


- 80T-150U Temperature Probe
- 80PK series thermocouples
- 80i-410 Clamp-on DC/AC Current Probe
- 80i-1010 Clamp-on DC/AC Current Probe
- 80i-500s Clamp-on AC Current Probe (requires the Y9108 adapter)
- 80i-1000s Clamp-on AC Current Probe (requires the Y9108 adapter)
- 80i-kW Current and Power Probe

## ***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 displayed, floor specifications are multiplied by 3. Floor specifications are the second part of the specifications, usually expressed as "% of full scale." The measure pressure, temperature, and frequency functions are specified only with damping on.

The standard specification intervals for the 744 are 1 and 2 years. Typical 90-day source and measurement accuracy can be estimated by dividing the 1 year "% of Reading" or "% of Output" specifications by 2. Floor specifications, expressed as "% of f.s.", remain constant.

To achieve the best noise rejection, use battery power and tie all three common jacks together.

Available for rent from:  
Accutech Rentals Ltd.  
1-800-667-7368  
[www.accutechrentals.com](http://www.accutechrentals.com)

**DC Voltage Measurement**

Range	Resolution	% of Reading +% of Full Scale	
		1 Year	2 Year
110 mV	1 $\mu$ V	0.025% + 0.015%	0.05% + 0.015%
1.1 V	10 $\mu$ V	0.025% + 0.005%	0.05% + 0.005%
11 V	100 $\mu$ V	0.025% + 0.005%	0.05% + 0.005%
110 V	1 mV	0.05% + 0.005%	0.1% + 0.005%
300 V	10 mV	0.05% + 0.005%	0.1% + 0.005%

**Temperature Coefficient:** (0.001% of rdg. + 0.0015% f.s.)/°C in the ranges -10 to 18°C and 28 to 50°C  
**Input Impedance:** 5 M $\Omega$   
**Common Mode Error:** 0.008% f.s./(Common Mode Volt)  
**Maximum Input Voltage:** 300 V rms

## AC Voltage Measurement

Frequency Range	% of Reading + Number of Counts	
	1 Year	2 Year
20 Hz to 40 Hz	2% + 10	2% + 10
40 Hz to 500 Hz	0.5% + 5	0.5% + 5
500 Hz to 1 kHz	2% + 10	2% + 10
1 kHz to 5 kHz	10% + 20	10% + 20

**Ranges :** 1.1000 V, 11.000 V, 110.00 V, 300.0 V rms  
**Resolution:** 11.000 counts in all ranges except 300 V; 3,000 counts on 300 V range.  
**Input Impedance:** 5 M  $\Omega$  and <100 pF  
**Temperature Coefficient:** 10% of specification/ $^{\circ}$ C in the ranges -10 to 18 $^{\circ}$ C and 28 to 50 $^{\circ}$ C  
**Input Coupling:** ac  
**Maximum Input Voltage:** 300 V rms  
**Minimum Input Voltage:** 0.5 V above 1 kHz

*Specifications apply for 10% to 100% of voltage range.*

**DC Current Measurement**

Range	Resolution	% of Reading +% of Full Scale	
		1 Year	2 Year
30 mA	1 $\mu$ A	0.01% + 0.015%	0.02% + 0.015%
110 mA	10 $\mu$ A	0.01% + 0.015%	0.02% + 0.015%
<b>Temperature Coefficient:</b> (0.001% of rdg. + 0.002% f.s.)/°C in the ranges -10 to 18°C and 28 to 50°C <b>Common Mode Error:</b> 0.01% f.s./(Common Mode Volt) <b>Maximum Input Voltage:</b> 30 V dc			

**Resistance Measurement**

Range	Resolution	% of Reading + ohms	
		1 Year	2 Year
11 $\Omega$	0.001 $\Omega$	0.05% + 0.05	0.075% + 0.05
110 $\Omega$	0.01 $\Omega$	0.05% + 0.05	0.075% + 0.05
1.1 k $\Omega$	0.1 $\Omega$	0.05% + 0.5	0.075% + 0.5
11 k $\Omega$	1 $\Omega$	0.1% + 10	0.1% + 10
<b>Temperature Coefficient:</b> (0.01% f.s. + 2 m $\Omega$ ) /°C in the ranges -10 to 18°C and 28 to 50°C <b>Common Mode Error:</b> 0.005% f.s./(Common Mode Volt) <b>Maximum Input Voltage:</b> 30 V dc			

## Continuity Testing

Tone	Resistance
Continuous tone	<25 $\Omega$
May or may not get tone	25 to 400 $\Omega$
No tone	>400 $\Omega$

## Frequency Measurement

Ranges	Accuracy	
	1 Year	2 Year
1.00 Hz to 109.99 Hz	0.05 Hz	0.05 Hz
110.0 Hz to 1099.9 Hz	0.5 Hz	0.5 Hz
1.100 kHz to 10.999 kHz	0.005 kHz	0.005 kHz
11.00 kHz to 50.00 kHz	0.05 kHz	0.05 kHz

### Minimum Amplitude for Frequency Measurement (square wave):

<1 kHz: 300 mV p-p

1 kHz to 30 kHz: 4 mV p-p

>30 kHz: 2.8 V p-p

### Maximum input:

<1 kHz: 300 V rms

>1 kHz: 30 V rms

Input Impedance: 5 M $\Omega$

*For frequency measurement less than 109.99 Hz, specifications apply for signals with a slew rate greater than 5 volt/millisecond.*

**DC Voltage Output**

Range	Resolution	% of Output + % of Full Scale	
		1 Year	2 Year
110 mV	1 $\mu$ V	0.01% + 0.005%	0.015% + 0.005%
1.1 V	10 $\mu$ V	0.01% + 0.005%	0.015% + 0.005%
15 V	100 $\mu$ V	0.01% + 0.005%	0.015% + 0.005%
<p><b>Temperature Coefficient:</b> (0.001% of output + 0.001% of f.s.)/<math>^{\circ}</math>C in the ranges -10 to 18 <math>^{\circ}</math>C and 28 to 50 <math>^{\circ}</math>C</p> <p><b>Maximum Output Current:</b> 10 mA</p> <p><b>Loading:</b> (0.001% f.s. + 1 <math>\mu</math>V)/ mA</p> <p><b>Common Mode Error:</b> 0.008% f.s./(Common Mode Volt)</p> <p><b>Maximum Input Voltage:</b> 30 V dc</p>			

**DC Current Output**

Range/Mode	Resolution	% of Output + % of Full Scale	
		1 Year	2 Year
22 mA/ Source mA	1 $\mu$ A	0.01% + 0.015%	0.02% + 0.015%
22 mA/ Simulate Transmitter (Current Sink)	1 $\mu$ A	0.02% + 0.03%	0.02% + 0.03%
<p><b>Maximum Burden Voltage:</b> 24 V</p> <p><b>Temperature Coefficient:</b> (0.003% of output + 0.003% of f.s.)/°C in the ranges -10 to 18°C and 28 to 50°C</p> <p><b>Common Mode Error:</b> 0.008% f.s./(Common Mode Volt)</p> <p><b>Maximum Input Voltage:</b> 30 V dc</p>			
<p><i>Specification applies for currents between 2 mA and 22 mA. For current below 2 mA, typical accuracy is 0.15% of full scale.</i></p>			

### **Resistance Sourcing**

Range	Resolution	% of Output + ohms	
		1 Year	2 Year
11.000 Ω	1 mΩ	0.01% + 0.02	0.02% + 0.02
110.00 Ω	10 mΩ	0.01% + 0.04	0.02% + 0.04
1.1000 kΩ	100 mΩ	0.02% + 0.5	0.03% + 0.5
11.000 kΩ	1 Ω	0.03% + 5	0.04% + 5

**Temperature Coefficient:** (0.01% of f.s.)/°C in the ranges -10 to 18 °C and 28 to 50 °C

**Maximum and Minimum Current through Source Resistance:**

- 11 Ω Range:** 8 mA dc max, 0.1 mA dc min
- 110 Ω Range:** 8 mA dc max, 0.1 mA dc min
- 1.1 k Ω Range:** 3 mA dc max, 0.01 mA dc min
- 11 k Ω Range:** 1 mA dc max, 0.01 mA dc min

**Common Mode Error:** 0.008% f.s./(Common Mode Volt)

**Maximum Input Voltage:** 30 V dc

## Frequency Sourcing

Range	Accuracy
	1 and 2 Year
0.00 Hz to 10.99 Hz	0.01 Hz
11.00 Hz to 109.99 Hz	0.01 Hz
110.0 Hz to 1099.9 Hz	0.01 Hz
1.100 kHz to 21.999 kHz	0.002 kHz
22.000 kHz to 50.000 kHz	0.005 kHz

**Waveform Choices:** Zero-symmetric sine or positive square wave, 50% duty cycle.  
**Amplitude:** 0.1 to 10 V pk  
**Amplitude Accuracy:**  
  **0 Hz to 1099 Hz:** 3% of output + 0.5% f.s  
  **1.1 kHz to 10.9 kHz:** 10% of output + 0.5% f.s  
  **11 kHz to 50 kHz:** 30% of output + 0.5% f.s  
**Maximum Input Voltage:** 30 V dc

**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
	-200 to -100	0.5	0.8	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	0.2	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

**Temperature, Thermocouples (cont)**

Type	Range °C	Measure °C		Source °C	
		1 Year	2 Year	1 Year	2 Year
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	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

**Temperature, Thermocouples (cont)**

Type	Range °C	Measure °C		Source °C	
		1 Year	2 Year	1 Year	2 Year
U	-200 to 0	0.6	0.9	0.4	0.6
	0 to 600	0.3	0.4	0.3	0.4

**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

**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.

**Temperature Coefficient:** 0.05°C/°C in the range -10 to 18°C and 28 to 50°C

**Common Mode Error:** 0.01°C/(Common Mode Volt)

**Maximum Input Voltage:** 30 V

**Temperature, Resistance Temperature Detectors**

Temperature, RTDs					
Type ( $\alpha$ )	Range °C	Measure °C		Source °C	
		1 Year	2 Year	1 Year	2 Year
100 $\Omega$ Pt(3926)	-200 to 0	0.3	0.4	0.1	0.2
	0 to 630	0.5	0.8	0.2	0.4
100 $\Omega$ Pt(385)	-200 to 0	0.3	0.5	0.1	0.2
	0 to 400	0.5	0.8	0.2	0.4
	400 to 800	0.8	1.0	0.4	0.5
120 $\Omega$ Ni(672)	-200 to 260	0.3	0.4	0.1	0.2
200 $\Omega$ Pt(385)	-200 to 0	0.3	0.5	0.1	0.2
	0 to 400	0.5	0.8	0.2	0.4
	400 to 630	0.8	1.0	0.4	0.5
500 $\Omega$ Pt(385)	-200 to 0	0.3	0.5	0.1	0.2
	0 to 400	0.5	0.8	0.2	0.4
	400 to 630	0.8	1.0	0.4	0.5

**Temperature, Resistance Temperature Detectors (cont)**

Type ( $\alpha$ )	Range °C	Measure °C		Source °C	
		1 Year	2 Year	1 Year	2 Year
1000 $\Omega$ Pt(385)	-200 to 0	0.3	0.5	0.1	0.2
	0 to 400	0.5	0.8	0.2	0.4
	400 to 630	0.8	1.0	0.4	0.5
10 $\Omega$ Cu(427)	-100 to 0	2	2	1	1
	0 to 260	2	2	1	1
100 $\Omega$ Pt(3916)	-200 to -190	0.3	0.4	0.3	0.4
	-190 to 0	0.3	0.4	0.1	0.2
	0 to 360	0.5	0.8	0.2	0.4
<p><b>Sensor inaccuracies not included</b>  <b>Resolution:</b> 0.1 °C  <b>Temperature Coefficient:</b> 0.02°C/°C in the ranges -10 to 18 °C and 28 to 50 °C  <b>Maximum Input Voltage:</b> 30 V  <b>Maximum Input Current for RTD Source:</b> 10 <math>\Omega</math> RTDs: 8 mA dc; 100 <math>\Omega</math> – 120 <math>\Omega</math> RTDs: 8 mA dc;            200 <math>\Omega</math> – 1000 <math>\Omega</math> RTDs: 1 mA dc, supports pulsed transmitters and PLCs with pulse times as short as 1 ms</p>					
<p><i>For two and three-wire RTD measurements, add 0.4°C to the specifications.</i></p>					

**Loop Power Supply**

<b>Setting</b>	<b>1 Year</b>	<b>2 Year</b>
24 Volt	5%	5%
28 Volt	5%	5%
<b>Short circuit protected</b> <b>Maximum Current:</b> 22 mA <b>Maximum Input Voltage:</b> 30 V dc <b>Output Resistance:</b> 250 $\Omega$ nominal		

**Top and Bottom Limits of Ranges with Auto Range On**

<b>Range, dc V Measure</b>	<b>Top of Range</b>	<b>Bottom of Range</b>
110 mV	±110.000 mV	0.000 mV
1.1 V	±1.10000 V	±0.10000 V
11 V	±11.0000 V	±1.0000 V
110 V	±110.000 V	±10.000 V
300 V	±300.00 V	±100.00 V
<b>Range, dc V Source</b>		
110 mV	+110.000 mV	-10.000 mV
1.1 V	+1.10000 V	+0.10000 V
15 V	+15.000 V	+1.1000 V
<b>Range, ohms Measure and Source</b>		
11 Ω	11.000 Ω	0.000 Ω
110 Ω	110.00 Ω	10.00 Ω
1.1 kΩ	1100.0 Ω	100.0 Ω
11 kΩ	11.000 kΩ	1.000 kΩ

**Top and Bottom Limits of Ranges with Auto Range On (cont)**

<b>Range, Current Measure</b>		
22 mA	+22.000 mA	0.000 mA
110 mA	+110.00 mA	+30.00 mA
<b>Range, Current Source</b>		
22 mA	+22.000 mA	0.000 mA
<b>Range, Frequency Measure</b>		
100 Hz	109.99 Hz	1.00 Hz
1 kHz	1099.9 Hz	100.00 Hz
10 kHz	10.999 kHz	1.000 kHz
50 kHz	50.00 kHz	10.00 kHz

## **General Specifications**

<b>Display:</b>	240 by 200 pixel graphic LCD, 70 x 58 mm.
<b>Power:</b>	Internal battery pack: NiMH, 7.2 V dc, 3500 mAh.
<b>Memory Backup:</b>	Lithium battery, 5 years typical lifetime.
<b>Dimensions:</b>	130 x 236 x 61 mm (5.1 x 9.3 x 2.4 in.).
<b>Weight:</b>	1.4 kg (3 lb. 1 oz.).
<b>Altitude:</b>	Up to 2800 meters (9186 ft) above mean sea level.
<b>Operating Temperature:</b>	-10 to 50 °C (typically to -20 °C, except for frequency measure and ac voltage measure)
<b>Storage Temperature:</b>	-20 to 60 °C
<b>Humidity:</b>	Avoid prolonged use outside the safe operating boundaries shown in the graph on the next page.

**RF Fields:**

Accuracy for all functions is not specified in RF fields  $>3$  V/m  
Accuracy for thermocouple measurement is not specified in RF fields  $>1$  V/m  
Accuracy for ohms/RTD source is not specified in RF fields  $>0.5$  V/m  
Accuracy for mA dc measurement is not specified in RF fields  $>1.5$  V/m

**Safety:**

Designed in accordance with CAT II 300 Volts Pollution Degree 2, IEC 1010-1, ANSI/ISA-S82, UL3111, and CSA C22.2 No. 1010.1-92. See "Safety Information" near the front of this manual.

**Warranty:**

See the WARRANTY, inside front cover.