ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Thermo / Neslab RTE-211* at our website: *Click HERE*

RTE Series
Analog/Digital

Thermo NESLAB Manual P/N 000258
Rev. 11/08/00

Instruction and Operation Manual

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

RTE-Series Refrigerated Bath/Circulator
Instruction and Operation Manual

Table of Contents

PREFACE

Compliance 2
Unpacking 2
Warranty 2
NES-care 2
After-sale Support 2

SECTION I
Safety

Warnings 3

SECTION II
General Information

Description 4
Specifications 4

SECTION III
Installation

Site 5
Electrical Requirements 5
Plumbing Requirements 6
Fluids 8
Filling Requirements 8

SECTION IV
Controllers

Controllers 9
Start Up 9
RTE-221 Boost Heater 11
Autorefill (Optional) 11
High Temperature/Low Liquid Level Safety 12
15-Pin Accessory Connector 13

SECTION V
Maintenance

Service Contracts 14
Condenser 14
Reservoir Cleaning 15
Algae 15

SECTION VI
Troubleshooting

Checklist 16
Service Assistance and Technical Support 16

APPENDIX A
International Quick Reference Guides

APPENDIX B
Programming Software

WARRANTY

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Preface

Compliance

Products tested and found to be in compliance with the requirements defined in the EMC standards defined by 89/336/EEC as well as Low Voltage Directive (LVD) 73/23/EEC can be identified by the CE label on the rear of the unit. The testing has demonstrated compliance with the following directives:

LVD, 73/23/EEC	Complies with UL 3101-1:93
EMC, 89/336/EEC	EN 55011, Class A Verification EN 50082-1:1992 IEC 1000-4-2:1995 IEC 1000-4-3:1994 IEC 1000-4-4:1995

For any additional information refer to the Letter of Compliance that shipped with the unit (Declaration of Conformity).

Unpacking

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

Warranty

Units have a warranty against defective parts and workmanship for one year from date of shipment. See back page for more details.

NES-care Extended Warranty Contract

- Extend parts and labor coverage for an additional year.
- Worry-free operation.
- Control service costs.
- Eliminate the need to generate repair orders.
- No unexpected repair costs.

Other contract options are available. Please contact Thermo NESLAB for more information.

After-sale Support

Thermo NESLAB is committed to customer service both during and after the sale. If you have questions concerning the operation of your unit, contact our Sales Department. If your unit fails to operate properly, or if you have questions concerning spare parts or Service Contracts, contact our Customer Service Department. Before calling, please obtain the following information from the unit's serial number label:

- *BOM number* _____
- *Serial number* _____

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section I Safety

Warnings

Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your unit. If you have any questions concerning the operation of your unit or the information in this manual, contact our Sales Department.

Performance of installation, operation, or maintenance procedures other than those described in this manual may result in a hazardous situation and may void the manufacturer's warranty.

Transport the unit with care. Sudden jolts or drops can damage the refrigeration lines. The units weigh approximately: RTE-111, 86 pounds (390 kilograms); RTE-211, 99 pounds (45 kilograms); RTE-221, 106 pounds (48 kilograms). Units should be transported with equipment designed to lift these weights.

Observe all warning labels.

Never remove warning labels.

Never operate damaged or leaking equipment.

Never operate the unit without bath fluid in the bath.

Never use pure ethylene glycol as a bath fluid. A minimum 80/20 mixture of Ethylene Glycol and tap water is allowed.

For 220 - 240 volt units supplied without a line cord, use a harmonized (HAR) grounded 3-conductor cord, type H 0 5 V V - F , with conductors listed below. A suitable cord end is required for connecting to the equipment (see unit socket) and must terminate with an IEC approved plug for proper connection to power supply.

NON-BOOST HEATER UNITS	**Nominal 1.0 mm² cross section rated 10 Amps Unit Socket: IEC - 320 C13**
BOOST HEATER UNITS	**Nominal 1.5 mm² cross section rated 16 Amps Unit Socket: IEC - 320 C19**

Always turn off the unit and disconnect the line cord from the power source before performing any service or maintenance procedures, or before moving the unit.

Always empty the bath before moving the unit.

Never operate equipment with damaged line cords.

Refer service and repairs to a qualified technician.

In addition to the safety warnings listed above, warnings are posted throughout the manual. These warnings are designated by an exclamation mark inside an equilateral triangle with text highlighted in bold print. Read and follow these important instructions. Failure to observe these instructions can result in permanent damage to the unit, significant property damage, personal injury or death.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section II General Information

Description

The RTE-Series Refrigerated Bath/Circulators are designed to provide temperature control for applications requiring a fluid work area or pumping to an external system.

Units consists of a non-CFC air-cooled refrigeration system, circulation pump, seamless stainless steel bath, work area cover, and a temperature controller.

Specifications

	RTE-111	RTE-211	RTE-221
Temperature Range[1] *Analog controller* *Digital controller*	-25°C to +100°C -25°C to +150°C		-23°C to +100°C -23°C to +150°C
Temperature Stability[2,3,4] *Analog controller* *Digital controller*	±0.1°C ±0.01°C		
Cooling Capacity[2,5] *Watts* *BTU/H*	500 1705		
Pump Capacity	15 lpm at 0' (0 M) 0 lpm at 16' (4.9 M)		
Heater (Watts) *60 Hz Models* *50 Hz Models*	800 1000	800 1000	800/800 boost 1000/800 boost
Bath Work Area *(L x W x D)* *Inches* *Centimeters*	4 3/4 x 8 x 6 12.1 x 20.3 x 15.3	9 1/4 x 10 x 6 23.5 x 25.4 x 15.2	9 1/4 x 10 x 9 23.5 x 25.4 x 22.9
Bath Volume *Liters*	7.0	12.25	20.5
Case Dimensions *(H x W x D)* *Inches* *Centimeters*	25 x 10 5/16 x 15 7/8 63.5 x 26.2 x 40.3	25 x 12 3/8 x 18 3/8 63.5 x 31.4 x 46.7	27 7/8 x 12 3/8 x 18 3/8 70.8 x 31.4 x 46.7
Power Requirements[6]	115 V, 60 Hz, 12 Amp 220/240 V, 50 Hz, 7.5 Amp	115 V, 60 Hz, 12 Amp 220/240 V, 50 Hz, 7.5 Amp	115 V, 60 Hz, 16 Amp 220/240 V, 50 Hz, 10 Amp

1. Low end temperature for analog and digital 50Hz units is -18°C, -23°C and -21°C respectively.
2. Specifications listed for units operating at +20°C bath temperature, +20°C (+70°F) ambient, with tap water as bath fluid.
3. For operation below 0°C, covering the bath work area may improve stability.
4. For some applications, agitation and stability above ambient may be may be improved by connecting a small length of hose between the pump connections on the rear of the unit.
5. 50 Hz RTE-111 units have a 375 watt cooling capacity.
6. Power Board Transformer Fuse–Analog T 0.5A 250V (Qty 1), Digital T 0.8A 250V (Qty 2) [T=Time Delay]

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section III Installation

Site

The indentations on the unit's sides are designed to function as handles. Lift the unit by the handles and locate it on a sturdy work area. Ambient temperatures should be inside the range of +50°F to +80°F (+10°C to +27°C).



Never place the unit in a location where excessive heat, moisture, or corrosive materials are present.

The unit has an air-cooled refrigeration system. Air is drawn through the front panel and discharged through the rear panel. The unit must be positioned so the air intake and discharge are not impeded. A minimum clearance of 12 inches (30 centimeters) at the front and rear of the unit is necessary for adequate ventilation. Inadequate ventilation will reduce cooling capacity and, in extreme cases, can cause compressor failure.

Excessively dusty areas should be avoided and a periodic cleaning schedule should be instituted (see Section VI, Cleaning).

The unit will retain its full rated capacity in ambient temperatures up to approximately +75°F (+24°C). Above +75°F, reduce the cooling capacity 1% for every 1°F above +75°F, to a maximum ambient temperature of +95°F. In terms of Celsius, reduce the cooling capacity 1% for every 0.5°C above +24°C, to a maximum ambient temperature of +35°C.

Electrical Requirements



Line voltage may be easily accessible inside the pump/control box. Always unplug the unit prior to removing pump/control box cover.

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

Ensure the voltage of the power source meets the specified voltage, ±10%.

The unit construction provides extra protection against the risk of electric shock by grounding appropriate metal parts. The extra protection may not function unless the power cord is connected to a properly grounded outlet. It is the user's responsibility to assure a proper ground connection is provided.



For 220 - 240 volt units supplied without a line cord, use a harmonized (HAR) grounded 3-conductor cord, type H 0 5 V V - F , with conductors listed below. A suitable cord end is required for connecting to the equipment (see unit socket) and must terminate with an IEC approved plug for proper connection to power supply.

BOOST HEATER UNITS	**Nominal 1.5 mm² cross section rated 16 Amps**
	Unit Socket: IEC - 320 C19
NON-BOOST HEATER UNITS	**Nominal 1.0 mm² cross section rated 10 Amps**
	Unit Socket: IEC - 320 C13

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Plumbing Requirements



Ensure the unit is off before connecting tubing to the unit.

Hose Connections

The pump connections are located at the rear of the pump box and are labelled PUMP INLET and PUMP OUTLET. These connections are bent upward so the recirculating fluid will drain back into the reservoir when the hoses are disconnected. Both connections are capped with stainless steel serrated plugs.

The pump lines have ¼ inch male pipe threads for mating with standard plumbing fittings. For your convenience stainless steel adapters, ¼ inch female pipe thread to $^{3}/_{8}$ inch O.D. serrated fitting, are provided. (To assure proper fit, they should be installed using Teflon® tape around the threads.)

Flexible tubing, if used, should be of heavy wall or reinforced construction. Make sure all tubing connections are securely clamped. Avoid running tubing near radiators, hot water pipes, etc. If substantial lengths of tubing are necessary, insulation may be required to prevent loss of cooling capacity.

Tubing and insulation are available from Thermo NESLAB. Contact our Sales Department for more information (see Preface, After-sale Support).

It is important to keep the distance between the unit and the external system as short as possible, and to use the largest diameter tubing practical. Tubing should be straight and without bends. If diameter reductions must be made, make them at the inlet and outlet of the external system, not at the unit.

If substantial lengths of cooling lines are required, they should be pre-filled with bath fluid before connecting them to the unit. This will ensure that an adequate amount of fluid will be in the bath once it is in operation.

Pumping

The pump is designed to deliver a flow of 15 liters per minute (4 gallons per minute) at 0 feet head. To prevent external circulation, the PUMP INLET and PUMP OUTLET lines on the rear of the unit are capped. The caps must be removed when external circulation is required.

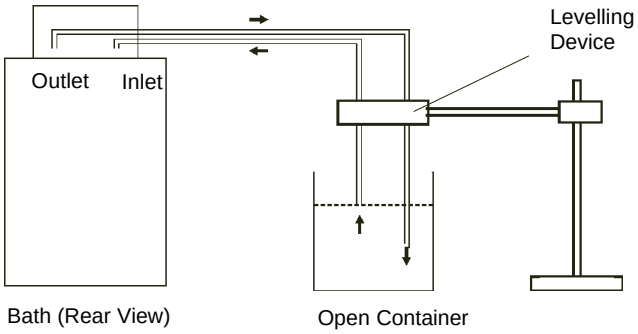
To properly secure external hose connections to the unit, wrap Teflon® tape around the pipe line threads before installation. Once the hose connections are made, the hoses must be properly plumbed to an external system. *It is important the bath is not in operation until all plumbing is complete.*

NOTE: To increase agitation in the bath when not circulating externally, connect a short loop of hose between the inlet and outlet lines.

If the bath is not used for external circulation or incresed agitation, make sure the stainless steel caps are in place prior to operating the bath.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Circulating to an open container



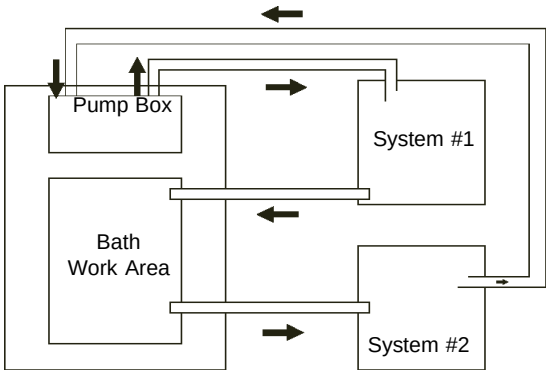
A stainless steel leveling device is available to aid circulation to an open vessel. Contact our Sales Department for more information (see Preface, After-sale Support).

Support the leveling device over the open container with a ringstand. Stagger the tubes in the leveling device so one tube is submerged in the vessel fluid, and the other tube is level with the fluid surface. Connect the deeper tube to the PUMP OUTLET and the shorter tube to the PUMP INLET.

Adjust the flow rate using the accessory flow control valve connected to the PUMP OUTLET, or by partially restricting the outlet tubing. When properly adjusted, the pump inlet will draw an occasional air bubble to prevent over flow, and the pump outlet will force fluid through the submerged tube to prevent aeration of the vessel.

To avoid siphoning the bath work area when the unit is shut off, lift the leveling device out of the vessel and above the level of the unit.

Circulating through two closed loops



Bath (Top View)

The pump can be used to circulate through two closed loop systems. Connect the shortest practical length of flexible tubing from the PUMP OUTLET to the inlet of external system #1. Connect the outlet of system #1 directly into the bath work area. Connect tubing from the bath work area to the inlet of system #2. Connect the outlet of system #2 to the PUMP INLET.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Drain



Ensure the temperature of the bath fluid is safe before draining the unit.

The unit is equipped with a drain located at the back of the unit at the base of the bath. The drain has ¼ inch male pipe threads and is capped with a stainless steel plug. To drain the reservoir simply remove the cap.

To assure proper fit when replacing the cap, be sure to line the threads with Teflon® tape.

Fluids



Never use flammable or corrosive fluids with this unit.

The selected fluid must have a viscosity of 50 centistokes or less at the lowest operating temperature.

Tap water is the recommended fluid for operation from +8°C to +80°C.

For operation from +8°C to -30°C, a 50/50 mixture, by volume, of tap water and laboratory grade ethylene glycol is suggested.

Above +80°C and below -30°C, the user is responsible for fluids used.



Never use pure ethylene glycol as a bath fluid. A minimum 80/20 mixture of Ethylene Glycol and tap water is allowed.

Filling Requirements

The bath work area has a high and low level marker to guide filling. The markers are 1 inch horizontal slits located in the center of the stainless steel baffle separating the work area and the pump assembly. The correct fluid level falls between these two markers. The heating and cooling coils will be exposed and may become damaged if the correct fluid level is not provided.

When pumping to an external system, keep extra fluid on hand to maintain the proper level in both the circulating lines and the external system.



Never run the unit when the work area is empty. Never overfill the unit, this may damage the insulation and affect stability.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section IV Controllers

Controllers

Two standard temperature controllers are available with the unit: Analog and Digital. This section explains the installation and operation of the controllers.

Start Up

Before starting the unit, check all electrical and plumbing connections and make sure the work area has been properly filled with bath fluid.

To start 115V units press the I/O switch on the side of the controller to the **I** (power on) position. The pump will start and the POWER LED will light.

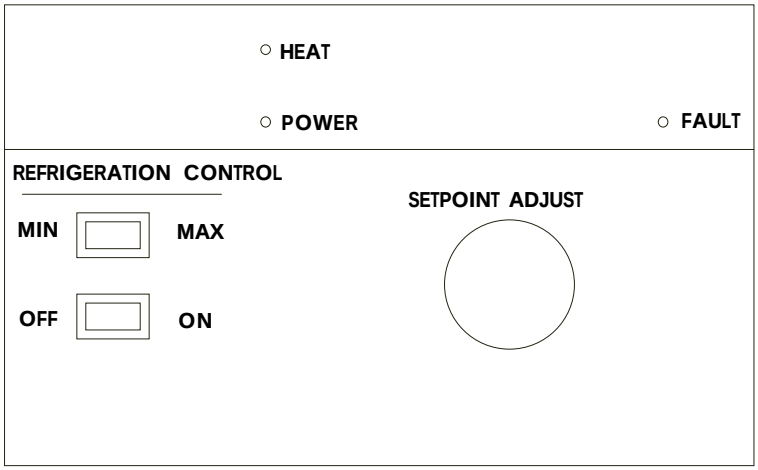
220V units have a circuit breaker instead of a switch. The circuit breaker is labeled **I** (power on) and **O** (power off). Ensure the circuit breaker is in the **I** position.

Two switches operate the REFRIGERATION system: ON/OFF and MIN/MAX. The REFRIGERATION switch should be ON for normal operation below 50°C. Above 50°C turn the REFRIGERATION switch ON only if you need a rapid cool-down.

We recommend you use MAX for operation between 0°C and 30°C.

MIN is for normal operation below 0°C and for maintaining temperature consistency in applications with low heat loads. MIN must be used for operation above 30°C.

The HEAT LED indicates the status of the heater. As the temperature of the fluid in the bath approaches the temperature setpoint, the lamp will cycle on and off to indicate the approximate duty cycle of the heater.



Analog Controller

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Analog Temperature Adjustment

Units with Analog temperature controller are equipped with a glass tube thermometer. Insert the thermometer in the grommet located on the left side of the work area.

To adjust the bath temperature, turn the dial to the desired setpoint. Use the bath thermometer to make fine adjustments to the bath temperature.

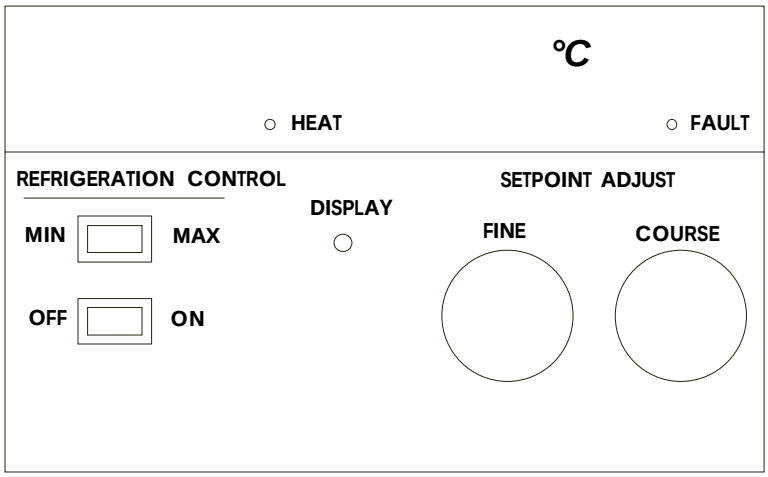
When the unit is shut off wait approximately five minutes before restarting. This allows time for the refrigeration pressures to equalize. If the pressures are not allowed to equalize, the compressor will short-cycle (clicking sound) and no cooling will occur.

Digital Temperature Adjustment

To display the temperature setpoint, press the DISPLAY switch. To adjust the setpoint, press and hold the DISPLAY switch and turn the COARSE and FINE dials until the temperature setpoint is indicated on the LED display.

NOTE: Inadvertent movement of the COARSE and FINE dials, regardless of the position of the DISPLAY switch, will result in a change of the setpoint. The change will not be immediately reflected on the LED display unless the DISPLAY switch is pressed. The display will eventually change as the unit responds to the new setpoint.

When the unit is shut off wait approximately five minutes before restarting. This allows time for the refrigeration pressures to equalize. If the pressures are not allowed to equalize, the compressor will short-cycle (clicking sound) and no cooling will occur.



Digital Controller

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

RTE-221 Boost Heater

All RTE-221 models have a boost heater. The boost heater is designed to provide additional heat to the unit's large work area to aid rapid heating.

To start the heater place the BOOST HEAT switch, located on the front of the temperature controller, to the ON position. Even though the switch automatically returns to the OFF position, the boost heater will start to function. (You can verify this by observing the fluid temperature rising.) The boost heater automatically ceases operation when the setpoint is reached.

If the REFRIGERATION switch is ON, placing the BOOST HEAT switch to ON automatically turns the refrigeration system off. The refrigeration system will restart once the boost heater turns off. Therefore, if you do not require the refrigeration system, the REFRIGERATION switch should be placed to OFF before turning the boost heater on.

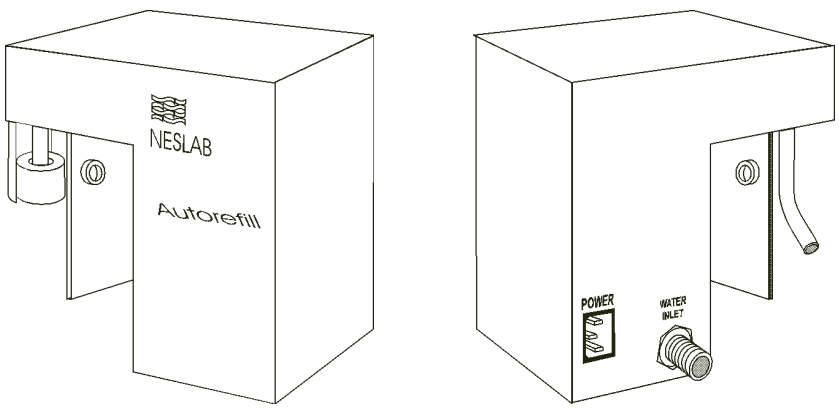
Autorefill (Optional)

An optional autorefill device is designed to maintain the correct level of cooling fluid in the reservoir. The device consists of a float switch and a solenoid valve. If the cooling fluid level falls, the float switch will open the solenoid valve and allow make-up fluid to fill the reservoir. Once the cooling level reaches the proper level, the float switch will rise and the solenoid valve will close.

The plumbing connection for the autorefill device, labeled WATER INLET, is located on the rear of the autorefill assembly. The connection is 3/8 inch OD stainless steel. Remove the nut and install the tubing from your make-up fluid source. Reinstall the nut and tubing on to the connection.

Tubing is available from Thermo NESLAB. Contact our Sales Department for more information (see Preface, After-sale Support).

The autorefill device requires its own source of electrical power. The connector for the line cord (provided with the assembly) is also located on the rear of the autorefill device. The connector is labelled POWER.



Autorefill Device

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

High Temperature/ Low Liquid Level Safety

To protect your application, the adjustable High Temperature/Low Liquid Level Safety (HIGH TEMP/LOW LEVEL) ensures the heater will not exceed temperatures which can cause serious damage to your unit. A single temperature sensor, located on the heater coils in the bath, monitors both conditions. A High Temperature/Low Liquid Level fault occurs when the temperature of the sensor exceeds the set temperature limit.

In the event of a fault, the unit will shut down. The cause of the fault must be identified and corrected before the unit can be restarted.

The safety on single heater systems is not preset and must be adjusted during initial installation.

Units with a boost heater have an additional nonadjustable safety located behind the main safety. It has a red reset button but no adjustment knob.

To set the safety, locate the HIGH TEMP/LOW LEVEL SAFETY adjustment dial on the right side of the pump box. Turn the dial fully clockwise and turn the I/O switch off then back on.

Start the unit. Adjust the setpoint for a few degrees higher than the highest desired fluid temperature and allow the bath to stabilize at the temperature setpoint. Turn the HIGH TEMP/LOW LEVEL SAFETY dial counter-clockwise until you hear a click and the unit shuts down. The red FAULT LED on the temperature controller will light to indicate a fault has occurred.

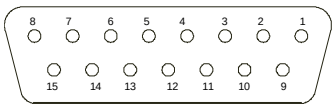
Cool the bath and then, without moving the adjustment dial, turn the I/O switch off then back on.

NOTE: The safety has a temperature range of 0°C to 180°C.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

15-Pin Accessory Connector

Digital units are equipped with a 15 pin D-subminiature female receptacle on the right side of the power box. An ENABLE/DISABLE switch is located just below the receptacle. Place the switch to the ENABLE position to control the bath via the receptacle connection. (The sensor temperature and setpoint, pin 7 and 8, can be read with the switch in either position.) The pin-out information is listed below.



15 pin D-subminiature female receptacle

Pin #	Function
1	Chassis ground.
2	No connection.
3	Span +. Indicates the maximum setpoint value the unit can be set to operate. The temperature scale is 10mV/°C, referenced to analog ground, pin 6 (example: +350mV = +35.0°C).
4	Span -. Indicates the minimum setpoint value the unit can be set to operate. The temperature scale is 10mV/°C, referenced to analog ground, pin 6 (example: +50mV = +5.0°C).
5	No connection.
6	Analog ground. The analog ground is physically separated from the power ground throughout the unit. To prevent offsets that result from ground currents, the analog and power grounds are only connected at the unit's power supply. Analog ground should only be used as a reference pin.
7	Sensor temperature (current limited through 2.7K OHM resistor). The fluid temperature, as measured by the controller's sensor located in the reservoir, can be read at this pin. The temperature scale is 10mV/°C, referenced to analog ground, pin 6 (example: +150mV = +15.0°C).
8	Setpoint out. The present temperature setpoint can be read at this pin. The temperature scale is 10mV/°C, referenced to analog ground, pin 6 (example: +150mV = +15.0°C).
9	Power Ground.
10	No connection.
11	No connection.
12	Digital display (input only). An external voltage can be displayed on the operator panel digital display by applying the voltage to this pin. The display has a low input resistance and a full scale rating of ±1.99VDC. Input is referenced to analog ground, pin 6. The maximum voltage applied to the display should be limited to ±2VDC.
13	- 5V. Power supply of -5VDC (15mA maximum).
14	+5V. Power supply of +5VDC (50mA maximum).
15	Setpoint in. The temperature setpoint can be controlled by applying a known voltage to this pin. The temperature scale is 10mV/°C, referenced to analog ground, pin 6 (example: +230mV = +23.0°C).

NOTE: With the switch in the ENABLE position and no input to pin 15, the bath will slowly go to the setpoint value set on the digital controller.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section V Maintenance



To avoid electrical shock, disconnect the mains cord prior to removing any access panels or covers.

Service Contracts

Thermo NESLAB offers on-site Service Contracts that are designed to provide extended life and minimal down-time for your unit. For more information, contact our Service Department (see Preface, After-sale Support).

Condenser

For proper operation, the unit needs to pull substantial amounts of air through a condenser. A build up of dust or debris on the fins of the condenser will lead to a loss of cooling capacity.

Periodic vacuuming of the condenser is necessary. To access the condenser the front grille must be removed.



The unit must be turned off before the front panel is removed.

RTE-111 units have a one-piece grille assembly. Pull forward to remove.

RTE-211 and RTE-221 units have a two piece grille assembly. First remove the left (blue-colored) section by simply pulling it forward. Pull forward on the remaining (white-colored) section to remove it.

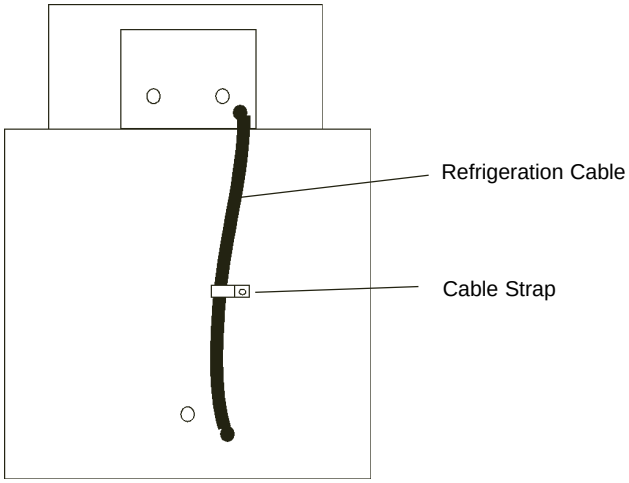
The frequency of cleaning depends on the operating environment. After initial installation, we recommend a monthly visual inspection of the condenser. After several months, the frequency of cleaning will be established.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Reservoir Cleaning

Routine cleaning can be achieved by simply sponging down the seamless stainless steel tank with tap water. (Dish washing detergent may be used but the tank must be thoroughly rinsed.)

To gain access to the entire reservoir the pump box and reservoir cover should be removed.



Remove the line cord from the rear of the unit and then remove the four screws (two on each side) securing the reservoir's cover.

To get slack on the refrigeration cable, remove the cable strap. The cable itself does not need to be disconnected.

Turn the cover assembly over and carefully place it on a supporting platform.

Algae

To restrict the growth of algae in the bath, we recommend the bath cover be kept in place and that all circulation lines be opaque. This will eliminate the entrance of light required for the growth of most common algae.

Thermo NESLAB recommends the use of Chloramine-T, 1 gram per 3.7 liters.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Section VI Troubleshooting

Checklist

Unit will not start

Make sure the voltage of the power source meets the specified voltage, ±10%. Refer to the serial number label on the rear of the unit to identify the specific electrical requirements of your unit.

Check the High Temperature/Low Liquid Level Safety. If the FAULT light is on, make sure the fluid level in the bath is between the marks in the baffle and the HIGH TEMP/LOW LEVEL SAFETY setting is greater than the fluid temperature. Turn the I/O switch off then back on, and attempt to restart.

Loss of cooling capacity

Check the position of the REFRIGERATION switch.

Be sure the cooling capacity of the unit has not been exceeded if circulating to an external system.

When the unit is shut off, wait approximately five minutes before restarting. This allows time for the refrigeration pressures to equalize. If the pressures are not allowed to equalize, the compressor will short-cycle (clicking sound) and no cooling will occur.

Proper ventilation is required for heat removal. Make sure ventilation through the front and rear panels is not impeded and the panels are free of dust and debris.

Ice build up on the cooling coils can act as insulation and lower the cooling capacity. Raise the temperature of the bath to de-ice the cooling coil and increase the concentration of non-freezing fluid.

No external circulation

Check for obstructions, kinks, or leaks in the circulation tubing.

Circulation will cease when the pump head has been exceeded.

Service Assistance and Technical Support

If, after following these troubleshooting steps, your unit fails to operate properly, contact our Customer Service Department for assistance (see Preface, After-sale Support). In addition to arranging warranty service, our Service Department can provide you with a wiring diagram and a complete list of spare parts for your unit. Before calling, please obtain the following:

Part number
Serial number
Voltage of unit
Voltage of power source

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix A International Quick Reference Guides

RTE - Serie Kurzbedienungsanleitung

Installation
Das Gerät verfügt über ein luftgekühltes Kühlsystem. Die Luft wird an der Vorderseite angesaugt und strömt an der Rückseite aus. Das Gerät muß so plaziert werden, daß der Luftstrom nicht behindert wird. Bei ungenügender Ventilation wird die Kühlleistung reduziert und kann in extremen Situationen zu einem Ausfall des Kühlsystems (Kompressors) führen.

Aufstellorte mit hoher Staubentwicklung sollten vermieden werden, und es sollte eine regelmäßige Reinigung des Gerätes durchgeführt werden. Um einwandfrei zu funktionieren, muß das Gerät große Luftmengen durch den Kondensor ansaugen. Bei Staub- und Schmutzablagerungen auf dem Kondensorheizkörper kommt es zu einem Verlust von Kühlleistung.

Das Gerät behält seine maximale Kühlleistung bis zu einer Umgebungstemperatur von ca. +24°C.

Vergewissern Sie sich, daß die Spannung Ihrer Stromanschlüsse mit der für das Gerät vorgesehenen Spannung übereinstimmt (± 10%).

Die Schlauchanschlüsse (1/4 Zoll MPT) des Gerätes befinden sich an der Rückseite und sind mit PUMP INLET und PUMP OUTLET bezeichnet. Entfernen Sie die Kappen, falls externe Zirkulation gewünscht wird. Schließen Sie den PUMP OUTLET-Anschluß an den Eingang Ihres Instruments und den PUMP INLET-Anschluß an den Ausgang Ihres Instruments an.

Füllen Sie das Reservoir bis zu einem Stand, der zwischen den horizontalen Markierungen liegt, die auf dem Blech markiert sind, das den Arbeitsbereich von der Pumpeneinheit trennt.

Verwenden Sie niemals entflammbare oder Korrosion verursachende Flüssigkeiten. Die gewählte Flüssigkeit muß eine Viskosität von maximal 50 Centistokes bei der niedrigsten möglichen Arbeitstemperatur haben. Für den Betrieb im Arbeits-Temperaturbereich von +8°C bis +80°C empfiehlt Thermo NESLAB Leitungswasser als Kühlmittel.

Wenn sie zu einem externen System zirkulieren, sollten Sie zusätzliche Kühlflüssigkeit zur Hand haben, um den Kühlflüssigkeitsstand in den Zirkulationsleitungen und dem externen System beibehalten zu können.

Betreiben Sie das Gerät niemals mit leerem Arbeitsbereich!

Inbetriebnahme
Vor Inbetriebnahme des Gerätes vergewissern Sie sich bitte, daß die elektrischen Anschlüsse und die Rohr- u. Schlauchanschlüsse sachgemäß installiert sind und daß das gesamte System mit Kühlflüssigkeit gefüllt ist.

Geräte, die bei 220 Volt betrieben werden, verfügen über einen Stromkreisunterbrecher auf der Rückseite des Gerätes. Vergewissern Sie sich, daß dieser auf ON gestellt ist. Um das Gerät einzuschalten, müssen Sie den I/O-Schalter auf „I“ stellen. Die Power-Lampe leuchtet auf, wenn das Gerät in Betrieb ist. Um das Gerät abzuschalten, muß der I/O-Schalter auf „O“ gestellt werden.

Bei Normalbetrieb unter +50 °C sollte der REFRIGERATION-Schalter auf ON gestellt werden. Die MIN-Einstellung ist für den Normalbetrieb bei unter 0 °C und bei +30 °C bis +50 °C. Verwenden Sie die MAX-Einstellung beim Betrieb bei 0 °C bis +30 °C.

Die HEAT-LED-Anzeige zeigt den Status des Heizelements an. Sie leuchtet auf, wenn das Heizelement arbeitet. Wenn die Arbeitstemperatur den gewünschten Setpoint erreicht, blinkt die LED-Anzeige, um den ungefähren Arbeitsrhythmus des Heizelements anzuzeigen.

Nach dem Ausschalten des Gerätes sollten Sie vor dem Wiedereinschalten ca. 5 Minuten warten, damit das Kühlsystem einen Druckausgleich durchführen kann. Beachtet man diese Wartezeit nicht, kommt es zu kurzen Schaltfrequenzen des Kompressors und eine Kühlung ist nicht möglich.

Einstellung der Analog-Temperatursteuerung
Um die Temperatur einzustellen (setpoint), drehen Sie den SETPOINT ADJUST-Schalter an der Vorderseite des Gerätes auf die gewünschte Temperatur.

Einstellung der Digital-Temperatursteuerung
Um sich den Temperatur-Setpoint anzeigen zu lassen, drücken Sie den DISPLAY-Schalter und halten Sie ihn gedrückt. Um den Temperatur-Setpoint einzustellen, drücken Sie den Display-Schalter, halten diesen, und drehen gleichzeitig den SETPOINT ADJUST-Schalter so lange, bis die gewünschte Temperatur in der Digitalanzeige angezeigt wird. Wenn die Temperatur eingestellt ist, lassen Sie den Display-Schalter los. Die Digitalanzeige zeigt dann die Temperatur der Kühlflüssigkeit im Reservoir an.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP