

## DESCRIPTION

MWH-10 Energy Meter provide high accuracy measurement, display and communication of Active Power & Energy. They are also building in 2 Relay outputs, 2 External Control Inputs and 1 RS485(Modbus RTU Mode) or Pulse output interface with versatile functions such as remote I/O, alarm and communication for a wide range of applications.

The meter has been designed in a timer for accumulation time setting of energy. When the time is over of setting, the energy will stop to accumulate; even the load has been running. It's very useful function for consumption testing of electric appliances and equipments.



## FEATURE

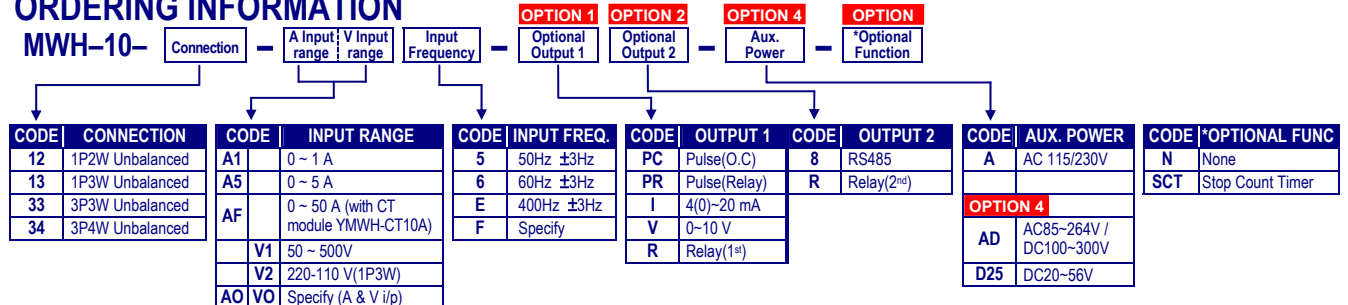
- Measuring Watt & Watt-Hr / 1P2W, 1P3W, 3P3W, 3P4W Unbalanced systems
- **Direct input 500V / 50A maximum with high accuracy current transformer.**
- Dual display for Watt & Watt-Hr and selectable engineer unit
- 2 relay can be programmed individual to be a Hi / Lo / Hi Latch / Lo Latch energized with Start Delay / Hysteresis / Energized & De-energized Delay functions, or to be a remote control.
- 2 external control inputs can be programmed individual to be relative
  - Active Power(Watt): Relative PV (Tare) / PV Hold / Maximum or Minimum Hold /
  - Active Energy(Watt-Hour): Gate / Reset
  - Other application: Timer Reset / DI (remote monitoring) / Reset for Relay Energized Latch....
- Pulse output relative active energy and RS 485 communication port in option
- Outside dimensions is DIN standard (96 x 48 mm)
- CE Approved & RoHS

## APPLICATIONS

Control panels and Consumption monitoring  
Energy and tariff managements for building automation

Switchgear distribution systems  
Energy Testing Equipment

## ORDERING INFORMATION



## TECHNICAL SPECIFICATION

### Measurement & Connection

Connection	AC Input			Input Burden
	Voltage	Current	Freq.	
1P2W	50~500V <sub>rms</sub>	1A	50 Hz	Voltage: ≤0.5VA/phase or Current: ≤0.1VA/phase
1P3W	220V <sub>eff</sub> -110V <sub>rms</sub>	5A	60 Hz	
3P3W	50~500V <sub>eff</sub>	50A	400 Hz	
3P4W	50~500V <sub>eff</sub>			

\* The maximum input is 500V and 5A. If the input over the level please connects with CT or PT to the meters. **The 50A input is connected to a CT module.**

### Accuracy & Resolutions

Parameters	Accuracy	Resolution(Programmable)	Display Range
Active Power	0.5%	1/0.01K/0.1K/1K/0.01M/0.1M/1M	0~29999
Active Energy	0.5%	1/0.01K/0.1K/1K/0.01M/0.1M/1M	0~999999999
Stop Count Timer	0.001%	X	999(H):59(M):59(S)

### Input

- Measurement:** True rms measurement
- Waveform effect:** ≤ 0.2% of F.S. at 30% distortion
- A/D Converter:** 16 bits resolution
- Accuracy:** ≤ 0.5% of FS ± 1C;
- Sampling Rate:** 15 cycles/sec
- Response Time:** ≤100 msec.(when the AvG = "1") in standard
- Connection:** 1P2W, 1P3W, 3P3W, 3P4W, Unbalance
- Input Range:** Voltage: 0 ~ 500V<sub>eff</sub>(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/~ 50A (max.)  
CT ratio(primary) programmable: 1~9999.9A  
CT ratio(secondary) programmable: 1.000~9.999A  
**50A Direct input with optional module**  
Frequency: 50/60 Hz±3 Hz, 400 Hz±3 Hz

### Max. Input over capability:

- Voltage:** 2 x rated continuous;  
4 x rated for 2 seconds
- Current:** 3 x rated continuous;  
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:** Can be programmed to relative power or Energy  
*Hi / Lo / Hi.HLd / Lo.HLd / do / off*
- Relative Power:** Start delay / Energized & De-energized delay / Hysteresis / Energized Latch
- Functions:** 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  
**Relative Energy:** *Totalizer/Batch of energy and N/R/C mode selectable*  
**Functions:** *Energized time: 0:00.0~9(Minutes):59.9(Sec.)*

**External Control Inputs**

**Input Mode:** 2 ECI points, Contact or open collect input, Level trigger  
**Functions:** *There are flexible functions can be programmed for*  
**Power:** *Relative PV / PV Hold / Reset Max or Mini. Hold*  
**Energy:** *Gate / Reset / Timer enable / Timer Reset*  
**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:** 7 or 8 bit programmable  
**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.

**Pulse output(option)**

**Output mode:** Open collect: 30V/60mA  
 Relay: DC24V/1A(The output frequency has to under 50Hz)  
**Output range:** Maximum frequency: 1000Hz; duty cycle 50%  
**Pulse divider:** *1 Pulse/1~9999 Count programmable.*

**Electrical Safety**

**Dielectric Strength:** AC 2.0 KV for 1 min, Between Power / Input / Output / Case  
 ≥ 100M ohm at 500Vdc, Between Power / Input / Output  
**Insulation Resistance:** Between Power / Input / Relay / RS485 / E.C.I.  
**Isolation:** EN 55011:2002; EN 61326:2003  
**EMC:** EN 61010-1:2001  
**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

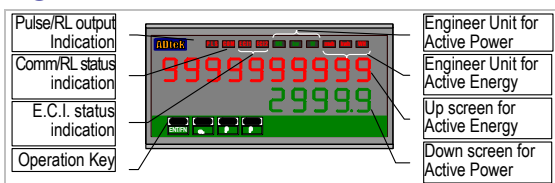
**Mechanical**

**Dimensions:** 96mm(W) x 48mm(H) x 120mm(D)  
**Panel Cutout:** 92mm(W) x 44mm(H)  
**Case Materiel:** ABS fire-protection (UL 94V-0)  
**Mounting:** Panel flush mounting  
**Terminal Block:** Plastic NYLON 66 (UL 94V-0)  
 10A 300Vac, M2.6, 16~22AWG  
**Weight:** 550g / 350g(Aux. Power Code: AH, D25)

**Power**

**Power Supply:** AC115/230V,50/60Hz; **Optional:DC20~56V or AC/DC100~300V**  
**Excitation Supply:** DC24V/30mA maximum in standard  
**Power Consumption:** 5.0VA maximum  
**Back Up Memory:** By EEPROM

**FRONT PANEL**



**Display:** Dual screen display for active power and active energy  
**Power:** 4 1/2 digital; 0.28"(7.1mm) green high-brightness LED  
**Energy:** 10 digital; 0.28"(7.1mm) red high-brightness LED  
**Engineer Unit:** Power: 3 square green LED for W / KW / MW  
 Energy: 3 square red LED for WH / KWH / MWH  
**Pulse output indication:** 1 square red LED  
**PLS** display will flash when the meter outputs pulse according to the accumulate of active energy.  
**PLS** flashing quicker means the accumulate of

energy quickly.

**RS 485 communication:** 1 square red LED  
**COM** will flash when the meter is receive or send data, and **COM** flash quickly means the data transient quickly  
**E.C.I. function indication:** 2 square red LED  
**EC1** display when External Control input 1 close(dry contact)  
**EC2** 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/Func 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 pass word so that access **Engineer Level** for configuration. the meter can be changed the pass word in **Engineer Level**. If you forget the pass word, please contact with our company.

**Lock Function:**

**Energy Reset:** 4 pass word reset in input group  
 4 lock mode for None / User Level / Engineer Level / All(Engineer Level & User Level)  
**None:** No lock, all function can be set and change  
**User Level:** The functions in User level can not be set, but, they still can access the level and view.  
**Engineer Level:** The functions in Engineer Level can not be set, but, they still can access the level and view.  
**All:** User Level and Engineer Level have been locked.

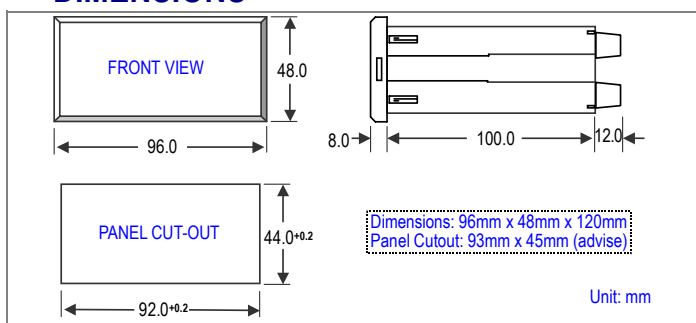
**UP Key Function:**

The UP key on front panel can be set to be same function as what was **EC1** set.  
**Down Key Function:** The DOWN key on front panel can be set to be same function as what was **EC2** set.

**For example:**

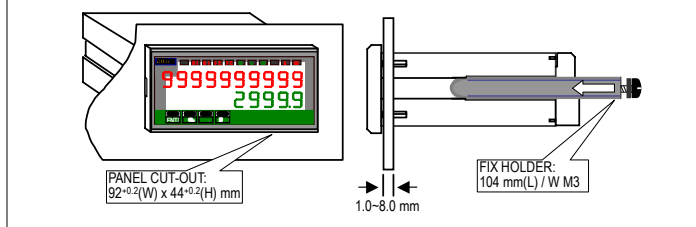
If the **[ EC1.1 ]** in **[ ECI GroUP ]** was set to be **[ Pv.HLd ]** function, and **[ E.1=UP ]** was set to be **[ YES ]** . It means, when you press the UP key, the PV will be hold and the square LED of EC11 will be bright until you press UP key again.  
 In case of UP or Down Key function have been set, the terminal of ECI will be locked out.

**DIMENSIONS**



**INSTALLATION**

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

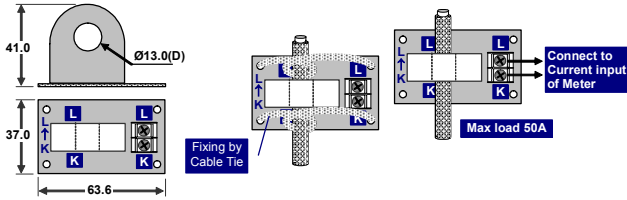


## CONNECTION DIAGRAM

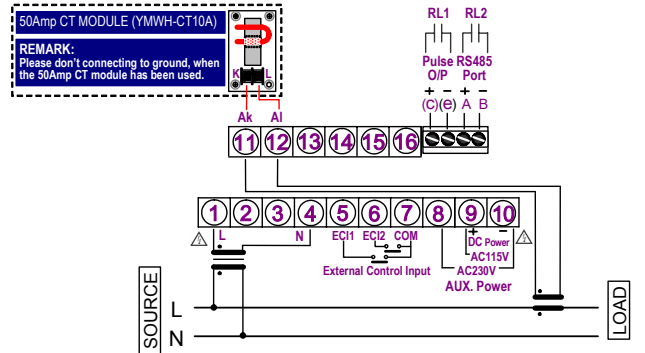
Please check the voltage of power supplied first, and then connect to the specified terminals. It is recommended that power supplied to the meter be protected by a fuse or circuit breaker.

RS485 / Pulse / Relay wiring: AWG22~16(0.5~1.3mm<sup>2</sup>)  
 Other: Wiring: AWG15~10(1.5~2.5mm<sup>2</sup>)

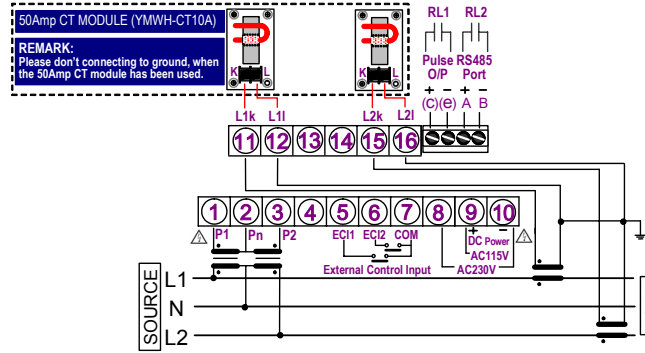
### High precision CT module – YMWH-CT10A – 0.1class



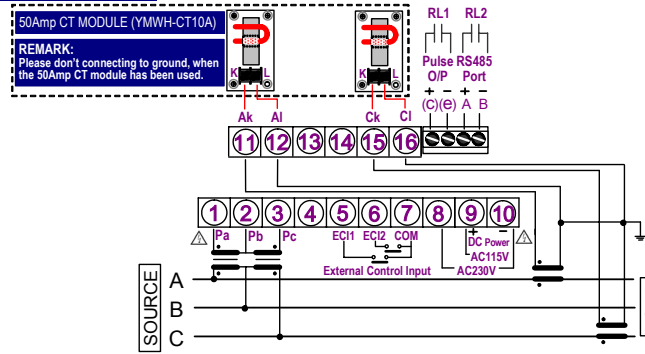
### 1Phase 2Wire



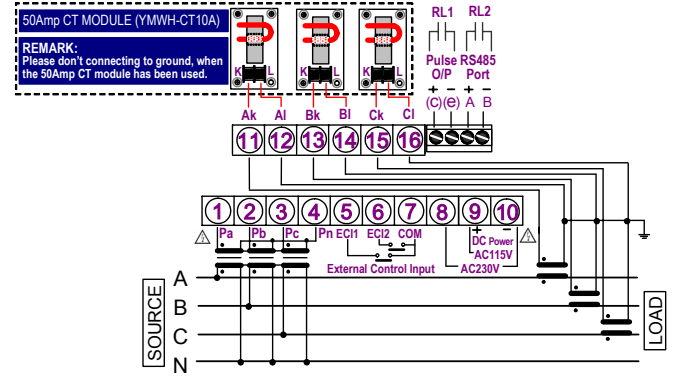
### 1Phase 3Wire



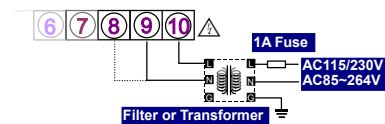
### 3Phase 3Wire



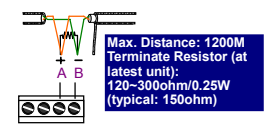
### 3Phase 4Wire



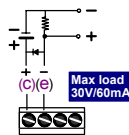
### Aux. Power Connection



### RS485 Communication Port



### Pulse Output



## FUNCTION DESCRIPTION

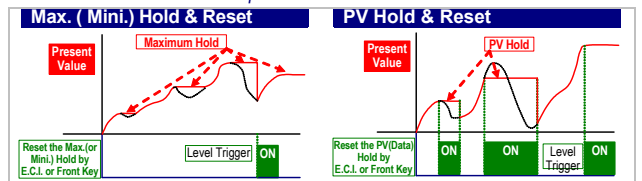
### Display & Functions

#### Display Messages:

**ovFL**, when input is over 120% of +signal range  
**-ovFL**: Appears when input is under -120% of -signal range  
**Max / Mini Memory**: The meter will store the maximum and minimum reading in [ user level ] during power on in order to review status of reading.

#### Display functions:

**PV / Max(Mini) Hold / RS 485 Selectable in display**  
**Function of [Input Group]** (Please refer to step A-12)  
**Present Value [Pv]** : The display will show the value that relatives to Input signal.  
**Maximum Hold [Max.H] / Minimum Hold [Mini.H]** : The meter will keep display in maximum(minimum) value, until manual reset by front key in [User Level] , [External Control Input] (E.C.I.) is close or press front down or up key to reset (UP Key or Down Key function have been set) Please find the sticker that enclosure the package of the meter to stick on the up side of square red LED



**Remote display by RS485 command [RS485]** : The meter support a **innovation solution** that the value received from RS485 command of master. In past, The meter normally receive 4~20mA or 0~10V from AO module or BCD code from DO module of PLC. The innovation solution **saves cost and wiring** from PLC.

**PV Hold [Pv.Hld]** : [External Control Input(E.C.I.)] can be set to be [PV Hold] function(Please refer to the function of ECI Group). The display will be hold, when the E.C.I. is closed.

➤ Please find the sticker to stick on the up side of square red LED.

#### Low Cut:

[Lo.Cut] Settable range: -29999~29999 counts  
 If the setting value is positive, it means when the absolutely value of PV ≤ Setting value, the display will be 0. If the setting value is negative, it means when the PV under setting value(PV ≤ -Setting value),









