INSTRUCTION MANUAL

POWER/NETWORK MODULE
(CC-Link Ver.2.00; for 64-point analog signals)

MODEL **R8-NC3**

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:

Power/network module .....(1)
Protective cover.....(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

■ CONFORMITY WITH EU DIRECTIVES

- The equipment must be mounted inside a panel.
- 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.

■ GENERAL PRECAUTIONS

- Before you remove or mount the unit, turn off the power supply.

■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:
  DC Power supply: 24V DC rating
  24V DC ± 10%, approx. 12W
  (@ internal power max. current 1.6A)
  Excitation supply (excitation for I/O module):
  24V DC ± 10%, operational current 10A
  (From power supply (excitation supply) connector, via connector for internal bus, supplied to each I/O module. Power output current consumption must be under operational current.)

■ 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 for analog module, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

INSTALLATION

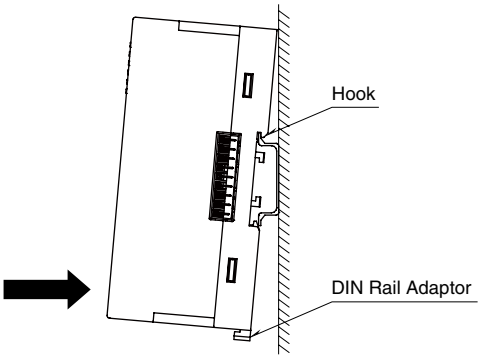
Internal power supply/communication is connected via each module's connector, therefore no backplane base is required, however, hot-swapping of modules is not possible.

■ STATION ADDRESS & NETWORK SETTING

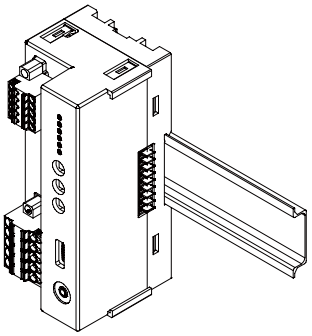
Settings of station address, baud rate, data allocation and cyclic expansion must be completed before mounting the module.

■ HOW TO MOUNT THE MODULE ON DIN RAIL

• Power/Network Module



Position the upper hook at the rear on the DIN rail and push in the lower. When removing the module, push down the DIN rail adaptor utilizing a minus screwdriver and pull.



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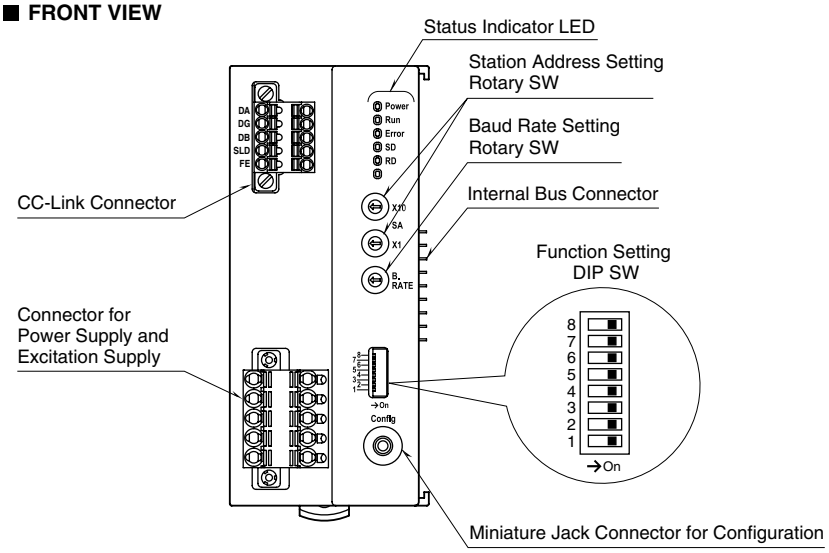
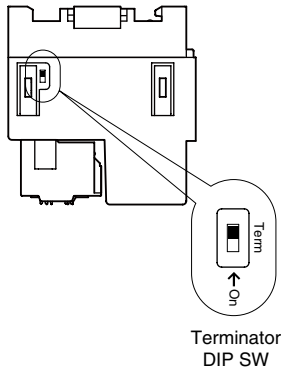
COMPONENT IDENTIFICATION

■ **FRONT VIEW**



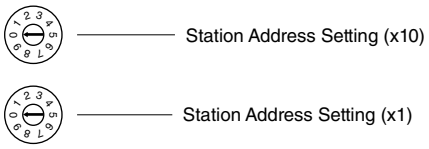
■ **TOP VIEW**



■ FRONT SWITCHES

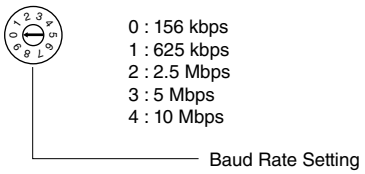
• Station Address

Station Address is selected between 1 and 99 in decimal. The upper switch determines the tenth place digit, while the lower switch does the ones place digit of the address. (Factory setting: 00)



• Baud Rate

Baud Rate is selected with the rotary switch. Positions 5 through 9 are unused. Be sure to select between 0 to 4. (Factory setting: 0)



■ FRONT DIP SW

(*) Factory setting

• Data Allocation Mode: SW1

DATA ALLOCATION MODE	SW1
1	ON
2 (*)	OFF

• Cyclic Expansion: SW2

CYCLIC EXPANSION	SW2
2 (*)	OFF
4	ON

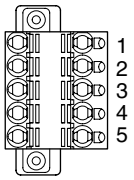
Note: Be sure to set unused SW3 through 8 to OFF.

■ TERMINATOR DIP SW

The termination resistor is connected to the network when it is turned on.

■ POWER SUPPLY, EXCITATION SUPPLY CONNECTOR ASSIGNMENT

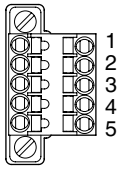
Printed-circuit board connector (Phoenix Contact)
Unit side connector: MSTBV2,5/5-GF-5,08AU
Cable side connector: TFKC2,5/5-STF-5,08AU



PIN No.	ID	FUNCTION
1	24V	Power supply 24V DC
2	0V	Power supply 0V DC
3	+	Excitation supply 24V DC
4	–	Excitation supply 0V DC
5	FE1	Grounding

■ CC-Link CONNECTOR ASSIGNMENT

Printed-circuit board connector (Phoenix Contact)
Unit side connector: MC1,5/5-GF-3,5
Cable side connector: TFMC1,5/5-STF-3,5



PIN No.	ID	FUNCTION
1	DA	DA
2	DG	DG
3	DB	DB
4	SLD	Shield
5	FE	FE

■ STATUS INDICATOR LED

ID	COLOR	FUNCTION
Power	Green	ON when the internal 5V power is in normal status.
Run	Green	ON with normal communication *1
Error	Red	ON when abnormal data is received.
SD	Green	ON with data transmitting
RD	Green	ON with data receiving

*1. Run LED turns off when no command is received from the master device.

■ STATUS INDICATOR LED

Power	Run	Error	SD *1	RD	STATUS *2
ON	ON	BL	BL	ON	Communicates normally with occasional CRC errors due to noise interference.
ON	ON	BL	BL	ON	Communicates normally but the Baud Rate and/or Station Address switches failed. Error LED blinks approximately in 0.5 seconds intervals.
ON	ON	BL	BL	OFF	----
ON	ON	BL	OFF	ON	CRC error found in the received data. Unable to respond.
ON	ON	BL	OFF	OFF	----
ON	ON	OFF	BL	ON	Normal communication
ON	ON	OFF	BL	OFF	----
ON	ON	OFF	OFF	ON	Unable to receive data addressed to the station.
ON	ON	OFF	OFF	OFF	----
ON	OFF	BL	BL	ON	Performs the interval-timed responses but CRC error found in receiving the refresh data.
ON	OFF	BL	BL	OFF	----
ON	OFF	BL	OFF	ON	CRC error found in the data addressed to the station.
ON	OFF	BL	OFF	OFF	----
ON	OFF	OFF	BL	ON	Link is not started.
ON	OFF	OFF	BL	OFF	----
ON	OFF	OFF	OFF	ON	No data addressed to the station. Or unable to receive data addressed to the station due to noise interference. (Missing parts of the data sent from the master)
ON	OFF	OFF	OFF	OFF	Unable to receive data due to wire breakdown
ON	OFF	ON	OFF	ON/ OFF	Faulty Baud Rate and/or Station Address setting
OFF	OFF	OFF	OFF	OFF	Power input removed. Or power supply failure.

OFF = OFF, ON = ON, BL = Blinking

*1. SD LED may look not blinking but ON with high baud rate and fewer connected modules.

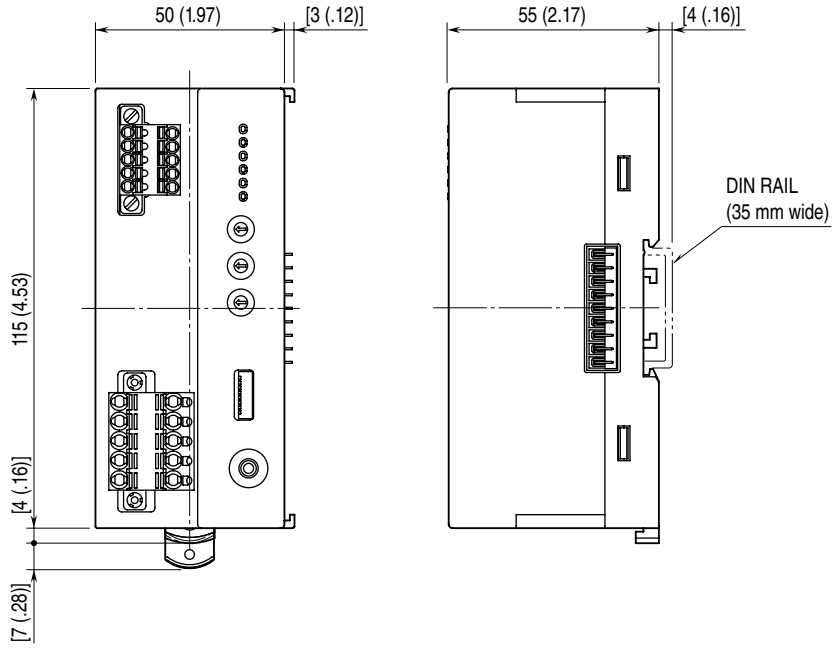
*2. LEDs indicated with "----" in STATUS rarely occurs in normal operation. (LED failure or the like as possible cause).

TERMINAL CONNECTIONS

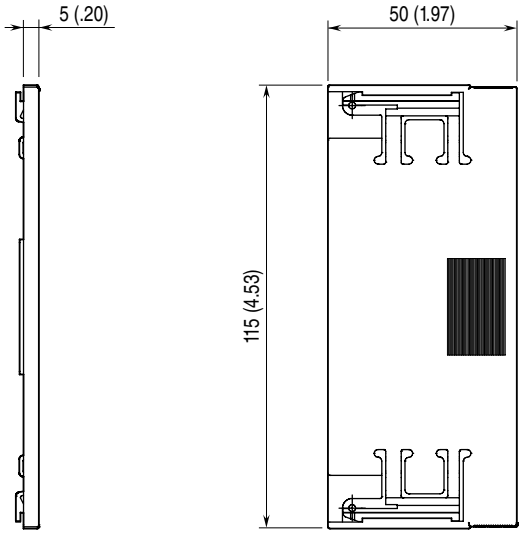
Connect the unit as in the diagram below.

■ **EXTERNAL DIMENSIONS unit: mm (inch)**

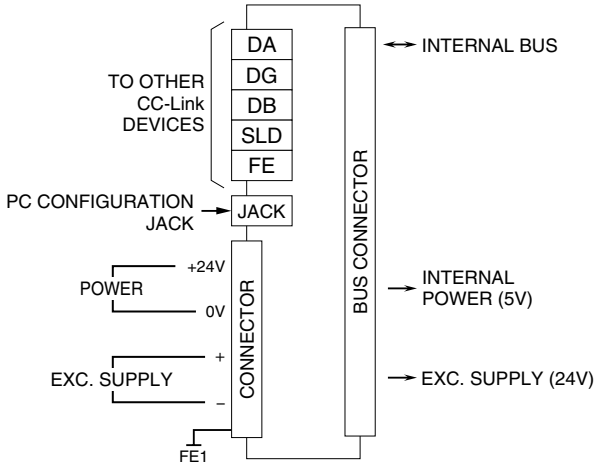
• **Unit**



• **Protective Cover**



■ **CONNECTION DIAGRAM**



Note: In order to improve EMC performance, bond the FE1 terminal to ground.
Caution: FE1 terminal is NOT a protective conductor terminal.

WIRING INSTRUCTIONS

■ **TENSION CLAMP TERMINAL BLOCK**

• **Power Input, excitation supply**

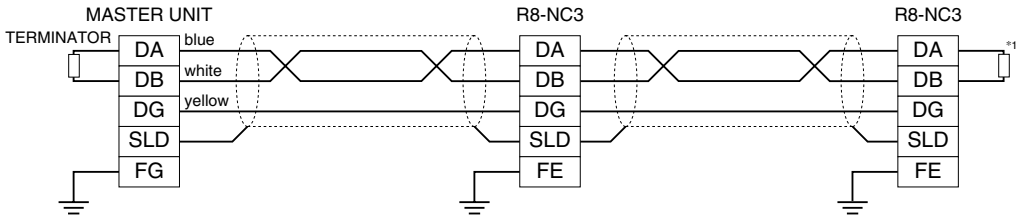
Applicable wire size: 0.2 – 2.5 mm²
Stripped length: 10 mm

• **CC-Link**

Transmission cable: Approved for CC-Link
Stripped length: 10 mm

COMMUNICATION CABLE CONNECTION

■ **MASTER CONNECTION**



*1. Turn on the terminator DIP switch to activate the internal terminating resistor.

DATA DESCRIPTIONS

The DIP SW located at the side of the module switches the unit's data allocation mode.
In the Data Allocation Mode 1, one (1) word is assigned per module. The second channel of analog I/O modules cannot be used. When I/O module of 32-bit data is used, set the Data Allocation Mode to 2.
In the Data Allocation Mode 2, two (2) words are assigned per module regardless of whether the second word area is required or not.
For discrete I/O, 16-channel area is automatically assigned to each module. With a 4-channel module, the bits assigned to ch. 5 through 16 remain "0."
A 4-point analog I/O module takes two addresses per module. For example with the model R8-SV4N located at the module address 5, the inputs 1 and 2 are assigned to the address 5, and the inputs 3 and 4 are to the address 6. Do not assign another module to the address 6. All 4 inputs (input 1 through 4) can be used with Data Allocation Mode 2, while only the inputs 1 and 3 can be used with Data Allocation Mode 1.

■ RESERVED AREA FOR CC-LINK CYCLIC DATA

Data areas of CC-Link cyclic data with Data Allocation: 4, Cyclic Expansion: 2 or 4 are as follows.

DATA ALLOCATION	CYCLIC EXPANSION		REMOTE INPUT RX	REMOTE OUTPUT RY	REMOTE REGISTER RWR	REMOTE REGISTER RWW
4	2	User area	RX (n+0) 0 – RX (n+C) F	RY (n+0) 0 – RY (n+C) F	RWr (n+0) – RWr (n+31)	RWw (n+0) – RWw (n+31)
		System area	RX (n+D) 0 – RX (n+D) F	RY (n+D) 0 – RY (n+D) F	—	—
	4	User area	RX (n+0) 0 – RX (n+1A) F	RY (n+0) 0 – RY (n+1A) F	RWr (n+0) – RWr (n+63)	RWw (n+0) – RWw (n+63)
		System area	RX (n+1B) 0 – RX (n+1B) F	RY (n+1B) 0 – RY (n+1B) F		

■ DATA ALLOCATION MODE 1

In Data Allocation Mode 1, set Cyclic Expansion 2.
R8-NC3's data areas used for CC-Link cyclic data is as follows.

• Cyclic Expansion: 2

Remote register (RWr)

[User area]

RWr (n+0)	Module address 0	Input data 1
RWr (n+1)	Module address 1	Input data 1
RWr (n+2)	Module address 2	Input data 1
RWr (n+30)	Module address 30	Input data 1
RWr (n+31)	Module address 31	Input data 1

Remote register (RWw)

[User area]

RWw (n+0)	Module address 0	Output data 1
RWw (n+1)	Module address 1	Output data 1
RWw (n+2)	Module address 2	Output data 1
RWw (n+30)	Module address 30	Output data 1
RWw (n+31)	Module address 31	Output data 1

Remote input (RX)

[User area]

RX (n+0) 0	Module address 0	Module state
RX (n+0) 1	Module address 1	Module state
RX (n+1) F	Module address 31	Module state

(Module state: 0= Mounted, 1= Unmounted)

Remote output (RY)

[User area]

Unused

[System area]

RX (n+D) B	Remote Ready Flag

(After reboot and preparation completion, it turns to 1.)

[System area]

Unused

■ DATA ALLOCATION MODE 2

In Data Allocation Mode 2, select Cyclic Expansion 2 or 4 according to the number of modules to use.
R8-NC3's data areas used for CC-Link cyclic data with each cyclic expansion are as follows.

• Cyclic Expansion: 2

Remote register (RWr)

[User area]

RWr (n+0)	Module address 0	Input data 1
RWr (n+1)	Module address 0	Input data 2
RWr (n+2)	Module address 1	Input data 1
RWr (n+3)	Module address 1	Input data 2
RWr (n+30)	Module address 15	Input data 1
RWr (n+31)	Module address 15	Input data 2

Remote register (RWw)

[User area]

RWw (n+0)	Module address 0	Output data 1
RWw (n+1)	Module address 0	Output data 2
RWw (n+2)	Module address 1	Output data 1
RWw (n+3)	Module address 1	Output data 2
RWw (n+30)	Module address 15	Output data 1
RWw (n+31)	Module address 15	Output data 2

Remote input (RX)

[User area]

RX (n+0) 0	Module address 0	Module state
RX (n+0) 1	Module address 1	Module state
RX (n+0) F	Module address 15	Module state

(Module state: 0= Mounted, 1= Unmounted)

Remote output (RY)

[User area]

Unused

[System area]

RX (n+D) B	Remote Ready Flag

(After reboot and preparation completion, it turns to 1.)

[System area]

Unused

• Cyclic Expansion: 4

Remote register (RWr)

[User area]

RWr (n+0)	Module address 0	Input data 1
RWr (n+1)	Module address 0	Input data 2
RWr (n+2)	Module address 1	Input data 1
RWr (n+3)	Module address 1	Input data 2
RWr (n+62)	Module address 31	Input data 1
RWr (n+63)	Module address 31	Input data 2

Remote register (RWw)

[User area]

RWw (n+0)	Module address 0	Output data 1
RWw (n+1)	Module address 0	Output data 2
RWw (n+2)	Module address 1	Output data 1
RWw (n+3)	Module address 1	Output data 2
RWw (n+62)	Module address 31	Output data 1
RWw (n+63)	Module address 31	Output data 2

Remote input (RX)

[User area]

RX (n+0) 0	Module address 0	Module state
RX (n+0) 1	Module address 1	Module state
RX (n+1) F	Module address 31	Module state

(Module state: 0= Mounted, 1= Unmounted)

Remote output (RY)

[User area]

Unused

[System area]

RX (n+1B) B	Remote Ready Flag

(After reboot and preparation completion, it turns to 1.)

[System area]

Unused

I/O DATA DESCRIPTIONS

■ ANALOG DATA

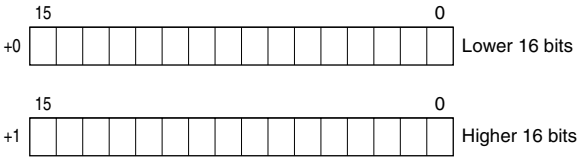
0 to 100% of the selected I/O range is converted into 0 to 10000 (binary).
Negative values are represented in 2's complements.

■ PULSE DATA (16-bit data)

Negative value is not available, the data is shown with the range 0 to 65535.
16-bit binary data is used for pulse data (16-bit data).

■ PULSE DATA (32-bit data)

32-bit binary data is used for pulse data (32-bit data).
Lower 16 bits are allocated a lower address and higher 16 bits are allocated a higher address.



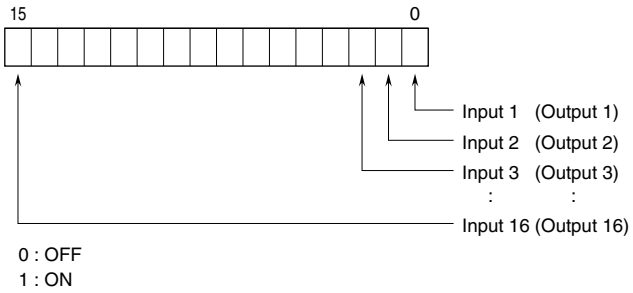
■ ANALOG DATA (Temperature date)

16-bit binary data is used for temperature data.
With °C, K 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 (CT data)

16-bit binary data is used for CT data.
Conversion data is shown by the engineering unit value multiplied by 100 or 1000. For example, for 520.35 A when 0 to 600 A range, the data is 52035 as the conversion data is the engineering value multiplied by 100.
Negative value is not available, the data is shown with the range 0 to 65535.

■ **DISCRETE DATA**



For I/O mixed modules shown below, interlock status is assigned to input 1 (to 3) in addition to output 1 to 16.

R8-DCM16ALZ	Input 1	Full interlock
R8-DCM16ALK	Input 1	Full interlock
	Input 2	Individual interlock 1
	Input 3	Individual interlock 2
R8-DCM16ALH	Input 1	Full interlock
	Input 2	Partial interlock 1
	Input 3	Partial interlock 2