MASTECH® MS8340B

Digital Multimeter
USER'S MANUAL

DIGITAL MULTIMETER

AUTO ⊶))) HOLD MAX MIN REL P-MAX P-MIN

PC Link
nμmF
°C°F%
μmVA
kMΩHz

AUTO POWER OFF

FUNC · HOLD · REL · RANGE

VAHz/% · PEAK · MAX/MIN · PC Link

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Ω ⊶   ⊣⊢   Hz%
mV   μA
V   mA

OFF

⚠ 1000V CAT III

A   μAmA   COM   ⊣⊢ Hz
              V Ω

A
10A
FUSED
MAX 30 sec.
every 15 min.

200mA
FUSED

⚠
MAX
750V
1000V

CAT III
1000V

C E

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CONTENTS

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1. INTRODUCTION

This Meter is a handheld and battery operated Digital Multi Meter(DMM) with multi function. This Meter is designed to meet EN 61010-1, EN 61010-2-033, EN 61010-031 CAT III 1000V over voltage category and double insulation. The entire outer suiface of the case has been formed with thermo plastic elastomer, giving the main body, though downsized, high resistance against the shock of a drop.

The MS8340B are a high performance, low power consumption and 4 1/2 digits (22000 counts) With 46 segments bar graph. It is have True-RMS function for AC voltage and AC current measurement. Most alternating voltage and current are expressed in effective value, which are referred to RMS (Root-Mean-Square) value. The effective value is the square root of the average of the square of alternating current or voltage value. But they actually measure the average value of input Voltage or current, assuming the voltage or current to be a sine wave. Therefore, the meter with rectifier type circuit are in error if the input voltage or current has some other shape than a sine wave. This operating instruction covers information on safety and caution. Please read relevant information carefully and observe all the warnings and note strictly.

2. SAFETY NOTE

⚠ Warning

To avoid possible electric shock or personal injury and to avoid possible damage to the meter or to the equipment under test, adhere to the following rule.

- Do not apply more than the rated voltage, of marked on the meter, between the input terminal and grounding terminal..
- Do not apply voltage between COM and OHM terminal, in the resistance measuring state.
- Do not measure current with test lead inserted into voltage or OHM terminal.
- Do not expose the instrument to the direct sun light, extreme temperature and humidity .
- Inspect the test lead for damaged insulation or exposed metal.
- Before measuring current, check the Meter's fuses and turn off power to the circuit before connecting the meter to the circuit.
- Disconnect circuit power and discharge all high voltage capacitors before testing continuity, diode, resistance, capacitance or current.

Note international Electrical Symbol:

⚠	Caution, possibility of electricshock
~	AC (Alternating current)
⎓	DC (Direct Current)
≂	Both direct and alternating current
⏚	Earth (ground) TERMINAL
⚠	Caution
▣	Equipment protected throughout by double insulation or reinforced insulation
⏦	Fuse
CAT III	Applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.

Measurement category(over voltage category):
This instrument is meet the safety condition of CAT III.
The equipment is used for measurement in building
facilities.Examples are measurements on distribution
boards,circuit breaker and industrial equipment located
in fixed facilities, as a fixed motor.
If the equipment (include probe assembly; type:10A1KV
CAT III) is used in a manner not specified by the
manufacturer, the protection provided by the equipment/
probe assembly may be impaired.If necessary,the probe
assembly must be replaced with the type specified in this
manual.

3. Explanation of controls and indicators

3.1 Meter illustration

(1) LCD display
(2) "REL" push button
(3) "RANGE" push button
(4) (10) "BKLIT"/"PC-Link" push button
(5) "MAX/MIN" push button
(6) "HOLD" push button
(7) "FUNC" push button
(8) "VAHz/%" push button
(9) "PEAK" push button
(11) Rotary Switch(Knob)
(12) Input terminal
(13) "COM"terminal
(14) "A" input jack
(15) "uA/mA"input jack
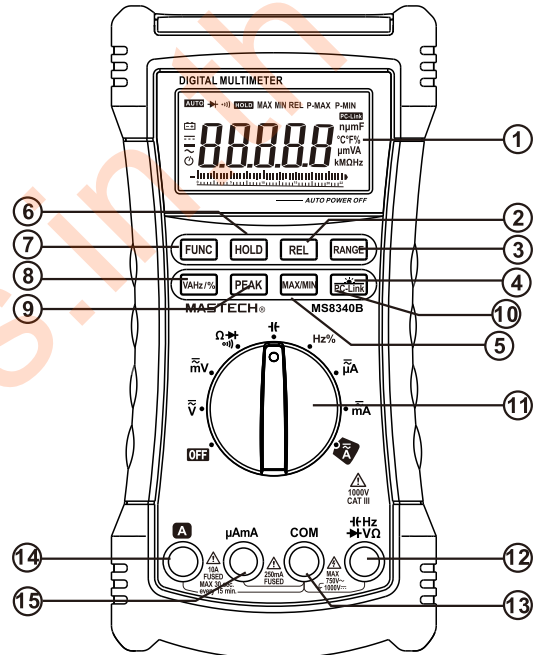
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3.2 Functional push button

Push button	Function
Func	"**FUNC**" key is the function select key that acts with trigger. Use the key as switch of DC/AC, Resistance/Continuity /Diode **.**
HOLD	Press "**HOLD**" to enter and exit the hold mode in any mode. That act with trigger.
MAX/MIN	This key is act with trigger. Press this key once, the maximum value is holding (Will displays "**MAX**"symbol in the LCD) and press once again this key, the minimum value on holding(Will displays "MIN"symbol in the LCD).When "**MAX/MIN**" key is pressed for third time, the meter displays max value, and then, "**MAX**"and "**MIN**"symbol is blinking. The meter returns to normal operation if "**MAX/MIN**" key is pressed and held for longer than once second. after pressing the key, A/D will keep working, and the display value are always up dated and kept the maximum or minimum value. (The actual gained value is not the peak value.). Pressing "**HOLD**" key in the MAX/MIN mode Makes the meter stop updating the maximum or the minimum value.

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	It is the auto/manual measurement push key that act with trigger. The default is auto measurement when power is on. To press once time, will switch to manual measurement. If continue to press the key in the top range, the meter will jump to the lowest range, and recirculate orderly. If press and hold this key Over 1second, the meter will switch to Auto Measurement mode.
RANGE	
REL	Press the "**REL**" key, you can measure the relative value and"**REL**"sign will appears on the LCD display in the relative mode.What is meant by relative value? Press the "**REL**" key, the meter make the first measured value into a reference value (You must be decide a reference value as the input signal.) , and the meter store the displayed reading as a reference value. The relative measured value that displayed in LCD is achieved by subtracting a reference value from the present reading value.Vx - Vref=Vdisplay Max/Min mode can be nested in REL mode. The meter displays maximum or minimum value relative to the reference when "**Max/Min**" is pressed in REL mode. This time, pressing "**HOLD**" key .the meter stop updating the LCD displayed value.

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VAHz/%	When press this key in the voltage or current measurement mode, the meter Will switch to frequency measurement mode, you can reading frequency value of the present measured voltage or current.This key acts in activation. Press "**VAHz/%** "key when frequency mode is in operation, the meter will switch to duty cycle measurement mode. Press this key again to switch to frequency measurement mode also. Duty cycle range is within 5.0% to 94.9%. If the source frequency duty cycle is smaller than 5.0%, the 'UL' sign will be shown on the LCD display, and then if the duty cycle is larger than 94.9%, the "**OL**" sign will be shown on the LCD display.
PEAK	Entering PEAK mode will automatically execute peak calibration, if peak calibration was never done before. When press this key, the meter can measure maximum peak value, and "**Pmax**" sign will be shown on the LCD display. when press this key again, the meter measure Minimum peak value and "**Pmin**"sign will be shown on the LCD display. If press and held this key over 1 second in "**Pmin**" active, the meter returned normal operating mode.

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BL/ PC-Link	This key is used control Backlight. This key is act with trigger. When press the key, will enable Backlight for 60 sec. Press the key again within 60 sec, Backlight will disable. When press this key more than 3secs ,"PC-Link"sign will be shown on the LCD display, this means serial data output is enabled.

3.3 Display indicators

Indicator	Meaning
Auto	The meter is in the auto range mode
⎓	DC voltage or current
~	AC voltage or current
➡️⊢	Diode
MAX	Maximum value
MIN	Minimum value
HOLD	Data hold
Pmax, Pnin	Maximum peak value and Minimum peak value
🔋	Low battery indicator
MKΩ	Ω KΩ MΩ is unit of resistance
°C/°F	he unit of temperature (°C: Centigrade; °F: Fahrenheit)

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umVA	uV mV V is unit of voltage uA mA A is unit of current
▬	Indicate negative reading
△	Relative measurement
%	Duty cycle
numF	Capacitance Units.
⏻	Auto- power OFF

AUTO ✦ •))) HOLD MAX MIN REL P-MAX P-MIN

PC-Link

nμmF
°C°F%
μmVA
kMΩHz

0   5   10   15   20 22
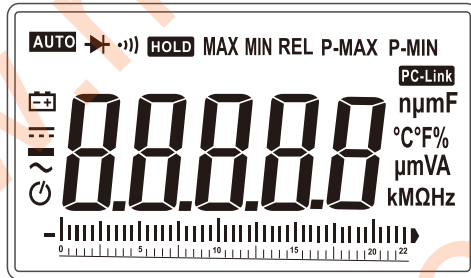
4. SPECIFICATION
4.1 General Feature
• Auto ranging DMM , that full scale is 22000 counts
• Display : 4 1/2 digit LCD display with 46 segment bar graph.

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• Over load protection: Used the PTC protection circuit for Resistance, capacitance And frequency measurement.
• DATA HOLD function
• MAX/MIN value measurement function
• AUTO/MANUAL Mode selection
• Back Light
• Low battery indication
• True- RMS measurement for AC voltage / AC current measurement
• Relative value measurement function
• USB interface for communication to the computer.
• Auto Power- OFF. The meter has a default auto-power function. If the meter is idle for more than 15minutes, the meter automatically turns the power off. User to disable Auto Power–OFF, may be power on the meter when any of the push function, except for HOLD is pressed down.
• Operating temperature & Humidity: 0 ~ 40°C (32 ~104°F) & < 80% RH.
• Storage temperature & Humidity: -10 ~ 50°C (14 ~ 122°F) & <70%RH.
• Power supply:1.5V Battery(AA Type)x4
• Safety Rating: IEC61010-1 CAT III 1000V
• Dimension(LxWxH)&Weight: Approx.205x102x58mm. Weight: Approx.390g.
• Environmental condition:
   (1)indoor use;(2)Altitude up to 2000meter
• Fuse protertion:
  (μA and mA position) Fuse:FF250mA/1000V
  (A position)Fuse:FF10A/1000V

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4.2 Electrical Specification

Function	Range	Best. R-esolution	Accuracy	Over Load Protection
DC Voltage	2.2/22/220/1000V	0.1mV	±(0.05%rdg+3dgt)	◯
AC Voltage (40-400Hz)	2.2/22/220/700V	0.1mV	±(0.8%rdg+4dgt)	◯
DC mV	220mV	0.01mV	±(0.05%rdg+3dgt)	◯
AC mV (40-400Hz)	220mV	0.01mV	±(0.8%rdg+4dgt)	◯
DC Current	220u/2200u/22m/220m/10A	0.01u	±(0.8%rdg+4dgt)	◯
AC Current (40-400Hz)	220u/2200u/22m/220m/	0.01u	±(1.0%rdg+3dgt)	◯
	10A	0.001A	±(1.5%rdg+3dgt)	
Resistance	220/2.2K/22K/220K/2.2M/22M/220MΩ	0.01Ω	±(0.8%rdg+2dgt)	◯
Capacitance	22n/220n/2.2u/22u/220u/2.2m/220mF	1nF	±(2.5%rdg+3dgt)	◯
Frequency	22Hz/220Hz/2.2KHz/22K/220KHz	0.01Hz	±(0.2%rdg+3dgt)	◯
Continuity Check	Buzzer sounds at less than30Ω		Open circuit voltage: about 2.7V	◯
Diode Check	Testing Current: About 1.5mA		Open circuit voltage: about 2.8V	

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4.3 Accessory
1. Test Leads ------------------------ 1 pair
2. Operation Manual --------------- 1 pc
3. Battery AA/1.5V ------------------ 4 pcs
4. USB Cable-------------------------- 1pc
5. CD(with USB program) ---------- 1pc

5. MEASUREMENT OPERATION
5.1 Push key function
All the enabled push key function will be reset when the measurement mode is changed by
Function rotary switch.Change measurement mode by "**FUNC**" key will reset enabled range,
"**HOLD**", "**MAX/MIN**", "**REL**" and "**PEAK**" function. The following table lists .The available push key function versus every measurement mode.

MODE \ KEYS	RANGE	HOLD	Max/Min	REL	PEAK	VAHz
Voltage	◯	◯	◯	◯	◯	◯
Current 1	◯	◯	◯	◯	◯	◯
Current 2	X	◯	◯	AC	◯	◯
Resistance	◯	◯	◯	◯	X	X
Capacitance	◯	◯	◯	◯	X	X
Frequency	◯	◯	X	X	X	◯
Duty cycle	X	◯	X	X	X	X
Continuity	X	◯	◯	◯	X	X
Diode	X	◯	◯	◯	X	X

Note: Current 1 includes Auto uA,Auto mA,10A mode.
Current 2 includes Manual 2.2A,10A mode.

5.2 DC & AC voltage measurement

> ⚠ **Warning**
>
> To avoid harms to you or damage to the meter from electric shock. Please do not attempt to measure voltage higher than DC 1000V/AC 750Vrms although readings may be obtained.
> To measure mV(millivolt) you can set the rotary switch to mV range, this range is 220.00mV only.

The DC voltage range are 2.2000V 22.000V 220.00V and 1000V; and then. The AC voltage ranges are 2.2000V 22.000V 220.00V and 750.0V.
To measure DC/AC voltage:

1. Insert the red test lead into the "VΩ" input terminal and the black test lead into the COM terminal.
2. Set the rotary switch to mV or V position.
   Default status is DC voltage measurement mode; and then AC voltage measurement mode may be select by FUNC push key.
3. Connect the test lead across with the object being measured.The measured value will be show on the LCD mdisplay.

Note:
When DC or AC voltage measurement has been completed, disconnect the connection between the testing lead and the circuit under testing.

5.3 Resistance Measurement

The resistance range are: 220.00Ω 2.2000KΩ,22.000KΩ, 220.000KΩ , 2.2000MΩ.22.000MΩ and 220.0MΩ
(Note: it is not 220.00MΩ to prevent the least digit from jumping).
To measure resistance, connect the meter as follows
1. Insert the red test lead into the "**VΩ**" terminal and the black test lead into the COM terminal.
2. Set the rotary switch to Ω◦))) ➤ position. At the start, the meter is resistance mode.In this range, you can switch to continuity and diode check mode by the "**FUNC**" key. Its sequence as follows:

   Ω — ◦))) — ➤ — Ω

3. Connect the test lead across with the object being measured.The measured value will be show on the LCD display.

Note:
• The test lead can add 0.1Ω to 0.2Ω of error to resistance measurement. To obtain precision reading in low-resistance measurement, that is the range of 200.00Ω, short the input terminal before measuring. In this time, the contact resistance displayed on the LCD. You can subtract the contact resistance value from the measured value.
• For high-resistance measurement (>10MΩ), it is normal taking several second to obtain stable reading.
• The LCD display OL indicating open-circuit for the tested resistor or the resistor value is higher than the maximum range of the meter.

5.4 Diode/Continuity check

1. insert the red test lead into the **"VΩ"** terminal and the black test lead into the COM terminal.
2. Set the rotary switch to **Ω ᵒⁱ⁾) ꜔+** position. To select the continuity mode, press one time the "**FUNC**" push button.
3. The buzzer sound if the resistance of a circuit under test is less than 30Ω.
4. Select the diode check mode by the "**FUNC**" key.
5. Use the diode test mode to check diodes, transistors and other semiconductor device. In the diode test mode sends a current through the semiconductor junction, and the measure the voltage drop across the junction. A good silicon junction drop between 0.5V and 0.8V.
6. For forward voltage drop reading on any semiconductor component, place the red test lead on the component anode and place the black test lead on the component cathode. The measured value show on the display.
7. Reverse the test lead and measure the voltage across the diode again.
- If diode is good, the display shows "OL".
- If diode is shorted, the display shows 0 (zero) in both direction.
- If display shows "OL" in both direction, the diode is open.

5.5 Capacitance measurement

⚠ **Warning**

To avoid damage to the Meter or to the equipment under test, disconnect power and discharge all high-voltage capacitors before measuring capacitance. You can use the DC voltage function to confirm that the capacitor is discharged.

Capacitance ranges are 22.00nF, 220.0nF, 2.200uF, 22.00uF, 220.0uF, 2.200mF and 220.0uF.
To measure capacitance, connect the Meter as follows:
1. Set the rotary switch to"꜔+"position.
2. Insert the red test lead into the "VΩ꜔+" terminal and the black test lead into the COM terminal.
3. Connect the test lead across with the object being measured. The measured value will be show on the LCD display.

NOTE:
To increase the accuracy of capacitance measurement when measuring under 5nF capacitance, you can connecting 0.15uF Capacitor in parallel with the capacitor being measured , or use relative measurement mode to automatically subtract the capacitance build-in equalized capacitance and residual capacitance of PCB lead wire from the result.

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5.6 Frequency & Duty cycle measurement

The normal measurement ranges are 22.00Hz, 220.0Hz, 22.000KHz, 220.00KHz,2.2000MHz. 22.000MHz and 220.00MHz.

1. Set the rotary switch to "**Hz/%**"position,and the"**Hz**"sign shown on the LCD display.
2. Insert the red test lead into the " **VΩ**" input terminal and the black
3. test lead into the "**COM**" terminal.
4. Connect the test leads across with the circuit under testing. The measured value shown.on the LCD display.
5. To switch to the duty cycle mode,press "**VAHz/%**". Push key.The duty cycle mode range is within 5.0% to 94.9%. The minimum resolution is 0.1%. If the sorce frequency duty cycle is smaller than 5.0%, the "**UL**" sign will be shown on The LCD display, and then, if the duty cycle is larger than 94.9%, the "**OL**" sign will be shown on the LCD display.

NOTE: Input signal level must be higher than 0.7V (it is sensitivity).

5.7 DC uA/AC uA measurement

1. Set the rotary switch to the uA position.
2. Select the DC uA or AC uA with "**FUNC**" push button. The meter default to DC current measurement mode.
3. Turn off power to the circuit. Break the circuit point to be measured.
4. Connect the two test lead to complete the broken circuit.
5. If the measured current is too high, the display will indicate "**OL**". In this care, the higher current range (mA or A) should be selected.

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5.8 DC/AC mA measurement

1. Turn off power to the circuit. Set the rotary switch to the mA position.
2. The meter default to DC current measurement mode. Select AC mA measurement mode by "**FUNC**" push button.
3. Break the current path to be tested. Connect the red test lead to the
4. more positive side of the break and the black test lead to the more negative side of the break.
5. Turn on power to the circuit. The measured value show on the display.

5.9 DC/AC 10A measurement

1. Turn off power to the circuit. Set the rotary switch to the A position. Default mode is
2. DC A measurement mode and select AC A measurement mode by the FUNC key.
3. Insert the red test lead into the input terminal marked as "**A**".
4. The measuring procedure is same as that of mA or uA.

Note:
• For safety sake, the measuring time for high current should be ≤10 second for each measurement and the interval time between two measurement should be greater than 5 minutes.
• When current measurement has been completed, disconnect the connection between the testing lead and the circuit under test

6. MAINTENANCE
6.1 Replacing the battery

When meter display ⊟⊞ the battery must be replace to maintain normal operation.

1. Disconnect and remove all test probes from any live source and meter.
2. Open the battery cover on the bottom case by screwdriver.
3. Remove old battery and snap new one into battery holder

⚠ **Warning**

To avoid electric shock, make sure the probes are disconnected from the measured circuit before removing the rear cover. Make sure the rear cover is tightly screwed before using the instrument. Do not mix old and new batteries. Do not mix alkaline, standard (carbon-zinc), or rechargeable (ni-cad, ni-mh, etc) batteries.

6.2 Fuse replacement
Replacing the defective fuse should the done according to the following procedure.

1. To avoid electrical shock, remove the test lead and any nput signal before opening the bottom case.
2. Remove the battery cover and remove the three screws from the bottom case.
3. Lift the button case until it gently unsnaps from the top case.
4. Remove the defective fuse and insert a new fuse of the same size and rating. (F1: F 10A H 1000V, F2: F 250mA H 1000V)
5. Replace the bottom case and reinstall all the screw.
6. If insulation on probe is damaged, replace it.

⚠ **Warning**

Use meet EN 61010-031 standard, rated CAT III 1000V, 10A or better probe.

6.3 Cleaning and Decontamination

The meter can be cleaned with soft clean cloth to remove any oil,grease or grim.
Do not use liquid solvent or detergent.

7. USB Interface with a Personal Computer (PC)
7.1 Connect the Meter to PC with USB cable

In this meter used special USB cable with A type USB connector and mini-USB connector.

7.2 Installation of application software

First you must be install the <USB –RS232 Driver> & < MS8340B USB Program>. The install process is automotive. First, insert the CD to the CD driver of PC.

1. Double click G:\\MS8340B USB PROGRAM\driver-232\ steup.exe
2. The dialog window will be displayed in the screen of PC as following, and then click the <**INSTALL**> Soft key on the screen.

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3. Click the <FINISH>soft key after the setup is completed.
4. Double click G:\\MS8340B USB PROGRAM\MS8340B USB PROGRAM \steup.exe
5. Connecting the USB Cable between the DMM and PC.
6. First, execute the file: \\PCLink for multimeter\ multimeter.exe , so that wll displayFollowing dialog window.
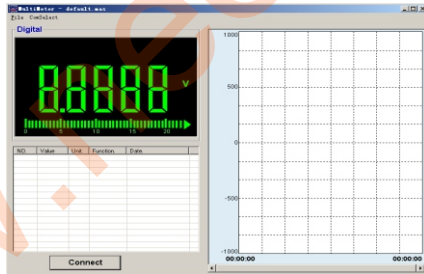
7. Select the communication port from the <ComSelect> menu. You are must be Select the COM4.

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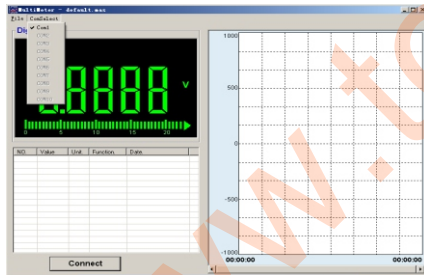
8. Power on the DMM and then push the "PC-Link"button more than 3secs to inert to the Communication mode. The 'PC-Link'symbol will be displayed on the LCD.

9. Click the <Connect> key on the screen . The measured data will be displayed on the screen of PC as following screen.
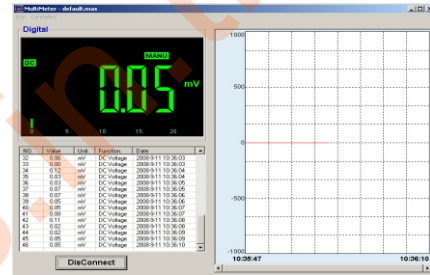
Note:
If communication is failed,should be adjusting the interval betwee the two infrared light emitting diode and phototransistor on the SUB PCB.First,open the back case and applied ±3V power supply to the spring terminal on the SUB PCB.You can lightly stir the two device and observe the screen as the same time.In common case,the light emitting diode and phototransistor is not easy fail. However,the interval between the two device is affect to the data(ASCII code) transfer.