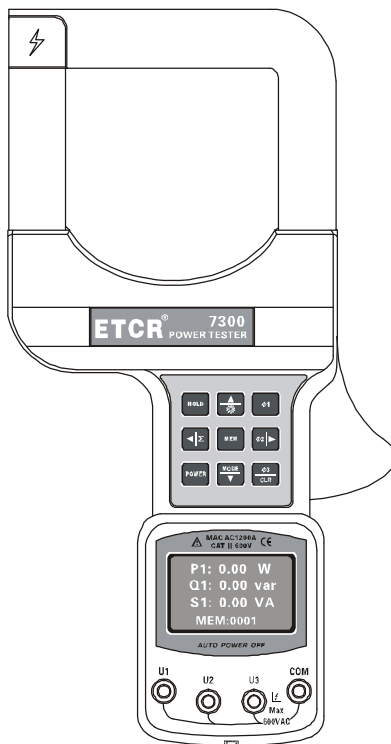


ETCR[®] LARGE CALIBER THREE PHASE POWER TESTER

ETCR 7300
ETCR 7300A



<http://www.etcrc.com>

MANUAL

ETCR Electronic Technology Company

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Warning



Thank you for purchasing our **ETCR7300 Series Large Caliber Three Phase Power Tester**, in order to better use of this product, be sure to:

----To read this user manual carefully.

----Comply strictly with safety rules and precautions set out in this manual.

- ⊍ Pay special attention to safety under any circumstances while using the instrument.
- ⊍ Take note of the label text and symbols on the panel and back of the instrument.
- ⊍ Keep the clamp clean and maintain regularly.
- ⊍ Please don't connect the tester with computer via RS232 during voltage measurement.
- ⊍ Please don't place and store the instrument at the place with high temperature, humidity, moisture condensation and straight sunlight for a long time.
- ⊍ Replace battery in time when the battery voltage is low.
- ⊍ Remove or replace the battery if you expect not to use the instrument for a long time.
- ⊍ Take note of the polarity when replace the battery.
- ⊍ The operation, demolition, calibration and maintenance of the instrument must be carried out by qualified personnel authorized to do so.
- ⊍ The meter should be stopped from being used immediately and sealed if danger is brought up in case of continued use; only a competent body can be authorized to deal with it.
- ⊍ “  ” in the manual is the safety warning sign, the contents of this manual must be followed for safe operation.
- ⊍ “  ” and other safety signs, the contents of this manual must be followed for safe operation.

I .Introduction

ETCR7300 Series Large Caliber Three Phase Power Tester is well designed and manufactured for measuring three phase AC voltage, current, leakage current, phase between current and voltage, phase between phase voltage, frequency, power energy, phase sequence, active power, reactive power, apparent power, power. It is a multifunctional, digital, intelligent tester. Its large caliber 80mm×80mm can clamp electric cable of 80mm diameter, or 96mm×4mm flat cable and steel earth wires. It has all the functions of Large Caliber Leakage Clamp Meter and Micro Power Clamp Meter. Besides, it also has this functions such as distinguish transformer wiring group, inductive and capacitive circuits, test second circuit and bus differential protection systems, read the phase relationship between CTs of the differential protection, check the meter wiring right, repair lines and equipment, etc. Provide operators with a safe, accurate and convenient tester.







ETCR7300 Series Large Caliber Three Phase Power Tester's clamp core is made of special alloy, adopt the latest magnetic shielding techniques, can almost shield the influence from external magnetic field, to ensure the high precision, high stability and high reliability of perennial uninterrupted measurement. The meter can store 200 sets of data, with RS232 interface, upload stored data to the computer through the system software, implementing online real-time monitoring, historical inquires, dynamic display. With the function of historical data read, preserve, print, and backlight, data hold, etc. It is a necessary tool for electrical safety testing.

II. Model

Model	Measurement Range	Resolution	Note
ETCR 7300	AC0.00mA-1200A	0.01mA	Can measure leakage current, low power
	AC 0.5W-720KW	0.01W	
ETCR 7300A	AC 0.0A-2000A	0.1A	Can measure big current, high power. Can't measure leakage current
	AC 0.1K-1200KW	1W	


Note: Other function is the same.

III. Electrical Symbols

	Extremely dangerous! The operator must strictly abide by the safety rules; otherwise there is risk of electric shock, resulting in bodily injury or fatalities.
	Dangerous! The operator must strictly abide by safety rules; otherwise there is risk of electric shock, resulting in bodily injury or fatalities.
	Warning! Safety rules must be strictly abided by, otherwise personal injury or equipment damage may be caused.
	Alternate Current (AC)
	Direct Current (DC)
	Double Insulation

IV. Technical Specification

Function	Measure three phase AC voltage, leakage current, current, active power, reactive power, apparent power, power, phase between current and voltage, phase between phase voltage, frequency, power energy, phase sequence
Power	6V DC(LR6×4 alkaline dry batteries, continuously working for 12 hours)
Test Mode	Clamp CT, integral mode
Clamp Size	80mm×80mm(can clamp electric cable of 80mm diameter, or 96mm×4mm flat cable and steel earth

	wires)
Measured Wire Position	Measured wire at approximately the geometric center of the clamp
Data Storage	200 sets, "FULL" symbol indicate the memory is full
RS232 Interface	With RS232 interface, download data to computer for analysis and management
Communication Wire	RS232 communication wire, 1.8m
Frequency	50Hz ,60Hz automatic identification
Gear Shift	Automatic shift
Sample Rate	About 2 times/second
Line Voltage	Below AC 600V line measurement
Display Mode	LCD: 128dots×64dots; Display area: 43mm×29mm
Meter Size	Length 275mm × Width 145mm × Height 40mm
Backlight	Controlled by "☒"key
Data Hold	"HOLD" symbol appears
Overflow	"OL" symbol appears
Automatic Shutdown	Automatically shutdown about 15 minutes after power on to reduce battery consumption
Voltage Detection	Low battery symbol  appears to remind the replacement of battery when the battery voltage drops below 5.2V.
Weight	1kg(with batteries and accessories)
Working Current	50mA with enabled backlight; 25mA with disabled backlight
Working Temperature and Humidity	-10℃-40℃; 80%rh
Storage Temperature and Humidity	-10℃-60℃; below 70%rh
Insulation strength	AC 3700V/rms(between core and shell)
Safety Specifications	IEC1010-1, IEC1010-2-032, 2 class of pollution, CAT III(600V)

V. Measurement Accuracy

1. Base Conditions and Working Conditions

Influence Quantity	Model	Base Condition	Working Condition	Note
Ambient Temp	7300 7300A	23°C±1°C	-10°C-40°C	----
Ambient Humidity	7300 7300A	40%-60%	< 80%	----
Signal Waveform	7300 7300A	sine wave	sine wave	β =0.01
Signal Frequency	7300 7300A	50HZ±1HZ	45HZ-65HZ	----
Current Amplitude in Power/Power Energy/Phase/Phase Sequence Test	7300	5A±0.1A	50mA-1200A	----
Current Amplitude in Power/Power Energy/Phase/Phase Sequence Test	7300A	50A±1A	10A-2000A	----
Voltage Amplitude in Power/Power Energy/Phase/Phase Sequence Test	7300 7300A	50V±1V	10V-600V	----
Current Amplitude in Power Factor Test	7300	5A±0.1A	50mA-1200A	Power factor: 0.3-1
Current Amplitude in Power Factor Test	7300A	50A±1A	10A-2000A	Power factor: 0.3-1
Voltage Amplitude in Power Factor Test	7300 7300A	100V±20V	10V-600V	----
External Electric Magnetic Field	7300 7300A	To be avoided		
Measured Wire Position	7300 7300A	Measured wire at approximately the geometric center of the clamp		

2. AC Voltage U

Measurement Range	Accuracy		Resolution	
	7300	7300A	7300	7300A
0.00V-9.99V	$\pm(1.5\%+5\text{dgt})$		0.01V	
10.0V-99.9V			0.1V	
100V-600V			1V	

3. AC Current I

Measurement Range	Accuracy		Resolution	
	7300	7300A	7300	7300A
0.00mA-9.99mA	$\pm(1.5\%+5\text{dgt})$	----	0.01mA	----
10.0mA-99.9mA	$\pm(1.5\%+5\text{dgt})$	----	0.1mA	----
100mA-999mA	$\pm(1.5\%+5\text{dgt})$	$\pm(2.0\%+5\text{dgt})$	1mA	0.1A
1.00A-9.99A	$\pm(1.5\%+5\text{dgt})$	$\pm(2.0\%+5\text{dgt})$	0.01A	0.1A
10.0A-99.9A	$\pm(1.5\%+5\text{dgt})$	$\pm(2.0\%+5\text{dgt})$	0.1A	0.1A
100A-1199A	$\pm(2.0\%+5\text{dgt})$	$\pm(2.0\%+5\text{dgt})$	1A	1A
1200A-2000A	----	$\pm(2.5\%+5\text{dgt})$	----	1A

4. Frequency F

Measurement Range	Accuracy		Resolution	
	7300	7300A	7300	7300A
25Hz-100Hz	$\pm(0.5\%+5\text{dgt})$		0.1Hz	

5. Active Power P: $W=(V \times A \times \text{COS } \Phi)$

Measurement Range	Accuracy		Resolution	
	7300	7300A	7300	7300A
0.50W-9.99W	$\pm(3\%+5\text{dgt})$	----	0.01W	----
10.0W-99.9W	$\pm(3\%+5\text{dgt})$	----	0.1W	----
0.10KW-9.99KW	$\pm(3\%+5\text{dgt})$	$\pm(3\%+5\text{dgt})$	0.01KW	0.01KW
10.0KW-99.9KW	$\pm(3\%+5\text{dgt})$	$\pm(3\%+5\text{dgt})$	0.1KW	0.1KW

100KW-719KW	$\pm(3\%+5\text{dgt})$	$\pm(3\%+5\text{dgt})$	1KW	1KW
720KW-1200KW	----	$\pm(4\%+5\text{dgt})$	----	1KW

6. Apparent Power S: $VA=(V \times A)$

Measurement Range	Accuracy		Resolution	
	7300	7300A	7300	7300A
0.50VA-9.99VA	$\pm(3\%+5\text{dgt})$	----	0.01VA	----
10.0VA-99.9VA	$\pm(3\%+5\text{dgt})$	----	0.1VA	----
0.10KVA-9.99KVA	$\pm(3\%+5\text{dgt})$	$\pm(3\%+5\text{dgt})$	0.01KVA	0.01KVA
10.0KVA-99.9KVA	$\pm(3\%+5\text{dgt})$	$\pm(3\%+5\text{dgt})$	0.1KVA	0.1KVA
100KVA-720KVA	$\pm(3\%+5\text{dgt})$	$\pm(3\%+5\text{dgt})$	1KVA	1KVA
720KVA-1200KVA	----	$\pm(4\%+5\text{dgt})$	----	1KVA

7. Reactive Power Q: $VAR=(V \times A \times \sin \Phi)$

Measurement Range	Accuracy		Resolution	
	7300	7300A	7300	7300A
0.50var-9.99var	$\pm(3\%+5\text{dgt})$	----	0.01var	----
10.0var-99.9var	$\pm(3\%+5\text{dgt})$	----	0.1var	----
0.10Kvar-9.99Kvar	$\pm(3\%+5\text{dgt})$	$\pm(3\%+5\text{dgt})$	0.01Kvar	0.01Kvar
10.0Kvar-99.9Kvar	$\pm(3\%+5\text{dgt})$	$\pm(3\%+5\text{dgt})$	0.1Kvar	0.1Kvar
100Kvar-719Kvar	$\pm(3\%+5\text{dgt})$	$\pm(3\%+5\text{dgt})$	1Kvar	1Kvar
720Kvar-1200Kvar	----	$\pm(4\%+5\text{dgt})$	----	1Kvar

8. Power Factor PF: $PF=W/VA$

Measurement Range	Accuracy		Resolution	
	7300	7300A	7300	7300A
0.3-1.0 (Capacitive or Inductive)	$\pm(0.02+5\text{dgt})$		0.001	

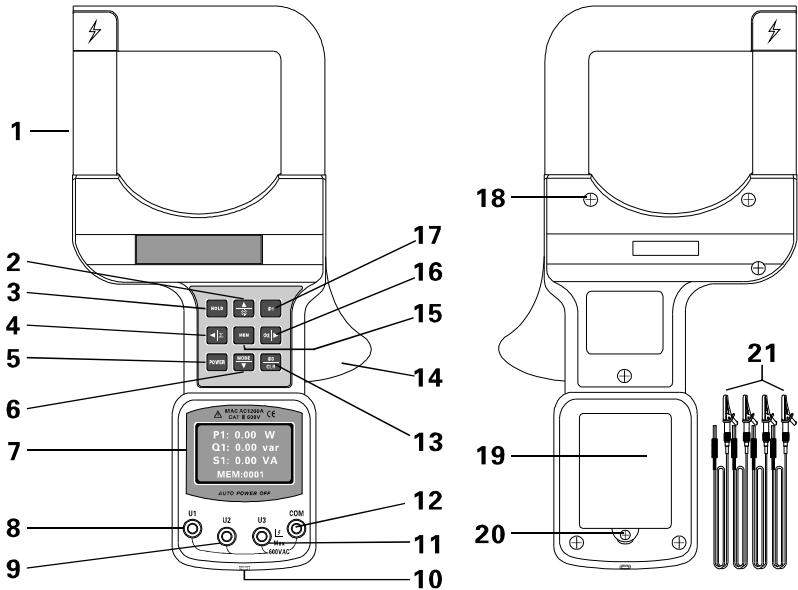
9. Phase Angle

Measurement Range	Accuracy		Resolution	
	7300	7300A	7300	7300A
0.0° -360.0°	$\pm(1.5^\circ +5\text{dgt})$		0.1°	

10. Power Energy W

Measurement Range	Accuracy		Resolution	
	7300	7300A	7300	7300A
0.0000KWh-9.9999KWh	$\pm (3\%+5\text{dgt})$	$\pm (4\%+5\text{dgt})$	0.0001KWh	
10.000KWh-99.999KWh	$\pm (3\%+5\text{dgt})$	$\pm (4\%+5\text{dgt})$	0.001KWh	
100.00KWh-999.99KWh	$\pm (3\%+5\text{dgt})$	$\pm (4\%+5\text{dgt})$	0.01KWh	
1000.0KWh-9999.9KWh	$\pm (3\%+5\text{dgt})$	$\pm (4\%+5\text{dgt})$	0.1KWh	
10000KWh-72000KWh	$\pm (3\%+5\text{dgt})$	$\pm (4\%+5\text{dgt})$	1KWh	

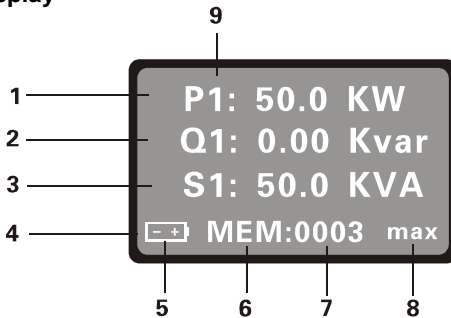
VI. Instrument Structure



1. Clamp(80mm×80mm)
2. key: Open/Close the backlight, increase the page number by one, switch MAX/MIN measurement states.
3. key: Data hold and store.
4. key: Left move the cursor, sum up the three phase power.
5. key: Power ON/OFF

6. **MODE** key: Switch the measurement mode (7 kinds of different modes), decrease the page number by one.
7. LCD display (See the below details)
8. U1 voltage input
9. U2 voltage input
10. RS232 interface, upload data to computer.
11. U3 voltage input
12. Public input of three phase voltage (COM)
13. **φ3**/**CLR** key: Choose to measure $\phi 3$ phase voltage or power, clear date storage.
14. Opening lever
15. **MEM** key: Access/Exit data reading
16. **φ2**/**▶** key: Choose to measure $\phi 2$ phase voltage or power, right move the cursor
17. **φ1** key: Choose to measure $\phi 1$ phase voltage or power
18. Up and down cover connecting screws
19. Battery cover
20. Battery cover screw
21. Test wires

LCD Display



1. The first row on the LCD: display the measurement value
2. The second row on the LCD: display the measurement value
3. The third row on the LCD: display the measurement value
4. The fourth row on the LCD: display states
5. Low power indicator: display when the batteries don't have enough power
6. State indicator: "MEM" indicating data store, "HOLD" indicating data hold, "READ" indicating historical data access.
7. Data group number

8. “max” indicating the maximum value measurement of active power, apparent power, voltage, current.
“min” indicating the minimum value measurement of active power, apparent power, voltage, current.
In the normal measurement state, this symbol doesn't display.

VII. Method of Operation

1. Switch On/Off

Press **POWER** key to switch on, LCD display, in test mode, press **POWER** key to switch off. The meter will automatically power off after booting 15 minutes later (The tester won't power off automatically in power energy measurement mode). If LCD display is darker, maybe the battery voltage is too low, please replace batteries.

2. Choose measurement mode

Press **MODE** key to switch 7 kinds of different mode: active power/reactive power/apparent power, voltage/current/power factor, power energy, phase angle between voltage and current, phase angle between three phase voltage, frequency, phase sequence. In the mode of active power/reactive power/apparent power and voltage/current/power factor, press **φ1**、**φ2**、**φ3** key to switch and display the corresponding power and voltage.

3. Max and Min measurement

In the mode of active power/reactive power/apparent power measurement and voltage/current/power factor measurement, long press **△** key or **▽** key for 3 seconds, when “max” or “min” displayed at the right bottom of the LCD, it is to measure the maximum or minimum value, and then press **△** key or **▽** key for 3 seconds to exit the measurement mode of max and min, return to normal measurement mode.

4. Backlight Control

After booting, press ***** key to control the backlight, suitable for dim places and night, default closed after booting.

5. Data Hold/Storage

In all the modes except phase sequence measurement, press **HOLD** key to lock currently displayed value and display “**HOLD**” symbol. At the same time, this locked value as a set of data followed by auto-ID and store, display the group number such as “**HOLD: 0003**”, and then press **HOLD** key to cancel the lock, “**HD**” symbol disappear, then continue to measure. Loop operation, the meter can store 200 sets of data. If the memory is full,

display “FULL” symbol. “MEM:0003” displays in test mode means there have 3 groups stored data.

6. Data Access/ Exit

In test mode, press **MEM** key to access data inquiry form group “**READ: 001**”, and display “**READ**” symbol. It is allowed to rapidly navigate to the desired page number. Press “ Δ ” key to increase the page number by one, press “ ∇ ” key to decrease the page number by one. Press “ \triangleleft ” key to decrease the page number by ten, when the pages is less then ten, please change to use the “ ∇ ” key. Press “ \triangleright ” key to increase the page number by ten, when the left pages is less than ten, please change to use the “ Δ ” key. Press **MEM** key to exit date inquiry.

7. Data Upload

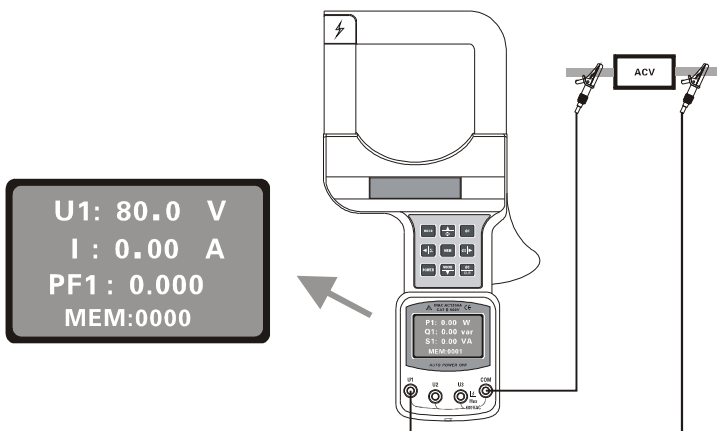
Connecting the meter and computer with USB-RS232 communication line attached in package. Start up the meter, run software, choose history access, then read, save, report, print history data, etc. The more data storage, take the longer time to read it. Historical data can be saved in Txt text or Excel format. Please don't connect the tester with computer via RS232 when the tester is under the state of voltage measurement, in case result in leakage current to damage the tester.

8. Delete Data

At the date inquiry mode, press CLR key to access deleting data menu, then press “ \triangleleft ” or “ \triangleright ” keys to move the cursor to “YES” or “NO” item. Press MENU key to confirm deletion or return to the test mode.

9. Measurement Instruction

(1) Single phase AC voltage (U1/U2/U3) measurement:

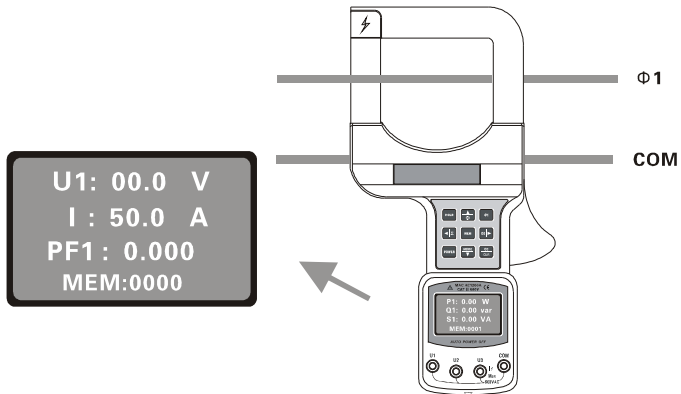


(Table-1)

Key	Input (+)		Input (-)		Measurement Quantity
ϕ 1 key	U1 interface	Yellow pen	COM interface	Black pen	Voltage of the first phase
ϕ 2 key	U2 interface	Green pen	COM interface	Black pen	Voltage of the second phase
ϕ 3 key	U3 interface	Red pen	COM interface	Black pen	Voltage of the third phase

- (a) Press **MODE** key to switch the mode to voltage/current/power factor measurement state. (Show as the above LCD display)
- (b) Connect wires according to Table-1, press **ϕ 1**、 **ϕ 2**、 **ϕ 3** key to switch the phase, and insert the testing pens (Yellow, Green, Red) into “U1/U2/U3” interface, insert the black pen into “COM” interface.
- (c) The first row on the LCD displays the corresponding voltage.
- (d) Long press **Δ** key or **∇** key for 3 seconds, when “max” or “min” displayed at the right bottom of the LCD, it is to measure the maximum or minimum voltage. And then press **Δ** key or **∇** key for 3 seconds to exit the measurement mode of max and min, return to normal measurement mode.
- (e) When the voltage exceeding 600V, “OL V” symbol will display.





(2) Single phase AC current (I) measurement



- (a) Press **MODE** key to switch the mode to voltage/current/power factor measurement state. (Show as the above LCD display)

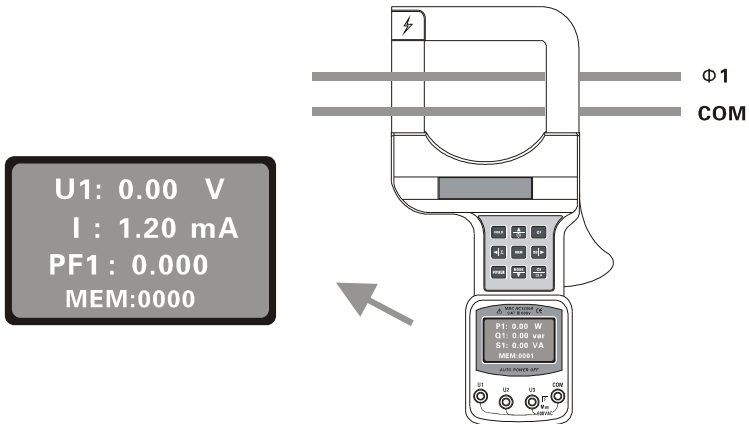
(b) Clamp the to-be-measured wire.

(c) The second row on the LCD displays the current.

(d) Long press  key or  key for 3 seconds, when “max” or “min” displayed at the right bottom of the LCD, it is to measure the maximum or minimum current. And then press  key or  key for 3 seconds to exit the measurement mode of max and min, return to normal measurement mode.

(e) When the current exceeding measurement range, “OL A” symbol will display.





(3) Single phase AC leakage current (I) measurement



(a) Press **MODE** key to switch the mode to voltage/current/power factor measurement state. (Show as the above LCD display)

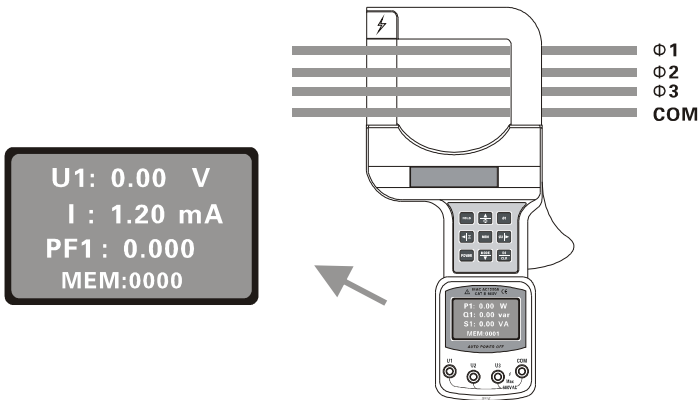
(b) Clamp the live wire and null line of single phase.

(c) The second row on the LCD displays the leakage current.

(d) Long press  key or  key for 3 seconds, when “max” or “min” displayed at the right bottom of the LCD, it is to measure the maximum or minimum current. And then press  key or  key for 3 seconds to exit the measurement mode of max and min, return to normal measurement mode.

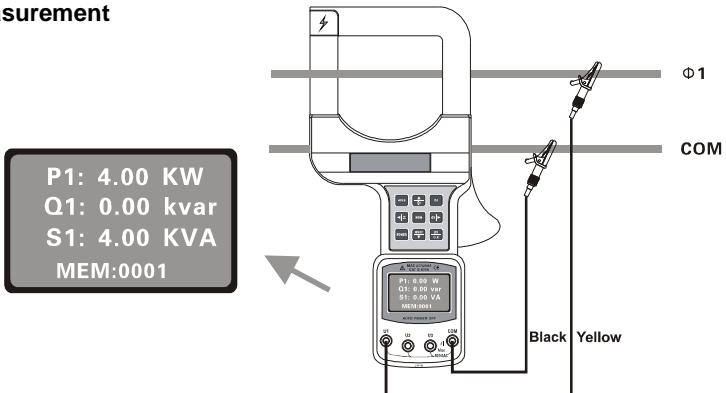
(e) When the current exceeding measurement range, “OL A” symbol will display.

(4) Three phase leakage current (I) measurement



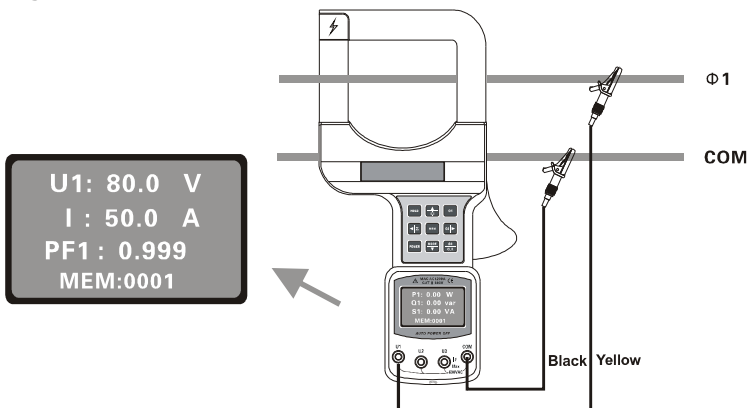
- Press **MODE** key to switch the mode to voltage/current/power factor measurement state. (Show as the above LCD display)
- Clamp three wires or four wires of the three phase together.
- The second row on the LCD displays the leakage current.
- Long press **▲** key or **▼** key for 3 seconds, when “max” or “min” displayed at the right bottom of the LCD, it is to measure the maximum or minimum current. And then press **▲** key or **▼** key for 3 seconds to exit the measurement mode of max and min, return to normal measurement mode.
- When the current exceeding measurement range, “OL A” symbol will display.

(5) Single phase active power (P)/reactive power (Q)/apparent power(S) measurement



- (a) Press **MODE** key to switch the mode to active power/reactive power/apparent power measurement state. (Show as the above LCD display)
- (b) Connect wires according to Table-1, press **φ1**、**φ2**、**φ3** key to switch the phase, and insert the testing pens (Yellow, Green, Red) into “U1/U2/U3” interface, insert the black pen into “COM” interface.
- (c) Clamp the to-be-measured wire.
- (d) The first row on the LCD displays the corresponding active power, while the second and third row respectively displays the corresponding reactive power and apparent power.
- (e) Long press **△** key or **▽** key for 3 seconds, when “max” or “min” displayed at the right bottom of the LCD, it is to measure the maximum or minimum values. And then press **△** key or **▽** key for 3 seconds to exit the measurement mode of max and min, return to normal measurement mode.
- (f) When the power exceeding measurement range, “OL” symbol will display.
- (g) When the measured voltage in the range of 10V-5V, and the measured current in the range of 50mA-20mA, the measurement error will be doubled. When the voltage below 5V or the current below 20mA, the tester will display “0.00W/0.00var/0.00VA”.

(6) Single phase power factor (PF1/PF2/PF3) measurement



- (a) Press **MODE** key to switch the mode to active power/reactive power/apparent power measurement state. (Show as the above LCD

display)

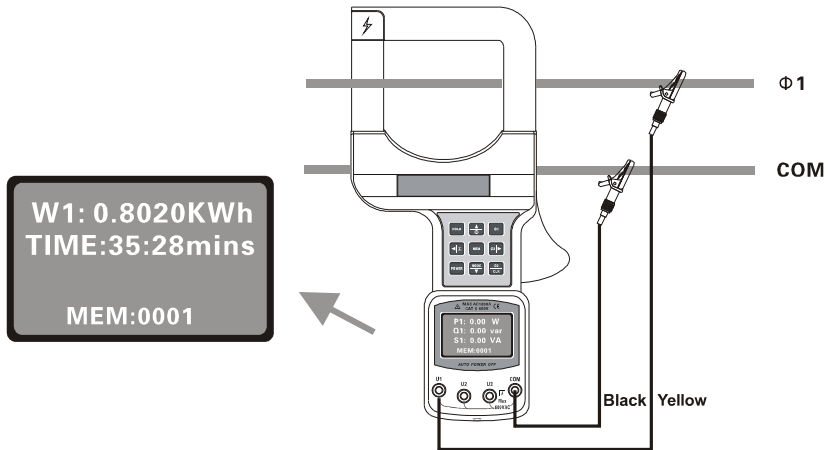
(b) Connect wires according to Table-1, press $\Phi 1$ 、 $\Phi 2$ 、 $\Phi 3$ key to switch the phase, and insert the testing pens (Yellow, Green, Red) into “U1/U2/U3” interface, insert the black pen into “COM” interface.

(c) Clamp the to-be-measured wire.

(d) The third row on the LCD displays the corresponding power factor.

(e) When the measured voltage in the range of 10V-5V, and the measured current in the range of 50mA-20mA, the measurement error will be doubled. When the voltage below 5V or the current below 20mA, the tester will display “PF1:0.000”.

(7) Single phase power energy (W1/W2/W3) measurement



(a) Press **MODE** key to switch the mode to power energy measurement state. (Show as the above LCD display)

(b) Connect wires according to Table-1, press $\Phi 1$ 、 $\Phi 2$ 、 $\Phi 3$ key to switch the phase, and insert the testing pens (Yellow, Green, Red) into “U1/U2/U3” interface, insert the black pen into “COM” interface.

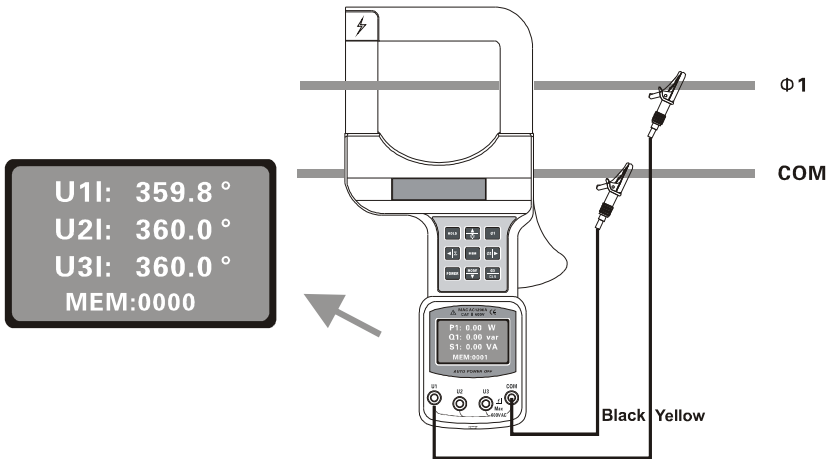
(c) Clamp the to-be-measured wire.

(d) The first row on the LCD displays the corresponding power energy, while the second row displays the measurement time, with unit of mins (minutes and seconds) when less than 1 hour, and hmin (hours and minutes) when more than 1 hour.

(e) When the power energy exceeding measurement range, “OL” symbol will display. When measuring power energy, the tester won't power off automatically after 15 minutes, it can be used for 100 hours. Press **HOLD** key to store the data, meanwhile the measurement is going on until press **MODE** key to exit. When press **φ1**、**φ2**、**φ3** key to switch the phase, the timer and the power energy value will be cleared, restart to measure again.

(f) When the measured voltage in the range of 10V-5V, and the measured current in the range of 50mA-20mA, the measurement error will be doubled. When the voltage below 5V or the current below 20mA, the tester will display “W1:0.0000KWh”.

(8) Phase angle between voltage (U1/U2/U3) and current measurement



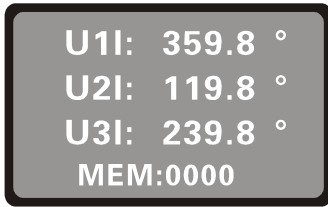
(a) Press **MODE** key to switch the mode to phase angle between voltage and current measurement state. (Show as the above LCD display)

(b) Connect wires according to Table-1, press **φ1**、**φ2**、**φ3** key to switch the phase, and insert the testing pens (Yellow, Green, Red) into “U1/U2/U3” interface, insert the black pen into “COM” interface.

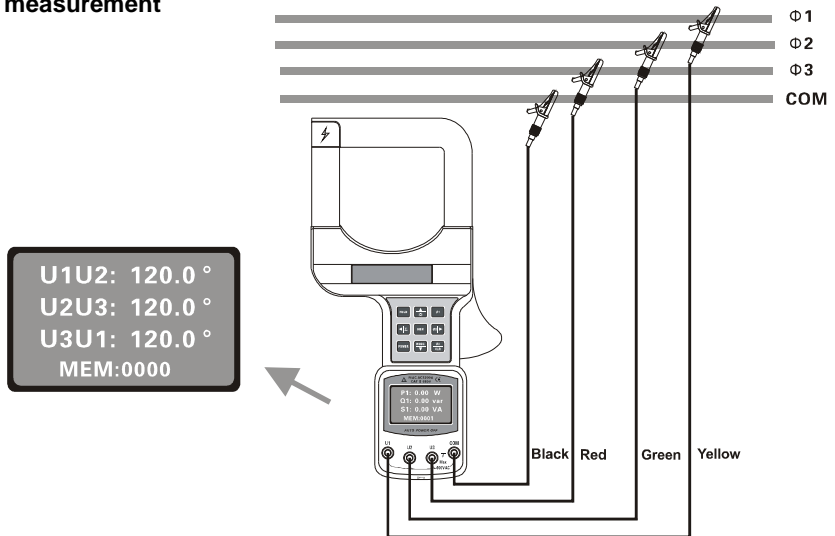
(c) Clamp the to-be-measured wire.

(d) The LCD displays corresponding phase angle. For example, the phase angle between U1 and I is U1I:359.8°, the other two phase have not connect voltage U2, U3, so its phase angle display 0° or 360.0° (0° is same with 360.0°).

(e) When the measured voltage in the range of 10V-5V, and the measured current in the range of 50mA-20mA, the measurement error will be doubled. When the voltage below 5V or the current below 20mA, the tester will display “U1:360.0”.



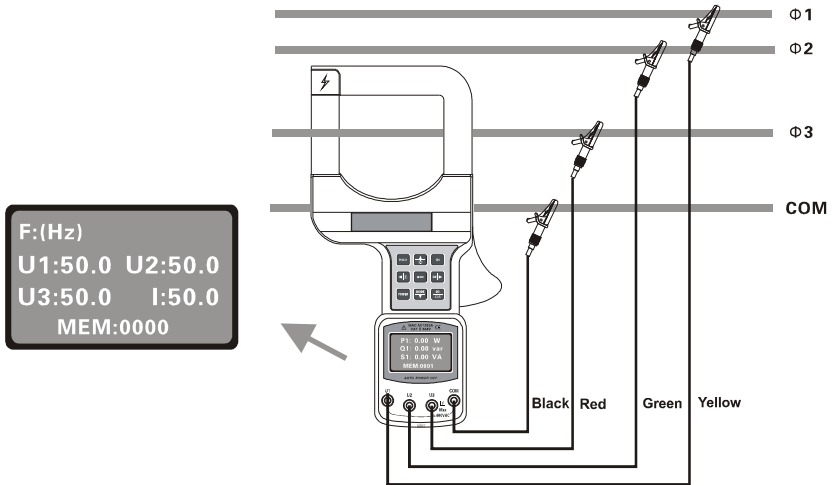
(9) Phase angle between three phase AC voltage (U1/U2/U3) measurement



- (a) Press **MODE** key to switch the mode to phase angle between voltages measurement state. (Show as the above LCD display)
- (b) Connect wires according to Table-1, press **φ1**、**φ2**、**φ3** key to switch the phase, and insert the testing pens (Yellow, Green, Red) into “U1/U2/U3” interface, insert the black pen into “COM” interface.
- (c) The LCD displays corresponding phase angle. For example, the phase angle between U1 and U2 is U1U2:120.0°.

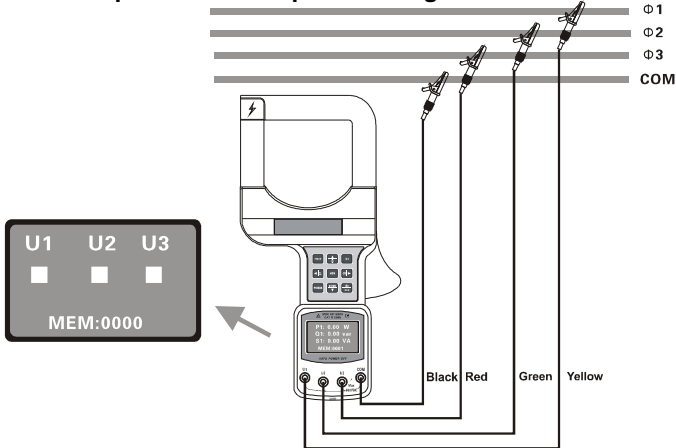
(d) When the measured voltage in the range of 10V-5V, and the measured current in the range of 50mA-20mA, the measurement error will be doubled. When the voltage below 5V or the current below 20mA, the tester will display “U1:360.0”.

(10) Frequency of three phase voltage and current (F) measurement



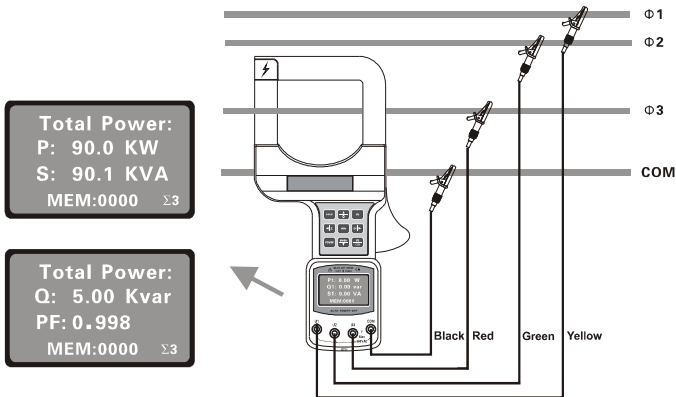
- Press **MODE** key to switch the mode to frequency measurement state. (Show as the above LCD display)
- Connect wires according to Table-1, press **Φ1**、**Φ2**、**Φ3** key to switch the phase, and insert the testing pens (Yellow, Green, Red) into “U1/U2/U3” interface, insert the black pen into “COM” interface.
- Clamp the to-be-measured wire.
- The LCD displays corresponding phase angle. For example, U1:50.0Hz.
- When the measured voltage in the range of 10V-5V, and the measured current in the range of 50mA-20mA, the measurement error will be doubled. When the voltage below 5V or the current below 20mA, the tester will display “U1:0.0”.

(11) Phase sequence of three phase voltage measurement






- (a) Press **MODE** key to switch the mode to phase sequence measurement state. (Show as the above LCD display)
- (b) Connect wires according to Table-1, press **φ1**、**φ2**、**φ3** key to switch the phase, and insert the testing pens (Yellow, Green, Red) into “U1/U2/U3” interface, insert the black pen into “COM” interface.
- (c) If no default phase, the phase sequence will display. The cursor flashing in order of U1-U2-U3 means positive phase sequence, and in order of U3-U2-U1 means negative phase sequence. If there is a default phase or voltage below 5V, the corresponding cursor won't display.


(12) Total active power/reactive power/apparent power/power factor (P/Q/S/PF) of three phase measurement




- (a) Press **MODE** key to switch the mode to active power/reactive power/apparent power measurement state. (Show as the above LCD display)
- (b) Connect wires according to Table-1, press **φ1**、**φ2**、**φ3** key to switch the phase, and insert the testing pens (Yellow, Green, Red) into “U1/U2/U3” interface, insert the black pen into “COM” interface.
- (c) Clamp φ1 wire, press **φ1** key to switch the mode to φ1 phase power measurement state, press **Σ** key to record the power of φ1 phase, “Σ1” symbol displays at the right bottom of LCD. And then repeat the same steps to measure the power of φ2 and φ3, the total power will automatically sum up when “Σ3” displays on the LCD.
- (d) The total active power (P)/reactive power (Q)/apparent power (S)/power factor (PF) displays in two pages on LCD, page turns every 5 seconds.


	High voltage, very dangerous! Only qualified personnel after training could conduct operation on it. The operator should obey safety regulations; Otherwise there will be the danger of electric shock resulting in personal injury or casualty.
	<p>Dangerous! Can not be used to test voltage higher than 600V. Otherwise there will be the danger of electric shock resulting in personal injury or casualty.</p> <p>Please don't measure the current which exceeding the measurement range, in case damage the tester.</p>

	<p>Make sure the clamp well closed when measuring leakage current and current.</p> <p>Make sure the measured wire at approximately the geometric center of the clamp.</p> <p>Clean the clamp after finishing measurement, regularly maintain the meter.</p> <p>Be sure to connect test wires correctly when measuring voltage to avoid short circuit.</p> <p>After measuring voltage, should firstly take the test line away from measured wire, and then draw from meter, in order to avoid shock.</p>
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	Clamp live wire and null line together to measure AC leakage current of single phase. (Note: 2 wires)
	Clamp earth wire to measure grounding line leakage current of electric equipment. (Note: single wire)
	Clamp four wires or three wires of there phase to measure the total leakage current. (Note: 4 wires or 3 wires)
	Clamp main line to measure total current of that main line. (Note: single wire)


VII. Battery Replacement

	Warning! Make sure the battery cover is well closed before measurement, otherwise there will be danger.
	Take note of the battery polarity, otherwise it may cause damage to the instrument.
	If the battery power is not enough, please change in time.
	Take out the batteries if you expect not to use the meter for a long time.

1. "  " is displayed when the power voltage is lower than 5.2V, indicating that the battery should be replaced.
2. Press **POWER** key, make sure the meter is power off. Loosen the battery cover screw, open the plate, replace new batteries and cover the plate, then tighten screw.
3. Press **POWER** key to check whether the batteries are successfully replaced, repeat step 2 if it doesn't work.

VIII. Accessories

Main Unit	1 piece
Meter Box	1 piece
Test Wires	4 pieces (Yellow, Green, Red, Black)
RS232 Data Wires	1 piece
Disk	1 piece
Battery	4 pieces (Alkaline Dry Battery LR6)
User Manual	1 piece
Guarantee Card	1 piece
Certification	1 piece

 **Manufactured by**

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