FLUKE®

753/754

Documenting Process Calibrators

Product Specifications

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Specifications

General Specifications

All specifications apply from +18 °C to +28 °C unless stated otherwise.

All specifications assume a 5-minute warmup period.

Measurement specifications are valid only when Damping is turned on. When damping is turned off, or when the g annunciator is shown, floor specifications are multiplied by 3. Floor specifications are the second part of the specifications. The measure pressure, temperature, and frequency functions are specified only with damping on.

Specifications are valid to 110 % of range. The following exceptions are valid to 100 % of range: 300 V dc, 300 V ac, 22 mA source and simulate, 15 V dc source, and temperature measure and source.

To achieve the best noise rejection, use battery power.

Size (H x W x L) ..... Height = 63.35 mm (2.49 inches) x Width = 136.37 mm (5.37 inches) x Length = 244.96 mm (9.65 inches)

Weight ..... 1.23 kg (2.71 lb) (Batteries included)

Display ..... 480 by 272 pixel graphic LCD, 95 x 54 mm

Power ..... Internal battery pack: Lithium Ion, 7.2 V dc, 30 Wh
External Power Supply: 15 V dc, 2 A

Environmental Specifications

Operating Altitude ..... 3000 m (9842 ft)

Storage Altitude ..... 13000 m (42650 ft)

Operating Temperature ..... -10 °C to 50 °C

Operating Temperature with Battery ..... 0 °C to 40 °C

Storage Temperature ..... -20 °C to 60 °C

Relative Humidity (Maximum, non-condensing) ..... 90 % to 35 °C
75 % to 40 °C
45 % to 50 °C

Battery

- Charging Temperature ..... 0 °C to 40 °C
- Charging Supply ..... Input 100 V ac to 240 V ac 50/60 Hz, ±10 %
  Output 15 V dc, 2 A, LPS

Standards and Agency Approval Specifications

Intrusion Protection ..... IEC 60529-1, IP 52

Safety

- General ..... IEC 61010-1, Pollution degree 2
- Measurement ..... IEC 61010-30: CAT II 300 V

Electromagnetic Compatibility (EMC)

- **International** ..... IEC 61326-1: Basic Electromagnetic Environment
  CISPR 11: Group 1, Class A

Group 1: Equipment has intentionally generated and/or uses conductively-coupled radio frequency energy that is necessary for the internal function of the equipment itself.

Class A: Equipment is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted and radiated disturbances.

Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

Emissions that exceed the levels required by CISPR 11 can occur when the equipment is connected to a test object.

Korea (KCC) ..... Class A Equipment (Industrial Broadcasting & Communication Equipment)

Class A: Equipment meets requirements for industrial electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and not to be used in homes.

USA (FCC)..... 47 CFR 15 subpart B. This product is considered an exempt device per clause 15.103.

Detailed Specifications

Specifications valid after a 5-minute warmup.

Specifications are valid to 110 % of Range with the following exceptions: 300 V dc measure, 300 V ac measure, 50 kHz measure and source, 22 mA source and simulate, 15 V dc source, and temperature measure and source which are valid to 100 % of range.

DC mV Measurement

Range	Resolution	% of Reading + Floor	
		1 Year	2 Year
±100.000 mV	0.001 mV	0.02 % + 0.005 mV	0.03 % + 0.005 mV, ±400.000 mV 0.001 mV 1 year 0.02 % + 0.005 mV
Input Impedance: >5 MΩ Maximum Input Voltage: 300 V, IEC 61010 300 V CAT II Temperature coefficient: (0.001 % of reading + 0.001% of range) / °C (<18 °C or >28 °C) Normal mode rejection: >100 dB at 50 or 60 Hz nominal			

DC Voltage Measurement

Range	Resolution	% of Reading + Floor	
		1 Year	2 Year
±3.00000 V	0.00001 V	0.02 % + 0.00005 V	0.03 % + 0.00005 V
±30.0000 V	0.0001 V	0.02 % + 0.0005 V	0.03 % + 0.0005 V
±300.00 V	0.01 V	0.05 % + 0.05 V	0.07 % + 0.05 V

Input Impedance: >4 MΩ
Maximum Input Voltage: 300 V, IEC 61010 300V CAT II
Temperature coefficient: (0.001 % of reading + 0.0002 % of range) / °C (<18 °C or >28 °C)
Normal mode rejection: >100 dB at 50 or 60 Hz nominal

AC Voltage Measurement

Range 40 Hz – 500 Hz	Resolution	% of Reading + Floor	
		1 Year	2 Year
3.000 V	0.001 V	0.5 % + 0.002 V	1.0 % + 0.004 V
30.00 V	0.01 V	0.5 % + 0.02 V	1.0 % + 0.04 V
300.0 V	0.1 V	0.5 % + 0.2 V	1.0 % + 0.2 V

Input Impedance: >4 M Ω and <100 pF
Input Coupling: AC
Maximum Input Voltage: 300 V, IEC 61010 300V CAT II
Temperature coefficient: 5 % of specified accuracy / °C (<18 °C or >28 °C)
Specifications apply for 9 % to 100 % of voltage range.

DC Current Measurement

Range	Resolution	% of Reading + Floor	
		1 Year	2 Year
±30.000 mA	1 µA	0.01 % + 5 µA	0.015 % + 7 µA
±100.00 mA	10 µA	0.01 % + 20 µA	0.015 % + 30 µA

Maximum Input: 110 mA
Maximum Burden Voltage: 420 mV at 22 mA
Temperature coefficient: 3 % of specified accuracy / °C (<18 °C or >28 °C)
No Fuse
Normal mode rejection: 90 dB at 50 or 60 Hz nominal, and 60 dB at 1200 Hz and 2200 Hz nominal (HART signals)

Resistance Measurement

Range	Resolution	% of Reading + Floor		Source Current
		1 Year	2 Year	
10.000 Ω	0.001 Ω	0.05 % + 0.050 Ω	0.07 % + 0.070 Ω	3 mA
100. 00 Ω	0.01 Ω	0.05 % + 0.05 Ω	0.07 % + 0.07 Ω	1 mA
1.0000 kΩ	0.1 Ω	0.05 % + 0.0005 kΩ	0.07 % + 0.0007 kΩ	500 µA
10.000 kΩ	1 Ω	0.10 % + 0.010 kΩ	0.15 % + 0.015 kΩ	50 µA

Open-circuit voltage: 5 V nominal
Temperature coefficient: 3 % of specified accuracy / °C (<18 °C or >28 °C)

Continuity Testing

Tone	Resistance
Continuous tone	<25 Ω
May or may not get tone	25 to 400 Ω
No tone	>400 Ω

Frequency Measurement

Ranges	Resolution	2 Year
1.00 Hz to 110.00 Hz [1]	0.01 Hz	0.05 Hz
110.1 Hz to 1100.0 Hz	0.1 Hz	0.5 Hz
1.101 kHz to 11.000 kHz	0.001 kHz	0.005 kHz
11.01 kHz to 50.00 kHz	0.01 kHz	0.05 kHz

Coupling: AC
Minimum Amplitude for Frequency Measurement (square wave):
<1 kHz: 300 mV p-p
1 kHz to 30 kHz: 1.4 V p-p
>30 kHz: 2.8 V p-p
Maximum input:
<1 kHz: 300 V rms
>1 kHz: 30 V rms
Input Impedance: >4 MΩ
[1] For frequency measurement less than 110.00 Hz, specifications apply for signals with a slew rate >5 volt/millisecond.

±DC Voltage Output

Range	Resolution	% of Output + Floor	
		1 Year	2 Year
±100.000 mV	1 µV	0.01 % + 0.005 mV	0.015 % + 0.005 mV
±1.00000 V	10 µV	0.01 % + 0.00005 V	0.015 % + 0.00005 V
±15.0000 V	100 µV	0.01 % + 0.0005 V	0.015 % + 0.0005 V

Maximum Output Current: 10 mA, In the 100 mV range add 0.010 mV to specification when sourcing >1 mA.
For sourcing dc voltages <110.000 mV, accuracy is not specified in RF fields >1 V/m, 80 MHz to 700 MHz.
Temperature Coefficient: 0.001 % of output + 0.001 % of range / °C (<18 °C or >28 C)

+DC Current Source

Range/Mode	Resolution	% of Output + Floor	
		1 Year	2 Year
0.100 to 22.000 mA	1 µA	0.01 % + 3 µA	0.02 % + 3 µA

Temperature Coefficient: 3 % of specified accuracy / °C (<18 °C or >28 °C)
Source mA Compliance Voltage: 18 V maximum
Source mA Open Circuit Voltage: 30 V maximum

+DC Current Simulate (External Loop Power)

Range/Mode	Resolution	% of Output + Floor	
		1 Year	2 Year
0.100 to 22.000 mA (Current Sink)	1 µA	0.02 % + 7 µA	0.04 % + 7 µA
Simulate mA Input Voltage: 15 to 50 V dc, add 300 µA to floor when >25 V is present on the loop Temperature Coefficient: 3 % of specified accuracy / °C (<18 °C or >28 °C)			

Resistance Sourcing

Range	Resolution	% of Output + Floor		Allowable Excitation Current
		1 Year	2 Year	
10.000 Ω	0.001 Ω	0.01 % + 0.010 Ω	0.015 % + 0.015 Ω	0.1 mA to 10 mA
100.00 Ω [1]	0.01 Ω	0.01 % + 0.02 Ω	0.015 % + 0.03 Ω	0.1 mA to 10 mA
1.0000 kΩ [2]	0.1	0.02 % + 0.0002 kΩ	0.03 % + 0.0003 kΩ	0.01 mA to 1.0 mA
10.000 kΩ	1 Ω	0.02 % + 0.003 kΩ	0.03 % + 0.005 kΩ	0.01 mA to 1.0 mA
Temperature Coefficient: (0.01 % of output +0.02 % of range / °C (<18 °C or >28 °C). When connected to mains, accuracy is not specified with conducted RF >1V, 8 to 15 MHz. [1] Add 0.01 Ω when the excitation current is <1 mA. [2] Add 0.0015 kΩ when the excitation current is <0.1 mA.				

Frequency Sourcing

Range	Specification
	2 Year
Sine Wave: 0.1 Hz to 10.99 Hz	0.01 Hz
Square Wave: 0.01 Hz to 10.99 Hz	0.01 Hz
Sine and Square Wave: 11.00 Hz to 109.99 Hz	0.1 Hz
Sine and Square Wave: 110.0 Hz to 1099.9 Hz	0.1 Hz
Sine and Square Wave: 1.100 kHz to 21.999 kHz	0.002 kHz
Sine and Square Wave: 22.000 kHz to 50.000 kHz	0.005 kHz
Waveform Choices: Zero-symmetric sine wave or positive 50 % duty-cycle square wave Square Wave Amplitude: 0.1 to 15 V p-p Square Wave Amplitude Accuracy, 0.01 to 1 kHz: 3 % p-p output + 75 mV, 1 kHz to 50 kHz: 10 % p-p output + 75 mV typical. Sine Wave Amplitude: 0.1 to 30 V p-p Sine Wave Amplitude Accuracy, 0.1 to 1 kHz: 3 % p-p output + 75 mV, 1 kHz to 50 kHz: 10 % p-p output + 75 mV typical. Frequency specifications are valid when averaged ≥100 ms	

Temperature, Thermocouples

Type	Range °C	Measure °C		Source °C	
		1 Year	2 Year	1 Year	2 Year
E	-250 to -200	1.3	2.0	0.6	0.9
	-200 to -100	0.5	0.8	0.3	0.4
	-100 to 600	0.3	0.4	0.3	0.4
	600 to 1000	0.4	0.6	0.2	0.3
N	-200 to -100	1.0	1.5	0.6	0.9
	-100 to 900	0.5	0.8	0.5	0.8
	900 to 1300	0.6	0.9	0.3	0.4
J	-210 to -100	0.6	0.9	0.3	0.4
	-100 to 800	0.3	0.4	0.2	0.3
	800 to 1200	0.5	0.8	0.3	0.3
K	-200 to -100	0.7	1.0	0.4	0.6
	-100 to 400	0.3	0.4	0.3	0.4
	400 to 1200	0.5	0.8	0.3	0.4
	1200 to 1372	0.7	1.0	0.3	0.4
T	-250 to -200	1.7	2.5	0.9	1.4
	-200 to 0	0.6	0.9	0.4	0.6
	0 to 400	0.3	0.4	0.3	0.4
B	600 to 800	1.3	2.0	1.0	1.5
	800 to 1000	1.0	1.5	0.8	1.2
	1000 to 1820	0.9	1.3	0.8	1.2
R	-20 to 0	2.3	2.8	1.2	1.8
	0 to 100	1.5	2.2	1.1	1.7
	100 to 1767	1.0	1.5	0.9	1.4
S	-20 to 0	2.3	2.8	1.2	1.8
	0 to 200	1.5	2.1	1.1	1.7
	200 to 1400	0.9	1.4	0.9	1.4
	1400 to 1767	1.1	1.7	1.0	1.5
C (W5Re/ W26Re)	0 to 800	0.6	0.9	0.6	0.9
	800 to 1200	0.8	1.2	0.7	1.0
	1200 to 1800	1.1	1.6	0.9	1.4
	1800 to 2316	2.0	3.0	1.3	2.0

L	-200 to -100	0.6	0.9	0.3	0.4
	-100 to 800	0.3	0.4	0.2	0.3
	800 to 900	0.5	0.8	0.2	0.3
U	-200 to 0	0.6	0.9	0.4	0.6
	0 to 600	0.3	0.4	0.3	0.4
BP	0 to 1000	1.0	1.5	0.4	0.6
	1000 to 2000	1.6	2.4	0.6	0.9
	2000 to 2500	2.0	3.0	0.8	1.2
XK	-200 to 300	0.2	0.3	0.2	0.5
	300 to 800	0.4	0.6	0.3	0.6

Sensor inaccuracies not included.
Accuracy with external cold junction; for internal junction add 0.2 °C
Resolution: 0.1 °C
Temperature Scale: ITS-90 or IPTS-68, selectable (90 is default)
Compensation: ITS-90 per NIST Monograph 175 for B,R,S,E,J,K,N,T; IPTS-68 per IEC 584-1 for B,R,S,E,J,K,T; IPTS-68 per DIN 43710 for L,U. GOST P 8.585-2001 (Russia) for BP and XK, ASTM E988-96 for C (W5Re/W26Re)
Temperature Coefficient: 0.05 °C/ °C (<18 °C or >28 °C)
0.07 °C/ °C for C type >1800 °C and for BP type >2000 °C
Instrument Operating Temperature: 0 °C to 50 °C for C and BP type thermocouples / -10 °C to 50 °C for all other types
Normal Mode Rejection: 65 dB at 50 Hz or 60 Hz nominal
For sourcing thermocouple voltages, accuracy is not specified in RF fields >1 V/m, 80 MHz to 700 MHz.

Temperature, Resistance Temperature Detectors

Temperature, RTDs Degrees or % of Reading [1]							
Type (α)	Range °C	Measure °C [2]			Source °C		Allowable Excitation Current [3]
		1 Year	2 Year	Source Current	1 Year	2 Year	
100 Ω Pt(385)	-200 to 100	0.07 °C	0.14 C	1 mA	0.05 °C	0.10 °C	0.1 to 10 mA
	100 to 800	0.02 % + 0.05 °C	0.04 % + 0.10 °C		0.0125 % + 0.04 °C	0.025 % + 0.08 °C	
200 Ω Pt(385)	-200 to 100	0.07 °C	0.14 C	500 µA	0.10 °C	0.20 °C	0.1 to 1 mA
	100 to 630	0.02 % + 0.05 °C	0.04 % + 0.10 °C		0.017 % + 0.09 °C	0.034 % + 0.18 °C	
500 Ω Pt(385)	-200 to 100	0.07 °C	0.14 C	250 µA	0.08 °C	0.16 °C	0.1 to 1 mA
	100 to 630	0.02 % + 0.05 °C	0.04 % + 0.10 °C		0.017 % + 0.06 °C	0.034 % + 0.12 °C	
1000 Ω Pt(385)	-200 to 100	0.07 °C	0.14 °C	150 µA	0.06 °C	0.12 °C	0.1 to 1 mA
	100 to 630	0.02 % + 0.05 °C	0.04 % + 0.10 °C		0.017 % + 0.05 °C	0.034 % + 0.10 °C	
100 Ω Pt(3916)	-200 to 100	0.07 °C	0.14 °C	1 mA	0.05 °C	0.10 °C	0.1 to 10 mA
	100 to 630	0.02 % + 0.05 °C	0.04 % + 0.10 °C		0.0125 % + 0.04 °C	0.025 % + 0.08 °C	
100 Ω Pt(3926)	-200 to 100	0.08 °C	0.16 °C	1 mA	0.05 °C	0.10 °C	0.1 to 10 mA
	100 to 630	0.02 % + 0.06 °C	0.04 % + 0.12 °C		0.0125 % + 0.04 °C	0.025 % + 0.08 °C	
10 Ω Cu(427)	-100 to 260	0.2 °C	0.4 °C	3 mA	0.2 °C	0.4 °C	1 to 10 mA
120 Ω Ni(672)	-80 to 260	0.1 °C	0.2 °C	1 mA	0.04 °C	0.08 °C	0.1 to 10 mA

[1] Specifications are valid to k=3
Sensor inaccuracies not included
[2] For two and three-wire RTD measurements, add 0.4 °C to the specifications.
Resolution: 0.01 °C except 0.1 °C for 10 Ω Cu(427)
Temperature Coefficient: 0.01 °C/°C for measure, 0.02 °C/°C (<18 °C or >28 °C) for source
[3] Supports pulsed transmitters and PLCs with pulse times as short as 1 ms
RTD Reference:
Pt(385): IEC 60751, 2008
Pt(3916): JIS C 1604, 1981
Pt(3926), Cu(427), Ni(672): Minco Application Aid #18

Loop Power

Open Circuit	Loaded Circuit
26 V ±10 %	18 V minimum at 22 mA
Short circuit protected to 25 mA Output Resistance: 250 Ω nominal	