

# ENERGY MONITORING RELAY INTERFACE

## BMS-IFWH4E2

- Thank you very much for purchasing this TOSHIBA Energy Monitoring Relay Interface.
- Please read this manual carefully beforehand for proper installation of the relay interface.

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# Precautions for Safety

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- Read this “Precautions for Safety” carefully before installation.
- The precautions described below include important items regarding safety. Observe them without fail.
- After the installation work, perform a trial operation to check for any problem. Follow the Owner's Manual to explain how to use and maintain the unit to the customer. Ask the customer to keep this Installation Manual together with the Owner's Manual.

## WARNING

- **Ask an authorized dealer or qualified installation professional to install or reinstall the relay interface.**  
Improper installation may result in electric shock or fire.
- **Turn off the main power supply switch or breaker before attempting any electrical work.**  
Make sure all power switches are off. Failure to do so may cause electric shock.
- **Perform installation work properly according to this Installation Manual.**  
Improper installation may result in electric shock or fire.
- **Do not modify the unit.**  
Any modification may cause a malfunction, resulting in overheating or fire.

## CAUTION

- **Perform wiring correctly in accordance with the specified current capacity.**  
Failure to do so may result in short-circuiting, overheating, or fire.
- **Connect the specified cables for the terminals securely to prevent external forces from affecting them.**  
Failure to do so may result in disconnection, overheating, or fire.

# Introduction

## Applications/Functions/Specifications

### • Applications

The Energy Monitoring Relay Interface is used to measure and distribute the power of the air conditioner.

### • Functions

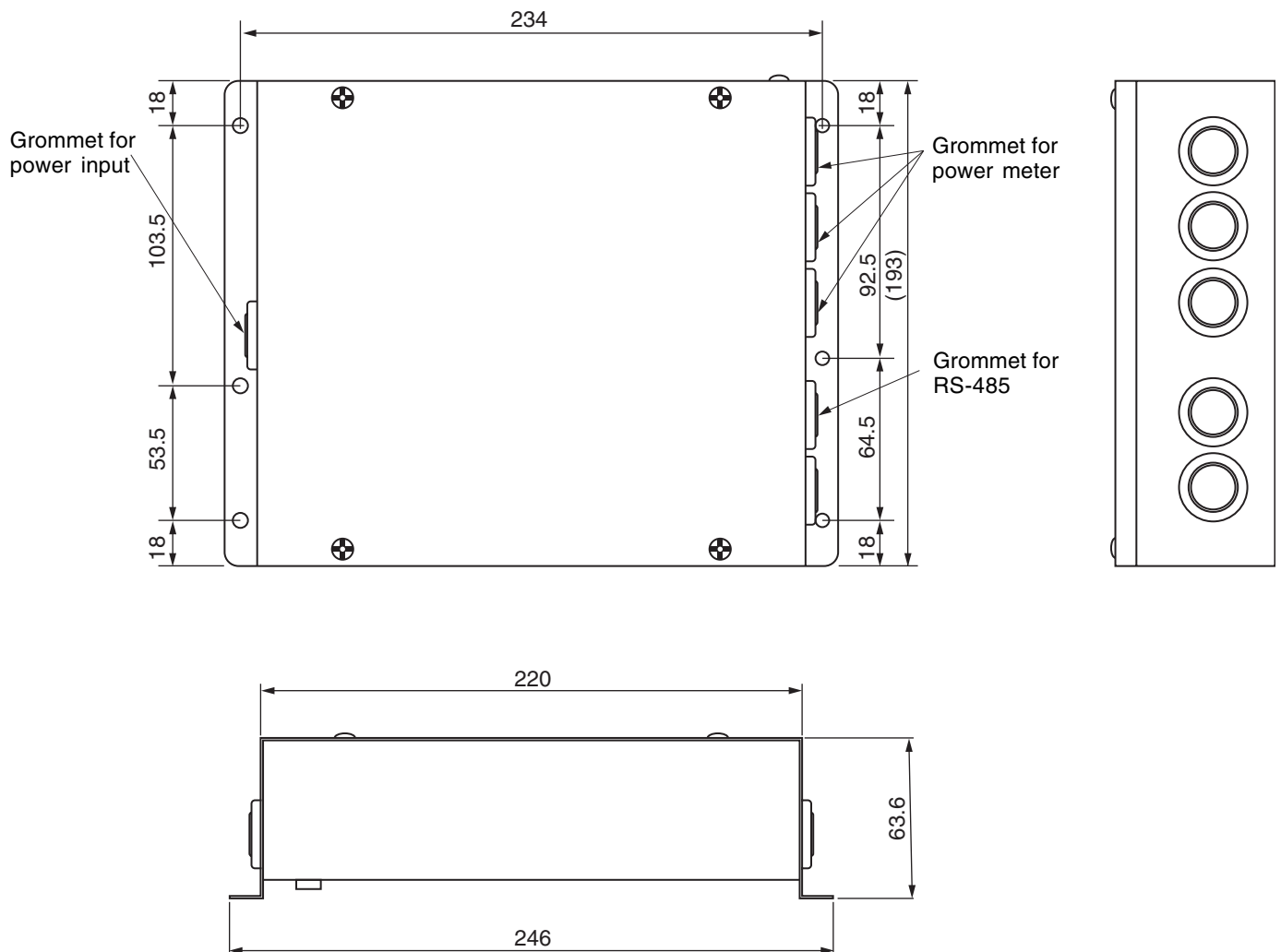
The interface calculates output power pulses with connected power meters, and then sends the calculation result to the Touch Screen Controller.

### • Specifications

Power supply	220 - 240 V, AC 50/60 Hz
Power consumption	2.8 W
Operating temperature/humidity	0 to 40°C, 10 to 90% RH
Storage temperature	-20 to +60°C
Chassis material	Galvanized sheet metal 0.8t
Dimensions	66(H) x 193(W) x 246(D) mm
Mass	1.65 kg

Power meter input	Input type	photo-coupler insulation
	Input point	8 points
	Input resistance	9 k ohm
	Input "ON" current	1 mA
	Input pulse condition	50 m - 1000 m sec

## External View



# Before Installation

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Check the following package contents.

No.	Item	Quantity	Remarks
1	ENERGY MONITORING RELAY INTERFACE	1	
2	Installation Manual	1	
3	Screw	4	M4 x 12mm tapping screws
4	Pin terminal	2	

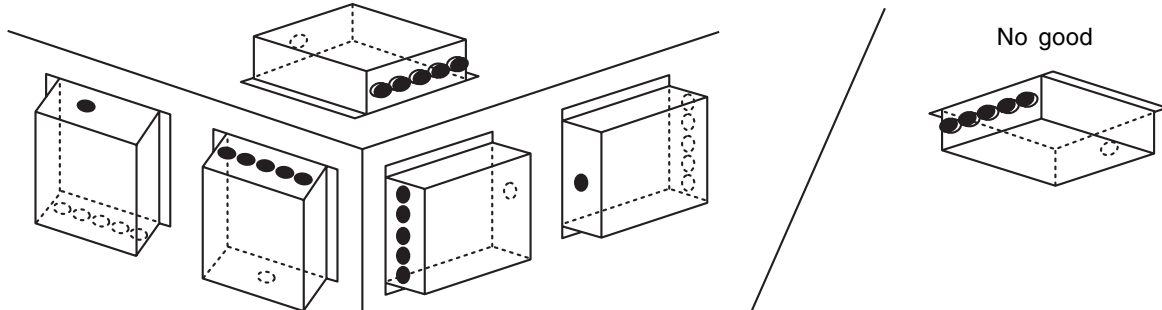
Use the following wiring materials to connect signal lines and power lines. (Procured on site)

No.	Line	Description	
1	For RS-485	Type	2-core shield wire
		Wire size	1.25 mm <sup>2</sup> , 500m max. (total length)
		Length	
2	For connection to power meter	Type	2-core wire
		Wire size	0.3mm <sup>2</sup> , 100m max.
		Length	
3	For power	Type	H07 RN-F or 245IEC66
		Wire size	0.75mm <sup>2</sup> , 50 m max.

# 1 Installation

## Energy Monitoring Relay Interface Installation Method and Orientation

There are five installation methods for this relay interface as shown below: surface mount and wall mounts. Use the attached screws.



### REQUIREMENT

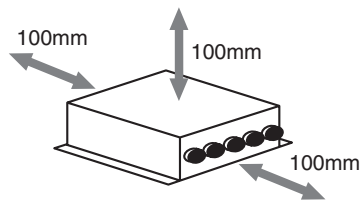
**Do not install the unit in any of the following places.**

- Humid or wet place
- Dusty place
- Place exposed to direct sunlight
- Place where there is a TV set or radio within one meter
- Place exposed to rain (outdoors, under eaves, etc.)

### Installation Space and Maintenance Space

A side space for connecting through cable inlets and an upper space for maintenance must be reserved before installation.

The other sides can be adjacent to surrounding objects.



# 2 Connection of Power cables/Earth wires/ Signal wires

## CAUTION

The RS-485 signal wire has polarity. Connect A to A, and B to B. If connected with incorrect polarity, the unit will not work.

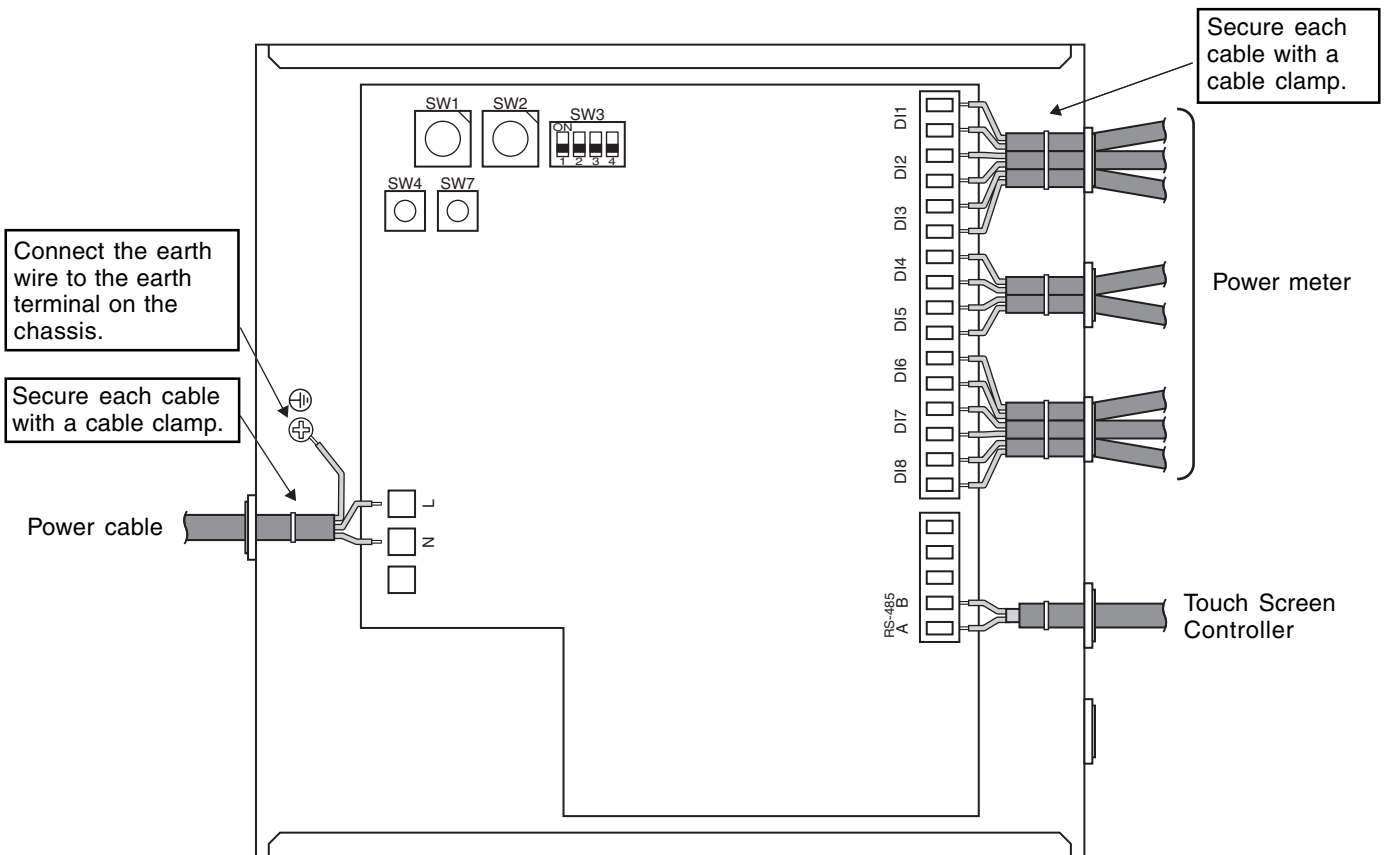
## REQUIREMENT

**Disconnect the appliance from the main power supply.**

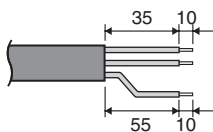
This appliance must be connected to the main power supply by a circuit breaker or switch with a contact separation of at least 3mm.

## Power cables/Earth wires/Signal wires

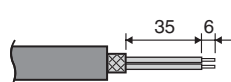
Connect power cables, earth wires, and signal wires to the specified terminals on the terminal block.



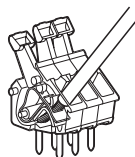
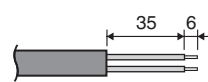
Length of stripped power cable



Length of stripped communication wire



Length of stripped power meter wire



Insert the wire by pushing the lever with a screwdriver. Check that the wire is inserted securely.



When inserting two RS-485 communication wires into a single terminal for connection to another interface, crimp them using the attached pin terminal.

# 2 Connection of Power cables/Earth wires/ Signal wires (continued)

## Wiring Connection

The following describes wiring connections of the Energy Monitoring Relay Interface when it is used in the air conditioner control system.

### • Terminator resistor setting

Set the RS-485 terminator resistor by the TCS-NET Relay Interface.  
Do not set it by the Energy Monitoring Relay Interface.

### • Shield earthing

The shield earth of the RS-485 signal wires should be single-point earth. Earth the wires on the Touch Screen Controller side.

Other shield lines should be closed, and the terminal end should be open and insulated.

### • Connection of power meter

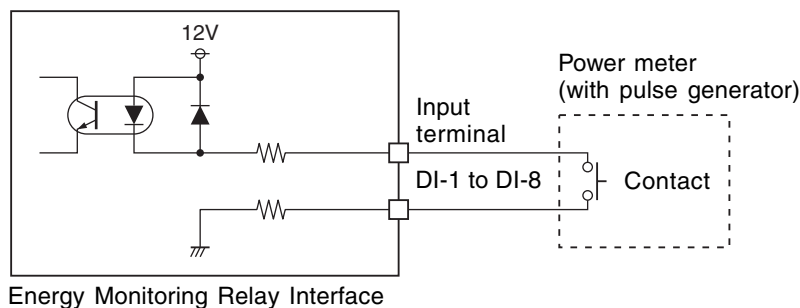
Use a power meter with a pulse generator.

Connect the non-voltage contact output of the power meter to the Energy Monitoring Relay Interface.

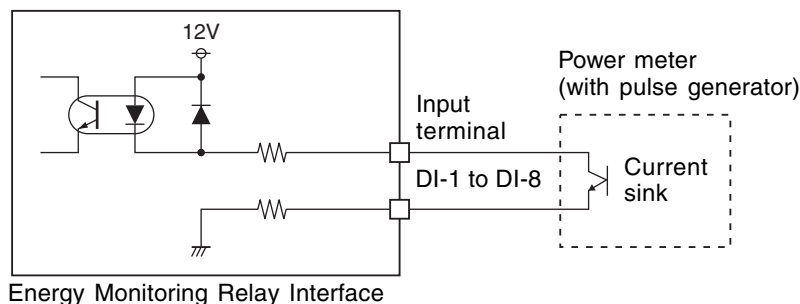
An external input circuit is shown below.

Input signal is electrically isolated by photo-coupler.

(1) Example of contact input connection

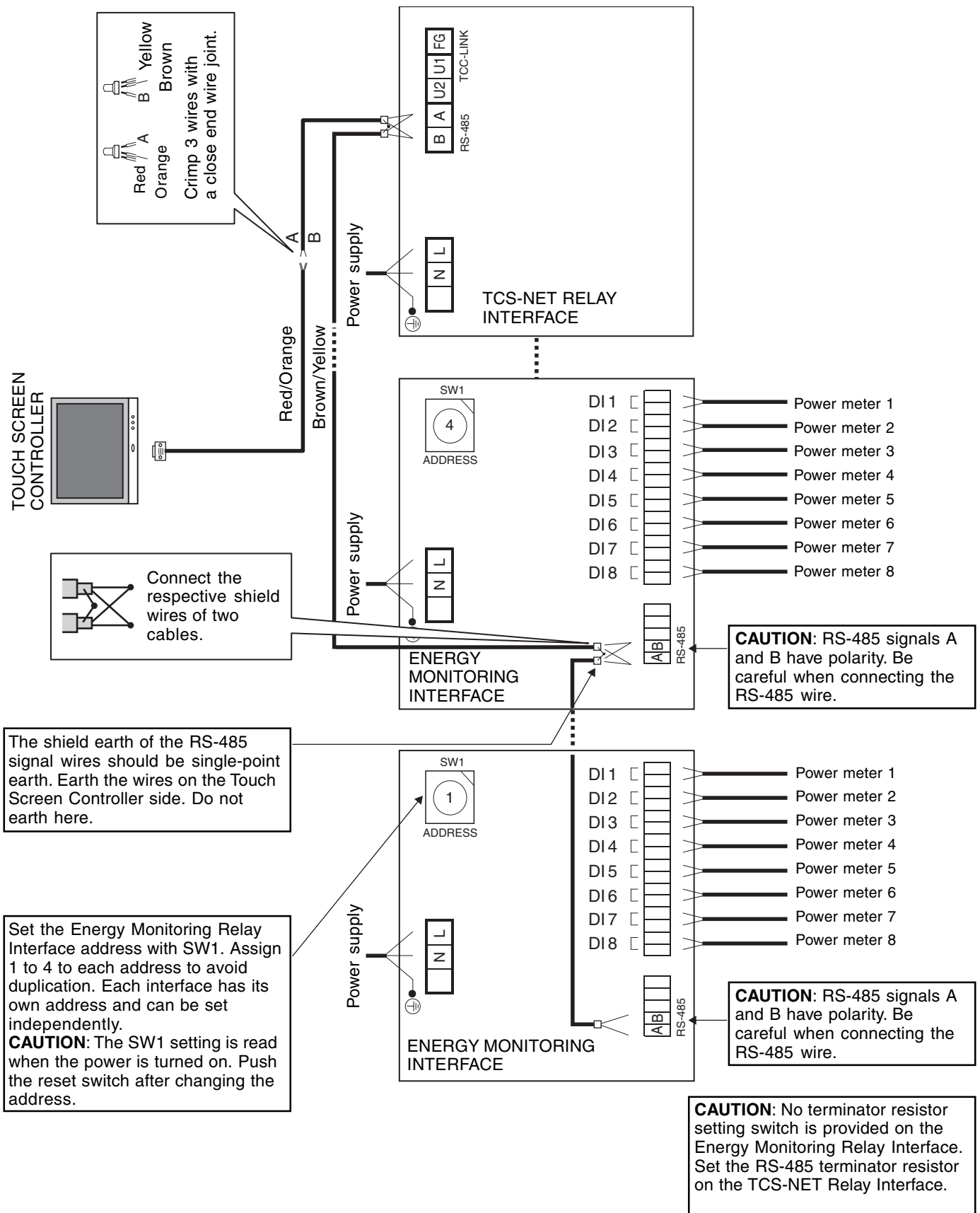


(2) Example of current sink connection

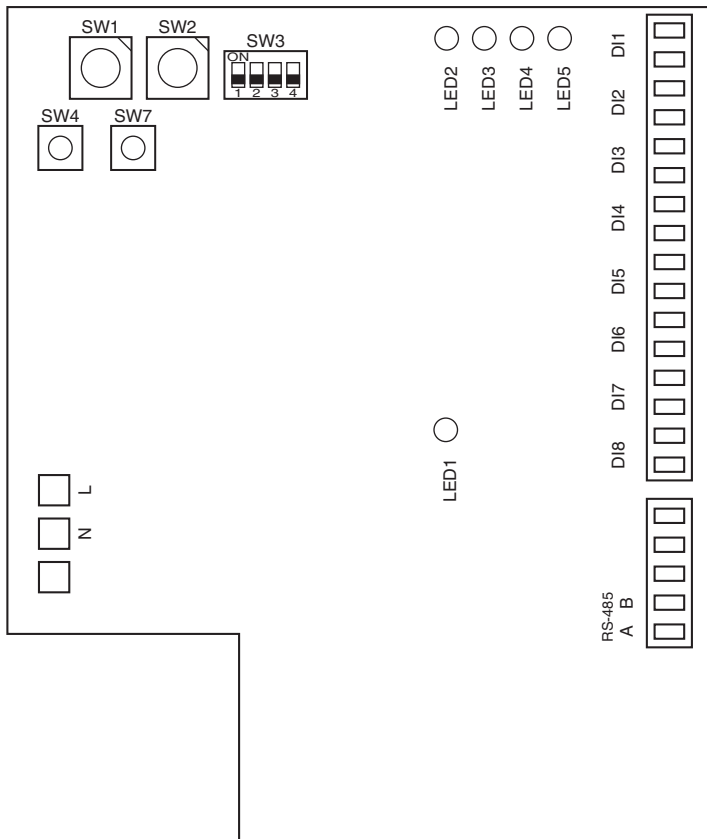


# 2 Connection of Power cables/Earth wires/ Signal wires (continued)

## Connection diagram



# 3 Setting



SW1	Address set switch	
	1 - 4	Address
	0,5 - F	Not used
SW2	Operating mode set switch (0 usually)	
SW3	Test switch (all OFF usually)	
SW4	Test switch	
SW7	Reset switch	
LED1	Power indicator	
LED2	RS-485 communication status indicator	
LED3	Not used	
LED4	Test indicator	
LED5	Test indicator	

The following settings are necessary to use Energy Monitoring Relay Interfaces.

- **SW1** Address set switch  
When two or more Energy Monitoring Relay Interfaces are used, set a different address for each unit to avoid address duplication.  
Assign addresses in an ascending order.

## ⚠ CAUTION

- Set relay interface addresses according to the air conditioner address table.
- When the SW1 setting has been changed, push reset switch SW7. The new address setting is read.
- You can set the Energy Monitoring Relay Interface address independently from the TCS-NET Relay Interface address or the Digital Input/Output Relay Interface address.

- **SW2** Operation mode set switch
  - **SW3** Test switch
  - **SW4** Test switch
  - **SW7** Reset switch
- ] These switches are not used during normal operation. Set zero (0) or "all OFF".
- When performing a address setting with SW1, push this reset switch after the address setting to read the set value.

# 4 Trial Operation Check

## Before starting trial operation

Turn on the power of the Energy Monitoring Relay Interface after all wire connections and settings are completed. Turn on power of the air conditioning control system.

## Trial operation

### • Confirming connection to power meters

In the test mode, when the external inputs connected to the input terminals DI-1 to DI-8 are ON, the respective LEDs will go on so you can confirm the connection.

Confirming procedure:

Set the operation mode switch SW2 to “3”, and push the reset switch SW7 to enter the test mode.

Unless SW4 is pushed, respective input status of DI-1 to DI-4 is indicated by LED2 to LED5.

When SW4 is pushed, respective input status of DI-5 to DI-8 is indicated by LED2 to LED5.

(\*) To return to the normal operation, reset SW2 to “zero (0)” and push SW7.

	LED2	LED3	LED4	LED5
SW4 OFF	Displays DI-1 input status.	Displays DI-2 input status.	Displays DI-3 input status.	Displays DI-4 input status.
SW4 ON	Displays DI-5 input status.	Displays DI-6 input status.	Displays DI-7 input status.	Displays DI-8 input status.

Input ON: LED lights

Input OFF: LED turns off

### • Checking the RS-485 communication status

Use LED2 for checking the RS-485 communication status.

When RS-485 communication with Touch Screen Controller is normal, LED-2 will blink.

		Normal	Abnormal
LED1	Power indicator	ON	OFF
LED2	RS-485 communication status indicator.	Blinking	OFF
LED3	Not used	OFF	—
LED4	Test indicator	OFF	—
LED5	Test indicator	OFF	—

# Memo

