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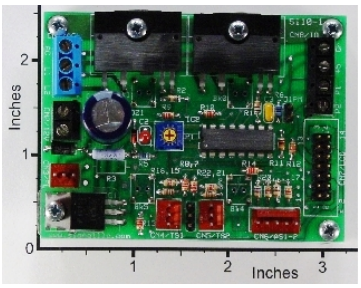
Si82Hy2ZPTC Hybrid Two-Zone Proportional Temperature Controller, with one LCD Port, and with Two AC 120/240V-5A Solid-State Relays



The **Si82Hy2ZPTC-120/240Vac-5A** is a versatile, closed-loop, microprocessor based, Hybrid, Two-Zone, Proportional Temperature Controller board that can control two independent thermal-zones. By proportional control, we mean that the amount of correction used in the closed-loop is proportional to the difference between the set and measured temperature values. Five PWM duty-cycle values are used depending on the absolute-value of the difference between the set and measured temperature values (|Td|). The duty-cycle is 0% when $|Td|=0^0C$; 25% when $0^0C< |Td|<0.5^0C$; 50% when $0.5^0C< |Td|<1^0C$; 75% when $1^0C< |Td|<1.5^0C$; 100% when $|Td|>1.5^0C$. Two120/240Vac, 5A solid-state relays (one for each zone) is used to control the currents in resistive heaters (600W in each zone). A single AC or DC voltage source (9V to 20V rang, unregulated and unfiltered) is required for the control electronics. The onboard microprocessor measures and controls the temperatures, and monitors the user inputs. Two small 9-bit digital thermometers (by Dallas Semi., DS18S20 sensor, connected to ports **CN4TS1** and **CN5TS2**) are used to measure temperatures in the $+5^0C$ to $+102^0C$ range, with $½^0$ C accuracy. Because each sensor is digital, it is virtually immune to noise and loading; ideally suited for remote sensing. As the name hybrid (**Hy**) implies the desired set-temperatures are derived from a variable, analog voltages ($V_{P1,G}$, $V_{P2,G}$) while the other control signals are digital. An LCD port (with HITACHI HD44780 Interface Standard) is provided for optional display of Set and Measured Temperatures data in 2 line x 20 character format. Two red LEDs are used to monitor the Heater currents. A small Aluminum plate (3.3”x4.0”x0.065”) is required to operate at 2x600W power level. Typical applications are: Dual Water-Baths, 2-Zone Heat-Pumps, etc. This board can be configured and programmed to perform efficiently in many customized applications.

Specification and Application for Si82Hy2ZPTC-120/240Vac-5A Board

- **Efficient Two-Zone Proportional Temperature Controller in the range of $+5^0C$ to $+102^0C$ with $1/2^0C$ Steps**
- **Two 120/240V, 5A AC Solid-State Relays for Heaters**
- **Two LEDs as Heater-On Indicators (one for each zone)**
- **Two Digital Thermometer with $1/2^0C$ Accuracy**
- **Two External potentiometers for Set-Temperature Control**
- **An LCD port (with HITACHI HD44780 Interface Standard) for Set and Measured Temperature Display.**
- **A single (9V to 20V) AC or DC Voltage (unregulated and Unfiltered) for Board-Control Power**

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- **Operating Temperature:** 45^{0}C with the Metal Heat-Ring Bolted to a small Aluminum plate (3.3”x4.0”x0.065”) acting as Heat-Sink, while the plate is exposed to air at 25^{0}C (as shown on photograph)

A Typical Application of the Si82Hy2ZPTC-120/240Vac-5A

In this closed-loop proportional temperature control application, the Set-Temperature (in the, +5^{0}C to +102^{0}C Range with 1/2^{0}C steps) is adjusted (for each zone) by two external linear taper 5KΩ potentiometers, Signal as **Si5Pot2-2x5k**. The resistive Heaters are operating with 120Vac at 5A max. A small transformer with 12Vac output provides the control-power to this board. The temperature in each zone is measured with the Dallas Semi. www.dalsemi.com (DS18S20 in TO-92 casing) Digital Thermometer. This sensor can be purchased from Signal Consulting, LLC as **Si18DTsens** (sensor with 12” leads and connector) or you can wire-up your own sensor using parts from www.digikey.com . The LCD module can be purchased from Signal as **Si24LCD2L20CH** , or from several vendors; for OEM pricing, contact: Sunlike Display Tech Corp. in Taiwan, www.lcd-modules.com.tw .