AN INTRODUCTION TO
TUTTNAUER MANUAL STERILIZERS

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Presented by
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Product Engineer
Replacement Parts Industries, Inc.
Overview of Today’s Presentation

- Cycles and Phases
- Troubleshooting
- Service Tips
- PM and Cleaning
- RPI Technical Assistance Center
Manual Models

1730, 2340, 2540 & 3870 ending in M & MK
Manually operated models: M = Manual and MK = Manual Kwiklave*
*The Kwiklave units have a faster sterilization time than standard units but still maintain the standard drying time.

Manual vs. Electronic Models

- Self-diagnostic software.
- Display codes to assist you with troubleshooting the unit when it will not operate properly.
- Heater circuit is microprocessor controlled and automatically changes from FILL to STERILIZER to DRYING cycle and powers down at the end of the drying cycle.
- Timing circuits that actuate solenoid valves to allow a premeasured volume of water for each cycle, thus eliminating operator errors in filling the chamber.
- Additional electronic surface temperature monitoring to prevent damage to the chamber because of low water conditions.
Fill Cycle: How To

1) Ensure drain is closed.

2) Check water level in reservoir, add as needed.

3) Turn on power switch – it should be illuminated.
Fill Cycle: How To

4) With door open, rotate the knob on the Multi-Purpose Valve (MPV) clockwise to fill position. Water should flow into chamber.
Fill Cycle: Micro-Switches

The micro-switches on the MPV should be in the following positions:
– MSW-1 is depressed; Switch is closed.
– MSW-2 is not depressed; Switch is open.
– MSW-3 is not depressed; Switch is open.

Important! If these are not in the positions as described above, simply adjust the activation screw for the switch in question.
Fill Cycle: Door Closed

Load the unit, close and lock the door. *When the door is closed*, the door Switch *should be depressed and ready for the Sterilizer cycle.*
# Heat Up and Sterilization

Sterilization Timetable chart

## Cycles and Phases

### M Series

<table>
<thead>
<tr>
<th>Cycle Type</th>
<th>Cold Start</th>
<th>Hot Start</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrapped</td>
<td>40 minutes</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Unwrapped</td>
<td>30 minutes</td>
<td>20 minutes</td>
</tr>
</tbody>
</table>

### MK Series & Valueklave 1730 MkV

<table>
<thead>
<tr>
<th>Cycle Type</th>
<th>Cold Start</th>
<th>Hot Start</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrapped</td>
<td>20 minutes</td>
<td>15 minutes</td>
</tr>
<tr>
<td>Unwrapped</td>
<td>15 minutes</td>
<td>12 minutes</td>
</tr>
<tr>
<td>Packs</td>
<td>45 minutes</td>
<td>35 minutes</td>
</tr>
<tr>
<td></td>
<td>25 minutes</td>
<td>20 minutes</td>
</tr>
</tbody>
</table>

- The sterilization times noted above are based on the information sticker located on the unit's outer covering. If the voltage is significantly less than the voltage noted, then additional time must be added to each cycle to ensure proper functionality.
- Tufnair sterilizers tend to run a few degrees higher than the set temperature.
Heat Up and Sterilization

Manual sterilizer schematic
Heat Up and Sterilization

Multi-Purpose Valve in sterilize position.
Heat Up and Sterilization

The heat indicator “ON” light blinking signifies the operation of the control thermostat, which keeps the temperature stable by turning the heating elements on and off.

*Note: Depending on the version of the unit’s face plate, the order of the indicator lights from top to bottom is Power, Heat, and Dry (as shown here), and the order of the other version is Power, Dry, and Heat.
Heat Up and Sterilization

The Air Jet Valve removes air pockets from the chamber during the heating and sterilization Phases.
Exhaust Phase

Rotating the MPV clockwise
From Sterilize to EXH + DRY
opens the path to the
condensation coil.
Exhaust Phase

Electronic Schematic
Exhaust Phase

Plumbing Diagram
Drying Phase

- Once the Exhaust stage is complete, the MPV knob will remain in the “EXH+DRY” position.

- To activate the Dry Cycle, open the door until it stops turning (approx. 1”), then set the timer for the appropriate time.

- The Dry indicator light (Amber) will be lit indicating the Dry Cycle has begun.

*Note: Depending on the version of the unit’s face plate, the order of the indicator lights from top to bottom is Power, Heat, and Dry (as shown here), and the order of the other version is Power, Dry, and Heat.*
Fill Stage

Power Switch does not illuminate
Make sure the power switch is not defective
Fill Stage

Power Switch does not illuminate
- Check the circuit breaker
- Check the manual safety thermostat
- Check the line voltage

Circuit Breaker
Manual Safety Thermostat
AC Inlet Receptacle
Troubleshooting

Fill Stage

Water does not flow into the chamber

Make sure the water filter is not clogged
Fill Stage

Water does not flow into the chamber

Make sure the copper tubing from the reservoir to the MPV and from the MPV to the chamber is not clogged.
Fill Stage

Water does not flow into the chamber
Check the water level of the machine.

<table>
<thead>
<tr>
<th>Model</th>
<th>Amount of Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>1730 Series &amp; Valueklave 1730 MKV</td>
<td>10 - 12 oz. (300 - 355 ML)</td>
</tr>
<tr>
<td>2340 &amp; 2540 Series</td>
<td>12 - 15 oz. (355 - 444 ML)</td>
</tr>
<tr>
<td>3870 Series</td>
<td>24 - 27 oz. (710 - 798 ML)</td>
</tr>
</tbody>
</table>
Fill Stage

Multi-Purpose Valve (MPV)
Ensure MPV Switches and activation Screws are in proper positions.

If MPV rotates in both directions, this indicates a broken Spring Clip.
Fill Stage

Door closing mechanism will not close properly
Examine threads and bushings for damage
Fill Stage

Door closing mechanism will not close properly

Door Switch activator requires adjustment.
Heat Up Phase

Heating elements will not heat up
Check heating elements for proper resistance
**Heat Up Phase**

Heating elements will not heat up
- Check setting of control thermostat
- Timer must be set to more than 10 minutes
- Faulty door switch
- Faulty switch on MPV
Heat Up Phase

Heating elements will not heat up
Check and clean air jet valve weekly to prevent clogging. If clogged, the air removal system will fail and result in incomplete sterilization and failed spore tests.

AIR JET

Slide the air jet in and out with pressure in the unit.

Safety

Use a pen, small screwdriver, or a long thin object to slide the air jet in and out.

Sterilization Phase

Steam leak
- Check door gasket
- Check door bellows
Sterilization Phase

Steam leak
– Check safety valve

– Check air jet valve

– If there are air bubbles in the reservoir, check the MPV – rebuild or replace
Exhaust Phase

Steam not evacuating the chamber quickly –
Should take less than 30 seconds
Check condensation coil,
tubing connecting the MPV
to the reservoir, the MPV
itself, or the mesh chamber
filter for clogging
Troubleshooting

Exhaust Phase

Chamber door will not open

Likely due to door bellows not retracting properly
Drying Phase

Unit not drying properly
– Check heating elements

– Chamber could be over-packed

– Excess water in chamber
# Troubleshooting

## Drying Phase

Other symptoms and solutions

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CAUSE</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPV will not motor.</td>
<td>MPV is jammed.</td>
<td>Remove, disassemble, clean and reassemble or replace MPV. See Important Note, above.</td>
</tr>
<tr>
<td>MPV valve rotates in both directions.</td>
<td>Valve Anti-rotation Spring Clip.</td>
<td>Remove, disassemble, clean and reassemble or replace MPV. See Important Note, above.</td>
</tr>
<tr>
<td>MPV will not extract in the 12H-0HR position. Pressure remains high.</td>
<td>Clogged MPV, Condenser Coil, or MPV Tiling.</td>
<td>Remove, disassemble, clean and reassemble or replace MPV. See Important Note, above.</td>
</tr>
<tr>
<td>With power ON, MPV is EAH-DRY, Dry Light is OFF, but unit is drying properly.</td>
<td>Dry Light malfunctions.</td>
<td>Replace Dry Light.</td>
</tr>
<tr>
<td>With power ON, MPV is EAH-DRY, Unit is not drying properly.</td>
<td>Excess water in Chamber.</td>
<td>Check Chamber drain is open, then open the door 1” to allow for proper ventilation.</td>
</tr>
<tr>
<td></td>
<td>Chamber door open.</td>
<td>Refer to Owners Manual for recommended condenser.</td>
</tr>
<tr>
<td></td>
<td>Heater malfunction.</td>
<td>Measure Resistor for proper resistance, see Sales-C, page 2. Check for ground/shorted/wired wiring, Replace if necessary.</td>
</tr>
<tr>
<td>In EAH-0HR position, Power Light is ON, Dry Light OFF, but unit is drying.</td>
<td>Timer not activated.</td>
<td>Activate Timer by setting it past full rotation. If Timer still does not activate, then replace Timer.</td>
</tr>
<tr>
<td></td>
<td>Micro-Switch 1 (A182) is defective or if it is stuck in the down position.</td>
<td>Set MPV to STE position, if Door Light is OFF, adjust or replace MDW2. Refer to MULTI-PURPOSE VALUE &amp; MICRO-CONTACTS, page 6.</td>
</tr>
<tr>
<td></td>
<td>Micro-Switch 2 (A182) is defective or if it is stuck in the down position.</td>
<td>Set MPV to STE position, if Door Light is OFF, adjust or replace MDW2. Refer to MULTI-PURPOSE VALUE &amp; MICRO-CONTACTS, page 6.</td>
</tr>
<tr>
<td></td>
<td>In EAH-0HR position, Door and Heat Lights OFF (Door open).</td>
<td>Adjust or replace MDW2. Refer to MULTI-PURPOSE VALUE &amp; MICRO-CONTACTS, page 6.</td>
</tr>
<tr>
<td></td>
<td>In EAH-0HR position, Door and Heat Lights ON (Door closed).</td>
<td>Adjust or replace MDW2. Refer to MULTI-PURPOSE VALUE &amp; MICRO-CONTACTS, page 6.</td>
</tr>
<tr>
<td></td>
<td>With power ON, MPV is EAH-0HR position, all three lights, Door (including and in overheat).</td>
<td>Short circuit in Wiring Harness.</td>
</tr>
<tr>
<td>Door will not open after Chamber is exhausted and MPV is in the EAH-0HR position.</td>
<td>Door Bellers could be jammed.</td>
<td>1) See Important Note, above. Then turn door closing device slightly clockwise to tighten, then turn counter clockwise to open.</td>
</tr>
<tr>
<td></td>
<td>Vacuum in Chamber (pressure below zero).</td>
<td>See Important Note, above, if this does not correct the situation, then check if MPV has blockage. See page 5, BLOWING OBSTRUCTIONS.</td>
</tr>
</tbody>
</table>
Multi-Purpose Valve Tips

Installation

What to order

- Long stem vs. short stem
- Rebuild or replace

How to install

- Two wrench installation technique

What knob to use

- Use the correct knob
# Heater Bank Tips

How to tell which band is bad (internal shorts and shorts to ground)

## AMP DRAW* & UNPLUGGED RESISTANCE**

<table>
<thead>
<tr>
<th>Model</th>
<th>VAC</th>
<th>STE Amps</th>
<th>STE Ohms</th>
<th>EXH-DRY Amps</th>
<th>EXH-DRY Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1730M</td>
<td>120</td>
<td>9.5</td>
<td>13.0</td>
<td>2.0</td>
<td>60</td>
</tr>
<tr>
<td>1730M</td>
<td>230</td>
<td>4.8</td>
<td>48.0</td>
<td>1.2</td>
<td>218</td>
</tr>
<tr>
<td>1730MK</td>
<td>230</td>
<td>6.0</td>
<td>38.0</td>
<td>1.3</td>
<td>170</td>
</tr>
<tr>
<td>1730MKV (Valuekve)</td>
<td>120</td>
<td>13.0</td>
<td>9.0</td>
<td>3.0</td>
<td>40</td>
</tr>
<tr>
<td>2340M</td>
<td>120</td>
<td>13.0</td>
<td>9.5</td>
<td>3.2</td>
<td>38</td>
</tr>
<tr>
<td>2340M</td>
<td>230</td>
<td>6.5</td>
<td>35.0</td>
<td>1.6</td>
<td>140</td>
</tr>
<tr>
<td>2340MK</td>
<td>230</td>
<td>11.5</td>
<td>21.0</td>
<td>2.8</td>
<td>90</td>
</tr>
<tr>
<td>2540M</td>
<td>120</td>
<td>13.0</td>
<td>9.0</td>
<td>3.2</td>
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<td>230</td>
<td>11.5</td>
<td>9.5</td>
<td>2.8</td>
<td>90</td>
</tr>
<tr>
<td>3870M</td>
<td>230</td>
<td>12.0</td>
<td>19.0</td>
<td>3.2</td>
<td>76</td>
</tr>
</tbody>
</table>

Approximate circuit values (±10%) at STE and EXH-DRY positions

## APPARENT HEATER ELEMENT RESISTANCE VALUES (±10%)

<table>
<thead>
<tr>
<th>Model</th>
<th>VAC</th>
<th>Watts</th>
<th>Resistance (Ohms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1730M</td>
<td>120</td>
<td>350</td>
<td>41</td>
</tr>
<tr>
<td>1730M</td>
<td>230</td>
<td>350</td>
<td>147</td>
</tr>
<tr>
<td>1730MK</td>
<td>230</td>
<td>450</td>
<td>117</td>
</tr>
<tr>
<td>1730MKV (Valuekve)</td>
<td>120</td>
<td>450</td>
<td>32</td>
</tr>
<tr>
<td>2340M</td>
<td>120</td>
<td>350</td>
<td>41</td>
</tr>
<tr>
<td>2340M</td>
<td>230</td>
<td>350</td>
<td>147</td>
</tr>
<tr>
<td>2340MK</td>
<td>230</td>
<td>550</td>
<td>96</td>
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<td>41</td>
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<td>230</td>
<td>550</td>
<td>96</td>
</tr>
<tr>
<td>3870M</td>
<td>230</td>
<td>1000</td>
<td>112</td>
</tr>
</tbody>
</table>

Approximate heater element resistance values (±10%)
Heater Band Tips
Tightening bands correctly
Heater Band Tips

Installing safety thermostat rods
– Install order and ensuring good contact in place
Door Closer and Switches Tips

- Closed door and safety system
- Releasing a stuck door bellows pin
- Removing door closure assembly
- Replacing door bellows (including canned air)
- Reassembling door bellows and using door tap
- Adjusting door switch and using door switch cover
Door Gasket Tips

- Proper way to install door gasket
- Cleaning door grooves
PM and Cleaning
Scheduled PM and cleaning using the RPI Sterilizer Cleaning Kit custom designed just for cleaning sterilizers.

Sterilizer Cleaning Kit
RPI Part #RPK791
PM and Cleaning

Scheduled PM and cleaning Tutt-Clean®

Tip #1 Do not run thru the Dry Cycle

Tip #2 Pour the Tutt-Clean power in a straight clean line inside the center of the chamber.

Pour Tutt-Clean powder in a straight line inside the center of the chamber.
PM and Cleaning

RPI Sterilizer PM Kits

RPI Part #TU0121
OEM Part #02610020 (Door Gasket Only)

STERILIZER PM KIT
• Includes all parts as shown plus a PM Check List & PM Sticker
• All parts also sold separately
Models: 1730E/M
RPI Troubleshooting Guide


You can download and print this guide from the RPI website: www.rpiparts.com.
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  - “Create a Parts Listing” feature to identify all parts available for a specific equipment model
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  - Tech Talk and Service Tip Articles
  - At-a-glance Cross References and Quick Reference Guides

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  - Informative posters featuring planned maintenance service tips and technical assistance articles

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Thank you for joining us for our presentation on Tuttnauer manual sterilizers.