

## Remote I/O R7I4D Series

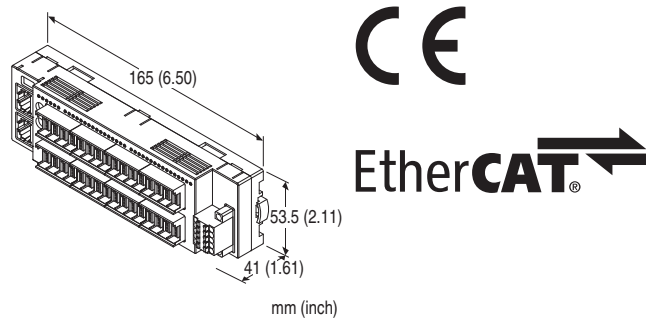
### EtherCAT I/O MODULE

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

#### Functions & Features

- 16 points NPN discrete input and 16 points NPN transistor output module for EtherCAT

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## MODEL: R7I4DECT-1-DAC32C-R[1]

### ORDERING INFORMATION

- Code number: R7I4DECT-1-DAC32C-R[1]  
Specify a code from below for [1].  
(e.g. R7I4DECT-1-DAC32C-R/D1/Q)
- Specify the specification for option code /Q  
(e.g. /C01/SET)

### TERMINAL BLOCK

- 1: Tension clamp terminal block for power supply  
RJ-45 Modular jack for communication  
e-CON connector for I/O

### I/O TYPE

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

### 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 M-System's web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

#### EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet  
(No. ESU-7779-DAC32)

### RELATED PRODUCTS

- PC configurator software (model: R7CFG)
- ESI file

The configurator software and ESI files are downloadable at M-System's web site.

Use a commercially available Mini-B USB cable to connect the unit to a PC.

### GENERAL SPECIFICATIONS

#### Connection

**EtherCAT:** RJ-45 Modular Jack

**Power & Sensor excitation:** Separable screwless spring terminal

**I/O:** e-CON connector

**Housing material:** Flame-resistant resin (gray)

**Isolation:** Input or output or sensor excitation to EtherCAT or FE to power

**Output at the loss of communication:** Configurable via R7CFG

**Status indicator LED:** PWR, RUN, ERR, L/A IN, L/A OUT  
(Refer to the instruction manual.)

**Discrete I/O status indicator LED:** Green LED turns on with I/O ON

**Read rate:** Selectable with R7CFG

### EtherCAT COMMUNICATION

**Standard:** IEEE 802.3u

**Transmission type:** 100BASE-TX

**Transmission speed:** Full-duplex 100 Mbps

**Transmission media:** 100BASE-TX (STP cable; Category 5e)

**Maximum internode length:** 100 meters

**Fixed address:** Set with rotary switches  
(The master must support MDP.)

# MODEL: R7I4DECT-1-DAC32C

## 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.,  $\leq 5$  A (including discrete input load charge); rated current 8 A  
**ON voltage / current:**  $\geq 15$  V DC (X0 through XF to +24V) /  $\geq 3.5$  mA  
**OFF voltage / current:**  $\leq 5$  V DC (X0 through XF to +24V) /  $\leq 1.0$  mA  
**Input current:**  $\leq 5.5$  mA per point at 24 V DC  
**Input resistance:** Approx. 4.4 k $\Omega$   
**ON delay:**  $\leq 0.5$  msec.  
**OFF delay:**  $\leq 0.5$  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.,  $\leq 5$  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:**  $\leq 1.2$  V  
**Leakage current:**  
With wire breakdown detection:  $\leq 0.7$  mA  
Without wire breakdown detection:  $\leq 0.1$  mA  
**ON delay:**  $\leq 0.2$  msec.  
**OFF delay:**  $\leq 0.5$  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:** Approx. 60 mA (rated current 8 A)  
**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:** 180 g (0.40 lb)

## PERFORMANCE

**Insulation resistance:**  $\geq 100$  M $\Omega$  with 500 V DC  
**Dielectric strength:** 1500 V AC @ 1 minute  
(input or output or sensor excitation to EtherCAT 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 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 $\Omega$ .  
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

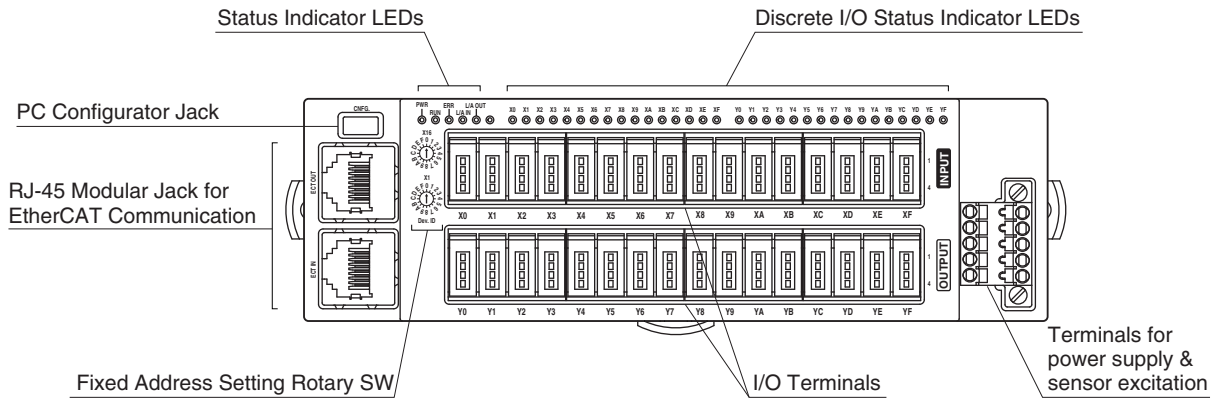
PARAMETER	SETTING RANGE	DEFAULT
Unused setting (output only)	CH enabled, CH disabled	CH enabled

### ■ 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: R7I4DECT-1-DAC32C

## EXTERNAL VIEW



# MODEL: R7I4DECT-1-DAC32C

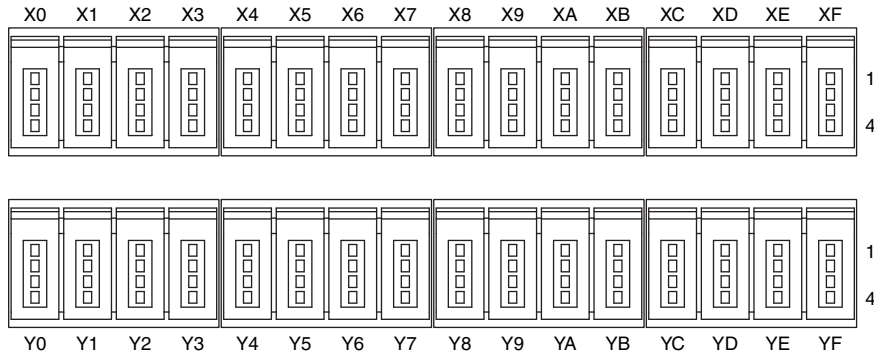
## TERMINAL ASSIGNMENTS

• 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

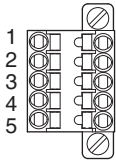
**Cable connector:** TFMC1,5 / 5-STF-3,5

(Phoenix Contact) (included in the package)

**Applicable wire size:** 0.2 – 1.5 mm<sup>2</sup>; stripped length 10 mm

### Recommended solderless terminal

- AI0,25–10YE 0.25 mm<sup>2</sup> (Phoenix Contact)
- AI0,34–10TQ 0.34 mm<sup>2</sup> (Phoenix Contact)
- AI0,5–10WH 0.5 mm<sup>2</sup> (Phoenix Contact)
- AI0,75–10GY 0.75 mm<sup>2</sup> (Phoenix Contact)
- A1–10 1.0 mm<sup>2</sup> (Phoenix Contact)
- A1,5–10 1.5 mm<sup>2</sup> (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

- Input module

Response time is time from when a step (0 to 100%) input signal is applied to the input module (slave) until when output from its communication CPU reaches 90% of the final value.

- Output module

Response time is time from when a step (0 to 100%) output signal is received by the communication CPU of the output module (slave) until when its output reaches 90% of the final value.

$T_{COM}$ : EtherCAT communication cycle set by the host device (master)  
(The cycle is determined in accordance with the system configuration and settings.)

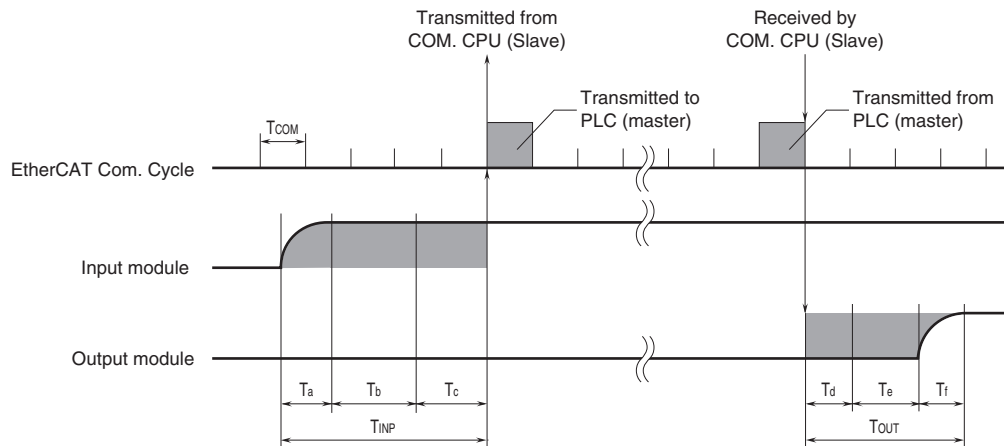
$T_{INP}$ : Input module response time  $\leq$  Delay time of input circuit ( $T_a$ ) + read cycle ( $T_b$ ) + Input internal processing time ( $T_c$ )  
(Communication cycle  $\times 2$ )

$T_{OUT}$ : Output module response time  $\leq$  Delay time of output internal processing ( $T_d$ ) (communication cycle  $\times 1$ ) + 0 msec. ( $T_e$ ) + Delay time of output circuit ( $T_f$ )

ex.) When EtherCAT communication cycle: 1 msec. and delay time of output: ON,

Input module response time ( $T_{INP}$ ): Delay time of input circuit (0.5 msec.) + Read time (1 msec.) + Input internal processing time (1 msec.  $\times 2$ ) = 3.5 [msec.]

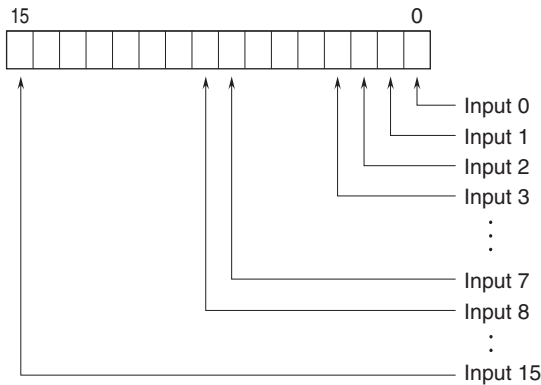
Output module response time ( $T_{OUT}$ ): Delay time of output internal processing (1 msec.) (communication cycle  $\times 1$ ) + 0 msec. + Delay time of output circuit (0.2 msec.) = 1.2 [msec.]



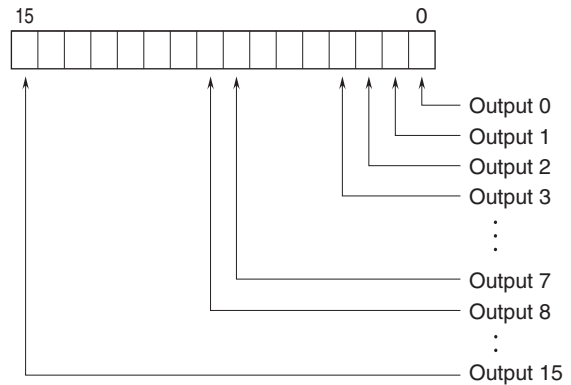
## I/O DATA DESCRIPTIONS

### ■ DISCRETE I/O MODULE

#### • Input Area Objects

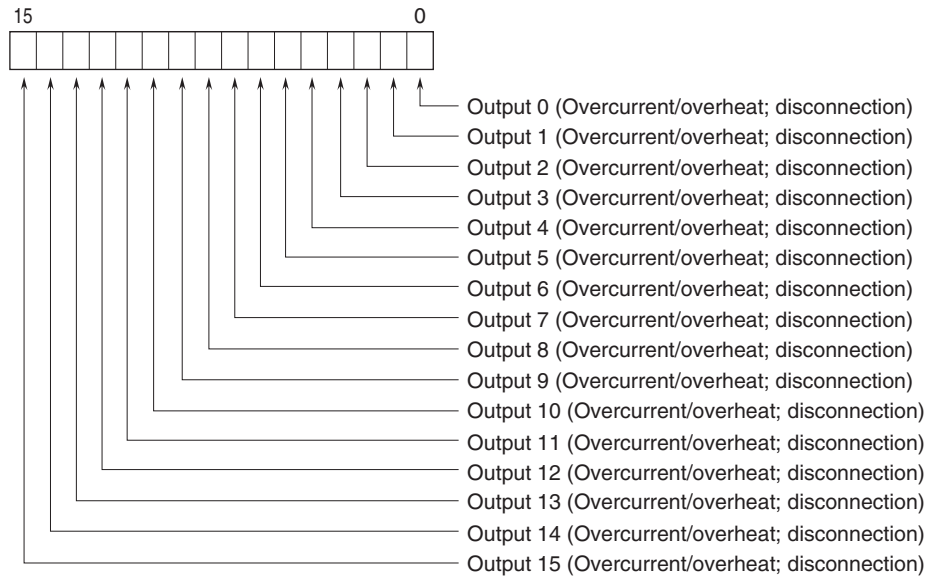


#### • Output Area Objects



0: OFF 1: ON

#### ■ STATUS (Input Area Object)



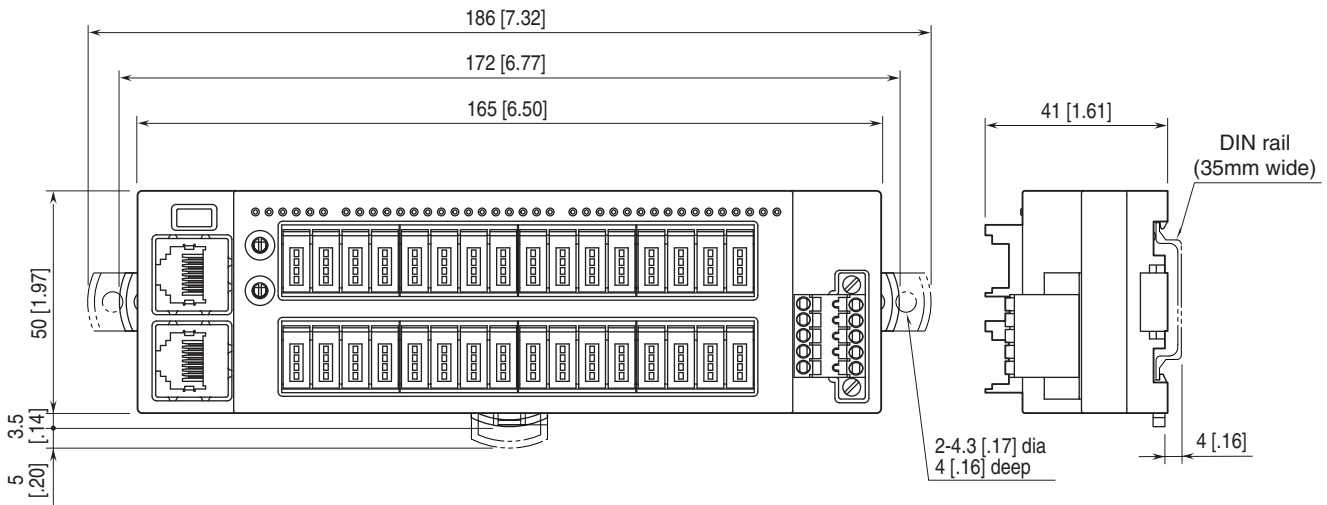
0 : Normal

1 : Detected the overcurrent/overheat and disconnection

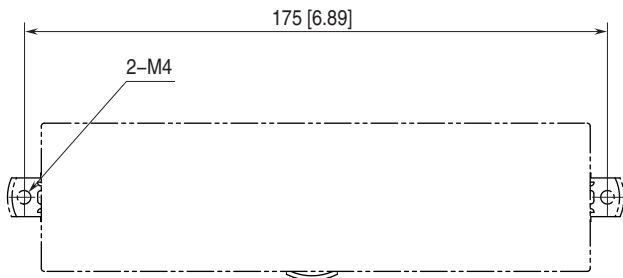
Note: Status is disabled with option code /D1 (without wire breakdown detection).

# MODEL: R7I4DECT-1-DAC32C

## EXTERNAL DIMENSIONS unit: mm [inch]



## MOUNTING REQUIREMENTS unit: mm [inch]



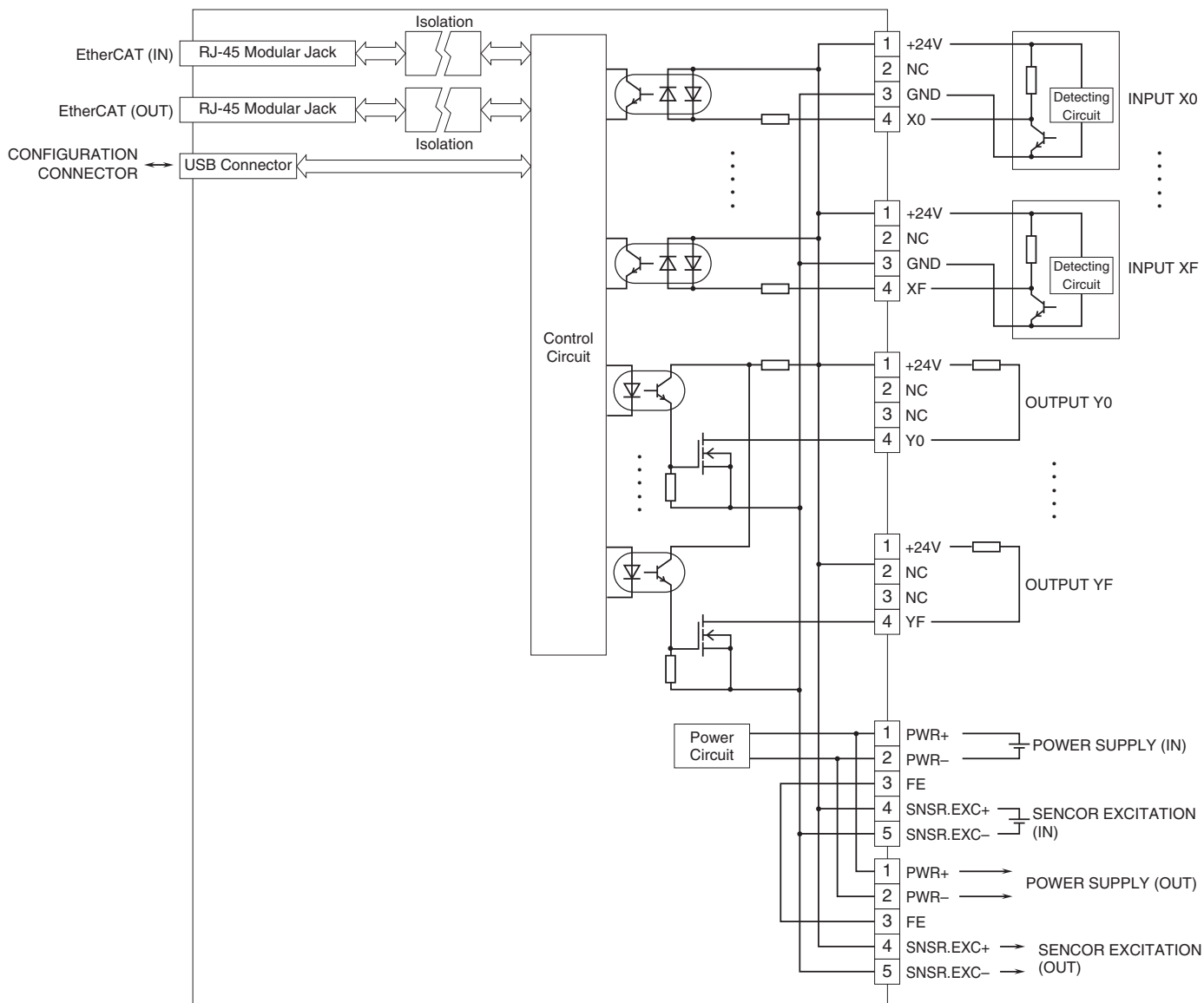


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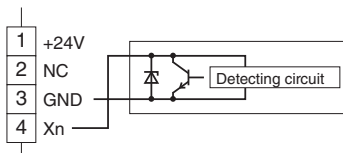
## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

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

Caution: FE terminal is NOT a protective conductor terminal.



### ■ 2-Wire Sensor



Specifications are subject to change without notice.