MODBUS/TCP I/O MODULE
(relay contact output, 16 points, screw terminal block)

MODEL **R7K4FE-6-DC16**

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 output module...(1)
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

• This equipment is suitable for Pollution Degree 2 and Measurement Category II (output, transient voltage 2500V). Basic insulation (output to power input: 250V) is maintained. Prior to installation, check that the insulation class of this unit satisfies the system requirements.
• The equipment must be mounted inside the instrument panel of a metal enclosure.
• 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.

■ 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%, approx. 130mA

■ GENERAL PRECAUTIONS

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

■ SECURITY PRECAUTIONS

• In the network environment where this module is installed, to maintain the security of the system (availability, integrity, confidentiality) against unauthorized access from external devices via the network such as the Internet, DoS attacks, and other cyber attacks, take measures such as installing firewalls or VPNs.
• We will not be responsible for any issues arising from system troubles caused by cyber attacks.

■ 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.

COMPONENT IDENTIFICATION
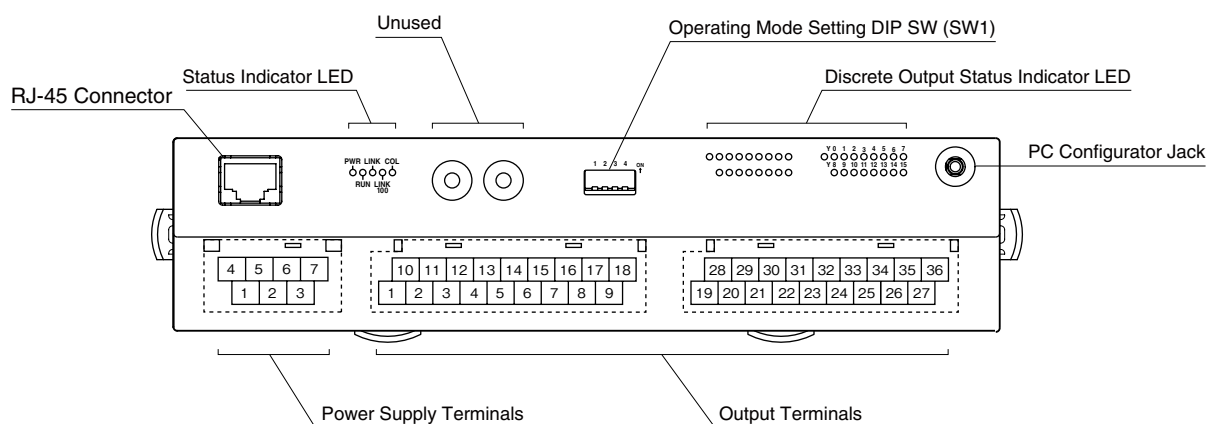
■ STATUS INDICATOR LED

ID	COLOR	FUNCTION
PWR	Green	Turns on when the internal power is supplied normally.
RUN	Green	Turns on in normal communications conditions.
LINK	Green	Turns on in LINK status.
LINK100	Green	Turns on when connected in 100 Mbps. *1
COL	Green	Blinks in case of collisions.

*1. Used only in 100BASE link. Dark in 10BASE link.

■ OPERATING MODE

• Output at the Loss of Communication: SW1-4

SW1-4	OUTPUT AT THE LOSS OF COMMUNICATION
OFF	Reset the output (turned off)
ON	Hold the output (*) (maintains the last data received normally)

(*) Factory setting
Note: Be sure to set unused SW1-1 through 1-3 to OFF.

■ DISCRETE OUTPUT STATUS INDICATOR LED

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

■ POWER SUPPLY TERMINAL ASSIGNMENT

4 NC	5 NC	6 +24V	7 0V
1 NC	2 NC	3 FE	

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

■ OUTPUT TERMINAL ASSIGNMENT

10 +24V	11 Y0	12 Y1	13 Y2	14 Y3	15 Y4	16 Y5	17 Y6	18 Y7
1 0V	2 COM0	3 COM1	4 COM2	5 COM3	6 COM4	7 COM5	8 COM6	9 COM7

28 +24V	29 Y8	30 Y9	31 Y10	32 Y11	33 Y12	34 Y13	35 Y14	36 Y15
19 0V	20 COM8	21 COM9	22 COM10	23 COM11	24 COM12	25 COM13	26 COM14	27 COM15

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	0V	0V	10	+24V	24V DC
2	COM0	Common 0	11	Y0	Output 0
3	COM1	Common 1	12	Y1	Output 1
4	COM2	Common 2	13	Y2	Output 2
5	COM3	Common 3	14	Y3	Output 3
6	COM4	Common 4	15	Y4	Output 4
7	COM5	Common 5	16	Y5	Output 5
8	COM6	Common 6	17	Y6	Output 6
9	COM7	Common 7	18	Y7	Output 7

NO.	ID	FUNCTION	NO.	ID	FUNCTION
19	0V	0V	28	+24V	24V DC
20	COM8	Common 8	29	Y8	Output 8
21	COM9	Common 9	30	Y9	Output 9
22	COM10	Common 10	31	Y10	Output 10
23	COM11	Common 11	32	Y11	Output 11
24	COM12	Common 12	33	Y12	Output 12
25	COM13	Common 13	34	Y13	Output 13
26	COM14	Common 14	35	Y14	Output 14
27	COM15	Common 15	36	Y15	Output 15

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.

PARAMETER	SETTING RANGE	DEFAULT SETTING
IP Address	0.0.0.0 – 255.255.255.255	192.168.0.1
Subnet Mask	0.0.0.0 – 255.255.255.255	255.255.255.0
Default Gateway	0.0.0.0 – 255.255.255.255	192.168.0.100
Linger Timer	0.0 – 3276.7 (sec.)	180.0 (sec.)
Time Out	0.0 – 3276.7 (sec.)	3.0 (sec.)

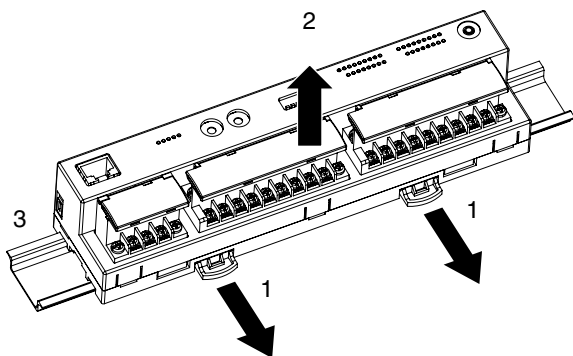# MOUNTING INSTRUCTIONS

■ DIN RAIL MOUNTING

• Mounting

1) Set the upper hook at the rear side of the unit on the DIN rail.
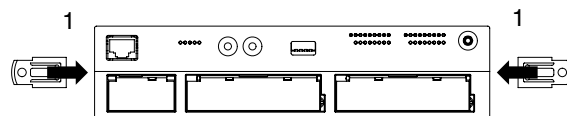
2) Push in the lower.
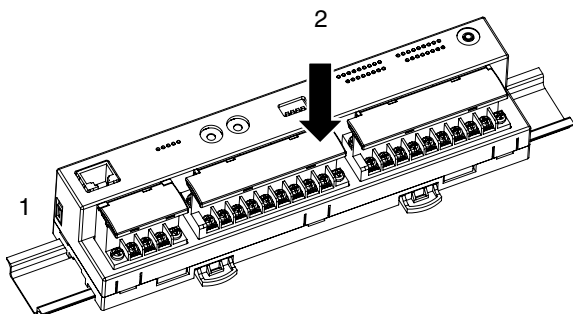
• Dismounting

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

2) Pull the lower of the unit.

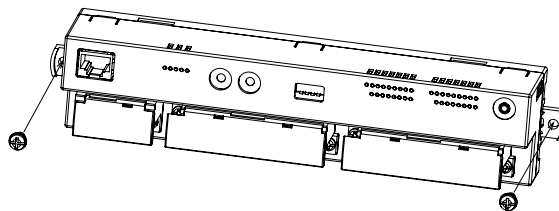3) Remove the upper hook of the unit from the DIN rail.

■ SURFACE MOUNTING

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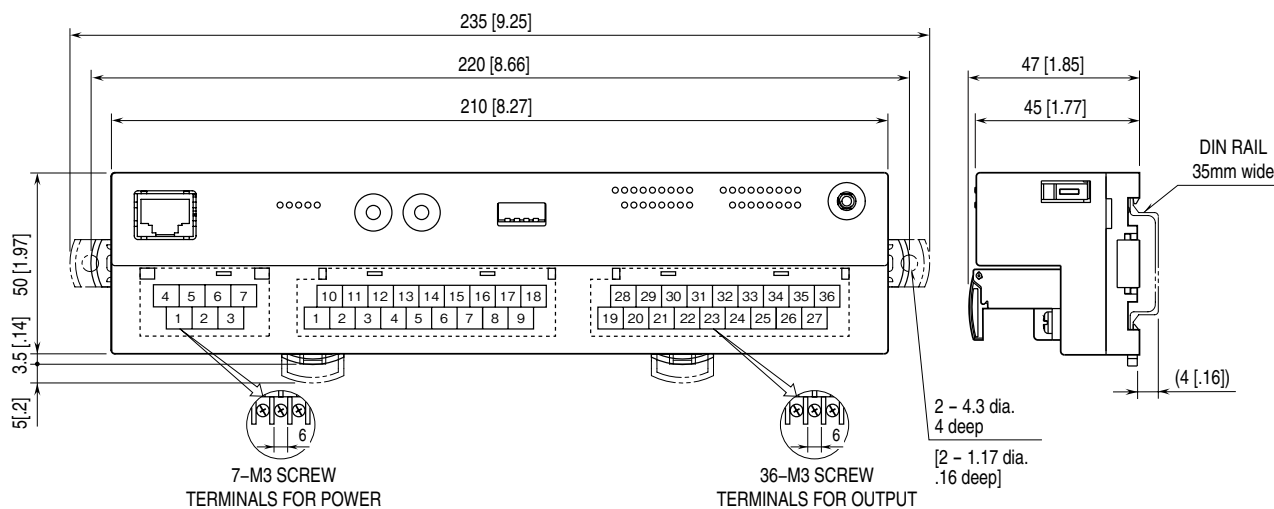

2) Mount the unit with M4 screws referring the Mounting Requirements. (Torque: 1.4 N·m)

TERMINAL CONNECTIONS

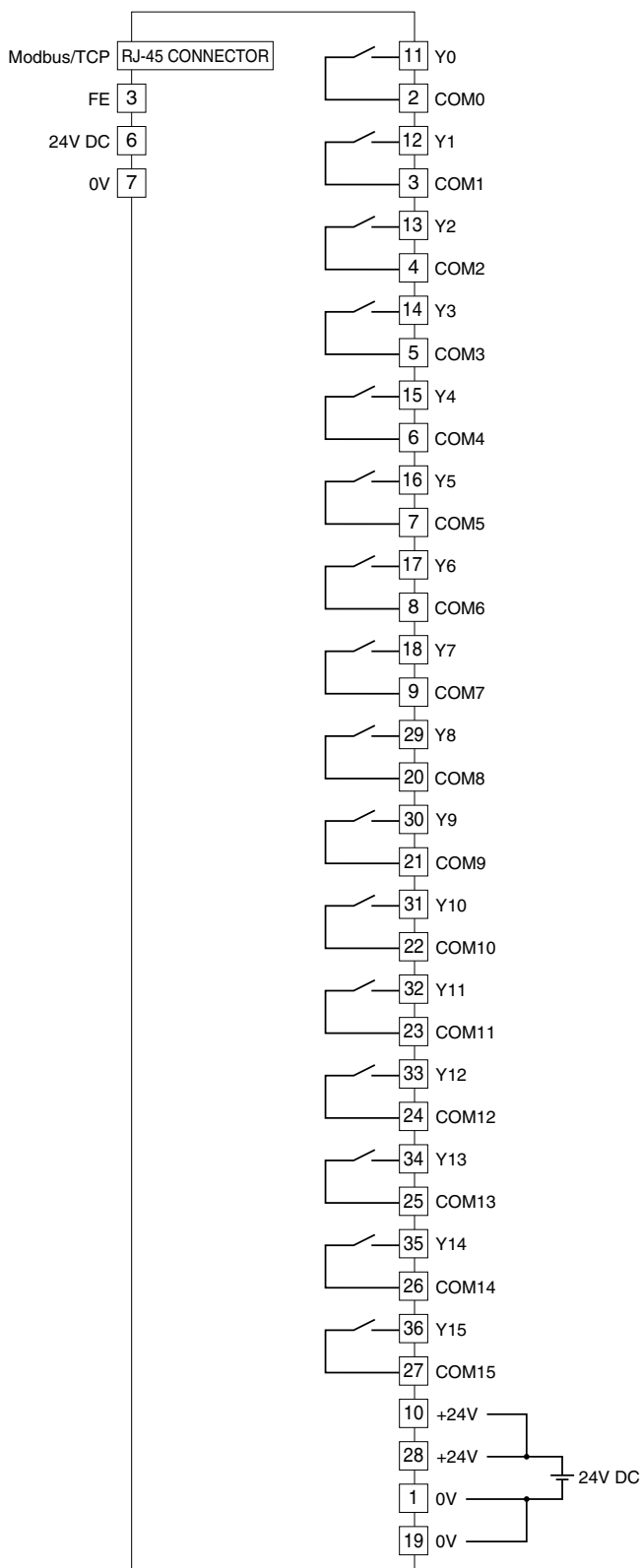Connect the unit as in the diagram below.

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

7–M3 SCREW
TERMINALS FOR POWER

36–M3 SCREW
TERMINALS FOR OUTPUT

2 – 4.3 dia.
4 deep
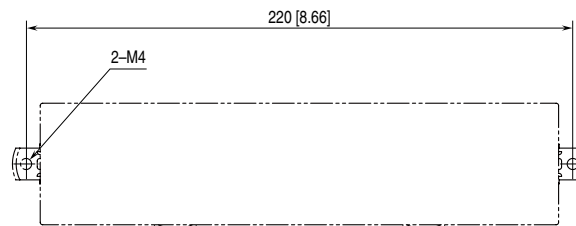[2 – 1.17 dia.
.16 deep]

DIN RAIL
35mm wide

■ CONNECTION DIAGRAM

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

Caution: FE terminal is NOT a protective conductor terminal.

MOUNTING REQUIREMENTS unit: mm [inch]

WIRING INSTRUCTIONS

■ TORQUE

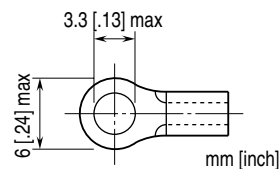Wiring screw for separable terminal: 0.5 N·m

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 mm^2 (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.

CHECKING ETHERNET CONNECTION

■ IP ADDRESS

The R7K4FE does not support BootP Table Software. The IP Address and Subnet Mask can be configured using the R7CFG Configurator Software.

The Modbus/TCP Port No. is fixed at 502.

Firmware version V3.00 or later support DHCP. Set IP address to 0.0.0.0 to activate DHCP.

■ CHECK WIRING

Connect an Ethernet cable to the RJ-45 connector.

■ CHECK LED

When wiring is correct, LINK is turned on. When the module is connected in 100 Mbps, LINK100 is ON.

■ CHECK R7K4FE CONNECTION

Enter "ping command" on the character user interface (CUI) such as Windows PowerShell or command prompt:

    C:¥WINDOWS>ping ***.***.***.***
    (***.***.***.***: Enter IP address in decimal.)

    ping ***.***.***.*** with 32 bytes of data:
    Reply from ***.***.***.*** : bytes=32 time<10ms TTL=64
    Reply from ***.***.***.*** : bytes=32 time<10ms TTL=64
    Reply from ***.***.***.*** : bytes=32 time<10ms TTL=64
    Reply from ***.***.***.*** : bytes=32 time<10ms TTL=64

    Ping statistics for ***.***.***.***
    Packets:Sent=4,Received=4,Lost=0(0% loss)

Replies in case of normal connection are as shown above. If the connection cannot be established normally due to e.g. wrong IP address, other replies such as 'timeout' will be received.

■ CHECK CONNECTION TO THE APPLICATION SOFTWARE

Check Point 1: LINK LEDs

When normal connection with PC, PLC or hub is established, the front LINK and LINK100 (when connected in 100 Mbps) is/are turned on regardless of data sending/receiving status. Check power supply to the switch/hub in case that these LEDs are not on.

Check Point 2: RUN Indicator LED

A green LED turns on at the RUN Indicator LED in normal data sending/receiving with an application.

MODBUS FUNCTION CODES & SUPPORTED CODES

■ DATA AND CONTROL FUNCTIONS

CODE	NAME		
01	Read Coil Status	X	Digital output from the slave (read/write)
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)
05	Force Single Coil	X	Digital output from the slave (read/write)
06	Preset Single Register		General purpose register within the slave (read/write)
07	Read Exception Status		
08	Diagnostics	X	
09	Program 484		
10	Poll 484		
11	Fetch Comm. Event Counter	X	Fetch a status word and an event counter
12	Fetch Comm. Event Log	X	A status word, an event counter, a message count and a field of event bytes
13	Program Controller		
14	Poll Controller		
15	Force Multiple Coils	X	Digital output from the slave (read/write)
16	Preset Multiple Registers		General purpose register within the slave (read/write)
17	Report Slave ID	X	Slave type / 'RUN' status
18	Program 884/M84		
19	Reset Comm. Link		
20	Read General Reference		
21	Write General Reference		
22	Mask Write 4X Register		
23	Read/Write 4X Register		
24	Read FIFO Queue		

■ EXCEPTION CODES

CODE	NAME		
01	Illegal Function	X	Function code is not allowable for the slave
02	Illegal Data Address	X	Address is not available within the slave
03	Illegal Data Value	X	Data is not valid for the function
04	Slave Device Failure		
05	Acknowledge		
06	Slave Device Busy		
07	Negative Acknowledge		
08	Memory Parity Error		

■ DIAGNOSTIC SUBFUNCTIONS

CODE	NAME		
00	Return Query Data	X	Loop back test
01	Restart Comm. Option		
02	Return Diagnostic Register		
03	Change Input Delimiter Character		
04	Force Slave to Listen Only Mode		

MODBUS I/O ASSIGNMENTS

	ADDRESS	DATA TYPE	DATA
Coils (0X)	1 – 16		Digital Output

I/O DATA DESCRIPTION

■ **DISCRETE OUTPUT MODULE**

```
15                          0
┌─┬─┬─┬─┬─┬─┬─┬─┬─┬─┬─┬─┬─┬─┬─┬─┐
└─┴─┴─┴─┴─┴─┴─┴─┴─┴─┴─┴─┴─┴─┴─┴─┘
```

Output 0
Output 1
Output 2
Output 3
⋮
Output 7
Output 8
⋮
Output 15

0: OFF   1: ON