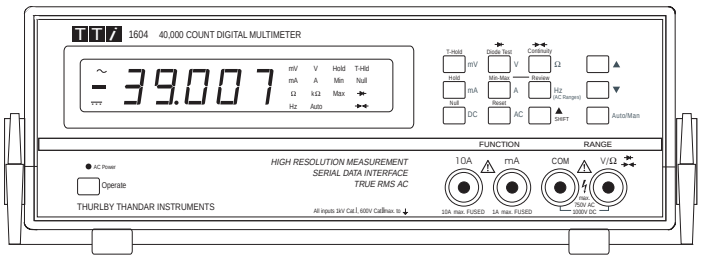
THURLBY THANDAR INSTRUMENTS

1604 4¾ digit Bench Multimeter



- 40,000 count scale length
- Accuracy 0.08%; resolution 10µV, 10mΩ & 0.1µA
- Large and bright LED display; ac line operation
- True RMS ac functions; wide ac bandwidth
- Frequency measurement; continuity; diode test
- Relative, T-Hold and Min-Max functions included
- Isolated RS-232 interface as standard

A value-for-money DMM

The 1604 is a low-cost auto/manual ranging bench-top DMM with a large and bright LED display.

It offers 4¾ digit (40,000 count) scale length, true RMS ac measurements, a basic accuracy of 0.08% and a resolution of 10µV, 10mΩ and 0.1µA.

A substantial bench-top instrument

The 1604 is a robust mains-powered bench-top instrument. Unlike a hand-held multimeter it stays where you put it even with heavy test leads connected. The multi-position tilt stand ensures that the large display is always readable.

Smart functions

The 1604 incorporates several "smart" functions such as Relative measurement and Minimum-Maximum storage.

The T-Hold function enables readings to be held on the display automatically each time a new test point is probed.

True RMS ac ranges

All AC measurements on the 1604 are True RMS. This avoids the errors on non-sinusoidal waveforms associated with other multimeters.

Good ac bandwidth enables measurement within the audio band and ensures that higher frequency components of switching waveforms are included within the measurement result.

Frequency measurement

The 1604 has a frequency function which can be selected on any ac range in order to measure the frequency of the signal. Frequencies up to 40kHz can be measured and the maximum resolution is 0.1Hz.

Isolated RS-232 interface

The 1604 is fitted with an isolated RS-232 interface. This permits remote control and data-logging to disk using optional Windows based software.

DISPLAY and RANGE CONTROL

0.56" (14mm) LED display. Annunciators for all ranges, functions and 'smart' modes. Scale Length 4¾ digits (± 40,000 counts) except ac ranges (4,000 counts). Reading rate 2.5 per second. Each measurement function can use automatic or up/down manual ranging.

RS-232 INTERFACE

Opto-isolated bi-directional RS-232 interface. 9600 baud.

GENERAL

Power:	230V or 115V AC nominal 50/60Hz, adjustable internally; operating range ±14% of nominal; 3VA max.; Installation category II
Size:	260(W) x 88(H) x 235(D)mm, excl. handle/feet.
Weight:	2.0kg (4.4lb)
Operating Range:	+ 5°C to 40°C, 20-80% RH.
Storage Range:	- 40°C to 70°C
Safety:	Complies with EN61010-1.
EMC:	Complies with EN55081-1 and EN50082-1.

Note: *This is a faxable data sheet, a colour brochure is also available.*

All 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 VOLTAGE

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

AC VOLTAGE (True RMS, 4000 count scale length)

Range	Accuracy			Resolution
	45Hz - 400Hz	400Hz - 5kHz	5kHz - 20kHz	
400mV	0.5% ± 4 dig.	1% ± 4 dig.	3% ± 4 dig.	100µV
4V		2% ± 4 dig.	5% ± 4 dig.	1mV
40V				10mV
400V		3% ± 4 dig.		100mV
750V	1% ± 4 dig.			1V

Accuracies apply for readings between 10% and 100% of full scale. Additional error at crest factor = 3 is typically 1%. Input impedance = 10MΩ nominal. Max. input = 750V rms, 1kV pk. (265V rms on 400mV range). 1kΩ unbalanced CMR = >60dB at DC or 50Hz (60Hz rejection available as factory option).

RESISTANCE

Range	Accuracy	Resolution	Notes
400Ω	0.15% ± 6 dig.*	10mΩ	* 400Ω specification applies after null Max. input 265V DC or AC rms on any range. Max. open circuit voltage 4V 40MΩ accuracy applies up to 20MΩthereafter add 1%
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	1.0% ± 10 dig.	1kΩ	

DC CURRENT

Range	Accuracy	Resolution	Notes
4mA	0.1% ± 4 dig.	0.1µA	Max. input 1A (Fused) Voltage burden <500mV
400mA	0.1% ± 4 dig.	10µA	
10A (up to 1A)	0.3% ± 4 dig.	1mA	Max. input 10A (Fused) Voltage burden <500mV
10A (up to 5A)	1.0% ± 4 dig.	1mA	
10A (up to 10A)	3.0% ± 10 dig.	1mA	

AC CURRENT (True RMS, 4000 count scale length)

Range	Accuracy	Resolution	Notes
1mA	0.5% ± 4 dig.	1µA	Max. input 1A (Fused) Voltage burden <500mV
100mA	0.5% ± 4 dig.	100µA	
10A (up to 1A)	0.8% ± 4 dig.	10mA	Max. input 10A (Fused) Voltage burden <500mV
10A (up to 5A)	1.5% ± 4 dig.	10mA	
10A (up to 10A)	3.0% ± 4 dig.	10mA	

Accuracies apply over 45Hz to 10kHz for readings between 10% and 100% of range. Additional error at crest factor = 3 is typically 1%.

FURTHER FUNCTIONS

Continuity

Selects 4kΩ range and sounds audible tone for impedance <10Ω. Max. input 265V DC or AC rms.

Diode Test

Displays junction voltages up to 3V at a test current of 1mA at 1V. Max. open circuit voltage approximately 4V. Max. input 265V DC or AC rms.

Null (Relative):	Stores current reading and subtracts it from future readings.
Hold:	Reading is frozen until released.
T-Hold:	Reading is frozen when it becomes stable.
Min/Max:	Minimum and maximum readings are stored.

Thurlby Thandar Instruments Ltd. operates a policy of continuous development and reserves the right to alter specifications without prior notice.

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