Digital Multimeter
Function Generator
10 Digit Counter
MODEL : 81K / 81K-TRMS
80000 Series

A unique Multi-functional device

Features :

- Multi-Display : Primary 80000
  Secondary 80000
  Bargraph 23 segments
- Basic DC Accuracy : 0.05%
- mV Impedance : >1000MΩ
- More than 50 measuring functions.
- Frequency measurement : 0.5Hz to 1000.000000 MHz
- 16 Freguency points, 1% to 99% duty selectable square wave output.
- Analyzing component of current or voltage signal.
- Resistance : 0.1Ω to 80MΩ,10MΩ to 8000MΩ
- Capacitance : 1PF to 100μF
- Temperature : -50^{0}C to 1372^{0}C, -58^{0}F to 2502^{0}F
- dBm 20 types of reference impedance.
- Auto data hold/peak hold.
- Relative measurement.
- 36-hours dynamic recording : MAX / MIN / AVG / MAX-MIN
- Communication : isolated optical RS232
- Timer for measurement.
- Backlight display.
- Auto power off

Brief introduction

These series have two models.

The 80000 is autorange and calibrated by 50Hz sine signal.

The 80000R is also antorange and can offer true RMS measurement.

Safety information

Read this operation manual completely before using the meter to ensure that you use the meter safety follow the safety guidelines as below :

- Use the meter only as specified in this manual; Other wise,the protection provided by the meter maybe impaired.
- Never measure voltage while the test leads are inserted into the current input terminals.
- Do not use the meter if it looks damaged .
- Inspect the leads for damaged insulation or exposed metal, check test lead continuity. Replace damaged leads.
- Disconnect the power and discharge all high-voltage capacitors before testing in resistance, continuity, and diode function.
- Be Cautions when working above DC 60V or AC 42V,such voltages may cause a shock hazard.
- When making measurement, keep your fingers behind the guards plant on the probes.
- Select the proper function and range for measurement, To avoid damaging the meter, disconnect the test leads from test points before change function.

Function of meter

Terminal

About terminal function refer to table 1

Table 1. terminal

Terminal	Function
COM	Common terminal for all measurement
V / Ω / Hz	Volts, Ohm, Diode, Freq., Temp. and Cap. measurement and square wave output terminal
mA	milliampere current measurement terminal
10A	Ampere current measurement terminal

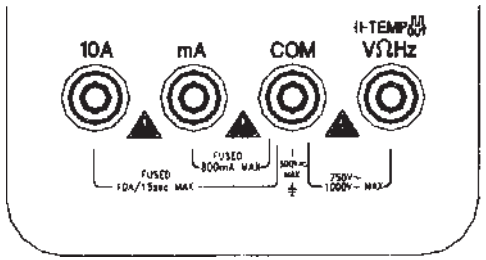

Figure 1. terminal

Rotary switch

About rotary switch function refer to table 2

Table 2. functions of rotary switch

position of rotary switch	Function
≂ V	AC V
⎓ V	DC V
≂ mV	DC, AC millivoltage
⊣◀ •)))	Diode & continuity
Ω	Resistance
DUTY/Hz	Duty / Frequency
⊣⊢	Capacitance
mA ≂	milliampere current
A ≂	Ampere current
⎍⎍ OUT	Squarer wave output
TEMP	Temperature
OFF	Power off

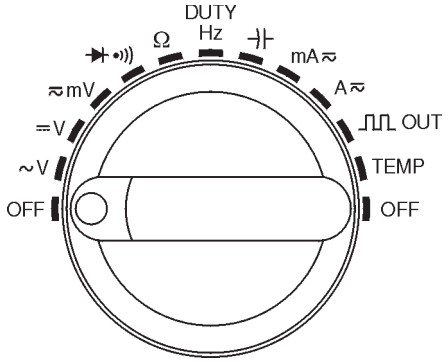

Figure 2. Rotary switch

Push button

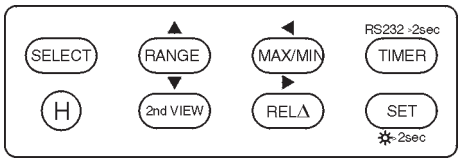

Figure 3. Push button

1. SELECT

- Press this button you can select your measurement mode.
- When meter as square wave output, press this button can select duty of square wave (1% - 99%).

2. RANGE

- When power on meter it at auto range mode,press this button can select your measurement range.
- While SET button operating the RANGE change as ▲(moving up) button. Press this button can move setting digits up.
- Press this push button more than 2 seconds meter return to auto range.

3. MAX / MIN

- Press this button momentary the meter enter dynamic record mode.
- At dynamic record mode, press this button momentary again to cycle MAX, MIN, AVG, MAX-MIN and Present Reading on secondary display.
- Press this push button more than 2 seconds meter retum to normal mode .
- At MAX/MIN state the recording time is 36 hours.
- While SET button operating the MAX / MIN change as ◀(moving left) button. Press this button can move setting digits left.

4. Timer [RS 232]

- Press this button more than 2 seconds the meter enter communication on and "RS232" appear on display screen .
- At communication mode auto power off disable.
- Press this button more than 2 seconds again the meter exit this mode and return normal state.
- Setting time for measuring see special functions.

5. H

- Press this button meter enter auto data hold mode and "A-H" appear on display screen .
- The data hold function allows aperator to hold the dispiayed digital value while analog bar graph continues showing the present reading.
- At auto hold mode the meter can refresh hold new stable readings and sound point out.
- Press this button again, the meter enter Peak + hold modc and a "PH+"appear on display screen.
- Press this button again, the meter enter Peak - hold mode and "PH-" appear on display screen.
- Press this button more than 2 seconds the meter exit HOLD mode and return to normal state.

6. 2nd VIEW

- Use **2nd VIEW** select secondary display functions. table 3 shows press **2nd VIEW** button various measuring states.

Table 3. press **2nd VIEW** for secondary display

Rotary Switch position	Measure state	Primary display	Second display
≂ V	ACV+Hz	ACV	Hz/⎍%/⎍%/⎍ms/⎍ms
	AC dBm+Hz	AC dBm	ACV/Hz
⎓ V	(ACV+DCV)+Hz	ACV+DCV	ACV/Hz
	dBm+Hz	dBm	Hz/ACV/DCV/ACV+DCV
≂ mV	ACmV+Hz	ACmV	Hz/⎍%/⎍%/⎍ms/⎍ms
	dBm+Hz	dBm	Hz/ACmV/DCmV/ACmV+DCmV
Hz / DUTY	Hz	Hz	⎍%/⎍%/⎍ms/⎍ms
⎍⎍ OUT	⎍⎍ OUT	Press **2nd VIEW** to change output frequency	Press **SELECT** to change duty value

- The meter as square wave output,press this button can selecting frequency :

0.5000Hz/1.0000Hz/2.0000Hz/10.000Hz/50.000Hz/60.240Hz/74.63Hz/100.00Hz/151.50Hzi200.00Hz/303.00Hz/606.10Hz/1.2500kHz/1.6660kHz/2.5000kHz/5.0000kHz .

- Press this button more than 2 seconds the meter return 606.10 Hz, 50% of duty output state.
- While **SET** button operating the **2nd VIEW** change as ▼ (moving down) button. Press this button can move setting digits down.

7. REL△

- Press this button the meter enter relative measuring state and "**REL△**" appear on display. In this mode

present readings as Relative reference value and display on secondary. Relative measurement has two mode. one is REL△ = measuring value - Reference value, the other is *REL*%= (REL△ /Reference value) x 100% (press **SELECT** to select REL△ or REL% mode).

- While **SET** button operating **REL**△ button change as ▶ (moving right) button.
- Set up reference value for measurement .

1. In every function use **RANGE** select your range.
2. After press **SET** once, press **SELECT** twice the meter enter set up reference value for measurement. At same time the ▲▼◀ ▶ button are started.
3. Use ▲▼◀ ▶ buttons set your reference value.
4. After set up, you can press **SET** to confirming.

- Press **REL**△ button more than 2 seconds the meter return to normal state.

8. SET

- Press this button to starting ▲ **RANGE** ▼ **2nd VIEW** ◀ **MAX/MIN** ▶ **REL**△ buttons. Use these buttons set up your digits . At this condition the **RANGE, 2nd VIEW, MAX/MIN, REL**△ original functions are disabled.
- Press this button more than 2 seconds backlight on and press this button again the backlight off. The light can auto off after it on 30 seconds if does not press this button.

Display

Table 4. symbols of display

Order No.	Symbol	Description
1		Analog bar graph
2, 3,17		Negative sign
4	OUT	Square wave output
5	Hi	Hi frequency or themocouple indicate
6		Battery power is weakening
7		Diodelaudible continuity function
8	REL△%	Relative measurement
9, 19	DC, AC, DC+AC	DC,AC, DC+AC voltage or current
10	PH+ PH-	+ peak hold, - peak Hold
11	A-H	Auto Hold
12	AVG	Average reading
13	Auto	Auto mode
14	APO	Auto power off sign
15	RS 232	Communication on annunciation
16	MAX/MIN/MAX-MIN	MAX Reading, MIN Reading /MAX-MIN Reading
20	mV/V/mA/A	Second display volt and current unit
21	Hz/kHz/MHz/Ω/kΩ/MΩ	Frequency and Resistance (ohms) unit [second]
22	% % ms ms	Duty cycle unit, pulse width unit

23	nF/ μF	Capcitance unit
24	mV/V/mA/A	Primary display volt and current unit
25	dBm	dBm annunciation
26	Hz/KHz/MHz/Ω/kΩ/MΩ	Frequency and Resistance (ohms) unit (primary)
27,18	^{0}C ^{0}F	Temperature measurement indicate
28	RPM	Round/per minute

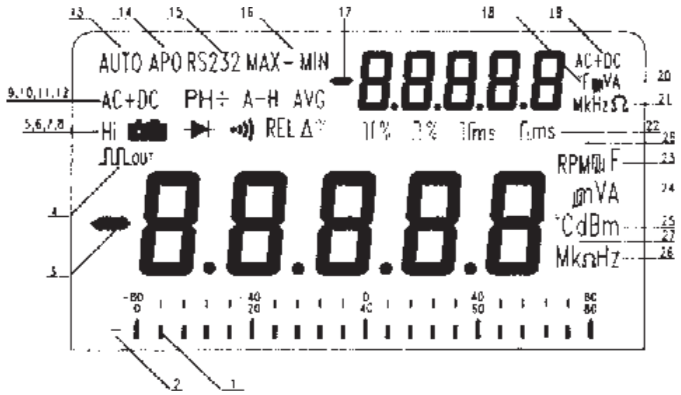

Figure 4. Display

Special functions

- Auto power off

The meter has auto power off function, in normal conditions, when the meter is power on, if any push buttons are not used or rotary switch is not changed, it can auto power off in 30 minutes after power on. Before power off five minutes, the audible five beepers that points out the meter will power off. In operating state any push button is used or rotary switch is changed the time of auto power off will recount.

- Set up time for measurement

1. Press **TIMER** button to set time [“0.00.00” appear at secondary display].
2. Press **SELECT** button the last digit of secondary display flash, at the same time, the ▲▼◀ ▶ are enable [The first digit of secondary display is hour, the second and third are minutes, tbe forth and fifth are seconds].
1. Lise ▲▼◀ ▶ buttons to select digit of time .
2. Press **TIMER** button again to confirming Complete this procedure measuring lime is starting .

- Set limited measurement

The meter has set up limited or down limited measurement functions, up limited and down limited setting as following.

1. Set Up limited : power on the meter → select range → press **SET** → press **SELECT** select Up limited seting state (secondary display “ SEtHJ ”) press moving buttons ▲▼◀ ▶ to set digits → press **SET** to confirm.
2. Set Down limited : power on the meter → select range → press **SET** → press **SELECT** select Down limited seting state (secondary display “ SEtLO ”) press moving buttons ▲▼◀ ▶ to set digits → press **SET** to confirm.

3. After setting proceeding measurement.

a. If measuring above limited the secondary display " HI " and primary display present value .

b. If measuring down limited ihe secondary display " LO " and primary display present value .

c. If mcasuring about high and low, secondary display " HI-LO "

● Analog bar graph

The Function of bar graph is analog needle of meter but without the overload, and updates 40 times per second because the graph responds 10 times faster than the digital display it is useful for making peak and null adjustments and abserving rapidly changing inputs. The bar graph has 23 segments. The number of lit segments is relative to the full-scale value of the selected range. The unit of the bar graph is 4000 counts/bar except when in the relative mode. The polarity indicated at left of the bar graph.

● Square wave output

The square wave output is a useful function is let user have free space for application. For instance, PWM (Pulse Width Modulation) out, regulate voltage control, timer to control circuit, synchronous clock, etc, this is a free-for-all application function.

Measurement ranges

A measurement range determines the highest vatue meter can measure. the meter functions have more than one range.

(1) Being in the right measurement range is important :

● If the range is too high, the meter will not display the must accurate measurement; If the range is too low, the meter will show "OL" on the display.

(2) Auto range and manual range ;

● The meter bas both auto range and manual range options :

● In the auto range (Auto) mode, the meter selects the best range for the input detected. This allows you to switch test points without having to reset the range.

● In the manual range mode you can select the range, this allaws you to override auto range and lock the meter in a specific range.

● When the meter in auto range mode the "AUTO" sign will be appear on display screen.

(3) To enter or exit manual range mode ;

● Press **RANGE** button momentary the meter enters the manual range mode and "AUTO" turns off.

● Each press of **RANGE** momentary increments the range. When the highest range is reached, the meter wraps to the lowest range.

● Press **RANGE** more than 2 seconds the meter returns to auto range mode and "AUTO" appear on display screen .

How to operate

● **DC Voltage measurement**

The measurement of DCV has three modes : DCV / [DCV+ACV] / dBm.

1. Set the rotary switch to " ⎓V " position.
2. Press **SELECT** to select measurement mode.
3. Connect the black test lead to "COM" terminal and the red test lead to "V Ω Hz" terminal.
4. For auto range mode the meter at auto range, if you want some range press **RANGE** to obtain your range.
5. According to your need, can press **REL△ MAX/MIN** and **2nd VIEW** buttons obtain relevant measurement .
6. Touch the probes to the test points and reading display.
7. Primary and secondary display as Table 5.

Table 5. primary and secondary display

Press **SELECT**	Primary	Secondary [press **2nd VIEW**]
DCV	DCV	
[DCV + ACV]	ACV	ACV/Hz
dBm	dBm	Hz/ACV/DCV/DCV+ACV

Note : When enter to dBm measurement, the impedance is 600 Ω, if you want change impedance, press **RANGE** to select impedance. The impedance selectable is : 4/8/16/32/50/75/93/110/125/135/150/200/250/300/500/600/800/900/1000/1200 of Ohms.

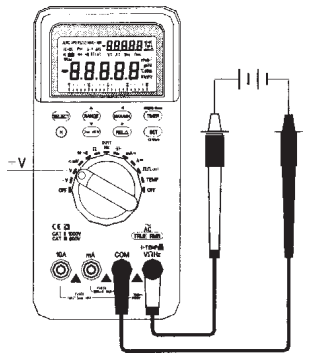

Figure 5. DCV measurement

● **AC Voltage measurement**

The measurement of AC voltage has three modes : ACV / [ACV+Hz] / dBm.

1. Set the rotary switch to " ~V " position.
2. Press **SELECT** to select measurement mode.
3. Connect the black test lead to "COM" terminal and the red test lead to "V Ω Hz" terminal.
4. For auto range mode the meter at auto range, if you want some range press **RANGE** to obtain your range.
5. According to your need, can press **REL△ MAX / MIN** and **2nd VIEW** buttons obtain relevant measurement.
6. Touch the probes to the test points and reading display.
7. Primary and secondary display as Table 6.

Table 6. primary and secondary display

Press **SELECT**	Primary	Secondary [press **2nd VIEW**]
ACV	ACV	
[ACV + Hz]	ACV	Hz/⎍%/⎏%/⎍ms/⎏ms
dBm	dBm	Hz/ACV

Note : When enter to dBm measurement, the impedance is 600 Ω, if you want change impedance, press **RANGE** to select impedance. The impedance selectable is : 4/8/16/32/50/75/93/110/125/135/150/200/250/300/500/600/800/900/1000/1200 of Ohms.

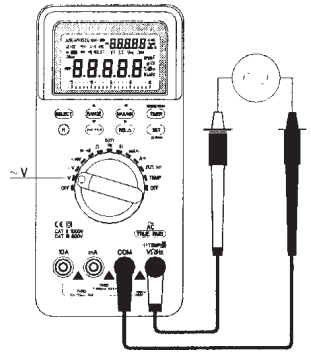

Figure 6. ACV measurement

● **AC/DC millivoltage measurement**

The measurement of millivoltage has three modes : DCmV / [ACmV+Hz] / dBm.

1. Set the rotary switch to " ⎓ mV " position.
2. Press **SELECT** to select measurement mode.
3. Connect the black test lead to "COM" terminal and the red test lead to "V Ω Hz" terminal.
4. According to your need, can press **REL△ MAX / MIN** and **2nd VIEW** buttons obtain relevant measurement.
5. Touch the probes to the test points and reading display.
6. Primary and secondary display as Table 7.

Table 7. primary and secondary display

Press **SELECT**	Primary	Secondary [press **2nd VIEW**]
DCmV	DCmV	
[ACmV + Hz]	ACmV	Hz/⎍%/⎍%/⎍ms/⎍ms
dBm	dBm	Hz/ACmV/DCmV/[DCmV+ACmV]

Note :

1. When enter to dBm measurement, the impedance is 600 Ω, if you want change impedance, press **RANGE** to select impedance. The impedance selectable is : 4/8/16/32/50/75/93/110/125/135/150/200/250/300/500/600/800/900/1000/1200 of Ohms.
2. At millivoltage mode the input impedance more than 1000 M Ω, therefore at test leads opening state input easy caused

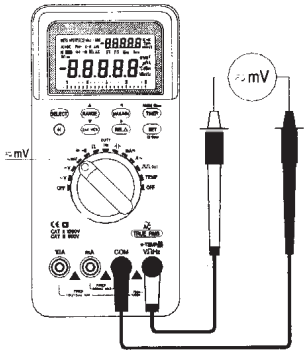

Figure 7. mV measurement

interference. Some random digits on display but have not effect on result of measurement.

3. At millivoltage measurement mode in order to obtain DC+AC function, the input terminal of ADC do not employed coupling capacitor. There for please never apply more than the double dc or ac voltage of the rated value of this range.

Warning For Current measurement

To avoid damage to meter or injury, if the fuse blows. Never attempt an in-circuit current measurement. Where the open-circuit potential to earth is greater than 1000V. To avoid damage to the meter, check the meter's fuses before proceeding. Use the proper terminals, function and range for your messurement. Never place the probes in parallel with a circuit or component when the leads are plugged into the current terminals.Never test voltage when test lead plug in "mA" or "10A" terminal !

Warning to wrong operation when probes are plugged in to the "mA" or "10A" terminal and the rotary switch is not at " ⎓ mA " or " ⎓ A " position, meter will beeper warning to wrong operation until rotary switch at right position or probes pull out "mA" or "10A" terminals.

● **AC/DC milliampere current measurement**

The measurement of milliampere has four modes : DCmA / ACmA / [DC mA + ACmA] / [ACmA + Hz].

1. Set the rotary switch to " ⎓ mA " position.
2. Press **SELECT** to select measurement mode.
3. Connect the black test lead to "COM" terminal and the red test lead to "mA" terminal.
4. According to your need, can press **REL△ MAX / MIN** buttons obtain relevant measurement. Turn off power to the circuit, discharge all high-voltage capacitors.
5. Break the circuit path to be tested. Touch the black test lead to more negative side of the break; Touch the red test lead to the more positive side of the break.

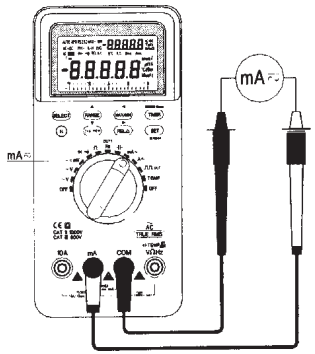

Figure 8. mA Current measurement

6. Turn on power to the circuit, then read the display.
7. Primary and secondary display as Table 8.
8. Turn off power to the circuit and discharge all high-voltage capacitors. Remove the meter and restore the circuit to normal operation. Pull out the red test lead from "mA" terminal.

Table 8. primary and secondary display

Press **SELECT**	Primary	Secondary [press **2nd VIEW**]
DCmA	DCmA	
ACmA	ACmA	
DCmA+ACmA	DCmA+ACmA	ACmA
ACmA+Hz	ACmA	Hz

● **AC/DC Ampere current measurement**

The measurement of ampere current has four modes : DCA / ACA / [DCA+ACA] / ACA+Hz

1. Set the rotary switch to " ⎓ A " position.
2. Press **SELECT** to select measurement mode.
3. Connect the black test lead to "COM" terminal and the red test lead to "10A" terminal.
4. According to your need, can press **REL△ MAX / MIN** buttons obtain relevant measurement.

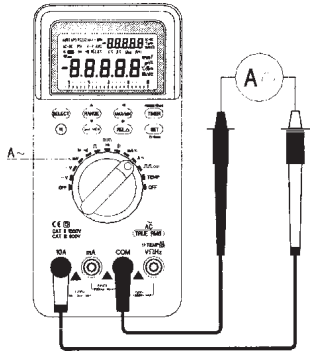

Figure 9. Ampere current measurement

5. Turn off power to the circuit, discharge all high-voltage capacitors.
6. Break the circuit path to be tested. Touch the black test lead to more negative side of the break. Touch the red test lead to the more positive side of the break.
7. Turn on power to the circuit, then read the display.
8. Primary and secondary display as Table 9.

Table 9. Primary and secondary display.

Press **SELECT**	Primary	Secondary [press **2nd VIEW**]
DCA	DCA	
ACA	ACA	
DCA+ACA	DCA+ACA	ACA
ACA+Hz	ACA	Hz

9. Turn off power to the circuit and discharge all high-voltage capacitors. Remove the meter and restore thc circuit to normal operation. Pull out the red test lead from “10A” terminal.

● **Resistance Measurement**

Caution

To avoid damage to meter or to the equipment under test,disconneet circuit power and discharge all high-voltage capacitors before measuring resistance.

The measurement of resistance has three modes : normal, continuity and Hi resistance. Use SELECT button to select these mode.

● Normal mode

1, Set the rotary switch to “Ω” position.
2. Connect the black test lead to “COM” terminal and the red test lead to “V Ω Hz” terminal.

3. Touch the probes to the test points and reading display.

Note : The test leads can add 0.1 Ω ~ 0.5 Ω of error to resistance measurement, please short test leads and press **REL△**

4. According to your need can press **REL△ MAX / MIN** buttons obtain relevant measurement.

● Continuity mode

At normal mode press **SELECT** until “ •)) ” sign appear on the display screen. If checking point resistance fall below 50 Ω the beeper will sound.

● Hi resistance mode

At normal mode press **SELECT** until “Hi” sign appear on display screen. Using this function can measure above 80M Ω resistance.

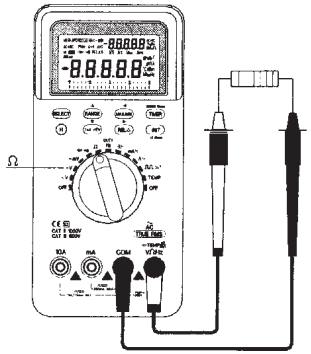

Figure 10.
resistance measurement

● **Capacitance Measurement**

⚠ **Caution**

To avoid damage to the meter or to the equipment under test disconnect circuit power and discharge all high-voltage capacitors before messuring capacitance. Use the DC voltage function to confirm that the capacitor is discharged.

1. Set the rotary switch to “ ⊣⊢ ” position.
2. Connect the black test lead to “COM” terminal and the red test lead to “V Ω Hz” terminal.
3. Touch the robes to capacitor’s legs, if the capacitor is a polarity. The red test lead to the positive leg.
4. Press **RANGE** option your range, with this method can speedup measurements of similar values.
5. According to your need can press **REL△ MAX / MIN** buttons obtain relevant measurement.

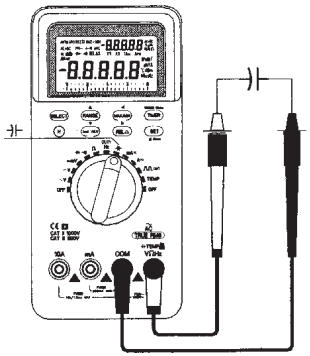

Figure 11. capacitance measurement

● **Frequency and rotational speed (RPM) measurement**

1. Set the rotary switch to “Hz” position.
2. Press **SELECT** to select normal, Hi Hz and RPM three Measuring Mode.
3. Connect the probes to signal source and reading display.
4. In normal mode the meter auto ranges to one af six frequencies : 999.99Hz / 9.9999kHz / 99.999kHz / 999.99kHz / 8.0000MHz.
5. Press **2nd VIEW** can change ⎍%/⎍%/⎍ms/⎍ms.
6. In Hi Hz mode, using Hi frequency accessory to measure more than10MHz Frequency. The reading is 10-Digit counter primary display + second display .
7. In RPM mode using rotational speed accessory to measure rotational speed and reading is RPM.

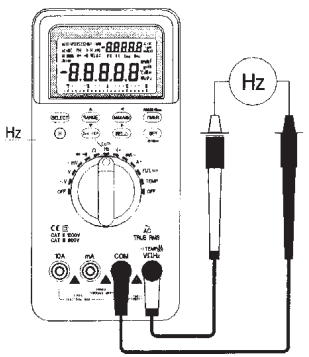

Figure 12. freq. and rotational speed measurement

● **Temperature measurement**

1. Set the rotary switch to “TEMP” position.
2. Press **SELECT** to select Hi or normal test mode.
3. In Hi mode using type K thermocouple to measure temperature.
4. Plug the red leg (+) to “V Ω Hz” terminal and the black leg (-) to “COM” terminal and reading display.
5. Press **SELECT** to “Hi” off the reading is room temperature.
6. Measurement range : -50^{0}C -1300^{0}C, -58^{0}F-2502^{0}F.
7. Display : primary ^{0}C, secondary ^{0}F.

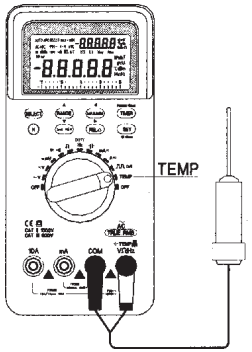

Figure 13.
temp. measurement

● **Diode and continuity check**

⚠ **Caution**

To avoid possible damage to the meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before checking diodes.

1. Set the rotary switch to “ ⊣◀ •))) ” position .
2. Connect the black test lead to “ COM” terminal and the red test lead to “V Ω Hz” terminal.
3. For diode checking, touch the red test lead to the positive side of the diode and the black test lead to the negative side. The meter can display diode voltage drop.
A good product a forward bias reading of 0.5V to 0.8V.
4. Reverse the probes and measure the voltage across the diode again if the diode good “OL” is displayed.

Note :

(1) Near 0V drop is displayed in both directions the diode shorted .

(2) “OL” is displayed in both directions the diode opened.

5. For continuity checking, while testing continuity, the beeper will sound if the resistance falls below 50 Ω.

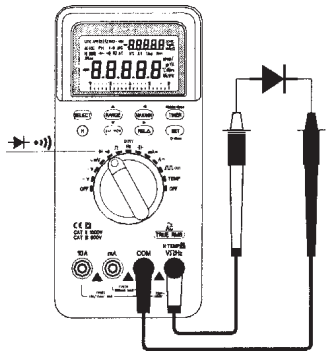

Figure 12. freq. and rotational speed measurement

● **Square Wave Output**

This meter can output square wave that frequency is selectable by **2nd VIEW** 0.5000Hz / 1.0000Hz / 2.0000Hz / 10.000Hz / 50.000Hz / 60.240Hz / 74.63Hz / 100.00Hz / 151.50Hz / 200.00Hz / 303.00Hz / 606.10Hz / 1.2500kHz / 1.6660kHz / 2.5000kHz / 5.0000kHz.

1. Set the rotary switch to “ ⎍⎍ OUT ” position.
2. Connect the black test lead to “COM” terminal and the red test lead to “V Ω Hz” terminal.
3. Press **SELECT** to select the duty of 1% to 99%. The square wave output from “COM” and “V Ω Hz” terminal or test leads.
4. Primary and secondary display as Table 10.

Table 10. primary and secondary display

Function	Primary [press **2nd VIEW**]	Secondary [press **SELECT**]
⎍⎍ OUT	Hz	⎍ %

5. Press **2nd VIEW** more than 2 seconds the meter return to 606.10Hz / 50% duty output state .

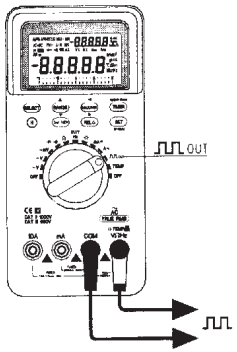

Figure 15.
square wave output

Electrical Specifications

Accuracy is specified for one year after calibration at operating temperatures of 18^{0}C to 28^{0}C, with relative humidity at 0% to 75%

Accuracy specifications take the form of : ±(a% of reading + number of least significant digits).

Table 11. DCV

Range	Resolution	Accuracy	Note
80mV	1μV	± (0.05% rdg + 10)	Input impedance : 80mV - 800mV>1000MΩ 8V - 1000V : 10MΩ
800mV	10μV		
8mV	0.1mV		
80V	1mV		
800V	10mV	± (0.08% rdg + 10)	
1000V	0.1V		

Table 12. ACV (True RMS)

Range	Resolution	Accuracy			
		50Hz / 60Hz	50Hz - 1kHz	1kHz - 10kHz	10kHz - 20kHz
80mV	1μV	±(0.8% rdg + 10)	±(1.0% rdg + 10)	±(3.0% rdg + 10)	±(8.0% rdg + 10)
800mV	10μV	±(0.8% rdg + 10)	±(1.0% rdg + 10)	±(3.0% rdg + 10)	±(5.0% rdg + 10)
8V	0.1mv	±(0.8% rdg + 10)	±(1.0% rdg + 10)	±(3.0% rdg + 10)	±(5.0% rdg + 10)
80V	1mV	50Hz - 400Hz : ±(1.0% rdg + 5)			
750V	10mV				

Input impedance : 8mV - 800mV>1000MΩ, 8V - 1000V, 10MΩ, Parallel capacitance<100pF

Table 13. ACV AVG (60Hz Sine Wave Calibrating)

Range	Resolution	Accuracy			
		50Hz / 60Hz	50Hz - 1kHz	1kHz - 10kHz	10kHz - 20kHz
80mV	1μV	±(1.0%0 rdg + 8)	±(1.5% rdg + 8)	±(4.0% rdg + 8)	±(8.0% rdg + 8)
800mV	10μV	±(0.8%0 rdg + 8)	±(1.5% rdg + 8)	±(4.0% rdg + 8)	±(8.0% rdg + 8)
8V	0.1mv	±(0.8%0 rdg + 8)	±(1.0% rdg + 8)	±(3.0% rdg + 8)	±(5.0% rdg + 8)
80V	1mV	50Hz - 400Hz : ±(1.0% rdg + 5)			
750V	10mV				

Input impedance : 8mV - 800mV>1000MΩ, 8V - 1000V, 10MΩ, Parallel capacitance<100pF

Table 14. DCA

Range	Resolution	Accuracy	Note
80mA	1μA	± (0.5% rdg + 10)	Fuses : F 800mA / 250V F 10A / 250V Voltage drop : ≤800mV
800mA	10μA		
8A	0.1mA		
10A	1mA		

Table 15. ACA (True RMS)

Range	Resolution	Accuracy	Note
80mA	1μA	50Hz - 2kHz ± (0.8% rdg + 10)	Fuses : F 800mA / 250V F 10A / 250V Voltage drop : ≤800mV
400mA	10μA		
8A	0.1mA		
10A	1mA		

Table 16. ACA AVG (60Hz Sine Wave Calibrating)

Range	Resolution	Accuracy	Note
80mV	1μA	50Hz - 500Hz ± (0.8% rdg + 10)	Fuses : F 800mA / 250V F 10A / 250V Voltage drop : ≤800mV
400mV	10μA		
8A	0.1mA		
10A	1mA		

Table 17. dBm

Function	Range	Accuracy	Resolution	Note
dBm	-80.00dBm--- + 80.00dBm	±1.0% rdg	0.01dBm	

Table 18. Resistance(Ⅴ)

Range	Resolution	Accuracy		Note
800Ω	0.01Ω	±(0.3% rdg+10)		Overload protection 250V RMS
8KΩ	0.1Ω			
80KΩ	1Ω			
800kΩ	10Ω			
8MΩ	100Ω			
80MΩ	1kΩ	±(2.5% rdg+8)	60MΩ-80MΩ : ±(3.5% rdg+10)	

Table 19. Diode

Function	Range	Accuracy	Resolution	Note
Diode	8.0000V	±(0.3% rdg+5)	0.0001V	Diode positive Voltage drop Overload protection: 250V RMS

Table 20. Frequenc (Hz)

Function	Range	Accuracy	Resolution	Note
Frequency	999.99Hz	±(0.05% rdg+5)	0.01Hz	Overload protection : 250RMS Sensitivity : 0.7 RMS
	9.9999kHz		0.1Hz	
	99.999kHz		1Hz	
	999.99kHz		10Hz	
	8.0000MHz		100Hz	
	10.0MHz	±(0.1% rdg+5)	1kHz	Plus adapter
	100.0MHz		10kHz	
	1000.0MHz		100KHz	

Table 21. Rotational speed (RPM)

Rotational speed	Range	Accuracy	Resolution	Note
	99999	±(0.1% rdg+5)	1RPM	Plus adapter

Table 22. Capacitance

Range	Resolution	Accuracy	Note
500PF-1nF	1pF	±(5.0% rdg+10)	Overload protection : 250V RMS
10nF	10pF	±(3.0% rdg+10)	
100nF	100pF		
1μF	1nF		
10μF	10nF		
100μF	100nF	±(3.5% rdg+10)	

Table 23. Square wave output

⎍⎍ OUT	Description
Voltage amplitude	3V approx.
Frequency	0.5Hz ~ 5000Hz
Duty cycle	1% ~ 99%

Table 24. Temperature

Temp	Accuracy	Resolution	Note
-50°C ~ 1372°C	±(2.5.% rdg+8)	1°C	type K themocouple
-58°F ~ 2502°F		1°F	

General Specification

Maximum voltage between any terminal and earth ground : 1000V RMS

Cantinuity Beeper: 3kHz Approx.

Display:Double Digital	: 80000
Bar graph	: 23 segments, update 40 time/sec
Temperature	: Operating : 0^0Cto + 50^0C Storage : -20^0Cto + 60^0C
Altitude	: Operating : under 2000m Storage: under 10,000m
Relative Humidity	: ≤75% at 0^0C to + 40^0C ≤45%at + 40^0C to + 50^0C
Battery Type	: 9V zinc, NEDA 1604 or 6F22 or 006p.
Battery Life	: Alkaline : ~500hrs, carbon-zinc: 200hrs typical.
Size	: 37 x 90 x 190mm
Weight	: 650g

Electromagnetic Compatibility : in a RF field of IV/m on all. ranges and function except Capacitance : total Accuracy = specified + 5% of range Capacitance not specified in RF fields performance above 1V/m is not specified. Safety / Compliance : IEC 61010 CAT II 1000V CATIII 600V.

Maintenance

This meter is precise device, Do not attempt to repair or service your meter you are qualified to do so and have the relevant calibration performance test, and service information. These products are intelligent meter, use self-calibrating technology. To avoid the specification error. All components not replaced except that if is specified.

General Maintenance

Periodically wipe case with a damp cloth mild detergent. Do not use abrasives or solvents. Dirt or moisture

in the terminals can affects readings. To clean the terminals.

1. Turn the meter OFF and remove all test leads.
2. Clean out any dirt that may be in the terminal.
3. Soak a new swap with a cleaning and oiling agent.
4. Work the swab around in each terminal the oiling agent insulates the terminals from moisture Related contamination.

Battery Replacement

⚠ Waring

To avoid electrical or are blast, or personal Injury or damage to the meter, use specified fuses ONLY in accordance with the following procedure

The meter is powered by a 9V battery (NEDA 1604, 6F22, 006P), Replace battery if the low battery sign " " displayed. Use the following procedures to replace the battery.

1. Set the rotary switch to "OFF" position.
2. Pull up test leads from terminals.
3. Loosen the screw on battery case, pull up and moce the case.
4. Replace the defective battery.
5. Reverse the procedure of opening to close the battery case.

Fuse Replacement

⚠ Waring

To avoid electrical shock or personal injury, remove the test leads and any input signals before replacing the Fuses. To prevent damages or injury, install ONLY replacement fuses with the ampere, voltage, and speed ratings specified.

1. Perform steps 1.2.35. of battery replacement procedure
2. Install new fuse of some size and rating.

Accessories

Manual 1	Test leads 1
Battery (9V) 1	Protective holster 1

Options

80KP-1 Rotational speed adapter

80KP-2 Hi frequency adapter

RS-232 Package

TP-03 Type K termocouple

RS232 adapter installation

This meter has a communication capability. This function will assist user to recording and keeping data easy. We have affer RS232 ADAPTER to optional accessories. The RS232 ADAPTER include a cable with photoelectric receiver and a software disc. We will continuous release ncw version per year. So you can contact the place of purchase to update the software.

Please refer following procedures if you want to communicate with personal computer.

1. Power on the meter and then press the **TIMER** push button more than 2 seconds, the symbol "RS232" will appear on the display.
2. Fixes one side of cable to the holster of meter and connect the 9 pin's terminal of cable to communication port 1 or 2 of personal computer. See the follow figure
3. Execute the software to take the date for your necessary.

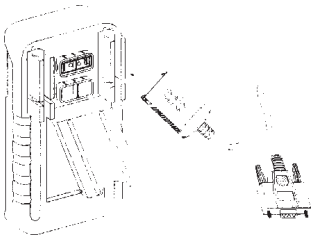

Figure 16. RS232 adapter installation

MECO®

Certificate of Calibration

We hereby certify that this product has been calibrated and found to be in accordance with the applicable SPECIFICATIONS and STANDARDS.

Accuracies of the standard equipment used in this calibration are traceable to the National Standards.

MECO METERS PVT. LTD.

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E-mail : sales@mecoinst.com **Web :** www.mecoinst.com

SR. NO. : ..... DATE : .....

CHECKED BY : ..... MODEL NO. : .....