Digital Programmable Controller

PCD-300 Series

Economical Program Controller

...at the lowest prices anywhere!

Standard Features

Model PCD

1/4 DIN (96mm x 96mm)

• Structure

Unit available in standard DIN size (1/4 DIN).
NEMA 4X protective construction.
Black enclosure.

• Programmable Features

Unit features nine patterns with up to nine steps per pattern. Steps can be programmed from 99 hours and 59 minutes each.

• True Multi-Input

Unit features true multi-input capabilities:
10 thermocouple types, 2 RTD type, 2 current inputs, and 4 voltage inputs.

• Auto/Manual Control

Manual overide allows you to take control of your process at anytime.

• Large LED Display

All units feature dual display. PV red 4 digits, SV green 4 digits.

• PID Autotune

All units feature as standard full function third generation PID Autotune. This feature minimizes process overshoot under the most demanding applications.

• Modbus Protocol With RS485 (Option)

Units offer communications capabilities. The PCD-300 can be used in conjunction withe the JC Series or the DCL DIN Rail Controller to set up master/slave control systems.

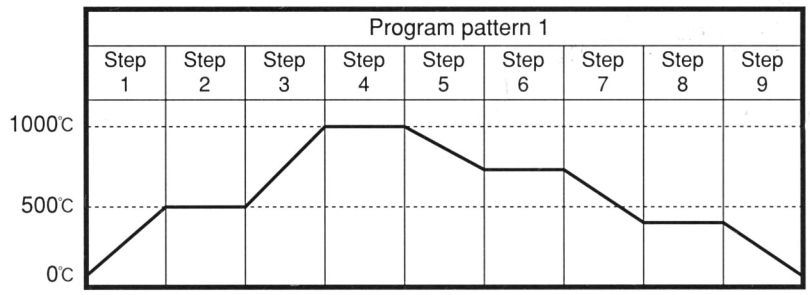
• Approvals

UL, cUL and CE Safety Approvals.

• Warranty

All units manufactured to strict ISO standards and offer full 3 year manufacturers warranty.

Program Pattern

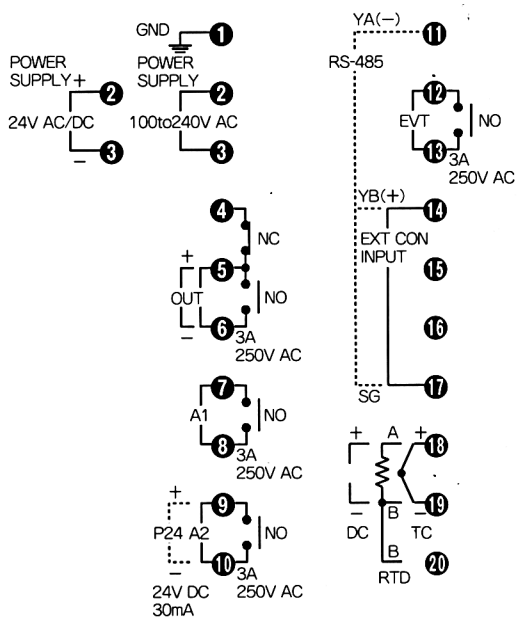


Input Range Table

	Input Type	Scale	
Thermocouple	K	-200 to 1370°C	-320 to 2500°F
		-199.9 to 400.0°C	-199.9 to 750.0°F
	J	-200 to 1000°C	-320 to 1800°F
	R	0 to 1760°C	0 to 3200°F
	S	0 to 1760°C	0 to 3200°F
	B	0 to 1820°C	0 to 3300°F
	E	-200 to 800°C	-320 to 1500°F
	T	-199.9 to 400.0°C	-199.9 to 750.0°F
	N	-200 to 1300°C	-320 to 2300°F
	PL-II	0 to 1390°C	0 to 2500°F
	C (W/Re5-26)	0 to 2315°C	0 to 4200°F
RTD	Pt100	-199.9 to 850.0°C	-199.9 to 999.9°F
		-200 to 850°C	-300 to 1500°F
DC	4 to 20mA DC 0 to 20mA DC 0 to 1V DC 0 to 10V DC 1 to 5V DC 0 to 5V DC	-1999.9 to 9999, -199.9 to 999.9 -19.99 to 99.99, -1.999 to 9.999	

• For DC current input a shunt resistor (50Ω) is provided as standard.

Terminal Wiring



All units feature a full 3 year warranty and lifetime technical support!

General Specifications

Display	PV.....Red 4-digit Character Size: 18.0 x 8.0 mm (H x W) SV.....Green 4-digit Character Size: 12.6 x 6.0 mm (H x W) PTN.....Green 1-digit Character Size: 12.6 x 6.0 mm (H x W) STEP.....Green 1-digit Character Size: 12.6 x 6.0 mm (H x W)
Input	Thermocouple ----- K, J, R, S, B, E, T, N, PL-II C (W/Re5-26) External resistance: 100Ω or less (However, for B input: 40Ω or less) RTD ---------- Pt100, 3-wire system (Allowable input wire resistance per wire: 10Ω or less) DC current ---------- 0 to 20mA DC, 4 to 20mA DC Input impedance: 50Ω (Connect shunt resistor 50Ω between input terminals.) Allowable input current: 50mA or less (When shunt resistor 50Ω is used.) DC voltage ---------- 0 to 1V DC Input impedance: 1MΩ or greater Allowable input voltage: 5V or less Allowable signal source resistance: 2kΩ or less 0 to 5V DC, 1 to 5V DC, 0 to 10V DC Input impedance: 100kΩ or greater Allowable input voltage: 15V or less Allowable signal source resistance: 100Ω or less Scale.....Refer to "Rated Scale" Resolution • Thermocouple, RTD (without decimal point----1°C (1°F) • Thermocouple, RTD (with decimal point)-------0.1°C (0.1°F) • DC current, DC voltage----------1
Accuracy (Setting • Indicating)	Thermocouple ---------- Within ±0.2% of each input span ±1 digit or ±2°C (4°F) whichever is greater However, R or S input 0 to 200°C (0 to 400°F): Within ±6°C (12°F) B input 0 to 300°C (0 to 600°F): Accuracy is not guaranteed. K, J, E and N input less than 0°C (32°F): Within ±0.4% of input span ±1 digit RTD ---------- Within ±0.1% of each input span ±1 digit or ±1°C (2°F) whichever is greater DC current and DC voltage ---- Within ±0.2% of each input span ± 1 digit
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 ∅=0.4), Electric life: 100,000 times • Non-contact voltage--12V DC Max. 40mA DC (Short-circuit protected) • DC current ----------4 to 20mA DC Load resistance: Max 550Ω
Control Action	Actions mentioned below can be selected by key operation. (Factory default set as PID) PID (with auto-tuning function), PI, PD (with manual Reset function), P (with manual reset function), ON/OFF Proportional band (P) --- Thermocouple: 0 to 1000°C (0 to 2000°F) (ON/OFF action when set to 0) RTD: 0.0 to 999.9°C (0 to 999.9°F) (ON/OFF action when set to 0.0) DC current and DC voltage: 0.0 to 100.0% (ON/OFF action when set to 0.0) 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 (DC current output type is not available.) ARW ---------- 0 to 100% Hysteresis ---------- Thermocouple and RTD: 0.1 to 100.0°C (F) DC current and DC voltage: 1 to 1000 (Decimal point place follows the selection) Output high limit, low limit ---------- 0 to 100% (For DC current output, -5 to 100%)
Alarm 1 (A1) Alarm 2 (A2)	Alarm action and Energized/De-energized can be selected by key operation. • Setting accuracy The same as the indicating accuracy. • Action ON/OFF action • Hysteresis Thermocouple and RTD: 0.1 to 100.0°C (°F) DC current and DC voltage: 1 to 1000 (The placement of the decimal point follows the selection) • Output Relay contact 3A 250V AC (Resistive load), Electric life: 100,000 times
Event Output (EVT)	One output can be selected from 3 outputs (Time signal output, Patten 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 ∅=0.4), Electric life: 100,000 times

Model Number Configuration

PCD-33A-___/M ___ ___

CONTROL OUTPUT	CODE
Relay Contact	R
SSR Driver	S
4-20mA	A

INPUT	CODE
True Multi-Input T/C, RTD. Voltage, Current	M

SUPPLY VOLTAGE	CODE
24V AC/DC	1
100 - 240V AC	-

OPTIONS	CODE
RS-485	C5
Setting Value Digital Transmission	SVTC
Transmission Power Supply 24 V DC	P24

When (option C5) or (option SVTC) is added, the external operation function is not available.
(Option C5) and (Option SVTC) cannot be added together.
When (Option P24) is added, Alarm 2 (A2) is not available.

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Options

Serial Communication (C5)

Each setting change, setting value reading and setting, etc. of PCD-33A can be operated from the external computer. (If option C% is added, external operation function is not available. The option SVTC and external operation cannot be applied together.

Communication interface	Based on EIA, RS-485
Data transfer rate	(2400/4800/9600/19200bps) Selectable by key operation
Communication protocol	Based on Shinko standard protocol or Modbus (Selectable by key operation) (When Modbus is selected, RTU mode or ASCII mode can be selected)
Number of connection units	A maximum of 31 units per host computer

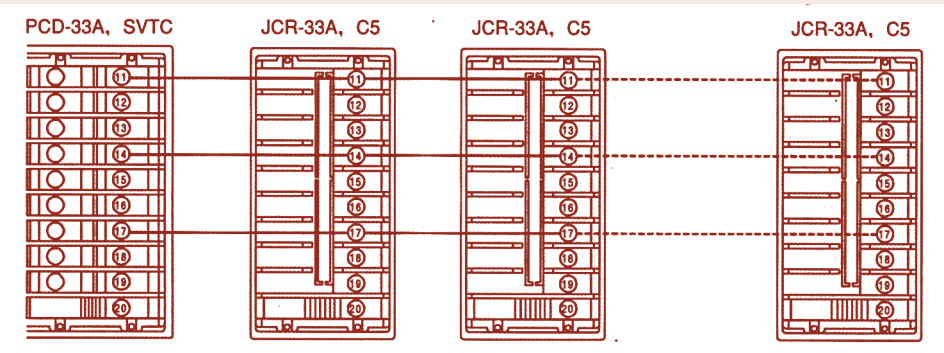
Data format

Communication protocol	Modbus ASCII Mode	Modbus RTU mode
Star bit	1	1
Data bit	7	8
Parity	Selectable (Even)	Selectable (Even)
Stop bit	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, 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 controller units with communication function (option C5) can be connected.



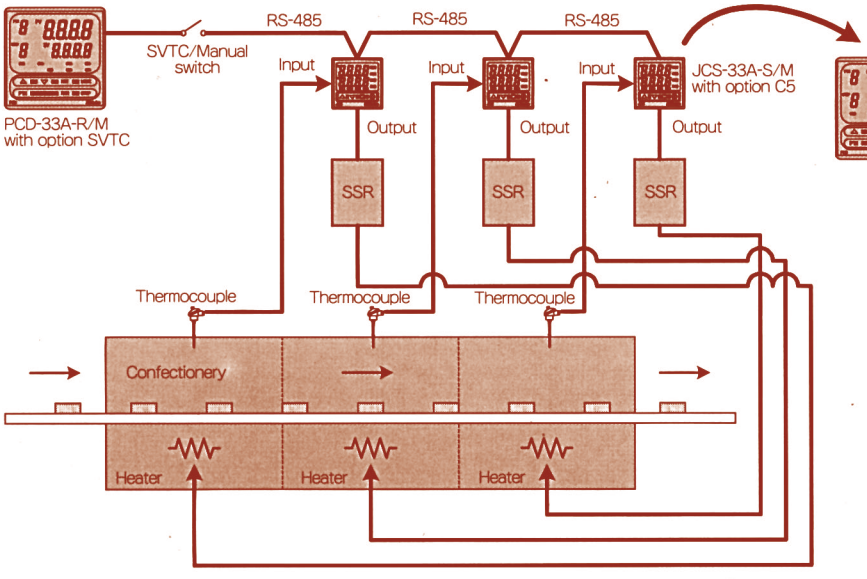
Setting value with digital reception (slave)
If Setting value digital reception (slave) is selected during Communication protocol selection, the setting value can be received from the PC-935/PCD-13A/PCD-33A (master) with Setting value digital transmission (option SVTC). (If the option SVTC is added, external operation function is not availabale, and option C5 and external operation funciton cannot be applied together.)

Transmitter Power Supply (P24)

Outputs 24V DC. This is used for the power of 2-wire tranmsitter such as 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

Application Example



Temperature control of tunnel kiln - This is an application that controls tunnel kiln temperatures showing master/slave control that JCD-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.

- cōnL Communication protocol selection
  (Selects with △ or ▽ key.)
  - noñL : Shinko protocol
  - MSr□ : Setting value digital transmission (master)
  - MSr r : Setting value digital reception (slave)
  - ñodA : Modbus ASCII protocol
  - ñodr : Modbus RTU protocol

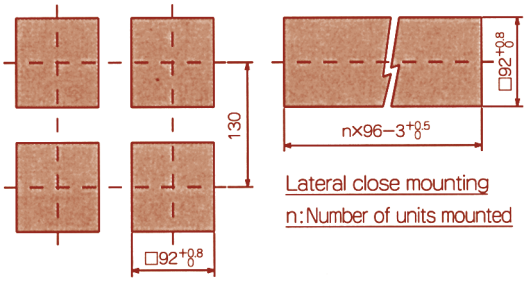
General Specifications

Mounting Method	Screw type mounting brackets
Setting Method	Sheet key input.
Material • Color	Material: Flame resistant resin. Color: Black
Supply Voltage	100 to 240V AC 50/60Hz, 24V AC/DC 50/60Hz Allowable voltage fluctuation: 85 to 264V AC, 20 to 28 AC/DC, Power consumption approximately 8VA
Environment	Ambient temperature: -10 to 50ºC Ambient humidity: 35 to 85%RH (No condensation)
ExternaDimension & Weight	96 x 96 x 98.5mm (W x H x D) Approx. 370g
Attached Function	Power failure countermeasures, Self diagnosis, automatic cold junction temperture compensation (only for thermocouple), Sensor burnout alarms, Input burnout

Program

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 100ºC)(ºF) ---- Thermocouple, RTD (without decimal point): ±(0.0 to 100.0ºC)(ºF) ---- 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 until selection (Hour:Minute or Minute:Second), Program control start type selection (PV start or SV start)
Program Time Range	0 to 99 hours and 59 minutes/stpe, or 0 to 99 minutes 59 seconds/step
Time Setting Accuracy	Within ±0.5% of setting time
Setting Resolution	Temperature: 1ºC (1ºF) or 0.1ºC (0.1ºF) 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

Panel Cutout



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Wiring Example