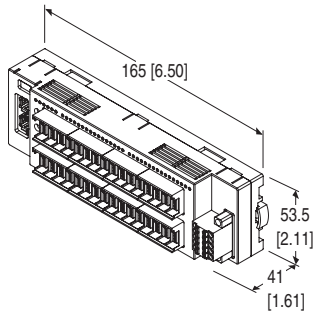
Remote I/O R7I4D Series

MECHATROLINK I/O MODULE

(NPN transistor output, 32 points, e-CON connector, MECHATROLINK- III use)

Functions & Features

32 points NPN transistor output module for MECHATROLINK-III



mm [inch]

CE

MECHATROLINK

MODEL: R7I4DML3-DC32A-B-R[1]

ORDERING INFORMATION

• Code number: R7I4DML3-DC32A-B-R[1]
Specify a code from below for [1].
(e.g. R7I4DML3-DC32A-B-R/Q)
• Specify the specification for option code /Q
(e.g. /C01/SET)

I/O TYPE

DC32A: NPN transistor output, 32 points

TERMINAL BLOCK

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

POWER INPUT

DC Power
R: 24 V DC
(Operational voltage range 24 V ±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-DC32A)

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
Output: e-CON connector
Power & Sensor excitation: Separable screwless spring terminal
Housing material: Flame-resistant resin (gray)
Isolation: 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 insruction manual)
Discrete output status indicator LED: Green LED turns on with output ON

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 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)

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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

OUTPUT SPECIFICATIONS

Common: Negative common (NPN) per 32 points
Maximum outputs applicable at once: No limit (at 24 V DC)
Sensor Excitation: 24 V DC ±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**: ≤ 75 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 MΩ with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute
(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 kΩ.
Pull-down resister is mounted to detect disconnection so weak leakage current flows even when the output is OFF.
Status bit is disabled and pull-down resister is not mounted with option code: /D1 (withourt 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
Output at communication error	Output hold, Output clear	Output hold

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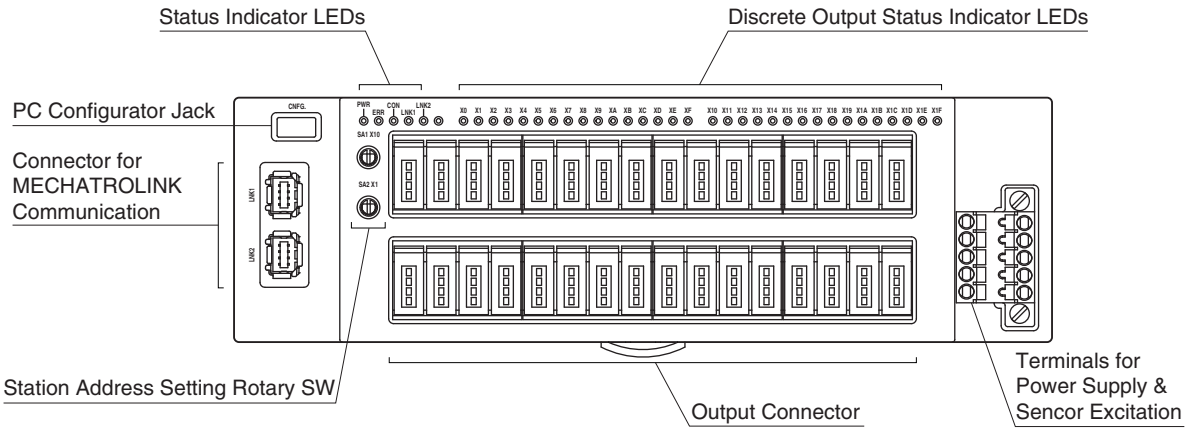
EXTERNAL VIEW



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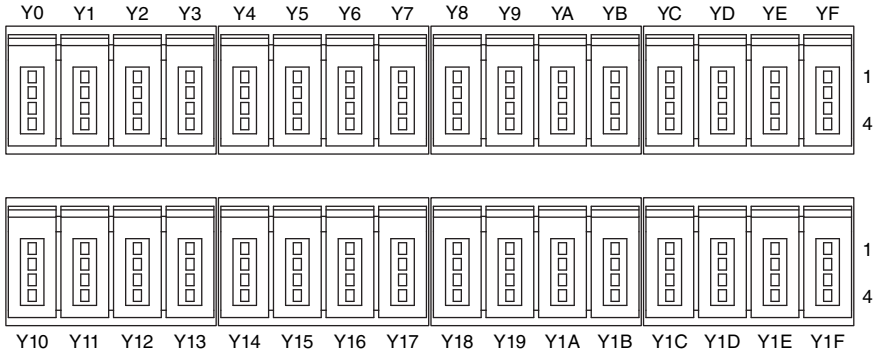
TERMINAL ASSIGNMENTS

■OUTPUT 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
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

PIN No.		ID	FUNCTION	PIN No.		ID	FUNCTION
Y10	1	+24V	24V DC	Y18	1	+24V	24V DC
	2	NC	Unused		2	NC	Unused
	3	NC	Unused		3	NC	Unused
	4	Y10	Output 16		4	Y18	Output 24
Y11	1	+24V	24V DC	Y19	1	+24V	24V DC
	2	NC	Unused		2	NC	Unused
	3	NC	Unused		3	NC	Unused
	4	Y11	Output 17		4	Y19	Output 25
Y12	1	+24V	24V DC	Y1A	1	+24V	24V DC
	2	NC	Unused		2	NC	Unused
	3	NC	Unused		3	NC	Unused
	4	Y12	Output 18		4	Y1A	Output 26
Y13	1	+24V	24V DC	Y1B	1	+24V	24V DC
	2	NC	Unused		2	NC	Unused
	3	NC	Unused		3	NC	Unused
	4	Y13	Output 19		4	Y1B	Output 27
Y14	1	+24V	24V DC	Y1C	1	+24V	24V DC
	2	NC	Unused		2	NC	Unused
	3	NC	Unused		3	NC	Unused
	4	Y14	Output 20		4	Y1C	Output 28
Y15	1	+24V	24V DC	Y1D	1	+24V	24V DC
	2	NC	Unused		2	NC	Unused
	3	NC	Unused		3	NC	Unused
	4	Y15	Output 21		4	Y1D	Output 29
Y16	1	+24V	24V DC	Y1E	1	+24V	24V DC
	2	NC	Unused		2	NC	Unused
	3	NC	Unused		3	NC	Unused
	4	Y16	Output 22		4	Y1E	Output 30
Y17	1	+24V	24V DC	Y1F	1	+24V	24V DC
	2	NC	Unused		2	NC	Unused
	3	NC	Unused		3	NC	Unused
	4	Y17	Output 23		4	Y1F	Output 31

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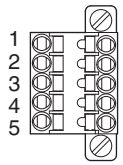
■ **POWER SUPPLY, SENSOR EXCITATION**
Cable connector: TFMC1,5 / 5–STF–3,5
(Phoenix Contact) (included in the package)
Applicable wire size: 0.2 – 1.5 mm²; stripped length 10 mm
Recommended solderless terminal
• AI0,25–10YE 0.25 mm² (Phoenix Contact)
• AI0,34–10TQ 0.34 mm² (Phoenix Contact)
• AI0,5–10WH 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.

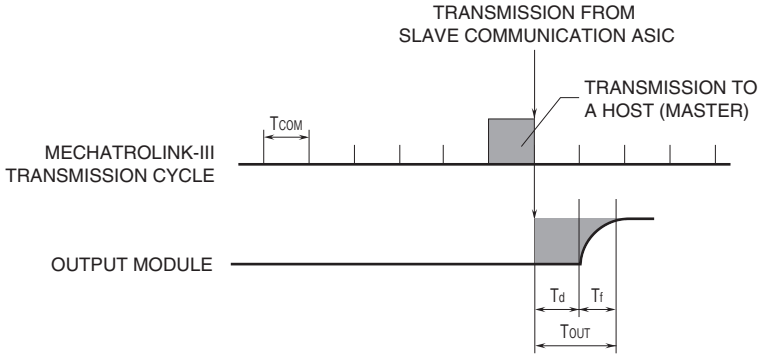
RESPONSE TIME

Response time of discrete 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_{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. 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.]



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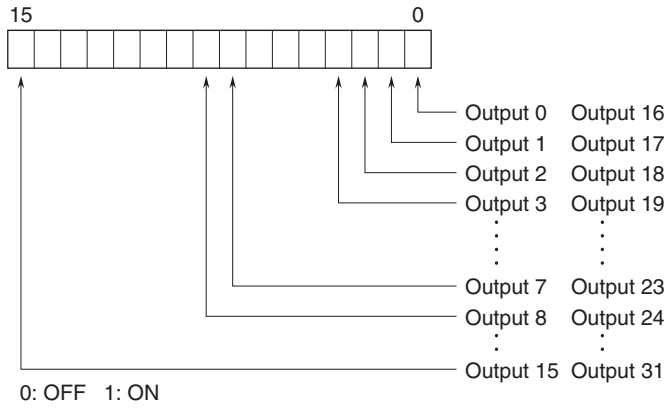
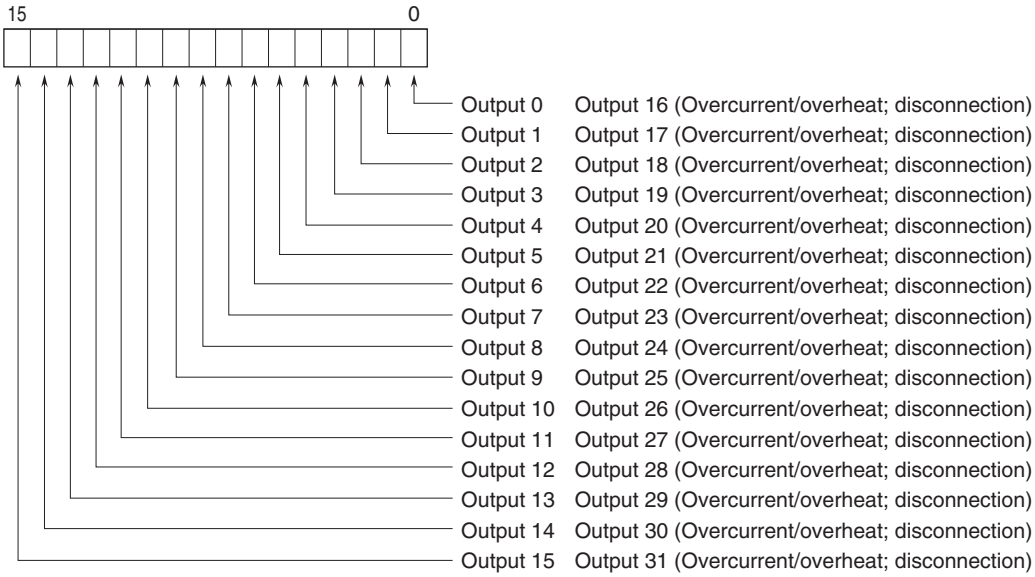
I/O DATA DESCRIPTIONS

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 OUTPUT**



■ **STATUS**



0 : Normal
1 : Detected the overcurrent/overheat and disconnection

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

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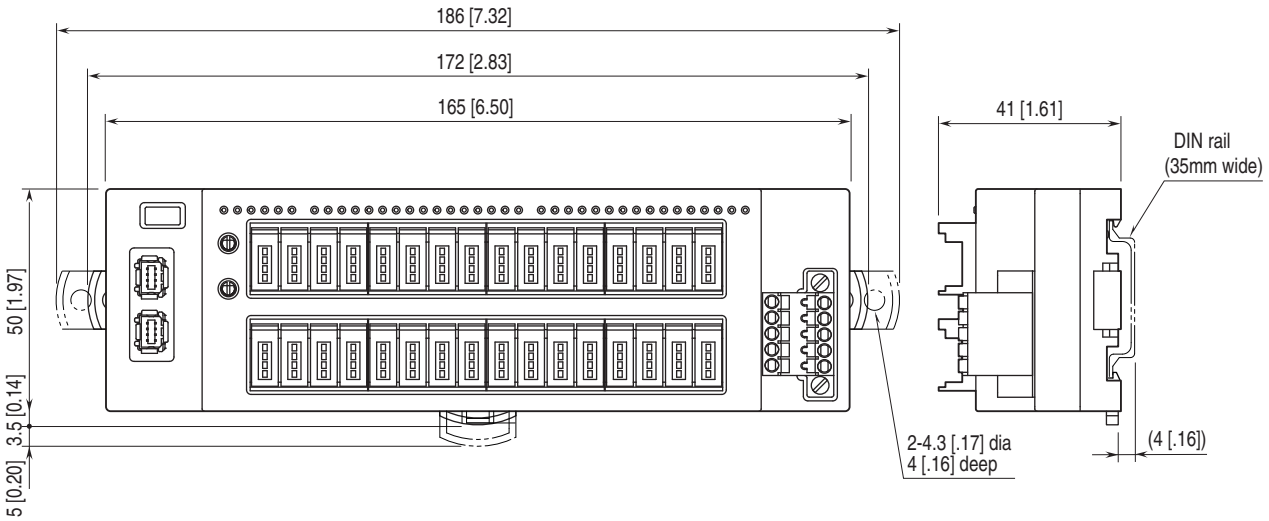
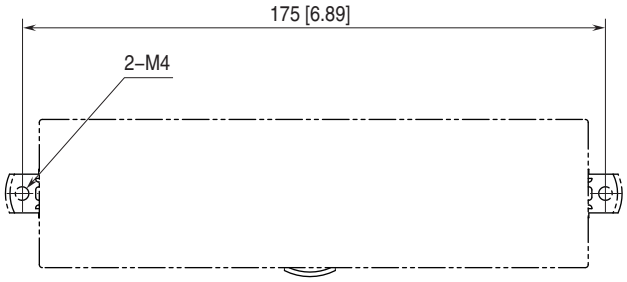
EXTERNAL DIMENSIONS unit: mm [inch]



MOUNTING REQUIREMENTS unit: mm [inch]



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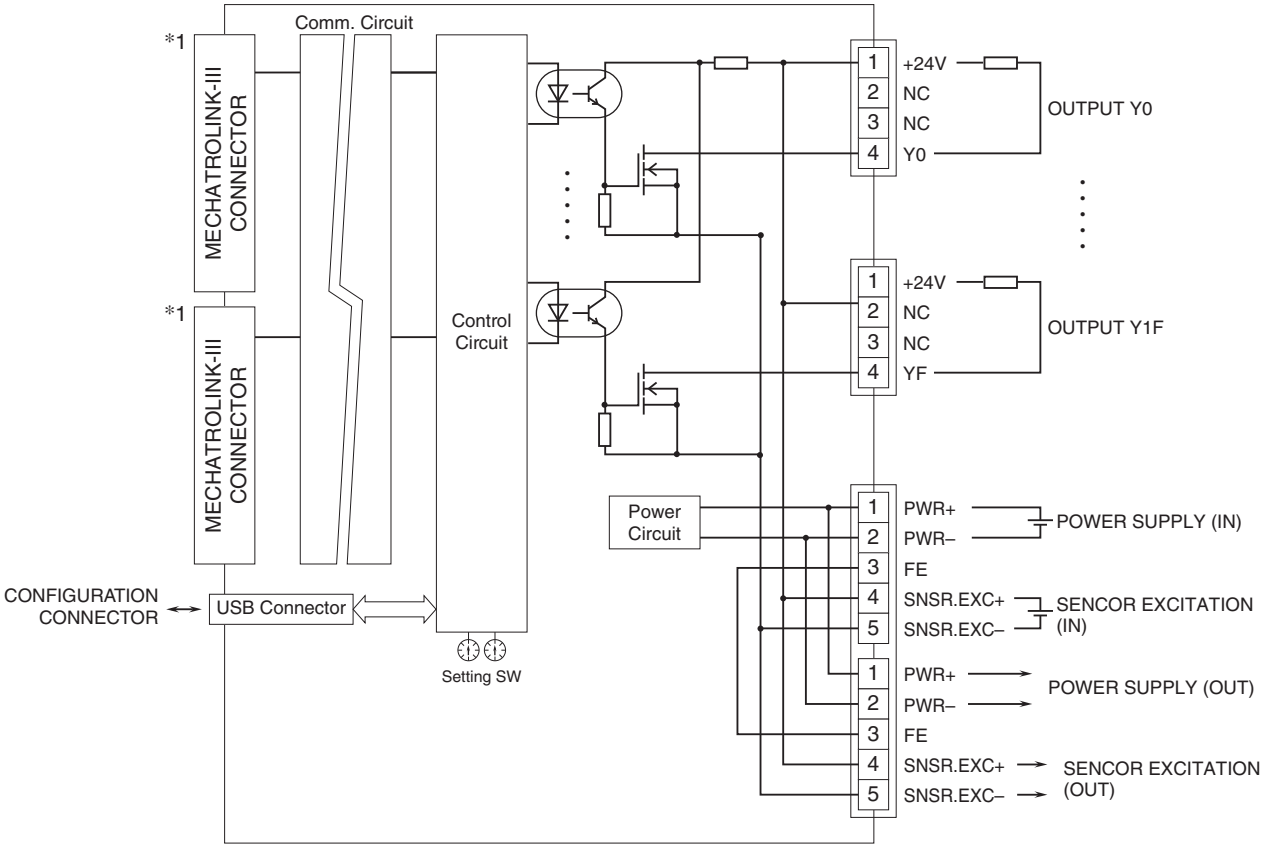
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

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.

⚠ Specifications are subject to change without notice.

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