

Remote I/O R7 Series

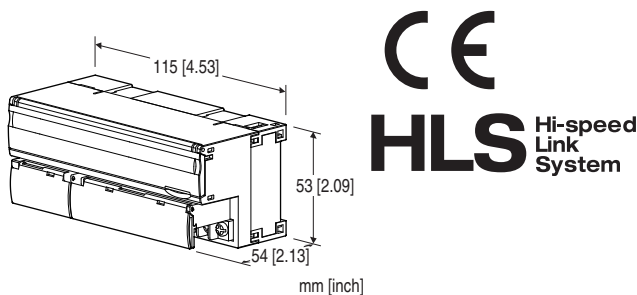
HI-SPEED LINK SYSTEM I/O MODULE

(thermocouple input, 4 points, isolated)

Functions & Features

- 4 points thermocouple input module for HLS
- Input sensor can be selected with the front DIP switches for all channels
- Individual channels, zero adjustment, span adjustment, scaling, and temperature unit can be set with the configurator software (model: R7CON)

HLS is the abbreviation for “Hi-speed Link System” of Step Technica Co., Ltd.



MODEL: R7HL-TS4-R[1]

ORDERING INFORMATION

- Code number: R7HL-TS4-R[1]
Specify a code from below for [1].
(e.g. R7HL-TS4-R/H/Q)
- Specify the specification for option code /Q
(e.g. /C01/SET)

I/O TYPE

TS4: Thermocouple input, 4 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)

Communication Mode

blank: Full-duplex

/H: Half-duplex

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-7812-B)

RELATED PRODUCTS

- PC Configurator cable (model: MCN-CON or COP-US)
- PC configurator software (model: R7CON)
Downloadable at our web site.

GENERAL SPECIFICATIONS

Connection: M3 separable screw terminal (torque 0.5 N·m)

Solderless terminal: Refer to the drawing at the end of the section.

• Communication cable

Recommended manufacture: J.S.T. Mfg. Co., Ltd.

Applicable wire size: 0.2 to 0.5 mm² (AWG 26 to 22)

• Others

Recommended manufacture: J.S.T. 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 power to HLS to FG

Zero adjustments: Configurable via R7CON

Span adjustments: Configurable via R7CON

Conversion rate: Configurable via R7CON

Thermocouple setting: Configurable via the front DIP switch or R7CON

Burnout setting: Selectable between upscale (*) and downscale with the front DIP switch

(*) Factory default setting

Linearization: Standard

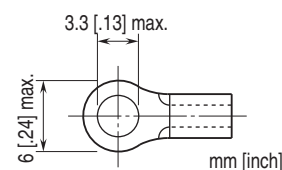
Cold junction compensation: CJC sensor attached to the input terminals

Status indicator LEDs: PWR, RUN

(Refer to the instruction manual)

Configurator connection: 2.5 dia. miniature jack

■ Recommended solderless terminal



HLS COMMUNICATION

Communication mode:

Communication mode option code blank: Full-duplex

Communication mode option code /H: half-duplex

Network cable

• Shield cable

Full-duplex communication:

ZHY262PS and ZHT262PS

(Shinko Seisen Industry Co., Ltd.)

Half-duplex communication:

ZHY221PS (Shinko Seisen Industry Co., Ltd.)

• Dual-shield cable:

ZHY262PBA (Shinko Seisen Industry Co., Ltd.)

Transmission distance / Transfer rate:

100 meters (328 ft)/12 Mbps (default),

200 meters (656 ft)/6 Mbps

(Selectable with DIP switch)

Station address: Rotary switch

(Refer to the instruction manual)

Data allocation: 4

Terminating resistor: Built-in (Selected with the DIP SW;
factory setting: disabled)

INPUT SPECIFICATIONS

Input resistance: $\geq 30 \text{ k}\Omega$

Burnout sensing: $\leq 0.1 \mu\text{A}$

T/C	BURNOUT INDICATION ($^{\circ}\text{C}$)		CONFORMANCE RANGE ($^{\circ}\text{C}$)
	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	1000 to 1760
R	-100	+1860	380 to 1760
S	-100	+1860	400 to 1760
C (WRe 5-26)	-52	+2416	100 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	300 to 1760

T/C	BURNOUT INDICATION ($^{\circ}\text{F}$)		CONFORMANCE RANGE ($^{\circ}\text{F}$)
	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	1832 to 3200
R	-148	+3380	716 to 3200
S	-148	+3380	752 to 3200
C (WRe 5-26)	-62	+4381	212 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	572 to 3200

INSTALLATION

Current consumption

•DC: Approx. 90 mA

Operating temperature: -10 to +55 $^{\circ}\text{C}$ (14 to 131 $^{\circ}\text{F}$)

Storage temperature: -20 to +65 $^{\circ}\text{C}$ (-4 to +149 $^{\circ}\text{F}$)

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

Atmosphere: No corrosive gas or heavy dust

Mounting: DIN rail (35 mm rail)

Weight: 200 g (0.44 lb)

PERFORMANCE

Conversion accuracy: $\pm 1^{\circ}\text{C}$ ($\pm 1.8^{\circ}\text{F}$) except $\pm 2^{\circ}\text{C}$ ($\pm 3.6^{\circ}\text{F}$) for B, R, S, C, PR

Conversion rate: 250 msec. (*) or 500 msec. selectable

(*) Factory default setting

Converted data range:

• Engineering unit value ($^{\circ}\text{C}$, K) $\times 10$ (integer)

• Engineering unit value ($^{\circ}\text{F}$)

Cold junction compensation error:

$\pm 1.0^{\circ}\text{C}$ at 25 $\pm 10^{\circ}\text{C}$ ($\pm 1.8^{\circ}\text{F}$ at 77 $\pm 18^{\circ}\text{F}$)

$\pm 1.5^{\circ}\text{C}$ ($\pm 2.7^{\circ}\text{F}$) for R, S, PR

Temp. coefficient: $\pm 0.015 \text{ }^{\circ}\text{C}/^{\circ}\text{C}$ ($\pm 0.008 \text{ }^{\circ}\text{F}/^{\circ}\text{F}$) of max. span

Response time: Conversion rate $\times 2 + 50$ msec. (0 - 90 %)

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

Dielectric strength: 1500 V AC @ 1 minute (input 0 to input 1 to input 2 to input 3 to power input to HLS to FG)

STANDARDS & APPROVALS

Refer to the manuals to comply with the standards.

EU conformity:

EMC Directive

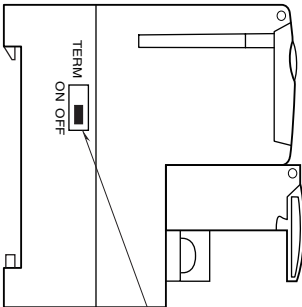
EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

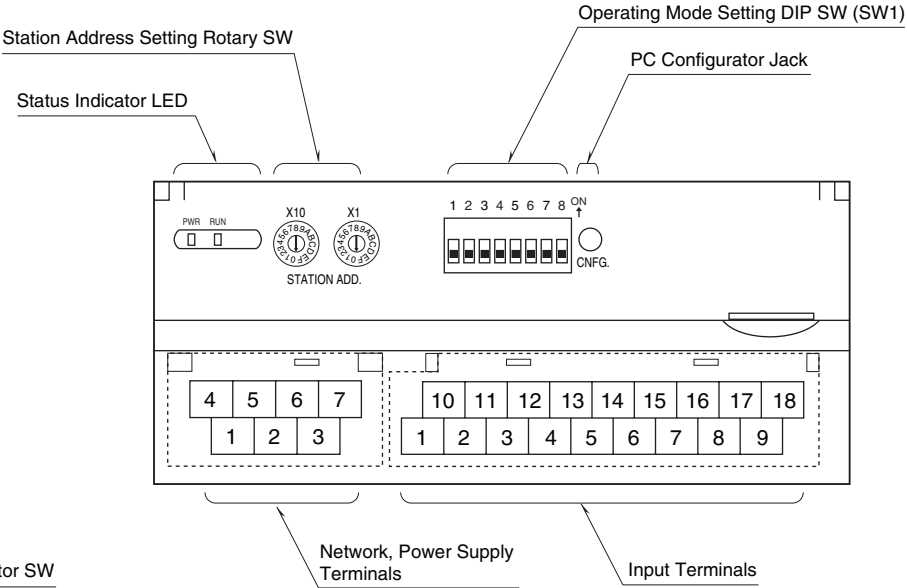
EXTERNAL VIEW

■ SIDE VIEW



Terminating Resistor SW

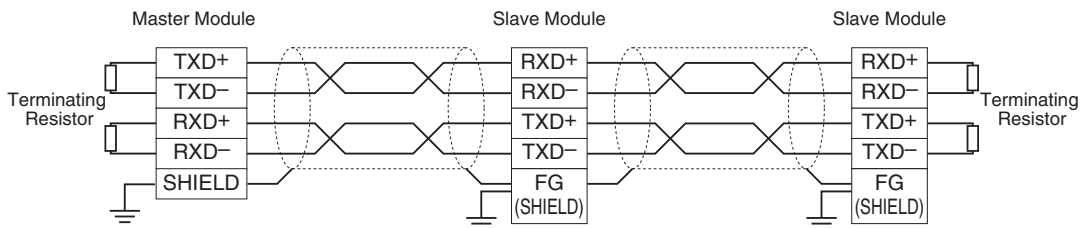
■ FRONT VIEW



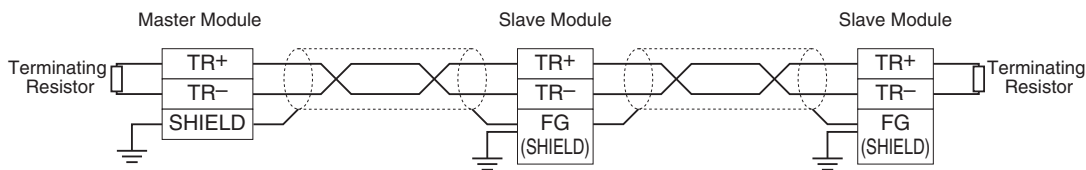
COMMUNICATION CABLE CONNECTIONS

■ MASTER CONNECTION

• Full-duplex communication



• Half-duplex communication



Note: Be sure to turn ON the switch of the terminating resistor located at both ends of the modules.

TERMINAL ASSIGNMENTS**■ INPUT TERMINAL ASSIGNMENT**

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

■ NETWORK, POWER SUPPLY TERMINAL ASSIGNMENT**• Full-duplex communication**

4	5	6	7
RXD+	RXD-	+24V	0V
1	2	3	
TXD+	TXD-	FG	

NO.	ID	FUNCTION, NOTES
1	TXD+	Network (slave, transmission +)
2	TXD-	Network (slave, transmission -)
3	FG	FG
4	RXD+	Network (master, transmission +)
5	RXD-	Network (master, transmission -)
6	+24V	Power input (24V DC)
7	0V	Power input (0V)

• Half-duplex communication

4	5	6	7
TR+	TR-	+24V	0V
1	2	3	
NC	NC	FG	

NO.	ID	FUNCTION, NOTES
1	NC	No connection
2	NC	No connection
3	FG	FG
4	TR+	Network
5	TR-	Network
6	+24V	Power input (24V DC)
7	0V	Power input (0V)

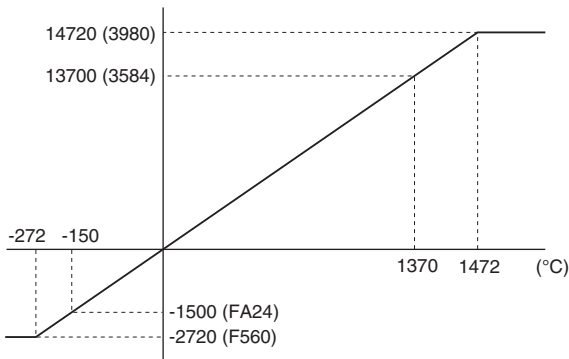
DATA CONVERSION

■ INPUT RANGE AND DATA CONVERSION (FACTORY DEFAULT SETTING)

Engineering unit value °C or K is multiplied by 10 and expressed in 16 bits. °F data is represented in engineering unit value, without multiplication. Negative value is represented in 2's complements.

• 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

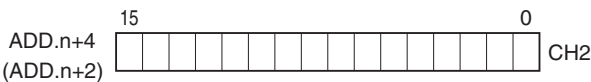


I/O DATA DESCRIPTIONS

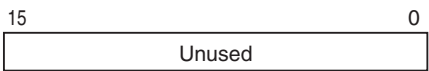
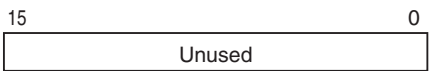
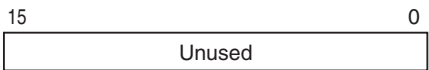
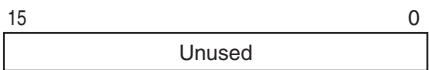
Scaling of analog input is configurable with the configurator software (model: R7CON). Refer to the software manual for details.

■ ANALOG INPUT

• Di area

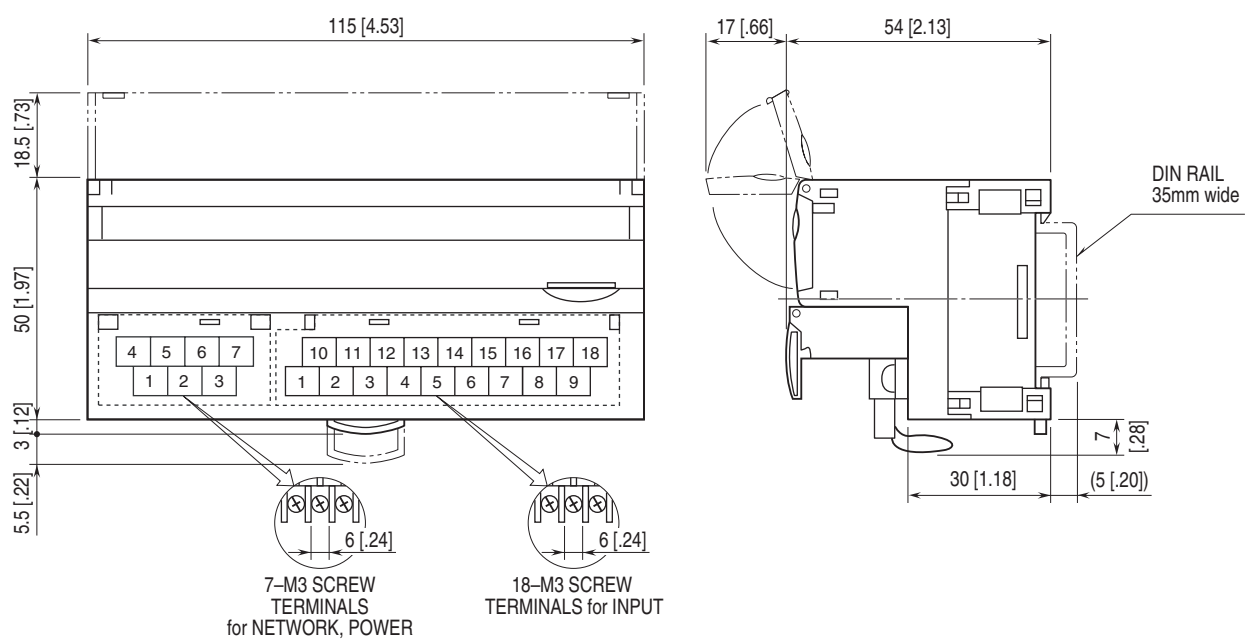


• Do area



The data is 16-bit binary.
Negative value is represented in 2's complements.
Address in parentheses are for half-duplex mode.

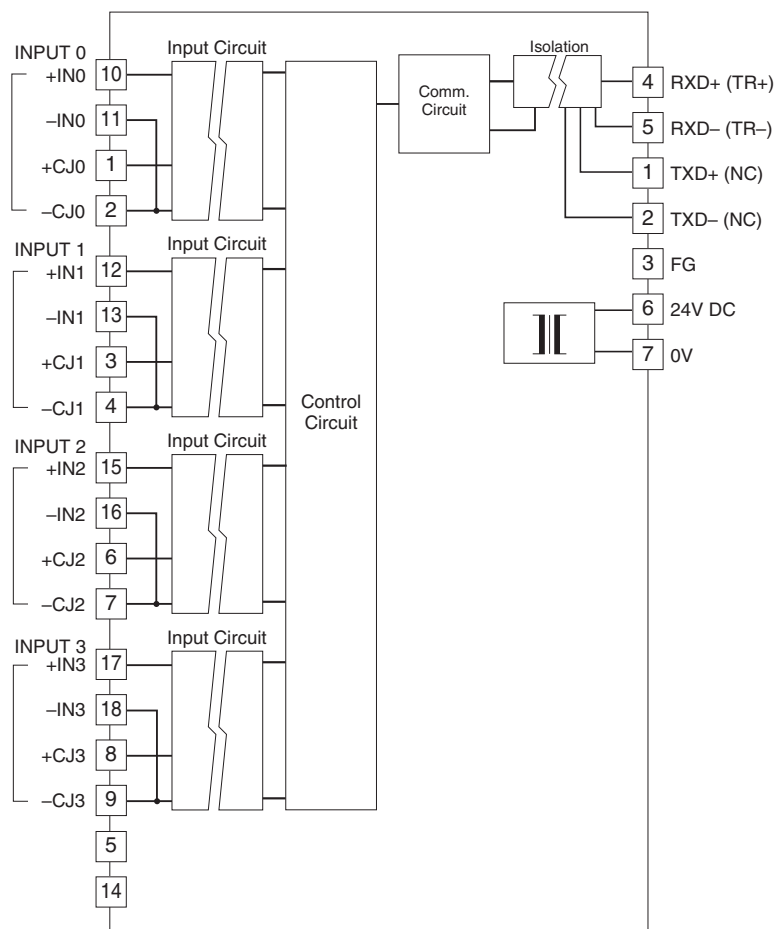
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

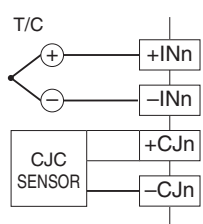
Note: In order to improve EMC performance, bond the FG terminal to ground.

Caution: FG terminal is NOT a protective conductor terminal.



Note: Terminal numbers in parentheses are for half-duplex communication model.

Input Connection Example



Specifications are subject to change without notice.