

Remote I/O R7I4D Series

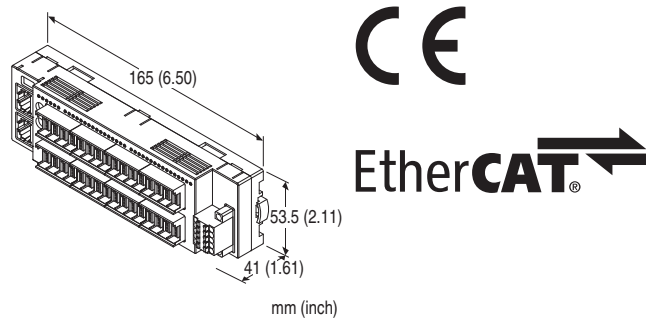
EtherCAT I/O MODULE

(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

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.



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 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-7779-DAC32)

RELATED PRODUCTS

- PC configurator software (model: R7CFG)
 - ESI file
- The configurator software and ESI files are downloadable at our 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., ≤ 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: 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: ≥ 100 M Ω 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 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

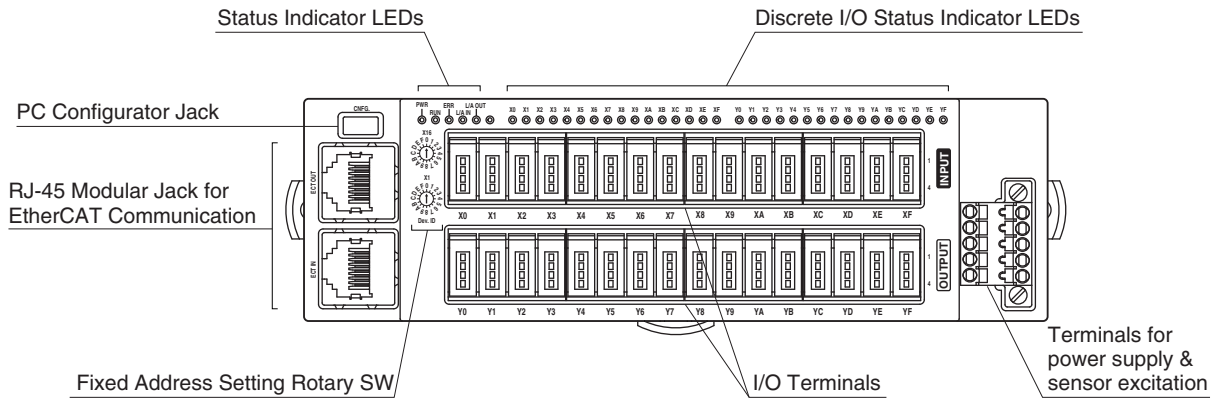
PARAMETER	SETTING RANGE	DEFAULT
Unused setting (output only)	CH enabled, CH disabled	CH enabled

■ 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: R7I4DECT-1-DAC32C

EXTERNAL VIEW



MODEL: R7I4DECT-1-DAC32C

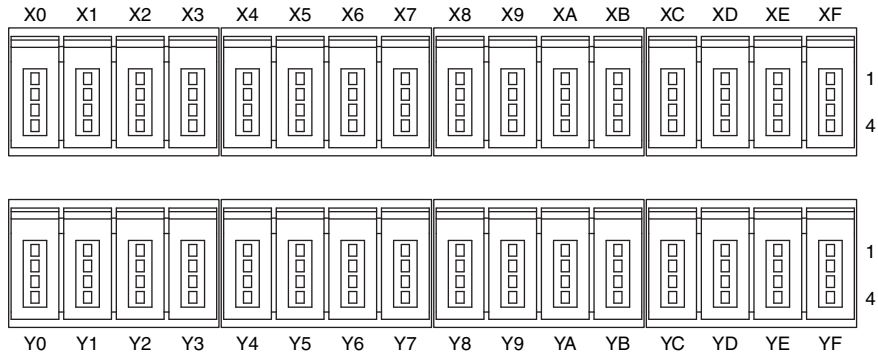
TERMINAL ASSIGNMENTS

• 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

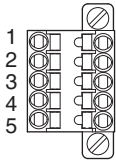
Cable connector: TFMC1,5 / 5-STF-3,5

(Phoenix Contact) (included in the package)

Applicable wire size: 0.2 – 1.5 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

- 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.)

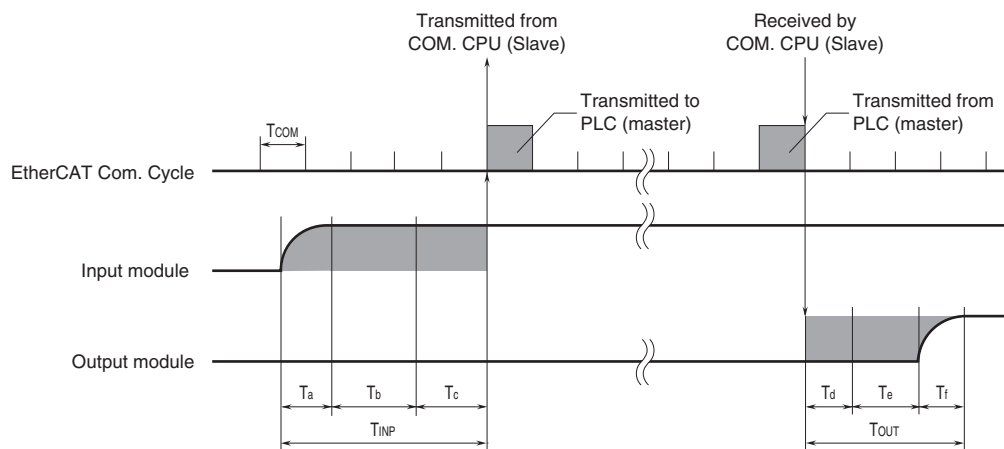
T_{INP} : Input module response time \leq Delay time of input circuit (T_a) + read cycle (T_b) + Input internal processing time (T_c)
(Communication cycle x 2)

T_{OUT} : Output module response time \leq Delay time of output internal processing (T_d) (communication cycle x 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. x 2) = 3.5 [msec.]

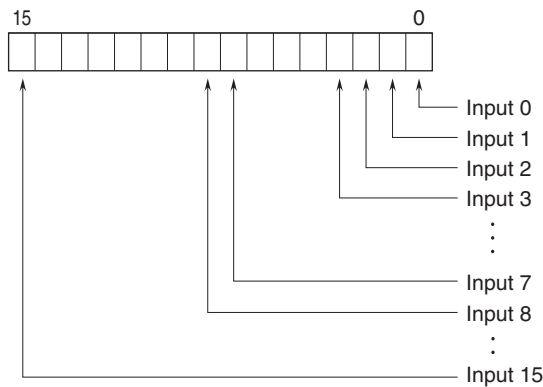
Output module response time (T_{OUT}): Delay time of output internal processing (1 msec.) (communication cycle x 1) + 0 msec. + Delay time of output circuit (0.2 msec.) = 1.2 [msec.]



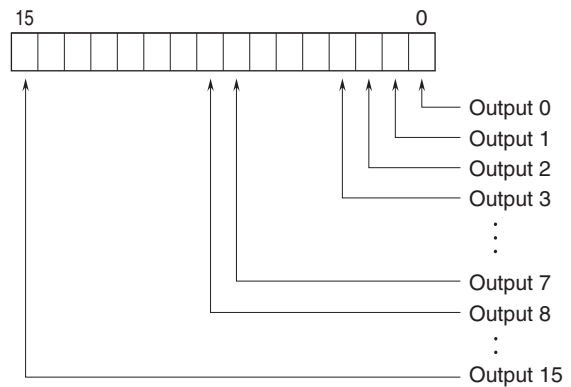
I/O DATA DESCRIPTIONS

■ DISCRETE I/O MODULE

• Input Area Objects

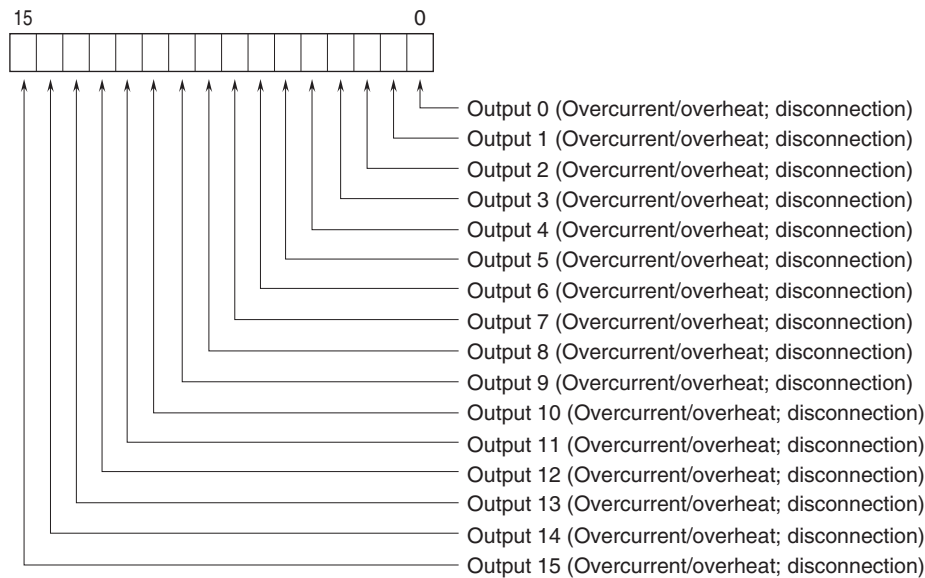


• Output Area Objects



0: OFF 1: ON

■ STATUS (Input Area Object)

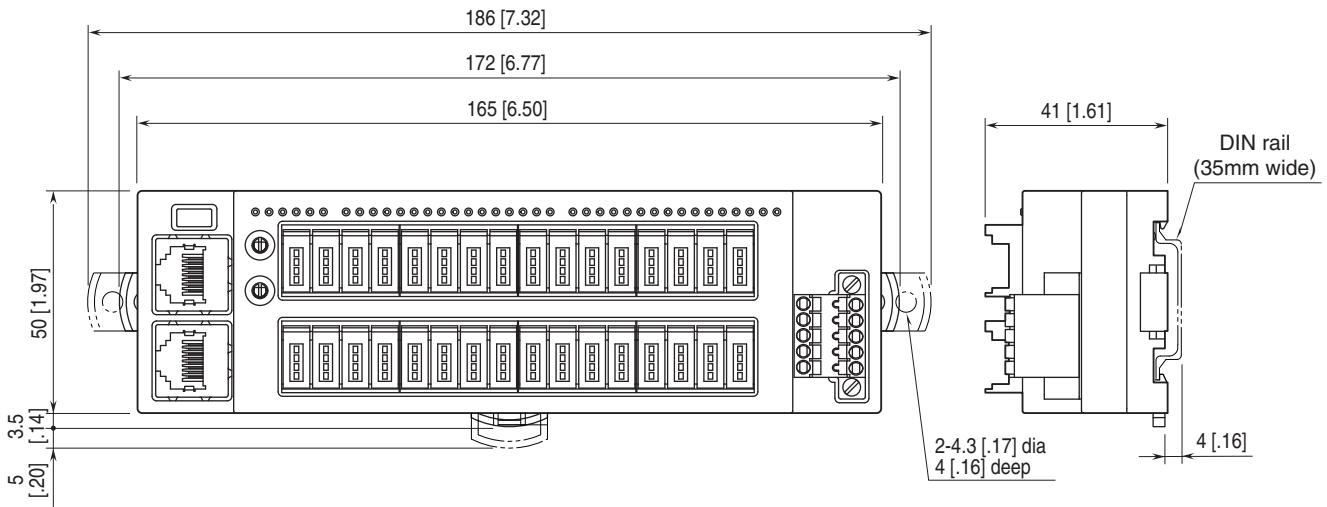


0 : Normal
1 : Detected the overcurrent/overheat and disconnection

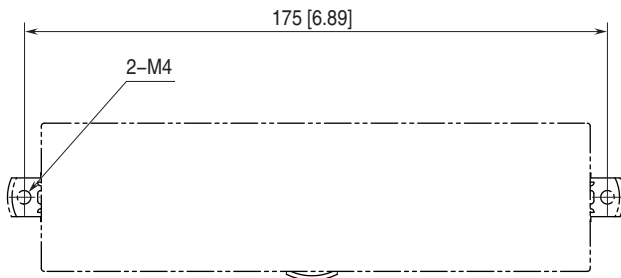
Note: Status is disabled with option code /D1 (without wire breakdown detection).

MODEL: R7I4DECT-1-DAC32C

EXTERNAL DIMENSIONS unit: mm [inch]



MOUNTING REQUIREMENTS unit: mm [inch]

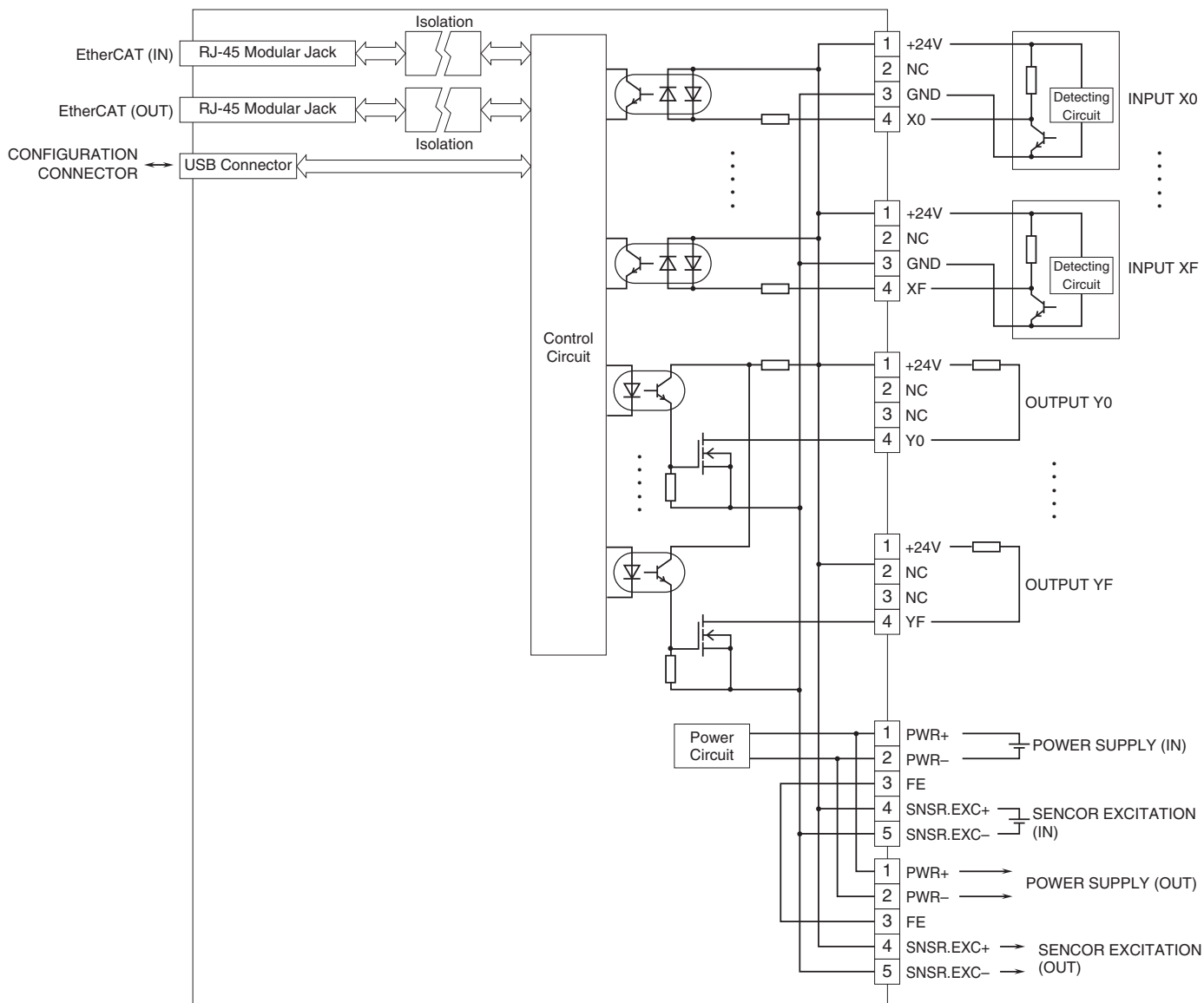


MODEL: R7I4DECT-1-DAC32C

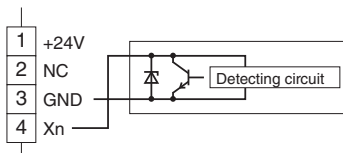
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

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.