Remote I/O R3 Series

MECHATROLINK INTERFACE MODULE
(MECHATROLINK-III)

27.5 (1.08)
130 (5.12)
109 (4.29)
mm (inch)
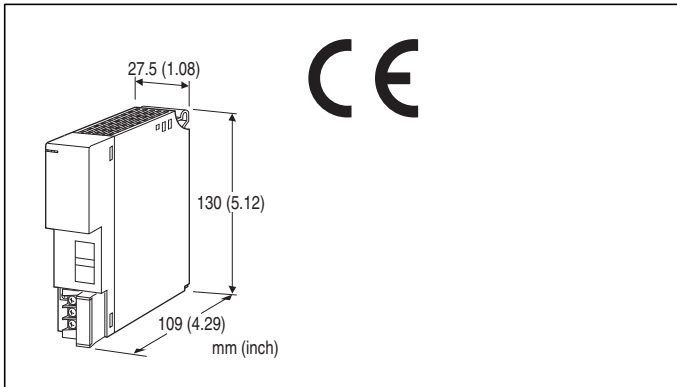
MODEL: R3-NML3-[1][2]

ORDERING INFORMATION

Code number: R3-NML3-[1][2]
Specify a code from below for each [1] and [2].
(e.g. R3-NML3-N/CE/Q)
• Specify the specification for option code /Q
 (e.g. /C01)

[1] POWER INPUT

N: No power supply
AC Power
K3: 100 – 120 V AC
(Operational voltage range 85 - 132 V, 47 - 66 Hz) *
 (CE not available)
L3: 200 – 240 V AC
(Operational voltage range 170 - 264 V, 47 - 66 Hz) *
(CE not available)
DC Power
R: 24 V DC
(Operational voltage 24 V ±10 %, ripple 10 %p-p max.) *
* Not selectable for use with independent power modules.
Not selectable for dual network.

[2] OPTIONS (multiple selections)
Standards & Approvals
blank: Without CE
/CE: CE marking
Other Options
blank: none
/Q: Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q
COATING (For the detail, refer to M-System's web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating

GENERAL SPECIFICATIONS

Connection
 Network: MECHATROLINK connector
 Internal bus: Via the Installation Base (model: R3-BSx)
 Internal power: Via the Installation Base (model: R3- BSx)
 or M3 screw terminals (torque 0.5 N·m)
Screw terminal: Nickel-plated steel
Isolation: MECHATROLINK to internal bus or internal power
to power supply to RUN contact output to FG
Main/Sub setting: Set with the side DIP switch
Slot assignment: Set with the side DIP switch
RUN indicator: Bi-color (green/red) LED
Green ON after correctly receiving CONNECT command;
OFF after wire breakdown or correctly receiving
DISCONNECT command;
Red when receiving (Function selected with DIP SW)
ERR indicator: Bi-color (green/red) LED
Green ON when receiving abnormal command
Green ON when communication cable broken
OFF when receiving normal command
Red ON when transmitting
OFF at cable breakdown
(Function selected with DIP SW)
■ **RUN CONTACT OUTPUT**
RUN contact: Turns ON when the ERR INDICATOR is OFF
(MECHATROLINK in normal communication).
Rated load: 250 V AC @ 0.5 A (cos ø = 1)
30 V DC @ 0.5 A (resistive load)
Maximum switching voltage: 250 V AC or 30 V DC
Maximum switching power: 250 VA or 150 W
Minimum load: 1 V DC @ 1 mA
Mechanical life: 2×10^7 cycles (rate 300 cycles/min.) When
driving an inductive load, external contact protection and
noise quenching recommended.

MECHATROLINK COMMUNICATION

MECHATROLINK-III
Baud rate: 100 Mbps
Transmission distance: 6300 m max.
Distance between stations: 100 m max.
Transmission media: CAT5e STP
Connector: TYCO AMP Industrial mini I/O connector
Max. number of slaves: 62
(The maximum number of slaves might change depending
on the master unit. Refer to the manual of the master unit)

Input output data length: 16/32/48/64 byte (Function selected with DIP SW)
  12(16 byte setting)
  28(32 byte setting)
  44(48 byte setting)
  60(64 byte setting)
Station address: 03H - EFH
(Function selected with Rotary SW)
Available communication mode:
 Cyclic communication mode: For cyclic communication and message communication
 Event-driven communication mode: For Event-driven communication
Other slaves monitoring: Not supported

INSTALLATION
Power consumption
 •**AC**:
Approx. 25 VA at 100 V
Approx. 30 VA at 200 V
•**DC**: Approx. 15 W
Current consumption (no power supply): 110 mA
Output current (power supply): 250 mA continuous at 20 V DC; 400 mA for 10 minutes
Operating temperature: -10 to +55°C (14 to 131°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Atmosphere: No corrosive gas or heavy dust
Mounting: Installation Base (model: R3-BSx)
Weight: 200 g (0.44 lb)

PERFORMANCE
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1000 V AC @ 1 minute (MECHATROLINK to internal bus or internal power to power input to RUN output to FG)

STANDARDS & APPROVALS
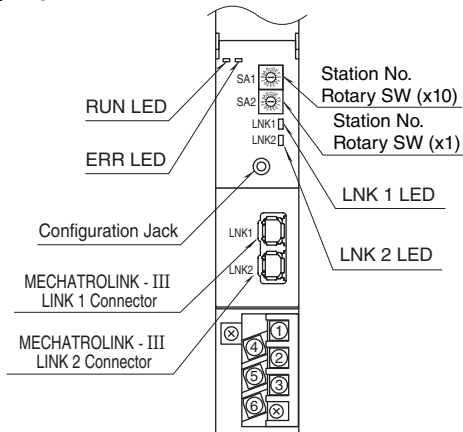**CE conformity**:
EMC Directive (2004/108/EC)
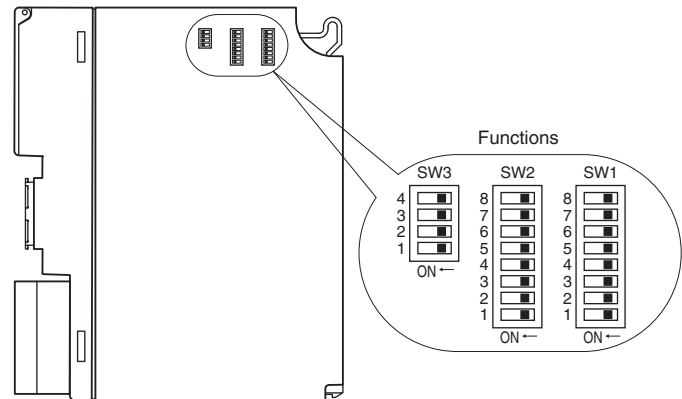 EMI EN 61000-6-4: 2007/A1: 2011
  EMS EN 61000-6-2: 2005

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MODEL: R3-NML3

EXTERNAL VIEW

■ **FRONT VIEW**

RUN LED
ERR LED
Configuration Jack
MECHATROLINK - III LINK 1 Connector
MECHATROLINK - III LINK 2 Connector

SA1
SA2
LNK1
LNK2

Station No. Rotary SW (x10)
Station No. Rotary SW (x1)
LNK 1 LED
LNK 2 LED

■ **SIDE VIEW**

Functions

SW3 SW2 SW1

SW3: 4 3 2 1 ON ←
SW2: 8 7 6 5 4 3 2 1 ON ←
SW1: 8 7 6 5 4 3 2 1 ON ←

MECHATROLINK RELATED COMMANDS

■ **DATA & CONTROL FUNCTIONS**

PROFILE	NAME	COMMAND	
Common Command	NOP	00	No operation
	ID_RD	03	Read ID
	CONFIG	04	Setup device
	ALM_RD	05	Read Alarm or Warning
	ALM_CLR	06	Clear Alarm or Warning
	CONNECT	0E	Establish connection
	DISCONNECT	0F	Release connection
I/O Basic Command	DATA_RWA	20	Refreshes I/O data

I/O DATA DESCRIPTIONS

■ **ANALOG DATA (models: R3-SV4, YV4, DS4, YS4, US4, etc.)**

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.

15   0

■ **TEMPERATURE DATA (models: R3-RS4, TS4, 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.

15   0

■ **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.
32-bit data cannot be accessed using floating addresses.

+0   15   0   Lower 16 bits
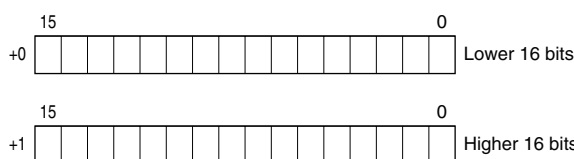
+1   15   0   Higher 16 bits

■ **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.
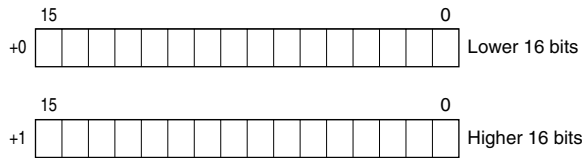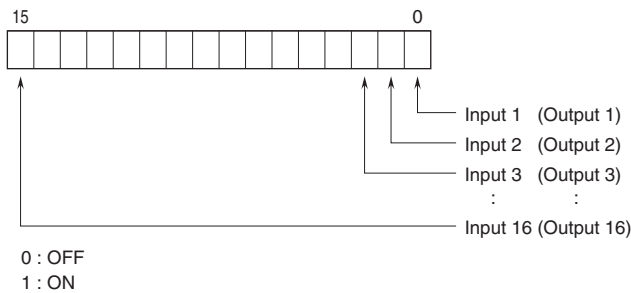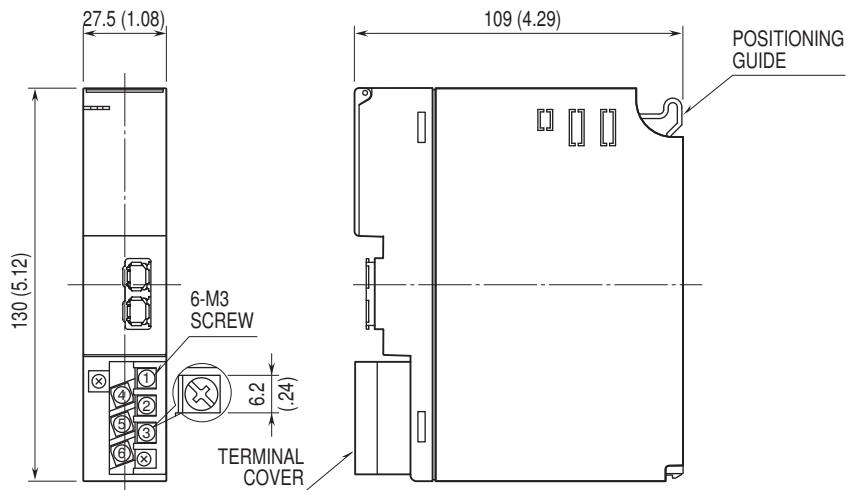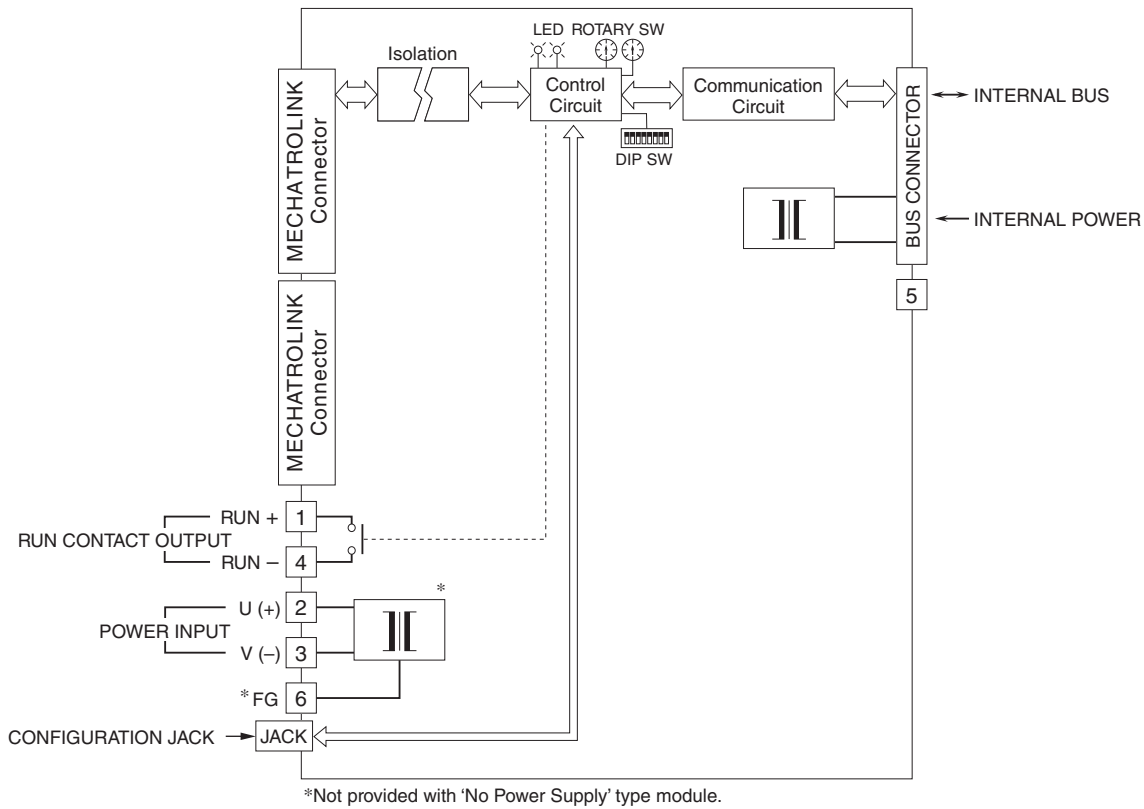32-bit data cannot be accessed using floating addresses.

```
        15                              0
+0    [                              ]  Lower 16 bits

        15                              0
+1    [                              ]  Higher 16 bits
```

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

```
  15                              0
 [                               ]
                          │ │ │
                          │ │ └── Input 1  (Output 1)
                          │ └──── Input 2  (Output 2)
                          └────── Input 3  (Output 3)
                              :        :
  └──────────────────────────── Input 16 (Output 16)
```

0 : OFF
1 : ON

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)

27.5 (1.08)   109 (4.29)   POSITIONING GUIDE

130 (5.12)

6-M3 SCREW

6.2 (.24)

TERMINAL COVER

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

*Not provided with 'No Power Supply' type module.

⚠ Specifications are subject to change without notice.