1100°C Three Zone Tube Furnace

Models: STF55346C
       STF55666C

Installation and Operation Manual

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LINDBERG/BLUE®
1 Introduction

The Lindberg/Blue M STF55346 and STF55666 models are ultra lightweight, economical, laboratory tube furnaces. The low thermal mass Moldatherm® insulation/heating element provides fast duty cycles, energy conservation, and efficient programming. Refer to Table 1 for specifications.

1.1 Features and Benefits

- Controlled heat-up rate eliminates thermal shock to materials.
- Quick heat-up and cool-down rates.
- Energy efficient Moldatherm insulation suitable for high interior-exterior temperature differential. These units are rated for a maximum operating temperature of 1100°C.
- Digital instrumentation for precise temperature setpoint and display. Microprocessor automatically optimizes control parameters during furnace operation. You can choose single setpoint or 16-segment control.
- Main power ON/OFF switch on front panel.
- Various sizes of tube adapters to accommodate various process tubes.

1.2 Specifications

Table 1. Lindberg/Blue M STF55346 and STF55666 Series Moldatherm Tube Furnaces

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions in. (cm)</th>
<th>Heated Length in. (cm)</th>
<th>Maximum Operating Temperature</th>
<th>Watts</th>
<th>Thermocouple</th>
<th>Voltage</th>
<th>Shipping Weight lbs (kg)</th>
<th>Number of Heat Zones</th>
</tr>
</thead>
<tbody>
<tr>
<td>STF55346C</td>
<td>35 x 17 x 21 (90 x 43.2 x 53.3)</td>
<td>1 to 3 (2.54 to 7.62)</td>
<td>1100°C</td>
<td>3630</td>
<td>Type K</td>
<td>240 VAC 50/60 Hz, single phase</td>
<td>75 (34)</td>
<td>3</td>
</tr>
<tr>
<td>STF55666C</td>
<td>54 x 22 x 26 (137.2 x 55.9 x 66)</td>
<td>3 to 6 (7.62 to 15.24)</td>
<td>1100°C</td>
<td>3600</td>
<td>Type K</td>
<td>240 VAC 50/60 Hz, single phase</td>
<td>165 (75)</td>
<td>3</td>
</tr>
</tbody>
</table>

* A process tube must be used with the furnace. Process tubes are customer supplied and will vary with the application.
2 Safety Considerations

WARNING! Do not modify or change system components. Replacement parts must be O.E.M. exact replacement equipment. Modification or use of the equipment in a manner other than expressly intended may cause death or serious injury. Reconfiguring the controller may cause death or serious injury.

Lindberg/Blue M shall not be liable for any damages, including incidental and/or consequential damages, regardless of the legal theory asserted, including negligence and/or strict liability.

Before using, user shall determine the suitability and integrity of the product for the intended use and that the unit has not been altered in any way. User assumes all risk and liability whatsoever therewith.

CAUTION! This product contains ceramic fiber or other refractories which can result in the following:

- May be irritating to skin, eyes, and respiratory tract.
- May be harmful if inhaled.
- May contain or form cristobalite (crystalline silica) with use at high temperature (above 871°C) which can cause severe respiratory disease.
- Possible cancer hazard based on tests with laboratory animals. Animal studies to date are inconclusive. No human exposure studies with this product have been reported.

WARNING! Before maintaining this equipment, read the applicable MSDS (Material Safety Data Sheets) at the back of this manual.

WARNING! When installing, maintaining, or removing the refractory insulation, the following precautions will minimize airborne dust and ceramic fiber:

- Keep personnel not involved in the installation out of the area.
- Use a good vacuum to clean area and equipment. Do not use compressed air.
- Use NIOSH high efficiency respirator (3M #8710 or equivalent).
- Wear long sleeve clothing, gloves, hat, and eye protection to minimize skin and eye contact. Do not wear contact lenses.
- Thoroughly wash self after work is complete.
- Launder work clothing separate from other clothes and thoroughly clean laundering equipment after use. If clothing contains a large amount of dust and/or ceramic fiber, dispose of rather than cleaning.
- Promptly place used ceramic fiber parts and dust in plastic bags and dispose of properly.

3 Pre-Installation

3.1 Unpacking

Carefully unpack and inspect the unit and all accessories for damage. If you find any damage, keep the packing materials and immediately report the damage to the carrier. We will assist you with your claim, if requested. Do not return goods to Lindberg/Blue M without written authorization. When submitting a claim for shipping damage, request that the carrier inspect the shipping container and equipment.

3.2 Operating Conditions

High concentrations of sulfates, chlorides, fluorides, alkalis, and V₂O₅ can have corrosive effects on the ceramic fiber. Contact Lindberg/Blue M for additional information about the effects of specific atmospheres on furnace performance.

With prolonged use, hairline cracks can develop in the insulation materials. These minor cracks will not affect the furnace's performance. We recommend turning off the furnace completely when not in use. The heating unit is not damaged by rapid heating and cooling cycles.

3.3 Atmosphere Systems

The Lindberg/Blue M STF55300/STF55600 Series furnaces are not designed for use with combustible or inert atmospheres requiring an air tight chamber. If an exhaust port is used, the furnace should not be located in an enclosed area without proper ventilation.

Note: Lindberg/Blue M tube furnaces must be used with process tubes. Do not operate the furnace without an appropriately installed process tube or other customer supplied vessel.

WARNING! Do not use combustible gases in this furnace.

CAUTION! Avoid combustible products which generate toxic or hazardous vapor or fumes. Work should only be done in a properly vented environment.
4 Installation

Do not exceed the electrical and temperature ratings printed on the dataplate of the furnace.

⚠️ CAUTION ⚠️ Improper operation of the furnace could result in dangerous conditions. To preclude hazard and minimize risk, follow all instructions and operate within design limits noted on the dataplate.

4.1 Location

Install the furnace in a level area free from vibration with a minimum of three inches of space, for air flow, around the unit.

4.2 Wiring

For detailed wiring information, refer to the wiring diagrams at the end of this manual.

4.2.1 240 VAC Operation

The STF5534GC and STF55666C models are 240 VAC furnaces. Power and ground wires are not provided with these furnaces.

1. Determine the length of wire needed to connect the furnace to the power source. Furnace installation requires two power wires and one ground wire. Refer to Table 2 for minimum recommended wire gauge sizes.

Table 2. Minimum Wire Gauge Sizes

<table>
<thead>
<tr>
<th>Furnace Model</th>
<th>Amps</th>
<th>Power Wire Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>STF5534GC</td>
<td>16.0</td>
<td>14 GA</td>
</tr>
<tr>
<td>STF55666C</td>
<td>45.8</td>
<td>10 GA</td>
</tr>
</tbody>
</table>

2. Label the power wires Line1 and Line2 and label the ground wire Ground.

3. Remove the screws from the corners of the top front and top back panels. This provides access to the terminal block (Model STF55666C) and the grounding screw.

4. Thread the Line1, Line2, and Ground wires through the 7/8 in. knock-out port in the bottom rear panel. Use wire nuts to connect the wires to the appropriate screws:

<table>
<thead>
<tr>
<th>Wire</th>
<th>Screw</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line1</td>
<td>L1</td>
</tr>
<tr>
<td>Line2</td>
<td>L2</td>
</tr>
<tr>
<td>Ground</td>
<td>GND</td>
</tr>
</tbody>
</table>

5. Check that the thermocouple is securely mounted and undamaged. Check the thermocouple wiring connections. Refer to Figure 1. Red is always negative.

⚠️ CAUTION ⚠️ Failure to check thermocouple wiring connections before initial start up could result in damage to the furnace.

6. Check that all electrical connections are secure.
7. Place the back panel on the furnace and secure with the corner screws.

Figure 1. Thermocouple

4.2.2 208 VAC Operation

Lindberg/Blue M Moldatherm tube furnace heating elements are specifically designed for operation on 208 or 240 VAC. A furnace wired for 240 VAC operation can also operate on 208 VAC. However, heatup and recovery times will be longer.

4.3 Tube Adapters

Install tube adapters to each end of the furnace.

⚠️ CAUTION ⚠️ Do not operate the furnace without properly sized and installed tube adapters.
5 Start Up

CAUTION! Observe the following precautions when operating the furnace:
- Never stand in front of an open furnace.
- Wear protective eyewear.
- Wear protective gloves.
- Use tongs to insert and remove furnace load.
- Do not allow the load to touch the furnace walls.
- Always use a process tube.

WARNING! When installing, maintaining, or removing the refractory insulation, the following precautions will minimize airborne dust and ceramic fiber:
- Keep personnel not involved in the installation out of the area.
- Use a good vacuum to clean area and equipment.
- Do not use compressed air.
- Use NIOSH high efficiency respirator (3M #8710 or equivalent).
- Wear long sleeve clothing, gloves, hat, and eye protection to minimize skin and eye contact. Do not wear contact lenses.
- Thoroughly wash self after work is complete.
- Launder work clothing separate from other clothes and thoroughly clean laundering equipment after use. If clothing contains a large amount of dust and/or ceramic fiber, dispose of rather than clean.
- Promptly place used ceramic fiber parts and dust in plastic bags and dispose of properly.

WARNING! Before operating this equipment, read the applicable MSDS (Material Safety Data Sheets) provided with your unit.

5.1 Furnace Start Up
To start up, the furnace, turn it ON using the power switch on the front panel. Refer to Figure 2 as you perform the following procedures:
1. Use the arrow keys to adjust the setpoint to 550°C.
2. Run the furnace for two hours at 550°C.
3. Use the arrow keys to adjust the setpoint to 1000°C.
4. Run the furnace for two hours at 1000°C.
5. Adjust setpoint to room temperature.

5.2 Controller Start Up
All LEDs illuminate at power up. After 3 or 4 seconds, two numbers display. The lower number is the setpoint and the upper number is the actual furnace temperature (refer to Figure 2).

![Diagram of controller interface]

Figure 2. Setpoint Operation
6 91p Controller

6.1 91p Controller

1100°C 3-zone Tube Furnace models use the 91p controller. The 91p controller is fully programmable with eight ramps and eight dwell times. This controller includes a tuning feature. Refer to the 91p Installation and Operation Manual for detailed instructions.

6.2 Basic Operation

The 91p control panel is shown in Figure 2 on page 4. Refer to the Model 91p Installation and Operation Manual for complete instructions.

- In general, to operate the 91p controller:
  - Touch any button to illuminate the ▲, ▼, and ➤ keys.
  - Press ▲ or ▼ until the desired setpoint is indicated on the bottom line of the display.
  - Press ➤ until °C, °F, or L1N is displayed. Then press the “secret key”. Continue pressing ➤ to view the parameters.
  - To modify parameter values, display the desired parameter in the upper display and press ▲ or ▼.
  - To return to the measured value display from the protected list, press the “secret key”.

6.3 Setting the Overtemperature Alarm

To set the alarm on the temperature controller (typically 50°C above the desired main temperature setpoint), follow the steps below:

1. Touch any button to illuminate the ▲, ▼, and ➤ keys. Proceed directly to step 2 if the keys are already lit.
2. Press ➤ until AL.SP is revealed on the top line of the display.
3. Press ▲ or ▼ until the desired setpoint is indicated on the bottom line of the display.

6.4 Changing Between Celsius and Fahrenheit

To change between Celsius and Fahrenheit display, follow the steps below:

1. Turn power to the controller off and then on. The following codes display:
   • tEST
   • 1111
   • 8888
   • XXXX (This will be a four digit configuration code, for example 6213).
2. When the four digit configuration code displays, press and hold the “secret key.”
3. Press ▼ until the fourth digit flashes. For Celsius operation, press ▲ until the number 7 is displayed (Fahrenheit is number 3).

Note: Don’t change the other three numbers since they will affect the alarm, sensor type, and range limits of the control.
4. Press the secret key to enter in the new configuration (or press ➤ to abort the procedure).

6.5 91p Program Parameters

Use the control parameters to adjust the 91p controller. Refer to Table 3 for a list of control parameters and a description of parameter functions. Refer to the 91p Installation and Operation Manual for more detailed instructions.

Table 3. 91p Program Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>tunE</td>
<td>Self-tune function available on demand.</td>
</tr>
<tr>
<td>AL.SP</td>
<td>Alarm setpoint max 1100°C.</td>
</tr>
<tr>
<td>Prog</td>
<td>Programmer state select and status annunciation. This parameter has three settings: IdLE: program in standby. run: program running. hold: program in hold.</td>
</tr>
<tr>
<td>ConF</td>
<td>Configuration code.</td>
</tr>
<tr>
<td>Id</td>
<td>Instrument mode ident.</td>
</tr>
<tr>
<td>ProP</td>
<td>Proportional band. Becomes hysteresis for ON/OFF control. Units (°C, °F, Lin, or %) selected in configuration.</td>
</tr>
<tr>
<td>Intl.t</td>
<td>Integral time constant. OFF plus 10 to 2000s.</td>
</tr>
<tr>
<td>dEr.t</td>
<td>Derivative time constant. OFF plus 1 to 200s.</td>
</tr>
<tr>
<td>OFSt</td>
<td>Calibration offset. -99.9 to 99.9°C (-99.9 to 179.8°F).</td>
</tr>
<tr>
<td>SP,Hi</td>
<td>Setpoint high limit. Must be greater than SP,Lo (max. 1100°C).</td>
</tr>
<tr>
<td>SP,Lo</td>
<td>Setpoint low limit. Must be less than SP,Hi.</td>
</tr>
<tr>
<td>H PL</td>
<td>Maximum power limit (0.0 to 100%).</td>
</tr>
<tr>
<td>H ct</td>
<td>Heat cycle time. 0.2 to 60.0s (5s or more for relay output).</td>
</tr>
<tr>
<td>LP.br</td>
<td>Loop break time constant.</td>
</tr>
<tr>
<td>LinE</td>
<td>Line frequency: 50 – 60 Hz.</td>
</tr>
<tr>
<td>Pushbutton Keypad</td>
<td>The scroll key advances the displays to the next parameter code and setting. Press and hold for 10 seconds to access setup menus. Press to scroll through the setup menu parameters.</td>
</tr>
<tr>
<td>Secret Key</td>
<td>Press the secret key from the alarm display (AL.SP) to access the protected list parameters.</td>
</tr>
</tbody>
</table>
6.6 Programming the 91p Controller

Use the 91p program parameters to program the 91p controller for specific applications. For sample programs refer to Section 6.5.3 and Section 6.5.4 below.

6.6.1 Entering a Program

To enter a program:

1. Scroll through parameters until °C is displayed.
2. Press the secret key (refer to Figure 2 on page 4) to access the program parameters.
3. Scroll to the first parameter Pr. Set Pr to the number of ramp/dwell pairs in the program you want to enter (see examples below). The maximum is 8.
4. Use the up and down arrows to enter the appropriate values for the ramp, dwell and level parameters. Set these three parameters for each ramp/dwell pair up to the number specified by Pr (for example, if Pr=4, then the last group of values you enter will be r4, d4, and L4).
5. The next parameter will be Hb, which specifies maximum deviation from temperature profile (see the example below).
6. Once you have entered the complete profile the controller will return to the normal display.

6.6.2 Running a Program

To run a program, scroll to Prog and select the value RUN. When the program has completed its run, the temperature will return to idle mode setpoint.

6.6.3 Three-step Example

Example 1 (shown in Figure 3) has three ramp/dwell pairs, so Pr is set to the value 3. The idle setpoint (SP) is set to 1000°C prior to running the program.

Ramp slowly to a level of 300°C (L1) at a rate of 5°C/minute (r1). At this level the furnace dwells for 30 minutes (d1). Then ramp to 900°C (L2) at a rate of 15°C/minute (r2). Dwell at 900°C for 50 minutes (d2), then ramp to 1100°C (L3) at a rate of 10°C/minute (r3). After dwelling at 1100°C for 40 minutes (d3) the furnace returns to the 1000°C setpoint (SP) at the natural cooling rate.

This program executes once because the loop counter (LC) is set to the value 1. The Holdback parameter (Hb) is set to 20: if at any time during program execution the measured temperature deviates from programmer setpoint profile by more than 20°C, the program clock will stop until the measured value is within the holdback band.

The program is:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SP</td>
<td>1000</td>
</tr>
<tr>
<td>tunE</td>
<td>OFF</td>
</tr>
<tr>
<td>LC</td>
<td>1</td>
</tr>
<tr>
<td>Pr</td>
<td>3</td>
</tr>
<tr>
<td>r1</td>
<td>5.00</td>
</tr>
<tr>
<td>L1</td>
<td>300</td>
</tr>
<tr>
<td>d1</td>
<td>30</td>
</tr>
<tr>
<td>r2</td>
<td>15.00</td>
</tr>
<tr>
<td>L2</td>
<td>900</td>
</tr>
<tr>
<td>d2</td>
<td>50</td>
</tr>
<tr>
<td>r3</td>
<td>10.00</td>
</tr>
<tr>
<td>L3</td>
<td>1100</td>
</tr>
<tr>
<td>d3</td>
<td>40</td>
</tr>
<tr>
<td>Hb</td>
<td>20</td>
</tr>
</tbody>
</table>

Figure 3. Three-step Program

6.6.4 Continuous Loop Example

Example 2 (shown in Figure 4) uses the setting LC = Cont to hold furnace temperature at 1000°C indefinitely.

Ramp to a level of 1000°C (L1) at a rate of 25°C/minute (r1). Then dwell at 1000°C for 20 minutes (d1). Because LC, the loop count parameter, is set to Cont (continuous), the program repeats the r1/d1 sequence, maintaining the L1 temperature 1000°C until the furnace is reprogrammed or shut off.

The program is:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>tunE</td>
<td>OFF</td>
</tr>
<tr>
<td>LC</td>
<td>Cont</td>
</tr>
<tr>
<td>Pr</td>
<td>1</td>
</tr>
<tr>
<td>r1</td>
<td>1000</td>
</tr>
<tr>
<td>L1</td>
<td>20</td>
</tr>
</tbody>
</table>

Figure 4. Continuous Loop
7 Three Zone Operation

Models STF55346C and STF55666C are capable of three-zone operation. These tube furnaces are designed with ample reserve power in the end zones to compensate for inherent heat losses from the ends of the furnace.

Generally, the greatest furnace temperature uniformity exists in the center zone, over a length that reaches almost to the ends of the center zone heating unit. This length of uniformity will change depending on how you balance the end zones of your furnace.

To achieve the desired uniformity within the furnace, it is necessary to use a separate monitoring thermocouple in conjunction with an appropriate measuring instrument, such as a digital thermometer.

By recording the temperature at various points inside the furnace process tube, a graph of temperature versus length can be drawn. Using the graph as a guide, make end zone adjustments in small increments.

A minimum of 60 minutes should be allowed for the power change to stabilize within the furnace. Make temperature measurements again each time before making another adjustment.

8 Maintenance

⚠️ CAUTION! Maintenance should only be performed by trained personnel.

⚠️ WARNING! Disconnect furnace from main power before attempting any maintenance to furnace or its controls.

⚠️ WARNING! Before maintaining this equipment, read the applicable MSDS (Material Safety Data Sheets) at the back of this manual.

⚠️ WARNING! When installing, maintaining, or removing the refractory insulation, the following precautions will minimize airborne dust and ceramic fiber:

- Keep personnel not involved in maintenance out of the area.
- Use a good vacuum to clean area and equipment. Do not use compressed air.
- Use NIOSH high efficiency respirator (3M #8710 or equivalent).
- Wear long sleeve clothing, gloves, hat, and eye protection to minimize skin and eye contact. Do not wear contact lenses.
- Thoroughly wash self after work is complete.
- Launder work clothing separate from other clothes and thoroughly clean laundering equipment after use. If clothing contains a large amount of dust and/or ceramic fiber, dispose of rather than cleaning.
- Promptly place used ceramic fiber parts and dust in plastic bags and dispose of properly.

For replacement parts specifications, refer to Table 5 on page 10. For wiring schematics, refer to Section 10 on page 9.
8.1 Thermocouple Replacement

**WARNING!** Disconnect furnace from main power before attempting any maintenance to furnace or its controls.

**Note:** For optimal performance, the thermocouple should be replaced once a year. In some situations a more frequent replacement schedule is warranted. Snb or Err H on the controller display indicates a broken thermocouple.

Refer to Figure 5 as you perform the following procedure:

1. Remove the screws from rear panel corners. Remove the rear panel.
2. Loosen the terminal screws and remove thermocouple lead wires.
3. Remove thermocouple mounting screws.
4. Slide out head and old thermocouple (refer to Figure 5).
5. Replace the thermocouple and connect new wires. Be careful not to bend the thermocouple wire. Red is always negative. (If the extension leads are black and white, white is negative).
6. Replace the furnace rear panel.

![Figure 5. Thermocouple Replacement](image)

8.2 Solid-State Relay Replacement

**WARNING!** Disconnect furnace from main power before attempting any maintenance to furnace or its controls.

If a solid-state relay is inoperable, complete the following steps to replace the relay:

1. Remove the screws located on the left and right sides of the control panel.
2. Slide the panel assembly away from the unit to expose components.
3. Locate the solid-state relay on the component tray (the relay is shown in Figure 6).
4. Note the terminal connections of the relay wires and label them for reattachment. Remove the wires from the terminals of the relay.
5. Remove the mounting screws from the relay.
6. Replace the relay and reconnect the wires.
7. Reassemble the unit.

![Figure 6. Solid State Relay](image)
8.3 Temperature Controller Replacement

WARNING! Disconnect furnace from main power before attempting any maintenance to furnace or its controls.

To replace the temperature controller, complete the following steps:

1. Disconnect main power and switch the circuit breaker to the OFF position.
2. Remove the two sheet metal screws located on each side of the furnace near the lower front. Pull the control panel forward to access the controller.
3. Note the terminal connections of the wires and label them for reattachment. Remove power input and output wires from the back of the controller. Observe polarity for the thermocouple lead wire. Red is always negative. Refer to wiring diagrams for additional wiring information.
4. Unscrew and remove the mounting bracket from the back of the temperature controller.
5. Pull the controller out through the front of the control panel.
6. Install the replacement controller by reversing the above procedure.

9 Troubleshooting

WARNING! Troubleshooting procedures involve working with high voltages which can cause injury or death. Troubleshooting should only be performed by trained personnel.

This section is a guide to troubleshooting furnace problems indicated by the controller. Furnaces are identified by the type of controller. Refer to Table 4 for troubleshooting procedures.

Table 4. Controller Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller reads SnSr.</td>
<td>Thermocouple:</td>
</tr>
<tr>
<td></td>
<td>1. Check the thermocouple visually for breaks.</td>
</tr>
<tr>
<td></td>
<td>If a break is evident, replace thermocouple.</td>
</tr>
<tr>
<td></td>
<td>2. Check the thermocouple for continuity with an ohmmeter. If there is no continuity, replace thermocouple.</td>
</tr>
<tr>
<td></td>
<td>3. Check all thermocouple connections.</td>
</tr>
<tr>
<td></td>
<td>Connections should be clean and free of corrosion.</td>
</tr>
<tr>
<td>Controller reads tuneFAIL</td>
<td>Self-tuning operation failed because controller cannot maintain setpoint.</td>
</tr>
<tr>
<td></td>
<td>1. Touch any key to acknowledge the message.</td>
</tr>
<tr>
<td></td>
<td>2. Remove the cause of failure, such as blown heater fuse, etc.</td>
</tr>
<tr>
<td>Controller reads LinEFAIL</td>
<td>Loss of controller power during self-tuning operation renders sampled data questionable.</td>
</tr>
<tr>
<td></td>
<td>1. Touch any key to acknowledge the message.</td>
</tr>
<tr>
<td></td>
<td>2. Verify power supply.</td>
</tr>
</tbody>
</table>
10 Replacement Parts and Wiring Diagrams

Table 5. Replacement Parts
Numbers in parentheses indicate quantities; otherwise the quantity is one.

<table>
<thead>
<tr>
<th>Furnace Model</th>
<th>STF55346C</th>
<th>STF55666C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating Unit</td>
<td>7012-1001-00A</td>
<td>7012-1002-00A</td>
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<td>Thermocouple Head</td>
<td>(3) 7214-2051-00A</td>
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<td>Thermocouple Wire</td>
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<td>(17 ft) 33940-002</td>
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<td>(4) 7218-2047-001</td>
<td>(5) 7218-2047-001</td>
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<td>Temperature Controller</td>
<td>(3) 36875H01</td>
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<td>Solid-State Relay</td>
<td>102460</td>
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<td>Power Relay (OTP)</td>
<td>16934</td>
<td>101235</td>
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<td>Fiber</td>
<td>34907H02</td>
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<td>Tube Adapter, 6 in. Bore</td>
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<td>(2) 7100-2444-065</td>
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<td>Tube Adapter, 5 in. Bore</td>
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<td>(2) 7100-2444-080</td>
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<td>Tube Adapter, 4 in. Bore</td>
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<td>(2) 7100-2444-081</td>
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<td>Tube Adapter, 3 in. Bore</td>
<td>(2) 7100-2444-064</td>
<td>(2) 7100-2444-082</td>
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<td>Tube Adapter, 2 in. Bore</td>
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<td>Tube Adapter, 1 in. Bore</td>
<td>(2) 7100-2444-078</td>
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<td>Tube Adapter, Blank (Solid)</td>
<td>(2) 7100-2444-079</td>
<td>(2) 7100-2444-083</td>
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<td>Terminal Block, Power</td>
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Figure 7. Wiring diagram for Model STF55346C
Figure 8. Wiring diagram for Model STF55366C
11 Warranty

11.1 Domestic Warranty (United States and Canada)
Lindberg/Blue M warrants this product to the owner for a period of twelve (12) months from date of shipment by Lindberg/Blue M. Under this warranty Lindberg/Blue M through its authorized Dealer or service organizations, will repair or at its option replace any part found to contain a manufacturing defect in material or workmanship, without charge to the owner, for a period of ninety (90) days, the labor, and a period of one (1) year, the parts, necessary to remedy any such defect. All components used in the manufacture of this product are covered by this warranty excluding heating elements and thermocouples.

This warranty is limited to products purchased and installed in the United States and Canada. It does not apply to damage caused from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided. This warranty shall not apply to equipment or parts which have been subjected to negligence, accident, or damage by circumstances beyond Lindberg/Blue M’s control or improper operation, application, maintenance, or storage.

To obtain prompt warranty service, contact the nearest Lindberg/Blue M authorized service center or Dealer. A listing of these companies will be provided upon request. Lindberg/Blue M’s own shipping records showing date of shipment shall be conclusive in establishing the warranty period.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. The owner agrees that Lindberg/Blue M’s sole liability with respect to defective parts shall be as set forth in this warranty, and any claims for incidental or consequential damages are expressly excluded.

11.2 International Warranty (excluding Canada)
12 Months Parts Warranty
Lindberg/Blue M warrants this product to the original owner for a period of twelve (12) months from the date of shipment from the Lindberg/Blue M factory. Thermocouples and heating elements are excluded from this warranty. If any part is found to contain a manufacturing defect in material or workmanship Lindberg/Blue M will, at its option, repair or replace the part. Lindberg/Blue M assumes no responsibility for any labor expenses for service, removal, or reinstallation required to repair or replace the part, or for incidental repairs, and such costs are the responsibility of the Owner and his Dealer.

The warranty does not apply to damage caused by accidents, misuse, fire, flood, Acts of God or any other events beyond Lindberg/Blue M’s control or to damage caused from failure to properly install, operate, or maintain the product in accordance with the printed instructions provided by Lindberg/Blue M. To obtain prompt warranty service, simply contact the Dealer from whom you purchased the product or the nearest Dealer handling Lindberg/Blue M products. Lindberg/Blue M’s own shipping records showing date of shipment shall be conclusive in establishing the warranty period.

This warranty is in lieu of any other warranties, expressed or implied, including merchantability or fitness for a particular purpose. The owner agrees that its sole remedy and Lindberg/Blue M’s sole liability with respect to defective parts or any other claim shall be as set forth in this warranty, and any claims for incidental, consequential or other damages are expressly excluded.