MOBILE AUTOMATION

USER MANUAL

ROTEC LASER LEVEL

LS.RH.HP
LS.RHV
LS.RHVG

WARANTY

STATEMENT OF LIMITED WARRANTY

MOBA Mobile Automation Australia Pty Ltd (MOBA Australia) warrants all equipment of its manufacture to be free of defects in material and workmanship for a period specified below. This warranty period is from the date of invoice. Items covered by this warranty are: sensors, transmitters, electronic levels, receivers, masts, control boxes, displays and accessories. All other components not manufactured by MOBA Australia but sold as part of the installation package, such as hydraulic or electrical components, hoses, fittings and clamps, will carry the original manufacturer's warranty.

Warranty period:

Rotec laser levels: 2 years
Rechargeable batteries: 90 days
All other equipment: 1 year

MOBA Australia or its authorised service centre will repair or replace, at its option, any defective part or component of which notice has been given during the warranty period. A warranty registration card must be filled out properly and be on file with the MOBA Australia service department before warranty repair or replacement can be approved. If service in the field is necessary to repair machine-mounted equipment under warranty, MOBA Australia may authorize on-site repairs at no charge for parts and labour. Travel time, accommodation and other expenses incurred to and from the place where repairs are made will be charged to the purchaser at the prevailing rates. If warranty service can be done at a factory authorised service centre, the customer will pay only one-way freight charges.

Any evidence of negligence or abnormal use, accident, or an attempt to repair equipment by other than factory authorised personnel even when using MOBA Australia's certified or recommended parts, automatically voids the warranty.

The foregoing states the entire liability of MOBA Australia regarding the purchase and use of its equipment. MOBA Australia will not be held responsible for any consequential loss or damage of any kind.

This warranty is in lieu of all other warranties, except as set forth above, including any implied warranty of merchantability or fitness for a particular purpose, are hereby disclaimed. This warranty is in lieu of all other warranties, expressed or implied.

This manual is an important part of your purchase. Please read it thoroughly before using your new equipment.

We recommend you record details of your purchase here so that its readily available if you ever need to contact us:

Serial number	
Date of purchase	
Purchased from	
Telephone	
Email	

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1. MAINTENANCE AND SAFETY

- While the instrument is operating, be careful not to expose your eyes to the laser beam. Direct exposure to a laser beam for a long time may be hazardous to your eyes. The laser beam is equivalent to a class 2M (and class 3R for LS.RHVG only).
- Operate this laser so that the laser beam plane avoids impact on the eyes of vehicle drivers or pedestrians.
- Do not try to dismantle the instrument. Have it repaired by your dealer or supplier. Dismantling yourself may worsen the problem or void your warranty.
- When attaching the instrument to a tripod, make sure the instrument is securely fixed. The tripod leg clamps should be securely fastened. If not securely fastened or tightened, the main unit could fall off or the tripod could fall over.
- The laser should not be stored or used in extreme temperature or during rapid temperature change. The laser may not function properly if used out of the ambient temperature range.
- Store inside the carry case and place in a dry area not subject to vibration, dust or high moisture.
- If the storage temperature and ambient temperature for usage vary significantly, leave the laser in its case until it can adjust to the ambient temperature.
- The laser should be transported or carried carefully to avoid impact or vibration.
- The laser should be stored in the carry case and packed with cushioning material. Always handle the laser with care.

2. PRINCIPLES OF OPERATION

The laser uses a semiconductor laser diode, which provides excellent beam visibility. The laser beam will rotate freely to form a plane-scanning surface. The rotary beam is emitted as illustrated here:

Horizontal mode
(all models)

The laser automatically emits following beam(s):

- horizontal scanning surface (all models)
- plumb dot (all models except LS.RH.HP)

Vertical mode for vertical and square applications
(all models except LS.RH.HP)

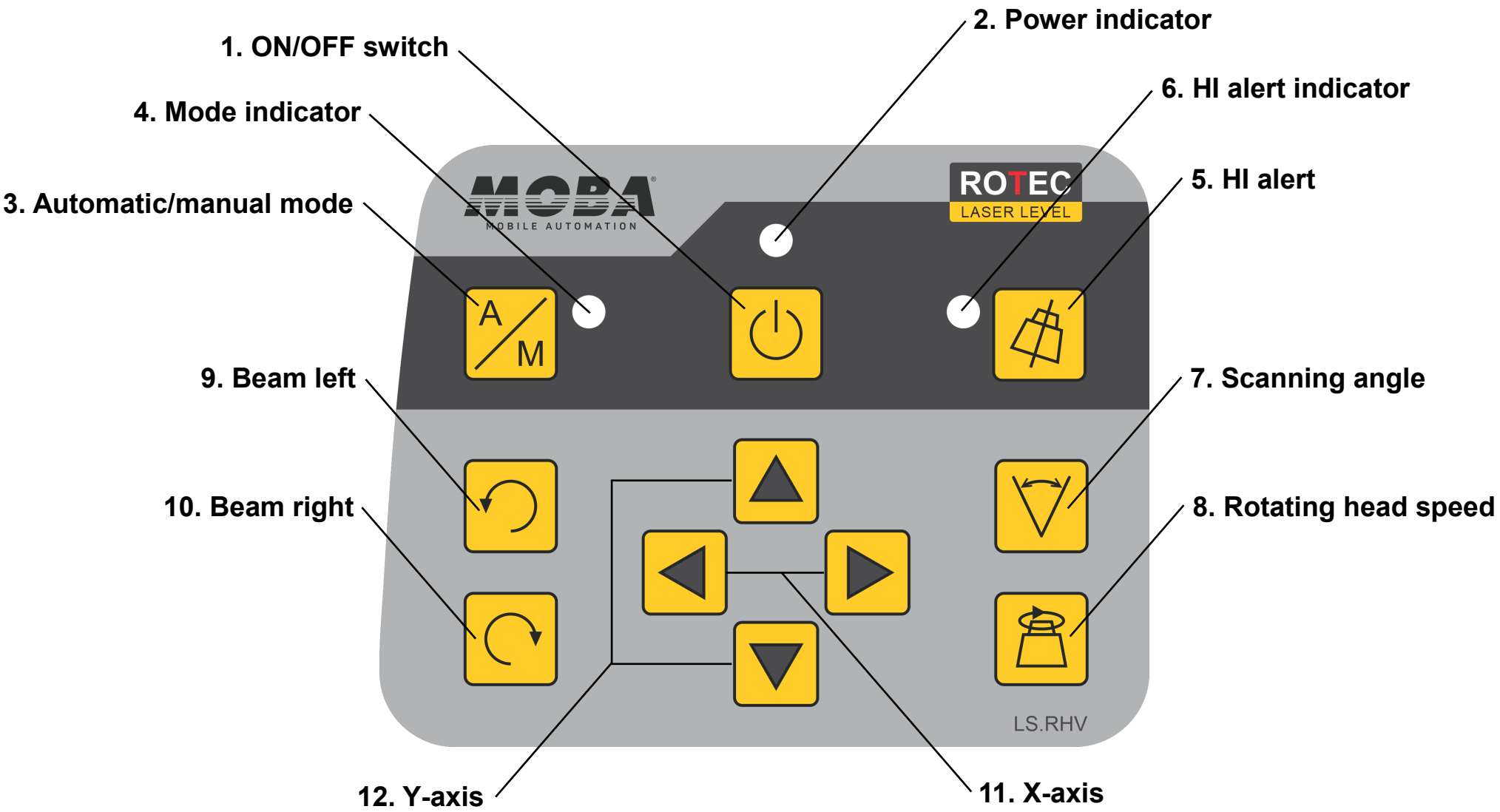
The laser automatically emits following beams:

- Vertical scanning surface
- Horizontal dot

3. PHYSICAL FEATURES

3.1 MAIN BODY

3.2 SWITCHPAD



3.3 SWITCHPAD FUNCTIONS

All models

1. ON/OFF: turns the instrument on and off.
2. Power indicator: lights up when the instrument is on and flashes to indicate low battery.
3. Automatic/manual mode: switches between automatic and manual modes.
4. Mode indicator: when this indicator is on, the instrument is in manual mode. When it flashes the instrument is out of self-levelling range.
5. Height of instrument alert (HI alert): enables the HI alert function. When activated the laser will stop rotating if it is jolted or moved.
6. Height of Instrument indicator (HI alert indicator): flashes slowly when HI alert is enabled. When flashing rapidly the laser has been jolted or moved and will not self-level.

All models except LS.RH.HP

7. Scanning angle: switches between 5 levels of beam scanning angle: 0, 10°, 45°, 90°, 180°
8. Rotating head speed: selects rotating head speed: 0, 60, 120, 300, 600 RPM
9. Beam left: moves the laser beam counter-clockwise, only when the unit is in 0 RPM or scan mode
10. Beam right: moves the laser beam clockwise, only when the unit is in 0 RPM or scan mode
11. X-axis: adjusts the slope of the X-axis when the instrument is in manual mode.
12. Y-axis: adjusts the slope of the Y-axis, when the instrument is in manual mode.

4. USING THE ROTEC LASER

4.1 BATTERY INSTALLATION

Rechargeable and alkaline battery packs are suitable for use to power this laser. To install:

- Un-screw the battery cover at the bottom of the instrument.
- Install the battery pack into the case making sure to observe correct polarity.
- Re-screw the battery cover at the bottom of the instrument.

4.2 INSTRUMENT PLACEMENT

4.2.1 HORIZONTAL MODE

Set-up the instrument on a tripod or lay on a stable flat surface, or hang it on a wall using a wall bracket. Keep the instrument as flat as possible to ensure it is within +/- 5 degree self-levelling range.

4.2.2 VERTICAL MODE

Lay the instrument on a flat surface on it’s side, and keep the slope of instrument within the range from -5° to +5 °.

4.3 OPERATION

4.3.1 POWER

Press the ON/OFF switch to switch the laser on. If the power indicator flashes, the voltage of the batteries is low and batteries need to be replaced or recharged.

4.3.2 LEVELLING

When you turn the laser on, it will automatically level. The levelling process is indicated by a flashing laser beam. After the laser has automatically levelled, the laser rotating head will start rotating at the speed of 600 RPM.

If the instrument is placed improperly, or the slope of instrument exceeds the range of -5° to +5°, the mode indicator and the laser beam will flash at the same time.

Note: the instrument will shut down automatically if the unit exceeds the self-levelling range for more than 5 minutes.

4.3.3 ROTATING HEAD SPEED (OPTIONAL FOR LS.RH.HP VIA REMOTE CONTROL)

a. Continuous spinning

Press the Rotating Head Speed switch to control the speed of the rotating head. If the switch is pressed repeatedly, the speed will correspondingly change to the following: 0, 60, 120, 300 & 600 RPM.

b. Stationary beam

Continue to press the Rotating Head Speed switch and set the speed to 0 RPM. The rotating head will stop rotating. To move the laser rotating head clockwise, press the Beam Right switch. To move the laser rotating head counter-clockwise, press the Beam Left switch.

4.3.4 SCANNING FUNCTION (OPTIONAL FOR LS.RH.HP VIA REMOTE CONTROL)

Press the Scanning Angle switch to make the rotating head scan. Press the switch repeatedly to change the angle of scanning among following angles: 0°, 10°, 45º, 90° and 180°. Press the Beam Left and Beam Right switches to change the position of the scanning. The scanning function is used to increase visibility of the laser beam over a specific scan angle.

4.3.5 SLOPE ADJUSTMENT (OPTIONAL FOR LS.RH.HP VIA REMOTE CONTROL)

When the instrument is set upright for horizontal rotation, the slope of the X-axis and Y-axis can be adjusted by using manual mode. To select manual mode, press the Automatic/Manual Mode switch. When the Mode Indicator light is on, the laser is in manual mode and will not self-level.

a. X-axis slope

Aim the X1-axis in the direction of the slope to be adjusted, as depicted below:

Press the X-axis left or right switch to move the laser beam up or down.

b. Y-axis slope

Aim the Y1-axis in the direction of the slope to be adjusted.

Press the Y-axis up or down switch to move the laser beam up or down.

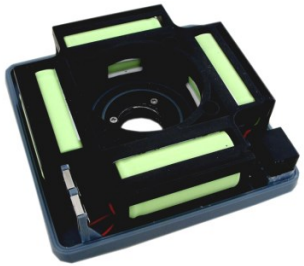
To return to automatic mode, press the Automatic/Manual Mode switch. Automatic mode is indicated by the Mode Indicator light switching off.

5. CHARGING THE LASER

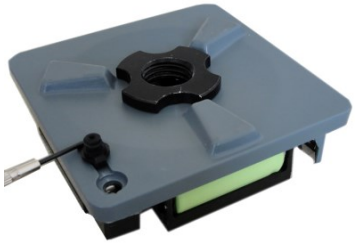
When the Power Indicator light is flashing, the laser must be recharged, or if alkaline batteries are used, they should be replaced. The charger plugs in to the laser via the plug hole under the laser, shown below.

- If the indicator light of the charger is red, the batteries are being charged.
- If the indicator light of the charger is flashing red, the batteries and charger have bad connection.
- If the indicator light of the charger is green, the charging cycle has ended and the unit is fully charged

Alkaline battery pack



Rechargeable battery pack



Charging socket

Notes:

- Standard rechargeable batteries will take no more than 7 hours to fully recharge.
- The power required for the charger is: 85-265 V AC 50-60HZ (standard mains supply).
- The instrument can be used while charging.
- If the laser will be kept in storage or left unused for a long time, the batteries (alkaline or rechargeable battery) should be taken out.

6. REMOTE

To use, aim the aperture of the remote towards the laser. The remote will work at a distance of up to 30 meters indoors and 20 meters outdoors. The light indicator on the remote will flash to show the operating signal has been sent.

NOTE: the remote is an optional accessory for LS.RH.HP model.

Functions that can be controlled by the remote are as follows:

- Rotating head: see section 4.3.3
- Directional scanning: see section 4.3.4
- Slope adjustment: see section 4.3.5

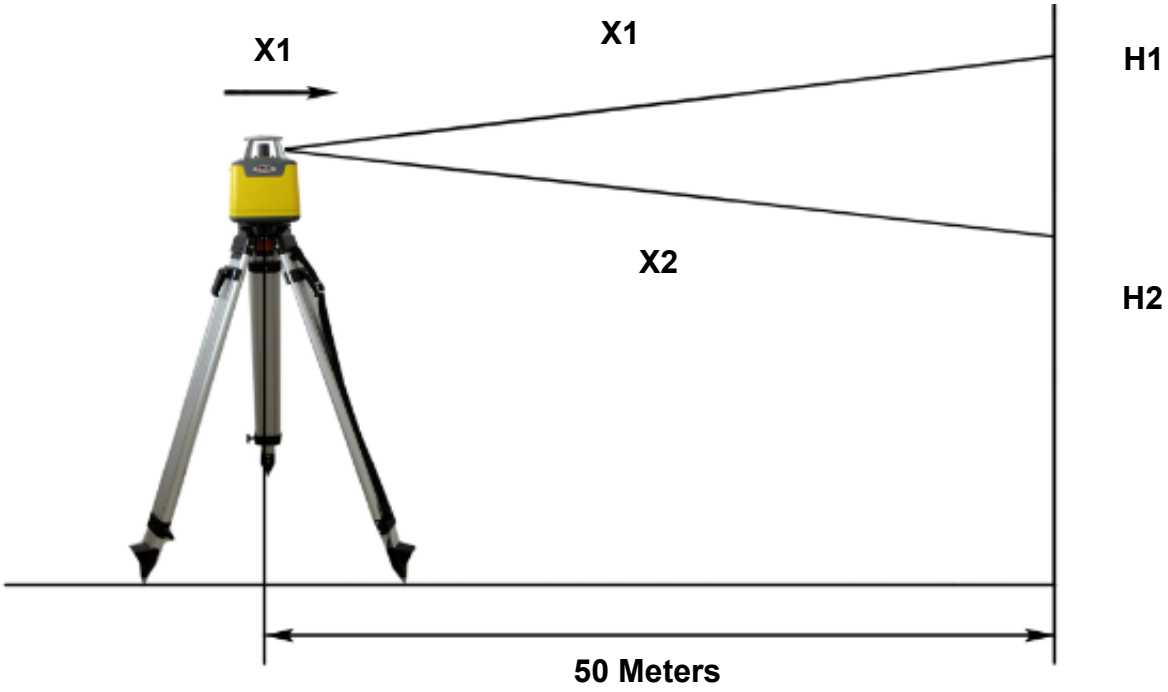
7. ACCURACY CHECKING

Follow these instructions to check self-levelling accuracy.

7.1 HORIZONTAL SURFACE CHECKING

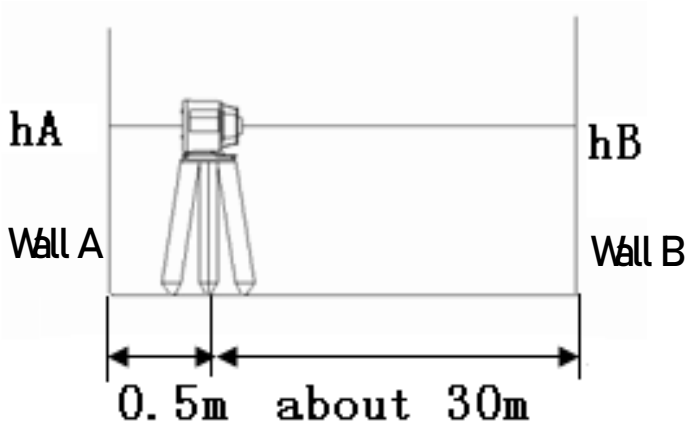
1. Place the laser 50 meters away from a vertical wall (or set a scale plate 50 meters away from the laser). Switch the laser on and aim X1 towards the wall (or scale plate), as depicted below:
2. Allow the unit to level and begin rotating. Mark the beam position on the wall or scale plate as H1.
3. Loosen the screw of the tripod, and then turn the laser 180°. Allow the unit to level and start rotating, mark the beam position on the wall or scale plate as H2. The distance between H1 and H2 should be less than 5 mm.
4. Repeat the same process to check your Y-axis beam. Again, the distance between the two points should be less than 5 mm.

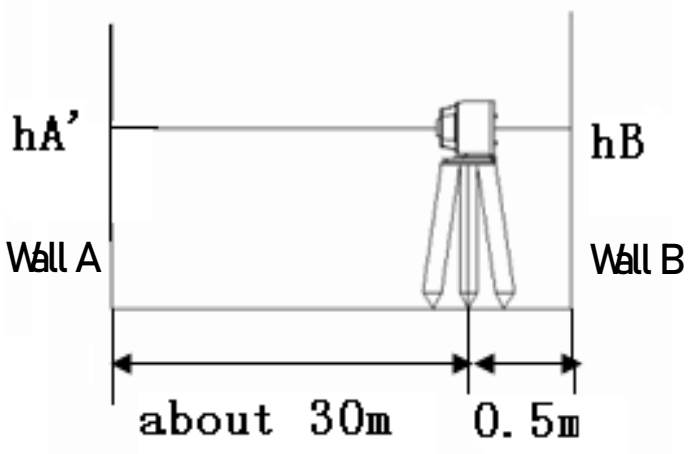
If the distance between H1 and H2 in either axis is more than 5 mm, the laser should be sent to your authorized dealer for service / calibration



7.2 HORIZONTAL LINE CHECKING

1. Place the instrument on it's side, between two walls such that it is 0.5 meters away from one wall (wall A) and 30 meters away from the other wall (wall B). See diagram below on the left. NOTE: you can use 2 targets on staffs instead of walls.
2. Mark the position hA on wall A where the bottom laser beam strikes the wall.
3. Mark the position hB on wall B where the top laser beam strikes the wall.
4. Move the tripod and the laser so that it is 0.5 meters away from wall B and 30 meters away from wall A and rotate the laser on its side by 180 degrees so that the bottom beam is pointing towards wall B. See diagram below on the right.
5. Adjust the tripod position and height so that the bottom laser beam strikes the point hB on wall B.
6. Mark the position hA' where the top laser beam strikes wall A.
7. The distance between hA and hA' should be less than 3 mm. If the distance is more than 3 mm, the laser should be sent to your authorized dealer for service.





8. SPECIFICATIONS

Model	LS.RH.HP	LS.RHV	LS.RHVG
Laser source	635 nm laser diode (red)	635 nm laser diode (red)	520 nm laser diode (green)
Laser class	Class 2M	Class 2M	Class 3R
Levelling Accuracy	±1.5 mm @ 30 m	±1.5 mm @ 30 m	±1.5 mm @ 30 m
Levelling Range	±5°	±5°	±5°
Operating distance (with hand-held receiver R.LAS.RH/R.LAS.RHG)	600 m	600 m	600 m
Operating distance (with R.3CHS.MC machine control receiver)	800 m (receiver in fine mode) 1,000 m (receiver in normal mode)	N/A	N/A
Rotating head speed	600 RPM (adjustable via optional remote: 60, 120, 300 & 600 RPM)	0, 60, 120, 300 & 600 RPM	0, 60, 120, 300 & 600 RPM
Laser scanning function	0°, 10°, 45°, 90° & 180° (via optional remote)	0°, 10°, 45°, 90° & 180°	0°, 10°, 45°, 90° & 180°
Manual slope adjustment	±5° (via optional remote)	±5°	±5°
Remote control operating distance (approximate)	30 m indoor 20 m outdoor (optional remote)	30 m indoor 20 m outdoor	30 m indoor 20 m outdoor
Power supply	Rechargeable battery pack or 4xC size alkaline batteries	Rechargeable battery pack or 4xC size alkaline batteries	Rechargeable battery pack or 4xC size alkaline batteries
Hours in continuous use (approximate)	40 hrs rechargeable 60 hrs alkaline	22 hrs rechargeable 30 hrs alkaline	18 hrs rechargeable 24 hrs alkaline
Ingress protection	IP 55	IP 55	IP 55
Dimensions (L x W x H)	160 x 160 x 185 mm	160 x 160 x 185 mm	160 x 160 x 185 mm
Weight	2.0 kg	2.0 kg	2.0 kg