

# Translation of the original assembly instructions

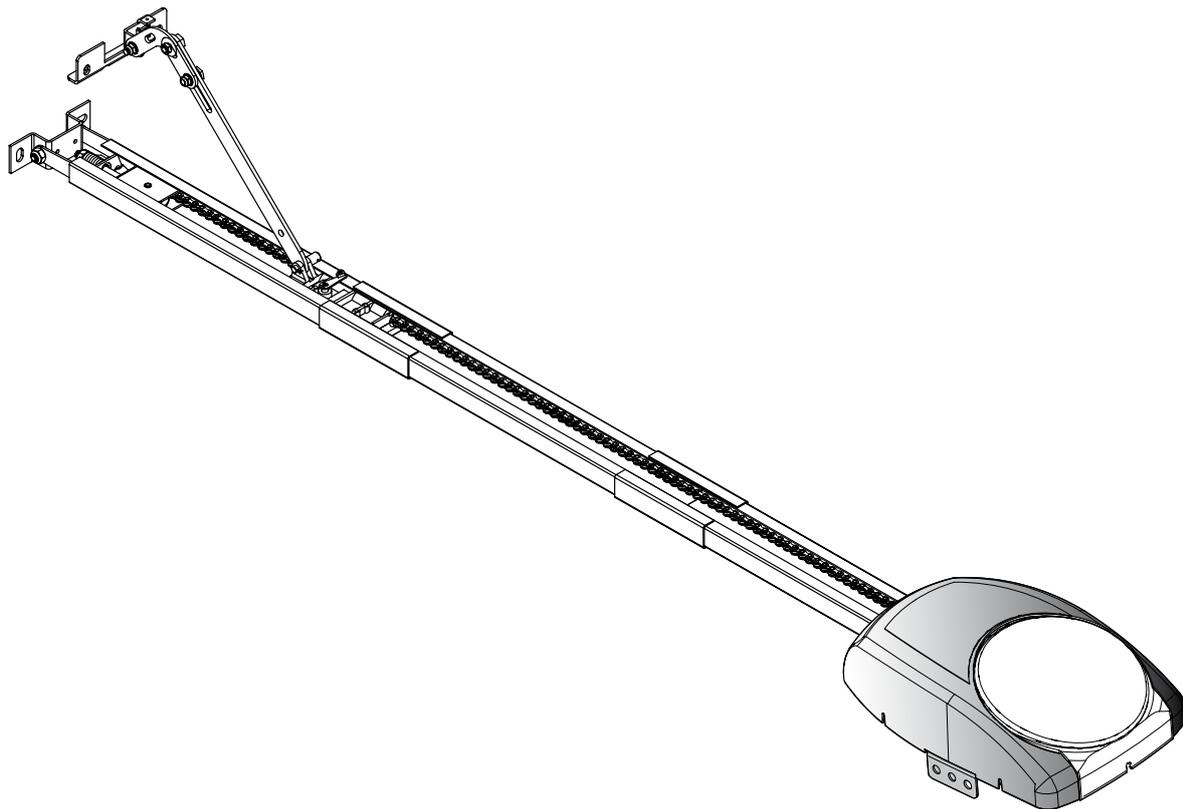
- including advices for operation and maintenance -

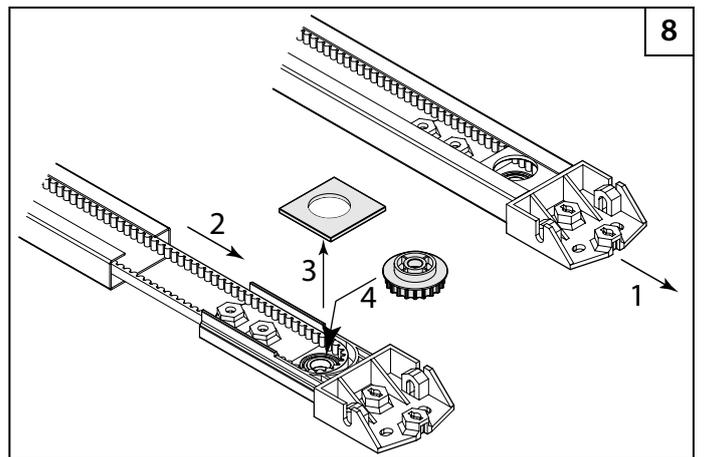
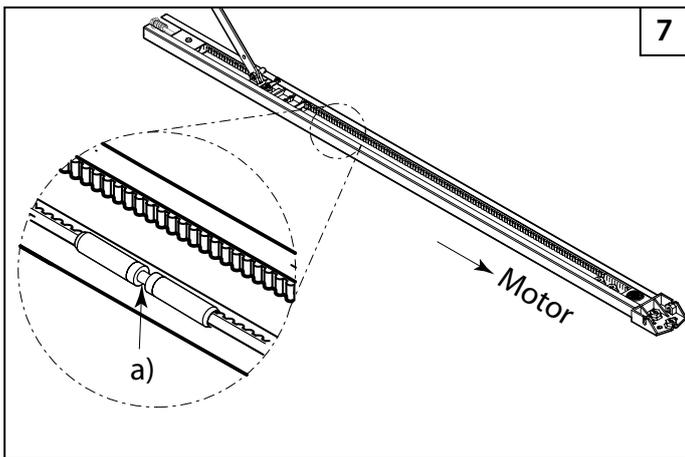
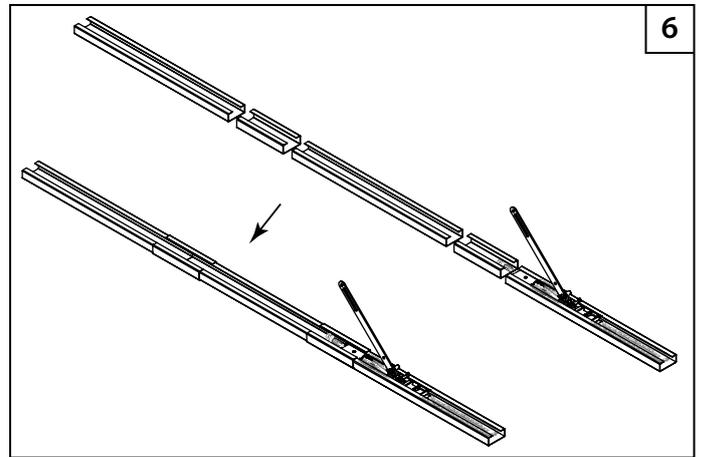
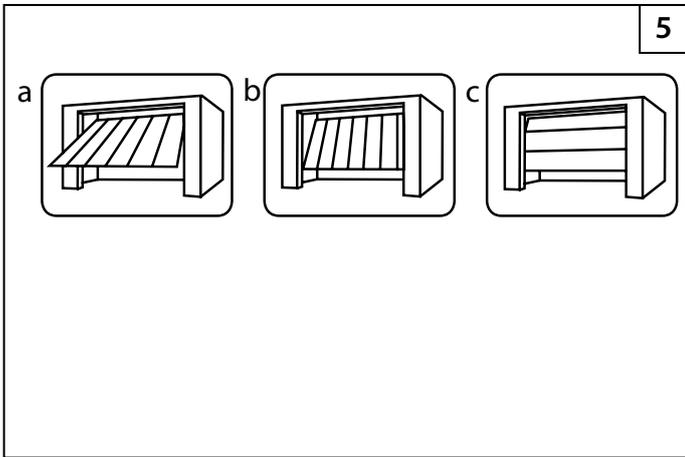
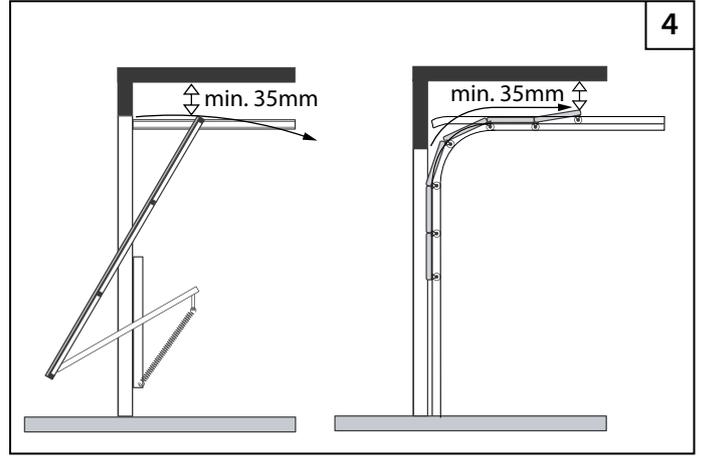
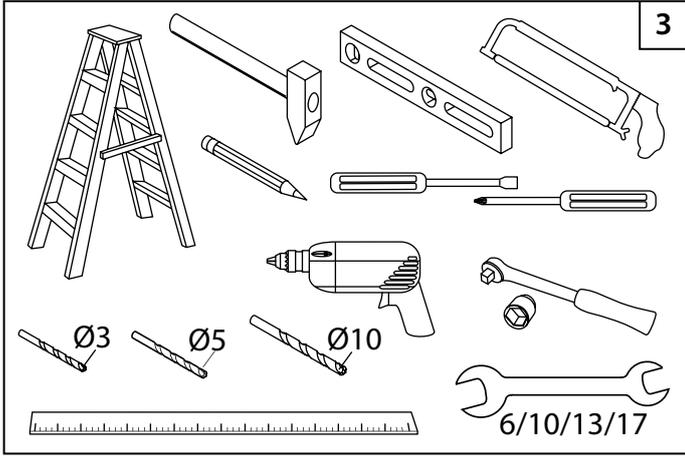
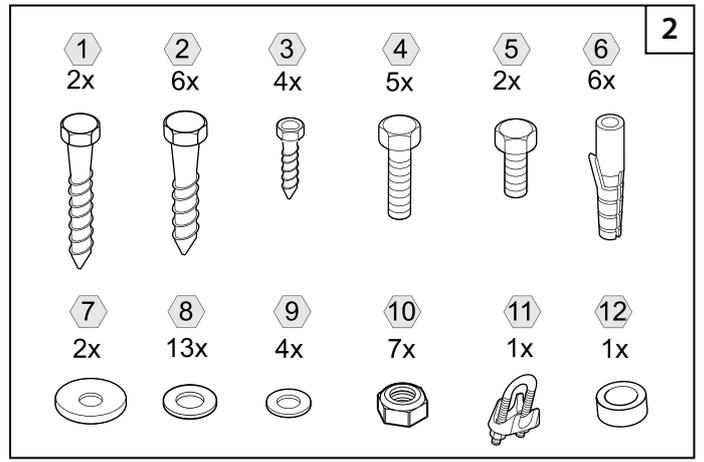
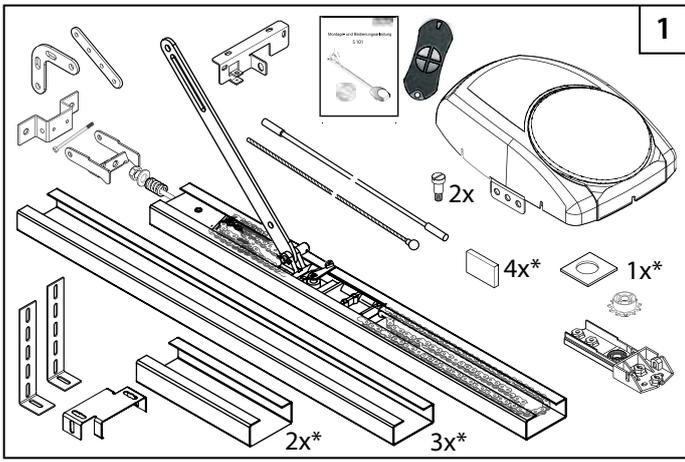
## Garage door drive

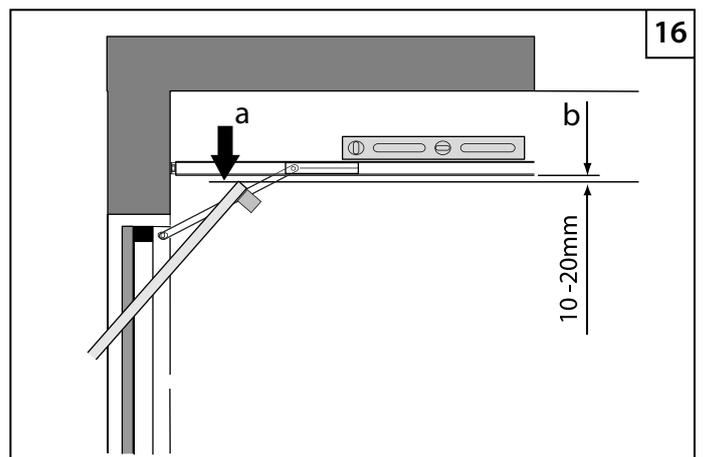
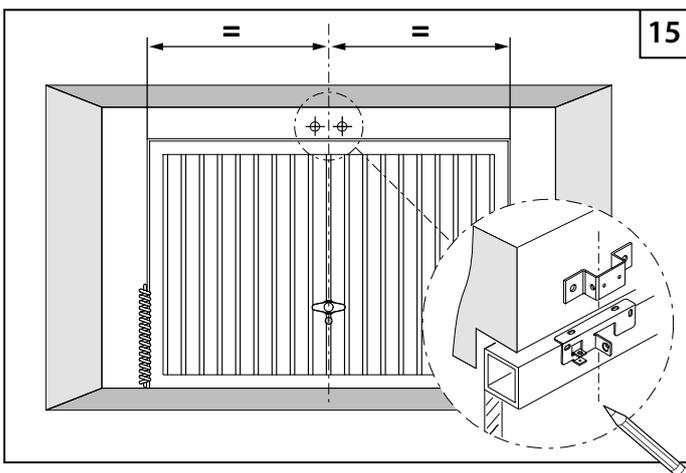
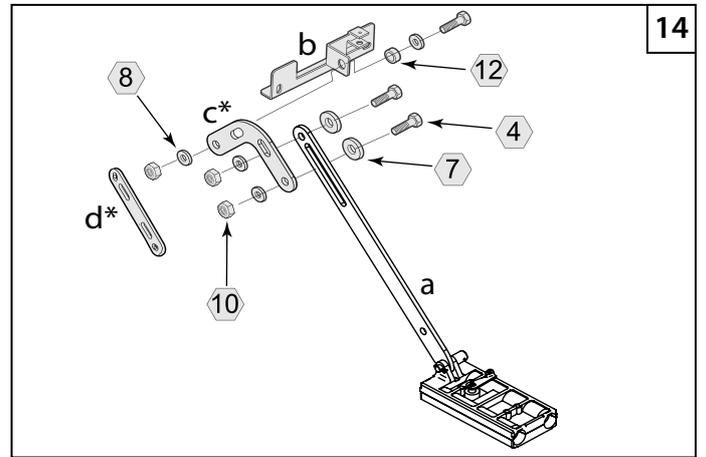
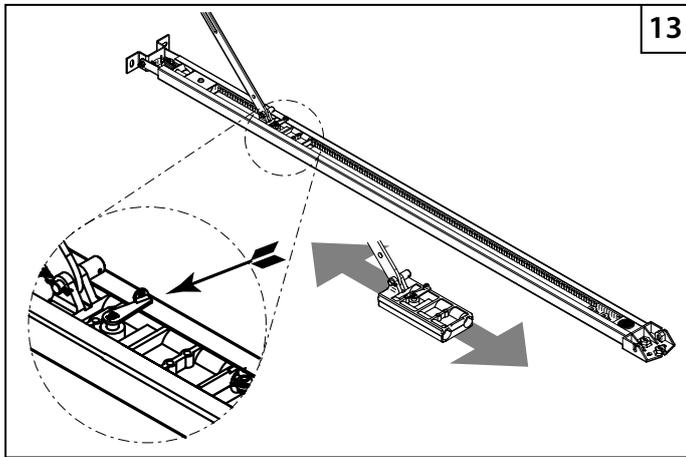
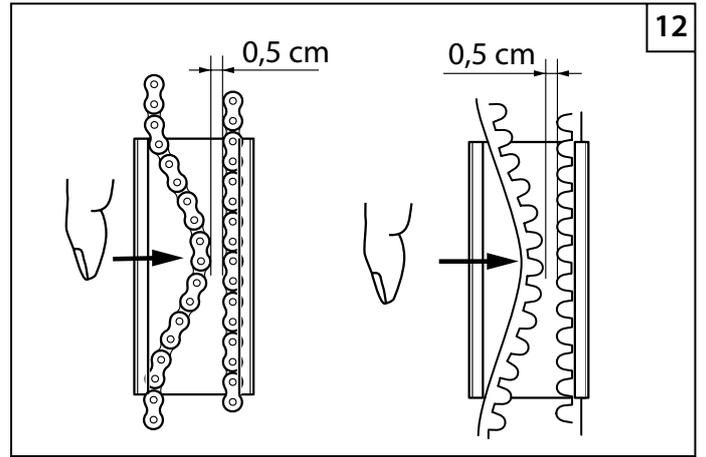
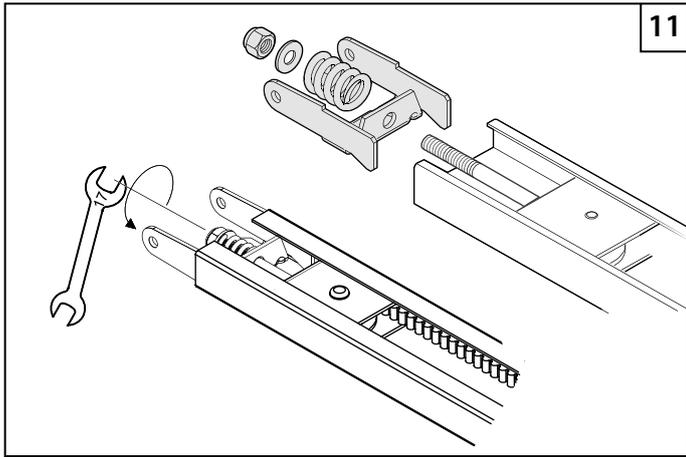
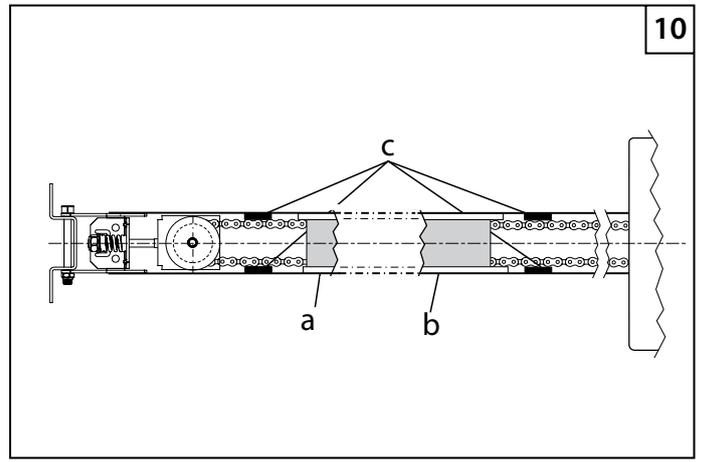
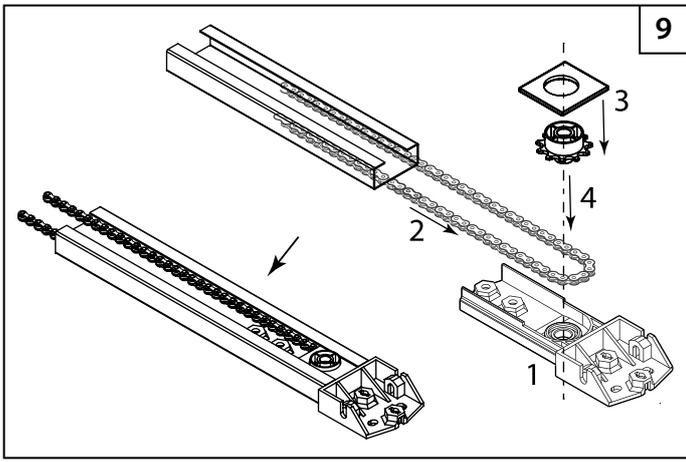
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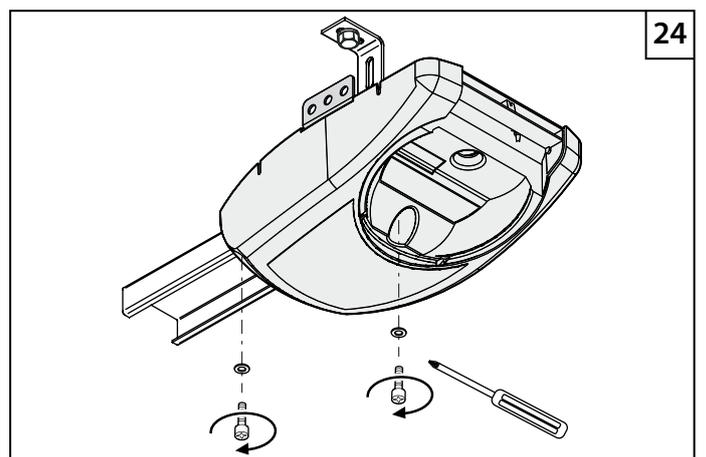
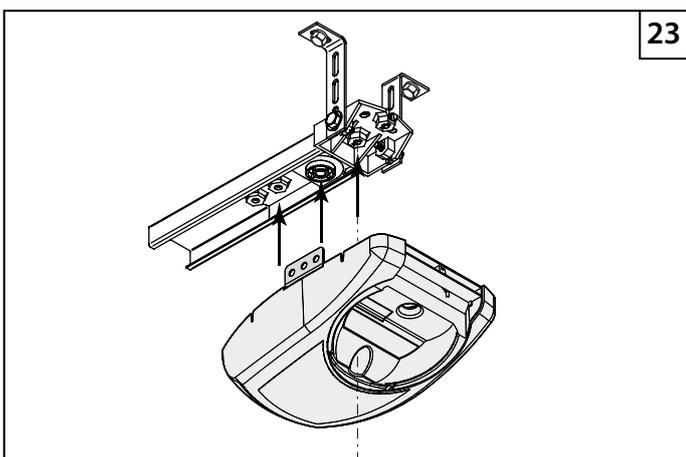
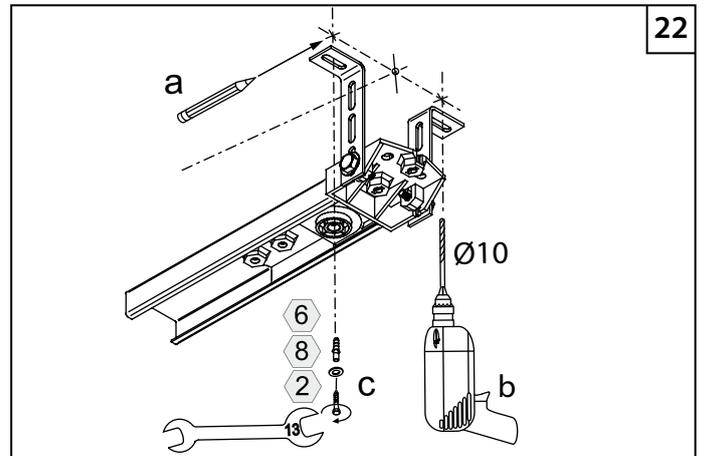
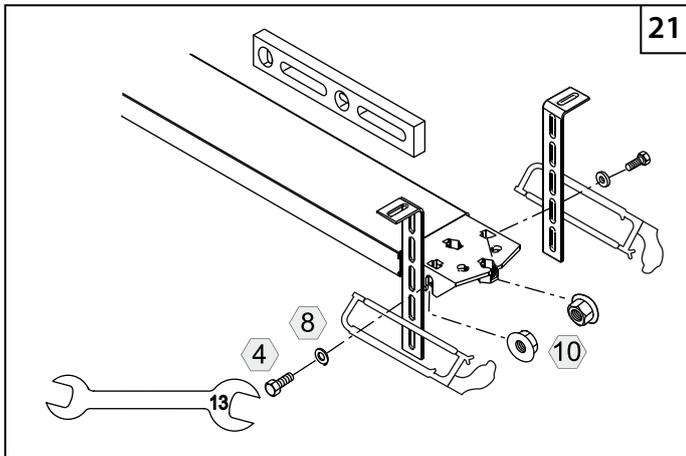
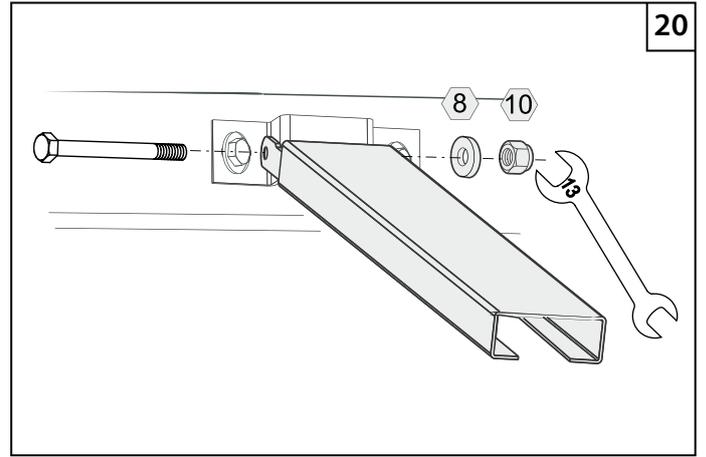
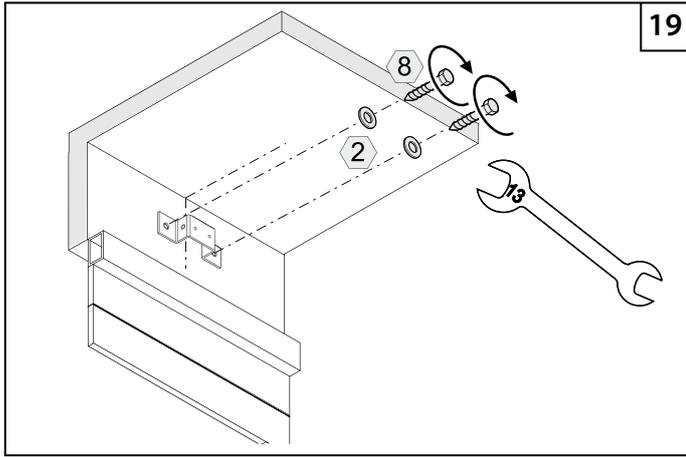
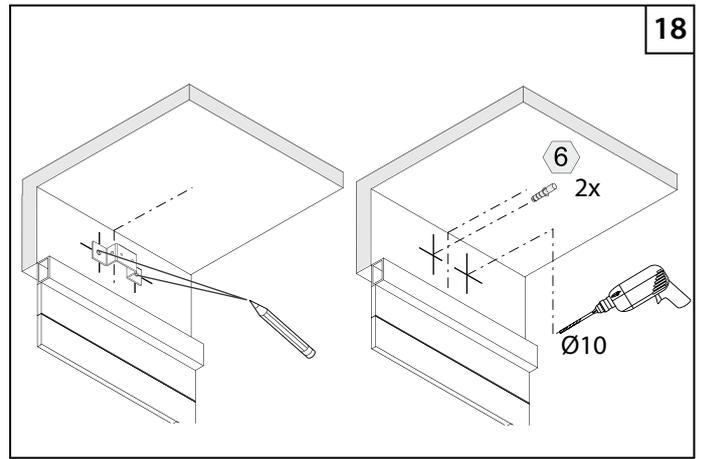
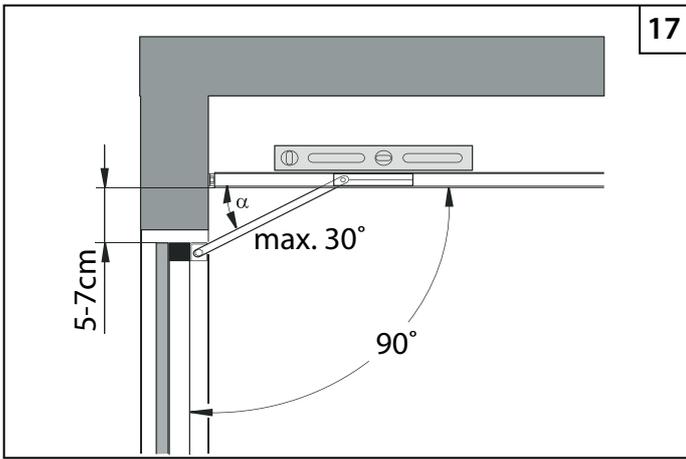
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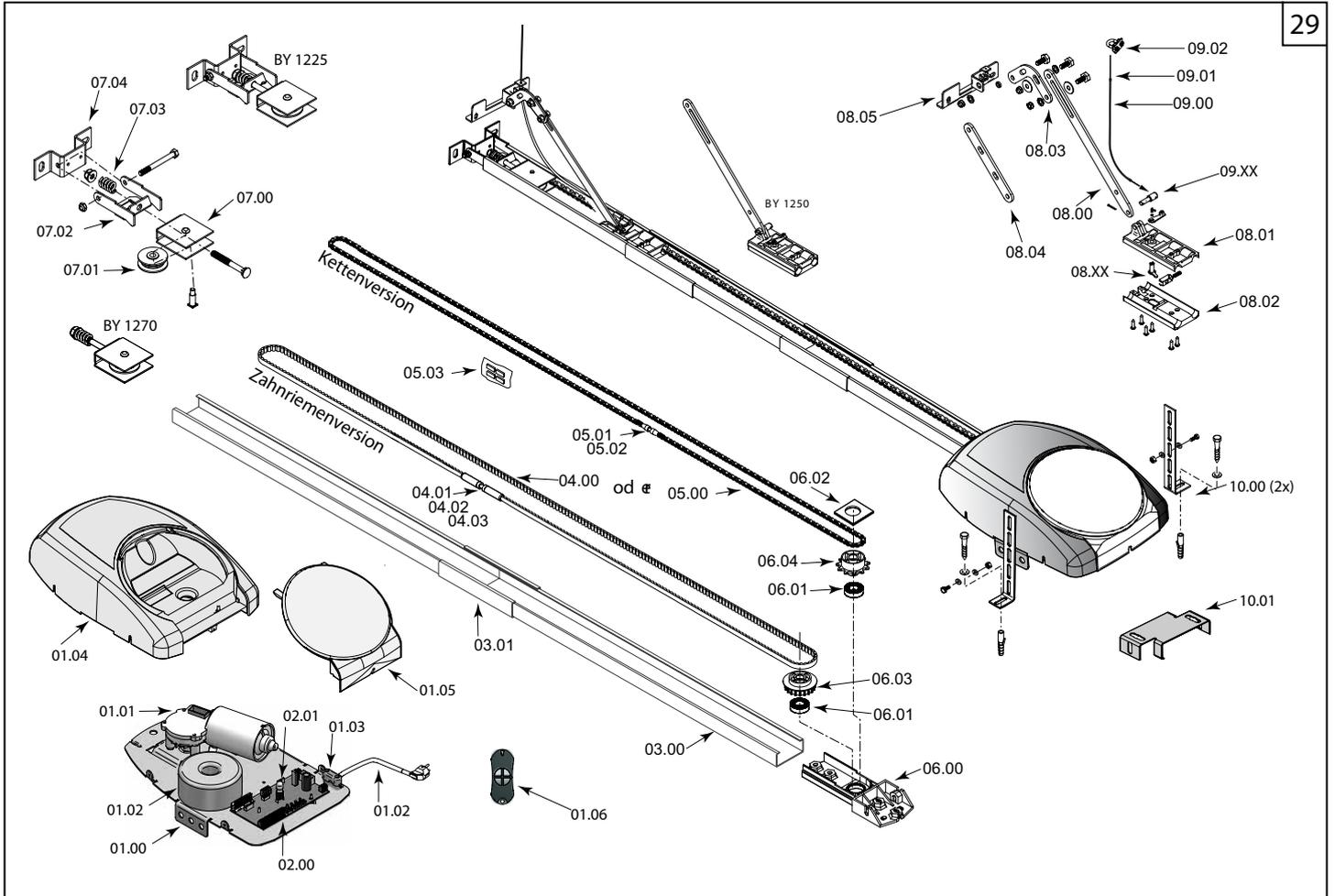
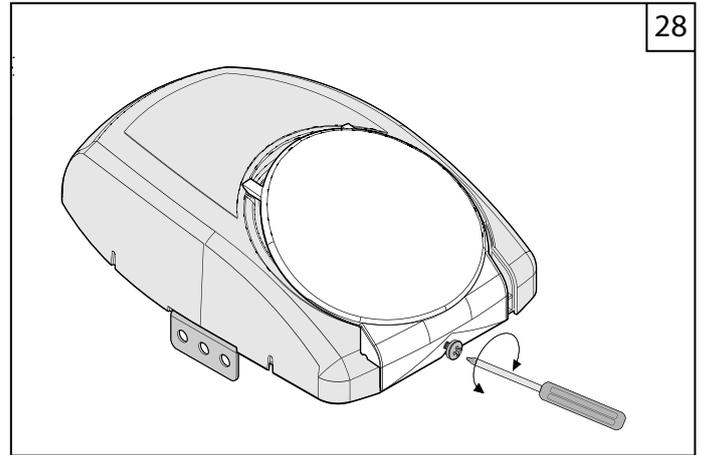
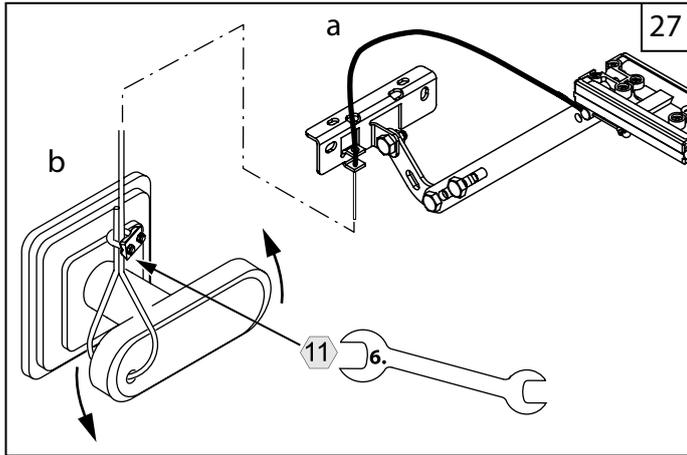
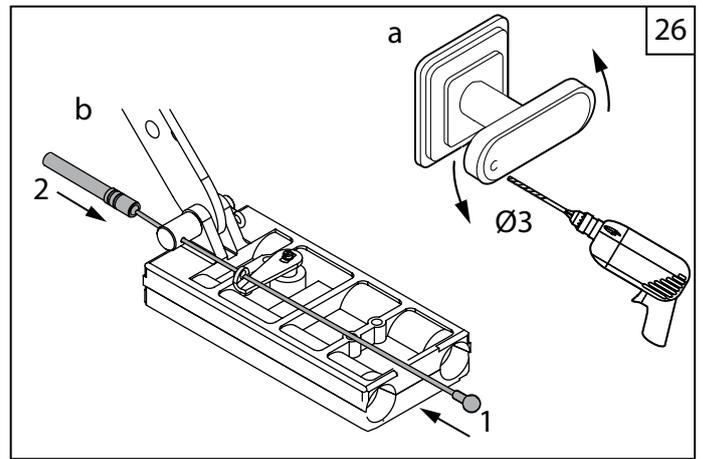
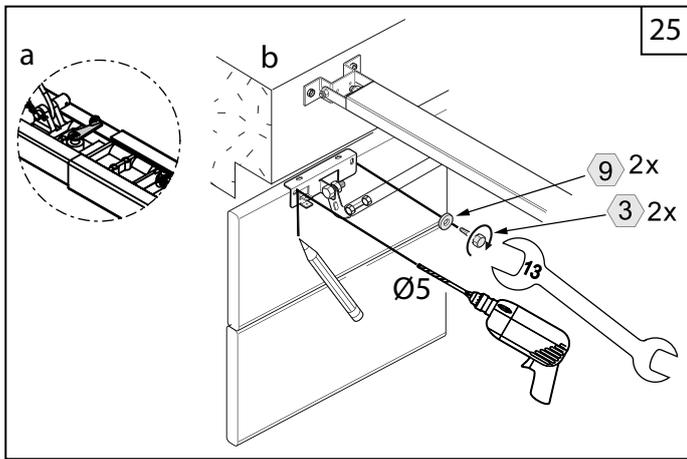
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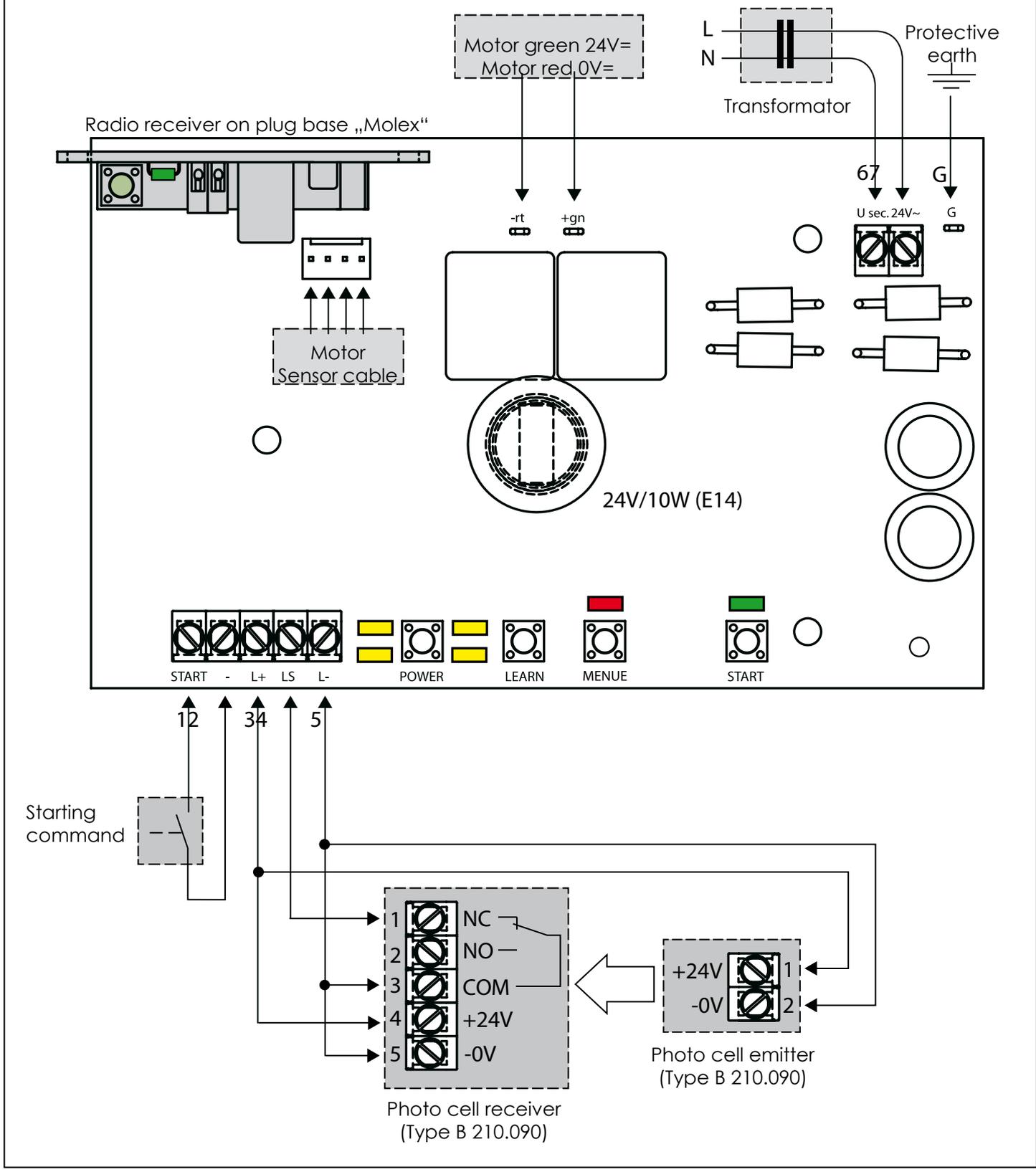








Control unit B 300.200-FC



The on-site electrical installation work -as well as all work on 230V/AC- is to be performed by a qualified electrician only!



At terminal START only non-latching NO (normally open) contacts (not self-holding or latching contacts of a switch or similar!) may be used! Only potential-free contacts may be connected - never connect any external power supply!



If no light barrier/photo cell is used at terminals 4 (LS and 5 (L-) the terminals has to be bridged by wire jumper (delivery status)!



**IMPORTANT SAFETY INSTRUCTION FOR PREVENTION OF BODILY INJURY AND MATERIAL DAMAGE!**



**IMPORTANT INSTRUCTION FOR PROPER INSTALLATION AND OPERATION!**

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## 1. GENERAL INSTRUCTIONS

Dear customer, congratulations on the purchase of this product. The garage door drive has been developed according to state-of-the-art technology and manufactured using the most reliable and modern electrical / electronic components.

The manufacturer reserves the right to make improvements or changes to the devices and operating instructions at any time without prior notice.

Please take a few minutes time to read the following operating instructions prior to mounting the device and commissioning it.

The manufacturer assumes no warranty and product liability if installation was incorrectly performed or any change was made to the drive without the latter's prior consent. Mounting may only be performed according to the assembly guidelines.

Please ensure that the national regulations for the operation of electrical devices are observed. We accept no responsibility for incorrect operation or maintenance of the door, accessories and drive.

**In the context of EC machinery directive 2006/42/EC a garage door drive represents a partly completed machinery. The final machinery results of the incorporation of the drive into the garage door by the declaration of conformity declared by the manufacturer: the initiation may be done by qualified personnel only. Part of initiation is the declaration of conformity and CE-marking of the final machinery.**



**The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the directive 2006/42/EC.**



### 1.1 General notes on safety



**IMPORTANT SAFETY INSTRUCTIONS! ATTENTION: ATTENTION! IT IS IMPORTANT FOR SAFEGUARDING HUMAN LIVES TO COMPLY WITH ALL INSTRUCTIONS!**



**THIS MANUAL MUST BE PRESERVED UNDER ALL CIRCUMSTANCES! Please ensure that all those who are entrusted with the operation, maintenance and repair of the system have access to this documentation.**



**This garage drive door may only be assembled, wired and connected, and commissioned by qualified technicians. In particular, knowledge and experience is required in the following areas:**

- general and special safety rules and regulations and accident prevention provisions,
- use of safety equipment and devices,
- EN 13241-1 (Garage door product standard)
- EN 12635 (Installation and operation requirements)
- EN 12453 (Safety issues when using power-operated doors and roller shutters)
- 2006/42/EC (Machinery Directive)



**The on-site electrical installation work is to be performed by a qualified electrician only!**



**During assembly the applicable safety regulations regarding accident prevention are to be observed.**



**The garage door drive should only be implemented for the operation of spring-balanced one-piece and sectional doors for single households in the residential sector.**

## 1.2 Storage and transportation

- The garage door drive may be stored and transported horizontal at following ambient conditions only: -20°C bis +40°C / relative humidity RF 20-80%, non-condensing.
- When stacking the equipment, please note that the maximum height of 6 motor heads or 6 rails must not be exceeded. Equipment that is completely packed (kit cartons) can be stacked up to a maximum height of 6 devices.
- While stacking the garage door drives, care must be taken to ensure that they or their components do not fall down.
- Equipment damaged by water or other noticeable damage to the housing, motor shaft, drive rail, carriage, push rod, door fittings, power cable, fixing materials or any parts of these components may not be installed for safety reasons.

## 1.3 The garage door drive

The garage door drive is a microprocessor-controlled device designed according to the latest European standards. The drive is self-inhibiting and keeps the garage door closed.

## 1.4 Scope of delivery

The scope of delivery may differ from the pictures (FIG. 1, FIG. 2) depending on the rail version (parts marked with "\*\*").

## 1.5 Intended use

The garage door drive may be implemented for the operation of well-balanced doors for single households in the residential sector only. The drive may only be used in dry areas.

(FIG. 5) The garage door drive may be implemented with the following door types: one-piece tilting doors (a), one-piece non-tilting doors (b) and overhead sectional doors (c). At one-piece non-tilting doors the accessory "curved arm" can become necessary. The garage door drive must not be implemented at doors including a wicket door!

## 1.6 Prerequisites

- (FIG. 4) There must be a clearance of at least 35 mm between the highest point of the upper edge of the garage door and the roof in order to install the appliance.
- The maximum values and forces specified in the section on Technical Specifications must be taken note of and complied with.
- Prior to drive assembly the mechanical door locking devices must be dismantled or put out of action.
- Before installing the drive, the garage door must be in proper mechanical condition. It must be possible to operate the door by hand without applying any large amount of force and it must remain fixed in any position when it is stopped. The garage door must be checked by qualified specialists and, if the above condition is not fulfilled, it must be repaired before installing the drive. Lintel and ceiling must be constructed in way so that the drive may be safely secured. Due to lintel and/or ceiling material the included fastening device may be changed for admissible material.
- The minimum load bearing capacity of lintel and ceiling must amount to 700N (approx. 70kg).
- The door securing bracket (FIG. 25) and its fastening material is designed for a solid doors' top edge of minimum 1,5mm thickness. Otherwise we strictly recommend the additional usage of sectional door fittings (Accessories/art. no. BY 4720).
- The use of foreign particles is prohibited cause it may harm the operational safety of the machinery.
- In accordance with EN 12453, the drive may not be used on doors that are located in public places or that require an increased minimum level of protection.

## 2.0 ASSEMBLY



**IMPORTANT INSTRUCTIONS FOR SAFE INSTALLATION. PLEASE FOLLOW ALL INSTALLATION INSTRUCTIONS IN THE SEQUENCE SPECIFIED - INCORRECT OR IMPROPER INSTALLATION CAN CAUSE FATAL INJURIES!**

**Before proceeding with the installation, please ensure that the mains plug has been removed. Safeguard the equipment against the mains plug being reinserted.**

**Prior to installation, ensure that the garage door is in proper and working condition.**

## 2.1 Preparations

You should do some preparatory work so that the installation can be completed expeditiously:

- Read the installation manual completely before commencing work, since it contains important information for installation
- Learn about the roof thickness and, if applicable, any cables / pipes that have been laid (hazard of drilling through them!).
- Check the scope of supply. Keep any accessories that may be required or desired ready at hand.
- Keep all tools (FIG. 3) as well as suitable material, if required, at hand to cover the drive when drilling bore holes (dust hazard) and any aids, if necessary, to support the drive (hazard of the drive falling down).

- Mechanical door locking devices and all devices that are not necessary any more after the installation of the drive have to be put out of action
- Please note that the drive is installed with the garage door closed: all tools and tackles required must be kept inside the garage if it does not have any other access route.

## 2.2 Subassembly

### FIG. 6: Rail pre-mounting

- According to the version, the rails have to be pre-mounted as requirements. Put the rails together via the connection rails. Slide the rails together to the stop position.

### FIG. 7: Chain / toothed belt assembly

- Pull chain/belt together with the rear bracket (FIG. 8/2) out of the rail. Check if the chain/belt lock (FIG. 7 a) is on the left side of the rail.

### FIG. 8: Drive pinion mounting (toothed belt version)

- Remove the transportation covering (3) and press the pinion (4) into the bearing. Take care of the belt not being squeezed. Push the rear bracket back into the rail.

### FIG. 9: Drive pinion mounting (chain version)

- Remove the transportation covering (3) and press the pinion into the bearing. Attach the transportation covering again. Push the rear bracket back into the rail.

### FIG. 10: Paste rubber buffers (chain version only)

- The rubber buffers minimize the noise caused of the chain touching the rail. Assure not to fix the buffers in the travel path of the trolley: the buffers have to be put close to the end of the rail, so that the trolley can not touch it in "Door closed" or "door open" position.

### FIG. 10: Idler wheel fixing

- Pull the idler wheel towards the end of the rail and guide the coach bolt through the hole of the tensioning bracket. Pay attention that the coach bolt fits into the tensioning bracket.

### FIG. 12: Adjust of tension of chain/belt

- Turn the nut of the tension unit, so that the spring is completely compressed. Than release the tension of the spring by turn-ing the nut back about 1 to 2 turns, until the chain or belt can be pushed together to approx. 0,5 cm distance in the middle of the rail.

### FIG. 13: Trolley test

- Check afterwards, that the trolley can easily be moved by hand. To release the trolley, from the chain lock, pushes the lever on the trolley and at the same time move the trolley in the rail.
- Make absolutely sure, that after this test the trolley engages on the chain lock. To perform this, move the trolley without holding the lever over the chain/belt lock and the trolley en-gages automatically.

### FIG. 14: Assembly of door bracket

- For the straight push rod version (a) 2 different extension are attached: use the straight extension (d) for one-piece doors and the the curved version (c) for sectional doors. The standard version of the drive is equipped with a slightly angled version of push rod (a), which will fit to all types of doors without any extension.
- Then the provided door bracket (b) has to be attached to the push rod.

## 2.3 Installation

### FIG. 15: Mark the middle of the door

- Measure the width of the door and mark the middle of the door at the lintel and at the ceiling at position "Door open".

### FIG. 16/17: Calculation of necessary height

- The rail has to be mounted on such a height, that between the highest door point (FIG. 16 a) -the highest point that the door can reach during the movement- and the lower edge of the rail, a clearance of at least 10-20 mm is available (FIG. 16b).
- Pay attention, that the rail is always mounted at a level position.
- The angle  $\alpha$  may not exceed  $30^\circ$ ; otherwise a correct transmission of the power is not guaranteed.
- The distance between the lower edge of the rail and the upper edge of the garage door should be between 5 and 7 cm in closed condition.

### FIG. 18/19: Mounting the lintel bracket

- Use a pen and mark the bracket holes according to the measurements determined before. Drill the holes and attach

the bracket to the lintel (due to lintel material the included fastening device may be changed for admissible material). Attention: when drilling, cover the drive!

FIG. 20: Attaching the rail to the lintel bracket

- Fasten the rail to the lintel bracket with a coach bolt and a lock nut.

FIG. 21: Fixing of the retaining angle

- Fit the retaining angles to the return head of the rail according to the measurements determined before (make sure that the rail is in a level position).

FIG. 22: Attachment of the rail

- Afterwards swing the rail with the backend up to ceiling. Make sure, that the rail is aligned with the earlier marked middle of the door. Safe the rail against drop down. Mark the points where the retaining angle shall be attached to the ceiling.
- Drill the required holes and affix the retaining angles to the ceiling. Attention: when drilling, cover the drive!
- Fit the retaining angles with suitable dowels, screws and washers to the ceiling.

FIG. 23/24: Attachment of the drive head

- Insert the drive head shaft on the collect of the return head.
- Fix the drive head using the 2 Philips-screws.

**FIG. 21-24: alternativ the attachment to the ceiling may be done by fitting the retaining angles directly to the drive head as shown at the exploded view.**

FIG. 25: Attachment of the door bracket

- First press the lever on the trolley and move the trolley towards the lintel. Mark and drill the holes.
- Then fix the door bracket with minimum 4 screws firmly to the door upper edge.

FIG. 26/27: Installing the emergency release

- If the garage is without a second entrance, the installation of a emergency release set is absolutely necessary, so that in case of an emergency the door can be opened from outside. If there is no internal turning handle the bowden cable of the emergency release can be installed to a plug-in lock (accessories, art. no. B 146.02). Check the proper function of the emergency release (see 2.5).

FIG. 28: Fixing the light cover

- Keep in mind to fix the light cover with the screws provided after finishing all assembly and programming works.

## 2.4 Affixing warning signs



The warning label, which draws attention to the risk of jamming and serves as a reminder for regular checking of the hindrance detection system, must be permanently affixed at a clearly visible location or in the vicinity of the operating elements that have been installed permanently.



The warning label that contains notes regarding the operation of the emergency unlocking mechanism must be fixed permanently near it and must be clearly and easily visible.



The warning label that advises children to stay away from the area of the open door must be fixed permanently near the pivoting range and it must be clearly and easily visible.

## 2.5 Manual function test / Emergency release

Check after finishing the installation works that the proper operation of the door is in no way affected by the installation of the drive!

- (Disconnect mains plug). Disengage the chain lock of the trolley pushing its lever or using internal turning handle. CAUTION: actuating the emergency release may cause uncontrolled door movement if the springs/cables are weak or broken or if the door is unevenly balanced!
- Open and close the door several times completely by hand (at this whenever the trolley (FIG. 13) is pushed over the chain lock (FIG. 7, a) the lever of the emergency release have to be pushed again). Look to it that the door is smooth-running at every point of its travel. The trolley may not touch the idler wheel nor the drive head. The door may not touch the rail or the drive head or parts of it.
- Check the tension of the cable of the emergency release. In position "Door closed" it should be tighten slightly so that the movement of the turning handle is enough for actuating the emergency release. The cable may never sag in a way so it may become caught by a roof rack system or other projections of the vehicle or door.
- Reconnect the chain lock. The door must not get moved by hand any more.

### 3. INITIATION



Starting the drive may cause uncontrolled door movement if the springs are weak or broken or if the door is unevenly balanced!



During initiation, you must remain inside the garage. This means that you can open the door using the manual unlocking mechanism in the event of a fault.

#### 3.1 Programming

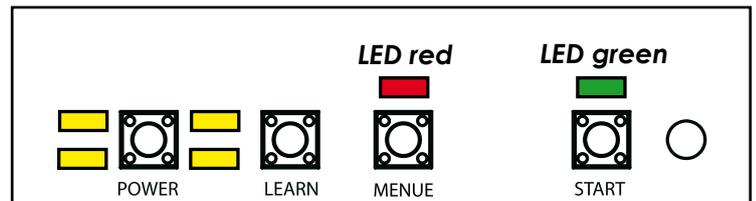
First, loosen the screw on the light cover. Remove the light cover from the housing (FIG. 28). The chain lock (FIG. 7, a) has to be engaged at the trolley (FIG. 13).

#### 3.2 Setting of travel path and force



During the setting procedure no evaluation of the photo cells and obstacle detection takes place. Take care that nobody stay inside or enter the danger area of the moving door!

The setting procedure may be interrupted at any time by disconnecting the mains plug. Once it has been plugged in again, after a self test the setting procedure may be begun again. During the setting procedure the control is "taught" the end positions of the garage door as well as the force required for the opening and closing process. To this end the following steps are to be performed:



##### A) First-time programming of the drive:

- Plug in mains plug. Wait for approx. 0 sec. until the control has completed its self test (= green LED START is flashing at 0,5Hz, afterwards all LED are activated for 1 sec.). Then the control will change automatically to the programming mode: LED MENUE (red) und LED START (green) flashes simultaneously at 0,5Hz.
- Now start with Step 1 of the programming.

##### B) Re-programming of a drive that has already been programmed before:

- Plug in mains plug. Wait for approx. 0 sec. until the control has completed its self test (= green LED START is flashing at 0,5Hz, afterwards all LED are activated for 1 sec.).
- Press and hold the MENUE button for at least 3 sec.. Meanwhile additionally press and hold the START button. Release both buttons as soon as the LED MENUE (red) and LED START (green) are changing flashing from slowly (5Hz) to fast (0,5Hz).
- Now start with Step 1 of the programming.

##### Step 1: Setting of "Door open" position

- Press and hold START button and move the door drive into the "Door open" position. LED MENUE (red) lights up. Release the START button approx. 10 cm before end position.
- By shortly and frequently pushing the START button you can bring the door into a precisely defined end position. LED MENUE (red) lights up. If the end position gets run over, the door can be set back pushing the LEARN button.
- Press the MENUE button. The „Door open“ position is stored, LED START (green) lights up. Continue with step 2. If LED START (green) does not light up, disconnect the mains plug from the socket and start again with the programming from the beginning.

##### Step 2: Setting of "Door closed" position

- Press and hold START button and move the door drive into the "Door closed" position. LED MENUE (red) lights up. Release the START button approx. 10 cm before end position.
- By shortly and frequently pushing the START button you can bring the door into a precisely defined end position. LED MENUE (red) lights up. If the end position gets run over, the door can be set back pushing the LEARN button.
- Press the MENUE button. The „Door closed“ position is stored, LED START (green) lights up. Continue with step 3. If LED START (green) does not light up, disconnect the mains plug from the socket and start again with the programming from the beginning.

##### Step 3: Setting of the required force (possible only after successful completionb of Step 1 and Step 2)

- Press the START button briefly. LED MENUE (red) and LED START (green) flash (0,5Hz), with a delay in time the door opens and closes for one time completely. Thereby the control stores the force required during the opening and closing process. Afterwards the LED extinguishes.
- Programming is complete, the drive is ready for operation. LED START (green) flashes at 0,5Hz. After approx. 3 min. the lighting of the drive extinguishes.

The programmed values remain stored even after a power failure or disconnection of the mains plug. Once the drive is programmed it will regularly make an automatic correction of the set end position "Door closed". Through this automatic correction it can avoid alteration of the end positions e.g. caused by varying temperature.

### 3.3 Adjustment of shutdown force



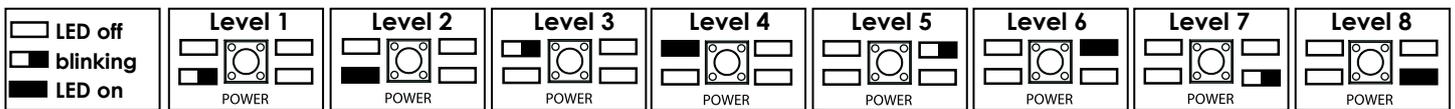
**CAUTION:** never set the shutdown force of the obstacle detection to high; this may cause severe injury to persons or damage to property. If the shutdown force is manually increased to a higher level so that a pressure of more than 150N at the door edge or shearing points may impact to objects or persons before the obstacle detection stops and reverses the drive an additional safety device -for example photo cells- must be provided.



**After every adjustment of the shutdown force the function of the obstacle detection and reversion have to be tested by placing a 50mm high object on the floor and then making the drive close the door. When hitting the object the door has to stop and reverse (see "Testing of obstacle detection", 3.4).**

The shutdown force is pre-set to level 5 (= 100%). A proper functioning door should not need a higher adjustment off the shutdown force after the setting od travel path and force (3.2) - it is essential to check the proper function of the door at manual operation before any adjustment of the shutdown force!

- Press and hold the power button for at least 3 sec. until one of 4 yellow LED near the POWER button starts lighting or flashing. This LED shows the currently set level of the shutdown force (see figure below).
- Each former activation of the POWER button increases the level of the shutdown force by one. After reaching the maximum level 8 the next activation sets the level to the minimum 1.
- If the level shown shall be stored it is necessary to press the MENUE button.
- The indication of the shutdown force level is shown in the following figure:



If no activation happens within 3 min. the setting mode ends automatically without any change. While the setting mode is activ no operation of the drive is possible. Any adjustment of the shutdown force will be impossible if there is no setting of force be done sucessfully before (3.2) or if the drive is in failure.

### 3.4 Testing of obstacle detection

After setting the drive it is necessary to check that the door stops and reverses (changes its direction) when hitting an obstacle.

The obstacle detection may be checked e.g. by placing a 50mm high piece of wood on the floor and then making the drive close the door. When hitting the obstacle the door has to stop and reverse (change its direction). If not the settings of the cut-off force must be decreased to lower level!



**If the drive is used on a door, which has perforations in the door wing >Ø 10mm or has edges or protruding parts that can grip a human being or which can stand on the door, please ensure that the drive prevents the opening movement or stops if the door encounters a mass of 20 kg at the centre of the lower edge of the door (safety shutdown to protect against lifting human beings / other objects).**

### 3.4 Automatic closing function



**Enabling the automatic closing feature makes it imperative to provide additional security for the system using at least one extra light barrier! For this purpose, please make sure to take note of and comply with the provisions of EN 12453 with respect to the usage type, hazard level and minimum level of protection! With the feature of automatic closing, operation in accordance with EN 60335-2-95 is not permissible - the machine must be approved on a case-by-case basis, based on the product standard for garage doors! The feature of automatic closing can lead to severe damage to property and serious human injuries if not used properly!**

The automatic closing feature closes the garage door automatically 60 sec. after it has switched off on reaching the "Door open" position. Please refer to the detailed information provided in Section "5.2 Operation" for an accurate description of the operating states and method of working. To enable the automatic closing feature, the drive that has undergone the learning process must be in the ready mode and have fault-free operation (START LED (green) flashes at approx. 0.5 Hz). Please proceed as follows:

- Loosen the screw on the light cover. Remove the light cover from the housing (FIG. 28).
- Keep the MENUE button pressed for at least 3 sec., until the MENUE LED (red) begins to flash at approx. 2 Hz and the START LED goes off: Release the MENUE button.
- The MENUE LED (red) now indicates the status of the automatic closing feature: MENUE LED (red) "on" = enabled; MENUE LED (red "off" = disabled.
- Each operation of the START button now changes the status of the automatic closing feature, which is reflected by the display of the MENUE LED (green): Set the desired status and finally quit the setup mode by pressing the MENUE button once.

The setting is accepted and the drive switches to the ready mode (START LED (green) flashes at approx. 0.5 Hz. Replace the light cover. The operating state is accepted after the next operation.

### 3.6 Reversion of rotation

The motor's direction of rotation can be reversed for the controller's special applications: Set the status to "Step 1" of programming (see 3.2). First press and hold the POWER button, and after a short time press and hold the MENU button. The START LED (green) and the MENU LED (red) light up and extinguish after about 3 sec.. Release both the buttons: the direction of rotation reverses; the drive now runs in the opposite direction when pressing the START button. Finally, carry out the entire learning procedure from start to finish, as described in section 3.2.

### 3.7 Radio programming



The following models pertain to equipment fitted with the BERNAL-Keeloq® wireless system "PICO" 868.5 MHz.

### 3.8 Teach-in the handheld transmitter

A maximum of 28 handheld transmitters can be programmed on the wireless receiver. At the end, the initial codes will be overwritten.

- Plug in the mains supply.
- Loosen the screw on the light cover. Remove the light cover from the housing.
- Press the WIRELESS LEARN button on the plug-in receiver briefly. The WIRELESS LED lights up.
- Press the desired button of the handheld transmitter until the WIRELESS LED goes off.
- Press the button of the handheld transmitter again until the WIRELESS LED starts flashing.
- WIRELESS LED goes off after about 5 sec., and the handheld transmitter has been taught.

Repeat the procedure for teaching other handheld transmitters. If no handheld transmitter is trained within 30 sec. after activation, the learning mode ends automatically.

### 3.9 Erasing the transmitters

If handheld transmitters are to be deleted from the wireless receiver, the latter must be deleted completely:

- Plug in the mains supply.
- Loosen the screw on the light cover. Remove the light cover from the housing.
- Press the WIRELESS LEARN button on the plug-in receiver (and hold it). The WIRELESS LED lights up and goes off after about 10 sec.: All trained handheld transmitters are deleted.

### 3.10 Declaration of conformity

Finally, the manufacturer of the machine or his authorised representative must effect the EC Declaration of Conformity in accordance with MRL 2006/42/EC Appendix II 1.A. and the CE mark in accordance with MRL 2006/42/EC Appendix III.

### 3.11 Handing over and user training

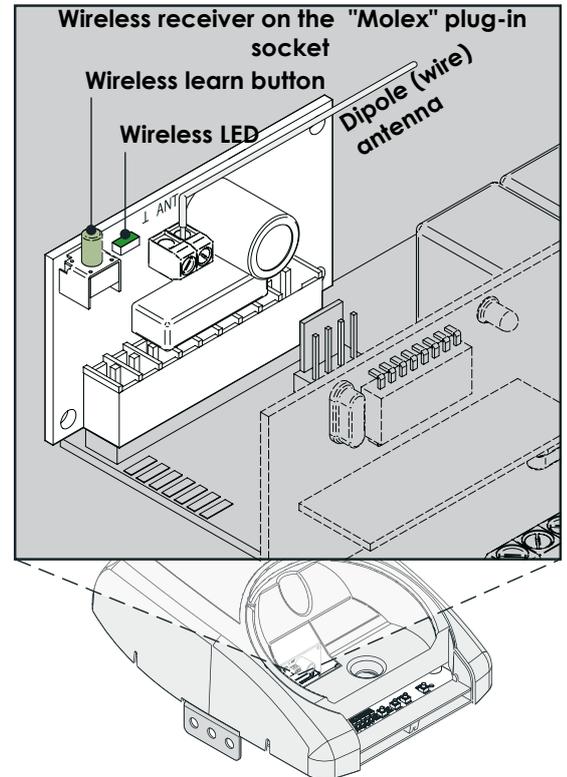
Hand over the machine including the documentation (see EN 12635) to the owner of the system. Please ensure that the operator and user are briefed and trained in the operation and maintenance of the system. Please ensure that these authorised persons receive:

- training on operating the system safely (see 5.0 to 5.3).
- training in the maintenance of the system (see 5.5) as well as.
- briefing on possible hazards of non-compliance with these instructions.

In addition, please also give a live demonstration on the machine regarding:

- the function of all operating elements and their effect during various operating states (5.2),
- the function and testing of the emergency unlocking mechanism (2.5),
- the function and testing of the hindrance detection system (3.4) and
- the function and testing of all and any additional safety devices connected (4.2) and
- if applicable and enabled, the method of operation for the automatic door closing feature (3.5 as well as 5.2).

Please draw attention to the fact that the instruction manual for the machine must be kept in safe custody in such a manner that all those concerned with the operation, maintenance or repair of the machine have access to it. Please recommend that a test logbook be maintained and that the system is checked once every year by a qualified technician, even for systems that belong to an individual household not having automatically operated garage doors. Please document the handing over and the user briefing and training in writing.



## 4.0 CONNECTION OF ACCESSORIES



Remove the mains plug prior to performing any wiring or connection work in order to prevent damage to the controller!

Always lay the control and signal lines as well as the antennas in such a way that they are separated and isolated from power cables in order to prevent interferences.

### 4.1 Push.button / key switch



Only non-latching NO (normally open) contacts (not self-holding or latching contacts of a switch or similar!) may be used! Only potential-free contacts may be connected - never connect any external power supply!

Connect the button contacts to terminals 1 and 2 of the control board (FIG. 30). If more than one element is used for this connections, the contacts must be connected in parallel.

Use cables with a core diameter of at least 0.25 mm<sup>2</sup> for maximum length of 20 m. Operating elements that are permanently installed must be within sighting range of the garage door. The distance between moving parts and the height above the ground must be at least 1.8 metres. They must be mounted beyond the reach of children under all circumstances!

### 4.2 Photo cells

The use of photo cells generally enhances the safety of the garage door system and can become urgently necessary under certain circumstances (e.g. contact with public places or minimum level of protection in accordance with EN 12453).

If the light beam gets interrupted during the door closing operation, the garage door stops immediately and reverses about 10 cm in the direction of door opening (Automatic door closing: complete opening). The photo cell is inactive during the door opening movement.

Use cables with a core diameter of at least 0.25 mm<sup>2</sup> for a maximum length of 20 m. We recommend that the photo cell be located at a height of 40 cm above the ground and as close as possible to the door (max. 50 mm away). If more than one pair of photo cells is used, they must be installed opposite one another and connected in series.

The power supply (24 V) of the transmitter photo cell (TX) and the receiver light barrier (RX) is connected to terminals 3 and 5. Connect the signal output of the receiver photo cell (RX) to terminal 4 and earth (terminal 5). Remove the factory-fitted jumper between terminals 4 and 5 (FIG. 30). After completing the installation, test the operation of the photo cell by interrupting the light beam using some object (e.g. a broom).

### 4.3 Antenna

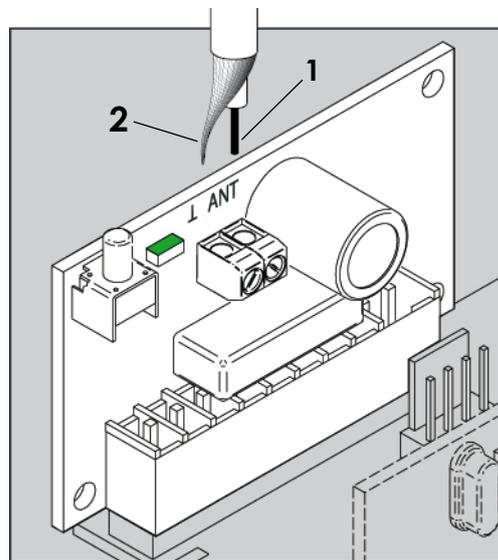


Please use only an antenna with a suitable (=matching) frequency and screened (or shielded) coaxial cable. Do not modify the antenna under any circumstances.

Please use only an antenna with a suitable (=matching) frequency and screened (or shielded) coaxial cable. Do not modify the antenna under any circumstances.

- Remove the dipole (wire) antenna fixed to the antenna connection ANT of the wireless receiver.
- Connect the inner conductor (1) of the rod antenna to the antenna connection ANT and the screen or shield (2) to the ⊥ terminal.
- Lay the antenna outside the garage and place it at a point that is exposed and at as high a location as possible with a line of vision to the operating location.

Do not extend the coaxial cable provided on the antenna and do not use more than one antenna simultaneously / for the same connection.



## 5.0 OPERATING THE SYSTEM



**IMPORTANT SAFETY INSTRUCTIONS: ATTENTION – IT IS IMPORTANT FOR SAFEGUARDING HUMAN LIVES TO COMPLY WITH ALL INSTRUCTIONS! THESE INSTRUCTIONS MUST BE KEPT IN SAFE CUSTODY!**



When operating the emergency unlocking mechanism, there can be uncontrolled movements of the garage door if springs are weak or broken or if the door is not balanced by weight. The emergency unlocking mechanism may only be operated when the mains plug has been removed.

## 5.1 Instructions for safe operation

- Do not lean on the bowden cable of the emergency unlocking mechanism with your body weight.
- Do not fasten any objects to the bowden cable of the emergency release mechanism or other components of the garage door drive.
- Please ensure that the emergency release or other moving parts of the system do not get caught on the roof supporting structure or other projections of the motor vehicle or the garage door or any other objects in the garage.
- In the event of malfunctions or faults, the garage door can be opened / closed by operating the emergency release mechanism.
- Attention: The garage door can close faster if springs are weak, broken or defective and if the door weight is not balanced properly.
- Only operate the garage door when you can see the entire area covered by the door. Please ensure that there are no human beings or objects in the path of movement of the garage door. Observe the moving door and keep persons away until the door has opened or closed completely and has stopped moving.
- Ensure that the garage door is completely open and has stopped moving before driving in and out of the garage.
- Do not keep the handheld transmitter in tight pant pockets or similar clothing. This can cause unintended operation.



**Do not allow children to play with the drive. Keep the wireless handheld transmitter away from children.**



**Please do not operate the garage door system if any repair or service work needs to be done, since a fault in the system or an incorrectly adjusted garage door can lead to severe injuries. Please ensure that such work is only carried out by qualified and skilled technicians.**



**Do not modify the system in any way after it has been commissioned. Any modification beyond the scope of the maintenance and repair work foreseen, or removal of parts or addition of (foreign) parts can impair the operational safety provided by the manufacturer and lead to serious injuries.**

## 5.2 Operation

**Normal operation mode:** the garage door can be opened or closed in a number of ways using the garage door drive: using the start pulse via the handheld transmitter, the START button, indoor button / key switch or a wireless code lock (accessory).

Each operation of these operating elements triggers a new impulse ("Impulse follow-up function"):

- |                   |  |
|-------------------|--|
| First operation:  | The drive runs in one direction (opposite to that of the last movement made) |
| Second operation: | (during the movement) The drive stops  |
| Third operation:  | The drive runs in the opposite direction                                     |
| Fourth operation: | (during the movement) The drive stops  |
| Fifth operation:  | same as with the first operation   |

Triggering the obstacle detection system while the door is closing causes it to stop and reverse (move in the opposite direction) by about 10 cm.

As a rule, the integrated light gets switched on whenever the drive is operated, and it shuts off automatically after about 3 min.

**Automatic closing operation enabled:** In general, the countdown to the door opening time of 60 sec. begins at the end of the door opening movement. After 60 sec. the drive light starts flashing for 2.5 sec., and finally, the door begins to close.

If a new start impulse is triggered while the door is closing, the drive stops and moves back to the "Door open" position and the countdown to the door opening time recommences.

If a start impulse is triggered while in the "Door open" condition, i.e. during the countdown to the door opening time, the countdown time is reset and recommences.

If a start impulse is triggered while the door is opening, the drive stops. The next start impulse results in the door getting closed.

If the obstacle detection function is triggered while the door is closing, the drive stops and moves back to the "Door open" position, and the countdown to the door opening time recommences. If the obstacle detection feature is triggered for a third time, the door remains in its last position; a new start command causes the door to close.

If any photo cell gets triggered while the door is closing, the drive stops and moves back to the "Door open" position, and the countdown to the door opening time recommences.

If the obstacle detection is triggered while the door is opening, the drive stops and reverses a few centimetres. A new start impulse causes it to close

**In the event of power failure** the drive stops in its last position, and a new start impulse causes the last movement to continue once the power supply is restored. Any movement initiated at the time of power supply failure is not continued automatically after power supply is restored.

### 5.3 Fault indications

Every time that the 230 V power supply is switched on, the first thing the control electronics does is to perform a self-test (see 4.2, A/B). After commissioning the equipment, the START LED (green) indicates normal readiness for operation with slow flashing at 0.5 Hz. If the drive cannot get started or if it stops, there are 2 indications that can be distinguished from one another:

	Possible cause:	Fault rectification:
<b>Fault mode:</b>  <b>MENUE LED (red) and START LED (green) flash simultaneously and quickly at 2 Hz</b>	<ul style="list-style-type: none"> <li>• The photo cell has been triggered</li> <li>• The photo cell is defect</li> <li>• The photo cell cable is loose or faulty</li> <li>• Terminals 4/5 are not connected with a jumper (Operation without the light barrier)</li> <li>• Power-operated shutdown (obstacle detection)</li> <li>• Fault in the motor or motor cable</li> <li>• Fault in the Hall sensor or the Hall sensor cable</li> <li>• Over-voltage or under-voltage</li> </ul>	The fault mode is reset automatically as soon as the fault has been rectified and a new "START" impulse has been triggered (with automatic door closing feature, the system is shut down after 3 repeat attempts).
<b>Fault mode:</b>  <b>MENUE LED (red) and START LED (green) flash simultaneously and quickly at 2 Hz</b>	<ul style="list-style-type: none"> <li>• Processor malfunction</li> <li>• Peripheral fault</li> </ul>	Switch off the mains power supply (remove the plug), wait for 10 sec. and switch the system on again (insert the mains plug).

### 5.4 Troubleshooting



**ATTENTION - DANGER TO LIFE! Faults in the 230 V part of the system may only be attended to by skilled electrical technicians. Service and repair work may only be carried out by qualified and skilled technicians. Please do not operate the system if service or repair work is required!**



**\*PLEASE NOTE: In the case of a defect in a transformer within the drive system, its power cable and / or moulded mains plug, the entire component (FIG. 29, 01.02) must be disposed of and replaced with an original spare part!**

Problem:	Fault rectification:
The lamp does not light up	<ul style="list-style-type: none"> <li>• Replace the bulb</li> <li>• Check the incoming cable and mains fuse*</li> </ul>
The door does not run via the manual transmitter	<ul style="list-style-type: none"> <li>• Check the battery in the manual transmitter and replace it, if necessary</li> <li>• The wireless receiver has not saved the manual transmitter code so repeat the learning procedure</li> </ul>
The wireless range is not satisfactory	<ul style="list-style-type: none"> <li>• Check the antenna connection</li> <li>• Check the battery in the manual transmitter and replace it, if necessary</li> </ul>
The drive is not fed with power supply The drive does not operate	<ul style="list-style-type: none"> <li>• Check the incoming cable and mains fuse*</li> <li>• Check the incoming cable and mains fuse*</li> <li>• Check the safety element connected (photo cell) to see if it is working</li> </ul>
The drive stops while running	<ul style="list-style-type: none"> <li>• Check the operating element connected to see if it is generating a continuous pulse</li> <li>• The door is defective. Have the mechanical system of the door checked by a specialised technician and repair it if required</li> </ul>
The drive reverses while running	<ul style="list-style-type: none"> <li>• Remove the hindrance in the path of the garage door</li> <li>• Remove the hindrance in the path of the garage door</li> <li>• If the garage door is difficult to move, adjust the shutdown force (3.3)</li> <li>• The door is defective. Have the mechanical system of the door checked by a specialised technician and repair it if required</li> </ul>
The drive runs but the door does not move	<ul style="list-style-type: none"> <li>• The guide slots must be latched in the carriage and locked. Check the emergency unlocking mechanism.</li> </ul>

### 5.5 Maintenance and repair



**Please do not operate the garage door system if any repair or service work needs to be done, since a fault in the system or an incorrectly adjusted garage door can lead to severe injuries.**



**Please have all repair and service work carried out by qualified and skilled technicians only. Only original spare parts may be used for repair work.**

- Please note that in the event of broken springs / cables, there is the potential hazard of the garage door falling down when operating the emergency unlocking system.
- Never put your hand in the way of moving parts of the system while doing maintenance work. Keep a safe distance away from moving parts (hazard of getting pulled in)!
- With except for programming work, the mains plug must always be pulled out before commencing any work on the garage door or the drive.
- We recommend that you get the entire system checked up by qualified technicians on an annual basis.
- The complete system, particularly fastenings, cables and springs as well as the drive chain and toothed belt, must be checked frequently for signs of wear and tear or damage, as well as for imbalance, strength or tension.
- The obstacle detection system (power-operated shutdown, see 3.4), and, if required, the safety elements connected and the emergency unlocking mechanism (2.5) should be checked every 4 weeks. Any faults must be attended to immediately by a qualified technician.
- (FIG. 30) The following parts of the drive are subject to wear and tear and must be replaced after 30,000 operating cycles

or 10 years at the latest: Toothed belt (04.00-04.03), chain (05.00-05.02), deflection roller assembly (07.00-07.04), drive assembly (6.00-06.04) and geared motor (01.01).

- Chains should be lubricated slightly once a year using a suitable lubricant. Toothed belts may not be lubricated under any circumstances.
- If the appliance gets dirty, it must be cleaned in dry conditions, and, if required, using a vacuum cleaner. Under no circumstances may you use water, steam or pressure cleaning.

## 5.6 Handheld transmitter - battery replacement

Valid for transmitter PICO III only: open the transmitter housing unscrewing the flipside and lift it off. Replace the old battery taking care of the correct polarity by a new battery, type CR2032. Close the housing again.

According to battery ordinance the disposal of batteries including heavy metals and hazardous substances with the domestic waste is strictly forbidden. Every consumer is obliged to hand back used batteries to community collection points. Alternatively used batteries may be given back to the manufacturer or dealer free of charge. If used batteries are sent back to the manufacturer or dealer the delivery must be exempted from postage.

One or more of the chemical symbols below, pictured on the batteries in combination with the symbol to the right, are indicating batteries with heavy metals or hazardous substances.

Cd	Cadmium
Li	Lithium
Li-Ion	Lithium-Ionen
Ni	Nickel
Mh	Metal-hybrid
Pb	Lead
Zi	Zinc
Hg	Mercury
Mn	Mangan



## 6.0 DISPOSAL

When dismantling and disposing of the equipment, please take note of and comply with the local rules and regulations on safety and disposal.

## 7.0 TECHNICAL DATA

	<b>60 (600N)</b>	<b>80 (800N)</b>
Weight in kg	ca. 17	ca. 18
Max. pulling / pushing force in N	600	800
Max. speed in cm/sec.	14	14
Max. running distance in m (3.00 m rail)	ca. 2,40	ca. 2.40 (Sectional door approx. 220 cm respectively)
Max. door surface in m <sup>2</sup>	10,8	13,2
Minimum installation height in mm	35	35
Length in m (3.00 m rail)	3,29	3,29
Emission sound pressure level in dB(A)	</= 70	</= 70
Ambient temperature in °C	-20 bis +40	-20 bis +40
Atmospheric humidity in operation (in %)	20-80	20-80 (non-condensing respectively)
Design time for operation in min	4	4
Duty cycle	30% ED	30% ED
Rated operating cycles in no.	30.000	30.000
Mains power supply	230V/AC, 50-60Hz	230V/AC, 50-60Hz
Rated motor power in W, max.	110	120
Protection class	IP20	IP20
Consumption in W during standby	ca. 4,5	ca. 4,5
Integrated lighting 24 V	10W E14	10W E14

## 8.0 ACCESSORIES

Wireless handheld transmitter "PICO" III 4-channel	B 440.504-S (black); B 440.504-W (white)
Spare battery for handheld transmitter (CR 2032)	B 132.10
Wireless code lock "PICO" 4-channel	B 161.45
Supplementary antenna with 6.00 m coaxial cable	B 260.58
Aluminium key switch IP54	B 161.15 (surface mounted); B 161.16 (flush mounted)
"FT" light barrier, 10 m range	B 210.090
Rail extension 1.00 m	BY 4355 (chain); BY 4351 (toothed belt)
Sectional door fitting	BY 4720
Insert lock for emergency unlocking	B 146.02



**Translation of the original EC declaration of incorporation for partly completed machinery acc. to directive 2006/42/EC annex II 1 B**

Hereby the manufacturer

*BERNAL Torantriebe GmbH  
Industriepark Sandwiesen  
D-72793 Pfullingen*

of the partly completed machinery

*Garage door drive S 101-60 / S101-80*

*Serial number/date of  
production see identifica-  
tion plate*

declares:

Following essential health and safety requirements according to directive **2006/42/EG** annex I are applied and observed:

*1.1.2, 1.1.3, 1.1.5, 1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.2.6, 1.3.2, 1.3.3, 1.3.4, 1.3.7, 1.5.1, 1.5.2, 1.5.4, 1.5.5, 1.5.6, 1.5.7, 1.5.8, 1.5.9, 1.5.10, 1.5.11, 1.5.13, 1.6.1, 1.6.2, 1.6.3, 1.6.4, 1.7.1, 1.7.2, 1.7.3, 1.7.4*

The conformity to the regulations of additional directives:

*The protection targets of EMC directive 2004/108/EG acc. to machinery directive 2006/42/EC, annex I no. 1.5.10 and 1.5.11 are observed.  
The protection targets of low voltage directive 2006/95/EG acc. to machinery directive 2006/42/EC, annex I no. 1.5.1 are observed.*

The relevant technical informations are prepared according to annex VII B. I will transmit the relevant technical informations in electronic form to national authorities by a reasonable request. Name/address of the person who is responsible for the documentation:

*Husam Amer  
Sandwiesenstr. 11  
72793 Pfullingen  
Germany*

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of machinery directive 2006/42/EC, where appropriate.

Pfullingen, 2010 August 06

  
Willi Prettl/CEO