

## User's Guide - Multi-GEM 12

For the more information of Multi-GEM 12, please refer full version manual (soft copy) that you can get via e-mail and homepage.

### 1. Introduction

Multi-GEM 12 is installed in electric distribution and local panels for supplying power to their production line. It measure the voltage and current, and calculate the power in real-time. You can monitor and manage the energy of equipment. It can help to operate efficiently and to reduce the energy consumption.

This equipment is capable of accurate analysis and diagnosis equipment for various problems of energy management and power plants.

### 2. Characteristics

- Multi channel power meter (Multi-GEM 12) is able to measure and monitor multi electric power loads.
- Max 12 single phase or 4 3P4W feeders power monitoring
- Measurement : V (L-N, L-L) , A, Hz, PF, Unbalance, Power(P,Q,S), Energy (P,Q,S).
- 1.0/0.5 Class accuracy for power measurement conformed by IEC61557-12
- Flexible application for the single phase/ 3phase 4wire / 3phase 3wire power line.
- Sag/Swell / Over Current / Temp Alarm.
- Total Harmonics Distortion (THD)
- Support Ethernet (Modbus TCP) and Wi-Fi.
- Support Cloud energy platform.
- Compact size for easy installation in narrow space (62 x 96 x 56 mm)

### 3. Specification

Model	Multi-GEM 12	
Power system	3P3W, 3P4W, 1P2W, 1P3W	
Power Input	100 ~ 240 VAC, Max. 0.05A, 50/60 Hz	
Measuring Inputs Rating	Voltage	Max. 415 V 3~ L-L, 240V L-N, CAT III Max. 1000 A, 3~
	Frequency	50/60 Hz
	CT type	VT model : Secondary Current = 333mV
Communication	LAN Wi-Fi (Option)	
Usage	Indoor use	
Altitude up to	2000 m	
Operating Temperature	-10°C~55°C	
Storage Temp.	-25°C~70°C	
Humidity	Maximum relative humidity 80% R.H. for temperatures up to 31 °C decreasing linearly to 50 % R.H. relative humidity at 40 °C	
Standards	IEC 62053-21/22	

#### Measurement

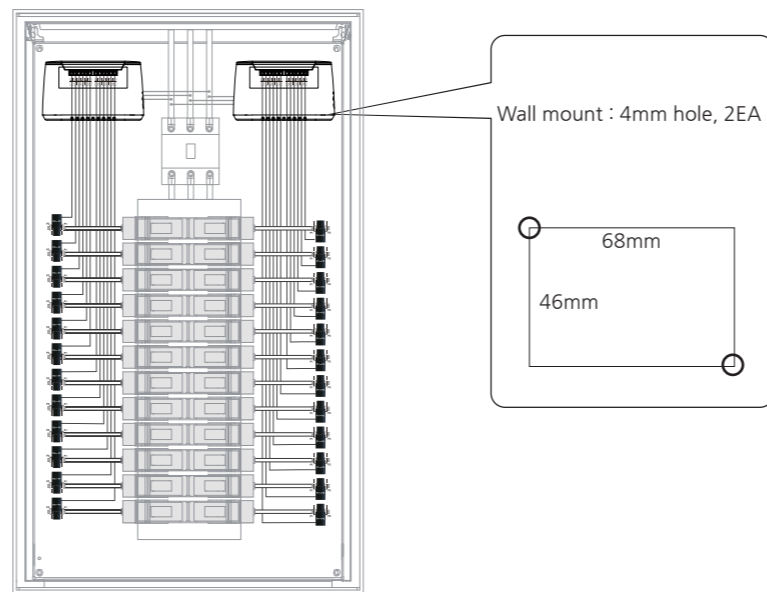
Item	Unit	Display		Accuracy
		Digit	Digit	
Phase voltage	V	0.0 ~ 99,999		±0.2% Reading
Line voltage	V	0.0 ~ 99,999		±0.2% Reading
Line current	A	0.0 ~ 99,999		±0.2% Reading
Active power	W	±0 ~ 999,999,999		Class 0.5S
Reactive power	Var	±0 ~ 999,999,999		Class 0.5S
Apparent power	VA	0.0 ~ 999,999,999		Class 0.5S
Frequency	Hz	45.00 ~ 65.00		

Item	Display		Accuracy
	Unit	Digit	
Power Factor	%	± 100.00	
Temp. (NTC)	°C	-20.0 ~ 100.00	
Voltage unbalance	%	00 ~ 100.00	
Current unbalance	%	00 ~ 100.00	
Phase angle	°	00 ~ 360.00	
THD	%	00 ~ 100.00	±0.5% Full scale
Active Energy	kWh	0.0 ~ 999,999,999	
Reactive Energy	kVarh	0.0 ~ 999,999,999	
Apparent Energy	kVAh	0.0 ~ 999,999,999	

### 4. Installation

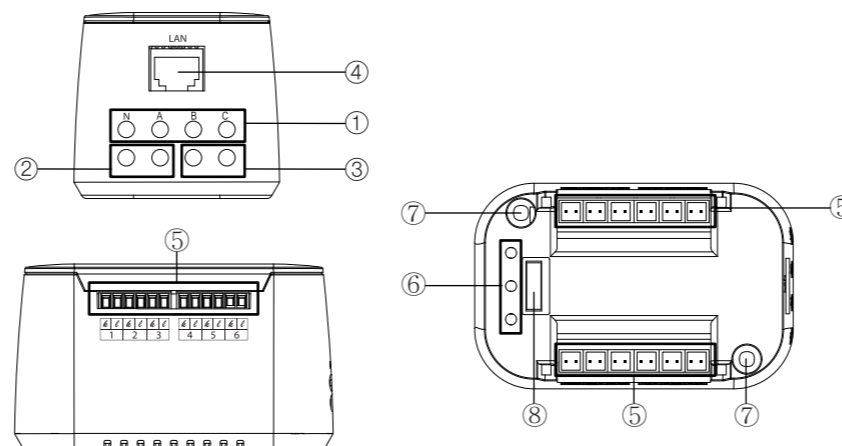
It needs to avoid a place where direct interference exists like as high temperature and electromagnetic field for the installation. Please check the environment condition around Multi-GEM 12 below for a correct operation.

Item	Condition
Location	Indoor
Operation temp,	-10°C to 55°C [14°F to 122°F]
Storage temp,	-25°C to 70°C [-13°F to 158°F]
Operation humidity	Non condensation, 5% R.H. to 80% R.H.



- Create two 4mm holes using the mounting hole guide in manual.  
→ The upper left and lower right position of the 68 x 46mm rectangle.
- Fix the product by using bolts provided.

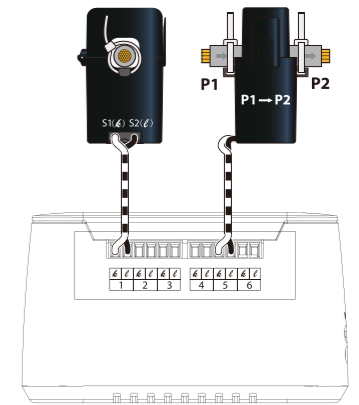
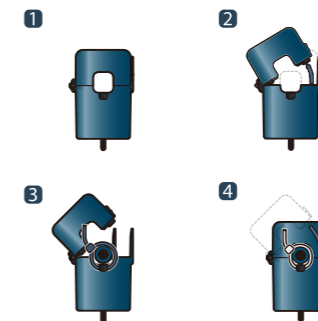
### 5. Name of parts



No.	Name	Description
1	Screw fixing holes	Screw holes for fixed terminals
2	Control Power	Supply the control power to the gems 3512 (AC/DC 100~240V) , Wire Size : 12 ~ 24AWG
3		N : Neutral (AC), -(DC) connection, A : Line (AC), +(DC) connection
4	Voltage Input	Voltage input terminal for measurement , Wire Size : 12 ~ 24AWG
5	Ethernet Port	Communication with Master (Modbus Slave) Protocol : Modbus TCP/IP Speed : 10/100 Mbps Automatic selection
6	CT Port	CT Input Terminal
7	Wall mount	Bolt spec : D = 4mm / L = 55mm
8	Upgrade Port	Upgrade Port

#### ◆ Example of CT wiring

How to use >>>



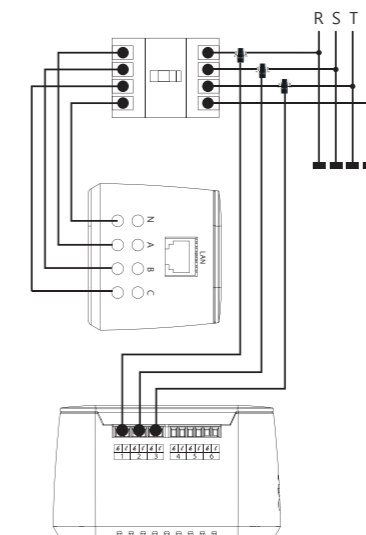
CTs are connected to this terminal. The terminal must meet the correct side of CT to measure power correctly.

◇ Wiring with a CT should follow the direction of CT that power line side is at S1 (⚡) of CT and Load side is at S2 (⚡) of CT

### 6. Voltage Input Terminal

You can select the 1P3W, 3P4W or 3P3W by setting menu.

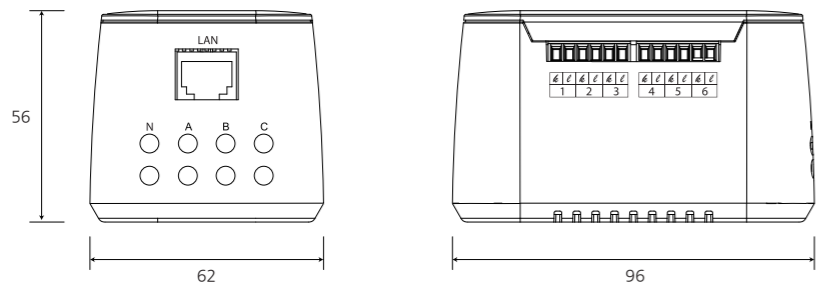
#### ◆ Wiring of 3Phase 4Wire system



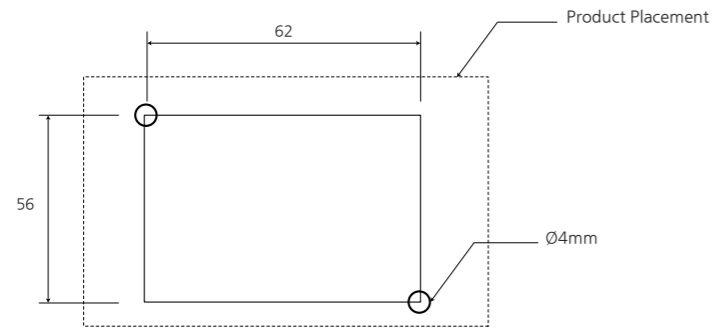
Pin Wiring	Input Port
R	A
S	B
T	C
N	N

CT Wiring	Input Port
(R)A	1,4,7,10
(S)B	2,5,8,11
(T)C	3,6,9,12

## 7. Dimension



For wall-mount holes (actual size is available when using fixed-hole operations).



## 8. Connecting Multi-GEM12 using Wi-Fi (Wi-Fi models only)

Multi-GEM12 with Wi-Fi can set Wi-Fi through the following process.



Step 1) Connect your device through the LAN with Multi-GEM 12 Utility software and click READ CONFIG.

Step 2) Set USE and DHCP to "Used" in the WIFI field.

Step 3) Enter the router information (router name and password).

Step 4) Click WRITE CONFIG(4-1) and ROM SAVE(4-2).



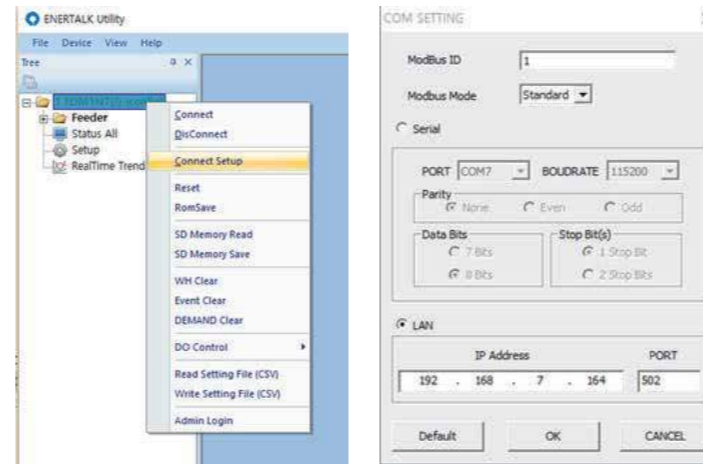
Step 5) If you click READ CONFIG and the information is updated, you can check the IP of Wi-Fi.

Step 6) Enter IP of Wi-Fi in CONNECT SETUP, and Wi-Fi connection is available.

## 9. Configuration software

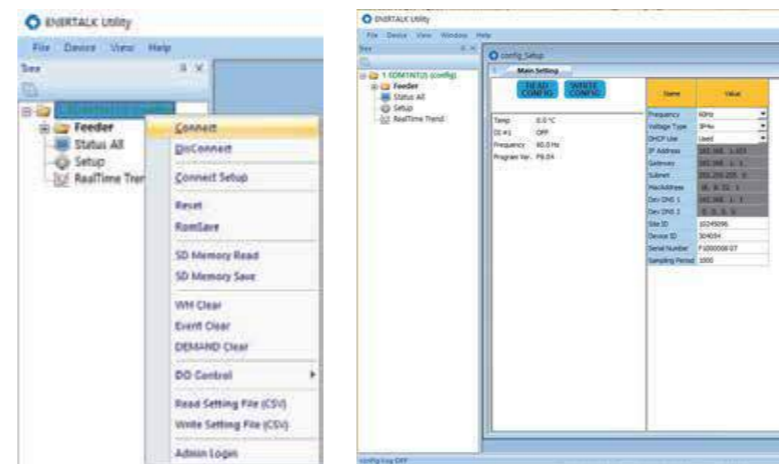
The IP of the original factory shipment is "192.168.7.164".

- To use LAN, you should set the PC IP as 192.168.7.xx
- Connect the LAN cable between the device and the PC.
- Verify communication using the Ping check.
- Running gems Utility at PC
- If this is the first time, select Device->Add/Remove in menu.
  - Device Name : the installation location, such as an identifiable name, distributor name
  - Device Type : Select the Multi-GEM12
  - Default Setting File : Select the file for reading preference.
  - File Read : Whether or not to execute the Default Setting File.
- Click the right mouse button in the left pane, and then click Device connect Setup.
- Select the LAN and then enter the IP address of the device.  
(Default IP : 192.168.7.164, Port : 502)



8. Click Connect to start the communication.

9. Click the Setup of the equipment.



## 10. Configuration

- Feeder Count : Number of feeders (Branch + Incoming)  
(Incoming : 3P4W 1EA, Branch : 3P4W 3EA, In case of 1P2W 2EA --> " 6 ")
  - Frequency : Select Frequency (50/60 Hz)
  - Voltage Type : Measurement Power Type (3P4W, 3P3W, 1P3W)  
(In case of single phase --> Select "3P4W" )
  - For the remaining items : Default
- Other settings (ETC)
    - 1st PT ratio : 220V (Default, Voltage to express, ex) 6,600V
    - 2nd PT ratio : 220V (Default, Voltage applied to the device)
  - Communication
    - When used to set a fixed IP
    - After the DHCP disable available.

CONFIG		ETC			COMMUNICATION	
Name	Value	Name	Value	Unit	Name	Value
Feeder Count	4	Temp Alarm	45.0	°C	Protocol	standard
Channel Type	18ch	Deadband	5	%	Modbus ID	1
Frequency	60Hz	1st PT ratio	220		485 port	not used
Voltage Type	3P4w	2nd PT ratio	220		485 baudrate	115200
DO Alarm	not used	Sag Level	198.0	V	TCP port	502
DO Reset	Status Change	Swell Level	242.0	V	IP Address	192.168. 1. 64
PF Sign	IEC	Sag Period	20	Half Cycle	Gateway	192.168. 1. 1
VA Type	Vector	Swell Period	20	Half Cycle	Subnet	255.255.255. 0
DataUpdate(sec)	0	DC Time	5	sec	MacAddress	16. 7. 21. 1
Temp Ai Type	NTC	DemandTime	15	Min	Dev DNS 1	192.168. 1. 1
MinTemp	0.0	Alarm Level 1	80	%	Dev DNS 2	0. 0. 0. 0
MaxTemp	0.0	Alarm Level 2	90	%		
		Alarm Level 3	100	%		

## 10. Appendix

### 1. Accessory

- You have to use authorized CTs that used with Multi-GEM 12.
- You have to use CTs certified by IEC/UL standards.

### Warning

It may cause the serious injury or death if a person handle the low and high voltage electricity with careless during installing and operating the product.

- Hazardous voltage always exists on the connecting terminal of PT/CT, Digital Input/Output, Control power always when it is on the power line
- Be sure to follow the safety instruction in this manual during installation and maintenance of the product. Keep the specified specifications and electric regulations.
- Take care that do not touch the terminals and wire sheath after the wiring is finished.

### 2. Limitation of responsibility

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