A Quick Start Guide to the Model 24C

BASIC FRONT PANEL OPERATION

Pressing the **Power** key will toggle the controller's AC power on and off. This key must be pressed and held for two seconds.

Pressing the **Stop** key will immediately disengage both control loops. Pressing the **Control** key will engage them.

Pressing the **Home** key will return the screen to the Home display from anywhere in the sub-menus. The Home display is the primary display for instrument status and can be configured by pressing the **Display** key.

CONTROL LOOP SETPOINTS

To access the setpoint for the control loops, press the **Set Pt** key and then use the navigation keys to select Loop #1, 2, 3 or 4. Use the keypad to enter the desired setpoint and press the **Enter** key to set it and return to the Home display.

CLEARING A LATCHED ALARM

During an alarm condition, the Alarm LED on the front panel will light and an audio alarm will optionally sound. To view the status of all alarms, press the **Alarm** key. To reset a latched alarm, press the **Alarm** key and then the **Home** key.

DISPLAY OPTIONS

The display time constant and display resolution fields may be accessed by pressing the **System** key.

The *Display TC* field is used to smooth temperature data with filters from 0.5 to 64 seconds. This is useful in noisy environments to provide stable readings.

```
+Display TC=0.5S
```

The display resolution field, *Display-RS* is used to set the number of significant digits shown in temperature displays. Settings 1, 2 ,3 or Full.

CONFIGURING A TEMPERATURE SENSOR

To configure an input channel for a specific temperature sensor, press the **ChA** key for input A, or the **ChB** key for input B.

The first line of this menu is used to change the sensor units. An example is shown here. Change the sensor units by using the **+** and **0** keys. When the desired units are shown, press the **Enter** key to make the selection. The current temperature is continuously displayed.

```
+ 77.123 K
```

Next, go to the sensor selection field and use the **+** and **0** keys to scroll through the available sensors. When the desired sensor is shown, press the **Enter** key to make the selection.

For advanced information on sensor configuration, see the user's manual section titled "Configuring a Sensor".

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```
+Sen:Pt100 385
```

ERROR DISPLAYS

A sensor fault condition is identified by a temperature display of seven dash (-) characters as shown here. The sensor is open, disconnected or shorted.

```
-------K
```

If a temperature reading is within the measurement range of the instrument but is not within the specified sensor's calibration curve, a display of seven dot (.) characters is shown.

```
.......K
```

Overtemp indicates that the controller's Internal Temperature Monitor circuit shut off the heater. This fault is usually the result of a shorted heater or use of a heater. After the controller has been allowed to cool to an acceptable temperature, pressing the **Control** key will clear the error and restore control mode.

OTDisconn indicates that the heater output was disconnected by the Over Temperature Disconnect Monitor. This monitor is configured by the user and functions to disable the heater if a specified over temperature condition exists on a selected input channel.

SHIELDING AND GROUNDING RECOMMENDATIONS

The Model 24C supports a single-point grounding scheme to prevent ground loops and low frequency power-line noise pickup. High frequency interference is eliminated by continuous shielding.

To work effectively, a good quality earth-ground point is essential. This is usually the 3rd wire ground of the AC power plug. All instruments and the cryostat should have a direct connection to this ground.

Sensors and heaters must be electrically floating.

The instrument side of all sensor cable shields must be connected to their connector's shield pin. Heater cables should have their shields connected to the chassis ground provided on the connector blocks.

For RFI shielding, the sensor cables should have their shields connected to the connector's back-shell on the cryostat end. If this connection causes a ground-loop, that is easily fixed by adding a connection from the cryostat directly to earth-ground to complete the single-point grounding scheme. Do not compromise RFI shielding by simply disconnecting shield grounds.

> ⓘ **Note:** The Ethernet LAN interface is electrically isolated and cannot introduce ground loops between instruments.

AC POWER CONNECTION

Before connecting AC power, check the input voltage setting through the window on the power entry module to ensure that it is set properly. If not, please refer to the User's Manual section titled Fuse Replacement and Voltage Selection.

CONTROL LOOP #1 OUTPUT

Before using the Loop #1 (main heater) control output, it is essential that the proper load resistance and output range be selected.

- ❑ Press the **Loop 1** key to go to the Control Loop Setup menu for Loop #1.

```
+Htr Resistance:50Ω
```

- ❑ Use the navigation to scroll to the **Htr Resistance** field and then use the **+** and **0** keys to select between a 50Ω and a 25Ω heater and then press the **Enter** key.

Range	Max. Output Power	
	25Ω	50Ω
Hi	25 W	50 W
Mid	2.5W	5.0 W
Low	0.25 W	0.50 W

CONTROL LOOP #2 OUTPUT

The second control loop is a 25-Watt output that is matched to a 50Ω resistive load. There is no load resistance to configure.

CONTROL LOOPS #3 AND #4

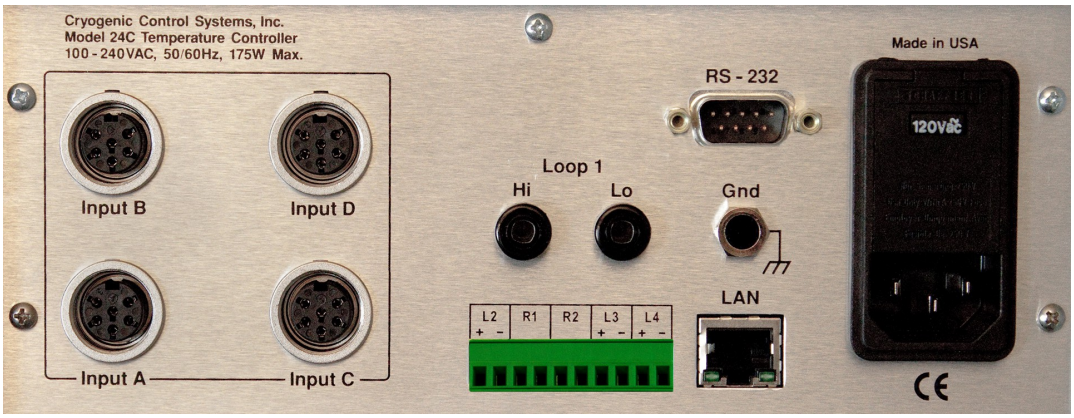
Loop #3 and #4 are a non-powered analog voltage outputs. Output is selectable at 10 or 5 Volts full scale.

CONTROL MODES

For information on how to determine PID values for the control loop, please refer to the user's manual section titled "Autotuning" for automatic generation, or to "Appendix D: Tuning Control Loops".

Type	Description
Off	Control loop is OFF.
Man	Manual control mode. A constant heater output power is applied. The **Pman** field selects the output power as a percentage of full-scale.
PID	Standard PID control. The **Pgain**, **Igain** and **Dgain** fields hold the PID values. **Igain** is in seconds and **Dgain** is in inverse seconds.
Table	PID control mode where the PID coefficients are generated from a stored, user supplied PID table.
RampP	Temperature ramp control.
RampT	Ramp using a PID table.

Rear Panel Connections



SENSOR CONNECTIONS

Silicon Diode and all resistor type sensors should be connected using the four-wire method. It is strongly recommended that sensors be connected using shielded, twisted pair wire. Wires are connected as shown below and the shield should be connected to the metal back-shell of the connector.

Pin	Function
1	Excitation (-), I-
2	Sense (-), V-
3	Aux. Power: 5V
4	Sense (+), V+
5	Excitation (+), I+
6	Not Connected

Rear View

TERMINAL BLOCK CONNECTIONS

Pin	Function	Pin	Function
1	Loop #2 +	6	Relay 2 common
2	Loop #2 -	7	Loop #3 +
3	Relay 1 N.O.	8	Loop #3 -
4	Relay 1 common	9	Loop #4 +
5	Relay 2 N.O.	10	Loop #4 -

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