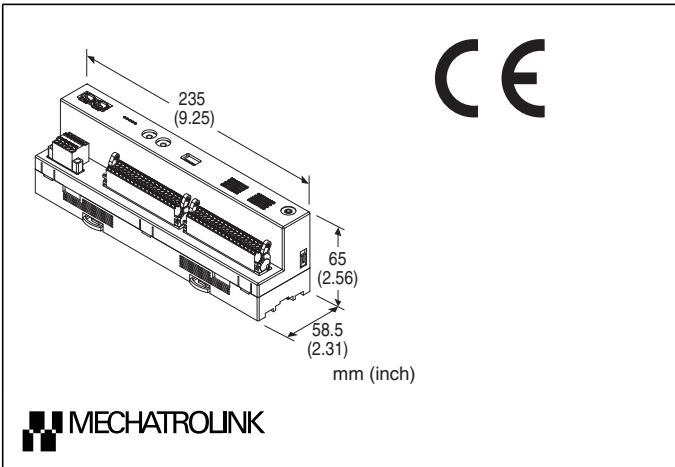


Remote I/O R7K4J Series

MECHATROLINK I/O MODULE

(MECHATROLINK-III)



MODEL: R7K4JML3-E-[1]-R[2]

ORDERING INFORMATION

- Code number: R7K4JML3-E-[1]-R[2]
Specify a code from below for each [1] and [2].
(e.g. R7K4JML3-E-DAFC64A-R/Q)
- Specify the specification for option code /Q
(e.g. /C01)

TERMINAL BLOCK: E

Tension clamp terminal block for power supply
Connector for MECHATROLINK-III for communication
Tension clamp terminal block for I/O

[1] I/O TYPE

DAFC64A: NPN/PNP discrete input, 32 points, high speed & NPN transistor output, 32 points

POWER INPUT

DC power

R: 24 V DC

(Operational voltage range: $\pm 10\%$; ripple 10 %p-p max.)

[2] OPTIONS

blank: none

/Q: With options (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to M-System's web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

FUNCTIONS & FEATURES

MECHATROLINK I/O module (this module), interfaces discrete I/Os and PLC or PC via MECHATROLINK-III.

GENERAL SPECIFICATIONS

• Common Specifications

Power input: 24 V DC $\pm 10\%$; ripple 10 %p-p max.

Insulation resistance: $\geq 100\text{ M}\Omega$ with 500 V DC

Dielectric strength: 1500 V AC @1 minute
(between isolated circuits)

Operating temperature: -10 to +55°C (14 to 131°F)

Operating humidity: 30 to 90 %RH (non-condensing)

Atmosphere: No corrosive gas or heavy dust

Storage temperature: -20 to +65°C (-4 to +149°F)

Mounting: DIN rail (35 mm wide) or wall

Connection

MECHATROLINK-III: MECHATROLINK-III connector

Power & I/O: Tension clamp terminal block

Housing material: Flame-resistant resin (gray)

Status indicator LEDs: PWR, ERR, CON, LNK1, LNK2
(Refer to the instruction manual for details)

■ Current Consumption & Weight

R7K4JML3-E-DAFC64A: Approx. 115 mA, 330 g (0.73 lb)
(Discrete I/O load charge is not included in the above-mentioned current consumption.)

MECHATROLINK-III COMMUNICATION

MECHATROLINK-III

Baud rate: 100 Mbps

Transmission distance: 6300 m max.

Distance between stations: 100 m max.

Transmission media: CAT5e STP

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 $\mu\text{sec.}$, 250 $\mu\text{sec.}$, 500 $\mu\text{sec.}$, 1 - 64 msec. (with 1 msec. increments)

Communication cycle: 125 $\mu\text{sec.}$ 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

Slave monitoring: None

STANDARDS & APPROVALS

EU conformity:

EMC Directive

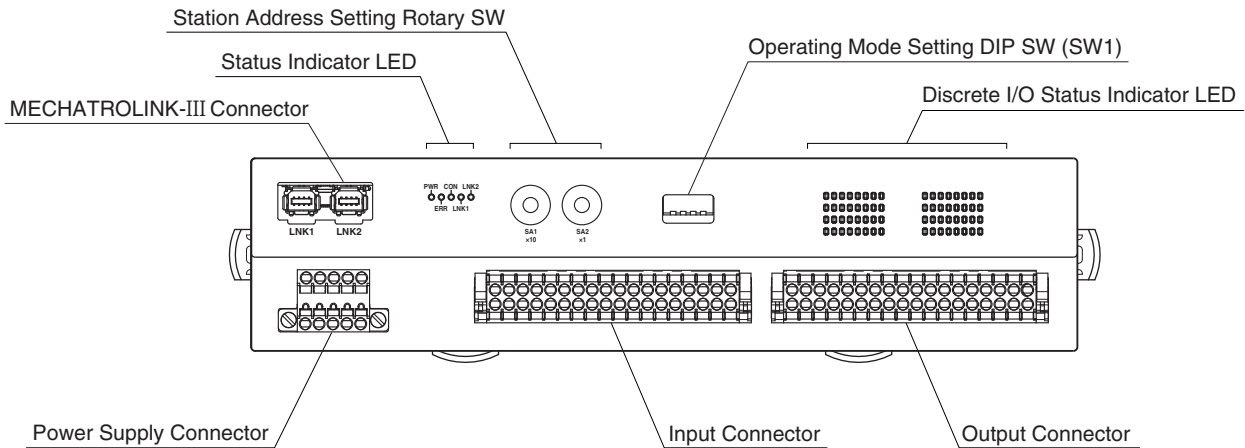
EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

EN 50581

EXTERNAL VIEW



CONNECTION DIAGRAMS

■ I/O Connection

(Refer to the detailed specification for terminal assignment.)

Applicable connector: DFMC1,5/18-ST-3,5-LR (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)

■ POWER SUPPLY

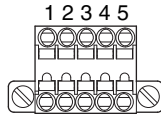
Applicable connector: TFMC1,5 / 5-STF-3,5(Phoenix Contact)

(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. 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

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.

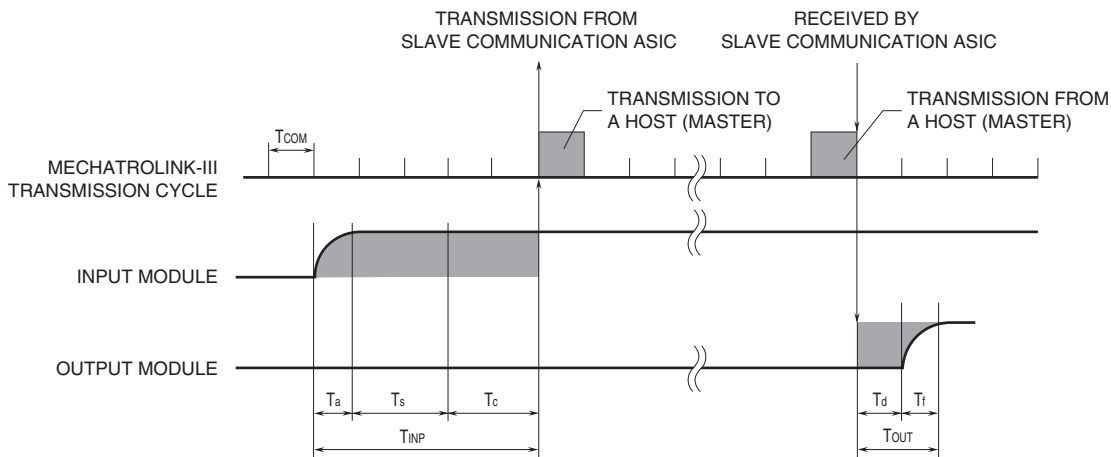
T_{COM} : MECHATROLINK-III transmission cycle set at master
(depends on system and configuration)

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)

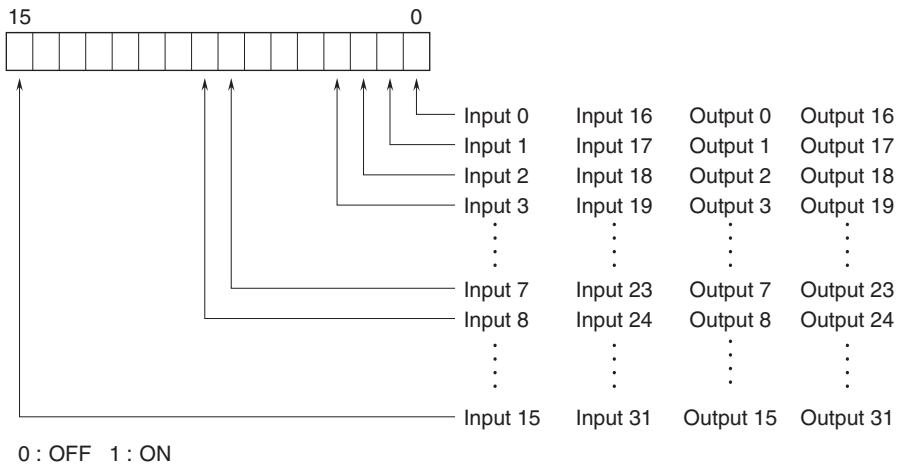
E.g. 1: R7K4JML3-E-DAFC64A: Acquire cycle: 0.1 msec., MECHATROLINK-III transmission cycle: 0.125 msec., discrete input ON
Response of input module (T_{INP}): Delay of input circuit (0.2 msec.) + Acquire cycle (0.1 msec.) + input internal processing delay time (0.125 msec. x 2) = 0.55 [msec.]

E.g. 2: R7K4JML3-E-DAFC64A: 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.]

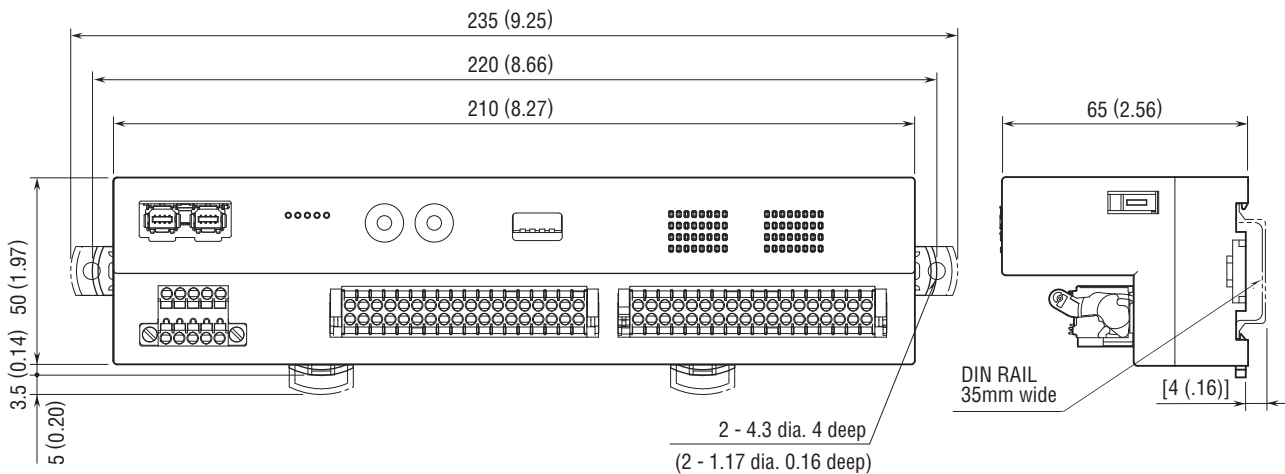


I/O DATA DESCRIPTIONS

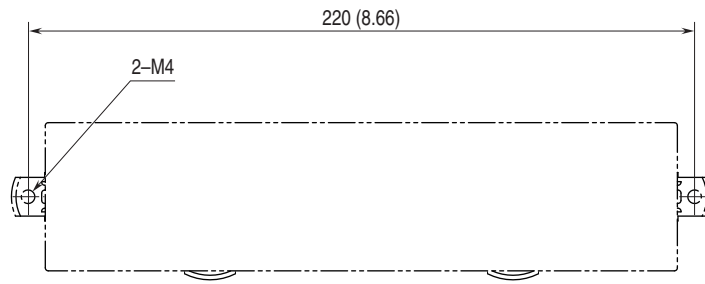
DISCRETE I/O



DIMENSIONS unit: mm (inch)



MOUNTING REQUIREMENTS unit: mm (inch)



NPN/PNP DISCRETE INPUT, 32 points, HIGH SPEED & NPN TRANSISTOR OUTPUT, 32 points

(Tension clamp terminal block)

MODEL: R7K4JML3-E-DAFC64A

SPECIFICATIONS

COMMON SPECIFICATIONS

Number of I/O: Input, 32 points; Output, 32 points
Maximum I/O applicable at once: No limit (at 24 V DC)
I/O status indicator: Green LED turns ON with contact ON
Isolation: Input to output to MECHATROLINK or FE to power input

INPUT

Input Common: Positive or negative common (NPN/PNP) per 32 points
Rated input voltage: 24 V DC $\pm 10\%$; 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 k Ω
ON delay: ≤ 0.2 msec.
OFF delay: ≤ 0.5 msec.

OUTPUT

Output common: Negative common (NPN) per 32 points
Rated load voltage: 24 V DC $\pm 10\%$ (ripple 5 %p-p max.)
Rated output current: 0.1 A per point, 3.2 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 output when overheat is detected

OPERATING MODE SETTING

(*) Factory setting

Acquire Cycle (SW-1, 2, 3)

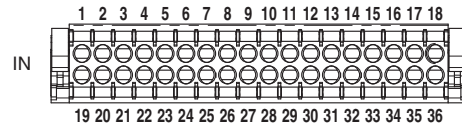
SW1-1	SW1-2	SW1-3	Acquire cycle
OFF	OFF	OFF	≤ 100 μ sec. (*)
ON	OFF	OFF	≤ 200 μ sec.
OFF	ON	OFF	≤ 400 μ sec.
ON	ON	OFF	≤ 800 μ sec.
OFF	OFF	ON	≤ 4 msec.
ON	OFF	ON	≤ 8 msec.
OFF	ON	ON	≤ 16 msec.
ON	ON	ON	≤ 40 msec.

Output at the Loss of Communication (SW1-4)

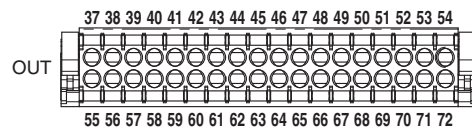
SW1-4	Output at the loss of communication
OFF	Reset the output (turned off)
ON	Hold the output (*) (maintains the last data received normally)

TERMINAL ASSIGNMENTS

I/O Terminal



NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	COM	In. Common	19	COM	In. Common
2	COM	In. Common	20	COM	In. Common
3	X0	Input 0	21	X16	Input 16
4	X1	Input 1	22	X17	Input 17
5	X2	Input 2	23	X18	Input 18
6	X3	Input 3	24	X19	Input 19
7	X4	Input 4	25	X20	Input 20
8	X5	Input 5	26	X21	Input 21
9	X6	Input 6	27	X22	Input 22
10	X7	Input 7	28	X23	Input 23
11	X8	Input 8	29	X24	Input 24
12	X9	Input 9	30	X25	Input 25
13	X10	Input 10	31	X26	Input 26
14	X11	Input 11	32	X27	Input 27
15	X12	Input 12	33	X28	Input 28
16	X13	Input 13	34	X29	Input 29
17	X14	Input 14	35	X30	Input 30
18	X15	Input 15	36	X31	Input 31

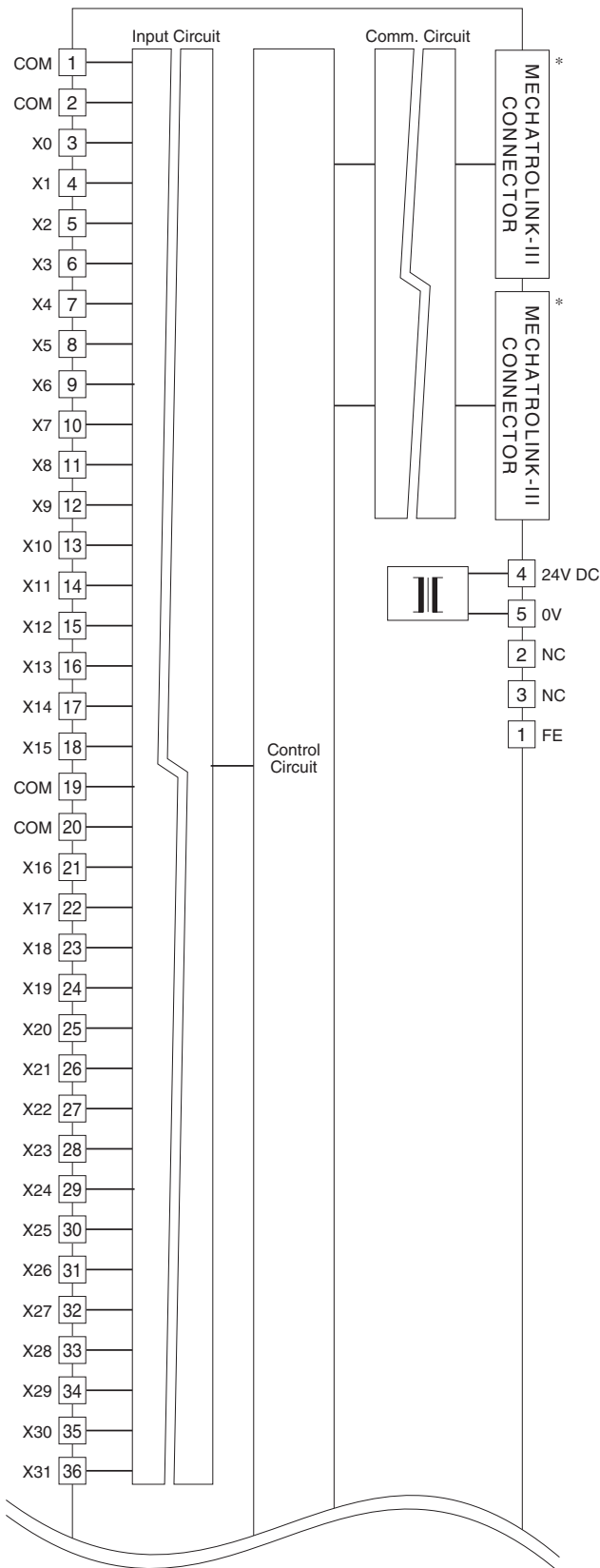


NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	V+	External excitation	19	V+	External excitation
2	V-	Out. Common	20	V-	Out. Common
3	Y0	Output 0	21	Y16	Output 16
4	Y1	Output 1	22	Y17	Output 17
5	Y2	Output 2	23	Y18	Output 18
6	Y3	Output 3	24	Y19	Output 19
7	Y4	Output 4	25	Y20	Output 20
8	Y5	Output 5	26	Y21	Output 21
9	Y6	Output 6	27	Y22	Output 22
10	Y7	Output 7	28	Y23	Output 23
11	Y8	Output 8	29	Y24	Output 24
12	Y9	Output 9	30	Y25	Output 25
13	Y10	Output 10	31	Y26	Output 26
14	Y11	Output 11	32	Y27	Output 27
15	Y12	Output 12	33	Y28	Output 28
16	Y13	Output 13	34	Y29	Output 29
17	Y14	Output 14	35	Y30	Output 30
18	Y15	Output 15	36	Y31	Output 31

SCHEMATIC CIRCUITRY

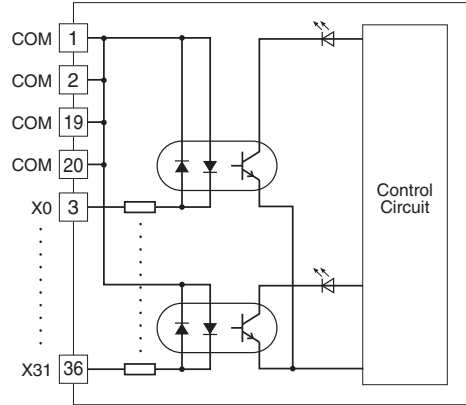
Note: In order to improve EMC performance, bond the FE terminal to ground.

Caution: FE terminal is NOT a protective conductor terminal.

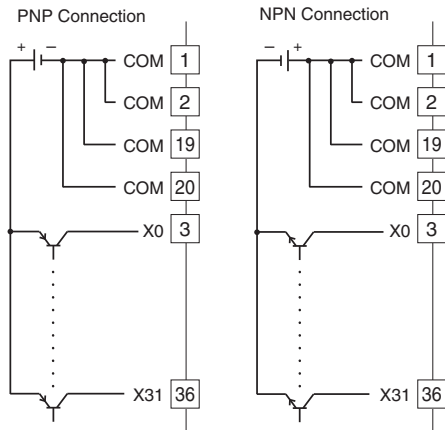


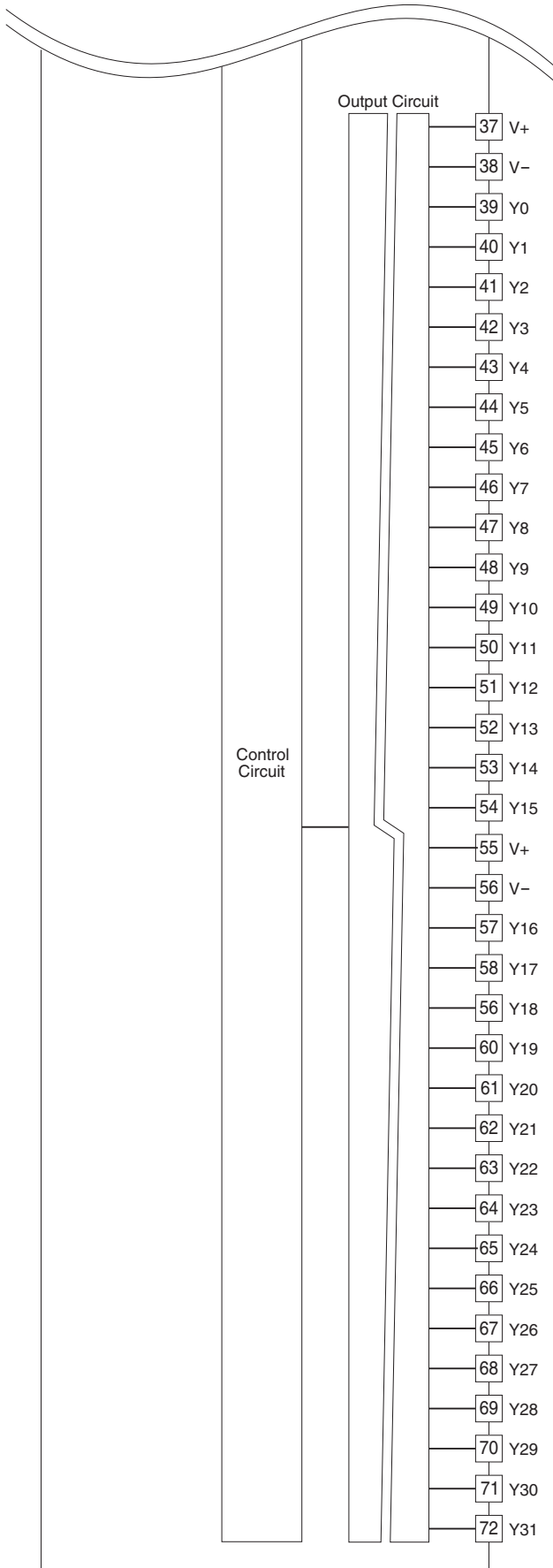
* The network cable can be connected to either one.

Input Circuit

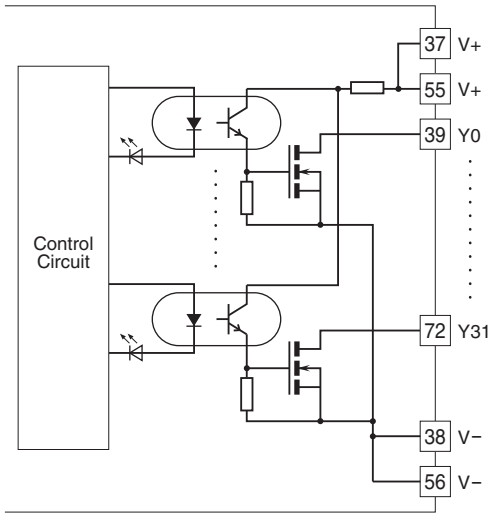


Input Connection Examples

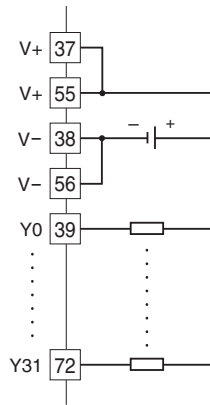




■ Output Circuit



■ Output Connection Examples





Specifications are subject to change without notice.