



## Operator Manual

# Water Cooled Process Chiller

Revision B  
June, 2019

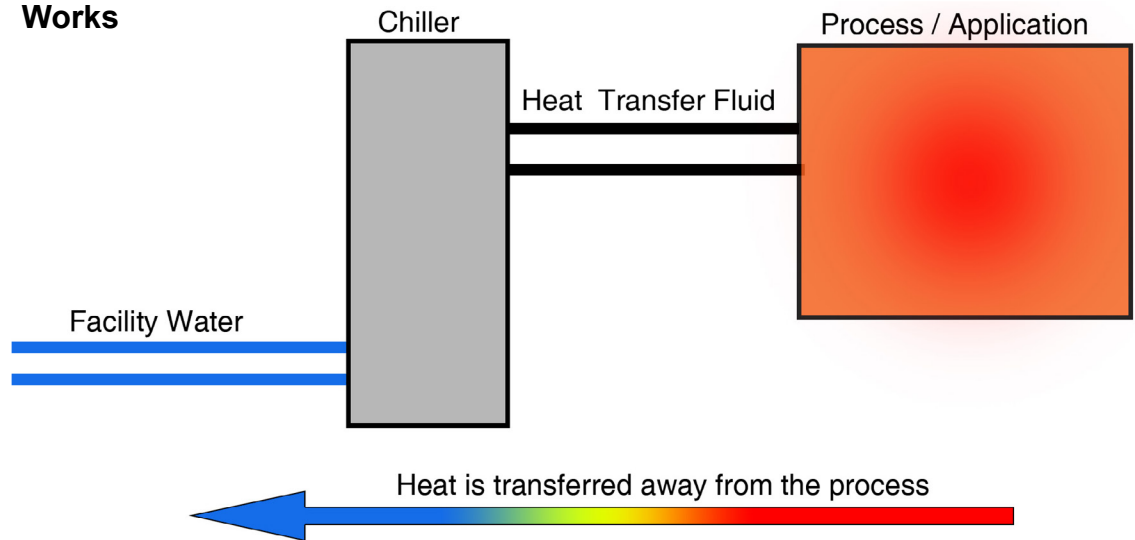
P/N LM08210

## Section B: How the Chiller Works

### How the Water Cooled Process Chiller Works

#### A Basic Explanation of How the Water Cooled Process Chiller Works:

The Chiller removes heat from a process or application and the facility water removes the heat from the chiller:



The chiller uses compressors and refrigerants to cool heat transfer fluid that will be circulated through the process. The heat transfer fluid picks up the heat created by the process and carries it back to the chiller. The heat is then carried away from the chiller by the facility water.

For proper operation, the chiller must ALWAYS have facility water and heat transfer fluid connected and filled. The requirements for facility water and heat transfer fluid are detailed in your chiller specifications.

## Section C: Chiller Installation

### Transporting

The chiller rolls easily on four casters. The leveling feet and (optional) seismic brackets must be raised before moving the unit via casters. If a forklift is to be used to carry the chiller, proceed slowly and carefully to avoid jarring the unit, being careful to prevent damage to the casters. Lock the casters when the unit is in place.

If the chiller will be shipped, protect it from shock and vibration or the warranty will be void. The chiller must not be transported unless suitably protected. Original factory packaging in good condition or equivalent is required. Request air-ride trucks when transporting over land. Thoroughly drain all fluid lines and blow them dry with low pressure compressed air before shipping or storing.

**Note:** The chiller's water circuit should be blown dry using 20-40 psi of clean, dry, air.

**The air must be blown into the Water Outlet port** for the air to circulate freely when the chiller is turned off. Failure to drain and dry the water circuit could lead to freezing and internal damage when shipping or storing the chiller.

### Placement

Select a level location, near the application, free from excessive moisture and dust. Refer to the system nameplate for operating temperature and humidity requirements.

Allow 12-18" of clearance on all sides of the chiller. This clearance is needed to keep all fluid and heat transfer lines from kinking and to allow air flow through the chiller's cabinet.

The Mains Breaker (CB1) of the ThermoStream System is located on the Rear Connector panel of the unit. Placement Location must be such that access to this function is not blocked, and is easy to access. The Facility Power Receptacle or Lockout must also be in a location that is not blocked, and is easy to access. See Warning 4 in *Safety, Page 1-2* for more Lockout information.

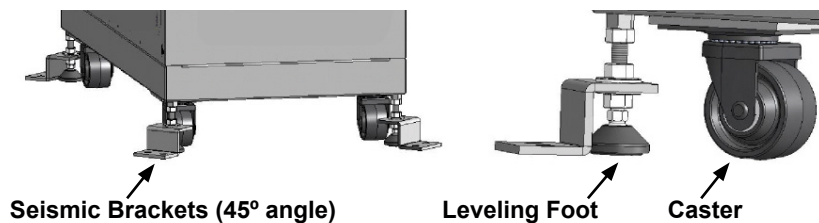
Keeping the heat transfer fluid lines as short as possible allows the pump to provide maximum pressure and flow to the application; longer lines can reduce the cooling capacity of the chiller. Thermonics chillers are typically located within 15' of the application, refer to your chiller's specification for exact distances required.

### Securing the Chiller

The chiller is equipped with locking casters or (optional) seismic brackets and leveling feet.

To secure chillers with (optional) seismic brackets and leveling feet:

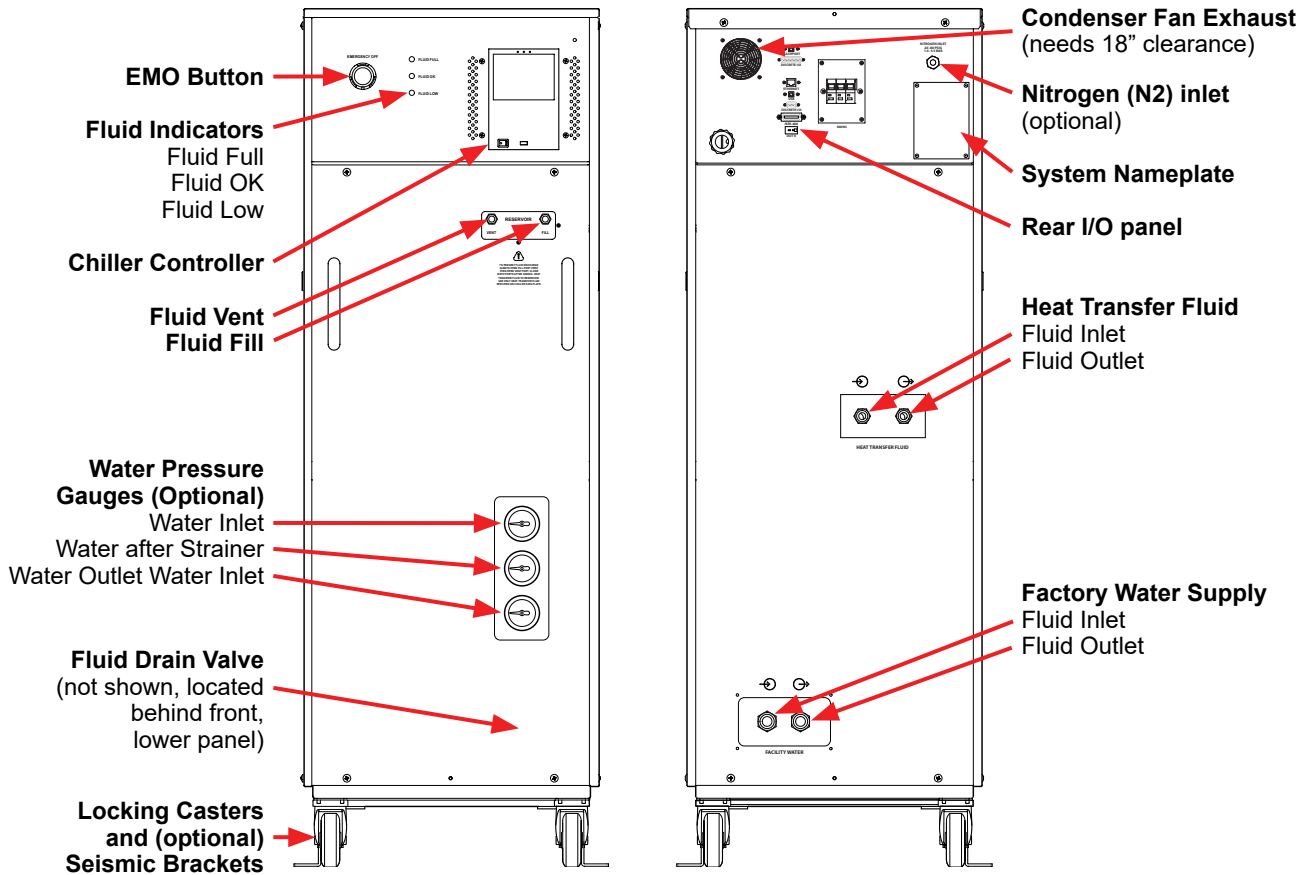
1. Secure the chiller in place by lowering the leveling feet.  
Unlock the jam nuts and turn the leveling feet until they sit firmly upon the ground surface.
2. Adjust all four leveling feet until the unit is level and does not tip or rock.
3. Loosen seismic brackets by loosening nuts on leveling feet.
4. Pull seismic brackets out and flip them over, then point them at a 45° angle as shown below.
5. Lock brackets back in place on leveling shaft.



### Advanced Leveling Casters

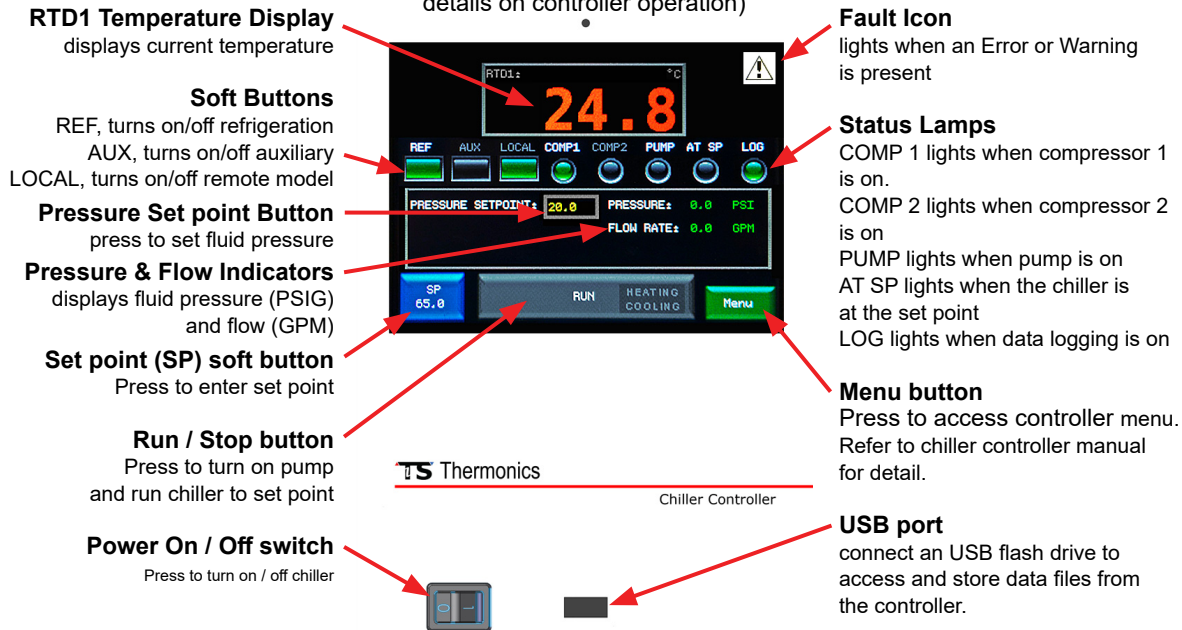
Some chillers may be equipped with Plate Type Leveling Casters. For information on the use of these advanced casters, see Appendix G: *Installation: Advanced Levelers*, on page A-28.

## Section D: Chiller Controls, Indicators and Ports



### Chiller Controller

(Refer to the Chiller Controller Manual for details on controller operation)



## Section E: Chiller Startup

All Facility Water, Heat Transfer Fluid, Nitrogen (N<sub>2</sub>), and Electrical Power connections must be made before starting up the chiller. The chiller should also be connected to the facility exhaust. The requirements for water, fluid, and power are detailed on the chiller nameplate.

Once all water, fluid, and power connections are made, the chiller can be powered on and filled with heat transfer fluid.

### Turning ON the Chiller

1. Verify that the main power is connected to the chiller.
2. Verify that CB1 is in the ON position.
3. Verify that all water and fluid lines are connected and tightened.
4. Press the ON / OFF switch on the chiller controller.  
Wait for compressor 1 and 2 to complete their start up sequence.  
The heat transfer fluid is usually drained from the chiller before shipping.  
If the chiller does not have any heat transfer fluid in the reservoir, low fluid errors will be present; this is normal.

### Turning OFF the Chiller

There are 3 ways to safely turn off the Chiller:

1. **Press the chiller controller ON/OFF switch**  
This will shut down the chiller. High voltage is still present in the chiller's internal high voltage panel.
2. **Press the front panel EMO button**  
The EMO button should be used for an emergency shutdown. This will shut down the chiller. High voltage is still present in the chiller's internal high voltage panel.  
**Note:** The EMO button will remain in the pressed position until it is physically reset. Before resetting the EMO, place the controller's ON/OFF switch in the **OFF** position.
3. **Place CB1 in the OFF (DOWN) position**  
Placing CB1 to **OFF** will remove power from the chiller and the chiller's internal high voltage panel.



#### CAUTION

The chiller's fluid circuit must be purged with dry air before commissioning. Refer to *Fluid Circuit Drying* on Page 2-11 for details. Failure to dry the fluid circuit before commissioning can lead to moisture in the circuit and freezing of internal components.



#### CAUTION

DO NOT turn on the pump if there is no heat transfer fluid in the system. Turning on the pump without fluid could damage the pump.



#### CAUTION

The chiller must be at AMBIENT TEMPERATURE (20.0 to 24.0°C before filling or adding heat transfer fluid. DO NOT add heat transfer fluid to the chiller until it is returned to ambient temperature.



#### Safety Glasses

Wear safety glasses when working with heat transfer fluid.





## Safety Gloves

Wear safety gloves when working with heat transfer fluid.



## ATTENTION

Use only the recommended Heat Transfer Fluid.  
Refer to the chiller nameplate (located on the back panel of the chiller).

## Filling the Heat Transfer Fluid

The best method is to use an optional Pressurized Fill Tank (PFT; inTEST P/N SA227160). If PFT is used see Appendix D: *Automated Fluid Fill Procedure* on page A-24. Fluid may also be poured by hand using the supplied funnel, or by using an optional hand pump. All three methods involve connecting a Fill Tube to the Fill Port.

**Note:** Some Chillers may be equipped with an Automatic Fill System. For more information, see Appendix D: *Automated Fluid Fill Procedure* on Page A-24.

### To Fill the Heat Transfer Fluid:



1. Verify that the chiller is powered on and at ambient temperature (25°C).
2. Open the Fill port by removing the nut. If using the funnel: Clean the funnel and connect it to the Fluid Fill Port. The connection is a quick-disconnect, no tools are required. If using a Hand pump, connect the pump's ½" Flare Fitting to the Fluid Fill Port. Finger tighten the flare fitting at the Chiller Fill Port, then further tighten by 1/8 turn with a wrench.
3. Loosen the Vent Port.
4. The Fluid OK Lamp will illuminate during fill, followed by the FLUID FULL Lamp. Fill until FLUID FULL illuminates. (An empty chiller will require approximately 2 gallons of heat transfer fluid.)  
**Note:** Keep the funnel or pump connected to allow the fluid circuit to vent when the pump is priming.
5. On the chiller controller touch screen, clear any Low Fluid Error if present. To clear the errors, press the error icon and press clear on the error screen.
6. Run the chiller to 25°C. Refer to *How To Run the Chiller to Temperature* on page 3-2. A Low fluid Error may appear and shut off the chiller. This error will persist until the fluid circuit is primed and the heat transfer lines are full.  
**If the error occurs:**
  - Pump more fluid into the chiller until the Fluid Full lamp illuminates.
  - Clear the errors and run the chiller to 25°C again.
  - Repeat the process until the chiller runs continuously.

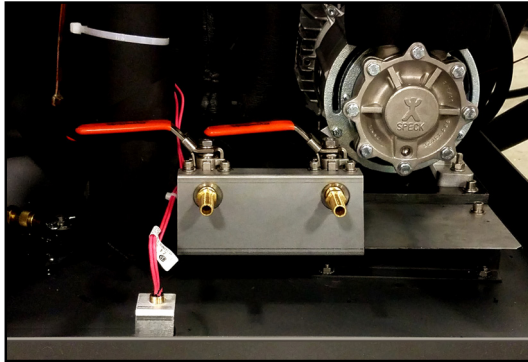
You may need to repeat this process 5 to 7 times to fill and prime the chiller.

## Draining the Heat Transfer Fluid

### To Drain the Heat Transfer fluid:

**Note:** The Left-hand Drain is connected to the inlet of the Pump and Reservoir; the Right-hand Drain is connected to the inlet of the system's Heat Exchanger.

1. Return the Chiller to ambient temperature - **Do Not** service the chiller until it has been returned to a safe temperature.
2. Turn OFF the Chiller (the pump must be off).
3. Remove the Lower Front Access Panel. Locate the Drain Valves; Lower Right).



4. Connect a hose and an empty 20 liter container to the drain. A full chiller will **contain** 1-2 gallons of fluid plus any volume contained in the fluid lines; user should have several containers available to drain all the fluid from the chiller.
5. Open the drains. Allow the fluid to drain into the empty container(s).
6. Once the fluid has stopped draining, close the drain. Close the containers of heat transfer fluid.
7. Replace the Lower Front Access Panel. This completes the Fluid Draining Procedure.

## Drying the Fluid Circuit

Before commissioning the chiller, the fluid circuit must be purged with dry air to remove all moisture. It is recommended that this procedure is performed after shipping or storing the chiller, or after leaving the fluid circuit open for more than 1 hour.



### CAUTION

The chiller's fluid circuit must be purged with dry air before commissioning. Refer to *Fluid Circuit Drying* (below) for details. Failure to dry the fluid circuit before commissioning can lead to moisture in the fluid circuit and freezing of internal components.

To dry the fluid circuit:

1. Make sure the chiller is powered off and drained of heat transfer fluid. The heat transfer fluid lines should be disconnected from the process and/or test subjects.
2. Open the Fluid Vent port.
3. Close the Fluid Fill port.
4. Open the Fluid Drain Valves.
5. Connect a fluid line from the Fluid Out port to the Fluid In port. This will close the fluid circuit, leaving only the Vent port as an entry and the Fluid Drain as an exit for the dry, purge air.
6. Connect 8psi of Dry Nitrogen or Clean Dry Air to the Vent port. The air must have a dew-point below 20°C. The dry air will enter through the Vent Port, circulate through the fluid circuit, and exit from the Drain Valves.
7. Allow the air to purge the fluid circuit for 12 hours. This will remove all moisture from the fluid circuit.

Once the drying procedure is complete, the fluid should be filled and the ports closed.

**Note:** It is recommended that you dry purge the fluid circuit at your process or test subject. Any moisture in the fluid circuit at the process or test subject can be carried into the chiller and freeze internal components.

## Section A: Chiller Controller: Basic Operations

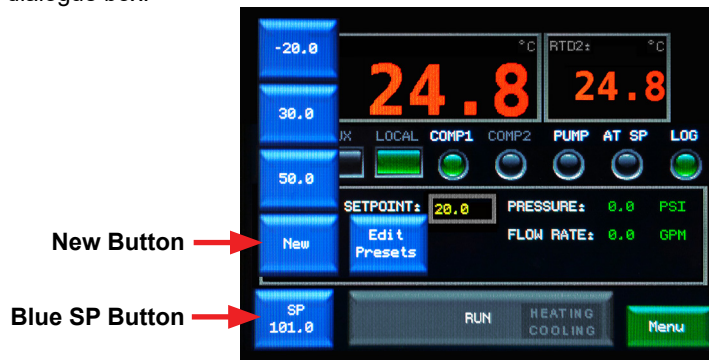
### Optional Features

**OPTIONAL**

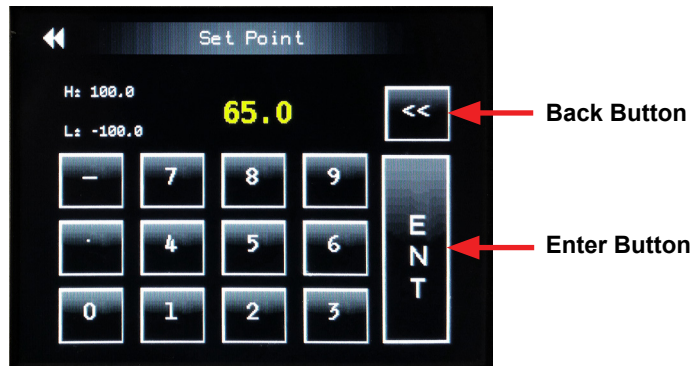
### Running the Chiller to Temperature

**Note:** Depending on the specific model of the user's chiller and its configuration, some features discussed in this chapter may not be available, and the appearance of the various GUI screens may differ slightly from the example shown. All Optional Features are flagged with the **OPTIONAL** icon (left).

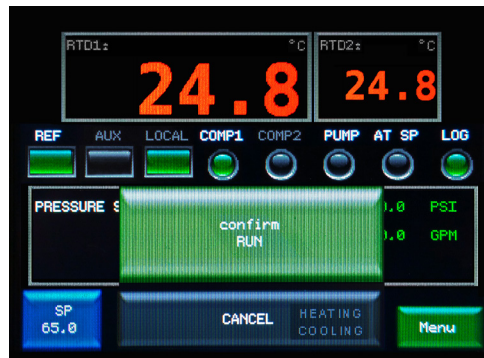
1. Visually check and verify the integrity of all power, communications, and fluid connections.
2. On the touch screen, press the Blue **SP** Button to open the Set Point fly-out menu.
3. In the Set Point fly-out menu, press the **NEW** button. This will open the Set Point dialogue box.



4. In the Set Point dialogue box, enter the set point. To enter the set point:
  - Press the Back Button to delete the current Set Point
  - Press the keypad to set the new Set Point
  - Press the ENTER button to enter the new Set Point



5. Press **RUN** and then **confirm RUN** to run the Set Point.



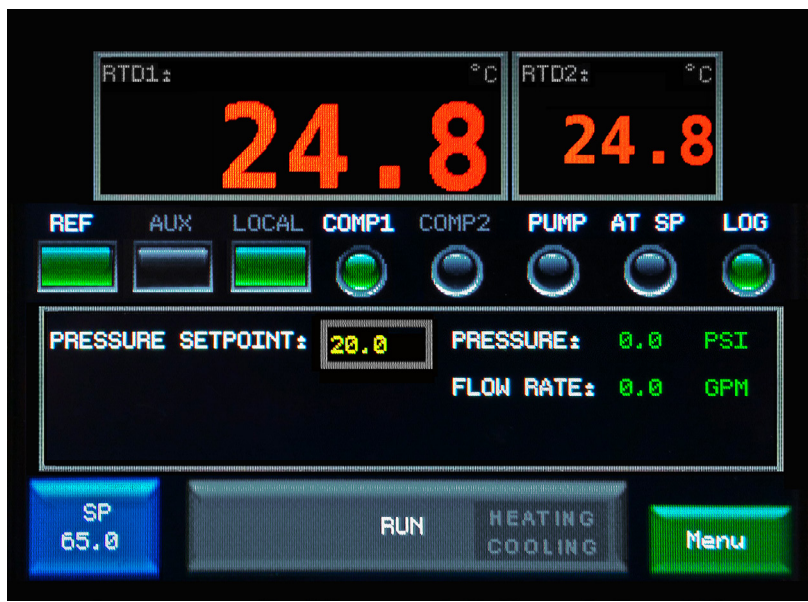
The chiller will now cool or heat to control at the Set Point you have entered.



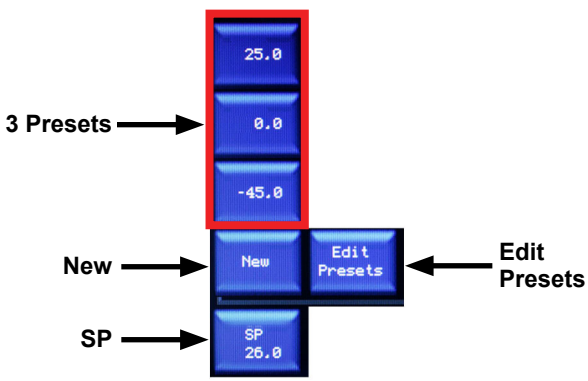


# Section B: Chiller Controller: Advanced Operations

**Screen Descriptions and Uses**  
**Local Mode:**  
**Main Screen**

**Note:** Depending on specific model and features, the appearance of the Main Screen may differ slightly.



Button / Indicator	
RTD1	Displays the current temperature of RTD1
RTD2	Displays the current temperature of RTD2
INDICATE	Indicator Lights illuminate to indicate Chiller Status. <b>LOCAL:</b> Illuminates when the chiller is in local control <b>RSVD:</b> Reserved, Not Used, <b>PUMP:</b> Illuminates when the Pump is on <b>AT SP:</b> Illuminates when the Chamber Interior Temperature is at the Set Point. <b>LOG:</b> Illuminates when Data Logging is occurring. (Will not illuminate if SD Card is not present.)
AUX OUTPUT	For use with an external device of the user's choosing: Press to turn the AUX device 'ON/OFF'. The button illuminates when the AUX device is on. <b>Note:</b> The AUX1 uses a +24VDC signal to control the external device.
<b>OPTIONAL</b> FLOW / PRESSURE SETPOINT	Depending on the configuration of the user's chiller, Optional Flow Control and/or Pressure Control may be available, and the GUI will display either 'PRESSURE SETPOINT' or 'FLOW SETPOINT' accordingly. Press to configure the flow set point (in GPM) of the Heat Transfer Fluid. Flow rates should be between 0.5 and 3.0 or 6.0 depending on the model of the Chiller.
<b>OPTIONAL</b> PRESSURE, FLOW RATE, INDICATORS	With the options described above, Indicators will display the Pressure and Flow of the Heat Transfer Fluid

<p>SP</p>	<p>Press to access the set point flyout menu:</p>  <p>The set point flyout Menu contains:</p> <ul style="list-style-type: none"> <li>• <b>3 Preset Buttons</b> (125.0°, 25.0°, -45.0° in the example above): Pressing a preset button loads that preset as the active set point. After the preset is loaded, use the <b>RUN/STOP</b> button to drive the system to active set point.</li> <li>• <b>New Button:</b> Press to access the <b>Set Point Screen</b>. Using the <b>New</b> Preset button to access the <b>Set Point Screen</b> allows you to change the active set point on-the-fly without changing or overwriting the (3) presets. For details on the <b>Set Point Screen</b>, refer to Local Mode: <b>Set Point Screen</b> on Page 3-8.</li> <li>• <b>Edit Preset Button:</b> Press to access the <b>Edit Preset Screen</b>. The <b>Edit Preset Screen</b> allows you to change the (3) presets. For details on the <b>Edit Preset Screen</b>, refer to Local Mode: <b>Edit Preset Screen</b> on 3-9.</li> <li>• <b>SP:</b> Displays the active set point, i.e. the set point the system will drive to if you press <b>RUN</b>. This set point may be one of the (3) Presets or a set point entered on-the-fly. Pressing the <b>RUN</b> button will run the system to the active set point.</li> </ul>
<p><b>RUN / STOP</b></p>	<p>Press <b>RUN</b> and then <b>Confirm Run</b> to drive the Chiller to the active set point.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;">  <p><b>WARNING</b></p> <p>Press <b>STOP</b> and then <b>Confirm Stop</b> to stop the Chiller from driving to the active set point. It is recommended that you return the system to ambient temperatures before stopping operations and/or shutting down the system.</p> </div> <p>Heating /Cooling Indicators- The <b>RUN</b> button also has Heating and Cooling indicators within the button. These indicators will illuminate to indicate when the system is Heating or Cooling.</p>
<p><b>MENU</b></p>	<p><b>Press</b> to access the <b>MENU</b> flyout. The <b>MENU</b> flyout contains:</p> <ul style="list-style-type: none"> <li>• <b>Go GRAPH:</b> Press to view the Graph. Once in Graph view, this button will change to Go Normal. Pressing Go Normal exits Graph View and returns to Normal View.</li> <li>• <b>Go PROG:</b> Press to enter Program Mode. Once in Program Mode, this button will change to Go Local. Pressing Go Local exits Program mode and returns to Local Mode.</li> <li>• <b>Go SETUP:</b> Press to enter Setup Mode. To exit SETUP Mode, use the Universal Back button at the top left of the screen.</li> <li>• <b>Menu:</b> Press to toggle the Menu open and closed</li> </ul> 

**Local Mode:  
Edit Preset  
Screen**

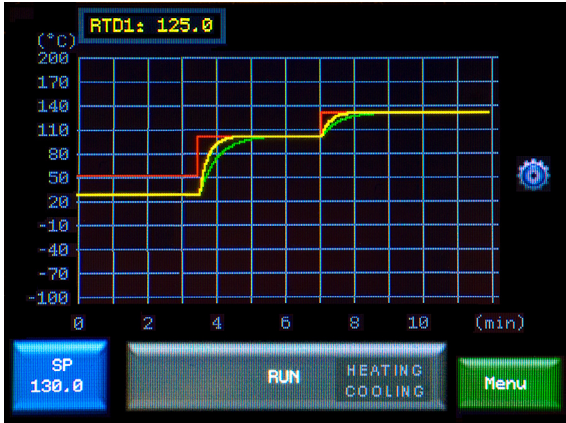


1. Press the (blue) SP button on the Local Mode Main screen to access the SP Flyout Menu.
2. Press the Edit Presets button on the SP flyout menu to access the Edit Set Point screen.
3. Press the set point you want to change.  
The set point screen with numeric keypad will be displayed:
4. Use the numeric keypad to enter the new set point.  
Press Enter to save the change and return to the Edit Press screen  
**Or** press the Universal Back Button to exit without changing.
5. Once returned to the Edit Presets screen press DONE.
6. The preset(s) will now be changed in the SP flyout menu.

For more information see *How To Select and Configure Set Point Presets* on Page 3-3.

**Graph:  
Main Graph  
Screen**

The Graph screen allows the operator to monitor real-time temperature over time

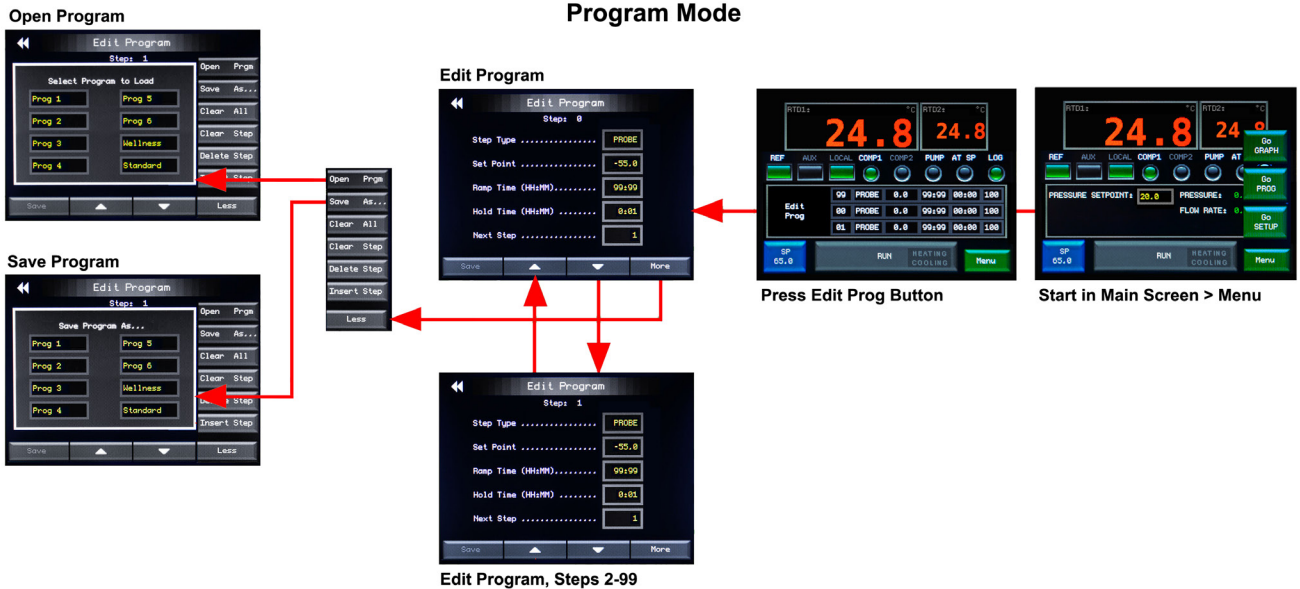


The **Red** line on the graph represents the set point.  
The **Yellow** and **Green** lines represent the current temperature of RTD1 and RTD2.

Button / Indicator	Description
RTD1	Displays the current temperature of RTD1
RTD2	Displays the current temperature of RTD2
STOP / RUN BUTTON	Press to Run the system to the active set point. Press to Stop the system from running to the active set point.
MENU BUTTON	Press to access the Menu flyout. See 'SP' on Page 3-6 for a description of the flyout button.
PARAMETERS ICON	Press to access the Graph Parameters Screen. See <i>Graph: Chart Parameters Screen</i> , next page

**Using Program Mode:**

The Program Mode allows operators to create and run temperature cycling programs. Up to 8 programs with 100 steps in each program can be entered and stored for recall and execution.



The **Edit Program Screen** allows the operator to configure each step of the program. Up to 100 steps may be configured (step0 thru step99). Use the UP (▲) and DOWN (▼) arrows at the bottom of the screen to cycle through the steps.

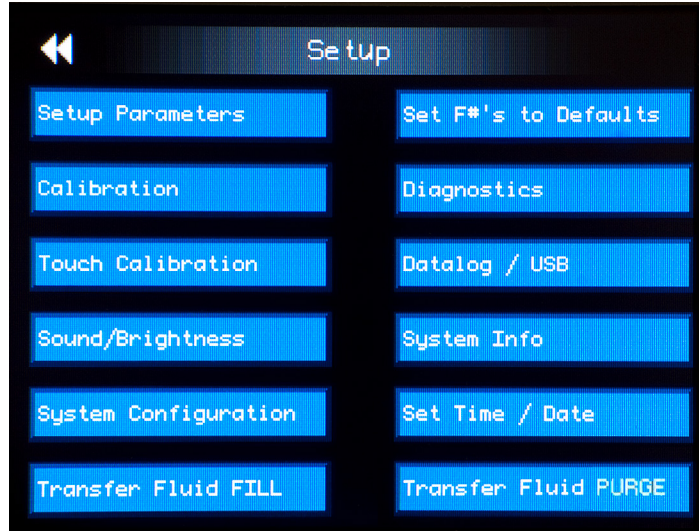
Button/Field	Description
<b>Step Type</b>	<p><b>Press</b> to cycle between step types, the current setting will display in yellow, all other settings will displays in red.</p> <p><b>Choosing Step Type Probe, Loop, or AUX:</b></p> <p><b>Probe-</b> a probe step or a “temperature step” drives the chiller to the set point; the following parameters may be set in a probe step:</p> <ul style="list-style-type: none"> <li>• Set Point: Press to access the numeric keypad and enter the desired set point</li> <li>• Ramp Time (HH:MM): - Set the time it will take to transition to the Set Point The slowest Ramp Time available is “99:59” (99hours and 59minutes). The fastest Ramp Time available is “99:99”. The system will transition as fast as possible (99:99 does NOT mean 99hours and 99minutes).</li> <li>• Hold Time (HH:MM): Sets the amount of time the system will stay at the set point before advancing to the next step of the program. A countdown indicator will appear above the MENU button as the Hold Time elapses.</li> <li>• Next Step: a value between 0 and 100 may be entered 0-99 will advanced the program to that step. 100 is the stop command. Entering 100 as the Next Step will end the program.</li> </ul>

Button/Field	Description
<p><b>Step Type (cont.)</b></p>	<p><b>Loop:</b> A loop step allows the program to 'loop' or cycle through steps in a Program Loop. The following parameters may be set in a loop step:</p> <ul style="list-style-type: none"> <li>• Loop (x1)- specifies the number of loops. Value must be in the 0 - 999 range.</li> <li>• Loop (x1000) - specifies the number of thousands of loops (k-loops). Value must be in the 0 - 999 range. The sum of Loop (x1) and Loop (x1000) is the total number of loops in the step. The maximum number of loops is 999,999.</li> <li>• N/A - this field is <i>Not Available</i> in a loop step.</li> <li>• Starting Step - specifies what step the loop will start on.</li> </ul> <p><b>Note:</b> Setting the starting step to 100 will stop the loop. Setting the starting step to the current step will result in an error and the loop will fail. If Step 3 is a Loop step, do not enter '3' as the starting step.</p> <p><b>Example:</b> A loop count of 5 will cause the program to execute the loop 5 times. If the program loop refers to a previously executed step as the loop start step, then that step will be executed once originally, plus the 4 more times for a total of 5 loops.</p> <p>When looping, a counter will appear at the top of the display screen. This counter indicates the number of loops completed.</p> <p><b>Example:</b> The loop counter indicating '2/ 5' means that 2 loops have been completed of 5, the third loop is in process.</p> <p>Once the loop has finished, the Program will advance to the next Step. It is common practice to set the step following the loop step as a Probe step that returns the system to Ambient temperatures and then shuts off the program (i.e., the Next Step value is set to 100).</p> <p><b>AUX:</b> There are (3) AUX steps available (AUX0, AUX1, AUX2). These AUX steps are used to turn on or off an external device.</p> <ul style="list-style-type: none"> <li>• ON/OFF - set to turn on or off the external device with a +24VDC signal.</li> <li>• Next Step - Next Step - a value between 0 and 100 may be entered <b>0-99</b> will advance the program to that step.</li> </ul> <p><b>100</b> is the stop command. Entering 100 as the Next Step will end the program</p>

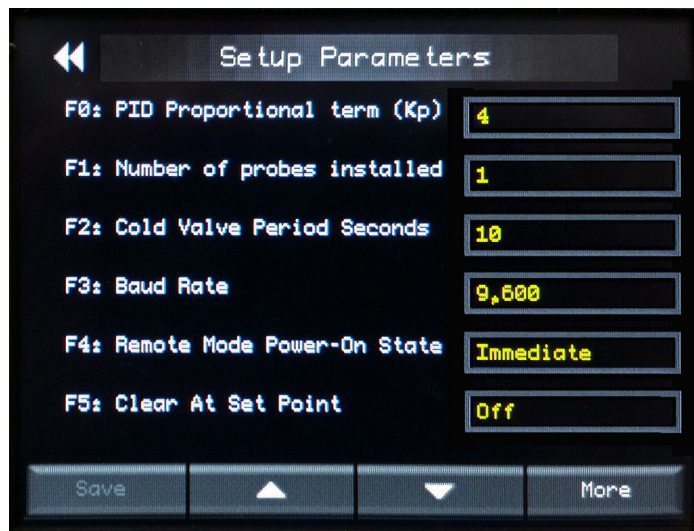


**Setup Mode** Setup Mode is the configuration mode of the controller. Setup Mode allows the operator to set and save Setup Parameters, and access Calibration, Diagnostics, Data Logging, and System Information, described in the following pages. Touch Calibration, Sound/Brightness and Set Time/Date are simple, user friendly controls for those functions. System Calibration is used at the factory to configure the particular unit, and is locked.

**Setup Mode:  
Setup Screen**



**Setup Mode:  
Setup Parameters  
(F#s)**



To access the Setup Parameters Screen, press:  
Menu > Go SETUP > Setup Parameters > enter Password <1969>

The Setup Parameters Screen contains Fields (F#s) for configuring parameters that are critical to the chiller's performance.

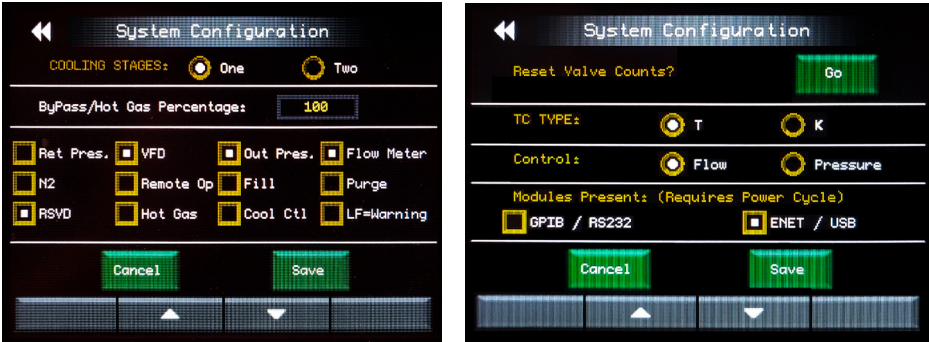
Your chiller is shipped with a Test Data Sheet that documents the parameter configurations at the time of commissioning.

**Note:** These parameter configurations are not the same configurations as 'Factory Default'. 'Factory Default' is for use by the factory when configuring the chiller before shipment.

**Before changing any parameter(s), always record the existing parameters in order to have a record of them, should the need arise to revert to the previous setting(s).**

F#	Description	Parameter / Notes	Remote Command	Default Value
58	Flow Switch Mask Time	Delay upon Flow starting before a Flow Rate error can occur		2
59	PID Kp DUT	DUT Control PID Proportional Term	WDP	.5
60	PID Ki DUT	DUT Control PID Integral Term	WDI	.3
61-65	Reserved			

**Setup Mode:  
Configuration Screen**

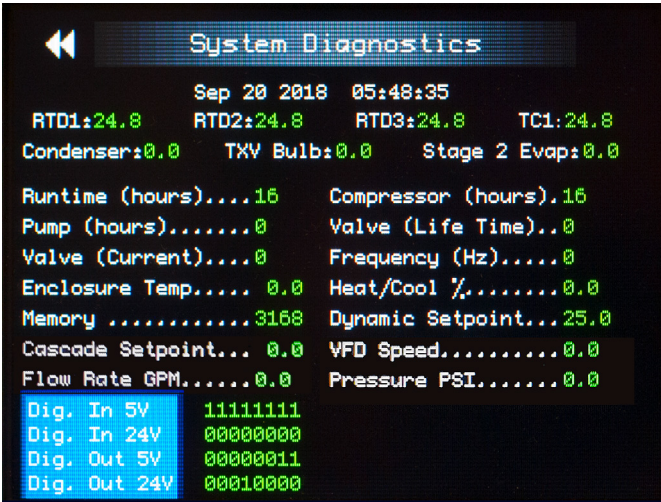


The two System Configuration Screens are for Factory Configuration of the controller for the specific Chiller being shipped, and can be accessed by password only. Options such as Cryo Boost, Purge Valve, Door Lock, Chamber Lamp, and AUX1 Output, as well as GPIB and Ethernet Modules must all be enabled in this Screen.

The **RESET VALVE COUNTS** is used to reset the cycle count of the cryo-valves, and should always be done after a new valve is installed. Valve replacement/installation should always be done by an inTest or inTest Authorized Technician. If necessary, contact inTEST Thermal Solutions for access to the *Controller System Configuration Setup Instructions* (P/N LMS210450) which contains the password and instructions on using these screens.

**Setup Mode:  
System  
Diagnostics Screen**

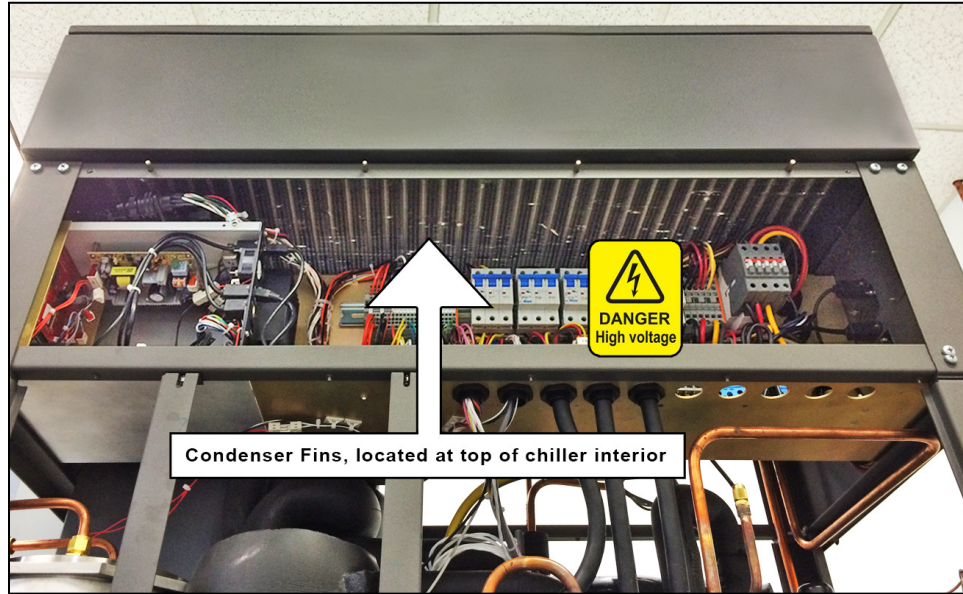
The System Diagnostics screen provides controller and chiller diagnostics including run times, voltages, operating temperatures, and current heating/cooling performance levels.



**NOTE:** systems that are not equipped with the optional flow meter will not display the FLOW RATE GPM information.

**Temp. Chiller Out:** The temperature of the fluid (HTF) recorded at the Chiller's Outlet

Below: Typical view of Condenser Fin location; may vary from Chiller to Chiller



5. Carefully use a vacuum cleaner with a soft brush tip to clean all the dust and debris from the condenser fins. Do not bend or damage the condenser fins.
6. Clean dust and debris from the condenser fans and fan housings. The fans are typically located at the top or rear of the chiller.
7. Once the fans and fins are cleaned, re-install the side panels and resume normal operations.

**Cleaning the Water Inlet Strainer as needed**

A strainer is located behind the panel at the water inlet. Use a wrench to open the strainer housing and access the strainer. Clean the strainer, removing debris, and re-install it in the strainer housing.





## Appendix C: Pressurized Fill Tank: Instructions for Use

### Pressurized Fill Tank: Instructions for Use

The Pressurized Fill Tank Assembly represents a cleaner, faster, more efficient means of filling and maintaining Heat Transfer Fluid in Thermonics Chillers; eliminating the slow fill times, spillage and inconvenience of hand pouring and hand powered pumps.

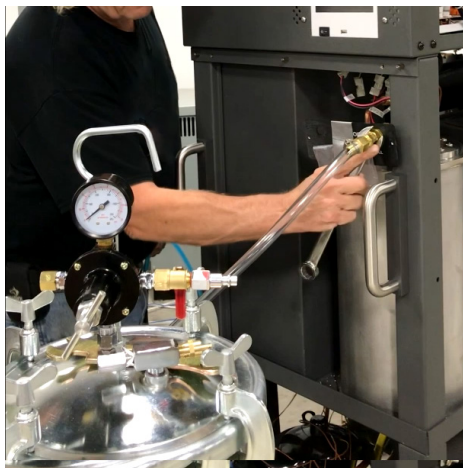
**Note:** The Pressurized Fill Tank (PFT) is available in 4 models, to accommodate the four most common Heat Transfer Fluids (HTFs), and should only be used with the particular HTF for which the tank was intended. Cross-contamination can cause serious damage to the chiller. See the end of this document for the specific PFTs and their ordering information.

**Note:** The Chiller must be at Ambient Temperature, and the Pump must be OFF.

Fill the Pressurized Fill Tank (PFT) with the Heat Transfer Fluid recommended for the specific chiller in operation, replace Tank Cover, then close and tighten all four latches of the Tank Cover with their thumb screws.



Connect the Fill Tube from the PFT to the Fill Port on the Chiller. Finger tighten the Flare Fitting at the Chiller Fill Port, then further tighten by 1/8 turn with a wrench.

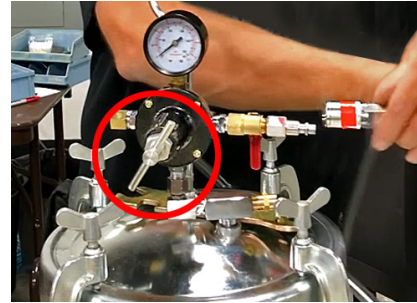


Connect a CDA (Clean Dry Air) Air Supply (30 to 100 PSI) to the Input Air Regulator on the PFT. Open the Ball Valve.

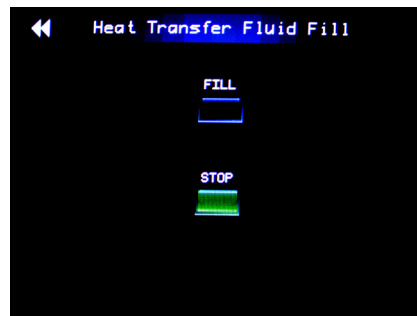
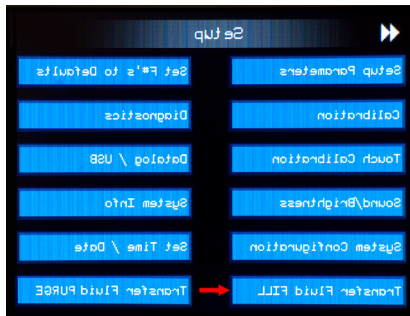


**WARNING: DO NOT ADJUST** the PFT Regulator (shown, circle, below)

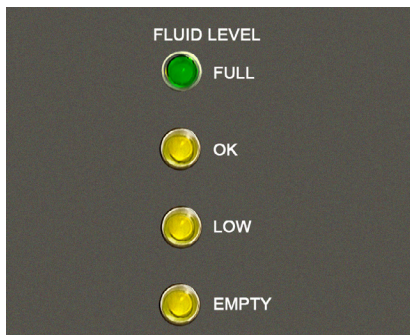
The PFT is Factory Set to 10 PSI. Before starting the fill procedure, always verify that the regulator reads 10 PSI; greater pressure can damage the Fill System.



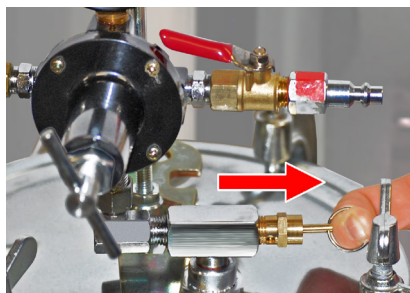
On the GUI Touch Screen, clear any low fluid errors. Then Press the Green MENU Button to navigate to the Transfer Fluid Fill screen: MENU > GoSetup > Transfer Fluid FILL. Press the FILL Button.



The Fill Button on the Operator Screen will light Green, and the Fluid will flow into Chiller. After 2 to 5 minutes, the Chiller Full LED (Green) will light, and the Chiller will automatically close the Fill Valve at the Fill Port. Close the Ball Valve on the PFT.



Vent the Tank by pulling the Pressure Release Pin OPEN, and hold the Pressure Relief Pin open while disconnecting the Fluid Fill Tube from the Chiller. Hold the length of the Fill Tube above the PFT while draining the fluid back into the PFT.





## Appendix D: Automated Fluid Fill Procedure

### Filling Heat Transfer Fluid using the Automatic Fill Feature

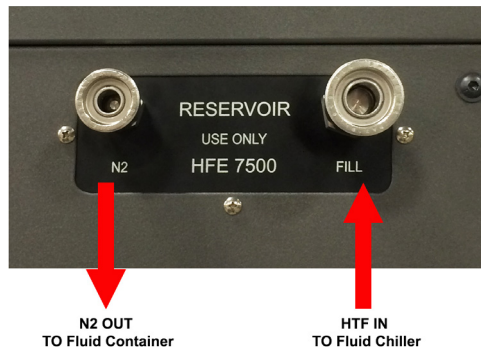
#### OPTIONAL

Some Chillers are not configured to support Automatic Fill, Drain and Purge Procedures. For Manual Fill, see *Filling the Heat Transfer Fluid* on Page 2-10

1. Verify that the chiller is powered on and at ambient temperature (25°C).
2. Verify that 50-80 psi N2 is connected.
3. Verify that pump is off.

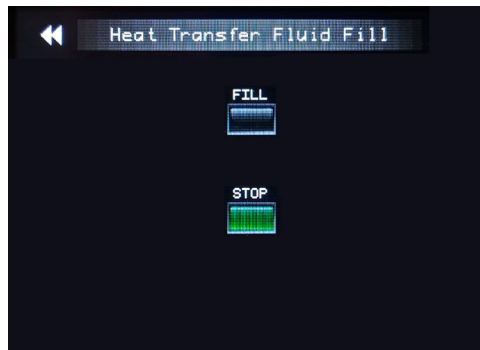
Connect the heat transfer fluid supply container to the chiller:

- a. Connect the fluid container's supply line to the chiller's FILL port.
- b. Connect the fluid container's nitrogen supply line to the chiller's N2 port.



On the touch screen, navigate to the Heat Transfer Fluid Fill screen and touch MENU > Go SETUP > Transfer Fluid FILL.

**Note:** The Heat Transfer Fluid Fill screen is not available if the pump is running or if the chiller temperature is below 15°C.



5. On the Heat Transfer Fluid Fill screen, touch the FILL button.
6. Fill until the Fluid OK and then the FLUID FULL Indicators illuminate. The STOP button on Heat Transfer Fluid Fill screen will also illuminate. The Fluid will automatically stop filling when the FLUID FULL indicator illuminates.
7. At the chiller's front panel N2 port, disconnect the N2 supply line.
8. At the chiller's front panel FILL port, disconnect the Fluid supply line.,
9. On the touch screen, navigate to the main screen.

Clear any errors if present.

Run the chiller to 25°C. See *How To Run the Chiller to Temperature* on page 3-2.

### Priming the Pump

**Note:** Low fluid Errors will appear and shut off the chiller until the fluid circuit is primed. Clear the errors and run the chiller to 25°C again. Repeat the process until the chiller runs continuously. This may take 5-7 repetitions before the chiller runs continuously.

## Appendix E: Warning Light Tower Installation

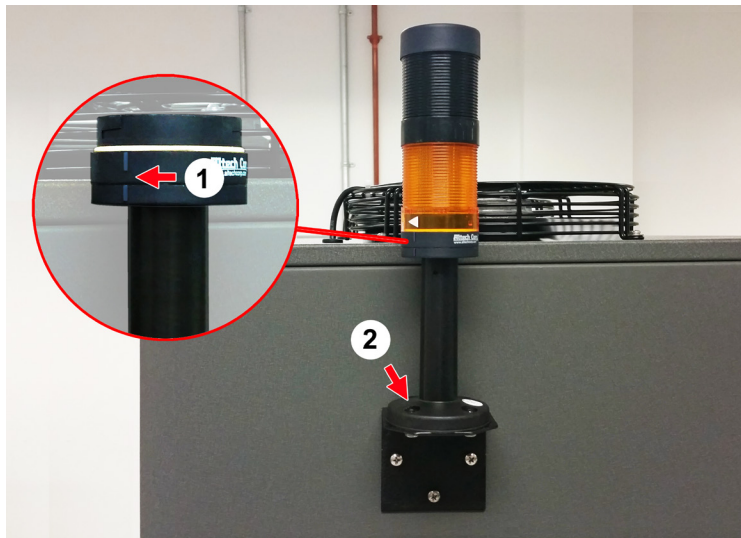
### Light Tower Installation

OPTIONAL

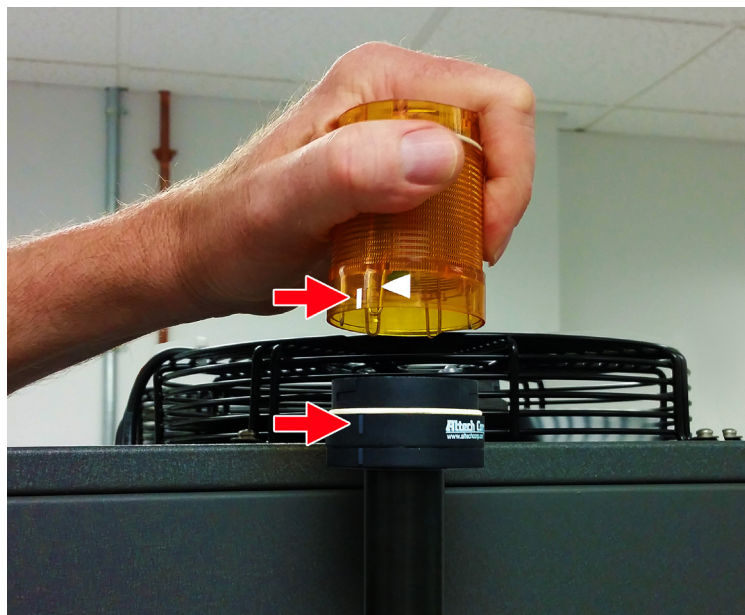
Your Chiller may have been shipped with an optional Light Tower. This appendix describes its installation.

Before installation, it is necessary to verify that the Orientation Tabs (1) necessary for proper installation are facing out for easy access. If they are not facing out and clearly visible, unscrew the 4 screws (2) that attach the mounting shaft to the bracket, rotate the shaft so that they are facing out, and re-attach the screws.

(photo shows light tower fully installed)



Firmly grasp the Light, orient the white line marker on the light with the tabs on the mounting shaft, push down onto the shaft, and rotate the light clockwise to install.



## Appendix F: HTF Filtration System

### OPTIONAL

Chillers may be equipped with an optional Heat Transfer Fluid Filtration Module which, where indicated, meets the demands of the end user's particular process. This system bypasses the normal fluid-out-to-process line to pass (arrows) through the desiccant (A) and particulate (B) filters and exit to the process through the system's Fluid Outlet (3).

The ball valves which control this flow (1) and (2) are open when parallel to the pipe line. When the filtration system is bypassed, the ball valve that controls the flow to the Outlet (1) is open, the ball valve which controls the flow to the filters (2) is closed.

To use the bypass system, first open ball valve 2, then shut ball valve 1. When the Filtration Bypass is in use, and the user wishes to return to direct flow to the outlet, first open ball valve 1, then close Ball valve 2. Following this sequence will prevent the 'deadheading' of the pump.

A Tool shipped with the filtration system (4) is inserted in the hole (5) in the retainer ring of the Particulate Filter, to turn the ring counter-clockwise, which releases the filter for cleaning and replacement.

