# A Quick Start Guide to the Model 54


## 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 more than 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**(5) key. To reset a latched alarm, press the **Alarm**(5) key and then the **Home** key.

## DISPLAY OPTIONS

The display time constant and display resolution fields may be accessed by pressing the **System**(9) 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.

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 **Input**(1) key. Then, use the drop-down box to select the desired input channel.

Touch the Units: indicator to select the units displayed.

Touch the Sensor: field to select the desired sensor from a list.

For resistance measurements using Constant-Voltage AC excitation, select the ACR sensor, then set a Bias Range and Bias Level. The range sets the full scale range and level sets the percent of that range.

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

## DOCUMENTATION AND SOFTWARE

The Cryo-con software package includes instrument utility software, user's manuals, LabView™ drivers, sensor calibration curves and application notes. A CD of this software is shipped with each instrument and is also available at:
http://www.cryocon.com/CCdownload/CustomerCD12.zip

## ERROR DISPLAYS

A sensor fault condition is identified by a clipping or clamping message as shown here. This usually indicates that the sensor is open, disconnected or shorted.


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.


**Overtemp** indicates that the controller's Internal Temperature Monitor circuit shut off the heater. This fault is usually the result of a shorted 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 54 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. For operation with 220V, select the 230V setting and, above 235V, select 240V.

## CONFIGURING CONTROL LOOPS

Control loops are configured by pressing the **Loop**(2) key.

Select the desired control loop from the first drop-down box.

Set the control type by touching the Type: field and the output range by touching the Range: field.

Set the setpoint and tuning parameters as desired.

Control Loop #1 is a four-range output that can supply a maximum of 75W into a 25Ω load.

| Range | Max. Output Power | |
|---|---|---|
| | 25Ω | 50Ω |
| 75W | 75W | -- |
| Hi | 25 W | 50 W |
| Mid | 2.5W | 5.0 W |
| Low | 0.25 W | 0.50 W |

Loop 1 Output Power

The second control loop is a three range output that can supply a maximum of 25W into a 25Ω load.

Loop #3 is fixed range output that can supply a maximum of 1.0W into a 100Ω load.

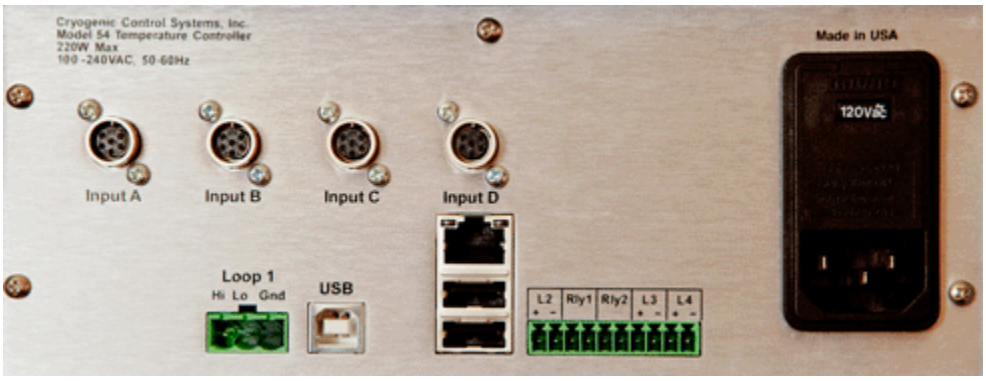
Loop #4 is a non-powered analog voltage output. Output is selectable at 10 or 5 Volts full scale.

## 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 | Aux Power Ground |
| 2 | Sense (+), V+ |
| 3 | Sense (-), V- |
| 4 | Excitation (+), I+ |
| 5 | Excitation (-), I- |
| 6 | Aux Power:+5VDC |


Rear View

## TERMINAL BLOCK CONNECTIONS

**Loop #1**

| Pin | Function |
|---|---|
| Hi | Heater Output High |
| Lo | Heater Output Low |
| GND | Ground |

**Loops #2, #3, #4 and Relays**

| Pin | Function |
|---|---|
| 1 | Loop #2 Heater Output High |
| 2 | Loop #2 Heater Output Low |
| 3 | Relay #1 N.O. |
| 4 | Relay #1 Common. |
| 5 | Relay #2 N.O. |
| 6 | Relay #2 Common. |
| 7 | Loop #3 output High |
| 8 | Loop #3 output Low |
| 9 | Loop #4 output High |
| 10 | Loop #4 output Low |

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