FLY INCUBATORS 100 - 120 Voltage

SHEL LAB®

Installation - Operation Manual

SRI6PF SRI20PF

For Fly Cultivation

This unit is designed for the growth, cultivation, incubation, and storage of fruit flies (*Drosophila melanogaster*). Other models are specifically manufactured for biological oxygen demand applications.

Use of this unit outside its intended range of applications voids the manufacturing defect warranty. If you have any questions, consult your incubator dealer or customer service representative to identify a model suitable for your study or process.

Pictured on Cover: SRI6PF left, SRI20PF right

SHEL LAB Refrigerated Incubator Peltier FLY

100 - 120 Voltage

Part Number (Manual): 4861674-1

Revision: November 28, 2017

SHEL LAB is a brand of Sheldon Manufacturing, INC.

Safety Certifications

These units are CUE listed by TÜV SÜD as incubators for professional, industrial, or educational use where the preparation or testing of materials is done at an ambient air pressure range of 22.14 – 31.3 inHg (75 – 106 kPa) and no flammable, volatile, or combustible materials are being heated.

These units have been tested to the following requirements:

CAN/CSA C22.2 No. 61010-1:2012
CAN/CSA C22.2 No. 61010-2-010:2004 Reaffirmed: 2014-07
UL 61010-1:2012-05
UL 61010A-2-010:2002-03
EN 61010-1:2010
EN 61010-2-010:2014
Supplemented by: UL 61010-2-010:2015

TABLE OF CONTENTS

INTRODUCTION 5

Read this Manual 5
Safety Considerations and Requirements 5
Contacting Assistance 6
Engineering Improvements 6
Temperature Reference Sensor Device 7

RECEIVING YOUR UNIT 9

Inspect the Shipment 9
Orientation Photos 10
Recording Data Plate Information 12

INSTALLATION 13

Installation Procedure Checklist 13
Required Ambient Conditions 14
Required Clearances 14
Environmental Disruption Sources 14
Power Source Requirements 15
Lifting and Handling 16
Leveling 16
Install the Incubator 16
Deionized and Distilled Water 16
Installation Cleaning 17
Install Side Air Ducts in the SRI20PF 17
Shelving 18
Access Port Stopper 20

GRAPHIC SYMBOLS 21

CONTROL PANEL OVERVIEW 23

OPERATION 25

Theory of Operation 25
Put the Incubator into Operation 28
Set Clock and Cycle Mode Start Times 29
Set the Night Mode Temperature 31
Set the Day Mode Temperature 33
Set the Over Temperature Limit 35
Loading Samples 37
Day – Night Autocycle 37
Chamber Accessory Power Outlet 38
Humidifying the Incubator 38
Condensation and the Dew Point 39
Deactivate / Reactivate Door Alarm 40

USER MAINTENANCE 43

Cleaning and Disinfecting 43
Door Components 44
Electrical Components 44
Calibrate the Temperature display 45

UNIT SPECIFICATIONS 53

Weight 53
Dimensions 53
Capacity 53
Shelf Capacity by Weight 54
Temperature 54
Power 54

PARTS AND CONSUMABLES 55

INTRODUCTION

Thank you for purchasing a SHEL LAB unit. We know you have many choices in today's competitive marketplace when it comes to constant temperature equipment. We appreciate you choosing ours. We stand behind our products and will be here for you if you need us.

READ THIS MANUAL

Failure to follow the guidelines and instructions in this user manual may create a protection impairment by disabling or interfering with the unit safety features. This can result in injury or death.

Before using the unit, read the manual in its entirety to understand how to install, operate, and maintain the unit in a safe manner. Keep this manual available for use by all operators. Ensure all operators are given appropriate training before the unit begins service.

SAFETY CONSIDERATIONS AND REQUIREMENTS

Follow basic safety precautions, including all national laws, regulations, and local ordinances in your area regarding the use of this unit. If you have any questions about local requirements, please contact the appropriate agencies.

SOPs

Because of the range of potential applications, this unit can be used for, the operator or their supervisors must draw up a site-specific standard operating procedure (SOP) covering each application and associated safety guidelines. This SOP must be written and available to all operators in a language they understand.

Intended Applications and Locations

The incubators are intended for the incubation of fruit flies in professional, industrial, and educational environments. The units are not intended for use at hazardous or household locations.

Power

Your unit and its recommended accessories are designed and tested to meet strict safety requirements.

- The unit is designed to connect to a power source using the specific power cord type shipped with the unit.
- Always plug the unit power cord into a protective earth grounded electrical outlet conforming to national and local electrical codes. If the unit is not grounded properly, parts such as knobs and controls can conduct electricity and cause serious injury.
- Do not bend the power cord excessively, step on it, or place heavy objects on it.
- A damaged cord can be a shock or fire hazard. Never use a power cord if it is damaged or altered in any way.
- Use only approved accessories. Do not modify system components. Any alterations or modifications to your unit not explicitly authorized by the manufacturer can be dangerous and will void your warranty.

CONTACTING ASSISTANCE

Phone hours for Sheldon Technical Support are 6 am – 4:30 pm Pacific Coast Time (west coast of the United States, UTC -8), Monday through Friday. Please have the following information ready when calling or emailing Technical Support: the **model number** and the **serial number** (see page 12).

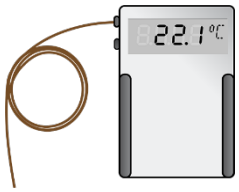
EMAIL: support@sheldonmfg.com
PHONE: 1-800-322-4897 extension 4, or (503) 640-3000
FAX: (503) 640-1366

Sheldon Manufacturing, INC.
P.O. Box 627
Cornelius, OR 97113

ENGINEERING IMPROVEMENTS

Sheldon Manufacturing continually improves all of its products. As a result, engineering changes and improvements are made from time to time. Therefore, some changes, modifications, and improvements may not be covered in this manual. If your unit's operating characteristics or appearance differs from those described in this manual, please contact your SHEL LAB dealer or customer service representative for assistance.

TEMPERATURE REFERENCE SENSOR DEVICE



Temperature Reference

Must be purchased separately

A reference sensor device is required for calibrating the incubator temperature display.

Reference devices must meet the following standards:

- Accurate to at least 0.1°C

The device should be regularly calibrated, preferably by a third party.

Temperature Probes

Use a digital device with wire thermocouple probes that can be introduced into the incubation chamber through the unit access port. Select thermocouples suitable for the application temperature you will be calibrating at.

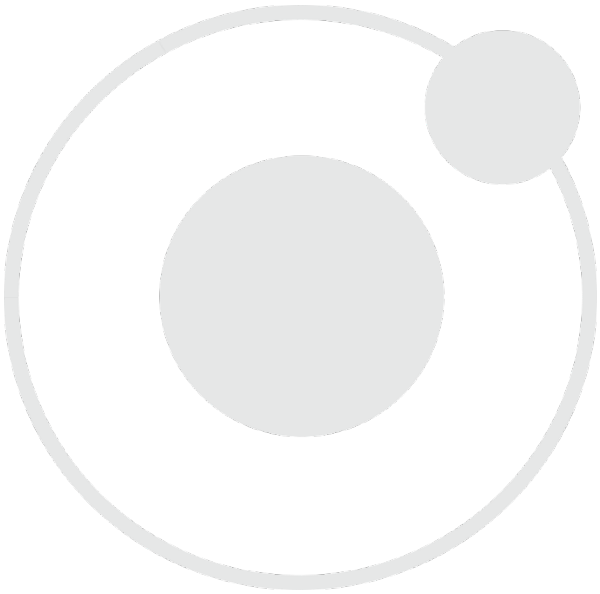
Why Probes?

Reference readings taken outside the chamber using wire temperature probes avoid chamber door openings. Openings disrupt the chamber temperature. Each disruption requires **a minimum 1-hour wait** to allow the atmosphere to re-stabilize before continuing.

No Alcohol or Mercury Thermometers

Alcohol thermometers do not have sufficient accuracy to conducti accurate temperature calibrations. **Never place a mercury thermometer in the incubation chamber!** Always use thermocouple probes.

INTRODUCTION



RECEIVING YOUR UNIT

INSPECT THE SHIPMENT

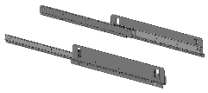
- When a unit leaves the factory, safe delivery becomes the responsibility of the carrier.
- **Damage sustained during transit is not covered by the manufacturing defect warranty**.
- Save the shipping carton until you are certain that the unit and its accessories function properly.

When you receive your unit, inspect it for concealed loss or damage to its interior and exterior. If you find any damage to the unit, **follow the carrier's procedure for claiming damage or loss**.

1. Carefully inspect the shipping carton for damage.
2. Report any damage to the carrier service that delivered the unit.
3. If the carton is not damaged, open the carton and remove the contents.
4. The unit should come with an Installation and Operation Manual.
5. Verify that the correct number of accessory items have been included.

Model	Shelves	Static Shelf Brackets	Sliding Shelf Brackets
SRI6PF	2	4	0
SRI20PF	5	8	2





Model	Leveling Feet	Power Cord	Humidification Kit	Side Air Duct Panels
SRI6PF	4	1	1	0
SRI20PF	4	1	1	2

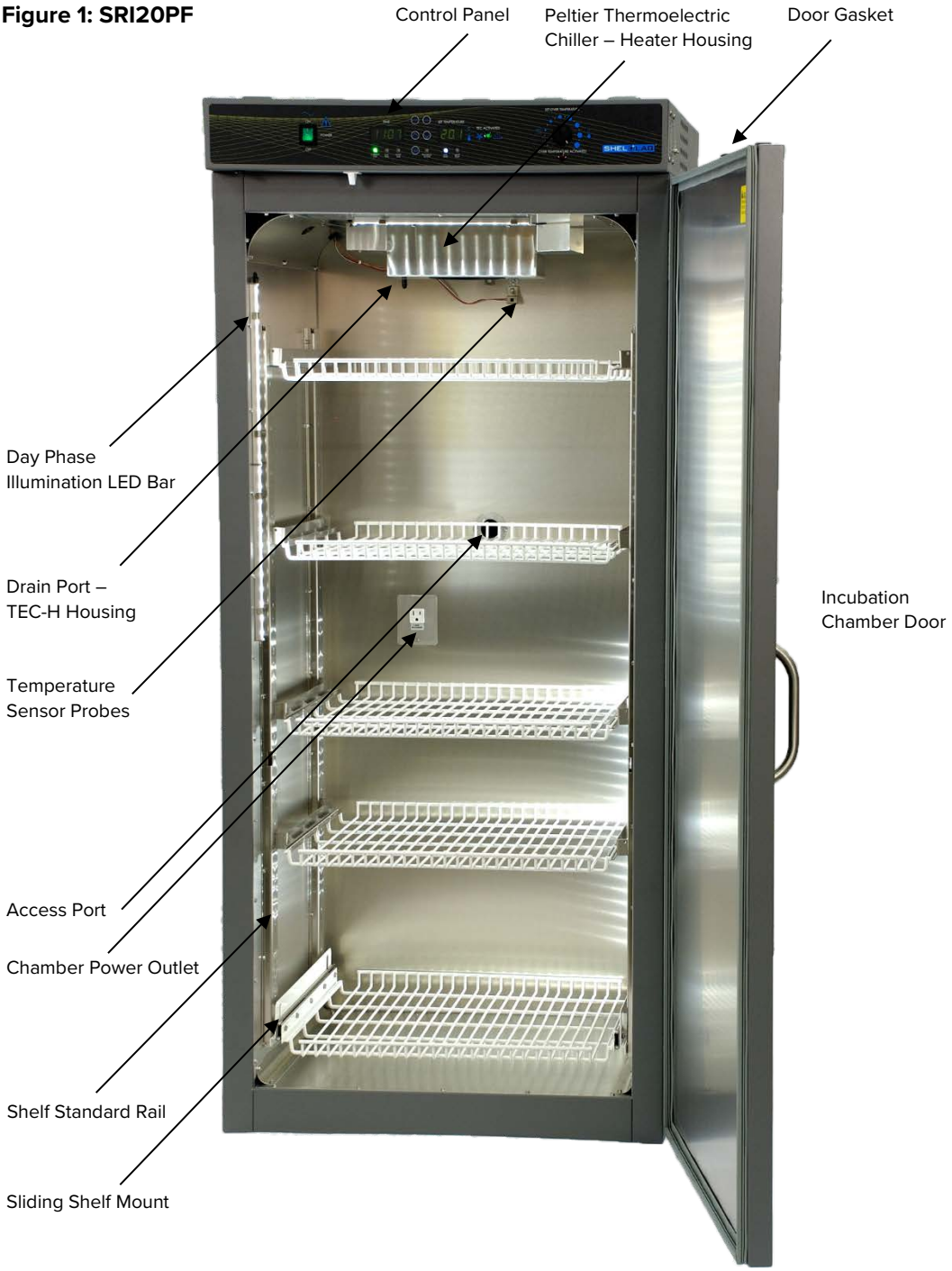



6. A rubber stopper should come installed in the access port inside the incubation chamber. Verify the presence of the stopper.

7. Carefully check all packaging for accessories before discarding.

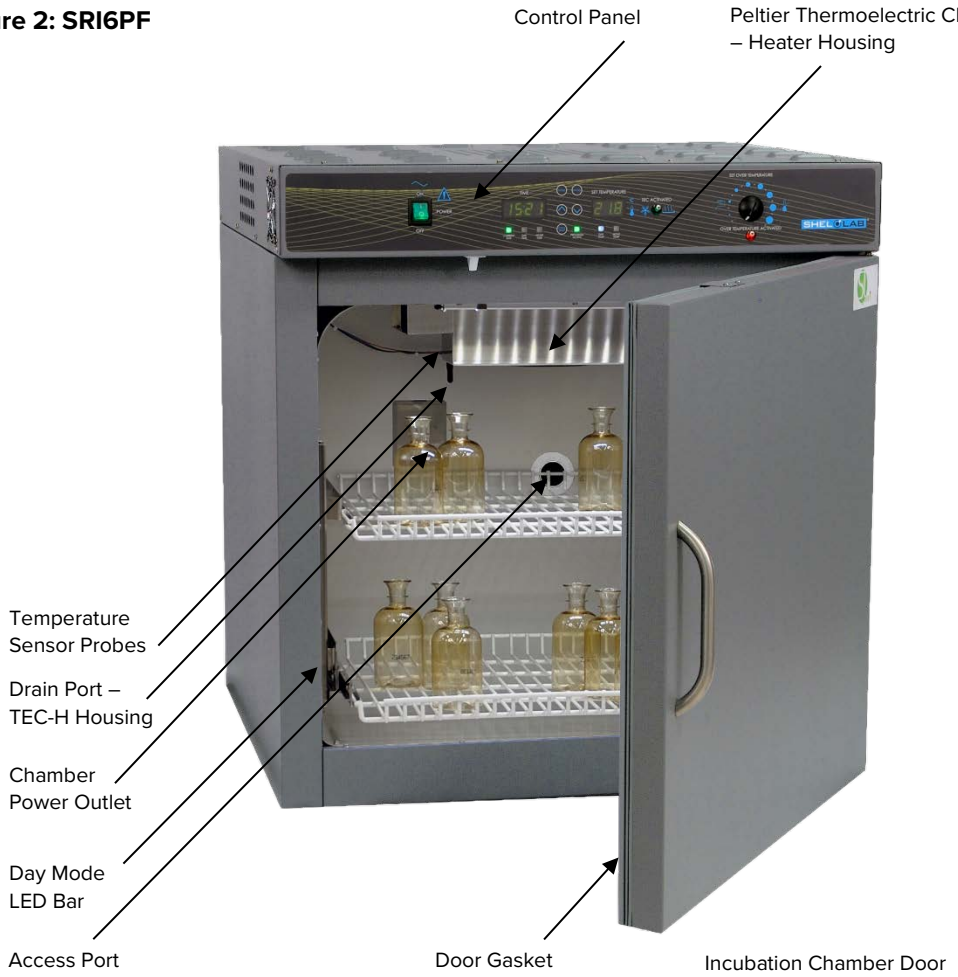
Orientation Photos

Figure 1: SRI20PF



Back of Unit
Power Cord Inlet with Fuse,
Data Plate

Figure 2: SRI6PF



Back of Unit
Power Cord Inlet with Fuse,
Data Plate

RECORDING DATA PLATE INFORMATION

The data plate contains the incubator **model number** and **serial number**. Tech Support will need this information during any support call. Record it below for future reference.

- The data plate is located on the left exterior wall of the incubator, toward the back and just above the power cord inlet.

Model Number	
Serial Number	

INSTALLATION PROCEDURE CHECKLIST

Carry out the procedures and steps listed below to install the incubator in a new workspace location and prepare it for use. All procedures are found in the Installation section of this manual.

Pre-Installation

✓ Check that the required ambient condition for the unit are met, page 14

✓ Check that the spacing clearance requirements are met, page 14

- Unit dimensions may be found on page 50

✓ Check for performance-disrupting heat and cold sources in the environment, page 14

✓ Check that a suitable electrical outlet and power supply is present, page 15

Installing the Incubator in a suitable workspace location

✓ Review the lifting and handling instructions, page 16

✓ Make sure the incubator is level, page 16

✓ Install the incubator in its workspace location, page 16

Set up the Incubator for use

✓ Clean and disinfect the unit and shelving (recommended), page 17

✓ SRI20PF only: Install the side air ducts inside the incubation chamber, page 17

✓ Install the shelving, page 18 through 19

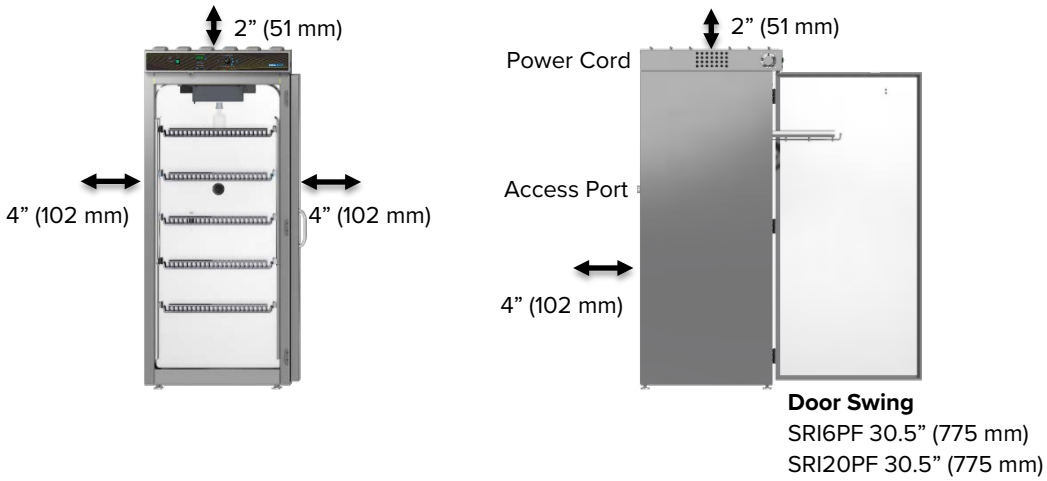
✓ Verify the stopper has been installed in the access port, page 20

Required Ambient Conditions

These units are intended for use indoors, at room temperatures between **15°C and 30°C (59°F and 86°F)**, at no greater than **80% Relative Humidity** (at 25°C / 77°F). Operating these units outside of these conditions may adversely affect its incubator temperature stability and effective operating range.

Required Clearances

These clearances are required to provide air flows for ventilation and cooling.



Door Swing
SRI6PF 30.5” (775 mm)
SRI20PF 30.5” (775 mm)

4 inches (102 mm) of clearance is required on the sides and back.

2 inches (51 mm) of headspace clearance between the top of the unit and any overhead partitions.

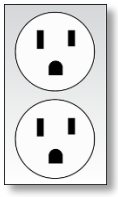
Environmental Disruption Sources

Consider proximate environmental factors that can affect the chamber temperature and atmospheric integrity when selecting a location to install the unit:

- Ovens, autoclaves, and any device that produces significant radiant heat
- High-traffic areas
- Direct sunlight
- Heating and cooling ducts or other sources of fast-moving air currents

POWER SOURCE REQUIREMENTS

When selecting a location for the unit, verify each of the following requirements is satisfied.



Standard NEMA 5-15R wall socket

Power Source: The power source for the unit must match the voltage and match or exceed the ampere requirements listed on the unit data plate. These units are intended for **100 - 120V 50/60 Hz** applications at the following amperages:

Model	Amperage
SRI6PF	4.0 Amps
SRI20PF	5.5 Amps

- **Supplied voltage must not vary more than 10% from the data plate rating**. Damage to the unit may result if the supplied voltage varies more than 10%.
- The wall power source must be protective earth grounded.
- Use a separate circuit to prevent loss of the unit due to overloading or circuit failure.
- **The recommended wall circuit breakers for these units are 15 amps.**
- The wall power source must conform to all national and local electrical codes.

Power Cord: The unit must be positioned so that all end-users can quickly unplug the cord in the event of an emergency.

- Each unit comes provided with a **125 volt, 15 Amp, 8.2ft (2.5m) NEMA 5-15P** power cord. Always use this cord or an identical replacement.

Fuses: These units each ship with a fuse installed in the power cord inlet.

- The fuse must be installed and intact for the unit to operate.
- Always find and fix the cause of a blown fuse prior to putting the unit back into operation.
- Fuse type
    - 250V, T6.3A, 5X20mm

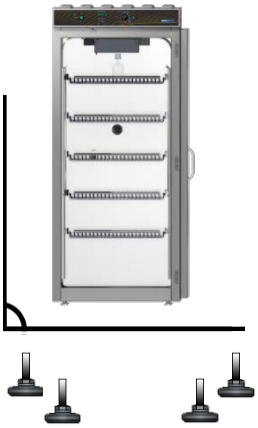
LIFTING AND HANDLING

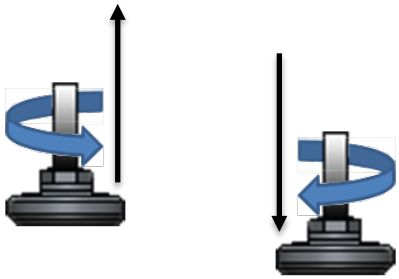
The unit is heavy. Use appropriate lifting devices that are sufficiently rated for these loads. Follow these guidelines when lifting the unit.

- Lift the unit only from its bottom surface.
- Doors, handles, and knobs are not adequate for lifting or stabilization.
- Restrain the unit completely while lifting or transporting so it cannot tip.
- Remove all moving parts, such as shelves and trays, and lock doors in the closed position during transfers to prevent shifting and damage.

LEVELING

Install the leveling feet in the 4 corner holes on the bottom of the unit. The unit must be level and stable for safe operation.





Note: To prevent damage when moving the unit, turn all 4 leveling feet so that the leg of each foot sits inside the unit.

INSTALL THE INCUBATOR

Install the unit in a workspace location that meets the criteria discussed in the previous entries of the Installation section.

DEIONIZED AND DISTILLED WATER

Do not use deionized water to clean or humidify the incubator. Use of deionized water may corrode metal surfaces and voids the warranty. The manufacturer recommends the use of distilled water in the resistance range of 50K Ohm/cm to 1M Ohm/cm, or a conductivity range of 20.0 uS/cm to 1.0 uS/cm, for cleaning and humidifying applications.

INSTALLATION CLEANING

Cleaning and disinfecting the incubation chamber during installation reduces the chance of microbiological contamination. The unit was cleaned and disinfected at the factory. However, the unit may have been exposed to contaminants during shipping. Additionally, the factory procedure may not meet the standards of your institutional protocols. Please see the **Cleaning and Disinfecting** entry on page 43 in the User Maintenance section for information on how to clean and disinfect without damaging the chamber.

- Remove all wrappings and coverings from shelving prior to cleaning and installation.

INSTALL SIDE AIR DUCTS IN THE SRI20PF

Hang the two side panels included with the SRI20PF on the chamber side walls. These air duct panels play an important role maintaining even heat distribution inside the long incubation chamber of the SRI20PF.

Not installing both air duct panels **may adversely impact the chamber temperature uniformity**.

1. Place the hooks on the top and bottom corners of each panel into the inside slots on the shelf standard mounting rails.

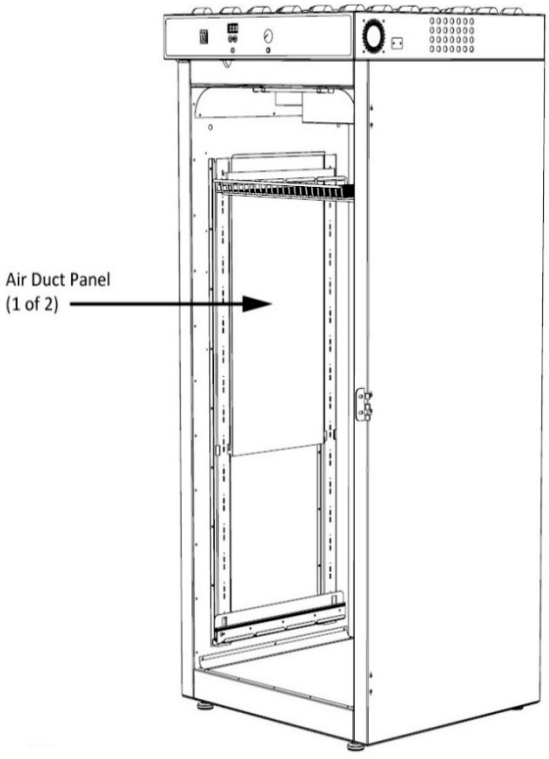


Figure 3: SRI20PF Air Duct Panel

SRI6PF incubators do not require side air ducts.

SHELVING

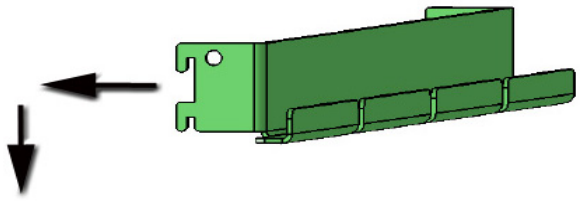


Figure 4: Standard Shelf Mounting Bracket Installation

1. Insert bracket tabs into the shelf standard slots in the incubation chamber.
2. Slide the bracket down so the tabs sit securely in the mounting slots.
3. Repeat the process on the opposite side of the chamber with the second mounting bracket.
4. Place 1 shelf on the 2 installed mounting brackets.

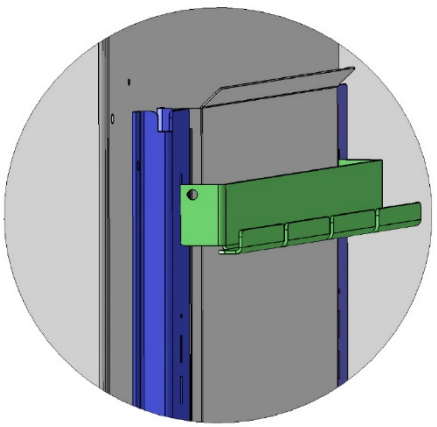


Figure 5: Standard Mounting

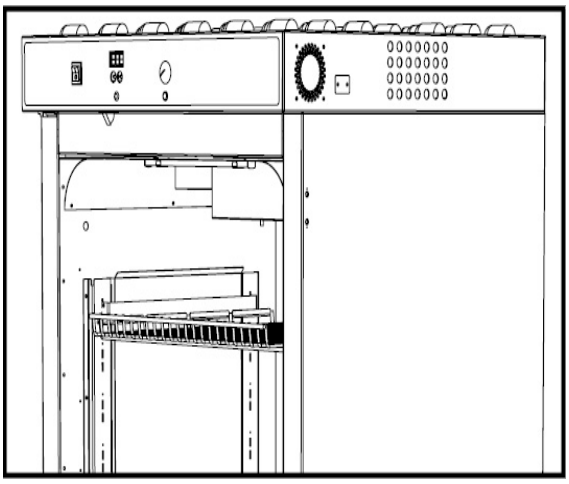


Figure 6: Standard Shelf Installed

Sliding Shelf Installation

The SRI6PF does not come with a sliding shelf. Sliding shelf mounts for the SRI6P must be purchased separately.

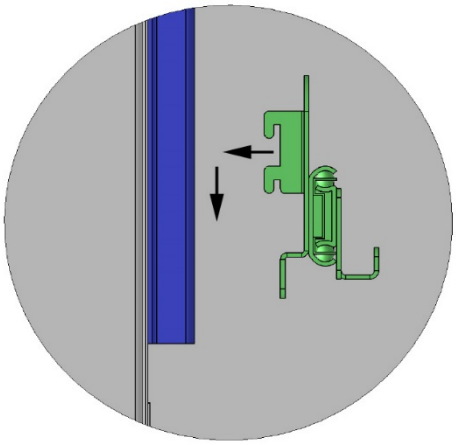


Figure 7: Sliding Shelf Mounting Bracket Installation

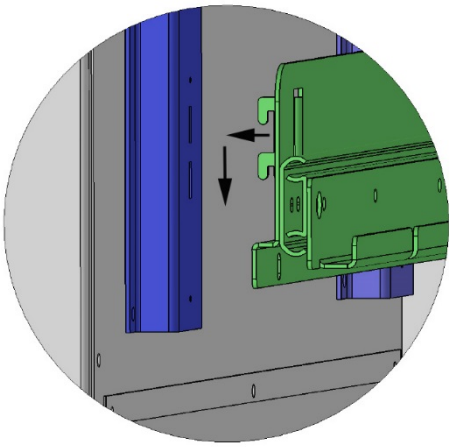


Figure 8: Sliding Shelf Mounting Bracket Installation

1. Insert the sliding bracket tabs into the mounting slots on the shelf standard rails. See Figure 7 and Figure 8.
2. Slide bracket down so the tabs sit securely in the slots.

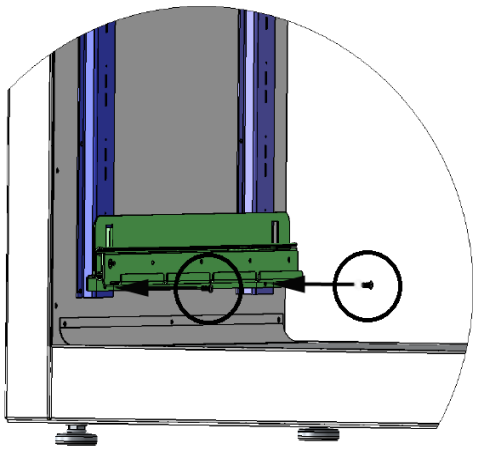


Figure 9: Sliding Mounting Bracket Screws

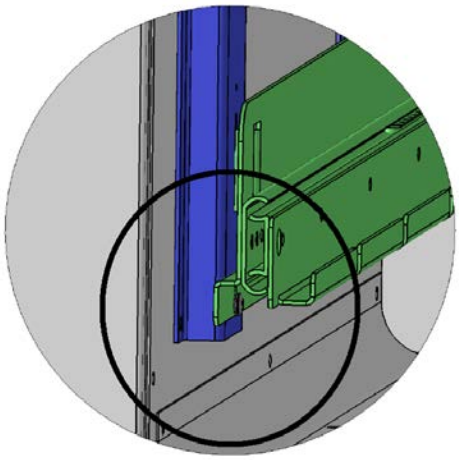


Figure 10: Front Screw Installed

3. Screw in the included screws on the front and back of the flange located on the bottom of the bracket. See Figure 9 and Figure 10.
    a. Repeat the process on the opposite side of the chamber with the second sliding mounting bracket.
4. Place 1 shelf on the 2 sliding brackets.

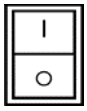
Access Port Stopper

Each incubator ships with a rubber stopper installed in the access port located in the back of the incubation chamber.

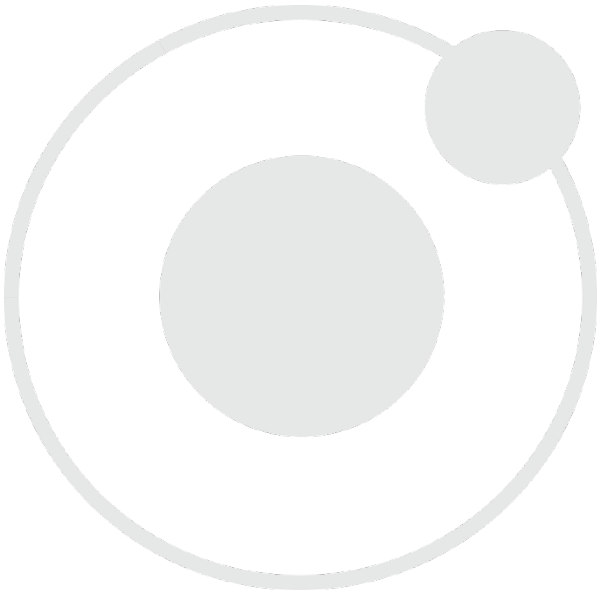
- The stopper should **always be installed inside the chamber** to obtain the best temperature uniformity and prevent condensation from forming inside the port. Do not install on the outside of the port on the back of the unit.
- Wires for thermocouples and other sensor probes may be introduced into the chamber through the access port. The stopper may be placed over the wires.

GRAPHIC SYMBOLS

The unit is provided with multiple graphic symbols on its exterior. The symbols identify hazards and the functions of the adjustable components, as well as important notes in the user manual.

Symbol	Definition
	Consult the user manual. Consulter le manuel d'utilisation
	Temperature display Indique l'affichage de la température
	Over Temperature Limit system Thermostat température limite contrôle haute
	AC Power Repère le courant alternatif
	I/ON O/OFF I indique que l'interrupteur est en position marche. O indique que le commutateur est en position d'arrêt.
	Protective earth ground Terre électrique
	Adjusts UP and DOWN Ajuster la température de l'incubateur vers le haut et vers le bas
	Manually adjustable Indique un réglage manuel
	Recycle the unit. Do not dispose of in a landfill. Reycle l'unité. Ne jetez pas dans une décharge.

GRAPHIC SYMBOLS



CONTROL PANEL OVERVIEW

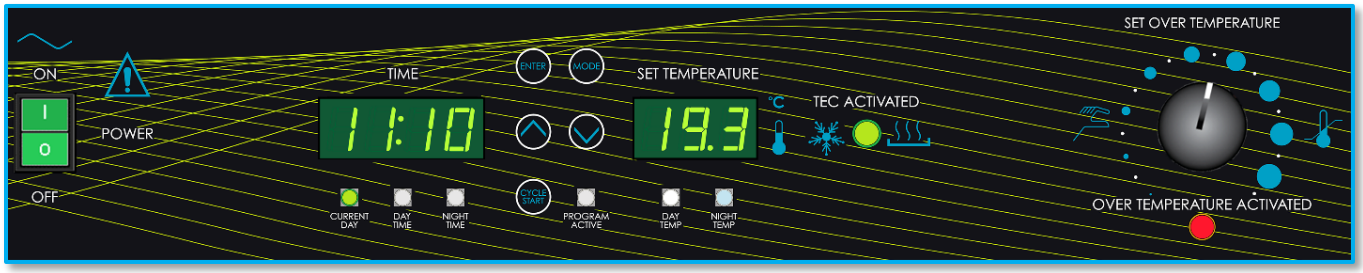


Figure 11: Control Panel Center

Power Switch

Illuminates when in the ON (I) position.

Time Display

This display operates as a 24-hour clock (00:00 – 23:59), showing the current time. The display is also used to set the **Daytime start time** and the **Nighttime start time** for the day – night illumination and heating autocycle.

Three LED indicators immediately below the display indicate which time is showing. The green **Current Day** lamp indicates the display is showing clock time. When setting start times for the Day – Night Autocycle, the Day Time and Night Time lamps indicate which start time is being displayed.

Temperature Display

Shows the current incubation chamber air temperature accurate to 0.1°C. It can also be placed in set point or calibration adjustment modes. When navigating to these modes, the display will show “SP” for Set Point or “C O” for Calibration Offset.

Just below the Temperature Display are two LED lights, **Day Temp** and **Night Temp**. These indicate which mode the incubator is running in as well as which mode’s temperature set point is being displayed when adjusting programed temperatures.

Control Arrow Buttons

Temperature functions: By default, the arrow buttons adjust the temperature set points of the Day and Night Modes. Additionally, these controls can be used to turn the Door Open Alarm off or on when adjusting the temperature set point (dO = door alarm off, dI = door alarm on).

These buttons can also be used to place the temperature display is in its calibration mode, then to make calibration adjustments to match the display to a reference device temperature reading.

Time functions: When the time display is in the Time Set Up menu, the arrow buttons adjust the Current Time, then the auto cycle Daytime and then Nighttime start times.

CONTROL PANEL OVERVIEW

Enter Button

Saves adjustments to the Current Time and the autocycle start times while in the Time Set Up menu. The Enter button can also be used to scroll forward through the menu without changing individual time settings.

Mode Button

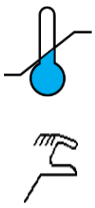
Pushing the Mode button enters the Time Setup menu. **Pressing and holding** the Mode button for 5 seconds manually switches the incubator between the Daytime and Nighttime modes when the Day – Night Autocycle is not running.

Cycle Start Button

This button launches the Day – Night Autocycle. To do so, press and hold for 2 seconds. The green PROGRAM ACTIVE indicator illuminates when the Autocycle is running. Pressing and holding while the indicator is lit terminates an active cycle.

TECH Activated

This light illuminates whenever the Peltier TEC-H device is chilling or heating the chamber. The light will be on almost continually during normal operations as the unit makes continual, small temperature compensations.



Set Over Temperature

The Over Temperature limit system is a mechanical heating cut off system that operates independently of the digital temperature controller. It helps safeguard samples against temperature spikes. Please see the **Over Temperature System** description in the Theory of Operations section (page 27) for a complete explanation.

Over Temperature Activated

This red light illuminates when the Over Temperature limit system cuts power to the Peltier TEC heating circuit. Under normal operating conditions this indicator should never turn on.

THEORY OF OPERATION

The SRIPF family of fly incubators provides a variable temperature and illumination environment suitable for the cultivation and storage of fruit flies (*Drosophila melanogaster*).

Modes of Operation

The incubator runs in one of two modes, Daytime or Nighttime. In its Daytime mode, the incubator provides continual illumination in the incubation chamber using a white light LED array mounted on the left chamber wall. In Nighttime Mode, the chamber is left dark, though a small LED bar at the top of the chamber illuminates whenever the chamber door is opened.

The Day and Night Modes have independent, programmable temperature set points. Both are set to 20°C at the factory, but can be adjusted to different temperatures in order provide a thermal variation between the modes.

Manual and Autocycle

Users can manually switch between Day and the Nighttime Modes by pressing and holding the MODE button. The SRIPF incubator comes from the factory set to Daytime Mode.

The incubator is also provided with a Day – Night Autocycle. When launched, the cycle automatically switches between the two modes twice per day until manually terminated. As set at the factory, the cycle switch points are 12 hours apart at a 08:00 (8 am) and 20:00 (8 pm). These mode “start times” can be adjusted using the incubator controls.

When running in Day Mode, the unit temperature controller automatically compensates for the small amount of heat generated by the active LED light array in the incubation chamber.

Peltier Heating and Cooling

To achieve a stable chamber temperature, refrigerated incubators normally rely on a near-continual competition between a refrigeration compressor and a conventional resistive heating element. SRIPF units employ a thermoelectric cooling-and-heating (TEC-H) device, which operates using the Peltier effect to supply heating **or** cooling as needed.

The effect: A current between two touching but dissimilar conductor plates produces a heat flow from one plate to the other. The direction of this gradient can be flipped by reversing the direction of the current. The sandwiched TEC-H conductors effectively operate as a reversible high-efficiency heat pump. Compared to a compressor–element pairing, Peltier effect devices consume far less electricity and generate significantly less waste heat, creating a corresponding reduction in cooling demand placed on laboratory climate control systems.

Control

The incubator controller monitors the air temperature of the incubation chamber using a solid-state sensor probe located in the chamber airstream. When the controller detects a temperature deviation from the current set point, it pulses power to the TEC-H device to add or remove heat from the chamber. Heated or chilled air is circulated through the chamber using a circulation fan attached to the TEC-H.

The controller employs proportional-integral-derivative (PID) analytical feedback-loop functions when measuring and controlling the chamber temperature. The intensity of PID-controlled heating and chilling is proportional to the difference between the measured chamber temperature and the set point. The frequency of heating or chilling pulses is derived from the rate of change in the difference. Integrator feedback slows the rate of heating or chilling as the chamber temperature approaches the set point, preventing overshoots.

During normal operations, with the chamber door closed, the Peltier device pulses heat or cold to the chamber almost continuously, as indicated by a flickering of the green TEC device pilot light. These are short, low-power pulses to compensate for deviations of a hundredth degree Celsius (±0.01°C).

As a solid-state device, the Peltier TEC-H offers significant maintenance savings cost. The device can be replaced by a service technician using a screwdriver and a nut driver. It does not require a certified refrigeration compressor specialist with refrigeration tools, replacement coolant fluid, and does not contain a system of easily damage, pressurized fluid vessels.

Door Alarm

The incubator is equipped with a magnetic induction door alarm, which activates when the door is open for more than 60 seconds. When the alarm is active, an audio alert will sound and the temperature display will flash. Closing the door will temporarily turn off the alarm. The alarm may be set to Off indefinitely using the **Turn Alarm Off / On** procedure on page 40.

Accessory Waste Heat

Powered accessories producing significant waste heat inside the incubation chamber may disrupt the incubator temperature stability and uniformity. Such equipment may also heat the chamber to the point the unit cannot obtain the low end of its specified operating range. Verify powered accessory equipment will not produce excessive waste heat.

The Over Temperature Limit System

The mechanical Over Temperature heating cutoff system monitors the chamber temperature using an independent hydrostatic temperature probe located in the chamber air stream. If the chamber exceeds the Over Temperature setting, the system prevents power from flowing to the Peltier TEC-H device in the direction adding heat to the chamber. In other words, the Peltier chiller – heater will not heat while the Over Temperature system is active, but it will continue to cool the chamber.

The Over Temperature heating cutoff limit is set **by the end-user,** normally at approximately 1°C above the application temperature. It is intended to help safeguard samples and prevent runaway heating in the event of a hardware failure or a heat spike generated inside or outside of the incubator chamber.

The OTL should be set when the incubator chamber is stabilized at **your warmest application temperature**. This is typically when the unit has been functioning in the Day Mode for several hours. Setting the over temperature limit while the unit is operating in the Night Mode risks tripping the Over Temperature system when the unit transitions to a warmer day temperature.

Put the Incubator into Operation

Carry out the following steps and procedures to put the unit into operation after installing it in a new workspace environment.

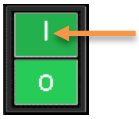
1.

2.

Attach the power cord that came with the unit to the power inlet receptacle on the incubator.

Plug the power cord into the workspace electrical supply outlet.

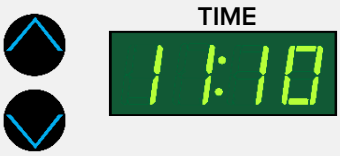
3.



Place the incubator **Power Switch** in the ON (I) position.

- The switch illuminates
- The displays illuminate

4.

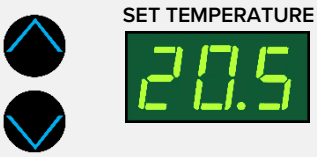


Set the Clock and Cycle Mode Start Times, page 29

5.

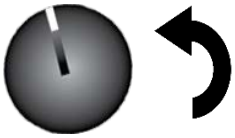
Set the Night Mode Temperature Set Point, page 31

6.



Set the Day Mode Temperature Set Point, page 33

7.



Set the Over Temperature Limit. See page 35.

The incubator must be **heated and stable** prior to performing this procedure.

Allow the unit to run 8 hours (overnight) prior to:

- **Loading Samples**, page 37
- **Launching the Day – Night Autocycle**, page 37

End of procedure

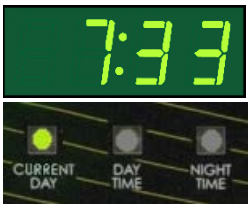
Set Clock and Cycle Mode Start Times

This procedure sets the incubator clock time to your local time, then allows you to adjust the Auto Cycle start times for the Day and Night modes. The incubator comes from the set to US Pacific Time. The Auto Cycle Daytime start comes from the factory set to 08:00 (8 am), and the default Nighttime start is 20:00 (8 pm).

1. Put the Time Display in Adjustment Mode.

Push

TIME

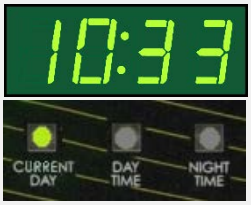


- The Current Day indicator stays lit.
- The Temperature display turns off.
- The Time display shows a blinking, adjustable clock setting.

2. Adjust the Current clock time to match your local time.

Adjust

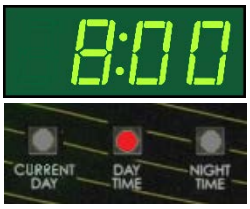
TIME



Skip to the next step if you do not wish to adjust the current clock time.

Note: Clock time set to 10:33 am in this example.

3. Save the Current time and advance to the Daytime start time.

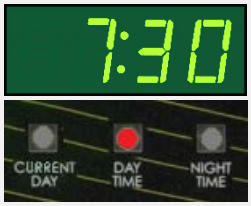


- Pressing Enter saves the flashing time value shown on the display as the new Current time.
- The display automatically advances to the Daytime mode start time.

Note: The default Day start time is 8:00 am.

4. Set the Autocycle Daytime Start Time.

Adjust



Note: Start of Day Mode operations moved forward by 30 minutes.

Continued Next Page

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Set clock and cycle start times continued

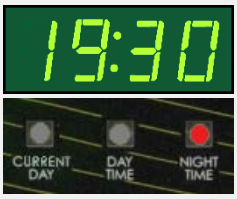
5. Save the Daytime start time and advance to the Nighttime start time

- Pressing Enter saves the flashing time value shown on the display as the autocycle Day mode start time.
- The display automatically advances to the Nighttime start time.

Note: The default Night start time is 8:00 pm.

6. Set the start time for the autocycle Nighttime mode.

Adjust

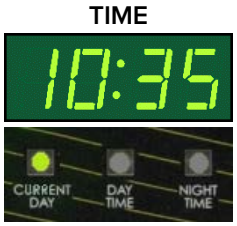


Skip to next step if you do not wish to adjust the current Nighttime start time.

Note: Start time advanced to 7:30 pm.

Note: 24-hour clock afternoon and evening times are 12 hours greater than the 12-hour clock PM equivalents. Example: 1 PM = 13:00; 6 PM = 18:00; 9 PM = 21:00. 12 AM = 00:00.

7. Save the Nighttime start time.



- Pressing Enter saves the flashing time value shown on the display as the new autocycle Night mode start time.
- The display automatically exits its time adjustment mode and returns to normal operations.
- The Temperature display turns back on.

Note: Display showing 10:35 am, with a total of 2 minutes elapsed during this example procedure.

End of procedure

SET THE NIGHT MODE TEMPERATURE

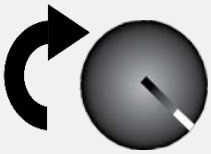
This procedure sets the temperature for the Nighttime mode used during both the autocycle and manual operations.

Turn Off the Autocycle

The Night and Day mode temperature set points cannot be changed while the Day – Night Autocycle is running. If the cycle is running, turn it off by pushing the Cycle Start button. The Program Active light will extinguish.

Program Active

1. Set the OTL control to its maximum setting, if not already set to max.



Note: This prevents the heating cutoff system from interfering if setting a higher temperature.

2. Put the incubator in Night Mode, if not already running in Night mode.

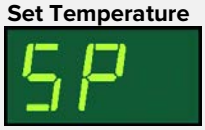
a. Press and hold the **Mode** button for 5 seconds to switch to modes.

- The Day Temp indicator extinguishes; the blue Night Temp illuminates.

3. Navigate to the Night Mode Temperature Set Point Adjustment mode.

Press and hold either

Set Temperature

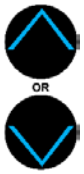


Set Point Adjustment Mode

Initial Set Point

Note: The display automatically exits the adjustment mode after 5 seconds of inactivity on the arrow keys, saving the last shown set point value.

4. Set the Temperature Set Point.



Adjust

Set Temperature

New Set Point

Note: To turn off heating and cooling for both modes, set the set point to its lowest setting (OFF).

Continued next page

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Set the Night Mode Temperature Continued

5. Wait for 5 seconds for the Set Point to save.

- The display will stop flashing. The set point is now saved in the controller.
- The display will revert to showing the current chamber air temperature, heating or cooling to match the new Night Mode set point.

End of procedure

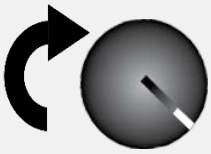
SET THE DAY MODE TEMPERATURE

This procedure sets the temperature for the Daytime mode used during both the autocycle and manual operations.

Turn Off the Autocycle if On

The Day and Night mode temperature set points cannot be changed while the Day – Night Autocycle is running. If the cycle is running, turn it off by pushing the Cycle Start button.

1. Set the OTL control to its maximum setting, if not already set to max.



Note: This prevents the heating cutoff system from interfering if setting a higher temperature.

2. Put the incubator in Day Mode, if not already running in Day mode.

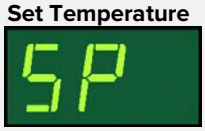
a. Press and hold the **Mode** button for 5 seconds to switch to modes.

- The Night Temp indicator extinguishes; the light blue Day Temp illuminates.

3. Navigate to the Day Mode Temperature Set Point Adjustment mode.

Press and hold either

Set Temperature

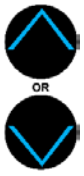


Set Point Adjustment Mode

Initial Set Point

Note: The display automatically exits the adjustment mode after 5 seconds of inactivity on the arrow keys, saving the last shown set point value.

4. Set the Temperature Set Point.



Adjust

Set Temperature

New Set Point

Note: To turn off heating and cooling for both modes, set the set point to its lowest setting (OFF).

Continued next page

Set the Day Mode Temperature Continued.

5. Wait for 5 seconds for the Set Point to save.

- The display will stop flashing. The set point is now saved in the controller.
- The display will revert to showing the current chamber air temperature, heating or cooling to match the new Night Mode set point.

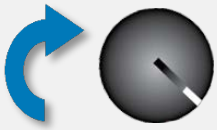
See page 35 for how to set the Over Temperature Limit heating cutoff.

Note: Test the OTL heating cutoff system at least once per year for functionality.

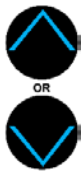
Set the Over Temperature Limit

The incubator temperature must be stable running at temperature in Day Mode for at least 1 hour prior to setting the OTL. Setting the OTL while running in the Night Mode risks tripping the OTL system whenever the unit is switched to a warmer Daytime temperature.

1. Set OTL control to its maximum setting, if not already set to max.



2. Temporarily set the incubator to 1°C above your Day Mode application temperature.



Adjust

SET TEMPERATURE

SET TEMPERATURE

Temporary Set Point

a. Adjust the Day Mode set point using the **Set the Day Mode Temperature Set Point** procedure starting on page 33.

- The temperature is increased to ensure the OTL does not interrupt normal Daytime operations.
- The set point will be restored to your application temperature in Step 7 of this procedure.

3. Wait at least 1 Hour before continuing.

- This allows the incubation chamber to achieve the new temperature and an acceptable level of thermal stability.

4. Turn the dial counterclockwise until the red Over Temperature Limit Light illuminates.

Continued next page

Set the Over Temperature Limit Continued

5. **Slowly turn the dial clockwise until the OTL Activated light turns off.**

6. **Leave the OTL dial set just above the activation point.**

- The Over Temperature Limit is now set close to the current incubator air temperature

7. **Restore the Day Mode set point to the temperature of your study application.**

SET TEMPERATURE

a. Use the **Set the Day Mode Temperature Set Point** procedure starting on page 33.

SET TEMPERATURE

Restored Application Set Point

If the OTL sporadically activates **after** the incubator has achieved the restored set point temperature, you may turn the dial slightly to the right (clockwise).

If the OTL continues activating, check for ambient sources of heat or cold that may be adversely impacting the unit temperature stability. Check if any powered accessories in the workspace chamber are generating heat. If you can find no sources of external or internal temperature fluctuations, contact Tech Support or your distributor for assistance.

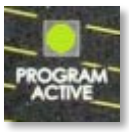
End of Procedure

LOADING SAMPLES

Place items on the shelves inside the incubation chamber as evenly spaced as possible. Proper spacing allows for maximum air circulation and a high degree of temperature uniformity. Leave 1 inch (25mm) between sample containers and the chamber walls.

DAY – NIGHT AUTOCYCLE

Launch the Cycle



1. Press and hold the **Cycle Start** button for 2 seconds.

- The Program Active indicator will illuminate.
- The auto cycle will now run indefinitely, switching between Day and Night Modes until manually terminated.

End the Autocycle

1. Push and hold the **Cycle Start** button for two seconds.

- The Program Active indicator extinguishes.

Power Outages

In the event of an outage, the incubator will adjust its clock time automatically when power is restored. If the Autocycle was running at the time of the outage, the cycle will also compensate to match to updated clock time.

Chamber Accessory Power Outlet

The power switch on the main control panel controls power to the chamber outlet.

- The outlet is intended to power low-draw equipment such as magnetic stirrers or a volatile compounds scrubber fan.
- **Do not attach equipment drawing more than 1 amp to the outlet.**

Waste Heat

Accessory equipment may generate heat in the incubation chamber. This can affect the temperature performance of the incubator.

Humidifying the Incubator

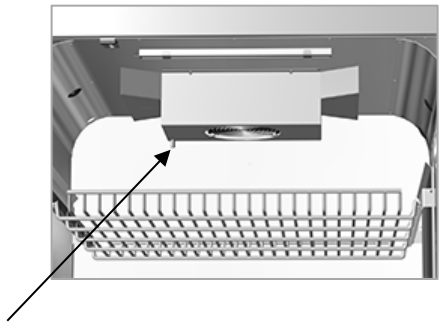
Placing only a small number of open or breathable media containers in the incubator chamber may lead to excessive drying of sample media. Unusually dry environmental conditions may also contribute to sample drying.

Humidification Kit

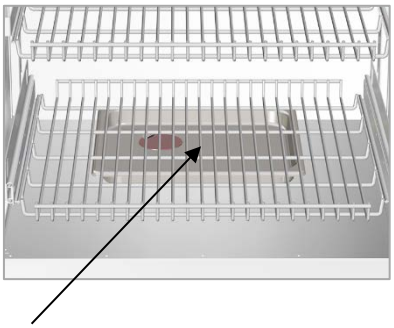
The SRI20PF incubator ship with a humidification kit as a standard accessory item. The kit may be purchased separately for the SRI6PF.

The humidification kit is intended for use while running **small loads**.

The kit consists of a collection pan, tubing, and a copper antimicrobial token for the pan, and redirects moisture condensing on the heatsink fins of the Peltier TEC heating and cooling device to use in humidification.



1. Remove the Peltier drain cover.
2. Connect the kit tubing to the port.
3. Run the tubing down behind the shelves.



1. Place humidification pan with copper token on chamber floor.
2. Place the other end of the tubing in the pan.

CONDENSATION AND THE DEW POINT

Condensation takes place whenever the humidity level in the incubation chamber reaches the dew point. The dew point is the level of humidity at which the air cannot hold more water vapor. The warmer the air, the more water vapor it can hold.

As the level of humidity rises in the chamber, condensate will first appear on surfaces that are cooler than the air temperature. Near the dew point, condensate forms on any item or exposed surface even slightly cooler than the air. When the dew point is reached, condensate forms on nearly all exposed surfaces.

Ambient relative humidity exceeding 80% or overloading the incubation chamber with open or breathable sample containers will likely result in condensation in the chamber, possible leaks around the incubator. This may cause corrosion damage if allowed to continue for any significant length of time.

Managing condensation primarily depends on either lowering the humidity level or increasing the air temperature in the incubator chamber.

Note: Rising or falling air pressure from the weather will adjust the dew point up and down in small increments. If the relative humidity in the incubation chamber is already near the dew point, barometric fluctuations may push it across the dew threshold.

Note: Thin air at higher altitudes holds less humidity than the denser air found at or near sea level.

If excessive condensate has appeared in the incubation chamber, dry the chamber interior and check the following.

- Check the door gaskets for damage, wear, or signs of brittleness or dryness. Arrange for replacement of the gaskets if damaged or excessively worn.
- Verify the chamber access port is closed. The black, rubber shipping cap that came with the unit should be installed on the inside of the incubator in the chamber.
- Make sure samples on the shelves are evenly spaced to allow for good airflow.
- Ensure the chamber door is closing and latching properly.
- Are frequent or lengthy chamber door openings causing significant temperature disruptions and chilling the chamber surfaces? If so, reduce the number of openings.
- Are there are too many open or “breathable” containers of evaporating sample media in the chamber? If so, reduce the number of open sample containers.
- Does the ambient humidity in the room exceed the stated operating range of 80% relative environmental humidity? If so, lower the room humidity.
- Is the incubator exposed to an external flow of cold air such as an air-conditioning vent or a door to a cooler hallway or adjacent room? Block or divert the air, or reposition the unit.

Note: The Day – Night Autocycle must be off when turning the Door Alarm off or on.

DEACTIVATE / REACTIVATE DOOR ALARM

The Door Open alarm sounds an audible alarm and causes the temperature display to blink on and off when the door has been open for longer than 60 seconds.

Turn the Alarm Off

The alarm comes from the factory set to ON.

1. Navigate to the Temperature Set Point Adjustment mode.

Press and hold either

Set Temperature

Set Point Adjustment Mode

Flashing Set Point

Note: The display will automatically exit the adjustment mode after 5 seconds of inactivity on the arrow keys, saving the last shown set point value.

2. Set the Temperature Set Point to Door Off.

Press and Hold

Set Temperature

Door Alarm Off

Press and hold the Up button until the display reads “dO”.

3. Wait 5 seconds.

Set Temperature

- Door Off will flash 6 times. The display will revert to showing the current chamber air temperature.
- The door alarm is now set to Off. The temperature set point has not been changed.

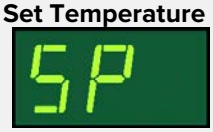
Continued next page

Turn the Door Alarm On

1. Navigate to the Temperature Set Point Adjustment mode.

Press and hold either

Set Temperature



Set Point Adjustment Mode

Flashing Set Point

Note: The display will automatically exit the adjustment mode after 5 seconds of inactivity on the arrow keys, saving the last shown set point value.

2. Set the Temperature Set Point to ON (I).

Press and Hold

Set Temperature

Door Alarm On

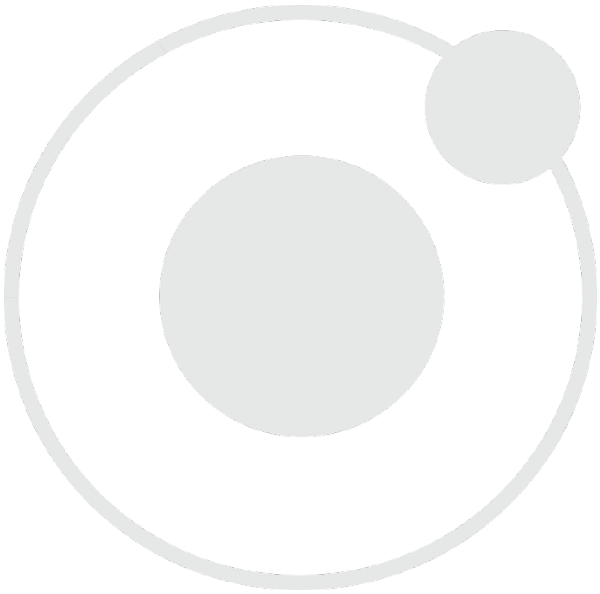
Press and hold the Up button until the display reads “dI”.

3. Wait 5 seconds.

Set Temperature

- Door On will flash 6 times. The display will revert to showing the current chamber air temperature.
- The door alarm is now set to On. The temperature set point has not been changed.

End of procedure



Warning: Disconnect this unit from its power supply prior to performing maintenance or services.

Avertissement: Débranchez cet appareil de son alimentation électrique avant d'effectuer la maintenance ou les services.

CLEANING AND DISINFECTING

If a hazardous material or substance has spilled in the unit chamber, immediately initiate your site Hazardous Material Spill Containment protocol. Contact your local Site Safety Officer and follow instructions per the site policy and procedures.

- Periodic cleaning and disinfection are required.
- Do not use spray on cleaners or disinfectants. These can leak through openings and coat electrical components.
- Consult with the manufacturer or their agent if you have any doubts about the compatibility of decontamination or cleaning agents with the parts of the equipment or with the material contained in it.
- Do not use cleaners or disinfectants that contain solvents capable of harming paint coatings or stainless steel surfaces. **Do not use chlorine-based bleaches or abrasives; these will damage the chamber liner.**

Warning: Exercise caution if cleaning the unit with alcohol or flammable cleaners. Always allow the unit to cool down to room temperature prior to cleaning and make sure all cleaning agents have evaporated or otherwise been completely removed prior to putting the unit back into service.

Avertissement: Soyez prudent lorsque vous nettoyez l'appareil avec de l'alcool ou des produits de nettoyage inflammables. Laissez toujours refroidir l'appareil à la température ambiante avant le nettoyage et assurez-vous que tous les produits de nettoyage se sont évaporés ou ont été complètement enlevés avant de remettre l'appareil en service.

Cleaning

1. Disconnect the unit from its power supply.
2. Remove all removable interior components such as shelving and accessories.
3. Clean the unit with a mild soap and water solution, including all corners.
    - **Do not use an abrasive cleaner**, these will damage metal surfaces.
    - **Do not use deionized water to rinse or clean with.**
    - Take special care when cleaning around the temperature sensor probes in the chamber to prevent damage. Do not clean the probes.
4. Rinse with distilled water and wipe dry with a soft cloth.

Disinfecting

For maximum effectiveness, disinfection procedures are typically performed after cleaning. Keep the following points in mind when disinfecting the unit.

- Turn off and disconnect the unit to safeguard against electrical hazards.
- Disinfect the unit chamber using commercially available disinfectants that are non-corrosive, non-abrasive, and suitable for use on stainless steel and glass surfaces. Contact your local Site Safety Officer for detailed information on which disinfectants are compatible with your applications.
- If permitted by your protocol, remove all removable interior accessories (shelving and other non-attached items) from the chamber when disinfecting.
- Disinfect all surfaces in the chamber, making sure to thoroughly disinfect the corners. Exercise care to avoid damaging the sensor probes.

When disinfecting external surfaces, use disinfectants that will not damage painted metal, glass, and plastic.

Door Components

Periodically, inspect the door latch, trim, catch, and gaskets for signs of deterioration. Failure to maintain the integrity of the door system shortens the life span of the incubator.

Electrical Components

Electrical components do not require maintenance. If the incubator fails to operate as specified, please contact your distributor or **Technical Support** for assistance.

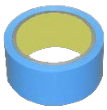
CALIBRATE THE TEMPERATURE DISPLAY

Note: Performing a temperature display calibration requires a temperature reference device. Please see the **Reference Sensor Device entry** on page 7 for the device requirements.

Temperature calibrations are performed to match the incubator temperature display to the actual air temperature inside the incubation chamber. The actual air temperature is supplied by a calibrated reference device. Calibrations compensate for long-term drifts in the incubator microprocessor controller as well as those caused by the natural material evolution of the sensor probe in the heated incubator space. Calibrate as often as required by your laboratory or production protocol, or regulatory compliance schedule. Always calibrate to the standards and use the calibration setup required by your industry requirements or laboratory protocol.

The Day and Night Modes must be separately calibrated. These are separate set points, which automatically adjust for extra heat produced by the Day Mode LED array or its absence.

A suggested calibration setup



Heat-resistant non-stick tape recommended

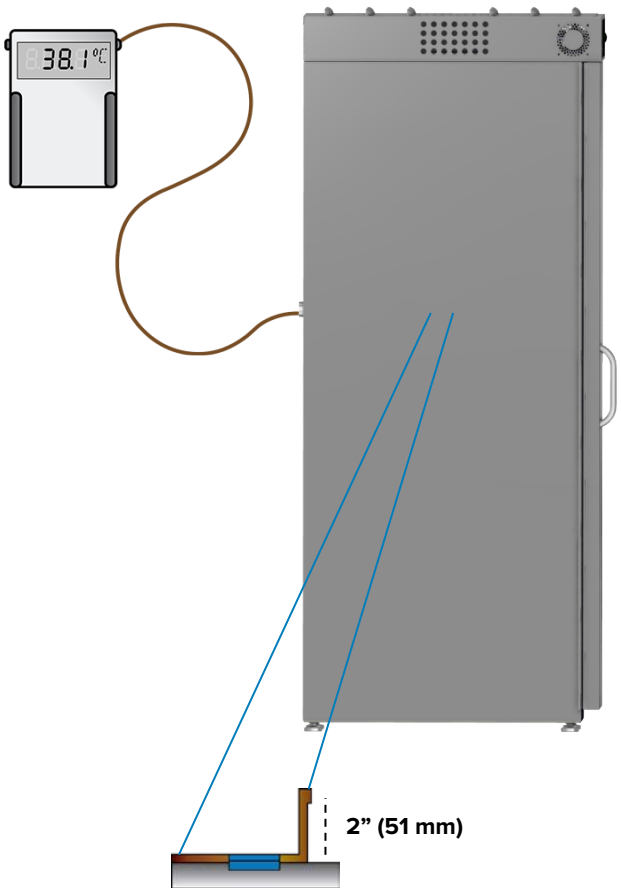
1. Introduce the reference device thermocouple sensor probe through the access port on the back of the incubator into the incubation chamber.

2. Position the sensor probe head as close as possible to the geometeric center point of the chamber.incubation chamber with the probe heads at least 2 inches (51 mm) above the shelving to avoid heatsinking.

Secure all probes in place with non-stick, heat-resistant tape.

3. After securing the probe in position, carefully place the access port stopper in the port over the probe wire. Use non-stick tape to seal any gaps created between the stopper and the port by the probe

4. The incubation chamber door must be closed and latched. Failure to do so will prevent an accurate calibration.



5. Autocycle Off

- The Autocycle must be turned off to conduct stable, accurate temperature calibrations for the Day and Night Modes.

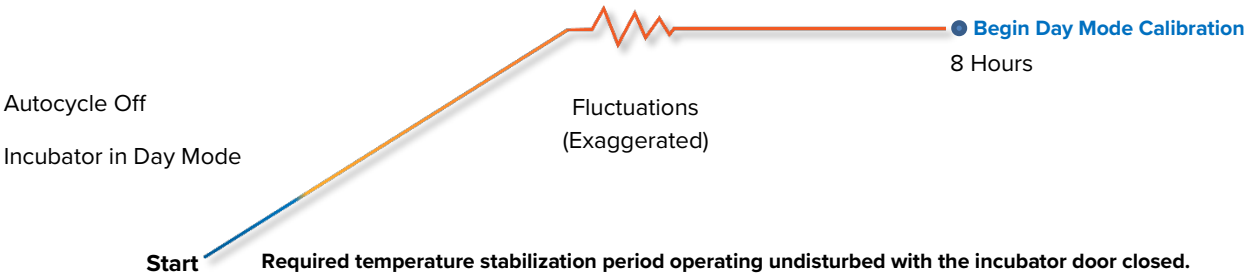
MODE

6. Set to Day Mode

a. Place the incubator in Day Mode. This prepares the unit to calibrate the temperature display to the Day Mode temperature set point.

7. Temperature Stabilization

- Allow the incubator to operate undisturbed with the door shut and in Day Mode **at least 8 hours** when first putting the unit into operation in a new environment.
- To be considered stabilized, the incubator chamber must operate at your calibration temperature for **at least 1 hour with no fluctuations of ±0.1°C or greater.**



Required temperature stabilization period operating undisturbed with the incubator door closed.

Suggested Day Mode Temperature Calibration

1

Once the incubator temperature has stabilized at your Day Mode temperature, compare the reference device and incubator temperature display readings.

Reference Device

- If the readings are the same, or the difference between the two falls within the acceptable range of your protocol, the display is accurately showing the Day Mode air temperature with the Day Mode illumination lights on. **Advance to page 47 to start the Night Mode calibration.**

- Or -

- If a difference falls outside of your protocol range, advance to step 2.

2

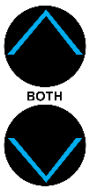
A display calibration adjustment must be entered to match the display to the reference device. See next step.

Reference Device

Day Mode Temperature Calibration Continued

3

Place the display in its temperature calibration mode for Day Mode.

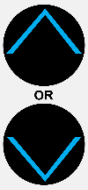


a. Press and hold both the **UP and DOWN** arrow buttons simultaneously for approximately 5 seconds.

b. Release the buttons when the temperature display shows the letters “C O”. The display will begin flashing the **current temperature display value**.

Note: If an arrow key is not pressed for five seconds, the display will cease flashing, and store the last displayed number as the new current chamber temperature value.

4



Use the **Up** or **Down** arrows to adjust the current display temperature value until it matches the reference device temperature reading.

Reference Device

5

After matching the display to the reference device, wait 5 seconds.

- The temperature display will cease flashing and store the corrected chamber display value.
- The incubator will now begin heating or cooling to reach the set point with the corrected display value.

Cooling to Set Point

6

After the incubator has achieved the corrected temperature, allow the chamber to stabilize sitting at least one 1 hour undisturbed.

- Failure to wait until the incubator is fully stabilized will result in an inaccurate reading.

Set Point Achieved

Continued next page

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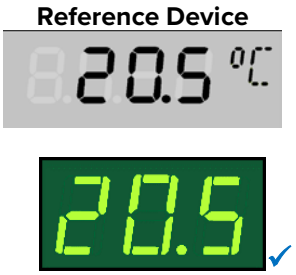
7

Compare the reference device reading with the chamber temperature display again.

- If the reference device and the chamber temperature display readings are the same or the difference falls within the range of your protocol, the incubator is calculated for Day Mode temperature. **Advance to page 47** and begin the calibration test for the for the Night Mode.

- OR -

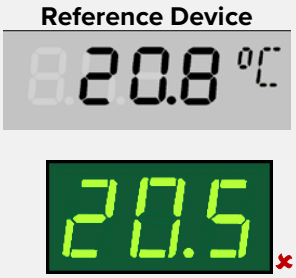
- See the next step if the readings fail to match or fall outside of your protocol range.



8

If the two readings are not the same, and the difference still falls outside the acceptable range of your protocol, repeat steps 3 – 7 up to two more times.

Three calibration attempts may be required to successfully calibrate units that are more than ±2°C out of calibration.



9

If the Day Mode temperature readings of the incubator temperature display and the reference device still fall outside your protocol after three calibration attempts, contact your incubator distributor or **Technical Support** for assistance.

Continued Next Page

Suggested Night Mode Temperature Calibration

1 Put the incubator into night mode.

a. Press and hold the **Mode** button for 5 seconds to switch to modes.

- The Day Temp indicator extinguishes; the blue Night Temp illuminates.

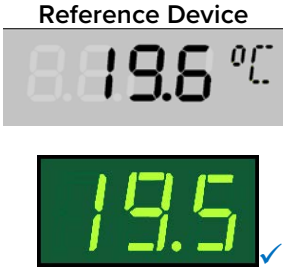
2 Allow the incubator to achieve the Night Mode temperature and stabilize.

a. Wait a minimum of 2 Hours.

- The incubator is considered stabalized when it has run at the Night Mode temepratuer with no fluctuations of ±0.1°C for 1 hour.

3

Once the incubator temperature has stabilized at your Night Mode temperature, compare the reference device and incubator temperature display readings.



- If the readings are the same, or the difference between the two falls within the acceptable range of your protocol, the display is accurately showing the Night Mode air temperature with the Day Mode illumination lights Off. **The calibration procedure is complete.**

- Or -

- If a difference falls outside of your protocol range, advance to the next step.

4

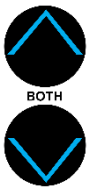
A display calibration adjustment must be entered to match the display to the reference device. See next step.

Continued next page

Night Mode Calibration Continued

3

Place the display in its temperature calibration mode for Night Mode.



a. Press and hold both the **UP and DOWN** temperature arrow buttons simultaneously for approximately 5 seconds.

b. Release the buttons when the temperature display shows the letters “C O”. The display will begin flashing the **current temperature display value**.

Note: If an arrow key is not pressed for five seconds, the display will cease flashing, and store the last displayed number as the new current chamber temperature value.

4

Use the **Up** or **Down** arrows to adjust the current display temperature value until it matches the reference device temperature reading.

Reference Device

5

After matching the display to the reference device, wait 5 seconds.

- The temperature display will cease flashing and store the corrected chamber display value.
- The incubator will now begin heating or cooling to reach the set point with the corrected display value.

Cooling to Set Point

6

After the incubator has achieved the corrected temperature, allow the chamber to sit at least one 1 hour undisturbed to stabilize.

- Failure to wait until the incubator is fully stabilized will result in an inaccurate reading.

Set Point Achieved

Continued next page

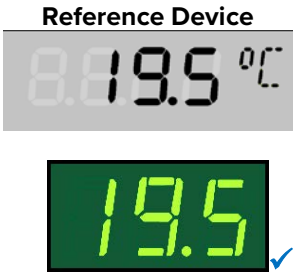
7

Compare the reference device reading with the chamber temperature display again.

- If the reference device and the chamber temperature display readings are the same or the difference falls within the range of your protocol, the incubator is calculated for Night Mode temperature. **The calibration procedure is complete**.

- OR -

- See the next step if the readings fail to match or fall outside of your protocol range.



8

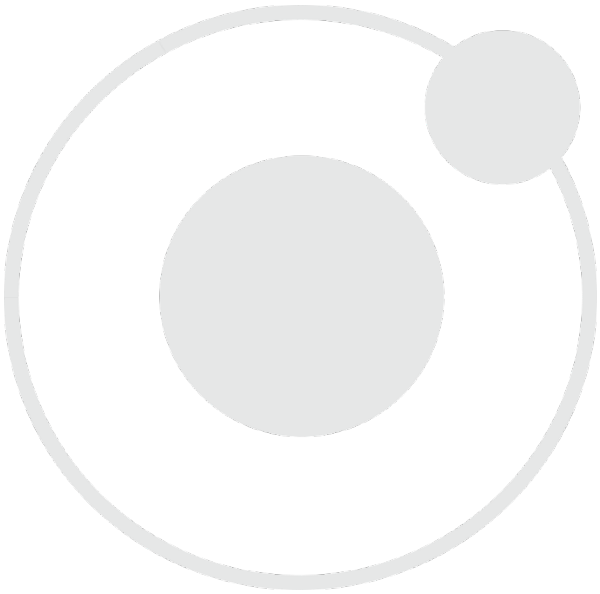
If the two readings are not the same, and the difference still falls outside the acceptable range of your protocol, repeat steps 3 – 7 for the Night Mode temperature calibration up to two more times.

Three calibration attempts may be required to successfully calibrate units that are more than ±2°C out of calibration.

9

If the Night Mode temperature readings of the incubator temperature display and the reference device still fall outside your protocol after three calibration attempts, contact your incubator distributor or **Technical Support** for assistance.

End of procedure



UNIT SPECIFICATIONS

These incubators are 100 - 120 voltage units. Please refer to the incubator data plate to verify its electrical specifications.

Technical data specified applies to units with standard equipment at an ambient temperature of 25°C and at nominal voltage. The temperatures specified are determined in accordance to factory standard following DIN 12880 respecting the recommended wall clearances of 10% of the height, width, and depth of the inner chamber. All indications are average values, typical for units produced in the series. We reserve the right to alter technical specifications at all times.

WEIGHT

Model	Shipping	Net Weight
SRI6PF	205 lbs. / 93 kg	125.0 lbs / 56.7 kg
SRI20PF	408 lbs. / 185 kg	246.0 lbs / 111.6 kg

DIMENSIONS

In Inches

Model	Exterior W × D × H	Interior W × D × H
SRI6PF	30.0 x 31.5 x 33.5 in	25.5 x 24.0 x 18.5 in
SRI20PF	30.0 x 31.5 x 69.5 in	25.5 x 24.0 x 54.5 in

In Millimeters

Model	Exterior W × D × H	Interior W × D × H
SRI6PF	762 x 800 x 851 mm	648 x 610 x 470 mm
SRI20PF	762 x 800 x 1766 mm	648 x 610 x 1384 mm

CAPACITY

Model	Cubic Feet	Liter
SRI6PF	6.5	185.5
SRI20PF	19.3	546.6

SHELF CAPACITY BY WEIGHT

Model	Per Shelf*	Total**
SRI6PF	75.0 lbs / 34.0 kg	150.0 lbs / 68.0 kg
SRI20PF	75.0 lbs / 34.0 kg	375.0 lbs / 170.0 kg

*Weight distributed evenly across the shelf.

**Exceeding this weight limit risks damaging the shelf standard rails and the chamber liner.

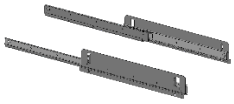
TEMPERATURE

Model	Temp Range	Uniformity	Stability
SRI6PF	15° to 40°C	±0.5° @ 20°C	±0.1°C @ 20°C
SRI20PF	15° to 40°C	±0.5° @ 20°C	±0.1°C @ 20°C

POWER

Model	AC Voltage	Amperage	Frequency
SRI6PF	100 – 120	4.0 Amps	50/60 Hz
SRI20PF	100 – 120	5.5 Amps	50/60 Hz

PARTS AND CONSUMABLES

Description	Part Number	Description	Part Number
Access Port Stopper	 7750517	Humidity Reservoir Pan, Copper Token, and Tubing	 9900686
Feet, Adjustable Glide	 2700506	Power Cord, 125V, 15 Amp, length 8 feet 2 inches (2.5m) NEMA 5-15P	 1800510
Fuse 250V T6.3A, 5X20mm (1, Requires 2 for operation)	 3300516	Shelf, 1	 6800525
SRI6PF: Gasket, Magnetic Door (29 inches X 26 inches)	 3450743	Static Shelf Bracket, 1	 5220942
SRI20PF: Gasket, Magnetic Door (29 inches X 62 inches)	 3450732	Sliding Shelf Brackets, 2	 9490560

If you have the Part Number for an item, you may order the item directly from Sheldon Manufacturing by calling (503) 646-3000 Ext. 3. If you are uncertain that you have the correct Part Number or if you need that specific part, please contact Sheldon Technical Support for help at 1-800-322-4897 or (503) 640-3000 extension 4. Please have the **model number** and **serial number** of the unit ready, as Tech Support will need this information to match your unit to its correct part.

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