

Manual Supplement

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This supplement contains information necessary to ensure the accuracy of the above manual.
This manual is distributed as an electronic manual on the following CD-ROM.

CD Title: 753/754
CD Rev. & Date: 8/2011
CD PN: 3377682

Change #1

On page 10, add the following Warning:

- **To prevent possible electrical shock, fire, or personal injury, always put the stackable end of the test lead into a terminal of the Product.**

Change #2, 58647, 59270, 59271, 59272, 59280, 59281, 59282, 59348, 59621, 61489


Replace pages 105 through 115 with the entire Specification section:

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  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

PowerInternal battery pack: Lithium Ion, 7.2 V dc, 30 Wh

Environmental Specifications

Operating Altitude3000 m (9842 ft)
Storage Altitude13000 m (42650 ft)
Operating Temperature-10 to 50 °C
Storage Temperature-20 to 60 °C
Relative Humidity (Maximum, non-condensing).....90 % to 35 °C
75 % to 40 °C
45 % to 50 °C

Standards and Agency Approval Specifications

Protection ClassPollution Degree II IP 52
Double Insulation Creepage and ClearancePer IEC 61010-1
Installation Category300 V CAT II
Design Standards and ComplianceEN/IEC 61010-1:2010, CAN/CSA C22.2 No. 61010-1-04, ANSI/UL 61010-1:2004
EMI, RFI, EMC.....EN 61326-1:2006
RF Fields.....Accuracy for all functions is not specified in RF fields >3 V/m

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
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 μ A	0.01 % + 5 μ A	0.015 % + 7 μ A
± 100.00 mA	10 μ A	0.01 % + 20 μ A	0.015 % + 30 μ A

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 k Ω	0.1 Ω	0.05 % + 0.0005 k Ω	0.07 % + 0.0007 k Ω	500 μ A
10.000 k Ω	1 Ω	0.10 % + 0.010 k Ω	0.15 % + 0.015 k Ω	50 μ A

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):

<p><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.</p>

±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 μ A	0.02 % + 7 μ A	0.04 % + 7 μ A
Simulate mA Input Voltage: 15 to 50 V dc, add 300 μ A 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 k Ω ^[2]	0.1 Ω	0.02 % + 0.0002 k Ω	0.03 % + 0.0003 k Ω	0.01 mA to 1.0 mA
10.000 k Ω	1 Ω	0.02 % + 0.003 k Ω	0.03 % + 0.005 k Ω	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 >1 V, 8 to 15 MHz. [1] Add 0.01 Ω when the excitation current is <1 mA. [2] Add 0.0015 k Ω 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
<p>Waveform Choices: Zero-symmetric sine wave or positive 50 % duty-cycle square wave</p> <p>Square Wave Amplitude: 0.1 to 15 V p-p</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.</p> <p>Sine Wave Amplitude: 0.1 to 30 V p-p</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.</p> <p>Frequency specifications are valid when averaged ≥ 100 ms</p>	

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 to 50 °C for C and BP type thermocouples / -10 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	

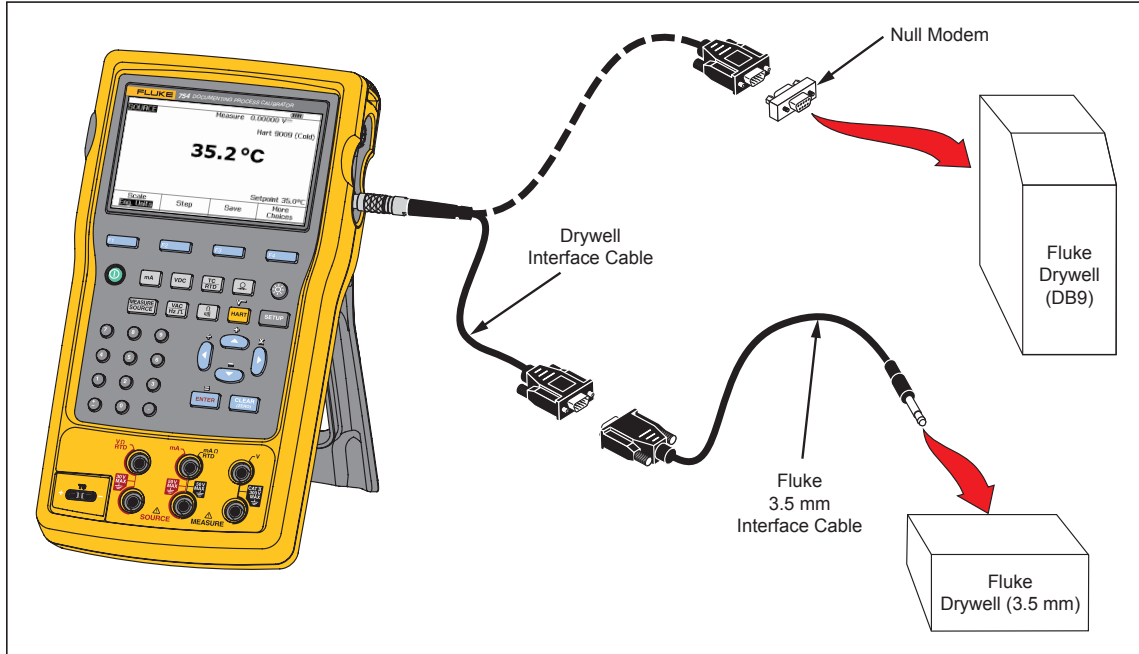
100 Ω Pt(3916)	-200 to 100	0.07 °C	0.14 °C	1 mA	0.05 °C	0.10 °C	0.1 to 10 mA
	100 to 630	0.02 % + 0.05 °C	0.04 % + 0.10 °C		0.0125 % + 0.04 °C	0.025 % + 0.08 °C	
100 Ω Pt(3926)	-200 to 100	0.08 °C	0.16 °C	1 mA	0.05 °C	0.10 °C	0.1 to 10 mA
	100 to 630	0.02 % + 0.06 °C	0.04 % + 0.12 °C		0.0125 % + 0.04 °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
<p>[1] Specifications are valid to k=3 Sensor inaccuracies not included</p> <p>[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</p> <p>[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</p>							

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	

Change #3

On page 59, replace Figure 24 with:



gks99f.eps