Harwell

VR-7

DC REFERENCE STANDARD

USER MANUAL

Revision D 2022

LIMITED WARRANTY AND LIMITATION OF LIABILITY

Harwell products have been engineered and designed with quality and longevity in mind. Every product is warranted to be free from defects in material and workmanship under normal use and service in a controlled environment. Harwell's warranty period is one year beginning on the date of shipment of the product. Parts, product repairs, and services are warranted for 90 days unless otherwise noted. This warranty extends only to the original buyer or end-user purchaser of a Harwell authorized reseller, and does not apply to fuses, disposable batteries, or to any product which, in Harwell's opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation or handling. Harwell warrants that software will operate in accordance with its design specifications. Harwell does not warrant that software will be error or "bug" free or operate without interruption.

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Harwell's warranty obligation is limited, at Harwell's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to a Harwell authorized service center within the specified warranty period.

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Some countries or states do not allow limitation of the term of an implied warranty, or exclusion or limitation of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any provision of this Warranty is held invalid or unenforceable by a court or other decision-maker of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision.

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INTRODUCTION

The Harwell VR-7 is a pocket-sized, portable DC Voltage Reference. It offers excellent short and long term drift, low temperature coefficient, and low noise.

DEVICE SPECIFICATIONS

Performance Specifications	
Output Voltage	2/2.048/5 VDC
Output Accuracy	±8 µV/V
Typical Temperature Coefficient	±3.58 ppm/°C (18-28°C)
Battery Life	120 hrs (approximate)
Low Battery Indicator Voltage	7 V

Mechanical Specifications	
Height	29mm
Width	30mm
Length	55mm
Weight	23.5g (Banana Plug Version) 16.3g (Post version)

Environmental	
Specified Operation	Temperature Range: 18 °C to 28 °C
	Relative Humidity: 0% to 90% to 28 °C, Noncondensing
	Altitude: 0 m to 1830 m (0 ft to 6000 ft)

Electromagnetic Compatibility	
USA (FCC)	47 CFR 15 subpart B, this product is considered an exempt device per clause 15.103 (b)

POWER REQUIREMENTS

Battery: One (1) 9V Battery (IEC 6LR61)
Power Consumption: <5mA
Battery Life: >120 hours
Power Indicator: Green LED
Low Battery Indicator: Red LED, illuminates when battery voltage is ~7V.

OPERATING INSTRUCTIONS

WARNING: This device is a voltage reference and not designed to be a power source. Output current is limited to 10ma.

1. Insert a 9V battery into the battery compartment located on the back of the device
2. Turn the device on by sliding the power switch to the ON position.
3. Ensure that the LOW BATT indicator does not illuminate, other replace battery.
4. Allow 15 minutes for the device to warm up and settle.
5. The output now may be measured at the output terminals.
6. Turn off the device when not in-use to reduce drift.

CALIBRATION

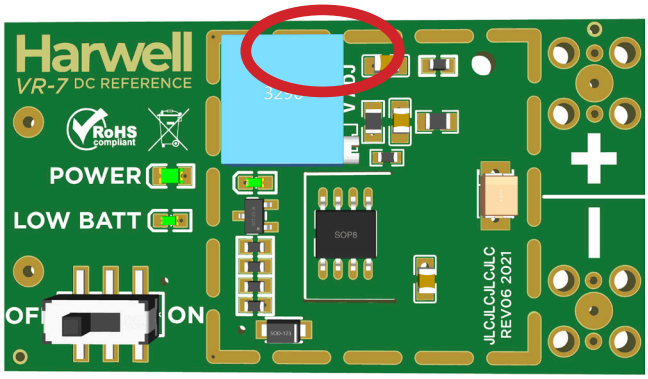
Your device was calibrated to within 0.008% of its nominal value at 23 °C.
The recommended calibration interval is 12 months.

RECOMMENDED EQUIPMENT

- 7.5-8.5 Digit Multimeter or Keysight 34420A/Keithley 2182A + Fluke 732 DC Reference
- Bourns H-90 Adjustment tool or Precision Slotted 1.8mm (.070") Screwdriver

CALIBRATION INSTRUCTIONS

1. Insert a fresh 9V battery into the device.
2. Turn on the device and allow the unit to operate and stabilize for at least 1 hour.
3. Attach test leads and measure output.
4. If output is not within specifications, adjustment is required.
5. Remove the RF shield by gently lifting on the corner of the shield using a plastic spudger or flat screwdriver. Shield edges may be sharp be careful to avoid injury.
6. Locate the blue adjustment trimmer located in the upper left corner. The adjustment screw is located on the right, under the shield frame.
7. Slowly turn the adjustment screw using a flat blade screwdriver until the unit is within specifications. 1/4 of a turn is approximately 5 microvolts. Allow the unit to settle for 30mins.
8. Measure and repeat adjustment procedure if necessary.
9. Replace cover.



A NOTE ON NOISE/EMF

This device has been engineered to reduce the effect of EMF however still may be effected due to the nature of low voltage measurements. Any radio sources may induce microvolt variances. For best results, keep cellphones, computers, access points, microwave ovens either off or as far away as possible during device usage. This also applied to certain lighting devices using transformers such as with fluorescent lamps. We also recommend using low EMF test connectors to reduce the effect of thermal EMF from dissimilar metals.

QUESTIONS?
PLEASE CONTACT US AT INFO@HARWELLUSA.COM