T257P Precision Chiller

User Manual

1 TABLE OF CONTENTS

2 INTRODUCTION

Read the entire guide before attempting to connect or operate this product. Keep this guide for future reference.

The T257P is a solid-state thermoelectric heating and cooling system. It is designed to maintain a set temperature of the working fluid that is circulated between the thermal management application and itself.

This guide provides the information required to setup and use the T257P precision temperature control system.

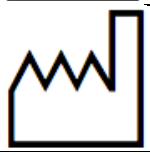
2.1 How to Contact ThermoTek Inc.

If you have questions about the T257P system, or require service, please contact ThermoTek Inc. at:

1200 Lakeside Parkway, #200
Flower Mound, TX 75028
Tel: 972-874-4949 (8:00am – 5:00 pm CT)

2.2 Explanation of Symbols

	IMPORTANT: Read Instructions before Use Before operating the device, please read the entire instruction guide. Keep the guide available for future reference.
	CAUTION. Consult user manual to determine potential hazards prior to operating the device.
	Manufacturer's Part Number
	Device Serial Number
	AC Power
IP20	Ingress Protection Of the Device. Solid Particles > 12.5 mm will be protected from access to hazardous parts. The device does not have any ingress protection against liquids.

	Do NOT Dispose with General Household Waste Please consult local government / city laws on acceptable method of disposal of electro-mechanical systems in compliance with the Waste Electric and Electronic Equipment Directive (WEEE) 2001/96/EC.
	Device Manufacturing location
	Device Manufacture Date Code
	RoHS Compliant

2.3 EMC Precautions

The T257P precision temperature control system is an Electrical Equipment that requires installation precautions regarding electromagnetic compatibility (EMC). Installation is to be completed as specified in the Technical Information Section.

2.4 Warnings: Risk of Electrical Shock

- ⚠ Do not attempt open or service the T257P system. Such attempts could result in injury and / or damage to the product, and will void any warranty.
- ⚠ Do not spill liquids of any kind on T257P system.
- ⚠ Always use the T257P system with a grounded power inlet.
- ⚠ Do not use the T257P system with power cord that is damaged or has exposed copper wires.
- ⚠ Do not use a power cord with lower electrical rating than 250 VAC, 10A.
- ⚠ Do not limit access to the power cord inlet. Only the removal of the power cord disconnects **ALL** hazardous voltages form the device.

2.5 Warnings: Risk of Personal Injury

- ⚠ Use T257P system for its intended purpose, as directed in this guide.
- ⚠ Install the T257P system as specified in the Technical Information Section.
- ⚠ Do not use the T257P with a working fluid temperature of > 45°C
- ⚠ Do not use the T257P system in the presence of flammable gasses, including flammable anesthetics.
- ⚠ Do not place the product on an unstable cart, stand or table. They product may fall, causing serious damage.

2.6 Warnings: Risk of Device Damage

- ⚠ Never block the ventilation openings on the side of the T257P device. Keep the ventilation openings free of debris such as lint and dust.
- ⚠ The device is to be used on a horizontal, level surface, with the reservoir opening at the top of the device. Do not use the device in any other orientation.
- ⚠ Do not install the device such that access to the power switch, power cord inlet and coolant connectors are limited.
- ⚠ Use recommended fluids only.
- ⚠ Do not use deionized water.
- ⚠ Do not use Copper or Brass fittings / cold plates with the T257P Chiller.
- ⚠ Never drop or insert any objects into the T257P device.
- ⚠ Do not drop or cause impact to the T257P device.
- ⚠ Do not operate the T257P device if it is damaged or leaking fluids.
- ⚠ Do not operate the T257P device beyond its rated capacity.
- ⚠ Do not operate the T257P device outdoors.
- ⚠ Do not operate the T257P device in a sealed environment.
- ⚠ Do not operate the T257P device at set points below 5°C without 90% distilled water and 10% inhibited Glycol solution, or 90% distilled water and 10% isopropyl alcohol.

2.7 Unpacking Instructions

When the T257P system arrives, it is important that you carefully unpack the contents and ensure that you have all the equipment required for operation. Please retain the shipping carton for storage and future transportation of the device.

Included in the box, you should find the following:

- User Manual
- T257P Precision Temperature Control system
- Power Cord
- Male QD Fittings in a bag
- Certificate of Conformance

3 DEVICE DESCRIPTION

The T257P is a solid-state, re-circulating cooling and heating system. It uses a pump to transfer temperature-controlled fluid to the thermal management application and itself. The system uses thermoelectric technology and custom electronics to generate the required energy to thermally control the re-circulating fluid. The heat removed from the application is rejected to the environment via the heat transfer system, housed within the device.

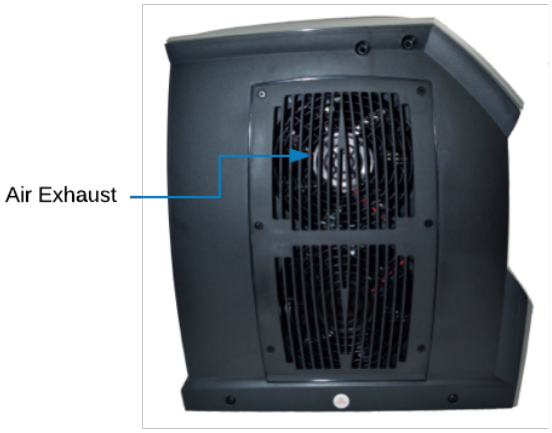
3.1 Features

- Lightweight, portable system
- Ergonomic, easy to carry handle
- User friendly, graphics display with integrated touch control
- Easy to read display
- Universal Input Voltage
- Nominally leak free fluid fittings
- Built in non-volatile memory for retention of user set parameters
- USB and RS232 communication interface
- Quiet mode fan operation
- Optional remote temperature sensor interface

3.2 Device Illustration

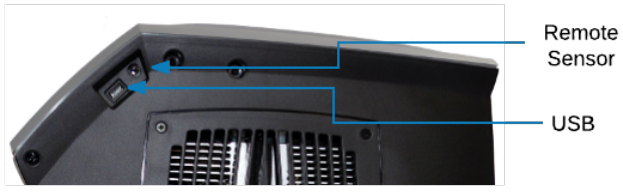
Front View

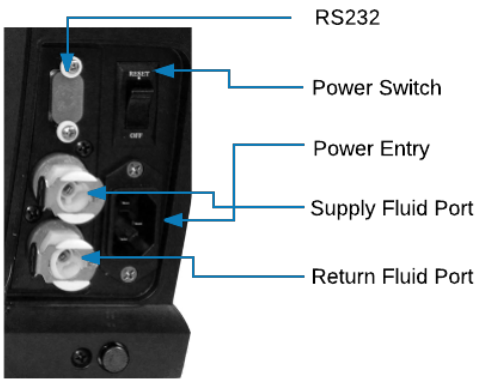
Back View



Left Side View

Right Side View





Right Side View (Detailed)

4 T257P SYSTEM SETUP

4.1 Setting up the T257P Temperature Control System

Follow the steps outlined below:

1. Connect the T257P chiller to the application using fluid transport hoses from ThermoTek or hoses using Colder PLC or PLCD insert fittings, or custom fittings as configured.
2. Keep the chiller horizontal and on a level surface.
3. Make sure there is a minimum 12” clearance and free path for flow of air entry and exit at the left side and right side of the T257P chiller prior to operation.
4. Check to see if the power switch is in the OFF position.
5. Insert the fluid transport hose into the T257P Chiller. If the fittings are the standard Colder quick disconnects, hearing a “click” indicates a secure connection. Check the labels next to the ports for coolant flow direction.
6. Remove the reservoir cap and add coolant to the reservoir until the fluid reaches the bottom of the neck. Please refer to the technical information section for recommended coolants.
7. Close the cap securely to the reservoir. Make sure not to overfill the reservoir.
8. Install the appropriate end of the power cord into the unit.
9. Plug the male end into the AC voltage outlet within the device specified voltage. Please refer to the technical information section for input voltage specifications.

4.2 Startup Procedure

1. Verify that the T257P Chiller is plugged into the appropriate AC voltage outlet.
2. Verify the T257P Chiller coolant ports are connected to the application.
   A. It is recommended that insulated tubing, with minimum 3/8” ID, be used when connecting to the application.
   B. Even if the application flow path is smaller than the recommended ID, it is important to use the recommended ID for the transport hose to minimize system pressure drops.
   C. Do not use Copper or Brass components in the application-wetted path. This will adversely impact the T257P Chiller heat exchanger. See the technical information section for T257P Chiller wetted path component list.
3. Turn ON the T257P Chiller. The power switch is located on the right side of the device, adjacent to the coolant ports.
4. When the unit first powers up a rotating circle will appear on the LCD screen located on the front of the unit.
5. The unit will automatically start and enter the RUN Mode with the fans and pump active and the control system set to control the operating fluid to 20 C or the last set temperature.

6. Open the reservoir and add additional fluid as needed. Close the cap securely to the reservoir.
7. It is possible that the initial startup and fluid transport could generate a “Low Fluid” alarm. Clear the alarm by pressing the “Accept” key. Open the reservoir cap and add fluid. Close the cap and press “Start” to re-start the chiller.
8. When the unit is operating and controlling to set temperature, the RUN Mode screen content will be displayed on the LCD screen.

Note: If the application is located above the chiller, there is a potential for the fluid to overflow the reservoir due to gravity, when the cap is opened with the pump stopped. During these cases, it is recommended that the external tubing sections be individually primed by connecting it to the chiller. When all sections are primed, then connect the external tubing to the chiller and the application, and complete the final priming of the application.

5 RUN MODE OPERATING PROCEDURES

When the T257P Chiller is operating and providing temperature controlled fluid it is said to be in the RUN Mode. During the RUN Mode the screen content shown in figure 5-1 is displayed. The RUN Mode screen shows the instantaneous fluid temperature, the maximum and minimum temperature stability over the past 60 minutes, the set temperate; the sensor used to control the fluid and if applicable, the coolant flow rate.

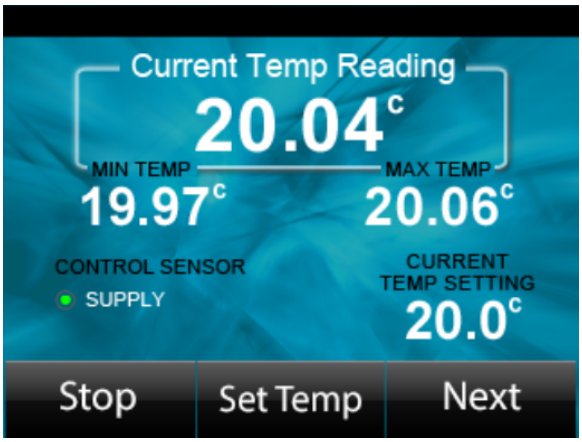


Figure 5-1: RUN Mode Screen

While in the RUN Mode the following features are accessible:

- Set the device in STANDBY Mode
- Set / Change control temperature
- Set / Change pump speed (if applicable)
- Set / Change user specified temperature alarms
- Access the Monitor screen for detailed operational status

5.1 How to Stop and Start the T257P Chiller

1. To stop the T257P Chiller, press the “Stop” button. This will place the system in standby mode with the coolant pump and the temperature control subsystem in idle state.
2. The fans will continue to operate for some time to cool the heat sinks. Once the heat sink temperature is near ambient the fans will enter the idle state.
3. To Start the T257P Chiller, press the “Start” button. This will display the RUN Mode screen with the chiller controlling the fluid to the previous set temperature.

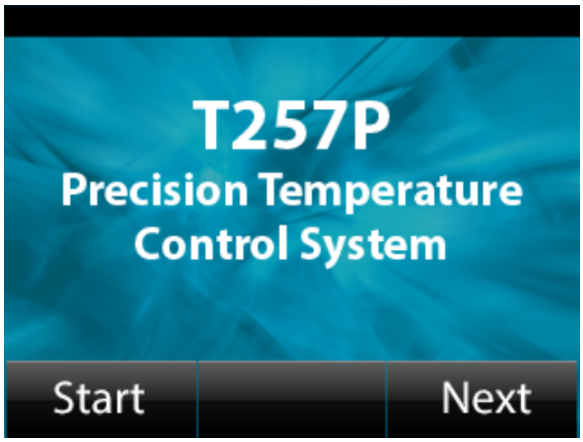


Figure 5-2: STANDBY Mode Screen

5.2 How to Change the Set Temperature

1. From the RUN Mode Screen, press the “SetTemp” button on the screen.
2. This will navigate to the Set temperature screen. This screen will show the current and the new temperature.
3. Press the UP or DOWN arrow to change the temperature to a new setting. The new setting will be shown on the right under “New Temp”.
4. When the arrow buttons are pressed the temperature setting will initially change in 0.1C increments. If the key is held down for more then 5 seconds, the temperature will change in 1.0C increments. To go back to 0.1C steps, let go of the arrow key and re-press it to achieve fine control.
5. Once the correct set temperature is selected, press the “Accept” button to confirm change to the set temperature.
6. If the “Cancel” button is pressed, the new changes are canceled and the previous set temperature will stay active.
7. Pressing the “Accept” or “Cancel” button will return you to the RUN Mode screen.

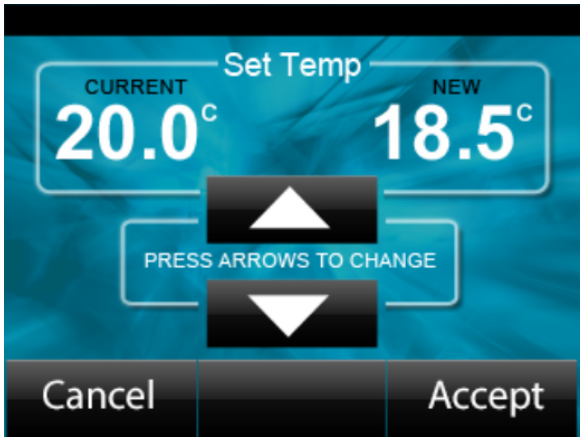


Figure 5-3: SET TEMP Screen

5.3 How to Change the User Specified Temperature Alarm Limits

1. From the RUN Mode screen, press the Next button.
2. On the Selection screen press the Set High Temp or Low Temp Alarm button.
3. This will navigate to the Set Temp Alarm screen. The screen will show the current and the new alarm limits.
4. Press the UP or DOWN arrow to change the temperature to a new setting. The new setting will be shown on the right under “New”.
5. Once the correct alarm temperature is selected, press the “Accept” button to confirm change to the alarm setting.
6. If the “Cancel” button is pressed, the new changes are canceled and the previous alarm temperature limits will stay active.
7. Pressing the “Accept” or “Cancel” button will return you to the RUN Mode screen.

Figure 5-4: User Set Temperature Alarm Limits Screen

5.4 How to Change the Pump Drive (for applicable configurations)

1. Some T257P Systems are equipped with a variable speed pump. For these models, the option to customize the system flow is available via the user interface.
2. From the RUN Mode screen, press the Next button.
3. On the Selection screen press the Set Pump Drive button.
4. This will navigate to the Set pump drive screen. The screen will show the current and the new pump drive.
5. Press the UP or DOWN arrow to change the pump drive to a new setting. The new drive setting will be shown on the right under "New".
6. Once the correct pump drive is selected, press the "Accept" button to confirm change to the set temperature.
7. If the "Cancel" button is pressed, the new changes are canceled and the previous pump drive will stay active.
8. Pressing the "Accept" or "Cancel" button will return you to the RUN Mode screen.

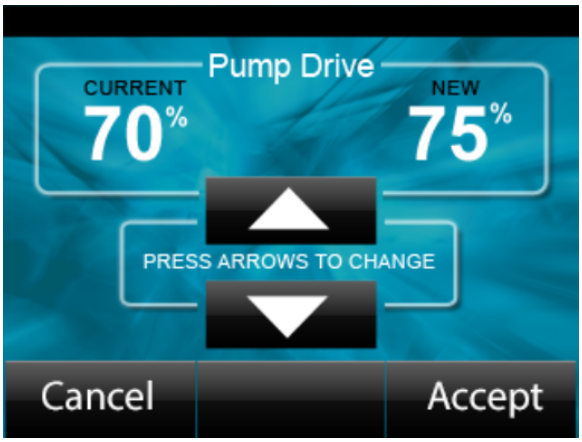


Figure 5-5: User Set Pump Drive Screen

5.5 How to Access the Monitor Screen

1. Press the Next button from the RUN Mode screen
2. On the Selection Screen press the Monitor Button.
3. This will display the monitor screen. The monitor screen shows the detailed operational state of the T257P system. This is a useful diagnostic tool to verify the operation of the device.
4. Press the Next button to cycle through the available monitor screens.
5. Press the Back button to return to the Selection screen.
6. Press the Home button to return to the RUN Mode screen.

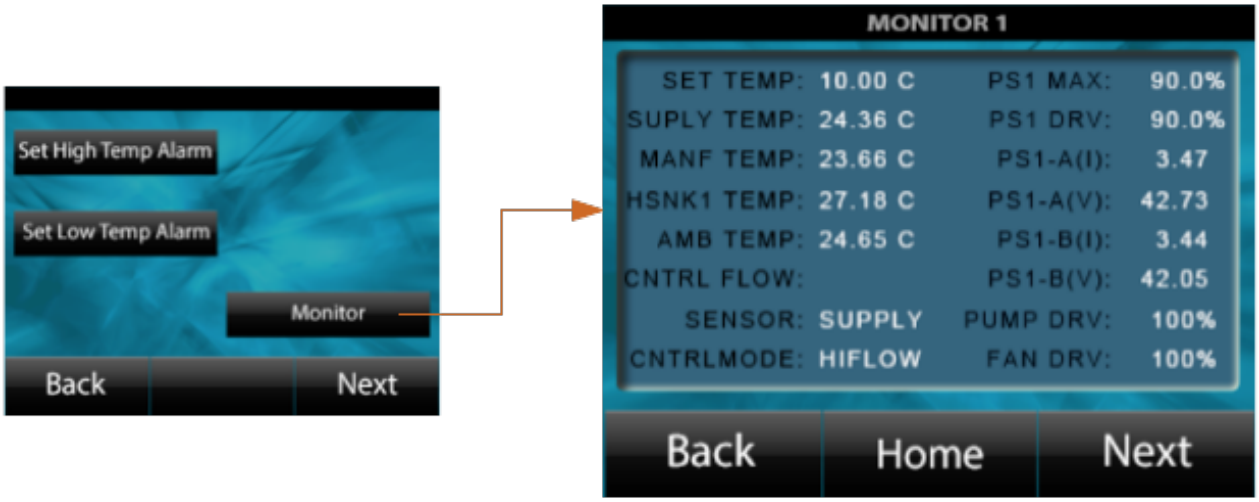


Figure 5-6: Monitor Screen

The monitor screen as shown in figure 5-6, displays the internal system control parameters of the T257P system. From this one can view all the available temperatures, TEC drive levels, pump and fan states to aid in the diagnosis of the system and its installation.

6 STANDBY MODE OPERATING PROCEDURES

When the T257P Chiller is powered on (AC power), and is in an idle state, it is said to be in the STANDBY mode. In the STANDBY state, the chiller pump and temperature control is turned off.

While in the STANDBY Mode the following features are accessible:

- Set the device to RUN Mode
- Set / Change Control Mode
- Set / Change Control Sensor
- Set / Change COM Port
- Set / Change fan speed
- View Alarm History
- View System Info

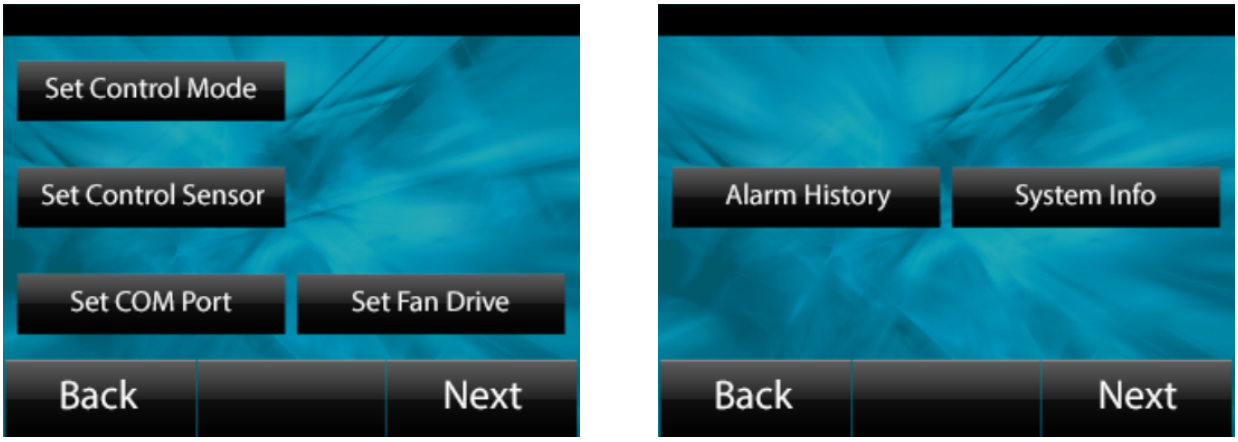


Figure 6-1: Standby Mode Options

6.1 How to Set the Control Mode

The control mode has been optimized to provide temperature stability from a minimum flow rate of 0.75 to 3.5 lpm. Currently only one control mode is available. In the future if additional optimization is required, it will be made available and settable from this selection.

6.2 How to Set the Control Sensor

1. Some T257P Systems are equipped with alternate temp sensors that can be selected as the control sensor. The “supply” sensor is the default selection.
2. Apply power to the chiller.
3. From the STANDBY Mode screen, press the Next button.
4. On the following screen, press the Set Control Sensor button.

5. This will navigate to the Set Control Sensor screen. The screen will show the current and the other available sensors.
6. Press the UP or DOWN arrow to change the control sensor to a new setting. The new sensor setting will be shown on the right under “New”.
7. Once the correct control sensor is selected, press the “Accept” button to confirm changes to the sensor selection.
8. If the “Cancel” button is pressed, the new changes are canceled and the previous control sensor selection will stay active.
9. Pressing the “Accept” or “Cancel” button will return you to the STANDBY Mode screen

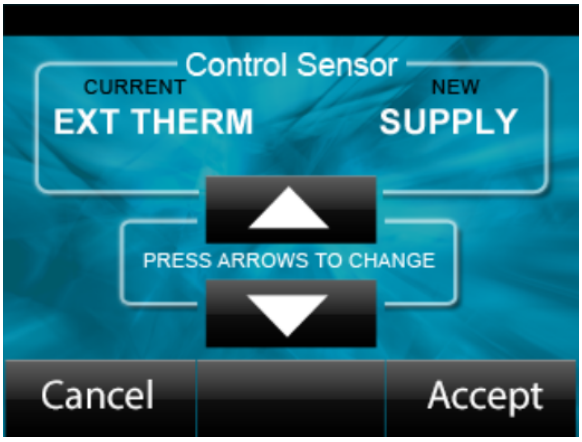


Figure 6-2: Control Sensor Selection Screen

Note:

1. At present only the supply sensor option is available. The remote sensor operation is a planned future update to the product.

6.3 How to Set the COM Port

1. T257P Systems are equipped with alternate communications port that can be selected for remote monitoring and communication. USB Port is the default selection.
2. Apply power to the chiller.
3. From the STANDBY mode, screen press the Next button.
4. On the following screen, press the Set COM Port button.
5. This will navigate to the Set COM Port screen. The screen will show the current and the other available ports.
6. Press the UP or DOWN arrow to change the port to a new setting. The new sensor setting will be shown on the right under “New”.
7. Once the correct com port is selected, press the “Accept” button to confirm changes to the port selection.

8. If the “Cancel” button is pressed, the new changes are canceled and the previous com port selection will stay active.
9. Pressing the “Accept” or “Cancel” button will return you to the STANDBY Mode screen.

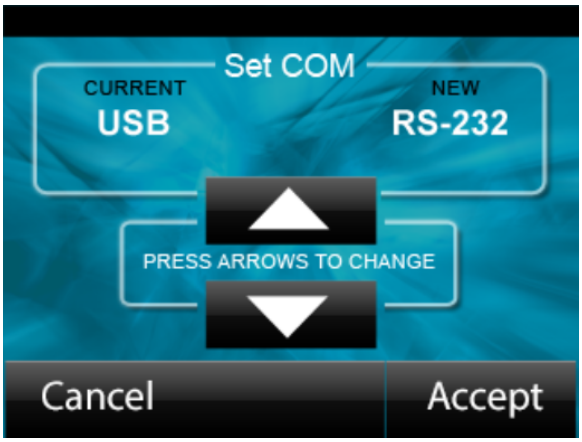


Figure 6-3: COM Port Selection Screen

6.4 How to Change the Fan Drive

1. From the RUN Mode screen, press the Next button.
2. On the Selection screen, press the Set Fan Drive button.
3. This will navigate to the Set Fan drive screen. The screen will show the current and the new Fan drive.
4. Press the UP or DOWN arrow to change the fan drive to a new setting. The new drive setting will be shown on the right under “New”.
5. Once the correct fan drive is selected, press the “Accept” button to confirm change to the fan drive setting.
6. If the “Cancel” button is pressed, the new changes are canceled and the previous fan drive will stay active.
7. Pressing the “Accept” or “Cancel” button will return you to the RUN Mode screen.

Figure 6-4: Fan Speed Selection Screen

If the selection is AUTO, the system will automatically control the fan speed by increasing or lowering the fan speed to maintain the set temperature and cooling requirements.

If the selection is HIGH, the fan speed will remain at its maximum setting. This will improve the time to temperature and will provide the most efficient operation of the system.

6.5 Alarm History

The Alarm History selection shows the last ten alarm events detected by the chiller. This is available for diagnosing and problem resolution of the chiller or installation.

1. Apply power to the chiller.
2. From the STANDBY Mode screen press the Next button twice.
3. On the following screen Press the Alarm History button.
4. After reviewing the alarm history press the “Accept” button to return to the Standby Mode screen.

6.6 System Information

The System Info selection shows the following system information:

- Device serial number
- Device operational hours (Lifetime hours)
- Software part numbers and revision

1. Apply power to the chiller.
2. From the STANDBY Mode screen press the Next button twice.
3. On the following screen, press the System Info button.
4. After reviewing the information, press the “Accept” button to return to the Standby Mode screen.

6.7 Turning the T257P System OFF

1. If the T257P system is operating, press the Stop button to set it in idle mode.
2. Wait 60 seconds and turn he power switch to the OFF position.

7 TAKING CARE OF YOUR T257P SYSTEM

7.1 Checking the Coolant Level

1. Once a week, check the coolant level of the T257P system
2. Set the system in RUN Mode.
3. Open the reservoir cap and check the fluid level in the reservoir. If the level is below the reservoir neck, add recommended fluid to fill it. Please refer to the technical information section for recommended coolants.
4. Close the cap, finger tight, when complete.

7.2 Changing the Coolant within the T257P System

1. Disconnect power to the unit by turning the power switch to the off position.
2. Disconnect the unit from the application by depressing the CPC fittings thumb tabs and gently remove the hose connectors from the unit connectors. If the connections are other than CPC, please refer to the specific connector manufacture's recommended practice for installation / removal of connectors.
3. Connect the drain hoses (with the CPC male connectors on one side and open tube on the other) to the supply and return ports and drain the fluid into a discard vessel.
4. Turn on the unit and set the unit in Run Mode.
5. Keep adding fresh fluid of 500 ml, into the reservoir to circulate it through the system and pump it out to the discard vessel.
6. When all the fluid is emptied from the reservoir, the system will issue a "Low Coolant Level" alarm message. Disconnect the drain hoses and reconnect the Chiller to the application.
7. Add fluid to the reservoir; press "Accept" to clear the alarm.
8. Start the system and add fluid as required for the fluid level to be at the bottom of the reservoir neck.
9. Once complete, close the cap.
10. It is recommended that a coolant change be implemented at minimum, every six months, to keep the system in working order. Based on your use conditions, you may need to perform this PM more frequently.

7.3 Changing the Application Coolant

1. It is highly recommended the fluid contained within the application also be flushed when the T257P Chiller coolant is changed.
2. Follow application guidelines for flushing procedure.

7.4 Cleaning the Exterior of the T257P System

Caution: When clearing the T257P system, make sure you follow the caution statements:

- Do not submerge the unit
- Do not pour water or cleaning fluid over the unit
- Do not disassemble
- Do not autoclave
- Do not steam sterilize
- Do not EtO sterilize
- Do not rub or get the display window wet.

7.4.1 Cleaning the Exterior of the T257P System

1. Power down the T257P system and unplug the AC power cord.
2. Use a damp “static free” cloth and mild household cleaner and wipe all exterior surfaces.
3. Use a dry “static free” cloth to clean the display window.
4. Let the T257P system dry completely before powering on the system.

7.4.2 Cleaning the Heat Sinks of the T257P system

1. Power down the T257P system and unplug the AC power cord.
2. Remove the six screws from the air intake cover on the right side of the device.
3. Use a vacuum to clean the heat sinks.
4. Replace the air intake cover and secure with the six screws.

Note: There are no user serviceable internal parts. To avoid possible electric shock, do not remove the left side, right side or top cover. The warranty is voided if the tamper seal is removed.

7.5 Storing the T257P System

For long-term storage of the T257P system, follow these steps:

1. Power down the T257P system and unplug the AC power cord.
2. Drain all fluid from the T257P system by following section 7.2, steps 1-6.
3. Replace the Reservoir cap.
4. Package the T257P system in its original packaging with the power cord for storage.

8 ALARM MESSAGES

Alarm Message	Alarm Description
Low Coolant Level Alarm	If the coolant level in the reservoir drops below the level sensor activation limit for 5 seconds, the device will issue this alarm. When this alarm is active, the device is stopped and will require user intervention to determine and resolve the cause of the alarm, and once cleared, restart the device.
High Temp Alarm – SW Default	If the supply temperature measures > 53C, for > 2.5 seconds, the device will issue this alarm. When this alarm is active, the device is stopped and will require user intervention to determine and resolve the cause of the alarm, and once cleared, restart the device.
Low Temp Alarm – SW Default	If the supply temperature measures < -8C, for > 2.5 seconds, the device will issue this alarm. When this alarm is active, the device is stopped and will require user intervention to determine and resolve the cause of the alarm, and once cleared, restart the device.
High Ambient Temp Alarm	If the ambient temperature measures > 50C, for > 2.5 seconds, the device will issue this alarm. The system will continue to operate until the fluid temperature reaches the High Temp Alarm – SW Default, at which point the device is stopped.
Low Ambient Temp Alarm	If the ambient temperature measures < -5C, for > 2.5 seconds, the device will issue this alarm. The system will continue to operate until the fluid temperature reaches the Low Temp Alarm – SW Default, at which point the device is stopped.
High Temp Alarm – User Set	If the supply temperature measures > user set high temperature alarm limit for > 2.5 seconds, the device will issue this alarm. The system will continue to operate until the fluid temperature reaches the High Temp Alarm – SW Default, at which point the device is stopped.

Alarm Message	Alarm Description
Low Temp Alarm – User Set	If the supply temperature measures < user set low temperature alarm limit for > 2.5 seconds, the device will issue this alarm. The system will continue to operate until the fluid temperature reaches the Low Temp Alarm – SW Default, at which point the device is stopped.
SYS ERR: Supply Sensor	If the supply temperature measurement is outside the acceptable operational limits for > 5 seconds, the device will issue this alarm. When this alarm is active, the device is stopped. This alarm indicates there is a potential failure of the supply temp sensor. Turn off power to the device for 60 seconds. Power up the device and if the alarm re-appears contact ThermoTek customer service for further assistance.
SYS ERR: “XXXX”	If the T257P alarm monitoring subsystem detects an internal failure, it will issue a critical alarm called system error (SYS ERR) followed by a description of the error code. If such an error were to be presented, power off the unit for 1 minute. Power the unit back on and set it to Run Mode. If the alarm re-appears, please call ThermoTek Customer Service for an RMA number to return the device for service.

9 ACCESSORIES / REPLACEMENT PARTS

The following accessories may be purchased from ThermoTek to be used with the T257P system

Power Cords:	
0P3C12MGCP	Power Cord, USA, 13A/110V, Medical Grade, 2.5 meter
0P3W10A8EU	Power Cord, EU, 10A/250V, 2.5 meter
0P3W10A8UK	Power Cord, UK, 10/250V, 2.5 meter
0P3W10A8AZ	Power Cord, AU/NZ, 10/250V, 2.5 meter
CPC Quick Disconnects:	
0P2EV22006	CPC Quick Disconnect, Male, Valved, ¼ Flow, 3/8 Barb, Acetal
0P2EV22004	CPC Quick Disconnect, Male. Valved, ¼ Flow, ¼ Barb, Acetal
0P2E100412	CPC Quick Disconnect, Female, Valved ¼M NPT, Acetal (QD on unit)
0P2ES17006	CPC Quick Disconnect, Male, Non-Valved, ¼ Flow, 3/8 Barb, Aceral
0P2ES17004	CPC Quick Disconnect, Male. Non-Valved, ¼ Flow, ¼ Barb, Acetal
0P2ES10004	CPC Quick Disconnect, Female, Non-Valved ¼M NPT, Acetal (Non-Valved QD on unit)
0P2EPLC300	CPC QD Sealing Plug, Male (for 0P2ES10004)
Other:	
0P2DCAPBTL	Reservoir Cap, Vented
0P2CT255AF	Air Filter, 5” x 9.5” (Optional Intake Air filter for dusty environments)
0P2H257DBX	Box, Device Packaging, T257P
0P2H257DFM	Foam, Device Package Set, T257P

Note:

1. Use of an air filter may reduce the cooling capacity of the system by approximately 10%.

10 TECHNICAL SPECIFICATIONS

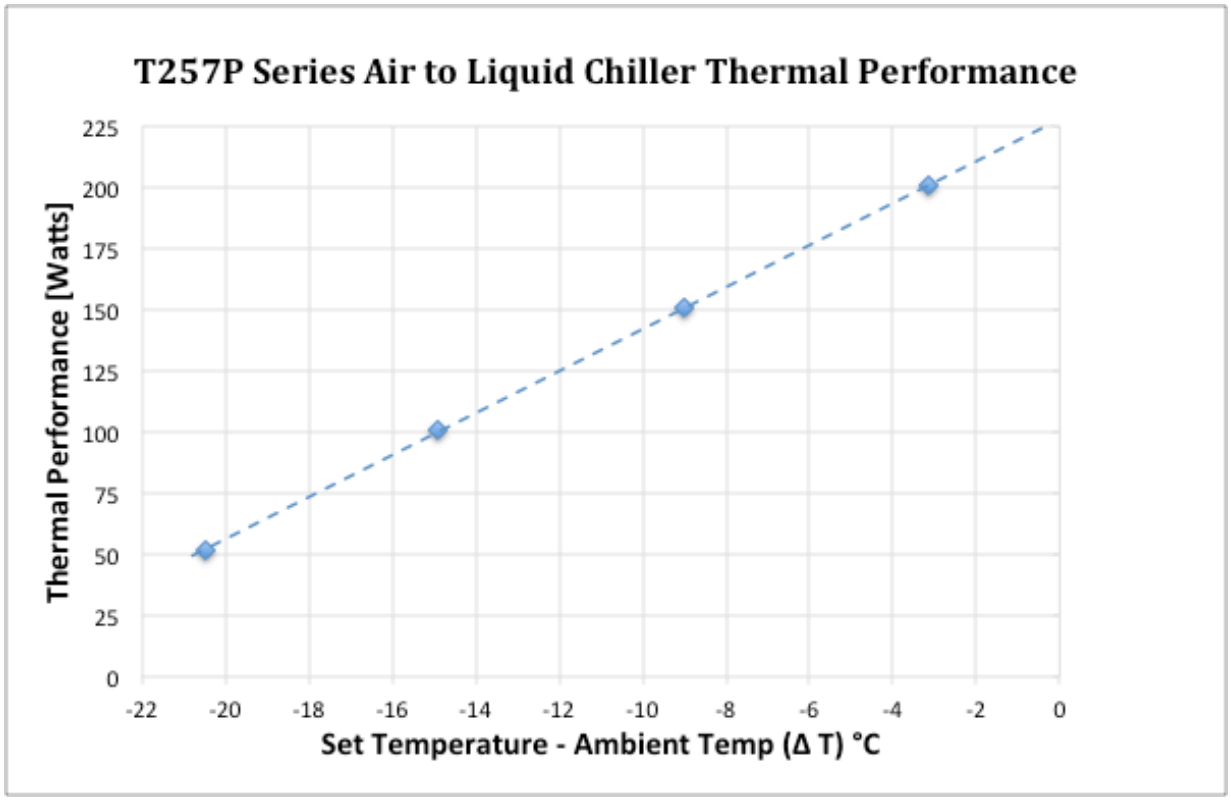
10.1 T257P System Technical Specification

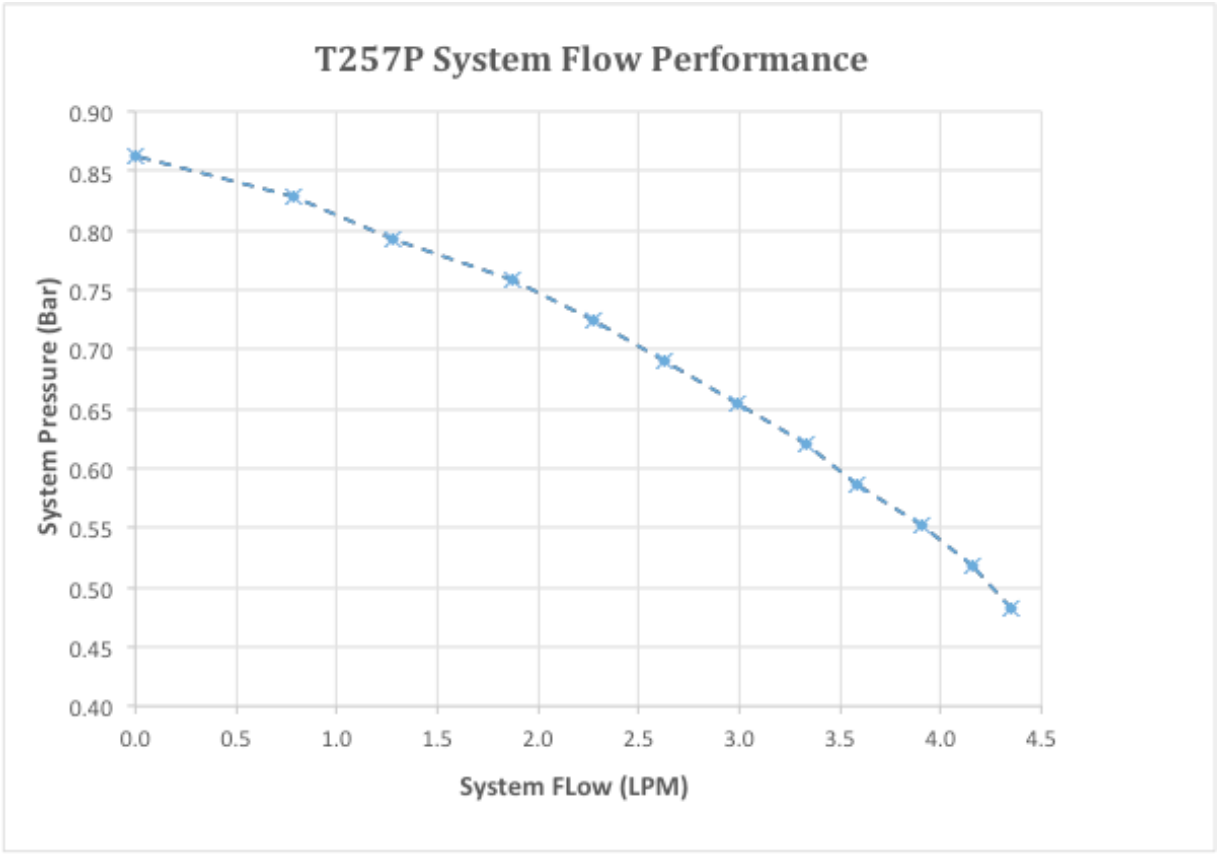
Device Dimensions:	13.2”H x 12.00”D x 6.6”W [335mmH x 305mmD x 167mmW]
Device Weight:	18.75 lbs [8.5kg]
Device Port Type:	Colder PLC Coupling Inserts (std)
Device Input Voltage:	100-240 VAC
Device Input Frequency:	50/60 Hz
Device Input Current:	6.0 Amps
Device Operating Temperature Limits:	10C to 40C (Indoor Use Only)
Device Operating Humidity Limits:	15% to 80% Non-Condensing
Device Operating Atmospheric Pressure Limits:	85 – 101 kPa
Device Operating Altitude:	0 – 2,000 meters
Device Transport and Storage Limits:	-40C to 70C 10% to 95% Non-Condensing
Device Control Temperature Range:	5C to 45C with Coolant Option 1 and 2 -5C to 45C with Coolant Option 3
Device Cooling Capacity:	225 Watts with control set point at ambient temperature
Device Pumping Capacity:	Pump Option 1: 3.5 LPM Open Flow / 12 psi Max Pressure @ 0 Flow Pump Option 2: 3.5 LPM Open Flow / 20 psi @ 0 flow*
Temperature Stability:	+/- 0.1C @ >2 LPM flow, constant load at a constant ambient (not to exceed system capacity)
Heating/Cooling Function:	Yes
Communication Interface:	USB (std), RS232 (std)
Communication Protocol:	ThermoTek TTK Communication Protocol
Recommended Coolants:	Option 1: Distilled Water Option 2: 95% distilled water and 5% isopropyl alcohol mixture prevents bio growth Option 3: 80% distilled water and 20% inhibited Glycol mixture for set temperatures below 5C

Note:

1. The performance of the chiller is based on recirculating water with >= 2.0 LPM flow.
2. Individual applications may affect chiller performance. Consult ThermoTek for application assistance.
3. Pump Option 2 is a future configuration
4. Specification subject to change without notice.

10.2 **T257P System Performance**





Note:

1. The performance stated in the above chart has a performance tolerance of ± 10 %.
2. The thermal performance stated above is based on recirculating water with >= 2.0 LPM flow.
3. The thermal performance stated above is with the fan speed set to 100%.
4. The flow performance was recorded with the coolant fluid controlled to 20°C and altitude < 500 meters.
5. Individual applications may affect chiller performance. Consult ThermoTek for application assistance.
6. Specification subject to change without notice.

10.3 T257P Communication Protocol

The T257P Communication protocol is available from ThermoTek Inc upon request. TTK Serial Communication Protocol (Document PN: 0P1GTTKC0M-3) is the latest implementation to address the new features of the T257P system.
For new applications ThermoTek recommends the use of this protocol.

The legacy T255P communication protocol is also supported by the T257P system for backward compatibility.

10.4 T257P System Wetted Path Materials

Heat Transfer Manifold	Aluminum with Electro less-Nickel plating
Tubing 1. Pre formed metal tubing 2. Flexible Hose Tubing	 304 Stainless Steel Synthetic rubber
Temperature Sensor	316 Stainless Steel
Colder CPC Connectors	1. Acetal body and valves, and 316 Stainless Steel springs and Buna O-ring 2. Chrome plated brass body, Acetal Valve, 316 Stainless Steel springs and Buna O-ring
Coolant Reservoir	HDPE with Silicon O-ring
Level Switch	PVC with Buna O-ring

10.5 T257P System – Conformance Information

Electrical Safety:	IEC 61010-1 3rd Ed
Electromagnetic Compatibility (EMC):	IEC 61326-1 2nd Ed
Waste Electrical & Electronic Equipment (WEEE):	Directive 2002/96/EC
Restriction of Hazardous Substance (RoHS):	Directive 2002/95/EC

10.6 T257P System – Guidance and Manufacture's Declaration – Electromagnetic Emissions

This device has been tested and found to comply with the limits for Electrical equipment for measurement, control and laboratory use, per IEC 61326-1. These limits are designed to provide reasonable protection against harmful interference in typical installation for the stated use.

This equipment generates and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity.

There is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to other devices, which can be determined by turning the equipment off and on, the user can try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving device.
- Increase the physical separation between the equipment and other device(s).

- Connect the equipment into an outlet or circuit different from the one where the other device(s) are connected.
- Connect an external 20 AWG ground wire from the eqi-potential ground tab on the right side of the chiller to earth ground.

11 WARRANTY

Limited Warranty Terms: ThermoTek, Inc. ("ThermoTek") warrants to the immediate purchaser from ThermoTek or an immediate purchaser of an unused unit from an authorized distributor of ThermoTek products, that any T257P system will be free from defects in workmanship and material under normal use for one year after the date of purchase. ThermoTek warrants to the immediate purchaser from ThermoTek, or an immediate purchaser of an unused wrap from an authorized distributor of ThermoTek products, that ThermoTek single patient use wraps will be free from defects in workmanship and material under normal use for only the first use of the wrap.

This Limited Warranty covers only defects in material or workmanship. Therefore, it does not cover any other claim, service, defect, condition, or damage, including: installation, set-up, or instructions or recommendations on use; accidents, tampering, improper product selection, misuse, neglect, or abnormal use; use of parts, accessories or fluids that are incompatible or adversely affect operation, performance, or durability; unauthorized service, repair or alteration; excessive moisture or humidity; normal wear and tear; cleaning or any condition caused by any dirt or foreign substance on or in the product; or damages resulting from shipping. **Installation or use of the product or any portion thereof in a manner that does not comply with the Operating Instructions voids the warranty. Any alteration or modification that changes the product's effectiveness or intended use voids the warranty.**

ThermoTek will, at its option, repair or replace within a reasonable time any product that is found to have a defect in material or workmanship under normal use during the applicable warranty period. This is the immediate purchaser's sole remedy. Any warranty on a repair or replacement expires at the same time as the warranty expires or would have expired on the original product. The product must be returned at the immediate purchaser's expense to an authorized ThermoTek Service Center for warranty service. ThermoTek will pay for the expense of returning the product receiving warranted service to the immediate purchaser. The immediate purchaser is responsible for and will be assessed a fee for test and calibration if no defects are found with the product.

Because ThermoTek updates and advances its products and technology, ThermoTek reserves the right to modify or improve the design of any product without assuming any obligation to modify any product previously manufactured.

Any product returned for warranty must have a Returned Materials Authorization ("RMA") number on the outside of the container or package. Please call ThermoTek Customer Service at 877-242-3232 for an RMA number. A ThermoTek unit must be drained of all fluids before return. Returned products must be in the ThermoTek approved box and packing material to ensure safe transport. To quickly process your warranty repair request, please have the following product information, which is located on the serial plate located on the back side of ThermoTek products, available: (1) Model Number, (2) Serial Number, (3) Description of Problem, and (4) Contact Name and Telephone Number.

Disclaimer of Warranties: ThermoTek disclaims all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose. the product is sold "as is" and NO WARRANTY OR AFFIRMATION OF FACT, OTHER THAN AS SET FORTH IN THE LIMITED WARRANTY ABOVE, IS MADE OR AUTHORIZED BY THERMOTEK (whether in the past or future). thermotek has not made any affirmation of fact or promise relating to the product being sold that has been relied upon or become the basis of a bargain. This limited warranty is not transferable or made to any person other than the original purchaser of the product from ThermoTek OR THE ORIGINAL PURCHASER OF THE PRODUCT FROM AN AUTHORIZED DISTRIBUTOR OF THERMOTEK. To the extent any disclaimer is not permitted by applicable law, any warranty shall expire upon the expiration of the limited warranty provided above, and recourse is limited to repair or replacement as provided above.

DISCLAIMER AND Limitation of Liability: the foregoing sets forth thermotek's only obligations and the exclusive claim and remedy against thermotek, regardless of whether such claims are based on warranty, contract, tort or any other theory. ThermoTek Disclaims and is not responsible for direct, special, incidental, consequential, or other damages, costs or loss. ThermoTeK's liability is limited to repair or replacement as provided above. In the event the repair or replacement warranty above is determined to fail OF its essential purpose, the foregoing terms and provisions apply except that, instead of repair or replacement, the exclusive remedy is thermotek's repayment of the purchase price less an amount equal to eight percent of the product's purchase price multiplied by the number of months that the product was available to or in use by the purchaser.

Other Limitations: ThermoTek assumes no responsibility for the accuracy or completeness of the information presented, which is subject to change without notice. Any mention of non-ThermoTek products or services is for informational purposes only and is not an endorsement, recommendation or representation. If any provision of this Limited Warranty is held to be invalid or unenforceable, such provision shall be fully severable and the remaining portions of the Limited Warranty shall remain in full force and effect.

PN: 0P1D257MEN Rev: X1 [08/2016]

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1200 Lakeside Parkway, #200
Flower Mound, TX 75028
Website: www.thermotekusa.com
Tel: (001) 972-874-4949