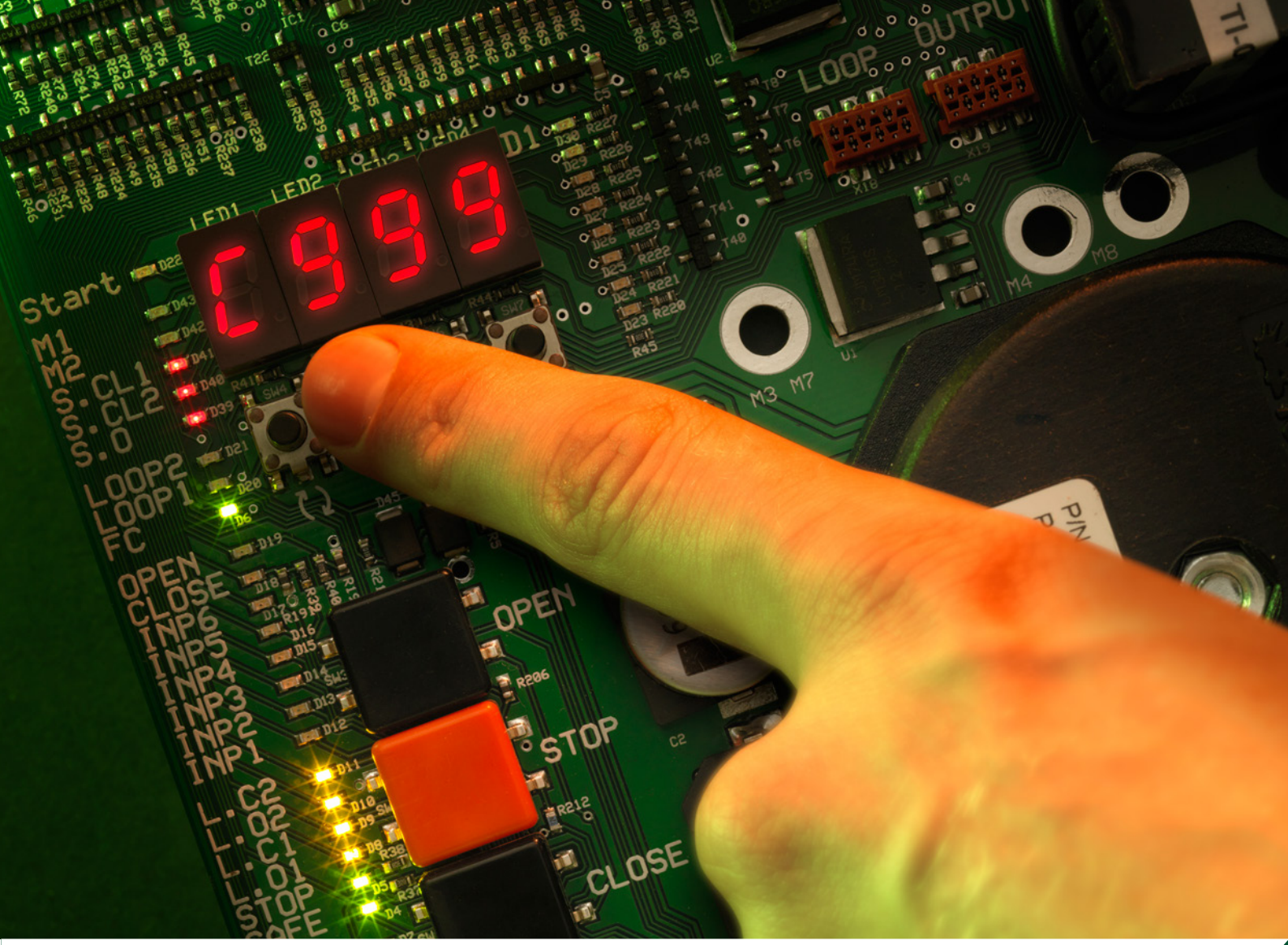

INSTRUCTION MANUAL FOR DAAB EP104 CONTROL BOARD

Instruction manual version
1 for software version 4.04

Revision: 8

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Contents

Manufacturer's declaration

Manufacturer

FAAC Nordic AB
Box 125, 284 22 Perstorp, Sverige
Telephone: +46 (0)435 77 95 00, Fax: +46 (0)435 77 95 29

Person authorised to compile the technical documentation

Name: Sören Andersson
Company name: FAAC Nordic AB

Type designation

EP104-1, EP104-2

We hereby declare that the EP104 automatic control unit meets the relevant requirements of Machinery Directive 2006/42/EC, EMC Directive 2004/108/EC, Low Voltage Directive 2006/95/EC and Construction Products Regulation 305/2011.

This declaration relates to the machinery specified below in the condition in which it is released to the market, and does not cover components added and/or modifications made thereafter. Nor does it relate to third-party equipment or to interfaces between third-party equipment and the equipment specified below and supplied by FAAC Nordic AB.

The machinery is, where applicable, compliant with the following standardised norms:

- SS-EN 13241-1+A1:2011 Industrial, commercial and garage doors and gates. Product standard – Part 1: Products without fire resistance or smoke control characteristics.
- SS-EN 13849-1:2008 Safety-related parts of control systems – Part 1: General principles for design.
- SS-EN 60335-1 Household and similar electrical appliances – Safety – Part 1: General requirements.
- SS-EN 60335-2-103 Household and similar electrical appliances – Safety – Part 2-103: Particular requirements for drives for gates, doors and windows.
- SS-EN 61000-6-2 Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments.
- SS-EN 61000-6-3 Electromagnetic compatibility (EMC) – Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments.

The technical documentation for the automatic control unit specified above (as set out in Machinery Directive 2006/42/EC Annex VII part A) is kept by the manufacturer and will be provided by the undersigned to a competent national authority, further to a reasoned request from that authority.

We declare that to the best of our knowledge, the EP104 does not contain, in concentrations above 0.1%, any substances specified in the REACH (1907/2006/EC) Candidate List of Substances of Very High Concern or banned substances in RoHS, 2002/95/EC.

Declaration of performance

Intended use of the construction product

Automatic control unit intended for installation is doors, gates or barriers for use in industry, commercial areas and residential areas that are open to the public, and intended to provide secure access for people, goods and vehicles.

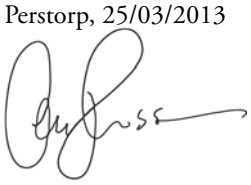
System for assessment and continuous verification of the performance of the construction product

System 3

Performance

Property	Performance	Harmonised standard
Force exerted		**SS-EN13241-1 + A1:2011**
• Safety edge	Performance level C*	SS-EN 13849-1:2008
• Load guard	Performance level D*	SS-EN 13849-1:2008
*) validated by SP, Certificate no. SC1105-11		

Perstorp, 25/03/2013



Ola Hansson, MD

Description of the EP104

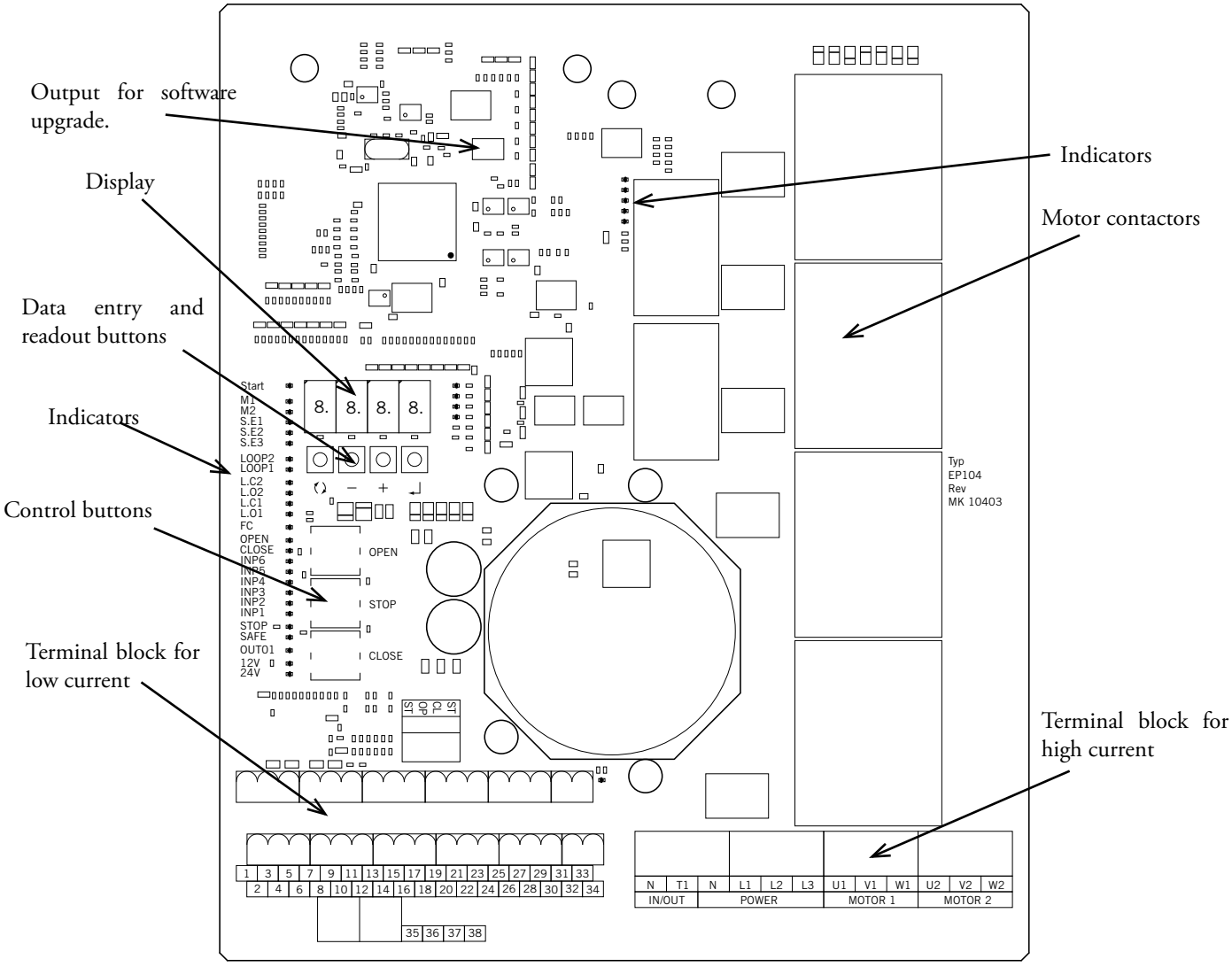
• General

The EP104 is an automatic control unit for doors, gates, up-and-over doors and barriers, including all the components necessary to control electric motors – contactors, motor protection, load guard, safety edge, alarm indicator, buttons on the PCB for operation and display, and a programming keypad.
The control unit can be supplied with accessories such as a vehicle loop, wireless functionality, signal lights and magnetic lock.

• Intended use

The purpose of the automatic control unit is to open and close doors, gates, up-and-over doors and barriers, using controllers connected to the unit.
No other use is permitted without the written agreement of FAAC Nordic AB.

• Identification



• Reference documentation

Instruction manual for motor winder
Instruction manual for the door, gate or barrier

• Disposal of electronic equipment

EP104 is an electronic product, and as such it is classified as hazardous waste. All used electronic equipment must be sent for recycling by a company authorised under environmental legislation to handle hazardous waste including electronic equipment.
FAAC Nordic AB will not charge to process used electronic products supplied by us, provided they are returned to us.

• Instruction manual

The installed control unit must be accompanied by this instruction manual or by an instruction manual that in every respect meets the requirements in the applicable Machine Directive and Low Voltage Directive and the relevant standardised norms, and must be provided to the installer and the end user.

• Safety

Carefully read through this instruction manual in its entirety – it contains important information about safety, installation, commissioning and use. Particularly important safety information is identified with the symbol ⚠ in the left margin.
If you fail to follow the safety instructions in this instruction manual, there is a risk of serious damage to property or injury to animals or people. You should keep this instruction manual in a safe place for future use.
The EP104 or units controlled by the EP104 must not be used unsupervised by children or by persons without sufficient experience, knowledge or mental capacity, unless adequate instruction has been given by a person with direct responsibility for their safety.
Children should be properly supervised to ensure they do not play with the installation or the controlled units. This particularly applies to remote controls.
The EP104 control unit or the accessories recommended by FAAC Nordic AB must not be modified without the express agreement of FAAC Nordic AB.
Only qualified persons working in their own fields may perform installation, adjustment, commissioning, repair and other work.
Electrical connections may only be made by qualified electricians, who accept responsibility for the connections.
Follow the safety instructions of the equipment to be controlled by the control unit.

• Safety classification

FAAC Nordic AB has validated the safety circuits in the EP104 to performance level PL = c and Category 2 as defined by SS-EN ISO 13849-2:2008.
The EP104 is designed with safety edge inputs and an integrated load guard for use in personal safety applications. These features are designed to meet the requirements of the Machinery Directive 2006/42/EC.
The validation process assumed a technical service life of 10 years or 1 million operating cycles for components in safety circuits.
FAAC Nordic is unable to guarantee this validation if the technical service life is exceeded for the motor contactors and for safety edge. For this reason, these components should be replaced before the end of the service life.

Operation

• General

⚠ Anyone installing or modifying the EP104 must have documented knowledge and understanding of its functions, and also knowledge of installing control systems for the application to be used.
Take care when operating internal buttons to avoid touching live components.
The unit may only be connected by a qualified electrician, who accepts responsibility for ensuring that the electric connections are in accordance with the applicable standards and this instruction manual.
Anyone commissioning the EP104 must have documented knowledge and understanding of its functions, and knowledge of commissioning control systems for the application to be used.

• Service and maintenance

⚠ The EP104 requires regular inspection of the external safety features, such as safety edge, stop buttons, photocells, load guards and safety loops. The enclosure, cabling and installation must also be checked. This inspection must be carried out at least twice a year.
Whenever work is carried out in or near the control unit, the power supply to the EP104 must be disconnected with a locked main switch.

• Resetting/replacing tripped fuses

If the fuse protecting the power supply to the automatic control unit trips, FAAC Nordic AB recommends following these steps to reset/replace it.

- Switch off the main switch to the automatic control unit.
- Decouple the motor winder.
- Reset or replace the fuse.
- Switch on the main switch to the automatic control unit.
- Check that none of the motor winders start before receiving the control signal.
- Check that the motor winders can be started and stopped from the control buttons.
- If the motor winder cannot be stopped, contact FAAC Nordic AB.

Technical specification

Dimensions (WxHxD)	190x224x60 mm.
Power supply	3-phase or single-phase.
Power supply	3x400V+N+PE, 3x230V+PE, 1x230V+N+PE, 3x400V+PE (requires external transformer)
Permitted voltage variation	±10%
Frequency	50 Hz.
Motor in 3-phase operation 3x400 V	3-phase asynchronous motor 0.18-1.5 kW.
Motor in 3-phase operation 3x230 V	3-phase asynchronous motor 0.18-0.75 kW.
Motor in single-phase operation	Single-phase motor with capacitor 0.18-0.37 kW.
Fuses	External fuse max T10A.
Power consumption	Automatic control unit 22 VA + electric motors.
Operating mode	Intermittent operation 50% / maximum period of use 4 minutes
Temperature range	0 to 45 °C.
Safety edge	2 closing inputs S.E1 and S.E2 for safety edge while closing.
	1 opening input S.E3 for safety edge in the opening movement.
	Impedance 1.0-8.2 kΩ, power capability at least ½ W.
Safety circuit	Max impedance 3 Ω in stop circuit.
	Cable length 0.75mm2 max 60m. Cable length 1.5mm2 max 120m.
	One 0-50 V analogue input to measure the voltage after the stop circuit.
Internal motor protection	Setting range 0.5-6 A.
Load guard	Setting range 0.05-1.99 kW.
Digital inputs	9
	Logical 0 0-8VDC.
	Logical 1 12-30VDC.
	Input current 5mA at 24VDC.
	Cable length max 200m
Supply voltage for photocell	24VDC max 50mA.
External supply	24VDC max 300mA.
Communication	RS-485 between two EP104 units. Cable length max 1000m.
Protection class	The PCB is designed for an enclosure rating of at least IP54.

Installing the EP104 PCB

If you are installing the PCB in a dedicated enclosure, you must follow the instructions below – otherwise the requirements of the applicable EU directive will not be met, FAAC Nordic's declaration of conformity will not be valid and the product will not be authorised for use. If the PCB is installed elsewhere, the installer is responsible for obtaining CE approval of the control system in its entirety.

- Authorisation

Persons installing the PCB in an enclosure must be trained and authorised for the particular task.

- Enclosure

The PCB must be installed in an enclosure designed for the surrounding environment, and must protect the electronics from moisture, dust and contact.

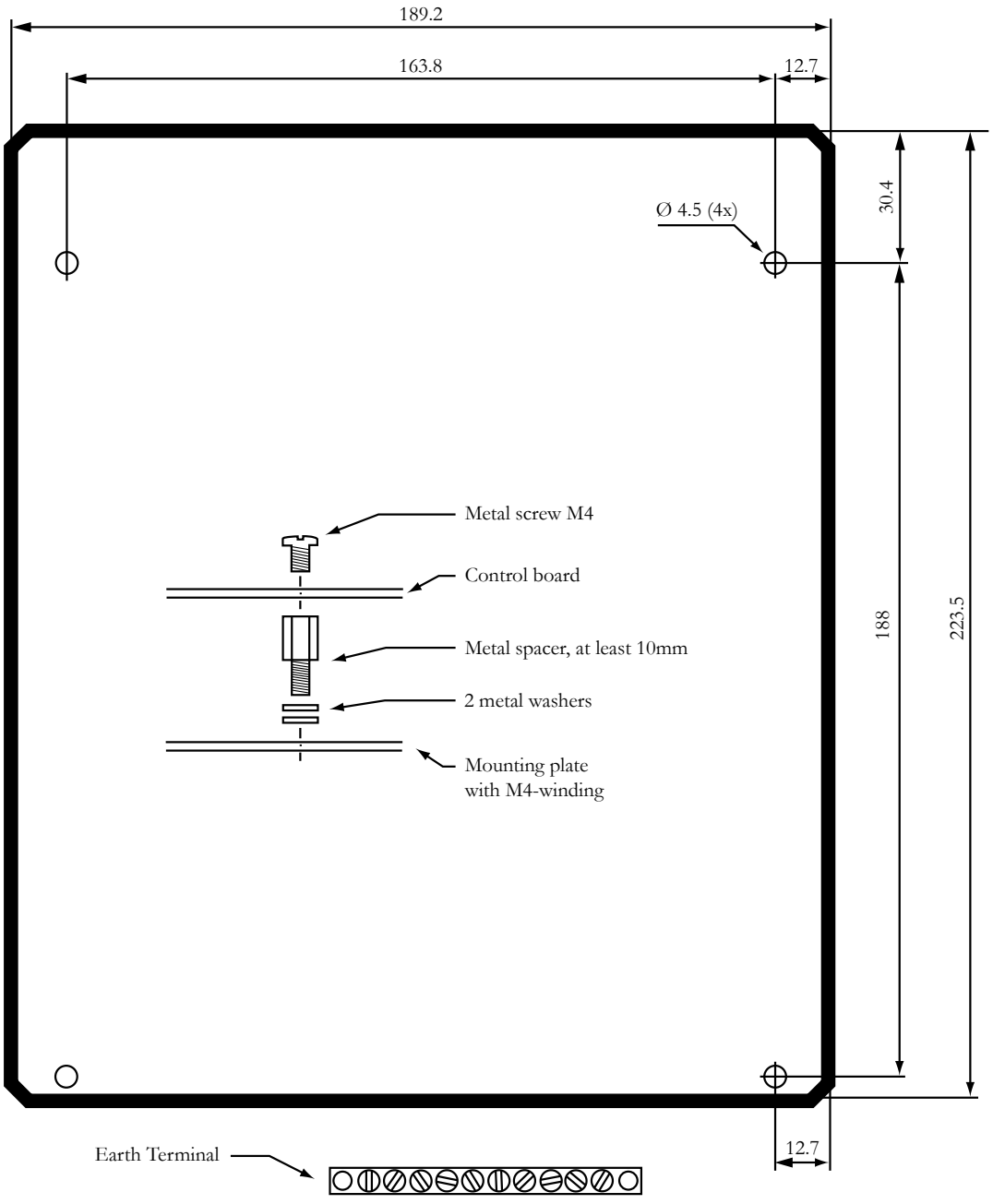
The enclosure must provide protection to class IP54 or better and must be designed for screw fixing to a wall or bracket. For outdoor use or if there is a risk of condensation in the enclosure, a heating element must be used.

- Installing the PCB

The PCB must be secured to a metal plate. The PCB dimensions are shown below.
Use the screws, spacers and washers provided to fix the PCB as illustrated.

If the fixing plate is painted, scrape off the paint around the holes to ensure good contact between the spacers and the plate.

Fit the earth bar to the fixing plate, for connecting the external earth.



Connections

- Safety

The electrical connections may only be made by a qualified electrician, who accepts responsibility for ensuring that the electric connections are in accordance with the applicable standards and this instruction manual.
Always disconnect the power supply when connecting the control box.
Mechanical installation of the control unit must be carried out by persons with the necessary knowledge for the task.

- Installation

The location of the control unit must be selected with regard to the protection class of the enclosure, at least IP54. A heating and/or cooling element should be included if necessary to maintain the operating temperature stated in the technical specification.
The control unit must be securely fixed to a wall or a bracket intended for this purpose, using screw joints. The fixing holes are on the rear or underside of the enclosure.
Cables into and out of the enclosure must have cable entry seals that are approved for use with the particular cable. Cables outside the enclosure must be securely fixed to the surrounding structure. They must not hang loose and there must be no possibility of catching on passing objects.

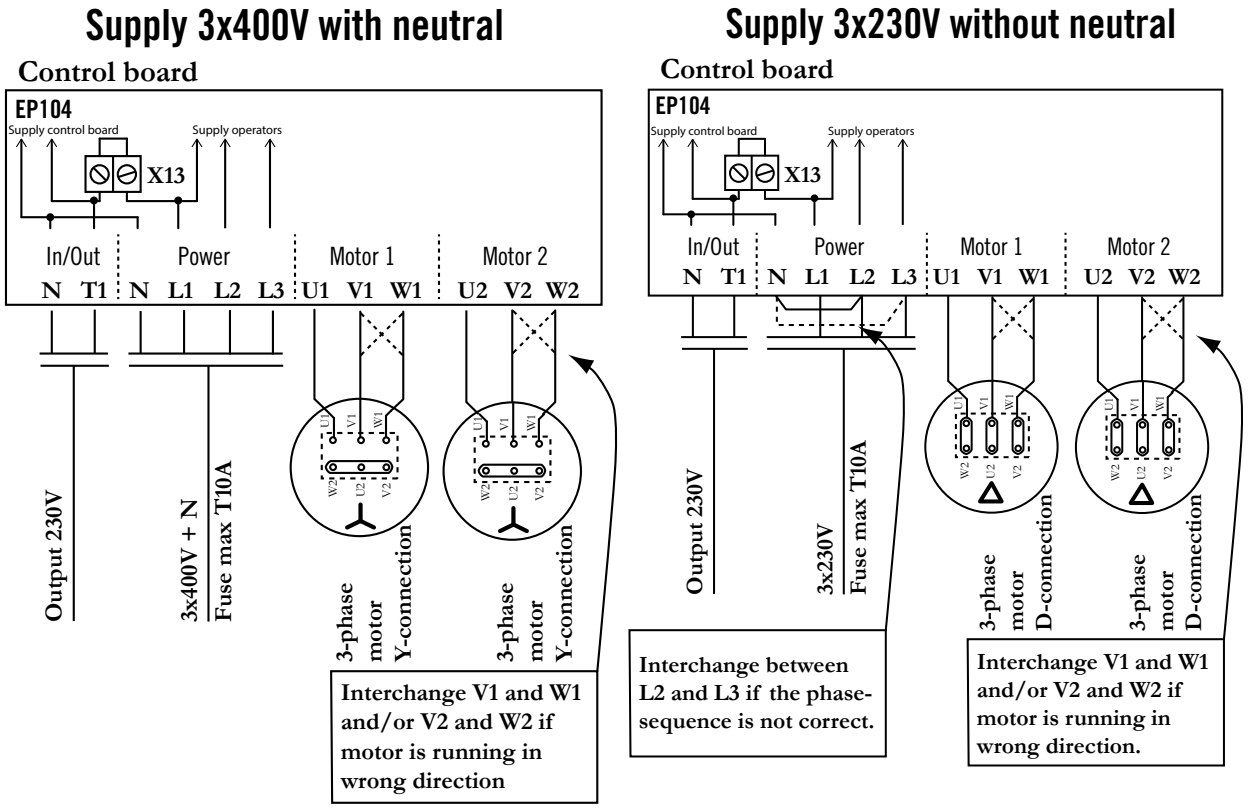
- High current

The power supply must be connected via a lockable main switch, and protected with maximum T10A.
Connect the incoming earth to the earth bar.
Check that the power supply and motor voltage are compatible.

Motors

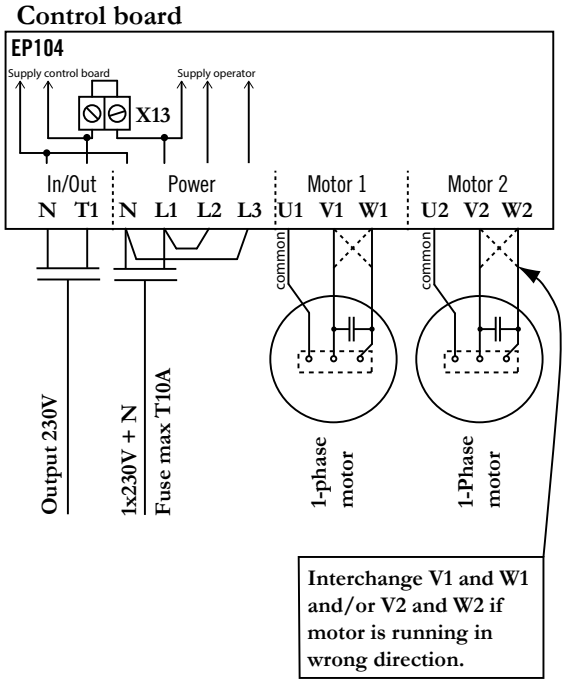
The largest motor that can be connected is 1.5 kW (3-phase 3x400 V).
See "Commissioning" for details of how to check the direction of rotation.

Connecting motors to the EP104



For information about connecting to the frequency converter, see the instructions for add-in card DB406.

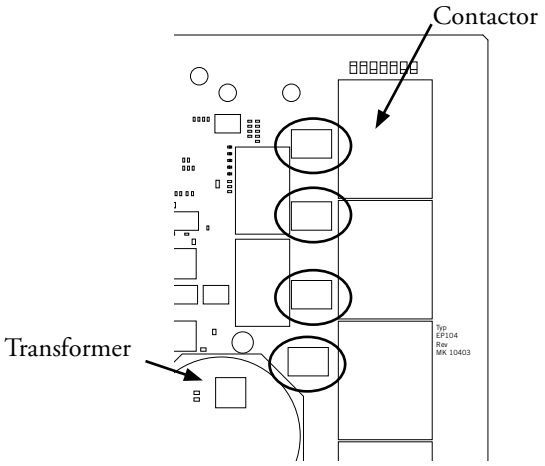
Supply 1x230V w/o neutral (symmetrical)



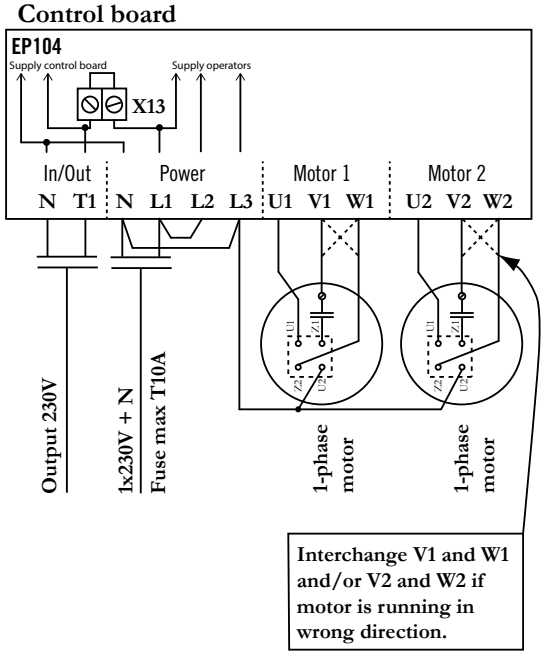
If a symmetrical single-phase motor is used (as shown on the left) make the following changes.

EP104-1: Swap the cable at X37: L1-1 with X37: L1-CUR1.

EP104-2: Remove the cable between X14: L2-1 and X39: L2-2.
Swap the cable at X37: L1-1 with X37: L1-CUR1.
Swap the cable at X38: L1-2 with L1-CUR2. See the diagram below for the terminal locations.



Supply 1x230V w/o neutral (asymmetrical)



• Connecting a safety edge

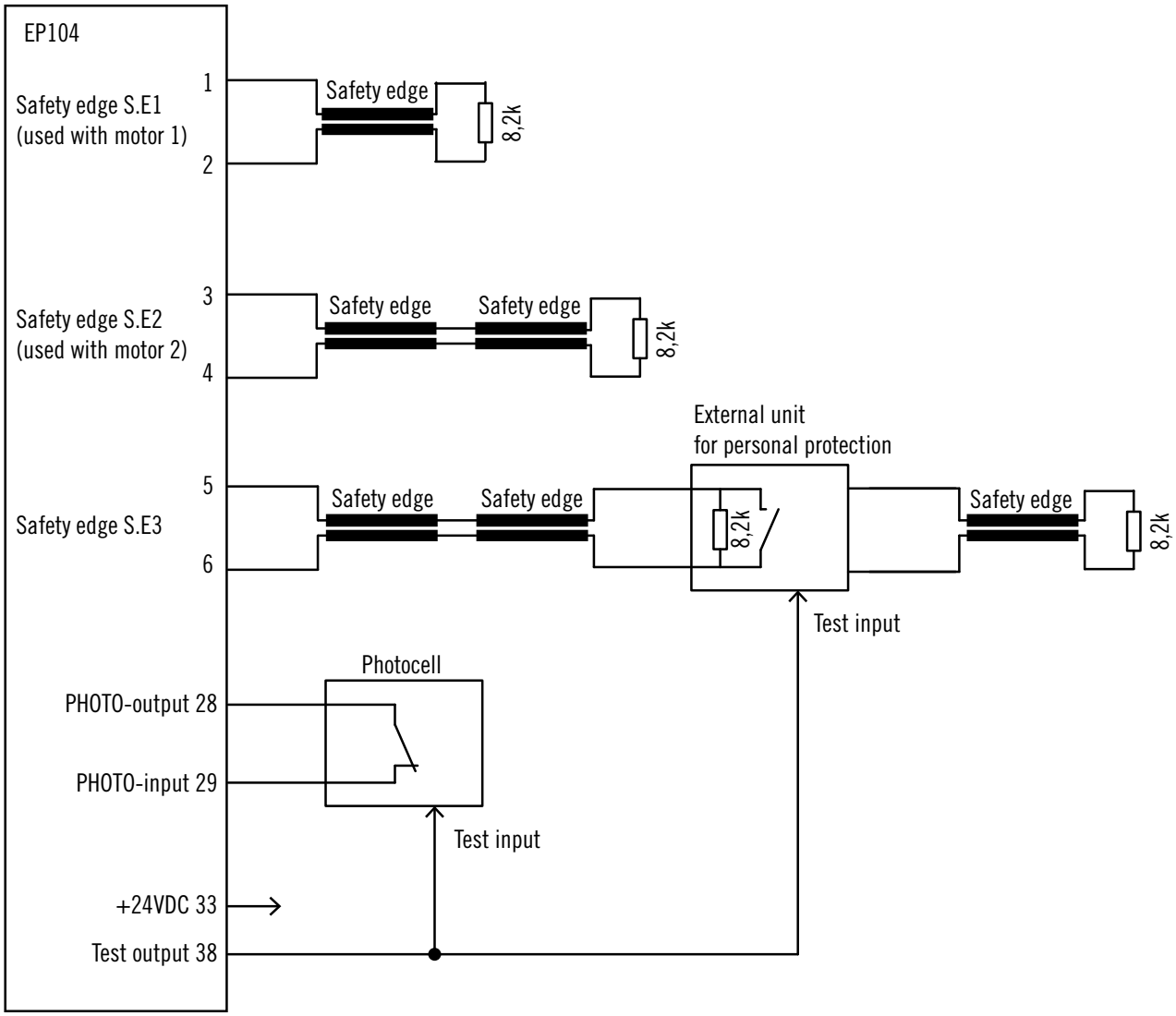
The safety edge resistor must be installed in the safety edge device so that a break in the resistor or the cable is interpreted as actuation of the device. See the wiring diagram below.
The resistor can be between 1.0-8.2 kΩ with 1% tolerance and a power capability of at least ½ W. FAAC Nordic AB recommends an impedance of 8.2 kΩ. A safety edge can only be connected in series.
When connecting in series, only one resistor is used in the outermost safety edge as shown in the wiring diagram below. The maximum number of safety edge devices connected in series with an impedance of 8.2 kΩ is six per input.
Note that the impedance used for a safety edge must be checked and entered into the EP104 during commissioning, see "Commissioning" below.

⚠ Other types of impedance safety edge must not be connected directly to the safety edge inputs – they require an external control unit.

See the instruction manual for the device used.
Only use safety edge devices approved by FAAC Nordic AB.

• Connecting a safety edge with photocell

The diagram below illustrates how to connect external safety edge units.



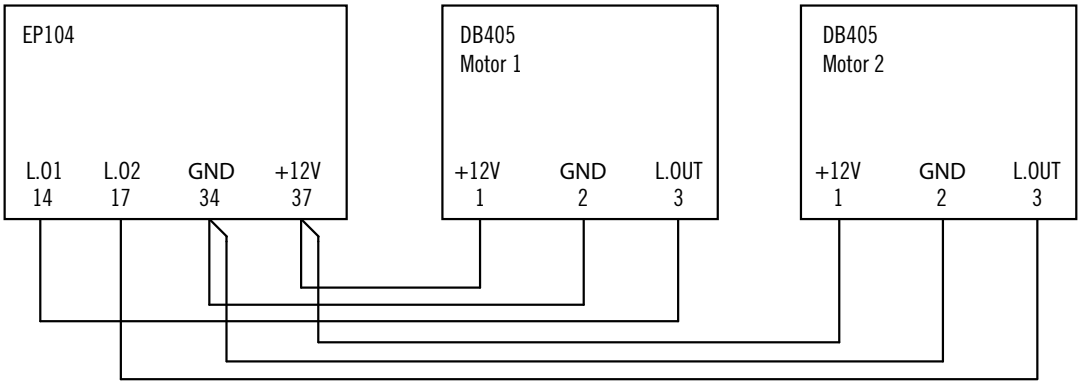
- Connecting communication

To optimise communication between two EP104s, it is important to choose suitable cable and to lay it correctly. FKAR-PG, E 01 721 20 is a suitable cable.
Otherwise use a twisted pair shielded cable with a conductor cross sectional area of at least 0.2 mm^2 and a capacitance of 50-70 pF/m.
Connect the shielding to the earth bar or to terminal 34.
The cable length must not exceed 1000 m.

- Connecting an encoder (electronic limit switch)

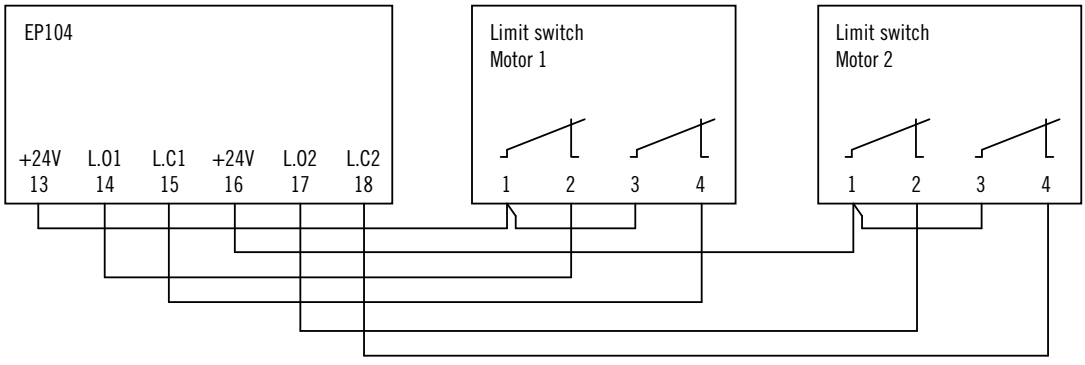
EP104 supports encoders of type DB405. The encoder uses the same terminals as a conventional mechanical limit switch. The two diagrams below illustrate how to connect the encoder, and they also show which is the left and right motor from the point of view of the automatic control unit. Make sure the cable to the encoder does not share the same ground pipe as the motor power supply.

Connections



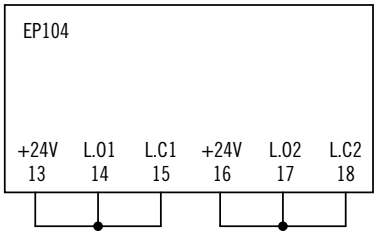
To determine which is the right and left side, view the unit from above as shown in the previous diagram – viewed from the motor winder, left is to the left of the door and right is to the right of the door.

- Connecting a mechanical limit switch (microswitch)



- Connecting timer control

Limit switches can still be used with time control – they are connected as shown above (mechanical limit switch) but only for the open position. If there is no limit switch, make the connections as shown below. A mechanical stop in the open position must be fitted.



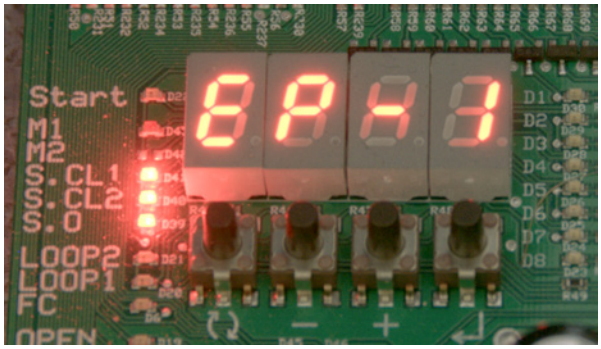
Configuring the EP104

This section provides general instructions on how to change settings in the EP104.
It is a good idea to discharge any static charge in your body by always touching an earthed connection before starting installation.

• General

All values are stored according to a list of channels (in the channel reference), with each channel corresponding to a particular control parameter or value in the EP104.
The display can show a value up to four digits long, or a channel number with the prefix C, d, L, o, P or r, followed by three digits.
The display can be used to show values as well as change settings – the value flashes while the setting is being changed.
If E appears followed by a number, this is an error message – see "Error messages". Note that the start-up values "EP-1" and "EP-2" are not error messages. When the power is connected, EP-1 appears when the unit controls one motor, and EP-2 when the unit controls two motors.
The <┘ button switches between the value and the channel number, or in configuration mode, it saves the value.
The + button scrolls up the channel list in channel mode. In configuration mode, the button increases the value.
The - button scrolls down the channel list in channel mode. In configuration mode, the button reduces the value.
If no button is pressed in 90 seconds, the display switches to economy mode with reduced brightness. Press any button to return to normal mode.

Display	Description
Cnnn	Channel number for the EP104
dnnn	Channel number for the vehicle detector
Lnnn	Channel number for the limit switch
onnn	Channel number for the output card
Pnnn	Channel number for programmable inputs
rnnn	Channel number for the wireless card
Ennn	Error message (not EP-1 and EP-2)
nnnn	Readout of value
nnnn (flashing)	Value being changed
Button	**Description**
+	Button to increase the channel or value
-	Button to decrease the channel or value
<┘	Switch between channel number and value
<┘	Save/confirm the changed value
( )	Switch between different channel groups



• Readout of parameters in the EP104

Press the <┘ button so the display shows the channel number – a letter followed by digits.
Press the ( ) button to quickly change between letters (channel groups).
Press the + or - button to step to the channel number you want.
Press the <┘ to show the value on the display.
Press the <┘ button again to exit and return to the channel number. Leave the unit in this mode – you cannot exit any further.

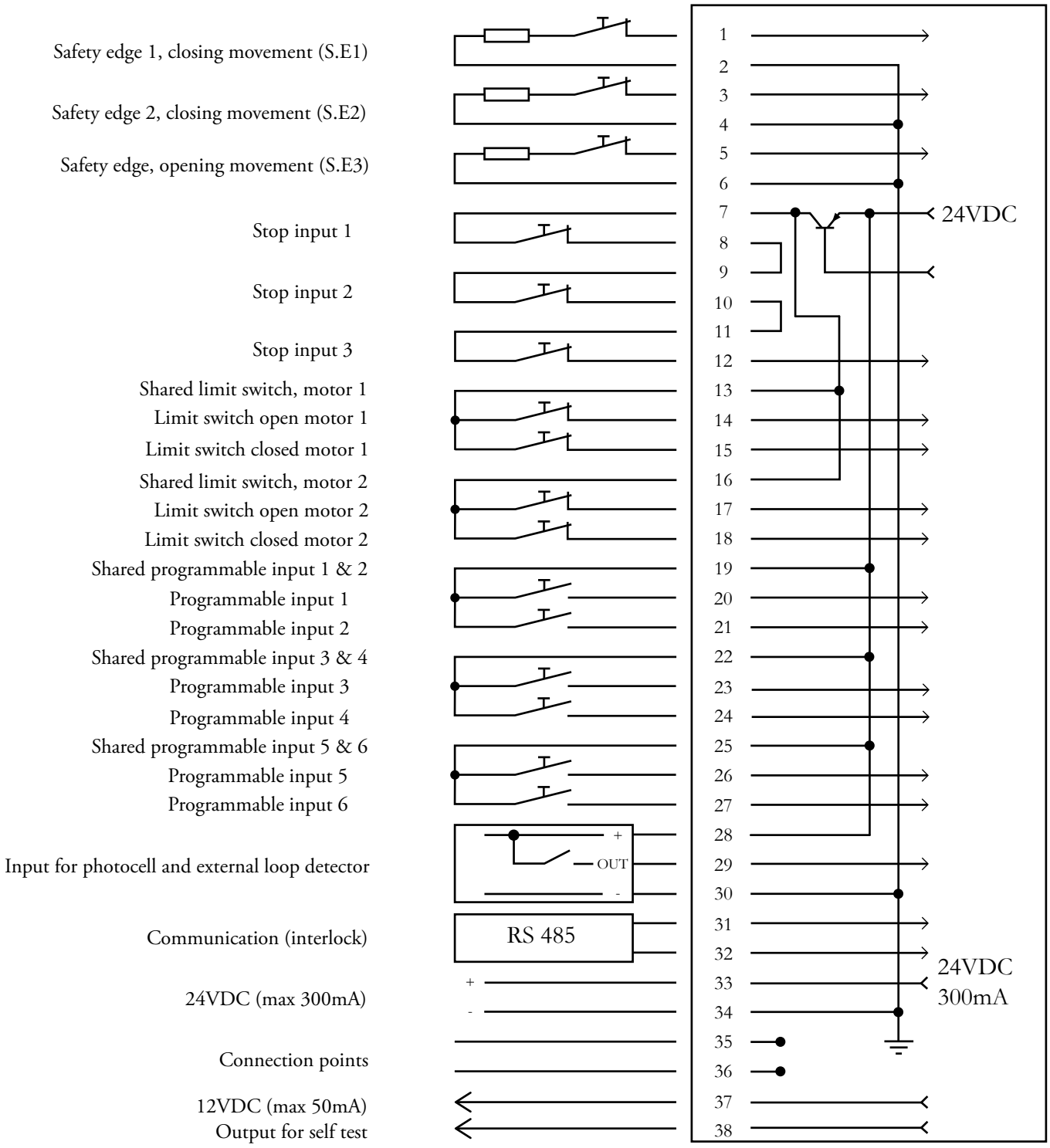
• Setting parameters in the EP104

Select the channel number according to the readout above.
Press the + button. The value starts flashing and is ready to be changed.
Press the + or - button to step to the value you want.
Press the <┘ button to save the value.
Press the <┘ button again to exit and return to the channel number. Leave the unit in this mode – you cannot exit any further.

• Locked settings

Settings may be locked by service personnel so they cannot be changed. Contact an authorised service engineer, who will have the instructions needed to release the unit for configuration.

- Signal reference



- Low current

The safety circuit, safety edge or limit switch must not be connected to, or used for, any other function. If signals from the EP104 are needed, a separate output card must be used.

The connection instructions are the same for all types of application, but not all signals may be needed.

If stop signals are unused, the associated input signals must be jumpered on the terminal block, see "Signal reference".

Note that the 24 V for the stop circuit must not be combined with other 24 V circuits.

• Indicators

To simplify commissioning and troubleshooting, LEDs are provided to indicate faults and the status of input signals, as shown in the table below.

Colour	Indication	Active when
Yellow	START	Constant when control signal received, flashing when counting down for automatic closing.
Red	M1	A constant LED means that the load guard settings has been exceeded, and a flashing LED means that the load guard has been triggered for motor 1.
	M2	A constant LED means that the load guard settings has been exceeded, and a flashing LED means that the load guard has been triggered for motor 2.
	S.E1	A constant LED means that the safety edge has been activated, and a flashing LED means that the safety edge has been reset.
	S.E2	A constant LED means that the safety edge has been activated, and a flashing LED means that the safety edge has been reset.
	S.E3	A constant LED means that the safety edge has been activated, and a flashing LED means that the safety edge has been reset.
Yellow	LOOP2	Vehicle loop 2 activated
	LOOP1	Vehicle loop 1 activated
	L.C2	Motor 2 not finished closing, extinguished in closed position, flashing means the input is not programmed
	L.O2	Motor 2 not finished opening, extinguished in open position, flashing means the input is not programmed
	L.C1	Motor 1 not finished closing, extinguished in closed position, flashing means the input is not programmed
	L.O1	Motor 1 not finished opening, extinguished in open position, flashing means the input is not programmed
Green	PHOTO	Photocell not activated, circuit closed
Yellow	OPEN	Signal from internal button – open
	CLOSE	Signal from internal button – close
	INP6	Signal at programmable input 6
	INP5	Signal at programmable input 5
	INP4	Signal at programmable input 4
	INP3	Signal at programmable input 3
	INP2	Signal at programmable input 2
	INP1	Signal at programmable input 1
Green	STOP	Stop not activated, circuit closed
	SAFE	Internal safety circuit – OK
Green	12V	Voltage 12VDC
	24V	Voltage 24VDC
Yellow	CLOSE2	Contactor for closing movement activated – motor 2
	OPEN2	Contactor for opening movement activated – motor 2
	CLOSE1	Contactor for closing movement activated – motor 1
	OPEN1	Contactor for opening movement activated – motor 1
Red	STOP	Stop activated, circuit interrupted (internal and external stop circuits)

Applications

This section describes the settings required for various types of application.

- Folding doors

Load guard

When a folding door is commissioned, the load guard must be configured for personal protection. This means that it provides protection during the opening movement according to the applicable standards (obstacles while opening and also inside the folds). Personal protection means that a normal power is defined – the power used by the motor cannot fall below a lower limit or exceed an upper limit, calculated automatically by the system on the basis of the normal power. As a result, the load guard cannot be set higher than the normal effect, providing optimum protection during the opening movement.

Safety edge

There are usually two safety edge devices for a folding door, one for each half. They are connected to S.E1 and S.E2 and adjusted as described in "Safety edge". If no safety edge is used for the opening movement, S.E3 is disabled.

- Sliding doors/sliding gates

Load guard

When a sliding door/gate is installed, the load guard should be configured without personal protection. This means that purpose of the load guard is more to protect the motor and other mechanisms from damage. The load guard does not therefore provide effective protection for the opening movement if the door is opened against an obstacle with a crush risk.

Safety edge

Up to two safety edge devices are used in a sliding door/gate – one at the front and possibly one at the back. More than one safety edge device is usually fitted to sliding gates to provide protection from crushing between the gate buffers and fixed objects like gate posts, motor winders, etc. The safety edge device fitted to the front provides protection for the closing movement, and the device fitted to the back provides protection for the opening movement. Safety edge devices providing protection for the closing movement are connected to S.E1 and S.E2, while S.E3 is for the opening movement. Adjust the safety edge as described in "Safety edge".

- Up-and-over doors

Load guard

When an up-and-over door is installed, the load guard should be configured without personal protection. This means that purpose of the load guard is more to protect the motor and other mechanisms from damage.

Safety edge

A safety edge for an up-and-over door must be set to send acknowledgements. To change this setting in the EP104, set the value of channel C101 – safety edge acknowledgement – to 1. The safety edge device is connected to S.E1 and adjusted as described in "Safety edge".

- Hinged gates

This section describes the commissioning steps required for hinged gates. See "Commissioning" to find out how to configure the functions.

Load guard

When a hinged gate is installed, the load guard should be configured without personal protection. This means that purpose of the load guard is more to protect the motor and other mechanisms from damage. The load guard does not therefore provide effective protection for the opening movement if the gate is opened against an obstacle with a crush risk.

Safety edge

There are usually two safety edge devices for a hinged gate, one on each side. They are connected to S.E1 and S.E2 and adjusted as described in "Safety edge". If no safety edge is used for the opening movement, S.E3 is disabled.

- Barriers

This section describes the commissioning steps required for barriers. See "Commissioning" to find out how to configure the functions.

Load guard

Load guards on barriers are only intended to protect the barrier and other mechanical components, so they are configured without personal protection. This means that the barrier changes direction in the presence of a high load in either direction.

Safety edge

A barrier usually has no safety edge at all – in this case, set S.E1, S.E2 and S.E3 to 0.0. Otherwise, adjust the safety edge as described in "Safety edge".

Commissioning

The process is the same for EP104-1 for one motor winder and EP104-2 for two motor winders.
The settings are changed as described in the section "Changing settings in the EP104".
An E on the far left of the display indicates an error message, see "Error messages". Note that the start-up values "EP-1" and "EP-2" are not error messages.
Carry out the commissioning steps in the order shown – this will ensure that the channels are configured in the correct sequence.
The automatic control unit is supplied in hold-to-run mode. Hold-to-run means that the motor runs while the button is pressed, and stops when it is released.
The control unit will only work correctly if the following steps are carried out:

• Safety

⚠ Anyone commissioning the EP104 must have documented knowledge and understanding of its functions, and knowledge of commissioning control systems for the application to be used.
⚠ See "Settings" to find out how to read and configure values in the EP104.
Check that:

- All equipment is mechanically secure and installed according to the applicable instruction manuals.
- All components are correctly connected and installed by authorised installers before switching on the power supply.
- The necessary safety measures are in place to remove the risk of crushing and other risks relating to the controlled unit.
- Any necessary decoupling devices are installed in the controlled unit and that they work as intended.

Make sure you:

- Discharge any static charge in your body by touching an earthed object, for example the earth connection between the door and the control unit, before changing settings or doing other work on the EP104.
- Take care when operating internal buttons to avoid touching live components.

• Stop circuit

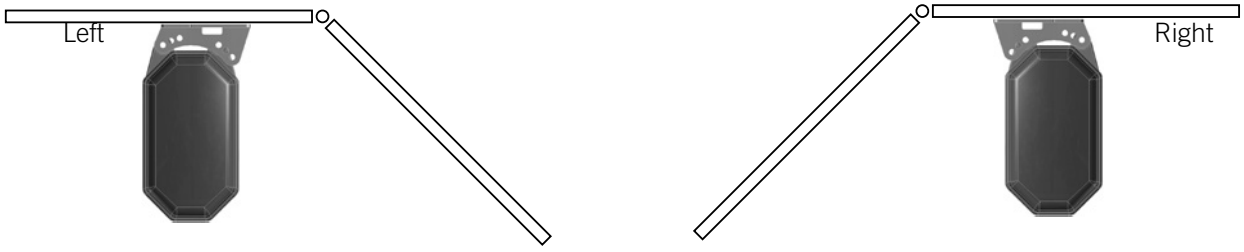
The stop circuit consists of a safety output, stop buttons and contactors. If the control unit detects a fault during the self test, the power to the contractors is interrupted. The stop buttons are connected in series with the contactors, and they interrupt the power to the contactors. Check that the stop diode lights up.

• Limit switch

Limit switches are used to inform the unit when the door is in the open or closed position. There are three limit switch options to choose from: encoders, which are electronic limit switches that detect the exact position of the door in degrees; mechanical limit switches using ridges that control microswitches; or, if the motor does not have any limit switches, timer control.

Encoder (electronic limit switch)

Right/left encoder position



The encoder works by detecting the position of the door, and acts as an intelligent limit switch. A magnetic sensor means that the EP104 knows the precise position of the door, and the limits for the open and closed positions can be directly configured in the unit using degrees, rather than physically changing the limit switch ridges in the motor winder. It is possible to commission one half at a time by activating only one limit switch at a time (L001, L002).
For a top-mounted motor winder, the motor is configured as for a right-mounted motor window. See below for the side-mounted motor winder. Note that if the motor winder is installed upside down, the sides must be swapped because the motor runs in the "wrong" direction.

- Connect the encoder according to the instructions on page 15, "Connecting an encoder".
- Specify that the encoder is used for motor 1 by setting L001 to 1, specify the position of the motor 1 in channel L110 – 1 is left and 2 is right.
- If two motor winders are used, activate the encoder for motor 2 in channel L002 by setting it to one 1, specify the position of motor 2 in channel L120 – 1 is left and 2 is right.
- After setting the encoder position and activating it, run the motor (hold-to-run) to the closed position, then read channel L111 for motor 1 and make a note of the value. If two motor winders are used, also read channel L121 and make a note of the value. This value must always decrease when closing and increase when opening.

- Set the value as the closed position in channel L113 for motor 1 and L123 for motor 2.
- Run the motor (hold-to-run) to the fully open position.
- Read the value in L111 for motor 1 and L121 for motor 2 and enter the respective values in L112 for motor 1 and L122 for motor 2.
- The limit switches are now configured and the motors will stop at the specified degrees. Note that some fine tuning may be necessary depending on the type of the door and if there is motor slippage.

Mechanical limit switches (microswitches)

If conventional mechanical limit switches are used, the unit is configured as follows.

- Set channel L001 to option 2 for mechanical limit switch.
- Set channel L002 to option 2 for mechanical limit switch if there are two motors.
- Adjust the limit switch ridges so they match the open and closed position of the door. The easiest way to do this is to move the door to the end position and adjust the ridge to it activates the limit switch.
- Fine adjustment is possible using the run-on times in channels C421, C422, C431 and C432.

Timer control (without limit switches)

Motor winders without a limit switch can use timer control instead. With timer control, you measure the actual opening time of the door and set the automatic control unit to operate the motors for that length of time. The configure the unit for timer control, use the following channel settings.

- Set L001 to 3 for timer control.
- Set L002 to 3 for timer control if there are two motors.
- Run the motor (hold-to-run) to the fully closed position, then run the motor to the fully open position.
- Read channel L211 for motor 1 and make a note of the value.
- Read channel L221 for motor 2 (if there is one) and make a note of the value.
- Set a time that is 20% longer than the time in channel L212 for motor 1 and L222 for motor 2.

• Direction of rotation of motors

To reduce the risk of injury or damage, the door must be decoupled during commissioning.
Check that the motor is running in the right direction by pressing the open and close buttons on the automatic control unit.
If the direction of rotation is wrong, change the phase sequence of the motor, see "Connection – high current".

• Setting the internal motor protection

Read the current consumption of each motor during hold-to-run operation – from channel C251 for motor 1 and C261 for motor 2 – then set the motor current in channels C252 and C253 for motor 1 and channels C262 and C263 for motor 2. A value of 0.0 means that the motor protection will not be tested – the intention is to use external contactors.

• Type of power supply

Only change this setting in high current installations with no neutral or a single-phase power supply.
Check that the correct type is installed using the value in channel C202.
The initial setting is 0, which means a supply voltage of 3x400V+N+PE. For other options, see the channel reference.

Checking the phase sequence for 3x230 V without neutral

If there is no neutral, the load guard takes two phases as reference points, so the phase sequence must be correct.
To check that the phase sequence is correct, decouple the motor winder to allow the motor to run without load. With the motor running, read the value in channel C271 for motor 1 and C281 for motor 2 – the value should be about 0.20. If the phase sequence is incorrect, the value is about 0.95 and the load guard is activated.

See "Connection – high current" to find out how to correct an incorrect phase sequence.

• External protection units

EP104 has a function to test external protection units. The test is run before every operation to ensure there are no problems with the safety edge unit. Only one safety edge unit with external testing can be connected to each safety edge input. To satisfy the safety requirements, the connected unit must have at least performance level C (PLc) in "EN ISO 13849-1 Safety of machinery - Safety-related parts of control systems". If the connected unit is a category 2 device, its test input must be connected to the test output of the EP104 (terminal 38). Note that the test output of the EP104 is connected to GND, +24V or set to high impedance (open), which can permanently damage units that are not designed to handle this. If a number of units are used, they are all connected to the common output signals for testing. Check with the unit manufacturer that this is permitted.
The EP104 is supplied configured to use external testing of a safety edge with photocell. If you have a safety edge and/or photocells that do not support external testing, change the following settings in order to continue commissioning. If there are no external units, set channel C102 to 0. There is no need to disable channels C113, C123, C133 and C343 because C102 overrides them.

⚠ Note that the factory setting of channel C102 is 0. If you want to test external protection units, set C102 to 1.

- Disabling external testing of S.E1
  To disable external testing of S.E1, set channel C113 to 0.
- Disabling external testing of S.E2
  To disable external testing of S.E2, set channel C123 to 0.
- Disabling external testing of S.E3
  To disable external testing of S.E3, set channel C133 to 0.
- Disabling external testing of photocells
  To disable external testing of PHOTO, set channel C143 to 0.

Settings for external protection

Before changing the other settings, you will need the following information about the unit to be tested.

- Check the power supply the unit needs.
- Check the required current – the maximum current for the 24VDC of the EP104 is 300mA, so an external transformer may be needed depending on what other equipment is connected.
- Check whether the external unit has an internal resistor at the output. If not, fit a 8.2kohm 0.5W resistor to the output. FAAC recommends that this output is short circuited when the protection is activated.
- Check the active and inactive levels of the test input on the unit. Set C102 to the right polarity.
- Check that the resistance detected in EP104 for the safety edge input to which the external unit is connected is correct.
- Check the resistance of the output of the unit when the test input is activated. Enter this in C103.

C102, controls how the test output works when external units are used with the test input according to the channel reference.
C103, indicates the resistance the safety edge inputs must have when the test signal is active. For the photocell the voltage level is low and cannot be adjusted. The procedure is the same for all inputs.

⚠ Make sure the system is serviced twice a year, even if external protection with daily function testing. Note that the test input only tests the external unit – not the safety edge/photocell connected to the unit.

• Load guard

The load guard can be used in two different ways.

- With certified personal protection – fixed upper and lower limits and adjustable normal power
- Without certified personal protection – adjustable upper and lower limits only

The automatic control unit is initially configured for certified personal protection. If the application requires certified personal protection with a load guard, you will need to check the normal power of the electric motor and enter it in the system.
If the application does not require certified personal protection with a load guard, you can disable the function by setting the normal power to 0. In this case, the load guard is not certified for personal protection.
In this mode, you can set your own upper limits for the load guard. There is an upper limit for the closing movement and an upper limit for the opening movement.
The load guard will only work properly if the door and all moving parts are free to move easily.

⚠ Note that the load guard never replaces other safety circuits such as a safety edge for example.

With certified personal protection – setting the normal power in the load guard

The load guard is configured separately for each motor by reading the motor power during operation.
Read the normal power in C231 for motor 1 and C241 for motor 2. Change the normal power setting (initial value 0.20 kW) to the power used on average by the motor, in C230 and C240 respectively. The permitted range is 0.12-0.35kW. The load guard will be activated when the load is 0.25kW above the setting. Example: C230=0.20 kW means an upper load limit of 0.45 kW. There is also a lower limit so it is impossible to set the normal power too high by mistake. This lower limit is 0.10 kW below the setting. Example: C230=0.20 kW means a lower load limit of 0.10 kW. In other words, personal protection will only work if the power used by the electric motor remains reasonably constant. The lower limit has a delay of 2 seconds to prevent the load guard activating when the door is swinging shut, momentarily using insufficient power.

⚠ The specified normal power applies to opening and closing movements.
If the fixed limits result in excessive crushing force, you can adjust the crushing force by reducing the limit settings in C232, C242 for the opening movement and C233, C243 for the closing movement. The initial value for these channels is 0.60 kW – you can reduce this value to a limit of your choice. In that case, the load guard is activated at the lower limit by the normal power setting (C230, C240) -0.10kW and by the limit you set in C232, C233 and C242, C243. The values in the above channels must be less than the normal power setting +0.20 kW.
If the following criteria are not all met, doors that fold or open against solid walls can only be certified from a safety point of view if other personal safety measures are used.

- The power read from the display must not exceed 0.4 kW for the opening and closing movements.
- The load guard delay in channel C211 is set to 0.06 seconds or less.
- The load guard connection delay in starts with channel C212 is set to 2 seconds maximum.
- The reversal delay following activation of a safety edge or a load guard must not be set to longer than 0.2 seconds in C493.

Without certified personal protection – setting upper limits in the load guard

⚠ Set the normal power to 0.00 kW in channel C230 for motor 1 and 0.00 kW in channel C240 for motor 2.
With these settings, the load guard is not certified for personal protection.
There is no lower limit – only an upper limit for high load. Read the values for C231 and C241 and add 0.20 kW, then set the limits in C232 for the opening movement and C233 for the closing movement of motor 1. C242 and C243 are for motor 2.

Reversal delay when the load guard is triggered

Select channel C493 and set a suitable delay.

⚠ Be careful when increasing the delay in C493, as this may increase the crushing forces and negate the safety settings on which the type approval was based.

- Safety edge

Safety edge monitor

The integrated safety edge monitor in the automatic control unit performs a self test before the start of every movement. If any of the safety edge devices is faulty, the EP104 is stopped and an error is indicated. Make sure that S.E1 is connected to motor 1 and S.E2 is connected to motor 2.
The principle is that the automatic control unit measures the impedance over the safety edge device to ensure it matches a specified value. The impedance changes if the safety edge device is activated, if there is a short circuit or if the circuit is interrupted – the automatic control unit interprets all these events as an activated safety edge.
LEDs indicate an activated safety edge with a constant light. If an activated safety edge is deactivated, the LED starts flashing and is extinguished the next time the door is operated.

⚠ The safety edge monitor only works correctly if the stop circuit and the limit switch are connected as described in this instruction manual. See the sections "Low current" and "Signal reference".

Setting the impedance value for protection

You can set the impedance value for the safety edge circuit to between 1.0 and 9.9 kΩ in the following channels:

- C115, impedance value for S.E1.
- C125, impedance value for S.E2.
- C135, impedance value for S.E3.

⚠ Note that the factory setting of S.E3 is disabled.

⚠ Note that if you enter the value 0.0, the safety edge input is disabled.
A safety edge can only be connected in series.
When safety edge devices are connected in series, one resistor is used in the outermost safety edge. The impedance value is set in the relevant channel.
You can read the current values in the channels C114, C124, C134 and check them against the values in the corresponding channels described above.

Safety edge function

The principal functions of the three safety edge inputs are:

- S.E1 for the closing movement
- S.E2 for the closing movement
- S.E3 for the opening movement

⚠ Note that the factory setting of S.E3 is disabled.

Safety edge functions – general

These settings are the same for a safety edge for the closing movement and a safety edge for the opening movement.

- Reversal/stop

A safety edge can be set to stop or reverse when it is activated.
S.E1 channel C112, S.E2 channel C122 and S.E3 channel C132.
1 = Reversal
2 = Stop
Option 1, Reversal, causes the unit to move to the fully open position after the delay configured in channel C493.

⚠ Option 2, Stop, stops the door without reversing. Use with care – the lack of the reversal function means people may be trapped.

- Reversal delay.

You can use channel C493 to set the time before reversal starts after the safety edge has been activated. The factory setting is 0.10 seconds. You can configure a different delay between 0.03 and 2.00 seconds. The same channel is used for the load guard and the safety edge.
Select channel C493 and set a suitable delay.
NOTE. Increasing the delay in C493 may increase the crushing forces.

Safety edge function in the closing movement

On delivery and after a reset, the EP104 is configured to reverse to the fully open position when the safety edge is activated in the closing movement.

Safety edge function in the opening movement

On delivery and after a reset, the EP104 is configured to reverse when the safety edge is activated in the opening movement.
The settings for opening a safety edge are the same as for closing a safety edge.
Set the reversal function with the value 1 in channel C132, and specify the delay in channel C493.

Function check of safety edge

Check that the automatic control unit reacts as configured above when the safety edge is activated.
Check that the LEDs indicate the affected safety edge S.E1, S.E2 and S.E3. And check that the safety edge flashes when it is no longer activated.

• PHOTO input

The EP104 has a PHOTO input for use with a photocell or a vehicle loop via an external control unit, see "Signal reference". To connect both devices to the same input, connect them in series via voltage-free contacts.

PHOTO input in the closing movement

When a vehicle passes the photocell or vehicle loop during the closing movement, the door usually reverses to the fully open position. To prevent vehicles sneaking in while the door reverses, you can instead set the door to stop and then close after the automatic closing time by setting C340 to 2 and C500 to a suitable delay.

PHOTO input in the opening movement

If a vehicle passes the photocell while the door is opening, nothing usually happens. It is possible to set the door to stop instead, then close after the automatic closing time when the photocell is clear. However, this setting would prevent reversal in response to an activated photocell during the closing movement too.

The door can either close again when the photocell or vehicle loop is clear, or stop while the photocell is activated and then close when the photocell is clear, as defined in channel C342.

Example: Set the value to 2 to stop the door in the opening movement and then close when the photocell is no longer activated. Set the value to 1 to reverse the door to the fully closed position. For other options, see the channel reference.

• Limited running time

Limiting the running time can protect the equipment from possible damage caused by a fault. The time should be set slightly longer than the normal running times for opening and closing.

In hold-to-run mode there is no limited running time, so this is a good way of measuring the running time.

Use hold-to-run to operate the door from fully closed to fully open and the other way around, and make a note of the running times from the readouts in C401 for motor 1 and C402 motor 2.

Select channel C403 and enter a value about 3 seconds longer than the longest time measured.

• Checking LED indicators

Before continuing the commissioning process, check that all LEDs are working correctly as described in "Indicators". If there is a problem, review the connection instructions and check the connections. If the problem is still not solved, see "Troubleshooting" to find out what to do next.

• Pulse mode and hold-to-run mode

Hold-to-run mode means that the button has to be kept pressed to open or close – when the button is released, the motor stops.

In pulse mode, pressing and releasing the button opens or closes the door automatically. Pulse mode can be configured for either direction. Pulse mode must be active for automatic operation of the door.

Note that the relevant directive does not allow wireless transmitters to operate in hold-to-run mode – this is why all wireless channels are disabled in hold-to-run mode.

Selecting pulse mode or hold-to-run mode

Select channel C033 and set the function you want.

Example 1: To set pulse mode for both opening and closing movements, set the value to 3.

Example 2: To set pulse mode for the opening movement and hold-to-run mode for the closing movement, set the value to 1.

Hold-to-run if there is an error in the safety edge or PHOTO input

If the safety edge, photocell or vehicle loop is faulty, the automatic control unit automatically switches to hold-to-run mode in the direction in which there is a fault. Even when the safety edge or photocell/vehicle loop are not working, you can still open and close the door by keeping the button on the PCB pressed

• Checking safety functions

When the automatic control unit is put into use, all safety functions should be tested. Start the motor winding running by recoupling it, and check the following functions:

- Check that the safety edge works as intended.
- Check that the load guard is activated under abnormal load.
- Check that the photocell (if there is one) is working.
- Check that the vehicle loop (if there is one) is working.
- If all the points above are OK, continue with commissioning. Otherwise return to the relevant section and check the settings. If this does not help, see "Troubleshooting".

• Programmable inputs, P channels

There are six programmable inputs available in the EP104.
The instructions are identical for all six programmable inputs, apart from the channel number – input 1 has channel number P1nn, input 2 has channel number P2nn, etc. The settings below are for input 1.
Activate input 1 by setting P100 to 1.
The following channels are used to set the function for the programmable inputs.

P160, Control function
Option 0 disables operation using the programmable input, 1 is for the opening function, 2 is for closing, and 3 is for stop. Option 4 means open the gate if it is not already open, then close it as soon as it is in the open position. Option 5 means open, stop and close alternately. 5 seconds after the last command, the next command is automatically set to open again.

P161, Type of control signal.
Use this channel to specify whether you want the signal to be a constant signal throughout the signal duration or just for the signal edge (the automatic control unit interprets the signal as a pulse). If the pulse option is set, hold-to-run does not work if the safety edge is faulty but door can be operated via another input even if the input is activated.

P162, Half operation
To only open half 1 set the value to 1, to only open half 2 set the value to 2, and to open halves 1 and 2 set the value to 3.

P163, Limited opening
Set the value to 0 to open the door to its end position, or set it to 0 to open the door for the time configured in C412 and/or C414.

P180, Park
Use this channel to park the door. Option 0 disables the function, option 1 parks the door in the open position and waits for a new control signal before the door is closed. To use a timer for parking and opening the door, set P160 to 1 and P180 to 2. The input will then send a command to open the door in response to a signal, and keep the door open for as long as there is a constant signal at the input.

P190, Interlock opening
Use this parameter with the value 1 if you want the input to open a local door and also forward the open signal to a remote door.

P196, Block disabled for local and remote doors
Set the value to 1 to disable the block for the local and remote doors.

P198, Automatic closing disabled for local and remote doors
Set the value to 1 to disable automatic closing for the local and remote doors.

• Automatic closing

To prevent the door being left open, you can configure the unit to close it automatically after a specified period. You can choose any time from 0.1 seconds to 9.59 minutes. The timer starts when the door stops moving. If any signal is received at a control input or if any safety device is activated in the closing direction, the timer is reset and starts counting from the beginning.
If you use automatic closing, it is a good idea to connect a wireless transmitter or a pull cord to an unused input. This is to allow passing users to send a new open signal and reset the automatic closing time.
You can use programmable inputs and a timer to disable automatic closing at certain times of the day.

Configuring automatic closing

Select channel C500 for times between 0.00 and 9.59 minutes – the automatic closing time has an accuracy of 1 second.
Select channel C500 for times between 0.0 and 9.9 seconds – the automatic closing time has an accuracy of 0.1 second.
Channel C501 has precedence over C500, which means that the time set in C500 is ignored if C501 has a value greater than 0.

Stop function

The automatic control unit has an adjustable stop function. The function applies to the normal stop buttons and also the stop function in programmable inputs.
The initial setting for the stop button is that when it is pressed it does not restart the countdown for automatic closing. If you always want the door to close automatically even if a stop button has been pressed or after a power failure, see "Automatic closing" below.

Automatic closing after stop

All control signals except stop and power failure restart the countdown for automatic closing. This means that automatic closing is not affected in the presence of a stop signal. This applies to conventional inputs and programmable inputs.
If you want the countdown to restart automatically even after a stop signal is received, you must set a delay in channel C520 as well as C500 or C501.
Select channel C520 and set a 0.20 - 9.59 minimum delay for automatic closing after a stop signal. Set the value to 0.00 to

disable automatic closing.

Automatic closing after photocell activation

This function enables automatic closing after a photocell is activated.
Use channel C351 to activate the function.
Select channel C351, set the value to 1 to activate or 0 to deactivate.
Use channel C354 to specify how the door closes once the photocell is no longer activated.
Select channel C354 and set the value to 0 to close immediately, or 1 to close only after opening fully.
If you want to delay closing after photocell activation, select channel C510 and set a time between 0.0 and 9.9 seconds.
Note that the delay configured in channel C510 is also used for automatic closing after the vehicle loop is activated.
If the photocell is not activated, automatic closing happens as described above.

Automatic closing after vehicle loop activation

This function enables automatic closing after the vehicle loop is activated.
To access the function, select channel d151.
Select channel d151, set the value to 1 to activate or 0 to deactivate.
Use channel d154 to specify how the door closes once the vehicle loop is no longer activated.
Select channel d154 and set the value to 0 to close immediately, or 1 to close only after opening fully.
If you want to delay closing after vehicle loop activation, select channel C510 and set a time between 0.0 and 9.9 seconds.
Note that the delay configured in channel C510 is also used for automatic closing after a photocell is activated.
If the vehicle loop is not activated, automatic closing happens as described above.

Direction sensing for internal closing pulse

Using channel C591 and the DB402 add-in card for vehicle loops, you can configure the internal close signal depending on the preferred direction sensing mode in LOOP1 and LOOP2 and the PHOTO input.
See the channel reference for all possible values.

Closing from PHOTO input

You can use channel C351 if you want the door to close following a signal from PHOTO.
The initial setting is 0, photocell closing not active.
Set the value to 1 to activate photocell closing.

Use channel C354 to configure the type of closing following PHOTO activation.
To close the door immediately after the photocell is activated, set the value to 0, or to leave the door to open fully before closing, set the value to 1.

- Control functions

Timer function for magnetic lock and two motors

You can configure delays between motor 1 and motor 2 if there is a magnetic lock in the system.
Channel C470 sets the delay before motor 1 is started, in order to give the magnet time to lose its residual magnetism before opening. Set the desired time between 0.00 and 0.99 seconds in channel C470.
To obtain the correct opening and closing sequence with a magnetic lock, set the delay in channel C460 to 0.1 – 9.9 seconds. The delay applies to motor 2 when opening and motor 1 when closing.

- Run-on times

See also "Stop function with run-on time" below to define how the stop function works during the run-on time.
The benefit of run-on times is that the limit switch does not need to be set precisely – you can fine-tune the end position using the run-on time. This avoids the need to climb up to the motor winder to adjust the limit switch. You can also use the run-on time if you want a door to close securely against the frame without triggering the load guard or safety edge.
NOTE. The run-on time must never be set if there is a risk that the limit switch cam can bypass the switch.

Reversal during run-on time

To change how the unit operates during the run-on time, set channel C448 to the desired function.
Initial value 2, Safety edge reversal during run-on time and during the time in C492
Set C448 to 0 to allow the unit to be operated within safety edge during the run-on time.
For other options, see the channel reference.

Run-on time for closing

Stopping with a run-on time means that when the limit switch is activated in the closing direction, the door continues for a specified time. Select channel C422 for motor 1 and channel C432 for motor 2, and set the run-on time in seconds.

Run-on time for opening

Stopping with a run-on time means that when the limit switch is activated in the opening direction, the door continues for a specified time. Select channel C421 for motor 1 and channel C431 for motor 2, and set the run-on time in seconds.

Stop function with run-on time

Select channel C436 and choose the stop function you want during the run-on time. The function specified in channel C436 is only active during the run-on time for closing. Depending on the stop function configured in C436, you can set the door to close tightly against rubber strips without triggering the load guard or safety edge.
NOTE. Channel C436 is subordinate to channel C448, safety edge reversal during the run-on time, see "Safety edge".
There are four options for the stop function during the run-on time in the closing movement – channel C436 0, 1, 2 or 3 – but safety edge reversal during the run-on time must be disabled in channel 448.

Setting times for timer control

To set timer control instead of limit switch control, set L001 to 1.
Note that the limit switch inputs must be jumpered if timer control is enabled.
Operate the barriers to the fully open position and read the time in channel L211 for motor 1 and L221 for motor 2. Set the time for motor 1 in channel L212 and for motor 2 in channel L222, adding about 20% to the times. If timer control is enabled, note that there must be some kind of mechanical stop to prevent the barrier opening or closing further than intended. The barrier will reach its mechanical stop but the motor will continue running for the specified period.

• Reversal

Reversal delay

If necessary you can adjust the time taken by the door to change direction, for faster or slower reversal.
You can use channel C492 to configure the reversal delay – either opening or closing – after the photocell or a vehicle loop is activated.
Select channel C492 and set a suitable delay.

Reversal priority

The automatic control unit is normally set to priority open, channel C063 = 1, which means that opening continues to the fully open position even if the close button is pressed while the door is opening.
Important. The change of priority does not apply to the open/stop/close or open/close function in programmable inputs.

- Priority open only

When the open button is pressed during closing, the direction changes to opening.
When the close button is pressed during opening, nothing happens.
Select channel C063 and set the value to 1.

- Priority close only

When the close button is pressed during opening, the direction changes to closing.
When the open button is pressed during closing, nothing happens.
Select channel C063 and set the value to 2.

- Priority open and close

When the open button is pressed during closing, the direction changes to opening.
When the close button is pressed during opening, the direction changes to closing.
Select channel C063 and set the value to 3.

- No priority

Pressing the open or close button has no effect if the door is already moving.
Select channel C063 and set the value to 0.

• Fence alarm

Outputs O11 and O12 are available for alarms. Note that IN1 is a shared input for O11 and O12. If there is a voltage drop, the outputs are open. The outputs must be connected so that the alarm is activated if a cable is detached or the EP104 loses its power supply. Change the following settings to use output 1 as an alarm.
o100 = 1, Position indicator.
o110 = 1, Signal in open position.
o111 = 1, Signal in mid position.
o113 = 3, Signal during opening/closing movement.
o114 = Delayed switch-off, at least 1 second and according to the alarm manufacturer's instructions.
o120 = Warning time before start, according to the alarm manufacturer's instructions.
o121 = 3, Constant signal before all signals.
o122 = 2, Output signal as configured in o110-o113.

• Interlock

Two EP104s can communicate with each other, sending interlocks and start signals between doors. Each of the doors must first be commissioned and tested locally in accordance with the "Commissioning" section. The text below mentions the local door and the remote door. The local door is the door currently being configured, and the remote door is the door connected to the local port via communication cables.

Communication

To pass signals and values from one EP104 to another, you need to configure C695. If C695 = 0, communication is disabled. The automatic control unit with C695=1 immediately starts transmitting values to the automatic control unit with C695=2, which responds by returning the values. If communication fails, the error message E614 appears in the display. This error message means that the automatic control unit with C695=2 is not responding to the transmitted messages. The error message appears for as long as the sending automatic control unit does not receive a response. Possible causes: only one of the automatic control units is configured for communication; C695 is set to the same value in both units; or one of the units is switched off. To acknowledge the error message, press any programming button. Always begin by setting C695=2 in one of the units first, then start communication by setting C695=1 in the other unit.

Blocking the other door (C664)

This channel is used to block the remote door as specified in the channel reference. The setting 0 means there is no block, and the value 1, for example, means the opening movement is blocked until the other door is closed. See the channel reference for more configuration options.

Opening memory, cancel block with stop (C665)

If the interlock and blocking functions are used between two doors, they are operated using a programmable input. Opening memory means that the remote door remembers the open signal that was sent, even though it must stay closed until the local door has reached the open position – the function can be configured in channel C665. With the setting 0, the automatic control unit does not remember the open signal, and a stop signal does not cancel a block. If you set the value to 1, for example, the automatic control unit will remember the open signal but the stop signal will not cancel a block. See the channel reference for more configuration options. A block is cancelled by interrupting the stop circuit for at least five seconds – after five seconds the block is cancelled.

Example applications

A few systems are described briefly below by way of example. Each example is introduced with a title in **bold**.

Opening two doors simultaneously:

If you want two adjacent doors to open at the same time, you can configure a programmable input, e.g. INP1 for interlock opening. If P160 = 1 and P190 = 1, the function opens the local door and passes the command on to the remote door. If C664 is set to 0, the signal is sent directly to the remote door. If it is set to 1, the signal is not passed on until after the local door has opened and then closed.

Preventing draughts in spaces with two doors, heat lock

If there is a problem with draughts, doors can be blocked so that only one can be opened at a time. The door will not open before the other linked door is closed. The software remembers the most recent opening operation, so the door will be opened once the other door closes, even if it is currently blocked from opening because the other door is opening or is open. The memory function can be disabled in channel C655. When only one door can be opened at a time, it is a good idea to use some form of visual indicator. Output cards for display functions are available as add-in cards.
Setting for example above with programmable input INP1:

- Door 1, C664 = 1.
- Door 2, C664 = 1.
- P160 = 1.
- P190 = 1.
- C500/C501 = suitable automatic closing time.

Directional heat lock

A heat lock can also be directional – in other words the interlock works from one direction but not the other.
Example: When door 1 is operated using the programmable input, door 1 opens and then closes using the automatic closing time, then door 2 opens automatically and closes using the automatic closing time. When approached from the other direction, however, doors 1 and 2 open at the same time.
Setting for example above with programmable input INP1:

- Door 1, C664 = 0
- P190 = 1
- Door 2, C664 = 1.
- P190 = 1.
- P196 = 1.

Functions using add-in cards

Add-in cards can be installed in the EP104 for access to extra functions. The add-in cards are DB401 for programmable outputs, DB402 for a vehicle detector, DB403 (DBR1 system) for four programmable wireless inputs, DB404 (FAAC SLH system) for one programmable input and DB406 for motor control using a frequency converter.
Follow the instruction manual supplied with the add-in card when installing the card in the EP104.

• Programmable outputs, o channels

You can use the DB401 add-in card to access four programmable outputs in the EP104.

Programmable outputs 1 - 3

The instructions are identical for these three programmable outputs, apart from the channel number – output 1 has channel number o1nn, output 2 has channel number o2nn, etc. The settings below are for output 1.
Activate programmable output 1 by setting o100 to the desired function. A value of 0 means that the output is disabled (open) regardless of the settings of other channels.
If you set the value to 1, the output can be used as a traffic light signal based on the position indicator. Movement and warning time signals are also available with this setting. The value 2 is for presence detection in the vehicle loop, the value 3 is for motor locks, and the value four turns the output into an alarm output.

Channel o110 Open position
Set to 1 for a constant signal in the open position.

Channel o111 Mid position
Set to 1 for a constant signal in the mid position.

Channel o112 Closed position
Set to 1 for a constant signal in the closed position.

Example for a green light: o110 = 1, o111 = 0, o112 = 0.
Example for a red light: o110 = 0, o111 = 1, o112 = 1.

Channel o113 Movement
Use this channel to specify the function during movement. The function will be active as soon as the door starts moving. See the channel reference for the available options. Only output 4 is able to send a flashing signal.

Channel o120 Warning time before start The time can be set to 0.00 – 9.59 minutes. 0.00 means the function is disabled and the function is defined in o121.
Channel o121 Warning function in combination with channel o120
Set the value to 1 for a constant signal before an opening movement, 2 for a constant signal before a close signal, parking and automatic closing, 3 for a signal within all control signals.

Channel o130 Delay for alarms specified in o131 and o132. The alarm is delayed by the specified time of 0.00 – 9.59 minutes. The factory setting is 0.00.

Channel o131 Alarm for faulty safety edge
This channel is available if the output card is used as an alarm output. The channel sends a signal if the safety edge has been activated for longer than the time specified in o130.

Channel o132 Alarm for error message in display
If the value is set to 1, a signal is sent if an error message appears in the display for longer than the time specified in o130.

Channel o191 Function when LOOP2, LOOP2 or PHOTO is activated:
Use this channel to specify the type of presence detection you want to use with the vehicle loop. See the channel reference for the available options.

You can set the output to normally open or normally closed by changing the value in o183 to:
The value 1 is for normally open (NO) and the value 2 is for normally closed (NC).

Programmable output 4

In principle, programmable output 4 is the same as outputs 1, 2 and 3, except that it is a triac output. The settings are all the same as for outputs 1, 2 and 3, except that output 4 also supports flashing signals. See the channel reference for the channel settings.

• Programmable wireless inputs, r channels

You can use the DB403 add-in card to access four programmable wireless inputs in the EP104.
The instructions are identical for all four wireless inputs, apart from the channel number – input 1 has channel number r1nn, input 2 has channel number r2nn, etc. The settings below are for output 1.
Use channel r001 for a readout showing which wireless channel is receiving a signal – the value displayed indicates the wireless input that is in use.

Control functions using wireless inputs

Use the following r channels to select the wireless signal function.

r160 Operation
Change the value in the channel to give the input the desired function. The value 1 means open, 2 means close, etc. See the channel reference for all possible options.

r162 Half operation
Use this channel to specify whether you want half 1, 2 or both to operate when the input is activated. 1 = half 1, 2 = half 2, and 3 = both half 1 and 2.

r163 Limited opening
To specify limited opening, set this channel to 1. The door will then open as configured in C412 and C414.

r170 Block wireless input from a programmable input
This channel is used to disable wireless operation from a programmable input. Make sure that the programmable input is active and that all the options for the input have been disabled. The value 1 will disable the wireless input if there is no signal at programmable input 1. Set the correct value for the programmable input you want to use.

r180 Park
Use this setting to allow the wireless input to park the door. If the input is activated, the door opens, but before it can close a new control signal is required at another input – regardless of the setting for automatic closing.

r190 Interlock opening
In an interlocking system, this input is used to send a command for the local door to open, and to pass on the open command to the remote door.

• Vehicle detector, d channels

Two vehicle loops can be connected to the EP104 via DB402 add-in cards – to activate the inputs set d100 and/or d200 to 1. When the unit is delivered and following a reset, channels d000, d100 and d200 are set to 0, disabled. The settings below apply to vehicle loop 1, using channel numbers d101 – d190. The functions are the same for vehicle loop 2, except that the channels are numbered d201 – d290. See the channel reference.

Configuring the vehicle loop

Activate the vehicle loop inputs by setting channel d100 to 1.
Channels d101, d102 and d103 are used for loop readouts, and channels d110 to d195 are all used to change settings.
The value in channel d102 (d202) must be between 08 and 50, otherwise the vehicle loops will not work correctly.
Basic settings for the vehicle loop

- Detection limit

Set the value in channel d110 to detect vehicles on the vehicle loop.
Set the difference between on and off in channel d111

- Vehicle loop reset

There are two channels you can use to reset presence on the vehicle loop – d121 for times between 00 – 99 seconds and d120 for longer times between 005 – 240 minutes.
The timer starts when the vehicle loop is activated, and the loop is reset even if there is still a signal at the loop when the timer ends.

- Compensation for door halves

These channel are used if the door halves activate the loops as they open or close. Open and close the door – the readout in channel d103 indicates the time of loop activation. Enter the time and increase it until the door no longer activates the loop, using channel d131 for the door half operated by motor 1 and d132 for the door half operated by motor 2.

Automatic closing after vehicle loop activation

See "Automatic closing"

Vehicle loop functions

A number of functions are available when a vehicle loop is activated, using the following channels:
d151, Loop-based closing
Use can use this channel to activate loop-based closing. The value 1 activates loop-based closing and 0 deactivates loop-based closing.

d154, Type of closing
This channel works with d151 to control the function of loop-based closing. Either the door closes as soon as the vehicle loop is no longer activated (option 0), or it is left to open fully before then closing (option 1).

P160, Control function
This channel is used to enable the opening function with the vehicle loop. The value 0 disables the opening function, and the value 1 activates it.

d161, Type of control signal.
This channel works with d160 and determines the type of the open signal from the vehicle loop – either a pulse (option 0) or a constant signal while the vehicle loop is activated (option 1).

d162, Half operation
This channel defines which half will be opened by the vehicle loop. The value 1 opens half 1, 2 opens half 2, and 3 opens both half 1 and 2.

d163, Limited opening
This channel is used to specify limited opening. The value 0 means full opening, and value 1 opens the door for the time specified in C412 and C414.

d170, Enable operation from a programmable input
This channel allows you to disable the opening function from a programmable input. Make sure that the programmable input is active and that all the settings have been disabled. The opening function of the vehicle loop will work for as long as there is a signal present at the programmable input specified in this channel.

d175, Delayed opening
This channel delays the open signal, for example to ensure that the door is not opened by passing cars that are not heading for the door. The channel is set to the number of seconds you want to delay the open signal.

d190, Interlock
Used to send an interlock open signal to the remote door.

Loop safety functions

You can use the following channels to select and configure these safety functions.

d140, Safety when closing

Used to configure the safety setting in the closing movement. The value 0 means the function is disabled – note that the door will close even if there is a vehicle over the loop. Set the value to 1 to reverse the door when something is detected by the vehicle loop, set the value to 2 to send a stop signal with automatic closing, or set the value to 3 to send a stop signal without automatic closing. The automatic closing timer starts when the vehicle exits the loop.

d141, Safety during run-on time

This channel activates safety during the run-on time The safety function is the same as specified in d140. Set the value of this channel to 0 to disable safety during the run-on time, or 1 to activate it.

d142, Safety function when opening

This channel sets the safety function in the opening movement – 0 means the function is disabled. The value 1 means reversal, 2 means stop with automatic restart when the loop is clear, and 3 means stop and wait for a new control signal.

Channel reference

There are six channel categories, each with its own letter and each handling different functions in the card.

- C channels: General readout and configuration channels.
- d channels: Channels relating to the DB402 vehicle detector.
- L channels: Channels relating to limit switches and timer control.
- o channels: Channels relating to the DB401 output card.
- P channels: Channels relating to programmable inputs.
- r channels: Channels relating to functions of the DB403 and DB404 wireless cards.

There is a reference column for each channel, showing where you can find more details and examples of how to use the channel, and the functions you can access with the channel.

Channels with a grey background are readout channels so they cannot be changed.

The  symbol means that the channel is a safety setting, and any change in value must be documented in the log book, with a name and date.

- General, C channels

General readout channels

No.	Name	Range	Factory	Setting	Ref. page
C001	Software version				
C002	Release of software version				
C003	EEPROM version				
C005	Voltage after stop circuit	00.0 – 30.0 V			
C014	Number of openings x1	000-999			
C015	Number of openings x1000	000-999			
C019	Automatic closing time	0.00-9.59 min			
C020	Most recent cause of motor stop				
	01	Limit switch motor 1 open			
	02	Limit switch motor 1 closed			
	03	Limit switch motor 2 open			
	04	Limit switch motor 2 closed			
	10	Stop			
	21	Photocell during opening movement			
	22	Photocell during closing movement			
	31	Loop 1 during opening movement			
	32	Loop 1 during closing movement			
	33	Loop 2 during opening movement			
	34	Loop 2 during closing movement			

General configuration channels

No.	Name		Range	Factory	Setting	Ref. page
⚠ C033	Pulse/hold-to-run		0 - 4	0		26
	0	Open and close with hold-to-run and load guard inactive				
	1	Open with pulse and close with hold-to-run and load guard active				
	2	Open with hold-to-run and close with pulse and load guard active				
	3	Open and close with pulse and load guard active				
	4	Open and close with hold-to-run and load guard active				
C063	Reversal priority during movement		0 – 3	1		29
	0	None				
	1	Open				
	2	Close				
	3	Open and close				

Safety edge

No.	Name		Range	Factory	Setting	Ref. page
⚠ C101	Safety edge acknowledgement S.E1 (CPC)		0 – 1	0		
	0	Disabled				
	1	Enabled				
⚠ C102	Function of output for external protection		0 – 4	0		
	0	Check disables, open output.				
	1	Closed to GND on activation, normally open.				
	2	Closed to +24VDC on activation, normally open.				
	3	Open on activation, normally closed to GND.				
	4	Open on activation, normally closed to +24VDC.				
⚠ C103	Function of safety edge input during test of external safety edge unit		1 – 2	1		
	1	Low resistance during test				
	2	High resistance during test				
⚠ C112	Reversal/stop with activated safety edge S.E1 (CPC)		1 - 2	1		24
	1	Reversal				
	2	Stop				
⚠ C113	Check of external protection connected to S.E1		0 - 1	1		
	0	No check				
	1	Test of protection connected to S.E1				
C114	Impedance readout S.E1 (CPC)		00.0-99.9 kΩ			24
⚠ C115	Set impedance value for safety edge S.E1 (CPC)		0.0 and 1.0-9.9 kΩ	8.2		24
⚠ C122	Reversal/stop with activated safety edge S.E2 (CPC)		1 – 2	1		24
	1	Reversal				
	2	Stop				
⚠ C123	Check of external protection connected to S.E2		0 - 1	1		
	0	No check				
	1	Test of protection connected to S.E2				
C124	Impedance readout S.E2 (CPC)		00.0-99.9 kΩ			24
⚠ C125	Set impedance value for safety edge S.E2 (CPC)		0.0 and 1.0-9.9 kΩ	8.2		24
⚠ C132	Reversal/stop with activated safety edge S.E3 (CPO)		1 – 2	1		24
	1	Reversal				
	2	Stop				
⚠ C133	Check of external protection connected to S.E3		0 - 1	1		
	0	No check				
	1	Test of protection connected to S.E3				
C134	Impedance readout S.E3 (CPO)		00.0-99.9 kΩ			24
⚠ C135	Set impedance value for safety edge S.E3 (CPO)		0.0 and 1.0-9.9 kΩ	0.0		24

Load guard and motor settings

No.	Name		Range	Factory	Setting	Ref. page
⚠ C200	Load guard function		0 – 4	3		<?>
	0	Disabled Service and troubleshooting only				
	1	Reversal when closing, stop when opening				
	2	Stop when closing and reversal when opening				
	3	Reversal when closing and opening				
	4	Stop when closing and opening				
⚠ C201	Low current limit active, inactive only with frequency converter (C202 = 4).		0 – 1	1		
	0	Inactive				
	1	Active				
⚠ C202	Type of power supply		0 - 5	0		21
	0	3x400 V with neutral				
	1	3x230 V without neutral				
	2	1x230 V with neutral, asymmetric				
	3	3x400 V without neutral (see separate instructions)				
	4	Frequency converter (see separate instructions)				
	5	1x230 V with neutral, symmetric				
⚠ C211	Load guard delay		0.01-2.50 sec	0.06		23
⚠ C212	Load guard connection delay when starting, all starts		0.1-2.5 sec	1.0		<?>
⚠ C221	Motor protection delay		3.0-5.0 sec	3.0		
⚠ C230	Set motor power readout for personal protection, motor 1		0.00 and 0.12-0.35 kW	0.20		23
C231	Motor power readout, motor 1		0.00-1.99 kW			23
⚠ C232	Set load guard limit for motor 1 opening		0.05-1.99 kW	0.60		23
⚠ C233	Set load guard limit for motor 1 closing		0.05-1.99 kW	0.60		23
⚠ C240	Set motor power readout for personal protection, motor 2		0.00 and 0.12-0.35 kW	0.20		23
C241	Motor power readout, motor 2		0.00-1.99 kW			23
⚠ C242	Set load guard limit for motor 2 opening		0.05-1.99 kW	0.60		23
⚠ C243	Set load guard limit for motor 2 closing		0.05-1.99 kW	0.60		23
C251	Motor current readout, motor 1		0.0-20.0A			21
⚠ C252	Set normal value for motor current opening, motor 1		0.0 and 0.5-6.0A	1.0		21
⚠ C253	Set normal value for motor current closing, motor 1		0.0 and 0.5-6.0A	1.0		21
C261	Motor current readout, motor 2		0.0-20.0A			21
⚠ C262	Set normal value for motor current opening, motor 2		0.0 and 0.5-6.0A	1.0		21
⚠ C263	Set normal value for motor current closing, motor 2		0.0 and 0.5-6.0A	1.0		21
C271	Power factor readout motor 1		0.00-0.99 cos φ			

No.	Name	Range	Factory	Setting	Ref. page
C281	Power factor readout motor 2	0.00-0.99 cos φ			

Photocell

No.	Name	Range	Factory	Setting	Ref. page
C340	Safety function in closing movement	0 – 3	1		<?>
	0 Disabled				
	1 Reversal to fully open				
	2 Stop with automatic restart of automatic closing				
	3 Stop without automatic restart of automatic closing, wait for new control signal				
C341	Disconnection/blocking of photocell in closing movement	0 - 2	0		
	0 Not blocked				
	1 Blocked if a limit switch is in the closed position				
	2 Blocked if both limit switches are in the closed position				
C342	Safety function in opening movement	0 – 3	0		26
	0 Disabled				
	1 Reversal to fully closed				
	2 Stop with automatic restart of automatic closing				
	3 Stop without automatic restart of automatic closing, wait for new control signal				
C343	Check of external protection connected to PHOTO	0 - 1	1		
	0 No check				
	1 Test of protection connected to PHOTO				
C351	PHOTO closing	0 – 1	0		28
	0 Disabled				
	1 Enabled and subordinated to C340				
C354	Type of closing with PHOTO	0 – 1	1		28
	0 Close immediately if PHOTO is clear				
	1 Open first then close if PHOTO is clear				

General time channels

No.	Name	Range	Factory	Setting	Ref. page
C401	Running time readout motor 1	000-999 sec			26
C402	Running time readout motor 2	000-999 sec			26
C403	Set limited running time	001-999 sec	001		26
C411	Time readout, opened to closed position motor 1, used for C412	00.0-99.9 sec			
C412	Set limited opening motor 1	00.3-99.9 sec	05.0		
C413	Time readout, opened to closed position motor 2, used for C414	00.0-99.9 sec			
C414	Set limited opening motor 2	00.3-99.9 sec	05.0		
C422	Run-on time following limit switch open, motor 1	0.00-4.99 sec	0.00		29
C423	Run-on time following limit switch closed , motor 1	0.00-4.99 sec	0.00		29
C432	Run-on time following limit switch open, motor 2	0.00-4.99 sec	0.00		29
C433	Run-on time following limit switch closed , motor 2	0.00-4.99 sec	0.00		29
⚠ C436	Type of stop during run-on time when closing, subordinated to C448	0 - 3	3		29
	0	Time			
	1	Time or load guard			
	2	Time or safety edge			
	3	Time, load guard or safety edge			
⚠ C448	Safety edge reversal during run-on time, C421, C422, C431, C432	0 - 2	2		<?>
	0	Function disabled			
	1	Safety edge reversal during run-on time			
	2	Safety edge reversal during run-on time and during the time in C492			
C460	Delay of open motor 2 and close motor 1. Used with magnetic locks or if the door halves overlap	0.1-9.9 sec	0.1		28
C470	Delay before first motor starts, used for magnetic locks that need to lose residual magnetisation	0.00-0.99 sec	0.00		28
C492	Reversal delay if PHOTO, SL1 or SL2 or control signal are activated	0.1-4.0 sec	0.8		29
⚠ C493	Reversal delay if safety edge or load guard are activated	0.03-2.00 sec	0.10		24
⚠ C494	Reversal time for protection in the opening movement, safety edge and load guard	0.1-2.0 sec	1.0		

Automatic closing

No.	Name	Range	Factory	Setting	Ref. page
C500	Automatic closing time	0.00-9.59min	0.00		27
C501	Short automatic closing time	0.0-9.9 sec	0.0		27
C510	Time for PHOTO closing when a vehicle passes	0.0-9.9 sec	0.0		28
C520	Blocking time for automatic closing after the stop button is pressed	0.00 and 0.20-9.59 min	0.00		27
C591	Direction sensing for internal closing pulse	00 - 14	00		28

	00	Disabled
	01	Presence detection, signal when LOOP1 is activated, remains until LOOP1 is clear.
	02	Presence detection, signal when LOOP2 is activated, remains until LOOP2 is clear.
	03	Presence detection, signal when both LOOP1 and LOOP2 are activated, remains until either LOOP1 or LOOP2 is clear.
	04	Presence detection, signal when PHOTO is activated, remains until PHOTO is clear.
	05	Presence detection, signal when both PHOTO and LOOP1 are activated, remains until either PHOTO or LOOP1 is clear.
	06	Presence detection, signal when both PHOTO and LOOP2 are activated, remains until either PHOTO or LOOP2 is clear.
	07	Presence detection, signal when PHOTO, LOOP1 and LOOP2 are activated, remains until either PHOTO, LOOP1 or LOOP2 is clear.
	08	Presence detection, signal when either LOOP1 or LOOP2 is activated, remains until either LOOP1 or LOOP2 is clear.
	09	Presence detection, signal when first LOOP1 and then LOOP2 are activated, remains until LOOP2 is clear.
	10	Presence detection, signal when first LOOP1 and then PHOTO are activated, remains until PHOTO is clear.
	11	Presence detection, signal when first LOOP2 and then LOOP1 are activated, remains until LOOP1 is clear.
	12	Presence detection, signal when first LOOP2 and then PHOTO are activated, remains until PHOTO is clear.
	13	Presence detection, signal when first PHOTO and then LOOP1 are activated, remains until LOOP1 is clear.
	14	Presence detection, signal when first PHOTO and then LOOP2 are activated, remains until LOOP2 is clear.

Interlock block

No.	Name		Range	Factory	Setting	Ref. page
C664	Block of the other door		0 – 3	0		30
	0	No block				
	1	Opening blocked until the other door is closed				
	2	Opening blocked until the other door is open				
	3	Closing blocked until the other door is closed				
C665	When blocked, opening memory, cancel block with stop		0 – 3	3		30
	0	Do not remember open and stop, do not cancel block				
	1	Remember open and stop, do not cancel block				
	2	Do not remember open and stop, cancel block				
	3	Remember open and stop, cancel block				
C695	Network number for communication		0 – 2	0		<?>
	0	Disabled				
	1	Automatic control unit no. 1 in communication				
	2	Automatic control unit no. 2 in communication				

Service channels

No.	Name		Range	Factory	Setting	Ref. page
C900	Service channel, for service personnel only Random number		000-999			
C901	Service channel, for service personnel only		00-99			
C902	Service channel, for service personnel only, checksum		0000-FFFF			
C903	Error code list showing the most recent error messages.					
	000	Start of list, followed by the earliest error message				
	...	Error messages				
	999	End of list after the last error message				

- Vehicle detector, d channels

Vehicle loop 1

No.	Name		Range	Factory	Setting	Ref. page
d100	Use loop 1		0 – 1	0		33
	0	Input disabled				
	1	Input enabled				
d101	Loop reading x1		000-999			33
d102	Loop reading x1000		00-99			33
d103	Activation from passing vehicle		000-999			33
d110	Detection limit for a vehicle in the loop		05-99	15		33
d111	Difference between on and off in the loop		00-50	03		33
d120	Loop presence reset		000 and 005-240min	120		33
d121	Fast loop presence reset		00-99 sec	00		33
d131	Compensation for the influence of the door half operated by motor 1 on the loop in the close position		00-50	03		33
d132	Compensation for the influence of the door half operated by motor 2 on the loop in the close position		00-50	03		33
d140	Safety function in closing movement		0 - 3	1		34
	0	Disabled				
	1	Reversal				
	2	Stop with automatic restart of automatic closing				
	3	Stop without automatic restart of automatic closing, wait for new control signal				
d141	Safety during run-on time in closing movement		0 – 1	1		34
	0	Disabled				
	1	Enabled and subordinated to d140				
d142	Safety function in opening movement		0 - 3	0		34
	0	Disabled				
	1	Reversal to fully closed				
	2	Stop with automatic restart of automatic closing				
	3	Stop without automatic restart of automatic closing, wait for new control signal				
d151	Loop closing		0 - 1	0		33
	0	Disabled				
	1	Active				
d154	Type of closing		0 - 1	1		33
	0	Close immediately when loop is clear				
	1	Continue to fully open, then close				
d160	Control function		0 - 1	0		33
	0	Disabled				
	1	Open				

No.	Name		Range	Factory	Setting	Ref. page
d161	Type of control signal when activated		0 - 1	0		33
	0	Pulse				
	1	Constant signal when loop is activated				
d162	Half operation		1 - 3	3		33
	1	Half 1				
	2	Half 2				
	3	Halves 1 and 2				
d163	Limited opening		0 - 1	0		33
	0	Disabled				
	1	Opening for the time set in channels C412 and C414				
d170	Disable opening /closing function in LOOP1.		0 - 6	0		33
	0	Disabled, normal opening/closing function. (Programmable input has no function for LOOP1)				
	1	Opening/closing possible only if there is a signal at programmable input 1				
	2	Opening/closing possible only if there is a signal at programmable input 2				
	3	Opening/closing possible only if there is a signal at programmable input 3				
	4	Opening/closing possible only if there is a signal at programmable input 4				
	5	Opening/closing possible only if there is a signal at programmable input 5				
	6	Opening/closing possible only if there is a signal at programmable input 6				
d175	Delayed opening		0.0-9.9 sec	0.0		
d190	Interlock opening		0 - 1	0		
	0	Disabled				
	1	Sends a normal open signal to the remote door, regardless of the setting in rX01				

Vehicle loop 2

No.	Name		Range	Factory	Setting	Ref. page
d200	Use loop 2		0 - 1	0		33
	0	Input disabled				
	1	Input enabled				
d201	Loop reading x1		000-999			33
d202	Loop reading x1000		00-99			33
d203	Activation from passing vehicle		000-999			33
d210	Detection limit for a vehicle in the loop		05-99	15		33
d211	Difference between on and off in the loop		00-50	03		33
d220	Loop presence reset		000 and 005-240min	120		33
d221	Fast loop presence reset		00-99 sec	00		33
d231	Compensation for the influence of the door half operated by motor 1 on the loop in the close position		00-50	03		33
d232	Compensation for the influence of the door half operated by motor 2 on the loop in the close position		00-50	03		33
d240	Safety function in closing movement		0 - 3	1		34
	0	Disabled				
	1	Reversal				
	2	Stop with automatic restart of automatic closing				
	3	Stop without automatic restart of automatic closing, wait for new control signal				
d241	Safety during run-on time in closing movement		0 - 1	1		34
	0	Disabled				
	1	Enabled and subordinated to d240				
d242	Safety function in opening movement		0 - 3	0		34
	0	Disabled				
	1	Reversal to fully closed				
	2	Stop with automatic restart of automatic closing				
	3	Stop without automatic restart of automatic closing, wait for new control signal				
d251	Loop closing		0 - 1	0		33
	0	Disabled				
	1	Enabled				
d254	Type of closing with loop		0 - 1	1		33
	0	Close immediately when loop is clear				
	1	Open fully first, then close				
d260	Control function		0 - 1	0		33
	0	Disabled				
	1	Open				

No.	Name		Range	Factory	Setting	Ref. page
d261	Type of control signal when activated		0 - 1	0		33
	0	Pulse				
	1	Signal when loop is activated				
d262	Half operation		1 - 3	3		33
	1	Half 1				
	2	Half 2				
	3	Halves 1 and 2				
d263	Limited opening		0 - 1	0		33
	0	Disabled				
	1	Opening for the time set in channels C412 and C414				
d270	Disable opening /closing function in LOOP2.		0 - 6	0		33
	0	Disabled, normal opening/closing function. (Programmable input has no function for LOOP2)				
	1	Opening/closing possible only if there is a signal at programmable input 1				
	2	Opening/closing possible only if there is a signal at programmable input 2				
	3	Opening/closing possible only if there is a signal at programmable input 3				
	4	Opening/closing possible only if there is a signal at programmable input 4				
	5	Opening/closing possible only if there is a signal at programmable input 5				
	6	Opening/closing possible only if there is a signal at programmable input 6				
d275	Delayed opening		0.0-9.9 sec	0.0		
d290	Interlock opening		0 - 1	0		33
	0	Disabled				
	1	Sends a normal open signal to the remote door, regardless of the setting in rX01				

- Limit switch, L channels

No.	Name		Range	Factory	Setting	Ref. page
L001	Choice of limit switch type for motor 1		0-3	0		20
	0	Disabled				
	1	Encoder				
	2	Limit switch				
	3	Time				
L002	Choice of limit switch type for motor 2		0-3	0		20
	0	Disabled				
	1	Encoder				
	2	Limit switch				
	3	Time				
L110	Position of motor 1, viewed from the motor side (If L001 = 1)		0-2	0		20
	0	Disabled				
	1	Left				
	2	Right				
L111	Position readout for motor 1 (if L001 = 1)		000-360 degrees			20
L112	Limit for open position, motor 1 (if L001 = 1)		145-360 degrees	180		21
L113	Limit for closed position, motor 1 (if L001 = 1)		015-180 degrees	90		21
L120	Position of motor 2, viewed from the motor side (If L0012 = 1)		0-2	0		20
	0	Disabled				
	1	Left				
	2	Right				
L121	Position readout for motor 2 (if L002 = 1)		000-360 degrees			21
L122	Limit for open position, motor 2 (if L002 = 1)		145-360 degrees	180		21
L123	Limit for closed position, motor 2 (if L002 = 1)		015-180 degrees	90		21
L211	Time readout for motor 1 (if L001 = 3)		00.1-99.9 sec			21
L212	Time setting, motor 1 (if L001 = 3)		00.1-99.9 sec	00.1		21
L221	Time readout for motor 2 (if L001 = 3)		00.1-99.9 sec			21
L222	Time setting, motor 2 (if L001 = 3)		00.1-99.9 sec	00.1		21

- Programmable outputs, o channels

Programmable output 1

No.	Name		Range	Factory	Setting	Ref. page
o100	Function of output 1		0 - 4	1		31
	0	Disabled				
	1	Position indicator/Movement/Warning Signal as configured in o110 – o122				
	2	Presence detection/Direction sensing Signal as configured in o191				
	3	Lock				
	4	Alarm output Signal as configured in o130 – o139				
o110	Open position		0 - 1	1		31
	0	Disabled				
	1	Constant signal				
o111	Mid position		0 - 1	0		31
	0	Disabled				
	1	Constant signal				
o112	Closed position		0 - 1	0		31
	0	Disabled				
	1	Constant signal				
o113	Movement		0 - 3	0		31
	0	Disabled				
	1	Constant signal in the opening movement				
	2	Constant signal in the closing movement				
	3	Constant signal in the opening and closing movement				
o114	Delayed switch-off Switch off after the specified time For example to switch off lighting a specified time after closing		0.00-9.59min	0.00		
o120	Warning time before start		0.00-9.59min	0.00		31
o121	Warning function in combination with o120		1 - 3	1		31
	1	Constant signal before timed opening and automatic closing				
	2	Constant signal before close signal, timed opening and automatic closing				
	3	Constant signal before all signals				
o122	Function during warning time		1 - 2	1		
	1	Output signal deactivated during warning				
	2	Output signal as configured in o110-o113				
o130	Alarm if there is an error as configured in o131-o139. The alarm is activated for at least the time set in this channel.		0.00-9.59min	0.00		31
o131	Alarm for faulty safety edge. Time as in o130.		0 - 1	0		31
	0	Disabled				
	1	Constant signal				

No.	Name		Range	Factory	Setting	Ref. page
o132	Alarm for error message in display		0 - 1	0		31
	0	Disabled				
	1	Constant signal				
o133	Alarm if stop circuit interrupted		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o134	Alarm if door open		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o135	Alarm if door is in mid position		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o136	Alarm if door is in closed position		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o137	Alarm if vehicle loop 1 is activated		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o138	Alarm if vehicle loop 2 is activated		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o139	Alarm if photocell interrupted		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o183	Inversion of contact function for output		1 - 2	1		31
	1	Normally open, NO				
	2	Normally closed, NC				

o191	Function when LOOP2, LOOP2 or PHOTO activated		01 - 14	01		31
	01	Presence detection Signal when LOOP1 is activated, remains until LOOP1 is clear.				
	02	Presence detection Signal when LOOP2 is activated, remains until LOOP2 is clear.				
	03	Presence detection Signal when both LOOP1 and LOOP2 are activated, remains until either LOOP1 or LOOP2 is clear.				
	04	Presence detection Signal when PHOTO is activated, remains until PHOTO is clear.				
	05	Presence detection Signal when PHOTO and LOOP1 are activated, remains until either PHOTO or LOOP1 is clear.				
	06	Presence detection Signal when PHOTO and LOOP2 are activated, remains until either PHOTO or LOOP2 is clear.				
	07	Presence detection Signal when PHOTO, LOOP1 and LOOP2 are activated, remains until either PHOTO, LOOP1 or LOOP2 is clear.				
	08	Presence detection Signal when either LOOP1 or LOOP2 is activated, remains until either LOOP1 or LOOP2 is clear.				
	09	Direction sensing Signal when first LOOP1 and then LOOP2 are activated. The signal remains until LOOP2 is clear.				
	10	Direction sensing Signal when first LOOP1 and then PHOTO are activated. The signal remains until PHOTO is clear.				
	11	Direction sensing Signal when first LOOP2 and then LOOP1 are activated. The signal remains until LOOP1 is clear.				
	12	Direction sensing Signal when first LOOP2 and then PHOTO are activated. The signal remains until PHOTO is clear.				
	13	Direction sensing Signal when first PHOTO and then LOOP1 are activated. The signal remains until LOOP1 is clear.				
	14	Direction sensing Signal when first PHOTO and then LOOP2 are activated. The signal remains until LOOP2 is clear.				

Programmable output 2

No.	Name		Range	Factory	Setting	Ref. page
o200	Function of output 2		0 - 4	1		31
	0	Disabled				
	1	Position indicator/Movement/Warning Signal as configured in o210 – o222				
	2	Presence detection/Direction sensing Signal as configured in o291				
	3	Lock				
	4	Alarm output Signal as configured in o230 – o239				
o210	Open position		0 - 1	0		31
	0	Disabled				
	1	Constant signal				
o211	Mid position		0 - 1	0		31
	0	Disabled				
	1	Constant signal				
o212	Closed position		0 - 1	1		31
	0	Disabled				
	1	Constant signal				
o213	Movement		0 - 3	0		31
	0	Disabled				
	1	Constant signal in the opening movement				
	2	Constant signal in the closing movement				
	3	Constant signal in the opening and closing movement				
o214	Delayed switch-off Switch off after the specified time For example to switch off lighting a specified time after closing		0.00-9.59min	0.00		
o220	Warning time before start		0.00-9.59min	0.00		31
o221	Warning function in combination with o220		1 - 3	1		31
	1	Constant signal before timed opening and automatic closing				
	2	Constant signal before close signal, timed opening and automatic closing				
	3	Constant signal before all signals				
o222	Function during warning time		1 - 2	1		
	1	Output signal deactivated during warning				
	2	Output signal as configured in o210-o213				
o230	Alarm if there is an error as configured in o231-o239. The alarm is activated for at least the time set in this channel.		0.00-9.59min	0.00		31
o231	Alarm for faulty safety edge. Time as in o230.		0 - 1	0		33
	0	Constant signal				
	1	Active				
o232	Alarm for error message in display		0 - 1	0		
	0	Constant signal				
	1	Active				

No.	Name		Range	Factory	Setting	Ref. page
o233	Alarm if stop circuit interrupted		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o234	Alarm if door open		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o235	Alarm if door is in mid position		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o236	Alarm if door is in closed position		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o237	Alarm if vehicle loop 1 is activated		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o238	Alarm if vehicle loop 2 is activated		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o239	Alarm if photocell interrupted		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o283	Inversion of contact function for output		1 - 2	1		31
	1	Normally open, NO				
	2	Normally closed, NC				

o291	Function when SL.1, SL.2 or photocell/loop activated		01 - 14	01		31
	01	Presence detection Signal when LOOP1 is activated, remains until LOOP1 is clear.				
	02	Presence detection Signal when LOOP2 is activated, remains until LOOP2 is clear.				
	03	Presence detection Signal when both LOOP1 and LOOP2 are activated, remains until either LOOP1 or LOOP2 is clear.				
	04	Presence detection Signal when PHOTO is activated, remains until PHOTO is clear.				
	05	Presence detection Signal when PHOTO and LOOP1 are activated, remains until either PHOTO or LOOP1 is clear.				
	06	Presence detection Signal when PHOTO and LOOP2 are activated, remains until either PHOTO or LOOP2 is clear.				
	07	Presence detection Signal when PHOTO, LOOP1 and LOOP2 are activated, remains until either PHOTO, LOOP1 or LOOP2 is clear.				
	08	Presence detection Signal when either LOOP1 or LOOP2 is activated, remains until either LOOP1 or LOOP2 is clear.				
	09	Direction sensing Signal when first LOOP1 and then LOOP2 are activated. The signal remains until LOOP2 is clear.				
	10	Direction sensing Signal when first LOOP1 and then PHOTO are activated. The signal remains until PHOTO is clear.				
	11	Direction sensing Signal when first LOOP2 and then LOOP1 are activated. The signal remains until LOOP1 is clear.				
	12	Direction sensing Signal when first LOOP2 and then PHOTO are activated. The signal remains until PHOTO is clear.				
	13	Direction sensing Signal when first PHOTO and then LOOP1 are activated. The signal remains until LOOP1 is clear.				
	14	Direction sensing Signal when first PHOTO and then LOOP2 are activated. The signal remains until LOOP2 is clear.				

Programmable output 3

No.	Name		Range	Factory	Setting	Ref. page
o300	Function of output 3		0 - 4	1		31
	0	Disabled				
	1	Position indicator/Movement/Warning Signal as configured in o310 – o322				
	2	Presence detection/Direction sensing Signal as configured in o391				
	3	Lock				
	4	Alarm output Signal as configured in o330 – o339				
o310	Open position		0 - 1	1		31
	0	Disabled				
	1	Constant signal				
o311	Mid position		0 - 1	0		31
	0	Disabled				
	1	Constant signal				
o312	Closed position		0 - 1	0		31
	0	Disabled				
	1	Constant signal				
o313	Movement		0 - 3	0		31
	0	Disabled				
	1	Constant signal in the opening movement				
	2	Constant signal in the closing movement				
	3	Constant signal in the opening and closing movement				
o314	Delayed switch-off Switch off after the specified time For example to switch off lighting a specified time after closing		0.00-9.59min	0.00		
o320	Warning time before start		0.00-9.59min	0.00		31
o321	Warning function in combination with o320		1 - 3	1		31
	1	Constant signal before timed opening and automatic closing				
	2	Constant signal before close signal, timed opening and automatic closing				
	3	Constant signal before all signals				
o322	Function during warning time		1 - 2	1		
	1	Output signal deactivated during warning				
	2	Signal as configured in o310-o313				
o330	Alarm if there is an error as configured in o331-o339. The alarm is activated for at least the time set in this channel.		0.00-9.59min	0.00		31
o331	Alarm for faulty safety edge. Time as in o330.		0 - 1	0		31
	0	Disabled				
	1	Constant signal				
o332	Alarm for error message in display		0 - 1	0		31
	0	Disabled				
	1	Constant signal				

No.	Name		Range	Factory	Setting	Ref. page
o333	Alarm if stop circuit interrupted		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o334	Alarm if door open		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o335	Alarm if door is in mid position		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o336	Alarm if door is in closed position		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o337	Alarm if vehicle loop 1 is activated		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o338	Alarm if vehicle loop 2 is activated		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o339	Alarm if photocell interrupted		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o383	Inversion of contact function for output		1 - 2	1		31
	1	Normally open, NO				
	2	Normally closed, NC				

o391	Function when SL.1, SL.2 or photocell/loop activated		01 - 14	01		31
	01	Presence detection Signal when LOOP1 is activated, remains until LOOP1 is clear.				
	02	Presence detection Signal when LOOP2 is activated, remains until LOOP2 is clear.				
	03	Presence detection Signal when both LOOP1 and LOOP2 are activated, remains until either LOOP1 or LOOP2 is clear.				
	04	Presence detection Signal when PHOTO is activated, remains until PHOTO is clear.				
	05	Presence detection Signal when PHOTO and LOOP1 are activated, remains until either PHOTO or LOOP1 is clear.				
	06	Presence detection Signal when PHOTO and LOOP2 are activated, remains until either PHOTO or LOOP2 is clear.				
	07	Presence detection Signal when PHOTO, LOOP1 and LOOP2 are activated, remains until either PHOTO, LOOP1 or LOOP2 is clear.				
	08	Presence detection Signal when either LOOP1 or LOOP2 is activated, remains until either LOOP1 or LOOP2 is clear.				
	09	Direction sensing Signal when first LOOP1 and then LOOP2 are activated. The signal remains until LOOP2 is clear.				
	10	Direction sensing Signal when first LOOP1 and then PHOTO are activated. The signal remains until PHOTO is clear.				
	11	Direction sensing Signal when first LOOP2 and then LOOP1 are activated. The signal remains until LOOP1 is clear.				
	12	Direction sensing Signal when first LOOP2 and then PHOTO are activated. The signal remains until PHOTO is clear.				
	13	Direction sensing Signal when first PHOTO and then LOOP1 are activated. The signal remains until LOOP1 is clear.				
	14	Direction sensing Signal when first PHOTO and then LOOP2 are activated. The signal remains until LOOP2 is clear.				

Programmable output 4

No.	Name		Range	Factory	Setting	Ref. page
o400	Function of output 4		0 - 4	0		31
	0	Disabled				
	1	Position indicator/Movement/Warning Signal as configured in o410 – o422				
	2	Presence detection/Direction sensing Signal as configured in o491				
	3	Lock				
	4	Alarm output Signal as configured in o430 – o439				
o410	Open position		0 - 2	0		31
	0	Disabled				
	1	Constant signal				
	2	Flashing signal				
o411	Mid position		0 - 2	1		31
	0	Disabled				
	1	Constant signal				
	2	Flashing signal				
o412	Closed position		0 - 2	1		31
	0	Disabled				
	1	Constant signal				
	2	Flashing signal				
o413	Movement		0 - 7	0		31
	0	Disabled				
	1	Constant signal in the opening movement				
	2	Constant signal in the closing movement				
	3	Constant signal in the opening and closing movement				
	4	No signal during movement				
	5	Flashing signal in the opening movement				
	6	Flashing signal in the closing movement				
	7	Flashing signal in the opening and closing movement				
o414	Delayed switch-off Switch off after the specified time For example to switch off lighting a specified time after closing		0.00-9.59min	0.00		
o420	Warning time before start		0.00-9.59min	0.00		31
o421	Warning function in combination with o420		1 - 6	1		31
	1	Constant signal before timed opening and automatic closing				
	2	Constant signal before close signal, timed opening and automatic closing				
	3	Constant signal before all signals				
	4	Flashing signal before timed opening and automatic closing				
	5	Flashing signal before close signal, timed opening and automatic closing				
	6	Flashing signal before all signals				

No.	Name		Range	Factory	Setting	Ref. page
o422	Function during warning time		1 - 2	1		
	1	Output signal deactivated during warning				
	2	Output signal as configured in o410-o413				
o423	Flashing frequency		0.1-2.0 sec	0.5		
o430	Alarm if there is an error as configured in o431-o439. The alarm is activated for at least the time set in this channel.		0.00-9.59min	0.00		31
o431	Alarm for faulty safety edge. Time as in o430.		0 - 1	0		31
	0	Constant signal				
	1	Active				
o432	Alarm for error message in display		0 - 1	0		31
	0	Constant signal				
	1	Active				
o433	Alarm if stop circuit interrupted		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o434	Alarm if door open		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o435	Alarm if door is in mid position		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o436	Alarm if door is in closed position		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o437	Alarm if vehicle loop 1 is activated		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o438	Alarm if vehicle loop 2 is activated		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o439	Alarm if photocell interrupted		0 - 1	0		
	0	Disabled				
	1	Constant signal				
o483	Inversion of contact function for output		1 - 2	1		31
	1	Normally open, NO				
	2	Normally closed, NC				

o491	Function when LOOP2, LOOP2 or PHOTO activated	01 - 14	01		31

	01	Presence detection Signal when LOOP1 is activated, remains until LOOP1 is clear.
	02	Presence detection Signal when LOOP2 is activated, remains until LOOP2 is clear.
	03	Presence detection Signal when both LOOP1 and LOOP2 are activated, remains until either LOOP1 or LOOP2 is clear.
	04	Presence detection Signal when PHOTO is activated, remains until PHOTO is clear.
	05	Presence detection Signal when PHOTO and LOOP1 are activated, remains until either PHOTO or LOOP1 is clear.
	06	Presence detection Signal when PHOTO and LOOP2 are activated, remains until either PHOTO or LOOP2 is clear.
	07	Presence detection Signal when PHOTO, LOOP1 and LOOP2 are activated, remains until either PHOTO, LOOP1 or LOOP2 is clear.
	08	Presence detection Signal when either LOOP1 or LOOP2 is activated, remains until either LOOP1 or LOOP2 is clear.
	09	Direction sensing Signal when first LOOP1 and then LOOP2 are activated. The signal remains until LOOP2 is clear.
	10	Direction sensing Signal when first LOOP1 and then PHOTO are activated. The signal remains until PHOTO is clear.
	11	Direction sensing Signal when first LOOP2 and then LOOP1 are activated. The signal remains until LOOP1 is clear.
	12	Direction sensing Signal when first LOOP2 and then PHOTO are activated. The signal remains until PHOTO is clear.
	13	Direction sensing Signal when first PHOTO and then LOOP1 are activated. The signal remains until LOOP1 is clear.
	14	Direction sensing Signal when first PHOTO and then LOOP2 are activated. The signal remains until LOOP2 is clear.

- Programmable inputs, P channels

Programmable input 1

No.	Name		Range	Factory	Setting	Ref. page
P100	Channels in programmable input 1		0 - 1	1		27
	0	Disabled				
	1	Enabled				
P160	Control function		0-5	1		27
	0	Disabled				
	1	Open				
	2	Close				
	3	Stop				
	4	Open/close				
	5	Open/stop/close				
P161	Type of control signal when activated		1 - 2	1		27
	1	Pulse (hold-to-run mode not possible)				
	2	Signal for as long as the input is activated				
P162	Half operation		1 - 3	3		27
	1	Half 1				
	2	Half 2				
	3	Halves 1 and 2				
P163	Limited opening		0 - 1	0		27
	0	Disabled				
	1	Timed opening based on the time specified in C412 and/or C414.				
P170	Motor lock		0 - 1	0		
	0	Disabled				
	1	The barrier cannot be operated without a signal at programmable input 1. If the signal disappears the barrier is stopped.				
P180	Park		0 - 2	2		27
	0	Disabled				
	1	Automatic closing disabled after the input is activated, reset by another control signal				
	2	Automatic closing disabled by a constant signal				
P190	Interlock opening		0 - 1	0		27
	0	Disabled				
	1	Opens the local door if P160 is set to open, and passes the signal on to the remote door				
P196	Blocking disabled for local and remote doors. Only works if there is a constant signal and P161 has the value 2.		0 - 1	0		27
	0	Disabled				
	1	Active				
P198	Automatic closing disabled for remote door Only works if there is a constant signal		0 - 1	0		27
	0	Disabled				
	1	Active				

Programmable input 2

No.	Name		Range	Factory	Setting	Ref. page
P200	Channels in programmable input 2		0 - 1	1		27
	0	Disabled				
	1	Enabled				
P260	Control function		0-5	2		27
	0	Disabled				
	1	Open				
	2	Close				
	3	Stop				
	4	Open/close				
	5	Open/stop/close				
P261	Type of control signal when activated		1 - 2	1		27
	1	Pulse (hold-to-run mode not possible)				
	2	Signal for as long as the input is activated				
P262	Half operation		1 - 3	3		27
	1	Half 1				
	2	Half 2				
	3	Halves 1 and 2				
P263	Limited opening		0 - 1	0		27
	0	Disabled				
	1	Timed opening based on the time specified in C412 and/or C414				
P270	Motor lock		0 - 1	0		27
	0	Disabled				
	1	The barrier cannot be operated without a signal at programmable input 2. If the signal disappears the barrier is stopped.				
P280	Park		0 - 2	2		27
	0	Disabled				
	1	Automatic closing disabled after the input is activated, reset by another control signal				
	2	Automatic closing disabled by a constant signal				
P290	Interlock opening		0 - 1	0		27
	0	Disabled				
	1	Opens the local door if P260 is set to open, and passes the signal on to the remote door				
P296	Blocking disabled for local and remote doors. Only works if there is a constant signal and P261 has the value 2.		0 - 1	0		27
	0	Disabled				
	1	Active				
P298	Automatic closing disabled for remote door Only works if there is a constant signal		0 - 1	0		27
	0	Disabled				
	1	Active				

Programmable input 3

No.	Name		Range	Factory	Setting	Ref. page
P300	Channels in programmable input 3		0 - 1	1		27
	0	Disabled				
	1	Enabled				
P360	Control function		0-5	0		27
	0	Disabled				
	1	Open				
	2	Close				
	3	Stop				
	4	Open/close				
	5	Open/stop/close				
P361	Type of control signal when activated		1 - 2	1		27
	1	Pulse (hold-to-run mode not possible)				
	2	Signal for as long as the input is activated				
P362	Half operation		1 - 3	3		
	1	Half 1				
	2	Half 2				
	3	Halves 1 and 2				
P363	Limited opening		0 - 1	0		27
	0	Disabled				
	1	Timed opening based on the time specified in C412 and/or C414.				
P370	Motor lock		0 - 1	0		27
	0	Disabled				
	1	The barrier cannot be operated without a signal at programmable input 3. If the signal disappears the barrier is stopped.				
P380	Park		0 - 2	2		27
	0	Disabled				
	1	Automatic closing disabled after the input is activated, reset by another control signal				
	2	Automatic closing disabled by a constant signal				
P390	Interlock opening		0 - 1	0		27
	0	Disabled				
	1	Opens the local door if P360 is set to open, and passes the signal on to the remote door				
P396	Blocking disabled for local and remote doors. Only works if there is a constant signal and P361 has the value 2.		0 - 1	0		27
	0	Disabled				
	1	Active				
P398	Automatic closing disabled for remote door Only works if there is a constant signal		0 - 1	0		27
	0	Disabled				
	1	Active				

Programmable input 4

No.	Name		Range	Factory	Setting	Ref. page
P400	Channels in programmable input 4		0 - 1	1		27
	0	Disabled				
	1	Enabled				
P460	Control function		0-5	0		27
	0	Disabled				
	1	Open				
	2	Close				
	3	Stop				
	4	Open/close				
	5	Open/stop/close				
P461	Type of control signal when activated		1 - 2	1		27
	1	Pulse				
	2	Signal for as long as the input is activated				
P462	Half operation		1 - 3	3		27
	1	Half 1				
	2	Half 2				
	3	Halves 1 and 2				
P463	Limited opening		0 - 1	0		27
	0	Disabled				
	1	Timed opening based on the time specified in C412 and/or C414.				
P470	Motor lock		0 - 1	0		27
	0	Disabled				
	1	The barrier cannot be operated without a signal at programmable input 4. If the signal disappears the barrier is stopped.				
P480	Park		0 - 2	2		27
	0	Disabled				
	1	Automatic closing disabled after the input is activated, reset by another control signal				
	2	Automatic closing disabled by a constant signal				
P490	Interlock opening		0 - 1	0		27
	0	Disabled				
	1	Opens the local door if P460 is set to open, and passes the signal on to the remote door				
P496	Blocking disabled for local and remote doors. Only works if there is a constant signal and P461 has the value 2.		0 - 1	0		27
	0	Disabled				
	1	Active				
P498	Automatic closing disabled for remote door Only works if there is a constant signal		0 - 1	0		27
	0	Disabled				
	1	Active				

Programmable input 5

No.	Name		Range	Factory	Setting	Ref. page
P500	Channels in programmable input 5		0 - 1	1		27
	0	Disabled				
	1	Enabled				
P560	Control function		0-5	0		27
	0	Disabled				
	1	Open				
	2	Close				
	3	Stop				
	4	Open/close				
	5	Open/stop/close				
P561	Type of control signal when activated		1 - 2	1		27
	1	Pulse				
	2	Signal for as long as the input is activated				
P562	Half operation		1 - 3	3		27
	1	Half 1				
	2	Half 2				
	3	Halves 1 and 2				
P563	Limited opening		0 - 1	0		27
	0	Disabled				
	1	Timed opening based on the time specified in C412 and/or C414.				
P570	Motor lock		0 - 1	0		27
	0	Disabled				
	1	The barrier cannot be operated without a signal at programmable input 5. If the signal disappears the barrier is stopped.				
P580	Park		0 - 2	2		27
	0	Disabled				
	1	Automatic closing disabled after the input is activated, reset by another control signal				
	2	Automatic closing disabled by a constant signal				
P590	Interlock opening		0 - 1	0		27
	0	Disabled				
	1	Opens the local door if P560 is set to open, and passes the signal on to the remote door				
P596	Blocking disabled for local and remote doors. Only works if there is a constant signal and P561 has the value 2.		0 - 1	0		27
	0	Disabled				
	1	Active				
P598	Automatic closing disabled for remote door Only works if there is a constant signal		0 - 1	0		27
	0	Disabled				
	1	Active				

Programmable input 6

No.	Name		Range	Factory	Setting	Ref. page
P600	Channels in programmable input 6		0 - 1	1		27
	0	Disabled				
	1	Enabled				
P660	Control function		0-5	0		27
	0	Disabled				
	1	Open				
	2	Close				
	3	Stop				
	4	Open/close				
	5	Open/stop/close				
P661	Type of control signal when activated		1 - 2	1		27
	1	Pulse				
	2	Signal for as long as the input is activated				
P662	Half operation		1 - 3	3		27
	1	Half 1				
	2	Half 2				
	3	Halves 1 and 2				
P663	Limited opening		0 - 1	0		27
	0	Disabled				
	1	Timed opening based on the time specified in C412 and/or C414.				
P670	Motor lock		0 - 1	0		27
	0	Disabled				
	1	The barrier cannot be operated without a signal at programmable input 6. If the signal disappears the barrier is stopped.				
P680	Park		0 - 2	2		27
	0	Disabled				
	1	Automatic closing disabled after the input is activated, reset by another control signal				
	2	Automatic closing disabled by a constant signal				
P690	Interlock opening		0 - 1	0		27
	0	Disabled				
	1	Opens the local door if P660 is set to open, and passes the signal on to the remote door				
P696	Blocking disabled for local and remote doors. Only works if there is a constant signal and P661 has the value 2.		0 - 1	0		27
	0	Disabled				
	1	Active				
P698	Automatic closing disabled for remote door Only works if there is a constant signal		0 - 1	0		27
	0	Disabled				
	1	Active				

- Programmable wireless inputs, r channels

Programmable wireless input 1

No.	Name		Range	Factory	Setting	Ref. page
r001	Readout of received wireless input		0 - 4	0		32
	0	No wireless reception				
	1	Wireless input 1 is receiving a wireless signal				
	2	Wireless input 2 is receiving a wireless signal				
	3	Wireless input 3 is receiving a wireless signal				
	4	Wireless input 4 is receiving a wireless signal				
r160	Operation		0 - 5	0		32
	0	Disabled				
	1	Open				
	2	Close				
	3	Stop				
	4	Open/close				
	5	Open/stop/close				
r162	Half operation		1 - 3	3		
	1	Half 1				
	2	Half 2				
	3	Half 1 and half 2				
r163	Limited opening		0 - 1	0		32
	0	Disabled				
	1	Timed opening				
r170	Disable operation at wireless input 1.		0 - 6	0		32
	0	Disabled, normal operation. (Programmable input has no function for wireless input 1)				
	1	Operate only if there is a signal at programmable input 1				
	2	Operate only if there is a signal at programmable input 2				
	3	Operate only if there is a signal at programmable input 3				
	4	Operate only if there is a signal at programmable input 4				
	5	Operate only if there is a signal at programmable input 5				
	6	Operate only if there is a signal at programmable input 6				
r180	Park		0 - 1	0		32
	0	Disabled				
	1	Park without automatic closing Reset by another control signal				
r190	Interlock opening		0 - 1	0		32
	0	Disabled				
	1	Sends a normal open signal to the remote door				

Programmable wireless input 2

No.	Name		Range	Factory	Setting	Ref. page
r001	Readout of received wireless input		0 - 4	0		32
	0	No wireless reception				
	1	Wireless input 1 is receiving a wireless signal				
	2	Wireless input 2 is receiving a wireless signal				
	3	Wireless input 3 is receiving a wireless signal				
	4	Wireless input 4 is receiving a wireless signal				
r260	Operation		0 - 5	0		32
	0	Disabled				
	1	Open				
	2	Close				
	3	Stop				
	4	Open/close				
	5	Open/stop/close				
r262	Half operation		1 - 3	3		
	1	Half 1				
	2	Half 2				
	3	Half 1 and half 2				
r263	Limited opening		0 - 1	0		32
	0	Disabled				
	1	Timed opening				
r270	Disable operation at wireless input 2.		0 - 6	0		32
	0	Disabled, normal operation. (Programmable input has no function for wireless input 2)				
	1	Operate only if there is a signal at programmable input 1				
	2	Operate only if there is a signal at programmable input 2				
	3	Operate only if there is a signal at programmable input 3				
	4	Operate only if there is a signal at programmable input 4				
	5	Operate only if there is a signal at programmable input 5				
	6	Operate only if there is a signal at programmable input 6				
r280	Park		0 - 1	0		32
	0	Disabled				
	1	Park without automatic closing Reset by another control signal				
r290	Interlock opening		0 - 1	0		32
	0	Disabled				
	1	Sends a normal open signal to the remote door				

Programmable wireless input 3

No.	Name		Range	Factory	Setting	Ref. page
r001	Readout of received wireless input		0 - 4	0		32
	0	No wireless reception				
	1	Wireless input 1 is receiving a wireless signal				
	2	Wireless input 2 is receiving a wireless signal				
	3	Wireless input 3 is receiving a wireless signal				
	4	Wireless input 4 is receiving a wireless signal				
r360	Operation		0 - 5	0		32
	0	Disabled				
	1	Open				
	2	Close				
	3	Stop				
	4	Open/close				
	5	Open/stop/close				
r362	Half operation		1 - 3	3		
	1	Half 1				
	2	Half 2				
	3	Half 1 and half 2				
r363	Limited opening		0 - 1	0		32
	0	Disabled				
	1	Timed opening				
r370	Disable operation at wireless input 3.		0 - 6	0		32
	0	Disabled, normal operation. (Programmable input has no function for wireless input 3)				
	1	Operate only if there is a signal at programmable input 1				
	2	Operate only if there is a signal at programmable input 2				
	3	Operate only if there is a signal at programmable input 3				
	4	Operate only if there is a signal at programmable input 4				
	5	Operate only if there is a signal at programmable input 5				
	6	Operate only if there is a signal at programmable input 6				
r380	Park		0 - 1	0		32
	0	Disabled				
	1	Park without automatic closing Reset by another control signal				
r390	Interlock opening		0 - 1	0		32
	0	Disabled				
	1	Sends a normal open signal to the remote door				

Programmable wireless input 4

No.	Name		Range	Factory	Setting	Ref. page
r001	Readout of received wireless input		0 - 4	0		32
	0	No wireless reception				
	1	Wireless input 1 is receiving a wireless signal				
	2	Wireless input 2 is receiving a wireless signal				
	3	Wireless input 3 is receiving a wireless signal				
	4	Wireless input 4 is receiving a wireless signal				
r460	Operation		0 - 5	0		32
	0	Disabled				
	1	Open				
	2	Close				
	3	Stop				
	4	Open/close				
	5	Open/stop/close				
r462	Half operation		1 - 3	3		
	1	Half 1				
	2	Half 2				
	3	Half 1 and half 2				
r463	Limited opening		0 - 1	0		32
	0	Disabled				
	1	Timed opening				
r470	Disable operation at wireless input 4.		0 - 6	0		32
	0	Disabled, normal operation. (Programmable input has no function for wireless input 4)				
	1	Operate only if there is a signal at programmable input 1				
	2	Operate only if there is a signal at programmable input 2				
	3	Operate only if there is a signal at programmable input 3				
	4	Operate only if there is a signal at programmable input 4				
	5	Operate only if there is a signal at programmable input 5				
	6	Operate only if there is a signal at programmable input 6				
r480	Park		0 - 1	0		32
	0	Disabled				
	1	Park without automatic closing Reset by another control signal				
r490	Interlock opening		0 - 1	0		32
	0	Disabled				
	1	Sends a normal open signal to the remote door				

Error messages

E-code	Meaning	Possible cause
EP-1	Not an error code – indicates the type of EP104 in use	
EP-2	Not an error code – indicates the type of EP104 in use	
E000	No error, shown to acknowledge a change in the service channel.	
E003	Limited running time exceeded	Gears slipping? Check C403
E008	Momentary loss of 24 V	Mains failure, momentary 24 V short circuit.
E015	Momentary loss of 230V	Has there been a power failure?
E017	Safety edge or load guard triggered five times in succession	It something preventing the door reaching the closed position?
E020	Voltage too high in safety circuit	The voltage measured by the automatic control unit is too high.
E025	Incorrect setting for personal protection, motor 1	Check C200 and C230, the load guard cannot be disabled with personal protection activated. Check C211, it cannot be longer than 0.06 sec. C212 cannot be longer than 2 sec. C493 cannot be longer than 0.20 sec.
E026	Incorrect setting for personal protection, motor 2	Check C200 and C240, the load guard cannot be disabled with personal protection activated. Check C211, it cannot be longer than 0.06 sec. C212 cannot be longer than 2 sec. C493 cannot be longer than 0.20 sec.
E032	Limit switch L.O1 has lost its position	Is the limit switch cam bypassing the switch? Loose contact in switch?
E033	Limit switch L.C1 has lost its position	Is the limit switch cam bypassing the switch? Loose contact in switch?
E042	Limit switch L.O2 has lost its position	Is the limit switch cam bypassing the switch? Loose contact in switch?
E043	Limit switch L.C2 has lost its position	Is the limit switch cam bypassing the switch? Loose contact in switch?
E044	Hidden channels shown	
E046	Opening counter reset	
E047	Factory reset of all channels	
E048	Error code list reset	
E116	No safety edge acknowledgement	Only applies to up-and-over control, fault in safety edge? Correct run-on time?
E201	Motor protection triggered for motor 1	Motor is taking more than 1.5x motor current. Motor is sluggish or stops. Faulty fuse? Phase failure in an incoming phase? Break in cable to motor or motor winding? Check the motor protection setting.
E202	Motor protection triggered for motor 2	
E203	Motor protection triggered three times in a row, control unit locked for three minutes	Is there an obstacle? Fault in electric motor? Check the configuration of channels C252, C253, C262, C263.
E204	Current through motor 1, which is switched off	
E205	Current through motor 2, which is switched off	
E206	No current or low current in motor 1	The electric motor is running at less than half the motor protection setting. Check the motor protection setting. Phase failure in an incoming phase? Faulty fuse? Break in cable to electric motor? Voltage drop in stop circuit/limit switch circuit? (Prevents the contactors operating.)
E207	No current or low current in motor 2	
E221	Start load too low, motor 1	Check that the motor is correctly connected.
E222	Start load too low, motor 2	Check that the motor is correctly connected.
E223	Normal power too low, motor 1	Check C230.

E224	Normal power too low, motor 2	Check C240.
E318	Error in loop 1	Are the loop and connectors electrically continuous? For more troubleshooting tips, see the instruction manual for the vehicle detector
E319	Error in loop 2	
E614	Communication error	Correct polarity in communication cables? Break in communication cable? Correct settings in both automatic control units? Is the external unit switched on?
E901	Error in safety edge S.E1	Contact FAAC Nordic AB.
E902	Error in safety edge S.E2	Contact FAAC Nordic AB.
E903	Error in safety edge S.E3	Contact FAAC Nordic AB.
E904	Error in limit switch sensor	Contact FAAC Nordic AB.
E905	Error in stop circuit	Contact FAAC Nordic AB.
E909	Internal watchdog triggered	Contact FAAC Nordic AB.
E910	Clock monitoring error	Contact FAAC Nordic AB.
E911	Repeated restart attempts	Short circuit in limit switch or stop circuit? After the problem is corrected, the unit makes a new attempt to restart after 20 seconds.
E912	Incorrect checksum in flash memory	Contact FAAC Nordic AB.
E913	Memory error in RAM	Contact FAAC Nordic AB.
E914	Memory error in EEPROM	Contact FAAC Nordic AB.
E915	Incorrect EEPROM version	Contact FAAC Nordic AB.
E916	Internal test not completed in time	Contact FAAC Nordic AB.
E917	Incorrect order of execution	Contact FAAC Nordic AB.
E918	Error code list reset	
E921	Contactor for motor 1 activated before the previously activated contactor has been deactivated.	Contact FAAC Nordic AB.
E922	Contactor for motor 2 activated before the previously activated contactor has been deactivated.	Contact FAAC Nordic AB.
E931	Stop at the same time as an open/close operation.	
E932	Open operation at the same time as a close operation.	
E941	Motor 1 running in the wrong direction according to the encoder setting.	Check that channel C110 is set to the correct side. Check the motor is running in the right direction.
E942	Motor 2 running in the wrong direction according to the encoder setting.	Check that channel C120 is set to the correct side. Check the motor is running in the right direction.
E961	SE1 did not change to low during the external test.	Check that the safety edge is functional, if the safety edge is not functional, set channel C113 to 0.
E962	SE2 did not change to low during the external test.	Check that the safety edge is functional, if the safety edge is not functional, set channel C123 to 0.
E963	SE3 did not change to low during the external test.	Check that the safety edge is functional, if the safety edge is not functional, set channel C133 to 0.
E964	PHOTO did not change to low during the external test.	Check that the safety edge is functional, if the safety edge is not functional, set channel C343 to 0.
E971	SE1 did not change to high during the external test.	Check that the safety edge is functional, if the safety edge is not functional, set channel C113 to 0.
E972	SE2 did not change to high during the external test.	Check that the safety edge is functional, if the safety edge is not functional, set channel C123 to 0.
E973	SE3 did not change to high during the external test.	Check that the safety edge is functional, if the safety edge is not functional, set channel C133 to 0.
E974	PHOTO did not change to high during the external test.	Check that the safety edge is functional, if the safety edge is not functional, set channel C343 to 0.

Troubleshooting

At each service, please check all the functions described in the relevant section on commissioning.

Problem	Possible cause, tip
Error message in the display (Ennn)	See the section above on error messages.
The door reverses and the red LEDs M1/M2 start flashing.	Is the load guard correctly installed? Has the correct supply voltage been set? Mechanical fault? Does the door move easily when decoupled?
Are the red LEDs S.E1, S.E2 or S.E3 on or flashing?	Check the channels for the safety edge value. Is the impedance correct? Adjust the safety edge switch if necessary? Are all the safety edge units in use? Are any of the limit switch LEDs on? The safety edge will not work unless the limit switches are connected at the time the power is switched on. Is the stop LED on? The safety edge will not work unless the stop circuit is uninterrupted at the time the power is switched on.
The door will not open or close.	Are all the green LEDs on? They should be on. Have the wrong stop inputs been jumpered? Are any of the LEDs INP1-INP6 on? They should not usually be on (unless the system is parked at certain times). The limit switch LEDs must light up before the door can be operated. Example: L.O1 is on = motor 1 can start. The limit switches are connected in series with the stop circuit. Fault/interruption in the wicket door contact or other contact in the stop circuit. Check that the warning is configured. Check that the block is configured.
The door will not close but it will open.	FC/SL LED should be on. Are any safety edge indicators on? They should normally be off. Suspect an incorrect connection to the safety edge. Alternatively, an adjustment may be necessary. Check the channel for pulse operation.
No automatic closing.	Suspect an interruption somewhere in the stop circuit. Wicket door contact? Stop button? Check the setting for restart after stopping.
The display and LEDs do not switch on	Are all supply phases present? Possibly a short circuit to earth in a low current connection. Switch off at the main switch for 1 minute and remove all push terminals. Switch on the power again with the jackable terminals disconnected.
You will need to hold down the run button to operate.	Check that the automatic control unit is in pulse mode. Is the FC/SL LED on? Are any of the safety edge LEDs on? Is SL1 or SL2 on? These should only be on if a vehicle is over the loop.
Does the door inexplicably close "by itself"? (Without an error message or alarm LEDs)	Try to operate the door again, opening and closing. Also check C020 for the most recent stop cause. Cross-check the number with the channel reference to find out what stopped the door.

• Resetting/replacing tripped fuses

If the fuse protecting the power supply to the automatic control unit trips, FAAC Nordic AB recommends following these steps to reset/replace it.

- Switch off the main switch to the automatic control unit.
- Decouple the motor winder.
- Reset or replace the fuse.
- Switch on the main switch to the automatic control unit.
- Check that none of the motor winders start before receiving the control signal.
- Check that the motor winders can be started and stopped from the control buttons.
- If the motor winder cannot be stopped, contact FAAC Nordic AB.

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