Section 1
Introduction and Specifications

1-1. INTRODUCTION

1-2. The Fluke Model 732A is a highly stable, rugged, and transportable, solid state, dc voltage reference standard. The 732A has 10V, 1.018V and 1V outputs. These outputs are available on front panel binding posts. The calibration adjustments for the 10V, 1.018V and 1V outputs are accessible through the front panel. A non-conducting adjustment tool is supplied with the unit for this purpose.

1-3. All outputs of the 732A can be shorted indefinitely without damage. Recovery occurs in less than 2 minutes after the short is removed, with no loss of stability.

1-4. The stability and accuracy of the 732A allow direct substitution for saturated standard cells in many applications. The stability specification of 0.5 ppm for 30 days is achieved by enclosing the reference amplifier and output divider of the 732A in a high thermal gain oven. Full accuracy is attained over the specified ambient temperature range of 23 ± 5°C (64.4 to 82.4°F). Variations in oven temperature may be monitored externally via the OVEN TEMP THERMISTOR terminals on the front panel.

1-5. The 732A may be powered from ac line power, an internal rechargeable battery, or an external low voltage ac or dc source. The 732A is designed to be powered continuously, including during storage or shipment. The back-up battery will continue to operate the 732A for up to 12 hours. Either line or battery power may be removed without affecting the output. The battery is kept charged by an internal battery charger when operating from ac line power, or from the external low voltage ac or dc source.

1-6. Various front panel LEDs (indicators) provide a continuous indication of the operating status of the 732A. The AC PWR indicator illuminates in the presence of ac line power. The BTRY CHG indicator is on steadily for normal charging activity, and is off when the battery is charged. The IN CAL indicator monitors the input voltage to the Reference and Oven. Should this voltage fall below that needed to keep the 732A operational, the IN CAL indicator is latched off, indicating a loss of power and standardization. Once power is restored and standardization has been verified, the IN CAL indicator can be reset.

1-7. The 732A may be used on the bench or rack mounted. The 732A is a half-rack width instrument and occupies 4 standard 1.75 inch rack spaces. Accessories for the 732A are listed in Table 1-1 and described in more detail in Section 6 of this manual. There are no options available for the 732A.

1-8. SPECIFICATIONS

1-9. Table 1-2 lists the specifications for the 732A.

Table 1-1. Accessories

MODEL NUMBER	DESCRIPTION
M00-800-523	Dual Mounting Fastener
M07-203-601	Half Width Rack Mount Kit
M07-200-601	Full Width Rack Mount Kit
5440A-7002	Low Thermal EMF Cable Assembly
732A-7001	Battery Pack
732A-7002	Transit Case
732A-7003	Battery Charger

Table 1-2. 732A Specifications

UTPUT VOLTAGE ..... 10 volts, 1.018 volts, or 1 volt

TRANSFER UNCERTAINTY ..... @18°C to 28°C

Output Voltage	Time Interval			
	30 Days	90 Days	6 Months	1 Year
10V	0.5 ppm	1.5 ppm	3.0 ppm	6.0 ppm
1.018V	1.5 ppm	4.0 ppm	8.0 ppm	12.0 ppm
1V	1.5 ppm	4.0 ppm	8.0 ppm	12.0 ppm

These specifications assume the unit has been continuously powered up with either ac or battery or both. The specifications include effects due to line regulation.

TEMPERATURE COEFFICIENT OF OUTPUT

Range	Temperature Coefficient (ppm/°C)	
	0°C to 18°C	28°C to 40°C
10V	±0.05	±0.05
1.018V	±1.0	±1.0
1V	±1.0	±1.0

OUTPUT ADJUSTMENT AND RESOLUTION

Output	Adj. Range	Adj. Resolution
10V	±50 μV	<0.05 ppm
1.018V	±50 μV	<0.25 ppm
1.0V	±5 μV	<0.10 ppm

OUTPUT IMPEDANCE

10V ..... ≤5 milliohms

1.018V, 1V ..... ≈1 kilohm

OUTPUT CURRENT

10V ..... 12 mA maximum

1.018V, 1V ..... Current limited by 1k Ω source impedance

OUTPUT PROTECTION ..... The output may be shorted indefinitely without damage to the instrument. The instrument is protected against high voltage up to 1000V provided that the net current into the 732A does not exceed 30 mA.

OUTPUT NOISE ..... ≤1 μV RMS at 10V output, 0.1-10 Hz.

LOAD REGULATION AT 0.12 mA OUTPUT CURRENT ..... ≤6.0 ppm

LINE REGULATION ..... ≤0.05 ppm of output for full ±10% power line variation.

LINE POWER REQUIREMENTS

Nominal Setting	Voltage Limits	Fuse
100V	90-110V	0.375A/250V SLO-BLO
120V	108-132V	0.375A/250V SLO-BLO
220V	198-242V	0.250A/250V SLO-BLO
240V	216-264V	0.250A/250V SLO-BLO

Table 1-2. 732A Specifications (cont)

AUXILIARY LOW VOLTAGE POWER REQUIREMENTS ..... 24-40V dc or 24-30V ac 50-400 Hz

INTERNAL BATTERIES ..... 24V gelled-electrolyte lead-acid

TYPICAL BATTERY LIFE ..... 12 hours at 23°C

PROTECTION CLASS ..... Class 1 as defined in IEC 348.

SIZE (HxWxD) ..... 19.1 cm x 22.1 cm x 60.3 cm
7.5 in. x 8.5 in. x 23.7 in. (see Figure 1-1)

WEIGHT ..... 12.3 kg (27 lbs.)

COMPLIANCE WITH EXTERNAL STANDARDS ..... ANSI C39.5 Draft #8
IEC 348 2nd edition, 1978
CSA bulletin 556B, 17 Sep 1973
VDE 0411-1973
UL 1244

OPERATING TEMPERATURE ..... 0°C to 40°C

ALTITUDE

Non-operating ..... 0-12,200 meters, (40,000 feet)
Operating ..... 0-3,050 meters, (10,000 feet)

TEMPERATURE AND HUMIDITY

Condition	Temperature (°C)	% Relative Humidity (Non-condensing)
Non-operating	-40 to +50 0 to 50	Not Controlled 95 ±5%
Operating	0 to 30 30 to 40	95 ±5% 7 ±5%

VIBRATION

Frequency	G Force Frequency	Double Amplitude
5-55 Hz	2 @ 55 Hz	0.013 inch

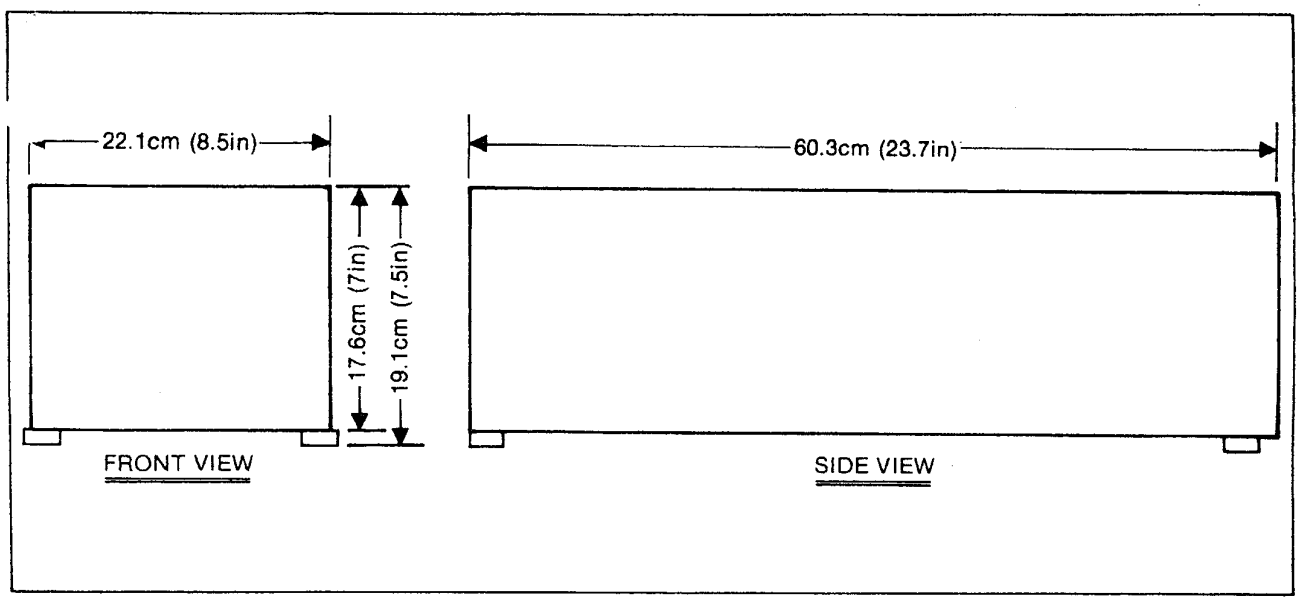

Figure 1-1. Outside Dimensions

Section 6
Accessories

6-1. INTRODUCTION

6-2. This section of the manual describes the accessories available for use with the model 732A.

6-3. DUAL MOUNTING FASTENER (M00-800-523)

6-4. The Dual Mounting Fastener is a 8-32 threaded fastener designed for bolting two half-rack width instruments together. The Dual Mounting Fasteners may be used for either dual rack mounting applications (as used in the M07-200-603 Full-Width Rack Mount Kit) or dual table top applications. Four M00-800-523 fasteners are required for each pair of half-rack width instruments.

6-5. HALF-WIDTH RACK MOUNT KIT (M07-203-601)

6-6. The Half-Width Rack Mounting kit permits the 732A to be rack mounted. A blank filler panel is supplied, allowing left or right hand offset mounting. Assembly instructions are supplied with the kit.

6-7. FULL-WIDTH RACK MOUNT KIT (M07-200-603)

6-8. The Full Width Rack Mounting kit permits the 732A to be rack mounted side-by-side with another half rack width instrument. This rack mounting method requires the 732A to be bolted to the adjacent instrument. To facilitate bolting the instruments together, four M00-800-523, Dual Mounting Fasteners are included with the kit. Assembly instructions are supplied with the kit.

6-9. LOW THERMAL EMF CABLE ASSEMBLY (5440A-7002)

6-10. The Low Thermal EMF Cable Assembly minimizes the effects of thermal emf errors in test and calibration set-ups. The plugs used are made of the same material as the jacks used in the instrument. Connections between the cables and plugs are carefully made to minimize generation of thermal errors.

6-11. BATTERY PACK (732A-7001)

6-12. The Battery Pack is a replacement module for the rear panel, Battery Module on the 732A. It may be used as an additional auxiliary source, or as a spare.

6-13. TRANSIT CASE (732A-7002)

6-14 The Transit Case provides a means of transporting the 732A while continuously powered by a battery source contained within the Transit Case. This allows continuity of standardization transportation over long distances.

6-15. BATTERY CHARGER (732A-7003)

6-16. The Battery Charger provides the capability to charge up to four battery packs at once. This unit is designed to be used with the transit case for extended battery operation during transit.