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LS-B200 machine receiver

Manufacturer documentation

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TOPCON

INSTRUCTION MANUAL

LASER SENSOR

LS-B200

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

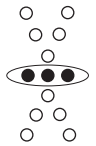
⃠	Do not perform disassembly or rebuilding. Fire, electric shock or burns could result.
⃠	Risk of fire or electric shock. Do not use damaged power cable, plug and socket.
⃠	Do not use the unit in areas exposed to high amounts of dust or ash, in areas where there is inadequate ventilation, or near combustible 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.
⃠	Do not use within the vicinity of hospitals. Malfunction of medical equipment could result.
⃠	Do not use onboard aircraft. The aircraft instrumentation may malfunction as a result.
⃠	Do not use within the vicinity of automatic doors, fire alarms and other devices with automatic controls as the electromagnetic waves produced may adversely affect operation resulting in an accident.
⃠	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.
●	Use the instrument at a distance of at least 22 cm (8 1/2") from anyone with a cardiac pacemaker. Otherwise, the pacemaker may be adversely affected by the electromagnetic waves produced and cease to operate as normal.

⚠ CAUTION

⃠	Do not touch liquid leaking from dry batteries. Harmful chemicals could cause burns or blisters.
⃠	Battery can cause explosion or injury. Remove battery when using the connector for external power supply.

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 4 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.
- Be sure to charge the battery within the charging temperature range. Charging temperature range: 10 to 40 °C (50 to 104 °F)
- Battery is an expendable item. The decline in retained capacity depending on the repeated charging/discharging cycle is out of warranty.
- 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.
- 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-B200 Instrument.....1 pc.
- Carrying case.....1 pc.
- Instruction manual.....1 pc.
- Export restrictions card (Be sure to read) .....1 pc.

Dry battery type*
- Battery holder DB-83A .....1 pc.
  Dry batteries (4 × C) are sold separately.

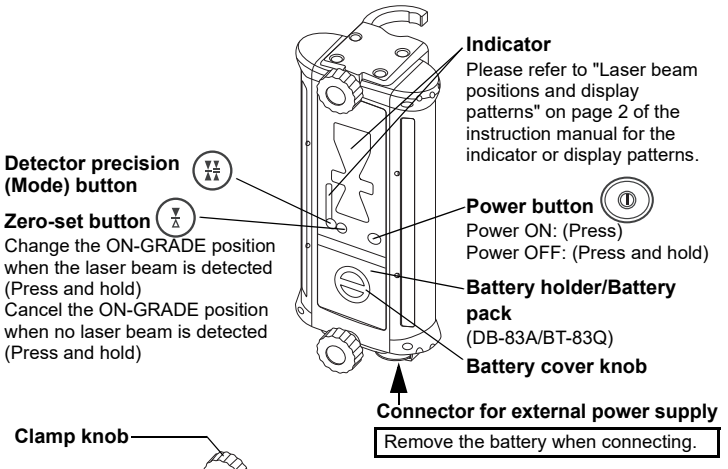
* In some destinations, a rechargeable battery is already set in the main unit.

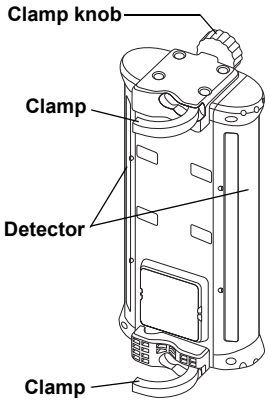
Rechargeable battery type (Optional accessories)
- Ni-MH battery pack BT-83Q.....1 pc.
- AC/DC converter AD-11 .....1 pc.

Ni-MH
CONTAINS Ni-MH BATTERY.
MUST BE RECYCLED OR DISPOSED OF PROPERLY.

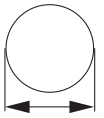
Before recycling or disposing of rechargeable batteries
Take the following measures to prevent smoke or fire caused by a short circuit in rechargeable batteries.
- Insert the rechargeable batteries into the instrument and use them up completely.
- Insulate the terminals of rechargeable batteries with tape or similar material.

PARTS OF THE INSTRUMENT AND FUNCTIONS





Poles that can be installed onto the LS-B200 are as described below.



Shape: Cylindrical
Dimension: 45 to 51 mm (1.78 to 2 in) in diameter

Please refer to the instruction manual for the machine or contact the machine manufacturer for instructions on installing the pole onto the machine (by welding, etc.).

REPLACE THE BATTERY

Dry battery

1 Remove the DB-83A battery holder by turning the battery cover knob.

2 Remove the old batteries and replace with new ones.

Rechargeable battery

1 Remove the BT-83Q by turning the battery cover knob.

2 Attach the charged BT-83Q to the LS-B200.

3 Attach the battery cover by turning the battery cover knob.

- Batteries generate power using a chemical reaction and as a result have a limited lifetime. Even when in storage and not used for long periods, battery capacity deteriorates with the passage of time. This may result in the operating time of the battery shortening despite having been charged correctly. In this event, a new battery is required.

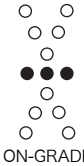
OPERATION

1 Position a rotating laser and turn on the laser.

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-B200 onto the pole near the path of the laser beam and turn on the LS-B200.

4 Keep the machine blade or arm motionless and raise or lower the LS-B200 and adjust until ON-GRADE position are flashing. This is the ON-GRADE position.



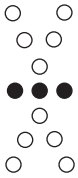
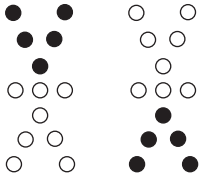
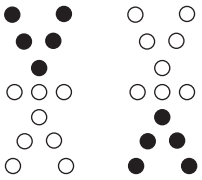
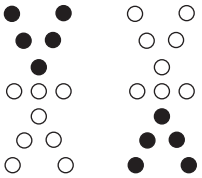
5 Securely clamp the LS-B200 in place. The reference position has been set.

6 While operating, use the LED display to continually check grade, moving the blade or cutting/filling according to the direction of the LS-B200 display.

- Do not compact soil by bumping it with the bucket of a hydraulic excavator while the instrument is attached. Excessive impact on the instrument and dry batteries may cause malfunction. When performing an operation that involves excessive impact, remove the instrument if it is not needed.

INDICATOR

Laser beam positions and display patterns

Indicator (LED)	Detector precision
	Mode 1: ±3 mm (0.12 in) Mode 2: ±6 mm (0.24 in) Mode 3: ±15 mm (0.59 in) Mode 4: ±30 mm (1.18 in)
 Flashing quickly	±50 mm (100 mm wide) (±1.97 in (3.94 in wide))
 Flashing slowly	±87.5 mm (175 mm wide) (±3.45 in (6.89 in wide))
 Flashing more slowly	When the laser beam is off to the top or to the bottom

Changing the detector precision (Mode)

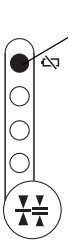
Precision mode



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.
(During battery remaining display shown below, the lamp will flash.)

Detector precision (Mode) button

Battery remaining display for LS-B200



Low battery warning LED for LS-B200

Battery remaining for the LS-B200 will be displayed at 3 levels.

Unlit:
Battery is sufficient. (When Mode 1 is selected, the lamp will light up.)

Flashing slowly:
Low battery power. Sensor is still usable.

Flashing quickly:
Dead battery. Replace the dry battery with new one or recharge the battery (BT-83Q Optional accessories).

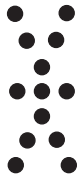
Low battery display for the rotating laser



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.)

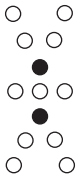
Height alert display for the rotating laser



Flashing

A flashing LED indicates 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.)

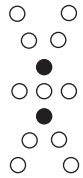
Power-save function (Effective only when using the internal battery)



Flashing

This instrument will enter the power-save mode when no operation is performed or no laser beam is received for approximately five minutes. The two LEDs (1 yellow and 1 red) 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.)
To disable the power-save function, press the power button for at least five seconds to turn the power on. When the function is disabled, the LEDs shown in the figure will flash twice.

Auto-cut off function (Effective only when using the internal battery)



Flashing

This instrument will automatically power off when no operation is performed or no laser beam is received for approximately 60 minutes. (Press the power button to turn on the instrument.)
To disable the auto-cut off function, press the power button for at least five seconds to turn the power on. When the function is disabled, the LEDs shown in the figure will flash twice.

Note

- The power-save function and auto-cut off function may not work as expected due to light* other than the laser beam emitted from the rotating laser.
  * Ambient light at a level that does not affect operations

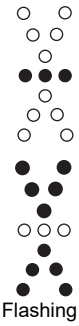
LED brightness adjustment function
(Effective only when using the internal battery)
This instrument detects the ambient brightness and automatically adjusts the LED brightness (high/low). If you want to keep the LED brightness high, press the power button while holding down the detector precision (Mode) button.

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-B200 on the pole of the machine allows easy setting of the height at which the ON-GRADE will be displayed on the LS-B200. The range in which the ON-GRADE position can be changed is ±50 mm (1.97 in) (total of 100 mm (3.94 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

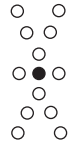


Flashing

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.

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.

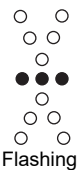
The LED display when the ON-GRADE position change function is used



Flashing quickly

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

Canceling the ON-GRADE position change



Flashing

1 When no laser beam is detected and all LEDs of the indicator are unlit, press and hold the zero-set button. The ON-GRADE position will be canceled. When the ON-GRADE position change is canceled, the center LEDs (3 green) flash for three seconds.

CONNECTOR FOR EXTERNAL POWER SUPPLY

Connecting the power cable PC-18 (sold separately) to the connector will enable the use of the LS-B200 from an external power supply.
The LS-B200 will turn on when connection is made to external power supply. The power button of the instrument will not function when an external power supply is used.
When the instrument is operated with the external power supply, the power-save and the auto-cut off functions will be invalidated.

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.

Means of conformity
This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines. This equipment has very low levels of RF energy that is deemed to comply without maximum permissive exposure evaluation (MPE). But it is desirable that it should be installed and operated keeping the radiator at least 20 cm (7.87 in) or more away from person's body.

[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.

[California and NY, U.S.A.] Recycling Batteries

DON'T THROW AWAY RECHARGEABLE BATTERIES, RECYCLE THEM.

Topcon Positioning Systems Inc., United States Return Process for UsedRechargeable Nickel Metal Hydride, Nickel Cadmium, Small Sealed Lead Acid, and Lithium Ion, Batteries

In the United States Topcon Positioning Systems Inc., has established a process by which Topcon customers may return used rechargeable Nickel Metal Hydride(Ni-MH), Nickel Cadmium(Ni-Cd), Small Sealed Lead Acid(Pb), and Lithium Ion(Li-ion) batteries to Topcon for proper recycling and disposal. Only Topcon batteries will be accepted in this process.

Proper shipping requires that batteries or battery packs must be intact and show no signs of leaking. The metal terminals on the individual batteries must be covered with tape to prevent short circuiting and heat buildup or batteries can be placed in individual plastic bag. Battery packs should not be dissembled prior to return.

Topcon customers are responsible for complying with all federal, state, and local regulations pertaining to packing, labeling, and shipping of batteries. Packages must include a completed return address, be prepaid by the shipper, and travel by surface mode. **Under no circumstance should used/recyclable batteries by shipped by air.**

Failure to comply with the above requirements will result in the rejection of the package at the shipper's expense.

Please remit packages to: Topcon Positioning Systems, Inc.
C/O Battery Return Dept. 150
7400 National Dr.
Livermore, CA 94551

DON'T THROW AWAY RECHARGEABLE BATTERIES, RECYCLE THEM.

[Canada] ICES (ICES-Class B)

This class B digital apparatus meets all requirements of Canadian interference-Causing Equipment Regulations.
Cet appareil numerique de la class B respecte toutes les exigences du Reglement sur le materique 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.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment and meets the RSS-102 of the IC radio frequency (RF) Exposure Guidelines. This equipment has very low levels of RF energy that is deemed to comply without maximum permissive exposure evaluation (MPE). But it is desirable that it should be installed and operated keeping the radiator at least 20 cm (7.87 in) or more away from person's body.

[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.

This product complies with the electromagnetic environmental testing of industrial locations.

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

Manufacturer

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

Europe Representative and Importer

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

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.

SPECIFICATIONS

Detector range	:	175 mm (6.89 in) (the range in which the ON-GRADE position can be changed: 100 mm (3.94 in))
Detector angle	:	360°
Detector precision	:	Mode 1: ±3 mm (0.12 in)
	:	Mode 2: ±6 mm (0.24 in)
	:	Mode 3: ±15 mm (0.59 in)
	:	Mode 4: ±30 mm (1.18 in)
Detectable laser wave length	:	633 to 785 nm
Laser detecting range (diameter)	:	800 m (2,625 ft) (using RL-200 1S/2S)
Minimum laser detecting range	:	5 m (16 ft) (using RL-200 1S/2S)
Internal battery	:	4 × C size dry batteries (sold separately)
	:	Battery pack BT-83Q (sold separately)
External power supply	:	DC 10 to 30 V
Continuous operating time (at 20 °C/68 °F)	:	More than 100 hours (using alkaline dry batteries)
	:	More than 50 hours (using Battery pack BT-83Q)
Operating temperature	:	-20 to 50 °C (-4 to 122 °F)
Water proof	:	IP66 (based on the standard IEC60529)
Dimensions (W × D × H)	:	158 × 166 × 357 mm (6.22 × 6.54 × 14.05 in) (with Mechanical Clamp)
Weight	:	2.2 kg (4.8 lb) (without dry batteries)

- Detector angle, Detector precision and Laser detecting range will vary depending on rotating laser being used and atmospheric conditions.
- Battery using time will vary depending on environmental conditions and operations done with LS-B200.

TOPCON CORPORATION (Manufacturer)

75-1 Hasunuma-cho, Itabashi-ku, Tokyo 174-8580, Japan **https://www.topcon.co.jp**

Please see the following website for contact addresses.

GLOBAL GATEWAY https://global.topcon.com

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