



PIPE LASER

STONEX SPL1



EN Operating Instruction

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STONEX SPL 1
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Copyright:

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These operating instructions have been drawn up with due care. However, STONEX does not accept any liability for possible errors in these operating instructions and their consequences. Equally, it does not accept any liability for direct losses or consequential losses resulting from improper use of the laser.

The specific national safety regulations and health & safety provisions as well as the specifications in these operating instructions must be noted and complied with when using the laser.

All product and brand names used are the property of the holder and are not explicitly labelled as such.

Contents subject to change without notice.

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1 About these operating instructions

These operating instructions contain all important information for handling the STONEX SPL1 pipe laser. Operation, maintenance and care of the laser as well as the warnings and error messages are also described.

- Do not use the STONEX SPL1 pipe laser until you have completely read and understood these operating instructions.
- Keep these operating instructions together with the STONEX SPL1 pipe laser at all times.
- In these operating instructions the STONEX SPL1 pipe laser is also referred to as the “Laser”.

1.1 Symbols used in these operating instructions

Compliance with the safety instructions and warnings is the basic requirement for safe use of the STONEX SPL1 pipe laser. The various instructions and warnings are labelled with corresponding symbols.

WARNING!



This pictogram with the word "WARNING!" indicates an imminent danger, which could result in severe physical injuries if it is not avoided.

► *This arrow indicates the appropriate measure to prevent the imminent danger.*

CAUTION!



This pictogram with the word „CAUTION!“ indicates an imminent danger, which could result in slight or moderate physical injuries or property damage if it is not avoided.

► *This arrow indicates the appropriate measure to prevent the imminent danger.*

NOTE



This „Note“ pictogram provides tips, recommendations and important information on use and handling of the laser.

In addition, the standard symbols are used in the appropriate places in these operating instructions.

2 Safety information

2.1 Documentation



Compliance with the following safety instructions and the specific national safety regulations and health & safety provisions is a basic requirement for trouble-free and safe use of the laser. Therefore, please read carefully through these operating instructions and all notes and follow them while working with the laser.

2.2 Laser radiation

The STONEX SPL 1 pipe laser is a Class 3R laser product in accordance with EN 60825-1:2014.



**LASER RADIATION
AVOID DIRECT
EYE EXPOSURE!
LASER CLASS 3R**

**EN 60825-1:2014
P ≤ 5 mW
λ: 630-680 nm
φ ≤ 1.5 mrad**

General safety instructions for handling laser radiation

WARNING!



- ▶ Laser radiation can damage the eyes.
- ▶ Prevent direct eye exposure to the beam.
- ▶ Do not direct the beam at other people/animals or into public areas.
- ▶ To prevent reflections, do not point the laser at reflective surfaces.
- ▶ If possible, do not operate the laser at eye level.
- ▶ The housing of the laser may be opened by trained service technicians only.

The emitted laser radiation has the following properties:

- Class 3R Power $P \leq 5\text{mW}$
- Wavelength λ : 515 nm
- Beam divergence $\phi \leq 0,3\text{ mrad}$

Signage

WARNING!



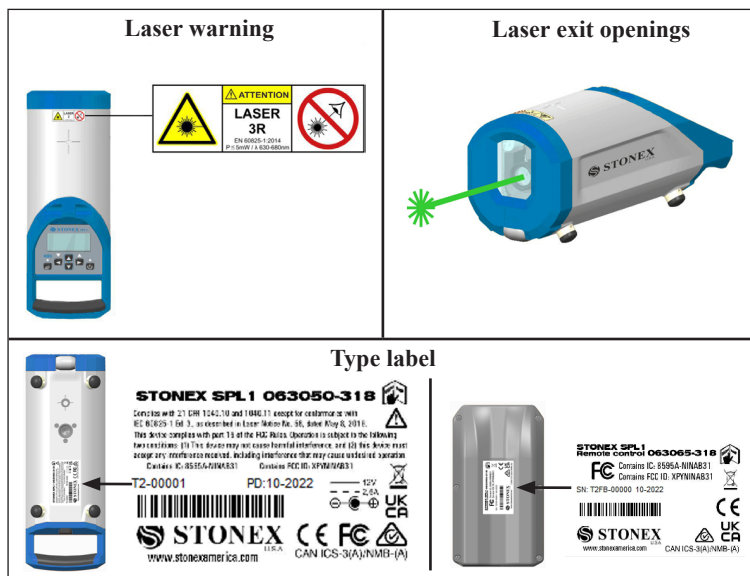
- ▶ Warning signs on the laser are for your safety.
- ▶ Never remove the warning signs!

NOTE



For users in Germany:

Please note and follow the regulations of the body responsible for industrial safety and insurance (Berufsgenossenschaft) BGI 832 on the operation of laser equipment and BGV B2 on accident prevention. We recommend registering operation of a class 3R laser with the relevant Berufsgenossenschaft. Information can be found in §5 of BGI 832 and section 2 - Annex 5 of BGI 832.



2.3 Power supply safety instructions

WARNING!



Destruction! Explosion risk!

- ▶ Use charger included in the scope of delivery only.
- ▶ Use the charger in dry rooms only.
- ▶ Never expose the units to heat or fire.
- ▶ Check live components regularly and stop using them if they are damaged.

CAUTION!



Damage!

- ▶ In case of lengthy storage, it may be necessary to charge and discharge the units several times to reach the maximum output.
- ▶ In case of storage for longer than 3 months, the units must be charged every 3 months.

NOTE



- ▶ Operation at ambient temperatures below 0° C leads to lower battery capacity.

2.4 General safety instructions

CAUTION!



Damage!

- ▶ Do not open the units.
- ▶ Do not modify or change the units.
- ▶ Do not use the units in case of obvious damage or defects.
- ▶ Do not charge the units in a wet environment.
- ▶ Only use accessories that have been explicitly approved by STONEX.
- ▶ Do not use the units as a climbing aid for people or machines.

2.5 Intended use

The STONEX SPL1 pipe laser is suitable for measuring tilts and alignments in pipes and sewers. The unit is submersible (IP68). The unit can be operated with a radio remote control or alternatively via infrared.

2.6 Transport and storage

The laser is a sensitive, high-precision instrument and must be handled with appropriate care. Always transport and store the laser and the accessories in the transportation case. Note the storage temperature given in the technical data.

NOTE



- ▶ Never store the units in the case if the units are wet.

2.7 Repair and service

Repairs may only be carried out by STONEX or an authorised customer service agent. Never open the units yourself, doing so cancels the warranty. Send the units to STONEX for repair or checking. Always send the laser together with the complete accessories in the original case and with completed repair form.

2.8 The environment



Product-specific information on disposal of the laser can be downloaded from www.stonexamerica.com. Batteries and rechargeable batteries are hazardous waste and may not be placed in the domestic waste. They must be properly disposed of according to the respective national guidelines

2.9 Conformity assessments

FCC note

This unit has been tested and conforms with the limits for a Class A digital device in accordance with Part 15 of the FCC Rules. These limits should provide appropriate protection against harmful interference, if the device is operated in a commercial, industrial or business environment. This device generates, uses and radiates potentially high-frequency energy, and if it is not installed and used in accordance with the operating instructions, it can cause radio disturbance. Operation of this device in residential areas can cause harmful disturbance and faults. In this case the user must correct the disturbance and faults at their own cost.

3 Description of the STONEX SPL1

3.1 General product description

The STONEX SPL1 is a fully automatic laser, which has been developed for use in pipe and sewer constructions. The STONEX SPL1 can be used to survey or measure and lay pipe systems quickly and easily. The innovative shock protection system and the robust, water and dust protected housing protect the laser. The laser can also be monitored and controlled from a distance using the remote control with integrated display. A Li-ion rechargeable battery in the laser and the remote control ensures a long operating time.

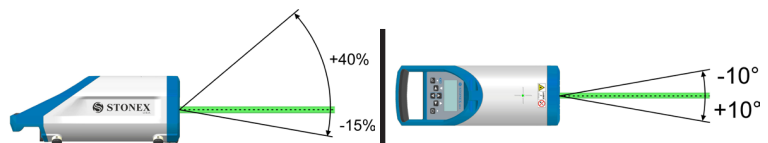
3.3 Specifications



- 1 Transportation case
- 2 Tool
- 3 STONEX SPL1 pipe laser
- 4 Remote control
- 5 Charger
- 6 Operating Instructions
- 7 Adapter cable
- 8 Target board with disc
- 9 Adjustable feet, different lengths

3.2 How it works STONEX SPL1

The STONEX SPL1 pipe laser emits a laser beam, which can be tilted within a range from -15% to $+40\%$. It can also be swung to the side by $\pm 10^\circ$ for precise alignment of the beam onto a target board. The STONEX SPL1 pipe laser is equipped with a self-levelling feature and levels out tilted positioning of the unit within a range of -15% to $+40\%$.



3.4 Device components

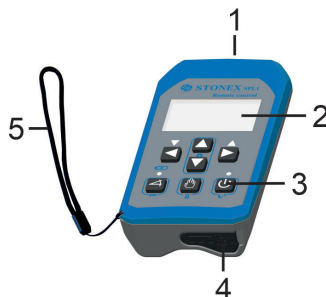
STONEX SPL1 pipe laser

- 1 LED for signalling the laser axis of rotation
- 2 OLED display
- 3 Control panel with rubber keypad
- 4 Handle, rubberised
- 5 Adjustable feet for pipe (Ø 150mm, 200mm, 250mm, 300mm)
- 6 Laser
- 7 Rubber protector
- 8 Sliding roller (pipe slider)
- 9 Charging socket with cover
- 10 5/8" connection thread
- 11 M8 thread for adjustable foot (three-point support)



STONEX SPL1 remote control

- 1 IR-LED outlet window
- 2 OLED-Display
- 3 Control panel with rubber keypad
- 4 Charging socket with cover
- 5 Hand loop



3.5 Technical specification Pipe laser

Pipe laser	STONEX SPL1
Ref-No.	472210-318
Self-levelling range:	-15% ... +40%
Transverse tilt compensation	±5°
Vertical adjustment range	-15% ... +40%
Horizontal adjustment range	±10°
Display resolution	0,001%
Levelling accuracy ^{1,2}	± 5mm over 100m
Laser type	≤ 5 mW, Laser class 3R, 515 nm
Power supply	Li-Ion rechargeable battery: Capacity approx. 6700 mAh / 7.2V. Varying voltage charger: 110V ... 230V, Charging voltage 12V (2A)
Operation duration	up to 40 h
Weight	3,5 kg
Dimensions (diameter/length):	D=120mm / L=300mm
Working temperature range	-20 °C to +50 °C
Charging temperature	+5 °C to +40 °C (recommended +10 °C to +30 °C)
Storage temperature	-20 °C to +60 °C
Class of protection:	IP 68

¹ at 22°C ambient temperature,

² without transverse tilt of the unit

3.6 Technical specification Remote control

Remote control	STONEX SPL1
Power supply	Li-Ion rechargeable battery: Capacity approx. 2900 mAh / 3.6V. Varying voltage charger: 110V ... 230V, Charging voltage: 12V (0.7A)
Range	Wireless: up to 100m IR: up to 150 m
Operation duration	up to 50 h
Weight	0,250 kg
Dimensions (width/length/height):	B=80mm / L=145mm / H=38mm
Working temperature range	-20 °C to +50 °C
Charging temperature	+5 °C to +40 °C (recommended +10 °C to +30 °C)
Storage temperature	-20 °C to +60°C
Class of protection	IP 67

NOTE



► Use of the units is only intended up to 2000 m a.s.l.

4 Initial start up STONEX SPL1

4.1 Charging the battery

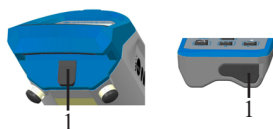


- 1 Remove the rubber cover from the charging socket.
- 2 Connect the adapter cable supplied to connect both units to the charger at the same time.
- 3 Connect the cable in the charging socket of the unit.
- 4 Connect the charger to the mains supply.

Note voltage! (110-230 V)

Charging time if battery empty and for complete charging: 3-4 h.

After charging, always use the rubber cover (1) to close off the charging socket.



- ▶ During charging, the red charging LED lights up on the control panel.
- ▶ The red LED goes out if the battery is fully charged.
- ▶ The laser can be operated during charging

NOTE



- ▶ The units do not charge at temperatures below 5 °C and above 45 °C.

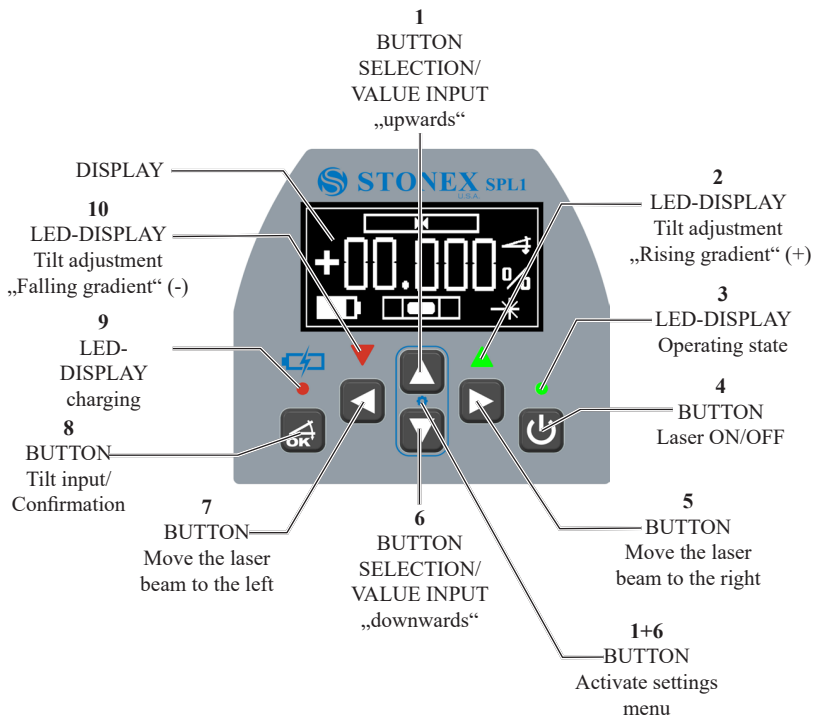
CAUTION!



- ▶ The typical design life of Li-ion cells and thus the EOL is 5 years at 20 °C ambient temperature or in case of a storage capacity of only 70% or less of the initial capacity.
- ▶ We recommend having the battery replaced by a service technician after 5 years or if the residual capacity is 70%.

5 STONEX SPL1 Controls












5.1 Buttons of the STONEX SPL1 control panel



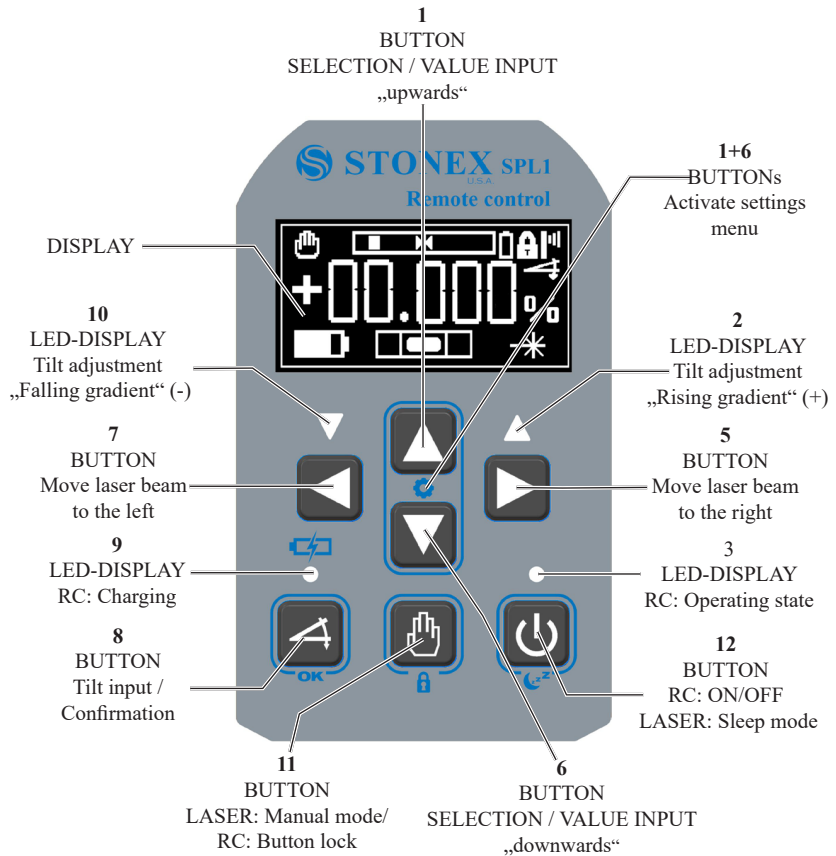
5.2 Display STONEX SPL1

Symbol	Description												
	HORIZONTAL LASER POSITION: Indicates the current position of the laser beam in relation to the unit's longitudinal axis.												
	VERTICAL TILT INPUT (symbol flashes during input)												
$\pm 00.000\%$	TILT INDICATOR (%): Displays the entered tilt in %. The green arrow LED display (2) also lights up in case of rising gradient (+), the red arrow LED display (10) also lights up in case of falling gradient (-)..												
	LASER BEAM: Flashing = laser is being aligned.												
	TILTI LEVEL: The spirit level symbol indicates the current transverse tilt of the laser.												
	<table border="1"> <tr> <td>Battery level</td> <td>100 %</td> <td>75%</td> <td>50%</td> <td>25%</td> <td>5%</td> </tr> <tr> <td>remaining operating time in hours</td> <td>~40 h</td> <td>~30 h</td> <td>~20 h</td> <td>~10 h</td> <td>~ 2 h</td> </tr> </table>	Battery level	100 %	75%	50%	25%	5%	remaining operating time in hours	~40 h	~30 h	~20 h	~10 h	~ 2 h
	Battery level	100 %	75%	50%	25%	5%							
remaining operating time in hours	~40 h	~30 h	~20 h	~10 h	~ 2 h								

5.3 Display and button functions STONEX SPL1 and Remote control

No.	Button/Display	Description
1		Up arrow Number selection upwards for tilt input or tilt adjustment upwards in manual mode
2		Tilt indicator Lights up green if a rising gradient (+) is set
3		LED display, operating state Lights up continuously , if the laser is in operation Flashes , if the laser has been switched to sleep mode via the remote control.
4		ON/OFF Switches the unit on and off.
5		Right arrow Swing the laser beam to the RIGHT or for directly selecting a decimal place when entering the tilt.
6		Down arrow Number selection downwards for tilt input or tilt adjustment downwards in manual mode.
7		Left arrow Swing the laser beam to the left or for directly selecting a decimal place when entering the tilt.
8		Tilt input / OK button Select tilt menu, confirm entered tilt and exit tilt menu or OK button to confirm other settings.
9		LED display, battery charging Lights up during charging and goes out if the battery is fully charged.
10		Tilt indicator Lights up red if a falling gradient (-) is set.
1 + 6		Settings Press the two buttons at the same time to switch the laser to the “Unit settings” menu.





5.4 Buttons of th STONEX SPL1 remote control panel



5.5 Additional displays of the STONEX SPL1 remote control

Symbol	Description
	MANUAL: Laser is in manual mode.
	RADIO CONNECTION active
	Button lock of the remote control activated
	Battery level, remote control
	remaining operating time in hours
	INFRARED CONNECTION active: Radio connection not possible. Setting of the horizontal, or in manual mode the horizontal and vertical, laser position only is possible.

5.6 Additional button functions of the STONEX SPL1 remote control



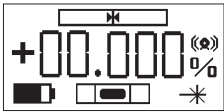
No.	Button	Description
8		BUTTON Tilt input / OK The same function as for STONEX SPL1 (for functions, see table on page 15)
11		Manual mode Activate / deactivate manual mode. Laser beam can be set and adjusted using the UP/DOWN/RIGHT/LEFT arrow buttons.
11		Keypad lock Press the button for approx. 3 sec. to activate / deactivate the keypad lock.
12		Sleep mode Press the button for approx. 3 sec. to activate / deactivate laser sleep mode.

6 Startup

6.1 Switching on the STONEX SPL1 Pipe laser

Press the ON/OFF button (4) to switch on the laser.

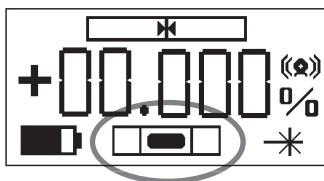
The following displays appear consecutively:

	->		->	
Company logo		Sand timer, unit references itself		Display ready

6.2 Aligning the STONEX SPL1 Pipe laser

The laser shows a tilt level in the bottom area of the display.

Position the laser so that the tilt level is aligned with the middle.







NOTE



The laser's display indicates possible problems, which result due to setting up of the unit → see *Error Messages / Displays chapter!*




7 Adjusting the Tilt

7.1 Adjusting the tilt in automatic mode

Button	Description
	Press the TILT/OK button to change the tilt. The angle symbol and the sign flash.
	Use the UP/DOWN arrow buttons to change the sign or to set the required numerical value within the range from 1 to 9. The numerical value selected can be reset to "0" by pressing the two buttons at the same time.
	Use the RIGHT/LEFT arrow buttons to switch between the individual decimal places. The tilt value can be reset to „00.000" by pressing the two buttons at the same time.
	To confirm the set value, press the TILT/OK button.




7.2 Plumb function

The STONEX SPL1 remote control can be used to manually adjust the laser beam vertically. This function can be used to align the laser beam with a target mark above the pipe. After exiting the plumb function the laser beam returns to the previously set tilt!

Button	Description
	To change the tilt manually, press the MANUAL button. A hand symbol appears in the display and the tilt value flashes.
	The UP/DOWN arrow buttons can now be used to set or adjust the tilt value. To do this, either press the respective button briefly or keep it pressed.
	Press the MANUAL button again to return to the previously set tilt value. The laser resets the previous value, manual mode is ended.

7.3 Measuring and accepting the tilt



The STONEX SPL1 remote control can be used to manually align the laser beam vertically with the target plate and the tilt value can be accepted.

Button	Description
	To change the tilt manually, press the MANUAL button. A hand symbol appears in the display and the tilt value flashes.
	The UP/DOWN arrow buttons can now be used to set or adjust the tilt value. To do this, either press the respective button briefly or keep it pressed.
	To save the set value, press the TILT/OK button and keep it pressed for approx. 3 sec. The value is saved, if the tilt value in the display no longer flashes or an acoustic signal sounds in IR mode and the laser beam stops flashing. Manual mode is ended.



7.4 Adjusting the laser direction

The laser beam of the STONEX SPL1 can be aligned horizontally with the unit's longitudinal axis within a range of +/- 10°.

Adjust the laser beam

Button/ Symbol	Description
	Use the RIGHT/LEFT arrow buttons to swing the laser beam to the side. To do so, press the button briefly or keep it pressed.
	The top part of the display shows the laser beam's current position.

Reset the laser beam

Button / Symbol	Description
	The laser beam can be reset to the middle by pressing the RIGHT/LEFT arrow buttons at the same time.
	The display shows two arrows pointed towards each other in the top area, if the laser beam is aligned with the middle.

NOTE



The display on the remote control is laterally reversed! A setting via the remote control is usually made on the opposite side of the laser, with the view of the target plate and the outlet of the laser beam.

8 Unit settings







The STONEX SPL1 pipe laser provides a unit setting mode with which the laser can be adjusted individually to the needs of the user. The settings can either be selected directly at the laser or using the remote control.

CAUTION!







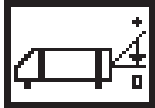




Incorrect entries in this area can result in malfunctioning of the unit and incorrect measurements!

8.1 Button function in the unit menu








Button	Description
	Press the UP and DOWN buttons at the same time to switch to the unit settings mode.
	Use the RIGHT/LEFT arrow buttons to switch between the individual menu items.
	Use the DOWN arrow button to select the required menu.
	Use the UP arrow button to exit the selected menu.
	Press the OK button to activate a function or to save a setting.
	Press the UP and DOWN buttons at the same time to exit the settings mode. Alternatively, the mode can also be ended by pressing the ON/OFF button

8.2 Unit menu




Symbol	Description		
	<p style="text-align: center;">Vibration sensitivity</p> <p>The threshold of the vibration sensitivity can be switched between OFF, COARSE and FINE. By default, the COARSE threshold is set.</p> <p>The function is active 60 seconds after the laser has levelled itself horizontally. Depending on the setting, a movement of the laser then triggers a warning.</p>		
			
	<p>OFF</p> <p>The laser readjusts automatically during a vibration. A vibration does not trigger a warning.</p>	<p>COARSE</p> <p>The Laser switches off in case of strong vibrations. The warning then appears on the display:</p> 	<p>FINE</p> <p>The laser switches off with even if the vibration is light. The warning then appears on the display:</p> 
	<p style="text-align: center;">Referencing</p> <p>In case of particularly high accuracy requirements, additional referencing can be started manually. Additional referencing can also improve the accuracy in case of large temperature changes (e.g. after acclimatising the unit). The unit checks the precise 0% reference.</p>		
	<p style="text-align: center;">Info</p> <p>The software version, the serial number, the service date, remaining time until the next service and the remaining battery capacity can be called up via the info menu.</p>		
	<p style="text-align: center;">Service</p> <p>This menu is only accessible to authorised service technicians.</p>		

9 Info displays and warnings

9.1 Displays in the control panel display

Symbol	Description
 bzw. 	<p>The horizontal levelling range or tilt range has been exceeded, the unit can no longer level itself or move to the set tilt.</p> <p>Remedy: Change the inclined position of the unit in the direction of the arrow, press the OK button. The laser re-aligns itself as soon as the inclined position is removed.</p>
 bzw. 	<p>Vibration Laser has been moved.</p> <p>Remedy: Press the OK button, the laser re-aligns itself and the function is active once more after 60 seconds.</p>
	<p>Time out Laser is unable to reference itself.</p> <p>Remedy: Remove cause, restart the laser. The cause can be, for example, strong vibrations below ground.</p>
	<p>Temperature warning Unit temperature too hot or too cold.</p> <p>Remedy: Adjust the unit temperature to the allowable working temperature (-20 °C to +50 °C).</p>
	<p>Service indicator During start referencing, the laser shows a service symbol at the top left next to the hourglass in the form of a wrench.</p> <p>Remedy: Service is due! Send device for service at STONEX or to an authorized customer service.</p>




Displays in the control panel display

Symbol	Description
	<p>Sleep-mode display on the remote control: Laser is in standby mode.</p> <p>Remedy: Use the remote control to disable the laser's standby mode</p>
	<p>Infrared display on the remote control If the radio connection is disrupted the unit switches to infrared communication automatically.</p> <p>Note: Setting of the horizontal, or in manual mode the horizontal and vertical, laser position only is possible.</p>
	<p>Error 01 - Error 05 Noncorrectable unit error!</p> <p>Remedy: Send in the laser for a service.</p>

9.2 Acoustic warning signal

<p>End position reached</p> <p>An acoustic warning signal is emitted if the horizontal adjustment range, or in manual mode the horizontal and vertical adjustment range, is ended. The end position has been reached.</p> <p>Remedy: Move the laser beam in the opposite direction. If necessary, change the position of the unit to reach the target point and then re-align the laser beam. The warning signal goes out as soon as the limit switch is no longer touched.</p>

9.3 Warnings of the laser beam

Laser beam	Description
Continuously on 	Referencing finished, target tilt is set
Uniform flashing 	Laser is referencing itself or moving to the target tilt. Please wait..
Irregular flashing 	Laser is in manual mode.



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