

General Specifications

Model CCU7 Universal Temperature Converter (Programmable Isolator)

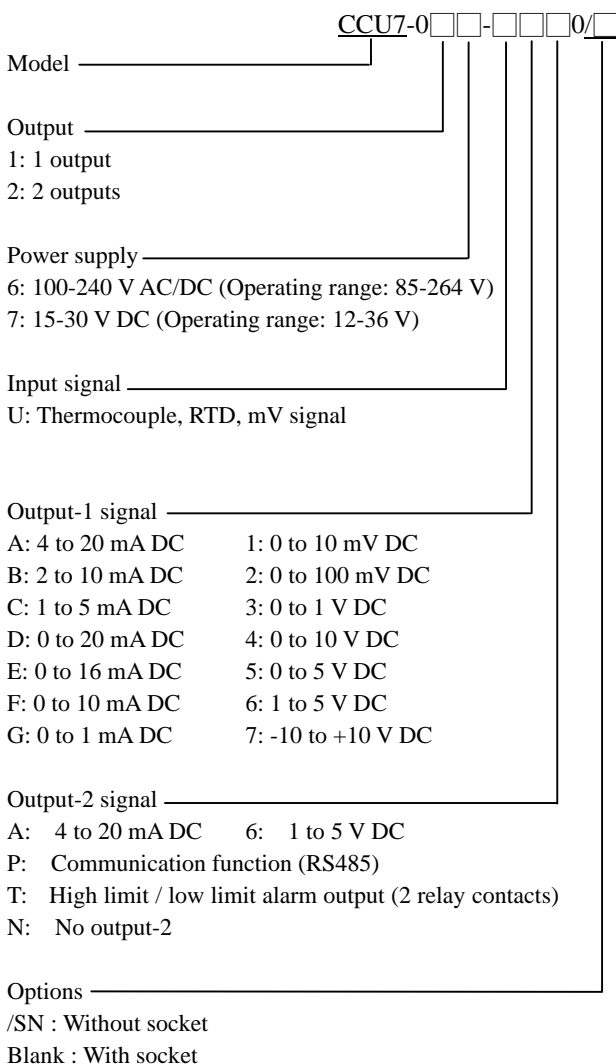
SMPSC

◆ General

The plug-in type universal transmitter converts input signal (thermocouple, RTD or mV signal) into isolated DC voltage signal or DC current signal.

- Universal input enables selection of input type (thermocouple, RTD, mV signal) and of measuring ranges with specifications.
- Dc voltage signal, DC current signal, communication output (RS485), or alarm output (2 relay contacts) is selectable as output-2.
- Change of input types /input ranges/ burnout action, and I/O monitoring etc. through Setup Utility.

◆ Model and Suffix Codes



◆ Input/Output Specifications

■ Input

Input Signal Type:

- Thermocouple (ITS-90): Type K, T, E, J, R, S, B, N, W3 (see Note 1), W5(see Note2).

Note 1: W3 is the abbreviation of W97Re3-W75Re25 (tungsten 97% rhenium 3% - tungsten 75% rhenium 25%) ASTM E988 Standard.

Note 2: W5 is the abbreviation of W95Re5-W74Re26 (tungsten 95% rhenium 5% - tungsten 74% rhenium 26%) ASTM E988 Standard.

- RTD: Pt100 (ITS-90)
Pt100 (ITS-90): $R_0 = 100\Omega$, $R_{100}/R_0 = 1.3851$
- mV signal: Can be set within -10 to 100 mV

Table 1 Input Type and Range

Input Type	Range
TC sensor type	(°C)
Type K	-200 to 1200
Type E	-200 to 800
Type J	0 to 750
Type T	-200 to 350
Type R	0 to 1600
Type S	0 to 1600
Type B	600 to 1700
Type N	-200 to 1200
Type W3	0 to 2000
Type W5	0 to 2000
RTD sensor type	(°C)
Pt 100 (ITS-90)	-200 to 660
mV (DC voltage)	mV DC
	-10 to 100

Measuring Span: 3mV or more (thermocouple, mV signal)
10°C or more (RTD).

Input Resistance: 1M Ω (when power on), 400K Ω (when power off) with thermocouple, mV input.

Input External Resistance:

Thermocouple, mV signal: 500 Ω or less

RTD: Input span (°C) \times 0.4 Ω or less/wire or 10 Ω or less

RTD Detective Current: About 0.4 mA

Permissible Applicable Voltage: \pm 4V DC or less



■ Output-1

Output-1 Range	Allowable Load Resistance	Output-1 Range	Allowable Load Resistance
4 to 20 mA DC	750Ω max.	0 to 10 mV DC	250KΩ min.
2 to 10 mA DC	1500Ω max.	0 to 100 mVDC	250KΩ min.
1 to 5 mA DC	3000Ω max.	0 to 1 V DC	2KΩ min.
0 to 20 mA DC	750Ω max.	0 to 10 V DC	10KΩ min.
0 to 16 mA DC	900Ω max.	0 to 5 V DC	2KΩ min.
0 to 10 mA DC	1500Ω max.	1 to 5 V DC	2KΩ min.
0 to 1 mA DC	15KΩ max.	-10 to +10V DC	10KΩ min.

■ Output-2

• Analog Output

Output Signal	Output Resistance	Permissible Load Resistance
1 to 5 V DC	1 Ω or less	2 kΩ or more
4 to 20 mA DC	500 kΩ or more	350Ω or less

• Communication Function

This transmitter can be connected to a personal computer, or programmable controllers.

Standards: EIA RS485

Maximum number of connectable controllers: 31 controllers

Maximum communication distance: 1200 m

Communication method: 2-wire half duplex, start-stop synchronization, non-procedural

Communication rate: 1200, 2400, 4800, 9600, 19200 bps

Data length: 8 bit

Stop bit: 1, 2 bit

Parity: Even parity, odd parity, or none

Communication protocol: MODBUS RTU

• Alarm Output

Signal type: Relay contact

Output signal: N.O. contact output (contact ON at excitation) 2 points, COM common

Contact capacity: 30 V DC, 1 A

Alarm operating direction: High limit alarm or low limit alarm

Relay operating direction setting: Excitation or non-excitation at normal status

Alarm setting range: 0 to 100 % of input range Temperature input [°C], mV input [%]

Setting resolution: 0.1°C or 0.1%, 4 significant digits

Hysteresis setting range: Set the value added to alarm setting point at alarm release

Setting range: 0 to 100% of input range temperature input [°C], mV input [%]

Setting resolution: 0.1°C or 0.1%, 4 significant digits

Alarm on-delay setting: Delay time from alarm condition completion to output

(Ex. Outputted when alarm status continues for 1 second or more after input value is over alarm point in case of set value "1 second.")

Setting range: 0 to 999 seconds

Setting resolution: 1 second (however, add about 0.2 seconds to setting time to prevent wrong operation)

Alarm off-delay setting: Delay time from alarm normal condition completion to output

(Ex. Released when normal status continues for 2 seconds or more after input value becomes normal status from alarm status in case of set value "2 seconds.")

Setting range: 0 to 999 seconds

Setting resolution: 1 second (however, add about 0.2 seconds to setting time to prevent wrong operation)

Alarm operation display: Front LED lights at excitation, 2 LEDs

◆ Items Available to Be Set

The following items can be set through Setup Utility:

Input range, address number, communication rate, parity, data length, stop bit, alarm operating direction, relay operating direction, alarm setting, hysteresis, alarm on-delay, alarm off-delay

◆ Standard Performance

Accuracy rating: ±0.1 % of span

However accuracy is limited in the following cases.

Thermocouple input :

Input range is -10 to 100 mV (M range), span is under 27.5 mV, in thermally generated emf conversion; accuracy (%) = ±0.1%×27.5 mV / input span [V]

Input range is -2.5 to 25 mV (L range), span is under 10 mV; in thermally generated emf conversion; accuracy (%) = ±0.1%×10 mV / input span [V]

RTD input:

Input range is 0 to 520Ω (H range), span is under 130Ω (refer to the reference resistance table); accuracy(%) = ±0.1%×130Ω / input span [Ω]

Input range is 0 to 176Ω (M range), span is under 38.6Ω (refer to the reference resistance table); accuracy(%) = ±0.1%×38.6Ω / input span[Ω]

Reference Junction Compensation Accuracy:

±1°C (except for Type R,S); ±2°C (Type R, S) for terminal temperature 25°C±15°C

Response Speed: 200ms 63% response (10 to 90%)

Alarm output: 350 ms (input change 10 to 90%, alarm setting point 50%, time till alarm output, when alarm delay setting and hysteresis are min.)

Burnout: No up/down

Burnout time: within 60 seconds

Effect of Power Supply Voltage Fluctuation: ±0.1% or less of span for power supply voltage fluctuation of 15 to 30V DC(±20%), 100 to 240V AC/DC

Effect of Ambient Temperature Change: ±0.2% or less of span for change of 10°C



◆ Safety and EMC Standards

The followings will be acquired.

Safety:

- Conforms to IEC1010-1: 1990 and EN61010-11: 1993.
- Certified for CSA1010
- CSA1010 category: CAT II (IEC1010-1)
- Certified for UL508

Non-Incendive Explosion-Proof:

- CSA C22.2 No. 213 Class I, Division 2, Groups A, B, C & D
- FM No. 3611 Class I, Division 2, Groups A, B, C & D

The above certified/approved instrument is only for voltage of 15 to 30 V DC.

EMC Standards:

- Conforms to the following EMC standards.
- EN55011: 1991 Class A Group1 for EMI (emissions)
- EN50082-2: 1995 for EMS (immunity)

The above conformed instrument is only for voltage of 15 to 30 V DC.

◆ Power Supply and Isolation

Supply rated voltage range: 100-240 V AC/DC 50/60Hz or 15-30 V DC

Supply input voltage range: 100-240 V AC/DC (-15, +10%) 50/60Hz or 15-30 V DC ($\pm 20\%$)

Power consumption: 2.6W at 24V DC; 2.6W at 110 V DC; 5VA at 100V AC; 6.7VA at 200 V AC

Insulation resistance: 100 M Ω minimum at 500V DC between input, output-1, output-2, power supply and grounding terminals mutually

Withstanding voltage: 2000 V AC for one minute between input, (output-1 and output-2), power supply and grounding terminals mutually; 1000 V AC for one minute between output-1 and output-2 terminals

◆ Environmental Conditions

Operating temperature range: 0 to 50

Operating humidity range: 5 to 90% RH (no condensation)

Operating conditions: Avoid installation in such environments as corrosive gas like sulfide hydrogen, dust, sea breeze and direct sunlight.

Installation altitude: 2000 m or less above sea level.

◆ Mounting and Appearance

Construction: Compact plug-in type

Material: Modified polyphenylene oxide (case body)

Mounting method: Wall or DIN rail mounting

Connection method: M3 screw terminal

External dimension: 29.5×76×124.5mm (W×H×D)

Weight: Approx. 170 g

◆ Accessories

Tag No. Label: 1 sheet

Range Label: 1 sheet

RJC Sensor: 1

◆ Instruction Required When Ordering

Shipped after setting the input type (selected from table1), input range (within available measuring range in table1), and burnout action as specified.

◆ Factory Setting

Factory settings are as follows:

Input type: RTD input Pt100 (ITS-90)

Input range: 0 to 100°C

Burnout: off

■ When output-2 is specified as communication output

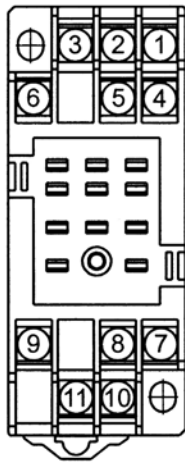
- Address No.: 01
- Communication rate: 9600 bps
- Parity: None
- Data length: 8 bit
- Stop bit: 1 bit
- Protocol: PCLINK

■ When output-2 is specified as alarm output

- Alarm operating direction: High limit alarm (alarm-1), High limit alarm (alarm-2)
- Relay operating direction: De-energized at alarm (alarm-1/2)
- Alarm setting: 100% (alarm-1), 100% (alarm-2)
- Hysteresis: The value equivalent to 3% (alarm-1/2)
- Alarm on-delay: 0 second (alarm-1/2)
- Alarm off- delay: 0 second (alarm-1/2)



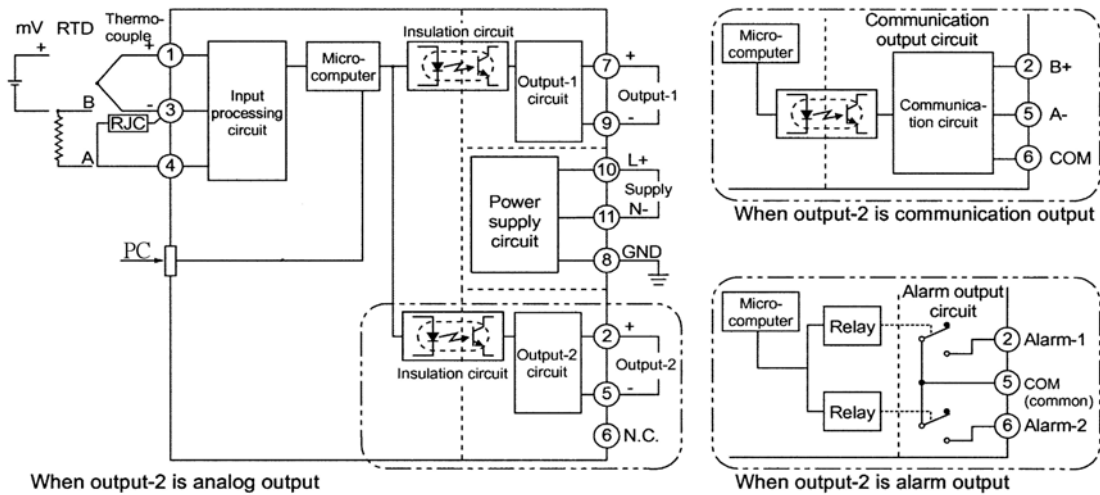
◆ Terminal Arrangement & Terminal Connection



Terminal No.	Signal	Thermocouple	RTD	mV input	Output-2 Analog output	Output-2 Communication output	Output-2 Alarm output	
1	Input	(+)	N.C.	(+)	←	←	←	
2	Output-2	→	→	→	(+)	B (+)	ALM1	
3	Input	(-) RJC	(B)	(-)	←	←	←	
4	Input	→	(A)	N.C.	←	←	←	
5	Output-2	→	→	→	(-)	A (-)	COM	
6	Output-2	→	→	→	N.C.	COM	ALM2	
7	Output-1						(+)	
8	GND						GND	
9	Output-1						(-)	
10	Supply						(L+)	
11	Supply						(N-)	

Note 3: In case of one output type, output-2 is N.C.

◆ Block Diagram



When output-2 is analog output

When output-2 is alarm output

◆ External Dimension

