THURLBY THANDAR INSTRUMENTS

1604

40,000 COUNT DIGITAL MULTIMETER

INSTRUCTION MANUAL

Introduction

This true RMS multimeter is a low-cost manual/autoranging bench-top instrument with a large, bright LED display. It offers 4¾ digit (40,000 count) scale length and a resolution of 10µV and 10mΩ.

The key features are:

- 0.56" (14mm) high brightness LED display.
- 0.08% basic accuracy, 40,000 counts.
- Manual or autoranging.
- DC and AC Volts, DC and AC current, Resistance and Frequency measurement; Continuity and Diode checks.
- True RMS AC measurement, 4,000 counts.
- Display nulling.
- Touch hold mode - holds onto a stable reading until updated.
- Remote control and data-logging to disk using optional Windows software.
- Fully compliant with EN61010-1 Safety and EN61326 EMC standards.

TEST EQUIPMENT RISK ASSESSMENT

Recommendation from the U.K. Health and Safety Executive

Users of this equipment and or their employers are reminded that Health and Safety Legislation require them to carry out valid risk assessments of all electrical work so as to identify potential sources of electrical danger and risk of electrical injury such as from inadvertent short circuits. Where the assessments show that the risk is significant then the use of fused test leads constructed in accordance with the HSE guidance note GS38 'Electrical Test Equipment' for use by electricians' should be used.

Specifications

ACCURACY

Accuracies apply for 1 year 19°C to 25°C. Temperature coefficient outside these limits is <0.1 x quoted range accuracy per °C.

DC Volts

Range	Accuracy	Resolution	Notes	
400mV	0.08% ± 4 dig.	10µV	265V DC/AC rms max	Input impedance 10MΩ nominal
4V	0.08% ± 4 dig.	100µV	Max input 1000V DC/AC pk. ⚠	NMR:>60dB @ 50/60Hz †
40V	0.08% ± 4 dig.	1mV		CMR:>90dB @ DC/50Hz/60Hz†
400V	0.08% ± 4 dig.	10mV		
1000V	0.09% ± 4 dig.	100mV		

AC Volts (True RMS)

Range	Accuracy			Resolution
	45Hz - 400Hz	400Hz - 4kHz	4kHz - 20kHz	
400mV	0.5% ± 4 dig	1% ± 4 dig.	2% ± 4 dig.	100µV
4V				1mV
40V		2% ± 4 dig	5% ± 4 dig.	10mV
400V		-	-	100mV
750V	1% ± 4 dig.	-	-	1V

Accuracies apply for readings between 400 and 4,000 counts. Additional error at crest factor = 3 is typically 1%. Input impedance = 10MΩ nominal.
1kΩ unbalanced CMR = >60dB at DC/50Hz/60Hz†.

⚠ Max. input = 750V rms, 1kV pk. (265Vrms on 400mV range).

Resistance

Range	Accuracy	Resolution	Notes
400Ω	0.15% ± 6 dig.*	10mΩ	⚠ Max. input 265V DC or ACrms any range. Max. open circuit voltage 4V.
4kΩ	0.1% ± 4 dig.	100mΩ	
40kΩ	0.1% ± 4 dig.	1Ω	
400kΩ	0.15% ± 4 dig.	10Ω	
4MΩ	0.3% ± 6 dig.	100Ω	
40MΩ (up to 20MΩ)	1.0% ± 10 dig.	1kΩ	
40MΩ (up to 40MΩ)	2.0% ± 10 dig	1kΩ	

* after Null

† 60Hz rejection is a factory option.

DC Current

Range	Accuracy	Resolution	Notes
4mA	0.1% ± 4 dig.	0.1µA	Max. input 1A, 250V, fuse protected
400mA	0.1% ± 4 dig.	10µA	Voltage burden <500mV
10A (up to 1A)	0.3% ± 4 dig.	1mA	
10A (up to 5A)	1.0% ± 4 dig.	1mA	Max. input 10A, 250V, fuse protected
10A (up to 10A)	3% ± 10 dig	1mA	Voltage burden <500mV

AC Current (True RMS)

Range	Accuracy (45Hz - 10kHz)	Resolution	Notes
4mA	0.5% ± 4 dig.	1µA	Max. input 1A, 250V, fuse protected
400mA	0.5% ± 4 dig.	100µA	Voltage burden <500mV
10A (up to 1A)	0.8% ± 4 dig.	10mA	
10A (up to 5A)	1.5% ± 4 dig	10mA	Max. input 10A, 250V, fuse protected
10A (up to 10A)	3% ± 4 dig.	10mA	Voltage burden <500mV

Accuracies apply for readings between 400 and 4,000 counts. Additional error at crest factor = 3 is typically 1%.

Frequency

Range	Accuracy	Resolution	Gate	Notes
4kHz	0.01% ± 1 dig.	0.01Hz	1s	Sensitivity set by
40kHz	0.01% ± 1 dig.	0.1Hz	10s	AC range setting

Continuity and Diode Test

Continuity:	4kΩ range selected; audible tone sounds for impedance <10Ω.
Diode Test:	Test current approximately 1mA at 1V; displays voltages up to 3V.
Maximum Open Circuit Voltage:	4V
Maximum Input:	265V DC or AC rms.

FURTHER FUNCTIONS

Hold:	Reading is frozen
T-Hold (Touch & Hold):	Reading is frozen when stable.
Min/Max:	Minimum and maximum readings stored.
Null (Relative):	Stores current reading and subtracts it from future readings. Up to ±1,000 counts can be nulled without restricting the measurement range. Counts greater than ±1,000 can be nulled to give a Relative reading but the measurement range is correspondingly reduced; OFL shows in the display when the measurement range is exceeded.

DISPLAY

Display Type:	High brightness LED. Height 0.56" (14mm).
Scale Length:	4¾ digits (40,000 counts); AC ranges 4,000 counts.
Annunciators:	For all ranges, functions and program modes.
Reading Rate:	2.5 readings/sec.
Overrange:	Display shows OFL if input too great for range.

GENERAL

Power:	110V-120V or 220V-240V AC ±10%, 50/60Hz, adjustable internally; 3VA max. Installation Category II. 60Hz operation is a factory option.
RS232 Interface:	Baud Rate 9600. Permits remote control and data-logging to disk using optional Windows software.
Operating Range:	+5°C to + 40°C, 20% to 80% RH.
Storage Range:	–40°C to + 70°C.
Environmental:	Indoor use at altitudes up to 2000m, Pollution Degree 1.
Safety:	Complies with EN61010-1.
EMC:	Complies with EN61326.
Size:	260(W) x 88(H) x 235(D)mm, excluding handle and feet.
Weight:	2.0kg.