80000 Series

USER'S MANUAL

Digital Multimeter
Function Generator
10-Digit Counter

A unique
Multi−functional device

Features

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

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Brief introduction

These series have two models.

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

The 8000R 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 :

1 Use the meter only as specified in this manual; Other wise ,the protection provided by the meter maybe impaired.

1 Never measure voltage while the test leads are inserted into the current input terminals.

1 Do not use the meter if it looks damaged .

1 Inspect the leads for damaged insulation or exposed metal , check test lead continuity .Replace damaged leads .

1 Disconnect the power and discharge all high-voltage capacitors before testing in resistance, continuity, and diode function.

1 Be Cautions when working above DC 60V or AC 42V,such voltages may cause a shock hazard .

1 When making measurement ,keep your fingers behind the guards plant on the probes.

1 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/ /Hz	Volts , Ohm , Diode , Freq. , Temp. and Cap. measurement and square wave output terminal
mA	milliampere current measurement terminal
10A	Ampere current measurement terminal
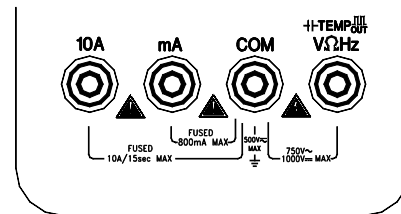
Figure 1. terminal

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
	Resistance
DUTY/Hz	Duty / Frequency
⊣⊢	Capacitance
mA ≂	milliampere current
A≂	Ampere current
ЛГЛ OUT	Squarer wave output
TEMP	Temperature
OFF	Power off
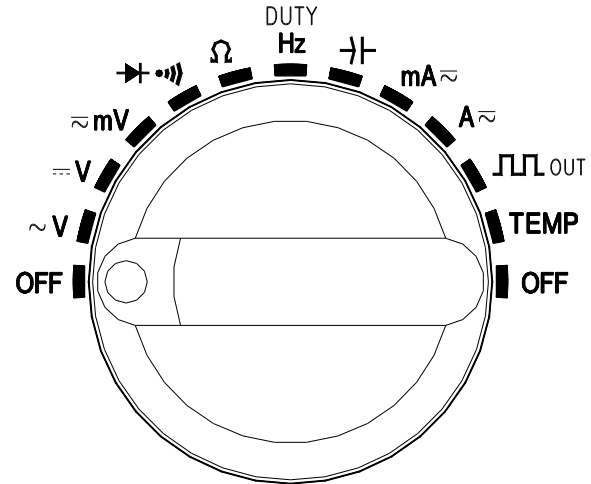
Push button

Figure 3. Push button

Figure 2. Rotary switch

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1. SELECT

1 Press this button you can select your measurement mode.

1 When meter as square wave output , press this button can select duty of square wave (1% - 99%).
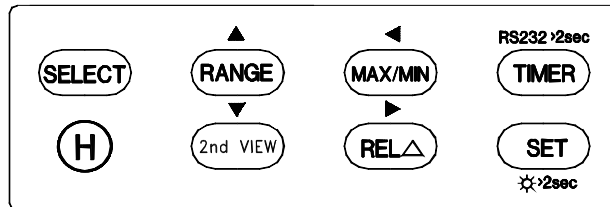
2. RANGE

1 When power on meter it at auto range mode ,press this button can select your measurement range.

1 While SET button operating the RANGE change as (moving up) button .Press this button can move setting digits up.

1 Press this push button more than 2 seconds meter return to auto range .

3. MAX/MIN

1 Press this button momentary the meter enter dynamic record mode.

1 At dynamic record mode ,press this button momentary again to cycle *MAX , MIN ,AVG , MAX-MIN* and *Present Reading* on secondary display.

1 Press this push button more than 2 seconds meter return to normal mode .

1 At MAX/MIN state the recording time is 36 hours.

1 While SET button operating the MAX/MIN change as (moving left) button .Press this button can move setting digits left.

4. Timer [RS 232]

1 Press this button more than 2 seconds the meter enter communication on and "RS232" appear on display screen .

1 At communication mode auto power off disable.

1 Press this button more than 2 seconds again the meter exit this mode and return normal state.

1 Setting time for measuring see special functions.

5. H

1 Press this button meter enter auto data hold mode and "A-H" appear on display screen .

1 The data hold function allows operator to hold the displayed digital value while analog bar graph continues showing the present reading.

1 At auto hold mode the meter can refresh hold new stable readings and sound point out.

1 Press this button again , the meter enter *Peak+* hold mode and a " PH+" appear on display screen .

1 Press this button again , the meter enter *Peak -* hold mode and "PH-"appear on display screen .

1 Press this button mare than 2 seconds the meter exit HOLD mode and return to normal state.

6. 2nd VIEW

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1 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

1 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/151.50Hz/200.00Hz/303.00Hz/606.10Hz/1.2500kHz /1.6660kHz/2.5000kHz/5.0000kHz .
1 Press this button more than 2 seconds the meter return 606.10 Hz, 50% of duty output state .
1 While SET button operating the 2nd VIEW change as (moving down) button .Press this button can move setting digits down.

7. REL

1 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)×100%* (press SELECT to select REL or REL% mode).

1 While SET button operating ,REL button change as (moving right) button.
1 Set up reference value for measurement .

In every function use RANGE select your range.

After press SET once , press SELECT twice the meter enter set up reference value for measurement . At same time the   buttons are started .

Use   buttons set your reference value.

After set up, you can press SET to confirming .

1 Press   REL   button more than 2 seconds the meter return to normal state .

8. SET

1 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.

1 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 dos not press this button .

Display

Table 4. symbols of display

| Order No.	Symbol	Description
1	ꞏꞏꞏꞏꞏꞏꞏꞏꞏꞏꞏ	Analog bar graph
2,3,17	▬	Negative sign
4	ЛЛ OUT	Square wave output
5	Hi	Hi frequency or themocouple indicate
6	🔋	Battery power is weakening
7	►+ •)))	Diode/audible 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/ / k /M	Frequency and Resistance (ohms) unit [second]
22	Л % Ⴑ % Л ms Ⴑ ms	Duty cycle unit , pulse width unit
23	nF / μF	Capacitance unit
24	mV/V/mA/A	Primary display volt and current unit
25	dBm	dBm annunciation
26	Hz / kHz / MHz/ / k /M	Frequency and Resistance (ohms) unit [primary]
27,18		Temperature measurement indicate
28	RPM	Round/per minute

Figure 4. Display

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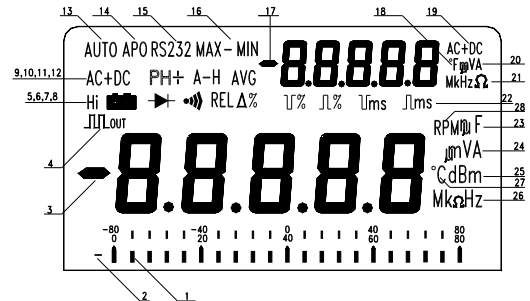
Special functions

1 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.

1 Set up time for measurement

1. Press TIMER button to set time [''O.OO.OO '' 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 , the forth and fifth are seconds] .

1. Use   buttons to selectt digit of time .

2. Press TIMER button again to confirming. Complete this procedure measuring time is starting .

1 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 " **HJ** " and primary display present value .

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

c. If measuring about high and low , secondary display " **HJ-LO** " .

1 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 observing 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.

1 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 value meter can measure ,the meter functions have more than one range.

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

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

(2)Auto range and manual range ;

1The meter bas both auto range and manual range options :

1 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.

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

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

(3)To enter or exit manual range mode;

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

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

1 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 " $\rightleftharpoons$ 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   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]	DCV	ACV/Hz
dBm	dBm	Hz/ACV/DCV/DCV+ACV

Note: When enter to dBm measurement , the impedance is 600   ,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 bas 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   Hz" terminal.

4. For auto range mode the meter at auto range mode, if you want some range please press   RANGE   to obtain your range.

5. According to you 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   ,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 .
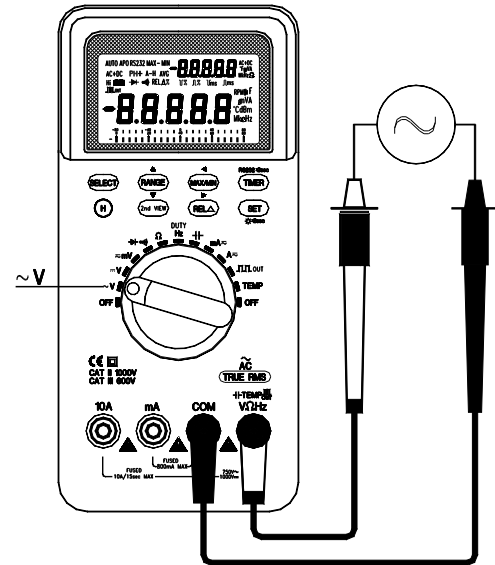
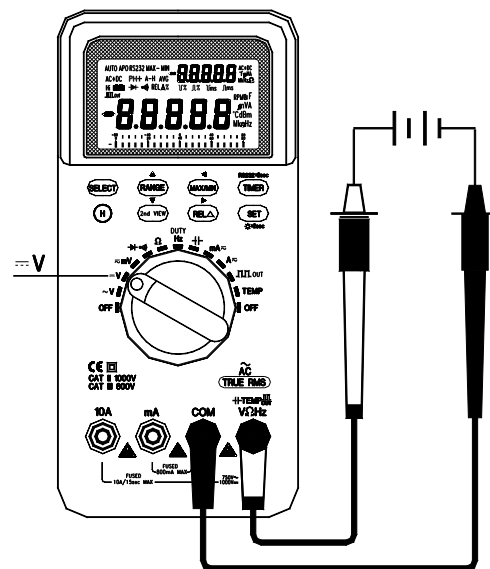Figure 6.ACV measurement

AC/DC millivoltage measurement

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

1. Set the rotary switch to " $\eqsim$ mV" position.

2. Press **SELECT** to option measurement mode .

3. Connect the black test lead to "COM" terminal and the red test lead to "V   Hz" terminal .

4. According to your need can press **REL**   **MAX/MIN** and   **2nd VIEW** push 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   ,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   ,therefore at test leads opening state input easy caused 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. Therefor please never apply more than the double dc or ac voltage of the rated value of this range.
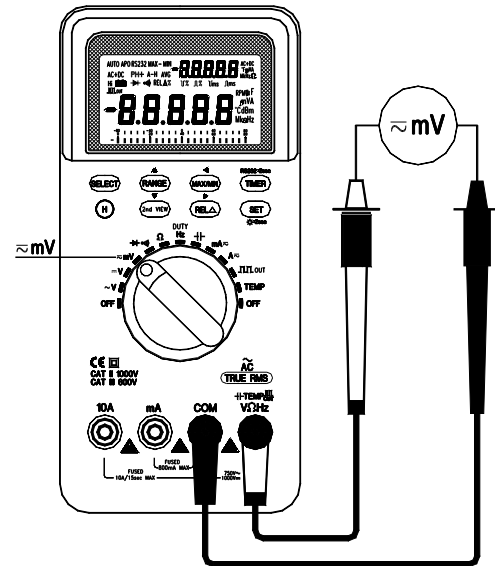

Figure 7.mV measurement

⚠ **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 measurement . 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 .
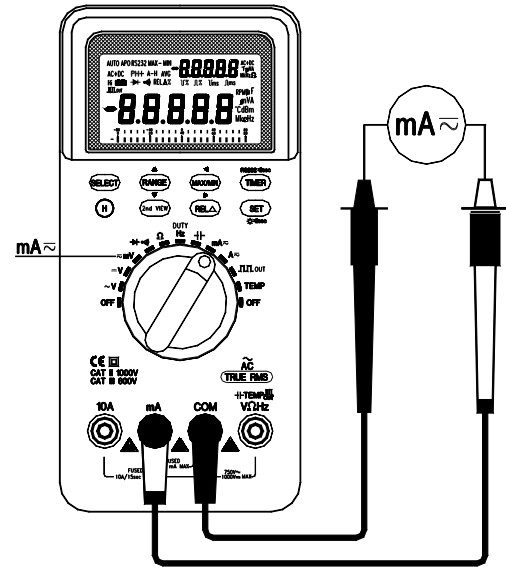

Figure 8.mA current measurement

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.

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
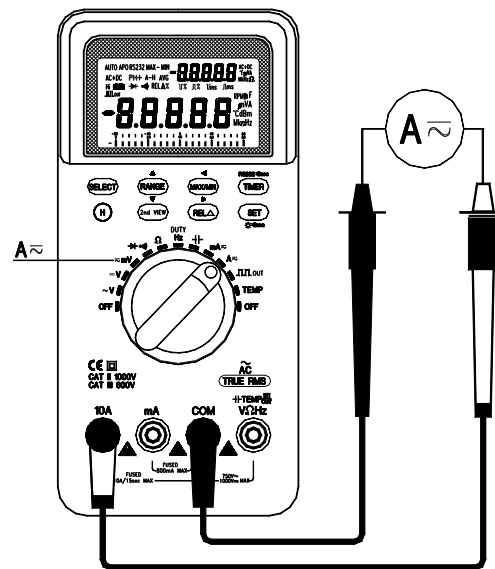

Figure 9.Ampere current measureme

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 the 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 ,disconnect 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.
1 Normal mode
1. Set the rotary switch to "   " position.
2. Connect the black test lead to "COM" terminal and the red test lead to "V   Hz" terminal.
3. Touch the probes to the test points and reading display.
Note: The test leads can add 0.1   ~ 0.5   of error to resistance measurement, please short test leads and press REL   .
4. According to your need can press REL   MIX/MIN buttons obtain relevant measurement .
1 Continuity mode
At normal mode press SELECT until " •))) " sign appear on the display screen . If checking points resistance fall below 50   the

beeper will sound .

1 Hi resistance mode

At normal mode press SELECT until " Hi " sign appear on display screen .Using this function can measure above 80M   resistance .
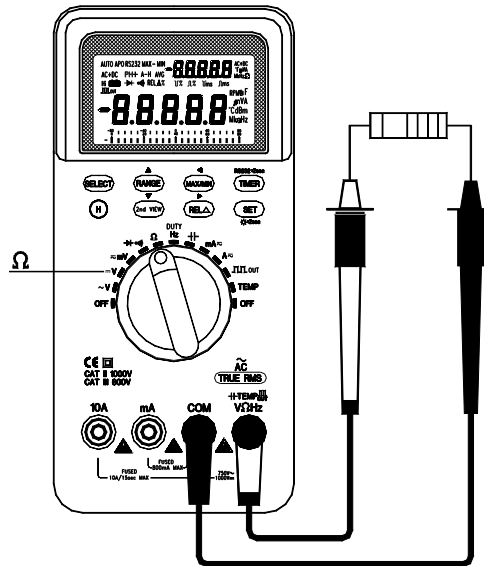
Figure 10.resistance measurement

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 measuring capacitance . Use the DC voltage function to confirm that the capacitor is discharged.

1. Set the rotary switch to " ⊣⊢ " position.

2. Connect the black lead to "COM" terminal and the red test lead to "V   Hz" terminal.

3. Touch the probes 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.
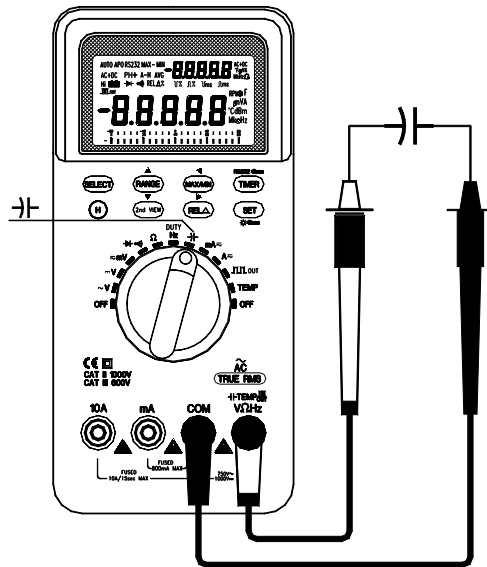
Figure 11.capacitance measurement

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 of 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 the reading is RPM .
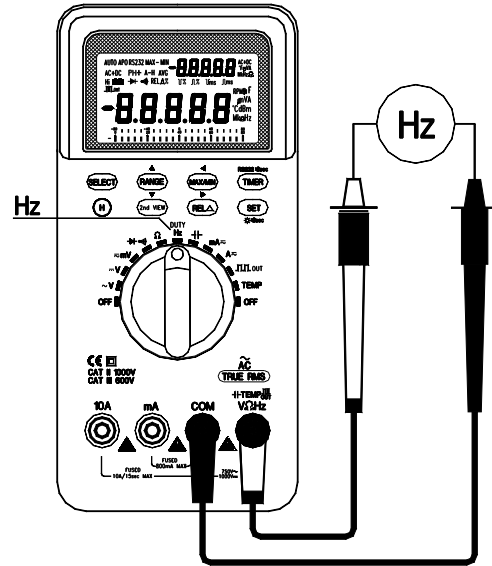
Figure 12.freq. and rotational speed measurement

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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   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   - 1300   ,   -58   - 2502   .

7. Display : primary   ,   secondary   .
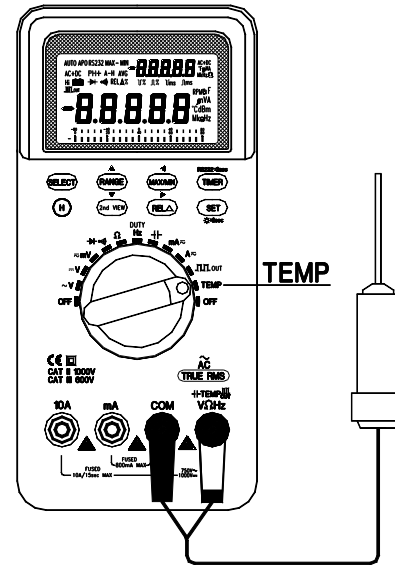
Figure 13.temp. measurement

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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   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   .
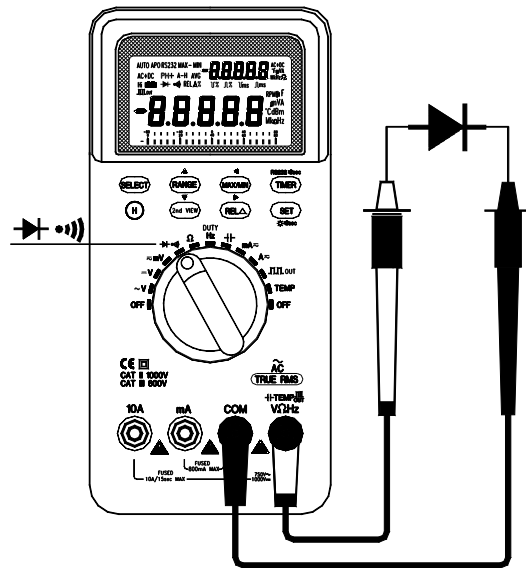
Figure 14.diode and continuity check

Square Wave   Output

This meter can output square wave that frequency is selectable by 2nd VI EW 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   Hz" terminal.

3. Press SELECT to select the duty of 1% to 99% .The square wave output from "COM" and "V   Hz" terminal or test   leads.

4. Primary and secondary display as Table 10.

Table 10. primary and secondary display

Function	Primary [press 2nd VI EW]	Secondary [press SELECT]
⎍ OUT	Hz	⎍ %

5. Press 2nd VI EW more than 2 seconds the meter return to 606.10Hz / 50% duty output state .
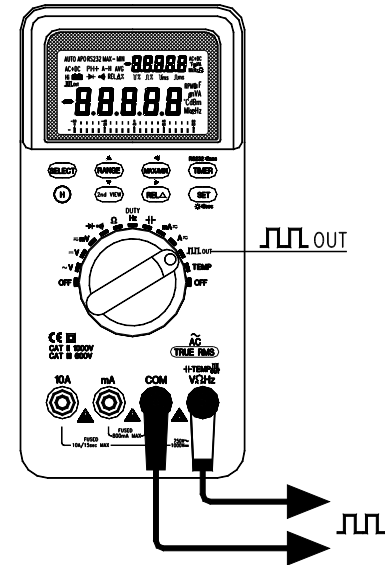
Figure 15 . square wave output

Electrical Specifications

Accuracy is specified for one year after calibration at operating temperatures of 18 to 28 , 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>1000M 8V—1000V : 10M
800mV	10μV		
8V	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)	± (1.2% rdg +10)	± (3.0% rdg +10)	± (8.0% rdg +10)
800mV	10μV	± (0.8% rdg +10)	± (1.2% rdg +10)	± (3.0% rdg +10)	± (5.0% rdg +10)
8V	0.1mV	± (0.8% rdg +10)	± (1.2% rdg +10)	± (3.0% rdg +10)	± (5.0% rdg +10)
80V	1mV	50Hz — 400Hz ± 1.0% rdg +5			
750V	10mV				

Input impedance: 8mV—800mV>1000M

8V—1000V 10M , 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%rdg+8	± 1.5%rdg +8	± 4.0%rdg +8	± 8.0%rdg +8
800mV	10μV	± 0.8%rdg+8	± 1.5%rdg +8	± 4.0%rdg +8	± 8.0%rdg +8
8V	0.1mV	± 0.8%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>1000M

　　　　　　8V—1000V , 10M   Parallel capacitance<100pF

Table 14. DCA

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

Table 15. ACA （True RMS）

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

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

Range	Resolution	Accuracy	Note
80mA	1μA	50Hz — 500Hz $\pm$ (0.8% rdg+10)	Fuses : F 800mA/250V F 10A/250V Voltage drop: 800mV
800mA	10μA		
8A	0.1mA		
10A	1mA		

Table 17. dBm

Function	Range	Accuracy	Resolution	Note
dBm	-80.00dBm — +80.00dBm	$\pm$ 1.0% rdg	0.01dBm	

Table 18. Resistance(   )

Range	Resolution	Accuracy		Note
800	0.01	$\pm$ (0.3% rdg+10)		Overload protection: 250V RMS
8K	0.1			
80k	1			
800k	10			
8M	100			
80M	1k	$\pm$ (2.5 % rdg+8)	60M — 80M : $\pm$ (3.5% rdg+10)	

Table 19. Diode

Function	Range	Accuracy	Resolution	Note
Diode	8.0000V	$\pm$ (3.0% rdg+5)	0.0001V	Diode positive Voltage drop Overload protection: 250V RMS

Table 20. Frequency (Hz)

Function	Range	Accuracy	Resolution	Note
Frequency	999.99Hz	± (0.05% rdg+5)	0.01Hz	Overload protection: 250V RMS Sensitivity : 0.7V 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
1nF	1pF	± (5.0% rdg+10)	Overload protection: 250V RMS
10nF	10pF	± (2.5% 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 ~ 1372	± (2.5% rdg+8)	1	type K themocouple
-58 ~ 2502		1	

General Specification

Maximum voltage between any terminal and earth ground: 1000V RMS
Continuity Beeper : 3kHz Approx.
Display: Double Digital: 80000
Bar graph :   23 segments , update 40 time/sec
Temperature: Operating: 0   to+50   Storage: -20   to+60
.Altitude: Operating: under 2000m   Storage : under 10,000m
Relative Humidity: 75% at 0   to +40   45% at +40   to +50
Battery Type: 9V zinc , NEDA 1604 or 6F22 or 006p.
Battery Life: Alkaline : ~500hrs, carbon-zinc: 200hrs typical.
Size: 37×90×190mm
Weight: 650g
Electromagnetic Compatibility: in a RF field of 1V/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   1000V   CAT   600V.

Maintenance

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

General Maintenance

Periodically wipe the case with a damp cloth and mild detergent .Do not use abrasives or solvents .Dirt or moisture in the terminals can affect 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 screws on battery case , Pull up and move the case.
4. Replace the defective battery.
5. Reverse the procedure of opening   to close the battery case .

Fuse Replacement
⚠ Warning

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

1. Perform steps 1, 2, 3, 5, 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 offer RS232 ADAPTER to optional accessories. The RS232 ADAPTER include a cable with photoelectric receiver and a software disc. We will continuous release new 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
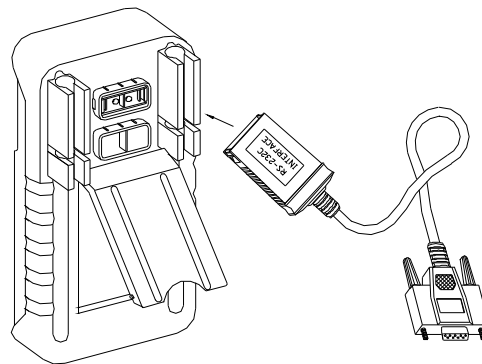
3. Execute the software to take the date for your necessary.

Figure 16.   RS232 adapter installation