

## APM489-5 3P4W WATT METER

### DESCRIPTION

MW-5 Watt Meter provides high accuracy measurements, display and communication functions. They are also built in 2 Relay outputs, 2 External Control Inputs and 1 RS485 (Modbus RTU Mode) with versatile functions such as remote I/O, alarm and communication for a wide range of applications.

### FEATURE

- Measuring AC Watt / 1P2W, 1P3W, 3P3W, 3P4W Unbalanced systems
- Direct input 500V / 50A maximum with high accuracy current transformer.
- 2 relay can be programmed individually to be a Hi / Lo / Hi Latch / Lo Latch energized with Start Delay / Hysteresis / Energized & De-energized Delay functions, or to be a remote controlled.
- 2 external control inputs can be programmed individually to be relative
  - Relative PV / PV Hold / Maximum or Minimum Hold
  - Other application: DI (remote monitoring) / Reset for Relay Energized Latch....
- RS 485 communication port in option
- Outside dimensions is 1/8 DIN standard (96 x 48 mm)
- CE Approved & RoHS

### APPLICATIONS

Control panels and Consumption monitoring, Switchgear distribution systems, Power managements for building automation, Power Testing Equipment.

### TECHNICAL SPECIFICATION

#### Measurement & Connection

Connection	AC Input			Input Burden
	Voltage	Current	Freq.	
1P2W	50~500V $\ell n$	1A 5A 50A	50 Hz 60Hz	Voltage: $\leq 0.5VA/\text{phase}$ Or Current: $\leq 0.1VA/\text{phase}$
1P3W	220V $\ell\ell$ - 110V $\ell n$			
3P3W	50~500V $\ell n$			
3P4W	50~500V $\ell\ell$			

\*The maximum input is 500V and 5A. If the input is over the level please connect with CT or PT to the meters. The 50A input is connected to a CT module (YMW-CT10A).

#### Accuracy & Resolutions

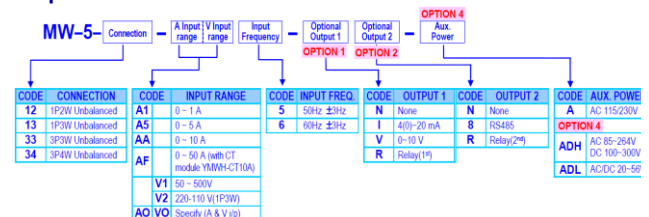
Parameters	Accuracy	Resolution(Programmable)	Display Range
Active Power	0.5%	1/0.01K/1K/0.01M/0.1M/1M	0~99999

#### Input

Measurement: True rms measurement  
 Waveform effect:  $\leq 0.2\%$  of F.S at 30% distortion  
 A/D Converter: 16 bits resolution  
 Accuracy:  $\leq 0.5\%$  of FS  $\pm 1C$ ;  
 Sampling Rate: 15 cycles/sec  
 Response Time:  $\leq 100$  msec.(when the AvF – "1") in standard  
 Connection: 1P2W, 1P3W, 3P3W, 3P4W, Unbalance  
 Input Range: Voltage: 0 ~ 5000V $\ell\ell$  (max.)  
 Unit for primary of PT programmable: V and KV  
 PT ratio (primary) programmable: 50.0V~999.99KV  
 PT ratio (secondary) programmable: 50.0~500.0V  
 Direct input: primary = secondary = under 500V  
 Current: 0~1/ ~5/ ~10/ ~50A (max.)  
 CT ratio (primary) programmable: 1~9999.9A  
 CT ratio (secondary) programmable: 1.000~9.999A  
 50A Direct input with optional module



#### Output



#### Max. Input over capability:

Voltage: 2 x rated continuous;  
 4 x rated for 2 seconds  
 Current: 3 x rated for 10 seconds;  
 10 x rated for 10 seconds;  
 50 x rated for 1 second (for 5A input type)

#### Control Functions (Optional)

Set-Points: Two set points  
 Relay: Dual FORM-A, 1A/230Vac, 3A/115V  
 Relay Energized Mode: Hi / Lo / Hi.HLd / Lo.HLd / do / oFF  
 Functions: Start delay / Energized & De-energized delay / Hysteresis / Energized Latch  
 Start band: 0~9999 counts  
 Start delay time: 0:00.0~9(Minutes):59.9(Second)  
 Energized delay time: 9(minutes):59.9(Second)  
 De-energized delay time: 9(Minutes):59.9(Second)  
 Hysteresis: 0~5000 counts

#### External Control Inputs

Input Mode: 2 ECI points, Contact or open collect input, Level trigger  
 Functions: There are flexible functions that can be programmed for Relative PV / PV Hold / Reset Max or Mini. Hold / Reset for Relay latch.  
 Digital Input(DI): Remote monitoring  
 Debouncing Time: 5 ~ 255 x 8mseconds

## RS 485 Communication (optional)

**Protocol:** Modbus RTU mode

**Baud Rate:** 1200/2400/4800/9600/19200/38400 programmable

**Data Bits:** 8 bit

**Parity:** Even, odd or none (with 1 or 2 stop bit) programmable

**Address:** 1 ~ 255 programmable

**Remote Display:** to show the value from RS485 command of master

**Distance:** 1200M

**Terminate Resistor:** 150Ω at latest unit.

## Electrical Safety

**Dielectric Strength:** AC 2.0 KV for 1 min, Between Power / Input / Output / Case

**Insulation Resistance:** ≥ 100M ohm at 500Vdc, Between Power / Input / Output

**Isolation:** Between Power / Input / Relay / RS485 / E.C.I.

**EMC:** EN 55011:2002; EN 61326:2003

**Safety(LVD):** EN 61010-1:2001

## Environmental

**Operating Temp.:** 0~60 °C

**Operating Humi.(%RH):** 20~95 %RH, Non-condensing

**Temp. Coefficient:** ≤ 100 PPM/°C

**Storage Temperature:** -10~70 °C

**Enclosure:** Front panel: IEC 549 (IP54); Housing: IP20

## Mechanical

**Dimensions:** 96mm(W) x 48mm(H) x 120mm(D)

**Panel Cutout:** 92mm(W) x 44mm(H)

**Case Material:** ABS fire-protection (UL 94V-0)

**Mounting:** Panel flush mounting

**Terminal Block:** Plastic NYLON 66 (UL 94V-0)

Relay, A/O and RS485: 5A 300Vac, M2.6, 22~16AWG

Other: 10A 600Vac, M3.0, 15~10AWG(1.5~2.5mm<sup>2</sup>)

**Weight:** 550g / 350g(Aux. Power Code: ADH, ADL)

## Power

**Power Supply:** AC115/230V, 50/60Hz;

**Optional:** AC 85~264V / DC 100~300V

**or AC/DC 20~56V**

**Power Consumption:** 5.0VA maximum

**Back Up Memory:** By EEPROM

## FRONT PANEL



## Display:

5 digital; 0.8"(2.0mm) red high-brightness LED

**I/O Status Indication:** RS 485 communication: 1 square orange LED COM will flash when the meter receive or send data, and when COM flashes quickly it means that the data transients quickly

**E.C.I. function indication:** 2 square green LED

EC11 display when External Control input 1 close

(dry contact)

EC12 display when External Control input 2 close

(dry contact)

**Relay energized indication:** 2 square red LED

RL1 display when Relay 1 energized;

RL2 display when Relay 2 energized;

For symbol of function

## Stickers:



**Symbol of function for Relay:** HH / Hi / Lo / LL / DO

**Symbol of function for E.C.I.:** PV.H(PV Hold) / Tare / DI / M.RS(Maximum or Minimum Reset) / R.RS(Reset for Relay Latch)

## Operating Key:

4 keys for Enter (Function) / Shift(Escape) / Up / Down

**Up key:** Increment the value / Back to previous function

**Down key:** Decrement the value / Go to next function

**Shift key:** Move the flash digit position / Return back to upper level / Escape

**Enter/Function key:** Access setting status / Stores selected parameter or set value and index to next parameter.

## Security Function:

4 digits password settable from 0000~9999 you have to enter correct password to access **Programming Level** for configuration. The meter can change the password in Engineer Level. If you forget the password, please contact our company.

## Lock Function:

4 lock mode for None / Normal Level / Programming Level / All(Normal Level & Programming Level)

**None:** No lock, all function can be set and changed

**User Level:** The functions in normal level cannot be set, but, they still can access the level and view.

**Programming Level:** The functions in programming level cannot be set, but, they still can access the level and view.

**All:** Normal Level and Programming Level have been locked.

## UP Key Function:

The UP key on front panel can be set to be the same function as what was **ECI 1** set.

## Down Key Function:

The DOWN key on front panel can be set to be same function as what was **ECI 2** set.

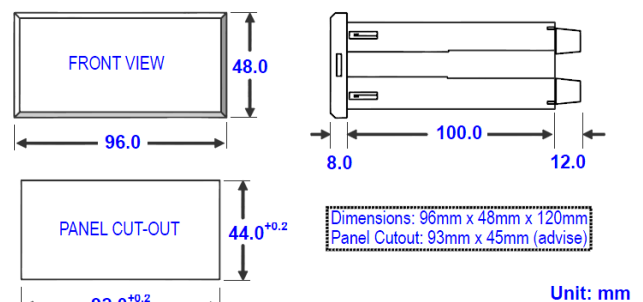
## For example:

If the **[EC 1.1]** in **[EC GROUP]** was set to the **[uHLd]** function, and **[E 1:UP]**

was set to be **[YES]**. It means, when you press the UP key, the PV will hold and if the square LED EC11 is bright press the UP key again.

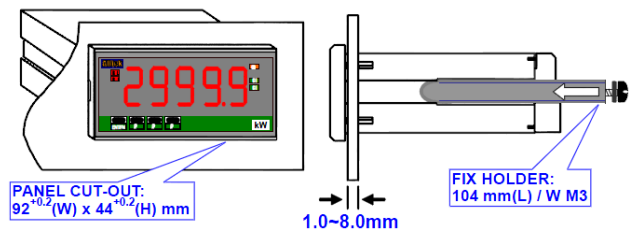
In case UP or Down Key functions have been set, the terminal of ECI will be locked out.

## DIMENSIONS



## INSTALLATION

The meter should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation.



## WIRING DIAGRAM 3P4W

### Connection with current transformers

