



732A

### 732A dV Reference Standard

- 10V, 1V and 1.018V outputs
- 0.5 ppm stability per month
- 18°C to 28°C operation at full accuracy specs
- Short circuit proof
- Traceable calibration available through Fluke Direct Voltage Maintenance Program to NBS
- Line and rechargeable battery powered
- 12-hour battery life for calibration transfer

The Fluke 732A is a solid state, dV reference standard which provides significant performance improvements in stability, ruggedness, and transportability. Its 10V output offers better resolution, lower noise, and simpler operation than standard cells. The 732A also includes outputs of 1.0 and 1.018 volts.

The accuracy and stability of the 732A allows direct substitution for saturated standard cells in many applications. Its stability of 0.5 ppm for 30 days provides the confidence necessary to calibrate high-performance instruments. In addition, the use of the 10V output as a primary reference standard means that the effects of thermal emfs and noise are reduced.

The 732A can be shorted, even for extended periods of time, without damage and recovers without loss of stability. The unit may be powered by line voltage or will operate 12 hours on its internal battery — even longer on external batteries. Either line power or the battery may be removed without affecting the output.

Saturated standard cells are fragile and susceptible to shock and vibration during traveling. The 732A was designed for air or ground shipment with no special handling.

The internal oven has high thermal gain allowing full accuracy to be specified over an operating range of 23°C ±5°C. Therefore, this new reference standard may be used outside of the conventional standards laboratory environment in areas where saturated cells or other transfer standards would not be reliable.

The 732A dV Reference Standard was originally developed by Fluke to transfer the volt into our own manufacturing facility. The unprecedented success achieved by this effort led to the development of the 732A for the commercial market. Fluke has developed a worldwide network of regional support centers to provide calibration support for the 732A where local standards are not available. These centers maintain volt-transfer programs with the national standards laboratories.

### Specifications\*

**Absolute Uncertainty:** The 732A is normally delivered without absolute uncertainty specifications because, to maintain calibration as a traceable standard, the 732A must continue to receive uninterrupted operating voltage from line power or from the self-contained batteries, which provide approximately 12 hours of off-line operation. The 732A is normally shipped from the factory with the battery switch turned off. Upon receipt, the 732A must be powered up and stabilized for 24 hours before calibration against traceable standards. The absolute uncertainty specifications for the 732A must then relate to the uncertainty specifications of the traceable standards used for this calibration.

For a certified calibration by the Fluke Standards Laboratory and shipment under power, refer to the 732A-000 and 732A-100 options described under the Direct Voltage Maintenance Program, next page.

These specifications include effects of line voltage variations of ±10% and assume the 732A has been continuously powered.

**Stability:** Parts per million, 18°C to 28°C

Output	30 Days	90 Days	6 Months	1 Year
10V	±0.5	±1.0	±1.5	±3.0
1.018V	±1.5	±4.0	±6.0	±12.0
1V	±1.5	±4.0	±6.0	±12.0

**Temperature Coefficient:** ±0.05 ppm per °C for 10V range, ±1.0 ppm per °C for 1V and 1.018V ranges, from 18°C to 0°C or 28°C to 40°C

**Output Adjustment:** ±50 μV for 10V and 1.018V ranges, ±5 μV for 1.0V range

**Output Impedance:** ≤5 mΩ for 10V output, 1 kΩ for 1V and 1.018V outputs

**Output Current:** ≤12 mA at 10V output. Limited by 1 kΩ output impedance at 1V and 1.018V output

**Output Protection:** May be shorted indefinitely. Protected against high voltage input transients to 1100V

**Load Regulation:** ≤6 ppm at 10V output from 0 to 12 mA

**Line Regulation:** ≤0.05 ppm of output for ±10% line change

**Output Noise:** ≤1 μV rms at 10V output from 0.1 Hz to 10 Hz

\*See the Direct Voltage Maintenance Program description on page 121 for the improved specifications and traceability which can be obtained for the 732A.

### General Specifications

**Temperature:** 0°C to 40°C, operating; 0°C to 50°C, non-operating (with internal battery pack switched off)

**Relative Humidity:** ≤95% to 30°C, ≤75% to 40°C, non-condensing

**Altitude:** ≤3050m (10,000 ft) operating

**Vibration:** Per MIL-T-28800, Type III, Class 5, Style E

**Safety:** IEC 348, 2nd edition, 1978 and ANSI C39.5, 1980

**Power:** 100V, 120V, 220V, or 240V ac ±10%, 50 to 400 Hz or 24 to 30V ac 50 to 60 Hz. Also external 24 to 40V dc. Internal 24-V lead acid, gelled electrolyte battery operates for 12 hours at 23°C when fully charged.

Trickle-charged continually when external power is applied

**Size:** 19.1 cm H x 22.1 cm W x 60.3 cm D (7.53 in x 8.69 in x 23.75 in)

**Weight:** 12.3 kg (27 lb)

**Included:** Instruction manual, line cord.