



Description

A digital multimeter module that combines high performance and accuracy with simple operation. With speed and precision, the 5075 measures from nanovolts to 10 kV, from picoamps to 30 Amps, from nano-ohms up to 1 GΩ, and from picofarads to 300 μF. It is ideal for users requiring a cost-effective DMM with multiple functions and exceptional resolution and accuracy up to 7½ digits. This makes the 5075B a versatile solution to essential laboratory calibration and verification, covering a wide range of applications with excellent measurement capabilities, whilst maintaining reliability and performance.

The Auto Dynamic Filter (ADF) mode allows the 5075B to automatically select the most suitable filter. For a fast changing signal or for when the signal is first connected the reading is displayed almost immediately, but if the input remains constant, the filter time is increased to provide a more stable accurate reading. If the input were disconnected the filter would immediately return to the fastest.

Operation is simple, all major functions from range selection to null require just one key press. The large 24 digit display shows clearly the range and reading and can even show the time to the next sample if required. Other functions can be easily selected from a scrolled menu.

Functions for diode/zener tests, max/min, peak hold and continuity checks are available and also various audible warnings can be selected. A bar graph function allows the user to program high and low pass/fail limits and switch to the bar display mode. This will give an audible and visual indication to the user of the components specification.

A low thermal, 10-channel scanner option, allows multiple inputs to be displayed or compared without the additional cost and inconvenience of a separate switching arrangement.

Features

- 7½ digit resolution
- 10 nV to 10 kV, 10 pA to 30 A
- Resistance, capacitance, frequency
- 18 ppm accuracy
- 10 channel scanner option
- Temperature measurements
- Internal connection to control centre module
- PC/laptop control via EasyCal software

EasyCal Calibration Software

The 5075B can be controlled via Time Electronics EasyCal software to automate the calibration process. This provides increased speed of calibration and consistency of results. Produce traceable calibration certificates and test reports for quality standards with additional uncertainty information for ISO 17025 conformance.





Accuracy specified as \pm ppm reading + \pm Floor at default resolution (shown in brackets), relative to calibration standards.

Basic Technical Specifications

DC Voltage

Range	Resolution <small>Resolution at default in brackets</small>	90 Day \pm 5 °C	1 Year \pm 5 °C
0 to 3 mV	10n V (10 nV)	22 + 80 nV	30 + 80 nV
0 to 10 mV			
0 to 30 mV	10n V (100 nV)	22 + 800 nV	30 + 800 nV
0 to 100 mV			
0 to 300 mV	100 nV (1 μ V)	22 + 8 μ V	30 + 8 μ V
0 to 1 V		12 + 6 μ V	18 + 6 μ V
0 to 3 V	1 μ V (10 μ V)	12 + 60 μ V	18 + 60 μ V
0 to 10 V			
0 to 30 V	10 μ V (100 μ V)	20 + 600 μ V	30 + 600 μ V
0 to 100 V			
0 to 300 V	100 μ V (1 mV)	22 + 8 mV	30 + 8 mV
0 to 1 kV			
0 to 3 kV	1 mV (10 mV)	250 + 1 V	350 + 1.2 V
0 to 10 kV		350 + 1.2 V	500 + 1.5 V

DC Current

Range	Resolution <small>Resolution at default in brackets</small>	90 Day \pm 5 °C	1 Year \pm 5 °C
0 to 3 μ A	10 pA (10 pA)	150 + 200 pA	200 + 250 pA
0 to 10 μ A			
0 to 30 μ A	100 pA (100 pA)	75 + 1 nA	100 + 1 nA
0 to 100 μ A			
0 to 300 μ A	100 pA (1 nA)	75 + 10 nA	100 + 10 nA
0 to 1 mA			
0 to 3 mA	1 nA (10 nA)	75 + 100 nA	100 + 100 nA
0 to 10 mA			
0 to 30 mA	10 nA (100 nA)	75 + 1 μ A	100 + 1 μ A
0 to 100 mA			
0 to 300 mA	100 nA (1 μ A)	150 + 10 μ A	200 + 10 μ A
0 to 1 A			
0 to 3 A	10 μ A (10 μ A)	500 + 200 μ A	750 + 200 μ A
0 to 10 A			
0 to 30 A	100 μ A (100 μ A)	500 + 2 mA	750 + 2 mA

AC Voltage

Range	Resolution	90 Day \pm 5 °C	1 Year \pm 5 °C
0 to 30 mV	1 μ V	0.05 % + 4 μ V	0.06 % + 4 μ V
0 to 300 mV	10 μ V	0.05 % + 40 μ V	0.06% + 40 μ V
0 to 3 V	100 μ V	0.05 % + 400 μ V	0.06 % + 400 μ V
0 to 30 V	1 mV	0.05 % + 4 mV	0.06 % + 4 mV
0 to 300 V	10 mV	0.15 % + 0.1 V	0.2 % + 0.12 V
0 to 3 kV	100 mV	0.15 % + 1 V	0.2 % + 1.2 V

AC Current

Range	Resolution	90 Day \pm 5 °C	1 Year \pm 5 °C
0 to 30 μ A	1 nA	0.1 % + 8 nA	0.2 % + 10 nA
0 to 300 μ A	10 nA	0.1 % + 80 nA	0.2 % + 100 nA
0 to 3 mA	100 nA	0.1 % + 800 nA	0.2 % + 1 μ A
0 to 30 mA	1 μ A	0.1 % + 8 μ A	0.2 % + 10 μ A
0 to 300 mA	10 μ A	0.1 % + 80 μ A	0.2 % + 100 μ A
0 to 3 A	100 μ A	0.15 % + 1 mA	0.2 % + 1 mA
0 to 30 A	1 mA	0.15 % + 10 mA	0.2 % + 10 mA

Resistance

Range	Resolution <small>Resolution at default in brackets</small>	90 Day \pm 5 °C	1 Year \pm 5 °C
0 to 30 m Ω	10 n Ω (100 n Ω)	70 + 2 $\mu\Omega$	100 + 2.5 $\mu\Omega$
0 to 100 m Ω			
0 to 300 m Ω	100 n Ω (1 $\mu\Omega$)	40 + 10 $\mu\Omega$	60 + 15 $\mu\Omega$
0 to 1 Ω			
0 to 3 Ω	1 $\mu\Omega$ (10 $\mu\Omega$)	30 + 80 $\mu\Omega$	40 + 100 $\mu\Omega$
0 to 10 Ω			
0 to 30 Ω	10 $\mu\Omega$ (100 $\mu\Omega$)	20 + 600 $\mu\Omega$	30 + 800 $\mu\Omega$
0 to 100 Ω			
0 to 300 Ω	100 $\mu\Omega$ (1 m Ω)	20 + 6 m Ω	30 + 8 m Ω
0 to 1 k Ω			
0 to 3 k Ω	1 m Ω (10 m Ω)	20 + 60 m Ω	30 + 80 m Ω
0 to 10 k Ω			
0 to 30 k Ω	10 m Ω (100 m Ω)	30 + 600 m Ω	45 + 800 m Ω
0 to 100 k Ω			
0 to 300 k Ω	100 m Ω (1 Ω)	60 + 8 Ω	90 + 10 Ω
0 to 1 M Ω			
0 to 3 M Ω	1 Ω (10 Ω)	100 + 100 Ω	150 + 120 Ω
0 to 10 M Ω			
0 to 30 M Ω	100 Ω (100 Ω)	750 + 10 k Ω	1000 + 10 k Ω
0 to 100 M Ω			
0 to 300 M Ω	10 k Ω (10 k Ω)	0.5 % + 1 M Ω	0.75 % + 1 M Ω
0 to 1 G Ω			

PRT (Pt100) Temperature

Range	Resolution	90 Day \pm 5 °C	1 Year \pm 5 °C
-200 to +600 °C	0.001 °C	0.05 °C	0.06 °C

Frequency

Range	Resolution	90 Day \pm 5 °C	1 Year \pm 5 °C
0 to 100 kHz	1 Hz	10 + 1	12 + 1

Capacitance

Range	Resolution <small>(5 digit)</small>	90 Day \pm 5 °C	1 Year \pm 5 °C
0 to 30 nF	1 pF	0.2 % + 20 pF	0.25 % + 20 pF
0 to 300 nF	10 pF	0.2 % + 200 pF	0.25 % + 200 pF
0 to 3 μ F	100 pF	0.2 % + 2 nF	0.25 % + 2 nF
0 to 30 μ F	1 nF	0.2 % + 20 nF	0.25 % + 20 nF
0 to 300 μ F	10 nF	0.2 % + 200 nF	0.25 % + 200 nF

Accuracy stated as 90 day and 1 year specification for all ranges \pm 5 °C in 6 digit mode for DC and 6 digit mode for AC.

For full technical information please see the 5075 extended specifications.



Basic Functions

N Digits: Changes the reading resolution, which can be changed from 4 up to 7 digits, depending on the scale selected.

Null: Null facility is available on all DC ranges, Ohms and Capacitance. Null is not available on AC or frequency. When this key is pressed, the DMM will accept the measured present value as the zero value for the range selected. If auto-range is on, the unit will null each range. This is useful for cancelling an offset voltage or for zeroing the value of the test leads on resistance.

Auto ranging: Auto-range (AUTO) will select the optimum range for the measurement. This will introduce very little delay for the operator. The indicator above the keypad will show when the DMM is in auto-range mode.

Filter: The filter alters the integration time of the reading. Filter times are 150 ms, 250 ms, 500 ms, 1 s, 2 s, 4 s, 8 s, 16 s, 32 s and off.

Internal temperature: Internal Temperature controlled at $35\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ with an ambient temperature of 20 to $28\text{ }^{\circ}\text{C}$.

Advanced Functions

Ohms compensation: Cancels the effects of any offset voltages by first measuring the input voltage with the current source on and then measuring the voltage with the current source off. The induced voltage is the difference between the two voltages, thus giving a more accurate reading. Can be used in 2 and 4 wire mode for measurements up to 100 k Ω . Ohms compensation doesn't work on ranges above 100 k Ω .

Diode / Zener diode test: The diode test function will pass a current of 1 mA through the diode under test and displays the diode forward voltage. May be used for zener diodes up to 10 V.

Self test reset: The instrument can perform a self-test of all its digital circuits including the IEEE and RAM.

Max – min: This function displays the maximum and minimum readings of the input. By using the up and down keys the Maximum, Minimum or Present value input may be displayed.

Peak hold: This function will display the peak value measured. By using the up and down keys the Peak value or Present input may be displayed.

Component test: Used for component selection. If a component to be tested must fall between a high and low value, component test can be used to make the selection process quicker. It provides a visual display which moves a pointer between the high and low values input, and also indicates whether the component is higher or lower in value than the high and low points if it doesn't fall between them.

PRT temp: Pt100 elements can be measured and displayed in $^{\circ}\text{C}$ using this function.

Dual display: Display Voltage and frequency of the input or the current and frequency (if the AC module has been installed), for AC inputs.

Analogue filter: The analogue filter can be switched into the input circuit to remove any high frequency noise that may be present on the input.

Auto dynamic filter: The Auto Dynamic filter automatically selects the most appropriate filter period. The auto dynamic filter will increase or decrease the filter period (up to the maximum set using the filter key) depending upon the stability of the input signal.

Continuity / sample beep: Continuity tests can be performed by selecting this option when in resistance mode. Any value below 30 % of the full range will produce the continuity beep. Sample beep alerts the operator to a new reading being displayed.

Internal date / time: Date and Time can be displayed or entered using this option.

Internal temp: The internal temperature of the 5075 can be displayed and is updated approximately every 5 minutes. The internal temperature is used to perform an internal calibration when the temperature varies by $1\text{ }^{\circ}\text{C}$, thus insuring the temperature coefficient of the unit remains negligible.

Remote Control: This instrument implements the requirements of the IEEE - 488/1978 standard. The IEEE - 488 interface, allows remote control of the instrument by a suitable computer or controller. Repetitive calibration work can be carried out with speed and accuracy, giving printed results if required. The main limitations of the IEEE are:

- 1) A maximum of 15 devices on the bus.
- 2) The maximum bus length should not be greater than 20 m or number of devices x 2, which ever is the shorter.

Scanner option: The scanner option for the 5075 DMM consists of an internally fitted relay board. This board provides 10 input channels. Up to two boards may be fitted giving up to 20 channels. The relays switch all 4 input terminals: V+, V-, I+, I- to one of 10/20 inputs via the 25 way 'D' connectors. The scanner card may be used for voltage, current, resistance, capacitance, frequency, and Pt100.

Scanner specifications

Maximum voltage.....	200 V DC / 150 V AC.
Maximum current.....	1 A DC / 1 A AC.
Thermal EMF.....	Less than 2 μV per contact.
Contact resistance.....	Less than 150 m Ω .
Operating life.....	Up to 200 million operations.
Operating time.....	20 ms.

General Specifications

Warm up.....	2 hours to full accuracy.
Interfaces.....	GPIB (with cable supplied). USB adaptor optional (code 9794).
Temperature performance.....	Operating: 0 to $40\text{ }^{\circ}\text{C}$. Full specification: $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. Storage: $-20\text{ }^{\circ}\text{C}$ to $60\text{ }^{\circ}\text{C}$.
Humidity.....	Operating: (0 to $30\text{ }^{\circ}\text{C}$) < 90 %, (30 to $40\text{ }^{\circ}\text{C}$) < 70 %.
Altitude.....	Operating: 0 to 3 km. Non operating: 3 km to 12 km.
Line power.....	As per CalBench supplied. 110/220/240 V AC, 50/60 Hz.
Module width.....	500 mm (primary console fitting only)

Ordering Information

5075B.....	Precision Digital Multimeter Module
9726.....	Low Thermal EMF 10 Channel Scanner
ECFLA.....	EasyCal Calibration Software (for options see separate datasheet)
9794.....	GPIB to USB Adaptor
C162.....	Traceable calibration certificate (Factory)
C130.....	Accredited calibration certificate (ISO 17025)