CLOSE-Command 1: CLOSE-Command after deactivating safety input 2: CLOSE-Command after deactivating safety input and additionally the CLOSE-Command is stored during OPENING. 3: Reserved
P.4C8	0 ... 1	Deactivation of triggering of the hold open time	If this function is active a command to this input will not start the hold open time again. 0: Input will recognised during opening 1: Input will not recognised during opening
P.4C9	0 ... 1	Deactivation during automatic synchronisation	The safety input is deactivated during automatic synchronisation: 0: Input active 1: Input not active

34 Foil keypad input OPEN

P.	[Unit] Range	Function	Description / Note
P.630	0 ... 2	Function foil keypad OPEN	Specifies the function (mode) of the OPEN key 0: No door function 1: Only deadman move during deadman operation 2: Deadman and Automatic
P.633	0 ... 4	End position to move to	This parameter specifies which end position is traveled to after activating the input. 0: End position Door OPEN 1: End position intermediate stop / partial opening 2: When activating Door CLOSE end position, the door travels up to the intermediate stop / partial opening end position, and when activating intermediate stop the door travels up to the Door OPEN end position. 3: like 2., but the door travels directly to the Door OPEN end position if activation takes place 2x in quick succession in the Lower end position. 4: The door travels to the end position which was driven to before.

P.	[Unit] Range	Function	Description / Note
P.634	0 ... 4	Hold-open time	<p>This parameter specifies if and which hold-open time / forced closing time runs after activating the input.</p> <p>0: Without hold-open time 1: With hold-open time (P.010 or P.011) 2: With minimum hold-open time (P.015) 3: No hold-open time until a CLOSE command is issued. 4: Hold -open time as used before with the last open command.</p>
P.635	0 ... 1	Clear time	<p>Activates the clear time / pre-warning time before closing the door if it was previously opened by pressing the OPEN key.</p> <p>0: No clear time 1: with clear time</p> <p>☞ The clear time / pre-warning time before closing is set using Parameter P.025.</p>
P.636	0 ... 3	Direction	<p>The direction of the OPEN command is used mainly for direction-dependent controlling of traffic lights. The parameter specifies for which direction the OPEN command works.</p> <p>0: No direction enabled 1: From outside to inside is enabled 2: From inside to outside is enabled 3: Both directions are cleared</p>
P.639	0 ... 39	LCD-Message	<p>For each input you can select an LCD message from a list which is displayed when the corresponding input is activated.</p> <p>The list of messages can be found in the Appendix LCD Messages</p>

35 Foil keypad STOP input

P.	[Unit] Range	Function	Description / Note
P.640	0 ... 1	Function foil keypad STOP	Specifies the function (mode) of the STOP key 0: After pressing the STOP key the door is stopped and waits for any command 1: After pressing the STOP key the door is stopped and waits for a keypad command
P.649	0 ... 39	LCD-Message	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages

36 Foil keypad CLOSE input

P.	[Unit] Range	Function	Description / Note
P.650	0 ... 2	Function foil keypad CLOSE	Specifies the function (mode) of the CLOSE key 0: No door function 1: Only deadman move during deadman operation 2: Deadman and Automatic
P.655	0 ... 1	Clear time	Changing this parameter specifies whether the clear time before closing is cancelled or not. 0: Direct closing without a clear time 1: Door closes after the clear time has elapsed ☞ The clear time / pre-warning time before closing is set using Parameter P.025.
P.659	0 ... 39	LCD-Message	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages

37 Induction loop plug-in detector

P.	[Unit] Range	Function	Description / Note
P.890	0 ... 2	Locking of Close commands from detector	<p>Locking of Close commands from detectors at cross traffic and/or convoy traffic. The close command is suppressed as long as cross- or convoy traffic is there.</p> <p>0: No Locking 1: Locking of cross traffic 2: Locking of cross traffic and convoy traffic</p>

37.1 Detector channel 1

P.	[Unit] Range	Function	Description / Note
P.660	0 ... 10	Detector function Channel 1	<p>The response of the door controller to triggering of Detector Channel 1 is specified in this parameter.</p> <p>The detector responds as:</p> <p>0: No response to detector tripping 1: OPEN command 2: Additional safety 3: Additional safety with CLOSE command after leaving the loop 4: Additional safety with CLOSE command after leaving the loop, but the door is only stopped if occupied during the CLOSE command. 5: Reserved 6: Reserved 7: Reserved 8: Reserved 9: Additional safety, monitoring of OPEN and CLOSE travel, after releasing in OPENING the door will move on, in CLOSING only stop 10: Additional safety, monitoring of OPEN and CLOSE travel, after releasing in OPENING the door will move on, in CLOSING only stop. After leaving the loop the door will close.</p> <p><i>☞ Additional safety = If occupied during closing the door reverses, no automatic closing possible during Door OPEN end position</i></p>
P.663	0 ... 1	End position to move to	<p>Specifies which end position is traveled to after Detector Channel 1 is activated.</p> <p>0: To Door OPEN end position 1: To intermediate stop / partial opening</p>

P.	[Unit] Range	Function	Description / Note
P.664	0 ... 4	Hold-open time	<p>This parameter specifies if and which hold-open time / forced closing time runs after activating the input.</p> <p>0: Without hold-open time 1: With hold-open time (P.010 or P.011) 2: With minimum hold-open time (P.015) 3: No hold-open time until a CLOSE command is issued. 4: Hold -open time as used before with the last open command.</p> <p><i>☞ The hold-open time / forced closing time is set using Parameter P.010.</i></p> <p><i>☞ The minimum hold-open time is set using Parameter P.015.</i></p>
P.665	0 ... 1	Clear time	<p>Activates the clear time / pre-warning time before closing the door if it was previously opened by Detector Channel 1.</p> <p>0: No clear time 1: with clear time</p> <p><i>☞ The clear time / pre-warning time before closing is set using Parameter P.025.</i></p>
P.666	0 ... 3	Direction	<p>The direction is used mainly for direction-dependent controlling of traffic lights. The parameter specifies for which direction Detector Channel 1 works.</p> <p>0: No direction enabled 1: From outside to inside is enabled 2: From inside to outside is enabled 3: Both directions are cleared</p>
P.667	0 ... 3	Locking Detector Channel 1	<p>To prevent false triggering, the Detector channel can be locked out for the time specified in P.678.</p> <p>Channel 1 is locked out by:</p> <p>0: Detector channel 2 1: Detector channel 2 and OPEN 2 commands 2: Reserved 3: Reserved</p>
P.678	[s] 0 ... 120	Lock-out time	<p>Detector Channel 1 is locked out for the time specified in this parameter (see also P.667).</p>
P.669	0 ... 39	LCD-Message	<p>For each input you can select an LCD message from a list which is displayed when the corresponding input is activated.</p> <p>The list of messages can be found in the Appendix LCD Messages</p>
P.66A	[s] 0 ... 20	Turn-on delay Detector Channel 1	<p>The parameterized function of Detector Channel 1 is only executed after the time specified in this parameter.</p>

P.	[Unit] Range	Function	Description / Note
P.66C	0 ... 2	CLOSE-Command after leaving loop detector 1	By leaving the loop 1 different Close commands can be generated. 0: No CLOSE-Command 1: CLOSE-Command after deactivating safety input 2: CLOSE-Command after deactivating safety input and additionally the CLOSE-Command is stored during OPENING.
P.66D	0 ... 1	Deactivation of detector channel 1 during automatic synchronisation	Deactivates the detector channel 1 during the automatic synchronisation. 0: Detector is active during synchronisation 1: Detector is not active during synchronisation

37.2 Detector channel 2

P.	[Unit] Range	Function	Description / Note
P.670	0 ... 10	Detector function Channel 2	The response of the door controller to triggering of Detector Channel 1 is specified in this parameter. The detector responds as: 0: No response to detector tripping 1: OPEN command 2: Additional safety 3: Additional safety with CLOSE command after leaving the loop 4: Additional safety with CLOSE command after leaving the loop, but the door is only stopped if occupied during the CLOSE command. 5: Reserved 6: Reserved 7: Reserved 8: Reserved 9: Additional safety, monitoring of OPEN and CLOSE travel, after releasing in OPENING the door will move on, in CLOSING only stop 10: Additional safety, monitoring of OPEN and CLOSE travel, after releasing in OPENING the door will move on, in CLOSING only stop. After leaving the loop the door will close. <i>☞ Additional safety = If occupied during closing the door reverses, no automatic closing possible during Door OPEN end position</i>
P.673	0 ... 1	End position to move to	This parameter specifies which end position is traveled to after Detector Channel 2 is activated. 0: To Door OPEN end position 1: To intermediate stop / partial opening

P.	[Unit] Range	Function	Description / Note
P.674	0 ... 4	Hold-open time	<p>This parameter specifies if and which hold-open time / forced closing time runs after activating the input.</p> <p>0: Without hold-open time 1: With hold-open time (P.010 or P.011) 2: With minimum hold-open time (P.015) 3: No hold-open time until a CLOSE command is issued. 4: Hold -open time as used before with the last open command.</p> <p><i>☞ The hold-open time / forced closing time is set using Parameter P.010.</i></p> <p><i>☞ The minimum hold-open time is set using Parameter P.015.</i></p>
P.675	0 ... 1	Clear time	<p>Activates the clear time / pre-warning time before closing the door if it was previously opened by Detector Channel 2.</p> <p>0: No clear time 1: with clear time</p> <p><i>☞ The clear time / pre-warning time before closing is set using Parameter P.025.</i></p>
P.676	0 ... 3	Direction	<p>The direction is used mainly for direction-dependent controlling of traffic lights. The parameter specifies for which direction Detector Channel 2 works.</p> <p>0: No direction enabled 1: From outside to inside is enabled 2: From inside to outside is enabled 3: Both directions are cleared</p>
P.677	0 ... 3	Locking Detector Channel 2	<p>To prevent false triggering, the Detector channel can be locked out for the time specified in P.668.</p> <p>Channel 2 is locked out by:</p> <p>0: Detector channel 1 1: Detector Channel 1 and OPEN 1 commands 2: Reserved 3: Reserved</p>
P.668	[s] 0 ... 120	Lock-out time	<p>Detector Channel 2 is locked out for the time specified in this parameter (see also P.677).</p>
P.679	0 ... 39	LCD-Message	<p>For each input you can select an LCD message from a list which is displayed when the corresponding input is activated.</p> <p>The list of messages can be found in the Appendix LCD Messages</p>
P.67A	[s] 0 ... 20	Turn-on delay Detector Channel 2	<p>The parameterized function of Detector Channel 2 is only executed after the time specified in this parameter.</p>

P.	[Unit] Range	Function	Description / Note
P.67C	0 ... 2	CLOSE-Command after leaving loop detector 1	By leaving the loop 1 different Close commands can be generated. 0: No CLOSE-Command 1: CLOSE-Command after deactivating safety input 2: CLOSE-Command after deactivating safety input and additionally the CLOSE-Command is stored during OPENING.
P.67D	0 ... 1	Deactivation of detector channel 2 during automatic synchronisation	Deactivates the detector channel 1 during the automatic synchronisation. 0: Detector is active during synchronisation 1: Detector is not active during synchronisation

38 Radio plug-in receiver

38.1 Radio Channel 1

P.	[Unit] Range	Function	Description / Note
P.680	0 ... 16	Input function Radio Channel 1	The standard function for this input is the single-channel / pull-switch function (P.680 = 2). It is possible to set each Standardfunction, which is possible by the Inputs 1 to 10 If you want to change the inputfunctions for the Radio Channel, have a look to the input parameter
P.681	0 ... 7	Radio Channel 1	The radio function works similar to the single-channel / pull-switch function By repeatedly activating the radio transmitter the various commands are run in the sequence shown below. 0: OPEN→STOP→OPEN→End position 1: OPEN→STOP→OPEN→End position→CLOSE→OPEN 2: OPEN→End position→CLOSE→OPEN 3: OPEN→STOP→CLOSE→OPEN 4: OPEN→STOP→CLOSE→STOP 5: OPEN→End position 6: CLOSE 7: OPEN only in End position Door CLOSE

P.	[Unit] Range	Function	Description / Note
P.683	0 ... 4	End position to move to	<p>This parameter specifies which end position is traveled to after Radio Channel 1 is activated.</p> <p>0: To Door OPEN end position 1: To intermediate stop / partial opening 2: To intermediate stop / open from intermediate stop to Door OPEN end position 3: Like 2., but when key is pressed twice the door moves to the Door OPEN end position. <i>☞ Function only possible if P.681 = 2 or 5.</i> 4: The door travels to the end position which was driven to before.</p>
P.684	0 ... 4	Hold-open time	<p>This parameter specifies if and which hold-open time / forced closing time runs after reaching at the end position.</p> <p>0: Without hold-open time 1: With hold-open time 2: With minimum hold-open time 3: Hold-open time starts only following a CLOSE command. 4: Hold -open time as used before with the last open command.</p> <p><i>☞ The hold-open time / forced closing time is set using Parameter P.010.</i> <i>☞ The minimum hold-open time is set using Parameter P.015.</i></p>
P.685	0 ... 1	Clear time	<p>Activates the clear time / pre-warning time before closing the door if it was previously opened by Radio Channel 1.</p> <p>0: No clear time 1: with clear time</p> <p><i>☞ The clear time / pre-warning time before closing is set using Parameter P.025.</i></p>
P.686	0 ... 3	Direction	<p>The direction is used mainly for direction-dependent controlling of traffic lights. The parameter specifies for which direction Radio Channel 1 works.</p> <p>0: No direction enabled 1: From outside to inside is enabled 2: From inside to outside is enabled 3: Both directions are cleared</p>
P.689	0 ... 39	LCD-Message	<p>For each input you can select an LCD message from a list which is displayed when the corresponding input is activated.</p> <p>The list of messages can be found in the Appendix LCD Messages</p>

38.2 Radio Channel 2

P.	[Unit] Range	Function	Description / Note
P.690	0 ... 16	Input function Radio Channel 2	The standard function for this input is the single-channel / pull-switch function (P.690 = 2). It is possible to set each Standardfunction, which is possible by the Inputs 1 to 10 If you want to change the inputfunctions for the Radio Channel, have a look to the input parameter
P.691	0 ... 7	Radio Channel 2	The radio function works similar to the single-channel / pull-switch function By repeatedly activating the radio transmitter the various commands are run in the sequence shown below. 0: OPEN→STOP→OPEN→End position 1: OPEN→STOP→OPEN→End position→CLOSE→OPEN 2: OPEN→End position→CLOSE→OPEN 3: OPEN→STOP→CLOSE→OPEN 4: OPEN→STOP→CLOSE→STOP 5: OPEN→End position 6: CLOSE command 7: OPEN only in End position Door CLOSE
P.693	0 ... 4	End position to move to	This parameter specifies which end position is traveled to after Radio Channel 1 is activated. 0: To Door OPEN end position 1: To intermediate stop / partial opening 2: To intermediate stop / open from intermediate stop to Door OPEN end position 3: Like 2., but when key is pressed twice the door moves to the Door OPEN end position. <i>☞ Function only possible if P.681 = 2 or 5.</i> 4: The door travels to the end position which was driven to before.
P.694	0 ... 4	Hold-open time	This parameter specifies if and which hold-open time / forced closing time runs after reaching at the end position. 0: Without hold-open time 1: With hold-open time 2: With minimum hold-open time 3: Hold-open time starts only following a CLOSE command. 4: Hold -open time as used before with the last open command. <i>☞ The hold-open time / forced closing time is set using Parameter P.010.</i> <i>☞ The minimum hold-open time is set using Parameter P.015.</i>

P.	[Unit] Range	Function	Description / Note
P.695	0 ... 1	Clear time	Activates the clear time / pre-warning time before closing the door if it was previously opened by Radio Channel 2. 0: No clear time 1: with clear time ☞ The clear time / pre-warning time before closing is set using Parameter P.025.
P.696	0 ... 3	Direction	The direction is used mainly for direction-dependent controlling of traffic lights. The parameter specifies for which direction Radio Channel 2 works. 0: No direction enabled 1: From outside to inside is enabled 2: From inside to outside is enabled 3: Both directions are cleared
P.699	0 ... 39	LCD-Message	For each input you can select an LCD message from a list which is displayed when the corresponding input is activated. The list of messages can be found in the Appendix LCD Messages

39 Output profile with TST FUS

P.	[Unit] Range	Function	Description / Note
P.701	0000 ... 2601	Function of Output 1	<p>The function of the output relay can be specified using this profile. All parameters needed for the function of the output are changed in one step.</p> <p>The output can be set under the following conditions:</p> <ul style="list-style-type: none"> 0000: Output relay deactivated 0001: Door is OPEN 0201: Door is CLOSED 0401: No fault 0501: Courtyard light function: Turned on during every OPEN and CLOSE move with 10s turn-off delay after opening. 0502: Courtyard light function: Turned on for 120 seconds 0701: Flashing during OPEN and CLOSE move and in intermediate stop / partial open position 0801: On during OPEN and CLOSE move and during active clear time / pre-warning time 1001: Locking of other door 1201: Green traffic light on inside of door 1210: Green traffic light on outside of door 1220: Red traffic light on inside of Door 1 1221: Flashing red traffic light on inside of Door 1 1222: Red traffic light on inside of Door 2 1223: Flashing red traffic light on inside of Door 2 1224: Red traffic light on inside, flashing during pre warning time 1250: Red traffic light on outside of Door 1 1251: Flashing red traffic light on outside of Door 1 1252: Red traffic light on outside of Door 2 1253: Flashing red traffic light on outside of Door 2 1254: Not flashing red traffic light 1255: Red traffic light on outside, flashing during pre warning time 1281: Direction independent green traffic light 1601: Airlock OPEN 1701: Test output in end position door CLOSE 2501: Test output in end position door OPEN 2601: Always flashing, but not in end position OPEN, CLOSE or intermediate stop / partial open. <p><i>☞ The flashing red traffic light flashes during OPEN and CLOSE movement and during active clear time. All red traffic lights type 1 are turned off in the Door CLOSED end position.</i></p> <p><i>☞ The exact settings which this profile involves can be found in Appendix: Output Profile</i></p>
P.702	0000 ... 2601	Function of Output 2	see P.701

40 Output profile with TST FuxE

P.	[Unit] Range	Function	Description / Note
P.704	0000 ... 2601	Function of Output 4	see P.701
P.705	0000 ... 2601	Function of Output 5	see P.701

41 Output profile with TST RFUE

IMPORTANT

The expansion board TST RFUE can only be used in conjunction with TST FUE2 and TST FU3E door controllers.

IMPORTANT

The expansion board TST RFUE must be activated with P.800.

P.	[Unit] Range	Function	Description / Note
P.706	0000 ... 2601	Function of Output 6	see P.701
P.707	0000 ... 2601	Function of Output 7	see P.701
P.708	0000 ... 2601	Function of Output 8	see P.701
P.709	0000 ... 2601	Function of Output 9	see P.701

42 Output parameterizing

Any desired function can be set for each output on the door controller. You can set the function either by selecting an output profile (P.701 and P.702, P.704 to P.709) or individually using Parameters P.P.7x0 to P.7xF.

X = number of the output you wish to configure

X = Output No.	TST FUS terminal	X = Output No.	TST FUXE terminal	X = Output No.	TST FuxE terminal with RFUE
1	K 1 10/11/12	4	K 4 41/43/45	6	K 6 88/90/92
2	K 2 20/21/22	5	K 5 42/44/46	7	K 7 89/91/93
				8	K 8 94/96/98
				9	K 9 95/97/99

X = number of the output you wish to configure

P.	[Unit] Range	Function	Description / Note
P.7x0	0 ... 25	Switching condition Output relay	<p>The selected output relay is energized under the following conditions:</p> <ul style="list-style-type: none"> 0: If End position Door OPEN was reliably detected 1: If End position Door OPEN was not reliably detected 2: If End position Door CLOSE was reliably detected 3: If End position Door CLOSE was not detected 4: If there is a fault condition or emergency stop, controller in Automatic mode 5: Courtyard light function, during every OPEN and CLOSE move with 10 turn-off delay after opening. 6: Command forwarding <i>☞ This setting involves additional setting under P.7x7.</i> 7: During each OPEN and CLOSE move 8: During each OPEN and CLOSE move and during active clearing time. 9: Forward external door release (e.g., airlock operation) 10: Forward external door locking (e.g., airlock operation) 11: reserved / no function 12: Traffic light function <i>☞ This setting involves additional settings under Parameter P.7x6 to P.7xd.</i> 13: reserved / no function 14: Position forwarding <i>☞ This setting involves additional settings under P.7x5.</i> 15: Output warning message from maintenance counter 16: Airlock OPEN, forwards OPEN command to second airlock door 17: Test of draw in safety device. Relay is active in Endposition Close and is used e.g. to switch of the photo eye of the draw in safety in order to test it. 18: Reserved 19: Reserved 20: Reserved 21: reserved 22: Reserved 23: Reserved 24: Reserved 25: Test at the End-Position Door Open Relay works at the End- Position Door Open <p><i>☞ If the Function Test (P.7x0 = 17 oder 25) is used, you must use the N.O.(normally open) contact of the relay, because the relay is switched on if the Test-Mode doesn't work.</i></p>

P.	[Unit] Range	Function	Description / Note
P.7x1	[s] 0 ... 1000	Switching behavior of the relay	This parameter is used to set the switching behavior of the relay after activation. 0: Relay flashes at 1Hz 1-999: Turn-on duration of the relay in seconds 1000: Relay continuously turned on <i>☞ For courtyard function 10 seconds Turn-off delay P.7x0 = 5</i>
P.7x2	[s] 0 ... 9999	Turn-on delay	The relay is turned on after a time delay specified in this parameter.
P.7x3	[s] 0 ... 9999	Turn-off delay	The relay is turned off after a time delay specified in this parameter.

42.1 Position forwarding

The position forwarding function is activated with **P.7x0 = 14**.

P.	[Unit] Range	Function	Description / Note
P.7x5	[Increments] 0 ... 9999	Position forwarding	The relay energizes above the position specified in this parameter. <i>☞ This function is only practical if electronic limit switches are used.</i>

42.2 Traffic light function

The traffic light function is activated with **P.7x0 = 12**.

P.	[Unit] Range	Function	Description / Note
P.7x6	0 ... 4	Select traffic light type	This parameter specifies which lamp in the traffic light is switched to the relay in use. 0: Green traffic light on inside of door 1: Red traffic light on inside of Door 2: Green light on outside of door 3: Red traffic light on outside of Door 4: Direction undepend traffic light
P.7x7	0 ... 4	Behavior in Door CLOSE end position	Specifies the switching behavior of the relay in the Door CLOSE end position. 0: Continuously off 1: Continuously on 2: Flashing at 0.5Hz 3: Flashing at 1Hz 4: Flashing at 2Hz

P.	[Unit] Range	Function	Description / Note
P.7x8	0 ... 4	Behavior during opening	Specifies the switching behavior of the relay during opening. 0: Continuously off 1: Continuously on 2: Flashing at 0.5Hz 3: Flashing at 1Hz 4: Flashing at 2Hz
P.7x9	0 ... 7	Behavior in Door OPEN end position	Specifies the switching behavior of the relay in the Door OPEN end position. 0: Continuously off 1: Continuously on 2: Flashing at 0.5Hz 3: Flashing at 1Hz 4: Flashing at 2Hz 5: Relay off if condition of P.7xF fulfilled is 6: Relay on if condition of P.7xF fulfilled is 7: Relay flashing with 1Hz wenn condition of P.7xF fulfilled is
P.7xA	0 ... 4	Behavior during the clearing phase	Specifies the switching behavior of the relay during active clearing time / pre-warning time. 0: Continuously off 1: Continuously on 2: Flashing at 0.5Hz 3: Flashing at 1Hz 4: Flashing at 2Hz at 2Hz
P.7xb	0 ... 4	Behavior during closing	Specifies the switching behavior of the relay during closing. 0: Continuously off 1: Continuously on 2: Flashing at 0.5Hz 3: Flashing at 1Hz 4: Flashing at 2Hz
P.7xc	0 ... 4	Behavior at stop	Specifies the switching behavior of the relay when door is stopped between the end positions. 0: Continuously off 1: Continuously on 2: Flashing at 0.5Hz 3: Flashing at 1Hz 4: Flashing at 2Hz at 2Hz
P.7xd	0 ... 4	Behavior when there is no automatic function	Specifies the switching behavior of the relay when there is no Automatic function. 0: Continuously off 1: Continuously on 2: Flashing at 0.5Hz 3: Flashing at 1Hz 4: Flashing at 2Hz at 2Hz

42.3 Command forwarding

The command forwarding function is activated with **P.7x0 = 6**.

P.	[Unit] Range	Function	Description / Note
P.7xF	0 ... 54	Command forwarding	<p>The selected relay is activated when one of the following inputs is activated:</p> <ul style="list-style-type: none"> 0: Function deactivated 1 - 10: Input 1 to 10 11 - 12: reserved 13: Internal Emergency-STOP 14: External Emergency-STOP 1 15: External Emergency-STOP 2 16: Foil key OPEN 17: Foil key STOP 18: Foil key CLOSE 19: Detector channel 1 20: Detector channel 2 21: Radio Channel 1 22: Radio Channel 2 23 - 30: Input 21-28 (only with TST RFUE) <p><i>Combinations:</i></p> <ul style="list-style-type: none"> 31: One of the above listed inputs 32: One of the optosensors 33: One of the detectors 34: OPEN commands from Direction 1 (from outside) 35: OPEN commands from Direction 2 (from inside) 36: Airlock Input (TTL) only in connection with RFUXE and RWU <ul style="list-style-type: none"> 37 – 39 reserved 40: automatic closing because of tripped internal safety edge not possible 41: automatic closing and opening (see P.470) because of tripped external safety edge not possible 42: One of the safety edges is disturbed 43: Reserved 44: Reserved 45: Forwarding all OPEN commands 46: Leaving detector 1 47: Leaving detector 2 48: Reserved 49: Reserved 50: Reserved 51: Reserved 52: Reserved 53: Reserved 54: Reserved

42.4 Turn of switch on logic of relay

P.	[Unit] Range	Function	Description / Note
P.7x4	0 ... 1	Switch on logic	<p>With this parameter you have the possibility to change the logic status of the relay. So you can make a N.C: contact to a N.O. contact and reverse.</p> <p>0: Not turned 1: Turned</p>



43 Airlock function

P.	[Unit] Range	Function	Description / Note
P.830	0 ... 4	Airlock mode	<p>This parameter specifies the mode of the airlock system.</p> <p>0: Airlock function deactivated 1: Airlock mode 1: Airlock procedure is activated by an OPEN command from Direction 1 (from outside). 2: Like mode 1, but an photoeye (Safety input B) mounted on the first door must be crossed so that the gate procedure is started (pass-through detection). 3: Like mode 1, but an photoeye (Safety input A) mounted on the first door must be crossed so that the gate procedure is started (pass-through detection). 4: Like mode 1, but an photoeye (Safety input C) mounted on the first door must be crossed so that the gate procedure is started (pass-through detection).</p> <p><i>☞ For pass-through detection, an photoeye must be activated with P.5x0 = 5 and P.5x1 = 1.</i></p>

44 Diagnostics display

P.	[Unit] Range	Function	Description / Note
P.910	0 ... 22	Display mode selection	<p>With the aid of this parameter you can show the variables listed below in the display of the door controller.</p> <p>The following variables are displayed:</p> <ul style="list-style-type: none"> 0: The control sequence is displayed (Automatic) 1: [Hz] The current travel speed 2: [A] The current motor current 3: [V] The current motor voltage 4: [A] The current DC-Bus current 5: [V] The current DC-Bus voltage 6: [°C] The power stage temperature in °Celsius 7: [°C] The power stage temperature in °Fahrenheit 8: [s] The run-time of the motor during the last door operation 9: [Increments] The current position 10: [Increments] The position of the reference 11: [Dig] Channel 1 value of the absolute encoder 12: [Dig] Channel 2 value of the absolute encoder 13: [V] Current reference voltage 14: [°C] Temperature inside the housing in °Celsius 15: [°C] Temperature inside the housing in °Fahrenheit 16: Reserved 17: Reserved 18: Rotation speed of the TST PD shaft <i>☞ only with TST PD</i> 19: Reserved 20: Reserved 21: Number of position requisition without answer 22: Number of wrong received signs in TST PD encoder (activates also the output in P.955) <p><i>☞ Settings 9 to 15 only have meaning when using an electronic limit switch.</i></p> <p><i>☞ Settings 14 and 15 are only possible when using TST FUS.</i></p>

45 Error Memory

P.	[Unit] Range	Function	Description / Note
P.920		Error Memory	The controller stores the last four errors in the error memory. After opening Parameter P.920: <ul style="list-style-type: none"> • Change level using OPEN and CLOSE keys • Opening the error memory with  STOP • Closing the error memory with  STOP • Exiting Parameter P.920 with Eb -
	Eb 1		Eb1: Error message 1 (most recent error)
	Eb 2		EB2: Error message 2
	Eb 3		EB3: Error message 3
	Eb 4		EB4: Error message 4
	Eb 5		EB5: Error message 5
	Eb 6		EB6: Error message 6
	Eb 7		EB7: Error message 7
	Eb 8		EB8: Error message 8
	Ebcl		Ebcl: Clear the complete error memory
	Eb--		EB--: Exit the error memory, jump back to Parameter P.920
			<i>Er—in the display means that no error was entered.</i>

46 Software Version

P.	[Unit] Range	Function	Description / Note
P.925		Software Version	This parameter displays the version of the currently used software.

47 Door run-Time

P.	[Unit] Range	Function	Description / Note
P.930	[s] 0 ... 120,0	Motor run-time	In this parameter the time required for the last door operation is stored.

48 Input Voltage Measurement

P.	[Unit] Range	Function	Description / Note
P.940	[V]	Input voltage	In this parameter the amount of the currently present input voltage is displayed.

49 Electronic Position Encoder Diagnostics

P.	[Unit] Range	Function	Description / Note
P.950	[Increments] -999 ... 9999	Current position	In this parameter the current position of the door referenced to the Door CLOSE end position is displayed.
P.951	[Increments] -999 ... 9999	Current counter state	This parameter indicates the current counter state of the incremental encoder.
P.953	[DIG] 0 ... 0xFFFF	Diagnostic of TST PD	Displays the diagnostic information.
P.954	0 ... 255	Bus diagnostic of encoder	This parameter shows the number of position requisitions without guilty answers. By opening the parameter and afterwards long time STOP pressing the counter will reset.
P.955		Bus diagnostic of TST PD	This parameter shows the number of protocols which were not understood by TST PD. The number can only be shown if P.910 = 22. By opening the parameter and afterwards long time STOP pressing the counter will reset (only possible if the communication with TST PD is O.K.).

50 TST RFUE Expansion Board

P.	[Unit] Range	Function	Description / Note
P.800	0 ... 1	Activate TST RFUE	The TST RFUE expansion board is activated with this parameter. 0: Board deactivated 1: Board activated

51 Operating Mode of the Controller

P.	[Unit] Range	Function	Description / Note
P.980	0 ... 5	Operating mode	<p>This parameter is used to set the operating mode for the controller.</p> <p>The following modes are possible:</p> <ul style="list-style-type: none"> 0: OPEN and CLOSE move in self-holding (Automatic) 1: OPEN move in self-holding, CLOSE move in manual mode (partial automatic) 2: OPEN and CLOSE move in Manual mode (deadman) 3: Deadman emergency operation <p>⚠ WARNING All safety devices and limit switches are ignored.</p> <ul style="list-style-type: none"> 4: Endurance test with safety devices Automatic OPEN and CLOSE operation. Before each new operation the hold-open time P.010 is in effect. 5: Endurance test without safety devices <p>⚠ WARNING All safety devices are ignored.</p> <p><i>☞ The endurance test setting is lost after turning off the controller. The controller then reverts to manual mode.</i></p>

52 Display Text Language

P.	[Unit] Range	Function	Description / Note
P.985	0 ... 4	Text language	<p>The language used for displaying texts can be set with this parameter.</p> <ul style="list-style-type: none"> 0: English text 1: German text 2: Spanish text 3: French text 4: Italien text

53 Password

P.	[Unit] Range	Function	Description / Note
P.999	0 ... FFFF	Password	<p>The password provides access to the various parameter levels.</p> <p>1: Start-up (commissioning) level 2: Expanded start-up (commissioning) level xxxx: Manufacturer level</p> <p>IMPORTANT There are different parameters visible depending on the password level. A changing of parameters without to know there functionality is forbidden. In order to avoid failure and endangering because of unauthorized access passwords are only allowed to give to trained staff.</p>

54 Factory Setting / Defaults

P.	[Unit] Range	Function	Description / Note
P.990	0 ... 1	Factory setting	By setting and saving this parameter to 1 all parameter values are restored to their original value.

55 Door Profile

P.	[Unit] Range	Function	Description / Note
P.991		Door Profile	<p>This profile is used to make settings for in- and outputs as well as typical settings for the door.</p> <p><i>☞ The exact settings which this profile involves can be found in Appendix: Door Profile.</i></p>

56 Converter Profile

P.	[Unit] Range	Function	Description / Note
P.17F		Converter Profile	<p>This profile is used to make converter-specific settings.</p> <p><i>☞ The exact settings which this profile involves can be found in Appendix: Converter Profile.</i></p>

57 Obstacle detection

By the help of the of this function, the controller is able to recognize an obstacle in the door area without safety edges. The controller will recognize that the increments of the encoder are not changing in the same way as it is normal for the door. In this case the door will stoped or reversed, like it is done with all other safety devices.

P.	[Unit] Range	Function	Description / Note
P.480	0 ... 2	Obstacle detection mode	With this Parameter you activate the obstacle detection function. 0: Deactivates 1: Reserved 2: Detection of incremental change
P.481	0 ... 3	Reaction of obstacle in open direction	This parameter lays down the reaction of the door after an recognised obstacle. 0. No reaction 1. Stop the door 2. Reversing after time of P.482 3. Stop the door and go on opening after time (P.482)
P.482	[10ms] 10 ... 250	Waiting period after obstacle in open direction	The door will go on opening or will reverse after detection of an obstacle in open direction when this time has run off. <i>☞ Function only active if P.481 = 2 or 3</i>
P.483	0 ... 5	Max. number of obstacles	With this parameter you set the max number of allowed obstacle detections for one opening. If the number is exceed the error message F.320 is shown. If the door reaches the open position the counting starts again. <i>☞ 0 = deactivated</i>
P.485	0 ... 2	Reaction of obstacle in close direction	This parameter lays down the reaction of the door after an recognised obstacle. 0. No reaction 1. Stop the door 2. Reverse the door
P.486	[10ms] 10 ... 250	Waiting period after obstacle in close direction	The door will reverse in open direction after this time has run off. <i>☞ Function only active if P.485 = 2</i>
P.487	0 ... 5	Max. number of obstacles	With this parameter you set the max number of allowed obstacle detections for one closing. If the number is exceed the error message F.325 is shown. If the door reaches the close position the counting starts again. <i>☞ 0 = deactivated</i>



P.	[Unit] Range	Function	Description / Note
P.451	[%] 0 ... 100	Threshold in case of obstacle detection	As higher the value is as later the obstacle is detected. This parameter is related to the allowed divergence between the expected and the actual speed.
P.452	[%] 0 ... 100	Dynamic in case of obstacle detection	As lower the value is as later the obstacle is detected. Short disturbances at start of door drive or reversing can be filtered out by the help of this parameter.
P.453	[INK] 0 ... 100	Tolerance band	The adjusted tolerance band has to be exceeded before the obstacle detection function starts to work.

☞ By the help of the voltage reduction function (P.143 for opening and P.148 for closing) the torque of the motor can be reduced and the torque to the obstacle will reduce too. This will help to adjust the best values for the motor torque and the obstacle detection.

58 Overview of 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.

For this, you press the  STOP button and keep it pressed and press the EMERGENCY STOP button afterwards. Alternatively, the  STOP button can also be kept pressed for approx. 5 seconds.

Improper end positions		
F.000	Door position too far up	<ul style="list-style-type: none"> • Too small a parameter value for upper emergency limit switch • Upper limit switch range (limit switch band) too small • Mechanical brake defective or improperly set
F.005	Door position too far down	<ul style="list-style-type: none"> • Too small a parameter value for lower emergency limit switch • Lower limit switch range (limit switch band) too small • Mechanical brake defective or improperly set

Implausibilities in door movement		
F.020	Run time exceeded (during opening, closing or deadman)	<ul style="list-style-type: none"> • current motor run time has exceeded set maximum run time, door may be sticking or is blocked • If using mechanical limit switches, one may not have tripped
F.030	Lag error (position change of the door is less than expected)	<ul style="list-style-type: none"> • Door or motor is blocked • Too little power for lift torque • Too little speed • Mechanical limit switch was not left or is defective • Absolute or incremental encoder not tightened sufficiently in its mounting • Wrong positioning system selected (P.205)
F.031	Detected rotational direction deviates from expected	<ul style="list-style-type: none"> • When using incremental encoders: Channel A and B reversed • Motor rotation direction reversed compared with calibration setting • Too much „pancaking“ when starting, brake releases too soon, or too little torque, adjust boost as necessary.
F.043	Pre-limit switch fault (light barrier)	<ul style="list-style-type: none"> • The pre-limit switch for the light barrier remains activated even in the middle end position or upper end position.

Error messages for incremental encoder		
F.050	Reference switch position deviates from permissible range. During cyclical synchronization	<ul style="list-style-type: none"> • Reference switch constantly tripped (defective) • Reference switch trips too far from the selected reference. • Reference switch trips in the limit switch band • P270 and P280 are both at the reference switch
F.051	Reference switch position deviates from permissible range.	<ul style="list-style-type: none"> • Reference switch lies in the limit switch band • Reference switch is beyond 15% EO • Reference switch defective
F.052	Reference switch not recognized	<ul style="list-style-type: none"> • The reference switch is not recognized within 20% EO during automatic synchronization after power-on • The reference switch is not recognized in the associated end position.

Maintenance counter exceeded		
F.080	Fault: Maintenance is required	<ul style="list-style-type: none"> Service counter has expired

Parameters not set		
F.090	Controller not parameterized	<ul style="list-style-type: none"> The basic parameters (P.205, P.100 to P.103) for the TST FUE controller have not yet been set.

Safety chain faults		
F.201	Internal E-Stop „push-button“ tripped or Watchdog (computer monitor)	<ul style="list-style-type: none"> E-Stop chain was interrupted starting at input „internal E-Stop“ 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	<ul style="list-style-type: none"> E-Stop chain was interrupted starting at Input 1
F.212	External E-Stop 2 tripped	<ul style="list-style-type: none"> E-Stop chain was interrupted starting at Input 2

Faults in the safety chain		
F.360	Short circuit detected on edge input	<ul style="list-style-type: none"> Short circuit detected on edges with normally closed contact
F.361	Number of edge trips for closing has reached set limit	<ul style="list-style-type: none"> Parameterized, maximum number of safety edge trips during a door cycle was exceeded
F.362	Redundancy error with short circuit	<ul style="list-style-type: none"> One of the processing channels for short circuit detection does not react identically with the second channel. → Controller board defective
F.363	Interruption on edge input	<ul style="list-style-type: none"> Connection cable defective or not connected Termination resistor incorrect or missing Jumper J600 incorrectly set
F.364	Safety edge testing failed	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> One of the processing channels for interruption detection does not react identically with the second channel. → Controller board defective Dynamic optical system connected but not set in Parameter P.460
F.366	Too high a pulse frequency for optical safety edge	<ul style="list-style-type: none"> Defective optical safety edge Defective input for internal safety edge
F.369	Internal safety edge incorrectly parameterized	<ul style="list-style-type: none"> An internal safety edge is connected but deactivated
F.371	Number of edge trips for external safety edge has reached set limit	<ul style="list-style-type: none"> Parameterized, maximum number of safety edge trips during a door cycle was exceeded

Faults in the safety chain		
F.372	Redundancy error with short circuit	<ul style="list-style-type: none"> One of the processing channels for short circuit detection does not react identically with the second channel. → Controller board defective
F.373	Fault in the safety edge (message comes from module)	<ul style="list-style-type: none"> 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 bar testing failed	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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.385	Fault in pre-limit switch for safety edge	<ul style="list-style-type: none"> Pre-limit switch for turning off the safety edge or reversing after safety edge tripping remains tripped even in the upper end position.

General hardware faults		
F.400	Controller hardware reset detected	<ul style="list-style-type: none"> Excessive noise on supply voltage Internal watchdog tripped RAM error
F.401	Watchdog Error	<ul style="list-style-type: none"> Internal Watchdog has released
F.40A	Software Exeption	<ul style="list-style-type: none"> Internal Error
F.410	Over-current (motor current or intermediate circuit)	<ul style="list-style-type: none"> Wrong motor data set (P100 – P103) Non-adjusted voltage increase / boost set (P140 or P145) Motor not properly dimensioned for door Door sticks
F.420	Overvoltage in intermediate circuit Limit 1	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> The supply voltage for the controller is to high
F.426	Undervoltage line supply	<ul style="list-style-type: none"> The supply voltage for the controller is to low
F.430	Temperature cooler outside of working range Limit 1	<ul style="list-style-type: none"> 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.440	Overcurrent in intermediate circuit Limit 1	<ul style="list-style-type: none"> Boost not adjusted Motor incorrectly dimensioned for door Door sticks
F.510	Motor / intermediate circuit overcurrent Limit 2	<ul style="list-style-type: none"> Wrong motor data set (P100 – P103) Non-adjusted voltage increase / boost set (P140 or P145) Motor not properly dimensioned for door Door sticks
F.515	Motor protection function detected overcurrent	<ul style="list-style-type: none"> Incorrect motor curve (motor rated current) set (P101) Too much boost (P140 or P145) Motor incorrectly dimensioned

General hardware faults		
F.519	IGBT driver chip detected overcurrent	<ul style="list-style-type: none"> • Short circuit or ground fault on motor terminals • Motor rated current setting extremely wrong (P100) • Extremely too much boost (P140 or P145) • Motor incorrectly dimensioned • Motor winding defective • Momentary interruption of the E-Stop circuit.
F.520	Overvoltage in intermediate circuit Limit 2	<ul style="list-style-type: none"> • Brake chopper interference / defective / missing • Feed voltage much too high • Motor feeds back too much energy in generator mode, door motion energy cannot be sufficiently brought down.
F.521	Overvoltage in intermediate circuit	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • The line supply for the Controller is too high • The line supply fluctuates very extremely
F.530	Temperature cooler outside of working range Limit 1	<ul style="list-style-type: none"> • 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.540	Overcurrent in intermediate circuit Limit 2	<ul style="list-style-type: none"> • Boost not adjusted • Motor incorrectly dimensioned for door • Door sticks

Positioning system faults		
F.700	Position sensing defective	<p>For mechanical limit switches:</p> <ul style="list-style-type: none"> • At least one limit switch does not correspond to the configured active status. • An implausible combination of at least 2 active limit switches <p>For electronic limit switches:</p> <ul style="list-style-type: none"> • 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.720	Synchronization error in position sensing with incremental encoder	<ul style="list-style-type: none"> • Intermediate stop position is less than the minimum incremental value (25). • Synchronization was not finished. • The selected reference switch was not reached or is outside its tolerance • The incremental encoder is not counting or the door is blocked (also F.030, lag error) • Incremental inputs IN 9 and IN 10 are reversed (also F.031 rotation error)
F.750	Protocol Transmission error	<ul style="list-style-type: none"> • Defective hardware or electrically noisy environment

Positioning system faults		
F.751	Synchronization FUE <-> absolute encoder	<ul style="list-style-type: none"> Defective hardware or electrically noisy environment Absolute encoder processor electronics defective
F.752	Timeout with protocol transmission	<ul style="list-style-type: none"> Interface cable defective / interrupted 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	<ul style="list-style-type: none"> Position encoder drive defective Absolute encoder processing electronics defective Defective hardware or electrically noisy environment
F.761	Distance Channel 1 <-> Channel 2 outside allowed window	<ul style="list-style-type: none"> Position encoder drive defective Defective hardware or electrically noisy environment
F.762	Electronic limit switch positions incorrect	<ul style="list-style-type: none"> Upper limit switch Eo or intermediate limit switch E1 has exceeded the valid limit range Controller not yet initialized Position values during calibration not correct or values are no longer plausible
F.763	DES-B Error	<ul style="list-style-type: none"> Position encoder drive defective -> make a reset
F.770	Door way is too high for the parameter set Encoder resolution	<ul style="list-style-type: none"> The Value of the Parameter P.202 (set Encoder resolution) is too high for the combination Encoder and Door.

Internal system faults		
F.920	Internal 2.5 V reference voltage incorrect	<ul style="list-style-type: none"> Hardware defect
F.921	Internal 15 V voltage incorrect	<ul style="list-style-type: none"> Hardware defect
F.922	E-Stop chain not complete	<ul style="list-style-type: none"> 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.930	External watchdog incorrect	<ul style="list-style-type: none"> Defective hardware or noise-saturated environment
F.931	ROM error	<ul style="list-style-type: none"> Wrong EPROM code Defective hardware or noise-saturated environment
F.932	RAM error	<ul style="list-style-type: none"> Defective hardware or noise-saturated environment
F.935	Stack error	<ul style="list-style-type: none"> UserStack or SystemStack overflowed Possible software error due to recursive invocations (e.g. profile)
F.960	Wrong parameter checksum	<ul style="list-style-type: none"> New EPROM version with different parameters Controller not yet initialized
F.961	Checksum from calibration values etc.	<ul style="list-style-type: none"> New EPROM version with different EEPROM structure Controller not yet initialized
F.962	Converter parameters not plausible	<ul style="list-style-type: none"> New EPROM version Controller not yet initialized
F.963	Ramp parameters not plausible	<ul style="list-style-type: none"> New EPROM version Controller not yet initialized
F.964	Program version / manufacturer code	<ul style="list-style-type: none"> New EPROM version Controller not yet initialized
F.970	Plausibility Param.block error	<ul style="list-style-type: none"> New EPROM version Controller not yet initialized Some parameter is implausible

58.1 Information messages

General messages

STOP	Stop / Reset state, wait for next incoming command
Eu	End position Lower Eu
≡Eu≡	End position Lower locked → no raising possible (e.g., lock-door)
ZUF [□]	Closing active
·Eo·	End position Upper Eo
≡Eo≡	End position Upper locked → no closing possible (e.g., safety edge)
□AUF	Opening active
-E1-	End position middle E1 (intermediate stop position)
≡E1≡	End position middle locked → no closing possible (e.g., safety edge)
FAIL	Fault → only deadman travel is possible, possibly automatic opening
EICH	Calibration → Setting the end positions in deadman travel (for absolute encoder) → Start procedure using STOP key
≡NA≡	E-Stop → No travel possible, hardware safety chain interrupted
NOTF	E-travel → Deadman travel without taking into account safeties, etc.
'Hd'	Manual → Deadman mode
ParA	Parameterizing
SYNC	Synchronization (incremental encoder / limit switch → Pos.unknown)
'Au'	Automatic → indicates change from „Manual“ to „Automatic“ status
'Hc'	Semi-automatic → indicates change from „Manual“ to „Semi-automatic“
FUE	Initial display after power up (Power Up and self-test)

Status messages during calibration

E.i.E.u.	Calibration of the End position Lower requested (in deadman travel)
E.i.E.o.	Calibration of the End position Upper requested (in deadman travel)
E.i.E.1.	Calibration of the intermediate position E1 (in deadman travel)

Status messages during synchronization

S.y.E.u.	Synchronization of End position Lower requested (Deadman or wait for start condition)
S.y.E.o.	Synchronization of End position Upper requested (Deadman or wait for start condition)
S.y.E.1.	Synchronization of intermediate stop position E1 (in deadman)
S.y.op	Automatic open until mechanical stop, then automatic synchronization of End position Upper
S.y.cL	Automatic close taking into account safeties until mechanical stop, then automatic synchronization of End position Lower
S.y.c≡	Automatic close is locked due to request [⊗]

Status messages during deadman

Hd.cL	Deadman close (membrane key: CLOSE)
Hd.oP	Deadman open (membrane key: OPEN)
Hd.Eu	End position Lower reached, no further deadman close possible
Hd.Eo	End position Upper reached, no further deadman open possible
Hd.Ao	Outside of permitted Eo position (no deadman open possible)

Information messages during Automatic mode

I.080	Maintenance required soon / service counter nearly expired
I.100	Speed when reaching upper end position too high
I.150	Speed when reaching lower end position too high
I.160	Continuous OPEN still active
I.170	Forced opening being performed
I.185	Wait for acknowledgement (operator call), display flashes
I.199	Door cycle not plausible (re-initialize → Parameters)
I.200	Reference position corrected or recognized (after calibration)
I.201	Reference position re-initialized

I.202	Reference position missing
I.203	Reference position incorrect
I.205	Synchronization
I.210	Pre-limit switch Upper not plausible
I.211	Pre-limit switch Lower not possible
I.310	Open-command on Door2 being issued
I.500	Correction of upper limit switch running
I.501	Upper pre-limit switch corrected
I.502	Upper limit switch band corrected
I.506	Lower pre-limit switch corrected
I.507	Lower limit switch band corrected
I.510	Limit switch correction finished
I.515	Controller is preparing automatic teach-in of the limit switches
I.520	Maximum speed during automatic limit switch correction is not reached
I.555	Limit switches being corrected

Information messages while parameterizing

noEr	Error memory: no error saved
Er--	Error memory: if error but no associated message 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.121	Input 21
E.128	Input 28

Safety/Emergency stop chain

E.201	Internal E-Stop „pushbutton“ tripped
E.211	External E-Stop 1 tripped
E.212	External E-Stop 2 tripped

Safety edge, general

E.360	Activation of internal safety edge
E.363	Fault in internal safety edge
E.370	Activation of external safety edge
E.373	Fault in external safety edge
E.379	External safety edge activated but not yet plugged in

RC plug-in module

E.401	RC Channel 1
E.402	RC Channel 2

Induction loop processor plug-in module

E.501	Detector Channel 1
E.502	Detector Channel 2

Internal inputs

E.900	Controller chip fault signal
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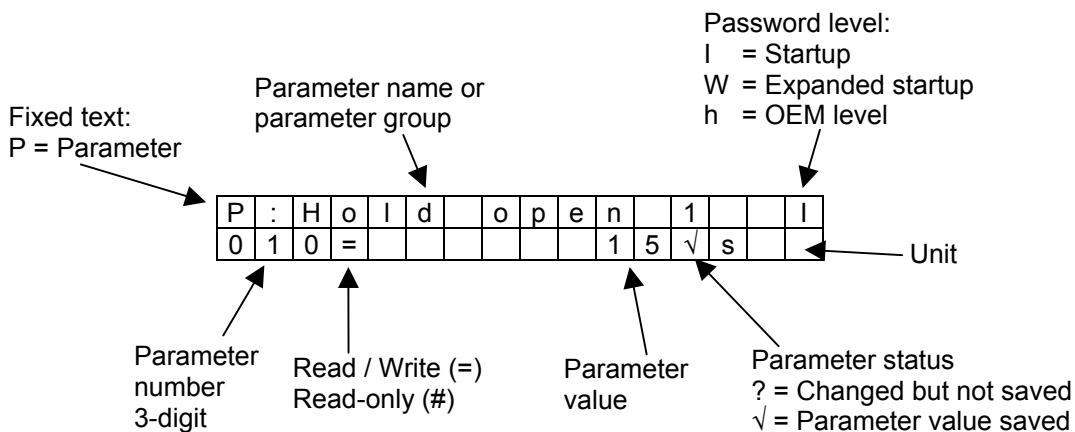
Displays

LCD-Display
LCD-Messages

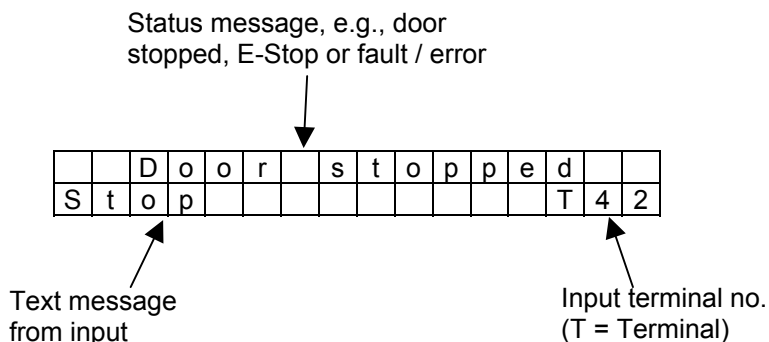
LCD-Display

By using the LCD display you can see the door controller messages in plain text. The basic structure of the display is explained here.

1. Display messages during parameterizing

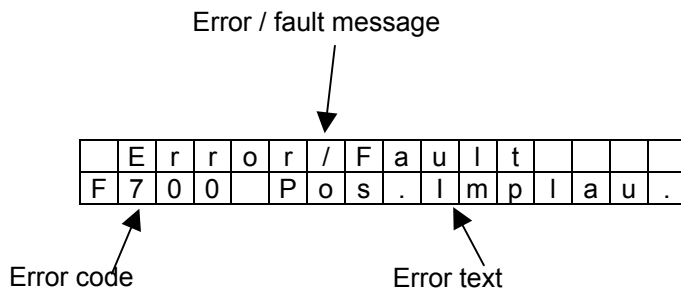


2. Display messages in normal operation



If more than one input is active, these are displayed in sequence.

3. Error messages



If more than one input is active, these are displayed in sequence. Relevant inputs are also displayed.

LCD Messages

For each input of the door controller you can select an LCD message from a list which is displayed when the corresponding input is activated.

The LCD message can be changed for the following inputs from standard fixed text to an LCD selectable message:

Input	Parameter	German LCD fixed text	English LCD fixed text
Inputs 1-10:	P.5x9	Eingang 1 bis Eingang 10	Input 1 up to Input 10
Inputs 21-28:	P.Ax9	Eingang 21 bis Eingang 28	Input 21 up to Input 28
Safety edge internal:	P.469	Leiste Ausl.	Edge Tripped
Safety edge external:	P.479	Leiste Ausl.	Edge Tripped
E-STOP internal:	P.610	Notaus int.	E-Stop Int
E-STOP 1-2:	P.61x	Notaus ext.1 bzw. Notaus ext.2	E-Stop Ext 1 and E-Stop Ext 2
Membrane key OPEN:	P.639	Folie Auf	Open-Keypad
STOP key:	P.649	Folie Stop	Stop-Keypad
CLOSE key:	P.659	Folie Zu	Close-Keypad
Detector 1:	P.669	Schleife 1	Loop Ch1
Detector 2:	P.679	Schleife 2	Loop Ch2
Radio 1:	P.689	Funkkanal 1	Radio Ch1
Radio 2:	P.699	Funkkanal 2	Radio Ch2

Selectable LCD messages are:

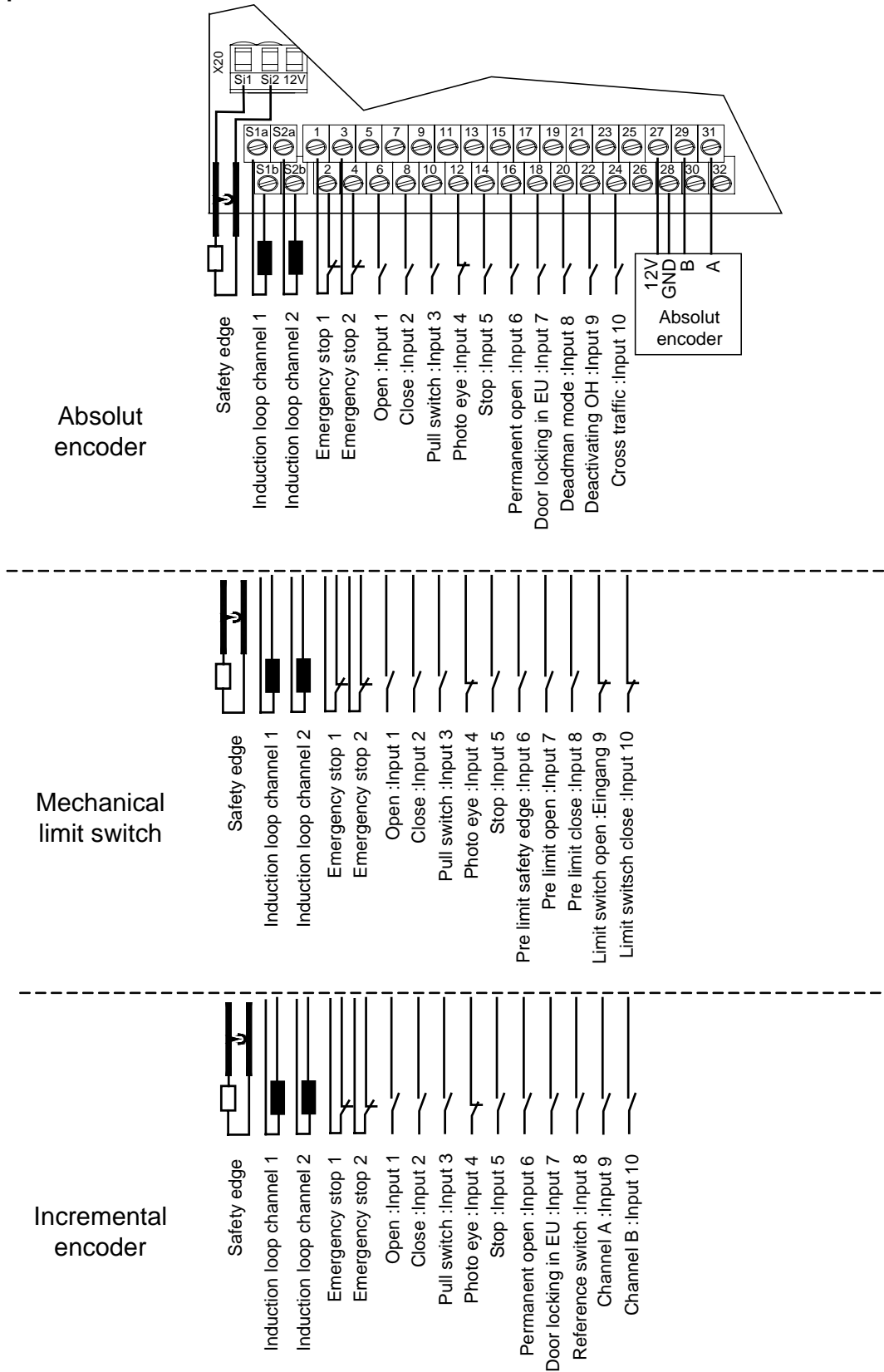
No.	Description	LCD-Text English	LCD-Text German
0	Fixed text (in this case the text factory assigned to the input is shown)		
1	OPEN command	Open	Auf
2	External open command	Open extern	Auf extern
3	Internal open command	Open intern	Auf intern
4	Single channel – pull switch	Pull Switch	Einkanal
5	Permanent open command	Perm. Open	Dauerauf
6	Stop command	Stop	Stopp
7	Optosensor input	Photoeye	Lichtschranke
8	Deadman operation	Deadman	Totmann
9	CLOSE command	Close	Zu
10	Lock in closed position	Locked Closed	Verrieg. EU
11	Input for cross-traffic	Cross Traffic	Querverkehr
12	Deactivate controller	Deactivation	Abschaltung
13	Limit switch input	Limit Switch	Endschalter
14	Signal from radar detector	Radar	Radardetektor
15	Signal from OBID card reader	OBID Card	OBID-Karte
16	The thermopile in the E-Stop chain is active	E-Stop Ext 1	Thermo-Pille
17	The slack switch in the E-Stop chain is active	E-Stop Ext 2	Schlaffseil
18	Input for keyswitch	Keyswitch	Schlüsselsch.
19	Optosensor pre-limit switch	PreLimitPhoto	VorendLi-schr
20	Safety edge pre-limit switch	PreLimit Edge	Vorend SiLei
21	Upper pre-limit switch	PreLimit Open	Vorend Oben
22	Intermediate stop pre-limit switch	PreLimInterm.	VorendZw.halt
23	Lower pre-limit switch	PreLimitClose	Vorend Unten
24	Upper limit switch	Limit Open	Endsch. Oben
25	Intermediate stop limit switch	LimitIntermed	EndschZw.halt
26	Lower limit switch	Limit Close	Endsch. Unten
27	Reference switch	Reference	Referenz
28	Door locked in intermediate position 2	Locked Interm	Verrieg. E2

Connection diagram

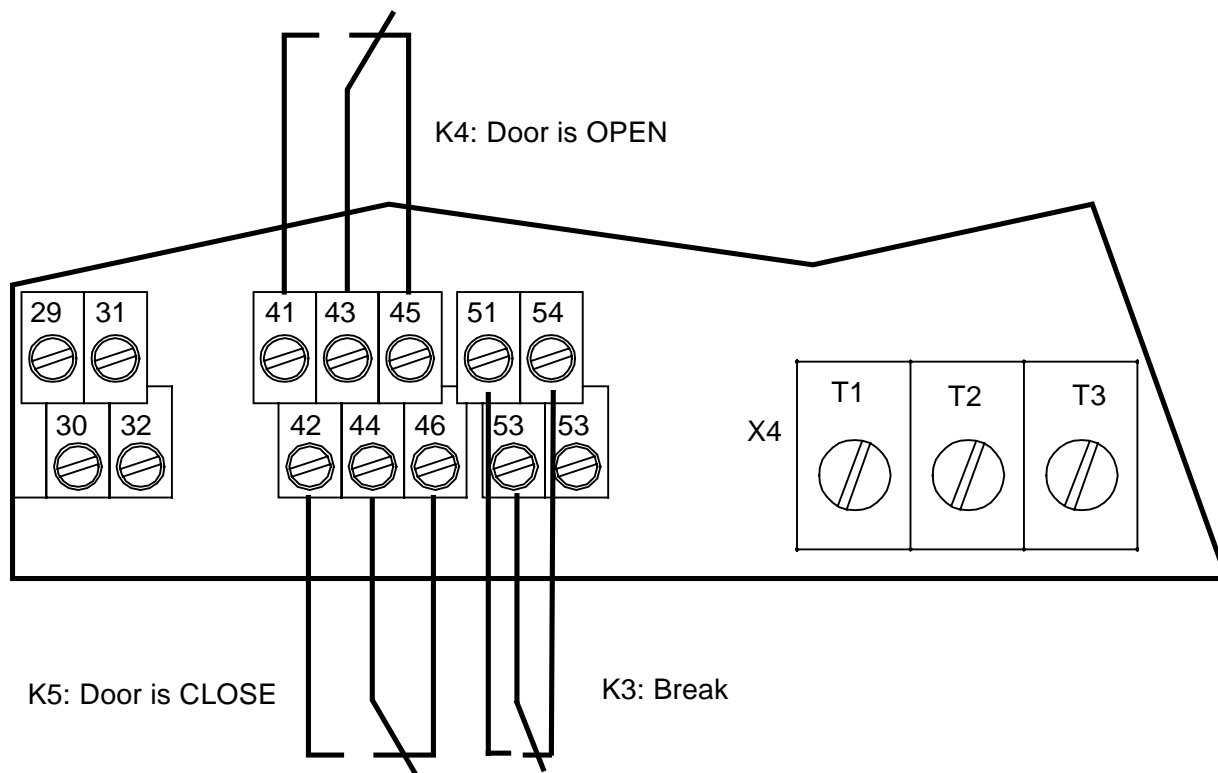
Connection diagram

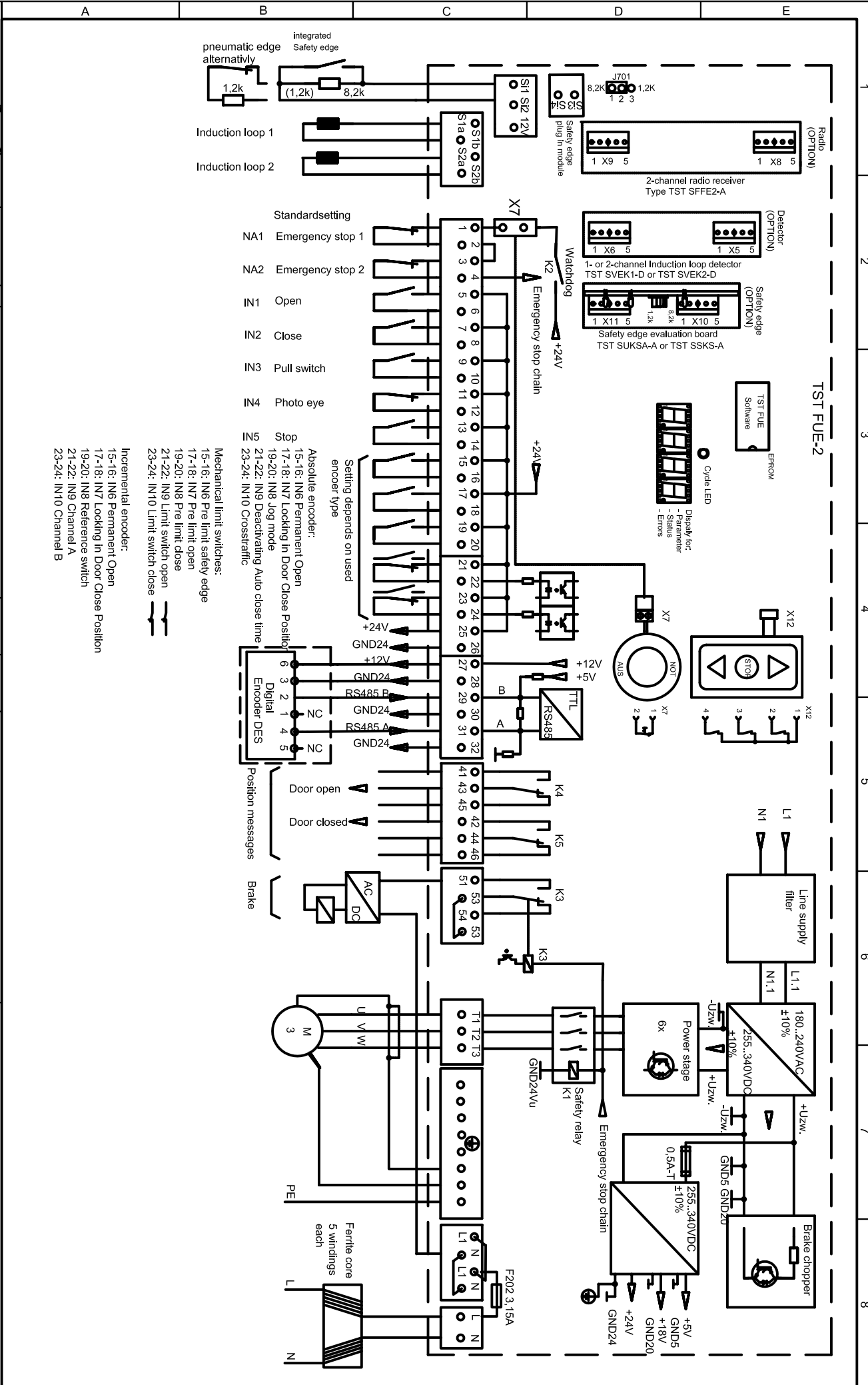
The standard settings of the input parameters depends on the chosen Limit switch system.

1. Inputs



2. Outputs





- Standardsetting
- 15-16: IN6 Permanent Open
 - 17-18: IN7 Locking in Door Close Position
 - 19-20: IN8 Reference switch
 - 21-22: IN9 Channel A
 - 23-24: IN10 Channel B
- Stop
- 19-20: IN8 Log mode
 - 21-22: IN9 Deactivating Auto close time
 - 23-24: IN10 Crosstraffic
- Absolute encoder:
- 15-16: IN6 Permanent Open
 - 17-18: IN7 Locking in Door Close Position
 - 19-20: IN8 Log mode
 - 21-22: IN9 Deactivating Auto close time
 - 23-24: IN10 Crosstraffic
- Mechanical limit switches:
- 15-16: IN6 Pre limit safety edge
 - 17-18: IN7 Pre limit open
 - 19-20: IN8 Pre limit close
 - 21-22: IN9 Limit switch open
 - 23-24: IN10 Limit switch close
- Incremental encoder:
- 15-16: IN6 Permanent Open
 - 17-18: IN7 Locking in Door Close Position
 - 19-20: IN8 Reference switch
 - 21-22: IN9 Channel A
 - 23-24: IN10 Channel B

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Positioning system profile

Positioning system profile

With Parameter P.205 you will choose a Positioning system profile.

With this profile you will define which limit switch is used.

Additionally the input parameterizing will be set so, that it is meaningful for the limit switch which is used.

These parameters will be set as shown:

0. P.205 = 0: Mechanical limit switch 1

Parameter	Value	Function
P.200 Selecting the positioning system	0	Mechanical limit switch
P.506 input 6	1104	Pre limit switch safety edge
P.507 input 7	1106	Pre limit switch open
P.508 input 8	1108	Pre limit switch closed
P.509 input 9	1110	Limit switch open
P.50A input 10	1111	Limit switch closed
P.980 Operating mode	2	Manual mode

1. P.205 = 1: Mechanical limit switch 2

Parameter	Value	Function
P.200 Selecting the positioning system	0	Mechanical limit switch
P.506 input 6	1105	Pre limit switch safety edge
P.507 input 7	1107	Pre limit switch open
P.508 input 8	1109	Pre limit switch closed
P.509 input 9	1110	Limit switch open
P.50A input 10	1111	Limit switch closed
P.980 Operating mode	2	Manual mode

2. P.205 = 2: Incremental encoder

Parameter	Value	Function
P.200 Selecting the positioning system	2	Incremental encoder
P.25F Synchronisation profil	-1	Forced queried
P.506 input 6	0301	Permanent open
P.507 input 7	0801	Locking in lower end position
P.508 input 8	1112	Reference switch
P.509 input 9	0000	Channel A
P.50A input 10	0000	Channel B
P.980 Operating mode	0	Automatic

3. P.205 = 3: Absolute encoder DES-A

Parameter	Value	Function
P.200 Selecting the positioning system	4	Absolut encoder DES-A
P.506 input 6	0301	Permanent open
P.507 input 7	0801	Locking in lower end position
P.508 input 8	0601	Manual / Automatic
P.509 input 9	1001	Deactivate hold-open time
P.50A input 10	0903	Cross traffic
P.980 Operating mode	0	Automatic

4. P.205 = 4: Absolute encoder TST PB-A

Parameter	Value	Function
P.200 Selecting the positioning system	5	Absolut encoder TST PB-A
P.506 input 6	0301	Permanent open
P.507 input 7	0801	Locking in lower end position
P.508 input 8	0601	Manual / Automatic
P.509 input 9	1001	Deactivate hold-open time
P.50A input 10	0903	Cross trafic
P.980 Operating mode	0	Automatic

5. P.205 = 5: SSI encoder (only with UL-Version)

Parameter	Value	Function
P.200 Selecting the positioning system	6	SSI encoder
P.506 input 6	0301	Permanent open
P.507 input 7	0801	Locking in lower end position
P.508 input 8	0601	Manual / Automatic
P.509 input 9	1001	Deactivate hold-open time
P.50A input 10	0903	Cross trafic
P.980 Operating mode	0	Automatic

6. P.205 = 6: reserved**7. P.205 = 7: Absolute encoder DES-B**

Parameter	Value	Function
P.200 Selecting the positioning system	7	Absolut encoder DES-B
P.506 input 6	0301	Permanent open
P.507 input 7	0801	Locking in lower end position
P.508 input 8	0601	Manual / Automatic
P.509 input 9	1001	Deactivate hold-open time
P.50A input 10	0903	Cross trafic
P.980 Operating mode	0	Automatic

8. P.205 = 7: Absolute encoder TST PD

Parameter	Value	Function
P.200 Selecting the positioning system	8	Absolut encoder TST PD
P.202 Resolution of encoder	13	High resolution
P.506 input 6	0301	Permanent open
P.507 input 7	0801	Locking in lower end position
P.508 input 8	0601	Manual / Automatic
P.509 input 9	1001	Deactivate hold-open time
P.50A input 10	0903	Cross trafic
P.980 Operating mode	0	Automatic

Input profiles

Input Profile

The selection of an input profile has some adjustments as a consequence.

Input profiles can be set for the inputs 1 to 10 and 21 to 28 (only with TST FUxE and expansion board TST RFUxE).

P.501 = Input 1	Only with TST RFUxE:
P.502 = Input 2	
P.503 = Input 3	P.A01 = Input 21
P.504 = Input 4	P.A02 = Input 22
P.505 = Input 5	P.A03 = Input 23
P.506 = Input 6	P.A04 = Input 24
P.507 = Input 7	P.A05 = Input 25
P.508 = Input 8	P.A06 = Input 26
P.509 = Input 9	P.A07 = Input 27
P.50A = Input 10	P.A08 = Input 28

Table 1: Input Profile

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
0000	Input deactivated									
0101	OPEN 1	N.O. ¹	Upper	With	With	Both	Without	Without	OPEN	No
0102	OPEN 1	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0103	OPEN airlock	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0104	OPEN 1	N.O.	Intermediate stop	With	With	from outside	Without	Without	OPEN	No
0105	OPEN 2	N.O.	Upper	With	With	Both	Without	Without	OPEN	No
0106	OPEN 2	N.O.	Upper	With	With	from inside	Without	Without	OPEN	No
0107	OPEN 4 ²	N.O.	Upper	With	With	Both	Without	Without	OPEN	No
0108	OPEN 2	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0109	OPEN 3	N.O.	Intermediate stop	With	With	Both	Without	Without	OPEN	No
0110	OPEN 1	N.O.	Upper	With	With	from outside	Without	Without	OPEN	No
0111	OPEN 1	N.C.	Upper	With	Without	Both	Without	Without	OPEN	No

¹ N.C. = normally closed, N.O. = normally open

² OPEN 3 and OPEN 4 cannot be locked out.

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
0112	OPEN 1	N.O. ³	Upper	Without	With	Both	Without	Without	OPEN	No
0114	OPEN airlock	N.O.	Intermediate stop	With	With	from inside	Without	Without	OPEN	No
0116	OPEN 1	N.O.	Upper	Without	With	from outside	Without	Without	OPEN	No
0117	OPEN 1	N.O.	Upper	Without	With	from inside	Without	Without	OPEN	No
0120	OPEN 2	N.O.	Upper	With	Without	from inside	Without	Without	OPEN	No
0121	OPEN 1	N.O.	Upper	With	Without	from outside	Without	Without	OPEN	No
0124	OPEN 2	N.O.	Intermediate stop	With	With	from inside	Without	Without	OPEN intern	No
0125	OPEN 2	N.O.	Upper	With	With	from inside	Without	Without	OPEN intern	No
0129	OPEN 2	N.O.	Intermediate stop	With	With	from outside	Without	Without	OPEN extern	No
0201	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper	With	With	Both	Without	Without	Pull switch	No
0202	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper	Without	With	Both	Without	Without	Pull switch	No
0203	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper 3. Pull straight up 2x	Without	With	Both	Without	Without	Pull switch	No
0204	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	Upper	Without	With	Both	Without	Without	Pull switch	No
0207	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	Intermediate stop	With	With	From inside	Without	Without	Pull Swit.int	No
0208	Pull switch OPEN -> Endposition -> CLOSE -> OPEN	N.O.	1. Intermediate stop 2. Upper	With	With	From outside	Without	Without	Pull Swit.ext	No
0209	Pull switch OPEN -> STOP -> CLOSE -> STOP	N.O.	1. Intermediate stop 2. Upper	Without	With	Both	Without	Without	Pull switch	No
0301	Permanent OPEN	N.O.	1. Intermediate stop 2. Upper	Without	Without	Both	Without	Without	Perm. Open	No
0304	Permanent OPEN	N.O.	Upper	Without	Without	No	Without	Without	Perm. Open	No
0401	Stop	N.C.	-	-	-	-	Without	Without	Stop	No
0402	Stop	N.O.	-	-	-	-	Without	Without	Stop	No

³ N.C. = normally closed, N.O. = normally open

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
0403	Stop, Reset possible	N.C.	-	-	-	-	Without	Without	Stop	No
0404	Stop, Reset possible	N.O.	-	-	-	-	Without	Without	Stop	No
0501	Photoeye	N.C.	as before	as before	With	Both	Without	Without	Photoeye	No
0502	Photoeye with through-travel sensing 1	N.C.	as before	as before	With	Both	Without	Without	Photo-eye	No
0504	Photoeye	N.C.	as before	Min. hold-open time	With	Both	Without	Without	Photo-eye	No
0505	Photoeye with through-travel sensing 1	N.O.	as before	as before	With	Both	Without	Without	Photo-eye	No
0506	Photoeye with through-travel sensing 2	N.C.	as before	Min. hold-open time	With	Both	Without	Without	Photo-eye	No
0507	Photoeye	N.O.	as before	as before	With	Both	Without	Without	Photo-eye	No
0601	Auto / Manual	N.O.	-	-	-	-	Without	Without	Dead-man	No
0602	Auto / semi automatic	N.O.	-	-	-	-	Without	Without	Dead-man	No
0701	CLOSE	N.O.	-	-	-	With	Without	Without	Close	No
0801	Locking in lower end position, deadman not possible	N.O.	-	-	-	-	Without	Without	Locked Closed	No
0802	Locking in lower end position, deadman possible	N.O.	-	-	-	-	Without	Without	Locked Closed	No
0803	Locking in position	N.O.	Locking in Door Open position	-	-	-	Without	Without	Locked Interm	No
0804	Locking in position	N.O.	Locking in Door Close position	-	-	-	Without	Without	Locked Interm	No
0901	Cross-traffic, OPEN1 and DET1	N.O.	-	-	-	-	Without	Without	Cross Traffic	No
0902	Cross-traffic, OPEN2 and DET2	N.O.	-	-	-	-	Without	Without	Cross Traffic	No
0903	Cross-traffic, OPEN1+2 and DET1+2	N.O.	-	-	-	-	Without	Without	Cross Traffic	No

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
1001	Deactivate hold-open time	N.O.	-	-	-	-	Without	Without	Deacti-vation	No
1002	Deactivate airlock	N.O.	-	-	-	-	Without	Without	Deacti-vation	No
1003	Deactivate intermediate stop	N.O.	-	-	-	-	Without	Without	Deacti-vation	No
1004	Deactivate detector commands from outside	N.O.	-	-	-	-	Without	Without	Deacti-vation	No
1101	Photeye pre-limit switch	N.O.	-	-	-	-	Without	Without	Pre-Limit Photo	No
1102	Intermediate stop limit switch	N.O.	-	-	-	-	Without	Without	Limit Intermed.	No
1103	Intermediate stop pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLim Intermed.	No
1104	Safety edge pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLimit Edge	No
1105	Safety edge pre-limit switch	N.C.	-	-	-	-	Without	Without	PreLimit Edge	No
1106	Upper pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLimit Open	No
1107	Upper pre-limit switch	N.C.	-	-	-	-	Without	Without	PreLimit Open	No
1108	Lower pre-limit switch	N.O.	-	-	-	-	Without	Without	PreLimit Close	No
1109	Lower pre-limit switch	N.C.	-	-	-	-	Without	Without	PreLimit Close	No
1110	Endswitch Open	N.C.	-	-	-	-	Without	Without	Limit Open	No
1111	Endswitch Close	N.C.	-	-	-	-	Without	Without	Limit Close	No
1112	Reference switch	N.O.	-	-	-	-	Without	Without	Reference -	No
1113	Reference switch	N.C.	-	-	-	-	Without	Without	Reference	No
1114	reserved	-	-	-	-	-	Without	Without	-	No
1401	Safety input stop during closing (not switch off able)	N.C.	-	-	-	-	Without	Without	Stop -	No
1402	Safety input reversing during closing (not switch off able)	N.C.	As before	As before	With	Both	Without	Without	Photo eye	No
1403	Safety input Stop during closing with move on after releasing th input	N.C.	As before	As before	With	Both	Without	Without	Photo eye	No

Value	Function	Contact type	End position	Hold-open time	Clear time	Direction	ON Delay	OFF Delay	LCD-Text	Test
1404	Safety input A Stop during opening and closing	N.C.	Upper	Without	With	No	Without	Without	Photo eye	No
1405	Safety input A Stop during opening and closing, after releasing in closing the door drives to the close position.	N.C.	Upper	Without	With	No	Without	Without	Photo eye	No
1406	Safety input A Reversing during opening	N.C.	As before	As before	With	Both	Without	Without	Photo eye	No
1407	Safety input A Stop during opening	N.C.	As before	As before	With	Both	Without	Without	STOP	No
1408	Safety input A Draw in safety	N.C.	As before	As before	With	Both	Without	Without	Feed Retent.	In Door close position

Output profiles

Output-Profile

The selection of an output-profile has some adjustments as a consequence.

Output-profiles can be set for the outputs 1 and 2 of TST FUS as well as for the outputs 4 and 5 of TST FUxE.

By using the TST RFUE expansion board, in connection with TST FUxE, outputs 6 to 9 can be set by an output-profile, too.

P.701 = Output 1 of TST FUS

P.702 = Output 2 of TST FUS

P.704 = Output 4 of TST FUxE

P.705 = Output 5 of TST FUxE

P.706 = Output 6 in connection with TST RFUE

P.707 = Output 7 in connection with TST RFUE

P.708 = Output 8 in connection with TST RFUE

P.709 = Output 9 in connection with TST RFUE

X = Number of output to parameterize

0. P.70x = 0: Output deactivated

Parameter	Value	Function
P.7x0 Condition under which the relay is energised	0	Deactivated
P.7x1 Switching behaviour of the relay	1000,0	Continuously on
P.7x2 Turn-on delay time	0	Deactivated
P.7x3 Turn-off delay time	0	Deactivated
P.7x4 Switch on logic	0	Not turned
P.7x5 Position for position forwarding message	0	Deactivated
P.7x6 Type of traffic light connected	0	Deactivated
P.7x7 Behaviour in Door CLOSE end position	0	Deactivated
P.7x8 Behaviour during opening	0	Deactivated
P.7x9 Behaviour in Door OPEN end position	0	Deactivated
P.7xA Behaviour during clearing phase	0	Deactivated
P.7xb Behaviour during closing	0	Deactivated
P.7xc Behaviour at stop between limit positions	0	Deactivated
P.7xd Behaviour if no Automatic function is possible	0	Deactivated
P.7xF Forwarding commands	0	Deactivated

1. P.70x = 1: Door is OPEN

Parameter	Value	Function
P.7x0 Condition under which the relay is energised	0	End position Door OPEN detected
P.7x1 Switching behaviour of the relay	1000,0	Continuously on
P.7x2 Turn-on delay time	0	Deactivated
P.7x3 Turn-off delay time	0	Deactivated
P.7x4 Switch on logic	0	Not turned
P.7x5 Position for position forwarding message	0	Deactivated
P.7x6 Type of traffic light connected	0	Deactivated
P.7x7 Behaviour in Door CLOSE end position	0	Deactivated
P.7x8 Behaviour during opening	0	Deactivated
P.7x9 Behaviour in Door OPEN end position	0	Deactivated
P.7xA Behaviour during clearing phase	0	Deactivated
P.7xb Behaviour during closing	0	Deactivated
P.7xc Behaviour at stop between limit positions	0	Deactivated
P.7xd Behaviour if no Automatic function is possible	0	Deactivated
P.7xF Forwarding commands	0	Deactivated

2. P.70x = 2: Door is CLOSE

Parameter	Value	Function
P.7x0 Condition under which the relay is energised	2	End position Door CLOSE detected
P.7x1 Switching behaviour of the relay	1000,0	Continuously on
P.7x2 Turn-on delay time	0	Deactivated
P.7x3 Turn-off delay time	0	Deactivated
P.7x4 Switch on logic	0	Not turned
P.7x5 Position for position forwarding message	0	Deactivated
P.7x6 Type of traffic light connected	0	Deactivated
P.7x7 Behaviour in Door CLOSE end position	0	Deactivated
P.7x8 Behaviour during opening	0	Deactivated
P.7x9 Behaviour in Door OPEN end position	0	Deactivated
P.7xA Behaviour during clearing phase	0	Deactivated
P.7xb Behaviour during closing	0	Deactivated
P.7xc Behaviour at stop between limit positions	0	Deactivated
P.7xd Behaviour if no Automatic function is possible	0	Deactivated
P.7xF Forwarding commands	0	Deactivated

3. P.70x = 3: Controller in automatic mode

Parameter	Value	Function
P.7x0 Condition under which the relay is energised	4	Automatic mode
P.7x1 Switching behaviour of the relay	1000,0	Continuously on
P.7x2 Turn-on delay time	0	Deactivated
P.7x3 Turn-off delay time	0	Deactivated
P.7x4 Switch on logic	0	Not turned
P.7x5 Position for position forwarding message	0	Deactivated
P.7x6 Type of traffic light connected	0	Deactivated
P.7x7 Behaviour in Door CLOSE end position	0	Deactivated
P.7x8 Behaviour during opening	0	Deactivated
P.7x9 Behaviour in Door OPEN end position	0	Deactivated
P.7xA Behaviour during clearing phase	0	Deactivated
P.7xb Behaviour during closing	0	Deactivated
P.7xc Behaviour at stop between limit positions	0	Deactivated
P.7xd Behaviour if no Automatic function is possible	0	Deactivated
P.7xF Forwarding commands	0	Deactivated

4. P.70x = 4: Courtyard light function

Parameter	Value	Function
P.7x0 Condition under which the relay is energised	5	Courtyard light function
P.7x1 Switching behaviour of the relay	1000,0	Continuously on
P.7x2 Turn-on delay time	0	Deactivated
P.7x3 Turn-off delay time	0	Deactivated
P.7x4 Switch on logic	0	Not turned
P.7x5 Position for position forwarding message	0	Deactivated
P.7x6 Type of traffic light connected	0	Deactivated
P.7x7 Behaviour in Door CLOSE end position	0	Deactivated
P.7x8 Behaviour during opening	0	Deactivated
P.7x9 Behaviour in Door OPEN end position	0	Deactivated
P.7xA Behaviour during clearing phase	0	Deactivated
P.7xb Behaviour during closing	0	Deactivated
P.7xc Behaviour at stop between limit positions	0	Deactivated
P.7xd Behaviour if no Automatic function is possible	0	Deactivated
P.7xF Forwarding commands	0	Deactivated

5. P.70x = 5: During each OPEN and CLOSE move and during active clearing time.

Parameter	Value	Function
P.7x0 Condition under which the relay is energised	8	During door move and clearance time
P.7x1 Switching behaviour of the relay	1000,0	Continuously on
P.7x2 Turn-on delay time	0	Deactivated
P.7x3 Turn-off delay time	0	Deactivated
P.7x4 Switch on logic	0	Not turned
P.7x5 Position for position forwarding message	0	Deactivated
P.7x6 Type of traffic light connected	0	Deactivated
P.7x7 Behaviour in Door CLOSE end position	0	Deactivated
P.7x8 Behaviour during opening	0	Deactivated
P.7x9 Behaviour in Door OPEN end position	0	Deactivated
P.7xA Behaviour during clearing phase	0	Deactivated
P.7xb Behaviour during closing	0	Deactivated
P.7xc Behaviour at stop between limit positions	0	Deactivated
P.7xd Behaviour if no Automatic function is possible	0	Deactivated
P.7xF Forwarding commands	0	Deactivated

6. P.70x = 6: Red traffic light on outside of Door 1

Parameter	Value	Function
P.7x0 Condition under which the relay is energised	12	Traffic light function
P.7x1 Switching behaviour of the relay	1000,0	Continuously on
P.7x2 Turn-on delay time	0	Deactivated
P.7x3 Turn-off delay time	0	Deactivated
P.7x4 Switch on logic	0	Not turned
P.7x5 Position for position forwarding message	0	Deactivated
P.7x6 Type of traffic light connected	3	Red light outside
P.7x7 Behaviour in Door CLOSE end position	0	Continuously off
P.7x8 Behaviour during opening	1	Continuously on
P.7x9 Behaviour in Door OPEN end position	0	Continuously off
P.7xA Behaviour during clearing phase	3	Flashing 1Hz
P.7xb Behaviour during closing	1	Continuously on
P.7xc Behaviour at stop between limit positions	1	Continuously on
P.7xd Behaviour if no Automatic function is possible	1	Continuously on
P.7xF Forwarding commands	0	Deactivated

7. P.70x = 7: Flashing red traffic light on outside of Door 1

Parameter	Value	Function
P.7x0 Condition under which the relay is energised	12	Traffic light function
P.7x1 Switching behaviour of the relay	1000,0	Continuously on
P.7x2 Turn-on delay time	0	Deactivated
P.7x3 Turn-off delay time	0	Deactivated
P.7x4 Switch on logic	0	Not turned
P.7x5 Position for position forwarding message	0	Deactivated
P.7x6 Type of traffic light connected	3	Red light outside
P.7x7 Behaviour in Door CLOSE end position	0	Continuously off
P.7x8 Behaviour during opening	3	Flashing 1Hz
P.7x9 Behaviour in Door OPEN end position	0	Continuously off
P.7xA Behaviour during clearing phase	4	Flashing 2Hz
P.7xb Behaviour during closing	3	Flashing 1Hz
P.7xc Behaviour at stop between limit positions	1	Continuously on
P.7xd Behaviour if no Automatic function is possible	1	Continuously on
P.7xF Forwarding commands	0	Deactivated

8. P.70x = 8: Green traffic light on outside of Door

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	12	Traffic light function
P.7x1	Switching behaviour of the relay	1000,0	Continuously on
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	2	Green light outside
P.7x7	Behaviour in Door CLOSE end position	0	Continuously off
P.7x8	Behaviour during opening	0	Continuously off
P.7x9	Behaviour in Door OPEN end position	1	Continuously on
P.7xA	Behaviour during clearing phase	0	Continuously off
P.7xb	Behaviour during closing	0	Continuously off
P.7xc	Behaviour at stop between limit positions	0	Continuously off
P.7xd	Behaviour if no Automatic function is possible	0	Continuously off
P.7xF	Forwarding commands	0	Deactivated

9. P.70x = 9: Red traffic light on inside of Door 1

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	12	Traffic light function
P.7x1	Switching behaviour of the relay	1000,0	Continuously on
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	1	Red light inside
P.7x7	Behaviour in Door CLOSE end position	0	Continuously off
P.7x8	Behaviour during opening	1	Continuously on
P.7x9	Behaviour in Door OPEN end position	0	Continuously off
P.7xA	Behaviour during clearing phase	3	Flashing 1Hz
P.7xb	Behaviour during closing	1	Continuously on
P.7xc	Behaviour at stop between limit positions	1	Continuously on
P.7xd	Behaviour if no Automatic function is possible	1	Continuously on
P.7xF	Forwarding commands	0	Deactivated

10. P.70x = 10: Flashing red traffic light on inside of Door 1

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	12	Traffic light function
P.7x1	Switching behaviour of the relay	1000,0	Continuously on
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	1	Red light inside
P.7x7	Behaviour in Door CLOSE end position	0	Continuously off
P.7x8	Behaviour during opening	3	Flashing 1Hz
P.7x9	Behaviour in Door OPEN end position	0	Continuously off
P.7xA	Behaviour during clearing phase	4	Flashing 2Hz
P.7xb	Behaviour during closing	3	Flashing 1Hz
P.7xc	Behaviour at stop between limit positions	1	Continuously on
P.7xd	Behaviour if no Automatic function is possible	1	Continuously on
P.7xF	Forwarding commands	0	Deactivated

11. P.70x = 11: Green traffic light on inside of Door

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	12	Traffic light function
P.7x1	Switching behaviour of the relay	1000,0	Continuously on
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	0	Green light inside
P.7x7	Behaviour in Door CLOSE end position	0	Continuously off
P.7x8	Behaviour during opening	0	Continuously off
P.7x9	Behaviour in Door OPEN end position	1	Continuously on
P.7xA	Behaviour during clearing phase	0	Continuously off
P.7xb	Behaviour during closing	0	Continuously off
P.7xc	Behaviour at stop between limit positions	0	Continuously off
P.7xd	Behaviour if no Automatic function is possible	0	Continuously off
P.7xF	Forwarding commands	0	Deactivated

12. P.70x = 12: Red traffic light on outside of Door 2

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	12	Traffic light function
P.7x1	Switching behaviour of the relay	1000,0	Continuously on
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	3	Red light outside
P.7x7	Behaviour in Door CLOSE end position	1	Continuously on
P.7x8	Behaviour during opening	1	Continuously on
P.7x9	Behaviour in Door OPEN end position	0	Continuously off
P.7xA	Behaviour during clearing phase	3	Flashing 1Hz
P.7xb	Behaviour during closing	1	Continuously on
P.7xc	Behaviour at stop between limit positions	1	Continuously on
P.7xd	Behaviour if no Automatic function is possible	1	Continuously on
P.7xF	Forwarding commands	0	Deactivated

13. P.70x = 13: Flashing red traffic light on outside of Door 2

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	12	Traffic light function
P.7x1	Switching behaviour of the relay	1000,0	Continuously on
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	3	Red light outside
P.7x7	Behaviour in Door CLOSE end position	1	Continuously on
P.7x8	Behaviour during opening	3	Flashing 1Hz
P.7x9	Behaviour in Door OPEN end position	0	Continuously off
P.7xA	Behaviour during clearing phase	4	Flashing 2Hz
P.7xb	Behaviour during closing	3	Flashing 1Hz
P.7xc	Behaviour at stop between limit positions	1	Continuously on
P.7xd	Behaviour if no Automatic function is possible	1	Continuously on
P.7xF	Forwarding commands	0	Deactivated

14. P.70x = 14: Red traffic light on inside of Door 2

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	12	Traffic light function
P.7x1	Switching behaviour of the relay	1000,0	Continuously on
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	1	Red light inside
P.7x7	Behaviour in Door CLOSE end position	1	Continuously on
P.7x8	Behaviour during opening	1	Continuously on
P.7x9	Behaviour in Door OPEN end position	0	Continuously off
P.7xA	Behaviour during clearing phase	3	Flashing 1Hz
P.7xb	Behaviour during closing	1	Continuously on
P.7xc	Behaviour at stop between limit positions	1	Continuously on
P.7xd	Behaviour if no Automatic function is possible	1	Continuously on
P.7xF	Forwarding commands	0	Deactivated

15. P.70x = 15: Flashing red traffic light on inside of Door 2

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	12	Traffic light function
P.7x1	Switching behaviour of the relay	1000,0	Continuously on
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	1	Red light inside
P.7x7	Behaviour in Door CLOSE end position	1	Continuously on
P.7x8	Behaviour during opening	3	Flashing 1Hz
P.7x9	Behaviour in Door OPEN end position	0	Continuously off
P.7xA	Behaviour during clearing phase	4	Flashing 2Hz
P.7xb	Behaviour during closing	3	Flashing 1Hz
P.7xc	Behaviour at stop between limit positions	1	Continuously on
P.7xd	Behaviour if no Automatic function is possible	1	Continuously on
P.7xF	Forwarding commands	0	Deactivated

16. P.70x = 16: Not flashing red traffic light

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	12	Traffic light function
P.7x1	Switching behaviour of the relay	1000,0	Continuously on
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	3	Red light outside
P.7x7	Behaviour in Door CLOSE end position	0	Continuously off
P.7x8	Behaviour during opening	1	Continuously on
P.7x9	Behaviour in Door OPEN end position	0	Continuously off
P.7xA	Behaviour during clearing phase	1	Continuously on
P.7xb	Behaviour during closing	1	Continuously on
P.7xc	Behaviour at stop between limit positions	1	Continuously on
P.7xd	Behaviour if no Automatic function is possible	1	Continuously on
P.7xF	Forwarding commands	0	Deactivated

17. P.70x = 17: Locking second door

Parameter	Value	Function
P.7x0 Condition under which the relay is energised	10	Locking second door
P.7x1 Switching behaviour of the relay	1000,0	Continuously on
P.7x2 Turn-on delay time	0	Deactivated
P.7x3 Turn-off delay time	0	Deactivated
P.7x4 Switch on logic	0	Not turned
P.7x5 Position for position forwarding message	0	Deactivated
P.7x6 Type of traffic light connected	0	Deactivated
P.7x7 Behaviour in Door CLOSE end position	0	Deactivated
P.7x8 Behaviour during opening	0	Deactivated
P.7x9 Behaviour in Door OPEN end position	0	Deactivated
P.7xA Behaviour during clearing phase	0	Deactivated
P.7xb Behaviour during closing	0	Deactivated
P.7xc Behaviour at stop between limit positions	0	Deactivated
P.7xd Behaviour if no Automatic function is possible	0	Deactivated
P.7xF Forwarding commands	0	Deactivated

18. P.70x = 18: OPEN airlock

Parameter	Value	Function
P.7x0 Condition under which the relay is energised	16	OPEN airlock
P.7x1 Switching behaviour of the relay	1000,0	Continuously on
P.7x2 Turn-on delay time	0	Deactivated
P.7x3 Turn-off delay time	0	Deactivated
P.7x4 Switch on logic	0	Not turned
P.7x5 Position for position forwarding message	0	Deactivated
P.7x6 Type of traffic light connected	0	Deactivated
P.7x7 Behaviour in Door CLOSE end position	0	Deactivated
P.7x8 Behaviour during opening	0	Deactivated
P.7x9 Behaviour in Door OPEN end position	0	Deactivated
P.7xA Behaviour during clearing phase	0	Deactivated
P.7xb Behaviour during closing	0	Deactivated
P.7xc Behaviour at stop between limit positions	0	Deactivated
P.7xd Behaviour if no Automatic function is possible	0	Deactivated
P.7xF Forwarding commands	0	Deactivated

19. P.70x = 19: Red traffic light mounted at outside, flashing during clearance time

Parameter	Value	Function
P.7x0 Condition under which the relay is energised	12	Traffic light function
P.7x1 Switching behaviour of the relay	1000,0	Continuously on
P.7x2 Turn-on delay time	0	Deactivated
P.7x3 Turn-off delay time	0	Deactivated
P.7x4 Switch on logic	0	Not turned
P.7x5 Position for position forwarding message	0	Deactivated
P.7x6 Type of traffic light connected	3	Red outside
P.7x7 Behaviour in Door CLOSE end position	1	Continuously on
P.7x8 Behaviour during opening	1	Continuously on
P.7x9 Behaviour in Door OPEN end position	0	Continuously off
P.7xA Behaviour during clearing phase	3	Flashing 1Hz
P.7xb Behaviour during closing	1	Continuously on
P.7xc Behaviour at stop between limit positions	1	Continuously on
P.7xd Behaviour if no Automatic function is possible	1	Continuously on
P.7xF Forwarding commands	0	Deactivated

20. P.70x = 20: Red traffic light mounted at inside, flashing during clearance time

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	12	Traffic light function
P.7x1	Switching behaviour of the relay	1000,0	Continuously on
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	1	Red inside
P.7x7	Behaviour in Door CLOSE end position	1	Continuously on
P.7x8	Behaviour during opening	1	Continuously on
P.7x9	Behaviour in Door OPEN end position	0	Continuously off
P.7xA	Behaviour during clearing phase	3	Flashing 1Hz
P.7xb	Behaviour during closing	1	Continuously on
P.7xc	Behaviour at stop between limit positions	1	Continuously on
P.7xd	Behaviour if no Automatic function is possible	1	Continuously on
P.7xF	Forwarding commands	0	Deactivated

21. P.70x = 21: Green traffic light non-directional

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	12	Traffic light function
P.7x1	Switching behaviour of the relay	1000,0	Continuously on
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	4	non-directional
P.7x7	Behaviour in Door CLOSE end position	0	Continuously off
P.7x8	Behaviour during opening	0	Continuously off
P.7x9	Behaviour in Door OPEN end position	1	Continuously on
P.7xA	Behaviour during clearing phase	0	Continuously off
P.7xb	Behaviour during closing	0	Continuously off
P.7xc	Behaviour at stop between limit positions	0	Continuously off
P.7xd	Behaviour if no Automatic function is possible	0	Continuously off
P.7xF	Forwarding commands	0	Deactivated

22. P.70x = 22:, Flashing during Door Open and Door Close

Parameter	Value	Function	
P.7x0	Condition under which the relay is energised	7	During motion
P.7x1	Switching behaviour of the relay	0	Flashing 1Hz
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	0	Deactivated
P.7x7	Behaviour in Door CLOSE end position	0	Deactivated
P.7x8	Behaviour during opening	0	Deactivated
P.7x9	Behaviour in Door OPEN end position	0	Deactivated
P.7xA	Behaviour during clearing phase	0	Deactivated
P.7xb	Behaviour during closing	0	Deactivated
P.7xc	Behaviour at stop between limit positions	0	Deactivated
P.7xd	Behaviour if no Automatic function is possible	0	Deactivated
P.7xF	Forwarding commands	0	Deactivated

23. P.70x = 23, Courtyard light with turn on time 120 seconds

Parameter		Value	Function
P.7x0	Condition under which the relay is energised	5	Courtyard light function
P.7x1	Switching behaviour of the relay	120	Turn on time in seconds
P.7x2	Turn-on delay time	0	Deactivated
P.7x3	Turn-off delay time	0	Deactivated
P.7x4	Switch on logic	0	Not turned
P.7x5	Position for position forwarding message	0	Deactivated
P.7x6	Type of traffic light connected	0	Deactivated
P.7x7	Behaviour in Door CLOSE end position	0	Deactivated
P.7x8	Behaviour during opening	0	Deactivated
P.7x9	Behaviour in Door OPEN end position	0	Deactivated
P.7xA	Behaviour during clearing phase	0	Deactivated
P.7xb	Behaviour during closing	0	Deactivated
P.7xc	Behaviour at stop between limit positions	0	Deactivated
P.7xd	Behaviour if no Automatic function is possible	0	Deactivated
P.7xF	Forwarding commands	0	Deactivated

Ramp profile

Synchronisation profile

Ramp profile

Parameter P.39F is chosen the ramp profile.
 With this profile the acceleration of the door is set.
 The start- and break ramps for opening and closing will be set.

These parameters will be set as shown:

0. P.39F = 0: No Ramp profile

The settings of the factory will be taken over.

1. P.39F = 1: Slow acceleration

Parameter	Value
P.312 Start ramp for Opening	50
P.322 Break ramp for Opening	40
P.352 Start ramp for Closing	40
P.362 Break ramp for Closing	20

2. P.39F = 2: Mittler acceleration

Parameter	Wert
P.312 Start ramp for Opening	150
P.322 Break ramp for Opening	120
P.352 Start ramp for Closing	120
P.362 Break ramp for Closing	60

3. P.39F = 3: Fast acceleration

Parameter	Wert
P.312 Start ramp for Opening	200
P.322 Break ramp for Opening	160
P.352 Start ramp for Closing	160
P.362 Break ramp for Closing	80

Synchronization profile

Parameter P.25F is chosen the synchronization profile.

With this profile the reference switch and the synchronization mode will be set.

These parameters will be set as shown:

0. P.25F = 0: No reference switch

Parameter	Value	Function
P.250 Incremental counting	0	Quadrature method
P.251 Mode for automatic synchronization after power-up	0	Manual deadman move to Door CLOSE end position
P.252 Synchronization time	5	Seconds
P.270 Select reference in Door CLOSE end position	0	No reference
P.271 Start condition for automatic synchronization	1	Automatically
P.272 Cyclical synchronization	0	No cyclical synchronization
P.280 Select reference in End position Door OPEN	0	No reference
P.281 Start condition for automatic synchronization	1	Automatically
P.282 Cyclical synchronization	0	No cyclical synchronization

1. P.25F = 1: Reference switch in end position Door CLOSE

Parameter	Value	Function
P.250 Incremental counting	0	Quadrature method
P.251 Mode for automatic synchronization after power-up	3	Automatic CLOSE move to reference in Door CLOSE position
P.252 Synchronization time	5	Seconds
P.270 Select reference in Door CLOSE end position	1	Reference switch
P.271 Start condition for automatic synchronization	1	Automatically
P.272 Cyclical synchronization	0	No cyclical synchronization
P.280 Select reference in End position Door OPEN	0	No reference
P.281 Start condition for automatic synchronization	1	Automatically
P.282 Cyclical synchronization	0	No cyclical synchronization

2. P.25F = 2: Synchronisation to safety edge

Parameter	Value	Function
P.250 Incremental counting	0	Quadrature method
P.251 Mode for automatic synchronization after power-up	3	Automatic CLOSE move to reference in Door CLOSE position
P.252 Synchronization time	5	Seconds
P.270 Select reference in Door CLOSE end position	3	Safety edge
P.271 Start condition for automatic synchronization	1	Automatically
P.272 Cyclical synchronization	0	No cyclical synchronization
P.280 Select reference in End position Door OPEN	0	No reference
P.281 Start condition for automatic synchronization	1	Automatically
P.282 Cyclical synchronization	0	No cyclical synchronization

3. P.25F = 3: Reference switch in end position Door OPEN

	Parameter	Value	Function
P.250	Incremental counting	0	Quadrature method
P.251	Mode for automatic synchronization after power-up	4	Automatic OPEN move to reference point in Door OPEN end position
P.252	Synchronization time	5	Seconds
P.270	Select reference in Door CLOSE end position	0	No reference
P.271	Start condition for automatic synchronization	0	Manuel
P.272	Cyclical synchronization	0	No cyclical synchronization
P.280	Select reference in End position Door OPEN	1	Reference switch
P.281	Start condition for automatic synchronization	1	Automatically
P.282	Cyclical synchronization	0	No cyclical synchronization

4. P.25F = 4: Mechanical stop in Door OPEN end position

	Parameter	Value	Function
P.250	Incremental counting	0	Quadrature method
P.251	Mode for automatic synchronization after power-up	4	Automatic OPEN move to reference point in Door OPEN end position
P.252	Synchronization time	5	Seconds
P.270	Select reference in Door CLOSE end position	0	No reference
P.271	Start condition for automatic synchronization	0	Manuel
P.272	Cyclical synchronization	0	No cyclical synchronization
P.280	Select reference in End position Door OPEN	2	Mechanical stop
P.281	Start condition for automatic synchronization	1	Automatically
P.282	Cyclical synchronization	0	No cyclical synchronization

5. P.25F = 5: Safety edge and then to mechanical stop in End position Door OPEN

	Parameter	Value	Function
P.250	Incremental counting	0	Quadrature method
P.251	Mode for automatic synchronization after power-up	5	Automatic CLOSE to reference point in Door CLOSE position, then automatic OPEN to reference point in Door OPEN position.
P.252	Synchronization time	5	Seconds
P.270	Select reference in Door CLOSE end position	3	Safety edge
P.271	Start condition for automatic synchronization	1	Automatically
P.272	Cyclical synchronization	0	No cyclical synchronization
P.280	Select reference in End position Door OPEN	2	Mechanical stop
P.281	Start condition for automatic synchronization	1	Automatically
P.282	Cyclical synchronization	0	No cyclical synchronization

6. P.25F = 6: Safety edge and reference switch in End Position Door Open

	Parameter	Value	Function
P.250	Incremental counting	0	Quadrature method
P.251	Mode for automatic synchronization after power-up	5	Automatic CLOSE to reference point in Door CLOSE position, then automatic OPEN to reference point in Door OPEN position.
P.252	Synchronization time	5	Seconds
P.270	Select reference in Door CLOSE end position	3	Safety edge
P.271	Start condition for automatic synchronization	1	Automatically
P.272	Cyclical synchronization	0	No cyclical synchronization
P.280	Select reference in End position Door OPEN	1	Reference switch
P.281	Start condition for automatic synchronization	1	Automatically
P.282	Cyclical synchronization	0	No cyclical synchronization

7. P.25F = 7: reference switch in Door CLOSE position and to mechanical stop in End position OPEN

	Parameter	Value	Function
P.250	Incremental counting	0	Quadrature method
P.251	Mode for automatic synchronization after power-up	5	Automatic CLOSE to reference point in Door CLOSE position, then automatic OPEN to reference point in Door OPEN position.
P.252	Synchronization time	5	Seconds
P.270	Select reference in Door CLOSE end position	1	Reference switch
P.271	Start condition for automatic synchronization	1	Automatically
P.272	Cyclical synchronization	0	No cyclical synchronization
P.280	Select reference in End position Door OPEN	2	Mechanical stop
P.281	Start condition for automatic synchronization	1	Automatically
P.282	Cyclical synchronization	0	No cyclical synchronization

8. P.25F = 8: Synchronization to mechanical stop in End-Position OPEN and CLOSE

	Parameter	Value	Function
P.250	Incremental counting	0	Quadrature method
P.251	Mode for automatic synchronization after power-up	5	Automatic CLOSE to reference point in Door CLOSE position, then automatic OPEN to reference point in Door OPEN position.
P.252	Synchronization time	1	Seconds
P.270	Select reference in Door CLOSE end position	2	Mechanical stop
P.271	Start condition for automatic synchronization	1	Automatically
P.272	Cyclical synchronization	0	No cyclical synchronization
P.280	Select reference in End position Door OPEN	2	Mechanical stop
P.281	Start condition for automatic synchronization	1	Automatically
P.282	Cyclical synchronization	0	No cyclical synchronization

9. P.25F = 9: Manuelle Synchronization End-Position OPEN and CLOSE

Parameter		Value	Function
P.250	Incremental counting	0	Quadrature method
P.251	Mode for automatic synchronization after power-up	2	Deadman Door CLOSE, then Deadman Door OPEN
P.252	Synchronization time	5	Seconds
P.270	Select reference in Door CLOSE end position	0	No Reference
P.271	Start condition for automatic synchronization	1	Automatically
P.272	Cyclical synchronization	0	No cyclical synchronization
P.280	Select reference in End position Door OPEN	0	No Reference
P.281	Start condition for automatic synchronization	1	Automatically
P.282	Cyclical synchronization	0	No cyclical synchronization

Appendixes

CE and TÜV documents
Data sheets
Optional accessories

Zertifikat

Certificate

Registrier-Nr.

Registered No.

44 780 07 351453-001

Zeichen des Auftraggebers
Customer's reference

Auftragsdatum
Date of order
13.08.2007

Aktenzeichen
File reference
8000351453

Prüfbericht Nr.
Test report no.
07 780 351453-001

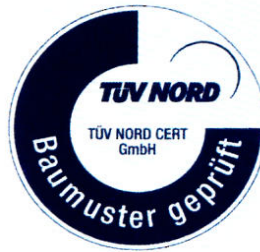
**Name und Anschrift
des Auftraggebers**

**Feig Electronic GmbH
Lange Straße 4**

*Name and address of
the customer*

35781 Weilburg - Waldhausen

ist berechtigt, das unten
genannte Produkt
mit dem abgebildeten Zeichen
zu kennzeichnen



*is authorized to
provide the product
mentioned below with
the mark as illustrated*

Fertigungsstätte

siehe oben

Manufacturing plant

Geprüft nach

EN 12453:2000 Nutzungssicherheit kraftbetätigter Tore
Abschnitt 5.2 Antriebssysteme und
Energieversorgung
EN 60335-1:2002 Sicherheit elektrischer Geräte für den
Hausgebrauch und ähnliche Zwecke
EN 13849-1:2006 Sicherheit von Maschinen -
Sicherheitsbezogene Teile von Steuerungen
Anforderungen an den Performance Level c
und Kategorie 2

Tested in accordance with

**Beschreibung des
Produktes**

Torsteuerung TST FUE-2

Description of product

Steuerung für den Automatik-, bzw. Impulsbetrieb von Industrietoren
mit elektrischen Antrieben bis 1,5 kW

Varianten:

TST FUE-2 A für Antriebe bis 0,75 kW
TST FUE-2 C für Antriebe bis 1,50 kW

TÜV NORD CERT GmbH
Zertifizierungsstelle für
Produktsicherheit

Gültig bis / Valid until: 23.08.2010

M. Wucherpfennig

Hannover, 23.08.2007

Bitte beachten sie auch die umseitigen Hinweise
Please also pay attention to the information stated overleaf

EG-Konformitäts-Erklärung
Declaration of conformity

Hiermit bescheinigt das Unternehmen / *The company*

FEIG ELECTRONIC GmbH
Lange Straße 4
D- 35781 Weilburg

die Konformität des Produkts / *herewith declares conformity of the product*

Bezeichnung / *Designation:*

Torsteuerung

Typ / *Type:*

TST FUE-2

Variante / *Version:*

-A, -C, -D, -E, -F und -G

mit folgenden einschlägigen Bestimmungen / *with applicable regulations below*

EG-Richtlinie / *EC directive*

EMV-Richtlinie:

89/336/EWG

mit Änderungen

Niederspannungsrichtlinie:

2006/95/EG

Maschinenrichtlinie

98/37/EG

mit Änderungen

Angewendete harmonisierte Normen / *Harmonized standards applied:*

EN 12453 / 02.2001	: Nutzungssicherheit kraftbetätigter Tore -Anforderungen
EN 12445 / 02.2001	: Nutzungssicherheit kraftbetätigter Tore –Prüfverfahren
EN 12978 / 09.2003	: Tore–Schutzeinrichtungen-Anforderungen-Prüfverfahren
EN 60335-1 / 02.2007	: Sicherheit elektrische Geräte für den Hausgebrauch
EN 61000-6-1 / 08.2002	: EMV: Fachgrundnorm – Störfestigkeit (Wohnbereich)
EN 61000-6-2 / 02.2005	: EMV: Fachgrundnorm – Störfestigkeit (Industriebereich)
EN 61000-6-3 / 08.2002	: EMV: Fachgrundnorm – Störaussendung (Wohnbereich)
EN 61000-6-4 / 08.2002	: EMV: Fachgrundnorm – Störaussendung (Industriebereich)

Weilburg, 03.März.2008


Eldor Walk, Technischer Leiter

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften. Die mitgelieferte Produktdokumentation und insbesondere die darin enthaltenen Sicherheitshinweise sind zu beachten.



Door control unit
with integrated
frequency converter

TRICON 0,75 kW
TST FUE-2-A
TST FUE-2-AG*

TRICON 1,5 kW
TST FUE-2-C
TST FUE-2-CG*



TST FUE-2-A
TST FUE-2-C



TST FUE-2-AG
TST FUE-2-CG

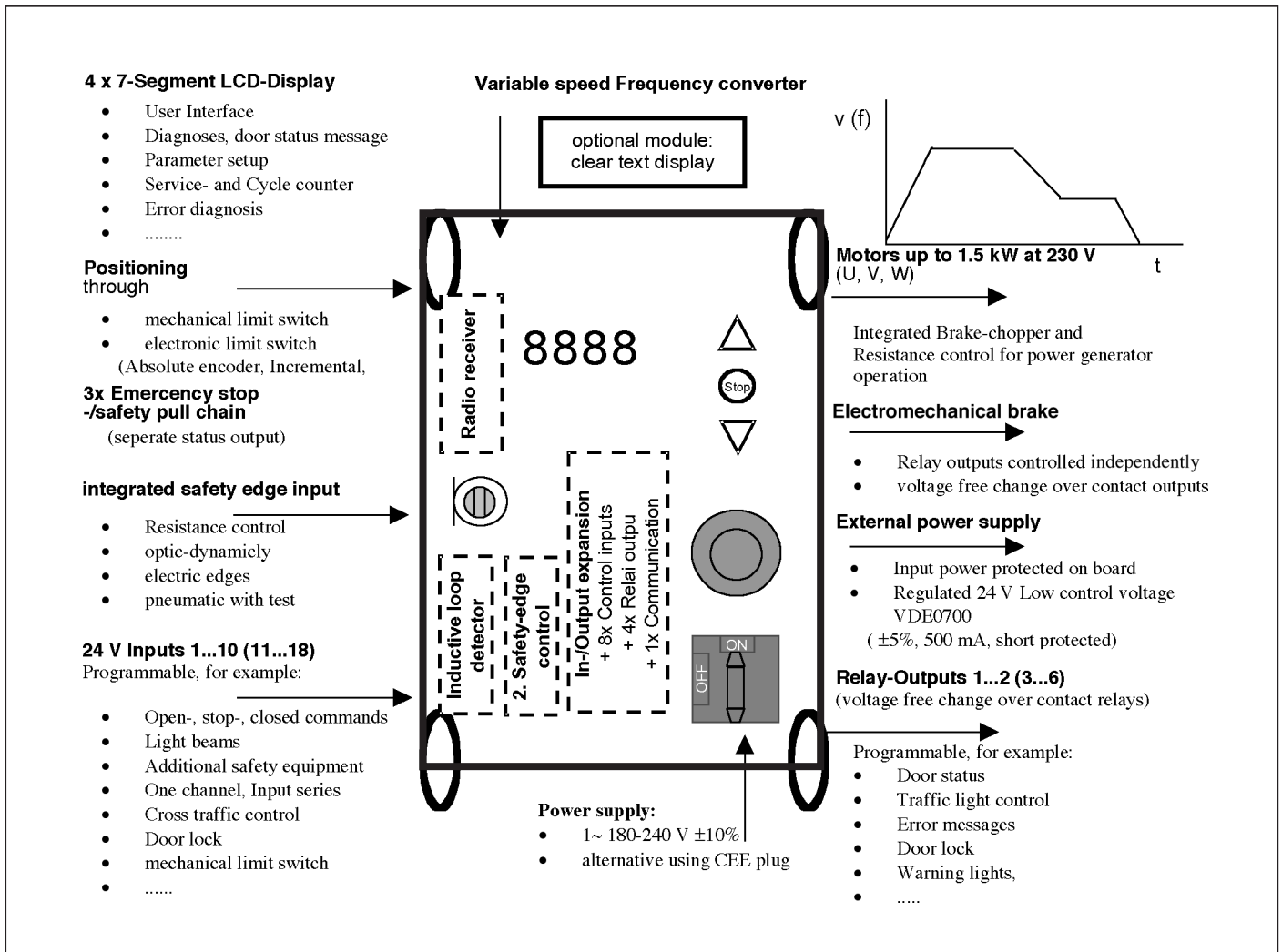
Control unit with integrated frequency converter for speed independent operation of fast speed, sectional and rolling doors

Features:

- Significant increase in door lifetime at highest dynamic and speed
- Interference-proof metal housing comes ready for installation with conformity to the EMC-guidelines
- Easy installation due to the self learning controller setup and pre-installed parameters for most standard doors
- SPS-programming is not necessary
- Integrated evaluation electronic for safety edge
- Plug-in slots for additional modules (e.g. real text display)
- Mechanical or electronic limit switch operation

* Optional available in a bigger housing with main switch





Additional Features

- Voltage range 1~ 180 V_{AC} ... 240 V_{AC} ±10%
- Conform to TÜV, UL and CE Standards
- 24 V low voltage VDE 0700
- ESD resistance up to 25 kV!
- Integrated control electronic works with most common safety edges (Resistance/ optical Systems)
- Plug in sockets for additional modules
 - In-/Output extension
 - One-/Two channel-inductive loop detector
 - One-/Two channel-radio receiver (433 MHz/868 MHz)
 - Additional safety edge control
 - LCD display with multilingual real text display
- Mechanical or electronic limit switch operation
- Up to 20 (28) digital Inputs and 2 (6) relays Outputs have standard functions ex factory – many special functions can be selected on side: Functionality, Operating Mode, In-/ Output type, Clear-/Open-hold-timer, Directional logic, Diagnostic for LCD, ...

FEIG ELECTRONIC GmbH • Lange Strasse 4 • D-35781 Weilburg
 Tel.: +49 6471/3109-0 • Fax.: 3109-99 • www.feig.de • info@feig.de

Technical Data

Housing:
 Sheet metal
 WxHxD 300 x 300 x 120 mm
 Alternative: 300 x 400 x 120 mm

Input Power:
 1~ 180-240 V_{AC} ±10%/ 50-60 Hz

Motor wiring:
 For 3-Phase-Motor up to 1.5 kW / 9 A
 (Alternative: up to 0.75 kW / 4.7 A)
 • High overload resistance for doors
 • incl. 3~ Safety Isolation relays

Possible operating frequency:
 6-200 Hz
 Separate adjustable frequency ramps
 For all door operating modes

Control voltage/Supply voltage for external equipment:
 24 V_{DC}, low voltage regulated 24 V_{DC} ±5% / 500 mA
 Electrical short protected

Temperature range:
 -10°C to 50°C environment

Regulations:
 Doors: EN 12453 / EN 12978
 Power: EN 60335 (VDE 0700)
 EMV: EN 50081 / EN 50082

Standards:
 TÜV
 UL (Underwriters Laboratories Inc.)

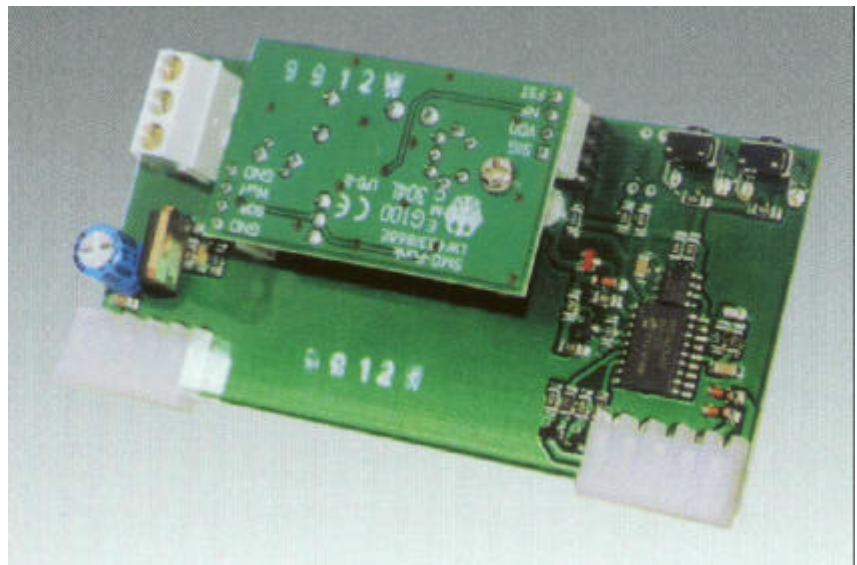
TST SFFE2-A

radio receiver

2-channel receiver module

TST SFFE2-A receiver 433 MHz

TST SFFE2-B receiver 40 MHz



Remote-controlled opening and closing of industrial doors and barriers

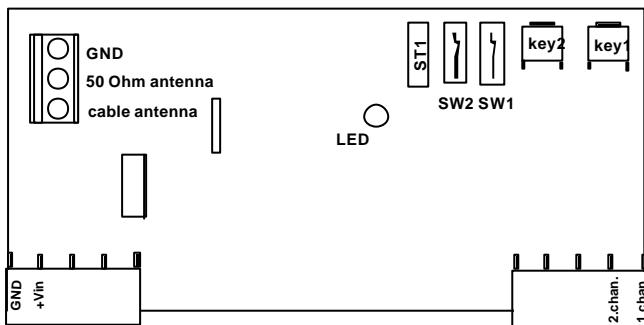
Special features:

- plug-in module for control boards of
- FEIG ELECTRONIC
- frequency range FM 433 MHz
- teach in of max. 32 transmitters possible
- signal evaluation with microprocessor
- operation with cable antenna or 50 Ohm technique
- receiving display via LED

Technical data

Dimensions:	wxh 100,65x49,21 mm
Mains voltage:	12-24 V DC
Current consumption:	approx. 8 milliamperes without RF module
Settings:	53200 mode 35 - 110 ms
Connections:	2x 5pin Molex type for supply and command 1x 3pol. screw terminal for antenna
Displays:	1x LED red for function check
Control elements.	2x learning press button 2x DIP-switch for latch function (optional)

Construction:



Learning and delete process:

The factory setting of the receiver is in the codification 1, 2, 3, 8, 9, 10 =ON . This codification should be changed always after the start up as following: Press the learn button for approx. 10 seconds; as a result, the processor is deleted completely. He signals this by short flashing of receiver LED. The codification in the manual transmitter must now be changed. Now, the learn button must be pressed on the receiver and within 5 sec. after this the button of the transmission channel which should be learned in. If the relay switches and the LED flashes on the learning process was successful. According to this principle it is possible to learn in 64 different transmitters. In order to delete the entire store the learn button must be pressed on the receiver again approx. 10 seconds (flashing of LED). After this new transmitter(s) can be learned in again.

For the operation of this receiver a transmitter has to be taught in. Firstly the transmitter has to be checked by pressing the transmission key and regarding the transmission LED. Now, the learn button of the receiver must be pressed and within 5 sec. after this the button of the transmission channel which should be taught in. If the LED flashes and the connected motor is running the learning process was successful. According to this a second transmitter can be taught in with the key for the second channel. In order to delete the entire store the learn button must be pressed on the receiver until red LED is on. (LED is on for the whole deleting process). After LED is off the store is empty and new transmitter(s) can be learned in again.

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35781 Weilburg-Waldhausen
Tel.: 06471-3109-0
Fax: 06471-3109-99
e-mail: hans-joachim.burle@feig.de
internet: <http://www.feig.de>



Digital two-channel motion detector with Planar technology

MWD BP



MWD BP
with remote control

Entrance control for industrial doors and barriers.






Features:

- Two-channel device for vehicular and pedestrian detection
- Microwave technology / planar Doppler
- Cross traffic suppression
- Object tracking function
- Various adjustment options of relay function
- Pre-configured profiles for simple set up
- Programming with pushbutton on device or optional with remote control



Infrared remote control:



-  LED for transmission control
-  Activation of device in the reception range/
Confirmation/change of parameter name/-value
- 1 .. 4** Possible device addresses 1..4
-  Changing parameter(↑)/Increasing parameter value
-  Changing parameter(↓)/Decreasing parameter value
-  --- (Button without function)
- i** Display device address
- F- / F+** Activating / displaying service parameter

List of standard parameters

Parameter	Value range / Definition
Sensitivity	1 – 9 and A - F 1 = low 7 = medium 9 = * F = high
Detection direction	0 = off 1 = approaching * 2 = removing
Person detection	0 = off * 1 = Detection only of persons, low 2 = Detection only of persons, medium 3 = Detection only of persons, high
Vehicle detection	0 = off * 1 = Detection only of vehicles, low 2 = Detection only of vehicles, medium 3 = Detection only of vehicles, high
Cross traffic suppression	0 = off * 1 = low 2 = medium 3 = high
Object tracking function	0 = off * 1 = low 2 = medium 3 = high
Relay function	0 = off * 1 = channel 1 *(for channel 1) 2 = channel 2 *(for channel 2) 3 = channel 1 or channel 2 4 = channel 1 and channel 2
Relay operation delay	0 = 0s * 1...F = 0,2s...3,0s (Value x 0,2s)
Relay drop-out delay	0 = 0s 1 = 0,2s (Value x 0,2s) 2 = 0,4s * 3...F = 0,6s...3,0s
Relay operation principle	0 = open-circuit current principle * 1 = closed current principle
Profiles	0 = Parameter changed after choice of profile (only display !) 1 = Parameter profile 1: Setup of factory setting * 2...9 = Parameter profiles 2...9

* Factory settings

Applications:

- a) Standard applications:**
Impulse generator for industrial gates/doors
Impulse generator for automatic doors
- b) Special applications:**
Detector for light signal plants in the area of building sites

Terminal connections :

Relay X1 terminal 1 : Relay 1 Normally closed contact
 Relay X1 terminal 2 : Relay 1 Common
 Relay X1 terminal 3 : Relay 1 Normally open contact
 Relay X1 terminal 4 : Power supply / earth
 Relay X1 terminal 5 : Power supply 24 V
 Relay X1 terminal 6 : Relay 2 Normally open contact
 Relay X1 terminal 7 : Relay 2 Common

Technical data:

Dimensions: 135 x 65 x 130 mm (HxWxD)
 Protection class: IP 65
 Power supply: 12-27 V AC / 12-30 V DC
 Power consumption: typ. 1.0 W; max. 2.4 W
 Temperature range:
 - Operation -20°C up to +55°C
 - Storage -30°C up to +75°C
 Humidity: <95% not condensing
 Frequency: typ. 24.125 GHz
 Transmitting power (EIRP) typ. 40 mW, max. 100 mW
 Output relay:
 max. turn on voltage 1 A at 30 V AC/DC
 min. turn on voltage 1 mA / 5 V DC
 maximum mounting height 7 m

TST FFE1-B

radio receiver

1-channel plug-in receiver



Remote-controlled opening and closing of industrial doors and barriers

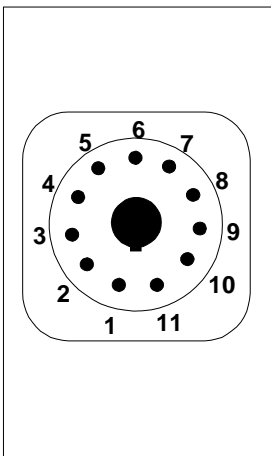
Special features:

- radio receiver in 11pin plug-in housing for mounting with plug socket on DIN-rail
- frequency range FM 433 MHz
- teach in of max. 64 transmitters possible
- signal evaluation with microprocessor
- operation with cable antenna or 50 Ohm technique
- relay and transistor output

Technical data

Dimensions:	wxhxd 42x60x85 mm
Power supply:	230 V AC or 12-24 V AC/DC
Current consumption:	approx. 39 milliamperes
Operation frequency:	433,920 MHz
Modulation:	FM
Sensitivity:	2 μ V or better
Switch output:	Relay, max. 10A, 230 V Transistor 100 mA
Control elements:	1x learn key

Connection:



- PIN 5 - power supply
12-24 V AC/DC**
- PIN 6 - power supply
12-24 V AC/DC**
- PIN 8 - power supply
230 V AC**
- PIN 9 - power supply
230 V AC**
- PIN 9 - cable antenna**
- PIN 10 - relay contact**
- PIN 11 - relay contact**

Learning and delete process:

The factory setting of the receiver is in the codification 1, 2, 3, 8, 9, 10 =ON . This codification should be changed always after the start up as following: Press the learn button for approx. 10 seconds; as a result, the processor is deleted completely. He signals this by short contacting of the relay (switching of transistor). The codification in the manual transmitter must now be changed. Now, the learn button must be pressed on the receiver and within 5 sec. after this the button of the transmission channel which should be learned in. If the relay switches (or transistor) the learning process was successful. According to this principle it is possible to learn in 64 different transmitters. In order to delete the entire store the learn button must be pressed on the receiver again approx. 10 seconds (switching of output). After this new transmitter(s) can be learned in again.

TST FFE1/2-C

radio receiver

1-channel receiver TST FFE1-C

2-channel receiver TST FFE2-C



Remote-controlled opening and closing of industrial doors and barriers

Special features:

- radio receiver in waterproofed housing for mounting on wall
- frequency range FM 433 MHz
- teach in of max. 64 transmitters possible
- signal evaluation with microprocessor
- operation with cable antenna or 50 Ohm technique
- relay outputs
- waterproofed housing

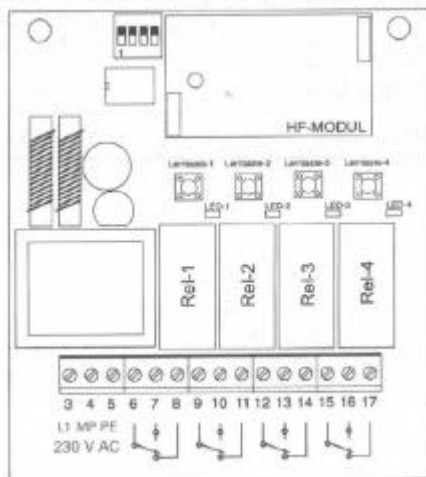
Technical data

Dimensions:	wxhxd 165x125x75 mm
Mains voltage:	230 V AC or 12-24 V DC
Current consumption:	approx. 39 milliamperes
Operation frequency:	433,920 MHz
Modulation:	FM
Sensitivity:	2 μ V or better
Switch output:	Relay, max. 8A, 230 V
Electr. connection	strip terminal
Control elements:	2x learn key

Learning and delete process:

The factory setting of the receiver is in the codification 1, 2, 3, 6, 8, 10 =ON . This codification should be changed always after the start up as following: Press the learn button for approx. 10 seconds; as a result, the processor is deleted completely. He signals this by short contacting of the relay (switching of transistor). The codification in the manual transmitter must now be changed. Now, the learn button must be pressed on the receiver and within 5 sec. after this the button of the transmission channel which should be learned in. If the relay switches (or transistor) the learning process was successful. According to this principle it is possible to learn in 64 different transmitters. In order to delete the entire store the learn button must be pressed on the receiver again approx. 10 seconds (switching of output). After this new transmitter(s) can be learned in again.

Connection:



FEIG ELECTRONIC GmbH
Lange Straße 4
35781 Weilburg-Waldhausen
Tel.: 06471-3109-0
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e-mail: hans-joachim.burle@feig.de
internet: <http://www.feig.de>

TST FFE1-D

radio receiver

1-channel receiver



Remote-controlled opening and closing
of industrial doors and barriers

Special features:

- radio receiver in 11pin plug-in housing
for direct mounting on DIN rail
- frequency range FM 433 MHz
- teach in of max. 64 transmitters possible
- signal evaluation with microprocessor
- operation with cable antenna or 50 Ohm technique
- relay and transistor outputs
- receiving display via LED

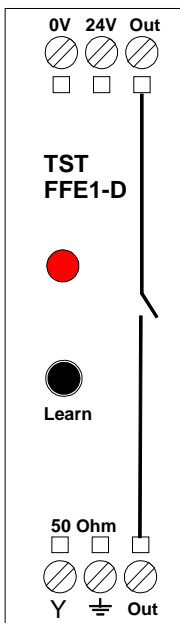
Technical data

Dimensions:	wxhxd 165x125x75 mm
Mains voltage:	12-24 V DC
Current consumption:	approx. 39 milliamperes
Operation frequency:	433,920 MHz
Modulation:	FM
Sensitivity:	2 μ V or better
Switch output:	Relay, max. 10A Transistor 100 mA
Control elements:	2x learn key

Learning and delete process:

The factory setting of the receiver is in the codification 1, 2, 3, 8, 9, 10 =ON . This codification should be changed always after the start up as following: Press the learn button for approx. 10 seconds; as a result, the processor is deleted completely. He signals this by short flashing of receiver LED. The codification in the manual transmitter must now be changed. Now, the learn button must be pressed on the receiver and within 5 sec. after this the button of the transmission channel which should be learned in. If the relay switches and the LED flashes on the learning process was successful. According to this principle it is possible to learn in 64 different transmitters. In order to delete the entire store the learn button must be pressed on the receiver again approx. 10 seconds (flashing of LED). After this new transmitter(s) can be learned in again.

Connection:



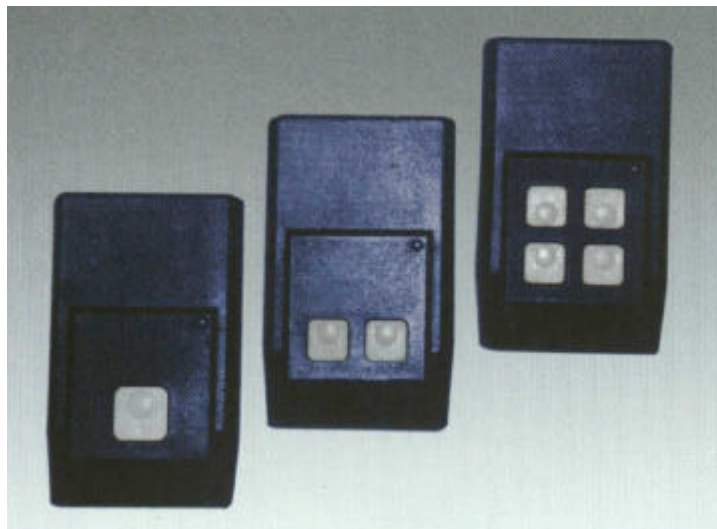
TST FFSx-A

manual radio transmitter

TST FFS1-A 1- channel transmitter

TST FFS2-A 2- channel transmitter

TST FFS4-A 4- channel transmitter



Remote-controlled opening and closing
of industrial doors and barriers

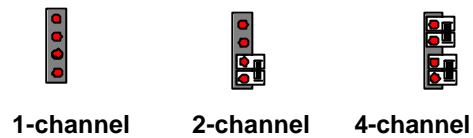
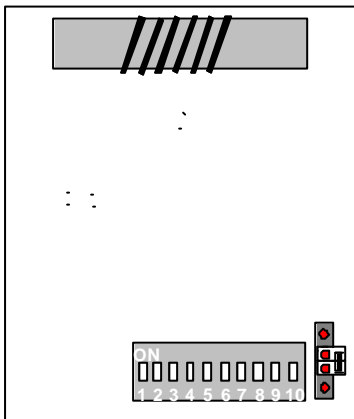
Special features:

- remote control radio transmitters in compact case
- frequency range FM 433 MHz
- transmitting range approx. 30-50 meters
- LED display

Technical data

Measurements:	WxHxD 95x60x23mm
Mains voltage:	9V block battery
Current consumption:	approx. 35 milliamperes
Operating frequency:	433,920 MHz
Modulation method.	FM
Modulation factor:	Shift +/- 20 kHz
Transmission power:	typical <10 mW

Construction, adjustments of the jumper:



jb/vk 06/00 errors and technical changes remain reserved

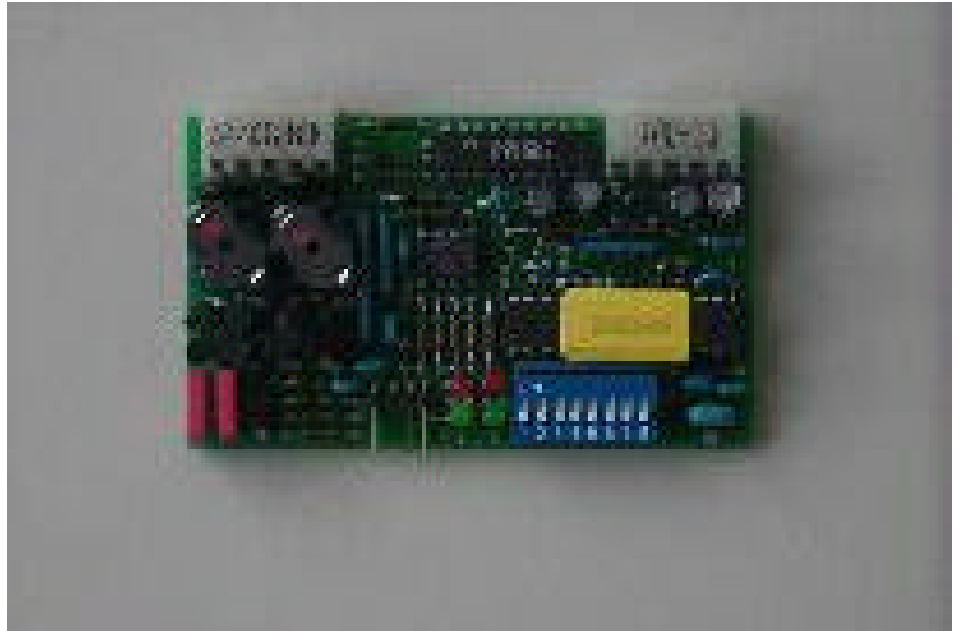
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TST SVEK...

loop detector module

TST SVEK1 single detector

TST SVEK2 double detector



presence vehicle detection for parking control and door/barriers applications

Special characteristics:

- Plug-in module for printed circuit board
- Connection with edge connectors
- Microprocessor controlled
- Isolation transformer between loop and detector electronics
- Automatic Calibration when switching on or when resetting
- Connection jacks for on-line diagnostic unit
- Adjustment of unlimited holding time possible
- Indication with LED's
- Adjustment possibilities with DIP-switches
- TTL- or open collector output

Technical data

Construction:	plug-in board 85x50 mm
Power supply:	24 VDC +/-20%
Power consumption:	250 mW
Working temperature:	-25° - +70° C
Max. humidity	95% not condensing
Loop inductivity	45 - 1000 uH
Frequency range:	30 - 130 kHz
Sensitivity range:	0,01% - 0,65% (df/f) 0,02% - 1,3% (dL/L)
Loop lead-in:	max. 100 m
Outputs:	TTL level (optional: open collector)
rise time:	80 ms TST SVEK1, 160 ms TST SVEK2
fall time:	40 ms TST SVEK1, 80 ms TST SVEK2
min. output time:	200 ms
Noise protection:	2 kV (burst impulse)
Connection:	MOLEX edge connector series 3215, 2x5pin

DIP switch - adjustments

1	2	3	4	5*	6*	7*	8*	function
off	off	-	-	-	-	-	-	sensitivity channel 1 - step 1
on	off	-	-	-	-	-	-	sensitivity channel 1 - step 2
off	on	-	-	-	-	-	-	sensitivity channel 1 - step 3
on	on	-	-	-	-	-	-	sensitivity channel 1 - step 4
-	-	-	-	off	off	-	-	sensitivity channel 2 - step 1 *
-	-	-	-	on	off	-	-	sensitivity channel 2 - step 2 *
-	-	-	-	off	on	-	-	sensitivity channel 2 - step 3 *
-	-	-	-	on	on	-	-	sensitivity channel 2 - step 4 *
-	-	-	off	-	-	-	-	low frequency (channel 1)
-	-	-	on	-	-	-	-	high frequency (channel 1)
-	-	-	-	-	-	-	off	low frequency (channel 2) *
-	-	-	-	-	-	-	on	high frequency (channel 2) *
-	-	off	-	-	-	-	-	holding time 5 minutes (channel 1)
-	-	on	-	-	-	-	-	holding time unlimited (channel 1)
-	-	-	-	-	-	off	-	holding time 5 minutes (channel 2) *
-	-	-	-	-	-	on	-	holding time unlimited (channel 2) *

* only for TST SVEK2

Edge connector

X1, left connector (component side):

PIN no.	connection
1	GND
2	24 VDC
3	GND open collector *
4	output 2 (impulse output**)
5	output 1

* GND of the open collector outputs is to be connected in the asterisk of current supply with normal GND

** for TST SVEK1 output 2 can be used optional as pulse output

X2, right connector (component side):

PIN no.	connection
1	loop 2 *
2	loop 2 *
3	not connected
4	loop 1
5	loop 1

* only for TST SVEK2

Function of LED's

LED green	LED red	function
off	off	power off
flash	off	detector calibrates
on	off	detector ready for operation, loop free
on	on	detector ready for operation, loop occupied
off	pulse	loop failure
pulse	-	loop failure
		detector again ready for operation

Function of outputs

detector status	output status
reset	high
calibration	high
loop free	high
loop occupied	low
loop failure	low

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