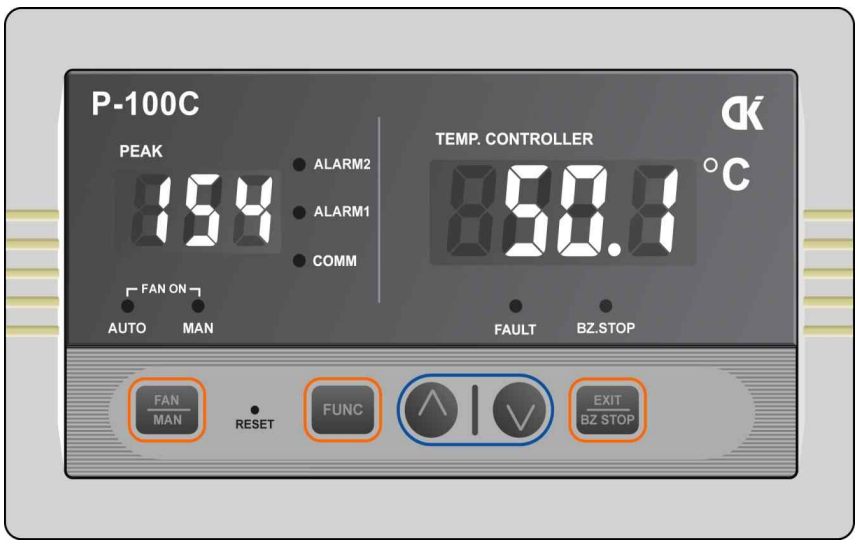
P-100C

Transformer Digital Temperature Controller
[4~20mA DC, RS485 Communication Function]

Instruction Manual



(주) 디케이아이
DIGITAL KOREA CO.,LTD

http://www.poard.co.kr
191, Haedong-ro, Dong-gu, Daegu, Korea 701-040 Tel +82.53.964.0475 Fax +82.53.964.1906

Table of contents

※	Safety Precaution	- -	3
1	Introduction	- -	5
2	Features	- -	5
3	Product Overview	- -	6
4	Set Up Method	- -	7
5	Specification	- -	9
6	Function and Operation	- -	9
7	Terminal Wiring Diagram	- -	11
8	Dimension	- -	11
9	Sensor	- -	11
10	Fan Wiring Diagram	- -	12

Safety Precaution

■ Thank you for purchasing **P-100C**.

■ **P-100C** is **a transformer digital temperature controller.**

■ This manual is to guide you for safe and correct use of P-100C.

Please read it carefully and understand the contents of instruction manual fully before use.

■ Safety precautions for installation

1. Installation of this production is limited to indoor or in a closed place clear of followings:

◎ Corrosive gases ◎ Moisture or high humidity ◎ Dust

◎ High radio frequencies ◎ Poor ventilation or air circulation

◎ Explosive substances ◎ Vibration or heat

If outdoor installation is the only option, protection housing should be built to avoid no rain or sunshine.

2. Do not fasten the case engagements too tightly.

3. The circuit for sensor wires (PT-100Ω sensor connection 3 wires) use delicate signals less than 1V.

For normal function and operation, please complete installation in compliance with followings.

3-1 To avoid noises, isolate sensor signal wires from high voltage cables such as power cables, power lines, and power loading lines.

3-2 Isolate control cabinet from relay output lines and control lines. Otherwise measurements can fluctuate due to high reverse current during relay operation.

3-3 Sensor wires included in the product unit are not equipped with grounding unlike conventional sensor wires used for other transformer temperature controllers. Therefore, it is prohibited to use under or near to high voltage environment. Especially, if extension sensor wires are used for remove control, errors can occur or measurements can be unstable. If remove installation is required, please use conventional sensor wires with ground in accordance to manufacturer's instructions.

■ Type of Safety Precautions

Following symbols are used in this manual to ensure safe operation.

Follow all the warnings and cautions before attempting to install or operate this product.

 **Warning**	**- WARNING indicates a potentially dangerous situation that will cause death or heavy wound unless it is avoided.**
 **Caution**	**- CAUTION indicates a potentially dangerous situation that will cause a slight injury or a medium-degree injury or property damage unless it is avoided.**
 **Electric shock**	**- ELECTRIC SHOCK indicates a caution against potential electric shock.**

■  **Warning**

Do not attempt to disassemble or modify this product without manufacture's approval.

Turn off the power supply in case of repair service and do not supply operation power as well as constant power before problem is resolved. Failure to do so could result in injury or death from electric shock.

Maintenance work should be performed only by licensed electricians trained in the installation and servicing of electrical equipment.

■  **Caution**

- The contents of this manual are subject to change without prior notice.
- Do not install this product near to the presence of explosive gas and hazardous substance.
- Do not use bolts longer than speficied and also use specified fastener only.
- Do not install in places subject to sun light or rain.
- Forcible fastening can damage bolts, nuts, and support poles.
- Connection to rear terminal should be done in reference to marked numbers.
- Connection to rear terminal should be done in reference to marked numbers.
- Isolate input signal wires from power cables, power lines, and loading cables to avoid inducing noise.
- Isolate sensor circuit [no 1 - no 3] i.s. input signal wire from output signal wires. If this is impossible, input signal wires should be shielded for protection.

■  **Caution**  **Electric shocks**

- Operation power is high at AC 80V to 265V or DC 100V to 300V. Pay high attention to avoid electric shock attention in electric shock.
- Wires for incoming power supply must be fed to terminal no. 12 and 13 in compliance with appropriate standards and specifications.
- Be aware of high voltage power AC 80V to 265V or DC 100V to 300V is supplied to following output terminals Alarm 1 [No 8 to No 9], Alarm 2 [No 10 to No 11], FAN MOTOR [No 6, No 7] and pay attention to avoid electric shock.
- Use power terminals for electric wiring purpose and do not use damaged wires.
- Do not use power terminals while power is on or during operation. Turn off power before use.

■  **Caution**  **Electric shocks**

Transformer installation can cause electrical voltage due to unstability in ground line. Therefore, properly ground P-100C following electricity safety standards not to increase electrical voltage at outside of housing.

■ Never attempt to disassemble this product without the manufacturer's approval. and instructions. Please contact quality control department for further instructions.

Tel : +82.53.964.0475 Fax : +82.53.964.1906

1. Introduction

P-100C is a device for monitoring and controlling transformer temperature using a thermal sensor PT-100Ω and it is to be installed where fire safety is required. It prevents the secondary damage from thermal increase by temperature monitoring and minimizes power loss by controlling cooling fan. Furthermore, long distance control via analogue **communication (4-20mA)** or **RS-485 communication** enables establishing a network of several devices and controlling them at the same time.

2. Features

2-1 3 wire usage: It operates while receiving the input from a thermal sensor PT-100Ω.

2-2 Peak value display function: Highest temperature i.e. peak is recorded and observed in a separate display screen designated for peaks only.

2-3 Digital correction: Analogue temperature correction is replaced with digital correction method, which enhances accuracy of temperature measurement.

2-4 Two steps of precaution: Alarm 1 and alarm 2 state different level of precautions for instant and flexible reaction.

Alarm 1 : When temperature exceeds the HI value, LED signal for Alarm 1 turns on.

Alarm 2 : When temperature exceeds the HI-HI value, LED signal Alarm 2 turns on.

2-5 Optional manual mode for FAN: It is possible to choose fan operation in between manual mode and auto mode. Default setting is auto mode and it is user changeable to manual mode.

2-6 Precaution display: In case of wrong, missing, or damaged connections in the 

sensor, display states precaution

2-7 Warning signal: In case of wrong, missing connection, or damaged connections in the sensor, LED lights for FAN, FAULT and BZ.STOP turn on, FAN Relay output sends.

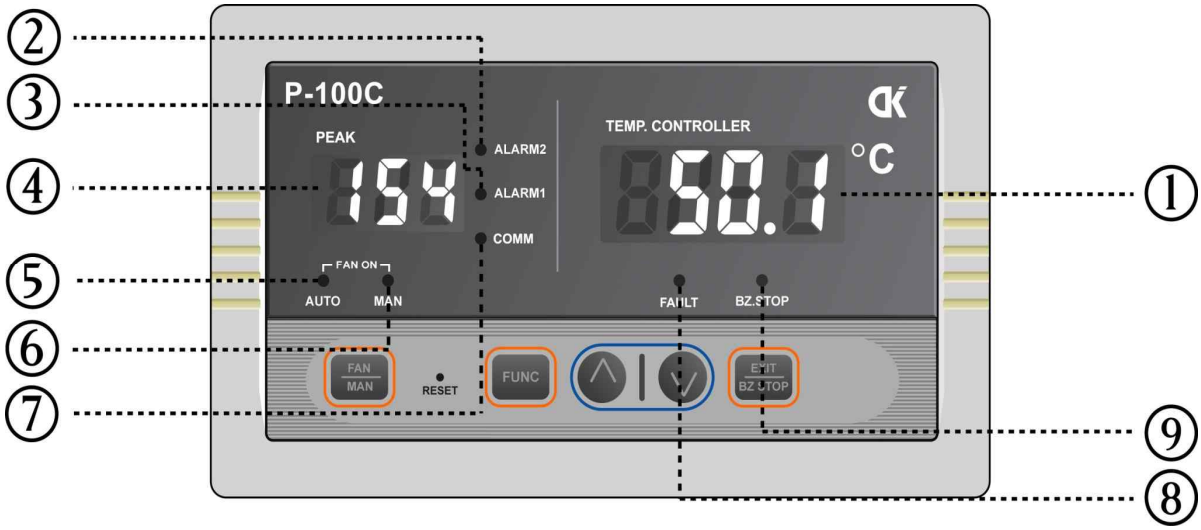
2-8 Remote monitor and control: Equipped with RS-485 communication, remote monitor and control from a long distance are possible.

Default Setting values

FAN ON : 100 ℃, FAN OFF : 80 ℃, Alarm 1 : 110 ℃, Alarm 2 : 130 ℃

Device No : 1, Analogue output range : 0.0 ℃ ~ 200.0 ℃

3. Product Overview



3-1 DISPLAY

Indication department	①	STANDARD DISPLAY	Present temperature and setting value
	④	PEAK VALUE DISPLAY	Temperature data at peak
Output department	②	Alarm 2 LED	Alarm 2 signal
	③	Alarm 1 LED	Alarm 1 signal
	⑤	FAN/ON AUTO LED	Automatic fan operation
	⑥	FAN/ON MANUAL LED	Manual fan operation
	⑦	COMM LED	RS-485 communication
	⑧	FAULT LED	Sensor fault indication
	⑨	BUZZER. STOP LED	Malfuction or precaution indication

3-2 Control

FUNC	Enter to setting mode and save values	EXIT BZ STOP	Exit setting mode and move to present temperature Turn off audible alarm
∧	Increase setting value(INC)		
∨	Decrease setting value(DEC)	FAN MAN	Manual operation for fan ON/OFF
RESET	CPU RESET		

※ When the device does not function normally, press RESET button with a pin.

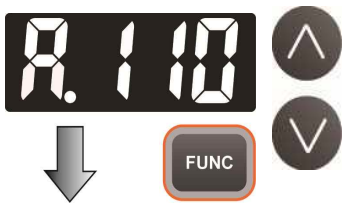
4. Set Up Method

※ FUNC button activates setting mode and to exit from setting mode and to see temperature data, press EXIT BZ STOP button. Adjust setting value with up and down buttons and to save it, press FUNC button. You will hear a long buzzer confirming that setting value is saved normally.

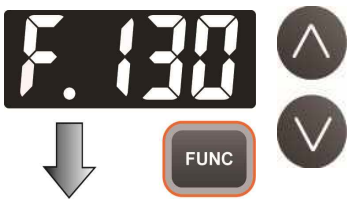
▶ Present temperature display

▶ PEAK value display

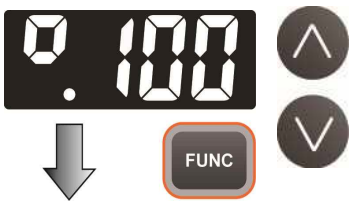
※ To return to present temperature, press ∨ button.



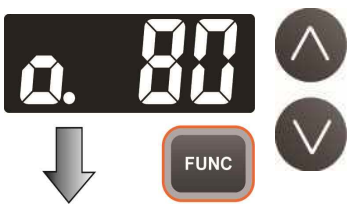
▶ Alarm 1 Set value for alarm 1 operation



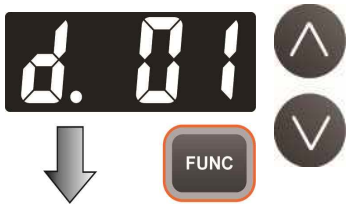
▶ Alarm 2 Set value for alarm 2 operation



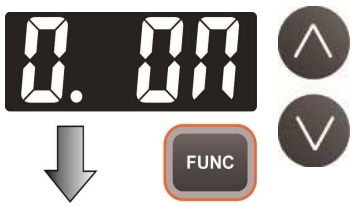
▶ FAN ON temperature setting display
Cooling fan will turn on at the set temperature.



▶ FAN OFF temperature setting display
Cooling fan will turn off at the set temperature.



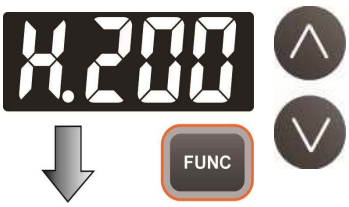
▶ Channel setting for RS-485 communication display



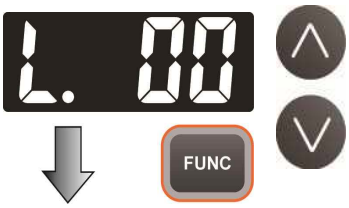
▶ Alarm 1, Alarm 2 Buzzer ON/OFF setting display

▶ Test screen : Compulsory operation of Alarm 1, Alarm 2, FAN Relay and LED with [ON : INC Key, OFF : DEC Key]

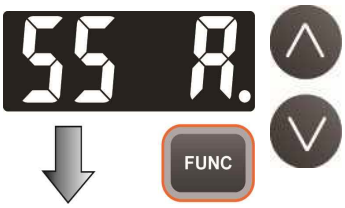
- Pay attention that test screen results in compulsory operation for output contact. Long use of test screen may lead abnormal control operation.



▶ 4 ~ 20mA Output High temperature setting display



▶ 4 ~ 20mA out-put Low temperature setting display
(Temperature that's 0℃ or lower is not applicable)



▶ Channel setting display

- SS A. (4-20mA DC) : Analog communication mode
- SS d. (ASCII) : RS-485 communication mode
- SS U. (MODBUS-RTU) : RS-485 communication mode

▶ Present temperature display

Buzzer beeps when 

button is pressed for movements.

Long buzzer beeps when setting value is saved.

If you exit pressing 

button, setting will return to default.

5. Specification

5-1 Sensor Input: PT-100Ω 3 Wires (JIS/IEC certified)	5-8 Operating environment
5-2 A line resistance : 10Ω/LINE below	① Operation temp and humidity : -10℃~60℃, 10%~80%
5-3 Measurement and indicate a cycle : 200ms/channel	② Storage temp and humidity : -25℃~70℃, 5%~95%
5-4 Precision : ±0.5℃(Full Scale)	5-9 Electric Current output : DC 4~20mA(Load resistance 600Ω less)
5-5 Measuring range : -25℃ ~ 230℃	5-10 Communication Function : RS-485 - ASCII, MODBUS-RTU
5-6 Temperature indication scale : 0.1℃	5-11 Temperature display : Current temperature, Peak temperature
5-7 Relay Output contact	5-12 Size : 153(W) × 92(H) × 148(D)
- FAN MOTOR Control Relay	5-13 Use voltage : AC 80~265V(50/60Hz), DC 100~300V
(16A 250VAC, 16A 30VDC(Max.)	5-14 Use electric power : 5VA(Max)
- Alarm 1 Relay, Alarm 2 Relay	5-15 Weight : 660g
(10A 250VAC, 10A 30VDC(Max.)	5-16 CMRR(Common Mode Rejection Ratio) : 120db more
	5-17 NMRR(Normal Mode Rejection Ratio) : 50db more

※ Note : Output for electric current is DC 6V~24V and output for use of RS-485 is DC 5V.

6. Function and Operation

6-1 Alarm 1, Alarm 2 Function

- When the present temperature exceeds setting value, it operates RELAY for output with Buzzer beeping and turns on LED simutaneously.
- Alarm 1 goes on immediately after present temp. exceeds setting value, Alarm 2 goes on 10sec later (As Alarm 1 Buzzer sound and Alarm 2 Buzzer sound are different, user can notice emergency status easily so take immediate action promptly)

6-2 FAULT display and output function

- In case of wrong or missing or damaged connections 

OR 

will be displayed and the FAN, FAULT and BZ.STOP LED indicator turn on, FAN Relay output is sent.

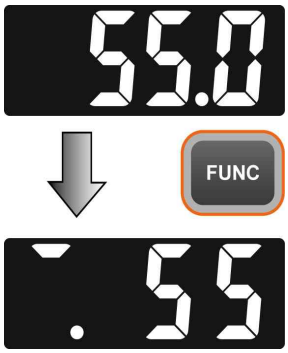
6-3 FAN AUTO / MANUAL Function

FAN / MAN KEY

- Manual On/Off switch for FAN
- When manually operated, FAN(MAN) LED lights on.

※ Auto mode is given priority over manual mode.

6-4 TEMP. PEAK Function



▶ Present temperature display

▶ Push the FUNC key to display PEAK value

Display the highest temperature which is measured untill now

(If you want to delete PEAK value, push the ∨ button)

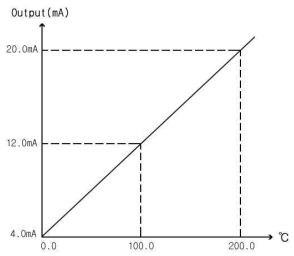
6-5 Alarm Function - Buzzer

In case of Alarm 1 and Alarm 2 or sensor error, Buzzer beeps.

※ Press the EXIT / BZ STOP Key, when you want to stop buzzer beeping.

6-6 Analog communication function - 4~20mA

(When operation power is supplied, output between 4~20mA appears as 20mA or 4mA for 20 seconds)



▶ If setting values are H.200 L. 00

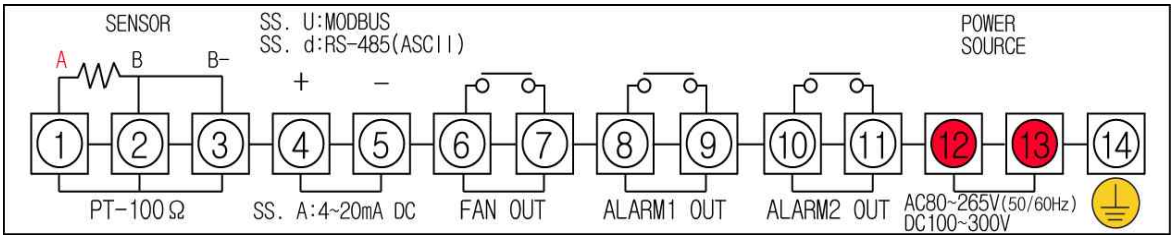
At 0℃, output displays 4mA for actual output 4-20mA and at 200℃,it displays 20mA for actual output 4-20mA.

6-7 RS-485 Communication Function (MODBUS-RTU)

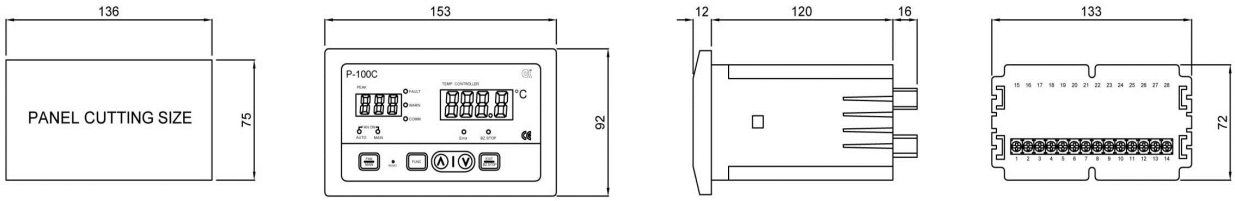
- Using the RS-485 communication, remote monitor for operation status and alarm status is possible.

▶ Baud rate : 9600bps
▶ Parity bit : None
▶ Data bit : 8bit
▶ Stop bit : 1bit

7. Terminal wiring diagram



8. Dimension (CUTTING SIZE 136 X 75)

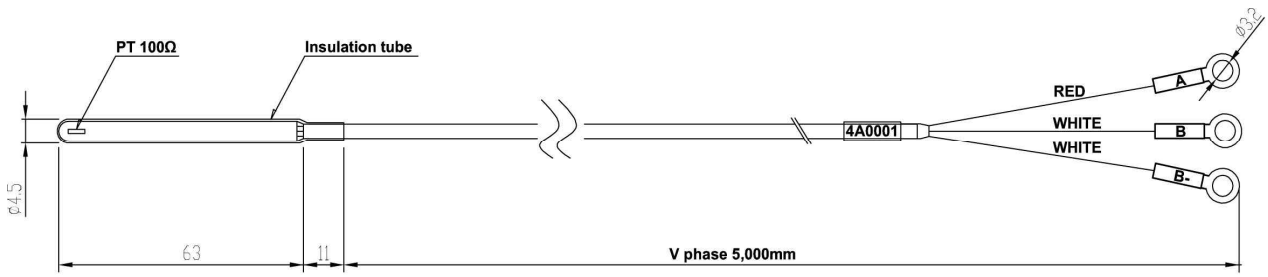


온도계 PANEL CUTTING SIZE | 온도계 정면도 | 온도계 좌측면도 | 온도계 후면도

9. Sensor specific

※ Caution : Do not attempt to extend sensor wires. This can cause a failure or malfuction.

In case extention is required, please contact us for further instructions.

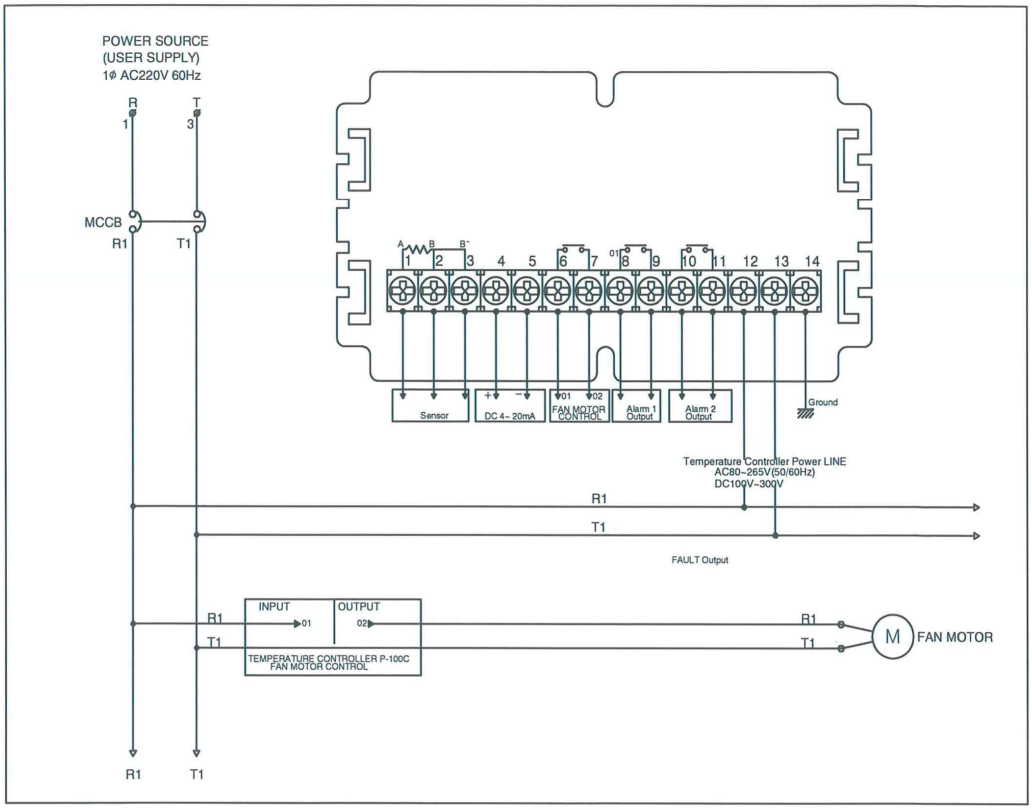


10. FAN wiring diagram

※ Caution : Cooling fan should only be powered by AC220V. If operation power is not AC220V but DC,

cooling fan will not operate and cause a heat problem.

– IN case of single phase fan



– IN case of three phase fan