## 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

130 [5.12]

55 [2.17]

57 [2.24]

mm [inch]

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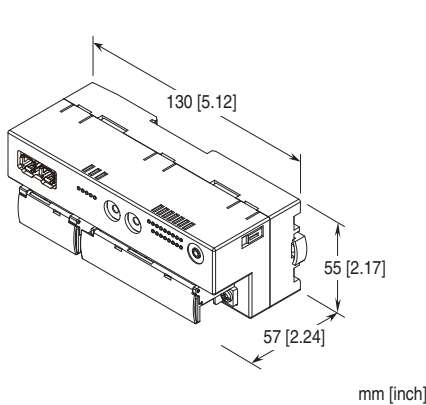
MODEL: R7G4HML3-6-STYVS1–R[1]

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 ±10 %, ripple 10 %p-p max.)

[1] OPTIONS

blank: none
/Q: Options 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-STYVS1)

RELATED PRODUCTS

• PC configurator software (model: R7CFG)
Downloadable at our 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^2 (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.

■Recommended solderless terminal

3.3 [.13] max

6 [.24] max

mm [inch]

-10 to +10 V DC: Approx. -11.5 to +11.5 V DC
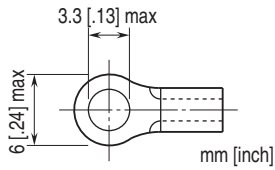
MECHATROLINK-III COMMUNICATION

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

Measurement range: 0 - 360°

Angle span: 60 - 360°

Input resistance: ≥ 1 MΩ

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: ≤ 550 Ω

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 kΩ min.

Operational range

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

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: ±0.2 % or ±0.5°, whichever is greater

  Linearize gain > 1: Conversion accuracy x linearize gain

 DC output: ±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: 200µsec.

Conversion data

 Self-synch input: 0 - 10000 for input range

 DC output: 0 - 10000 for output range

Temp. coefficient:

 Self-synch input: ±0.015 %/°C (±0.008 %/°F) of max. span

 DC output: ±0.015 %/°C

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

Output delay time: ≤ 250 µsec. (0 - 90 %)

Insulation resistance: ≥ 100 MΩ 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

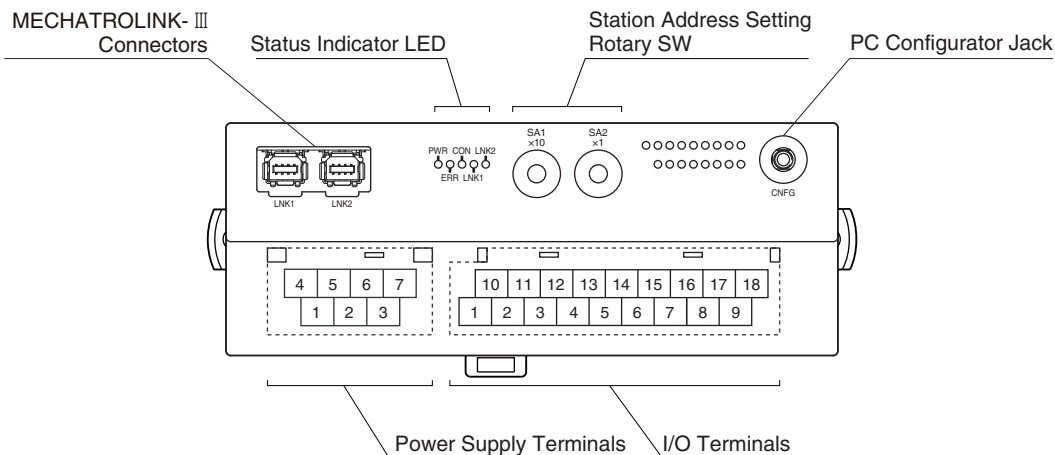 Input to power: Basic insulation (300 V)

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

MECHATROLINK- Ⅲ Connectors

Status Indicator LED

Station Address Setting Rotary SW

PC Configurator Jack

Power Supply Terminals

I/O Terminals

TERMINAL ASSIGNMENTS

■I/O TERMINAL ASSIGNMENT

10 NC	11 NC	12 IO	13 ICOM	14 R1	15 NC	16 NC	17 NC	18 NC
1 NC	2 VO	3 VCOM	4 NC	5 R2	6 NC	7 S1	8 S2	9 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 NC	5 NC	6 +24V	7 0V
1 NC	2 NC	3 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

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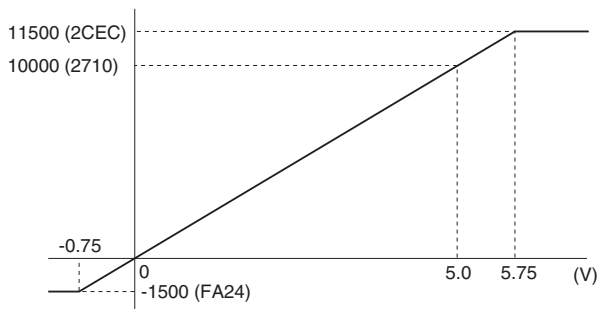
Analog output is converted in the reverse order of the input data. The output range 0 – 5 V DC is expressed as 10000 at 5.0 V (100%) and 0 at 0 V (0%).

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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.

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

T_{COM}: MECHATROLINK-III transmission cycle configured by a host device.
MECHATROLINK-III transmission cycle vavies 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)

T_{OUT}: Output module response time ≤ Output internal processing delay time (Td) (one minimum transmission cycle the unit can handle) + Conversion rate (Te) + Output Delay time (Tf)

*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.) × 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.]
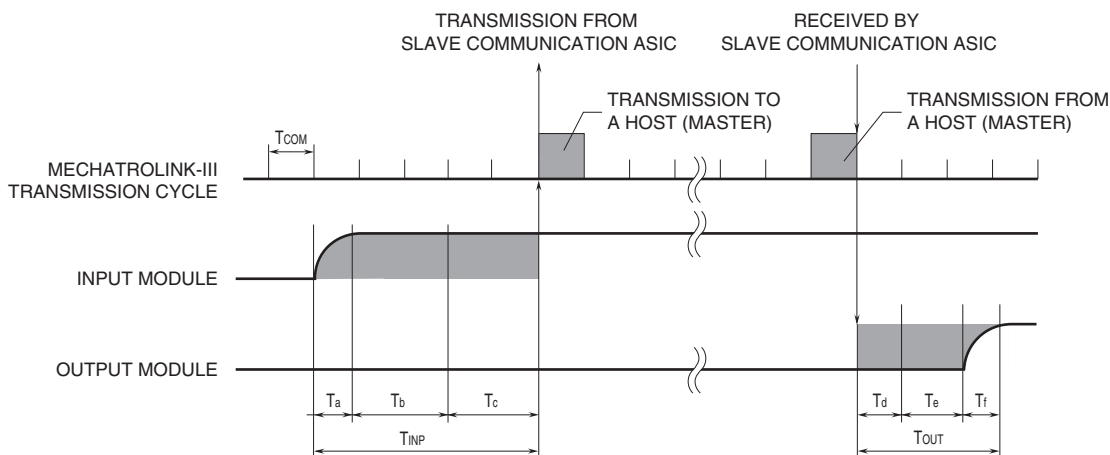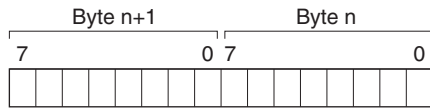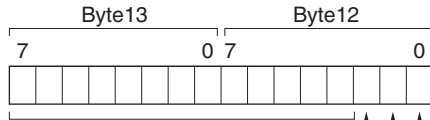
I/O DATA DESCRIPTIONS

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

■ ANALOG I/O

Byte n+1								Byte n							
7							0	7							0

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

■ STATUS

Byte13								Byte12							
7							0	7							0

CH0 (Input range error (≤ -15%, ≥ 115%))
CH0 (ADC error)
CH0* (breaking output wire detected)
Not used (fixed to 0)

Input range error
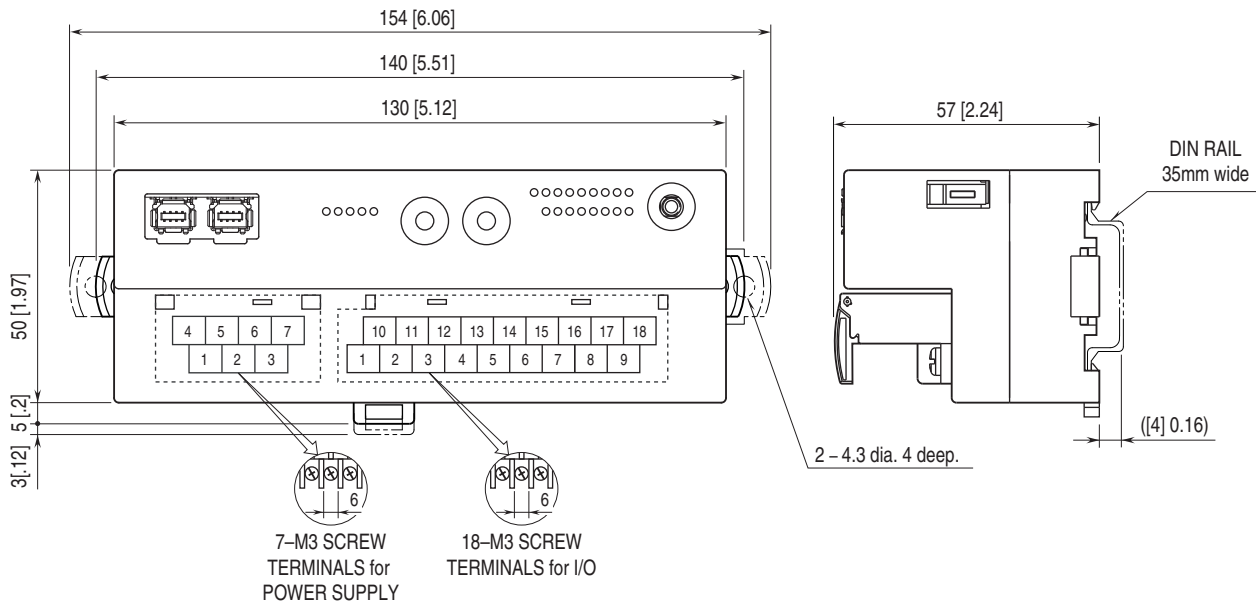   0: Normal 1: Error
ADC error
    0: Normal 1: Error
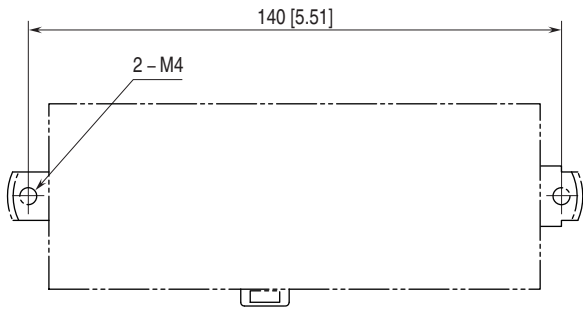Detected breaking output wire
    0: Normal 1: Error

* 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]

154 [6.06]
140 [5.51]
130 [5.12]
57 [2.24]
DIN RAIL 35mm wide
50 [1.97]
5 [2]
3[.12]

| 4 | 5 | 6 | 7 |
| 1 | 2 | 3 |

| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

6
6

7–M3 SCREW TERMINALS for POWER SUPPLY

18–M3 SCREW TERMINALS for I/O

2 – 4.3 dia. 4 deep.

([4] 0.16)
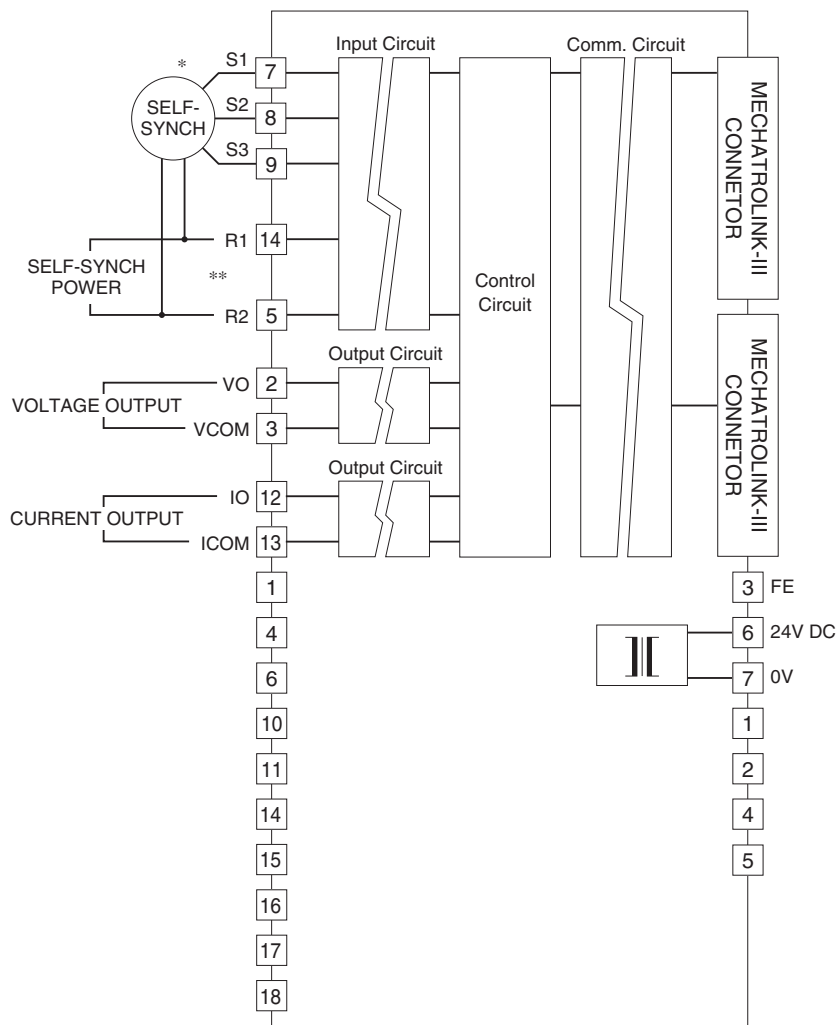
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MOUNTING REQUIREMENTS　unit: mm [inch]

140 [5.51]

2 – M4

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.

* SELF-SYNCH

S1 | 7
S2 | 8
S3 | 9

Input Circuit

Comm. Circuit

MECHATROLINK-III CONNETOR

R1 | 14

SELF-SYNCH POWER

**

R2 | 5

Control Circuit

MECHATROLINK-III CONNETOR

VOLTAGE OUTPUT
VO | 2
VCOM | 3

Output Circuit

CURRENT OUTPUT
IO | 12
ICOM | 13

Output Circuit

1
4
6
10
11
14
15
16
17
18

3 | FE
6 | 24V DC
7 | 0V
1
2
4
5

*　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 input polarity. When the connetion is reversed, the module input data will be shifted by 180°.

⚠ Specifications are subject to change without notice.

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