

T-Link INTERFACE MODULE (Fuji Electric T-Link use)	MODEL R3-NF1
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BEFORE USE

Thank you for choosing M-System. 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 M-System's Sales Office or representatives.

■ PACKAGE INCLUDES:

Network interface module(1)

■ 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

■ 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 – 120V AC rating: 85 – 132V, 47 – 66 Hz, approx. 25VA
 - 200 – 240V AC rating: 170 – 264V, 47 – 66 Hz, approx. 25VA
 - 24V DC rating: 24V ±10%, approx. 14W

■ GENERAL PRECAUTIONS

- DO NOT set the switches 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.

■ 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.

INSTALLATION

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

Before mounting the Network Interface Module onto the Base, make sure to configure the module as explained below.

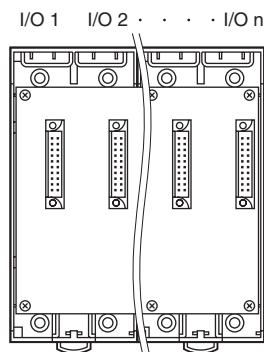
■ DATA ALLOCATION

The setting determines the data area size assigned to each I/O module mounted on the base. The data sent/received via T-Link is mapped according to this setting. See "COMPONENT IDENTIFICATION."

■ NODE ADDRESS

See "COMPONENT IDENTIFICATION."

■ NETWORK SLOTS ON THE BASE



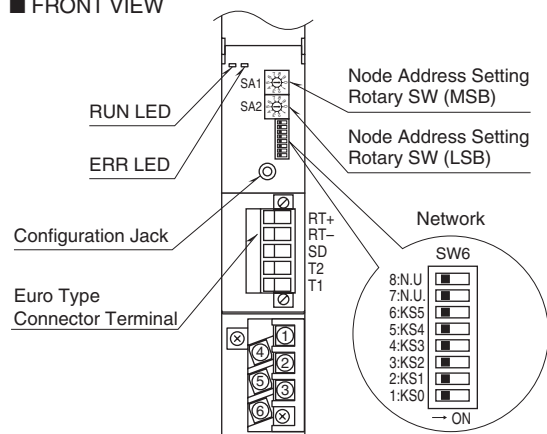
With Model R3-BS base, mount the I/O Modules from the left end (I/O 1) to the right in order that the Network Module assigns data areas from I/O 1.

Network Module(s) and Power Module are mounted basically at the right end though technically they could be mounted in any position. When mounting Network Module(s) or Power Module to I/O 1 or I/O 2 etc. the I/O data area occupied with Network Module(s) and Power Module will not be usable.

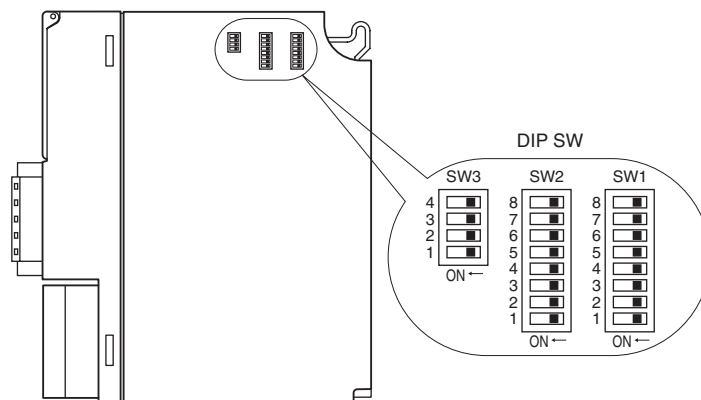
With Model R3-BSW base, there is no limitation in mounting positions as I/O address can be assigned freely to each module using rotary switches equipped on the base.

COMPONENT IDENTIFICATION

FRONT VIEW



SIDE VIEW



FRONT ROTARY SW

Node Address: SA1, SA2

Node Address is set in decimal.
(Setpoint adjustment: 00 – 99)

FRONT DIP SW

(*)Factory setting

I/O Points: KS0, KS1, KS2, KS3 (SW6)

SW	I/O POINTS			
	64 POINTS (64 words)	16 POINTS (16 words)	8 POINTS (8 words)	4 POINTS (4 words)
KS0	OFF	ON	OFF	ON
KS1	OFF	OFF	ON	ON
KS2	ON	ON	ON	ON
KS3	OFF	OFF	OFF	OFF

I/O Type: KS4, KS5 (SW6)

SW	I/O TYPE		
	INPUT/OUTPUT MIXED	OUTPUT ONLY	INPUT ONLY
KS4	OFF	ON	OFF
KS5	OFF	OFF	ON

Note: All switches are ex-factory set to the positions OFF.
Be sure to set appropriate I/O points and I/O type before commissioning the network module. Be sure to set unused SW6-7 and 6-8 to OFF.

SIDE DIP SW

Data Allocation: SW1, SW2

Data Allocation Type*1 must be assigned to each I/O module position to specify how many data areas (four types) are to be occupied by each.

Two bits from SW1 and SW2 are assigned to each position, and data areas can be specified from the module No. 1 through 8. Setting for No. 9 and later modules is identical to No. 8.

SW ASSIGNMENT		MODULE NO.
SW1-1	SW1-2	1
SW1-3	SW1-4	2
SW1-5	SW1-6	3
SW1-7	SW1-8	4
SW2-1	SW2-2	5
SW2-3	SW2-4	6
SW2-5	SW2-6	7
SW2-7	SW2-8	8

SW SETTING		DATA ALLOCATION
OFF	OFF	1
ON	OFF	4
OFF	ON	8
ON	ON	16

*1. Refer to the specifications of the related series for the Data Allocation Type of I/O modules.

Dual Communication: SW3-1

When two network modules are mounted, one must be 'Main' (OFF) network and the other must be 'Sub' (ON) network. For single communication, the network module must always be set to 'Main' (OFF).

SW	DUAL COMMUNICATION	
	MAIN	SUB
SW3-1	OFF (*)	ON

Input Error Data: SW3-2

Hold: When the communication from an input module is lost due to the input module error, the network module holds the signal and stands by until the communication recovers.

Set to '0': When the communication from an input module is lost due to the input module error, the network module outputs '0.'

SW	INPUT ERROR DATA	
	HOLD	SET '0'
SW3-2	OFF (*)	ON

Status Data: SW3-3 *2

Status is assigned to the last 2 words of the input area.

SW	STATUS DATA	
	WITHOUT	WITH
SW3-3	OFF (*)	ON

*2. Not available with firmware version earlier than 1.02.

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 ON or blinking when abnormal
ON	Red when receiving	Red when transmitting

PC CONFIGURATOR

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

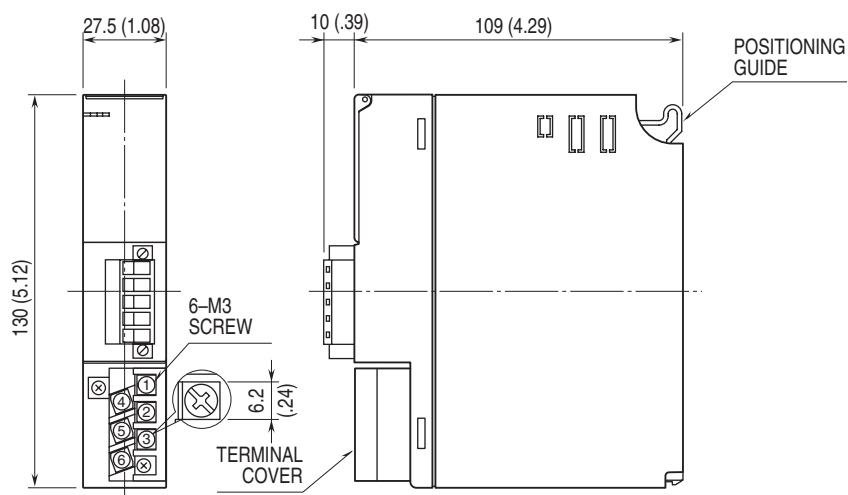
NETWORK MODULE SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Time (no communication time)	0.2 – 3200.0 (sec.)	3.0 (sec.)

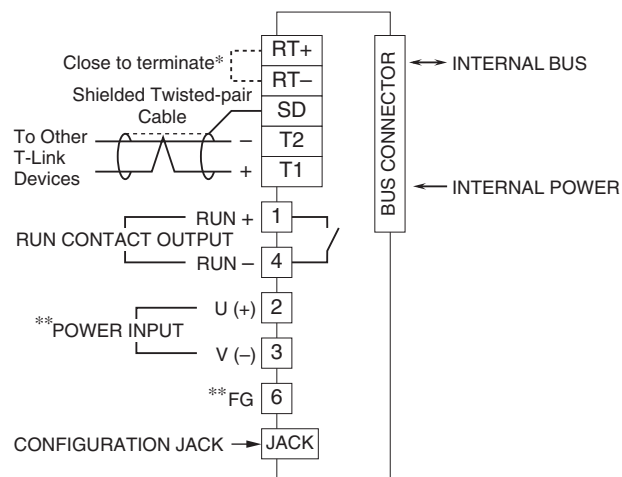
TERMINAL CONNECTIONS

Connect the unit as in the diagram below.

EXTERNAL DIMENSIONS unit: mm (inch)



CONNECTION DIAGRAM



- * When the module is at an end of the transmission line via twisted-pair cable (= when there is no cross wiring), close across the RT+ and RT- terminals with the jumper included in the product package. Remove the jumper for all other locations.
 **Not provided with 'No Power Supply' type module.
 Caution: FG terminal is NOT a protective conductor terminal.

WIRING INSTRUCTIONS

M3 SCREW TERMINAL (power input, RUN contact output)

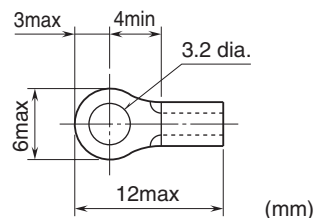
Torque: 0.5 N·m

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: Japan Solderless Terminal MFG.Co.Ltd, Nichifu Co.,ltd

Applicable wire size: 0.75 to 1.25 mm²



EURO TYPE CONNECTOR TERMINAL (T-Link)

Applicable wire size: 0.2 to 2.5 mm² (AWG24 to 12)

Stripped length: 7 mm

TRANSMISSION DATA DESCRIPTIONS

The DIP switches on the front of the module specify each I/O module's I/O points and I/O type. The DIP switches on the side of the module specify status data.

The allocation area, which is set in order from the slot No. 1, is assigned to the I/O data. I/O module's data exceeding the configured area is unable.

With input status data ON, the last 2 words of the input data area are used as status data. The status data setting is available for firmware version 1.02 or later. For other versions SW3-3 setting is ignored and the device works as if SW3-3 is off. When I/O data and the status area are duplicated, status data takes priority.

For example, when the total number of I/O points is of 16, the data areas are assigned as shown below:

Module 1	4
Module 2	4
Module 3	4
Module 4	1
Module 5	1
Module 6	1
Module 7	1

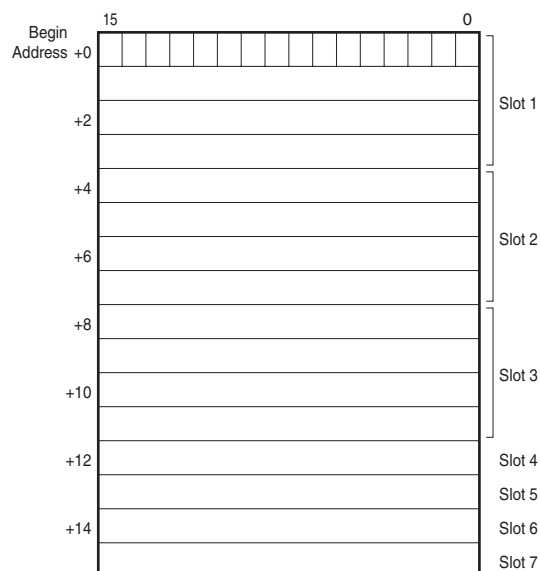
Then the I/O data are assigned as in the figures below:

■ WITHOUT STATUS DATA (SW3-3: OFF)

• INPUT-ONLY or OUTPUT-ONLY DATA

Data areas specified with the side DIP switches are assigned to each module from Module 1 through Module 7 in turn.

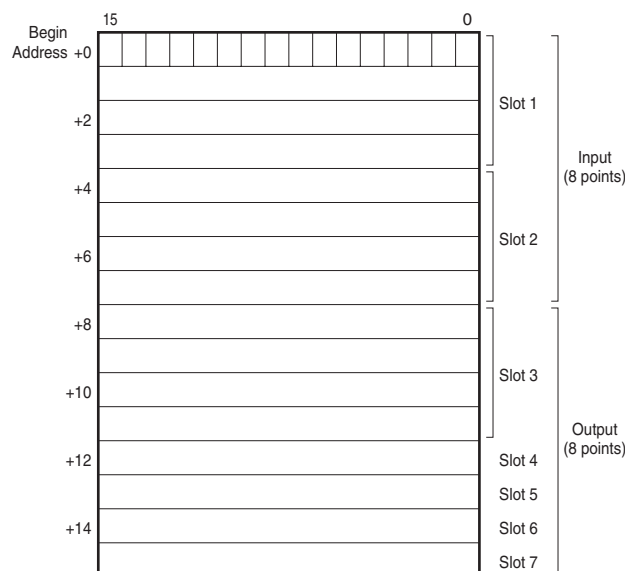
If the total number of I/O points is of 4 or 8, non-existing data are not sent/received.



• I/O MIXED DATA

Half of the words specified with the KS0 through KS3 are assigned to the inputs, the other half to the outputs.

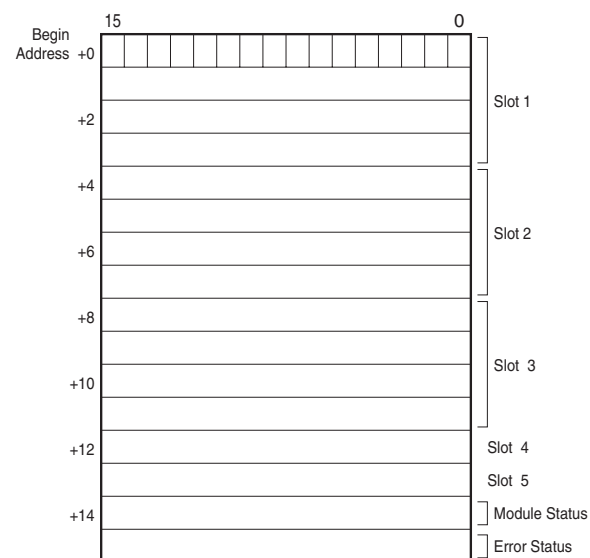
Module 1 is always assigned to the input. Insert the input modules to the slots 1 and 2, and the output modules to the slots 3 through 7.



■ WITH STATUS DATA (SW3-3: ON)

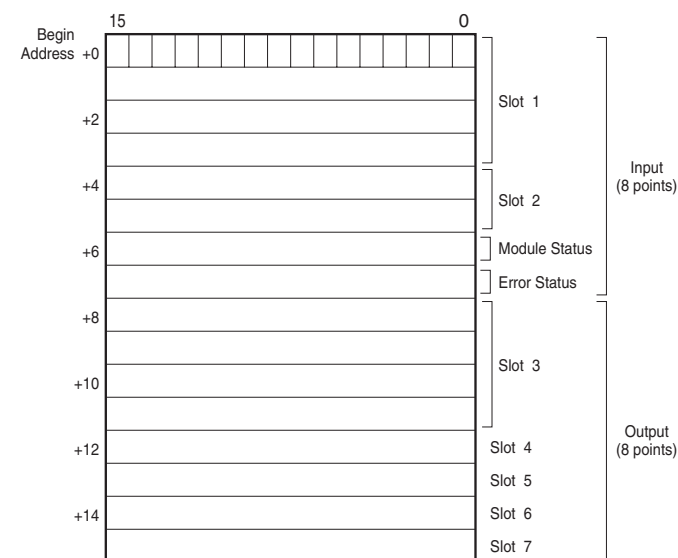
• I/O type: Input

Status data is assigned to the last 2 words.
Data of the slots 6 and 7 is unable.



• I/O type: Input/Output Mixed

Status data is assigned to the last 2 words of the input area.
Data on the words 3 and 4 of the slot 2 is unable.



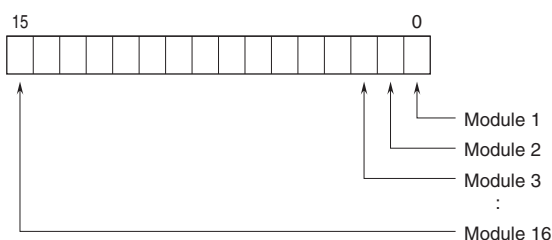
• I/O type: Output

Status data cannot be assigned because there is no input data.
For output only, operate without status area.

- Module Status indicates whether individual I/O modules are mounted or not. The bit corresponding to the mounted slot turns to "1," and the unmounted slot to "0."
- Error Status indicates error status for each module as described below. The bit corresponding to such module turns to "1."
 R3-TSx, R3-RSx, R3-US4 (T/C, RTD input): Input burnout
 R3-DA16A: Power input in error or disconnected
 R3-YSx: Output current error (e.g. load unconnected)
 R3-PC16A: External power supply in error or disconnected
 Every module which input is less than -15% or more than +115%
 R3-US4 (voltage input): out of -10% to +110% input.

MODULE STATUS, ERROR STATUS

Shows each module's availability and error status.



I/O DATA DESCRIPTIONS

The data allocations for typical I/O modules are shown below.
Refer to the manual for each module for detailed data allocations.

■ ANALOG DATA (16-bit data, models: R3-SV4, YV4, DS4, YS4 and US4, etc.)

16-bit binary data.

Basically, 0 to 100% of the selected I/O range is converted into 0 to 10000 (binary).

-15 to 0 % is a negative range represented in 2's complement.

In case of R3-US4, -10 to 0% is a negative range represented in 2's complement.



■ TEMPERATURE DATA (16-bit data, models: R3-RS4, TS4 and US4, etc.)

16-bit binary data.

With °C temperature unit, raw data is multiplied by 10. For example, 25.5°C is converted into 255.

With °F temperature unit, the integer section of raw data is directly converted into the data. For example, 135.4°F is converted into 135.

Minus temperature is converted into negative values, represented in 2's complements.



■ ANALOG DATA (16-bit data, models: R3-CT4A, CT4B, etc.)

16-bit binary data.

Integer obtained by multiplying unit value (A) by 100.

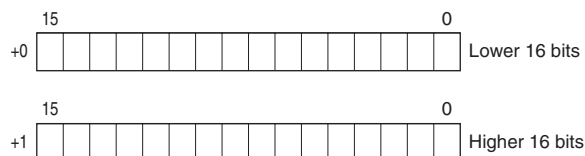
In case of CLSE-R5, integer obtained by multiplying unit value (A) by 1000.



■ ACCUMULATED COUNT DATA (32-bit data, models: R3-PA2, PA4A, WT1, WT4, etc.)

32-bit binary data is used for accumulated counts and encoder positions.

Lower 16 bits are allocated from the lowest address to higher ones, higher 16 bits in turn.



■ BCD DATA (32-bit data, models: R3-BA32A, BC32A, etc.)

32-bit binary data is used for BCD.

Lower 16 bits are allocated from the lowest address to higher ones, higher 16 bits in turn.



■ DISCRETE DATA (models: R3-DA16, DC16, etc.)

