



**3510PHW-AUTO**

### Features

- Check 3 $\phi$  Phase Sequence
- 4 Digit LCD, 9999 Count, Autoranging
- Data Hold, Auto Power Off
- Dual Display KW+HP, KW+PF, KW+KVAR, KVA+ $\phi$ , V+A, A+Hz, V+Hz
- Cable of Diameter upto 43mm / Busbar upto 65mm x 16mm

### Applications

- 1 $\phi$  & 3 $\phi$  (3 $\phi$ 3w / 3 $\phi$ 4w) Power Analyzer
- Ideal for Electrical Audit of Heating, Ventilation & Aircon Systems (HVAC)
- Check Current drawn in Motors and Compressors
- Test Run / Start Capacitors
- Check for Energized Circuits & Balance Loads
- Capture Motor In-Rush Current Readings
- Determine Peak Power Demand Periods
- Analyze Temperature Data with the Aid of the Time Stamp
- Resistance upto 100M $\Omega$
- Use MAX / MIN / REC in Temperature Mode to Assess Efficiency
- Evaluate Electrical Contacts
- Verify the Stability of Voltage
- Check Motor Run / Start Capacitor Values
- To Identify Low Voltage Control Signal
- To Identify Power Sources

1 $\phi$ /3 $\phi$ TRUE Power (KW) : (PF lag 1.000~0.000~lead 1.000 or 00.00°~360.0°) (1 hp=0.7457KW)			
Range	Resolution	Accuracy $\pm$ (%rdg+dgts)	Overload Protection
99.99KW	0.01KW	$\pm$ (5% + 30)	600VAC/ 1000AAC
600.0KW	0.1KW	(50, 60Hz)	

1 $\phi$ /3 $\phi$ HP (1HP=745.7W) : (PF lag 1.000~0.000~lead 1.000 or 00.00°~360.0°)			
Range	Resolution	Accuracy $\pm$ (%rdg+dgts)	Overload Protection
99.99HP	0.01 HP	$\pm$ (5% + 30)	600VAC/ 1000AAC
800.0HP	0.1 HP	(50, 60Hz)	

1 $\phi$ /3 $\phi$ Apparent Power (KVA)			
Range	Resolution	Accuracy $\pm$ (%rdg+dgts)	Overload Protection
99.99KVA	0.01 KVA	$\pm$ (2.5% + 30)	600VAC/ 1000AAC
600.0KVA	0.1 KVA		

1 $\phi$ /3 $\phi$ Reactive Power (KVAR) : (PF lag 1.000~0.000~lead 1.000 or 00.00°~360.0°)			
Range	Resolution	Accuracy $\pm$ (%rdg+dgts)	Overload Protection
99.99KVAR	0.01KVAR	$\pm$ (5% + 50dgts)	600V AC/1000AAC
600.0KVAR	0.1KVAR	(50, 60Hz)	

3 $\phi$ Phase Sequence Indication		
Range	Frequency Response	Overload Protection
80V to 480V	(50Hz / 60Hz)	600V

ACA Inrush Current				
Range	Resolution	Sensitivity	Measurement Time	Overload Protection
99.99A	0.01A	>5A	100ms	1000A AC
999.9A	0.1A	>50A		

1 $\phi$ /3 $\phi$ PF & Phase Angle (50Hz, 60Hz)			
Range	Resolution	Accuracy	Sensitivity
00.00°~99.99°	0.01°	$\pm$ 6.0°	ACV>100V, ACA>10A
100.0°~360.0°	0.1°		
lag 1.000~0.000~lead 1.000	0.001		

Frequency			
Range	Resolution	Accuracy $\pm$ (%rdg+dgts)	Sensitivity
40.00Hz~999.9Hz	0.01Hz/0.1Hz	$\pm$ (0.5% + 2)	ACV>1.2V, ACA>6A

AC Current (50Hz to 400Hz) : TRMS				
Range	Resolution	Accuracy $\pm$ (%rdg+dgts)	Sensitivity	Overload Protection
99.99A	0.01A	$\pm$ (2% + 30) (50,60Hz)	0.10A	1000A
999.9A	0.1A	$\pm$ (4% + 30) (40-400Hz)	1.0A	

$\mu$ A : DC + AC TRMS (Burden Voltage : 5mV/ $\mu$ A) (50Hz to 400Hz)				
Range	Resolution	Accuracy $\pm$ (%rdg+dgts)	Sensitivity	Overload Protection
99.99 $\mu$ A	0.01 $\mu$ A	$\pm$ (1% + 30)	0.20 $\mu$ A	500V DC or AC rms for 1 min.
999.9 $\mu$ A	0.1 $\mu$ A		2.0 $\mu$ A	

AC Voltage (50Hz to 400Hz) : TRMS				
Range	Resolution	Accuracy $\pm$ (%rdg+dgts)	Sensitivity	Overload Protection
999.9mV	0.1mV	$\pm$ (1% + 30) (50, 60Hz)	2.0mV	600V
9.999V	0.001V		0.020V	
99.99V	0.01V	$\pm$ (2% + 30) (40-400Hz)	0.20V	
600.0V	0.1V		2V	

Input Impedance : 3M $\Omega$

DC Voltage				
Range	Resolution	Accuracy ±(%rdg+dgts)	Sensitivity	Overload Protection
999.9mV	0.1mV	±(1% + 30)	2.0mV	600V
9.999V	0.001V		0.020V	
99.99V	0.01V		0.20V	
600.0V	0.1V		2V	
Input Impedance : 3MΩ				

Resistance (Continuity < 40Ω on the 999.9Ω range)				
Range	Resolution	Accuracy ±(%rdg+dgts)	Overload Protection	
999.9Ω	0.1Ω	±(1% + 10)	500V DC or AC rms for 1 min.	
9.999KΩ	0.001KΩ			
99.99KΩ	0.01KΩ			
999.9KΩ	0.1KΩ			

MΩ (Auto Ranging)				
Range	Resolution	Accuracy ±(%rdg+dgts)	Overload Protection	
9.999MΩ	0.001MΩ	±(5% + 10)	500V DC or AC rms for 1 min.	
99.99MΩ	0.01MΩ			

### General Specifications

- Numerical Dual Display** : 4 Digit 9999 Count LCD
- Low Battery Indication** : is displayed
- Power** : 9V Battery x 1
- Sampling Rate** : 2.5 times/sec. (Digital Display)  
1 times/6 sec. (on KW, KVA)
- Operating Temperature and Humidity** : 0°C to 50°C (32°F to 122°F)  
RH < 80% non-condensing
- Storage Temperature and Humidity** : -10°C to 60°C (14°F to 140°F)  
RH < 70% non-condensing
- Dimensions** : 247 x 90 x 40mm

### Usage

#### 1φ 2W System

Press "RANGE" Key to Select KW+HP, KW+PF, KW+KVAR, KVA+θ or A+V

HP = 746 watts  
KVA = (V x A) / 1000  
KVAR = KVA x Sinθ

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

#### 3φ 3W System

$W_{3\phi 3W} = W_{RY(L1L2)} + W_{YB(L2L3)}$

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

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

#### 3φ 4W System

$W_{3\phi 4W} = W_{R(L1)} + W_{Y(L2)} + W_{B(L3)}$

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

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

#### 3Φ Phase Sequence Indication

Normal Phase: R → Y → B

Reverse Phase: B → Y → R

R:L1, Y:L2, B:L3

Capacitance				
Range	Resolution	Accuracy ±(%rdg+dgts)	Overload Protection	
10.000μF	0.001μF	±(3.0% + 5)	500V DC or AC rms for 1 min.	
100.00μF	0.01μF			
1000.0μF	0.1μF	±(1.5% + 5)		
7000μF	1μF			

Diode (Continuity < 40mV)				
Range	Resolution	Accuracy ±(%rdg+dgts)	Overload Protection	
2.000V	0.001V	±(2% + 1)	500V DC or AC rms for 1 min.	

Temperature (K-Type Thermocouple)				
Range	Resolution	Accuracy ±(%rdg+dgts)	Overload Protection	
-50°C to 900°C	0.1°C	±(.2% + 4°C)	30VAC or 60VDC	
-58°F to 1000°F	0.1°F			

- Weight** : 425gms Including Battery (approx.)
- Jaw Opening** : Cable Dia 43mm (max.)  
Bus Bar 16mm x 65mm
- Accessories** : Carrying Case, Battery (installed), Test Leads Pair, K Type Thermocouple (Upto 260°C) (Optional), Instruction Manual
- Auto Power off Time** : Approx. 30 minutes
- Temperature Coefficient** : 0.1 x (specified accuracy) / °C (<18 or >28°C, <64 or >82°F)