Remote I/O R7G4H Series

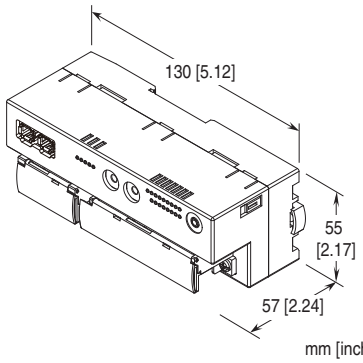
MECHATROLINK I/O MODULE

(strain gauge input, 2 points, isolated, screw terminal block, message transmission command, MECHATROLINK- III use)

Functions & Features

• 2 points strain gauge input for MECHATROLINK- III

• Easy parameter setting of individual channels with the configurator software



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MECHATROLINK

MODEL: R7G4HML3-6-LC2–R[1]

ORDERING INFORMATION

• Code number: R7G4HML3-6-LC2-R[1]

Specify a code from below for [1].

(e.g. R7G4HML3-6-LC2-R/R20/F2K/Q)

• Specify the specification for option code /Q

(e.g. /C01/SET)

TERMINAL BLOCK

6: Screw terminal block for power supply
Connector for MECHATROLINK- III
Screw terminal block for I/O

I/O TYPE

LC2: Strain gauge input, 2 points

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

CR 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-7772-LC2)

RELATED PRODUCTS

• PC Configurator cable (model: MCN-CON or COP-US)

• PC configurator software (model: R7CFG)
Downloadable at our web site.

GENERAL SPECIFICATIONS

Connection

MECHATROLINK-III: MECHATROLINK-III connector

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 MECHATROLINK or FE to power

Zero adjustments: Configurable via R7CFG

Span adjustments: Configurable via R7CFG

Load coefficient: Configurable via R7CFG

Averaging: Configurable via R7CFG

Excitation Voltage: Configurable via R7CFG

Lowpass filter: Configurable via R7CFG

Monitor output: Configurable via R7CFG

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

Input status indicator LEDs: A.ZERO, ZERO, SPAN, MODE, RESET, UNDER, 0-100, OVER
(Refer to the instruction manual for details)

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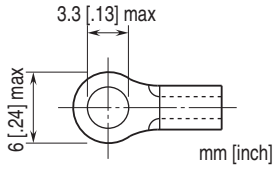
Configurator connection: 2.5 dia. miniature jack

■Recommended solderless terminal



MECHATROLINK-III COMMUNICATION

Baud rate: 100 Mbps
Transmission distance: 6300 m max.
Distance between stations: 100 m max.
Transmission media: MECHATROLINK cable (Model JEPMC-W6013-x-E, Yaskawa Controls Co., Ltd.)
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 µsec., 250 µsec., 500 µsec., 1 – 64 msec. (with 1 msec. increments)
Communication cycle: 125 µsec. 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
Message transmission command: 01H, 7FH
Slave monitoring: None

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
•DC: Approx. 160 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)

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±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
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 MECHATROLINK 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 using PC Configurator Software (model: R7CFG)
Refer to the users manual for the R7CFG for detailed operation of the software program.

■ SETTINGS FOR INDIVIDUAL CHANNELS

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 (%)
Averaging	2, 4, 8, 16, 32, 64, 128, 256, 512, 1024	16
Excitation	5V, 2.5V	5V
Lowpass filter	2Hz, 2kHz (1Hz only for /F1)	2kHz (1Hz only for /F1)
Monitor output	-115.00 to +115.00 (%)	–

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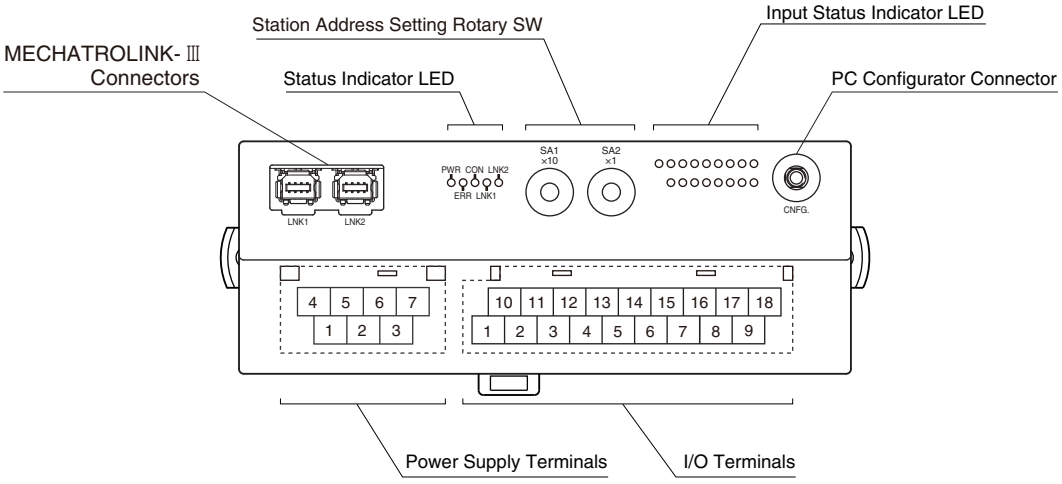
EXTERNAL VIEW



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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MECHATROLINK RELATED COMMANDS

Commands available with the unit are as follow.

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

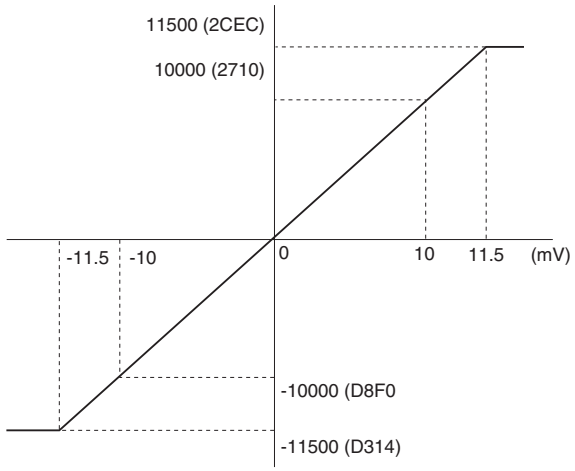
DATA CONVERSION

■ 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

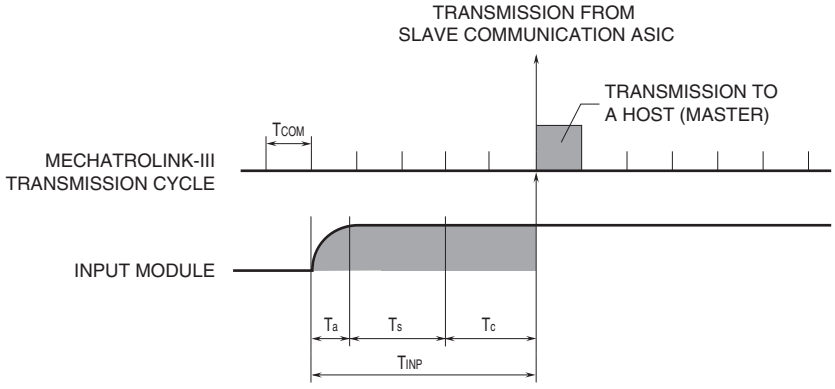
Response time of analog input module is time from when 0 to 100% stepwise signal change is applied to the analog module till when the communication ASIC of the module (slave) transmits 90% of input signal.

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

T_{INP}: Input module response time ≤ Input Delay time (Ta) + Conversion rate[*1] (Tb) + input internal processing delay time (Tc) (two transmission cycle)

*1. Conversion rate x Averaging

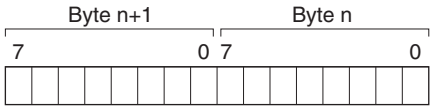
E.g.: Averaging (2), input delay time of 20 msec, transmission cycle of 0.5 msec.
Input module response time (T_{INP}): Input Delay time (20 msec.) + Conversion rate (0.5 msec.) × Averaging (2) + internal processing delay time (0.5 msec. x 2) = 22 [msec.]



I/O DATA DESCRIPTIONS

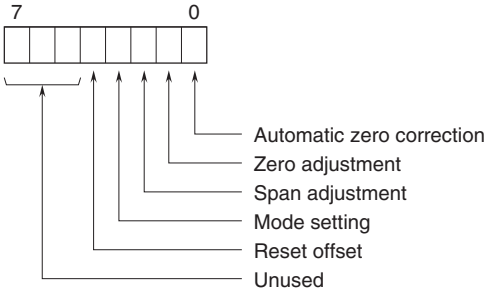
Scaling of analog I/O module is configurable with the configurator software (model: R7CFG). Refer to the software manual for details.

■ **ANALOG I/O**



Data is represented in 16-bit binary. Negative value is represented in 2's complements.

■ **SETTING COMMAND**



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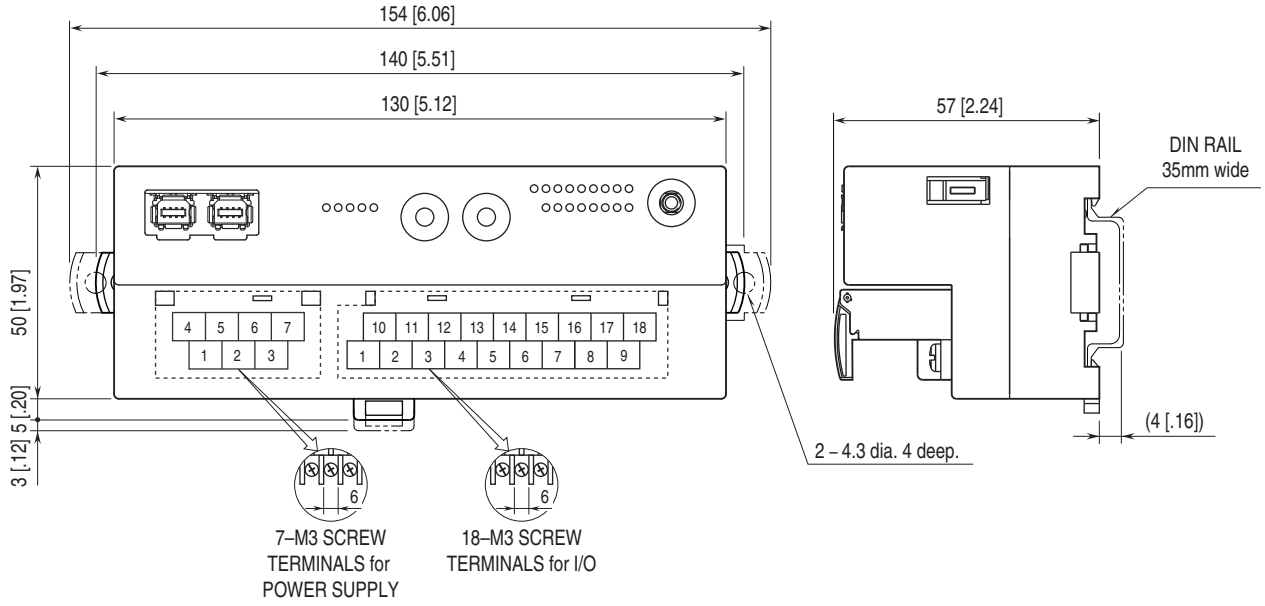
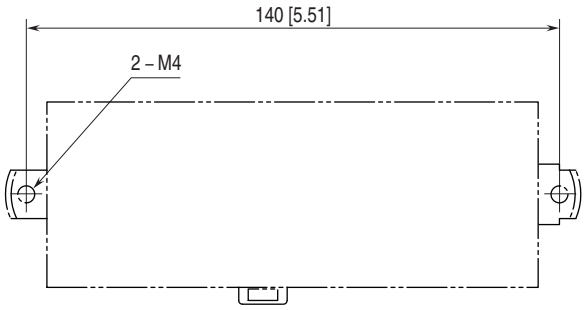
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



MOUNTING REQUIREMENTS unit: mm [inch]



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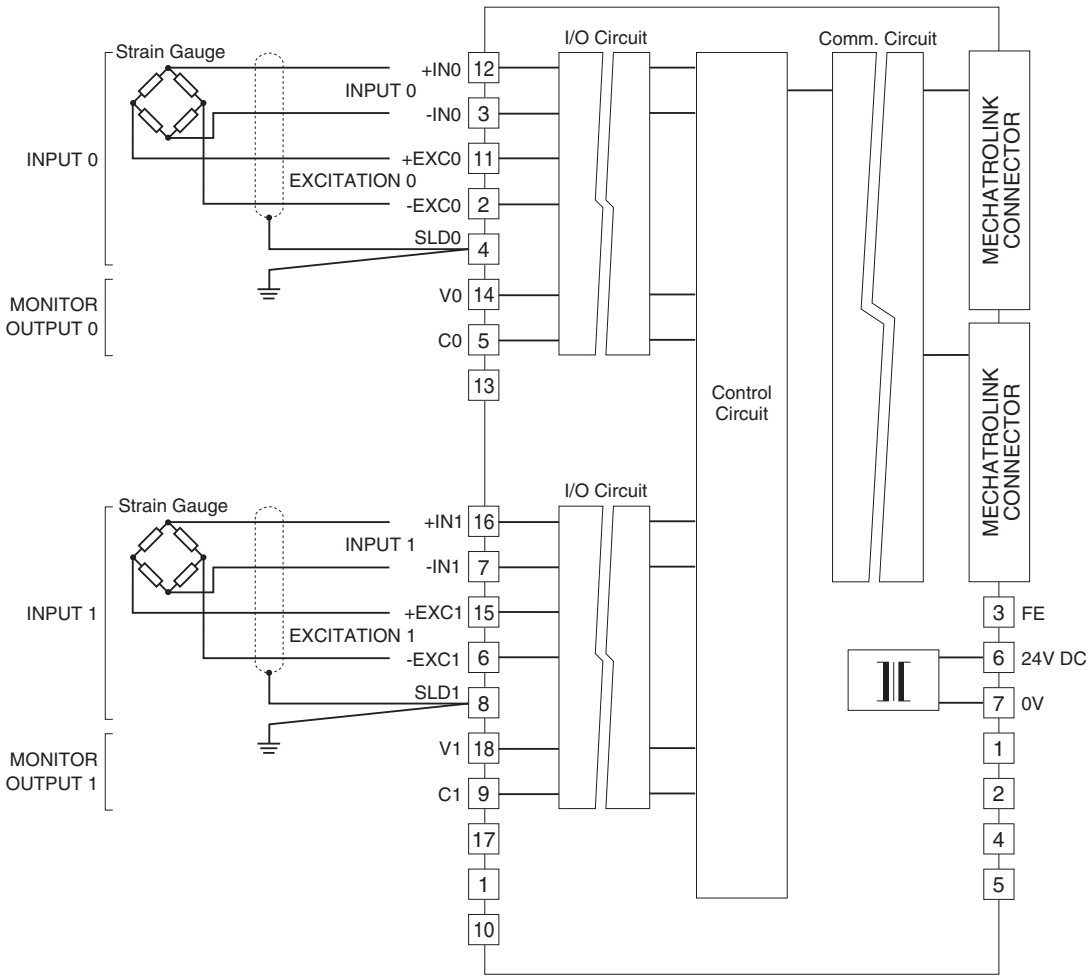
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

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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