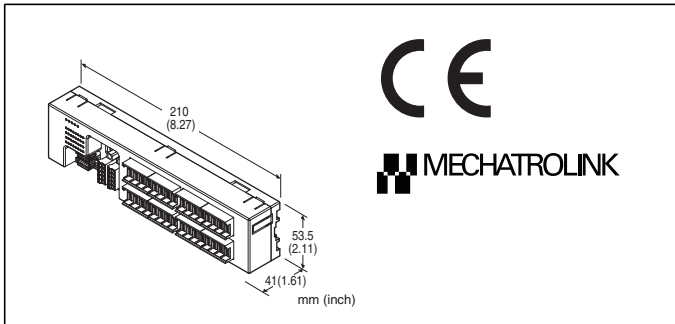


Remote I/O R7K4D Series

MECHATROLINK I/O MODULE

(MECHATROLINK-I/-II)



MODEL: R7K4DML-B-[1]-R[2]

ORDERING INFORMATION

- Code number: R7K4DML-B-[1]-R[2]
Specify a code from below for each [1] and [2].
(e.g. R7K4DML-B-DAC32A-R/Q)
- Specify the specification for option code /Q
(e.g. /C01)

TERMINAL BLOCK

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

[1] I/O TYPE

- DA32A:** NPN discrete input, 32 points
- DA32B:** PNP discrete input, 32 points
- DAC32A:** PNP discrete input & NPN transistor output, 16 points each
- DAC32B:** NPN discrete input & PNP transistor output, 16 points each
- DAC32C:** NPN discrete input & NPN transistor output, 16 points each
- DAC32D:** PNP discrete input & PNP transistor output, 16 points each

POWER INPUT

DC Power

R: 24 V DC

(Operational voltage range 24 V \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

R7K4DML, complying with MECHATROLINK-I/-II Simple I/O specifications, interfaces discrete I/Os via PLC or PC, and MECHATROLINK.

GENERAL SPECIFICATIONS

• Common Specifications

Power input: 24 V DC \pm 10 %; ripple 10 %p-p max., connector current rating 2 A

Sensor excitation: 24 V DC \pm 10 %; ripple 5 %p-p max., \leq 2 A (including discrete I/O load charge); rated current 8 A

Insulation resistance: \geq 100 M Ω with 500 V DC

Operating temperature: 0 to 55°C (32 to 131°F)

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

Atmosphere: No corrosive gas or heavy dust

Mounting: DIN rail (35 mm wide) or wall

Connection

MECHATROLINK: MECHATROLINK-I/-II connector

Power supply: Tension clamp terminal block

I/O: e-CON connector

Status indicator LEDs: PWR, ERR, SD, RD (Refer to the instruction manual for details)

■ Current Consumption & Weight

R7K4DML-B-DA32A: Approx. 60 mA/200 g (0.44 lb)

R7K4DML-B-DA32B: Approx. 60 mA/200 g (0.44 lb)

R7K4DML-B-DAC32A: Approx. 75 mA/200 g (0.44 lb)

R7K4DML-B-DAC32B: Approx. 75 mA/200 g (0.44 lb)

R7K4DML-B-DAC32C: Approx. 75 mA/200 g (0.44 lb)

R7K4DML-B-DAC32D: Approx. 75 mA/200 g (0.44 lb)

(Discrete I/O load charge is not included in the above-mentioned current consumption.)

MECHATROLINK COMMUNICATION

MECHATROLINK:

Mode: Set with DIP switches

(MECHATROLINK-I or -II, data length; Factory setting:

MECHATROLINK-II, data length 32 byte)

(Refer to the manual)

Station address: 60H - 7FH

(Function selected with Rotary SW. Factory setting: 61H).

(Refer to the manual)

■ MECHATROLINK-I

Baud rate: 4 Mbps

Transmission distance: 50 m max.

Distance between stations: 30 cm min.

Transmission media: MECHATROLINK cable (Model JEPMC-W6003-x-E, Yaskawa Controls Co., Ltd.)

Max. number of slaves: 15

(The maximum number of slaves might change depending on the master unit. Refer to the manual of the master unit.)

Transmission cycle: 2 msec. (fixed)

Data length: 17 byte

■ MECHATROLINK-II

Baud rate: 10 Mbps

Transmission distance: 50 m max.

Distance between stations: 50 cm min.

Transmission media: MECHATROLINK cable (Model JEPMC-W6003-x-E, Yaskawa Controls Co., Ltd.)

Max. number of slaves: 30

(The maximum number of slaves might change depending on the master unit. Refer to the manual of the master unit.)

Transmission cycle: 0.25 msec., 0.5 msec., 1 msec., 1.5 msec., 2 msec., 2.5 msec., 3 msec., 4 msec., 8 msec.

Data length: 17 byte / 32 byte selectable (Must choose identical data size for all stations within the network)

STANDARDS & APPROVALS

EU conformity:

EMC Directive

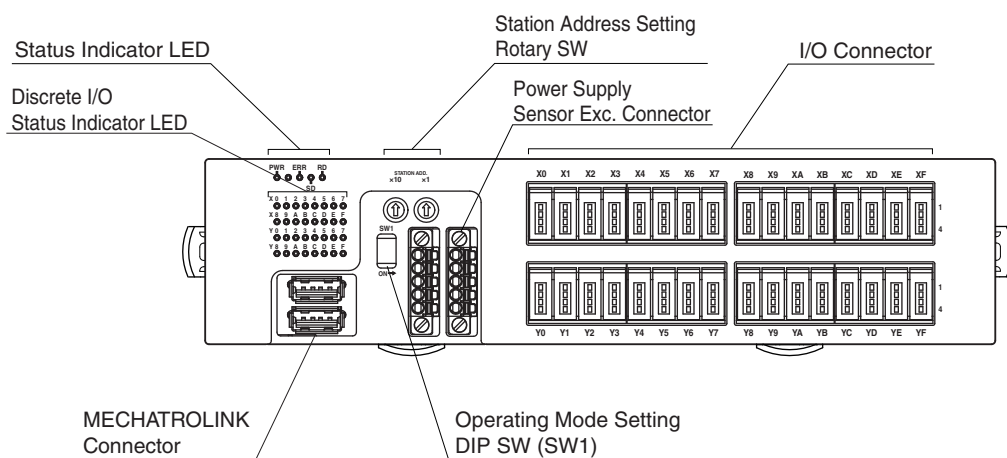
EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

EN 50581

EXTERNAL VIEW



CONNECTION DIAGRAMS

■ I/O connection (Refer to each model 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.)

■ POWER SUPPLY, SENSOR EXCITATION

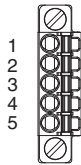
Cable connector: FMC1,5 / 5-STF-3,5

(Phoenix Contact) (included in the package)

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

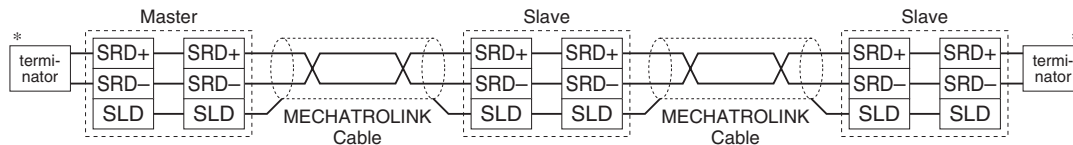
Recommended solderless terminal

- 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 (24 V DC) |
| 2. | PWR- | Power Supply (0 V) |
| 3. | FE | Functional earth |
| 4. | SNSR.EXC+ | Sensor excitation (24 V DC) |
| 5. | SNSR.EXC- | Sensor excitation (0 V) |

■ MECHATROLINK CONNECTION



*Terminator

Be sure to connect the terminating resistors to the unit at both ends of transmission line.

Use the terminating resistor dedicated for MECHATROLINK: Model JEPMC-W6022, Yaskawa Controls Co., Ltd.

Certain types of Master units may have incorporated terminating resistors. Consult the instruction manual for the Master.

MECHATROLINK RELATED COMMANDS

R7K4DML (Simple I/O) communicates with I/O service with no processor, therefore it uses a connectionless communication protocol. There is no application layer either; the R7K4DML interchanges I/O data via data link layer.

■ MECHATROLINK DATA LINK LAYER COMMAND DESCRIPTIONS

The following tables explain the two Commands supported by the R7K4DML.

• MDS Command (04H) Data Format

BYTE	COMMAND	RESPONSE	REMARKS
0	MDS (04H)	S(0) (90H)	Message Data Search (MDS) Command: Read the ID from slave station(s) S(0): Response to MDS
1	0	ID	
2	0		
3	0	0	All 0
4	0	0	
5	0	0	
6	0	0	
7	0	0	
8	0	0	
9	0	0	
10	0	0	
11	0	0	
12	0	0	
13	0	0	
14	0	0	
15	0	0	
16	0	0	
17	0	0	Byte 17 through 31 are always 0 in the 32-byte mode. These bytes are unavailable for MECHATROLINK-I and MECHATROLINK-II in the 17-byte mode.
:	:	:	
31	0	0	

• CDRW Command (03H) Data Format

BYTE	COMMAND	RESPONSE	REMARKS
0	CDRW (03H)	ACK (01H)	Cyclic Data Read/Write (CDRW) Command: Link transmission Acknowledge (ACK): Positive response to CDRW
1	Out Data: Lowest	In Data: Lowest	Order of data: Little Endian
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17	(Out Data: Highest)	(In Data: Highest)	Byte 17 through 31 are unavailable for MECHATROLINK-I and MECHATROLINK-II in the 17-byte mode. (Only available for MECHATROLINK-II in the 32-byte mode)
:			
31			

I/O DATA DESCRIPTIONS

■ 17-BYTE MODE

•16 points input data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
1	In7	In6	In5	In4	In3	In2	In1	In0
2	In15	In14	In13	In12	In11	In10	In9	In8
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
⋮	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0

•16 points output data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
⋮	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	Out7	Out6	Out5	Out4	Out3	Out2	Out1	Out0
16	Out15	Out14	Out13	Out12	Out11	Out10	Out9	Out8

•32 points input data (In Data)

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
1	In7	In6	In5	In4	In3	In2	In1	In0
2	In15	In14	In13	In12	In11	In10	In9	In8
3	In23	In22	In21	In20	In19	In18	In17	In16
4	In31	In30	In29	In28	In27	In26	In25	In24
5	0	0	0	0	0	0	0	0
⋮	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0

■ 32-BYTE MODE

•16 points input data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
1	In7	In6	In5	In4	In3	In2	In1	In0
2	In15	In14	In13	In12	In11	In10	In9	In8
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
⋮	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0

•16 points output data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
⋮	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
31	Out7	Out6	Out5	Out4	Out3	Out2	Out1	Out0
32	Out15	Out14	Out13	Out12	Out11	Out10	Out9	Out8

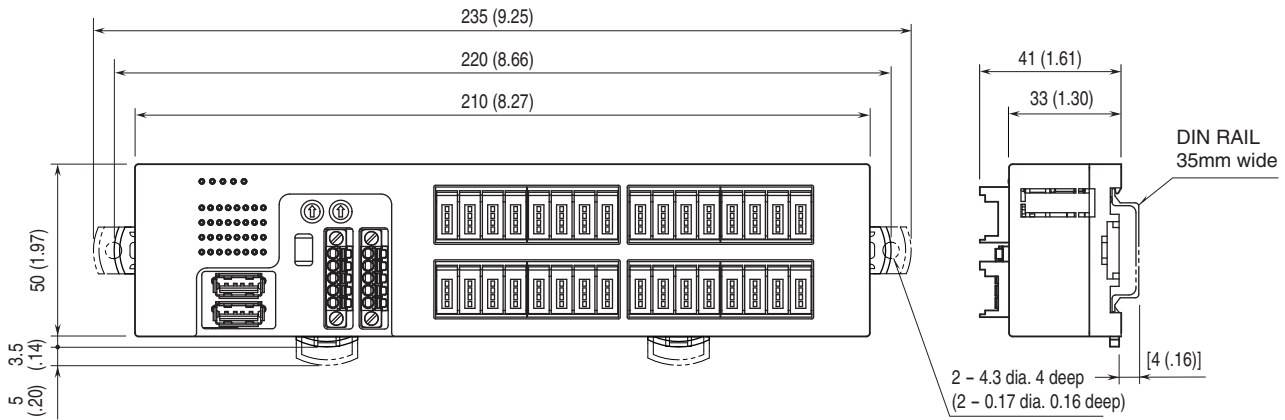
•32 points input data (In Data)

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
1	In7	In6	In5	In4	In3	In2	In1	In0
2	In15	In14	In13	In12	In11	In10	In9	In8
3	In23	In22	In21	In20	In19	In18	In17	In16
4	In31	In30	In29	In28	In27	In26	In25	In24
5	0	0	0	0	0	0	0	0
⋮	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0

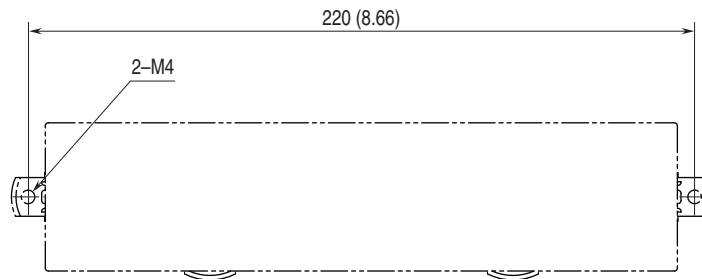
0: OFF, 1: ON

At the loss of communication, output is hold. (last data correctly received is hold)

DIMENSIONS unit: mm (inch)



MOUNTING REQUIREMENTS unit: mm (inch)



NPN DISCRETE INPUT MODULE, 32 points

(e-CON connector)

MODEL: R7K4DML-B-DA32A**SPECIFICATIONS****Common:** Positive common (NPN) per 32 points**Number of I/O:** Input, 32 points**Maximum inputs applicable at once:** No limit (at 24 V DC)**Input status indicator:** Green LED turns ON with contact ON**Isolation:** Input or sensor excitation to MECHATROLINK or FE to power input**Dielectric strength:** 1500 V AC @ 1 minute (input or sensor excitation to power)

500 V AC @ 1 minute (MECHATROLINK or FE to input or sensor excitation or power)

■ INPUT**ON voltage / current:** ≥ 18 V DC (Input's X0 through X1F to +24 V) / ≥ 2.0 mA**OFF voltage / current:** ≤ 9 V DC (Input's X0 through X1F to +24 V) / ≤ 1.0 mA**Input current:** ≤ 3.0 mA per point at 24 V DC**Input resistance:** Approx. 8.6 k Ω **ON delay:** ≤ 0.5 msec.**OFF delay:** ≤ 1.0 msec.**OPERATING MODE SETTING****■ MECHATROLINK MODE**

Set either MECHATROLINK-I or -II, and the data size with SW1-1 and SW1-2.

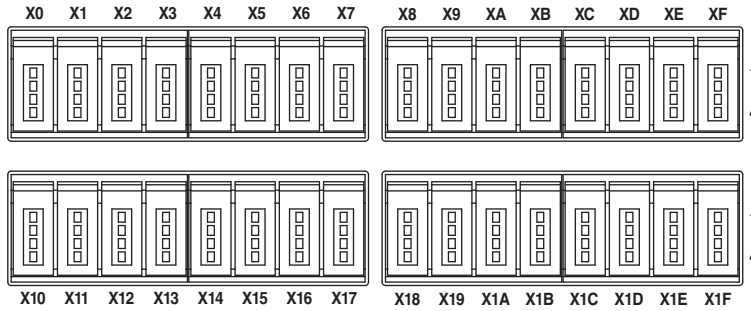
SW1-1	SW1-2	MECHATROLINK
OFF	OFF	MECHATROLINK-II (32 byte mode) (*)
ON	OFF	MECHATROLINK-II (17 byte mode)
ON	ON	MECHATROLINK-I (17 byte mode)

(*) Factory setting

Caution ! - Since SW1-3 and SW1-4 are unused, be sure to turn them off.

TERMINAL ASSIGNMENTS

■ Input terminal



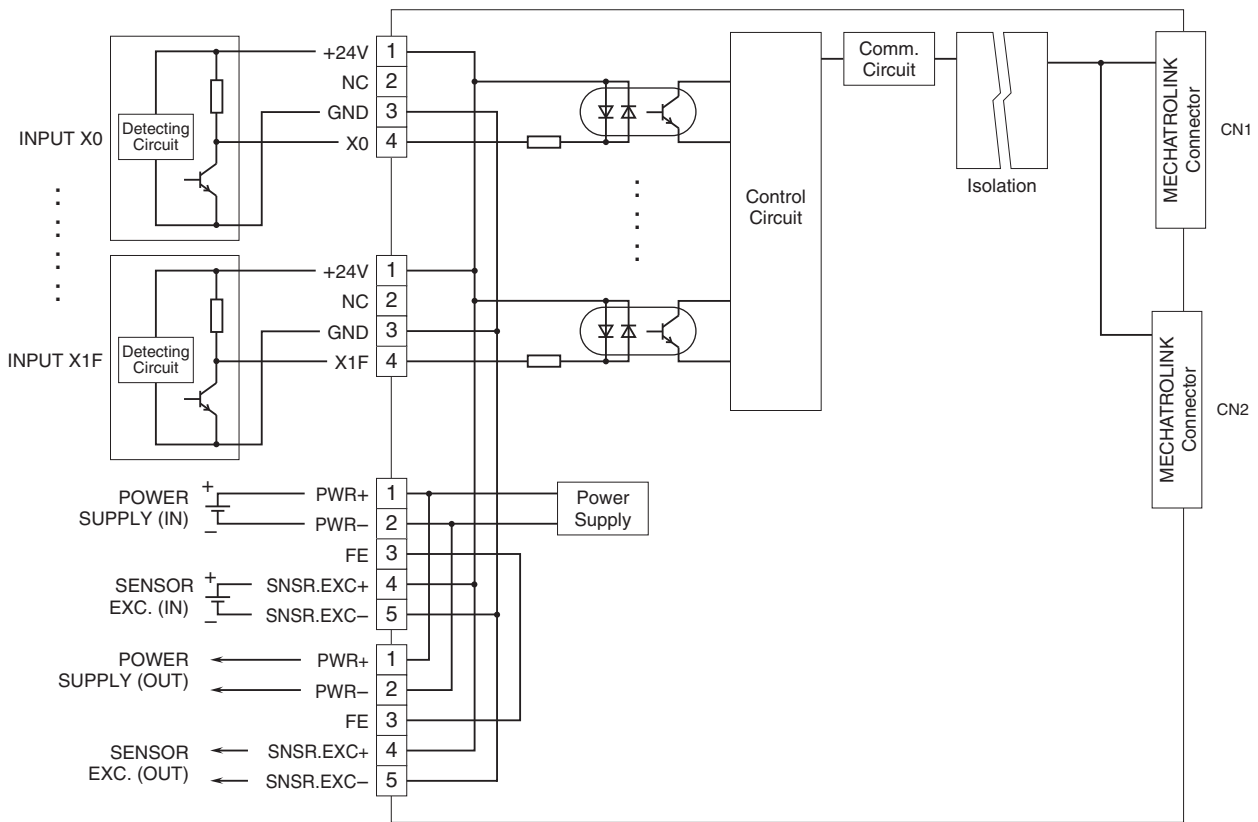
No.	ID	FUNCTION	No.	ID	FUNCTION
X0	1	+24V 24V DC	X8	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X0 Input 0		4	X8 Input 8
X1	1	+24V 24V DC	X9	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X1 Input 1		4	X9 Input 9
X2	1	+24V 24V DC	XA	1	+24V 24V DC
	2	NC Unused		2	NC 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

No.	ID	FUNCTION	No.	ID	FUNCTION
X10	1	+24V 24V DC	X18	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X10 Input 16		4	X18 Input 24
X11	1	+24V 24V DC	X19	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X11 Input 17		4	X19 Input 25
X12	1	+24V 24V DC	X1A	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X12 Input 18		4	X1A Input 26
X13	1	+24V 24V DC	X1B	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X13 Input 19		4	X1B Input 27
X14	1	+24V 24V DC	X1C	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X14 Input 20		4	X1C Input 28
X15	1	+24V 24V DC	X1D	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X15 Input 21		4	X1D Input 29
X16	1	+24V 24V DC	X1E	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X16 Input 22		4	X1E Input 30
X17	1	+24V 24V DC	X1F	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X17 Input 23		4	X1F Input 31

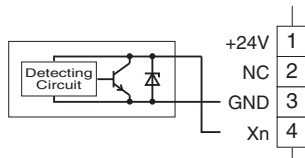
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

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

Caution: FE terminal is NOT a protective conductor terminal.



■ 2-Wire Sensor



PNP DISCRETE INPUT MODULE, 32 points

(e-CON connector)

MODEL: R7K4DML-B-DA32B**SPECIFICATIONS****Common:** Negative common (PNP) per 32 points**Number of I/O:** Input, 32 points**Maximum inputs applicable at once:** No limit (at 24 V DC)**Input status indicator:** Green LED turns ON with contact ON**Isolation:** Input or sensor excitation to MECHATROLINK or FE to power input**Dielectric strength:** 1500 V AC @ 1 minute (input or sensor excitation to power)

500 V AC @ 1 minute (MECHATROLINK or FE to input or sensor excitation or power)

■ INPUT**ON voltage / current:** ≥ 18 V DC (Input's X0 through X1F to GND) / ≥ 2.0 mA**OFF voltage / current:** ≤ 9 V DC (Input's X0 through X1F to GND) / ≤ 1.0 mA**Input current:** ≤ 3.0 mA per point at 24 V DC**Input resistance:** Approx. 8.6 k Ω **ON delay:** ≤ 0.5 msec.**OFF delay:** ≤ 1.0 msec.**OPERATING MODE SETTING****■ MECHATROLINK MODE**

Set either MECHATROLINK-I or -II, and the data size with SW1-1 and SW1-2.

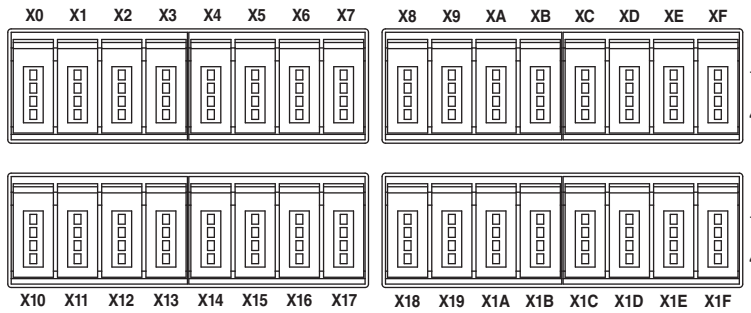
SW1-1	SW1-2	MECHATROLINK
OFF	OFF	MECHATROLINK-II (32 byte mode) (*)
ON	OFF	MECHATROLINK-II (17 byte mode)
ON	ON	MECHATROLINK-I (17 byte mode)

(*) Factory setting

Caution ! - Since SW1-3 and SW1-4 are unused, be sure to turn them off.

TERMINAL ASSIGNMENTS

■ Input terminal



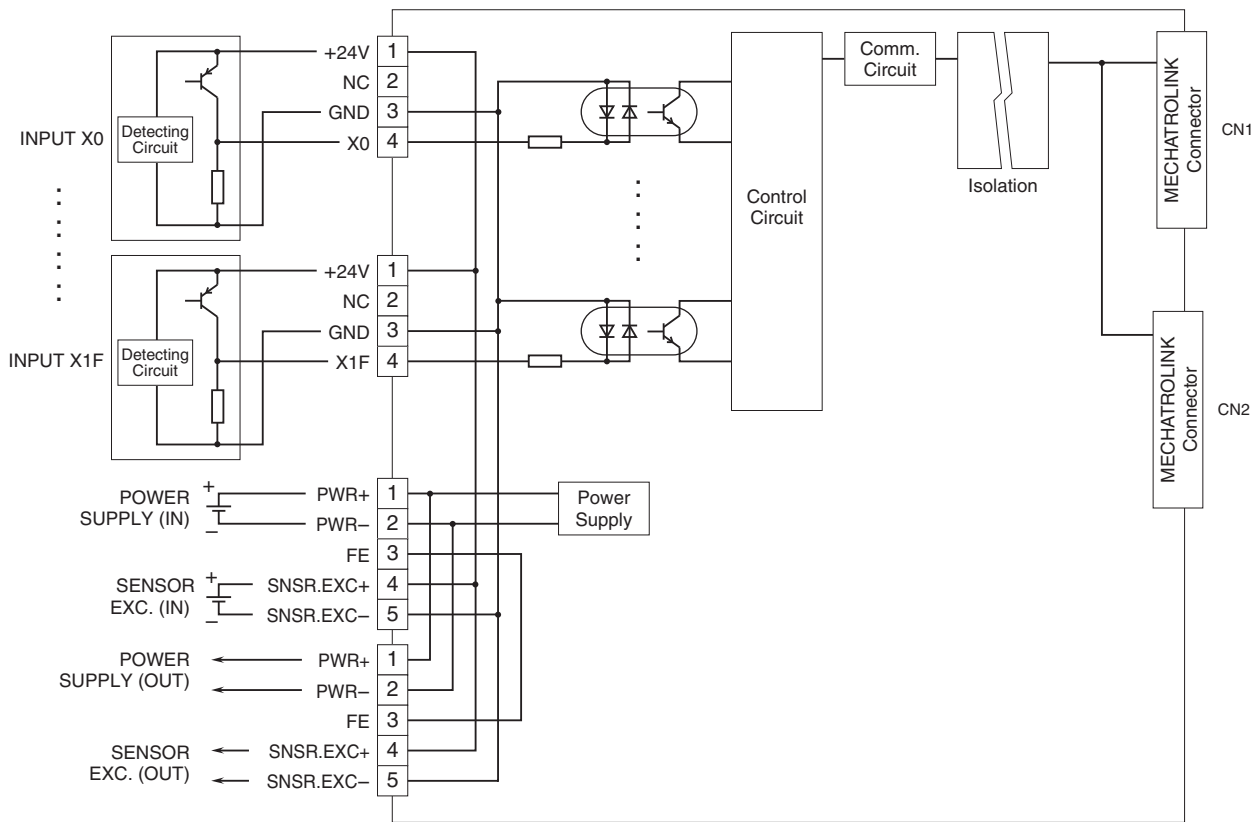
No.	ID	FUNCTION	No.	ID	FUNCTION
X0	1	+24V 24V DC	X8	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X0 Input 0		4	X8 Input 8
X1	1	+24V 24V DC	X9	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X1 Input 1		4	X9 Input 9
X2	1	+24V 24V DC	XA	1	+24V 24V DC
	2	NC Unused		2	NC 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

No.	ID	FUNCTION	No.	ID	FUNCTION
X10	1	+24V 24V DC	X18	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X10 Input 16		4	X18 Input 24
X11	1	+24V 24V DC	X19	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X11 Input 17		4	X19 Input 25
X12	1	+24V 24V DC	X1A	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X12 Input 18		4	X1A Input 26
X13	1	+24V 24V DC	X1B	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X13 Input 19		4	X1B Input 27
X14	1	+24V 24V DC	X1C	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X14 Input 20		4	X1C Input 28
X15	1	+24V 24V DC	X1D	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X15 Input 21		4	X1D Input 29
X16	1	+24V 24V DC	X1E	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X16 Input 22		4	X1E Input 30
X17	1	+24V 24V DC	X1F	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X17 Input 23		4	X1F Input 31

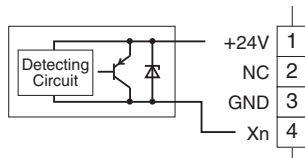
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

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

Caution: FE terminal is NOT a protective conductor terminal.



■ 2-Wire Sensor



PNP DISCRETE INPUT &

NPN TRANSISTOR OUTPUT MODULE, 16 points each
(e-CON connector)

MODEL: R7K4DML-B-DAC32A

SPECIFICATIONS

COMMON SPECIFICATIONS

Common: Negative common per 32 points

Input rating/load voltage: 24 V DC $\pm 10\%$, ripple 5 %p-p max.

Number of I/O: Input, 16 points; Output, 16 points

Maximum I/O applicable at once: No limit (at 24 V DC)

I/O status indicator: LED turns ON with contact ON

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

Dielectric strength: 1500 V AC @ 1 minute (input or output or sensor excitation to power)

500 V AC @ 1 minute (MECHATROLINK or FE to input or output or sensor excitation or power)

INPUT

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

OFF voltage / current: ≤ 5 V DC (X0 through XF to GND) / ≤ 1 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: ≤ 1.0 msec.

OUTPUT

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: ≤ 0.5 msec.

OFF delay: ≤ 1.0 msec.

Overload current protection function: Limits the current value when overcurrent is detected

Overheat Protection Function:

Turns OFF the output when overheat is detected

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

OPERATING MODE SETTING

MECHATROLINK MODE

Set either MECHATROLINK-I or -II, and the data size with SW1-1 and SW1-2.

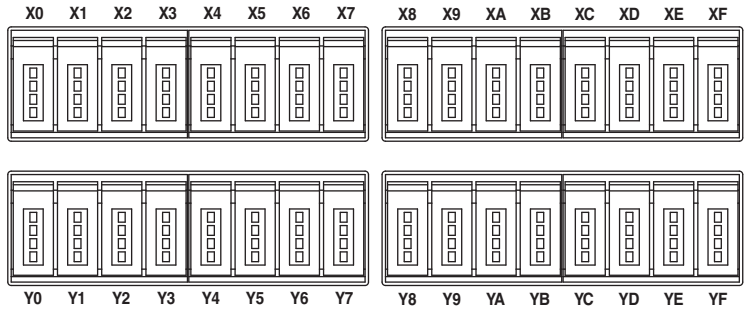
SW1-1	SW1-2	MECHATROLINK
OFF	OFF	MECHATROLINK-II (32 byte mode) (*)
ON	OFF	MECHATROLINK-II (17 byte mode)
ON	ON	MECHATROLINK-I (17 byte mode)

(*) Factory setting

Caution ! - Since SW1-3 and SW1-4 are unused, be sure to turn them off.

TERMINAL ASSIGNMENTS

■ I/O terminal



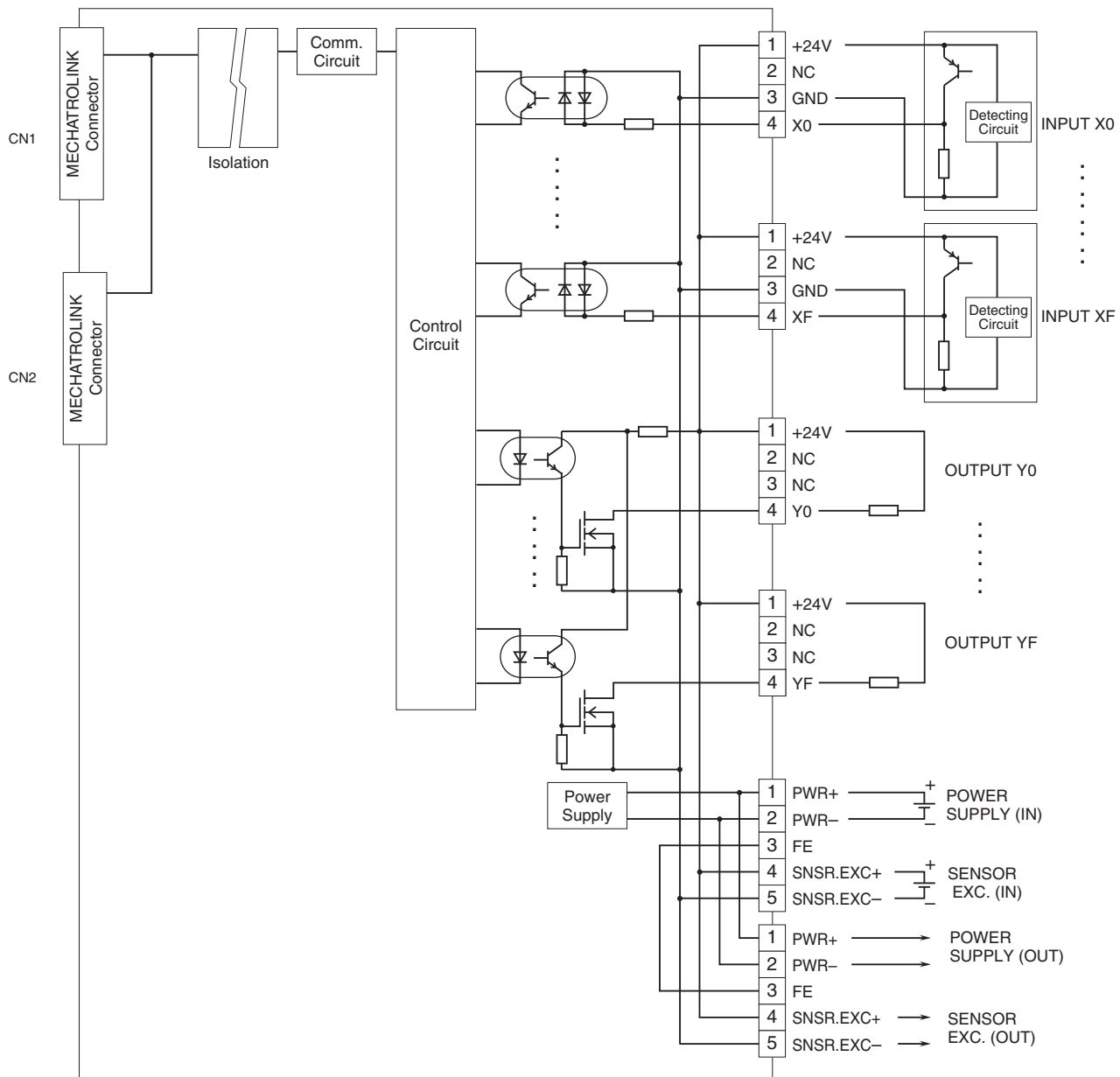
No.	ID	FUNCTION	No.	ID	FUNCTION
X0	1	+24V 24V DC	X8	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X0 Input 0		4	X8 Input 8
X1	1	+24V 24V DC	X9	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X1 Input 1		4	X9 Input 9
X2	1	+24V 24V DC	XA	1	+24V 24V DC
	2	NC Unused		2	NC 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

No.	ID	FUNCTION	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

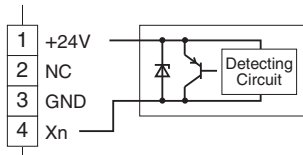
SCHEMATIC CIRCUITRY

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

Caution: FE terminal is NOT a protective conductor terminal.



■ 2-Wire Sensor



**NPN DISCRETE INPUT &
PNP TRANSISTOR OUTPUT MODULE, 16 points each**
(e-CON connector)

MODEL: R7K4DML-B-DAC32B

SPECIFICATIONS

■ **COMMON SPECIFICATIONS**

Common: Positive common per 32 points
Input rating/load voltage: 24 V DC $\pm 10\%$, ripple 5 %p-p max.
Number of I/O: Input, 16 points; Output, 16 points
Maximum I/O applicable at once: No limit (at 24 V DC)
I/O status indicator: LED turns ON with contact ON
Isolation: Input or output or sensor excitation to MECHATROLINK or FE to power input
Dielectric strength: 1500 V AC @ 1 minute (input or output or sensor excitation to power)
 500 V AC @ 1 minute (MECHATROLINK or FE to input or output or sensor excitation or power)

■ **INPUT**

ON voltage / current: ≥ 15 V DC (X0 through XF to +24 V) / ≥ 3.5 mA
OFF voltage / current: ≤ 5 V DC (X0 through XF to +24 V) / ≤ 1 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: ≤ 1.0 msec.

■ **OUTPUT**

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: ≤ 0.5 msec.
OFF delay: ≤ 1.0 msec.
Overload current protection function: Limits the current value when overcurrent is detected
Overheat Protection Function:
 Turns OFF the output when overheat is detected
 (When driving an inductive load, connect a diode in parallel with the load.)

OPERATING MODE SETTING

■ **MECHATROLINK MODE**

Set either MECHATROLINK-I or -II, and the data size with SW1-1 and SW1-2.

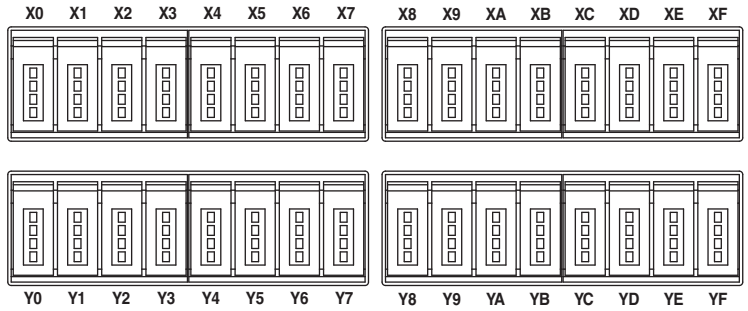
SW1-1	SW1-2	MECHATROLINK
OFF	OFF	MECHATROLINK-II (32 byte mode) (*)
ON	OFF	MECHATROLINK-II (17 byte mode)
ON	ON	MECHATROLINK-I (17 byte mode)

(*) Factory setting

Caution ! - Since SW1-3 and SW1-4 are unused, be sure to turn them off.

TERMINAL ASSIGNMENTS

■ I/O terminal



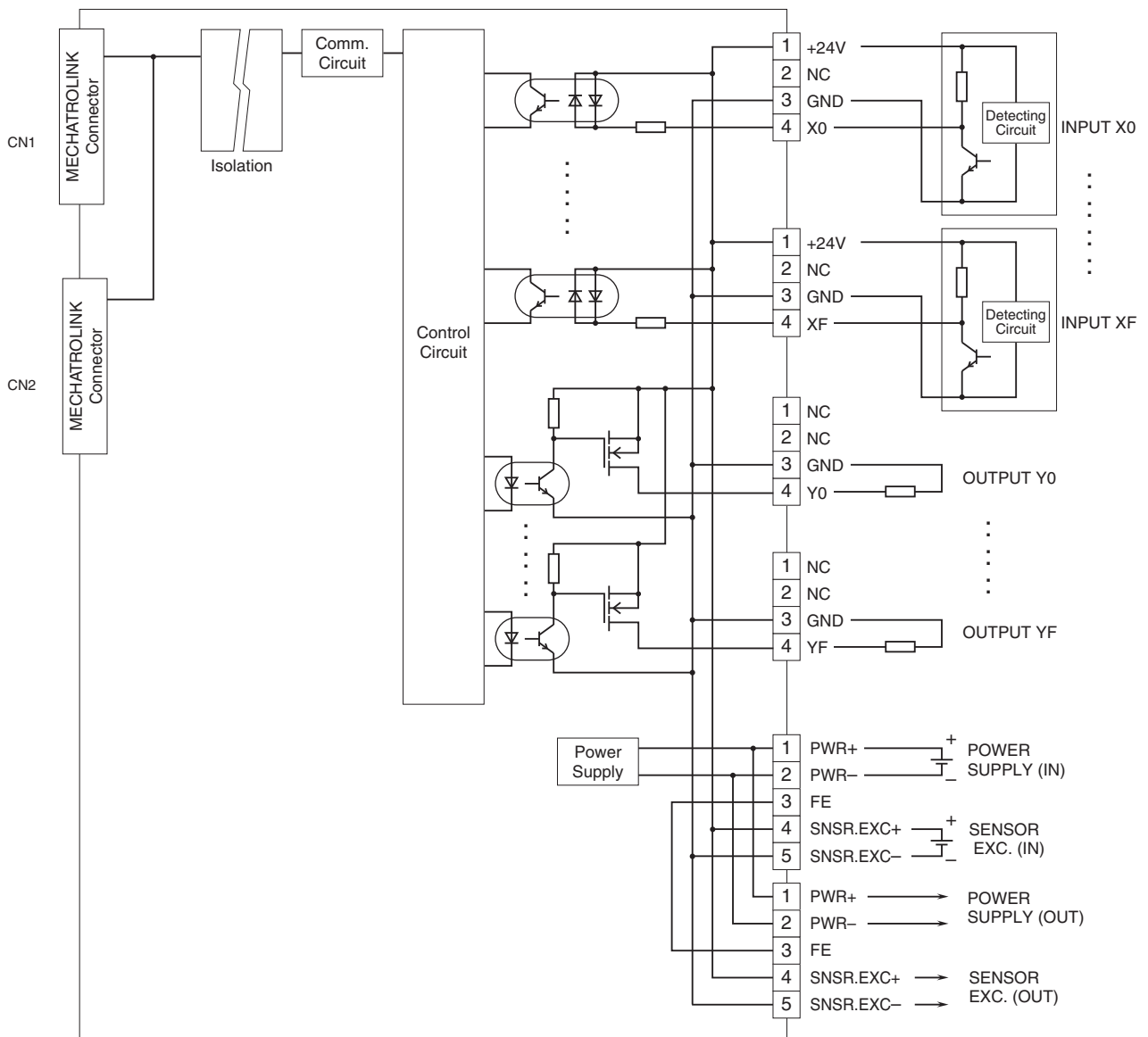
No.	ID	FUNCTION	No.	ID	FUNCTION
X0	1	+24V 24V DC	X8	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X0 Input 0		4	X8 Input 8
X1	1	+24V 24V DC	X9	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X1 Input 1		4	X9 Input 9
X2	1	+24V 24V DC	XA	1	+24V 24V DC
	2	NC Unused		2	NC 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

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

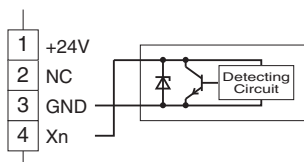
SCHEMATIC CIRCUITRY

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

Caution: FE terminal is NOT a protective conductor terminal.



■ 2-Wire Sensor



NPN DISCRETE INPUT &

NPN TRANSISTOR OUTPUT MODULE, 16 points each
(e-CON connector)

MODEL: R7K4DML-B-DAC32C

SPECIFICATIONS

■ COMMON SPECIFICATIONS

Input common: Positive common per 16 points

Output common: Negative common per 16 points

Input rating/load voltage: 24 V DC $\pm 10\%$, ripple 5 %p-p max.

Number of I/O: Input, 16 points; Output, 16 points

Maximum I/O applicable at once: No limit (at 24 V DC)

I/O status indicator: LED turns ON with contact ON

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

Dielectric strength: 1500 V AC @ 1 minute (input or output or sensor excitation to power)

500 V AC @ 1 minute (MECHATROLINK or FE to input or output or sensor excitation or power)

■ INPUT

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

OFF voltage / current: ≤ 5 V DC (X0 through XF to +24 V) / ≤ 1 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: ≤ 1.0 msec.

■ OUTPUT

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: ≤ 0.5 msec.

OFF delay: ≤ 1.0 msec.

Overload current protection function: Limits the current value when overcurrent is detected

Overheat Protection Function:

Turns OFF the output when overheat is detected

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

OPERATING MODE SETTING

■ MECHATROLINK MODE

Set either MECHATROLINK-I or -II, and the data size with SW1-1 and SW1-2.

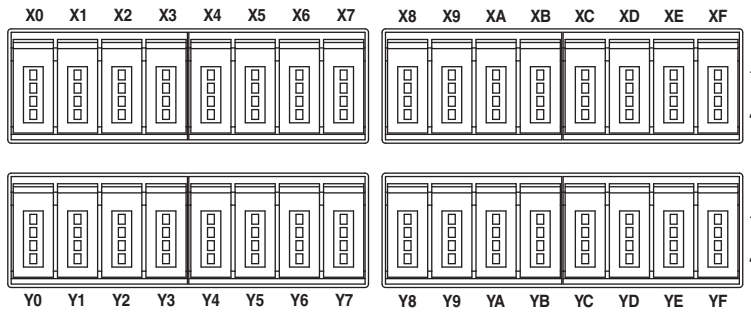
SW1-1	SW1-2	MECHATROLINK
OFF	OFF	MECHATROLINK-II (32 byte mode) (*)
ON	OFF	MECHATROLINK-II (17 byte mode)
ON	ON	MECHATROLINK-I (17 byte mode)

(*) Factory setting

Caution ! - Since SW1-3 and SW1-4 are unused, be sure to turn them off.

TERMINAL ASSIGNMENTS

■ I/O terminal



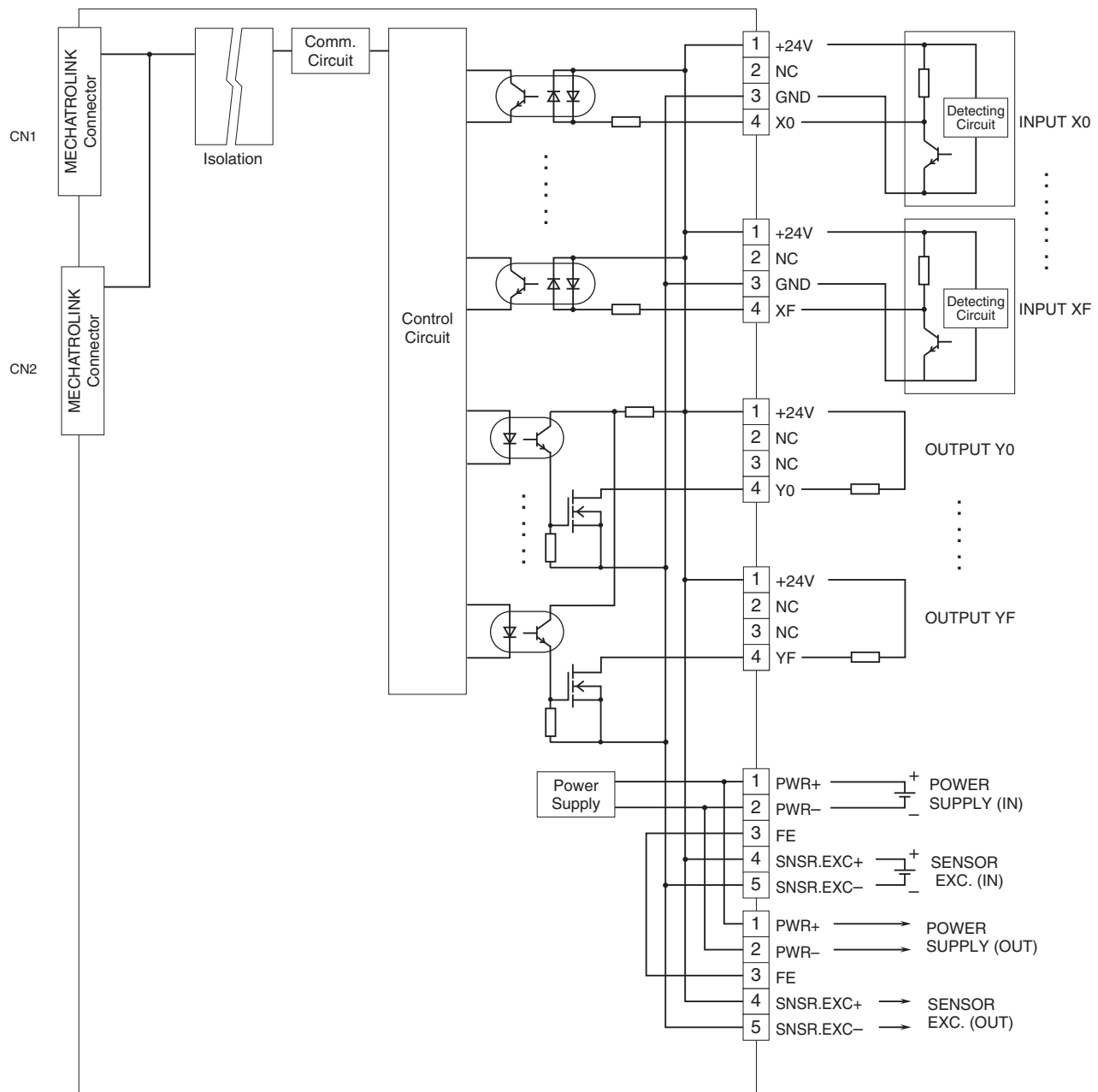
No.	ID	FUNCTION	No.	ID	FUNCTION
X0	1	+24V 24V DC	X8	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X0 Input 0		4	X8 Input 8
X1	1	+24V 24V DC	X9	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X1 Input 1		4	X9 Input 9
X2	1	+24V 24V DC	XA	1	+24V 24V DC
	2	NC Unused		2	NC 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

No.	ID	FUNCTION	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

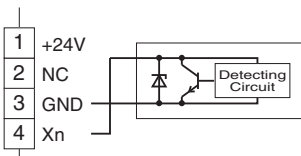
SCHEMATIC CIRCUITRY

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

Caution: FE terminal is NOT a protective conductor terminal.



■ 2-Wire Sensor



PNP DISCRETE INPUT &

PNP TRANSISTOR OUTPUT MODULE, 16 points each
(e-CON connector)

MODEL: R7K4DML-B-DAC32D

SPECIFICATIONS

■ COMMON SPECIFICATIONS

Input common: Negative common per 16 points

Output common: Positive common per 16 points

Input rating/load voltage: 24 V DC $\pm 10\%$, ripple 5 %p-p max.

Number of I/O: Input, 16 points; Output, 16 points

Maximum I/O applicable at once: No limit (at 24 V DC)

I/O status indicator: LED turns ON with contact ON

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

Dielectric strength: 1500 V AC @ 1 minute (input or output or sensor excitation to power)

500 V AC @ 1 minute (MECHATROLINK or FE to input or output or sensor excitation or power)

■ INPUT

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

OFF voltage / current: ≤ 5 V DC (X0 through XF to GND) / ≤ 1 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: ≤ 1.0 msec.

■ OUTPUT

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: ≤ 0.5 msec.

OFF delay: ≤ 1.0 msec.

Overload current protection function: Limits the current value when overcurrent is detected

Overheat Protection Function:

Turns OFF the output when overheat is detected

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

OPERATING MODE SETTING

■ MECHATROLINK MODE

Set either MECHATROLINK-I or -II, and the data size with SW1-1 and SW1-2.

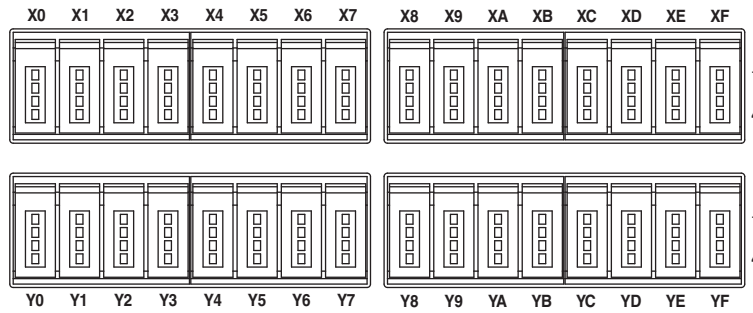
SW1-1	SW1-2	MECHATROLINK
OFF	OFF	MECHATROLINK-II (32 byte mode) (*)
ON	OFF	MECHATROLINK-II (17 byte mode)
ON	ON	MECHATROLINK-I (17 byte mode)

(*) Factory setting

Caution ! - Since SW1-3 and SW1-4 are unused, be sure to turn them off.

TERMINAL ASSIGNMENTS

■ I/O terminal



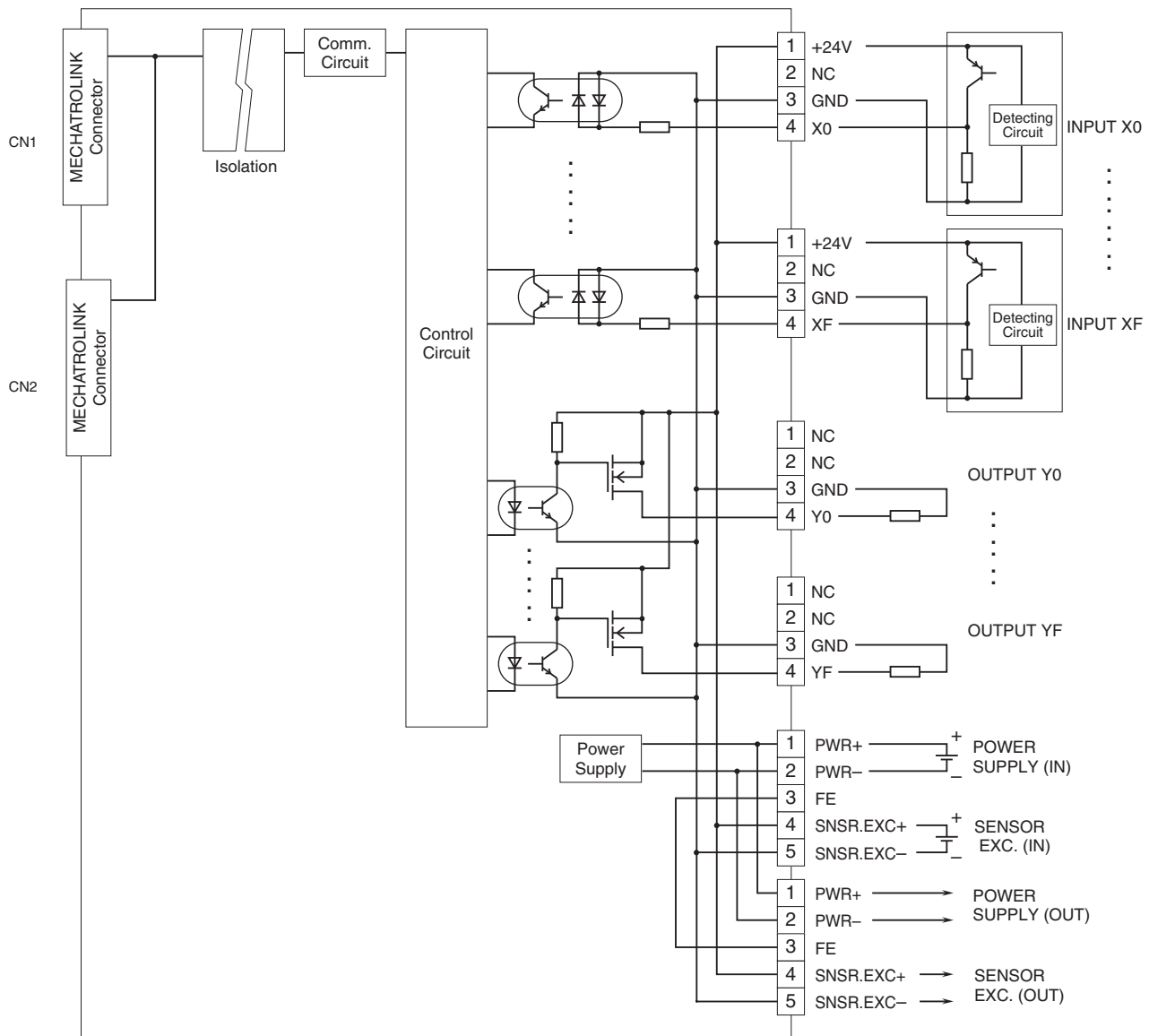
No.	ID	FUNCTION	No.	ID	FUNCTION
X0	1	+24V 24V DC	X8	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X0 Input 0		4	X8 Input 8
X1	1	+24V 24V DC	X9	1	+24V 24V DC
	2	NC Unused		2	NC Unused
	3	GND 0V		3	GND 0V
	4	X1 Input 1		4	X9 Input 9
X2	1	+24V 24V DC	XA	1	+24V 24V DC
	2	NC Unused		2	NC 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

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

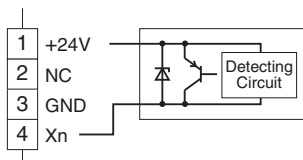
SCHEMATIC CIRCUITRY

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

Caution: FE terminal is NOT a protective conductor terminal.



■ 2-Wire Sensor



Specifications are subject to change without notice.