

# PD500

SuperNova PID Process & Temperature Controllers



PD530



PD520



PD510



## PID PROCESS & TEMPERATURE

- 1/16, 1/8 (V), and 1/4 DIN Auto-Tuning PID Process & Temperature Controllers
- Reverse Polarity Three-Color LCD: -1999 to 9999
- Thermocouple and RTD Inputs
- DC Voltage and Current Inputs (1-5 V, 0-5 V, 0-10 V, 0-50 mV, 0-100 mV; 4-20 mA with Resistor)
- 250 Ω Resistor(s) Included Standard
- High Accuracy Auto-Tuning PID
- High Durability IP65 Front with Hard Plastic Pushbuttons
- Large Easy to Read 14-Segment PV Display up to 1.1" (29 mm)
- Input Power 100-240 VAC
- Heating, Cooling, and Heating & Cooling Control
- Primary Control Output Options: 4-20 mA (SCR), Voltage Pulse (SSR), or Relay
- Secondary Control Output Relay Standard on All Models
- Easily Switch Between Auto and Manual Control Modes
- Up to 2 Alarm Relays & 4-20 mA Retransmit Outputs
- Remote Set Value 1-5 V Input Option (4-20 mA with External Resistor)
- Digital Input Set Value Selection
- RS-485 Serial Communications Option
- Modbus® RTU/ASCII Communications
- Mini-USB Port Standard
- FREE Programming and Monitoring Software
- Shallow Depth Case Extends Only 2.5" (63 mm) Behind Panel
- UL & C-UL Recognized Process Control Equipment, Electrical - Component



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# PD500 SuperNova PID Process & Temperature Controllers

## OVERVIEW

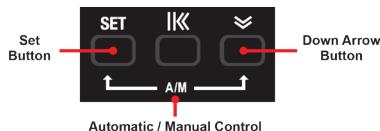
### The Only PID Process & Temperature Controller You Will Ever Need

The SuperNova PD500 Series of PID Process & Temperature Controllers are a complete line of PID and on/off controllers. Available in popular 1/4, 1/8 (V), and 1/16 DIN sizes, and with a shallow depth behind panel of only 2.5" (63 mm) they are easy to fit into almost any panel, product, or enclosure.

Voltage, current (with external resistor), and direct temperature thermocouple and RTD inputs make them an excellent choice for any control application requiring easy to change, visible set points.

This modern line of controllers shows the process variable (PV), set value (SV), and manipulated value (output level %, MV) on a striking reverse polarity LCD screen. The front panel has indicators for RUN, COM, OUT 1 & 2, REM, MANU, TUNE, and LOCK. Indicators for units (°C, °F, %, or none) can also be displayed.

Changing between auto and manual control modes is accomplished by holding two buttons that are labelled SET and . A graphic on the front panel indicates that these buttons control the Auto/Manual (A/M) function:



The main control outputs can be a 4-20 mA (SCR), voltage pulse (SSR), or relay output. A secondary control output relay is standard, which allows for one or two direction SV control (i.e., heating and cooling).

Two alarm relays increase the utility of the SuperNova controller. The relays can be used for alarm or simple control applications. The alarms may relate directly to the process variable, or be based on deviation from the current set value.

A 4-20 mA retransmit option is available to retransmit the process variable, set value, or output level. This is especially useful for temperature inputs like thermocouples and RTDs.

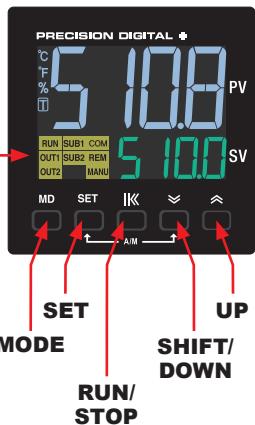
Other options include a secondary 4-20 mA input to remotely control the set value, and RS-485 for Modbus communication.

A mini-USB port may be used for a direct PC connection to run the SuperNova software for monitoring, programming, and data logging. This USB port is located on the rear behind the panel for PD510 1/16 DIN models, and on the front behind an IP65 rubber tab on PD520 and PD530 1/8 and 1/4 DIN models.

## Front Panel Buttons and Status Indicators

### STATUS INDICATORS

**RUN:** RUN or STOP status. Turns on during control.  
**OUT1:** Control output 1 status. Blinks proportionally for 0-100% output.  
**OUT2:** Control output 2 status. Blinks proportionally for 0-100% output.  
**SUB1:** Sub output 1 status. Turns on when sub output 1 is on.  
**SUB2:** Sub output 2 status. Turns on when sub output 2 is on.  
**COM:** Communications status. Blinks during active serial communications.  
**REM:** Remote input status. Turns on when remote input is active.  
**MANU:** Manual control mode status. Turns on when manual output is on.  
**TUNE (T):** Auto-tuning status. Blinks during the auto-tuning process.  
**LOCK:** Lock setting status. Turns on when lock is set.



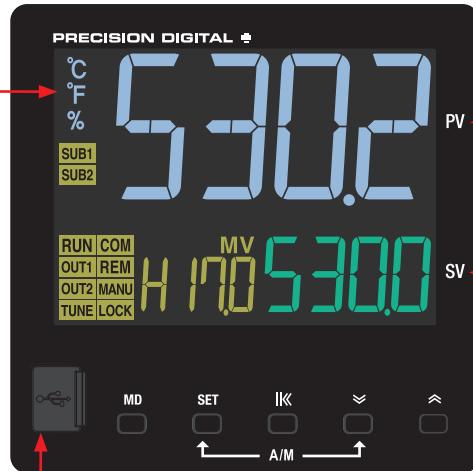
**USB PORT**  
The USB port for the PD510 is located on the top of the unit.

### MANIPULATED/OUTPUT VALUE

Control output value in operating mode.

### UNIT

Displays °C, °F, %, or no unit depending on set value unit.



**SET VALUE OR OUTPUT VALUE**  
Displays SV or control output value in operating mode, displays parameter set value in menu mode.

**PROCESS VALUE**  
Displays PV value in operating mode, displays parameter name in menu mode.

# PD500 SuperNova PID Process & Temperature Controllers

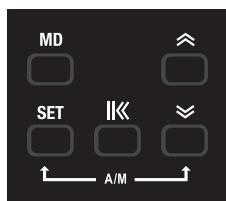
## EASY TO READ & OPERATE

The SuperNova PD510 digital controller has two lines with four-digits each of white & green reverse polarity LCD digits and the PD520 and PD530 have three lines with four-digits each of white, green, & amber reverse polarity LCD digits. All can display commonly used setup parameters defined by the user.

## Operating Displays & Function Keys

### Information-Packed Display

- PV line displays process variable
- SV line displays set value (or selectable for output value on a PD510).
- MV line displays the manipulated value, or the output value as a %. H (heating) and C (cooling) indicated when enabled.



### Function Keys

- Hold **Shift** for two seconds to toggle Run and Stop modes.
- Use **SET** to change the set value.
- Hold **SET** and **DOWN** for three seconds to toggle Automatic and Manual modes.
- Press **UP** or **DOWN** to acknowledge a latching alarm.
- Hold **SET** and **Shift** for three seconds to Lock/Unlock the unit.

## QUICK SETUP & PROGRAMMING

Setup and programming are done through the front panel buttons or using SuperNova TCS software.

After power and input signal connections have been completed and verified, apply power to the controller. There are no jumpers to set for the controller input selection.

## SuperNova TCS Software



The SuperNova line of controllers includes the FREE SuperNova TCS monitoring and programming software.

The easiest and quickest way to connect to the SuperNova TCS software is to use the on-board mini-USB port available on all SuperNova controllers.

This software can be used for monitoring, data logging, programming, and troubleshooting SuperNova controllers. See [page 7](#) for more details.

## Setup Group Menus

For easy setup parameter navigation, all parameters are grouped by category. To access the group menus, press and hold the **Mode (MD)** button for one second. Navigate through the group menus using the **UP** or **DOWN** arrow buttons. To enter a Group or change a parameter, press **SET**.

Group Display	Group Name	General Description
GSV	Set Value Group	Select active Set Values and Set Value limits.
GIN	Input Group	Configure input type and display scaling.
GOUT	Output Group	Configure control outputs.
GSET	Settings Group	Activate digital inputs and view system information.
GCOM	Comm Group	Configure Modbus RS-485 parameters.
GSUB	Sub Group	Assign alarm relays, set delays and relay operation.
GTRX	Transmit Group	Configure retransmit output and remote SV input.
GALM	Alarm Group	Configure alarm types and related parameters.
GCTL	Control Group	Configure for auto-tuning, PID zones, and SV ramps.

## Front Panel Buttons

- Press and hold the **Mode (MD)** button for one second to enter Programming Mode then press the **Down (or Up)** arrow button to scroll through the programming groups.
- Hold the **Mode (MD)** button at any time to exit and return to Run Mode. Changes made to settings prior to pressing **SET** are not saved.
- To enter a Group or change a parameter, press **SET**.
- Press the **Down (or Up)** arrow button to scroll through individual parameters within a Group.
- Press the **Mode (MD)** button when navigating parameters to return to the group menu.
- Changes to the settings are saved to memory only after pressing **SET**.
- The display moves to the next menu every time a setting is accepted by pressing **SET**.

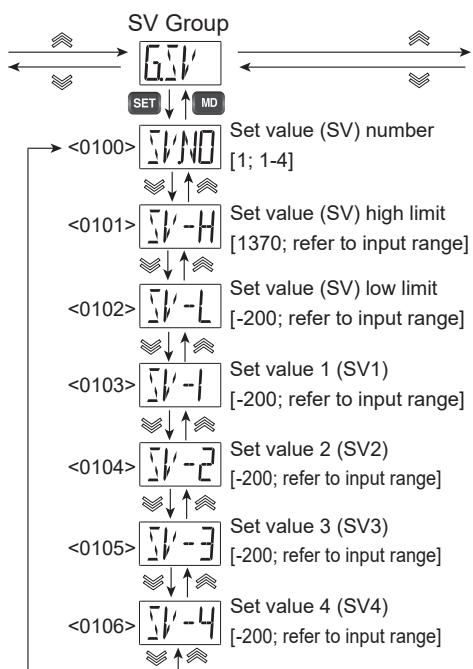
# PD500 SuperNova PID Process & Temperature Controllers

## Setup Parameter Lock

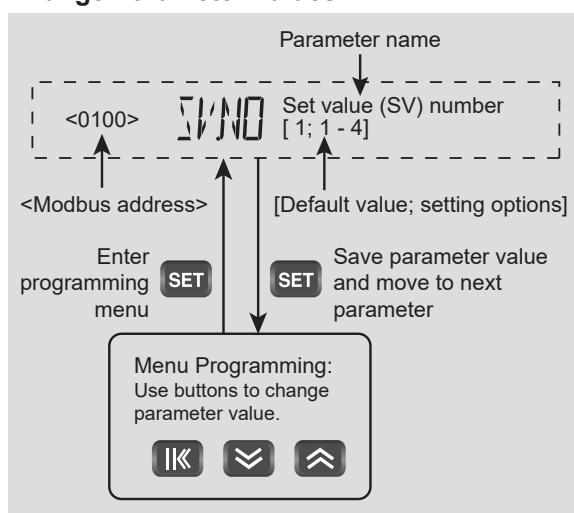
To prevent unauthorized changes to key parameters with pushbuttons or software, a user may lock the settings. Two levels of lock exist. Lock setting 1 locks all parameters except LOCK and the G.SV group to allow set value changes. Lock setting 2 locks all parameters except the LOCK parameter. To unlock the controller, an operator must change the LOCK parameter to off (0) with pushbuttons or software.

## Easy to Use Menu Structure

Each parameter is located in an associated menu group.



## How to Read Parameters and How To Change Parameter Values



For a complete list of setup parameters, their functions, and setting options, refer to the PD500 Series Instruction Manual

## PROCESS & TEMPERATURE INPUTS

SuperNova Controllers use a single universal input that accepts process and temperature inputs.

**Thermocouple:** K, J, E, T, R, B, S, L, N, U, W, PLII

**RTD:** JPT100, PT100

**Process:** 1-5 V (4-20 mA), 0-5 V, 0-10 V, 0-50 mV, 0-100 mV

External 250 Ω resistor required to read 4-20 mA.

Recommended accessory PDX-RES2.

## VERSATILE OPERATION

Powerful standard and optional features such as universal inputs, current 4-20 mA (SCR), voltage pulse (SSR), or relay control outputs, two alarm relays, two digital inputs, serial communications, and remote setpoint control make the SuperNova an excellent choice for any process or temperature control application requiring easy to change, visible set points.

## Main Control & Secondary Outputs

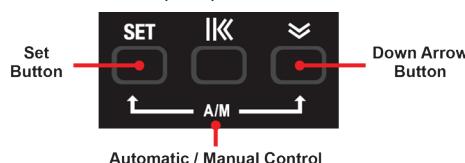
The main control output can be a 4-20 mA (SCR), voltage pulse (SSR), or relay output. A secondary relay control output is standard, which allow for one or two direction SV control (i.e., heating and cooling).

## Mini-USB Port for SuperNova Software

A mini-USB port may be used for a direct PC connection to run the SuperNova software for monitoring, programming, and data logging. This USB port is located behind the panel on the top of the controller for PD510 1/16 DIN models, and on the front behind an IP65 rubber tab on PD520 and PD530 1/8 and 1/4 DIN models.

## Easy Auto/Manual Control Mode Switching

Changing between auto and manual control modes is accomplished by holding two buttons that are labelled SET and . A graphic on the front panel indicates that these buttons control the Auto/Manual (A/M) function:



## Programmable Alarm Relays

All PD500 Series controllers have two SPST alarm relays. These alarm relays can be used for a variety of alarm and control functions and include a number of useful features.

- On/Off Control
- High/Low Alarms
- Set Point Deviation Alarms
- Loop Break Alarm
- Latching or Automatic Reset
- Fail-Safe and Standby Alarms
- Alarm Delays and Wide Deadbands

## Analog Retransmit Output

An optional 4-20 mA retransmitting output is available on all sizes of SuperNova Controllers.

This is especially useful when using a temperature input, to provide a 4-20 mA signal to the control room or other equipment.

- 4-20 mA Retransmitting Output
- Retransmit Based on PV, SV, or MV

## Auto-Tuning PID

A high accuracy auto-tuning function calculates the PID values for your system with the push of a button, eliminating the need for complex PID calculations and time consuming setup. After several on/off cycles, the PID values will be setup automatically.

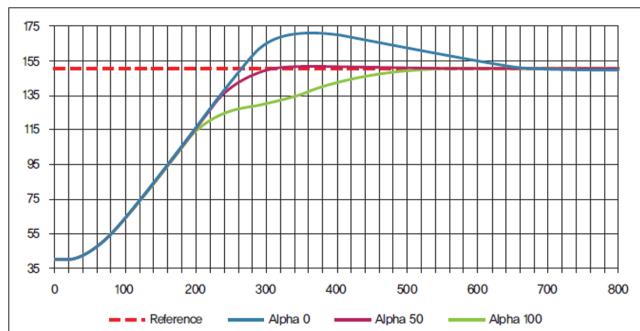
## Simple PID Response Adjustment

The Alpha parameter allows for easily adjusting the system response without the need to change P, I, or D values.

The ALPHA parameter is used to adjust the response characteristics to the set value (SV) changes.

If ALPHA is set to 0%, it is the same as the normal PID control response.

If ALPHA is set to 100%, it may take a long time to reach a normal state, but overshoot and undershoot will be minimized.



## Set Value Ramp Up/Down

When the ramp functions are used, the set value (SV) changes over time to reach a newly selected set value. When ramp functions are not used, a newly selected SV immediately becomes the active SV.

This is useful to prevent overshoot and protect equipment from rapidly changing output values as set points are changed.

## Digital Input Set Point Selection

Two digital inputs can be added as an optional feature. Digital inputs are active with dry contacts or low logic levels. The configuration of the two inputs can select which set point to use (SV1, SV4, or remote) and select run and stop modes.

Function		DI 1	DI 2
R/S	STOP	0	-
	RUN	1	-
SV	SV1	-	0
	SV4 or REM	-	1

Normally open switches (external excitation not required) or open collector transistor contacts may be used to operate the digital inputs.

## Serial Communications & Adapters

SuperNova controllers with the serial communications option include RS-485 serial communications for Modbus.

The SuperNova Controllers are Modbus server (slave) devices. Process control information can be read from the units, and setting parameters can be read or written to the controllers.

The PDA7485 RS-232 to RS-485 and PDA8485 USB to RS-485 converters are available for use with the SuperNova TCS software or other PC applications. They are especially useful with Modbus communications packages, so multiple controllers on the RS-485 bus may be accessed by computers without RS-485 communications ability.



PDA7485  
PDA8485

# PD500 SuperNova PID Process & Temperature Controllers

## SUPERNOVA TCS SOFTWARE



The SuperNova line of controllers includes the FREE SuperNova TCS monitoring and programming software. The easiest and quickest way to connect to the SuperNova TCS software is to use the on-board mini-USB port available on all SuperNova controllers.

This software can be used for monitoring, data logging, programming, and troubleshooting SuperNova controllers. SuperNova TCS software can connect to a maximum of 31 units when using the RS-485 communications option. A single unit can be connected via the USB connection.

- Easy to Set Up and Use
- Connect up to 31 SuperNova Controllers
- View PV, SV, MV, and Alarm Status Simultaneously
- Control Set Points
- Save Configurations
- Log, View, and Save Data in Spreadsheet Files
- Free Download from [www.predig.com](http://www.predig.com)

## Specifications

**Availability:** Download directly from [www.predig.com/download\\_software](http://www.predig.com/download_software)

**Operating System Requirements:** Microsoft® Windows® 7/8/10 64-bit (x64) or 32-bit (x86)

**Minimum Hardware Requirements:** Pentium 1 GHz, 512 MB RAM, 1 GB available hard drive space (x86), 2 GB available hard drive space (x64)

**Communications:** USB 2.0 (single controller only) (Standard USB A to Mini-B USB)

RS-232 to RS-485 converter or USB to RS-485 converter (programming, monitoring, and data logging of multiple units)

**Configuration:** Configure parameters of all connected controllers.

**Data Log:** Data log onto computer hard drive. Data log files may be exported to HTML, .xls, .xlsx, or .pdf format as graphs or data tables. Graphs may also be exported as .bmp, .gif, .jpeg, or .png. Data tables may also be exported as .csv.

**USB Powered:** USB port provides power to the controller for programming. Apply normal power for general controller operations.

## Remote Programming

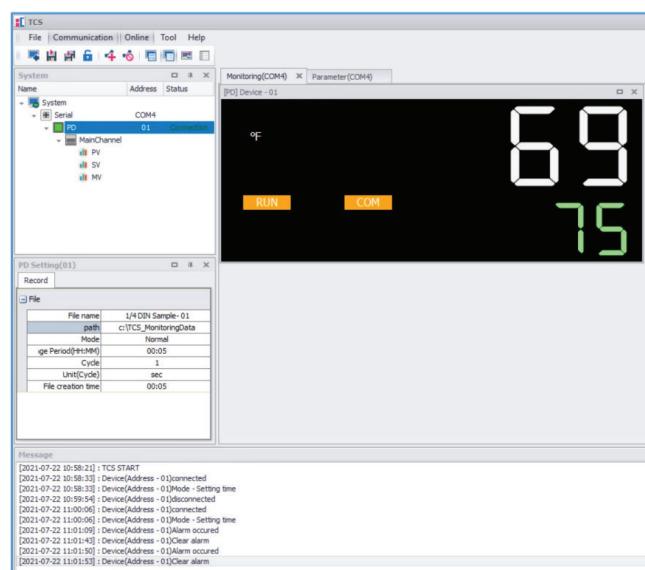
SuperNova TCS software allows all setup parameters to be programmed remotely from a PC and saved to a file for reporting or programming other controllers.

## Data Acquisition

SuperNova TCS software provides a convenient way to collect the data from the SuperNova controller. The user can select the logging time interval. Data can be written to a file, which can then be imported into a spreadsheet or other application or viewed in the SuperNova TCS software.

## Monitoring

SuperNova TCS software can be used to monitor up to 31 SuperNova controllers on a PC. The screenshot below shows SuperNova TCS software monitoring a single SuperNova controller.



## Monitoring with RS-485 Connection

SuperNova TCS software may be connected directly to the controller using the on-board USB connector. However, if used in the application, it may be convenient to use the RS-485 connection to connect to a computer. This method is also required when monitoring multiple SuperNova controllers.

To connect the SuperNova controllers with the RS-485 option to a computer, the PDA8485 USB to RS-485 Isolated Converter is recommended.

One PDA8485-I may support all SuperNova controllers, up to 31 units, connected.



Refer to the PD500 Series Instruction Manual for installation and programming for the SuperNova TCS Software.

# PD500 SuperNova PID Process & Temperature Controllers

## NEMA 4 & 4X FIELD ENCLOSURES

Precision Digital offers a variety of rugged enclosures that provide a high degree of protection against harsh operating environments. These enclosures are available in thermoplastic, stainless steel (NEMA 4X), and painted steel (NEMA 4). In addition, Precision Digital offers a Light / Horn that can be mounted to most of these enclosures to provide visual and audible indication of alarms. Many enclosures also have sufficient space to house Precision Digital's model PDA1024-01 24 V power supply, signal splitters/isolators/conditioners, and other devices.



Need help selecting  
the right enclosure?  
[www.predig.com/esu](http://www.predig.com/esu)

## Plastic Enclosures (Externally Mounted)

### PDA2300 Series (Covers with Hinge & Latch)

This is Precision Digital's most economical line of enclosures for the SuperNova. The controller mounts through a hinged cover with a stainless steel latch allowing for easy access to the controller wiring. Enclosures are available for (1-2) PD510, (1-6) PD520, or (1-2) PD530 SuperNovas. The enclosure is large enough to mount the PDA1024-01 DIN rail mounted 24 V transmitter supply.



PDA2301-4 with One  
PD530 (1/4 DIN)



PDA2301-16 with One  
PD510 (1/16 DIN)



PDA2301-V with One PD520 (1/8 DIN)  
and PDA1024-1 Power Supply

### PDA2800 Series (Covers with screws)

This is Precision Digital's low cost NEMA 4X plastic line of enclosures for the SuperNova. The controller mounts through the front cover with four screws. Enclosures are available for (1-4) PD510, (1-2) PD520, or (1) PD530 SuperNovas.



PDA2812-V with Two  
PD520s (1/8 DIN)



PDA2801-V with One  
PD520 (1/8 DIN)

## Plastic Enclosures (Internally Mounted)

### PDA3400 Series (Covers with screws)

The PDA3400 Series enclosures for the SuperNova fully cover the controller. The controller is fully housed inside the enclosure behind a clear plastic cover with four screws. The controller mounts in an internal sub-panel.



PDA3408 with One PD530 (1/4 DIN)

See Ordering Guide on [page 16](#) for complete listing  
or call factory for custom enclosure.

## ENCLOSURES CONTINUED

### Stainless Steel Enclosures (Externally Mounted)

#### PDA2600 Series (Covers with Hinge & Latch)

This is Precision Digital's stainless steel line of enclosures for the SuperNova. The controller mounts through a hinged cover with a SS latch allowing for easy access to controller wiring. Enclosures are available for (1-6) PD520 SuperNovas.



PDA2606-V with Six  
PD520s (1/8 DIN)



PDA2601-V with One  
PD520 (1/8 DIN)

### Steel Enclosures (Externally Mounted)

#### PDA2700 Series (Covers with Hinge & Latch)

This is Precision Digital's painted steel line of enclosures for the SuperNova. The controller mounts through a hinged cover with a latch allowing for easy access to controller wiring. Enclosures are available for (1-6) PD520 SuperNovas.



PDA2706-V with Six  
PD520s (1/8 DIN)

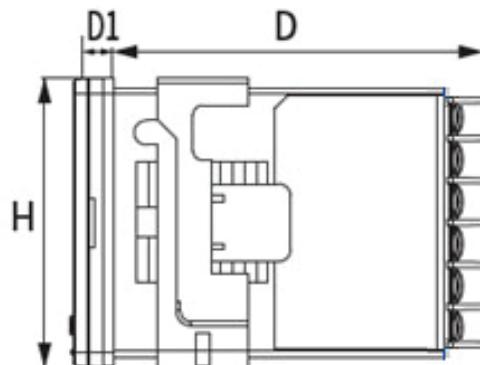
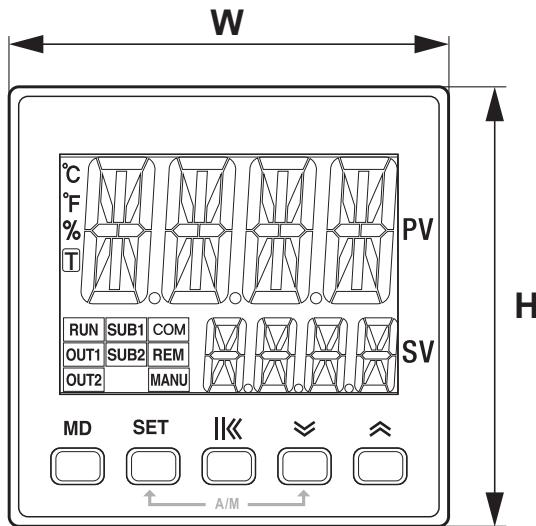


PDA2701-V with One  
PD520 (1/8 DIN)

See Ordering Guide on [page 16](#) for complete listing  
or call factory for custom enclosure.

# PD500 SuperNova PID Process & Temperature Controllers

## DIMENSIONS



Controller Dimensions			
Dimension	PD510	PD520	PD530
W	1.9 (48.0)	1.9 (48.0)	3.8 (96.0)
H	1.9 (48.0)	3.8 (96.0)	3.8 (96.0)
D	2.5 (63.0)	2.5 (63.0)	2.5 (63.0)
D1	0.2 (5.0)	0.2 (5.0)	0.2 (5.0)

## Panel Mounting

- Prepare the appropriate standard DIN panel cutout. Refer to Figure 3. Panel Cutout Dimensions below for more details.
- Clearance: allow at least 3.5" (88.4 mm) behind the panel for wiring.
- Panel thickness: 0.04" - 0.28" (1.0 mm - 7.0 mm).
- Remove the mounting bracket(s) provided with the controller.
- Insert controller into the panel cutout.
- Install mounting bracket(s) and tighten the screws against the panel. To achieve a proper seal, tighten the mounting bracket screws evenly until controller is snug to the panel. DO NOT OVER TIGHTEN, as the rear of the panel may be damaged. See Figure 1 and Figure 2.

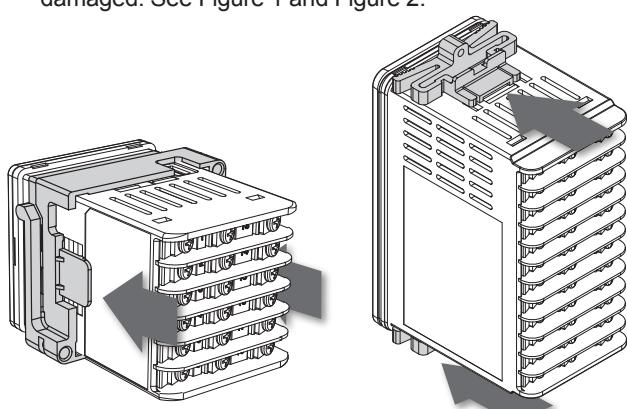
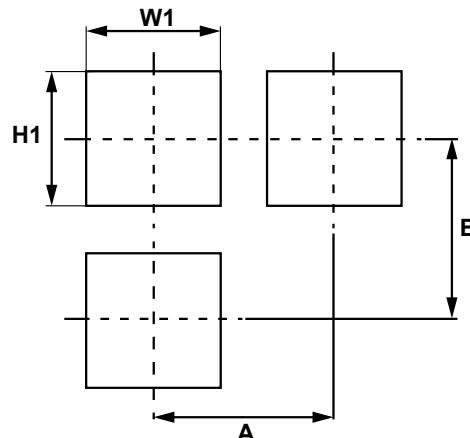


Figure 1. PD510 Mounting Bracket Installation

Figure 2. PD520 & PD530 Mounting Bracket Installation



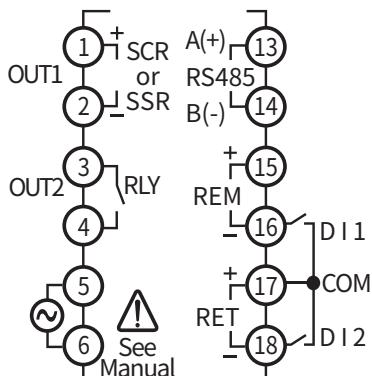
Panel Cutout			
Dimension	PD510	PD520	PD530
W1	1.8 (45)	1.8 (45)	3.7 (93)
H1	1.8 (45)	3.7 (93)	3.7 (93)
A	2.4 (60)	2.7 (70)	4.6 (117)
B	2.4 (60) <sup>2</sup>	4.8 (122)	4.6 (117)

1. +0.5 mm tolerance applied.
2. Allow 3.9 in (100.0 mm) above controller for use of a USB cable with PD510.

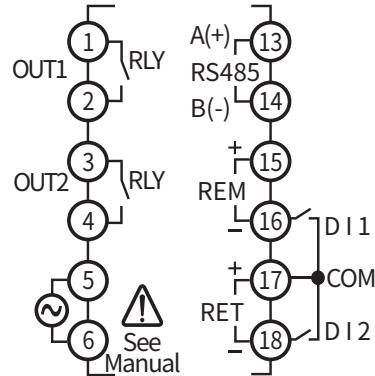
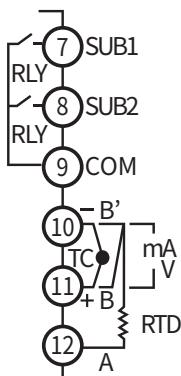
Figure 3. Panel Cutout Dimensions

## CONNECTIONS

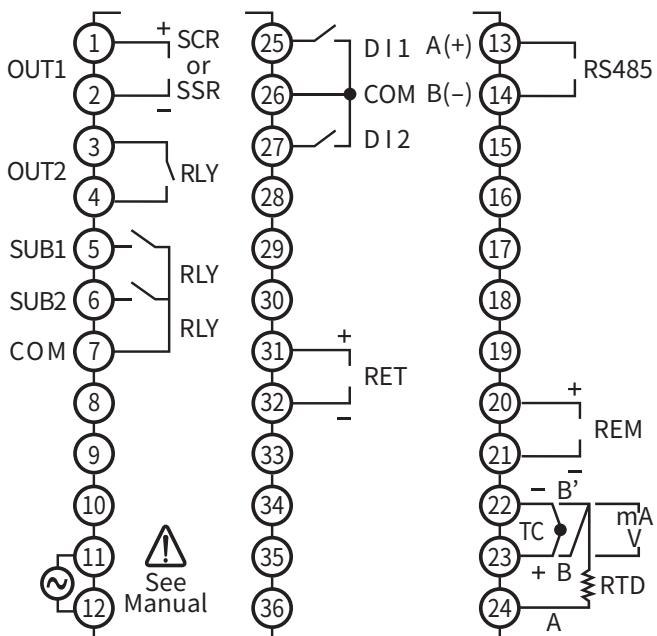
**PD510-A or -S (1/16 DIN)**



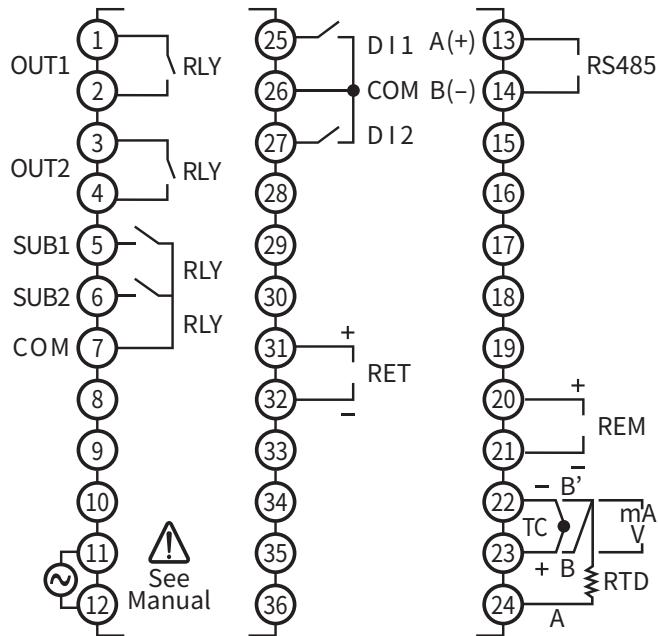
**PD510-R (1/16 DIN)**



**PD520-A or -S (1/8 DIN)**

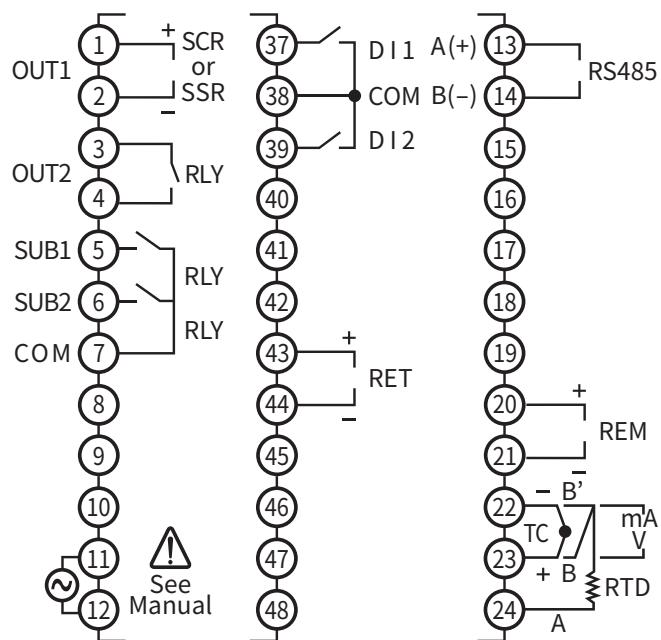


**PD520-R (1/8 DIN)**

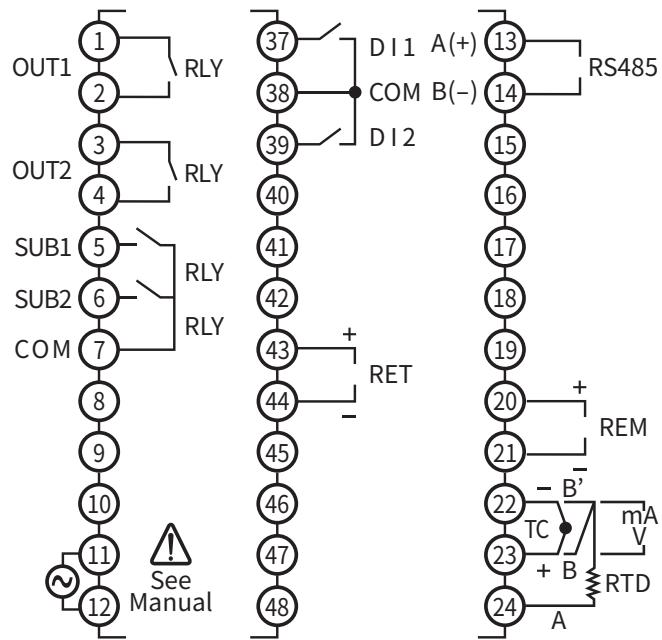


# PD500 SuperNova PID Process & Temperature Controllers

**PD530-A or -S (1/4 DIN)**



**PD530-R (1/4 DIN)**



## SPECIFICATIONS

Except where noted all specifications apply to operation at +25°C.

### General

**Display:** Wide viewing angle reverse polarity

LCD; PV: white, SV: green, MV: amber

PD510: PV and SV display

PD520: PV, SV, and MV display

PD530: PV, SV, and MV display

**Display Height:** inches (mm)

	PV	SV	MV
PD510	0.60 (15.2)	0.29 (7.4)	N/A
PD520	0.81 (20.5)	0.50 (12.8)	0.37 (9.3)
PD530	1.14 (29.0)	0.59 (15.0)	0.43 (11.0)

**PV Display Update Rate:** 4/second (250 ms)

**Non-Volatile Memory:** Settings stored for a minimum of 10 years.

EEPROM life: 1 million writes

**Included Components:** Controller with rubber gasket and mounting bracket, 250 Ω resistor (1%), and Quick Start Guide.

Additional 250 Ω resistor (1%) provided for models with remote setpoint input option.

**EEPROM Lock:** Programmable lock or unlock write access to the EEPROM. When locked, setting changes stored in RAM (not saved on power down).

**Power:** 100 - 240 VAC ±10%, 50 / 60 Hz, 8.5 VA max.

**Insulation Resistance:** 20 MΩ minimum, 500 VDC

**Dielectric Strength:** 3,000 VAC; 50/60 Hz for 1 minute across power terminals

### Environmental:

Operating temperature range: -10 to 50°C (14 to 122°F)

Storage temperature range: -25 to 65°C (-40 to 185°F)

Relative humidity: 35 to 85% non-condensing

**Front Panel:** IP65

**Depth Behind Panel:** Case extends 2.5 in (63 mm) behind panel.

**Required Fuse:** UL Recognized, 250 VAC 0.5 A max, slow-blow fuse. Use fuses or circuit breakers compliant with IEC60947-1 or IEC60947-3

**Connections:** Fixed rear screw terminals and mini-USB

**Mounting:** 1/16, 1/8, or 1/4 DIN panel cutout required: panel mounting bracket assemblies are provided.

**Weight:** PD510: 4.2 oz (120 g)

PD520: 7.1 oz (202 g)

PD530: 10.2 oz (290 g)

**Warranty:** 1 year parts & labor. See Warranty Information and Terms & Conditions on [www.predig.com](http://www.predig.com) for complete details.

## Process Inputs

**Process Input Selection:** Voltage or current (with included external resistor)

**Process Input:** 1-5 V (4-20 mA), 0-5 V, 0-10 V, 0-50 mV, 0-100 mV External 250 Ω resistor required to read 4-20 mA. Recommended accessory PDX-RES2.

**Decimal Point:** Up to 3 decimals.

**Input Sampling:** 20 samples/sec (50 ms per sample). For display update rate, see *Display Update Rate*

**Input Accuracy:**

Input Type	Prog. No.	Display	Scale Range	Accuracy
4-20 mA*	30	1-5	-1999 to 9999	±0.2% of FS ± 1 digit
1-5 V	30	1-5		
0-5 V	31	5V		
0-10 V	32	10V		
0-50 mV	33	0.05V		
0-100 mV	34	0.1V		

\*To achieve the highest accuracy with a 4-20 mA input to the controller, connect a 250 Ω (0.1% or higher precision) resistor across the input terminals. The 250 Ω (1%) resistor included with the product is not a precision resistor. For precision resistor, order PDX-RES2.

# PD500 SuperNova PID Process & Temperature Controllers

## Temperature Inputs

**Temperature Input Selection:** Field programmable for thermocouple or RTD

**Thermocouple Type:** K, J, E, T, R, B, S, L, N, U, W, PLII

**RTD Type:** JPT100, PT100

**Cold Junction Compensation:** (RJC)  $\pm 1.5^\circ\text{C}$  (-10 to 50°C)

**RTD Max Line Resistance:** Three wire RTD with identical line resistance up to 10  $\Omega$

**Input Sampling:** 20 samples/sec (50 ms per sample). For display update rate, see *Display Update Rate*

**Input Accuracy:**

Input Type	Prog. No.	Display	Scale Range	Accuracy
K	1	K0	-328 to 2498°F -200 to 1370°C	$\pm 0.2\%$ of FS $\pm 1$ digit
	2	K1	-148 to 932°F -100.0 to 500.0°C	
J	3	J0	-328 to 2192°F -200 to 1200°C	$\pm 0.2\%$ of FS $\pm 1$ digit
	4	J1	-328 to 1652°F -199. To 900.0°C	
E	5	E1	-328 to 1652°F -199.9 to 900.0°C	
T	6	T1	-328 to 752°F -199.9 to 400.0°C	
R	7	R0	32 to 3092°F 0 to 1700°C	
B	8	B0	212 to 3272°F 100 to 1800°C	$\pm 0.2\%$ of FS $\pm 1$ digit 100 to 200°C: $\pm 2.0\%$ of FS $\pm 1$ digit
S	9	S0	32 to 3092°F 0 to 1700°C	$\pm 0.2\%$ of FS $\pm 1$ digit
L	10	L1	-328 to 1652°F -199.9 to 900.0°C	
N	11	N0	-328 to 2372°F -200 to 1300°C	
U	12	U1	-328 to 752°F -199.9 to 400.0°C	
W	13	W0	32 to 4172°F 0 to 2300°C	
PLII	14	PL0	32 to 2372°F 0 to 1300°C	
JPt100	20	JPt0	-328 to 932°F -200 to 500°C	$\pm 0.2\%$ of FS $\pm 1$ digit
	21	JPt1	-328 to 932°F -199.9 to 500.0°C	
Pt100	22	Pt0	-328 to 1184°F -200 to 640°C	$\pm 0.2\%$ of full scale $\pm 1$ digit
	23	Pt1	-328 to 1184°F -199.9 to 640.0°C	

## Control Outputs

**Control Outputs:** Each controller has a main control output and a secondary control relay output for two directions of control. The secondary control relay output is always used for On/Off operation.

**Main Control Output:** 4-20 mA output (SCR), voltage pulse (SSR), or electromechanical relay (On/Off) outputs available.

**Control Type:** ON/OFF, PID control

**Output Operation:** Programmable for reverse or direct action.

**Current SCR Output:** 4-20 mA linear current output

Load resistance: 600  $\Omega$  maximum

$\pm 0.2\%$  of FS  $\pm 1$  digit

**Voltage Pulse SSR Output:** 12 V  $\pm 1$  VDC

Load resistance: 600  $\Omega$  minimum

Recommended minimum cycle time: 1 sec

**Relay Output:** Rated resistive load switching capacity:

5 A, 250 VAC; 5 A, 30 VDC

Max switching power: 750 VA, 90 W

Max switching voltage: 250 VAC, 110 VDC

Max switching current: 5 A

Mechanical life: 20 million cycles (at 180 CPM)

Recommended minimum cycle time: 20 sec

## Alarm Relay Outputs

**Function:** Programmable for 13 different alarm types or off.

**Number:** Two alarm relays standard on all models.

**Alarm Relay Ratings:** Rated resistive load switching capacity:

5 A, 250 VAC; 5 A, 30 VDC

**Deadband:** 0-100% FS, user selectable

**High or Low Alarm:** User may program any alarm for high, low, or high-low range operation.

**Absolute or Deviation Alarm:** User may program any alarm as an absolute value alarm or a set value deviation alarm.

**Loop Break Alarm:** User may program any SUB alarm relay as a loop break alarm.

**Alarm Relay Operation:**

- Automatic (non-latching) and/or manual reset
- Latching (requires manual acknowledge) with/without clear
- Off (disable unused relays)

**Relay Reset (Acknowledge):** Automatic, front panel button, in setup parameter menu, or through serial communications.

**Time Delay:** 0 to 999 seconds, on and off delays; programmable for each SUB relay.

**Fail-Safe Operation:** Programmable, independent for each alarm relay. Relay coils are energized in non-alarm condition. In case of power failure, relays will go to alarm state.

**Standby Operation:** Programming, independent for each alarm relay

**Auto Initialization:** When power is applied to the controller, relays will reflect the state of the input to the controller unless standby mode is enabled.

## 4-20 mA Retransmit Output

**Function:** 4-20 mA linear current output

**Scaling Range:** 0-100% of full scale

**Output Loop Resistance:** 600  $\Omega$  maximum load

**Output Accuracy:**  $\pm 0.2\%$  of full scale  $\pm 1$  digit

**0-10 VDC Output:** The PD659-1MA-1V can convert the optional 4-20 mA output to a 0-10 VDC output

## Remote SV Process Input

**Function:** Process input to remotely change SV

**Input Type & Range:** 1-5 V, 4-20 mA

External 250  $\Omega$  resistor required to read 4-20 mA.

**Input Accuracy:**  $\pm 0.2\%$  of full scale  $\pm 1$  digit

# PD500 SuperNova PID Process & Temperature Controllers

## USB Connection

**Function:** SuperNova software connection only  
**Location:** PD510: Top, behind panel  
PD520 & PD530: Front mounted behind rubber seal, accessible from front panel  
**Communication:** UMS (USB Mass Storage) 2.0  
**Compatibility:** USB 2.0 Standard, Compliant  
**Connector Type:** Mini-USB receptacle  
**Cable:** USB A Male to Mini-USB Cable  
**Protocol:** Protocol: PC-LINK  
Baud rate: 38400 bps  
Start bit: 1 bit  
Data bits: 8 bits  
Parity bit: None  
Stop bit: 1 bit  
**Communication Distance:** 16.4 ft (5 m) maximum

## Digital Inputs

**Function:** Digital Input 1: Select Run/Stop Mode  
Digital Input 2: Select SV 1 or SV4/REM  
**Contacts:** DI1 and DI2, shared common  
**Logic Levels:** On: 1.5 V; Off: 0.1 V  
**Input Current:** Approximately 2 mA each contact  
**Input Impedance:** On: 1 kΩ max, Off: 100 kΩ min.  
**Open Contact Voltage:** Open contact voltage approximately 5 VDC

## Modbus® RTU Serial Communications

**Communication Method:** EIA RS-485 standard, 2-wire half-duplex with grounded, shielded cable  
**Slave Id:** 1 – 99 (Controller address); 31 maximum bus connections  
**Max Range:** 3,937 ft (1.2 km)  
**Baud Rate:** Programmable for 4800, 9600, 14400, 19200, 38400, 57600 bps.  
**Start Bit:** 1 bit  
**Data Bits:** Programmable for 7 or 8 bits  
**Parity:** Programmable for none, even, or odd.  
**Stop Bit:** Programmable for 1 or 2 bits  
**Protocol:** PC-LINK STD, PC-LINK SUM, MODBUS-ASCII, MODBUS-RTU  
**Response Time:** Actual response time = processing time + (response time x 50 ms)

## SuperNova TCS Software

**Availability:** Download directly from [www.predig.com/download\\_software](http://www.predig.com/download_software)  
**Operating System Requirements:** Microsoft® Windows® 7/8/10 64-bit (x64) or 32-bit (x86)  
**Minimum Hardware Requirements:** Pentium 1 GHz  
512 MB RAM  
1 GB available hard drive space (x86)  
2 GB available hard drive space (x64)  
**Communications:** USB 2.0 (single controller only)  
(Standard USB A to Mini-B USB)  
RS-232 to RS-485 converter or USB to RS-485 converter  
(programming, monitoring, and data logging of multiple units)  
**Configuration:** Configure parameters of all connected controllers.  
**Data Log:** Data log onto computer hard drive. Data log files may be exported to HTML, .xls, .xlsx, or .pdf format as graphs or data tables. Graphs may also be exported as .bmp, .gif, .jpeg, or .png. Data tables may also be exported as .csv.  
**USB Powered:** USB port provides power to the controller for programming. Apply normal power for general controller operations.

# PD500 SuperNova PID Process & Temperature Controllers

## ORDERING INFORMATION

Model	Main Control Output	Additional Features	Power
<b>PD510 1/16 DIN Controllers</b>			
PD510-A	4-20 mA (SCR)	Relay Control Output, 2 Alarm Relays	100-240 VAC
PD510-A-CD	4-20 mA (SCR)	Relay Control Output, 2 Alarm Relays, RS-485, 2 Digital Inputs	100-240 VAC
PD510-A-CTR	4-20 mA (SCR)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 4-20 mA SV Input	100-240 VAC
PD510-S	Voltage Pulse (SSR)	Relay Control Output, 2 Alarm Relays	100-240 VAC
PD510-S-CD	Voltage Pulse (SSR)	Relay Control Output, 2 Alarm Relays, RS-485, 2 Digital Inputs	100-240 VAC
PD510-S-CTR	Voltage Pulse (SSR)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 4-20 mA SV Input	100-240 VAC
PD510-R	Relay (On/Off)	Relay Control Output, 2 Alarm Relays	100-240 VAC
PD510-R-CD	Relay (On/Off)	Relay Control Output, 2 Alarm Relays, RS-485, 2 Digital Inputs	100-240 VAC
PD510-R-CTR	Relay (On/Off)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 4-20 mA SV Input	100-240 VAC
<b>PD520 1/8 DIN Vertical Controllers</b>			
PD520-A	4-20 mA (SCR)	Relay Control Output, 2 Alarm Relays	100-240 VAC
PD520-A-CTD	4-20 mA (SCR)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs	100-240 VAC
PD520-A-CTDR	4-20 mA (SCR)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs, 4-20 mA SV Input	100-240 VAC
PD520-S	Voltage Pulse (SSR)	Relay Control Output, 2 Alarm Relays	100-240 VAC
PD520-S-CTD	Voltage Pulse (SSR)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs	100-240 VAC
PD520-S-CTDR	Voltage Pulse (SSR)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs, 4-20 mA SV Input	100-240 VAC
PD520-R	Relay (On/Off)	Relay Control Output, 2 Alarm Relays	100-240 VAC
PD520-R-CTD	Relay (On/Off)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs	100-240 VAC
PD520-R-CTDR	Relay (On/Off)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs, 4-20 mA SV Input	100-240 VAC
<b>PD530 1/4 DIN Controllers</b>			
PD530-A	4-20 mA (SCR)	Relay Control Output, 2 Alarm Relays	100-240 VAC
PD530-A-CTD	4-20 mA (SCR)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs	100-240 VAC
PD530-A-CTDR	4-20 mA (SCR)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs, 4-20 mA SV Input	100-240 VAC
PD530-S	Voltage Pulse (SSR)	Relay Control Outputs, 2 Alarm Relays	100-240 VAC
PD530-S-CTD	Voltage Pulse (SSR)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs	100-240 VAC
PD530-S-CTDR	Voltage Pulse (SSR)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs, 4-20 mA SV Input	100-240 VAC
PD530-R	Relay (On/Off)	Relay Control Output, 2 Alarm Relays	100-240 VAC
PD530-R-CTD	Relay (On/Off)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs	100-240 VAC
PD530-R-CTDR	Relay (On/Off)	Relay Control Output, 2 Alarm Relays, RS-485, 4-20 mA Retransmit, 2 Digital Inputs, 4-20 mA SV Input	100-240 VAC

# PD500 SuperNova PID Process & Temperature Controllers

Model	Model Number Digits						Description
PD5	□	- □	- □	□	□	□	PID Process & Temperature Controller
	10						(1/16 DIN) 1.9" x 1.9" x 2.5" (48 x 48 x 63 mm) (W x H x D)
Size	20						(1/8 DIN) 3.8" x 1.9" x 2.5" (48 x 96 x 63 mm) (W x H x D)
	30						(1/4 DIN) 3.8" x 3.8" x 2.5" (96 x 96 x 63 mm) (W x H x D)
		A					Control OUT 1 = 4-20 mA current output for PID control Control OUT 2 = Relay output for On/Off control 2 SUB alarm relay outputs
Control & Alarm Outputs		R					Control OUT 1 = Relay output for On/Off or time-proportional PID control Control OUT 2 = Relay output for On/Off control 2 SUB alarm relay outputs
		S					Control OUT 1 = Voltage pulse output for On/Off or time-proportional SSR PID control Control OUT 2 = Relay output for On/Off control 2 SUB alarm relay outputs
Communication (RS485)							None
		C					RS-485 communication
Retransmission Output (RET)							None
		T					Retransmission output (4-20 mA)
Digital Input (DI)							None
		D					2 digital inputs, D1 and D2
Remote Input (REM)							None
		R					1 input, 1-5 VDC (4-20 mA with included external resistor)

# PD500 SuperNova PID Process & Temperature Controllers

## Enclosures



Model/Series	# Controllers	Material
Enclosures for PD510 1/16 DIN Controllers		
PDA2301-16	1	Plastic NEMA 4X Hinged
PDA2302-16	2	Plastic NEMA 4X Hinged
PDA2801-16	1	Low Cost Plastic NEMA 4X
PDA2802-16	2	Low Cost Plastic NEMA 4X
PDA2811-16	1	Low Cost Plastic NEMA 4X
PDA2812-16	2	Low Cost Plastic NEMA 4X
PDA2813-16	3	Low Cost Plastic NEMA 4X
PDA2814-16	4	Low Cost Plastic NEMA 4X
Enclosures for PD520 1/8 DIN Vertical Controllers		
PDA2301-V	1	Plastic NEMA 4X Hinged
PDA2302-V	2	Plastic NEMA 4X Hinged
PDA2303-V	3	Plastic NEMA 4X Hinged
PDA2304-V	4	Plastic NEMA 4X Hinged
PDA2305-V	5	Plastic NEMA 4X Hinged
PDA2306-V	6	Plastic NEMA 4X Hinged
PDA2801-V	1	Low Cost Plastic NEMA 4X
PDA2811-V	1	Low Cost Plastic NEMA 4X
PDA2812-V	2	Low Cost Plastic NEMA 4X
Enclosures for PD530 1/4 DIN Controllers		
PDA2301-4	1	Plastic NEMA 4X
PDA2302-4	2	Plastic NEMA 4X
PDA2811-4	1	Low Cost Plastic NEMA 4X
PDA3408	1	Plastic NEMA 4X w/Clear Cover
PDA2600*	1-6	Stainless Steel NEMA 4X
PDA2700**	1-6	Painted Steel NEMA 4

\* See [LDS2600](#) data sheet for details.

\*\* See [LDS2700](#) data sheet for details.

## Accessories

Model	Description
PDX-RES2	250 Ω 0.1% Precision Resistor for SuperNova 4-20 mA Input
PDA7485-I	RS-232 to RS-485 isolated converter
PDA8485-I	USB to RS-485 isolated converter
PD9501	Multi-function calibrator
PDA-LH	Light / horn accessory
MOD-LH	Light / horn / enclosure modification
PDA-MINIUSB	USB Cable for SuperNova Series, Type A Male to Type Mini-B Male
PDX6901	Snubber: 0.01 μF/470 Ω, 250 VAC
PDA1024-01	24 VDC Power Supply for DIN Rail

## Signal Splitter & Conditioner Accessories



Model	Description
PD659-1MA-1MA	Signal Isolator with One 4-20 mA Input and One 4-20 mA Output
PD659-1MA-2MA	Signal Splitter with One 4-20 mA Input and Two 4-20 mA Outputs
PD659-1V-1MA	Signal Conditioner with One 0-10 VDC Input and One 4-20 mA Output
PD659-1MA-1V	Signal Conditioner with One 4-20 mA Input and One 0-10 VDC Output

Your Local Distributor is:

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