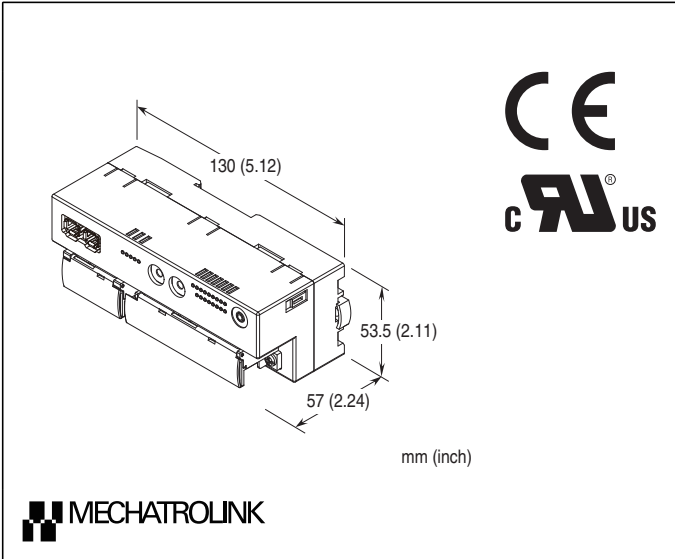


Remote I/O R7G4H Series

MECHATROLINK I/O MODULE

(MECHATROLINK-III)



MODEL: R7G4HML3-6-[1]-R[2]

ORDERING INFORMATION

- Code number: R7G4HML3-6-[1]-R[2]
Specify a code from below for each [1] and [2].
(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

[1] I/O TYPE

- SV4:** DC voltage/current input (10 V/20 mA), 4 points
- SVF4:** DC voltage /current input (10 V/20 mA), high speed, 4 points
- TS4:** Thermocouple input, 4 points
- LC2:** Strain gauge input, 2 points
- LC2A:** Tension sensor input, 2 points, (tension sensor MB, MG Nireco Corp.)
- PA1J:** Encoder input (speed / position) 1 point (RS-422 input)
- PA1A1:** Encoder input (speed / position) 1 point (5 V open collector input)
- PA1A4:** Encoder input (speed / position) 1 point

- (12 V open collector input)
- PA1A7:** Encoder input (speed / position) 1 point (24 V open collector input)
- STVVS1:** Self-synch input, DC voltage/current output, 1 point each
- YVF4:** DC voltage output, high speed, 4 points
- YSF4:** DC current output, high speed, 4 points

POWER INPUT

DC power

R: 24 V DC
(Operational voltage range: $\pm 10\%$; ripple 10 %p-p max.)

[2] OPTIONS (multiple selections)

Standards & Approvals

blank: CE marking
/UL: UL approval, CE marking
(only selectable for SVF4 and YVF4)

Input Range

(Selectable only for LC2 (be sure to specify))
/R20: -2 - +2 mV/V
/R10: -1 - +1 mV/V
/R05: -0.5 - +0.5 mV/V

CR Filter

(Selectable only for LC2 (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 (UL not available)

EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet (No. ESU-7772-X)

FUNCTIONS & FEATURES

MECHATROLINK I/O module, R7G4HML3 interfaces discrete I/Os and PLC or PC via MECHATROLINK-III. Removable terminal blocks make the module replaceable without disconnection of wiring

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

• Common Specifications

Power input: 24 V DC $\pm 10\%$; ripple 10 %p-p max.

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

Dielectric strength: 1500 V AC @1 minute
(between isolated circuits)

Operating temperature: -10 to +55°C (14 to 131°F)

Operating humidity: 30 to 90 %RH (non-condensing)

Atmosphere: No corrosive gas or heavy dust

Mounting: DIN rail (35 mm wide) or wall

Connection

MECHATROLINK-III: MECHATROLINK-III connector

Power & I/O: M3 separable screw terminals
(torque 0.5 N·m)

Screw terminal material: Nickel-plated steel

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)

Housing material: Flame-resistant resin (gray)

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)

■ DC Power Current Consumption & Weight

R7G4HML3-6-SV4: Approx. 100 mA, 220 g (0.49 lb)

R7G4HML3-6-SVF4: Approx. 100 mA, 220 g (0.49 lb)

R7G4HML3-6-TS4: Approx. 100 mA, 220 g (0.49 lb)

R7G4HML3-6-LC2: Approx. 160 mA, 220 g (0.49 lb)

R7G4HML3-6-LC2A: Approx. 100 mA, 220 g (0.49 lb)

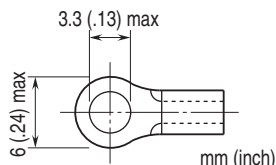
R7G4HML3-6-PA1x: Approx. 80 mA, 220 g (0.49 lb)

R7G4HML3-6-STYVS1: Approx. 100 mA, 220 g (0.49 lb)

R7G4HML3-6-YVF4: Approx. 100 mA, 220 g (0.49 lb)

R7G4HML3-6-YSF4: Approx. 150 mA, 220 g (0.49 lb)

■ 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 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 (R7G4HML3-6-LC2, LC2A and STYVS1)

Slave monitoring: None

STANDARDS & APPROVALS

Refer to the manuals to comply with the standards.

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

Low Voltage Directive

EN 61010-1, EN 61010-2-201

(R7G4HML3-6-STYVS1 only. Refer to the instruction manual for the detail.)

Measurement Category II

Pollution Degree 2

Input to power: Basic insulation (300 V)

RoHS Directive

EN 50581

Safety approval:

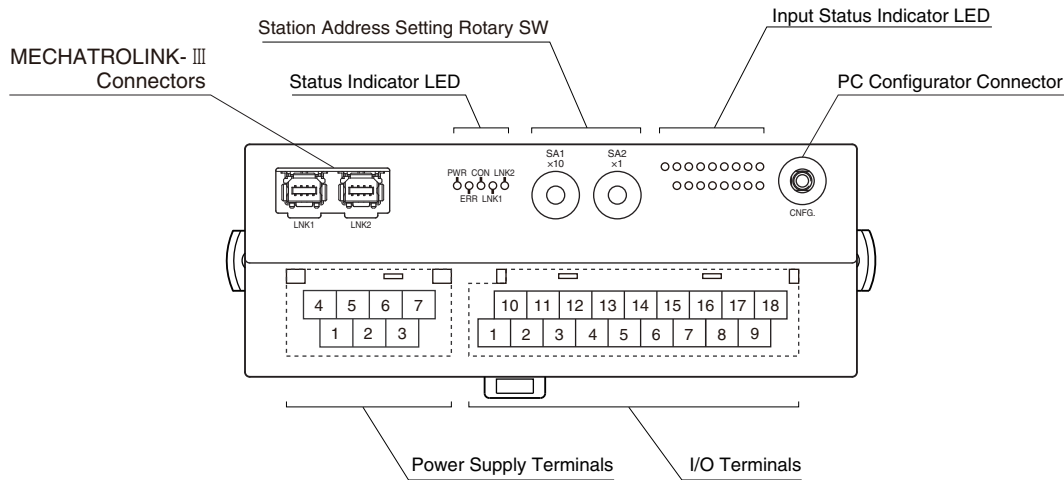
UL/C-UL general safety requirements

(only available for I/O type SVF4 and YVF4)

(UL 61010-1, CAN/CSA-C22.2 No.61010-1-12)

UL 61010-2-201, CAN/CSA-C22.2 No.61010-2-201

EXTERNAL VIEW



CONNECTION DIAGRAMS

■ 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

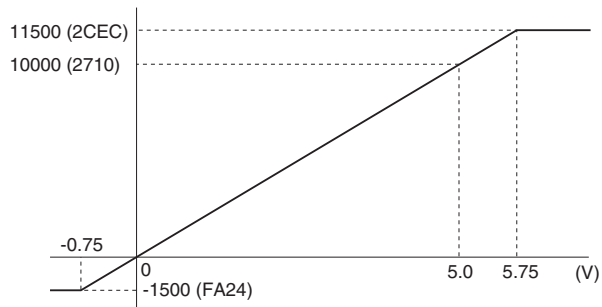
■ 0 – 100% DATA CONVERSION

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.

•Input Range 0 – 5V DC

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



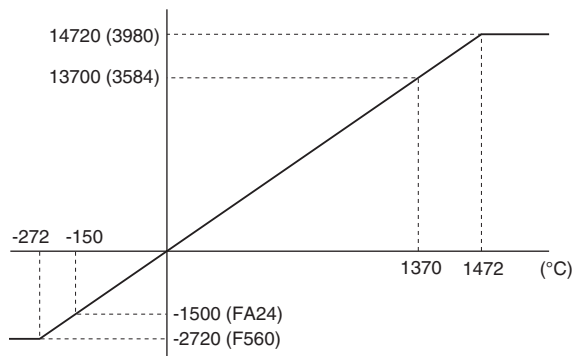
Analog output is converted in the reverse order of the input data. The output range 0 – 5V DC is expressed as 10000 at 5.0V (100%) and 0 at 0V (0%).

■ TEMPERATURE DATA CONVERSION

Temperature data (thermocouple and RTD) are represented in engineering unit value, °C or K, multiplied by 10 and expressed in 16 bits. °F data is represented in engineering unit value, without multiplication.

•Input Type K Thermocouple

Input Value	Converted Data, Decimal	Converted Data, Hex
≤ -272°C	-2720	F560
-150°C	-1500	FA24
1370°C	13700	3584
≥ 1472°C	14720	3980



■ ENCODER INPUT (SPEED CONVERSION DATA)

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

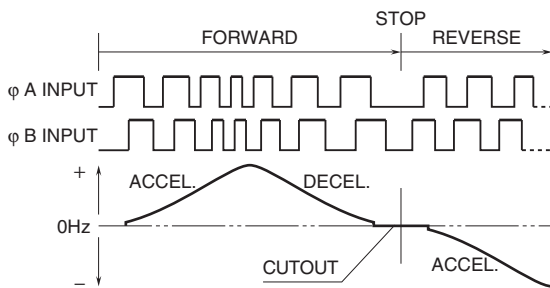
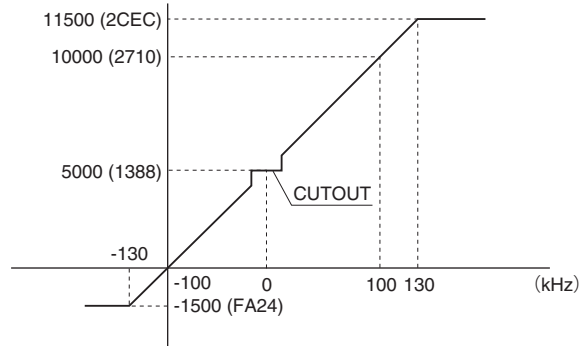
The converted % values are multiplied by 100 and expressed in 16 bits.

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.

· Input Range 0 – 100 kHz

Input Value	Input %	Converted Data, Decimal	Converted Data, Hex
-130kHz	-15%	-1500	FA24
-100kHz	0%	0	0
0kHz	50%	5000	1388
100kHz	100%	10000	2710
130kHz	115%	11500	2CEC



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 from 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 set at master
(depends on system and configuration)

T_{INF} : 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)

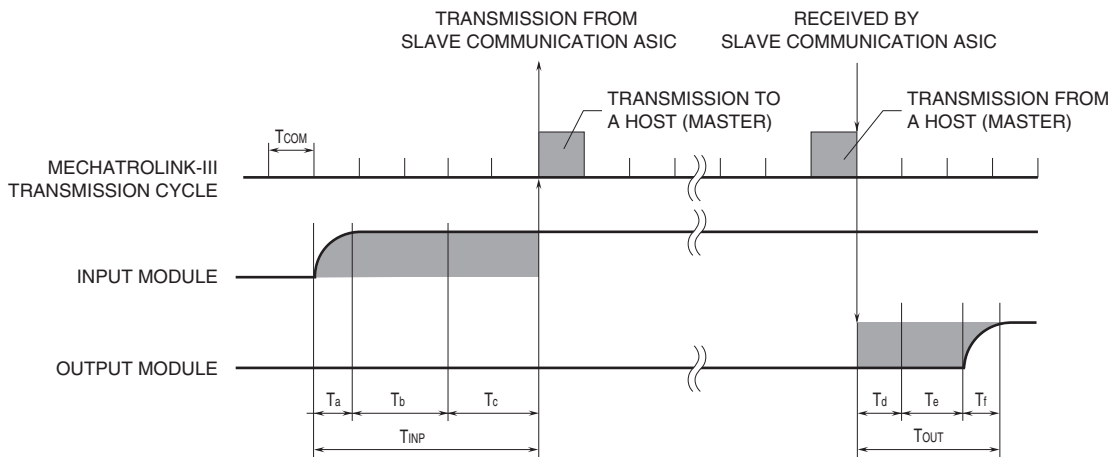
- *1. R7G4HML3-6-SV4: Conversion rate \times 2
- R7G4HML3-6-SVF4: Conversion rate \times Averaging
- R7G4HML3-6-TS4 (Averaging): Conversion rate \times 3
- R7G4HML3-6-LC2, LC2A, Conversion rate \times Averaging

E.g. 1: R7G4HML3-6-SVF4 Averaging (1), transmission cycle of 0.5 msec.

Input module response time (T_{INF}): Input Delay time (1 msec.) + Conversion rate (0.2 msec.) \times Averaging (1) + internal processing delay time (0.5 msec. \times 2) = 2.2 [msec.]

E.g. 2: R7G4HML3-6-YVF4 MECHATROLINK-III transmission cycle: 1 msec.

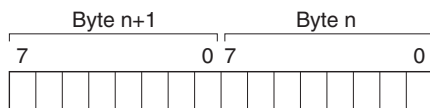
Output module response time (T_{OUT}): Output internal processing delay time (0.125 msec.) + Conversion rate (0.20 msec.) + Output Delay time (0.25 msec.) = 0.575 [msec.]



I/O DATA DESCRIPTIONS

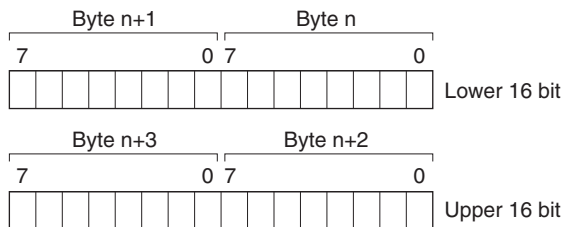
Scaling of analog I/O module is configurable with the configurator software (model: R7CFG). Refer to the software manual for details.

ANALOG I/O (R7G4HML3-6-SV4, SVF4, TS4, LC2, LC2A, STYVS1, YVF4, YSF4)



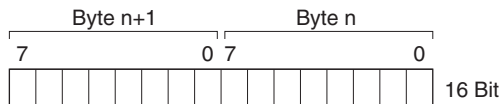
Data is represented in 16-bit binary. Negative value is represented in 2's complements.

PULSE POSITION CONVERSION (R7G4HML3-6-PA1)



Position conversion data is represented in 16-bit binary. Negative value is represented in 2's complements.

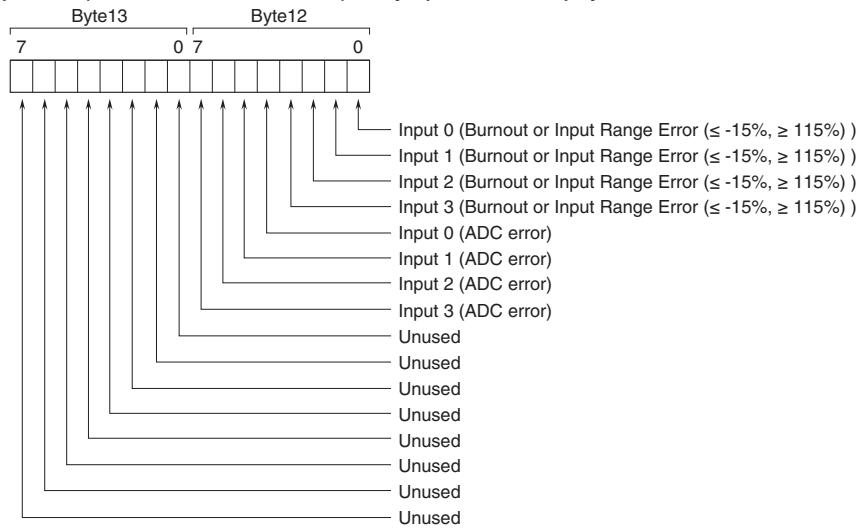
PULSE SPEED DATA (R7G4HML3-6-PA1)



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

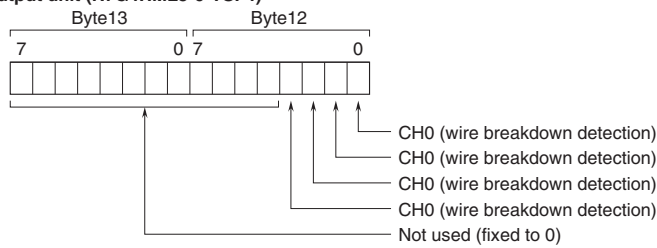
■ STATUS

- Analog input units (R7G4HML3-6-SV4, SVF4, TS4) every input status is displayed.



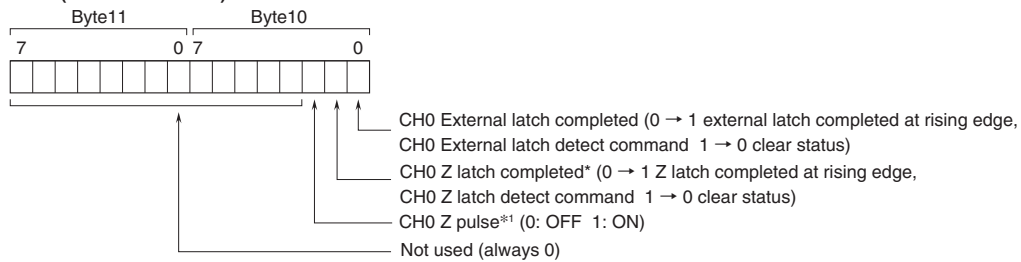
Burnout, Input Range Error
 0: Normal operating 1: Error
 ADC error (no response from ADC)
 0: Normal operating 1: Error

- Analog output unit (R7G4HML3-6-YSF4)



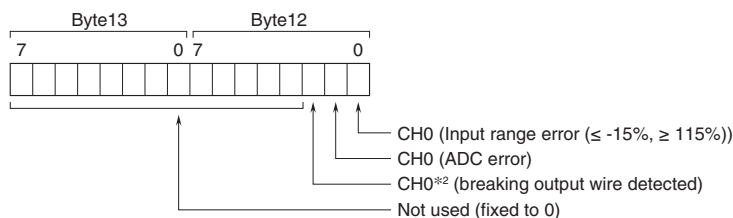
Wire breakdown detection
 0: Normal
 1: Breakdown

- Pulse input unit (R7G4HML3-6-PA1)



*1. Available when the firmware version is V1.11 or later

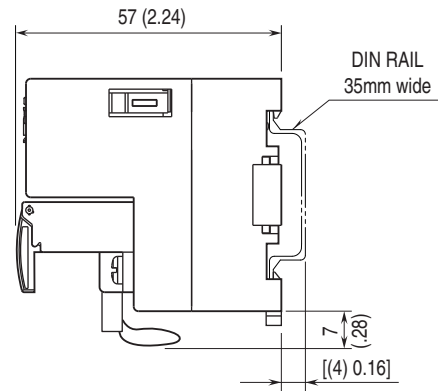
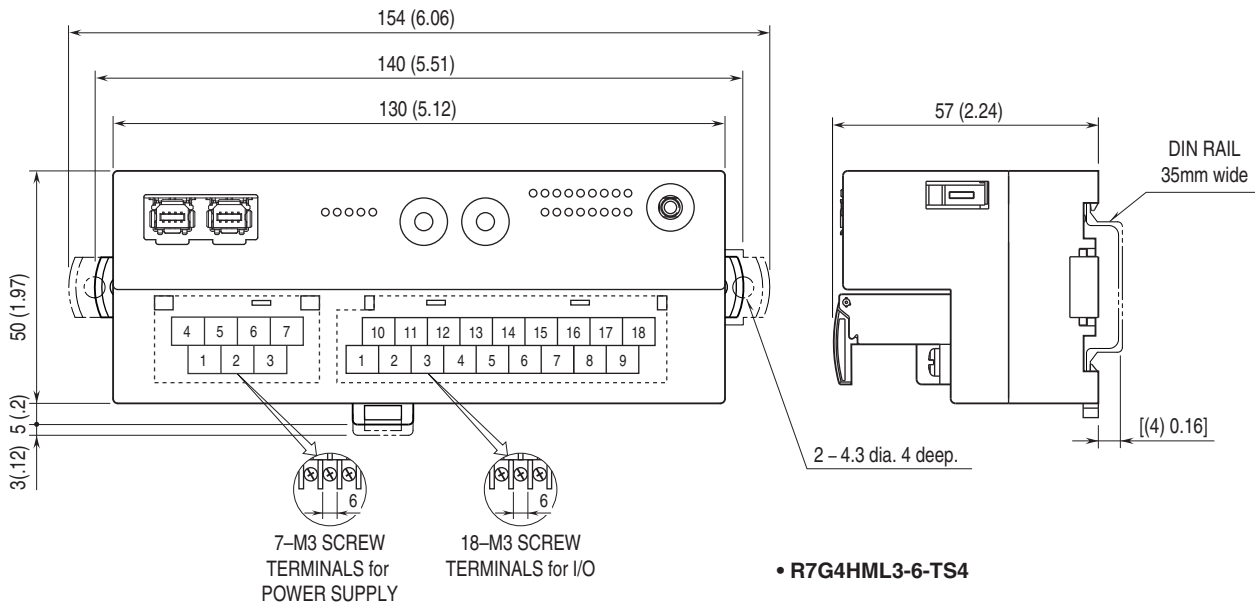
- Self-sync input, analog output unit (R7G4HML3-6-STYVS1)



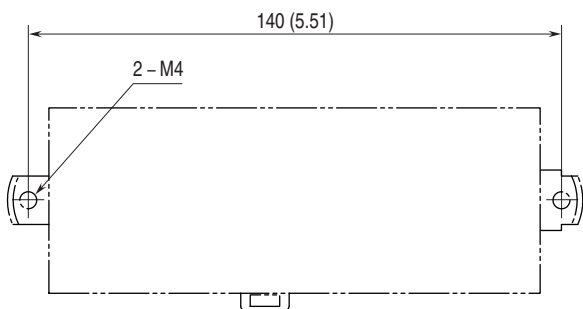
Input range error
 0: Normal 1: Error
 ADC error
 0: Normal 1: Error
 Detected breaking output wire
 0: Normal 1: Error

*2. 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)



DC VOLTAGE/CURRENT INPUT MODULE

(4 points, isolated; screw terminal block)

MODEL: R7G4HML3-6-SV4

SPECIFICATIONS

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

Converted data range: 0 - 10000 of the input range

• **Input range**

Wide span voltage: -10 - +10 V DC, -5 - +5 V DC, 0 - 10 V DC, 0 - 5 V DC, 1 - 5 V DC

Narrow span voltage: -1 - +1 V DC, 0 - 1 V DC, -0.5 - +0.5 V DC

Current range: -20 - +20 mA DC, 0 - 20 mA DC, 4 - 20 mA DC

• **Input resistance**

Wide span voltage: $\geq 1 \text{ M}\Omega$

Narrow span voltage: $\geq 100 \text{ k}\Omega$

Current range: 70Ω

Conversion rate / conversion accuracy:

10 msec./ $\pm 0.8 \%$, 20 msec./ $\pm 0.4 \%$, 40 msec./ $\pm 0.2 \%$,

80 msec./ $\pm 0.1 \%$

Input delay time: $\leq 50 \text{ msec.}$ (0 - 90 %)

Temperature coefficient: $\pm 0.015 \%/^{\circ}\text{C}$ ($\pm 0.008 \%/^{\circ}\text{F}$)

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	AVAILABLE RANGE	FACTORY SETTING
Validating/ Invalidating	Valid Invalid	Valid
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 adjustment	-320.00 - +320.00 (%)	0.00 (%)
Gain adjustment	-3.2000 - +3.2000	1.0000
Zero scale	-32 000 - +32 000	0
Full scale	-32 000 - +32 000	10 000

■ SETTINGS FOR ALL CHANNELS

PARAMETER	AVAILABLE RANGE	FACTORY SETTING
Conversion rate/ accuracy	80 msec. / $\pm 0.1 \%$ 40 msec. / $\pm 0.2 \%$ 20 msec. / $\pm 0.4 \%$ 10 msec. / $\pm 0.8 \%$	80 msec. / $\pm 0.1 \%$

TERMINAL ASSIGNMENTS

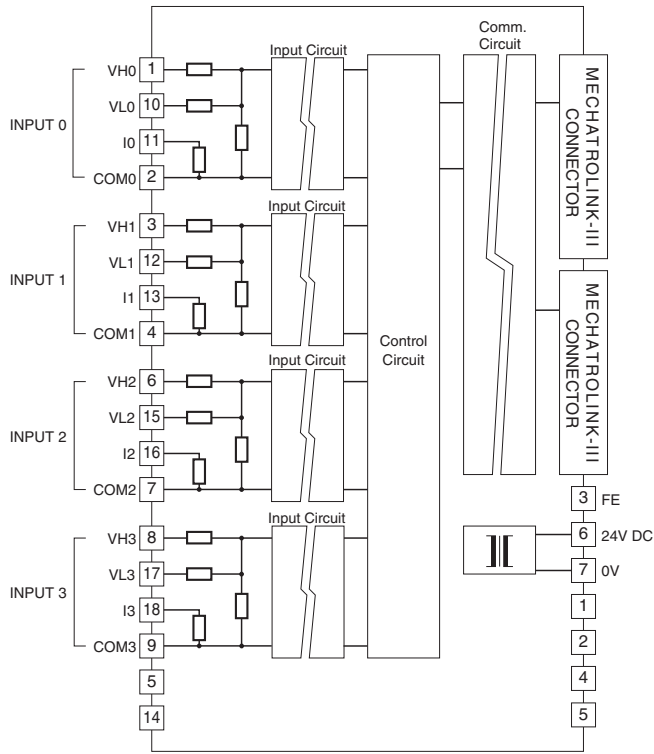
10	11	12	13	14	15	16	17	18
VLO	I0	VL1	I1	NC	VL2	I2	VL3	I3
1	2	3	4	5	6	7	8	9
VH0	COM0	VH1	COM1	NC	VH2	COM2	VH3	COM3

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	VH0	Wide span volt. 0	10	VLO	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

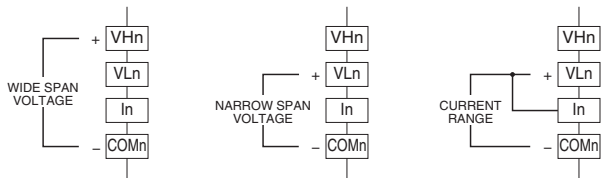
CIRCUIT DIAGRAM

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 \overline{VLn} and \overline{In} terminals are cross-wired at DC current input.

MODEL: R7G4HML3

HIGH-SPEED DC VOLTAGE/CURRENT INPUT MODULE

(4 points, isolated; screw terminal block)

MODEL: R7G4HML3-6-SVF4

SPECIFICATIONS

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

Converted data range: 0 - 10000 of the input range

• **Input range**

Wide span voltage: -10 - +10 V DC, -5 - +5 V DC, 0 - 10 V DC, 0 - 5 V DC, 1 - 5 V DC

Narrow span voltage: -1 - +1 V DC, 0 - 1 V DC, -0.5 - +0.5 V DC

Current range: -20 - +20 mA DC, 0 - 20 mA DC, 4 - 20 mA DC

• **Input resistance**

Wide span voltage: > 1 M Ω

Narrow span voltage: > 100 k Ω

Current range: 50 Ω

Conversion accuracy: ± 0.1 %

Conversion rate: 200 μ sec. / 4 channels

Input delay time: ≤ 1 msec. (0 - 90 %)

Temperature coefficient: ± 0.015 %/°C (± 0.008 %/°F)

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	AVAILABLE RANGE	FACTORY SETTING
Validating/Invalidating	Valid Invalid	Valid
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 adjustment	-320.00 - +320.00 (%)	0.00 (%)
Gain adjustment	-3.2000 - +3.2000	1.0000
Zero scale	-32 000 - +32 000	0
Full scale	-32 000 - +32 000	10 000

■ SETTINGS FOR ALL CHANNELS

PARAMETER	AVAILABLE RANGE	FACTORY SETTING
Averaging	1, 2, 4, 8, 16, 32, 64, 128, 256	1

TERMINAL ASSIGNMENTS

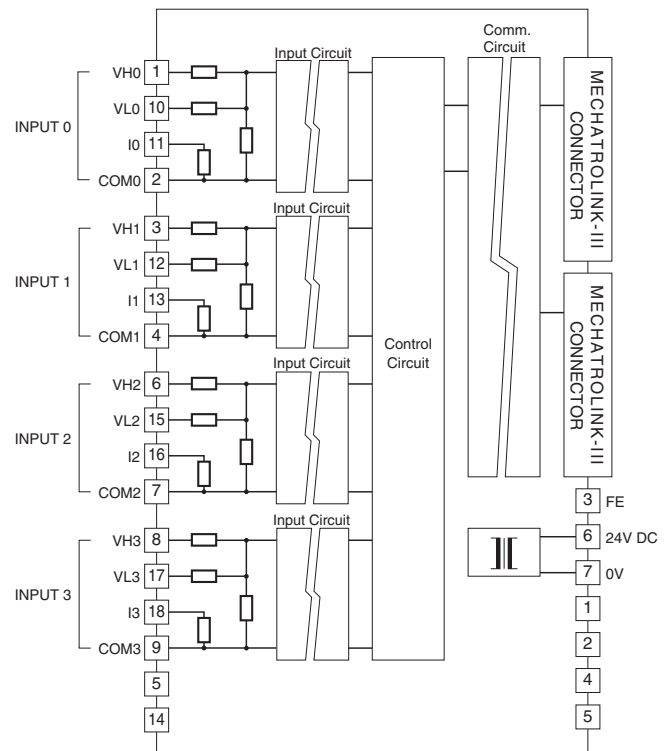
10	11	12	13	14	15	16	17	18
VL0	I0	VL1	I1	NC	VL2	I2	VL3	I3
1	2	3	4	5	6	7	8	9
VH0	COM0	VH1	COM1	NC	VH2	COM2	VH3	COM3

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

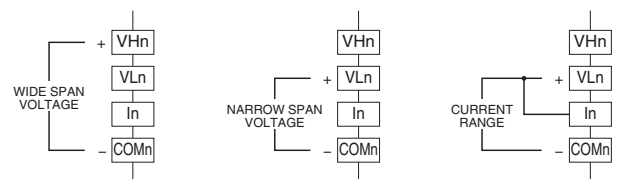
CIRCUIT DIAGRAM

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 VLn and In terminals are cross-wired at DC current input.

THERMOCOUPLE INPUT MODULE

(4 points, isolated; screw terminal block)

MODEL: R7G4HML3-6-TS4

SPECIFICATIONS

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

Converted data range

Engineering unit value: (°C, K) × 10(integer);

No multiplication for °F

Scaling: Refere to the R7CFG operation manual for details.

Thermocouple: K, E, J, T, B, R, S, C, N, U, L, P, PR

Input resistance: ≥ 30 kΩ

Burnout sensing: ≤ 0.1 μA

Burnout response time: ≤ 1 sec.

Conversion accuracy: ±1°C (±1.8°F) (±2°C (±3.6°F) for B, R, S, C, PR)

Conversion rate: 240 msec.

Input delay time: ≤ 60 msec. (0 - 90 %)

Temperature coefficient: ±0.015 %/°C (±0.008 %/°F), ±0.03 %/°C (±0.02 %/°F) for R, S, C, PR, ±0.05 %/°C (±0.03 %/°F) for B

CJC error: ±1.0°C at 25°C ±10°C

(±1.8°F at 77°F ±18°F)

±1.5°C (±2.7°F) for R, S, PR

Cold junction compensation is not available for B thermocouple.

T/C	BURNOUT INDICATION (°C)		CONFORMANCE RANGE (°C)
	Downscale	Upscale	
K (CA)	-272	+1472	-150 to +1370
E (CRC)	-272	+1120	-170 to +1000
J (IC)	-260	+1300	-180 to +1200
T (CC)	-272	+ 500	-170 to + 400
B (RH)	24	1920	400 to 1760
R	-100	+1860	200 to 1760
S	-100	+1860	0 to 1760
C (WRe 5-26)	-52	+2416	0 to 2315
N	-272	+1400	-130 to +1300
U	-252	+ 700	-200 to +600
L	-252	+1000	-200 to +900
P (Platinel II)	-52	+1496	0 to 1395
(PR)	-52	+1860	0 to 1760

T/C	BURNOUT INDICATION (°F)		CONFORMANCE RANGE (°F)
	Downscale	Upscale	
K (CA)	-458	+2682	-238 to +2498
E (CRC)	-458	+2048	-274 to +1832
J (IC)	-436	+2372	-292 to +2192
T (CC)	-458	+932	-274 to +752
B (RH)	75	3488	752 to 3200
R	-148	+3380	392 to 3200
S	-148	+3380	32 to 3200
C (WRe 5-26)	-62	+4381	32 to 4199
N	-458	+2552	-202 to +2372
U	-422	+1292	-328 to +1112
L	-422	+1832	-328 to +1652
P (Platinel II)	-62	+2725	32 to 2543
(PR)	-62	+3380	32 to 3200

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	AVAILABLE RANGE	FACTORY SETTING
Validating/ Invalidating	Valid Invalid	Valid
Sensor type	K (CA) E (CRC) J (IC) T (CC) B (RH) R S C (WRe 5-26) N U L P (Platinel II) (PR)	K (CA)
Temperature unit	°C °F K	°C
Burnout	Up Down	Up
Bias adjustment	-320.00 - +320.00 (%)	0.00 (%)
Gain adjustment	-3.2000 - +3.2000	1.0000
Zero scale	-32000 - +32000	0
Full scale	-32000 - +32000	10000
Input 0 %	Depends on sensor type	0.00
Input 100 %	Depends on sensor type	0.00

■ SETTINGS FOR ALL CHANNELS

PARAMETER	AVAILABLE RANGE	FACTORY SETTING
Averaging	Valid Invalid	Valid

TERMINAL ASSIGNMENTS

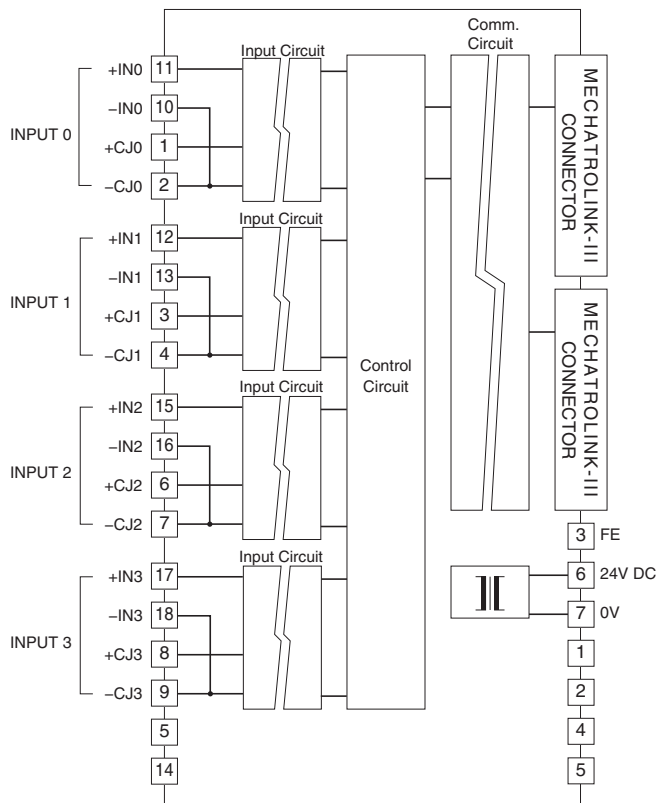
10	11	12	13	14	15	16	17	18
+IN0	-IN0	+IN1	-IN1	NC	+IN2	-IN2	+IN3	-IN3
1	2	3	4	5	6	7	8	9
+CJ0	-CJ0	+CJ1	-CJ1	NC	+CJ2	-CJ2	+CJ3	-CJ3

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	+CJ0	CJC + 0	10	+IN0	T/C + 0
2	-CJ0	CJC - 0	11	-IN0	T/C - 0
3	+CJ1	CJC + 1	12	+IN1	T/C + 1
4	-CJ1	CJC - 1	13	-IN1	T/C - 1
5	NC	No connection	14	NC	No connection
6	+CJ2	CJC + 2	15	+IN2	T/C + 2
7	-CJ2	CJC - 2	16	-IN2	T/C - 2
8	+CJ3	CJC + 3	17	+IN3	T/C + 3
9	-CJ3	CJC - 3	18	-IN3	T/C - 3

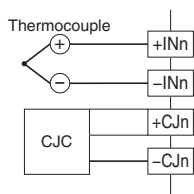
CIRCUIT DIAGRAM

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



STRAIN GAUGE INPUT MODULE

(2 points, isolated, screw terminal block, message transmission command)

MODEL: R7G4HML3-6-LC2

SPECIFICATIONS

Isolation: Input 0 or monitor output 0 to input 1 or monitor output 1 to MECHATROLINK or FE to power input

INPUT

Excitation: 5 V \pm 10% or 2.5 V \pm 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)

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)

Accuracy:

Option code except /R05

\pm 0.04% (Averaging 128 samples or more)

\pm 0.05% (Averaging 64 samples)

\pm 0.10% (Averaging 8, 16, 32 samples)

\pm 0.15% (Averaging 4 samples)

\pm 0.20% (Averaging 2 samples)

Option code /R05

\pm 0.05% (Averaging 512 samples or more)

\pm 0.10% (Averaging 64, 128, 256 samples)

\pm 0.20% (Averaging 16, 32 samples)

\pm 0.30% (Averaging 2, 4, 8 samples)

Lowpass filter:

Approx. 2 kHz or approx. 2 Hz (option code /F2K)

Approx. 1 Hz or approx. 2 Hz (option code /F1)

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%)

Conversion rate:

min. 2000 samples/sec.

Resolution:

1/10000

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

Load coefficient:

10.00 - 100.00 (%)

Averaging:

2, 4, 8, 16, 32, 64, 128, 256, 512, 1024 samples

Temperature coefficient:

\pm 0.015 %/ $^{\circ}$ C (\pm 0.008 %/ $^{\circ}$ F)

OUTPUT

Output range:

0 - 10 V (for input 0 - 100 %)

Operational range:

-115 - +115 %

Load resistance:

\geq 100 k Ω

Conversion accuracy:

\pm 0.1 %

Output delay time:

\leq 250 msec. (0 - 90 %)

Temperature coefficient:

\pm 0.015 %/ $^{\circ}$ C (\pm 0.008 %/ $^{\circ}$ F)

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

ITEM	AVAILABLE RANGE	FACTORY DEFAULT
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	-15.00 to +115.00 (%)	-

TERMINAL ASSIGNMENTS

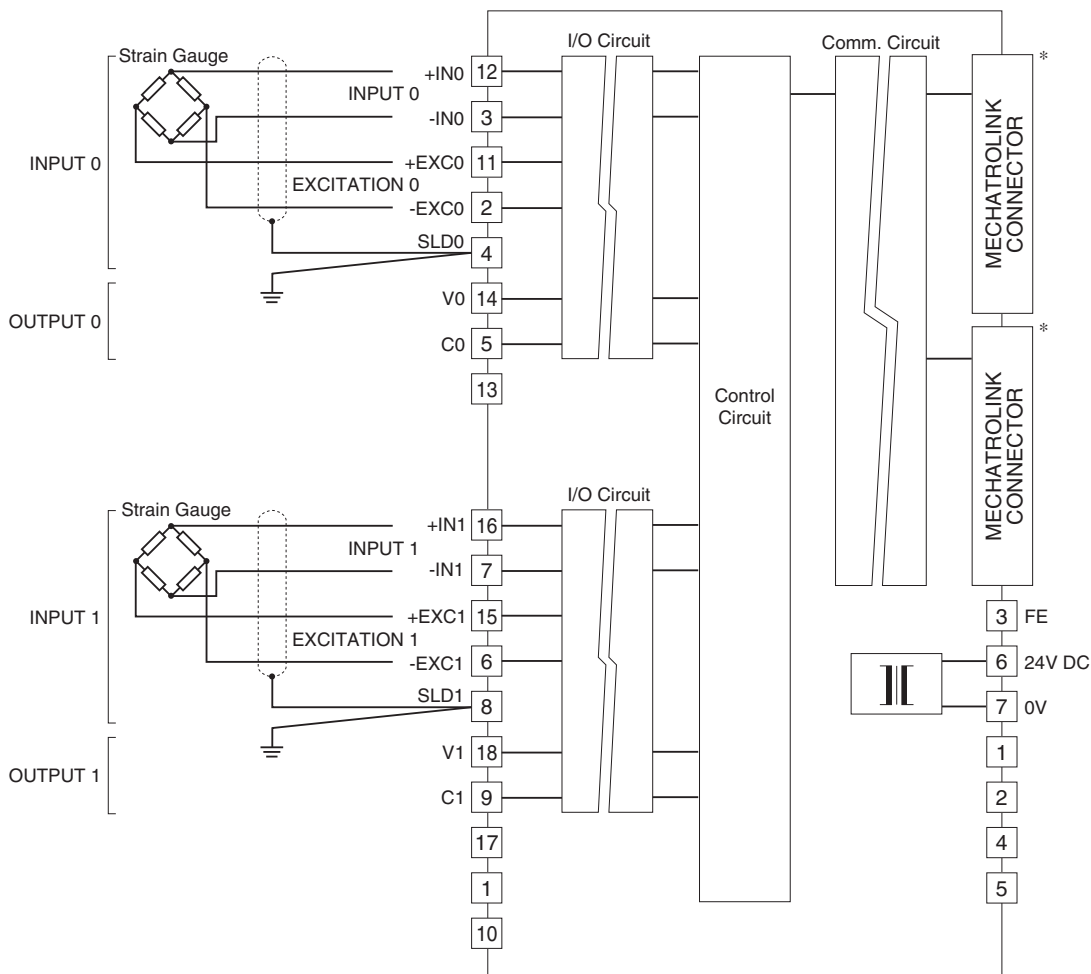
10	11	12	13	14	15	16	17	18
NC	+EXC0	+IN0	NC	V0	+EXC1	+IN1	NC	V1
1	2	3	4	5	6	7	8	9
NC	-EXC0	-IN0	SLD0	C0	-EXC1	-IN1	SLD1	C1

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+

SCHEMATIC CIRCUITRY

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

Caution: FE terminal is NOT a protective conductor terminal.



*MECHATROLINK connectors are internally connected.
The network cable can be connected to either one.

TENSION SENSOR INPUT MODULE

(Nireco tension sensor, 2 points, isolated, screw terminal block, message transmission command)

MODEL: R7G4HML3-6-LC2A

SPECIFICATIONS

Isolation: Input 0 or monitor output 0 to input 1 or monitor output 1 to MECHATROLINK or FE to power input

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

■ **INPUT**

Applicable sensor: MB tension sensor, MG tension sensor (Nireco)

Excitation: 6 V \pm 5%

Maximum current: max. 15 mA

Zero adjustment: max. allowable roll weight of a sensor

Accuracy: \pm 0.1% (% for max. span of wrap angle 0°, number of average min. 16)

Lowpass filter: approx. 2 kHz or approx. 2 Hz

Input delay time:

Lowpass filter 2 kHz max. 20 msec. (0 - 90%)
Lowpass filter 2 Hz max. 200 msec. (0 - 90%)

Conversion rate: min. 2000 samples/sec.

Resolution: 1/10000 (max. span of wrap angle 0°)

Load coefficient: 10.00 - 100.00 (%)

Averaging: 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024 samples

Temperature coefficient: \pm 0.015 %/°C (\pm 0.008 %/°F)
% for max. span of wrap angle 0°

■ **OUTPUT**

Output range: 0 - 10 V (for input 0 - 100%)

Operational range: -115 - +115 %

Load resistance: \geq 100 k Ω

Conversion accuracy: \pm 0.1 %

Output delay time: \leq 250 msec. (0 - 90 %)

Temperature coefficient: \pm 0.015 %/°C (\pm 0.008 %/°F)

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**

ITEM	AVAILABLE RANGE	FACTORY DEFAULT
Zero adjustment	Not exceeding allowable roll weight of the sensor	-
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
Lowpass filter	2Hz, 2kHz	2kHz
Monitor output	-15.00 to +115.00 (%)	-

TERMINAL ASSIGNMENTS

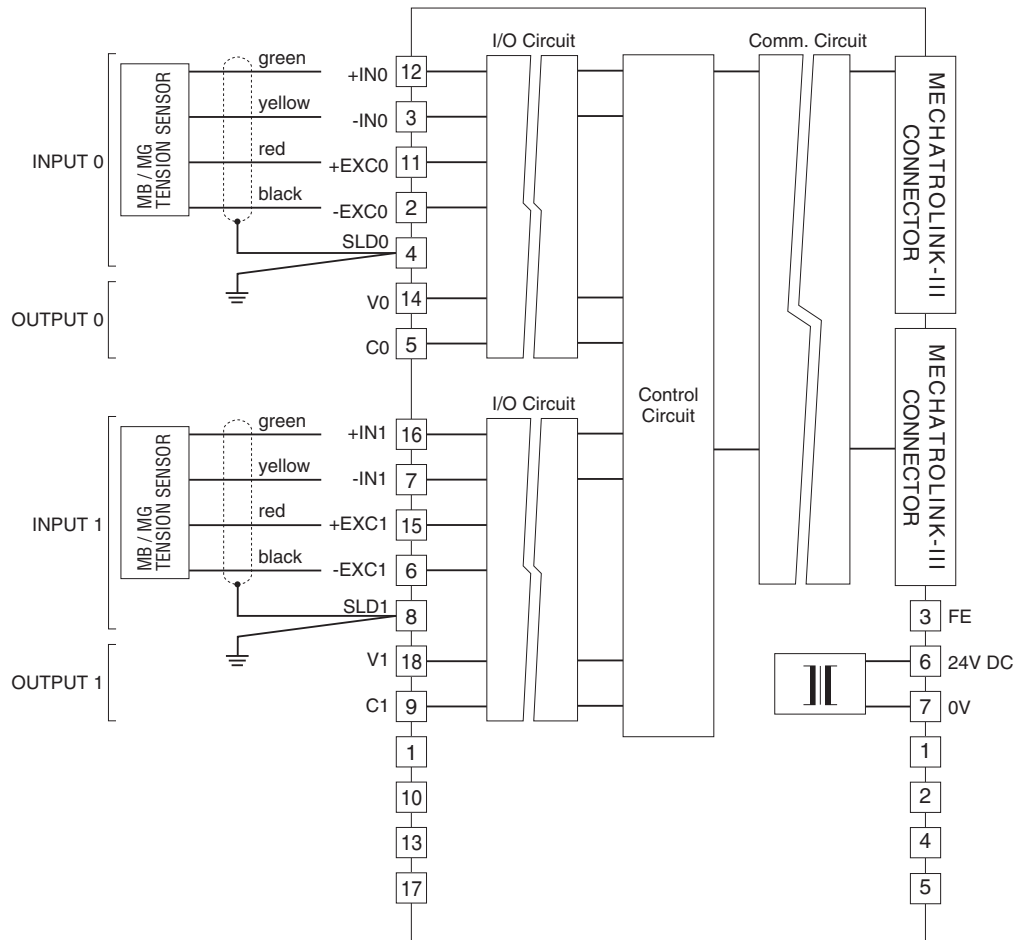
10	11	12	13	14	15	16	17	18
NC	+EXC0	+IN0	NC	V0	+EXC1	+IN1	NC	V1
1	2	3	4	5	6	7	8	9
NC	-EXC0	-IN0	SLD0	C0	-EXC1	-IN1	SLD1	C1

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+

SCHEMATIC CIRCUITRY

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

Caution: FE terminal is NOT a protective conductor terminal.



ENCODER INPUT MODULE

(screw terminal block)

MODEL:

R7G4HML3-6-PA1J

R7G4HML3-6-PA1A1

R7G4HML3-6-PA1A4

R7G4HML3-6-PA1A7

SPECIFICATIONS

Isolation: Input or output or sensor excitation to MECHATROLINK or FE to power input

Counter type: Ring or linear

Speed conversion accuracy: $\pm 0.1\%$

Data range

Speed: 0 - 10000 of the input range

Position

Ring: 0 to 4 294 967 295

Linear: -2 100 000 000 to +2 100 000 000

Sensor Excitation* (External):

24 V DC $\pm 10\%$, ripple 5 %p-p max., 20 mA to 1 A

* Must be supplied since the input circuit also works with it.

When Latch or Reset turns on, its current is added.

Encoder excitation (External source; only for PA1Ax)

PA1A1: 5 V DC $\pm 5\%$, 1 A max.

PA1A4: 12 V DC $\pm 5\%$, 1 A max.

PA1A7: 24 V DC $\pm 5\%$, 1 A max.

Low-end cutout (speed): Programmable within 0.1 - 50 %

Encoder pulse input

Input: 1 point

Input pulse

•PA1J (RS-422)

Receiver: Conforms to RS-422

•PA1A1 (5 V open collector)

Sensing: Approx. 4 V DC @ 4.4 mA

ON/OFF level: $\geq 3\text{ k}\Omega / 3.3\text{ V}$ for OFF, $\leq 300\ \Omega / 1\text{ V}$ for ON

•PA1A4 (12 V open collector)

Sensing: Approx. 10 V DC @ 5.7 mA

ON/OFF level: $\geq 3\text{ k}\Omega / 6.5\text{ V}$ for OFF, $\leq 400\ \Omega / 1.8\text{ V}$ for ON

•PA1A7 (24 V open collector)

Sensing: Approx. 22 V DC @ 7.8 mA

ON/OFF level: $\geq 3\text{ k}\Omega / 11.5\text{ V}$ for OFF, $\leq 300\ \Omega / 2\text{ V}$ for ON

Pulse phase: A, B and Z

A and B phases are necessary to work.

Maximum input frequency

•PA1J (RS-422)

Position data: 4 MHz (quad multiplication)

Speed data: 100 kHz

•PA1Ax (Open collector)

Position data: 400 kHz (quad multiplication)

Speed data: 100 kHz

Minimum pulse width (ON and OFF)

•Phase A/B

•PA1J (RS-422)

Position data: $\geq 0.5\ \mu\text{sec}$.

Speed data: $\geq 5\ \mu\text{sec}$.

•PA1Ax (Open collector)

Position data: $\geq 5\ \mu\text{sec}$.

Speed data: $\geq 5\ \mu\text{sec}$.

•Phase Z

$\geq 1\text{ msec}$ (firmware version 1.10)

$\geq 0.5\ \mu\text{sec}$ (firmware version 1.11 or later)

Reset input: Discrete input

Number of input: 1

Common: Positive common

Detecting voltage: Supplied sensor excitation voltage

Detecting current: 5.5 mA per channel (@24 V DC)

Detecting levels:

$\geq 15\text{ V DC}$ (between +24V1 and RST), $\geq 3.5\text{ mA}$ for ON

$\leq 5\text{ V DC}$ (between +24V1 and RST), $\leq 1\text{ mA}$ for OFF

Input resistance: Approx. 4.4 k Ω

ON delay time: $\leq 50\ \mu\text{sec}$.

OFF delay time: $\leq 500\ \mu\text{sec}$.

Pulse width: $\geq 50\text{ msec}$.

Latch input: discrete input

Number of input: 1

Common: Positive common

Detecting voltage: Supplied sensor excitation voltage

Detecting current: 5.5 mA per channel (@24 V DC)

Detecting levels:

$\geq 15\text{ V DC}$ (between +24 V1 and LCH), $\geq 3.5\text{ mA}$ for ON

$\leq 5\text{ V DC}$ (between +24 V1 and LCH), $\leq 1\text{ mA}$ for OFF

Input resistance: Approx. 4.4 k Ω

ON delay time: $\leq 10\ \mu\text{sec}$.

OFF delay time: $\leq 10\ \mu\text{sec}$.

Alarm Output: Open collector

Number of output: 2

Common: Negative common

Rated load voltage: 24 V DC $\pm 10\%$

Max. load current: 0.1 A per point

Voltage drop at ON: $\leq 1.2\text{ V}$

Leakage current at OFF: $\leq 1\text{ mA}$

ON delay: $\leq 50\ \mu\text{sec}$.

OFF delay: $\leq 500\ \mu\text{sec}$.

Command

Data type, Latch, Reset, Latch data clear, Reset data clear,

Preset and Alarm output

(For details refer to the instruction manual.)

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.

■ DATA TYPE

PARAMETER	AVAILABLE RANGE	FACTORY SETTING
Data type	Position Speed	Position

■ POSITION DATA MODE

PARAMETER	AVAILABLE RANGE	FACTORY SETTING
Reset value (linear counter)	Min. totalized value – Max. totalized value	0
Minimum totalized value (linear counter)	-2 100 000 000 to +2 099 999 999	-2 100 000 000
Maximum totalized value (linear counter)	-2 099 999 999 to +2 100 000 000	2 100 000 000
Count mode	Mode 0: x1 (phase A, B) Mode 1: x1 (phase A) Mode 2: x2 Mode 3: x4	Mode 3: x4
Data type	Linear counter Ring counter	Linear counter

■ SPEED DATA MODE

PARAMETER	AVAILABLE RANGE	FACTORY SETTING
Frequency range	0 – 100 kHz 0 – 10 kHz 0 – 1 kHz 0 – 100 Hz 0 – 10 Hz 0 – 1 Hz 0 – 0.1 Hz	0 – 100 kHz
Drop out (low-end cutout)	0.10 – 25.00 (%)	0.10 (%)
Bias adjustment	-320.00 – +320.00 (%)	0.00 (%)
Gain adjustment	-3.2000 – +3.2000	1.0000
Zero scale	-32 000 – +32 000	0
Full scale	-32 000 – +32 000	10 000

■ ALARM

PARAMETER	AVAILABLE RANGE	FACTORY SETTING
MECHATROLINK-III command	Valid Invalid	Invalid
Alarm Type	Not used Speed high Speed low Position high Position low	Not used
Setpoint A (position data)	Linear high setpoint: Min to [Max–1] Linear low setpoint: [Min+1] to Max	100 000 000
Setpoint B (position data)	Ring high setpoint: 0 to 4 294 967 294 Ring low setpoint: 1 to 4 294 967 295	100 000 000
Hysteresis (deadband) A (position data)	Linear: < [Max – Min] [Hi Setpoint – Hysteresis] > Min [Lo Setpoint + Hysteresis] < Max Ring: 0 to 4 294 967 295	1 000
Hysteresis (deadband) B (position data)	[Hi Setpoint – Hysteresis] > 0 [Lo Setpoint + Hysteresis] < 4 294 967 295	1 000
Setpoint A (speed data)	-15.00 to 115.00 (%)	80.00 (%)
Setpoint B (speed data)		80.00 (%)
Hysteresis (deadband) A (speed data)	0.00 to 115.00 (%)	5.00 (%)
Hysteresis (deadband) B (speed data)		5.00 (%)
Alarm power on delay	0.0 to 60.0 sec.	5.0 sec.
Alarm on delay timer	0.0 to 60.0 sec.	0.1 sec.
Alarm on hold timer	0.0 to 60.0 sec.	0.1 sec.

■ LATCH AND RESET

PARAMETER	AVAILABLE RANGE	FACTORY SETTING
External latch	Valid Invalid command via MECHATROLINK-III	Valid
MECHATROLINK-III latch	Valid Invalid	Valid
MECHATROLINK-III latch data clear	Valid Invalid	Valid
External reset	Valid Invalid	Valid
MECHATROLINK-III reset	Valid Invalid	Valid
MECHATROLINK-III reset data clear	Valid Invalid	Valid
Z reset / Z latch*1	Invalid Z reset valid Z latch valid*1	z reset valid

*1. Selectable when the firmware version is V1.11 or later.

TERMINAL ASSIGNMENTS

■R7G4HML3-6-PA1J (RS-422 INPUT)

10 SNSR EXC-	11 A-	12 B-	13 Z-	14 +24V1	15 GND	16 GND	17 GND	18 GND
1 SNSR EXC+	2 A+	3 B+	4 Z+	5 +24V1	6 LCH	7 RST	8 OCA	9 OCB

NO.	ID	FUNCTION
1	SNSR EXC +	SENSOR EXCITATION +
2	A +	PHASE A +
3	B +	PHASE B +
4	Z +	PHASE Z +
5	+24V1	24V DC
6	LCH	LATCH INPUT
7	RST	RESET INPUT
8	OCA	OPEN COLLECTOR OUTPUT A
9	OCB	OPEN COLLECTOR OUTPUT B
10	SNSR EXC -	SENSOR EXCITATION -
11	A -	PHASE A -
12	B -	PHASE B -
13	Z -	PHASE Z -
14	+24V1	24V DC
15	GND	0V
16	GND	0V
17	GND	0V
18	GND	0V

■R7G4HML3-6-PA1Ax (OPEN COLLECTOR INPUT)

10 SNSR ENCDR-	11 ENCDR+	12 Z	13 V-	14 +24V1	15 GND	16 GND	17 GND	18 GND
1 SNSR EXC+	2 A	3 B	4 V+	5 +24V1	6 LCH	7 RST	8 OCA	9 OCB

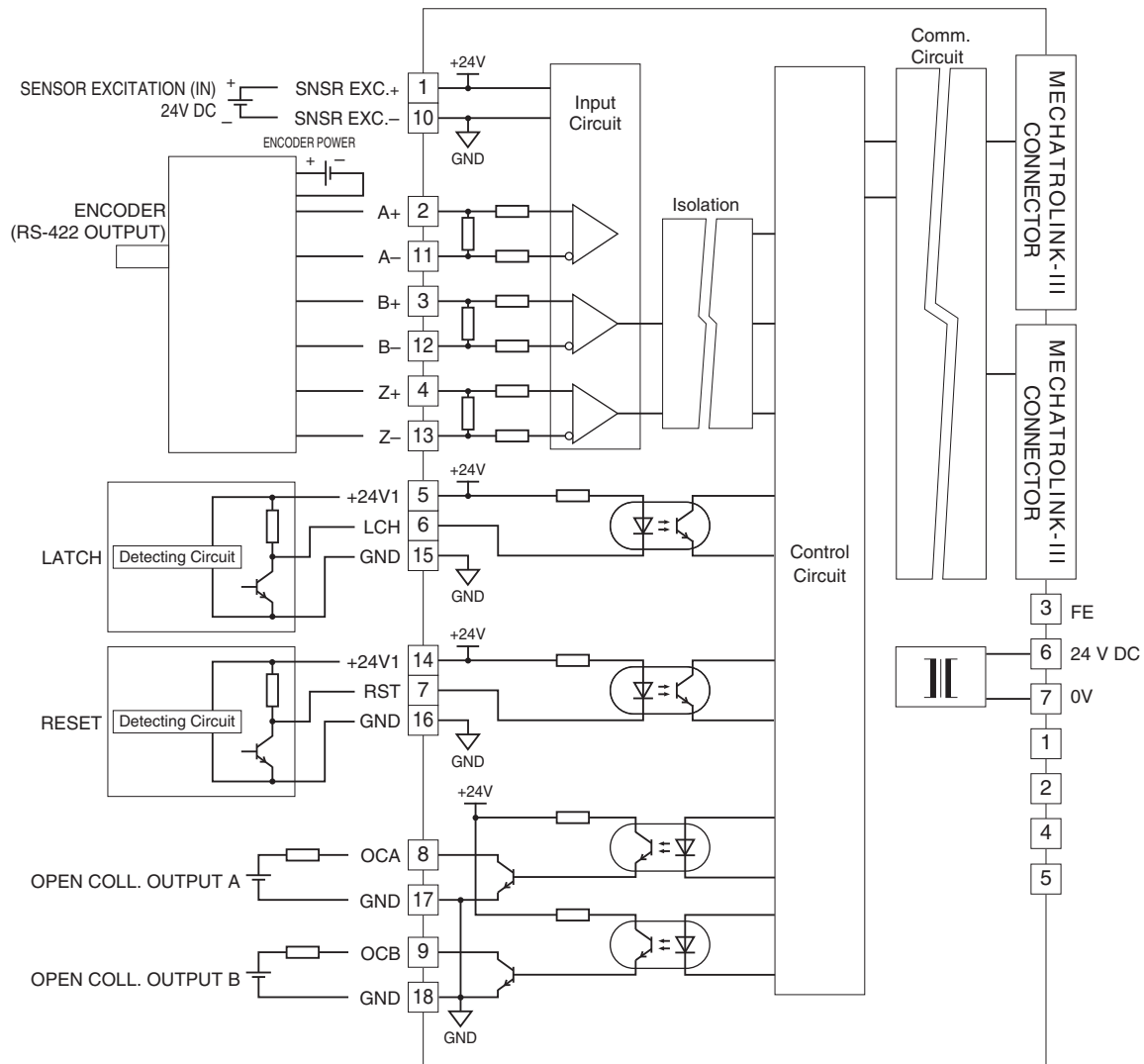
NO.	ID	FUNCTION
1	SNSR EXC +	SENSOR EXCITATION +
2	A	PHASE A
3	B	PHASE B
4	V +	PENCODER POWER OUTPUT +
5	+24V1	24V DC
6	LCH	LATCH INPUT
7	RST	RESET INPUT
8	OCA	OPEN COLLECTOR OUTPUT A
9	OCB	OPEN COLLECTOR OUTPUT B
10	SNSR / ENCDR -	SENSOR EXCITATION - / ENCODER POWER INPUT -
11	ENCDR +	ENCODER POWER INPUT +
12	Z	PHASE Z
13	V -	PENCODER POWER OUTPUT -
14	+24V1	24V DC
15	GND	0V
16	GND	0V
17	GND	0V
18	GND	0V

SCHEMATIC CIRCUITRY

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

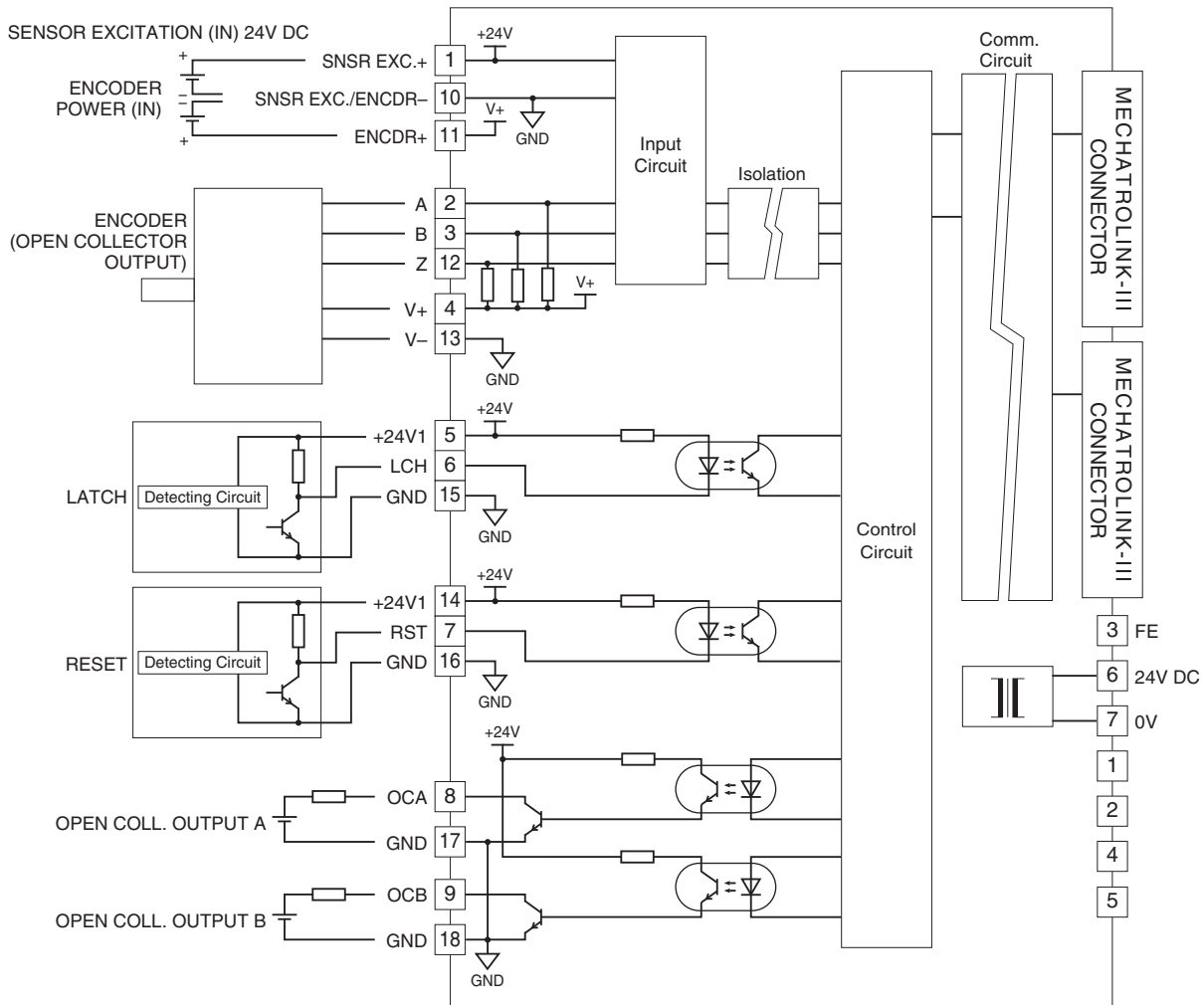
Caution: FE terminal is NOT a protective conductor terminal.

■ R7G4HML3-6-PA1J (RS-422 INPUT)



Note. For wiring of encoder input, use twisted pair cable with shield. Be sure to ground the shield.

■ R7G4HML3-6-PA1Ax (OPEN COLLECTOR INPUT)



Note. For wiring of encoder input, use twisted pair cable with shield. Be sure to ground the shield.

SELF-SYNCH INPUT, DC VOLTAGE/CURRENT OUTPUT MODULE

(1 point each, isolated, screw terminal block)

MODEL: R7G4HML3-6-STYVS1

SPECIFICATIONS

Isolation: Input to output to MECHATROLINK or FE to power input

Linearization: 32 points

■ INPUT

Conversion data: 0 to 10000 for input range

Measurement range: 0 - 360°

Angle span: 60 - 360°

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

Input resistance: ≥ 1 MΩ

Conversion accuracy: Linearize gain ≤ 1:

±0.2 % or ±0.5°, whichever is greater

Linearize gain > 1:

Conversion accuracy x linearize gain

Conversion rate: Sync signal input frequency 50 Hz, 20 msec.

Sync signal input frequency 60 Hz, 16.7 msec.

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

Temp. coefficient: ±0.015 %/°C (±0.008 %/°F) of max. span

■ OUTPUT

Conversion data: 0 - 10000 for output range

Output rang: -10 - +10V DC, -5 - +5V DC, 0 - 10V DC, 0 - 5V DC, 1 - 5V DC, 4 - 20mA DC

Operational range: -15 - +115 % of the output range (except -10 - +10 V DC);

approx. -11.5 - +11.5 V DC (-10 - +10 V DC)

Load resistance: ≥ 100 kΩ (voltage output)
≤ 550Ω (current output)

Conversion accuracy: ±0.1 %

Conversion rate: 200 μsec.

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

Temperature coefficient: ±0.015 %/°C (±0.008 %/°F)

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	AVAILABLE RANGE	FACTORY 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	CW
		CCW	
	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	-10 - +10 V DC
		-5 - +5 V DC	
		0 - 10 V DC	
		0 - 5 V DC	
		1 - 5 V DC	
	4 - 20 mA 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	Hold the output	
	Output reset value		

TERMINAL ASSIGNMENTS

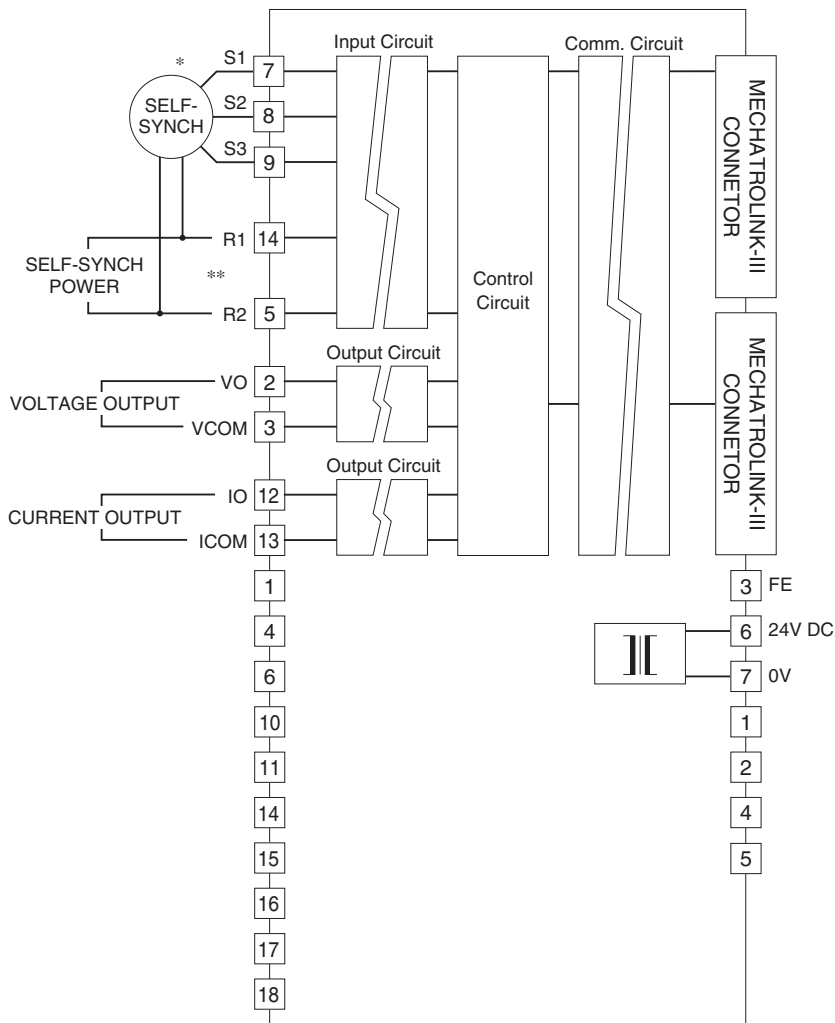
10	11	12	13	14	15	16	17	18
NC	NC	IO	ICOM	R1	NC	NC	NC	NC
1	2	3	4	5	6	7	8	9
NC	VO	VCOM	NC	R2	NC	S1	S2	S3

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

SCHEMATIC CIRCUITRY

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

HIGH-SPEED DC VOLTAGE OUTPUT MODULE

(4 points, isolated; screw terminal block)

MODEL: R7G4HML3-6-YVF4

SPECIFICATIONS

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

Converted data range: 0 - 10000 of the output range

Output range

Wide span voltage: -10 - +10 V DC, -5 - +5 V DC, 0 - 10 V DC, 0 - 5 V DC, 1 - 5 V DC

Narrow span voltage: -1 - +1 V DC, 0 - 1 V DC, -0.5 - +0.5 V DC

Operational range: -15 - +115 % of the output range (except -10 - +10 V DC);

approx. -11.5 - +11.5 V DC (-10 - +10 V DC)

Load resistance: $\geq 100 \text{ k}\Omega$

Conversion accuracy: $\pm 0.1 \%$

Conversion rate: 200 $\mu\text{sec.}$ / 4 channels

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

Temperature coefficient: $\pm 0.015 \%/^{\circ}\text{C}$ ($\pm 0.008 \%/^{\circ}\text{F}$)

TERMINAL ASSIGNMENTS

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

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

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	AVAILABLE RANGE	FACTORY SETTING
Validating/ Invalidating	Valid Invalid	Valid
Output 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	-10 - +10 V DC
Bias adjustment	-320.00 - +320.00 (%)	0.00 (%)
Gain adjustment	-3.2000 - +3.2000	1.0000
Zero scale	-32 000 - +32 000	0
Full scale	-32 000 - +32 000	10 000
Output reset value*1	-15.00 - +115.00 (%)	-15.00 (%)

■ SETTINGS FOR ALL CHANNELS

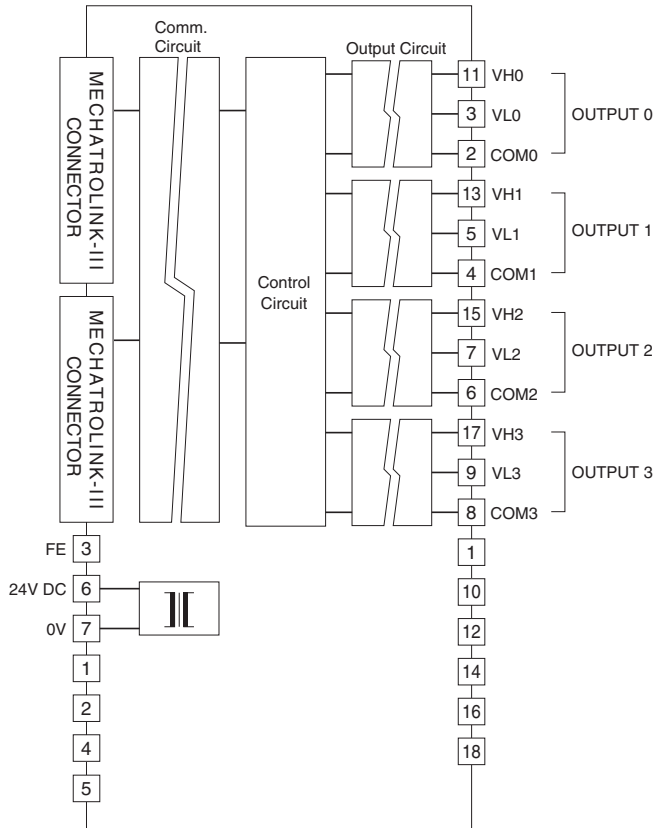
PARAMETER	AVAILABLE RANGE	FACTORY SETTING
Setting indication for output function at the loss of communication	Hold the output Output reset value	Hold the output

*1. When output range is -10 - +10 V DC, approx. -115 V DC at approx. -7.5 - -15% and approx. +11.5 V DC at approx. 107.5 - 115% are outputted respectively.

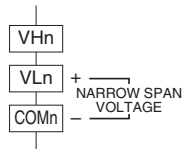
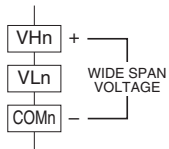
CIRCUIT DIAGRAM

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

Caution: FE terminal is NOT a protective conductor terminal.



Output Connection Examples



HIGH-SPEED DC CURRENT OUTPUT MODULE

(4 points, isolated; screw terminal block)

MODEL: R7G4HML3-6-YSF4

SPECIFICATIONS

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

Converted data range: 0 - 10000 of the output range

Output range: 4 - 20 mA DC

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

Load resistance: $\leq 550\Omega$

Conversion accuracy: $\pm 0.1\%$

Conversion rate: 200 $\mu\text{sec.}$ / 4 channels

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

Temperature coefficient: $\pm 0.015\ \%/^{\circ}\text{C}$ ($\pm 0.008\ \%/^{\circ}\text{F}$)

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	AVAILABLE RANGE	FACTORY SETTING
Validating/ Invalidating	Valid Invalid	Valid
Bias adjustment	-320.00 - +320.00 (%)	0.00 (%)
Gain adjustment	-3.2000 - +3.2000	1.0000
Zero scale	-32000 - +32000	0
Full scale	-32000 - +32000	10000
Output reset value	-15.00 - +115.00 (%)	-15.00 (%)

■ SETTINGS FOR ALL CHANNELS

PARAMETER	AVAILABLE RANGE	FACTORY SETTING
Setting indication for output function at the loss of communication	Hold the output Output reset value	Hold the output

TERMINAL ASSIGNMENTS

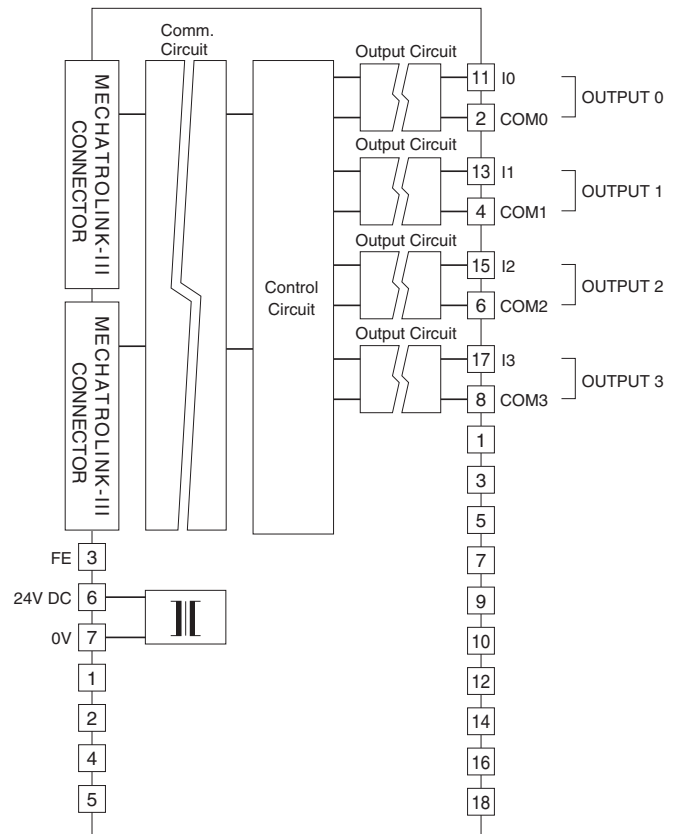
10	11	12	13	14	15	16	17	18
NC	I0	NC	I1	NC	I2	NC	I3	NC
1	2	3	4	5	6	7	8	9
NC	COM0	NC	COM1	NC	COM2	NC	COM3	NC

NO.	ID	FUNCTION	NO.	ID	FUNCTION
1	NC	No connection	10	NC	No connection
2	COM0	Common 0	11	I0	Current 0
3	NC	No connection	12	NC	No connection
4	COM1	Common 1	13	I1	Current 1
5	NC	No connection	14	NC	No connection
6	COM2	Common 2	15	I2	Current 2
7	NC	No connection	16	NC	No connection
8	COM3	Common 3	17	I3	Current 3
9	NC	No connection	18	NC	No connection

CIRCUIT 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.