

Photonix Industries

International, Inc.

**PIC300 Chiller Warming Plate
Installation and Operation Manual**



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Warning! Read this manual carefully before starting the installation of the PIC300 Chiller Warming Plate.

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Preface -

The PIC300 Chiller Warming Plate accessory is an option to achieve temperature regulation, and increased laser stability, in laser systems that dissipate a low value of average power when operated in a lower ambient temperature environment compared to the chiller set temperature.

Background –

The PIC300 Chiller is designed to only remove input heat energy. The PIC300 Chiller cannot provide a heat energy source for a laser system with a laser diode set temperature that is several degrees higher than the ambient environment temperature of the laser system. Under these operating conditions the laser stability is compromised due to lack of temperature regulation. The unregulated temperature range being the lower environmental temperature, and the diode set temperature.

The Warming Plate provides a selectable amount of constant heat energy that is inputted to the coolant loop thereby permitting the PIC300 Chiller to provide closed loop coolant temperature regulation.

Description –

The PIC300 Chiller Warming Plate is resistively heated by 2 resistors thermally mounted onto the Warming Plate.



An isolation transformer rated for 80 VA, having a total of four separate windings, two primary windings, and two secondary windings is used.

The AC input voltage must be selected, 115/230, by the end user to be compatible with the local utility service. The voltage selector is located at the rear panel AC entry of the Chiller Warming Plate cabinet and can be removed using a flat bladed screwdriver used to lift up the tab while pulling outward. Failure to observe compatible voltage selection could result in hardware failure!

Two 5mm x 20mm, 250 VAC, 2.5 ampere time delay fuses are located inside the AC EMI Power Entry Block. This block can be removed using a flat bladed screwdriver used to lift up the tab while pulling outward.

The voltage across the 2 resistors can be selected to either 12VAC, or 24VAC, as determined by the connections of the two 12VAC secondary transformer windings. The 2 values of resistors, either 25 ohms or 40 ohms, can be electrically connected in any series parallel combination by placement of the female ¼” lugs. The selection is made experimentally and dependent upon environmental conditions.

The Chiller Warming Plate includes a high temperature shutoff bi-metallic SPST thermostat switch mounted onto the warming plate for safety; shutoff (Switch contacts opening) occurring at ~46C to 52C.

A 9 pin sub-D connector located at the rear panel of the laser controller and Warming Plate Controller is used for remote ON/OFF control of the warming plate. A cable inter-connects the I/O connector at the rear panel of the laser controller to the Warming Plate Controller 9 pin connector.

Rear View – right to left:

AC Line Entry, I/O 9-pin D connector for ON/OFF S.S.R. control, and coolant IN/OUT Hose Barb fittings



A red colored AC Rocker Switch located on the front panel of the PIC300 Chiller Warming Plate provides two functions:

- 1) Manually turns ON or OFF the incoming AC line voltage to the Housing.
- 2) Indicates the presence of incoming AC line voltage via the red colored AC Rocker Switch internal indicator.

Packaging / Contents –

The packaging contains:

- 1 Ea. Electrical Enclosure
- 1 Ea. AC Line-cord
- 2 Ea. Hose Clamp – (For coolant hoses at IN/OUT Hose Barbs)
- 1 Ea. Modified 15 pin I/O connector cable with two cable breakouts at the 15 pin male I/O connector. Each cable is ~8' 6" (2.6M) long.

Each cable breakouts connects the laser controller I/O to:

The PIC300 Chiller and the warming plate remote start connector.
Choice of cable breakout end to Chiller or to Warming Plate is not specific and can be interchanged.

1 Ea. Coolant hose ~6' (2M) long with one male quick disconnect self sealing fitting at one end to engage in PIC300 Chiller return (IN) coolant line. Opposite end of coolant hose is not terminated in a fitting.



Line Voltage Selection

The AC input voltage must be selected, 115/230, by the end user to be compatible with the local utility service. The voltage selector is located at the rear panel AC entry of the Chiller Warming Plate cabinet and can be removed using a flat bladed screwdriver used to lift up the tab while pulling outward.

Two 5mm x 20mm, 250 VAC, 2.5 ampere time delay fuses are located in the AC EMI Power Entry Block. This block can be removed using a flat bladed screwdriver used to lift up the tab while pulling outward.

Coolant Tubing

Coolant hose ~6' (2M) long with one male quick disconnect at one end to engage in PIC300 Chiller return (IN) coolant line. Opposite end of coolant hose must be pushed onto a male hose barb fitting at warming plate; use of cable clamp provided. Choice of male hose barb fitting is not specific.

Power Dissipation Settings

Preset and non-selectable at ~40 watts for 220 VAC Input

Interconnection Block Diagram

Interconnect components as shown in sketch below:

Modified 15 pin I/O connector cable with two cable breakouts at the 15 pin male I/O connector. Each cable is ~8' 6" (2.6M) long.

Each cable breakout connects the laser controller I/O to:

The PIC300 Chiller and the warming plate remote start connector.

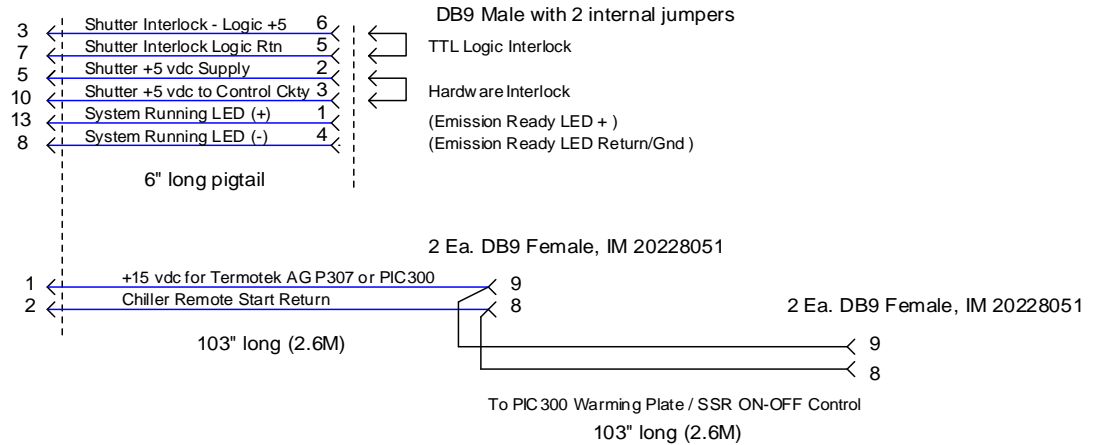
Choice of cable breakout end to Chiller or to Warming Plate is not specific.

DS User I/O Chiller and Warming Plate Cable / Shutter Breakout Cable / 15Pin --> 9 Pin (IM 8026214)

15 Pin D-Subminiature
Photonics p/n 2028051

DB9 Female
Photonics p/n 2028051

3 Ea. Housings Reqd. p/n 2026146



Operation

To verify proper operation and regulated temperature control, note the laser diode set temperature, the chiller set temperature, and the ambient environmental temperature.

Note: The reason for using this accessory is the laser diode set temperature is above the environments ambient temperature, and the laser diode actual temperature is not being regulated. The actual LD temperature is below the PIC300 Chiller set temperature.

With the Warming Plate Enclosure red colored AC Rocker Switch in the OFF position, turn ON the laser controller AC red colored red Rocker Switch. At this time the laser controller and PIC300 Chiller should turn on. Allow the system to operate for a couple of minutes and note all the temperatures. Initially the Chiller (T_a) will be lower than chiller (T_s) temperature.

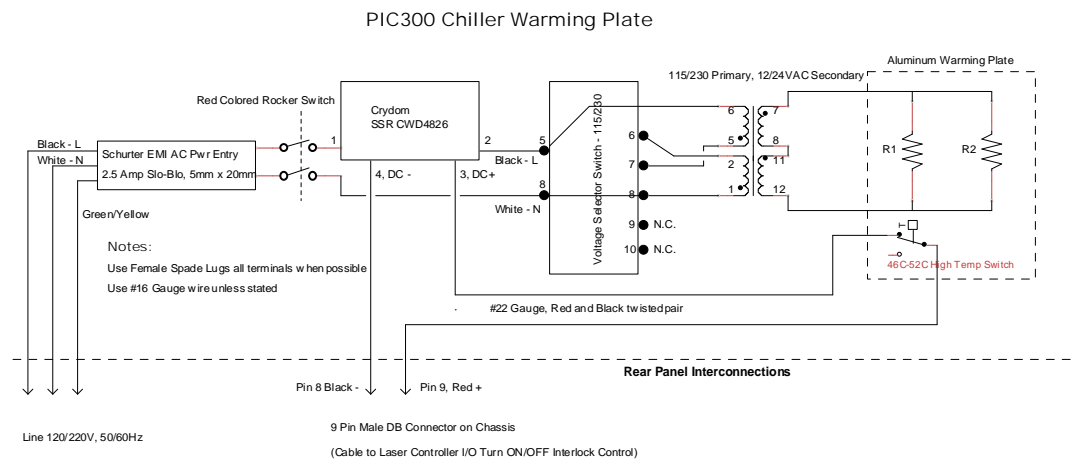
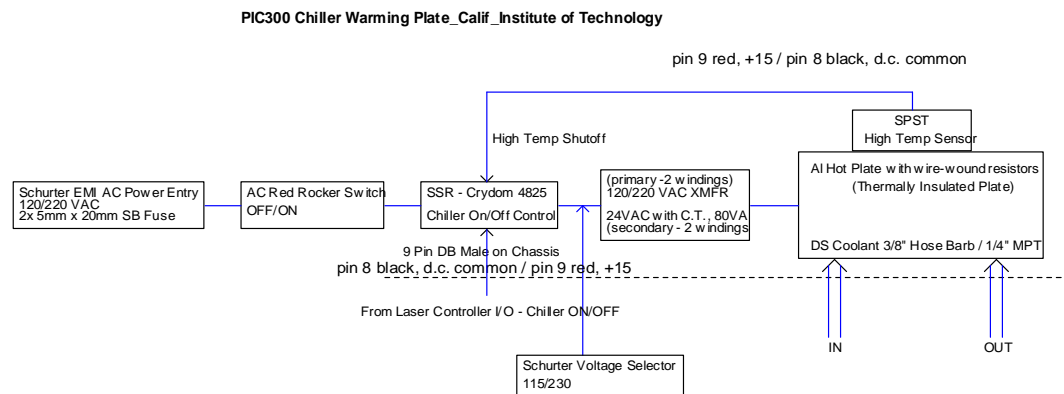
Turn on the Warmer Enclosure red colored AC Rocker Switch. The Chiller (T_a) temperature should not start to slowly increase over several minutes, approaching and equaling the chiller (T_s) temperature. At this time the chiller temperature should become stabilized with time. The laser can now be operated by increasing the laser diode current to operating value. The chiller temperatures should now be (T_s) = (T_a) within $\pm 0.2^\circ\text{C}$.

Note:

The laser diode temperature displayed on the laser controller front LCD panel may indicate a higher temperature. This is normal, the heat inputted results in a laser diode coolant temperature rise on return side of the chiller.

The temperature displayed on the laser controller LCD screen does not control the laser diode temperature. It only serves as a warning, and temperature interlock, to shut-down the system due to a chiller malfunction, etc.

PIC300 Warming Plate Wiring Block Diagram/Description



Top Cover Removed showing components

