

NanoTherm3 Industrial™ User Manual



1. Introduction

Please read the entire manual carefully before trying to operate the NanoTherm3 Industrial™ system. It is unsafe to start using the NanoTherm3 Industrial system before reading the entire user manual.

At ThermoTek, we pledge to provide the highest quality product with excellent support and service. If we can do anything to make your NanoTherm3 Industrial experience better, please do not hesitate to contact us.





User Assistance Information:

The NanoTherm3 Industrial system is manufactured by:

ThermoTek, Inc.
1200 Lakeside Parkway #200
Flower Mound, TX 75028
(972) 874-4949
(877) 242-3232 (toll free service number)

Visit us on the web at www.thermotekusa.com

Icons Used for Warnings and Cautions:

-  Electrical Shock Risk
-  Burn Risk
-  Frostbite or Cryogenic Burn Risk
-  General Caution



Do not drink or ingest the coolant mixture.

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2. General Warnings and Cautions

2.1 Precautions:

When using the NanoTherm3 Industrial system, basic safety precautions should always be followed to reduce the risk of fire, electric shock and personal injury. Please read the entire manual carefully before trying to operate the unit. Precautions include:

2.2 Warnings:

-  Never push objects of any kind into the unit through the air filter or frame.
-  Never spill liquid of any kind on the unit.
-  Do not overfill the reservoir of the unit.
-  If the unit gets wet, unplug the unit from the wall and allow the unit to dry before use.
-  The unit must be operated with the supplied power cord and plugged into a 3-prong grounded outlet.
-  Do not operate the unit if it has any noticeable or physical damage or is leaking fluid.
-  Do not operate the unit with a damaged or frayed power cord.
-  The unit is not intended to be used in a wet environment or when relative humidity is greater than 60%.
-  Do not spray the unit with any water solvents or cleaners.
-  Do not drop the unit or cause impact to the unit.
-  Do not use this device without the supplied air filter.
-  Do not use near equipment that generates electromagnetic or other interferences as this may be harmful to the unit.
-   Do not touch the heat sink fins on the sides of the unit during or immediately after operation.
-    Do not stick a finger or any other foreign objects into the reservoir.
-  Do not attempt to sterilize this device by any means.



Use only the approved coolant in the NanoTherm3 Industrial unit.



Slots and openings in the cabinet are provided for ventilation to protect the unit from overheating. These openings must not be blocked or covered at any time except by the supplied air filter.



Observe all warning labels. Never remove the warning labels.



Do not drink or ingest the coolant.

3. NanoTherm3 Industrial Device Description

The NanoTherm3 Industrial system is an electronic heating and cooling system. The NanoTherm3 Industrial system provides precisely controlled fluid temperature for cooling and heating applications. This lightweight, portable system utilizes solid-state thermoelectric heat pumps that heat and cool with electricity in a safe and environmentally friendly manner.

3.1 Features:

- Fluid Temperature Range between 10°C – 45°C
- Lightweight and Portable Package
- User-Friendly Interface
- 110-240 VAC Power Input
- Easy to read graphical Display
- Quiet Operation
- RS232 Communication

3.2 General Specifications:

- Weight: 15 lbs.
- Hose Length: 7 ft.
- Hospital Grade Power Cord
- Dimensions: 5.25”W x 8.75”H x 14.25”D
- Operating Fluid: 90% Distilled Water/10% Isopropyl Alcohol

3.3 Device Description:

Rear Panel Connections

“Fluid In” Fitting

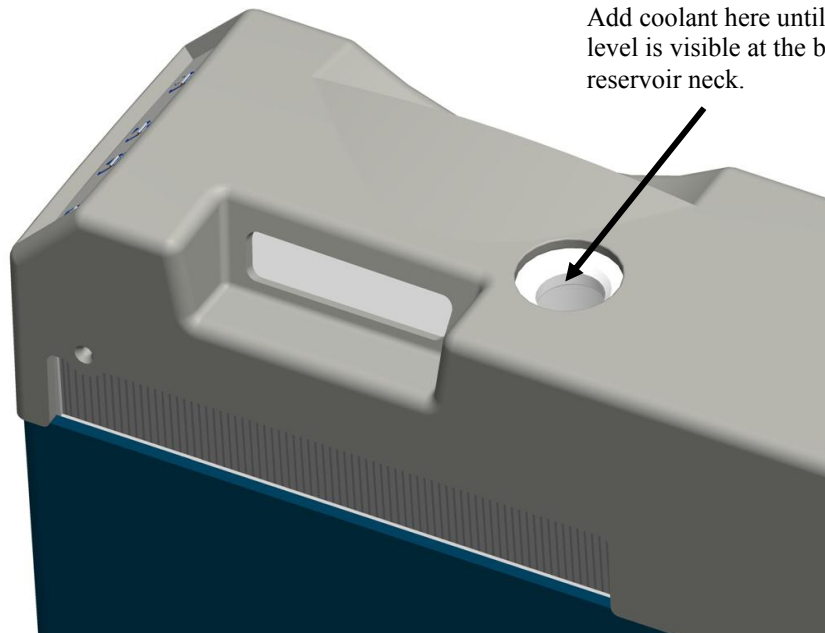
“Fluid Out” Fitting

USB Port



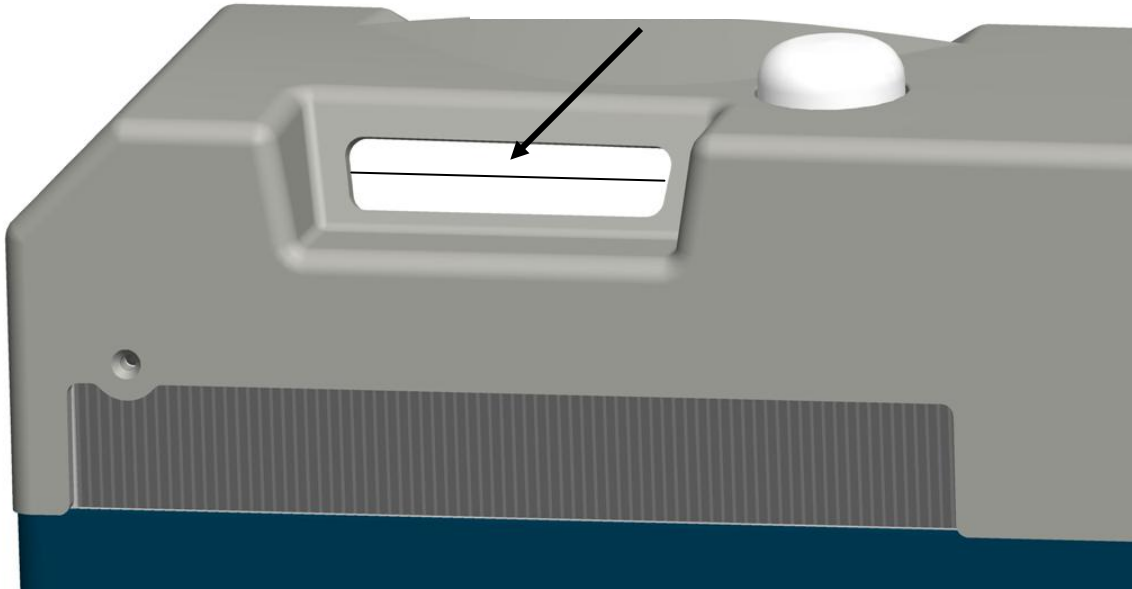
Coolant Reservoir Fill Location

Add coolant here until the fluid level is visible at the base of the reservoir neck.

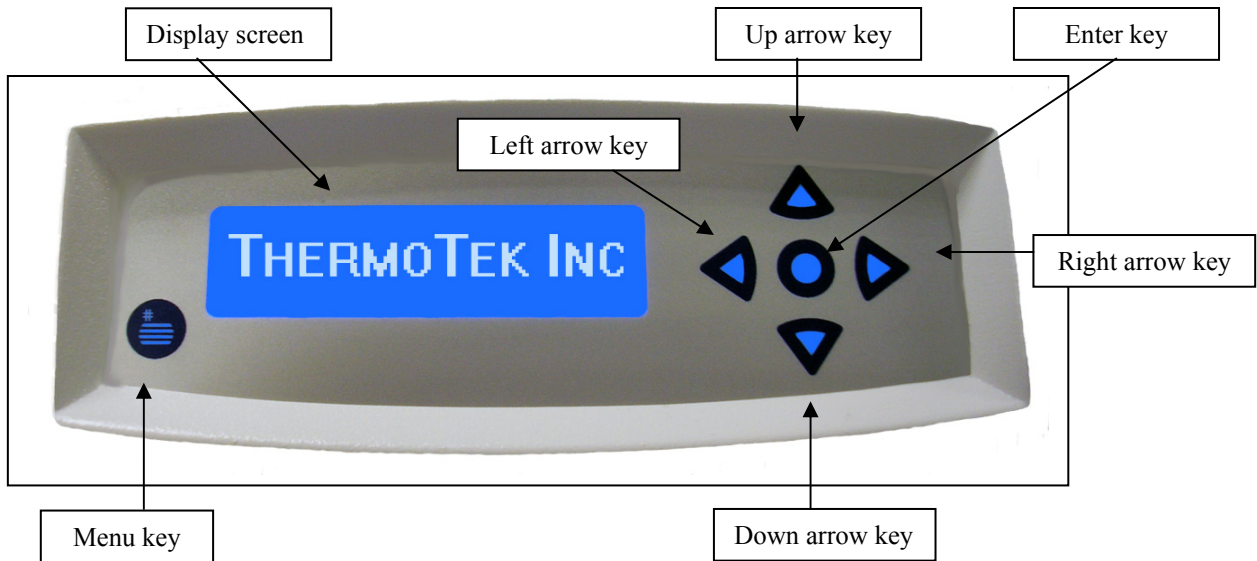


Reservoir Coolant Level Window

If the coolant level can be seen lower than halfway down the window, more coolant should be added. See Chapter 6 for instructions on how to add more coolant.

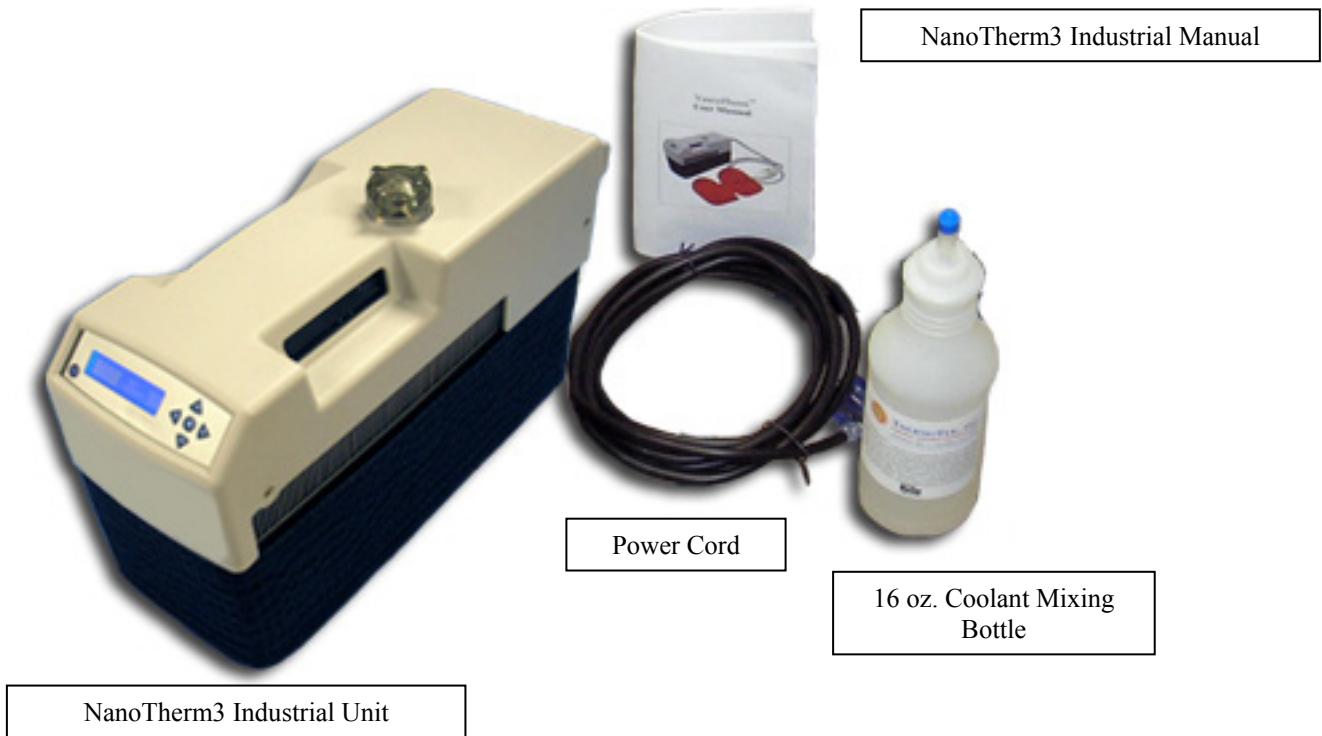


Keypad Interface and Illuminated Display



4. Unpacking Your NanoTherm3 Industrial System

When you first unpack the carrying case you should have the following items:






All of these items are needed for safe system operation. If any of these items are missing from the carrying case or shipping container, please contact ThermoTek Customer Service at 877-242-3232.

Immediately upon unpacking your NanoTherm3 Industrial System, inspect your unit. If the unit shows shipping damage, contact the transportation company and file a freight damage claim. **Be sure to retain all packing material and the original box or case.**

5. Environmental Conditions You Should be Aware of Before Operating Your NanoTherm3 Industrial Device


 The NanoTherm3 Industrial system is intended for indoor use only.




 Do not operate the NanoTherm3 Industrial system in or near a wet environment.

  The NanoTherm3 Industrial system is not to be used in a confined space. Adequate air flow distance from the unit sides must be maintained during operation. Inadequate air flow can result in overheating of internal electrical components and undesirable or excessive noise.

Only use the NanoTherm3 Industrial system in an ambient environment between 60-80 °F (degrees Fahrenheit) and a relative humidity below 60%.

Failure to meet these operating environment conditions may result in:

 Condensate buildup inside the unit.

   Overheating or freezing of the unit.

 Internal electronics malfunction

- A reduction in the heating or cooling capabilities of the unit
- A potential to blow the unit's electrical breaker due to an internal electrical overload.
- The inability of the unit to properly regulate the fluid temperature during system operation.

6. How to Set Up Your NanoTherm3 Industrial System

1. Connect the unit to the application using a fluid transport from ThermoTek, or hoses using Colder PLC or PLCD insert fittings.
2. Keep unit upright and on a level surface.
3. Make sure there is a 6-inch clearance and free path for flow of air entry and exit around the unit prior to operation.
4. Verify the power switch is in the OFF position.
5. Remove the reservoir cap and add coolant to the reservoir until the fluid level reaches the bottom of the neck. **See Recommended Coolants (Section 8.3).** Re-attach the cap tightly to the reservoir.
6. DO NOT overfill the reservoir.
7. Install the appropriate end of the power cord into the unit. Plug the male end into the appropriate AC voltage within the specified voltage.

7. Operating Instructions for Your NanoTherm3 Industrial System

Refer to Chapter 6 “How to Set Up Your NanoTherm3 Industrial System” before beginning any application.

7.1. Start Up and Operating Position:

1. Verify the unit is plugged into the appropriate AC voltage outlet.
2. Turn the unit to the ON position. The ON/OFF switch is located on the rear panel of the unit.
3. When the unit is first powered up, a blue back light will illuminate the display screen located on the front panel of the unit and the fans will turn on. The message **ThermoTek, Inc.** will appear on the display screen.



4. Once the unit is powered up, it may be necessary to add more fluid to the reservoir.
5. During the power up sequence, there will be a moment when the keypad is disabled and you will hear the pump being powered up and brought up to speed. This sequence will be repeated each time the unit is powered up or taken from standby to operation.
6. The unit will automatically control to the last set temperature.
7. To stop the coolant flow to your application, press the ENTER or MENU key on the keypad and select STANDBY. The unit will stop running.



8. To restart the unit, select the RUN option on the display.
9. To change the set temperature, press the MENU key on the keypad and select SET TEMP. To lower the fluid temperature, press the DOWN key on the keypad. To raise the fluid temperature, press the UP key on the keypad.



Note: If you hold the appropriate key down, the set point will scroll.

10. Press the ENTER key.
11. Highlight ACCEPT. Press ENTER to accept the temperature selection.



12. To determine the current fluid temperature in your application, press the MENU key until the status screen is displayed.



7.2. Selecting Temperature Scale:

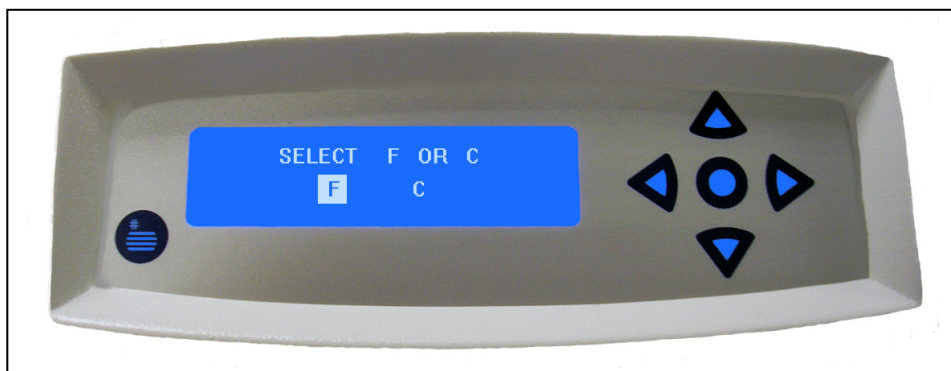
1. Set the unit in STANDBY mode.
2. Press the MENU key until the display shows the following menu:



3. Press the DOWN key until the utility menu is displayed. Highlight TEMP SCALE and press the ENTER key.



4. Press the LEFT or RIGHT key to select "Celsius" or "Fahrenheit" on the display. Press the ENTER key to accept.



8. Display Messages and Alarm Indicators

8.1. Normal Operation

The following list contains display messages that you may encounter during normal operation:

- **RUN/STANDBY:** Standby mode indicates that the pump is OFF and the unit is ready for use. Select the RUN key to begin the heating/cooling application.
- **RUNNING XXF:** Indicates the unit is controlling to set temperature.
- **SET TEMPERATURE:** Shows the current set temperature. This can be adjusted by pressing the UP and DOWN keys to the desired temperature setting.
- **LIFE TIMER:** Displays total system hours.
- **SUPPLY TEMP:** Coolant temperature at the supply port.
- **PLATE TEMP:** Internal reservoir plate temperature reading.

8.2. Warnings, Alarms, and System Errors

The NanoTherm3 Industrial system has many internal software safeguards to help protect the unit from unsafe operation. In this section you will find a list of possible system warnings and alarms that may occur if a potentially unsafe situation arises while using the NanoTherm3 Industrial unit.

Warnings indicate that an unsafe condition could or is about to occur. Warning notifications combine the use of a flashing description on the upper line of the display and a fast beeping noise.

Alarms indicate that an unsafe condition is currently present and halts all current applications to protect the user. The alarm state must be corrected before any application can be restarted. Alarm notification combines the use of “ALARM ACTIVE” text on the upper line and an alarm description on the lower line of the display. An audible notification is also initiated by a slow beeping noise. Press the ENTER key to clear the active alarm. If the alarm state is still present, the alarm message will reappear and prevent the start of any application.

System Errors indicate that an internal software or hardware error has occurred and that an unsafe condition is currently present and all current applications are halted to protect

the user. An example of this is when there is a problem reading from one of the internal sensors. System errors typically require service to the unit to identify and correct the problem. If you encounter a system error, please write down the 3-digit number indicated on the display and contact ThermoTek technical assistance toll-free at 1-877-242-3232 during the hours of 8am-5pm Central Time.

Below is a list of common user-related warnings and alarms that may occur during application operation of the unit.

!!ALARM ACTIVE!! HIGH TEMP ALARM: Anytime the unit is turned ON, the software constantly monitors the temperature of the internal coolant. If the software determines that the temperature of the coolant is hotter than a safe level this alarm activates.

!!ALARM ACTIVE!! LOW TEMP ALARM: Anytime the unit is turned ON, the software constantly monitors the temperature of the internal coolant. If the software determines that the temperature of the coolant is colder than a safe level this alarm activates.

!!ALARM ACTIVE!! HIGH H-SINK TEMP: Anytime the unit is turned ON, the software constantly monitors the temperature of the heat sink fins visible on either side of the unit. If the software determines that the heat sink fin temperature is hotter than a safe level this alarm activates.

!!ALARM ACTIVE!! LOW H-SINK TEMP: Anytime the unit is turned ON, the software constantly monitors the temperature of the heat sink fins visible on either side of the unit. If the software determines that the heat sink fin temperature is colder than a safe level this alarm activates.

SYSTEM ERROR XXX: This alarm indicates that an internal software or hardware error has occurred. The unit potentially requires service by an authorized technician. If you encounter a system alarm, please write down the 3-digit number indicated on the display and contact ThermoTek technical assistance toll-free at 1-877-242-3232 during the hours of 8am-5pm Central Time.

8.3. Recommended Coolants:

1. Distilled water: For operation from 10°C to 45°C only. Replace monthly to prevent biological growth.
2. 95% distilled water and 5% alcohol mixture prevents bacterial growth. Replace every 90 days.

9. Things You Can Do To Keep Your NanoTherm3 Industrial System Performing



Do not use abrasive or solvent-based cleaners on the unit.



There are no user serviceable internal parts. The system warranty is voided if the tamper seals are breached or removed.



Keep water away from vents, power ON/OFF switch and the power cord connection of the unit.



To avoid possible electric shock, do not remove the cover of the unit.



Do not immerse the unit in water or any liquid.

- **Check the fluid level weekly.**

- **Wipe the exterior of the unit with a damp cloth.**

Do not use abrasive or solvent-based cleaners on the unit.

- **Cleaning the filter:**

1. The filter is attached to the unit with Velcro strips. Carefully remove (separate) the filter from the Velcro strips installed to the unit.
2. Use warm, soapy water to clean the filter.
3. Allow the filter to air dry completely before re-installing to the unit.

- **Re-installing the filter:**



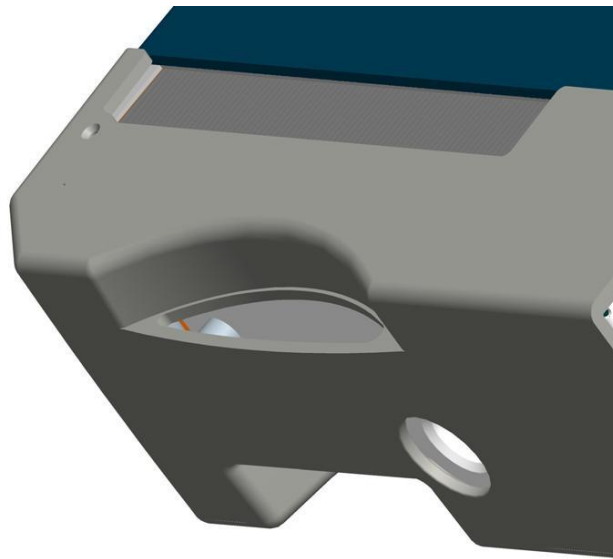
The air filter must be completely dry before installing on the unit. Using a wet air filter has a strong risk of causing an internal electrical short and is hazardous to both the user and the unit.

1. Turn the unit OFF and disconnect the power cord.
2. Starting at the rear of either side of the unit, begin attaching one end of the air filter towards and around the front of the unit using the Velcro strips.
3. Continue attaching the air filter around to the opposite side of the unit.
4. The filter should be taught without bulge across the top and bottom of the filter to prevent bypassing of air.

10. Draining the Fluid from the Unit

If the unit is going to be stored for a long period of time or periodically between uses, the unit should be drained of fluid.

1. Turn the unit OFF and unplug from electrical source.
2. Remove the reservoir cap from the unit by twisting the cap counter-clockwise.
3. Lift the unit on both ends and tip backward to empty the fluid from the reservoir into a bucket or sink.



4. Continue to tip the unit until the reservoir is completely empty of all fluid.

11. Storage and Re-Packing the Unit

When user application is complete and it is time to return or store the NanoTherm3 Industrial system, you can use the transport box.

1. Turn the unit OFF and unplug from the electrical source
2. Disconnect all fittings from the rear panel of the unit.
3. Follow the “Draining the Fluid from the Unit” instructions in Chapter 10.
4. Do not screw the unit’s reservoir cap on, but rather leave it off to allow the unit to dry completely. This helps avoid the risk of microbial growth in the unit during storage or long transport.
5. Collect the following items together:
 - NanoTherm3 Industrial Unit
 - Reservoir Cap
 - Power Cord
 - User Manual
 - Coolant Mixing Bottle
6. Store the above items in the original packaging box or in the travel case you received.
7. Store indoors in an ambient environment between 40 °F and 105 °F.

Failure to properly store the unit may result in the following:



Damage to the unit.



Catastrophic system damage if the unit is not properly drained.



Microbial growth inside the unit if not properly drained.

12. Troubleshooting Guide

Refer to Chapter 5 “Environmental Conditions You Should Be Aware of Before Operating Your NanoTherm3 Industrial Device” for a list of acceptable environmental conditions for safe operation.

This unit is NOT intended for field repair. Do not attempt to service the unit in any way other than using the instructions listed in this guide.

If the unit is displaying an alarm, warning, or system error not listed in the above Troubleshooting Guide, contact Customer Support. See the Customer Support contact information below.

If your issue cannot be resolved with the following scenarios, first contact ThermoTek technical assistance toll-free at 1-877-242-3232 during the hours of 8am-5pm Central Time.

Problem	Cause	Suggested Actions
Nothing happens when I turn the unit to the ON position.	No AC Power to the unit.	Make sure the unit is plugged into the appropriate electrical outlet. Make sure the power cord is also plugged into the therapy unit.
	Internal fault within the therapy unit.	Turn the power switch off, wait, and turn it back on. Contact ThermoTek customer service if problem persists.

Problem	Cause	Suggested Actions
My unit gives me a HIGH H- SINK alarm.	Dirty air filter.	Check the filter. If it is dirty, clean or replace with new filter. Refer to Chapter 9 for details.
	Unit operated in a place with restricted airflow.	Make sure the unit is operated in a location with adequate airflow from all sides. Make sure there is at least 6" of clearance around the unit.
	Unit is operated in a hot ambient environment	Make sure the unit is operated indoors in an ambient < 80° F
	Internal fault within the unit.	Turn the power switch off, wait, and turn it back on. Contact ThermoTek customer service if problem persists.

Problem	Cause	Suggested Actions
My unit gives me a LOW H- SINK alarm.	Unit is operated in a cold ambient environment.	Make sure the unit is operated indoors in an ambient > 60° F.
	Internal fault within the unit.	Turn the power switch off, wait, and turn it back on. Contact ThermoTek customer service if problem persists.

Problem	Cause	Suggested Actions
My unit gives me a HIGH TEMP alarm.	The unit was filled with hot coolant.	Make sure the unit is filled with room temperature fluid.
	Unit is operated in a hot ambient environment.	Make sure the unit is operated indoors in an ambient < 80° F.
	Internal fault within the unit.	Turn the power switch off, wait, and turn it back on. Contact ThermoTek customer service if problem persists.
	Low or no coolant	Check the fluid level in the reservoir;

	flow.	check coolant lines for proper connection, kinks and air entrapment.
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Problem	Cause	Suggested Actions
My unit gives me a LOW TEMP alarm.	The unit was filled with cold coolant.	Make sure the unit is filled with room temperature fluid.
	Unit is operated in a cold ambient environment.	Make sure the unit is operated indoors in an ambient > 60° F.
	Internal fault within the unit.	Turn the power switch off, wait, and turn it back on. Contact ThermoTek customer service if problem persists.

Problem	Cause	Suggested Actions
My unit gives me a SYSTEM ERROR XXX alarm.	Reservoir cap is not screwed tightly.	<p>Make sure the unit is unplugged from the AC outlet.</p> <p>Check the reservoir cap and secure it tightly.</p> <p>Connect to AC power and restart unit.</p> <p>Contact ThermoTek Customer Support.</p>

Problem	Cause	Suggested Actions
The unit is leaking. (cont'd on next page)	The coolant ports are not connected / seated properly.	<p>Make sure the unit is unplugged from the AC outlet.</p> <p>Check the coolant connections; disconnect and reconnect the ports to make sure they are seated properly.</p>
	Physical damage to the unit.	Inspect the unit for physical damage. . If the unit shows any cracks or dents and is leaking, the unit should not be used. Contact ThermoTek Customer Support.

Problem	Cause	Suggested Actions
The unit is heating when it should be cooling (or cooling when it should be heating)	Internal fault within the unit.	Turn the power switch off, wait, and turn it back on. Contact ThermoTek customer service if problem persists.
	The unit is in Alarms Active state.	Check display for alarm events. If alarms are displayed use the troubleshooting guide to resolve the issue.

Problem	Cause	Suggested Actions
Unit turns on, but it is not heating or cooling.	Internal fault within the unit.	Turn the power switch off, wait, and turn it back on. Contact ThermoTek customer service if problem persists
	Physical damage to unit.	Inspect the unit for physical damage. If the unit shows any cracks or dents, the unit should not be used. Contact ThermoTek Customer Support.

Problem	Cause	Suggested Actions
The unit is noisy.	Foreign objects lodged inside the air filter.	Turn the unit off and unplug it from the power source. Remove the air filter and inspect the chassis vents for any foreign objects that may be lodged inside or present in the unit. If the foreign object cannot be removed, Contact ThermoTek Customer Support.
	Internal fault within the unit.	Turn the power switch off, wait, and turn it back on. Contact ThermoTek customer service if problem persists.
	Unit not connected to AC power.	Make sure the unit is connected to the AC outlet. Make sure the power switch on unit is switched to the ON position.

Problem	Cause	Suggested Actions
The display is not functioning.	Physical damage to unit.	Inspect the unit for physical damage. If the unit shows any cracks or dents, the unit should not be used. Contact ThermoTek Customer Support.
	Internal fault within the unit.	Turn the power switch off, wait, and turn it back on. Contact ThermoTek customer service if problem persists.
	Unit not connected to AC power	Make sure the unit is connected to the AC outlet. Make sure the power switch on unit is switched to the ON position.

Problem	Cause	Suggested Actions
The keypad is not responding	Physical damage to unit.	Inspect the unit for physical damage. If the unit shows any cracks or dents, the unit should not be used. Contact ThermoTek Customer Support.
	Internal fault within the unit.	Turn the power switch off, wait, and turn it back on. Contact ThermoTek customer service if problem persists.

13. Service and Customer Support

ThermoTek, Inc. is committed to servicing our NanoTherm3 Industrial™ unit both during and after sale to the customer. If you have any questions concerning the operation of your NanoTherm3 Industrial™ unit, please refer to the following to contact us at our Flower Mound, Texas facility:

- **Sales Organization:** (972) 874-4949
- **Toll Free Number:** (877) 242-3232
(between 8:00am and 5:00pm CST, Monday through Friday)
- **ThermoTek Website:** www.thermotekusa.com



Do not drink or ingest the coolant mixture.

14. Accessories and Replacement Parts

Boxes/Foam:

Part Number	Description
0P2HNTFSET	Packing Foam
0P2HNTSBX0	Shipping Box
0P7ANANTRC	Traveling Case, Single

Replacement Parts:

Part Number	Description
0P2CDMARFT	Washable Air Filter
0P2DDMRSPG	Reservoir Cap
0P3C12MGCP	Cord, Power 13A/110 VAC, Medical Grade
0P2HNAN0FL	Mixing Bottle, Thermoflow
0P2HNAN0SP	Mixing Bottle, Spout
0P2EBBMQKD	Fittings

15. Specifications

NanoTherm3 Industrial Part Number	0P9TNAN003
Dimensions	5.25”W x 8.75”H x 14.25”D
Ambient Operating Range	60 – 80 °F
Relative Humidity	< 60% RH
Set Temperature Range	10°C – 45°C
Centrifugal Pump	12-volt Brushless DC
Weight without Fluid	15-pounds
System Fluid Capacity	32-ounces
Power Consumption (Max)	650 Watts
Input Voltage (Nominal)	100-240 VAC, 50/60 Hz, Single Phase
Input Current (Max)	6.5 Amps
Accuracy	± 2 °F
Refrigerant	None
Heating/Cooling Function	Yes, Standard
RS232 Interface	Yes, Standard
Recommended Coolants	90% distilled water, 10% alcohol

18.1 Calibration

The NanoTherm3 Industrial unit is comprised of components that are of high accuracy and low drift. Under normal operation, the unit does not require calibration. The end user has the option to send the unit to ThermoTek for calibration or request documentation from the factory, which details the calibration steps.

18.2 Product Listing



ThermoTek is a registered medical equipment manufacturer with The United States Food and Drug Administration (FDA).

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17. Warranty and Disclaimer Information

ThermoTek Inc. warrants for twelve months from the date of shipment to the end user, any ThermoTek NanoTherm3 Industrial™ unit according to the following terms:

All parts of the unit manufactured or supplied by ThermoTek Inc. shall be free from defects in material and workmanship for a period of one year from the date of shipment. ThermoTek Inc. shall repair or exchange the product within the warranty period when the unit has been found in the reasonable judgment of ThermoTek to have defective material or workmanship. The unit must be returned to an authorized ThermoTek Service Center. The buyer shall pay for the expense of returning the unit to the authorized ThermoTek Service Center for warranty service. ThermoTek Inc. will pay for the expense of returning the unit back to the buyer. Return units must be in the ThermoTek approved box and packing material to ensure safe transport. Removal of the warranty seals or other attempts of servicing the inside of the unit shall void this warranty.

The buyer shall be responsible and assessed a fee for test and calibration if no defects are found with the ThermoTek product.

In the event that the product or any portion thereof is not installed or used in accordance with the manufacturer's Operating Instructions, any and all warranties either expressed or implied shall be and are hereby voided. Only upon the proper installation and use of the items shall this warranty apply. This warranty does not cover any unit that has been altered or modified so as to change its intended use. In addition, this warranty does not extend to the use of parts, accessories, or fluids which are either incompatible with the unit or adversely affect its operation, performance, or durability.

Because ThermoTek Inc. constantly provides our customers with the latest technology, we reserve the right to change or improve the design of any unit without assuming any obligation to modify any unit previously manufactured.

All units returned for warranty claims must have a Returned Materials Authorization (herein referred to as RMA) number on the outside of the container. Please call ThermoTek Customer Service at 972-242-3232 for an RMA number. Before returning a system to the factory, it must be drained of all fluids and packed in the original packaging.

In order to quickly process your warranty repair request, your customer service representative will require the following information about your system:

- Model Number
- Serial Number
- Description of Problem
- Contact Name and Phone Number

This information is on the serial plate located on the back side of the unit.

DISCLAIMER

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Flower Mound, TX 75028
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Website: www.thermotekusa.com

For customer service information please see Section 13 of this manual.

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