



Mechanical operating instructions

Chain drive - ELEKTROMATEN® KE



consisting of:

M : Mechanical Operating Instructions

E : Electrical Operating Instructions (separately enclosed)

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GENERAL DIRECTIONS

For driving all rolling grilles, roller shutters and other horizontal or vertical movements. All other applications of the ELEKTROMATEN® need to be approved by the manufacturer. Where changes are made to the ELEKTROMATEN® (e.g. re-wiring), the manufacturer's declaration of incorporation cease to apply.

Basic Directions

This drive has been built and tested in accordance with **DIN EN 12453 Industrial, commercial and garage doors and gates - Safety in use of power operated doors - Requirements** and **DIN EN 12604 Industrial, commercial and garage doors and gates - Mechanical aspects - Requirements** and left the factory in perfect condition from the point of view of safety. To maintain this condition and to ensure safe operation, the user must observe all the directions and warnings contained in these operating instructions.

In principle, only trained electrical craftsmen should work on electrical equipment. They must assess the work which has been assigned to them, identify potential danger sources and take suitable safety precautions.

Reconstruction of or changes to ELEKTROMATEN® are only permissible with the approval of the manufacturer. Original replacement parts and accessories authorised by the manufacturer guarantee safety. Liability ceases to apply if other parts are used.

The operational safety of an ELEKTROMATEN® is only guaranteed if it is used in accordance with the regulations. The limiting values stated in the technical data should not be exceeded under any circumstances (see corresponding sections of the operating instructions).

Safety Regulations

During the installation, initial operation, maintenance and testing of the ELEKTROMATEN®, it is necessary to observe the safety and accident-prevention regulations valid for the specific application.

In particular, you should observe the following regulations (this list is not exhaustive):

European normative

- DIN EN 12453
Safety in use of power operated doors - Requirements
- DIN EN 12604
Industrial, commercial and garage doors and gates - Mechanical aspects - Requirements

Please check normative's bellow.

VDE-regulations

- VDE 0100
Regulations regarding the construction of power installations with a nominal voltage of up to 1000 V
- VDE 0105
Operation of power installations
- DIN EN 60204-1 / VDE 0113-1
Safety of machinery - Electrical equipment of machines - Part 1:
General requirements
- DIN EN 60335-1 / VDE 0700-1
Safety of household and similar electrical appliances - Part 1:
General requirements



Regulations

- Please ensure that the local regulations relating to the Safety of Operations of Doors are followed

Explanation of warnings

These operating instructions contain directions which are important for using the ELEKTROMATEN® appropriately and safely.

The individual directions have the following meaning:



DANGER

This indicates danger to the life and health of the user if the appropriate precautions are not taken.



CAUTION

This warns that the ELEKTROMATEN® or other materials may be damaged if the appropriate precautions are not taken.

General warnings and safety precautions

The following warnings are to be understood as a general guideline for working with the ELEKTROMATEN® in conjunction with other devices. These directions must be observed strictly during installation and operation.



- Please observe the safety and accident prevention regulations valid for the specific application. The installation of the ELEKTROMATEN®, the opening of covers or lids and electrical connection must be carried out when the supply is switched off.
- The ELEKTROMATEN® must be installed with the authorised coverings and protective devices. Care should be taken that any seals are fitted correctly and screw couplings are tightened correctly.
- In the case of ELEKTROMATEN® with a permanent mains connection, an all-pole main switch with appropriate back-up fuse must be provided.
- Check live cables and conductors regularly for insulation faults or breakages. When a fault is detected in the cabling, the defective cabling should be replaced after immediately switching off the mains supply.
- Before starting operation, check whether the permissible mains voltage range of the devices corresponds to the local mains voltage.
- Emergency stop devices in accordance with VDE 0113 should remain operational in all operating modes of the control. Releasing the emergency stop device should not cause any uncontrolled or undefined restart.

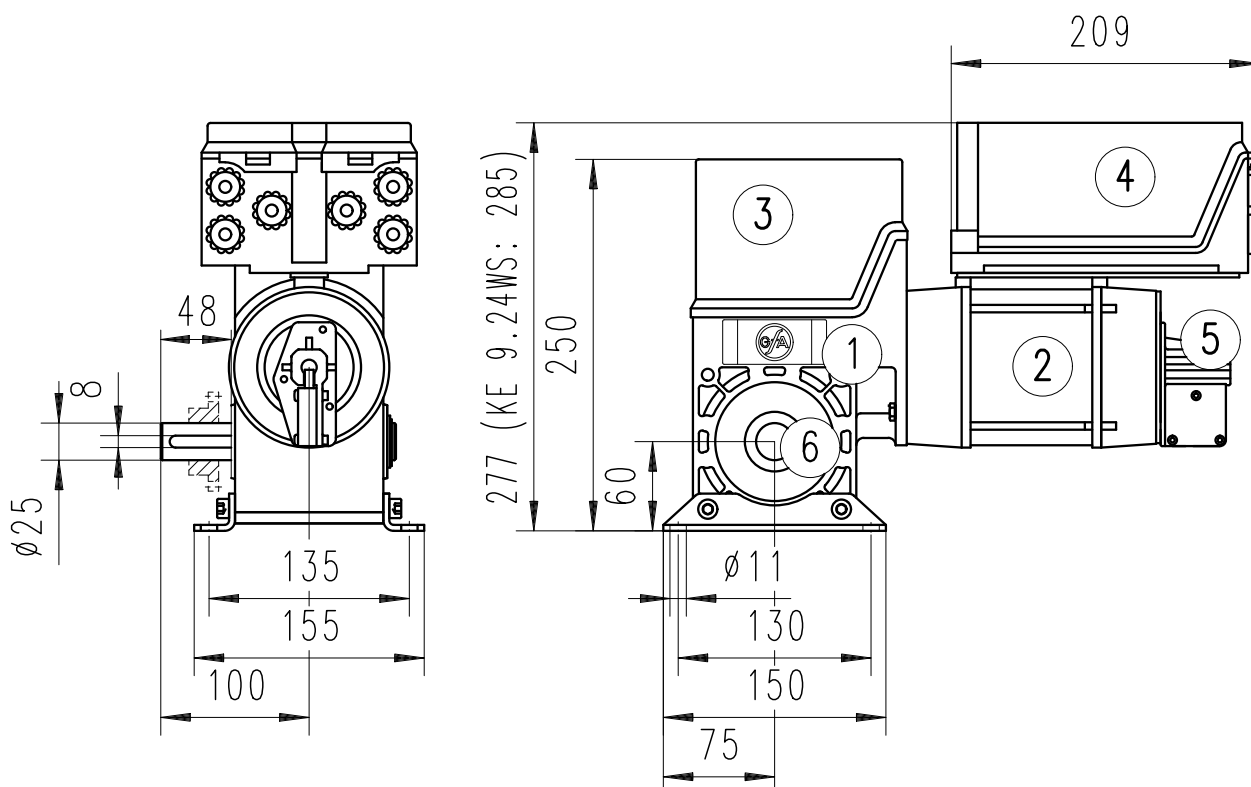
Size		KE 9.24	KE 9.24 WS Single phase
output torque	Nm	90	90
output revolutions	min ⁻¹	24	24
motor performance	kW	0,37	0,45
operational voltage	V	3 x 230/400	1 x 230
frequency	Hz	50	50
control voltage	V	24	24
nominal motor current	A	2,1 / 1,2	3,9
motor duty cycle	ED	S3-60%	S3-20%
power supply / fusing on attachment side		5x1,5 ² / 10A delay	3x1,5 ² / 10A delay
limit switch range, max. revolution of hollow shaft		20 (40)	20 (40)
permissible temperature range (in the case of deviation, please check)		-5°C / +40°C	-5°C / +40°C
permanent sound emission	dB(A)	< 70	< 70
class of protection	IP	54	54
ELEKTROMATEN®-weight	kg	16	17

In the case of structurally similar ELEKTROMATEN® or special sizes, deviations are possible, in particular in the output torque, output revolutions and the motor data. In each case, the details on the nameplate apply.



Regulations

- Please ensure that the local regulations relating to the Safety of Operations of Doors are followed



Model NHK
Manual crank

- ① Hollow shaft / worm gear
- ② Electric motor
- ③ Limit switch
- ④ Removable reversing contactor with 0.7m cable
- ⑤ Emergency manual operation
- ⑥ Interchangeable shaft

max. Hand-forces (N)

Size	NHK	KNH
KE 9.24	70	180
KE 9.24 WS		

- Subject to dimensional and structural changes
- deviations in the overall length and the motor diameter are possible in special sizes

TECHNICAL DATA KE 20.24 / KE 30.24 / KE 40.24

52230004

Size		KE 20.24	KE 30.24	KE 40.24
output torque	Nm	200	300	400
output revolutions	min ⁻¹	24	24	24
motor performance	kW	0,40	0,85	1,1
operational voltage	V	3 x 230/400	3 x 230/400	3 x 230/400
frequency	Hz	50	50	50
control voltage	V	24	24	24
nominal motor current	A	3,1 / 1,8	3,7 / 2,1	4,6 / 2,7
motor duty cycle	ED	S3-60%	S3-60%	S3-60%
power supply / fusing on attachment side		5x1,5 ² / 10A delay	5x1,5 ² / 10A delay	5x1,5 ² / 10A delay
limit switch range, max. revolution of hollow shaft		20 (40, 60,110)	20 (40, 60,110)	20 (40, 60,110)
permissible temperature range (in the case of deviation, please check)		-5°C / +40°C	-5°C / +40°C	-5°C / +40°C
permanent sound emission	dB(A)	< 70	< 70	< 70
class of protection	IP	54	54	54
ELEKTROMATEN®-weight	kg	23	28	31

In the case of structurally similar ELEKTROMATEN® or special sizes, deviations are possible, in particular in the output torque, output revolutions and the motor data. In each case, the details on the nameplate apply.

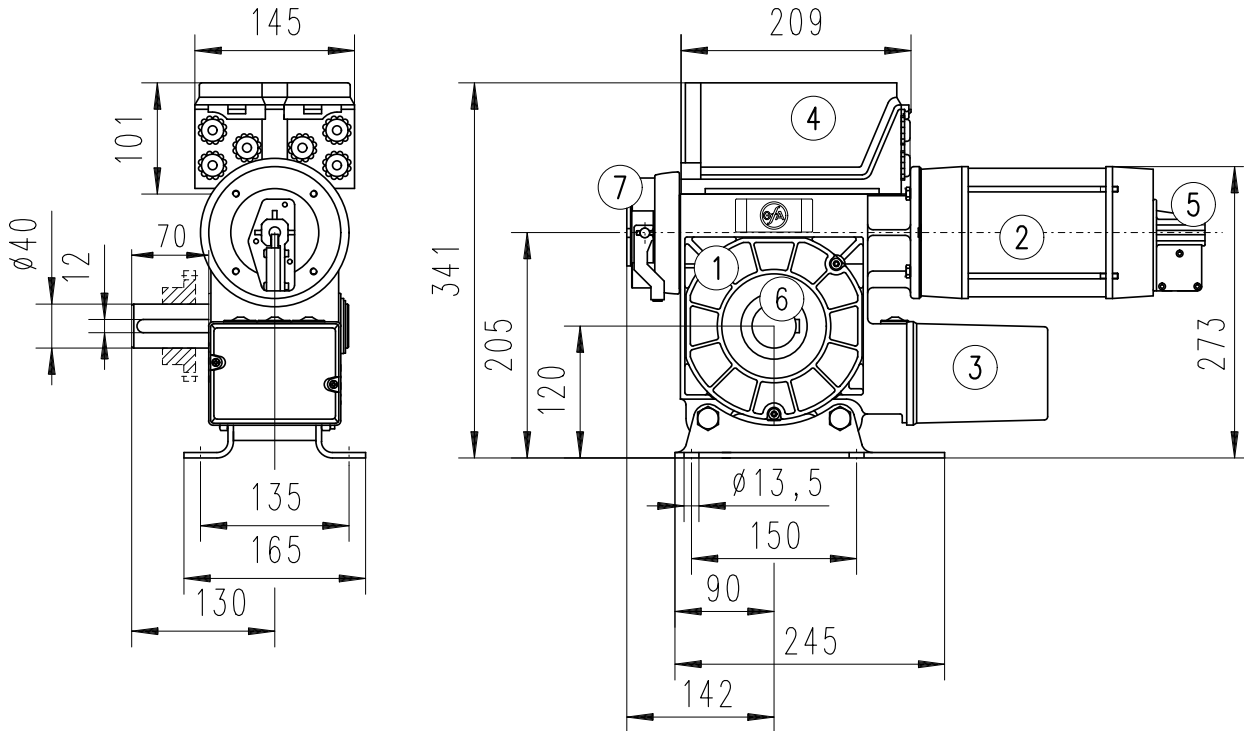


Regulations

- Please ensure that the local regulations relating to the Safety of Operations of Doors are followed

DIMENSIONS KE 20.24 / KE 30.24 / KE 40.24

52240030



Model NHK
Manual crank

- ① Hollow shaft / worm gear
- ② Electric motor
- ③ Limit switch
- ④ Removable reversing contactor with 0.7m cable
- ⑤ Emergency manual operation
- ⑥ Interchangeable shaft
- ⑦ electromagnetic spring operated brake with manual release

max. Hand-forces (N)

Size	NHK	KNH
KE 20.24	145	165 (i=2)
KE 30.24	180	120 (i=3,5)
KE 40.24	215	150 (i=3,5)

- Subject to dimensional and structural changes
- deviations in the overall length and the motor diameter are possible in special sizes

TECHNICAL DATA KE 60.24 / KE 80.24 / KE 120.24

52230018

Size		KE 60.24	KE 80.24	KE 120.24
output torque	Nm	600	800	1200
output revolutions	min ⁻¹	24	24	24
motor performance	kW	1,5	2,0	3,0
operational voltage	V	3 x 230/400	3 x 230/400	3 x 230/400
frequency	Hz	50	50	50
control voltage	V	24	24	24
nominal motor current	A	6,8 / 3,9	8,1 / 4,7	12,0 / 6,9
motor duty cycle	ED	S3-60%	S3-60%	S3-60%
power supply / fusing on attachment side		5x2,5 ² / 16A delay	5x2,5 ² / 16A delay	5x2,5 ² / 16A delay
limit switch range, max. revolution of hollow shaft		20 (60, 110)	20 (60, 110)	20 (60, 110)
permissible temperature range (in the case of deviation, please check)		-5°C / +40°C	-5°C / +40°C	-5°C / +40°C
permanent sound emission	dB(A)	< 70	< 70	< 70
class of protection	IP	54	54	54
ELEKTROMATEN®-weight	kg	48	52	58

In the case of structurally similar ELEKTROMATEN® or special sizes, deviations are possible, in particular in the output torque, output revolutions and the motor data. In each case, the details on the nameplate apply.

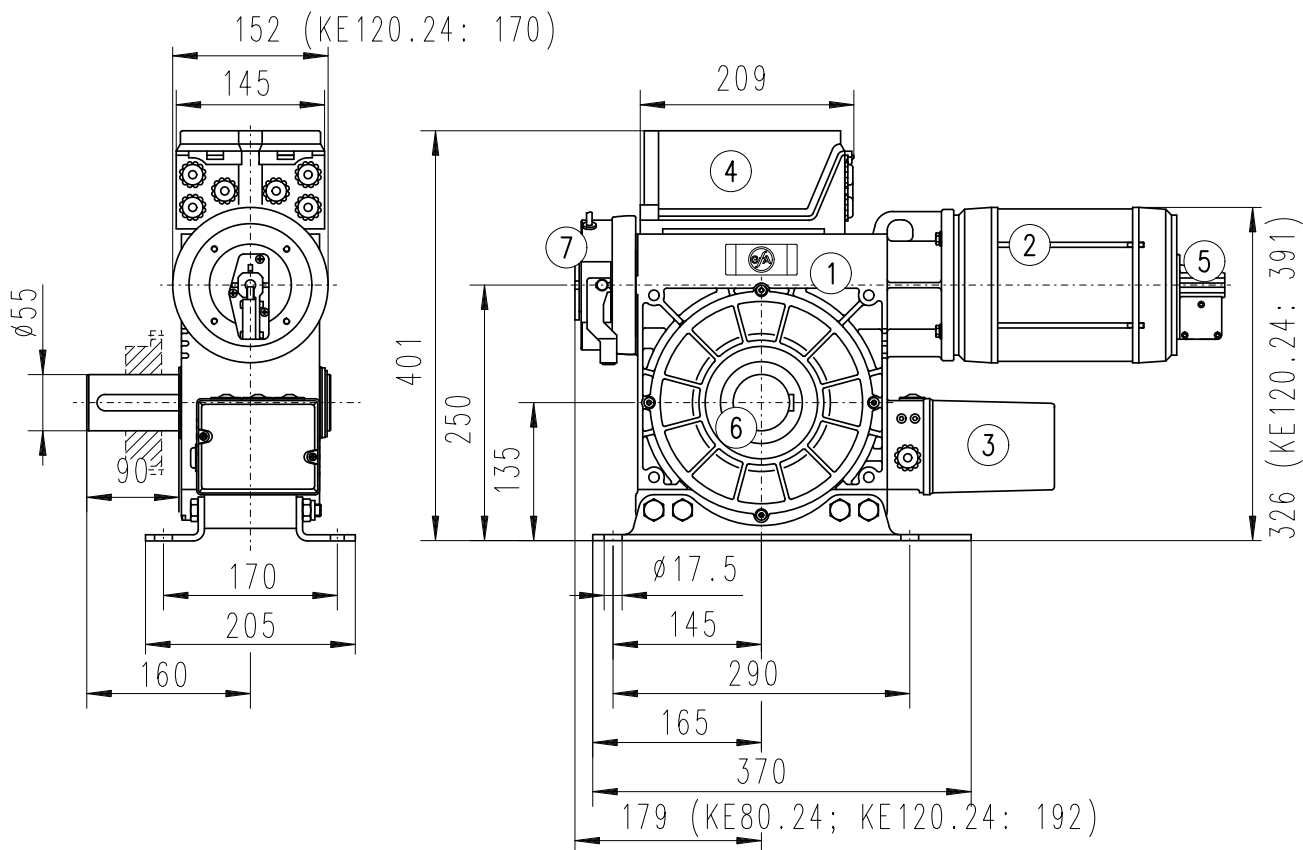


Regulations

- Please ensure that the local regulations relating to the Safety of Operations of Doors are followed

DIMENSIONS KE 60.24 / KE 80.24 / KE 120.24

52240031



Model NHK
Manual crank

- ① Hollow shaft / worm gear
- ② Electric motor
- ③ Limit switch
- ④ Removable reversing contactor with 0.7m cable
- ⑤ Emergency manual operation
- ⑥ Interchangeable shaft
- ⑦ electromagnetic spring operated brake with manual release

max. Hand-forces (N)

Size	NHK	KNH
KE 60.24	185	170 (i=3,5)
KE 80.24	290	270 (i=3,5)
KE 120.24	190	180 (i=3,5)

- Subject to dimensional and structural changes
 - deviations in the overall length and the motor diameter are possible in special sizes

INSTALLATION INSTRUCTIONS

52245003

General information for using a chain drive:

- The sprocket is not allowed mounting out on the shaft (see drawing), it must be fixed close as possible at the gear.
- The admissible tension chain is not permitted to cross.
- It is essential to tighten the chain, and changing tightness is necessary with brackets or slide rail.
- At shafts and bearing housing the fracture-proof is dependent on the pull direction of chain.

Use with roller shutters etc.:

- For insulated shutters with doublewalled, thick and / or deep sections, the rolling diameter must be checked. Do not calculate using the tube diameter. The biggest torque moment will be afterwards the 2 winding. Please request.
- In the selection chart by shutter weight it is additional calculated 20% for friction. This is calculated for normal using. If you have special requests please ask.

Use with vertical liftgates:

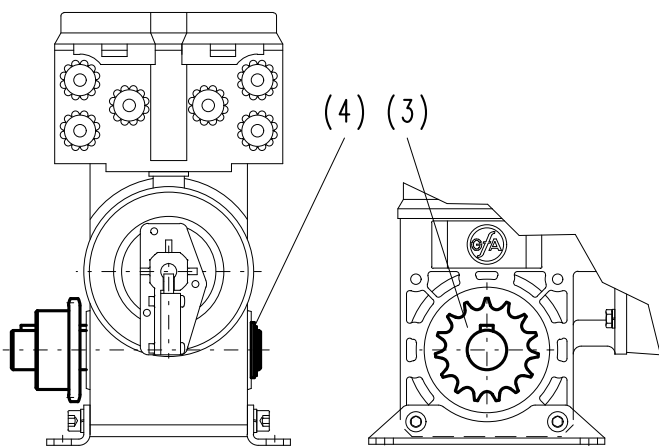
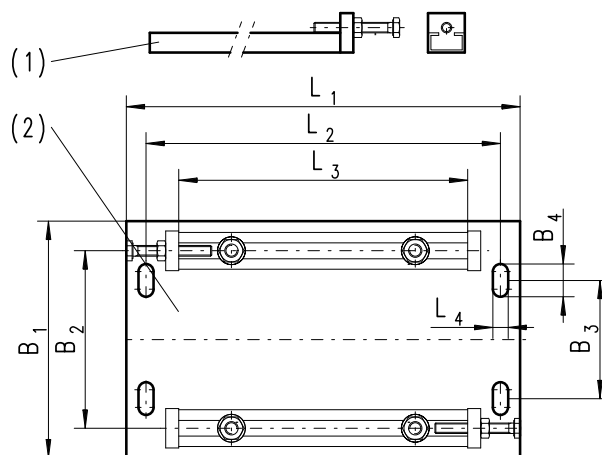
- Please reduce the output torque with 20%.

The chain drive ELEKTROMAT® will be mounting with slide rails or console. Drive takes place via a stub shaft with a sprocket (3). After removing the retaining ring and the supporting disk (4), the stub shaft can be pulled out and the output side can be changed.

The sprocket should only be assembled when the stub shaft is extended. The chain should not be overstrained. (The sagging in the slack strand should be maximum 2% of the axle distance); the sprockets should be in alignment.

The standard transmission is 1:1. When the transmission is changed to "high-speed" (large sprocket on the ELEKTROMATEN®), the permissible leaf weight should be reduced (check with us, if necessary).

If the gearbox housing is provided with an additional coat of paint, the shaft sealing rings should not be painted under any circumstances.



Size	KE 9.24	KE 20.24 KE 30.24 KE 40.24	KE 60.24 KE 80.24 KE 120.24
Art.-Nr.	30000567	30002872	30003070
B ₁	180	180	220
B ₂	135	135	170
B ₃	90	90	100
B ₄	25	25	30
L ₁	300	380	520
L ₂	270	350	485
L ₃	220	300	425
L ₄	11,5	11,5	17,5

The emergency manual operation is provided in order to open or close the door without an electrical supply.



Warning! Danger of injury through improper operation!

- Before using the emergency manual operation, the main switch should be switched off.
- The emergency manual operation should only be carried out when the motor is stationary.
- A secure position should be adopted to operate the equipment manually.
- In the case of ELEKTROMATEN® with a spring-operated brake, the door should be opened or closed with the brakes on.
- For safety reasons, the brakes should only be lifted for inspection.
- Precautions must be taken on the construction site to prevent the brake from being lifted unintentionally.



The door should not be moved beyond the normal end positions by the emergency manual operation, since this will operate the safety limit switch. Electrical operation of the door is then no longer possible.

Emergency manual operation by the manual hand crank (NHK) (Fig. 1)

- The manual crank must be inserted into the manual switch receptacle and is turned whilst pressing gently until it engages, on that way the control circuit would be interrupted. It is no longer possible to operate the door electrically.
- The door can be opened and closed by turning the manual crank
- After pulling out the manual crank, electrical operation is once possible.

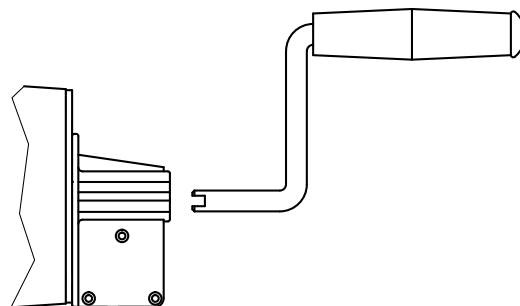


Fig. 1: Emergency manual operation by the manual hand crank

Execution: **SK** "Rapid hand chain operator" (Fig. 1)
Execution: **KNH** "Chain operator" (without Fig.)

Emergency manual operation

"Rapid hand chain operator" (Fig. 1)

- The red handle of the engaging and disengaging mechanism is first pulled lightly until it stops (max. operating force 50N), the control circuit is now interrupted, it is no longer possible to operate the door electrically.
- The door can be opened and closed by pulling the chain (2).
- By lightly pulling the engaging and disengaging mechanism by the green handle until it stops (3) (max. operating force 50N), the control circuit is re-made and the door is electrically operational.

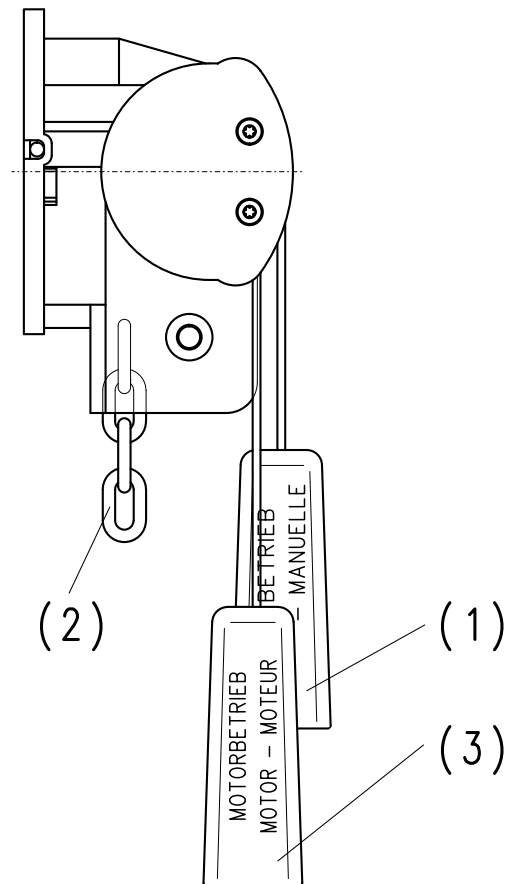


Fig. 1: Emergency manual operation
"Rapid hand chain operator"

Variation of the hand chain length (Fig. 2)

- The hand chain can be opened at the connection point and can be lengthened or shortened with connecting links.
- The connecting links should be bent together carefully.
- When changing the chain length, care should be taken that the chain is cross - assembled (Fig. 2).

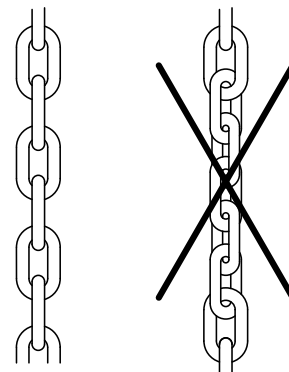


Fig. 2: Variation of the hand
chain length

VOLTAGE CHANGEOVER OF MOTORS

5239009



Warning! Danger to life through electric shock

Before starting assembly, disconnect the cables from the electricity supply and check that they are dead.

The motor windings are wired so that it is possible to operate the ELEKTROMATEN® on a 3 X 400 V or 3 X 230 V supply.

Ex factory the motor is wired in star connection for a 3 X 400 V mains. The motor should be in delta connection for a 230 V mains.

In order to change-over the voltage of the motor, the ends of the coils should be re-arranged, as shown in Fig. 1.

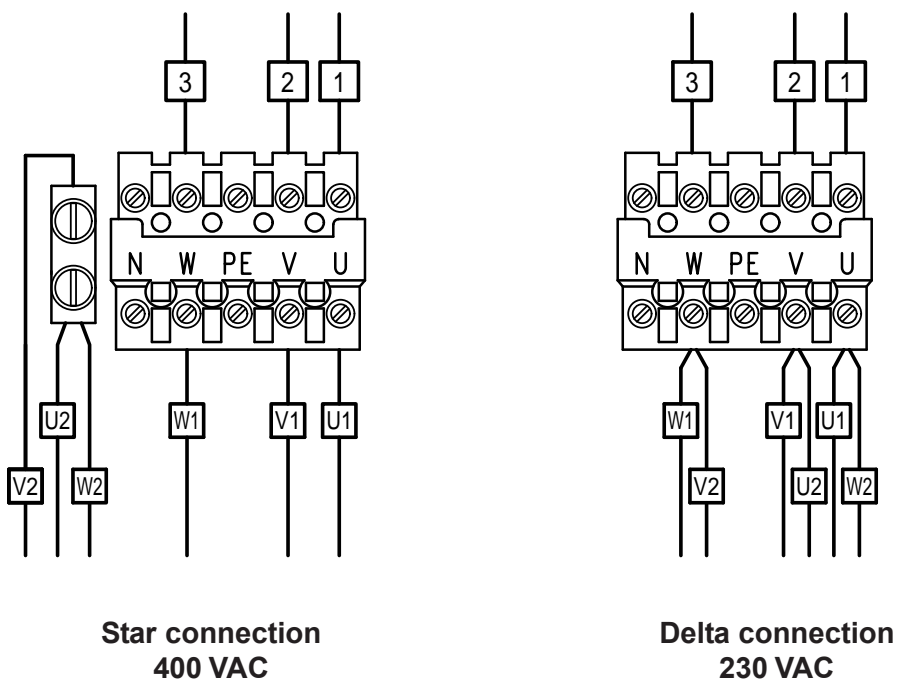


Fig. 1: Motor terminals plug in connection



When attaching the motor cables, care should be taken that the individual cables are inserted deep enough to ensure secure connection. This connection can be checked by pulling the cables.

If the motor is changed over for operation in a 3 X 230 V mains, the reversing contactor board should also be modified.

At Universal - contactor board, fit link G between T1 -T2.
(electrical operating 51171134)

Adjusting the working limit switches sets the upper and lower stopping positions of the door. In order to make this adjustment, the ELEKTROMATEN® should be connected electrically. The limit switch board (Fig. 2: limit switch board with 7 limit switches) is accessible after unscrewing the limit switch cover. If no external control devices are fitted, the door can be moved in dead man operation using the built-in OPEN, CLOSE and STOP push buttons (S11-13) where a reversing starter has also been supplied.

The door should open when the pushbutton S11 is operated, otherwise the two phases L1 and L2 should be exchanged at the contactor with the current switched off.

Lower stopping position

In order to adjust the limit switch for the lower stopping position of the door, the following steps should be carried out (Fig. 1):

- shut the door
- rotate switching cam (1) of the limit switch "CLOSE" to the middle of the switching cam (2) and tighten the coarse adjustment screw (3) with the hexagonal socket screw key supplied
- open door until the limit switch "CLOSE" switches back again
- close door again
- correct lower stopping position, possibly by turning the fine adjustment screw (4); the fine adjustment screw can be moved from both sides with the hexagonal socket screw key supplied
- the "CLOSED SAFETY" limit is pre-adjusted automatically by the limit switch adjustment "CLOSE"
- the switch point for the safety limit switch must be corrected, possibly using the fine adjustment screw, so that the door still stops safely if the direction of rotation is reversed or the operating limit switch fails.

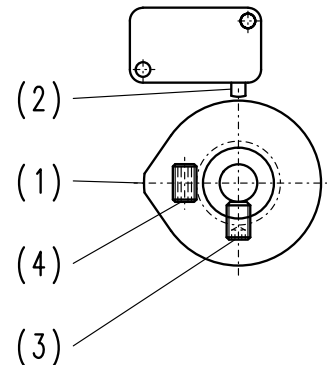


Fig. 1: Limit switch cam

Upper stopping position

After opening the door, the "OPEN" and/or "OPEN SAFETY" limit switch are adjusted similarly to the lower position.

SAFETY CIRCUIT

The terminals 21 to 28 on the limit switch board (Fig. 2) are reserved for the safety circuit. An interruption of the safety circuit causes the control current to be interrupted. Electrical operation is then no longer possible.

The terminals 25 to 28 on the limit switch board are connected to the safety switch of the emergency manual operation and/or the thermal protection of the motor.

The terminals 21 to 24 on the limit switch board are provided with jumpers. Additional safety switches can be attached instead of these jumpers.

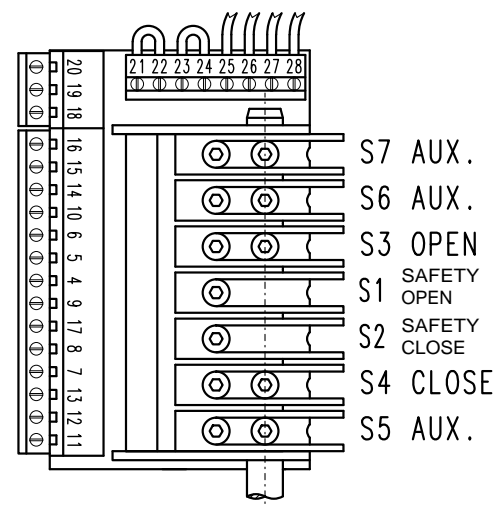


Fig. 2: Limit switch board

DIGITAL LIMIT SWITCH (type DES)

52340012

The digital limit (type DES) is an absolute position encoder for doors.

Evaluation and installation of the limit positions is done through the control panel, which corresponds to the electronic limit.

For installation only a 6 pole plug has to be connected. Adjustment of mechanical parts is not required.

The connections for the safety circuit (e.g. safety limits) are on the side of the DES.

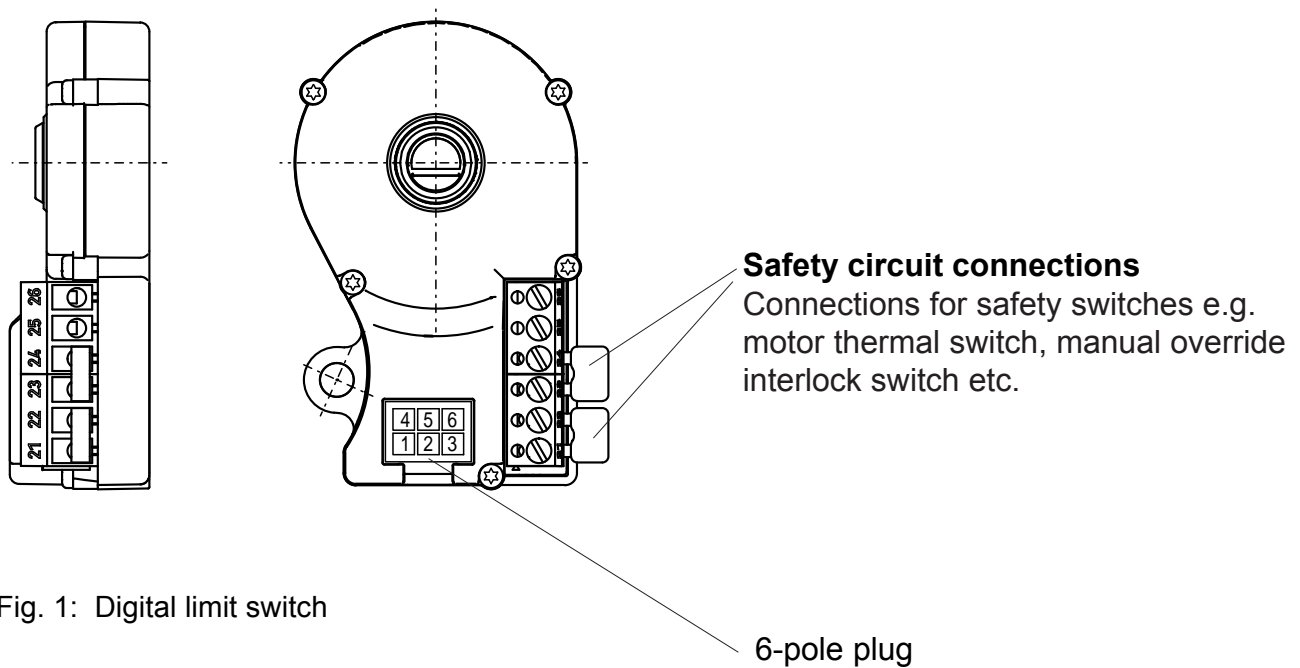


Fig. 1: Digital limit switch



The maintenance of power-assisted windows, doors and gates should only be carried out by persons authorized by the employer and who are familiar with the respective maintenance work.

Directions for the inspector

Gearbox:

The gear construction is maintenance-free and has lifetime lubrication. The output shaft should be kept rust-free.

Attachments:

All attachment screws should be inspected to make sure they are fitted securely and are in perfect condition.

Counter-balancing of sectional doors:

According to the regulations regarding counterbalancing, the door should be balanced in every position (cf. Installation instructions).

Brake (if fitted)

The correct function of the brake should be checked during the annual inspection.

Where there is increased wear, the brake lining or - once the rectifier has been disconnected - the entire brake can be exchanged.

The ELEKTROMATEN® is assembled completely and is wired ready for connection. Transport and any storage should be carried out in the provided (or equivalent) packaging to avoid damage.

On disposal the ELEKTROMATEN®,

- metals
- plastic parts
- electric parts
- lubricants

must be separated.

SERVICE / REPLACEMENT PARTS / ACCESSORIES

Please note that replacement parts and accessories which have not been supplied by us have also not been tested and released by us.

Fitting and / or using such products can therefore negatively affect the above properties of the ELEKTROMATEN® and thus reduce its safety.

GfA accepts no liability for nor provides any guarantee against damage caused by using non-original replacement parts and accessories.

Faults which the users cannot rectify themselves should only be corrected by the manufacturer of the door equipment or another specialist firm. Replacement parts can also be requested from such firms.

