Wiring and programming manual
EDSL450 Sliding door controller
This manual is for firmware version: v0.04.0212

The information contained in this document is subject to change without notice.
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1 Technical specifications

Supply
Nominal supply voltage 36 Vdc
Voltage range 18 ... 50 Vdc
Fuse internal 10 A slow blow; 5 x 20 mm

Battery
Supply voltage battery mode 18 ... 27 Vdc
Charge voltage 27 Vdc
Maximum charge current 1 A
Fuse internal 10 A slow blow; 5 x 20 mm

Power consumption
Inactive ≤ 2 W
(Maximum 500 W)
(Outputs off and without sensors and program switch)

Brake resistor
Supply voltage active > 52 Vdc
Resistance 60 Ω
Power 6 W

Environmental specifications
Ambient temperature -15 ... +50 °C
Relative humidity 10 ... 80 % non condensing

Weight
Weight 0.7 kg

Measurements
Measurements (l x b x h) 325 x 74.5 x 34.1 mm

Motor
Motor type DC brush motor
Nominal motor voltage 12 ... 60 Vdc
Maximum nominal motor current output 10 A
Maximum motor current output 20 A
PWM frequency 20 kHz

Encoder
Type single ended and differential
Pulses per revolution 500
Supply voltage 5 Vdc or 24 Vdc
Maximum current 100 mA

Lock
Voltage -Supply ... +Supply Vdc
Maximum current 1 A, electronic overload protection
PWM frequency 20 kHz

Sensors and I/O
Supply voltage 12 or 24 Vdc
Maximum current 1 A, 500 mA for sensors
Voltage high (motion) 4 ... 30 Vdc
Presence See Digital inputs
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<td>NPN or PNP (jumper selection)</td>
</tr>
<tr>
<td>Input voltage low</td>
<td>0 ... 3 Vdc</td>
</tr>
<tr>
<td>Input voltage high</td>
<td>9 ... 30 Vdc</td>
</tr>
<tr>
<td>Input impedance</td>
<td>5 kΩ</td>
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<table>
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<tr>
<th><strong>Digital outputs</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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<td>NPN (3x) and One potential free relay contact (CO)</td>
</tr>
<tr>
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<td>250 mA</td>
</tr>
<tr>
<td>Connecting voltage</td>
<td>0 ... 24 Vdc</td>
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<td>2.0, hi-speed, host and peripheral</td>
</tr>
<tr>
<td>Bluetooth</td>
<td>With USB to bluetooth adapter (SPP)</td>
</tr>
<tr>
<td>Program switch</td>
<td>RS485</td>
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</tr>
<tr>
<td></td>
<td>89/336/EEC (EMC)</td>
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<td></td>
<td>DIN 18650</td>
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<td>EN-ISO 13849</td>
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<td>EN-IEC 60335-1</td>
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| Manufactured according to                 | ISO 9001:2000                           |
2 Introduction

This sliding door controller has been designed with safety and flexibility in focus.

As for safety, all requirements for an escape route can be fulfilled without any additional extensions. Presence sensors can be tested and redundant signals from motion sensors can be handled directly from the controller. Both escape routes requiring either a second motor (dual motor) and having an intrinsic mechanical opening can be created. The second motor can be connected directly to the controller. The secondary required power comes from batteries, which are also monitored for sufficient capacity.

The flexibility of the controller allows most sensors, locks, motors and other peripherals to be connected. With the ability to handle such vast amount of different parts, it could be difficult to configure. However, the intuitive setup from the slider configurator, combined with a logically selected set of factory standard values allows fast and easy configuration. The layout shows the present state together with the settings making verification of the configuration easy. Connection for the slider configurator can be via a standard USB connection or via bluetooth. Bluetooth adapters connected get their power supply from the controller and allows for wireless connection. The slider configurator can be run from a Windows® desktop system (such as Windows 7 or 8) or from a smart phone running Windows Phone 8.

The compact design allows the controller to replace most existing controllers. Most of the existing parts, such as lock and sensors do not need to be replaced.

The program switch is an integral part in the safe operation of the door. With the program switch, it is both easy and safe to change programs and allows simple diagnostics.

The six programmable inputs allow for a wide range of devices to be connected, for opening the door, indicating a robbery, force a program, etc. The programmable outputs can be used for instance to signal an open door, indicate a warning, test side screen presence sensors, etc.
3 Connecting

Figure 1 Connection overview of controller
This chapter describes the connections to the controller. Connections are divided into three sections: power, motor and encoder, and IO (Input / Output).
In this connecting chapter text saying high or low refers to a high or low voltage (+24Vdc compared to 0Vdc).

3.1 Power supply
The controller requires an external DC power supply. Batteries connected are used for backup and are charged from the controller. The controller has supply outputs for sensors (+12V or +24V) and encoders (+5V and +24V).

3.1.1 Main supply
The main supply for the controller comes from an external DC power supply. This power supply is connected to J11. The supply range for normal operation needs to be from 32 volt to 50 volt. The standard supply is 36 volt. The power supply needs to be either a SELV or a PELV. It has to be capable to withstand regenerated voltages up to 60 volt. The mains connection of the power supply must have either a plug connection or an on/off switch. The – (minus) connection of the main supply is the controller internal Gnd connection, which is connected to the housing.

3.1.2 Battery
A battery can be connected to create a no-brake solution. If the main supply fails, the battery will supply the controller.
The battery is connected to J10. The middle two connections are for series connection of two batteries. The terms battery and batteries are used mixed in this manual, either referring to the general term for batteries (multiple controllers and multiple batteries) or the fact that mostly two 12 volt batteries are connected in series.
When the main supply is present, the battery is charged with 27 V supply voltage. The maximum charge current is 1A.

⚠️ Do not connect the main supply to the battery input.

⚠️ Only use a battery that can handle the 27 V charge voltage (series connection is possible).

For power saving, a reduction factor is applied, which lowers the speed and acceleration during battery operation. The actual speed can be lower still, since the supply voltage is used in the speed limitation, see 3.1.3 door speed and supply voltage.

To indicate to the controller a battery is connected, it must be configured with the Battery capacity. The battery capacity is in Ah, rounded to the nearest number. If two batteries are connected in series for the voltages then the capacity set is that of a single battery. Two dedicated connections are there for the series connection. No additional internal connection is made to these connections.
When the battery capacity is set to 0 (zero) it indicates that no battery is connected. Any other value will trigger the battery monitoring process. Battery monitoring is mostly transparent. Every 5 seconds the controller checks to verify that the battery is still connected, or, if disconnected, when it is connected again. This allows for fast reactions to the problem.
Dual motor escape routes require batteries. This type Escape route cannot be selected with the Battery capacity parameter set to 0 (zero). Battery operation, low charge and battery monitoring faults cause the Battery action to perform.

3.1.3 Door speed and supply voltage
Supply voltage, motor type and motor current determine the maximum reachable speed, acceleration and deceleration of the door. In order to prevent the automatic return system to activate, because the supply voltage is to low, the acceleration and deceleration is paused when the voltage or current limit is reached. This process is used throughout the movement.

3.1.4 Brake resistor
There is a brake resistor inside the controller. During the deceleration, the motor works as a generator and will generate a voltage. When the voltage gets too high, the brake resistor is used to lower the voltage. Spikes on the supply voltage are also dissipated in the brake resistor.

The controller limits the amount of energy into the resistor so it is not overloaded for an extended period. The brake resistor is only used when the voltage is above 52 volts. The brake resistor is no guarantee that an overvoltage protection of the power supply will not activate. It is required that the power supply can handle regenerated power from the controller.

3.1.5 Supply outputs
The controller has a +5V and a +24V outputs for encoders. The program switch is supplied with +5V. The optional Bluetooth module, connected to the USB connector, will get the standard +5V. A maximum total load of 150 mA is allowed on the +5V lines. Sensors and other peripherals can use the +24V or +12V supply output. The IO supply voltage parameter determines whether the supply output is +12V or +24V. The maximum total current drawn from +24V output is 1 A. Sensors get supply from the separately protected connections S+24V. The maximum total current from these connections is 500 mA.

3.2 Motor and encoder
The motor drives the door and the encoder returns the position with which the controller can control the motor. Two motors and one encoder can be connected. One main motor and one for when the Escape route is set to Dual motor.

3.2.1 Main motor
The controller has a 4 quadrant PWM output to drive a DC brush motor. The nominal current can be up to 10 A and the maximum motor current is 20 A. To drive the motor, the controller uses Pulse Width Modulation (PWM) with a frequency of 20kHz.

On power up, the controller tests to see if a motor is connected by measuring the current. During initialisation the polarity of the motor is automatically adjusted to the encoder. Re-initialisation is required if the connection polarity of the motor or encoder is changed.

The motor must be connected using a two wire shielded cable. The shield must be connected to the special shield connection tabs and to the motor so that the shield is in direct contact with the frame and the motor. Connecting wires should not be used, since this cancels the effect of shielding.
The motor is connected to J9. The + and – connections are not absolute. Polarity is automatically adjusted to the encoder and direction of movement.

### 3.2.2 Encoder

An encoder is used to determine the position of the motor, and thus of the door. The encoder that can be used with the controller is a standard incremental encoder, 2 channels and 500 pulses per revolution. An optional index signal from the encoder will not be used by the controller. Only one encoder is used. The encoder must be mounted on the main motor. The encoder must be connected using a shielded cable. The shield must be connected to the motor so that the shield is in direct contact with the frame and the motor. Connecting wires should not be used, since this cancels the effect of shielding.

The controller can handle 5V single ended, 5V differential and 24V differential encoders. The type is selected by the switch on the side of the controller. The encoder is connected to J8. For 5V single ended encoders only the lower part is connected.

On power up, the controller tests if the encoder is connected and functioning. During initialisation the polarity of the motor is automatically adjusted to the encoder. Re-initialisation is required if the connection polarity of the motor or encoder is changed. If the direction to close the door is incorrect, change parameter *Close direction*, selection can be made between *Left* and *Right*. The close direction is determined by this parameter and the connection of the encoder.

#### 5V single ended

#### 5V differential

#### 24V differential

### 3.2.3 Escape motor

For a *Dual motor* type *Escape route* a second motor needs to be connected to the controller. The criteria for this second motor are almost the same as for the main motor.

The big difference is that the motor polarity cannot be changed through software. The polarity is tested and wrong connection or configuration will result in the *EM movement*
direction error. The solution is to swap the motor connection if the close direction is correct of the main motor. The escape module will use the encoder signals provided by the main motor. The escape motor is tested by opening the door a short distance. Since the power to open the door via the escape module comes from the battery, the door is not opened completely. During this short test, the encoder operation is verified. If there is no mechanical connection between the two motors, an error Door connection will be issued. The escape motor is connected to J7. As the polarity of the escape motor cannot be changed, there is no defined colour for + and – connections.

### 3.3 Sensors

Sensors (activators) are used to detect people coming towards the door (motion) and detected them within the door opening (presence). The first is to open the door and the second to keep the door open. Sensors exist in various type, most of them have the motion and presence combined into one single housing. Numerous technologies are used for detection:
- radar,
- infrared detection,
- photocell,
- contact, for instance switch or relay switch or
- remote control.

#### 3.3.1 Inside and outside

The controller has two dedicated sensor connections, one for the inside and one for the outside. Connections for the sensors are on J1. The difference is made for program one-way (exit-only) that only uses the inside motion sensor. Both the inside and outside presence sensors used equal. Requirements for the inside sensor can also be higher, especially for escape routes, as they are used for the direction of escape. Escape routes require the inside sensor to be a certified type. The motion sensor must be either having analog, frequency or redundant outputs and the presence sensor must be testable (monitoring). Not all certified sensors may be used for escape routes on this controller.

#### 3.3.2 Motion sensors

The motions sensors are the activators that open a closed door. An open door or a closing door will stay open or open again. Certain motion sensors only detect when people move towards the sensor (direction sensing). Therefore, the motion sensors alone are not good for the safety within the door opening.

Motion sensors are connected to the Motion+ and Motion– connections. The input can have a direct input voltage from 4.5 to 30 volt. The motion input is a floating input so both inputs must be connected for it to operate. In the figures below, the various connections are shown.

![Figure 2 Analog voltage](image1)
![Figure 3 Frequency output](image2)
3.3.3 Presence sensors

The presence sensors are used to detect the presence of objects within the door opening. Presence sensors will keep a door open and re-open a closing door. They will not open a closed door.

Presence sensor can be tested. A special test output on the controller is used to initiate the test. With the test signal, the correct connection of the presence sensor can be verified. Testing does not test the motion sensor. The test output supplies 24 V and can be used to power the transmitter of presence sensors. Current limit for the test output is 100 mA. Make sure that the sensor is configured and capable to have a supply voltage as the test signal.

The outputs of presence sensors can be either Normally Close (NC) or Normally Open (NO). Presence sensors can be testable or not, the test active when the signal is high or low (off) and testing with or without a delay. This all comes to eight combinations that can be selected with the slider configurator. The delay can be configured as the sensor may require time for internal testing. If the delay option is selected, then the controller will verify that the input signal to the controller does not change immediately when the test output is changed.

The presence inputs have the same input circuitry as the programmable inputs. For more information on the input specifications, see 3.4.

As presence sensors are used to safeguard the door opening, certain actions may not be performed when they are active. The most common of these actions is homing after start-up. An active presence sensor will prevent the door from homing and therefore prevent any further operation. Activating the presence sensor while the door is homing will stop the door. Once the door has homed on start-up, any subsequent homing will ignore the presence sensors as the door is considered closed.

![Active presence sensors prevent homing the door on start-up.](image)
3.4 Programmable inputs

The controller has six programmable digital inputs. The function for each input can be programmed using the slider configurator. Together with the function, it is possible to **invert** the input to allow for normally closed contacts.

For a complete list of functions selectable see the *Input X Function* parameter in 5.5.4.

A jumper is installed on the controller (between the USB and program switch connectors). With this jumper, a selection is made between NPN and PNP to be used for most digital inputs. These inputs are the programmable inputs and both presence sensor. The controller will automatically detect in which position the jumper is installed. Verification can be made with the *Input level* parameter. The controller is shipped with the jumper mounted to NPN as standard.

In the table below, the two types of input are depicted. Do note that the sensor may use electronic components to create the sensor signal and not a relay. A relay contact has been used for ease of understanding.

High input voltage is 9 to 30V, therefore 12V sensors can be used. Low input voltage is below 3V. The input function being active depends on more software settings, such as **invert**.

### Table 1 NPN and PNP connections

<table>
<thead>
<tr>
<th>NPN</th>
<th>PNP</th>
</tr>
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<tbody>
<tr>
<td>Sensor</td>
<td>Controller</td>
</tr>
<tr>
<td>+24V</td>
<td>Gnd</td>
</tr>
<tr>
<td>Input</td>
<td></td>
</tr>
</tbody>
</table>

3.5 Emergency input

With the emergency input (Emcy), it is possible to activate a special action that is required in the event of fire or other emergency. The emergency input requires a normally closed contact that connects the input to +24V (PNP only). If fire is not used, a jumper wire must be installed.

See the sections for more information: fire 4.4.1, emergency open 4.4.2 and the parameter descriptions 5.5.8.

3.6 Digital outputs

The controller has four programmable digital outputs. The function for these outputs can be programmed via the slider configurator. For information on the possibilities, see the *Output function* parameter in 5.5.4.

Three of the outputs are open drain (NPN) outputs and one is a potential free relay contact (change over). Maximum current is 250 mA (protected) and the maximum voltage is 24 V.

An external power supply may be used. Make sure that the Gnd of the controller is connected to the Gnd of the external power supply. The voltage on the digital output connection may not be above the +24V (or +12V) of the controller. A freewheeling diode is installed to allow direct connection of inductive loads (relays, solenoids, etc.)
3.7 Electromechanical lock

With the two lock output connection (Lock+ and Lock–), combined with the controllers ability to control these outputs, almost all electromechanical locks can be connected directly to the controller. Various type (solenoid, bi-stable, etc.) are possible. With the parameters it is possible to select fail safe (locked when powered) and fail secure (unlocked when powered). It is also possible to connect a brake to one output and a lock to the second output, having the brake hold the door in position and the lock to lock the door.

Parameters are available to configure the lock(ing) voltage, hold voltage, lock delays and when the lock should be active. For more information on the lock parameters, see 5.5.6.

The lock output voltages are created in two parts. The first is the voltage generator. It generates the required lock voltage using PWM. The second part is relays that control the connection of the lock terminal (Lock+ and Lock–) to either the voltage generator or Gnd. Even though it is possible to program a voltage above the supply voltage, the output is limited to the supply. The actual output voltage (in mV) is measured and reported in the slider configurator. As the voltage generator uses PWM to generate the voltage it cannot be used for some electronic locks. Electronic locks can be connected though, but will disable the voltage generator. With the main module generating the lock voltage and the escape module driving the relays there is some possibility for escape routes to unlock the door in the event of an escape. This however, also can prevent properly locking the door when a problem exists in either module or problematic battery power.

With the 2x solenoid and 2x electronic settings the devices connected the Lock+ terminal are used for a brake and the devices connected to the Lock– terminal are the auxiliary locks. The auxiliary lock only activates in programs close and one-way or during robbery.

The lock voltage is generated using a PWM signal with the supply voltage. For electronic locks, the Lock type should be set to 2x electronic and connected as such.

The voltage generator is electronically protected for over current to 2 A. Capacitive loads may cause this over current protection to activate. For troubleshooting verify that the Lock output voltage is correct. The relay outputs, as used with electronic locks, are not protected. The lock output connections are protected for overvoltage, but external freewheeling diodes are better. For Solenoid connections, it is not required to use external freewheeling diodes.

Table 2 lists the various types of locks and mentions which connection figure should be used to connect it.
<table>
<thead>
<tr>
<th>Lock type</th>
<th>Connection figure</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>(no lock connected)</td>
</tr>
<tr>
<td>Solenoid</td>
<td>A</td>
</tr>
<tr>
<td>Bistable (2 wire)</td>
<td>A</td>
</tr>
<tr>
<td>Bistable (3 wire)</td>
<td>B</td>
</tr>
<tr>
<td>Bistable (4 wire)</td>
<td>C</td>
</tr>
<tr>
<td>Linear</td>
<td>A</td>
</tr>
<tr>
<td>2x solenoid</td>
<td>C</td>
</tr>
<tr>
<td>2x electronic</td>
<td>D</td>
</tr>
</tbody>
</table>

Figure 9 Connection examples for the various lock types
### 3.8 Push button and status LED

The status LED on the controller gives an indication about the status. The colour and, whether or not it is blinking, can be used to determine the state.

<table>
<thead>
<tr>
<th>Colour</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blinking green</td>
<td>System is running without problems</td>
</tr>
<tr>
<td>Blinking orange</td>
<td>One or more warnings are active. The number of times that the LED is off is the warning code. The end of the count is indicated by a green instead of off. For details on the warnings and the codes, see the warnings appendix.</td>
</tr>
<tr>
<td>Blinking orange / green</td>
<td>Warning code end, see the previous item.</td>
</tr>
<tr>
<td>Blinking red</td>
<td>An error has occurred. The number of times that the LED is off is the error code. The end of the count is indicated by a green instead of off. For details on the errors and the codes, see the errors appendix.</td>
</tr>
<tr>
<td>Blinking red / green</td>
<td>Error code end, see the previous item.</td>
</tr>
<tr>
<td>Continues orange</td>
<td>Hardware error, system not operational</td>
</tr>
<tr>
<td>Intermittent fast blinking red</td>
<td>Controller is in bootloader mode. Firmware update is required.</td>
</tr>
<tr>
<td>Off</td>
<td>Controller not powered, internal fuse(s) defective, 5V supply shorted or hardware error.</td>
</tr>
</tbody>
</table>

The push button allows for very simple interaction with the controller. The length of time that the button is pressed determines the action used.
### Time

<table>
<thead>
<tr>
<th>Time</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 second</td>
<td>Reset on error and some warnings. Warnings applicable are errors in the escape module.</td>
</tr>
<tr>
<td>4 seconds</td>
<td>Initialisation request. This will automatically reset any errors present.</td>
</tr>
<tr>
<td>8 seconds</td>
<td>Enter or leave service mode.</td>
</tr>
</tbody>
</table>

#### 3.9 Program switch

The program switch can be connected to J6 on the controller. This is a standard RJ type connector, which uses four wires to connect to the program switch. The program switch is used to select programs and give program selection feedback to the operator and allows for some status information.

For details on the operation and interaction with the program switch see the program switch manual.

#### 3.10 USB

The USB connector is used to communicate with the controller using the slider configurator. It can be used in two ways – either connected to a PC as a peripheral or by installing an adapter via bluetooth.

The bluetooth adapter can be mounted directly in the controller. The controller will supply the adapter (max 300 mA). The SPP (Serial Port Profile) is used. Adapters are supplied separately. It is recommended to use a bluetooth 4.0 (Low Energy) capable adapters for future use.

When connected to a PC the PC can (will) supply the controller. As the PC can power the controller, the USB to PC connection is ideal for updating units in stock. Do note that a power hub is required as the current drawn is more than 100 mA. No current is required when the controller is powered normally, nor does it supply to the PC. A driver is required before using.

The USB connector (J4) is a type A connector. To connect to the PC a A to A cable is required.
4 Door operation

This chapter describes all the programs and program options influencing the door movement. To make things easy, not all combinations of the conditions are described. The priority list gives a good indication of the action taken for the actual situation.

4.1 Programs

The programs define the functioning of the controller for normal operation. Programs define the acceptance of sensors, open position, manual operation and the requirement for safety tests. For safety reasons it is not possible for some programs to be selected.

4.1.1 Close

In program close the door closes and locks. Neither the inside nor the outside motion sensors can be used to open the door. However, the door will reopen when a presence sensor activates if the door is closing. The porter switch can be used to open the door at all times, even after the door has closed and locked.

Program close is a so-called “locked program”. This means that may only be selected by authorised persons. Program close cannot be selected without a program switch. In program close any cyclic tests that require the door to move are paused until another program is selected.

Program close cannot be issued from an input for a door in an escape route. However, when five pulses are given on the porter input, then the controller will select program close. The pulses should be given in about 1 Hz.

At start-up in program close the controller will unlock the door, find its closed position and lock again. This is done to make sure that the door is closed.

4.1.2 Automatic

In the program automatic the door opens when one of the motion sensors is activated. The door remains open for a certain time as set with the Open time parameter. Program automatic can be set with reduced or full open as option. However, escape routes always require full open.

4.1.3 One-way

In the program one-way the controller reacts only to the inside motion sensor. The rest of this program is the same as program automatic.

Program one-way is the fail-over program. If program close is selected, but the program switch is missing or not connected than program one-way is used. This allows exit traffic for safety. Once the program switch is connected, the selected program will be used again (for instance program close).

4.1.4 Open

In the program open the door goes to the selected open position and remains open. Program open can be set with reduced or full open as option. However, escape routes always require full open.
4.1.5 Manual

In program manual the motor is switched off. This way the door can be moved manually. Program manual is a so-called “locked program”. This means that may only be selected by authorised persons. Program manual cannot be selected without a program switch. In program manual, any cyclic tests that require the door to move are paused until another program is selected. This allows the door to be locked manually. Unlock the door prior to selecting another program. Program manual cannot be issued from an input for a door in an escape route.

For safety and functional consistency it is not allowed to use program manual for service purposes. This required the service mode.

⚠️ Program manual may not be used for service purposes. This requires the service mode.

4.2 Full or reduced open

With most programs, it is possible to select full or reduced open as an option.

![Diagram of door positions and offsets]

**Figure 10 the open positions and offsets**

With **fully open**, the door always goes from the closed position to the full open position.

With **reduced open**, the door opens to the reduced open position when it is opened using the motion sensors. The porter switch will always open the door fully, as will special events (fire, power, etc.) and certain input functions via the programmable inputs.
If the door closes from the full open position, then reopening the door will always go back to the full open position. The reduced open position will be applied after the door has closed. The reduced open position can be set via the Reduced open pos. parameter.

Reduced open cannot be selected in escape routes.

### 4.3 Activators (sensors)

Activators are devices that send signals to open the door such as motion sensors, push buttons, porter switches, etc. Besides activators, other events can also demand the door to open.

#### 4.3.1 Motion sensors

The most common activators to open the door are the motion sensors. There are the inside and the outside motion sensor. Acceptance of these sensors depends on the program selected. The used door open position can be reduced and full open.

<table>
<thead>
<tr>
<th>Program</th>
<th>Inside</th>
<th>Outside</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Exit only (full)</td>
<td>Full</td>
<td>–</td>
</tr>
<tr>
<td>Automatic (full)</td>
<td>Full</td>
<td>Full</td>
</tr>
<tr>
<td>Open (full)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Exit only (reduced)</td>
<td>Reduced ¹</td>
<td>–</td>
</tr>
<tr>
<td>Automatic (reduced)</td>
<td>Reduced ¹</td>
<td>Reduced ¹</td>
</tr>
<tr>
<td>Open (reduced)</td>
<td>n/a ¹</td>
<td>n/a ¹</td>
</tr>
<tr>
<td>Manual</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

¹ Activation of sensor while the door closes from fully open position will cause the door to reopen to the full open position. It will also prevent a door from closing from the full open position while active.

Motion sensors come in many different types, such as radar, infrared, push buttons, remote controls, etc. With an escape route, the inside motion sensor must be of a certified type. These type an analog voltage, frequency or redundant output. Simple normally open (NO) or normally closed (NC) type outputs are not accepted.

Motion sensors are commonly combined with presence sensors.

#### 4.3.2 Presence sensors (safety)

The presence sensors detect the presence of an object within the door opening. The presence sensors are for the safety in the closing direction. They are only used while the door is open, to prevent the door from closing, and during closing, which will cause the door to reopen. A closed door will not open. During initialisation, the door will stop if the presence sensors activate. In normal operation, the door opens again.

Presence sensors have either a normally open (NO) or normally closed (NC) output. Some types can be tested. For escape routes, it is mandatory to have inside sensor be a testable type. Testing is performed by applying or removing a supply voltage on the test output connection. The inside and outside both have their own individual test output. Testing is done continuously, alternating between inside and outside. For the escape route, the escape
module verifies that the presence sensor testing is performed on time. Failure to do so will result in the warning *Program flow error*.

Do not confuse the presence sensors with the side screen sensors. Even though side screen sensors are also presence sensors, they are called side screen sensors to distinguish the direction of safety. Side screen sensors provide safety for the open direction. Presence sensors are commonly combined with motion sensors.

### 4.3.3 Porter

The porter input is used to open the door in program close. The porter input generally comes from a key switch on the outside of the building. Using the porter will always open the door to the full open position. Porter has its own time, which allows for longer or shorter openings compared to other sensor activations. This time is adjustable with the parameter *Porter time*. If five short pulses are given on the porter input, then the controller will switch over to program close. The pulses should be about 1Hz. After program close is selected this way, the program switch shows the program as close. Pulsing the porter again five times or selecting program closed from the program switch will cause the controller to revert to normal operation. This function allows the door to be closed from the outside. While the controller is in this program close state the program close indicator on the switch is blinking.

### 4.3.4 Side screen sensors

Side screen sensors are used for safety in the open direction. If the side screen sensor is active while the door opens, the speed will reduce, but the opening continues. The reduced speed is the *Home speed*. The position at which the speed decreases can be adjusted. For escape routes, this position may not be less than 80% of the full open position. The door continues to use the reduced speed until the door is open, even if the sensor deactivates. If the *Side screen start* parameter is set to 0 %, then the door may open in reduced speed from the beginning.

Side screen sensors can be tested. This, however, requires a different approach compared to presence sensors. Connection examples are provided in the sensor connection document.

### 4.3.5 FullSens

FullSens sensors are like motion sensors with the exception that they will always open the door to the full open position. This allows the ‘normal’ motion sensors for pedestrians to open the door to the reduced open position, and using a remote control (for instance from a forklift) to open the door fully. FullSens can only be connected to the programmable inputs and therefore require being either *Simple NO* or *Simple NC* types. As with motion sensors, selection can be made for inside or outside sensor.

### 4.3.6 Toggle

The toggle input function is used to toggle (switch) between open and close using an input. Commonly this is with via remote control. Toggle always opens the door to the full open position and have the same priority as the inside motion sensors.

### 4.3.7 Pull and go

With the pull and go function, pulling door open for a short distance will open the door automatically. The door will open to the fully or reduced open position depending the selection of the program. If the door was open at the reduced open position, then the door will go to the fully open position. This function can only be used to open the door. Pull and go can be enabled or disabled with the parameter *Pull and go*. 
In the case an automatic mode is selected for fire action (Close or automatic or Auto + Pull and go) pull and go is always enabled when fire is active.

4.3.8 Pharmacy
In program close the door can be opened to the Pharmacy position. This special function also locks the door in that position. Although the door is open, the presence sensors will not cause any opening to the reduced or full open position. Pharmacy can only be activated in program close and the door being closed.

4.4 Events
Besides the activators mentioned in the previous section there are other events or input functions that have an effect on door movement.

4.4.1 Fire
With the emergency input, it is possible to activate a special action that is required in the event of fire or other emergencies. These actions include closing the door. However, limits do apply for escape routes. See 5.5.8 for a full list of the possible options and actions. In the event of fire, it is possible to disable sensors as the sensors may be affected by the smoke, fire or falling debris. The parameter Fire disables sensors enables or disables the sensors. Opening and closing speeds during fire may be reduced.

4.4.2 Emergency open
The emergency open command is used to open the door for emergency purposes. It is comparable with fire with the exception that it will always open the door and sensors will not be disabled. This function can be selected for the dedicated emergency input as well.

4.4.3 Power and battery
Batteries connected to the controller allow the door to be opened after the mains power is missing. These batteries will be tested for sufficient capacity and charge to open the door at least once. Even though the batteries are the back-up power, if they fail, the action to be taken is the same as when the mains is missing. Different actions can be selected to use when there is a power failure. See 5.5.8 for a full list of possible options and action. As power failure can occur while the door is closed and locked, it is possible to select whether the battery action should be performed in the ‘locked’ programs. Locked programs are program close and manual (see parameter Battery action in program close).

4.4.4 Disable motion
The disable motion is an input function that disables door movement. Activating the input while the door is moving will perform a quick stop. As disable motion prevents any door movement, it is not allowed in escape routes. Disable motion is not allowed for service as the input can have another function. Service mode is the proper method for service. With the quick stop action of disable motion it can be used where safety requires the door to stop. This can also be used to safeguard in the open direction where the door is not allowed to move any further, as compared to the side screen sensors that do allow further travel. With disable motion, any previous movement is aborted. When disable motion deactivates, the action performed depends on the current state of the system (program, sensors, etc.).
4.4.5 Robbery

The robbery input function is to prevent the door from opening from the outside. An opening door or a door waiting to close will close immediately. However, the inside motion sensor and both presence sensors will still (re)open the door. In addition, the porter will open the door to allow ingoing traffic. Once the door is closed, it will lock.

4.5 Escape routes and escape module

The controller consists of two ‘parts’, a main module and an escape module. These two are integrated onto one single board. The escape module allows for a redundant method to open the door and a redundant path for critical inputs. The two modules monitor each other and discrepancies will cause the door to open. The escape module is always used, however, only when Dual motor is selected as the Escape route, will it actual do any door opening.

The supply for the escape module comes solely from the battery. If no batteries are connected then the battery charger will supply the power for the escape module. Any problems with the battery supply may cause the escape module to fail and the door to (remain) open. As the escape module handles the relays in the lock circuit, any resets of the escape module will prevent the door from properly being locked.

Safe doors require tests to be performed on regular intervals. If these tests are not performed on time, the escape module will signal that the test has not been performed. These signals are reported through the warning Program flow error. The monitored tests are inside presence sensor, battery, system, main motor and optional the escape motor or mechanical escape. The system test of a Dual motor escape route includes a test of the motor, drive and mechanics. The presence and battery tests are performed without any noticeable result (if successful). The system test is only performed in the full open position and during start-up. The mechanical escape tests that the mechanical part is capable of opening the door from the closed to 80% of the full open position within 10 seconds. If any activator requests to open the door, the test is aborted and the controller takes over the door opening.

Regulations have strict requirements for escape routes. Some of these requirements are enforced in the controller if an escape route is selected. This does not mean that these requirements are exclusively for escape routes.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program</td>
<td>No reduced open allowed</td>
</tr>
<tr>
<td>Battery capacity</td>
<td>&gt;= 1 Ah for dual motor escape route</td>
</tr>
<tr>
<td>Battery action</td>
<td>Open direct</td>
</tr>
<tr>
<td>Fire action</td>
<td>Open or Open or close</td>
</tr>
<tr>
<td>Input x function</td>
<td>Disable motion and Interlock hold are not allowed</td>
</tr>
<tr>
<td>Program (1)</td>
<td>Not Close or Manual</td>
</tr>
<tr>
<td>Program (2, start)</td>
<td>Not Close or Manual</td>
</tr>
<tr>
<td>Program (2, final)</td>
<td>Not Close or Manual</td>
</tr>
<tr>
<td>Lock type</td>
<td>None, Solenoid, 2x solenoid, bi-stable or linear</td>
</tr>
<tr>
<td>Main lock type</td>
<td>Fail safe</td>
</tr>
<tr>
<td>Aux lock type</td>
<td>Fail safe</td>
</tr>
<tr>
<td>Presence inside type</td>
<td>Testable</td>
</tr>
<tr>
<td>Presence outside type</td>
<td>Testable</td>
</tr>
<tr>
<td>Motion inside type</td>
<td>Analog, redundant or frequency</td>
</tr>
<tr>
<td>Open speed</td>
<td>&gt;= 300 mm/s</td>
</tr>
<tr>
<td>Open acceleration</td>
<td>&gt;= 300 mm²/s</td>
</tr>
<tr>
<td>Side screen start</td>
<td>&gt;= 80 %</td>
</tr>
</tbody>
</table>
A failure in the escape module will be indicated as a warning *Escape module error*. As the main module is capable of controlling the door, it will not go into an error state itself. Escape route doors only close if all faults are resolved. Program close allows some warnings to be active, yet still close.

### 4.6 Speed and acceleration

The motor connected to the door controller opens and closes the door. The current through the motor defines the force to do so. The encoder feedback is used to control the velocity and position of the door. The time it takes to open and close the door is defined by the speed and acceleration parameters. Opening and closing have their own set of parameters. For each set there is a separate acceleration and deceleration to allow fast starts and slow stops. With the two sets it is also possible to open fast and close slowly. Current is required to accelerate the door and overcome friction. The higher the mass of the door the more current is required to open the door in the same time. One parameter directly limiting the acceleration is the *Max. motor current*. Power supply current limits and output voltage also decrease the speed and acceleration possible. The controller will automatically limit the speed, acceleration and deceleration to the limits of the power supply. However, as the deceleration is limited, an overshoot could cause the door to hit the end stop. Make sure the deceleration is low enough to prevent the deceleration to be limited.

Escape routes are required to open within a defined time depending on the width of the door. The minimum open speed and acceleration for a door in an escape route is set to 300mm/s and 300mm/s$^2$. However, these minimum values do not guarantee the door is open fast enough.

### 4.7 Interlock

Interlock is an additional function to prevent multiple doors from being open at the same time. It is mostly used to reduce draft. The interlock implementation on this controller cannot be used for security purposes. Interlock is only active in programs automatic and exit-only when the door is opened with the sensor inputs. Porter will always open the door regardless of interlocking. Interlocking keeps a door closed up to 20 seconds, after which the door opens anyhow. Sensor activation is remembered during this time. Interlock will not (force) close a door.

Interlock works by providing cross connections between the two controllers where the *Door not closed* signal is connected to the *Interlock hold* input. If the Gnd signals of both
controllers are securely connection together then no additional relay is required and the
digital output of one controller can be connected directly to the second controller input. As a
programmable input is used to activate the hold function for interlock, the interlock option can
only be activated when a programmable input is configured to have the Interlock hold
function. Different methods can be used to signal the hold function; therefore, no specific
requirement is made for the digital output. However, the Door not closed function can be
used for this purpose and is the recommended settings.

![Figure 11 Cross connection for interlock](image)

Interlock requires a program switch connected that can report the interlock status. Interlock
can be switched on and off from the program switch. A status indication is used for safety
reasons as interlock can prevent the door from opening.
As interlock delays the door from opening it cannot be used in escape routes. Selecting Interlock hold is not possible in escape routes.

⚠️ Interlock is not possible in escape routes

### 4.8 Service mode

Service mode is designed for service activities on the door. It is not meant as a replacement
for disconnecting power for most activities, but does allow for safe diagnostics of the electric
circuits. The service mode flag is stored in memory and is not affected by power cycles. In
service mode, a (accidental) disconnection of any part, or sensor detection or power failure
will not cause any door movement. Make sure that service mode is entered before any
service or maintenance is performed, even if the unit is switched off. This assures that
service mode is active when the unit is switched back on. It also prevents door movement
while applying power, such as connecting the batteries. On leaving service mode, the whole
system is tested. The open position is not detected. This will require re-initialisation.
Initialisation can be requested in service mode and will then be performed after the system
test has completed.

Entering and leaving service mode can be done in various ways:
- Pressing the push button on the controller for 7 … 9 seconds.
- Selecting Basic / Service mode from the menu of the slider configurator.
- Pressing the service mode button in the slider configurator.

For safety purposes, it is not possible to enter or leave service mode from the program
switch. Leaving service mode via the slider configurator will ask for conformation to leave
service mode.

Service mode is indicated as follows:
- The LED on the controller blinks orange (2 short blinks followed by a pause)
- The service indicator on the program switch (2 short blinks followed by a pause)
- The Service mode menu item of the slider configurator (in Basic) has a checkmark
- The service mode button of the slider configurator is coloured red.
Service mode is the highest priority state of the door controller. It will not abort any door movement, but will switch over in all the stationary states. The door is unlocked and the motor is disconnected allowing manual movement. The escape module is placed in service mode to prevent it from opening the door. Presence sensor and battery testing is continued in service mode.

4.9 Initialisation

There are two kinds of initialisation. The first is searching for the close position or homing. This always occurs after start-up and is done prior the full initialisation. The speed for homing is set by the Home speed parameter and the current limit is set by Home current. The home position or the close position is the position at which the door is blocked. Any program or option that set manual operation (service mode, program manual, etc.) will prevent initialisation on start-up. Prior to homing the system is tested (CPU, memory, motor, encoder, etc.) This system test causes a small movement of the door. Homing is paused when presence sensors are active. This state can be diagnosed with Door state being “Homing” and the Door local state being number 2. Prior to door movement, the presence sensors must have been tested (if testable). While this has not been done, the system waits with Door state value being Starting and Door local state being 2.

- Homing is paused when presence sensors are active.

The second form of initialisation not only searches for the close position, it also searches for the open position and measures the currents. Searching for the open position uses the Home speed and Home current as well. After the door is blocked in the open position, it will move back a short distance, as set by the Open offset parameter. This position is the fully open position.

During the search for the open position, the controller measures the current. This is the friction current. After the open position has been determined, the acceleration current and the high-speed current are measured during the time the door closes. This process always closes the door and will use the specified close speed and acceleration/deceleration. During this current measurement, the maximum allowed current is set by the parameter Max. motor current.

If one of the sensors activates when the door closes, then the door opens again and the measurement will restart. After the measurement has been completed successfully, the normal program will recommence.

This form of initialisation starts when:
- the external initialisation switch activates,
- by selecting Initialise from the menu,
- pressing the button on the controller for more than 3 seconds,
- selecting reset on the program switch for more than 5 seconds and then switching to program selection,
- after each error with the exception of power breakdown.

If the program reduced open has been selected, then the door will still close completely to get an accurate measurement. After the door has closed, the normal program will commence and the door will move to the reduced open position. Program full open will pause the measurement, as the door does not need to close.
4.10 Automatic return system and sensitivity

The automatic return system is used to stop the door and return to its previous position when the door is obstructed or pushed back. It is a safeguard, to prevent passers-by from being caught by the door.

Various parameters influence the automatic return system’s sensitivity. The most direct is the Sensitivity parameter. With the sensitivity parameter, the actual speed may differ from the demanded speed by the specified percentage. This allows the door the slow down when there is more friction without interpreting it as an obstruction and activating the automatic return system.

High priority events may force the door to continue to open after an obstruction is detected.

4.10.1 Current, speed and acceleration

During initialisation, currents required to move the door are measured and stored. Prior to each subsequent movement, the controller calculates current limits using these measured currents. These current limits are multiplied with the Current gain parameter. As current is required to overcome friction, the speed will decrease if the current limit is too low for the movement. When the speed drops below the limit as set by the Sensitivity parameter the automatic return system will activate. The force to stop the door by the automatic return system is the maximum motor current.

The Max. motor current parameter sets the absolute maximum current for the motor. This value generally is higher than the motor can handle continuously. The Nominal current parameter defines the nominal current of the motor and is used to prevent the motor from overheating while in use. Once the motor loaded to the limits of the nominal current the current is limited to the nominal current. In automatic movement the door will not close while the motor is in this protected state.

For high acceleration the Max.motor current parameter may need to be increased.

High values for current parameters such as Max.motor current allow higher forces exerted by the door making it more difficult to stop.

4.10.2 Other activations

The automatic return system also activates when the door hits the end post with a high speed. The Close offset parameter is used to slowdown the door before it comes to the close position.

Secondly, the loss of power (mains) during a (high speed) movement may trigger the automatic return system.

4.10.3 Movement

If the automatic return system reacts while closing the door, then the door opens with the normal speed and afterwards closes with a reduced speed (Home speed.)

When the obstruction is in the open direction, high priority events may cause the door open again once the automatic return system has stopped the door. The door will then continue to open without obstruction detection until the full open position is reached or the open requirement has gone. Regardless of the direction after the activation the open speed will be reduced until the requested open position is reached.
For each close obstruction the open time is increased with two seconds, with a maximum of 100 obstructions, or 200 seconds.

⚠️ Close obstructions can cause long open times, with up to 200 seconds additional to Open time parameter.
4.11 Priorities

Seen simply there are various priorities for starting a door movement. Below is a list with the priorities, starting with the highest priority.

<table>
<thead>
<tr>
<th>Priority</th>
<th>State/event</th>
<th>Position 1</th>
<th>Moving</th>
<th>Speed</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>Service mode</td>
<td>–</td>
<td>●</td>
<td>Stop</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>Disable motion</td>
<td>–</td>
<td>●</td>
<td>Slow</td>
<td>Lower</td>
</tr>
<tr>
<td></td>
<td>Obstruction</td>
<td>Prev 4</td>
<td>●</td>
<td>Slow</td>
<td>Lower</td>
</tr>
<tr>
<td></td>
<td>Emergency open</td>
<td>Full</td>
<td>●</td>
<td>Fast</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>Fire</td>
<td>F / C / M 5</td>
<td>● 5</td>
<td>Fast 7</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td>Battery/power event</td>
<td>F / M 5</td>
<td>● 5</td>
<td>Fast 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Side screen</td>
<td>–</td>
<td>●</td>
<td>Slow</td>
<td>Lower</td>
</tr>
<tr>
<td></td>
<td>Inside presence</td>
<td>Prev 10</td>
<td>● 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outside presence</td>
<td>Prev 10</td>
<td>● 11</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program manual</td>
<td>Manual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Motor / encoder test</td>
<td>–</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Find close position</td>
<td>Closed</td>
<td>Slow</td>
<td>Special</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Porter</td>
<td>–</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pharmacy</td>
<td>Pharmacy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program close</td>
<td>Closed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Find open position</td>
<td>Full</td>
<td>Slow</td>
<td>Special</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Escape module error</td>
<td>Full</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program open</td>
<td>F / R 13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interlock hold close</td>
<td>Closed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inside motion sensor</td>
<td>F / R 13</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Robbery</td>
<td>Closed</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Program one-way</td>
<td>– 14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outside motion sensor</td>
<td>F / R 13</td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest</td>
<td>Ghost opening</td>
<td>Full</td>
<td>●</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Target position for the door, F=Full, R=Reduced, C=Close, M=Manual
2. Service mode can only be initiated from PC/PDA or pushbutton on the controller and is for service purposes and therefore allowed in escape routes
3. Not applicable in escape routes
4. Obstruction returns to the previous position or slowly continues to open
5. Action can be programmed, but program limitation apply for escape routes and only open actions allowed
6. Fire opening not performed if program close and “fire action” is “Open of close” or “Close or automatic”
7. If sensors are disabled during fire the door moves slowly
8. Battery/power event not performed in programs close and manual
9. Slow speed position adjustable, minimum for escape routes is 80%. Only sets slow open speed, does not give or change any positions. Higher priority events prevent slow speed transition.
10. The previous open position will be used
11. Only re-open a closing door
12. For dual motor escape routes where one of the modules fails
13. Full open has priority over reduced, depending on program and sensor demands. Escape routes allow full open only
14. Program exit-only will only prevent the incoming events
4.11.1 General notes for escape routes
1. The only allowed open position is full open.
2. Program close and manual may **not** be selected via programmable inputs.
3. Ghost opening for mechanical escape will be performed by the mechanical opening. If another event requires the door to open, then the opening will be resumed by the normal method. Once the door has opened to 80% of the open width, the motor will take over.

4.11.2 General notes for none escape routes
1. Opening is always to full during initialisation.
2. Program close and manual may be selected via programmable inputs.
3. A full opening has priority over reduced opening.

4.11.3 General notes on all doors
1. The close position must be known before any other movement can be performed. Finding the close position is paused if any of the higher priority events are active (and require opening).
2. Find open position is performed if the open position is not known and the door needs to open for events.
3. FullSens inputs are equal in priority as motion sensors, but position is fixed to full open.
4. “Toggle” has the same priority as the inside motion sensor.
5. Obstruction is detected in the high priority events. However, due to the high priority of these events the door will continue to open after it has stopped. When the door continues, it continues with a low speed and does not detect obstructions anymore. The other events will cause the obstruction to fully return to the previous position, which could mean that the door will close fully before opening again. The next time that the door is opened, it will open with a low speed.

⚠️ With the various combinations, it is possible that certain functions are enabled or disabled, which may change the action taken other than the priority list shows.
5 Slider configurator

Configuring the controller is done with the slider configurator. It shows the values of parameters in logically grouped pages, allowing easy changing and monitoring of the configuration. The software requires the .Net framework version 2 or higher.

5.1 Connection

The slider configurator can communicate with the controller either with the USB directly or with an optional bluetooth adapter installed in the USB connector of the controller. Setting up the bluetooth connection and USB driver installation falls out of the scope of this manual. In the preferences dialog it is possible to select the COM port used for the connection. This COM port is remembered for the next time the slider configurator is used. The connection is made by selecting File/Connect or pressing the connect button. When the COM port is opened the icon changes into . Pressing the connected button will disconnect from the controller. Connection state is also indicated by a checkmark before the Connect menu item in the File menu. The connected/disconnected state does not imply that a communication connection to the controller has been made, but only indicates that the COM port was opened without error. Any errors reported on connecting or disconnecting should be solved with the PC, slider configurator preferences, bluetooth status, etc. These errors are not caused by the door controller.

5.2 Parameters

Changes to the operation of the controller are made via parameters. These parameters are accessible via the programmer tool.

<table>
<thead>
<tr>
<th>Type</th>
<th>Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text box</td>
<td>Text boxes are in three different categories.</td>
</tr>
<tr>
<td></td>
<td>• Simple read-only, gray boxes. The value of the parameter cannot be changed.</td>
</tr>
<tr>
<td></td>
<td>• Read-only with zero. The value itself cannot be changed, however, pressing on the 0 (zero) button will set the value to zero.</td>
</tr>
<tr>
<td></td>
<td>• Editable (white). These contain numerical values which can be changed. The value entered will be checked by the controller before acceptance. These parameters may have a unit attached to it (mm, mV, etc.)</td>
</tr>
<tr>
<td>Check box</td>
<td>The parameters is either on or off. If on the box is checked. Read-only is not visualised, however, clicking on the box will not change the checked state.</td>
</tr>
<tr>
<td>Selection box</td>
<td>A selection can be made from any of the listed items.</td>
</tr>
<tr>
<td>Command buttons</td>
<td>A button that will send a command.</td>
</tr>
</tbody>
</table>

Parameter saving depends on the Auto save setting in the programmer tool preferences.
5.3 **File menu**

5.3.1 **File – Open**
Open a saved settings file for reviewing or downloading into the controller. If a connection is made with a controller, the question will be asked to download to the controller. Press Yes to download the settings to the controller, No to disconnect from the controller and open the file and Cancel to abort opening the file. If no connection was made the file is opened without message.

5.3.2 **File – Save**
The Save command is only available if a file was opened or a Save as has been done before it. Saves the settings to the file opened or saved before.

5.3.3 **File – Save as**
Save the settings to the file specified. A file “Save as” dialog appears to select the folder and give the name of the file.

5.3.4 **File – Connect**
Connects or disconnects from the controller. If the connection has been established the menu item has a checkmark. For more information about the connection, see 5.1.

5.3.5 **File – Terminal**
With the terminal it is possible to enter special commands, which are not provided through the graphical user interface. These special commands fall out of the scope of this manual. In the Comm. box it is possible to write the command and using enter or the Tx button that command is transmitted to the controller. The big response box shows the transmissions received from the controller.

5.3.6 **File – Preferences**
The Preferences menu command shows the preferences of the programmer tool. These preferences are:
- **COM port**: Selects the serial COM port used for the connection to the controller. Only existing ports are shown. The list is not sorted.
- **Language**: Select the language to use in the programmer tool.
- **Auto save**: Select whether or not the changes made to parameters should automatically be saved in the controller. If this unchecked, the changes can be lost when the power is cycled from the controller. This does allow testing. To save the settings, check this value (when connected).

Press Ok to apply the preferences.

5.3.7 **File – About**
Shows the about dialog box. The about dialog shows the version of the programmer too, the language selected and the version of the language file.

5.3.8 **File – Exit**
Closes the program.
5.4 Basic menu

The basic menu is used to adjust, test and check basic information of the door controller.

5.4.1 Basic – Status

The status menu page is used for overall status of the door and program selection.

**Door state**

Range: –, read only

Function: Informative value that reports the state the door is in. Little detailed explanation is presented here on the values, as it is used for diagnostics / support purposes. The Door state is used in conjunction with the Door local state.

**Door local state**

Range: –, read only

Function: Informative number that shows a local (internal) state of the door, relative to the Door state value. Little detailed explanation is presented here on the values, as it is used for diagnostics / support purposes.
- Door state “Homing” local 2 – the homing is paused due to an active presence sensor.
- Door state “Starting” local 2 – presence sensors have not been tested yet. Testing cannot be performed if configured wrong or sensor is active.

Do note that the values could change in future firmware versions.

**Program**

Range: Closed
- One-way (full)
- Automatic (full)
- Open (full)
- One-way (reduced)
- Automatic (reduced)
- Open (reduced)
- Manual

Function: Selection for the program. All possible programs and there functions are listed in 4.1.

**Interlock**

Range: On or Off

Function: Activation of the interlock option. Interlock can only be activated when an input is set the Interlock hold function, otherwise an error is reported when trying to select this option. For more information about interlock, see section 4.7.

**Program buttons**

Range: –

Function: Buttons that allow for easy, direct program selection. Has the same effect as selecting the program from the list above. Buttons chosen for their frequent use. These are automatic (full), manual, open (full) and close.
Porter open
Range: –
Function: Buttons that sends a porter command to the controller to open the door.

5.4.2 Basic – Warnings+Errors
The warnings + errors page shows the warning and errors of the controller. Warnings are cleared on start-up; errors are stored in non-volatile memory.
The warnings are split into two columns. The first is the present warning and the second is the history. The history is always active if the present is. To clear the history values press the Clear warnings button. Any present warnings will be copied into the history. For the complete list of warnings and their meaning, see the warning appendix.
The controller can store up to eight errors in its memory. These errors stored in non-volatile memory and therefore will retain their values even after removing power. Clearing errors is done by pressing on the Clear error list button. The Error code escape however, is not stored and should be used in combination with the Escape module error warning. For the complete list of errors and their meaning, see the errors appendix.

5.4.3 Basic – Measurements
Measurement values done by the controller. These values are updated constantly.

**Actual position**
Range: 0 … 30000 mm, read only
Function: Displays the actual position of the door referenced from the close position. Move the door to test the encoder position feedback, this should change the value. This value can be used to check and correct the value of parameter Increments per mm. The displayed position should match the distance the door is moved.

**Actual speed**
Range: 0 … 1000 mm/s, read only
Function: Displays the actual speed of the door.

**Actual current**
Range: 0 … 20000 mA, read only
Function: Displays the actual current through the motor.

**Supply current**
Range: 0 … 20000 mA, read only
Function: Displays the actual current that supplies the controller. Do note that this is not the current through the motor.

**Temperature**
Range: -40 … 85 °C, read only
Function: Displays the temperature of the power stage in the controller.
Main supply
Range: 14000 … 56000 mV, read only
Function: Displays the supply voltage of the main supply input. An error is given when the supply voltage is below 18V or above 56V. If the supply voltage is below 27V, the controller switches to battery operation and will use a reduced speed. This speed reduction is set to 40% of the normal speed.

Main battery
Range: 14000 … 30000 mV, read only
Function: Displays the voltage of the battery as measured from the main control unit. If the voltage is below 24V, the battery is considered low in charge (during battery testing). A voltage below 21V will trigger the low/bad warning and the door will not close in automatic modes.

27V supply
Range: 24000 … 30000 mV, read only
Function: Displays the voltage used to charge the battery.

12/24V supply
Range: 10000 … 30000 mV, read only
Function: Displays the voltage available for sensors etc. that get their supply from the +24V connections on the controller. The selection for 12 or 24 volt is made with the IO supply voltage parameter (see 5.5.4). A low voltage indicates a short or overload in the 12/24V circuit. A short in the +24V may not necessary cause this value to be low. Sensors powered from the S+24V connections have a separate overload (short circuit) protection. The +24V connections can have a supply voltage when the sensors are in overload protection. Overload in the sensor supply (S+24V) is indicated with warning Sensor supply overloaded. This warning is only given if the overload occurs after correct operation.

Friction current
Range: 0 … 10000 mA, read only
Function: The average current necessary to move the door with the Home speed as measured by the controller. No good value can be give, although a value above 4500mA should be considered bad.

Accel. current
Range: 0 … 10000 mA, read only
Function: The average current necessary per 100 mm/s² acceleration as measured by the controller.

Speed current
Range: 0 … 10000 mA, read only
Function: The average current necessary per 100 mm/s speed as measured by the controller.
5.4.4 Basic – User settings

In this menu the user settings for the programs can be changed.

**Open time**

<table>
<thead>
<tr>
<th>Range:</th>
<th>10 … 120 000 ms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
<td>The minimum time that the door remains open when it is opened by an activator, except the porter. The timer shall re-start as long as an activator remains active.</td>
</tr>
</tbody>
</table>

**Porter time**

<table>
<thead>
<tr>
<th>Range:</th>
<th>10 … 120 000 ms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
<td>Specifies the time that the door remains open if opened with the porter input. If the Open time is greater than the Porter time and one of the presence sensors activates while the door is open then the used open time will be from the Open time parameter.</td>
</tr>
</tbody>
</table>

**Fully open pos.**

<table>
<thead>
<tr>
<th>Range:</th>
<th>0 … 30000 mm, read only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
<td>Displays the found full open position. This position is determined during initialisation.</td>
</tr>
</tbody>
</table>

**Reduced open pos.**

<table>
<thead>
<tr>
<th>Range:</th>
<th>300 … 30000 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
<td>The reduced open position. For double doors the actual open distance will be twice the distance set in this parameter. See figure 10 the open positions for a drawing of the door and the positions / distances.</td>
</tr>
</tbody>
</table>

![Warning]

The opening will be twice this value for double leave doors.

**Pharmacy position**

<table>
<thead>
<tr>
<th>Range:</th>
<th>30 … 30000 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
<td>The position of the door when opened to the pharmacy position.</td>
</tr>
</tbody>
</table>

5.4.5 Basic – Service

The service menu shows parameters and values required for service.

**Cycle counter**

<table>
<thead>
<tr>
<th>Range:</th>
<th>0 … 1999999999, read only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
<td>The number of door cycles. A door cycle is close → open → close.</td>
</tr>
</tbody>
</table>
Service on cycles
Range: 0 … 500 (x1000)
Function: Specifies the number of door cycles before a service warning is issued. A value 0 (zero) disables the service warning on cycle count. The number of cycles since the last service is reported in the Service (cycles) parameter. A service warning activates the warning output. The value entered here is multiplied with 1000 for the internal value. This allows more reliable entry for the large values usually used.

Service (cycles)
Range: 0 … 1999999999, resettable to 0.
Function: Reports the actual number of door cycles since the last service. This value can be set to 0 (zero) by pressing the set-to-zero button. Resetting this value to 0 should be done after service has been performed.

Reset this value to 0 after service has been performed.

If this value exceeds the Service on cycles parameter, then the warning output activates. If Service on cycles is set to 0 (zero) then no warning is reported. Do note that the value entered in Service on cycles is multiplied with 1000, whereas this value is not.

Service on time
Range: 0 … 1825 days
Function: Specifies the time (in days) before a service warning is issued. A value 0 (zero) disables the service warning on time.

Service (time)
Range: 0 … 1825 days, resettable to 0.
Function: Reports the time (in days) since the last service. This value can be set to 0 (zero) by pressing the set-to-zero button. Resetting this value to 0 should be done after service has been performed.

Reset this value to 0 after service has been performed.

If this value exceeds the Service on time parameter, then the warning output activates. If Service on time is set to 0 (zero) then no warning is reported.

System up time
Range: 0 … 1999999999 h, read-only
Function: Reports the time (in hours) that the system is up and running. This value can be used to determine unexplained resets and power failures. This value always starts at 0 (zero) when the system starts or resets.
Firmware version
Range: Version <Major>.<Minor>.<Build>, read-only
Function: The version of the controller firmware (main module). Operation of the door depends on the version of the software. This manual is written for a specific version as can be seen on page 2. Differences between the version can be seen in the revision history. Firmware loaded depend on the Hardware version.

Hardware version
Range: Ref <Major><Minor>, read only
Function: Hardware version (revision) of the controller. The firmware to load must match the hardware version.

Escape firmware
Range: Version <Major>.<Minor>.<Build>, read-only
Function: The firmware version of the escape module. Operation of the door depends on the version of the software. This manual is written for a specific version as can be seen on page 2. Differences between the versions can be seen in the revision history. The escape module firmware cannot be updated in the field.

Prog.switch version
Range: Version <Major>.<Minor>.<Build>, read-only
Function: The firmware version of the connected program switch. Is no program switch is connected, or there are problems communication with it, the version reported will be v0.00.0000. The program switch firmware cannot be updated in the field.

5.4.6 Basic – Update firmware
Using the update firmware command it is possible to update the firmware of the controller. Before updating the firmware, first check the existing version and hardware version. Once the update firmware command has been selected the slider configurator will ask to save the current settings to a file. Firmware update starts with selection of the new firmware. Select the firmware file to download. Only firmware for matching hardware can be downloaded. Before firmware download starts, the controller is put into service mode. If the firmware download is cancelled or aborted due to some other reason, it can be started again (may require a power cycle). After firmware download has completed press Ok to continue.

For the parameters there can be different situations, as a result of the different versions of firmware:
• No difference between the two – parameters are unchanged.
• A supported older firmware is updated – new/changed parameters are converted.
• Downgrade to older firmware – may cause loading of factory standard values.
• Unsupported parameter set – factory standard values are loaded.

No indication is given when the factory standard values are applied. Before updating the firmware, the slider configurator asks to save the settings to a file. After update, the saved settings can be downloaded to the controller if the factory standard values are loaded.
5.4.7 Basic – Service mode
Entering and leaving service mode can be done via the Basic / Service mode menu command. This menu item will have a checkmark before it when the controller is in service mode. For more information on service mode, see 0.

5.4.8 Basic – Initialisation
The initialisation command is used to instruct the controller to perform a full initialisation (see 4.9). With full initialisation, the open position will be determined. Before initialisation is started, the system will be tested.

5.5 Advanced menu
The advanced menu contains the parameters that are more advanced and only required for the correct installation of the door. Care must be taken in adjusting the values so that it complies with national regulations.

5.5.1 Door distances
There are many different position and distanced or offsets in the door controller, most of which can be configured. These are used to position the door (reduced open and pharmacy position) or for the movements and mechanical variations.

Figure 12 Distances of the door

The fully open position of the door is determined by the width of the door minus the Open offset. The Close offset, Reduced open pos. and the Pharmacy position can be adjusted. A construction offset and maximum stationary error are fixed values internal to the controller. The meanings of the parameters are described in the following sections.
All positions, offsets, speeds and accelerations are entered in mm or derivatives. They all depend on the *Increments per mm* parameter to convert the encoder signals into mm. If this parameter is inaccurate, then none of the positions will be correct.

### 5.5.2 Advanced – Movement

The movement page contains settings for the movement of the door.

National regulations may define limits for speed and acceleration.

---

#### Open speed

- **Range:** 50 … 1000 mm/s
- **Function:** Maximum speed for opening the door during normal operation. The controller will limit the speed to the capabilities of the controller and power supply. For escape routes the open speed must be set to at least 300 mm/s.

#### Open acceleration

- **Range:** 50 … 1000 mm/s²
- **Function:** The acceleration to open the door. The controller will limit the acceleration to the capabilities of the controller and power supply. The actual acceleration also depends on the weight of the door. For escape routes the open acceleration must be set to at least 300 mm/s².

#### Open deceleration

- **Range:** 50 … 1000 mm/s²
- **Function:** The deceleration for opening the door. The controller will limit the deceleration to the capabilities of the controller and power supply. If the deceleration is set to high, an overshoot could occur and the door could therefore hit the end stop. General rule is to have a maximum deceleration of 400 mm/s².

#### Close speed

- **Range:** 50 … 1000 mm/s
- **Function:** Maximum speed for closing the door during normal operation. The controller will limit the speed to the capabilities of the controller and power supply.

#### Close acceleration

- **Range:** 50 … 1000 mm/s²
- **Function:** The acceleration to close the door. The controller will limit the acceleration to the capabilities of the controller and power supply. The actual acceleration also depends on the weight of the door.
Close deceleration
Range: 50 ... 1000 mm/s²
Function: The deceleration for closing the door. The controller will limit the deceleration to the capabilities of the controller and power supply. If the deceleration is set too high, an overshoot could occur and the door could therefore hit the end stop. General rule is to have a maximum deceleration of 400 mm/s².

Home speed
Range: 50 ... 1000 mm/s
Function: The speed of the door:
• During homing;
• After the automatic return system activated;
• On determining the fully open position.
• During creep open (side screen sensor activation)

Close direction
Range: Right
Left
Function: Indicates the direction of movement to close the door. If the close position is incorrect, the value should be changed. Initialisation will be requested automatically when this value changes.

The door must be able to move freely in both directions when this parameter is changed.

Close offset
Range: 1 ... 100 mm
Function: On closing the door, the controller will first move the door to this position (offset from the true closed position), after which the door is shut. This parameter has influence on the close behaviour. The automatic return system will not activate when an obstacle between the door and the end stop is smaller than the Close offset on closing the door.
The current used to shut the door is set in parameter Home current.

Presence sensors are not used within the Close offset distance.

Open offset
Range: 2 ... 100 mm
Function: The fully open position is the maximum sliding distance of the door minus the Open offset. This parameter determines the distance between a fully opened door and the post of the door. During normal operation, the door must not touch the end stop in the open position, which requires the door to stop before the end stop.
Side screen start

Range: 0 … 100 %
Function: The percentage of the open distance after which the side screen sensors start to cause the door to creep open. This is the start position for the door to decelerate, the position at which the door actually moves slowly is determined by the Open speed and Open deceleration. The minimum value for escape routes is 80%.

Pull and go

Range: On or Off
Function: With pull and go the door will open when it is pulled open a short distance (10 mm.) Pull and go will open the door to the reduced open position when it is selected, otherwise the door will open fully. If the door already is at the reduced open position then the door will open fully as well. Pull and go does not work in programs close or manual.

Pull and go will, in most cases during fire, automatically be active, as set with the Fire action parameter.

Hold door

Range: On or Off
Function: Specifies whether the door must be held at its position. For instance, if the door is pushed open by the wind, than this value must be On. The door will be held at position to a maximum of ½ of the nominal motor current. Mechanical escape routes automatically have this function active.

Hold door must be active before the door is closed for it to operate.

5.5.3 Advanced – Sensors

The sensor settings page is used to set the settings of the sensors and diagnose the status.

- Escape routes require sensors that are certified for escape routes to be used on the inside.
- Escape routes and some national or local regulations require testable presence sensors on the inside and outside.

The controller has two sensor connections, one for the inside and one for the outside. They are almost identical. For the inside sensor, there are the most requirements to fulfil. Some of the descriptions that are identical for both inputs are described only once here.

Open time

Range: 10 … 120 000 ms
Function: The minimum time that the door remains open when it is opened by an activator, except the porter. The timer shall re-start as long as an activator remains active.
Inside sensor type

Range: Custom, list

Function: The inside sensor type allows the selection of a sensor from a list to set multiple parameters of that sensor with a single selection. The types and specifications of sensors in the list fall out of the scope of this manual. If any of the parameters (Motion type, Presence type or Presence test delay) is changed than the Sensor type is set to Custom. Not all sensors may be selected for escape routes.

Motion inside type

Range: Analog
Frequency
Redundant
Simple NC
Simple NO

Function: The type of electrical connection or signal to the motion sensor. This is not the type of detection, such as radar, passive infra red, etc., but the method that the sensor uses to signal to the controller that it detects something or not. Push buttons and single relay output sensors are of the “simple” type, either Normally Closed (simple NC) or Normally Open (Simple NO). For redundant outputs it is required that the second output is connected to a programmable input. This input must be inverted.
Escape routes require analog, frequency or redundant types for the inside motion sensor.

Presence inside type

Range: NC, test high (delay)
NO, test high (delay)
NC, test low (delay)
NO, test low (delay)
NC, test low (direct)
NO, test low (direct)
NC, no test
NO, no test

Function: The type of contact from the presence sensor as Normally Open (NO) or Normally Closed (NC) combined with the test method. Testable sensors are tested either with a high voltage on the test connection or with a low voltage (open connection). If the sensor has a defined delay in the output signal compared to the test signal, then that delay is tested as well. The signal is verified after Presence test delay time when the test signal is applied. A monitoring error is triggered when testing has failed. Monitoring errors have a warning level and the effect is equal to an active sensor.
Escape routes require testable presence sensors. Beside escape routes, other national or local regulations may require testable presence sensors. Only for escape routes it is not possible to select an Escape route without testable presence sensors.
Presence test delay

Range: 0 ... 250 ms
Function: The delay between applying the test signal and testing the presence sensor output. After the test, this delay is used to allow the sensor to set the output again for normal operation. If this delay is set to short, a monitoring error could be triggered. If the value is set too high, there is the problem of not detecting objects. Typical values are 10 and 30 ms.

Motion active

Range: On or Off, read-only
Function: Indicates the active state of the motion sensor. This state is after processing (NC/NO, frequency, etc.) and will be used to open the door.

Presence active

Range: On or Off, read-only
Function: Indicates the active state of the presence sensor. This state is after processing (NC/NO and testing) and will be used to re-open the door or keep it open.

Presence inside monitor error

Range: On or Off, read-only
Function: Indicates that an error was detected while monitoring (testing) the inside presence sensor.

Outside sensor type

Range: Custom, list
Function: The same as *Inside sensor type* except that it is for the outside sensor. Not all sensors may be selected for escape routes.

Motion outside type

Range: Analog
- Frequency
- Redundant
- Simple NC
- Simple NO
Function: The same as *Motion outside type* except that it is for the outside motion sensor. Escape routes do not require any type in particular for the outside motion sensor.

Presence outside type

Range: *See list of Presence inside type*
Function: The same as *Presence inside type* except that it is for the outside presence sensor. Escape routes require testable presence sensors. Beside escape routes, other national or local regulations may require testable presence sensors. Only for escape routes it is not possible to select an *Escape route* without testable presence sensors.
Presence outside monitor error
Range: On or Off, read-only
Function: Indicates that an error was detected while monitoring (testing) the outside presence sensor.

5.5.4 Advanced – Inputs
The inputs page is used for configuring the function of the inputs, diagnose or test the states and contains related parameters. The six programmable inputs on the controller are all identical in capabilities and the description is only given once.

Input X function
Range: None
Motion inside
Motion outside
Presence inside
Presence outside
Porter
FullSens inside
FullSens outside
Interlock hold
Side screen
Disable motion
Fire
Emergency open
Initialisation
Robbery
Use program 1
Use program 2
Toggle
Pharmacy
Lock feedback
Function: The programmable inputs can be used for various functions.

- None: No function assigned to the input.
- Motion inside: See 4.3.1 for information on motion sensors.
- Motion outside: See 4.3.1 for information on motion sensors.
- Presence inside: See 4.3.2 for information on presence sensors.
- Presence outside: See 4.3.2 for information on presence sensors.
- Porter: See 4.3.3 for information on porter input. The programmable input porter function allows for Normally Closed type input to be connected with Invert set.
- FullSens inside: See 4.3.5 for information on FullSens inputs.
- FullSens outside: See 4.3.5 for information on FullSens inputs.
- Interlock hold: See 4.7 for more information on interlock. This function cannot be selected for escape routes.
- Side screen: See 4.3.4 for information on side screen sensors.
- Disable motion: See 4.4.4 for information on disable motion. This function
cannot be selected for escape routes.

- **Fire:** See 4.4.1 for information on fire.
- **Emergency open:** See 4.4.2 for information on emergency open.
- **Initialisation:** Activation the initialisation input will cause a full initialisation to start. See 0 for more information on initialisation.
- **Robbery:** See 4.4.5 for information on robbery.
- **Use program 1:** Forces the use of a special program even if the program switch is set to another program. This allows certain remote control bypassing the standard program selection. An example can be with building automation. When this force is released, the program from the program switch is applied again. The program switch shows the program of the switch itself, but the hand symbol blinks with a special pattern to indicate that the selected program is overridden. Program selection is done with the *Program (1)* parameter. Escape routes do not allow the programs close or manual to be selected this way. *Use program 1* has the highest priority for program selection.

- **Use program 2:** Forces program selection in two stages. On activation of the input the program set in *Program (2, start)* is used. After the *Program2 delay*, the program set in *Program (2 final)* is used. This program remains in used until the input is released. An example is for a shop that want to set exit-only at 18:00 and program close 900 seconds (15 minutes) later. The input can then be issued from a time clock. See the text on *Use program 1* on the notification via the program switch. Escape routes do not allow the programs close or manual to be selected this way. *Use program 2* overrides program selection of the program switch, but is superseded in priority by *Use program 1*.

- **Toggle:** See 4.3.6 for information on toggle.
- **Pharmacy:** See *fout! Verwijzingsbron niet gevonden.* for information on pharmacy.
- **Lock feedback:** Feedback that the lock is in the locked state. This signal is used when the digital output is set to *Closed and locked.*

**Is active**

<table>
<thead>
<tr>
<th>Range:</th>
<th>On or Off, read-only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Function:</td>
<td>Shows the active state of the input after processing (<em>Invert</em>). It does not show the active state of the function selected.</td>
</tr>
</tbody>
</table>
Invert
Range: On or Off
Function: Specifies whether the input must be inverted or not. This allows for Normally Closed and Normally Open connections to be used. Invert cannot be used to distinguish between NPN or PNP.

Toggle (state) active
Range: On or Off, read-only
Function: Shows the active state of the toggle function. It does not show the active state of any input with the input function toggle.

Emergency input active
Range: On or Off, read-only
Function: Shows the active state of the dedicated emergency input.

Emergency input function
Range: Fire
Emergency open
Function: Allows the selection of action to be performed when the dedicated emergency input activates. It is like a programmable input, but is limited in function Fire or Emergency open. In addition, the emergency input requires a Normally Closed PNP connection. For more information on fire see 4.4.1 and for emergency open see 4.4.2.

Input level
Range: NPN or PNP, read-only
Function: The input level shows the input level or input type used for most of the inputs (programmable inputs and presence inputs). This setting matches the jumper position on the controller. It should not be used to switch between Normally Close or Normally Open for these inputs.

Output X function
Range: Error
Warning
Auxiliary lock
Closed and locked
Door closed
Door closing
Door fully open
Door moves
Door not closed
Door open
Door opening
Monitor sidescreen
Bell
Lock
Function: The function for the digital output can be any selected from the list below.
- Error: The output will be active when the controller is in the error state. For a complete list of errors see the errors appendix.
- **Warning:** The output will be active when a warning or error is active. For a complete list of warnings, see the warnings appendix.

- **Auxiliary lock:** This output is for connection of an auxiliary lock. The auxiliary lock output is only active in program close. It is used to connect both a lock and a brake, when the brake holds the door in each position and the lock, in program close, locks the door. This output is also active during a robbery. The auxiliary lock has its own lock time (*Aux. lock delay*).

  ! The auxiliary lock output is only switched as fail safe.

- **Closed and locked:** Indicates that the door is closed and locked. This is only for electromechanical locks and closed by the controller. The lock feedback signal is used in combination with the close state and the lock output state. If the lock does not have a feedback, a jumper must be used for the lock feedback.

- **Door closed:** Indicates that the door is closed in any automatic program. Manually closing does not activate it.

- **Door closing:** Indicates that the door is closing. Does not activate in program manual.

- **Door fully open:** Indicates that the door is fully open. Does not activate in program manual.

- **Door moves:** The output will be active when an automatic movement is in progress. Manually moving the door will not activate this output.

- **Door not closed:** The output will be activated when the door is not closed. In program manual, this output is active when the door is opened for more than 10mm, otherwise it is off. Active in service mode and disable motion state.

- **Door open:** The output will be activated when the door is in the open state. Does not activate in program manual.

- **Door opening:** Indicates that the door is opening. Does not activate in program manual.

- **Monitor side screen:** The output is used for the test signal of side screen sensors. All side screen sensors connected to the controller directly are tested simultaneously. Side screen sensor testing is only performed when the output is set to monitor. If the output is set to this function, but the side screen sensor is not connected to it, a side screen sensor monitoring error is generated.

  ! Side screen monitoring is performed simultaneously on all side screen sensors connect to the controller directly.

- **Bell:** The bell output is activated when the outside motion
sensor activates. Only activates if the outside sensor is used (program automatic or open).

- **Lock:** The lock output activates when the door should be locked. It switches simultaneously with the lock output.

### Program (1)

<table>
<thead>
<tr>
<th>Range</th>
<th>Close</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>One-way (full)</td>
</tr>
<tr>
<td></td>
<td>Automatic (full)</td>
</tr>
<tr>
<td></td>
<td>Open (full)</td>
</tr>
<tr>
<td></td>
<td>One-way (reduced)</td>
</tr>
<tr>
<td></td>
<td>Automatic (reduced)</td>
</tr>
<tr>
<td></td>
<td>Open (reduced)</td>
</tr>
<tr>
<td></td>
<td>Manual</td>
</tr>
</tbody>
</table>

**Function:** Sets the program to use when a input with the function *Use program 1* is active.

---

Escape routes do not allow programs close or manual to be selected via an input. Nor does it allow any reduced open programs.

### Program (2, start)

<table>
<thead>
<tr>
<th>Range</th>
<th>Close</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>One-way (full)</td>
</tr>
<tr>
<td></td>
<td>Automatic (full)</td>
</tr>
<tr>
<td></td>
<td>Open (full)</td>
</tr>
<tr>
<td></td>
<td>One-way (reduced)</td>
</tr>
<tr>
<td></td>
<td>Automatic (reduced)</td>
</tr>
<tr>
<td></td>
<td>Open (reduced)</td>
</tr>
<tr>
<td></td>
<td>Manual</td>
</tr>
</tbody>
</table>

**Function:** Sets the program to use when a input with the function *Use program 2* is activated. After the delay set in *Program2 delay*, the program switches to the program set in *Program (2, final)*.

---

Escape routes do not allow programs close or manual to be selected via an input. Nor does it allow any reduced open programs.

### Program (2, final)

<table>
<thead>
<tr>
<th>Range</th>
<th>Close</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>One-way (full)</td>
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<tr>
<td></td>
<td>Automatic (full)</td>
</tr>
<tr>
<td></td>
<td>Open (full)</td>
</tr>
<tr>
<td></td>
<td>One-way (reduced)</td>
</tr>
<tr>
<td></td>
<td>Automatic (reduced)</td>
</tr>
<tr>
<td></td>
<td>Open (reduced)</td>
</tr>
<tr>
<td></td>
<td>Manual</td>
</tr>
</tbody>
</table>

**Function:** Sets the program to use when a input with the function *Use program 2* has been active for more than the delay set in *Program2 delay*.

---

Escape routes do not allow programs close or manual to be selected via an input. Nor does it allow any reduced open programs.
Program2 delay
Range: 0 … 86400 s (24 hours)
Function: Sets the delay to be used between the use of Program (2, start) and Program (2, final) when a programmable input with the function Use program 2 is active.

5.5.5 Advanced – Motor
In this menu settings for the motor and encoder can be configured.

Sensitivity
Range: Very low
Low
Medium-low
Medium
High
Very high
Function: Specifies the sensitivity of the automatic return system. The automatic return system activates when the speed if the door drops too much.

The Sensitivity parameter only specifies how sensitive door is to speed variations. The force of the door is determined by the mass and speed of the door and various current parameters, such as Current gain and Max.motor current.

Motor type
Range: Custom, list
Function: A selection of a motor from this list will automatically configure the motor parameters such as nominal– and maximum motor current. These parameters are only changed when a motor is selected from the list, except for Custom. After the motor has been selected, changing any of the coupled parameter will set the motor type to Custom. Encoder specifications (Increments per mm)are also set with the motor type. The Home current is not changed with the Motor type, care must be taken that the home current is sufficient for the door.

Changing the motor type can only be done in service mode. If the Increments per mm value changes on the motor selection then the controller will start initialisation on leaving service mode.

Current gain
Range: 80 … 200 %
Function: The current gain is a multiplication factor for the automatic current limits. It allows for higher currents than calculated theoretically. The standard value of 120% is sufficient for most doors. Care must be taken when increasing this value, as it makes the door more difficult to stop in the event of an obstruction.
Max. motor current

Range: 256 … 20000 mA
Function: The maximum current of the motor. For each movement the allowed current is automatically calculated and generally is lower than the set maximum motor current. If the calculated current is higher than the set maximum motor current, then the current is limited to the set maximum.

⚠️ This value is automatically replaced when selecting a Motor type other than Custom.

⚠️ Max. motor current does not limit Home current.

Nominal current

Range: 256 … 10000 mA
Function: The nominal current of the motor. This value is used for the protection of the motor.

⚠️ This value is automatically replaced when selecting a Motor type other than Custom.

Home current

Range: 256 … 20000 mA
Function: With this parameter, it is possible to adjust the current used to home the door (search close and open positions). The value is not limited to Max. motor current or Nominal current. Do make sure that the home current is sufficient to move the door.

⚠️ The Home current is not changed when a Motor type is selected. Care must be taken that the home current is sufficient for the door.
Increments per mm

Range: 1 … 1000
Function: Specifies the number of increments when the door moves 1 mm (500 pulses = 2000 increments)

There are two methods to acquire the increments per mm.

By measurement:
- Close the door using an automatic mode.
- Enter service mode.
- Open the door a specified distance, say 1 meter.
- Divide the value of Encoder position by the distance of the door movement in mm.
- Enter the result of the division at parameter Increments per mm.

By calculation:
$$\frac{\text{Increment}_{\text{per mm}}}{\text{mm}} = \frac{2000 \times \text{gear\_ratio}}{\text{pulley\_diameter} \times \pi}$$

The value gear\_ratio must be 10 for a gear of 1:10 and the pulley\_diameter is in mm.

This value should apply to a single door. For double leaf doors, the open positions will be twice the settings.

Changing this value can only be done while in service mode. Initialisation is performed automatically on leaving service mode.

Encoder position

Range: -10000000 … +10000000, read-only
Function: The encoder position is the position from the encoder in increments. It can be used to diagnose the encoder and determine the Increments per mm parameter.

5.5.6 Advanced – Lock

This page contains the parameters for the electromechanical lock.

Lock type

Range: None
Solenoid
Bi-stable
Linear
2x solenoid
2x electronic
Function: Sets the type of lock. See 3.7 for details on the connection of the various types of locks.
Main lock type

- **Range:** Fail safe  
  Fail secure  

- **Function:** Sets the fail type of the main lock. Fail safe/secure is only applicable for solenoid and electronic locks. This parameter is also used for the bi-stable and linear locks to invert the operation, but a failure should keep the lock in the last state. 
  
  *Main lock type only applies for the “Lock+” connection for the 2x solenoid and 2x electronic settings, otherwise it applies for both the “Lock+” and “Lock−” connection.*
  
  - **Fail safe:** Fail safe locks are only locked when power is applied to them. Fail safe for solenoid and electronic locks, non-inverting for bi-stable and linear locks.
  
  - **Fail secure:** Fail secure locks are locked when no power is applied (voltage free). Fail safe is for solenoid and electronic locks, inverted operation for bi-stable and linear locks. Escape routes do not allow fail secure type locks.

Aux lock type

- **Range:** Fail safe  
  Fail secure  

- **Function:** The Aux lock type sets the fail type for the auxiliary lock. This is only for auxiliary locks connected to the “Lock−” connection, which can only be used when the Lock type is set to 2x solenoid or 2x electronic. 
  
  See Main lock type for more details on the settings.

Lock activation

- **Range:** Program close  
  Close + one-way  
  All programs  
  Each position  

- **Function:** Specifies whether the door must be locked in all programs, program close and one way or just in program close, although the door only locks when the door is closed. 
  
  With the option *Each position* a brake is used to hold the door in each position without the use of the motor. 
  
  During error, whenever an automatic opening is requested or manual operation requested the door will unlock.

Lock voltage

- **Range:** 0 … 50 V  

- **Function:** The supply voltage for switching the lock. This voltage is only used for the locking period, after Lock delay the Hold voltage is used. For the 2x electronic type locks the voltage generator is disabled and the voltage is floating, regardless of this setting.
Hold voltage
Range: 0 ... 50 Volt
Function: The supply voltage for holding the lock in the desired state. This allows a lower voltage for continues operation. For the 2x electronic type locks the voltage generator is disabled and the voltage is floating, regardless of this setting. Lock voltage will be used to switch the lock, after Lock delay the Hold voltage will be used.

Lock delay
Range: 0 ... 60000 mSec.
Function: The time between switching the lock and door movement. This value is also used for switching from the Lock voltage to Hold voltage. Both the main and auxiliary locks can be switched at the same time. If both are switched than the longest time of Lock delay and Aux. lock delay will be used.

Aux. lock delay
Range: 0 ... 600000 mSec.
Function: The time between switching the auxiliary lock and door movement. Both the main and auxiliary locks can be switched at the same time. If both are switched than the longest time of Lock delay and Aux. lock delay will be used.

Ignore disable motion
Range: On
Off
Function: Specifies whether to stay locked with disable motion. The door is always unlocked when the disable motion is active and this parameter is set to Off. If the value is On then the door may be locked. This can be useful to use the disable motion as an emergency stop without the possibility to use the emergency stop as a way to unlock the door (security).

Lock feedback input active
Range: On or Off, read-only
Function: Shows the active state of the dedicated lock feedback input.

Main lock voltage
Range: 0 ... 50 V, read-only
Function: The voltage present on the “Lock+” connection. Allows easy diagnostics of the lock. The voltage is the required value. “Gnd” is shown if the lock relay is switched to Gnd and “Float” is shown for electronic locks when the relay is switched to the floating (supply off) state.

Aux. lock voltage
Range: 0 ... 50 V, read-only
Function: The voltage present on the “Lock-” connection. See Main lock voltage for more information.
**Lock output voltage**

Range: 0 … 50000 mV, read-only

Function: The voltage output for the lock. This is the measured voltage coming out of the PWM generated voltage.

---

### 5.5.7 Advanced – Power

The power page shows the values of power related parameters, such as the various voltages and battery status. Battery testing is performed every 4 hours (if applicable).

**Battery capacity**

Range: 0 … 25 Ah

Function: Battery capacity in Ah as connected to the controller. If two batteries are connected in series, only set the capacity of one battery. The battery capacity value is also used to activate battery testing. If this value is set to 0 (zero), then battery testing is switched off. The test of the battery test depends on the capacity specified.

Escape routes with dual motors are required to have batteries connected and they must be tested.

---

**Battery status**

Range: Unknown

- Ok
- Low/bad
- Hardware failure
- Not installed
- Missing

Function: **Battery status** holds the status of the battery test. Status details are shown in **Battery failure**.

- **Unknown**: The status of the batteries is unknown, mostly caused on start-up with insufficient supply voltage to start testing.
- **Ok**: Battery test completed successfully.
- **Low/bad**: Battery voltage dropped below threshold of 21V during operation or during battery test. Can be caused by batteries with insufficient charge (low) or bad batteries. Check battery voltage (*Main battery*). If condition persists, batteries are considered bad.
- **Hardware failure**: A hardware failure was detected during testing. See **Battery failure** for possible causes. Generally a replacement of the controller is required.
- **Not installed**: Status reported when no batteries are installed (*Battery capacity* set to 0).
- **Missing**: Batteries are considered missing. During testing the battery voltage dropped below missing threshold. Test for missing/connected batteries is every 5 seconds.
### Battery failure

**Range:**
- None
- Operating low
- Low voltage
- Charger faulty
- Hardware fault
- Software error

**Function:** Battery failure shows the type of failure detected during battery testing.
- **None:** No failure detected.
- **Operation low:** Battery voltage drops below 21V during battery operation. Charging and retesting required before normal operation is resumed.
- **Low voltage:** Battery voltage was low during battery testing. Mostly caused by batteries with insufficient charge or bad batteries.
- **Charger faulty:** A problem with the battery charger. Mostly insufficient supply voltage or charge switch.
- **Hardware faulty:** A hardware fault in the controller, preventing reliable battery testing.
- **Software error:** A problem in the software for battery testing.

### Main supply

**Range:** 14000 … 56000 mV, read only

**Function:** Displays the supply voltage of the main supply input. An error is given when the supply voltage is below 18V or above 56V. If the supply voltage is below 27V, the controller switches to battery operation and will use a reduced speed. This speed reduction is set to 40% of the normal speed.

### Main battery

**Range:** 14000 … 30000 mV, read only

**Function:** Displays the voltage of the battery as measured from the main control unit. If the voltage is below 24V, the battery is considered low in charge (during battery testing). A voltage below 21V will trigger the low/bad warning and the door will not close in automatic modes.

### EM supply

**Range:** 0 … 30000 mV, read only

**Function:** Displays the battery voltage as measured by the escape module. The battery is the only supply for the escape module.

### 27V supply

**Range:** 24000 … 30000 mV, read only

**Function:** Displays the voltage used to charge the battery.
12/24V supply
Range: 10000 … 30000 mV, read only
Function: Displays the voltage available for sensors etc. that get their supply from the +24V connections on the controller. The selection for 12 or 24 volt is made with the IO supply voltage parameter (see 5.5.4). A low voltage indicates a short or overload in the 12/24V circuit. A short in the +24V may not necessary cause this value to be low. Sensors powered from the S+24V connections have a separate overload (short circuit) protection. The +24V connections can have a supply voltage when the sensors are in overload protection. Overload in the sensor supply (S+24V) is indicated with warning Sensor supply overloaded. This warning is only given if the overload occurs after correct operation.

12V supply
Range: 9000 … 15000 mV, read only
Function: Displays the exact voltage of the internal 12V supply. This supply is used internally to control the motor and lock output.

5.5.8 Advanced – Safety
This page contains parameters that set the actions taken for safety reasons. In addition, escape module status can be seen here.

Escape route
Range: No escape route
Dual motor
Mechanical
Function: The Escape route parameter sets the type of redundancy for escape routes. Escape routes require a redundant means to open the door. Opening can be either using a second motor (dual motor) or mechanically (usually elastic bands).

- No escape route: The door is not installed in an escape route and therefore no additional safety settings are required.
- Dual motor: Escape route has a redundant open method by using an additional motor. The second motor is controlled by the escape module and it can only open the door.
- Mechanical: Redundant door opening is done mechanically, for instance using elastic bands or counter weights.

Regulations have strict requirements for escape routes. Some of these requirements are enforced in the controller. See 4.5 for more information.

⚠️ See 4.5 for information on escape route requirements.
Battery action

Range: Open, direct  
Open, low battery  
Normal operation  
Manual operation  

Function: When the controller operates in battery mode (mains power supply is not present), the here selected action will be used. The battery action is performed if there is a failure in either battery or mains supply (power failure) or when the battery tests fail.

- Open, direct: Door opens direct after a power failure. Only action allowed for escape routes.
- Open, low battery: Door opens when the capacity of the batteries drops below a threshold.
- Normal operation: No special action taken. Warning will still be active to indicate battery operation.
- Manual operation: Door switches over to manual operation.

Battery action is continued to at least 10 seconds after the mains is restored. When the warning Battery low has activated, the battery need to be tested before normal operation is resumed. The battery test is executed after the 10 seconds delay.

Battery action is not performed in programs close or manual if the parameter Battery action in program or manual is set.

Fire/battery action in locked programs

Range: On or Off  

Function: Sets whether the fire and battery action are performed in the locked programs (close or manual). As the door may be locked in these programs, it can be impossible or unwanted to perform the fire or battery action.

Battery status

Range: See list in 5.5.7, Battery status  

Function: This Battery status is the same as the one in Advanced – Power. For details on the values, see 5.5.7, Battery status.
Fire action

Range: Open
       Automatic
       Close, then manual
       Manual operation

Function: The action to use while the fire input is active. Whether or not the action is performed depends on the program selected and the value of the Fire/battery action in locked programs parameter. The dedicated fire input can also be configured to have the Emergency open function. In that case it will not cause the fire action as emergency open always opens the door fully. For details on setting the function, see 5.5.4.

- **Open**: the door opens fully.
- **Automatic**: Door operates as in program automatic (full). Sensors open the door and it closes on time. Pull and go allows the door to be opened manually. If program open is selected, the door will close without any sensor activation.
- **Close, then man**: the door closes and then switches to manual operation. This is the only action to close the door. Motion and presence sensors are active as prescribed by the selected program, except when Fire disables sensors is set.
- **Manual operation**: Switch over to manual operation once the door is stationary.

The ability to use sensors depends on the value of the Fire disables sensors parameter.

**Fire disables sensors**

Range: On or Off

Function: As sensor detection can be effected by smoke and falling debris during fire, it is possible to disable them during fire. During fire, the door opens, is in manual operation or has pull and go active. In either situation it is possible to open the door.

**Fire warning**

Range: On or Off, read-only

Function: Indicates a fire warning. This is the same flag as the one in 5.5.4 (Advanced – Inputs).
### Motor position
- **Range:** -10000000 … +10000000 cnt, read-only
- **Function:** Shows the motor position of the escape motor as measured by the escape module. This value is only used in dual-motor escape routes, where the encoder position of that motor is connected to the controller.

### EM supply
- **Range:** 0 … 30000 mV, read only
- **Function:** Displays the battery voltage as measured by the escape module. The battery is the only supply for the escape module.

### Inside motion active
- **Range:** On or Off, read only
- **Function:** Displays the active state of the inside motion sensor as detected by the escape module.

### Inside presence active
- **Range:** On or Off, read only
- **Function:** Displays the active state as determined by the escape module. Only the presence testing state is shown, not the actual (physical) state.

### Emergency active
- **Range:** On or Off, read only
- **Function:** Displays the active state of the dedicated emergency input as detected by the escape module.
## Warnings

Possible warnings with the controller

<table>
<thead>
<tr>
<th>Warning</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service required</td>
<td>Service is required. After the door has been serviced the Service (cycles) and Service (time) parameters must be reset to zero using the 0 (zero) button. These parameters can be found in the Basic / Service page.</td>
</tr>
<tr>
<td>Battery missing</td>
<td>Battery is missing or not connected. Battery connection is tested every 5 seconds when the capacity is set to 1 or more.</td>
</tr>
<tr>
<td>Battery low</td>
<td>Battery voltage has dropped to below 21 volt. Battery will be tested before normal operation is resumed.</td>
</tr>
<tr>
<td>Battery operation</td>
<td>Supply voltage is less than 29 volt – battery operation is active. Make sure that the supply voltage is above that threshold.</td>
</tr>
<tr>
<td>Battery hardware</td>
<td>A hardware problem has been detected in the battery circuit.</td>
</tr>
<tr>
<td>Motion inside fault</td>
<td>The motion inside sensor has been active for more than 10 minutes. Make sure that the correct type has been selected, that the sensor is working and connected properly. Verify sensor operation with the detected and non-detected states.</td>
</tr>
<tr>
<td>Motion outside fault</td>
<td>The motion outside sensor has been active for more than 10 minutes. Make sure that the correct type has been selected, that the sensor is working and connected properly. Verify sensor operation with the detected and non-detected states.</td>
</tr>
<tr>
<td>Presence inside fault</td>
<td>The presence inside sensor has been active for more than 10 minutes. Make sure that the correct type has been selected, that the sensor is working and connected properly. Verify sensor operation with the detected and non-detected states.</td>
</tr>
<tr>
<td>Presence outside fault</td>
<td>The presence outside sensor has been active for more than 10 minutes. Make sure that the correct type has been selected, that the sensor is working and connected properly. Verify sensor operation with the detected and non-detected states.</td>
</tr>
<tr>
<td>Motor I2T activated</td>
<td>The motor I2T protection has activated. Current requirement to move door exceeds rated value of motor. Correct motor settings, decrease friction, decrease speed/acceleration, or use motor that is more powerful.</td>
</tr>
<tr>
<td>Disable motion active</td>
<td>The disable motion input is active.</td>
</tr>
<tr>
<td>Fire active</td>
<td>The fire input is active.</td>
</tr>
<tr>
<td>Error Type</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Program flow error</td>
<td>One of the cyclic tests has not been performed in time. Tests are inside presence, battery, system and mechanical escape. All depends on settings. Old escape module firmware is known for false reports.</td>
</tr>
<tr>
<td>Escape module error</td>
<td>The escape module encountered an error. Details of the error are in the <em>Error code escape</em> parameter.</td>
</tr>
<tr>
<td>Presence inside monitor error</td>
<td>Monitoring the inside presence sensor failed. Make sure correct type is selected and sensor is connected and working properly.</td>
</tr>
<tr>
<td>Presence outside monitor error</td>
<td>Monitoring the outside presence sensor failed. Make sure correct type is selected and sensor is connected and working properly.</td>
</tr>
<tr>
<td>Mechanical opening failed</td>
<td>With a mechanical escape route it is required that the mechanics is able to open the door from the closed position to 80% of the full open position within 10 seconds. This warning is issued when the mechanical opening was not capable in doing so. Giving a reset command from the program switch will restart testing.</td>
</tr>
<tr>
<td>Side screen monitor error</td>
<td>Monitoring the side screen sensor failed. Make sure correct type is selected and sensor is connected and working properly.</td>
</tr>
<tr>
<td>Sensor supply overload</td>
<td>Indicates that an overload has been detected on the sensor supply (S+24V). This warning is not given when the overload is present at start-up.</td>
</tr>
</tbody>
</table>
Errors

The door controller can have the following error messages:

**Supply failure (1)**
- **Meaning:** There is a problem with one of the (internal) power supplies.
- **Cause:** Input voltage exceeds limits (main and battery), outputs overloaded or short circuit, power circuit defect

**Current offset (2)**
- **Meaning:** A problem was detected in determining the current measurement offset.
- **Cause:** Faulty controller

**Temperature range (3)**
- **Meaning:** The temperature measured inside the controller was out of a valid range, or an over temperature was measured (85 °C)
- **Cause:** Ambient temperature too high, load too big, faulty controller.

**Motor drive fault (4)**
- **Meaning:** A problem was detected in the motor drive of the controller.
- **Cause:** Faulty controller

**Motor inv. operated (5)**
- **Meaning:** The motor operated in reverse during a system test without initialisation request.
- **Cause:** Motor or encoder wiring reverted – initialise system.

**Connect motor (6)**
- **Meaning:** Motor not connected, current through motor to low.
- **Cause:** Motor not connected, bad connection, motor parameters incorrect, motor defective, low power supply voltage, faulty controller.

**Motor shorted (7)**
- **Meaning:** Short circuit detection of the motor activated.
- **Cause:** Motor connection shorted, motor characteristics wrong, faulty controller.

**Motor/encoder (8)**
- **Meaning:** A problem was detected getting the door to move (no movement) or the speed during homing was too fast.
- **Cause:** Motor faulty, encoder faulty, motor parameters incorrect (Max. motor current and Home current), bad connection.
Encoder (9)
Meaning: Error with encoder, motor or lock. No movement measured.
Cause: Encoder not connected, bad connection, encoder faulty, door at end post, motor blocked, lock active, improper shielding, maximum motor current to low, friction to high.

This error message is used when the encoder does not change significantly during the test and a current is measured through the motor, which will be the case if the motor cannot turn, caused by a blocked motor or the lock being active.
Another cause can be a bad connection between the motor and the controller or improper shielding, which causes interference on the encoder lines.

If the current through the motor is not sufficient to move the door, then the Max. motor current is to low.

Low home current (10)
Meaning: The home current is set to low to be able to move the door.
Cause: Home current to low or friction to high.

EM movement direction (11)
Meaning: The detected movement direction of the escape module motor (Dual motor) was wrong compared to the main motor.
Cause: Wiring of escape motor wrong, wiring of main encoder wrong, Close direction wrong.

Memory error (12)
Meaning: A problem was detected while testing the internal memory of the controller.
Cause: Faulty controller.

Overvoltage (13)
Meaning: Supply voltage detected above limit of 58 V.
Cause: Supply voltage to high, deceleration to high, insufficient capacitance in power supply, faulty controller.

Controller error (14)
Meaning: Problem detected inside the controller.
Cause: Faulty controller.

Door connection (15)
Meaning: Mechanical connection of the door between the main and escape motor not correct.
Cause: Mechanical connection between main and escape motor faulty.

No close position (16)
Meaning: The close position cannot be found. During the search for the close position, the maximum distance of 30 meter has been exceeded.
Cause: Belt broken, gear defective, pulley slips.
No open position (17)
Meaning: The open position cannot be found. During the search for the fully open position the maximum distance of 30 meter has been exceeded, or it is smaller than 250 mm.
Cause: Gear defective, pulley slips, belt broken, door blocked or moves difficult, maximum motor current to low.

Software error (29)
Meaning: An internal software error was detected.
Cause: Faulty firmware.

Untested unit
Meaning: The controller was not tested.
Cause: The controller (unit) was not tested.
## Troubleshooting

Errors and warnings have appendixes describing the possible causes and solutions. Below is an additional list with problems and possible solutions.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door does not open</td>
<td>No supply voltage</td>
<td>Connect the power supply.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switch the power supply on.</td>
</tr>
<tr>
<td></td>
<td>controller is not on</td>
<td>Check supply voltage going into controller.</td>
</tr>
<tr>
<td></td>
<td>No sensor supply</td>
<td>Check if there is a sensor supply.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the 24V supply, in Advanced / Power</td>
</tr>
<tr>
<td>Program close selected</td>
<td></td>
<td>Select program automatic, one way traffic or open.</td>
</tr>
<tr>
<td>Program manual selected</td>
<td></td>
<td>Select program automatic, one way traffic or open.</td>
</tr>
<tr>
<td>Robbery or disable motion input active</td>
<td></td>
<td>Wrong input signal.</td>
</tr>
<tr>
<td>Fire active and Fire action = Close, then manual or Manual operation</td>
<td></td>
<td>Select other function for the programmable inputs</td>
</tr>
<tr>
<td>Battery mode and Battery action = Manual operation</td>
<td></td>
<td>Set Fire action to Open or Automatic.</td>
</tr>
<tr>
<td>Motion sensor not active</td>
<td></td>
<td>Check motion sensor input.</td>
</tr>
<tr>
<td>Interlock mode active</td>
<td></td>
<td>Deselect interlock mode</td>
</tr>
<tr>
<td>Controller in service mode</td>
<td></td>
<td>Close second door</td>
</tr>
<tr>
<td>LED flashes red</td>
<td></td>
<td>An error occurred. See the error appendix for the description and possible causes of the errors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reset by:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• pressing the reset button on the program switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• push button on the controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• select Initialisation from the programmer or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• switching off and then switching on the controller (both mains and battery supply must be switched off).</td>
</tr>
<tr>
<td>Door opens only halfway</td>
<td>Reduced open has been selected</td>
<td>Select fully open program.</td>
</tr>
<tr>
<td>Problem</td>
<td>Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Full open position found incorrect</td>
<td>(Re) initialise door.</td>
<td></td>
</tr>
<tr>
<td>Door opens fully and not reduced</td>
<td>Fully open program selected</td>
<td>Select reduced open program (not possible in escape route).</td>
</tr>
<tr>
<td></td>
<td>FulSens input activated</td>
<td>Set input function to <em>Motion inside</em> or <em>Motion outside</em>.</td>
</tr>
<tr>
<td></td>
<td>Reduced open position is incorrect</td>
<td>Correct the <em>Reduced open pos.</em> parameter.</td>
</tr>
<tr>
<td>Door stays opens to long / short</td>
<td>Porter is used to open door</td>
<td>Change <em>Porter time</em>.</td>
</tr>
<tr>
<td></td>
<td>Sensor used to open door</td>
<td>Change <em>Open time</em>.</td>
</tr>
<tr>
<td></td>
<td>Toggle input used</td>
<td>Door closed with second pulse from the toggle input.</td>
</tr>
<tr>
<td></td>
<td>Door opens against the end stop</td>
<td>Initialise door.</td>
</tr>
<tr>
<td>Door does not close</td>
<td>Program open selected</td>
<td>Select program automatic, one way traffic or close.</td>
</tr>
<tr>
<td></td>
<td>LED flashes red</td>
<td>An error occurred. See the <em>error appendix</em> for the description and possible causes of the errors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reset by:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• pressing the reset button on the program switch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• push button on the controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• select <em>Initialisation</em> from the programmer or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>switching off and then switching on the controller (both mains and battery supply must be switched off).</td>
</tr>
<tr>
<td>Door state = Homing and Door local state = 2</td>
<td>Presence sensor is active on start-up</td>
<td></td>
</tr>
<tr>
<td>Door state = Starting and Door local state = 2</td>
<td>Wait for presence sensor to be tested correct.</td>
<td>Presence sensor not operating correctly.</td>
</tr>
<tr>
<td>Sensor remains active</td>
<td>Check the sensors, programmable inputs and porter.</td>
<td>If the door does open after start-up, but remains open when another sensor actives, check the presence sensors.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the overload protection for sensors (S+24V). Warning <em>Sensor supply overload</em> can be active to indicate an overload during operation. On start-up no warning is given, but sensors will be set as active.</td>
</tr>
<tr>
<td>Problem</td>
<td>Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Initialisation input active</td>
<td>Change input function.</td>
<td>Reactivate the toggle input.</td>
</tr>
<tr>
<td>Toggle input ‘active’</td>
<td></td>
<td>Check initialisation input.</td>
</tr>
<tr>
<td>Controller in service mode</td>
<td>Verify safe operation and leave service mode.</td>
<td></td>
</tr>
<tr>
<td>Battery operation or battery fault</td>
<td>Check supply voltage.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Check battery condition and connection.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Replace controller if hardware failure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>indicated.</td>
<td></td>
</tr>
<tr>
<td>Fire input active</td>
<td>Check fire input (normally closed.)</td>
<td></td>
</tr>
<tr>
<td>Door does not shut completely</td>
<td><em>Home current</em> to low</td>
<td>Increase <em>Home current</em>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decrease friction.</td>
</tr>
<tr>
<td>Door shuts with too high current</td>
<td><em>Home current</em> to high</td>
<td>Decrease <em>Home current</em>.</td>
</tr>
<tr>
<td>Automatic return system activates</td>
<td>Irregular friction causes speed decrease</td>
<td>Remove friction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decrease <em>Sensitivity</em>.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase <em>Current gain</em>.</td>
</tr>
<tr>
<td>Automatic return system is too sensitive</td>
<td>Decrease the <em>Sensitivity</em>.</td>
<td>Increase <em>Current gain</em>.</td>
</tr>
<tr>
<td>Activates when just closed</td>
<td>Increase the <em>Close offset</em>.</td>
<td></td>
</tr>
<tr>
<td>Motor parameters incorrect</td>
<td>Select the correct motor.</td>
<td></td>
</tr>
<tr>
<td>Door movement is jerky</td>
<td><em>Motor parameters</em> incorrect</td>
<td>Select the correct motor.</td>
</tr>
<tr>
<td></td>
<td><em>Encoder faulty</em></td>
<td>Check encoder operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check encoder cable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check cable shielding. See 3.2.2 encoder for connection regulations.</td>
</tr>
<tr>
<td>Door opens or closes slowly</td>
<td><em>Battery mode</em></td>
<td>Check if main supply is present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check supply voltage.</td>
</tr>
<tr>
<td></td>
<td><em>Side screen sensor active</em></td>
<td>Check side screen sensor.</td>
</tr>
<tr>
<td></td>
<td><em>Supply voltage low</em></td>
<td>Check supply voltage.</td>
</tr>
<tr>
<td></td>
<td><em>Fire input active</em></td>
<td>Check fire input.</td>
</tr>
<tr>
<td></td>
<td><em>Ghost opening</em></td>
<td>Normal operation, controller test mechanical opening.</td>
</tr>
<tr>
<td></td>
<td><em>Low temperature</em></td>
<td>Normal operation, controller opens slowly after period rest at low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>temperature.</td>
</tr>
</tbody>
</table>

*Note: *Home current* is the current setting for the controller.*
<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Close position is incorrect</td>
<td>Wrong value for Close direction</td>
<td>Correct the value of Close direction.</td>
</tr>
<tr>
<td>Close position 'moves' open</td>
<td>Low Home current</td>
<td>Increase Home current.</td>
</tr>
<tr>
<td>LED color</td>
<td>Flashes red</td>
<td>An error has occurred.</td>
</tr>
<tr>
<td></td>
<td>Flashes orange</td>
<td>A warning is active or controller is in service mode.</td>
</tr>
<tr>
<td></td>
<td>Flashes green</td>
<td>Normal operation.</td>
</tr>
<tr>
<td>Program changes not applied</td>
<td>Error active</td>
<td>Fix problem and reset</td>
</tr>
<tr>
<td></td>
<td>Warning active</td>
<td>Remove cause of warning</td>
</tr>
<tr>
<td></td>
<td>Program inputs forced</td>
<td>Programmable input is active and function set to Use program 1 or Use program 2, disable programmable input or change input function.</td>
</tr>
</tbody>
</table>
Dimensions
Encoder cable

**Encoder**
1. Green  Gnd
2. -      -
3. Yellow Encoder A
4. Brown  +5Vdc
5. White Encoder B

**Controller**

<table>
<thead>
<tr>
<th>J8 – Encoder</th>
<th>+5V</th>
<th>Brown</th>
<th>+5Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>Yellow</td>
<td>Encoder A</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>White</td>
<td>Encoder B</td>
</tr>
<tr>
<td></td>
<td>Gnd</td>
<td>Green</td>
<td>Gnd</td>
</tr>
</tbody>
</table>

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