OMRON

Model

CJ1W-TS562

RTD input unit

INSTRUCTION SHEET

Thank you for purchasing an OMRON product. Read this instruction sheet thoroughly and familiarise yourself with the functions and characteristics of the product before using it. To ensure safe and correct use of this Unit, also read the Operation- and Programming Manuals for your CJ1 PLC system.

Keep this instruction sheet for future reference.

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■ Unit Description

The CJ1W-TS562 is a 6-channel input unit for Pt100 and Pt1000 RTD's. It can be installed in any CJ1-series PLC system.
It is classified as a basic I/O unit, occupying 48, 64 or 96 I/O points, depending on the number of activated inputs.
Always verify that the maximum I/O capacity of the CJ1 CPU is sufficient for the number of required I/O points.

■ Nomenclature

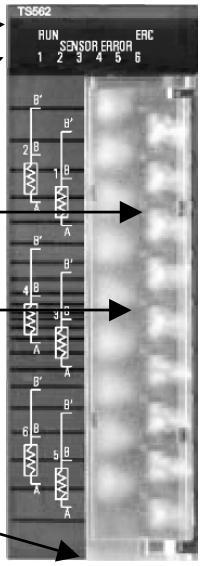
Unit status indicators
- RUN (green)
- ERC (red)

Sensor error indicators
- 1 - 6 (red)

Removable Terminal Block
- Connections for RTDs 1 through 6

DIP switches
(remove terminal block for access)
- Select input types (Pt100/Pt1000)
- Select filter functions
- Select number of active inputs (1-6)

Terminal Block latch
- Slide down to remove
- Slide up to lock



■ Wiring

- Use the same length and type of leadwire for each RTD's terminals A, B, and B', so that the leadwire impedances will be the same. 2-wire connection can be used by shorting B-B', but the specified indication accuracy cannot be guaranteed.
- For activated but unused inputs, short-circuit the A–B and B–B' terminals, to prevent unstable readout on the other inputs.
- Keep the input wiring away from power lines including AC power supply lines and high-power lines. Do not run the I/O lines in the same duct or conduit as power lines.
- The input circuits are galvanically isolated from the PLC's I/O bus, but there is no galvanic isolation between individual inputs. All B' terminals are interconnected in the unit.
- Always ground the ⏚ terminal on the Power Supply Unit of the PLC. In case of shielded sensor wiring, connect the shields to the same grounding point as the PLC.

■ General Specifications

Unit classification	CJ-series Basic I/O Unit
Compatible Racks	CJ-series CPU Rack or CJ-series Expansion Rack
Max. number of Units	10 Units/Rack max. (This requires a CJ1G or CJ1H CPU)
CPU Unit data area for inputs	Basic I/O area CIO0000 – 0999 (3, 4 or 6 words allocated in IO Table)
Insulation resistance	20 MΩ min. (at 500 V DC) between input terminals and external AC terminals (Power Supply Unit)
Dielectric Strength	500 VAC 50/60 Hz for 1 min. (detection current: 1 mA), between Input terminals and external AC terminals (Power Supply Unit)
Internal current consumption	250 mA max., 5 V DC, from the CJ1 I/O bus.
Dimensions	31 x 90 x 65 mm (W x H x D)
Weight	150 g max.
Other	Other general specifications conform to the CJ-series general specifications. See Operation Manual W393.

■ Characteristics

Temperature Sensor	Pt100 or Pt1000 (IEC 60751)
Number of inputs	1 to 6
Measurement range	Pt100: -200.0 to +650.0 °C Pt1000: -200.0 to +650.0 °C
Indication resolution	0.1 °C
Leadwire compensation	Automatic, measured on B' terminals, updates one sensor in each scan cycle.
Temperature value Data representation	16-bit signed integer in units of 0.1 °C: #F830 = -200.0 °C, #1964 = +650.0 °C
Indication accuracy over full operational range (0 – 55 °C ambient temperature)	± 0.5 % of indicated value or ± 0.8 °C (whichever is larger) ± 1 digit max. when using 3-wire connection.
Input response time (per active input)	40 ms (100 Hz suppression) 67 ms (60 Hz suppression) 80 ms (50 Hz suppression) 400 ms (50+60 Hz suppression)
Input update cycle time (all active inputs)	[number of active inputs + 1] x [input response time] + 40 ms
I/O refresh time (influence on PLC cycle time)	1-3 inputs (48pt mode): 0.008 ms 4 inputs (64pt mode): 0.011 ms 5-6 inputs (96pt mode): 0.016 ms

■ LED indicators

Name	State	Description
RUN (Green)	OFF	Fatal error or no power supply. • Check the host PLC's CPU status, and the status of other I/O units. If all other units function normally, replace the Unit
	ON	Unit functions normally.
ERC (Red)	**OFF**	No fatal errors.
	ON	Incorrect DIP switch setting Fatal error in the Unit. • Check the CPU unit for error codes. • Re-start the PLC system. • If the ERC LED is still lit, replace the unit.
Sensor Error 1 – 6 (Red)	**OFF**	• Measurement of the corresponding channel is within range, or • Channel has been deactivated by DIP switch settings
	ON	• Measured temperature out-of-range, or • RTD broken wire or short circuit
	All ON	Calibration data not found or incorrect. The Unit should be returned to OMRON for calibration.

■ DIP switches



8 DIP switches are accessible after removing the front terminal block. Switch settings are processed at time of power ON, and should not be changed while the unit is powered.

Default (ex-factory) setting is all switches ON, i.e. all 6 inputs are active and set to Pt100 sensor, with filtering at n x 100 Hz. Be sure to adjust the settings to your requirements before use.

SW 1, 2 and 3 : Input type selection

Any combination of input types (different numbers of Pt100/Pt1000 sensors) can be set.

SW	State	Input type selection
1	OFF	Input channel 1 is Pt1000
	ON	Input channel 1 is Pt100
2	OFF	Input channels 2 and 3 are Pt1000
	ON	Input channels 2 and 3 are Pt100
3	OFF	Input channels 4, 5 and 6 are Pt1000
	ON	Input channels 4, 5 and 6 are Pt100

SW 4 + 5 : Input filtering (valid for all active input channels)

Use filtering if the measured value is affected by the mains frequency or other sources of electrical interference.

SW4	SW5	Filtering	Response time
OFF	OFF	n x 10 Hz suppression	400 ms each input
OFF	ON	n x 50 Hz suppression	80 ms each input
ON	OFF	n x 60 Hz suppression	67 ms each input
ON	ON	n x 100 Hz suppression	40 ms each input

SW 6+7+8 : Input activation

To prevent broken wire indication for unused inputs, and to reduce the number of input channels occupied in CIO memory, the number of required inputs can be set by SW 6+7+8.

Input words are allocated in the PLC's CIO area as Basic I/O Unit, i.e. sequentially starting at the leftmost unit. See CJ1-series Operation Manual W393 for details.

Create the I/O table in the PLC after changing the switch settings, to register the correct number of input words in the PLC CPU. The unit is registered as 48-point, 64-point, or 96-point input unit, depending on the number of 16-bit CIO words it occupies.

SW6	SW7	SW8	Active inputs	Occupied input words
OFF	OFF	OFF	Not valid, ERC indicator will be ON	
ON	OFF	OFF	1	3 CIO words (1 used)*
OFF	ON	OFF	1, 2	3 CIO words (2 used)*
ON	ON	OFF	1, 2, 3	3 CIO words
OFF	OFF	ON	1, 2, 3, 4	4 CIO words
ON	OFF	ON	1, 2, 3, 4, 5	6 CIO words (5 used)*
OFF	ON	ON	1, 2, 3, 4, 5, 6	6 CIO words
ON	ON	ON	1, 2, 3, 4, 5, 6	6 CIO words

* In these cases, more CIO words will be occupied than required for the active inputs. The remaining occupied CIO words will be filled with 0's, and cannot be used as work bits.

■ Data representation

Measured temperatures are indicated in °C. Each input value occupies one word (16 bits) in the CIO area and is encoded as a signed integer, with a resolution of 0.1 °C.

Examples: #0300 = 768 (dec) = 76.8 °C
#FF85 = -123 (dec) = -12.3 °C

Measured values are updated in CIO memory in each I/O refresh cycle. The following values are to be interpreted as error codes:

Value	Description
#7AAA	Error detected at startup, or calibration data invalid
#7BBB	Sensor error, broken wire or short circuit
#7CCC	Measured value out of range (over max. Temperature)
#8CCC	Measured value out of range (under min. Temperature)

During initialisation after power ON, data of active inputs will be #0000 until the "Not Ready' flag turns OFF.

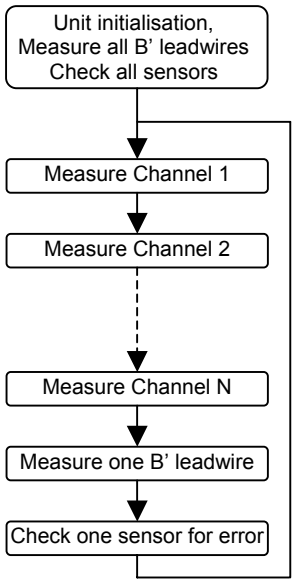
■ 'Not Ready' flag

During initialisation after power-on, and in case of internal failure, a 'Not Ready' flag will be set in the PLC memory area A050 to A069 (Basic I/O Unit information area, refer to CJ1 Operation Manual W393 for details).
The lower bit of each unit is the Not Ready flag; the error code indicated in the remaining bits is relevant for repair purposes only. While this flag is ON, the temperature sensor data indicated by the unit in the CIO area is invalid.

Address	Bit	When Bit = ON
A050	00	Unit in rack 0, slot 0 is not ready
	08	Unit in rack 0, slot 1 is not ready
A051	00	Unit in rack 0, slot 2 is not ready
	…	…
A055	00	Unit in rack 1, slot 0 is not ready
	…	…
A069	00	Unit in rack 3, slot 9 is not ready
	08	Unit in rack 3, slot 10 is not ready

■ Unit cycle time

The internal processing time for all measurements by the unit is determined by the number of active channels and the filter type.



The leadwire compensation measurement and sensor error detection for each input are executed once every N cycles (N = number of active inputs)

The leadwire measurement time depends on the input filter setting, whereas the sensor error (broken wire) check takes a fixed 40 ms.

Example:
If 4 inputs are active, and filtering is set to n x 50 Hz (response time = 80 ms):

Each measurement cycle takes (4+1) x 80 + 40 ms = 440 ms.

The leadwire compensation of each channel is recalculated every N x 440 ms = 1760 ms.

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Note: Specification subject to change without notice

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