



# Time Electronics

## 5075 Precision Digital Multimeter



- **7½ digit resolution**
- **10nV to 10kV, 10pA to 30A**
- **Resistance, capacitance, frequency**
- **18ppm accuracy/best 1 year**
- **10 channel scanner option**
- **Temperature measurements**
- **GPIB interface (USB adaptor available)**
- **Rack mount kit option**
- **PC/laptop control via EasyCal software**

### DESCRIPTION

A benchtop digital multimeter that combines high performance and accuracy with simple operation. With speed and precision, the 5075 easily measures from nanovolts to 10kV, from picoamps to 30 Amps, from nano-ohms up to 1GΩ, and from picofarads to 300μF. 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 5075 is 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 5075 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.

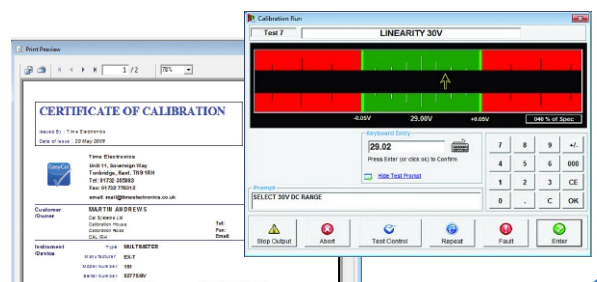
A bar graph function allows the user to program high and low pass/fail limits and switch to the bar display mode. This will give an audible and visual indication to the user of the components specification.

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.

### CALIBRATION MADE EASY

To automate the calibration process the 5075 can be controlled using Time Electronics' EasyCal software. This provides increased speed of calibration and consistency of results.

Easily produce calibration certificates and reports to ISO 9001, ISO 17025, and other international quality standards.



# 5075 Specifications

Accuracy specified as  $\pm$  ppm reading +  $\pm$  Floor at default resolution (shown in brackets), relative to calibration standards.  
TCAL = 20°C

## TECHNICAL SPECIFICATION

### DC Voltage (All specifications $\pm$ 0.4 $\mu$ V)

Range	Resolution Resolution at default in brackets	90 Day $\pm$ 5°C	1 Year $\pm$ 5°C
0 – 3mV	10nV (10nV)	22 + 80nV	30 + 80nV
0 – 10mV			
0 – 30mV	10nV (100nV)	22 + 800nV	30 + 800nV
0 – 100mV			
0 – 300mV	100nV (1 $\mu$ V)	22 + 8 $\mu$ V	30 + 8 $\mu$ V
0 – 1V		12 + 6 $\mu$ V	18 + 6 $\mu$ V
0 – 3V	1 $\mu$ V (10 $\mu$ V)	12 + 60 $\mu$ V	18 + 60 $\mu$ V
0 – 10V			
0 – 30V	10 $\mu$ V (100 $\mu$ V)	20 + 600 $\mu$ V	30 + 600 $\mu$ V
0 – 100V			
0 – 300V	100 $\mu$ V (1mV)	22 + 8mV	30 + 8mV
0 – 1kV			
0 – 3kV	1mV (10mV)	250 + 1V	350 + 1.2V
0 – 10kV			

### AC Voltage (All AC Voltages $\pm$ 50 $\mu$ V)

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

### \* Voltage AC + DC / Current AC + DC

Total measurement error will not exceed the sum of the separate AC + DC accuracy spec, plus one display digit.

### Resistance (2 wire ranges begin at 300m $\Omega$ . Accuracy applies to 2 and 4 wire resistances)

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

### DC Current

Range	Resolution Resolution at default in brackets	90 Day $\pm$ 5°C	1 Year $\pm$ 5°C
0 – 3 $\mu$ A	10pA (10pA)	150 + 200pA	200 + 250pA
0 – 10 $\mu$ A			
0 – 30 $\mu$ A	100pA (100pA)	75 + 1nA	100 + 1nA
0 – 100 $\mu$ A			
0 – 300 $\mu$ A	100pA (1nA)	75 + 10nA	100 + 10nA
0 – 1mA			
0 – 3mA	1nA (10nA)	75 + 100nA	100 + 100nA
0 – 10mA			
0 – 30mA	10nA (100nA)	75 + 1 $\mu$ A	100 + 1 $\mu$ A
0 – 100mA			
0 – 300mA	100nA (1 $\mu$ A)	150 + 10 $\mu$ A	200 + 10 $\mu$ A
0 – 1A			
0 – 3A	10 $\mu$ A (10 $\mu$ A)	500 + 200 $\mu$ A	750 + 200 $\mu$ A
0 – 10A			
0 – 30A	100 $\mu$ A (100 $\mu$ A)	500 + 2mA	750 + 2mA

### AC Current (All AC Current $\pm$ 50nA)

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

### \* Voltage AC + DC / Current AC + DC

Total measurement error will not exceed the sum of the separate AC + DC accuracy spec, plus one display digit.

### 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

**NOTE:** Only available in four terminal mode on the 300 $\Omega$  range.

### Frequency

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

**NOTE:** Frequency may be measured on either voltage or current inputs if the AC option has been fitted.

### Capacitance (All Capacitances $\pm$ 1pF)

Range	Resolution (5 digit)	90 Day $\pm$ 5°C	1 Year $\pm$ 5°C
0 – 30nF	1pF	0.2% + 20pF	0.25% + 20pF
0 – 300nF	10pF	0.2% + 200pF	0.25% + 200pF
0 – 3 $\mu$ F	100pF	0.2% + 2nF	0.25% + 2nF
0 – 30 $\mu$ F	1nF	0.2% + 20nF	0.25% + 20nF
0 – 300 $\mu$ F	10nF	0.2% + 200nF	0.25% + 200nF

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.

# 5075 Operation 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 150ms, 250ms, 500ms, 1s, 2s, 4s, 8s, 16s, 32s & off.

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

## ADVANCED FUNCTIONS

**Ohms Compensation:** Cancels the effects of any offset voltages by first measuring the input voltage with the current source on and the 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 100k $\Omega$ . Ohms compensation doesn't work on ranges above 100k $\Omega$ .

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

**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  $1^{\circ}\text{C}$ , 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 speedily and accurately carried out, 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 20m 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 .....	200V DC / 150V AC	Contact resistance .....	Less than 150m $\Omega$
Maximum current .....	1A DC / 1A AC	Operating life .....	Up to 200 million operations
Thermal EMF .....	Less than 2 $\mu\text{V}$ per contact	Operating time .....	20ms

## GENERAL SPECIFICATION

Operating Temperature .....	0 to $50^{\circ}\text{C}$
Line Power .....	110/220/240V AC, 50/60Hz
Interfaces .....	GPIB (with cable supplied). USB adaptor optional (code 9794).
Dimensions / Weight .....	W423 x H89 x D415mm / weight 8.5kg

## ORDERING INFORMATION

5075 .....	Precision Digital Multimeter
9726 .....	Low Thermal EMF 10 Channel Scanner
9728 .....	19" Universal Rack Mount Kit
ECFLA .....	EasyCal Calibration Software (for options see separate datasheet)
C162 .....	Factory Calibration Certificate (NPL traceable)
C130 .....	UKAS Calibration Certificate (17025)

*Due to continuous development Time Electronics reserves the right to change specifications without prior notice.*