5075 Precision Digital Multimeter

Time Electronics
Calibration, Test & Measurement

- **7 Digit Resolution**
- **AC/DC Voltage & Current**
- **Resistance**
- **Capacitance & Frequency**
- **18ppm / Year accuracy**

Introduction

The Time Electronics 5075 Digital Multimeter makes a major breakthrough in multimeter technology. For the first time has the full range of measurements been provided on a precision DMM.

With speed and precision, the 5075 easily measures from nanovolts to 10kV, from picoamps to 30 Amps, from micro-ohms up to 1GΩ, from picofarads to 300uF, with up to 7½ digit accuracy and a price that is less than many 6½ digit multimeters.

The low level voltage, current and resistance ranges enables the 5075 to make measurements of small signals without using the 6½ or 7½ digit resolution mode, which is often slow, noisy and inaccurate. For example, with the 30mΩ range a 100nΩ resistance can be resolved using the 6½ digit resolution mode.

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. No more waiting to find that the input is not connected!

Operation is simple, all major functions from range selection to null require just one key press. The large 24 digit, custom vacuum fluorescent 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. Ideal for component selection at goods in!

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.

Also available to complement the 5075 Precision DMM is EasyCal software. This will enable the user to automate the calibration of voltage sources, current sources, decade boxes and frequency sources.

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Specifications

Accuracy Specifications

Accuracy specified as ± ppm reading + ± Floor at default resolution (shown in brackets), relative to calibration standards. T_{CAL} = 20°C

D.C. Voltage (All specifications ± 0.4uV)

RANGE	RESOLUTION Resolution at default In brackets	90 DAY ± 5ºC	1 YEAR ± 5ºC
0 - 3mV	10nV (10nV)	22 + 80nV	30 + 80nV
0 - 10mV			
0 - 30mV	10nV (100nV)	22 + 800nV	30 + 800nV
0 - 100mV			
0 - 300mV	100nV (1uV)	22 + 8uV	30 + 8uV
0 - 1V		12 + 6uV	18 + 6uV
0 - 3V	1µV (10uV)	12 + 60uV	18 + 60uV
0 - 10V			
0 - 30V	10µV (100uV)	20 + 600uV	30 + 600uV
0 - 100V			
0 - 300V	100µV (1mV)	22 + 8mV	30 + 8mV
0 - 1kV			
0 - 3kV	1mV (10mV)	250 + 1V	350 + 1.2V
0 - 10kV			

D.C. Current

RANGE	RESOLUTION Resolution at default In brackets	90 DAY ± 5ºC	1 YEAR ± 5ºC
0 – 3uA	10pA (10pA)	150 + 200pA	200 + 250pA
0 – 10uA			
0 – 30uA	100pA (100pA)	75 + 1nA	100 + 1nA
0 – 100uA			
0 – 300uA	100pA (1nA)	75 + 10nA	100 + 10nA
0 - 1mA			
0 - 3mA	1nA (10nA)	75 + 100nA	100 + 100nA
0 - 10mA			
0 - 30mA	10nA (100nA)	75 + 1uA	100 + 1uA
0 - 100mA			
0 - 300mA	100nA (1uA)	150 + 10uA	200 + 10uA
0 - 1A			
0 - 3A	10uA (10uA)	500 + 200uA	750 + 200uA
0 - 10A			
0 - 30A	100uA(100uA)	500 + 2mA	750 + 2mA

Resistance

Two wire ranges begin at 300mΩ
Accuracy applies to 2 and 4 wire resistances.

RANGE	RESOLUTION Resolution at default In brackets	90 DAY ±5 ºC	1 YEAR ± 5ºC
0 - 30mΩ	10nΩ (100nΩ)	70 + 2uΩ	100 + 2.5uΩ
0 - 100mΩ			
0 - 300mΩ	100nΩ (1uΩ)	40 + 10uΩ	60 + 15uΩ
0 - 1Ω			
0 - 3Ω	1uΩ (10uΩ)	30 + 80uΩ	40 + 100uΩ
0 - 10Ω			
0 - 30Ω	10uΩ (100uΩ)	20 + 600uΩ	30 + 800uΩ
0 - 100Ω			
0 - 300Ω	100uΩ (1mΩ)	20 + 6mΩ	30 + 8mΩ
0 - 1kΩ			
0 - 3kΩ	1mΩ (10mΩ)	20 + 60mΩ	30 + 80mΩ
0 - 10kΩ			
0 - .30kΩ	10mΩ (100mΩ)	30 + 600mΩ	45 + 800mΩ
0 - 100kΩ			
0 - 300kΩ	100mΩ (1Ω)	60 + 8Ω	90 + 10Ω
0 - 1MΩ			
0 - 3MΩ	1Ω (10Ω)	100 + 100Ω	150 + 120Ω
0 - 10MΩ			
0 - 30MΩ	100Ω (100Ω)	750 + 10kΩ	1000 + 10kΩ
0 - 100MΩ			
0 - 300MΩ	10kΩ (10kΩ)	0.5% + 1MΩ	0.75% + 1MΩ
0 - 1GΩ			

A.C. Voltage (All A.C. Voltages ± 50uV)

RANGE	RESOLUTION *	90 DAY ±5ºC	1 YEAR ±5ºC
0 - 30mV	1uV	0.05% + 4uV	0.06% + 4uV
0 - 300mV	10uV	0.05% + 40uV	0.06% + 40uV
0 - 3V	100uV	0.05% + 400uV	0.06% + 400uV
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

A.C. Current (All A.C. Current ± 50nA)

RANGE	RESOLUTION *	90 DAY ± 5ºC	1 YEAR ± 5ºC
0-30uA	1nA	0.1% + 8nA	0.2% + 10nA
0-300uA	10nA	0.1% + 80nA	0.2% + 100nA
0-3mA	100nA	0.1% + 800nA	0.2% + 1uA
0-30mA	1uA	0.1% + 8uA	0.2% + 10uA
0-300ma	10uA	0.1% + 80uA	0.2% + 100uA
0-3A	100uA	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 ± 5ºC	1 YEAR ± 5ºC
-200ºC to +600ºC	0.001ºC	0.05ºC	0.06ºC

NOTES:
Only available in four terminal mode on the 300Ω range.

Capacitance (All Capacitances ± 1pF)

RANGE	RESOLUTION (5 Digit)	90 DAY ±5ºC	1 YEAR ±5ºC
0-30nF	1pF	0.2% + 20pF	0.25% + 20pF
0-300nF	10pF	0.2% + 200pF	0.25% + 200pF
0-3uF	100pF	0.2% + 2nF	0.25% + 2nF
0-30uF	1nF	0.2% + 20nF	0.25% + 20nF
0-300uF	10nF	0.2% + 200nF	0.25% + 200nF

Frequency

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

FREQUENCY RANGE	RESOLUTION	90 DAY ± 5ºC	1 YEAR ± 5ºC
0-100kHz	1Hz	10 + 1	12 + 1

Accuracy stated as 90 day and 1 year specification for all ranges ± 5ºC in 6 digit mode for D.C. and 6 digit mode for A.C.

Operation Specification

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 D.C. ranges, Ohms and Capacitance. Null is not available on A.C. 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 D.M.M 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 and off.

Internal Temperature

Internal Temperature controlled at 35ºC ± 2ºC with an ambient temperature of 20 - 28ºC

Advanced Operation Specification

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 100KΩ. Ohms compensation doesn't work on ranges above 100 KΩ.

Diode / Zener Diode Test

The diode test function will passes 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 ˚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 A.C. 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

The 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^{o}C, thus insuring the temperature co-efficient of the unit remains negligible.

Remote control

This instrument implements the requirements of the IEEE - 488/1978 standard.

The IEEE - 488 interface, sometimes called GPIB (General Purpose Interface Bus) or the HPIB (Hewlett Packard Interface Bus) 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 PT 100.

Scanner Specifications

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

General Information

POWER:	110/220/240V A.C. – 50/60Hz
DIMENSIONS (in mm):	423w x 89h x 393d (415w inc. terminals, 108h inc feet)
WEIGHT:	8.5 Kg
OPERATING TEMPERATURE:	0 – 50˚C

Ordering Information

Description	Order Code
7 Digit Precision Digital Multimeter	**5075**
Low Thermal 10 Channel Scanner	**9726**
19” Rack Mount Kit	**9728**
N.P.L. Traceable Calibration Certificate	**9162**
UKAS Calibration Certificate	**9130**

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