

FL-net INTERFACE MODULE
(OPCN-2, Ver. 2.0 supported)

MODEL **R3-GFL1**

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.

For detailed information, refer to the users manual (EM-8461-B). For configuration of FL-net, refer to the users manual for FL-net Configuration Builder (Model: R3-NFLBLD). FL-net Configuration Builder and users manual re downloadable at M-System's web site: <http://www.m-system.co.jp>.

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.

■ 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.

■ 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.

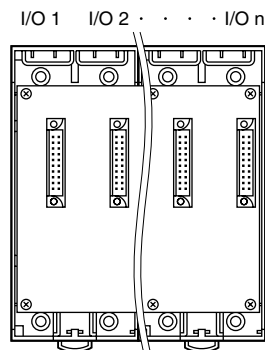
■ AND

- 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.

■ NETWORK SLOTS ON THE BASE



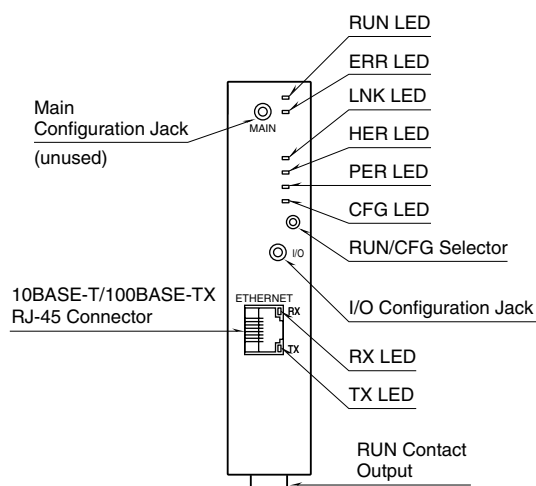
With Model R3-BS base, mount the I/O Modules and FL-net Interface Module from the left end (I/O 1) to the right in order that the Network Module assigns data areas from I/O 1. Network Module(s) and Power Module are mounted basically at the right end though technically they could be mounted in any position.

With Model R3-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.

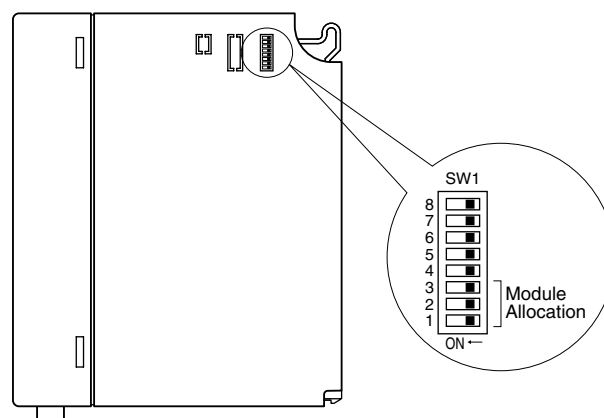
R3-GFL1 occupies up to 16 slots. Be careful not to use the slot numbers occupied by this unit for real I/O modules to be mounted on the same base. Also, when mounting this unit, be careful about the slot position and the number of slots to be occupied so that any of the slot numbers will not be greater than 16. The Network module cannot read data for an I/O module assigned to slot No. 17 or later.

COMPONENT IDENTIFICATION

FRONT VIEW



SIDE VIEW



STATUS INDICATOR LED

ID	COLOR	FUNCTION
RUN	Green	ON when the CPU, internal bus and field bus on the other interface module are in normal conditions.
ERR	Red	ON in an abnormality of the system.
LNK	Red	ON while the R3-GFL1 is participating FL-net (normal communication).
HER	Red	ON in an abnormality of I/O data.
PER	Red	Blinks on with the parameter setting error.
CFG	Red	Blinks in high speed at the startup. Blinks in low speed while the builder software is used.
TX	Green	ON while transmitting.
RX	Amber	ON while receiving.

RUN / CFG SELECTOR

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.'

SIDE DIP SW

Module Allocation: SW1-1, 1-2, 1-3

MODULE	SW1-1	SW1-2	SW1-3
1	OFF(*)	OFF(*)	OFF(*)
2	ON	OFF	OFF
3	OFF	ON	OFF
4	ON	ON	OFF
5	OFF	OFF	ON
6	ON	OFF	ON
7	OFF	ON	ON
8	ON	ON	ON

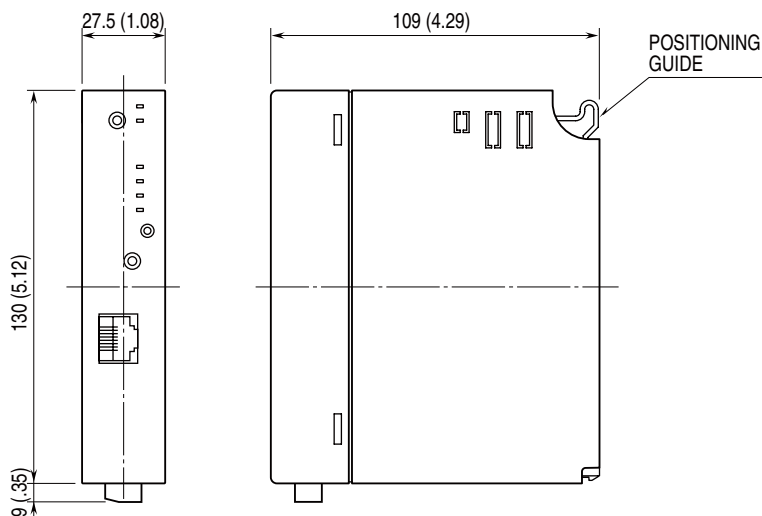
(*) Factory setting

Note: Be sure to set unused SW1-4 through 1-8 to OFF.

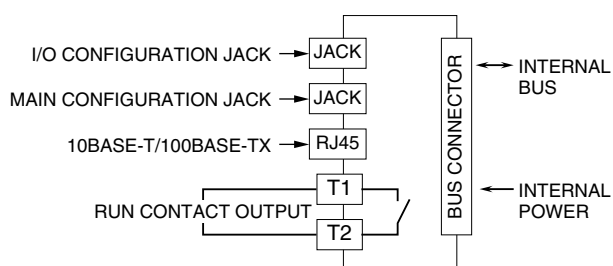
TERMINAL CONNECTIONS

Connect the unit as in the diagram below.

EXTERNAL DIMENSIONS unit: mm (inch)



CONNECTION DIAGRAM



WIRING INSTRUCTIONS

EURO TYPE CONNECTOR TERMINAL

Applicable Wire size: 0.2 – 2.5 mm²

Stripped length: 7 mm

FL-net DESCRIPTION

CYCLIC TRANSMISSION

- Transmitting virtual I/O value, R3-GFL1's information and node error of signal source.
- Supplying common memory word data transmitted from another devices as virtual output.
- If the node that the R3-GFL1 is accessing has been removed from the common memory, the operations "Hold output" and "Clear Output" are selectable.

MESSAGE TRANSMISSION

The R3-GFL1 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.

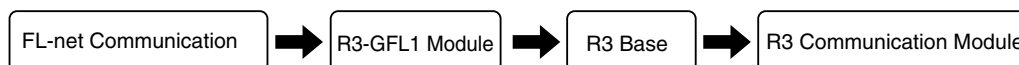
MESSAGE TYPE	SERVER	CLIENT
Byte block read	No	No
Byte block write	No	No
Word block read	Yes	No
Word block write	Yes	No
Network parameter read	Yes	No
Network parameter write	No	No
Stop command	Yes	No
Start command	Yes	No
Profile read	Yes	No
Transparent mode	No	No
Log data read	Yes	No
Log data clear	Yes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

TRANSMISSION DATA DESCRIPTION

Use the DIP SW located at the side of the module to specify module allocation.

1 module is equivalent to 1 I/O module with 16 words analog input and 16 words analog output. Max. 8 modules (128 words input, 128 words output) transmission is available. R3-GFL1 seems as if max. 8 I/O modules are mounted to 8 slots via FL-net.

The input of the module is processed as follows.

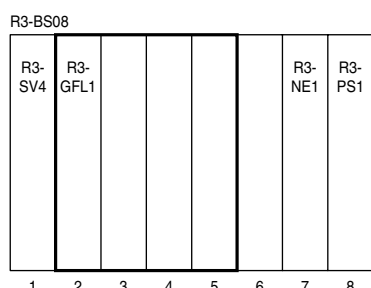


The data set with output tab of R3-NFLBLD to input is transmitted to R3 communication module. Output is reversed. The data set with transmitting area 1 and transmitting area 2 is transmitted to FL-net.

Note: Do not mount any modules in the slots which are occupied by virtual modules. If a real I/O module is mounted in the slot, an internal bus error occurs and the ERR LED turns on. Max. 16 real I/O modules and virtual modules are available. The interface module can not read the data for more than 16 modules.

■ WHEN R3-GFL1 IS MOUNTED ON SLOT NO. 2 (4 modules)

Real I/O modules are mounted on Slots No. 1 and 2, however, the network module (R3-NE1) recognizes that each of Slots No. 1 to 5 is occupied. That is, R3-NE1 recognizes R3-SV4 mounted on Slot No.1 as it is and recognizes R3-GFL1 mounted on Slot No.2 as divided into four modules and occupying Slots No. 2 to 5.



SLOT	REAL MODULE	VIRTUAL MODULE	NO. OF WORDS
Slot No. 1	R3-SV4	R3-SV4	4 Words
Slot No. 2	R3-GFL1	R3-GFL1 (1/4)	16 Words
Slot No. 3	No module	R3-GFL1 (2/4)	16 Words
Slot No. 4	No module	R3-GFL1 (3/4)	16 Words
Slot No. 5	No module	R3-GFL1 (4/4)	16 Words
Slot No. 6	No module	No module	----
Slot No. 7	R3-NE1	R3-NE1	----
Slot No. 8	R3-PS1	R3-PS1	----

CONFIGURATION EXAMPLE

Usable as a gateway between different protocols combined with R3 interface modules.

I/O data of each I/O module are assigned to specific areas 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:

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Common memory area 1 top address : 0x0000
Common memory area 1 data size   : 6
Common memory area 2 top address : 0x0000
Common memory area 2 data size   : 4
  
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Module allocation: 4

Module (slot) 1: AIO16 (Analog input 16 words, analog output 16 words)

Module (slot) 2: AIO16

Module (slot) 3: AIO16

Module (slot) 4: AIO16

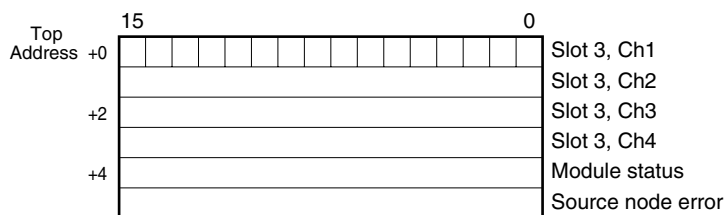
■ COMMON MEMORY AREA 1

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 <==	AI03.01	Transmitting the AIO16 module ch1 data on slot 3 (output from the R3 interface module) to the common memory area 1, address 0x0000
0x0001 <==	AI03.02	Transmitting the AIO16 module ch2 data on slot 3 (output from the R3 interface module) to the common memory area 1, address 0x0001
0x0002 <==	AI03.03	Transmitting the AIO16 module ch3 data on slot 3 (output from the R3 interface module) to the common memory area 1, address 0x0002
0x0003 <==	AI03.04	Transmitting the AIO16 module ch4 data on slot 3 (output from the R3 interface module) 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 <==	DI00.49 ... 64	Transmitting the source node error to the common memory area 1, address 0x0005

• Data Frame



Module Status indicates whether individual I/O module are mounted or not. The number of bit that turns “1” is the module allocation set with SW1.

Source Node Error indicates when any node, which transmits data to common memory area assigned to output, is removed from FL-net, the bit corresponding to such module turns “1”.

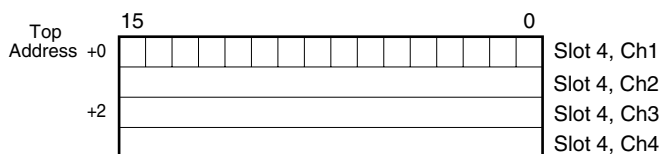
■ COMMON MEMORY AREA 2

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 <==	AI04.01	Transmitting the AIO16 module ch1 data on slot 4 (output from the R3 interface module) to the common memory area 2, address 0x0000
0x0001 <==	AI04.02	Transmitting the AIO16 module ch2 data on slot 4 (output from the R3 interface module) to the common memory area 2, address 0x0001
0x0002 <==	AI04.03	Transmitting the AIO16 module ch3 data on slot 4 (output from the R3 interface module) to the common memory area 2, address 0x0002
0x0003 <==	AI04.04	Transmitting the AIO16 module ch4 data on slot 4 (output from the R3 interface module) to the common memory area 2, address 0x0003

• Data Frame



■ OUTPUT

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

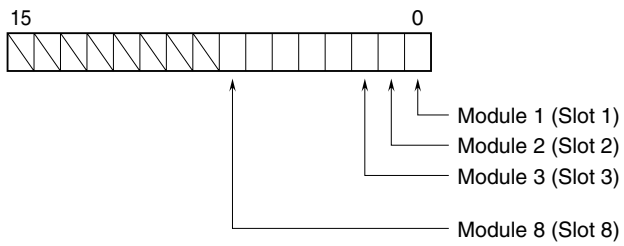
• R3-NFLBLD Setting Example

I/O module/ch	Address	Description
AO01.01 <==	1-0x0000	Transmitting the data at the common memory area 1, address 0x0000 (slot 3 ch.1) to the AIO16 module ch1 output (input from the R3 interface module) on slot 1
AO01.02 <==	1-0x0001	Transmitting the data at the common memory area 1, address 0x0001 (slot 3 ch.2) to the AIO16 module ch2 output (input from the R3 interface module) on slot 1
AO02.01 <==	2-0x0000	Transmitting the data at the common memory area 2, address 0x0000 (slot 4 ch.1) to the AIO16 module ch1 output (input from the R3 interface module) on slot 2
AO02.02 <==	2-0x0001	Transmitting the data at the common memory area 2, address 0x0001 (slot 4 ch.2) to the AIO16 module ch2 output (input from the R3 interface module) on slot 2

I/O DATA DESCRIPTIONS

■ MODULE STATUS, SOURCE NODE ERROR

Shows each module's availability and error status.



■ ANALOG DATA



16-bit binary data.