

Owner's Manual

Original Instructions

Intelligent Billing System

Model:

EPCSG-01

To Users

Thank you for selecting Energolux's product. Please read this instruction manual carefully before installing and using the product, so as to master and correctly use the product. In order to guide you to correctly install and use our product and achieve expected operating effect, we hereby instruct as below:

- (1) This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.
- (2) In order to ensure reliability of product, the product may consume some power under stand-by status for maintaining normal communication of system and preheating refrigerant and lubricant. If the product is not to be used for long, cut off the power supply; please energize and preheat the unit in advance before reusing it.
- (3) Please properly select the model according to actual using environment, otherwise it may impact the using convenience.
- (4) This product has gone through strict inspection and operational test before leaving the factory. In order to avoid damage due to improper disassembly and inspection, which may impact the normal operation of unit, please do not disassemble the unit by yourself. You can contact with the special maintenance center of our company if necessary.
- (5) For personal injury or property loss and damage caused by improper operation such as improper installation and debugging, unnecessary maintenance, violation of related national laws and rules and industrial standard, and violation of this instruction manual, etc., we will bear no liability.
- (6) When the product is faulted and cannot be operated, please contact with our maintenance center as soon as possible by providing the following information.
 - 1) Contents of nameplate of product (model, cooling/heating capacity,

product No., ex-factory date).

2)Malfunction status (specify the situations before and after the error occurs).

- (7) All the illustrations and information in the instruction manual are only for reference. In order to make the product better, we will continuously conduct improvement and innovation. We have the right to make necessary revision to the product from time to time due to the reason of sales or production, and reserve the right to revise the contents without further notice.

Important Statements

Dear User,

Thank you for choosing Intelligent Billing System. This system consists of two parts: Intelligent Billing Eudemon (computer software) and Power Billing Gateway. It should be used with KWH meter, current transformer and router. By deciding to use this system, you understand and accept the following terms:

- (1) Energolux reserves all rights for the final interpretation of this calculation method.
- (2) This Intelligent Billing System provided by Energolux will not accept any test or verification done by any entity or person in terms of the reasonableness of the calculation method.
- (3) Our company will not assume any legal responsibility if product fails to work normally and/or results in other losses because of force majeure such as hacker attack, government regulation, power failure or other network and communication problem.
- (4) When using Intelligent Billing System, make sure the gateway is power connected. Our company will not assume any legal responsibility for any losses caused by power failure of the gateway.
- (5) All graphics in this manual are for reference only. Please refer to the actual product.

Before installing and using this device, please pay special attention to the following items:

1) Device Installation

- ① Make sure this device is installed indoors in an electric control cabinet that is difficult to reach and is securely locked.
- ② Please install this device in a place without either wave interference or dust.
- ③ Power cord must be arranged separately from communication cables.
- ④ Never lay the power cord and communication cables along with a lightning conductor.
- ⑤ Make sure the indoor unit will not be powered off arbitrarily. Otherwise other indoor units that are in the same system will not function normally (poor cooling, malfunction of lack of indoor unit).

⑥ Normal working conditions for Power Billing Gateway:

- a. Temperature: -20 ~ +60℃;
- b. Humidity: less than 85%;
- c. Location: indoor (it is highly recommended to install this product in the electric control cabinet), not subject to direct sunlight, rain and snow etc.

2) Power Supply

- ① Installation must be performed by professional personnel. Improper installation may result in fire hazard or electric shock.
- ② Do not insert the power plug into a power socket until you make sure it is dry and clean.
- ③ Before touching the electric components, make sure the device is power-off.
- ④ Never touch the device with wet hands, otherwise electric shock may occur.
- ⑤ Power cord of stated specification must be used. Poor contact or improper installation may lead to fire hazard.
- ⑥ If power cord is connected inversely or the input power is out of the allowable range, it may lead to fire hazard or even cause damage to the device.

3) Communication

- ① Make sure the communication cables are connected to correct ports, otherwise communication error will occur.
- ② After the circuit is connected, use insulated adhesive bandage to protect the circuit from oxidation and short circuit.

4) Debugging

- ① If main board of outdoor unit needs to be replaced, each DIP switch of the new main board must be the same with that of the original board.
- ② If KWH meter needs to be replaced, the code of the new KWH meter must be different from that of the original KWH meter.
- ③ To ensure accurate billing, prohibit cutting off the power supply of KWH meter. Otherwise, it may lead to abnormal calculation of electricity
- ④ If main board of indoor unit needs to be replaced, the project code of the new main board must be the same with that of the original board.
- ⑤ If the unit or gateway needs to be replaced, it's necessary to confirm whether matched resistance is connected to the unit or gateway. Configure the new

unit or gateway according to the confirmed results.

- ⑥ If any change is made to the unit, for instance, adding or reducing units, gateway must be restarted. 3min after gateway is restarted, start up the Intelligent Billing Eudemon to restart self-check and configuration.
- ⑦ Please power on the gateway 3min after the unit is debugged and communication is normal. Do not enable software self-check and configuration until the gateway is energized for 3min.
- ⑧ If unit is found with errors, e.g. communication error, system conflict, project code conflict, etc, it is necessary to eliminate errors for the first time to ensure normal calculation.
- ⑨ Please install UPS power supply for the gateway and make sure the gateway is always energized so as to ensure normal calculation.
- ⑩ If the KWH meter has communication error, please eliminate the error immediately; otherwise calculation result will be incorrect.
- ⑪ If the indoor unit has communication error for a long time, please confirm whether it is power-off or damaged. If power connection is normal and the unit can be used, please eliminate the error in time.

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1 Safety Notices (Please be sure to abide)



Warning: If not abide strictly, it may cause severe damage to the unit or the people.



Note: If not abide strictly, it may cause slight or medium damage to the unit or the people.



This sign indicates that the operation must be prohibited. Improper operation may cause severe damage or death to people.



This sign indicates that the items must be observed. Improper operation may cause damage to people or property.



WARNING!

This product can't be installed at corrosive, inflammable or explosive environment or the place with special requirements, such as kitchen. Otherwise, it will affect the normal operation or shorten the service life of the unit, or even cause fire hazard or serious injury. As for above special places, please adopt special air conditioner with anti-corrosive or anti-explosion function.

2 System Overview

Intelligent Billing System includes (without limitation to) Intelligent Billing Eudemon, Power Billing Gateway, KWH meter, router and current transformer. System will automatically collect data from the air conditioning system and KWH meter and then distribute power consumption based on logical calculation.

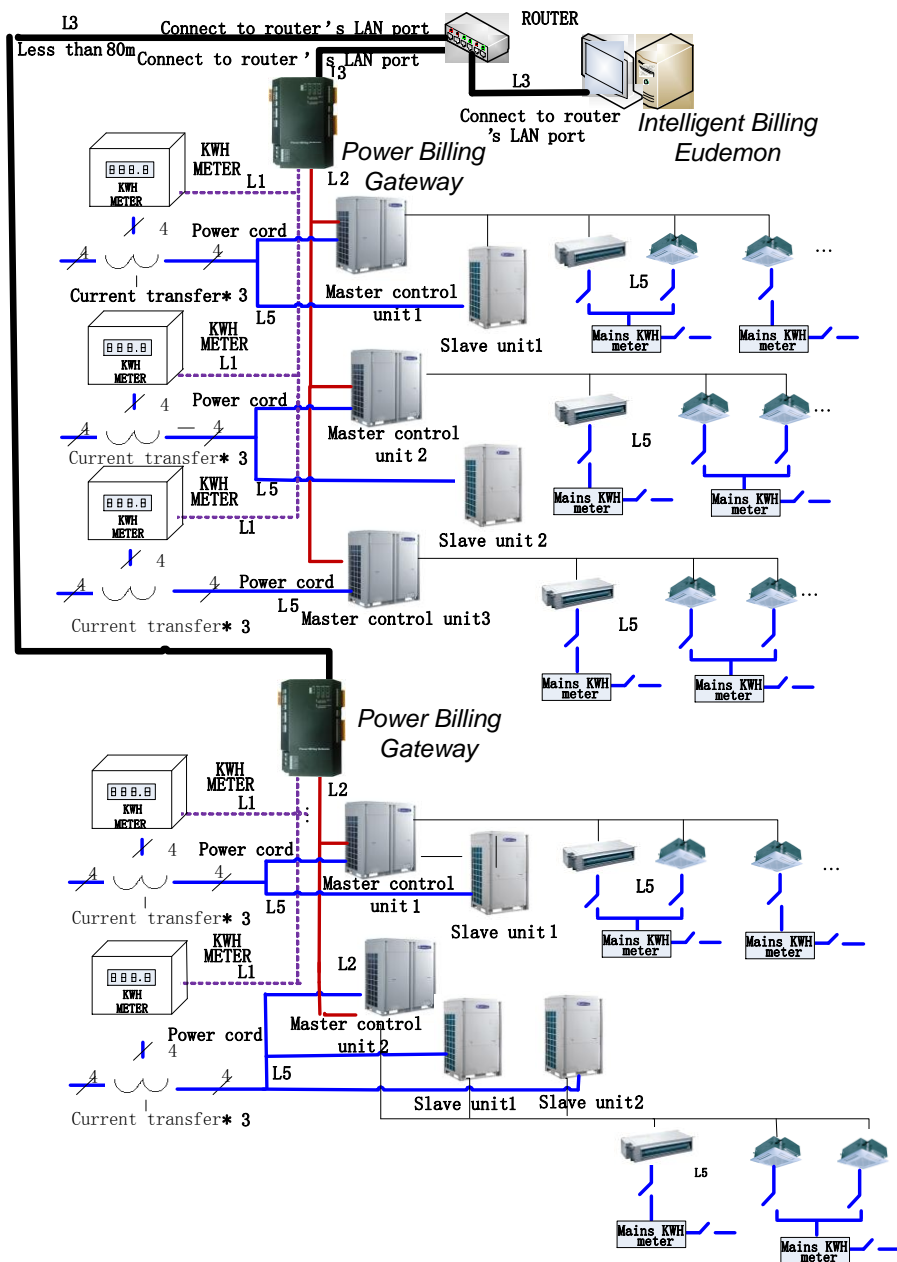
2.1 System Structure

User should prepare the following parts based on actual engineering conditions. Please check before installation.

Name	Quantity	Supply Type
Intelligent Billing Eudemon	As required	Standard supply
Router	As required	Self-supplied by user
Power Billing Gateway	Some	Standard supply
Electronic KWH meter	Some	Self-supplied by user
Current transformer	Some	Self-supplied by user

2.2 Network Topology

One set of Intelligent Billing System includes a Intelligent Billing Eudemon (computer software), some Power Billing Gateways, some KWH meters and current transformers. One gateway can be connected to 15 systems at most and 255 indoor units in maximum. User can determine the number of gateways in an Intelligent Billing System according to the number of units in a project. The number of KWH meters and current transformers should be determined according to units' load and the maximum electric current.



Instructions on Network Topological Diagram

L1: L1 in the above diagram is RS485 bus, which is used for communication between KWH meter and gateway. Total length of L1 should not exceed 800m. The number of KWH meters connected to L1 should not exceed 15.

L2: L2 in the above diagram is CAN2 bus, which consists of gateway and the master outdoor unit. Total length of L2 should not exceed 500m and the number of outdoor units connected to L2 should not exceed 15 (excluding slave modules). (In theory, the total length of CAN2 bus can be 500m—1000m. In actual application, wire material and environmental condition will affect the communication distance. Please refer to the actual case.)

L3: L3 in the above diagram is the standard ethernet connection line. Each network cable should not be over 80m's long. Each gateway and the Intelligent Billing Eudemon must be connected to router's LAN port.

L5: L5 in the above diagram is a power cable. One KWH meter can be connected with 2 refrigeration systems at most.

CAN2 network: One CAN2 network can be connected with 15 outdoor units and 255 indoor units in maximum. If there are over 15 sets of outdoor units or over 255 indoor units, two CAN2 networks must be used.

One Power Billing Gateway can only be connected with one CAN2 network. One set of Intelligent Billing Eudemon can be connected with 16 Power Billing Gateways at most.



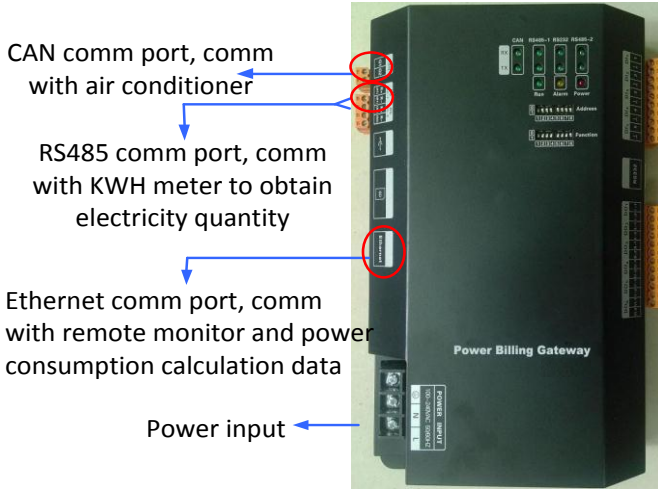
Note!

DIP switch of each gateway address under one router should not be identical; otherwise communication will not work!

3 System Details

3.1 Power Billing Gateway

3.1.1 Diagram of Ports



3.1.2 Power Supply

Power supply should be 100VAC-240VAC, 50/60Hz. Please pay attention to the following matters:

- (1)The port of power input must be connected with the ground; otherwise danger may occur.
- (2)Never touch the port of power input when the gateway is energized.
- (3)Gateway must be configured with UPS. We will not take any responsibility for any loss caused by power consumption calculation problem because of power failure of the gateway.



Note: Power cord should be fixed with the wire clip in the toolkit, as shown in

the picture.

Note: For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible.

3.1.3 Communication Ports



CAN communication port: Connect to air conditioners via two-core communication cable to obtain data from air conditioners;

RS485-1 communication port: Connect to the bus of KWH meter via two-core communication cable to obtain electricity quantity from KWH meter.

RS485-2 communication port: currently not available for this device.

USB, SD card ports: currently not available for this device.

Ethernet port: Connect via network cable to the computer that is installed with Intelligent Billing Eudemon.



DI and DO ports: currently not available for this device.

3.1.4 LED



CAN	RX	When data of the gateway-connected equipment (e.g. air conditioner) is received, this LED indicator will be flickering.
	TX	When data is transferring to the gateway-connected equipment (e.g. air conditioner), this LED indicator will be flickering.
RS485-1	RX	When data from the KWH meter is received, this LED indicator will be flickering.
	TX	When data is transferring to the KWH meter, this LED indicator will be flickering.
RS232	RX	This LED display is not applicable to this device.
	TX	This LED display is not applicable to this device.
RS485-2	RX	This LED display is not applicable to this device.
	TX	This LED display is not applicable to this device.
Power supply		If power supply of Power Billing Gateway is normal, this indicator will be on.
Operation		If Power Billing Gateway is operating normally, this indicator will be flickering.
Alarm		This LED display is not applicable to this device.

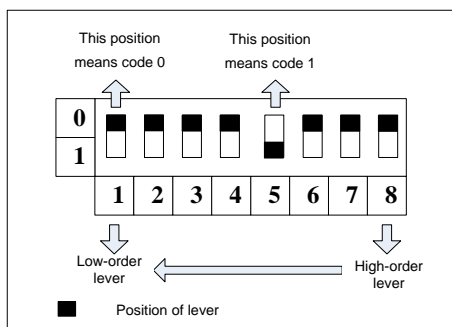
3.1.5 DIP Switch

※Before using this device, set the DIP switch first; otherwise the device will not work!

The setting zone of gateway DIP switch is combined of address DIP switch and functional DIP switch.



3.1.5.1 Diagram of DIP Switch



3.1.5.2 Address DIP Switch—Gateway Equipment Address Setting

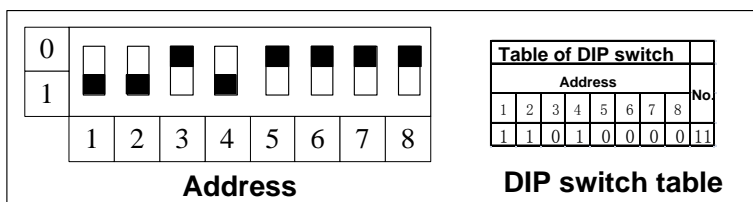
Address DIP switch is used for setting equipment address of gateway.

※Before using the gateway, set address DIP switch of gateway first. Address of DIP switch shall be different from one another in a same network (router); otherwise the Power Billing Gateway will not work.

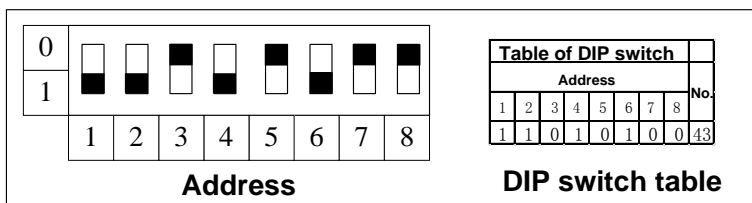
The range of address set for the gateway: 1~255. Please see the Table of DIP Switch for specific address numbers.

How to set an address:

The setting method of address 11 is as follows.



The setting method of address 43 is as follows.



3.1.5.3 The 8th Lever of Functional DIP Switch—CAN2 Bus Matched Resistance Setting

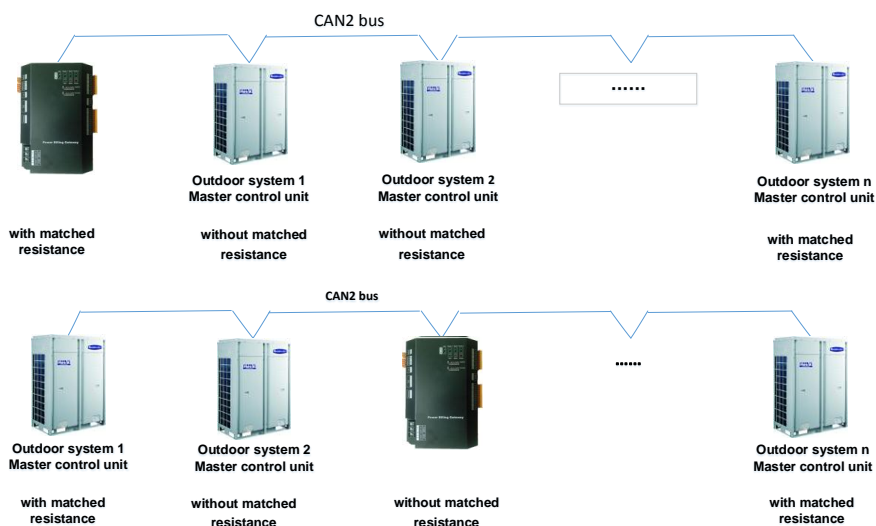
The master outdoor unit or gateway at the beginning or ending place of CAN2 bus must be set with matched resistance; otherwise communication will not work!

※ CAN2 bus: please refer to 4.2 Network Topological Diagram for its specific meaning.

The 8th lever of the functional DIP switch is used for setting matched resistance for gateway in CAN2 bus.

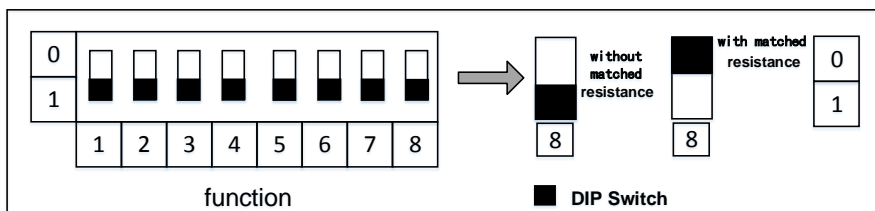
If gateway is at the beginning / ending place of CAN2 bus, it should be set with matched resistance, which means the 8th lever should be switched to 0.

If the gateway is not at the beginning / ending place of CAN2 bus, it should be set without matched resistance, which means the 8th lever should be switched to 1.



n refers to the number of outdoor systems. $n \leq 15$

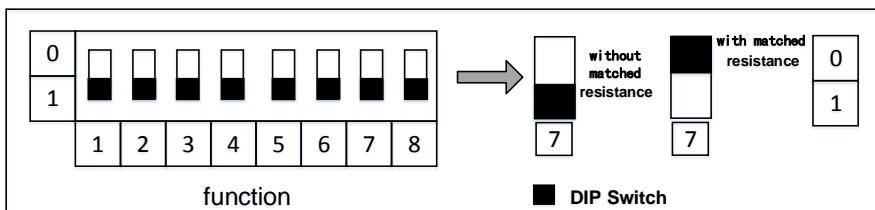
Diagram of Matched Resistance DIP Switch



3.1.5.4 The 7th Lever of Functional DIP Switch—RS-485 Bus Matched Resistance Setting

The 7th lever of the functional DIP switch is used for setting matched resistance for gateway in RS-485 bus (It is referred to as the KWH meter communication bus in the network).

If the gateway needs to be the joint with matched resistance in RS-485 bus, the 7th lever should be set with matched resistance.



3.1.6 Battery



This battery provides power for the hardware clock when the gateway is de-energized. When the battery power is insufficient, the clock of gateway will have failure, which may affect normal billing. If you find that the initial time of billing record is Jan, 2000 during operation, please contact the certified contractor.

Cautions:

Risk of explosion if battery is replaced by incorrect type. Dispose of used batteries according to the instructions.

3.2 KWH Meter & Current Transformer

Power Billing Gateway should be equipped with the applicable KWH meter and current transformer. Users should prepare the KWH meter and current transformer by themselves. Be sure that they are in compliance with the specified technical requirements.

※The KWH meter should be meter of mutual inductance. Power consumed by the unit is the electricity quantity detected by the meter (reading of the meter) *mutual-inductance ratio of current transformer.

Please select KWH meter and current transformer according to actual engineering status. For more details, please refer to Appendix A in this manual.

3.3 Router

In Intelligent Billing System, router is necessary for the communication between gateway and the computer software.

3.3.1 Selection Requirements for Router

Router should be selected according to the actual engineering conditions. Please select a router that is made by a well-known brand with high product quality. Make sure the router's DHCP function is available and MAC address can be configured and connected to the terminal. Gateway and the computer that is installed with Intelligent Billing Eudemon must be connected to router's LAN ports.

- (1) Router's type: enterprise router, industrial router
- (2) Support protocol (including but not limited to): TCP/IP, DHCP, ICMP, HTTP, UpnP
- (3) Number of LAN ports: select as required
- (4) Transmission rate: $\geq 100\text{Mbps}$
- (5) Configuration mode: WEB page management

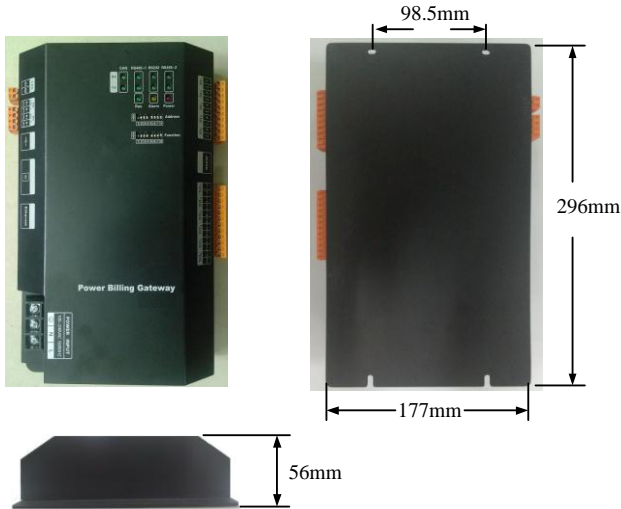
3.4 Intelligent Billing Eudemon

Please refer to the instruction manual of Intelligent Billing Eudemon.

4 Installation Guide

4.1 Gateway Dimensions and Installation Dimensions for Electric Control Cabinet

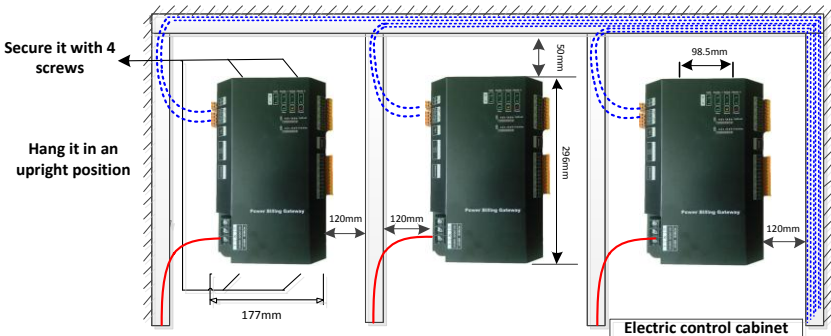
4.1.1 Gateway Dimensions



LxWxH: 296 x 177 x 56 (mm)

4.1.2 Installation Dimensions for Electric Control Cabinet of the Power Billing Gateway

Gateway must be installed inside the electric control cabinet. Hang it in an upright position and secure it with 4 screws. The space required for the installation is as below (only for reference).



Power cord and communication cable of the gateway must be arranged separately; otherwise malfunction will occur to the gateway!

Slim dotted line in the diagram indicates the communication cable while the thick dotted line indicates the heavy current lead. Above lines are only for reference.

4.2 Dimensions and Installation of KWH Meter & Current Transformer

Please refer to the installation instruction manuals of specific KWH meter and current transformer for the dimensions and installation of KWH meter and current transformer.

4.2.1 Setting Requirements for KWH Meter

In order to guarantee calculation accuracy, please set the KWH meter according to the following requirements:

- (1) When configuring the KWH meter, please set the current transformation ratio according to actual requirement.
- (2) Set the voltage transformation ratio of KWH meter to be 1 to prevent repeated calculation;
- (3) Addresses of KWH meters on a same bus must be different from one another; otherwise communication error will occur;

4.2.2 Connection Diagram of Current Transformer and KWH Meter

Please refer to the installation instruction manuals of specific KWH meter and current transformer.

4.2.3 Wiring Diagram of KWH Meter & Current Transformer

Please refer to the installation instruction manuals of specific KWH meter and current transformer.

4.2.4 Notices for Using KWH Meter

- ① Please refer to KWH Meter Instruction Manual to install the KWH meter.
After wiring is finished, fix the cover of KWH meter in place to avoid security risk.
- ② Connect voltage in strict accordance with the voltage grade stated on nameplate. If the input voltage is 1.5 times larger than the rated voltage,

even for a short time, the instrument may be damaged.

- ③ Connect wires in strict accordance with the wiring diagram pasted on the back of KWH meter cover. After turning on the power, check the voltage, current, active power, inactive power and their poles displayed by the KWH meter. Check the screen of malfunction display to judge the wire connection and operation status of the instrument.
- ④ It is suggested to use 3-core shield wire to connect the RS485. The 3 cores will connect terminals with A, B and communication of the meter. The single end of shield layer should be connected to ground securely.
- ⑤ During installation, tighten up the wiring terminals and hang the instrument on a barrier that is secure, fire-proof and vibration-proof. In order to have the best visual effect, please install it vertically at a height of 1.8m.

4.2.5 Notices for Using Current Transformer

- (1) Please select the current transformer in strict accordance with the range of load. In order to ensure the accuracy of measurement, current under normal load shall reach 60% of the rated value of current transformer as much as possible. This is to avoid long-time overload operation and overheating of iron core and secondary coil, which will wear off or even damage the transformer.
- (2) Please use straight-through low voltage type current transformer. It is flexible and able to select transformation ratio according to actual current. Pay attention to the method stated on nameplate when confirming the number of windings. Usually the number of winding is based on the winding crossed through the center of transformer rather than the external winding. If the number of winding is calculated based on the external winding, power calculation will be incorrect.
- (3) When wiring for the current transformer, the secondary side must be reliably grounded. Dotted terminal must be consistent with one another.
- (4) When the current transformer is working normally, secondary open-circuit is forbidden because it will generate high voltage and affect personal and property safety.

4.3 Dimensions and Installation of Router

For dimensions and installation of router, please refer to the installation and instruction manual of the specific router.

4.4 Installation of Intelligent Billing Eudemon

For installation of Intelligent Billing Eudemon, please refer to the installation manual of the software.

4.5 Connection of Communication Cables

System is made up of different parts, so each part must be able to communicate effectively. Communication connection includes:

- (1) Communication between gateways and the computer that is installed with Intelligent Billing Eudemon;
- (2) Communication between gateways and air conditioners;
- (3) Communication between gateways and KWH meters;

4.5.1 Selection of Materials for Communication Cables

- (1) Select communication cable for gateway and KWH meter

Cable type	Communication cable for gateway and KWH meter L(m)	Cable size (mm ²)	Cable standard	Remark
Light/Ordinary PVC sheathed twisted pair copper wire(60227 IEC 52 /60227 IEC 53)	$L \leq 800$	$\geq 2 \times 0.75$	IEC 60227-5:2 007	If communication distance is over 800m, optoelectronic isolated relay device should be added.

- (2) Select communication cable for gateway and air conditioners

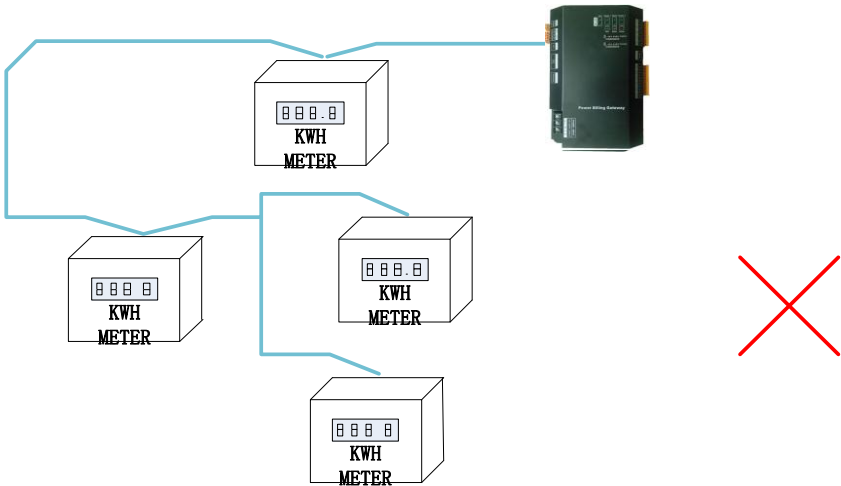
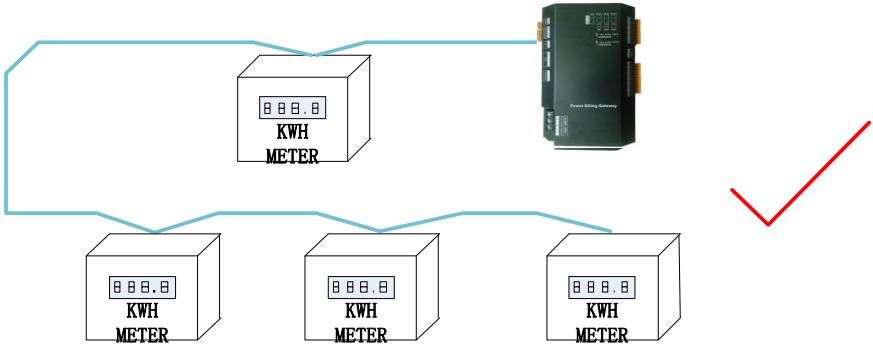
Cable type	Communication cable for gateway and air conditioners L(m)	Cable size (mm ²)	Cable standard	Remark
Light/Ordinary PVC sheathed twisted pair copper wire(60227 IEC 52/60227 IEC 53)	$L \leq 500$	$\geq 2 \times 0.75$	IEC 60227-5:2 007	Total length of communication cable should not exceed 500m.

(3) Select standard Ethernet communication cable for the communication between gateways and the computer that is installed with Intelligent Billing Eudemon.

4.5.2 Communication Connection Method

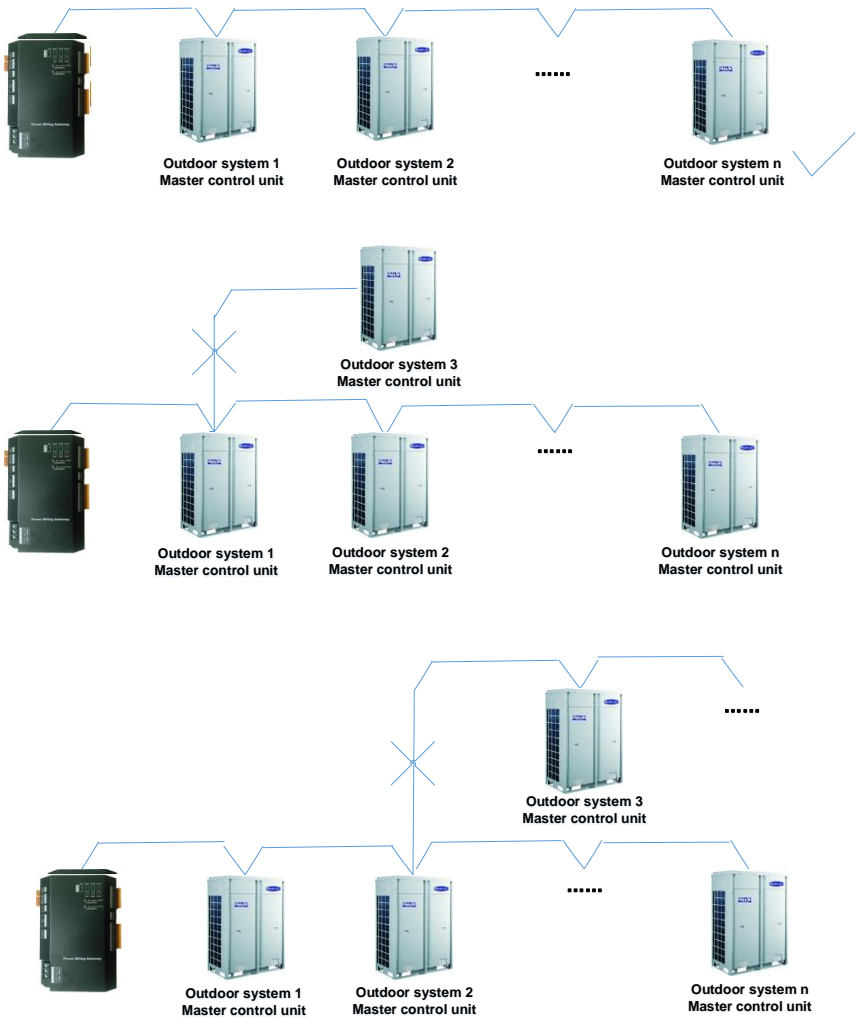
All communication cables of the gateways must adopt series connection instead of Y-connection.

(1) Communication connection between gateway and KWH meter



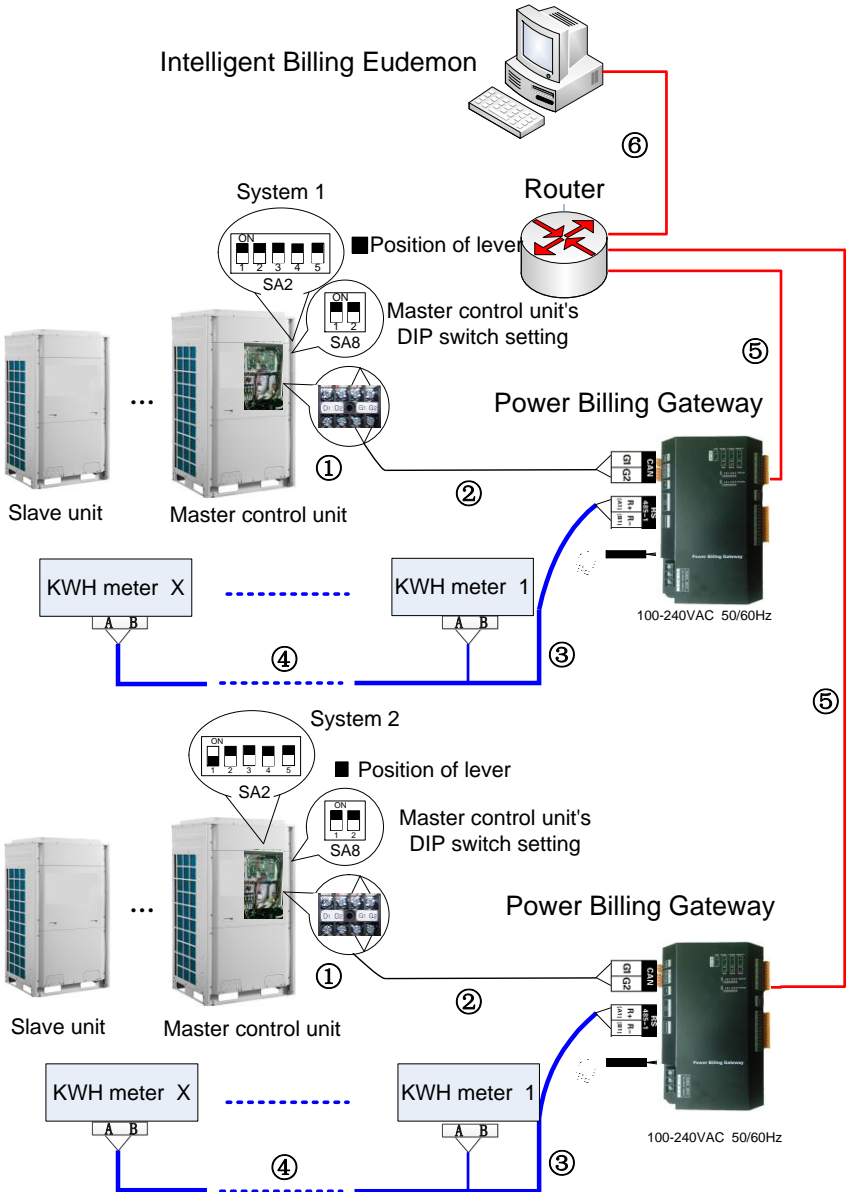
The number of KWH meters connected to one gateway should not exceed 15.

(2) Communication connection between gateway and air conditioners



n refers to the number of outdoor systems. $n \leq 15$.

4.5.3 Communication Connection Steps



(1) Communication cable connection between gateway and air conditioners:

Step 1: Confirm the master control unit that gateway is going to connect, as shown above. Switch the 2 levers of main board DIP switch SA8 to the "ON"

position, which means that the module is the master control unit. Meanwhile, make sure the address code of each refrigeration system connected to the gateway is different. SA2 is an address DIP switch. Please refer to "5.2.2 (2) Communication connection between gateway and air conditioners" and adopt series connection. See step ① in the above diagram.

Step 2: Connect G1, G2 terminals of CAN communication port of the gateway to the corresponding G1, G2 terminals of the patch board of master control unit via communication cables. See step ② in the above diagram.

(2)Communication cable connection between gateway and KWH meter:

Step 1: Connect R+, R- terminals of RS485-1 communication port of the gateway to the R+, R- terminals of KWH meter via communication cables. See step ③.

Step 2: Connect the KWH meters in one Intelligent Billing System in series via 485 communication cable. See step ④.

(3)Gateway DIP switch setting:

Step 1: Please refer to section 3.1.5.2 to set DIP switch for gateway's equipment address.

Step 2: Please refer to 3.1.5.3 ~ 3.1.5.4 to set matched resistance for the gateway.

(4)Communication cable connection between gateway and Intelligent Billing Eudemon software:

Step 1: Prepare a router with DHCP function.

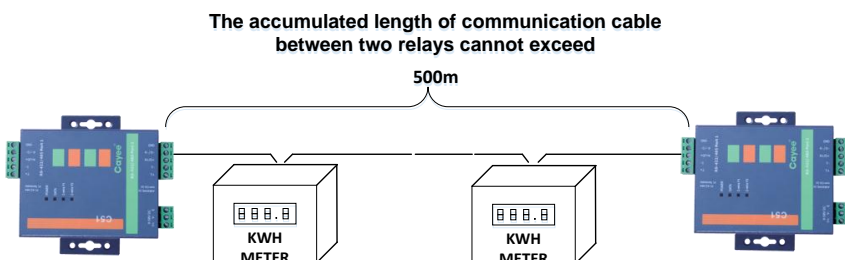
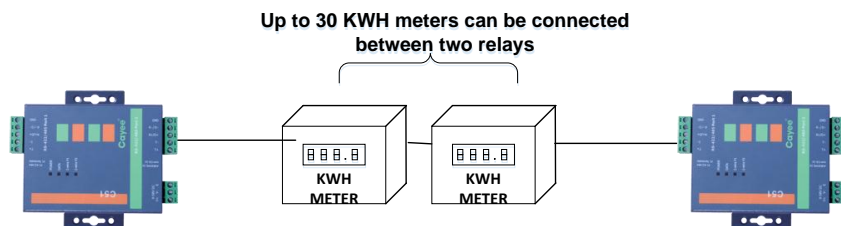
Step 2: Use standard ethernet connection cables to connect gateway with router, and computer to router. Gateway and the computer must be connected to LAN ports of the same router. See step ⑤.



Note:

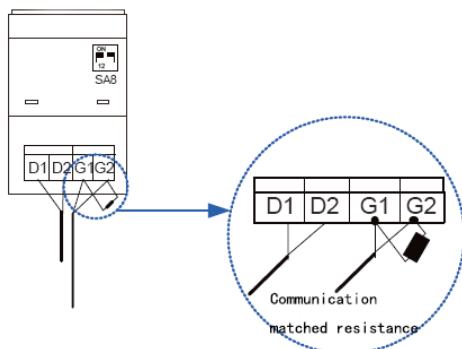
- ① In an RS485 bus, when there are more than 30 KWH meters connected or the communication distance is over 800m, an optoelectronic isolated relay device must be connected. Connect the R+, R- terminals of the relay device to the A, B terminals of RS485 communication port of a nearby KWH meter (i.e. R+ terminal of relay connects to A terminal of KWH meter; R- terminal of relay connects to

B terminal of KWH meter).



- ② In "3.1.5.3 The 8th Level of Functional DIP Switch—CAN2 Bus Matched Resistance Setting", setting method of gateway matched resistance is introduced. Likewise, the master outdoor unit at the beginning/ending place of CAN 2 bus should be set with matched resistance. Below is the setting positions and method for GMV5 DC Inverter Multi VRF Units:

Master control unit



5 Product Debugging

In order to make sure that the Intelligent Billing System can work accurately and reliably, it is necessary to conduct separate debugging and joint debugging for each part of the system.

5.1 Debugging of Air Conditioning System

The Power Billing Gateway needs to obtain the real-time status of air conditioners to ensure reliable calculation, so before debugging the calculation system, we have to debug the air conditioning units. Debugging requirements are as below:

- (1) Make sure each indoor unit project code under the CAN2 bus is different;
- (2) All outdoor and indoor units must be power connected;
- (3) No communication error occurs to the units;
- (4) Make sure there is no way to disconnect power of any indoor unit arbitrarily after all the indoor units are power connected; otherwise, other indoor units in the system will be affected.

Please refer to the debugging and installation instructions of air conditioning units for the debugging methods of air conditioners.

5.2 Debugging of Gateway

Gateway is an important part of the Intelligent Billing System, so we have to guarantee that the gateway can operate reliably and normally.

- (1) Before connecting power to the gateway, CAN2 bus of the units must be connected to the CAN port of the gateway;
- (2) Before connecting power to the gateway, make sure that all KWH meters can function normally and remember to connect the RS485 bus of KWH meter to the RS485-1 port of the gateway;
- (3) Before connecting power to the gateway, make sure all the units are power connected;
- (4) After the gateway is power connected, please wait for 3 minutes before using the software for detection.

5.3 Debugging of Software

Intelligent Billing Eudemon is a kind of software for the interaction between man and machine. By using Intelligent Billing Eudemon, user can realize gateway configuration, configure engineering information, export billing data and output billing details, etc. To ensure calculation accuracy, please confirm the following information before setting up the software.

- (1) Confirm that all the gateways that need for debugging have been powered on and started working, and are connected with computer via a router.
- (2) Confirm that room information matches the indoor unit project codes; otherwise configuration will fail and cause billing mistakes.
- (3) Confirm that each KWH meter is corresponding to its conditioning system; otherwise configuration setting will be wrong and lead to billing mistakes;
- (4) The software must be installed in an operating system that is in compliance with requirements (please refer to the instruction manual of the software for the specific requirements);
- (5) Confirm that the computer is dedicated to the Intelligent Billing System. Do not install any antivirus software, system management software or game software in the computer; otherwise the software may not be able to work reliably.

Please refer to the instruction manual of the software for the specific installation and operating methods.

Appendix A: Selection of KWH Meter & Current Transformer

Selection scheme 1

KWH meter model: ENTES EPR-04S-96

Parameters of ENTES EPR-04S-96

- (1) Measure the 3-phase voltage and electric current. Calculate the forward and reverse active electricity quantity;
- (2) Working voltage: 45-265V AC/DC;
- (3) Measuring voltage: 10-300V AC(L-N), 10-500V AC(L-L);
- (4) Frequency: 45-65Hz;
- (5) Reference current: 0.05-5.5A;
- (6) Communication port: RS-485 port;
- (7) Communication protocol: Modbus RTU.

Current transformer: comply with the following parameters.

Parameters of Current Transformer.

- (1) Rated voltage & frequency: 630V, 50Hz;
- (2) Grade of accuracy: 1;
- (3) Secondary rated current: 5A;
- (4) Rated output load: 5VA;
- (5) Rated primary current of current transformer: Select according to table 1.

Please use the current transformer made by a well-known brand with high reliability.

Table 1: Reference Table of Load and Mutual-Inductance Ratio

Rated capacity of unit (HP)	Rated capacity of unit (KW)	Mutual-inductance ratio of current transformer
≤18	≤50.4	50/5A
20~36	56~101	100/5A
38~74	106.4~207.2	200/5A
76~88	212.8~246.4	250/5A

Selection scheme 2

KWH meter model: Wattnode Modbus WNC-3D-240-MB

Parameters of WNC-3D-240-MB:

- (1) Measure the 3-phase voltage and electric current. Calculate the forward and reverse active electricity quantity;
- (2) Working voltage: 208-240V AC;
- (3) Frequency: 50/60Hz;
- (4) CT Input: 0.333Vac;
- (5) Communication port: RS-485 port;
- (6) Communication protocol: Modbus RTU.

Current transformer: Accu CT ACTL-0750-xxx

Parameters of Accu CT ACTL-0750-xxx.

- (1) Accuracy: 0.75%
- (2) Frequency :50 or 60 Hz
- (3) Output Options: 0.333 Vac, 1 V, 100 mA
- (4) Rated primary current of current transformer: Select according to table 2.

Table 2: Reference Table of Load and Mutual-Inductance Ratio

ODU capacity (Ton)	ODU capacity (KBTU/h)	Mutual-inductance ratio
6-8	72-96	50A
10-16	120-192	100A
18-24	216-288	150A
26-28	312-336	200A
30	360	250A

Note:

- ① “xxx” indicates the full scale current rating.
- ② WNC-3D-240-MB must match with Accu CT ACTL-0750-xxx for operation.

③ Selection scheme 3

KWH meter model: SIEMENS SENTRON PAC3200

Parameters of SIEMENS SENTRON PAC3200

- (1) Measure the 3-phase voltage and electric current. Calculate the forward and reverse active electricity quantity;
- (2) Voltage input: 95...240 V AC、50/60 Hz $\pm 10\%$
Or 110...340 V DC $\pm 10\%$;
- (3) Measuring voltage: max 690V/400V AC (L-L / L-N);
- (4) Current input: $\times 5$ A;
- (5) Communication port: (Ethernet can be expanded to be RS485);

Current transformer: comply with the following parameters.

Parameters of Current Transformer.

- (1) Rated voltage & frequency: 630V, 50Hz;
- (2) Grade of accuracy: 1;
- (3) Secondary rated current: 5A;
- (4) Rated output load: 5VA;
- (5) Rated primary current of current transformer: Select according to table 3.

Please select a proper current transformer based on local using environment and actual engineering condition (working condition, installation location).

Table 3: Reference Table of Load and Mutual-Inductance Ratio

Rated capacity of unit (HP)	Rated capacity of unit (KW)	Mutual-inductance ratio of current transformer
≤ 18	≤ 50.4	50/5A
20~36	56~101	100/5A
38~74	106.4~207.2	200/5A
76~88	212.8~246.4	250/5A

Note:

SIEMENS SENTRON PAC3200 must work with communication module SENTRON PAC RS485; otherwise, it cannot function normally.

Selection scheme 4

KWH meter model: Schneider iEM3255

Parameters of Schneider iEM3255

(1) Measure the 3-phase voltage and electric current. Calculate the forward and reverse active electricity quantity;

(2) Voltage input:

Measured voltage : Wye: 100 - 277 V L-N, 173 - 480 V L-L $\pm 20\%$

Delta: 173 - 480 V L-L $\pm 20\%$

Overload: 332 V L-N or 575 V L-L

Frequency: 50 / 60 Hz $\pm 10\%$

(3) Current input: $x/5$ A;

(4) Communication port: RS-485 port;

(5) Communication protocol: Modbus RTU.

Current transformer: comply with the following parameters.

Parameters of Current Transformer.

(1) Rated voltage & frequency: 630V, 50Hz;

(2) Grade of accuracy: 1;

(3) Secondary rated current: 5A;

(4) Rated output load: 5VA;

(5) Rated primary current of current transformer: Select according to table 4.

Please use the current transformer made by a well-known brand with high reliability.

Table 4: Reference Table of Load and Mutual-Inductance Ratio

Rated capacity of unit (HP)	Rated capacity of unit (KW)	Mutual-inductance ratio of current transformer
≤ 18	≤ 50.4	50/5A
20~36	56~101	100/5A
38~74	106.4~207.2	200/5A
76~88	212.8~246.4	250/5A

Appendix B: Table of DIP switch

Reference table of address code 0~31								
DIP1								Address No.
1	2	3	4	5	6	7	8	
0	0	0	0	0	0	0	0	Null
1	0	0	0	0	0	0	0	1
0	1	0	0	0	0	0	0	2
1	1	0	0	0	0	0	0	3
0	0	1	0	0	0	0	0	4
1	0	1	0	0	0	0	0	5
0	1	1	0	0	0	0	0	6
1	1	1	0	0	0	0	0	7
0	0	0	1	0	0	0	0	8
1	0	0	1	0	0	0	0	9
0	1	0	1	0	0	0	0	10
1	1	0	1	0	0	0	0	11
0	0	1	1	0	0	0	0	12
1	0	1	1	0	0	0	0	13
0	1	1	1	0	0	0	0	14
1	1	1	1	0	0	0	0	15
0	0	0	0	1	0	0	0	16
1	0	0	0	1	0	0	0	17
0	1	0	0	1	0	0	0	18
1	1	0	0	1	0	0	0	19
0	0	1	0	1	0	0	0	20
1	0	1	0	1	0	0	0	21
0	1	1	0	1	0	0	0	22
1	1	1	0	1	0	0	0	23
0	0	0	1	1	0	0	0	24
1	0	0	1	1	0	0	0	25
0	1	0	1	1	0	0	0	26
1	1	0	1	1	0	0	0	27
0	0	1	1	1	0	0	0	28
1	0	1	1	1	0	0	0	29
0	1	1	1	1	0	0	0	30
1	1	1	1	1	0	0	0	31

Reference table of address code 32~63								
DIP1								Address No.
1	2	3	4	5	6	7	8	
0	0	0	0	0	1	0	0	32
1	0	0	0	0	1	0	0	33
0	1	0	0	0	1	0	0	34
1	1	0	0	0	1	0	0	35
0	0	1	0	0	1	0	0	36
1	0	1	0	0	1	0	0	37
0	1	1	0	0	1	0	0	38
1	1	1	0	0	1	0	0	39
0	0	0	1	0	1	0	0	40
1	0	0	1	0	1	0	0	41
0	1	0	1	0	1	0	0	42
1	1	0	1	0	1	0	0	43
0	0	1	1	0	1	0	0	44
1	0	1	1	0	1	0	0	45
0	1	1	1	0	1	0	0	46
1	1	1	1	0	1	0	0	47
0	0	0	0	1	1	0	0	48
1	0	0	0	1	1	0	0	49
0	1	0	0	1	1	0	0	50
1	1	0	0	1	1	0	0	51
0	0	1	0	1	1	0	0	52
1	0	1	0	1	1	0	0	53
0	1	1	0	1	1	0	0	54
1	1	1	0	1	1	0	0	55
0	0	0	1	1	1	0	0	56
1	0	0	1	1	1	0	0	57
0	1	0	1	1	1	0	0	58
1	1	0	1	1	1	0	0	59
0	0	1	1	1	1	0	0	60
1	0	1	1	1	1	0	0	61
0	1	1	1	1	1	0	0	62
1	1	1	1	1	1	0	0	63

Reference table of address code 64~95									
DIP1								Address No.	
1	2	3	4	5	6	7	8		
0	0	0	0	0	0	1	0	64	
1	0	0	0	0	0	1	0	65	
0	1	0	0	0	0	1	0	66	
1	1	0	0	0	0	1	0	67	
0	0	1	0	0	0	1	0	68	
1	0	1	0	0	0	1	0	69	
0	1	1	0	0	0	1	0	70	
1	1	1	0	0	0	1	0	71	
0	0	0	1	0	0	1	0	72	
1	0	0	1	0	0	1	0	73	
0	1	0	1	0	0	1	0	74	
1	1	0	1	0	0	1	0	75	
0	0	1	1	0	0	1	0	76	
1	0	1	1	0	0	1	0	77	
0	1	1	1	0	0	1	0	78	
1	1	1	1	0	0	1	0	79	
0	0	0	0	1	0	1	0	80	
1	0	0	0	1	0	1	0	81	
0	1	0	0	1	0	1	0	82	
1	1	0	0	1	0	1	0	83	
0	0	1	0	1	0	1	0	84	
1	0	1	0	1	0	1	0	85	
0	1	1	0	1	0	1	0	86	
1	1	1	0	1	0	1	0	87	
0	0	0	1	1	0	1	0	88	
1	0	0	1	1	0	1	0	89	
0	1	0	1	1	0	1	0	90	
1	1	0	1	1	0	1	0	91	
0	0	1	1	1	0	1	0	92	
1	0	1	1	1	0	1	0	93	
0	1	1	1	1	0	1	0	94	
1	1	1	1	1	0	1	0	95	

Reference table of address code 96~127									
DIP1								Address No.	
1	2	3	4	5	6	7	8		
0	0	0	0	0	1	1	0	96	
1	0	0	0	0	1	1	0	97	
0	1	0	0	0	1	1	0	98	
1	1	0	0	0	1	1	0	99	
0	0	1	0	0	1	1	0	100	
1	0	1	0	0	1	1	0	101	
0	1	1	0	0	1	1	0	102	
1	1	1	0	0	1	1	0	103	
0	0	0	1	0	1	1	0	104	
1	0	0	1	0	1	1	0	105	
0	1	0	1	0	1	1	0	106	
1	1	0	1	0	1	1	0	107	
0	0	1	1	0	1	1	0	108	
1	0	1	1	0	1	1	0	109	
0	1	1	1	0	1	1	0	110	
1	1	1	1	0	1	1	0	111	
0	0	0	0	1	1	1	0	112	
1	0	0	0	1	1	1	0	113	
0	1	0	0	1	1	1	0	114	
1	1	0	0	1	1	1	0	115	
0	0	1	0	1	1	1	0	116	
1	0	1	0	1	1	1	0	117	
0	1	1	0	1	1	1	0	118	
1	1	1	0	1	1	1	0	119	
0	0	0	1	1	1	1	0	120	
1	0	0	1	1	1	1	0	121	
0	1	0	1	1	1	1	0	122	
1	1	0	1	1	1	1	0	123	
0	0	1	1	1	1	1	0	124	
1	0	1	1	1	1	1	0	125	
0	1	1	1	1	1	1	0	126	
1	1	1	1	1	1	1	0	127	

Reference table of address code 128~159									
DIP1								Address No.	
1	2	3	4	5	6	7	8		
0	0	0	0	0	0	0	1	128	
1	0	0	0	0	0	0	1	129	
0	1	0	0	0	0	0	1	130	
1	1	0	0	0	0	0	1	131	
0	0	1	0	0	0	0	1	132	
1	0	1	0	0	0	0	1	133	
0	1	1	0	0	0	0	1	134	
1	1	1	0	0	0	0	1	135	
0	0	0	1	0	0	0	1	136	
1	0	0	1	0	0	0	1	137	
0	1	0	1	0	0	0	1	138	
1	1	0	1	0	0	0	1	139	
0	0	1	1	0	0	0	1	140	
1	0	1	1	0	0	0	1	141	
0	1	1	1	0	0	0	1	142	
1	1	1	1	0	0	0	1	143	
0	0	0	0	1	0	0	1	144	
1	0	0	0	1	0	0	1	145	
0	1	0	0	1	0	0	1	146	
1	1	0	0	1	0	0	1	147	
0	0	1	0	1	0	0	1	148	
1	0	1	0	1	0	0	1	149	
0	1	1	0	1	0	0	1	150	
1	1	1	0	1	0	0	1	151	
0	0	0	1	1	0	0	1	152	
1	0	0	1	1	0	0	1	153	
0	1	0	1	1	0	0	1	154	
1	1	0	1	1	0	0	1	155	
0	0	1	1	1	0	0	1	156	
1	0	1	1	1	0	0	1	157	
0	1	1	1	1	0	0	1	158	
1	1	1	1	1	0	0	1	159	

Reference table of address code 160~191									
DIP1								Address No.	
1	2	3	4	5	6	7	8		
0	0	0	0	0	1	0	1	160	
1	0	0	0	0	1	0	1	161	
0	1	0	0	0	1	0	1	162	
1	1	0	0	0	1	0	1	163	
0	0	1	0	0	1	0	1	164	
1	0	1	0	0	1	0	1	165	
0	1	1	0	0	1	0	1	166	
1	1	1	0	0	1	0	1	167	
0	0	0	1	0	1	0	1	168	
1	0	0	1	0	1	0	1	169	
0	1	0	1	0	1	0	1	170	
1	1	0	1	0	1	0	1	171	
0	0	1	1	0	1	0	1	172	
1	0	1	1	0	1	0	1	173	
0	1	1	1	0	1	0	1	174	
1	1	1	1	0	1	0	1	175	
0	0	0	0	1	1	0	1	176	
1	0	0	0	1	1	0	1	177	
0	1	0	0	1	1	0	1	178	
1	1	0	0	1	1	0	1	179	
0	0	1	0	1	1	0	1	180	
1	0	1	0	1	1	0	1	181	
0	1	1	0	1	1	0	1	182	
1	1	1	0	1	1	0	1	183	
0	0	0	1	1	1	0	1	184	
1	0	0	1	1	1	0	1	185	
0	1	0	1	1	1	0	1	186	
1	1	0	1	1	1	0	1	187	
0	0	1	1	1	1	0	1	188	
1	0	1	1	1	1	0	1	189	
0	1	1	1	1	1	0	1	190	
1	1	1	1	1	1	0	1	191	

Reference table of address code 192~223									
DIP1								Address No.	
1	2	3	4	5	6	7	8		
0	0	0	0	0	0	1	1	192	
1	0	0	0	0	0	1	1	193	
0	1	0	0	0	0	1	1	194	
1	1	0	0	0	0	1	1	195	
0	0	1	0	0	0	1	1	196	
1	0	1	0	0	0	1	1	197	
0	1	1	0	0	0	1	1	198	
1	1	1	0	0	0	1	1	199	
0	0	0	1	0	0	1	1	200	
1	0	0	1	0	0	1	1	201	
0	1	0	1	0	0	1	1	202	
1	1	0	1	0	0	1	1	203	
0	0	1	1	0	0	1	1	204	
1	0	1	1	0	0	1	1	205	
0	1	1	1	0	0	1	1	206	
1	1	1	1	0	0	1	1	207	
0	0	0	0	1	0	1	1	208	
1	0	0	0	1	0	1	1	209	
0	1	0	0	1	0	1	1	210	
1	1	0	0	1	0	1	1	211	
0	0	1	0	1	0	1	1	212	
1	0	1	0	1	0	1	1	213	
0	1	1	0	1	0	1	1	214	
1	1	1	0	1	0	1	1	215	
0	0	0	1	1	0	1	1	216	
1	0	0	1	1	0	1	1	217	
0	1	0	1	1	0	1	1	218	
1	1	0	1	1	0	1	1	219	
0	0	1	1	1	0	1	1	220	
1	0	1	1	1	0	1	1	221	
0	1	1	1	1	0	1	1	222	
1	1	1	1	1	0	1	1	223	

Reference table of address code 224~255									
DIP1								Address No.	
1	2	3	4	5	6	7	8		
0	0	0	0	0	1	1	1	224	
1	0	0	0	0	1	1	1	225	
0	1	0	0	0	1	1	1	226	
1	1	0	0	0	1	1	1	227	
0	0	1	0	0	1	1	1	228	
1	0	1	0	0	1	1	1	229	
0	1	1	0	0	1	1	1	230	
1	1	1	0	0	1	1	1	231	
0	0	0	1	0	1	1	1	232	
1	0	0	1	0	1	1	1	233	
0	1	0	1	0	1	1	1	234	
1	1	0	1	0	1	1	1	235	
0	0	1	1	0	1	1	1	236	
1	0	1	1	0	1	1	1	237	
0	1	1	1	0	1	1	1	238	
1	1	1	1	0	1	1	1	239	
0	0	0	0	1	1	1	1	240	
1	0	0	0	1	1	1	1	241	
0	1	0	0	1	1	1	1	242	
1	1	0	0	1	1	1	1	243	
0	0	1	0	1	1	1	1	244	
1	0	1	0	1	1	1	1	245	
0	1	1	0	1	1	1	1	246	
1	1	1	0	1	1	1	1	247	
0	0	0	1	1	1	1	1	248	
1	0	0	1	1	1	1	1	249	
0	1	0	1	1	1	1	1	250	
1	1	0	1	1	1	1	1	251	
0	0	1	1	1	1	1	1	252	
1	0	1	1	1	1	1	1	253	
0	1	1	1	1	1	1	1	254	
1	1	1	1	1	1	1	1	255	



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