INSTRUCTION MANUAL

MODBUS I/O MODULE
(NPN/PNP discrete input, 32 points, screw terminal block, Modbus use)

MODEL **R7K4FM-DA32**

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:

Discrete input module.....(1)
Terminating resistor (110Ω, 0.25W).....(1)
Modbus Communication Terminal.....(1)
Surface mounter slider .....(2)

■ MODEL NO.

Confirm Model No. marking on the product to be 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.

POINTS OF CAUTION

■ CONFORMITY WITH EU DIRECTIVES

- The equipment must be mounted inside the instrument panel of a metal enclosure.
- 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.

■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:
  24V DC rating: 24V ±10%, ≤ 50mA

■ GENERAL PRECAUTIONS

- Before you remove the unit or mount it, turn off the power supply and input signal for safety.
- Before you remove the terminal block or mount it, make sure to turn off the power supply and input signal for safety.
- 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.

■ WIRING

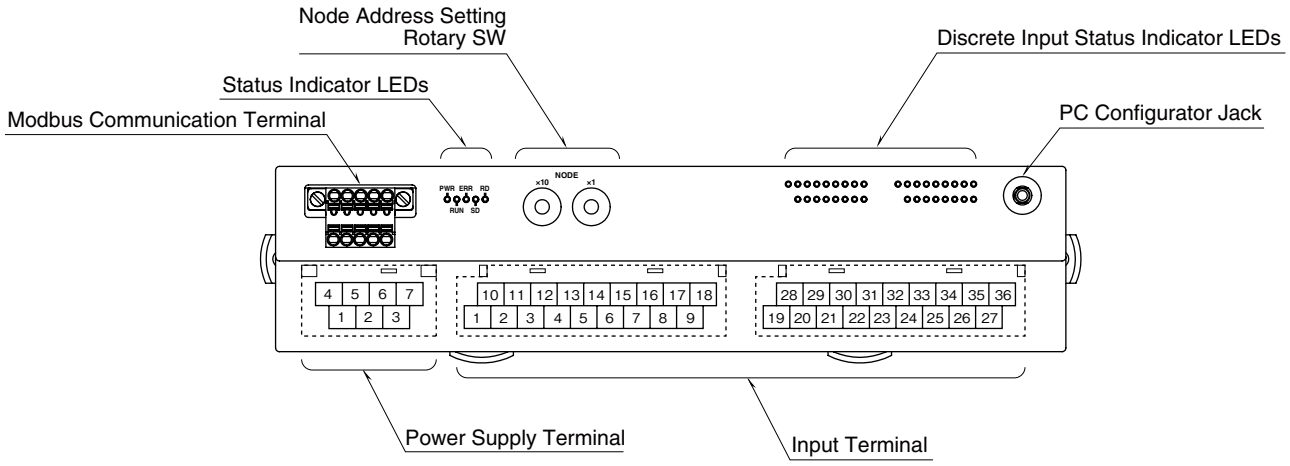
- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.
- Be sure to close the terminal cover for safety.

■ AND ....

- 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.

MG CO., LTD. www.mgco.jp
5-2-55 Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN

COMPONENT IDENTIFICATION

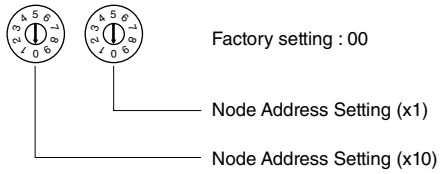


■ STATUS INDICATOR LED

ID	STATUS	COLOR	FUNCTION
PWR	ON	Green	Normal internal power supply
	OFF	–	No power supply
RUN	ON	Green	Normal communication
	OFF	–	No communication
ERR	ON	Red	Communication error
	OFF	–	Normal
SD	ON	Green	Sending data
	OFF	–	
RD	ON	Green	Receiving data
	OFF	–	

■ NODE ADDRESS

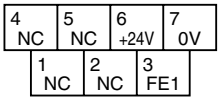
Node Address is selected between 1 and 99 in decimal. The left switch determines the tenth place digit, while the right switch does the ones place digit of the address.



■ DISCRETE INPUT STATUS INDICATOR LED

LED green indicators shows the signal status.
ON : LED ON
OFF : LED OFF

■ POWER SUPPLY TERMINAL ASSIGNMENT



1. NC	-
2. NC	-
3. FE1	Functional earth
4. NC	-
5. NC	-
6. +24V	Power supply (24V DC)
7. 0V	Power supply (0V)

■ INPUT TERMINAL ASSIGNMENT

10	11	12	13	14	15	16	17	18
COM	X1	X3	X5	X7	X9	X11	X13	X15
1	2	3	4	5	6	7	8	9
COM	X0	X2	X4	X6	X8	X10	X12	X14

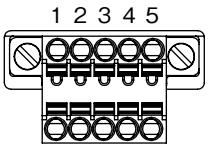
28	29	30	31	32	33	34	35	36
COM	X17	X19	X21	X23	X25	X27	X29	X31
19	20	21	22	23	24	25	26	27
COM	X16	X18	X20	X22	X24	X26	X28	X30

PIN NO.	ID	FUNCTION	PIN NO.	ID	FUNCTION
1	COM	Common	10	COM	Common
2	X0	Input 0	11	X1	Input 1
3	X2	Input 2	12	X3	Input 3
4	X4	Input 4	13	X5	Input 5
5	X6	Input 6	14	X7	Input 7
6	X8	Input 8	15	X9	Input 9
7	X10	Input 10	16	X11	Input 11
8	X12	Input 12	17	X13	Input 13
9	X14	Input 14	18	X15	Input 15

PIN NO.	ID	FUNCTION	PIN NO.	ID	FUNCTION
19	COM	Common	28	COM	Common
20	X16	Input 16	29	X17	Input 17
21	X18	Input 18	30	X19	Input 19
22	X20	Input 20	31	X21	Input 21
23	X22	Input 22	32	X23	Input 23
24	X24	Input 24	33	X25	Input 25
25	X26	Input 26	34	X27	Input 27
26	X28	Input 28	35	X29	Input 29
27	X30	Input 30	36	X31	Input 31

■ NETWORK CONNECTOR ASSIGNMENT

Unit side connector: MC1,5/5-GF-3,5 (Phoenix Contact)
Cable side connector: TFMC1,5/5-STF-3,5 (Phoenix contact)



PIN NO.	ID	FUNCTION
1	DA	DA
2	DB	DB
3	DG	DG
4	SLD	Shield
5	FE	Functional earth

■ TENSION CALMP TERMIANL BLOCK
Applicable wire: 0.2 - 1.5 mm^2
Stripped length: 10 mm
Recomended terminal:
AI0,25-10YE 0.25 mm^2 (Phoenix Contact)
AI0,34-10TQ 0.34 mm^2 (Phoenix Contact)
AI0,5-10WH 0.5 mm^2 (Phoenix Contact)
AI0,75-10GY 0.75 mm^2 (Phoenix Contact)

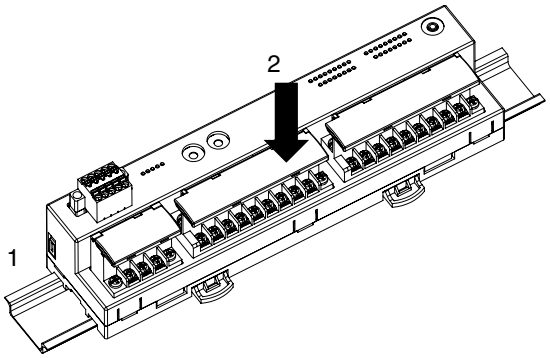
MOUNTING INSTRUCTIONS

■ DIN RAIL MOUNTING

• Mounting

1) Set the upper hook at the rear side of the unit on the DIN rail.

2) Push in the lower.

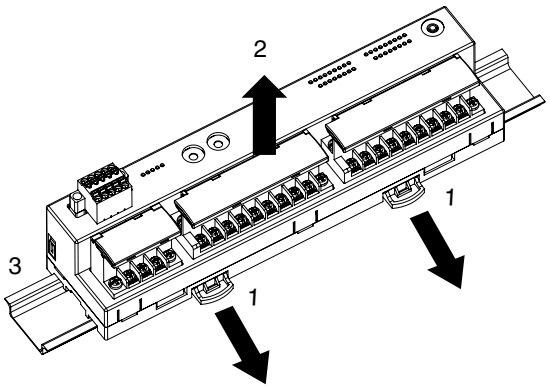


• Dismounting

1) Push down the DIN rail mounter slider with tip of a minus screwdriver.

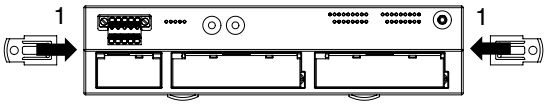
2) Pull the lower of the unit.

3) Remove the upper hook of the unit from the DIN rail.

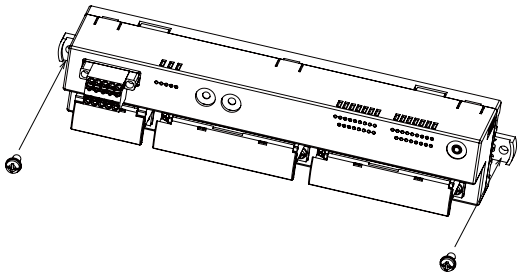


■ SURFACE MOUNTING

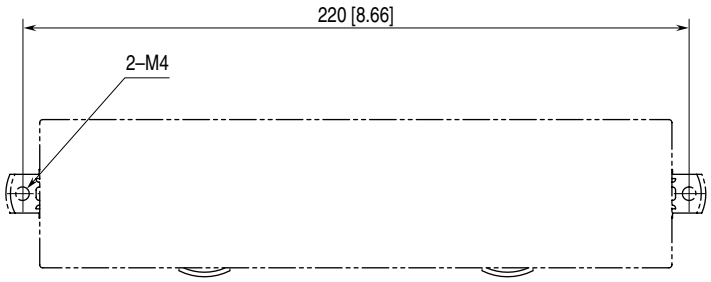
1) Insert the two DIN rail mounter sliders until it clicks once, as shown below.



2) Mount the unit with M4 screws referring the Mounting Requirements. (Torque: 1.4 N·m)



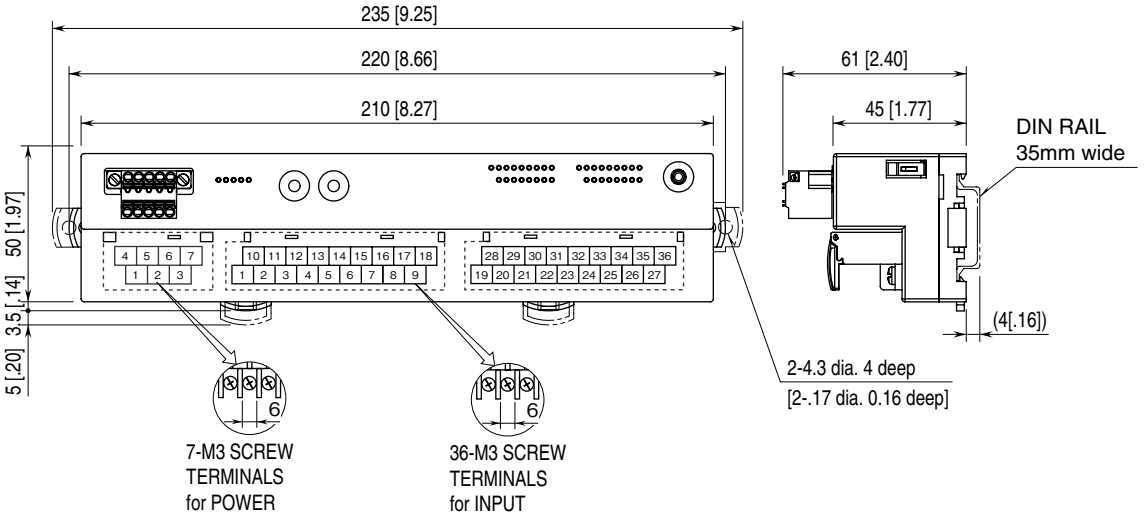
MOUNTING REQUIREMENTS unit: mm [inch]



TERMINAL CONNECTIONS

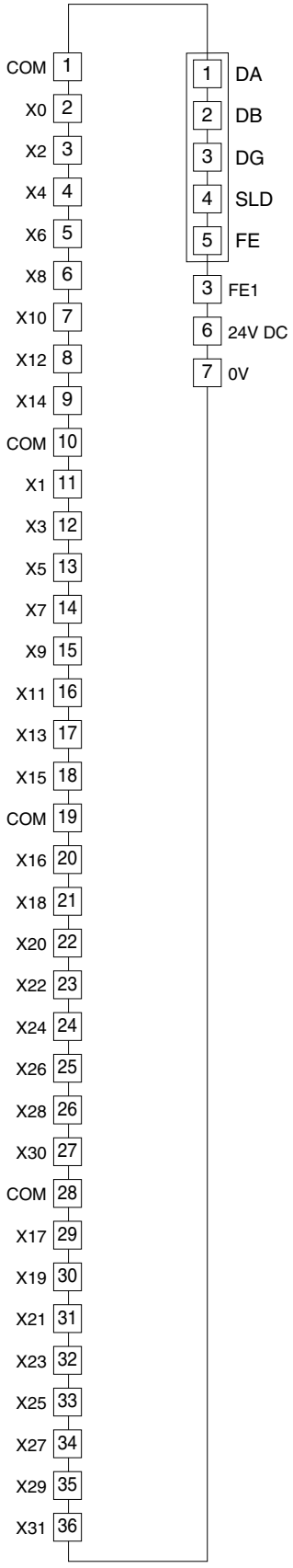
Connect the unit as in the diagram below.

■ EXTERNAL DIMENSIONS unit: mm [inch]

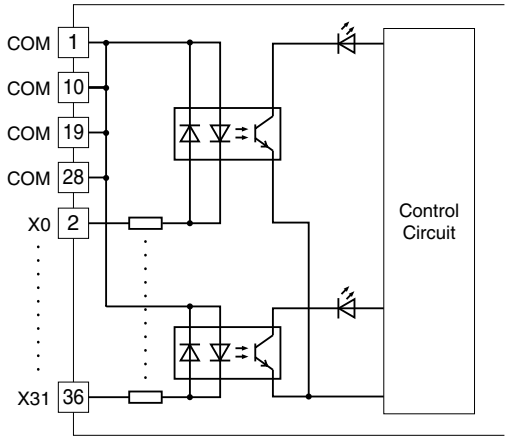


■ CONNECTION DIAGRAM

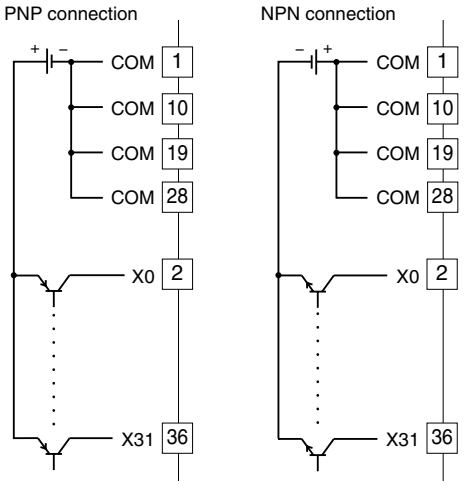
Note: In order to improve EMC performance, bond the FE1 terminal to ground.
Caution: FE1 terminal is NOT a protective conductor terminal.



■ INPUT CIRCUIT



■ INPUT CONNECTION EXAMPLE



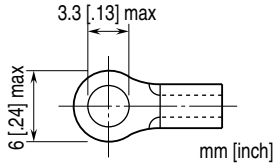
WIRING INSTRUCTIONS

■ TORQUE

Wiring screw for separable terminal: 0.5 N·m
Fixing screw for separable terminal: 0.5 N·m

■ SOLDERLESS TERMINAL

Refer to the drawing below for recommended ring tongue terminal size. Spade tongue type is also applicable.
Applicable wire size: 0.25 to 1.65 mm² (AWG 22 to 16)
Recommended manufacturer: Japan Solderless Terminal MFG. Co., Ltd, Nichifu Co., Ltd



■ HOW TO UNMOUNT THE SEPARABLE TERMINAL

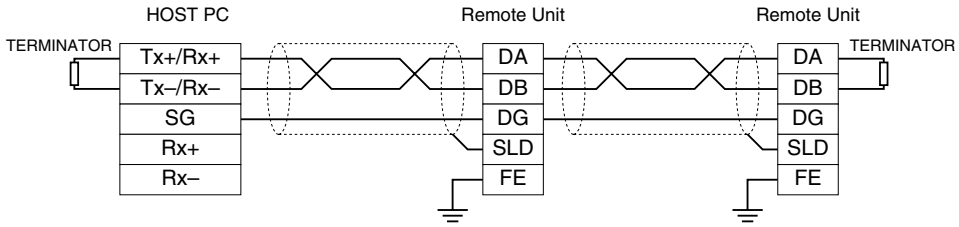
The separable terminal of the unit is 2 piece constructions. It is possible to remove the terminal by loosening two screws of terminal alternately.

■ TENSION CALMP TERMIANL BLOCK

Applicable wire: 0.2 - 1.5 mm²
Stripped length: 10 mm
Recommended terminal:
AI0,25-10YE 0.25 mm² (Phoenix Contact)
AI0,34-10TQ 0.34 mm² (Phoenix Contact)
AI0,5-10WH 0.5 mm² (Phoenix Contact)
AI0,75-10GY 0.75 mm² (Phoenix Contact)

COMMUNICATION CABLE CONNECTIONS

■ MASTER CONNECTION



Be sure to connect the terminating resistor included in the product package to the unit at both ends of transmission line.
The terminator must be connected across DA and DB.
The Host PC can be located other than at the extreme ends of transmission line.

PC CONFIGURATOR

The following parameter items can be set with using PC Configurator Software (model: R7CFG).
Refer to the users manual for the R7CFG for detailed operation of the software program.

■ Modbus SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Baud rate	38400 / 19200 / 9600 / 4800 bps	38400 bps
Parity bit	Odd / Even / None	Odd
Stop bit length	1-bit / 2-bit	1-bit
32-bit pulse data swapping	Upper (n+1) Lower (n) / Upper (n) Lower (n+1)	Upper (n+1) Lower (n)

■ PULSE INPUT SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Totalized pulse upper limit	1 (0x1) - 4294967295 (0xFFFFFFFF)	4294967295 (0xFFFFFFFF)
Overflow reset value	0 / 1	0
Preset of totalized pulse	0 (0x0) - 4294967295 (0xFFFFFFFF)	-

MODBUS FUNCTION CODES & SUPPORTED CODES

Modbus function codes are shown below.

■ Data and Control Functions

CODE	NAME	
02	Read Input Status	Status of digital inputs to the slave (read only)
03	Read Holding Registers	General purpose register within the slave (read / write)
04	Read Input Registers	Collected data from the field by the slave (read only)
16	Preset Multiple Registers	General purpose register within the slave (read / write)

■ Exception Codes

CODE	NAME	
01	Illegal Function	Function code is not allowable for the slave
02	Illegal Data Address	Address is not available within the slave
03	Illegal Data Value	Data is not valid for the function

MODBUS I/O ASSIGNMENT

	ADDRESS	DATA TYPE	DATA
Input (1X)	1 - 32		Digital Input
Input Register (3X)	1 - 64	ULI	Totalized Pulse Input
Holding Register (4X)	1 - 64	ULI	Preset of totalized pulse input

Note: DO NOT access addresses other than mentioned above.
Accessing such an address may result in problem such as malfunction of the unit.

■ DATA TYPE

ULI: Unsigned Long Integer 0 - 4294967295

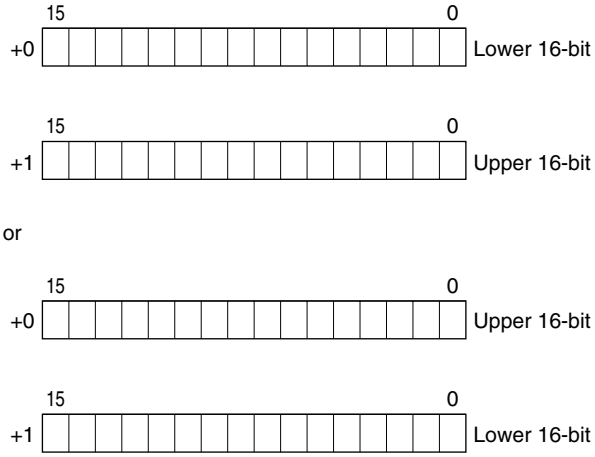
For preset of totalized pulse, following setting can be configurable by using Holding Register (4X) of Modbus.

■ PULSE INPUT SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Preset of totalized pulse	0 (0x0) – 4294967295 (0xFFFFFFFF)	-

I/O DATA DESCRIPTIONS

■ PULSE DATA (32-bit)



Pulse data is an unsigned 32-bit data. Use R7CFG to set allocation of lower 16-bit and upper 16-bit.

■ DISCRETE DATA (1-bit)

Discrete data 1-bit for each input and output.

0: OFF

1: ON