Remote I/O R7G4J Series

EtherCAT I/O MODULE

(strain gauge input, 2 points, isolated, screw terminal block)

Functions & Features

• 2 points strain gauge input module for EtherCAT

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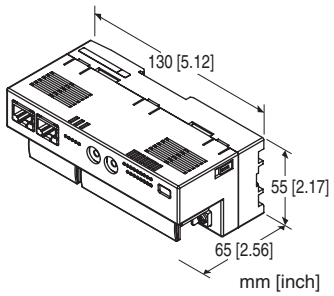

MODEL: R7G4JECT-LC2-A-R[1]

ORDERING INFORMATION

• Code number: R7G4JECT-LC2-A-R[1]

Specify a code from below for [1].
(e.g. R7G4JECT-LC2-A-R/R20/F2K/Q)

• Specify the specification for option code /Q
(e.g. /C01/SET)

I/O TYPE

LC2: Strain gauge input, 2 points

TERMINAL BLOCK

A: Screw terminal block for power supply
RJ-45 Modular jack for communication
Screw terminal block for I/O

POWER INPUT

DC Power

R: 24 V DC
(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)

[1] OPTIONS (multiple selections)

Input Range
(be sure to specify)
/R20: -2 - +2 mV/V
/R10: -1 - +1 mV/V
/R05: -0.5 - +0.5 mV/V

Lowpass Filter
(be sure to specify)
/F2K: 2 kHz/2 Hz
/F1: 1 Hz/2 Hz

Other Options
blank: none
/Q: Option other than the above (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-7741-A)

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 input, I/O: M3 separable screw terminal (torque 0.5 N·m)
Solderless terminal: Refer to the drawing at the end of the section.
Recommended manufacturer: Japan Solderless Terminal MFG.Co.Ltd, Nichifu Co.,ltd
Applicable wire size: 0.25 to 1.65 mm^2 (AWG 22 to 16)
Screw terminal: Nickel-plated steel
Housing material: Flame-resistant resin (gray)
Isolation: Input 0 or monitor output 0 to input 1 or monitor output 1 to EtherCAT or FE to power
Setting item (set from R7CFG or EtherCAT master)
• Zero/span point adjustment
• Auto zero
• Offset clear
• Load coefficient
• Moving average
• Excitation voltage
• Lowpass filter
• Monitor output
Status indicator LED: PWR, RUN, ERR, L/A IN, L/A OUT (Refer to the instruction manual)
Input status indicator LEDs: A.ZERO, ZERO, SPAN, MODE,

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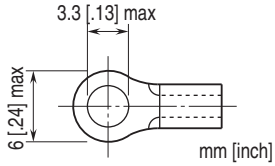
RESET, UNDER, 0-100, OVER
(Refer to the instruction manual for details)

■Recommended solderless terminal



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.)

INPUT SPECIFICATIONS

■Strain Gauge Input:
• Strain Gauge
Input range:
Option code /R20
-2 – +2 mV/V (at 5 V excitation)
-4 – +4 mV/V (at 2.5 V excitation)
Option code /R10
-1 – +1 mV/V (at 5 V excitation)
-2 – +2 mV/V (at 2.5 V excitation)
Option code /R05
-0.5 – +0.5 mV/V (at 5 V excitation)
-1 – +1 mV/V (at 2.5 V excitation)
Max. Input range:
Option code /R20
-3 – +3 mV/V (at 5 V excitation)
-6 – +6 mV/V (at 2.5 V excitation)
Option code /R10
-1.5 – +1.5 mV/V (at 5 V excitation)
-3 – +3 mV/V (at 2.5 V excitation)
Option code /R05
-0.75 – +0.75 mV/V (at 5 V excitation)
-1.5 – +1.5 mV/V (at 2.5 V excitation)
Zero adjustment:
Option code /R20
-1 – +1 mV/V (at 5 V excitation)
-2 – +2 mV/V (at 2.5 V excitation)
Option code /R10
-0.5 – +0.5 mV/V (at 5 V excitation)
-1 – +1 mV/V (at 2.5 V excitation)
Option code /R05
-0.25 – +0.25 mV/V (at 5 V excitation)
-0.5 – +0.5 mV/V (at 2.5 V excitation)
Lowpass filter:
Approx. 2 kHz or approx. 2 Hz (option code /F2K)
Approx. 1 Hz or approx. 2 Hz (option code /F1)
Conversion rate: min. 2000 samples/sec.
• Excitation: 5 V ±10% or 2.5 V ±10%
(Input range doubled in the case of 2.5 V excitation)
Maximum current: max. 60 mA (Up to 4 strain gauges of 350 Ω can be connected in parallel-adding connection at 5 V excitation)
max. 100 mA (at 2.5 V excitation)

OUTPUT SPECIFICATIONS

Output range: 0 – 10 V DC (for input 0 - 100 %)
Load resistance: ≥ 100 kΩ
Operational range: -115 - +115 %

INSTALLATION

Current consumption: ≤ 150 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: 220 g (0.49 lb)

PERFORMANCE

Accuracy:
Option code except /R05
±0.04 % (Averaging 128 samples or more)
±0.05 % (Averaging 64 samples)
±0.10 % (Averaging 8, 16, 32 samples)
±0.15 % (Averaging 4 samples)
±0.20 % (Averaging 2 samples)
Option code /R05
±0.05 % (Averaging 512 samples or more)
±0.10 % (Averaging 64, 128, 256 samples)
±0.20 % (Averaging 16, 32 samples)
±0.30 % (Averaging 2, 4, 8 samples)
Monitor output accuracy: ±0.1 %
Converted data range:
Input 0 / input 1: 0 – 10000 of the range from zero to span
Total input data: Sum of input 0 and input 1
Temperature coefficient:
Strain gauge input: ±0.015 %/°C (±0.008 %/°F)
Monitor output: ±0.015 %/°C (±0.008 %/°F)
Input delay time:
Lowpass filter 2 kHz max. 20 msec. (0 - 90 %)
Lowpass filter 2 Hz max. 200 msec. (0 - 90 %)
Lowpass filter 1 Hz max. 400 msec. (0 - 90 %)
Output delay time: ≤ 250 msec. (0 – 90 %)
Resolution: 1/10000

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Insulation resistance: ≥ 100 MΩ with 500 V DC
Isolation: 1500 V AC @ 1 minute
(input 0 or monitor output 0 to input 1 or monitor output 1 to EtherCAT or FE to power)

STANDARDS & APPROVALS

EU conformity:
EMC Directive
EMI EN 61000-6-4
EMS EN 61000-6-2
RoHS Directive

PC CONFIGURATOR

The following parameters can be set with PC Configurator Software (model: R7CFG)
Refer to the users manual for the R7CFG for detailed operation of the software program.
However, settings from the host communication EtherCAT and from the configurator software cannot be used at the same time. Use either method of communication for setting parameters.

■ CHANNEL INDIVIDUAL SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Zero adjustment	-50 to +50%	-
Span adjustment	10% to full scale	full scale
Auto zero	-	-
Reset offset	-	-
Auto scale	0 to 32,000	-
Bias	-320.00 to +320.00 (%)	0.00 (%)
Gain	-3.2000 to +3.2000	1.0000
Zero scale	-32,000 to +32,000	0
Full scale	-32,000 to +32,000	10,000
Load ratio	10.00 to 100.00 (%)	100.00 (%)
Moving average	2, 4, 8, 16, 32, 64, 128, 256, 512, 1024	16
Monitor output	-32,000 to +32,000	-
Output gain adjustment	-3.2000 to +3.2000	1.0000

■ CHANNEL BATCH SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Excitation	5V, 2.5V	5V
Lowpass filter	2Hz, 2kHz (1Hz)*	2kHz (1Hz)*

*. Values in ( ) are for the option code: /F1.

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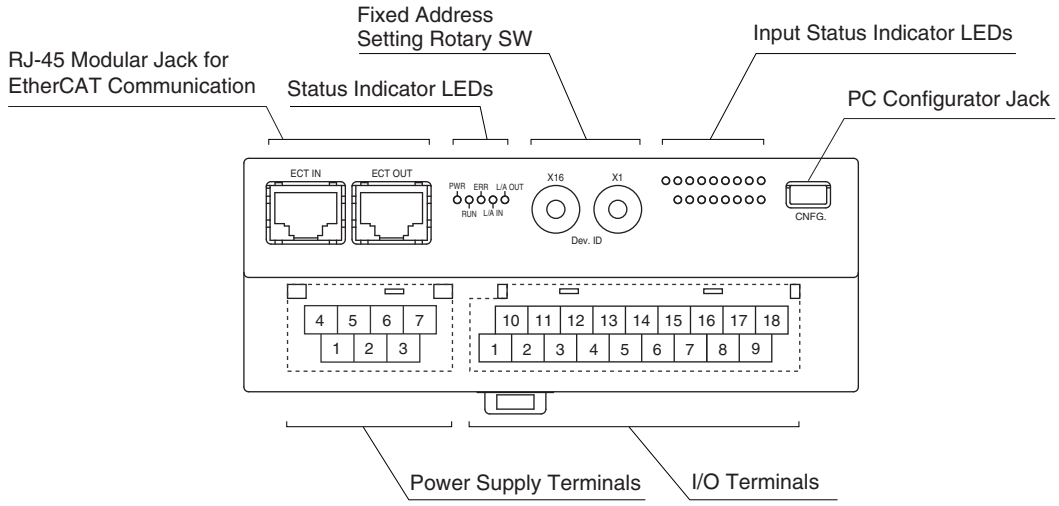
EXTERNAL VIEW



TERMINAL ASSIGNMENTS

■I/O TERMINAL ASSIGNMENT

10	11	12	13	14	15	16	17	18
NC	+EXC0	+IN0	NC	V0	+EXC1	+IN1	NC	V1
1	2	3	4	5	6	7	8	9
NC	−EXC0	−IN0	SLD0	C0	−EXC1	−IN1	SLD1	C1

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	10	NC	No connection
2	-EXC0	Excitation 0-	11	+EXC0	Excitation 0+
3	-IN0	Input 0-	12	-IN0	Input 0+
4	SLD0	Shield 0	13	NC	No connection
5	C0	Monitor output 0-	14	V0	Monitor output 0+
6	-EXC1	Excitation 1-	15	+EXC1	Excitation 1+
7	-IN1	Input 1-	16	+IN1	Input 1+
8	SLD1	Shield 1	17	NC	No connection
9	C1	Monitor output 1-	18	V1	Monitor output 1+

■ POWER SUPPLY TERMINAL ASSIGNMENT

4	5	6	7
NC	NC	+24V	0V
1	2	3	
NC	NC	FE	

1. NC –
2. NC –
3. FE Functional earth
4. NC –
5. NC –
6. +24V Power supply (24V DC)
7. 0V Power supply (0V)

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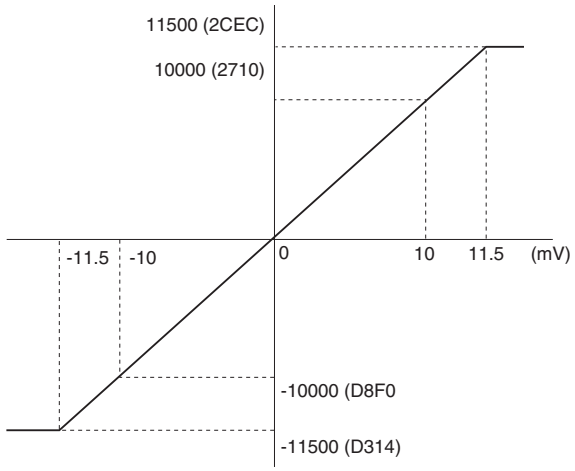
DATA CONVERSION

■ I/O RANGE AND DATA CONVERSION (FACTORY DEFAULT SETTING)

Analog input data is converted into digital representations of -100 – +100% proportional to each scaled range.
The converted % values are multiplied by 100 and expressed in16 bits.
Overrange input is possible from -115 to +115% of the nominal range.
When the signal exceeds the limit, the data is fixed at -115% or +115%.
Minus value is converted into negative values, represented in 2's complements.

• Input Range 0 – 10 mV DC (±2 mV/V, 5 V DC excitation)

Input Value	Input %	Converted Data, Decimal	Converted Data, Hex
≤ -11.5 mV	-115 %	-11500	D314
-10 mV	-100 %	-10000	D8F0
0 mV	0 %	0	0
10 mV	100 %	10000	2710
≥11.5 mV	115 %	11500	2CEC



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RESPONSE TIME

• Input module

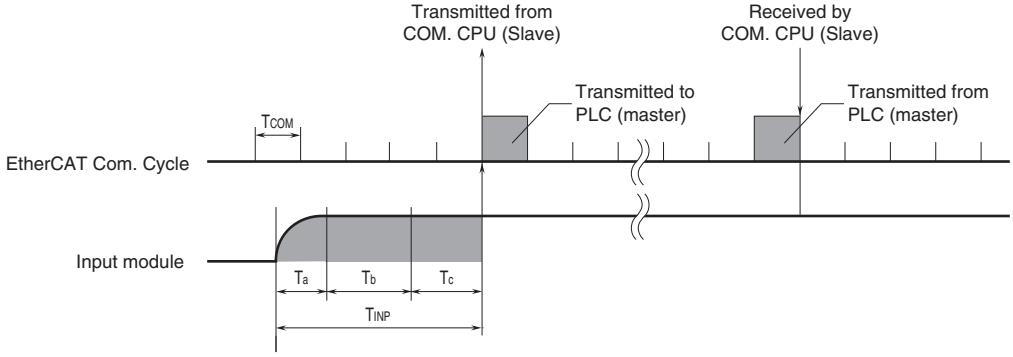
Response time is time from when a step (0 to 100%) input signal is applied to the input module (slave) until when output from its communication CPU reaches 90% of the final value.

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 ≤ Delay time of input circuit (Ta) + Conversion speed[*1] (Tb) + Input internal processing time (Tc) (Communication cycle x 2)

*1. Conversion speed x No. of moving averages (1 to 128)

ex.) When No. of moving averages: 2, Delay time of input circuit: 20 msec., and EtherCAT communication cycle: 1 msec., Input module response time (T_{INP}): Delay time of input circuit (20 msec.) + Conversion speed (0.5 msec.) x No. of moving averages (2) + Input internal processing time (1 msec. x 2) = 23 [msec.]



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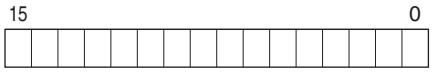
I/O DATA DESCRIPTIONS

Scaling of analog I/O module is configurable with the configurator software (model: R7CFG). Refer to the software manual for details.

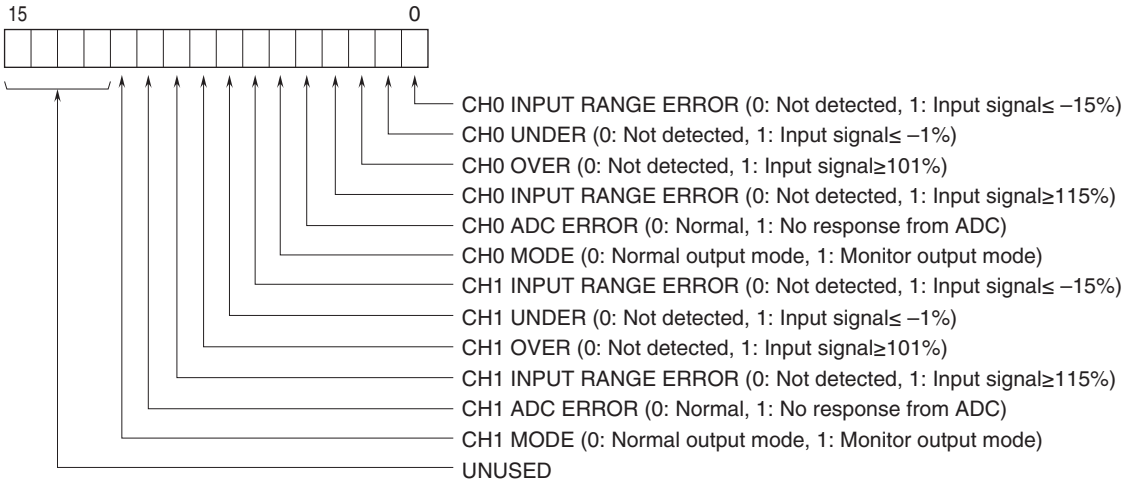
■ Analog I/O module

• Input Area Objects/Output Area Objects



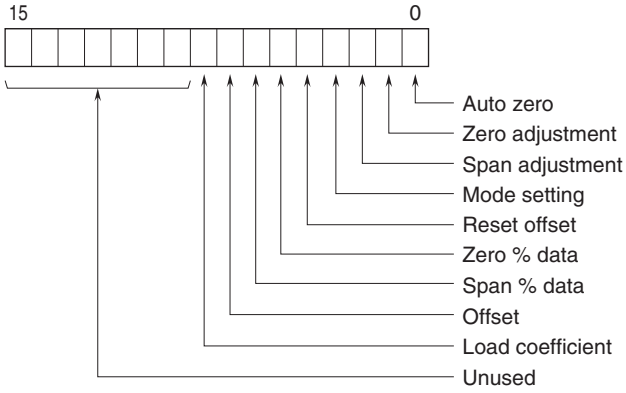
16-bit binary data.
Negative range is represented in 2's complement.

■ Status



■ LC2 setting command

• Common with Output Area Objects, Configuration Area Objects



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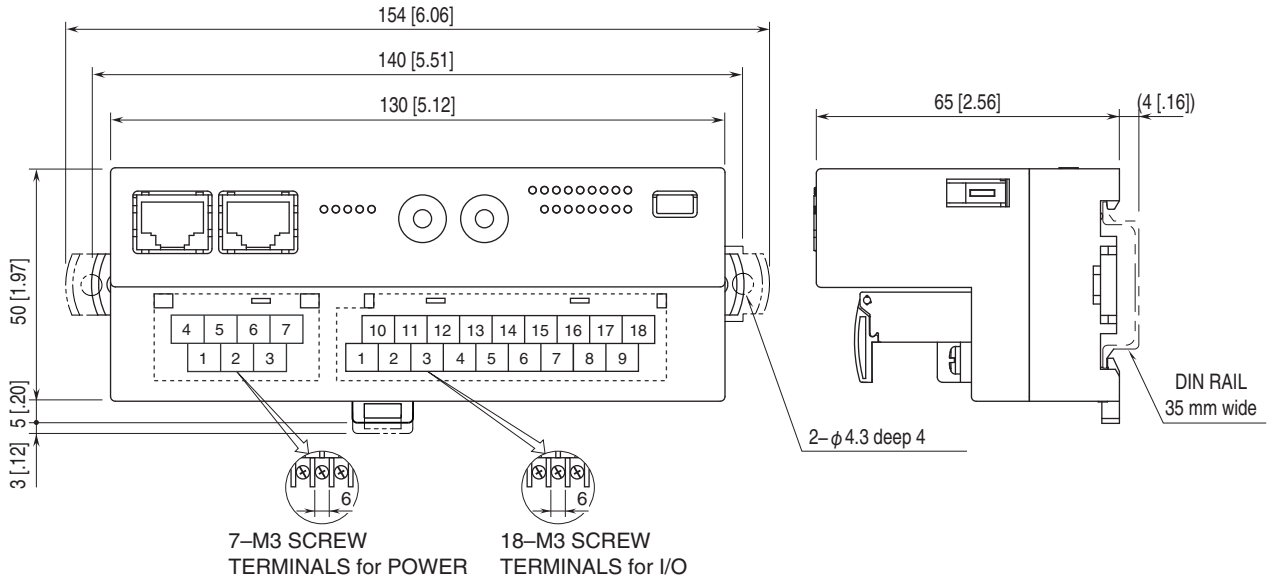
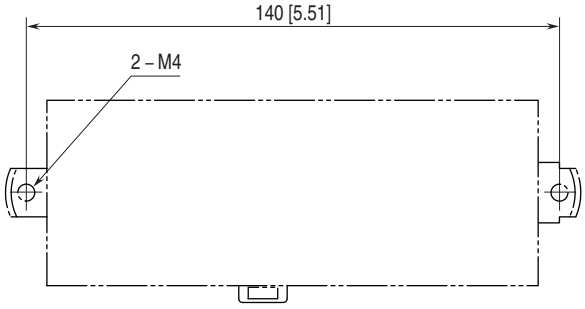
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



MOUNTING REQUIREMENTS unit: mm [inch]



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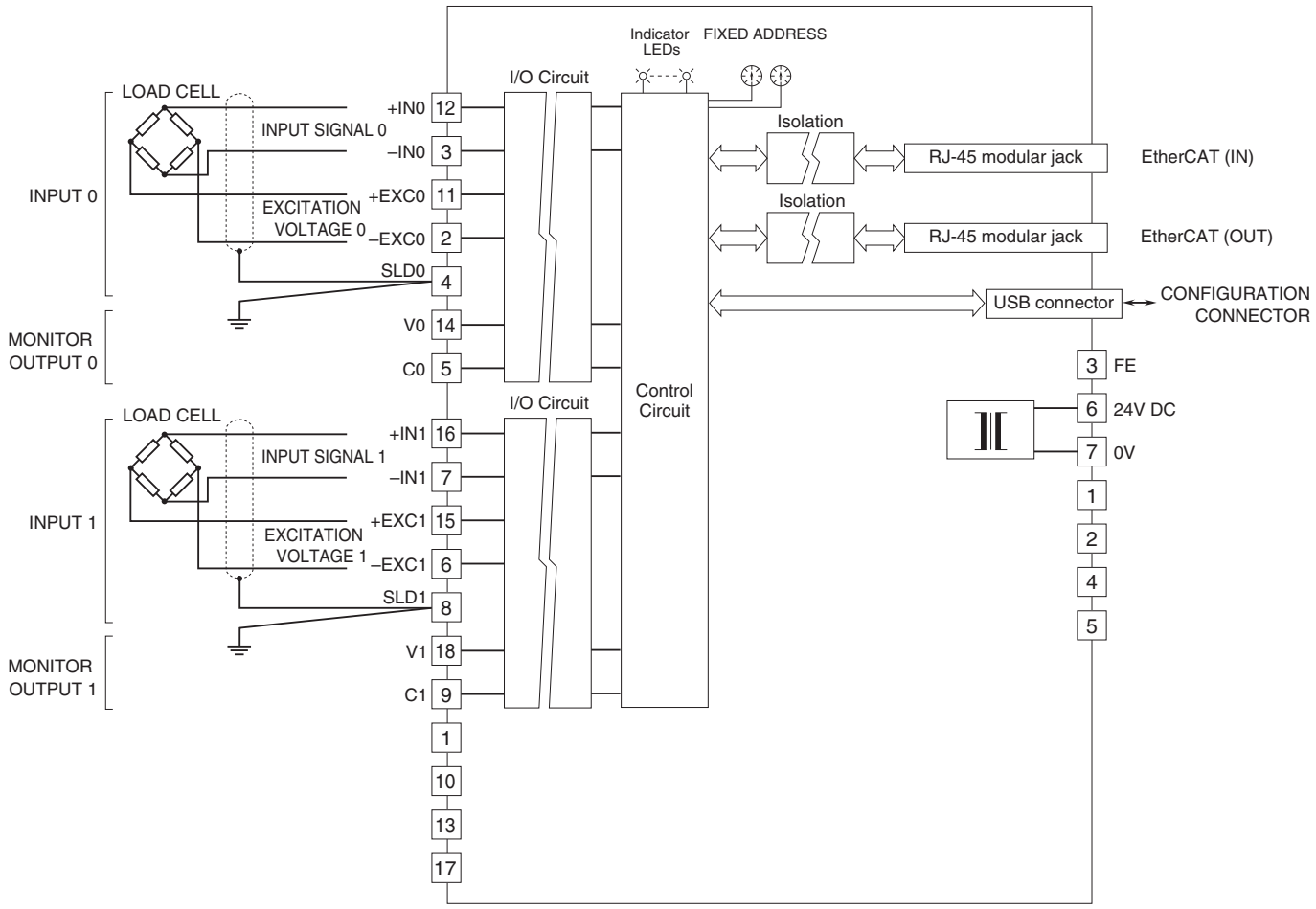
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

Note: In order to improve EMC performance, bond the FE terminal to ground.
Caution: FE terminal is NOT a protective conductor terminal.



⚠ Specifications are subject to change without notice.

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