Motor controller ACM400S
Assembly and operating manual
(Translation of original operating manual)



1 Data summary and functions

General

- 1 or 2-motor door control system for 400V AC 3~ motors until 2,000VA 25% ED **or**
- 1-motor door control system for 230V AC 1~ motors until 1,000VA 25% ED
- For turning, sliding, folding, rolling, tilting and swing doors in residential and industrial areas
- Motors / tubular motors with integrated limit switches cannot be operated or can only be operated with certain settings. For details, see point 13.7 “Tubular motor operation”.

Inputs

- Operating voltage
- Impulse
- OPEN-STOP-CLOSED
- Emergency stop (safety input cat. 1)
- Limit switch (safety input cat. 1)
- Light barriers (safety input cat 2 / PL C)
- 4 x closing edge protection (optical bar OSE or 8k2) (safety input cat 2 / PL C)
- RPM sensor (motor monitoring by RPM sensor, optional)
- Universal 1

Outputs

- Motor
- Light
- Warning light
- Universal 2
- 12V DC
- 24V AC

Functions

- Part opening
- Trip counter
- Radio / traffic lights / one-way street over plug-in cards (optional).

Operating modes / type of end position detection

- Limit switch operation (absolutely necessary)

Safety features

- Self-monitoring inputs for light barriers and closing edge protection
- Motor monitoring by RPM sensor (optional)
- Start-up monitoring through time control of the limit switch
- Travel route monitoring by light barrier and up to four safety device safety bars
- Self-monitoring functions of the controller Watchdog, RAM/ROM and EPROM, undervoltage
- All-pole motor shutdown
- Motor runtime limit

Plug-in cards (optional)

- Radio receiver
- MMZ442 (traffic lights, one-way street, end position, fault test)

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3 Safety notes

3.1. Symbols used



BEWARE!
Risk of personal injury!
The following important safety instructions must absolutely be observed to prevent personal injury!



CAUTION!
Risk of property damage!
Here are important instructions which must be followed to avoid property damage.



Information / note
In the following is information and instructions for the control unit and its operation.



ESD hazard
Instructions for possible failure due to static electricity.

3.2. Basic safety notes

- **This control system is build according to**
  - **EN 12453 (Safety in the use of power operated doors, requirements)**
  - **EN 12978 (Safety devices for power operated doors, requirements and test methods)**
  - **Low Voltage Directive 2006/95/EC**
  - **EMC Directive 2004/108/EC**
  - **EN 13849-1 / 2008 (safety of machinery)**

  and left the factory in safe and sound condition.
- **These installation and operating instructions must be read, understood and followed by the person who installs, connects, operates and services this control system. The manufacturer is not liable for damages, consequential damages or operational errors arising due to non-observance of these installation and operating instructions.**
- **The accident prevention regulations and relevant standards in force must be observed at the installation site.**
- **Before working on the controller, disconnect the controller from the power supply and secure it against reconnection.**
- **Following installation and commissioning, all users must be trained in the functions and operation of the system. All users are to be informed of the hazards and risks posed by the system and their user and testing obligations. Documentation of these points is recommended.**
- **Do not allow children or non-authorised persons to operate the door control.**
- **When opening or closing the door, no persons, animals or objects may be present in the operating range of the door.**
- **Operation of the control is only safe if used as directed and in compliance with the limits specified in the "technical data"!**
- **After installation, the fitter who has final responsibility for the door drive must check whether the maximum closing force is in accordance with the standards EN 12445 (Safety in use of power operated doors, test methods) and EN 12453 Safety in use of power operated doors, requirements) and the standards, regulations and guidelines which are applicable at each installation site!**
- **Due to the various setting options, settings for the operated machine can also be adopted which could clearly be illogical, unreliable or dangerous. This is not a matter of an error or shortcoming in the controller. The fitter / plant manager must carefully check the adopted settings for this and change them if necessary.**

3.3. Safety regulations

During assembly, installation, commissioning, testing and maintenance of the controller, the safety and accident prevention regulations for the specific application must be observed. Particularly the following regulations (not exhaustive):

- **Machine Directive 2006/42/EC**
- **EN 12453 (Safety in the use of power operated doors, requirements)**
- **EN 12445 (Safety in the use of power operated doors, test methods)**
- **EN 12978 (Safety devices for power operated doors, requirements and test methods)**
- **EN 60335 (Safety of electrical appliances for household use and similar purposes)**
- **Fire prevention regulations**
- **Accident prevention regulations ASR A1.7 (power-operated windows, doors and gates) (previously BGR232 and ZH1/494)**

3.4. Storage / Shipping / Packaging

- **Storage conditions: -25°C to + 80°C at 20 to 90% relative humidity, non-condensing.**
- **The existing packaging is only used as a surface protection and is not permitted for direct further shipping. Shipping must only be done in a sufficiently padded additional package. Damages due to non-compliance are not covered in the manufacturer's liability.**

3.5. Use of wireless remote control units (optional)

- **These remote control units are only approved for use with devices and systems where a functional problem in the transmitter or receiver does not result in a hazard for people, animals or property hazard or this risk is covered by other safety equipment.**
- **The user must be informed that the wireless remote control of doors systems with a risk of accidents is only permissible, if at all, with direct eye contact to the door system and when the motion range must be free of people, animals and objects.**
- **Store the transmitter so that unwanted activation, e.g. by children or animals, is impossible.**
- **The wireless remote control units in use work on generally-approved frequencies (ISM bands). The operator of such wireless remote control units is not protected from faults caused by other wireless systems or devices (e.g., wireless systems being operated in the same frequency range such as baby phones, intercoms, etc.).**

4 Intended use

- This motor controller is designed for 400V (230V) AC drives in one or two-engine door systems, such as turning, sliding, folding, rolling, tilting and swing doors in residential and industrial areas.
- In accordance with the legal requirements and guidelines in this manual.
- Only motors, control devices and sensors which are in good working condition may be connected and used for their intended purpose, safely and risk-aware, according to these instructions.

4.1. Assembler / installer

- These instructions require knowledge from electrical technicians, who can evaluate the work required from you, detect possible sources of danger and take the suitable safety measures.
- This manual is designed for the fitter /installer of the control system as well as the further processing industry, but not for submission to the operator of the door system.
- This manual is to be kept with the technical documentation of the system.
- The fitter / installer is to create a manual which is tailored to the complete door system.

4.2. CE marking

- The motor controller is only considered as a "complete machine" within the meaning of the machinery directive when it is complete with the motor, control devices, sensors and the door system.
- The manufacturer of the "ready-to-use door system" is responsible for compliance and the declaration of CE conformity. This is usually the assembler / installer who is responsible.

Information / note
For the complete system (machine),
an EC declaration of conformity in accordance with the Machinery Directive 2006/42/EC must be issued, and the CE label and nameplate must be attached. This also applies to residential areas, where a previously manually operated door system has been automated by means of retooling.

4.3. Legal requirements

The control meets the requirements according to:

- **DIN EN 50081 T1/2** and **EN 55011** and **EN 55014**. (conformity assessment according to EMC Directive)
- **VDE 0700 Part 95** (version 02/98; IEC 60335-2-95)
- **EN 12445** and **EN 12453** (Requirements on motor control systems for “power operated doors and gates”,
  previously ZH 1/494
- **DIN EN 60335-1**. (Declaration of Conformity according ot the “Low Voltage Directive”)
- **EN ISO 13849-1**, Cat.2, PL d, Functional safety of the functions of the light barrier evaluation and safety switch bar evaluation.

5 Improper use

Any use other than the intended use shall be considered improper use for which the manufacturer is not liable. The fitter, electrician or operating organisation bears the risk and the liability here.

6 Terms used

In this manual, the following non-everyday terms are used:

6.1. OSD

Self-monitoring **O**ptical **S**afety **D**evice as a light barrier or closing edge protection / contact strip.

6.2. 8k2 safety bar

Closing edge protection / contact bar

6.3. Release / release time

The door only moves in the “opposite direction” for the set release time, in order to release an obstacle.

6.4. Reversing

The door travels in the “opposite direction” until reaching the end position.

6.5. Panic function

With the panic function, a “targeted” Open / Close command always leads to a stop during a door movement. Only a further actuation starts the door in the desired direction of movement.

6.6. Part opening

The gate can be specifically moved to a pre-selected position between the limit switches (e.g.: clearance for persons).

7 Abbreviations used

[BL.1]	= “Radio”, 2x10 pin slot for radio receivers
[BL.2]	= “Slot A”, 2 x 10-pole slot for additional MMZ card.
[BL.3]	= Slot for service functions (manufacturer)
[SL.1]	= 8-pin contact strip, membrane keyboard connection (housing cover)

[Kl.1] .. [Kl.42] = Reference to connecting terminals
[M.0]..[M.L] = Menu table, menu points, “0” to “L”
[Ta.+] = Button “**+**” in control panel = ↑
[Ta.-] = Button “**-**” in control panel = ↓
[Ta.M] = Button “Menu” in control panel
[X1]..[X9] = Reference to image
E1 to E9 & LP = Error / fault message, shown on the display

8 Assembly

8.1. Assembly screws

This needs 4 screws with a shaft diameter of max. 4mm and a head diameter of max. 8mm.

8.2. Assembly location

- Please refer to the technical data for the environmental conditions; see page 29
- Do not select any assembly location which is exposed to electromagnetic fields. That is, not directly next to contactors, power transformers, fluorescent lights, etc. or their connection wires.
- Safe protection from direct sunlight and driving rain must be guaranteed.
- When the design is used with an integrated membrane keyboard, then the assembly location should, just like external controls, be situated in a secure server area and within sight of the main closing edge.



Information / note
An installation site (indoor area, north side, etc.) with protection from direct sun increases the service life of the controller about tenfold!

8.3. Assembly

- The internal temperature measurement is designed for vertical mounting.
  The images [X1] and [X3], point show the assembly, where the lines are to be fed from below and sealed with the provided plugs / screws, to prevent the ingress of moisture and insects.
- Consider the weight of the control system when choosing the type of mounting (technical data) page 29 point 21).
- Mount the control box properly at the suitable location.



Information / note

- The housing may not be tensioned during screwing (uneven surface). There is the risk that the cover is not properly sealed, that water enters and the controller fails.
- During assembly, no moisture may get into the controller! This could result in corrosion, defects, failure of the controller and risk to people and property!

9 Connection / Commissioning / Programming / Reset



BEWARE!

- Read the safety instructions under point 3 again and follow them exactly!
- During first installation / commissioning, the safety devices are only partly connected or are not yet effective! This, therefore, requires caution to avoid personal injury and damage to property!
- After a successful commissioning, all further specifications of this manual must be checked and completely implemented!

9.1. 1. Step: Connection

- Connect operating voltage according to point 12.2
- Connect 400V motor according to point 12.5 (230V motor incl. operating capacitor according to point 12.5)
- Connect limit switch according to point 12.12
- At first, connect no control devices and insert no plug-in cards!

9.2. 2. Step: Door position

- Manually set the door to the half path and lock the drive.
- In this way, there is sufficient time to shut down, in the case of malfunction upon first start-up, over the key [Ta.+] or [Ta.-].

9.3. 3. Step: Turn on operation voltage

- Check again that all connections are correct.
- Now turn on the operating voltage
- The controller carries out a self-test. 88 & CH = Check briefly appears once on the display.
- The LEDs SE1 to SE4 behind the connection terminals light up and show that the safety inputs are available. This prevents the engine from running. This block must be removed in the next step.
- The middle segment (B) of the left display lights up on the display. The segment shows that the door is on the route (not in the end position).



Information / note

Should additional LEDs behind the terminals light up, then the bridges in the corresponding inputs are missing. It can be determined which bridges are missing over point 10.6 “LEDs behind the terminals” and over the point 12 “Connections & functions”.

9.4. 4. Step: Check motor movement direction

- Now familiarise yourself with the “operating elements & functions / displays” according to point 10.
- The safety inputs SE1 to SE4 are effective from the factory and initially prevent door operation. For start-up, the respective locks must be removed by setting
  - o SE1 = Menu [M.1] = 00
    > Modify the SE1 setting according to point 10.3 or proceed as follows
    > Press [Ta.M] and hold until 0 .. L is shown
    > Press [Ta.+] or [Ta.-] several times until 0 is displayed
    > [Ta.M] briefly press. A value between “06” appears on the display.
    > Press [Ta.-] several times until “00” is displayed
    > Let go all keys
    > Press [Ta.M] and hold until the display on “Door status” resets.
  - o Safety device 2 = Menu [M.1] = 00
    > Repeat procedure for safety device 2 Procedure as before.
  - o Safety device 3 = Menu [M.1] = 00
    > Repeat procedure for safety procedure 3 Procedure as before.
  - o Safety device 4 = Menu [M.1] = 00
    > Repeat procedure for safety procedure 4 Procedure as before.
  - o The LEDs behind [Kl.32] to [Kl.37] are then off and the direction of movement is released
- Check again that the door is in the centre of the path.
- Now briefly press the key [Ta.+] (start command in open direction).
- The door must now move in the OPEN direction!
- Stop the movement immediately over the button [Ta.+] before the end position is reached.
- If the OPEN direction is activated, then the motor is connected properly. If the CLOSED direction is activated, then switch off the operating voltage and swap the cables on [Kl.13] and [Kl.14].
- Repeat the test until the door moves in the OPEN position after switching on the operating voltage and first pressing [Ta.+].
- The motor is then properly connected.

9.5. 5. Step: Set up and test limit switches

- Align the limit switch to the path.
- Check that the limit switches are assigned to the correct side (corresponding LED must light up when manually pressed)
- Start the drive via the button [Ta.+] and test for correct movement until the chosen end position.
- Readjust the limit switches if needed.



CAUTION!

Doors without a mechanical end stop must be secured behind the normal limit switch over a “safety limit switch” if the door presents a danger when overrunning the end position, because of a defective limit switch, for example. The “safety limit switch” must be connected to the “emergency stop input”, which then stops the door operation. Slack rope switches or small door fuses

are to also be connected to the “emergency stop input”.

9.6. 6. Step set up and test safety bars (SE bars)

- First only connect the safety bar **SE1** according to point 12.14.
- Set the required function according to menu table point 11 [M.1].
- If the function “release” was selected, then set the required release time according to menu table point 11 [M.B], if needed. The release time for an SE bar or light barrier command is the same. The base factory setting is 2.0 sec.
- Now check the set function.
- If available, proceed accordingly for **SE2 to SE4**.

9.7. 7. Step: Other control devices / plug-in cards

- Turn off the operating voltage, connect all other control devices and insert all plug-in cards on the correct side.
- Adopt the connection, function and setting from this manual or the manual of the control device / plug-in card.

9.8. 8. Step: Back up programming / tests / settings

CAUTION!



- Using the menu table, check the pre-set menu values (basic settings) of the individual menu points. All menu values can be modified if needed
- It is necessary that you again check all control devices, functions and settings, step-by-step, according to this manual.
- Particularly check that the force values comply with EN12445 and EN12453!
- For control and traceability, enter the set values in the “Settings” column.
- We recommend blocking the control panel against unauthorised changes once all work is complete. To do this, set the menu point [M.L] = 01 according to point 13.10.

9.9. 9. Step: Reset / default setting

If needed, the controller can be reset to the factory settings (basic values according to menu table). Press and hold the keys Ta+ (↑) and Ta- (↓) until the two dots on the display stop flashing (~ 5 sec. It is then necessary to readjust the entire control system!

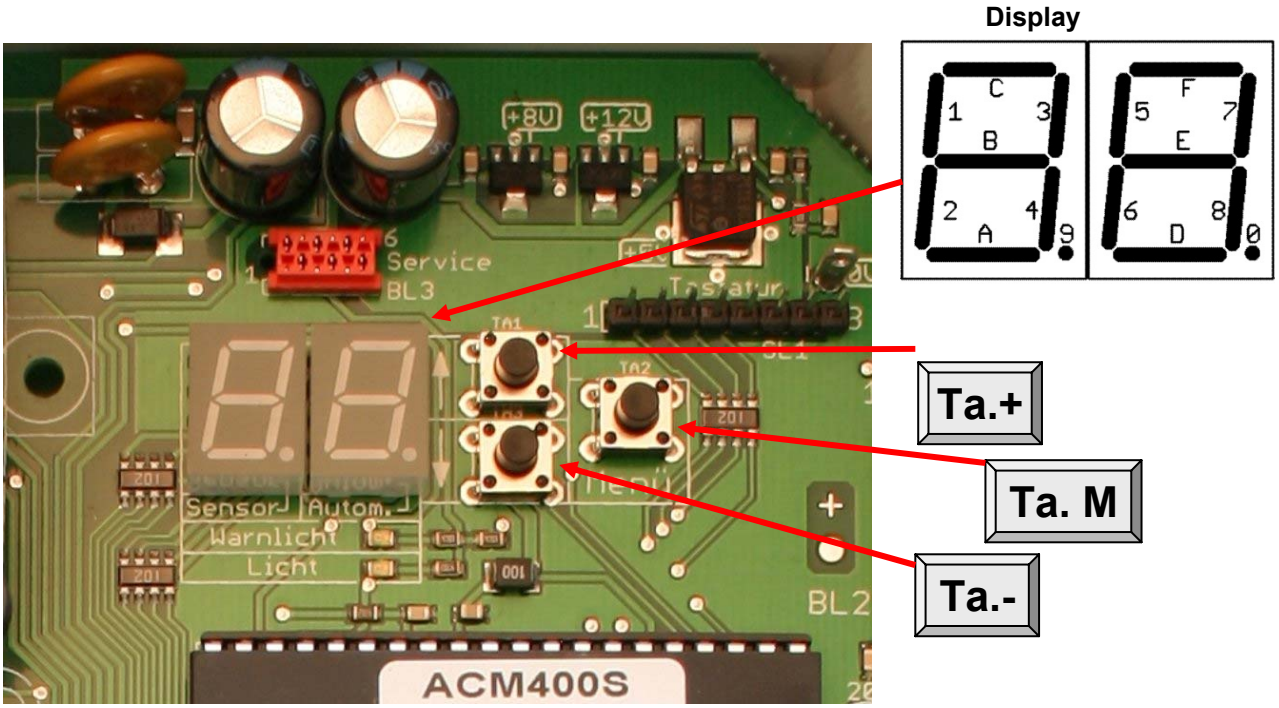
10Controls & functions / displays

10.1. General

The controls are arranged on two levels.

1. Level (top level) = select menu point or function
2. Level (bottom level) = select menu value / setting value

The keys, therefore, have different purposes / functions depending on the level.



10.2. Function of the keys

- [Ta.**+**] **+ Value** and **+** Menu and Open / Stop in open direction
- [Ta.**-**] **- Value** and **-** Menu and Closed / Stop in closed direction
- [Ta.M] **Menu button** Menu selection / Input status display

10.3. Set menu point / menu value according to menu table (point 11)

- Display or modify menu point (1st level), to do so,
  - press and hold down [Ta.M]
  - After approx. 3 sec, “A0” or the last called menu point appears on the display.
  - Release [Ta.M]
  - Using [Ta.+] or [Ta.-], select the desired menu point according to the menu table
- Display or modify menu point (2nd level), to do so, now
  - briefly press [Ta.M]
  - The menu value appears on the display as a figure from “00 .. 99”
  - Using [Ta.+] or [Ta.-], change the desired menu value from “00 .. 99”
- Adopt all settings according to this graph.
- To leave the menu, press [Ta.M] > 1 sec (hold down).
- About 15 seconds after the last actuation, the display returns to the “door status display”.

Information / note

- If it is not possible to change any menu values, then the complete control panel is locked. Release over point 13.10 “Lock / release control panel”.
- This setting is automatically adopted and saved by changing the menu value.
- The motor cannot run during configuration.

10.4. Display “door status”

- Is shown automatically following “operational voltage on”
- This is shown after pressing [Ta.M] shortly (< 1 sec) many times alternately with “door status” - “status of inputs” - “internal control voltage”
-

Segment	Segment condition	Door condition
A	Lit	CLOSED in end position
B	Lit	Between end positions
C	Lit	OPEN in end position
A > B > C	Upward bars	Starts up
C > B > A	Downward bars	Runs

10.5. Display “Error messages”

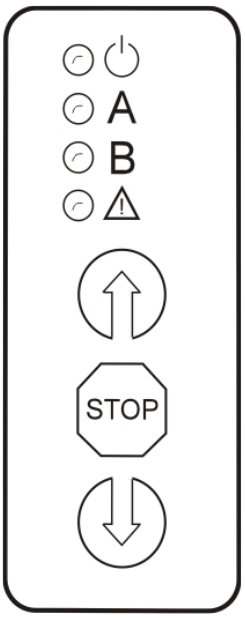
- Display E1 to E9 & LP.
- Error list; see point 20 “Error messages”

10.6. LEDs on circuit board / display

Where	Colour	Function
behind [Kl.23]	yellow	Input - Universal 1
behind [Kl.25]	yellow	Input impulse
behind [Kl.26]	yellow	Input open
behind [Kl.28]	yellow	Input closed
behind [Kl.29]	yellow	Input stop
behind [Kl.31]	yellow	Input light barrier (LB)
behind [Kl.32]	red	Input SE1
behind [Kl.34]	red	Input SE2
behind [Kl.35]	red	Input SE3
behind [Kl.37]	red	Input SE4
behind [Kl.38]	red	Input emergency stop
behind [Kl.40]	green	Input limit switch open
behind [Kl.42]	green	Input limit switch closed
Behind relay	yellow	Output Universal 2:
Below display	yellow	Warning light output is switched on
Below display	yellow	Light output is switched on
Point, display left	red	Lights up when there is a signal from the RPM sensor
Point, display right	red	Lights up when automatic closing is activated

10.7. LEDs in front membrane (optional)

Labelling	LED	Function
Ò	permanently on	Controller is in operation
	Flashes	When there are errors, flashes according to the “error messages” table point20.
A	permanently on	Door open in end position
	Flashes slowly	Door is on the track
	Flashes quickly	Door opens or closes
	permanently off	Door closed in end position
B	permanently on	As long as a valid radio command is detected
!	permanently on	When an error is detected.



10.8. Buttons in front membrane (optional)

Labelling	Function	Function
⇧	Open	As with the open input
Stop	Stop	As with the stop input
⇩	Closed	As with the closed input

11 Menu table

Basic setting = default setting

Menu point	Menu value	Function / value	Basic values	Setting	Manual point
0		**RPM SENSOR**			12.19
	00	No sensor connected	00		
	01	RPM sensor “Casali” available			
	02	RPM sensor “DSLTA-51” available			
	03	RPM sensor “FAAC” available			
1		**CLOSING EDGE PROTECTION SE1**			12.14
		Bar Opening Closing			
	00	8K2 No effect No effect (test purposes)			
	01	8K2 No effect Stop			
	02	8K2 No effect Release			
	03	8K2 No effect Reverse			
	04	8K2 Stop No effect			
	05	8K2 Stop Stop			
	06	8K2 Stop Release	06		
	07	8K2 Stop Reverse			
	08	8K2 Release No effect			
	09	8K2 Release Stop			
	10	8K2 Release Release			
	11	8K2 Release Reverse			
	12	8K2 Reverse No effect			
	13	8K2 Reverse Stop			
	14	8K2 Reverse Release			
	15	8K2 Reverse Reverse			
	16	OSE No effect No effect (test purposes)			
	17	OSE No effect Stop			
	18	OSE No effect Release			
	19	OSE No effect Reverse			
	20	OSE Stop No effect			
	21	OSE Stop Stop			
	22	OSE Stop Release			
	23	OSE Stop Reverse			
	24	OSE Release No effect			
	25	OSE Release Stop			
	26	OSE Release Release			
	27	OSE Release Reverse			
	28	OSE Reverse No effect			
	29	OSE Reverse Stop			
	30	OSE Reverse Release			
	32	OSE Reverse Reverse			
2		**CLOSING EDGE PROTECTION SE2**			12.14
	00...31	Settings as menu 1	06		
3		**CLOSING EDGE PROTECTION SE3**			12.14
	00...31	Settings as menu 1	09		
4		**CLOSING EDGE PROTECTION SE4**			12.14
	00...31	Settings as menu 1	09		
5		**AUTOMATIC CLOSING / OPEN TIME**			13.8
	00	Off	00		
	01…82	Open time 2...164 sec, in 2-sec steps			
	83…95	Open time 3 min, 84=4min, 85=5min, ... 95 = 15min			
		plus 5 seconds advance warning time			
6		**WARNING LIGHT**			12.4
	00	Only during motor operation	00		
	01	4 sec before motor start open + closed and during motor operation			
	02	10 sec before motor start open + closed and during motor operation			
	03	4 sec before motor closed and during motor operation			
	04	10 sec before motor closed and during motor operation			
7		**LIGHT**			12.3
	00…60	Light time from 0...600 sec, in 10-sec steps	18		
	61	Light output = door status display			
	62	Short impulse with each motor start			

8		**LIGHT BARRIERS**			12.13
		Opening	**Closing**		
	00	No effect	No effect (test purposes)		
	01	No effect	Stop		
	02	No effect	Release		
	03	No effect	Reverse		
	04	Stop	No effect		
	05	Stop	Stop	05	
	06	Stop	Release		
	07	Stop	Reverse		
	08	Release	No effect		
	09	Release	Stop		
	10	Release	Release		
	11	Release	Reverse		
	12	Reverse	No effect		
	13	Reverse	Stop		
	14	Reverse	Release		
	15	Reverse	Reverse		
	16	No effect	Reverse Closing 0.5 sec after LB Advance warning time 0.5 sec **see also point**		
	17	**12.13**			
		No effect	Reverse Closing 3.0 sec after LB		
	18		Advance warning time 1.5 sec		
		No effect	Reverse closing 7.0 sec after LB		
			Advance warning time 4.0 sec		
9		**EMERGENCY STOP**			12.12
	00	Automatic closing restarts completely new following emergency stop.			
	01	After an emergency stop, automatic closing is locked until the next command.		01	
A		**UNIVERSAL 1 INPUT**			12.17
	00	Timer: Automatic closing only with closed contact			
	01..60	Part-opening function, motor runtime until part opening position in 1-sec steps		05	
B		**RELEASE TIME**			13.4
		Release after light barrier or safety bar command			
	00...15	Release 0.25 .. 4.00 sec, in 0.25 sec steps		07	
C		**OPEN / CLOSE control by radio during motor operation**			14.1
	00	RADIO OPEN: Stop in opening, stop in closing (panic function)		00	
		RADIO CLOSE: Stop in opening, stop in closing (panic function)			
	01	RADIO OPEN: No effect in opening, reverse in closing			
		RADIO CLOSE: Stop in opening, stop in closing (panic function)			
	02	RADIO OPEN: Stop in opening, stop in closing (panic function)			
		RADIO CLOSE: Reverse in opening, no effect in closing			
	03	RADIO OPEN: No effect in opening, reverse in closing			
		RADIO CLOSE: Reverse in opening, no effect in closing			
D		**OPEN / CLOSE inputs, activating during motor operation**			13.2
	00	OPEN: Stop in opening, stop in closing (panic function)		00	
		CLOSE: Stop in opening, stop in closing (panic function)			
	01	OPEN: No effect in opening, reverse in closing			
		CLOSE: Stop in opening, stop in closing (panic function)			
	02	OPEN: Stop in opening, stop in closing (panic function)			
		CLOSE: Reverse in opening, no effect in closing			
	03	OPEN: No effect in opening, reverse in closing			
		CLOSE: Reverse in opening, no effect in closing			
E		**OPEN / CLOSE inputs, operating mode**			13.2
	00	OPEN: Impulse	CLOSE: Impulse	00	
	01	OPEN: Impulse	CLOSE: Dead man		
	02	OPEN: Dead man	CLOSE: Impulse		
	03	OPEN: Dead man	CLOSE: Dead man		
F		**UNIVERSAL 2 OUTPUT**			12.18
	00	Light barrier test (interruption of transmitter voltage)			
	01	Traffic light (idle mode in end position “open”, otherwise always controlled)		01	
	02	Radio, channel 4: Switched when correct radio signal is present			
H	Only display!	**TRIP COUNTER READING** Left position: “0”...”5”, right position according to 100,000 1		-	13.12

L		**Block / release control panel**			13.10
	00	Control panel free, menu points adjustable	00		
	01	Control panel locked, menu points not adjustable			
		Changeover			
		Press emergency stop, [Ta.+] and [Ta.-] at the same time			
		with [Ta.M], switch between 00 and 01			

12 Connections & functions



BEWARE!

- Work on the control unit may only be carried in a voltage-free condition! Non-compliance can lead to severe or fatal injuries.
- 400V AC can be present at [Kl.5]..[Kl.15]. Risk of electric shock! Non-compliance can lead to severe or fatal injuries.



CAUTION!
Never switch operating voltage / mains voltage to [Kl.9]..[Kl.42].
Non-compliance can lead to failure, destruction and property damage. No guarantee!



Information / note

- Control and motor cables (e.g. impulse, open, stop, close...) must not exceed a length of max. 30 m! This does not apply to the power line.
- Always run the power line, motor line and control lines in separate cables and lay at a distance from each other. Non-compliance can lead to functional errors!



ESD hazard
Static electricity can lead to an immediate failure or later failure of the control unit.
Care must be taken that grounding is in line with ESD requirements during all work on the control unit.

12.1. General

Images, see point 16
Block diagram / pin assignment; see point 17
Terminals [Kl.16] to [Kl.42] are pluggable and can be removed for connection.

12.2. Operating voltage / mains voltage

400V AC operating voltage. Point 16 image [X5]

[Kl.1]..[Kl.4] Earth conductor / PE
[Kl.5] L1-conductor 400V / AC
[Kl.6] L2-conductor 400V / AC
[Kl.7] L3-conductor 400V / AC
[Kl.8] N-conductor 400V / AC

230V AC operating voltage. Point 16 image [X7]

[Kl.1]..[Kl.4] Earth conductor / PE
[Kl.5] L1-conductor 230V / AC
[Kl.6] Free
[Kl.7] Bridge on [Kl.8]
[Kl.8] N-conductor 230V / AC



CAUTION!
Connection to the building installation must be done in accordance with the Machinery Directive Appendix I point 1.6.3 over a sufficiently dimensioned mains isolating device. This can be achieved with a plug connection or a lockable main power switch.

The controller is to be protected on-site by a multi-pole, switching, short-circuit protected, motor protection switch! Measure the motor protection switch and the supply line according to the connected services (drive + peripheral devices).

12.3. Light

[Kl.1]..[Kl.4] Earth conductor / PE
[Kl.9] L-conductor (connected)
[Kl.10] N-conductor (switched)

- 230 V / AC Output, max. 500W
- The switching status is indicated by the yellow LED “light”, point 16 image [X3].
- The light function is set over [M.7].
- With [M.7] = 01 to 60, the light is controlled during the entire motor operation and after one motor operation for the selected time, (e.g. value = 18 x 10 sec. = 180 sec.).
- In [M.7] = 61, the door status is displayed Here, the light output is controlled depending on the door position (end position to open / closed).
- With [M.7] = 62, there is a short impulse with each motor start. For command transmission to external device, such as a staircase light.



CAUTION!
The output has 230V AC!
To control potential-free inputs, a cut-off relay must be used!

12.4. Warning light

[Kl.1]..[Kl.4] Earth conductor / PE
[Kl.10] N-conductor (connected)
[Kl.1] L-conductor (connected)

- 230 V / AC Output, max. 500W
- The switching status is indicated by the yellow LED “warning light”, point 16 image [X3].
- The warning light function is set over [M.6].
- With [M.6] = 00, the warning light is controlled during motor operation.
- With [M.6] = 01, the warning light is controlled 4 sec before and during motor operation (**open & closed**).
- With [M.6] = 02, the warning light is controlled 10 sec before and during motor operation (**open & closed**).
- With [M.6] = 03, the warning light is controlled 4 sec before and during motor operation (**closed**).
- With [M.6] = 04, the warning light is controlled 10 sec before and during motor operation (**closed**).

12.5. 3~ 400V AC motor

Point 16 image [X5]
[Kl.1]..[Kl.4] Earth conductor / PE
[Kl.12] W output 400V AC
[Kl.13] W output 400V AC
[Kl.14] U output 400V AC

- The drive must move in the OPEN direction after “operating voltage / mains voltage on” and the first impulse command. Should the drive move in the CLOSE direction despite upward bars, the connection wires [Kl.13]+[Kl.14] must be exchanged.
- Maximum motor capacity 2,000VA 25% ED.

12.6. 1~ 230V AC motor

Point 16 image [X7]
[Kl.1]..[Kl.4] Earth conductor / PE
[Kl.12] Common, 230V AC output
[Kl.13] CLOSED direction, 230V / AC output
[Kl.14] OPEN direction, 230V / AC output
[Kl.13 +14] Operating capacitor according to manufacturer instructions
[Kl.15] Free

- The drive must move in the OPEN direction after “operating voltage / mains voltage on” and the first impulse command. Should the drive move in the CLOSE direction despite upward bars, the connection wires [Kl.13]+[Kl.14] must be exchanged.
- Maximum motor capacity 1,000VA 25% ED.
- Bridge [Kl.7] on [Kl.8] necessary!

12.7. Limit switch

[Kl.40] OPEN limit switch
[Kl.41] Common

[Kl.42] CLOSED limit switch

- Safety input category 1 according to EN ISO 13849-1/2008 (directly switches off the movement direction relay)
- Open contact, potential-free
- An unused limit switch input must be bridged! When used, the bridge / sheet metal bracket is to be removed.
- The LEDs behind the terminals [Kl.40] - [Kl.42] light up in the end position when the limit switch is pressed / open.



CAUTION!

- Only potential-free contacts may be connected.
- Light barriers with an OC output (open collector output) cannot be used (malfunction!).
- [Kl.41] / common must not be connected with mass / ground! Non-compliance can lead to failure, destruction and property damage. No guarantee!

12.8. Impulse input

[Kl.24] 0V / reference
[Kl.25] Impulse input

- Input for buttons, key switches, external radio receivers, etc.
- Closing contact, potential-free
- Several control devices can be connected in parallel.
- The yellow LED behind [Kl.25] lights up when the contact is closed.
- The “impulse” command can be controlled in exactly the same way over the optional radio receiver channel 1.

12.9. Open input

Point 16 Image [X9]
[Kl.26] Open input
[Kl.27] 0V / reference

- Input for buttons, key switches, external radio, etc.
- Closing contact, potential-free
- Several control devices can be connected in parallel.
- The input function is set in [M.D] and [M.E].
- The yellow LED behind [Kl.26] lights up when the contact is closed.
- With [M.E] = “dead man function”, radio operation over the radio module [BL1] is blocked for the associated direction of movement.
- With [M.D] = “panic function” and an operating door, pressing the open input leads to a stop the first time. Pressing a second time starts the door in the open direction.
- If no “panic function” is set, actuation in a door moving in an opposite direction brings the door to a stop and immediate start in the opposite direction. In the same direction (current direction of movement), pressing has no effect.
- When pressing the open input and the close input at the same time, the door stops.
- The “open” command can be controlled in exactly the same way as described here over the optional radio receiver channel 2.

12.10. Stop input (function input)

Point 16 Image [X9]
[Kl.29] Stop input
[Kl.30] Switched mass

- Input for buttons, key switches, external radio, etc.
- Closing contact, potential-free
- Several control devices can be connected in parallel.
- The yellow LED behind [Kl.29] lights up when the contact is closed.



CAUTION!

- The input has no safety function!
- For the emergency stop function, the emergency stop input [Kl.38]+[Kl.39] is to be used!
- [Kl.30] = Switched mass. Must not be connected with mass / ground, as the stop input will otherwise be faulty or will not function! Non-compliance can lead to failure, destruction and property damage. No guarantee!

12.11. Closed input

Point 16 Image [X9]
[Kl.27] Mass / ground
[Kl.28] Close input

- Input for buttons, key switches, external radio, etc.
- Closing contact, potential-free
- Several control devices can be connected in parallel.
- The input function is set in [M.D] and [M.E].
- The yellow LED behind [Kl.28] lights up when the contact is closed.
- With [M.E] = “dead man function”, radio operation over the radio module [BL1] is blocked for the associated direction of movement.
- With [M.D] = “panic function” and an operating door, pressing the open input leads to a stop the first time. Pressing a second time starts the door in the open direction.
- If no “panic function” is set, actuation in a door moving in an opposite direction brings the door to a stop and immediate start in the opposite direction. In the same direction (current direction of movement), pressing has no effect.
- When pressing the open input and the close input at the same time, the door stops.
- The “close” command can be controlled in exactly the same way as described here over the optional radio receiver channel 3.

12.12. Emergency stop (safety input)

[Kl.38] Emergency stop
[Kl.39] Emergency stop

- Safety input category 1 according to EN ISO 13849-1/2008 (directly switches off the movement direction relay)
- Safety input is monitored in the self-test.
- Input for emergency stop control device, slack rope switch, small door fuse, etc.
- Open contact, potential-free
- Several control devices can be connected in sequence.
- An unused emergency stop input must be bridged! When used, the bridge / sheet metal bracket is to be removed.
- The red LED behind [Kl.38] is lit when the contact is opened.
- The automatic closing function after emergency stop is set in [M.9]
- The emergency input is located in series with the limit switches and directly switches off the motor relay. It is thus also effective in the case of an electronic failure. The motor stops immediately.
- Following an emergency stop command during motor operation, the door moves in the “opposite direction” (away from the hazard area) with the next impulse command.
- Following an emergency stop command when the door is stationary, the door generally starts with the next impulse command.

12.13. Light barrier (LB / safety input)

[Kl.30] Switched mass
[Kl.31] Light barrier input

- Safety function category 2 / performance level C according to EN ISO 13849-1/2008.
- Input for light barriers with potential-free contact output or safety contact bars
- Open contact, potential-free
- An unused light barrier input must be bridged! When used, the bridge / sheet metal bracket is to be removed.
- The light barrier output is set in [M.8].
- The red LED behind [Kl.31] is lit when the contact is opened.
- The input has a safety function and is monitored over the electronics’ self-tests. If an error is detected in the self-test, E3 is displayed. No door operation is possible.
- When the light barrier input is pressed, a motor can only start when the light barrier has no effect in the corresponding direction of movement (setting [M.8]).
- During motor operation, a command acts on the light barrier input. Stop, release, reverse or no effect, depending on the direction of movement and the setting in [M.8].
- When automatic closing is enabled, by pressing the light barrier input, the open time is reset until the input is released again.

- The function **"close after leaving the light barrier"** is set in [M.8]. If the light barrier is not left when the door is open, the door closes following the set delay time [M.8]. Also applicable with [M.8] = 16 and actuated OPEN input.



CAUTION!

- Light barriers with an OC output (open collector output) cannot be used. (malfunction!)
- [Kl.30] = Switched mass. Must not be connected with mass / ground, as the light barrier input will otherwise be faulty or will not function!
- External safety equipment must be permitted for personal safety and are not tested by the controller (the self-test only concerns the controller and not the connected peripherals)!
- An external light barrier test is possible: Point 12.18 "Output Universal 2".

12.14. Safety input SE1 (8K2 / OSD)

[Kl.32]	SE1 input 8k2 (inner conductor)	[Kl.32]	OSD signal (green)
[Kl.33]	Switched mass (casing)	[Kl.20]	OSD 0V / mass (white)
		[Kl.22]	OSD +12V (brown)
[Kl.34]	SE2 input 8k2 (inner conductor)	[Kl.34]	OSD signal (green)
[Kl.33]	Switched mass (casing)	[Kl.20]	OSD 0V / mass (white)
		[Kl.22]	OSD +12V (brown)
[Kl.35]	SE3 input 8k2 (inner conductor)	[Kl.35]	OSD signal (green)
[Kl.36]	Switched mass (casing)	[Kl.20]	OSD 0V / mass (white)
		[Kl.22]	OSD +12V (brown)
[Kl.37]	SE4 input 8k2 (inner conductor)	[Kl.37]	OSD signal (green)
[Kl.36]	Switched mass (casing)	[Kl.20]	OSD 0V / mass (white)
		[Kl.22]	OSD +12V (brown)

- Safety function category 2 / performance level C according to EN ISO 13849-1/2008.
- Input for safety contact bars (8k2 or OSD) for closing edge protection
- The type and function of the input is set in [M.1] to [M.4].
- If an SE input is not used, the function is to be deactivated. [M.1] to [M.4] = 00 or 16.
- The switching status of the SE bar is displayed over the red LEDs behind [Kl.32] to [Kl.37].
- A closed or open SE input is considered as pressed. LED flashes.
- When an SE input is pressed, a motor can only start when the closing edge protection has no effect in the corresponding direction of movement (setting [M.1] to [M.4]).
- During motor operation, a command acts on the SE input. Stop, release, reverse or no effect, depending on the direction of movement and the setting in [M.1] to [M.4].
- When automatic closing is enabled, by pressing the SE input (SE1 to SE4), the open time is reset until the input is released again.
- The SE inputs have a safety function and are monitored over the electronics' self-tests. If an error is recognised in an SE input, E4 appears on the display. Door operation is not possible. See point 20.



CAUTION!

- [Kl.33] and [Kl.36] = Switched mass. Must not be connected with mass / ground, as the safety device input will otherwise be faulty or will not function!
- External safety devices must be permitted for personal protection.
- Connect the 8k2 safety device to the correct side! Non-compliance can lead to functional errors.

12.15. 24V AC output (unstable)

[Kl.20] 0V / reference
[Kl.21] 24V AC (unstable); I_{max} < 200mA

- Connection for external users, e.g. light barriers, etc.



CAUTION!
The maximum power according to "Technical data" must not be exceeded!
Non-compliance can lead to malfunction, failure, destruction and property damage.

12.16. 12V DC output (stabilised)

[Kl.20] 0V / reference
[Kl.22] +12V DC (stabilised), I_{max}< 100mA

- Connection for external users, e.g. OSD, light barriers, etc.



CAUTION!
The maximum power according to point “Technical data” must not be exceeded!
Non-compliance can lead to malfunction, failure, destruction and property damage.

12.17. Input Universal 1 (part opening / timer)

[Kl.23] Universal1 input
[Kl.24] 0V / reference

- Input for buttons, key switches, timer, external radio receivers, etc.
- Closing contact, potential-free
- Several control devices can be connected in parallel.
- The input function is set according to menu table [M.A].
  - Timer operation [M.A] = 00
    When automatic closing is enabled [M.5], the automation can be deactivated with a timer (contact closed).
  - Part opening [M.A] = 01 to 60
    Part opening time from 1 to 60 sec. Can also be controlled over channel 4. See point 12.18.
- The yellow LED “Univ1” behind [Kl.23] lights up when the contact is closed.

12.18. Output Universal 2:

[Kl.16] Common
[Kl.17] Closer
[Kl.18] Opener

- Relay output, potential-free
- The output function is set in [M.F].
  - Light barrier test [M.F] = 00
    For this, the operating voltage of the light barrier transmitter is led over [Kl.16] + [Kl.18].
    The relay is briefly retracted during the self-test. The operating voltage of the
    light barrier transmitter is interrupted over the opener contact [Kl.16]+[Kl.18] of the Universal 2 output.
    By switching off the transmitter during the self-test, the receiver must
    indicate actuation of the light barrier. This is evaluated in the software. To define the categories of causes, the individual fields/bones usually receive the headings:
    The light barrier receiver must react within 2.5 seconds of switching of the operating voltage
    of the light barrier.
  - Traffic light / door status display: [M.F] = 01
    For this, connect the signal lights “red” to the opener and “green” to the closer. Door closed in end position
    and “red” lights up on the track. “Green” lights up in the end position.
  - Radio function: [M.F] = 02
    The output Universal 2 can be controlled over channel 4 in radio mode for special functions, such as bell, timer or impulse for garage doors. The changer energises as long as a radio signal is correctly received on channel 4.
- The yellow LED “Univ2” above the relay lights up for the duration of the relay control.

12.19. RPM sensor (open collector)

[Kl.19] Signal input
[Kl.20] 0V / reference

- The type of sensor is to be set in [M.0]
- The RPM sensor monitors the running of the motor. If a sensor signal remains off for > 0.5 seconds following motor start, the controller interrupts motor operation with the error message E2. Error is a sensor defect or motor defect (gear breakage).
- Detection of an obstacle or end position over the RPM sensor is not possible.
- Types other than those listed in the menu table are possible on request.

13Function descriptions

13.1. Impulse / radio operation

Door condition	With key actuation in "part open operation"	With key actuation in "impulse mode"
Stands on the track following Stop	Closes	Runs in opposite directions
Stands on the track following Release	Closes	Runs further
"Open" in end position	Closes	Closes
Stands "closed" in end position	Runs in part opening position	Opens
Is in part-opening position	Closes	Opens completely
Opens	Stops	Stops
Closes	Stops	Stops

13.2. Open / stop / close operation

Door condition		"Open" pressed	"Close" pressed	"Stop" pressed
"Open" in end position		-	Closes	-
Stands "closed" in end position		Opens	-	-
Is in part-opening position		Opens	Closes	-
is somewhere on the path		Opens	Closes	-
Opens & menu D:	00	Stops	Stops	Stops
	01	-	Stops	
	02	Stops	Runs	
	03	-	Runs	
Runs & menu D:	00	Stops	Stops	Stops
	01	Opens	Stops	
	02	Stops	-	
	03	Opens	-	
"Emergency stop" is pressed		-	-	-
Automatic closing operation		The door remains open as long as this is pressed Not applicable with [M8.16]	Closes, open time is ignored	Stops. Open time Restarts

Door condition		Reaction in "automatic closing operation"	
Stands "closed" in end position		-	
"Open" key shortly pressed		Opens	
Not "closed" in end position		First 5s warning light before each closing operation	
"Open" in end position		Automatically closes	After expiry of the open time
Is in part-opening position		Automatically closes	After expiry of the open time
Hold down "open" key		Remains open	Open time begins to restart
"Close" key pressed		Closes	Open time is interrupted
"Stop" key pressed		Stops	Open time begins to restart
During closing, an safety bar is triggered (not light barrier)		Stops	Automatic closing deactivated until next command entry
In a standstill, one of the SE bars or light barriers are triggered		-	Open time restarts as long as there is no more trigger
"Emergency stop"	Menu **"9"** – value **00**	Open time begins to restart	
	factory-set **01**	Automatic closing until next command	

13.3. Emergency stop function

Door condition		Reaction to “emergency stop”
Stands still, light is on		Light goes out (targeted light switch-off)
Opens / closes		Stop
“Open” or “closed” in end position		-
Automatic closing operation	Menu 9” – value **00** factory-set **01**	Open time restarts completely Automatic closing deactivated until next command

13.4. Release / release time (with detected obstacle)

- The door is moved in the opposite direction for the set release time. Setting: [M.B].
- The function can be controlled over the inputs light barrier and SE1 to SE4. The precondition is that the “reverse” function is set in the corresponding menu.
- A safety device, activated during motor operation (e.g. an obstacle in activated direction of movement), then leads to a “release” of the obstacle.

13.5. Reverse (with detected obstacle)

- The function can be controlled over the inputs light barrier and SE1 to SE4. The precondition is that the “reverse” function is set in the corresponding menu.
- A safety device, activated during motor operation (e.g. an obstacle in activated direction of movement), then leads to door operation in the opposite direction until the end position.

13.6. Dead man operation

- Function according to menu table [M.E]
- Dead man operation by radio is not permitted and not possible.
- Automatic closing is not effective during dead man operation in the closing direction.

13.7. Tubular motor operation

- Tubular motors usually have internal limit switches, which directly switch off the corresponding direction of movement.
- These tubular motors can only be operated when the internal limit switches are set so that they do not cause a shutdown in the necessary path!
- For this, with internal, mechanical limit switches, the cut-off point can be set at about 3 rotations before the starting point and behind the end of the path.
- With this setting, a tubular motor can also be operated with internal limit switches on this control.
- Operation with external limit switches is absolutely necessary!



CAUTION!
Obstacle detection and compliance of the closing forces need careful checking and, if necessary, by additional external safety devices, (e.g. light barriers, SE contact bars, etc.)

13.8. Automatic closing

- The automatic closing is activated or set in [M.5].
  - o [M.5] = 00 Off
  - o [M.5] = 01 .. 82 Open time 2 .. 164 sec, in 2-sec steps, plus 5-sec advance warning time
  - o [M.5] = 63 .. 95 Open time 63 = 3 min, 64 = 4 min ... 95=15min plus advance warning time
- If the door is not CLOSED in the end position, automatic closing becomes effective following expiry of the open time.
- During the open time, the LED automation to the right of the display lights up.
- If the door is OPEN in the end position, only the open time is reset with an open command or actuated SE input. As long as there is an open or SE command, the open time remains reset until the command is deleted.
- When automatic closing is activated, an impulse command always results in an open procedure. This is also applicable when the door is already moving in the closing direction. The open time restarts.
- Commands for targeted open / close are also effective during activated automatic closing.
- The closing operation is stopped and the open time reset over the light barrier input.
- The automatic closing function after emergency stop is set in [M.9].
- With a stationary motor, only the open time (not cut-off) is reset when SE1, SE4, or the light barrier is actuated. The open time starts to expire only once the inputs are no longer actuated.

When automatic closing is activated, this is always effective when the door is not in the end position. Automatic closing also occurs in part opening and inactive leaf operation.

- In [M.A] = 00, automatic closing can be deactivated over the input Universal 1, such as over a timer. When the input is closed / actuated, automatic closing is interrupted.
- If one-way operation is running over the additional card MMZ442-50, the open time only starts to expire when the green and clearance time have expired.

13.9. Part opening

- Part opening can be set over the input Universal 1 [M.A].
- The runtime is the reference for the part-opening position. There can, therefore, be differences in the opening position.
- A part opening command on the CLOSED door in the end position always effects movement in the part open position.
- If the door is “on track” (outside the CLOSE / OPEN position, in part opening, operation runs in the CLOSE end position.
- The door can also be moved into the part open position during automatic closing. Automatic closing occurs after the open time expires.
- An impulse command while the door is in the part open position effects movement toward the OPEN end position.
- Part opening can also be controlled over channel 4 of a radio receiver in [BL 1]. For this, the output Universal 2 must be switched to the input Universal 1.

13.10. Block / release control panel

- All menu points can be locked against adjusting in [M.L]. (Recommended)
- [M.L] = 00 Control panel / menu points released / changeable (delivery status)
- [M.L] = 01 Control panel / menu points blocked / no changes possible
- Block / release oontrol panel
    - Hold down emergency stop
    - Select menu [M.L]
    - Press and hold down keys [Ta.+] and [Ta.-]
    - Using [Ta.M], it is now possible to switch between 00 and 01

13.11. Self-test

The controller automatically carries out several self-tests. When there is an error, the controller is locked and an error message is displayed in accordance with the table according to point 20.
Faulty self-tests are automatically repeated after 1 min. Should errors arise again, the next self-test is only carried out by an external command (e.g. impulse, but not over radio).
Self-tests are carried out

- Immediately after switching on the operating voltage
- About 1 sec after reaching the end position “closed”,
- 20 min after a motor operation
- About every 4 hours in standby mode

Contact service if there is a permanent error message.

13.12. Trip counter

- The menu [M.H] is a pure display menu, which shows the number of “open” trips.
- Select menu [M.H]
- The position of the number which is to be presented is now shown In the left-hand display segment.
- The corresponding value of the position is displayed in the right-hand side of the display segment.
- Example: The sequentially scrolling display 0**0** 1**4** 2**5** 3**3** 4**8** 5**2** 6**-** 7**-** = **045382--** open movements. This is the consecutively displayed number on the right-hand display on the segment.
- The trip counter cannot be reset or adjusted (read-only memory).

13.13. Emergency operation

- To be able to move the door in a controlled manner (e.g. when there is a defect on a safety device) when there are continuously actuated safety devices (closing edge protection, light barriers)
- Hold down the external button “open” / “close” longer than 15 seconds until the warning light comes on. The door then moves for 2 seconds in the desired direction.
- To move for another 2 seconds, just repeat this step.

Information / note
There must be an external key or membrane keyboard.
Emergency operation is not possible over radio!

14Plug-in cards / slots

14.1. Radio receiver (optional)

- The radio codes are evaluated and saved on the radio receiver plug-in card.
- The correct radio receiver is to be inserted into the connection socket BL1 / RADIO without current. Point 16 Image [BL1].
- The function is set according to menu table [M.C]. Point 11.
- The channels 1 to 4 (if available) are assigned to the following functions:
  - Channel 1 Impulse = function / effect as with input “impulse”
  - Channel 2 Open = function / effect as with input “open”
  - Channel 3 Close = function / effect as with input “close”
  - Channel 4 Function according to Universal 2 output, point 12.18 or, e.g. part opening (Univers.2
    Output on Universal 1 input led and menu [M.A] set appropriately).
- Please refer to the operating manual for the operating / technical data for the radio receiver.
- Antenna connection
  - An antenna wire must be connected to the radio receiver and passed down through the 2mm drill-hole from the casing.
  - A rod antenna is to be connected as specified on the radio receiver. Feeding into the casing can be accomplished via free sealing elements.

Information / note
- The greatest range results in laying the antenna wires or coaxial cables at the greatest possible distance to power, control and motor cables.
- Laying in cable channels reduce the range and can lead to faults!
- Dead man operation by radio is not possible!

14.2. Additional card MMZ442 (optional)

The multi-functional card MMZ442-50 is to be inserted in the connection switch BL2 / slot A without voltage. Point 16, Image [BL2].
The following special functions can be performed with the additional card:

- Traffic light / door status display
- One-way function
- End position display
- Fault display
- Test mode
- Read data carriers and send the control data

Please refer to the MMZ442-50 manual for the operating and safety instructions!

Information / note
Membrane keyboards are not recommended when using the MMZ442, for reasons of space.

14.3. Membrane keyboard (optional)

If the controller is equipped with a membrane keyboard on the casing cover, then connection is established according to point 16 pin connector SL1.

Information / note
Ensure during connection that the flat tape cable is not inserted twisted.

15Regular inspections

All safety devices are to be inspected regularly for their correct functioning in accordance with EN60335 and UVV ASR A1.7.

- Pressure-sensitive safety inputs (SE bars) once a month.
- All other safety devices at least once a year.
- The test results are to be kept in a record / service book.

15.1. LB input

If the LB input is used for test purposes, the light barrier(s) are to be interrupted during the open / close operation. When there is proper functioning, the controller responds according to the setting from [M.8]. The “LB” LED behind [Kl.31] lights up for the duration of the LB actuation.

15.2. SE1 .... SE4 inputs

If 8k2 / OSD bars are connected to the SE inputs, these are to be actuated during the open / close operation for test purposes. When there is proper functioning, the controller responds according to the menu setting in [M.1 to M.4].

15.3. Emergency stop

If an EMERGENCY STOP control device is connected, this is to be pressed during opening / closing for test purposes. With proper functioning, the door comes to an immediate stop. The “emergency” LED behind [Kl.38] lights up for the duration of the emergency stop actuation.

15.4. Dead man operation

If the controller is run in dead man operation [M.E], it must be checked whether the door stops immediately when opening the open / close input during door operation in the corresponding direction.

15.5. Malfunction

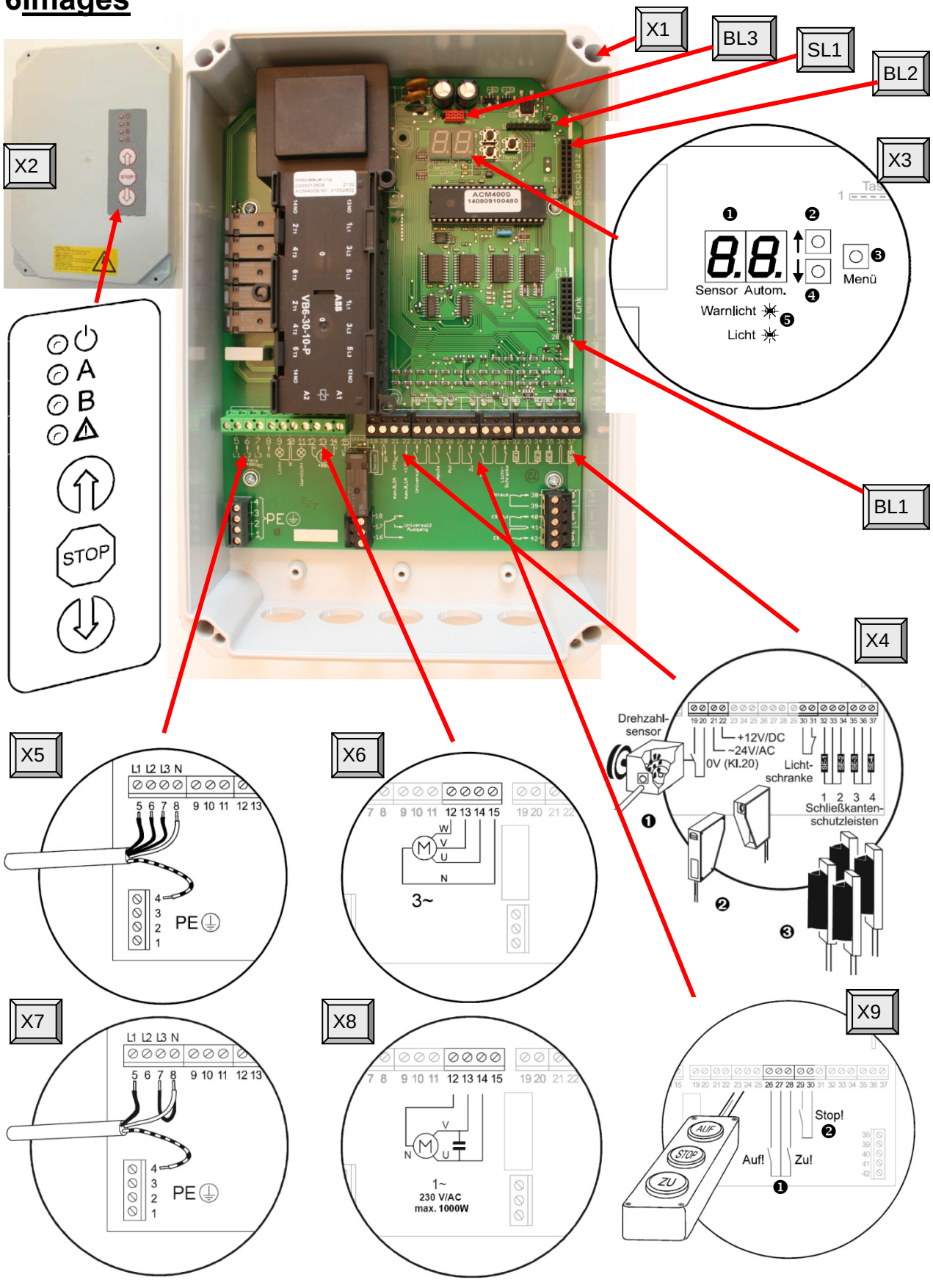
If the door does not react as described in on the corresponding safety device,

- check the associated menu setting.
- check the safety device connection.
- check the safety device (switches, bards, light barriers) itself.

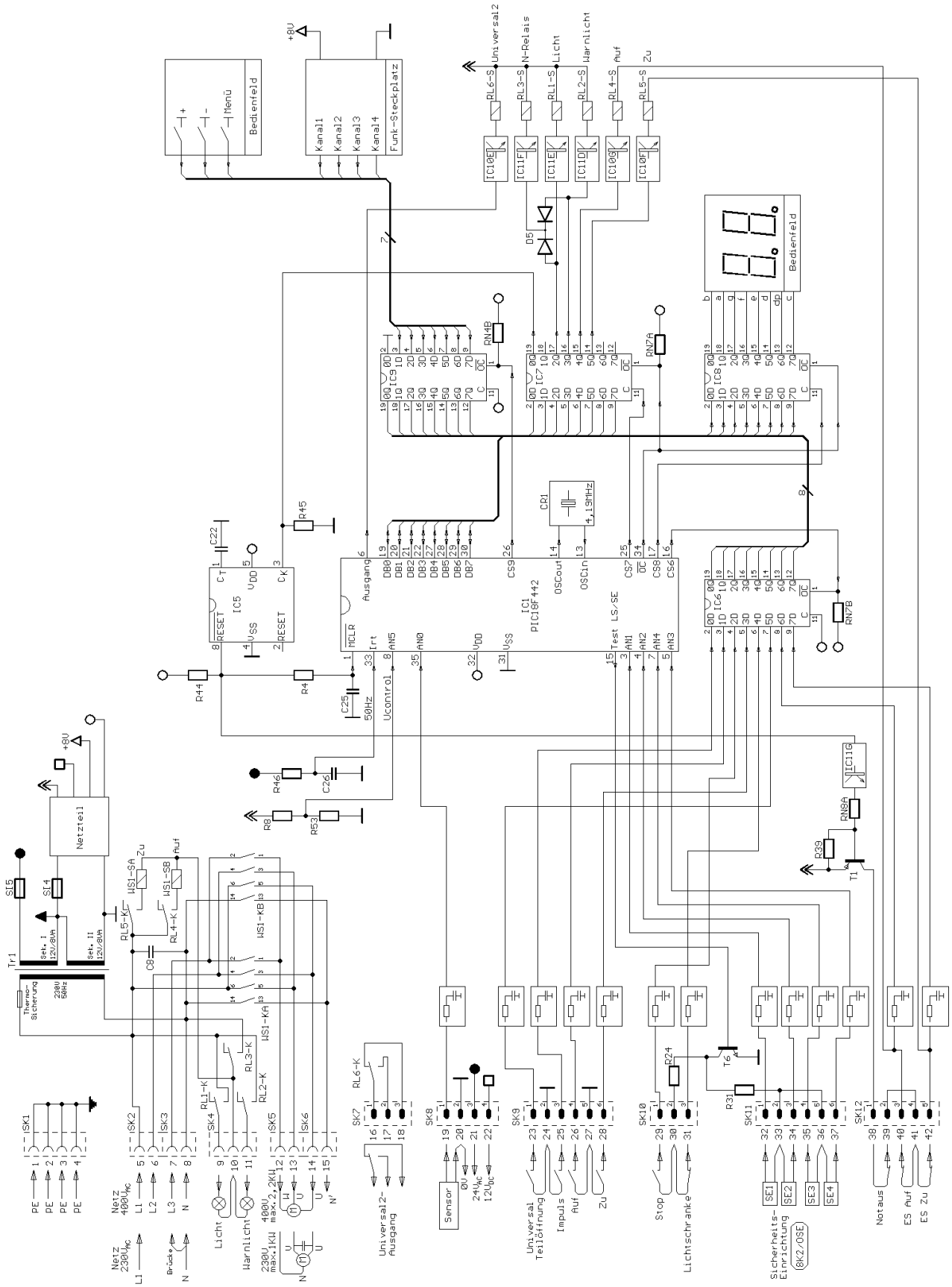
If the cause of error is not identified and removed:

- Take door out of operation
- Secure against switching on again
- Contact customer service

16Images


X1
BL3
SL1
BL2
X2
X3
Sensor
Autom.
Menü
Warnlicht
Licht
A
B
STOP
BL1
X4
Drehzahl-sensor
+12V/DC
~24V/AC
0V (Kl.20)
Licht-schranke
Schließkanten-schutzleisten
X5
L1 L2 L3 N
PE
X6
3~
X7
PE
X8
1~
230 V/AC
max. 1000W
X9
Stop!
Auf!
Zu!
AUF
STOP
ZU

17Block diagram / pin layout



18EC Declaration of Conformity

The company Dickert Electronic GmbH, Fünfhausen1, 35091 Cölbe, Germany hereby declares that the controller ACM400S-00 and ACM400S-01 are incomplete machines in the sense of the Machinery Directive 2006/42/EC, Appendix II Part 1B and intended for installation in a door system.

The following basic safety directives were applied and are complied with

- Machine Directive 2006/42/EC
- EN 12453:2000 (Safety in the use of power operated doors, requirements)
- EN 60335-1:2012
- EN 12978 10/2009 (Safety devices for power operated doors, requirements and test methods)
- EN ISO 13849-1:2008 (Safety of machinery)
- Low Voltage Directive 2006/95/EC
- EMC Directive 2004/108/EC

EC type-examination certificate
Registered no. 44 205 12 383677-001
Certification body: TÜV NORD CERT GmbH Langemarckstraße 20, 45141 Essen,
Notified Body 0044

Valid for serial number range: 07030xxxxx

The special technical documents were created in accordance with the Machinery Directive 2006/42/EC Appendix VII B. On reasoned request, we undertake to electronically forward the special technical documentation to the national authorities.

The controller may only be operated once it has been determined that the door system complies with the Machinery Directive 2006/42/EC.

Cölbe, 20.11.2012
Hans Dickert
Hans Dickert
Director &
Authorised document representative

19Environmental protection / disposal

The control unit does not contain any integrated batteries. Solely ROHS-conform components are used. Properly dispose of old and defective appliances and device parts at a collection point! Do not put them in domestic waste!

20Error messages

Code in display	Front membrane LED ! is flashing	Possible causes of errors	Measure
E1	1x	Control: Watchdog test negative	Turn off operating voltage, wait 10 seconds, turn on operating voltage again. If the error message remains, there is a hardware error in the control system. The control system must be exchanged.
E2	2x	RPM sensor: No signal was detected 0.5 seconds after motor start	New motor start If the error message remains: a) Check connections b) Check sensor type (menu “0”) c) Turn off sensor (menu “0” to 00) d) Exchange sensor / control system
E3	3x	Light barriers: Self-test negative	Turn off operating voltage, wait 10 seconds, turn on operating voltage again. If the error message remains: a) Check setting menu “8” and “F” (external light barrier test) or connected light barrier. b) Check light barrier connection (operating voltage and signal output)

			c) if a) and b) are correct, there is a possible hardware error in the control system. The control system must be exchanged.
E4	4x	Safety bars: Self-test negative	Turn off operating voltage, wait 10 seconds, turn on operating voltage again. If the error message remains: a) Check setting menu “1”...”4” or connected safety bar. b) Check safety bar connection (resistance / function) c) if a) and b) are correct, there is a possible hardware error in the control system. The control system must be exchanged.
E5	5x	Motor control: the door did not leave the limit switch within 2s from the start	Restart motor. Error remains. Door does not move. Check mechanics (motor, gearbox, emergency release, door frozen) Door moves. Check limit switches, contact, wiring.
		or speed signal in standby mode.	unauthorised speed signal on terminals 19 and 20. Check sensor and turn off (menu “0” to 00) or replace, if necessary.
E6	6x	Control: ROM test negative	Turn off operating voltage, wait 10 seconds, turn on operating voltage again. If the error message remains, there is a hardware error in the controller. The control system must be exchanged.
E7	7x	Control: RAM test negative	Turn off operating voltage, wait 10 seconds, turn on operating voltage again. If the error message remains, there is a hardware error in the controller. The control system must be exchanged.
E8	8x	Control: EEPROM test negative	Turn off operating voltage, wait 10 seconds, turn on operating voltage again. If the error message remains, the saved values in the control system are invalid. The control system must be reset (see point 9.9. reset / default setting)
E9	9x	In idle mode, the door was pulled “closed” from the end position	a) There is an attempted break-in. b) The emergency unlock was pressed. c) Limit switch in the end position no longer pressed.
LP	--	Undervoltage, possible overload	The operating voltage of the controller is sometimes or always too low. a) Check network connection (measure 230V) b) Low voltage output (too many users on terminals 20-22? Test by disconnecting) c) external control device not potential-free

If the cause of the error is removed, the error message is deleted with the next command input, but not over a radio command.

21 Technical data

Operation of the control system is only permitted according to these specifications / data!

Parameters	Symbol	Threshold value			Unit	Test condition
		min.	Model	max.		
Voltage						
Operating voltage 1~ 230V	U_{Netz1}	205	230	255	V_{AC}	To terminals 5 / 8
Operating voltage 3~ 400V	U_{Netz3}	360	400	440	V_{AC}	On terminals 5 / 6 / 7
Max. total connection power				**1000**	**W**	
Max. total connection power				**2000**	**W**	
Operating frequency	f_{Netz}	48	50	52	Hz	
Internal logic voltage	U_V	4.8	5.0	5.2	V	
Power consumption	P_{Prim}		8	10	VA	Primary, excluding plug-in cards, standby mode
Start-time operating voltage / 1. Start	t_{Start}		2.5	3.5	s	@ U_{Netz} = 230V_{AC}
Inputs						
RPM sensor, low level	U_{DSLow}	0.7		4.2	V	On terminal 19/20, depending on setting menu 00
RPM sensor high level	U_{DSHigh}	1.3		4.4	V	On terminal 19/20, depending on setting menu 00
RPM sensor frequency	f_{DS}	10		500	Hz	
Limit switch on / closed not pressed (closed)	$U_{ESclosed}$	9.0			V	Terminal 40 / 0V, terminal 42 / 0V
Limit switch on / closed pressed (open)	U_{ESopen}			1.0	V	Terminal 40 / 0V, terminal 42 / 0V
Limit switch on / closed power (closed)	I_{ES}		28	40	mA	Over terminals 40/41, 42/41
Emergency stop not pressed (closed)	$U_{NOTclosed}$	0.0		0.5	V	Over terminals 38/39
Emergency stop pressed (open)	$U_{NOTopen}$			1.0	V	Terminals 39 / 0V
Emergency stop power (closed)	I_{NOT}		33	45	mA	Over terminals 38/39
Light barrier not pressed (closed)	$U_{Lsclosed}$	0.0		0.5	V	Terminals 31 / 0V
Light barrier pressed (open)	U_{Lsopen}	4.0			V	Terminals 31 / 0V

Light barrier short circuit power	I_{LSin-0}		5.0	6.0	mA	Over terminals 31/30
Light barrier response time	t_{LS-1}		65	100	ms	Time light barrier until motor on
Light barrier reset time	t_{LS-0}		500	800	ms	
SE1-SE4 (8K2) not pressed	R_{SE12-0}	6.2	8.2	10.3	KΩ	For SE1-SE4
SE1-SE4 (8K2) pressed	R_{SE12-1}	11.0		5.8	KΩ	For SE1-SE4
SE1-SE4 (OSD) level, release	$U_{SE12OSE-0}$	0.9		2.5	V	On terminals 32, 34, 35 and 37
SE1-SE4 (OSE) frequency	$f_{SE12OSE-0}$	0.6		1.8	KHz	On terminals 32, 34, 35 and 37
SE1-SE4 response time	t_{SE12-1}		50	80	ms	At 8K2 or OSE
SE1-SE4 reset time	t_{SE12-0}		500	700	ms	
Universal not switched (open)	U_{UNIV-0}	4.0	5.0		V	On terminals 23/24
Universal pressed (closed)	U_{UNIV-1}		0.0	1.0	V	On terminals 23/24
Universal pressed (closed)	I_{UNIV-1}		8.0	10.0	mA	
Universal input resistance	R_{UNIVin}		625		Ω	Pull-up from +5V
Universal imp. duration (debouncing)	t_{UNIV}		50		ms	
Impulse not switched (open)	U_{IMP-0}	4.0	5.0		V	On terminals 25/24
Impulse pressed (closed)	U_{IMP-1}		0.0	1.0	V	On terminals 25/24
Impulse pressed (closed)	I_{IMP-1}		8.0	10.0	mA	
Impulse input resistance	R_{IMP}		625		Ω	Pull-up from +5V
Imp. duration (debouncing)	t_{IMP}		50		ms	
Open not pressed (open)	U_{AUF-0}	4.0	5.0		V	On terminals 26/27
Open pressed (closed)	U_{AUF-1}		0.0	1.0	V	On terminals 26/27
Open pressed (closed)	I_{AUF-1}		8.0	10.0	mA	
Open input resistance	R_{AUFin}		625		Ω	Pull-up from +5V
Open Imp. duration (debouncing)	t_{AUF}		50		ms	
Closed not pressed (open)	U_{ZU-0}	4.0	5.0		V	On terminals 28/27
Closed pressed (closed)	U_{ZU-1}		0.0	1.0	V	On terminals 28/27
Closed pressed (closed)	I_{ZU-1}		8.0	10.0	mA	
Closed resistance	R_{ZUin}		625		Ω	Pull-up from +5V
Closed Imp. duration (debouncing)	t_{ZU}		50		ms	
Stop not pressed (open)	U_{Stop-0}	4.0	5.0		V	On terminals 29/0V
Stop pressed (closed)	U_{Stop-1}		0.0	1.0	V	On terminals 29/0V
Stop pressed (closed)	I_{Stop-1}		8.0	10.0	mA	
Stop input resistance	R_{Stop}		625		Ω	Pull-up from +5V
Stop Imp. duration (debouncing)	t_{Stop}		50		ms	
Outputs						
Light output ($230V_{AC}$)	P_{Licht}			500	W	To terminals 9 / 10
Warning light output ($230V_{AC}$)	P_{Warn}			500	W	To terminals 11 / 10
Motor capacity 1~ 230V	$P_{Motor1~}$			1000	VA	**Max. 25% cut-in time**
Motor capacity 3~ 400V	$P_{Motor3~}$			2000	VA	**Max. 25% cut-in time**
Motor runtime	t_{Mot}			120	s	
Motor connection time	ED			25	%	At maximum motor power, max. runtime
Universal2 - switching voltage	U_{Univ2}			275	V_{AC}	
Universal2 - switching voltage	P_{Univ2}			750	VA	Max. 3A
Voltage 24V output	U_{24V}	22		33	V_{AC}	Full load / standby mode on terminals 21 /20
Power 24V output	I_{24V}	0		200	mA	@ 2 plug-in cards, full load, U_{Netz} = 195V
Voltage 12V - output	U_{12V}	10		12	V_{DC}	Full load / standby mode on terminals 22 /20
Power 12V output	I_{12V}	0		100	mA	@ 2 plug-in cards, full load, U_{Netz} = 195V
Voltage 5V output	U_{5V}	4.8	5.0	5.2	V_{DC}	On BL3, Pin 3
Power 5V output	I_{5V}	0		20	mA	On BL3, Pin 3
Environmental conditions						
Ambient temperature	T_{Umgeb}	-20		+50	°C	Outside the housing
Operating temperature	T_{Betr}	-20		+70	°C	Inside the housing, normal installation position
Storage temperature	T_{Lag}	-25		+80	°C	
Relative air humidity	RH	20		90	%	No condensation permitted!
PCB						
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	Excluding plug-in cards and housing
Housing						
Length	L_{Geh}		255		mm	Excluding cable insert
Width	B_{Geh}		176		mm	
Height	H_{Geh}		78		mm	
Weight	m_{Gesamt}		1680		g	Housing incl. circuit board of membrane plugs
Material						ABS, self-extinguishing
Type of protection						IP65

22Document change history

From	Changes	File name
20/11/2012	First issue	28504300_ACM400S_DE_2012-11-20

23Notes

