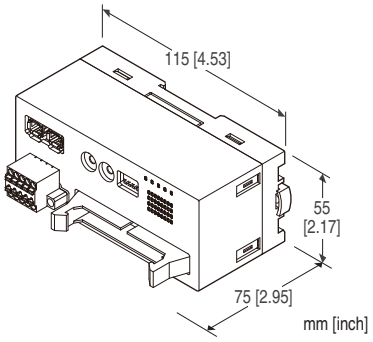
Remote I/O R7F4H Series

MECHATROLINK I/O MODULE

(NPN/PNP discrete input & NPN transistor output, 16 points each, MIL connector, MECHATROLINK- III use)

Functions & Features

• 16 points NPN/PNP discrete input & 16 points NPN transistor output module for MECHATROLINK- III



MECHATROLINK

MODEL: R7F4HML3-D-DAC32A-R[1]

ORDERING INFORMATION

• Code number: R7F4HML3-D-DAC32A-R[1]
Specify a code from below for [1].
(e.g. R7F4HML3-D-DAC32A-R/NR/Q)
• Specify the specification for option code /Q
(e.g. /C01)

TERMINAL BLOCK

D: Tension clamp terminal block for power supply
Connector for MECHATROLINK-III for communication
MIL connector for I/O

I/O TYPE

DAC32A: NPN/PNP discrete input &
NPN transistor output, 16 points each

POWER INPUT

DC power
R: 24 V DC
(Operational voltage range: ±10 %; ripple 10 %p-p max.)

[1] OPTIONS (multiple selections)

Output data read back
blank: With
/NR: Without
Other Options
blank: none
/Q: Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to our web site.)
/C01: Silicone coating
/C02: Polyurethane coating
/C03: Rubber coating

GENERAL SPECIFICATIONS

Connection
MECHATROLINK-III: MECHATROLINK-III connector
I/O: MIL connector
Power input: Separable screwless spring terminal
Housing material: Flame-resistant resin (gray)
Isolation: Input to output to MECHATROLINK or FE to power
Output at the loss of communication:
Output hold (*), Output clear
Selectable with the front DIP SW
(*) factory default setting
Status indicator LEDs: PWR, ERR, CON, LNK1, LNK2 (5 LEDs) indicate the module's operating conditions. (Refer to the instruction manual)
Discrete I/O status indicator LED: Green LED turns on with I/O ON
Read rate: 1 / 5 / 10(*) / 20 / 50 / 70 / 100 / 200 msec. selectable with front DIP SW
(*) factory default setting

MECHATROLINK-III COMMUNICATION

Baud rate: 100 Mbps
Transmission distance: 6300 m max.
Distance between stations: 100 m max.
Transmission media: MECHATROLINK cable (Model JEPMC-W6013-x-E, Yaskawa Controls Co., Ltd.)
Connector: TE Connectivity Industrial mini I/O connector
Max. number of Subordinate Devices: 62
(The maximum number of Subordinate Devices might change depending on the Main Device unit. Refer to the manual of the Main Device unit)
Transmission cycle: 125 µsec., 250 µsec., 500 µsec., 1 – 64 msec. (with 1 msec. increments)
Communication cycle: 125 µsec. through 64 msec.
Applicable profile: Standard I/O profile (cyclic communication)
Event-driven communication acquiring ID profile (event-driven communication)
Transmission bytes: 16 bytes
Station address: 03H through EFH (set with rotary switches)

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Cyclic communication: Available
Event-driven communication: Available
Subordinate Device monitoring: None

INPUT SPECIFICATIONS

Common: Positive or negative common (NPN/PNP) per 16 points
Maximum inputs applicable at once: No limit (at 24 V DC)
Rated input voltage: 24 V DC ±10 %; ripple 5 %p-p max.
ON voltage / current: ≥ 15 V DC (input – COM) / ≥ 3.5 mA
OFF voltage / current: ≤ 5 V DC (input – COM) / ≤ 1 mA
Input current: ≤ 5.5 mA per point at 24 V DC
Input resistance: Approx. 4.4 kΩ
ON delay: ≤ 0.2 msec.
OFF delay: ≤ 0.5 msec.

OUTPUT SPECIFICATIONS

Common: Negative common (NPN) per 16 points
Maximum outputs applicable at once: No limit (at 24 V DC)
Rated load voltage: 24 V DC ±10 %, ripple 5 %p-p max.
Rated output current: 0.1 A per point, 1.6 A per common
Residual voltage: ≤ 1.2 V
Leakage current: ≤ 0.1 mA
ON delay: ≤ 0.2 msec.
OFF delay: ≤ 0.5 msec.
Overload current protection function: Limits the current value when overcurrent is detected
Overheat protection function: Turns OFF the outputs when overheat is detected
(When driving an inductive load, connect a diode in parallel with the load.)

INSTALLATION

Current consumption
•**DC at 24 V DC**: Approx. 100 mA
Operating temperature: -10 to +55°C (14 to 131°F)
Storage temperature: -20 to +65°C (-4 to +149°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Atmosphere: No corrosive gas or heavy dust
Mounting: Surface or DIN rail (35 mm rail)
Weight: 175 g (0.39 lb)

PERFORMANCE

Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute (input or output to MECHATROLINK or FE to power input)
500 V AC @ 1 minute (input to output)

STANDARDS & APPROVALS

EU conformity:
EMC Directive
EMI EN 61000-6-4
EMS EN 61000-6-2
RoHS Directive

FUNCTIONS

■**Output Data Read Back**
It is possible to send back by return the receiving output data of the unit to the host on MECHATROLINK-III communication data. Specifying option code for the output data read back to /NR enables to set invalid the output data read back.
(With or without the output data read back, the data allocation of DATA_RWA(20H) command data format is different. Refer to the instruction manual for detailed information.)

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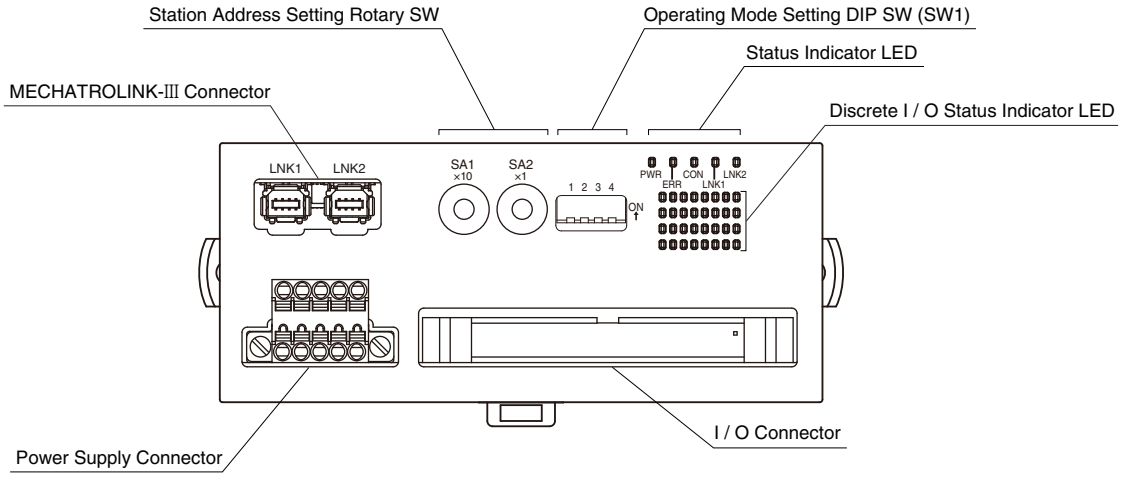
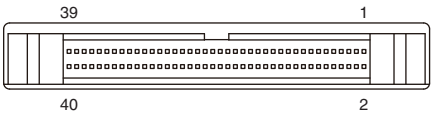
EXTERNAL VIEW



TERMINAL ASSIGNMENTS

■I/O TERMINAL ASSIGNMENT

(Refer to the detailed specification for terminal assignment.)
Recommended cable connector: XG4M-2030 (OMRON)
The cable connector is not included in the package.



PIN No.	ID	FUNCTION	PIN No.	ID	FUNCTION
1	V+	External excitation	2	V+	External excitation
3	V–	Out. Common	4	V–	Out. Common
5	Y15	Output 15	6	Y7	Output 7
7	Y14	Output 14	8	Y6	Output 6
9	Y13	Output 13	10	Y5	Output 5
11	Y12	Output 12	12	Y4	Output 4
13	Y11	Output 11	14	Y3	Output 3
15	Y10	Output 10	16	Y2	Output 2
17	Y9	Output 9	18	Y1	Output 1
19	Y8	Output 8	20	Y0	Output 0
21	NC	NC	22	NC	NC
23	COM	In. common	24	COM	In. common
25	X15	Input 15	26	X7	Input 7
27	X14	Input 14	28	X6	Input 6
29	X13	Input 13	30	X5	Input 5
31	X12	Input 12	32	X4	Input 4
33	X11	Input 11	34	X3	Input 3
35	X10	Input 10	36	X2	Input 2
37	X9	Input 9	38	X1	Input 1
39	X8	Input 8	40	X0	Input 0

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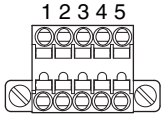
■ POWER SUPPLY TERMINAL ASSIGNMENT

Applicable connector: TFMC1,5 / 5–STF–3,5(Phoenix Contact)
(included in the package)
Applicable wire size: 0.2 – 1.5 mm^2; stripped length 10 mm
Recommended solderless terminal
- AI0,25-10YE 0.25 mm^2 (Phoenix Contact)
- AI0,34-10TQ 0.34 mm^2 (Phoenix Contact)
- AI0,5-10WH 0.5 mm^2 (Phoenix Contact)
- AI0,75-10GY 0.75 mm^2 (Phoenix Contact)
- A1-10 1.0 mm^2 (Phoenix Contact)
- A1,5-10 1.5 mm^2 (Phoenix Contact)



1. FE Functional Earth
2. NC —
3. NC —
4. +24V Power Input (24V DC)
5. 0V Power Input (0V)

MECHATROLINK RELATED COMMANDS

Commands available with this unit are the following.

PROFILE	COMMAND	CODE	FUNCTION
Common command	NOP	00H	No operation command
	ID_RD	03H	Read ID command
	CONFIG	04H	Setup device command
	ALM_RD	05H	Read alarm or warning command
	ALM_CLR	06H	Clear alarm or warning command
	CONNECT	0EH	Establish connection command
	DISCONNECT	0FH	Release connection command
Standard I/O profile	DATA_RWA	20H	Transmit I/O data

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RESPONSE TIME

Response time of discrete input module is the time till when the communication ASIC of the module transmits input data from when input signal is applied to the module.
Response time of discrete output module is the time till when the module output the signal from when output data is received by the communication ASIC of the module.

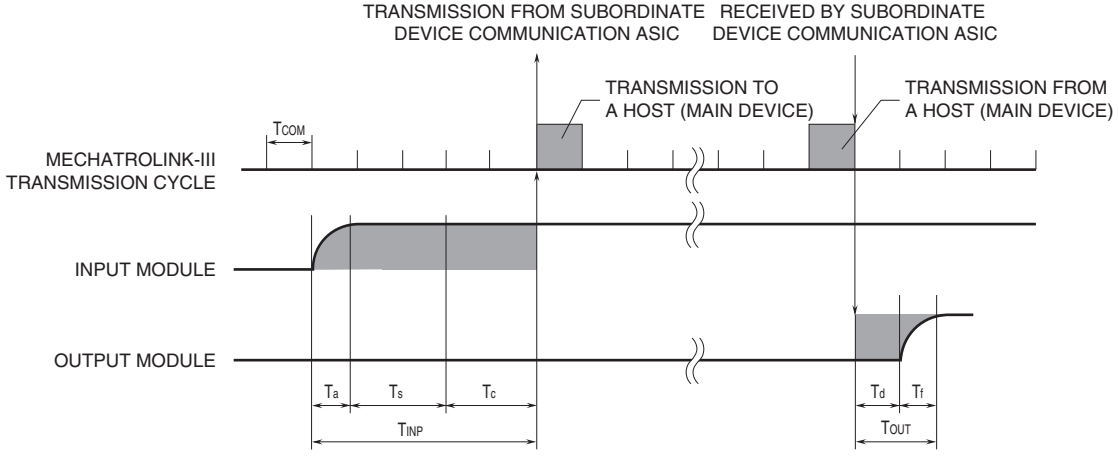
T_{COM}: MECHATROLINK-III transmission cycle set at Main Device
(depends on system and configuration)

T_{INP}: Response of input module ≤ Delay of input circuit (Ta, ON delay time or OFF delay time) + Acquire cycle (Ts) + input internal processing delay time (Tc, two transmission cycle)

T_{OUT}: Response of output module ≤ Output internal processing delay time (Td, one minimum transmission cycle the unit can handle) + Conversion time (Te) + Delay of output circuit (Tf, ON delay time or OFF delay time)

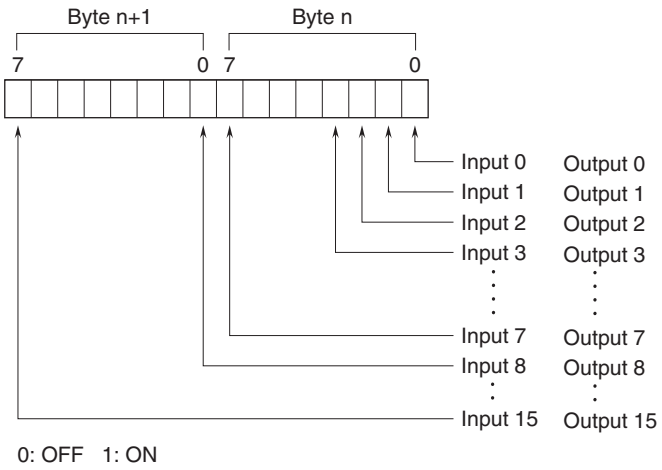
E.g. 1: Acquire cycle: 1 msec., MECHATROLINK-III transmission cycle: 0.125 msec., discrete input ON
Response of input module (T_{INP}): Delay of input circuit (0.2 msec.) + Acquire cycle (1 msec.) + input internal processing delay time (0.125 msec. x 2) = 1.45 [msec.]

E.g. 2: MECHATROLINK-III transmission cycle: 0.5 msec., discrete output OFF
Response of output module (T_{OUT}): Output internal processing delay time (0.125 msec.) + Delay of output circuit (0.5 msec.) = 0.625 [msec.]



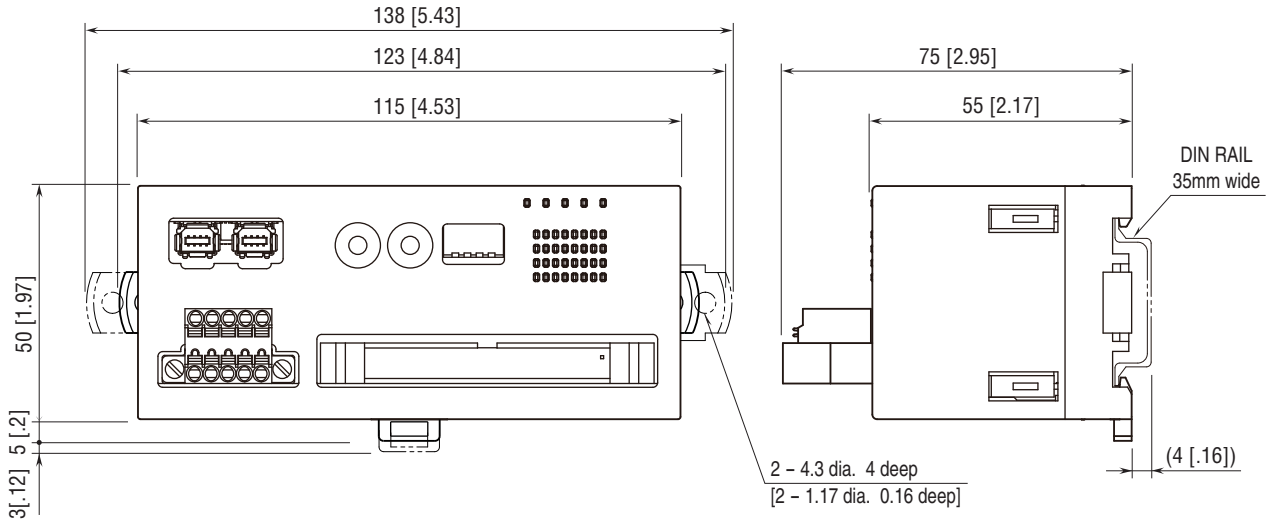
I/O DATA DESCRIPTIONS

■ **DISCRETE I/O**

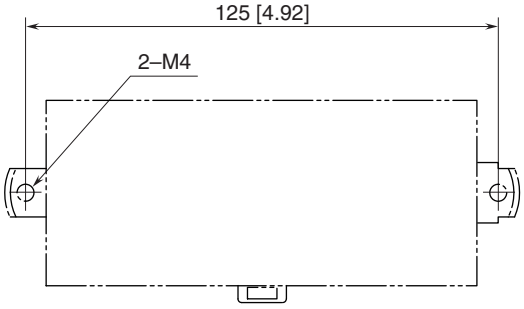


0: OFF 1: ON

EXTERNAL DIMENSIONS unit: mm [inch]



MOUNTING REQUIREMENTS unit: mm [inch]



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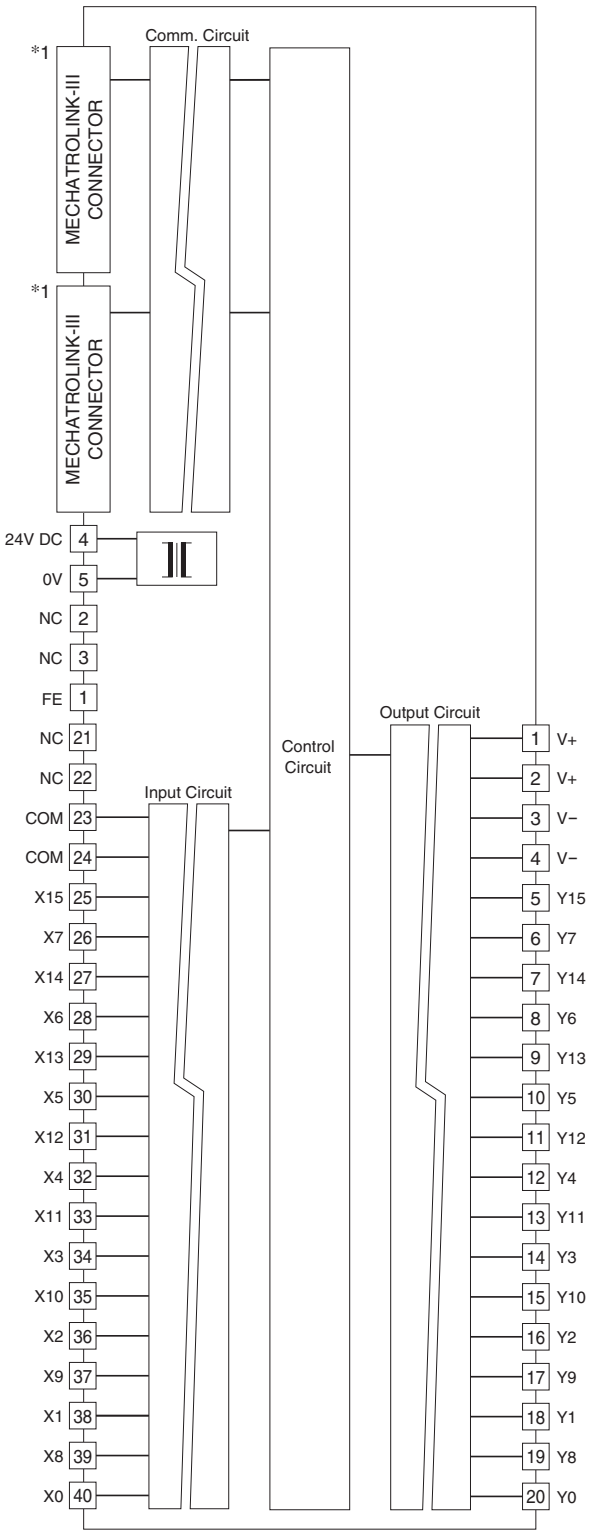
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

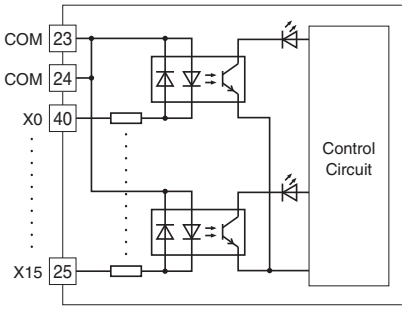
Note: In order to improve EMC performance, bond the FE terminal to ground.

Caution: FE terminal is NOT a protective conductor terminal.

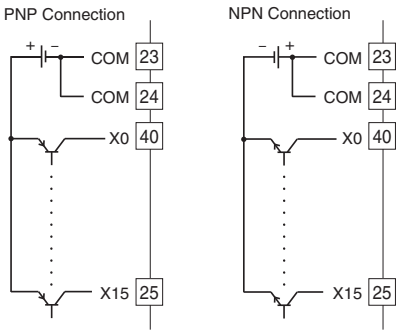


*1. The network cable can be connected to either one.

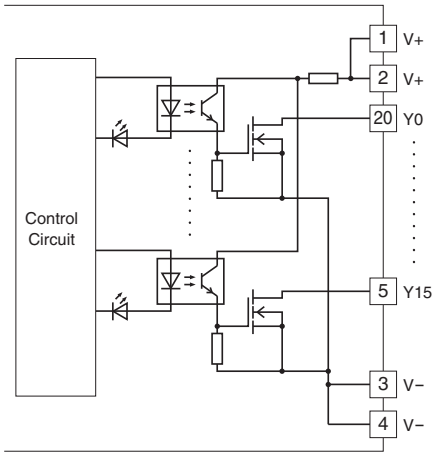
■ **Input Circuit**



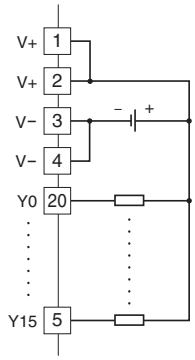
■ **Input Connection Examples**



■ **Output Circuit**



■ **Output Connection Examples**



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⚠ Specifications are subject to change without notice.

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