TOPCON

INSTRUCTION MANUAL
ROTATING LASER
RL-H4C

Class 3R Laser Product

- Please read this operator's manual carefully before using this product.
- Verify that all equipment is included.

☞ "STANDARD EQUIPMENT"

- 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.

STANDARD EQUIPMENT

Make sure all of the following are included.

Rechargeable battery type

1	RL-H4C Instrument	1pc.
2	Level Sensor (LS-80L)	1pc.
3	Battery holder DB-74C	1pc.
4	Ni-MH battery pack BT-74Q	1set
5	AC/DC converter AD-15	1pc.
6	AA-size dry cell batteries*1)	2pcs.
7	Model-6 Level Sensor Holder	1pc.
8	Carrying case	1pc.
9	Instruction manual	1vol.

Dry battery type

1	RL-H4C Instrument	1pc.
2	Level Sensor (LS-80L)	1pc.
3	Battery holder DB-74	1pc.
4	D-size dry cell batteries*2)	4pcs.
5	AA-size dry cell batteries*3)	2pcs.
6	Model-6 Level Sensor Holder	1pc.
7	Carrying case	1pc.
8	Instruction manual	1vol.

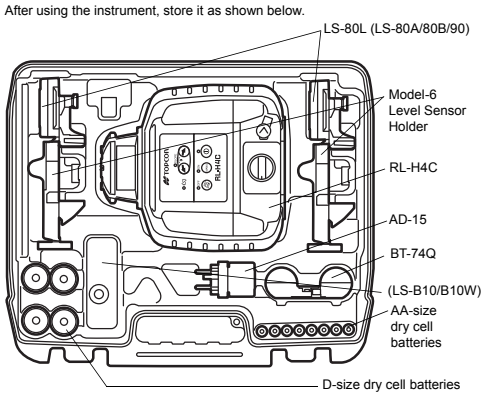
*1), 2), 3)
Batteries included in the package are to confirm the initial operation. Please replace the batteries provided with new batteries (alkaline) as soon as possible.

EXCEPTIONS FROM RESPONSIBILITY

- The user of this product is expected to follow all operating instructions and make periodic checks of the product's performance.
- The manufacturer, or its representatives, assumes no responsibility for results of faulty or intentional usage or misuse including any direct, indirect, consequential damage, or loss of profits.
- The manufacturer, or its representatives, assumes no responsibility for consequential damage, or loss of profits due to any natural disaster, (earthquake, storms, floods etc.), fire, accident, or an act of a third party and/or usage under unusual conditions.
- The manufacturer, or its representatives, assumes no responsibility for any damage (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, and loss of profits caused by usage different to that explained in the operator's manual.
- The manufacturer, or its representatives, assumes no responsibility for damage caused by incorrect operation, or action resulting from connecting to other products.

HOW TO STORE

After using the instrument, store it as shown below.



- It is possible to store LS-80A/80B/90 and LS-B10/B10W. (LS-70 cannot be stored.)
- Any other holder except the holder model 6 cannot be stored.

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 by an exclamation point within a triangle used with WARNING and CAUTION statements in this operator's 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 minor injury or property damage.

Definition of Symbols

△	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.

▶General

⚠WARNING

- 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 perform disassembly or rebuilding. Fire, electric shock, burns or hazardous radiation exposure could result.
- When securing the instrument in the carrying case make sure that all catches, including the side catches, are closed. Failure to do so could result in the instrument falling out while being carried, causing injury.

⚠CAUTION

- Do not use the carrying case as a footstool. The case is slippery and unstable so a person could slip and fall off it.
- Do not place the instrument in a case with a damaged catch or handle. The case or instrument could be dropped and cause injury.

▶Tripod

⚠CAUTION

- When mounting the instrument to the tripod, tighten the centering screw securely. Failure to tighten the screw properly could result in the instrument falling off the tripod, causing injury.

⚠CAUTION

- Tighten securely the leg fixing screws of the tripod on which the instrument is mounted. Failure to tighten the screws could result in the tripod collapsing, causing injury.
- Do not carry the tripod with the tripod shoes pointed at other persons. A person could be injured if struck by the tripod shoes.
- Keep hands and feet away from the tripod shoes when fixing the tripod in the ground. A hand or foot stab wound could result.
- Tighten the leg fixing screws securely before carrying the tripod. Failure to tighten the screws could lead to the tripod legs extending, causing injury.

▶Power Supply

⚠WARNING

- Do not use voltage other than the specified power supply voltage. Fire or electrical shock could result.
- Do not short circuit. Heat or ignition could result.
- Do not use damaged power cords, plugs or loose outlets. Fire or electric shock could result.
- Do not place articles such as clothing on the battery charger while charging batteries. Sparks could be induced, leading to fire.
- To prevent shorting of the battery in storage, apply insulating tape or equivalent to the terminals. Otherwise shorting could occur, resulting in fire or burns.
- Do not use batteries or the battery charger if wet. Resultant shorting could lead to fire or burns.
- Do not connect or disconnect power supply plugs with wet hands. Electric shock could result.
- Do not use the battery or charger for any other equipment or purpose. Fire or burns caused by ignition could result.
- Use only the specified battery charger to recharge batteries. Other chargers may be of different voltage rating or polarity, causing sparking which could lead to fire or burns.
- Do not use batteries other than those designated. An explosion could occur, or abnormal heat generated, leading to fire.
- Do not heat or throw batteries into fire. An explosion could occur, resulting in injury.

⚠CAUTION

- Do not touch liquid leaking from batteries. Harmful chemicals could cause burns or blisters.

PRECAUTIONS

Before starting work or during operation, check that the instrument is functioning correctly and performance is normal.

STORAGE PRECAUTIONS

Always clean the instrument after use.
Use a clean cloth moistened with neutral detergent or water.
Never use an abrasive cleaner, ether, thinner, benzene, or other solvents.
Always make sure the instrument is completely dry before storing. Dry any moisture with a soft, clean cloth.

PRECAUTIONS REGARDING LONG-TERM STORAGE

Remove batteries before storing when the instrument will not be used for periods on 1 month or more.Batteries may leak fluid when left inside the instrument causing malfunction.

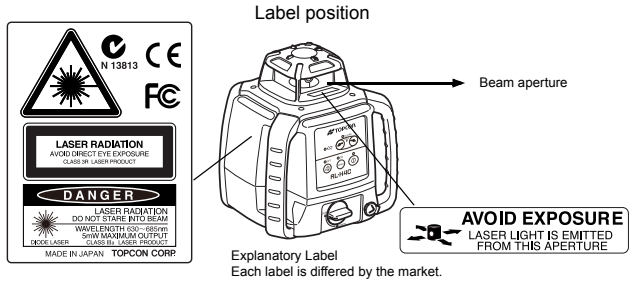
LASER SAFETY INFORMATION

The RL-H4C is classified as a class 3R Laser Product according to IEC Standard Publication 60825-1 Ed.2.0: 2007 and United States Government Code of Federal Regulation FDA CDRH 21CFR Part1040.10 and 1040.11 (Complies with FDA performance standards for laser products except for deviations pursuant to Laser Notice No.50, dated June 24, 2007.)

⚠WARNING

- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- Follow the safety instructions on the labels attached to the instrument as well as in this manual to ensure safe use of this laser product.

Label position



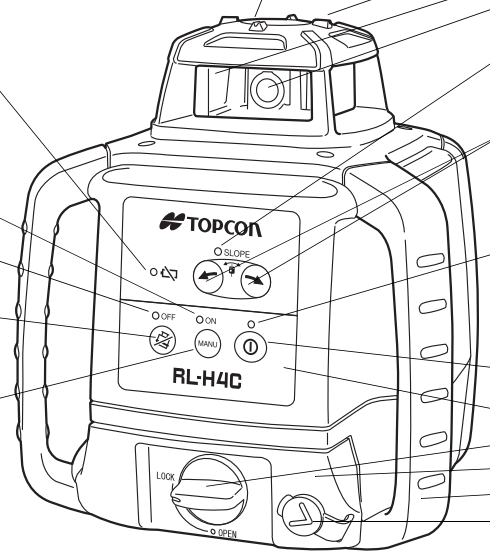
Explanatory Label
Each label is differed by the market.

- Do not look directly into the laser beam. Doing so could cause permanent eye damage.
- Do not stare at the laser beam. Doing so could cause permanent eye damage.
- If an eye injury is caused by exposure to the laser beam, seek immediate medical attention from a licensed ophthalmologist.

⚠CAUTION

- Perform checks at start of work and periodic checks and adjustments with the laser beam emitted under normal conditions.
- When the instrument is not being used, turn off the power.
- When disposing of the instrument, destroy the battery connector so that the laser beam cannot be emitted.
- Operate the instrument with due caution to avoid injuries that may be caused by the laser beam unintentionally striking a person in the eye. Avoid setting the instrument at heights at which the path of the laser beam may strike pedestrians or drivers at head height.

NOMENCLATURE AND FUNCTIONS



RL-H4C

Battery power lamp (Red)
Blinking:
The power is low, but laser is still usable. (Blinking continues for one minute.)
On Solid:
Dead batteries. Replace the batteries with new ones. (The lamp is solid for five minutes, then turned off automatically.)

Manual mode ON lamp (Red)
Auto leveling does not function.

Height alert OFF lamp (Red)
Height alert function is not active.

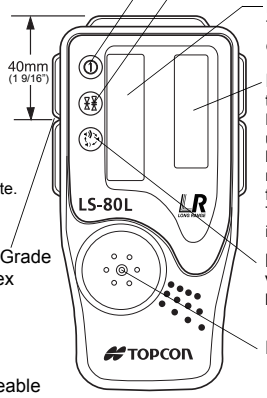
Height alert OFF key
OFF: Push twice continuously.
ON: Push once.
☞ Height alert function (Refer to the description on the back page.)

Manual mode ON key
ON: Push twice continuously.
OFF: Push once.

Note:
In manual mode
- Auto-leveling function is not active.
- Height alert function is not active.
- Setting slope function is not active.

Sight
Protective glass
Rotary head
Laser beam emits from here.
Slope lamp (Green)
Red: Error
☞ Aligning Direction of Slope (Refer to the description on the back page.)
Slope key
Tilts beam plane in direction of arrow
This key does not function during auto leveling and in the "Manual" mode.
☞ Aligning Direction of Slope (Refer to the description on the back page.)
Auto leveling lamp (Green)
Blinking quickly : Auto leveling is in process.
☞ Auto leveling function (Refer to the description below.)
Blinking slowly : Auto leveling is almost complete.
On Solid : Auto leveling is complete.
Power switch
Turn the instrument ON or OFF.
Control panel
Battery holder knob
Battery holder
Handle
Charging connector (only in the rechargeable battery type)
with cap

Auto leveling function
When the power is turned on, the laser beam is automatically positioned within the accuracy range by the auto leveling function.



On-Grade Index

LS-80L
(Level Sensor)

Power switch
The power switch turns ON or OFF by pressing.

On-Grade precision switch
Two on-grade precision options are available, normal precision (±2mm) and high precision (±1mm). By pressing this switch, the precision options are switched alternately. Confirm the precision choice by the indicator. (Normal precision is the default setting each time the sensor is turned on.)

Beam receiving window
Turn the beam receiving window side towards RL-H4C to detect the laser beam.

Indicator ☞ LS-80L Indicator (Refer to the description on the back page.)
Detect the on-grade position "---" by moving the level sensor up and down. Directional arrows and audio signals assist in locating the on-grade position as the laser strikes the beam receiving window. (Top of level sensor is 40mm (1 9/16") from on-grade index for offset marking.)
The indicators are located on front and back sides of the instrument.

Buzzer sound switch
Volume of the sensor buzzer can be alternately switched to LOW/LOUD/OFF by pressing the switch.

Buzzer speaker

- Auto-cut off function
  The power will be turned off automatically if no laser beam is detected for approximately 30 minutes. (To turn on the level sensor, press the power switch again.)

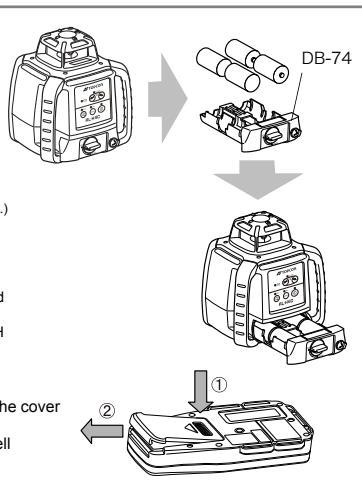
MAINTAINING POWER SOURCES

RL-H4C (Replacing dry cell batteries)

1 Remove the DB-74 battery holder by turning battery holder knob to "OPEN" side.
2 Install the new 4xD size dry cell batteries (alkaline) referring to the illustration on the battery holder.*1), 2), 3)
3 Install the battery holder. Tighten the battery cover knob to "LOCK" side.

*1 Replace all 4 batteries with new ones at the same time. Do not mix used and new batteries, and do not mix different types of batteries together.
*2 Use alkaline dry cells. (Dry cells for movement confirmation are packed in shipment.) Nickel hydrogen dry cells and nickel cadmium dry cells can be used too, but the operating time is different from the time of alkaline dry cells.
*3 Generally, performances of dry cell deteriorate temporarily in low temperature, but recover in normal temperature.

- It is possible to remove the dry cell batteries from the DB-74 battery holder and use the battery pack BT-74Q.
- The DB-74 dry cell battery holder cannot be used to charge the BT-74Q Ni-MH battery pack. Use the DB-74C charging battery holder instead.



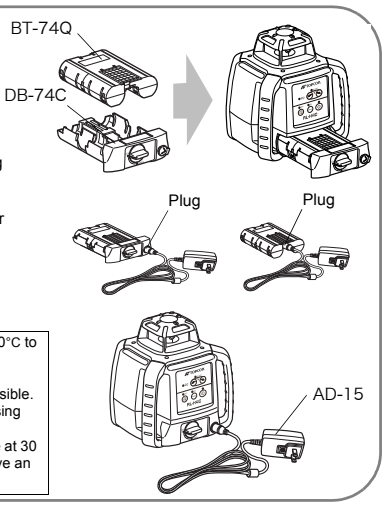
LS-80L Replacing Battery

1 Keep pushing the battery cover in 1 direction, and then try to slide the cover in 2 direction.The cover does not move but it will be open.
2 Take out the battery and place a new one (2xAA size alkaline dry cell batteries) into the battery box.
3 Press the lid down and click to close.

RL-H4C (Rechargeable battery pack)

1 Insert the battery pack BT-74Q into the DB-74C battery holder.
2 Install the battery holder. Tighten the battery cover knob to "LOCK" side.

- It is possible to remove the battery pack BT-74Q from the DB-74C battery holder and use the dry cell batteries.



For Charging

1 Plug the AC/DC converter (AD-15) into the DB-74C battery holder or plug the AD-15 into the battery pack BT-74Q.
2 Insert the AD-15 power cord in an outlet.
3 Complete charging by unplugging the plug from the DB-74C battery holder or battery pack BT-74Q after approximately 13 hours.
4 Unplug the AD-15 power cord from the outlet.

RUN charge

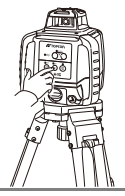
As illustrated at the right, while charging is in process with the power supply unit installed to the instrument, you can use the instrument.

- Recharging should take place in a room with an ambient temperature range of 10°C to 40°C (50°F to 104°F).
- Do not perform charging with others except the AC/DC converter AD-15.
- For longer battery life, conform to the suggested charging time to the extent possible.
- The battery source will discharge when stored and should be checked before using with instrument.
- Be sure to charge stored battery source every 3 or 6 months and store in a place at 30 C or below. If you allow the battery to become completely discharged, it will have an effect on future charging.

OPERATION

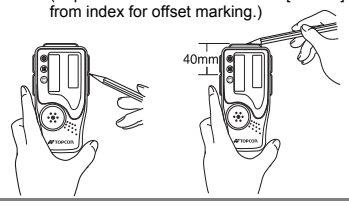
How To Operate

1 Set the instrument to the tripod or smooth surface.
2 Make sure instrument is roughly level.
3 Press power switch (ON).



4 Press power switch on level sensor (ON).
5 Select the precision mode by pressing the On-Grade precision switch.

6 Locate the on-grade position "---" by moving the level sensor up and down.
7 Mark the position of On-Grade index. (Top of the level sensor is 40mm [1 9/16"] from index for offset marking.)

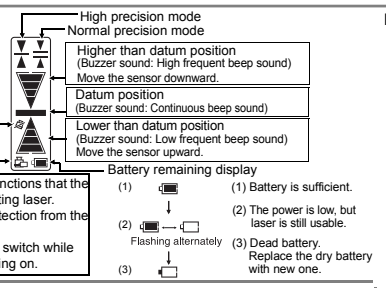


LS-80L Indicator

Height alert warning of rotating laser*1
A flash and a buzzer sound signifies that the height alert function of rotating laser is operating.

Rotating laser battery warning*2
A flash shows that the rotating laser power is low.

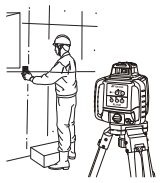
Note: The warning displays *1 and *2 are the functions that the level sensor detects alarm signal from the rotating laser.
The level sensor can be canceled the alarm detection from the rotating laser.
To be canceled the detection; Press the power switch while pressing the buzzer sound switch when powering on.



Detective Range

Display	Precision LS-80L
	High ±1mm (2mm width)
	Normal ±2mm (4mm width)
	±5mm (10mm width)
	±10mm (20mm width)
	±15mm (30mm width)
	more than ±15mm (more than 30mm width)
	Level sensor is moved upward or downward from laser beam.

Example Operational

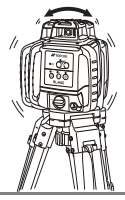


Height Alert Function

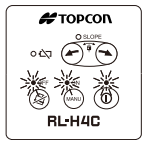
When the instrument system detects a shock, this function informs the operator of it.

- When the instrument's installation status (height) is sharply changed by the contact of the operator or the like, this function stops auto leveling to keep the operation accuracy and informs the operator of the situation. The three lamps blink at the same time as shown at the right.
- After 1 minute has passed since the auto leveling function was activated and the laser beam was emitted, this function works.
- The height alert function does not work in the "Manual" mode.

Shock is given to the instrument.



Height alert status



The three lamps blink at the same time and the rotary head rotates at low speed.

[How to reset]

1 Turn off the power switch.
2 Check whether the instrument is installed correctly.
3 Turn on the power switch. Auto leveling starts again. After auto leveling is finished, the laser beam is emitted.
4 Make sure that the laser beam is set at the correct height. Then, restart the operation.

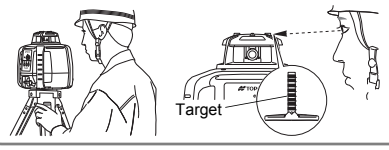
Aligning Direction of Slope

It is possible to set slope only in the X axis direction (refer to "CHECKS AND ADJUSTMENTS").

[1. Installation of the instrument]

When using the laser to set the slope, the laser must be properly aligned so the slope axis of the laser beam is parallel to the desired direction of slope.
The sight on top of the instrument is calibrated to the slope axis of the laser beam. Follow the steps below to align the laser to the desired direction of slope:

1 Establish a target line parallel to desired direction of slope.
2 Set up the laser over this line (drop a plumb bob from the tripod mounting screw).
3 Rough align the instrument to the direction of slope. Make sure it is properly oriented for the slope to be set.
4 Using the sight, position the instrument so the sight is centered on the target. (see illustration at right)



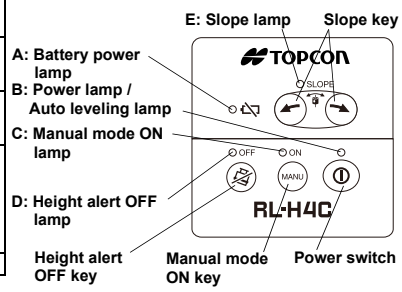
[2. Setting slope]

Operating procedure (Setting slope)	Key operation	Lamp display (Refer to the right illustration)
1 Press **Power switch** ON. You can set the slope after auto-leveling is completed.	**Power switch**	During auto-leveling : Lamp B (Green) blinks. After auto-leveling is completed. : Lamp B (Green) lights.
2 Press one of **Slope keys** once. The laser beam keeps sloping in the direction of the pressed key.	After auto-leveling is completed. **Slope key**	Lamp E (Green) blinks quickly.
3 Press the **Slope key** again. The laser beam stops sloping. (Unless you press the Slope key again, the laser beam is set horizontally.)	**Slope key**	Lamp E (Green) lights.
4 Press the **Slope key** to adjust the slope. How long you press the **Slope key** can change the laser beam sloping speed. The blinking speed of the lamp provides a visual indication of the beam movement speed.	**Slope key**	When Slope key is not pressed : Lamp E (Green) lights. Slope key / Lamp E (green) / Beam movement Press for a shorter time : Blinks slowly : Moves slowly ↓ ↓ ↓ Press for a longer time : Blinks quickly : Moves quickly
5 Press **Power switch** OFF to cancel the slope setting.	**Power switch**	All lamps are OFF.

How to set the slope before the power is OFF again

1 To set the slope before the power is OFF again, turn on the **Power switch** as pressing either right or left of the **Slope keys**. The slope is kept and you can adjust the slope in the same way as Step 4.
(When the **Power switch** is ON without the **Slope key** pressed, the laser beam will return to level.)

Lamp Position



- When you set the "Manual" mode to ON after setting the slope, the beam is fixed at the set slope position. At this time the Slope key does not function.
  For information about Manual mode ON/OFF, refer to "NOMENCLATURE AND FUNCTIONS".
- Check the beam often during slope use for slope accuracy. Check instrument calibration periodically.

CHECKS AND ADJUSTMENTS

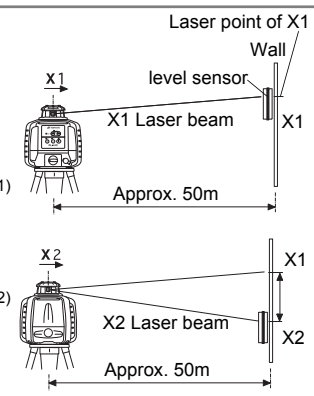
1 Checking and adjusting calibration

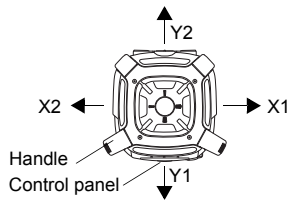
Horizontal calibration of the laser beam can be checked by the user.

[Checking]

1 Set up a tripod approx. 50m (160ft) from a wall. Mount the instrument on the tripod, facing the X1 side toward the wall.
2 Turn the instrument on and allow auto-leveling to complete.
3 Put the level sensor in fine detection mode by pressing the On-Grade precision switch.
4 By using the level sensor, mark the center position of laser beam on the wall. (X1)
5 Turn off the instrument.
Loosen the tripod screw, rotate the instrument 180 degrees and re-secure it on the tripod. The X2 side of the instrument faces toward the wall.
When rotating the instrument, avoid changing the height.
6 Turn the unit on again and allow auto-leveling to complete.
7 By using the level sensor, mark the center position of laser beam on the wall. (X2)
8 If the difference value of marked two laser beam heights (difference value of X1 and X2) are less than 5mm, adjustments are not needed.
The difference value is greater than 5mm, adjust the instrument as described in right.*
9 Check the Y side as the same way.

* If the difference value is greater than 40mm (±90"), it exceeds the adjustment range. Please contact your Topcon dealer.





[To calibrate the X axis]

1 Face the X1 side of the instrument toward a wall, press the Power switch while pressing the height alert OFF key. Then the height alert OFF lamp will light, and manual mode ON lamp will blink. (X axis is selected.)
2 Press the height alert OFF key to calibrate the X axis. The manual mode ON lamp will light. When auto-leveling finishes, the laser beam will emit.
3 Using the level sensor, mark the on-grade height of laser beam on a wall.
4 Rotate the instrument 180 degrees to face X2 side toward a wall.
5 In the same way as step 3, mark the on-grade height of laser beam on a wall.
6 Press the slope key to make adjustment so that the laser beam height may be at the center between the positions of Step 3 and Step 5.
7 Press the height alert OFF key to memorize the new laser beam calibration. The height alert OFF lamp will blink. Power will shut off automatically when the calibration memorization is complete.
The X axis adjustment is completed now.

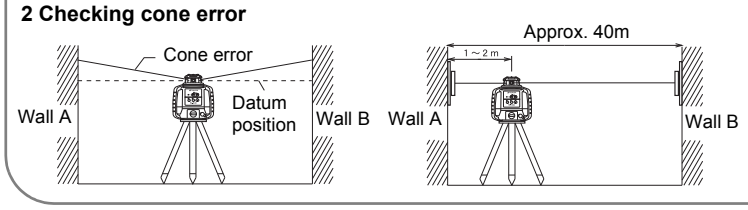
[To calibrate the Y axis]

1 Face the Y1 side of the instrument (Control panel side) toward a wall, press the Power switch while pressing the height alert OFF key. Then the height alert OFF lamp will light, and manual mode ON lamp will blink. (X axis is selected.)
2 Press the right Slope key once again. The auto leveling lamp will light. (Y axis is selected.)
3 Press the height alert OFF key to calibrate the Y axis. The auto leveling lamp will light.
4 Using the level sensor, mark the on-grade height of laser beam on a wall.
5 Rotate the instrument 180 degrees to face Y2 side toward a wall.
6 In the same way as step 4, mark the on-grade height of laser beam on a wall.
7 Press the slope key to make adjustment so that the laser beam height may be at the center between the positions of Step 4 and Step 6.
8 Press the height alert OFF key to memorize the new laser beam calibration. The height alert OFF lamp will blink. Power will shut off automatically when the calibration memorization is complete.
The Y axis adjustment is completed now.

If the height alert OFF lamp blinks quickly and the power is not automatically turned off when pressing the height alert OFF key to memorize the height, the height exceeds the adjustment range. Please contact your local Topcon dealer.

To discontinue calibration the instrument, press the Power switch.

2 Checking cone error



Perform the following check after completing horizontal calibration procedure.

[Checking]

1 Set up the laser centered between two walls approximately 40m (131ft) apart. Orient the instrument so one axis, either X or Y, is facing the walls.
2 Locate and mark the position of the rotating laser beam on both walls using the level sensor.
3 Turn off the instrument and move the instrument closer to wall A (1m to 2m /3 ft to 6 ft). Do not change the axis orientation of the instrument. Turn the instrument on.
4 Again locate and mark the position of the rotating laser beam on both walls using the level sensor.
5 Measure the distance between the first and second marks on each wall. If the difference between each set of marks is less than 4mm (5/32 of an inch), no error exists.

* If the difference value is greater than 4mm (5/32 inch), contact your Topcon dealer.

ERROR CODE

Use the table below to determine operation errors indicated by blinking lamps on the control panel. (For the lamp indication, refer to "Lamp position".)
If corrective action listed does not correct error, please contact your local Topcon dealer.

Lamp Indication	Error Code	Corrective Action
Lamp B, C and D blink in turn	Auto-leveling range error	Correct tilt of the instrument until it less than 3 degrees.
Lamp A lights	Battery power error	Replace the four alkaline dry cell batteries with new ones at a time or charge the battery pack.
Lamp B, C and D blink simultaneously	Height alert error	Turn power off, rough level the instrument, then turn power on again. Check height of laser beam as it may have changed.
Lamp D blinks quickly	Calibration error	Repeat calibration procedure. If error repeats contact your local Topcon dealer.
Lamp E (Red) lights Lamp B, C and D blink in turn	Checking and adjusting calibration error	Push the slope key of the opposite side, and align slope.
Lamp A, B, C and D blink simultaneously	Internal error	Turn power off, then on again. If error repeats contact your local Topcon dealer.

REGULATION

FCC

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.

Declaration of Conformity
Model Number:RL-H4C
Trade Name:TOPCON CORPORATION

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

U.S.A. Representative
Responsible party:TOPCON POSITIONING SYSTEMS,INC.
Address:7400 National Drive Livermore, CA94551, U.S.A
Telephone number:925-245-8300

CE

N 13813

SPECIFICATIONS

RL-H4C

Laser source	:	Laser diode (Visible, 635nm)
Laser output	:	2.4mW
Safety standard for laser beam	:	CDRH (FDA) Class IIIa, IEC Class 3R
Automatic correction range	:	±5°
Accuracy	:	±10" (1mm/20m)
Manual slope settable range	:	±5° (When the instrument is installed on the 0° surface) The slope range is increased or decreased according to the tilt of the surface on which the instrument is installed.
Rotational speeds	:	600r.p.m
Operating range	:	Diameter Approx. 2m to 800m (When using LS-80L)
Power supply/Operating time	:	4 x D size dry cell batteries (alkaline)*1or Ni-MH battery pack BT-74Q (7000mAh)
Charging time	:	Approx. 13 hours (Using with AD-15)
Operating time	:	Approx. 100 hours (Using with alkaline manganese drybattery / at +20°C (+68°F))
	:	Approx. 60 hours (Using with Ni-MH battery pack BT-74Q/ at +20°C (+68°F))
Protection against water and dust	:	IP66 (Based on thestandard IEC60529)
Operating temperature	:	-20°C to +50°C (-4°F to +122°F)
Storable temperature range	:	-30°C to +60°C (-22°F to +144°F)
LS warning display	:	RL-H4C height alert warning(Warning is displayed on the indicator of LS-80L.) RL-H4C battery warning (Warning is displayed on the indicator of LS-80L.)
Dimensions	:	177(L)x196(W)x217(H)mm (7.0 x 7.7 x 8.5 in)
Laser beam height	:	187mm (Height from the instrument's bottom surface to the center point of laser beam)
Weight (Dry battery type)	:	2.4kg [5.3 lbs] (Including dry cell batteries)
(Rechargeable battery type)	:	2.6kg [5.7 lbs] (Including BT-74Q)
Tripod screw	:	5"/8X11 threads for surveying instrument

LS-80L

Beam detection window	:	50mm (2.0 in)
Beam detection precision	:	High precision: ±1mm (±0.04 in)/Normal precision: ±2mm (±0.08 in)
Beam detection indication	:	Liquid crystal (both sides) and buzzer
Power source	:	2 x AA size dry cell batteries
Operating time	:	Approx. 120 hours at +20°C (+68°F) (Using alkaline manganese dry cell batteries)
Auto shut-off delay	:	Approx. 30 minutes without beamdetection
Protection against water and dust	:	IP66 (Based on thestandard IEC60529)
Operating temperature	:	-20°C to +50°C (-4°F to +122°F)
Storage temperature	:	-30°C to +60°C (-22°F to +140°F)
Dimensions	:	146(L)x76(W)x26(H)mm (5.7x2.9x1.0 in)
Weight	:	0.19 kg [0.41 lbs] (including dry cell batteries)

JSIMA Japan Surveying Instruments Manufacturers' Association

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