

MODEL: R7G4HML3-6-STYVS1

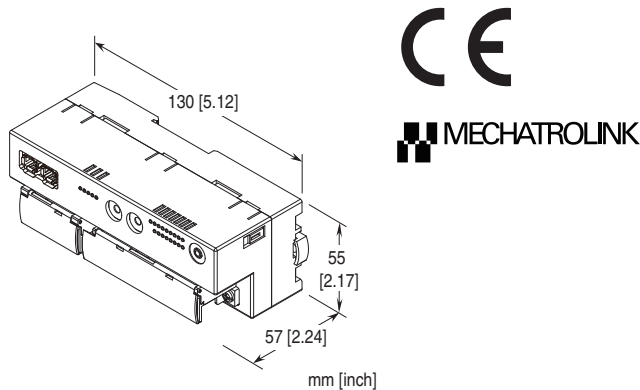
Remote I/O R7G4H Series

MECHATROLINK I/O MODULE

(self-synch input & DC voltage/current output, 1 point each, isolated, screw terminal block, message transmission command, MECHATROLINK-III use)

Functions & Features

- 1 point self-synch input and 1 point each DC voltage/current output for MECHATROLINK- III
- Easy parameter setting with the configurator software



MODEL: R7G4HML3-6-STYVS1-R[1]

ORDERING INFORMATION

- Code number: R7G4HML3-6-STYVS1-R[1]
Specify a code from below for [1].
(e.g. R7G4HML3-6-STYVS1-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

STYVS1: Self-synch input, DC voltage/current output, 1 point each

POWER INPUT

DC Power

R: 24 V DC

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

[1] 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-7772-STYVS1)

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 mm² (AWG 22 to 16)

Screw terminal: Nickel-plated steel

Housing material: Flame-resistant resin (gray)

Isolation: Input to output to MECHATROLINK or FE to power

Status indicator LEDs: PWR, ERR, CON, LNK1, LNK2

(Refer to the instruction manual for details)

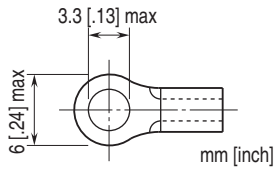
Parameter setting: With PC configurator software (model: R7CFG)

- Angle span
 - Moving average
 - Number of point for linearization
 - Linearization
 - Output range
 - scaling
 - Output function at the loss of communication
- Refer to the instruction manual for detail.

Configurator connection: 2.5 dia. miniature jack

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■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: TE Connectivity Industrial mini I/O connector

Max. number of Subordinate Devices: 62

(The maximum number of Subordinate Devices might change depending on the Main Device unit. Refer to the manual of the Main Device 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

Message transmission command: 01H, 7FH

Subordinate Device monitoring: None

INPUT SPECIFICATIONS

Measurement range: 0 - 360°

Angle span: 60 - 360°

Input resistance: $\geq 1 \text{ M}\Omega$

Rated input voltage: 90 V AC, 50/60 Hz

Sync signal input voltage (in common with self-synch power supply): 85 - 132 V AC, 50/60 Hz

OUTPUT SPECIFICATIONS

■ DC Current

Output range: 4 to 20 mA DC

Load resistance: $\leq 550 \Omega$

Operational range: -15 to +115 % of output range

■ DC Voltage

Output range: -10 - +10 V, -5 - +5 V, 0 - 10 V, 0 - 5 V, 1 - 5 V DC

Load resistance: 100 k Ω min.

Operational range

Except -10 to +10 V DC: -15 to +115 % of output range

-10 to +10 V DC: Approx. -11.5 to +11.5 V DC

INSTALLATION

Current consumption

•DC: Approx. 100 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

Conversion accuracy

Self-synch input:

Linearize gain ≤ 1 : $\pm 0.2 \%$ or $\pm 0.5^\circ$, whichever is greater

Linearize gain > 1 : Conversion accuracy x linearize gain

DC output: $\pm 0.1 \%$

Conversion rate

Self-synch input: Sync signal input frequency 50 Hz, 20

msec. Sync signal input frequency 60 Hz, 16.7 msec.

DC output: 200 μ sec.

Conversion data

Self-synch input: 0 - 10000 for input range

DC output: 0 - 10000 for output range

Temp. coefficient:

Self-synch input: $\pm 0.015 \%/^\circ\text{C}$ ($\pm 0.008 \%/^\circ\text{F}$) of max. span

DC output: $\pm 0.015 \%/^\circ\text{C}$

Input delay time: ≤ 100 msec. (0 - 90 %)

Output delay time: $\leq 250 \mu$ sec. (0 - 90 %)

Insulation resistance: $\geq 100 \text{ M}\Omega$ with 500 V DC

Dielectric strength: 1500 V AC @ 1 minute (input to output to MECHATROLINK or FE to power)

STANDARDS & APPROVALS

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

Low Voltage Directive

EN 61010-1, EN 61010-2-201

Measurement Category II (input)

Pollution Degree 2

Input to power: Basic insulation (300 V)

RoHS Directive

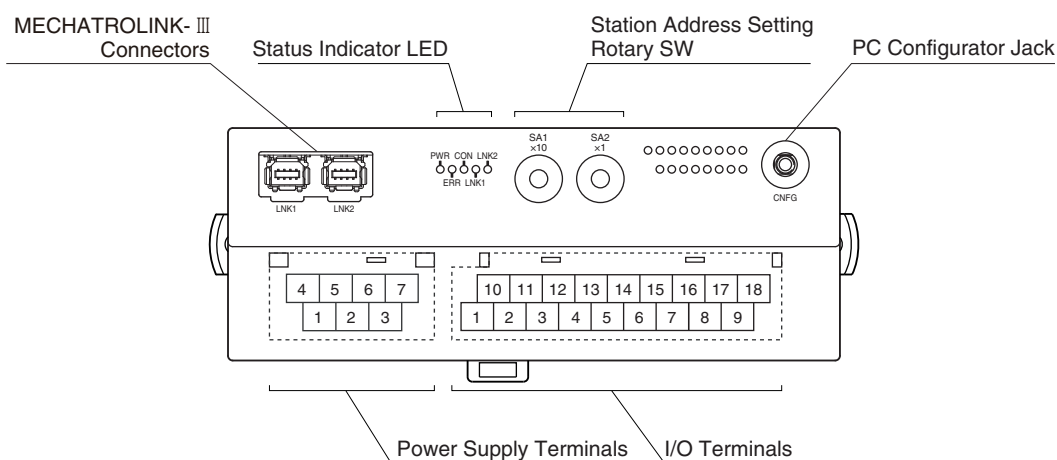
PC CONFIGURATOR

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.

	PARAMETER	SETTING RANGE	DEFAULT SETTING
INPUT	Angle offset	0.00 – 360.00 (deg.)	0.00 (deg.)
	Angle span	60.00 – 360.00 (deg.)	270.00 (deg.)
	Input rotate direction	CW CCW	CW
	Bias adjustment	-320.00 – +320.00 (%)	0.00 (%)
	Gain adjustment	-3.2000 – +3.2000	1.0000
	Scaled range Zero	-32 000 – +32 000	0
	Scaled range Span	-32 000 – +32 000	10 000
	Moving average	1, 2, 4, 8, 16, 32, 64, 128, 256	1
	Number of point for linearization	0 (linearization disable), 3 – 32	0
	Linearization (depends on number of point)	-15% (-1500) – +115% (+11500)	0
OUTPUT	Unused setting	CH enable CH disable	CH enable
	Output range	-10 – +10 V DC -5 – +5 V DC 0 – 10 V DC 0 – 5 V DC 1 – 5 V DC 4 – 20 mA DC	-10 – +10 V DC
	Bias adjustment	-320.00 – +320.00 (%)	0.00 (%)
	Gain adjustment	-3.2000 – +3.2000	1.0000
	Scaled range Zero	-32 000 – +32 000	0
	Scaled range Span	-32 000 – +32 000	10 000
	Output reset value	-15.00 – +115.00 (%)	-15.00 (%)
	Setting indication for output function at the loss of communication	Hold the output Output reset value	Hold the output

EXTERNAL VIEW



TERMINAL ASSIGNMENTS**■ I/O TERMINAL ASSIGNMENT**

10	11	12	13	14	15	16	17	18
NC	NC	IO	ICOM	R1	NC	NC	NC	NC
1	2	3	4	5	6	7	8	9
NC	VO	VCOM	NC	R2	NC	S1	S2	S3

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	10	NC	No connection
2	VO	Voltage out.	11	NC	No connection
3	VCOM	Voltage out. common	12	IO	Current out.
4	NC	No connection	13	ICOM	Current out. common
5	R2	Sync signal input 2	14	R1	Sync signal input 1
6	NC	No connection	15	NC	No connection
7	S1	Self-synch input 1	16	NC	No connection
8	S2	Self-synch input 2	17	NC	No connection
9	S3	Self-synch input 3	18	NC	No connection

■ 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

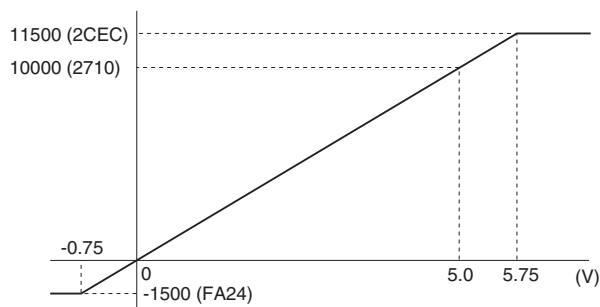
DATA CONVERSION**■ I/O RANGE AND DATA CONVERSION (FACTORY DEFAULT SETTING)**

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 (Subordinate Device) transmits 90% of input signal.

Response time of analog output module is time from when 0 to 100% stepwise signal change is received by the communication ASIC of the module (Subordinate Device) till when the analog output signal reaches 90%.

T_{COM} : MECHATROLINK-III transmission cycle set at Main Device
(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)

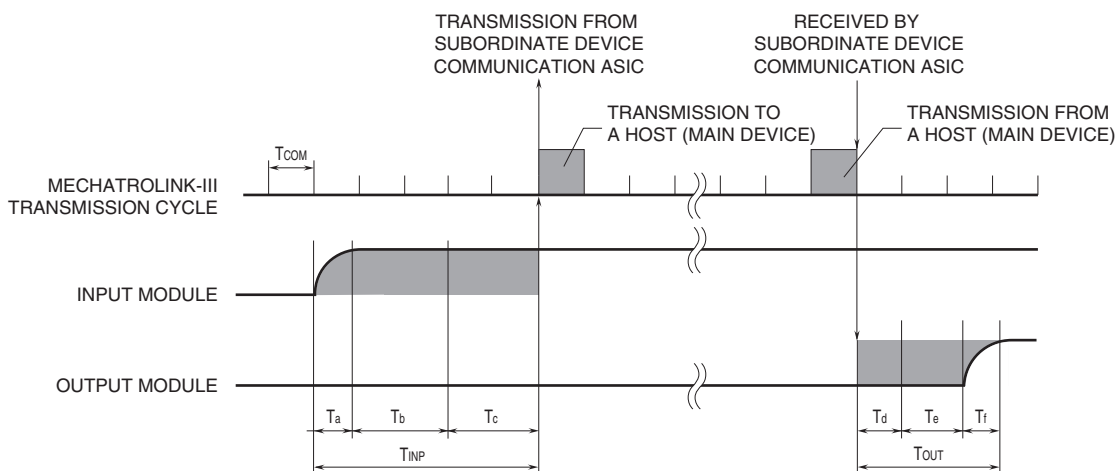
T_{OUT} : Output module response time $\leq$ Output internal processing delay time (T_d) (one minimum transmission cycle the unit can handle) + Conversion rate (T_e) + Output Delay time (T_f)

*1. Conversion rate x Averaging

E.g. 1. Averaging (1), sync signal input frequency of 50 Hz, transmission cycle of 1 msec.

Input module response time (T_{INP}): Input Delay time (100 msec.) + Conversion rate (20 msec.) x Averaging (1) + internal processing delay time (1 msec. x 2) = 122 [msec.]

Output module response time (T_{OUT}): Output internal processing delay time (0.125 msec.) + Conversion rate (0.20 msec.) + Output Delay time (0.25 msec.) = 0.575 [msec.]

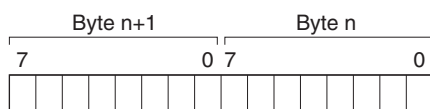


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I/O DATA DESCRIPTIONS

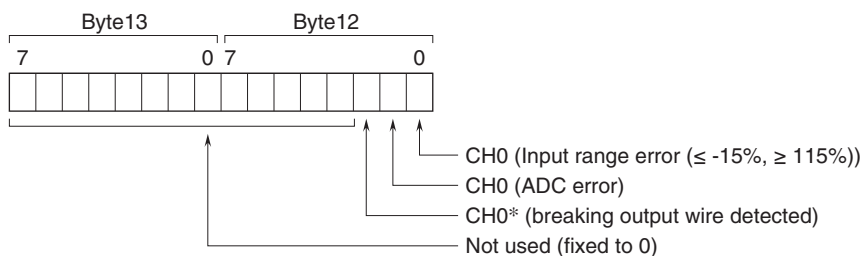
Scaling of analog I/O module is configurable with the configurator software (model: R7CFG). Refer to the software manual for details.

■ ANALOG I/O



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

■ STATUS



Input range error

0: Normal 1: Error

ADC error

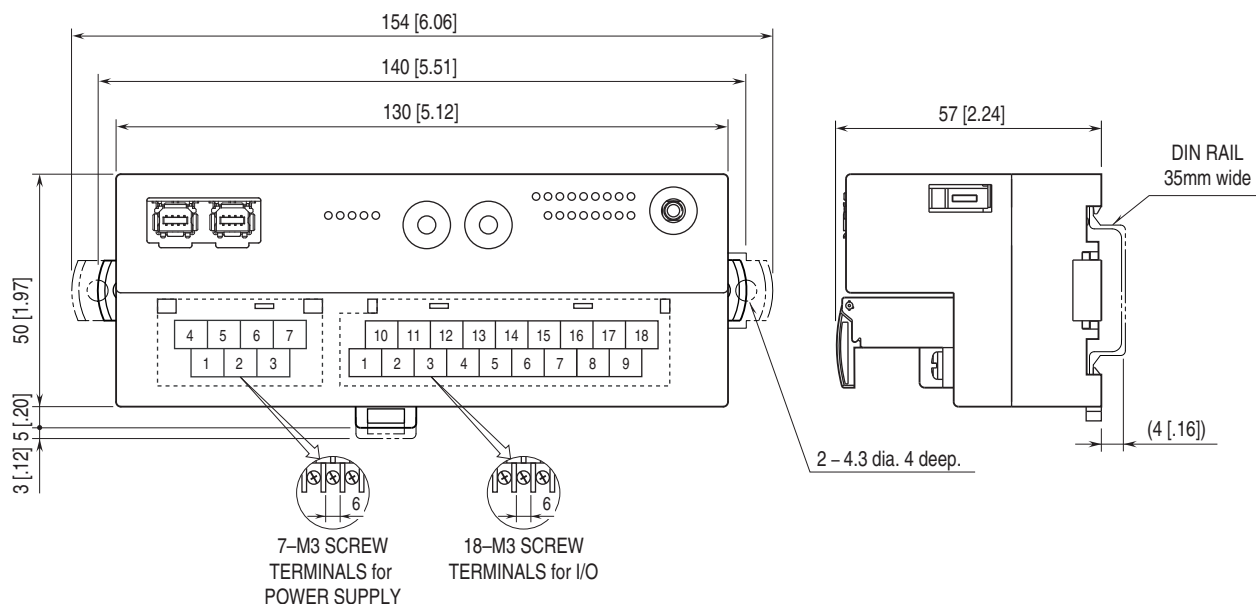
0: Normal 1: Error

Detected breaking output wire

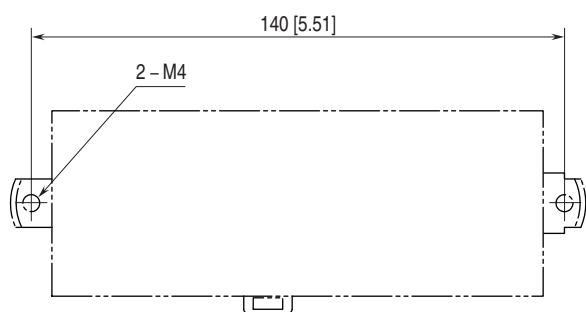
0: Normal 1: Error

* When '4 to 20mA' is chosen for output range. It is fixed to 0 for except '4 to 20mA' range.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



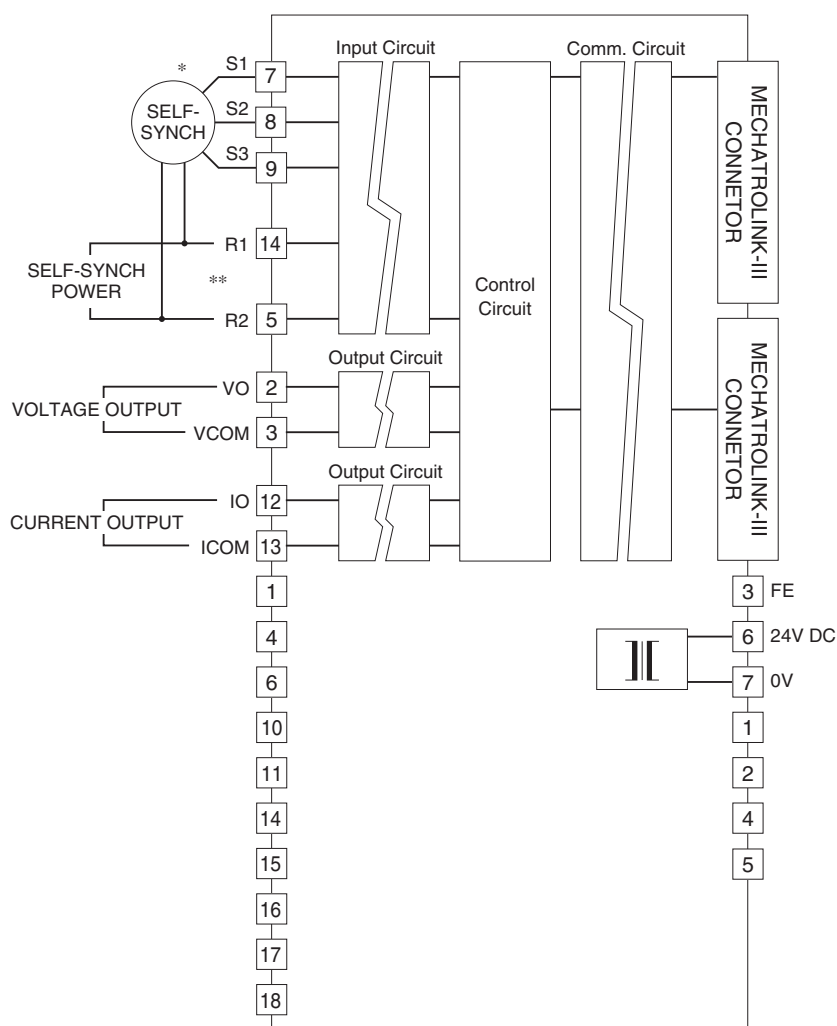
MOUNTING REQUIREMENTS unit: mm [inch]



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.



* The output increases when the self-synch rotates clockwise. For changing the operation to counterclockwise, replace the connection of the S2 and S3.

**Be sure that the polarity of the self-synch power input to the module matches to the self-synch polarity. When the connection is reversed, the module input data will be shifted by 180°.



Specifications are subject to change without notice.