

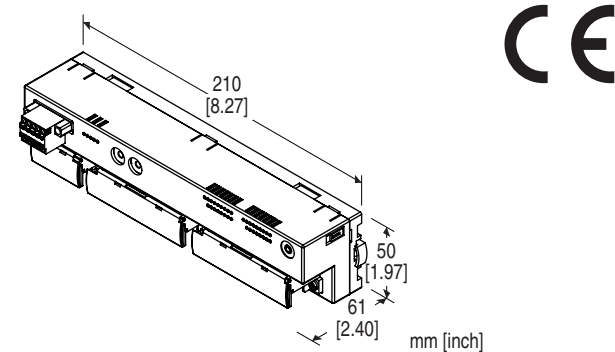
Remote I/O R7K4F Series

MODBUS I/O MODULE

(NPN/PNP discrete input, 32 points, screw terminal block, Modbus use)

Functions & Features

- 32 points NPN/PNP discrete input module
- Totalized pulse input



MODEL: R7K4FM-DA32-N-R[1]

ORDERING INFORMATION

- Code number: R7K4FM-DA32-N-R[1]
Specify a code from below for [1].
(e.g. R7K4FM-DA32-N-R/Q)
- Specify the specification for option code /Q
(e.g. /C01)

TYPE

DA32: NPN/PNP discrete input, 32 points

TERMINAL BLOCK

- N:** Screw terminal block for power supply
Tension clamp terminal block for communication
Screw terminal block for input

POWER INPUT

DC power
R: 24 V DC
(Operational voltage range: $\pm 10\%$; ripple 10 %p-p max.)

[1] OPTIONS

blank: none
/Q: Options other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to our web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating

PACKAGE INCLUDES...

- Terminating resistor (110 Ω , 0.25 W)

GENERAL SPECIFICATIONS

Connection

Modbus: Tension clamp terminal block (Front Twin connection)

Applicable wire size: 0.2 - 1.5 mm²

Stripped length: 10 mm

Power supply, Input: M3 separable screw terminal (torque 0.5 N·m)

Solderless terminal: Refer to the drawing at the end of the section.

Recommended manufacturer: Japan Solderless Terminal MFG.Co.Ltd, Nichifu Co.,Ltd

Applicable wire size: 0.25 to 1.65 mm² (AWG 22 to 16)

Screw terminal: Nickel-plated steel

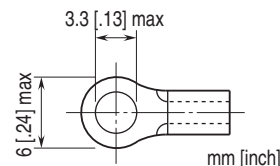
Housing material: Flame-resistant resin (gray)

Isolation: Input to Modbus or FE1 to power

Status indicator LEDs: PWR, RUN, ERR, SD, RD (Refer to the instruction manual)

Discrete input status indicator LEDs: Green LED turns on with input ON

■ Recommended solderless terminal



MODBUS COMMUNICATION

- **Standard:** Conforms to TIA/EIA-485-A
- **Transmission distance:** 500 meters max.
- **Transmission media:** Shielded twisted-pair cable (CPEV-S 0.9 dia.)

Communication setting: Use the R7CFG

- **Parity:** None, even, odd
- **Baud rate:** 4800, 9600, 19.2k, 38.4k (bps)
- **Stop bit length:** 1-bit / 2-bit

Node address: 1 - 99 (with rotary switch)

INPUT SPECIFICATIONS (WITH TOTALIZED PULSE INPUT)

Common: Positive or negative common (NPN/PNP) per 32 points

Maximum inputs applicable at once: No limit (at 24 V DC)
Rated input voltage: 24 V DC $\pm 10\%$; ripple 5 %p-p max.
ON voltage / current: ≥ 15 V DC (input - COM) / ≥ 3.5 mA
OFF voltage / current: ≤ 5 V DC (input - COM) / ≤ 1 mA
Input current: ≤ 5.5 mA per point at 24 V DC
Input resistance: Approx. 4.4 k Ω
ON delay: ≤ 0.2 msec.
OFF delay: ≤ 0.5 msec.
Maximum input frequency: 100 Hz
ON / OFF minimum pulse width: 5 msec.
No. of totalized pulse: 0 - 4,294,967,295
Maximum totalized pulse: 1 - 4,294,967,295
Overflow reset value: 0 or 1

INSTALLATION

Current consumption

•DC at 24 V DC: ≤ 50 mA

Operating temperature: -10 to +55°C (14 to 131°F)

Storage temperature: -20 to +65°C (-4 to +149°F)

Operating humidity: 30 to 90 %RH (non-condensing)

Atmosphere: No corrosive gas or heavy dust

Mounting: Surface or DIN rail (35 mm rail)

Weight: 330 g (0.73 lb)

PERFORMANCE

Insulation resistance: ≥ 100 M Ω with 500 V DC

Dielectric strength: 1500 V AC @ 1 minute
(input to Modbus or FE1 to power)

STANDARDS & APPROVALS

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

CONFIGURATOR SOFTWARE SETTING

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.

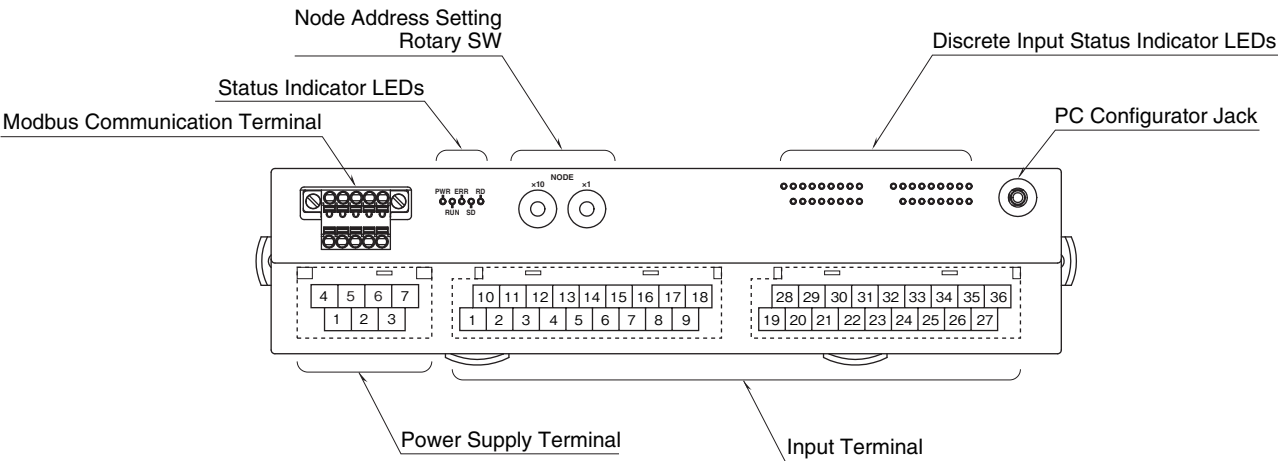
■ Modbus SETTING

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

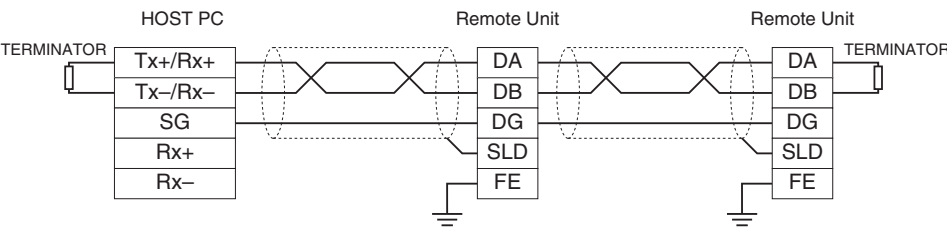
PARAMETER	SETTING RANGE	DEFAULT SETTING
Totalized pulse upper limit	1 (0x1) - 4294967295 (0xFFFFFFFF)	4294967295 (0xFFFFFFFF)
Overflow reset value	0 / 1	0
Preset of totalized pulse	0 (0x0) - 4294967295 (0xFFFFFFFF)	-

EXTERNAL VIEW



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.

TERMINAL ASSIGNMENTS**■ 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

■ POWER SUPPLY TERMINAL ASSIGNMENT

4	5	6	7
NC	NC	+24V	0V

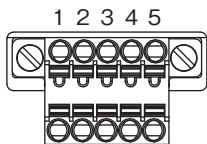
1	2	3
NC	NC	FE1

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

■ NETWORK CONNECTOR ASSIGNMENT

Unit side connector: MC1,5/5-GF-3,5 (Phoenix Contact)

Cable side connector: TFM1,5/5-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 BLOCKApplicable wire: 0.2 - 1.5 mm²

Stripped length: 10 mm

Recomended 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)

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)**

or



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

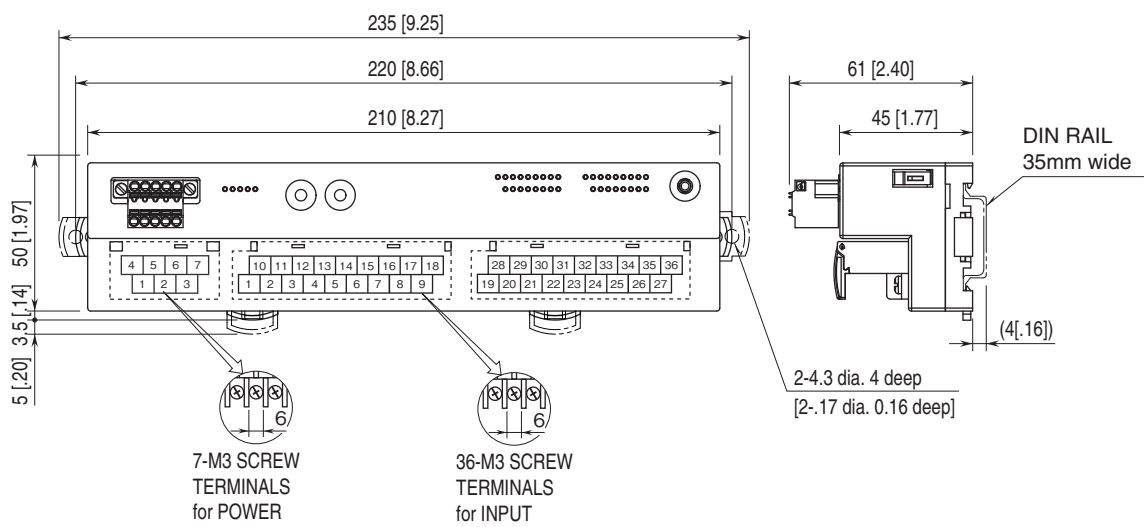
■ DISCRETE DATA (1-bit)

Discrete data 1-bit for each input and output.

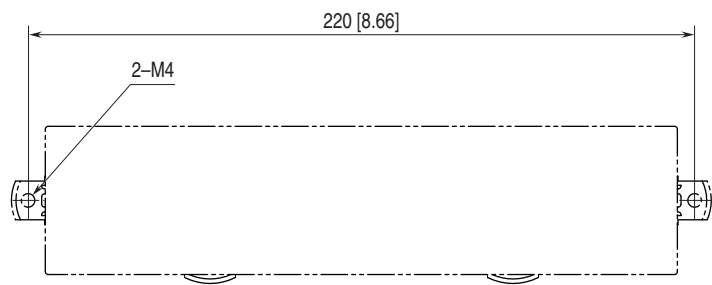
0: OFF

1: ON

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



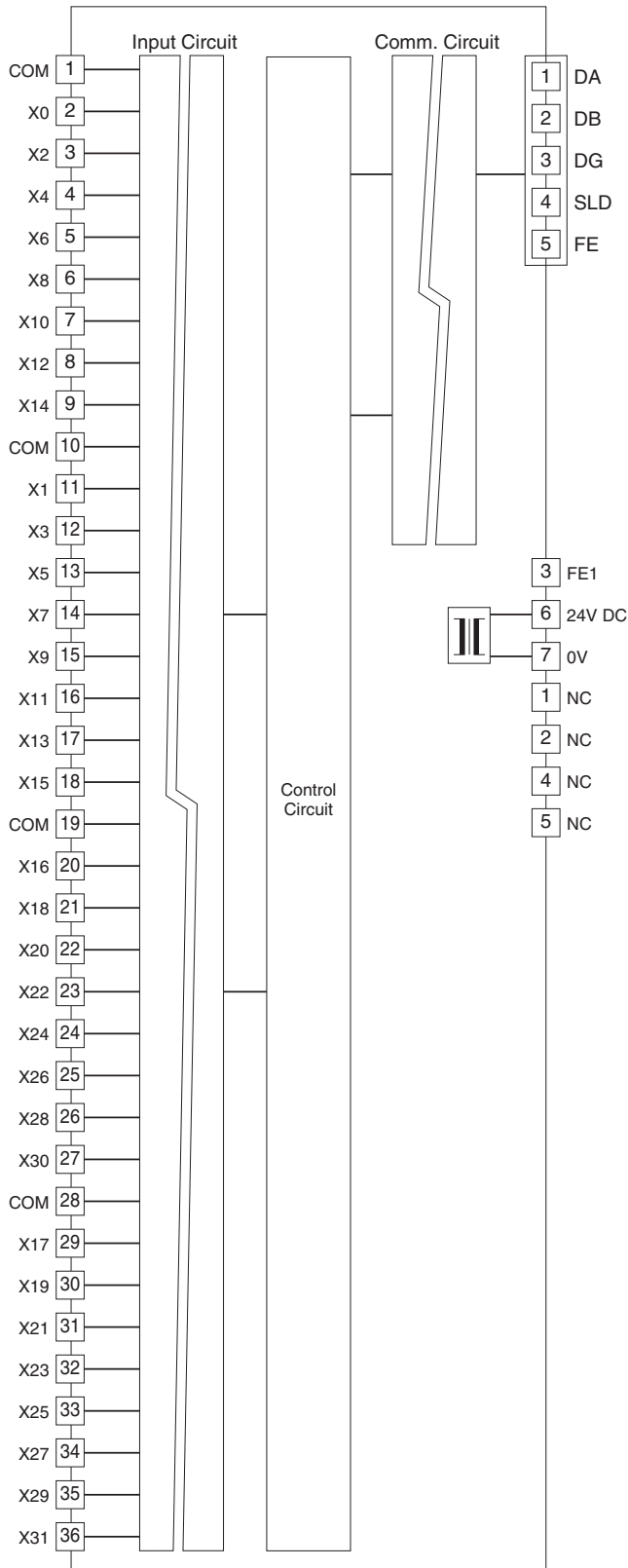
MOUNTING REQUIREMENTS unit: mm [inch]



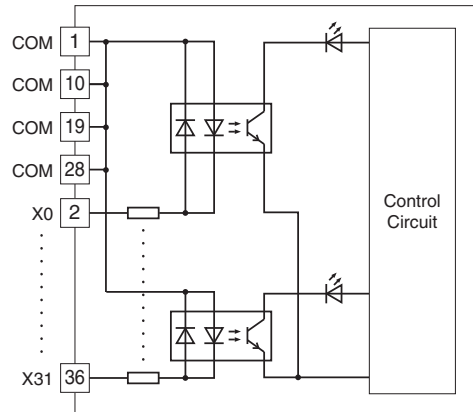
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

Note: In order to improve EMC performance, bond the FE1 terminal to ground.

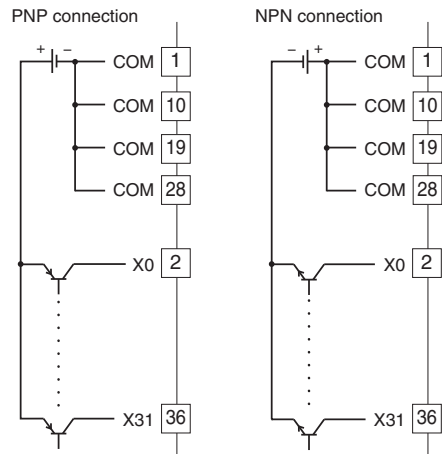
Caution: FE1 terminal is NOT a protective conductor terminal.



■ INPUT CIRCUIT



■ INPUT CONNECTION EXAMPLE





Specifications are subject to change without notice.