



for Professionals

RedBack Lasers DR100/G

Pipe Laser - DrainRight100/G

Instruction Manual



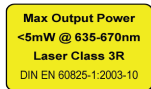
www.redbacklasers.com.au

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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.



DR100 Red Beam

CAUTION: Class 3R laser <5mW at 635-670nm red/ 520nm green.

Do NOT stare into laser beam or aim at another person.

Follow relevant Australian Standards

DR100G Green Beam

CAUTION: Class 3r laser <5mW at 522nm.

Do NOT stare into laser beam or aim at another person.

Follow relevant Australian Standards

DR100 INTRODUCTION

Congratulations on purchasing the DrainRight100/G (DR100/DR100G) an electronic self levelling pipe grade laser level built tough with full cast metal housing and sealed water tight (IP68).

The DrainRight100 has been designed and built specifically for plumbers and drainage contractors for levelling and grading pipes.

The DR100 has fully automatic digital grade setting to 3 decimal places -20.000% to +30.000% range. Simply enter in the desired grade and the laser does the rest.

The DR100 also features laser dot centering which can be accessed either by the control panel or the included remote control.

The DR100 can be placed either on top of the pipe or inside and comes with a selection of feet allowing the laser to fit into popular pipe sizes between 100mm to 300mm diameter. The DR100 also comes with a heavy duty target and holder again designed for fitting within pipes 150mm to 300mm diameter. The DR100 comes with a rechargeable Li-ion battery pack but can also use Std batteries if needed and comes with a Two Year Redback Lasers Warranty. (See page 16)

DrainRight100 Included Accessories

Note DR100G comes with Green Targets

- DR100™ Pipe Laser Unit
- Protective Carry Case
- Rechargeable Li-ion Battery
- Charger
- Standard Cell Battery Pack
- Remote Control
- Targets and Holder (150mm-300mm)
- Sets Feet (125, 150, 200, 225, 250, 300mm)
- Instruction Manual

DrainRight100 DIAGRAMS

DR100/G Laser Unit

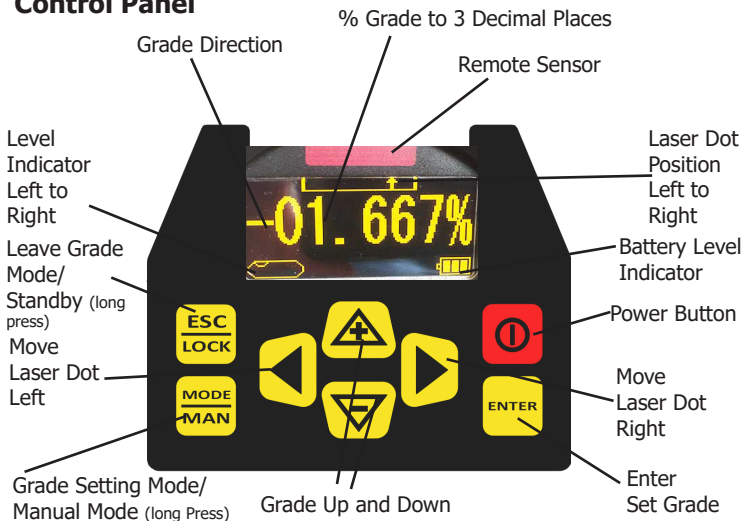
1. Alignment Guide Plumb Ref LED
2. Tripod 5/8" Mount (Optional)
3. Control Panel
4. Interchangeable Feet
5. Laser Dot Output
6. Battery Li-ion/ Box



Laser Target



Control Panel



Remote Control

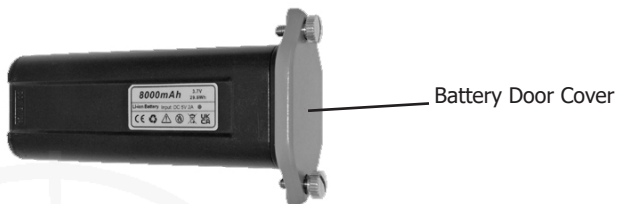


DR100/G OPERATING INSTRUCTIONS

Battery Instructions

The DrainRight100 has two battery options either 4 x standard "C" cell size Alkaline cells or the Li-ion rechargeable pack. For standard 4 x "C" alkaline operation simply insert into the battery holder in the direction indicated, insert into laser and tighten the locking screws.

To use the rechargeable battery pack, remove standard battery holder from laser if installed and place the rechargeable pack into the same recess and tightening locking screws.



To remove the battery door from the alkaline spacer or from the Li-Ion battery pack, hold either the alkaline spacer or the Li-Ion battery pack and turn the battery door 90° counterclockwise.


To charge this battery pack simply inserting the charger plug into the charging socket on the battery pack. The LED on the battery blinks during the charging process and will turn solid once the battery pack is fully charged.

When the power symbol on the LCD shows low, the rechargeable batteries needs recharging or standard batteries need replacing.

Handy Hints

- *Prior to use, charge the rechargeable battery for approx 6 hours.*
- *Remember the DR100 can operate using standard batteries when rechargeable pack is out of charge.*
- *If not being used for an extended period of time remove battery pack from laser.*
- *DO NOT pack laser away wet, dry laser before packing away.*
- *Regularly self check the accuracy of the laser before each job.*

Turning Laser On

Press Power button  on the laser keypad to turn on the DR100/G. Note 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 DR100 will first have a flashing laser dot and flashing grade numerical display, when both of these stop flashing the laser is then level. On the bottom left of the LCD display screen is an electronic bubble vial and an arrow indicating the direction needed to twist the DR100 Housing, within or on top of the pipe, in order to get it level left to right. When the bubble is show in the center of the vial then it is level left to right and will ensure maximum accuracy for the laser dot.



Twist DR100
Clockwise
(when looking at display)






Twist DR100
Anti-Clockwise
(when looking at display)






DR100 level
left to right

Setting a Grade



Setting a grade on the DR100 slopes the laser dot either up for a +ve grade and down for a -ve grade. The grades are set as a percentage and the maximum grade that can be set is +30.000% to -20.000%. (see page 12 for conversion chart). Note self levelling range is +25% to -10%.

The required grade is entered using the center four buttons on the key pad, first press the "MODE" (short press)  button the +/- symbol is flashing, use the up + or down - arrow buttons   to select either a +ve or -ve grade.

Next you shift the blinking cursor with the left and right arrow buttons   Then set the required number for each of the decimal places with the UP and DOWN buttons (leave as "0" if required). Once all the digits have been set to the required figure then press "ENTER" button  The laser will begin to set that grade. When the laser dot stops flashing the grade is set. Note: you can cancel out of the grade setting mode by pressing either the "MODE" button or "ESC" button anytime prior to pressing "ENTER".

DR100 OPERATING INSTRUCTIONS cont.



Grade Setting using alternate method

Power up and let level as normal then press and hold (2 seconds) either the "UP" + or "DOWN" - button.   This will change the grade value incrementally from the currently displayed value.



To quickly reset the grade value back to 00.000 press the "UP" + and "DOWN" - buttons simultaneously.

Once all buttons are released the displayed grade will be set.

Adjusting the Dot Left to Right

The DR100 Pipe Laser dot can be adjusted left and right in order to hit the target. This can be done with the use of either the Keypad or remote control by pressing the left and right arrow keys   . Single presses of the buttons move the dot by very small increments, by holding the button the dot will move faster and the longer the button is pressed the faster the dot will move.

On the top side of the LCD display is a graphical representation of the position of the dot left to right, the display will flash when the dot has been moved to the maximum allowed position.

There is an auto center feature which is activated with a single press of both the left and right arrow buttons   at the same time. Whilst it is centering the display will flash, once centered it will return to normal.



LCD Display showing the laser dot right of the central position





Note that the DR100 Pipe Laser has a remote control receiving sensor both at the keypad and laser output ends of the unit making it easier to center the dot onto the target and set grade when standing at the target end of the pipe.

Manual Mode

The DR100 continually self levels or continually retains the set grade during normal operation. The laser has a manual mode which disengages the self levelling mechanism. This mode can be useful when wanting to match a particular grade without knowing it numerically.

To enter manual mode press and hold the "MODE/MAN" button for 5 seconds



The position of the laser dot can now be moved up and down with the "UP" and "DOWN" buttons   and left and right with the "LEFT" and "RIGHT" buttons  

Note: That in manual mode the left to right twist bubble vial is not active.

Out of Levelling Range

There may be a situation where the laser has been set on a surface outside of its self levelling range. (Self levelling range +25% to -10%) If this is the case then the LCD display will indicate the direction the body of the laser needs to be moved to get the laser into self levelling range.



LCD Display graphic showing
to lower control panel end



LCD Display graphic showing
to raise control panel end

The body can be propped up by using different sized legs front to back.

DR100/G OPERATING INSTRUCTIONS cont.

Using the Feet for Different Diameter Pipes

The DR100 has a number of sets of legs of differing lengths and each set has a size printed on them which refers to the diameter size of the pipe you wish to use the laser inside of. The idea is that with the correct size feet the laser dot should be central to the pipe. The feet are interchanged by un-screwing them in anti-clockwise direction. Note that the laser with no legs will fit a 100mm pipe. Legs are supplied to fit additional pipe diameters of 125mm, 150mm, 200mm, 225mm, 250mm, 300mm.

Using the Targets for Different Diameter Pipes

The DR100 comes with a heavy duty target holder that can hold either the 100-200mm target plate or 250-300mm target plate. To change plates or to adjust the height of the plate simply unlock the locking knob on the right and slide plate up, the pointer above the knob indicates the diameter.




The Target is designed to fit either inside or on top of the pipe and can be levelled left to right with the help of the bubble vial.



Note: DR100 comes with red target set and DR100G comes with a green target set.




Lock Keypad

The DR100 features a keypad lock function which when activated prevents unwanted button presses.

To activate this press the "ESC/LOCK" button  and either of the "LEFT" or "RIGHT" buttons   within one second to lock the arrow buttons. The LCD will display the following symbol.



To unlock press the same sequence of buttons.

The "UP" + or "DOWN" - button can be locked by pressing the "ESC/LOCK" button  and either the "UP" + button  or "DOWN" - button . These button will then be locked and the LCD display will show the following symbol.




To Unlock press the same sequence of buttons.

All four buttons can be locked by completing both combinations and the following symbol will be displayed.



Standby Mode

The DR100 features a standby mode, where the laser beam and LCD display is turned off. The Battery symbol remains showing and the grade set blinks to indicate standby mode. To enter standby press and hold the "ESC/LOCK" button  for three seconds. Repeat the same button press for three seconds to exit standby mode. Note: after 4 hours in standby mode the laser will automatically power down.

GRADE CONVERSION CHART

RATIO	%	RATIO	%	RATIO	%	RATIO	%	RATIO	%	RATIO	%	RATIO	%
1:1	100.000	1:41	2.439	1:81	1.235	1:121	0.826	1:157	0.637	1:196	0.510	1:380	0.263
1:2	50.000	1:42	2.381	1:82	1.220	1:122	0.820	1:158	0.633	1:197	0.508	1:385	0.260
1:3	33.333	1:43	2.326	1:83	1.205	1:123	0.813	1:159	0.629	1:198	0.505	1:390	0.256
1:4	25.000	1:44	2.273	1:84	1.190	1:124	0.806	1:160	0.625	1:199	0.503	1:395	0.253
1:5	20.000	1:45	2.222	1:85	1.176	1:125	0.800	1:161	0.621	1:200	0.500	1:400	0.250
1:6	16.667	1:46	2.174	1:86	1.163	1:126	0.794	1:162	0.617	1:205	0.488	1:410	0.244
1:7	14.286	1:47	2.128	1:87	1.149	1:127	0.787	1:163	0.613	1:210	0.476	1:420	0.238
1:8	12.500	1:48	2.083	1:88	1.136	1:128	0.781	1:164	0.610	1:215	0.465	1:430	0.233
1:9	11.111	1:49	2.041	1:89	1.124	1:129	0.775	1:165	0.606	1:220	0.455	1:440	0.227
1:10	10.000	1:50	2.000	1:90	1.111	1:130	0.769	1:166	0.602	1:225	0.444	1:450	0.222
1:11	9.091	1:51	1.961	1:91	1.099	1:131	0.763	1:167	0.599	1:230	0.435	1:460	0.217
1:12	8.333	1:52	1.923	1:92	1.087	1:132	0.758	1:168	0.595	1:235	0.426	1:470	0.213
1:13	7.692	1:53	1.887	1:93	1.075	1:133	0.752	1:169	0.592	1:240	0.417	1:480	0.208
1:14	7.143	1:54	1.852	1:94	1.064	1:134	0.746	1:170	0.588	1:245	0.408	1:490	0.204
1:15	6.667	1:55	1.818	1:95	1.053	1:135	0.741	1:171	0.585	1:250	0.400	1:500	0.200
1:16	6.250	1:56	1.786	1:96	1.042	1:136	0.735	1:172	0.581	1:255	0.392	1:510	0.196
1:17	5.882	1:57	1.754	1:97	1.031	1:137	0.730	1:173	0.578	1:260	0.385	1:520	0.192
1:18	5.556	1:58	1.724	1:98	1.020	1:138	0.725	1:174	0.575	1:265	0.377	1:530	0.189
1:19	5.263	1:59	1.695	1:99	1.010	1:139	0.719	1:175	0.571	1:270	0.370	1:540	0.185
1:20	5.000	1:60	1.667	1:100	1.000	1:140	0.714	1:176	0.568	1:275	0.364	1:550	0.182
1:21	4.762	1:61	1.639	1:101	0.990	1:141	0.709	1:177	0.565	1:280	0.357	1:560	0.179
1:22	4.545	1:62	1.613	1:102	0.980	1:142	0.704	1:178	0.562	1:285	0.351	1:570	0.175
1:23	4.348	1:63	1.587	1:103	0.971	1:143	0.699	1:179	0.559	1:290	0.345	1:580	0.172
1:24	4.167	1:64	1.563	1:104	0.962	1:144	0.694	1:180	0.556	1:295	0.339	1:590	0.169
1:25	4.000	1:65	1.538	1:105	0.952	1:145	0.690	1:181	0.552	1:300	0.333	1:600	0.167
1:26	3.846	1:66	1.515	1:106	0.943	1:146	0.685	1:182	0.549	1:305	0.328	1:625	0.160
1:27	3.704	1:67	1.493	1:107	0.935	1:147	0.680	1:183	0.546	1:310	0.323	1:650	0.154
1:28	3.571	1:68	1.471	1:108	0.926	1:148	0.676	1:184	0.543	1:315	0.317	1:675	0.148
1:29	3.448	1:69	1.449	1:109	0.917	1:149	0.671	1:185	0.541	1:320	0.313	1:700	0.143
1:30	3.333	1:70	1.429	1:110	0.909	1:150	0.667	1:186	0.538	1:325	0.308	1:725	0.138
1:31	3.226	1:71	1.408	1:111	0.901	1:151	0.662	1:187	0.535	1:330	0.303	1:750	0.133
1:32	3.125	1:72	1.389	1:112	0.893	1:152	0.658	1:188	0.532	1:335	0.299	1:775	0.129
1:33	3.030	1:73	1.370	1:113	0.885	1:153	0.654	1:189	0.529	1:340	0.294	1:800	0.125
1:34	2.941	1:74	1.351	1:114	0.877	1:154	0.649	1:190	0.526	1:345	0.290	1:825	0.121
1:35	2.857	1:75	1.333	1:115	0.870	1:155	0.645	1:191	0.524	1:350	0.286	1:850	0.118
1:36	2.778	1:76	1.316	1:116	0.862	1:156	0.641	1:192	0.521	1:355	0.282	1:875	0.114
1:37	2.703	1:77	1.299	1:117	0.855	1:157	0.637	1:193	0.518	1:360	0.278	1:900	0.111
1:38	2.632	1:78	1.282	1:118	0.847	1:158	0.633	1:194	0.515	1:365	0.274	1:950	0.105
1:39	2.564	1:79	1.266	1:119	0.840	1:159	0.629	1:195	0.513	1:370	0.270	1:1000	0.100
1:40	2.500	1:80	1.250	1:120	0.833	1:160	0.625	1:196	0.510	1:375	0.267		

DEGREES	%
1.00	1.746
2.00	3.492
3.00	5.240
4.00	6.993
5.00	8.749
6.00	10.510
7.00	12.278
8.00	14.054
9.00	15.838
10.00	17.636

PL650™ TECHNICAL SPECIFICATIONS

Technical Specifications

Laser Wavelength	635-670nm <5mW (520nm green)
Laser Class	3R
Range	150m with Target
Horizontal Accuracy	±1.5mm/30m
Grade Accuracy	±0.6mm/30m per Degree C
Gradient Range	-20% to +30%
Self Levelling Range	-10% to +25%
Li-ion Battery Duration approx	36 hours
Back up Battery	4x "C" cell Alkaline
Temperature Range	-10°C - +50°C
Storage Temperature	-20°C - +70°C
IP Dust Water Resistance	IP68
Low Power	LCD Display Graphic Flashes
Size	96 x 372mm
Weight	3Kg

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 your work with the laser located in a different position. 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 DR100 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 "C" size Alkaline batteries and check they are inserted correctly and pack fully tightened up into recess.*

Q. *Laser fails to find level, continually flashing!*

A. *Check that the laser is on a stable location without vibration, check batteries and replace if necessary, check that the left to right bubble vial is central. If still not working whilst the laser is turned on tilt the laser vertically upwards (do not look into beam) hold for 10 seconds then place back onto ground, this will re-set the sensors without changing calibration.*

Notes

REDBACK LASERS WARRANTY

Duration of warranty is fixed and automatic, when we advertise 3 years on a particular model, its three 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 Unit 2, 381-383 Thompson Rd, Bell Park, Victoria 3215 ph 1800 769 858

"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 PL650 / PL650G Two 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. 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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