Laboratory Equipment Manufacturer
www.mrclab.com

DATALOGGING AC/DC CLAMP POWER METER

TES - 3060/3063

INSTRUCTION MANUAL

PLEASE READ THIS MANUAL CAREFULLY BEFORE OPERATION

3, Hagavish st. Israel 58817 Tel: 972 3 5595252, Fax: 972 3 5594529 mrc@mrclab.com

MRC.7.14

CONTENTS

I. SAFETY INFORMATION 1

II. TECHNICAL SPECIFICATIONS 3

2-1 Environment Conditions 3
2-2 Maintenance 3
2-3 Features 3
2-4 General Specifications 4
2-5 Measurement Specifications 5

III. PARTS & CONTROLS 7

3-1 Description of Parts & Control 7

IV. AC+DC POWER MEASUREMENT 11

4-1 AC+DC 1ϕ2W Power(W) and Power Factor (PF) Measurement 11
4-2 3ϕ3W AC+DC Power Measurement 13
4-3 3ϕ4W AC+DC Power Measurement 17
4-4 1ϕ3W Power Measurement 20

V. OPERATING INSTRUCTION 24

5-1 AC+DC Voltage Measuremen 24
5-2 AC+DC Current Measurement 25
5-3 To Improve Power Factor of a 3ϕ4W Power System ... 26
5-4 To Improve Power Factor of a 3ϕ3W Power System 26
5-5 To Improve Power Factor of a 1ϕ2W Power System 27
5-6 Resistance & Continuity Measurement 27
5-7 Diode Test & Continuity Measurement 28
5-8 Peak Detection Measurement 28
5-9 Operation Of Data Record And Read 29

VI. BATTERY REPLACEMENT 30

I. SAFETY INFORMATION

- Read the following safety information carefully before attempting to operate or service the meter.
- To avoid damages to the instrument do not exceed the maximum limits of the input values shown in the technical specification tables.
- Do not use the meter or test leads if they look damaged. Use extreme caution when working around bare conductors or bus bars.
- Accidental contact with the conductor could result in electric shock.
- Use the meter only as specified in this manual; otherwise, the protection provided by the meter may be impaired.
- Read the operating instructions before use and follow all safety information.
- Caution when working with voltages above $60V_{DC}$ or $30V_{AC}$ RMS. Such voltages pose a shock hazard.
- Before taking resistance measurements or testing acoustic continuity, disconnect circuit from main power supply and all loads from circuit.

Safety symbols

Caution refer to this manual before using the meter.

Dangerous voltages.

Meter is protected throughout by double insulation or reinforced insulation.
When servicing, use only specified replacement parts.

Comply with EN-61010-1, IEC 1010-2-32

II. TECHNICAL SPECIFICATIONS

2-1 Environment Conditions:

① Installation categories III
② Pollution degree 2
③ Altitude up to 2000 meters
④ Indoor use only
⑤ Relatively humidity 80% max.
⑥ Operation ambient 0 ～50℃

2-2 Maintenance

① Repairs or servicing not covered in this manual should only be performed by qualified personnel.
② Periodically wipe the case with a dry cloth. Do not use abrasives or solvents on this instruments.

2-3 Features•

① RS-232 interface to talk with PC

② 4000 continuity point data logger , 25 point manual data logger

③ True Power / Apparent Power / Power Factor measurement

④ True RMS. V, A, W, lead, lag, PF indicator

⑤ 4 digits with dual display LCD

⑥ MIN / MAX Measurement

⑦ Amp / Voltage frequency measurement

⑧ PEAK HOLD detector

⑨ Dual display KW + PF , KVA + PF , V+A

⑩ Dual display A + Hz , V + Hz

2-4 General Specifications

Maximum voltage between any terminal and earth ground
: 600Vrms.

Numerical dual display : 4 digit liquid crystal display (LCD) maximum reading 9999.

Bargraph display : 40 segments.

Battery life : 30hr approx. (Alkaline).

Low battery indication : The  is displayed when the battery voltage drops below the operating voltage.

Auto power off time : 30 minutes approx.

Sampling rate : 5 times / sec (Barograph),
5 times / sec (Digital display)
1 times /3sec (on kw function)

Jaw opening diameter : Cables ϕ 46mm.

Operating temperature and humidity : 0℃ to 50℃ (32℉ to 122℉)
R.H. < 80% non-condensing.

Storage temperature and humidity : -10℃ to 60℃ (14℉ to 140℉)
R.H. < 70% non-condensing.

Dimensions : 260(L) x 93(W) x 45mm(H).

Weight : Approx. 450 g.

Accessories : Carrying case, Test leads,
Battery (one 006p 9V) &
Instruction manual.

Optional Accessory : RS-232 interface & computer P.C. software.

2-5 Measurement Specifications

Accuracy are•±(• of reading • number of digits) at 18• to 28• (64• to 82•) with relative humidity to 80•.

❑ TRUE power & Apparent power measurement

Input	Resolution	Accuracy	Frequency range	Overload protection
V<130V , A<150A	0.01	±(2%+5)	45Hz～500Hz	600V/1100A
V>130V , A<150A				
V<130V , A>150A				
V>130V , A>150A	0.1	±(2%+1)		

❑ DCA

Range	Resolution	Accuracy	Overload protection
1000A	0.1A	± (1.5% + 5)	1100A

❑ ACA

Range	Resolution	Accuracy	Frequency range	Overload protection
1000A	0.1A	± (1.5% + 5)	45Hz～500Hz	1100A

※ Crest factor : < 3 for stated accuracy

❑ DCV

Range	Resolution	Accuracy	Input impedance	Overload protection
600V	0.1V	± (0.5% + 5)	1MΩ	600V

❑ ACV

Range	Resolution	Accuracy	Input impedance	Frequency range	Overload protection
600V	0.1V	± (0.5%+5)	1MΩ	45Hz～500Hz	600Vrms

※ Crest factor : < 3 for stated accuracy

❑ **Peak indication**

Range	Resolution	Accuracy	Overload protection
20A~80A	0.1A	± (10% + 10)	1100A
80A~1000A	0.1A	± (6% + 10)	1100A

※Peak detect acquisitions time ≦1ms

❑ **Peak indication**

Range	Resolution	Accuracy	Overload protection
20V~80V	0.1V	± (10% + 10)	600Vrms
80V~600V	0.1V	± (6% + 10)	600Vrms

※Peak detect acquisitions time ≦1ms

❑ **Audible continuity**

Range	Continuity beeper	Open circuit voltage	Overload protection
•))	< 0.050	≦3.2V	600Vrms

❑ **Resistance (Ω)**

Range	Resolution	Accuracy	Open circuit voltage	Overload protection
10KΩ	1Ω	± (1 % + 5)	≦ 3.2 V	600Vrms

❑ **Diode test**

Range	Resolution	Overload protection
▶|	0.001V	600Vrms

❑ **Frequency (Hz)**

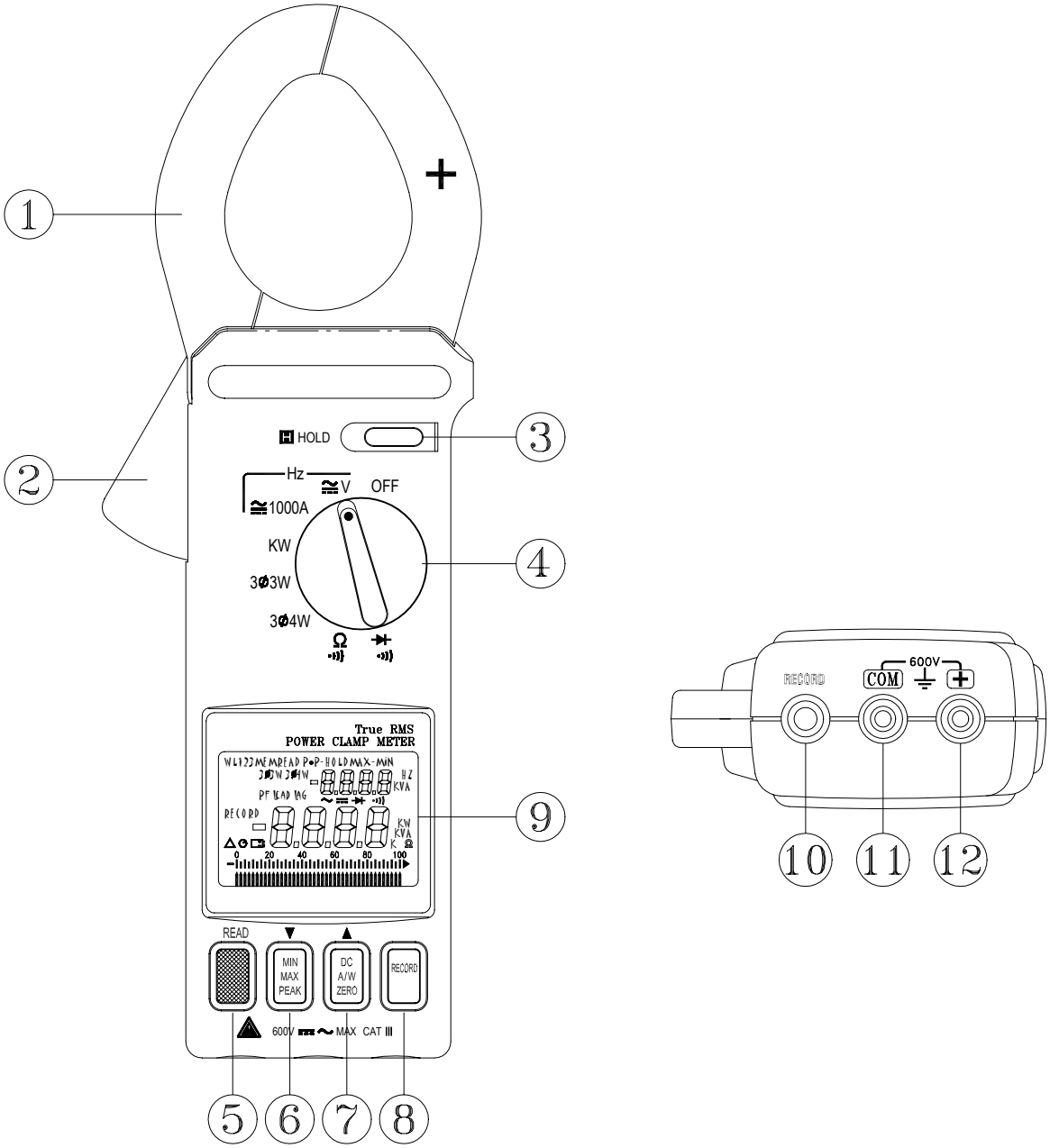
Range	Resolution	Accuracy	Voltage sensitivity	Overload protection
1KHz	0.1Hz	± (0.5% + 5)	10V or 10A	600V / 1100A
5KHz	1Hz			

❑ **Optional accessories:**

RS-232 interface adaptor / software

III. **PARTS & CONTROLS**

3-1 Description of Parts & Control



(Figure-1)

Press and hold the button until the beeper sounds that means the function activating.

(1). Transformer jaws
Pick up the AC and DC current flowing through the conductor.

(2). Jaw opening trigger.

(3). Data Hold button
Press it once to hold the measured value and store the value in memory. Press again to release hold function.

(4). Function selector
For selection of desired function, and awakening from auto-power-off mode.

(5). Yellow button (P+ or P- selection)

a. Press “Yellow” button once, LCD will display “P+P-” symbol, then press “PEAK” button to measure peak value of a transient signal.
b. Press “Yellow” button until the READ symbol is shown on LCD and then Press “•” button to read the previous data. Press “•” button to read the next data. Press “Yellow” button again to exit.
c. When the rotary switch is set to KW function, press this button to select KW/PF, A/V or KVA/PF dual displayed.
d. When the rotary switch is set to the 3•3W or 3•4W function, press on the yellow button to select the phase to be measured.

(6). MIN/MAX/PEAK function button

a. Press it once to select MIN or MAX. Keep pressing it for 2 seconds to exit MIN/MAX mode.
b. Press “Yellow” button once then press this button to measure peak value P+ or P- of a transient signal, keep pressing it for 2 seconds to exit peak mode. It can be used in ACV and ACA. One of the most common applications is the measurement of the current value when starting electrical motors. When measuring alternating signals, LCD shows the peak value.

(7). DC A/W ZERO button

Press the button once to zero the A or KW reading.

(8). RECORD button

- Single Data Record

  The clamp meter can store 25 data record in memory. Once the button is pressed, the data number and RECORD symbol will be shown on LCD. If the memory is full, the FULL signal will be shown on LCD when the record button is pressed.

- Continue Data Record

  The memory size is of 4000 records. To start recording data, press the RECORD button until 2 “beep” sounds heard and “RECORD” symbol will be shown on LCD. To stop recording data, press the RECORD button again until the RECORD symbol disappears.

- Clear data logger

  To clear the memory of the meter, turn the instrument off. Press on the RECORD button and power on the instrument. The LCD will show CLr.

(9). LCD display

4 digital LCD with indications for measurement values, unit symbols, decimal point, polarity, over range, and low battery ; etc.

(10). RS-232 PC Interface Jack

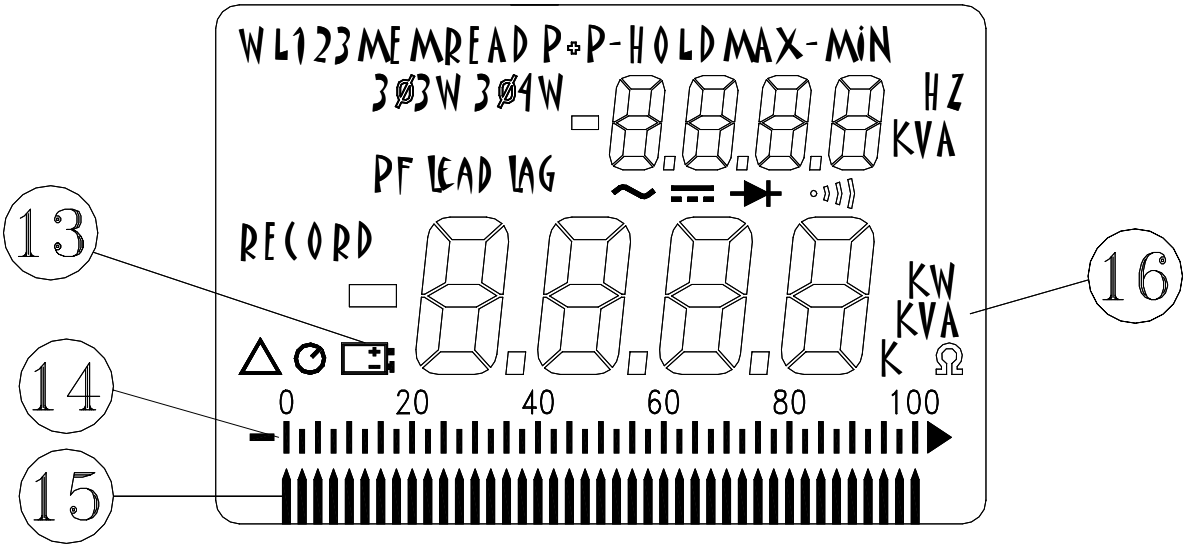
To connect the RS-232 interface to the PC and meter.

(11). COM Jack

Connect black test lead for voltage, frequency, resistance, continuity and diode measurement as a negative terminal.

(12). " V• Hz " Jack

Connect red test lead for voltage, frequency, resistance, continuity and diode measurement as a positive terminal.



(Figure-2)

(13). Low Battery:

As battery power is not sufficient . Will be displayed as a symbol of low battery.

(14). Analog Display Scale.

(15). Analog Display.

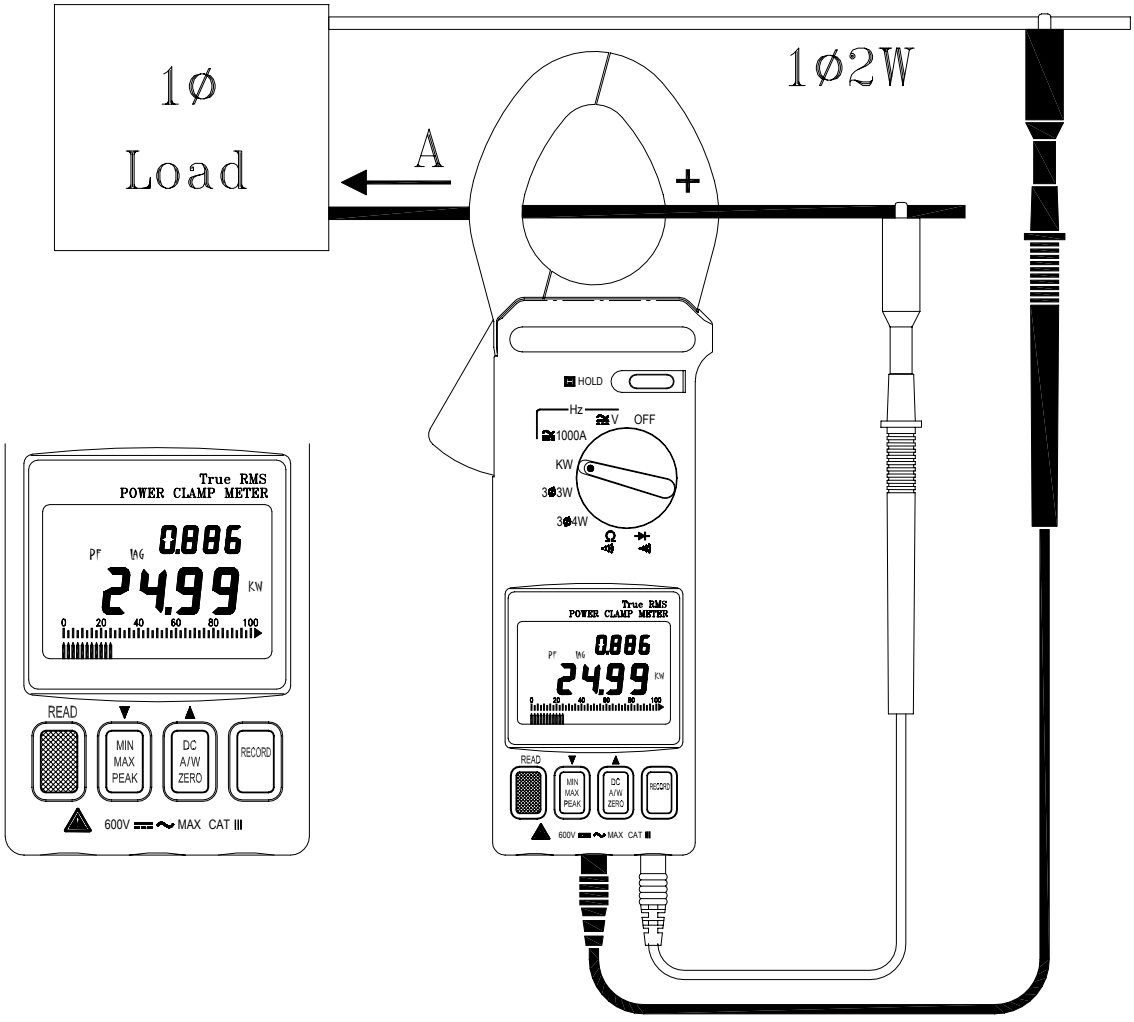
(16). Units Symbols.

IV. AC+DC POWER MEASUREMENT

WARNING

Wait until "- - - -" symbol is shown on LCD before clamping on to any conductor and pressing on the ZERO button to zero any residual magnetic field in the jaws.

4-1 AC+DC 1ϕ2W Power(W) and Power Factor (PF) Measurement



(Figure-3)

① Turn the clamp on with the jaws clamped on to no conductor.

② Set the rotary switch to KW (refer to figure 3).

③ Insert the test leads into the input terminals.

④ Connect the test probe of COM (black) terminal to the neutral line.

⑤ Connect the test probe of V (red) terminal to the power line.

⑥ Clamp the conductor where V (red) terminal is connected.

⑦ The power clamp will automatically select the appropriate range.

⑧ Read the Watt and PF values displayed on the LCD.

⑨ Press YELLOW button to select KW/PF, A/V, or KVA/PF.

⑩ KVAR is a calculated value, and its accuracy greatly depends on the accuracy of V, A and KW especially when PF is very close to 1. To get a more accurate value when PF is greater than 0.91 (ϕ < 25°), users can obtain KVAR by themselves from the following equation for pure sine wave input :

$$PF = \frac{KW}{KVA}$$

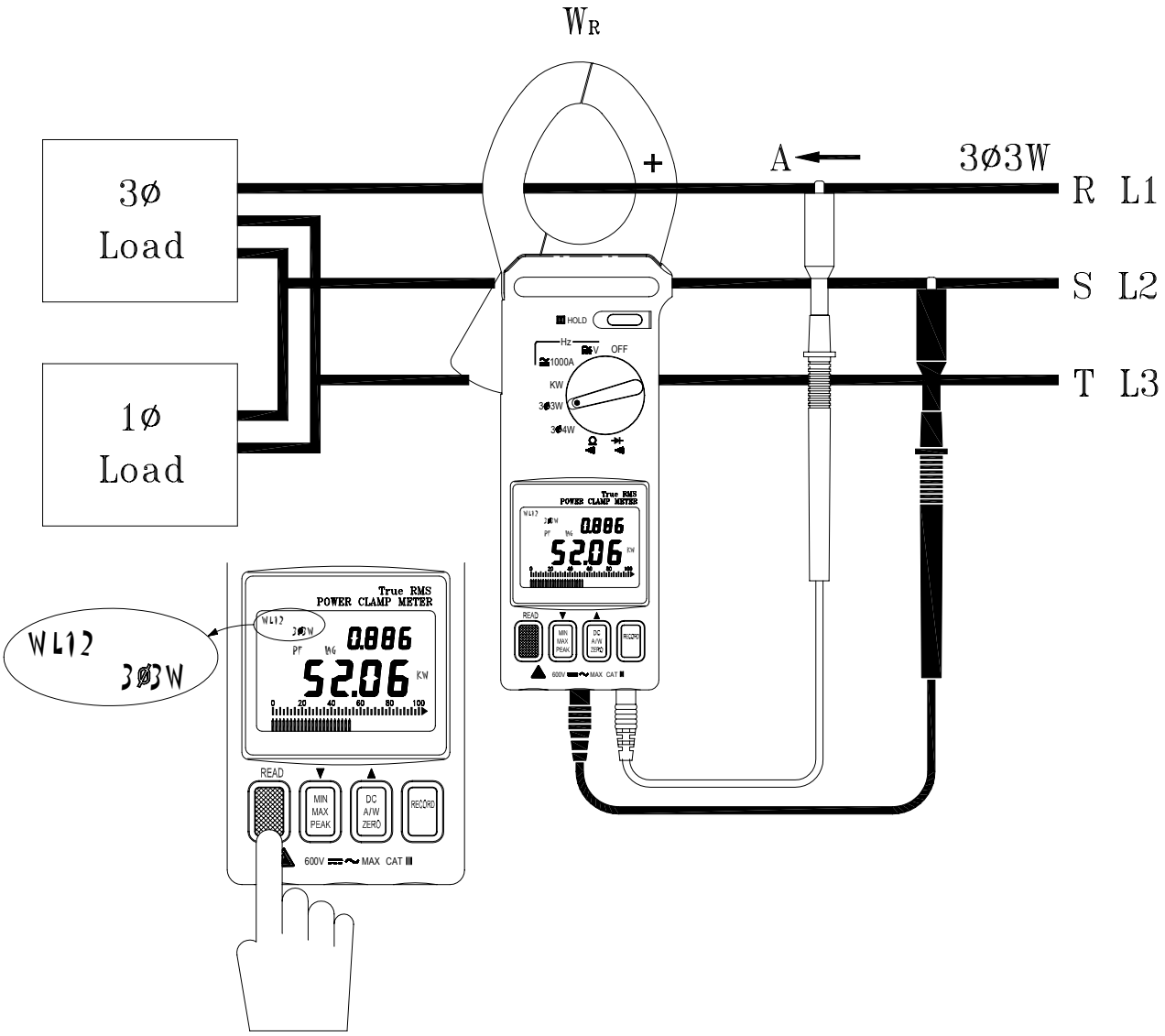
KVA (Apparent Power) : $KVA = \frac{V * A}{1000}$

KVAR (Reactive Power) : $KVAR = \sqrt{(KVA)^2 - (KW)^2}$

NOTE

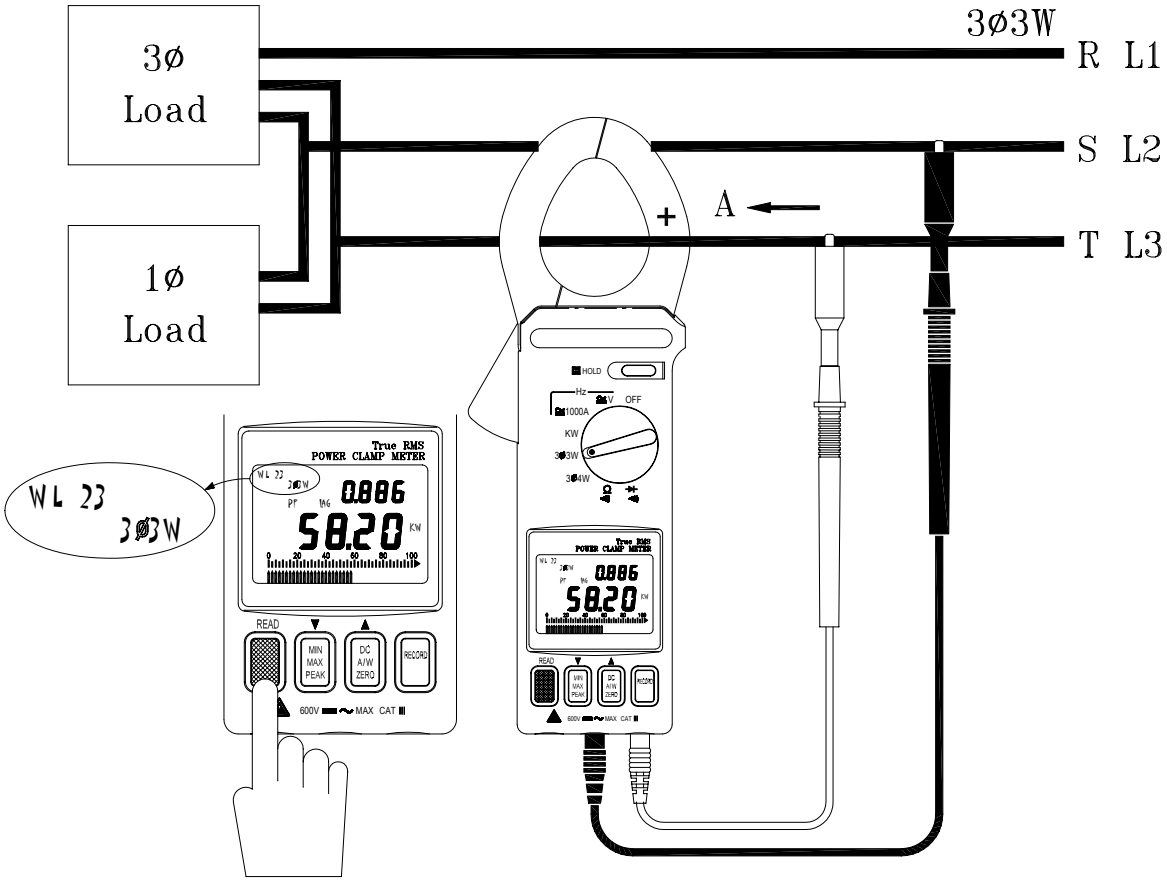
The "+" sign printed on jaw must face the power source for accurate measurement.

4-2 3ϕ3W AC+DC Power Measurement

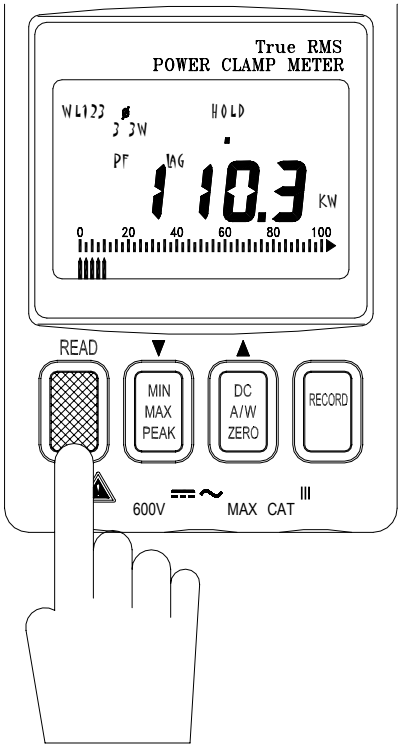


(Figure-4)

W_T



(Figure-5)



(Figure-6)

① First, measure $W_{RS(L1L2)}$ (refer to figure 4).

a. Turn the power on without clamping to any wire.

b. Set the rotary switch at 3ϕ3W, and W_{L12} symbol will appear to instruct users to take measurement of $W_{RS(L2L1)}$.

c. Insert the test leads into the input jack.

d. Select one phase (eg. S or L2) as COM and connect the test probe of the COM (black) terminal to that phase (eg. S or L2).

e. Connect the test probe of V (red) terminal to the second phase (eg. R or L1).

f. Clamp the same phase as step e. (eg. R or L1).

g. The power clamp will automatically select proper range.

h. Wait until the reading is stable (about 3~6 seconds), press the YELLOW button and W_{L23} symbol will appear to instruct users to take measurement of W_{TS} (W_{L3L2}).

② Second, measure $W_{TS(L3L2)}$ (refer to figure 5).

a. Disconnect the test probe from the phase where jaws is clamp on in previous measurement.

b. Connect the test probe to the third phase (eg. T or L3).

c. Camp the third phase where test probe is connected to (eg. T or L3)

d. The power clamp will automatically select proper range.

e. Wait until the reading is stable (about 3~6 seconds), press the YELLOW button.

③ The power clamp will process those two sets of data (W_{L12}, W_{L23}), and show the result on the LCD. W_{L123} symbol will be shown to indicate the watt of 3ϕ3W power.
At this moment, the watt of 3ϕ3W power is stored into the memory.

④ If willing to read the details of that singly data record, please refer to 5-9.

⑤ $W_{3\phi 3W} = W_{RS(L1L2)} + W_{TS(L3L2)}$

$$KVA_{3\phi 3W} = \sqrt{KW^2{}_{3\phi 3W} + KVAR^{\ 2}{}_{3\phi 3W}}$$

$$PF_{3\phi 3W} = \frac{KW_{3\phi 3W}}{KVA_{3\phi 3W}}$$

⑥ If willing to record data (W_{L12} or W_{L23}), press “RECORD” button to complete.

NOTE

Once a phase is selected as COM, users can not change this selection in the subsequent measurement. For example, if S (or L2) phase is selected, S (or L2) phase is always connected to the COM during measurement of W_{RS} (or W_{L1L2}) and W_{TS} (or W_{L3L2}) in 3ϕ 3W unbalanced power.

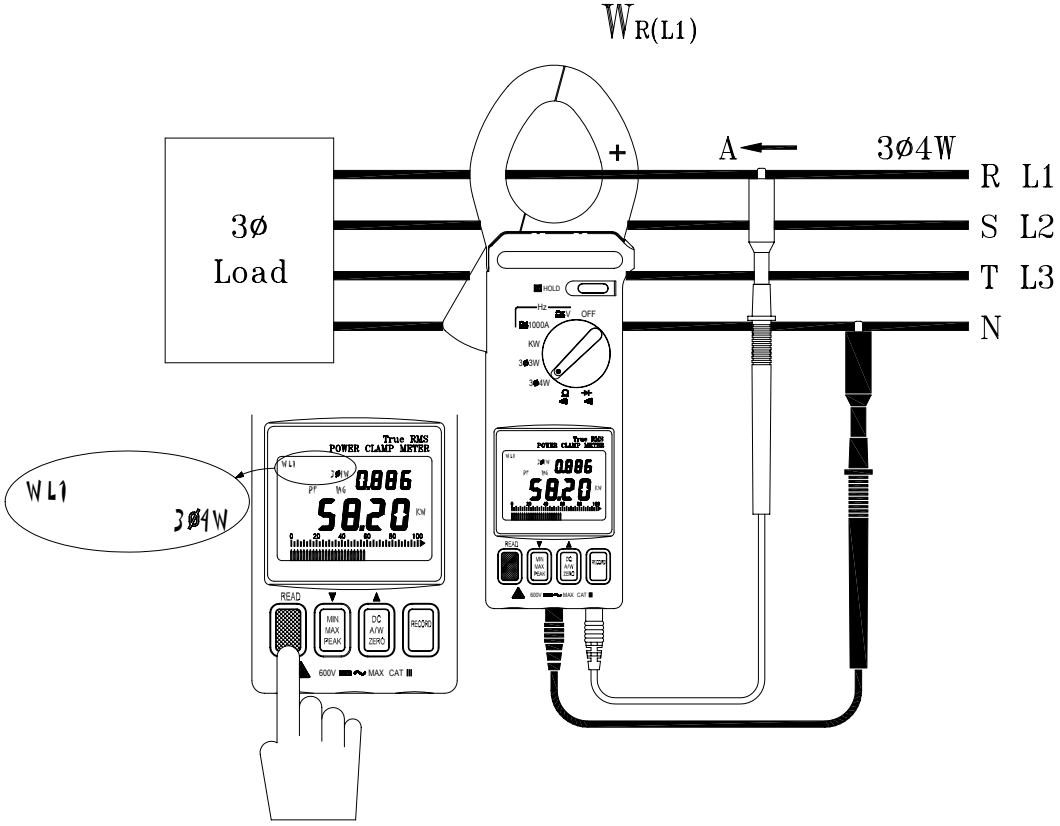
NOTE

The "+" sign printed on jaw must face the power source, and make sure all the connections and clamping are correct for correct measurement.

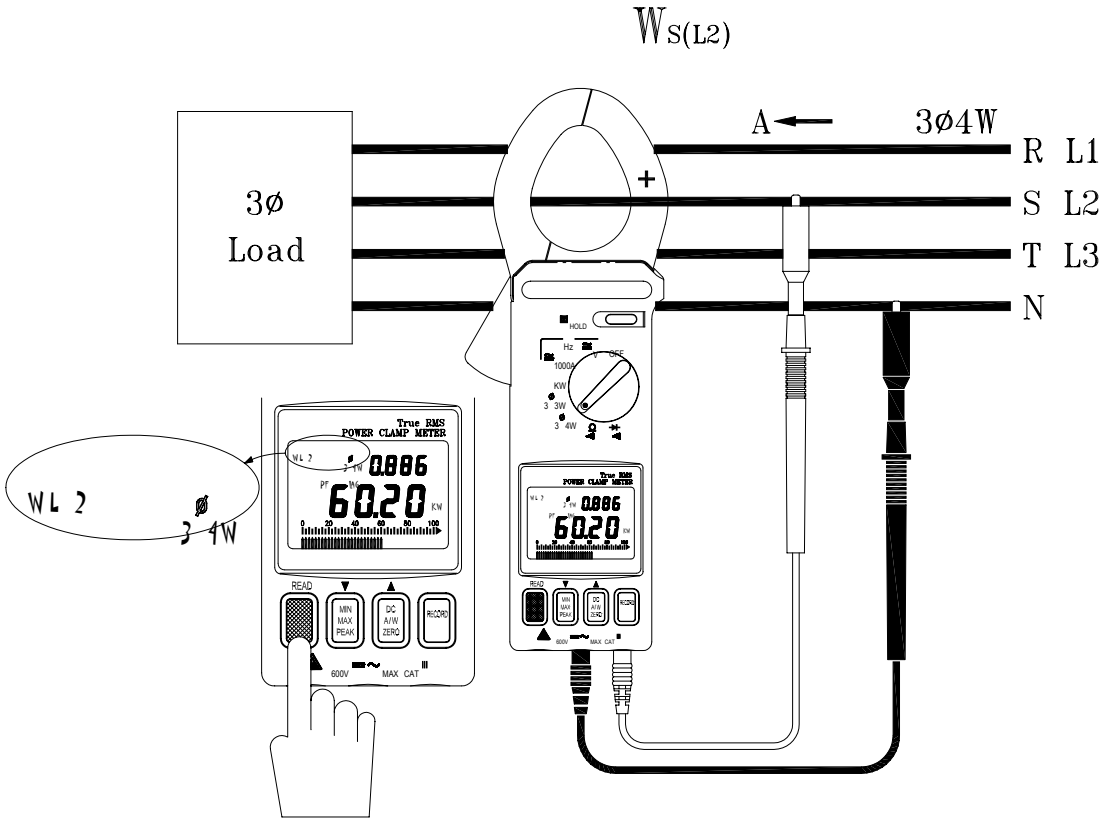
NOTE

In the 3ϕ3W unbalanced power measurement, one of W_{RS} or W_{TS} could be negative. Users must make sure all the connections and clamping are correct to obtain correct power.

4-3 3ϕ4W AC+DC Power Measurement

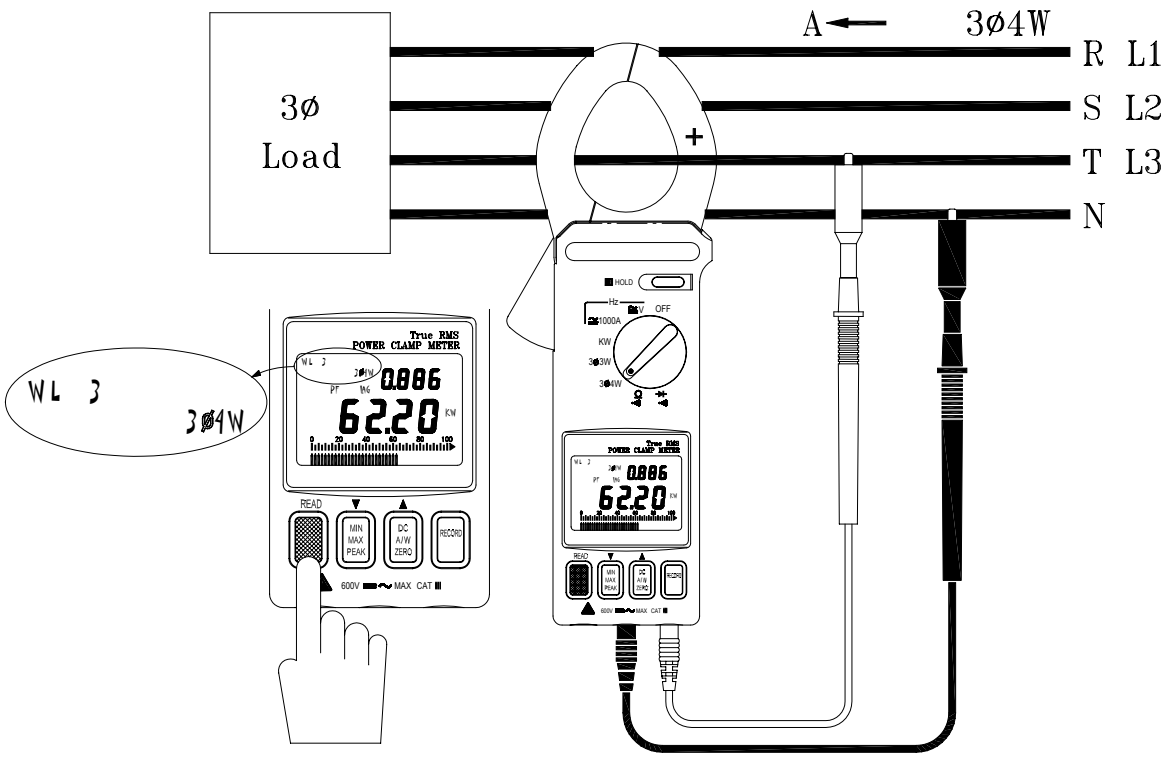


(Figure-7)

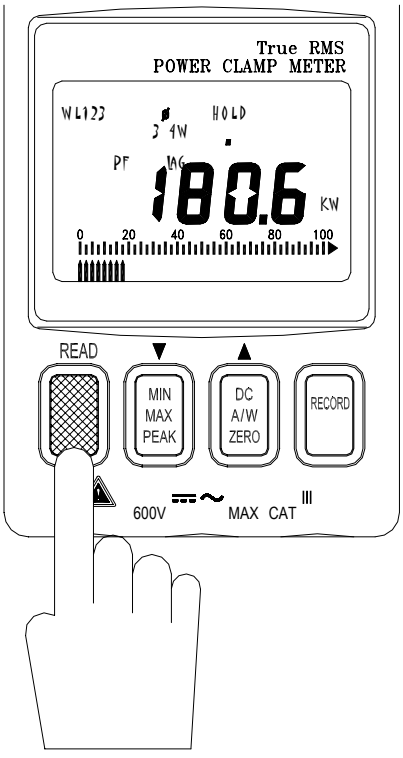


(Figure-8)

$W_{T(L3)}$



(Figure-9)



(Figure-10)

① First, measure $W_{R(L1)}$ /$PF_{R(L1)}$ (refer to figure 7).

a. Turn the power on without clamping on to any wire.

b. Set the rotary switch at $3\phi 4W$.

c. Insert the test leads into the input jack.

d. Connect the neutral line to the COM (black) terminal.

e. Connect the test probe of the V (red) terminal to the first phase (eg. R or L1).

f. Clamp on to the same phase (eg. R or L1).

g. The power clamp meter will automatically select proper range.

h. Wait until the reading is stable (about 3~6 seconds), press the YELLOW button, and W_{L1} symbol will disappear. and W_{L2} symbol appears to instruct users to take measurement of $W_{S(L2)}$/$PF_{S(L2)}$.

② Second, measure $W_{S(L2)}$/$PF_{S(L2)}$ (refer to figure 8)

a. Disconnect the test probe from the phase where jaws is clamp on in previous measurement.

b. Connect the test probe of the V (red) terminal to the second phase (eg. S or L2).

c. Clamp the phase where test probe is connected to (eg. S or L2 phase)

d. The power clamp will automatically select proper range.

e. Wait until the reading is stable (about 3~6 seconds), press the YELLOW button, and W_{L2} symbol will disappear. W_{L3} symbol will appear to instruct users to take measurement of $W_{T(L3)}$/$PF_{T(L3)}$.

③ Third, measure $W_{T(L3)}$/$PF_{T(L3)}$ (refer to figure 9)

a. Disconnect the test probe from the phase where jaws clamped in previous measurement.

b. Connect the test probe of the V (red) terminal to the third phase (eg. T or L3 phase).

c. Clamp the phase where test probe is connected to (eg. T or L3).

d. The power clamp will automatically select proper range.

e. Wait until the reading is stable (about 3~6 seconds), press the YELLOW button, and W_{L3} symbol will disappear.

④ The power clamp will process these three sets of data ($W_{L1,}$ W_{L2} W_{L3}) and show the result on the LCD. WL_{123} symbol will be shown to indicate the watt of 3ϕ4W power (refer to figure 10). At this moment, the of 3ϕ4W power are stored in the memory.

⑤ If willing to read the details of that singly data record, please refer to 5-9.

⑥ $W_{3\phi 4W} = W_{R(L1)} + W_{S(L2)} W_{T(L3)}$

$$KVA_{3\phi 4W} = \sqrt{KW^2{}_{3\phi 4W} + KVAR^{\,2}{}_{3\phi 4W}}$$

$$PF_{3\phi 4W} = \frac{KW_{3\phi 4W}}{KVA_{3\phi 4W}}$$

⑦ If willing to record data ($W_{L1,}$ W_{L2} or W_{L3}), press “RECORD” button to complete.

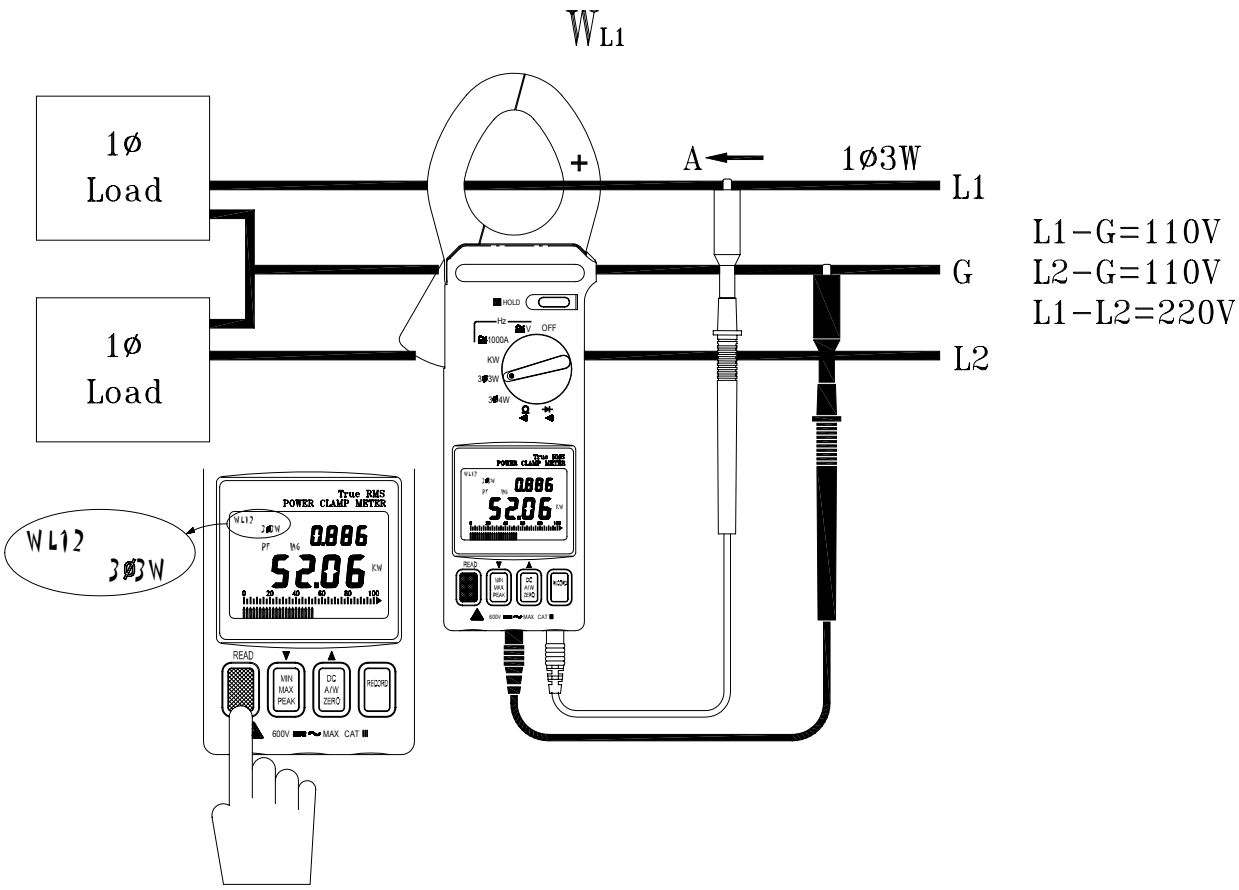
NOTE

The "+" sign printed on jaw must face the power source. Make sure all the connections and clamping are correct for correct measurement.

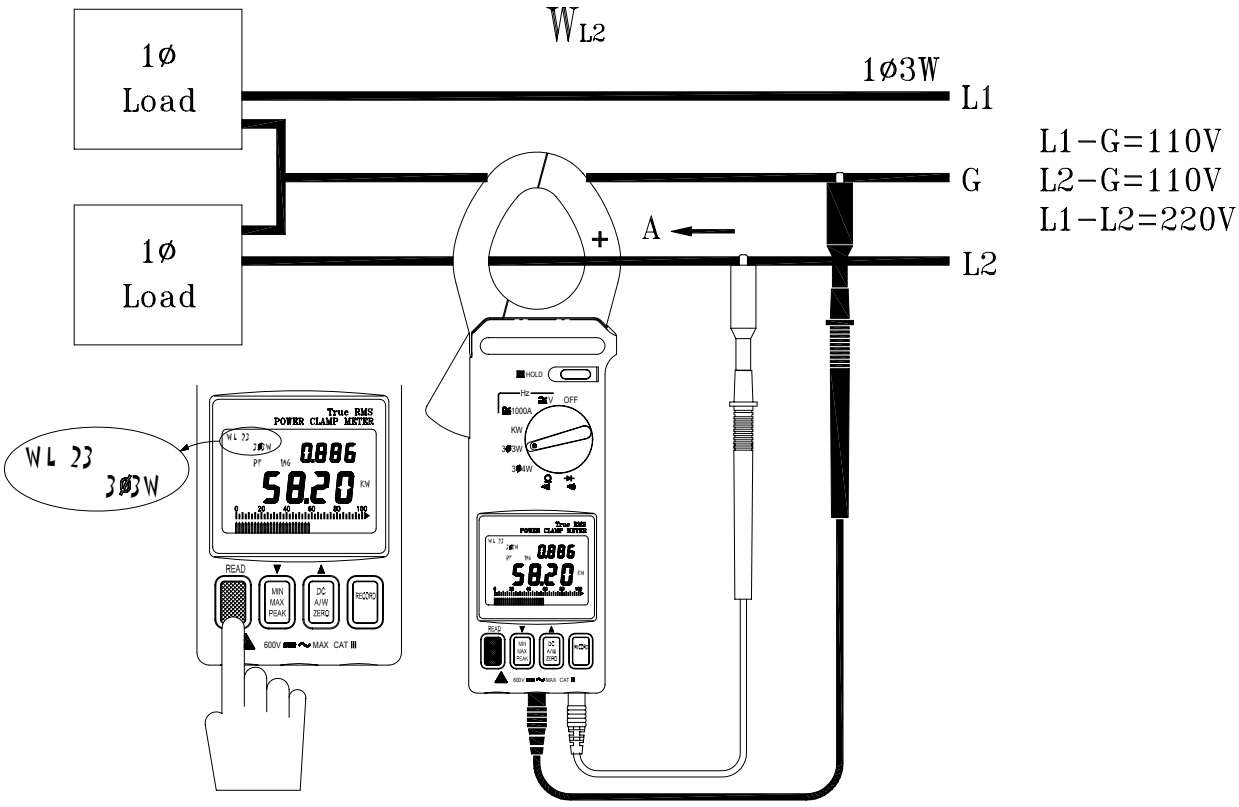
NOTE

In the 3ϕ4W power measurement, all three W_R or W_S and W_T must be positive. If users find one negative power, check the connection of test leads and clamping of jaw. Make sure all the connections and clamping are correct to obtain correct power.

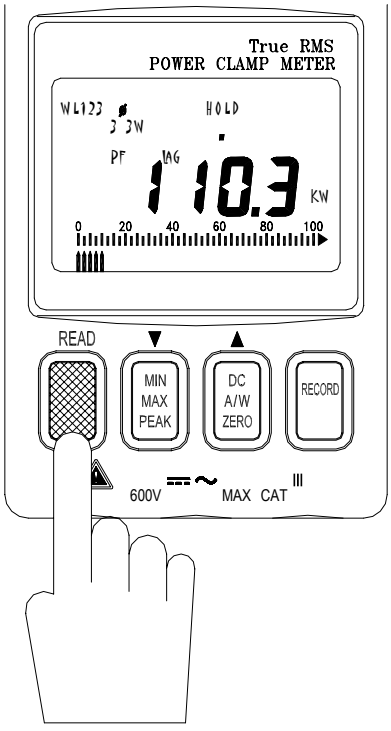
4-4 1ϕ3W Power Measurement


WL1
1ø
Load
1ø
Load
+
A
1ø3W
L1
G
L2
L1−G=110V
L2−G=110V
L1−L2=220V
WL12
3ø3W
True RMS
POWER CLAMP METER
0.886
52.06
KW
READ
MIN
MAX
PEAK
DC
A/W
ZERO
RECORD
600V MAX CAT III
HOLD
OFF

(Figure-11)



(Figure-12)



(Figure-13)

$1\phi 3W$ power measurement is similar to $3\phi 3W$ unbalanced power measurement except the nomenclature is different.

① Two measurements of $W_{RS(L1G)}$ and $W_{TS(L2G)}$ are required.

② First, measure $W_{RS(L1G)}$ (refer to figure 11).

a. Turn the power on without clamping to any wire.

b. Set the rotary switch at $3\phi 3W$.

c. Insert the test leads into the input jack.

d. Connect the test probe of the COM (black) terminal to ground.

e. Connect the test probe of V (red) terminal to the second phase (eg. L1).

f. Clamp the same phase as step e. (eg. L1).

g. The power clamp will automatically select proper range.

h. Wait until the reading is stable (about 3~6 seconds), press the YELLOW button, and W_{L23} symbol will appear to instruct users to take measurement of $W_{TS(L2G)}$.

③ Second, measure W_{TS} (or W_{L2G}) (refer to figure 12).

a. Disconnect the test probe from the phase where jaws clamped in the previous measurement.

b. Connect the test probe to the L2 line.

c. Clamp the L2 line where test probe is connected to.

d. The power clamp will automatically select proper range.

e. Wait until the reading is stable (about 3~6 seconds), press the YELLOW button.

④ The power clamp will add the two values together and show the result on the LCD. At this moment the watt of $1\phi 3W$ power is stored in the memory.

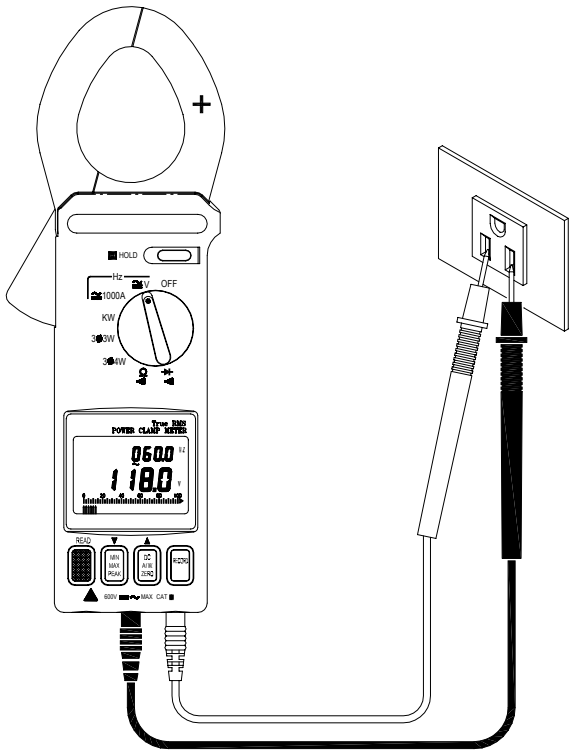
$W_{1\phi 3W} = W_{RST} = W_{RS(L1G)} + W_{TS(L2G)}$

⑤ If willing to read the details of that singly data record, please refer to 5-9.

⑥ If willing to record data (W_{L1G} or W_{L2G}), press “RECORD” button to complete.

V. OPERATING INSTRUCTION

5-1 AC+DC Voltage Measuremen



(Figure-14)

WARNING: Maximum input is 600V. Do not attempt to take any voltage measurement that exceeds these limits. Exceeding these limits could cause electrical shock and damage to the clamp meter.

① Set the rotary switch to V (refer to figure 14).

② Insert the test leads into the input terminal.

③ Connect the test probes of the test leads in PARALLEL to the circuit to be measured.

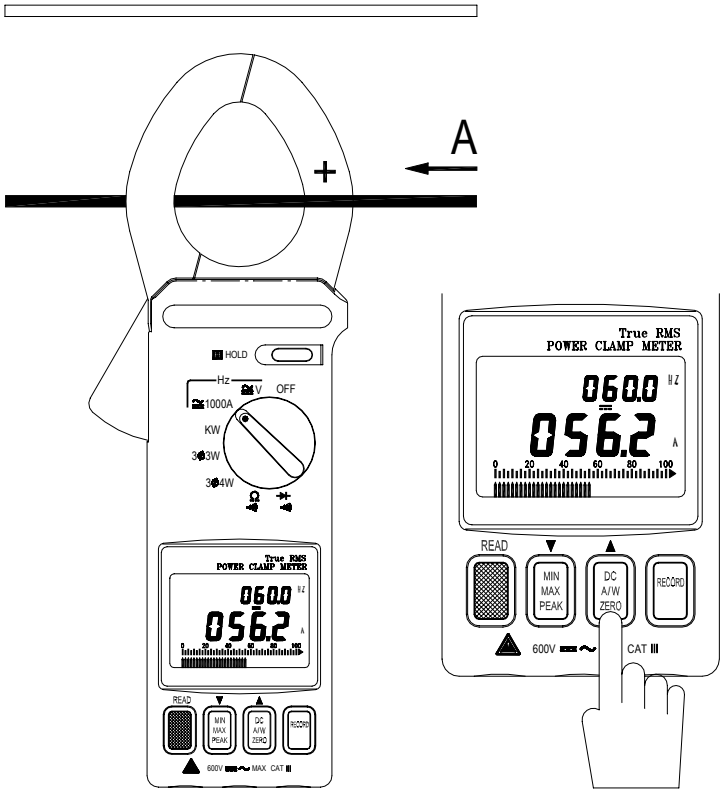
④ The clamp will automatically select the appropriate range.

⑤ Read the voltage and frequency values displayed on the LCD.

NOTE

The sensitivity for voltage frequency measurement is 10V, and the frequency range is 45 - 500Hz. If the frequency is less than 45 Hz, the LCD will show -.- Hz.

5-2 AC+DC Current Measurement



(Figure-15)

① Set the rotary switch at A (refer to figure 15).

② Press the ZERO button once to zero the reading and LCD will show “- - - -” sign.

③ Press the trigger to open the jaw and fully enclose the conductor to be measured. No air gap is allowed between the two jaw halves.

④ The clamp will automatically select the appropriate range.

⑤ Read the current and frequency values displayed on the LCD.

NOTE

The sensitivity for current frequency measurement is 10A, and the frequency range is 45 - 500Hz. If the frequency is less than 45 Hz, the LCD will show -.- Hz.

5-3 To Improve Power Factor of a 3φ4W Power System

① Calculate $KVAR_{R(L1)}$, $KVAR_{S(L2)}$, and $KVAR_{T(L3)}$ values of each phase.

② Based upon the calculated values, users can purchase required 3φ or 1φ capacitor at rated voltage and frequency to improve power factor.

③ If value of capacitance is needed, users can obtain the value by the following equation.

Where

$$\text{Capacitance (Farad)} = \frac{KVAR * 1000}{2\pi f V^2}$$

f: frequency in Hz, V: phase voltage

④ It is recommended that the KVAR value of the capacitor should be a little less than the value measured.

5-4 To Improve Power Factor of a 3φ3W Power System

① Calculate $KVAR_{3\phi}$ value of a balanced system.

② Based upon the calculated value, users can purchase required 3φ capacitor at rated voltage and frequency to improve power factor.

③ If value of capacitance is needed, users can obtain the value by the following equation.

$$\text{Capacitance (Farad)} = \frac{KVAR * 1000}{2\pi f V^2}$$

where

f : frequency in Hz, V: line voltage

④ It is recommended that the KVAR value of the capacitor should be a little less than the value measured.

5-5 To Improve Power Factor of a 1φ2W Power System

① Calculate KVAR value of a 1φ2W power system.

② Based upon the calculated value, users can purchase required capacitor at rated voltage and frequency to improve power factor.

③ If value of capacitance is needed, users can obtain the value by the following equation.

$$\text{Capacitance (Farad)} = \frac{KVAR * 1000}{2\pi f V^2}$$

where

f : frequency in Hz, V: line voltage

④ It is recommended that the KVAR value of the capacitor should be a little less than the value measured.

5-6 Resistance & Continuity Measurement

WARNING

Before taking any in circuit resistance measurement, remove power form the circuit being tested and discharge all capacitors.

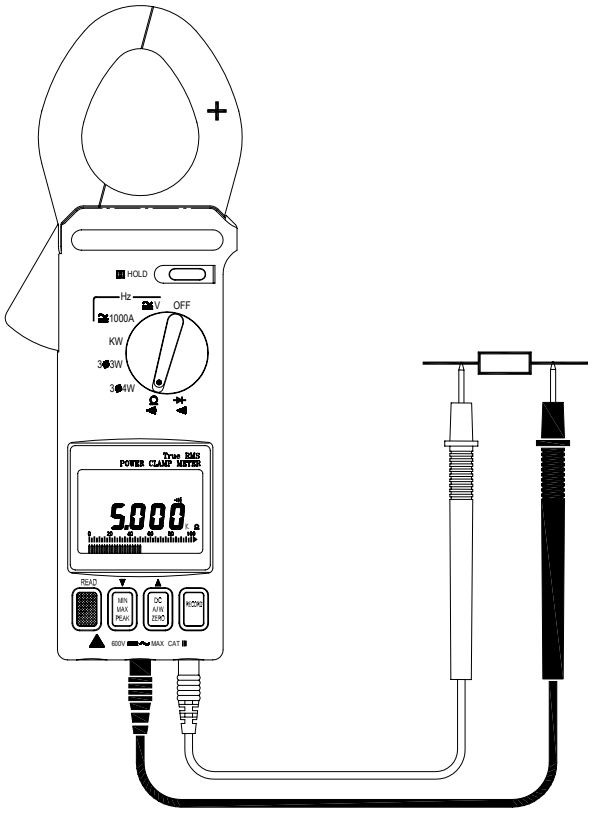
① Before taking resistance measurements, make sure the circuit is not live and discharge any capacitors present in the circuit.

② Set the function switch to • range.

③ Connect the black test lead to the COM terminal and the red test lead to the • terminal.

④ Connect the test leads to the circuit being measured and read the displayed value.

⑤ When the reading is below 50•, it will be indicated by a continuous beeping.



(Figure-16)

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

5-7 Diode Test & Continuity Measurement

① Connect red test lead to the " • " terminal and black test lead to the " COM" terminal.

② Set range switch to the diode test position " ⊣◀ " .

③ Connect the red test lead to the anode side and black test lead to the cathode side of the diode being tested.

④ Read forward voltage (Vf) value on LCD.

⑤ If the test leads is connected rather than procedure(4), the digital reading should nearly equal to the reading in the open circuit condition. This can be used for distinguishing anode and cathode poles of a diode.

⑥ When the reading is below 0.050V, it will be indicated by a continuous beeping.

5-8 Peak Detection Measurement

① Set Function / Range Switch to desired •A or •V range.

② Set the clamp Meter into the " PEAK HOLD " mode by pushing the "YELLOW" button. The LCD will display " P+ P- ".

③ Press the “PEAK” button to enter PEAK mode. LCD will display “P+ MAX” or “P- MIN”. The “PEAK” button is toggle selector the P+ and P- value.

④ Press the “PEAK” button for two seconds to exit the PEAK mode.

⑤ Follow this procedure for AC Voltage and current measurement.

The displayed reading is the positive peak value or negative peak value of a surge in current or a voltage transient pulse.

Because the surge transient pulse is usually asymmetric.

5-9 Operation Of Data Record And Read

① Singly Data Record

The clamp meter can store 25 data record in memory. Once the button is pressed, the data number and RECORD symbol will be shown on LCD. If the memory is full, the FULL signal will be shown on LCD when the record button is pressed.

② Singly Data Record

Press “Yellow” button until the READ symbol shown on LCD, then Press “•” button to read previous data. Press “•” button to read next data. Press “Yellow” button again to exit.

③ Continue Data Record

The full memory size got 4000 records. To start recording data, press the RECORD button until 2 “beep” sounds heard and “RECORD” symbol will be shown on LCD. To stop recording data, press the RECORD button again until the RECORD symbol disappears.

④ Continue Data Record

With the connection of RS-232 interface & computer P.C. software.

⑤ Clear data logger

To clear the memory of the meter, power off the meter, then hold RECORD button and then power on it until the LCD shows CLr.

VI. BATTERY REPLACEMENT

WARNING

To prevent electrical hazard or shock, turn off clamp meter and disconnect test leads before removing back cover.

① As battery power is not sufficient, LCD will display  . Replacement with one new battery type 9 V is required.

② Set Range switch to OFF position.

③ Use a screwdriver to unscrew the screw secured on back cover. Take out the batteries and replace with one new battery Type 9V.

④ Place back cover and secure by a screw.