TASK Turbo Pumping System

ConFlat Flange is a registered trademark of Varian, Inc.
Warranty

Products manufactured by Seller are warranted against defects in materials and workmanship for twelve (12) months from date of shipment thereof to Customer, and Seller’s liability under valid warranty claims is limited, at the option of Seller, to repair, to replace, or refund of an equitable portion of the purchase price of the Product. Items expendable in normal use are not covered by this warranty. All warranty replacement or repair of parts shall be limited to equipment malfunctions which, in the sole opinion of Seller, are due or traceable to defects in original materials or workmanship. All obligations of Seller under this warranty shall cease in the event of abuse, accident, alteration, misuse, or neglect of the equipment. In-warranty repaired or replaced parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the repaired or replaced parts. After expiration of the applicable warranty period, Customer shall be charged at the then current prices for parts, labor, and transportation.

Reasonable care must be used to avoid hazards. Seller expressly disclaims responsibility for loss or damage caused by use of its Products other than in accordance with proper operating procedures. Except as stated herein, Seller makes no warranty, express or implied (either in fact or by operation of law), statutory or otherwise; and, except as stated herein, Seller shall have no liability under any warranty, express or implied (either in fact or by operation of law), statutory or otherwise. Statements made by any person, including representatives of Seller, which are inconsistent or in conflict with the terms of this warranty shall not be binding upon Seller unless reduced to writing and approved by an officer of Seller.

Warranty Replacement and Adjustment

All claims under warranty must be made promptly after occurrence of circumstances giving rise thereto, and must be received within the applicable warranty period by Seller or its authorized representative. Such claims should include the Product serial number, the date of shipment, and a full description of the circumstances giving rise to the claim. Before any Products are returned for repair and/or adjustment, written authorization from Seller or its authorized representative for the return and instructions as to how and where these Products should be returned must be obtained. Any Product returned to Seller for examination shall be prepaid via the means of transportation indicated as acceptable by Seller. Seller reserves the right to reject any warranty claim not promptly reported and any warranty claim on any item that has been altered or has been returned by non-acceptable means of transportation. When any Product is returned for examination and inspection, or for any other reason, Customer shall be responsible for all damage resulting from improper packing or handling, and for loss in transit, notwithstanding any defect or non-conformity in the Product. In all cases, Seller has the sole responsibility for determining the cause and nature of failure, and Seller’s determination with regard thereto shall be final.

If it is found that Seller’s Product has been returned without cause and is still serviceable, Customer will be notified and the Product returned at Customer’s expense; in addition, a charge for testing and examination may be made on Products so returned.

3/1/00
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<td>A-2</td>
</tr>
</tbody>
</table>
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We declare under our sole responsibility that the product, to which this declaration relates is in conformity with the following standard(s) or other normative documents.

**TASK Turbo Pumping System**

EN 61010-1 . . . . . . . . . . . . . . . . . . Safety requirements for electrical equipment for measurement, control and laboratory use.

**EMC Emissions:**
EN 55011: 1998 . . . . . . . . . . . . . . . Group 1 Class A ISM emissions requirements (EU).

**EMC Immunity:**
EN 61326: 1997 . . . . . . . . . . . . . . . Measurement, control and laboratory equipment EMC requirements – Industrial use.

Frederick C. Campbell
Operations Manager
Vacuum Technologies
Varian, Inc.
Lexington, Massachusetts, USA

September 2003
Preface

Warnings, Cautions and Notes

The following icons are used in this manual to call attention to hazards and important formation:

**WARNING**  
*Warnings are used when failure to observe instructions or precautions could result in injury or death.*

**CAUTION**  
*Cautions are used when failure to observe instructions could result in damage to equipment, whether Varian supplied or other associated equipment.*

**NOTE**  
*Notes contain information to aid the operator in obtaining the best performance from the equipment.*

**TASK System Hazards**

This product must only be operated and maintained by trained personnel.

Before operating or servicing equipment, read and thoroughly understand all operation and maintenance manuals provided by Varian. Be aware of the hazards associated with this equipment, know how to recognize potentially hazardous conditions, and how to avoid them. Read carefully and strictly observe all cautions and warnings. The consequences of unskilled, improper, or careless operation of the equipment can be serious.

In addition, consult local, state, and national agencies regarding specific requirements and regulations. Address any safety, operation, and/or maintenance questions to your nearest Varian office.
EMC Warnings

EN 55022 Class A Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation.

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, can cause harmful interference to radio communications. Operation of this equipment in a residential area is also likely to cause harmful radio communications interference, in which case, the user is required to correct the interference at their own expense.
Contacting Varian

In the United States, you can contact Varian Customer Service at 1-800-8VARIAN.

Internet users:

☐ Send email to Customer Service & Technical Support at vpl.customer.support@varianinc.com
☐ Visit our web site at www.varianinc.com/vacuum
☐ Order on line at www.evarian.com

See the back cover of this manual for a listing of our sales and service offices.

About this Manual

This manual is intended as an overall guide for installing, configuring and operating the TASK turbo pumping system. The TASK system is comprised of three critical components:

☐ A turbo pump: Either an V-81M or a V-301.
☐ A turbo controller: Either an V-81-AG or a V-301-AG.
☐ An SH-110 scroll vacuum pump.

Instruction manuals for the turbo pump, turbo controller and the SH-110 scroll pump are included with the TASK system. Refer to these individual manuals, listed below, for in-depth discussions on use and troubleshooting:

<table>
<thead>
<tr>
<th>Component</th>
<th>Component Part Number</th>
<th>Instruction Manual Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>V-81M turbo pump</td>
<td>9698901, 02, 03, 04</td>
<td>8790098301</td>
</tr>
<tr>
<td>V-301 turbo pump</td>
<td>9698918, 19, 20, 21</td>
<td>8790094601</td>
</tr>
<tr>
<td>V-81-AG turbo controller</td>
<td>9698988</td>
<td>8790098601</td>
</tr>
<tr>
<td>V-301-AG turbo controller</td>
<td>9698991</td>
<td>8790098201</td>
</tr>
<tr>
<td>SH-110 scroll pump</td>
<td>SH01101UNIV</td>
<td>699904311</td>
</tr>
</tbody>
</table>
Maintenance

Personnel responsible for pump operation and maintenance must be well-trained and aware of the accident prevention rules.

**WARNING**
- Death can result from contact with high voltages. Always take extreme care and observe the accident prevention regulations in force.
- When the machine is powered up, be careful of moving parts and high voltages.
- If you have to perform maintenance on the pump after a considerable time in operation, allow it to cool as the temperature of the outer surface may be in excess of 60 °C.
- Always disconnect the pump power supply before beginning maintenance work.

**NOTE**

Before returning the pump to the factory for repair, the Health and Safety sheet in this manual must be completed and sent to the local sales office. A copy of the sheet must be inserted in the pump package before shipping.

Dispose of the pump in accordance with specific national standards.
This page intentionally left blank.
Introduction and Installation

TASK is an indoor, bench-top turbo pumping system that is comprised of an SH–110 Scroll backing pump and either a V-81M or V-301 turbomolecular pump. TASK produces an oil-free high vacuum, while maintaining one button operation. The system is available with a variety of different inlet flanges (see Appendix A “Specifications and System Configurations”).

The SH-110 is a hermetic, dry scroll vacuum pump suitable for pumping air or inert gases. The pump is not intended to pump toxic, corrosive, explosive, or particulate-forming gases.

The turbopump controllers are microprocessor-based frequency converters with self-diagnostic and protection features to ensure the highest degree of reliability. They display all of the relevant operating parameters and pump status information.

TASK system features include:

- One button operation
- Available in 120 VAC (50/60 Hz) or 220 VAC (50/60 Hz)
- Oil free high vacuum performance
- CE and CSA approvals
- Lifting hand holds
- KF, ISO or ConFlat flanges
- Manual turbo vent valve
- NW16 / ¼” FNPT exhaust connection
- Compact console
- Air-cooled vented case

Storage

When transporting and storing the TASK system, do not exceed the following environmental requirements:

Temperature: -20 °C to +60 °C (-4 °F to 140 °F)
Relative humidity: 0 to 95% (non-condensing)
Controller Description

The controller is available in two versions that operate with the voltage range listed below:

- V-81-AG: Model 969-8988 (100-240 Vac, 50-60 Hz)
- V-301-AG: Model 969-8911 (100-240 Vac, 50-60 Hz)

The Turbo V-81-AG and V-301-AG Rack controller is a micro-processor controlled frequency converter with a new, enhanced feature that allows for greater control and communication capabilities. This compact, 1/4 rack unit is designed for full worldwide compatibility for vent valve control, active gauge pressure reading and pump operation parameters control, as well as for self diagnostic and protection features.

Controller Interface

Figure 1-1 shows the V-81-AG front panel. The key pad functions are explained in Table 1-1 on page 1-2 for both the V-81-AG and the V-301-AG turbo controllers.

![Figure 1-1 V-81-AG Font Panel](image)

Table 1-1 V-81-AG and V-301-AG Front Panel Keypad Functions

<table>
<thead>
<tr>
<th>Keypad Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Keyboard push-button to recall on the display the cycle number, cycle time and pump life.</td>
</tr>
</tbody>
</table>
| 2           | Keyboard push-button for LOW SPEED mode selection. This is active only when the front panel operation is selected. Press:  
  - Once and the pump runs at stand-by speed.  
  - Again to unselect the mode. |
3 Keyboard push-button to recall on the display the pump current, pump temperature, pump power and rotational speed. This is always active regardless of the operating mode selected. Press push-buttons 3 and 1 together for 2 seconds to put the controller in a routine to program some operation parameters.

4 Keyboard push-button for START, STOP/RESET mode selection. This is active only when the front panel operation is selected. Press:
- Once and the starting phase begins
- Again and the pump stops.
If the pump has been stopped automatically by a fault, press this push-button once to reset the controller and a second time to restart the pump.

5 LCD back-lit alphanumeric display: dot matrix 2 lines x 16 characters.

<table>
<thead>
<tr>
<th>Keypad Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Keyboard push-button to recall on the display the pump current, pump temperature, pump power and rotational speed. This is always active regardless of the operating mode selected. Press push-buttons 3 and 1 together for 2 seconds to put the controller in a routine to program some operation parameters.</td>
</tr>
</tbody>
</table>
| 4           | Keyboard push-button for START, STOP/RESET mode selection. This is active only when the front panel operation is selected. Press:
- Once and the starting phase begins
- Again and the pump stops.
If the pump has been stopped automatically by a fault, press this push-button once to reset the controller and a second time to restart the pump. |
| 5           | LCD back-lit alphanumeric display: dot matrix 2 lines x 16 characters. |
Installation

General

The TASK system is shipped with a plastic protective cover to prevent debris from entering the turbo pump. If the cover shows signs of damage, which may have occurred during transport, contact your local sales office. Always take care to prevent anything, including fingers, from touching the turbo blades. The use of an inlet screen is recommended (factory installed).

Obey the following:

- Use this equipment only on a sturdy, horizontal surface and indoors.
- Do not install or use the pump in an environment exposed to atmospheric agents (rain, snow, ice), dust, aggressive gases, or in explosive environments or those with a high fire risk.
- During operation, the following environmental conditions must be maintained:
  - Temperature: +5 °C to +35 °C (41 to 95 °F)
  - Relative humidity: 0 to 95% (non-condensing)

**CAUTION**

Be certain the electrical mains power voltage corresponds to that indicated on the white tab (110 or 220) adjacent to the On/Off switch on the rear of the TASK system.

- Connect the TASK system to the power supply using an IEC-320 style power cord of at least 10 A capacity (power cord included).

The total weight of TASK system and packaging is approximately 117.3 kg (53.2 lbs.).

**WARNING**

When unpacking the TASK system, do not drop it. Avoid sudden impact or shock vibration.

**NOTE**

Normal exposure to the environment will not damage the TASK system. Nevertheless, keep the pump inlet closed until the turbo pump is installed in the system.
Installation Procedure

Figure 1-2 and Figure 1-3 show the TASK system front and back views, respectively, and lists the components by number.

Table 1-2 TASK System Components

<table>
<thead>
<tr>
<th>Number</th>
<th>Item</th>
<th>Number</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Turbo pump</td>
<td>7</td>
<td>Vent valve lever</td>
</tr>
<tr>
<td>2</td>
<td>Turbo controller</td>
<td>8</td>
<td>Main switch on/off and fuse holder</td>
</tr>
<tr>
<td>3</td>
<td>Turbo controller power receptacle(s)</td>
<td>9</td>
<td>System cooling fan</td>
</tr>
<tr>
<td>4</td>
<td>SH-110 scroll pump</td>
<td>10</td>
<td>Scroll pump inlet filter</td>
</tr>
<tr>
<td>5</td>
<td>Scroll pump on/off switch (factory set on)</td>
<td>11</td>
<td>Scroll pump exhaust, NW16 Remove flange for ¼&quot; FNPT</td>
</tr>
<tr>
<td>6</td>
<td>Scroll pump power receptacle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There are three types of inlet flange connections for the TASK pumping system:

- "ISO Inlet Flange"
- "KF Inlet Flange" on page 1-7
- "ConFlat Inlet Flange" on page 1-7

**ISO Inlet Flange**

Figure 1-4 shows the ISO flange.

![ISO Flange Connection](image)

**Figure 1-4 ISO Flange Connection**

To install:

1. Use the Varian claw clamps (P/N IC63250DCMZ) to connect to a turbo pump. *Do not use any other style.* Table 1-3 lists the number of clamps required by flange size.

   **Table 1-3 Flange Size - Clamps Required**

<table>
<thead>
<tr>
<th>Flange size</th>
<th>Number of clamps required</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 63</td>
<td>4</td>
</tr>
<tr>
<td>ISO 100</td>
<td>8</td>
</tr>
<tr>
<td>ISO 160</td>
<td>8</td>
</tr>
</tbody>
</table>

2. Select the correct size centering ring; material and style.

3. Place the mating flange on the inlet flange, equally spacing clamps around the connection and tighten.
KF Inlet Flange

Figure 1-5 shows the KF flange.

To install:

1. Select the correct size centering ring and clamp material and style.
2. Place the mating flange on the inlet flange and secure with the clamp.

ConFlat Inlet Flange

Figure 1-6 shows the ConFlat flange.

To install:

1. Selected appropriate size ConFlat flange hardware. Silver plated hardware is recommended to prevent galling.
2. Select the proper size copper gasket.
3. Insert bolts; tighten from the nut side in a clockwise rotation.
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Operation

The TASK system comes factory configured for normal speed, one-button operation. The controller can be reconfigured to support your specific requirements. Please consult the turbo controller manual for more detail.

Operation of the TASK system consists of:

- “Startup”
- “TASK System Shutdown” on page 2-2
- “Power Failure” on page 2-2
- “Troubleshooting” on page 2-2

Startup

To start the TASK system:

1. Close the manual vent valve, located in the upper left corner on the rear of the unit. The lever should be pointed down toward the floor. See Figure 1-3 on page 1-5, item number 7.

2. Plug the Task system power cord into the appropriate power source. Turn on the system using the on/off switch located in the lower left corner on the rear of the unit. See Figure 1-3 on page 1-5, item number 8.

   AUTO TEST appears on the turbo controller display and after a few seconds AUTO TEST OK appears. In the event an error code appears, follow the repair action in Table 2-2 on page 2-4.

   After a few seconds STOP HZ FRONT appears.

3. Push the START/STOP button on the turbo controller front panel. STARTING - XXXXHz - FRONT appears. The scroll pump starts and then the turbo starts.

   The controllers are configured at the factory for high-speed operation. When the pump accelerates to its normal rotational speed, NORMAL - XXXXHz - Front appears.

   XXXX is:
   - 963 Hz........... for the V-301
   - 1350 Hz........... for the V-81M

   **WARNING** Never expose the TASK system inlet when operating at normal speed to the atmosphere. This could result in permanent turbo pump damage and injury to personnel.
TASK Turbo Pumping System

TASK System Shutdown

To shutdown the system:

1. Press the START/STOP keypad button on the turbo controller. The SH-110 stops immediately. The turbo pump winds down slowly unless it is vented.

2. Vent the turbo by lifting the toggle lever on the manual vent device, located in the rear of the unit. See Figure 1-3 on page 1-5, item number 7.

Power Failure

In the event of a power failure:

- The controller shuts down. The turbo pump, scroll pump, and all the interconnected devices also shut down. The system remains under vacuum.

- When power is restored the controller runs the self-diagnostic test. When finished with the test, STOP * Hz * Front appears on the display.

To restart the TASK system:

- Push the START/STOP keypad function button (See “Startup” on page 2-1).

Troubleshooting

TASK System Start-Up Troubleshooting

Table 2-1 lists the TASK system start-up troubleshooting.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Causes</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbo controller display does not come on.</td>
<td>One or both fuses blow</td>
<td>Replace fuses (see Table 1-3 on page 1-6, item 8)</td>
</tr>
<tr>
<td></td>
<td>Turbo controller may be unplugged</td>
<td>Remove task cover and check plug connections</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If the problem is not resolved, check Table 2-2 on page 2-4. For more details, see the turbo controller operators manual.</td>
</tr>
</tbody>
</table>
One-Button Start Configuration Procedure

The turbo controller is configured for one-button start.

To configure for one-button start:

1. Press the COUNTERS and MEASURES buttons simultaneously for 2 seconds until MODE FRONT appears.
2. Press the MEASURES button until INPUT/OUTPUT appears.
3. Press the COUNTERS button.
4. Press the MEASURES button until START OUT MODE STARTING appears.
5. Press the COUNTERS button until START OUT MODE RUNNING appears.
6. Press the MEASURES button.
7. Press the COUNTERS and MEASURES buttons simultaneously for 2 seconds until STOP XXXXHz Front appears.
8. If the scroll pump still does not start, continue on with the scroll pump troubleshooting procedures.
Table 2-2 lists some turbo controller error messages common to startup and describes how to resolve the error.

<table>
<thead>
<tr>
<th>Message/Turbo</th>
<th>Description</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHECK CONNECTION TO PUMP</td>
<td>Incorrect connection between the pump and the controller.</td>
<td>1. Check connection between controller and pump.</td>
</tr>
<tr>
<td></td>
<td>Or</td>
<td>2. Press <strong>START</strong> twice to start the pump.</td>
</tr>
<tr>
<td></td>
<td>The pump temperature is below 0° C.</td>
<td></td>
</tr>
<tr>
<td>WAITING INTERLOCK</td>
<td>The interlock signal of connector P1 is activated by an interruption of the link between pin 3 and pin 8 of connector J1, or the external interlock signal is open.</td>
<td>Reset the short circuit between pin 3 and pin 8 of connector J1, or close the external interlock signal.</td>
</tr>
<tr>
<td>PUMP OVERTEMP</td>
<td>The upper bearing/pump temperature exceeds 60 °C.</td>
<td>1. Wait until the temperature decreases below threshold value.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Press <strong>START</strong> twice to start the pump.</td>
</tr>
<tr>
<td>CONTROLLER OVERTEMPERATURE</td>
<td>The controller environment temperature exceeds 70 °C.</td>
<td>1. Wait until the temperature decreases below threshold value.</td>
</tr>
<tr>
<td></td>
<td>Or</td>
<td>2. Press <strong>START</strong> twice to start the pump.</td>
</tr>
<tr>
<td></td>
<td>The controller radiator temperature exceeds 60 °C.</td>
<td></td>
</tr>
<tr>
<td>TOO HIGH LOAD</td>
<td>The current drawn by the pump is higher than programmed.</td>
<td>1. Check that the pump rotor is free to rotate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Press <strong>START</strong> twice to start the pump.</td>
</tr>
<tr>
<td>SHORT CIRCUIT</td>
<td>After the starting phase, the output connection is shorted.</td>
<td>1. Check the connections and shortages between pump and controller.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Press <strong>START</strong> twice to start the pump.</td>
</tr>
<tr>
<td>SYSTEM OVERRIDE</td>
<td>The pump was stopped by an emergency stop signal provided via a remote contact.</td>
<td>1. Remove the controller power cable and check the emergency condition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Reconnect the power cable and press <strong>START</strong> twice to start the pump.</td>
</tr>
</tbody>
</table>
Table 2-2 Turbo Controller Troubleshooting Guide (Continued)

<table>
<thead>
<tr>
<th>Message/Turbo</th>
<th>Description</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERVOLTAGE</td>
<td>The controller power supply circuitry is faulty, or the Controller received a spike.</td>
<td>Press <strong>START</strong> twice to start the pump. If the message reappears, call Varian for service.</td>
</tr>
<tr>
<td>POWER FAIL</td>
<td>Failure in the controller pump power supply section.</td>
<td>Contact Varian for maintenance.</td>
</tr>
</tbody>
</table>
**SH-110 Troubleshooting**

Table 2-3 assists in troubleshooting SH-110 problems.

**Table 2-3  SH-110 Troubleshooting Guide**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Causes</th>
<th>Corrective Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will not start</td>
<td>One or both fuses blown</td>
<td>❑ Replace fuses (see SH-110 user manual: P/N 699904311)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>❑ Identify cause of overload</td>
</tr>
<tr>
<td></td>
<td></td>
<td>❑ Check the line voltage and the pump voltage configuration</td>
</tr>
<tr>
<td></td>
<td>Motor thermal protector open</td>
<td>❑ Allow motor to cool</td>
</tr>
<tr>
<td></td>
<td></td>
<td>❑ Identify cause of overload</td>
</tr>
<tr>
<td></td>
<td>Defective motor</td>
<td>Inspect.; Contact Varian</td>
</tr>
<tr>
<td>Poor ultimate pressure</td>
<td>System leak</td>
<td>Locate and repair leak</td>
</tr>
<tr>
<td></td>
<td>Water in pump</td>
<td>Flush pump with air or dry nitrogen</td>
</tr>
<tr>
<td></td>
<td>Gas ballast plugged</td>
<td>Replace breather vent; Contact Varian</td>
</tr>
<tr>
<td></td>
<td>Solvent in pump</td>
<td>Flush pump with air or dry nitrogen, Install trap or filter.</td>
</tr>
<tr>
<td></td>
<td>Seals worn out</td>
<td>Rebuild pump</td>
</tr>
<tr>
<td>Hammering noise</td>
<td>Pump overheated</td>
<td>❑ Check ventilation to pump.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>❑ Check ambient temperature.</td>
</tr>
<tr>
<td></td>
<td>Debris in pump</td>
<td>❑ Check intake screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>❑ Flush pump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>❑ Disassemble pump and inspect</td>
</tr>
<tr>
<td>Pump runs intermittently</td>
<td>Motor thermal protector is</td>
<td>❑ Allow the motor to cool</td>
</tr>
<tr>
<td></td>
<td>intermittently cycling open and</td>
<td>❑ Identify the cause of the overload</td>
</tr>
<tr>
<td></td>
<td>closed*</td>
<td></td>
</tr>
</tbody>
</table>

*The SH-110 is equipped with an auto-reset thermal motor protector. This protector automatically shuts down the pump when it detects an overload condition; and automatically restarts the pump when the motor has cooled to within an acceptable temperature range.*
Appendix A. Specifications and System Configurations

Table A-1 lists the TASK technical specifications.

<table>
<thead>
<tr>
<th>TASK System Specifications</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Pressure</td>
<td>$5 \times 10^{-9}$ mbar</td>
</tr>
<tr>
<td>Pumping Speed (l/s)</td>
<td>V-81-M KF 40 / 2.75&quot; CFF (DN 40)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>V-81-M ISO 63 / 4.50&quot; CFF (DN63)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>V-301 ISO 100 / 6.00&quot; CFF (DN100)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>V-301 ISO 160 / 8.00&quot; CFF (DN160)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotational Speed</td>
<td>V-81M</td>
</tr>
<tr>
<td></td>
<td>V-301</td>
</tr>
<tr>
<td>Operating Position</td>
<td>Vertical</td>
</tr>
<tr>
<td>Operating Ambient Temperature</td>
<td>5 °C to 35 °C</td>
</tr>
<tr>
<td>Input Voltage/Frequency</td>
<td>120 or 220 VAC, 50/60 Hz</td>
</tr>
<tr>
<td>Maximum Input Power</td>
<td>736 W/486 W (V-81M/V-301)</td>
</tr>
<tr>
<td>Bakeout Temperature</td>
<td>CFF: 120 °C at Inlet</td>
</tr>
<tr>
<td></td>
<td>KF, ISO: 80 °C at Inlet</td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m maximum</td>
</tr>
<tr>
<td>Humidity</td>
<td>0 to 95% non-condensing</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-20 to 60 °C</td>
</tr>
</tbody>
</table>
Table A-2 lists the TASK configurations available.

<table>
<thead>
<tr>
<th>Turbo Pump</th>
<th>Inlet Flange</th>
<th>Part Number 120 V 50/60 Hz</th>
<th>Part Number 220 V 50/60 Hz</th>
<th>Shipping Weight kgs (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V-81M</td>
<td>KF 40</td>
<td>TPSK81MKF040120</td>
<td>TPSK81MKF040220</td>
<td>47.9 (105.7)</td>
</tr>
<tr>
<td></td>
<td>2.75&quot; CFF</td>
<td>TPSK81MCF035120</td>
<td>TPSK81MCF035220</td>
<td>49.4 (108.8)</td>
</tr>
<tr>
<td></td>
<td>ISO 63</td>
<td>TPSK81MIS063120</td>
<td>TPSK81MIS063220</td>
<td>47.9 (105.7)</td>
</tr>
<tr>
<td></td>
<td>4.50&quot; CFF</td>
<td>TPSK81MCF063120</td>
<td>TPSK81MCF063220</td>
<td>49.4 (108.8)</td>
</tr>
<tr>
<td>V-301</td>
<td>ISO 100</td>
<td>TPSK301IS100120</td>
<td>TPSK301IS100220</td>
<td>49.8 (109.7)</td>
</tr>
<tr>
<td></td>
<td>6.00&quot; CFF</td>
<td>TPSK301CF100120</td>
<td>TPSK301CF100220</td>
<td>53.2 (117.3)</td>
</tr>
<tr>
<td></td>
<td>ISO 160</td>
<td>TPSK301IS160120</td>
<td>TPSK301IS160220</td>
<td>49.8 (109.7)</td>
</tr>
<tr>
<td></td>
<td>8.00&quot; CFF</td>
<td>TPSK301CF150120</td>
<td>TPSK301CF150220</td>
<td>53.2 (117.3)</td>
</tr>
</tbody>
</table>
1. Return authorization numbers (RA#) **will not** be issued for any product until this Certificate is completed and returned to a Varian, Inc. Customer Service Representative.

2. Pack goods appropriately and drain all oil from rotary vane and diffusion pumps (for exchanges please use the packing material from the replacement unit), making sure shipment documentation and package label clearly shows assigned Return Authorization Number (RA#). VVT cannot accept any return without such reference.

3. Return product(s) to the nearest location:

   **North and South America**
   Varian, Inc.
   121 Hartwell Ave.
   Lexington, MA 02421
   Fax: (781) 860-9252

   **Europe and Middle East**
   Varian S.p.A.
   Via F.lli Varian, 54
   10040 Leini (TO) – ITALY
   Fax: (39) 011 997 9350

   **Asia and ROW**
   Varian Vacuum Technologies
   Local Office

   For a complete list of phone/fax numbers see [www.varianinc.com/vacuum](http://www.varianinc.com/vacuum)

4. If a product is received at Varian, Inc. in a contaminated condition, the customer is held responsible for all costs incurred to ensure the safe handling of the product, and is liable for any harm or injury to Varian, Inc. employees occurring as a result of exposure to toxic or hazardous materials present in the product.

---

**CUSTOMER INFORMATION**

| Company name: | .......................................................... |
| Contact person: | Name: .......................................................... Tel: .......................................................... |
| | Fax: .......................................................... E-mail: .......................................................... |
| Ship method: | Shipping Collect #: .......................................................... P.O. #: .......................................................... |
| Europe only: | VAT Reg Number: .......................................................... |
| USA only: | ☐ Taxable ☐ Non-taxable |
| Customer ship to: | .......................................................... Customer bill to: .......................................................... |

---

**PRODUCT IDENTIFICATION**

<table>
<thead>
<tr>
<th>Product Description</th>
<th>Varian, Inc. Part Number</th>
<th>Varian, Inc. Serial Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**TYPE OF RETURN** (check appropriate box)

- ☐ Paid Exchange
- ☐ Paid Repair
- ☐ Warranty Exchange
- ☐ Warranty Repair
- ☐ Loaner Return
- ☐ Credit
- ☐ Shipping Error
- ☐ Evaluation Return
- ☐ Calibration
- ☐ Other

---

**HEALTH and SAFETY CERTIFICATION**

**VARIAN, INC. CANNOT ACCEPT ANY BIOLOGICAL HAZARDS, RADIOACTIVE MATERIAL, ORGANIC METALS, OR MERCURY AT ITS FACILITY. CHECK ONE OF THE FOLLOWING:**

- ☐ I confirm that the above product(s) has (have) **NOT** pumped or been exposed to any toxic or dangerous materials in a quantity harmful for human contact.
- ☐ I declare that the above product(s) has (have) pumped or been exposed to the following toxic or dangerous materials in a quantity harmful for human contact (Must be filled in):

  Print Name: .......................................................... Signature: .......................................................... Date: ..........................................................

---

**PLEASE FILL IN THE FAILURE REPORT SECTION ON THE NEXT PAGE**

Do not write below this line

Notification (RA) #: .......................................................... Customer ID #: .......................................................... Equipment #: ..........................................................

---

August 2003 — Page 1 of 2
FAILURE REPORT
(Please describe in detail the nature of the malfunction to assist us in performing failure analysis):

**TURBO PUMPS AND TURBOCONTROLLERS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Position</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>❑ Does not start</td>
<td>❑ Noise</td>
<td>❑ Vertical</td>
</tr>
<tr>
<td>❑ Does not spin freely</td>
<td>❑ Vibrations</td>
<td>❑ Horizontal</td>
</tr>
<tr>
<td>❑ Does not reach full speed</td>
<td>❑ Leak</td>
<td>❑ Upside-down</td>
</tr>
<tr>
<td>❑ Mechanical Contact</td>
<td>❑ Temperature</td>
<td>❑ Other</td>
</tr>
<tr>
<td>❑ Cooling defective</td>
<td>❑ Clogging</td>
<td></td>
</tr>
<tr>
<td>❑ Cooling defective</td>
<td>❑ Clogging</td>
<td></td>
</tr>
</tbody>
</table>

Describe Failure:

Turbocontroller Error Message:

**ION PUMPS/CONTROLLERS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>❑ Bad feedthrough</td>
<td>❑ Poor vacuum</td>
</tr>
<tr>
<td>❑ Vacuum leak</td>
<td>❑ High voltage problem</td>
</tr>
<tr>
<td>❑ Error code on display</td>
<td>❑ Other</td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:

**VALVES/COMPONENTS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>❑ Main seal leak</td>
<td>❑ Bellows leak</td>
</tr>
<tr>
<td>❑ Solenoid failure</td>
<td>❑ Damaged flange</td>
</tr>
<tr>
<td>❑ Damaged sealing area</td>
<td>❑ Other</td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:

**LEAK DETECTORS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>❑ Cannot calibrate</td>
<td>❑ No zero/high background</td>
</tr>
<tr>
<td>❑ Vacuum system unstable</td>
<td>❑ Cannot reach test mode</td>
</tr>
<tr>
<td>❑ Failed to start</td>
<td>❑ Other</td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:

**INSTRUMENTS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>❑ Gauge tube not working</td>
<td>❑ Display problem</td>
</tr>
<tr>
<td>❑ Communication failure</td>
<td>❑ Degas not working</td>
</tr>
<tr>
<td>❑ Error code on display</td>
<td>❑ Other</td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:

**ALL OTHER VARIAN, INC.**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>❑ Pump doesn't start</td>
<td>❑ Noisy pump (describe)</td>
</tr>
<tr>
<td>❑ Doesn't reach vacuum</td>
<td>❑ Overtemperature</td>
</tr>
<tr>
<td>❑ Pump seized</td>
<td>❑ Other</td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:

**DIFFUSION PUMPS**

<table>
<thead>
<tr>
<th>Claimed Defect</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>❑ Heater failure</td>
<td>❑ Electrical problem</td>
</tr>
<tr>
<td>❑ Doesn't reach vacuum</td>
<td>❑ Cooling coil damage</td>
</tr>
<tr>
<td>❑ Vacuum leak</td>
<td>❑ Other</td>
</tr>
</tbody>
</table>

Describe failure:

Customer application:
Sales and Service Offices

Canada
Central coordination through:
Varian, Inc.
121 Hartwell Avenue
Lexington, MA 02421
USA
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Fax: (781) 860 5437
Toll Free: (800) 882 7426

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Beijing 100031
P.R. China
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Fax: (86) 10 6608 1541

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Les Ulis cedex (Orsay) 91941
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Fax: (33) 1 69 28 23 08

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64289 Darmstadt
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Fax: (49) 6151 703 302

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Italy
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vtl.technical.support@varianinc.com

Japan
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Korea
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vtk.technical.support@varianinc.com

Taiwan
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Catalog and On-line Orders:
www.varianinc.com

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