Sidoor

Operating and Installation AT40

Rev. 1.02, 1/2011 Edition

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1 Table of contents

NOTE
The illustrations in the instructions refer to Sidoor Software Kit version 1.11 and AT40 version 1.04. The illustrations for other versions may differ slightly.

2 Legal notes

Warning notice system
This manual contains information which you must observe in order to ensure your own safety, as well as to avoid material damage. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to equipment damage have no safety alert symbol. These notices are shown below in decreasing order of danger.

DANGER
Indicates that death or severe personal injury will result if proper precautions are not taken.

WARNING
Indicates that death or severe personal injury can result if proper precautions are not taken.

CAUTION
with a triangular safety alert symbol, indicates that slight personal injury may result if proper precautions are not taken.

CAUTION
without triangular safety alert symbol means that there can be damage to property if the corresponding safety measures are not followed.

Notice
indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one level of danger is simultaneously applicable, the warning notice for the highest level is always used. If a warning notice is used with the safety alert symbol to warn against injury, this same notice may also include a warning regarding property damage.

NOTE
Within the context of these operating instructions, this symbol indicates important information about the product or draws attention to a specific section of the instructions.

Qualified personnel
The product/system associated with this documentation may be operated only by personnel qualified for the particular task while observing the documentation relevant to the particular task, in particular the safety and warning notes provided in the documentation. Because of their training and experience, qualified personnel can recognize any risks involved with handling these products/ systems and avoid any possible dangers.

Intended use of Siemens products Please note the following:

CAUTION
Siemens products may only be used for the applications specified in the catalog and in the technical documentation. If third-party products and components are to be used, they must be recommended or approved by Siemens. These products can only function correctly and safely if they are transported, stored, set up, mounted, installed, commissioned, operated and maintained correctly. The permissible ambient conditions must be adhered to. The notes in the associated documentation must be complied with.

Trademarks
All designations with the trademark symbol ® are registered trademarks of Siemens AG. Other designations in this documentation may be trademarks whose use by third parties for their own purposes can violate the rights of the owner.

Disclaimer of liability
We have checked that the contents of this document correspond to the hardware and software described. However, since deviations cannot be precluded entirely, we cannot guarantee full consistency. The information given in this publication is reviewed at regular intervals, and any corrections that might be necessary are made in subsequent editions.

2.1 General safety instructions

Before commissioning
Please read through these instructions carefully. They contain essential information for the installation, use and safety of the equipment.

WARNING
Only appropriately qualified personnel may work on or in the vicinity of this equipment. These people must be thoroughly familiar with all the warnings, notices, and functions of the AT40 door controller described in these operating instructions.

In the context of these operating instructions and warning notices, a qualified person is a person who is familiar with assembling, installing, commissioning, and operating the product, and who has the relevant qualifications, such as:

- Training, instruction or authorization to switch on and off electric circuits and devices/ systems in compliance with safety engineering standards.
- Training or instruction in the maintenance and use of appropriate safety equipment in compliance with safety engineering standards.
- First aid training.

Faultless, safe operation of this equipment requires appropriate transport and storage, professional installation and assembly, as well as careful operation and maintenance. Before commissioning, all electrical connections must be inspected to ensure that all contacts are secure. Before starting work on the door drive, it must be disconnected from the power supply by unplugging the power plug.

NOTE
The illustrations in the instructions refer to Sidoor-User Software version 1.11 and AT40 version 1.04. The illustrations for other versions may differ slightly.

3 Introduction

The comfort elevator door drive AT40 is an „intelligent“ door drive with which the cabin and shaft doors can be opened and closed at adjustable speeds and accelerations. It can also be used as a drive for power-actuated protective devices (PL-D) for machines. This maintenance-free drive unit consists of a speed-controlled DC motor with non-self-locking gearing. The power is transmitted by a toothed belt. The toothed belt passes over a deflector pulley, and can be fitted with two door clutch holders. This enables it to drive both single-sided and centrally-opening doors.

The AT40 is currently supplied with the following motors:
M2 - 24 V / 1.8 A motor, suitable for a maximum total door panel weight of 120 kg
M3 - 30 V / 4.0 A motor, suitable for a maximum total door panel weight of 180 kg
M4 - 30 V / 4.0 A motor, suitable for a maximum total door panel weight of 400 kg

The door drive can be ordered with the drive pinion either on the left or right-hand side, please see the drawing in the appendix. Operation of the door drive does not require limit switches. The door width and the OPEN and CLOSED positions are determined automatically. A 7-segment display (H401) on the controller indicates the current operating states.

The appendix includes all the important dimension drawings, an assembly suggestion, and the identification numbers for ordering the individual drive components. These operating instructions are valid for devices as from firmware version 1.04.

NOTE
In the interests of clarity, these Operating Instructions do not contain full details of all information for all product types and cannot take into account every possible aspect of installation, operation, or maintenance.

You can obtain further information about this product and its use by calling phone no.: +49 (40) 2889-4322. For technical support, or if problems occur which are not covered in sufficient detail in these operating instructions, you can obtain the necessary information by calling the AT Service Hotline, phone: +49 (5 11) 877-1471.

Furthermore, the contents of these operating instructions shall not become a part of or modify any prior or existing agreement, commitment, or legal relationship. All obligations on the part of Siemens arise from the relevant contract of sale, which also contains the complete and solely valid warranty conditions. These contractual warranty conditions are neither extended nor limited by the statements in these operating instructions.

NOTE
The switch mode power supplies of the system series AT are fitted with an integrally extruded safety plug in line with VDE. This plug must not be removed (cut off) under any circumstances. The plug forms part of the safety chain of the AT system, in the form of the „emergency stop“ function. The general safety instructions in the operating instructions of all AT controllers state that the system must be disconnected from the mains before starting work on the drive. Permanently connected switch mode power supplies, including those with a separate „emergency stop“ switch, represent a change to the device certified according to EN81/2 and are not permissible.

A permanent connection must not be made for the reasons stated, because it cannot be ensured that the device can be properly disconnected from the mains when required. Changes to the components of the AT system series: motor, controller, switch mode power supply lead to the loss of liability for defects and any claims.

CAUTION
Taking the counterweights into account, the maximum static closing force must not exceed 150 N!

NOTE
After the optimal settings of the parameters have been determined, they should be noted in the configuration record (see Appendix 17.14). These records should also be kept at hand when asking questions on the Hotline.

4 Terms / abbreviations

Initial speed = reduced speed in the opening and closing directions after power on until normal operation is detected.

Slow end distance open = range of door travel in the vicinity of the OPEN position while opening
Slow start distance open = range of door travel in the vicinity of the CLOSED position while opening
Slow start distance close = range of door travel in the vicinity of the CLOSED position while closing
Slow end distance close = range of door travel in the vicinity of the OPEN position while closing

Slow end speed open = reduced speed in the vicinity of the OPEN position while opening
Slow start speed open = reduced speed in the vicinity of the CLOSED position while opening
Slow start speed close = reduced speed in the vicinity of the CLOSED position while closing
Slow end speed close = reduced speed in the vicinity of the OPEN position while closing
Firmware = software for the AT40 door controller

FE Functional ground
LED light-emitting diode
PE Protective ground

5 Overview of operator controls

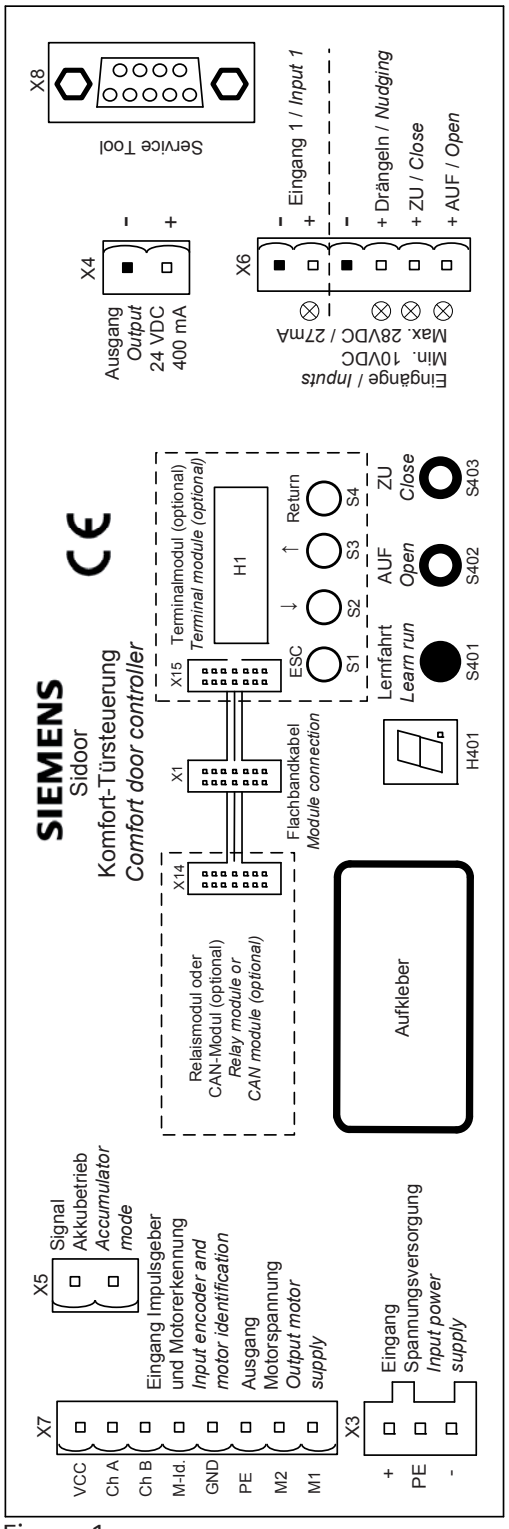


Figure 1

X1: Flat cable connector for the add-on modules

X3: Connector for switch mode power supply

X4: Voltage output 24 V / 0.4 A

X5: Input signal emergency power module

X6: Connector for input signals
- Input 1 (settable function)
- Nudge
- Close
- Open

X7: Motor plug

X8: Connector for Service Tool and USB adapter

H401: 7-segment display for door status and event codes

S401: Learn run

S402: Service button OPEN

S403: Service button CLOSE

X14: Flat cable connector for relay module (optional) or CAN module (optional)

X15: Flat cable connector to the H1 controller: LCD display

S1-S4: Operator buttons for terminal module

6 Functions and device responses

6.1 Learn and test run

Pressing the learn run button (S401) initiates automatic determination of the parameters:

1. Detection of the motor type
2. Detection of the direction of door movement and the CLOSED position.
3. Determination of the friction values of the door system and the weight of the door.
4. Determination of the door width and the OPEN position. Closure of the door until it has traveled through the entire determined door width and reached the CLOSED position. These parameters are then saved, which takes three seconds.

6.2 DOOR OPEN command

The DOOR OPEN command opens the door according to the set speed of travel curve as long as the command is present. The transitions along the speed of travel curve (e.g. from acceleration to constant velocity) are smoothed to prevent noises possibly arising from the play between the cabin and shaft doors. The door reaches the OPEN position at slow end speed open. Then, if the DOOR OPEN command is present, the door is held open with a reduced torque.
- The DOOR OPEN command must remain present throughout the entire opening movement.
- The DOOR OPEN command must remain present continuously in order to maintain continuous torque in the OPEN position. - The DOOR OPEN command has priority over all other control commands.

6.3 DOOR CLOSE command

The DOOR CLOSE command must remain present continuously in order to close the door. After the door has closed, it is held in this position with reduced torque as long as the DOOR CLOSE command remains present.

6.4 Service buttons

The door can be opened and closed from the controller with the service buttons OPEN (S402) and CLOSE (S403). When these buttons are pushed, the controller receives the DOOR OPEN or DOOR CLOSE command in addition to the input signals present at X6.

6.5 Parameter settings

The terminal module, Service Tool and Sidoor-User Software offer additional setting and diagnostic options. The terminal module is integrated into the controller housing. The Service Tool is available as an extra, separate option. It is connected to the X8 connector on the controller. The Sidoor-User Software offers the easiest diagnostic option. A PC can be connected to X8 on the controller via the USB adapter (part of the Sidoor Software Kit).

NOTE
The current parameters are overwritten by the factory parameters at the end of the learn run if the learn run button (S401) is pressed at the same time as the supply voltage is switched on. If the door

learn run button is pressed during operation only the door width and weight are determined. The speed of travel curve parameters, force limits and continuous torques are retained unchanged. The maximum closing speed and the nudge speed are limited as a function of the determined weight.

6.6 Blockage detection „CLOSE"

If the door is blocked in the „CLOSE" direction with a DOOR CLOSE command present, the door stops and reverses direction. After reaching the open position, the door closes again at normal speed to within about 2 cm of the obstacle. It then travels at reduced speed (initial speed) against the obstruction before reversing again. This function is repeated continuously, as long as the obstruction remains. Once the obstruction has been cleared, the door travels at reduced speed to approximately 2 cm past the stored position of the obstruction, and then continues the rest of the way at normal closing speed.

6.7 Blockage detection „OPEN"

The door stops if it is blocked in the „OPEN" direction with a DOOR OPEN command present. After approximately 2 seconds, the door automatically tries to reach its open position again. This action is repeated a maximum of three times. The door then remains stationary in this position. If the DOOR OPEN command is canceled, the close command given, and the DOOR OPEN command is then repeated, the door travels at normal speed to within about 2 cm of the stored position of the obstruction, and then up to the obstruction at reduced speed. The door drive stops at the obstacle, and the opening action is repeated another 3 times. If the obstruction has been removed beforehand, the door travels at reduced speed to approximately 2 cm past the stored position of the obstruction, and then continues to its open position at normal speed.

6.8 Restart after power failure

After a supply voltage failure, the controller has to redetermine the end positions of the door travel. To do this, the door travels at reduced speed (initial speed) until the controller has detected the OPEN and CLOSED end positions. The door then resumes traveling at normal speed.
The door travels at normal speed immediately if the DCPS (Door Closed Position Sensor) is installed. In this case, the door must be in the CLOSED position for the restart.

6.9 Closing force

The closing force can be set to between 70 N and 120 N for motor 2 (24 V / 1.8 A, up to 120 kg door weight), to between 70 N and 230 N for motor 3 (30 V / 4 A, up to 180 kg door weight), and to between 70 N and 230 N for motor 4 (30 V / 4 A, up to 400 kg door weight). A warning appears on the LCD display of the terminal module if 150 N is exceeded. The stated values refer to doors opening to one side. A load cell in middle of centrally opening doors would show only half the value.

WARNING
When the closing force is set, it is imperative that any effective closing weight is taken into account. The desired closing force must be reduced by 10 N for each 1 kg of counterweight.

This affects:
- Closing force CLOSE
- Closing force slow end distance close
  CLOSE - Nudge force CLOSE

Example: Closing weight = 4 kg
Desired static force limit CLOSE = 150 N
The counterweight of 4 kg corresponds to a force of 40 N. The force limit then has to be adjusted to 150 N - 40 N = 110 N.

The factory setting assumes a counterweight of 4 kg for motor 2 (24 V/ 1.8 A), 6 kg for motor 3 (30 V / 4 A), and 8 kg for motor 4. This means that the resulting static closing forces are limited to 110 N, 90 N and 70 N respectively.

6.10 Emergency release

WARNING
An emergency release can only be actuated if:
- Neither a DOOR OPEN nor a DOOR CLOSE command is present,
- The service buttons are not pressed,
- The terminal module, Service Tool or Sidoor-User Software are not in the menu item Quick adjustment or Total adjustment or one of their sub-menus,
- The door has come to a standstill.

The door drive is only torque-free if these conditions are fulfilled. According to TRA (German Technical Rules for Elevators) and EN 81, the force required to open the door must be less than 300 N.

6.11 Nudging

The door does not reverse in the operating state NUDGE. The DOOR CLOSE and NUDGE commands must be present simultaneously. When an obstruction is detected, the torque is reduced after 1 second to the motor's holding shut torque limit.

6.12 Input 1

There are two possible settings for input 1: Light barrier and DCPS (Door Closed Position Sensor). The setting can be made with the Service Tool.

6.12.1 Light barrier

The input for the light barrier signal has the same function as the DOOR OPEN command. Exception: if the door is opened at less than 1 cm, the light barrier signal is ignored. If no power is available at the light barrier input, this is interpreted as an interruption of the light barrier. The door cannot then close.
The door opens if the light barrier is interrupted. If a DOOR CLOSE command is present at the same time, the door only moves in the OPEN direction for as long as the light beam is interrupted.

6.12.2 DCPS (Door Closed Position Sensor)

DCPS stands for Door Closed Position Sensor or door CLOSED sensor. This is not a special sensor, but an open or closed contact as far as the controller is concerned. If the contact is closed, the door is in the CLOSED position. The user is responsible for the design of this contact.
The DCPS enables the door to travel in normal operation immediately the power is switched on. An initialization run is then no longer required. This requires the door to be in the CLOSED position when the power is switched on. This enables the controller to be completely switched off if the elevator is not going to be used for a lengthy period, for example during the night.

NOTE
If the contact remains closed although the door has left its CLOSED position, the controller switches to initial operation after ten centimeters, and continues the movement at initial speed. The door does not resume moving at normal speed until after it has traveled to both end positions.

6.13 Emergency power supply (optional)

If the mains power supply fails, a battery or rechargeable battery (e.g. lead-gel rechargeable battery) can be connected to the external emergency power module (optional) to make emergency operation possible. The door can be opened and closed in this condition, the light barrier signal is evaluated. In this case, the travel speeds are reduced over the complete traveling distance. When the mains power supply becomes available again, the controller automatically switches back to normal operation in the OPEN or CLOSED end position of the door.

CAUTION
The customer must install a 6 A slow-blow fuse for the emergency power supply.

6.14 Overload protection

If the drive motor is subjected to severe strain by DOOR OPEN and DOOR CLOSE commands repeated in quick succession, the hold-open time is automatically increased. The next closing movement is delayed, even if a DOOR CLOSE command is present, the 7-segment display (H401) shows „4“. This function prevents the motor from overheating.

6.15 Event and statistics memories

The AT40 has event and statistics memories to provide a better diagnostic option. Up to eight timed events are stored in chronological order in the event memory. The time stated is the time that has passed since the event occurred. This can be used to calculate the absolute time at which the event occurred. The time information is lost if the controller is disconnected from the power supply. The frequency of occurrence of the events is stored in the statistics memory. The event and statistics memories can be deleted if required.

7 Mechanical installation and configuration

CAUTION
Safe operation of the elevator door drive requires proper assembly and commissioning by qualified personnel, with due attention given to the warning notices in these operating instructions. The controller must be disconnected from the power supply before starting any work on the door drive. Only then is immobility of the door guaranteed.

The mechanical assembly and configuration of the elevator door drive are performed in the following steps:

1. Mount the motor on the rubber-metal anti-vibration motor mounting. Then, if necessary, mount the motor on the mounting bracket.
2. Mount the deflector pulley, if necessary with a mounting bracket. Make sure that the drive pinion and deflector pulley are aligned. They should be aligned as precisely as possible with one another (flush).
3. Bolt the two ends of the toothed belt to the door clutch holder. Place the closed toothed belt over the motor pinion and deflector pulley.

NOTE
Only install the door clutch holders (toothed-belt joint) specified in the Appendix. Unsuitable fastenings can concentrate the stress on the toothed belt, which can lead to its destruction. The door clutch holder (toothed-belt joint) must not run over or touch the drive pinion or deflector pulley!

4. Tension the toothed belt with the aid of the tensioning device. The correct tension has been reached when the midpoint of the toothed belt can be pushed in by approximately 3 cm for every meter of distance between the drive pinion and the deflector pulley.
5. Mount the controller close to the drive motor (take the length of the cable into account).
6. Mount the switch mode power supply close to the controller (take the length of the cable into account).

CAUTION
The temperature of the housing of the switch mode power supply can rise to over 105 °C in the event of a fault in the controller or a short circuit in the output line of the switch mode power supply. For this reason, the switch mode power supply may only be mounted on surfaces with no risk of ignition, and which cannot be touched by unauthorized persons. The service personnel must be informed of this.

8 Electrical configuration and commissioning

WARNING
Dangerous voltages are inevitable in certain parts of these electrical units during operation. Failure to observe the operating instructions can therefore lead to serious injuries or material damage. It is essential to observe the warning notices. The door movements cannot always be externally controlled while the controller is being commissioned (in particular during the automatic determination of parameters).
The light barrier is not active during the learn run. Therefore an authorized person must be posted near the door to ensure that no one else can come near the elevator door during commissioning. After commissioning, the forces and energies in the entire elevator system must be checked by the service personnel to ensure that they are within their permissible limits.

NOTE
The motor temperature must not be below 0 °C during the learn run, as otherwise the weight of the door will be incorrectly determined, and the closing and nudge speeds may lie in impermissible ranges.

1. Push the door into the CLOSED position.
2. Open housing lid.
3. Plug in the X7 motor plug.

NOTE
The X6 control inputs plug is not plugged in during commissioning in order to prevent uncontrolled movements.

4. Connect the switch mode power supply to the 230 VAC mains supply. The on-site fuse must not exceed 10 A.
5. Press and hold down the red learn run button (S401).
6. Connect the switch mode power supply output to X3.
7. The learn run starts automatically, and the learn run button can be released. The 7-segment display (H401) shows „H.“. During the learn run, the door is opened about 10 cm, and closed once or twice at slow speed. The friction of the door system is then determined by opening and closing the door once through a range of 25 cm at slow speed. The door then opens and closes through its complete range of movement at reduced speed. After the door has opened about 10 cm, it passes through a short acceleration ramp to determine the weight of the door. In the CLOSED position, the door parameters and the determined door width are saved. The decimal point in the 7-segment display (H401) flashes during the save process. The 7-segment display (H401) shows „u“ when saving has finished.
8. The door can now be opened with the OPEN button S402. The 7-segment display (H401) shows „o“ while the door is opening.
9. Switch off the controller by pulling out the power plug or the X3 plug.
10. Connect the control signals to the X6 connector as shown in the terminal circuit diagram (see Appendix).
11. Connect the light barrier to X6 (see figure 1 or text on cover). If the light barrier input (input 1) is not used, X6 must be wired to X4 as indicated by the lines in the layout diagram. The sensor must be connected here if the DCPS function is used.
12. Plug in terminal connectors X6 and X4.

CAUTION
The controller will be operative after the next switch-on. If a control signal is present, the door will move in the set direction.

13. Switch on the controller (plug in the power plug or the X3 plug). The four LEDs alongside the plug connector X3 indicate which control signal is currently active. If there is no obstruction in the range of movement of the door, the LED for the light barrier should be lit continuously.
14. If the control signal CLOSE is present, the door moves into the CLOSED position at initial speed. If an OPEN control signal is present, the door moves into the OPEN position at initial speed.
15. Once the controller has detected the door OPEN and CLOSED end positions, the subsequent opening and closing movements proceed at normal speed once again.

WARNING
After the elevator door has been commissioned, the energies and forces on the heaviest door in the entire elevator system must be checked by the service personnel, and adjusted if they exceed their limiting values.
Gearing up or down is not allowed on the toothed belts because this would change the kinetic energies or static forces on the door.

The door width would then no longer be valid.

NOTE
Door movements in the OPEN and CLOSE directions can also be actuated with the service buttons S402 (OPEN) and S403 (CLOSE). These buttons are located parallel to the OPEN and CLOSE signals which are output at X6. Each of these buttons has to be pushed continuously to reach the end position of the door, because the door stops if the button is released.
If the OPEN and CLOSE buttons are pressed simultaneously or the OPEN and CLOSE signals are present simultaneously, the door always moves in the OPEN direction.
When the Service Tools or the Sidoor-User Software are used, the external input signals are disabled in some menus.
The learned parameters can only be saved when the door is in the CLOSED position.

16. The door travel values can be matched to the individual door for specific applications with the aid of the integrated terminal module or the Service Tool (optional). Parameters can also be changed with the aid of the Sidoor-User Software (optional, part of the Sidoor Software Kit).
    Its operation is described in the Appendix to these instructions.
    Simple settings can also be made with the three buttons and the 7-segment display on the controller (see chapter 18.13).

The following settings can be made:

		Motor 2 (24 V / 1,8 A up to 120 kg door wt.)		Motor 3 (30 V / 4 A up to 180 kg door wt.)	
Parameter	Unit	Setting range	Factory setting	Setting range	Factory setting
Slow end distance open	mm	0 ... 100	25	0 ... 100	30
Slow start distance open	mm	0 ... 100	30	0 ... 100	30
Slow start distance close	mm	0 ... 100	20	0 ... 100	20
Slow end distance close	mm	0 ... 100	40	0 ... 100	40
Maximum speed open	mm	100 ... 500	500	100 ... 650	650
Slow end speed open	mm/s	30 ... 90	40	30 ... 90	40
Slow start speed open	mm/s	30 ... 90	60	30 ... 90	60
Slow initial speed open	mm/s	30 ... 90	90	30 ... 90	90
Maximum speed close	mm/s	100 ... 500	250	100 ... 500	319
Slow start speed close	mm/s	30 ... 90	60	30 ... 90	60
Slow end speed close	mm/s	30 ... 90	40	30 ... 90	40
Slow initial speed close	mm/s	30 ... 90	90	30 ... 90	90
Nudging speed	mm/s	50 ... 250	150	50 ... 250	150
Acceleration ramp open	mm/s	300 ... 850	850	300 ... 1400	1300
Deceleration ramp open	mm/s2	300 ... 850	600	300 ... 1400	600
Reversal ramp open/close	mm/s2	300 ... 850	850	300 ... 1400	1200
Acceleration ramp close	mm/s2	300 ... 850	500	300 ... 1400	500
Deceleration ramp close	mm/s2	300 ... 850	500	300 ... 1400	500

Reversal ramp close/open	mm/s2	300 ... 850	850	300 ... 1400	850
Idle torque open	mm/s2	0 ... 1	1	0 ... 2,5	1
Idle torque close	A	0 ... 1,5	1	0 ... 2,5	1
Peak torque close	A	0 ... 5	2,5	0 ... 5	3
Limit force open	N	70 ... 120	120	70 ... 300	300
Limit force close	N	70 ... 120	110	70 ... 230	90
Limit force end close	N	70 ... 120	110	70 ... 230	90
Limit force close nudging	N	70 ... 120	70	70 ... 230	70

		Motor 4 (30 V / 4 A bis 400 kg door wt.)	
Parameter	Unit	Setting range	Factory setting
Slow end distance open	mm	0 ... 100	30
Slow start distance open	mm	0 ... 100	30
Slow start distance close	mm	0 ... 100	20
Slow end distance close	mm	0 ... 100	40
Maximum speed open	mm/s	100 ... 750	600
Slow end speed open	mm/s	30 ... 90	40
Slow start speed open	mm/s	30 ... 90	60
Slow initial speed open	mm/s	30 ... 90	90
Maximum speed close	mm/s	100 ... 500	319
Slow start speed close	mm/s	30 ... 90	60
Slow end speed close	mm/s	30 ... 90	40
Slow initial speed close	mm/s	30 ... 90	90
Nudging speed	mm/s	50 ... 250	150
Acceleration ramp open	mm/s2	300 ... 1400	1300
Deceleration ramp open	mm/s2	300 ... 1400	600
Reversal ramp open/close	mm/s2	300 ... 1400	1200
Acceleration ramp close	mm/s2	300 ... 1400	500
Deceleration ramp close	mm/s2	300 ... 1400	500
Reversal ramp close/open	mm/s2	300 ... 1400	850
Idle torque open	A	0 ... 2,5	1
Idle torque close	A	0 ... 2,5	1
Peak torque close	A	0 ... 5	3
Limit force open	N	70 ... 500	300
Limit force close	N	70 ... 230	70
Limit force end close	N	70 ... 230	70
Limit force close nudging	N	70 ... 230	70

Parameters should always be adjusted during normal operation with the door in the CLOSED position, because the controller then accepts the values immediately.

CAUTION

Taking the counterweights into account, the maximum static closing force must not exceed 150 N!

WARNING

After the elevator door has been commissioned, the energies and forces on the heaviest door in the entire elevator system must be checked by the service personnel, and adjusted if they exceed their limiting values.

NOTE

After the optimal settings of the parameters have been determined, they can be noted in the configuration record (see the Configuration record Appendix). These records should also be kept at hand when asking questions on the Hotline.

9 The relay contacts (optional)

The relay contacts are located on the relay module, and can be used to report the following door states to the higher-level elevator controller:

- X11

The door has reached the CLOSED position.
The relay switches on when the controller has detected the CLOSED position and the pulse generator ceases to output pulses, that is the door is stationary. Pin 3 remains connected to Pin 1 only until the door OPEN command is issued. The relay then drops again immediately, and Pin 3 is once again connected to Pin 2.

- X12

The door reverses.
The relay switches on when, for example, the door reverses due to a blockage,
a light barrier is interrupted or there is an opening command present. Pin 1 is then connected to Pin 3 until the OPEN position is reached.

- X13

The door has reached the CLOSED position.
The relay switches on when the distance of the door from the OPEN position falls below 2 cm. Pin 1 and Pin 3 are then connected. The relay drops immediately the distance exceeds 2 cm again, and Pin 3 is once again connected to Pin 2.

In the “Overview of operator controls”, the contacts are always shown with the relay de-energized (inactive). The active state is also indicated by an LED on the switching relay.

WARNING

The door controller is not a safety mechanism. Therefore the relay contacts must not be used for the elevator safety circuit.
When the housing cover is opened, only a safety extra-low voltage of less than 42 V may be present. The protective cover provided must be used when a higher voltage (maximum 230 VAC) is connected to the relay module. The following must be observed: The cables connected must be suitable for the voltage used and have appropriate (double or reinforced) insulation.

Cables with an external diameter of 6 to 7 mm are recommended.
Inside the cover, the single-insulation must be removed from the single cores at least 5 mm from the cable entry openings, and the cores connected as short as possible to the terminal connectors X11 (CLOSE signal) and X13 (OPEN signal).
The cables must be secured inside the plastic cover against being pulled out. A cable tie, which has been pulled tightly around the cable, prevents the cable from being pulled through the oval opening in the relay cover (see photo 1). The cable tie must be applied in such a way that a minimum of 5 mm of the outer cable jacket lies inside the protective cover. Components of the controller and connecting cable as well as the motor plug and its wires may only come in contact with the additional (or reinforced) insulation of the current-carrying wires.
Networks with different voltages (e.g. 24 V and 230 V) must not be connected to the relay module.
Additional strain relief is provided by cable ties at the fixing points provided in the housing.

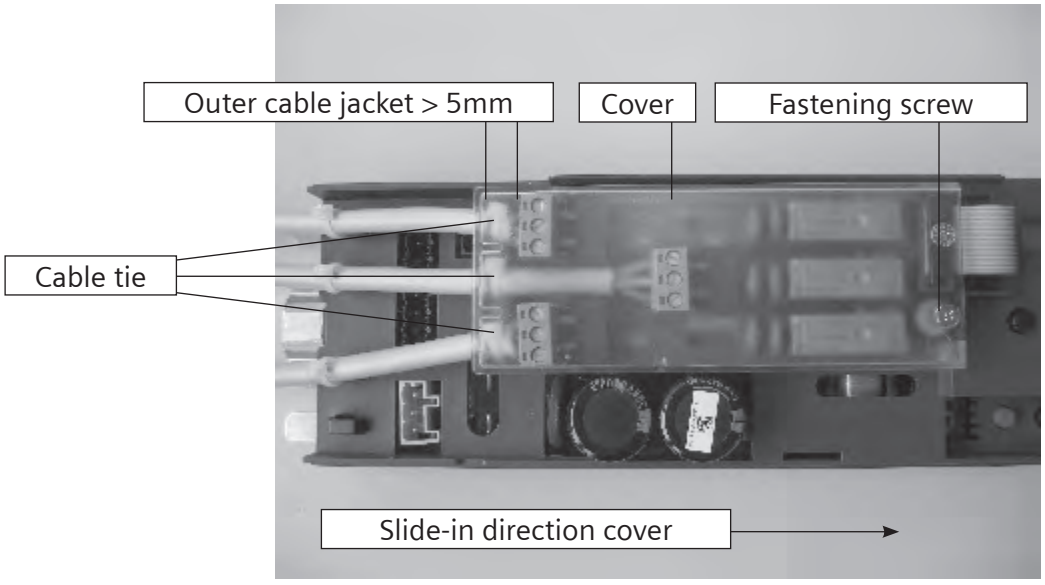


Photo 1: Protective cover for relay module

There is no need for the protective cover if safety extra-low voltages of less than 42 V are connected to the relay module.

10 CAN module (optional)

The CAN module enables the AT40 controller to be connected to a CAN bus. The interface is implemented according to CiA Draft Standard 301, profile 417. The Service Tool must be used to set the power of command to CAN so that the controller can be addressed via the CAN bus. This deactivates the digital inputs. The factory settings of the major parameters are:

Parameter	Factory setting
Command output	Digital IO (digital inputs)
CANopen node ID	7
Baud rate	Automatic
Door number	1

When the baud rate is set to „automatic“, the CAN module automatically determines the baud rate on the CAN bus. To do this, the CAN module must have received some valid CAN telegrams. The LED H3 flashes quickly at 5 Hz while the baud rate is being automatically determined. All LED signals are listed in the following table.

LED signal (H3)	CANopen state machine
Off	"Pre-operational" or "Stopped" and no CAN telegrams are received.
Flashes briefly once per second	"Pre-operational" or "Stopped" and CAN telegrams are received.
Goes out briefly once per second	"Operational" and CAN telegrams are received
On	"Operational" and no CAN telegrams are received
Flashes rapidly	Automatic determination of baud rate

The connection can be made via the RJ45 socket (X15) and/or the terminal connector (X16). Each of the ferrites included in the scope of delivery must be laid around a CAN line near the controller. The pin assignment is listed in the following table.

Pin	Signal	Description
1	CAN_H	CAN high bus cable
2	CAN_L	CAN low bus cable
3	GND	CAN ground
4	-	Reserve
5	-	Reserve
6	Shield	CAN cable shield
7	GND	CAN ground
8	-	Reserve

Connector X15

Pin	Signal	Description
1	CAN_H	CAN high bus cable
2	Shield	CAN cable shield
3	CAN_L	CAN low bus cable

Connector X16

The bus can be terminated with 120 ohms via the switch S1.

The EDS file is available on the www.sidoor.com Internet page.

In addition to the CAN interface, there are also two relays on the CAN module. They can switch a maximum of 30 V and 0.5 A. The pin assignment is:

Pin	Assignment	Description
1, 2	NO contact. CLOSED position	The relay switches on when the controller has detected the CLOSED position and the pulse generator ceases to output pulses. LED H1 is on.
3, 4	NO contact. OPEN position reached.	The relay switches on when the distance of the door from the OPEN position falls below 2 cm. LED H2 is on.

Connector X11

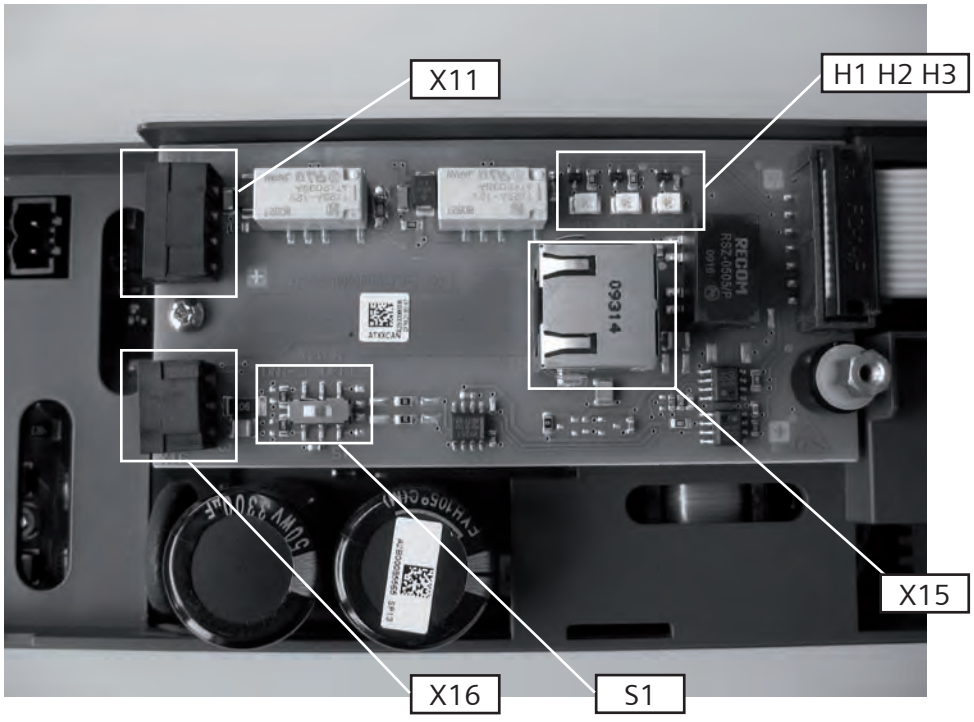


Photo 2: CAN module

ESD protective measures. The protective cover may only be opened after the controller has been disconnected from the mains supply and the user has been grounded (this is required in order to connect the CAN cable or to activate/deactivate the terminating resistor).
A maximum of 32 nodes can be connected to the CAN bus.
A folding ferrite (RFC-6 Kitagawa) must be attached to the start and finish of the CAN cable (outside the housing).

11 Travel curve

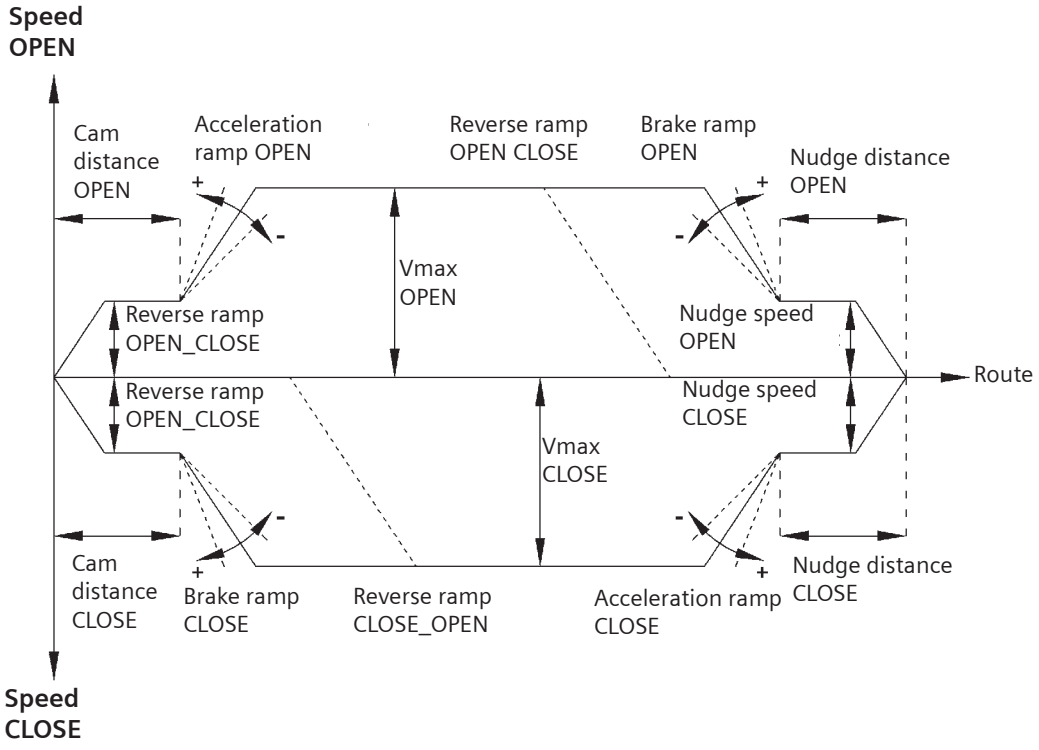


Figure 2

Reversing ramp OPEN_CLOSE = reversal of movement from the OPEN to the CLOSE direction.
Reversing ramp CLOSE_OPEN = reversal of movement from the CLOSE to the OPEN direction.

When reversing from the open to the close direction, the door is braked with the reversing ramp OPEN_CLOSE, and starts the closing movement with the acceleration ramp CLOSE.

12 Profiles AT40 firmware version 1.04

12.1 Motor 2

Parameter	Unit	P1	P2	P3	P4	P5	P6
Slow end distance open	mm	25	20	20	25	25	25
Slow start distance open	mm	30	30	30	40	50	30
Slow start distance close	mm	20	0	0	0	0	20
Slow end distance close	mm	40	30	30	40	50	40
Maximum speed open	mm/s	500	300	400	500	500	500
Slow end speed open	mm/s	40	40	50	60	70	40
Slow start speed open	mm/s	60	40	50	60	70	60
Slow initial speed open	mm/s	90	50	60	70	90	90
Maximum speed close	mm/s	250	150	200	300	400	150
Slow start speed close	mm/s	60	40	50	60	70	60
Slow end speed close	mm/s	40	40	50	60	70	40
Slow initial speed close	mm/s	90	50	60	70	90	90
Nudging speed	mm/s	150	100	100	150	150	150
Acceleration ramp open	mm/s²	850	600	700	850	850	850
Deceleration ramp open	mm/s²	600	500	600	800	850	850
Reversal ramp open/close	mm/s²	850	500	600	800	850	850
Acceleration ramp close	mm/s²	500	500	600	800	850	500
Deceleration ramp close	mm/s²	500	500	600	800	850	500
Reversal ramp close/open	mm/s²	850	600	700	850	850	850
Idle torque open	A	1	0,8	1	1,2	1,3	1
Idle torque close	A	1	0,8	1	1	1	1
Peak torque close	A	2	2	2,4	2,6	3	2,5
Limit force open	N	120	120	120	120	120	120
Limit force close	N	110	110	110	110	110	110
Limit force end close	N	110	110	110	110	110	110
Limit force close nudging	N	70	70	70	70	70	70

P1: M2 default profile
P2: M2 min. profile 1
P3: M2 min. profile 2
P4: M2 max. profile 1
P5: M2 max. profile 2
P6: M2 special profile

12.2 Motor 3

Parameter	Unit	P1	P2	P3	P4	P5	P6
Slow end distance open	mm	30	20	20	30	30	30
Slow start distance open	mm	30	30	30	40	40	30
Slow start distance close	mm	20	0	0	0	0	0
Slow end distance close	mm	40	30	30	40	40	30
Maximum speed open	mm/s	650	400	500	650	650	650
Slow end speed open	mm/s	40	40	50	60	70	70
Slow start speed open	mm/s	60	40	50	60	70	70
Slow initial speed open	mm/s	90	50	60	70	90	90
Maximum speed close	mm/s	319	250	300	319	319	250
Slow start speed close	mm/s	60	40	50	60	70	50
Slow end speed close	mm/s	40	40	50	60	70	50
Slow initial speed close	mm/s	90	50	60	70	90	60
Nudging speed	mm/s	150	100	100	150	150	100
Acceleration ramp open	mm/s²	1300	800	1000	1200	1400	1400
Deceleration ramp open	mm/s²	600	600	800	1000	1200	1200
Reversal ramp open/close	mm/s²	1200	600	800	1000	1200	1200
Acceleration ramp close	mm/s²	500	600	800	1000	1200	500
Deceleration ramp close	mm/s²	500	600	800	1000	1200	500
Reversal ramp close/open	mm/s²	850	800	1000	1200	1400	1200
Idle torque open	A	1	0,7	1	1,2	1,5	1,2
Idle torque close	A	1	0,7	1	1,2	1,5	1,2
Peak torque close	A	3	2	2,5	3	3	3
Limit force open	N	300	300	300	300	300	300
Limit force close	N	90	90	90	90	90	90
Limit force end close	N	90	90	90	90	90	90
Limit force close nudging	N	70	70	70	70	70	70

P1: M3 default profile
P2: M3 min. profile 1
P3: M3 min. profile 2
P4: M3 max. profile 1
P5: M3 max. profile 2
P6: M3 special profile

12.3 Motor 4

Parameter	Unit	P1	P2	P3	P4	P5	P6
Slow end distance open	mm	30	20	20	30	30	30
Slow start distance open	mm	30	30	30	40	40	30
Slow start distance close	mm	20	0	0	0	0	0
Slow end distance close	mm	40	30	30	40	40	30
Maximum speed open	mm/s	600	400	500	650	750	650
Slow end speed open	mm/s	40	40	50	60	70	70
Slow start speed open	mm/s	60	40	50	60	70	70
Slow initial speed open	mm/s	90	50	60	70	90	90
Maximum speed close	mm/s	319	250	300	319	319	250
Slow start speed close	mm/s	60	40	50	60	70	50
Slow end speed close	mm/s	40	40	50	60	70	50
Slow initial speed close	mm/s	90	50	60	70	90	60
Nudging speed	mm/s	150	100	100	150	150	100
Acceleration ramp open	mm/s²	1300	800	1000	1200	1400	1400
Deceleration ramp open	mm/s²	600	600	800	1000	1200	1200
Reversal ramp open/close	mm/s²	1200	600	800	1000	1200	1200
Acceleration ramp close	mm/s²	500	600	800	1000	1200	500
Deceleration ramp close	mm/s²	500	600	800	1000	1200	500
Reversal ramp close/open	mm/s²	850	800	1000	1200	1400	1200
Idle torque open	A	1	0,7	1	1,2	1,5	1,2
Idle torque close	A	1	0,7	1	1,2	1,5	1,2
Peak torque close	A	3	2	2,5	3	3	3
Limit force open	N	300	300	300	300	300	300
Limit force close	N	70	70	70	70	70	70
Limit force end close	N	70	70	70	70	70	70
Limit force close nudging	N	70	70	70	70	70	70

P1: M4 default profile
P2: M4 min. profile 1
P3: M4 min. profile 2
P4: M4 max. profile 1
P5: M4 max. profile 2
P6: M4 special profile

13 Operating state display

The 7-segment display H401 indicates the following operating states:

Display	Meaning
0	Light barrier signal present (light barrier interrupted)
1	RAM, EEPROM or CPU error (system error)
2	Braking chopper defective
3	Error in the second shutdown route
4	Increased hold-open time with longer motor switch-on time
5	Motor undefined*
6	Motor blocked in direction of closure
7	Error in pulse generator
8	Minimal editor is started (press the service buttons OPEN and CLOSE simultaneously).
9	Motor overcurrent
A	Minimal editor (force setting) active
b	Reserve
c	Blockage while opening
C	Minimal editor (profile setting) is active
d	Door remains stationary during initialization run (no OPEN or CLOSE signal)
E	Motor overvoltage
F	Motor undervoltage
h	Reserve
H	Parameter determination (learn run)
n	Output stage defective
L	Ammeter error
o	Function OK
P	Parameter error (error during learn run)
r	CAN error
u	Door closed
U	Maximum door weight exceeded
_	Controller waiting for learn run

* If a different motor version is used, commissioning must be repeated as described in these operating instructions

14 Speed limit curve

The speed limit curve is the characteristic curve which defines the maximum permissible door speed Vmax as a function of the total door panel weight. According to EN 81, the maximum kinetic energy of the door in the closing direction must not exceed 10 joules.
WKIN = 1/2 m · v 2 = 10 J.
If the reversing device is switched off, the maximum kinetic energy must not exceed 4 joules.

Example from the following speed limit curve:
Total door panel weight m = 180 kg => Vmax = 0.33 m/s.

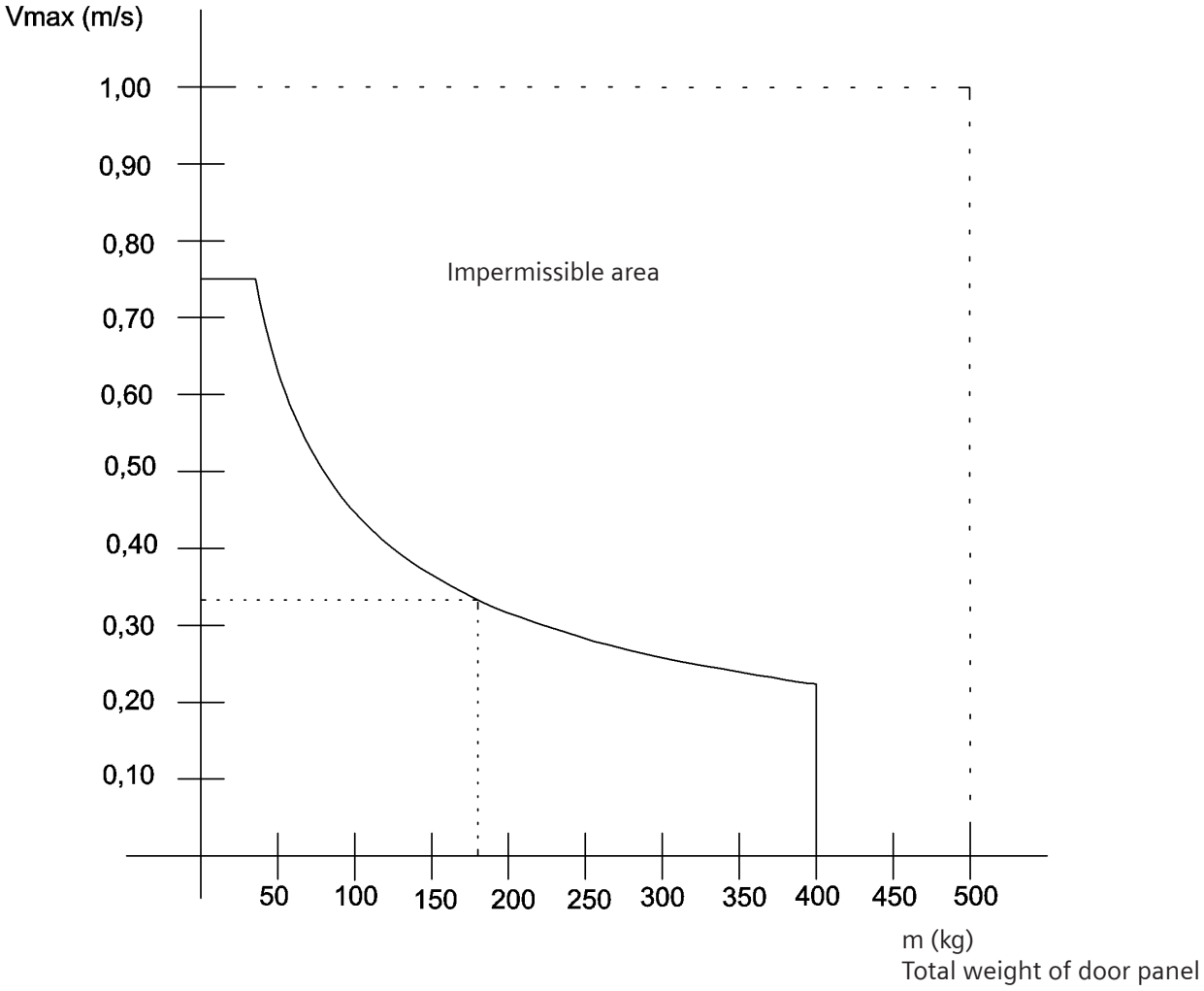


Figure 3

NOTE
The speed can be set in the range between 0 % and 100 %. The value 0% corresponds to a speed of 0.10 m/s. The value 100% corresponds to a speed of 0.5 m/s with motor 2 (24 V / 1.8 A, up to 120 kg door wt.), 0.65 m/s for motor 3 (30 V / 4 A, up to 180 kg door wt.), and 0.75 m/s for motor 4 (30 V / 4 A, up to 400 kg door wt.).

15 The Sidoor NT40 switch mode power supply

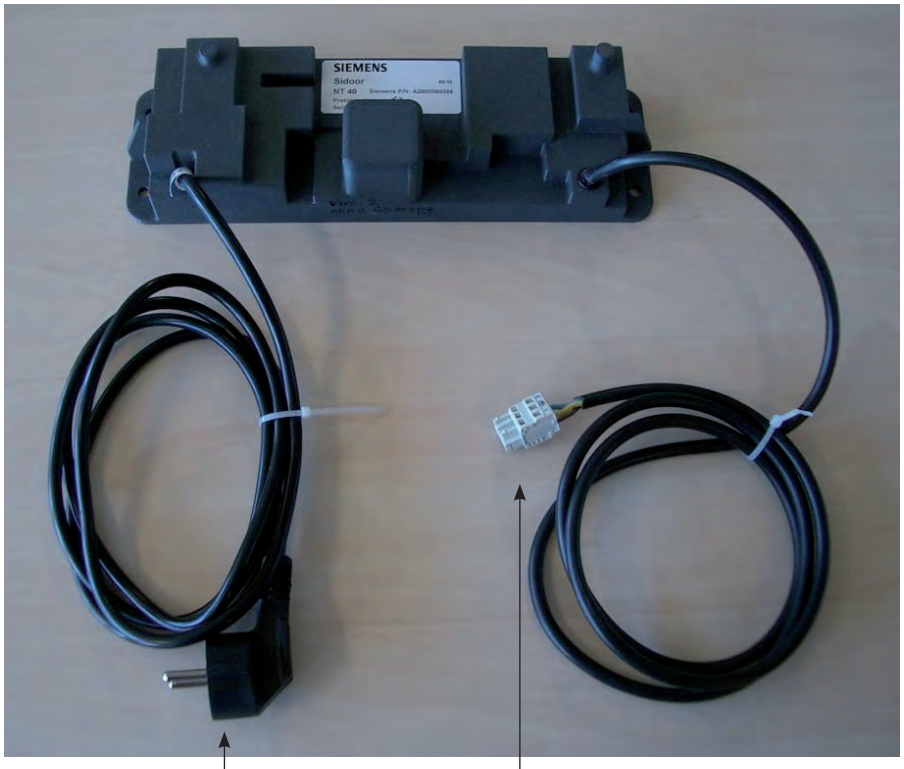
15.1 Proper Use

The equipment has been designed for operation exclusively in an industrial environment and may only be operated in conjunction with the AT40 door controller. Other loads must not be connected to the output connector X2.

15.2 Hardware configuration and functions

The Sidoor NT40 is a 230 VAC (± 15%) 50/60 Hz power supply unit for supplying the AT40 door controller for door weights up to 500 kg.
On the output side, the power supply unit supplies a 36 VDC (± 3%) SELV at a rated output power < 100 W. The device can briefly (< 2 s) deliver a 15 A current to enable a fast acceleration/braking process (corresponds to a brief power output of 540 W). The device is designed for ambient temperatures ranging from - 20 to + 55°C.

Figure 1: Power supply unit



Power plug X1	Output X2
230 VAC (±15%) 50/60 Hz	36V DC (±3%) 2,5 A (15 A für <2 s)

15.3 Connections and LED display

15.3.1 Input line X1

X1 is the connection line to the power supply.

Connections	L, N, PE 195 – 265 Vac
Cable type	H05RN-F 3G1
Length of cable	2 m
Connectors	Molded on schuko plug, approved for 10/16 A, 250 VAC, double protective receptacle, in accordance with DIN 49.441, CEE7/VII

15.3.2 Output line X2

X2 is the output line connecting to the AT40 controller.

Connections	UA+, UA-, FE
Cable type	H05RN-F 3G1
Length of cable	1,5 m
Connectors	WAGO 721-103/026-045

The rated data of the output are:

Rated output voltage	36 V
Rated output current	2,5 A
Continuous output power rating	< 100 W

CAUTION
The third line brought out at the output is only a functional grounding connection, this must not be regarded or used as a ground in the sense of a PE connection!

15.4 Overload operation

The power supply can deliver a current of 15 A for less than 2 seconds.

15.5 Short-circuit protection

Output X2 is short-circuit resistant.

15.6 LED display

LED L1 indicates that the output voltage is present.

NOTE
If the LED does not light up although it is correctly connected to supply line X1 and there is no measurable output voltage, this indicates a short circuit on the output side or a defective module. In order to find out whether the module is defective, it can be operated at no load by the AT40 controller. If the LED at the output does not light up in this mode and there is no measurable voltage at the output, this indicates that the device is defective.

15.7 Installation and commissioning

WARNING
Dangerous voltages are inevitable in certain parts of these electrical units during operation. Non-observance of the operating instructions could result in serious injury or substantial property damage. The device should only be assembled and connected electrically by appropriately qualified personnel. In particular, it is essential to observe the warning notices.

WARNING
The device may only be connected to the power supply by connected supply lines.

15.7.1 Installation

- The installation point should as far as possible be vibration-free. The permissible climatic conditions (operating, storage and transport temperatures) must be observed (see technical data).
- Operation outside the specified temperature range can lead to danger, malfunctions and failure of the equipment.
- Protection class I according to EN 60950-1:2006
- The device must be mounted in places that are accessible only to qualified personnel. - In order to protect the modules from static electrical discharges, personnel must discharge themselves electrostatically before opening control cabinets or terminal boxes.
- It is essential to ensure that the maximum temperature of 55°C is not exceeded in the installation position. The equipment must not be exposed to direct sunlight.

15.7.2 Connection

- The regulations for the construction of high voltage installations must be observed when carrying out the electrical installation.
- The power supply (230 VAC ± 15%) must be connected according to VDE 0100 and VDE 0160.
- The supply voltage to the device must be equipped with a protective device (automatic circuit breaker) (10 A / tripping characteristic B).
- The protective conductor is connected via the supply line X1.
- Output lines may only be connected to the AT40 or the EPM24 emergency power module.
- When the device is connected to the power supply. it must be ensured that this supply meets the requirements of over-voltage category II (see EN 60950-1:2006). If necessary, external overvoltage protection must be connected upstream in order to comply with the requirements of over-voltage category II (see EN 60950-1:2006).

15.7.3 Commissioning

NOTE
THE FOLLOWING STEPS MUST BE CARRIED OUT IN THE STATED ORDER. IN PARTICULAR, THE SUPPLY LINES MUST BE CONNECTED LAST!

1. Check that the operating data matches the values on the rating plate.
2. Mount the device with 4 x 5 mm screws and washers.
3. Connect the AT40 controller to the output line, observing the polarity printed on the device.
4. Connect the supply lines to the power supply.
5. When the supply is switched on, the device is ready for operation. The green LED lights up.

16 The emergency power module

The emergency power module is connected between the switch mode power supply and the power input of the AT40 controller (plug-in connector X3) (see photos 3 and 4). In the event of a power failure, this module switches the power supply from the switch mode power supply to the 24 V emergency power supply (battery). When the switchover is made, the controller receives the command (X5 plug-in connector) to reduce the door speed to initial speed to prevent excessive discharging of the connected batteries.

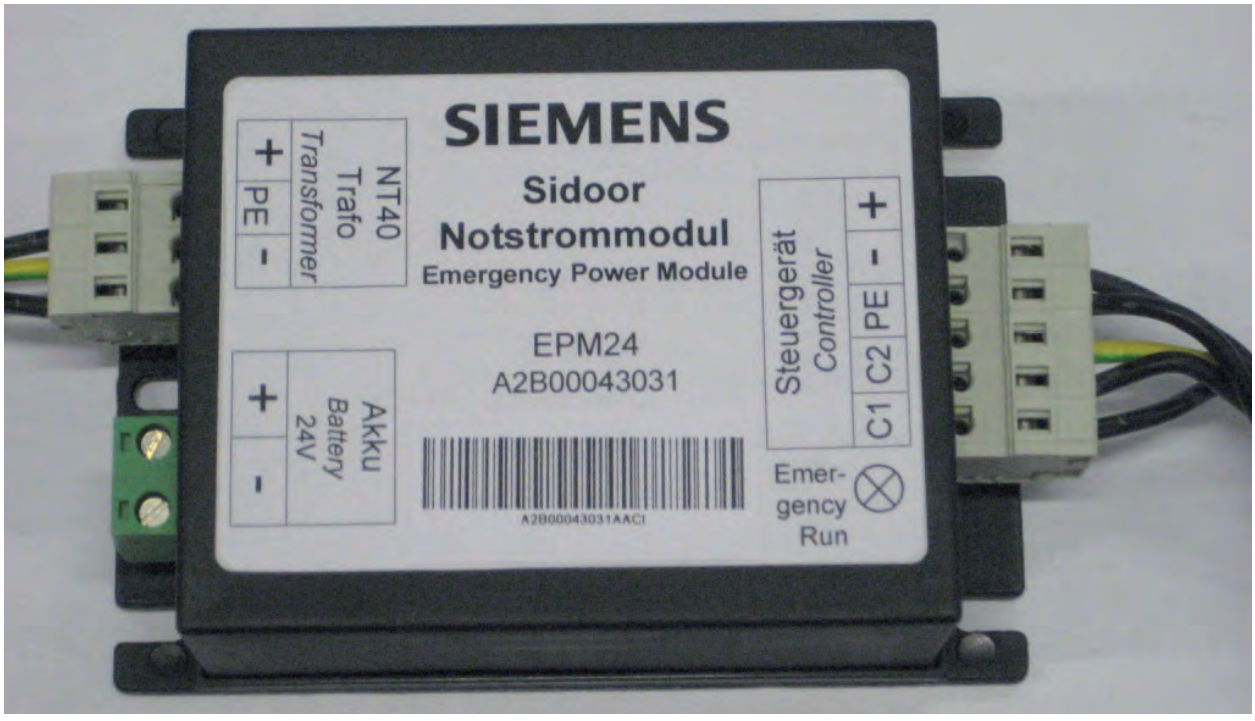


Photo 3

16.1 Connection of the emergency power module to the controller

Photo 4

17 Technical data

17.1 DC geared motor

	Motor 2	Motor 3	Motor 4
Supply voltage	24 VDC	30 VDC	30 VDC
Max. speed	0.5 m/s	0.65 m/s	0.75 m/s
Degree of protection	IP20	IP54 (gear IP40)	IP54 (gear IP40)
Gear ratio	1/15	1/15	1/15
Pulse generator	100 pulses/revolution	100 pulses/revolution	100 pulses/revolution
Rated current	1.8 A	4 A	4 A
Maximum door weight	120 kg	180 kg	400 kg
Max. permissible storage temperature	-40 to +85°C	-40 to +85°C	-40 to +85°C
Max. permissible operating temperature	-20 to +50°C	-20 to +50°C	-20 to +50°C

17.2 Sidoor NT40 switch mode power supply

Design data	
Enclosure	L x W x H 270 mm x 80 mm x 55 mm
Installation	
Mounting	5 mm screwed connection
Maximum weight	1,5 kg
Cooling	The device is cooled via the enclosure. Do not expose to direct sunlight.

Electrical data	
Power supply	230 VAC ± 15% / 47 to 63 Hz / 0.7 A
Maximum current consumption	3.5 A for 2 s
Power consumption	Max. 650 VA
Efficiency	Typically 90% at 230 VAC and 100 W output line
Power supply connection X1	Connecting line X1 (L1 / N / PE)

External protection	10 A provided by customer
Protection class	I
Circuit insulation	Overvoltage category II
IP protection class	Insulation according to EN 60950-1 : 2006 IP54

Voltage output X2	Output line X2 (UA+, UA-, FE)
Rated output voltage	+36 VDC, ± 3%
Rated output current	+0 to 2.7 A
Rated output	< 100 W
Overload capability	15 A for < 2 s
Response to short-circuit	Sustained short-circuit strength

Permissible climatic conditions	
Temperature during operation	-20°C to +55°C Do not expose to direct sunlight
Storage temperature	-20°C to +50°C
Transport temperature	-40°C to +70°C
Humidity	10% to 93% (condensation must not be allowed to form)
Permissible operating altitude	Up to 2000 m above mean sea level

Standards and regulations	
Safety	EN 60950-1: 2006
EMC	EMC Directive 2004/108/EC EN 12015 (interference emission) EN 12016 (immunity to interference)

17.3 Controller

Supply voltage	36 VDC + 3% max.
Degree of protection	IP20
Control inputs	+10 V to +28 VDC, 9 to 27 mA per input (potential-free, switching to P potential)
Door width	0.3 m to 4.00 m
Maximum counterweight	Motor 2 4 kg Motor 3 6 kg Motor 4 8 kg
Output relay switching capacity (optional)	230 VAC or 50 VDC (ohmic load); 1.0 A (10 mA min.)
Max. permissible storage temperature	-40 to +50°C
Max. permissible operating temperature	-20 to +50°C
Moisture requirement	No condensation
Emergency power input	24 VDC ± 15%; 1.6 A (e.g. lead-gel battery)
Recommended battery capacity	2 Ah, on-site (!) protected by 6 A slow-blow fuse. An opening and closing cycle requires energy of up to 2.4 Wh (0.1 Ah at 24 V)
24 VDC output	Max. output current 400 mA, short-circuit proof CAUTION: Do not supply with external voltage

17.4 Regulations and standards

EMC test	EN 12015 and EN 12016
TÜV (German Technical Inspectorate)	Type-tested
CE	Conformity declared
Elevator standard EN 81	Conforming
CANopen	CiA draft standard 301, profile 417
Safety level (application area: power-operated protective devices for machines)	EN ISO 13849-1:2008 Cat. 2/PL-D Safe function: force and energy limitation and end position detection

18 Appendix

18.1 Appendix 1: Identification numbers of components

ID number	Product	Short description
Controllers		
A2B00093323	AT40 controller with terminal module and relay	
A2B00093317	AT40 controller with terminal module and CAN	
Power supply unit		
A2B00089566		Switch mode power supply
Add-on modules		
A2B00043031	EPM24	Emergency power module with connecting
Geared motor		
A2B00059632		24 V motor, pinion right, for doors up to 120 kg
A2B00059634		24 V motor, pinion left, for doors up to 120 kg
A2B00069115		30 V motor, pinion right, for doors up to 180 kg
A2B00069116		30 V motor, pinion left, for doors up to 180 kg
A2B00089337		30 V motor, pinion right, for doors up to 400 kg
A2B00089334		30 V motor, pinion left, for doors up to 400 kg
Accessories		
H 070220794		Rubber-metal anti-vibration mount for motor
H 070220816		Mounting bracket with tensioning device for deflector pulley
H 070040052		Door clutch holder
H 070040060		Deflector unit
H 070040028		Toothed belt 4 m
H 070040087		Toothed belt 45 m
Servicing accessories		
A2B00061214		Sidoor Software Kit with USB adapter
A2B00043033		Service Tool

18.2 Appendix 2: Dimension drawing of AT40 controller

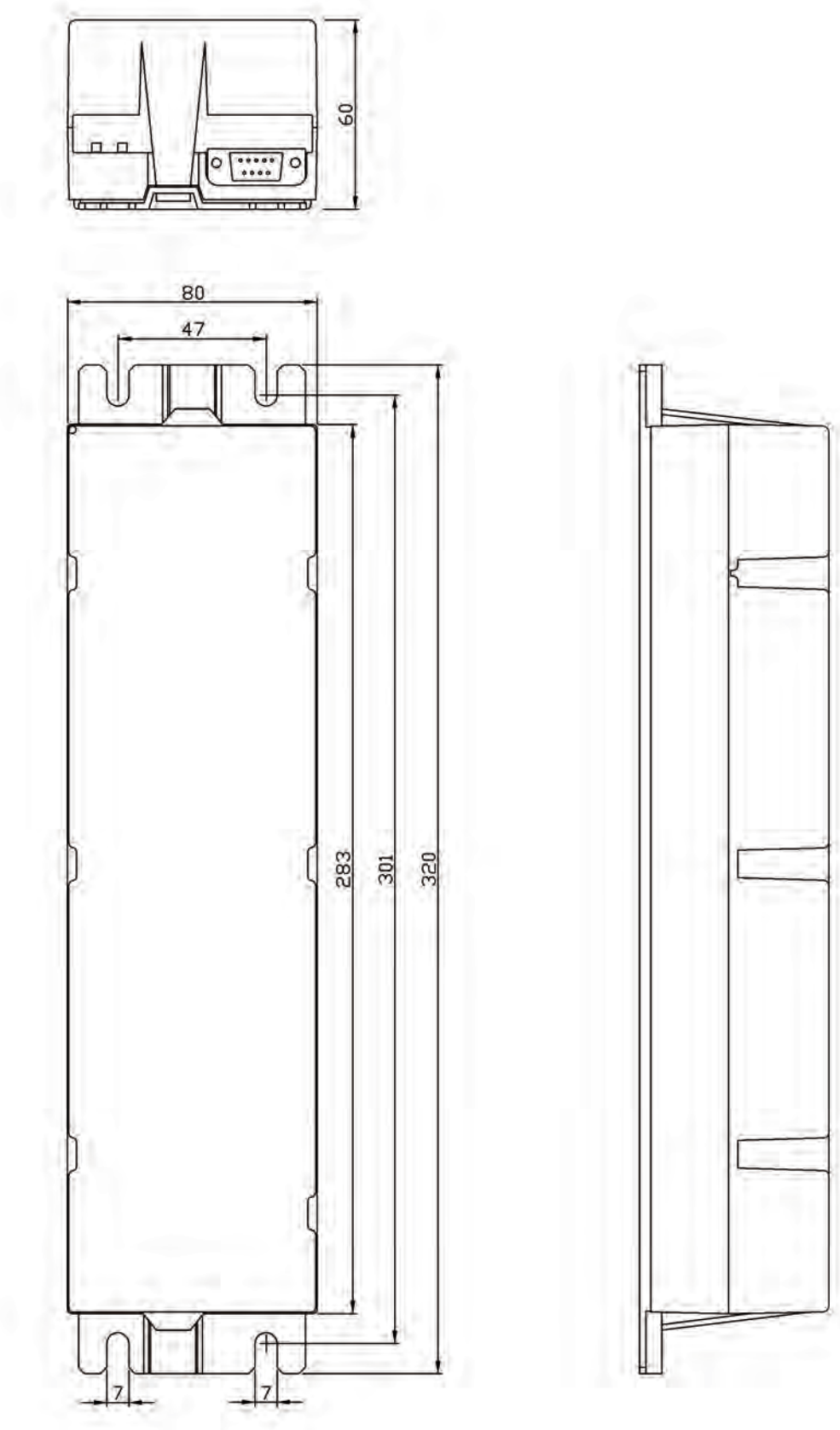
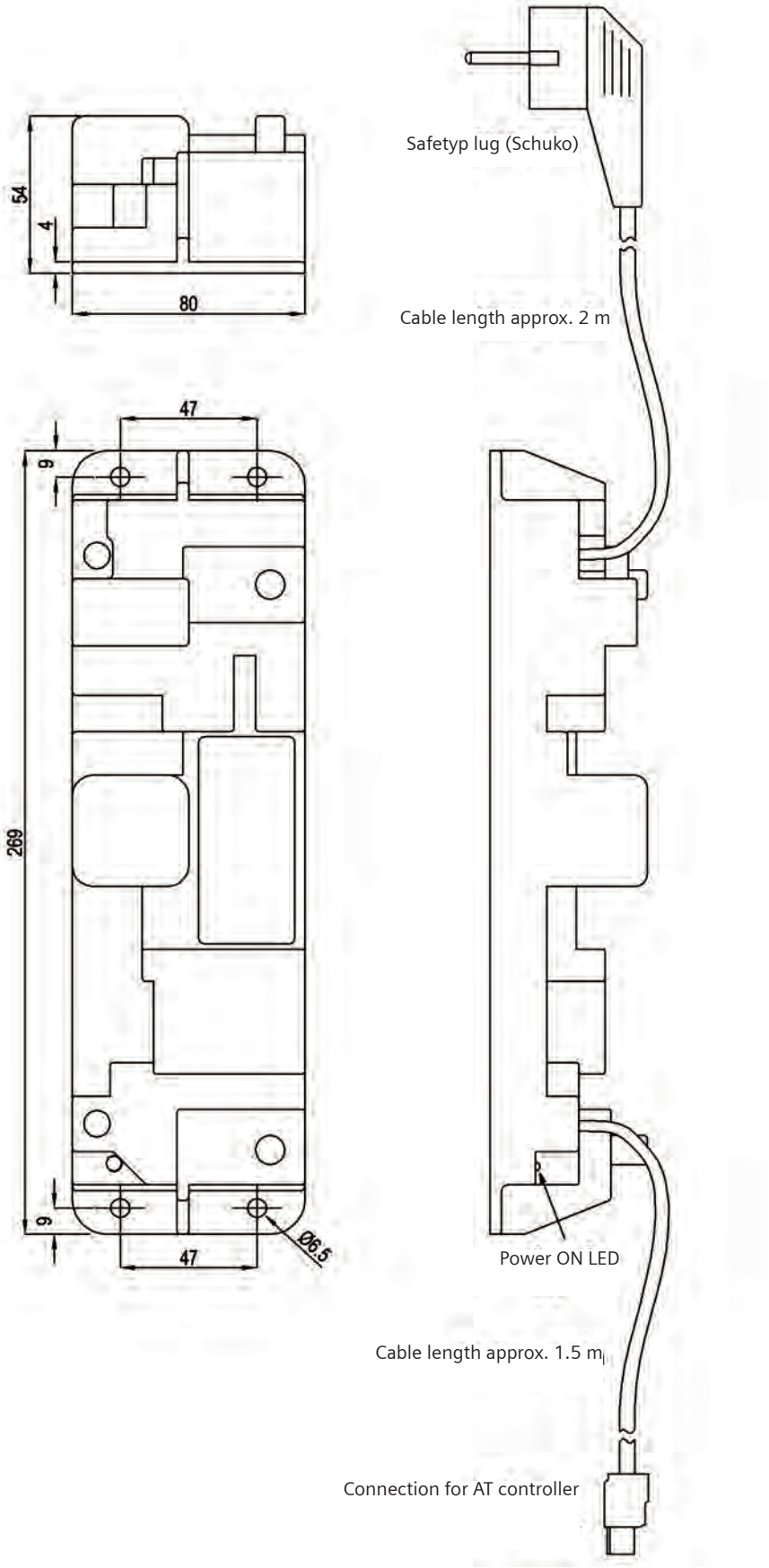


Abbildung 4

18.3 Appendix 3: Sidoor NT40 switch mode power supply



18.4 Appendix 4: Geared motors

18.4.1 24 V geared motor with rubber-metal anti-vibration mount and mounting bracket (motor 2)

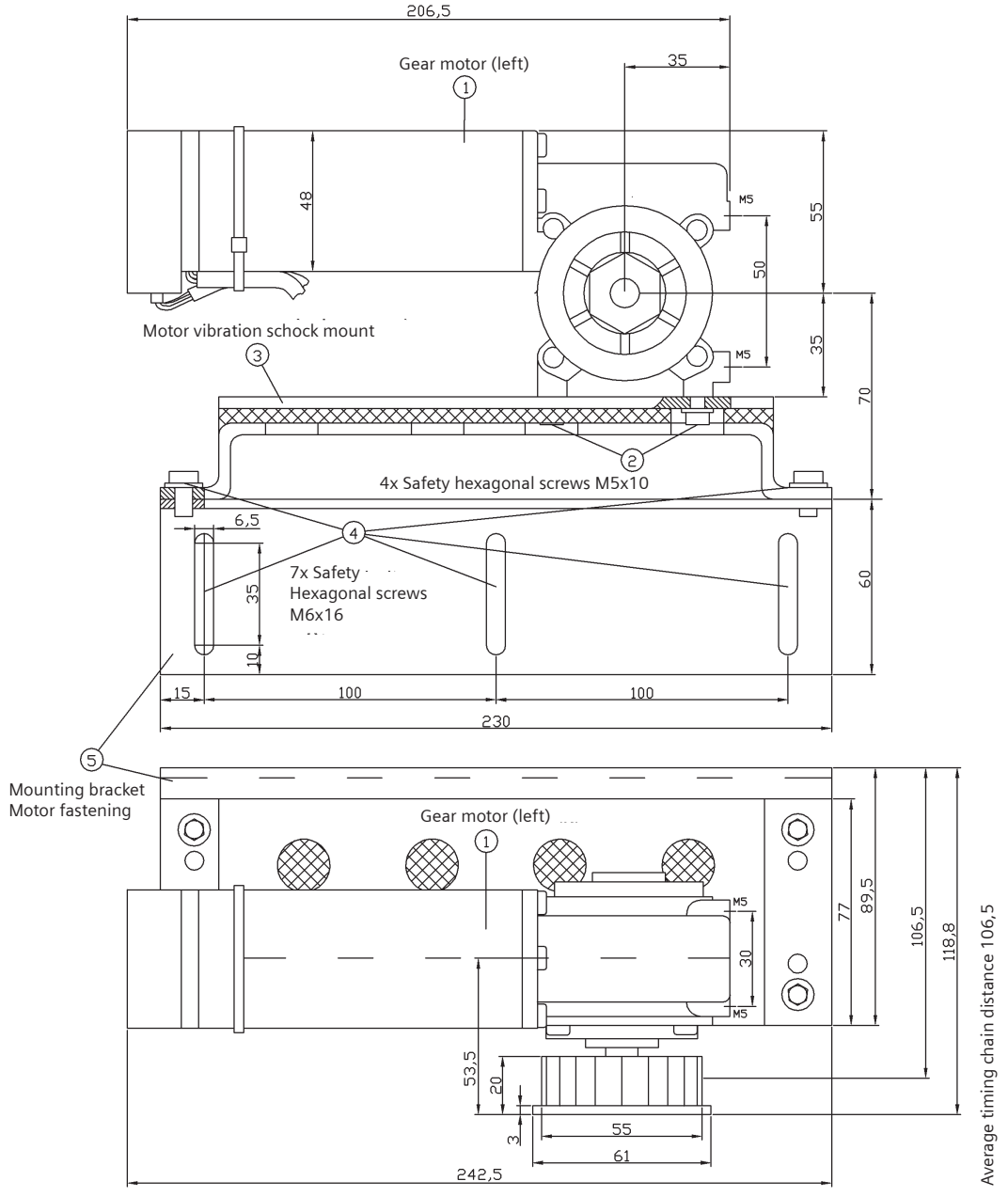


Figure 5a

18.4.2 30 V geared motor with rubber-metal anti-vibration mount and mounting bracket (motor 3)

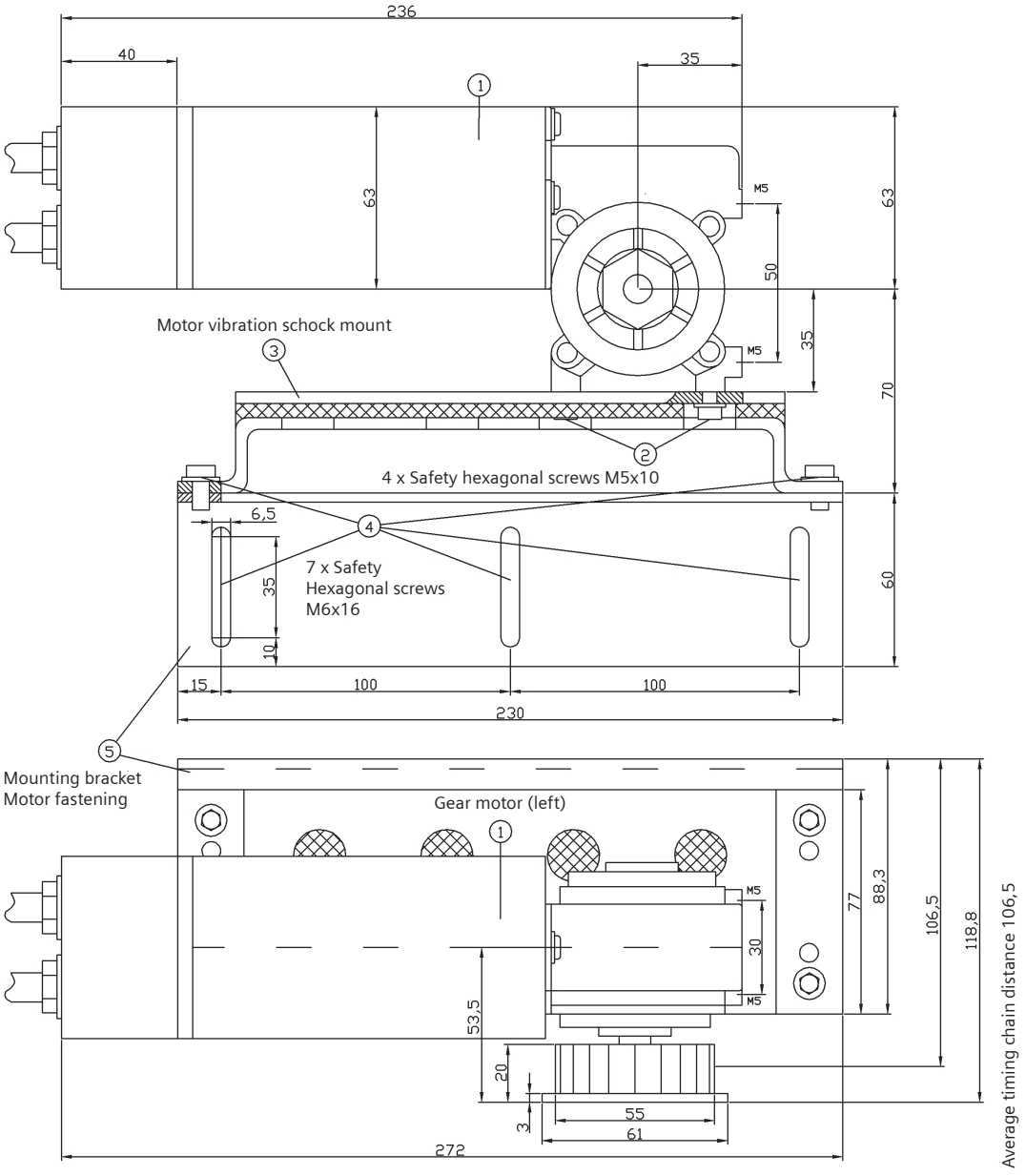


Figure 5b

18.4.3 30 V geared motor with rubber-metal anti-vibration mount and mounting bracket (motor 4)

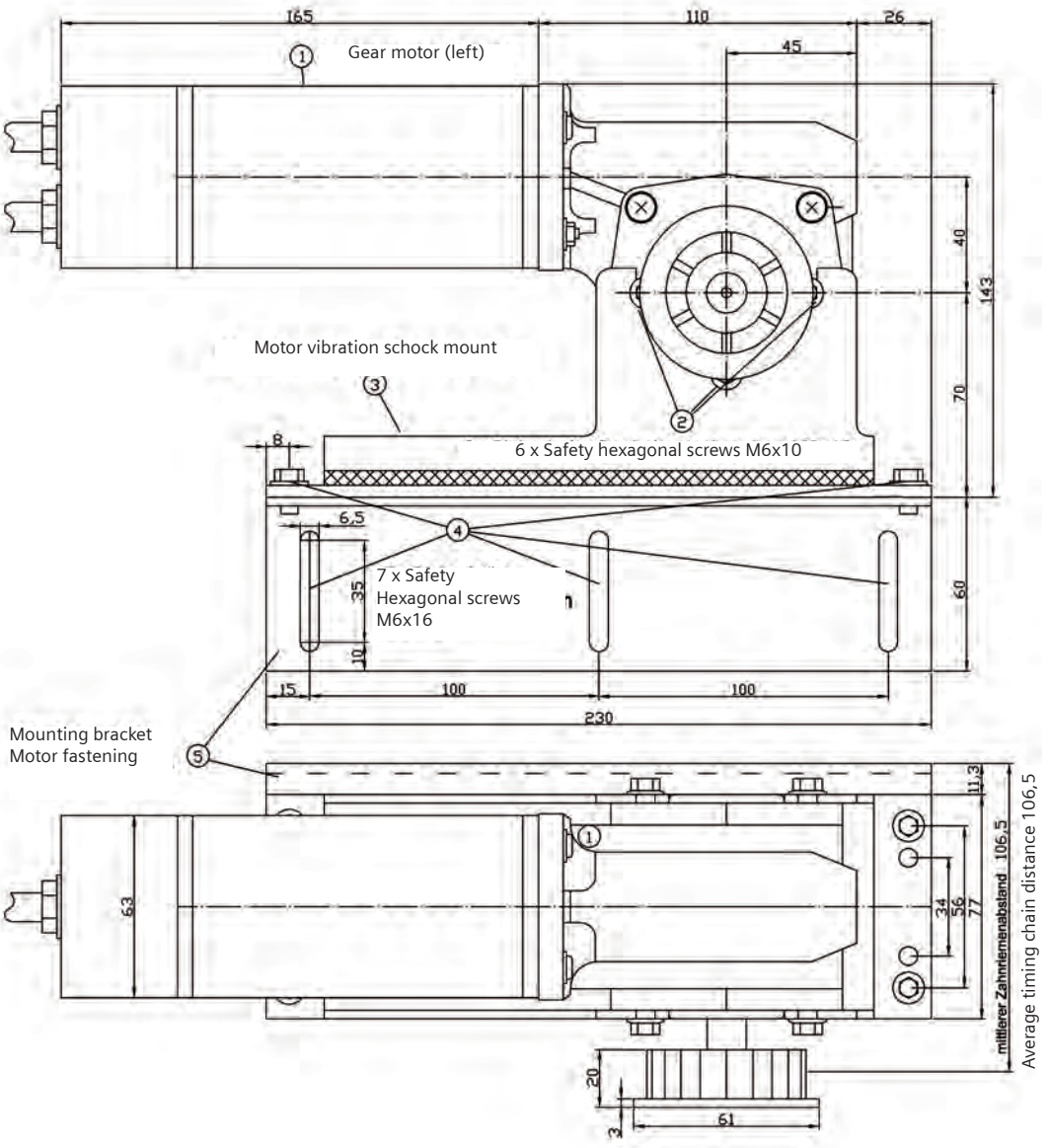


Figure 5c

18.4.4 Conductor assignment of motor plug

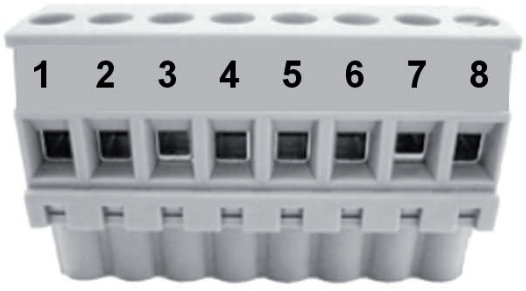


Figure 5d

Terminal	Signal	Motor 2	Motor 3	Motor 4
1	+5V	gray	gray	gray
2	Channel A	white	yellow	yellow
3	Channel B	yellow	green	green
4	Motor identification (Motor-ID)	green	brown	brown
5	GND	brown	white	white
6	PE	n.a.	yellow-green	yellow-green
7	Motor+	brown	black 2	black 2
8	Motor-	white	black 1	black 1

18.5 Appendix 5: Deflector pulley with tensioning device and mounting bracket

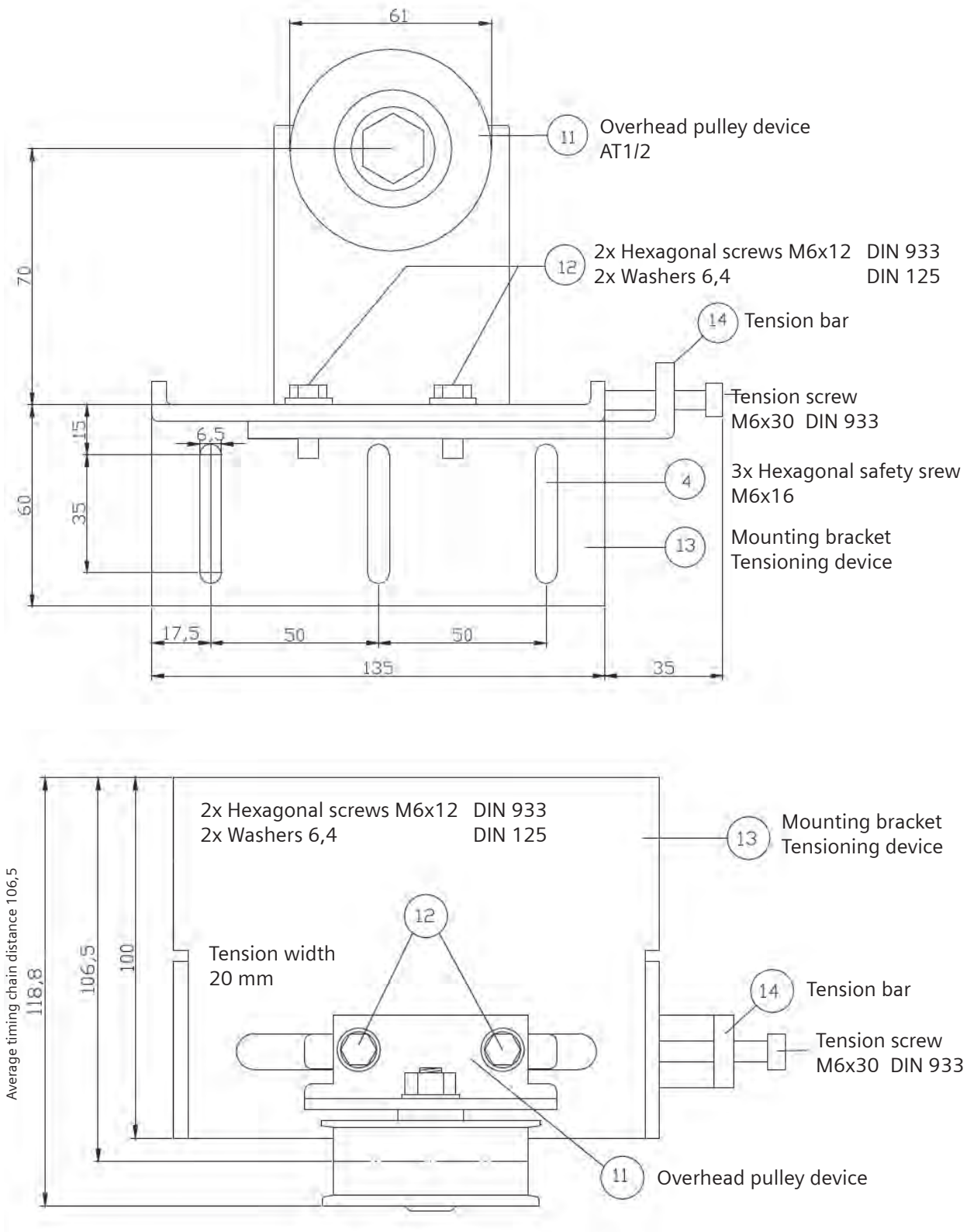


Figure 6

18.6 Appendix 6: Door clutch holder

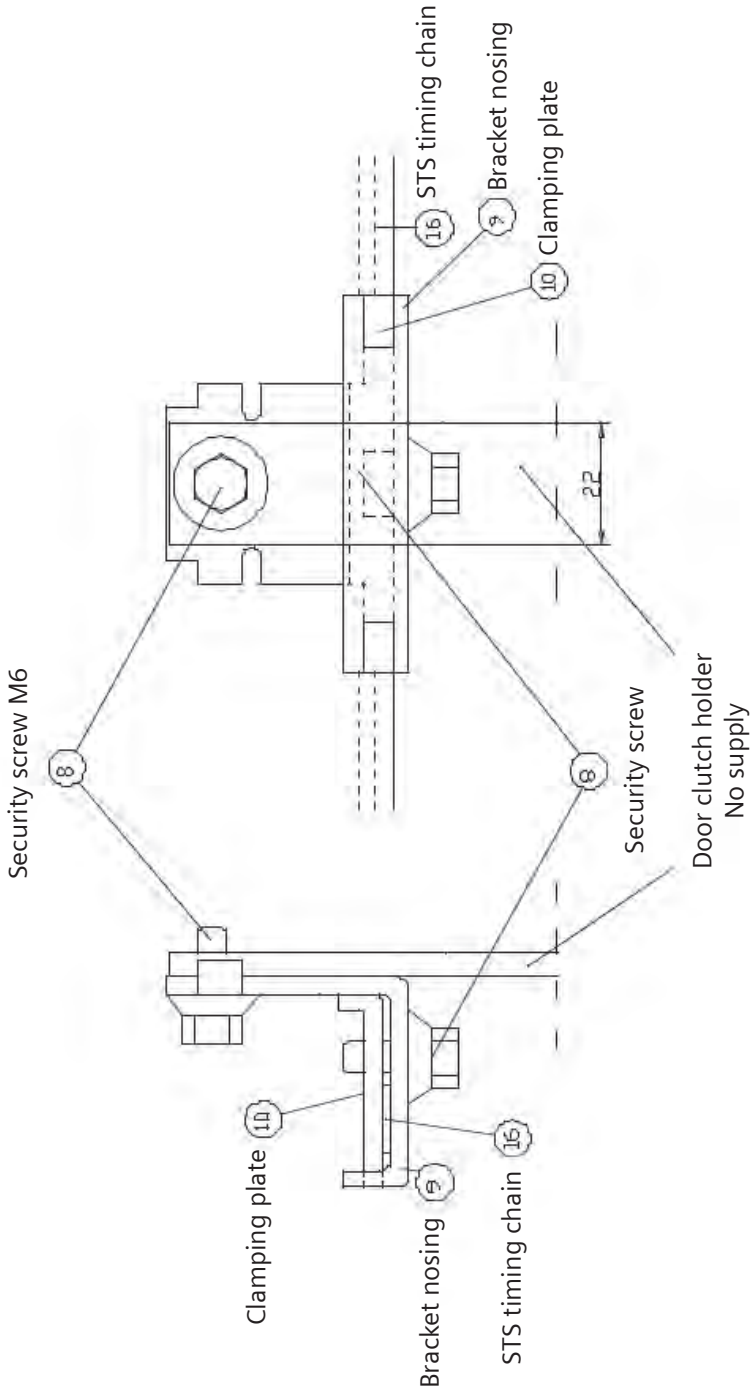
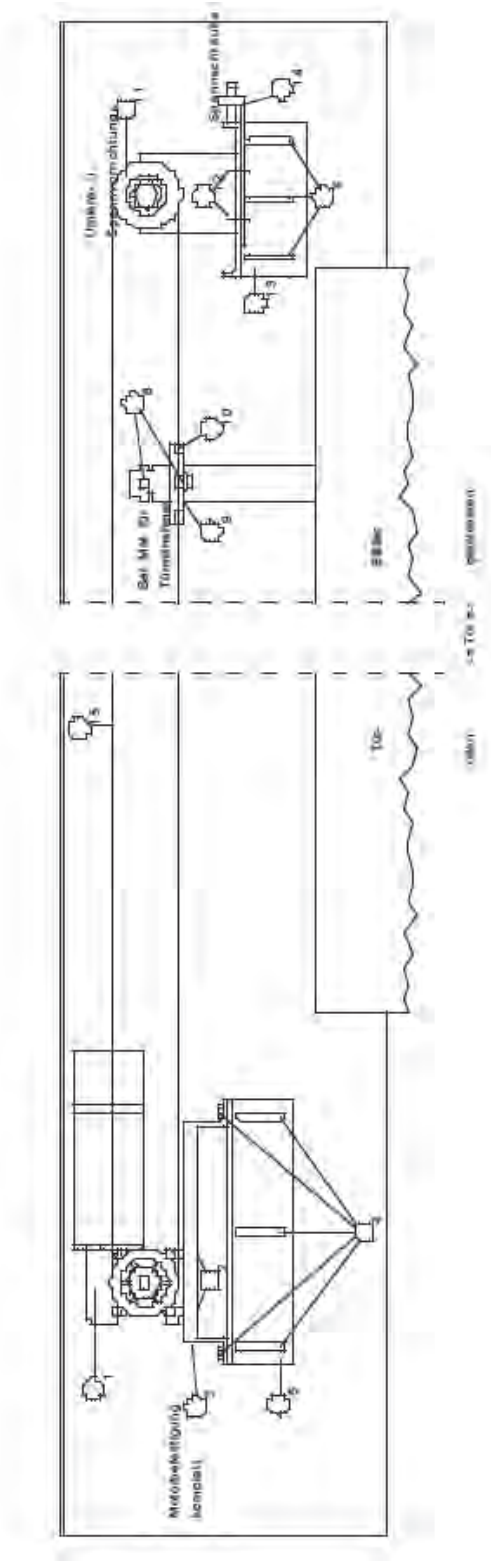


Figure 7

18.7 Appendix 7: Assembly suggestion



1. Geared motor
2. 4 M5x10 hexagonal safety bolts
3. Motor mount
4. 10 M6x16 hexagonal safety bolts
5. Motor mounting bracket
8. 2 M6x12 locking hexagonal safety bolts for door clutch holder
9. Holder of door clutch holder
10. Terminal board
11. Deflector unit
12. 2 M6x12 hexagonal bolts with plain washers
13. Mounting bracket for tensioning device
14. Tensioning lug for tensioning device
15. Toothed belt (4 m standard length)

Figure 8

18.8 Appendix 8: Terminal circuit diagram of control inputs

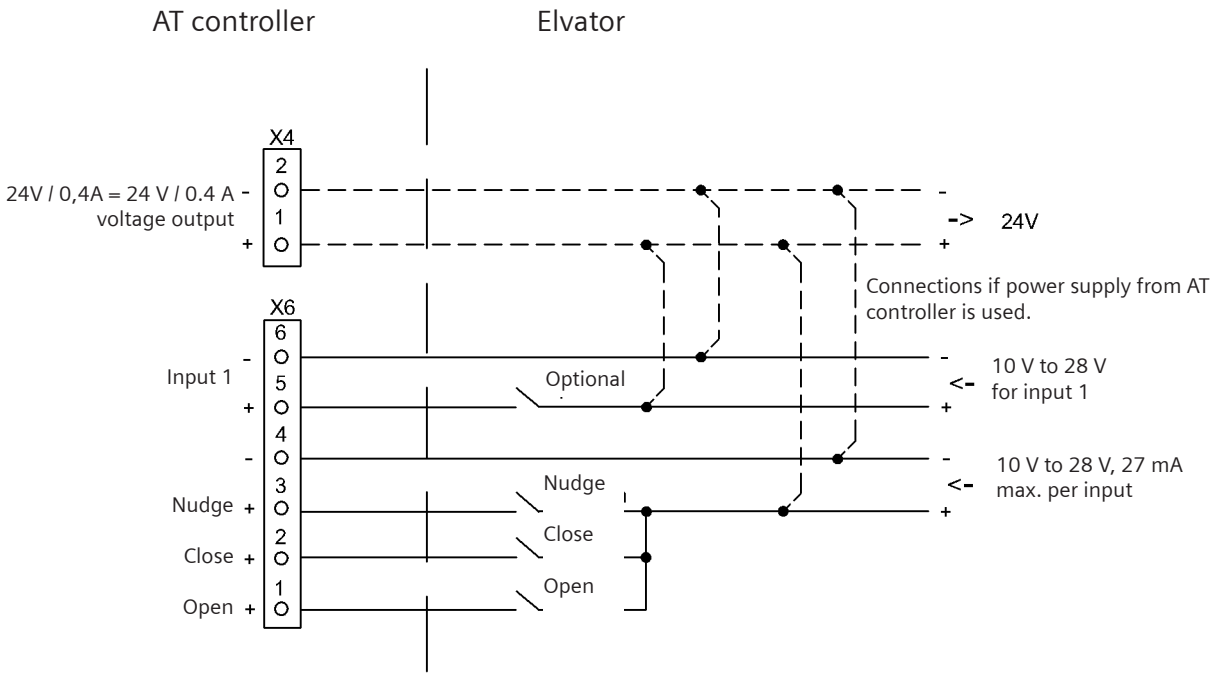


Figure 9

Nudge = simultaneous activation of the CLOSE and Nudge commands (effective only in the closing direction).

NOTE
The X4 24 V voltage output must not be connected to an external voltage potential, for example a higher-level elevator controller.
The X4 connector 2 (minus 24 V) can be connected to the PE.

18.9 Appendix 9: Dimension drawing of emergency power module

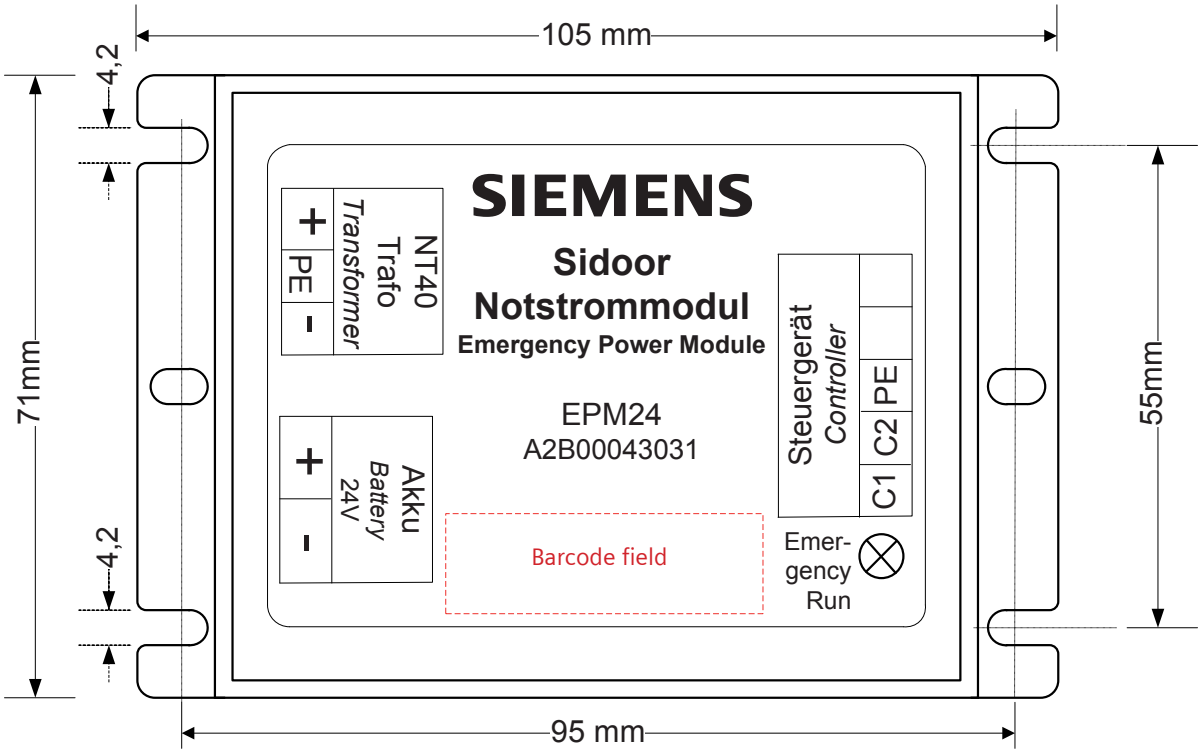


Figure 10

18.10 Appendix 10: Connecting cable for emergency power module

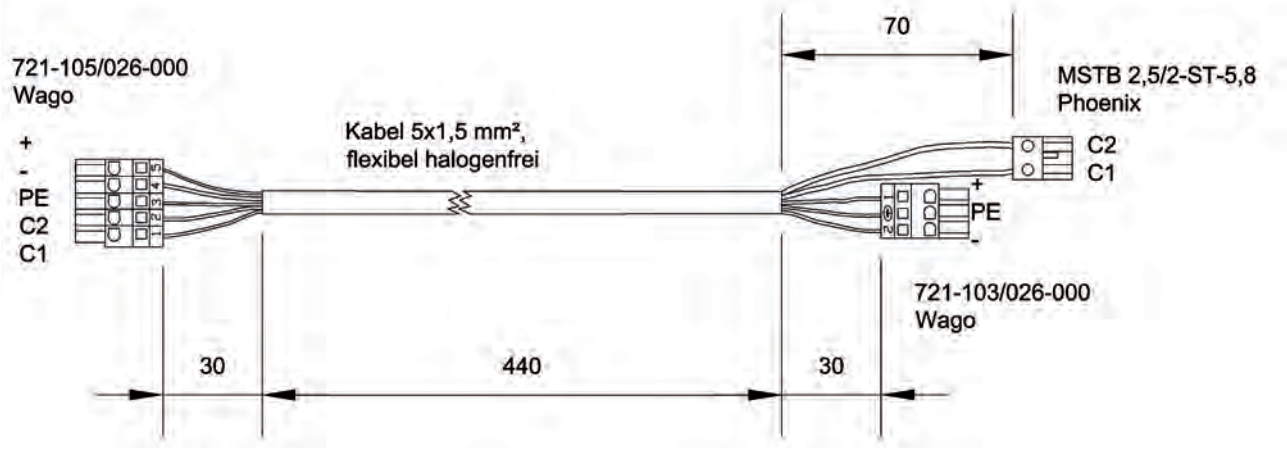


Figure 11

18.11 Appendix 11: Diagnostics and parameterization

The (integrated) terminal module, Service Tool (optional), or the Sidoor-User Software (optional, part of the Sidoor Software Kit) can be used equally well to diagnose and set parameters. The Service Tool and the USB adapter can be connected to X8 on the controller with the associated cable. The keys and tool buttons have identical inscriptions and functions.

↵	Return key - jumps to the next menu below
ESC	Escape key - jumps back to the higher-level menu
↑	Menu selection key - increases a parameter value
↓	Menu selection key - reduces a parameter value

Parameters can be changed in the „MAIN MENU QUICK ADJUSTMENT ➡ Parameter Setting“ and in the „MAIN MENU TOTAL ADJUSTMENT ➡ Profile Parameter“. The desired parameter is selected with the „↑“ or „↓“ key, and activated for setting with the Return key „ ↵ “ (parameter value flashes). The parameter value can then be increased or reduced by pressing the corresponding key (see above). The value is accepted by pressing the Return key again.

18.11.1 Terminal module and Service Tool

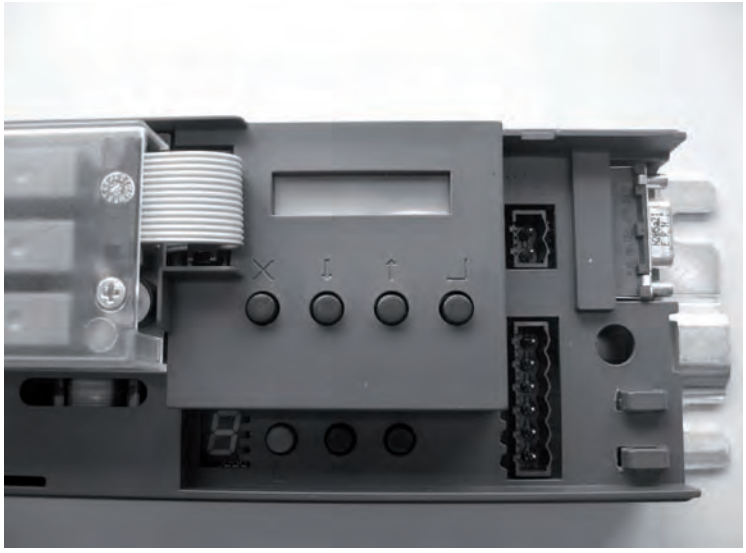
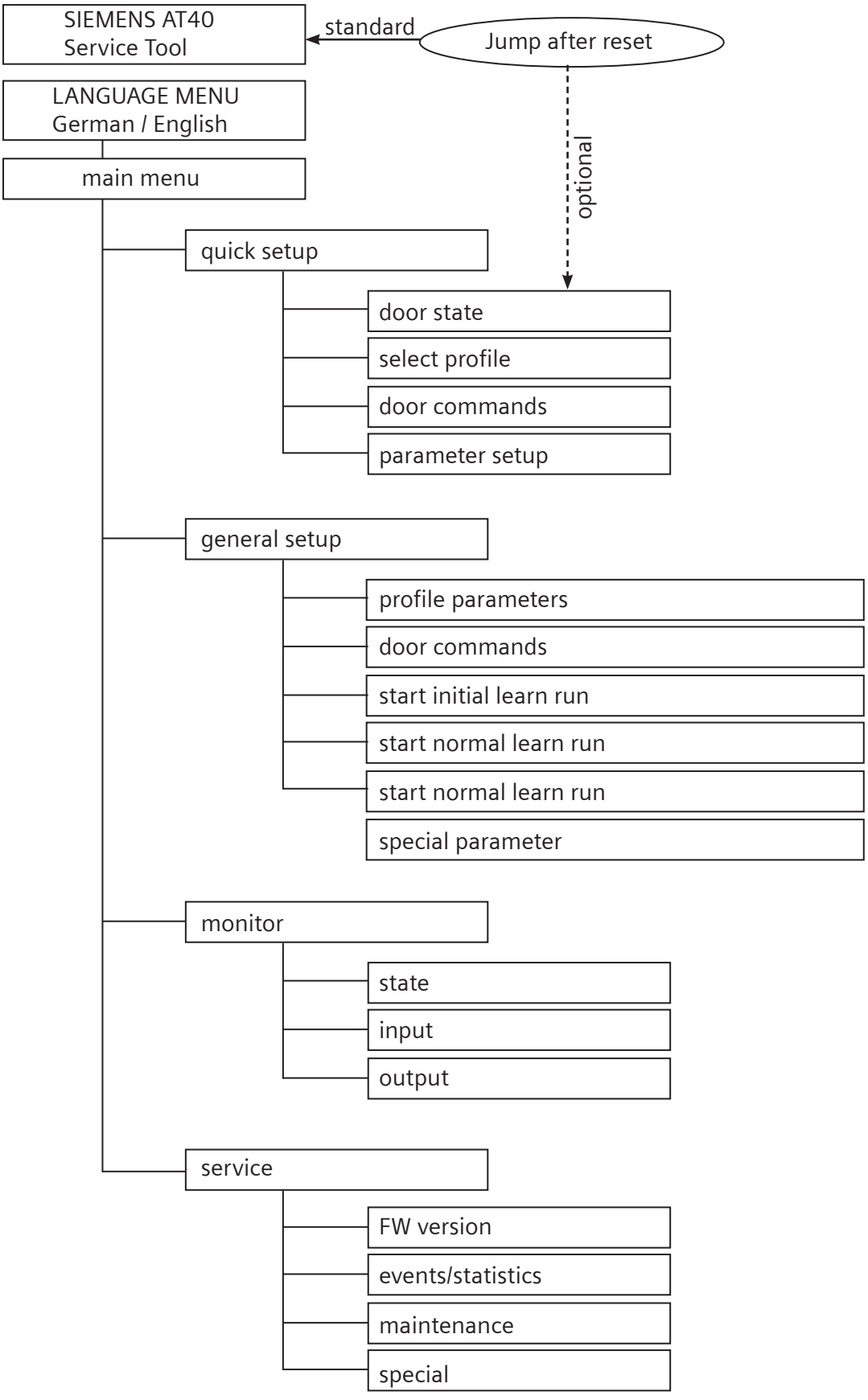
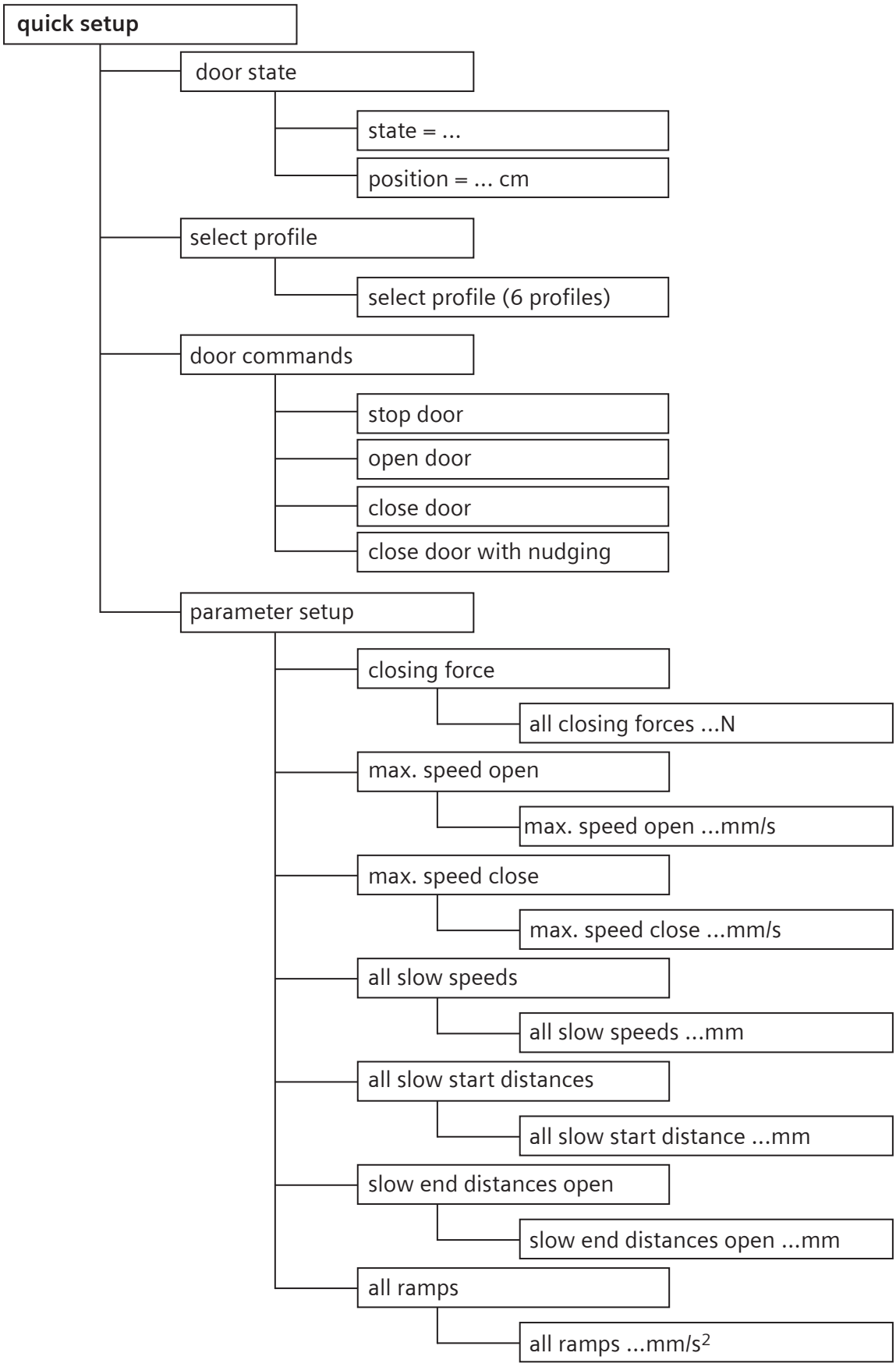


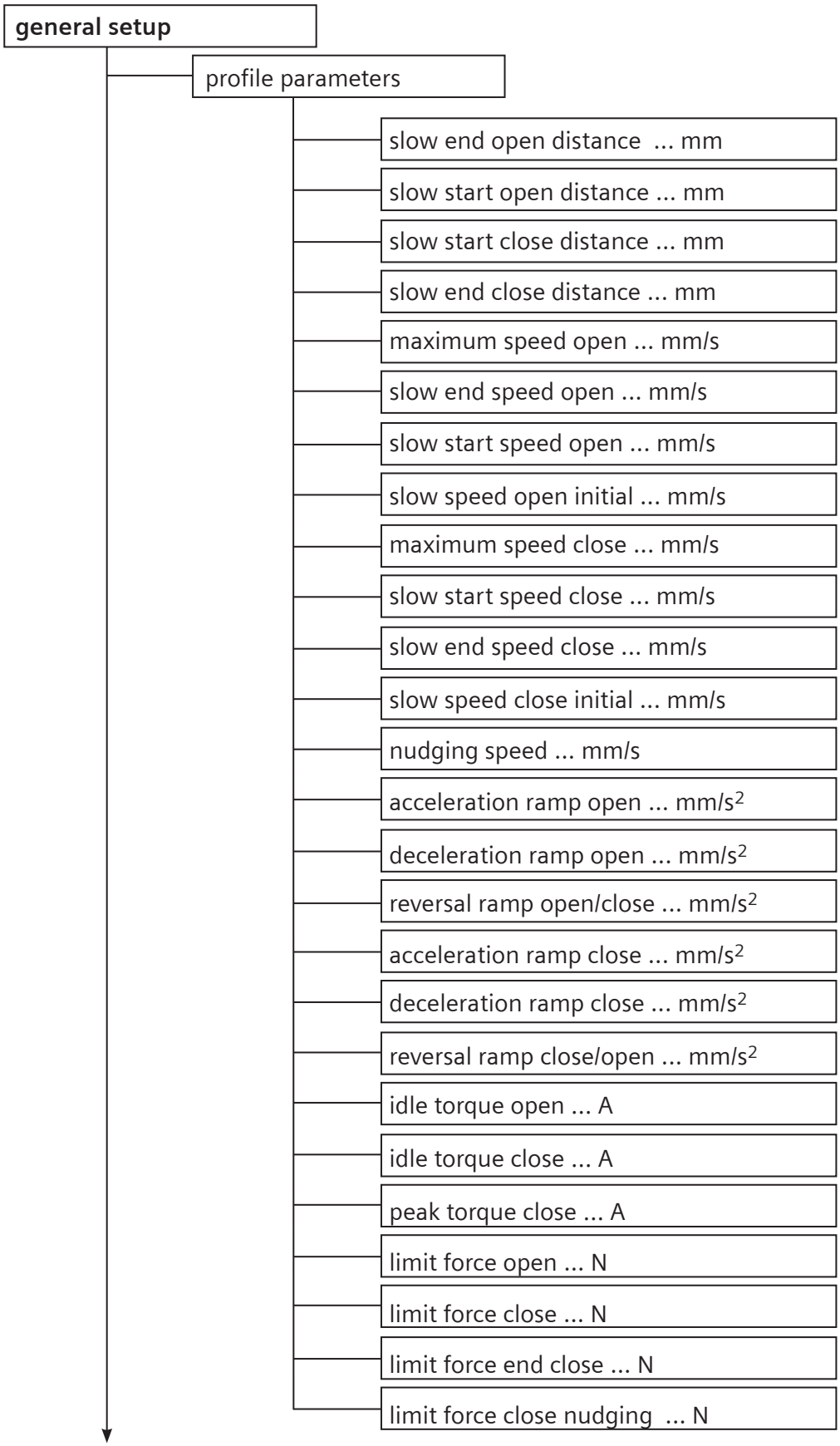
Photo 5

Photo 6

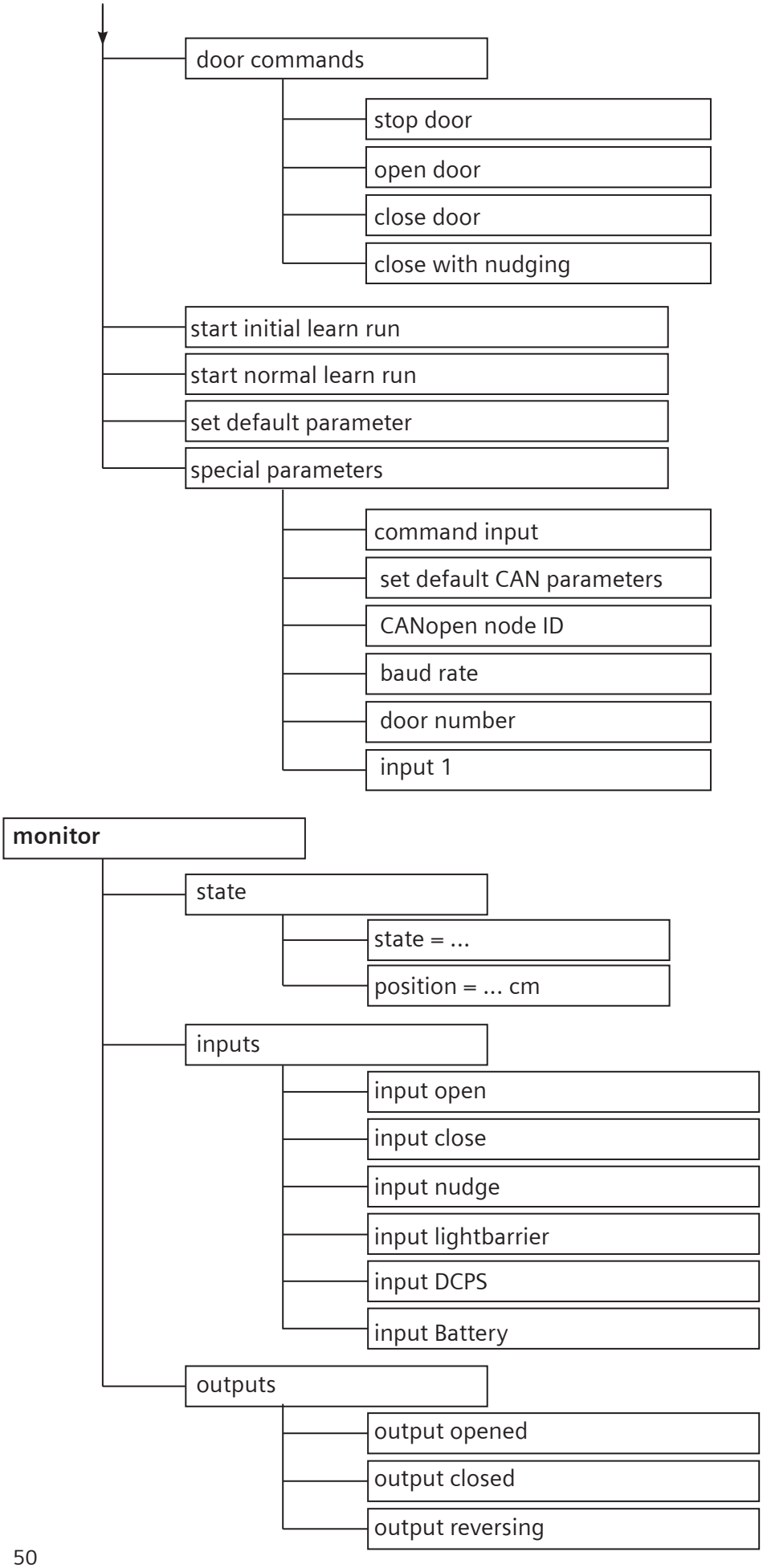
18.11.2 Menu

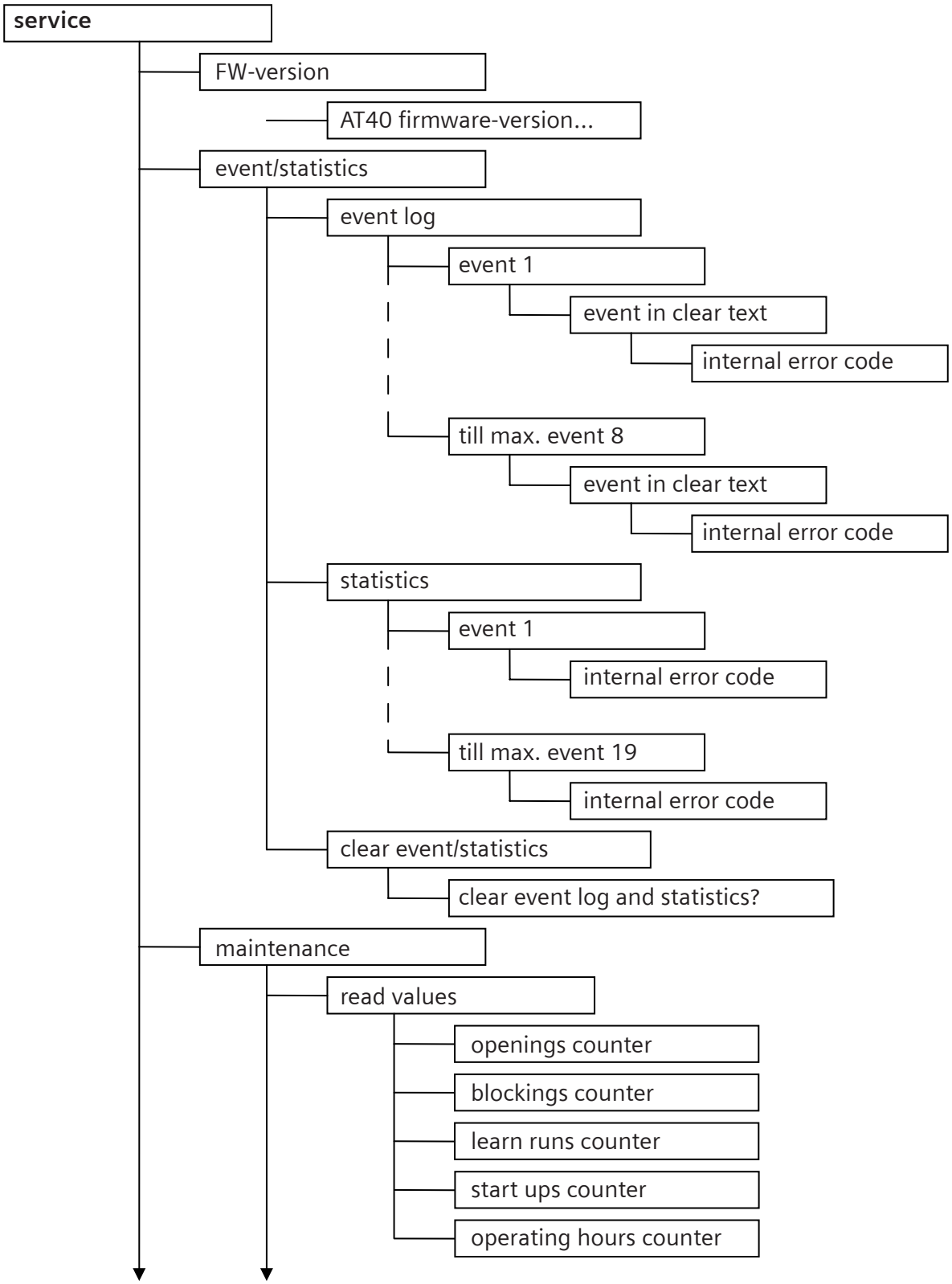

SIEMENS AT40
Service Tool
standard
Jump after reset
optional
LANGUAGE MENU
German / English
main menu
quick setup
door state
select profile
door commands
parameter setup
general setup
profile parameters
door commands
start initial learn run
start normal learn run
start normal learn run
special parameter
monitor
state
input
output
service
FW version
events/statistics
maintenance
special


quick setup
door state
state = ...
position = ... cm
select profile
select profile (6 profiles)
door commands
stop door
open door
close door
close door with nudging
parameter setup
closing force
all closing forces ...N
max. speed open
max. speed open ...mm/s
max. speed close
max. speed close ...mm/s
all slow speeds
all slow speeds ...mm
all slow start distances
all slow start distance ...mm
slow end distances open
slow end distances open ...mm
all ramps
all ramps ...mm/s2

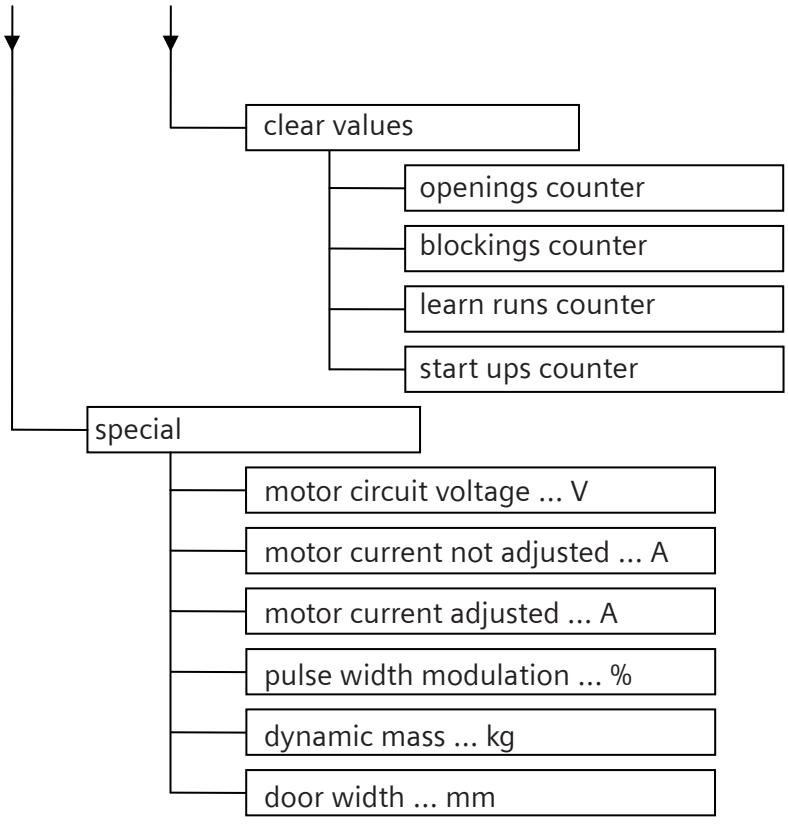


continue on the next page


door commands
stop door
open door
close door
close with nudging
start initial learn run
start normal learn run
set default parameter
special parameters
command input
set default CAN parameters
CANopen node ID
baud rate
door number
input 1
monitor
state
state = ...
position = ... cm
inputs
input open
input close
input nudge
input lightbarrier
input DCPS
input Battery
outputs
output opened
output closed
output reversing



continue on the next page



18.12 Sidoor Software Kit

The Sidoor Software Kit consists of:
Sidoor-User Software - simple parameter setting and oscilloscope function Siemens HCS12
Firmware Loader - updates the firmware
USB adapter - the hardware interface to the controller
Accessories - connecting cable and manual

18.12.1 Installation of Sidoor Software Kit

Refer to the CD insert or the PDF file on the installation CD for a description of the installation of the Sidoor Software Kit.

18.12.2 Sidoor-User Software

The Sidoor-User Software is started from the Start menu Sidoor Software Kit ->Sidoor-User Software or from the Sidoor-User Software desktop shortcut. The controller is automatically searched for when the program starts in order to establish communication. If the controller is not detected automatically, the „Establish connection to AT“ button can be pressed. If communication is still not established, please refer to the help description.
The AT USB adapter must be connected to the USB port of the PC in order to establish communication successfully. The controller must also be connected to the AT USB adapter by the 9-pin connecting cable. The controller must be switched on, otherwise only the speed of travel curve editor can be selected. After the program has started the following window appears on screen

if communication has been established successfully. The title bar displays the firmware version of the connected controller.

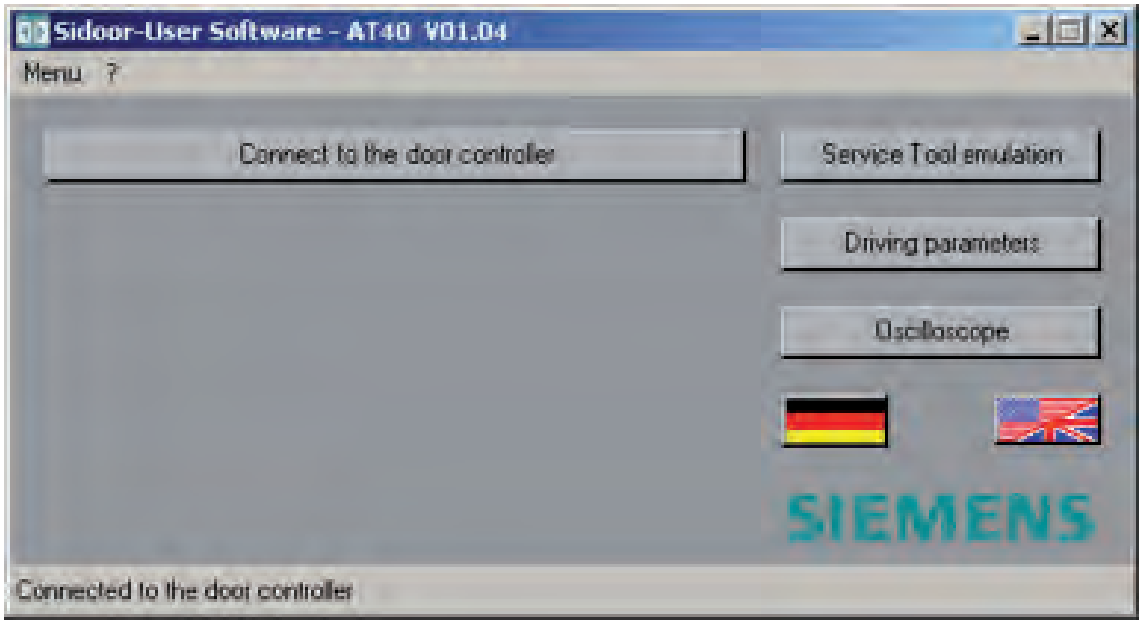


Figure 12

Please select the language here by clicking the appropriate „Country button". The main functions of the Sidoor-User Software are called by clicking the „Service Tool Emulation", „Travel curve editor" and „Oscilloscope" buttons.

18.12.3 Service Tool-Emulation

Service Tool Emulation simulates the Service Tool. The operation and menu-guidance are the same as in the Service Tool (see description of Service Tool 17.11). Clicking the „Main menu" button returns to the main menu of the Sidoor-User Software.

Abbildung 13

18.12.4 Travel curve editor

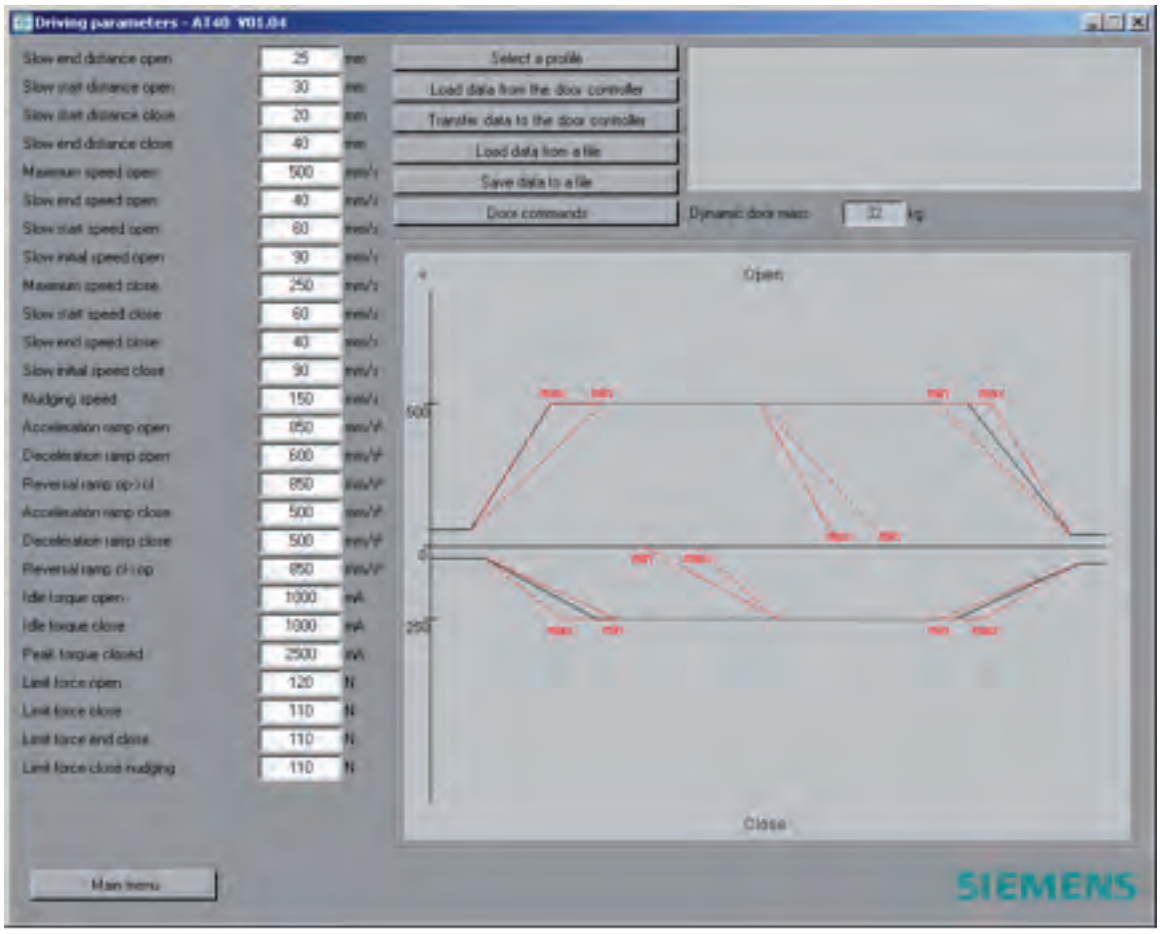


Figure 14

When the travel curve editor is started, the parameters are automatically read from the controller, provided that communication has been established.

All adjustable parameters can be loaded, easily adjusted and saved again in the travel curve editor. Parameters can be loaded and saved in the controller as well as in a text file on the PC. This enables speed of travel curves stored on the PC to be used to commission another, identical elevator door.

The following buttons are provided for this purpose:

- „Load data from the door controller“
- „Transfer data to the door controller“
- „Load data from a file“
- „Save date to a file“

Additional buttons are „Select a profile“ and „Door commands“.

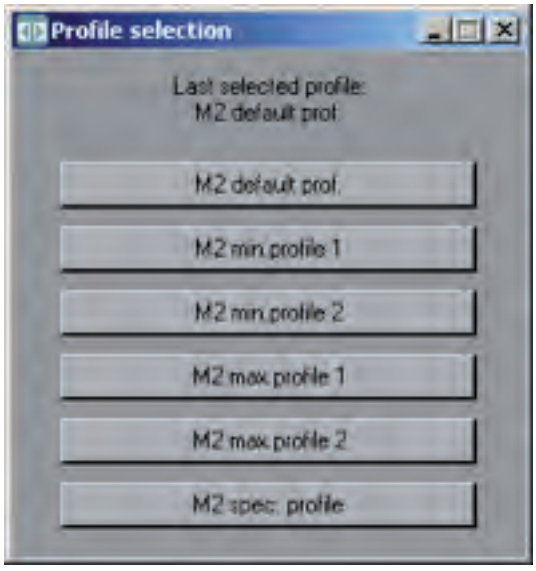


Figure 15

Figure 16

A suitable profile (1-6) can be selected and activated in the „Profile selection" window. The profiles are stored on the controller.
The input signals of the AT40 can be simulated and the elevator door moved by clicking the buttons in the „Door commands" window.
Clicking a speed of travel curve value on the left-hand side of the Editor menu (Fig. 14) highlights this value in the speed of travel curve shown on the right. Similarly, clicking a ramp or another value in the speed of travel curve diagram highlights the associated value in the parameter list so it can be easily found.
Changing a value has a direct effect on the shape of the speed of travel curve displayed. As an aid, the setting limits of the current parameter are shown in the top right-hand window, an indication is also given if they are exceeded.
The newly set parameters are transferred to the controller by clicking the „Transfer data to the door controller" button.
Clicking the „Main menu" button exits the travel curve editor.

WARNING
So that the closing speed and nudge speed can be limited as a function of the door weight, it is essential that a new learn run is made after taking over another profile. (Click the S401 button to start the run.)

18.12.5 Oscilloscope function

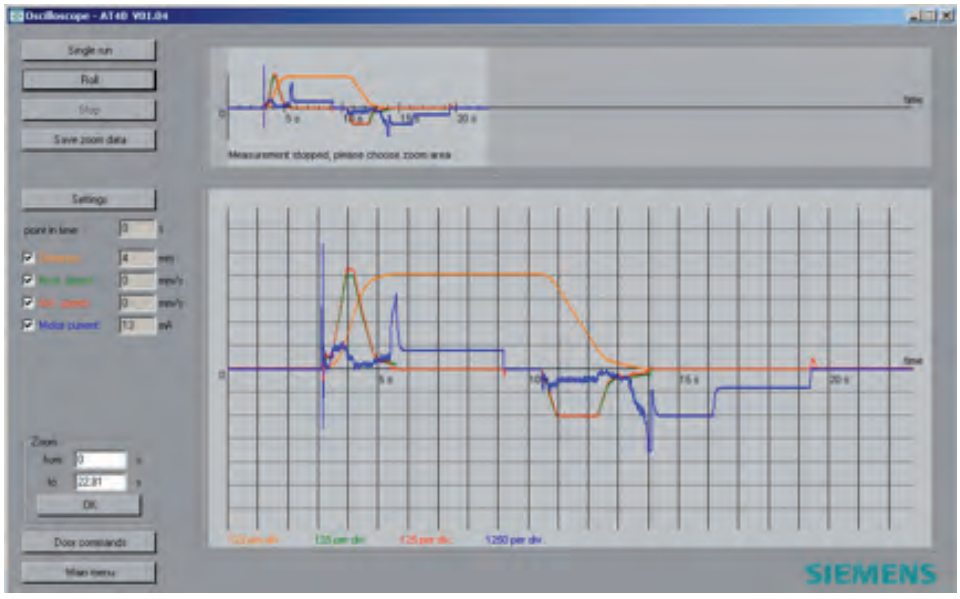


Figure 17

The oscilloscope function enables the door speed and distance traveled to be recorded in a time window of 60 seconds (single recording) or continuously (continuous recording).

As with the Speed of travel curve editor, the elevator door can be moved as desired by clicking the „Door commands“ button.
The zoom function enables an area of the time axis to be magnified in the large diagram window. The desired display area is set by making entries in the „Zoom“ field or by selecting the area to be magnified in the recording window with mouse clicks. The starting point of the zoom area is selected with the left mouse button, and the end point with the right mouse button. The selected section is highlighted by a lighter background color, and shown magnified in the large window.

The scales for the distance and recorded speeds can be set via the „Settings“ button (Figure 18). The measured values can be saved in a CSV-format file with the „Save zoom data“ button. Clicking the „Main menu“ button exits the oscilloscope.

Figure 18

18.12.6 Siemens HCS12 Firmware Loader

Please refer to the CD insert or the PDF file on the installation CD for the instructions for the Siemens HCS12 Firmware Loader.

18.13 Electrical configuration with the minimal editor

The minimal editor is a tool for changing the parameters of an AT40 controller if the terminal module, Service Tool or Sidoor-User Software are not available. In this case, the learn run button (S401) and the two service buttons (S402, S403) are assigned second functions. The LED display (H401) is used to visualize messages.

Activating the minimal editor requires a specific button pressing procedure, which can only be done after a mains reset. The detailed operation is as follows:

a) The OPEN and CLOSE buttons must be pressed simultaneously when the program starts (supply voltage switched on). An 8 appears in the display for approx. 5 seconds as confirmation.
b) As soon as the display stops, the user must release both buttons (time window approx. 3 seconds), and not touch them until the time window has ended.
c) A ‚C' is now shown in the display to confirm successful activation of the minimal editor.

The minimal editor allows two settings: the selection of a fixed profile or the joint setting of the closing forces. A value is set with the service buttons (S402, S403). The data are accepted by pressing the learn run button (S401) for more than two seconds. Successful saving is confirmed by a dot in the LED display. Briefly pressing the learn run button merely switches to the other parameters without the changing the value.

The display of a value alternates between a numerical value and an identifying code letter (‚A' for forces in the closing direction or ‚C' for the selection of a profile). Values between 1 and 6 can be used to set the profile (1 for the default profile and 6 for profile no. 6). The closing forces are set in the form of a counterweight, whereby 1 kg is simply taken as 10 N. The input can range from 0 to 8, where 0 stands for „no counterweight" and 8 for an „8 kg counterweight". The input of the counterweight changes the closing force, as it is subtracted from the maximum value of 150 N. The setting 4 therefore reduces the closing force to 110 N (150 N - 40 N = 110 N), whereas the setting 0 activates the maximum closing force of 150 N. The minimal editor is exited by switching the power supply voltage off and on again.

WARNING
So that the closing speed and nudge speed can be limited as a function of the door weight, it is essential that a new learn run is made after taking over another profile. (Click the S401 button to start the run.)

WARNING
Selecting a profile overwrites the input of the counterweight. Therefore the value for the counterweight (parameter ‚A') must be set last.

18.14 Configuration record

Please have your questions ready when you call the Hotline!
Hotline: (05 11) 8 77-14 71 Fax: (05 11) 8 77-16 30

	Set value		
Function	Motor 2 24 V / 1.8 A up to 120 kg door wt.	Motor 3 30 V / 4 A up to 180 kg door wt.	Motor 4 30 V / 4 A up to 400 kg door wt.
Slow end distance open	mm	mm	mm
Slow start distance open	mm	mm	mm
Slow start distance close	mm	mm	mm
Slow end distance close	mm	mm	mm
Maximum speed open	mm/s	mm/s	mm/s
Slow end speed open	mm/s	mm/s	mm/s
Slow start speed open	mm/s	mm/s	mm/s
Slow initial speed open	mm/s	mm/s	mm/s
Maximum speed close	mm/s	mm/s	mm/s
Slow start speed close	mm/s	mm/s	mm/s
Slow end speed close	mm/s	mm/s	mm/s
Slow initial speed close	mm/s	mm/s	mm/s
Nudging speed	mm/s	mm/s	mm/s
Acceleration ramp open	mm/s2	mm/s2	mm/s2
Deceleration ramp open	mm/s2	mm/s2	mm/s2
Reversal ramp open/close	mm/s2	mm/s2	mm/s2
Acceleration ramp close	mm/s2	mm/s2	mm/s2
Deceleration ramp close	mm/s2	mm/s2	mm/s2
Reversal ramp close/open	mm/s2	mm/s2	mm/s2
Idle torque open	A	A	A
Idle torque close	A	A	A
Peak torque close	A	A	A
Limit force open	N	N	N
Limit force close	N	N	N
Limit force end close	N	N	N
Limit force close nudging	N	N	N

Parameters should always be adjusted during normal operation with the door in the CLOSED position, because the controller then accepts the values immediately.

19 Notes

www.siemens.com/sidoor

Contact

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