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PCD-300 SERIES

A glimpse of the future!

Expand control capability with the PCD-300 series' master slave function.

Shinko

■Standard specifications

Display	PV------- Red 4-digit character size: 18.0 x 8.0mm (H x W) SV------- Green 4-digit character size: 12.6 x 6.0mm (H x W) PTN----- Green 1-digit character size: 12.6 x 6.0mm (H x W) STEP--- Green 1-digit character size: 12.6 x 6.0mm (H x W)

Input

Types

Thermocouple	K, J, R, S, B, E, T, N, PL-Ⅱ, C (W/Re5-26)	External resistance: 100Ω or less (For B input: 40Ω or less)
RTD	Pt100, JPt100	3-wire system (Allowable input lead wire resistance, 10Ω or less per wire)
DC current	4 to 20mA, 0 to 20mA DC	Input impedance: 50Ω [When connecting 50Ω shunt resistor (sold separately) between input terminals.] Allowable input current: 50mA DC or less [when using 50Ω shunt resistor (sold separately)]
DC voltage	0 to 1V DC	Input impedance: 1MΩ or greater Allowable input voltage: 5V DC or less Allowable signal source resistance: 2kΩ or less
DC voltage	0 to 5V, 1 to 5V, 0 to 10V DC	Input impedance: 100kΩ or greater Allowable input voltage: 15V DC or less Allowable signal source resistance: 100Ω or less

Scale--------------- Refer to "Rated scale".

Resolution
- Thermocouple, RTD (without decimal point)---- 1℃(1°F)
- Thermocouple, RTD (with decimal point)-------- 0.1℃(0.1°F)
- DC current, DC voltage------------------------------ 1

Accuracy (setting, indication)	Thermocouple-------------- Within ±0.2% of input span ±1digit, or within ±2℃(4°F), whichever is greater
	                              However, for R or S input, 0 to 200℃(0 to 400°F): Within ±6℃(12°F)
	                              B input, 0 to 300℃(0 to 600°F): Accuracy is not guaranteed.
	                              K, J, E, N, T inputs, less than 0℃(32°F): Within ±0.4% of input span ±1digit
	RTD-------------------------- Within ±0.1% of input span ±1digit, or within ±1℃(2°F), whichever is greater
	DC current, DC voltage--- Within ±0.2% of input span ±1digit

Time indication accuracy	Within ±0.5% of setting time
Input sampling period	0.25 seconds
Control output (OUT)	Must be designated • Relay contact---------- 1a1b 3A 250V AC(resistive load), 1A 250V AC (inductive load cos φ =0.4), Electric life: 100,000 times • Non-contact voltage-- 12$^{+2}_{-0}$V DC Max. 40mA DC (short-circuit protected) • DC current-------------- 4 to 20mA DC Load resistance: Max. 550Ω

Control action	Control action type
	• PID action (with auto-tuning)
	• PI action (when derivative time is set to 0)
	• PD action (when integral time is set to 0)
	• P action (when both derivative and integral times are set to 0)
	• ON/OFF action (when proportional band is set to 0)
	
	Control parameter
	• Proportional band (P)--------- Thermocouple, RTD (without decimal point): 0 to 1000℃(0 to 2000°F)
	                                 Thermocouple, RTD (with decimal point): 0.0 to 999.9℃(°F)
	                                 For DC input, 0.0 to 100.0%
	• Integral time(I)------------------ 0 to 1000 seconds (Off when set to 0)
	• Derivative time(D)------------- 0 to 300 seconds (Off when set to 0)
	• Proportional cycle------------- 1 to 120 seconds (Not available for DC current output)
	• ARW------------------------------- 0 to100%
	• Hysteresis----------------------- 0.1 to 100.0℃(°F)
	                             For DC input, 1 to 1000 (The placement of the decimal point follows the selection.)
	• Output high limit, low limit--- 0 to 100% (For DC current output, −5 to 105%)

Alarm 1, 2 (A1, A2)

A1 and A2 alarm action types and status Energized/Deenergized can be selected by keypad operation.
All alarm actions (except for Process high alarm and low alarm) are ±deviation setting to SV. If Energized is selected and when input is out of the range, the alarm output turns ON (If Deenergized is selected, the alarm output turns OFF).

Alarm action	Setting range
No alarm action	
High limit alarm	−Input span to input span (Off when set to 0 or 0.0)
Low limit alarm	−Input span to input span (Off when set to 0 or 0.0)
High/Low limits alarm	0 to input span (Off when set to 0 or 0.0)
High/Low limit range alarm	0 to input span (Off when set to 0 or 0.0)
Process high alarm	Input range minimum value to input range maximum value
Process low alarm	Input range minimum value to input range maximum value
High limit alarm with standby	−Input span to input span (Off when set to 0 or 0.0)
Low limit alarm with standby	−Input span to input span (Off when set to 0 or 0.0)
High/Low limits alarm with standby	0 to input span (Off when set to 0 or 0.0)

When input has a decimal point, the negative minimum value is −199.9 and the positive maximum value is 999.9.
For DC input, input span is the same as scaling span, and input range minimum (or maximum) value is the same as the scaling low (or high) limit value.

Setting accuracy-- The same as the indicating accuracy
Action--------------- ON/OFF action
Hysteresis--------- 0.1 to 100.0℃(°F)
                  For DC input, 1 to 1000 (The placement of the decimal point follows the selection.)
Output-------------- Relay contact 1a 3A 250V AC (resistive load), 1A 250V AC (inductive load cos φ =0.4), Electric life: 100,000 times

Event output (EVT)	One output can be selected from 3 outputs (Time signal output, Pattern end output and RUN output) by front keypad operation. Time signal output : If time signal OFF time and time signal ON time are set, time signal output is outputted within the total time taken for 1 pattern during program control. Pattern end output : Outputs the set time after the program ends. RUN output : Outputs during program control. Output : Relay contact, 1a 3A 250V AC (resistive load), 1A 250V AC (inductive load cos φ =0.4), Electric life: 100,000 times
Supply voltage	Must be designated: 100 to 240 V AC 50/60Hz 24V AC/DC 50/60Hz (For the supply voltage, 100 to 240 V AC is standard. However, when 24V AC/DC is designated, "1" is entered after PCD-33A-□/M.) Allowable voltage fluctuation range: 85 to 264V AC, 20 to 28V AC/DC
Power consumption	Approx. 8VA

Features

Max. 9 patterns

9 steps per pattern are available for program control.
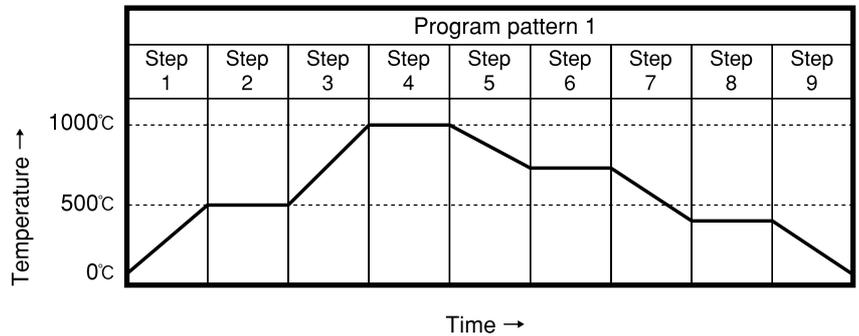
Easy programming

To set the program, just input the step temperature and step time for each step.

Multi-input

18 types of input are provided from thermocouple (10 types), RTD (2 types), DC current (2 types) and DC voltage (4 types).

Drip-proof structure

IP66 for the front part

Program pattern 1

| Step 1 | Step 2 | Step 3 | Step 4 | Step 5 | Step 6 | Step 7 | Step 8 | Step 9 |

Temperature →
1000℃
500℃
0℃

Time →

Enhanced communication functions

The communication type can be selected from 5 types (Shinko standard, Setting value digital transmission, Setting value digital reception, Modbus ASCII mode and Modbus RTU mode).
If Setting value digital transmission is selected, SV of PCD-33A can be transmitted digitally to the JC□-33A series, etc. to which communication function (option C5) is added.
If Setting value digital reception function is selected, PCD-33A can also receive the setting value digitally from devices such as the JC□-33A series, etc. to which communication function (option C5) is added.

■Model name

P C D－3 3 A－□／M □,□□□	Series name: PCD-33A(W96xH96xD100mm)
Control output (OUT)	R	Relay contact: 1a1b
	S	Non-contact voltage (for SSR drive): 12^{+2}_{-0}V DC
	A	DC current: 4 to 20mA DC
Input	M	Multi-input (K, J, R, S, B, E, T, N, PL-Ⅱ, C (W/Re5-26), Pt100, JPt100, 4 to 20mA, 0 to 20mA, 0 to 1V, 0 to 5V, 1 to 5V, 0 to10V)
Supply voltage	1	24V AC/DC 50/60Hz (*1)
Option	C5	Serial communication (Based on EIA RS-485)(*2)
	SVTC	Setting value digital transmission(*2)
	P24	Isolated power output (*3)
	BK	Color, black
	TC	Terminal cover

Designate your specifications in the □, □□□ columns.
When adding an option, enter it punctuated by a comma.
(*1) For the power supply, 100 to 240V AC is standard. However, when ordering 24V AC/DC, enter "1" after the input.
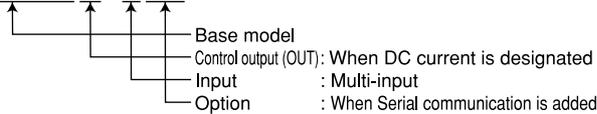(*2) When [option C5] or [option SVTC] is added, the external operation function is not available.
    [Option C5] and [option SVTC] cannot be added together.
(*3) When [option P24] is added, Alarm 2 (A2) is not available.

Example of order code

P C D－3 3 A－A／M,C 5

- Base model
- Control output (OUT): When DC current is designated
- Input : Multi-input
- Option : When Serial communication is added

■Rated scale

Input type		Scale	
Thermocouple	K	−200 to 1370 ℃	−320 to 2500 ˚F
		−199.9 to 400.0℃	−199.9 to 750.0 ˚F
	J	−200 to 1000 ℃	−320 to 1800 ˚F
	R	0 to 1760 ℃	0 to 3200 ˚F
	S	0 to 1760 ℃	0 to 3200 ˚F
	B	0 to 1820 ℃	0 to 3300 ˚F
	E	−200 to 800 ℃	−320 to 1500 ˚F
	T	−199.9 to 400.0℃	−199.9 to 750.0 ˚F
	N	−200 to 1300 ℃	−320 to 2300 ˚F
	PL-Ⅱ	0 to 1390 ℃	0 to 2500 ˚F
	C (W/Re5-26)	0 to 2315 ℃	0 to 4200 ˚F
RTD	Pt100	−199.9 to 850.0℃	−199.9 to 999.9 ˚F
		−200 to 850 ℃	−300 to 1500 ˚F
	JPt100	−199.9 to 500.0℃	−199.9 to 900.0 ˚F
		−200 to 500 ℃	−300 to 900 ˚F
DC current	4 to 20mA	−1999 to 9999 (*)	
	0 to 20mA	−1999 to 9999 (*)	
DC voltage	0 to 1V	−1999 to 9999 (*)	
	0 to 5V	−1999 to 9999 (*)	
	1 to 5V	−1999 to 9999 (*)	
	0 to 10V	−1999 to 9999 (*)	

(*) For DC current and DC voltage input, scaling and decimal point place change are possible.
−1999 to 9999, −199.9 to 999.9, −19.99 to 99.99, −1.999 to 9.999
For DC current input, 50Ω shunt resistor (sold separately) has to be externally installed.

■Name and functions of the sections

①PV display : Indicates Process variable (PV). During the setting mode, this indicates the setting mode.
②SV display : Indicates Setting value (SV). During the setting mode, this indicates the setting value.
③Pattern number display : Indicates a Pattern number.
④Step number display : Indicates a Step number. While WAIT function is working, the related step number blinks.
⑤Control output indicator : Lights when control output is ON. (For DC current output, this blinks corresponding to the manipulated variable at a cycle of 0.25 seconds.)
⑥Program control RUN indicator : Lights while program control is running. Blinks while program control is held.
⑦ AT indicator : Blinks during auto-tuning.
⑧Serial communication indicator : Lights while serial communication output data is transmitted.
⑨Alarm 1 (A1) output indicator : Lights when temperature alarm 1 (A1) output is ON.
⑩Alarm 2 (A2) output indicator : Lights when temperature alarm 2 (A2) output is ON.
⑪Event output indicator : Lights when the output (time signal output, pattern end output, RUN output) selected during Event output function selection is ON.
⑫Increase key : Increases the value on the SV display or switches the selecting item.
⑬Decrease key : Decreases the value on the SV display or switches the selecting item.
⑭Reset key : Cancels the setting mode, and reverts to program standby mode or RUN mode.
⑮Mode key : Switches or registers each setting mode.
⑯Pattern key : Selects program pattern number.
⑰RUN key : Runs (Starts) program control, or stops current step, then advances to the next step (ADVANCE function).
⑱STOP key : Stops program control and cancels pattern end output.

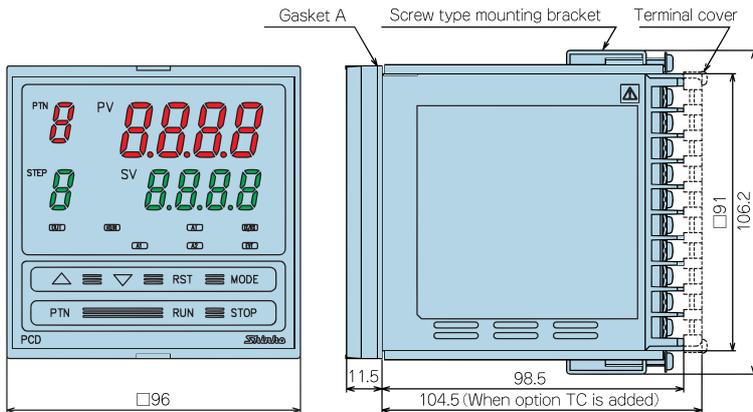| Isolation resistance	If control output (OUT) is non-contact voltage output or DC current output, isolation tests must not be carried out between control output (OUT) terminal and external operation terminal, and between control output (OUT) terminal and communication terminal because they are not isolated from one another. Other combinations except the above: 10MΩ or greater at 500V DC
Dielectric strength	Between input terminal and ground terminal, between input terminal and power terminal--------- 1.5kV AC for 1 minute Between power terminal and ground terminal-- 1.5kV AC for 1 minute Between output terminal and ground terminal, between output terminal and power terminal----- 1.5kV AC for 1 minute
Environment	Ambient temperature : 0 to 50℃ Ambient humidity : 35 to 85%RH (non-condensing)
Material, Color	Material: Flame resistant resin Color: Light gray
Mounting method	Flush, Mounting bracket: Screw type Mountable panel thickness: Within 1 to 15mm
Dust-proof/Drip-proof	IP66 for front panel
Setting method	Sheet key input
Weight	Approx. 370g
Attached function	Power failure countermeasures, Self diagnosis, Automatic cold junction temperature compensation (only for thermocouple), Sensor burnout alarm, Input burnout

■Program performance

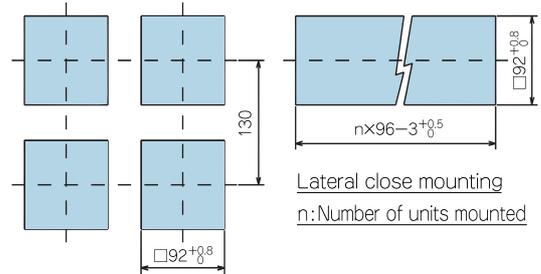| Number of patterns	9 patterns
Number of steps	9 steps/pattern
External operation function	Program control can be performed/stopped by opening/closing the external contact or open collector. Program control is being performed when the contact is switching from Open to Closed, and stops when the contact is switching from Closed to Open.

WAIT function	During program run, the program does not proceed to the next step until deviation between PV and SV when step ends enters the WAIT setting value.
	Setting range------ Thermocouple, RTD (without decimal point): ±(0 to 100)℃(˚F)
	                  Thermocouple, RTD (with decimal point): ±(0.0 to 100.0)℃(˚F)
	                  DC input: 0 to 1000 (The placement of the decimal point follows the selection.)

HOLD function	Program control RUN time is held temporarily.
ADVANCE function	The step during program control RUN can be stopped and advanced to the next step.
Other functions	Step time unit selection (Hour:Minute or Minute:Second), Program control start type selection (PV start or SV start), Step temperature setting when starting program control
Program time range	0 to 99 hours 59 minutes/step, or 0 to 99 minutes 59 seconds/step
Time setting accuracy	Within ±0.5% of setting time
Setting resolution	Temperature: 1℃(1˚F) or 0.1℃(0.1˚F) Time: 1 minute or 1 second
Status after power failure is restored	Program starts to perform from the status before power failure. (Progressing time error after power failure is restored: Max. 1 minute or 1 second

■Options

Serial communication (C5)	Each setting status change, setting value reading and setting, etc. of PCD-33A can be operated from the external computer. (If option C5 is added, external operation function is not available. The option SVTC and external operation function cannot be applied together.) Communication line--------------- Based on EIA RS-485 Communication method--------- Half-duplex communication start-stop synchronous Communication protocol -------- Shinko protocol/Setting value digital transmission/Setting value digital reception/Modbus ASCII mode/Modbus RTU mode Selectable by keypad operation (Default value: Shinko protocol) Communication speed ---------- 2400/4800/9600/19200bps Selectable by keypad operation (Default value: 9600bps) Parity ------------------------------- Even/Odd/No parity Selectable by keypad operation (Default value: Even) Stop bit ----------------------------- 1 or 2 Selectable by keypad operation (Default value: 1) Communication error ------------ Double detection by parity and checksum Number of connectable units--- Max. 31 units per host computer

Data format	Communication protocol	Shinko protocol	Modbus ASCII mode	Modbus RTU mode
	Start bit	1	1	1
	Data bit	7	7	8
	Parity	Even	Selectable (Even)	Selectable (Even)
	Stop bit	1	Selectable (1)	Selectable (1)

Data bit is automatically switched by the selection of communication protocol.   ( ): Basic setting value

Setting value digital transmission (SVTC)	Setting value digital transmission (master)
	    If Setting value digital transmission (master) is selected during Communication protocol selection, SV of PCD-33A can be transmitted digitally to the controllers such as JC□-33A series (slave) with communication function (option C5).
	    Wiring example of Setting value digital transmission
	    [A maximum of 31 units of controller with communication function (option C5) can be connected.]
	
	Setting value digital reception (slave)
	    If Setting value digital reception (slave) is selected during Communication protocol selection, the setting value can be received from the PC-935/PCD-13A/PCD-33A (master) with Setting value digital transmission (option SVTC).
	    (If the option SVTC is added, external operation function is not available, and option C5 and external operation function cannot be applied together.)

Isolated power output [P24]	Outputs 24V DC. This is used for the power of 2-wire transmitter such as a pressure converter.(If the option P24 is applied, Alarm 2 (A2) is not available.) Output voltage-------------- 24V±3V DC（load current 30mA） Ripple voltage-------------- Within 200mV DC（load current 30mA） Max. load current---------- 30mA DC
Terminal cover [TC]	Electric shock protection terminal cover (If there is a possibility that an operator may touch the back of the controller when it is running, be sure to add the option for a terminal cover.)
Color Black [BK]	Case: Black, Panel: Dark gray

■ External dimension

Gasket A Screw type mounting bracket Terminal cover

□96

11.5 98.5

104.5 (When option TC is added)

□91 106.2

■ Panel cutout

130

□92+0.8/0

n×96−3+0.5/0

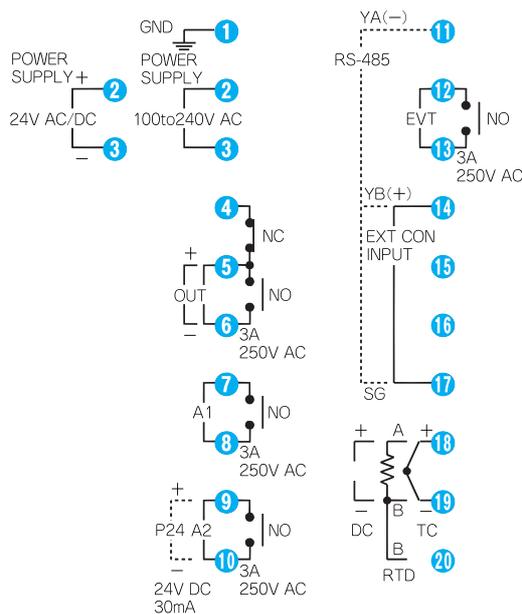Lateral close mounting
n：Number of units mounted

□92+0.8/0

⚠ Caution: When Lateral close mounting is applied, Dust-proof and Drip-proof specification is not fulfilled.

⚠ · Panel thickness is within 1 to 15mm.
   When soft front cover (FC-96-S) is used, panel thickness is within 1 to 14.5mm.
· As the case is made of resin, do not use excessive force while screwing in the mounting bracket, or the case or screw type mounting bracket could be damaged.
   The tightening torque should be approximately 0.12N・m.

■ Terminal arrangement

GND ❶
POWER SUPPLY ＋ ❷ POWER SUPPLY ❷
24V AC/DC   100to240V AC
❸   ❸

❹
NC
＋ ❺
OUT   NO
－ ❻
3A
250V AC

❼
A1   NO
❽
3A
250V AC

＋
❾
P24 A2   NO
❿
24V DC   3A
30mA   250V AC

YA(−) ⓫
RS-485
⓬
EVT   NO
⓭
3A
250V AC
YB(＋) ⓮
EXT CON INPUT ⓯
⓰
SG ⓱

DC   A ＋ ⓲
B ⓳
TC
B ⓴
RTD

· POWER SUPPLY : 100 to 240V AC or 24V AC/DC
· OUT   : Control output
· A1   : Alarm output 1
· A2   : Alarm output 2
· P24   : Isolated power output (option P24)
· RS-485   : Serial communication (option C5)
· EVT   : Event output
· EXT CON INPUT : External operation input
· TC   : Thermocouple input
· RTD   : RTD input
· DC   : DC current, DC voltage inputs

⚠ · The terminal block is designed to be wired from the left side.
· Dotted lines show options.
· When [option P24] is added, Alarm 2 (A2) is not available.
· When [option C5] is added, external operation function is not available.

■ Solderless terminal

Use a solderless terminal with an isolation sleeve that fits in the M3 screw as shown below.
The tightening torque should be 0.6N・m to 1.0N・m.
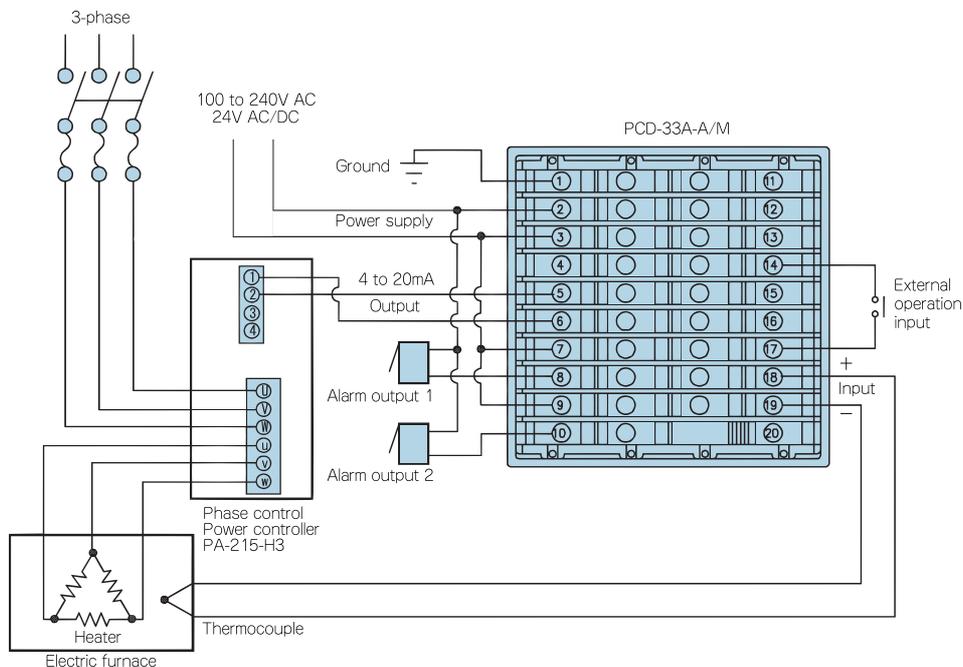

5.8mm or less   φ3.2mm   3.2mm
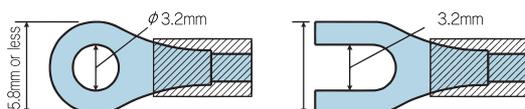
■ Wiring example

Temperature control of electric furnace

This is a wiring example of PCD-33A-A/M.

This example shows that PCD-33A-A/M controls the temperature of ceramic kilns, testing furnaces, incubators, etc.
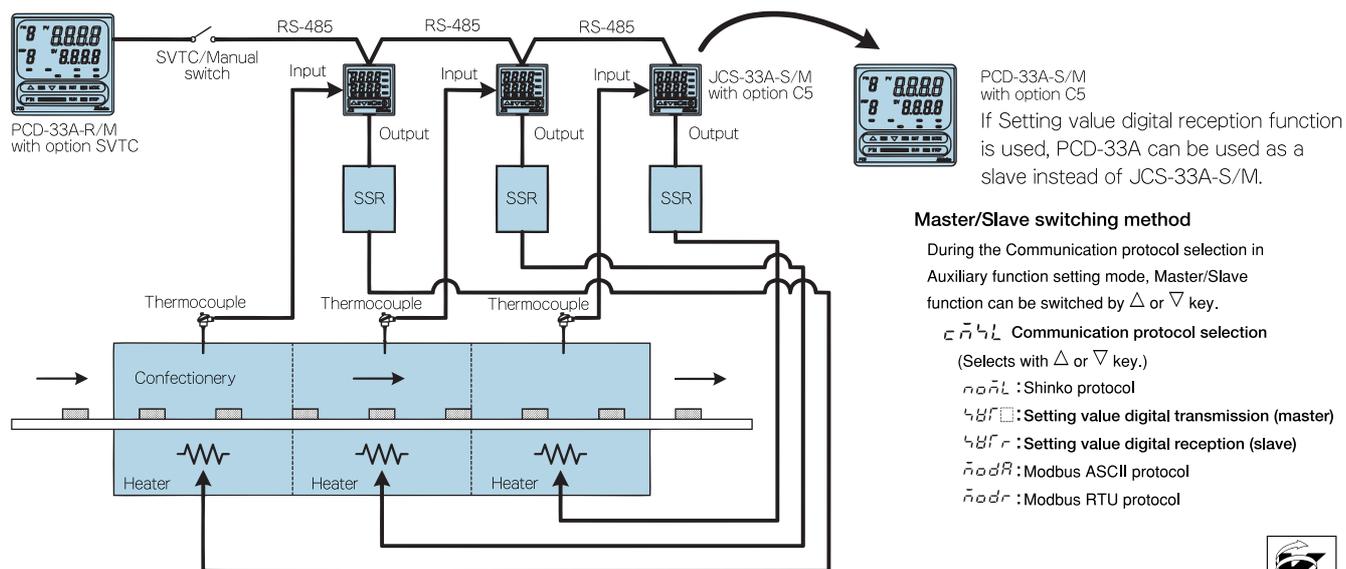

■ Application example

Temperature control of tunnel kiln

This is an application that controls tunnel kiln temperature using PCD-33A with option SVTC (Setting value digital transmission) and JCS-33A with option C5.

This shows master/slave control that JCS-33A-S/M receives the setting value from PCD-33A with SVTC function.

PCD-33A-S/M with option C5

If Setting value digital reception function is used, PCD-33A can be used as a slave instead of JCS-33A-S/M.

Master/Slave switching method

During the Communication protocol selection in Auxiliary function setting mode, Master/Slave function can be switched by △ or ▽ key.

$c\bar{a}$4L Communication protocol selection
(Selects with △ or ▽ key.)

$no\bar{a}L$: Shinko protocol

$58\Gamma\Box$: Setting value digital transmission (master)

$58\Gamma r$: Setting value digital reception (slave)

$\bar{a}od8$: Modbus ASCII protocol

$\bar{a}odr$: Modbus RTU protocol

· This catalog is as of July 2003, and its contents are subject to change without notice.
· If you have any inquiries, please consult us or our agency.

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