

Thank you for purchasing the TOPCON Level Sensor LS-100D.

For the best performance of the instruments, please read these instructions carefully and keep them in a convenient location for future reference.

HANDLING PRECAUTIONS

- When transporting the instrument, provide some protection using cushioning to minimize risk of shock. Heavy shock may affect the performance of the instrument or cause a failure.
- In the case where the instrument is not used for a long time, remove the battery from the instrument.
- Any part other than the supplied accessories shall not be used or cannot be attached.
- The fixing screws for the holder, etc. are designed to bear normal uses, but if they are tightened with an excessive force, they may be damaged.
- The rotating laser to be used is RL-H4C, RL-SV2S, or RL-200. For other lasers, the operation is not ensured.

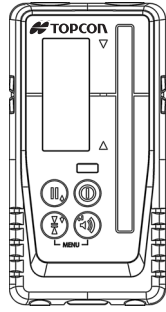
EXCEPTIONS FROM RESPONSIBILITY

- 1) The user of this product is expected to follow all operating instructions and make periodic checks of the product's performance.
- 2) The manufacturer, or its representatives, assumes no responsibility for results of a faulty or intentional usage or misuse including any direct, indirect, consequential damage, and loss of profits.
- 3) The manufacturer, or its representatives, assumes no responsibility for consequential damage, and loss of profits by any disaster, (an earthquake, storms, floods etc.). A fire, accident, or an act of a third party and/or a usage any other usual conditions.
- 4) The manufacturer, or its representatives, assumes no responsibility for any damage, and loss of profits due to a change of data, loss of data, an interruption of business etc., caused by using the product or an unusable product.
- 5) The manufacturer, or its representatives, assumes no responsibility for any damage, and loss of profits caused by usage except for explained in the user manual.
- 6) The manufacturer, or its representatives, assumes no responsibility for damage caused by wrong movement, or action due to connecting with other products.

INSTRUCTION MANUAL

Level Sensor

LS-100D



1012002-01-B

1. PRECAUTIONS FOR SAFE OPERATION

DISPLAY FOR SAFE USE

In order to encourage the safe use of products and prevent any danger to the operator and others or damage to properties, important warnings are put on the products and inserted in the instruction manuals.

We suggest that everyone understand the meaning of the following displays and icons before reading the "Safety Cautions" and text.

Display	Meaning
WARNING	Ignoring or disregard of this display may lead to death or serious injury.
CAUTION	Ignoring or disregard of this display may lead to personal injury or physical damage to the instrument.

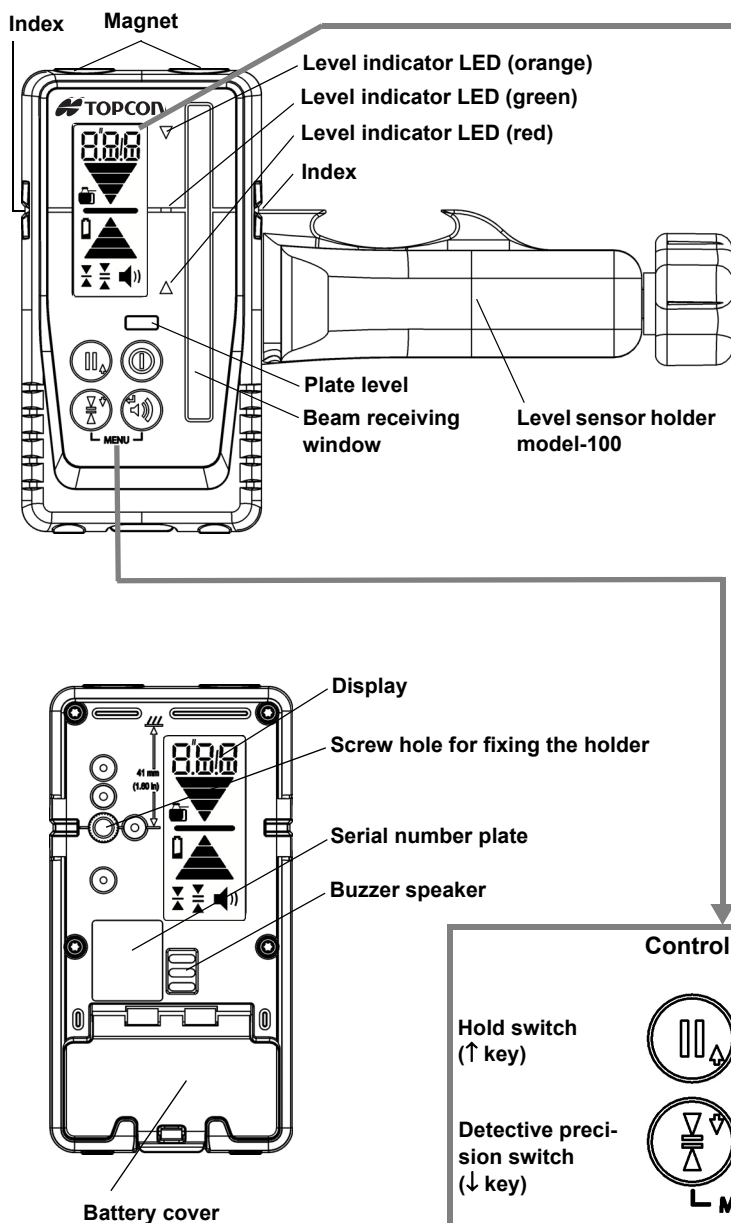
- Injury refers to hurt, burn, electric shock, etc.
- Physical damage refers to extensive damage to buildings, equipment, furniture, livestock and pets.

SAFETY CAUTIONS

WARNING
1) There is a risk of fire, electric shock or physical harm if you attempt to disassemble or repair the instrument yourself. This is only to be carried out by TOPCON or an authorized dealer, only!
2) Risk of fire or electric shock. Do not use a wet battery or charger.
3) Do not use the level sensor in areas exposed to high amounts of dust or ash, in areas where there is inadequate ventilation, or near combustible materials. An explosion could occur.
4) Do not use the level sensor near a cardiac pacemaker user. A magnetic field is generated from the magnet and may affect the function of the pacemaker.
5) Battery can cause explosion or injury. Do not dispose in fire or heat.
6) The short circuit of a battery can cause a fire. Do not short circuit battery when storing it.

CAUTION
1) Do not allow skin or clothing to come into contact with acid from the batteries, if this does occur then wash off with copious amounts of water and seek medical advice.

2. NOMENCLATURE AND FUNCTION



Rotating laser display

In some of our rotating laser models, a warning signal is given by changing the laser rotational speed (rpm). On the rotating laser having this function, the mark of the rotating laser flashes when a warning signal is output.

Low battery warning

If only the battery mark flashes, replace the battery of the level sensor (LS-100D).

Height alert function

This is the function for notifying the worker of an impact detected by rotating laser (height alert is also called safety lock). When the auto leveling function operates and the laser is irradiated, if the rotating laser installation status (height) is suddenly changed by contact with a worker etc., the rotating head rotates at 150rpm to keep the work accuracy..

Height alert HiA	Rotating laser: low battery	Rotating laser & sensor: simultaneously low batteries	Only sensor: low battery
Flashing 	Flashing 	Flashing alternately 	Decreases --> replace
With buzzer sound 		Still lighting 	

Display

Numeric value/character display

This is 3-digit display part for displaying a value representing height from reference position or simple text message. The numeric value indicating a level is displayed in [mm], [cm], [inch] or [F.in.]. For a value out of the measuring range, "----" is displayed. If a value is flashing, it is out of accuracy guarantee range.

Level display arrows

The high/low level is displayed in 4 steps. The arrow size increases as the level is farther away than the datum position. The bars of the arrow show the steps of the selected dead band.

Lost beam display:

If the laser light comes free from light detecting range in vertical direction, an arrow will be displayed flowingly. Move the level sensor according to the direction of arrow.

Buzzer sound volume display

Center bar

Indicates the reference position.

Procedure for switching the detective precision

By pressing the detective precision switch once, the current set precision is numerically displayed. By pressing once more while the precision is displayed (for one second), the current precision setting can be changed. By keeping pressing, the 5-step precision (mode 1 to 5) is displayed in turn.

Precision mode	Resolution (mm)	Precision display	Flashing/Lighting
Mode 1	0.5		Flashing
Mode 2	1.0		Lighting
Mode 3	2.0		Lighting
Mode 4	5.0		Lighting
Mode 5	10.0		Flashing

Procedure for adjusting the buzzer sound volume

When the buzzer sound switch is pressed, Loud/Quiet/OFF is repeatedly displayed in turn.

Loud:

The mark of the buzzer sound is displayed and the characters "Hi" are displayed for one second.

Quiet:

The mark of the buzzer sound is displayed and the characters "LOW" are displayed for one second.

OFF:

The mark of the buzzer sound is not displayed and the characters "OFF" are displayed for one second.

Remark(Precision mode)

- When the power supply is turned ON, the mode is set to mode 3.
- In the mode 3, the pitch of selected resolution is set to 2mm, so the display of height from reference position is switched as 0, 2, 4, 6, 8...

3. MENU FUNCTION

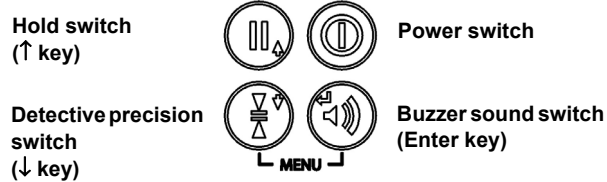
By using the menu function, the settings below can be changed. Generally, the factory settings are used. It is recommended that the settings should not be changed except in any special application.

Setting items

The following settings can be set/displayed.
 Display unit: mm/Fin/In/cm
 Level display LED: ON/OFF
 Information you want: Software version "Fw"

Procedure for setting the unit

1. Press the power switch to ON.
2. Press the buzzer sound switch and the detective precision switch at the same time for 2 or more seconds. "Unt" is displayed.
3. Press the buzzer sound (Enter key).
4. Press the detective precision switch (↓ key) or the hold switch (↑ key) and select the unit.
5. Press the buzzer sound switch (Enter key). Now the unit has been set.
6. Press the power switch to reset the mode to usual mode.



Procedure for setting the level display LED

1. Press the power switch to ON.
2. Press the buzzer sound switch and the detective precision switch at the same time for 2 or more seconds. "Unt" is displayed.
3. Press the detective precision switch (↓ key). "LEd" is displayed.
4. Press the buzzer sound switch (Enter key).
5. Press the detective precision switch (↓ key) or the hold switch (↑ key) and select On/OFF.
6. Press the buzzer sound switch (Enter key). Now the setting for the level display LED has been made.
7. Press the power switch to reset the mode to usual mode.

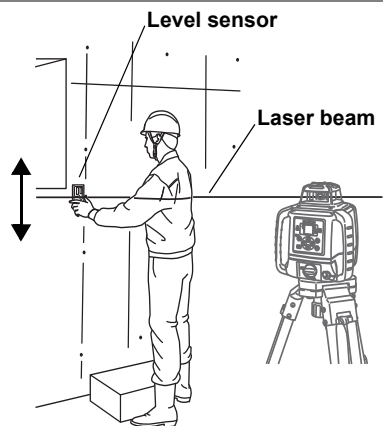
Procedure for setting the information you want

1. Press the power switch to ON.
2. Press the buzzer sound switch and the detective precision switch at the same time for 2 or more seconds. "Unt" is displayed.
3. Press the detective precision switch (↓ key) twice. "InF" is displayed.
4. Press the buzzer sound switch (Enter key). "Fw" is displayed.
5. Press the buzzer sound switch (Enter key). Now the information has been displayed.
6. Press the power switch to reset the mode to usual mode.

Note:

Make sure that any part of the beam receiving window is not covered during measurement to obtain a correct measurement result.

4. OPERATION



Operating procedure

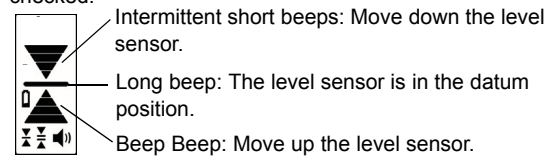
1. Press the power switch.
The power is turned on.
2. Move up and down the level sensor so that the center bar is displayed.
3. Mark the position of the index.
Press the power switch. The power is turned off.

Note:

When using the level sensor, point it at the front of the rotating laser to the extent possible. If the laser beam is received from the slant direction, a correct measurement value may not be obtained.

Each buzzer sound and position of the level sensor

By the buzzer sound, the position of the level sensor can be checked.

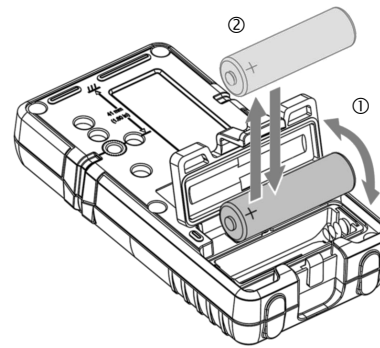


Capturing the measurement value

By pressing the hold switch while the level sensor is receiving the laser beam, the buzzer sounds and the currently measuring value is fixed. At this time, the level display arrow and the numeric value display flash. By pressing any switch, the operation is returned to normal.

By pressing the hold switch while the level sensor is not receiving the laser beam, "CAP" is displayed on the level sensor. If the laser beam is received for 5 seconds or more continuously in this status, the buzzer sounds and the currently measured value is fixed. At this time, the level display arrow and the value display flash. By pressing any switch, the operation is returned to normal.

5. REPLACING BATTERY



If the low battery warning is displayed, replace the battery.

1. Open the battery cover. If it is fixed firmly and cannot be opened, use a coin.
2. Remove the battery.
3. Insert a new battery. (Ensure correct polarity.)
4. Close the battery cover till you hear two click sounds.

Remark:

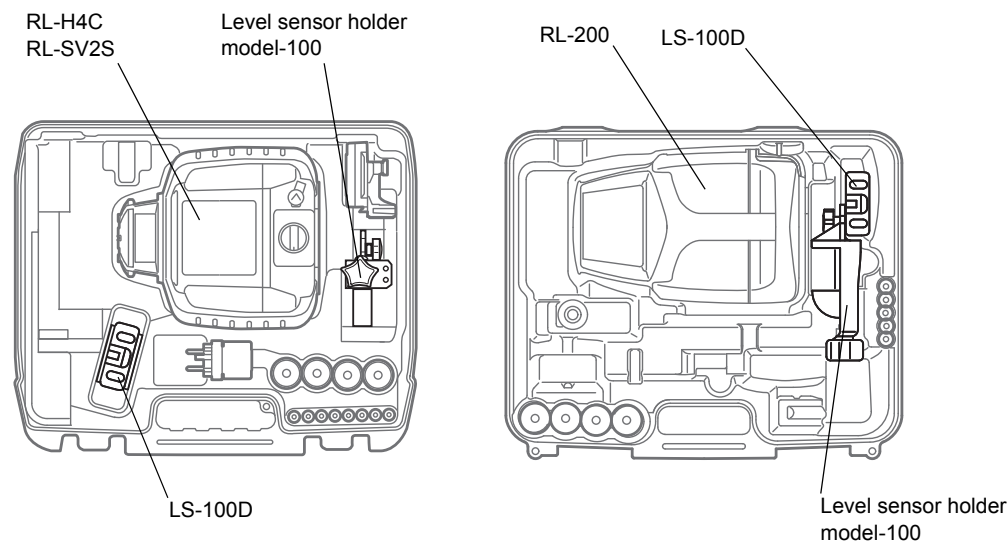
Immediately after the battery is replaced, the power may not be turned on unless the power switch is pressed twice. It is not a failure.

6. MAINTENANCE

- Always keep this instrument clean, especially the beam receiving window.
- Do not use a strong cleaning agent or solvent.
- If the instrument gets extremely dirty, it may be washed with running water.
- Do not use a high pressure washing machine.
- Before storing the instrument in a closed case, dry it completely. Any remaining water on the instrument may give rise to corrosion of the battery contact. In this case, the warranty is not applied.
- Should the instrument have any problem or defect, contact to your nearest sales office for inspection and repair.

7. STORAGE

LS-100D and the level sensor holder model-100 can be stored in the carrying case. (The storage is supported if RL-H4C, RL-SV2S, or RL-200 is bundled, however, it is not supported if LS-100D is purchased alone.)



8. SPECIFICATIONS

Detective range	: 90 mm
Value reading range	: 70 mm
Value display accuracy	
guarantee range	: 1m to 50 m
Detective angle	: ± 45°
Detective spectrum	: 620 nm to 800 nm
Detective radius*1)	: 400 m or more (however, the warning is displayed as 3 m or more)
Detective resolution*2)	: 0.5 mm, 1.0 mm, 2.0 mm, 5.0 mm, 10.0 mm
Buzzer sound volume	: Loud/Quiet/OFF
The time for auto-cut off	: Approx. 30 min. (after no key operation/after no laser beam receiving)
Index position	: 41mm above the top surface of this instrument
Dimensions	: 135 (L) × 69 (W) × 25 (H) mm
Weight	: 190 g (level sensor holder model-100 not included)
Waterproof property / dust resistance	: JIS protection grade IP67 (JIS C 0920: 2003)
Power source	: One AA-size dry battery (Battery included in the package is to confirm the initial operation. Replace the battery with a new one as soon as possible.)
Continuous operating time	: Approx. 45 hours or more (With the conditions; LED: OFF, buzzer sound: large, center bar: displayed, temperature: 25 °C, and use of alkaline dry battery)
Operating temperature	: + 20 °C to + 50 °C
Storage temperature	: - 40 °C to + 60 °C

*1), *2): These values may vary depending on the rotating laser used or status of the atmosphere.

8. REGULATIONS

FCC Compliance

WARNING:

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE:

This equipment has been tested and found to comply with limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio / TV technician for help.

EMC NOTICE

In industrial locations or in proximity to industrial power installations, this instrument might be affected by electromagnetic noise. Under such conditions, please test the instrument performance before use.

Model: Level Sensor LS-100D

Manufacturer

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 Address: 75-1, Hasunuma-cho, Itabashi-ku, Tokyo, 174-8580 JAPAN

Europe Representative

Name: Topcon Europe Positioning B.V.
 Representative Director: Jim Paetz
 Address: Essebaan 11, 2908 LJ Capelle a/d IJssel, The Netherlands



EU Battery Directive

This symbol is applicable to EU members states only.

Battery users must not dispose of batteries as unsorted general waste, but treat properly.

If a chemical symbol is printed beneath the symbol shown above, this chemical symbol means that the battery or accumulator contains a heavy metal at a certain concentration. This will be indicated as follows:

Hg: mercury(0.0005%), Cd: cadmium(0.002%), Pb: lead(0.004%)

These ingredients may be seriously hazardous to human and the global environment.