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A Single Unit Handling All Types of Inputs such as Temperature Sensor Inputs and Analog Signal Inputs (e.g., 4 to 20 mA or 1 to 5 V)

- A Unit supports four input channels, each of which can be set to a platinum resistance thermometer, thermocouple, and DC signal (current, voltage). All inputs are isolated.



CJ1W-PH41U

CJ1W-AD04U

Features

- Supports a maximum of four inputs in one Unit: resistance thermometer, thermocouple, and DC current/voltage. (The input type is set separately for each input.)
- Isolation between input channels prevents unwanted current paths between input channels.
- Scaled values are transferred to the CPU Unit in four digits hexadecimal with voltage/current inputs.
- Process value alarm with two alarms for each input
- Alarm ON-delay timer and hysteresis for process value
- Zero/Span adjustment capability during operation
- Input error detection
- Maximum or minimum process value can be specified for when an input error is detected.
- A Unit with fully universal inputs, high-speed and high-resolution (256,000 resolution, 60 ms/ch is available.)


Ordering Information

International Standards

- The standards are abbreviated as follows: U: UL, U1: UL (Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, and CE: EC Directives.
- Contact your OMRON representative for further details and applicable conditions for these standards.

Process I/O Units

Isolated-type Thermocouple Input Units

Unit classification	Product name	Input points	Signal range selection	Signal range	Conversion speed (resolution)	Accuracy (at ambient temperature of 25°C)	External connection	No. of unit numbers allocated	Current consumption (A)		Model	Standards
									5 V	24 V		
CJ1 Special I/O Units	Process Input Units (Isolated-type Thermocouple Input Units) 	2 inputs	Set separately for each input	Thermocouple: B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII DC voltage: ±100 mV	Conversion speed: 10 ms/ 2 inputs, Resolution: 1/64,000	Standard accuracy: ±0.05% of F.S. *1	Removable terminal block	1	0.18	0.06 *2	CJ1W-PTS15	UC1, CE
		4 inputs	Common inputs	Thermocouple: R, S, K, J, T, L, B	Conversion speed: 250 ms/ 4 inputs	Accuracy: (±0.3% of PV or ±1°C, whichever is larger) ±1 digit max. *3			0.25	–	CJ1W-PTS51	


Note: This unit cannot be used, with the Machine Automation Controller NJ-series.

*1. The accuracy depends on the sensors used and the measurement temperatures. For details, refer to the user's manual.

*2. This is for an external power supply, and not for internal current consumption.

*3. L and –100°C or less for K and T are ±2°C±1 digit max., and 200°C or less for R and S is ±3°C±1 digit max. No accuracy is specified for 400°C or less for B.


Isolated-type Resistance Thermometer Input Units

Unit classification	Product name	Input points	Signal range selection	Signal range	Conversion speed (resolution)	Accuracy (at ambient temperature of 25°C)	External connection	No. of unit numbers allocated	Current consumption (A)		Model	Standards
									5 V	24 V		
CJ1 Special I/O Units	Process Analog Input Units (Isolated-type Resistance Thermometer Input Units) 	2 inputs	Set separately for each input	Resistance thermometer: Pt100, JPt100, Pt50, Ni508.4	Conversion speed: 10 ms/ 2 inputs, Resolution: 1/64,000	Accuracy: ±0.05% of F.S. or ±0.1°C, whichever is larger.	Removable terminal block	1	0.18	0.07 *	CJ1W-PTS16	UC1, CE
		4 inputs	Common inputs	Resistance thermometer: Pt100, JPt100	Conversion speed: 250 ms/ 4 inputs	Accuracy: ±0.3% of PV or ±0.8°C, whichever is larger, ±1 digit max.			0.25	–	CJ1W-PTS52	

Note: This unit cannot be used, with the Machine Automation Controller NJ-series.


* This is for an external power supply, and not for internal current consumption.

Isolated-type DC Input Units

Unit classification	Product name	Input points	Signal range selection	Conversion speed (resolution)	Accuracy (at ambient temperature of 25°C)	External connection	No. of unit numbers allocated	Current consumption (A)		Model	Standards
								5 V	24 V		
CJ1 Special I/O Units	Isolated-type DC Input Units 	2 inputs	DC voltage: 0 to 1.25 V, –1.25 to 1.25 V, 0 to 5 V, 1 to 5 V, –5 to 5 V, 0 to 10 V, –10 to 10 V, ±10 V selectable range DC current: 0 to 20 mA, 4 to 20 mA	Conversion speed: 10 ms/ 2 inputs Resolution: 1/64,000	Accuracy: ±0.05% of F.S.	Removable terminal block	1	0.18	0.09 *	CJ1W-PDC15	UC1, CE

* This is for an external power supply, and not for internal current consumption.

Isolated-type Units with Universal Inputs

Unit classification	Product name	Input points	Signal range selection	Signal range	Conversion speed (resolution)	Accuracy (at ambient temperature of 25°C)	External connection	No. of unit numbers allocated	Current consumption (A)		Model	Standards
									5 V	24 V		
CJ1 Special I/O Units	Process Input Units (Isolated-type Units with Universal Inputs) 	4 inputs	Set separately for each input	Fully universal inputs: Pt100, JPt100, Pt1000, K, J, T, L, R, S, B, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 5 V, 0 to 10 V	Conversion speed: 250 ms/4 inputs	Accuracy: Platinum resistance thermometer input: ±0.3% of PV or ±0.8°C, whichever is larger) ±1 digit max. Thermocouple input: (±0.3% of PV or ±1.5°C, whichever is larger) ±1 digit max. *1 Voltage or current input: ±0.3% of F.S. ±1 digit max.	Removable terminal block	1	0.32	–	CJ1W-AD04U	UC1, CE, L
				Universal inputs: Pt100 (3-wire), JPt100 (3-wire), Pt1000 (3-wire), Pt100 (4-wire), K, J, T, E, L, U, N, R, S, B, WRe5-26, PL II, 4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 1.25 V, 0 to 5 V, 0 to 10 V, ±100 mV selectable range –1.25 to 1.25 V, –5 to 5 V, –10 to 10 V, ±10 V selectable range, potentiometer	Resolution (conversion speed): 1/256,000 (conversion cycle: 60 ms/4 inputs) 1/64,000 (conversion cycle: 10 ms/4 inputs) 1/16,000 (conversion cycle: 5 ms/4 inputs)	Standard accuracy: ±0.05% of F.S.			0.30	–	CJ1W-PH41U *2	UC1, CE

*1. L and –100°C or less for K and T are ±2°C±1 digit max., and 200°C or less for R and S is ±3°C±1 digit max. No accuracy is specified for 400°C or less for B.

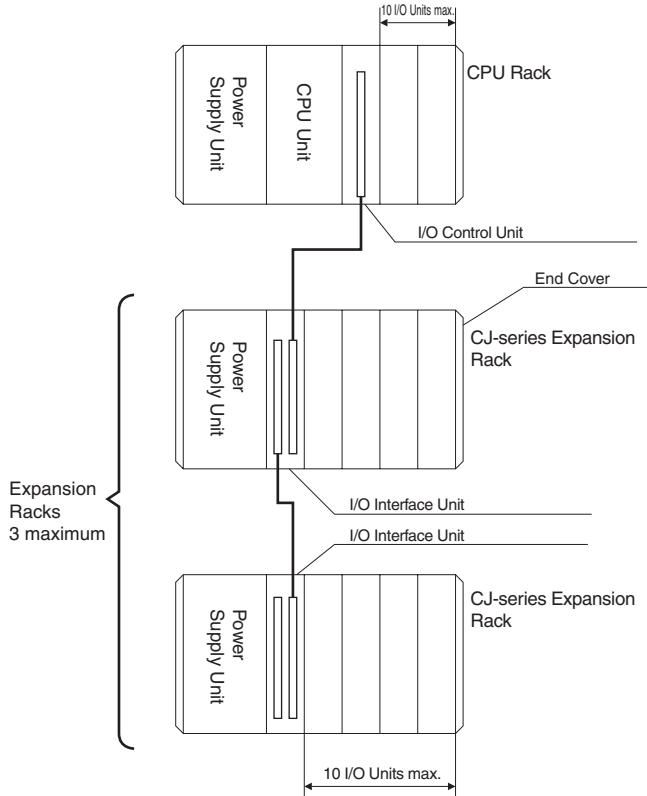
*2. Do not connect a Relay Contact Output Unit in the same CPU Rack or Expansion Rack as the CJ1W-PH41U Isolated-type Universal Input Unit.

System Overview

These Analog I/O Units belong to the CJ-series Special I/O Unit group.

- They can be mounted to CJ-series CPU Racks or Expansion I/O Racks.

The number of Units that can be mounted to one Rack (either a CPU Rack or Expansion I/O Rack) depends upon the maximum current supplied by the Power Supply Unit and the current consumption by the other Units.
There are no restrictions on Rack position.



Note: I/O addresses for Special I/O Units are allocated according to the unit number set on the switches on the front panel, and not according to the slot position in which they are mounted.

Mountable Racks

Model	NJ system		CJ system (CJ1, CJ2)		CP1H system	NSJ system	
	CPU Rack	Expansion Rack	CPU Rack	Expansion Backplane	CP1H PLC	NSJ Controller	Expansion Backplane
CJ1W-PTS15 CJ1W-PTS51 CJ1W-PTS16 CJ1W-PTS52	Not supported		10 Units	10 Units (per Expansion Backplane)	2 Units	Not supported	10 Units (per Expansion Backplane)
CJ1W-PDC15 CJ1W-AD04U CJ1W-PH41U	10 Units	10 Units (per Expansion Rack)					

Common Specification

Item	Specification
Unit classification	CJ-series Special I/O Unit
Dimensions	31 × 90 × 65 mm (W × H × D)
Weight	150 g max.
Maximum number of Units	40 Units (10 Units × 4 Racks) Confirm that the total current consumption of all the Units (including the CPU Unit) mounted to a single CPU Rack or Expansion Rack does not exceed the maximum power supplied by the Power Supply Unit.
Ambient operating temperature	0 to 55°C
Ambient operating humidity	10% to 90% (with no condensation)

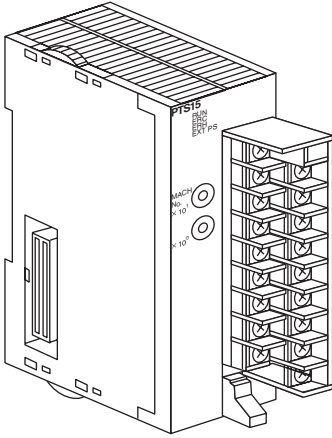
Current consumption

Name	Model	Current consumption (power)		
		5 V	24-V relay driver current	24-V external
Isolated-type Thermocouple Input Unit	CJ1W-PTS51	0.25 A (1.25 W)	–	Not used.
	CJ1W-PTS15	0.18 A (0.9 W)	–	0.06 A
Isolated-type Resistance Thermometer Input Unit (Pt100, JPt100)	CJ1W-PTS52	0.25 A (1.25 W)	–	Not used.
	CJ1W-PTS16	0.18 A (0.9 W)	–	0.07 A
Isolated-type Direct Current Input Unit	CJ1W-PDC15	0.18 A (0.9 W)	–	0.09 A
Isolated-type Universal Input Unit	CJ1W-AD04U	0.32 A (1.6 W)	–	Not used.
	CJ1W-PH41U	0.30 A (1.5 W)	–	Not used.

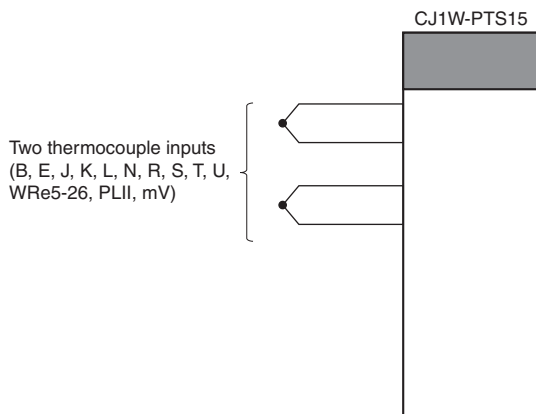
CJ1W-PTS15 Isolated-type Thermocouple Input Unit

Overview

The CJ1W-PTS15 Isolated-type Thermocouple Input Unit provides two direct thermocouple inputs, and sends the data to the CPU Unit each cycle. All inputs are isolated.



System Configuration



Specifications

Item	Specifications	
Model	CJ1W-PTS15	
Applicable Controller	CJ Series	
Unit classification	CJ-series Special I/O Unit	
Mounting position	CJ-series CPU Rack or CJ-series Expansion Rack	
Maximum number of Units	40 (within the allowable current consumption and power consumption range)	
Unit numbers	00 to 95 (Cannot duplicate Special I/O Unit numbers.)	
Areas for data exchange with CPU Unit	Special I/O Unit Area (Operation Data)	10 words/Unit Thermocouple Input Unit to CPU Unit: All process values, process value alarms (LL, L, H, HH), conversion data enabled flags, sensor errors.
	DM Area words allocated to Special I/O Units (Setting parameter)	100 words/Unit CPU Unit to Thermocouple Input Unit: Temperature sensor type, input range (user set), process value alarm setting (L, H), zero/span adjustment value.
	Expansion Control/Monitor Area words (Expansion Operation Data)	35 words/Unit CPU Unit to Thermocouple Input Unit: Hold function selection start/reset, adjustment period control, control bits Thermocouple Input Unit to CPU Unit: Adjustment period warnings/notices (for each input), peak and bottom values, top and valley values
	Expansion Setting Area words (Expansion Setting parameter)	46 words/Unit CPU Unit to Thermocouple Input Unit: Expansion Setting Area settings, adjustment period control, peak and bottom detection, top and valley detection
Number of temperature sensor inputs	2	
Temperature sensor type	The sensor type, input range, and scaling can be set individually for each of 2 inputs, which are each selectable from B, E, J, K, L, N, R, S, T, U, WRe5-26, PL II, and mV.	
Scaling	Data to be stored in the allocated words in the CIO area must be scaled (with the minimum and maximum values set by user) (2 inputs set separately). For example, data can be stored at 0% to 100%.	
Data storage in the CIO Area	The value derived from carrying out the following processing in order of the actual process data in the input range is stored in four digits hexadecimal (binary values) in the allocated words in the CIO Area. 1) Mean value processing → 2) Scaling → 3) Zero/span adjustment → 4) Output limits	
Accuracy (25°C)	±0.05% (Depends on the Sensor used and the measured temperature. Refer to <i>Accuracy by Sensor Type and Measured Temperature Range</i> on page 9 for details.)	
Temperature coefficient	±0.01%/°C (For full scale of electromotive force. *)	
Resolution	1/64000	
Cold junction compensation error	±1°C, at 20 ±10°C	
Maximum signal input	±120 mV	
Input impedance	20 kΩ min.	
Input disconnection detection current	0.1 μA (typical)	
Warmup time	45 min	
Response time	100 ms (travel time from input 0% to 90%, for ±100 mV step input and with moving average for 4 samples)	
Conversion period	10 ms/2 inputs	
Maximum time to store data in CPU Unit	Conversion period + one CPU Unit cycle	
Disconnection detection	Detects disconnections at each input and turns ON the Disconnection Detection Flag. Hardware detection time: Approx. 0.5 s max. The process value overrange direction for when a disconnection occurs can be specified. (High: 115% of set input range; low: -15% of set input range)	

Item		Specifications
Function	Mean value processing (input filter)	Calculates the moving average for the specified number of process values (1 to 128), and stores that value in the CIO Area as the process value.
	Process value alarm	Process value 4-point alarm (LL, L, H, HH), alarm hysteresis, and ON-delay timer (0 to 60 s) are available.
	Rate-of-change calculation	Calculates the amount of change per comparison time interval (1 to 16 s).
	Rate-of-change alarm	Rate-of-change 2-point alarm (L, H), alarm hysteresis (shared with process value alarm), and ON-delay timer (0 to 60 s, shared with process value alarm) are available.
	Adjustment period control	When zero/span adjustment is executed, the date is internally recorded at the Unit. When the preset zero/span adjustment period and number of days notice have elapsed (allocated in Expansion Setting Area), this function turns ON a warning flag to give notice that it is time for readjustment.
	Peak and bottom detection	This function detects the maximum (peak) and minimum (bottom) analog input values, from when the Hold Start Bit (output) allocated to the Expansion Control/Monitor Area turns ON until it turns OFF, and stores them in the Expansion Control/Monitor Area.
	Top and valley detection	This function detects the top and valley values for analog inputs, from when the Hold Start Bit (output) allocated to the Expansion Control/Monitor Area turns ON until it turns OFF, and stores them in the Expansion Control/Monitor Area.
Isolation	Between inputs and Controller signals, and between inputs: Isolation by transformer for power supply, and by photocoupler for signals. Cold junction compensation circuit: No isolation from input 2	
Insulation resistance	20 MΩ (at 500 V DC) between inputs	
Dielectric strength	Between inputs: 1,000 V AC, at 50/60 Hz, for 1 min, leakage current 10 mA max.	
External connections	Terminal block (detachable)	
Unit number settings	Set by rotary switches on front panel, from 0 to 95.	
Indicators	Four LED indicators on front panel (for normal operation, errors detected at the Thermocouple Input Unit, errors related to the CPU Unit, and use of external power supply).	
Front panel connector	Sensor input connector terminal block (detachable)	
Effect on CPU Unit cycle time	0.3 ms	
Current consumption	5 V DC at 180 mA max.	
External power supply	24 VDC +10%/–15% 60 mA max., inrush current: 20 A for 1 ms max. (The external 24-VDC power supply must be isolated.)	
Dimensions	31 × 90 × 65 mm (W × H × D)	
Weight	150 g max.	
Standard accessories	Two cold junction sensors (installed in terminal block)	

* The method for calculating the error in temperature measurements, including the temperature coefficient, is given below. The "full scale of electromotive force" is the difference between the high limit and low limit converted to electromotive force for each thermocouple.

Example

Ambient temperature: 30 °C
 Temperature Sensor: K thermocouple (–270 to 1,372 °C)
 Measured temperature: 500 °C

From electromotive force table

–270 °C: –6.458 mV
 1,372 °C: 54.86 mV
 Full scale: 61.344

Electromotive conversion of temperature coefficient:

$$61.344 \text{ mV} \times \pm 0.01\%/^{\circ}\text{C} = \pm 6.13 \text{ } \mu\text{V}/^{\circ}\text{C}$$

Error in electromotive force at 30°C:

$$\pm 6.13 \text{ } \mu\text{V}/^{\circ}\text{C} \times (30^{\circ}\text{C} - 25^{\circ}\text{C}) = 30.65 \text{ } \mu\text{V}/^{\circ}\text{C}$$

Temperature difference between measurement point and terminals on Unit (ambient temperature) (based on ambient temperature of 30 °C and Measured temperature of 500 °C):

$$470 \text{ } ^{\circ}\text{C}$$

Electromotive force per °C at a measured temperature of 470 °C (from the electromotive force tables for a K thermocouple):

$$43 \text{ } \mu\text{V}/^{\circ}\text{C}$$

$$\text{Error in temperature coefficient: } \pm 30.65 \text{ } \mu\text{V} \div 43 \text{ } \mu\text{V}/^{\circ}\text{C} = \pm 0.7^{\circ}\text{C}$$

$$\text{Error in measured temperature} = \text{Accuracy} \pm \text{Error from temperature coefficient} + \text{Error in cold junction compensation} = \pm 0.8^{\circ}\text{C} + \pm 0.7^{\circ}\text{C} + \pm 1.0^{\circ}\text{C} = \pm 2.5^{\circ}\text{C}$$

Sensor Type and Input Range

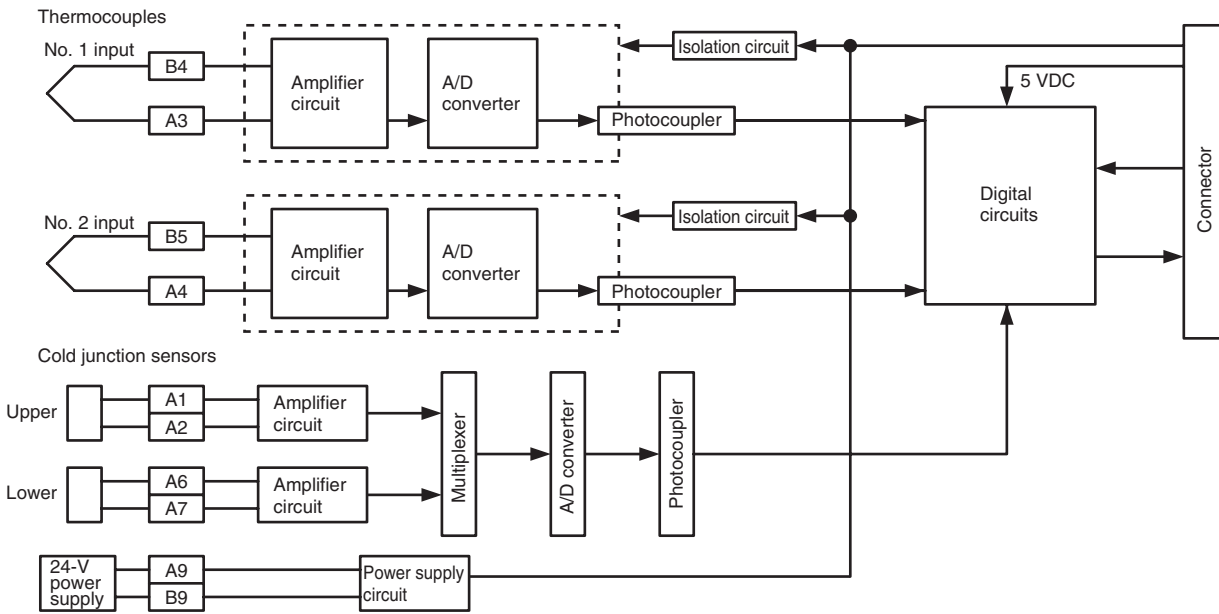
The Temperature Sensor type and input range are set in the allocated words in the DM Area for every four inputs. The input range can be set anywhere within the measurable input ranges shown in the following table. Accuracy and resolution, however, are not determined from the set input range, but rather from the measurable input range shown in the following table. Therefore, accuracy and resolution do not change even when a narrow input range is set.

Sensor type	DM Area setting	Measurable input range
B	0	0 to 1,820°C
E	1	-270 to 1,000°C
J	2	-210 to 1,200°C
K	3	-270 to 1,372°C
N	4	-270 to 1,300°C
R	5	-50 to 1,768°C
S	6	-50 to 1,768°C
T	7	-270 to 400°C
mV	8	-100 to 100 mV
L	9	-200 to 900°C
U	10	-200 to 600°C
WRe5-26	11	0 to 2,300°C
PLII	12	0 to 1,300°C

Accuracy by Sensor Type and Measured Temperature Range

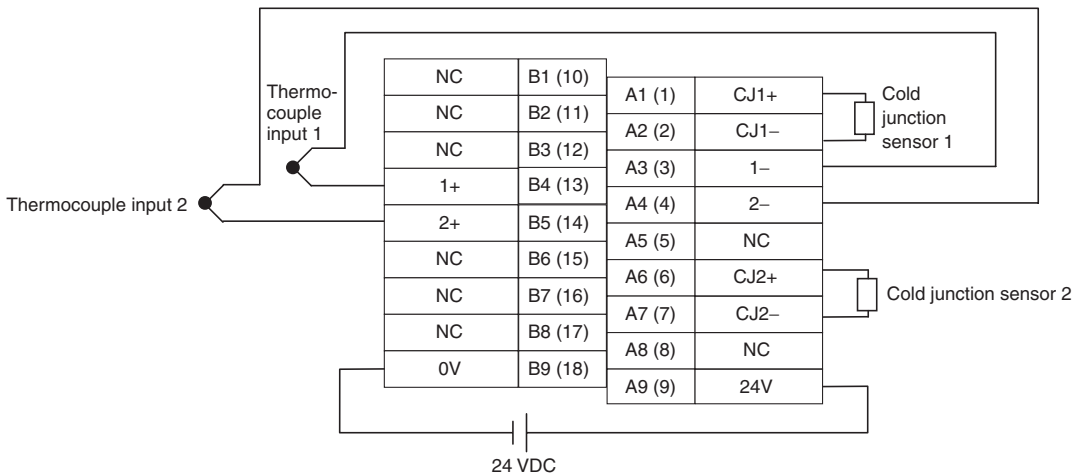
Sensor type	Temperature range	Standard accuracy	Details
B	0 to 1,820°C	±1.8°C (±0.1%)	400 to 800°C: ±3°C Less than 400°C: Accuracy is not specified.
E	-270 to 1,000°C	±0.6°C (±0.05%)	-250 to 200°C: ±1.2°C Less than -250°C: Accuracy is not specified.
J	-210 to 1,200°C	±0.7°C (±0.05%)	
K	-270 to 1,372°C	±0.8°C (±0.05%)	-250 to 200°C: ±2°C Less than -250°C: Accuracy is not specified.
N	-270 to 1,300°C	±0.8°C (±0.05%)	-200 to 150°C: ±1.6°C Less than -200°C: Accuracy is not specified.
R	-50 to 1,769°C	±1.8°C (±0.1%)	0 to 100°C: ±2.5°C Less than 0°C: Accuracy is not specified.
S	-50 to 1,769°C	±1.8°C (±0.1%)	0 to 100°C: ±2.5°C Less than 0°C: 3.2°C
T	-270 to 400°C	±0.35°C (±0.05%)	-180 to 0°C: ±0.7°C -200 to -180°C: ±1.3°C Less than -200°C: Accuracy is not specified.
L	-200 to 900°C	±0.5°C (±0.05%)	
U	-200 to 600°C	±0.4°C (±0.05%)	-100 to 0°C: ±0.5°C Less than -100°C: ±0.7°C
WRe5-26	0 to 2,315°C	±1.2°C (±0.05%)	More than 2,200°C: ±1.4°C
PLII	0 to 1,395°C	±0.7°C (±0.05%)	

Terminal Block Diagram



Terminal Connection Diagram

Input Circuit



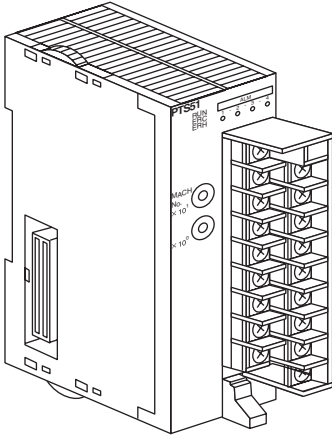
Note: Action for Unused Input Terminals

- Short-circuit the positive (+) and negative (-) sides of the thermocouple input section using a lead wire. For example, short terminals A4 and B5 for No. 2 thermocouple input.
- Cold junction sensors are mounted between A1 and A2, and A6 and A7 before shipment. If one of the cold junction sensors is disconnected, cold junction compensation will stop and correct measurement of temperatures cannot be made. Always make sure the cold junction sensors are connected when using the Units.
- Cold junction sensors are calibrated separately for each Unit and connected circuit, so correct temperatures will not be measured if a cold junction sensor from another Unit is used or if the two cold junction sensors in a Unit are swapped. Use the cold junction sensors as they are provided, without making any changes.
- Always ground the GR terminal on the Power Supply Unit of the Controller.
- If the input device uses a voltage generator, temperature compensator, or similar device, then ground the input device if it has a ground terminal.

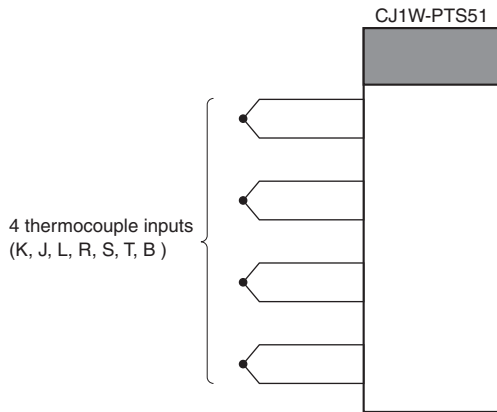
CJ1W-PTS51 Isolated-type Thermocouple Input Unit

Overview

The CJ1W-PTS51 Isolated-type Thermocouple Input Unit provides four direct thermocouple inputs, and sends the data to the CPU Unit each cycle. All inputs are isolated.



System Configuration



Specifications

Item		Specifications
Model		CJ1W-PTS51
Applicable Controller		CJ Series
Unit classification		CJ-series Special I/O Unit
Mounting position		CJ-series CPU Rack or CJ-series Expansion Rack
Maximum number of Units		40 (within the allowable current consumption and power consumption range)
Unit numbers		00 to 95 (Cannot duplicate Special I/O Unit numbers.)
Areas for data exchange with CPU Unit	Special I/O Unit Area (Operation Data)	10 words/Unit Thermocouple Input Unit to CPU Unit: All process values, process value alarms (L, H), conversion data enabled flag, sensor errors, cold junction sensor errors
	DM Area words allocated to Special I/O Units (Setting parameter)	100 words/Unit CPU Unit to Thermocouple Input Unit: Temperature sensor type, input range (same for all I/O), process value alarm setting (L, H), zero/span adjustment value.
Number of temperature sensor inputs		4
Temperature sensor types		Selectable from K, J, L, R, S, T, B. (Same setting for all inputs.)
Data storage in the CIO Area		The actual process data in the input range is stored in four digits hexadecimal (binary or BCD values) in the allocated words in the CIO Area.
Accuracy (25°C) (See note.)		With Celsius selected: $\pm 0.3\%$ of PV or $\pm 1^\circ\text{C}$, whichever is greater, ± 1 digit max. With Fahrenheit selected: $\pm 0.3\%$ of PV or $\pm 2^\circ\text{F}$, whichever is greater, ± 1 digit max. However, the accuracy of K and T at -100°C or lower and L is $\pm 2^\circ\text{C} \pm 1$ digit max. The accuracy of R and S at 200°C or lower is $\pm 3^\circ\text{C} \pm 1$ digit max. The accuracy of B at 400°C or lower is not specified. PV: Process value data
Temperature characteristics		Refer to <i>Temperature Characteristics According to Thermocouple Type</i> on page 14.
Warmup time		30 min
Conversion period		250 ms/4 inputs
Maximum time to store data in CPU Unit		Conversion period + one CPU Unit cycle
Sensor error detection		Input Types Other Than B: A Sensor error is detected and the Sensor Error Flag is turned ON if the upper or lower limit of the set input range is exceeded by 20°C or 20°F . The process value overrange direction when a Sensor error occurs can be specified (high: set input range $+20^\circ\text{C}$ or $+20^\circ\text{F}$, low: set input range -20°C or -20°F). B Input Type: A Sensor error is detected and the Sensor Error Flag is turned ON if the upper limit of $1,820^\circ\text{C}$ or $3,220^\circ\text{F}$ or the lower limit of 0°C or 0°F is exceeded. The process value overrange direction when a Sensor error occurs can be specified (high: set input range $1,820^\circ\text{C}$ or $3,220^\circ\text{F}$, low: set input range 0°C or 0°F).
Function	Process value alarm	Process value 2-point alarm (HH, H, LL, L), alarm hysteresis, and ON-delay timer (0 to 60 s) are available. External alarm outputs: One per input (H or L).
	External alarm outputs	NPN outputs (with short-circuit protection) External power supply voltage: 20.4 to 26.4 V DC Max. switching capacity: 100 mA (for one output) Leakage current: 0.3 mA max. Residual voltage: 3 V max.
Isolation		Between inputs and Controller signal: Transformer for power supply and photocoupler for signals Between each input: Transformer for power supply and photocoupler for signals.
Insulation resistance		20 M Ω max. (at 500 V DC). Between all output and NC terminals and external AC terminals (Power Supply Unit) Between all input terminals and external AC terminals (Power Supply Unit) Between all input terminals and all output terminals Between all external DC terminals (input, output, and NC terminals) and FG plate Between all input and output terminals and all NC terminals
Dielectric strength		Between all output and NC terminals and external AC terminals (Power Supply Unit) 2,000 VAC, 50/60 Hz 1 min., detection current: 1 mA Between all input terminals and external AC terminals (Power Supply Unit) Between all input terminals and all output terminals Between all external DC terminals (input, output, and NC terminals) and FG plate 1,000 VAC, 50/60 Hz 1 min., detection current: 1 mA Between all channels 500 VAC, 50/60 Hz 1 min., detection current: 1mA
External connections		Terminal block (detachable)
Unit number settings		Set by rotary switches on front panel, from 0 to 95.
Indicators		Seven LED indicators on front panel (for normal operation, errors detected at the Thermocouple Input Unit, errors related to the CPU Unit, and four indicators for external alarm outputs.)
Current consumption (supplied from Power Supply Unit)		5 V DC at 250 mA max.
Dimensions		31 × 90 × 65 mm (W × H × D)
Weight		150 g max.

Sensor Type and Input Range

The Temperature Sensor type and input range are set in the allocated words in the DM Area for every four inputs.

The measurable data range is ± 20 digits wider than the sensor input range.

Setting	Input	°C			°F		
		16-bit binary	BCD		16-bit binary	BCD	
			F□□□ indicates minus sign.	Leftmost bit indicates minus sign.		F□□□ indicates minus sign.	Leftmost bit indicates minus sign.
0	K: -200 to 1300°C (-300 to 2300°F)	FF38 to FFFF to 0514 (-200 to -1 to 1300)	F200 to 1300 (-200 to 1300)	8200 to 1300 (-200 to 1300)	FED4 to FFFF to 08FC (-300 to -1 to 2300)	F300 to 2300 (-300 to 2300)	F300 to 2300 (-300 to 2300)
1	K: 0.0 to 500°C (0.0 to 900.0°F)	0000 to 1388 (0.0 to 500.0)	0000 to 5000 (0.0 to 500.0)	0000 to 5000 (0.0 to 500.0)	0000 to 2328 (0.0 to 900.0)	0000 to 9000 (0.0 to 900.0)	0000 to 7999 *2 (0.0 to 799.9)
2	J: -100 to 850°C (-100 to 1500°F)	FF9C to FFFF to 0352 (-100 to -1 to 850)	F100 to 0850 (-100 to 850)	8100 to 0850 (-100 to 850)	FF9C to FFFF to 05DC (-100 to -1 to 1500)	F100 to 1500 (-100 to 1500)	8100 to 1500 (-100 to 1500)
3	J: 0.0 to 400.0°C (0.0 to 750.0°F)	0000 to 0FA0 (0.0 to 400.0)	0000 to 4000 (0.0 to 400.0)	0000 to 4000 (0.0 to 400.0)	0000 to 1D4C (0.0 to 750.0)	0000 to 7500 (0.0 to 750.0)	0000 to 7500 (0.0 to 750.0)
4	T: -200 to 400°C (-300 to 700.0°F)	F830 to FFFF to 0FA0 (-200.0 to -0.1 to 400.0)	F999 to 4000 *2 (-99.9 to 400.0)	A000 to 4000 (-200.0 to 400.0)	F448 to FFFF to 1B58 (-300.0 to -0.1 to 700.0)	F999 to 7000 *2 (-99.9 to 700.0)	B000 to 7000 (-300.0 to 700.0)
5	L: -100 to 850°C (-100 to 1500°F)	FF9C to FFFF to 0352 (-100 to -1 to 850)	F100 to 0850 (-100 to 850)	8100 to 0850 (-100 to 850)	FF9C to FFFF to 05DC (-100 to -1 to 1500)	F100 to 1500 (-100 to 1500)	8100 to 1500 (-100 to 1500)
6	L: 0.0 to 400.0°C (0.0 to 750.0°F)	0000 to 0FA0 (0.0 to 400.0)	0000 to 4000 (0.0 to 400.0)	0000 to 4000 (0.0 to 400.0)	0000 to 1D4C (0.0 to 750.0)	0000 to 7500 (0.0 to 750.0)	0000 to 7500 (0.0 to 750.0)
7	R: 0 to 1700°C (0 to 3000°F)	0000 to 06A4 (0 to 1700)	0000 to 1700 (0 to 1700)	0000 to 1700 (0 to 1700)	0000 to 0BB8 (0 to 3000)	0000 to 3000 (0 to 3000)	0000 to 3000 (0 to 3000)
8	S: 0 to 1700°C (0 to 3000°F)	0000 to 06A4 (0 to 1700)	0000 to 1700 (0 to 1700)	0000 to 1700 (0 to 1700)	0000 to 0BB8 (0 to 3000)	0000 to 3000 (0 to 3000)	0000 to 3000 (0 to 3000)
9	B: 400 to 1800°C *1 (750 to 3200°F)	0190 to 0708 (400 to 1800)	0400 to 1800 (400 to 1800)	0400 to 1800 (400 to 1800)	02EE to 0C80 (750 to 3200)	0750 to 3200 (750 to 3200)	0750 to 3200 (750 to 3200)

Note: If the indication range is exceeded, a sensor error will occur and the sensor error bit will turn ON. The process value will be clamped at the lower or upper limit of the indication range, depending on the setting for data direction at sensor error.

*1. The lower limit for B thermocouples is 0°C/°F.

*2. The indicator range for BCD display will be clamped at the lower (or upper) limit in the region between the lower (or upper) limit of the setting range and the point where a sensor error occurs.

For 0.1°C/0.1°F indication with minus sign indicated by leftmost 4 bits (bits 12 to 15): Lower limit = .99.9, Upper limit = 999.9.

For 0.1°C/0.1°F indication with minus sign indicated by leftmost bit (bit 15): Lower limit = .799.9, Upper limit = 799.9.

Temperature Characteristics According to Thermocouple Type

Thermocouple	Temperature range	Set value error when ambient temperature changes by 1°C
R	0 to 200 °C	±0.43°C
	200 to 1,000°C	±0.29°C
	1,000 to 1,700°C	±285 ppm of PV
S	0 to 200 °C	±0.43°C
	200 to 1,000°C	±0.29°C
	1,000 to 1,700°C	285 ppm of PV
B	400°C or less	Not specified.
	400 to 800°C	±0.43°C
	800 to 1,000°C	±0.29°C
	1,000 to 1,800°C	285 ppm of PV
K	-200 to -100°C	±0.29°C
	-100 to 400°C	±0.11°C
	400 to 1,300°C	±285 ppm of PV
J	-100 to 400°C	±0.11°C
	400 to 850°C	±285 ppm of PV
T	-200 to -100°C	±0.29°C
	-100 to 400°C	±0.11°C
L	-100 to 400°C	±0.11°C
	400 to 850°C	±285 ppm of PV

The measured temperature error is calculated as shown in the following example.

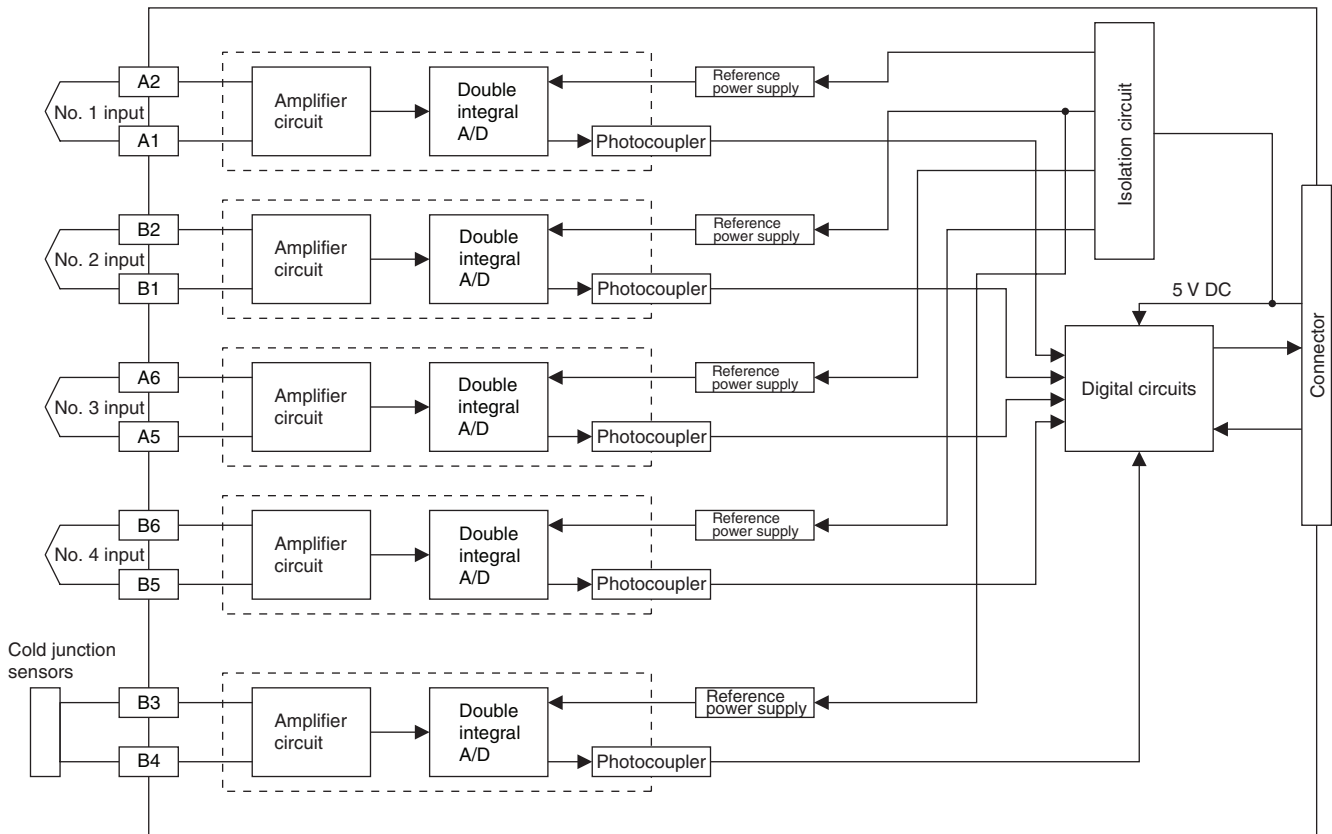
Item	Details
Ambient temperature	30°C
Thermocouple type	K
Measured temperature (PV)	500°C
Reference accuracy (25°C)	±0.3% of PV or ±1°C, whichever is greater, ±1 digit. In this example, ±1.5°C.
Temperature characteristics	400 to 1,300°C: ±285 ppm of PV. In this example, 285 ppm × 500°C = 0.143°C.
Change in ambient temperature	5°C (25 to 30°C).

Overall accuracy =

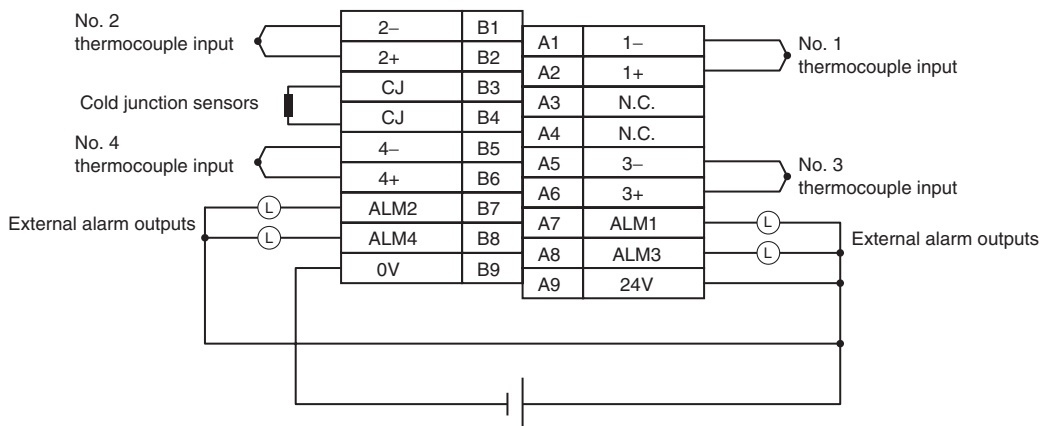
Reference accuracy + Temperature characteristic × Change in ambient temperature = ±1.5°C + ±0.143°C × 5 = Approx. ±2.2°C ± 1 digit.

Terminal Block Diagram

Thermocouple



Terminal Connection Diagram



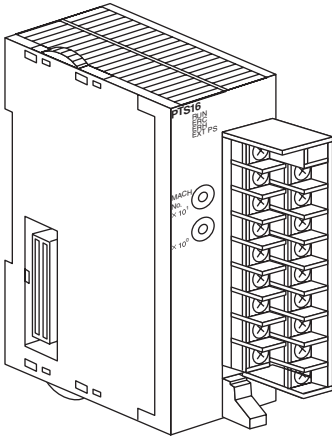
Note: Action for Unused Input Terminals

- Short-circuit the positive (+) and negative (-) sides of the thermocouple input section using a lead wire. For example, short terminals A3 and A2 for No. 1 thermocouple input.
- Cold junction sensors are mounted before shipment. If one of the cold junction sensors is disconnected, cold junction compensation will stop and correct measurement of temperatures cannot be made. Always make sure the cold junction sensors are connected when using the Units.
- Cold junction sensors are calibrated separately for each Unit and connected circuit, so correct temperatures will not be measured if a cold junction sensor from another Unit is used or if the two cold junction sensors in a Unit are swapped. Use the cold junction sensors as they are provided, without making any changes.
- Do not connect anything to NC terminals. Do not use NC terminals as relay terminals.
- Always ground the GR terminal on the Power Supply Unit of the Controller.
- If the input device uses a voltage generator, temperature compensator, or similar device, then ground the input device if it has a ground terminal.

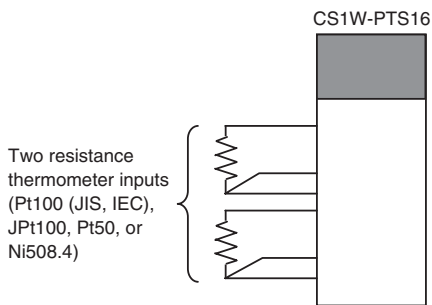
CJ1W-PTS16 Isolated-type Resistance Thermometer Input Unit (Pt100, JPt100, Pt50, Ni508.4)

Overview

The CS1W-PTS16 Isolated-type Resistance Thermometer Input Unit provides two direct resistance thermometer inputs, and sends the data to the CPU Unit each cycle. All inputs are isolated.



System Configuration



Specifications

Item	Specifications	
Model	CJ1W-PTS16	
Applicable Controller	CJ Series	
Unit classification	CJ-series Special I/O Unit	
Mounting position	CJ-series CPU Rack or CJ-series Expansion Rack	
Maximum number of Units	40 (within the allowable current consumption and power consumption range)	
Unit numbers	00 to 95 (Cannot duplicate Special I/O Unit numbers.)	
Areas for data exchange with CPU Unit	Special I/O Unit Area (Operation Data)	10 words/Unit Resistance Thermometer Input Unit to CPU Unit: All process values, process value alarms (LL, L, H, HH), rate-of-change values, rate-of-change alarms (L, H), disconnection alarms, adjustment period end/notices.
	DM Area words allocated to Special I/O Units (Setting parameter)	100 words/Unit CPU Unit to Resistance Thermometer Input Unit: Temperature sensor type, input range (user set), scaling of process value data to be stored in allocated words in CIO area, rate-of-change input range, scaling of rate-of-change data, number of items for moving average, process value alarm setting (LL, L, H, HH), rate-of-change alarm setting (L, H), zero/span adjustment value.
	Expansion Control/Monitor Area words (Expansion Operation Data)	35 words/Unit CPU Unit to Resistance Thermometer Input Unit: Hold function selection start/reset, adjustment period control, control bits Resistance Thermometer Input Unit to CPU Unit: Adjustment period warnings/notices, peak and bottom values, top and valley values
	Expansion Setting Area words (Expansion Setting parameter)	46 words/Unit CPU Unit to Resistance Thermometer Input Unit: Expansion Setting Area settings, adjustment period control, peak and bottom detection, top and valley detection
Number of temperature sensor inputs	2	
Temperature sensor type	Pt100 (JIS, IEC), JPt100, Pt50, Ni508.4 Sensor type, input range, and scaling to industrial units are separate for each of the 2 inputs.	
Scaling	Data to be stored in the allocated words in the CIO area must be scaled (with the minimum and maximum values set by user) (2 inputs set separately.). Data can be stored at 0% to 100%.	
Data storage in the CIO Area	The value derived from carrying out the following processing in order of the actual process data in the input range is stored in four digits hexadecimal (binary values) in the allocated words in the CIO Area. 1) Mean value processing → 2) Scaling → 3) Zero/span adjustment → 4) Output limits	
Accuracy (25°C)	The greater of the following: ±0.05% or ±0.1°C	
Temperature coefficient	Pt100: 0.009%/°C JPt100: 0.01%/°C Pt50: 0.02%/°C Ni508.4: 0.012%/°C	
Resolution	1/64,000	
Sensing method	3-wire method	
Allowable lead wire resistance	20 Ω max. per wire	
Input detection current	0.5 mA	
Warmup time	10 min	
Response time	100 ms (travel time from input 0% to 90%, for step input and with moving average for 4 samples)	
Conversion period	10 ms/2 inputs	
Maximum time to store data in CPU Unit	Conversion period + one CPU Unit cycle	
Disconnection detection	Detects disconnections at each input and turns ON the Disconnection Detection Flag. Hardware detection time: Approx. 0.5 s max. The process value overrange direction for when a disconnection occurs can be specified. (High: 115% of set input range; low: -15% of set input range)	

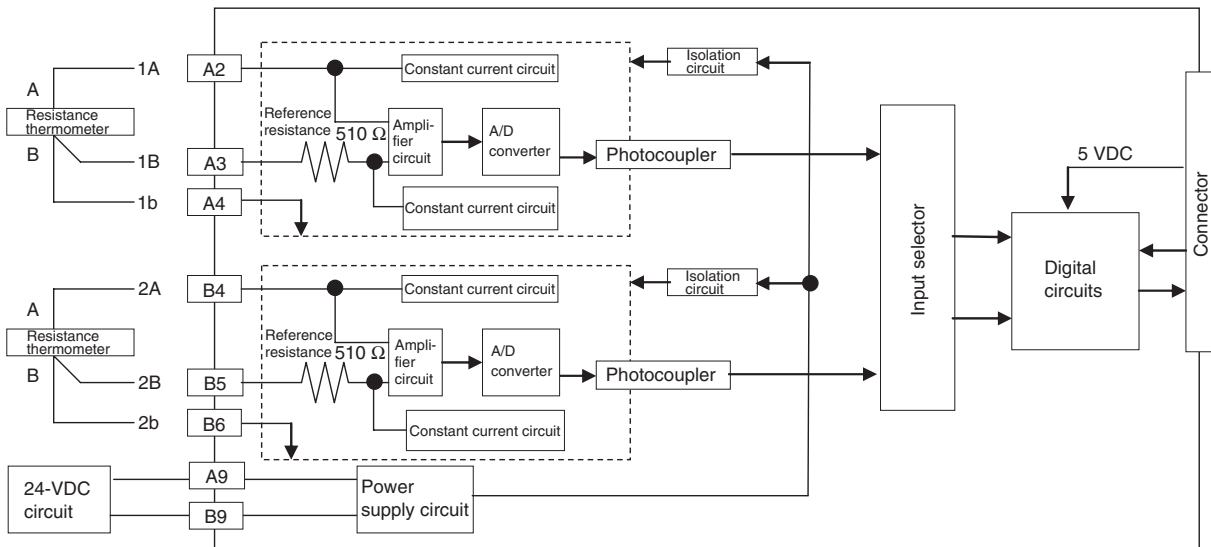
Item		Specifications
Function	Mean value processing (input filter)	Calculates the moving average for the specified number of process values (1 to 128), and stores that value in the CIO Area as the process value.
	Process value alarm	Process value 4-point alarm (HH, H, LL, L), alarm hysteresis, and ON-delay timer (0 to 60 s are available).
	Rate-of-change calculation	Calculates the amount of change per comparison time interval (1 to 16 s).
	Rate-of-change alarm	Rate-of-change 2-point alarm (H, L), alarm hysteresis, and ON-delay timer (0 to 60 s are available, shared with process value alarm).
	Adjustment period control	When zero/span adjustment is executed, the date is internally recorded at the Unit. When the preset zero/span adjustment period and the notice of days remaining have elapsed, this function turns ON a warning flag to give notice that it is time for readjustment.
	Peak and bottom detection	Detects the maximum (peak) and minimum (bottom) analog input values, from when the Hold Start Bit (output) allocated to the Expansion Control/Monitor Area turns ON until it turns OFF. These values are stored as the peak and bottom values in the Expansion Control/Monitor Area.
	Top and valley detection	This function detects the top and valley values for analog inputs, from when the Hold Start Bit (output) allocated to the Expansion Control/Monitor Area turns ON until it turns OFF. These values are stored as the top and valley values in the Expansion Control/Monitor Area.
Isolation		Between temperature inputs and between input terminals and Controller signals: Power supply isolated by transformers, signals isolated by photocouplers.
Insulation resistance		20 MΩ (at 500 V DC) between inputs
Dielectric strength		Between inputs: 1,000 V AC, at 50/60 Hz, for 1 min, leakage current 10 mA max.
External connections		Terminal block (detachable)
Unit number settings		Set by rotary switches on front panel, from 0 to 95.
Indicators		Four LED indicators on front panel (for normal operation, errors detected at the Resistance Thermometer Input Unit, errors detected at the CPU Unit, and use of external power supply).
Front panel connector		Sensor input connector terminal block (detachable)
Current consumption		5 V DC at 180 mA max.
External power supply		24 VDC +10%/–15% 70 mA max., inrush current: 20 A for 1 ms max. (The external 24-VDC power supply must be isolated.)
Dimensions		31 × 90 × 65 mm (W × H × D)
Weight		150 g max.
Standard accessories		None

Sensor Type and Input Range

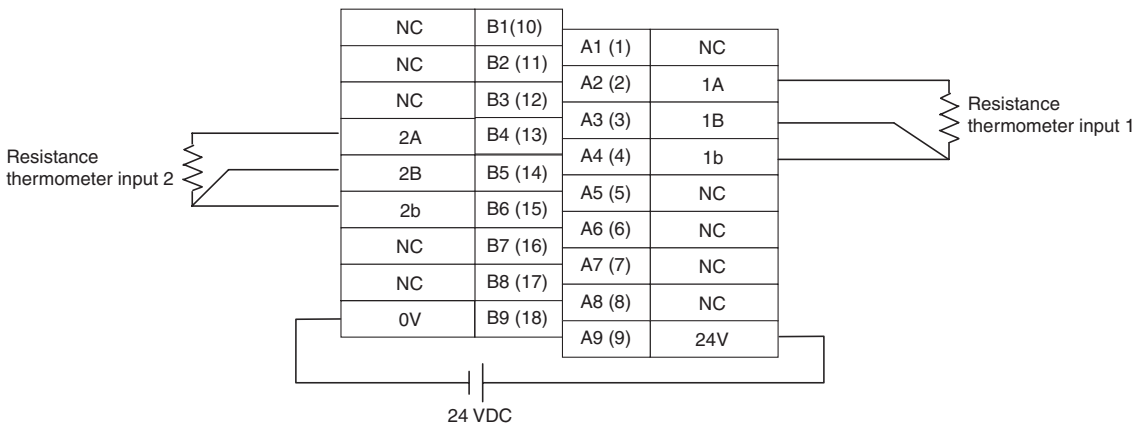
The resistance thermometer type and input range are set in the allocated words in the DM Area for every four inputs. The input range can be set anywhere within the measurable input ranges shown in the following table. Accuracy and resolution, however, are not determined from the set input range, but rather from the measurable input range shown in the following table. Therefore, accuracy and resolution do not change even when a narrow input range is set.

Sensor type	DM Area setting	Measurable input range
Pt100	0	–200 to 850°C
JPt100	1	–200 to 500°C
Pt50	2	–200 to 649°C
Ni508.4	3	–50 to 150°C

Terminal Block Diagram



Terminal Connection Diagram

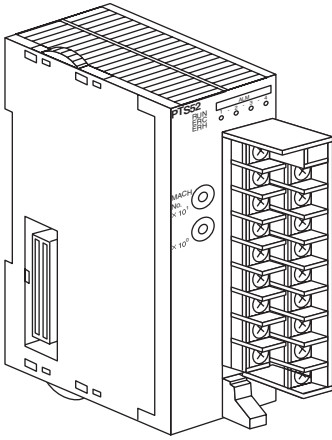


- Note:**
1. Wire the same length to A, B, and b, so that the impedance will be the same. In particular, do not short circuit between B and b at the terminal block.
 2. For unused input terminals, short-circuit between A-B and B-b (e.g., B4-B5 and B5-B6 for input No. 2) of the resistance thermometer inputs with the lead wire.
 3. Always ground the GR terminal on the Power Supply Unit of the Controller.
 4. If the input device uses a voltage generator, temperature compensator, or similar device, then ground the input device if it has a ground terminal.

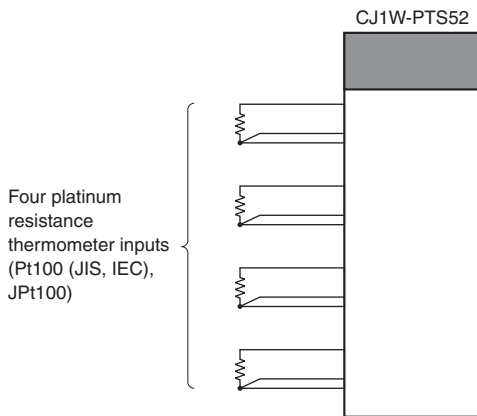
CJ1W-PTS52 Isolated-type Resistance Thermometer Input Unit (Pt100, JPt100)

Overview

The CJ1W-PTS52 Isolated-type Resistance Thermometer Input Unit provides four direct platinum resistance thermometer inputs, and sends the data to the CPU Unit each cycle. All inputs are isolated.



System Configuration



Specifications

Item		Specifications
Model		CJ1W-PTS52
Applicable Controller		CJ Series
Unit classification		CJ-series Special I/O Unit
Mounting position		CJ-series CPU Rack or CJ-series Expansion Rack
Maximum number of Units		40 (within the allowable current consumption and power consumption range)
Unit numbers		00 to 95 (Cannot duplicate Special I/O Unit numbers.)
Areas for data exchange with CPU Unit	Special I/O Unit Area (Operation Data)	10 words/Unit Resistance Thermometer Input Unit to CPU Unit: All process values, process value alarms (L, H), conversion data enabled flags, sensor errors.
	DM Area words allocated to Special I/O Units (Setting parameter)	100 words/Unit CPU Unit to Resistance Thermometer Input Unit: Temperature sensor type, input range (user set), process value alarm setting (L, H), zero/span adjustment value.
Number of temperature sensor inputs		4
Temperature sensor type		Pt100 (JIS, IEC), JPt100 Sensor type, input range, and scaling to industrial units are the same for all I/O.
Data storage in the CIO Area		The actual process data in the input range is stored in four digits hexadecimal (binary or BCD values) in the allocated words in the CIO Area.
Accuracy (25°C)		± 0.3% of PV or ± 0.8°C, whichever is greater, ± 1 digit max. ± 0.3% of PV or ± 1.6°F, whichever is greater, ± 1 digit max. PV: Process value data
Temperature characteristics		Refer to <i>Temperature Characteristics According to Platinum Resistance Thermometer Type</i> on page 22.
Sensing method		3-wire method
Influence of conductor resistance		0.4°C/Ω max.
Warmup time		10 min
Conversion period		250 ms/4 inputs
Maximum time to store data in CPU Unit		Conversion period + one CPU Unit cycle
Sensor error detection		Detects sensor error at each input and turns ON the Sensor error Flag. Hardware detection time: Approx. 0.5 s max. The process value overrange direction for when a sensor error occurs can be specified. (High: +20 digit of set input range; low: -20 digit of set input range)
Function	Process value alarm	Process value 2-point alarm (H, L), alarm hysteresis, and ON-delay timer (0 to 60 s are available).
	External alarm outputs	NPN outputs (with short-circuit protection) External power supply voltage: 20.4 to 26.4 V DC Max. switching capacity: 100 mA (for one output) Leakage current: 0.3 mA max. Residual voltage: 3 V max.
Isolation		Between inputs and Controller signal: Transformer for power supply and photocoupler for signals Between each input: Transformer for power supply and photocoupler for signals
Insulation resistance		20 MΩ max. (at 500 V DC). Between all output and NC terminals and external AC terminals (Power Supply Unit) Between all input terminals and external AC terminals (Power Supply Unit) Between all input terminals and all output terminals Between all external DC terminals (input, output, and NC terminals) and FG plate Between all input and output terminals and all NC terminals
Dielectric strength		Between all output and NC terminals and external AC terminals (Power Supply Unit) 2,000 V AC, 50/60 Hz 1 min., detection current: 1 mA Between all input terminals and external AC terminals (Power Supply Unit) Between all input terminals and all output terminals Between all external DC terminals (input, output, and NC terminals) and FG plate 1,000 V AC, 50/60 Hz 1 min., detection current: 1 mA Between all channels 500 VAC, 50/60 Hz 1 min., detection current: 1 mA
External connections		Terminal block (detachable)
Unit number settings		Set by rotary switches on front panel, from 0 to 95.
Indicators		Seven LED indicators on front panel (for normal operation, errors detected at the Resistance Thermometer Input Unit, errors detected at the CPU Unit, and four indicators for external alarm outputs.)
Current consumption		5 V DC at 250 mA max
Dimensions		31 × 90 × 65 mm (W × H × D) Note: The height including the Backplane is 145 mm.
Weight		150 g max.

Sensor Type and Input Range

The Platinum Resistance Thermometer type and input range are set in the allocated words in the DM Area for every four inputs. The measurable data range is ±20 digits wider than the sensor input range.

Setting	Input	°C			°F		
		16-bit binary	BCD		16-bit binary	BCD	
			F□□□ indicates minus sign.	Leftmost bit indicates minus sign.		Leftmost 4 bits (bits 15 to 12) indicate minus sign.	Leftmost bit (bit 15) indicates minus sign.
0	Pt100: -200.0 to 650.0°C (-300.0 to 1200.0°F)	F830 to FFFF to 1964 (-200.0 to -0.1 to 650.0)	F999 to 6500 * (-99.9 to 650.0)	A000 to 6500 (-200.0 to 650.0)	F448 to FFFF to 2EE0 (-300.0 to -0.1 to 1200.0)	F999 to 9999 * (-99.9 to 999.9)	B000 to 7999 * (-300.0 to 799.9)
1	JPt100: -200.0 to 650.0°C (-300.0 to 1200.0°F)	F830 to FFFF to 1964 (-200.0 to -0.1 to 650.0)	F999 to 6500 * (-99.9 to 650.0)	A000 to 6500 (-200.0 to 650.0)	F448 to FFFF to 2EE0 (-300.0 to -0.1 to 1200.0)	F999 to 9999 * (-99.9 to 999.9)	B000 to 7999 * (-300.0 to 799.9)
2 to 9	Do not set.			Do not set.			

Note: If the indication range is exceeded, a sensor error will occur and the sensor error bit will turn ON. The process value will be clamped at the lower or upper limit of the indication range, depending on the setting for data direction at sensor error.

* The indicator range for BCD display will be clamped at the lower (or upper) limit in the region between the lower (or upper) limit of the setting range and the point where a sensor error occurs.

For 0.1°C/0.1°F indication with minus sign indicated by leftmost 4 bits (bits 12 to 15): Lower limit = -99.9, Upper limit = 999.9.

For 0.1°C/0.1°F indication with minus sign indicated by leftmost bit (bit 15): Lower limit = -799.9, Upper limit = 799.9.

Temperature Characteristics According to Platinum Resistance Thermometer Type

Platinum Resistance Thermometer	Temperature range	Set value error when ambient temperature changes by 1°C
Pt100	-200 to 200°C	±0.06°C
	200 to 650°C	285 ppm of PV
JPt100	-200 to 200°C	±0.06°C
	200 to 650°C	285 ppm of PV

The measured temperature error is calculated as shown in the following example.

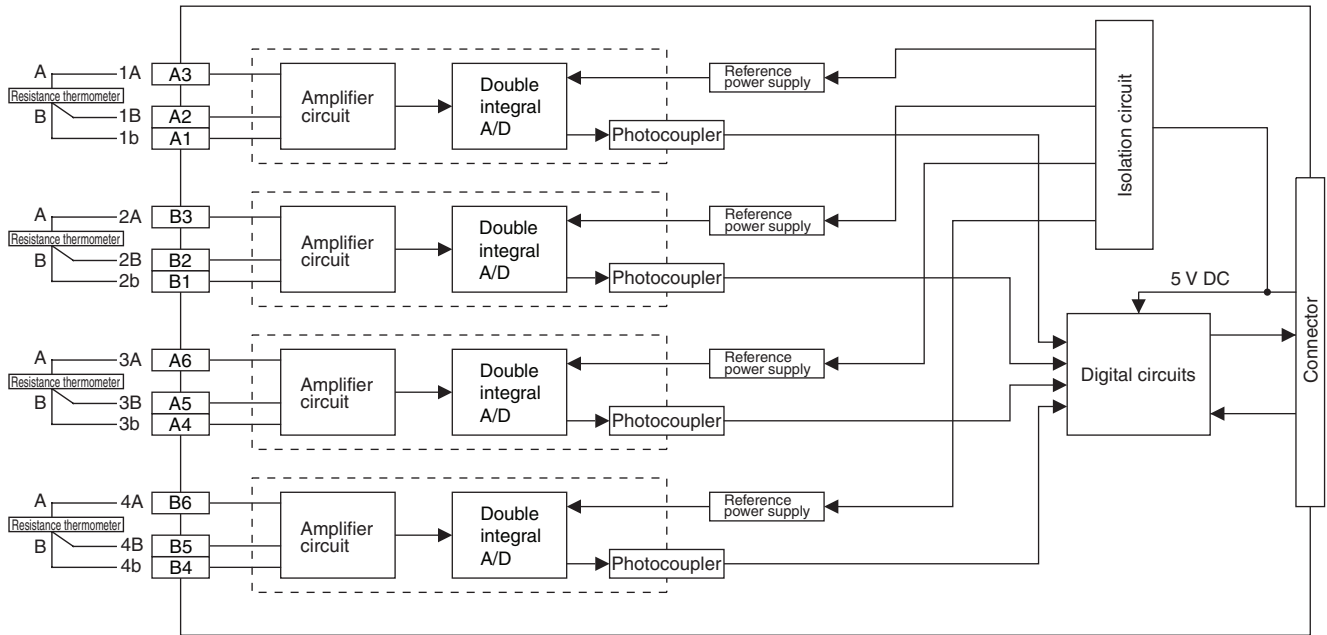
Item	Details
Ambient temperature	30°C
Platinum Resistance Thermometer	Pt100
Measured temperature (PV)	500°C
Reference accuracy (25°C)	±0.3% of PV or ±0.8°C, whichever is greater, ±1 digit. In this example, ±1.5°C.
Temperature characteristics	200 to 650°C: 285 ppm of PV. In this example, 285 ppm × 500°C = 0.143°C.
Change in ambient temperature	5°C (25 to 30°C)

Overall accuracy =

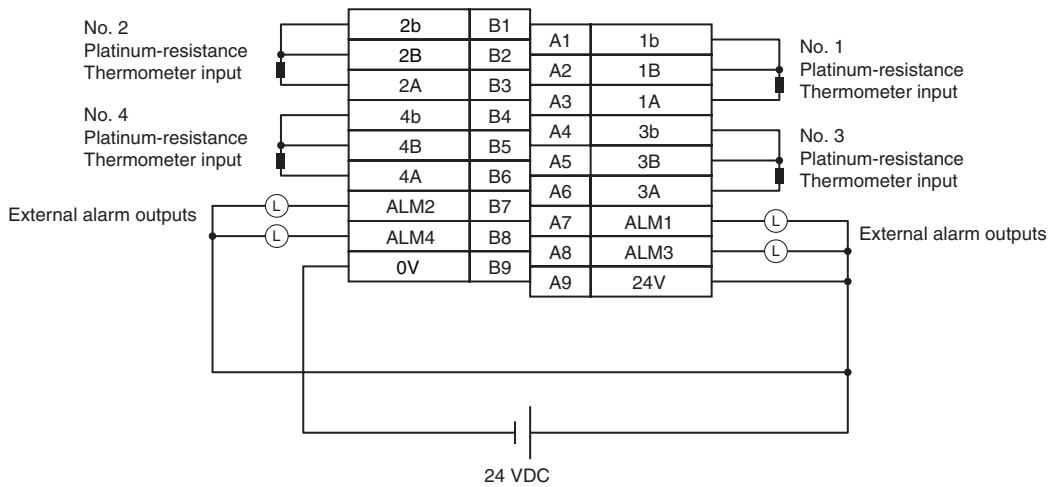
Reference accuracy + Temperature characteristic × Change in ambient temperature = ±1.5°C + ±0.143°C × 5 = Approx. ± 2.2°C ±1 digit.

Terminal Block Diagram

Input Circuit



Terminal Connection Diagram

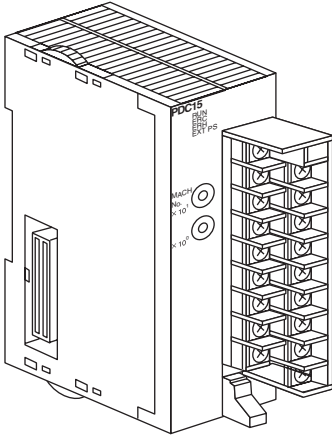


- Note:**
1. Wire the same length to A, B, and b, so that the impedance will be the same. In particular, do not short circuit between B and b at the terminal block.
 2. For unused input terminals, connect approximately 100 Ω between the platinum-resistance thermometer input terminals A and B and short terminals B and b with a lead wire. If resistance is not connected between terminals A and B and terminals B and b are shorted or if terminals A and B and terminals B and b are left open, the alarm output will turn ON and the ALM indicator will light.
 3. Always ground the GR terminal on the Power Supply Unit of the Controller.
 4. If the input device uses a voltage generator, temperature compensator, or similar device, then ground the input device if it has a ground terminal.

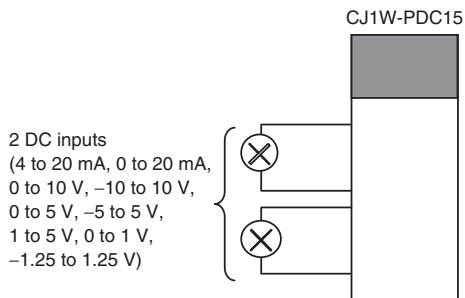
CJ1W-PDC15 Isolated-type Direct Current Input Unit

Overview

The CJ1W-PDC15 Isolated-type Direct Current Input Unit provides two direct-current inputs, and sends the data to the CPU Unit each cycle. All inputs are isolated.



System Configuration



Specifications

Item	Specifications
Model	CJ1W-PDC15
Applicable Controller	CJ/NJ Series
Unit classification	CJ-series Special I/O Unit
Mounting position	CPU Rack or Expansion Rack
Maximum number of Units	40 (within the allowable current consumption and power consumption range)
Unit numbers	00 to 95 (Cannot duplicate Special I/O Unit numbers.)
Areas for data exchange with CPU Unit	Special I/O Unit Area (Operation Data) 10 words/Unit Direct Current Input Unit to CPU Unit: All process values, process value alarms (LL, L, H, HH), rate-of-change values, rate-of-change alarms (L, H), disconnection alarms, cold junction sensor errors, adjustment period end/notice
	DM Area words allocated to Special I/O Units (Setting parameter) 100 words/Unit CPU Unit to Direct Current Input Unit: Input signal type, scaling of process value in industrial units, process value alarm setting (L, H), inrush input upper limit, inrush input upper limit time, zero/span adjustment value, Square root function. Temperature input signal type, input range (user set), scaling of process value data to be stored in allocated words in CIO area, rate-of-change input range, scaling of rate-of-change data, number of items for moving average, process value alarm setting (LL, L, H, HH), rate-of-change alarm setting (L, H), zero/span adjustment value
	Expansion Control/Monitor Area (Expansion Operation Data) 35 words/Unit CPU Unit to Direct Current Input Unit: Bits for beginning or resetting the hold function selection, adjustment period control, control bits Direct Current Input Unit to CPU Unit: Adjustment period notices, peak and bottom values, top and valley values, integral values
	Expansion Setting Area (Expansion Setting parameter) 46 words/Unit CPU Unit to Direct Current Input Unit: Expansion Setting Area settings, adjustment period control, peak and bottom detection, top and valley detection, integral value calculation
Number of inputs	2
Input signal type	4 to 20 mA, 0 to 20 mA, 0 to 10 V, -10 to 10 V, 0 to 5 V, -5 to 5 V, 1 to 5 V, 0 to 1.25 V, -1.25 to 1.25 V (separate for each input), and ± 10 -V user-set range (specified range within -10.000 V to 10.000 V)
Scaling	Data to be stored in the allocated words in the CIO area must be scaled (Any minimum and maximum values can be set.) (2 inputs set separately.) Data can be converted at 0% to 100%.
Data storage in the CIO Area	The value derived from carrying out the following processing in order of the actual process data in the input range is stored in four digits hexadecimal (binary values) in the allocated words in the CIO Area. 1) Mean value processing → 2) Scaling → 3) Zero/span adjustment → 4) Square root calculation → 5) Output limits
Accuracy (25°C)	$\pm 0.05\%$
Temperature coefficient	$\pm 0.008\%/^{\circ}\text{C}$
Resolution	1/64,000
Input signal range	For 4 to 20 mA, 0 to 20 mA, 0 to 10 V, 0 to 5 V, 1 to 5 V, 0 to 1.25 V inputs: -15 to 115% For -10 to 10 V, -5 to 5 V, -1.25 to 1.25 V inputs: -7.5 to 107.5%
Input impedance	For current inputs: 250 Ω (typical) For voltage inputs: 1 M Ω min.
Warmup time	10 min
Conversion period	10 ms/2 inputs
Maximum time to store data in CPU Unit	Conversion period + one CPU Unit cycle
Input error detection	Check only for 4 to 20 mA and 1 to 5 V. Error detected for -17.2% (1.25 mA, 0.3125 V) or less and 112.5% (22 mA, 5.5 V) or more.
Operation at input disconnection	For 4 to 20 mA and 1 to 5 V: Stores -15% process value. For all other ranges: Stores same process value as 0-V or 0-mA inputs.
Input disconnection detection delay time	Approx. 1 s.