Link Controls

Operating Instructions for Control Panel

CS 310

Warning : Please read these instructions fully before installation

Software Version 1.55

Control Panel / CS 310 / LC-3057 Rev.H – 1

1. Contents

2. General Document Information

Original Operating Instructions

- Subject to alterations in the interest of technical progress.
- All dimensions given in mm.
- The diagrams in this manual are not to scale.

Key to symbols

⚠ DANGER!

Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

⚠ WARNING!

Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.

⚠ CAUTION!

Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates an imminent danger of damage or destruction.

CHECK

Indicates a check to be performed.

REFERENCE

Reference to separate documents which must be complied with.

☞ Action request

– List, itemisation

➜ Reference to other sections of this document

3. General Safety Instructions

⚠ DANGER!

Failure to comply with the documentation could result in life-threatening danger!

☞ Be sure to follow all the safety instructions in this document.

Warranty

The function and safety of the equipment is only guaranteed if the warning and safety instructions included in these operating instructions are adhered to.
Link Controls is not liable for personal injury or damage to property if these occur as a result of the warnings and safety advice being disregarded. Link Controls does not accept any liability or warranty for damage due to the use of non-approved spare parts and accessories.

Using the equipment for its intended purpose

The CS 310 controls are designed only for controlling gates and doors with digital (AWG) or mechanical end limit position systems.

Target group

Only qualified and trained electricians may connect, programme and service the controls. Qualified and trained electricians must meet the following requirements:

- knowledge of the general and specific safety and accident-prevention regulations.
- knowledge of the relevant electrical regulations,
- training in the use and care of appropriate safety equipment.
- capable of recognising the dangers associated with electricity.

Instructions regarding installation and connection

- The control must be disconnected from the electricity supply before carrying out any electrical work. It must be ensured that the electricity supply remains disconnected for the duration of the works.
- Local protective regulations must be complied with.

Information concerning operation

- Unauthorised persons (particularly children) should not be allowed to play with permanently installed adjusting or control devices.
- Keep remote controls beyond the reach of children.

Regulations and test specifications

For connecting, programming and servicing, the following regulations must be observed (the list is not exhaustive).

Construction product standards

- EN 13241-1 (Products without fire resistance or smoke control characteristics)
- EN 12445 (Safety in use of power operated doors - Test methods)
- EN 12453 (Safety in use of power operated doors - Requirements)
- EN 12978 (Safety devices for power operated doors and gates - Requirements and test methods)

Electromagnetic compatibility (EMC)

- EN 55014-1 (Radio disturbance, household appliances)
- EN 61000-3-2 (Disturbances in supply systems - harmonic currents)
- EN 61000-3-3 (Disturbances in supply systems - voltage fluctuations)
- DIN EN 61000-6-2 (Electromagnetic compatibility (EMC) -
  Part 6-2: Generic standards – Immunity for industrial environments)
- DIN EN 61000-6-3 (Electromagnetic compatibility (EMC) -
  Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments)

Machinery Directive

- EN 60204-1 (Safety of machinery, electrical equipment of machines) Part 1: General requirements
- EN ISO 12100 (Safety of machinery – general principles for design - risk assessment and risk reduction)

Low voltage

- DIN EN 60335-1 (Household and similar electrical appliances - Safety - Part 1: general requirements)
- DIN EN 60335-2-103 (Household and similar electrical appliances - Safety - Part 2-103: Particular requirements for drives for gates, doors and windows)

Committee for Workplaces (ASTA)

- Workplace regulation ASR A1.7 (“Doors and gates“)

4. Product Overview

4.1 Various options

The following package options are available for the CS 310 control:

- CS 310 control with LCD display / programmer
- CS 310 control without LCD display / programmer (programmer is required for all advanced settings)

All the above options can be fitted with a plug-in 24/7 weekly timer, a plug-in radio receiver and a plug-in radio transmission system (for low power opto safety edge sensors).

The following options are available for the enclosure:

- Enclosure with CS three-button station
- Enclosure with KDT three-button station
- Enclosure with ON/OFF key switch
- Enclosure with mains isolation switch
- Housing with emergency stop

The operating instructions describe the connection possibilities and programming procedures for the different models:

- CS 310 control with attached LCD display / programmer

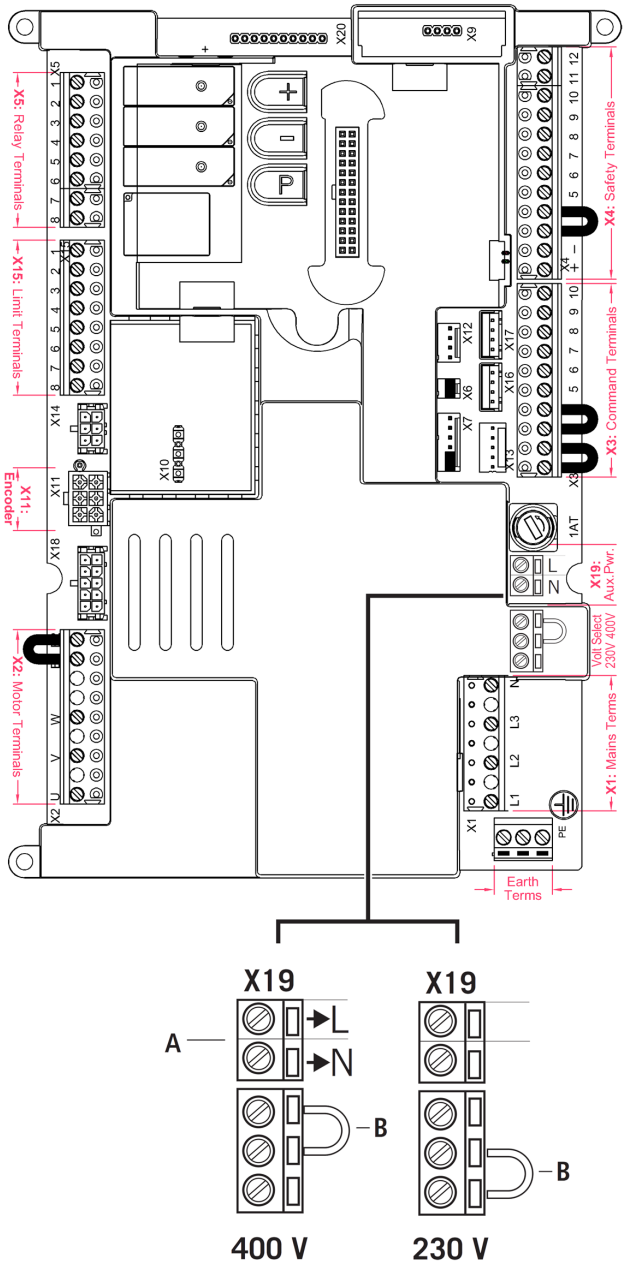
4.2 CS 310 basic board (with optional LCD display programmer)

Key:

X1: Mains power supply terminals
X2: Motor terminals
X3: Terminal block for command devices
X4: Terminal block for safety devices
X5: Terminal block for programmable relays
X6: Connector for lid mounted ON-OFF switch
X7: Connector for lid mounted 3-button station
X8: Connector for display / programmable
X9: Connector for radio receiver
X10: Connector for 24/7 weekly timer
X11: Connector for electronic limit (AWG)
X12: Connector for external loop detector
X13: Connector for CS three-button station
X14: Not used
X15: Terminal block for mechanical limits
X16: Connector for BUS system (MS BUS)
X17: Connector for BUS system (MS BUS)
X18: Frequency converter interface
X19: Power supply for external devices 230V / 50 Hz protected by F1 (1 A fuse)
X20: Connector for radio safety edge system

H4: Green LED to show operational readiness illuminated when control is working
H6: Red LED to show status messages lights up / flashes when the safety devices are activated or in the case of errors

S1: Programming button (+) (under display)
S2: Programming button (-) (under display)
S3: Programming button (P) (under display)



A Output 230 V.
Power supply for external devices.
No power entry for the control unit itself.
➜ See ‘5.3 Power supply for external devices (only for 400 V / 3-phase connection)’

B The position of the jumper must take into account the power supply and the motor voltage.

5. Initial operation

5.1 General

To ensure that the system functions properly, the following conditions must apply:
- The door/gate is installed and operational.
- The Link Controls operator is installed and ready for operation.
- The command and safety devices are installed and function properly.
- The control housing with the CS 310 control is installed properly.

REFERENCE

The relevant manufacturers’ instructions must be adhered to for the installation of the door/gate, the Link Controls operator , and the command & safety devices.

5.2 Mains connection

Preconditions

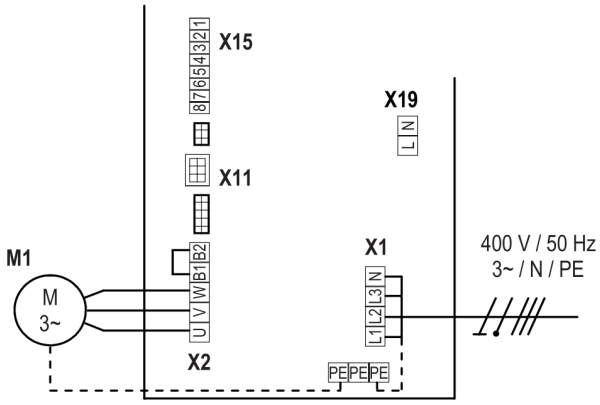
To ensure that the controls functions properly, the following conditions must apply:
- The mains voltage must correspond to the voltage stated on the type plate.
- The mains voltage must be the same as the voltage of the operator.
- For a three-phase current, a clockwise rotating field is required.
- For a permanent connection, an all-pole main isolating switch must be used.
- For a three-phase connection, only 3-way automatic circuit breakers (max 10 A) may be used.

NOTICE

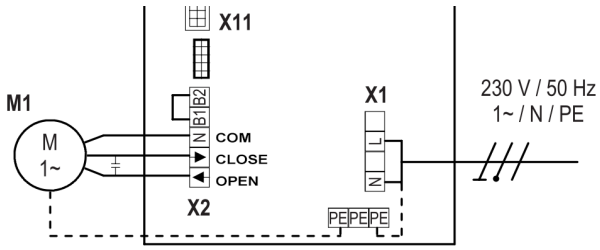
Malfunctions can occur as a result of incorrect installation of the control!

Before switching on the control for the first time, a check must be carried out after completing the wiring to ensure that all the motor connections at the motor and at the control are securely fixed.
All control voltage inputs are galvanically isolated from the supply.

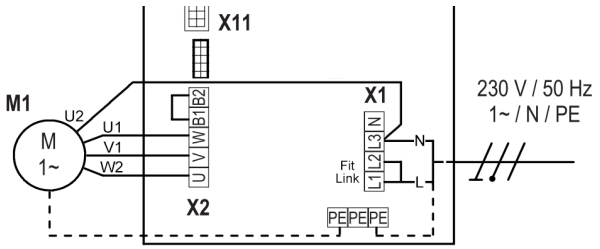
400Vac / 3 phase, motor & mains connection



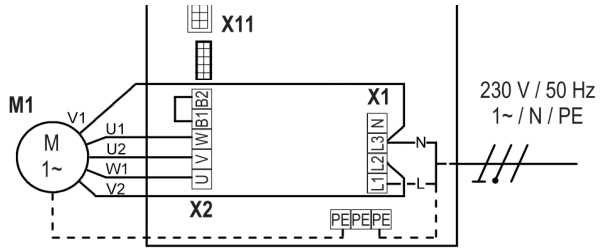
1 phase motor (3 wire) & mains connection



1 phase motor (4 wire) & mains connection



1 phase motor (5 wire) & mains connection



Key:

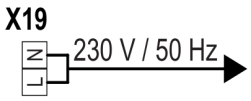
M1: Motor
X1: Terminal block for mains connection
X2: Terminal block for motor
X11: Sockets for electronic limit system (AWG) with safety circuit (STOP CHAIN)
X15: Terminal block for mechanical limit switches (stop circuit at X2 / B1-B2)
X19: Power supply connection for external devices

Connection:

☞ Connect the digital end position system or mechanical limit switches to the control.
☞ Connect the control to the motor.
☞ Connect the control to the mains power supply.
☞ Cable groups must be secured close to their relevant terminals using a cable tie.

➔ “11. Technical data“ on page 40

5.3 230 Vac Aux Power supply for external devices (only for 400Vac / 3-phase)

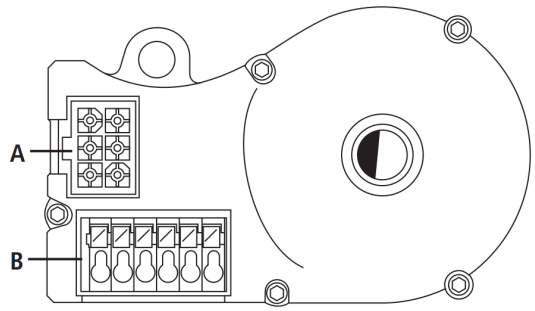


NOTICE

Damage to property or irreparable damage due to incorrect installation!
Using terminal X19 if the control is connected to a 230 V power supply will destroy the circuit board.

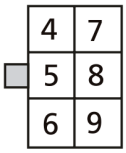
☞ Protect terminal X19 with F1, 1A (delay) fuse.

5.4 Connection of electronic limit system - encoder AWG (plug X11)



A: AWG plug
B: AWG plug terminals (for N/C safety circuits)

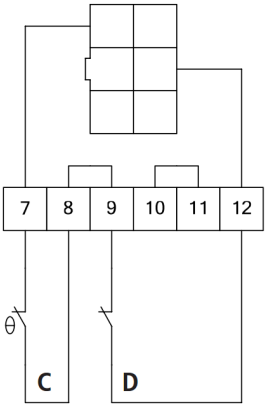
Plug X11 (at connection A)



The numbers on the plug are also the wire numbers.

4: Safety circuit input (N/C)
5: RS 485 B
6: GROUND (0v)
7: RS485 A
8: Safety chain output (N/C)
9: 12V $_{DC}$

Plug terminal B (encoder AWG only)



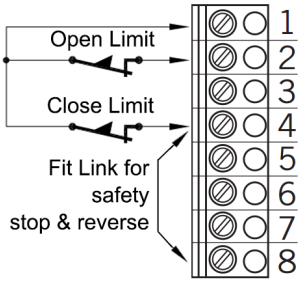
C: Thermal element in door/gate operator
D: Emergency hand operation switch (emergency hand crank or emergency hand chain)

The limit system will be recognised automatically by the control during initial use. If replaced at a later date, the relevant limit system must be selected in a parameter setting in the INPUT operating mode.

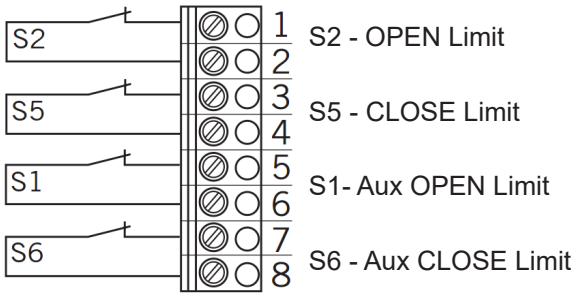
➜ “9.2 Input operating mode - LIMIT SW”

5.5 Connection of Mechanical limit switches (terminals X15 and X2)

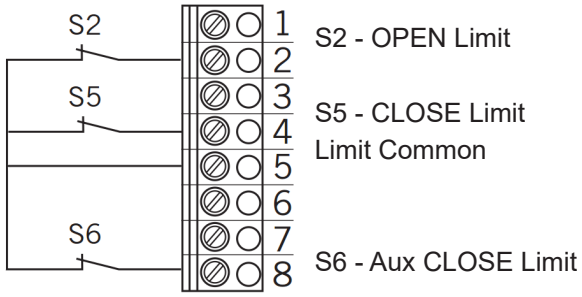
Example wiring for 3 wire connection Terminal block X15

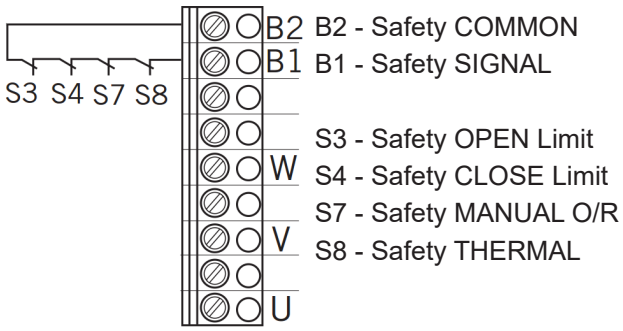


Example wiring for individual limit connection Terminal block X15



Example wiring for 6 wire connection Terminal blocks X15 and X2





The limit system will be recognised automatically by the control during initial use. If replaced at a later date, the relevant limit system must be selected in a parameter setting in the INPUT operating mode.

➜ “9.2 Input operating mode - LIMIT SW”

5.6 Connection of command devices

⚠ CAUTION!

Danger of injury due to uncontrolled movement of the door/gate!

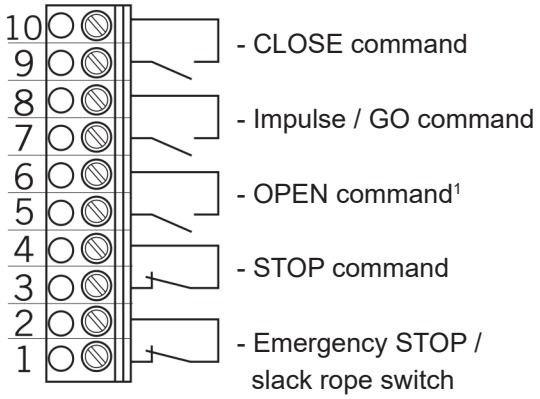
☞ Install command devices for deadman operation within site of the door/gate, but beyond the danger zone for the user.

If the command device is not a key switch:

☞ Install it at a height of at least 1.5 m off the ground.

☞ Install it so as to make it inaccessible to the general public.

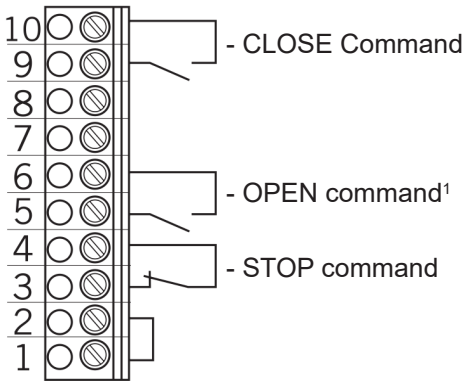
Terminal block X3



[1] *If two-way traffic control is activated: OPEN command from inside*

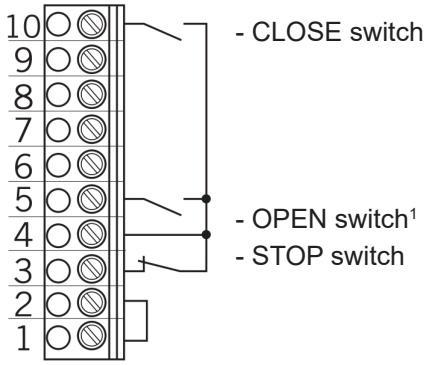
5.7 Connection examples for command devices (terminal block X3)

OPEN / STOP / CLOSE buttons
6-wire example



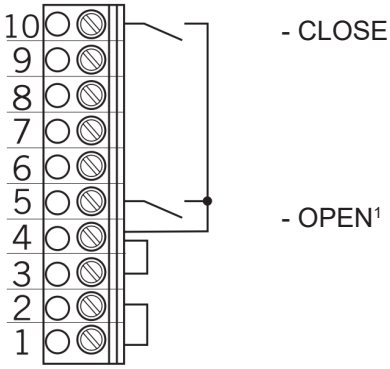
[1] *If two-way traffic control is activated: OPEN command from inside*

OPEN / STOP / CLOSE switches
4-wire example



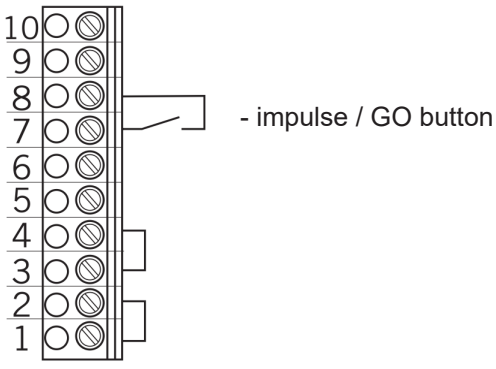
[1] *If two-way traffic control is activated: OPEN command from inside*

Key switch OPEN / CLOSE



[1] *If two-way traffic control is activated: OPEN command from inside*

Impulse / GO button
(sequence, step by step control)



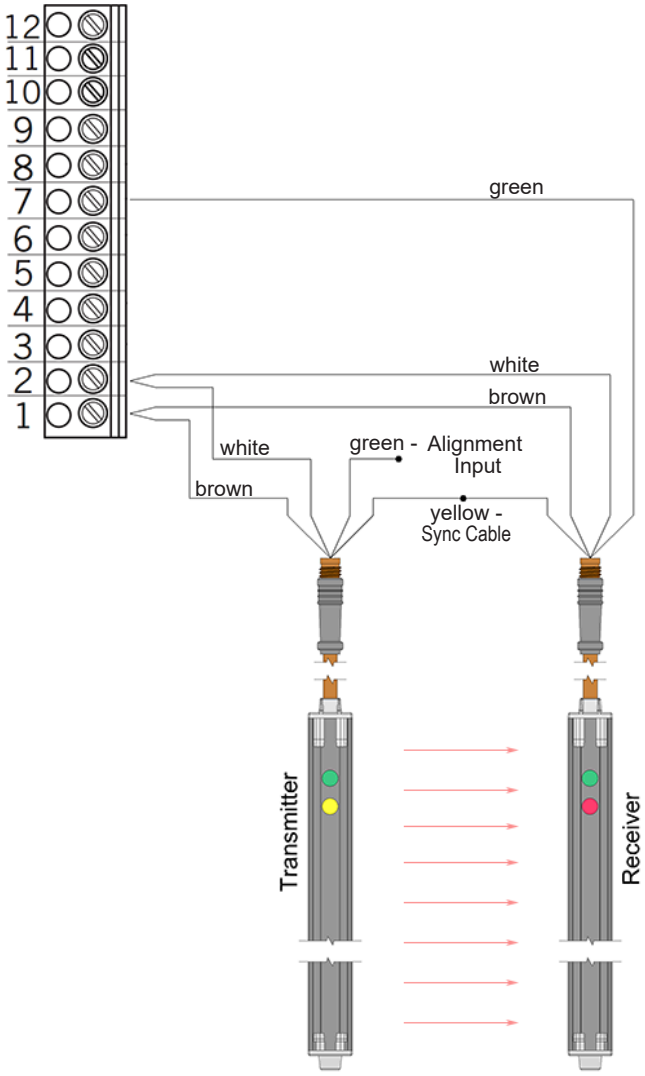
[1] *If two-way traffic control is activated: OPEN command from inside*

5.8 Connection of safety edge devices

The closing safety edge device will be recognised and programmed automatically during initial use and following a reset. If a closing safety edge device is not connected, the input will be queried every time the power supply is switched on, until a closing safety edge device is recognised. If a change is made at a later date, the appropriate system must be selected in a parameter setting in INPUT mode.

➔ “7.2 LCD display, modes of operation“

Terminal block X4
Light curtains (OSE output)



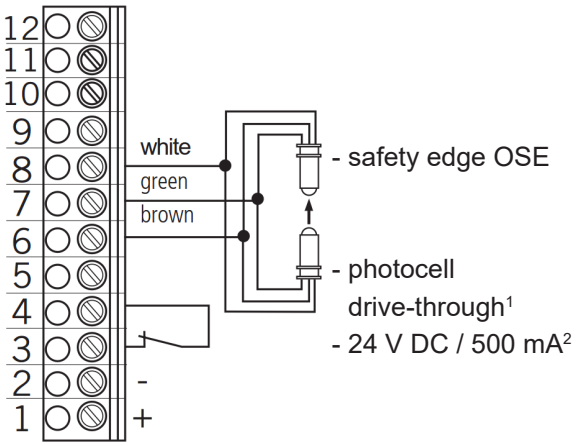
Safety edge mode ‘SKS’ should be set to MOD4 for light curtain operation (not automatically detected).

➔ “9.2 Input operating mode - SKS”

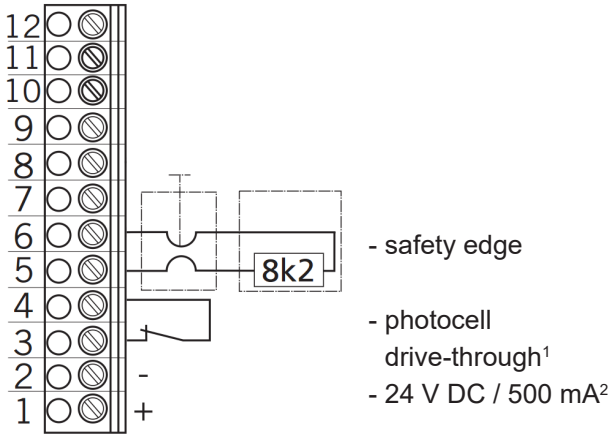
Safety edge reverse time ‘Revers.Time’ should be set to >1000ms.

➔ “9.2 Input operating mode - Revers.Time”

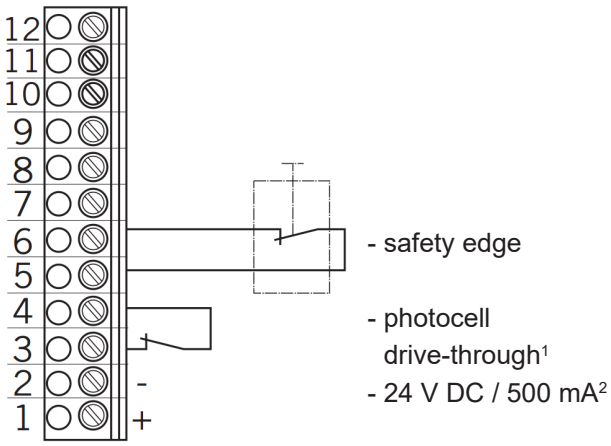
Terminal block X4
optoelectronic safety edge (OSE)



Terminal block X4
8.2 kOhm safety edge (electric)



Terminal block X4
pneumatic safety edge (airswitch)
pressure switch test - testing at door close position



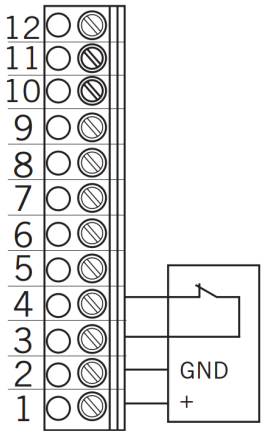
[1] effective in close direction
[2] for external switching devices (connection to terminals 1 & 2)

5.9 Connection of photocells

The photocell system will be recognised and programmed automatically during initial operation and following a reset. If a photocell system is not connected, the input will be queried every time the power supply is switched on, until a photocell is recognised. If a change is made at a later date, the appropriate system must be selected in a parameter setting in INPUT mode.

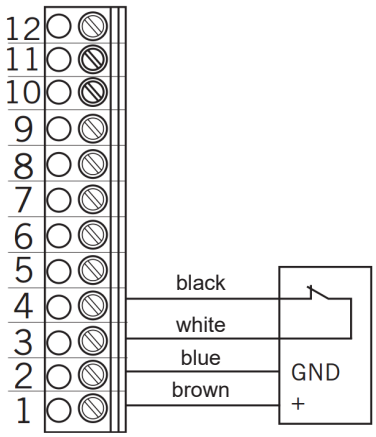
➔ “7.2 LCD display, modes of operation“

Terminal block X4
photocell N/C 24 V DC



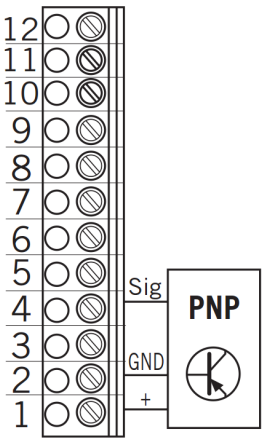
- N/C photocell

Terminal block X4
Link Controls ‘standard’ retro-photocell



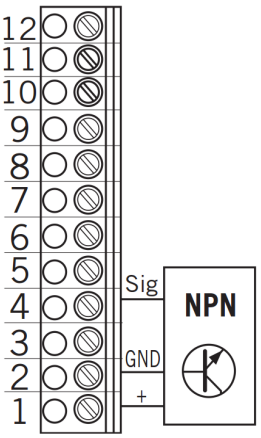
Terminal block X4

3-wire PNP photocell



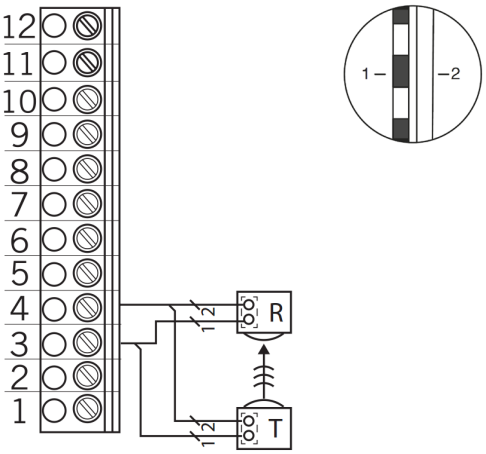
- 3-wire PNP photocell

Terminal block X4
3-wire NPN photocell



- 3-wire NPN photocell

Terminal block X4
2-wire photocell



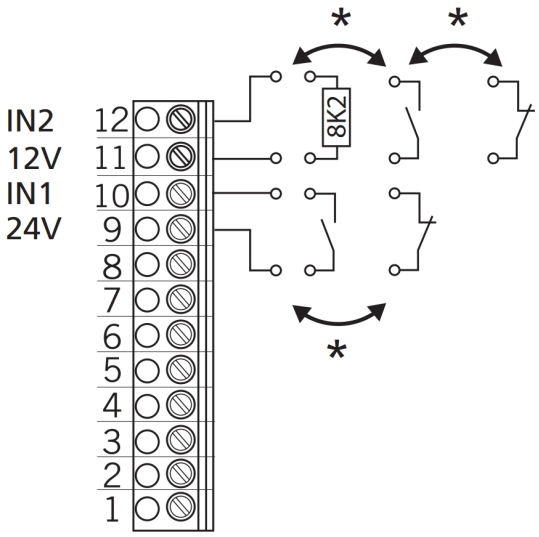
R: Receiver
T: Transmitter

Terminal block X4

Terminal block X4
Programmable inputs
Input 1: Terminal 9 & 10
Input 2: Terminal 11 & 12

NOTICE

Danger of damage to the circuit board due to incorrect connection!
Inputs 1 & 2 have different voltages and they must NOT be connected together!

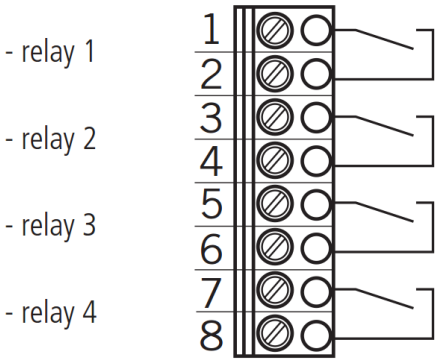


IN1 Input 1
IN2 Input 2
* either/or

The type of wiring depends on the parameter settings for both inputs in INPUT mode.

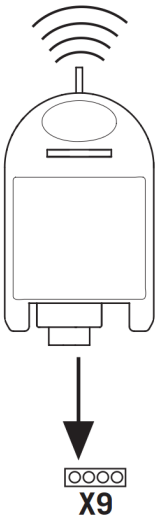
5.10 Connections for relay outputs

Terminal block X5
(voltage-free switching contacts)
– Assignment of functions in INPUT mode
– Setting for each single relay



5.11 CS radio

Terminal block X9



Connection

☞ Insert the plug-in receiver into socket X9.

Teaching-in the transmitter codes

☞ Press the programming button on the receiver briefly (<1.6 seconds). The programming mode is activated and the LED flashes.
☞ Press the required channel button on your transmitter.
Once the remote control has saved the transmission code, the LED lights up to approx. 4 seconds.

It is possible to teach-in up to 15 individual transmission codes, although the transmitters may be cloned using the relevant pin connector (refer to the individual transmitter instructions to check if this is possible). If cloning is possible, then an infinite number of transmitters can be used.
If the memory is full, the LED will flash rapidly.

Selectively deleting a transmission code

☞ Press the programming button on the receiver briefly (<1.6 seconds). The programming mode is activated and the LED flashes.
☞ Keep the programming button pressed for longer than 1.6 seconds. The delete mode is activated and the LED flashes very fast.
☞ Press the required channel button for deleting on your transmitter. The LED lights up for approx. 4 seconds if the appropriate transmission code has been deleted.

The deletion procedure can be cancelled by briefly pressing the programming button.

Reset (completely delete memory)

☞ Press the programming button on the receiver briefly (<1.6 seconds). The programming mode is activated and the LED flashes.
☞ Keep the programming button pressed for longer than 1.6 seconds. The delete mode is activated and the LED flashes very fast.
☞ Press the programming button again for more than 1.6 seconds. The LED lights up for approx. 4 seconds if all memory spaces have been deleted.

The deletion procedure can be cancelled by briefly pressing the programming button

6. Setting the end limit positions

6.1 Checking the rotation direction / travel direction

During initial operation, the door may travel in the wrong direction. Be prepared to stop the door quickly and change if necessary.

Changing to ADJUSTMENT mode:

☞ Press button (P) until the red LED begins to flash slowly. (if the display is used - ADJUSTMENT).

Checking the direction of travel:

☞ If you press button (+), the door/gate should open; if you press button (-), the door/gate should close. If it is correct, continue with setting the end positions.

Changing the direction of rotation:

☞ If the direction of rotation needs to be changed, proceed as follows.
Press buttons (+) and (-) at the same time for > 5 seconds. The red LED will flash rapidly. (if the display is used - ROT FIELD). Any end positions that have been saved will be deleted. Continue with setting the end positions.

Alternatively, two of the supply phases can be swapped with each other.
For example swap the wires in X1 'L1' & 'L2' or the wires in X2 'U' & 'V' (for single phase).

6.2 Setting electronic limits using the buttons on the circuit board

Changing to ADJUSTMENT mode

☞ Press the 'P' button for approx. 5 seconds. The red LED flashes slowly.

Setting the fully OPEN position

☞ Press the '+' button to move the door/gate to the fully OPEN position.

☞ Then save the limit position by pressing the 'P' button and the '+' button at the same time. The red LED will flash quickly for 1 second to indicate that the position is stored.

Setting the fully CLOSED position

☞ Press the '-' button to move the door/gate to the fully CLOSED position.

☞ Then save the limit position by pressing the 'P' button and the '-' button at the same time. The red LED will flash quickly for 1 second to indicate that the position is stored.

☞ The ADJUSTMENT mode will then end automatically and the red LED will switch off.

N.B.

– The adjustment mode will end automatically after 7 minutes unless a button is pressed.
– When carrying out adjustments for the first time, it is necessary to teach-in both limit positions, as otherwise normal operation is not possible.
– If a limit position has been corrected, the ADJUSTMENT menu can be exited by pressing button 'P' once the teaching-in of the special limit position has been completed.
– After programming the limit positions, the teach-in of the system 'running time' is carried out automatically. The functions of the control are the same as in automatic mode.

N.B.

– The adjustment mode will end automatically after 7 minutes unless a button is pressed.
– When carrying out adjustments for the first time, it is necessary to teach-in both limit positions, as otherwise normal operation is not possible.
– If a limit position has been corrected, the ADJUSTMENT menu can be exited by pressing the 'STOP' button once the teaching-in of the special limit position has been completed.
– After programming the limit positions, the teach-in of the system 'running time' is carried out automatically. The functions of the control are the same as in automatic mode.

6.3 Setting the electronic limits using the LCD display

NOTICE

Damage to property or irreparable damage due to incorrect installation!
The display must be plugged in only if it is disconnected from the power supply and at zero voltage. Only one display must be used:
At plug-in socket X8: LCD Display Standard

Changing to ADJUSTMENT mode

☞ Press the 'P' button until ADJUSTMENT appears.

Setting the fully OPEN position

☞ Press the '+' button to move the door/gate to the fully OPEN position.

☞ Then save the limit position by pressing the ‘P’ button and the ‘+’ button at the same time.

Setting the fully CLOSED position

☞ Press the ‘-’ button to move the door/gate to the fully CLOSED position.

☞ Then save the limit position by pressing the ‘P’ button and the ‘-’ button at the same time.

☞ Exit the ADJUSTMENT mode by pressing & holding the ‘P’ button until the display shows AUTOMATIC

N.B.

– When carrying out adjustments for the first time, it is necessary to teach-in both limit positions, as otherwise normal operation is not possible.

– If a limit position is corrected, the ADJUSTMENT menu can be exited by pressing button ‘P’ once the teaching-in of the special limit position has been completed.

– After programming the limit positions, the teach-in of the system ‘running time’ is carried out automatically. The display shows TEACH IN RUN. The functions of the control are the same as in automatic mode.

6.4 Setting the electronic intermediate limit position using the LCD display

In AUTOMATIC mode, move the door/gate to the desired position

Example shown for part open limit (INC.P.OP)

☞ Press the ‘+’ or ’-’ buttons to move the door/gate to the desired position.

Changing to INPUT mode

☞ Press & hold the ‘P button until INPUT appears.

☞ Press the ‘+’ and ‘-’ buttons together for >2s to activate INPUT mode.

Saving the intermediate limit position (INC.P.OP)

☞ Press the ‘+’ or ’-’ buttons until INC.P.OP appears. The value is set at A (Automatic).

☞ Press the ‘P’ button to set the current door/gate position as the intermediate limit position.

☞ Save the intermediate limit position by pressing the ‘P’ button again.

Exiting INPUT mode

☞ Press & hold the ‘+’ and ‘-’ buttons for >1s to exit INPUT mode.

☞ **Changing to AUTOMATIC mode**

☞ Press & hold the ‘P’ button until AUTOMATIC appears.

N.B.

– If an intermediate limit position requires correcting, the teach-in value can be altered in the INPUT menu or set to A (Automatic) again to allow a new teach-in procedure to be carried out.

6.5 Setting mechanical limits

Changing to ADJUSTMENT mode:

Using the buttons on circuit board

☞ Press & hold the ‘P’ button for approx. 5 seconds until the red LED flashes slowly.

or

Using the LCD display

☞ Press the ‘P’ button until ADJUSTMENT appears.

Setting the OPEN and CLOSED positions

☞ Press the ‘+’ button to move the door/gate to the fully OPEN position and check / adjust limit cam to suit.

☞ Press the ‘-’ button to move the door/gate to the fully CLOSED position and check / adjust limit cam to suit.

Changing to AUTOMATIC mode:

Using the buttons on the circuit board

☞ Press & hold the ‘P’ button for approx. 5 seconds until the red LED stops flashing.

or

Using the LCD display

☞ Press & hold the ‘P’ button until AUTOMATIC appears

REFERENCE

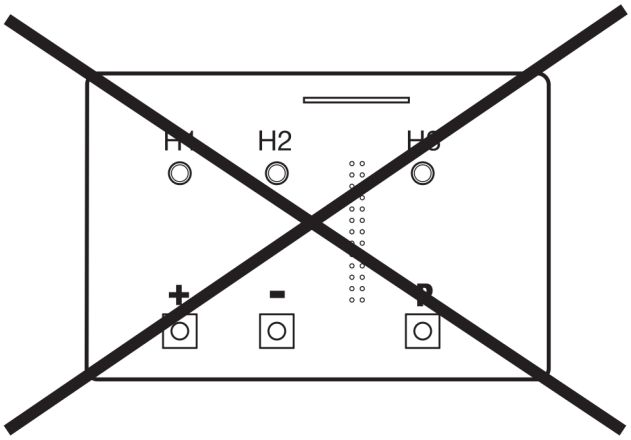
The procedure for setting the mechanical limits is described in separate documentation (see operator instructions)

N.B.

– ADJUSTMENT mode is not exited automatically. To return to normal operating mode, ADJUSTMENT mode must be exited by pressing the ‘P’ button.

NOTICE

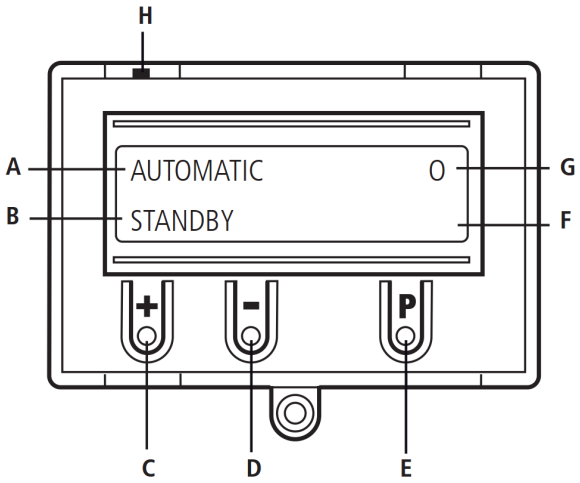
Damage can occur through improper installation! The old style LED module (article no. 590045) cannot be combined with the CS310. Inserting this module and putting it into service can damage the CS310 circuit board beyond repair.



7.1 Overview of the LCD display

NOTICE

Damage can occur through improper installation! The mains power supply must be switched off before connecting the display unit. Only a display unit supplied by Link Controls may be used.



Key:

A: mode of operation / diagnostic info
B: parameter / diagnostic info
C: ‘+’ button
D: ‘-’ button
E: ‘P’ button
F: value / status
G: value / status
H: jumper

7.2 LCD display, modes of operation

The control has four modes with the LCD display:

1. AUTOMATIC
2. ADJUSTMENT
3. INPUT
4. DIAGNOSIS

If the jumper H is removed, the '+' , '-' and 'P' buttons are disabled. The display still functions.

After switching on the, the control will first be in INITIALISATION mode. The display shows 'PLEASE WAIT' and will not be ready for use until this mode has detected any connected devices. This phase lasts for approx. 5 seconds. ADJUSTMENT, INPUT and DIAGNOSIS modes are exited 7 minutes after the last button was pressed, and reverts back to AUTOMATIC mode.

Operating mode 1:

AUTOMATIC (Normal operation)

The door/gate system is operated in AUTOMATIC. Impulse OPEN / CLOSE will depend on connected devices (safety edge) and 'SELF LOCK' parameter.

Display:

– displays the function being carried out
– displays any error messages

If the "SELF LOCK" parameter is set to MOD2 or MOD3 in the input menu, the display changes from AUTOMATIC to MANUAL.

Operating mode 2:

ADJUSTMENT (Limit adjustment)

In the ADJUSTMENT mode, the OPEN and / or CLOSED limit positions can set or adjusted.

NOTICE

Malfunctions can occur as a result of incorrect operation of the control!

In ADJUSTMENT mode, the door will not stop automatically when it reaches the limit position if electronic limits (AWG – absolute value encoders) are used.The door/gate can be damaged if driven beyond the limit position.

Fine adjustments can be made in the INPUT operating mode (FINE-UP & FINE-DOWN).

Display:

- displays the limit position value

Operating mode 3:

INPUT (Changing parameters)

In the INPUT operating mode, the values of various parameters can be changed.

Display:

– displays the selected parameter
– displays the programmed value / status

Operating mode 4:

DIAGNOSIS (Fault finding)

In the DIAGNOSIS operating mode, door / gate/ control panel checks can be queried.

Display:

– displays the item to be checked
– displays the item status

7.3 RESETTING the control using the LCD display

Changing to INPUT mode.

☞ Press & hold the 'P button until INPUT appears.
☞ Press the '+' and '-' buttons together for >2s to activate INPUT mode.

Resetting the controls

☞ Press the '+' or '-' buttons until RESET appears in the display. The value is set at OFF.
☞ Press the 'P' button - OFF flashes.
☞ Press the '+' button until MOD4 appears in the display.
☞ Press the 'P' button to begin the reset.

The initialisation phase is run through, and all safety devices that are connected, as well as the limit position system, are automatically detected.

Exiting INPUT mode

☞ Press & hold the '+' and '-' buttons for >1s to exit INPUT mode.

Changing to AUTOMATIC mode

☞ Press & hold the 'P' button until AUTOMATIC appears.

7.4 RESETTING the control without the LCD display

☞ Disconnect the system from the power supply.
☞ Press & hold the ‘P’ and ‘–’ buttons on the circuit board at the same time, and keep them pressed.
☞ Switch the power supply back on again.
☞ Keep the ‘P’ and ‘–’ buttons on the circuit board pressed until the red LED (H6) flashes quickly.
☞ Let go of the ‘P’ and ‘–’ buttons on the circuit board.

The initialisation phase is run through (approx 60s) While initialisation is being carried out, it is not possible to programme or operate the system. After initialisation has been completed, the limit positions are deleted and all parameters are reset back to the factory default setting.

7.5 Expert Menu

In the factory setting (standard), INPUT mode shows only a few parameters that can be set by the user. These settings parameters reflect the most commonly used requirements for a commercial door/gate system and are adequate for commissioning purposes in a standard situation. The last item in this list is the parameter “EXPERT MENU”.
The default setting for this is OFF

OFF: Limited number of parameter settings:

– Menu Language
– INC.P.OP
– OPEN TIME
– FOREWARNING
– FAST CL.
– REVERSEPOINT.
– INPUT 1
– SELF LOCK
– EXPERT MENU

Setting the parameter EXPERT MENU to ON activates expert
mode. In this mode, all parameters in the input menu can be
called up and set.
☞ "10.2 Input operating mode"

Please note
– Expert mode is automatically closed after aprox. 7 minutes if no buttons are pressed. in this case, only the limited choice of parameters is available unless the parameter EXPERT MENU is set to ON again.
– The same applies for switching the power off. In this case, too, the parameter EXPERT MODE is set to OFF again.

7.6 Initialising / resetting

The following devices will be recognised and configured automatically during initial operation and following a RESET.
– Limit position system
– Closing safety edge device
– Photocell system
– Input 2 (8.2 kΩ wicket door sensor)

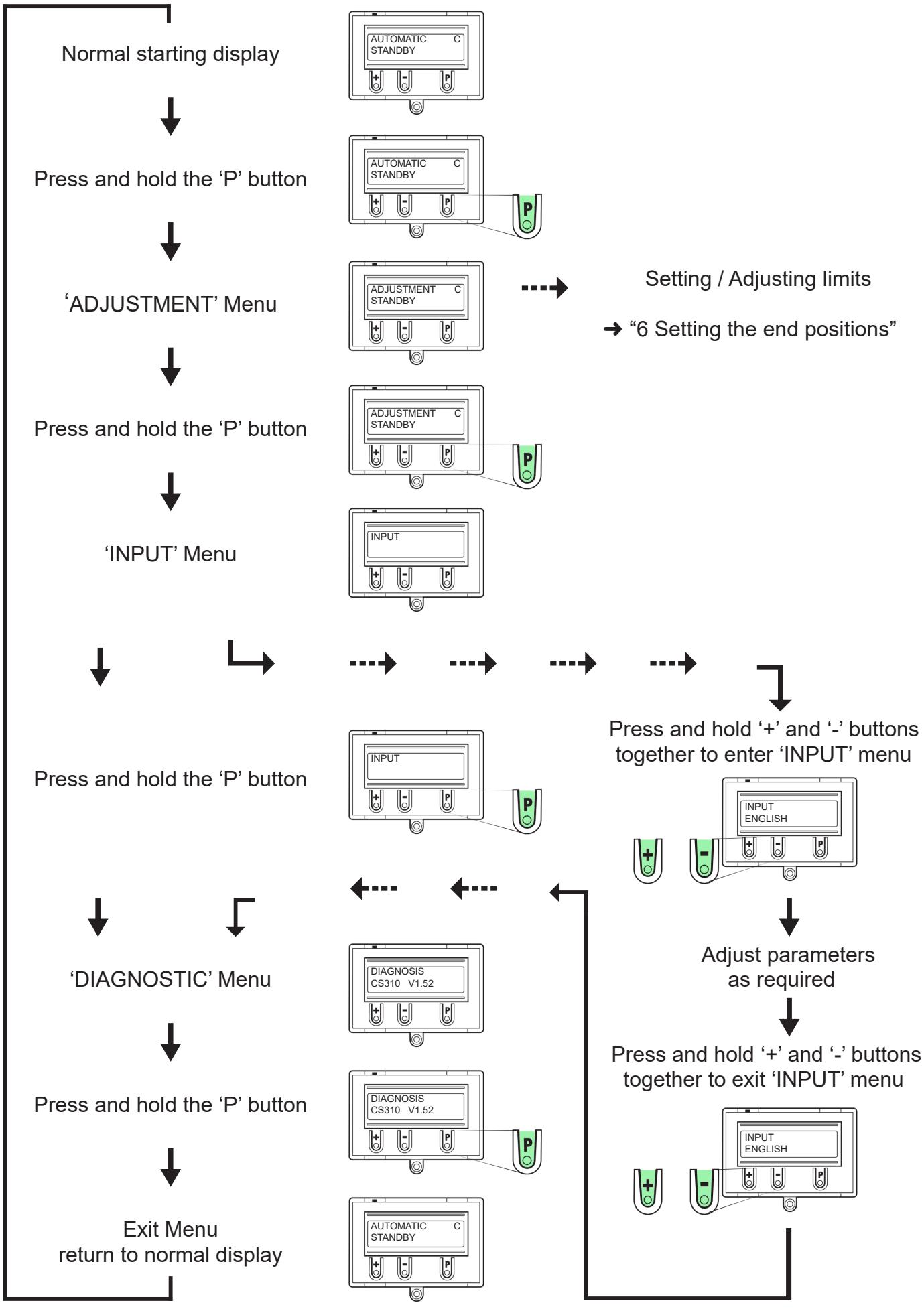
During this process (approx. 60 seconds), the green and red LED flash and the top line of the display indicates ‘PLEASE WAIT...’.
It is not possible to operate the system during this process.

Components can be changed or added at a later date using the LCD display or by resetting the system.
If one of the devices has not yet been connected, this will be indicated by ‘A’ (Auto detect) in the display.
This device will be searched for if any further initialisation procedure is carried out. If this device is recognised, the system automatically switches to the appropriate adjustment mode.

Exception:
Input 2 remains inactive (MOD1) if 8.2 kΩ was not recognised the first time that initialisation was carried out.

8. Navigating Parameters (LCD Display only)

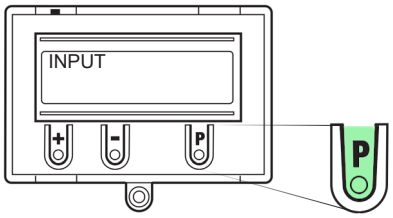
8.1 Menu Navigation



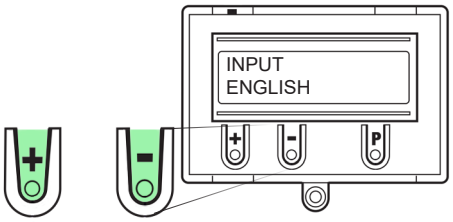
8.2 Example Parameter Adjustment

Requirment :
A building management alarm (Fire signal) is to be connected in order to open the door under a Fire condition (N/C signal going N/O on alarm).
Solution:
Program Input 1 (X4, terminals 9 & 10) to *MOD9: Fire alarm (BMA) switch 2 (emergency opening) N/C* , as follows :

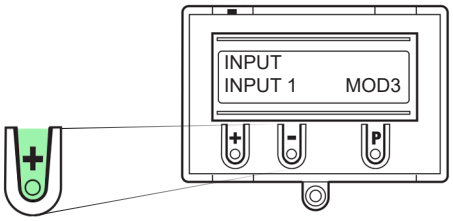
Press and hold the ‘P’ button until ‘INPUT’ Menu is reached



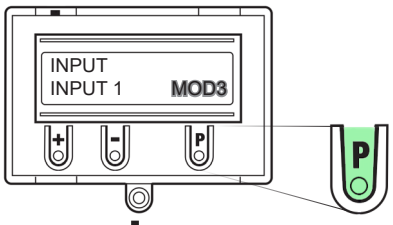
Press both ‘+’ and ‘-’ buttons together - ‘ENGLISH’ is displayed



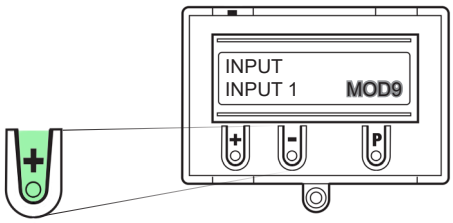
Press the ‘+’ button to scroll through the menu until ‘INPUT 1’ is reached



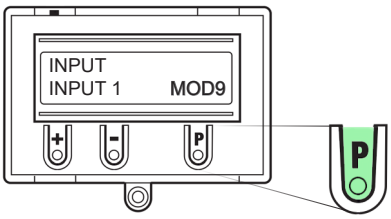
Press the ‘P’ button and ‘MOD3’ will flash



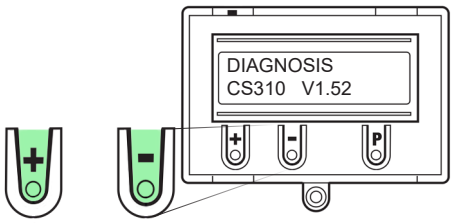
Press the ‘+’ Button until ‘MOD9’ is displayed



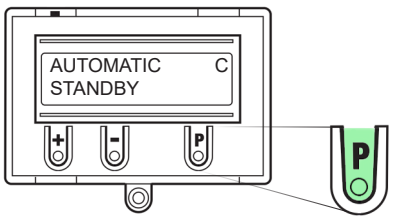
Press the ‘P’ Button to store the new ‘MOD9’ setting



Press both ‘+’ and ‘-’ buttons together to exit the ‘INPUT’ menu



Press and hold the ‘P’ button until ‘AUTOMATIC’ is reached Programming is now completed



9. Overview of functions

9.1 Automatic operating mode

Display		Description
AUTOMATIC TEACH IN RUN		Automatic teach-in of the running time
AUTOMATIC OPENING PHASE		The door/gate is driven to the OPEN end position
AUTOMATIC CLOSING PHASE		The door/gate is driven to the CLOSED end position
AUTOMATIC STANDBY		The door/gate stands between the end positions
AUTOMATIC STANDBY	O	The door/gate stands at the OPEN end position
AUTOMATIC STANDBY	o	The door/gate stands at the PART OPEN position (“before-end position“ top)
AUTOMATIC STANDBY	C	The door/gate stands at the CLOSED end position
AUTOMATIC STANDBY	R	The door/gate stands at the PART CLOSED position (“before-end position“ bottom)

If the “SELF LOCK“ parameter is set to MOD2, 3, 4, 5 or MOD6 in the input menu, the display changes from AUTOMATIC to MANUAL.

Display	Description
MANUAL MAIN UP	The door/gate is driven to the OPEN end position
MANUAL MAIN DOWN	The door/gate is driven to the CLOSED end position
MANUAL STANDBY	The door/gate stands between the end positions

9.2 Input operating mode

Function	Description	Setting options	Factory settings
ENGLISH	Select the menu language **Only possible using the LCD display:** Alternatively, the menu language can also be selected during the initialisation phase (during initial operation or after a reset). The menu language preset in the factory (ENGLISH) is then displayed as a flashing text for approximately 10 seconds. At this point, the menu language can still be changed during the initialisation procedure. Pressing buttons [+] or [-] will allow you to scroll through and select a language. Save the language you have selected by pressing button [P]. After this, all texts or messages displayed are shown in the language that you have selected.	DEUTSCH ENGLISH FRANCAIS NEDERLANDS DANSK ESPANOL POLSKI CESKY ITALIANO SUOMI SVENSKA TÜRKÇE NORSK MAGYARUL	ENGLISH
FINE-UP	Fine adjustment of the OPEN position, (+ higher , - lower). Only visible in systems with electronic limit switch.	-250 – 250	0
FINE-DOWN	Fine adjustment of CLOSED position, (+ higher , - lower). Only visible in systems with electronic limit switch.	-250 – 250	0
INC.P.OP	Adjustment of the PART OPEN position, in relation to the stored OPEN position. Only visible in systems with electronic limit switch. Automatic teach-in of position: ➔ “6.5 Setting the electronic intermediate limit position using the LCD display“	A - teach-in 0 = ES-CLOSE – ES-OPEN	A - teach-in
INC.P.CL	Adjustment of the pre-limit in the CLOSE position, in relation to the stored CLOSE position. Only visible in systems with electronic limit switch. Automatic teach-in of position: ➔ “6.5 Setting the electronic intermediate end position using the LCD display“	A - teach-in 0 = ES-CLOSE – ES-OPEN	A - teach-in
OPEN TIME	After the door has opened and all of the safety devices are healthy, the OPEN TIME starts to count down.When the count reaches 0 the door automatically closes to the CLOSE position (AUT.CLOSE). Notice: By pressing the CLOSE-SWITCH during the open time, the closing run is started. By pressing the OPEN-SWITCH or STOP button during the open time, the opening time is restarted. If an automatic closing run is interrupted by the safety edge (SKS) the open time is doubled, and after 3 attempts, automatic closing is aborted.	0 - 3600 (seconds) 0 = OFF	15
START WARN.	The START WARN. time delays both the opening and closing door movement after a command has been given.	0 - 10 (seconds) 0 = OFF	0 = OFF
FORE-WARNING	The FOREWARNING is activated before carrying out an automatic closing run or closing in impulse mode. Note: This time is added to the START WARN.	0 - 300 (seconds) 0 = OFF	0 = OFF
AUT.CLOSE	MOD1: AUT.CLOSE from OPEN position MOD2: AUT.CLOSE from PART OPEN position MOD3: AUT.CLOSE from OPEN and PART OPEN position MOD4: AUT.CLOSE from all door/gate positions	MOD1 MOD2 MOD3 MOD4	MOD1

Function	Description	Setting options	Factory settings
FAST CL.	OFF : The OPEN TIME counts down as usual. MOD2: The OPEN TIME is cut short after the photocell is triggered (the door closes immediately) MOD3: The OPEN TIME is cut short after the photocell is triggered for a minimium of 2 seconds (in order to ignore pedestrian traffic). MOD4 : As MOD2 but only when the door is fully open - not active during door travel	OFF MOD2 MOD3 MOD4	OFF
RELAY 1	A relay mode from 1 - 13, 17 - 40 and 60 - 62 can be assigned to all four relays. RELAY 4 can also be programmed with MOD14 - 16. MOD1: (**Red** light 1) flashes during FOREWARNING and is ON during door/gate run* MOD2: (**Red** light 2) flashes during FOREWARNING and during door/gate run* MOD3: (**Red** light 3) is ON during FOREWARNING and during door/gate run* MOD4: Impulse signal when there is an OPEN command MOD5: Error message MOD6: Door is in the OPEN position MOD7: Door is in the CLOSE position MOD8: Door is not in OPEN position MOD9: Door is not in CLOSE position MOD10: Pre-limit position in the OPEN direction MOD11: Pre-limit position in the CLOSE direction MOD12: Below Pre-limit position in CLOSE direction MOD13: Magnetic lock function MOD14 Brake N/O MOD15: Brake N/C MOD16: Brake also remains ON during OPEN TIME MOD17: Safety edge activated (SKS) or test error MOD18: (Red light 4) flashes during FOREWARNING and is OFF during door/gate run MOD19: Above Pre-limit position in OPEN direction MOD21: Test of draw-in protection before opening run (additional module required) MOD22: Activation of radio transmission systems 1 and 3 and/or light curtain testing MOD23: (**Green** light) is on during OPEN position, OFF during FOREWARNING and OFF when door is running* MOD24: Capacitor switching (start) for 230V single phase motors MOD25: Yard light function 2 minutes after OPEN command (including indirectly through impulse) MOD26: Activation of radio 2 transmission system MOD27: Impulse when OPEN position is reached MOD28: Relay OFF MOD29: Door is opening MOD30: Door is closing MOD31: Service, continuous signal once the preset maintenance interval is reached MOD32: Battery operation MOD33: Battery operation not possible MOD34: Fire alarm system signal (BMA signal) MOD35: Photocell activated MOD36: Wicket door locking cylinder MOD37: Testing of stop signal through radio transmission systems 1 and 3 MOD38: Testing of light curtain 2 (input 2) MOD39: Fault - relay mimics Fault / error RED LED MOD40: Impulse signal when there is an OPEN command from outside MOD41: Test of radio transmission system 4 in OPEN direction MOD43: Door is opening or closing (running) MOD45: All SKS OK MOD46: Control at Adjustment Mode MOD60: **Red** traffic light outside (forewarning - flashing, door travel - on) MOD61: **Red** traffic light outside (forewarning - flashing, door travel - flashing) MOD62: **Green** traffic light outside * If two-way traffic control is activated: traffic light inside	MOD1 - MOD13 MOD17 - MOD43 MOD60 - MOD62	MOD6
RELAY 2		MOD1 - MOD13 MOD17 - MOD43 MOD60 - MOD62	MOD7
RELAY 3		MOD1 - MOD13 MOD17 - MOD43 MOD60 - MOD62	MOD1
RELAY 4		MOD1 - MOD43 MOD60 - MOD62	MOD14
TL REST	Switches traffic lights MOD1: In standby mode: OFF MOD2: In standby mode: ON MOD3: In standby mode: OFF after 5 minutes	MOD1 – MOD3	MOD1

Overview of functions

Function	Description	Setting options	Factory settings
SKS	MOD1: Optical safety edge (OSE) MOD2: Conductive safety edge (8K2) MOD3: Pneumatic airswitch (N/C) with testing MOD4: Light curtain (OSE) without testing (without switching off automatic closing) MOD5: Light curtain (8K2) without testing MOD6: Light curtain (8K2) without testing (without switching off automatic closing)	A - teach-in MOD1 – MOD5	A - teach-in
DW TEST	Selection of testing function for the pneumatic safety edge in the CLOSED position. Only visible if parameter setting SKS = MOD3. OFF : Testing OFF ON : Testing ON	OFF – ON	ON
DW-POINT	Point at which the pneumatic safety edge is tested (X4 / 5+6). Only indicated if parameter setting SKS = MOD3. Setting is done in increments (only AWG), starting from the lower travel cut-out point. **Notice:** In systems with mechanical limit switches the 'additional limit switch, CLOSED' serves as the DW-POINT.	A - teach-in 0 – 1000	20
SKS FUNC	Safety Edge (SKS) activation response MOD1: Stop + reverse MOD2 Stop + 2 second reversing movement	MOD1 – MOD2	MOD1
SKS REV	Safety Edge (SKS) override using programmed reverse point - REVERSPOINT (RP) MOD1: Stop + reverse above REVERSPOINT (RP), stop only below REVERSPOINT MOD2 Stop + reverse above REVERSPOINT (RP), no action below REVERSPOINT MOD3: Stop + reverse between OPEN position (EO) and CLOSE position (EU) **Notice:** In systems with mechanical limit switches the 'additional limit switch, CLOSED S6' serves as the reverse point (RP).	MOD1 – MOD3	MOD1
REVER-SPOINT	Reverse point (RP) before the CLOSED position is reached - Safety Edge override limit. Only visible in systems with electronic limit switch.	A - teach-in 0 - 1000	50
LIGHT BARR.	MOD1: MFZ 2-wire photocell MOD2: N/C contact (relay type) or NPN photocell MOD3: PNP photocell	A - teach-in MOD1 – MOD3	A - teach-in
LB FUNC	**MODE / CLOSING / OPENING** MOD1: Stop + reverse / No action MOD2: Stop + 2s reversing movement / No action MOD3: STOP / No action MOD4: STOP / STOP MOD5: Stop + reverse / Travel suppression MOD6: No Action / Stop + reverse MOD7: No Action / Stop + 2s reversing movement MOD8: No Action / STOP MOD9: Travel suppression / Stop + reverse	MOD1 – MOD9	MOD1
LB FUNC 2	Function of photocell 2 - functions as LB FUNC 1 above only visible if INPUT 1 is set for MOD15 (Photocell 2 connected to X4 terminals 9&10)	MOD1 – MOD9	MOD1
PEB POINT	The photocell is overridden between the PEB POINT and the CLOSE position. (Door/gate in frame function). Only visible in systems with electronic limit switch.	A - teach-in 0 - 7581	A
IMPULS	MOD1: OPEN – Stop – CLOSE – Stop MOD2: OPEN only MOD3: OPEN only, Stop when door/gate moving MOD4: OPEN only, inactive during door/gate movement MOD5: CLOSE from OPEN position (EO), otherwise OPEN	MOD1 – MOD5	MOD1

Function	Description	Setting options	Factory settings
INPUT 1	MOD1: PART OPEN button (go to PART OPEN limit position) N/O MOD2: PART OPEN switch (select OPEN or PART OPEN position) OFF/ON MOD3: AUTO CLOSE switch (disable OPEN TIME) N/O MOD4: External CLOCK (permanent open & disable OPEN TIME) N/O MOD5: Fire alarm (BMA) switch 3 (part opening) N/O MOD6: Fire alarm (BMA) switch 1 (emergency closing) N/O MOD7: Fire alarm (BMA) switch 1 (emergency closing) N/C MOD8: Fire alarm (BMA) switch 2 (emergency opening) N/O MOD9: Fire alarm (BMA) switch 2 (emergency opening) N/C MOD10: Ventilation button (part opening) N/O MOD11: Automatic closing button MOD12: Radar motion detectors (special solution in conjunction with INPUT 2) MOD13: Fire alarm (BMA) switch 3 (part opening) N/C MOD14: Wicket door lock MOD15: Photocell 2 - LB FUNC 2 (without FAST CL) MOD16: Forewarning switch MOD17: Impulse button MOD18: Crash sensor MOD19: Deactivate the + and − button at the display for driving UP or DOWN MOD30: OPEN button inside MOD31: OPEN button outside MOD32: CLOSE button (Automatic mode only - no function in deadman control)	A - teach-in MOD1 – MOD17 MOD30 – MOD32	MOD3
INPUT 2 (SKS 2)	OFF : NOT active MOD2: Wicket door/gate switch (8K2 Stop only) MOD3: Safety edge OPEN direction (8K2 Stop + reverse) MOD4: Safety edge OPEN direction (8K2 Stop + 2 second reversing movement) MOD5: Battery operation MOD6: Radar motion detectors (special solution in conjunction withINPUT 1) MOD7: Light curtain 2 (8K2 stop + reverse / reversing movement)	A - teach-in OFF - MOD7	OFF
SKS 3	MOD1: Not in use MOD2: SKS CLOSE MOD3: SKS OPEN MOD4: Stop Only to be used in conjunction with the wireless signal transmission plug-in circuit card in terminal X20.	MOD1 - MOD4	MOD1
SKS 4	MOD1: Not in use MOD2: SKS CLOSE MOD3: SKS OPEN MOD4: Stop Only to be used in conjunction with the wireless signal transmission plug-in circuit card in terminal X20.	MOD1 - MOD4	MOD1
RUNNING-TIME	Monitoring the maximum running time for an OPEN and CLOSE movement. After programming the limit switches, the teach-in of the system running time is carried out automatically. In the event of a 20% deviation, an ERROR RUNTIME appears. After the automatic teach-in, the running time can be manually changed.	A - teach-in 1 - 300 seconds	A - teach-in
REVERS. TIME	Pause time at every change of direction. The reversal time when the safety edge is activated during closing amounts to a quarter of this programmed time.	100 - 5000 milliseconds	1000 milliseconds
LIMIT SW.	MOD1: Electronic Limits (AWG) MOD2: Mechanical limit switches (N/C switches) MOD4: Electronic Limits (AWG with negative impulses - Inveter operation only) MOD5: Electronic Limits (AWG) with extra N/C limit switch in CLOSE position MOD6: Electronic Limits (AWG with negative impulses - Inveter operation only)	A - teach-in MOD1 – MOD6	A - teach-in

Overview of functions

Function	Description	Setting options	Factory settings
SELF LOCK	MOD1: Automatic operation MOD2: Manual operation for OPEN + CLOSE with CESD evaluation MOD3: Manual operation for CLOSE with SKS evaluation MOD4: Manual operation for OPEN with SKS evaluation MOD5: Manual operation for OPEN + CLOSE without SKS evaluation MOD6: Manual operation for CLOSE without SKS evaluation	MOD1 – MOD6	MOD1
POWER	Automatic power monitoring (monitoring the rotational speed) Error message is displayed if the door cannot move freely or is obstructed. Setting the sensitivity for both directions of travel. A reading giving the power value (rotational speed) is shown during opening and closing runs. If the power monitoring facility is activated, a value must be set that is lower than the lowest value displayed during door or gate travel. The larger the difference, the less sensitively the power monitoring reacts. The power monitoring facility is only activated if the value is set to > 0.	OFF 0 – 999	10
RESET MSBUS	All MSBUS addresses assigned will be reset. After restarting the control, all MSBUS devices connected will be re-addressed. Refer to the instruction manual for the MSBUS device for detailed information.	ON / OFF	OFF
RESTART	Controller is restarted if function is activated.	ON / OFF	OFF
FACTORY SET.	Resets all parameters of the control to the factory settings. OFF: No reset MOD10: Total reset (complete with 15s autoclose - as per this manual)	OFF MOD1 – MOD99	MOD10
RESET	OFF: No reset MOD2: Partial reset 1 (without FU parameters) MOD3: Partial reset 2 (everything except limit positions / limit switch system) MOD4: Total reset (everything returned to factory default setting)	OFF MOD2 – MOD4	OFF
PIN NO. 2	Input and selection of a PIN code for programming a maintenance interval. After entering the PIN code, the second programming level is accesible. A maintenance interval can now be set at the parameter SERVICE. Input level 2 goes off again after the power has been switched off, or goes off automatically after 10 minutes. The PIN code can only be changed at the second programming level.	0 – 9999	1111
SERVICE	OFF: Maintenance indicator not activated Setting a maintenance interval:- After the preset door cycle has expired, a maintenance message (LED / LCD) is given. If a relay output is programmed to MOD31, the relay is triggered (continuous signal). Only visible after input level 2 is activated with the parameter PIN NO. 2.	OFF 0 – 9999	OFF
INVERTER	Inverter frequency converter connected (ON / OFF) Refer to CS310FU instruction manual for detailed information OFF: NO Inveter (FU) connected MOD2: Inverter (FU) connected - mode 2 MOD3: Inverter (FU) connected - mode 3	OFF MOD2 – MOD3	OFF
EXPERT MENU	Activation and deactivation of expert setting. In the factory setting OFF, only a limited choice of parameters appears in INPUT mode. If this parameter is set to ON, all parameters in the input menu can be called up and set. OFF: Limited number of parameter settings: – Menu language – INC.P.OP – OPEN TIME – FOREWARNING – FAST CL. – REVERS- POINT. – INPUT 1 – SELF LOCK – EXPERT MENU ON: Access to all parameters as listed in Chapter 10.2.	ON – OFF	OFF

Explanation of the relay modes:

A. Traffic light functions

MOD	Description	CLOSED position	OPEN position	Forewarning	Door/gate run
MOD1	Red traffic light 1 [3]	ON / OFF [1]	OFF [2]	Flashing	ON
MOD2	Red traffic light 2 [3]	ON / OFF [1]	OFF [2]	Flashing	Flashing
MOD3	Red traffic light 3 [3]	ON / OFF [1]	OFF [2]	ON	ON
MOD18	Red traffic light 4 [3]	OFF	OFF	Flashing	OFF
MOD23	Green traffic light [3]	OFF	ON [2]	OFF	OFF
MOD60	Red traffic light 1 [4]	ON / OFF [1]	ON / OFF [2]	Flashing	ON
MOD61	Red traffic light 2 [4]	ON / OFF [1]	ON / OFF [2]	Flashing	Flashing
MOD62	Green traffic light [4]	OFF	ON [2]	OFF	OFF

[1] depending upon parameter TL REST
[2] If two-way traffic control is activated: dependent on inside or outside OPEN command
[3] If two-way traffic control is activated: traffic light inside
[4] If two-way traffic control is activated: traffic light outside

B. Position status

MOD	Description	Remarks
MOD6	OPEN position	The relay contact closes when the door/gate is in the OPEN position.
MOD7	CLOSED position	The relay contact closes when the door/gate is in the CLOSED position.
MOD8	Not OPEN position	The relay contact closes when the door/gate is not in the OPEN position.
MOD9	Not CLOSED position	The relay contact closes when the door/gate is not in the CLOSED position.
MOD10	Pre-limit OPEN / PART OPEN position	The relay contact closes when the door/gate is in the pre-limit OPEN / part OPEN position.
MOD11	Pre-limit CLOSED position	The relay contact closes when the door/gate is in the pre-limit CLOSED position.
MOD12	Between pre-limit CLOSED and CLOSED position	The relay contact closes when the door/gate is in the area between the pre-limit CLOSED and CLOSED position (below pre-limit CLOSED).
MOD19	Between pre-limit OPEN and OPEN position	The relay contact closes when the door/gate is in the area between the pre-limit OPEN and OPEN position (above pre-limit OPEN).

C. Impulse signals

MOD	Description	Remarks
MOD4	Impulse when there is an OPEN command	The relay contact closes for 1 second when the door/gate receives an OPEN command. This impulse can be used to control lights, for instance.
MOD27	Impulse when OPEN position is reached	The relay contact closes for 2 seconds when the door/gate reaches the OPEN position. This impulse can be used, for instance, to enable a following photocell.
MOD40	Impulse when there is an OPEN command from the outside	The relay contact closes for 1 second when the door/gate receives an OPEN command from the outside. This impulse can be used to control lights, for instance.

D. Brake functions (only adjustable on relay 4)

MOD	Description	Remarks
MOD14	Brake (N/O)	Switching the dc output of the brake rectifier via the relay to achieve a quicker brake function. The contact is closed, and the brake released as a result, as soon as the door/gate moves.
MOD15	Brake (N/C)	Switching the dc output of the brake rectifier via the relay to achieve a quicker brake function. The contact is opened, and the brake released as a result, as soon as the door/gate moves.
MOD16	Brake remains ON during open time	Switching the dc output of the brake rectifier via the relay to achieve a quicker brake function. The contact is closed, and the brake released as a result, as soon as the door/gate moves. To obtain a smoother stop by the door/gate in the OPEN position, the relay contact remains energised in the OPEN position (OPEN TIME).

E. Error messages

MOD	Description	Remarks
MOD5	Error message	The relay contact opens when a stop command is given or an error occurs for more than 5 seconds. All errors described in Section 10 result in activation of the relay.
MOD17	SKS activated (safety edge)	The relay contact closes when the safety edge is activated. An error with the safety edge or an unsuccessful test is shown via MOD5.
MOD35	Light Barr. (Photocell)	The relay contact shows the photocell status of terminals X4 (3&4), the relay contact is energised as below :-. Relay ON: Photocell signal is OK Relay OFF: Light beam interrupted or fault in photocell
MOD39	FAIL	The relay contact shows the status of the fail / error RED LED

F. Movement signal

MOD	Description	Remarks
MOD29	Door is OPENING	The relay contact closes during door/gate opening direction.
MOD30	Door is CLOSING	The relay contact closes during door/gate closing direction.
MOD43	Door is OPENING or CLOSING	The relay contact closes during door/gate operation

G Functions for external accessories

MOD	Description	Remarks
MOD13	Magnetic lock function	The relay contact closes before every door movement. When the door is stationary, the relay contact is open. A delay of 0.5 seconds is programmed before each door movement.
MOD20	Activation of infrared transmission system	Before every CLOSE command, the infrared transmission system is activated and remains active for the duration of the closing run. This activation results in a closing run delay of approx. 0.5 seconds.
MOD21	Test of draw-in protection	The relay generates a test signal (contact closes) when the CLOSED position is reached and expects, as a reaction to the test signal, that the stop circuit is interrupted.
MOD22	Activation of radio 1 transmission system, Testing light curtain 1 (8.2 kΩ or OSE)	The relay generates a test signal (contact closes) when the OPEN position is reached and expects, as a reaction to the test signal, that the safety edge circuit is activated.
MOD24	Motor start capacitor	At every open or close command the relay contact closes for approx. 1 second. With the aid of this relay, an additional starting capacitor that is required for AC applications is switched on, to ensure safe starting of the motor.
MOD25	Yard light function	At every OPEN command, the relay contact closes for 2 minutes and can therefore be used to control a light.
MOD26	Activation of radio 2 transmission system	Before every CLOSE command the radio transmission system is activated by an impulse. The duration of the activation must be set on the transmission system. This activation results in a closing run delay of approx. 0.5 seconds.
MOD28	Relay OFF	The relay is always open.
MOD36	Pneumatic cylinder for locking wicket door (threshold-less door system).	Every time an OPEN command is given, the relay is activated and controls a pneumatic cylinder which mechanically locks the wicket door that is incorporated in the main door. The locking position of the cylinder is queried through a limit switch. The door only starts moving after this limit switch has been released. The relay remains activated until the CLOSED position has been reached again.
MOD37	Testing the stop signal through radio transmission systems 1 and 3	The relay generates a test signal when the OPEN position is reached and expects, as a reaction to the test signal, that the stop circuit is interrupted.
MOD38	Testing light curtain 2 (8.2 kΩ) Connection to input 2 (X4 / 11&12)	The relay generates a test signal when the OPEN position is reached and expects, as a reaction to the test signal, that there is an interruption to input 2.

H. Input-dependent messages

MOD	Description	Remarks
MOD32	Battery mode	Active during battery operation. Input 2 bridged (setting MOD5).
MOD33	Not in battery mode	Active during mains operation. Input 2 open (setting MOD5) When programmed with MOD32/33, the relays work as delayed change-over contacts and follow the signal at input 2 if set to MOD5. In this case, input 2 is supplied with a control signal from the uninterruptable power supply (UPS) system which is responsible for switching between mains power and the UPS power supply.
MOD34	BMA signal	Triggered if BMA (fire alarm system) active. Follows the signal at input 1 if set to MOD5-9 / 13. In this case, input 1 is supplied with a control signal from the fire alarm system, and depending on the setting, opens or closes the door to an end position or an intermediate position.

Overview of functions

Key to inputs:

A. Input 1 functions

MOD	Description	Remarks
MOD1	PART OPEN button	When the button is pressed (input 1), the door opens as far as the PART OPEN intermediate position.
MOD2	PART OPEN switch	Closed: All OPEN commands go to the PART OPEN position. Open: All OPEN commands go to the OPEN position.
MOD3	AUTO CLOSE switch	Closed: No automatic CLOSING (OPEN TIME is ignored) Open: Automatic CLOSING is activated (only if OPEN TIME > 0)
MOD4	External CLOCK (permanent open)	The door opens once the contact closes and remains in the OPEN position (OPEN TIME is paused) until the contact opens. The door then closes automatically (only if OPEN TIME > 0). This function can be overriden by pressing the CLOSE button. The door CLOSES.
MOD5	Fire alarm (BMA) switch 3 (partial opening) N/O	Open: Normal operation Closed: Partial opening of the door. The BES-OPEN position is approached from either direction. BUTTON: No function PHOTOCELL: / SKS: Door stops and briefly reverses (only in CLOSING direction), and closes again after 5 seconds STOP: Emergency closing interrupted as long as this is activated
MOD6	Fire alarm (BMA) switch 1 (emergency closing) N/O	Open: Normal operation Closed: Emergency closing of door BUTTON: No function PHOTOCELL / SKS: Door stops and briefly reverses; closing again after 5 seconds STOP: Emergency closing interrupted as long as this is activated
MOD7	Fire alarm (BMA) switch 1 (emergency closing) N/C	Closed: Normal operation Open: Emergency closing of door BUTTON: No function PHOTOCELL / SKS: Door stops and briefly reverses; closing again after 5 seconds STOP: Emergency closing interrupted as long as this is activated
MOD8	Fire alarm (BMA) switch 2 (emergency opening) N/O	Open: Normal operation Closed: Emergency opening of door BUTTON: No function PHOTOCELL / SKS: No function STOP: Emergency opening interrupted as long as this is activated. Automatic closing is disabled after fire alarm signal (BMA).
MOD9	Fire alarm (BMA) switch 2 (emergency opening) N/C	Closed: Normal operation Open: Emergency opening of door BUTTON: No function PHOTOCELL / SKS: No function STOP: Emergency opening interrupted as long as this is activated. Automatic closing is disabled after fire alarm signal (BMA).

MOD	Description	Remarks
MOD10	Ventilation button N/O	Open: Normal operation Closed: Partial opening of the door or gate. The BES-CLOSE position is approached from either direction.
MOD11	Automatic closing button	1st activation: No automatic CLOSING (OPEN TIME is ignored) 2nd activation: Automatic CLOSING activated (OPEN TIME > 0) 3rd activation: No automatic CLOSING (OPEN TIME is ignored) ...
MOD12	Radar motion detectors (special solution)	in conjunction with input 2 (MOD6). See key to input 2.
MOD13	Fire alarm (BMA) switch 3 (partial opening) N/C	Open: Normal operation Closed: Partial opening of the door. The BES-OPEN position is approached from either direction. BUTTON: No function PHOTOCELL / SKS: Door stops and briefly reverses (only in CLOSING direction), and closes again after 5 seconds STOP: Emergency closing interrupted as long as this is activated.
MOD14	Wicket door lock	
MOD15	Photocell 2	A second photocell can be installed by setting INPUT 1 to MOD15. This photocell is not effected by the FAST CL function
MOD16	Forewarning switch	
MOD17	Impulse button	
MOD18	Crash switch	A N/C swich can be connected as a break out / crash switch. The door will stop and show the error 'ERROR CRASH SENSOR' if the switch is activated. Reset can be achieved with a 5s press of the stop button or by turning the power OFF/ON.
MOD30	OPEN button - inside	When the button is pressed, the door opens to the OPEN position. The traffic light inside changes to green.
MOD31	OPEN button - outside	When the button is pressed, the door opens to the OPEN position. The traffic light outside changes to green.
MOD32	CLOSE button	When the button is pressed, the door closes to the CLOSED position. (Automatic mode only - will not operate in deadman mode)

B. Functions of input 2

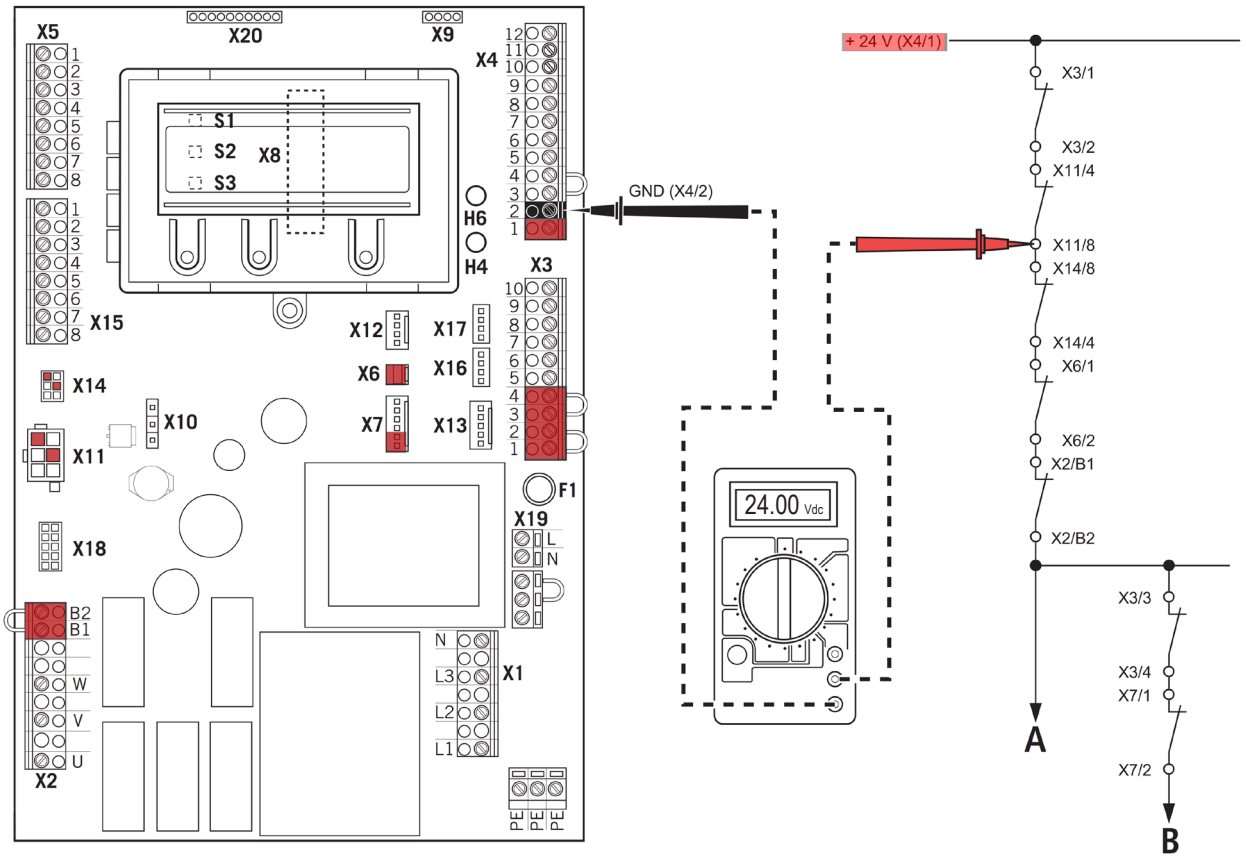
MOD	Description	Remarks
OFF	OFF	Not active
MOD2	Wicket door switch (8.2 kΩ)	Stop if activated
MOD3	OPEN safety edge (8.2 kΩ)	Stop + reverse
MOD4	OPEN safety edge (8.2 kΩ)	Stop + brief reverse
MOD5	Battery operation (MDFU special solution) N/O	Active if power supplied by battery. Relay switchover MOD32 / MOD33.
MOD6	Radar motion detectors (special solution) N/O	OPEN commands from input 2 lead to the OPEN position if input 1 (MOD12) is ON. OPEN commands from input 2 lead to the PART OPEN position if input 1 (MOD12) is OFF. All OPEN commands from X3, X7, X13 and X9 always lead to the OPEN position. Input 1 is of no significance here.
MOD7	Light curtain 2 (8.2 kΩ)	Acts in same way as light curtain 1 (SKS MOD4): Stop + reverse Type of reversing (reverse / reversing movement) is also adopted.

9.3 Diagnosis / error memory operating mode

Display	Meaning	Condition
UPPER SWITCH	UPPER end position (OPEN)	OFF: End position reached ON: End position not reached
LOWER SWITCH	LOWER end position (CLOSED)	OFF: End position reached ON: End position not reached
UP-SWITCH	Command button / OPEN input	ON: Button activated / input active OFF: Button not activated / input not active
DOWN-SWITCH	Command button / CLOSE input	ON: Button activated / input active OFF: Button not activated / input not active
INPUT 1	INPUT 1 (X4 / 9 & 10)	ON: Input 1 active OFF: Input 1 not active
INPUT 2	INPUT 2 (X4 / 11 & 12)	ON: Input 2 active OFF: Input 2 not active (only visible if INPUT 2 set to MOD5 / MOD6)
SKS	Closing edge safety device 1 (Airswitch (DW), 8.2kΩ or optosensor OSE) (X4 / 5-8) CLOSING direction	ON: System healthy OFF: System interrupted (fault)
SKS 2	Closing edge safety device 2 (8.2 kΩ) INPUT 2 (X4 / 11+12) OPEN direction	ON: System healthy OFF: System interrupted (fault) (only visible if INPUT 2 set to MOD3 / MOD4)
STOP 2	Safety circuit 2 Wicket door switch (8.2 kΩ) INPUT 2 (X4 / 11+12)	ON: Safety circuit healthy OFF: Safety circuit interrupted (fault) (only visible if INPUT 2 set to MOD2)
SKS 3	Closing edge safety device 3 (8.2 kΩ or optosensor OSE) Radio transmission system channel 1 OPENING or CLOSING direction	ON: System healthy OFF: System interrupted (fault) (only visible if SKS 3 set to MOD2 / MOD3)
STOP 3	Safety circuit 3 Radio transmission system channel 1	ON: Safety circuit healthy OFF: Safety circuit interrupted (fault) (only visible if SKS 3 set to MOD4)
SKS 4	Closing edge safety device 4 (8.2 kΩ or optosensor) Radio transmission system channel 2 OPENING or CLOSING direction	ON: System healthy OFF: System interrupted (fault) (only visible if SKS 4 set to MOD2 / MOD3)
STOP 4	Safety circuit 4 Radio transmission system channel 2	ON: Safety circuit healthy OFF: Safety circuit interrupted (fault) (only visible if SKS 4 set to MOD4)
MPULS INPUT	Command button / IMPULSE input	ON: Button activated / input active OFF: Button not activated / input not active
SWITCH CLOCK	Weekly timer (plug-in at X10)	ON: Timer activated OFF: Timer not activated
LIGHT BARR.	Photocell	ON: Photocell signal OK OFF: Light beam interrupted or fault in photocell
SAFETY CIRC.	Safety circuit 1 Emergency stop of door system	ON: Safety circuit healthy OFF: Safety circuit interrupted
STOP	STOP command button (button on enclosure)	ON: Button not activated OFF: Button activated

Display	Meaning	Condition
ROT FIELD	Shows currently set rotational direction of operator.	RIGHT: Setting for clockwise rotating field LEFT: Setting for anticlockwise rotating field
CYCLE	Door cycle counter (1xOPEN + 1xCLOSE = 1 cycle) Counts only if the limits are reached.	Displays number of full door cycles completed so far Counts complete door cycles only, i.e OPEN & CLOSE is one cycle. Reversions of a closing door due to photocell, safety edge, open commands etc are not counted.
SERVICE	Service alarm function Set via INPUT parameter SERVICE and PIN NO. 2	OFF: Maintenance indicator not activated 0 - 9999: Maintenance indicator activated Displays the number of door cycles left until a maintenance message is sent.
AWG	Shows position of absolute value encoder (digital limits)	Displays the current door position (value) as seen by the encoder.
ERROR >>> COUNT >>> CYCLE >>>	Controller error / fault memory Error messages from the control unit can be read out here with information on the frequency and cycle. The list of error messages can be scrolled through using buttons [+] and [–] on the LCD display. ➜ "10.1 Error message shown on LCD display"	Display changes at 2-second intervals between – error / fault type, – frequency of occurrence, and – indication of cycle in which error last occurred. **With the log storing the individual errors along with the number of times the error has ocurred and the last cycle at which it happened, fault finding of intermittant faults becomes easier.** If the quantity given under 'COUNT' is 0, this means that this particular fault has never occurred before. Deleting the error log: Press buttons [+] and [-] at the same time for approx. 2 seconds. Every error message must be individually deleted.

9.4 Stop / Safety Circuit test points



The multimeter must be set for 24 Vdc. Measure at all test points on the diagram to locate the fault.

Circuit A - Emergency Stop / Safety Circuit
Circuit B - Stop

10. Error messages and rectification

10.1 Error message shown on LCD display

Fault / error message	Cause	Rectification
System does not respond	– No voltage supply.	– Check the voltage supply of the operator and the controls.
Door travels in the CLOSE direction when the OPEN button is pressed or travels in the OPEN direction when the CLOSE button is pressed	– Rotating field (phase rotation) is incorrect.	– Check the phase rotation and establish clockwise rotating field if necessary.
FAULT – X	– Internal software or hardware fault.	– Restart control.
SAFETY CIRC.	– The safety circuit is interrupted. X3 / 1+2 Emergency stop, slack rope switch X6 / 1+2 Internal ON / OFF switch X11 / 4+8 Safety circuit for operator X2 / B1+B2 Jumper X3 / 3+4 External stop button X7 / 1+2 Internal stop button	– Check safety circuits at connections indicated, localise interruption and rectify problem.
ERROR INVERTER	– A problem has arisen in the frequency converter connected.	– Identify cause. – Acknowledge with STOP. – Turn power on and off.
ERROR RUNTIME	- The programmed RUNNING TIME has been exceeded.	– Check the path of the door and the running time. – Re-programme the running time, if necessary.
ERROR AWG	– Communication between absolute value encoder and control is interrupted and/or has broken down.	– Check the cable and socket connections at the control panel (X11) and door operator. Replace if necessary.
TERM SWITCH FAIL	– The door has travelled beyond the programmed end position area (limit positions). – The manual override is engaged (if wired through limit switches). – The end positions have not yet been programmed.	– Move the door back into the programmed area using the emergency manual override facility. – Re-engage the manual override The power must also be turned OFF/ON to clear this condition. – Program the end positions first.
ERROR REVOLUTION	– The power monitoring has been triggered - door is stalling / jammed.	– Check the door for any mechanical impairment or damage. – Check the incomming supply voltage is stable. – The programmed POWER is set incorrectly.
ERROR DIRECTION	– The rotating field present is not a clockwise rotating field.	– Check the rotating field (incomming supply phase rotation) and change the direction, if necessary. ➜ '6.1 Checking the direction of rotation / direction of travel'
ERROR POSITION	– The rotational speed of the absolute value encoder (AWG) deviates from the taught-in rated speed.	– Disconnect from the power supply and inspect the control shaft of the AWG on the door operator.
ERROR SKS CLS.	– Closing safety edge device 1 is faulty in the CLOSING direction –> (X4 / 5-8).	– Check the closing safety edge and the spiral cable.
ERROR SKS OPEN 2	– Closing safety edge device 2 is faulty in the OPENING direction –> (X4 / 11+12) input 2	– Check the opening safety edge and the spiral cable.
ERROR STOP 2	– Safety circuit 2 is interrupted. wicket door switch 8.2 kΩ –> (X4 / 11+12) input 2	– Check wicket door switch.
ERROR SKS CLS. 3	– Closing safety edge device 3 is faulty in the CLOSING direction –> RADIO transmission system	– Check closing safety edge device. – Test the RADIO transmission system.

Fault / error message	Cause	Rectification
ERROR SKS OPEN 3	– Opening safety edge device 3 is faulty in the OPENING direction –> RADIO transmission system	– Check opening safety edge device. – Test the RADIO transmission system.
ERROR STOP 3	– Safety circuit 3 is interrupted. –> RADIO transmission system	– Test the safety circuit. – Test the RADIO transmission system.
ERROR SKS CLS. 4	– Closing safety edge device 4 is faulty in the CLOSING direction –> RADIO transmission system	– Check closing safety edge device. – Test the RADIO transmission system.
ERROR SKS OPEN 4	– Opening safety edge device 4 is faulty in the OPENING direction –> RADIO transmission system	– Check opening safety edge device. – Test the RADIO transmission system.
ERROR STOP 4	– Safety circuit 4 is interrupted. –> RADIO transmission system	– Test the safety circuit. – Test the RADIO transmission system.
ERROR SKS TEST	– Testing of pneunatic (DW) airswitch unsuccessful.	– Check the pneumatic safety edge, spiral cable and rubber profile. – Check the DW-POINT setting.
	– Testing of RADIO 1 or RADIO 2 transmission system failed.	– Test the RADIO transmission system. – Check whether the right relay MOD was selected for the transmission system. ➜ “G Functions for external accessories“ on page 27
ERROR LIGHT BAR	– The photocell attached shows a permanent fault.	– Check photocell (function and alignment). – Check cabling.
ERROR LB TEST	– Testing of two-wire photocell failed.	– Check photocell (function and alignment). – Check cabling.
ERROR STOP TEST	– Testing of wicket door switch (8.2 kΩ) failed. –> Input 2	– Check wicket door switch.
ERROR TRAPIN	– Draw-in protection testing (additional module) failed. –> Relay MOD21	– Check photocell (function and alignment). – Check cabling.
ERROR CYLINDER	– The monitoring limit switch for the lock system for threshold-less wicket doors has failed to trigger within 10 seconds of entering an OPEN command.	– Check limit switch for the cylinder.
ERROR MSBUS	– Communication between the control and the MS BUS module attached is interrupted.	– Check the cable and socket connections and replace, if necessary.
ERROR CRASH SENSOR	– The monitoring crash switch for the break away system has activated. –> Input 1	– Identify cause. – Acknowledge with 5s STOP. – Turn power on and off.

After rectifying the cause of the error, the power supply to the control must be turned off once and/or the control restarted (> INPUT menu > parameter RESTART > ON) in the event of the following errors

- ERROR DIRECTION
- ERROR RUNTIME
- TERM SWITCH FAIL

10.2 Error message through LED indicator

GREEN LED H4 (main circuit board or CSI button unit)

Fault / error message	LED display	Remarks
No operating voltage	Off	– Check the voltage supply of the operator and the controls.

RED LED H6 (main circuit board or CSI button unit)

Fault / error message	LED display	Remarks
SAFETY CIRC.	Flashes 1x	Safety circuit is interrupted. – Check safety circuit, localise interruption and rectify problem.
ERROR AWG	Flashes 2x	Signal transmission between encoder and control interrupted and/or broken down. – Check the cable and socket connections at the control panel (X11) and door operator. Replace if necessary.
TERM SWITCH FAIL	Flashes 3x	The door has travelled beyond the programmed end position area, the manual override is / has been engaged, or the end positions have not yet been programmed. – Move the door back into the programmed area using the emergency manual override facility. – Re-engage the manual override The power must also be turned OFF/ON to clear this condition. – Program the end positions first.
ERROR DIRECTION	Flashes 4x	The rotating field present is not a clockwise rotating field. – Check the rotating field and change the direction, if necessary. ➜ “6.1 Checking the direction of rotation / direction of travel“
ERROR REVOLUTION	Flashes 5x	The power monitoring has been triggered. – Check that the door for any mechanical damage.
ERROR RUNTIME	Flashes 6x	The programmed RUNNING TIME has been exceeded. – Check the path of the door and the running time. – Re-programme the running time, if necessary.
ERROR INVERTER	Flashes 7x	A problem has arisen in the frequency converter connected. – Identify cause, and acknowledge with STOP. – Turn power supply on and off.
ERROR MSBUS	Flashes 9x	Communication error between the control and the MS BUS end device connected. – Check the cable and socket connections and replace, if necessary.
ERROR SKS	Continuous light Travel in CLOSING direction only possible in deadman mode	Closing edge safety device faulty in OPENING or CLOSING direction. – Check closing edge safety device and spiral cable, check RADIO transmission system, if necessary.
ERROR LIGHT BAR	Continuous light Travel in CLOSING direction only possible in deadman mode	The photocell connected shows a permanent fault. – Check photocell (function and alignment). – Check cabling.

11. Technical data / Maintenance

11.1 Mechanical and electrical data

Housing dimensions:	215 x 275 x 190 mm
Installation:	Vertical mounting on the wall, minimum height above floor = 1,100 mm
Power supply via	
L1, L2, L3, N, PE:	400V/3~ , 50/60Hz 230V/3~ , 50/60Hz
L1, N, PE:	230V/1~ , 50/60Hz
	Power input max. 2,200 W for power supply 400V/3~
Fuse protection:	10 A K type
Internal consumption of control:	max. 750 mA
Control voltage:	24 V DC, max. 500 mA; protected by self-resetting fuse for external sensor systems.
Control inputs:	24 V DC, all input connections must be potential-free; minimum signal duration for input control command >100 ms
Control outputs:	24 V DC max. 500 mA
RS485 A and B	Only for electronic limit switches RS485 level, terminated with a 120Ω
Safety circuit / emergency off:	All input connections must be potential-free; if the safety circuit is interrupted, no further electrically powered movement of the operator is possible, not even in deadman mode
Closing safety edge input (performance level C)	Performance level C For 8.2 k electrical safety edge with 8.2 kΩ terminating resistor and for dynamic optical systems (OSE)
Photocell (performance level D):	If the photocell is used as a D performance level system, it must be checked at regular intervals, but at least every 6 months, to ensure that the system functions properly. MFZ two-wire photocell barriers have a self teach-in facility, and so this requirement does not apply in this case.
Display (LCD):	Only an original MFZ display must be used as an LCD programming circuit board.
Relay outputs:	If inductive loads are connected (e.g. further relays or brakes), these must be fitted with appropriate suppressor elements (recovery diodes, varistors, RC circuits). Potential-free normally open contact; min. 10 mA ; max. 230 V AC = 4A. Once contacts have been used for power circuits, they can no longer be used for extra-low current circuits.
Temperature range:	Operation -10°C ... +45°C Storage: -25°C ... +70°C
Air humidity:	Up to 80% with no condensation
Vibrations:	Low-vibration mounting, e.g. on a masonry wall
Type of enclosure	IP 54
Weight	approx. 1.8 kg

11.2 Functional safety category and performance level according to EN ISO 13849-1

Function	Implementation	$MTTF_D$ electronics	$MTTF_D$ total with output contactor (1)	DC_{avg}	Category	Performance level
Emergency stop button	Input terminal X3, X6, X7, X11 Interrupts voltage supply to the output relay and main contactor, independently of the CPU. Signal received by CPU .	1175 years	191 years	85,3%	3	D
Stop circuit	Input terminal X3, X7 Interrupts the power supply to the main contactor. Signal to CPU.	1175 years	191 years	-	B	B
End position detection by AWG (absolute value encoder) (2)	Input terminal X11 For determining the position, and end position detection. Safety through checking plausibility of commands with signals received.	1062 years	188 years	85,6%	2	D
End position detection through limit switches (2)	Input terminal X15 Safeguarded through excess travel stop. Inputs are evaluated by the CPU.	1248 years	193 years	85,5%	2	D
Photocell evaluation	Input terminal X4 Impulse evaluation through CPU. Faults are detected through plausibility check in the CPU. The frequency must lie between 130 Hz and 190 Hz. The function is tested by switching on the supply voltage (T117, IC111) of the photocell before every run and every two minutes in standby. If activated in the CLOSING direction, the door stops or reverses.	1000 years	186 years	85,7%	2	D

DC_{AVG} Average diagnostic coverage
$MTTF_D$ Mean time to dangerous failure

The CS 310 control is maintenance-free.

⚠ DANGER!

Life-threatening danger due to electric shock!

☞ The control unit or door/gate system MUST be disconnected from the electricity supply before carrying out any electrical work. Take measures to ensure that the power supply remains disconnected for the duration of the work.

The following points must be taken into account when carrying out maintenance on the door/gate or gate system:

- Maintenance must only be carried out by authorized persons.
- Directive ASR A1.7 must be complied with.
- Worn or faulty parts must be replaced.
- Only approved parts may be installed.
- All maintenance work must be documented.
- Replaced faulty parts must be disposed of properly in accordance with the materials they contain and local regulations.

12. EC Declaration of Conformity

We hereby declare that the product described below
CS 310 Door Control
are in conformity with the essential requirements of the Machinery Directive 2006/42/EC.

In addition, the logic unit is in conformity with all the provisions of the
- EC Construction Products Regulation (305/2011/EC)
- EC Electromagnetic Compatibility Directive (2004/30/EU)
- EC Low Voltage Directive (2014/35/EU)

The following standards were applied:

EN 60204-1 : 2006
Safety of machinery, electrical equipment of machines; Part 1: General requirements

EN ISO 12100 : 2010
Safety of machinery – general principles for design - risk assessment and risk reduction

DIN EN 12453 : 2000
Safety in use of power operated doors - Requirements

prEN 12453 : 2014
Safety in use of power operated doors
(exclusively for items 1.3.7 and 1.4.3 of Annex I of the Machinery Directive)

DIN EN 61000-6-2 : 2005
Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

DIN EN 61000-6-3 : 2007
Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission - standard for residential, commercial and light-industrial environments

DIN EN 60335-1 : 2012
Household and similar electrical appliances - Safety - Part 1: general requirements

DIN EN 60335-2-103 : 2003
Household and similar electrical appliances - Safety - Part 2-103: Particular requirements for drives for gates, doors and windows

The relevant technical documentation is compiled in accordance with Annex VII(B) of the Machinery Directive 2006/42/EC. We undertake to transmit, in response to a reasoned request by the market surveillance authorities, this information in electronic form within a reasonable term.

EC Type Examination Certificate No. 4420513133301
TÜV NORD CERT GmbH (NB 0044)
Langemarckstraße 20
D - 45141 Essen, Germany

Person authorised to compile the relevant technical documentation:
MFZ Antriebe GmbH & Co. KG, Neue Mühle 4,
D-48739 Legden, Germany

The logic unit must not be put into service until the machinery into which the logic unit is to be incorporated has been declared in conformity with the provisions of the Machinery Directive 2006/42/EC.

Place / Date:
Legden, 04/01/2016

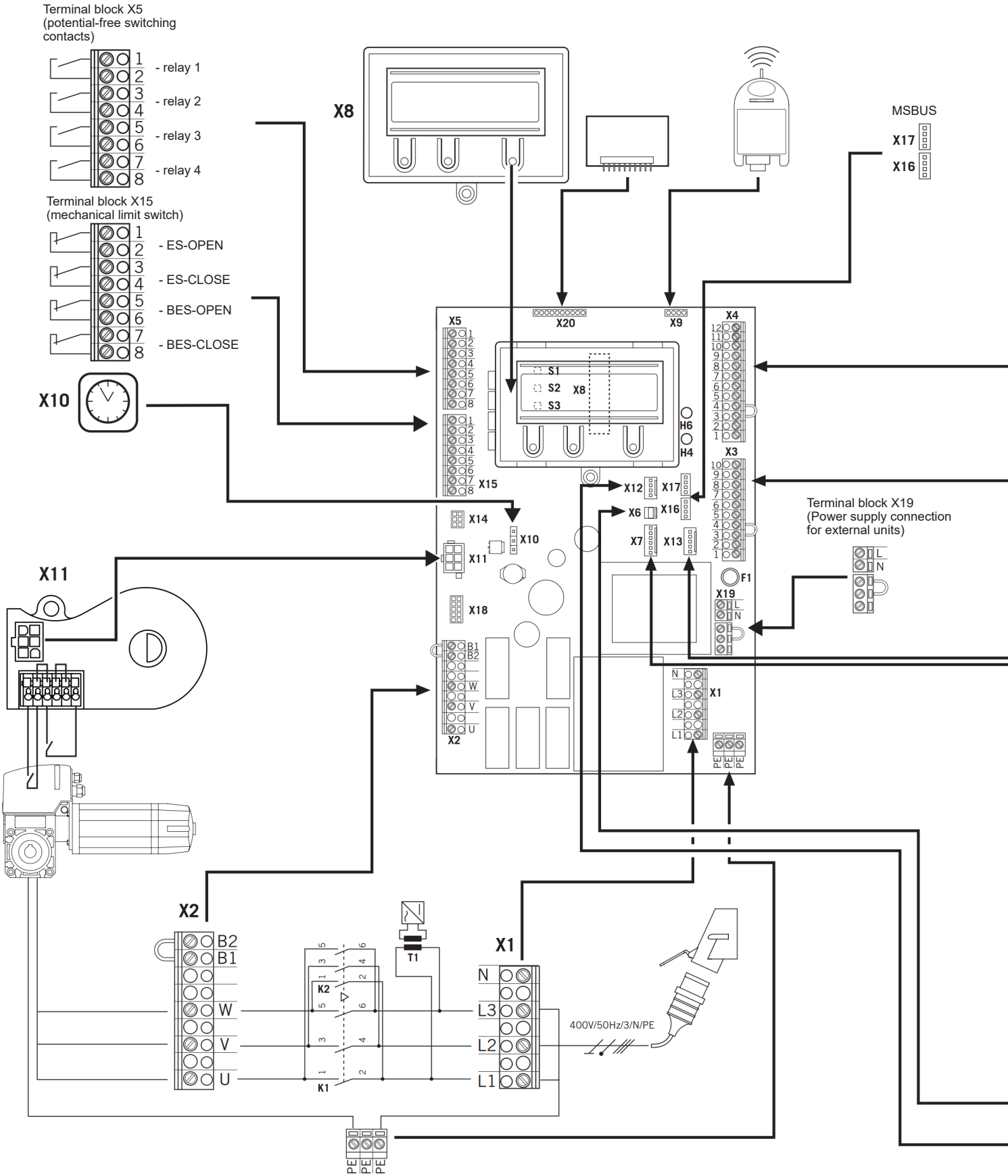
Manufacturer's signature

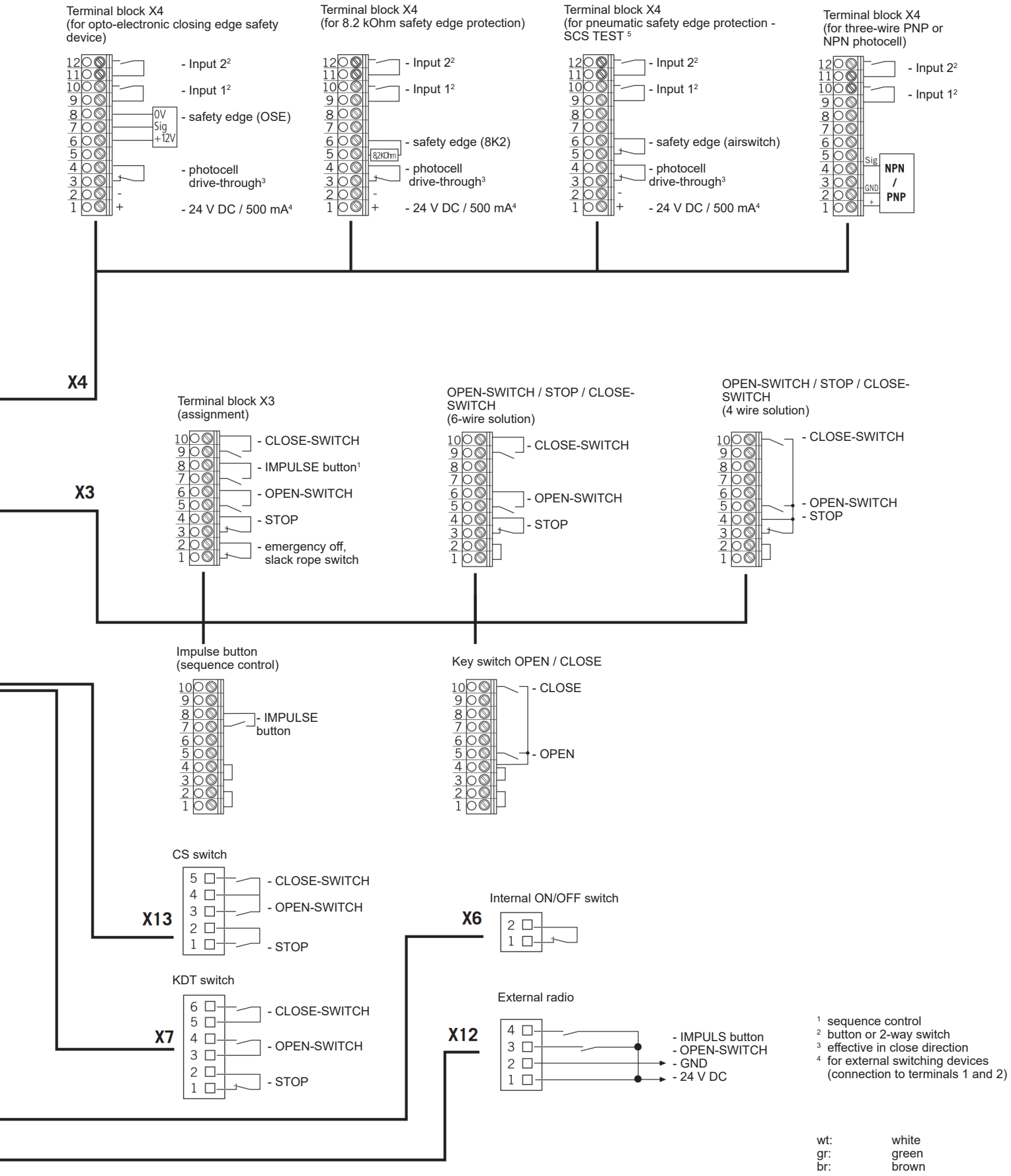
Dirk Wesseling

Position of signatory
Management

13. Appendix

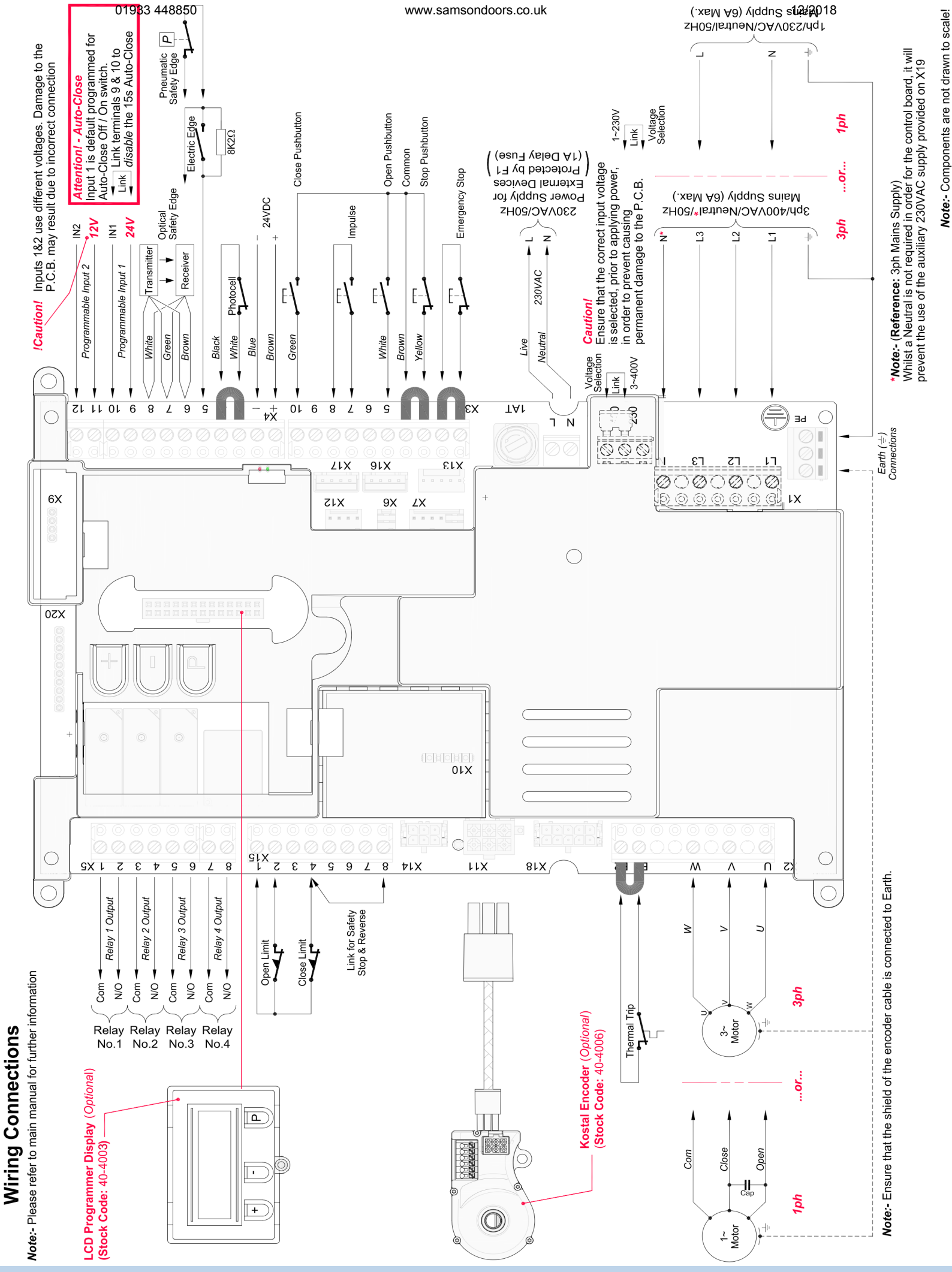
13.1 Overview of connections





[1] sequence control
[2] button or 2-way switch
[3] effective in close direction
[4] for external switching devices (connection to terminals 1 and 2)

wt:	white
gr:	green
br:	brown



Wiring Connections

Note:- Please refer to main manual for further information