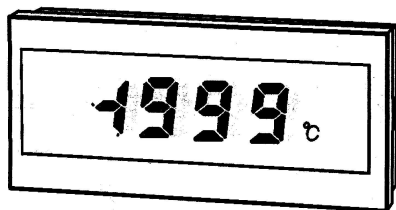


# INSTRUCTION MANUAL DIGITAL THERMOMETER MODEL AT-501



## Caution

- (1) If voltage or current exceeding the allowable maximum voltage or current is applied to the input terminals, the converter may be damaged.
- (2) Apply power within the applicable range of the converter. Otherwise fire, electric shock or meter damage may result.
- (3) The contents of this instruction manual may subject to change without prior notice.
- (4) This instruction manual is carefully prepared. However, if any mistake or omission is found, contact your nearest Watanabe sales agent or Watanabe directly.
- (5) Keep this manual available easily anytime.

## 1. Introduction

Thank you for purchasing our AT-501 digital thermometer. Although this meter is manufactured under strict quality control, prior to using it, check it to make sure that it has not been damaged during transportation and/or there are no mistakes in the specifications. If there are any discrepancies in the quality and specification, contact us or the Watanabe agent which you purchased it.

## 2. Specifications

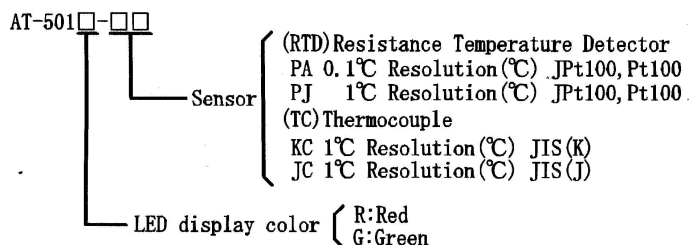
### TC Type (Thermocouple)

Model & code	Input Sensor	Measuring range	Resolution	Accuracy (23 ± 5)
AT-501 -KC	K	0 to +1000	1	±0.8% of FS
AT-501 -JC	J	0 to +400	1	±0.8% of FS

### RTD Type (Resistance Temperature Detector)

Model & code	Input Sensor	Measuring range	Resolution	Accuracy (23 ± 5)
AT-501 -PA	Jpr-100 Pt-100	-100.0 to +199.9	0.1	±0.2% of FS
AT-501 -PJ	Jpr-100 Pt-100	-200 to +600	1	±0.4% of FS

### Model Configuration



### General Specifion

Operation Method	: Double integral
Input Circuit	: Single-ended
Smpling Speed	: 2.5 times / sec
Noise Rejection Ratio	: NMR40dB (TYP)
Display	: LED numeric display, height-14.2mm Red or Green

Polarity Display	: " - " is displayed automatically at minus temperature
Operating Temperature Range	: 0 to 50 , 35 to 85%RH (Nodew-Condense)
Storage temperature	: -10 to +70 Less than 60%RH
Power supply/	: 12 to 24V DC ±10%
Power Consumption	: Approx. 37mA (TYP) (at 24V DC)
Dimentions	: 96mm (W) × 48mm (H) × 22mm (D) DIN size
Weight	: Approx 60g
Dielectric strenght	: 1 min. at 500V DC Between input (A, B, COM) / power supply terminal 0V
Insulation resistance	: More than 100M at 500V DC between each terminal described above.
Accessory	: Instruction manual

### Thermocouple Type Specification

Input Sensor	: Type K or J
Temperature display	:
Resolution	: 1
External Resistance	: Less than 100
Cold Junction	: ±2 (10 to 40 )
Compensation Accuracy	:
Burnout Alarm	: " - 1999 " (K type) or " - 999 " (J type) flashes
Excess Input Voltage	: ±5V DC
Temperature	: 200ppm/ of FS (K type)
Coefficient	: 300ppm/ of FS (J type)

### RTD Type Specifications

Input Sensor	: Pt100 (JPT100)
Temperature display	:
Resolution	: 0.1 or 1
External Resistance	: Less than 1 /lead
Linearizer	: Analog linearizer
Temperature coefficient	: 200ppm/
Resistance current	: 1mA (TYP)

## 3. Handling

### 3-1 Preparation Required to Operation and General Caution

- 1) Use this meter at ambient temperatures of between 0 to 50 and in humidity of up to 85%. Do not expose the meter to dew condensation.
- 2) Use the meter only wherw therw is no dust or chemicals and gases harmful to electrical components and parts.
- 3) Do not subject the meter to vibration and shock.
- 4) Noise

#### a) Power Circuit

As it is very difficult to build a complete noise rejection cirucuit into a small device such as this meter, use a surge absorption cirucuit such as an external line filter, varistor or to prevent excess surge when it in the same power line as magnet switches and/or where lightening occurs frequently.

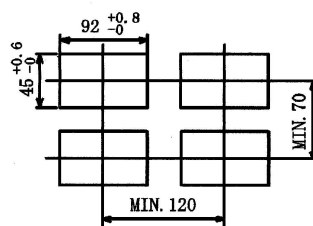
#### b) Shield

When noise causes a problem, connect the 0V terminal to the earth or an equipment grounding terminal. If air induction causes a problem, enclose the molded mainframe case in a metal case.

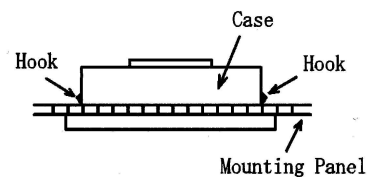
### 3-2 Mounting

#### 1) Panel Mounting

Make a cutout on the panel as specified in Fig. 1 and insert the meter into the cutout from the front side of the panel. (Meke the panel thickness 1.0 to 3.2mm)



[Fig. 1]



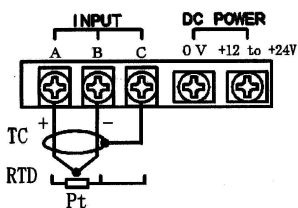
[Fig. 2]

#### 2) Pulling Out the Internal Assembly

Insert a screwdriver into each of the holes on both sides to force out the front panel. Gently move the case up and down and then slowly remove the internal assembly.

### 3-3 Terminal Connection

#### Input/Output Screw Terminal



#### 1) Power connection : POWER

Connect the power (12 to 24V DC) to " POWER " on the input /output terminal board.

Since this meter is not provide with a power switch, it is ready to operate as soon as it is connected to the power supply.

#### 2) Measured-Input Terminal Connection

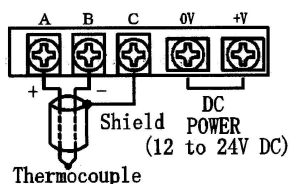
##### Thermocouple Type

)Connect the thermocouple + leg to A on the terminal, and the thermocouple - leg to B on the same terminal.

)When compensation wires with shield are used, connect the shield to C(COM) on the terminal.

)Never apply voltage beyond an allowable maximum voltage to the input (terminals A,B and COM)

#### ● Terminal Board Connection Diagram



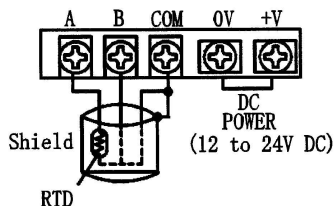
##### RTD Type

)Connect 3-wire system Pt100 to A,B,COM terminals.

)For the 2-wire system short the terminals B and COM.

)Never apply input other than the RTD to the input terminals.

#### ● Terminal Board Connection Diagram



## 4. Maintenance and inspection

### 4-1 Caution for maintenance

Store the meter at a storage temperature of - 10 to 70 and a relative humidity of less than 60%.

If the meter is used at a dusty location, occasionally remove the internal board from the case, then remove dust accumulated on the board.

(Otherwise a rise in temperatures of internal parts may shorten a meter service life.)

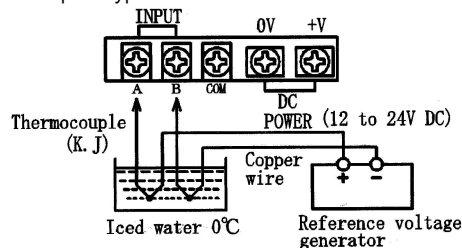
As the case and panel are molded by plastics, do not remove stains from them with a volatile liquid such as thinner.

### 4-2 Calibration

In order to assure the initial accuracy for a long period of time, calibrate the meter periodically at an ambient temperature of  $23 \pm 5$  and a humidity of 35 to 85% RH.

If the meter is out of the specified accuracy as a result of calibration, contact us.

#### Thermocouple Type



Conduct calibration in the following order at  $23 \pm 5$

(1) Remove the front panel of this meter

(2) First, turn the power ON with the wiring made as shown in the above Figure, then warm up the meter for more than 20 minutes. Note: Select a thermocouple appropriate to this calibration.

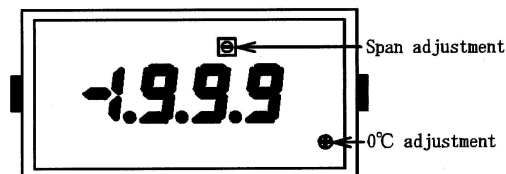
(3) 0 Check and Adjustment

Verify that the display shows 0 with reference voltage generator output set to 0.00mV.

(4) Span Adjustment

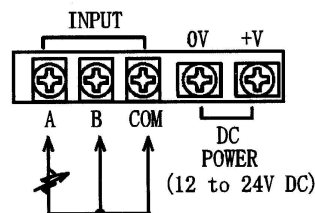
Set reference voltage generator output to a value the fullscale (the following table) and if the display deviates from the above value, turn the span adjustment VR until it displays the value.

Sensor	Display	Input voltage(mV)
KC	1000	41.276
JC	400	21.848



#### RTD Type

Connect a decade type resistance box as shown in the following diagram



#### Decade type resistance box

Calibrate the meter the order shown below.

(1) Remove the front panel of this meter.

(2) First, turn the power ON with the wiring made as shown in the above Figure, then warm up the meter for more than 20 minutes.

(3) Zero Adjustment

Turn the zero adjustment VR until the display shows 00.0 for the PA Type and 000 for the PJ Type with the resistance box set to 100

(4) Span Adjustment

Set the resistance box to a value as shown in the following table. If the display deviates from the above value, turn the span adjustment VR until it shown the value.

Model	Display	Pt100
		Resistance on resistance box( )
PA	199.0	175.49
PJ	600	313.71

## 5. Warranty

This meter is warranted for a period of one year from date of delivery. Any defect which occurs in this period and is undoubtedly caused by Watanabe Electric Industry faults will be remedied free of charge.

This warranty dose not apply to the meter showing abuse or damage which has been altered or repaired by others except as authorized by Watanabe Electric Industry.

## 6. After-sale service

This meter is delivered after being manufactured, tested and inspected under strict quality control.

However, if any problem dose occur, contact your nearest Watanabe Electric Industry sales agent or Watanabe Electric Industry giving as much information on problem as possible.

**watanabe**  
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