

**FL-net INTERFACE MODULE
(OPCN-2)**

MODEL R3-NFL1

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)
- CD (Configuration Builder software + manuals)..... (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.

To set up and operate the product, please carefully read instruction manuals in the CD.

POINTS OF CAUTION

■ CONFORMITY WITH EC DIRECTIVES

- The equipment must be mounted inside the instrument panel of a metal enclosure.
- The actual installation environments such as panel configurations, connected devices and 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 CE conformity.

■ GENERAL PRECAUTIONS

Before you remove the unit from its base or mount it, turn off the power supply for safety.

■ 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 (power supply, input and output) 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

- When you use this module with discrete output modules, before installing the modules, set the output tub with the FL-net Configuration Builder (model: R3-NFLBLD) and write it to the R3-NFL1.
- 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-BSx, or Model R3-BSWx for free I/O address capability.

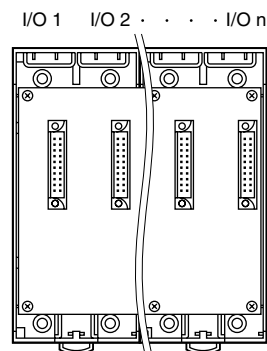
Before mounting the Network Interface Module onto the Base, be sure to configure the module as explained below.

■ NETWORK SLOTS ON THE BASE

With Model R3-BSx 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.

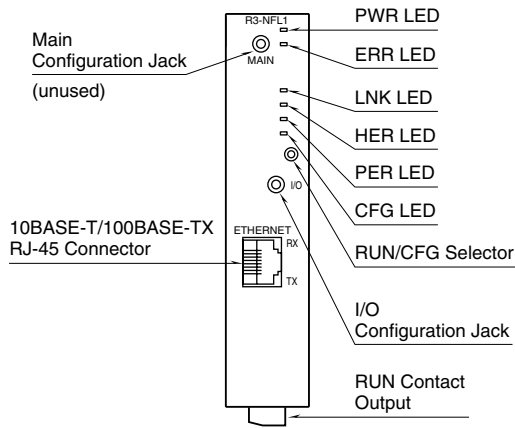
Network Module(s) and Power Module are mounted basically at the right end though technically they could be mounted in any position.

With Model R3-BSWx 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.

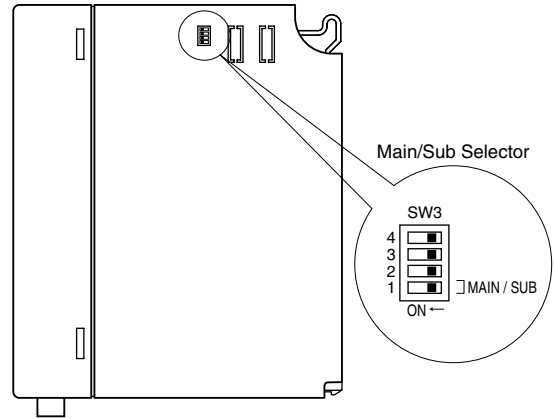


COMPONENT IDENTIFICATION

FRONT VIEW



SIDE VIEW



DIP SW SETTING

Dual Communication: SW3

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).

| | DUAL COMMUNICATION | |
|-------|--------------------|-----|
| | Main (*) | Sub |
| SW3-1 | OFF | ON |

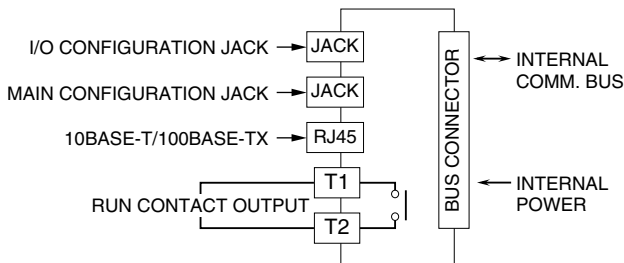
(*) Factory setting

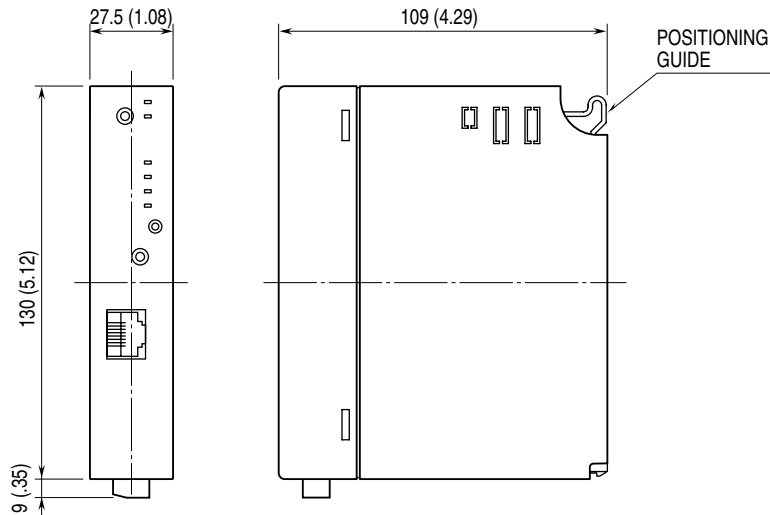
RUN / CFG SETTING

RUN / CFG Selector determines the Network Module's function mode: RUN or Configuration (CFG). With the switch set to CFG, the module stops the internal data scanning, and is ready to download the configuration setting from the PC via Ethernet. The output operation also stops when the exiting node output clear setting is set to 'Switch to the sub-system's control.'

TERMINAL CONNECTIONS

Connect the unit as in the diagram below.



EXTERNAL DIMENSIONS unit: mm (inch)**FL-net DESCRIPTION****■ CYCLIC TRANSMISSION**

- Transmitting discrete I/O status, analog I/O values and modules' information on hardware commissioning, hardware errors, data errors and signal source node errors.
- Supplying word data transmitted from another devices to local output modules. The R3-NFL1 operation when this device exits the FL-net is selectable: Hold output, Clear output, Switch to the sub system's control.
- Allotting the cyclic transmission output data of multiple devices bit by bit to local output modules.

■ MESSAGE TRANSMISSION

The R3-NFL1 supports the FL-net defined functions listed in the following table. Only the server function is supported.

Server function allows the module to build a response frame to a request message.

Client function allows the module to transmit a request message and to receive its response frame.

| MESSAGE TYPE | SERVER | CLIENT |
|-------------------------|--------|--------|
| Byte block read | No | No |
| Byte block write | No | No |
| Word block read | Yes | No |
| Word block write | Yes | No |
| Network parameter read | Yes | No |
| Network parameter write | No | No |
| Stop command | Yes | No |
| Start command | Yes | No |
| Profile read | Yes | No |
| Transparent mode | No | No |
| Log data read | Yes | No |
| Log data write | Yes | No |
| Message echo back | Yes | No |

TRANSMISSION DATA DESCRIPTION

I/O data of each I/O module are assigned to specific area of the common memory using the FL-net Configuration Builder software (model: R3-NFLBLD) by each channel, in the word / bit units.

For example, suppose as follows:

Common memory area 1 top address : 0x0000
 Common memory area 1 data size : 8
 Common memory area 2 top address : 0x0000
 Common memory area 2 data size : 4

Module (slot) 1 : R3-SV4
 Module (slot) 2 : R3-DA16
 Module (slot) 3 : R3-YV4
 Module (slot) 4 : R3-DC16

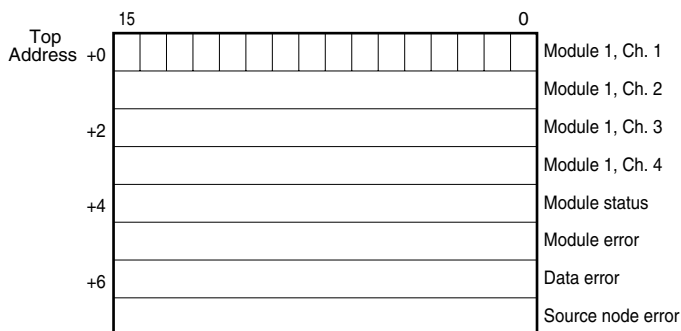
COMMON MEMORY AREA 1

The following shows the data transmitted to the common memory area 1 from the network module.

R3-NFLBLD Setting Example

| Address | I/O module/ch | Description |
|------------|----------------|--|
| 0x0000 <== | AI01.01 | Transmitting the R3-SV4 ch.1 data to the common memory area 1, address 0x0000 |
| 0x0001 <== | AI01.02 | Transmitting the R3-SV4 ch.2 data to the common memory area 1, address 0x0001 |
| 0x0002 <== | AI01.03 | Transmitting the R3-SV4 ch.3 data to the common memory area 1, address 0x0002 |
| 0x0003 <== | AI01.04 | Transmitting the R3-SV4 ch.4 data to the common memory area 1, address 0x0003 |
| 0x0004 <== | DI00.01 ... 16 | Transmitting the module status to the common memory area 1, address 0x0004 |
| 0x0005 <== | DI00.17 ... 32 | Transmitting the module error to the common memory area 1, address 0x0005 |
| 0x0006 <== | DI00.33 ... 48 | Transmitting the data error to the common memory area 1, address 0x0006 |
| 0x0007 <== | DI00.49 ... 64 | Transmitting the source node error to the common memory area 1, address 0x0007 |

Data Frame



- Module Status indicates whether individual I/O module are mounted or not. The bit corresponding to the mounted slots turns to "1," and the unmounted slots to "0."
- Error Status indicates error status for each module as described below. The bit corresponding to such modules turns to "1."
 - R3-TSx, R3-RSx, R3-US4: Input burnout
 - R3-DA16A: Power input in error or disconnected
 - R3-YSx: Output current error (e.g. load unconnected)
- Data Error Status indicates overrange (R3-US4: out of -10% to +110%; the other types: out of -15% to +115%) status for each module. The bit corresponding to such modules turns to "1."

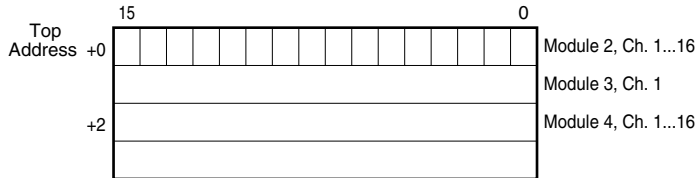
■ COMMON MEMORY AREA 2

The following shows the data transmitted to the common memory area 2 from the network module.

• R3-NFLBLD Setting Example

| Address | I/O module/ch | Description |
|------------|----------------|--|
| 0x0000 <== | DI02.01 ... 16 | Transmitting the R3-DA16 ch.1 through ch.16 data to the common memory area 2, address 0x0000 |
| 0x0001 <== | AO03.01 | Transmitting the R3-YV4 ch.1 data to the common memory area 2, address 0x0001 |
| 0x0002 <== | DO04.01 ... 16 | Transmitting the R3-DC16 ch.1 through ch.16 data to the common memory area 2, address 0x0002 |

• Data Frame



■ OUTPUT MODULE

The output data at designated addresses of the common memory area are transmitted to the R3 series output modules.

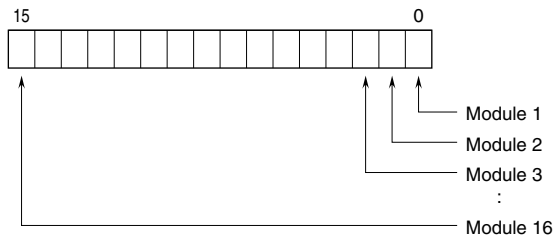
• R3-NFLBLD Setting Example

| I/O module/ch | Address | Description |
|---------------|-------------|---|
| < Module 3 > | | |
| AO03.01 <== | 1-0x0000 | Transmitting the data at the common memory area 1, address 0x0000 (R3-SV4 ch.1) to the R3-YV4 ch.1 |
| AO03.02 <== | 1-0x0001 | Transmitting the data at the common memory area 1, address 0x0001 (R3-SV4 ch.2) to the R3-YV4 ch.2 |
| AO03.03 <== | 1-0x0002 | Transmitting the data at the common memory area 1, address 0x0002 (R3-SV4 ch.3) to the R3-YV4 ch.3 |
| < Module 4 > | | |
| DO04.01 <== | 2-0x0000-16 | Transmitting the data at the common memory area 2, address 0x0000, 16th bit (R3-DA16 ch.16) to the R3-DC16 ch.1 |

I/O DATA DESCRIPTIONS

■ MODULE STATUS, ERROR STATUS, DATA ERROR STATUS

Shows each module's availability and error status.



■ ANALOG DATA (models: R3-SV4, YV4, DS4, YS4 and US4)

16-bit binary data.

Basically, 0 to 100% of the selected I/O range is converted into 0 to 10000 (binary). Negative percentage is represented in 2's complements.



■ TEMPERATURE DATA (models: R3-RS4, TS4 and US4)

16-bit binary data.

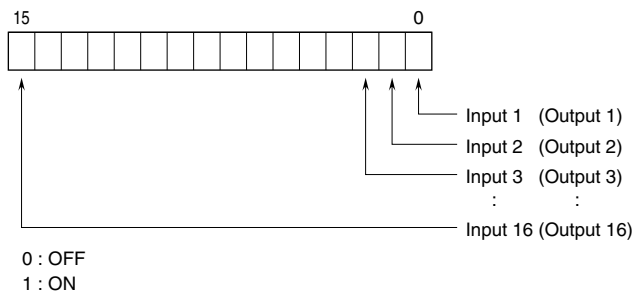
With °C temperature unit, raw data is multiplied by 10. For example, 25.5°C is converted into 255.

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.



■ DISCRETE DATA (models: R3-DA16 and DC16)



M-SYSTEM WARRANTY

M-System warrants such new M-System product which it manufactures to be free from defects in materials and workmanship during the 36-month period following the date that such product was originally purchased if such product has been used under normal operating conditions and properly maintained, M-System's sole liability, and purchaser's exclusive remedies, under this warranty are, at M-System's option, the repair, replacement or refund of the purchase price of any M-System product which is defective under the terms of this warranty. To submit a claim under this warranty, the purchaser must return, at its expense, the defective M-System product to the below address together with a copy of its original sales invoice.

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M-System Co., Ltd., 5-2-55, Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN, Phone: (06) 6659-8201, Fax: (06) 6659-8510, E-mail: info@m-system.co.jp