ETG ELEVATOR TRADING

German manufacturer

User manual
for the
door drive LDO AC 2.2

Please read the manual before assembly, installation and start-up, that serve your own security and you avoid damage to the door drive.

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Stand: 09/11

Contents Section

Safety regulations

Scope of application and Regulations

Present operating instructions apply to everyone involved in the installation and operation of the door drive LDO 2.2. it is imperative to act in strict compliance with the operating instructions at all times.

Further applicable regulations

Complementary to present instructions, the regulations listed below must be acted upon:

- Accident prevention regulations
  VBG 1 General regulations
  VBG 4 Electrical units and equipment
  ZH 1/228 Safety regulations for the utilisation of electrical equipment constituting a significant Electrical hazard
- Laws, regulations, safety rules issued by national and international safety institutions such as: DIN VDE 0100 Set up of high voltage units with a nominal voltage of up to 1000 V DIN VDE 0105 Operation of high-voltage units DIN VDE 0106 Protection of the human body from dangerous contact with high voltage Directive on utilisation of electrical equipment (EEC directive 89/655/EWG)
- In-house requirements, to the extent that they do not invalidate the safety regulations contained herein.

Authorized Labour, Responsibility

All activities described herein must be performed under the direction and supervision of a qualified professional. Only those are to be considered qualified professionals, and therefore authorised to perform aforementioned activities, who are able to perform or supervise the entire set of activities required as described herein. In addition, the qualified professional must:

- be at least 18 years of age physically fit (have successfully passed the German preventive medical check-up G 20 certified by a doctor specialising in industrial medicine)
- be authorised by the company in charge of the installation of the elevator
- have read all of the operating instructions and understood them fully
- have received instruction on the particular technical features of this door drive and their interaction with the other components and functioning of the elevator uni
- have acquired sufficient knowledge about the entire elevator unit and the interaction between its individual components
- have proof of sufficient knowledge about safety regulations and accident prevention regulations as well as the relevant factual knowledge of technology

The qualified professional must only supervise and perform those activities that are described herein

Any further work and activities required for the door drive LDO 2.2 that are beyond of the scope of activities contained herein, must only be performed by Elevator Trading GmbH.

Accident prevention

Only by knowing the procedures of accident prevention and acting upon them it is possible to create a safer work environment! By taking preventive action as soon as health hazards are recognised, severe damage in physical health and material can be avoided. Every employee is obliged to do all in their power to prevent accidents or damage to anyone‘s health. Health hazards must be eliminated as soon as they are detected. Should their immediate elimination be impossible, the recognised danger spot has to be marked and closed off, and the situation is to be reported to the hierarchy.

Health and safety regulations

Each employee‘s obligations to create a safe work environment include:

- the compliance with accident prevention rules as well with all other rules geared towards the creation of a safe work environment; the elimination of health hazards
- regular check-ups of the functioning of all accident preventing equipment and devices, as well as the safety of operation of the unit
- immediate shut down of faulty equipment and subsequent appropriate accident prevention steps
- immediate reporting to the hierarchy of defects in material or equipment as well as of events of non-compliance with health and safety regulations
- power must be disconnected before starting to work on any energized parts or material

What to do after an accident

In the event of an accident with significant injury, perform first aid and call an ambulance right away (emergency doctor). Every accident has to be reported to the management. An accident report must be written.

Outside persons

Outside persons are not allowed on site during elevator assembly and installation.

Safety symbols

The following safety symbols were used to mark individual components of the elevator drive as per VGB 125 and are also contained herein.

.

Caution: dangerous voltage

de-energise before working on

Caution: randomly starting moving parts

Preliminary Remarks

The present operating instructions describe the door drive LDO for passenger and freight transportation complying with the EN81.
The operating instructions are structured in sections. Section 1 describes and defines the scope of utilisation for which this elevator drive is authorised. Section 2 contains a technical description providing a general idea and good overview of the set-up and functioning of this elevator unit. It also describes the operational control and display elements. Section 3 gives the technical key data. Section 4 describes the activities necessary to assemble and install the unit. The parameterisation of the door drive is described in Section 5. Section 6 contains information about the relay points for the status display. The data sheets of the door drive are contained in Section 7.

For reasons of clarity, these operating instructions do not contain detailed information about all types of the door drive LDO 2.2 and do not consider all conceivably possible types of application, operation or maintenance.
Should you require any particular further information or should you encounter any particular problems, please do not hesitate to contact our company Elevator Trading GmbH.

Elevator Trading GmbH would like to point out to you that the contents of present instructions do not form part of or alter any previous or existing agreement, warrant or legal relationship. The only commitments for Elevator Trading GmbH shall be arising out of the respective sales agreement, which will also contain the only complete and valid warranty regulations. These legal warranty regulations shall neither be restricted nor extended by present Operating Instructions

Elevator Trading GmbH is continuously working on the further development of their products. Thank you for your understanding for the fact that pictures and figures may become subject to changes in shape, size, equipment, technology and know-how due to technical enhancement.

It has been our goal to make these operating instructions as user-friendly as possible by including illustrative charts and figures and clear text information. References to charts and figures have been put into brackets. The numbers before the slash indicate the number of the Section and the chart or figure; the number behind the slash indicates the respective position within the chart or figure.

For example:
(Fig. 3-2/1) Means: Fig. 2 in Section 3, item number 1
(Fig. 3-2/3,6) Means: Fig. 2 in Section 3, item number 3 and 6
Particularly important pieces of information for maintenance and operating personnel are marked by pictograms:

This symbol indicates important information for the maintenance and operating personnel.

This symbol indicates a prcedure wich must be acted upon in strict compliance in ordert o avoid damage tot he door drive or the entire elevator unit.

This symbol indicates a procedure wich must be acted upon in strict compliance in ordert o eliminate a severe health hazard

1 Regulations for utilisation

1.1 Authorised utilisation

The door drive LDO 2.2 made by Elevator Trading GmbH, described in the present operating instructions, is to be used to drive and control doors of electrically driven elevators pursuant to the EN 81.

Present Operating instructions describe in detail how the door drive LDO 2.2 is to be installed and operated and which regulations and requirements must be complied with.

Only operation of the unit within the scope of the EN81 shall be considered as compliance with the regulations for utilisation. Any other operation beyond the scope shall be considered non-compliance with the regulations for utilisation and is not authorised.

1.2 Unauthorised utilisation

Any operation of the unit beyond the scope of aforementioned EEC standard or present operating instructions shall not be permissible. This particularly applies to the parameters given in Section 3 ‡Technical Data—. Elevator Trading GmbH shall refuse liability for any damage caused by non-compliance with regulations contained herein.

1.3 Commitment by the company in charge oft he installation

The company in charge of the complete and final installation of the elevator unit, as well of its maintenance, is fully responsible for the compliance of the door drive‘s utilisation with the operating instructions contained herein as well as with the EN81. The company in charge of installation will incorporate the operating instructions of the door drive into those of the entire elevator unit without altering, omitting or invalidating any requirement contained herein

1.4 Modifications and add-ons

In the event that utilisation or ambient conditions should change to the extent that the functioning of the door drive and its parameters do no longer comply with the regulations of present operating instructions, Elevator Trading GmbH shall have the exclusive right to perform the necessary modifications or adaptations. Additionally, permission by the local authorities may become necessary. Unauthorised modifications and changes made to the door drive can significantly impair the safety of the unit, whereby Elevator Trading´s manufacturer‘s declaration shall cease to be valid.

2 Technical Description

2.1 Systems Description

The door drive LDO 2.2 is an —intelligent— door drive. It is designed to open and close the elevator doors with adjustable speed and acceleration of the opening and closing motion. The maintenance-free door drive consists of the control unit, located in a casing (see data sheet ETG-LDO-2-001.001 —casing“), the drive unit in the form of a gear motor (see data sheet ETG-LDO 2.2-001.002 —Gear motor“). A standard three-phase asynchronous motor with self-locking gears is used. The power transmission is achieved by a toothed belt (not included in standard package. The drive unit can drive both side-opening and centrally opening doors. The gear motor can be ordered with toothed belt disks especially geared for left or righthand side opening doors. The door drive does not require final limit switches. The door width as well as the door position —open“ and —closed“ are determined automatically. The door position is conveyed to the superordinated elevator drive unit via relay points.

2.2 Functions

Door-width determination

Door-width determination during installation can be done automatically as described in Section 4 —Assembly and Installation“.

Command – „open door“

The —open door“ command opens the door in accordance to the set parameters, as long as the command is maintained. The —open door“ command must be maintained throughout the entire opening motion.

Command – „close door“

The ,,close door“ command closes the door in accordance to the set parameters, as long as the command is maintained. The ,,close door“ command must be maintained throughout the entire closing motion.

The first closing door motion following initial operation of the unit must be performed at creeping speed

Via the door drive LDO 2.2 the door can be opened and closed using the pushbuttons ,,open door“ and ,,close door“ (see Fig. 2-1, page 2-3)

Stopping and reversing the closing motion

There are three events that will discontinue and reverse the closing motion:

- A light barrier with direct hook-up to the door drive, reports blocked light beams
- The door meets an obstructing object during the closing motion
- The door is already blocked in its —open“ position

.

In case that one of the above events is detected, a possibly running closing motion will be stopped and the door will reopen up to its —open“ position and remain in this position. This is repeated up to ten times after which the door drive takes on a pausing position of 30 seconds, during which it will not accept any control commands from the control unit. After these 30 seconds, the sequence of events will be repeated.

Command „Nudging“

During the operating state ,,Nudging” the state of the light barrier, which is directly hooked up to the door drive, is ignored. The commands ,,Nudging” and ,,Close” must be active at the same time.

Emergency evacuation

Emergency evacuation with closed doors is possible if the following conditions are met:

- The doors do not move
- There are no active commands outstanding from the elevator control unit
- No service button of the door drive has been pressed

The force required to open the door is less than 300 N

Light barrier

A light barrier can be hooked up at the plug-in connection X5. A voltage between 15 and 24 V at PIN 2 will be interpreted as blocked light beams of the hooked up light barrier. This voltage will be measured against 24 V GND, as it is present for example at PIN 3 of plug-in connection X5. In this event the open door will not accept any closing commands and the closing door will discontinue its closing motion and re-open all the way up to the —open“ position.

2.3 Operational control and Display elements

The operational and display elements can only be accessed if the casing has been opened. The following sections will explain the functioning of the operational control and display elements and how to employ them best.

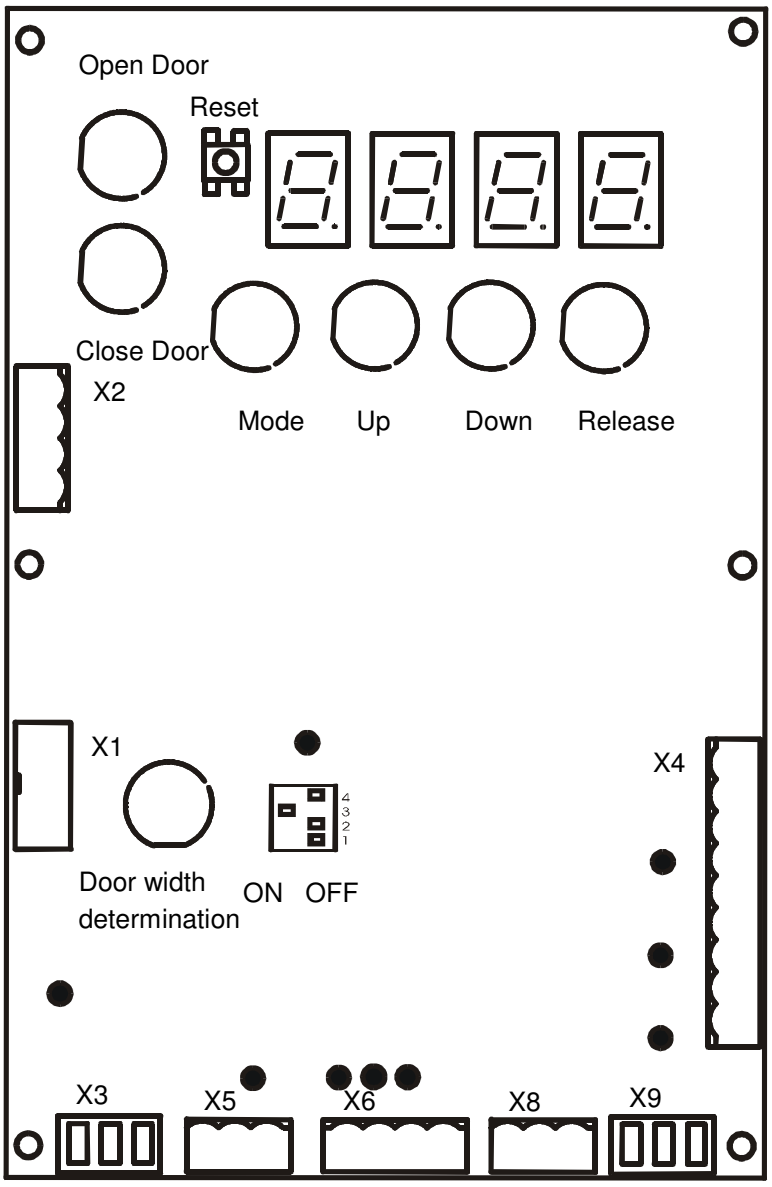

Fig. 2-1 Operational control and display elements

2.4 Status Display

The status of the relays contacts is shown with LEDs placed near the app. relay. LEDs D34, D31 and D33 are connected in parallel with the status relays, whose front contacts are joined at X4. If one LED is illuminated, the corresponding closing contact is closed and the opening contact is open. (c.f. Table below)

LED	Contacts of plug in Connector X4		
	Opening contact	Center contact	Closing contact
D34	1	2	3
D31	4	5	6
D33	7	8	9

Table 2-1 Assignment of relay points to the LEDs

Note on DIP switches:

- The DIP switches 1 and 2 only serve for diagnostic purposes. Operating these switches can affect the functioning of the door drive.

The DIP switches 1 and 2 must always be in the OFF position (see Fig 2-2).

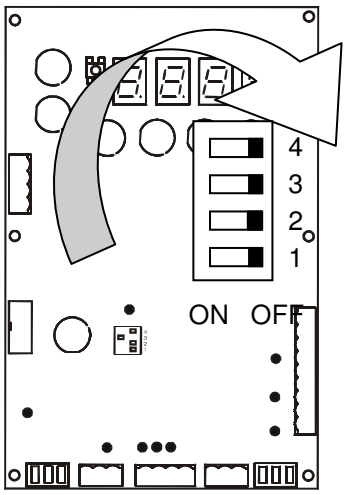

Fig. 2-2 DIP-switches

- The DIP switch N°3 selects the Reset travel mode. If the DIP switch N°3 is in the OFF position, the door drive unit will in this mode too only continue the movement for as long as it is addressed by a control command. In the event that such control command is disrupted, the door drive will stop immediately. If the DIP switch N° 3 is in the ON position, disruption of the control command will not stop the door drive right away but will have it continue its motion up to the —open“ or —closed“ position. The first door run following the Reset operation is a Reset run. It is carried out at a very low speed and is only completed once the status display (see Table 2-1) shows either —open“ or —closed“..

- The function of the DIP switch N°4 is to provide adaptation for centrally opening doors. For centrally opening doors the DIP switch N° 4 must be brought to an "ON" position, for side opening doors the DIP switch must be in an "OFF" position. If the DIP switch N° 4 is in an "ON" position, the door is held in an open position under moment.

- During the door width determination, DIP switch N°4 sets the parameter values to the standard parameter values for centrally opening doors or side opening doors

3 Technical Data

General

admissible door panel weight	max. 200 kg for Type 200 max. 420 kg for Type 420
admissible door width	max. 4000 mm
admissible operating temperature	max. 50℃ min. -10℃

Casing

design	galvanized, base fixture
Protection system	IP 23
Category of protection	1
Dimensions	See data sheet ETG-LDO 2.2-001.001 —Casing“

Control Unit

Mains voltage	1x230 V AC œ 15 % / +10%; 50 Hz ± 5%
Control inputsX5, X6	+ 12 V to +30 V DC, 5 mA to 17 mA per input
Control outputs X4	30 V DC, 1 A
Clamps	Female multipoint connector with CAGE CLAMP connection (WAGO)

Three.phase asynchronous gear motor

Protection system	IP 55
Mains voltage	230 V Delta connection
Rated current	0.88 A Delta connection, Type 200 1.19 A Delta connection, Type 420
Power	0.12 kW for Type 200 0.18 kW for Type 400
Rated frequency	50 Hz
Weight	4.5 kg
Dimensions	See data sheet ETG-LDO 2.2-001.002 —gear motor“
Driven pulley	Toothed belt pulley Width of tooth profile: 15 mm Number of teeth: 24
Incremental encoder	Pulse generator for touch-free scanning of the toothed belt disk Protection system: IP 54 Mains voltage: +5 V DC ± 5%

4 Assembly and Installation

– 1 – Assembly of the door drive in accordance with the local requirements and the manufacturer‘s set up plan for the entire elevator unit. Electric installation needs to be performed in strict compliance with the connection and wiring diagrams.

– 2 – Hook up the motor cable at the motor .

Before starting any work on the door drive, make sure to have all power feeding lines de-energised.

- The motor has been delta connected by the manufacturer
- For hooking up the motor cable see below

Lead marked as	In centrally opening doors connect with motor clamp:	In side opening doors connect with motor clamp:
1	W1	U1
2	V1	V1
3	U1	W1

– 3 – open the cover of the casing of the door drive LDO 2.2

– 4 – the encoder will be delivered fully mounted on the drive motor œ it will only need to be connected at the plug-in connection X2 as well as at the threaded bolt M4 in the controls casing via the cable lug of the cable screen. Please note the following color allocation:

brown – bn – 4
white – wh – 3
green – gn – 2
yellow – ye - 1

– 5 – Check whether all DIP switches are in their original states: 1,2 OFF and 3 ON. Is the door centrally opening, bring DIP switch N°4 to an ON position.

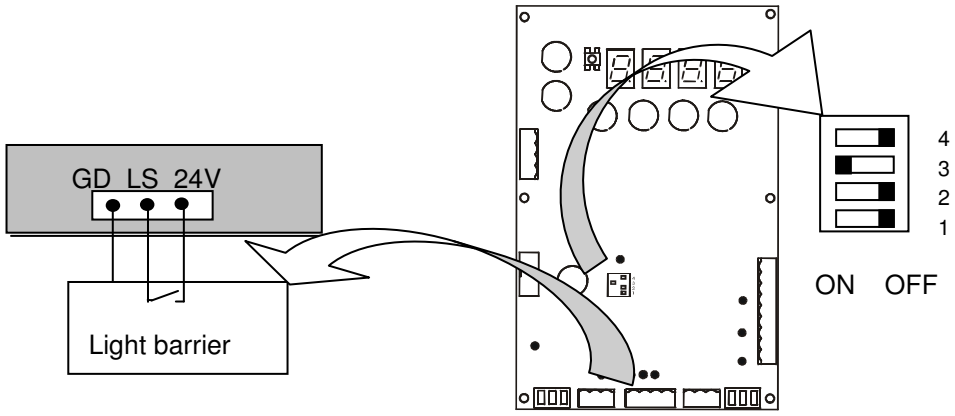

Fig 4-1 DIP switches and Light barrier at X5

– 6 – Plug in the ligh barrier contact at X5. In the event that no light barrier is provided, omit the aforementiones connecting.

The light barrier must be hooked up in compliance with data sheet ETG-LDO AC 2.2-002.001 „Control inputs“

– 7 – Hook up to mains voltage using prefitted mains cable.

The mains feeding line must be secured by the customer using a line safety switch 3 A / C or a power circuit breaker (protective motor switch) 1.6 to 2.4 A

– 8 – Turn the power on.

– 9 – Door - width determination

The door position before starting the door width determination has no significance

- Press the button —door-width determination“ (Fig. 4-3/1) and keep it pressed. Press the Reset button (Fig. 4-3/2) and release it. Once the door sets in motion, you can also release the —door-width determination“ button.
- The following functions will now run automatically. To determine the door width, a slow closing motion will take place first so as to determine the position of the closed door. Then a slow opening motion is going to take place, determining the position of the open door. The so-determined opening width is memorised and will continue to be available even after a power failure. Thereupon the control unit will take on the —door open“ state.

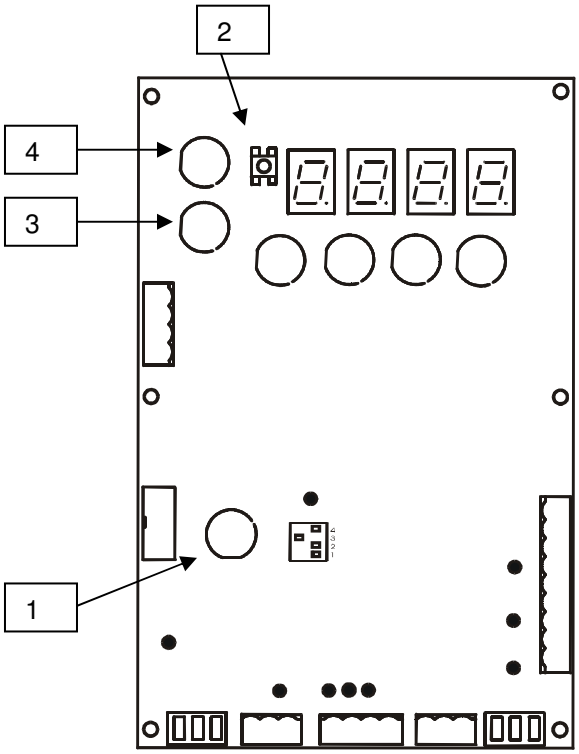

Fig4-3 Bedienelemente zur Türweitenermittlung

– 10 – Using the service button —close door“ (Fig. 4-3/4) the door can now be closed. The service button —open door“ will (Fig. 4-3/3) will open the door. When moving the door with these service buttons —close door“/“open door“ the button needs to remain pressed until the —open“ or —closed“ door position has been reached. Previous release will stop the door motion immediately. The open or closed state is only achieved once the status display (Table 2-1) indicates so. The service buttons are parallel to the control inputs X6.

– 11 – Due to the pre-set parameterization by the manufacturer, the door drive is now ready for operation. For modification or adjustment of the parameterization to the particular travel characteristics desired, please see Section 5 “Parameterisation” page 5-1

– 12 – Finally, hook up the control signal cables to the elevator control unit at the control signal inputs X6 (Fig. 4-4)

The control signal cables must be hooked up in strict compliance with the data sheet ETG-LDO 2.2-002.001 —Control inputs and outputs, encoder connection

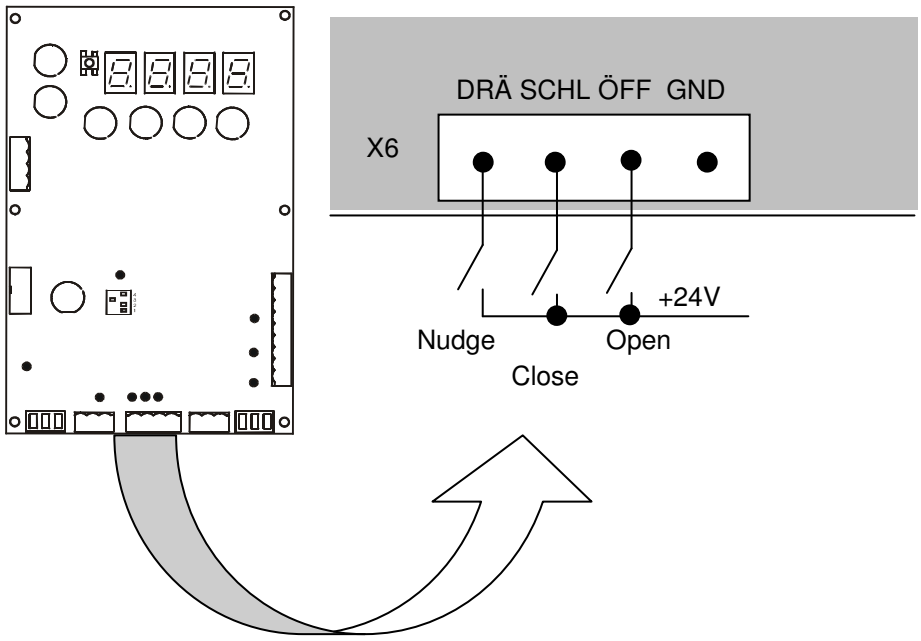

Bild 4-4 Control signal inputs

5 Parameterisation

The following parameters can affect the characteristics of the door drive: The standard values apply to a door width of 900 mm in side-opening doors and to a door width of 1800 mm in centrally opening doors.

Parameter N°	Meaning	Setting range		Standard valuea	
		min.	max.	one s.	centr.
P1	Opening frequency	5 Hz	100 Hz	89 Hz	50 Hz
P2	Closing frequency	5 Hz	100 Hz	49 Hz	46 Hz
P3	Creeping frequency	5 Hz	20 Hz	5 Hz	5 Hz
P4	Stopping/Acceleration time	1,0 s	2,0 s	1,9 s	1,6 s
P5	Braking point „opening“	0	450	250	250
P6	Braking point „closing“	0	450	120	120
P7	Max. voltage	24 V	150 V	140 V	140 V

Tabelle 5-1 Adjustable parameters

Erläuterungen zu einigen Parametern

- Fig. 5-1 depicts the individual parameters and their significance to the door drive.
- The frequencies selected via the parameters P1 to P3 determine the speed of the door motion. The speed is directly proportional to the frequency.
- Parameter P4 determines the time it takes to achieve max. frequency starting from min. frequency. This parameter thereby determines the rise and fall (see Fig. 5-1) during frequency changes.
- Parameter P7 determines the max. voltage during the closing motion and thereby affects the torque available. This parameter determines the closing force as well as the reversing force.

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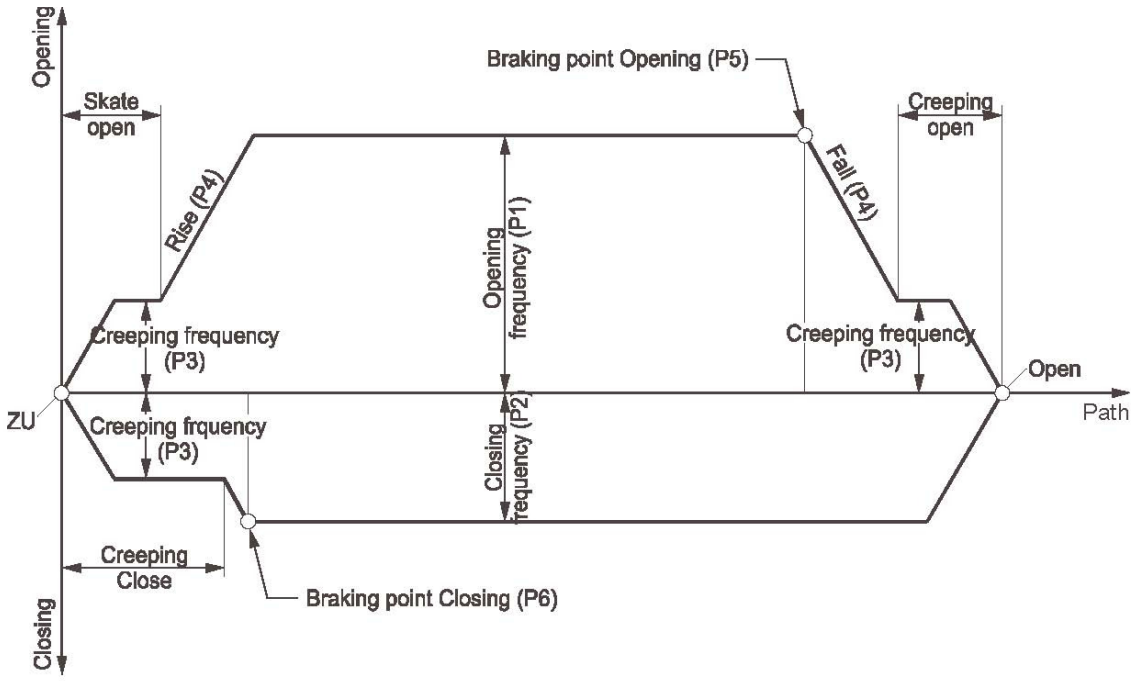

Fig. 5-1 Graph depicting the travel characteristics of the door motion

Sequence of actions during parameterisation

During parameterisation make sure thet no control signals of the control unit are active.If necessary disconnect the plug-connection X6

- Press the “Reset“ button (Fig. 5-2/1). The 7-segment display (Fig. 5-2/4) indicates the software version number for 1 second and then init.
- Press the —Mode“ button (Fig. 5-2/8) to select the Parameter mode. The 7-segment display will now be different. The first digit indicates the Parameter number. The three digits after the colon indicate the contents of the parameter.
- Once the Parameter mode is active, initially only the parameter N° will be displayed.
- Press the —Release“ button (Fig. 5-2/6) to also have the contents of the parameter displayed
- The parameter value can now be modified by pressing the —Up“ and —Down“ buttons (Fig. 5-2/7,5).
- Once the desired value is reached, press the Release button to confirm it, whereupon only the parameter N° will be displayed again.
- The parameter N° can now be selected using the —Up“ and —Down“ buttons.
- Once all parameters have been set to the desired values, the parameter mode can be left by pressing the —Mode“ button. Right after leaving the parameter mode, the door drive is ready to accept opening and closing commands. It must be noted, however, that the first run after leaving the parameter mode, is always a Reset run.
- To return to the Parameter mode it is necessary press the Reset button again.

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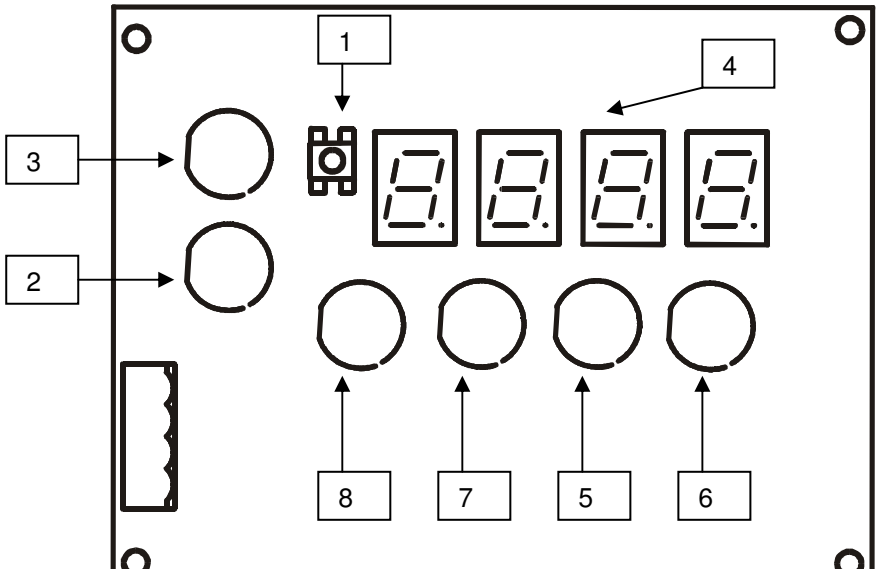


Fig 5-1 Operational control elements for Parameterisation

Correlation between door-width determination and determination oft he braking points

During door-width determination, standard values for the braking points are registered in the set of parameters

To optimise the travel characteristics it is necessary to adjust the braking points. The following will describe the activities required for this.

During every door-width determination, the parameters P5 and P6 will be replaced by the standard values for the current door width.

Setting other Parameters

Now, the other parameters can be adjusted as well. Note, however, that the parameters are interdependent. If you reduce, for example the —Opening“ frequency, the —Opening“ braking point will be too early and the creep motion too long. Therefore, modifying the opening frequency will also entail the necessity to modify the —Opening“ braking point.

The max. static closing force must not exceed 150 N.

6 Relay points

The relay points (Fig. 6-1) are there to communicate the state of the door to the super-ordinate elevator control unit. The status signals —open“, —closed“, and —reversing“, which are required by the elevator control unit, are generated by the door drive and provided using potential-free relay points. Using the DIP switch N°5 during initial operation, it is selected which relay points are going to have an opening and which a closing function. The —ON“ position of the DIP switch N°5 selects the closing function, the —OFF“ position selects the opening function. Whenever the position of the DIP switch N°5 is changed, Reset needs to be performed subsequently

Relay point „closed“

Once the door is closed, the corresponding opening contact (PIN 4 and 5) at the plug-in connection X4 is closed and the closing contact (PIN 5 and 6) is open. If the door is not in this state, the opening contact is open and the closing contact is closed.

Relay point „open“

Once the door is open, the corresponding opening contact (PIN 1 and 2) at the plug-in connection X4 is closed and the closing contact (PIN 2 and 3) is open. If the door is not in this state, the opening contact is open and the closing contact is closed.

Relay point „reversing“

Once the door is reversing, the corresponding opening contact (PIN 7 and 8) at the plug-in connection X4 is closed and the closing contact (PIN 8 and 9) is open. If the door is not in this state, the opening contact is open and the closing contact is closed.

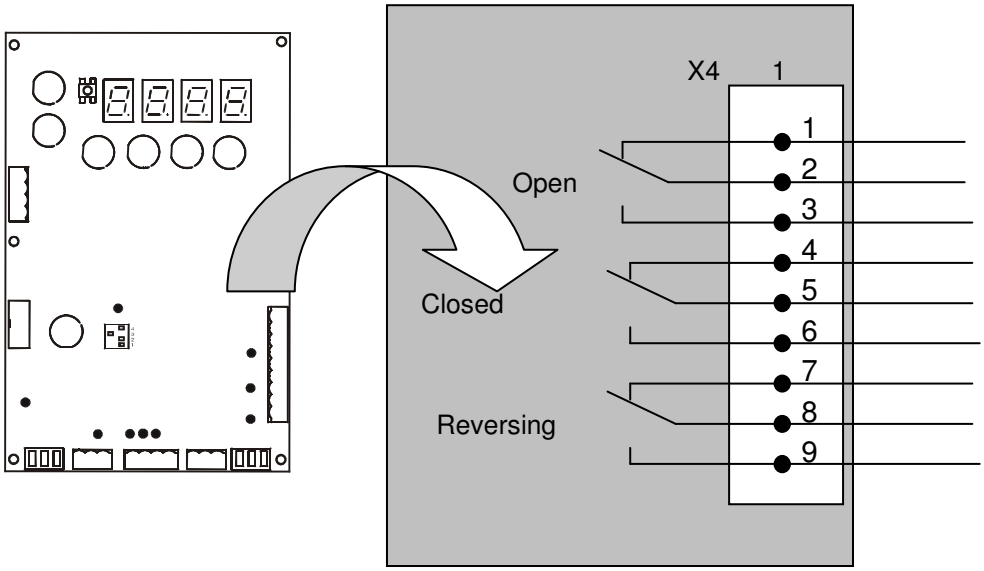
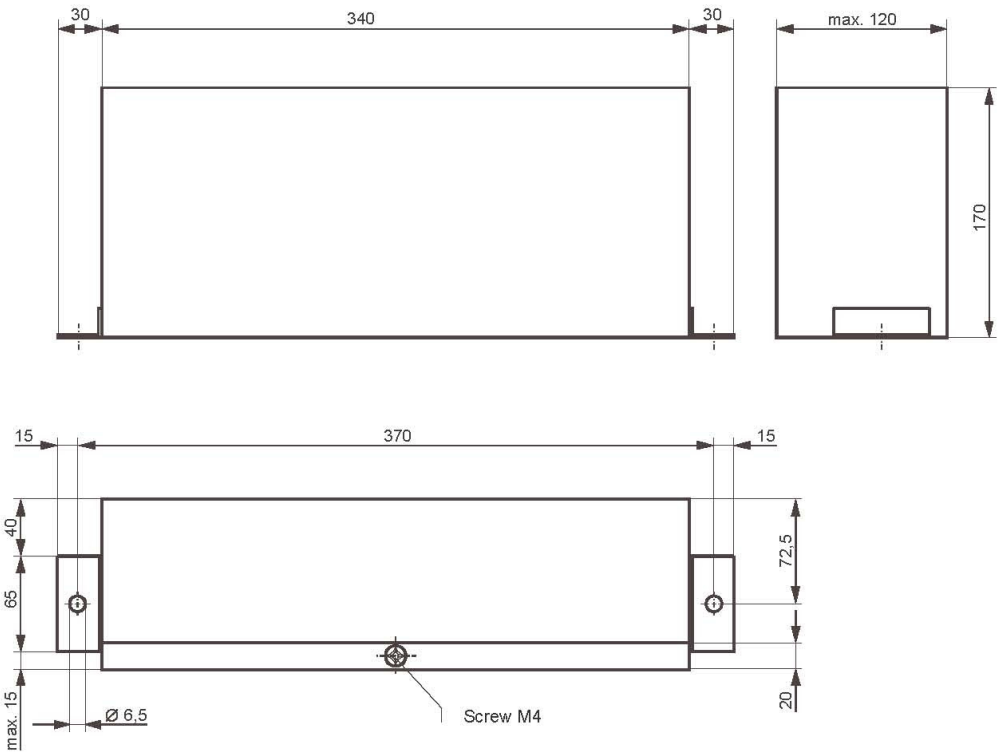


Fig 6-1 Relay points

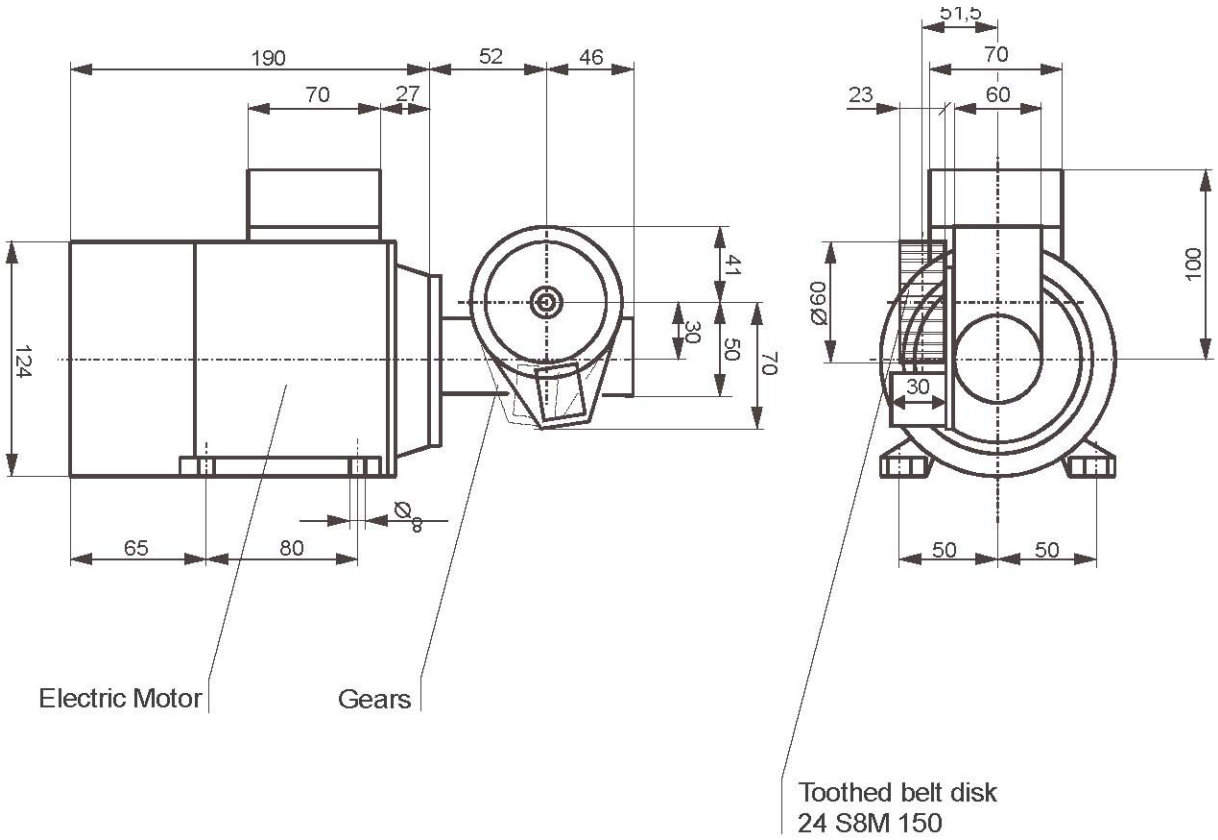
7 Annex

Annex	Title
ETG-LDO-2.2-001.001	Casing
ETG-LDO-2.2-001.002	Gear motor with encoder
ETG-LDO-2.2-002.001	Control Inputs and outputs, encoder hook-up
ETG-LDO-2.2-003.001	Troubleshooting index



Unit of measure: mm

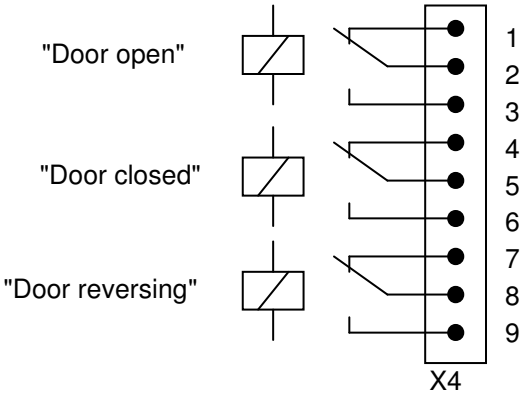
No scale



Unit of measure: mm

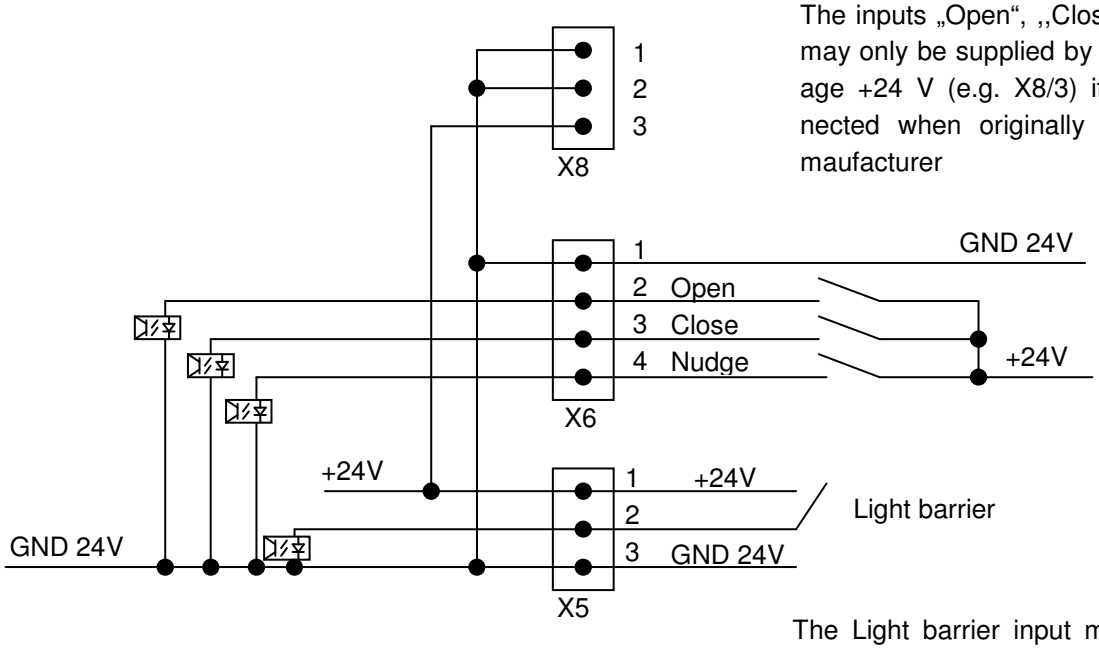
No scale:

Control outputs



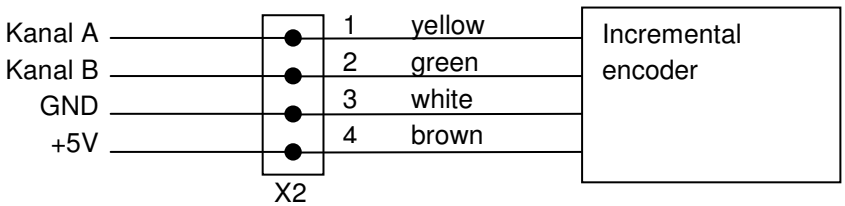
Steuereingänge

The inputs „Open“, ,,Close“, ,,Nudge“ may only be supplied by internal voltage +24 V (e.g. X8/3) if X9 is connected when originally supplied by maufacturer



The Light barrier input may also be supplied by external +24 V voltage

Geberanschluss



Malfunctioning	Source of Malfunctioning	Eliminating the source of Malfunctioning
The door does not move	No operating voltage	Check hook-up to mains voltage
Wrong direction of door movement during door-width determination	Wrong phase position	Swap phases in the motor connecting box
After door-width determination LED 2 starts flashing	Incorrect storage of door-width in memory	Door operation not possible, notify Service
It is impossible to enter into parameter mode	After turning on, one command has already been taken on	Disconnect the command lines of the elevator control unit from the door control and perform a (Re-start) Reset
	The parameter mode has just been exited	After exiting the parameter mode, wait for 5 seconds to re-enter into parameter mode
	The mode button was pressed for longer than 1 second	Press mode button only briefly
	The converter is still processing the data	Please be patient for another moment.
The Reset run is not completed.	The elevator control stops the command.	Turn on the DIP switch N°3. The Reset run will also continue without the command of the elevator control.
The door does not move.	No commands given by the elevator control unit.	If the door moves when operating the Service buttons, the door drive is functioning properly. Check the commands given by the elevator control unit.
The door discontinues closing motion and reopens	High mechanical resistance causes door to reverse	Mechanical adjustment of the door. Remove pollution from the guide rails.
Alert LED of the converter remains illuminated	Converter error has occurred	Turn off mains voltage and wait until all indicators and displays are off. Turn on mains voltage again. Should the error persist, notify Service.
Door panel bumps into —CLOSED“ position and does not reach —OPEN“ position or vice versa	The encoder has come loose.	Tighten encoder fastening.