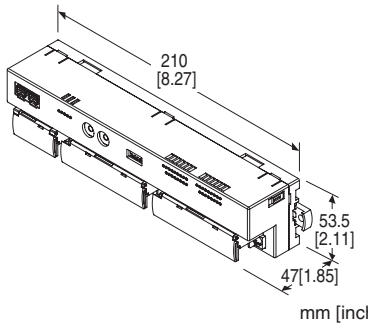
Remote I/O R7K4F Series

MECHATROLINK I/O MODULE

(NPN/PNP discrete input & PNP transistor output, 16 points each, screw terminal block, MECHATROLINK-III use)

Functions & Features

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



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MECHATROLINK

MODELR7K4FML3-6-DAC32B-R[1]

ORDERING INFORMATION

• Code number: R7K4FML3-6-DAC32B-R[1]
Specify a code from below for [1].
(e.g. R7K4FML3-6-DAC32B-R/NR/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

DAC32B: NPN/PNP discrete input &
PNP 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)

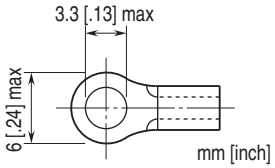
SPECIFICATIONS OF OPTION: Q (multiple selections)

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-DAC32)

GENERAL SPECIFICATIONS

Connection
MECHATROLINK-III: MECHATROLINK-III connector
Power input, I/O: 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 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

■**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.)

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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)
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: Positive common (PNP) 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**: ≤ 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 output to MECHATROLINK or FE to power)

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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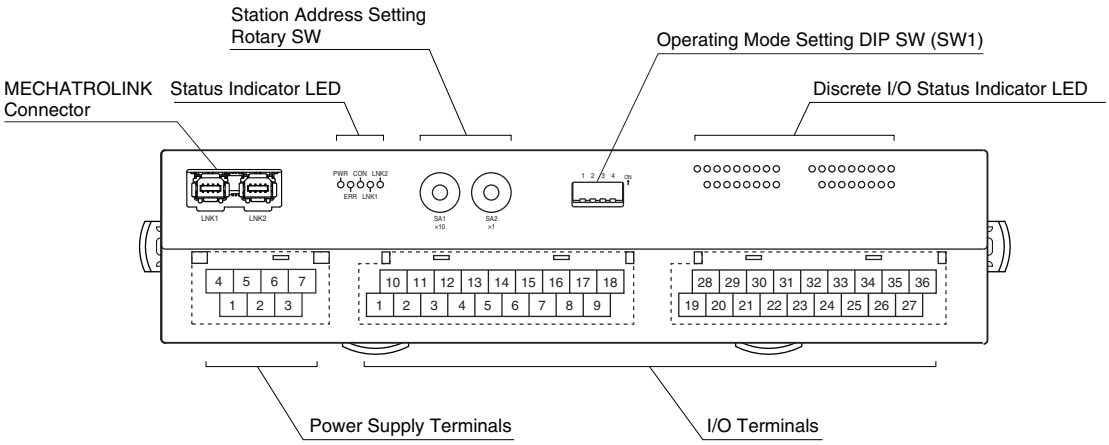
EXTERNAL VIEW



TERMINAL ASSIGNMENTS

■I/O TERMINAL ASSIGNMENT

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
V+	Y1	Y3	Y5	Y7	Y9	Y11	Y13	Y15
19	20	21	22	23	24	25	26	27
V–	Y0	Y2	Y4	Y6	Y8	Y10	Y12	Y14

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	V–	Out. Common	28	V+	External excitation
20	Y0	Output 0	29	Y1	Output 1
21	Y2	Output 2	30	Y3	Output 3
22	Y4	Output 4	31	Y5	Output 5
23	Y6	Output 6	32	Y7	Output 7
24	Y8	Output 8	33	Y9	Output 9
25	Y10	Output 10	34	Y11	Output 11
26	Y12	Output 12	35	Y13	Output 13
27	Y14	Output 14	36	Y15	Output 15

■ 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.
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.

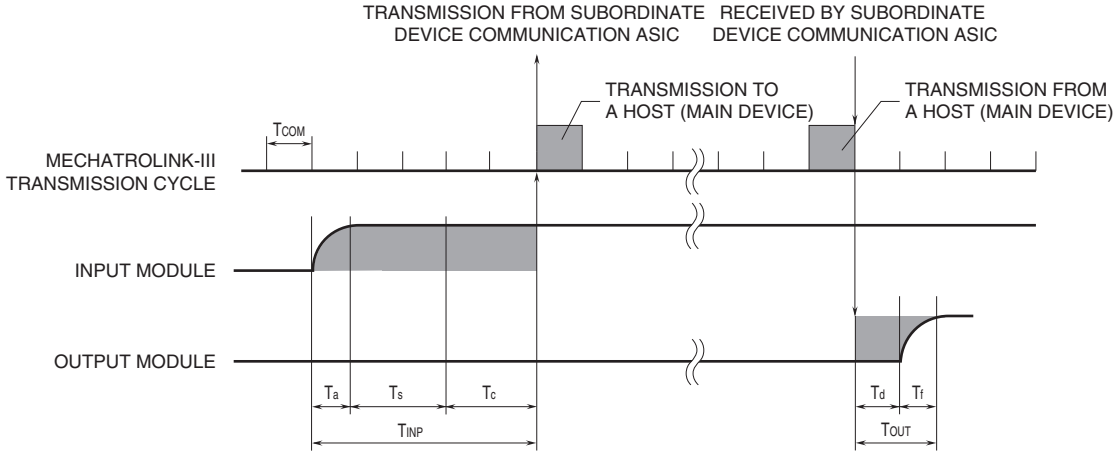
T_{COM}: MECHATROLINK-III transmission cycle set at Main Device
(depends on system and configuration)

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)

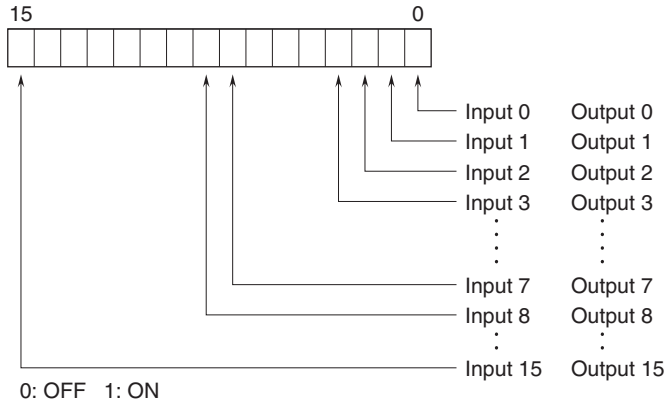
E.g. 1: Acquire cycle: 1 msec., MECHATROLINK-III transmission cycle: 0.125 msec., discrete input ON
Response of input module (T_{INP}): Delay of input circuit (0.2 msec.) + Acquire cycle (1 msec.) + input internal processing delay time (0.125 msec. x 2) = 1.45 [msec.]

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.]

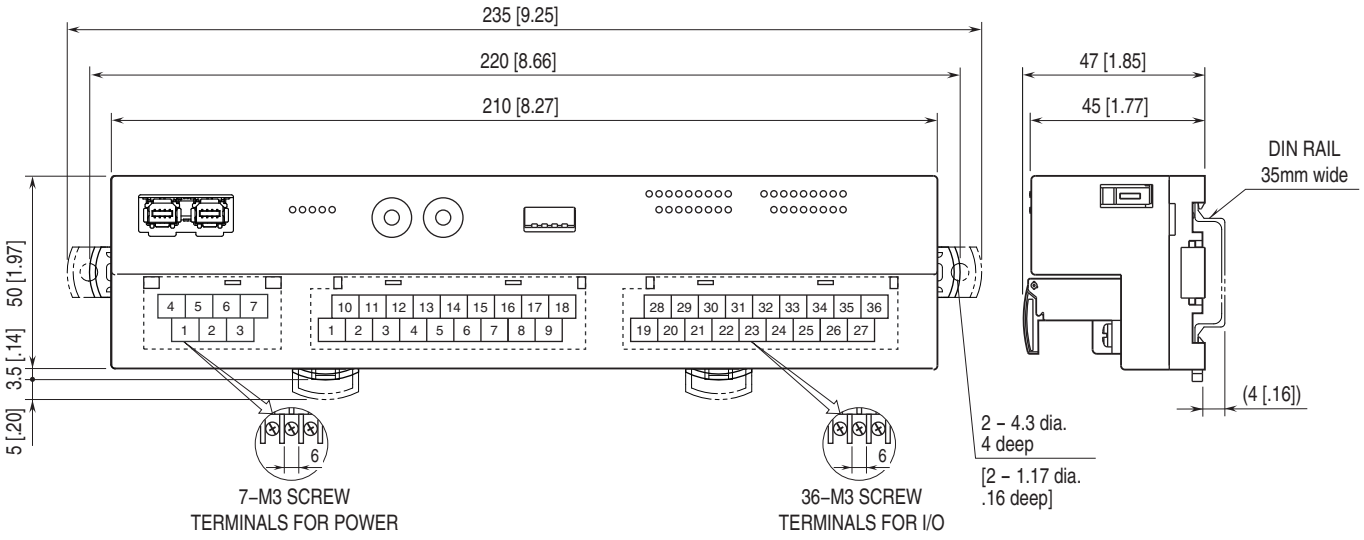


I/O DATA DESCRIPTIONS

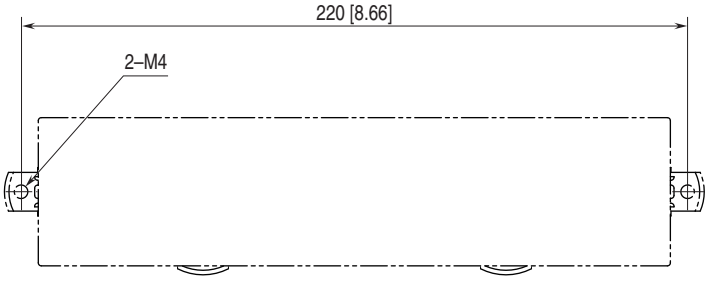
■ **DISCRETE I/O**



EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



MOUNTING REQUIREMENTS unit: mm [inch]



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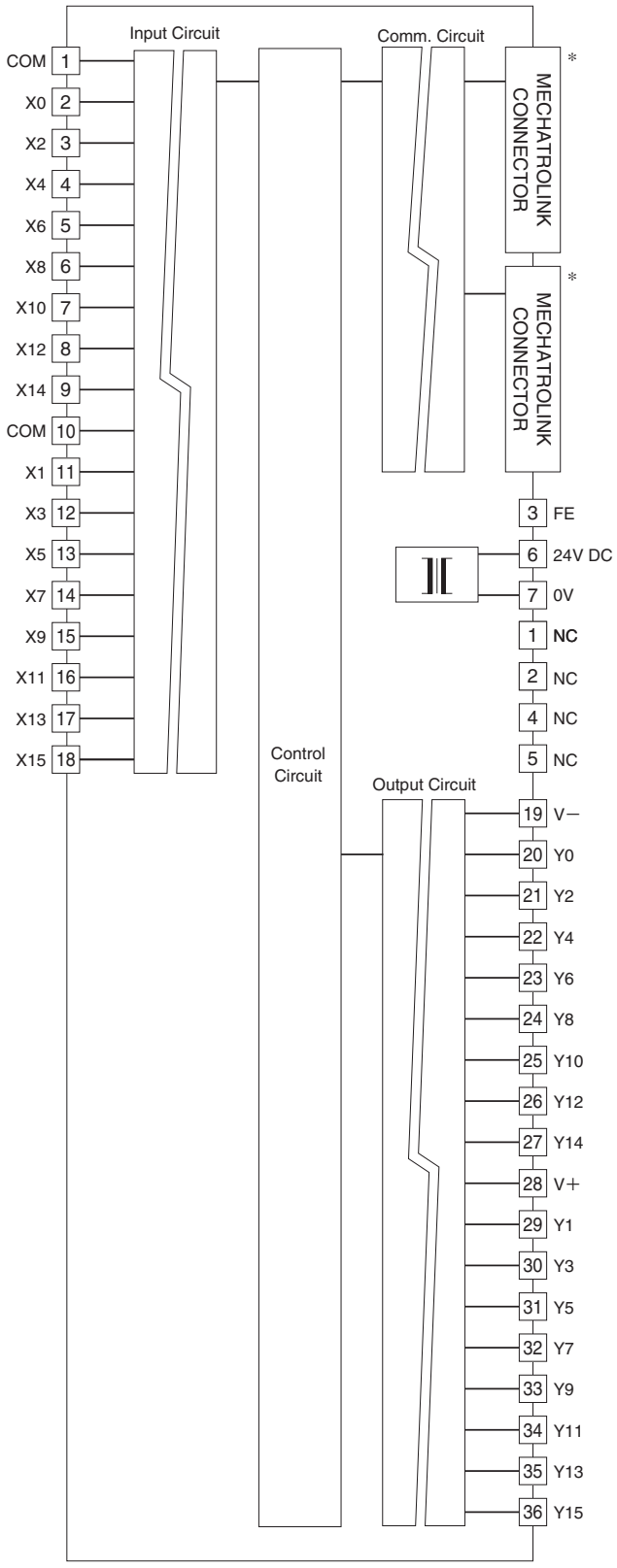
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

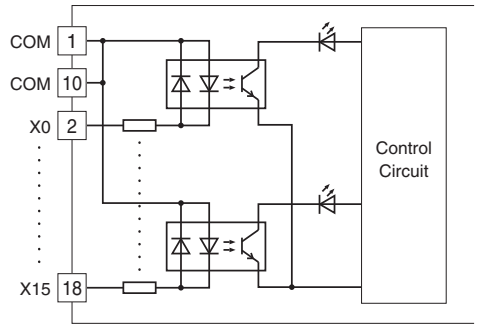
Note: In order to improve EMC performance, bond the FE terminal to ground.

Caution: FE terminal is NOT a protective conductor terminal.

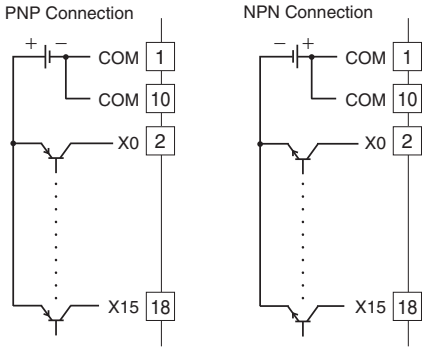


*MECHATROLINK connectors are internally connected.
The network cable can be connected to either one.

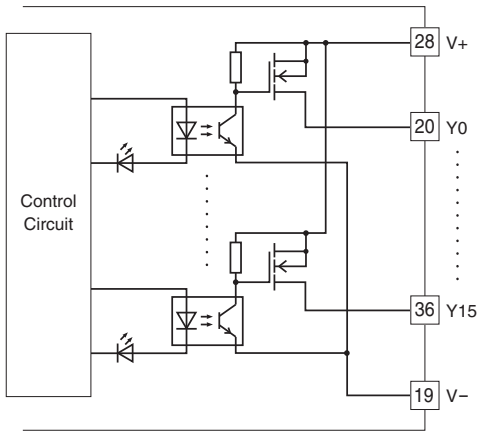
■ **Input Circuit**



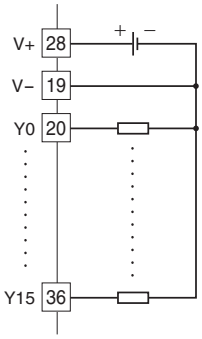
■ **Input Connection Examples**



■ **Output Circuit**



■ **Output Connection Examples**



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⚠ Specifications are subject to change without notice.

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