

# MODBUS GATEWAY MODULE

(master function, communication distance: 2 km supported)

MODEL **R3-GMM1**

## BEFORE USE ....

Thank you for choosing us. Before use, please check contents of the package you received as outlined below.

If you have any problems or questions with the product, please contact our sales office or representatives.

### ■ PACKAGE INCLUDES:

Modbus gateway module .....(1)  
Terminating resistor (110 Ω, 0.25 W).....(1)

### ■ MODEL NO.

Confirm that the model number described on the product is exactly what you ordered.

### ■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

### ■ SYMBOLS USED ON THE PRODUCT AND IN THIS MANUAL



This symbol on the product indicates that the operator must refer to an explanation in the user's manual in order to avoid the risk of injury or death of personnel or damage to the instrument.

## POINTS OF CAUTION

### ■ CAUTION

- If the equipment is used in a manner not specified by this manual, the protection provided by the equipment may be impaired.

### ■ CONFORMITY WITH EU DIRECTIVES

- This equipment is suitable for Pollution Degree 2 and Installation Category II (power input, transient voltage 2500V). And insulation class of this unit is as following.

Power input or RUN contact output to internal power or internal bus or Modbus: Reinforced insulation (300V)

Power input to RUN contact output:

Reinforced insulation (300V)

Prior to installation, check that the insulation class of this unit satisfies the system requirements.

- The equipment must be mounted inside a panel.
- Altitude up to 2000 meters.
- The equipment must be installed such that appropriate clearance and creepage distances are maintained to conform to CE requirements. Failure to observe these requirements may invalidate the CE conformance.
- The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this unit when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures\* to ensure the CE conformity.  
\* For example, installation of noise filters and clamp filters for the power source, input and output connected to the unit, etc.

### ■ HOT SWAPPABLE MODULES

- The module can be replaced while the power is ON. Be sure to replace it when the module is not communicating with a host, as it may affect the system. Replacing multiple modules at once may greatly change line voltage levels. We highly recommend to replace them one by one.

### ■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:

100 – 240V AC rating, 50 – 60 Hz: :  
85 – 264V, 47 – 66 Hz  
approx. 20VA at 100V AC  
approx. 28VA at 200V AC  
approx. 30VA at 240V AC  
24V DC rating: 24V ±10%, approx. 13W

### ■ GENERAL PRECAUTIONS

- DO NOT set the switches on the module while the power is supplied. The switches are used only for maintenance without the power.

### ■ ENVIRONMENT

- Indoor use.
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

### ■ COMMUNICATION DISTANCE

- The connected device must be R3-NM5 and this unit for communication distance of 2 km. If other devices are connected, the communication distance may not reach 2 km. A communication distance of 2 km has been confirmed for 1-to-1 communication at baud rate of 57.6 kbps by using CPEV-0.9 transmission media.

Depending on the wiring conditions or the connected devices, connection may not be possible unless the baud rate is reduced.

### ■ WIRING

- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

### ■ AND ....

- This unit cannot be used in combination with anything other than the Ethernet interface module (model: R3-NE2) on the same base.  
If you install anything other than R3-NE2, the system will not operate normally.
- For compatible Modbus function codes and Modbus I/O assignment, refer to the instruction manual of the Modbus device.

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

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## INSTALLATION

Use the Installation Base Model R3-BS, or Model R3-BSW for free I/O address capability.

### ■ NODE ADDRESS & BAUD RATE, ETC.

Be sure to set the node address and the baud rate, etc. before mounting modules.

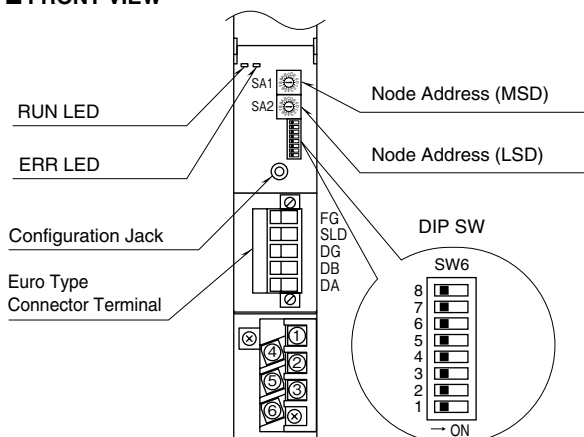
### ■ NETWORK SLOTS ON THE BASE

This unit does not depend on the slot position on the base as the address is determined by the rotary switch.

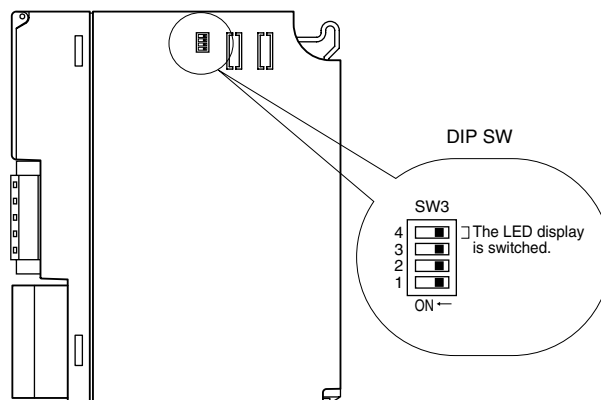
There is no problem installing it in any slot.

## COMPONENT IDENTIFICATION

### ■ FRONT VIEW



### ■ SIDE VIEW



### ■ FRONT DIP SW

(\*) Factory setting

#### • Node Address: SA1, SA2

Set the module's node address in hexadecimal with SA1 and SA2. (Setpoint adjustment: 01 – F7H)  
Do not set 00 when 00 is used for the broadcast communication etc.

#### • Baud Rate: SW6-1, 6-2, 6-3

| SW    | BAUD RATE (bps) |        |        |        |        |        |      |      |
|-------|-----------------|--------|--------|--------|--------|--------|------|------|
|       | 115.2 k         | 57.6 k | 38.4 k | 28.8 k | 19.2 k | 14.4 k | 9600 | 4800 |
| SW6-1 | OFF (*)         | ON     | OFF    | ON     | OFF    | ON     | OFF  | ON   |
| SW6-2 | OFF (*)         | OFF    | ON     | ON     | OFF    | OFF    | ON   | ON   |
| SW6-3 | OFF (*)         | OFF    | OFF    | OFF    | ON     | ON     | ON   | ON   |

#### • Parity: SW6-5, 6-6\*1

| SW    | PARITY   |     |      |     |
|-------|----------|-----|------|-----|
|       | NONE (*) | ODD | EVEN | N/A |
| SW6-5 | OFF      | ON  | OFF  | ON  |
| SW6-6 | OFF      | OFF | ON   | ON  |

#### • Data Mode: SW6-7\*1

| SW    | DATA MODE       |       |
|-------|-----------------|-------|
|       | RTU (Binary)(*) | ASCII |
| SW6-7 | OFF             | ON    |

\*1. Bit assignment according to Parity and Data Mode setting.

| MODE  | START | DATA | PARITY | STOP |
|-------|-------|------|--------|------|
| RTU   | 1     | 8    | 1      | 1    |
|       | 1     | 8    | None   | 2    |
| ASCII | 1     | 7    | 1      | 1    |
|       | 1     | 7    | None   | 2    |

Note: Be sure to set unused SW6-4 and 6-8 to OFF.

### ■ SIDE DIP SW

#### • Transmission enabling signal: SW3-2

Enabled/disabled can be selected.

| SW3-2   | TRANSMISSION ENABLING SIGNAL                                     |
|---------|------------------------------------------------------------------|
| OFF (*) | Enable (Transmission controlled by transmission enabling signal) |
| ON      | Disable (Continuous transmission)                                |

#### • RUN Contact output: SW3-3

ON or OFF can be selected.

| SW3-3   | RUN CONTACT OUTPUT |
|---------|--------------------|
| OFF (*) | OFF                |
| ON      | ON                 |

#### • LED Function: SW3-4

Functions assigned to the front RUN and ERR LEDs can be selected.

| SW3-4   | LED FUNCTION                                   |                                                   |
|---------|------------------------------------------------|---------------------------------------------------|
|         | RUN                                            | ERR                                               |
| OFF (*) | Green when normal                              | Green when abnormal                               |
| ON      | Modbus/TCP communication<br>Red when receiving | Modbus/TCP communication<br>Red when transmitting |

Note: Be sure to set unused SW3-1 to OFF.

## PC CONFIGURATOR

The following parameter items can be set with PC Configurator Software (model: R3CON).  
Refer to the users manual for the R3CON for detailed operation of the software program.

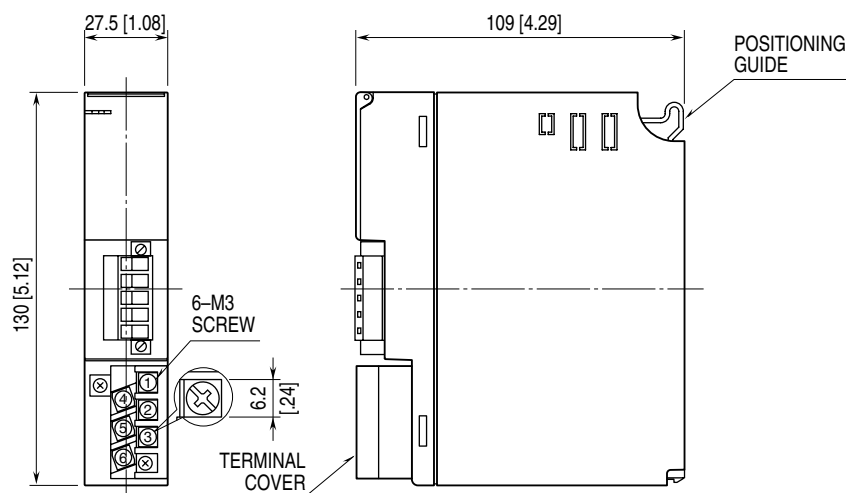
### ■ NETWORK MODULE SETTING

| PARAMETER                                 | SETTING RANGE        | DEFAULT SETTING |
|-------------------------------------------|----------------------|-----------------|
| Time (no communication time)              | 2 – 32000 (0.1 sec.) | 30 (0.1 sec.)   |
| Delay Time (Inter-frame interval (msec.)) | 0 – 50 (msec.)       | 0               |

## TERMINAL CONNECTIONS

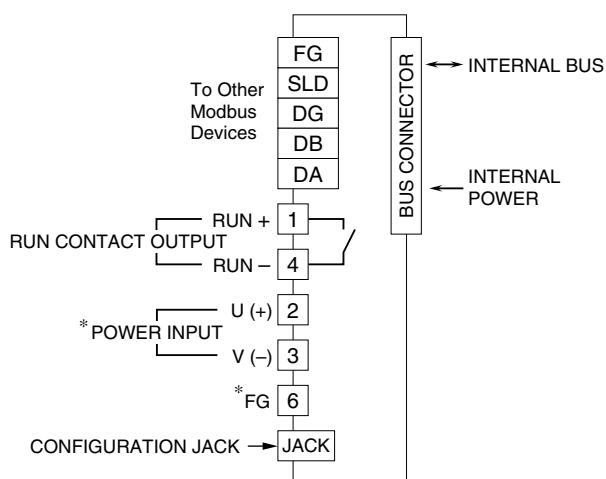
Connect the unit as in the diagram below.

### ■ EXTERNAL DIMENSIONS unit: mm [inch]



### ■ CONNECTION DIAGRAM

Note: In order to improve EMC performance, bond the FG terminal to ground.  
Caution: FG terminal is NOT a protective conductor terminal.



\*Not provided with 'No Power Supply' type module.

## WIRING INSTRUCTIONS

### ■ M3 SCREW TERMINAL (power input, RUN contact output)

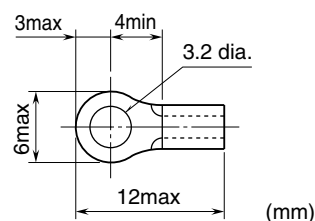
Torque: 0.5 N·m

### ■ SOLDERLESS TERMINAL

Refer to the drawing below for recommended ring tongue terminal size. Spade tongue type is also applicable. Solderless terminals with insulation sleeve do not fit.

**Recommended manufacturer:** J.S.T. Mfg. Co., Ltd.,  
NICHIFU Co., Ltd.

**Applicable wire size:** 0.75 to 1.25 mm<sup>2</sup>



### ■ EURO TYPE CONNECTOR TERMINAL (Modbus)

**Applicable wire size:** 0.2 to 2.5 mm<sup>2</sup>

**Stripped length:** 7 mm



## MODBUS I/O ASSIGNMENTS

The Modbus I/O assignment of the device is as follows.

For the Modbus I/O assignment of the device to be connected, refer to the operation manual for each device.

|             |             | ADDRESS   | DATA TYPE | NAME                                       |
|-------------|-------------|-----------|-----------|--------------------------------------------|
| Coil (0X)   |             | 1025      | Bit       | Transmission enabling signal               |
| Inputs (1X) | R3-GMM1 (1) | 1 – 64    | Bit       | Slave information connected to R3-GMM1 (1) |
|             | R3-GMM1 (2) | 65 – 128  | Bit       | Slave information connected to R3-GMM1 (2) |
|             | R3-GMM1 (3) | 129 – 192 | Bit       | Slave information connected to R3-GMM1 (3) |
|             | R3-GMM1 (4) | 193 – 247 | Bit       | Slave information connected to R3-GMM1 (4) |

R3-GMM1 (1) to (4) are determined by the address set by R3-GMM1.

### ■ DATA TYPE

Bit: Bit data

Note: Do not access addresses other than the above. Such access may cause problems such as inadequate operation.

#### 1) Transmission Enabling Signal

Set whether to allow/stop the transmission of function codes to the connected device.

When the transmission is stopped, the data communication is not performed.

| TRANSMISSION ENABLING SIGNAL | OPERATION                                                                            |
|------------------------------|--------------------------------------------------------------------------------------|
| 1                            | Function code transmission is enabled.<br>Green RUN LED turns on. RUN contact is ON. |
| 0                            | Function code transmission is stopped.<br>RUN LED turns off. RUN contact is OFF.     |

The transmission enabling signal operates differently depending on the communication section when an error occurs during communication.

| COMMUNICATION ERROR SECTION  | OPERATION                                         |
|------------------------------|---------------------------------------------------|
| Host PC to R3-NE2 to R3-GMM1 | Becomes 0 after the communication timeout period. |
| R3-GMM1 to R3-NM5 (slave)    | "1" continues.                                    |

When connecting 2 or more R3-GMM1 on the same network, consider the above operation and be careful to ensure that the commands of each R3-GMM1 do not collide on the network.

#### 2) Device Information

The communication status of the connected device is indicated.

Regarding R3-GMM1, data only within the usable address range of its own station can be confirmed.

| DEVICE INFORMATION | STATUS                                                            |
|--------------------|-------------------------------------------------------------------|
| 1                  | Normal communication with the device of the corresponding address |
| 0                  | No communication with the device of the corresponding address     |