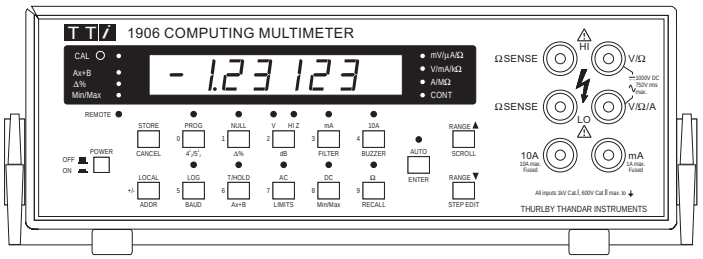
THURLBY THANDAR INSTRUMENTS

1906 5½ digit Precision Bench Multimeter



- 5½ digit scale length (±210,000 counts)
- 0.012% basic one year accuracy
- 1uV, 1mΩ and 1nA resolution, 4 terminal Ohms
- Full automatic or manual ranging
- True RMS ac functions, wide ac bandwidth
- Full set of current ranges from 200uA to 10A
- Wide range of computing and data logger functions
- Fully programmable by RS-232 or GPIB interfaces

Greater resolution and accuracy

The 1906 is a true 5.5 digit meter with a scale length of ± 210,000 counts. This gives it not just superior resolution relative to 4.5 digit meters, but much higher effective accuracy as well.

Greater sensitivity and higher input impedance

With a maximum resolution of 1µV, 1mΩ and 1nA, the 1906 is ten times more sensitive than a 4.5 digit meter.

This extra senstivity enables accurate measurements to be made in areas previously impossible such as thermocouple junctions, switch contact resistance or capacitor leakages.

4 terminal Ohms for improved stability

Resistance measurements can be made in either 2 terminal or 4 terminal mode. High impedance sensing ensures that the meter switches automatically between modes. For low resistance measurements, 4 terminal mode offers much higher accuracy and repeatability.

True RMS ac functions

The 1906 provides True RMS ac response which gives accurate measurements regardless of the waveform shape. The wide bandwidth voltage attenuator provides high accuracy within the audio band and gives extended response to avoid distortion when measuring switching waveforms.

Full bus control via RS-232 or GPIB

The 1906 is designed for complete bus control. Every function of the instrument can be controlled using either the RS-232 interface or the GPIB interface (optional).

Wide range of Smart functions

The 1906 offers computing and datalogging functions as standard: dBs, Ax+b, Limits, % deviation, Min-Max, and a 100 reading Data-logger.

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

ACCURACY

Accuracies apply for 1 year 18°C to 26°C. Temp. coefficient outside these limits is <0·1 x quoted range accuracy per °C. Warm-up time to rated accuracy is 1 hour.

DC VOLTS

Range	Accuracy(±)	Input Impedance	Max Input
200mV	0·017% + 3d	10MΩ or >1GΩ (Hi Z mode)	1kV DC or AC Peak any range
2V	0·012% + 3d		
20V	0·019% + 3d	10MΩ	
200V	0·019% + 3d		
1000V	0·019% + 3d		

RESISTANCE (OHMS)

Range	Accuracy(±)	Max. Measuring Current	Max. Input
200	0·025% + 4d	1·5mA	300V DC or RMS continuous any Ohms input any range
2k	0·019% + 3d	1·5mA	
20k	0·019% + 3d	0·4mA	
200k	0·019% + 3d	40µA	
2M	0·022% + 3d	4µA	
20M	0·07% + 3d	400nA	

Max open circuit voltage 3·5V. Diode Test on 2k range.
Audible continuity check available on all ranges.

AC VOLTS (True RMS)

Range	Accuracy(±)			
	45Hz - 5kHz	5kHz - 10kHz	10kHz-20kHz	20kHz-50kHz
200mV	0·2% + 150d	0·2% + 250d	3% + 500d	-
2V	0·2% + 150d	0·2% + 250d	0·5% + 300d	3% + 1500d
20V	0·2% + 150d	0·2% + 250d	0·5% + 300d	2% + 1000d
200V	0·2% + 150d	0·2% + 250d	0·5% + 500d	-
750V	0·2% + 150d	-	-	-

Additional error at crest factor=3 typically 0·7%, Input impedance 1MΩ / <100 pF any range. Max input 750V rms, 1kV peak, any range.

DC AMPS

Range		Accuracy(±)	Voltage Burden	Max. Input
200µA		0·08% + 12d	300 mV max	1A, 300V fuse protected
2mA		0·08% + 12d		
20mA		0·08% + 12d		
200mA		0·08% + 12d		
10A	<2000mA	0·08% + 12d	650mV max	10A, 300V fuse protected
	>2000mA	0·12% + 12d		

AC AMPS (True RMS)

Range	Accuracy(±) 45 Hz - 1 kHz		Voltage Burden	Max Input
200µA		0·37% + 100d	300mV max	1A, 300V fuse protected
2mA		0·37% + 100d		
20mA		0·37% + 100d		
200mA		0·37% + 100d		
10A	<2000mA	0·37% + 100d	650mV max	10A, 300V fuse protected
	>2000mA	0·4% + 100d		

Additional error at crest factor=3 typically 0·7%.

Note: Further information on this product is available on a 'Supplemental' data sheet.

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

Designed and built in the EEC by:

Thurlby Thandar Instruments Ltd.
Glebe Road, Huntingdon. Cambs. PE29 7DR England
Tel: +44 (0)1480 412451 Fax: +44 (0)1480 450409
e-mail: sales@tti-test.com Web: http://www.tti-test.com

THURLBY THANDAR INSTRUMENTS

1906 5½ digit Precision Bench Multimeter - Supplemental

Auto or manual ranging

The 1906 offers fully automatic ranging on all functions including current. Alternatively any range can be selected and held manually.

Closed case calibration

The 1906 stores its calibration constants in permanent memory. Consequently it can be recalibrated without ever opening the case.

Storage of front-panel set-ups

The 1906 can store up to six front panel set-ups in non-volatile memory. In addition to the range and function each set-up defines the active computing or logging functions along with their parameters.

Single key convenience functions for ease of use

Press the "null" key and the present displayed reading is stored and subtracted from all future readings. This powerful feature has a host of uses such as removing test lead resistance, observing deviation levels, or measuring relative to alternative voltage points using a fixed ground lead connection.

Touch and Hold

The touch and hold function is invaluable when taking measurements in awkward situations where it may be difficult to see the multimeter display. With touch and hold selected, the display is automatically frozen every time a stable reading is achieved. A further press of the T/HOLD key un-freezes the display.

Digital filtering for better noise performance

The 1906 uses non-linear digital filtering which is highly effective in eliminating unwanted noise, but responds rapidly to a change in the reading. When working with very noisy or unstable measurements, the characteristics of the digital filter can be adjusted to suit the application.

Linear scaling with offset (Ax+b)

This function enables a reading to be multiplied by a scale factor (A) and for an offset (b) to be added or subtracted. This means, for example, that the electrical output of a transducer can be scaled to give a direct readout of the physical parameter e.g. temperature or weight. It is particularly useful with 4-20mA current loops.

Limits comparison

This function enables the reading to be tested against high and low limits set by the user. The display then shows a code of H (high), L (low) or P (pass) at the end of the display.

Percentage deviation (Δ%)

This function enables the meter to display the percentage amount by which the reading differs from a nominal value chosen by the user. It is invaluable for measuring tolerance or stability.

Min-Max storage

The Min-Max function stores the highest and lowest values of a set of readings. This facility has many uses such as checking for power supply glitches, recording peak temperature excursions and avoiding "missed" readings when using the Logger function.

Logarithmic measurements (dB)

This function allows measurements to be displayed in the form $20\log_{10}X$. Built-in zero reference scaling enables voltages to be displayed in dBV or dBm relative to any required impedance. Using the null key allows gains and losses to be measured directly.

Automatic data logging

The 1906 can store up to 100 readings at any required time interval from 1 reading per second up to 1 reading every 3 hours.

A simple recall sequence allows the readings to be scrolled onto the display whenever required. Alternatively results can be downloaded using the RS232 or GPIB interfaces. As a result, tedious time related measurement sequences can be handled automatically without disrupting your work.

Manual storage of readings is also available eliminating the need for paper and pencil when making a series of measurements. Storage can also be triggered from the RS-232 or GPIB interfaces.

Note: *This is a faxable data sheet, and is supplemental to the main 1906 faxable data sheet. A full colour brochure is also available.*

Full protection for the instrument and the user

The 1906 incorporates extensive protection against damage from accidental overloads on all ranges including 10 Amps.

In addition the 1906 meets the stringent safety requirements of IEC348 and IEC1010-1 for measurements up to 1kV.

FURTHER SPECIFICATIONS

INPUT CHARACTERISTICS

Input Current:	< 100 pA.
DC NMR:	> 60dB at 50/60Hz.
1k Unbalanced CMR:	> 120dB at DC/50Hz/60Hz, DC ranges; > 60dB at DC/50Hz/60Hz, AC ranges.

DISPLAY

Display Type:	13mm LED, 8 digit.
Scale Length:	Selectable 5½ digit or 4½ digit.
Reading Rate:	3 readings/sec (5½ digit). 10 readings/sec (4½ digit).
Overrange:	Displays **OL** if input too great for range.
Overflow:	Displays **OFLO** if calculated result overflows display.
Annunciators:	LEDs for range, function and program modes.

COMPUTING FUNCTIONS

Null:	Operates over full range; values can be stored for every function.
Digital Filter:	10 options, including optimised default values for each range and function.
Touch & Hold:	Reading is held when stable.
% DEV:	Displays % deviation from entered reference value.
dB:	Displays measurement in dB relative to 1V, 1mA, 1kΩ or user entered value, or in dBm.
Ax+B:	Linear scaling of results, with offset.
Limits:	Reading displayed with **H**, **L**, or **P** (pass) with respect to user-defined high and low limits.
Min/Max:	Minimum and maximum reading stored.
Data Logger:	Manual or automatic storage of 100 measurements, Storage interval 1s to 9999s.

INTERFACES

RS232:	Baud rates 300, 1200 or 9600. Complies fully with the ARC (Addressable RS232 Chain) interface standard. Address selectable from the front panel.
GPIB (Optional):	Fully complies with IEEE-488.1 and IEEE-488.2

POWER REQUIREMENTS

AC Input:	110/120 Volts AC nominal 50/60Hz or 220/240 Volts AC nominal 50/60Hz by rear panel adjustment. The instrument will operate safely and meet specification within normal AC supply variations, viz. 99-132 Volts AC and 198-264 Volts AC respectively.
Consumption:	25VA max.

GENERAL

Operating Range:	+5°C to +40°C, 20% to 80% RH
Storage Range:	-40°C to +60°C
Size:	260(W) x 88(H) x 235(D)mm, excl. handle and feet
Weight:	2·2kg.

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