

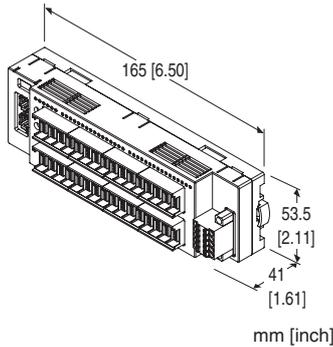
Remote I/O R7I4D Series

MECHATROLINK I/O MODULE

(NPN discrete input & NPN transistor output, 16 points each, e-CON connector MECHATROLINK- III use)

Functions & Features

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



MODEL: R7I4DML3-DAC32C-B-R[1]

ORDERING INFORMATION

- Code number: R7I4DML3-DAC32C-B-R[1]
Specify a code from below for [1].
(e.g. R7I4DML3-DAC32C-B-R/Q)
- Specify the specification for option code /Q
(e.g. /C01/SET)

I/O TYPE

DAC32C: NPN discrete input & NPN transistor output, 16 points each

TERMINAL BLOCK

B: Tension clamp terminal block for power supply
Connector for MECHATROLINK- III
e-CON connector for I/O

POWER INPUT

DC Power
R: 24 V DC
(Operational voltage range 24 V \pm 10 %, ripple 10 %p-p max.)

[1] OPTIONS (multiple selections)

Wire Breakdown Detection

Blank: With

/D1: Without

Other 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-8008-DAC32C)

RELATED PRODUCTS

- PC configurator software (model: R7CFG)

Downloadable at our web site.

For connecting to PC, use commercially available Mini-B type USB cable. (provided by user)

GENERAL SPECIFICATIONS

Connection

MECHATROLINK-III: MECHATROLINK-III connector

I/O: e-CON connector

Power & Sensor excitation: Separable screwless spring terminal

Housing material: Flame-resistant resin (gray)

Isolation: Input or output or sensor excitation to MECHATROLINK or FE to power

Output at the loss of communication: Configurable via R7CFG

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: Selectable with R7CFG

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: 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)

Transmission cycle: 125 μ sec., 250 μ sec., 500 μ sec., 1 - 64 msec. (with 1 msec. increments)

Communication cycle: 125 μ sec. through 64 msec.

Applicable profile: Standard I/O profile (cyclic)

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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

Slave monitoring: None

INPUT SPECIFICATIONS

Common: Positive common (NPN) per 16 points

Maximum inputs applicable at once: No limit (at 24 V DC)

Sensor excitation: 24 V DC $\pm 10\%$; ripple 5 %p-p max., ≤ 5 A (including discrete input load charge); rated current 8 A

ON voltage / current: ≥ 15 V DC (X0 through XF to +24V) / ≥ 3.5 mA

OFF voltage / current: ≤ 5 V DC (X0 through XF to +24V) / ≤ 1.0 mA

Input current: ≤ 5.5 mA per point at 24 V DC

Input resistance: Approx. 4.4 k Ω

ON delay: ≤ 0.5 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)

Sensor Excitation: 24 V DC $\pm 10\%$, ripple 5 %p-p max., ≤ 5 A (including discrete output load charge); rated current 8 A

Rated output current: 0.2 A per point, 3.2 A per common

Residual voltage: ≤ 1.2 V

Leakage current:

With wire breakdown detection: ≤ 0.7 mA

Without wire breakdown detection: ≤ 0.1 mA

ON delay: ≤ 0.2 msec.

OFF delay: ≤ 0.5 msec.

Overload current protection function: Turns OFF the outputs when overcurrent is detected

Overheat protection function: Turns OFF the outputs when overheat is detected

Diagnostic function: When the overcurrent, overheat and open load (disconnection) are detected, notifies to the status bit of upper input area. Refer to the users manual for details

Note: Status is disabled with option code: /D1 (without wire breakdown detection).

(When driving an inductive load, connect a diode in parallel with the load.)

INSTALLATION

Current consumption

•DC at 24 V DC: ≤ 70 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: 170 g (0.37 lb)

PERFORMANCE

Insulation resistance: ≥ 100 M Ω with 500 V DC

Dielectric strength: 1500 V AC @ 1 minute

(input or output or sensor excitation 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

■ WIRE BREAKDOWN DETECTION

The function to notifies to the status bit of upper input area in case of open load (disconnection) of discrete output is detected.

Connect output load under 10 k Ω .

Pull-down resistor is mounted to detect disconnection so weak leakage current flows even when the output is OFF. Status bit is disabled and pull-down resistor is not mounted with option code: /D1 (without wire breakdown detection).

PC CONFIGURATOR

The following parameters can be set with using PC Configurator Software (model: R7CFG)

Refer to the users manual for the R7CFG for detailed operation of the software program.

■ CHANNEL INDIVIDUAL SETTING

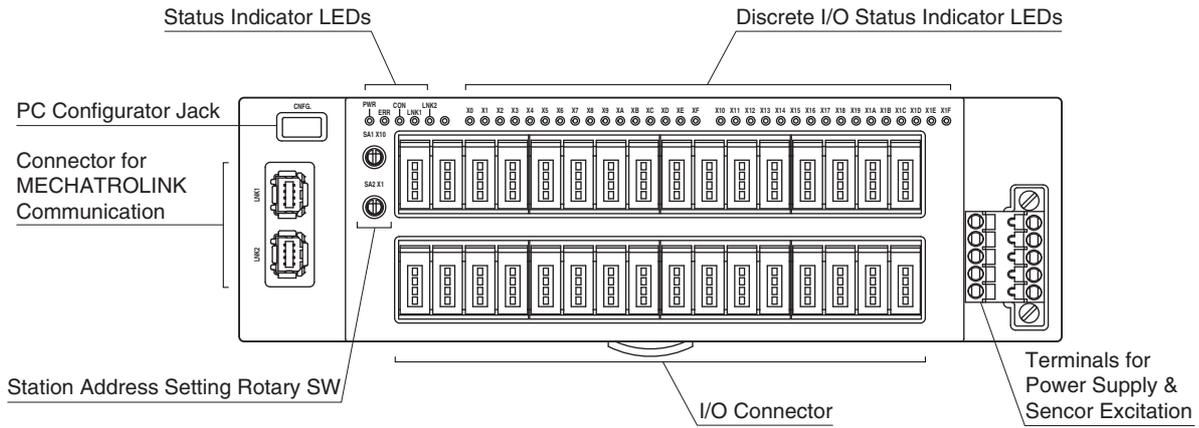
PARAMETER	SETTING RANGE	DEFAULT
Unused setting (output only)	CH enabled, CH disabled	CH enabled

■ CHANNEL BATCH SETTING

PARAMETER	SETTING RANGE	DEFAULT
Read cycle	1 msec., 5 msec., 10 msec., 20 msec., 50 msec., 70 msec., 100 msec., 200 msec.	10 msec.
Output at communication error	Output hold, Output clear	Output hold

MODEL: R7I4DML3-DAC32C

EXTERNAL VIEW



TERMINAL ASSIGNMENTS

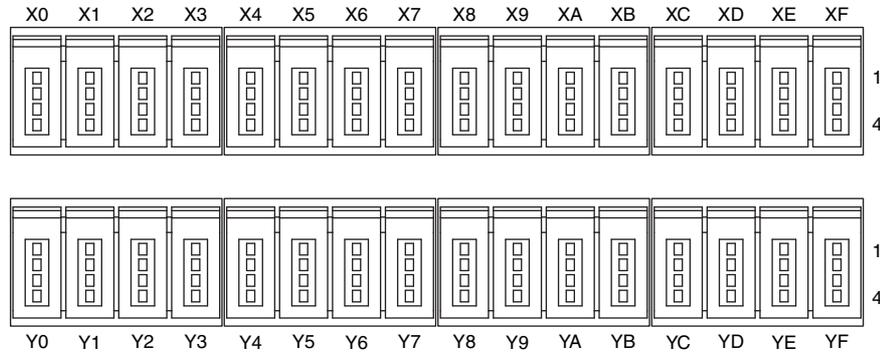
I/O TERMINAL ASSIGNMENT

e-CON connector

Recommended cable connector: 37104-()-000FL (3M Company)

(The cable connector is not included in the package.)

Specify wire size instead of (); refer to the specifications of the product.)



PIN No.	ID	FUNCTION	PIN No.	ID	FUNCTION
X0	1	+24V 24V DC	X8	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X0 Input 0		4	X8 Input 8
X1	1	+24V 24V DC	X9	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X1 Input 1		4	X9 Input 9
X2	1	+24V 24V DC	XA	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X2 Input 2		4	XA Input 10
X3	1	+24V 24V DC	XB	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X3 Input 3		4	XB Input 11
X4	1	+24V 24V DC	XC	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X4 Input 4		4	XC Input 12
X5	1	+24V 24V DC	XD	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X5 Input 5		4	XD Input 13
X6	1	+24V 24V DC	XE	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X6 Input 6		4	XE Input 14
X7	1	+24V 24V DC	XF	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X7 Input 7		4	XF Input 15

PIN No.	ID	FUNCTION	PIN No.	ID	FUNCTION
Y0	1	+24V 24V DC	Y8	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	NC Unused		3	NC Unused
	4	Y0 Output 0		4	Y8 Output 8
Y1	1	+24V 24V DC	Y9	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	NC Unused		3	NC Unused
	4	Y1 Output 1		4	Y9 Output 9
Y2	1	+24V 24V DC	YA	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	NC Unused		3	NC Unused
	4	Y2 Output 2		4	YA Output 10
Y3	1	+24V 24V DC	YB	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	NC Unused		3	NC Unused
	4	Y3 Output 3		4	YB Output 11
Y4	1	+24V 24V DC	YC	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	NC Unused		3	NC Unused
	4	Y4 Output 4		4	YC Output 12
Y5	1	+24V 24V DC	YD	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	NC Unused		3	NC Unused
	4	Y5 Output 5		4	YD Output 13
Y6	1	+24V 24V DC	YE	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	NC Unused		3	NC Unused
	4	Y6 Output 6		4	YE Output 14
Y7	1	+24V 24V DC	YF	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	NC Unused		3	NC Unused
	4	Y7 Output 7		4	YF Output 15

■ POWER SUPPLY, SENSOR EXCITATION

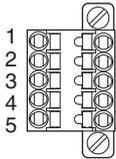
Cable connector: TFMC1,5 / 5-STF-3,5

(Phoenix Contact) (included in the package)

Applicable wire size: 0.2 – 1.5 mm²; stripped length 10 mm

Recommended solderless terminal

- AI0,25–10YE 0.25 mm² (Phoenix Contact)
- AI0,34–10TQ 0.34 mm² (Phoenix Contact)
- AI0,5–10WH 0.5 mm² (Phoenix Contact)
- AI0,75–10GY 0.75 mm² (Phoenix Contact)
- A1–10 1.0 mm² (Phoenix Contact)
- A1,5–10 1.5 mm² (Phoenix Contact)



- | | |
|--------------|-------------------|
| 1. PWR+ | Power Supply |
| 2. PWR- | Power Supply |
| 3. FE | Functional earth |
| 4. SNSR.EXC+ | Sensor excitation |
| 5. SNSR.EXC- | Sensor excitation |

Note: The numbers marked on the connector have no relationship to the pin number of the unit.

Wire according to the instruction manual of the unit.

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 master
(depends on system and configuration)

T_{INP} : Response of input module \leq Delay of input circuit (T_a , ON delay time or OFF delay time) + Acquire cycle (T_s) + input internal processing delay time (T_c , two transmission cycle)

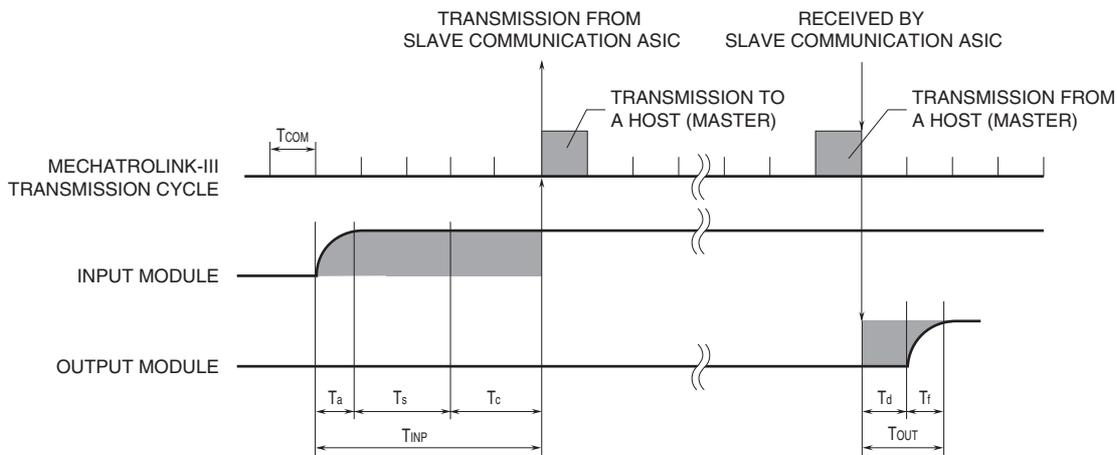
T_{OUT} : Response of output module \leq Output internal processing delay time (T_d , one minimum transmission cycle the unit can handle) + Conversion time (T_e) + Delay of output circuit (T_f , ON delay time or OFF delay time)

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 (0.5 msec.) + Acquire cycle (1 msec.) + input internal processing delay time (0.125 msec. x 2) = 1.75 [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

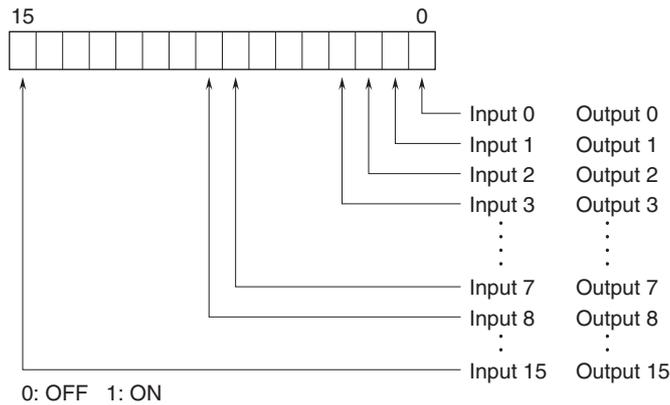
When overcurrent or overheat is detected on each channel of discrete output while the output is ON, the status bit corresponding to the output turns "1" and is latched*. Then the discrete output is also latched to OFF.

To reset the latched bit and discrete output, set this output to OFF from the host PC/PLC or turn off and on the power supply to the unit.

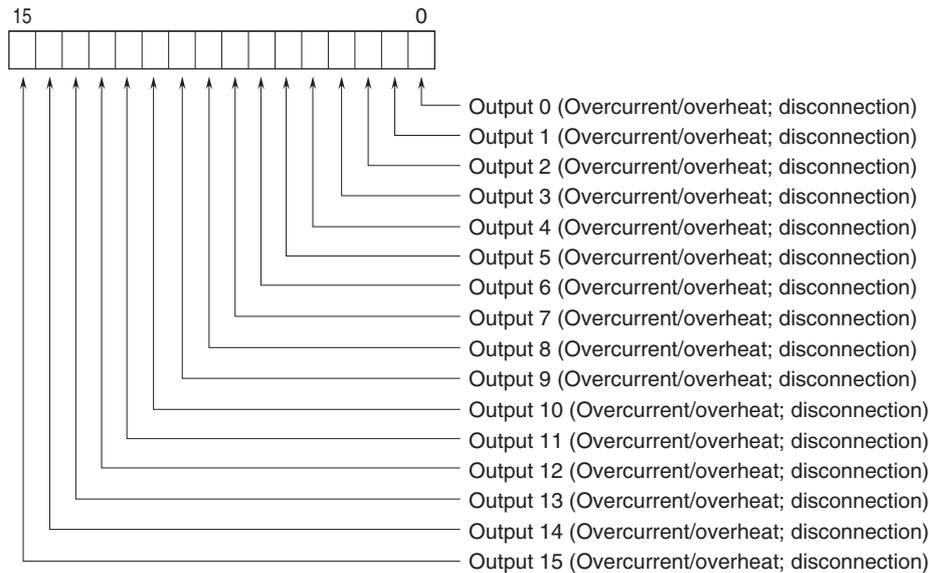
When disconnection (open load) is detected while output is OFF, the corresponding status bit turns "1" but is not latched.

* The status bit turns "0" if the load is opened in the state overcurrent or overheat is detected. However, the discrete output of the unit remains latched. Be sure to remove the cause of error and reset the latched output by setting the output to OFF or turning off/on the power supply

■ DISCRETE I/O



■ STATUS



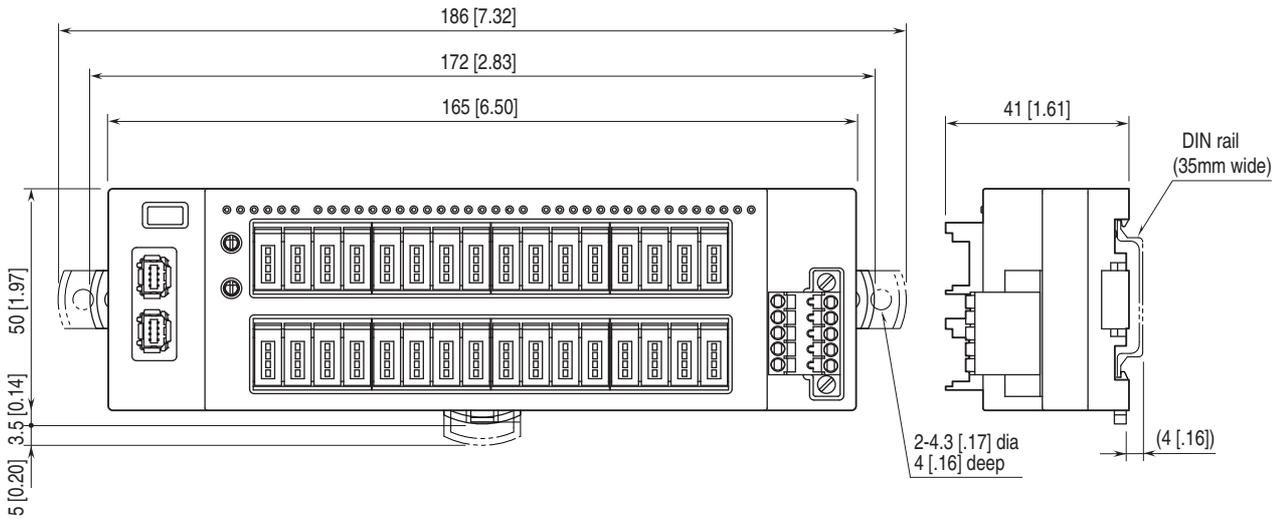
0 : Normal

1 : Detected the overcurrent/overheat and disconnection

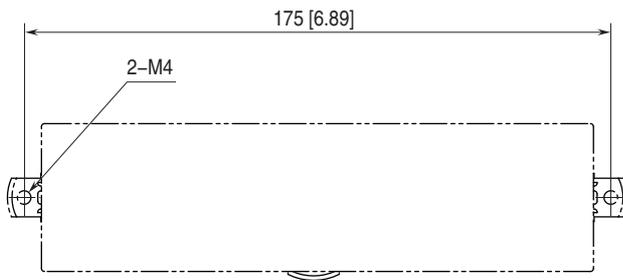
Note: Status is disabled with option code /D1 (without wire breakdown detection).

MODEL: R7I4DML3-DAC32C

EXTERNAL DIMENSIONS unit: mm [inch]



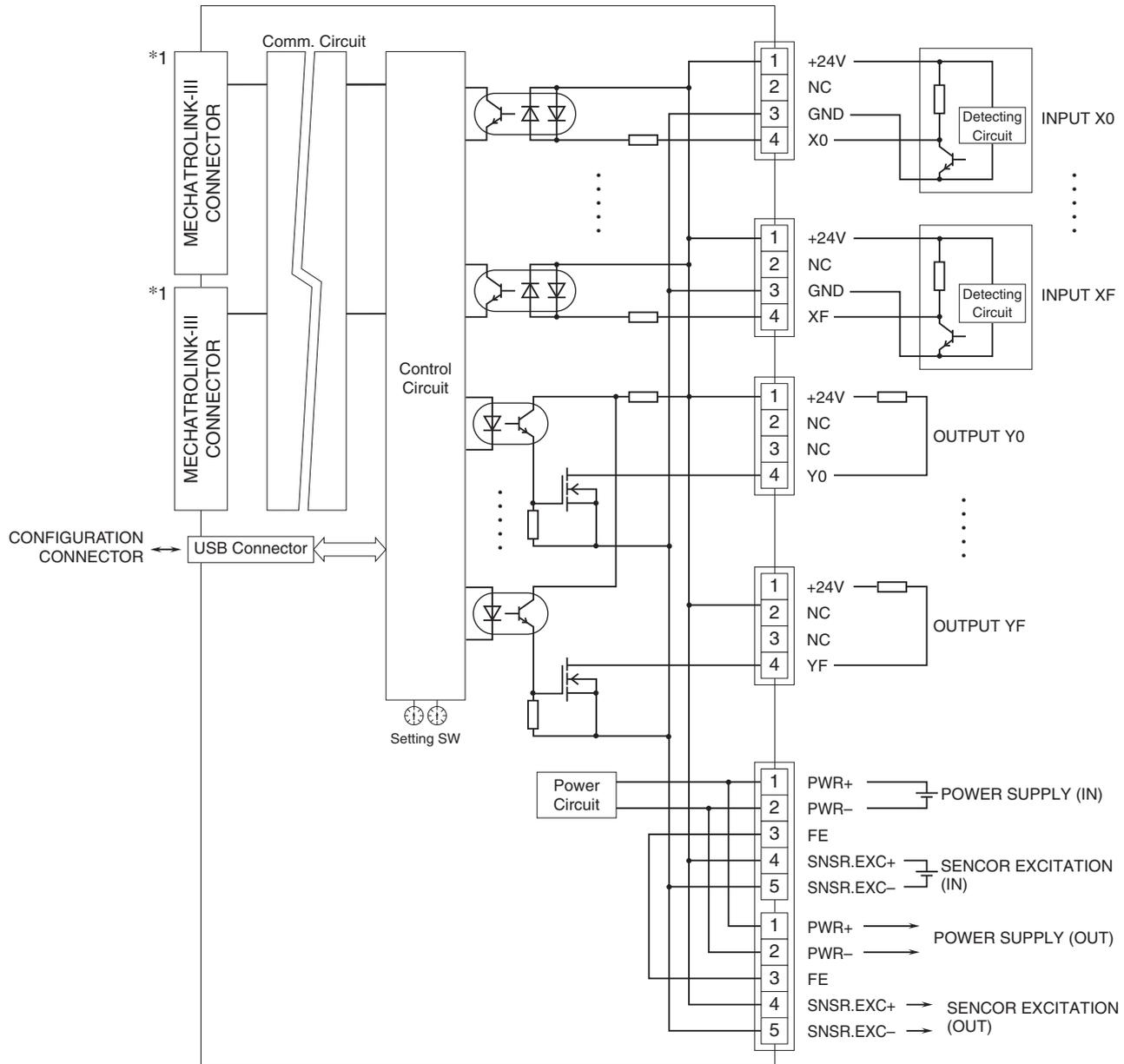
MOUNTING REQUIREMENTS unit: mm [inch]



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

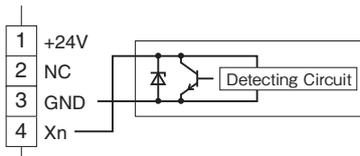
Note: In order to improve EMC performance, bond the FE terminal to ground.

Caution: FE terminal is NOT a protective conductor terminal.



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

■ 2-Wire Sensor



Specifications are subject to change without notice.