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TENMA®

REVISIONS			DOC. NO. SPC-F004 * Effective: 7/8/02 * DCP No: 1398					
DCP #	REV	DESCRIPTION	DRAWN	DATE	CHECKD	DATE	APPRVD	DATE
		NOT Released	JWM	8/20/02				



DC Voltage Measurement

Resolution and Maximum Readins

Range	Resolution			Maximum reading		
	3 1/2	4 1/2	5 1/2	3 1/2	4 1/2	5 1/2
200mV	100μV	10μV	1μV	199.9	199.99	199.999
2V	1mV	100μV	10μV	1.999	1.9999	1.99999
20V	10mV	1mV	100μV	19.99	19.999	19.9999
200V	100mv	10mV	1mV	199.9	199.99	199.999
1000V	1V	100mV	10mV	1000	1000	1000

Measurement accuracy and input impedance

Range	Measurement Accuracy			Input Impedance
	3 1/2	41/2	5 1/2	
200mV	0.01+ 2	0.01+ 2	0.01 + 5*	1GΩ or more
2V	0.01+ 2	0.01+ 2	0.01+ 5	
20V	0.01+ 2	0.01+ 2	0.01+ 5	11.1MΩ±1%
200V	0.01+ 2	0.01+ 2	0.01+ 5	10.1MΩ±1%
1000V	0.01+ 2	0.01+ 2	0.01+ 5	10.0MΩ±1%

* Using relative (REL) control

Maximum allowable input voltage: between input terminals: ±1100V

Note : In the 2nd mode, when the volts AC and volts DC function are selected, the 10MΩ DC input divider is in parallel with the 1M Ω AC divider

Noise Rejection Ratio

Sampling Rate	Effective Common-mode Noise Rejection Ratio (unbalanced impedance 1KΩ) 50/60Hz ±0.15, DC	Normal-mode Rejection Ratio 50/60Hz ±0.1%
3 1/2	Approx. 60dB	0dB
4 1/2	Approx. 120dB	Approx. 50dB
5 1/2		

Discontinued

Interim Drawing - NOT Released

SPC-F004.DWG

TOLERANCES:	DRAWN BY:	DATE:	DRAWING TITLE: Dual Display Digital Multimeter			
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE FOR REFERENCE PURPOSES ONLY.	Jeff McVicker	8/20/02	SIZE	DWG. NO.	ELECTRONIC FILE	REV
	CHECKED BY:	DATE:	A	72-6558	84N1418	
			SCALE: NTS	U.O.M.: INCHES [mm]	SHEET: 1 OF 4	
	APPROVED BY:	DATE:				

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Interim Drawing - NOT Released

AC Voltage Measurement (AC coupling mode)
Resolution and Maximum Reading

Range	Resolution			Maximum reading		
	31/2	41/2	5 1/2	31/2	41/2	5 1/2
200mV	100 V	10 V	1 V	199.9	199.99	199.999
2V	1mv	100 V	1011V	1.999	1.9999	1.99999
20V	lOmV	1mv	100 V	19.99	19.999	19.9999
200V	100mV	lOmV	1mV	199.9	199.99	199.999
750V	1V	100mV	lOmV	750	750	750

Measurement Accuracy
Number of Digits : 3 1/2

Range	20Hz to 50 Hz	50Hz to 10kHz	10kHz to 20kHz	20kHz to 50kRz	50kHz to 100kHz
200mV	1+19	0.2+17	0.5+17	1.5+20	31+40
2V	1+5	0.2+3	0.5+3	1.5+6	3+12
20V	1+5	0.2+3	0.5+3	1.5+6	3+12
200V	1+5	0.2+3	0.5+3	1.5+6	3+12
750V	1+5	0.2+3	0.5+3	Not Specified	

Number of digits: 4 1/2

Range	2014z to 50 Hz	50Hz to 1okFz	IOkHz to 20kHz	20kHz to 50kHz	50kHz to 100kHz
200mV	1+45	0.2+30	0.5+30	1.5+60	3 + 120
2V	1+45	0.2+21	0.5+21	1.5+51	3+100
20V	1+45	0.2+21	0.5+21	1.5+51	3+100
200V	1+45	0.2+21	0.5+21	1.5±51	3+100
750V	1+45	0.2+21	0.5+21	Not Specified	

Number of digits: 51/2

Range	20Hz to 50 Hz	50Hz to 10kHz	10kHz to 20kHz	20kHz to 5OkHz	50kHz to 100kHz
200mV	1+100	0.2+100	0.5+100	1.5+200	3+400
2V	1+100	0.2+100	0.5+100	1.5+200	3+400
20V	1+100	0.2+100	0.5+100	1.5+200	3+400
200V	1+100	0.2+100	0,5+100	1.5+200	3+400
750V	1+100	0.2+100	0.5+100	Not Specified	

Measurement method: TrueRMS Input range: 5 % or more of scale full
Crest factor: 3:1 on full scale Input impedance: 1.1 Mr2 f 10 %,100pF or less
Maximum allowable input voltage : 800Vrms,1100Vpeak,10 VHz
Response time: Approx. 1 sec. (until it reaches a value within 0.1 % of the final value at the same range)

Resistance measurement
Resolution and maximum reading

Range	Resolution			Maximum Reading		
	3 1/2	41/2	51/2	3 1/2	41/2	5 1/2
200Ω	l00mΩ	10mΩ	1mΩ	199.9	199.99	199.999
2kΩ	1Ω	100mΩ	10mΩ	1999	1.9999	1.99999
20kΩ	10Ω	1Ω	100mΩ	19.99	19.999	19.9999
200kΩ	100Ω	10Ω	1Ω	199.9	199.99	1999.99
2MΩ	1kΩ	100Ω	10Ω	1999	1999.9	1999.99
20MΩ	10kΩ	1kΩ	100Ω	19.99	19.999	19.9999
200MΩ	100kΩ	10kΩ	1kΩ	199.9	199.99	199.99

Measurement current and measurement accuracy

Range	Measurement Current	Measurement Accuracy		
		3 1/2	4 1/2	5 1/2
200Ω	1mA	0.03 + 2	0.03 + 2	0.03 + 6*
2kΩ	1mA	0.02 + 2	0.02 + 2	0.02 + 5
20kΩ	100μA	0.02 + 2	0.02 + 2	0.02 + 5
200kΩ	10μA	0.02 + 2	0.02 + 2	0.02 + 5
2MΩ	1μA	0.02 + 2	0.02 + 2	0.02 + 5
20MΩ	100nA	0.2 + 2	0.2 + 3	0.2 + 5
200MΩ	l0nA	2.0 + 2	2.0 + 2	2.0 + 2

* Using relative (REL) control

Open terminal voltage: Max. 11V
Zero resistance error: 0.05Ω or less in each range (when REL function is used)
Excluding cable resistance for the measurement accuracy.
Response time: Approx. 1 sec. for 20MΩ
Approx. 1.5 sec. for 200MΩ

Discontinued

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SPC-F004.DWG

SIZE	DWG. NO.	ELECTRONIC FILE	REV
A	72-6558	84N1418.dwg	

DOC. NO. SPC-F004 * Effective: 7-8/02 * DCP No: 1398

SCALE: NTS | U.O.M.: INCHES [mm] | SHEET: 2 OF 4

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Interim Drawing - NOT Released

Resolution and Maximum Reading

Range	Resolution			Maximum Reading		
	3 1/2	4 1/2	5 1/2	3 1/2	4 1/2	5 1/2
20mA	10μA	1μA	0.1μA	19.99	19.999	19.9999
200mA	100μA	10μA	1μA	199.9	199.99	199.999
10A	10mA	1mA	100μA	10.00	10.000	10.0000

Measurement Accuracy and Input Terminal Resistance

Range	Input Terminal Resistance	Measurement accuracy		
		3 1/2	4 1/2	5 1/2
20mA	10Ω or less	0.1 + 2	0.1 + 2	0.05 + 15*
200mA	1Ω or less	0.1 + 2	0.1+ 2	0.05 + 5
10A	0.05Ω or less	0.2 + 2	0.2 + 2	0.2 + 7

* Using relative (REL) control

Overload Current Protection: 200mA terminal (0.25A/250V) IEC127 sheet 1 immediately blown fuse protection
10A terminal (15A/600V) breaking capacity 10000A immediately blown fuse protection

AC current measurement (AC coupling mode)
Resolution, Maximum Reading and Input Terminal Resistance

Range	Input Terminal Resistance	Resolution			Maximum Reading		
		3 1/2	4 1/2	5 1/2	3 1/2	4 1/2	5 1/2
20mA	10Ω or less	10μA	1μA	0.1μA	19.99	19.999	19.9999
200mA	1Ω or less	100μA	10μA	1μA	199.9	199.99	199.999
l0A	0.05Ω or less	10mA	1mA	100μA	10.00	10.000	10.0000

Measurement accuracy
Number of digtits : 31/2

Range	20Hz to 50Hz	50Hz to 2kHz	2kHz to 10kHz
20mA	1.5 + 2	0.5 + 2	2 + 5
200mA	1.5 + 2	0.5 + 2	2 + 5
10A	2 + 2	1 + 2	unspecified

Number digits: 4 1/2

Range	20Hz to 50Hz	50Hz to 2kHz	2kHz to 10kHz
20mA	1.5 + 12	0.5 + 12	2 + 30
200nA	1.5 + 12	0.5 +1 2	2 + 30
10A	2 + 12	1 + 12	unspecified

Number digits: 5 1/2

Range	20Hz to 50Hz	50Hz to 2kHz	2kHz to 10kHz
20mA	1.5 + 100	0.5 + 100	2 + 200
200mA	1.5 + 100	0.5 + 100	2 + 200
10A	2 + 100	1 + 100	unspecified

Measurment method: True RMS
Overload current protection: 200mA terminal (0.25A/250V) IEC127 sheet 1 immediately blown fuse protection
10A terminal (15A/250V) breaking capacity 10000A immediately blown fuse protection
Input range: 5% or more of full scale
Crest factor: 3:1 on full scale
Response time: Approx. 1sec. (until it reaches a value within 0.1% of the final value at the same range)

AC Voltage Measurement (AC + DC coupling mode)
Resolution and Maximum Reading

Range	Resolution			Maximum Reading		
	3 1/2	4 1/2	5 1/2	3 1/2	4 1/2	5 1/2
200mV	100μV	10μV	1μV	199.9	199.99	199.999
2V	1mV	100μV	10μV	1.999	1.9999	1.99999
20V	10mV	1mV	100μV	19.99	19.999	19.9999
200V	100MV	10mV	1mV	199.9	199.99	199.999
750V	1V	100mV	10mV	750	750	750

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Interim Drawing - NOT Released

Measurement Accuracy
Number digits: 3 1/2, 4 1/2

Range	20Hz to 50 Hz	50Hz to 10kHz	10kHz to 20kHz	20kHz to 50kHz	50kHz to 100kHz
200mV	1 + 45	0.2 + 30	0.5 + 30	1.5 + 60	3 + 120
2V	1 + 45	0.2 + 21	0.5 + 21	1.5 + 51	3 + 100
20V	1 + 45	0.2 + 21	0.5 + 21	1.5 + 51	3 + 100
200V	1 + 45	0.2 + 21	0.5 + 21	1.5 + 51	3 + 100
750V	1 + 45	0.2 + 21	0.5 + 21	Not Specified	

Number digits : 5 1/2

Range	20Hz to 50Hz	50Hz to 10kHz	10kHz to 20 kHz	20kHz to 50kHz	50kHz to 100kHz
200mV	1 + 100	0.2 + 100	0.5+100	1.5 + 200	3 + 400
2V	1 + 100	0.2 + 100	0.5 + 100	1.5 + 200	3 + 400
20V	1 + 100	0.2 + 100	0.5 + 100	1.5 + 200	3 + 400
200V	1 + 100	0.2 + 100	0.5+100	1.5 + 200	3 + 400
750V	1 + 100	0.2 + 100	0.5+100	Not Specified	

Measurement method: True RMS
Input range: 5% or more of full scale
Crest factor: 3:1 on full scale
Input impedance: 1.1 MCI t 10%,100pF or less
Maximum allowable input voltage: 800Vrms,1100Vpeak,10' VHz
Response time: Approx. 1.8 sec. (until it reaches a value within 0.1% of the final value at the same range)

AC Current Measurement (AC + DC coupling mode)
Resolution, Maximum Reading and Input Terminal Resistance

Range	Input Terminal Resistance	Resolution			Maximum Reading		
		3 1/2	4 1/2	5 1/2	3 1/2	4 1/2	5 1/2
20mA	10Ω or less	10μA	1μA	0.1μA	19.99	19.999	19.9999
200mA	1Ω or less	100μA	10μA	1μA	199.9	199.99	199.999
10A	0.01Ω or less	10mA	1 mA	100μA	10.00	10.000	10.0000

Measurement accuracy

Range	3 1/2, 4 1/2			51/2		
	20Hz to 50Hz	50Hz to 2kHz	2kHz to 10kHz	20Hz to 50Hz	50Hz to 2kHz	2kHz to 10kHz
20mA	1.5 + 17	0.6 + 17	2 + 30	1 + 120	0.5 + 100	2 + 200
200mA	1.5 + 17	0.6 + 17	2 + 30	1 + 120	0.5 + 100	2 + 200
10A	2 + 22	1.0 + 22	2 + 30	1.5 + 120	1 + 100	Unspecified

Measurement method: True RMS
Overload Current Protection: 200mA terminal (0.25A/250V) IEC127 sheet 1 immediately blown fuse protection
10A terminal (15A/600V) breaking capacity 10000A immediately blown fuse protection
Input range: 5% or more of full scale
Crest factor: 3:1 on full scale
Response time: Approx. 1.8sec. (until it reaches a value within 0.1% of the fmal value at the same range)

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