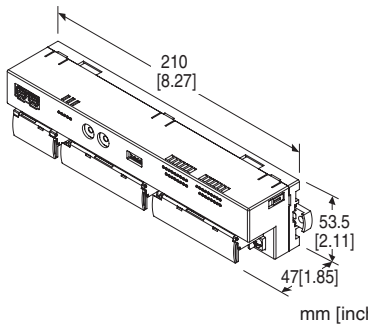
Remote I/O R7K4F Series

MECHATROLINK I/O MODULE

(NPN/PNP discrete input, 32 points, screw terminal block, MECHATROLINK-III use, external excitation 12V)

Functions & Features

• 32 points NPN/PNP discrete input module for MECHATROLINK- III



MECHATROLINK

MODELR7K4FML3-6-DA32-1-R[1]

ORDERING INFORMATION

• Code number: R7K4FML3-6-DA32-1-R[1]

Specify a code from below for [1].
(e.g. R7K4FML3-6-DA32-1-R/Q)

• Specify the specification for option code /Q
(e.g. /C01/SET)

TERMINAL BLOCK

6: Screw terminal block for power supply
Connector for MECHATROLINK- III
Screw terminal block for I/O

I/O TYPE

DA32-1: NPN/PNP discrete input, 32 points
(12 V external input power)

POWER INPUT

DC power

R: 24 V DC

(Operational voltage range: ±10 %; ripple 10 %p-p max.)

[1] OPTIONS

blank: none

/Q: With options (specify the specification)

SPECIFICATIONS OF OPTION: Q (multiple selections)

COATING (For the detail, refer to our web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet (No. ESU-7773-DA32)

GENERAL SPECIFICATIONS

Connection

MECHATROLINK-III: MECHATROLINK-III connector

Power input, input: M3 separable screw terminal (torque 0.5 N·m)

Solderless terminal: Refer to the drawing at the end of the section.

Recommended manufacturer: Japan Solderless Terminal MFG.Co.Ltd, Nichifu Co.,ltd

Applicable wire size: 0.25 to 1.65 mm^2 (AWG 22 to 16)

Screw terminal: Nickel-plated steel

Housing material: Flame-resistant resin (gray)

Isolation: Input to MECHATROLINK or FE to power

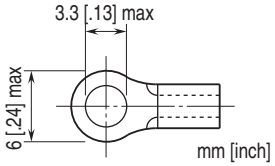
Status indicator LEDs: PWR, ERR, CON, LNK1, LNK2 (5 LEDs) indicate the module's operating conditions. (Refer to the insruction manual)

Discrete input status indicator LED: Green LED turns on with input ON

Read rate: 1 / 5 / 10(*) / 20 / 50 / 70 / 100 / 200 msec. selectable with front DIP SW

(*) factory default setting

■**Recommended solderless terminal**



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.

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

INPUT SPECIFICATIONS

Common: Positive or Negative common (NPN/PNP) per 32 points
Maximum inputs applicable at once: No limit (at 12 V DC)
Rated input voltage: 12 V DC ±10 %; ripple 5 %p-p max.
ON voltage / current: ≥ 7.5 V DC (input – COM) / ≥ 3.5 mA
OFF voltage / current: ≤ 3 V DC (input – COM) / ≤ 1 mA
Input current: ≤ 5.5 mA per point at 12 V DC
Input resistance: Approx. 2.2 kΩ
ON delay: ≤ 0.2 msec.
OFF delay: ≤ 0.5 msec.

INSTALLATION

Current consumption
•**DC at 24 V DC**: ≤ 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: 330 g (0.73 lb)

PERFORMANCE

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

STANDARDS & APPROVALS

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

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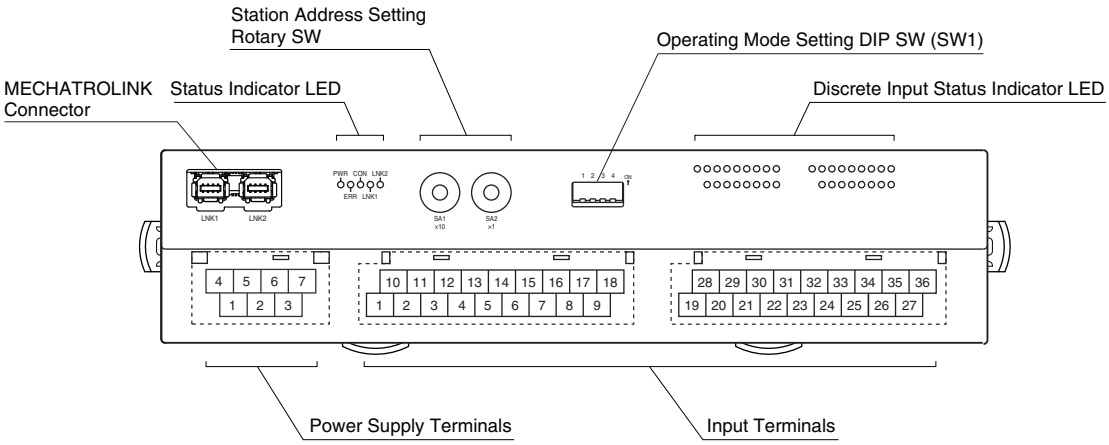
EXTERNAL VIEW



TERMINAL ASSIGNMENTS

■ INPUT TERMINAL ASSIGNMENT

10	11	12	13	14	15	16	17	18
COM	X1	X3	X5	X7	X9	X11	X13	X15

1	2	3	4	5	6	7	8	9
COM	X0	X2	X4	X6	X8	X10	X12	X14

28	29	30	31	32	33	34	35	36
COM	X17	X19	X21	X23	X25	X27	X29	X31

19	20	21	22	23	24	25	26	27
COM	X16	X18	X20	X22	X24	X26	X28	X30

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	COM	Common	10	COM	Common
2	X0	Input 0	11	X1	Input 1
3	X2	Input 2	12	X3	Input 3
4	X4	Input 4	13	X5	Input 5
5	X6	Input 6	14	X7	Input 7
6	X8	Input 8	15	X9	Input 9
7	X10	Input 10	16	X11	Input 11
8	X12	Input 12	17	X13	Input 13
9	X14	Input 14	18	X15	Input 15

NO.	ID	FUNCTION	NO.	ID	FUNCTION
19	COM	Common	28	COM	Common
20	X16	Input 16	29	X17	Input 17
21	X18	Input 18	30	X19	Input 19
22	X20	Input 20	31	X21	Input 21
23	X22	Input 22	32	X23	Input 23
24	X24	Input 24	33	X25	Input 25
25	X26	Input 26	34	X27	Input 27
26	X28	Input 28	35	X29	Input 29
27	X30	Input 30	36	X31	Input 31

■ POWER SUPPLY TERMINAL ASSIGNMENT

4	5	6	7
NC	NC	+24V	0V

1	2	3
NC	NC	FE

1. NC –
2. NC –
3. FE Functional earth
4. NC –
5. NC –
6. +24V Power supply (24V DC)
7. 0V Power supply (0V)

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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

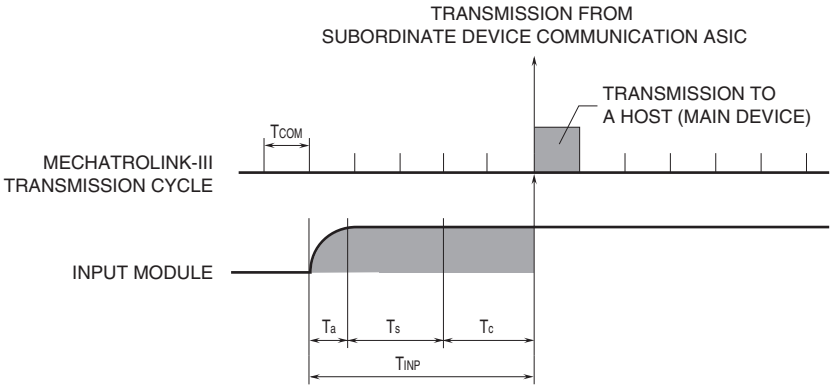
RESPONSE TIME

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.

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)

E.g.: 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.]



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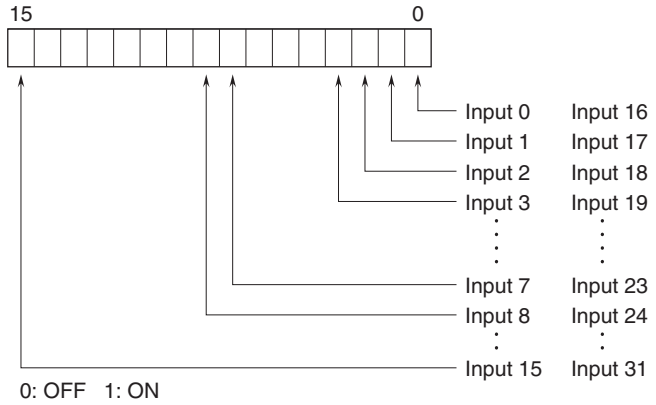
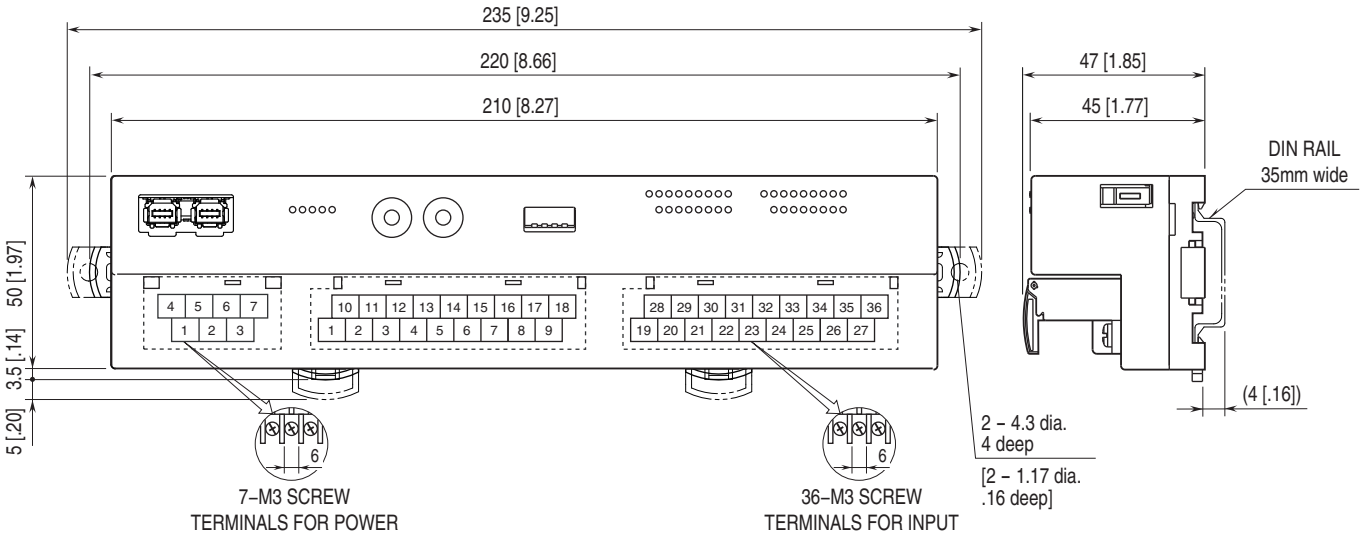
I/O DATA DESCRIPTIONS

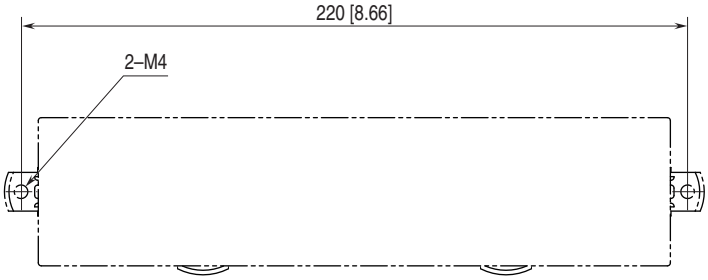
■ **DISCRETE INPUT**



EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



MOUNTING REQUIREMENTS unit: mm [inch]



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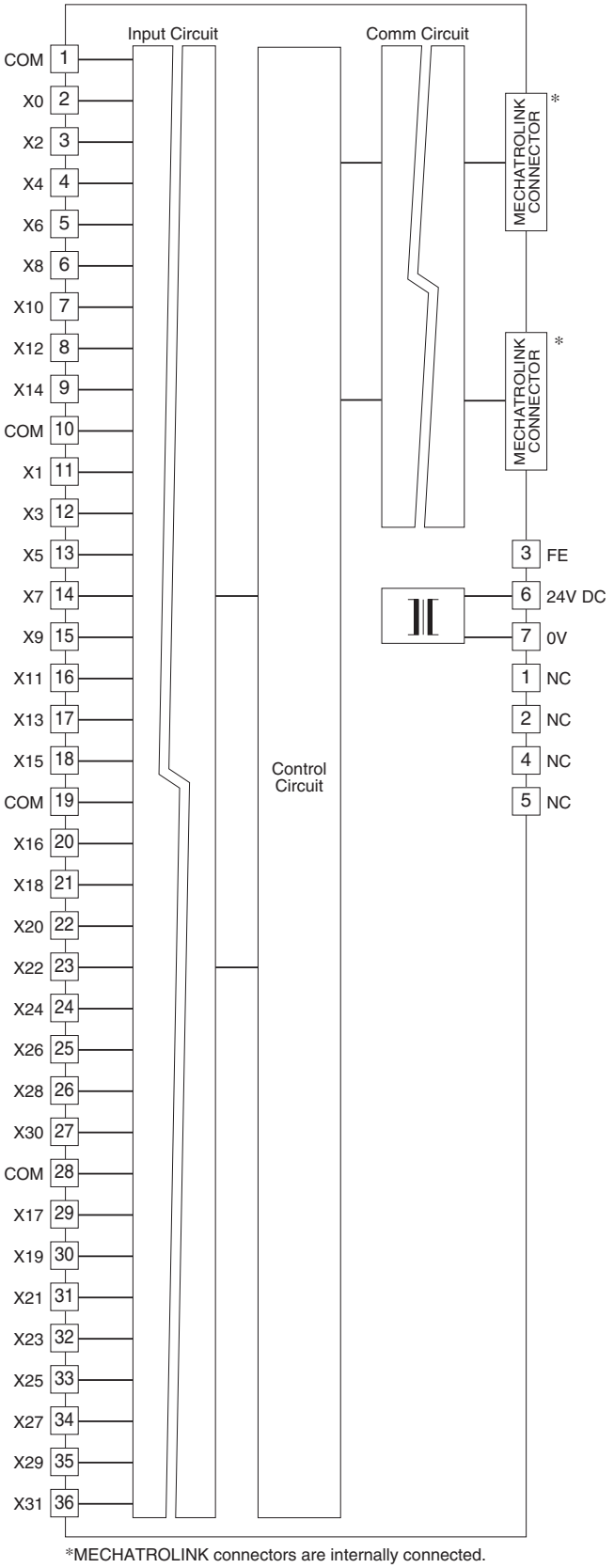
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

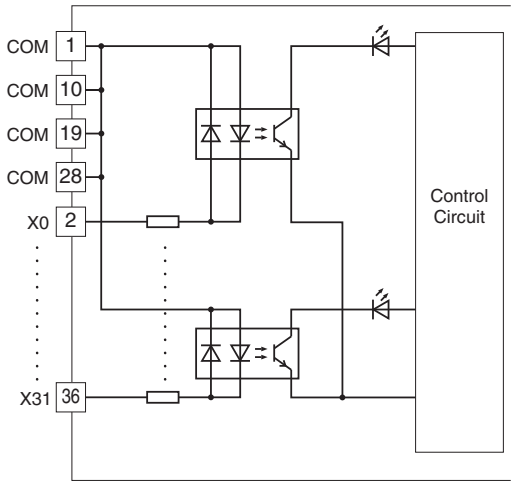
Note: In order to improve EMC performance, bond the FE terminal to ground.

Caution: FE terminal is NOT a protective conductor terminal.



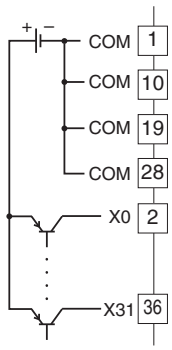
*MECHATROLINK connectors are internally connected.
The network cable can be connected to either one.

■ **Input Circuit**

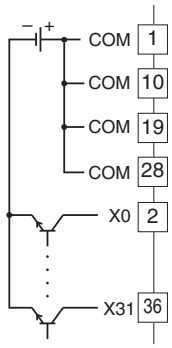


■ **Input Connection Examples**

PNP Connection



NPN Connection



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⚠ Specifications are subject to change without notice.

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