



Installation instructions

Door control

TS 959

Hold-to-run control

Version: 51171547

-en-

Version: g / 06.2016



0000000 0000 51171547 XXXXX



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Symbols



Warning - Risk of injury or danger to life!



Warning - Danger to life from electric shock!



Note - Important information!



Prompt - Required action!

Illustrations show example products. Differences from the delivered product are possible.

1 General safety information

Specified normal use

The door control is intended for a power-operated door with a drive unit (NES/DES GfA limit switch system).

The safe operation is only guaranteed with specified normal use. The drive unit is to be protected from rain, moisture and aggressive ambient conditions. No liability for damage caused by other applications or non-observance of the information in the manual.

Modifications are only permitted with the agreement of the manufacturer. Otherwise the manufacturer's Declaration shall be rendered null and void.

Safety information

Installation and commissioning are to be performed by skilled personnel only.

Only trained electrical craftsmen are permitted to work on electrical equipment. They must assess the tasks assigned to them, recognise potential danger zones and be able to take appropriate safety measures.

Installation work is only to be carried out with the supply off.

Observe the applicable regulations and standards.

Coverings and protective devices

Only operate with corresponding coverings and protective devices.

Ensure that gaskets are fitted correctly and that cable glands are correctly tightened.

Spare parts

Only use original spare parts.



2 Technical data

| | | |
|---|---|------------|
| Series | TS 959 | |
| Dimensions W x H x D | 155 x 386 x 90 | mm |
| Installation | Vertical, free of vibration | |
| Operating frequency | 50 / 60 | Hz |
| Supply voltage (+/- 10%) | 1 N~230 V, PE 3 N~230 / 400 V, PE 3~230 / 400 V, PE | |
| Output power for drive unit, maximum | 3 | kW |
| Protection per phase, on-site | 10-16 | A |
| External supply voltage: X1/L, X1/N (protection via F1 micro-fuse) | 1 N~230 V | |
| | 1,6 | A time-lag |
| Control inputs | 24 | V DC |
| | Type 10 | mA |
| Relay contacts | 1 potential-free changeover contact | |
| Load of the relay contact ohmic/inductive | 230 V AC, 1 A | |
| | 24 V DC, 0,4 A | |
| Control power consumption | 4 | W |
| Temperature range | Operation: -10..+50 Storage: +0..+50 | °C |
| Air humidity | up to 93 % non-condensing | |
| Protection class of housing | IP54 | |
| Compatible GfA limit switch | NES (mechanical limit switch) DES (digital limit switch) | |

3 Mechanical installation



Control installation!

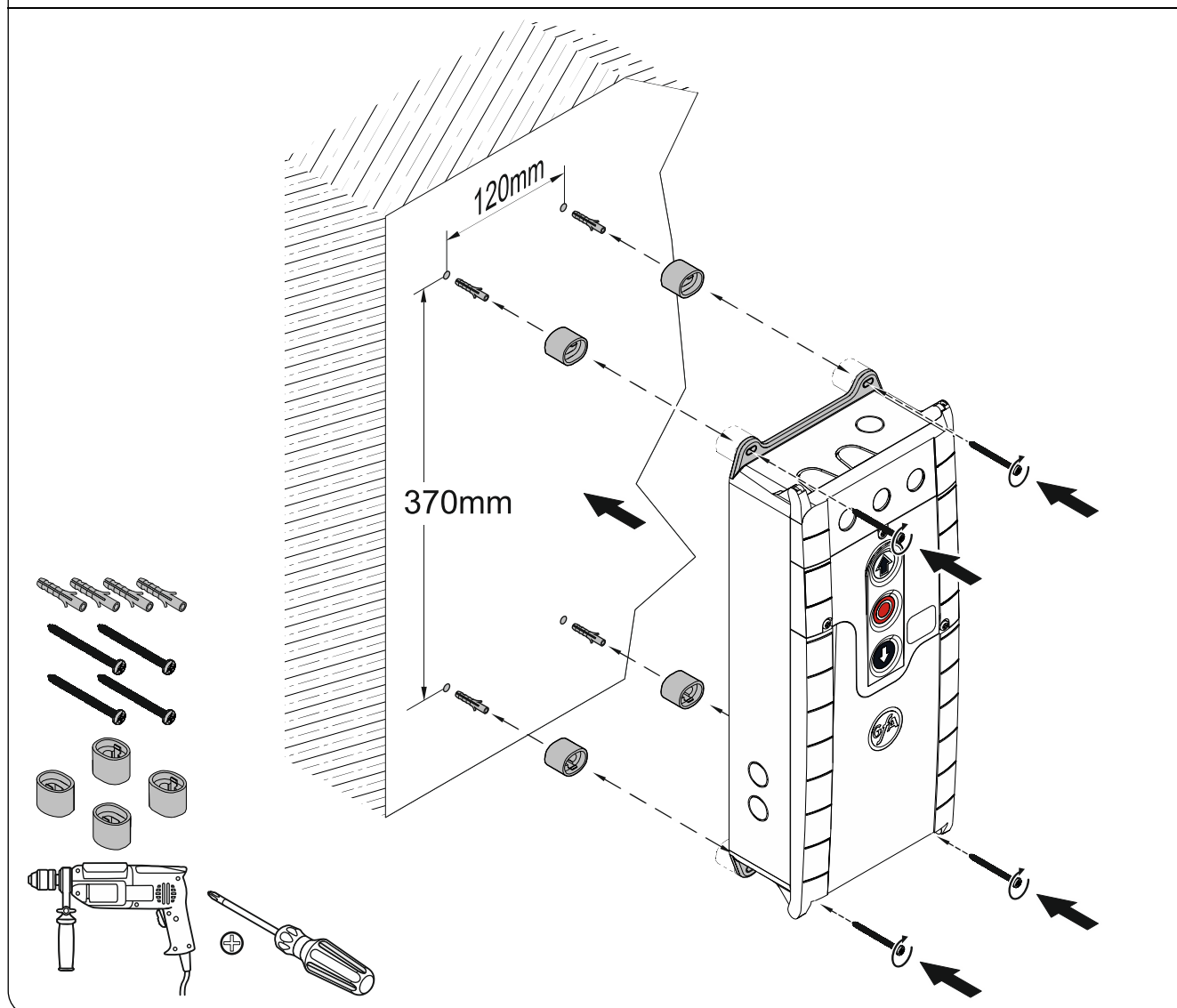
- Indoor use only
- Mounting only on even ground that is free of vibration
- Only mount in the vertical position
- Door must be in clear view from place of installation

Requirements

The permissible loads on walls, mountings, connection and transmission elements must not be exceeded.

Mounting

The control is mounted via 4 elongated holes



4 Electrical installation



Warning - Danger to life due to electrical current!

- Disconnect the cables (mains OFF) and check that the supply is off
- Observe the applicable regulations and standards
- Ensure proper electrical connection
- Use suitable tools



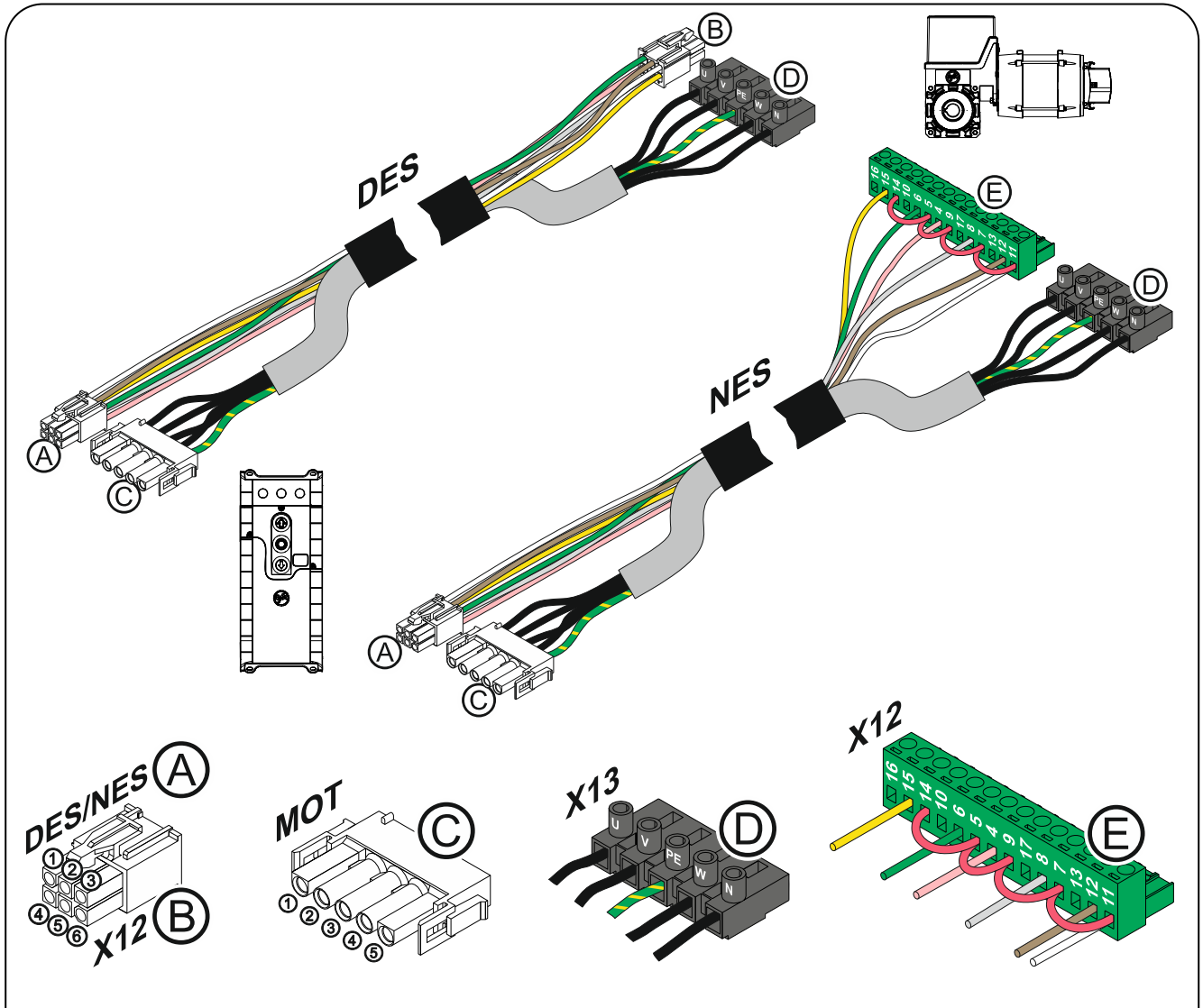
On-site backup fuse and disconnecter unit!

- Connection to the indoor installation via an all-pole disconnecter unit, with current ≥ 10 A as per EN 12453 (e.g. CEE plug connector, main switch)



Observe the installation instructions of the drive unit!

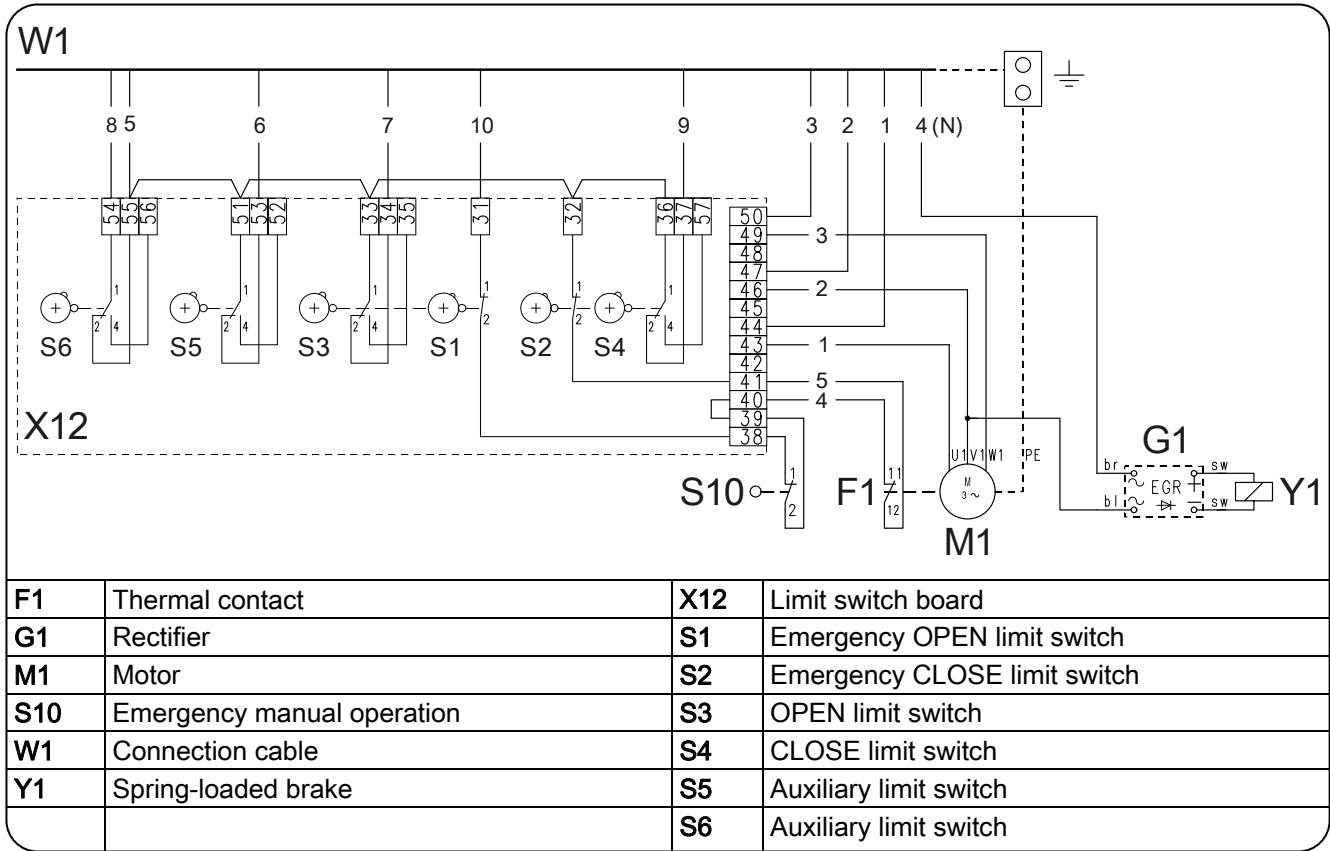
Connection cable connection overview



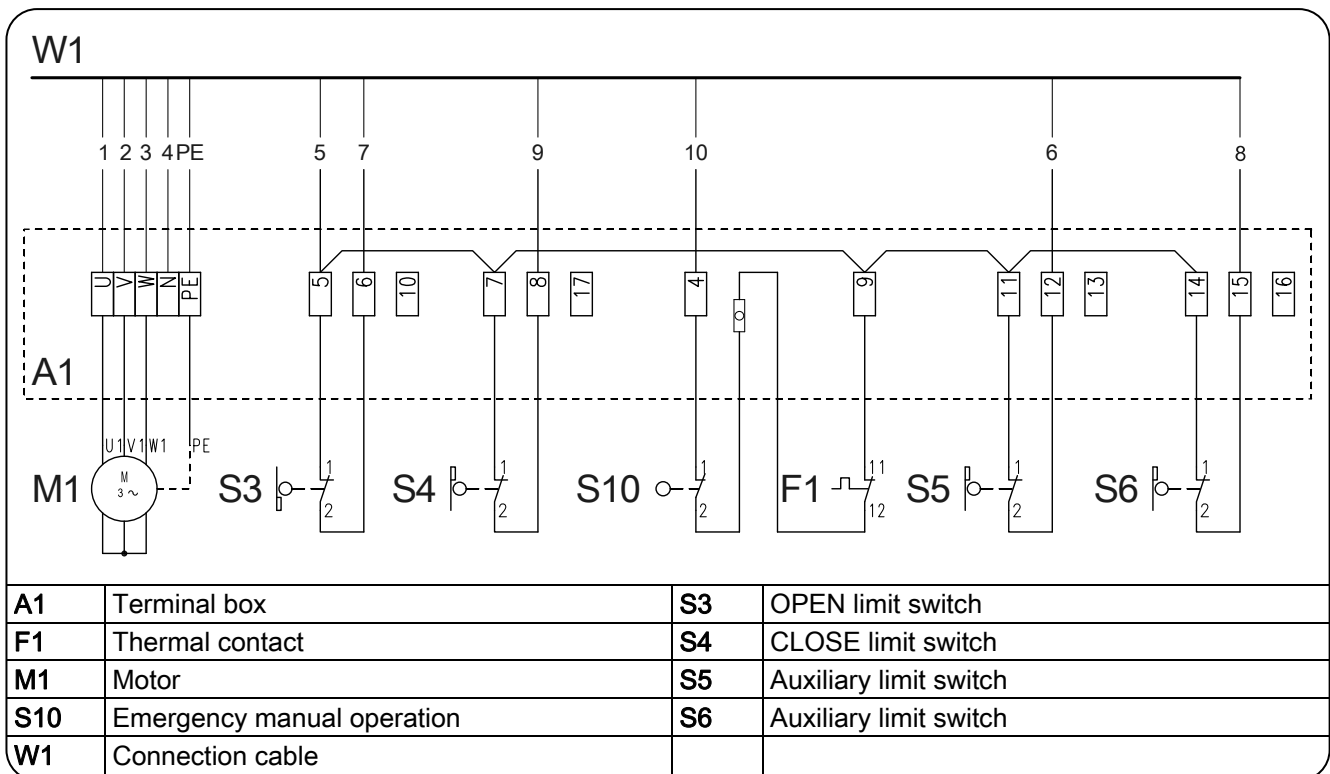
| Ⓐ DES → | | Ⓑ X12 DES | | Ⓒ MOT → | | Ⓓ X13 | |
|---------|-------|-----------|-----------------------|---------|------|-------|-----------------------|
| Pin | Core | Pin | Description: | Pin | Core | Term. | Description: |
| ① | 5/wh | ① | +24 V safety circuit | ① | 3 | W | Phase W |
| ② | 6/bn | ② | Channel B (RS485) | ② | 2 | V | Phase V |
| ③ | 7/gn | ③ | Ground | ③ | 1 | U | Phase U |
| ④ | 8/ye | ④ | Channel A (RS485) | ④ | 4 | N | Neutral conductor (N) |
| ⑤ | 9/gy | ⑤ | Safety circuit | ⑤ | PE | PE | |
| ⑥ | 10/pk | ⑥ | 8 V DC supply voltage | | | | |

| Ⓐ NES → | | Ⓔ X12 NES | |
|---------|-------|-----------|--|
| Pin | Core | Term. | Description: |
| ① | 5/wh | 11 | Limit switch common +24 V, wire link to: 7, 9, 5, 14 |
| ② | 6/bn | 12 | S5 Auxiliary limit switch |
| ③ | 7/gn | 6 | S3 Open limit switch |
| ④ | 8/ye | 15 | S6 Auxiliary limit switch |
| ⑤ | 9/gy | 8 | S4 CLOSE limit switch |
| ⑥ | 10/pk | 4 | Safety circuit |

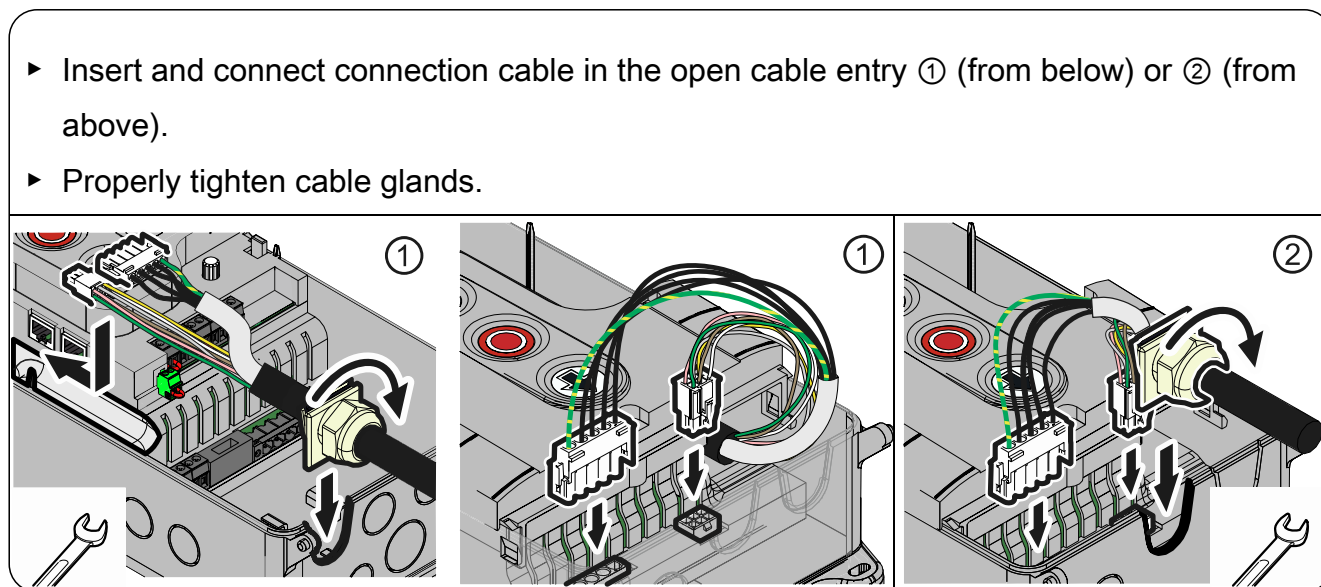
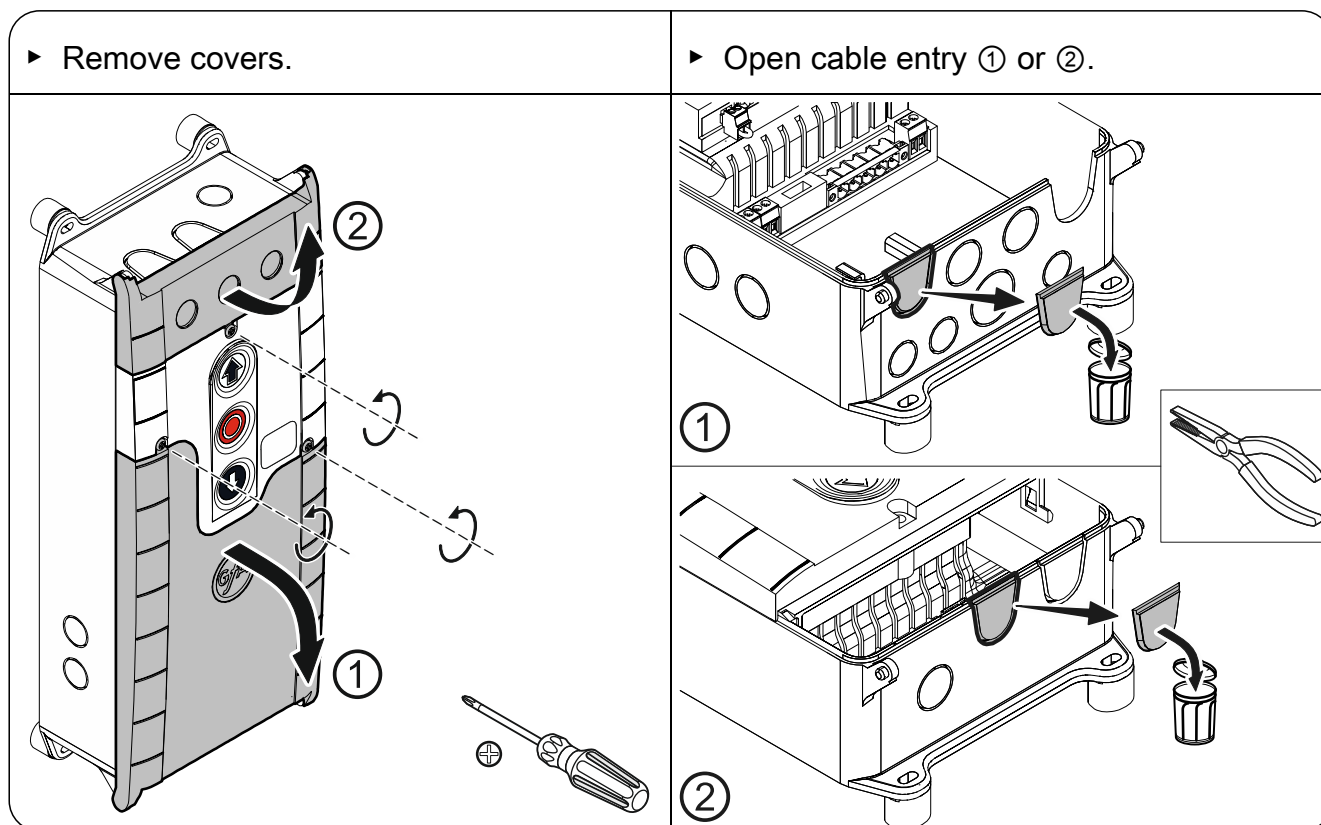
Limit switch configuration, screwable version up to year of construction in 1997



Limit switch configuration, single limit switches



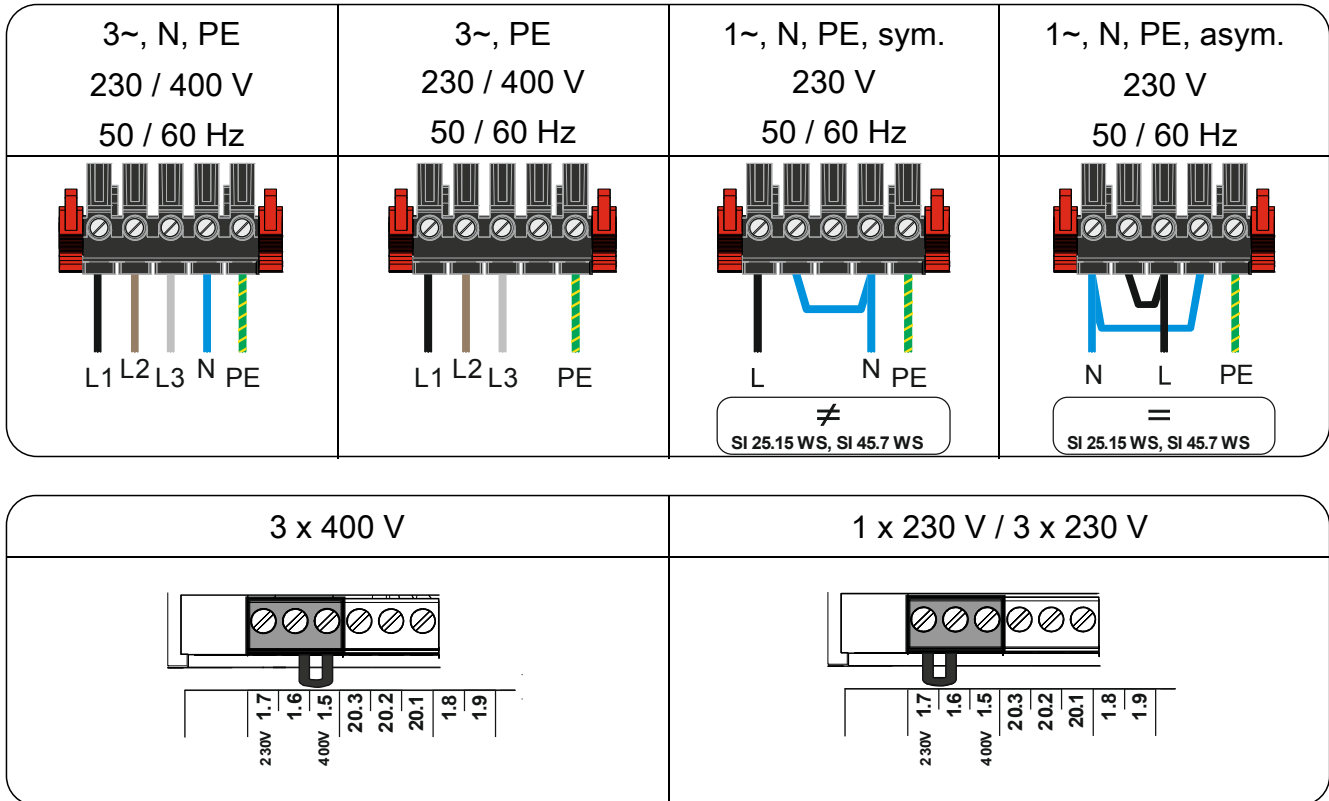
Carrying out the electrical installation



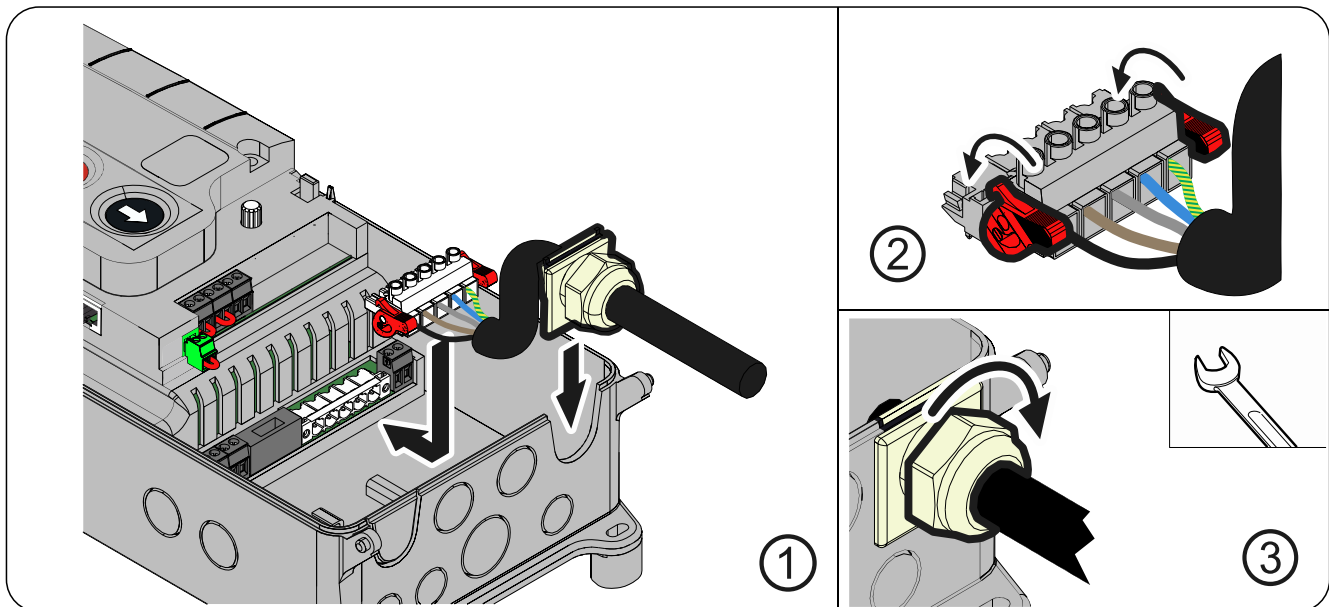
Avoid damage to parts!

- Open cable entry with suitable tool

Mains supply



Mains connection to control

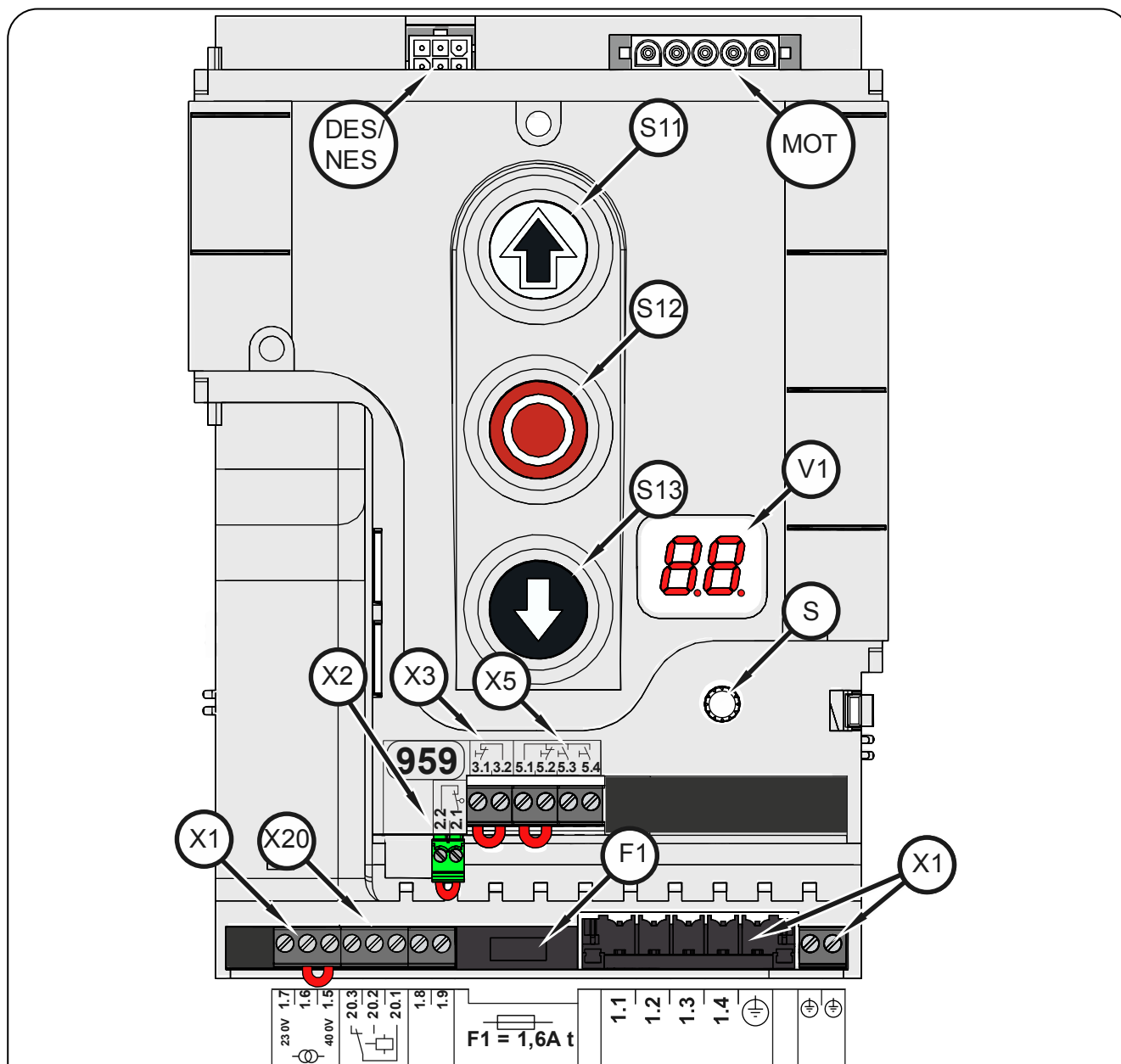


Completing the electrical installation

Install and tighten cable entries and/or cable glands.

For commissioning of the control, leave the covers open.

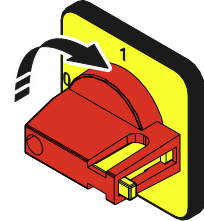
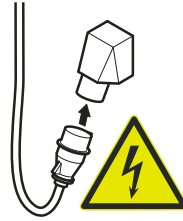
Overview of control



| | | | |
|-----------------|--------------------------------|------------|--|
| DES/ NES | DES or NES limit switch socket | X1 | Mains supply |
| | | X2 | Door safety switch |
| F1 | Micro-fuse 1.6 A time-lag | X3 | Emergency STOP control device |
| MOT | Motor socket | X5 | Control device, external three push-button |
| S | Selector switch | X20 | Potential-free relay contact |
| S11 | OPEN push-button | | |
| S12 | STOP push-button | | |
| S13 | CLOSE push-button | | |
| V1 | Display | | |
| | | | |

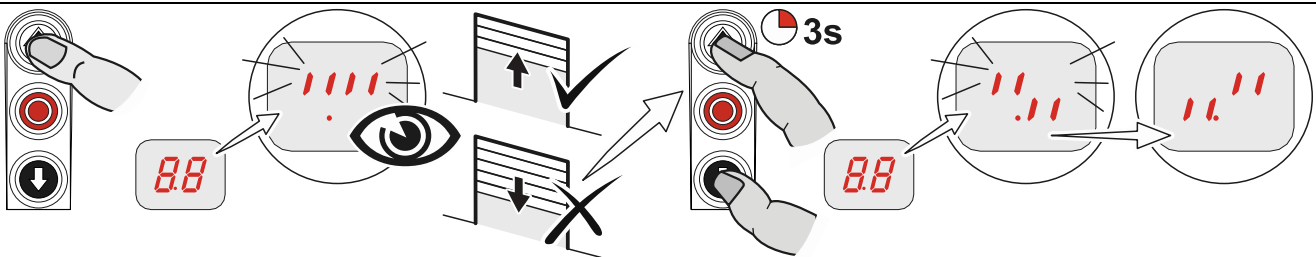
5 Commissioning of the control

- Supply cables
Insert / switch on

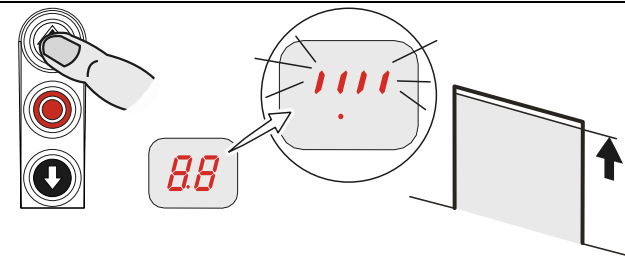


DES: Rapid adjustment of final limit positions

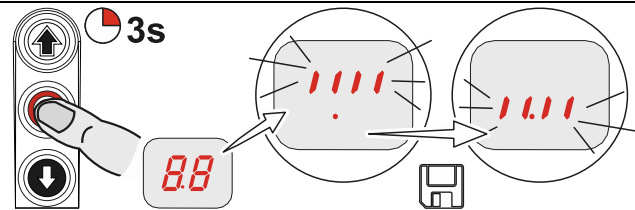
1. Check output rotating direction



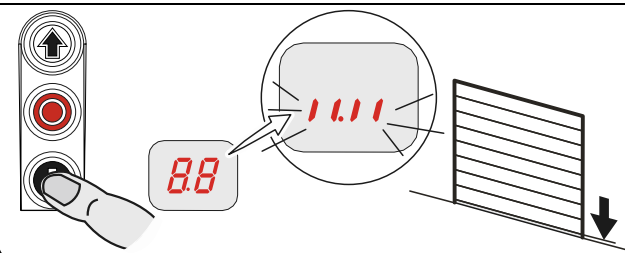
2. Move to OPEN final limit position



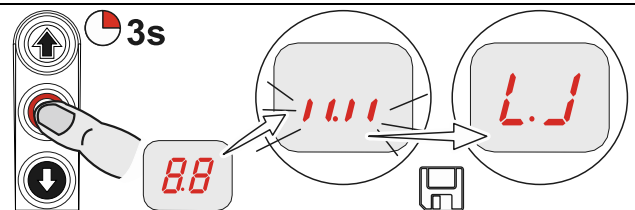
3. Save OPEN final limit position



4. Move to CLOSE final limit position



5. Save CLOSE final limit position



Note!

- The rapid adjustment is complete, "Hold-to-run" door operating mode is active
- Change of OPEN/CLOSE final limit positions via menu items "1.1" to "1.4"

i Observe the installation instructions of the drive unit!

- For adjusting the mechanical limit switch, see the drive unit installation instructions

NES: Rapid adjustment of final limit positions

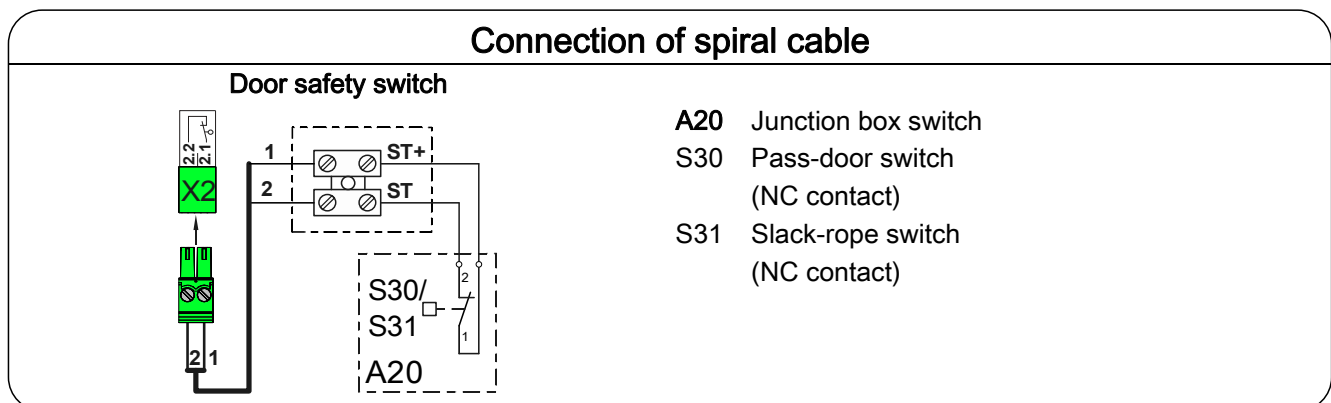
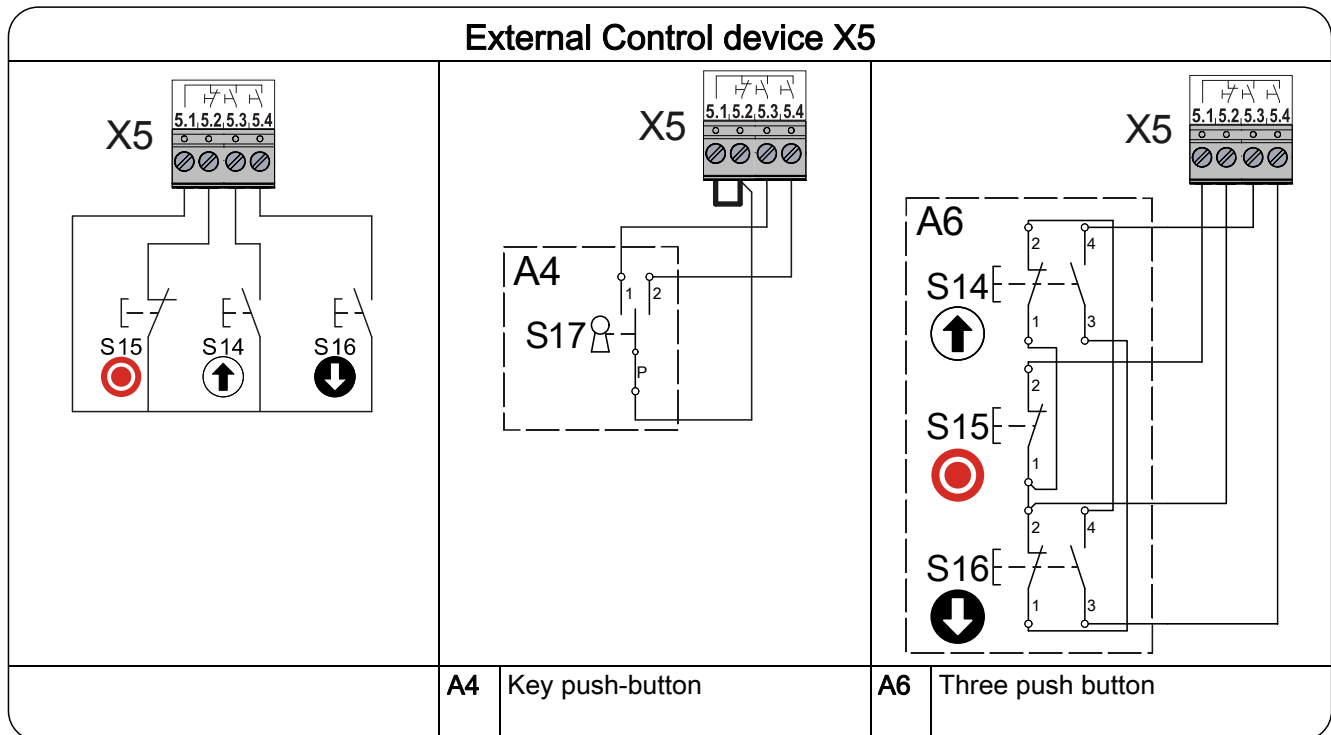
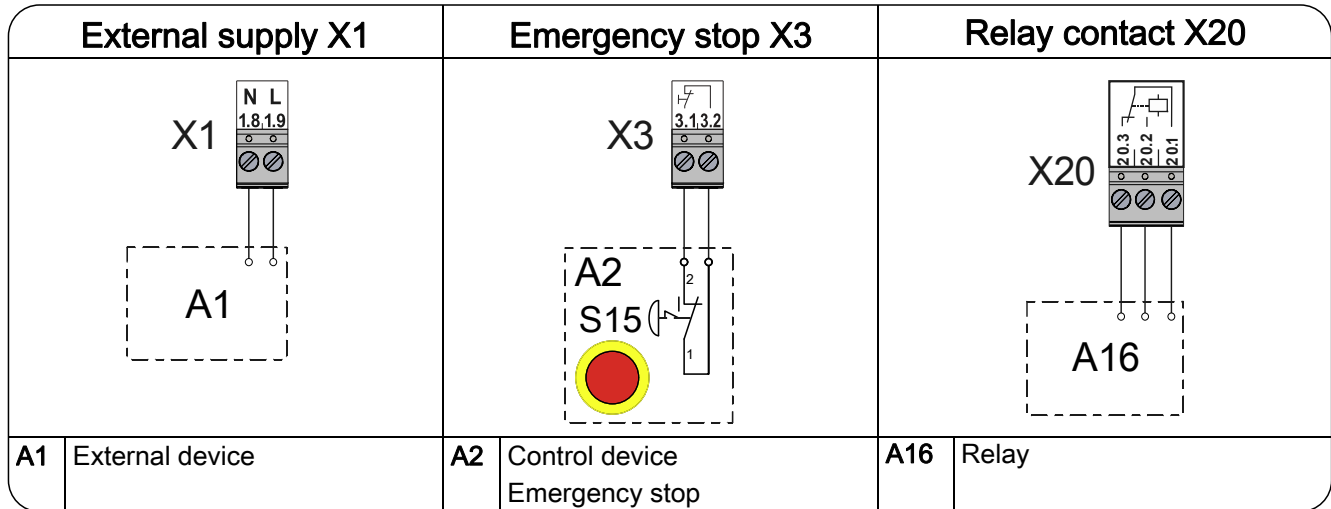
1. Check output rotating direction

2. Move to OPEN final limit position and adjust S3 OPEN limit switch

3. Move to CLOSE final limit position 5cm above the ground and adjust S5 pre-limit switch

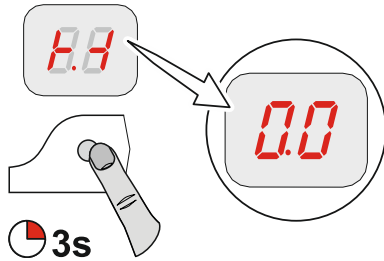
4. Move to CLOSE final limit position and adjust S4 CLOSE limit switch

6 Advanced electrical installation



7 Control programming

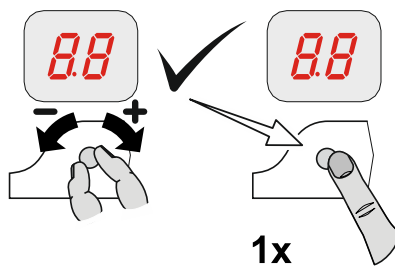
1. Start programming



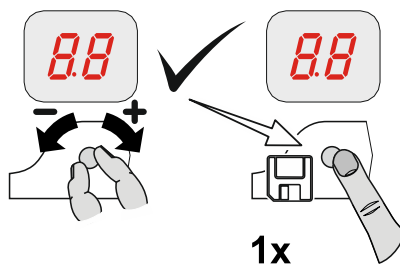
! Note!

- Possible after rapid adjustment of final limit positions

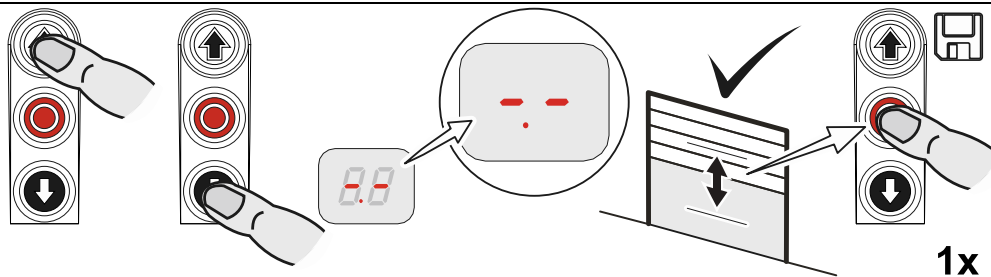
2. Select menu item and confirm



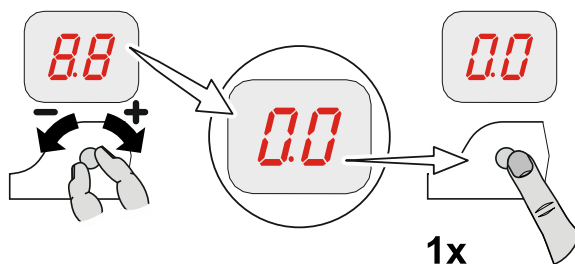
3.a) Set and store functions



3.b) Set and store positions



4. Exit programming



8 Table menu items

| Door operating modes | | | | |
|----------------------|--|--|--|--|
| | | Door operating mode | | |
| | | OPEN Hold-to-run CLOSE Hold-to-run | | |
| | | OPEN Self-hold CLOSE Hold-to-run | | |
| | | Extended hold-to-run For NES: Set the S5 limit switch right before the CLOSE final limit position | | |
| | | Output rotating direction | | |
| | | Maintain output rotating direction | | |
| | | Change output rotating direction | | |
| Door positions | | | | |
| | | OPEN final limit position, coarse correction (DES) | | |
| | | Approach and store desired door position | | |
| | | CLOSE final limit position, coarse correction (DES) | | |
| | | Approach and store desired door position | | |
| | | OPEN final limit position, fine correction (DES) | | |
| | | Without door movement, [+] OPEN correction [-] CLOSE correction | | |
| | | CLOSE final limit position, fine correction (DES) | | |
| | | Without door movement, [+] OPEN correction [-] CLOSE correction | | |
| | | Setting for position of relay switching point (DES) | | |
| | | Select relay function via menu item 2.7 | | |
| | | Approach and store desired door position; To use NES the switching point must be adjusted via the S6 auxiliary limit switch at the drive unit. | | |

Door functions




















| | | | | | |
|------------|--------|---|--|--|------------|
| 2.7 | 1x | Relay function on X20 | | | |
| | | Off | | | 1x |
| | | Impuls contact* for 1 second | | | |
| | | Permanent contact* | | | |
| | | Red lamp, permanently lit during door movement OPEN final limit position 3 seconds permanent light CLOSE final limit position 3 seconds permanent light | | | |
| | | Red lamp, permanently lit during door movement OPEN final limit position 3 seconds permanent light CLOSE final limit position Off | | | |
| | | Clearance dock leveller Active at OPEN final limit position only | | | |

*) Previous teach-in of door positions via menu item 1.7 Relais X20 (only DES) or respectively via the S6 auxiliary limit switch at the drive unit (NES).

Safety functions

| | | | | | | | | |
|------------|--------|-------------------------------------|--|----------------------------|--|--|--------|--------|
| 3.1 | 1x | Force monitoring (DES) | | | | | | |
| | | | | | 0 = Off Adjustable for 2 % to 10 % overload | | | 1x |
| 3.3 | 1x | Travel time monitoring (NES) | | | | | | |
| | | | | 0 = Off 0 to 90 seconds | | | 1x | |

Maintenance cycle counter

| | | | | | | | |
|---|---|--|---|---|---|---|---|
|  1x | Maintenance cycle preselection | | | |  |  1x |  |
|  |  |  |  |  | 01-99 corresponds to 1,000 to 99,000 cycles Cycles are counted down |  1x | |
|  1x | Reaction upon reaching "zero" | | | | | |  |
|  |  | Status indication "CS" appears in turns with value set by menu item 8.5. | | | |  1x |  |
| |  | Changeover to "hold-to-run" door operating mode. Status indication "CS" appears in turns with value set by menu item 8.5. | | | | | |
| |  | Changeover to "hold-to-run" door operating mode. Status indication "CS" appears in turns with value set by menu item 8.5. Option: Press STOP-button for 3 seconds to deactivate changeover and status indications for 500 cycles. | | | | | |
| |  | Status indication "CS" appears in turns with value set by menu item 8.5 and relay contact X20 switches. | | | | | |

Readout of Data memory

| | | | |
|--|---|---|--------|
| | 1x | Cycle counter 7-digit number | |
| | M | HT | ZT |
| | T | H | Z |
| | E | | |
| | Displayed in division of ten consecutively M = 1,000,000 ZT = 10,000 H = 100 E = 1 HT = 100,000 T = 1,000 Z = 10 | | |
| | Display change of the last 6 faults | | |
| | 1x | Data counter 7-digit number | |
| | M | HT | ZT |
| | T | H | Z |
| | E | | |
| | Displayed in division of ten consecutively M = 1,000,000 ZT = 10,000 H = 100 E = 1 HT = 100,000 T = 1,000 Z = 10 | | |
| | | Cycle counter of the last change in programming | 1x |
| | | Number of activations of slack-rope, pass-door switch | |
| | 1x | Software version | |
| | The firmware version of the control is displayed. | | |

Deleting / Readout

| | | | |
|--|--------|--|--------|
| | 1x | Deleting of all settings | |
| | | Activating GfA stick | 1x |
| | | All settings are set to factory setting! Except for cycle counter | 3s |

9 Safety devices

X2: Input, door safety switch function

The door safety switch is installed on the door and connected to the door control via the spiral cable.

| Function | Reaction upon activation |
|----------------------|--|
| Slack-rope/pass-door | Switching contact is interrupted: Door stop |
| | Switching contact is closed: Door is ready for operation |

Slack-rope/pass-door

If the pass-door switch is open circuit when an open or close command is given, fault “F1.2” is displayed. If activated during the door movement, the door is immediately stopped and fault “F1.2” is displayed.

Entrysense (electronic pass-door switch)

The pass-door switch, which has been tested to performance level c (plc) in accordance with EN 13849-1, is monitored by the door control. If the pass-door switch is open circuit when an open or close command is given, fault “F1.2” is displayed. If activated during the door movement, the door is immediately stopped and fault “F1.2” is displayed.

The magnetic contacts in the pass-door switch are switched by a permanent magnet. The door control assesses the switching status of the contacts independently of each other. The “F1.7” fault indication appears if there is a fault.

X3: Input, emergency stop

Connection of an emergency stop control device as per EN 13850 or an evaluation unit for an anti-trap safety device. The “F1.4” fault indication appears upon activation.

10 Functional description

X1: Mains supply of the control and supply of external devices

Mains supply of the control

Connection via the terminals X1/1.1 to X1/1.4 and PE

Various mains connections: 3 N~, 3~, 1 N~ for symmetric and asymmetric motors.

Power supply 400 V = Wire link 1.5 – 1.6

Power supply 230 V = Wire link 1.6 – 1.7



Note!

- ▶ Pay attention to the "Mains supply connection" and "Mains supply connection to control" descriptions

Supply of external devices

Connection of external devices for 230 V, such as traffic-light, illumination, relay, etc. via the terminals X1/1.8 and X1/1.9.



Note!

- • Supply of external devices 3 N~400 V or 1 N~230 V, symmetric
- • Protection via F1, 1,6 A time-lag micro-fuse

X5: Input, control device



Warning!

▶ "Hold-to-run" door operating mode:

The door must be fully visible from the operating point



Note!

▶ Application without STOP push-button: Connect wire link X5.1 to wire link X5.2

Door operating mode "Extended hold-to-run"

Menu item „0.1“ Function „.5“.

At the door operating mode "Extended hold-to-run", the CLOSE-button must be pressed until door final position CLOSED is reached. If the CLOSE button is released beforehand, the door will automatically move to OPEN-direction.



Note!

• When using NES

▶ Door can't be closed if S5 limit switch for door operating mode "Extended hold-to-run" is not set right before CLOSE

Potential-free X20 Relay contact

The relay functions are described under menu item "2.7".



Attention – Damage to components!

- Maximum current of 1 A at 230 VAC and 0,4 A at 24 VDC
- We recommend the use of LED lamps
- When using light bulbs, these should have power of maximum 40 W and be shock-proof

Force monitoring (DES only)

Menu item "3.1":

The force monitoring can only be used with fully balanced doors and drive units with DES. It should be able to detect when persons are moving with the door.



Warning!

- The force monitoring is no substitute for safety measures in providing protection against the trapping hazard

| Function | Force monitoring |
|--------------|--|
| „.0“ | <ul style="list-style-type: none"> • Off |
| „.2“ - „1.0“ | <ul style="list-style-type: none"> • ".2": Low limit value • "1.0": High limit value |



Important!

- Force monitoring for doors with spring balance only
- Environmental factors such as changes in temperature or wind load can lead to inadvertent triggering of force monitoring

After exiting programming, the door must carry out a full OPEN and CLOSE-operation in self-hold mode.

The force monitoring is a self-learning system which is effective for an opening width range of 5 cm to 2 m (approx.). Slow progressive changes, e.g. gradual reduction of the spring torsion, are compensated automatically.

After force monitoring has been triggered, only the "Hold-to-run" door operating mode is possible and the "F4.1" fault indication is displayed. The resetting occurs when a final limit position for the door is reached.

Travel time monitoring (NES only)

Menu item "3.3"

The set travel time is automatically compared with the time measured for movement between the final limit positions. If the travel time is exceeded, the "F5.6" fault indication appears.

Fault indication "F5.6" is reset by closing the door.



Note!

- The travel time is set at the factory to 90 seconds
- Recommended setting value: door travel time + 7 seconds

Maintenance cycle counter

Menu item "8.5":

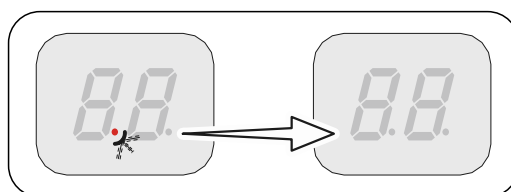
A value between 0 and 99,000, as a multiple of 1000, can be selected for the maintenance cycle setting.

The maintenance cycle counter reading is reduced by one each time the Open final limit position is reached.

Once the maintenance cycle reaches zero, the setting from menu item "8.6" is activated.

Short-circuit/overload display

If there is a short circuit or an overload of the 24 VDC supply voltage, the 7-digit display vanishes.

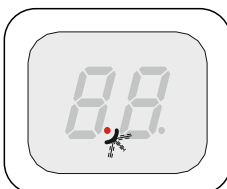


Standby function

If there is no fault or command pending, the control switches to "Standby".










If the automatic closing duration is longer than 60 seconds, the control also switches to "Standby".













Only the left dot is lit up.







The "Standby" function is terminated with a command or by activation of the selector switch "S".












11 Status display

| Faults | | |
|---|---|---|
|  | Display: "F" and code | |
| Code | Fault description | Fault causes and fault correction |
|  | Terminals X2.1 – X2.2 are open. Slack-rope switch/Pass-door contact is open. | Check door safety switch. Check whether the connection cable is connected. |
|  | Open safety circuit (DES) Emergency manual operation has been activated. Thermal protection of the motor has tripped. | Check emergency manual operation. Check for overload or stalling of the drive unit. |
|  | Terminals X3.1 – X3.2 are open. Emergency stop has been activated. | Check emergency stop. Check whether the connection cable is connected. |
|  | Faulty entrysense switch. Contact resistances are too high. Faulty entrysense installation. | Open and close pass door. Check resistance. Check the pass door installation. |
|  | Input Entrysense X2.1 – X2.2 is faulty. | Switch control off and on. Replace control if necessary. |
|  | (DES) OPEN emergency stop switch reached. | In the voltage-free state, move the door back via the emergency manual operation. |
| | (NES) OPEN or CLOSE emergency stop switch reached. Emergency manual operation has been activated. Thermal protection of the motor has tripped Limit switch system has changed over from NES to DES without the control being reset. | Check OPEN/CLOSE emergency stop switch. Check emergency manual operation. Check drive unit for overload or stalling. Reset of control via menu item "9.5". |
|  | (DES) CLOSE emergency stop switch reached. | In the voltage-free state, move the door back via the emergency manual operation. |
|  | No limit switch detected (active at initial operation). | Connect the limit switch to the control. Check the limit-switch connection cable. |













| Faults | | |
|---|---|---|
|  | Display: "F" and code | |
| Code | Fault description | Fault causes and fault correction |
|  | Limit switch system has changed over from DES to NES without the control being reset. | Reset of control via menu item "9.5". |
|  | Internal plausibility error. | Execute fault clearance trough movement command. |
|  | Triggering of force monitoring. | Check the door mechanism for stiffness. |
|  | ROM error. | Switch control off and on. Replace control if necessary. |
|  | CPU error. | Switch control off and on. Replace control if necessary. |
|  | RAM error. | Switch control off and on. Replace control if necessary. |
|  | Internal fault of control. | Switch control off and on. Replace control if necessary. |
|  | Fault of digital limit switch (DES). | Check DES connector and connection cable. Switch control off and on. |
|  | Fault with door movement. | Check the door mechanism for stiffness. Check the limit switch turn. Switch control off and on. |
|  | Fault with rotating direction (DES). | Change rotating direction via menu item "0.2". |
|  | At initial operation minimum travel distance was not completed. | Move the door for at least 1 second. |










| Commands | |
|---|--|
|  | Display: "E" and code |
| Code | Command description |
|  | An OPEN-command is present. Inputs X5.3 |
|  | A STOP command is present. Inputs X5.3 |
|  | A CLOSE command is present. Inputs X5.4 |

Status indications

| Status display | Description |
|---|--|
|  | Preset value for maintenance cycle counter reached. |
|  | Dot on left is not lit: Control circuit has a short circuit or is overloaded. |
|  | Function for changing the rotating direction is activated, only possible during initial operation. |
|  | Change of rotating direction has been carried out, only possible during initial operation. |
|  Flashing | Teach in OPEN final limit position. |
|  Flashing | Teach in CLOSE final limit position. |
|  Flashing | UPWARDS travel active. |
|  Flashing | CLOSING operation active. |
|  | Stop between the set final limit positions. |
|  | Stop at the OPEN final limit position. |
|  | Stop at the CLOSE final limit position. |

12 Explanation of symbols

| Symbol | Explanation |
|---|---|
|  | Prompt: Read installation instructions |
|  | Prompt: Check |
|  | Prompt: Note |
|  | Prompt: Note the setting of the menu below |
|  | Factory setting of the menu |
|  | Factory setting of the menu, value on the right |
|  | Factory setting of the minimum limit, dependent on drive unit |
|  | Factory setting of the maximum limit, dependent on drive unit |
|  | Setting range |
|  | Prompt: Select menu item or value, turn selector switch to the left or to the right |
|  | Prompt: View menu item, press selector switch once |
|  | Prompt: Store, press selector switch once |

| Symbol | Explanation |
|---|---|
|  | Prompt: Setting via OPEN/CLOSE built in push-button; Use OPEN push-button to increase value, CLOSE push-button to decrease value |
|  1x | Prompt: Press stop button once via built in push-button |
|  1x | Prompt: Save, press stop button once via built in push-button |
|  3s | Prompt: Save, press stop button for three seconds via built in push-button |
|  3s | Prompt: Reset the control, press stop button for three seconds via built in push-button |
|  | Prompt: Move to door position |
|  | Prompt: Move to door position for OPEN final limit position |
|  | Prompt: Move to pre-limit |
|  | Prompt: Move to door position for CLOSE final limit position |

Declaration of Incorporation

pursuant to Machinery Directive 2006/42/EC for a partly completed machine Appendix II Part B



Declaration of Conformity

pursuant to EMC Directive 2014/30/EU

GfA ELEKTROMATEN GmbH & Co. KG
Wiesenstraße 81 · 40549 Düsseldorf
Germany

We,

GfA ELEKTROMATEN GmbH & Co. KG

hereby declare that the product specified in the following complies with the above-mentioned EC Directive and is only intended for installation in a door.

TS 959

Applied standards

| | |
|-------------------------|---|
| DIN EN 12453 | Doors – Safety in use of power operated doors |
| DIN EN 12978 | Safety devices for power operated gates and doors |
| DIN EN 60335-1 | Household and similar electrical appliances safety – Part 1: General requirements |
| DIN EN 61000-6-2 | Electromagnetic compatibility (EMC) – Part 6-2 Generic standards – Immunity for industrial environments |
| DIN EN 61000-6-3 | Electromagnetic compatibility (EMC) – Part 6-3 Generic standards – transient emission for residential, commercial and light-industrial environments |

On reasoned request, we undertake to submit the special documents for this partly completed machine to the supervisory authorities.

Authorised representative for the compilation of the technical documentation

(EU address in the company)
Dipl.-Ing. Bernd Synowsky
Documentation representative

Partly completed machinery according to EC Directive 2006/42/EC is only intended to be installed in, or combined with, other machinery (or other partly completed machinery/systems) to form a completed machine pursuant to the Directive. Therefore, this product may be put into operation only when it has been determined that the complete machine/equipment in which it has been installed complies with the provisions of the above-mentioned directives.

Düsseldorf, 01.03.2016

Stephan Kleine
Managing Director


Signature