



TotalTemp Technologies, Inc.

Mechanically Cooled Thermal Platform Operator's Manual



**Models SCC49, SCC98 and SCC144
with 2 stage refrigeration for operation from +175 to -70°C**

Rev. 1n 06/29/2021



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Introduction

Thank you for purchasing a Thermal Platform and Controller from TotalTemp Technologies. This product was designed to provide years of efficient trouble free operation. Please read and understand this manual plus the controller manual for safe and best use of this product.

Safety

Safety Symbols:

The following symbol on equipment indicates the existence of a hazard that is explained in more detail in the manual.



The following symbol on the equipment indicates there is danger of electric shock if the indicated panel is removed while the product is connected to power.



The following symbol indicates the possible presence of danger caused by hot surfaces.



General Warnings:

This device employs line voltage connected components and caution should always be used to avoid electrical hazards.

Due to the extreme temperatures that these systems are capable of, always exercise caution in the vicinity of the platform. Burns from either extreme hot or cold conditions may result. As a rule, hands off should be the policy for the thermal platform surface.

Although the connections between the platform and refrigeration unit are made of durable convoluted stainless steel with over-braid, they are not by any means damage-proof. Damage to the hoses will likely

result in the need for expensive repairs to the system and down-time. Never pull on hose from either end. Use caution that hose does not get pinched, cut, abraded, rolled over or stepped on. Connections between platform and condensing unit are not designed to be detachable.

When operating at cold temperatures, condensation or frost on the surface of the platform will occur if operated for longer periods of time with below ambient temperature settings. Always avoid moisture near electrical power connections. Do not operate the product with the cover panels removed. The protective covers reduce the risks of exposure to electrical and thermal hazard, as well as protect the internal components from damage due to corrosion from condensation inside the unit. Excessive condensation or additional electrical hazards may result if this precaution is not observed. TotalTemp provides an optional polycarbonate probing cover and an optional gas purge system that can be used to keep frost from accumulating on the surface of the platform. It is recommended to acquire both these items and keep the nitrogen gas purge hooked up to this cover for increased protection from excessive moisture accumulation on the devices under test and the platform surface at cold temperature.

These systems employ recirculating refrigerants. Any small loss of refrigerant will likely greatly compromise performance. If it is suspected that there is loss of refrigerant, discontinue use until the unit is serviced or until it is known that there is not refrigerant loss in the system. No Cryogenic fluids or gasses are required for the operation of this system, only electricity.

Built in out-of-range safety controls:

The controllers employed by TotalTemp have several built in watchdog features.

- 1) Setpoint entries above and below the allowable or safe limits of product operation have been blocked at the factory. Do not attempt to defeat these limits.
- 2) Additionally, the controllers will go into an alarm/shutdown condition if the temperatures measured goes beyond preset limits
- 3) Open or shorted sensor or erratic readings will put the controller into a shut down mode.

All TotalTemp thermal platform systems have a fixed bimetal thermostat that latches power off for heating and cooling circuits in the event that temperatures exceed 205°C. If this limit has been exceeded, the system must be turned off and back on before operation can be re-established. Before using the system again, make sure the temperature of the platform is back in normal operating range (< 200 deg C), then turn power back on again. Cycling power resets the bimetal failsafe thermostat latch. If the operation is not re-established by cycling power, the system needs to cool down or is in need of service. Consult factory.

Controllers may also be equipped with a built in, independent redundant failsafe system, a high and low limit setting may be easily entered from the front panel to protect from unintended cooling and heating beyond user set limits. This controller uses its own sensor in the platform and provides an enhanced level of safety. Consult factory for options and pricing.

Equipment Ratings

Power Supply:

Check the Voltage and Amperage ratings on your product label near the power connector of your platform and on the rear of the controller. Do not exceed the rated voltage and amperage as indicated when connecting to your power source. The controller and platform can operate in the 50/60Hz range. The correct Environmental Conditions for proper operation of the Thermal Platform System are as follows:

- Indoor use only, unless specified differently on the product label
- Altitude up to 2,000 M maximum
- Ambient temperature range no lower than 10°C and no higher than 31°C
- Maximum relative humidity of 80% for temperatures up to 31°C
- Pollution index of degree 2 or better
- Mains power supply voltage fluctuations shall not exceed $\pm 10\%$ of the nominal voltage as indicated on the product label
- Transient overvoltage's according to overvoltage category II

System Description

Theory:

Testing of electronic or other items at specific temperatures is required for a variety of purposes and is a common requirement of modern design and production.

Thermal Platforms provide a rapid, convenient method to perform this testing/conditioning.

Especially for items with a flat thermally conductive surface, the Thermal Platform will often provide a very efficient, faster and more accessible method for this work.

Heating is provided by symmetrically distributed resistance heaters and cooling is provided by vaporizing a recirculating refrigerant fluid in a sealed internal channel. As the fluid vaporizes, heat is removed from the platform and absorbed by the coolant.

Often these systems prove to be more cost effective and convenient than chambers. There is no expendable cryogenic fluid to maintain and no bulky external tanks.

Primary System Contents:

Platform

Controller

Power cord

Under bench refrigeration condensing unit, permanently connected to platform.

Accessories:

- Purge accessories
- Polycarbonate covers
- Hold down accessories
- Adapter plates
- Chassis mounted terminal block
- Controller options
- Optional redundant failsafe controller
- DUT sensing probes and connections
- Cascade Temperature Control
- Complete list of accessories:
<https://www.totaltemptech.com/thermal-platforms-coldplates-options-and-accessories/>

Specifications:

SCC49 – Surface area 6.5” x 7.5”, 48.75 square inches or 314 square centimeters.

SCC98- Surface area 6.5” x 15”, 98 square inches or 628 square centimeters.

SCC144 – Surface area 12” x 12”, 144 square inches or 929 square centimeters.

Power:

Standard configuration SCC49, SCC98, and SCC144 thermal platform in North America is 20A. or 30A./208-230vac. As indicated on product.

Always confirm proper configuration before connecting power to controller and controller to platform.

The umbilical cable on your TotalTemp Controller is designed to be plugged into only other similar refrigerated platforms. This controller is configured for TotalTemp SCC49, SCC98 or SCC144 Platforms, and not Cryogenic models SD14, SD49, SD144 unless otherwise specified for a custom configured TotalTemp Thermal Platform.

Controller systems can operate on either 120, 208-240vac. 50/60 Hz.

Platforms must be operated on specified voltage. Platform power connectors are keyed to disallow mating systems intended for alternate voltages however always note that the voltage applied is in accordance with platform product labeling.

Other power configurations are possible on special order basis.

Assembly / General Precautions:

- 1) Handles on condensing unit are ***not intended for lifting the unit***, only for moving unit on the floor.

- 2) Never pull condensing unit or platform by the hose or lift the platform by the hose. Additionally, do not allow the hose to be abraded by allowing it to drag on the floor when transporting the system.
- 3) The condensing unit is designed to be located under a workbench with the hose-umbilical coming up from the rear of the bench and warm exhaust from the refrigeration system expelled towards the rear
- 4) The power source – Verify proper voltage and amperage capacity before applying power.
Be aware of Voltage and current rating on platform and controller
- 5) The controller – Note power switch is off when applying power, be familiar with proper use.
Make sure switches on rear always stays ON. Controllers are universal 120-240 v.
Maximum amperage as indicated on unit. Note white dot on platform connectors indicates top.
- 6) The platform – Verify unintended items do not contact surface, hands off and caution must be the rule.
- 7) Platform may be operated in any position, inverted, upright. Platform must always be above condensing unit to prevent extreme refrigeration oil migration into the platform.
- 8) Refrigeration hose – Use caution with the refrigeration hose. While the internal hoses are designed for many years of service with rugged bellows type stainless steel and over braid, use caution to avoid pinching, twisting, kinking or abrading the hose assembly. Avoid sharp bends, particularly near the ends of the hose.
- 9) Keep refrigeration chassis upright with wheels downward at all times.

For testing and programming purposes the controller can easily be powered up without the platform. Otherwise it is recommended to have all above system parts connected per this document before connecting the power source. An alarm condition will be displayed when there is no sensor hooked to the controller.

Before Operating:

Verify that the voltage of the electrical supply matches the product ID tag for the product and it has adequate capacity to supply the required current for the system heaters.

Controllers are typically of universal voltage. Standard model controllers for cryogenic platforms are different from those for use with refrigeration systems. As indicated. Platforms have specific voltage ratings which must be observed.

Verify that the system power cord is plugged into a properly grounded receptacle and secure at both ends.

Make sure that any items that might be melted/burned by heat or damaged from extreme cold are removed from the surface of the thermal platform prior to use.

Hands off is a good rule for operation of the platform.

Never operate system without free access to ventilation on both sides of refrigeration condensing unit. Room air temperature must be lower than 31C or 86F.

Note on anodized surfaces:

Black anodize is both cosmetic and functional to protect the surface from corrosion and abrasion. The black color is a dye that will fade with long term use at high temperatures. The anodization will continue to protect even though the color will fade. Some of the thermal compound used to assemble unit may be noticed coming out on the surface of the plate. This is normal and temporary. It will not persist over the life of the unit.

Note on threaded holes in platform surface:

All TotalTemp platforms come standard with threaded holes in the surface as a convenience to the user for mounting their DUT, or for mounting an adapter plate, or for using DUT clamp sets. The quantity of these holes varies based on the model size. Additional threaded holes can be purchased at time of ordering, in specific patterns if the customer chooses. If the end user wishes to drill their own additional threaded holes after receiving the equipment, ***always consult the factory first***. There is the possibility of damage to the system if drilling too deep. Maximum depth for any hole on the platform surface is 0.250" (6.35mm) to the drill point.

Operation

Please read the controller operation manual for a good understanding of proper use of the controller.

Shut down:

Normal shut down.

The main power switch/breaker on the front of the controller may be used to apply and remove power from the system.

Failsafe shutdown. See page 3.

Normal operation may be restored when the temperature comes back into the operating range by turning power off, then back on.

NOTE: The built in failsafe shutdown system is designed for proper operation only. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Optionally, platform controllers also have an independent redundant high / low limit temperature safety. Typically the Watlow 1/32 DIN, EZ Zone PM limit controller.

Automatic refrigeration control:

The refrigeration system control is managed by the Synergy Temperature controller. Automatic startup and shut down of the refrigeration is controlled by parameters found in the "Setup" menu, L-Values. Careful consideration must be taken before altering these parameters. See the CD/Media supplied with equipment or download "Synergy Unified Technical Manual" online.

<http://www.totaltemptech.com/manualsdocs-total-temp-technologies/>

Setup Menu L-Values	
1L1 Main Cooling Turn ON (Preset to 85)	Percentage of PID cooling output that will trigger the compressor to turn on
1L2 Main Cooling Turn OFF (Preset to 75)	Percentage of PID heating output to trigger the compressor to shut off
L9 Ramp Up Cooling (Preset to 50)	Temperatures set above this threshold turns off the compressor when heating. Note L15 below will still apply
L15 Compressor Turn OFF delay (Preset to 2)	Compressor turn-off delay in minutes. <u>Prevents short cycling damage to the compressor</u>

Only use positive integers in these parameters. Under normal circumstances, these parameters should not require adjustment. For maintaining temperatures near or slightly below ambient (+25 to +10), the compressor may have to be allowed to cycle on and off.

Maintenance:

The only required maintenance for the refrigerated thermal platform is periodic inspection of the condenser coil fins on the condensing unit. The pollution level of the lab where it is being used and the amount of time that the refrigeration is on will dictate the need for condenser coil cleaning. Typically inspect the condenser coil every six months. If it is noted that there is more than very minimal dust accumulation on the condenser coil fins at this point, inspect and clean more often. The panel is easily removable for inspection and cleaning. Failure to keep the condenser coil clean will void warranty and risk premature failure. Preferably use a vacuum cleaner to remove dirt and dust accumulation from the condenser coil

Periodically inspect the hoses, power cord, and umbilical to plate and associated connectors. Remove product from service if a hose or electrical connection appears damaged or worn.

Check to confirm the silicone surround foam is complete around the platform and make sure access panels are always in place during use to prevent safety hazards and to prevent damage due to buildup of condensation or frost inside unit.

Do not use any abrasive cleaners on the anodized thermal platform surface. A soft nonabrasive damp cloth with mild dishwashing detergent is all that is needed. Care should be taken not to poke, depress or dent the soft silicone foam insulation perimeter around the plate surface. It is important to keep condensation moisture from entering the platform system.

The brushed stainless steel chassis can be easily polished up with a Scotch Brite pad. Care should be taken to not rub the pad over any product labels, and especially the TotalTemp logo label!

Troubleshooting:

After reading the operation manual, if problem persists or a clear solution is not provided, please consult the factory for resolution of the problem. Offices are open 8-5 Pacific time, weekdays.

Storage:

When in use, some condensation can occur on surfaces of the thermal platform. Make sure system is dry before closing into any packaging. Warm system up to evaporate any condensed water or ice before letting system set idle. When packing or moving, be careful to prevent stress from being applied to the

electrical or plumbing connections.

Special storage considerations for the thermal platform and controller:

Store in a dry environment. Normal safe packing procedures should be followed if the unit is to be shipped. Controllers must be stored in a non condensing environment,

Service:

TotalTemp Technologies, Inc

3630 Hancock St. A

San Diego, CA 92110

www.TotalTempTech.com Support@TotalTempTech.com

(888) 712-2228 x1

Parts: Contact the factory for any needs involving maintenance or accessory parts.

Warranty: following page



TotalTemp Technologies, Inc.
1 Year Domestic Warranty
(U.S.A. & Canada)

WARRANTY

TotalTemp Technologies, Inc (TotalTemp) warrants their standard Thermal Platform Systems (Platform *and* Temperature Controller) to be free from defects in material and workmanship for a period of one year from shipment date of product. If a defect is discovered in the product, TotalTemp will replace the failed component at their option. The replacement of failed components does NOT include labor for diagnosing the problem, or repairs and installation. In the event that TotalTemp will provide the warranty replacement components, TotalTemp will pay the least expensive transportation costs to the original sale destination of the product. The customer will be responsible for the costs and labor for installation of the new component.

If the customer wishes, for purposes of diagnosing the problem, TotalTemp will provide a reasonable amount of technical assistance to the customer via email or telephone. The purpose of which is to help both parties provide the fastest solution possible at a reasonable cost to the customer.

EXCLUSIONS

This warranty covers defects in manufacturing discovered while using the product as recommended by the manufacturer. This warranty does not cover loss or theft, nor does coverage extend to damage caused by misuse, abuse, unauthorized modification, repair, or shipping of the product, improper storage conditions, or natural disasters. This warranty does not cover parts that are subject to normal wear and tear such as cryogenic solenoid valves.

LIMITS OF LIABILITY

Should the product(s) fail, TotalTemp will provide replacement components, at their discretion, as described in the preceding paragraphs. TotalTemp cannot be held liable for any damage that results from the failure of this product. Damages excluded include, but are not limited to the following: lost profits, lost savings, lost data, damage to other equipment, and incidental or consequential damages arising from the use, or inability to use this product. In no event, under any circumstances, will TotalTemp be liable for more than the amount of the original purchase price, excluding tax, shipping and handling charges.

By installing or using this product, the user accepts all terms described herein.

Venue for enforcement of this warranty rests in San Diego County, California, U.S.A.

