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THE 4910 DC VOLTAGE REFERENCE STANDARD

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THE MODEL 4910 DC VOLTAGE REFERENCE STANDARD

- FOUR INDEPENDENT 10V OUTPUT CELLS
- AVERAGE OUTPUT PROVIDES 1ppm/YEAR STABILITY
- 1V and 1.018V OUTPUTS AT 2ppm/YEAR STABILITY
- REMOTE SENSING BUFFER FOR DRIVING DIVIDERS
- TC BETTER THAN 0.05ppm/°C
- 7 DAYS INTERNAL BATTERY BACKUP, WITH FULL DISCHARGE PROTECTION
- ELECTRICALLY AND MECHANICALLY RUGGED

The Datron Models 4910 and 4911 are the ultimate in Electronic DC Voltage Reference Standards, providing a benchmark against which all other devices of this type should be compared. While offering all the practical advantages of electronic references -ruggedness and ease of use - they are the first solid state devices available with sufficient stability to replace the saturated Weston Cell as a company prime DC Voltage Standard.

4910 DC VOLTAGE REFERENCE STANDARD

4911 DC VOLTAGE REFERENCE STANDARD

LINE STATUS INDICATOR

COMMON DIGITAL POWER SUPPLY STATUS

7 DAY BACKUP FROM INTERNAL BATTERIES

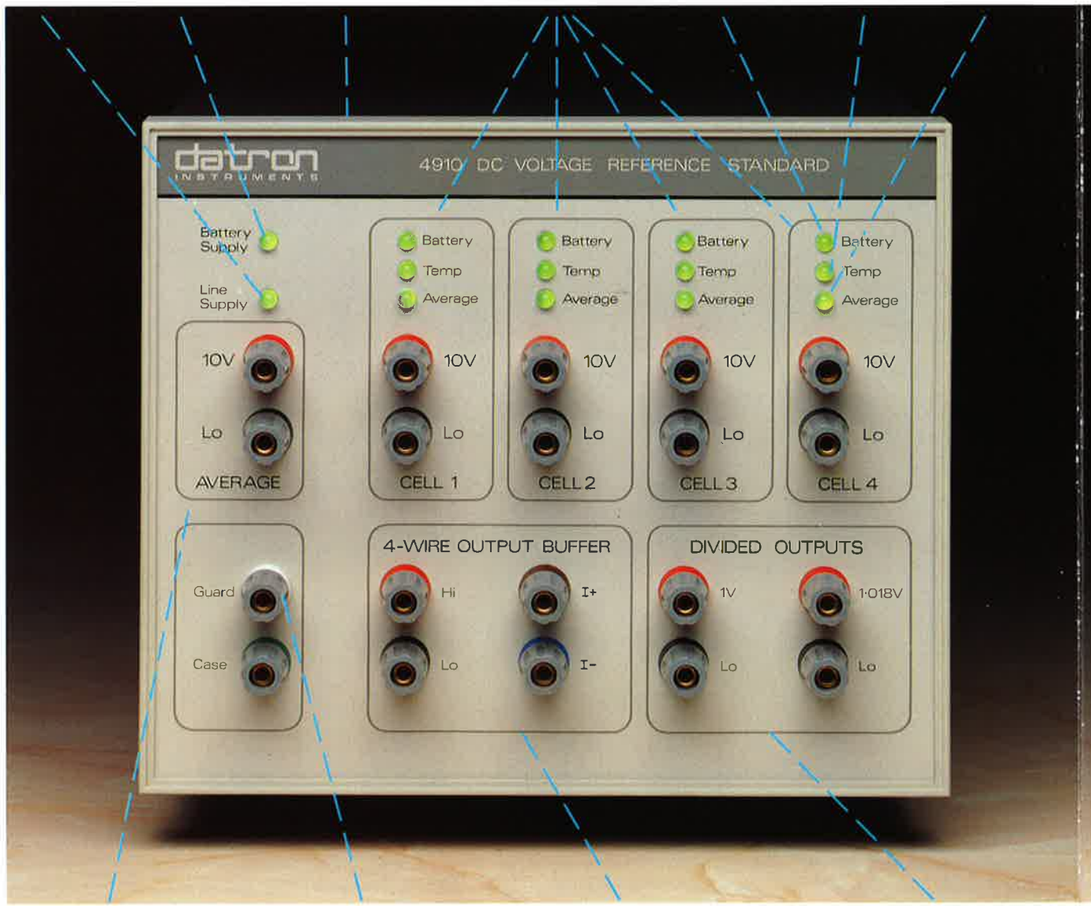
4 INDEPENDENT 10V CELLS

STATUS OF CELL POWER SUPPLY (GREEN/RED)

REFERENCE TEMPERATURE INDICATOR (GREEN/RED)

GREEN IF INCLUDED IN AVERAGE, RED IF NOT

FOR APPLICATIONS REQUIRING A 10V STANDARD ONLY, THE 4911 OFFERS A COST-EFFECTIVE SOLUTION, ELIMINATING THE HIGH CURRENT 4-WIRE OUTPUT BUFFER, THE 1V AND THE 1.018V OUTPUTS. OTHERWISE, ALL DESCRIPTIONS AND SPECIFICATIONS APPLY TO BOTH INSTRUMENTS.



AVERAGE OUTPUT GIVES 1PPM/YEAR STABILITY

LOW THERMAL GOLD PLATED TERMINALS

REMOTE SENSING OUTPUT BUFFER DRIVES 10V AVERAGE TO 15mA

LOW VOLTAGE OUTPUTS GIVE 2PPM/YEAR STABILITY

VERSATILE ARCHITECTURE

The 4910 and 4911 are Electronic DC Voltage References, each offering four independent 10V 'cells'. This allows direct intercomparison between the cells at the output terminals, so the user may detect and evaluate excessive drift in any individual cell without the use of a higher accuracy standard. Each cell is truly independent, possessing separate power supplies, heaters and temperature control circuits, meaning that errors due to variations in these elements are uncorrelated and therefore detectable. In addition, the output of each 10V cell may be adjusted with better than 0.1ppm resolution, so that at re-calibration, they may be reset to nominal. Since all of the cell output levels are then within microvolts of each other, the intercomparison may be performed with a very high level of accuracy.

The four 10V cells may be selectively averaged in hardware, giving a significant improvement in long term stability and short term noise over the individual cell outputs. As well as providing the highest stability, the 10V average output provides the ideal low noise reference against which to measure the individual cells. Since the difference between the bank average and each cell may be measured directly, the extra stage of calculations required by standards without this facility is eliminated. A set of easily accessible low thermal EMF links determine whether or not a cell is included in the average, while the presence, or not, of the links is indicated by the state of the 'In Average' indicator LED on the front panel. The 10V Average output is also permanently connected to the input of a 4-wire remote sensing buffer capable of sourcing up to 15mA. This allows the user to drive an accurate voltage into a load (such as a Kelvin-Varley type divider) without having to compensate for lead resistances. If higher voltages are required, the total independence of each output cell means that they may be electrically isolated from each other by removal of the averaging links and 'stacked' to provide voltages in multiples of 10V, for instance up to 40V from a single unit.

'. . . .the new standard in DC Voltage measurements.'

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TRANSIT MODE

The four independent zener diode chips are the only circuit elements in the instrument that require a constant temperature to maintain accuracy, so a transit mode is offered in which all circuits are de-energised - with the exception of the zener diode, the heater control circuits and the battery monitor circuits. Since the heat losses from the chips themselves are so low, the battery backup will maintain the zener diodes at a constant temperature for seven days entirely on the unit's self-contained batteries. If the zener diode is operating at the correct temperature, the corresponding 'TEMP' LED on the instrument's front panel lights up green. If, however, the heater control circuits fail to maintain the zener diode at the correct temperature, the 'TEMP' LED lights up red. This state is latched, and the LED will remain red until the heaters regain control and the heater reset switch, recessed inside the rear panel, is depressed. This provides an indication to the user that the instrument's calibration is not necessarily valid.

In the transit mode, the charge levels of the batteries are constantly monitored, and the 'Battery' LED on the front panel will periodically flash green to indicate correct operation. When the battery charge levels fall to a threshold below which the heaters cannot maintain the zener diode's temperature, the LED will alternatively flash red and green. When this point is passed, the LED will flash red only. If the battery charge level falls further, the monitor circuits automatically disconnect all circuits from the battery supplies to avoid discharge past the batteries' deep discharge point, thereby preventing permanent damage.

If more than 7 days backup is required, the unit accepts a low DC voltage input in the range 10V to 40V, meaning that it may be kept powered by a car battery, or any other convenient source. Application of supply of the correct level and polarity is automatically detected, and the green 'ON' LED mounted on the unit's rear panel is illuminated.

Datron engineers have designed the 4910 and 4911 with reliability as a prime objective. If repairs do become necessary, a comprehensive warranty and worldwide network of centers offer the level of after-sales service that only a specialist company can provide.

Throughout design and manufacture, Datron improve methods which have already yielded high quality and reliability in earlier products. Our reputation for specialization and technical excellence is widely acknowledged, and with the 4910 and 4911 DC Voltage Reference Standards, Datron can continue to provide users with the finest range of measurement instruments.

'Seven day battery backup and rugged construction take precision DC Voltage measurements outside the standards lab - to anywhere in the world.'

4910 AND 4911 SPECIFICATIONS

	10V AVERAGE	10V CELL	10V 4-WIRE BUFFER*	...1.018V*	1V*
STABILITY (±1°C), ppm 30 days 90 days 1 year	 0.3 0.8 1.0	 0.3 1.0 1.5	 0.3 1.0 1.5	 0.6 1.5 2.0	 0.6 1.5 2.0
TC (0°C-50°C), ppm/°C	0.05	0.05	0.06	0.10	0.12
NOISE, 0.01Hz-2Hz, ppm RMS	0.02	0.04	0.03	0.10	0.10
OUTPUT RESISTANCE	100Ω	100Ω	<100μΩ	100Ω	100Ω
CURRENT DRIVE	-	-	15mA	-	-
SETTING RESOLUTION, ±ppm	-	<0.1	-	<0.2	<0.2

*Not applicable to 4911

LINE REGULATION: <0.01ppm for all power supply conditions
OUTPUT PROTECTION: The outputs may be indefinitely shorted, and will withstand 1100V transients (to 25mA)
All terminals may be floated to 100V from instrument case.
LOW VOLTAGE POWER INPUT: 10V to 40V DC.
BATTERY BACKUP: Transit Mode: 168 hours (7 days) at 25°C ambient falling to 100 hours (4 days) at 0°C ambient
Operating Mode: 17 hours at 25°C ambient

POWER SUPPLY	100V, 120V, 220V, 240V ±10%, 47-63Hz
POWER CONSUMPTION	<40VA
OPERATING TEMPERATURE	0°C to +40°C
STORAGE TEMPERATURE	−40°C to +50°C
DIMENSIONS (H×W×D)	177mm (7") × 214mm (8.5") × 591mm (23.3")
WEIGHT	20kg (44lbs)
SAFETY	Designed to UL1244, IEC 348, BS4743
WARRANTY	1 Year

ORDERING INFORMATION

4910	DC Voltage Reference Standard
4911	DC Voltage Reference Standard
Option 10	Calibration and Hot Shipment
Option 20	Drift rate characterization derived from 90 days of pre-shipment measurements (must be ordered with Option 10)
Option 30	1.018V set to requested level (must be ordered with Option 10). Not applicable to 4911
Option 40	Ruggedized Transit Case
Option 50	Soft Carrying Case and Terminal Protector Cover
Option 90	Rack Mount Kit

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