CFT Series
Recirculating Chiller

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Instruction and Operation Manual

NESLAB online
Product Service Information, Electronic Catalog,
Applications Notes, MSDS Forms, e-mail.

(603)427-2490
Set modem to &N-I protocol, 1200 - 14400 baud

Voice Info: (800) 4-NESLAB

Visit our Web page at:
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Constant Temperature Bath/Circulators
Immersion Coolers
Recirculating Chillers
Section IV Operation

Start Up

Before starting the unit, double check all electrical and plumbing connections and make sure the circulating system (the CFT, the instrument being cooled, and the tubing that connects them) has been properly filled with cooling fluid. To start the unit, place the POWER Switch to the on (I) position. The refrigeration system and the recirculation pump will start. The POWER Switch illuminates (except for the CPT-150) to indicate the system is operating. Units with PD pumps display the pump operating pressure on the RECIRCULATING PRESSURE gauge.

To turn the unit off, place the POWER Switch to the off (0) position.

The Cool LED on the front panel indicate the status of the refrigeration system. It illuminates to indicate the refrigeration system is removing heat from the cooling fluid. As the operating temperature approaches the temperature setpoint, the LED will extinguish.

The Idle LED on the front panel of CPT-150 units indicates the unit is in a hot-gas-bypass mode of operation. As the operating temperature approaches the temperature setpoint, the Cool and Idle LEDs cycle to indicate the approximate duty cycle of the unit.

When the unit is shut off, wait approximately five minutes before restarting. This allows time for the refrigeration pressures to equalize. If the pressures are not allowed to equalize, the compressor will short-cycle (clicking sound) and no cooling will occur.

Analog Temperature Controller

Temperature Adjustment

To adjust the temperature setpoint, turn the calibrated °C dial on the front of the unit to the desired temperature.
Digital Temperature Controller

Temperature Adjustment
To display the temperature setpoint, press and hold the DISPLAY switch. To adjust the temperature setpoint, press and hold the DISPLAY switch and turn the ADJUST knob until the desired temperature setpoint is indicated on the digital display. Once the setpoint is adjusted, release the DISPLAY switch. The display will now indicate the temperature of the fluid in the reservoir.

NOTE: Inadvertent movement of the ADJUST knob, regardless of the position of the DISPLAY switch, will result in a change in the setpoint. This change will not be immediately reflected on the digital display, unless the DISPLAY switch is pressed. The digital display will eventually change as the unit reacts to the new setpoint.

Pressure Relief Valve
Units with PD pumps have a pressure relief valve which establishes the maximum operating pressure of the unit. If the pressure of the fluid leaving the pump exceeds the valve setting, the relief valve will bypass the fluid within the unit to relieve the pressure. The relief valve does not determine the actual operating pressure; the operating pressure is determined by the back pressure of the system.

If an adjustment is necessary, contact our Customer Service Department.
High Temperature Cutout (Optional)

The High Temperature Cutout (HTC) is designed to shut down the unit in the event the temperature of the fluid in the reservoir exceeds the HTC setting. The HTC is normally located on the rear of the unit.

NOTE: The HTC temperature scale is in °F.

CFT-300 High/Low Pressure Cutout

CFT-300 units are equipped with high and low refrigeration pressure cutouts. Should either cutout activate the unit will shut down.

The High Pressure Cutout (HPC) activates if there is a blockage in the refrigeration lines or if the refrigerant temperature becomes too hot. The HPC is factory preset at 400psi.

The Low Pressure Cutout (LPC) activates if there is a leak in the refrigeration lines. The LPC is factory preset at 4psi.

Both cutouts are located inside the case behind the rear panel. Once the cause of the shut down has been determined and corrected, manually depress the white button on the applicable cutout. If a “click” is not heard when depressing the button, the cutout was not activated and the unit shut down for another reason.

CFT-150 High Pressure Cutout

Some CFT-150 units are equipped with High Pressure Cutouts (HPC). Should the HPC activate the unit will shut down.

The HPC activates if there is a blockage in the refrigeration lines or if the refrigerant temperature becomes too hot. The HPC is factory preset at 400psi.

The cutout is located inside the case behind the rear panel. Once the cause of the shut down has been determined and corrected, manually depress the white button on the applicable cutout. If a “click” is not heard when depressing the button, the cutout was not activated and the unit shut down for another reason.
Heater Package (Optional)

Heaters are controlled by a switch on the temperature controller. The heater itself is accessible through the small service panel on the rear of the unit.

These units also have a Low Level indicator. The indicator illuminates if the fluid level in the reservoir drops below proper operating level.

Illustration A shows the desired fluid level for normal operation.

Should the reservoir be filled as shown in illustration B, units designed to operate at high-end temperatures (near boiling) may cause air in the reservoir to become trapped. The air can be vented by slightly tilting the unit forward on its front castors.

Any fluid venting from the reservoir will drain through a hose which feeds to a small hole in the bottom of the unit.

Do not use silicon-based fluids with units designed to operate at high temperatures. These type fluids will damage the hoses and pump seal.

![Illustration A](image1.png)  ![Illustration B](image2.png)
External Pressure Regulator (Optional)

For applications requiring a maximum pressure less than 55 PSI (380 kPa), an External Pressure Reducer (EPR) is available. An EPR allows an adjustable operating pressure of 10 to 50 PSI (70 to 345 kPa). If the pressure of the fluid leaving the chiller exceeds the relief valve setting, the relief valve will bypass excess fluid back into the chiller to relieve the overpressure.

The pressure of the system is determined by the back pressure of the connected equipment and the flow rate of the recirculating fluid to your application. Connect the EPR as described.

NOTE: Install the fittings in the exact sequence shown.

NOTE: Use Teflon" tape on all threaded fittings.

Connect the Inlet Tee Assembly (1) to the chiller. Connect the Outlet Tee Assembly (2) to the chiller. Attach the relief valve (3) to the Outlet Tee Assembly (2). Attach the Hose Nipple (4) to the Relief Valve (3). Attach the Hose (5) between the Inlet Tee Assembly (1) and the Hose Nipple (4).

The EPR is now installed. Connect the inlet (to your application) to the remaining fitting of the Outlet Tee Assembly (2). Connect the outlet (from your application) to the remaining fitting of the Inlet Tee Assembly (1).

Tighten the hose clamps tight enough to prevent leakage. Do not overtighten or the clamps will bite into the flexible tubing and cause excessive wear. If a torque wrench is available, torque hose clamps to 50 in/lbs (280 cm/kg). Nylon-reinforced hose tends to cold-flow, so the clamps will need to retorqued later. (The hose clamps do not actually loosen, but rather the hose outside diameter decreases!).

The "T" adjustment handle is equipped with a locknut. To adjust the relief pressure setting loosen the locknut and turn the "T" handle to the minimum pressure setting (direction of arrow).

To simulate blockage, close (or pinch off) the hose between the EPR outlet tee assembly and the instrument being cooled. Monitor the operating pressure of the unit. Turn the "T" handle until the desired relief pressure is set. (The EPR valve cannot be set lower than the total back pressure of the instrument being cooled or the instrument will not receive any flow.)

Tighten the locknut to secure the position of the "T" handle. Open the hose between the EPR outlet tee assembly and the instrument being cooled.