Model AX-176

INSTRUCTION MANUAL

TITLE PAGE

1. GENERAL INSTRUCTIONS

This instrument complies with IEC 61010-1: 2001, CAT III and CAT IV 600V overvoltage standards. See Specifications. To get the best service from this instrument, read carefully this user's manual and respect the detailed safety precautions. International symbols used on the Meter and in this manual are explained in chapter 1.2.

1.1. Precautions safety measures

1.1.1. Preliminary

*As the possibilities of high transient overvoltages occurred in today's power system increase, more stringent safety standards are set for the electrical test equipment. Transients on electrical systems (power grid, feeder or branch circuits) will trigger a series of incidents that may result in serious personal injury. To protect you against transients, safety must be built into the test equipment.

Overvoltage category	In brief	Examples
CAT I	Electronic	• Protected electronic equipment • Equipment connected to (source) circuits in which measures are taken to limit transient overvoltage to an appropriately low level. • Any high-voltage, low-energy source derived from a highwinding resistance transformer, such as the high-voltage section of a copier
CAT II	Single-phase receptacle connected loads	• Appliance, portable tools, and other household and similar loads. • Outlet and long branch circuits. • Outlets at more than 10 meter (30 feet) from CAT III • Outlets at more than 20 meters (60 feet) from CAT IV source.
CAT III	Three-phase distribution, including single-phase commercial lighting	• Equipment In fixed installations, such as switchgear and polyphase motors. • Bus and Feeder In industrial plants. • Feeders and short branch circuits, distribution panel devices. • Lighting system in larger buildings. • Appliance outlets with short connections to service entrance.
CAT IV	Three-phase At utility connection, any outdoor conductors.	• Refers to the „origin of installation"; i.e., where low-voltage connection is made to utility power.

		• Electicity meters, primary overcurrent protection equipment. • Outsider and service entrance, service drop from pole to building, run between meter and panel. • Overhead line to detached building, underground line to well pump

*When using this Multimeter, the user must observe all normal safety rules concerning:
- protection against the dangers of electric current
- protection of the Multimeter against misuse.
*For your own safety, only use the test probes supplied with the instrument. Before use, check that they are in good condition.

1.1.2. During use

*If the meter is used near noise generating equipment, be aware that display may become unstable or indicate large errors.
*Do not use the meter or test leads if they look damaged.
*Use the meter only as specified in this manual; otherwise, the protection provided by the meter may be impaired.
*Use extreme caution when working around bare conductors or bus bars.
*Do not operate the meter around explosive gas, vapor, or dust.
*Verify a Meter's operation by measuring a known voltage. Do not use the Meter if it operates abnormally. Protection may be impaired. When in doubt, have the Meter service.
*Uses the proper terminals, function, and range for your measurements.
*When the range of the value to be measured is unknown, check that the range initially set on the multimeter is the highest possible or, wherever possible, choose the autoranging mode.
*To avoid damages to the instrument, do not exceed the maximum limits of the input values shown in the technical specifications tebles.
*When the multimeter is linked to measurement circuits, do not touch unused terminals.
*Caution when working with voltages above 60Vdc or 30Vac rms. Such voltages pose a shock hazard.
*When using the probes, keep your fingers behind the finger guards.
*When making connections, connect the common test lead before connecting the live test lead; when disconnecting, disconnect the live test lead before disconnecting the common test lead.
*Before changing functions, disconnect the test leads from the circuit under test.
*For all dc functions, including manual or auto-ranging, to avoid the risk of shock due to possible improper reading, verify the presence of any ac voltages by first using the ac function. Then select a dc voltage range equal to or greater than the ac range.
*Disconnect circuits power and discharge all high-voltage capacitors before testing resistance, continuity, diodes or capacitance
*Never perform resistance or continuity measurement on live circuits.
*Before measuring current, check the meter's fuse and turn off power to the circuit before connecting the meter to the circuit.
*In TV repair work, or when carrying out measurements on power switching circuits, remember that high amplitude voltage pulses at the test points can damage the multimeter. Use of a TV filter will attenuate any such pulses.
*Use just one 6F22 battery, properly installed in the Meter's battery case, to power the Meter.

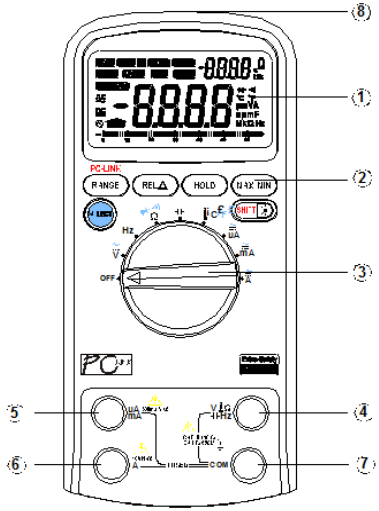
*Replace the battery as soon as the battery indicator ( ) appear. With a low battery, the Meter might produce false readings that can lead to electric shock and personal injury.
*Do not measure voltages above 1000V in Category III, or 600V in Category IV installations.
*When in REL mode, the “REL” symbol is displayed. Caution must be used because hazardous voltage may be present.
*Do not operate the Meter with the case (or part of case) removed.

1.2. Symbols

Symbols used in this manual and on the instrument:

⚠ **Caution:** refer to the instruction manual. Incorrect use may result in damage to the device or its components.
~ AC (Alternating Current)
⎓ DC (Direct Current)
⎓~ AC or DC
⏚ Earth Grodnu
⧈ Double insulated
⎓ Fuse
CE Conform to European Union directives

1.3. Instructions



*Remove test leads from the Meter before opening the Meter case or battery cover
*When servicing the Meter, use only specified replacement parts.
*Before opening up the instrument, always disconnect from all sources of electric current and make sure you are not charged with static electricity, which may destroy internal components.
*Any adjustment, maintenance or repair work carried out on the meter while it is live should be carried out by appropriately qualified personnel, after having taken into account the instructions in this present manual.
*A “qualified person” is someone who is familiar with the installation, construction and operation of the hazards involved. He is trained and authorized to energize and de-energize circuits and equipment in accordance with established practices.
*When the instrument is opened up, remember that some internal capacitors can retain dangerous potential even after the instrument is switched off.
*If any faults or abnormalities are observed, take the instrument out of service and ensure that it cannot be used until it has been checked out.
*If the meter is not going to be used for a long time, take out the battery and do not store the meter in high temperature or high humidity environment.

2. DESCRIPTION

2.1. Instrument Familiarization

The front panel is shown as in Figure 2-1, explanation being as follows:

1) LCD display

Used for displaying the measuring results and various symbols.

2) Keypad

Measurement function keys.

3) Rotary switch

Use for selecting measurement functions.

4) V Ω Hz

Terminal receiving the red test lead for voltage, resistance, capacitance, frequency, temperature, diode and continuity measurements.

5) uA/mA

Terminal receiving the red test lead for μA, mA measurements

6) A Terminal receiving the red test lead for 10A measurements.

7) COM

Figure 2-1

Terminal receiving the black test lead as a common reference

8) PC-Link interface

2.2. LCD Display

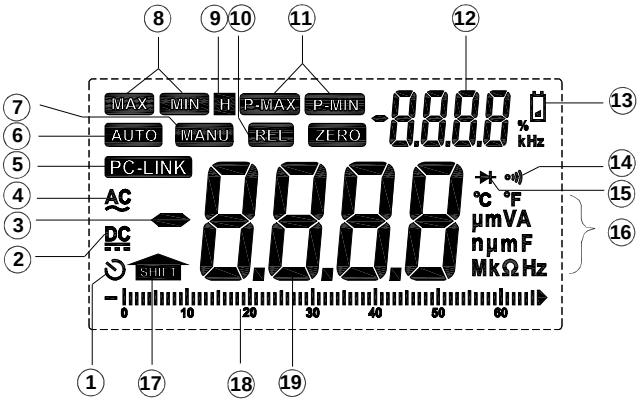


Figure 2-2

LCD screen is shown as in Figure 2-2, with its every symbol's meaning shown as in the Table 1:

Nr.	Symbol	Meaning
1.		Indicator for auto Power off
2.	DC	Indicator for DC voltage or current
3.		Indicates negative readings
4.	AC	Indicator for AC voltage or current
5.	**PC-LINK**	The Meter is In the data transmission mode
6.	**AUTO**	The meter is in the Autorange mode In which the meter automatically selects the range with the best resolution
7.	**MANU**	The meter is in the Manual Range mode in which the user selects the range
8.	**MAX MIN**	Display maximum/minimum dta
9.	**H**	The meter is in Data Hold mode. When delay hold is selected, the HOLD symbol will be blinking for 6 seconds.
10.	**REL**	The meter is in Relative Measurement mode
11.	**P-MAX P-MIN**	Indicating the display value being the PEAK maximum value, the PEAK minimum value. (Only the true RMS+PEAK meter)
12.		The sub-display usually show sub-measurement mode or some special reading
13.		Low battery indication
14.		The meter is in Continuity Check mode
15.		The meter is in Diode Test mode.
16.	**℃℉** **µmVA** **nµmF** **MKΩHz**	Measurement units
17.		The second function is enabled
18.		Analog bar, indicating the measurement value with a graphic mode.
19.		The main-display for the meter's measurement value, showing all the measurement values

2.3. Keypad

2.3.1. SELECT

1) At Ω position

Switches between Resistance measurement, Diode Test and Continuity check.

2) At V position

Switches between dc and ac voltage

3) At position

Switches between °C and °F

4) At A mA μA position

Switches between dc and ac current.

2.3.2. RANGE

At V, Hz, ⊣⊢, Ω, A, Ma and μA

1) Press RANGE to enter the manual ranging mode

2) Press RANGE to step through the ranges available for the selected function.

3) Press and hold RANGE for 2 seconds to return to autoranging.

2.3.3. REL Δ

1) Press REL Δ to enter the Relative measurement mode. The sub-display will show the value measured at the time when pressing the key (it is called the initial value), and the main-display shows the relative value that will be equivalent to the present value minus the initial value. By pressing the key again the relative measurement state will be exited. (Except Hz/Duty)

2) Power-up Option

Disables automatic power-off feature.

2.3.4. HOLD

1) Press it to enter the Data Hold mode. Used to maintain the measurement data unchanging, by pressing the key again it will exit the Data Hold mode.

2) Pressing this key and last for 2 seconds, the meter will delay for 6 seconds, than enters HOLD mode.

3) Powering on the meter while pressing HOLD and lasts 2 seconds turns on all LCD segments until HOLD is pressed again.

2.3.5. MAX/MIN

This key is for measuring maximum value and minimum value.

1) Press it to enter Max/Min mode. The main-display always shows the current value, and the sub-display shows the Maximum Value.

2) Press it again; sub-display will show the Minimum Value.

3) Press and hold it for two seconds, the meter will return to normal measurement state. (Except Hz/Duty).

2.3.6. 

1) Press this key and last for 2 seconds, backlight on; Press it again, backlight off.

2) Press the key and the 'SHIFT' symbol will be displayed on LCD. Then press the RANGE key to enter into the PC-LINK mode. Repeat it to exit PC-LINK mode.

3) When input AC signal, press SHIFT key and the 'SHIFT' symbol will show on LCD. Then press the MAX/MIN key to enter peak mode. The main-display always shows current value of signal, and the sub-display shows PMAX value. Repeat it to show PMIN value. To exit peak mode, after press SHIFT key, press MAX MIN key larger than 1 second. (Only the true RMS+PEAK meter).

3. FUNCTION DESCRIPTION

3.1. General Function

3.1.1. DATA HOLD mode

Data Hold mode makes the meter stop updating the display. Enabling Data Hold function in autorange mode makes the meter switch to Manual ranging mode, but the full-scale range remains the same. Data Hold function can be cancelled by changing the measurement mode, pressing **RANGE** key, or push **HOLD** key again.

To enter and exit the Data Hold mode:

1) Press **HOLD** key (short press). Fixes the display on the current value, **H** is displayed.

2) A second short press returns the meter to normal mode.

3.1.2. Manual ranging and Autorange mode

The Meter has both manual ranging and autorange options.

*In the autorange 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 ranging mode, you select the range. This allows you to override autorange and lock the meter in a specific range.

*The Meter defaults to the autorange mode in measurement functions that have more than one range. When the Meter is in the autorange mode, AUTO is displayed

To enter and exit the manual range mode:

1) Press RANGE key. The Meter enters the manual ranging mode. AUTO turns off. Each presses of RANGE key increments the range. When the highest range is reached, the Meter wraps to the lowest range.

NOTE: If you manually change the measurement range after entering the Data Hold modes, the Meter exits this mode.

2) To exit the manual ranging mode, press and hold down RANGE key for two seconds. The Meter returns to the autorange mode and Auto is displayed.

3.1.3. TRUE RMS measurement

All the measurement values of the true RMS meter and true RMS+PEAK meter on the AC voltage and AC current are true root-mean-square values. The basic meter can only measure the AC average value.

3.1.4. Relative measurement mode

The Meter will display relative measurement in all functions except frequency.

To enter and exit the relative measurement mode:

1) With the Meter in the desired function, touch the test leads to the circuit on which you want future measurement to be based.

2) Press RELΔkey to store the measured value and activate the relative measurement mode.

The difference between the reference value and subsequent reading is displayed on the sub-display. The main-display always displays the current value.

3) Press RELΔ key for more than 2 seconds to return the Meter to normal operation.

3.1.5. Analog indication bar

Analog indication bar is used for graphic measurement value and it always synchronizes with the size of the present measured value. During the maximum value/minimum value measurement it still synchronizes with the size of the present measured alue, and not indicating the maximum value/minimum value or the relative value.

3.1.6. Auto power off setting

1) The Meter enters the ”sleep mode” and blanks the display if the Meter is not but used for 30 minutes. Press any key or rotate the rotary switch to wake the meter up.

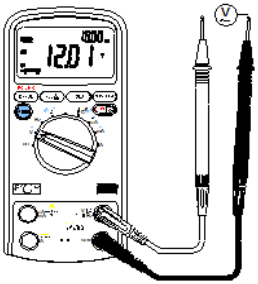
2) To disable the auto power off function, hold down RELΔ key while turning the meter on.

Then the icon will disappear.

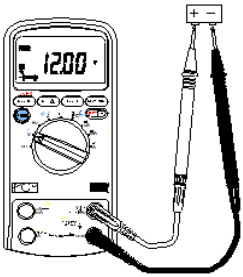
3) When RS232 output is active, the auto Power off function is disabled.

3.2. Measurement Functions

3.2.1. AC and DC Voltage measurement.



AC Voltage



DC Voltage

Figure 3-1 measuring AC and DC Voltage

⚠ To avoid electrical shock and/or damage to the instrument, do not attempt to take any voltage measurement that might exceeds 1000Vdc or 1000Vac rms.

To avoid electrical shock and/or damage to the instrument, do not apply more than 1000Vdc or 1000Vac rms between the common terminal and the earth ground

Voltage is the difference in electrical potential between two points. The polarity of ac (alternating current) voltage varies over time; the polarity of dc (direct current) voltage is constant.

To measure ac or dc voltage (set up and connect the Meter as shown in Figure 3-1):

Set the rotary switch to the position of $\tilde{\overline{\underline{V}}}$

1) Press SELECT key to select between AC and DC voltage mode.

2) Connect the black and red test leads to the COM and V terminals respectively.

3) Connect the test leads tip in parallel with the circuit to be measured.

4) Read the voltage value on the main-display and read the frequency of AC signal on the sub-display.

NOTE:

In case of probe hanging in the air, the voltage inducted by the test leads may cause unstable readings on the display screen, but that will not affect the accuracy of measurement.

3.2.2. Frequency and Duty Cycle measurement

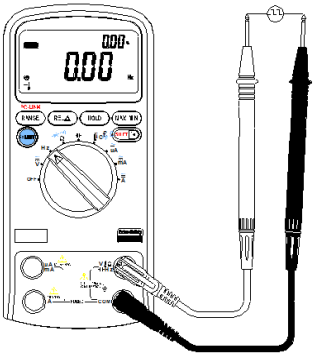


Figure 3-2

Measuring Frequency and Duty Cycle

⚠ Do not measure Frequency on high voltage (>1000V) to avoid electrical shock hazard and/or damage to the instrument.

To measure frequency or Duty Cycle (set up and connect the Meter as shown in Figure 3-2):

1) Set the rotary switch to the Hz range.

2) Insert the black and red test leads into the COM and Hz input terminals.

3) Connect the test leads tip in parallel with the circuit to be measured. And don't touch any electrical conductors.

4) Read the frequency on the main-display and read the percent of duty cycle on the sub-display.

NOTE:

In noisy environment, it is preferable to use shield cable for measuring small signal.

3.2.3. Resistance measurement

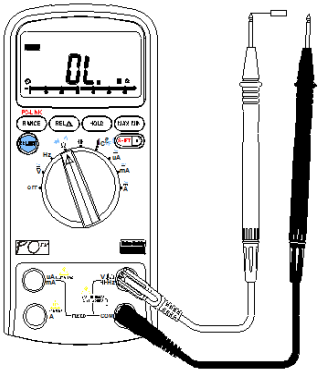


Figure 3-3

Measuring Resistance

⚠To avoid electrical shock and/or damage to the instrument, disconnect circuit power and discharge all high-voltage capacitors before measuring resistance.

Resistance is an opposition to current flow.

The unit of resistance is the ohm (Ω). The Meter measures resistance by sending a small current through the circuit. Because this current flows through all possible path between the probes, an in-circuit resistance reading represents the total resistance of all path between the probes.

To measure resistance (set up the Meter as shown in figure 3-3):

1) Set the rotary switch to Ω Range.

2) Connect the black and red test leads to the COM and VΩterminals respectively.

3) Connect the test leads tip to the circuit being measured.

4) Read the displayed value.

NOTE:

Ina case of performing resistance test on circuit board, it is necessary firstly to turn off power of the circuit board and then perform the measurement. As there may be other parallel circuits, so the displayed value of test is not surely the actual value of the resistor.

3.2.4. Diode Test

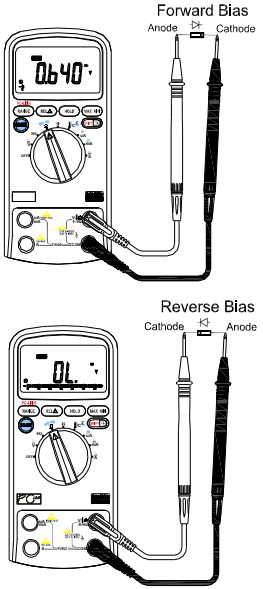


Figure 3-4 Testing a Diode

⚠To avoid elecrical shock and/or damage to the instrument, disconnect circuit Power and discharge all high-voltage capacitors before testing diodes.

To test diode out of a circuit (set up the Meter as shown in Figure 3-4):

1) Set the rotary switch to

Ω range

2) Press the SELECT key once to activate Diode Test.

3) Connect the black and red test leads to the COM and VΩ terminals respectively.

4) For forwards-bias readings on any semiconductor component, place the red test lead tip on the component's anode and place the black test lead tip on the component's cathode.

5) The meter will show the approx. forward voltage of the diode. If the polarity of test leads is reversed, "OL" will be displayed.

In a circuit, a good diode (Silicon) should still produce a forward bias reading of 0.5V to 0.8V; however, the reverse-bias reading can very depending on the resistance of other pathways between the probe tips.

3.2.5. Continuity Check

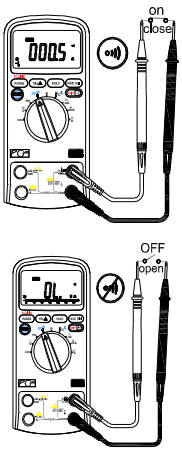


Figure 3-5 Checking the Continuity

⚠To avoid electrical shock and/or damage to the instrument, disconnect circuit Power and discharge all high-voltage capacitors before testing for Continuity.

To test for continuity (set up the Meter as shown in Figure 3-5):

1) Set the rotary switch to

Ω range

2) Press the SELECT key twice to activate Continuity Check.

3) Connect the black and red test leads to the COM and Ω terminals respectively.

4) Connect the test leads tip to the resistance in the circuit being measured.

5) When the test lead to the circuit is below 30Ω, a continous beeping will indicate it.

NOTE:

Continuity test is available to check open/short of the circuit.

3.2.6. Capacitance measurement

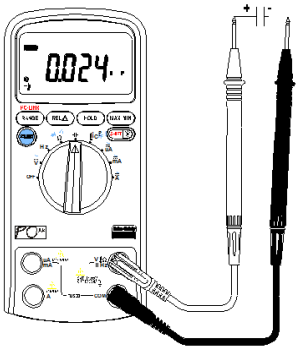


Figure 3-6 Measuring Capacitance

⚠To avoid electrical shock and/or damage to the instrument, disconnect circuit power and discharge all high-voltage capacitors before measuring capacitance. Use the dc voltage function to confirm that the capacitor is discharged.

Capacitance is the ability of a component to store an electrical charge. The unit of capacitance is the farad (F). Most capacitors are in the nanofarad to microfarad range. The Meter measures capacitance by charging the capacitor with a known current for a known period of time, measuring the resulting voltage, then calculating the capacitance. The measurement takes about 1 second per range.

To measure capacitance (set up the Meter as shown in Figure 3-6):

1) Set the rotary switch to ⊣⊢ range

2) Connect the black and red test leads to the COM and ⊣⊢ terminals respectively.

3) Connect the test leads tip to the capacitor being measured.

4) Read the displayed value form LCD.

NOTE: The meter may take a few seconds to stabilize reading when measurement on 660uF~66mF. To improve the accuracy of measurements less than 660nF, subtract the residual capacitance of the Meter and leads.

3.2.7. Current measurement

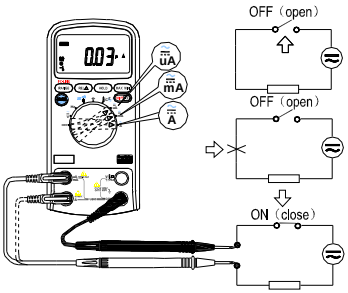


Figure 3-6 Measuring Current

⚠To avoid damage to the 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 fuse 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.

To measure current (set up the Meter as shown in Figure 3-7):

1) Turn off power to the circuit. Discharge all high voltage capacitors.

2) Set the rotary switch to the μA, mA or A range.

3) Press the SELECT key to select DCA or ACA measuring mode. (When measuring AC current, the sub-display will show the frequency of AC signal)

4) Connect the balck test to the COM terminal and the red leads to the mA terminal for a maximum of 600mA. For a maximum of 10A, move the red test lead to the A terminal.

5) Break the circuit path to be tested. Touch the black probe to the more negative side of the break; touch the red probe to the more positive side of the break (reversing the leads will give a negative reading, but will not damage the Meter.)

6) Turn on power to the circuit, then read the display. Be sure to note the measurement units at the circuit; then read the display. Be suer to note the measurement units at the right side of the display (μA, mA or A). When only the figure "OL" displayed, it indicates overrange situation and the higher range has to be selested.

7) Turn off power to the circuit and discharge all high voltage capacitors. Remove the Meter and restore the circuit to normal operaton.

3.2.8. Temperature measurement

⚠ To avoid electrical shock and/or damage to the instrument, do not apply more than 250Vdc or 220Vac rme between the°C terminal and the COM terminal.

To avoid electrical shock, do not use this instrument when voltages at the measurement surface exceed 60v dc or 24v rms. Ac.

To avoid damage or burns. Do not make temperature measurement in microwave ovens.

To measure temperature:

1) Set the rotary switch to range and the LCD will show the current environment temperature.

2) Press SELECT key to select °C or °F.

3) Insert 'K' type thermocouples into the COM terminal and °C terminal (or you can insert it by using Multi Function Socket), Takings care to observe the correct polarity.

4) Touch the object with the thermocouple probe for measurement.

5) Read the stable reading from LCD.

3.2.9. PC Link

The meter has serial data output function. It can be connected with PC by USB interface, so the measured data can be recorded, analyzed, processed and printed by PC. Before use this function, you need install the PC-Link software and USB driver in your PC.

PC-LINK SOFT OPERATING MANUAL

1) Make sure the two Install USB driver and Install software files in the attached CD successfully installed before any measurement.

2) After turning on the meter, press the Shift key and the SHIFT symbol will appear on LCD. Then press the RANGE key to enter PC-Link mode, the symbol "PC-LINK" will appear on LCD, and the serial data output function is active.

3) Connect the meter's OPTICAL PORT and computer USB port with the USB line.

4) Select the default sampling rate or you can select other desired sampling rate.

5) Now press the Start in the PC-LINK SOFT to measure and view the synchronic data or graph in the software interface.

6) To disable the serial data output function, press SHIFT and then press RANGE again.

7) More information about the PC-LINK SOFT, please refer to the Help topic including in the software or enter our webside: www.mastech.com.cn

4. TECHNICAL SPECIFICATIONS

4.1. General specifications

Environment conditions:	1000V CAT III and 600V CAT IV
Pollution degree:	2
Altitiude:	<2000m
Operating temperature:	0~40°C, 32°F~122°F(<80%RH, <10°C non-condensing)
Storage temperature:	-10~60°C, 14°F~140°F(<70%RH, battery removed)
Temperature Coefficient:	0.1x(specified accuracy)/°C(<18°C or >28°C)
Max Voltage between terminals and earth ground:	1000V AC rms or 1000V DC.
Fuse Protection:	μA and mA: F 0.63A/1000VØ10.3x38; A:F10A/1000VØ10,3x38
Sample Rate:	3 times/sec for digital data
Display:	6600 counts. Automatic indication of functions and symbols.
Range selections:	automatic and manual.
Over Range indication:	LCD will display "OL"
Low battery indication:	The  is displayed when the battery is under the proper operation range.
Polarity indication:	"-" displayed automatically
Power source:	9V ⎓
Battery type:	6F22
Dimensions:	190(L)x90(W)x40(H)mm
Weight:	500g.approx.(battery included)

4.2. Measurement specifications

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

Accuracy specifications take the form of: ±(% of Reading+Number of Least Significant Digits)

4.2.1. AC Voltage

ACV:

Range	Resolution	Accuracy	
		60Hz	40Hz~400Hz

660mV	0.1mV	±(1.0% +5)	
6.6V	1mV		±(1.0% +5)
66V	10mV		±(1.0% +5)
660V	100mV		±(1.0% +5)
1000V	1V		±(1.5% +5)
Above accuracies can be guaranteed within 5%~100% of the full range. The true RMS meter and the true RMS+PEAK meter has residual value within 10 counts when the test leads are shorten, but that will not affect the accuracy of measurement.			

4.2.2. DC Voltage

DCV:

Range	Resolution	Accuracy
660mV	0.1mV	±(0.5% +5)
6.6V	1mV	±(0.8% +5)
66V	10mV	±(0.8% +5)
660V	100mV	±(0.8% +5)
1000V	1V	±(1.0% +2)

4.2.3. Frequency

Logic frequency (1Hz-1MHz)

Function	Range	ResolutionaCCURACY	Dokładność
Frequency (6Hz-66MHz)	66.00Hz	0.01Hz	±(0.1%+3)
	660.0Hz	0.1Hz	
	6.600kHz	0.001kHz	
	66.00kHz	0.01kHz	
	660.0kHz	0.1kHz	
	6.600MHz	1KHz	
	66.00MHz	10KHz	

Linear frequency (6HZ~10KHZ)

Function	Range	Resolution	Accuracy
Frequency (6Hz-66KHz)	600mV	600mV	±(0.05%+8)
	6.6V	2V	
	66V	10V	
	660V	20V	
Above accuracies can be guaranteed within 10 %~100% of the full range			

4.2.4. Duty cycle

Range	Resolution	Accuracy
1% ~ 99%	0.01%	±(2%+10)

4.2.5. Resistance

Range	Resolution	Accuracy
660.0Ω	0.1Ω	±(1.2%+2)
6.600kΩ	1Ω	
66.00kΩ	10Ω	
660.0kΩ	100Ω	
6.600MΩ	1kΩ	
66.00MΩ	10kΩ	±(2%+5)

4.2.6. Diode Test

Range	Resolution	Test Condition
2 V	0.001V	Forward DC current approximately 1mA. Reversed DC voltage approximately 2.8V

4.2.7. Continuity Check

Range	Resolution	Test Condition
660Ω	0.1Ω	Open circuit voltage: approx. 0.5V

Description: Continuity beeper ≤30Ω

4.2.8. Capacitance

Range	Resolution	Accuracy
6.6nF	1pF	±(5.0% +5)
66nF	10pF	±(3.0% +3)
660nF	100pF	
6.6μF	1nF	
66μF	10nF	±(5.0% +3)
660μF	100nF	
6.6mF	1μF	
66mF	10μF	Unspecified

4.2.9. Current

Range	Resolutions	Accuracy
-55°~0℃	0.1℃	±(5.0% + 4℃)
1°~400℃		±(2.0% + 3℃)
401°~1000℃	1℃	±2.0%

Note: The specifications of temperature don't include thermocouple errors.

4.2.10. Current

DCA:

Range	Resolution	Accuracy
660μA	0.1μA	±(1.0% +3)
6600μA	1μA	
66mA	0.01mA	±(1.5% +3)
600mA	0.1mA	
10A	10mA	±(1.8% +5)

ACV:

Range	Resolution	Accuracy
660μA	0.1μA	±(1.5% +5)
6600μA	1μA	
66mA	0.01mA	±(1.8% +8)
600mA	0.1mA	
10A	10mA	±(2% +8)
Above accuracies can be guaranteed within 5%~100% of the full range. The true RMS meter and the true RMS+PEAK meter has residual value within 10 counts when the test		

leads are shorten, but that will not affect the accuracy of measurement.

Overload protection: F 10A/1000V fuse for 10A range

F 0.63A/1000V fuse for μA and mA ranges

Maximum input current:600mA dc or 600mA ac rms for μA and mA ranges

10A dc or 10A ac rms for 10A ranges.

For measurements>7A, 4 minutes ON to measure 10 minutes OFF; Above 10A unspecified.

5. MAINETENANCE

This section provides basic maintenance information, including fuse and battery replacement instructions.

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.

5.1. General Maintenance

⚠ To avoid electrical shock or damage to the meter, do not get water inside the case. Remove the test leads and any input signals before opening the case

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:

Turn the meter off and remove all test leads.

Shake out any dirt that may be in the terminals.

Soak a new swab with a cleaning and oiling agent (such as WD-40)

Work the swab around in each terminal. The oiling agent insulates the terminals from moisture-related contamination.

5.2. Fuse replacement

⚠ Before replacing the fuse, disconnect test Leeds and/or any connectors from any circuit under test. To prevent damage or injury replace the fuse only with specified ratings.

1) Set rotary switch to the OFF position.

2) Disconnect test leads and/or any connectors form the terminals.

3) Use a screwdriver to unlock the four screws on the rear cover.

4) Take out the rear cover from the meter.

5) Remove the fuse by gently prying one end loose, then sliding that fuse out of its bracket.

6) Install the replacement fuses only with specified ratings: F 0.63A/1000V ∅10.3×38 and

F 10A/1000V ∅10.3×38

7) Rejoin the rear cover and tighten the screws.

5.3. Battery replacement

⚠ To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator ( ) appears.
Before replacing the battery, disconnect test leads and/or any connectors from any circuit under test, turn the meter off and remove test leads from the input terminals.

1) Set rotary switch to the OFF position.
2) Disconnect test leads and/or any connectors from the terminals.
3) Use a screwdriver to unlock the two screws on the battery cover.
4) Take out the battery cover from the meter.
5) Remove the used battery.
6) Replace with one new 9V battery (6F22).
7) Rejoin the battery cover and tighten the screws.

6. ACCESSORIES

Delivered with the multimeter:

User's manual	One piece
Test leads	One piece
"K" type Thermocouple	One piece
Multi-function socket	One piece
USB line	One piece
PC-Link software CD	One piece

If there are some changes in accessories, please refer to the real product as standard.