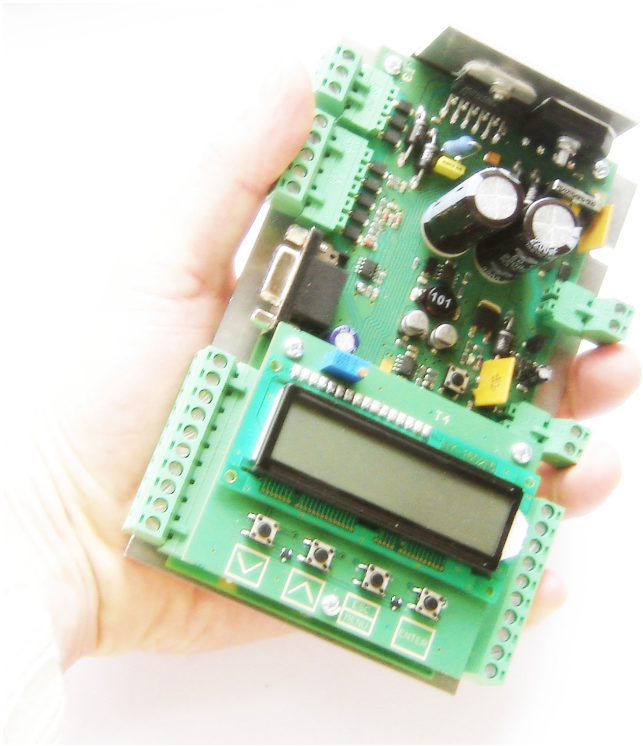
SDK 250
User's Manual



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Regulatory

CE

Table of Contents

1. Introduction

SDK 250 is an electronic controller of automatic elevator door. It ensures optimum operating conditions for doors of up to 250 kg. It was designed to work with drives fitted with shaft encoders powered with 5V DC, which generate from 150 to 999 pulses per centimetre.

The SDK 250 automatically calculates door motion parametres (e.g. speed profile, acceleration and deceleration points, acceleration values) based on the door physical characteristics (mass and travel) such as to ensure optimum operation of the drive. Once the automatic calibration routine is completed, the calculated settings are stored in non-volatile memory of the controller. The SDK 250 controls the door drive such as to meet the requirements of norms regulating the maximum driving force and the maximum kinetic energy of the door. Thanks to continuous monitoring of the drive's parameters the SDK 250 can detect increasing motion friction of the drive and alert the service person that maintenance is required.

All important operation information is presented in a clear manner on the built-in, backlit LCD display, which is also used to program the device and initiate the automatic calibration routine.
The SDK 250 ships in a metal housing that ensures protection against mechanical damage as well as adverse environmental conditions.

INFORMATION:

- This operating instruction do not contain detailed information on all types of the product for clarity reasons and can not take into account each possible case of the assembly, operation, or maintenance. Should you require more information, or should particular problem occur which are insufficiently described in that operating instruction, please us for the required information.

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2. Safety Notes

- Prior to commissioning thoroughly read the operating instructions at hand through. Instruction contains important information on installation, use, and safety of the device. Not following the instructions in some cases can lead to the serious injuries or damage to the property may occur if the respective precautions are not taken.

WARNING:

- Only qualified staff should work on this device or in its vicinity. The stuff must thoroughly be informed about all warnings and maintenance measures according to this operating instruction.
- To ensure the correct and safe operation of this device, proper transport, storage and assembly as well proper operation and professional maintenance is required.
- GROS Controls has no any responsibility for property damage or personal injuries caused by not professional and not proper installation and unit usage. GROS Controls highlights that improper installation may case serious body injuries or property damage.
- GROS Controls has a right to modify the product increasing its functionality and quality .Thus some versions of the manual can be related to the previous release. Please be so kind to check if the version of the manual refers to the version of controller you have.
- Checking if the unit has no any visible signs of the transportation defect is mandatory before the installation. In case the defects are visible contact GROS Controls for replacement.
- Any modification neither in the hardware nor software of the controller are not allowed.
- It is not permitted to power the unit using different sources then described in the next chapters of this manual.
- It is mandatory to power down the whole unit prior to the controller installation. The entire wiring should be done and checked by the qualified installers with the valid certification according to the electrical regulations.
- Once installation is finished all connections should be checked once more.
- Usage of the controller without calibration and without entering proper door parameters is not allowed. The defaults parameters are not universal and can't provide optimal conditions of the work. Especially some regulations related to the maximum kinetic energy can't be meet without correct door parameters.

3. Controller Installation

Figure 3.1 shows all external connectors of SDK 250 controller. Connectors of opticall barrier, Relay outputs, Control inputs and communication interface of RS 485 are located under the LCD display board.

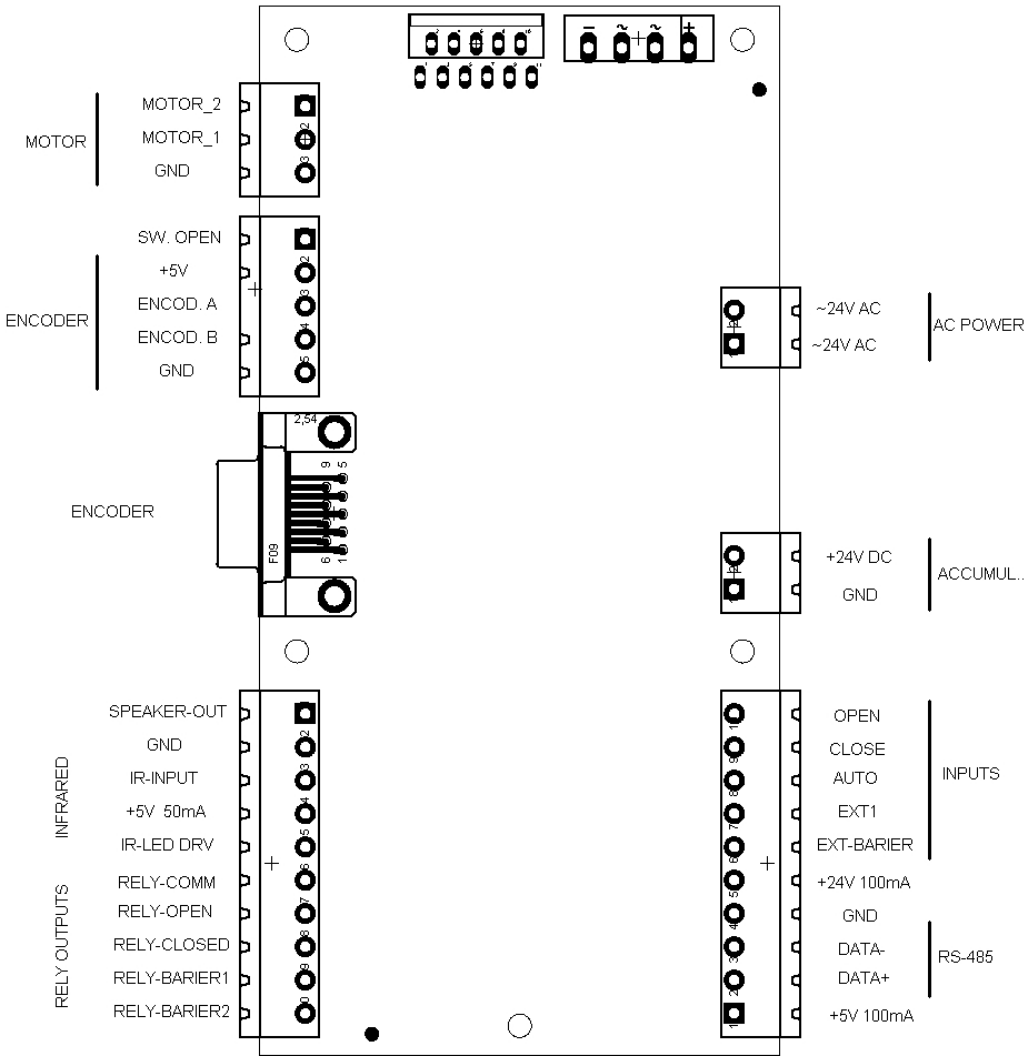


Figure 3.1 External connectors of SDK 250

3.2 External Wiring

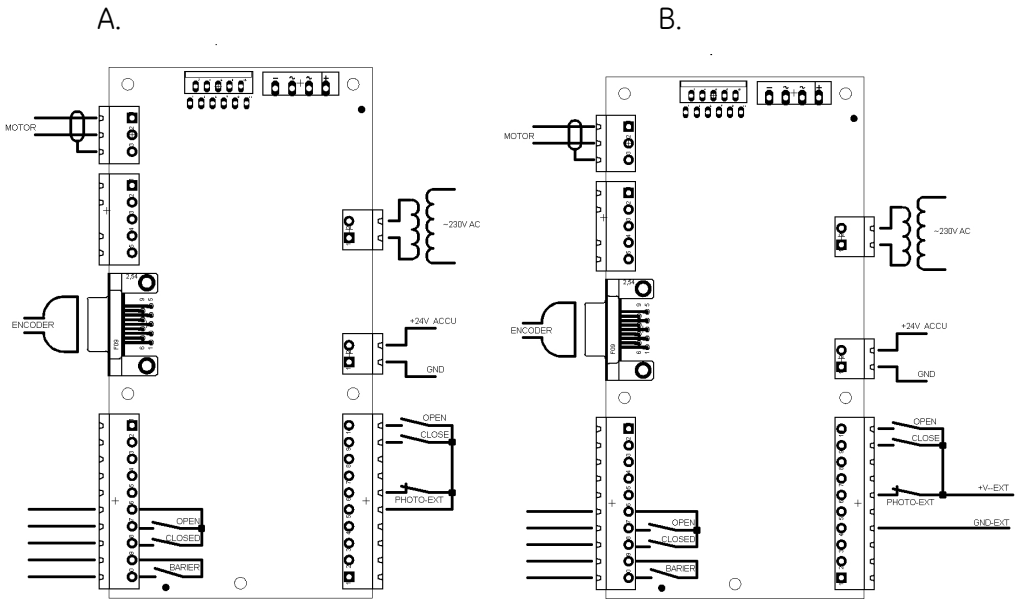


Figure 3.2 Connection options of SDK 250 Controller

Fig. 3.2 shows examples of basic connections of external devices to the SDK 250 controller. Inputs can be controlled using voltage supplied either from the internal circuitry of the controller (option A) or from the external elevator control system (option B)

3.2 Power Supply

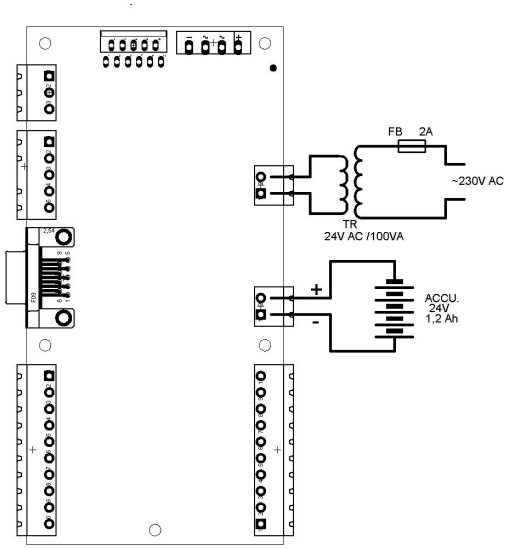


Figure 3.3 Power Supply connections

Main power is supplied by a toroidal transformer - minimum 100VA and nominal output voltage 24VAC.

- It is mandatory to protect the transformer primary winding circuit with a 2A fuse.
- Do not use transformer with higher no-load secondary voltage than 27 VAC

If door operation is required also during mains failure a 24V battery of minimum 1,2Ah capacity must be connected externally. Use of two standard 12V batteries connected in series is possible. An automatic battery charger circuitry is a part of the controller board and is designed to charge battery with 40 mA current, which is sufficient to keep the battery fully charged, but will not be able to quickly charge fully discharged batteries. When SDK 250 is working on battery its voltage is continuously monitored. When the battery voltage drops below certain threshold LCD backlight will be switched off. Further discharging of the battery will eventually cause the controller to shut down.

Battery connection is not mandatory and the controller can operate normally without it, however the battery voltage read-out on the LCD will be displayed incorrectly.

3.3 Motor

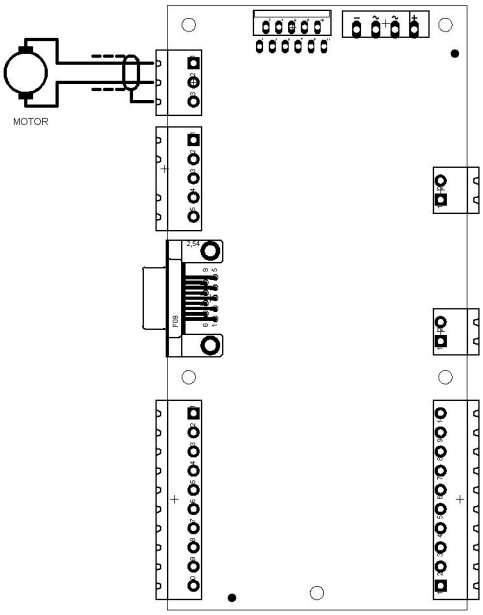


Figure 3.4 Motor connections of the SDK 250

The motor should be connected to SDK 250 using shielded 2-wire cable. Make sure that shield is connected properly to GND at one end only. Please consult chapter 6 to find out about the order of wire connections.

3.4 Encoder

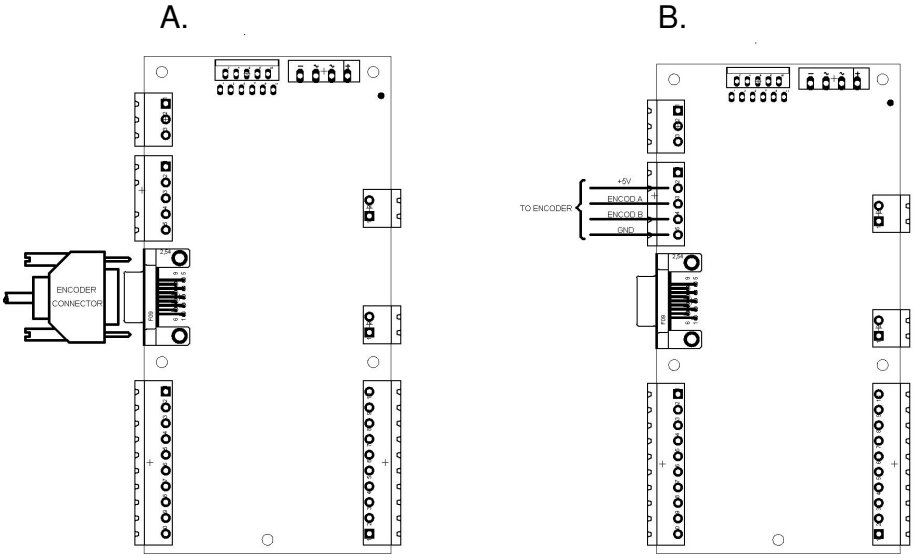


Figure 3.5 Connection of encoder to SDK 250 using DB-9 connector or wire terminals.

The controller is designed to work with motors equipped with 5V quadrature encoders, generating from 150 to 999 pulses per centimetre of door's linear movement. Typically encoder cables are terminated with a DB-9 connector. The SDK 250 has a DB-9 socket on board in order to facilitate fast and convenient installation.

- WARNING! Make sure that encoder signal pins match SDK-250 connector to avoid damage to the controller.

If the encoder cable is not terminated with DB-9 connector, the encoder can be connected directly to the SDK 250 board's screw terminals as shown in fig. 3.5 B.

3.5 Control inputs

The SDK 250 controller has with two control inputs provided for compatibility with different types of elevator controllers. Both inputs or either of them individually can be activated from the menu of the controller. Connection alternatives are shown in fig. 3.7.

A. B.

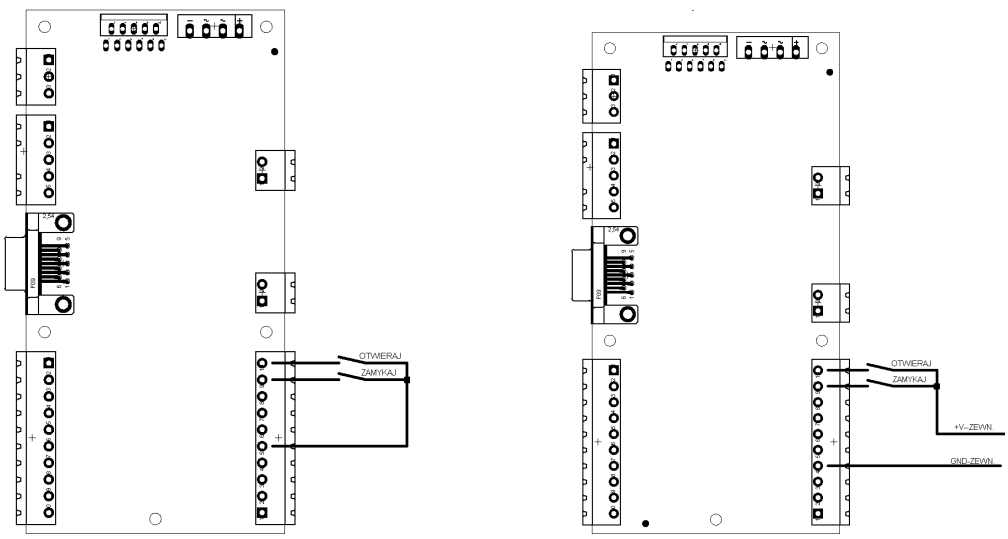


Figure 3.7 Connections of control inputs

Fig. 3.7. shows how to connect open/close control signals to inputs of the SDK 250. The control signals are generated by the main controller of the elevator. If the elevator control system has normally-open potential-free (e.g. relay) outputs to control the doors they can be connected to SDK 250 as shown in fig. 3.7A utilising the on-board voltage source of the controller.
If the elevator control system uses voltage outputs to control doors, they can be connected to SDK 250 as shown in fig. 3.7B. Make sure that both inputs are activated in the controller's menu.

Application of voltage to the OPEN input will make SDK 250 start the door opening procedure. During that, until the door is fully open (until the OPEN relay output is active) removal of the voltage from OPEN input will cause the SDK 250 to reverse the door movement in order to close it. Removal of the voltage from OPEN input after the door has fully opened will not initiate the closing procedure and the door will remain open.

Application of voltage to the CLOSE input will make SDK 250 start the door closing procedure. During that, until the door is fully closed (until the CLOSED relay output is active) removal of the voltage from CLOSE input will cause the SDK 250 to reverse the door movement in order to open it. Removal of the voltage from CLOSE input after the door has fully closed will not initiate the opening procedure and the door will remain closed.

Voltage should not be applied to both control inputs at a time. If it is, however, the CLOSE signal wins and the SDK 250 will behave as if only voltage was applied to CLOSE input.

Fig. 3.8 shows how to connect the control inputs in systems where only one output is used by the main elevator controller to control door's opening and closing. Fig. 3.8A shows how to connect the OPEN input using internal SDK's 250 voltage source and fig. 3.8B shows connection in case of using voltage output on the elevator's main controller. Make sure that only the OPEN input is activated in the menu of SDK 250 for this type of control. In this mode, if the voltage is applied to the OPEN input, SDK 250 will open the door and keep it open as long as the voltage remains applied. Removal of the voltage from the OPEN input will make the controller close the door.

A. B.

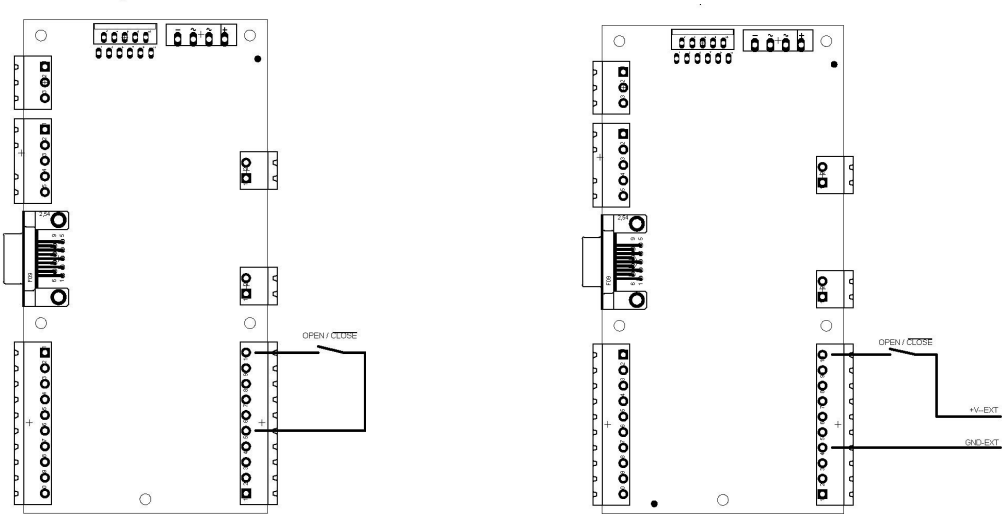


Figure 3.8 Connection of control signals - using OPEN input only

Although the SDK 250 can also be controlled using CLOSE input only as shown in fig. 3.9. For this purpose only the CLOSE input must be activated in the controller's menu. In this case the application of voltage to CLOSE input will make the controller to close door and keep it closed. Removal of voltage will make the controller to open the door. Therefore this control variant is NOT RECOMMENDED for SAFETY REASONS. Even momentary drop of voltage on the CLOSE control input will immediately start door opening procedure and, as a result, opening of safety interlock circuitry of the elevator.

A. B.

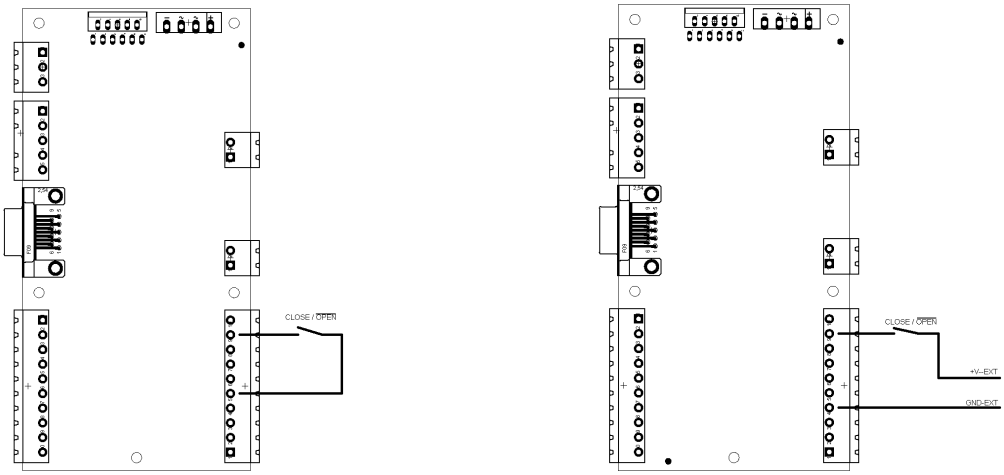


Figure 3.9 Connection of control signals - using CLOSE input only

3.6 Relay outputs

The SDK controller is equipped with three normally-open relay outputs. Two of them (OPEN, CLOSED) indicate the door reaching the terminal positions (fully open or fully closed). The third one (BARRIER) is used to indicate detection of an obstacle during the door movement. It is activated both in case of the optical barrier interruption as wells as in case of a mechanical blocking of the door movement.

Note that the relay outputs operation depends on the menu option settings. Connections are shown in fig. 3.10

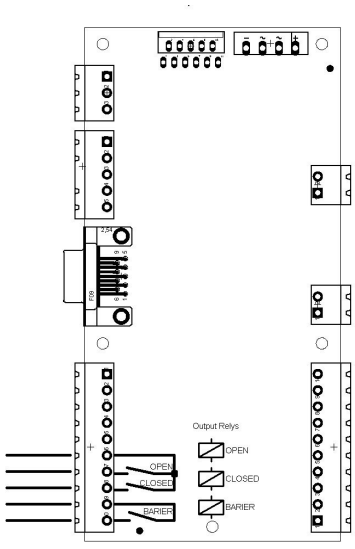


Figure 3.10 Connection of relay outputs of SDK 250 controller.

3.7 Chime output

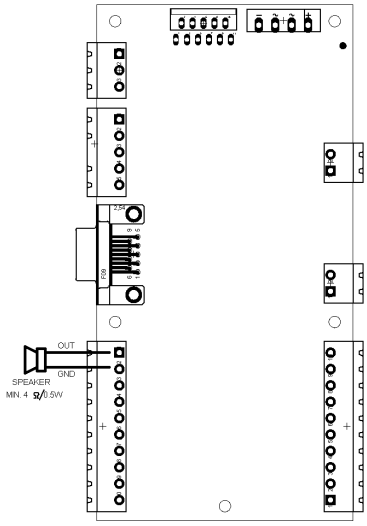


Figure 3.11 Connection of a chime speaker.

Connections of a chime speaker is shown in fig. 3.11. Minimum speaker rating is 4Ohm and 0,5 W.

The chime sound is generated at the moment of receiving the signal to open the door from the main elevator controller (the way of receiving such a signal depends on the way of connecting described in section 3.5).

- The door will start opening AFTER the chime sound has played fully.
- Menu 8 contains chime speaker and sound settings. Make sure that option 8.1 is set to active in order to hear the sound. Menu option 8.4. is provided as a convenient way to test the selected chime sound.

3.7 Optical Barrier

Typically optical barriers and optical detectors are connected into the main elevator controller. In order to speed up system reaction to interruption of the barrier, connect the barrier signal directly to SDK 250.

External

Connections of external optical barrier is shown in fig. 3.12 A – using internal voltage source of SDK 250 and in fig. 3.12 B using external voltage from the main controller unit or from the external optical barrier power supply.

A. B.

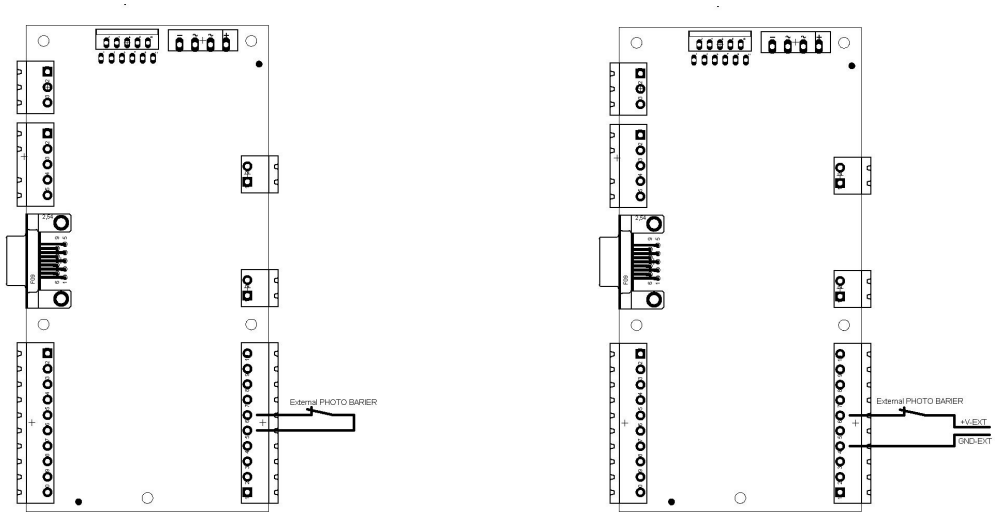


Figure 3.12. Connections of the external optical barrier.

CAUTION!

With the barrier not interrupted the voltage must at all times be applied to the BARRIER input.

Remember to activate external barrier in the controller's menu

Remember to properly select operation options of the BARRIER relay output of SDK 250

Internal

It is possible to use specialised cost-efficient IR transmitter and receiver modules designed to work with the SDK 250 as shown in fig. 3.13

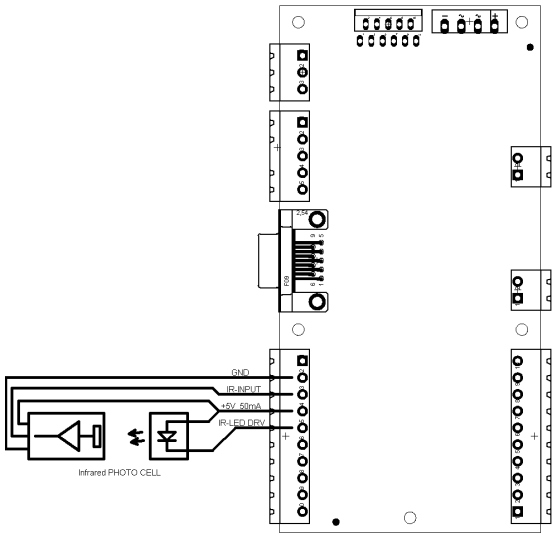


Figure 3.13. Connections of dedicated optical receiver and transmitters to SDK 250 controller.

CAUTION!

Remember to activate internal barrier in the controller's menu

Remember to properly select operation options of the BARRIER relay output of SDK 250

3.8 Auto Initialisation Switch

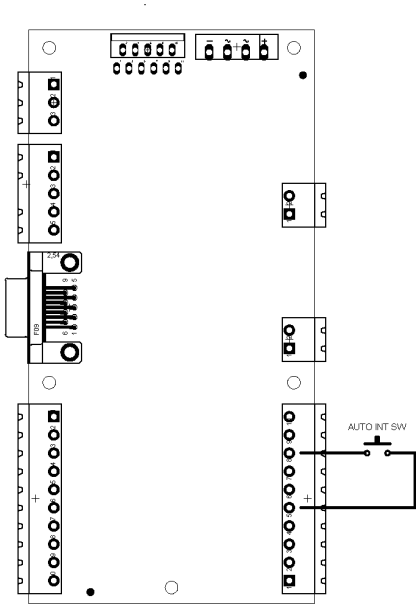


Figure 3.14 Connections of auto initialisation switch to SDK 250 controller.

Fig. 3.14 shows connections of an Auto-Initialization switch to the SDK 250. The Auto-Initialization switch can be mounted on the housing of the SDK 250 in order to perform calibration procedure without the need to enter the controller's menu. If the switch is activated for a few seconds the SDK 250 will enter the initialization procedure.

CAUTION!

- Before auto initialisation switch can be used door parameters must be entered to the controller.
- It is important to activate the switch functionality in the menu. The controller has this function disabled by default.

3.9 Terminal position contact - option

Fig. 3.15 shows the connections of the optional terminal position contact to indicate the full opening of the door. Use of such contact is optional as the SDK 250 detects the terminal positions of door by detecting the mechanical resistance at its terminal positions. This input is provided for compatibility of SDK 250 with the widest range of doors and control systems.

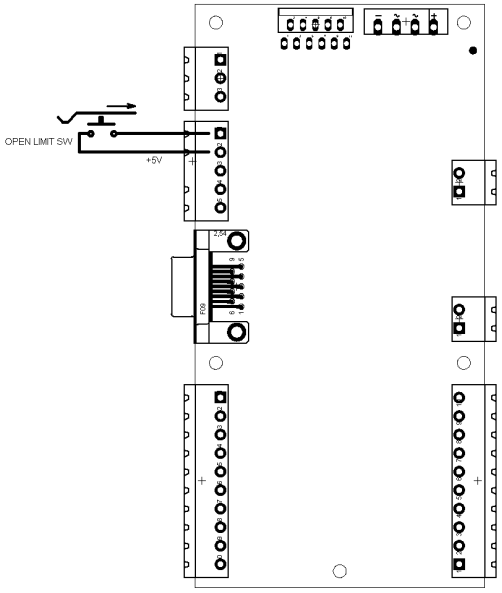


Figure 3.15. Connections of optional terminal position contact – door open.

3.10 RS-485 communication bus

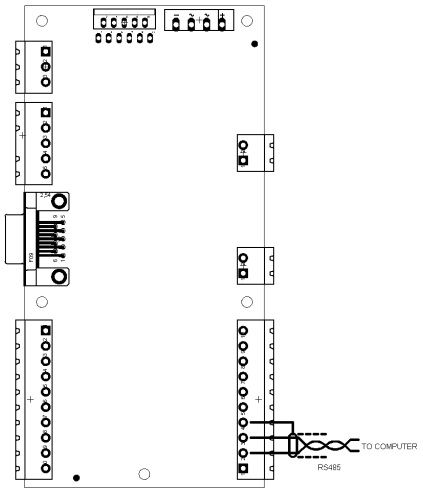


Figure 3.16 Connections of RS 485 communication bus.

Fig. 3.16 shows the connections of the RS-485 communication bus used for connecting the SDK 250 with other elevator controller products from GROS Controls. The following functions are available via the RS-485 bus.

- Door control (open/close)
- Continuous current consumption monitoring
- Momentary door speed read-out
- Detailed information about current door position
- Monitoring of mechanical resistance during the door movement

3.11 Back-up battery power supply switch

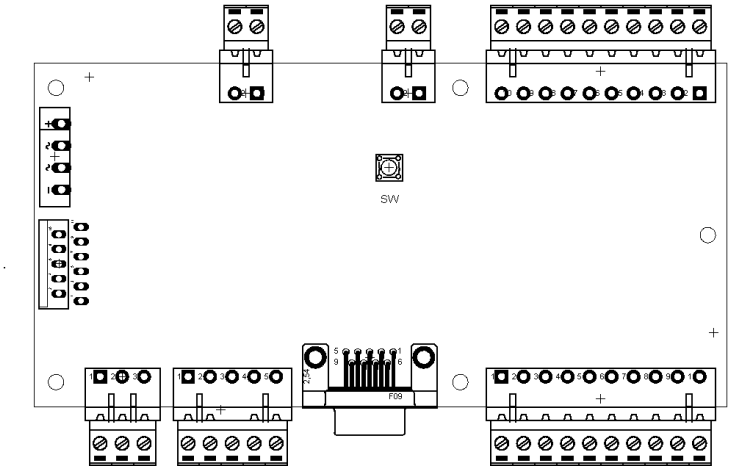


Figure 3.17 Location of the back-up battery power supply switch on the main board.

The SDK 250 controller is equipped with the input for back-up battery power supply connection. It allows the controller to continue operation and open the door in the case of mains failure. To prevent dmage to the battery, SDK 250 will automatically shut down and disconnect the battery after battery voltage drops below certain level or when the battery operation exceeds certain time. In order to resume the SDK 250 operation on battery power, press the switch located as shown in fig. 3.17.

4. Menu

- Be sure to read First power-on section before first powering the SDK 250

- Entering the menu is achieved by pressing and holding for 3 seconds MENU button. In case the password was entered (see menu 9), the first message will be “Enter Password” message.

4.1 Keys functionality during menu browsing .

Scrolling the menu up and down, and parameter changing are done using these keys. The name of selected option is displayed on the LCD.

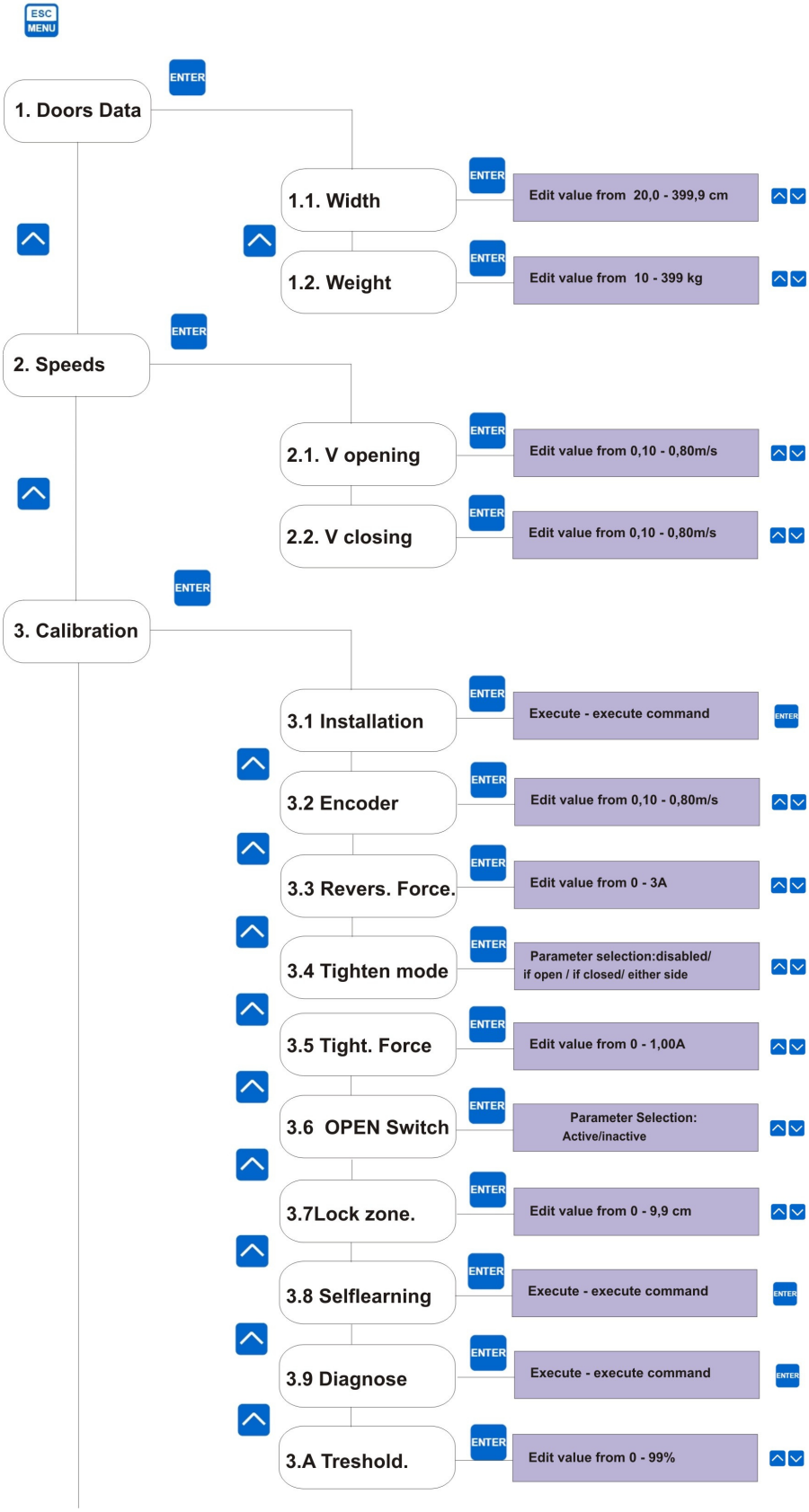
[ENTER] button functionality depends on the current position in the Menu:
If selected menu position is a parameter, pressing this button allows to edit its value. If selected menu position is a sub-menu, pressing this button will enter the sub-menu and show the first of its options.

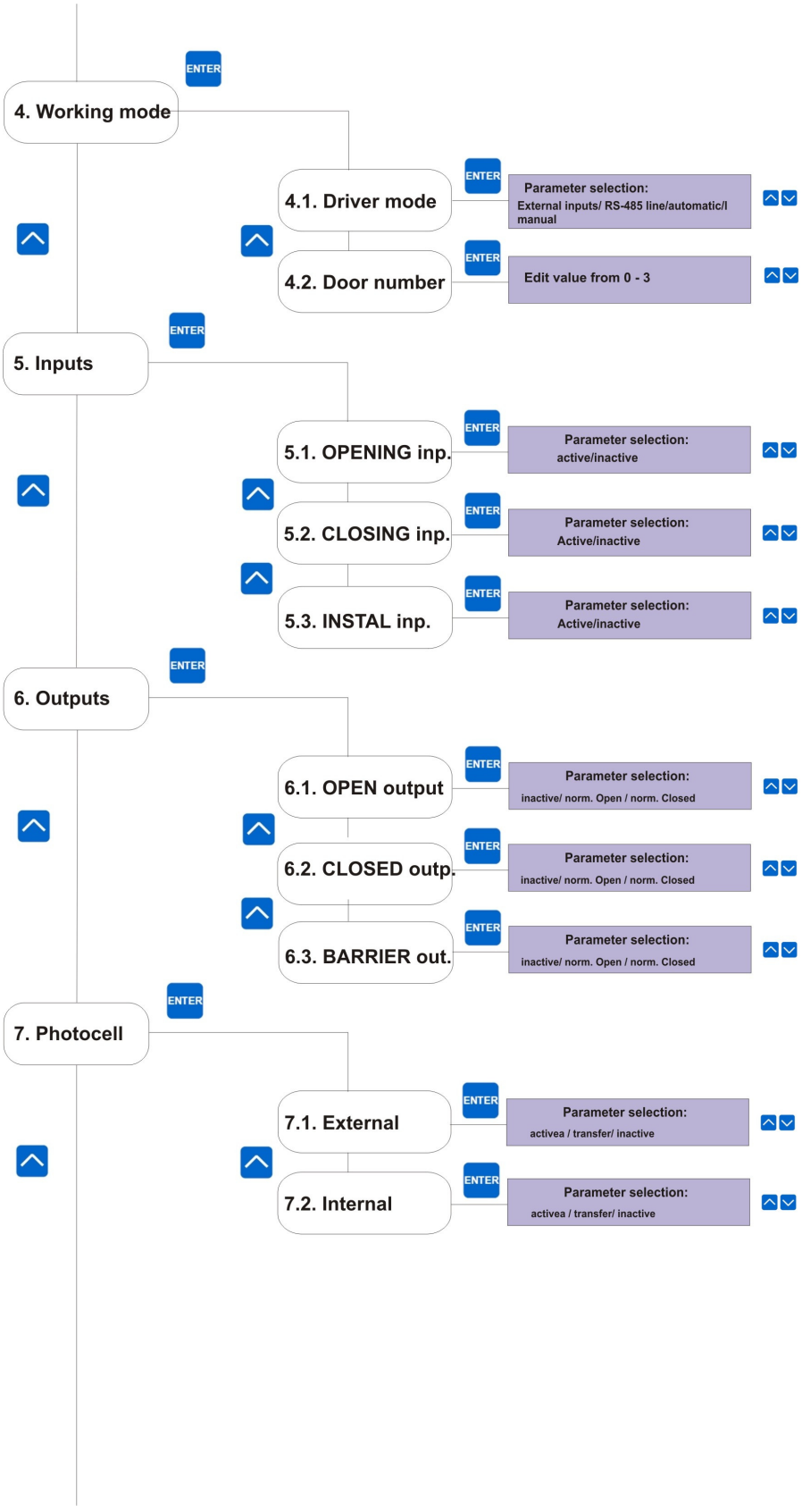
The [ESC/MENU] button allows to leave current sub-menu and abandon changes. If pressed in the main menu it will make SDK 250 exit the programming mode and resume normal operation

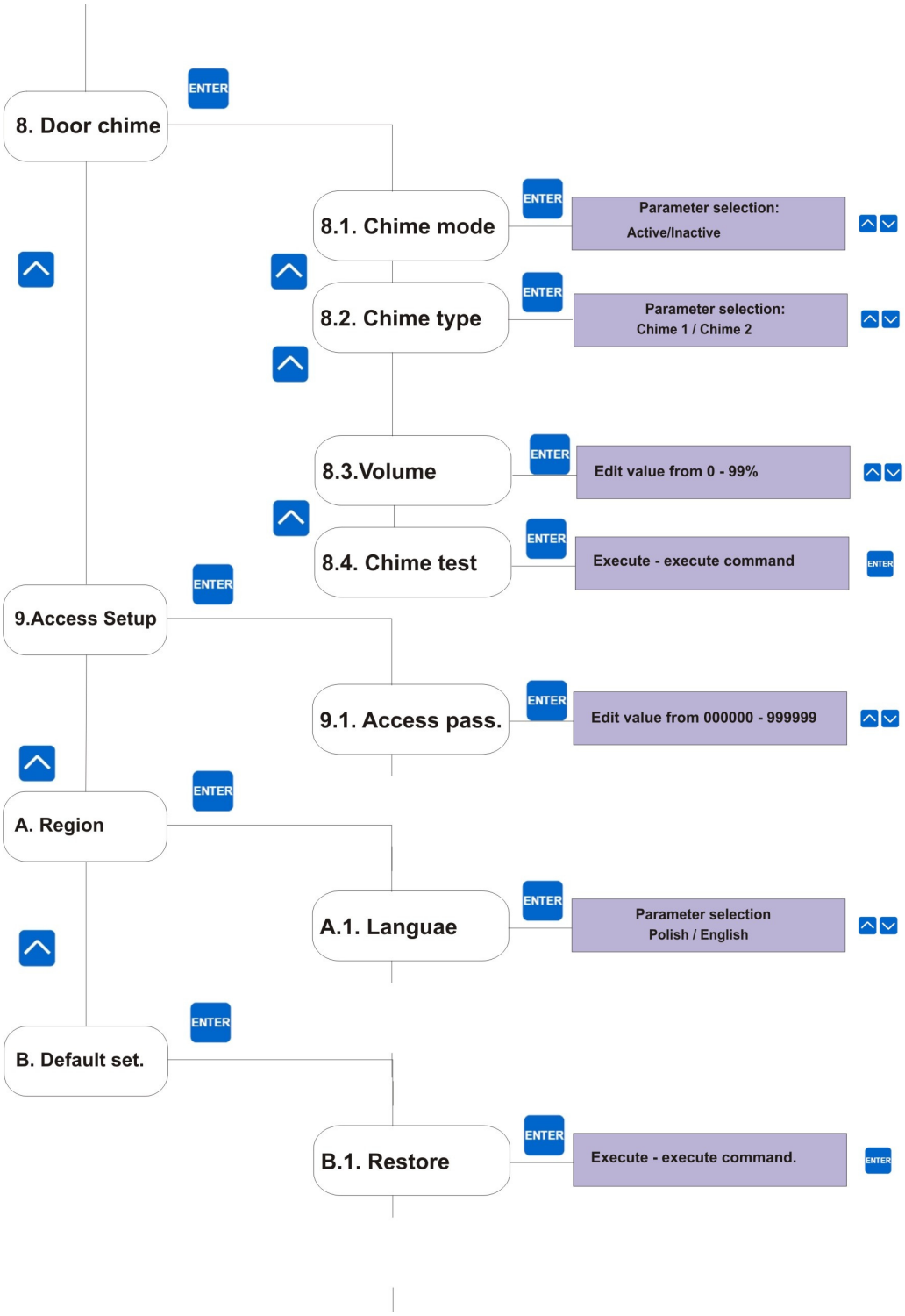
Pressing and holding down [MENU/ESC] for 3 seconds will activate menu.

4.2 Menu structure

NOTE: All sections below are numbered to correspond with the actual menu positions in the menu tree of the SDK 250


ESC MENU
ENTER
1. Doors Data
1.1. Width
Edit value from 20,0 - 399,9 cm
1.2. Weight
Edit value from 10 - 399 kg
2. Speeds
2.1. V opening
Edit value from 0,10 - 0,80m/s
2.2. V closing
Edit value from 0,10 - 0,80m/s
3. Calibration
3.1 Installation
Execute - execute command
3.2 Encoder
Edit value from 0,10 - 0,80m/s
3.3 Revers. Force.
Edit value from 0 - 3A
3.4 Tighten mode
Parameter selection:disabled/ if open / if closed/ either side
3.5 Tight. Force
Edit value from 0 - 1,00A
3.6 OPEN Switch
Parameter Selection: Active/inactive
3.7Lock zone.
Edit value from 0 - 9,9 cm
3.8 Selflearning
Execute - execute command
3.9 Diagnose
Execute - execute command
3.A Treshold.
Edit value from 0 - 99%


ENTER
4. Working mode
4.1. Driver mode
ENTER
Parameter selection:
External inputs/ RS-485 line/automatic/l
manual
4.2. Door number
ENTER
Edit value from 0 - 3
ENTER
5. Inputs
5.1. OPENING inp.
ENTER
Parameter selection:
active/inactive
5.2. CLOSING inp.
ENTER
Parameter selection:
Active/inactive
5.3. INSTAL inp.
ENTER
Parameter selection:
Active/inactive
ENTER
6. Outputs
6.1. OPEN output
ENTER
Parameter selection:
inactive/ norm. Open / norm. Closed
6.2. CLOSED outp.
ENTER
Parameter selection:
inactive/ norm. Open / norm. Closed
6.3. BARRIER out.
ENTER
Parameter selection:
inactive/ norm. Open / norm. Closed
ENTER
7. Photocell
7.1. External
ENTER
Parameter selection:
activea / transfer/ inactive
7.2. Internal
ENTER
Parameter selection:
activea / transfer/ inactive


ENTER
8. Door chime
8.1. Chime mode
ENTER
Parameter selection:
Active/Inactive
8.2. Chime type
ENTER
Parameter selection:
Chime 1 / Chime 2
8.3.Volume
ENTER
Edit value from 0 - 99%
8.4. Chime test
ENTER
Execute - execute command
ENTER
9.Access Setup
ENTER
9.1. Access pass.
ENTER
Edit value from 000000 - 999999
A. Region
ENTER
A.1. Languae
ENTER
Parameter selection
Polish / English
B. Default set.
ENTER
B.1. Restore
ENTER
Execute - execute command.
ENTER

1. Door Data

1.1 Width [centimetres] value 20 - 399,9

The real (measured) value must be entered here. Entering incorrect value will lead to incorrect calculation of the real door speed, which is necessary to stay in line with value entered to the menu.

- CAUTION! For sliding doors build with two separate parts meeting in the centre, the half of the door width must be entered.

1.2 Weight [kilograms] 10 – 399

It is mandatory to enter real door weight. It is critical to control door kinetic energy, whose maximum value must not exceed 10 J.

- CAUTION ! Entering incorrect values can lead to the faulty work of the door and/or can create serious risk of injuries.
- If the door weight setting is being changed after the speed settings have been made and a value is entered which would result in exceeding the maximum allowable kinetic energy of the door, the controller will display "Kinetic energy exceeded" message and automatically adjust maximum speed such as to account for the new weight setting.

2. Speeds

2.1 V opening (door opening speed in meters per second) from 0,1 – 7,99 m/s

Required door opening speed should be entered here.

2.2 V closing (Door closing speed in meters per second) from 0,1 – 7,99 m/s

Required door closing speed should be entered here.

Based on the entered door weight SDK 250 automatically calculates maximum door speed not to exceed the maximum allowed kinetic energy of the door. If the V opening or V closing entered here is greater than the calculated maximum speed, it will be adjusted down not to exceed the maximum value.

- When the door weight setting is changed by the installer SDK 250 such that the kinetic energy calculated for speed **V opening** or **V closing** exceeds the permissible value, adjustments are made automatically to **V opening**, **V closing** or both to bring the kinetic energy down to its maximum value.

Subsequent change of door weight setting back to original value will not affect the **V opening** or **V closing** values.

3. Calibration

3.1 Installation [run]

The Installation procedure must be performed during the first power-on of the SDK 250 controller. The door will be driven slowly to fully closed position and then to fully open position. During this movement terminal positions of the door will be identified and stored in the controller's non-volatile memory. Then the door will be closed again. Finally, door will open and close three times with programmed speeds and entered values of the door parameters. During that operation an average current value will be stored in the controller's non-volatile memory as the reference values for the door mechanical resistance.

Installation procedure should only be executed when all door parameters are correctly set in the SDK 250

3.2 Encoder [pulses per cm] values 150 – 999

The pulse density of the motor's shaft encoder should be entered here as a number of pulses per centimetre of linear door motion. SDK 250 can work with quadrature shaft encoders powered from 5V DC, that generate between 150 and 999 pulses per centimetre.

This value is used by the SDK 250 during the calibration procedure and also to determine the slowest door-locking speed.

Note that the number of pulses per centimetre of door linear movement already takes into account all mechanical gear ratios between the motor and the door actuator.

3.3 Reverse force [Current in Amps] [values from 0 – 3A]

In this menu the static door holding force is entered, expressed as the corresponding motor current in Amperes. In order to determine it, during the calibration use a dynamometer to find the current corresponding to the force of 150 N, which the regulations adopt as the maximum permissible static force applied by the door to any object in its path. The corresponding current value is treated by the controller as the absolute maximum current to be supplied to the motor.

- When the door encounters an obstacle in its path, the motor current consumption rapidly increases. If it exceeds the value set in the menu 3.3. the controller will stop the door and reverse its motion to move it away from the obstacle.
- Once the door is moved away from the obstacle, the controller will attempt to close the door once again. If the obstacle is still in the door's way, the procedure will be repeated up to 5 times. If the obstacle is still in the door's way the controller will attempt to close the door moving it at minimum speed. If this attempt also fails, the controller will move the door to fully open position and wait for 20 sec. Next the closing procedures starts again.

3.4 Tighten mode – [disabled / when open / when close / either side]

Tighten mode setting determines if and when tightening force is used. When the tighten mode is disabled, the motor is not powered when door is in fully open or fully closed position. If the Tighten mode is set to „when open" the motor remains powered even if the door is fully open. If the Tighten mode is set to "when closed" the motor remains powered even if the door is fully closed. Motor is powered in either door position when Tighten mode is set to "either side". The current powering the motor in tighten mode is determined by setting in the menu 3.5.

3.5 Tight. force (Tighten force) [current in Amperes] [value from 0 – 3A]

The value of the current used to tighten door in its terminal positions. It's value should be determined empirically taking into account forces from all mechanical closing elements like springs and weights.

3.6 Open switch – [active / inactive]

Open switch is an additional optional switch often mounted in sliding doors. It is activated at door's fully open position. Its usage is optional as the controller automatically detects the terminal positions of the door by detecting mechanical resistance (by measuring the current consumed by the motor).

3.7 Lock zone – [values from 0 – 9,9cm]

When door reaches fully closed position, its mechanism still continues its motion to lock it in position. To ensure smooth door movement (especially during door opening), the lock zone value should be set equal or greater than the real (physical) lock zone length.

- Failure to set the lock zone properly may cause faulty operation of heavy doors (200kg and above)
- CAUTION! It is important to remember that for new controllers default value of the lock zone is equal to 4 cm. Please remember to enter the correct value. For doors without lock zone the value should be 0.

3.8 Self learning [execute]

During the self-learning procedure the controller will move the door from the fully open position to the fully closed position. During such a move all pulses are calculated and stored into the controller memory. Counted pulses represent door width.

- There is no need to enter any characteristic points of the travelling curve as SDK 250 controller calculate these points automatically adjusting all movement parameters for optimal door functionality. All parameters are set according to meet regulations.

3.9 Control [execute]

It is recommended to execute the Control procedure on the new installation or after door mechanism maintenance. SDK 250 will perform closing procedure three times and will remember average current value during this operation which will be stored as a reference value during the normal operation. During operation dirt and mechanical factors will cause additional movement resistance which will influence the current value. As the controller is monitoring current has a chance to detect and signal maintenance need. .

3.A Threshold [value in %]

The value in % defines increase of the average current activating alarm „Thresh" and display message on the controller LCD informing that the value stored in the memory during the calibration was exceeded.

4. Working mode

4.1 Driver mode [external inputs / RS 485 line/ automatic / manual]

The SDK 250 controller is designed as a universal unit to be used with various 3rd party elevator control systems. To provide proper connection to different types of main controllers, correct menu option must be chosen:

External inputs

For control systems using separate signals close / open (see figure 3.7-3.9).

RS - 485

For control systems using RS-485 communication bus and ModBus RTU protocol.

Automatic

Automatic closing and opening option is used for service purposes only. It allows for automatic opening and closing door. Once it is selected doors are opening and closing every 5 second ignoring any external signals.

Manual

After setting this option and leaving the menu, each [ENTER] pressing will close and open doors alternately.

4.2 Door Number [0-3]

Used in multi-door instalation. It corresponds to the address of the SDK-250 controller and is used in systems using RS-485 communication only.

5. Inputs

5.1 Opening Inp. (Opening Input): - [active/inactive]

Voltage controlled input. Receives signals from the main elevator controller. If set to 'active', then signal on this input will open the door. If **Closing Inp.** is set to 'inactive', then removing the signal will close the door.

5.2 Closing Inp. (Closing Input): – [active/inactive]

Voltage controlled input. Receives signals from the main elevator controller. If set to 'active', then signal on this input will close the door. If **Opening Inp.** is set to 'inactive', then removing the signal will open the door.

- It is not advisable to set Opening Inp. to inactive and Closing Inp. to active. Such settings may cause malfunction of the door if electrical wiring of these inputs becomes damaged.

5.3 Instal Inp. – [active/inactive]

If the menu option Install is set to active, then applying voltage to it will automatically perform Installation procedure (menu 3.1).

6. Outputs

SDK 250 controller has 3 relay outputs used to feed control signals to the elevator control system.

6.1 Output Open – [inactive/ normally closed/ normally open]

The relay connected to the output is not controlled when this option is set to 'inactive'. When set to 'normally open' the relay will be in the closed state after the full door opening. When set to 'normally closed' the relay will be open after the full door opening.

6.2 Output Close - [inactive/ normally closed/ normally open]

The relay connected to the output is not controlled when this option is set to 'inactive'. When set to 'normally open' the relay will be in the closed state after the full door closing. When set to 'normally closed' the relay will be open after the full door closing.

6.3. Output Barrier - [inactive/ normally closed/ normally open]

If set to 'inactive' the relay is not controlled by the SDK-250. Otherwise it will open or close (depending on the setting of this option) when the photo barrier is activated or SDK-250 detects mechanical obstacle in the way of the door.

7. Photo Cell

Allows for sending signals from the optical barrier to the SDK-250. When optical barrier is not connected to the door controller, both options must be set as inactive.

7.1 External (Photo Cell) – [active/transfer/inactive]

To be set when the eternal optical barrier is connected. There is only optical barrier activation signal transmitted to the door controller. This is done through the normally closed connections in the Optical Barrier Output relay. (see fig. 3.12). Setting of external optical barrier to active state, automatically opens doors immediately after barrier activation regardless of any controlling signals.

CAUTION! The door controller retries closing door attempts when the optical barrier signal disappears. Optical barrier state testing and closing retries every 3 seconds. The door controller tries to close the door 5 times. If all 5 tries are unsuccessful, controller tries once more moving the door with minimal speed and ignoring optical barrier signals. During this operation however the possibility of mechanical obstruction is being checked.

When the option is set to 'transfer' state, SDK-250 ignores signals from the optical barrier and only controls the optical barrier relay (menu 6.3) according to the signal from the barrier.

CAUTION! Incorrect setting of the optical barrier work type can cause improper work , for example very slow closing after long waiting time.

7.2 **Internal – (Photo Cell) – [active/transfer/inactive]**

This option is used only when specialized optical barrier manufactured by GROS Controls and dedicated for SDK 250 controller is connected.

Setting of internal optical barrier to 'active' causes SDK-250 to open doors immediately after barrier activation regardless of any other controlling signals.

CAUTION! The door controller retries closing door attempts when the optical barrier signal disappear. Optical barrier state testing and closing retries every 3 seconds. The door controller tries to close the door 5 times. If all 5 tries are unsuccessful, controller tries once more moving the door with minimal speed and ignoring optical barrier signals. During this operation however the possibility of mechanical obstruction is being checked.

When the option is set to 'transfer' state, SDK-250 ignores signals from the optical barrier and only controls the optical barrier relay (menu 6.3) according to the signal from the barrier.

CAUTION! Incorrect setting of the optical barrier work type can cause improper work , for example very slow closing after long waiting time.

8. Door Chime

8.1 Chime mode – [active/ inactive] – this menu allows to choose if the door chime will be activated or not. The chime will be activated (and the signal will be audible) when the controller receives 'open' signal.

8.2 Chime type – allows to choose chime type.

8.3 Volume [%] - from 0 – 99% allows to set volume of the chime.

8.4 Chime test – execute – allows to activate chime immediately upon this menu execution. Helps during setup or maintenance.

9.Access Setup

9.1 Pass – Password – value – 000000 – 999999.

Setting the password to 000000 allows free access to the menu. Once any other password is selected and stored it will be asked each time the menu is started.

- There is no way to recover a lost password. In such cases please contact GROS Controls for assistance

10. Region

10.1 **Language –** language settings.

- SDK-250 is only capable of simultaneously having two language versions of the menu. The default languages for the Polish market version are Polish and English. Please contact GROS Controls about other language versions

11. Default set

11.1 **Restore – [execute] –** allows to return all settings to their factory defaults . The description of the factory default settings is included in the menu described in this manual.

CAUTION! Restoring all values to the factory defaults will overwrite all settings including any door / drive parameters. All initialisation and calibration procedures have to be repeated.

5. Messages

CAUTION! The last characters in either of the two lines is used for diagnostic purposes and have following meaning:

Upper line, rightmost character _ (underscore) – input J8-1 (OPEN) state is low.

^ - input J8-1 (OPEN) state is high

Lower line, rightmost character_ (underscore) – input J8-2 (CLOSE) state is low

^ - input J8-2 (CLOSE) state is high

These are not shown in the screen-shots below.

NORMAL OPERATION

Following screens are available during the normal operation

SCREEN 1

line 1: GROSControls
line2: Opening < >

```
GROSControls
Opening <>
```

line1: GROSControls
line2: Closing ><

```
GROSControls
Closing ><
```

line1: GROSControls
line2: Initiatialization

```
GROSControls
Initialization
```

line1: GROSControls
line2: Encoder Error

```
GROSControls
Encoder Error
```

SCREEN 2

line1: "Veloc.:" (actual speed value in m/s)
line2: "Curr: " (actual current in Amps)

```
Veloc.:
Curr:
```

SCREEN 3

line1: "Position: " (actual position in cm)
line2: "Counter: " (pulse counter position)

```
Position:
Counter:
```

SCREEN 4

line1: "Avar. curr:" (avarage current value calculated including opening + closing, in Amps.)

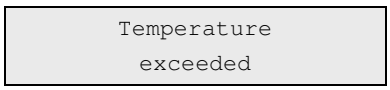
```
Avar Curr:
Max. Curr:
```

line2: "Max.curr:" (maximum value of current for opening/closing in Amps.)

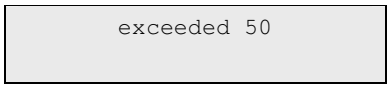
SCREEN 5
line1: "Power: " (power voltage in V)
line2: "Acu.: " (battery voltage in V)

SCREEN 6
line1: "Tight: " (value in Amps – set in the menu)
line2: "Force s.: " (value for the maximum value of the static force, in Amps)

When motor driver is overheated the message „Temperature exceeded" is displayed alternately to current screen.

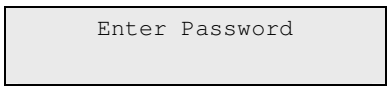


If the average current value calculated for opening+closing cycle is higher then value calculated as: (parameter „Control" *(100+ parameter "Exceeded")), then current screen is displayed alternately to the message "Maintenance required".

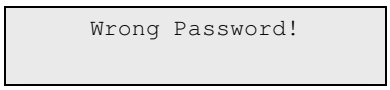


Parameter "Control" is equal to the average current for the opening+closing cycle.
Parameter "Exceeded" is equal to the permissible percentage of exceed parameter "Control".

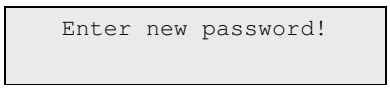
If the parameter Pass in the menu Access Setup was set to the value other then 000000, then password is required before entering menu. There is "Enter Password" message displayed to remind about it.



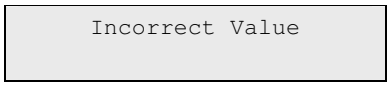
In case of wrong password entering "Wrong Password" message is displayed.



In case your password is forgotten please contact GROS Controls to receive new – single use password. Once the single use password is entered the message „Enter new password!" is displayed. User must enter new password. This operation can not be omitted.

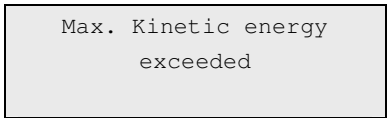


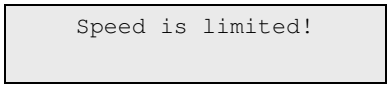
All menu parameters have their range which can be entered. If the value out of range is entered „Incorrect Value" message is displayed and edit function is continued.



Controller checks the allowed limit of the maximum kinetic energy, once parameter Weight , V opening or V closing are changed in the menu.

If the opening /closing speed is to high for the door weight then speed is automatically reduced to value corresponding to maximum allowed value of kinetic energy. (Ekmax<10J). In such a case message „Max kinetic energy exceeded" and „ Speed is limited!"





6. First power-on

- Before the first power-on, please make sure that all electrical connections are made properly. Pay special attention to the motor and encoder connections. See "Installation" section of this manual for further detail.

Having made sure that all electrical connections to the controller are made properly, position the elevator's car such that the car's door latches on to the shaft's door. Please check that all mechanical parts of the transmission (guides, rollers, bearings) are in good condition. This is necessary for proper execution of the calibration procedure.

Slide the door manually into half-open position and power up the controller. The controller will display the welcome screen, containing the software version number, and will automatically begin the initialisation procedure. As described in the previous sections of this manual, the controller will attempt to slowly close the door. Please observe carefully whether the door is moving towards closed position. Should the door begin to move towards the open position, disconnect power from the controller, reverse the motor power wiring (terminals 1 and 2 in fig. 6.1) and repeat this procedure
While the door is moving slowly towards the close position, enter the menu of the controller by holding the ESC/MENU button for 3 seconds. Entering menu will cause the door to stop moving.

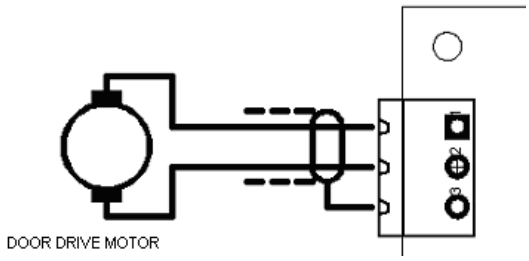


Fig. 6.1 Motor power terminals

Once in the menu, enter all parameters characterising the door, and its drive. See the section Menu for detail.

- CAUTION: Entering wrong parameters (i.e. not corresponding to actual door and drive characteristics) may cause malfunction of the door controlled by SDK 250 and/or may pose significant danger to persons using the door

When all parameters are set, please perform the Installation procedure by selecting it from the Menu (see section Menu). During installation the controller will slowly drive the door to the close position and then to the full open position. This will allow the controller to find and store the terminal positions of the door. After this motion, the controller will repeat the close-open cycle three times driving it at the pre-set speed. This will allow the controller to measure and store the average current value corresponding to normal door motion friction.

Next, execute the procedure to set the maximum allowed static driving force of the door (when it is blocked by a physical object in its way) and to set the reference value of current corresponding to the desired door holding force in open or close positions. (Calibration menu 3.3 and 3.5)

- The controller uses the entered value of the door's mass and controls the speed such as to ensure that the door never exceeds the maximum allowed kinetic energy limit.

Once all procedures described above are finished, leave the controller's menu by pressing the ESC/MENU button. Again, the initialisation procedure will start automatically and the door will move to the close position. You will see "Door closed" information on the display. The door and the controller are ready for normal operation.