T.O. 33K1-4-1820-1

TECHNICAL MANUAL

CALIBRATION PROCEDURE

FOR

HIGH VOLTAGE INSTRUMENTS

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HIGH VOLTAGE INSTRUMENTS

1 CALIBRATION DESCRIPTION:

Table 1.

Test Instrument (TI) Characteristics	Performance Specifications	Test Method
DC Voltage	Range: 0 to 40 kVDC Accuracy: As specified in Appendix A	Apply a known Voltage

2 EQUIPMENT REQUIREMENTS:

	Noun	Minimum Use Specifications	Calibration Equipment	Sub-Item
2.1	HIGH VOLTAGE SYSTEM	Range: 0 to 40 kVDC Accuracy: ±0.05%	Universal Voltronics BRC-40-4-NA-1	
2.2	DIGITAL MULTIMETER (2 ea)	Range: 0 to 10 VDC, 10 G Input Impedance Accuracy: ±0.01%	Hewlett-Packard 3458A	Fluke 8506A

3 PRELIMINARY OPERATIONS:

3.1 Review and become familiar with entire procedure before beginning Calibration Process.

WARNING

Unless otherwise designated, and prior to beginning the Calibration Process, ensure that all test equipment voltage and/or current outputs are set to zero (0) or turned off, where applicable. Ensure that all equipment switches are set to the proper position before making connections or applying power.

3.2 Connect all test equipment to 115 V/60 Hz power and allow a warm-up as required by manufacturer.

NOTE

For PMELs without the High Voltage Measurement System, T.O. 33K1-4-676-1 may be used as an alternate method to certify ESH( ) Model Electrostatic Voltmeters up to 10 kVDC or 30 kVAC.

3.3 Use para 4.2 if TI has a meter and para 4.1 if TI does not have a meter.

3.4 If the item to be certified has an Analog Meter, it is necessary to zero before placing the item into the HV Measurement System cage.

3.5 This procedure is for certification of DCV only. If TI has ACV specifications that are required by the owner/user, a written request may be submitted to AFPSL, or use T.O. 33K1-4-676-1 as specified in NOTE under para 3.2. Attach a Limited Certification Label annotated DC ONLY if this procedure only, T.O. 33K1-4-1820-1, is used to certify a TI with ACV capabilities. For ESH( ) Model Electrostatic Voltmeters, if fully calibrated, annotate calibration label AC Volts T.O. 33K1-4-676-1, DC Volts T.O. 33K1-4-1820-1.

3.6 Use only that portion of the calibration process section and Calibration Performance Table (CPT) applicable to the TI being calibrated.

3.7 The High Voltage System output voltage is certified at 5 kV to 40 kVDC. If desired, an additional check may be made at 1 kVDC (if within TI specifications) using a DC Voltage Standard such as the Fluke 332D or 5440B. This is not required, but need only be performed as a confidence check.

WARNING

Voltages hazardous to personnel may be encountered during the sequence of these test procedures. All necessary precautions during the conduct of these tests must be observed. When using the BRC-40-4-NA-1 High Voltage System, ensure ground lead on the rear panel of the power supply is connected to building ground to provide maximum protection against shock due to an ungrounded chassis. This ground stud should be connected to the low voltage end of the load.

4 CALIBRATION PROCESS:

NOTE

Unless otherwise specified, verify the results of each test and take corrective action whenever the test requirement is not met, before proceeding.

4.1 PROBE CALIBRATION:

CAUTION

Unless otherwise specified in Appendix A, do not apply High Voltage any longer than is necessary to sequentially complete steps in the CPT.

4.1.1 Connect the Digital Multimeter to the KNOWN and UNKNOWN jacks on the HV Measurement System, observe polarity.

4.1.2 Select VDC on the Digital Multimeter. Select 10 V range for the KNOWN Digital Multimeter. Set the range as required on the UNKNOWN Digital Multimeter. If TI requires a specified impedance for maximum accuracy, as stated in Appendix A, ensure that the range selected for the UNKNOWN Digital Multimeter matches this impedance.

WARNING

Ensure that HIGH VOLTAGE indicator is not ON before opening the cage door on the HV Measurement System. Ensure that the voltage has been set to 00000.

4.1.3 Open the cage door on the HV Measurement System and connect the TI high voltage terminal to the HV Measurement System high voltage lead and the TI ground to the HV Measurement System ground lead. Connect TI OUTPUT to the UNKNOWN Digital Multimeter lead, observe polarity. Close the cage door on the HV Measurement System.

4.1.4 On the HV Measurement System, set the mA ADJUST control to maximum and press HIGH VOLTAGE ON button.

4.1.5 Set the HV Measurement System HV ADJUST to the first applied value.

4.1.6 While monitoring the KNOWN Digital Multimeter, adjust the KV ADJUST until the KNOWN Digital Multimeter indication equals the applied value divided by 10000.

4.1.7 The indication on the UNKNOWN Digital Multimeter multiplied by Ratio of the TI must indicate within the corresponding values listed in the Limits column.

4.1.8 Repeat steps 4.1.5 through 4.1.7 for each remaining applied value.

4.1.9 Set FW Measurement System voltage to zero, press OFF RESET and disconnect all equipment.

4.2 METER CALIBRATION:

CAUTION

Unless otherwise specified in Appendix A do not apply High Voltage any longer than is necessary to sequentially complete steps in the CPT.

4.2.1 Connect the Digital Multimeter to the KNOWN jacks on the HV Measurement System, observe polarity.

4.2.2 Set Digital Multimeter to the 10 VDC range.

WARNING

Ensure that HIGH VOLTAGE indicator is not ON before opening the cage door on the HV Measurement System. Ensure that the voltage has been set to 00000.

4.2.3 Connect TI high voltage terminal to the HV Measurement System high voltage lead and the TI ground to the HV Measurement System ground lead. Place TI so that the meter can be seen through the cage door. Close the cage door on the HV Measurement System.

4.2.4 On the HV Measurement System, set the mA ADJUST control to maximum.

4.2.5 Set TI to first range indicated in the Range column (if applicable) and press HV ON button.

4.2.6 Set the HV Measurement System HV ADJUST to the first applied value.

4.2.7 While monitoring the TI, adjust the KV ADJUST until the TI or associated meter indicates the first applied value.

4.2.8 The indication on the KNOWN Digital Multimeter multiplied by 10000 must indicate within the corresponding values listed in the Limits column.

4.2.9 Repeat steps 4.2.5 through 4.2.8 for each remaining applied value.

4.2.10 Set HV Measurement System voltage to zero, press OFF RESET and disconnect and secure all equipment.

4.3 DIVIDER CALIBRATION:

CAUTION

Unless otherwise specified in Appendix A, do not apply High Voltage any longer than necessary to sequentially complete steps in the CPT.

4.3.1 Connect Digital Multimeter to the KNOWN and UNKNOWN on the HV Measurement System.

4.3.2 Set Digital Multimeter to the 10 VDC range.

WARNING

Ensure that HIGH VOLTAGE indicator is not ON before opening the cage door on the HV Measurement System. Ensure that the voltage has been set to 00000.

4.3.3 Open the cage door on the HV Measurement System, connect the TI high voltage terminal to the HV Measurement System high voltage lead and the TI ground to the HV Measurement System ground lead. Connect TI OUTPUT or TAP to be certified to the UNKNOWN Digital Multimeter lead, observe polarity. Close the cage door on the HV Measurement System.

4.3.4 On the HV Measurement System, set the mA ADJUST control to maximum and press HIGH VOLTAGE ON button.

4.3.5 Set the HV Measurement System HV ADJUST to the first applied value.

4.3.6 While monitoring the KNOWN Digital Multimeter, adjust the KV ADJUST until the KNOWN Digital Multimeter indication equals the applied value divided by 10000.

4.3.7 The indication on the UNKNOWN Digital Multimeter multiplied by the Ratio of the TI must indicate within the corresponding values listed in the Limits column.

4.3.8 Repeat steps 4.3.3 through 4.3.7 for each TI OUTPUT or TAP to be certified.

4.3.9 Set HV Measurement System voltage to zero, press OFF RESET and disconnect and secure all equipment. Set HV Measurement System voltage to zero, press OFF RESET and disconnect and secure all equipment.

APPENDIX A

HIGH VOLTAGE INSTRUMENTS

Table A-1.

SPECIFICATIONS AND CALIBRATION PERFORMANCE TABLES LISTING

APPENDIX A

SPECIFICATIONS AND CALIBRATION PERFORMANCE TABLES

D102H (W.H. ASSOCIATES/MEDISTOR) HV DIVIDER

Performance Specifications

RANGE: 5 kVDC

OUTPUT TAPS:

Accuracy: ±0.01%

Stability: ±0.01%

FRONT PANEL METER:

Not specified, for approximate magnitude indications only.

CALIBRATION PERFORMANCE TABLE

Tap	Applied (VDC)	Limits (VDC)
1 V	5 k	4990 to 5010
10 V	5 k	4990 to 5010

NOTE

Attach a Limited Certification Label annotated with Accuracy ±0.2%

ESH ( )

(SENSITIVE RESEARCH, SINGER, SR ENGINEERING)

ELECTROSTATIC VOLTMETER

Performance Specifications

0 to 40 kVDC/AC,

±1% FS, ±0.5% FS

NOTE

Use ±0.5% FS limits if TI P/N ends with X. Use ±1% FS limits for all others.

CALIBRATION PERFORMANCE TABLE

Range *	Applied (VDC)	Limits (VDC) (±1% FS)	Limits (VDC) (±0.5% of FS)
5000	5 k	4950 to 5050	4975 to 5025
7500	5 k	4925 to 5075	4962 to 5038
	6 k	5925 to 6075	5962 to 6038
	7.5 k	7425 to 7575	7462 to 7538
10000	5 k	4900 to 5100	4950 to 5050
	7 k	6900 to 7100	6950 to 7050
	10 k	9900 to 10100	9950 to 10050
15000	5 k	4850 to 5150	4925 to 5075
	10 k	9850 to 10150	9925 to 10075
	15 k	14850 to 15150	14925 to 15075
20000	5 k	4800 to 5200	4900 to 5100
	10 k	9800 to 10200	9900 to 10100
	15 k	14800 to 15200	14900 to 15100
	20 k	19800 to 20200	19900 to 20100
25000	5 k	4750 to 5250	4875 to 5125
	10 k	9750 to 10250	9875 to 10125
	15 k	14750 to 15250	14875 to 15125
	20 k	19750 to 20250	19875 to 20125

See footnote at end of Table.

CALIBRATION PERFORMANCE TABLE *(Cont.)*

Range *	Applied (VDC)	Limits (VDC) (±1% FS)	Limits (VDC) (±0.5% of FS)
25000	25 k	24750 to 25250	24875 to 25125
30000	10 k	29700 to 30300	29850 to 30150
	20 k	19700 to 20300	19850 to 20150
	30 k	29700 to 30300	29850 to 30150
40000	5 k	4600 to 5400	4800 to 5200
	10 k	9600 to 10400	9800 to 10200
	20 k	19600 to 20400	19800 to 20200
	30 k	29600 to 30400	29800 to 30200
	40 k	39600 to 40400	39800 to 40200

* Use ranges that apply to the TI being calibrated.

HVP-40 (PINTEK) HV PROBE

Performance Specifications

±1% at 1 to 20 kVDC
±2% at 20 to 40 kVDC
Use with 10 M Ohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4950 to 5050
10 k	9900 to 10100
20 k	19800 to 20200
25 k	24500 to 25500
30 k	29400 to 30600
35 k	34300 to 35700
40 k	39200 to 40800

HV-2 (VALHALLA) HV PROBE

Performance Specifications

Up to 40 kVDC, ±2% FS Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
10 k	9200 to 10800
15 k	14200 to 15800
20 k	19200 to 20800
25 k	24200 to 25800
30 k	29200 to 30800
35 k	34200 to 35800
40 k	39200 to 40800

HV231-22 (BECKMAN) HV PROBE

Performance Specifications

Up to 40 kVDC, ±2%
Use with 22 MΩ Input Impedance Voltmeter

NOTE

Owner must supply the meter with which the TI will be used or a meter with 22 MΩ input impedance and a DCV accuracy of at least 0.5% may be substituted for the UNKNOWN Voltmeter.

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4900 to 5100
10 k	9800 to 10200
20 k	19600 to 20400
30 k	29400 to 30600
40 k	39200 to 40800

HV40 (B & K PRECISION) HV PROBE

Performance Specifications

±2% at 25 kVDC
±4% at 1 to 20 kVDC and 30 to 40 kVDC

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4800 to 5200
10 k	9600 to 10400
20 k	19200 to 20800
25 k	24500 to 25500
30 k	28800 to 31200
35 k	33600 to 36400
40 k	38400 to 41600

HV40B (COLINE LTD) HV PROBE

Performance Specifications

±2% at 0 to 40 kV, DC to 300 Hz
Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4900 to 5100
10 k	9800 to 10200
20 k	19600 to 20400
25 k	24500 to 25500
30 k	29400 to 30600
35 k	34300 to 35700
40 k	39200 to 40800

HV 40C (Test Probes Inc.) HV Probe

Performance Specifications

±1% 1 to 20 kVDC
±2% 20 to 40 kVDC

Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	DC Limits (VDC)
5 k	4950 to 5050
10 k	9900 to 10100
20 k	19600 to 20400
25 k	24500 to 25500
30 k	29400 to 30600
35 k	34300 to 35700
40 k	39200 to 40800

IM5210 (HEATH) HV PROBE

Performance Specifications

±3% FS, 0 to 40 kVDC

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	3800 to 6200
10 k	8800 to 11200
15 k	13800 to 16200
20 k	18800 to 21200
25 k	23800 to 26200
30 k	28800 to 31200
35 k	33800 to 36200
40 k	38800 to 41200

LHM-80B (LEADER) HV METER PROBE

Performance Specifications

±0 to 40 kVDC, ±3% FS

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	3800 to 6200
10 k	8800 to 11200
15 k	13800 to 16200
20 k	18800 to 21200
25 k	23800 to 26200
30 k	28800 to 31200
35 k	33800 to 36200
38 k	36800 to 39200

PM9246 (PHILLIPS) HV PROBE

Performance Specifications

±2%, 30 kVDC Max
Input Impedance set to
10 Megohm

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4900 to 5100
10 k	9800 to 10200
15 k	14700 to 15300
20 k	19600 to 20400
25 k	24500 to 25500
30 k	29400 to 30600

PR-28 (B & K PRECISION) & PR28 (DYNASCAN CORP) HV PROBE

Performance Specifications

±3% of output at 1 to 40 kVDC;
±5% of output at 1 to 20 kVAC, 50/60 Hz
Use with 10 Megohm Input Impedance Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4850 to 5150
10 k	9700 to 10300
15 k	14550 to 15450
20 k	19400 to 20600
25 k	24250 to 25750
30 k	29100 to 30900
35 k	33950 to 36050
40 k	38800 to 41200

V41A/V40A (DATA PRECISION) HIGH VOLTAGE PROBE

Performance Specifications

±2% at 20 kVDC
±4% at 1 to 2 kVDC and 30 to 40 kVDC
Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4815 to 5185
10 k	9690 to 10310
15 k	14450 to 15550
20 k	19600 to 20400
30 k	28800 to 31200
35 k	33600 to 36400
40 k	38400 to 41600

00033 (SIMPSON) HV PROBE

Performance Specifications

±2% FS, 0 to 40 kVDC

NOTE

Before proceeding, connect a 50 kΩ, 1 watt, 0.5% resistor across the INPUT of the UNKNOWN Digital Multimeter. Division Ratio 20000:1.

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4200 to 5800
10 k	9200 to 10800
15 k	14200 to 15800
20 k	19200 to 20800
25 k	24200 to 25800
30 k	29200 to 30800
35 k	34200 to 35800
40 k	39200 to 40800

00034 (SIMPSON) HV PROBE

Performance Specifications

±2% FS, 0 to 10 kVDC

NOTE

Before proceeding, connect a 50 kΩ, 1/2 watt, 0.5% resistor across the input of the UNKNOWN Digital Multimeter. Multiply UNKNOWN Digital Multimeter indication by 4000 to obtain reading for Limits.

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4800 to 5200
6 k	5800 to 6200
7 k	6800 to 7200
8 k	7800 to 8200
9 k	8800 to 9200
10 k	9800 to 10200

00749 (SIMPSON) HV PROBE

Performance Specifications

±2% FS, 0 to 40 kVDC
Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4200 to 5800
10 k	9200 to 10800
15 k	14200 to 15800
20 k	19200 to 20800
25 k	24200 to 25800
30 k	29200 to 30800
35 k	34200 to 35800
40 k	39200 to 40800

10800BC (BALLANTINE) HV PROBE

Performance Specifications

±4% at 1 and 40 kVDC
±3% at 10 kVDC
±2% 20 and 30 kVDC
±1% at 25 kVDC
Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
10 k	9700 to 10300
20 k	19600 to 20400
25 k	24750 to 25250
30 k	29400 to 30600
40 k	38400 to 41600

12100 (JENNINGS) KILOVOLTMETER

Performance Specifications

DC and AC PK 0 to 10 kV, 0 to 50 kV;
AC rms 1 to 10 kV, 2 to 35 kV; ±1% FS ±1 Digit

CALIBRATION PERFORMANCE TABLE

Range (VDC)	Applied (VDC)	Limits (VDC)
10 k	5 k	4890 to 5110
	9 k	8890 to 9110
50 k	10 k	9400 to 10600
	20 k	19400 to 20600
	22 k	21400 to 22600
	24 k	23400 to 24600
	26 k	25400 to 26600
	28 k	27400 to 28600
	30 k	29400 to 30600
	35 k	34400 to 35600
	40 k	39400 to 40600

12500 (JENNINGS) KILOVOLTMETER

Performance Specifications

DC and AC rms
2 to 20 kV, ±(1% Rdg + 0.1% FS + 1 Digit);
5 to 50 kV, ±(1% Rdg + 0.1% FS + 1 Digit)

CALIBRATION PERFORMANCE TABLE

Range (VDC)	Applied (VDC)	Limits (VDC)
20 k	5 k	4920 to 5080
	10 k	9870 to 10130
	15 k	14820 to 15180
	19 k	18780 to 19220
50 k	5 k	4800 to 5200
	10 k	9700 to 10300
	20 k	19600 to 20400
	22 k	21600 to 22400
	24 k	23600 to 24400
	26 k	25600 to 26400
	28 k	27600 to 28400
	30 k	29500 to 30500
	35 k	34500 to 35500
	40 k	39400 to 40600

1600A (KEITHLEY) HV PROBE

Performance Specifications

±2% at 1 to 40 kVDC
Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4900 to 5100
10 k	9800 to 10200
15 k	14700 to 15300
20 k	19600 to 20400
25 k	24500 to 25500
30 k	29400 to 30600
35 k	34300 to 35700
40 k	39200 to 40800

248 (SIMPSON) HV PROBE

Performance Specifications

±3% up to 40 kVDC

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4850 to 5150
10 k	9700 to 10300
15 k	14550 to 15450
20 k	19400 to 20600
25 k	24250 to 25750
30 k	29100 to 30900
35 k	33950 to 36050

34111A (HEWLETT-PACKARD) HV PROBE

Performance Specifications

Less than; ±2% at 20 to 30 kVDC
Less than; ±4% at 0 to 20 kVDC and 30 to 40 kVDC
Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4800 to 5200
10 k	9600 to 10400
15 k	14400 to 15600
22 k	21560 to 22440
25 k	24500 to 25500
28 k	27440 to 28560
35 k	33600 to 36400
40 k	38400 to 41600

34119A (HEWLETT-PACKARD) HV PROBE

Performance Specifications

±1.5% 0 to 5 kVDC;
±1.5% 0 to 5 kVAC @ <100 kHz;
±2.5% 0 to 5 kVAC @ 100 kHz to 250 kHz;
±2.5% 0 to 2.5 kVAC @ 250 kHz to 1 MHz
Use with 10 Megohm input meter for DC and
1 Megohm input meter for AC

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4925 to 5075

382846 (FLUKE) HV PROBE

Performance Specifications

±1% at 25 kVDC;
±2% at 20 to 30 kVDC;
±5% up to 28 kVAC @ 60 Hz
Changes Linearly from;
±4% at 1 kVDC to ±2% at 20 kVDC and
±2% at 30 kVDC to ±4% at 40 kVDC
Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4825 to 5175
10 k	9700 to 10300
20 k	19600 to 20400
25 k	24750 to 25250
30 k	29400 to 30600
35 k	33950 to 36050
40 k	38400 to 41600

80E10 (FLUKE) HV DIVIDER

Performance Specifications

Range: 10 kVDC

OUTPUT TAPS:
Accuracy: ±0.01%

Stability: ±0.01%

FRONT PANEL METER:
Not specified, for approximate magnitude indications only.

NOTE

Full input voltage should be applied for a minimum of 30 minutes prior to calibration.

CALIBRATION PERFORMANCE TABLE

Tap	Applied (VDC)	Limits (VDC)
1 V	5 k	4990 to 5010
	10 k	9980 to 1020
10 V	5 k	4990 to 5010
	10 k	9980 to 10020

NOTE

Attach a Limited Certification Label annotated with Accuracy ±0.2%.

80E5 (FLUKE) HV DIVIDER

Performance Specifications

Range: 5 kVDC

OUTPUT TAPS:

Accuracy: ±0.01%

Stability: ±0.01%

FRONT PANEL METER:

Not specified, for approximate magnitude indications only.

NOTE

Full input voltage should be applied for a minimum of 30 minutes prior to calibration.

CALIBRATION PERFORMANCE TABLE

Tap	Applied (VDC)	Limits (VDC)
1 V	5 k	4990 to 5010
10 V	5 k	4990 to 5010

NOTE

Attach a Limited Certification Label annotated with Accuracy ±0.2%.

80F15( ) (FLUKE) HV PROBE

Performance Specifications

1 kV to 15 kVDC, ±0.05%

NOTE

Ensure that input impedance of multimeter matches the value marked on TI divider box. Attach a Limited Certification Label annotated with Accuracy ±0.2%.

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4990 to 5010
10 k	9980 to 10020
15 k	14970 to 15030

80F5 (FLUKE) HV PROBE

Performance Specifications

Accuracy: ±0.05%

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4990 to 5010

NOTE

Attach a Limited Certification Label annotated with Accuracy ±0.2%.

80K30 (FLUKE) HV PROBE

Performance Specifications

±1% at 15 kVDC
Changes Linearly to 4% at
1 kVDC and 30 kVDC
±5% to 21 kVAC, 60 Hz
Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4800 to 5200
10 k	9750 to 10250
15 k	14850 to 15150
20 k	19530 to 20470
25 k	24075 to 25925
30 k	28800 to 31200

80K40 (FLUKE) HV PROBE

Performance Specifications

NOTE

The 80K40 HV Probe may have one of at least three different sets of known Comm Data specifications depending upon when it was manufactured. Please refer to the specifications that came with the probe and match it to the correct specifications. Use applicable Limits column listed below.

If specifications do not accompany the probe, or are not available from the User, please calibrate the TI to the first set of specifications below. If the TI does not meet these specifications, calibrate to the second or third set of specifications and place an appropriate Limited Certification Label on the probe. If this is unacceptable to the User, a second option is to return the probe to the User and have them upgrade it to the latest specifications by purchasing an upgrade kit from Fluke Corp., or by sending the probe to Fluke Corp. for upgrade. After this upgrade, the probe should meet the first set of specifications.

In all situations, annotate the Certification Label or Limited Certification Label, as appropriate, with the accuracy TI is calibrated to.

*1 ±1%, 20 to 35 kV DC at 20 to 30 °C
add 1% at 10 °C to <20 and >30 to 45 °C;
±2%, 0 to <20 and >35 to 40 kV DC;
±5% @ 60 Hz, up to 28 kV AC rms
Use with 10 Megohm Input Voltmeter

*2 ±1%, 20 to 30 kV DC
Changes linearly from:
±1% at 30 kV DC to 2% at 40 kV DC and
±1% at 20 kV DC to 2% at 1 kV DC;
±5% @ 60 Hz, up to 28 kV AC rms
Use with 10 Megohm Input Voltmeter

*3 ±2%, 20 to 30 kV DC;
Changes linearly from:
±2% at 30 kV DC to 4% at 40 kV DC and
±2% at 20 kV DC to 4% at 1 kV DC;
±5% @ 60 Hz, up to 28 kV AC rms
Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC) *1	Limits (VDC) *2	Limits (VDC) *3
5 k	4900 to 5100	4910 to 5090	4821 to 5179
10 k	9800 to 10200	9847 to 10153	9695 to 10305
20 k	19800 to 20200	19800 to 20200	19600 to 20400
25 k	24750 to 25250	24750 to 25250	24500 to 25500
30 k	29700 to 30300	29700 to 30300	29400 to 30600
35 k	34650 to 35350	34475 to 35525	33950 to 36050
40 k	39200 to 40800	39200 to 40800	38400 to 41600

80K-40-5 (FLUKE) HV PROBE

Performance Specifications

±2% at 1 to 5 kVDC
±5% at 1 to 5 kVAC @ 60 Hz

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4900 to 5100

80K6 (FLUKE) HV PROBE

Performance Specifications

±1% at 0 to 6 kV, DC to 500 Hz
Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4950 to 5050
6 k	5940 to 6060

PR28A (B & K PRECISION) HV PROBE

Performance Specifications

±3% of output at 1 to 40 kVDC;
±5% of output at 1 to 28 kVAC, 50/60 Hz
Use with 10 Megohm Input Impedance Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4850 to 5150
10 k	9700 to 10300
15 k	14550 to 15450
20 k	19400 to 20600
25 k	24250 to 25750
30 k	29100 to 30900
35 k	33950 to 36050
40 k	38800 to 41200

2900, 2900A (POMONA) HV PROBE

Performance Specifications

±3% of FS at 0 to 30 kVDC

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4100 to 5900
10 k	9100 to 10900
15 k	14100 to 15900
20 k	19100 to 20900
25 k	24100 to 25900
30 k	29100 to 30900

N2771A (AGILENT) HV PROBE

Performance Specifications *

±2% rdg at 0 to 15 kVDC

±2% rdg at 1 kHz VAC

Use with 1 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (VDC)	Limits (VDC)
5 k	4900 to 5100
10 k	9800 to 10200
15 k	14700 to 15300

* See step 3.5.

34136A (AGILENT) HV PROBE

Performance Specifications *

±2% of rdg at 1 to 20 kVDC

±3% of rdg at 20 to 40 kVDC

±5% of rdg to 28 kVAC @ 60 Hz

Use with 10 Megohm Input Voltmeter

CALIBRATION PERFORMANCE TABLE

Applied (kVDC)	Limits (VDC)
5	4900 to 5100
10	9800 to 10200
15	14700 to 15300
20	19600 to 20400
25	24250 to 25750
30	29100 to 30900
35	33950 to 36050
40	38800 to 41200

* See step 3.5.

VD60 SERIES (ROSS ENGINEERING CORP) HV DIVIDERS

VD60-12.5B, VD60-6.2-A, VD60-6.2-B

Performance Specifications *

±0.1% of rdg at 0 to 60 kVDC

±0.5% of rdg to 60 kVAC p @ 60 Hz

CALIBRATION PERFORMANCE TABLE

Applied (kVDC)	Limits (VDC)
5	4995 to 5005
10	9990 to 10010
15	14985 to 15015
20	19980 to 20020
25	24975 to 25025
30	29970 to 30030
35	34965 to 35035
40	39960 to 40040

* See step 3.5.

NOTE

Attach a Limited Certification Label annotated with Accuracy ±0.2%.

139D (BRANDENBURG) HIGH VOLTAGE METER

Performance Specifications

0 to ±40 kVDC;
±(0.25% of rdg @ 20 kV + 0.025%/kV < or > 20 kV)

CALIBRATION PERFORMANCE TABLE

Range)	Applied (VDC)	Limits (VDC)
20 kV	6 k	5964 to 6036
	12 k	11946 to 12054
	19 k	18948 to 19052
40 kV	13 k	12945 to 13055
	20 k	19950 to 20050
	26 k	25896 to 26104
	39 k	38717 to 39283

DVM-1 (HD ELECTRIC COMPANY) VOLTMETER/PHASER

Performance Specifications

0 to ±20 kV DC/AC, (DC to 1000 Hz)
±(2% of rdg + 3 dgts)

CALIBRATION PERFORMANCE TABLE

Applied (kVDC)	Limits (VDC)
6	5850 to 6150
14	13690 to 14310
18	17610 to 18390

MARK-IV (HD ELECTRIC COMPANY) VOLTMETER/PHASER

Performance Specifications

±3% of FS at 0 to ±5 kV DC *
±3% of FS at 0 to 5 kV AC at 50/60 Hz *

CALIBRATION PERFORMANCE TABLE

Range (kV DC)	Applied (kV DC)	Limits (VDC)
5	5	4850 to 5150

* Hotsticks Required

MARKV (HD ELECTRIC COMPANY) VOLTMETER/PHASER

Performance Specifications

±3% of FS at 0 to ±15 kV DC *
±3% of FS at 0 to 15 kV AC at 50/60 Hz *

CALIBRATION PERFORMANCE TABLE

Range (kV DC)	Applied (kV DC)	Limits (VDC)
5	5	4850 to 5150
15	5	4550 to 5450
	10	9550 to 10450
	15	14550 to 15450

* Hotsticks Required