

MODEL: R7G4HML3-6-SVAF4

Remote I/O R7G4H Series

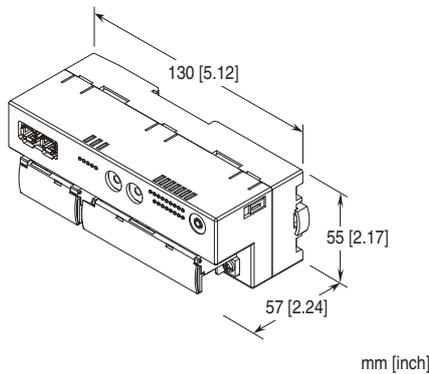
(Operational voltage range 24 V \pm 10 %, ripple 10 %p-p max.)

MECHATROLINK I/O MODULE

(high resolution, high-speed DC voltage/current input, 4 points, isolated, screw terminal block, MECHATROLINK-III use)

Functions & Features

- 4 points high-speed DC voltage/current input for MECHATROLINK-III
- Easy parameter setting of individual channels with the configurator software



MECHATROLINK

MODEL: R7G4HML3-6-SVAF4-R[1]

ORDERING INFORMATION

- Code number: R7G4HML3-6-SVAF4-R[1]
Specify a code from below for [1].
(e.g. R7G4HML3-6-SVAF4-R/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

SVAF4: high resolution, high-speed DC voltage/current input, 4 points (10 V/20 mA)

POWER INPUT

- DC Power**
R: 24 V DC

[1] OPTIONS

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-J)

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, input: 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 mm² (AWG 22 to 16)

Screw terminal: Nickel-plated steel

Housing material: Flame-resistant resin (gray)

Isolation: Input 0 to input 1 to input 2 to input 3 to MECHATROLINK or FE to power

Zero adjustments: Configurable via R7CFG

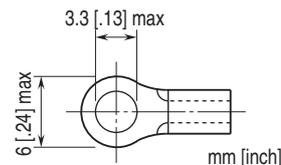
Span adjustments: Configurable via R7CFG

Input range: Configurable via R7CFG

Number of times of averaging: Configurable via R7CFG

Status indicator LEDs: PWR, ERR, CON, LNK1, LNK2
(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 JEMC-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 μ sec., 250 μ sec., 500 μ sec., 1 - 64 msec. (with 1 msec. increments)
Communication cycle: 125 μ sec. 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
Slave monitoring: None

INPUT SPECIFICATIONS

- **Current range**
 - **Input resistance:** 50 Ω
 - **Operational range:** -23- +23mA
 - **Input range:** -20 - +20 mA DC, 0 - 20 mA DC, 4 - 20 mA DC
- **Narrow span voltage**
 - **Input resistance:** \geq 100 k Ω
 - **Operational range:** -1.15- +1.15V
 - **Input range:** -1 - +1 V DC, 0 - 1 V DC, -0.5 - +0.5 V DC
- **Wide span voltage**
 - **Input resistance:** \geq 1 M Ω
 - **Operational range:** -11.5 - +11.5V
 - **Input range:** -10 - +10 V DC, -5 - +5 V DC, 0 - 10 V DC, 0 - 5 V DC, 1 - 5 V DC

INSTALLATION

Current consumption
 • DC: Approx. 100 mA
Operating temperature: -10 to +55 $^{\circ}$ C (14 to 131 $^{\circ}$ F)
Storage temperature: -20 to +65 $^{\circ}$ C (-4 to +149 $^{\circ}$ 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

Conversion accuracy: \pm 0.1 %
Conversion rate: 1 msec. / 4 CH
Conversion data: -32768 - +32767 or 0 - 65535
Temp. coefficient: \pm 0.015 %/ $^{\circ}$ C (\pm 0.008 %/ $^{\circ}$ F)
Input delay time: \leq 1 msec. (0 - 90 %)
Insulation resistance: \geq 100 M Ω with 500 V DC
Dielectric strength: 1500 V AC @ 1 minute
 (input 0 to input 1 to input 2 to input 3 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.

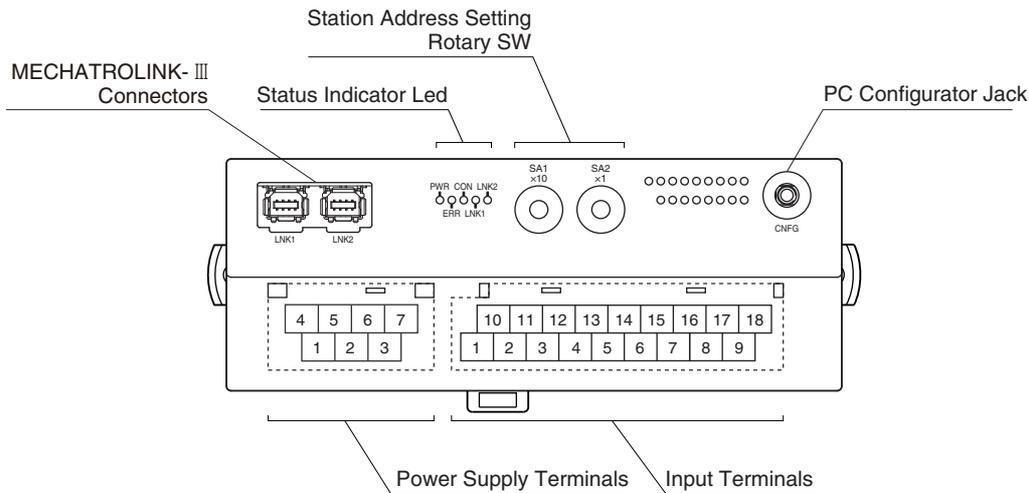
■ CHANNEL INDIVIDUAL SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Unused setting	CH enabled CH disabled	CH enabled
Input range	-10 - +10 V DC -5 - +5 V DC -1 - +1 V DC 0 - 10 V DC 0 - 5 V DC 1 - 5 V DC 0 - 1 V DC -0.5 - +0.5 V DC -20 - +20 mA DC 0 - 20 mA DC 4 - 20 mA DC	-10 - +10 V DC
Bias	-320.00 - +320.00(%)	0.00 (%)
Gain	-3.2000 - +3.2000	1.0000
Zero scale	-32,768 - +32,767 or 0 - 65535	-32,768
Full scale	-32,768 - +32,767 or 0 - 65535	32,767

■ CHANNEL BATCH SETTING

PARAMETER	SETTING RANGE	DEFAULT SETTING
Moving average	1, 2, 4, 8, 16, 32, 64, 128, 256	1

EXTERNAL VIEW



TERMINAL ASSIGNMENTS

■ INPUT TERMINAL ASSIGNMENT

10	11	12	13	14	15	16	17	18
VL0	I0	VL1	I1	NC	VL2	I2	VL3	I3
1	2	3	4	5	6	7	8	9
VH0	COM0	VH1	COM1	NC	VH2	COM2	VH3	COM3

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	VH0	Wide span volt. 0	10	VL0	Narrow span volt. 0
2	COM0	Common 0	11	I0	Current range 0
3	VH1	Wide span volt. 1	12	VL1	Narrow span volt. 1
4	COM1	Common 1	13	I1	Current range 1
5	NC	No connection	14	NC	No connection
6	VH2	Wide span volt. 2	15	VL2	Narrow span volt. 2
7	COM2	Common 2	16	I2	Current range 2
8	VH3	Wide span volt. 3	17	VL3	Narrow span volt. 3
9	COM3	Common 3	18	I3	Current range 3

■ 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

■ INPUT RANGE AND DATA CONVERSION (FACTORY DEFAULT SETTING)

Analog input data is converted into digital representations of 0 – 100% proportional to each scaled range.

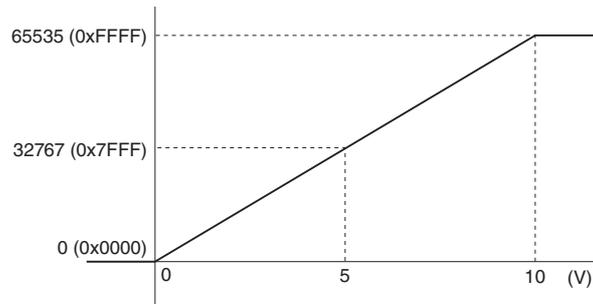
The conversion data is the value converted into 16 bits (0~65535 or -32768~+32767) from this converted % value.

Overrange input is possible from 0 to 100% of the nominal range.

When the signal exceeds the limit, the data is fixed at 0% or 100%.

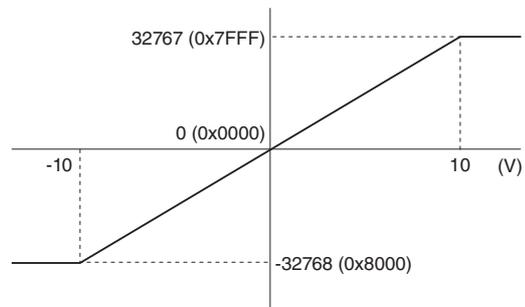
• Input Range 0 – 10V DC

Input Value	Input %	Converted Data, Decimal	Converted Data, Hex
<0V	0%	0	0x0000
0V	0%	0	0x0000
5V	50%	32767	0x7FFF
10V	100%	65535	0xFFFF
>10V	100%	65535	0xFFFF



• Input Range -10 – +10V DC

Input Value	Input %	Converted Data, Decimal	Converted Data, Hex
<-10V	0%	-32768	0x8000
-10V	0%	-32768	0x8000
0V	50%	0	0x0000
10V	100%	32767	0x7FFF
>10V	100%	32767	0x7FFF



The hardware input range is -15 to +115% of the input range.

(For ±10V range, ±1V range, and ±20mA range, it is -7.5 to +107.5%)

By setting the Data type/Zero scaling value/Full scaling value in the configurator software (Model: R7CFG),

the conversion data narrowed from 0 to 65535 or -32768 to +32767, conversion data of -15 to +115% can be obtained.

E.g.) If the input range is set to 0 to 10V with Data type: unsigned, Zero scaling value: 0, Full scaling value: 10000, the input range of -1.5 to +11.5V is obtained as conversion data: -1500 to +11500.

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.

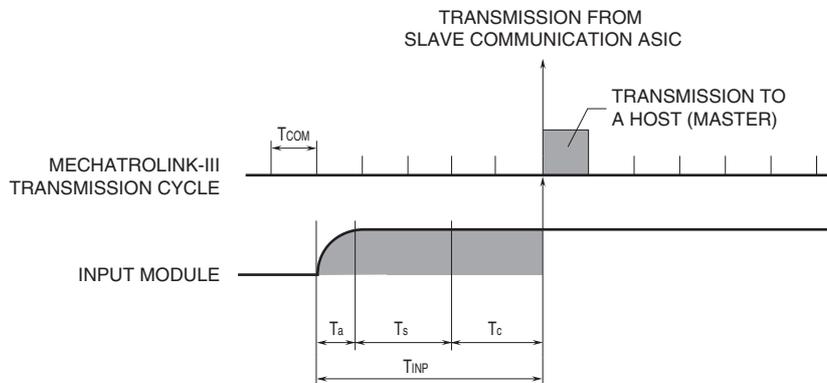
T_{COM} : MECHATROLINK-III transmission cycle set at master
(depends on system and configuration)

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

*1. Conversion rate \times Averaging

E.g.: Averaging (1), transmission cycle of 0.5 msec.

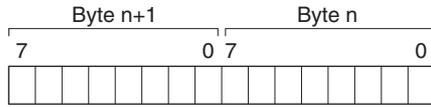
Input module response time (T_{INP}): Input Delay time (1 msec.) + Conversion rate (1 msec.) \times Averaging (1)
+ internal processing delay time (0.5 msec. \times 2) = 3.0 [msec.]



I/O DATA DESCRIPTIONS

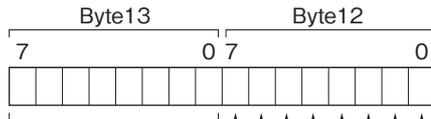
Scaling of analog input module is configurable with the configurator software (model: R7CFG). Refer to the software manual for details.

ANALOG INPUT



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

STATUS



- CH0: Input range error (-15% or less, 115% or more*¹, Data exceeding 16 bit*²)
- CH1: Input range error (-15% or less, 115% or more*¹, Data exceeding 16 bit*²)
- CH2: Input range error (-15% or less, 115% or more*¹, Data exceeding 16 bit*²)
- CH3: Input range error (-15% or less, 115% or more*¹, Data exceeding 16 bit*²)
- CH0: ADC error
- CH1: ADC error
- CH2: ADC error
- CH3: ADC error
- Not used (fixed to 0)

Input range error

0: normal, 1: error

ADC error (no response from ADC)

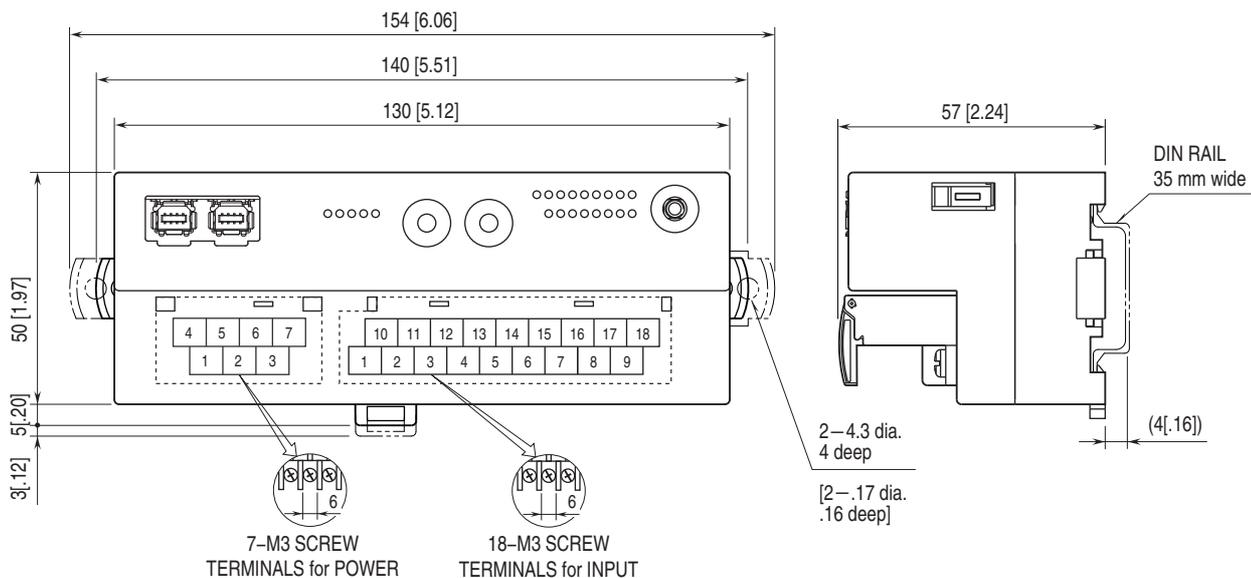
0: normal, 1: error

*1. In $\pm 10V$ range, $\pm 1V$ range or $\pm 20mA$ range, -7.5% or less, 107.5% or more

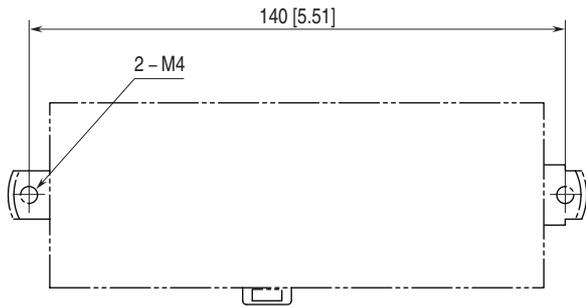
*2. Data type: In case of `signed`, 0 or less, 65535 or more

Data type: In case of `unsigned`, -32768 or less, 32767 or more

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



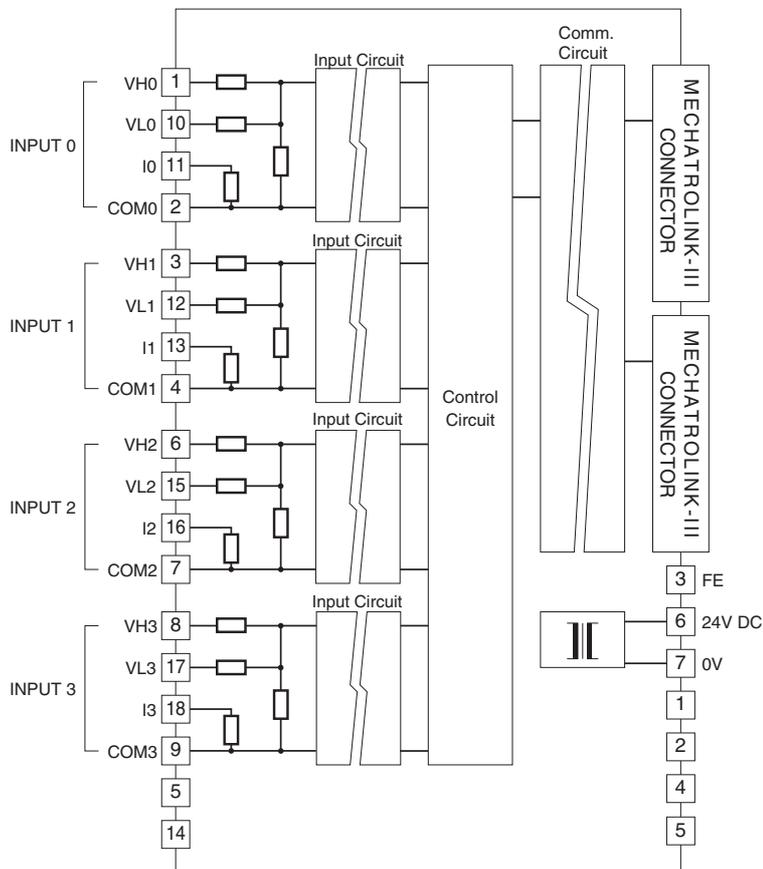
MOUNTING REQUIREMENTS unit: mm [inch]



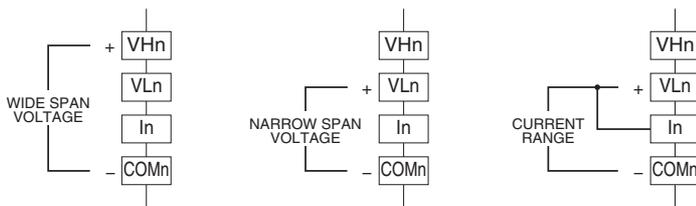
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

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

Caution: FE terminal is NOT a protective conductor terminal.



INPUT CONNECTION EXAMPLES



Note: Be sure VL_n and IN terminals are cross-wired at DC current input.



Specifications are subject to change without notice.