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LS-B20 machine receiver

Manufacturer documentation

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TOPCON

INSTRUCTION MANUAL

LASER SENSOR

LS-B20

Thank you for selecting Topcon product.

- The specifications and general appearance of the instrument, and the content of this manual are subject to change without notice.
- Some of the diagrams shown in this manual may be simplified for easier understanding.
- Always keep this manual in a convenient location and read it when necessary.
- Please read the Instruction manual of the paired instrument in conjunction with this manual.

PRECAUTIONS FOR SAFE OPERATION

For the safe use of the product and prevention of injury to operators and other persons as well as prevention of property damage, items which should be observed are indicated herein by an exclamation point within a triangle used with WARNING and CAUTION statements in this manual.
The definitions of the indications are listed below. Be sure you understand them before reading the manual's main text.

Definition of Indication

⚠ **WARNING**	Ignoring this indication and making an operation error could possibly result in death or serious injury to the operator.
⚠ **CAUTION**	Ignoring this indication and making an operation error could possibly result in personal injury or property damage.

△ This symbol indicates items for which caution (hazard warnings inclusive) is urged. Specific details are printed in or near the symbol.

⃠ This symbol indicates items which are prohibited. Specific details are printed in or near the symbol.

● This symbol indicates items which must always be performed. Specific details are printed in or near the symbol.

⚠ WARNING

	Do not perform disassembly or rebuilding. Fire, electric shock or burns could result.
	Do not use the unit 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.
	Do not use dry batteries other than those designated. An explosion could occur, or abnormal heat generated, leading to fire.
	Do not use the dry batteries if its terminals are wet. Resultant poor contact or shorting could lead to fire or burns.
	Keep the magnet parts of the instrument away from persons using a pacemaker or other electronic medical devices. Malfunction of medical equipment could result.
	Do not heat or throw dry batteries into fire. An explosion could occur, resulting in injury.
	To prevent shorting of the dry batteries in storage, apply insulating tape or equivalent to the terminals. Otherwise shorting could occur, resulting in fire or burns.

⚠ CAUTION

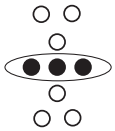
	Do not place fingers on the magnet parts of the instrument while mounting to equipment. Injury to fingers could result.
	Keep the magnet parts of the instrument away from any sensitive electronic devices or magnetic storage media such as computer disks. Malfunction of these devices or data corruption could result.
	Do not touch liquid leaking from dry batteries. Harmful chemicals could cause burns or blisters.

PRECAUTIONS

Before starting work or operation, be sure to check that the system is functioning properly.

- Remove the batteries from the instrument when you will not be using it for long period.
- Replace all 3 dry batteries with new ones at the same time. Do not mix used and new dry batteries, and do not mix different types of dry batteries together.
- Use alkaline dry batteries. Nickel hydrogen dry batteries and nickel cadmium dry batteries can be used too, but the operating time is different from the time of alkaline dry batteries.
- **Do not submerge the instrument in water.**
- Do not clean the instrument with a high pressure water stream. The inside of the instrument will be damaged.
- This instrument is designed based on the International Standard IPX 6, but it is not protected from a high pressure water stream or submergence.
- Radio waves can cause faulty operation of the instrument. Use care in the following locations.
  - Near an instrument emitting strong radio waves. (e.g. Transceiver)
  - Near radio wave towers such as television or radio.
- In addition to the laser beam emitted from the rotating laser, the laser sensor may be sensitive to smartphone screens, LED lamps, fluorescent lamps, construction safety light, and other modulated lights. In this case, turn off these modulated lights that may be the cause, or block them before performing measurement.
- Do not use the instrument near reflective objects (glass window, car windshield etc.) the laser sensor can malfunction. Block the laser beam in the direction of the reflective object.

  Examples of malfunctions:
  - The display shows "●●●" even though the location is not a datum position.
  - Errors occur for the datum position.
  - The display does not show "●●●" even though the location is a datum position.



- Be sure that the laser emitting window of the rotating laser, and the beam receiving window of the laser sensor are free from dirt (oil, water droplets, etc.). The measurement result may be in error if these windows are dirty.
- When the power is turned OFF, the indicator (LEDs) may light up for a second, but this is not a malfunction.
- **Exceptions from responsibility**
  - The manufacturer, or its representatives, assumes no responsibility for any damage, or loss of profits (change of data, loss of data, loss of profits, an interruption of business etc.) caused by use of the product or an unusable product.
  - The manufacturer, or its representatives, assumes no responsibility for any damage, or loss of profits caused by usage different to that explained in this manual.
  - The manufacturer, or its representatives, assumes no responsibility for consequential damage, or loss of profits due to heavy rain, strong wind, high-temperature and humidity, or storing or use of the product under unusual conditions.
  - Product failures caused by rebuilding are out of warranty.
  - Cautions and warnings included in this manual do not cover all the possible events.

STANDARD PACKAGE COMPONENTS

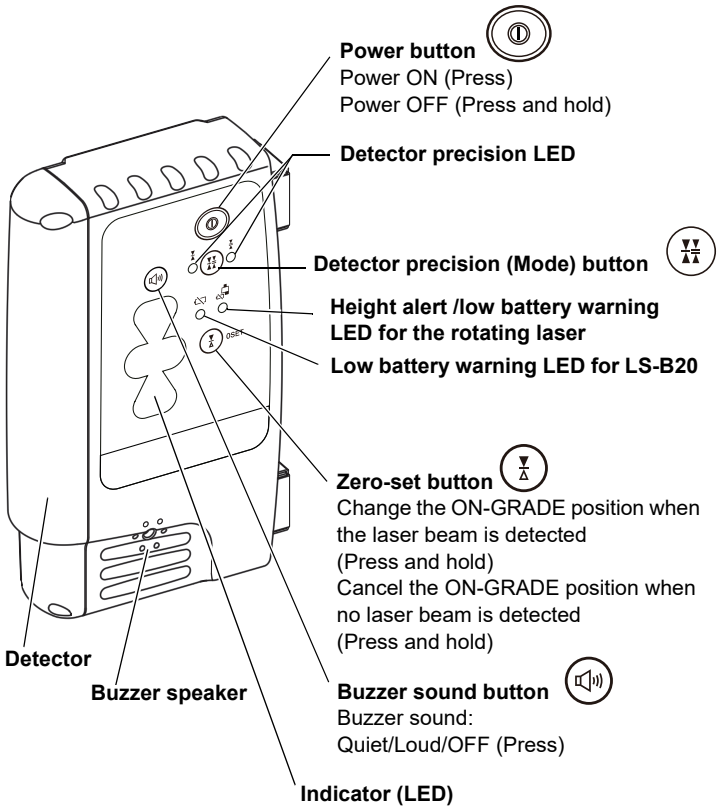
- LS-B20 Instrument..... 1 pc.
- Instruction manual ..... 1 pc.
- Export restrictions card (Be sure to read) ..... 1 pc.

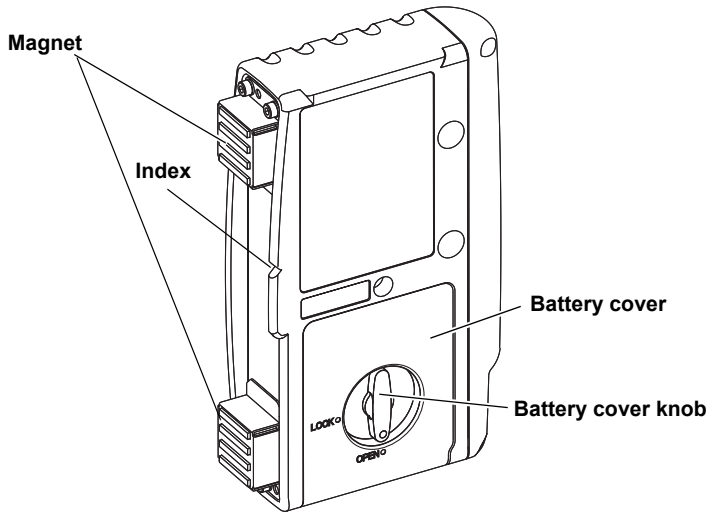
Dry batteries (3 x AA) are sold separately.

REPLACE THE DRY BATTERY

1 Open the battery cover by turning the battery cover knob to "OPEN".
2 Remove the old batteries and replace with new ones.

PARTS OF THE INSTRUMENT AND FUNCTIONS

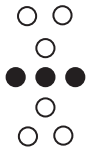




- Risk of damage to installation surface of machine, because it uses a strong magnet.
- See “Laser beam positions and display patterns” in the Instruction manual for the display area and display pattern.

OPERATION

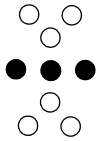
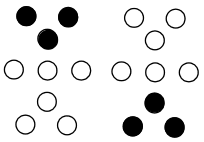
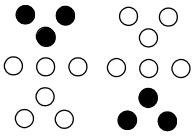
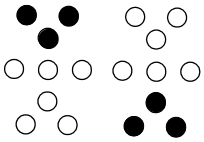
1 Position a rotating laser and turn on the power.
2 Raise or lower the machine blade or arm to position the cutting edge or bucket at the desired grade elevation.
3 Mount the LS-B20 onto the machine and turn on the power.
4 Keep the machine blade or arm motionless and raise or lower the LS-B20 and adjust until ON-GRADE position are flashing.This is the ON-GRADE position.
The reference position has been set.


ON-GRADE

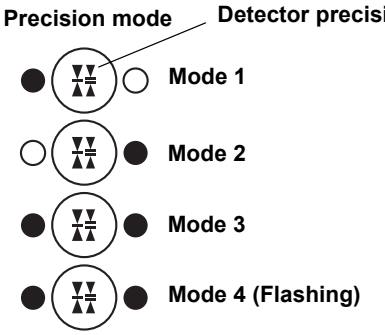
5 While operating, use the LED display to continually check grade, moving the blade or cutting/filling according to the direction of the LS-B20 display.

INDICATOR

Laser beam positions and display patterns

Indicator (LED)	Detector precision
	Mode 1: ±2 mm (0.08 in) Mode 2: ±6 mm (0.24 in) Mode 3: ±12 mm (0.47 in) Mode 4: ±30 mm (1.18 in)
 Flashing quickly	±35 mm (70 mm wide) (±1.38 in (2.75 in))
 Flashing slowly	±60 mm (120 mm wide) (± 2.36 in (4.72 in))
 Flashing more slowly	When the laser beam is off to the top or to the bottom

Change the detector precision (Mode)



It is possible to change the detector precision of the instrument.
Please select Mode 1 to 4 according to the objective of the operation.
(☞"Laser beam positions and display patterns")
Pressing the detector precision (Mode) button will change the mode and the corresponding LED lamp will light up/flash.

Battery remaining display for LS-B20



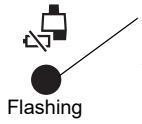
Low battery warning LED for LS-B20

Battery remaining for the LS-B20 will be displayed.

Flashing/Lit

Flashing: Low battery power. Sensor is still useable.
Lit: Dead battery. Replace the dry battery with new one.

Height alert display for the rotating laser



Height alert warning LED for the rotating laser

A flashing LED and a buzzer sound indicate the height alert function of the rotating laser is operating.
(This function is not usable to the rotating laser which does not have the height alert and the function to output alarm signal.)

Flashing



Flashing slowly

Low battery display for the rotating laser

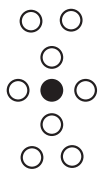


Low battery warning LED for the rotating laser

The LED flashes when the battery level of the rotating laser is low. (This function is not usable to the rotating laser which does not have the function to output alarm signal.)

Flashing

Power-save function



This instrument will enter the power-save mode when no operation is performed or no laser beam is received for approximately five minutes. The center LED (1 green) will flash, when in power-save mode. (Power-save mode will automatically turn off when a laser beam is received, or the power button is pressed.)

Flashing

Auto-cut off function

This instrument will automatically power off when no operation is performed or no laser beam is received for approximately 30 minutes after entering the power-save mode.
(Press the power button to turn on the instrument.)

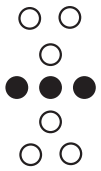
CHANGE THE ON-GRADE POSITION FUNCTION

The ON-GRADE position can be changed to the position where laser beam is detected. Using this function when installing the LS-B20 on the machine allows easy setting of the height at which the ON-GRADE will be displayed on the LS-B20. The range in which the ON-GRADE position can be changed is ±20 mm (0.79 in) (total of 40 mm (1.57 in)) from the center of the detector range.

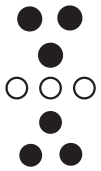
In order to set the ON-GRADE position at high precision, set it while the laser beam is stable. When setting the ON-GRADE position while the laser beam is unstable (when using at a long-distance - more than 150 m (492 ft) - or when atmospheric condition is unstable due to air shimmering or other conditions), the sensor will automatically detect it and the LED indicating the failure will be displayed while changing the ON-GRADE position.

Setting the ON-GRADE position change

1 Press and hold the zero-set button while detecting the laser beam.



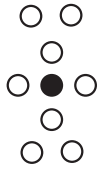
When setting the ON-GRADE position change, the center LEDs light up for three seconds, as shown in the figure. The current position where the laser beam is detected is the new ON-GRADE position.



Flashing

The LEDs flash as shown in the figure for three seconds when you have failed to change the ON-GRADE position. Be careful not to change the position at which the laser beam is detected and try setting once again.

The LED display when the ON-GRADE position change function is used

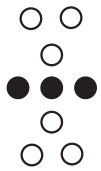


Flashing

The LED display indicating beam position and the center LED (1 green) flashes.

Canceling the ON-GRADE position change

1 Press and hold the zero-set button when no laser beam is detected. The ON-GRADE position will be canceled.



Flashing

When the ON-GRADE position change is canceled, the center LEDs (3 green) flash for three seconds.

RESET FUNCTION

While holding down the detector precision (Mode) button, the zero-set button, and the buzzer sound button, press the power button. The settings stored in the LS-B20 are reset to the factory settings.

Factory settings

Detector precision (Mode)	:	Mode 2
Buzzer sound	:	Quiet
ON-GRADE position	:	Center of detector range

SPECIFICATIONS

Detector range	:	120 mm (4.72 in) (The range in which the ON-GRADE position can be changed: 40 mm (1.57 in))
Detector angle	:	270°
Detector precision	:	Mode 1: ±2 mm (0.08 in) Mode 2: ±6 mm (0.24 in) Mode 3: ±12 mm (0.47 in) Mode 4: ±30 mm (1.18 in)
Detectable laser wave length	:	633 to 780 nm
Laser detecting range (diameter)	:	300 m (984 ft) (using RL-H5A Class3R/IIIa)
	:	700 m (2,297 ft) (using RL-200 1S/2S)
Power source	:	3 x AA size dry batteries (sold separately)
Continuous operating time (20 °C/68 °F)	:	Approximately 100 hours (using alkaline dry batteries)
Operating temperature	:	-20 to 50 °C (-4 to 122 °F)
Dust and water resistance	:	IP66 (Based on the standard IEC60529)
Size (W x D x H)	:	111 x 36 x 177 mm (4.37 x 1.41 x 6.96 in)
Weight	:	0.55 kg (1.22 lb) (without dry batteries)

- Detector angle, Detector precision and Laser detecting range will vary depending on rotating laser being used and atmospheric conditions.

REGULATIONS

[U.S.A.] FCC Compliance (FCC-Class B)

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.

[California, U.S.A.] Proposition65

⚠ WARNING:
This product can expose you to chemicals including Lead, which is known to the State of California to cause birth defects or other reproductive harm.
For more information go to www.P65Warnings.ca.gov.

[Canada] ICES (ICES-Class B)

This class B digital apparatus meets all requirements of Canadian interference-Causing Equipment Regulations.
Cet appareil numérique de la class B respecte toutes les exigences du Réglement sur le matérique brouilleur du Canada.

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numerique de la Class B est conforme a la norme NMB-003 du Canada.

[EU/UK] EMC NOTICE (EMC-Class B)

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.

Declaration of conformity is available depending on your request. Contact your local dealer.

Manufacturer
Name: TOPCON CORPORATION
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UK Importer
Name: Topcon Positioning (Great Britain) Ltd.
Address: Unit 2 Sandy Hill Park, Sandy Way, Tamworth, Staffordshire B77 4DU U.K.

[EU] WEEE Directive
[UK] The Waste Electrical and Electronic Equipment Regulations



The use of the symbol indicates that this product may not be treated as household waste. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about the take-back and recycling of this product, please contact your supplier where you purchased the product or consult.

[EU] EU Battery Directive
[UK] The Waste Batteries and Accumulators Regulations 2009



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.

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Please see the following website for contact addresses.
GLOBAL GATEWAY https://global.topcon.com

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