

# User's Guide

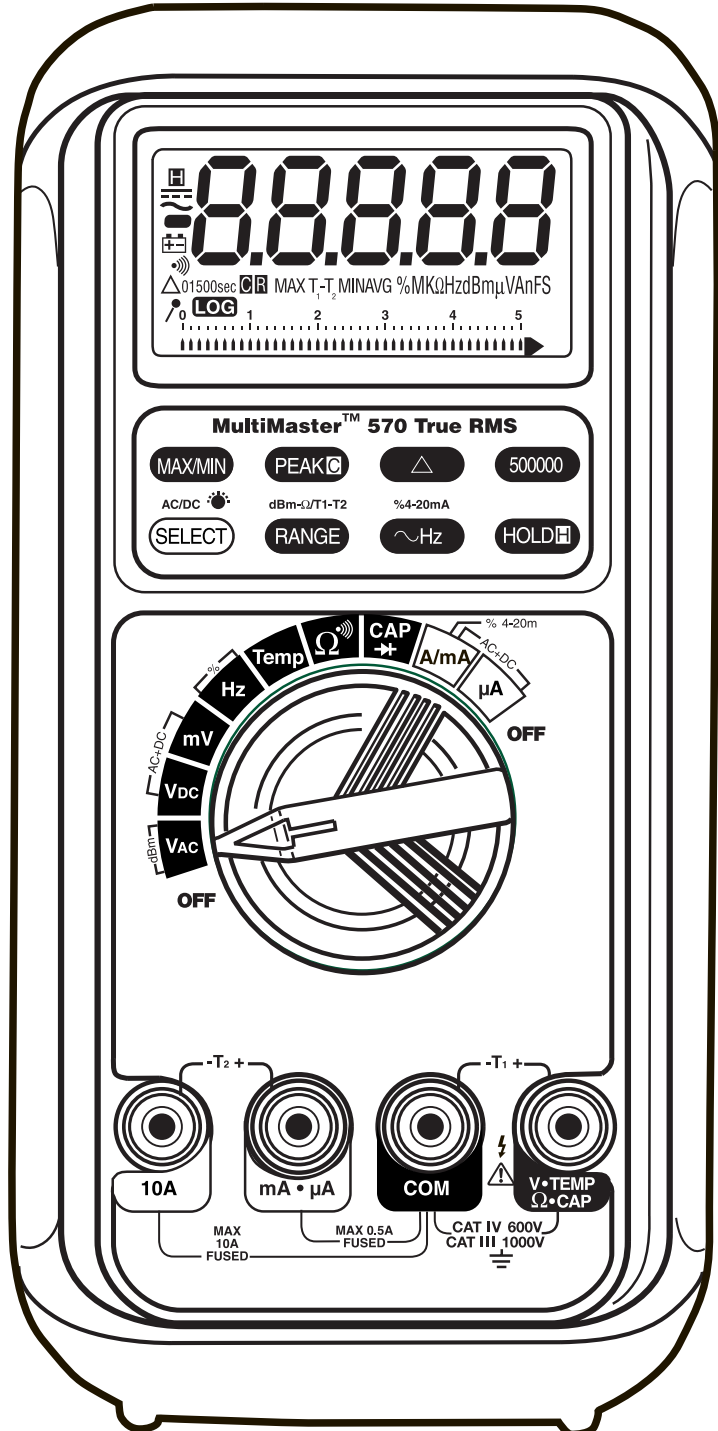


## MultiMaster™ Digital MultiMeter Series With PC Interface

### Models:

MM560

MM570



## **WARRANTY**

EXTECH INSTRUMENTS CORPORATION warrants this instrument to be free of defects in parts and workmanship for three years from date of shipment (a six month limited warranty applies on sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department at (781) 890-7440 ext. 210 for authorization. **A Return Authorization (RA) number must be issued before any product is returned to Extech.** The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. Extech specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. Extech's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

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**MM Series V2.2 9/03  
P/N: 7M1C-0271-A000**

## ***Introduction***

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Congratulations on your purchase of Extech model MM560 or MM570 digital multimeter. Properly used, this meter will provide many years of reliable service.

MultiMaster™ Meters provides high resolution, high accuracy, true rms measurements of AC Voltage and Current, DC Voltage and Current, AC+DC, Resistance, Frequency, Capacitance, Duty Cycle, dBm, Peak, %4-20, Diode, and Continuity. The MultiMaster™ also offers RS-232 PC Interface data acquisition capabilities as an option. Model MM570 offers dual input Temperature measurements and very wide bandwidth.

## ***Safety***

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### **International Safety Symbols**

-  Caution ! Refer to the explanation in this Manual
-  Caution ! Risk of electric shock
-  Earth (Ground)
-  Double Insulation or Reinforced insulation
-  Fuse
-  AC, Alternating Current or Voltage
-  DC, Direct Current or Voltage
-  AC+DC, Current or Voltage

### ***Safety Precautions***

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1. Improper use of this meter can cause damage, shock, injury or death. Read and understand this users manual before operating the meter.
2. Make sure any covers or battery doors are properly closed and secured.
3. Always remove the test leads before replacing the battery or fuses.
4. Inspect the condition of the test leads and the meter itself for any damage before operating the meter. Repair or replace any damage before use.
5. To reduce the risk of fire or electric shock, do not expose this product to rain or moisture.
6. Do not exceed the maximum rated input limits.

7. Use great care when making measurements if the voltages are greater than 25VAC rms or 35VDC. These voltages are considered a shock hazard.
8. Always discharge capacitors and remove power from the device under test before performing Capacitance, Diode, Resistance or Continuity tests.
9. Remove the battery from the meter if the meter is to be stored for long periods.
10. To avoid electric shock, do not measure AC current on any circuit whose voltage exceeds 1000V AC.
11. Voltage checks on electrical outlets can be difficult and misleading because of the uncertainty of connection to the electrical contacts. Other means should be used to ensure that the terminals are not "live".
12. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
13. The product is intended only for indoor use.

## **PER IEC1010 OVERVOLTAGE INSTALLATION CATEGORY**

### *OVERVOLTAGE CATEGORY III*

Equipment of OVERVOLTAGE CATEGORY III is equipment in fixed installations.

Note – Examples include switches in the fixed installation and some equipment for industrial use with permanent connection to the fixed installation.

### *OVERVOLTAGE CATEGORY IV*

Equipment of OVERVOLTAGE CATEGORY IV is for use at the origin of the installation.

Note – Examples include electricity meters and primary over-current protection equipment

**CENELEC Directives:** These instruments conform to CENELEC low-voltage directive 73/23/EEC and Electromagnetic compatibility directive 89/336/EEC.

## Specifications

### DC VOLTAGE

Range	Accuracy	
	MM570	MM560
500.00 mV, 5.0000V, 50.000V	0.02% + 2d	0.03% + 2d
500.00V	0.04% + 2d	0.05% + 2d
1000.0V	0.05% + 2d	0.1% + 2d

NMRR: >60dB @ 50/60Hz, CMRR: >120dB @ DC, 50/60Hz,  $R_s=1k\Omega$

Input impedance:  $10M\Omega$ , 30pF nominal (80pF nominal for 500mV range)

### DC CURRENT

Range	Accuracy	Burden Voltage
500.00 $\mu$ A	0.15% + 20d	0.15mV/ $\mu$ A
5000.0 $\mu$ A	0.1% + 20d	0.15mV/ $\mu$ A
50.000mA	0.15% + 10d	3.3mV/mA
500.00mA	0.1% + 20d	3.3mV/mA
5.0000A	0.5% + 10d	0.03V/A
10.000A*	0.5% + 20d	0.03V/A

\*10A continuous, 20A for 30 seconds max with a 5 minute cool down interval

### RESISTANCE

Range	Accuracy	
	MM570	MM560
500.00 $\Omega$	0.07% + 10d	0.1% + 6d
5.0000k $\Omega$ , 50.000k $\Omega$ , 500.00k $\Omega$	0.07% + 2d	
5.0000M $\Omega$	0.2% + 6d	0.4% + 6d
50.000M $\Omega$	2.0% + 6d	2.0% + 6d

Open circuit voltage: <1.3V (<3VDC on the 500 $\Omega$  range)

## AC & AC+DC VOLTAGE

Range	Accuracy*	
	MM570	MM560
	<b>20Hz to 45Hz</b>	
500.00mV, 5.0000V, 50.000V	1.5% + 40d	unspecified
500.00V, 1000.0V	unspecified	
<b>45Hz to 300Hz</b>		
500.00mV	0.3% + 20d	0.8% + 60d
5.0000V, 50.000V	0.8% + 20d	
500.00V, 1000.0V	0.4% + 40d	
<b>300Hz to 5kHz</b>		<b>300Hz to 1kHz</b>
500.00mV	0.3% + 10d	0.8% + 40d
5.0000V, 50.000V, 500.00V	0.4% + 40d	2.0% + 60d
1000.0V	0.8% + 40d (300Hz-1kHz)	1.0% + 40d
<b>5kHz to 20kHz</b>		<b>1kHz to 20kHz</b>
500.00mV	0.5% + 20d	1dB**
5.0000V, 50.000V	0.8% + 20d	2dB**
500.00V	0.5% + 20d	3dB**
1000.0V	Unspecified	Unspecified
<b>20kHz to 100kHz</b>		
500.00mV	2.0% + 40d	Unspecified
5.0000V, 50.000V	4.0% + 40d**	
500.00V, 1000.0V	Unspecified	

\*From 5% to 10% of range: accuracy % of reading (or in dB) + 80digits

\*\*From 5% to 10% of range: accuracy % of reading (or in dB) +180digits

\*\*From 10% to 15% of range: accuracy % of reading (or in dB) +100digits

CMRR: >90dB @ DC to 60Hz, Rs=1kΩ

Input Impedance: 10MΩ, 30pF nominal (80pF nominal for 500mV range)

Residual reading less than 50 digits with test leads shorted

## AC & AC+DC CURRENT

Range	Accuracy		Burden Voltage
	MM570	MM560	
	<i>50Hz to 60Hz</i>		
500.00μA, 5000.0μA	0.5% + 50d	1.0% + 40d	0.15mV/μA
50.000mA, 500.00mA			3.3mV/mA
5.0000A, 10.000A*			0.03V/A
	<i>40Hz to 1kHz</i>		
500.00μA, 5000.0μA	0.7% + 50d	1.0% + 40d	0.15mV/μA
50.000mA, 500.00mA			3.3mV/mA
5.0000A, 10.000A*			0.03V/A
	<i>1kHz to 10kHz</i>		
500.00μA, 5000.0μA	2.0% + 50d	Unspecified	0.15mV/μA
50.000mA, 500.00mA			3.3mV/mA
5.0000A, 10.000A*	Unspecified		0.03V/A

\*10A continuous, 20A for 30 seconds max with a 5 minute cool down interval

## TEMPERATURE; T1, T2 DUAL (MM570 ONLY)

Range	Accuracy*
-50.0°C TO 1000.0°C	0.3% + 1°C
-58.0°F TO 1832.0°F	0.3% + 2°F

\*Thermocouple range and accuracy not included

## CAPACITANCE

Range	Accuracy*
50.00nF, 500.0nF	0.8% + 3d
5.000 $\mu$ F	1.0% + 3d
50.00 $\mu$ F	2.0% + 3d
500.0 $\mu$ F	3.5% + 5d
9999 $\mu$ F	5.0% + 5d

\*Accuracies with film capacitor or better

## FREQUENCY, AC LINE LEVEL

Range	5.0000Hz to 200.000kHz	
Accuracy	0.002% + 4d	
Sensitivity	500mV range	0.1V min
	5V range	1V min
	50V range	10V min
	500V range	100V min
	1000V range	900V min

## FREQUENCY, LOGIC LEVEL

Range	5.0000Hz to 2.00000MHz
Accuracy	0.002% + 4d
Sensitivity	2.5Vp square wave

## % DUTY CYCLE

Range	0.10% to 99.99%
Accuracy	3d/kHz + 2d
Input Frequency	5Hz-500kHz, 5V logic family

## dBm

Range	-11.76dBm to 54.25dBm (@ 600 $\Omega$ )
Accuracy	0.25dB + 2d (@40Hz to 20kHz)
Reference Impedance	Selectable: 4, 8, 16, 32, 50, 75,93, 110, 125, 135, 150, 200, 250, 300, 500, 600, 800, 900, 1000, 1200 $\Omega$

\*Input impedance 10M $\Omega$ , 30pF nominal

**DC Loop Current %4 to 20mA:**

4mA = 0% (zero), 20mA = 100% (span), Resolution: 0.01%, Accuracy:  $\pm 25d$

**Diode Test:**

Accuracy: 1%+1d, Current 0.8mA(typical), Open circuit: <3.5VDC

**Peak Capture (Instantaneous Peak Hold):**

Accuracy: Specified accuracy  $\pm 100$  digits for changes > 0.8ms in duration

**Audible Continuity:**

Measurement threshold: Between 20 $\Omega$  and 200 $\Omega$ , response time: <100 $\mu$ s

**Accuracy Notes:** Accuracy is  $\pm$  (% reading + number of digits), or as otherwise specified, at 23°C  $\pm 5^\circ$ C < 75% R.H. True RMS accuracies are specified from 5% to 100% of range or as otherwise specified. Maximum Crest Factor <5:1 at full scale & <10:1 at half scale with frequency component within the specified frequency bandwidth for non-sinusoidal waveforms.

**Sensing:** DC, AC True RMS, AC+DC True RMS

**Digital Display:** 4-4/5 digits, 50000 count  
5-4/5 digits, 500000 count for DCV  
6 digits, 999999 count for Hz

**Bar Graph Display:** 42-segment bargraph

**Polarity:** Automatic

**Update rate:** 5 /second for 50,000 count display (fast mode), 1.25 /second for 500,000 count display (stable mode)  
60 per second for bar graph display

**Low Battery:** Below approx. 7V

**Operating Temperature:** 41° to 104°F (5° to 40°C)

**Storage Temperature:** -4° to 140°F (-20 to 60°C)

**Relative Humidity:** Max 80% up to 87°F (31°C) decreasing linearly to 50% at 104°F(40°C): <80% storage

**Operating Altitude:** Below 2000 meters

**Temp. Coefficient:** Nominal 0.1x(specified accuracy)/°C @(0°C to 18°C or 28°C to 40°C), or otherwise specified

**Power Supply:** 9V battery (NEDA1604, JIS006P or IEC6F22)

**Power Consumption:** 5mA typical

**Auto Power Off:** After 17 minutes of inactivity with no input signal.

Power consumption during auto power off; 20 $\mu$ A

**Safety:** The MultiMaster™ Series meters are intended for indoor use and are protected, against the users, by double insulation per EN61010-1 and IEC61010-1 2nd Edition (2001) to CAT III 1000V & CAT IV 600V. The meter (all versions) also meets UL3111-1(1994)\* and CSA C22.2 No. 1010-1-92\* to CAT III 1000V.

**MM560** Terminals (to COM) ratings:  
V : CATEGORY III 1000 VOLTS AC & DC, AND  
CATEGORY IV\* 600 VOLTS AC & DC.

A / mA $\mu$ A : CATEGORY III AND CATEGORY IV\* 500  
VOLTS AC AND 300 VOLTS DC.

**MM570** Terminals (to COM) ratings:  
V/A/ $\mu$ mA: CATAGORY III 1000 Volts and CATAGORY IV\*  
600V AC & DC

*\*Category IV safety standard (for DMMs) was first released in IEC61010-1 2nd Edition in year 2001, and was yet an UL published standard at the time this manual was written.*

**E.M.C.:** Meets EN61326(1997, 1998/A1), EN61000-4-2(1995) and EN61000-4-3(1996). Also meets former standards EN55011 (1991) and EN50082-1(1997)

In an RF field of 3V/m: Capacitance function is not specified

Other function ranges: Total Accuracy = Specified Accuracy + 30 digits. Performance above 3V/m is not specified

**Overload Protection:**

**$\mu$ A/mA:** 0.63A/500V F, IR 200kA, fuse for MM560  
1A/1000V F, IR 10kA (acceptable alternative;  
0.44A/1000V IR 10kA) fuse for MM570

**A :** 12.5A/500V F, IR 20kA, for MM560  
15A/1000V F, IR 10kA (acceptable alternative; 11A/1000V  
IR 20kA) fuse for MM570

**V,  $\Omega$  other:** 600VDC/VAC for MM560  
1050V rms, 1450V peak for MM570

**Transient Protection** 8kV (1.2/50 $\mu$ s surge)

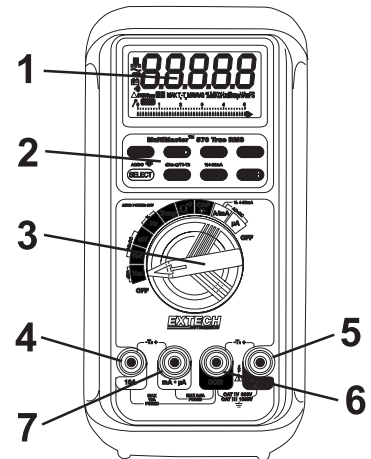
**Dimension:** 7.32 x 3.43 x 1.4" with holster (186mm x 87mm x 35.5mm)

**Weight:** 15.17 oz. with holster (430g)

## Meter Description (MM570 Shown)

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1. Liquid Crystal display
2. Function push-keys
3. Rotary function switch
4. 10A/-T2 input jack
5. V/Hz/ $\Omega$ /Cap/+T1 input jack
6. COM input jack/-T1 input
7. mA-uA current/+T2 input jack



NOTE: RS-232 Optical interface is located on the top rear of the meter.

## Considerations & Features

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### Average sensing RMS calibrated

RMS (Root-Mean-Square) is the term used to describe the effective or equivalent DC value of an AC signal. Most digital multimeters use average sensing RMS calibrated technique to measure RMS values of AC signals. This technique is to obtain the average value by rectifying and filtering the AC signal. The average value is then scaled upward (calibrated) to read the RMS value of a sine wave. In measuring pure sinusoidal waveform, this technique is fast, accurate, and cost effective. In measuring non-sinusoidal waveforms, however, significant errors can be introduced because of different scaling factors relating average to RMS values.

### AC True RMS

AC True RMS, normally referred to as True RMS, identifies a DMM function that is AC coupled, and responds accurately only to the effective RMS AC component value regardless of the waveforms. However, DC component plays an important role in the distorted non-symmetrical waveforms, and will also be of interest sometimes. A full wave rectified sine waveform is a good example, and the AC true RMS function will only give the AC component reading which is at 43.6% of the total effective RMS reading.

## **DC+AC True RMS**

DC+AC True RMS calculates both of the AC and DC components given by the expression  $\sqrt{DC^2 + (AC\ rms)^2}$  when making measurement, and can respond accurately to the total effective RMS value regardless of the waveform. Distorted waveforms with the presence of DC components and harmonics may cause:

- 1) Overheated transformers, generators and motors to burn out faster than normal
- 2) Circuit breakers to trip prematurely
- 3) Fuses to blow
- 4) Neutrals to overheat due to the triplen harmonics present on the neutral
- 5) Bus bars and electrical panels to vibrate

## **AC Bandwidth**

AC bandwidth of a DMM is the range of frequencies over which AC measurements can be made within the specified accuracy. It is not the frequency measurement function, and is the frequency response of the AC functions. A DMM cannot accurately measure the AC value with frequency spectrums beyond the AC bandwidth of the DMM. Therefore, wide AC bandwidth plays an important role in a high performance DMM. In reality, complex waveforms, noise and distorted waveforms contain a much higher frequency spectrum than its fundamental.

## **NMRR (Normal Mode Rejection Ratio)**

NMRR is the DMM's ability to reject unwanted AC noise effect that can cause inaccurate DC measurements. NMRR is typically specified in terms of dB (decibel). This series has a NMRR specification of >60dB at 50 and 60Hz, which means a good ability to reject the effect of AC noise when making DC measurements.

## **CMRR (Common Mode Rejection Ratio)**

Common mode voltage is voltage present on both the COM and VOLTAGE input terminals of a DMM, with respect to ground. CMRR is the DMM's ability to reject common mode voltage effects that can cause digit rattle or offset in voltage measurements. This series has a CMRR specifications of >90dB at DC to 60Hz in ACV function; and >120dB at DC, 50 and 60Hz in DCV function. If neither a NMRR nor a CMRR specification is specified, a DMM's performance will be uncertain.

## **Analog bar-graph**

The analog bar graph provides a visual indication of measurement like a traditional analog meter needle. It is excellent in detecting faulty contacts, identifying potentiometer clicks, and indicating signal spikes during adjustments.

## **Default Functions**

The Multimaster™ will set the function last used as the default function. For example, if dBm is last used in the VAC position, the meter will display dBm the next time that function is selected.

## **Backlit display**

The MultiMaster™ series multimeters are equipped with a backlight for viewing the LCD display in poorly lit areas.

## **Data Hold**

The **HOLD** function freezes the reading on the display for later viewing.

## **Manual and Automatic Ranging**

The MultiMaster™ series multimeters are Autoranging, with manual override.

## **Smart Power Auto Power Off (APO)**

Smart Power automatically shuts the meter down after approximately 17 minutes of inactivity. APO can be disabled on power up and is also disabled if a signal is present.

## **Audible Beeper**

The audible beeper confirms a keystroke. It can be disabled.

## **MAX/MIN mode**

MAX/MIN mode stores the minimum and maximum readings in memory for later viewing.

## **Δ Relative mode**

Relative mode allows the meter to display the difference between the actual measurement and a stored reference value.

## **PeakC capture mode**

PeakC captures voltage or current signals that have durations as short as 0.8ms. This mode is available in DCV, ACV, DCA, & ACA functions.

## **Sealing**

The meter is sealed using an o-ring and gasket to prevent moisture and dust from entering.

## **Rubber Holster**

The heavy duty rubber holster provides drop resistance, good grip and can be removed and washed if necessary.

## Operation

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### Measurement Considerations

**NOTICE:** Read and understand all **warning** and **caution** statements listed in the safety section of this operation manual prior to using this meter.

1. Always move the rotary function switch to the OFF position when the meter is not in use. This meter has Auto Power OFF that automatically shuts the meter OFF if 17 minutes elapse without activity.
2. If "OL" appears on the display during a measurement, the measurement exceeds the range selected. Change to a higher range.

### AC, DC or AC+DC Voltage Measurements

1. Insert the black test lead into the negative **COM** jack and the red test lead into the positive **V** jack.
2. Set the function switch to the "**VAC**", "**VDC**" or "**mV**" position
3. In "**VAC**" press the **SELECT** key to toggle between AC and dBm.
4. In "**VDC**" press the **SELECT** key to toggle between DC and AC+DC.
5. In "**mV**" press the **SELECT** key to toggle between DC, AC and AC+DC.
6. Read the voltage measurement on the display.
7. Press the 500000 key momentarily to toggle between 50,000 counts and 500,000 counts in DCV or DC mV.

Note: The setting selected will be stored in non-volatile memory and will become the default setting.

### dBm Measurements

1. Set up and connect as described for ACV measurements.
2. Press the **SELECT** key momentarily to select dBm.
3. The reference impedance will be displayed for 1 second before the dBm display appears.
4. Press the **RANGE** key momentarily to change the reference impedance.

### AC or DC Current Measurements

**CAUTION:** Do not make current measurements at 20A for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.

1. Insert the black test lead into the negative **COM** jack.

2. For current measurements up to 5000 $\mu$ A, set the function switch to the " $\mu$ A" position and insert the red test lead into the **mA- $\mu$ A** jack.
3. For current measurements up to 500mA, set the function switch to the "**A/mA**" position and insert the red test lead into the **mA- $\mu$ A** jack.
4. For current measurements up to 10A, set the function switch to the "**A/mA**" position and insert the red test lead into the **10A** jack.
5. Press the **SELECT** key momentarily to toggle between DC, AC and AC+DC
6. Remove power from the circuit under test and open the circuit at the point where you wish to measure current.
7. Touch the black test probe tip to the negative side of the circuit and touch the red test probe tip to the positive side of the circuit.
8. Apply power to the circuit.
9. Read the current on the display

**CAUTION:** When measuring a 3-phase system, special attention should be taken to the phase to phase voltage which is significantly higher than the phase to earth voltage. To avoid accidentally exceeding the voltage rating of the protection fuse(s), always consider the phase to phase voltage as the working voltage for the protection fuse(s).

#### **% 4 – 20mA Measurements**

1. Set up and connect as described for DC mA measurements.
2. Press and hold the %4-20mA key for 1 second.
3. The meter will display loop current as a % with 4mA = 0% and 20mA = 100%

#### **Resistance and Continuity Measurements**

**CAUTION:** Using the resistance or continuity function in a live circuit will produce false readings and may damage the meter. Always remove power and isolate the component from the circuit to obtain an accurate reading.

1. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the  $\Omega$  jack.
2. Set the function switch to the " $\Omega$   $\cdot$ )]" position.
3. Press the **SELECT** key momentarily to select Continuity.
4. Touch the test probe tips across the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the resistance reading.
5. For Resistance tests, read the resistance on the display.

6. For Continuity tests, if the resistance is less than the threshold ( $20\Omega$  to  $200\Omega$ ), an audible tone will sound.

## Capacitance Measurements

1. Insert the black lead into the negative **COM** jack and the red test lead into the positive **CAP** jack.
2. Set the function switch to the " **▶ CAP**" position.
3. Press the **SELECT** key momentarily to select Capacitance
4. Touch the test leads to the capacitor to be tested and read the measured value.

## Line Frequency Measurements

1. Connect and make a voltage or current measurement as described in the previous paragraphs.
2. Press the **Hz** key to select the Frequency (Hz) function.
3. Read the frequency on the display

### Notes on sensitivity:

The input sensitivity varies automatically with voltage (or current) range selected. The lower the measuring range, the higher the sensitivity. It is recommended to first measure the voltage (or current) level then activate the Hz function in that voltage (or current) range to automatically get the most appropriate trigger level. When activated from voltage function, you can also press the **RANGE** key momentarily to select another trigger level range manually. The analog bargraph pointer will point at the selected trigger level range scale 1, 2, 3, or 4. If the Hz reading is unstable, select lower sensitivity to avoid electrical noise. If the reading shows zero, select a higher sensitivity.

## Logic Level Frequency Measurements

1. Insert the black lead into the negative **COM** jack and the red test lead into the positive **V** jack.
2. Set the function switch to the "**Hz**" position.
3. Press the **SELECT** key momentarily to select Hz
4. Read the frequency on the display
5. Press the 500000 key momentarily to toggle between 5 full digits and 6 full digits display.

## % Duty Cycle

1. Insert the black lead into the negative **COM** jack and the red test lead into the positive **V** jack.
2. Set the function switch to the "**Hz**" position.
3. Press the **SELECT** key momentarily to select %
4. Read the % duty cycle on the display

## Diode Test

1. Insert the black lead into the negative **COM** jack and the red test lead into the positive **CAP** jack
2. Set the function switch to the "**▶ CAP**" position.
3. Press the **SELECT** key momentarily to select the diode function
4. Touch the test probe tips to the diode or semiconductor junction you wish to test. Note the meter reading.
5. Reverse the test lead polarity by reversing the red and black leads. Note this reading.
6. The diode or junction can be evaluated as follows:
  - a. If one reading displays a value and the other reading displays "OL", the diode is good.
  - b. If both readings display "OL", the device is open.
  - c. If both readings are very small or 0, the device is shorted.

## Temperature Measurements (MM570 only)

1. Insert the T1 Temperature Probe into the **COM** and **TEMP** input jacks observing polarity.
2. Insert the T2 Temperature Probe into the **10A** and **mA- $\mu$ A** input jacks observing polarity
3. Set the function switch to the "**TEMP**" position.
4. Use the **SELECT** key to toggle between  $^{\circ}\text{C}$  and  $^{\circ}\text{F}$ .
5. Use the **RANGE** key to toggle between T1, T2 and T1-T2.
6. Touch the Temperature Probe tip to the device under test.
7. Wait 30 seconds for the measurement to stabilize and then read the display.


## MAX/MIN

Press the **MAX/MIN** key momentarily to activate MAX/MIN recording mode. The LCD annunciators "**R**" and "MAX MIN" turn on. The meter beeps when a new maximum or minimum reading is updated. Press the key momentarily to step through the Maximum (MAX), Minimum (MIN), and Maximum minus Minimum (MAX - MIN) readings. Press the key for 1 second or more to exit MAX/MIN recording mode. Auto Power Off feature will be disabled automatically in this mode.

## **Δ Relative mode**

Relative Zero allows the user to offset the meter by using the displayed value as the zero reference value. Practically all of the displayed readings can be set as the relative reference value including the MAX/MIN recording feature. Press the **Δ** key momentarily to activate and to exit Relative Zero mode.

## **Peak capture mode**

Press PEAK key momentarily to activate the mode to capture voltage or current signal duration as short as 0.8ms. This mode is available in DC, AC, DC+AC modes of voltage and current functions. The LCD annunciators "****" & "MAX" turn on. The meter beeps when a new maximum or minimum reading is updated. Press the key momentarily to read throughout the Maximum (MAX), Minimum (MIN), and Maximum - Minimum readings. Press the key for 1 second or more to exit PEAK capture mode. Auto Power Off feature will be disabled automatically in this mode.

## **Smart Power Auto Power Off**

Smart Power shuts the meter down automatically after approximately 17 minutes of inactivity. The 17-minute time period is reset any time the rotary switch is moved or as long as a signal is being fed into the meter is greater than 10% of the range. This prevents auto powering off during long-term tests. To wake the meter, press the MAX/MIN key or turn the meter off and on again.

## **Disabling Auto Power Off**

Press the RANGE key while turning the meter on to disable the Auto Power Off feature. Auto power off is also disabled in the MAX/MIN and Peak modes.


## **Audible Beeper**

The audible beeper can be disabled by pressing the Hz key while turning the meter on.

## **Backlighted display**

Press the **SELECT** key for 1 second or more to turn on or off the display backlight function. The backlight will automatically turn off after 30 seconds.

## **Hold**

The hold function freezes the reading in the display. Press the **HOLD ** key momentarily to activate or to exit the hold function

## RS-232 PC Interface

This instrument is equipped with an optically isolated interface port (located on the rear of the meter). An optional Windows™ software and interface package is available for data acquisition applications. This optional kit is required to connect the meter to a PC. The software provides digital, analog, and graphical data displays. Refer to the README file in the interface kit for further details.

## Maintenance

**WARNING:** To avoid electrical shock, disconnect the meter from any circuit, remove the test leads from the input jacks and turn OFF the meter before opening the case. Do not operate with open case. Install only the same type of fuse or equivalent

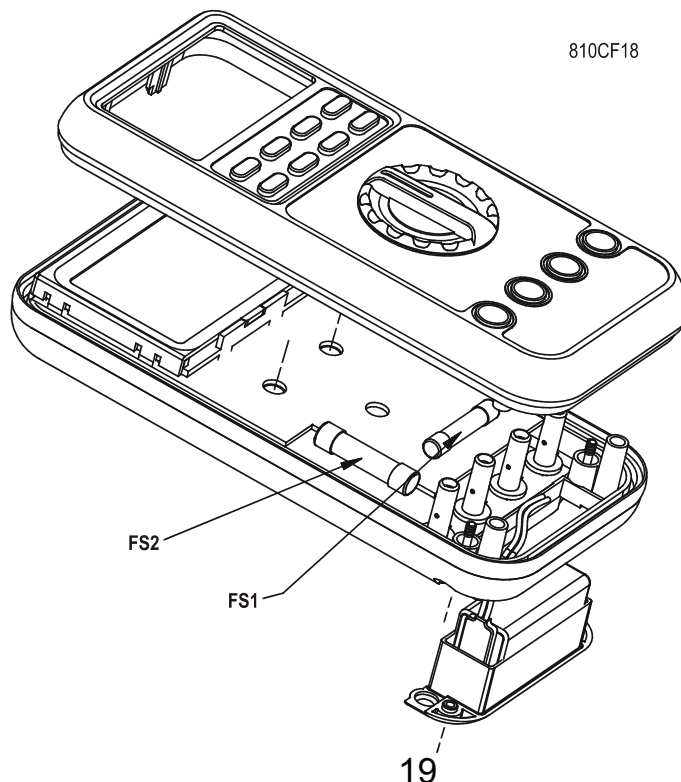
### Cleaning and Storage

Periodically wipe the case with a damp cloth and mild detergent; do not use abrasives or solvents. If the meter is not to be used for periods of longer than 60 days, remove the battery and store it separately

### Battery Replacement

Loosen the 2 screws from the battery access door of the case bottom. Lift the battery access door and thus the battery compartment up. Replace the battery. Re-fasten the screws.

Battery: Standard 9V Alkaline (NEDA1604, JIS006P, IEC6F22)



## Fuse Replacement

1. Remove the four screws from the case bottom and stand using a Philips head screwdriver.
2. Lift the end of the case bottom nearest the input jacks until it unsnaps from the case top
3. Replace the battery or blown fuse(s)
4. Replace the case bottom, and ensure that all the gaskets are properly seated and that the two snaps on the case top (near the display side) are engaged
5. Re-fasten the screws.

Battery: one 9V standard battery (NEDA1604, JIS006P, IEC6F22) or alkaline battery (NEDA1604A, JIS6AM6, IEC6LF22)

FS1 (for  $\mu$ A/mA current input):

For MM560: 0.63A/500V F IR 200kA fast acting fuse.

For MM570: 1A/1000V F IR 10kA (acceptable alternative;  
0.44A/1000V IR 10kA)

FS2 (for A current input):

For MM560: 12.5A/500V F IR 20kA fuse.

For MM570: 15A/1000V IR 10kA (acceptable alternative;  
11A/1000V IR 20kA)

Fuse kits, Extech P/N FS880-4 & FS881-4 are available which contain one each of the fuses for the meters.

## UL Listed

The UL mark does not indicate that this product has been evaluated for the accuracy of its readings.

## REPAIR AND CALIBRATION SERVICES

**Extech offers complete repair and calibration services** for all of the products we sell. For periodic calibration, NIST certification or repair of any Extech product, call customer service for details on services available. Extech recommends that calibration be performed on an annual basis to insure calibration integrity.



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