EM623 - Electronic levelling Rotating Laser
Earthmovers Laser

RedBack™ Lasers

# EM623

# Instruction Manual


www.redbacklasers.com.au

# CONTENTS




## User Safety

- Laser output sign lies near the output aperture.
- Do not stare directly into laser beam.
- Do not disassemble the instrument or attempt to perform any internal servicing. Repairs and service should be performed only authorised service centres of Redback Lasers.
- This instrument complies with the safety Classification standards of laser radiation.


CAUTION: Class II laser <1mW at 635nm. Do NOT stare into laser beam or aim at another person.

Follow relevant Australian Standards

Congratulations on purchasing the EM623™ an electronic self levelling earth movers rotating lasers level built tough to handle the harshest of job sites.

The EM623™ is ideal for earth movers and landscapers, simply set it up on a tripod, turn on, it electronically self levels and the laser starts rotating. Then using the supplied LR715 receiver you can set up your levels or grades.

The EM623™ has manual dual grade setting capability and has anti vibration features ideal for operating around heavy machinery.

The EM623™ is one of the first laser levels with Li-ion rechargeable battery technology giving you up to a massive 40 hours operation on one charge. The EM623™ can also use Std "AA" Size batteries and comes with a Five Year Redback Warranty. (See page 16)

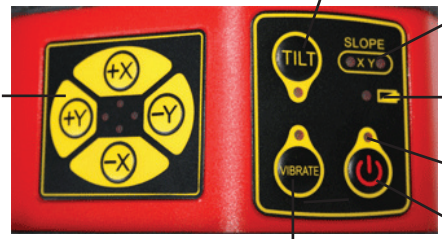
EM623™ Included Accessories

- EM623™ Laser Unit
- Protective Carry Case
- Rechargeable Li-ion Battery
- Charger
- Std Battery Compartment
- Laser Receiver LR715
- Receiver Staff Clamp
- Remote Control
- Instruction Manual

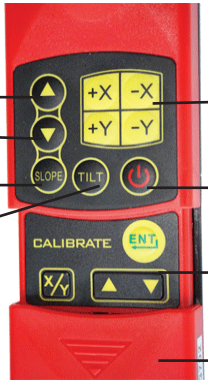
## EM623™ Laser Unit


1. Cast Metal Top Casing
2. Laser Output Window
3. keypad 1
4. Battery Compartment
5. 5/8" – 11tpi Screw
6. Keypad 2 (Quadrant Features)

## Keypads



## Remote Control




Grade/Slope Up

Grade/Slope Down

Grade/Slope On/Off & Axis Select

Tilt Button

Quadrant Beam Shield Controls (see page 10)

Power/Standby Button

Calibration Controls
(For Service Technicians Only)

Battery Compartment

## Receiver - LR715


Rubber Casing

Magnetic Mounting

LCD Display
(Repeated on rear)

Reception Sensors

Bubble Vial

Fine/Coarse Mode

Speaker Control

Display back light

Power On/Off

## Battery Instructions

The EM623 has two battery options either 6 x standard "AA" size Alkaline or the Li-ion rechargeable pack. For standard 6 x "AA" alkaline operation simply insert into standard battery holder in the direction indicated and slide into battery recess and tighten the locking screw.

To use the rechargeable battery pack first remove standard pack if inserted and place into the same battery recess and tighten locking screw. Note packs will only tighten up when inserted the correct way.


To charge this battery pack simply insert the charger plug into the charging socket next to the locking screw. The LED on the charger is illuminated red during the charging process and will turn green once the batteries are fully charged. Battery pack can be charged while inserted in the laser or independently.

When the low battery LED on the keypad iluminates, the rechargeable battery pack needs recharging or standard batteries need replacing. Note the charger will only charge the supplied rechargeable battery pack.

***Handy Hints***

- *Prior to initial use, charge the rechargeable batteries for at least 8 hours.*
- *Running rechargeable batteries completely flat will increase battery life.*
- *The EM623™ can operate off mains by plugging the charger (for indoor use only) into the unit.*
- *Remember the EM623™ can operate using standard batteries when rechargeable pack is out of charge.*

## Turning Laser On

Press Power button  on the keypad to turn on the EM623™, power LED will light. After turning the laser on, the laser will auto level and rotate. The power button on the remote will not operate until the laser has been powered up from the keypad direct, the power button on the remote then acts as a standby button. The EM623™ has a large self levelling range, if the laser happens to be set up outside this range, a warning will sound and the laser will flash. Re-set the laser housing more level if this occurs.

## Tilt Mode

Tilt mode is somewhat similar to tilt on a pinball table in that if when running the EM623 detects significant disturbance or movement that could affect the accuracy of your work the laser will "Tilt" (stop working) and the laser beams and tilt LED will flash to indicate this.

To turn the tilt feature on use the 'tilt" button  on either the keypad or the remote control and the tilt LED will light, a further press will turn off the tilt feature.

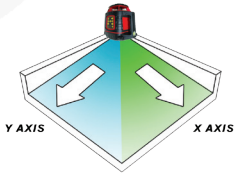
If during operating the laser "tilts" then you will need to re level the laser by pressing the tilt button  on the remote or keypad, wait a few seconds to level and then re-check your work to maintain maximum accuracy.

It is recommended to use tilt mode when optimal accuracy is required or when there is a chance that machinery or workers may interfere inadvertently with the lasers level.

## Setting Slope/Grades (refer to diagram page 4)

The EM623™ can be used to set grades. In Slope (Grade) Mode you can set a Grade in either the X or the Y Axis of up to 8% see the markings on top of laser for axis alignment. With the EM623 "Quadrant Shield" mode can still be used, "Tilt" and "Vibration" cannot. The EM623 is dual grade capable, so a grade can be set on the X and Y axis simultaneously.

- Turn the laser on, allow to level and begin rotating.
- With the remote control a short press of the Slope button SLOPE (single remote beep) will activate grade/slope mode indicated by the X LED on the laser units keypad SLOPE X Y.
- The "X" axis is automatically selected, if you wish to select the "Y" axis a short press the grade/slope button (single remote beep) will toggle between the "X" and "Y" axis. Note a long press (two remote beeps) returns the laser to normal auto levelling mode.
- With the required axis selected move the laser plane up or down using the Slope Grade Direction buttons ◀ ▶ on the remote. To set a grade on the other axis simply use the slope button SLOPE to select the second axis and move the plane up and down ◀ ▶.
- A long press of the Slope button SLOPE (two remote beeps) and the "X", "Y" LED goes out on the laser units panel and the laser re-levels.

## Setting a Grade

Following is a method of setting a grade using the slope (grade) buttons as previously discussed. Here we will show setting a single grade on the X axis, for a dual grade simple repeat the process on the Y axis.

Set up the laser aligning the X axis with the direction of the required grade rise/fall, the laser can be placed anywhere on site as long as the X axis runs parallel with the desired grade.

For this example we want a grade of 1 in 60 or 1.667% or in other words for every 6m (6000mm) travelled away from the laser along the X axis we want the laser plain to tilt down/up 0.1m (100mm).

To achieve this measure out 6m away from the laser along the X axis and hold the staff at this point slide the receiver up/down the staff until the receiver indicates level (see receiver instructions page 10).

Then making a note of the height on the staff slide the receiver up/down the staff 100mm, this is now the height the laser needs to be hitting to be setting a 1 in 60 slope or grade.

Using the remote, select grade mode on the X axis and use the Slope Grade Direction buttons to slope the laser until the receiver shows level.

The Grade is now set at 1 in 60 or 1.667% on the X axis and anywhere parallel to the X axis on site.

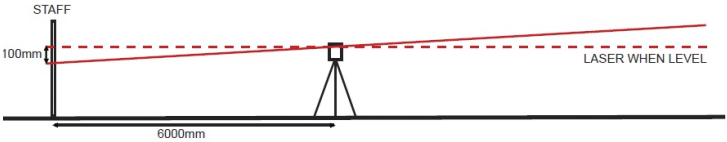



*Chart below gives a range of grades and the distance the receiver shifts all based a 5m distance of staff away from laser.*

| GRADIENT | % | DISTANCE LASER (M) | MOVE RECEIVER (MM) |
|---|---|---|---|
| 1 IN 20 | 5 | 5 | 250 |
| 1 IN 30 | 3.3 | 5 | 167 |
| 1 IN 40 | 2.5 | 5 | 125 |
| 1 IN 60 | 1.66 | 5 | 83 |
| 1 IN 80 | 1.25 | 5 | 63 |
| 1 IN 100 | 1 | 5 | 50 |

## Vibration Sensor Setting

The EM623™ continuously self levels for utmost accuracy, in high winds or vibrations the laser will stop rotating to re-level this may be inconvenient by slowing down your work. By selecting Vibration button 

the laser still continually re-levels but does not stop rotating whilst doing so meaning that you can keep on working while the laser absorbs minor vibrations.

Vibration mode can be used in conjunction with the tilt mode so still giving you the protection of being warned if the laser has sensed a major jolt or shift in position.

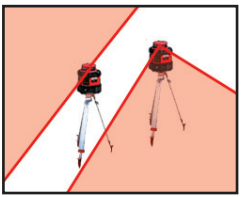
Vibration mode is especially use full when the laser is being used in close proximity to heavy machinery.

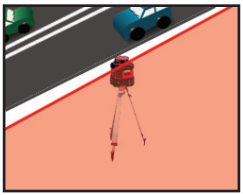
## Quadrant Beam Shield Feature

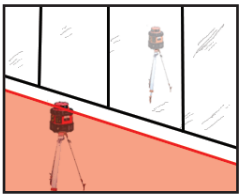
The EM623™ has a feature called "Quadrant Beam Shield" which gives the user the ability to turn the laser beam off during certain quadrants or segments of each rotation. The rotation is segmented into 4 sectors or quadrants and each of these quadrants can be turned on or off in order to prevent the laser beam shining in those particular directions.

There are a number of advantages of this feature;

1. The EM623™ can be used on site with other rotating lasers with out interfering with the receivers of those lasers.
2. You can set up the EM623™ next to a busy road and shield the users of that road from the laser beam.
3. On sites with large reflective surfaces such as windows you can set the quadrants off to prevent getting reflected laser readings on your receiver.







The EM623™ quadrant beam shield feature can be set from either the control keypad on the laser (see page 4) or by the remote control (page 5) by pressing the +X, -X, +Y and -Y buttons.

The "X" and "Y" refers to the axis as labelled on the top of the casing, positive being in the direction of the arrow. As you press the buttons the relevant LED's will light on the keypad on the laser unit and the laser beam will turn off on the same quadrant selected. Any of the quadrants can be selected up to a maximum 3 quadrants at any one time.


Note that the receiver operates normally when located within the quadrants of rotation that are left turned on. Also note that all other features and functions such as "Tilt" "Vibration" and "Grade/Slope" can be used at the same time as Quadrant Beam Shield.

## Laser Receiver LR715 (refer to diagram page 5)

The LR715 is a heavy duty dual sided display rotating laser receiver, it can be either hand held or with the staff bracket clamped onto a staff. The bubble vials can be used to keep the receiver level.

- A press of the power button toggles the receiver on and off.
- The Speaker button toggles through 3 speaker volumes.
- Pressing the Coarse/Fine Mode button toggles through 3 levels the first being fine mode indicated by on the LCD the accuracy of level is at its highest with 1mm tolerance movement by the receiver before showing it off level. The next coarser mode allows 2mm before showing off level the third press shows no symbol on the LCD and allows 3mm before showing off level, these two coarser modes are more suitable for general site levelling.
- The Back Light button toggles the LCD display back light.

The LR715 has two large LCD displays with progressive bars indicating when the laser gets closer to the level mark. Move the receiver up and down slowly and watch the display change when the solid tone is heard and the centre line is shown then the receiver is at the height of the laser beam plane. The receiver will auto power down after 10 minutes when not receiving laser pulses. Note receivers do not work in Scan mode.

## Technical Specifications

| | |
|---|---|
| Laser Wavelength | 635nm <1mW |
| Laser Class | II |
| Range with Receiver | 500m Diam Rotating |
| Horizontal Accuracy | ±1.5mm/20m |
| Rotation Speeds | 800rpm |
| Self Levelling Range | ±5° |
| Temperature Range | -10°C - 45°C |
| IP Dust Water Resistance | IP66 |
| Power | 6 x "AA" Alkaline or Li-ion pack |
| Low Power | Power LED Flash |
| Size | 140x140x190mm |
| Weight | 2.1Kg |

## Calibration & Self Check

All Redback Lasers have been checked for calibration and certified by one of our technicians here in Australia prior to despatch and should under normal conditions not go out of calibration. A calibration certified sticker with the date and name of technician is located on the laser itself. It is worth checking calibration from time to time particularly after any known knocks or drops. An easy way to continually check calibration is to always double check you work with the laser located in a different position or use an alternate vertical line. Various other methods for checking calibration can be found at **www.redbacklasers.com.au/downloads** or the laser can be returned to our service department for checking and re-calibration. We at Redback Lasers provide a once off free calibration and check within the duration of the warranty period see page 16 for details.

## Care & Maintenance

- Keep laser and accessories stored in protective case.
- Make sure laser is stored dry, dry out before storage to prevent damage.
- Remove batteries when not used for an extended period of time to prevent leakage.
- The EM623™ is a precision instrument and should not be subjected to excessive knocks, drops or vibrations.
- Self check calibration from time to time. See page 13
- For service contact Redback Lasers. **www.redbacklasers.com.au**

## Trouble Shooting - FAQ

***Q.*** ***I have difficulty using the remote control!***

***A.*** *When you press a button each tone is equal to one press, so on a toggle button like the power button if you press and hold and hear 2 tones then it will have turned it on and then off again.*

***Q.*** ***The Laser does not power up!***

***A.*** *Check the rechargeable batteries are charged and connected correctly and or replace standard "AA" size Alkaline batteries and check they are inserted correctly and pack fully tightened up into recess.*

***Q.*** ***Using the receiver I get multiple heights showing as level!***

***A.*** *This is a common problem with all laser levels and is usually due to the laser being reflected off a window or other reflective surface. So the original laser beam plus the reflection are both hitting the receiver at slightly different heights. To prevent this, set the laser unit up so that you cannot see a reflective surface from where you are holding the receiver i.e. Any glass behind receiver not the laser.*

**Notes**

# REDBACK LASERS WARRANTY

Duration of warranty is fixed and automatic, when we advertise 5 years on a particular model, its five years. No drop down to a lesser time if you forget to register, registration is NOT required just proof of purchase showing date.

Although the duration of our warranties are for a particular period it does not mean we will charge you for a genuine warranty failure a month or two outside that warranty period, we believe in a fair go.

Even though a product shows signs of accidental damage, scratches and the like, we will not automatically fail the warranty claim, if the fault is NOT caused by a drop or misuse and is a genuine warranty failure then we will cover it.

Calibration is not covered by warranty much the same as the wheel balance on your car is not covered by warranty, we do however offer a one off free re-calibration service during the period of warranty, conditions and details below.

CMI Industries Pty Ltd provides consumers with a warranty to our products, this is in addition to requirements of any relevant legislation such as the Competition and Consumer Act 2010. Definitions:

"CMI", "We" or "Our" refers to CMI Industries Pty Ltd (ABN 29 102 713 922) of 8 Autumn St, Geelong West, Victoria 3218 ph (03) 5228 0777

"You" or "Consumer" refers to the initial purchaser of the product.

"Product" refers to goods manufactured by or for CMI Industries Pty Ltd under the brands of RedBack Lasers, Level1Laser and CMI Lasers.

"Material" refers to material or component used in the construction and manufacture of the product.

"Workmanship" refers to handling, assembly and manufacturing processes done by or for CMI Industries Pty Ltd in order to manufacture the products.

"Warranty Period" For the EM623 Five Years. Warranty period is from original purchase date, no extension is made in the event of warranty replacement products supplied or time spent being repaired.

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. LR715 receiver 2 Year warranty, Ni-Mh Battery & Charger have 1 Year Warranty.

CMI warrants that our products will be free from defects in material and workmanship for the warranty period.

CMI promises to repair or replace, free of charge, the product or part of product if found to be faulty due to defective workmanship or materials within the duration of the warranty as long as the following terms and conditions are met;

- Product must not have been misused or abused, must not have incurred accidental damage or had un-authorised repair or tampering that has caused or contributed to its fault or failure.
- You must contact CMI by phone, mail or email immediately when a fault or defect has become apparent and within the warranty period.
- Product must be returned to store of purchase or directly to CMI, we will cover cost of postage only when sent by our reply paid Australia Post service (Australian Main land and Tasmania only) details will be provided upon phone, post or email communications with us.
- CMI will cover cost of freight back of repaired or replaced product to original purchase store or you directly (depending on how it was sent Australian Main Land and Tasmania only).
- CMI will determine whether to repair or replace the product or part of product on a case by case basis.
- Further exclusions in this warranty include damage or defect caused by use of non-original accessories or parts, damage in transportation, normal wear and tear, damage through moisture, damage due to electric surge, failure due to neglect or damaged caused by adjustments not outlined in CMI's instructions.

Subject to the requirements of all applicable Australian Acts or legislation and to the extent permitted by law, CMI accepts no liability (whether expressed or implied) of any nature whatsoever for any loss of earnings, hiring of replacement equipment, Inaccurate work carried out by the consumer or agent, damage or injury arising as a result of any fault in the product. It is the consumers responsibility to maintain good working practices and regularly test their tools for accuracy and serviceability.

Calibration of the product is not covered by warranty subject to the requirement of all applicable Australian Acts or legislation and to the extent permitted by law, CMI does however offer a free re-calibration service (once within the period of the warranty) you are liable for the cost to send the product to us then we will recalibrate and return the product to you free of charge. Note this offer is invalid if the product shows signs of misuse or accidental damage that has caused it to go out of calibration.

A CMI product returned that fails to fall within the terms and conditions of this warranty will be quoted for repair.

RedBack Lasers™ distributed by CMI Industries Pty Ltd
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