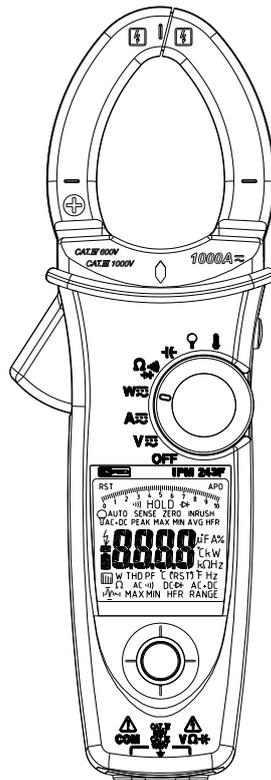




# Instruction Manual IPM 240F Series Power Clamp Meters

EN



## SECTION 1 –SAFETY INFORMATION

### **Safety Information**

Understand and follow operating instructions carefully.

Use the meter only as specified in this manual; otherwise, the protection provided by the meter may be impaired.

### **WARNING**

Identifies hazardous conditions and actions that could cause **BODILY HARM** or **DEATH**

### **CAUTION**

Identifies conditions and actions that could **DAMAGE** the meter or equipment under test

### **WARNING**

- Examine the instrument and probes before use. Do not use the instrument if it is wet or damaged
- When using test leads or probes, keep your fingers behind the finger guards.
- Remove the test lead from the instrument before opening the battery cover or instrument case.
- Always use the correct terminals, switch position and range for measurements.
- Never attempt a voltage measurement with the test leads inserted into the “A” input terminals.
- Verify the instrument is operating correctly by measuring a known voltage before use. If in doubt, have the instrument serviced.
- Do not apply more than the rated voltage, as marked on the instrument, between terminals or between any terminal and earth ground.
- Do not attempt a current measurement when the open-circuit voltage is above the fuse protection rating.
- Only replace a fuse with the correct type and rating as specified in this instruction manual.
- Use caution when measuring voltages above 30 Vac rms or 60 Vdc. These voltages pose a shock hazard.
- To avoid incorrect readings that can lead to electric shock, replace the battery as soon as the low battery indicator appears in the display.
- Disconnect the circuit power and discharge all high-voltage capacitors before making resistance, current, continuity, diode or capacitance measurements.
- Do not use the instrument in a hazardous area or around explosive gasses or vapours.
- Wear suitable personal protective equipment when working around or near hazardous live conductors which could be accessible.
- Probe assemblies to be used for MAINS measurements shall be RATED as appropriate for MEASUREMENT CATEGORY III or IV according to EN 61010-031 and shall have a voltage RATING of at least the voltage of the circuit to be measured.

## CAUTION

- Disconnect the test leads from the test points before changing the position of the function rotary switch.
- Never connect a source of voltage with the function rotary switch in the  $\Omega$ ,  $\overleftarrow{\ominus}$  nor  $\text{⏏}$  position.
- Do not expose the meter to extremes in temperature or high humidity.
- Never set the meter in  $\Omega$ ,  $\overleftarrow{\ominus}$  nor  $\text{⏏}$  function to measure the voltage of a power supply circuit in equipment that could result in damage to the meter and the equipment under test.

## Symbols as marked on the Meter and Instruction

	Risk of electric shock
	See instruction manual
	DC measurement
	Equipment protected by double or reinforced Insulation
	Battery
	Earth
	AC measurement
	Conforms to EU directives
	Application around and removal from hazardous live conductors is permitted
	Dispose of in accordance with local regulations.

## Unsafe Voltage

When the voltage measurement function “V” is selected, the “” symbol is displayed to indicate the presence of a potentially hazardous voltage, when the tester detects a voltage  $\geq 30$  V or a voltage overload (OL)

## Maintenance

Do not attempt to repair this meter. It contains no user serviceable parts. Repair or servicing should only be performed by qualified personnel.

## Cleaning

Periodically wipe the case with a dry cloth and detergent.  
Do not use abrasives or solvents.

## SECTION 2 - INTRODUCTION

### Features

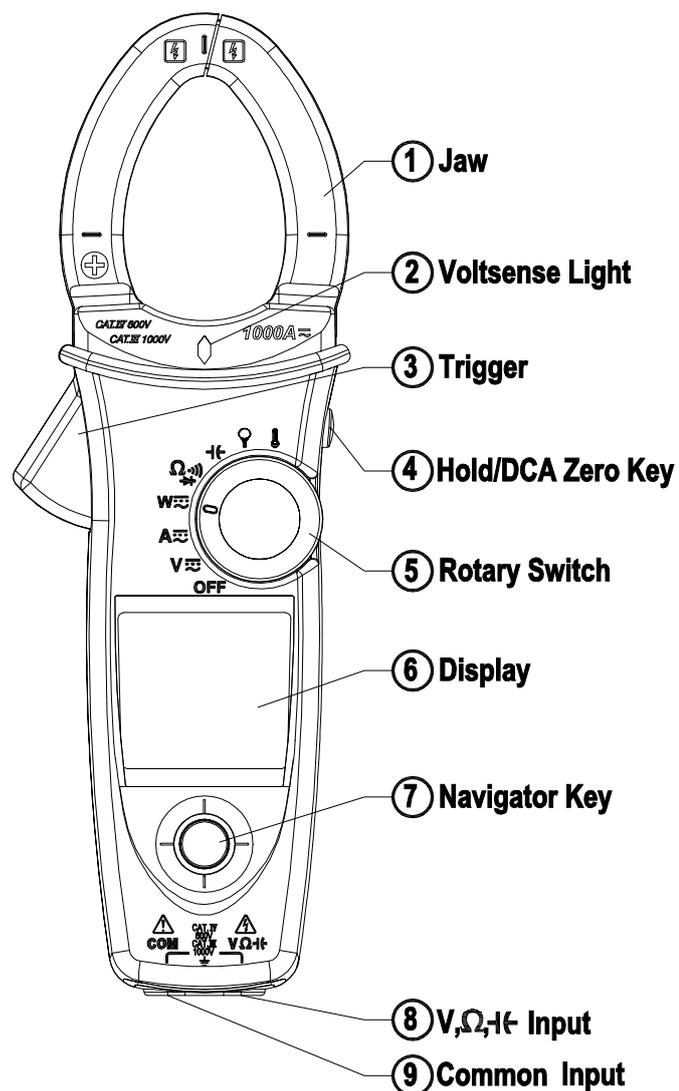
- 10000 count digital display
- Active display backlight and analogue bargraph
- VoltSense (Non contact Voltage)
- Analogue bargraph
- True RMS reading on AC and AC+DC mode
- Auto torch-light when clamp
- Auto AC/DC 1000 Amps capability and selection (For 245F only)
- Auto AC/DC 600 Amps capability and selection (For 243F only)
- Compatible with ISO-TECH ICA10T / ICA18T 3000A AC Flexi Current Probes (available separately)
- Auto AC/DC 1000 Volts capability and selection
- Auto Ohms/Continuity/Diode selection
- 100k $\Omega$  resistance capability
- Continuity beeper
- Frequency counter
- Power and power factor measurement
- Total harmonics distortion and harmonics 1 to 25
- Capacitance capability
- °C / °F temperature measurement function ( For 245F only)
- Inrush current
- DCA Auto-zeroing key (For 243F/245F only)
- Peak HOLD
- MIN/MAX HOLD
- Smart Data HOLD
- Phase rotation indication
- High Frequency Rejection
- Auto power off
- Safety Standard: IEC 61010-1 CAT IV 600V / CAT. III 1000V

## Unpacking and Inspection

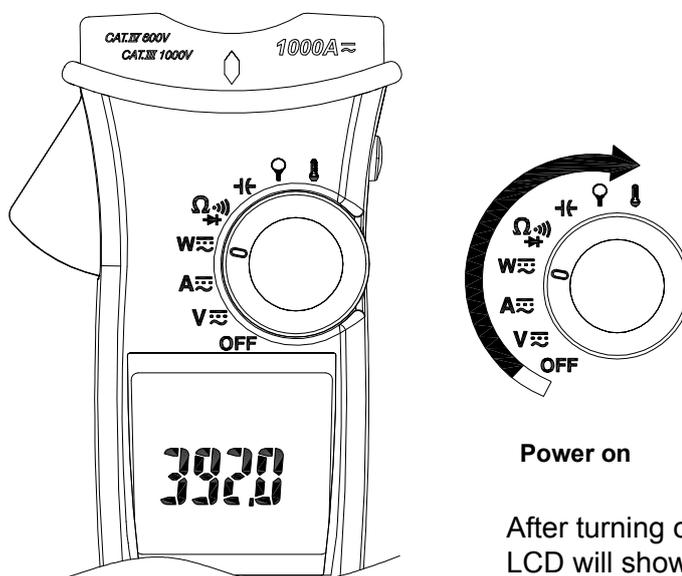
### Contents

1. IPM 240F series power clamp meter
2. Test leads set (one black, one red)
3. Temperature probe (For 245F only)
4. User manual
5. Carrying case
6. 9V alkaline battery (installed)

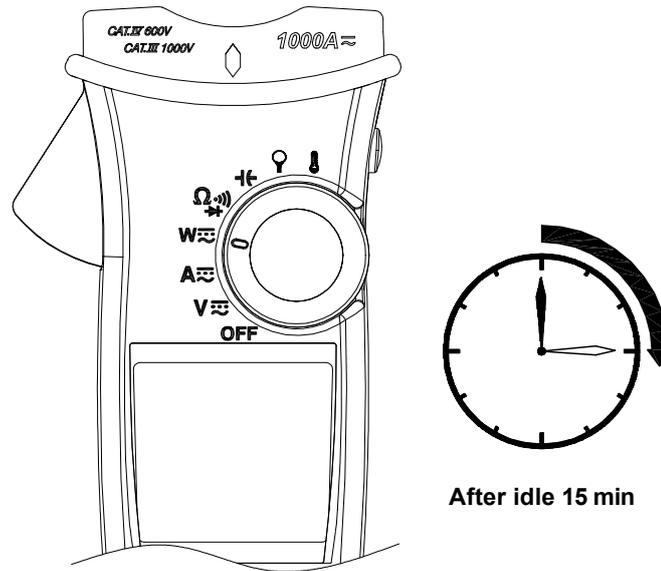
## SECTION 3 – METER DESCRIPTION



### Power On/ Off



## Auto Power Off

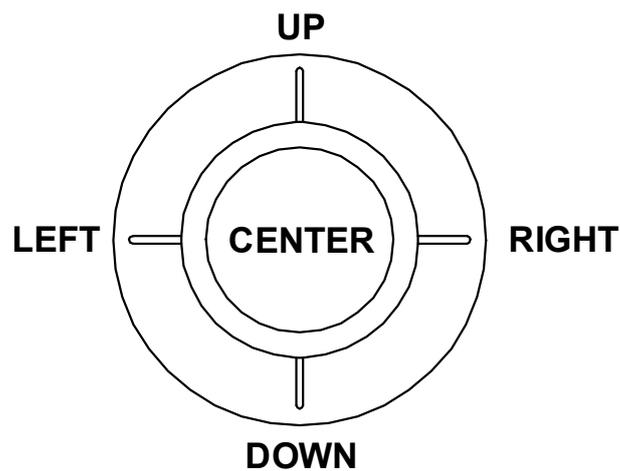


The meter can work again by turning it on from the OFF position.

### **Auto Power Off (APO) disable :**

Press the Navigator key “DOWN” while turning the meter on from the OFF position.

### **Navigator KEY**



The Navigator key has 5 directions of switch on the display, toggle the navigator key to select the desired feature and to activate the feature by a simple click.

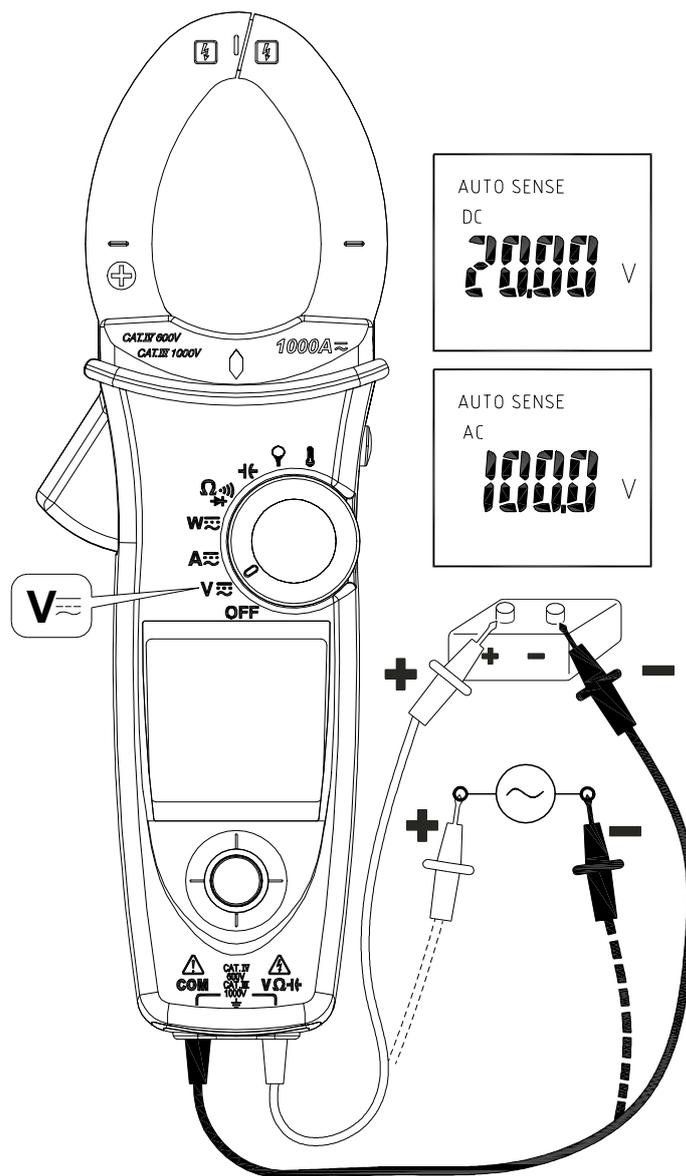
## SECTION 4- MEASUREMENTS

### Making Basic Measurements

Before and after hazardous voltage measurements, test the voltage function on a known source to determine proper meter functioning.

When connecting the test leads to the DUT (Device Under Test) connect the common test lead before connecting the live lead; when removing the test leads, remove the live test lead before removing the common test lead.

### Voltage Measurement



### Warning

To avoid electrical shock, hazard or damage to meter, do not attempt a measurement that might exceed 1000 V DC or AC RMS. Do not apply more than 1000 V DC or AC RMS between the common input terminal and earth ground.

Note - If the measured voltage is greater than 30 V DC or AC RMS, the display will show the "" symbol.



## AUTO SENSE mode :

Display measurement result; AC only with RMS value or DC value, whichever is greater.

**AC mode** : AC only with RMS value.

**DC mode** : DC value.

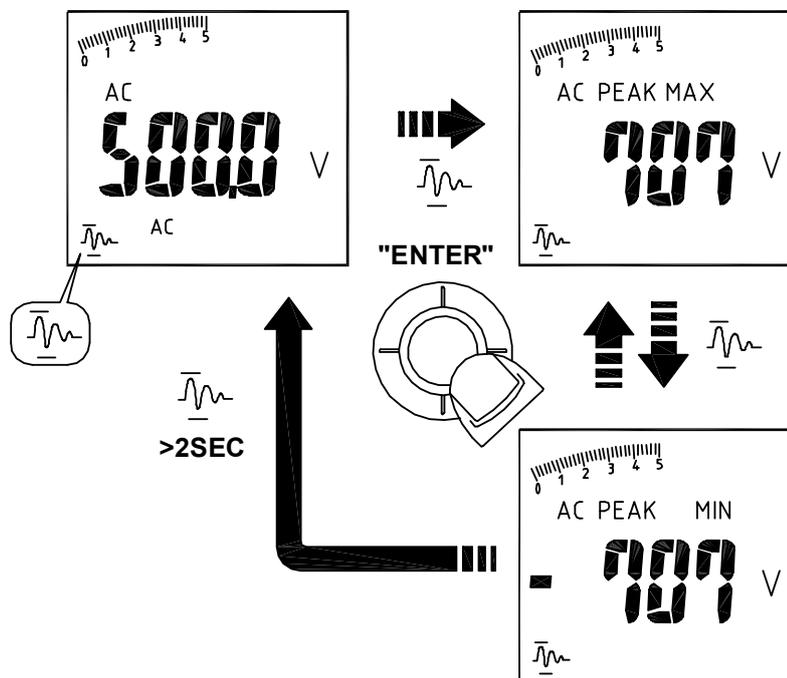
**AC+DC mode** : AC+DC RMS value.

### Note

- Select " AC", " DC" or " AC+DC" indicator then press the navigator key to enter the AC/DC/AC+DC mode.
- Select " AC", " DC" or " AC+DC" indicator then press the navigator key for more than 2 seconds to return to the AUTO SENSE mode.

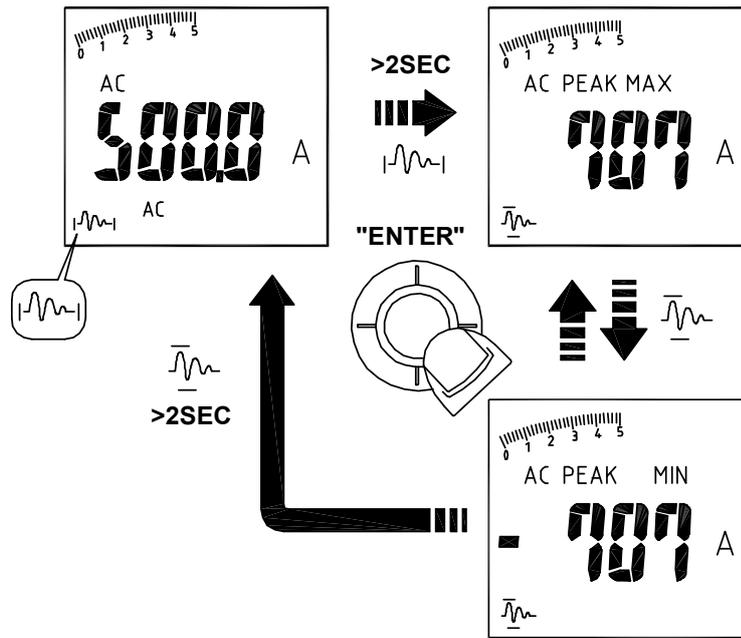
## PEAK HOLD $\bar{V}_m$ (AC mode only)

1. In ACV mode, select " $\bar{V}_m$ " indicator on the display to enter PEAK HOLD mode.  
To exit from PEAK HOLD mode, press the navigator key for more than 2 seconds.



2. In ACA mode, select " $\bar{V}_m$ " indicator then press the navigator key for more than 2seconds to enter PEAK HOLD  $\bar{V}_m$  mode. To exit from PEAK HOLD  $\bar{V}_m$  mode, press the navigator key for more than 2 second to return to the " $\bar{V}_m$ " indicator.

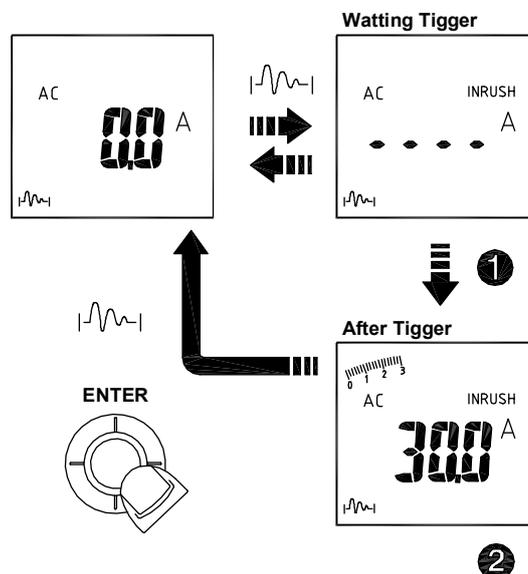
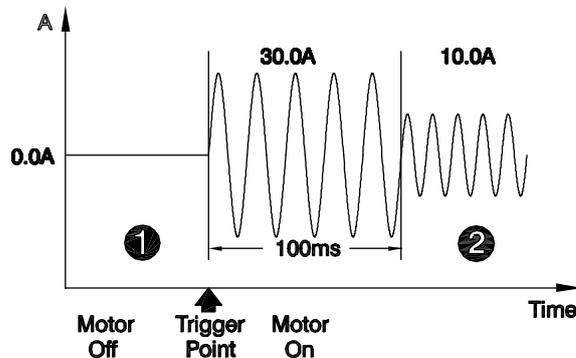
# IPM 240F Series English



In PEAK HOLD mode, the meter is activated to save the positive peak value and the negative peak value. Positive peak value is displayed in PEAK MAX mode. Negative peak value is displayed in PEAK MIN mode.

## Inrush current : (AC mode only)

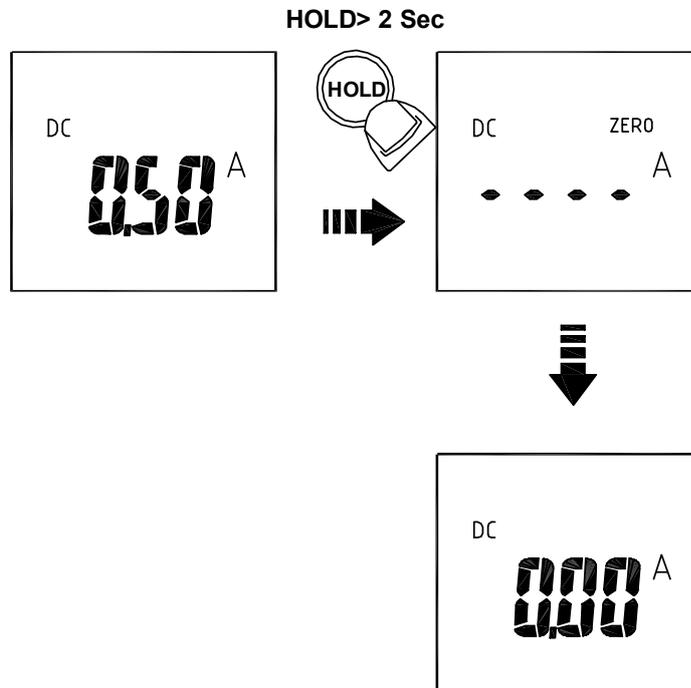
If inrush current during testing could be greater than 100A ac, select the range to 600A/1000A in advance before activating inrush current.



## DCA ZERO (For 243F/245F only)

Remove the current clamp jaws from around the conductor.

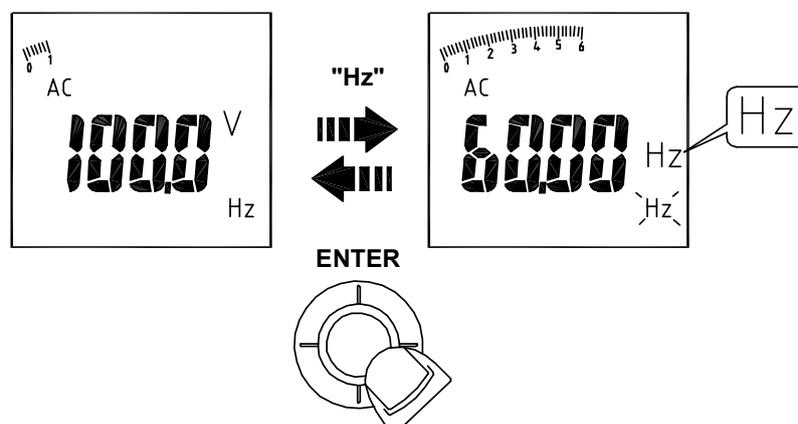
Press HOLD key for greater than 2 seconds to compensate for the residual magnetism.



- DCA Zero is only available in Auto Sense, DC and AC+DC mode.

## Frequency Measurement (AC mode only)

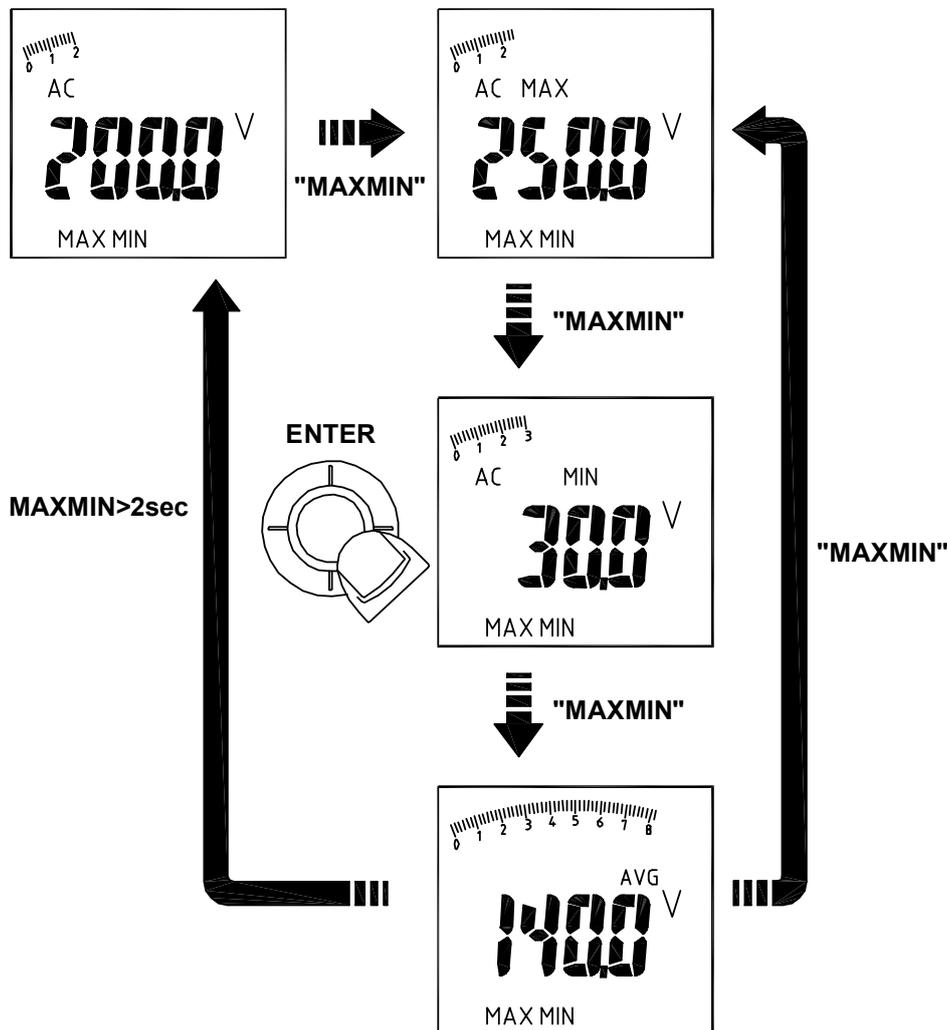
Select the "Hz" indicator then press the navigator key to enter/exit the frequency measurement mode.



## MAX/MIN/AVG

Select the "MAX MIN" indicator then press the navigator key to enter the MAX/MIN/AVG mode. To exit from the MAX/MIN/AVG mode, press the navigator key for more than 2 seconds.

The MAX/MIN/AVG mode records the minimum and maximum input values. When the inputs go below the recorded minimum value or above the recorded maximum value, the meter records the new value. The MAX/MIN/AVG mode can also calculate the average of the maximum value and the minimum value.



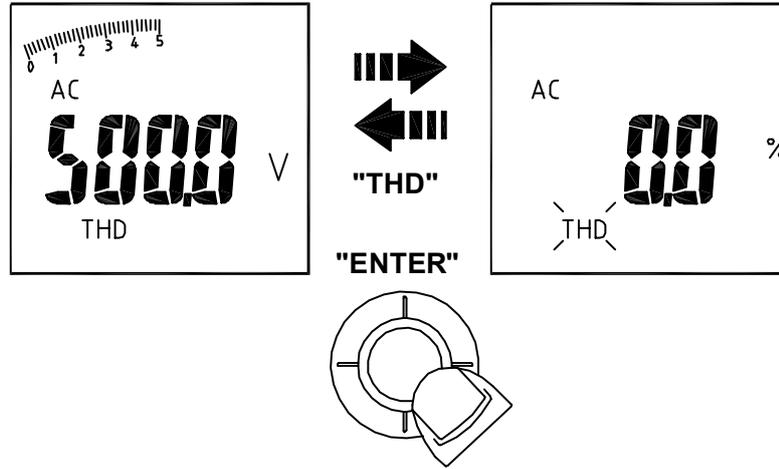
### NOTE :

- Press HOLD key in MAX MIN mode to make the meter stop updating the maximum and minimum value. When the HOLD mode is activated in MAX MIN mode, the HOLD mode must be released before the MAX MIN mode.

## Total Harmonic Distortion Measurement (AC mode only)

Select the "THD" indicator then press the navigator key to enter the THD mode.

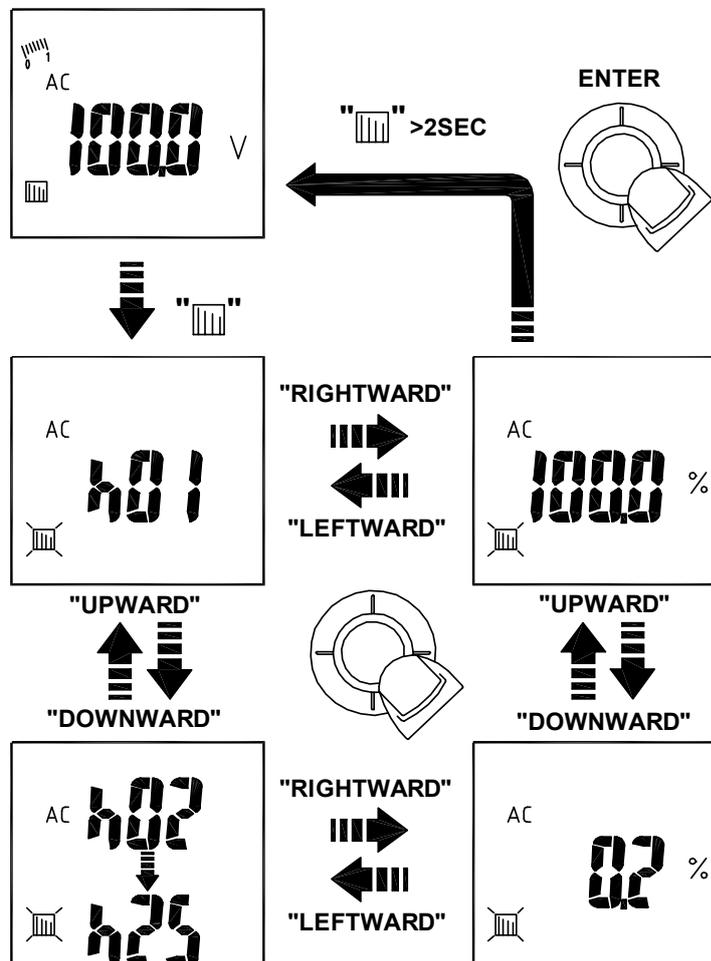
$THD-F = \text{RMS of Harmonics} \div \text{RMS of fundamental} \times 100\%$ . (harmonics up to the 25th)



## Individual Harmonic Measurement (AC mode only)

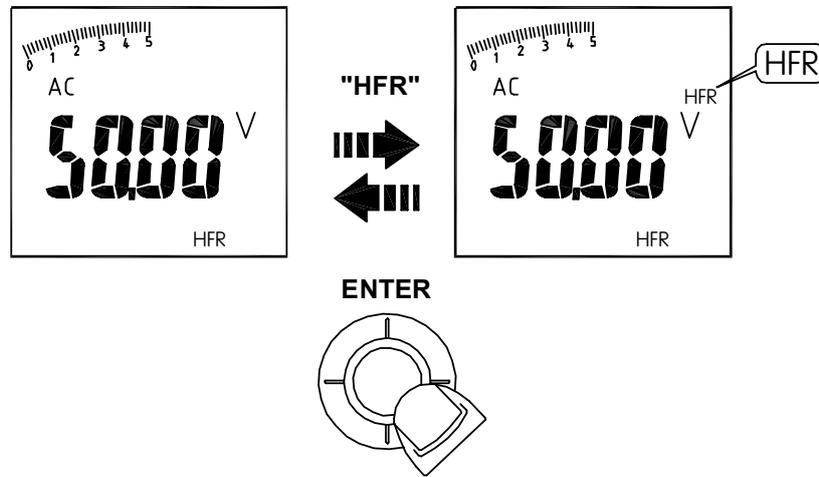
Select the "Hn" indicator then press the navigator key to enter the individual harmonic mode.

To exit from the individual harmonic mode, press the navigator key for more than 2 seconds.  $H_n = \text{RMS of Individual Harmonic} \div \text{RMS of fundamental} \times 100\%$ .



## HFR Mode (AC mode only)

Select the "HFR" indicator then press the navigator key to eliminate high frequency noise.



### NOTE :

Peak Hold, Inrush, THD, Hz, Individual Harmonic and HFR mode are only available in AC mode.

## Active power (W) / Power factor(PF) measurement

### 1.Single Phase Power Measurement

Step1. Set the rotary switch to the "W" position.

Step2. Connect the red test lead to the L, and the black test lead to the N.

Step3. Press the trigger to open the transformer jaws and clamp one conductor only, make sure that the jaw is firmly closed around the conductor.

Step4. Use the Navigator key to choose the "W/PF" mode.

### NOTE :

- The “ + ” symbol on the jaw must face onto the power source side.
- In Autosense mode, the meter will displays ACW/DCW depending on whether AC frequency been detected.
- IPM 244F offer AC power measurement mode only.

### Active power sign :

No sign : Indicates the power flows from the power source to the load.

" \_ " sign : Indicates the power flows from the load to the power source.

# IPM 240F Series English

## Power factor sign :

No sign : The phase of the current signal is lagging behind the voltage signal (inductive load).

" \_ " sign : The phase of the current signal is leading the voltage signal (capacitive load).

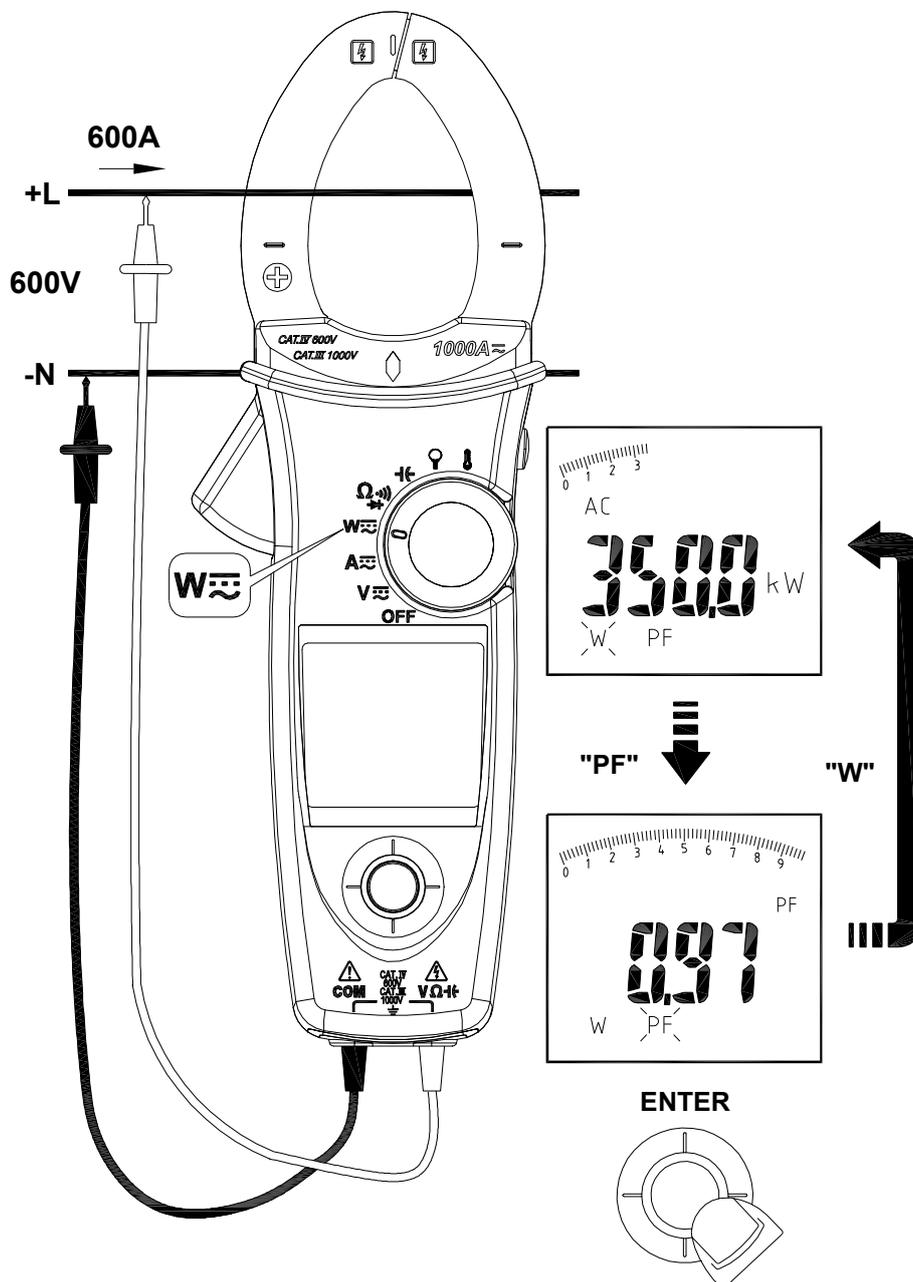
## Over range display :

**OL.U** : Voltage overload

**OL.A** : Current overload

**OL.UA** : Both Voltage and Current overload.

**± OL kW** : Active Power > 1000 kW or < -1000 kW.

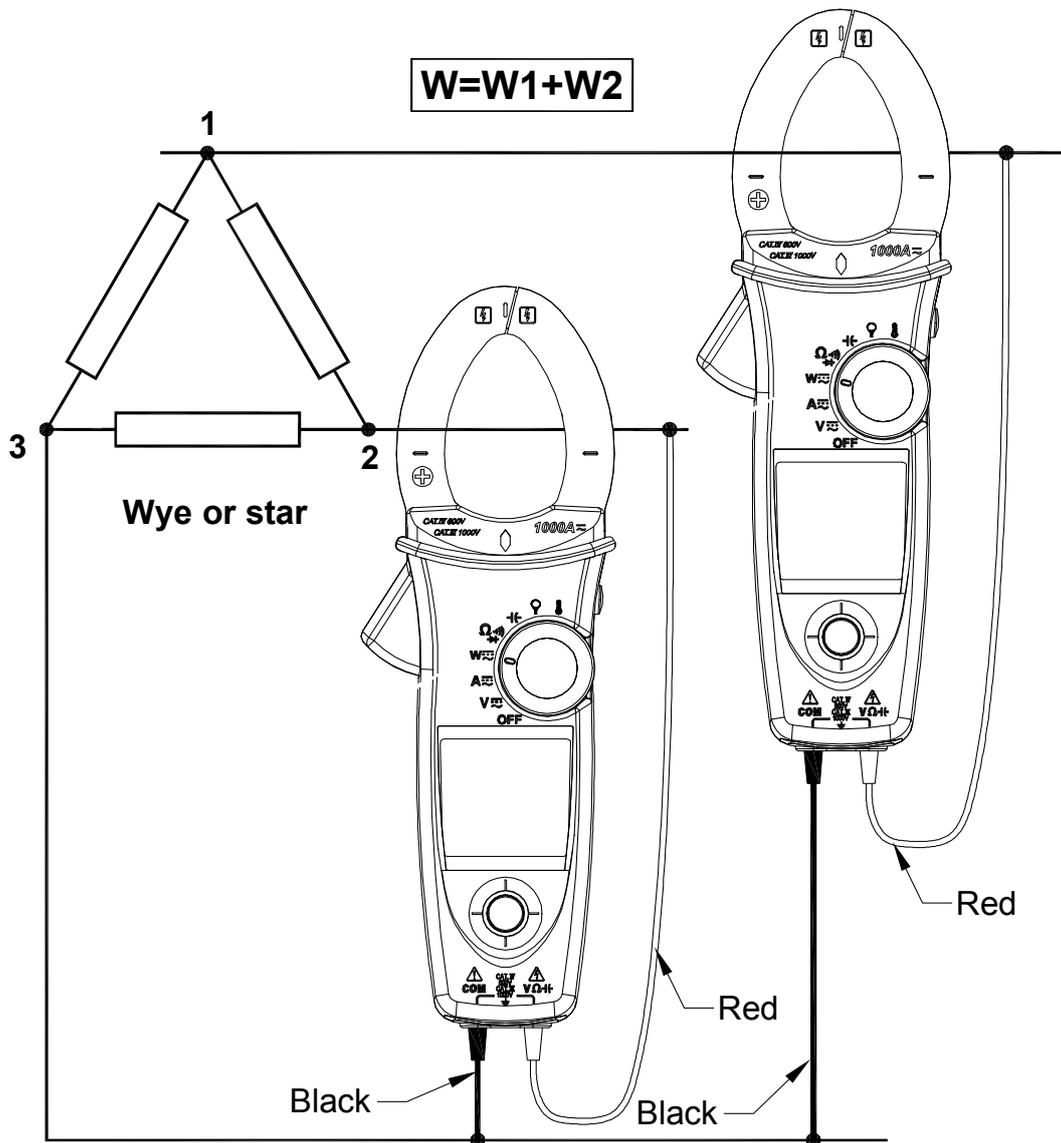


## 2.Three Phase Power Measurement

### A. 3 phase 3 wire balanced / unbalanced

Step1. Set the rotary switch to the "W" position

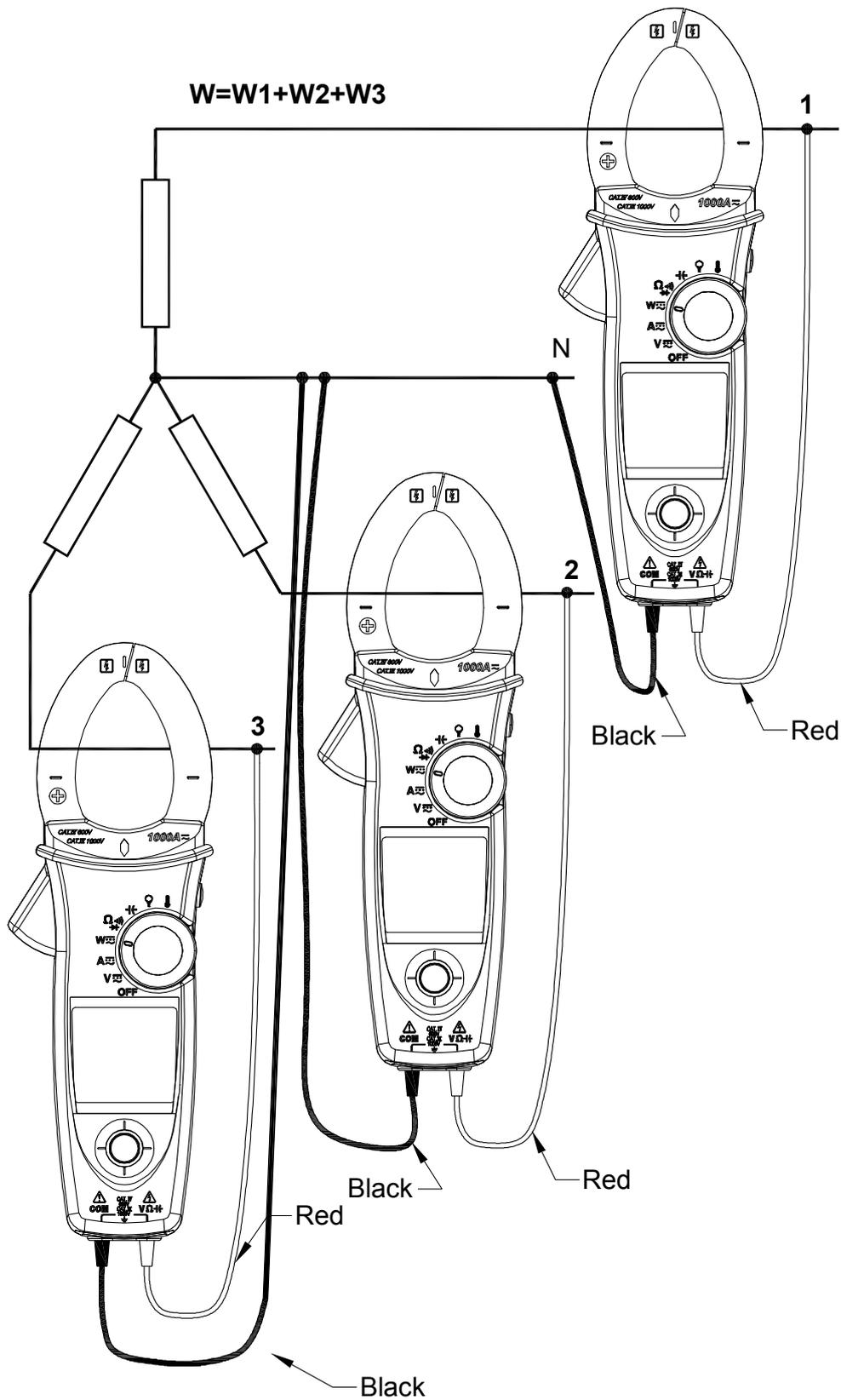
Step2. Using the Navigator key to choose the "W" mode.



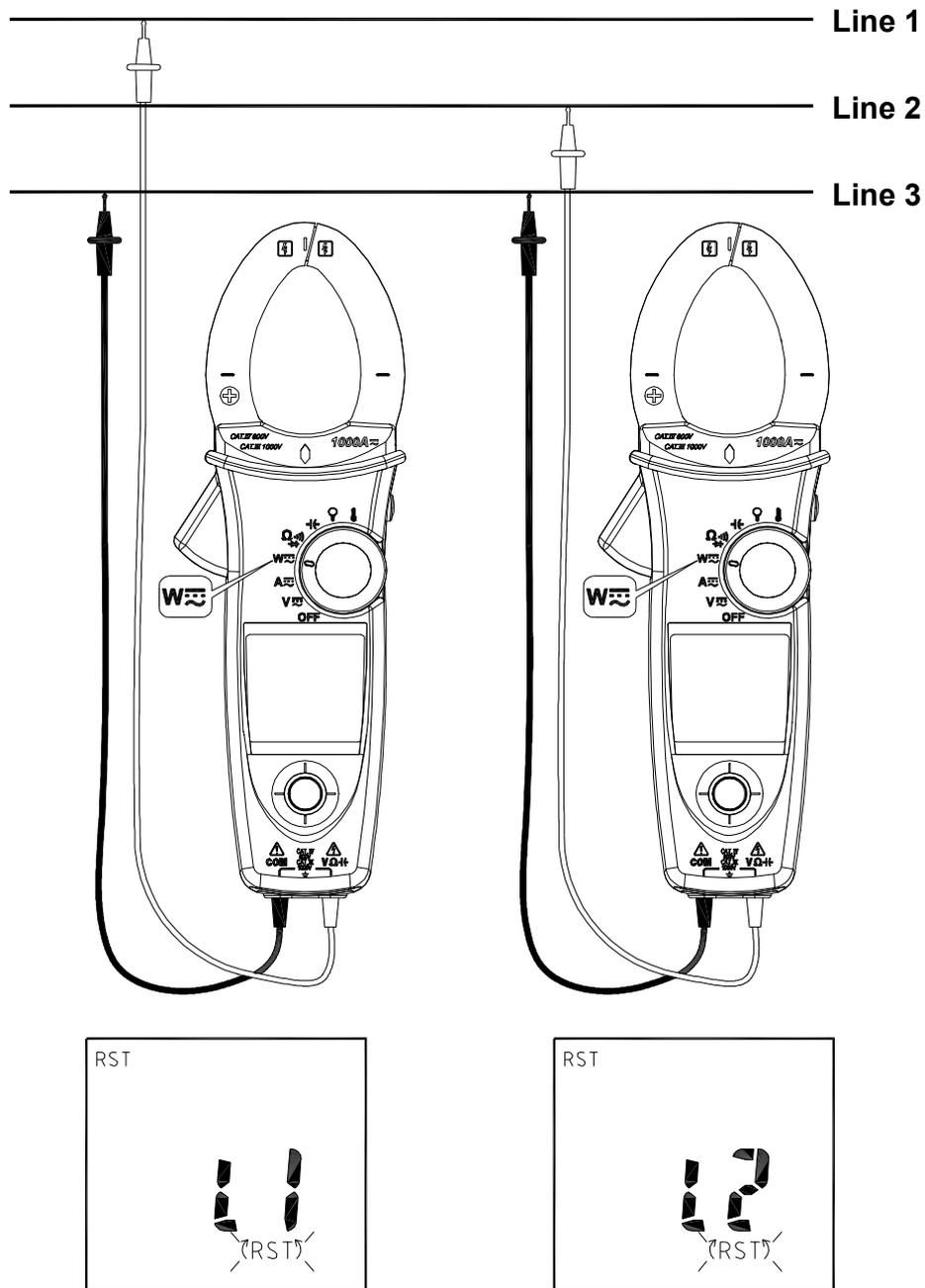
## B. 3 phase 4 wire balanced / unbalanced

Step1. Set the rotary switch to the "W" position

Step2. Using the Navigator key to choose the "W" mode.



## Phase Rotation



### NOTE :

- Connect the three phase of power source as shown above.
- The test is only available while the system frequency is stable.

Step 1. Set the rotary switch to the "W" position.

Step 2. Using the Navigator key to choose the " (RST) " mode

Step 3. Connect the red test lead to the supposed phase 1 conductor and the black test lead to the supposed phase 3 conductor.

If the phases are correct "L1" is displayed and flashes for about 3 seconds.

# IPM 240F Series English

## NOTE:

The meter will not be able to determine the line phase if any of the following conditions occur:

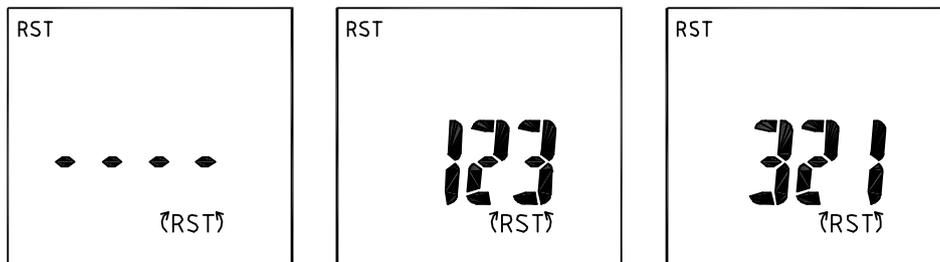
the screen displays “OLU” and flashes: voltage > 1000V

the screen displays “LoU” and flashes: voltage <30V

the screen displays “outF” and flashes: frequency > 65Hz or < 45Hz

Step 4. If “L2” is displayed and the buzzer sounds twice, reconnect the red test lead to the supposed phase 2 conductor 2 immediately before “L2” disappears.

Step 5. When “L2” has disappeared, the test results will be displayed.

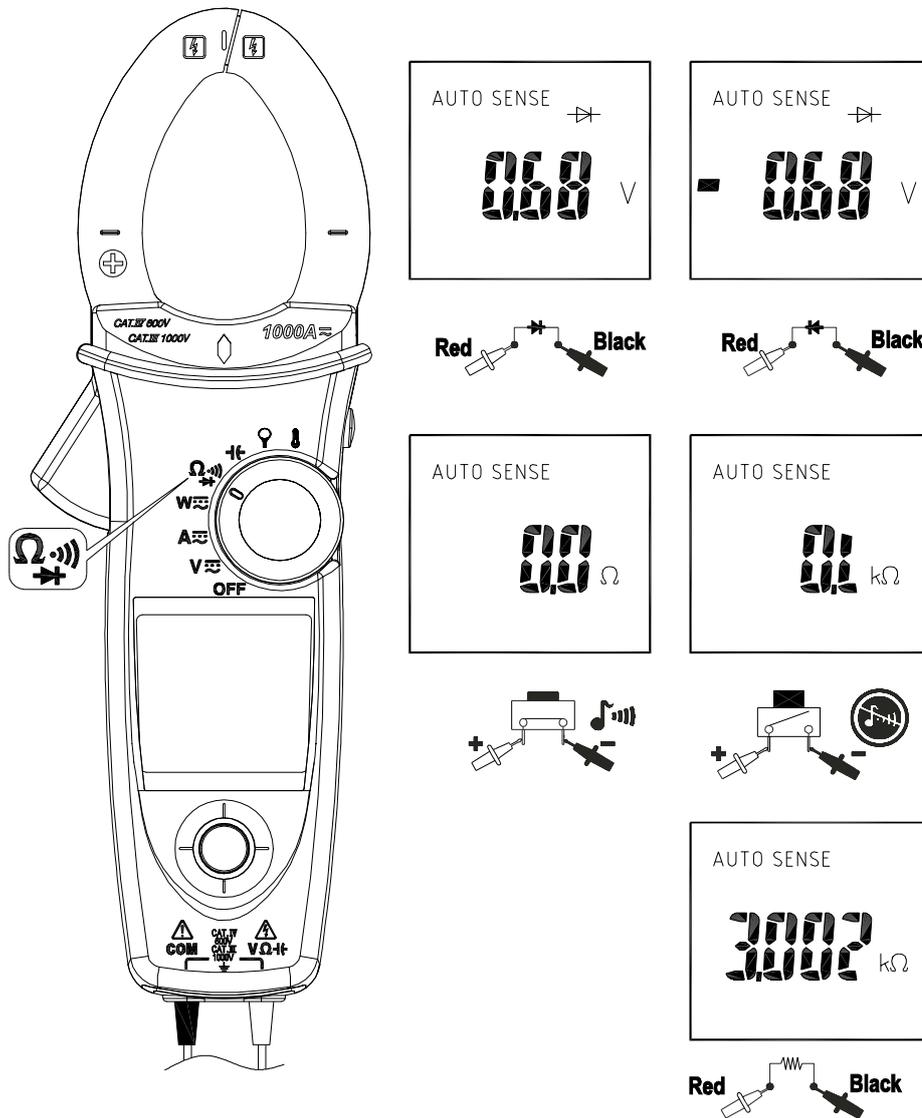


- If “1 2 3 “ is displayed, then the phase sequence is forward sequence
- If “ 3 2 1 ” is displayed, then the phase sequence is reversed sequence
- If “ - - - - ” is displayed it is unable to determine the phases.
- If “LoU” is displayed it is possible that the test leads were removed before the testing procedures were complete.

Step 6 : To repeat the test, using the Navigator key to choose the

“ ⌈RST⌋ ” mode again.

## Resistance Measurement



### CAUTION

To avoid possible damage to the meter or to the equipment under test, disconnect circuit power and discharge all high voltage capacitors before measuring resistance and testing diodes.

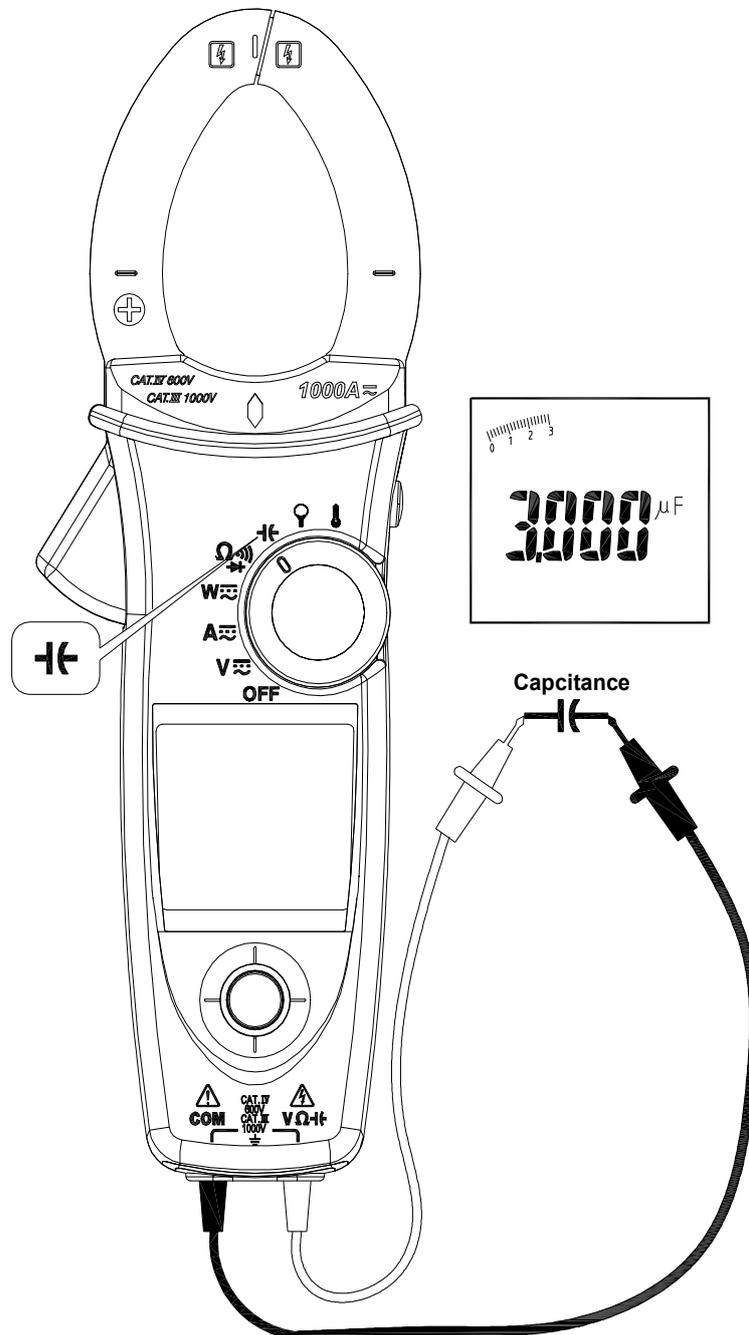
### NOTE :

- Select  $\Omega$  mode then press the navigator key to enter the  $\Omega$  mode.
- Select  $\Omega$  mode then press the navigator key for more than 2 seconds to return to the AUTO SENSE mode.
- The red LED will turn on if the resistance of the device under test is <30 Ohm

Note - Under diode test mode, if "bad" is displayed when measuring a diode, the diode may be damaged.

## Capacitance Measurement

Set the rotary switch to the "  " position.



### CAUTION

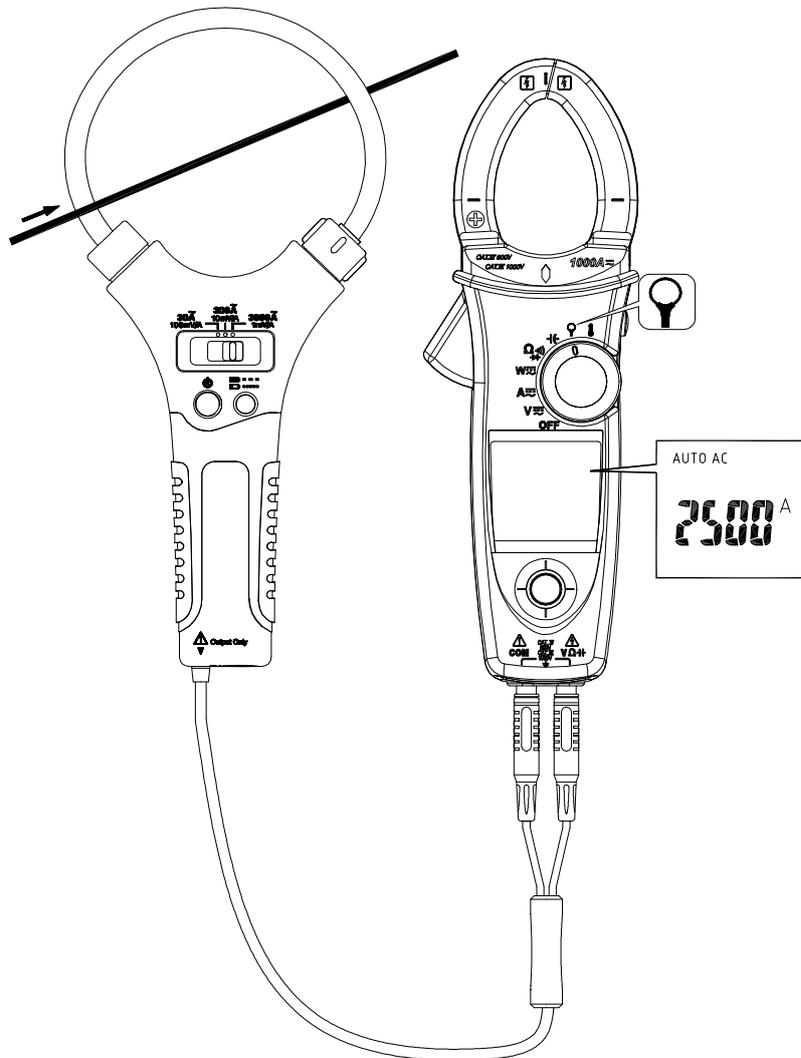
To avoid possible damage to the meter or to the equipment under test, disconnect circuit power and discharge all high-voltage capacitors before measuring capacitance. Use the DC voltage function to confirm that the capacitor is discharged.

Note - The meter will display "diSC" while discharging the capacitor.

## Current Measurement with External Current Probes

Set the rotary switch to the "⚡" position.

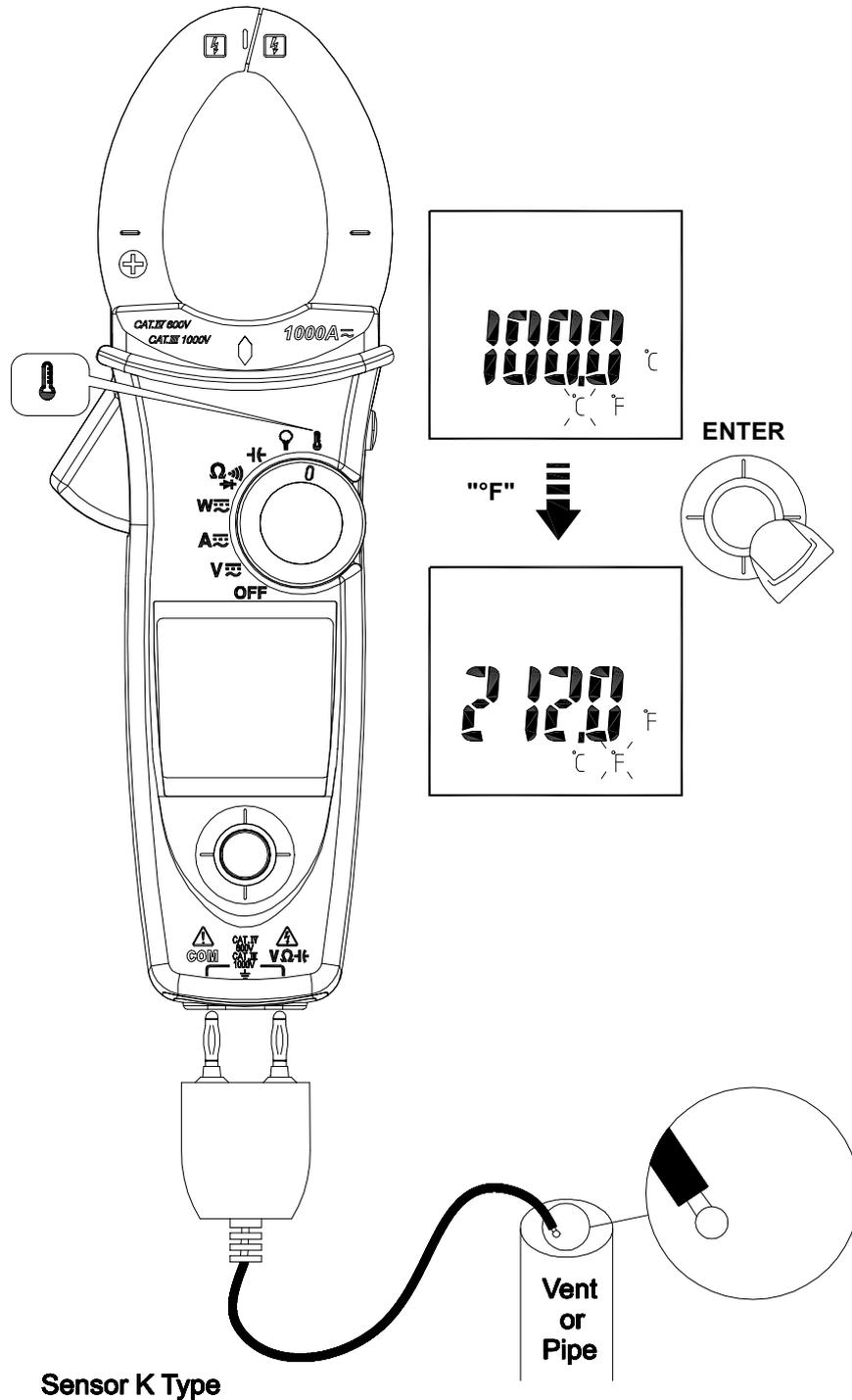
Keep the range of the ICA10T/ICA18T Flexi Current Probe set to 3000A.



Note - Measure a known current to make sure that the ICA10T / ICA18T Flexi Current Probe and IPM 240F operate correctly.

## Temperature Measurement °C / °F (:For 245F Only)

Set the rotary switch to the "  " position.

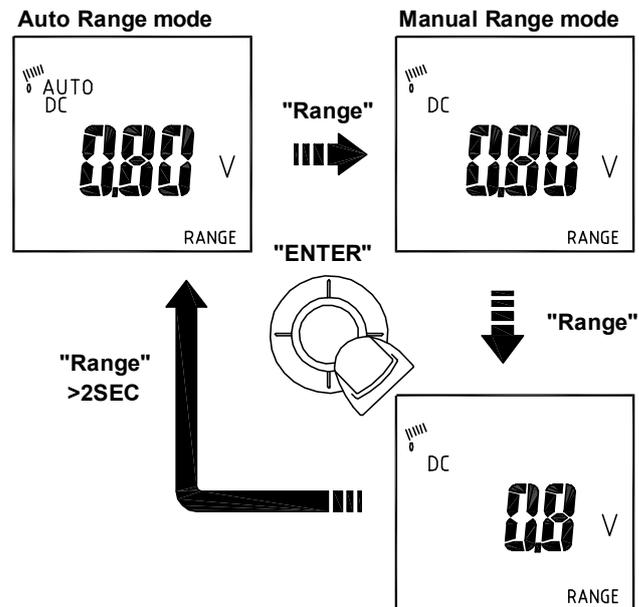


Do not take any high voltage measurement prior to accurate °C/°F measurements.

## Other Functions :

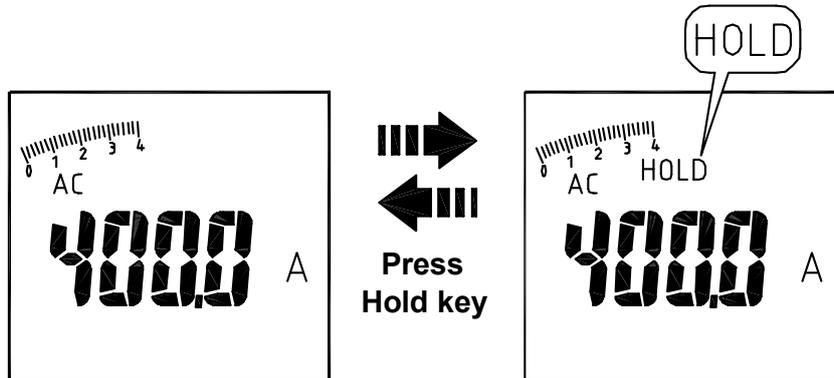
### AUTO/MANUAL RANGE

Select the "RANGE" indicator then press the navigator key to enter the manual range mode. To return to the auto range mode, press the navigator key for more than 2 seconds.



## HOLD Key

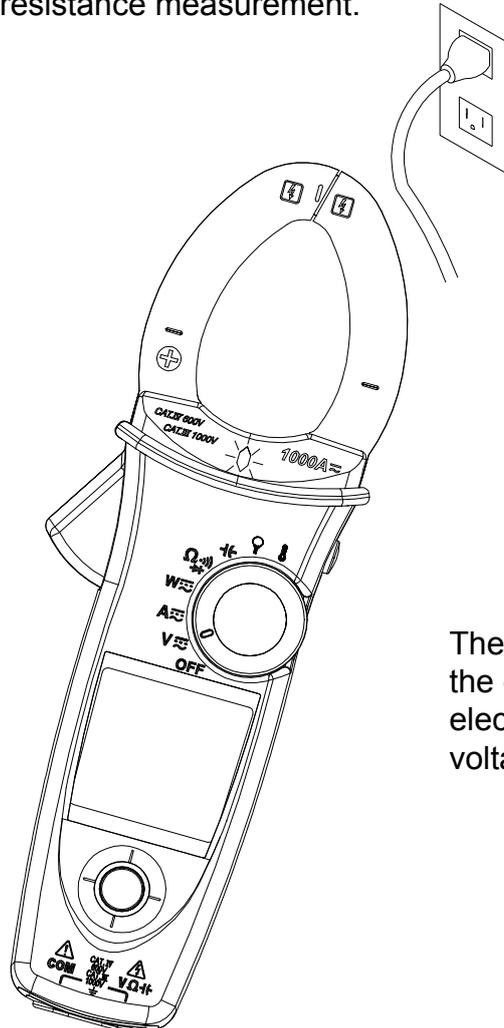
Press HOLD key to freeze the display value.



**SMART HOLD:** The meter will beep continuously and the display will flash if the measured signal is larger than the reading held on the display. (for V, A, W, and Flex AC current function).

## VoltSense :

The red LED will illuminate, if an electric field is detected by the jaws. This function is invalid for resistance measurement.



The indicator lights up while the clamp jaws are close to an electric field. If no indication, voltage could still be present.

## Buzzer

The meter beeps once for every valid key-press, and beeps twice for every invalid key-press.

## Power-up options:

Press one of the following keys while turning the meter on from OFF position.

**Upward of Navigator key** : Display of the software version.

**Downward of Navigator key** : Disable auto power off.

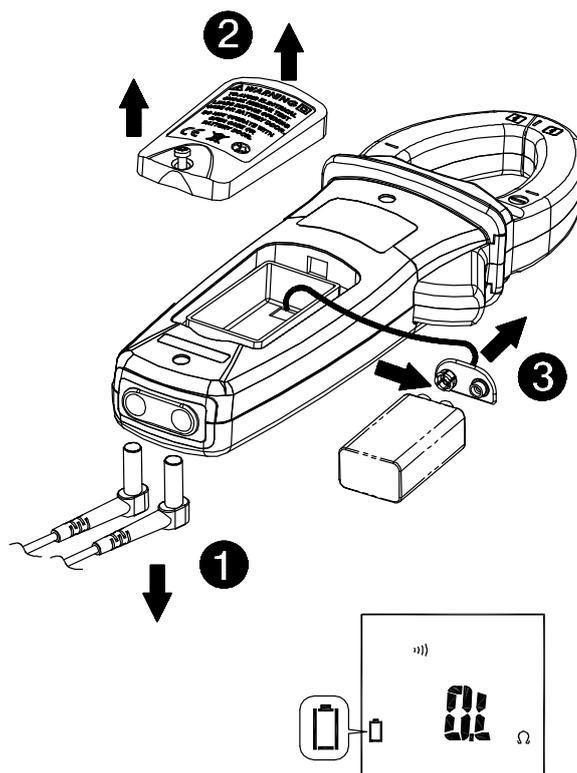
**Leftward of Navigator key** : Disable active backlight.

**HOLD KEY** : Display all LCD symbols for approximately 10 seconds.

## Battery State display

Battery State Indicator	Description
	The battery is full charged
	The battery has 2/3 power remaining
	The battery has 1/3 power remaining
	Replace the battery as soon as the low battery indicator appears, to avoid inaccurate reading.

## SECTION 5 – BATTERY REPLACEMENT



## CAUTION

1. To avoid electric shock, remove the test leads from the meter and from any circuit under test before opening the battery cover or meter case.
2. Check the battery polarity carefully when inserting the battery.
3. Do not short-circuit used batteries, disassemble them, or throw them in a fire. Doing so may cause the batteries to explode.
5. Dispose of the used batteries in accordance with local regulations.

## SECTION 6 - SPECIFICATIONS

### General Specifications

<b>Display count :</b>	10000 or 4000
<b>Measuring rate :</b>	3 times / sec.
<b>Over range display :</b>	“OL” or “-OL” .
<b>Auto Power Off :</b>	Approx 15 minutes.
<b>Low battery indicator :</b>	 is displayed. Replace the battery when the indicator  appears in the display.
<b>Power requirement :</b>	9V battery.
<b>Battery life :</b>	Alkaline 9V: 50 hours typical (without backlight).
<b>Dimensions :</b>	87.5mm(W) x 242mm(L) x 50.5mm(D) for 243F 87.5mm(W) x 257mm(L) x 50.5mm(D) for 244F/245F
<b>Weight :</b>	approx. 435g (with battery) for 243F approx. 470g (with battery) for 244F/245F

### Environmental Conditions

#### Indoor Use.

<b>Calibration :</b>	One year calibration cycle.
<b>Operating temperature :</b>	0 °C ~ 10 °C 10 °C ~ 30 °C ( $\leq 80\%$ RH) 30 °C ~ 40 °C ( $\leq 75\%$ RH) 40 °C ~ 50 °C ( $\leq 45\%$ RH)
<b>Storage temperature :</b>	-10 to 50 °C 0 to 80% RH (batteries not fitted).
<b>Temperature coefficient :</b>	0.2 x (Specified accuracy) / °C, < 18°C, > 28°C .
<b>Over voltage category :</b>	IEC 61010-1 600V CAT IV 1000V CAT. III IEC 61010-2-32, IEC 61010-2-33

# IPM 240F Series English

Measurement Category	Application
II	Measurements on circuits directly connected to the low voltage installation
III	Measurements performed in the building installation
IV	Measurements performed at the source of the low-voltage installation

**Operating altitude :** 2000m (6562 ft)  
**Conductor Size :** 37mm diameter (For 243F)  
 42mm diameter (For 244F/245F)  
**Pollution degree :** 2  
**EMC :** EN 61326-1  
**Shock vibration :** Sinusoidal vibration per MIL-T- 28800E  
 (5 ~ 55 Hz, 3g maximum).  
**Drop Protection :** 4 feet drop to hardwood on concrete floor.

## Electrical Specifications

Accuracy is  $\pm$ (% reading + number of digits) at  $23^{\circ}\text{C} \pm 5^{\circ}\text{C} < 80\%\text{RH}$ .

### (1) Voltage

IPM243F/244F/245F		
Function	Range	Accuracy*
DCV	99.99V	$\pm (0.7\% + 2\text{dgt})$
	999.99V	
ACV	99.99V	$\pm (1.0\% + 5\text{dgt})$
	999.99V	50 ~ 500Hz
HFR	99.99V	50 ~ 60Hz $\pm (1\% + 5\text{dgt})$
ACV	999.99V	>60 ~ 400Hz $\pm (5\% + 5\text{dgt})$

\* DCV <1000dgt, add 6 dgt to the accuracy.  
 ACV <1000dgt, add 3 dgt to the accuracy.

# IPM 240F Series English

**Overload protection :**  $1000V_{rms}$

**Input Impedance :**  $3.5M\Omega // <100pF$

**AC Conversion Type :** AC Conversions are ac-coupled, true RMS responding, calibrated to the RMS value of a sine wave input. Accuracies are given for sine wave at full scale and non-sine wave below half scale. For non-sine wave (50/60Hz) add the following Crest Factor corrections:

For Crest Factor of 1.4 to 2.0, add 1.0% to accuracy.

For Crest Factor of 2.0 to 2.5, add 2.5% to accuracy.

For Crest Factor of 2.5 to 3.0, add 4.0% to accuracy.

CF 3 @ 460V, 460A (For 244F/245F), 280A (For 243F)

2 @ 690V, 690A (For 244F/245F), 420A (For 243F)

**AC+DC Vrms Accuracy :** same as ACV specification. +DCV specification.

## (2) Current

IPM244F		
Function	Range	Accuracy
ACA	99.99A	50 ~ 60Hz $\pm (1.5\% + 5dgt)^{**}$
	999.9A	>60 ~ 400Hz $\pm (2\% + 5dgt)^{**}$
HFR	0.10A ~ 99.99A	50 ~ 60Hz $\pm (1.5\% + 5dgt)^{**}$
ACA	999.9A	>60 ~ 400Hz $\pm (5\% + 5dgt)^{**}$

\*\* The measured value <1000dgt, add 5 dgt to the accuracy.

IPM243F/245F		
Function	Range	Accuracy
DCV	99.99A	$\pm (1.5\% + 0.2A)$
	599.9A/999.9A*	$\pm (1.5\% + 5dgt)^{**}$
ACA	0.10A ~ 99.99A	50 ~ 60Hz $\pm (1.5\% + 5dgt)^{**}$
	599.9A/999.9A*	>60 ~ 400Hz $\pm (2\% + 5dgt)^{**}$
HFR	0.10A ~ 99.99A	50 ~ 60Hz $\pm (1.5\% + 5dgt)^{**}$
ACA	599.9A/999.9A*	>60 ~ 400Hz $\pm (5\% + 5dgt)^{**}$

\* 243F : 599.9A ; 245F : 999.9A

\*\* The measured value <1000dgt, add 5 dgt to the accuracy.

# IPM 240F Series English

**Overload protection :**  $1000A_{rms}$  For 244F/245F  
 $600A_{rms}$  For 243F

**Position Error :**  $\pm 1\%$  of reading.

AC conversion type and additional accuracy is same as AC Voltage.

**AC+DC Arms Accuracy :** Same as ACA specification + DCA specification.

- For better measurement accuracy of high current, do not take a measurement for more than 10 minutes (For 244F).
- DCA is affected by the temperature and the residual magnetism.  
 Press HOLD key for greater than 2 seconds to compensate for residual magnetism.

### (3) Peak Hold : Peak MAX / Peak MIN

IPM243F		
Function	Range	Accuracy
ACV	140.0V	$\pm (3.0\% + 15dgt)$
	1400V	
ACA	140.0A	$\pm (3.0\% + 15dgt)$
	850A	

IPM244F/245F		
Function	Range	Accuracy
ACV	140.0V	$\pm (3.0\% + 15dgt)$
	1400V	
ACA	140.0A	$\pm (3.0\% + 15dgt)$
	1400A	

**Overload protection :**  $1000 V_{rms}$

$600 A_{rms}$  For 243F

$1000 A_{rms}$  For 244F/245F

**Accuracy defined for :**

Sine wave,  $ACV > 5V_{rms}$  /  $ACA \geq 5A_{rms}$ , Freq. 50~400Hz.

- Only suitable for repetitive events.

## (4) Frequency

IPM243F/244F/245F		
Function	Range	Accuracy
Frequency	20.00 ~ 99.99Hz	± (0.5% + 3dgt)
	20.0 ~ 999.9Hz	
	0.020 ~ 9.999KHHz	

**Overload protection :** 1000 V<sub>rms</sub>

600 A<sub>rms</sub> For 243F

1000 A<sub>rms</sub> For 244F/245F

**Sensitivity :**

10~100V<sub>rms</sub> for AC 100V range

10~100A<sub>rms</sub> for AC 100A range ( >400Hz Unspecified)

100~1000V<sub>rms</sub> for AC 1000V range

100~600/1000A<sub>rms</sub> for AC 600A/1000A range

( >400Hz Unspecified)

- Reading will be 0.0 for signals below 10.0 Hz.

## (5) Total Harmonic Distortion :

IPM243F/244F/245F		
Function	Range	Accuracy
ACA/ACV	99.9%	± (3.0% + 10dgt)

**Harmonic distortion measurement :**

IPM243F/244F/245F		
Harmonic order	Range	Accuracy
H01 ~ H12	99.9%	± (5% + 10dgt)
H13 ~ H25		± (10% + 10dgt)

**Overload protection :** 1000 V<sub>rms</sub>

600 A<sub>rms</sub> For 243F

1000 A<sub>rms</sub> For 244F/245F

- If ACV < 10V<sub>rms</sub> or ACA < 10A<sub>rms</sub>, it will display "rdy".

- If the fundamental frequency is out of the range 45 ~ 65Hz, it will display "out.F".

# IPM 240F Series English

## (6) Inrush Current :

IPM243F/244F/245F		
Function	Range	Accuracy
ACA	99.99A	$\pm (2.5\% + 0.2A)$
	599.9A/999.9A	$\pm (2.5\% + 5dgt)$

\* 243F : 599.9A  
244F/245F : 999.9A

**Overload protection :**  $1000 V_{rms}$

$600 A_{rms}$  For 243F

$1000 A_{rms}$  For 244F/245F

**Accuracy defined for :**

Sine wave,  $ACA \geq 10A_{rms}$ , Freq. 50/60Hz

- Integration time about 100m sec

## (7)Active Power : Watt (DC/AC)

IPM243F/244/245F		
Function	Range	Accuracy
ACW / DCW	9.999 kW**	$A_{error} \times V_{reading} +$ $V_{error} \times A_{reading}$
	99.99 kW	
	599.9KW/999.9kW*	

\* IPM 243F : 599.9KW

IPM 244F/245F : 999.9KW

\*\* for measured value < 1.000kW add 10 dgt to the accuracy.

**Overload protection :**  $1000 V_{rms}$

$600 A_{rms}$  For 243F

$1000 A_{rms}$  For 244F/245F

**Accuracy defined for :**

ACW :

Sine wave ,  $ACV \geq 10 V_{rms}$ ,  $ACA \geq 5 A_{rms}$

Freq. 50~60Hz, PF=1.00

DCW (For 243F/245F only) :

$DCV \geq 10V$  ,  $DCA \geq 5 A$

## (8) Power Factor

IPM243F/244F/245F		
Function	Range	Accuracy
PF	1.00	± 5dgt

\* ACA<100A, add ±3dgt to the accuracy (For 244F)

**Overload protection** : 1000 V<sub>rms</sub>

600 A<sub>rms</sub> For 243F

1000 A<sub>rms</sub> For 244F/245F

## (9) Resistance & Continuity & Diode :

IPM243F/244F/245F		
Function	Range	Accuracy
Resistance	999.9 Ω	± (1.0% + 5dgt)
	9.999 kΩ	± (1.0% + 3dgt)
	99.99 kΩ	
Continuity	999.9 Ω	± (1.0% + 5dgt)
Diode	0.40 ~ 0.80V	± 0.1V

**Overload protection** : 1000V<sub>rms</sub>

**Max. Test Current** : Approx. 0.5mA.

**Maximum Open Circuit Voltage for Ω, "**: Approxate 3V

**Maximum Open Circuit Voltage for diode** : Approximate ±1.8V

**Continuity Threshold** : <30Ω Beep On.

>100Ω Beep OFF.

**Continuity Indicator** : 2kHz Tone Buzzer

**Continuity response time** : < 100ms.

# IPM 240F Series English

## (10) Capacitance :

IPM243F/244F/245F		
Function	Range	Accuracy
Capacitance	3.999 $\mu$ f	$\pm (1.9\% + 8\text{dgt})$
	39.99 $\mu$ f	
	399.9 $\mu$ f	
	3999 $\mu$ f	

**Overload protection:** 1000 V<sub>rms</sub>

## (11) Flex AC Current (voltage input):

IPM243F/244/245F		
Function	Range (1mV/1A)	Accuracy*
ACA	300.0A/3000A	$\pm (1\% + 5\text{digit}) (50\sim 500\text{Hz})^{**}$
HFR ACA	300.0A/3000A	$\pm (1\% + 5\text{digit}) (50\sim 60\text{Hz})^{**}$ $\pm (5\% + 5\text{digit}) (61\sim 400\text{Hz})^{**}$
Peak	420.0A/4200A	$\pm (3\% + 80\text{digit}) (50\sim 500\text{Hz})$
INRUSH	300.0A/3000A	$\pm (2\% + 10\text{digit}) (50/60\text{Hz})$
Frequency	99.99Hz/999.9Hz	$\pm (0.5\% + 3\text{digit}) (<500\text{Hz})$
THD	99.9%	$\pm (5\% + 10\text{digit})$
Harmonics H01-H12	99.9%	$\pm (5\% + 10\text{digit})$

\* The accuracy of ICA10T/ICA18T is not included.

\*\* ACA <300dgt, add 3 dgt to the accuracy.

**Overload protection :** 1000 V<sub>rms</sub>

**Trigger level of INRUSH :** 1% of current range.

## (12) Temperature

IPM245F		
Function	Range	Accuracy
°C	-50°C ~ 99.9°C	± (1% + 2°C)
	100°C ~ 399.9°C	± (1% + 1°C)
	400°C ~ 1000°C	
°F	-58°F ~ 211.9°F	± (1% + 4°F)
	212.0°F ~ 751.9°F	± (1% + 2°F)
	752°F ~ 1832°F	

**Overload protection :**  $1000 V_{rms}$

-The above specification is assumed with the ambient temperature stable within  $\pm 1^{\circ}\text{C}$ . In addition, the temperature probe has to be connected to meter for more than 1 hour in advance. The meter needs 2 hour for stability for ambient temperature change more than  $\pm 5^{\circ}\text{C}$ .

### Limited Warranty

This instrument is warranted to the original purchaser against defects in material and workmanship for 3 years from the date of purchase. During this warranty period, RS Components will, at its option, replace or repair the defective unit, subject to verification of the defect or malfunction. This warranty does not cover disposable batteries, fuses or damage from abuse, neglect, accident, unauthorized repair, alteration, contamination, or abnormal conditions of operation or handling.

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