

Remote I/O R7 Series

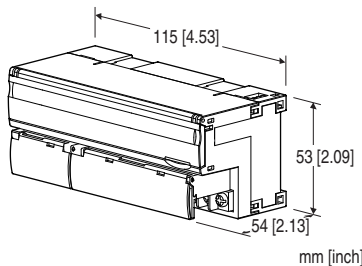
(UL not available)

CC-Link I/O MODULE

(CC-Link V.1.10; thermocouple input, 4 points, isolated)

Functions & Features

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



MODEL:R7C-TS4-R[1]

ORDERING INFORMATION

- Code number: R7C-TS4-R[1]

Specify a code from below for [1].

- (e.g. R7C-TS4-R/Q)
- Specify the specification for option code /Q (e.g. /C01)

If you need factory setting, use Ordering Information Sheet (No. ESU-7801-B).

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

Standards & Approvals

blank: CE marking

/UL: UL approval, CE marking

Other Options

blank: none

/Q: Option other than the above (specify the specification)

SPECIFICATIONS OF OPTION: Q

COATING (For the detail, refer to our web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

RELATED PRODUCTS

- PC Configurator cable (model: MCN-CON or COP-US)
- PC configurator software (model: R7CON)
- CSP+ file

The configurator software and CSP+ file are downloadable at our web site.

CSP+ file is also downloadable at CC-Link Partner Association's web site.

- Discrete input extension module (model: R7C-EAx)
- Discrete output extension module (model: R7C-ECx)

PACKAGE INCLUDES...

- Terminating resistor (110 Ω , 0.5 W)

GENERAL SPECIFICATIONS

Connection: 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 power to CC-Link or FG

Zero adjustments: Configurable via R7CON

Span adjustments: Configurable via R7CON

Extension: No extension (*), Discrete input 8 or 16 points, Discrete output 8 or 16 points

Selectable with the front DIP SW

(*) Factory default setting

Conversion rate: Selectable with the front DIP SW

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

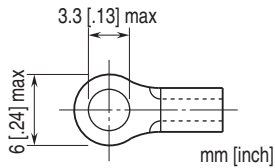
Linearization: Standard

Cold junction compensation: CJC sensor attached to the input terminals

Status indicator LED: PWR

Configurator connection: 2.5 dia. miniature jack

■Recommended solderless terminal



CC-Link COMMUNICATION

CC-Link: Ver.1.10

Connector: M3 screw terminal

Network cable: CC-Link cable designated by Mitsubishi Electric

Station number: 1 - 64 (rotary switch, default:00)

Station Type: Remote device

Data allocation: 1

Baud rate setting: 156 kbps (default), 625 kbps, 2.5 Mbps, 5 Mbps, 10 Mbps (rotary switch)

Status indicator LEDs: RUN, ERR, SD, RD

INPUT SPECIFICATIONS

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

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

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	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 (°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	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°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: 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 to CC-Link or FG)

STANDARDS & APPROVALS

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

Approval:

UL/C-UL nonincendive Class I, Division 2,

Groups A, B, C, and D

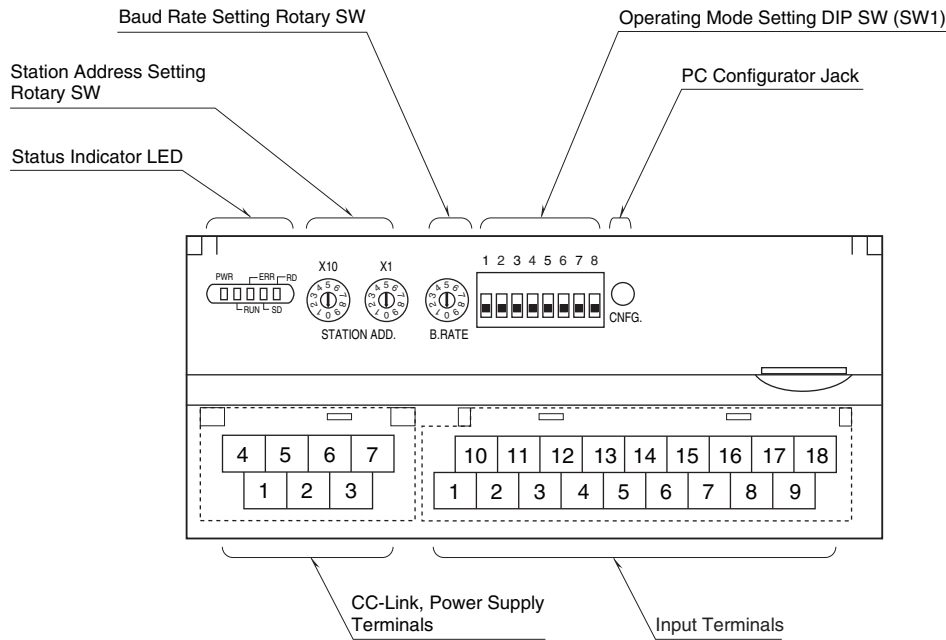
(ANSI/UL 121201, CAN/CSA-C22.2 No.213-17)

UL/C-UL general safety requirements

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

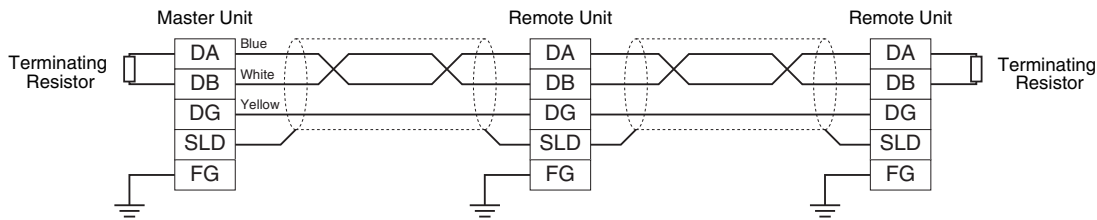
Note: This equipment is to be supplied by a Class 2 power supply when using as conformity with UL/C-UL.

EXTERNAL VIEW



COMMUNICATION CABLE CONNECTIONS

MASTER CONNECTION



Note: Be sure to connect the terminating resistor included in the product package to the unit at both ends of communication line.
The terminator must be connected across DA and DB.
The Master Unit can be located at not only both ends but also any node of the of communication line.

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

■ POWER SUPPLY, CC-LINK TERMINAL ASSIGNMENT

4	5	6	7
DA	DG	+24 V	0V
1	2	3	
DB	SLD	FG	

NO.	ID	FUNCTION, NOTES
1	DB	White
2	SLD	Shield
3	FG	FG
4	DA	Blue
5	DG	Yellow
6	+24 V	Power input (24 V DC)
7	0 V	Power input (0 V DC)

INDICATOR LED

■ STATUS INDICATOR LED

PWR	RUN	ERR	SD*1	RD	STATUS*2
ON	ON	BL	BL	ON	Communicates normally with occasional CRC errors due to noise interference.
ON	ON	BL	BL	ON	Communicates normally but the Baud Rate and/or Station Address switches failed. ERR LED blinks approximately in 0.5 seconds intervals.
ON	ON	BL	BL	OFF	----
ON	ON	BL	OFF	ON	CRC error detected in the received data. Unable to respond.
ON	ON	BL	OFF	OFF	----
ON	ON	OFF	BL	ON	Normal communication
ON	ON	OFF	BL	OFF	----
ON	ON	OFF	OFF	ON	Unable to receive data addressed to the station.
ON	ON	OFF	OFF	OFF	----
ON	OFF	BL	BL	ON	Polling response is made but CRC error is detected in received refresh data.
ON	OFF	BL	BL	OFF	----
ON	OFF	BL	OFF	ON	CRC error detected in the data addressed to the station.
ON	OFF	BL	OFF	OFF	----
ON	OFF	OFF	BL	ON	Link is not started.
ON	OFF	OFF	BL	OFF	----
ON	OFF	OFF	OFF	ON	No data addressed to the station. Or unable to receive data addressed to the station due to noise interference. (Missing parts of the data sent from the master)
ON	OFF	OFF	OFF	OFF	Unable to receive data due to wire breakdown
ON	OFF	ON	OFF	ON/OFF	Faulty Baud Rate and/or Station Address setting
OFF	OFF	OFF	OFF	OFF	Power input removed or power supply failure.

OFF = OFF, ON = ON, BL = Blinking

*1. SD LED which is blinking may appear to be ON with high baud rate especially when fewer modules are connected.

*2. LED combinations indicated with "----" do not occur in normal operation unless LED failure or the like occurs.

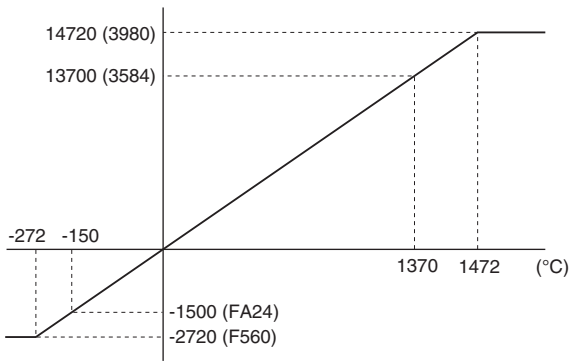
DATA CONVERSION

■ 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



DATA ALLOCATION

■ ANALOG INPUT

Interval-timed Response (X)

RWn n+0	Analog input 0
+1	Analog input 1
+2	Analog input 2
+3	Analog input 3

Refresh Data (Y)

RWw n+0	Unused
+1	Unused
+2	Unused
+3	Unused

• Without Extension Module

Interval-timed Response (X)

RX(n+0)	Status
RX(n+1)	Reserved

Refresh Data (Y)

RY(n+0)	Unused
RY(n+1)	Unused

• With Extension Module R7C-EA16

Interval-timed Response (X)

RX(n+0)	R7C-EA16
RX(n+1)	Reserved

Refresh Data (Y)

RY(n+0)	Unused
RY(n+1)	Unused

• With Extension Module R7C-EC16x

Interval-timed Response (X)

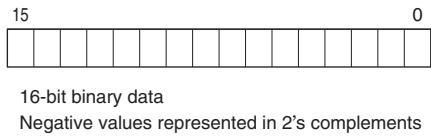
RX(n+0)	Status
RX(n+1)	Reserved

Refresh Data (Y)

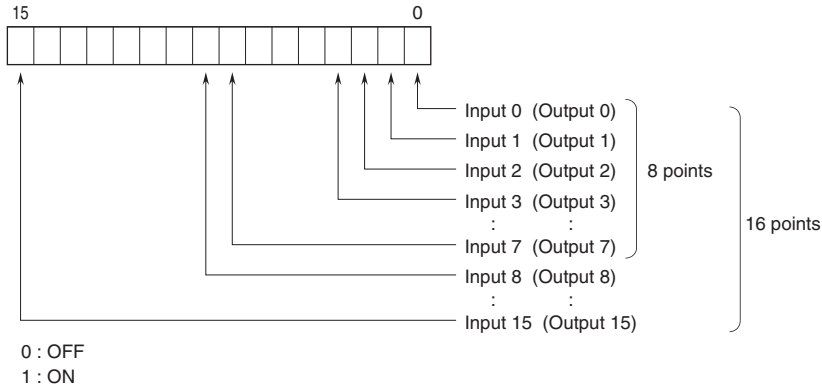
RY(n+0)	R7C-EC16x
RY(n+1)	Unused

I/O DATA DESCRIPTIONS

■ ANALOG INPUT

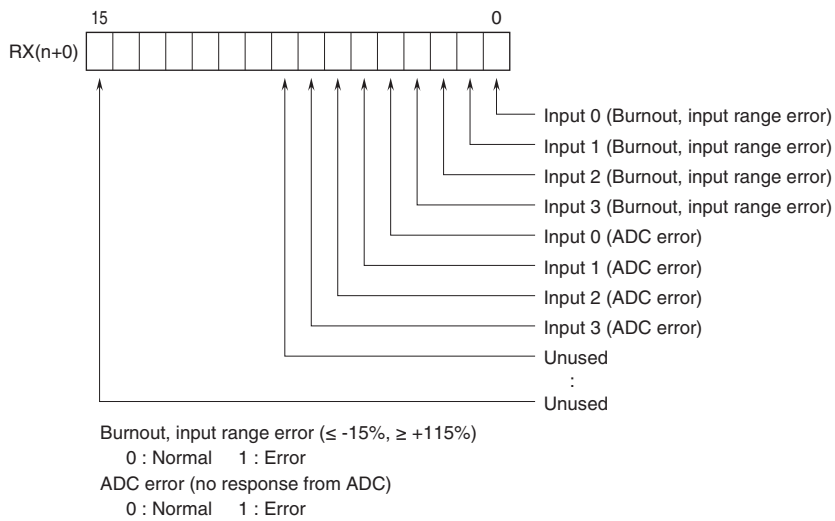


■ DISCRETE I/O

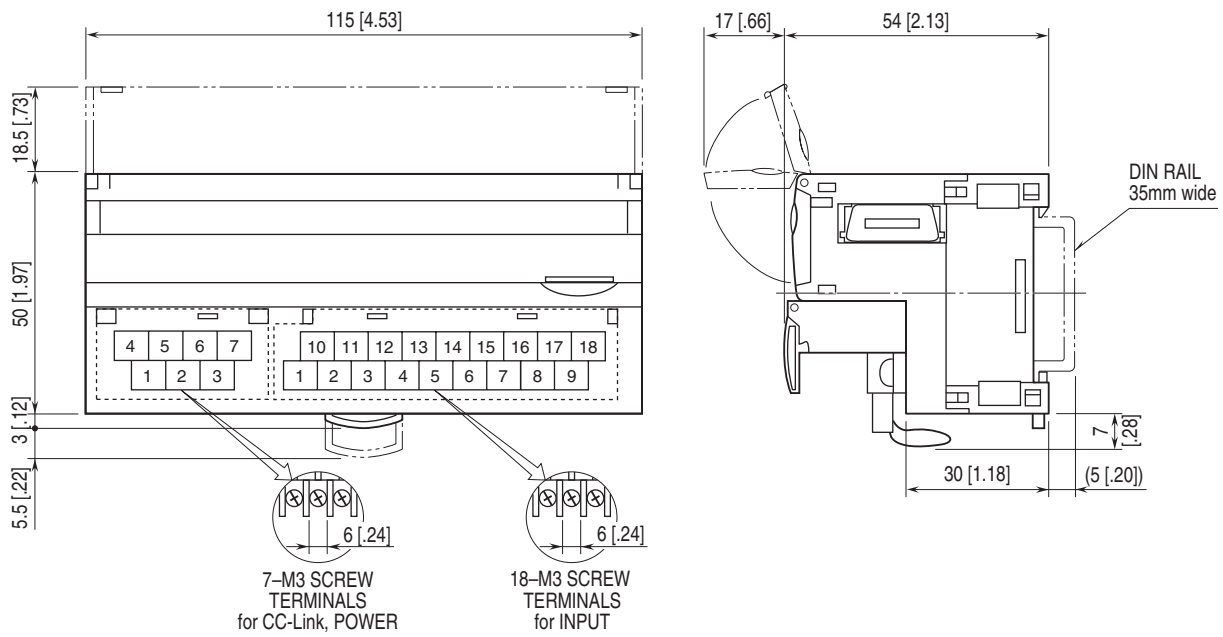


■ STATUS

Analog input module without extension module can show input status of each channel.



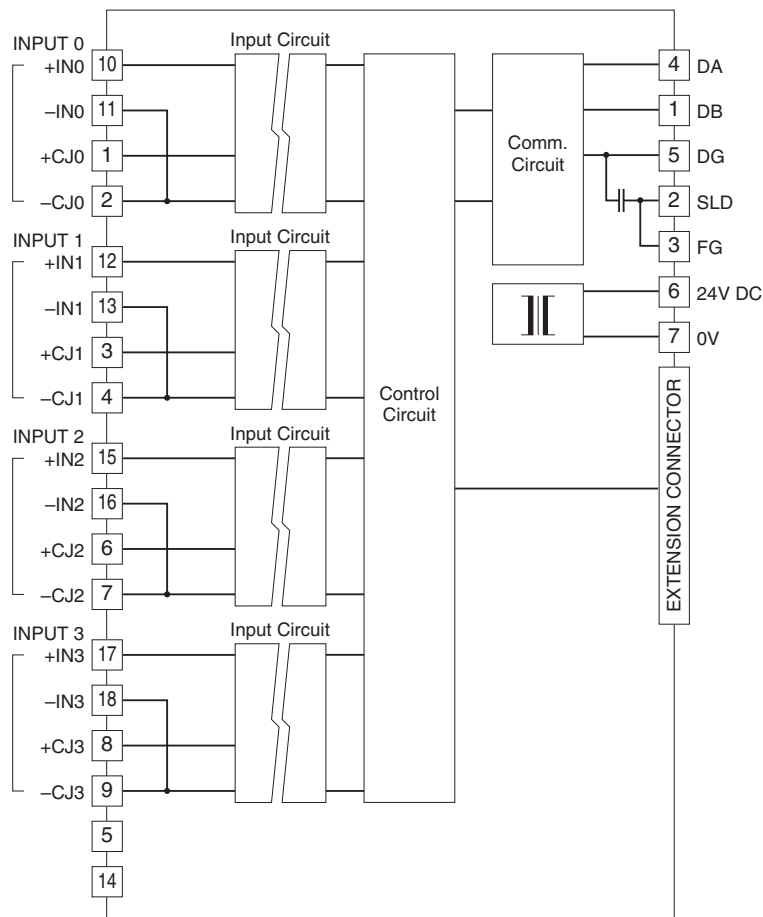
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



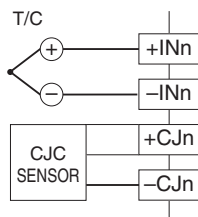
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

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

Caution: FG terminal is NOT a protective conductor terminal.



Input Connection Example



Specifications are subject to change without notice.