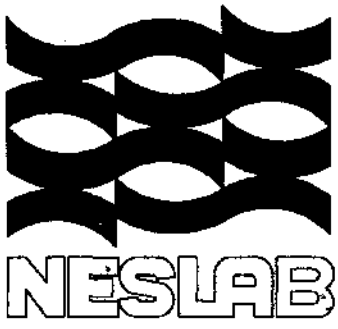
CFT-Series
Recirculating Chiller

Instruction and Operation Manual



NESLAB Instruments, Inc.
25 Nimble Hill Road
Portsmouth, NH 03801

NESLAB P/N 013387
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CFT-Series Recirculating Chiller Instruction and Operation Manual

Table of Contents

Preface

Unpacking

Retain all cartons and packing material until the unit is operated and found to be in good condition. If the unit shows external or internal damage, or does not operate properly, contact the transportation company and file a damage claim. Under ICC regulations, this is your responsibility.

Warranty

All NESLAB units are shipped with a warranty card. The top portion of the card remains with the unit. The bottom portion must be filled out and returned to NESLAB.

Units are warranted against defective parts and workmanship for one full year from date of shipment.

After-Sale Support

NESLAB is committed to customer service both during and after the sale. Whether you need a Service Contract, or have problems or questions concerning your unit, spare parts, or available accessories, our Service Department is ready to assist you. Give us a call at the NESLAB Service Center nearest you.

Headquarters
NESLAB Instruments, Inc.
25 Nimble Hill Road
Newington, New Hampshire
For immediate Service Assistance:
Phone: (603) 427 - 2877
For ordering and product information:
Phone: (800) 258 - 0830
(603) 436 - 9444
Fax: (603) 436 - 8411

Mid Atlantic States
NESLAB Instruments, Inc.
8 Ilene Court
Suite 1
Belle Mead, NJ 08502
Phone: (908) 281-0127
Fax: (908) 281-0627

Mid West States
NESLAB Instruments, Inc
12249 Rhea Drive
Plainfield, Illinois 60544
Phone: (815) 436-1151
Fax: (815) 436-1195

West Coast and Mountain States
NESLAB Instruments, Inc.
6747 Sierra Court, Suite F
Dublin, California 94568
Phone: (800) 423-7831 (CA only)
(415) 829-1660
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Continental Europe
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5554 HA Valkenswaard
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Bilborough, Nottingham
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Phone: (0602) 280834
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Section I General Information

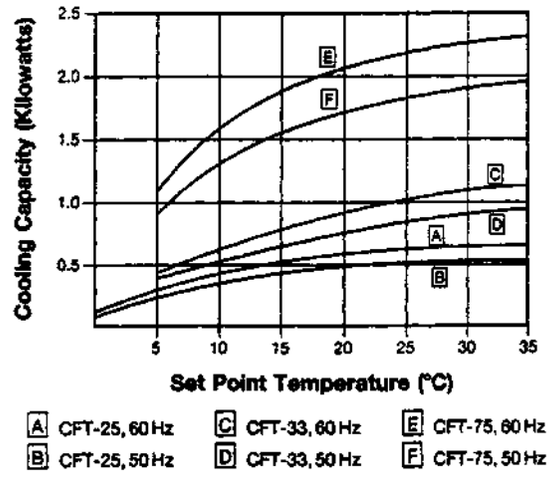
Description

The CFT-Series Recirculating Chiller is designed to provide a continuous supply of cooling fluid at a constant temperature and pressure. It is a self-contained unit consisting of a sealable reservoir, temperature controller, recirculating pump, and an air-cooled refrigeration system. The sealable reservoir allows the unit to circulate to either a closed loop system or an open vessel or tank.

The CFT is designed for use indoors in a laboratory or clean industrial environment.

After installation and completion of start-up procedures, the CFT will provide low maintenance service.

Specifications

	CFT-25	CFT-33	CFT-75
Cooling Capacity			
Temperature Range	-5°C to +35°C	+5°C to +35°C	
Temperature Stability	±1.0°C		
Reservoir Volume			
Gallons	0.5	1.1	1.8
Liters	1.9	4.1	6.8
Electrical Requirements	Refer to the serial number label on the rear of the unit for the specific electrical requirements of your unit.		

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Refer to the serial number label on the rear of the rear for the specific electrical requirements of your unit.

Plumbing Requirements

Plumbing connections are located on the rear of the unit. The standard connections are 1/2" FPT. Plastic water connectors are provided to accept either 3/8" I.D. or 1/2" I.D. flexible tubing.

Connect the SUPPLY of the CFT to the inlet of the system being cooled. Connect the RETURN of the CFT to the outlet of the system being cooled.

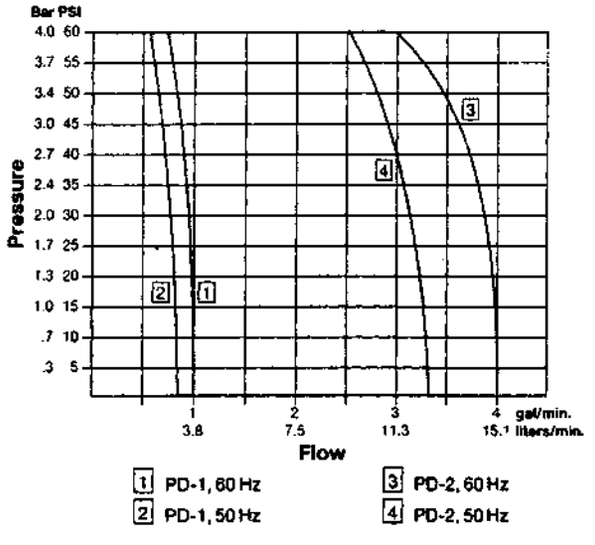
All hose connections should be securely clamped. Avoid running lines near radiators, hot water pipes, etc. If substantial lengths of tubing are necessary, insulation may be required to prevent loss of cooling capacity.

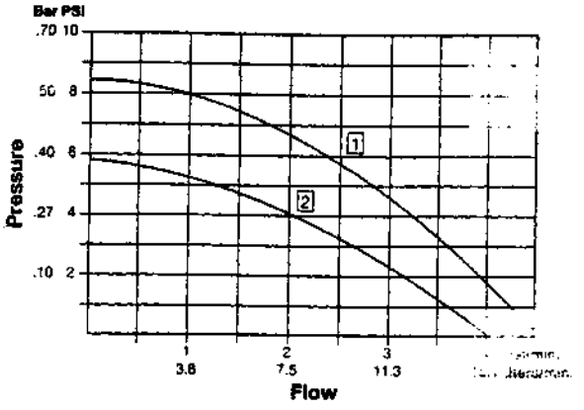
It is important to keep the distance between the unit and the system being cooled as short as possible and to use the largest diameter tubing practical. Tubing should be straight and without bends. If plumbing reductions must be made, they should be made at the inlet and outlet of the system being cooled, not at the CFT SUPPLY and RETURN.

Tubing smaller than 3/8" I.D. is not recommended.

Pumps

Refer to the pump identification label on the rear of the unit to identify the type of pump that is installed in your unit.





Fluids

Water is recommended as the cooling fluid when circulating above +8°C (+46°F). A mixture of water and laboratory grade ethylene glycol (40% ethylene glycol by volume) is recommended when circulating below +8°C.

The use of automobile antifreeze or other cooling fluids is not recommended. Use of such fluids will void the manufacturer's warranty.

Filling Requirements

Remove the access panel on the top of the CFT unit by unscrewing the thumb screws. Locate the reservoir plug (square nut). Remove the plug and fill the reservoir with clean cooling fluid.

Circulating to a closed system (closed to the atmosphere)
Fill the reservoir to the bottom of the fill hole flange. Since the reservoir capacity is small compared to many systems being cooled, have extra cooling fluid on hand to keep the system topped off when external circulation is started.

Before installing a CFT on a system that previously used tap water, flush the system to remove any rust or particles that built up. The manufacturer of the system being cooled should be able to supply information on cleaning their equipment.

When the unit is connected to a closed system, the reservoir must be protected from over pressurization. Leave the filler cap loosely threaded (or not installed at all). This will allow the reservoir to vent as thermal expansions and contractions cause small changes in the volume of the fluid in the system and the dimensions of the vessels it circulates through.

Circulating to an open system (open to the atmosphere)
The CFT can be used to circulate cooling fluid to an open vessel or a tank. When used for open circulation, run the RETURN and SUPPLY lines to the open tank. Secure the RETURN (suction) line below the fluid surface. The RETURN line should be submersed deep enough to avoid sucking air.

Fill the reservoir to the top of the fill hole flange. Wrap the tank plug with teflon sealing tape. Replace the tank plug and tighten securely to prevent air entry.

Make sure the RETURN line is free of particles and debris that can block the flow of fluid. A baffle or screen may be required.

Pump Priming

Fill the reservoir with cooling fluid (see Filling Requirements).

Place a container under the hose connector labeled SUPPLY. Remove the SUPPLY connector. After a few moments, water should begin to flow. If water does not start to flow on its own accord, attach a short piece of tubing to the supply hose fitting and apply suction to start flow. Once flow has been established, replace the SUPPLY connection.

Section III Operation

Start-up

Make sure the proper electrical and plumbing connections have been made, the unit reservoir has been filled, and the pump has been primed. Place the ON/OFF toggle switch on the front panel in the ON position. The compressor and the circulation pump will start.

Do not run the pump without fluid in the system. If fluid does not flow from the SUPPLY line within a few seconds, reprime the pump.

If the unit is shut off for any reason, allow it to remain off for 5 minutes before restarting. The compressor will short cycle (a clicking sound will be heard) if time is not allowed for the equalization of refrigerant pressures.

Temperature Controllers

Analog Controller
To set the temperature setpoint, turn the calibrated dial on the front of the unit to the desired setpoint temperature.

Digital Controller
To set the temperature setpoint, press and hold the SETPOINT/ACTUAL TEMP button. Turn the ADJUST knob until the desired temperature setpoint is displayed on the digital display. Once the temperature setpoint is set, release the SETPOINT/ACTUAL TEMP button. The digital display will indicate the coolant temperature.

Analog/Digital Controller
Once the operating temperature has stabilized at the setpoint, the unit will maintain temperature by cycling between the IDLE and COOL modes. The cycling status is indicated by the IDLE and COOL lights on the front panel. As the heat load of the system being cooled increases, the percentage of time the unit spends in the COOL mode will increase. The compressor runs continuously, while a solenoid valve and a hot gas bypass valve cycle to maintain constant temperature.

Section IV Maintenance

Service Contracts

NESLAB offers on-site Service Contracts that are designed to provide extended life and minimal downtime for your unit. For more information, call our Service Manager toll free (800) 258 - 0830.

Cleaning

Substantial amounts of air are pulled through the front panel and across a fin refrigerant/air heat exchanger. A build up of dust or debris on the protective screen or heat exchanger fins will interfere with the transfer of heat and cause loss of cooling capacity. Periodic cleaning of the condenser fins is necessary.

To clean the condenser fins, remove the grille on the front of the unit and vacuum the condenser. In some environments, it may be necessary to loosen adhering dust by brushing.

After initial installation, it is recommended that a visual inspection be made monthly. After several months, the frequency of required cleaning will be established by experience.

Algae

To restrict the growth of algae in the reservoir, it is recommended that all circulation lines be opaque. This will eliminate the entrance of light which is required for the growth of most common algae.

If algae becomes a problem, contact our Service Department for an algicide recommendation.

Section V Troubleshooting

Checklist

Unit will not start
- Check power supply, make sure CFT is plugged in.
- Check the voltage of the power source. Make sure it is within the rated voltage of the unit, ±10% (see Electrical Requirements).

Unit will not circulate fluid (CFT-25)
- Check reservoir level. Fill, if necessary.
- Make sure pump is primed.
- Make sure the back pressure in the system to be cooled does not exceed the output pressure of the CFT-25.

Unit will not circulate fluid (CFT-33 and CFT-75)
- Check reservoir level. Fill, if necessary.
- Make sure pump is primed.
- Check pressure gauge. If reading is 60 psig or more, check the system to be cooled for restrictions in the cooling line.
- Check pressure gauge. If reading is 0 psig with no flow, gauge may be faulty. Verify by placing a second gauge in the line.
- Check pump strainer. A clogged strainer can starve the pump.

Inadequate temperature control
- If temperature rises, check the heat load of the system being cooled against the CFT rating. If the heat load is not excessive, check the location of the unit to be sure the ambient temperature does not exceed +80°F (+27°C).
- If the compressor short-cycles (a clicking sound), check the line voltage. It should be within the 10% of the specified voltage. Wait 5 minutes before restarting the unit.
- Make sure the air intake and discharge (front and back of unit) are not impeded.

Service Assistance

If, after following these troubleshooting steps, your unit fails to operate properly, contact our Service Department. Please have the following information ready when you call:

- Model number.
- Serial number of unit.
- Voltage of power supply to the unit.
- Fluid being used.
- Ambient temperature where unit is being operated.

Section VI Service

For personal safety and equipment reliability, service tasks should be performed by a competent service technician. Contact our Service Department for service assistance.

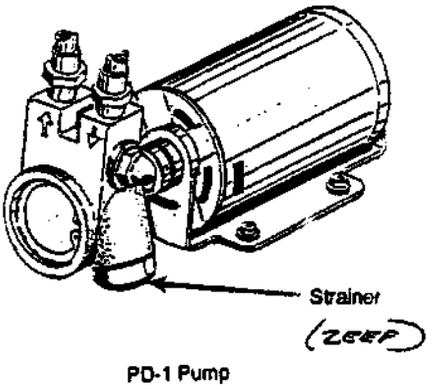
Pump Strainer

MD-30 Pump: this pump does not have a pump strainer.

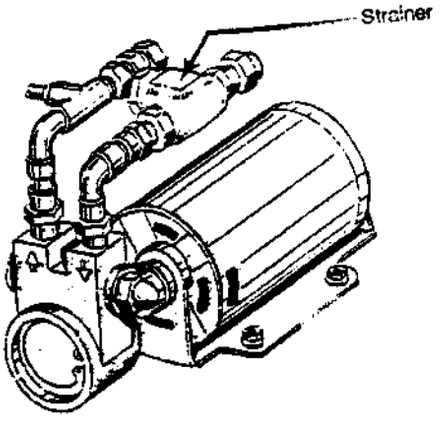
PD-1 Pump: a wire mesh screen is located under the large acorn nut on the head of the pump.

PD-2 Pump: a wire mesh screen is located under the large hex nut on the pump suction line.

PD-1, PD-2 Pump: if debris is drawn into the system, the strainer will prevent the material from damaging the pump. The unit must be turned off and drained before removing the strainer. Remove the strainer by removing the appropriate nut. Remove the strainer from the unit and rinse it with water. Place the strainer back in the unit, and secure the nut.



PD-1 Pump

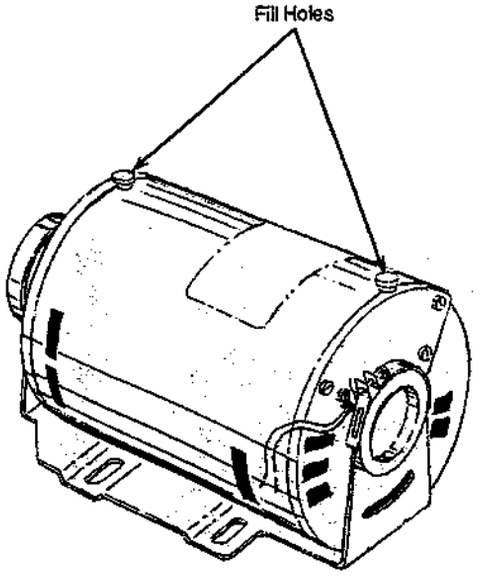


PD-2 Pump

PD Pump Lubrication

Units with PD pumps require motor lubrication. Motors used to drive PD type pumps are manufactured by several companies. Most use sleeve type bearings with large oil reservoirs. Oiling instructions are generally posted in each motor. In the absence of legible lubrication instructions, add approximately 30 to 35 drops of SAE 20 oil (SAE 20 = 142 CS viscosity) to each bearing on the following schedule:

Duty Cycle	Oiling Frequency
Continuous	Each Year
Intermittent	Each 2 years
Occasional	Each 5 years



Pressure Relief Valve Adjustment

An adjustable relief valve is located in the pump output line to limit the maximum pump pressure. The factory set pressure limit is 80 psi. Note that the pump bypass setting does not determine the actual operating pressure, it establishes a maximum limit. Units equipped with PD pumps should never be operated on a system where the back pressure exceeds 80 psi.

The standard pressure relief valve is adjustable over a range from 35 to 80 psi. If adjustment is necessary, contact our Service Department for assistance.

For applications requiring bypass pressures less than 35 psi, an External Pressure Reducer (EPR) is available. An EPR allows a pump pressure setting of 10 to 50 psi. Contact our Sales Department for more information.

Temperature Adjustment

The factory set temperature range for the CFT-33 and CFT-75 is +5°C (+41°F) to +35°C (+95°F). These units can be adjusted to operate at lower temperatures. Contact our Service Department for instructions.

Section VII Parts List

Parts List

The following spare parts are available for CFT-Series Recirculating Chillers. Contact our Service Department for more information.

Pressure gauge
Pump motor
5/8" I.D. Polybraid
Solenoid Valve
2" Castor with lock
2" Castor without lock
Relief Valve
Fan blade
Fan motor
Toggle switch
Transformer
Clamp ring
Pump
Bypass Valve
Dryer
Rubber feet
Tank coil assembly
Water bracket
Compressor
Control board
Amp connector

Section VIII Warranty

NESLAB Instruments, Inc. warrants for one (1) year from date of shipment any NESLAB unit according to the following terms.

Any part of the unit manufactured or supplied by NESLAB and found in the reasonable judgement of NESLAB to be defective in material or workmanship will be repaired by an authorized NESLAB Service Center without charge for parts or labor. The unit including any defective part must be returned to an authorized NESLAB Service Center within the warranty period. The expense of returning the unit to the authorized NESLAB Service Center for warranty service will be paid for by the buyer. NESLAB's responsibility in respect to warranty claims is limited to making the required repairs or replacements, and no claim of breach of warranty shall be cause for cancellation or rescission of the contract of sale of any unit.

This warranty does not cover any unit that has been subject to misuse, neglect, or accident. The warranty does not apply to any damage to the unit that is the result of improper installation or maintenance, or to any unit that has been operated or maintained in any way contrary to the operating or maintenance instructions as specified in NESLAB's Instruction and Operation Manual. This warranty does not cover any unit that has been altered or modified so as to change its intended use.

In addition, the warranty does not extend to repairs made by the use of parts, accessories, or fluids which are either incompatible with the unit or adversely effect its operation, performance or durability.

NESLAB reserves the right to change or improve the design of any unit without assuming any obligation to modify any unit previously manufactured.

The foregoing express warranty is in lieu of all other warranties, expressed or implied, including warranties or merchantability and fitness for a particular purpose.

NESLAB's obligation under this warranty is strictly and exclusively limited to the repair or replacement of defective parts, and NESLAB does not assume or authorize anyone to assume for them any other obligation.

NESLAB assumes no responsibility for incidental, consequential, or other damages including, but not limited to loss or damage to property, loss of revenue, loss of use of the unit, loss of time, or convenience.

This warranty applies to units sold in the United States. Any units sold elsewhere are warranted by the affiliated marketing company of NESLAB Instruments, Inc. This warranty and all matters arising pursuant of it shall be governed by law of the State of New Hampshire, United States.