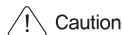


## 1. Product Usage Precautions



### Warning

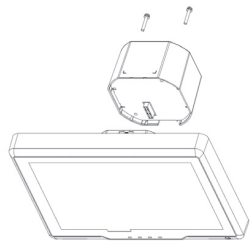
- Be sure to work with two or more people during installation or inspection.
- Do not perform wiring work while the product is powered on or in operation. There is a danger of electric shock.
- The product must be grounded.
- In any case, do not disassemble the product. Charging current inside the product may cause electric shock.
- Do not short-circuit PT secondary side. It may cause fire.
- Do not disconnect the CT secondary side. It may cause fire or explosion.
- Do not install or operate with wet hands. It may cause electric shock.
- Do not use cables that are damaged. It may cause electric shock.
- Work after wearing protective equipment.
- Please attach the safety warning sign during work.
- Remove all input and output wiring of the product when measuring the insulation withstand voltage test or insulation resistance of the switchboard where the product is installed.



### Caution

- Precautions for installation and terminal wiring
  - ▷ Apply to the power terminal of the product according to the power rating. Overvoltage may cause damage or fire.
  - ▷ Do not allow any objects such as screws, metallic objects, water, or oil to enter the product.
  - ▷ Connect the input and output terminals according to the rated specifications and polarity of the product. It may cause damage and fire.
  - ▷ Do not apply power to the DI terminal. It may cause damage to the product.
  - ▷ Please install it by a qualified person when installing and maintaining the product. Incorrect installation can cause unexpected malfunctions and accidents.
- Check the following before turning on the power.
  - ▷ Make sure that the control power source is rated.
  - ▷ Check that the input and output terminals are wired correctly.
- Please note the following when storing and handling.
  - ▷ Store in a place free from moisture and dust.
  - ▷ When transporting the product, be careful not to throw it or to avoid external shock.
  - ▷ It is not recommended to use it in an environment exposed to chemicals, gases, etc., because it may cause measurement hunting or power failure due to corrosion.
- Disposal considerations
  - ▷ When disposing of the product, treat it as industrial waste.

## 2.3 Precautions for terminal wiring



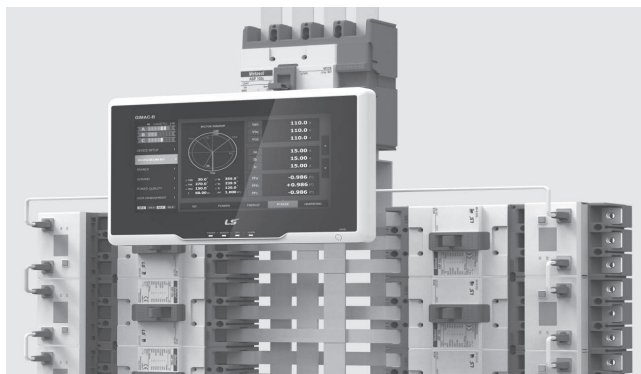
This product is composed of a main body and a power module (SMPS) connected with a connector and two screws.

For the voltage and current connection of the product, the power module should be disconnected after disassembling the two screws fastened to the back of the product using the (+) driver

※ Precautions

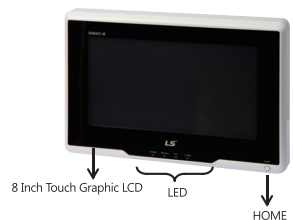
- 1) Be careful not to let foreign substances such as dust get into the connector of the power module that has been disconnected for terminal wiring.
- 2) Do not apply the power because DI input terminal is dry-contact (No voltage type).
- 3) When reassembling the power module after finishing the wiring, be careful not to apply excessive force or to prevent warping or displacement of the connection connector between the main unit and the power module.

## 3. Product installation and settings



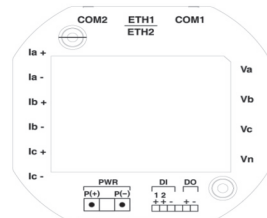
## 2. Product Outline and Configuration

### 2.1 Appearance of product



Display name	Function	Remarks
POWER	LED lights on when control power is in normal state	Green
BRNACH	LED blinks when the main instrument requests communication data to the branch instrument connected to COM1 or COM2 via RS-485 communication or When the main instrument responds to the data requested by the supervisor.	Green
ETH	LED blinks when transmitting data by Ethernet communication.	Green
ALARM	LED lights on when the alarm condition is satisfied and it is in DO output state.	Green
HOME	Press home key to go to total measurement(summary) screen.	

### 2.2 Input / output terminal configuration



Terminal name	Usage	Remarks
P(+), P(-)	Control power input	
Va, Vb, Vc, Vn	AC voltage input	
Ia+, Ia-, Ib+, Ib-, Ic+, Ic-	AC current input	
DL1(+), DL2(+), DI(-)	Digital Input (Dry-contact)	2 port
DO(+), DO(-)	Digital Output	1 port
ETH1, ETH2	Ethernet Communication (RJ-45)	
COM1, COM2	RS-485 Communication (RJ-12)	

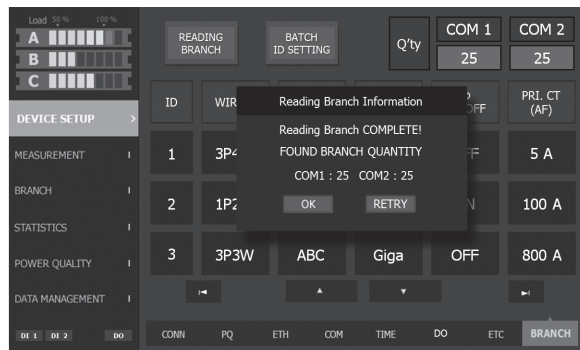
### 3.1 Cable specifications for system configuration

Cable connection location	Cable Specifications	Quantity	Remarks
Connection between branch and branch	RJ-12 Cable, 10cm	1	Enclosed in product box
Connection between main and branch	RJ-12 Cable, 3M	2	Enclosed in product box
Connection between main and scada	RJ-45 Cable, 100m or less	-	Users buy on demand

※ When connecting more than 16 branch instruments per 1 port (RJ12) of main instrument, separate power booster module connection is needed between 10th and 11th branch. (\* Power Boost module sold separately, connection cable specification: RJ12, 10cm)

※ All cables necessary for system configuration are consumable parts. Therefore, it is recommended to replace if any abnormality occurs or corrosion occurs. (\* Cable can be ordered in units)

### 3.2 How to set up communications with the branch instrument on the main instrument



- 1) When installing this product and setting up for the first time, Click the 'BATCH ID SETTING' button in the 'Device Setup - Branch' menu of the main instrument.
- 2) The main instrument detects branch instruments connected to COM1 and COM2 through RS-485 communication and assigns each address in close order.
- 3) Branch instrument connected to COM1 is given an odd branch address, and branch instrument connected to COM2 is assigned an even branch address.
- 4) After 'Auto setup of branch address' is completed, check if it matches the actual number of branch instruments. If yes, click 'OK' button. Otherwise, click 'Retry' button.
- 5) After clicking 'OK' button, normal communication is performed between the main instrument and the branch instrument. (Communication status can be checked in 'BRANCH' menu on the left)

## 4. Product Specification

### 4.1 Standard usage environment

This product should be used under the following standard usage conditions.

- 1) Temperature
  - Normal operating temperature: -20°C ~ 60°C
  - Storage temperature: -25°C ~ 70°C
- 2) Humidity condition: 80% or less (No dew)
- 3) Location
  - Height: Below 2,000M above sea level
  - Where there is no vibration or impact.
  - Where the ambient air pollution is not significant.

※ **Caution) In the environment exposed to chemicals and gas, it may cause measurement hunting and control power failure due to metal corrosion. Therefore, product performance in the environment is not guaranteed.**

### 4.2 Product Input / Output Rating

Division	Rated specification	Remarks
Rated control power	AC/DC 88 ~ 264V	Normal : AC/DC 110/220V
Power Consumption	Up to 19W for single main connection Up to 40W for branch maximum connection	Based on the connection of 50 branches
The Rated frequency	60Hz or 50Hz	Order 60Hz / 50Hz products separately
Connection type	3P4W, 3P3W(Y), 3P3W(OPEN-DELTA), 1P3W, 1P2W	
Voltage Measurement Range	9 ~ 452V (Guaranteed range: 30 to 452V)	Va, Vb, Vc ↔ Vn A, B, C phase voltages based on Vn
Current Measurement Range	0.045 ~ 6A (Guaranteed range: 0.05 to 6A)	
PT and CT input burden	0.5VA or less	
Digital Input Specification	Dry-Contact (Voltage-free input)	DI 2EA
Digital Output Specification	AC250V 5A, DC30V 5A	DO 1 RELAY
Temperature measurement guarantee range	-20°C to 65°C (°C / °F conversion possible)	Display in main instrument when temperature module is connected.

## 5. Measuring function

### 5.1 Measurement item & Accuracy rate

Type	Measuring item	Detailed measuring item	Accuracy	Remarks
Voltage	Line Voltage	Vab, Vbc, Vca	0.2%	V
	Phase Voltage	Va, Vb, Vc	0.2%	V
	Normal Voltage	V1	-	V
	Reverse Voltage	V2	-	V
	Zero phase Voltage	Vo	-	V
	Unbalanced Voltage rate (V2/V1)	UBV	-	%
Current	Line Current	Ia, Ib, Ic	0.2%	A
	Normal Current	I1	-	A
	Reverse Current	I2	-	A
	Zero phase Current	Io	-	A
	Unbalanced Current rate (I2/I1)	UBA	-	%
Phase	Line Voltage	∠Vab, ∠Vbc, ∠Vca	0.5°	°
	Phase Voltage	∠Va, ∠Vb, ∠Vc	0.5°	°
	Line current	∠Ia, ∠Ib, ∠Ic	0.5°	°
Electric Power	Active Power	Pa, Pb, Pc, P3Φ	Class 0.5	IEC 62053-21, ICE 62053-22
	Reactive Power	Qa, Qb, Qc, P3Φ	Class 0.5	
	Apparent power	Sa, Sb, Sc, S3Φ	Class 0.5	
	Active electric energy	PEa, PEb, PEc, PE3Φ	Class 0.5	
Electric Energy	Reactive electric energy	QEa, QEb, QEc, QE3Φ	Class 0.5	
	Apparent electric energy	rPEa, rPEb, rPEc, rPE3Φ	Class 0.5	
	Frequency	f	0.05Hz	Hz
Power Factor	Power Factor	PF3Φ, PFa, PFb, PFc	Following phase error	
Harmonics	Voltage harmonics	Va, Vb, Vc 1~15th Harmonics	-	%
	Current harmonics	Ia, Ib, Ic 1~15th Harmonics	-	%
	THD	Va, Vb, Vc, Ia, Ib, Ic	-	%
	TDD	Ia, Ib, Ic	-	%
	K-FACTOR	Ia, Ib, Ic	-	

## 6. Communication Specifications and Configuration

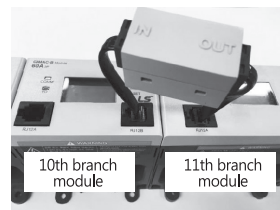
### 6.1 Communication Specifications

GIMAC-B supports independent triple system with two RS-485 communication ports and two Ethernet communication ports.

#### 6.1.1 RS-485 Communication Specifications

- 1) Port specifications: RJ-12, 2 ports
- 2) Communication speed: 9600, 19200, 38400 Bps (Fixed 38400 for MASTER)
- 3) Topology: Multi-Drop (BUS)
- 4) Maximum transmission distance: Communication with upper (SLAVE)
  - Max 1.2Km (depending on transmission speed)
  - Communication with branch (MASTER) - Max 5.6m
- 5) Protocol: Modbus RTU
- 6) Communication method: MASTER / SLAVE function
  - Up to 25 branch instruments can be connected per RJ-12 port when set to MASTER

However, when connecting more than 16 branch instruments per port (RJ-12) of the main instrument, Separate Power-boost module connection is required between tenth and eleventh branches



\* Power-boost module (sold separately)



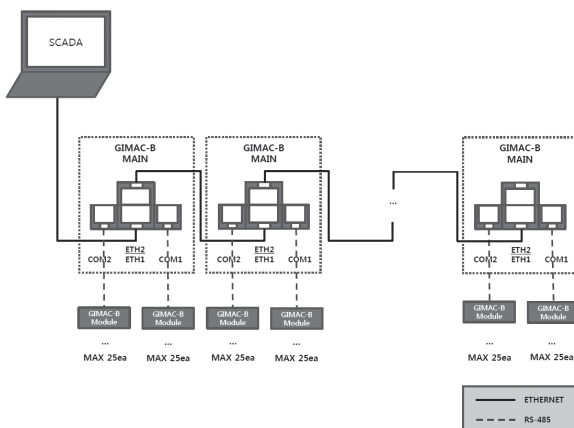
※ When connecting Boost module, please pay attention to direction.  
Connect the 10th module to the 'IN' port of the Boost module and connect the 11th module of the branch to the 'OUT' port of the Boost module.

#### 6.1.2 Ethernet Communication Specifications

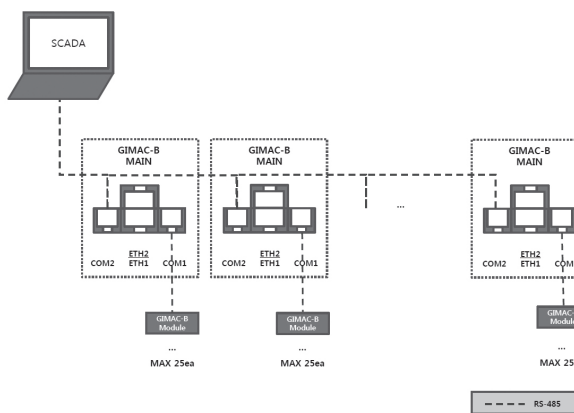
- 1) Port specifications: RJ-45, 2 ports
  - 2) Communication speed: 10 / 100Mbps
  - 3) Topology: Star, Daisy-chain type
  - 4) Maximum transmission distance : 100m between HUB and main instrument  
or 100m between main and main instrument
  - 5) Protocol: Modbus TCP
  - 6) Communication method: Server function (main and branch instrument information)
- 6.1.3 Branch communication function (RS485-MASTER-Monitoring of measured value of branches)
- 1) Reflect branch setting data Delay time: Within 1 second
  - 2) Branch measurement value display of main instrument Delay time : About 6 seconds when connecting 50 units

### 6.2 Communication configuration

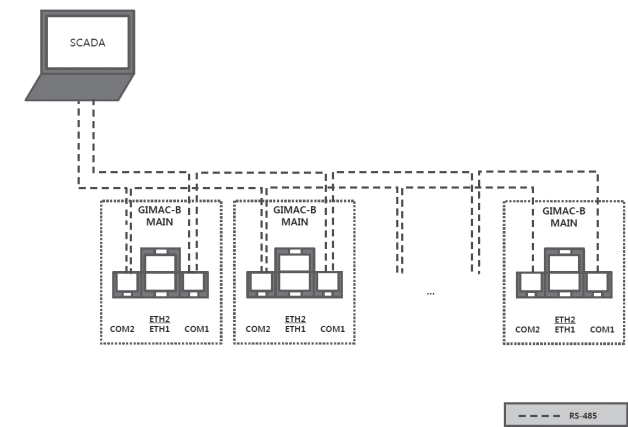
- 1) Connection between multiple GIMAC-B Main instruments using Ethernet 2 ports



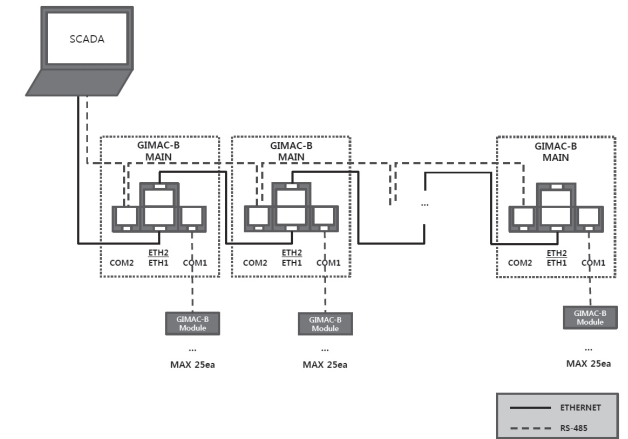
- 2) Connection between multiple GIMAC-B Main instruments using RS-485 1port



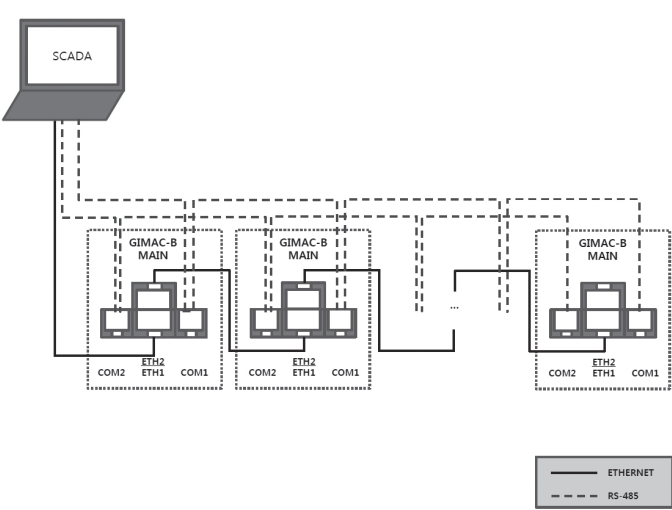
3) Connection between multiple GIMAC-B Main instruments using RS-485 2ports (Duplication)



4) Connection between multiple GIMAC-B Main instruments using Ethernet 2ports and RS-485 1port



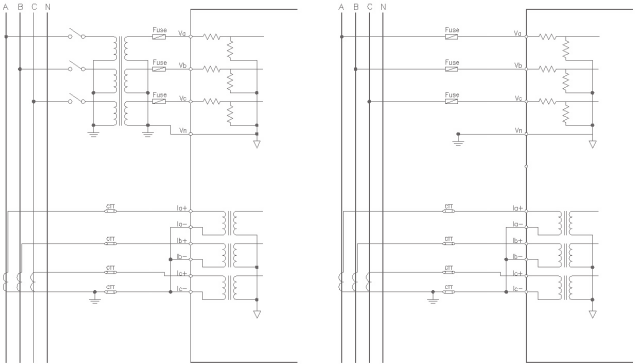
5) Connection between multiple GIMAC-B Main instruments using Ethernet 2ports and RS-485 2ports



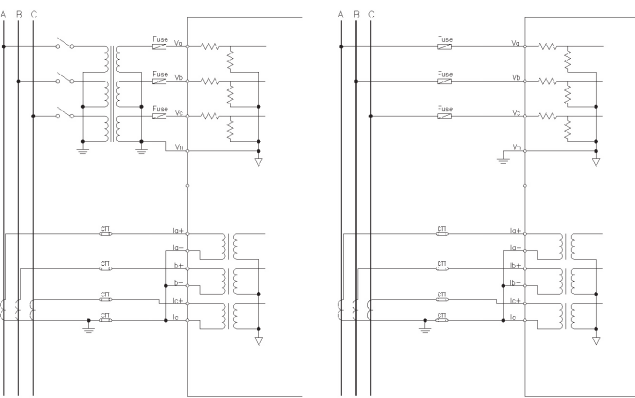
- ※ Please use shielded twisted cable for RS-485 communication.
- ※ Ground the shield wire of the RS-485 communication cable to minimize the influence of noise.
- ※ The maximum distance of RS-485 communication is 1.2km and the maximum number of branch modules that can be connected is 32 units.
- ※ The maximum distance of Ethernet communication is 100m, and the maximum number of GIMAC-B Main instruments that can be connected is 20 units.
- ※ Communication maximum distance means the maximum length of connection cable between products.

## 7. Wiring Connection

### 7.1 3P 4W Connection

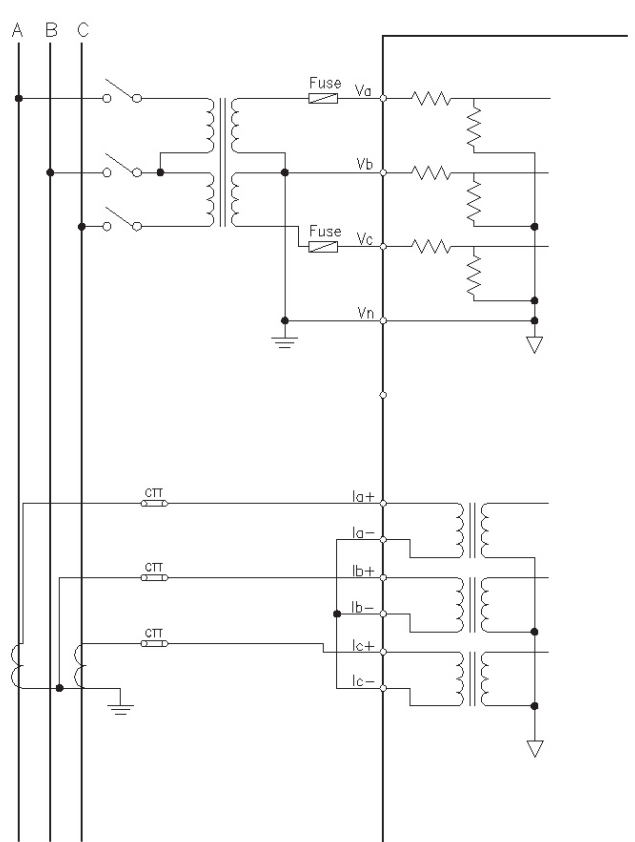


### 7.2 3P 3W - Y Connection



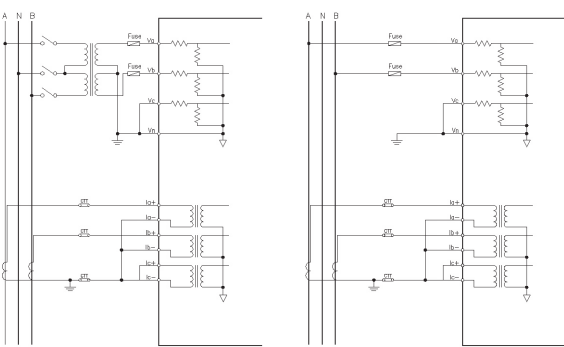
- ※ PT, CT secondary side should be grounded.
- ※ Power Quality function monitors Va, Vb, Vc voltage.
- ※ If the phase voltage is more than 380V in Vn standard, a transformer should be used.
- ※ Unused terminals should be grounded.

### 7.3 3P 3W – Open Delta Connection

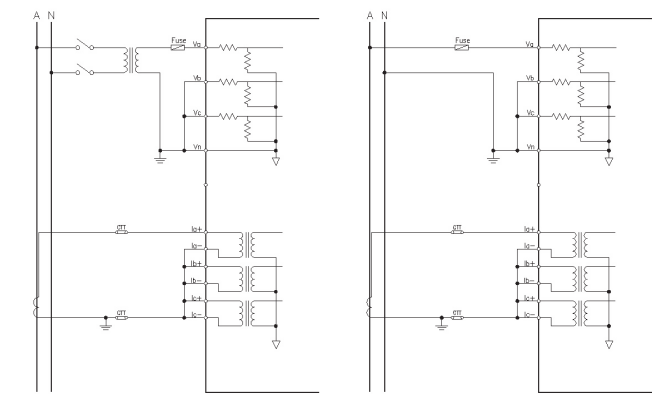


- ※ It should be used in balanced load. In unbalanced load, error occurs in power / electric power.
- ※ Power quality monitoring and waveform display is done by Vab, Vcb phase.
- ※ PT, CT secondary side should be grounded.

### 7.4 1P 3W Connection

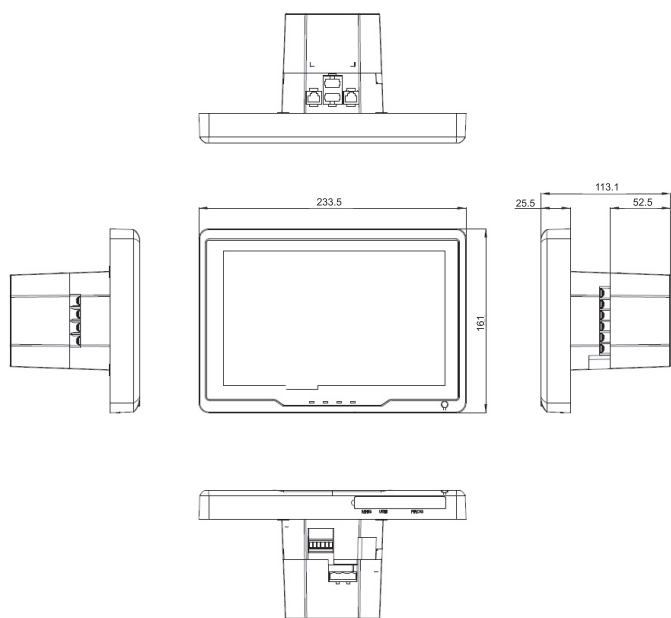


### 7.5 1P 2W Connection



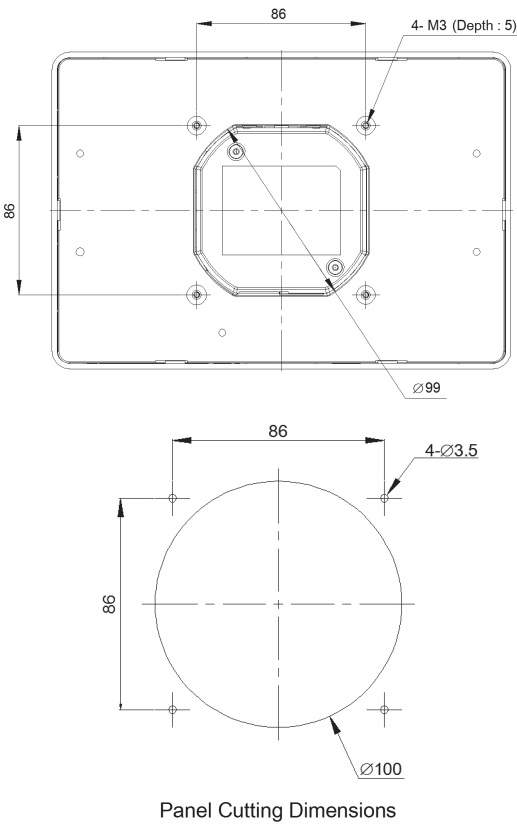
## 8. Dimensions of the product

The external dimension (W \* L \* H) of the Main instrument of GIMAC-B is 233.5 \* 161 \* 133.1 (mm) as shown in the figure below.



## 8. Dimensions of the product

The perforation dimensions of the GIMAC-B Main instrument are shown in the figure below.



## 9. Classification of product type name (ordering method)

GIMAC-B	TE	M	5A	60Hz
		Modbus		
		Ethernet 1port, Rs485 2Port		
				frequency
				60Hz 60Hz
				50Hz 50Hz

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Specifications in this instruction manual are subject to change without notice due to continuous products development and improvement  
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