Instructions for Fitting, Operating and Maintenance
Garage Door Operator

Instructions de montage, d'utilisation et d'entretien
Motorisation de porte de garage
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* Accessory, not included as standard equipment!

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Dear customer,
We are delighted that you have chosen a high-quality product from our company.

1 About These Instructions
These instructions are original instructions as outlined in the EC Directive 2006/42/EC. Read through all of the instructions carefully, as they contain important information about the product. Pay attention to and follow the instructions provided, particularly the safety instructions and warnings. Please keep these instructions in a safe place and make sure that they are available to all users at all times.

1.1 Further applicable documents
The following documents for safe handling and maintenance of the door system must be placed at the disposal of the end user:
- These instructions
- The enclosed test log book
- The garage door operating instructions

1.2 Warnings used

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="DANGER" /></td>
<td>Indicates a danger that can lead to injury or death. In the text, the general warning symbol will be used in connection with the caution levels described below. In the illustrated section, an additional instruction refers back to the explanation in the text.</td>
</tr>
<tr>
<td><img src="image" alt="WARNING" /></td>
<td>Indicates a danger that can lead to death or serious injuries.</td>
</tr>
<tr>
<td><img src="image" alt="CAUTION" /></td>
<td>Indicates a danger that can lead to minor or moderate injuries.</td>
</tr>
<tr>
<td><img src="image" alt="ATTENTION" /></td>
<td>Indicates a danger that can lead to damage or destruction of the product.</td>
</tr>
</tbody>
</table>

1.3 Definitions used

Automatic timed closing
Automatic timed closing of the door after a set time has elapsed and after reaching the OPEN end-of-travel position or partial opening.

Impulse sequence control
With each push of the button, the door is started against the previous direction of travel, or the motion of the door is stopped.

Learning runs
Door travels in which the travel and the forces needed for moving the door are taught in.

Normal operation
Door travel with the taught-in travel distances and forces.

Safety reversal
Door travel in the opposite direction when the safety device or force limit is activated.

Reversal limit
If a safety device is activated, door travel is triggered in the opposite direction (reverse cycle) up to the reversal limit shortly before the CLOSE end-of-travel position. If this limit is passed, no reversal occurs to ensure that the door reaches the end-of-travel position without disrupting travel.

Partial opening
Individually adjustable second opening height to ventilate the garage.

Path of travel
The distance the door takes to traverse from the OPEN end-of-travel position to the CLOSE end-of-travel position.

Pre-warning time
The time between the travel command (impulse) and the start of travel.

1.4 Symbols used
The illustrated section shows how to fit an operator on a sectional door. Deviations for fitting with an up-and-over door are also shown. For this purpose, the following letters are assigned to the figures:

- a = Sectional door
- b = Up-and-over door

All dimensions in the illustrated section are in [mm].

Symbols:
- See text section
- In the example, 2.2 means: See text section, section 2.2
- Important advice to prevent injury to persons and damage to property
- High exertion of force
- Check for smooth running
- Use protective gloves
Slow flashing in the 7-segment display

Rapid flashing in the 7-segment display

1.5 Abbreviations used

Colour code for cables, single conductors and components

The abbreviations of the colours for identifying the cables, conductors and components comply with the international colour code according to IEC 757:

<table>
<thead>
<tr>
<th>Colour Code</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>WH</td>
<td>White</td>
</tr>
<tr>
<td>BN</td>
<td>Brown</td>
</tr>
<tr>
<td>GN</td>
<td>Green</td>
</tr>
<tr>
<td>YE</td>
<td>Yellow</td>
</tr>
</tbody>
</table>

Article designations

- **HE 2**: 2-channel receiver
- **HE 3**: 3-channel receiver
- **IT 1b**: Internal push button with illuminated impulse button
- **IT 3b**: Internal push button with illuminated impulse button, additional buttons for light on/off and operator on/off
- **EL 101**: One-way photocell
- **STK**: Wicket door contact
- **SKS**: Activating kit for closing edge safety device
- **VL**: Activating kit for leading photocell
- **HSM 4**: 4-button mini hand transmitter
- **HOR 1**: Option relay
- **UAP 1**: Universal adapter print
- **HNA 18**: Emergency battery
- **SLK**: Yellow LED warning light

2 Safety Instructions

**ATTENTION:**

**IMPORTANT SAFETY INSTRUCTIONS.**

FOR THE SAFETY OF PERSONS, IT IS IMPORTANT TO COMPLY WITH THE FOLLOWING INSTRUCTIONS. THESE INSTRUCTIONS MUST BE KEPT.

### 2.1 Intended use

The garage door operator is intended for impulse operation of spring compensated sectional and up-and-over doors, as well as counterbalanced retractable up-and-over doors. Depending on the type of operator, the operator can be used in private/non-commercial areas or in commercial areas (e.g. in underground and collective garages).

Note the manufacturer’s specifications regarding the door and operator combination. Potential hazards as outlined in DIN EN 13241-1 are avoided by construction and fitting according to our guidelines. Door systems which are located in a public area and only have one protective device, such as a force limit, may only be operated under supervision.

The garage door operator is designed for operation in dry areas.

### 2.2 Non-intended use

The operator must not be used for doors without a safety catch.

### 2.3 Fitter qualification

Only correct fitting and maintenance in compliance with the instructions by a competent/specialist company or a competent/qualified person ensures safe and flawless operation of the system. According to EN 12635, a specialist is a person with suitable training, specialist knowledge and practical experience sufficient to correctly and safely fit, test, and maintain a door system.

### 2.4 Safety instructions for fitting, maintenance, repairs and disassembly of the door system

#### DANGER

- **Compensating springs are under high tension**
  - See warning in Section 3.1

#### WARNING

- **Danger of injury due to unexpected door travel**
  - See warning in Section 9

Fitting, maintenance, repairs, and disassembly of the door system and garage door operator must be performed by a specialist.

In the event of a failure of the garage door operator, a specialist must be commissioned immediately for the inspection or repair work.

### 2.5 Safety instructions for fitting

The specialist must ensure that the applicable regulations on occupational safety, as well as the regulations on the operation of electrical devices, are followed during assembly work. In the process, the relevant national guidelines must be observed. Potential hazards as outlined in DIN EN 13241-1 are avoided by construction and fitting according to our guidelines.

The garage ceiling must guarantee secure fastening of the operator. For ceilings which are too high or too light, the operator must be fastened on additional struts.

#### DANGER

- **Mains voltage**
  - See warning in Section 3.6

#### WARNING

- **Unsuitable fixing material**
  - See warning in Section 3.3
- **Danger to life from the rope**
  - See warning in Section 3.3
- **Danger of injury due to unwanted door travel**
  - See warning in Section 3.3
2.6 Safety instructions for initial start-up and for operation

**WARNING**

Danger of injury during door travel
► See warning in Section 4

**CAUTION**

Danger of crushing in the boom
► See warning in Section 4

Danger of injury from the cord knob
► See warning in Section 4

Danger of injuries due to the hot lamp
► See warning in Section 4 and Section 8

Danger of injury due to the force value being set too high
► See warning in Section 7.6 and Section 7.8

Danger of injury resulting from uncontrolled door movement in the CLOSE direction if the torsion spring breaks and the slide carriage is released.
► See warning in Section 8

2.7 Safety instructions for using a radio system

**WARNING**

Danger of injury during door travel
► See warning in Section 5

**CAUTION**

Danger of injuries due to unwanted door travel
► See warning in Section 5

2.8 Approved safety devices

Safety relevant functions or components of the control from our company, such as the power limit, external photocells/switching strips, when installed, have been designed and approved in accordance with category 2, PL “c” of EN ISO 13849-1:2008.

**WARNING**

Danger of injuries due to faulty safety equipment
► See warning in Section 4.5.1

3 Fitting

**ATTENTION:**

IMPORTANT INSTRUCTIONS FOR SAFE INSTALLATION.

OBSERVE ALL INSTRUCTIONS, INCORRECT FITTING COULD RESULT IN SERIOUS INJURY.

3.1 Inspect door/door system

**DANGER**

Compensating springs are under high tension
Serious injuries may occur while adjusting or loosening the compensating springs!
► For your own safety, only have a specialist conduct work on the door compensating springs and, if necessary, maintenance and repair work!
► Never try to replace, adjust, repair or reposition the compensating springs for the counterbalance of the door or the spring mountings yourself.
► Furthermore, inspect the entire door system (joints, door bearings, cables, springs and fastening parts) for wear and possible damage.
► Check for the presence of rust, corrosion, and cracks.
A fault in the door system or an incorrectly aligned door may lead to serious injuries!
► Do not use the door system if repair or adjustment work must be conducted!

The design of the operator is not suitable nor intended for the opening and closing of sluggish doors, i.e. doors that can no longer be opened or closed manually, or can only be opened/closed manually with difficulty.

The door must be in perfect mechanical condition and balanced, so that it is easy to operate by hand (EN 12604).
► Lift the door by approx. one meter and let it go. The door should stay in this position and neither move downward nor upward. If the door does move in either direction, there is a danger that the compensating springs/weights are not properly adjusted or are defective. In this case, increased wear and malfunctioning of the door system can be expected.
► Check whether the door can be opened and closed correctly.
► The mechanical locking devices of the door that are not needed with a garage door operator must be put out of commission. This especially includes the locking mechanisms of the door lock (see Section 3.3).
► Change to the illustrated section for the fitting and initial operation. Observe the respective text section when you are prompted to by the symbol for the text reference.

3.2 Clearance required

The clearance between the highest point of the door and the ceiling (also when opening the door) must be at least 30 mm (see Figures 1.1a/1.2b).
► Check this dimension!

If the clearance is smaller, the operator can also be mounted behind the opened door if enough space is available. In such cases, an extended fitting bracket has to be used, which must be ordered separately. In addition, the garage door operator can be arranged up to max. 50 cm off-centre. Exceptions are sectional doors with a high-lift (high-lift track application H); a special fitting is required for this arrangement. The electrical outlet necessary for the electrical connection should be fitted approx. 50 cm from the operator head. Please check these dimensions!
3.3 Fitting the garage door operator

**WARNING**

**Unsuitable fixing material**

Use of unsuitable fixing material may mean that the operator is insecurely attached and could come loose.

- The fitter must check that the fitting materials supplied are suitable for the purpose and the intended fitting location.
- Only use the provided fixing materials (plugs) in concrete ≥ B15 (see Figures 1.6a/1.8b/2.4).

**WARNING**

**Danger to life from the rope**

A running rope may lead to strangulation.

- Remove the rope while fitting the operator (see Figure 1.2a).

**WARNING**

**Danger of injury due to unwanted door travel**

Incorrect assembly or handling of the operator, may trigger unwanted door travel that may result in persons or objects being trapped.

- Follow all the instructions provided in this manual. Incorrectly attached control devices (e.g. buttons) may trigger unwanted door travel. Persons or objects may be trapped as a result.
- Install control devices at a height of at least 1.5 m (out of the reach of children).
- Fit permanently installed control devices (such as buttons, etc.) within sight of the door, but away from moving parts.

**ATTENTION**

**Damage caused by dirt**

Drilling dust and chippings can lead to malfunctions.

- Cover the operator during drilling work.

**NOTE:**

An emergency release is necessary for garages without a second entrance that prevents the possibility of being locked out; this must be ordered separately.

- Check the emergency release monthly for proper function.

1. Completely disassemble the mechanical door locking on the sectional door (see Figure 1.3a).
2. For sectional doors with centre door locking, arrange the lintel joint and link bracket off-centre (see Figure 1.5a).
3. With an off-centre reinforcement profile on the sectional door, fit the link bracket on the nearest reinforcement profile to the left or right (see Figure 1.1a).

**NOTE:**

In a deviation from figure 1.5a: Use the 5 x 35 woodscrews from the door accessory pack (hole Ø 3 mm) for timber doors.

4. The mechanical door locking on an up-and-over door must be rendered inoperable (see Figures 1.3b/1.4b/1.5b).

For door models not covered here, block the catches on site.

5. In a deviation from the Figures 1.6b/1.7b: The lintel joint and link bracket must be attached off-centre for up-and-over doors with ornamental iron door handles.

**NOTE:**

On NB0 doors with timber infill, use the bottom holes on the lintel joint for fitting (see Figure 1.7b).

3.4 Fitting the operator boom

**NOTES:**

- Before the boom is fitted on the lintel or under the ceiling, the engaged slide carriage must be moved approx. 20 cm from the CLOSE end-of-travel position in the OPEN direction (see Section 3.4.1, Boom operating modes) (see Figure 2.1). This is no longer possible with an engaged carriage as soon as the end stops and operator have been fitted.
- For operators used in underground and collective garages, it is necessary to fix the boom under the ceiling of the garage using a second suspension (see Figure 2.4 and Figure 2.5).
- Only use the booms recommended by us for the garage door operators – depending on the respective purpose of use (see product information).

**3.4.1 Boom operating modes**

There are two different operating modes with the boom:

- Manual operation
- Automated operation

**Manual operation**

- See Figure 4

The slide carriage is disengaged from the belt lock to enable the door to be moved by hand.

**For disengaging the slide carriage:**

- Pull on the cord of the mechanical release.

**CAUTION**

**Danger of injury resulting from uncontrolled door movement in the CLOSE direction if the torsion spring breaks and the slide carriage is released.**

The slide carriages may decouple automatically unless a retrofit set is fitted.

- The fitter responsible must install a retrofit set on the slide carriage if the following prerequisites are at hand:
  - The standard DIN EN 13241-1 applies.
  - The garage door operator is retrofitted to a Hörmann sectional door without spring safety device (BR30) by a technical expert.

This set comprises a screw that secures the slide carriage against uncontrolled unlocking as well as a new cord knob sign where the images show how the set and the slide carriage can be handled for the two operating modes of the operator boom.

**NOTE:**

The use of an emergency release or an emergency release lock is not possible in conjunction with the retrofit set.

**Automated operation**

- See Figure 6

The belt lock is engaged in the slide carriage to enable the door to be moved with the operator.

**For preparing the slide carriage for engaging:**

1. Press the green knob.
2. Move the belt in the direction of the slide carriage until the belt lock engages.
3.4.2 Determining the door end-of-travel positions by fitting the end stops

1. Loosely position the end stop for the OPEN end-of-travel position in the boom between the slide carriage and operator.
2. Push the door into the OPEN end-of-travel position by hand. This will push the end stop near to the correct position.
3. Tighten the end stop for the OPEN end-of-travel position (see Figure 5.1).

NOTE:
If the door should not reach the complete passage height in the OPEN end-of-travel position, the end stop can be removed so that the integrated end stop (on the operator head) is used.

4. Loosely position the end stop for the CLOSE end-of-travel position in the boom between the slide carriage and door.
5. Push the door into the CLOSE end-of-travel position by hand. This will push the end stop near to the correct position.
6. After reaching the CLOSE end-of-travel position move the end stop by approx. 1 cm in the CLOSE direction and fix the end stop (see Figure 5.2).

NOTE:
If the door cannot be easily pushed manually into the desired OPEN or CLOSE end-of-travel position, this means that the door mechanism is too stiff for operation with the garage door operator and must be inspected (see Section 3.1).

3.4.3 Tension of the toothed belt

The toothed belt of the operator boom is tensioned optimally ex-factory. During the start-up and slow-down phase, with larger doors it is possible that the belt will briefly hang out of the boom profile. However, this does not result in any technical consequences and does not negatively affect the function and service life of the operator.

3.5 Fixing the warning sign

Fix the sign warning about getting trapped in a noticeable, cleaned and degreased place, for example, near to the permanently installed button for moving the operator.
» See Figure 8

3.6 Garage door operator electrical connection

### CAUTION

**Danger of crushing in the boom**

- Do not reach into the boom with your fingers during door travel, as this can cause crushing.
- Do not reach into the boom during door travel

### ATTENTION

**External voltage on the connecting terminals**

- Do not apply any mains voltage (230/240 V AC) to the connecting terminals on the control.

To prevent malfunctions:
- The connection cables of the operator (24 V DC) must be laid in a separate installation system from the other supply cables (230 V AC).

3.6.1 Electrical connection/connecting terminals

- See Figure 9
- Remove the plug cover to access the connecting terminals.

**NOTE:**

All connecting terminals can be assigned several times. However, observe the following thicknesses (see Figure 10):
- Minimum thickness: 1 x 0.5 mm²
- Maximum thickness: 1 x 2.5 mm²

Accessories with special functions can be connected to the BUS connecting terminal.

3.7 Connecting additional components/accessories

**NOTE:**

Loading of the operator by all accessories: max. 250 mA.

3.7.1 Connecting an external radio receiver *

An external receiver can be connected to this garage door operator. Insert the plug of the receiver in the corresponding slot (see Figure 9).

**NOTE:**

The aerial wire of the radio receiver should not come into contact with metal objects (nails, bracing, etc.). The best orientation to achieve an optimum range must be established by trial and error. When used at the same time, GSM 900 mobile phones can affect the range of the radio remote control.

With a 2-channel receiver, the first channel is always for the impulse sequence control function. The second channel can be used to activate the operator light or for partial opening (see Section 6.2.3).

3.7.2 External impulse button * to start or stop door runs

One or more buttons with normally open contacts (volt-free), such as internal push buttons or key switches, can be connected in parallel (see Figure 11).

3.7.3 Internal push button IT 3b *

- See Figure 12

3.7.4 Impulse button to start or stop door runs

- See Figure 12.1

3.7.5 Light button to switch the operator light on and off

- See Figure 12.2

3.7.6 Button to switch all control elements on and off

- See Figure 12.3

* Accessory, not included as standard equipment!
3.7.7 2-wire photocell * (dynamic)

NOTE:
Follow the fitting instructions when mounting photocells.
► Connect the photocell as shown in Figure 13.
After the photocell triggers, the operator stops and a safety reversal of the door is performed to the OPEN end-of-travel position.

3.7.8 Self-testing wicket door contact *
► Connect wicket door contacts that switch to ground (0 V) as shown in Figure 14.

3.7.9 Closing edge safety device *
► Connect closing edge safety devices that switch to ground (0 V) as shown in Figure 15.
After the closing edge safety device triggers, the operator stops and the door reverses in the OPEN direction.

3.7.10 Option relay HOR 1 *
► See Figure 16
Option relay HOR 1 is required to connect an external lamp or warning light (programming via menu 5).

3.7.11 Universal adapter print UAP 1 *
► See Figure 17
The universal adapter print UAP 1 can be used:
► For choosing a direction (Open/Stop/Close) via external control elements
► For control of the operator light and second opening height via external command units
► For OPEN and CLOSE limit switch reporting
► For the option relay (programming via menu 5).

3.7.12 Emergency battery HNA 18 *
► See Figure 18
To enable door movement in the event of a mains failure, an optional emergency battery can be connected. In the case of a mains failure, the system automatically switches to battery operation. During battery operation, the operator light remains switched off.

4 Putting into Service

4.1 Notes on the operator control
The operator control includes 13 menus that contain many user functions.
However, two menus are needed for initial start-up of the operator.
► To adjust/set the door type (menu J)
► To teach in door travel (menu 1)

NOTE:
Menus J, 1, P and 2 are initial start-up/function selection menus and customer menus; menus 3, 4, 5, 6, 7, 8, 9 and A are special menus and should only be changed if needed.

* Accessory, not included as standard equipment!
4.2 Menu selection

- Press the PRG button to select a menu.

If the operator has been taught in, the PRG button must be held down for 5 seconds in order to be able to change the menus. Afterwards, switch to the next menu by pressing this button again. After reaching menu P, the display switches to menu 0.

**NOTE:**
The menus are activated for approx. 60 seconds, after which the system goes back to menu 0.

4.3 Control behaviour during initial start-up

During initial start-up, the control automatically switches to menu J.

- After you have set the door type, press the PRG button to go to menu 1.

Once the learning runs have been completed, the system automatically goes to menu 0 (normal operation).

4.4 MENU J – Adjust/set the door type

- See Figure 21

**NOTE:**
Menu J can only be accessed during initial start-up or after resetting the system to the factory settings (see Section 4.6, Figure 33).

This menu helps you optimally adjust the operator to the respective door.

To be able to change a parameter:

- Press the PRG button until the display begins flashing rapidly.

To scroll through the menu:

- Press the ▶ or ◄ button.

To change a parameter:

1. Select the parameter to be set.
2. Press the PRG button until the decimal point also flashes.

<table>
<thead>
<tr>
<th>Display</th>
<th>Operator on</th>
<th>Active settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 END</td>
<td>Sectional door</td>
<td>0, 2, 5</td>
</tr>
<tr>
<td>1</td>
<td>Up-and-over door</td>
<td>0, 2, 5</td>
</tr>
<tr>
<td>2</td>
<td>Retractable up-and-over door</td>
<td>0, 2, 5</td>
</tr>
<tr>
<td>3</td>
<td>Side sectional door, ...</td>
<td>0, 2, 5</td>
</tr>
<tr>
<td>4</td>
<td>Sliding door</td>
<td>0, 4, 5</td>
</tr>
</tbody>
</table>

1) A door swinging outwards
2) A door tilting inwards
3) Dependent on the operator type
4) With this door type, an 8k2 resistance contact strip must be fitted to the secondary closing edge for the OPEN direction and connected to the operator via the 8k2-1T decoder unit.

**NOTE:**
- Set parameter 3 for hinged doors.

If the door behaviour has to be changed:

- Select the required settings in menus 7 and 9.

4.5 MENU 1 – Learning run/teaching in the operator

- With the PRG button, select menu 1.

The operator is adjusted to the door in this menu. The travel length, required force for opening and closing, and any connected safety devices are automatically taught in and saved.

4.5.1 Teaching in the end-of-travel positions and connected safety devices

- See Figure 22

**NOTES:**
- Safety devices must be fitted and connected before teaching in the operator.
- If further safety devices are connected at a later point, a new learning run is required for automatic learning on the operator or the appropriate parameter must be manually set in menu 4.

Before the first learning run in the CLOSE direction, the system checks whether any safety devices are connected. If this is the case, menu 4 is set automatically.

**NOTE:**
The slide carriage must be engaged (see Figure 6) and there may not be any obstructions in the function range of the safety devices!

- If needed, put the control into learning mode by switching to menu 1 with the PRG button.

A flashing L will appear in the display after the 1.

1. Press the button.
   - The door will move to the OPEN end-of-travel position.
2. Press the button again.
   - The door moves to the CLOSE end-of-travel position. The door fully opens and a rapidly flashing L appears in the display.
3. Press the button again.
   - The door moves to the CLOSE end-of-travel position. After the door reaches the CLOSE end-of-travel position, it automatically opens again completely. The next cycle (CLOSE and OPEN) will be automatically performed by the operator.

A number flashes after reaching the OPEN end-of-travel position. This indicates the maximum detected force.

**NOTE:**
The displays of the maximum detected force have the following meanings:

- 0-2  Optimum force conditions
- 3-9  Poor force conditions

The door system must be inspected or readjusted.

### WARNING

**Danger of injuries due to faulty safety equipment**

In the event of a malfunction, there is a danger of injuries due to faulty safety equipment.

- After the learning runs, the person commissioning must check the function(s) of the safety equipment as well as the settings in menu 4.

The system is ready for operation only after this.

**NOTE:**
The garage door operator motor is equipped with thermal overload protection. If two fast OPEN cycles take place within two minutes, overload protection reduces the travel speed, i.e. OPEN and CLOSE runs are at the same speed. After a waiting period of two minutes, the next OPEN run will be fast.
6 Selecting Functions

NOTE:
In the menus that consist of several parameter blocks, only one parameter can be activated per block.

6.1 MENU P
The following functions can be set in this menu:
- Partial opening position (parameter 3)
- SKS/VL reversal limit (parameter 4)

<table>
<thead>
<tr>
<th>Display</th>
<th>Radio</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>-</td>
<td>Setting the partial opening position</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>SKS/VL reversal limit (SKS is preset)</td>
</tr>
</tbody>
</table>

6.1.1 Setting the partial opening position

NOTE:
The Partial opening position can only be set if the operator has been taught in.

Partial opening can be set in menu P via parameter 3:
The display flashes slowly.
1. Press the PRG button until the decimal point flashes.
The parameter is activated.
2. Move the door in press-and-hold operation with the and buttons.
3. Once the desired position is reached, press the PRG button until the display begins flashing rapidly.
The decimal point goes out and the display flashes slowly.

NOTE:
The setting range for Partial opening is from the OPEN end-of-travel position to approx. 120 mm (slide travel) before the CLOSE end-of-travel position. The standard factory setting is approx. 260 mm (slide travel) before the CLOSE end-of-travel position.

6.1.2 Setting the SKS/VL reversal limit

NOTE:
The SKS/VL reversal limit can only be set under the following prerequisites:
- The operator has been taught in.
- Parameter 3 or 4 is activated in menu 4.

In menu P, the SKS/VL reversal limit can be set via parameter 4. The SKS/VL reversal limit is preset before the CLOSE end-of-travel position for the closing edge safety device.

To set the SKS/VL reversal limit:
1. Press the PRG button until the decimal point is illuminated. Parameter 4 is thus selected and activated.
2. Move the operator into the OPEN end-of-travel position with the button.
3. Place a test body in the centre of the door (max. 300 x 50 x 16.25 mm, e.g. a folding rule) on the ground so that its smallest edge is towards the top and in the range of the leading photocell.
4. Press the button.
   - The door moves until the test body is detected by the safety device.
   - The position is stored and checked for plausibility.
5. Change to normal operation by pressing the PRG button (menu 0).

6.2 MENU 2
1. With the PRG button, select menu 2.
   — The menu number is always briefly displayed after selection.
   — Then the active menu parameter (switch-off delay) is displayed flashing rapidly with the decimal point.
2. Press the 6 or 7 button to scroll in the menu and select the parameter to be changed.
3. Press the PRG button until the decimal point flashes.
4. Change to normal operation by pressing the PRG button (menu 0).

6.2.1 Operator light – Setting the switch-off delay
▶ See Figure 24.1
Menu 2 acts on the internal light relay.
If a parameter > 0 (1 – 5) is selected, the light relay is activated as soon as the door starts to move.
After the door has stopped moving, the operator light remains active for the set period (switch-off delay).

6.2.2 Operator light – Setting the illumination time, switched via radio/external button
▶ See Figure 24.2
The illumination time of the operator light can be set via parameters 6 – 9 and switched on via radio or an external button (e.g. internal push button IT3b).
The operator light can also be turned off ahead of time using the same control elements (radio or external button).

6.2.3 External radio
▶ See Figure 24.3
If an external 2-channel radio receiver is connected to the operator, you can select whether the second channel should be used to actuate the operator light (parameter A) or for partial opening (parameter b).
If an external 3-channel radio receiver is connected to the operator, no further settings need to be carried out.

NOTE:
The light cannot be switched on and off while the door is in motion.

<table>
<thead>
<tr>
<th>Display</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator light switch-off delay</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Not active</td>
</tr>
<tr>
<td>7,6</td>
<td>5 minutes</td>
</tr>
<tr>
<td>8</td>
<td>10 minutes</td>
</tr>
<tr>
<td>9</td>
<td>15 minutes</td>
</tr>
</tbody>
</table>

Radio/function of the 2nd channel

<table>
<thead>
<tr>
<th>A,9</th>
<th>Operator light</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>Partial opening</td>
</tr>
</tbody>
</table>

▶ Change to normal operation by pressing the PRG button (menu 0).

6.3 MENU 0 – Normal operation
During normal operation, the garage door operator works with the impulse sequence control, which is triggered via an external button or a taught-in radio code:
1st impulse: The door runs towards an end-of-travel position.
2nd impulse: The door stops.
3rd impulse: The door runs in the opposite direction.
4th impulse: The door stops.
5th impulse: The door runs in the direction of the end-of-travel position selected in the 1st impulse.

7 Special Menus

7.1 Selecting special menus
To access the special menus (menu 3 – menu A):
1. In menu 2, press the 6 and 7 buttons simultaneously.
2. Then select the special menu via the PRG button.

7.2 Notes on the special menus
The menu number is always briefly displayed after selection. Then the first active menu parameter is displayed flashing slowly.
1. To scroll through the menu, press the 6 or 7 button. Active parameters are indicated by an illuminated decimal point.
2. To be able to change a parameter, press the PRG button until the display begins flashing rapidly.
3. To scroll through the menu, press the 6 or 7 button. The parameter that is active is identified by an illuminated decimal point.
4. To activate a parameter, press the PRG button until the decimal point is illuminated.
The system will change to the next menu if the PRG button is released too early. If the operator is taught in and no button is pressed, the control automatically changes back to normal operation (menu 0).

7.2.1 7-segment display when switching from the customer menu to the special menus

NOTE:
When changing to the special menus, a number between 0 to 5 with a decimal point may flash in the 7-segment display, depending on the current setting in menu 2.

7.2.2 7-segment display after selecting a special menu

NOTE:
After selecting a special menu, a number between 0 to 9 with a decimal point may flash in the 7-segment display, depending on the menu. This number indicates the (first) active parameter.

7.3 MENU 3 – Automatic timed closing
► See Figure 25

NOTE:
Automatic timed closing can only be activated if at least one safety device is active (menu 4).

<table>
<thead>
<tr>
<th>Display</th>
<th>Automatic timed closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not active</td>
</tr>
<tr>
<td>1</td>
<td>After 10 seconds</td>
</tr>
<tr>
<td>2</td>
<td>After 20 seconds</td>
</tr>
<tr>
<td>3</td>
<td>After 30 seconds</td>
</tr>
<tr>
<td>4</td>
<td>After 45 seconds</td>
</tr>
<tr>
<td>5</td>
<td>After 60 seconds</td>
</tr>
<tr>
<td>6</td>
<td>After 90 seconds</td>
</tr>
<tr>
<td>7</td>
<td>After 120 seconds</td>
</tr>
<tr>
<td>8</td>
<td>After 150 seconds</td>
</tr>
<tr>
<td>9</td>
<td>After 180 seconds</td>
</tr>
</tbody>
</table>

NOTE:
The door stops and opens again if the operator receives an impulse during automatic timed closing (menu 3, parameter > 0).
► Change to normal operation by pressing the PRG button (menu 0).

7.4 MENU 4 – Safety devices
► See Figure 26

<table>
<thead>
<tr>
<th>Display</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not present</td>
</tr>
<tr>
<td>1</td>
<td>Present (with dynamic testing)</td>
</tr>
<tr>
<td>2</td>
<td>Not present</td>
</tr>
<tr>
<td>3</td>
<td>Already fitted</td>
</tr>
<tr>
<td>4</td>
<td>Already fitted</td>
</tr>
<tr>
<td>5</td>
<td>Not present</td>
</tr>
<tr>
<td>6</td>
<td>Already fitted</td>
</tr>
</tbody>
</table>

NOTE:
Safety devices without testing must be tested every six months.
► Change to normal operation by pressing the PRG button (menu 0).

7.5 MENU 5 – Setting the pre-warning time, option relay, and maintenance display
► See Figure 27

7.5.1 Maintenance display
If the maintenance display is activated (parameter A), the operator light will flash at the end of a door run if the specified maintenance interval for the door system has been exceeded.
The maintenance display can be reset after a learning run.
Overview of maintenance intervals

Operator for single/double garages
1 year operating time or 2,000 door cycles

Operator for underground and collective garages
1 year operating time or 10,000 door cycles

<table>
<thead>
<tr>
<th>Display</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-warning time/external with option relay *</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>Not active</td>
</tr>
<tr>
<td>1</td>
<td>5 seconds</td>
</tr>
<tr>
<td>2</td>
<td>10 seconds</td>
</tr>
</tbody>
</table>

| Option relay * | |
| 3       | Not active |
| 4       | The relay clocks during the pre-warning time and door travel. |
| 5       | The relay is on during door travel and the pre-warning time. |
| 6       | The relay picks up with the operator light. It is on during the pre-warning time, if parameters 1 – 5 are activated in menu 2. |
| 7       | The relay is on during door travel. |
| 8       | The relay picks up for 1 second at the start of door travel or the pre-warning time, e.g. with a momentary impulse to switch stairwell lighting with 100% ON time. |

Maintenance display

| 9 | Not active |
| A | Active |

* Accessory, not included as standard equipment!

7.6 MENU 6 – Force limit in the CLOSE direction

See Figure 28
The sensitivity of the automatic force limit for closing can be set in this menu (factory setting: parameter 4).

NOTE:
An increase in the force limit (parameter > 4) is only possible if parameter 3 has been selected in menu J.

CAUTION

Danger of injury due to the force value being set too high (menu 6 and menu 8)
When the force value is set too high, the force limit is less sensitive. This could lead to injury or damage.

Do not set a force value that is too high.

A lower value can be selected for very easy-to-move doors if the sensitivity to obstructions should be increased.

7.8.1 Checking the forces in the OPEN direction

If changing the settings in menu 8, the forces in the OPEN direction must comply with standard EN 12453, i.e., an inspection is required afterwards.
7.9 MENU 9 – Behaviour in the OPEN direction

The automatic belt relief and braking behaviour in the OPEN end-of-travel position can be influenced in this menu.

**NOTE:**
A learning run may be necessary after changing this menu.

<table>
<thead>
<tr>
<th>Display</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft stop</td>
<td>Extra long</td>
</tr>
<tr>
<td></td>
<td>Long</td>
</tr>
<tr>
<td></td>
<td>Short</td>
</tr>
</tbody>
</table>

**Relief**

- Automatic
- Short

**Soft start from the CLOSE end-of-travel position**

- Short
- Long

**Speed**

- Slowly
- Normal
- Fast

**Response with force limit**

- Stop
- Short reversal

1) This parameter is the factory setting if parameter 4 (sliding door) has been set in menu J.

Notes on the parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>0, 6</td>
<td>These parameters are adapted to the characteristics of retractable up-and-over doors.</td>
</tr>
<tr>
<td>A, b</td>
<td>These parameters can only be set if parameter 3 has been selected in menu J. Otherwise, parameter A is active in this menu.</td>
</tr>
<tr>
<td>b</td>
<td>If error 5 (force limit) occurs during travel in the OPEN direction, the door will briefly reverse (approx. 10 cm slide travel) in the opposite direction and then stop.</td>
</tr>
</tbody>
</table>

- Change to normal operation by pressing the PRG button (menu 0).

---

7.10 MENU A – Maximum force

The force of the force limit is set in this menu.

**Display**

<table>
<thead>
<tr>
<th>Maximum force of the force limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
</tr>
<tr>
<td>2)</td>
</tr>
<tr>
<td>3)</td>
</tr>
</tbody>
</table>

**NOTE:**
An increase in the force limit (parameter \( > 0 \)) is only possible if parameter 3 has been selected in menu J.

- Change to normal operation by pressing the PRG button (menu 0).

---

8 Operation

**WARNING**

*Danger of injury during door travel*

If people or objects are in the area around the door while the door is in motion, this can lead to injuries or damage.

- Children are not allowed to play near the door system.
- Make sure that no persons or objects are in the door’s travel range.
- If the door system has only one safety feature, only operate the garage door operator if you are within sight of the door’s area of travel.
- Monitor the door travel until the door has reached the end-of-travel position.
- Only drive or pass through remote control door systems if the door is in the OPEN end-of-travel position!
- Never stay standing under the open door.

**CAUTION**

*Danger of crushing in the boom*

Do not reach into the boom with your fingers during door travel, as this can cause crushing.

- Do not reach into the boom during door travel.

*Danger of injury from the cord knob*

If you hang on the cord knob, you may fall and injure yourself. The operator could break away and injure persons or damage objects that are located underneath, or the operator itself could be destroyed.

- Do not hang on the cord knob with your body weight.
8.3 Functions of various radio codes for external 3-channel receivers

8.3.1 Channel 1 / impulse
During normal operation, the garage door operator works with the impulse sequence control, which is triggered via an external button or a taught-in radio code:
1st impulse: The door runs towards an end-of-travel position.
2nd impulse: The door stops.
3rd impulse: The door runs in the opposite direction.
4th impulse: The door stops.
5th impulse: The door runs in the direction of the end-of-travel position selected in the 1st impulse.
e tc.

8.3.2 Channel 2 / light
The operator light can be switched on and switched off ahead of time using the taught-in light radio code.

8.3.3 Channel 3 / partial opening
If the door is not in partial opening position, it is moved in the partial opening position using the partial opening radio code.
If the door is in partial opening position, it is moved in the CLOSE end-of-travel position using the partial opening radio code and in the OPEN end-of-travel position using the impulse radio code.

8.4 Behaviour during a power failure
To be able to open or close the garage door by hand during a power failure, it must be disengaged from the slide carriage.

ATTENTION

8.5 Behaviour following a power failure
After the power returns, the slide carriage must be re-engaged.

9 Inspection and Maintenance
The garage door operator is maintenance-free.
For your own safety, however, we recommend having the door system checked and maintained by a specialist in accordance with the manufacturer’s specifications.

WARNING

Danger of injury due to expected door travel
Unexpected door travel can result during inspection and maintenance work if the door system is inadvertently actuated by other persons.

Pull out the mains plug and, if applicable, the plug of the emergency battery when performing all work on the door system.
Safeguard the door system against being switched on again without authorization.

An inspection or necessary repairs may only be carried out by a qualified person. Contact your supplier for this purpose.
A visual inspection may be carried out by the operator.

Check all safety and protective functions monthly.
Malfunctions and/or defects at hand must be rectified immediately.
9.1 Replacement bulb

**CAUTION**

**Danger of injuries due to the hot lamp**
Touching the cold-light reflector lamp during or immediately following operation can lead to burns.
- Do not touch the cold-light reflector lamp if it is switched on or was recently switched on.

If the light is switched on, an alternating current of 12 V AC is present at the lamp socket.
- Exchange the cold-light reflector lamp only if the operator is voltage-free.
- For using/Replacing the operator light, see Figure 34.

<table>
<thead>
<tr>
<th>Type</th>
<th>Only cold-light reflector lamp with safety glass and UV protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>GU 5.3</td>
</tr>
<tr>
<td>Nominal power</td>
<td>20 W</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>12 V</td>
</tr>
<tr>
<td>Angle of reflected beam</td>
<td>36° – 60°</td>
</tr>
<tr>
<td>Diameter</td>
<td>51 mm</td>
</tr>
<tr>
<td>Lamp colour</td>
<td>Clear</td>
</tr>
</tbody>
</table>

10 Dismantling and Disposal

**NOTE:**
When disassembling, observe the applicable regulations regarding occupational safety.

Have a specialist dismantle the garage door operator in the reverse order of these instructions and dispose of it properly.

11 Warranty Conditions

**Warranty**
We shall be exempt from our warranty obligations and product liability in the event that the customer carries out his own structural alterations or undertakes improper installation work or arranges for same to be carried out by others without our prior approval and contrary to the fitting guidelines we have provided. Moreover, we shall accept no responsibility for the inadvertent or negligent use of the operator and the accessories nor for improper maintenance of the door and its counterbalance. Batteries are also not covered by the warranty.

**Warranty period**
In addition to the statutory warranty provided by the dealer in the sales contract, we grant the following warranty for parts from the date of purchase:
- 5 years for the operator mechanics, motor and motor control
- 2 years on radio equipment, accessories and special systems

There is no warranty on consumables (e.g. fuses, batteries, lamps). Claims made under the warranty do not extend the warranty period. For replacement parts and repairs the warranty period is six months or at least the remainder of the warranty period.

**Prerequisites**
A claim under this warranty is only valid for the country in which the equipment was bought. The product must have been purchased through our authorised distribution channels. A claim under this warranty exists only for damage to the object of the contract itself. Reimbursement of expenditure for dismantling and fitting, testing of corresponding parts, as well as demands for lost profits and compensation for damages, are excluded from the warranty.

The receipt of purchase substantiates your right to claim under the warranty.

11.1 Performance
For the duration of the warranty we shall eliminate any product defects that are proven to be attributable to a material or manufacturing fault. We pledge to replace free of charge and at our discretion the defective goods with non-defective goods, to carry out repairs, or to grant a price reduction. Damages caused by the following are excluded:
- improper fitting and connection
- improper initial start-up and operation
- external factors such as fire, water, abnormal environmental conditions
- mechanical damage caused by accidents, falls, impacts
- negligent or intentional destruction
- normal wear or deficient maintenance
- repairs conducted by unqualified persons
- use of non-original parts
- removal or defacing of the data plate

Replaced parts become our property.

12 Excerpt from the Declaration of Incorporation

(as defined in EC Machinery Directive 2006/42/EC for incorporation of partly completed machinery according to annex II, part 1 B).

The product described on the reverse side has been developed, constructed and produced in accordance with the following directives:
- EC Machinery Directive 2006/42 EC
- EC Construction Products Directive 89/106/EEC
- EC Directive Low-Voltage 2006/95/EC

Applied and consulted standards and specifications:
- EN ISO 13849-1, PL “c”, Cat. 2
- Safety of machinery – Safety-related parts of control systems – Part 1: General principles
- EN 60335-1/2, when applicable
- Safety of electrical appliances / Operators for doors
- EN 61000-6-3
- Electromagnetic Compatibility – interference immunity
- EN 61000-6-2
- Electromagnetic Compatibility – Electromagnetic radiation

Partly completed machinery as defined in the EC Directive 2006/42/EC is only intended to be incorporated into or assembled with other machinery or other partly completed machinery or equipment, thereby forming machinery to which this Directive applies.

This is why this product must only be put into operation after it has been determined that the entire machine/system in which it will be installed corresponds with the guidelines of the EC Directive mentioned above.

Any modification made to this product without our express permission and approval shall render this declaration null and void.
13 Technical Data

13.1 Operator

<table>
<thead>
<tr>
<th>Technical Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains voltage</td>
<td>230/240 V, 50/60 Hz</td>
</tr>
<tr>
<td>Stand-by</td>
<td>Approx. 4.5 W</td>
</tr>
<tr>
<td>Protection category</td>
<td>Only for dry rooms</td>
</tr>
<tr>
<td>Automatic safety cut-out</td>
<td>Is automatically taught in for both directions separately</td>
</tr>
<tr>
<td>End-of-travel position cut-out/force limit</td>
<td>Designed without mechanical switches, additionally integrated run time limitation to approx. 60 s. Automatic safety cut-out, readjusting at every door run</td>
</tr>
<tr>
<td>Rated load</td>
<td>See data label</td>
</tr>
<tr>
<td>Pull and push force</td>
<td>See data label</td>
</tr>
<tr>
<td>Motor</td>
<td>Direct current motor with hall sensor</td>
</tr>
<tr>
<td>Transformer</td>
<td>With thermal protection</td>
</tr>
<tr>
<td>Connection</td>
<td>No-screw connection technology for external equipment with 24 V DC low safety voltage, such as internal and external buttons with impulse operation</td>
</tr>
<tr>
<td>Special functions</td>
<td>• Stop/off switch can be connected</td>
</tr>
<tr>
<td></td>
<td>• Photocell or closing edge safety device can be connected</td>
</tr>
<tr>
<td></td>
<td>• Option relay for warning lamp, additional external illumination can be connected via HCP bus adapter</td>
</tr>
<tr>
<td>Quick release</td>
<td>Actuated from inside with pull cord in the event of a power failure</td>
</tr>
<tr>
<td>Universal fittings</td>
<td>For up-and-over doors and sectional doors</td>
</tr>
<tr>
<td>Door travel speed</td>
<td>• In CLOSE direction max. 14 cm/s&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>• In OPEN direction max. 22 cm/s&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td>Garage door operator airborne sound emission</td>
<td>70 dB (A)</td>
</tr>
<tr>
<td>Operator boom</td>
<td>Extremely flat at 30 mm, with integral door security kit and maintenance-free toothed belt</td>
</tr>
</tbody>
</table>

<sup>1</sup> Depending on operator type, door type, door size and door leaf weight
14 Displays for Errors/Warnings and Operating Conditions

If there is an error or warning, a number will appear with a rapidly flashing decimal point.

### 14.1 Display of errors and warnings

<table>
<thead>
<tr>
<th>Display</th>
<th>Error/warning</th>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reversal limit cannot be set</td>
<td>An obstacle was in the way when the SKS/VL reversal limit was set</td>
<td>Remove the obstruction</td>
<td></td>
</tr>
<tr>
<td>Partial opening height cannot be set</td>
<td>The partial opening height is too close to the CLOSE end-of-travel position (≤ 120 mm slide travel)</td>
<td>The partial opening height must be higher</td>
<td></td>
</tr>
<tr>
<td>Entry not possible</td>
<td>The parameter is set to 0 in menu 4 and an attempt was made to activate automatic timed closing (menu 3, parameters 1 – 9)</td>
<td>Activate the safety device(s)</td>
<td></td>
</tr>
<tr>
<td>Not possible to give a travel command</td>
<td>The operator has been blocked for the control elements and a travel command was given</td>
<td>Release the operator for the control elements</td>
<td></td>
</tr>
<tr>
<td>Run time limitation</td>
<td>The belt is torn</td>
<td>Exchange the belt</td>
<td></td>
</tr>
<tr>
<td>Force limit</td>
<td>The door is sluggish or does not move smoothly</td>
<td>Correct the door travel</td>
<td></td>
</tr>
<tr>
<td>Obstruction in door area</td>
<td>Remove the obstruction and teach in the operator again, if necessary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Static current circuit</td>
<td>The wicket door is open</td>
<td>Close the wicket door</td>
<td></td>
</tr>
<tr>
<td>The magnet has been fitted the wrong way</td>
<td>Fit the magnet correctly (see the instructions for the wicket door contact)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The testing result is not OK</td>
<td>Exchange the wicket door contact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photocell</td>
<td>No photocell is connected</td>
<td>Connect a photocell or set the parameter to 0 in menu 4</td>
<td></td>
</tr>
<tr>
<td>The light beam is interrupted</td>
<td>Adjust the photocell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The photocell is defective</td>
<td>Exchange the photocell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Closing edge safety device</td>
<td>The light beam is interrupted</td>
<td>Check the transmitter and receiver and exchange, if necessary, or exchange the complete closing edge safety device</td>
<td></td>
</tr>
<tr>
<td>8k2 resistance contact strip is defective or not connected</td>
<td>Check the 8k2 resistance contact strip or connect to the operator via the 8k2-1T decoder unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No reference point</td>
<td>Power failure</td>
<td>Move the door to the OPEN end-of-travel position</td>
<td></td>
</tr>
<tr>
<td>The operator has not been taught in</td>
<td>The operator has not been taught in yet</td>
<td>Teach in the operator</td>
<td></td>
</tr>
</tbody>
</table>

### 14.2 Display of the operating conditions of the operator

<table>
<thead>
<tr>
<th>Display</th>
<th>The operator is in the OPEN end-of-travel position</th>
<th>The operator is in an intermediate position</th>
</tr>
</thead>
<tbody>
<tr>
<td>The operator is currently in motion</td>
<td>The operator is in the CLOSE end-of-travel position</td>
<td></td>
</tr>
<tr>
<td>The operator is in the partial opening position</td>
<td>Impulse input from a radio code</td>
<td></td>
</tr>
</tbody>
</table>
3.4.1

5.1 3.4.2

5.2 3.4.2

6 3.4.1
NOTE
The current settings are displayed in the menus by an illuminated decimal point.

REMARQUE
Dans les différents menus, les réglages actuels sont marqués par un point lumineux.
23.1  6.1.1

23.2  6.1.2
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