

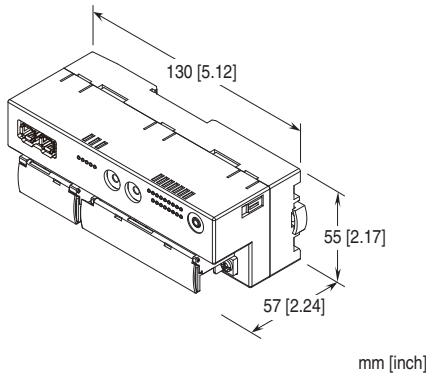
## Remote I/O R7G4H Series

### 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 M-System's configurator software



## 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  $\pm$ 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 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-7772-LC2)

### RELATED PRODUCTS

- PC configurator software (model: R7CFG)

Downloadable at M-System's web site.

A dedicated cable is required to connect the module to the PC. Please refer to the internet software download site or the users manual for the PC configurator for applicable cable types.

### 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<sup>2</sup> (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

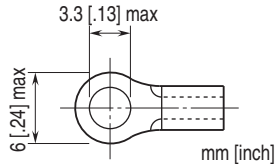
(Refer to the instruction manual for details)

**Input status indicator LEDs:** A.ZERO, ZERO, SPAN, MODE,

RESET, UNDER, 0-100, OVER

(Refer to the instruction manual for details)

**■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)

±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

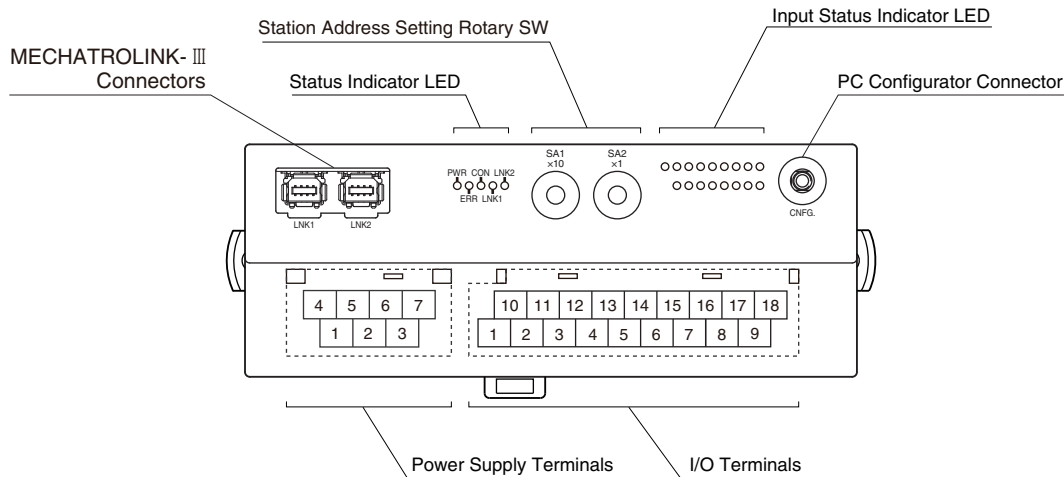
The following parameters can be set with using PC Configurator Software (model: R7CFG)

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 (%)	-

## 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)

## 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

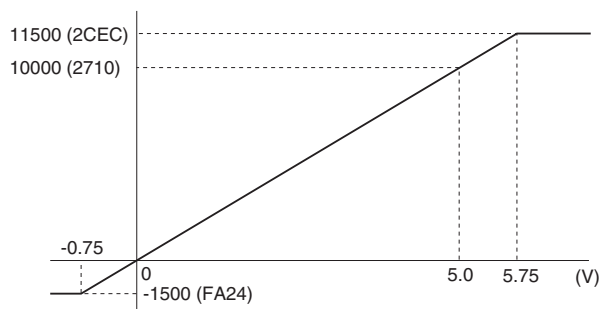
### ■ I/O RANGE AND DATA CONVERSION (FACTORY DEFAULT SETTING)

Analog input data is converted into digital representations of 0 – 100% proportional to each scaled range. The converted % values are multiplied by 100 and expressed in 16 bits.

Overrange input is possible from -15 to +115% of the nominal range. When the signal exceeds the limit, the data is fixed at -15% or +115% respectively. Negative value is represented in 2's complements.

#### • Input Range 0 – 5 V DC

Input Value	Input %	Converted Data, Decimal	Converted Data, Hex
≤ -0.75 V	-15%	-1500	FA24
0 V	0%	0	0
5 V	100%	10000	2710
≥ 5.75 V	115%	11500	2CEC



Analog output is converted in the reverse order of the input data. The output range 0 – 5 V DC is expressed as 10000 at 5.0 V (100%) and 0 at 0 V (0%).

## 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.

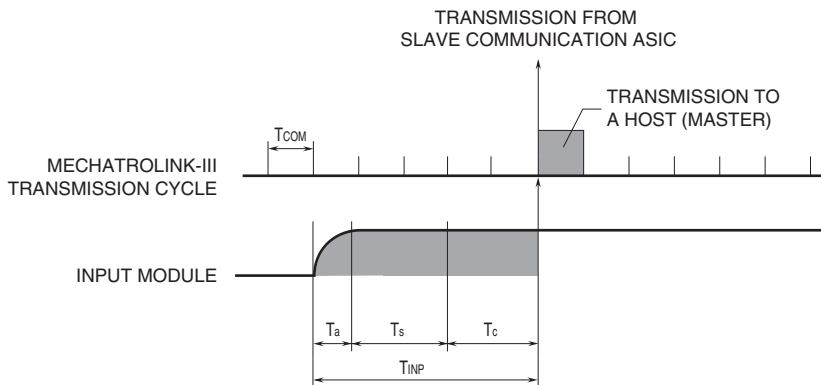
$T_{COM}$ : MECHATROLINK-III transmission cycle set at master  
(depends on system and configuration)

$T_{INP}$ : Input module response time  $\leq$  Input Delay time ( $T_a$ ) + Conversion rate<sup>\*1</sup> ( $T_b$ ) + input internal processing delay time ( $T_c$ )  
(two transmission cycle)

\*1. Conversion rate x Averaging

E.g.: Averaging (2), input delay time of 20 msec, transmission cycle of 0.5 msec.

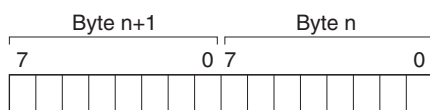
Input module response time ( $T_{INP}$ ): Input Delay time (20 msec.) + Conversion rate (0.5 msec.) x Averaging (2)  
+ internal processing delay time (0.5 msec. x 2) = 22 [msec.]



## I/O DATA DESCRIPTIONS

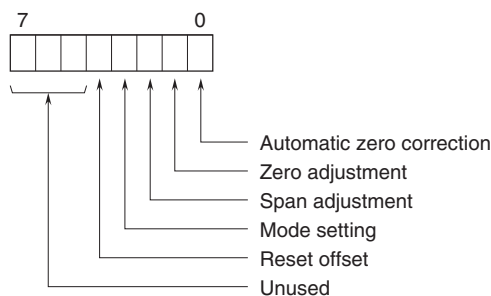
Scaling of analog I/O module is configurable with the configurator software (model: R7CFG). Refer to the software manual for details.

### ANALOG I/O



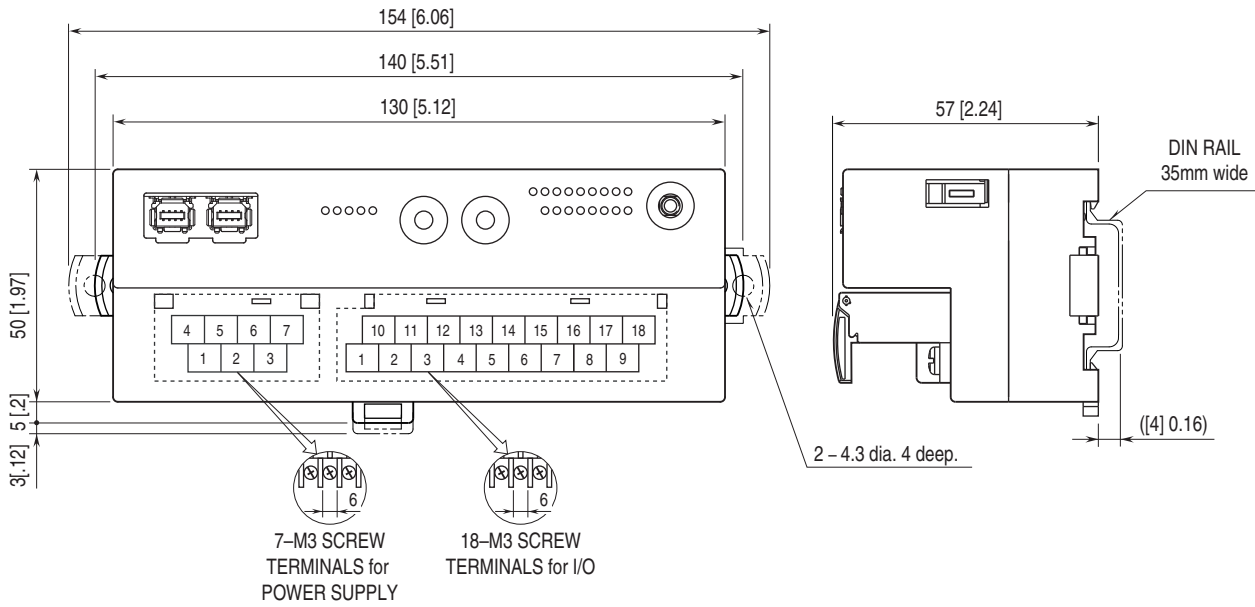
Data is represented in 16-bit binary. Negative value is represented in 2's complements.

### SETTING COMMAND

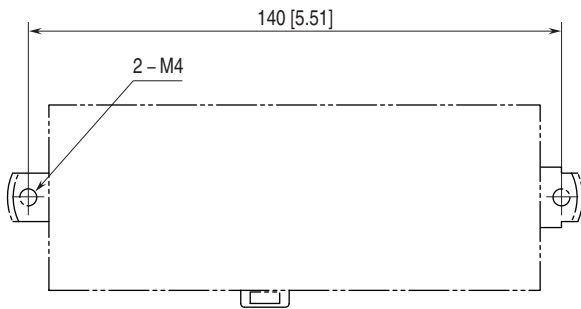


# MODEL: R7G4HML3-6-LC2

## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



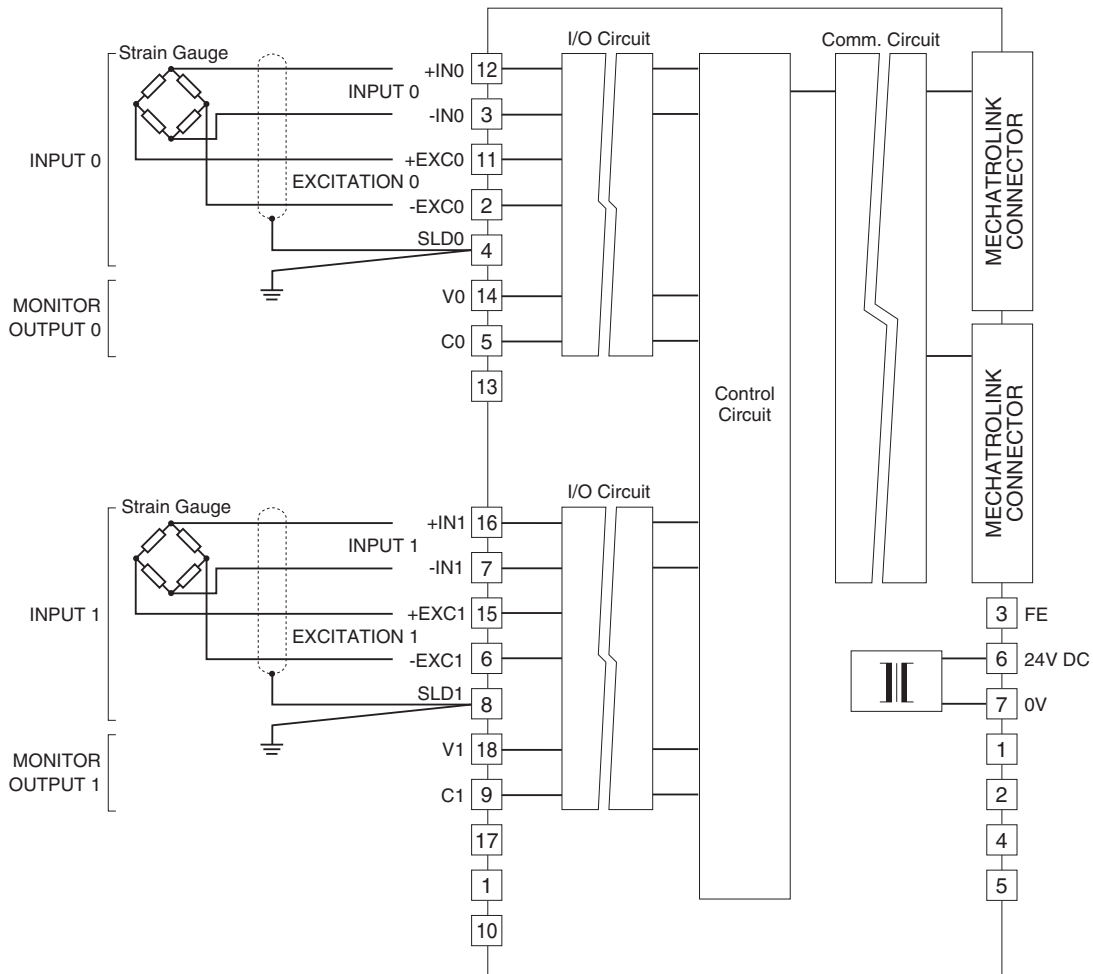
## MOUNTING REQUIREMENTS unit: mm [inch]



## 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.