Power Door PLC 24V

89110013
89110014
89110020

User Manual

Table of content

1 General information about these instructions

This manual contains important information about your product.

- ! Read the entire manual carefully. This will prevent installation errors and hazards/danger.
- ! Observe and follow these instructions, particularly the safety and warning instructions.
- ! Keep these instructions and all other product related instructions in a safe place.
- ! Follow the instructions in this manual step by step.
- ! Reliable operation is only possible if the unit is carefully installed in accordance with these instructions.
- ! The manufacturer does not take any responsibility for any consequences caused by improper use or tampering or defeat of the product/products.
- ! All PL/SIL information and associated data in this document is recommendations and the client need to perform their own risk assessment to confirm their respective safety level.
- ! The manufacturer takes no responsibility for the clients achieved safety level.
- ! Possible crushing and shearing points on the system must be considered and secured if necessary.
- ! Before moving the gate, it must be ensured that there are no persons or objects in the danger zone of the gate.
- ! Never reach into a moving gate or moving parts.

Troax Power Door may only be commissioned by a skilled person.

The product may only be used for the purpose intended by the manufacturer. Any other use is considered improper and therefore hazardous/dangerous. We cannot give any guarantee or warranty for damage/defeat caused by others or incorrect installation and are not liable for this.

Changes, additions and/or conversions to the Troax Power Door system parts which are not in accordance with the intended purpose may lead to unforeseeable hazards/danger.

More technical data, manuals and regulations can be found at www.troax.com

> ⚠️ **WARNING**
>
> **If the instructions are not followed, the system may be defective!**

Penetrating moisture or dirt can permanently damage or destroy the system.
Incorrectly connected cables can lead to malfunctions or destruction of the system.

2 System description

2.1 General

Figure 2-1 Single Sliding Door assembly with Power Door Single Rail PLC 24V

Troax Power Door is a system designed to enable motorized opening and closing of gates using a PLC.

Power Door is built to be combinable with Troax machine guarding systems "Single Sliding Door" and "Linear Sliding Door" configurations.

The Power Door system is a 24V DC system.

Note: Power Door do not have safety classified sensors and extra sensors may be needed to achieve required safety demand.

2.2 Single Sliding Door

Figure 2-2

Single sliding door can be built from our mesh, polycarbonate or steel sheet panels to fit your chosen machine guard system.
Single sliding door can be built with both 60x40 and 80x80 posts.
Combining this with our "Power Door Single Rail PLC 24V" gives you a motorized gate controllable from a PLC.
The standard opening width is approximately 700-3,000 mm.

2.3 Linear Sliding Door

Figure 2-3

The linear sliding door can be built with our mesh and polycarbonate panels to fit your chosen machine guard system.
Linear sliding door can be built with both 60x40 and 80x80 posts.
Combining this with our "Power Door Linear PLC 24V" gives you a motorized gate controllable from a PLC.
The standard opening width is approximately 1,800-4,000 mm.

3 Parts of Power Door system

3.1 Door system

3.1.1 Power Door Single Rail PLC 24V

(Art nr: 89110013)
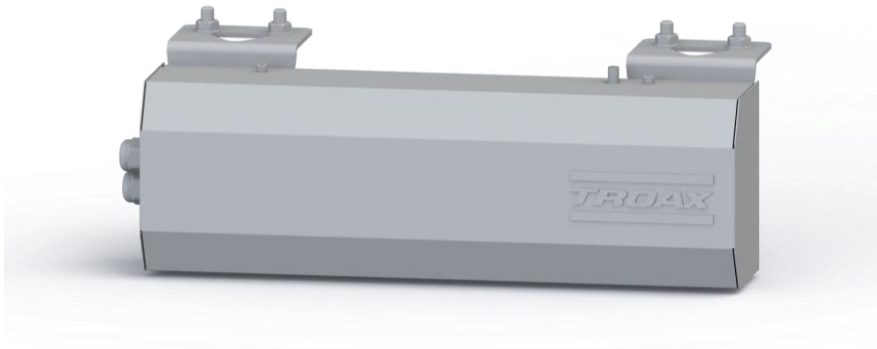
Figure 3-1

The power door single rail PLC 24V is used in combination with a single sliding door. Inside Power Door Single Rail PLC 24V there is a 47-40-MC control unit. This part of the control unit is controlled by the 47-40-L control unit.

3.1.2 Power Door Linear PLC 24V

(Art nr: 89110014)
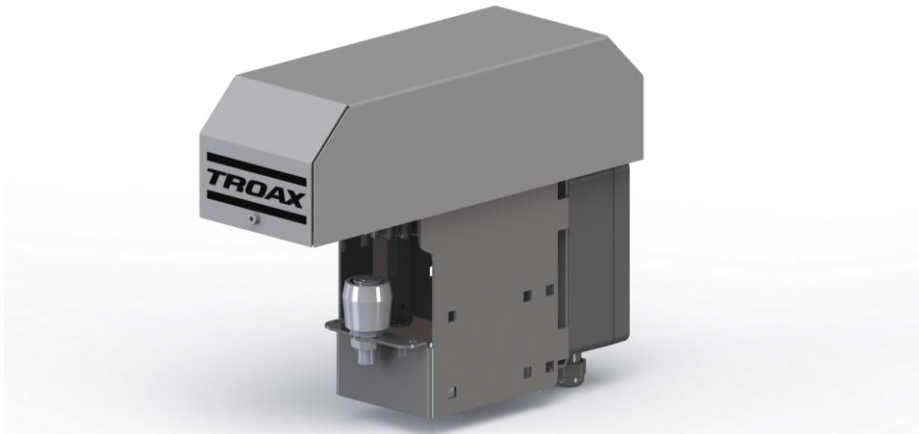
Figure 3-2

The power door linear PLC 24V is used in combination with a linear sliding door. Inside Power Door Linear PLC 24V there is a 47-40-MC control unit. This part of the control unit is controlled by the 47-40-L control unit.

3.1.3 Power Door Control Box PLC 24V

(Art nr: 89110020)
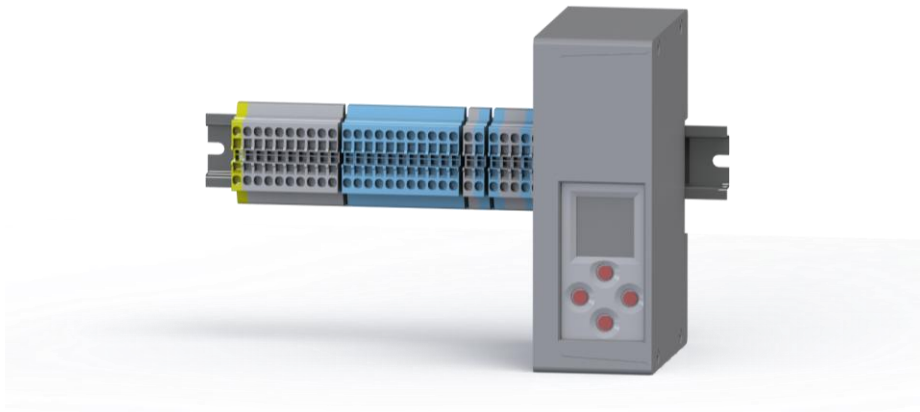
Figure 3-3

This control unit controls the motor unit(s).

Inside Power Door Control Box PLC 24V there is a 47-40-L control unit.

For more information on the control box see chapters:

6.6 Control unit display.

6.7 Control unit menu.

Note: The power door control box PLC 24V must be placed in a separate IP classified enclosure.

Depth: 107 mm
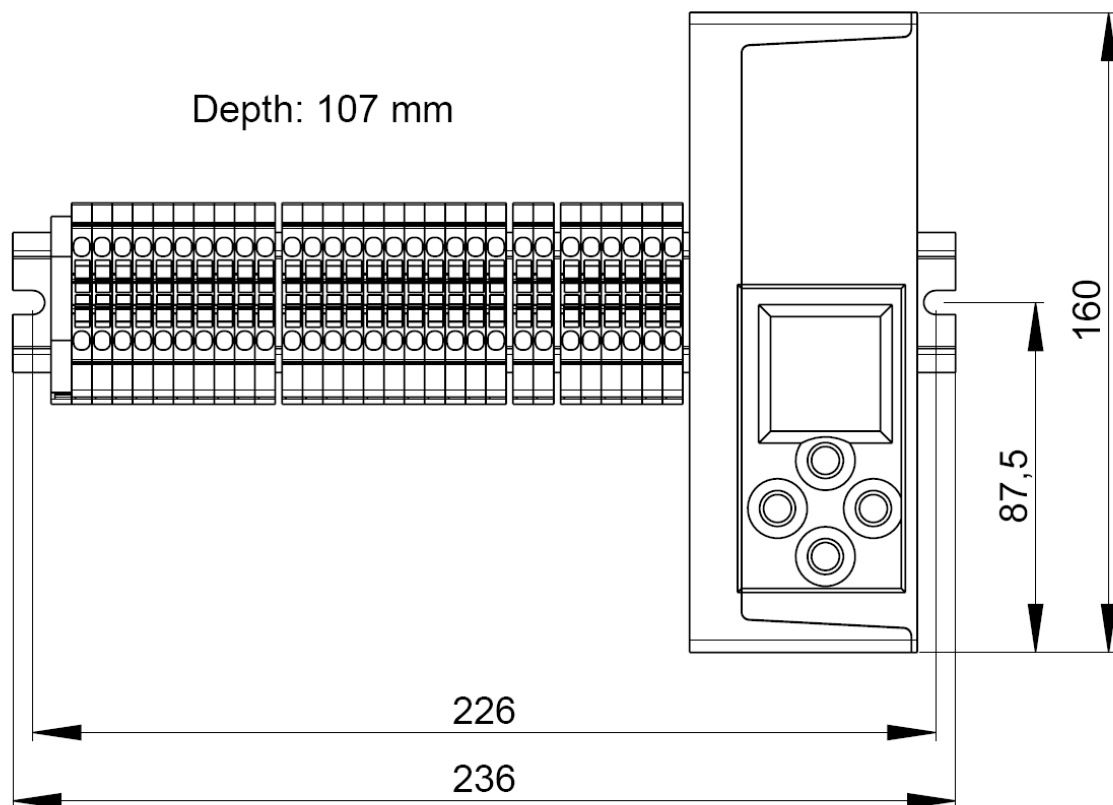
Figure 3-4

3.2 Accessories

3.2.1 Toothrack Single Rail 300mm, with holder

(Art nr: 89110002)
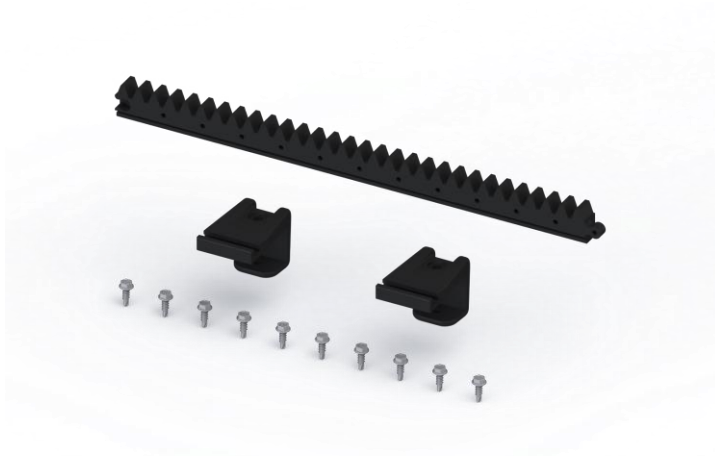
Figure 3-5

The toothrack single rail 300mm, with holder is used in combination with a single sliding door.

3.2.2 Toothrack Linear 300mm, with holder

(Art nr: 89110005)
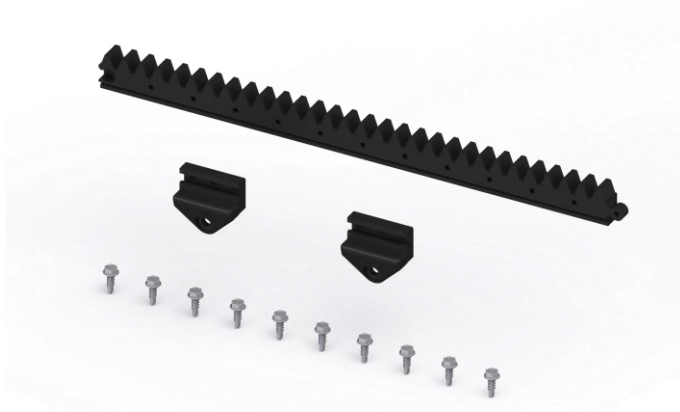
Figure 3-6

The toothrack linear 300mm, with holder is used in combination with a linear sliding door.

3.2.3   Power Door Reset Wire

(Art nr: 89110022)

Figure 3-7

The Power Door Reset wire can be connected to any of the motors to enable resetting of the emergency release without needing to remove the motor cover.

3.2.4   Power Door Magnets & Screws

(Art nr: 89110023)

Figure 3-8

The Power Door Magnets & screws includes spare magnets and screws that comes with every motor, if any of the original becomes damaged or lost this article can be ordered to replace the broken/lost part(s).

4 Installation guide mechanic:

4.1 Power Door Single Rail PLC 24V

Mechanical installation guide in separate document to be found at:

Figure 4-1

qr.troax.com/qr-88754814/

4.2 Power Door Linear PLC 24V

Mechanical installation guide in separate document to be found at:
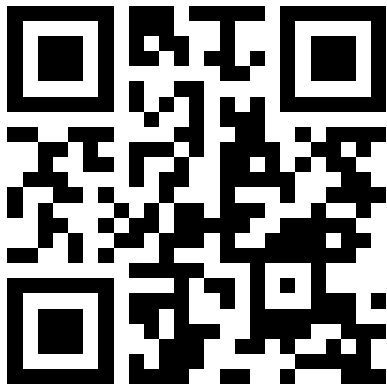
Figure 4-2

qr.troax.com/qr-88754815/

4.3 Power Door Reset Wire

Mechanical installation guide in separate document to be found at:

Figure 4-3

qr.troax.com/qr-88754818/

5 Installation guide electric:

> ## DANGER
>
> ⚠️ Disconnect the system from the power supply before carrying out any work.

- Electrical connections must only be connected by a skilled/licensed person.
- Ensure that the on-site electrical installation complies with the relevant safety regulations.
- To avoid hazards/danger, a damaged cable must be replaced with an intact cable by a skilled/licensed person.
- Reliable operation is only possible if the unit is carefully installed in accordance with these instructions.
- Switch on the main voltage only after a second inspection.

5.1 Connecting Power Door Control Box PLC 24V
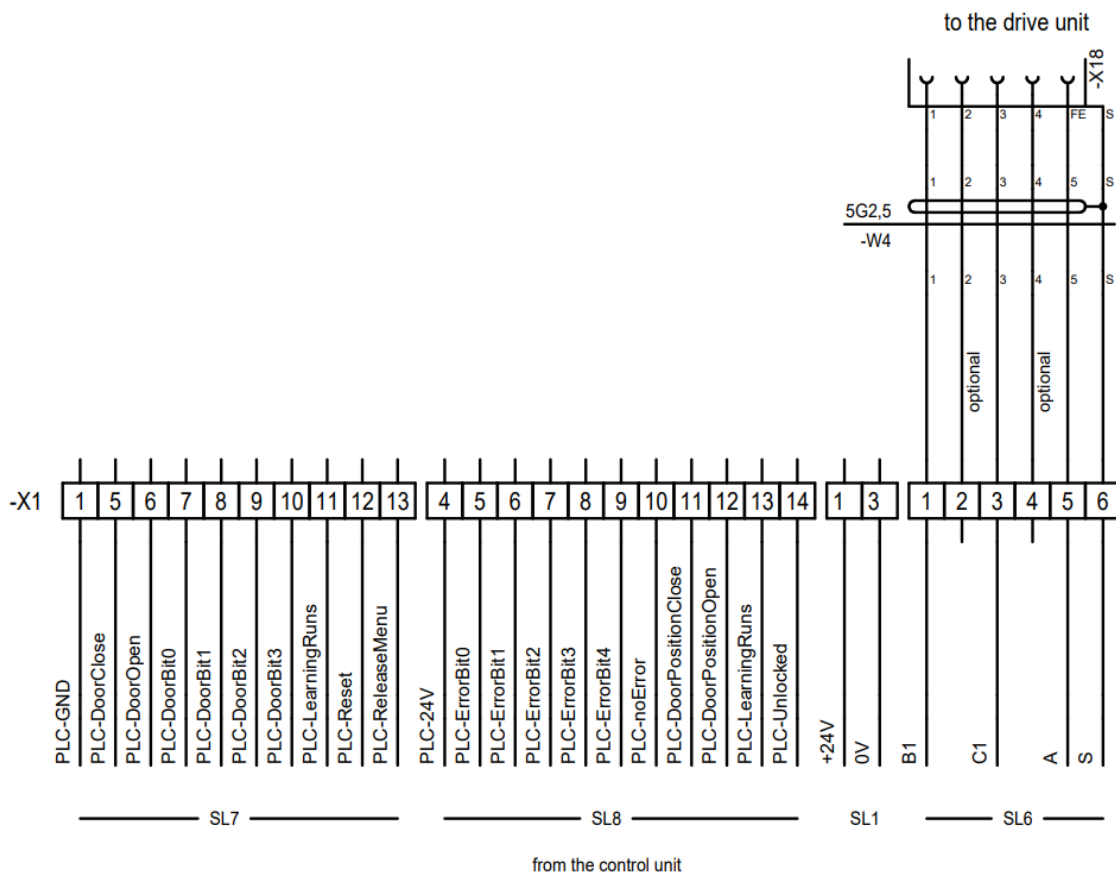
Figure 5-1

Note: SL7 is input signals from PLC output, SL8 is output signals to PLC input.

5.1.1   Connecting to PLC

Connecting the Power Door Control Box to your PLC requires a minimum of these connections:

- SL7
  - 1: Connected to PLC ground.
  - 5: Connected to PLC output to receive signal when a gate should close.
  - 6: Connected to PLC output to receive signal when a gate should open.
  - 12: Connected to PLC 24V.
- SL8
  - 4: Connected to PLC 24V.
- SL1
  - 1: Connected to 24V, min 4A.
  - 3: Connected to 0V.
- SL6
  - 1: Connected to motor terminal block SL3 B.
  - 3: Connected to motor terminal block SL3 C.
  - 5: Connected to motor terminal block SL3 A.
  - 6: Connected to shielding in cable.

Additional connections that can be made:

- SL7
  - 7: Door Bit 0, Connected to PLC output to control different gates.
  - 8: Door Bit 1, Connected to PLC output to control different gates.
  - 9: Door Bit 2, Connected to PLC output to control different gates.
  - 10: Door Bit 3, Connected to PLC output to control different gates.
  - 11: Connected to PLC output to receive signal when a gate should perform a Learning Run.
  - 13: Activate to unlock the settings "Open power stop", "Close power stop" and "Speed" in the menu.
- SL8
  - 5: Error Bit 0, Connect to PLC input to receive errors from selected gate.
  - 6: Error Bit 1, Connect to PLC input to receive errors from selected gate.
  - 7: Error Bit 2, Connect to PLC input to receive errors from selected gate.
  - 8: Error Bit 3, Connect to PLC input to receive errors from selected gate.
  - 9: Error Bit 4, Connect to PLC input to receive errors from selected gate.
  - 10: Connect to PLC input to receive "No errors" signal from selected gate.
  - 11: Connect to PLC input to receive "Gate closed" signal from selected gate.
  - 12: Connect to PLC input to receive "Gate open" signal from selected gate.
  - 13: Connect to PLC input to receive "Learning Run complete" signal from selected gate.
  - 14: Connect to PLC input to receive "Gate emergency release NOT-pulled" signal from selected gate.

5.1.2 Connecting to other applications (NOT PLC)

Connecting the Power Door Control Box to non-PLC applications requires these features of the connected application:
- 24V, min 4A.
- 0V.
- Minimum one controllable 24V output.

Extra requirements:
- Control Box needs to be placed in separate, properly IP-classified enclosure.

Restrictions of using the Control Box with non-PLC applications:
- Only one motor can be connected to each Control Box.

Connecting the Power Door Control Box to remote control, buttons or similar non-PLC application requires a minimum of these connections:
- SL7
    - 1: Connected to 0V.
    - 6: Connected to application output to receive signal when the gate should open.
    - 12: Connected to 24V.
- SL8
    - 4: Connected to 24V.
- SL1
    - 1: Connected to 24V, min 4A.
    - 3: Connected to 0V.
- SL6
    - 1: Connected to motor terminal block SL3 B.
    - 3: Connected to motor terminal block SL3 C.
    - 5: Connected to motor terminal block SL3 A.
    - 6: Connected to shielding in cable.

Additional connections that can be made:
- SL7
    - 5: Connected to application output to receive signal when the gate should close.
    - 13: Activate by connecting 24V to unlock the settings "Open power stop", "Close power stop" and "Speed" in the menu.

Notes:
- If only one controllable 24V signal is possible then this should be set to open the gate, the gate can then be set to close automatically after a set time. See chapter: 6.7.13 Auto close.
- Outputs from the Control Box can still be connected to a separate PLC if the gate is to be monitored but only controllable by separate application.
- Photocell connected to the motor control board can still be used in this application. See chapter: 5.2.5 Connecting a photocell.

5.2 Connecting motor unit

Figure 5-2 Motor unit control board

Figure 5-3

5.2.1 Connecting to control unit/previous motor unit

The motor unit is connected to the control unit or to the previous motor unit via the 3 x 2-pole terminal block SL3.
The shielding is connected to terminal S8 with a 2.8 mm blade terminal (not included).

5.2.2 Connecting to subsequent motor unit

The motor unit is connected to a subsequent motor unit via the 3 x 2-pole terminal block SL2.
The shielding is connected to terminal S1 with a 2.8 mm blade terminal.

5.2.3 Connecting a limit switch

The limit switch for the open position and the limit switch for the closed position are pre-connected to terminal block SK3, terminals "ES1" and terminals "ES2". Potential-free normally closed contacts (NC) must be used as limit switches.
When changing the direction of rotation of the motor via the "Motor direction of rotation" menu, the limit switches are switched over in the software and do not need to be reconnected.

5.2.4 Emergency unlocking

A potential-free NC contact (NC) is connected to terminal block SK3, terminals "NOTENT.", which signals to the control unit and, via the control unit, to the higher-level main controller whether the motor is in the locked or unlocked state.
Note: If no NC contact is connected, the input must be terminated with a cable jumper, this is not recommended.

⚠️ As long as this input is activated (no cable jumper or unlocked), it is not possible to start the engine!

5.2.5 Connecting a Photocell/Light barrier

A 24 V photocell/light barrier with a potential-free NC contact can be connected to terminal block SK4. To do this, connect the switching contact of the light barrier to the "LS" terminals of the terminal block. Connect the operating voltage of the light barrier to the "GND" terminal (negative contact) and to the "+24V" terminal (positive contact).

⚠️ The light barrier is only effective when closing.
Closing is not possible when the input is activated. If no light barrier is connected, the "LS" terminals must be terminated with a cable jumper.
The "Light barrier" menu can be used to select whether the control unit releases or reverses the gate after the light barrier is triggered. See chapter: 6.7.7 Light barrier.
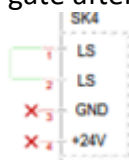
Figure 5-4

6 Commissioning:

Before commissioning can be executed safely a visual inspection needs to be performed.

6.1 Visual inspection

Before commissioning a gate, a visual inspection is required to validate the mechanical installation and make sure no damages will occur by starting the commissioning process.
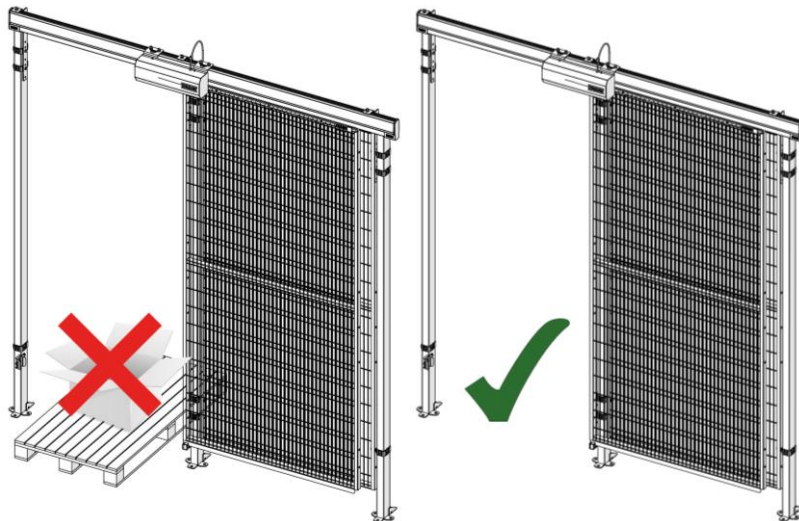
Figure 6-1

1. Make sure no object or person is in the way of the gate and that it is clear to stay away from the gate area during the commissioning process.

   ⚠️ The gate moves with maximum strength and without safety features during the "Learning Run" in the startup process.
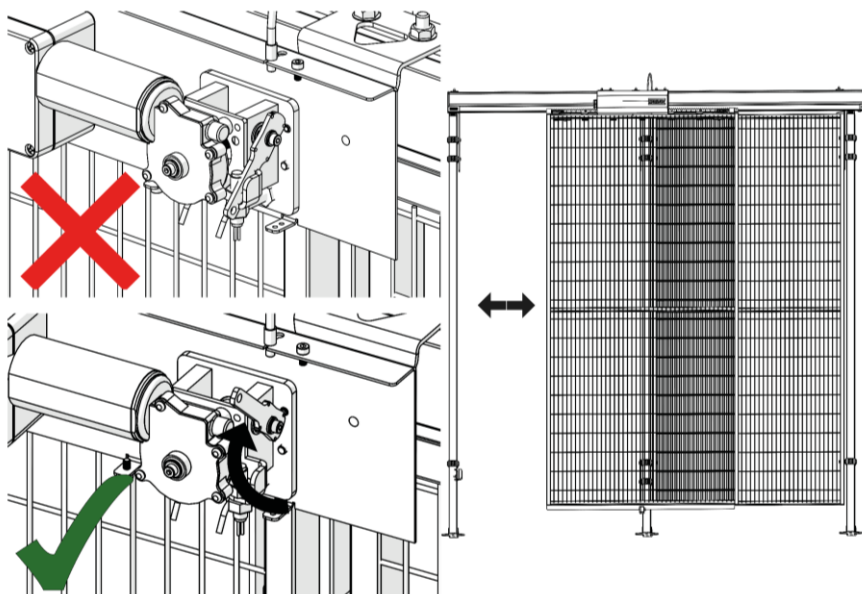
Figure 6-2

2. Make sure the gate runs freely to both end positions by pulling the emergency release and manually moving the gate.
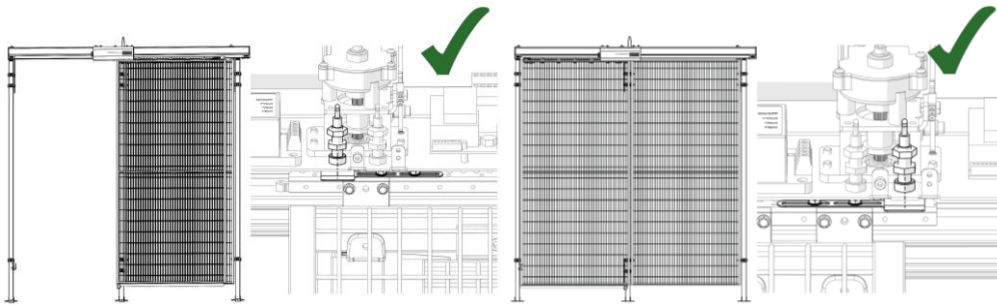
Figure 6-3

3. Make sure the magnets are properly positioned so that they align with the sensors when the gate is in its end positions.
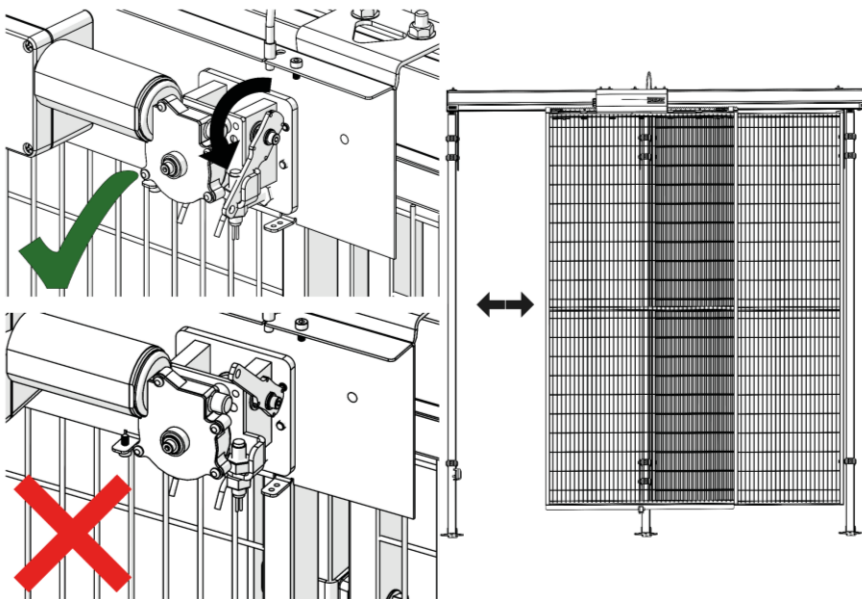
Figure 6-4

4. Make sure to reset the emergency release before commissioning can begin.
    Note: Reset by pulling an installed Reset wire or by removing the motor casing to reset the emergency release manually.

After the visual inspection have been performed without encountering faults/problems the commissioning of the gate can be executed.

6.2 Connecting one motor

Note: When connecting only one motor there is no need to program what motor you want to operate.

6.2.1 Quick start guide

- Make sure the motor rotary switch is set to 0.

Figure 6-5

- Connect the motor and the control unit.
- Connect the required connections for your application to the PLC.
- If the gate is opened to the left, as seen from outside, change the motor rotation direction to DIN-Left.
- Do "Learning Run" in the control units built in screen or with commands through the PLC.
- Now the gate can be controlled from the PLC.

6.2.2   Detailed installation guide

When installing only one motor with a control box there is no need to be able to talk to different motors from the PLC.

To avoid needing to connect PLC-DoorBit0-3 (SL7, 7-10) which is used to select what motor to talk to the motor rotary switch can be set to 0 which is equal to not having any signals from the PLC on PLC-DoorBit0-3 (SL7, 7-10). This way the motor will always be selected without needing extra input from the PLC.

Figure 6-6

- Start by setting the motor rotary switch to 0.

The motor is connected to the control box with a Shielded cable 3x2.5mm², the maximum length of cable between the control box and the motor is 50M.
- Connect the motor and the control box together.

To communicate between the control box and the PLC the PLC and control box needs to be connected between the PLC's out/in connection (24V) and the terminal block of the control box. What connections that need to be made depends on the needs of the specific installation.
- Connect the control box with the PLC and a 24V power source of minimum 4A.

Learning run is an automatic setup of a gate where the control box learns how heavy the gate is and how wide the opening is by opening and closing the gate several times, it also adjusts the speed and force settings appropriately for the information received from the setup.

Learning run needs to be done after starting the system for the first time and later if any changes have been made to the gate.

Learning Run can be done in the control units built in screen by performing the Learning Run, this can also be done with commands through the PLC, PLC-Learning runs (SL7, 11).
- Set the motor rotation direction.

Note: The motor rotation direction is preset to DIN-Right.
- Do "Learning Run" for the gate.

When the Learning Run is complete the system is set up and ready to be used.

6.3 Connecting two or more motors

Note: only one gate can be active at any time, this gate must also be actively selected for the entire operation.

6.3.1 Quick start guide

- Make sure the motors rotary switches are set to different values.

Figure 6-7

- Connect the motors to each other and to the control unit.
- Connect the required connections for your application to the PLC.
- If the gate is opened to the left, as seen from outside, change the motor rotation direction to DIN-Left.
- Do "Learning Run" for each gate by selecting the gate in the control units built in screen and then performing the Learning Run, this can also be done with commands through the PLC.
  Note: Each gate needs to finish its Learning Run before the next gate can begin.
- Now the gates can be controlled from the PLC.

6.3.2 Detailed installation guide

When installing 2 or more motors to the same control unit, every motor needs to have a unique identity. This is set with the rotary switch in the electrical box of each motor. 16 unique identities can be set by the rotary switch, and therefore up to 16 motors can be connected to one control box.

Figure 6-8

- Start by setting each motor to a unique identity.

The motors are connected to each other and to the control box with Shielded cable 3x2.5mm², the maximum length of cable between the control box and the last motor is 50m.
- Connect all the motors and the control box together.

To communicate between the control box and the PLC the PLC and control box needs to be connected between the PLC's out/in connection (24V) and the terminal block of the control box. What connections that need to be made depends on the needs of the specific installation.
In order to select what motor to send commands to the PLC-DoorBit0-3 (SL7, 7-10) needs to be connected.

⚠️ A gate will only be able to operate (open/close) and send information back to the PLC while it is selected with the PLC-DoorBit0-3.

⚠️ Only one gate can be selected at the same time.
- Connect the control box with the PLC and a 24V power source of minimum 4A.

Learning run is an automatic setup of a gate where the control box learns how heavy the gate is and how wide the opening is by opening and closing the gate several times. It also adjusts the speed and force settings appropriately for the information received from the setup.

⚠️ Learning run needs to be done individually for each gate after starting the system for the first time and later if any major changes have been made to the gate.
Learning Run can be done by selecting the gate in the control units built in screen and then preforming the Learning Run, this can also be done with commands through the PLC, PLC-Learning runs (SL7, 11). Remember to keep the gate selected until the Learning Run is complete if preformed through the PLC.
- Set the motor rotation direction for each gate.
Note: The motor rotation direction is preset to DIN-Right.
- Do "Learning Run" for each gate.

When all Learning Runs are complete the system is set up and ready to be used.

6.4 DIN-Left / DIN-Right
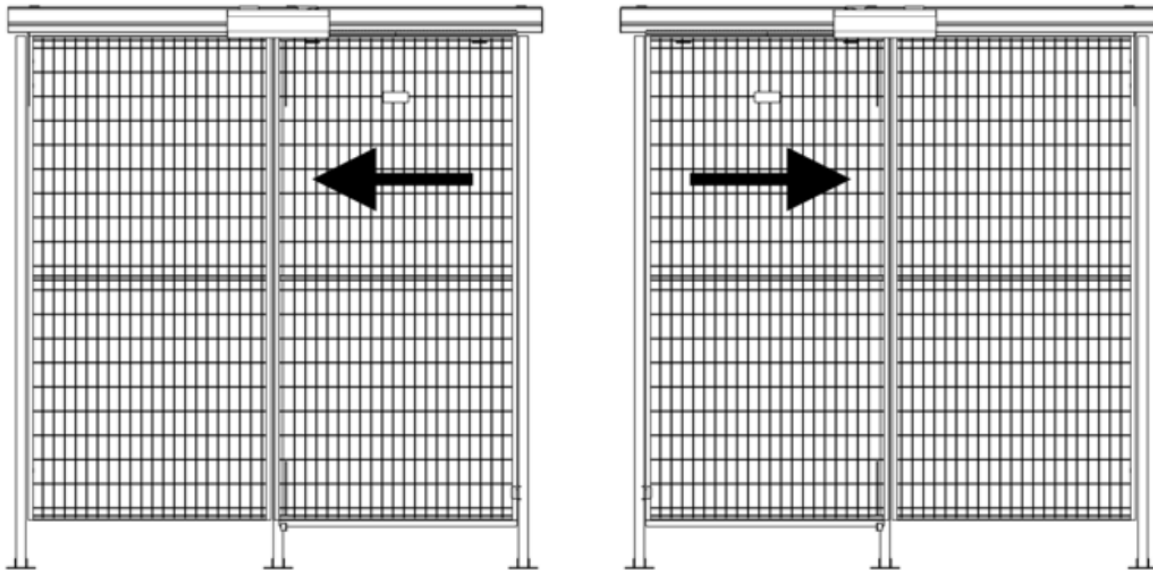
Figure 6-9

DIN-Left is a gate that opens to the left side when seen from the outside.
DIN-Right is a gate that opens to the right side when seen from the outside.
Notes:
- For Single sliding door the motor is on the outside of the gate.
- For Linear sliding door the motor is on the inside of the gate.

If the DIN-Direction is changed a new Learning Run will have to be performed.

6.5 Gate Bit number selection table

Gate number	Bit 0	Bit 1	Bit 2	Bit 3	Rotary switch
1	1	0	0	0	1
2	0	1	0	0	2
3	1	1	0	0	3
4	0	0	1	0	4
5	1	0	1	0	5
6	0	1	1	0	6
7	1	1	1	0	7
8	0	0	0	1	8
9	1	0	0	1	9
10	0	1	0	1	A
11	1	1	0	1	B
12	0	0	1	1	C
13	1	0	1	1	D
14	0	1	1	1	E
15	1	1	1	1	F
16	0	0	0	0	0

Figure 6-10

Figure 6-11-Rotary switch

The motor unit to be controlled by the main controller is selected via the gate bit inputs. The rotary switch in the corresponding motor unit must be set according to the Gate Bit number selection table.

⚠ In systems with more than one motor unit, no gate number may be set more than once in the motor units.

6.6 Control unit display
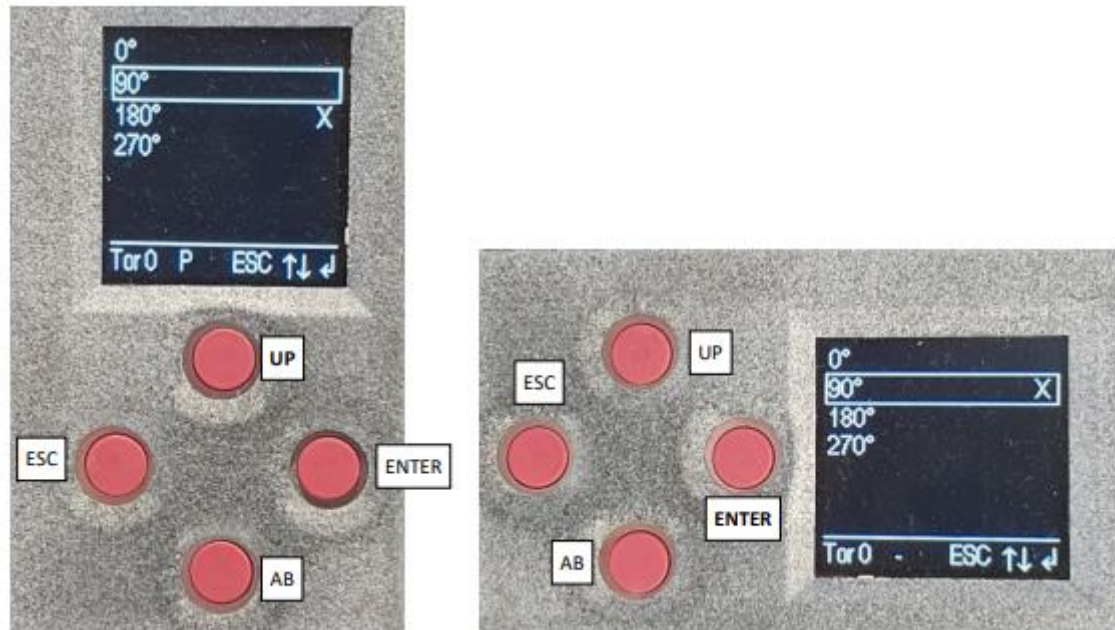
Figure 6-12

The control unit can be used to make settings in the control unit and in the selected motor unit and to operate the selected motor unit.

As soon as the menu of the control unit has been called up and the control unit is now in menu mode, control via PLC is not possible. All commands are ignored. This is indicated to the PLC by the error number 0.

Four buttons are available to the user for operating the control unit.

The assignment of the ESC, UP, DOWN and ENTER/MENU functions to the four buttons depends on the "Rotate display" setting. If you can read the display, the left button is set for ESC, the top middle button for UP, the bottom middle button for DOWN and the right button for ENTER.

Press the ENTER button to switch from PLC mode (operation via the main controller is possible) to menu mode (operation via the main controller is not possible).

Use the "UP" and "DOWN" buttons to select the sub-menu item or the new parameter. Use the "ENTER" button to either call up the sub-menu or confirm the selected parameter. The selected parameter is marked with an X. Press the "ESC" button to return to the previous menu level or exit the menu mode and the Control unit is back in PLC mode and can be operated from the main controller.

6.7 Control unit menu

6.7.1 Layout Table

Menu item
       Sub-menu **item/parameter/value range**
          Parameter/value range
	Description	Default

Language		
Deutsch		
English		X
Francais		
Nederlands		
Polski		
Español		
Italiano		
Current motor unit		
Gate 0	Gate number 16	X
Gate 1	Gate number 1	
Gate 2	Gate number 2	
Gate 3	Gate number 3	
Gate 4	Gate number 4	
Gate 5	Gate number 5	
Gate 6	Gate number 6	
Gate 7	Gate number 7	
Gate 8	Gate number 8	
Gate 9	Gate number 9	
Gate A	Gate number 10	
Gate B	Gate number 11	
Gate C	Gate number 12	
Gate D	Gate number 13	
Gate E	Gate number 14	
Gate F	Gate number 15	
Motor rotation direction		
DIN-Left		
DIN-Right		X
Learning Run		
Learning Run		
Extended menu		
Rotate the display		
0°	Rotation 0°	
90°	Rotation 90°	
180°	Rotation 180°	X
270°	Rotation 270°	
Light barrier		
reverse		X
release		
Command		
with stop	Open/Stop/Open, Close/Stop/Close	X
without stop	Open, Close	
Open power stop **Note: PLC-ReleaseMenu must be active to enter this menu.**		
Blanking		
0.5-3.0	Blanking time in 0.5 s steps	1.5
Set		
5-100	Addition value in %	35

Figure 6-13

Close power stop **Note: PLC-ReleaseMenu must be active to enter this menu.**		
Blanking		
0,5-3,0	Blanking time in 0.5 s steps	1.5
Set		
5-100	Addition value in %	35
Speed **Note: PLC-ReleaseMenu must be active to enter this menu.**		
Open end speed		
20-100	Speed in %	60
Close end speed		
20-100	Speed in %	60
Start-up speed		
5-100	Speed in %	30
Acceleration		
1-20	Acceleration in cm/s²	10
Brake ramp 1		
1-20	Acceleration in cm/s²	4
Open soft run		
Speed		
20-100	Speed in %	35
Outlet path		
0-100	Distance in % of running distance	15
Close soft run		
Speed		
20-100	Speed in %	35
Outlet path		
0-100	Distance in % of running distance	15
Delete values		
Weights and forces		
Settings		
Auto close		
off		off
1-90 sec, 2-10 min		
Info		
Trip counter		
Version Logic		
Motor control version		
Logbook (status)		
Logbook entries		
Logbook (Secure)		
Logbook entries		
Teach in mode		
All parameters		X
Weights and forces		
Date/Time		
Date/Time		
Manual control		
OPEN		
STOP		X
CLOSE		

Figure 6-14

Note: Open/Close power stop & Speed require that PLC-ReleaseMenu is active to be able to make changes (SL7, 13).

6.7.2 Language

Set the preferred language here.
Use the UP / DOWN button to select the desired language for the display and confirm with the ENTER button.

6.7.3 Current motor unit

All 16 gate numbers, 0-9, A-F, are listed here in tabular form.
You can select the motor unit that you want to set or control.

⚠ In this menu, you can see the connected motor units (active) and free gate numbers (inactive). You can also check whether gate numbers have been assigned more than once (collision). In this case, the gate number must be changed to a free gate number (inactive) using the selector switch in the corresponding motor unit.
Use the UP / DOWN button to select the motor unit and confirm with the ENTER button.

6.7.4 Motor rotation direction

If the gate closes with an "Open door" command or opens with a "Close door" command, change the direction of rotation of the motor here.
Correctly connected limit switches are also switched in their function between "Limit switch open" and "Limit switch closed" by this and do not need to be additionally reconnected.
Use the UP / DOWN button to select the desired motor rotation direction and confirm with the ENTER button.

6.7.5 Learning Run

In this menu, you have the option of carrying out learning run with the selected motor unit.

⚠ Learning run needs to be performed for each individual motor unit for the motor unit to function.

⚠ The gate moves with maximum strength and without safety features during the "Learning Run" in the startup process.
A gate missing Learning Run is shown as "Learning Run – ".
A gate with completed Learning Run is shown as "Learning Run X".
Press the ENTER button to start the learning run.

6.7.6 Rotate the display

Use the UP / DOWN button to select the desired direction of rotation of the display and confirm with the ENTER button.

6.7.7   Light barrier

If a Photocell/Light barrier is connected, this menu can be used to select how the control unit should react when the light barrier is triggered.
When reversing, the supply is stopped, and the movement is reversed to the end position OPEN. In contrast, when releasing, only a short reversal of movement is carried out after stopping.
Use the UP / DOWN button to select the desired setting and confirm with the ENTER button.

6.7.8   Command

If set to "with stop" an open/close command opens/closes the gate, a second open/closing command during the opening/closing process stops the gate.
If set to "without stop" an open/close command opens/closes the gate, a second open/closing command during the opening/closing process does nothing.
Use the UP / DOWN button to select the desired setting and confirm with the ENTER button.

6.7.9   Open power stop / Close power stop

⚠ PLC-ReleaseMenu must be active to enter this menu (SL7, 13).

⚠ Manual changes in this menu may cause risk/danger/injury.
The blanking time specifies the time the motor needs to start before an obstacle can be detected.
With the addition value (Set), the obstacle detection can be set to be more sensitive (reduce value) or less sensitive (increase value).
Use the UP / DOWN button to select the corresponding sub-menu item and confirm with the ENTER button. In the sub-menu, you can change the value using the UP / DOWN button. Press the ENTER button to confirm the new value.

6.7.10   Speed

⚠ PLC-ReleaseMenu must be active to enter this menu (SL7, 13).

⚠ Manual changes in this menu may cause risk/danger/injury.
The gate speed can be changed here. The maximum speed (100 %) is 20 cm/s.
The start-up speed and acceleration can also be set here. If the gate is difficult to start, the Start-up speed can be increased so that the motor can apply more force when starting. The acceleration is used to set how quickly the final speed should be reached after starting.
Use the UP / DOWN button to select the corresponding sub-menu item and confirm with the ENTER button. In the sub-menu, you can change the value using the UP / DOWN button. Press the ENTER button to confirm the new value.

6.7.11 Open soft run / Close soft run

In this menu, you can set the soft run-out speed and the length of the run-out path. The maximum soft stop speed (100 %) is 20 cm/s. The length of the run-out distance is specified as a percentage of the distance traveled.
Use the UP / DOWN button to select the corresponding sub-menu item and confirm with the ENTER button. In the sub-menu, you can change the value using the UP / DOWN button. Press the ENTER button to confirm the new value.

6.7.12 Delete values

In this menu, it is possible to delete the paths and forces learned in the current motor unit or to reset all settings of the control unit and the selected motor unit to the default values. In both cases, new learning run must be carried out for the selected motor unit.
Use the UP / DOWN button to select whether you only want to delete the paths and forces or the settings. Press the ENTER button to execute the selected deletion process.

6.7.13 Auto close

Automatic closing is deactivated by default. If a time is set, the control unit will close the gate after this time has elapsed.
Use the UP / DOWN button to select the desired hold-open time and confirm with the ENTER button. A hold-open time of less than 1 second (off) deactivates the automatic closing function.

6.7.14   Info

Trip counter, the cycles (openings and closings) of the currently selected motor unit are displayed here.
Version Logic, the software version of the control unit is displayed here.
Motor control version, the software version of the selected motor unit is displayed here.

Logbook (status)
The Logbook Status has 252 entries. These are organized on 84 pages with 3 entries. You will find the following information for each entry:

Page 001
09.03.2023 10:36:03 (Entry 4: Timestamp)
Status 026 0   (Status, Status value, Gate number)
09.03.2023 10:36:02 (Entry 5: Timestamp)
Status 250 0   (Status, Status value, Gate number)
09.03.2023 10:36:02 (Entry 6: Timestamp)
Status 251 0   (Status, Status value, Gate number)

Logbook (Secure)
The Logbook (secure) Status has 252 entries. These are organized into 3 entries on 84 pages. Each entry is displayed in two lines. You will find the following information for each entry:

Page 010
09.03.2023 15:33:39 (Entry 31: Timestamp)
Parameter 101 000 0 (Parameter number, Parameter value, Gate number)
09.03.2023 08:12:01 (Entry 32: Timestamp)
Parameter 031 000 0 (Parameter number, Parameter value, Gate number)
07.03.2023 11:25:14 (Entry 33: Timestamp)
Parameter 002 237 0 (Parameter number, Parameter value, Gate number)

6.7.15   Teach in mode

If set to "All parameters", the speed and the Open/Close soft run settings are set during the Learning Run.
If set to "Weights and forces", the Learning run are carried out without changing the preset speeds and Open/Close soft run settings.
After switching on the operating voltage, the learning mode is automatically set to "All parameters".
If manual settings have been made in Speed or Open/Close soft run, the teach in mode automatically changes to "Weights and forces".
Use the UP / DOWN button to select the desired teach in mode and confirm with the ENTER button.

6.7.16 Date/Time

Here you can set the time and date of the integrated real-time clock.
You can use the UP / DOWN button to change the value at which the cursor
is positioned. If you confirm the new value with the ENTER button, the
cursor jumps to the next value to be set. If you press the ESC button, the
cursor jumps to the previous value to be set without making a change.
Press the ENTER button repeatedly to exit the menu and accept the new
date and time. Press the ESC button repeatedly to exit the menu without accepting the new
date and time.

6.7.17 Manual control

In this menu, you have the option of controlling the selected motor unit. You can give the
motor unit an OPEN command to open the gate, a STOP command to stop the gate or a
CLOSE command to close the gate.
Use the UP / DOWN button to select the desired command to the motor unit and press the
ENTER button to execute the selected command.

7 Connection/Setup examples

Following are some examples of how the Power Door system can be connected.

7.1 Two sliding doors and one linear door

The gates are connected to a PLC that can Open/Close and receives signals back for when the gates are Opened/Closed and if the emergency release is pulled.
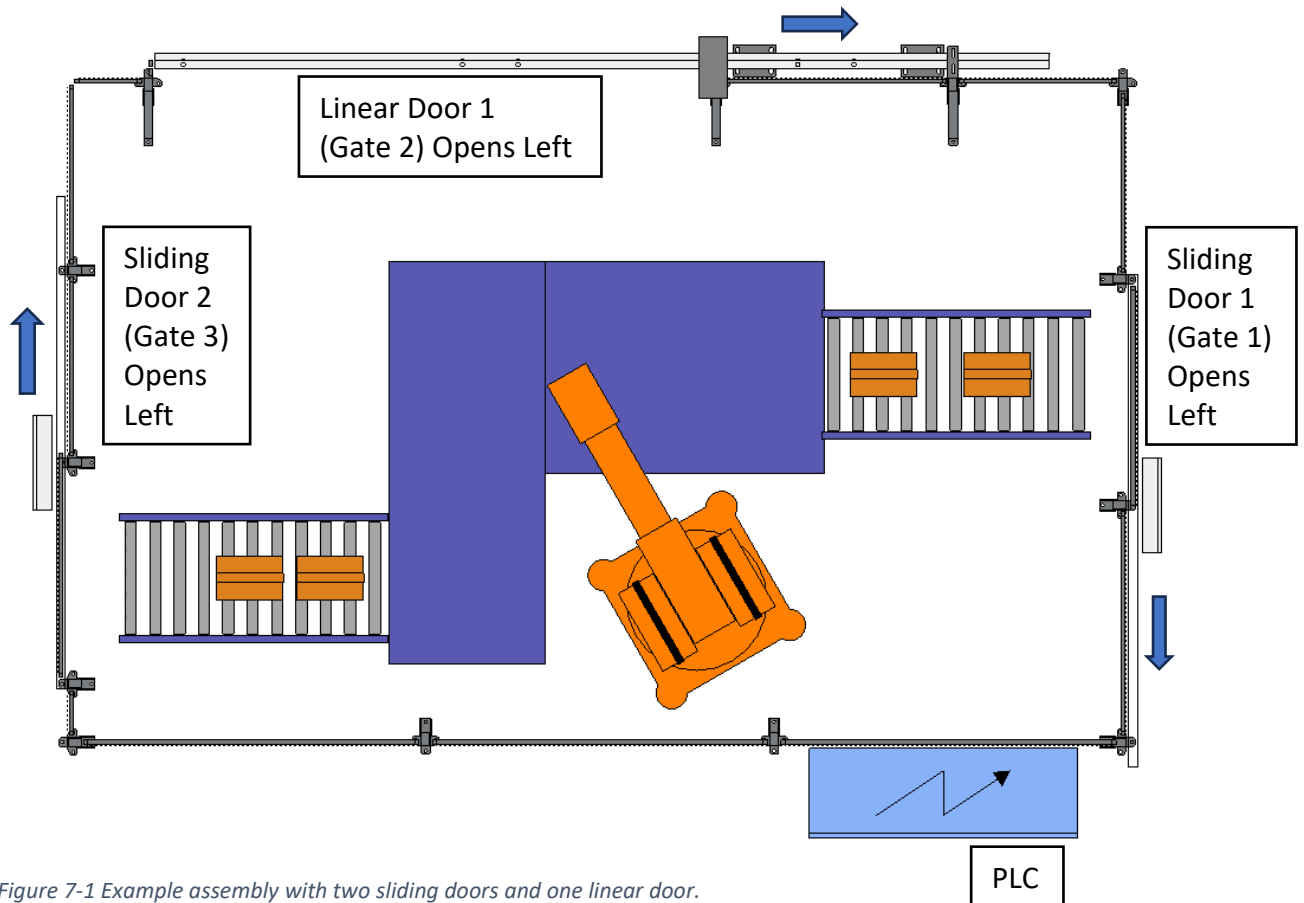
Figure 7-1 Example assembly with two sliding doors and one linear door.

Figure 7-2

- Connections to control box is done as above.
- Gate 1 rotary dial is set to 1.
- Gate 2 rotary dial is set to 2.
- Gate 3 rotary dial is set to 3.
- Gate 1 is set as DIN-Left.
- Gate 2 is set as DIN-Left.
- Gate 3 is set as DIN-Left.
- Learning Run is performed on each individual gate.
- PLC is programed to open and close the individual gates and to see the input signals (door opened/closed & emergency release pulled).

Note: Only one gate can be operated or monitored at a time, during opening/closing the gate needs to be continuously selected by the Gate Bits.

7.2 One linear door

This gate is connected to a PLC that can Open/Close and receives signals back for when the gate is Opened/Closed.
Gate is opened to the right.

Figure 7-3

- Connections to control box is done as above.
- Gate rotary dial is set to 0.
- Gate is set as DIN-Right.
- Learning Run is performed.
- PLC is programed to open and close the gate and to see the input signals.

7.3 Three sliding doors and two linear doors

The gates are connected to a PLC that can Open/Close and receives signals back for when the gates are Opened/Closed and any error messages.

Sliding door 1 is opened to the right. (Gate 1)
Sliding door 2 is opened to the left. (Gate 2)
Sliding door 3 is opened to the right. (Gate 3)
Linear door 1 is opened to the right. (Gate 4)
Linear door 2 is opened to the left. (Gate 5)
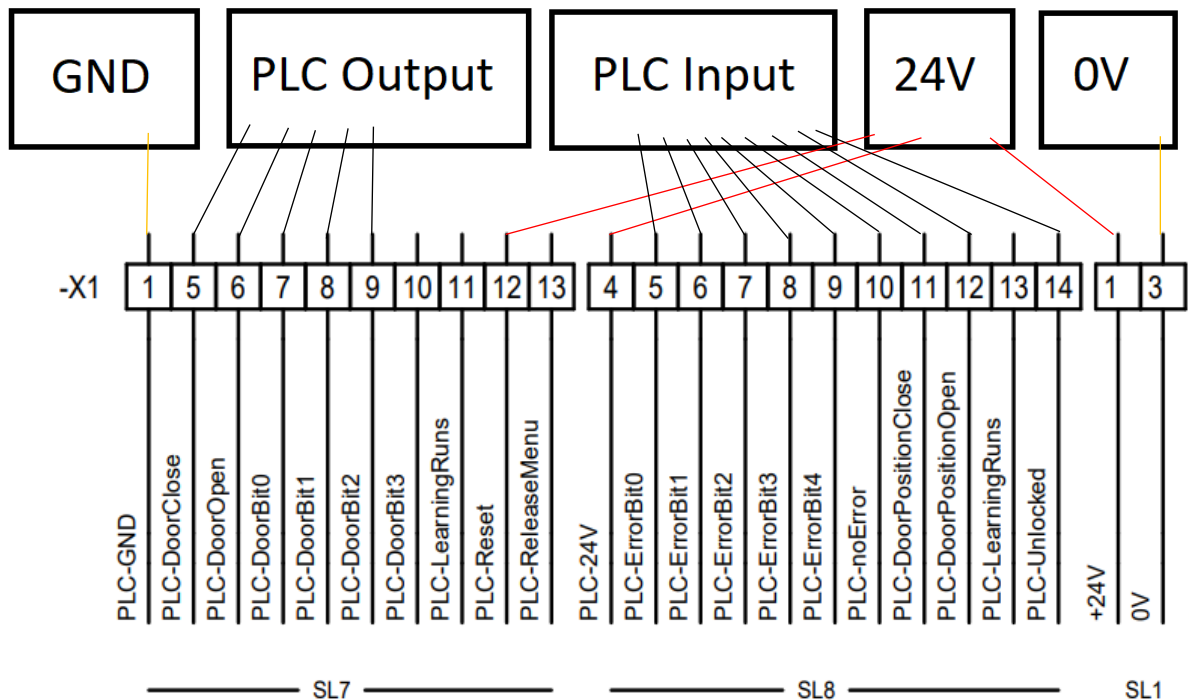
Figure 7-4

- Connections to control box is done as above.
- Gate 1 rotary dial is set to 1.
- Gate 2 rotary dial is set to 2.
- Gate 3 rotary dial is set to 3.
- Gate 4 rotary dial is set to 4.
- Gate 5 rotary dial is set to 5.
- Gate 1 is set as DIN-Right.
- Gate 2 is set as DIN-Left.
- Gate 3 is set as DIN-Right.
- Gate 4 is set as DIN-Left.
- Gate 5 is set as DIN-Right.
- Learning Run is performed on each individual gate.
- PLC is programed to open and close the individual gates and to see the input signals.

Note: Only one gate can be operated or monitored at a time, during opening/closing the gate needs to be continuously selected by the Gate Bits.

7.4 Double gate from two single sliding doors plus one linear door

This gate configuration requires two control boards to get both gates of the double gate to move at the same time.

One single sliding door motor and a linear sliding door motor is connected to the first control unit, the last single sliding door motor is connected to the second control unit.

Both control units are connected to the PLC that can Open/Close and receives signals back for when the gates are Opened/Closed and if any emergency release have been pulled.

Sliding door 1 is opened to the right. (Gate 1)

Linear door 1 is opened to the right. (Gate 2)

Sliding door 2 is opened to the Left. (Gate 3)

First control unit
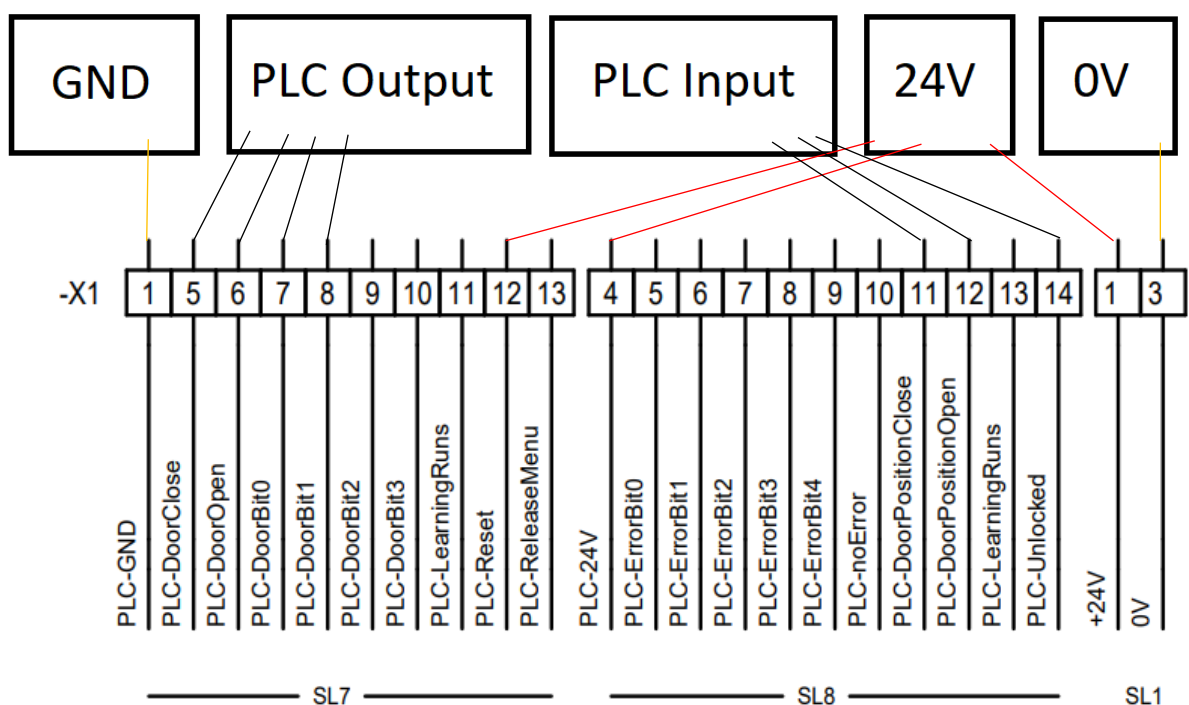
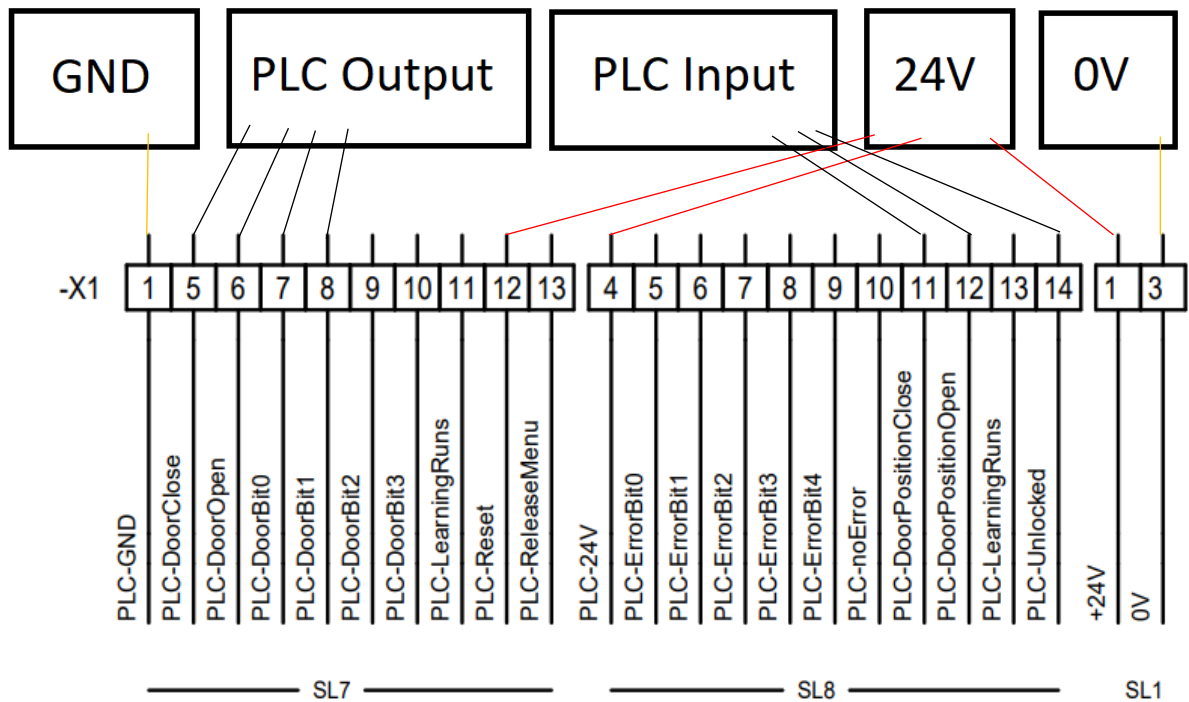*Figure 7-5*

- Connections to control box is done as above.
- Gate 1 rotary dial is set to 1.
- Gate 2 rotary dial is set to 2.
- Gate 1 is set as DIN-Right.
- Gate 2 is set as DIN-Right.
- Learning Run is performed on each individual gate.
- PLC is programed to open and close the individual gates and to see the input signals.

Note: Only one gate can be operated or monitored at a time from each control board, during opening/closing the gate needs to be continuously selected by the Gate Bits.
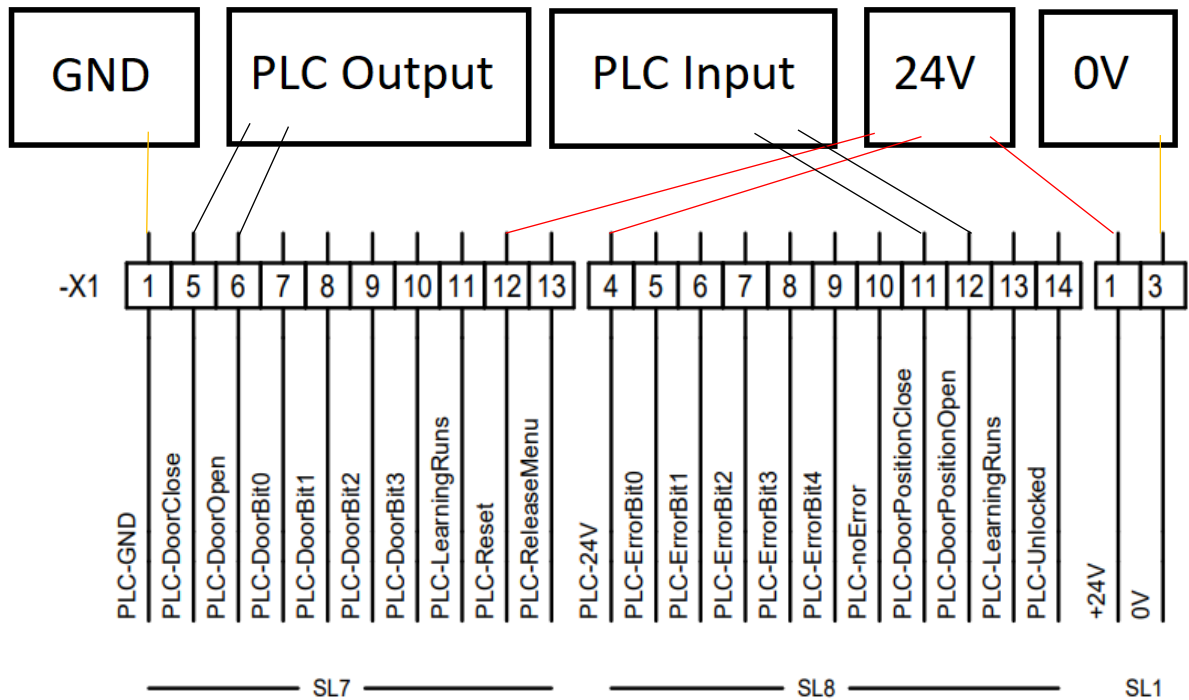
Second control unit
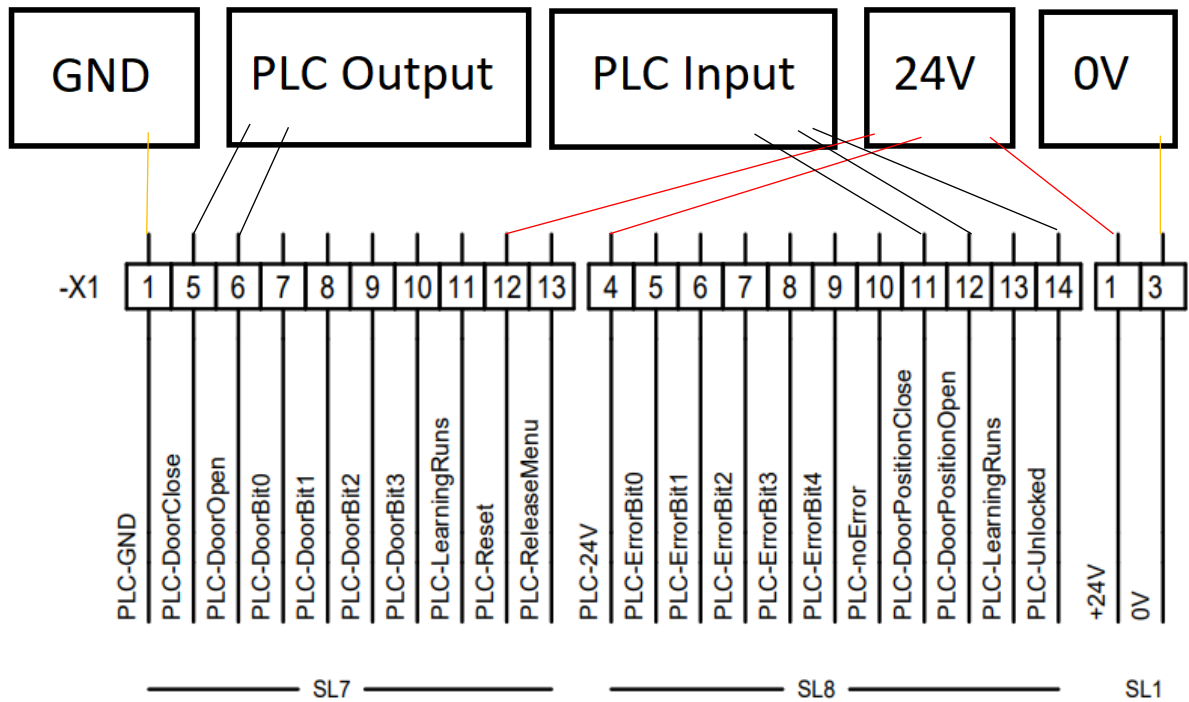
Figure 7-6

- Connections to control box is done as above.
- Gate 3 rotary dial is set to 0.
- Gate 3 is set as DIN-Left.
- Learning Run is performed.
- PLC is programed to open and close the gate and to see the input signals.
- PLC is programed to send signals to (first control unit) gate 1 and (second control unit) gate 3 at the same time to open the double gate simultaneously.

Note: a minimum off 24V 4A per control unit is required.

7.5 One linear door connected to Remote control (NOT PLC)

This gate is connected to a remote-control receiver that can Open/Close the gate.
Gate is opened to the right.
Gate has a photocell.
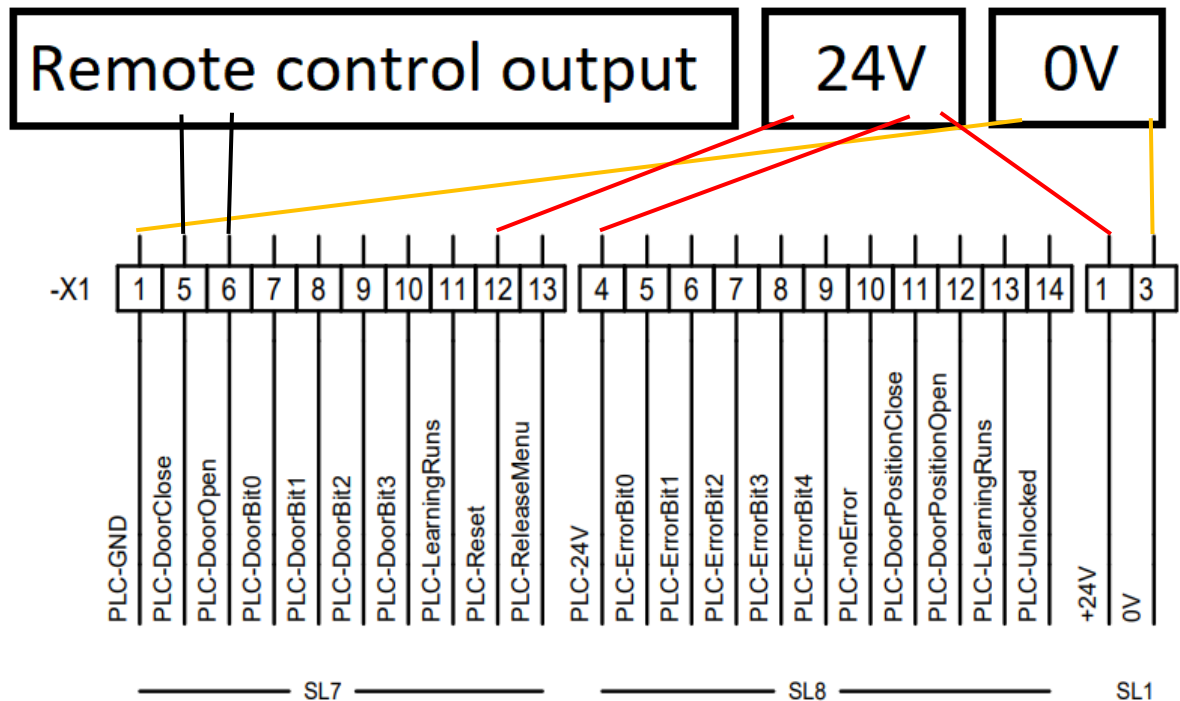
Figure 7-7

- Connections to control box is done as above. (Min 24V 4A power).
- Gate rotary dial is set to 0.
- Gate is set as DIN-Right.
- Learning Run is performed.
- A photocell is connected to the motor control board.
  Note: See chapter: 5.2.5 Connecting a photocell
- Remote control and receiver are programed so one button opens the gate and one button closes the gate.

Notes:
- Gate can be programed to automatically close after a set time if only an open signal can be sent from the chosen remote-control receiver. See chapter: 6.7.13 Auto close.
- Outputs from the Control Box can still be connected to a separate PLC if the gate is to be monitored but only controllable by remote.

TROAX

8 Safety instructions for maintenance

<table>
<tr>
<td rowspan="2">⚠️</td>
<td>DANGER</td>
</tr>
<tr>
<td>The system shall be disconnected from the power supply before carrying out any work.</td>
</tr>
</table>

- All cleaning and maintenance must be carried out by skilled personnel.
- To ensure the performance and operational capability of the system, the necessary maintenance must be carried out by skilled personnel at regular intervals in accordance with the applicable regulations.
- Document any maintenance done on or near the Power Door system.

8.1 Maintenance routine

Maintenance of the system shall be carried out at an interval of at least every third month:

- Clean powder coated steel with a damp cloth, if necessary, use a mild detergent.
- For installations that are subject to vibrations, all bolts and fixings in the system shall be retightened.
- Damage to the paint should be covered with paint to prevent corrosion developing.

9 Troubleshooting instructions

9.1 Gate is not moving

Below are some steps to check in order to find and fix this problem:

- Is the control unit in PLC mode?
  - Press ESC on the control unit's buttons until back on the main screen, only when in this screen the gates can be controlled from the PLC.

- Is the emergency release pulled?
  - Resetting the emergency release requires removing the motor cover and resetting the emergency release lever.
    (Note: If you have a power gate reset wire installed you can reset by pulling it).
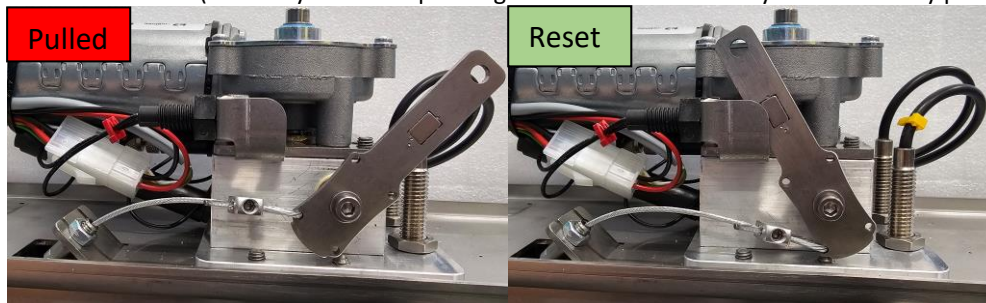
Figure 9-1 Emergency release pulled / Emergency release reset

- Is the gate stuck?
  - Perform a visual inspection.
    See chapter:
    6.1 Visual inspection.

- Is the photocell damaged/moved/blocked?
  - Check the photocell.

- Are the end magnets intact and in the right position?
  - Perform a visual inspection.
    See chapter:
    6.1 Visual inspection.

- Is the Control Box connected properly?
  - SL7, 12 (PLC-Reset) requires permanent 24V power for the Control Box to receive signals from the PLC.
  - Double check the connections between the PLC and Control Box.
    See chapter:
    5.1 Connecting Power Door Control Box PLC 24V

- Is the cable intact and is the motor receiving power?
  - Inspect the cables and connections to make sure no damages/loose wires are creating issues.
  - Inspect the motor control unit and make sure the motor is seen as active.

Figure 9-2 Gate inactive, collision / Gate active

- Is the gate learned?
  - Perform a new Learning Run for the gate.

- Is the motor spinning but the gate is not moving?
  - The motor and cogwheel are spinning but the gate is not moving.
    - Check so that the cogwheel is properly aligned and distanced from the toothrack.
    - Check that the cogwheel or toothrack don't have any damaged/missing cogs/teeth.
  - The motor is spinning but the cogwheel is not.
    - Make sure the emergency release is not pulled.
    - Check for signs of mechanical damage.
    - Replace motor unit.

9.2 Gate is moving but not all the way to Opened/Closed

Below are some steps to check in order to find and fix this problem:
- Is the gate hitting something/getting stuck?
  - Perform a visual inspection.
    See chapter:
    6.1 Visual inspection.

- Are the end magnets intact and in the right position?
  - Perform a visual inspection.
    See chapter:
    6.1 Visual inspection.

- Is the gate changed after Learning Run where performed?
  - Perform a new Learning Run for the gate.

- Try reducing sensitivity for obstacle detection.
  See chapter:
  6.7.9 Open power stop / Close power stop

9.3 How do I assemble Power Door?

General assembly instructions in interactive form and in "Follow me" are available separately.
See chapter:
4 "Installation guide mechanic" for instructions on where to find the information.

9.4 No signal is coming from the gate

Signals will only be sent to the PLC from the actively selected motor unit.
See chapters:
6.2 Connecting one motor, and 6.3 Connecting two or more motors.

9.5 Open/Close power stop / Speed, are not accessible in the menu

PLC-ReleaseMenu must be active to enter these menus (SL7, 13).
See chapter:
5.1 Connecting Power Door Control Box PLC 24V

9.6 Gate opens/closes in the wrong direction

The direction of the gate must be selected in the control board menu.
See chapter:
6.4 DIN-Left / DIN-Right

9.7 Learning Run is not working properly

Make sure the teach in mode is set to "All parameters" before running another Learning Run.
See chapter:
6.7.15 Teach in mode

9.8 Photocell is not working

The photocell is only active when the gate is closing.
- Check if the photocell and reflector/transmitter are aligned and within their maximum distance.
- Check so the photocell works.
- Check the connections between the photocell and the motor board.
  See chapter:
  5.2.5 Connecting a photocell
- Check so that the setting is as you want them in the control box menu.
  - Select the correct gate in the menu and check the settings.
  See chapter:
  6.7.7 Light barrier

9.9 Lost/broken magnet/screw

A spare parts article with magnets and screws can be ordered to replace the lost/broken part.
See chapter:
3.2.5 Power Door Magnets & Screws
Note: All the required parts are delivered with the motors, this article is only for replacement parts.

10 Error bits

As soon as an error is detected by the control unit or by the selected motor unit, the error is further characterized by the error bits. To determine the error number, the value for each active error bit must be added together, e.g. if error bit 2 and error bit 3 are set, the limit switch has not been exited (error number 12)

10.1 Bit to number table

Number	Bit 0	Bit 1	Bit 2	Bit 3	Bit4
0	0	0	0	0	0
1	1	0	0	0	0
2	0	1	0	0	0
3	1	1	0	0	0
4	0	0	1	0	0
5	1	0	1	0	0
6	0	1	1	0	0
7	1	1	1	0	0
8	0	0	0	1	0
9	1	0	0	1	0
10	0	1	0	1	0
11	1	1	0	1	0
12	0	0	1	1	0
13	1	0	1	1	0
14	0	1	1	1	0
15	1	1	1	1	0
16	0	0	0	0	1
17	1	0	0	0	1
18	0	1	0	0	1
19	1	1	0	0	1
20	0	0	1	0	1
21	1	0	1	0	1
22	0	1	1	0	1
23	1	1	1	0	1
24	0	0	0	1	1
25	1	0	0	1	1
26	0	1	0	1	1
27	1	1	0	1	1
28	0	0	1	1	1
29	1	0	1	1	1
30	0	1	1	1	1
31	1	1	1	1	1

Figure 10-1

10.2 Error list

#	Feedback	Resetting the message
0	LOGIK not ready or not yet initialized.	Automatic
1	Motor control not available	Manual (if MC was found via Discovery)
2	Overtemperature logic board	Automatic (if temp. iO)
3	Overtemperature motor control	Automatic (if temp. iO)
4	Undervoltage motor control	Automatic (if Spg. iO)
5	Free	-
6	Light barrier	Automatic
7	Free	-
8	End position OPEN not reached	Automatic (with new command)
9	End position OPEN not reached - Power cutoff	Automatic (with new command)
10	End position OPEN not reached - blockage	Automatic (with new command)
11	End position OPEN not reached - Running time	Automatic (with new command)
12	Limit position OPEN not reached - Limit switch not left	Automatic
13	End position OPEN not reached - Critical voltage Motor-Control	Automatic (if Spg. iO)
14	End position Open not reached - Light barrier	Automatic: Change to message #8
15	Free	-
16	End position CLOSED not reached	Automatic (with new command)
17	End position CLOSED not reached - Power cut-off	Automatic (with new command)
18	End position CLOSED not reached - blockage	Automatic (with new command)
19	End position CLOSED not reached - Running time	Automatic (with new command)
20	Limit position CLOSED not reached - Limit switch not left	Automatic
21	End position CLOSED not reached - Critical voltage Motor-Control	Automatic (if voltage is OK)
22	End position CLOSED not reached - Light barrier	Automatic: Switches to message #16
23	Free	-
24	No steps Motor	Automatic (if renewed start command is error-free)
25	No minimum motor current (e.g. if no motor is connected)	Automatic (if renewed start command is error-free)
26	Hardware logic board error (if e.g. error from H-bridge)	Restart (disconnect power supply)
27	Hardware motor control error (e.g. if self-test is faulty	Via !RESET input
28	Communication error	Automatic (if comm. is OK)
29	Motor direction of rotation error	Automatic (if renewed start command is error-free)
30	Error current measurement logic board	-
31	Wrong limit switch approached	Via !RESET input

Figure 10-2

11 Recycling

The Troax products should be disposed of in accordance with applicable national regulations.

Figure 11-1

Following components should be considered as electronic goods:

89110013	Power Door Single Rail PLC 24V
89110014	Power Door Linear PLC 24V
89110020	Power Door Control Box PLC 24V

Figure 11-2

Following components should be considered as plastic goods:

89110002	Toothrack Single Rail 300mm, with holder
89110005	Toothrack Linear 300mm, with holder

Figure 11-3

Following components should be considered as metal goods:

89110022	Power Door Reset Wire
89110023	Power Door Magnets & Screws

Figure 11-4

12 Spare parts

To ensure system safety all damaged or malfunctioning components shall be replaced with a new component.

89110002	Toothrack Single Rail 300mm, with holder
89110005	Toothrack Linear 300mm, with holder
89110013	Power Door Single Rail PLC 24V
89110014	Power Door Linear PLC 24V
89110020	Power Door Control Box PLC 24V
89110022	Power Door Reset Wire
89110023	Power Door Magnets & Screws

Figure 12-1

13 Warranty

Troax Power Door system is covered by a 2-year warranty.

Warranty is only valid if the instructions in this document have been followed.

Warranty will be invalidated if the system is damaged due to faulty/incorrectly connected power supply/PLC.

Warranty will be invalidated if the system is damaged due to incorrect installation of Single/Linear sliding door systems.

Unauthorized modifications or repairs to the control unit/units will invalidate any warranty and liability of the manufacturer.

Warranty will be invalidated if environmental conditions are not followed.

Warranty will be invalidated if operating lifespan is exceeded.

14 Technical specifications

Art nr:	89110013	89110014	89110020
Name:	Power Door Single Rail PLC 24V	Power Door Linear PLC 24V	Power Door Control Box PLC 24V
Service temperature:	-20-50°C		
Storage temperature:	-20-80°C		
Humidity:	< 90% (no condensation)		
Standby current:	60mA		
Power supply:	24V ± 20%, min 4A		24V ± 20%
Surge voltage max:	1000 V		
Serial connection:	Up to 16 units		NA
Maximum distance control box – motor:	50M		
Maximum motor force:	880N		NA
Response time:	200ms		NA
For gate type:	Single Sliding Door	Linear Sliding Door	NA
Gate size:	700-3,000 mm	1,800-4,000 mm	NA
Operating lifespan:	250 000 cycles		NA
Maximum movement speed:	20 cm/s.		NA
Connection:	Shielded cable 3x2.5mm²		Terminal block
Local signalling:	NA		LED Screen
IP class:	IP 65, control circuits & sensors / IP 20, motor		IP 20
Weight:	5kg	7kg	1kg
Dimensions:	380x150x150mm	300x230x110mm	230x170x110mm
Packaging dimensions:	560x280x260	560x280x260	250x190x170
Cover material:	Stainless steel		Plastic
Color:	Stainless steel, black text		Grey, Blue, Yellow/Green
Standards:	(EMC) Directive 2014/30/EU DIRECTIVE 2006/42/EC on machinery ROHS (EU Directive 2011/65/EU) Industrial, commercial, garage doors and gates 13241+A2:2016		

Figure 14-1

15 Declaration of conformity

Declaration for the installation of partly completed machinery

as defined in Directive 2006/42/EC, Annex II, Part 1B

BelFox Torautomatik GmbH
Forsthaus 4
36148 Kalbach

We hereby declare that the partly completed machine
10004520 / 89110013 with 10004565 / 89110020
10004521 / 89110014 with 10004565 / 89110020

as far as the scope of delivery allows, the basic requirements of the
complies with the following guidelines:

Machinery Directive 2006/42/EC
EMC Directive (2014/30/EU)
RoHS (EU Directive 2011/65/EU)

Applied harmonized standards whose references have been published in the Official Journal
of the EU:

DIN EN 60335-1/2, insofar as these apply
Safety of electrical devices/drives for gates
DIN EN 61000-6-3
Electromagnetic compatibility - emission
DIN EN 61000-6-2
Electromagnetic compatibility - immunity
DIN EN 60335-2-103
Safety of electrical appliances for household and similar use
-Part 2: Special requirements for drives for gates, doors and windows

Furthermore, we declare that the special technical documentation for this partly completed
machine has been prepared in accordance with Annex VII Part B and undertake to forward
this documentation to the market surveillance authorities via our documentation
department on reques.

Commissioning of the partly completed machine is prohibited until the partly completed
machine has been incorporated into a machine which complies with the provisions of the EC
Machinery Directive and for which an EC Declaration of Conformity in accordance with
Annex II A is available

D-36148 Kalbach; 16.01.2024Signature   : _____

Name and function: Jens Broßmann, standards and documentation officer,
document manager,
electrical and development engineer

Annex

Requirements of Annex I of 2006/42/EC that have been complied with. The numbers refer to
the sections of Annex I:

1.1.2, 1.1.3, 1.1.5, 1.2.1, 1.2.6, 1.3.2, 1.3.4, 1.3.7, 1.3.9, 1.5.1, 1.5.6, 1.5.11, 1.7.1, 1.7.1.1,
1.7.2, 1.7.3, 1.7.4, 1.7.4.1, 1.7.4.2 (partly)

Figure 15-1

16 Technical documentation

Troax AB (Org nr. 556093-5719)
Tyngel 34
335 74 Hillerstorp
Sweden
www.troax.com
info@troax.com
+46 (0)370-828 00

Postal address:
Box 89
335 04 Hillerstorp
Sweden