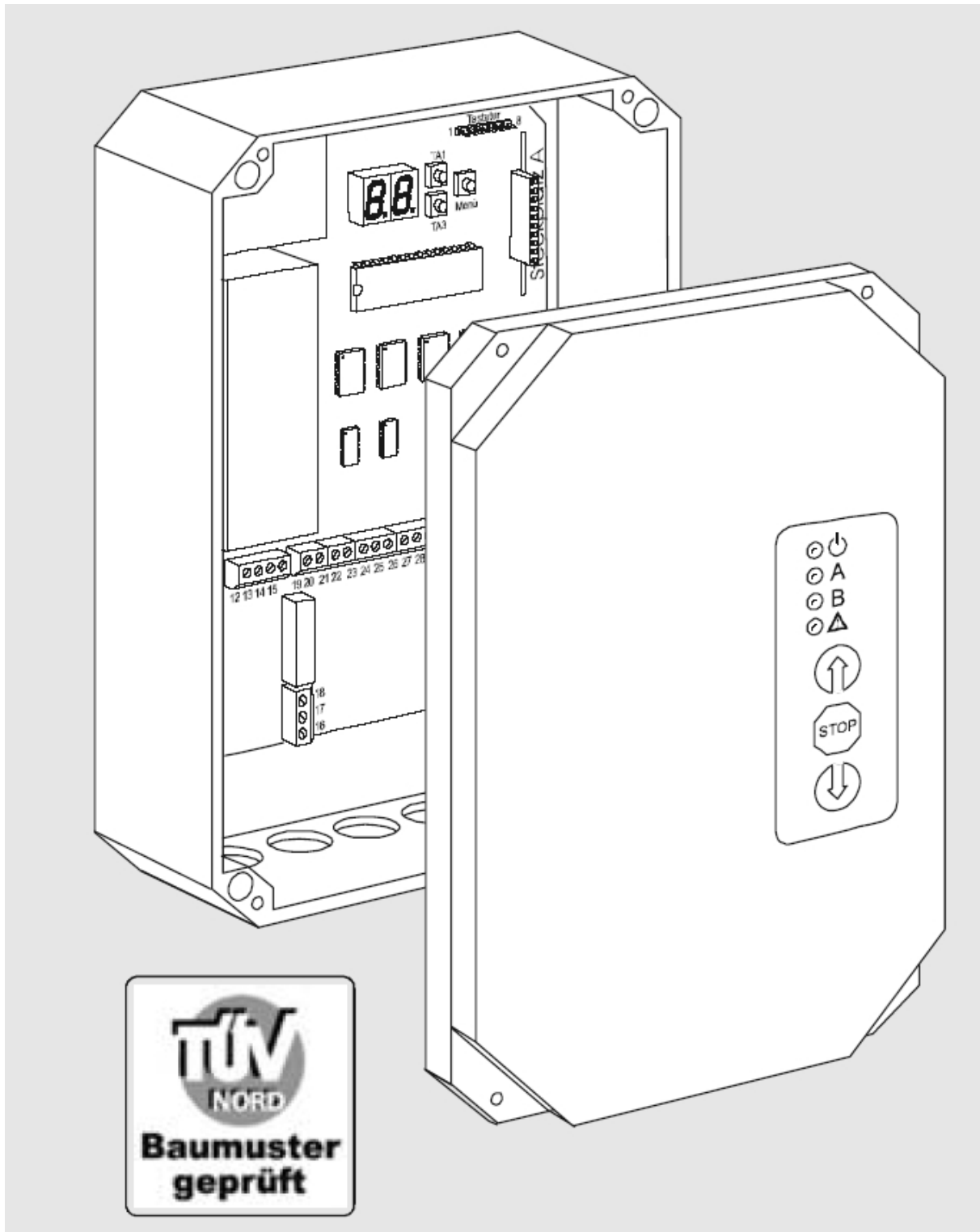


ACM 400 S

1-motor 230V/400 gate control unit



Assembly, installation, connection and programming instructions for the fitter

Please keep these instructions in a safe place, so you can refer to them should any questions arise at a later date.

Contents

1)	Safety Characteristics	3
2)	Intended Purpose	3
3)	Technical Specifications	3
4)	Requirements	5
	a) Legal requirements	5
	b) Technical qualification requirements	5
5)	Installation.....	6
	a) The suitable installation location	6
	b) Installation	6
6)	Connect	6
	a) Cables.....	7
	b) System (mains)	7
	c) 400V motor (3~)	7
	d) 230V motor (1~)	7
	e) Limit switch	7
	f) Open/Closed/Stop input [X9].....	8
	g) Emergency stop [X19].....	8
	h) Membrane keyboard [X3.3], [X1], [X5]	9
	i) Universal input [X8.1]	9
	j) Pulse input [X8.2].....	10
	k) Dead man's mode (not possible via radio!)	10
	l) Power supply for sensors [X7]	11
	m) Method of connection for "self-test"	11
	n) Speed sensor [X7].....	11
	o) Photoelectric barrier [X7].....	11
	p) Closing edge safety device [X7]	11
	q) Light outputs [X10]	12
	r) Universal output [X12].....	13
	s) Radio receiver (optional) [X4].....	13
7)	Putting into Service [X2].....	14
	a) The LEDs auf der printed circuit board.....	14
	b) The LEDs on the membrane keyboard [X5]	14
	c) Displayed errors [X2.1], [X5.4]	15
8)	Programming [X2].....	16
	a) Functions of the pushbuttons	16
	b) Start programming mode	16
	c) Select menu / change value	16
	d) Reset.....	16
	e) Change block.....	16
	f) Quit programming mode	16
9)	Operation	17
	a) Selg-test.....	17
	b) Normal operation [X2.1], [X5.1].....	17
	c) Emergency operation	18
	d) Read out trip counter.....	18
10)	Disposal	19
11)	Extensions/Add-Ons	19
12)	Menu Table.....	20
13)	Figures/Diagrams	22
14)	Block CIRCUIT DIAGRAM.....	24

1) Safety Characteristics

- Self-monitoring inputs for photoelectric barrier and closing edge safety device
- Motor monitoring through speed sensor
- Path monitoring through photoelectric barrier and up to four safety strips
- Self-monitoring functions of the control unit: Watchdog, RAM/ROM and EEPROM, undervoltage
- All-pole motor cut-out
- Motor running time limit

2) Intended Purpose

This **motor control unit** is intended for 230V and 400V drive units

- for 1-motor gates (e.g. rotary, sliding, tiling and swing gates as garage or courtyard gate systems)
- in industrial, residential, business and commercial areas and for small businesses,
- according to the specifications in these instructions.

These **instructions** are intended for the fitter and further processing industry, however are not for issuing to the owner/operator of the gate system.

The end product manufacturer is responsible for preparing instructions suitable for the owner/operator of the gate system.

3) Technical Specifications

Safe operation of the control unit with all its functions is only possible if all the named values are adhered to! Data based on software status ACM400S V1.2

Parameter	Symbol	Limit values			Units	Test conditions
		Min.	Typical	Max.		
Power supply						
System voltage 1~ 230V	U_{Netz1}	205	230	255	V_{AC}	At terminals 5 / 8
System voltage 3~ 400V	U_{Netz3}	360	400	440	V_{AC}	An terminals 5 / 6 / 7
System frequency	f_{Netz}	48	50	52	Hz	
Internal logic voltage	U_{V}	4.8	5.0	5.2	V	
Power input	P_{Prim}		8	10	VA	Primary, without plug-in card, at rest/idle mode
Starting time system voltage / 1. Start	t_{Start}		2.5	3.5	s	@ $U_{\text{Netz}} = 230V_{\text{AC}}$
Inputs						
Speed sensor Low-level	U_{DSLow}	0.7		4.2	V	An terminal 19/20, depending on setting menu 00
Speed sensor High-level	U_{DSHigh}	1.3		4.4	V	An terminal 19/20, depending on setting menu 00
Speed sensor frequency	f_{DS}	10		500	Hz	
ES Open / Closed not actuated (closed)	U_{ESclosed}	9.0			V	terminal 40 / 0V, terminal 42 / 0V
ES Open / Closed actuated (open)	U_{ESopen}			1.0	V	terminal 40 / 0V, terminal 42 / 0V
ES Open / Closed Strom (closed)	I_{ES}		28	40	mA	Via terminals 40/41, 42/41
Emergency stop not actuated (closed)	$U_{\text{NOTclosed}}$	0.0		0.5	V	Via terminals 38/39
Emergency stop actuated (open)	U_{NOTopen}			1.0	V	terminals 39 / 0V
Emergency stop Strom (closed)	I_{NOT}		33	45	mA	Via terminals 38/39
Photoelectric barrier not actuated (closed)	U_{Lsclosed}	0.0		0.5	V	terminals 31 / 0V
Photoelectric barrier actuated (open)	U_{Lsopen}	4.0			V	terminals 31 / 0V
Photoelectric barrier Short circuit current	$I_{\text{LSin-0}}$		5.0	6.0	mA	Via terminals 31 / 30

ACM 400 S motor control unit

photoelectric barrier reaction time	t_{LS-1}		65	100	ms	LS command time until motor switched
photoelectric barrier reset time	t_{LS-0}		500	800	ms	
SE1-SE4 (8K2) not actuated	R_{SE12-0}	6.2	8.2	10.3	K Ω	For SE1-SE4
SE1-SE4 (8K2) actuated	R_{SE12-1}	11.0		5.8	K Ω	For SE1-SE4
SE1-SE4 (OSE) level, release	$U_{SE12OSE-0}$	0.9		2.5	V	At terminals 32, 34, 35 and 37
SE1-SE4 (OSE) frequency	$f_{SE12OSE-0}$	0.6		1.8	KHz	At terminals 32, 34, 35 and 37
SE1-SE4 reaction time	t_{SE12-1}		50	80	ms	At 8K2 or OSE
SE1-SE4 reset time	t_{SE12-0}		500	700	ms	
Universal not actuated (open)	U_{UNIV-0}	4.0	5.0		V	At terminals 23/24
Universal actuated (closed)	U_{UNIV-1}		0.0	1.0	V	At terminals 23/24
Universal actuated (closed)	I_{UNIV-1}		8.0	10.0	mA	
Universal input resistance	R_{UNIVin}		625		Ω	Pull-Up from +5V
Universal pulse duration (debounce)	t_{UNIV}		50		ms	
Pulse not actuated (open)	U_{IMP-0}	4.0	5.0		V	At terminals 25/24
Pulse actuated (closed)	U_{IMP-1}		0.0	1.0	V	At terminals 25/24
Pulse actuated (closed)	I_{IMP-1}		8.0	10.0	mA	
Pulse input resistance	R_{IMP}		625		Ω	Pull-Up from +5V
Pulse duration (debounce)	t_{IMP}		50		ms	
Open not actuated (open)	U_{AUF-0}	4.0	5.0		V	At terminals 26/27
Open actuated (closed)	U_{AUF-1}		0.0	1.0	V	At terminals 26/27
Open actuated (closed)	I_{AUF-1}		8.0	10.0	mA	
Open input resistance	R_{AUFin}		625		Ω	Pull-Up from +5V
Open Pulse duration (debounce)	t_{AUF}		50		ms	
Closed not actuated (open)	U_{ZU-0}	4.0	5.0		V	At terminals 28/27
Closed actuated (closed)	U_{ZU-1}		0.0	1.0	V	At terminals 28/27
Closed actuated (closed)	I_{ZU-1}		8.0	10.0	mA	
Closed input resistance	R_{ZUin}		625		Ω	Pull-Up from +5V
Closed Pulse duration (debounce)	t_{ZU}		50		ms	
Stop not actuated (open)	U_{Stop-0}	4.0	5.0		V	An terminals 29 / 0V
Stop actuated (closed)	U_{Stop-1}		0.0	1.0	V	An terminals 29 / 0V
Stop actuated (closed)	I_{Stop-1}		8.0	10.0	mA	
Stop input resistance	R_{Stop}		625		Ω	Pull-Up von +5V
Stop pulse duration (debounce)	t_{Stop}		50		ms	
Outputs						
Light output (230V _{AC})	P_{Licht}			500	W	An terminals 9 / 10
Warning light output (230V _{AC})	P_{Warn}			500	W	An terminals 11 / 10
Motor output 1~ 230V	$P_{Motor1-}$			0.5	KW	
Motor output 3~ 400V	$P_{Motor3-}$			2.2	KW	
Motor running time	t_{Mot}			120	s	
Motor operating time	ED			25	%	At maximum motor output, max running time
Universal2- switching capacity	U_{Univ2}			275	V _{AC}	
Universal2- switching capacity	P_{Univ2}			750	VA	Max. 3A
Voltage 24V- output	U_{24V}	22		33	V _{AC}	full load / idle mode at terminals 21 / 20
Current 24V- output	I_{24V}	0		200	mA	@ 2 plug-in card, full load, $U_{Netz} = 195V$
Voltage 12V- output	U_{12V}	10		12	V _{DC}	full load / idle mode an terminals 22 / 20
Current 12V- output	I_{12V}	0		200	mA	@ 2 plug-in card, full load, $U_{Netz} = 195V$
Voltage 5V- output	U_{5V}	4.8	5.0	5.2	V _{DC}	An BL3, Pin 3
Current 5V- output	I_{5V}	0		20	mA	An BL3, Pin 3
Ambient conditions						
Ambient temperature	T_{Umgeb}	-20		+50	°C	Outside the housing
Operating temperature	T_{Betf}	-20		+70	°C	Inside the housing, normal installed position
Storage temperature	T_{Lag}	-25		+80	°C	
Relative air humidity	RH	20		90	%	No condensation permitted!
Printed circuit board						
Controller frequency	f_{Cont}		4.19		MHz	Internal PLL at 16.76MHz
Length	L_{LP}		218		mm	
Width	B_{LP}		166		mm	
Height	H_{LP}		55		mm	
Weight	m_{LP}		1030		g	Without plug-in card and housing
Housing						
Length	L_{Geh}		255		mm	Without cable entry
Width	B_{Geh}		176		mm	
Height	H_{Geh}		78		mm	
Weight	m_{Gesamt}		1680		g	housing incl. printed circuit board and self-sealing plug
Material						ABS, self-extinguishing
Degree of protection						IP65

4) Requirements

The motor control unit is not operational until it is installed in the ready for use gate system.

This requires external components such as e.g. ...

- **command input** devices,
- **signalling devices**,
- **sensors** and
- the **drive unit**,

but which are not supplied with this motor control unit.

This control unit is therefore a "non ready for use component" from a legal point of view. It therefore does not fall within the scope of various EC Directives until it is integrated in the end product (gate system).

a) Legal requirements

The end product manufacturer is thus responsible for compliance and declaration of **CE conformity**. The control unit complies with the requirements in

- **DIN EN 60204**. This makes it easier for you to carry out the conformity assessment according to the Machinery Directive.
- **DIN EN 50081 T1/2** and **EN 55011** and **EN 55014**. This makes it easier for you to carry out the conformity assessment according to the EMC Directive.
- **VDE 0700 Part 95** (Draft 02/98; IEC 60335-2-95) and **EN 12445** and **EN 12453** concerning requirements for motor control units for "power-driven doors and gates" (formerly ZH 1/494).
- **DIN EN 60335-1**. This makes it easier for you to prepare the declaration of conformity according to the so-called "Low Voltage Directive".
- **DIN V VDE 0801, AK3** concerning "Basic principles for computers in systems with safety tasks".

b) Technical qualification requirements

These instructions require **technical knowledge**, which corresponds to completed vocational training in at least one of the following job profiles:

- **Electrical fitter**,
- **Electrical installation fitter**,
- **Electrical machine fitter**,
- **Electro-mechanic**,
- **Industrial electronics technician ...**

or knowledge as an (electrically) **skilled person** according to the German accident prevention regulation **BGV A2** (VBG 4).

The product is supplied as a component in "**especially EMC-expert firms**" in accordance with EMC law.

5) Installation

This requires 4 screws with a shank diameter of 4mm

a) The suitable installation location

The motor control unit is supplied as a printed circuit board in a simple plastic housing [X11]. You should therefore choose an installation location with the following conditions:

- The **ambient temperature** may not be lower than -20°C and not higher than +50°C.
- The **air humidity** must lie within 30...90% RH.
- **Electromagnetic fields** at the installation site must be reliably shielded.
- If you use the version with the integrated membrane keyboard, the installation location should lie within a safe and secure **operator area**.

b) Installation


The internal temperature rating is designed for **vertical installation** [X3], [X5], whereby the **cables must be brought out at the bottom** and sealed with the enclosed **threaded joints** to prevent penetrating moisture [X13].

The **weight** of the control unit is approx 1.7 kg. Please take this into account when choosing the type of fixing.

- **Install** the control unit housing professionally at the suitable installation location.

6) Connect

You may only work on the control unit if it is disconnected from the power supply!

- 203 or 400 Volt system voltages can be applied at terminals 1-18. Danger!
- Never connect system (i.e. mains) voltage to terminals 19..42.
- Disregarding the above causes immediate destruction of the control unit, and the warranty expires!
- Whenever you carry out any work on the control unit ensure  **ESD compatible earthing**. Otherwise there is a risk of the control unit being damaged or destroyed.

For improved clarity, the respective setting options (values) are also described in this chapter. The "Programming" chapter (see page 16) explains how you can call up the necessary Settings menu.

The screw-type terminals 16...42 can be plugged in, you can easily pull them out from the front. This should make it easier for you to connect the individual wire strands/cores.

a) Cables

- The length of signal cables for sensors and control devices must not exceed **max 30m**, in order to avoid EMC effects.
- Avoid parallel layout of signal cables with power or antenna cables, to avoid coupling interference.

b) System (mains)

[X17], [X18]

- The control unit power supply unit must be protected on site with an all-pole short-circuit proof motor protection switch with maximum permissible tripping range of 2.5...4.0A! Dimension the supply lead according to the **power input ...**
 - for the drive unit (max. 2000W)
 - for the control unit (approx 8VA)
 - and all external devices connected to it (e.g. sensors, control stations, lighting and signalling devices, etc.).

[X18] Connect a **230V system** to **terminals "L1 / N / PE"**.

The terminals **"L3" and "N" (terminals 7 and 8) must be jumpered!**

[X17] Connect a **400V system** to **terminals "L1...3 / N / PE"**.

c) 400V motor (3~)

[X14]

The load tap of the motor control unit and 3-phase operation is designed for a max motor output of **2000W / 400V**. However, a max **operating time of 25%** must not be exceeded.

Connect the **motor** to **terminals 12...15** [X14].

The running direction switchover is determined by the motor terminals "V" and "U".

d) 230V motor (1~)

[X15]

The load tap of the motor control unit and 1-phase mode is designed for **max motor output** of **1000W / 230V**.

Connect a **230V supply** to **terminals "L1 / N / PE"** [X18].

The terminals **"L3" and "N" must be jumpered!**

Connect the **motor** to **terminals 12...14** [X15], as shown in the diagram. The running direction switchover is determined by the motor terminals "V" and "U".

e) Limit switch

[X16]

Limit switch operation is absolutely necessary to detect the respective end position. These can be e.g. roller or inductive limit switches, which are executed as **break-contact elements**.

Connect the **limit switch** to **terminals 40...42** [X16].

Warning!

Do not connect the gate drive unit to the motor, until you are convinced the motor runs in the **correct rotational direction** – e.g. after electrical startup. Otherwise there is a **risk of accidents** if the motor turns in an unexpected direction!

Gates without a mechanical end stop must be secured via a second "safety limit switch" downstream of the normal limit switch, if the gate causes a hazard if the end position is exceeded, e.g. due to a defective limit switch. **The "safety limit switch" must be connected to the "Emergency stop"**, which then stops the gate movement. slack cable switches or wicket safety devices must also be connected in the "Emergency stop" safety circuit.

f) Open/Closed/Stop input [X9]

These control stations can be designed as pushbuttons, key-operated switches, coded locks or external radio buttons – and each as a **make contact element**.

[X9.1] Connect the "Open" and "Closed" buttons to **terminals 26...28**.

[X9.2] Connect the "Stop" button to **terminals 29 / 30**.

"Stop" is a purely function input without safety function!

Gate status	"Open" pressed	"Closed" pressed	"Stop" pressed
standing in limit position "Open"	-	closes	-
standing in limit position "Closed"	opens	-	-
standing in "Partly open" position	opens	closes	-
Stands somewhere along the path	opens	closes	-
opens menu "D" value:	00	Stop	Stop
	01	-	Stop
	02	Stop	closes
	03	-	closes
closes menu "D" value:	00	Stop	Stop
	01	opens	Stop
	02	Stop	-
	03	opens	-
"Emergency stop" is actuated	-	-	-
Automatic closing mode	As long as it is pressed the gate remains permanently open	closes, keep open time is ignored	Stop, keep open time restarts

The **"Open"** and **"Closed"** functions can also be actuated via channels 2 / 3 of the optional **radio receiver**, as described on page 13.

g) Emergency stop [X19]

This can be realised as a mushroom button or wicket safety device, etc., and is a floating **break contact element**.

Connect the emergency stop button to **terminals 38 / 39**.

If you do **not** want to connect an emergency stop button, these terminals must be **jumpered!**

The "Emergency stop" function directly blocks the relay for the motor control. It is not possible to start the motor via the dead-man's mode or by other inputs, as long as terminals 38 / 39 are interrupted.

Gate status		Reaction if "emergency stop" pressed
At a standstill, light is on		Light goes out (specific light shut-down)
opens / closes		Stop
in limit position "open" or "closed"		-
Automatic closing mode	Menu 9" – value: 00 Factory value: 01	keep open time completely restarts Automatic closing mode disabled up to the next command

Note:

This "emergency stop" function is merely a **command function** – it does **not** act as a disconnecting device according to **DIN VDE 0100 Part 537**. If necessary you must implement this facility on site!

h) Membrane keyboard [X3.3], [X1], [X5]

If you use the version with the membrane keyboard integrated in the cover [X1], [X5], connect it at the "Keyboard" slot on the printed circuit board [X3.3].

When connecting, ensure that the **ribbon cable is not twisted**. The gate can also be controlled from this, as via the separate buttons at terminals 26...30. Emergency operation (page **Fehler! Textmarke nicht definiert.**) is also possible via the membrane keyboard.

i) Universal input [X8.1]

With this you can realise both optional "partial opening mode" and "Automatic closing".

"**Partial opening mode**" enables only partial opening, e.g. as man lock. This is achieved by limiting the opening time.

To do this connect a **button** (make contact element) to **terminals 23 / 24** [X8.1].

In "**automatic closing mode**", automatic closing can be set via a time allowance.

To do this, connect a **switch**, e.g. a time switch, to **terminals 23 / 24** [X8.1].

If menu "A" is set to 00, then automatic closing is only active when the switch is closed!

Menu	Value	Function
"A"	00	Automatic closing mode
	01	Partial opening function: opening time
	...60	Limit of 01...60 sec.

Menu	Value	Keep open time (automatic closing)
"5"	00	Automatic closing off
	01	In 2-second steps per digit
	...82	From 2...164 seconds
	83	In minute steps per digit from
	...95	3...15min, with 5 s warning time

If you have used a **radio receiver** (optional) (page 13), you can also use it to connect the **universal input (channel 4)**. This of course only makes sense if you have select the **partial opening function** in menu "A".

j) Pulse input [X8.2]

In "**pulse mode**" you can open the gate with a single press of a button, open and close and stop.

Connect the **button** for pulse mode to **terminals 24 / 25** [X8.2].

If you have used the optional **radio receiver** (page 16), you can also use it to give the "**Pulse**" command (**channel 1**), as described here as button function.

Gate status	If press "partial opening mode" button	If press "pulse mode" button
Standing along the path after Stop	Closes	Runs in opposite direction
Standing along the path after release	Closes	Continues running
standing in limit position "Open"	Closes	Closes
standing in limit position "Closed"	Moves to partial opening position	Opens
standing in partial opening position	closes	Completely opens
Opens	Stop	Stop
Closes	Stop	Stop

Gate status	Reaction in "Automatic closing mode"	
standing in limit position "Closed"	-	
"Open" button briefly pressed	opens	
Not in "Closed" limit position	5s warning light before each closure!	
standing in limit position "Open"	Automatically closes	after expiry of the keep open time
standing in partial opening position	Automatically closes	after expiry of the keep open time
keep "Open" button pressed	Stays open	keep open time starts running again
"Closed" button pressed	closes	keep open time is quit
"Stop" button pressed	Stop	keep open time starts running again
While closing one of the safety strips is triggered (not photoelectric barrier).	Stop	Automatic closing disabled until next command is given
While standing one of the safety strips or photoelectric barrier is triggered.	-	keep open time starts running again as soon as no more triggering
"Emergency stop"	Menu "9" – value: 00	keep open time starts running again
	Factory setting: 01	Automatic closing mode until next command

Control stations /sensors	"Dead man's mode" possible
"Open"/ "Closed" button	Depending on setting via menu "E"
"Emergency stop" or "Stop"	-
Photoelectric barrier (terminals 30 / 31)	For emergency mode
Closing edge safety device (terminals 32...37)	For emergency mode
Limit switch "Open"/ "Closed" (terminals 40...42)	-

k) Dead man's mode (not possible via radio!)

Menu "E" specifies the performance for the Open / Closed inputs.

Menu	Value	Pulse	"Dead man's mode"
"E"	00	"Open" / "Closed"	-
	01	"Open"	"Closed"
	02	"Closed"	"Open"
	03	-	"Open" / "Closed"

l) Power supply for sensors [X7]

0.2 A max are available for the sensors power supply as

- 24V~ at terminal 21
- 12V= at terminal 22

each applied against the 0V connection at terminal 20.

m) Method of connection for "self-test"

The **receiver side** of the photoelectric barrier or the 8K2 safety strips are tested during self-test by **short interruption** of the 0V connections (earthing).

You can also include the **transmitter side** in the self-test – by **supply it with power** via the universal output (see page 13).

n) Speed sensor [X7]

- The speed sensor monitors running of the motor. If a sensor signal remains off although the motor has been started, the control unit stops the motor running with the error message E2, as either the sensor is defective or a motor/transmission break exists.
- Obstruction / limit position detection via the speed sensors is not possible.
- The type of speed sensor is set via menu "0".

[X7.1] Connect the **signal output** to **terminals 19 / 20**.

Gate status	Reaction
Standing	-
running Menu "0" – value: 00 no sensor connected	-
01 Type "Castalia" connected	If signal cannot be measured 0.5s after motor starts: "Stop" until next command input
02 Type "DSLTA-51" connected	
03 Type "FACT" connected	

o) Photoelectric barrier [X7]

You can connect photoelectric barriers, DWG strips, ground loops, etc. as floating **break contact elements** to monitor the space within which the gate moves.

[X7.2] Connect a **photoelectric barrier** to **terminals 30 / 31**.

If you do not want to connect **any photoelectric barrier**, the terminals must be **jumpered** or **disabled**.

p) Closing edge safety device [X7]

4 safety strips can be connect to the control unit as closing edge safety devices, e.g. Type "8K2" or "-OSE".

[X7.3] Connect the safety strips 1...4 to terminals 32...37.

If using "8K2" strips, the outer surround of the safety strip must be connected to terminal 33 and/or 36 (0V).

Any unused inputs must be **jumpered with 8.2 kohl** or **disabled**.

OSE connection:

+12V	terminal 22 (brown cable),
0V	terminal 20 (white cable)
Signal	terminal 32, 34, 35, 37 (green cable)

Function	Photoelectric Light barrier Menu "8"	Safety strips Menu "1...4"		Sensor triggering while opening	Sensor triggering whole closing
		8K2	OSE		
gate at a standstill	-	-	-	No effect	No effect
Disable sensor	00	00	16	No effect	No effect
Stop	01	01	17	No effect	Stop
	04	04	20	Stop	No effect
	05	05	21	Stop	Stop
Release *)	02	02	18	No effect	Release *)
	08	08	24	Release *)	No effect
	10	10	26	Release *)	Release *)
Reversing	03	03	19	No effect	opens
	12	12	28	closes	No effect
	16	--	--	No effect	opens
	17	--	--	No effect	opens
	18	--	--	No effect	opens
	--	--	--	No effect	opens
Automatic closing after quitting LS	16	--	--	No effect	Closes 0.5s after command
	17	--	--	No effect	Closes 3s after command
	18	--	--	No effect	Closes 7s after command
Combined functions	06	06	22	Stop	Release *)
	07	07	23	Stop	opens
	09	09	25	Release *)	Stop
	11	11	27	Release *)	opens
	13	13	29	closes	Stop
	14	14	30	closes	Release *)
	15	15	31	closes	opens
*) Release = if an obstruction is detected the gate moves a short distance in the opposite direction (released)					
Release time (in 0.25s steps)	Menu "B" value	00		0.25s	
	15		4.00s	

q) Light outputs [X10]

Two lamps for signal and lighting purposes can be connected for **230V AC**, namely...
 [X10.1] at **terminals 9 / 10** with a load of max. **200 W**,
 [X10.2] at **terminals 10 / 11** with a load of max. **200 W**.

Gate status	Menu "7" value	Light output terminals 9 / 10
	00	No light
Gate started	01	Lit time from 0 600s in 10s steps
	...60	
in limit position "Closed"	61	Light off
in limit position "Open"		Light on
Stopped along the path		Light flashes slowly (0.5Hz)
opens / closed		Light flashes quickly (4Hz)
When motor starts	62	Short pulse (1.5s)

Gate status	Menu "6" - value	Warning light output terminals 10 / 11
opens / closes	00	Only while motor running
	01	4s before motor starts + while motor running
	02	10s before motor starts + while motor running
Closes	03	4s before motor starts + while motor running
	04	10s before motor starts + while motor running

r) Universal output [X12]

This universal output consists of a **floating changeover contact**, which can be started with different functions, for example...

- for the **self-test** of the transmitter side of photoelectric barriers: During the self-test (page 17) the changeover contact briefly picks up and can therefore interrupt a power supply passed via the **break contact element (terminals 16 / 18)** – which must be recognised as a command at the photoelectric barrier input after max 0.5s.
- for connecting a **traffic signal light**: To do this, connect the “red” signal light to the break content element and “green” to the make contact element. The changeover contact does not pick up until the limit position "Open", along the gate's path and in the "Closed" limit position the signal light remains "red".
- for special functions to be switched on **by radio button**, e.g. bell, time switch or pulse for garage gates. The changeover contact picks up if a radio signal is correctly received on channel 4.

Menu “F” value	Universal output terminals 16...18
00	Self-test function
01	Traffic light function
02	Radio button (channel 4)

s) Radio receiver (optional) [X4]

If an optional radio receiver is installed, as described in the radio receiver instructions, the following functions are available:

Channel	Function
1	“Pulse” (page 10f)
2	“Open” (see table)
3	“Closed” (see table)
4	Partial opening function (page 11), or Universal output (menu “F” = 02)

Radio command causes	Menu “C” value	While opening	While closing
“Open” (channel 2)	00	Stop	Stop
	01	-	closes
	02	Stop	Stop
	03	-	closes
“Closed” (channel 3)	00	Stop	Stop
	01	Stop	Stop
	02	opens	-
	03	opens	-

7) Putting into Service [X2]

If the control unit has been installed and connected as described, it can now be put into service:

- First, check whether all **non-connected inputs** are closed, as far as necessary, e.g. at the inputs for ...
 - Emergency stop (page **Fehler! Textmarke nicht definiert.**)
 - Photoelectric barrier (page **Fehler! Textmarke nicht definiert.**)
 - Closing edge safety device (page **Fehler! Textmarke nicht definiert.**)
- Ensure safety, regarding the remaining part of the **whole system**, in particular ...
 - ensure that when the motor is started up nobody can be injured and the system cannot be damaged.

It makes sense, when switching the gate on for the first time, for the gate to be in the **middle** of the gate path, to allow sufficient reaction time if unexpected movements occur.

If you now switch on the system voltage, a complete **self-test** (see page 17) is now carried out.

[X2.1] The **display** first displays "**88**" and then "**CH**" as an indication that the self-test is running.

a) The LEDs on the printed circuit board

signal the switched condition of the respective **inputs / outputs**:

[X6.1] At terminals **23...39**, lit LEDs mean that the respective **inputs** have been triggered or are not closed off.

[X6.2] At terminals **40...42**, lit LEDs mean that the respective **limit switch has triggered**, i.e. the gate is in this limit position.

[X2.5] The lit LEDs **under the display** mean that the outputs for **light and warning light** conduct voltage at **terminals 9...11**.

[X2.1] The **left-hand display point** lights up if a signal from the **speed sensor** is received at **terminals 19...20**.

[X2.1] The **right-hand display point** lights up, if **automatic closing** is activated.

b) The LEDs on the membrane keyboard [X5]

signal the **gate status** and indicate error statuses:

[X5.1] The "**Running**" LED lights up...

- continuously during normal operation
- flashes if errors occur according to the "error messages" table.

[X5.2] The LED "**A**" (gate) lights up...

- continuously, if the gate is in the limit position "Open",
- does not (= off), if the gate is in the limit position "Closed",
- flashes slowly (0.5Hz), if the gate is stopped along the gate's path,
- flashes quickly (4 Hz), if the gate is moving open or closed.

[X5.3] The LED "**B**" (radio) lights up if a valid **radio command** has been analysed.

[X5.4] The LED "**S**" lights up if an error has been detected (e.g. a sensor triggered or Emergency Stop or undervoltage).

c) Displayed errors [X2.1], [X5.4]

Code in the display [X2.1]	LED "S" flashes [X5.4]	Possible cause	Remedy
E1	1x	control unit: Watchdog test negative	Switch off voltage, wait 10sec, switch voltage back on. If error message remains, a hardware error exists in the control unit. The control unit must be replaced.
E2	2x	Speed sensor: No signal detected 0.5s after motor start	Renewed motor start. If the error message remains: a) check connections b) check sensor type (menu "0") c) switch off sensor (menu "0" set to 00) d) Replace sensor/control unit
E3	3x	photoelectric barrier: Self-test negative	Switch off voltage, wait 10sec, switch voltage back on. If error message remains: a) Check setting menu "8" and "F" (external LS test) with respect to connected photoelectric barrier. b) Check connection of the photoelectric barrier (power supply and signal output) c) if a) and b) correct, there is possibly a hardware error in the control unit. The control unit must be replaced.
E4	4x	safety strips: Self-test negative	Switch off voltage, wait 10sec, switch voltage back on. If error message remains: a) Check setting menu "1"... "4" with respect to connected safety strip. b) Check connection of the safety strip (resistance/function) c) if a) and b) correct, there is possibly a hardware error in the control unit. The control unit must be replaced.
E5	5x	Motor control: the gate has not left the limit switch within 2s of starting	Restart motor. If error remains. Gate won't move: Check mechanics (motor, transmission, emergency unlocking, gate frozen) Gate moves: Check limit switch, contact, wiring.
		or speed signal in idle mode.	Unauthorised speed signal at terminal 19 and 20. Check sensor possibly switch off (Menu "0" set to 00) or replace.
E6	6x	control unit: ROM-test negative	Switch off voltage, wait 10sec, switch voltage back on. If error message remains, there is a hardware error in the controller. The control unit must be replaced.
E7	7x	control unit: RAM-test negative	Switch off voltage, wait 10sec, switch voltage back on. If error message remains, there is a hardware error in the controller. The control unit must be replaced.
E8	8x	control unit: EEPROM test negative	Switch off voltage, wait 10sec, switch voltage back on. If the error message remains, the stored value of the control unit is invalid. The control unit must be reset (see page Fehler! Textmarke nicht definiert.)
E9	9x	The gate was moved from the limit position "Closed" in idle mode	a) A break-in attempt exists. b) The emergency release has been actuated. c) Limit switch in the limit position no longer actuated
LP	--	undervoltage, possible overload	The power supply voltage to the control unit is temporarily or continuously too low. a) Check mains connection. (measure 230V) b) Low voltage output overloaded (too many loads connected at terminals 20-22? Disconnect to check) c) External control stations not floating

If the cause of the error has been removed, you can quit the error message by entering the next command (not by radio!).

8) Programming [X2]

This chapter describes how you can change the preset default values in the control unit. Which values are available and what effect they have is described in chapter 5, next to the respective possible connections.

a) Functions of the pushbuttons

[X2.2] Key "↑" value + / Menu + / Test and pulse function Open-Stop-Closed-Stop-...

[X2.4] Key "↓" value - / Menu -

[X2.3] Key "**Menu**" menu management with 7 segment display

b) Start programming mode

- For safety reasons the motor is locked in programming mode, as if Emergency stop has been actuated.
- Keep the "**Menu**" key pressed for longer than 1s, ...
- until in the **left-hand display segment** the digit for the **Menu "0...L"** appears.
- If you do **not press any key for longer than 15s** or press the "**Menu**" key for **longer than 1s**, the programming mode is switched **off** again.

c) Select menu / change value

- You can use the arrow **keys "↑↓"** to now select the menu "0...L".
- If you now briefly press the "**Menu**" key, the value just set for this menu item appears in the display.
- You can now use the "**↑↓**" keys to change the value, as described on pages 8...16.
- The **value is immediately adopted**, as soon as you set it.

d) Reset

You can reset the values to the **factory default settings**, by pressing **both "↑↓" keys in "Function" mode** (approx 5s) until the two points in the display **stop flashing**.

e) Change block

You can block the control panel on the printed circuit board so that the menu values can only be read, however, it is not possible to change the values.

- To do this, go to **Menu "L"**, as described under a) and b).
- Then **simultaneously** press both "**↑↓**" keys and the "**Emergency stop**" button.
- You can now use the "**Menu**" key to switch the value in **Menu "L"** between...
 - **00** = free, changes possible
 - **01** = blocked, page through menu only

This block feature is useful, e.g. during a phone diagnosis, in order to enable you to read off the menus and notify the person at the other end without accidentally changing anything.

f) Quit programming mode

If you do not press any key for longer than 15s or press the "Menu" key for longer than 1s, programming mode is terminated. The values are already accepted, as soon as you set them.

The factory default settings are given in the table from page 20.

9) Operation

This chapter is intended for the fitter and further processing industry – however it is not for issuing to the owner/operator of the gate system.

The end product manufacturer is responsible for preparing instructions for the gate system suitable for issuing to the owner/operator.

You can find information on this e.g. in the following standards and regulations:

- ZH 1/494: Guidelines for power operated doors and gates
- DIN EN 60335-2-95: Requirements for vertically moved garage gates in residential facilities
- EN 12445 + EN 12453: Safe use of power-operated gates
- DIN EN 62079: Instructions

There are also legal requirements for regular checking of the safety devices.

You must point out to the owner/operator that if drive units are remotely controlled, they must always have direct eye contact with the moving gate in order to avoid accidents.

a) Self-test

The control unit constantly performs various self-tests. If an error occurs the control unit is locked and an error message is displayed (see table on page 15).

Faulty self-tests are automatically repeated after around 1 min. If an error then occurs again, the next self-test is carried out by an external command (e.g. Pulse, but not via radio).

Self-tests are carried out...

- immediately after the control unit is switched on,
- around 1s after reaching the limit position "Closed",
- after a motor has been running for 20 min,
- around every 4 h in idle mode.

If an error message occurs continuously please contact our service department.

b) Normal operation [X2.1], [X5.1]

After a successful self-test, the control unit is ready to use.

This is indicated at the **LEDs** in the optional membrane keyboard [X5.1] if ...

- the green LED "running" is lit,
- the red LED "S" however, is not lit.

Or by a **transverse bar** in the left-hand display segment [X2.1].

Bar in left-hand display segment	Gate status
At top	limit position "Open"
In the middle	gate at standstill along the path
At bottom	limit position "Closed"
moves upwards	Opening
Moves downwards	Closing

You can now operate the gate system, either...

- via the **external control station**, as connected in chapter 6)
- or via die **membrane keyboard** (optional) [X5.5]..[X5.7]

In this case the gate moves...

- **open** when you press **↶** [X5.5]
- **closed** when you press the Key **↷** [X5.7].

The "Stop" key [X5.6] on the membrane keyboard has the same function, as Stop as external control station.

LED "A" on the front membrane [X5.2]	Gate status
Continuously on	limit position "Open"
Continuously off	limit position "Closed"
Flashes slowly (0.5Hz)	gate stopped along the path
Flashes quickly (4Hz)	Opening or closing

Before each motor start the warning light indicates the motor will be starting soon as an advance warning. Both the time and running direction for this can be set (Menu "6", page **Fehler! Textmarke nicht definiert.**).

c) Emergency operation

In order to enable controlled movement of the gate when safety equipment (closing edge safety device, photoelectric barrier) is continuously actuated (e.g. in case of a defect in a safety device)

- keep one of the external "Open" / "Closed" buttons pressed for longer than 15s,
- until the warning light goes on.
- When you release the button the named waiting times are reset and the gate's movement is interrupted. Simply repeat these steps for another 2s movement.

Note: It must be an external button or a membrane keyboard key.

Emergency operation is not possible via radio!

d) Read out trip counter

The "H" menu is a pure display menu – it shows the number of "Open" movements of the gate system to date.

- Go to Menu "H", as described on page 16.
- The position of the number to be displayed is shown in the left-hand display segment, the corresponding value of the position is displayed in the right-hand display segment

Example: The consecutive display of the numbers 00 14 25 33 48 52 6- 7- therefore means 045382-- movements, this is the number displayed one after the other in the right-hand display segment.

10) Disposal

The control unit does not contain any materials for which known disposal regulations exist at the time these instructions were written (November 2005). The control unit does not contain any built-in energy sources.

11) Extensions/Add-Ons

[X3]

On the printed circuit board there are three slots for optional extensions/add-ons, which have already been partly covered in these instructions:

[X3.1] For the "Open", "Closed", "Pulse" and "Partial opening" functions or the universal-output, a **radio receiver** can be installed in the "**Radio**" slot (see page 13)

[X4]. This is described in greater detail in the installation instructions for the radio receiver.

[X3.2] At "**Slot A**" the optional available multi-functional card MMZ442-50 can be inserted with the following functions:

- One way road (red/green traffic signal lights)
- Display motor run via traffic signal lights
- Limit position display (gate open or closed)
- Diverse service functions

The **MMZ442-50** card works correctly from software version V1.2 for the motor control unit.

[X3.3] An optional membrane keyboard can be connected to the control unit (see pages **Fehler! Textmarke nicht definiert.**, 14, 17). For space reasons, its use is not recommended together with the plug-in card MMZ442-50.

12)

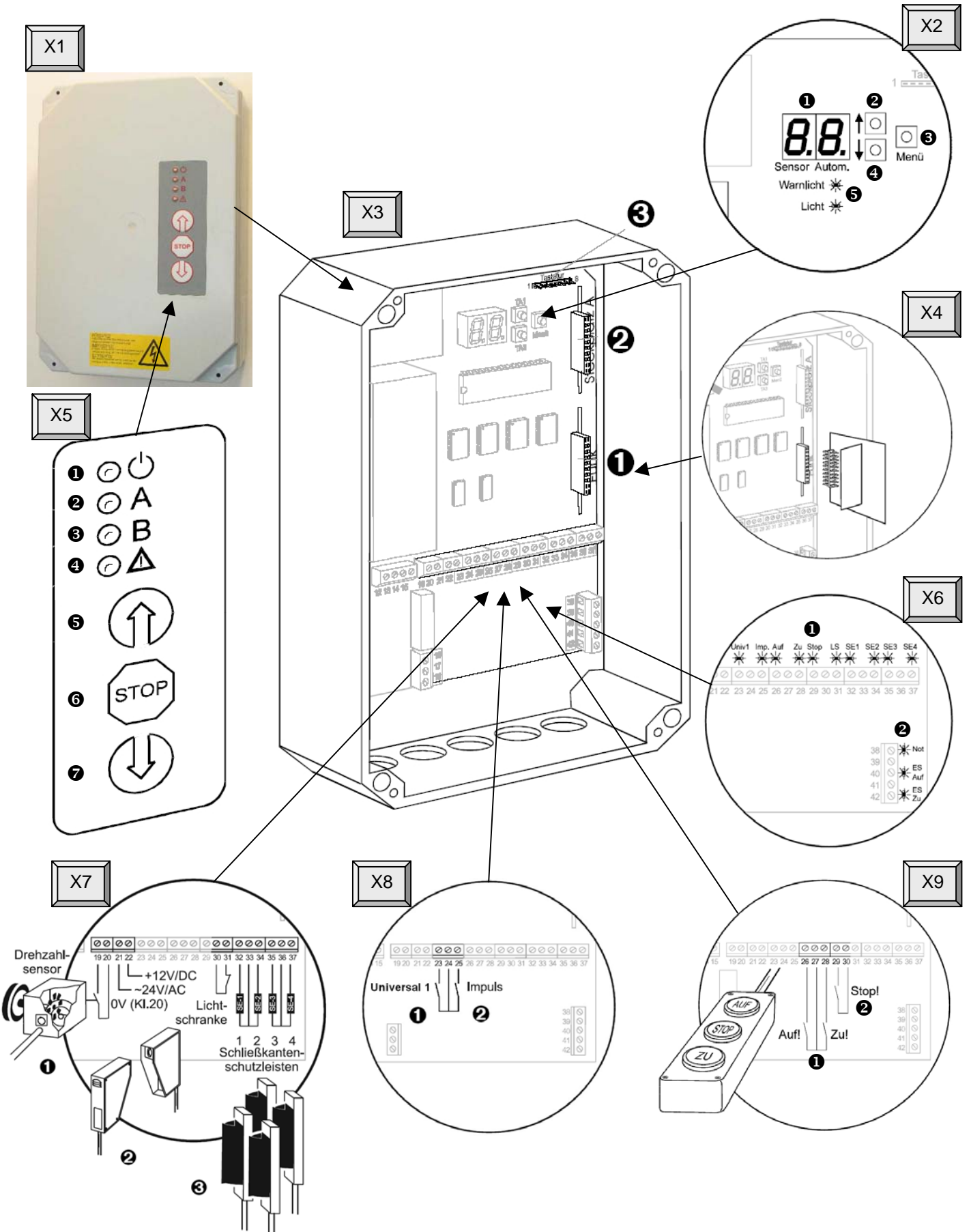
Menu Table

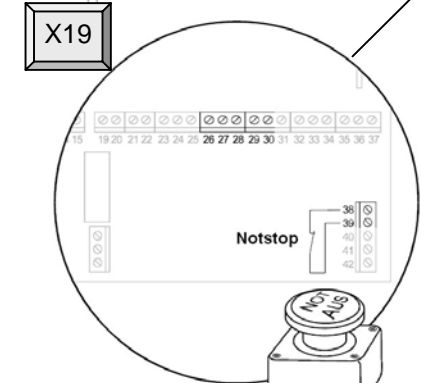
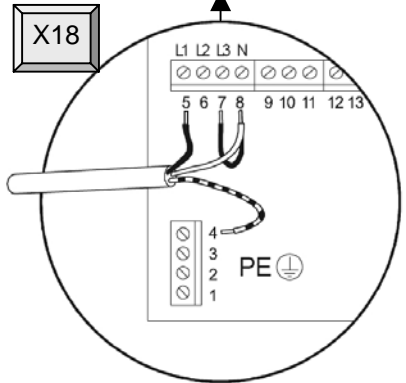
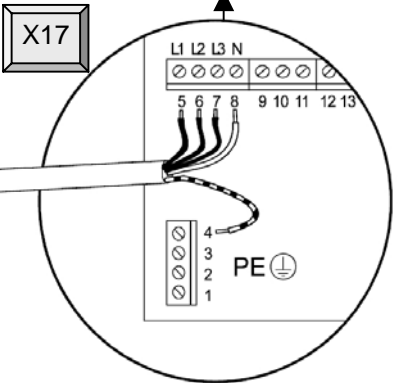
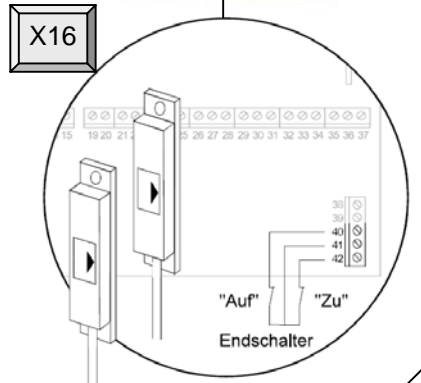
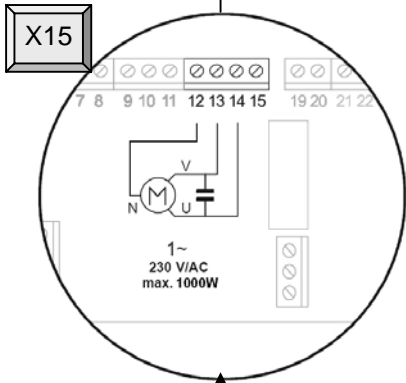
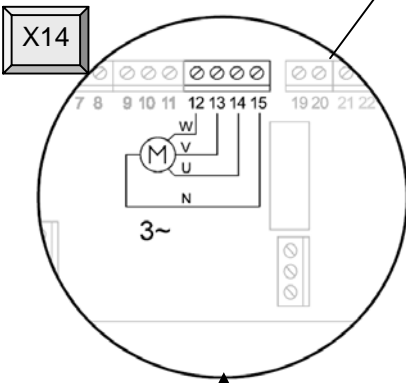
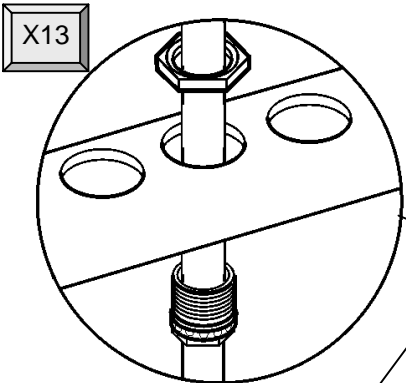
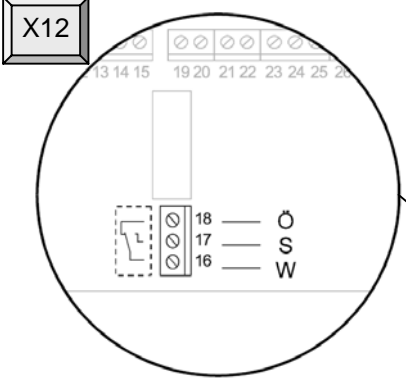
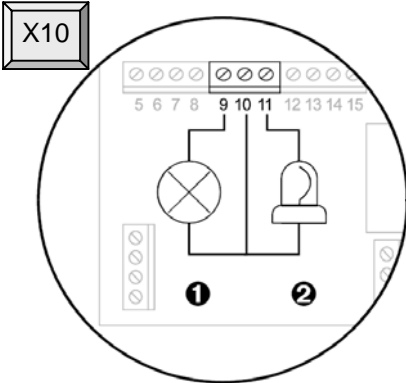
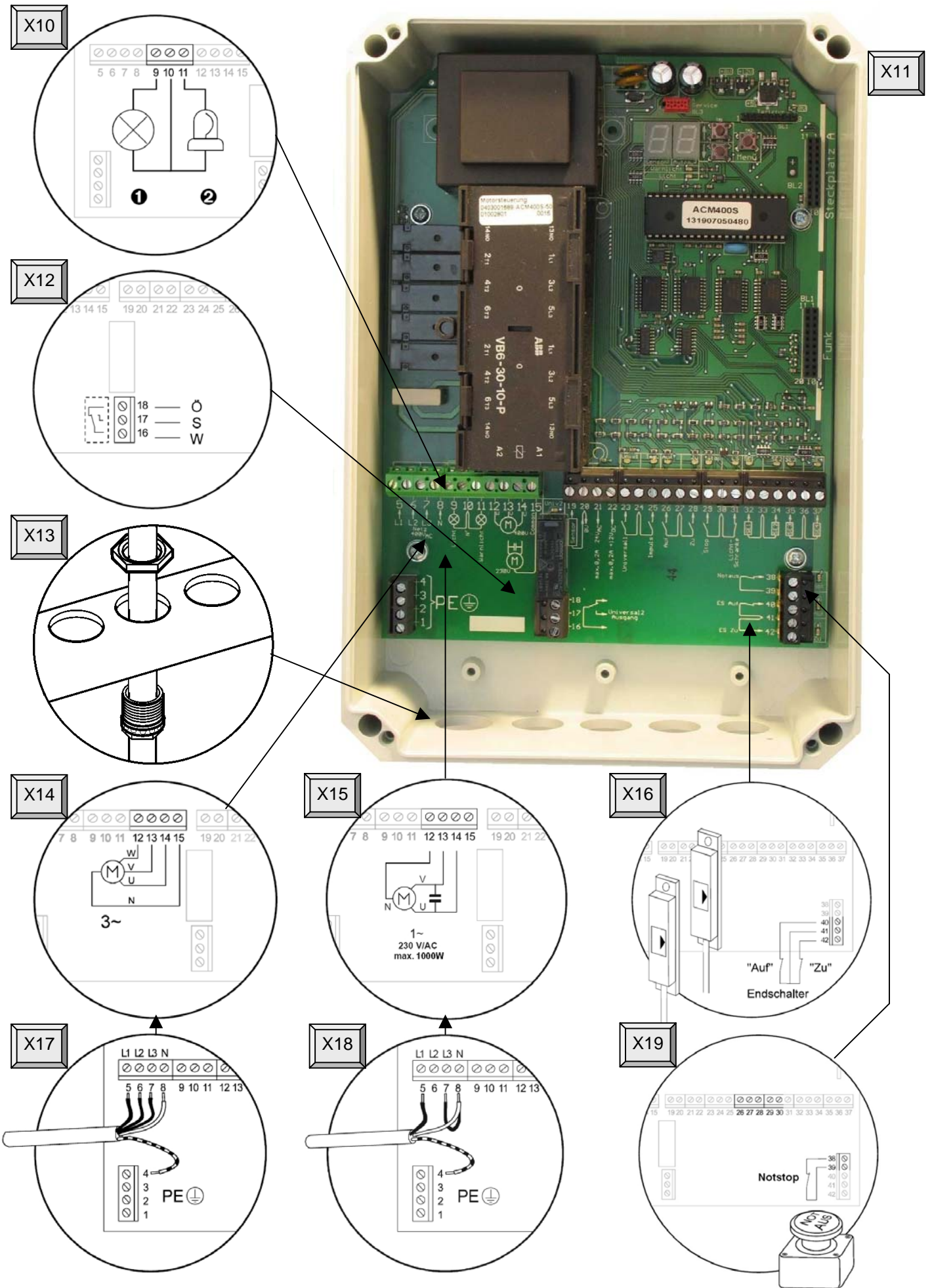
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1	00...31	Function of the CLOSING EDGE SAFETY DEVICE SE1 <table border="1"> <thead> <tr> <th></th> <th>Strip</th> <th>Opening</th> <th>Closing</th> </tr> </thead> <tbody> <tr> <td>00⇒</td> <td>8K2</td> <td>No effect</td> <td>No effect (test purposes)</td> </tr> <tr> <td>01⇒</td> <td>8K2</td> <td>No effect</td> <td>Stop</td> </tr> <tr> <td>02⇒</td> <td>8K2</td> <td>No effect</td> <td>Release</td> </tr> <tr> <td>03⇒</td> <td>8K2</td> <td>No effect</td> <td>Reversing</td> </tr> <tr> <td>04⇒</td> <td>8K2</td> <td>Stop</td> <td>No effect</td> </tr> <tr> <td>05⇒</td> <td>8K2</td> <td>Stop</td> <td>Stop</td> </tr> <tr> <td>06⇒</td> <td>8K2</td> <td>Stop</td> <td>Release</td> </tr> <tr> <td>07⇒</td> <td>8K2</td> <td>Stop</td> <td>Reversing</td> </tr> <tr> <td>08⇒</td> <td>8K2</td> <td>Release</td> <td>No effect</td> </tr> <tr> <td>09⇒</td> <td>8K2</td> <td>Release</td> <td>Stop</td> </tr> <tr> <td>10⇒</td> <td>8K2</td> <td>Release</td> <td>Release</td> </tr> <tr> <td>11⇒</td> <td>8K2</td> <td>Release</td> <td>Reversing</td> </tr> <tr> <td>12⇒</td> <td>8K2</td> <td>Reversing</td> <td>No effect</td> </tr> <tr> <td>13⇒</td> <td>8K2</td> <td>Reversing</td> <td>Stop</td> </tr> <tr> <td>14⇒</td> <td>8K2</td> <td>Reversing</td> <td>Release</td> </tr> <tr> <td>15⇒</td> <td>8K2</td> <td>Reversing</td> <td>Reversing</td> </tr> <tr> <td>16⇒</td> <td>OSE</td> <td>No effect</td> <td>No effect (test purposes)</td> </tr> <tr> <td>17⇒</td> <td>OSE</td> <td>No effect</td> <td>Stop</td> </tr> <tr> <td>18⇒</td> <td>OSE</td> <td>No effect</td> <td>Release</td> </tr> <tr> <td>19⇒</td> <td>OSE</td> <td>No effect</td> <td>Reversing</td> </tr> <tr> <td>20⇒</td> <td>OSE</td> <td>Stop</td> <td>No effect</td> </tr> <tr> <td>21⇒</td> <td>OSE</td> <td>Stop</td> <td>Stop</td> </tr> <tr> <td>22⇒</td> <td>OSE</td> <td>Stop</td> <td>Release</td> </tr> <tr> <td>23⇒</td> <td>OSE</td> <td>Stop</td> <td>Reversing</td> </tr> <tr> <td>24⇒</td> <td>OSE</td> <td>Release</td> <td>No effect</td> </tr> <tr> <td>25⇒</td> <td>OSE</td> <td>Release</td> <td>Stop</td> </tr> <tr> <td>26⇒</td> <td>OSE</td> <td>Release</td> <td>Release</td> </tr> <tr> <td>27⇒</td> <td>OSE</td> <td>Release</td> <td>Reversing</td> </tr> <tr> <td>28⇒</td> <td>OSE</td> <td>Reversing</td> <td>No effect</td> </tr> <tr> <td>29⇒</td> <td>OSE</td> <td>Reversing</td> <td>Stop</td> </tr> <tr> <td>30⇒</td> <td>OSE</td> <td>Reversing</td> <td>Release</td> </tr> <tr> <td>31⇒</td> <td>OSE</td> <td>Reversing</td> <td>Reversing</td> </tr> </tbody> </table>		Strip	Opening	Closing	00⇒	8K2	No effect	No effect (test purposes)	01⇒	8K2	No effect	Stop	02⇒	8K2	No effect	Release	03⇒	8K2	No effect	Reversing	04⇒	8K2	Stop	No effect	05⇒	8K2	Stop	Stop	06⇒	8K2	Stop	Release	07⇒	8K2	Stop	Reversing	08⇒	8K2	Release	No effect	09⇒	8K2	Release	Stop	10⇒	8K2	Release	Release	11⇒	8K2	Release	Reversing	12⇒	8K2	Reversing	No effect	13⇒	8K2	Reversing	Stop	14⇒	8K2	Reversing	Release	15⇒	8K2	Reversing	Reversing	16⇒	OSE	No effect	No effect (test purposes)	17⇒	OSE	No effect	Stop	18⇒	OSE	No effect	Release	19⇒	OSE	No effect	Reversing	20⇒	OSE	Stop	No effect	21⇒	OSE	Stop	Stop	22⇒	OSE	Stop	Release	23⇒	OSE	Stop	Reversing	24⇒	OSE	Release	No effect	25⇒	OSE	Release	Stop	26⇒	OSE	Release	Release	27⇒	OSE	Release	Reversing	28⇒	OSE	Reversing	No effect	29⇒	OSE	Reversing	Stop	30⇒	OSE	Reversing	Release	31⇒	OSE	Reversing	Reversing	06	
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5	00...95	AUTOMATIC CLOSING / KEEP OPEN TIME 00 ⇒ Switched off 01...82 ⇒ 2...164s in 2s steps 83 ⇒ 3min, 84 ⇒ 4min, 85 ⇒ 5min, 86 ⇒ 6min, ... , 95 ⇒ 15min Additionally 5 seconds warning time each	00 (Off)																																																																																																																																					
6	00...04	WARNING LIGHT function 00 ⇒ Only while motor running 01 ⇒ 4s before motor starts Open + Closed, while motor running 02 ⇒ 10s before motor starts Open + Closed, while motor running 03 ⇒ 4s before motor starts Closed, while motor running 04 ⇒ 10s before motor starts Closed, while motor running	00 (while motor running)																																																																																																																																					
7	00...62	LIGHT function 00...60 ⇒ Lit time of 0...600s in 10s steps 61 ⇒ Light output has gate status display 62 ⇒ Short pulse when motor started	18 (3.0min)																																																																																																																																					

8	00...18	Function of the PHOTOELECTRIC BARRIER	05																																																									
		<table border="1"> <thead> <tr> <th>Opening</th> <th>Closing</th> <th></th> </tr> </thead> <tbody> <tr> <td>00⇒ No effect</td> <td>No effect</td> <td>(test purposes)</td> </tr> <tr> <td>01⇒ No effect</td> <td>Stop</td> <td></td> </tr> <tr> <td>02⇒ No effect</td> <td>Release</td> <td></td> </tr> <tr> <td>03⇒ No effect</td> <td>Reversing</td> <td></td> </tr> <tr> <td>04⇒ Stop</td> <td>No effect</td> <td></td> </tr> <tr> <td>05⇒ Stop</td> <td>Stop</td> <td></td> </tr> <tr> <td>06⇒ Stop</td> <td>Release</td> <td></td> </tr> <tr> <td>07⇒ Stop</td> <td>Reversing</td> <td></td> </tr> <tr> <td>08⇒ Release</td> <td>No effect</td> <td></td> </tr> <tr> <td>09⇒ Release</td> <td>Stop</td> <td></td> </tr> <tr> <td>10⇒ Release</td> <td>Release</td> <td></td> </tr> <tr> <td>11⇒ Release</td> <td>Reversing</td> <td></td> </tr> <tr> <td>12⇒ Reversing</td> <td>No effect</td> <td></td> </tr> <tr> <td>13⇒ Reversing</td> <td>Stop</td> <td></td> </tr> <tr> <td>14⇒ Reversing</td> <td>Release</td> <td></td> </tr> <tr> <td>15⇒ Reversing</td> <td>Reversing</td> <td></td> </tr> <tr> <td>16⇒ No effect</td> <td>Reversing</td> <td>Closure 0.5s after LS warning time 0,5s</td> </tr> <tr> <td>17⇒ No effect</td> <td>Reversing</td> <td>Closure 3.0s after LS warning time 1.5s</td> </tr> <tr> <td>18⇒ No effect</td> <td>Reversing</td> <td>Closure 7.0s after LS warning time 4.0s</td> </tr> </tbody> </table>			Opening	Closing		00⇒ No effect	No effect	(test purposes)	01⇒ No effect	Stop		02⇒ No effect	Release		03⇒ No effect	Reversing		04⇒ Stop	No effect		05⇒ Stop	Stop		06⇒ Stop	Release		07⇒ Stop	Reversing		08⇒ Release	No effect		09⇒ Release	Stop		10⇒ Release	Release		11⇒ Release	Reversing		12⇒ Reversing	No effect		13⇒ Reversing	Stop		14⇒ Reversing	Release		15⇒ Reversing	Reversing		16⇒ No effect	Reversing	Closure 0.5s after LS warning time 0,5s	17⇒ No effect	Reversing
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9	00 / 01	EMERGENCY STOP 00 ⇒ keep open time (automatic closing) starts again from beginning after Emergency stop. 01 ⇒ After Emergency stop Automatic closing is blocked until next command.	01 (Block AZ)																																																									
A	00...60	UNIVERSAL INPUT function: 00 ⇒ Time switch: Automatic closing only when closed contact 01...60 ⇒ Partial opening function with 1...60s partial opening time	05 (5s partial opening)																																																									
B	00...15	RELEASE TIME Release after photoelectric barriers or safety strips command 00...15 ⇒ 0.25s...4,00s in 0.25s steps	07 (2.00s)																																																									
C	00...03	RADIO OPEN / CLOSED while motor running 00 ⇒ FUNK-OPEN: Stop during opening, Stop while closing (panic function) RADIO CLOSED: Stop while opening, Stop while closing (panic function) 01 ⇒ RADIO OPEN: No effect while opening, Reversing while closing RADIO CLOSED: Stop while opening, Stop while closing (panic function) 02 ⇒ RADIO OPEN: Stop while opening, Stop while closing (panic function) RADIO CLOSED: Reversing while opening, no effect while closing 03 ⇒ RADIO OPEN: No effect while opening, Reversing while closing RADIO CLOSED: Reversing while opening, no effect while closing	00 (Panic function)																																																									
D	00...03	inputs OPEN / CLOSED while motor running 00 ⇒ OPEN: Stop while opening, Stop while closing (panic function) CLOSED: Stop while opening, Stop while closing (panic function) 01 ⇒ OPEN: No effect while opening, Reversing while closing CLOSED: Stop while opening, Stop while closing (panic function) 02 ⇒ OPEN: Stop while opening, Stop while closing (panic function) CLOSED: Reversing while opening, no effect while closing 03 ⇒ OPEN: No effect while opening, Reversing while closing CLOSED: Reversing while opening, no effect while closing	00 (Panic function)																																																									
E	00...03	PULSE / DEAD MAN's mode with OPEN / CLOSED input 00 ⇒ OPEN: Pulse CLOSED: Pulse 01 ⇒ OPEN: Pulse CLOSED: dead man's 02 ⇒ OPEN: dead man's CLOSED: Pulse 03 ⇒ OPEN: dead man's CLOSED: dead man's	00 (Pulse)																																																									
F	00 / 01	UNIVERSAL OUTPUT 2 00 ⇒ Photoelectric barrier test (interruption in transmitter voltage) 01 ⇒ Traffic signal lights (idle position in limit position "Open", otherwise always connected)	01 (Traffic signal light)																																																									
H	Display only!	READ OUT TRIPS COUNTER Left position: "0"... "5", right position corresponds to 100,000s... 1s	-																																																									
L	00 / 01	SERVICE MODE 00 ⇒ Control panel unblocked, normal setting possibilities 01 ⇒ Control panel locked, no changes possible. Change from Menu "F": Emergency stop, Key + and Key - actuated, ⇒ Switch over with menu key!	00 (unblocked/released)																																																									

13)

Figures/Diagrams





14)

Block CIRCUIT DIAGRAM

