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TASK Turbo Pumping System

Manual No. 699933001

Revision C

March 2007

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Agilent Technologies



INSTRUCTION MANUAL

TASK Turbo Pumping System



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Declaración de Conformidad
Verklaring de Overeenstemming
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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:

Component	Component Part Number	Instruction Manual Part Number
❑ V-81M turbo pump	9698901, 02, 03, 04	8790098301
❑ V-301 turbo pump	9698918, 19, 20, 21	8790094601
❑ V-81-AG turbo controller	9698988	8790098601
❑ V-301-AG turbo controller	9698991	8790098201
❑ SH-110 scroll pump	SH01101UNIV	699904311

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.

TASK Turbo Pumping System

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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 of 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.

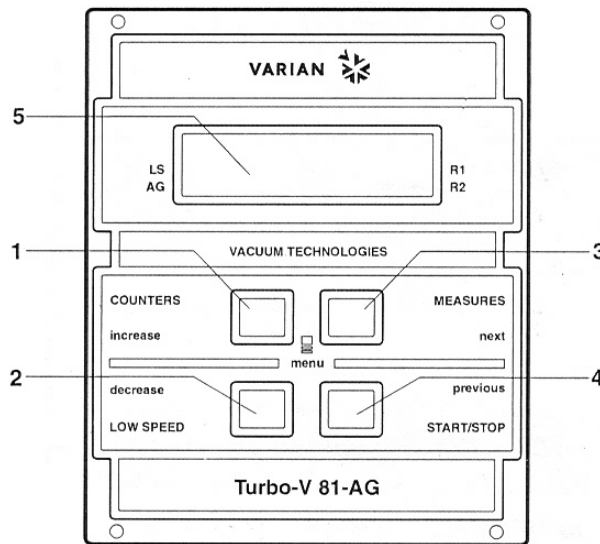


Figure 1-1 V-81-AG Front Panel

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

Keypad Item	Description
1	Keyboard push-button to recall on the display the cycle number, cycle time and pump life.
2	Keyboard push-button for <i>LOW SPEED</i> mode selection. This is active only when the front panel operation is selected. Press: ❑ Once and the pump runs at <i>stand-by</i> speed. ❑ Again to unselect the mode.

TASK Turbo Pumping System

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

Keypad Item	Description
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 <i>START</i>, <i>STOP/RESET</i> 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.

TASK Turbo Pumping 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.

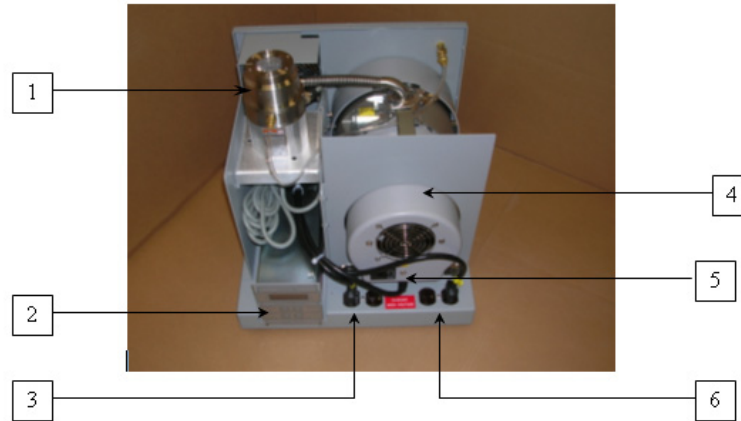


Figure 1-2 TASK System – Front View



Figure 1-3 TASK System – Rear View

Table 1-2 TASK System Components

Number	Item	Number	Item
1	Turbo pump	7	Vent valve lever
2	Turbo controller	8	Main switch on/off and fuse holder
3	Turbo controller power receptacle(s)	9	System cooling fan
4	SH-110 scroll pump	10	Scroll pump inlet filter
5	Scroll pump on/off switch (factory set set <i>on</i>)	11	Scroll pump exhaust, NW16 Remove flange for ¼" FNPT
6	Scroll pump power receptacle		

TASK Turbo Pumping System

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.

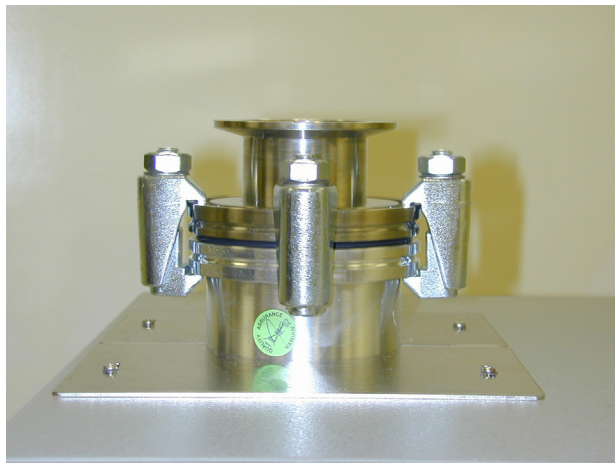


Figure 1-4 ISO Flange Connection

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

Flange size	Number of clamps required
ISO 63	4
ISO 100	8
ISO 160	8

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.

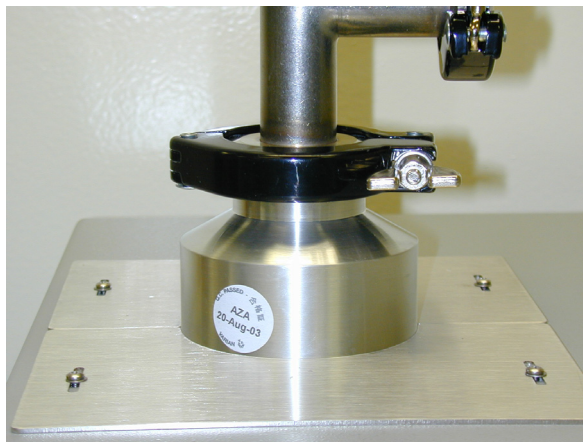


Figure 1-5 KF Flange Connection

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.

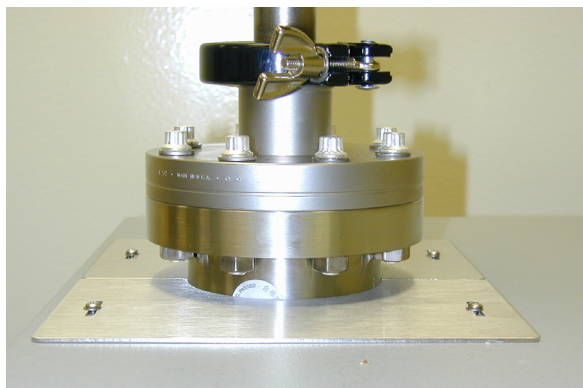


Figure 1-6 ConFlat Flange Connection

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 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 2-1 TASK System Start-Up Troubleshooting Guide

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

TASK Turbo Pumping System

Table 2-1 TASK System Start-Up Troubleshooting Guide (Continued)

Problem	Possible Causes	Corrective Action
Turbo controller <i>START</i> button is pushed, and scroll pump does not turn on.	Turbo controller not configured for one-button start	Reconfigure as per the "One-Button Start Configuration Procedure".
	Scroll pump may be unplugged	Remove the TASK cover and check plug connections.
	Defective relay	Check that voltage is present at the scroll pump receptacle once the <i>START</i> button is pushed. If not replace the relay.
	If the problem is not resolved, check Table 2-3 on page 2-6. For more details, see the scroll pump operator manual.	

One-Button Start Configuration Procedure

The turbo controller is configured for one-button start.

To configure for one-button start:



Buttons discussed below are all located on the turbo controller front panel.

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.

TASK Turbo Pumping System

Table 2-2 lists some turbo controller error messages common to startup and describes how to resolve the error.

Table 2-2 Turbo Controller Troubleshooting Guide

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

TASK Turbo Pumping System

Table 2-2 Turbo Controller Troubleshooting Guide (Continued)

Message/Turbo	Description	Resolution
<i>OVERVOLTAGE</i>	The controller power supply circuitry is faulty, or the Controller received a spike.	Press START twice to start the pump. If the message reappears, call Varian for service.
<i>POWER FAIL</i>	Failure in the controller pump power supply section.	Contact Varian for maintenance.

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SH-110 Troubleshooting

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

Table 2-3 SH-110 Troubleshooting Guide

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

** 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 A-1 TASK Technical Specifications

TASK System Specifications	Description	
Base Pressure		5×10^{-9} mbar
Pumping Speed (l/s)	V-81-M KF 40 / 2.75" CFF (DN 40)	☐ N ₂ – 50 ☐ H ₂ – 46 ☐ He – 56
	V-81-M ISO 63 / 4.50" CFF (DN63)	☐ N ₂ – 77 ☐ H ₂ – 50 ☐ He – 65
	V-301 ISO 100 / 6.00" CFF (DN100)	☐ N ₂ – 250 ☐ H ₂ – 200 ☐ He – 220
	V-301 ISO 160 / 8.00" CFF (DN160)	☐ N ₂ – 280 ☐ H ₂ – 210 ☐ He – 230
Rotational Speed	V-81M	1350 Hz
	V-301	963 Hz
Operating Position	Vertical	
Operating Ambient Temperature	5 °C to 35 °C	
Input Voltage/Frequency	120 or 220 VAC, 50/60 Hz	
Maximum Input Power	736 W/486 W (V-81M/V-301)	
Bakeout Temperature	CFF: 120 °C at Inlet KF, ISO: 80 °C at Inlet	
Altitude	2000 m maximum	
Humidity	0 to 95% non-condensing	
Storage Temperature	-20 to 60 °C	

TASK Turbo Pumping System

Table A-2 lists the TASK configurations available.

Table A-2 Task Configurations

Turbo Pump	Inlet Flange	Part Number 120 V 50/60 Hz	Part Number 220 V 50/60 Hz	Shipping Weight kgs (lbs)
V-81M	KF 40	TPSK81MKF040120	TPSK81MKF040220	47.9 (105.7)
	2.75" CFF	TPSK81MCF035120	TPSK81MCF035220	49.4 (108.8)
	ISO 63	TPSK81MIS063120	TPSK81MIS063220	47.9 (105.7)
	4.50" CFF	TPSK81MCF063120	TPSK81MCF063220	49.4 (108.8)
V-301	ISO 100	TPSK301IS100120	TPSK301IS100220	49.8 (109.7)
	6.00" CFF	TPSK301CF100120	TPSK301CF100220	53.2 (117.3)
	ISO 160	TPSK301IS160120	TPSK301IS160220	49.8 (109.7)
	8.00" CFF	TPSK301CF150120	TPSK301CF150220	53.2 (117.3)



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

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

Product Description	Varian, Inc. Part Number	Varian, Inc. Serial Number

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 #:



FAILURE REPORT

(Please describe in detail the nature of the malfunction to assist us in performing failure analysis):

TURBO PUMPS AND TURBOCONTROLLERS

Claimed Defect	Position	Parameters
☐ Does not start ☐ Does not spin freely ☐ Does not reach full speed ☐ Mechanical Contact ☐ Cooling defective	☐ Noise ☐ Vibrations ☐ Leak ☐ Overtemperature ☐ Clogging	☐ Vertical ☐ Horizontal ☐ Upside-down ☐ Other Power: Rotational Speed: Current: Inlet Pressure: Temp 1: Foreline Pressure: Temp 2: Purge flow: Operation Time:
Describe Failure:		
Turbocontroller Error Message:		

ION PUMPS/CONTROLLERS

☐ Bad feedthrough ☐ Vacuum leak ☐ Error code on display	☐ Poor vacuum ☐ High voltage problem ☐ Other
Describe failure:	
Customer application:	

VALVES/COMPONENTS

☐ Main seal leak ☐ Solenoid failure ☐ Damaged sealing area	☐ Bellows leak ☐ Damaged flange ☐ Other
Describe failure:	
Customer application:	

LEAK DETECTORS

☐ Cannot calibrate ☐ Vacuum system unstable ☐ Failed to start	☐ No zero/high background ☐ Cannot reach test mode ☐ Other
Describe failure:	
Customer application:	

INSTRUMENTS

☐ Gauge tube not working ☐ Communication failure ☐ Error code on display	☐ Display problem ☐ Degas not working ☐ Other
Describe failure:	
Customer application:	

ALL OTHER VARIAN, INC.

☐ Pump doesn't start ☐ Doesn't reach vacuum ☐ Pump seized	☐ Noisy pump (describe) ☐ Overtemperature ☐ Other
Describe failure:	
Customer application:	

DIFFUSION PUMPS

☐ Heater failure ☐ Doesn't reach vacuum ☐ Vacuum leak	☐ Electrical problem ☐ Cooling coil damage ☐ Other
Describe failure:	
Customer application:	

Sales and Service Offices

Canada

Central coordination through:

Varian, Inc.
121 Hartwell Avenue
Lexington, MA 02421
USA
Tel: (781) 861 7200
Fax: (781) 860 5437
Toll Free: (800) 882 7426

China

Varian Technologies - Beijing

Room 1201, Jinyu Mansion
No. 129A, Xuanwumen Xidajie
Xicheng District
Beijing 1000031
P.R. China
Tel: (86) 10 6608 1031
Fax: (86) 10 6608 1541

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Varian s.a.

7 avenue des Tropiques
Z.A. de Courtaboeuf – B.P. 12
Les Ulis cedex (Orsay) 91941
France
Tel: (33) 1 69 86 38 13
Fax: (33) 1 69 28 23 08

Germany and Austria

Varian Deutschland GmbH

Alsfelder Strasse 6
Postfach 11 14 35
64289 Darmstadt
Germany
Tel: (49) 6151 703 353
Fax: (49) 6151 703 302

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Varian India PVT LTD

101-108, 1st Floor
1010 Competent House
7, Nangal Raya Business Centre
New Delhi 110 046
India
Tel: (91) 11 5548444
Fax: (91) 11 5548445

Italy

Varian, Inc.

Via F.lli Varian, 54
10040 Leini, (Torino)
Italy
Tel (39) 011 997 9 111
Fax (39) 011 997 9 350

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Varian, Inc.

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4-16-36 Shibaura
Minato-ku, Tokyo 108
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Fax: (81) 3 5232 1263

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Varian Technologies Korea, Ltd.

Shinsa 2nd Building 2F
966-5 Daechi-dong
Kangnam-gu, Seoul
Korea 135-280
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Fax: (82) 2 3452 2451

Mexico

Varian S.A.

Concepcion Beistegui No 109
Col Del Valle
C.P. 03100
Mexico, D.F.
Tel: (52) 5 523 9465
Fax: (52) 5 523 9472

Russia

Central coordination through:

Varian, Inc.
via F.lli Varian 54
10040 Leini, (Torino)
Italy
Tel: (39) 011 997 9 252
Fax: (39) 011 997 9 316

Taiwan

Varian Technologies Asia Ltd.

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Sec. 1, Hsi Chih, Taipei Hsien
Taiwan, R.O.C.
Tel: (886) 2 2698 9555
Fax: (886) 2 2698 9678

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Varian Ltd.

28 Manor Road
Walton-On-Thames
Surrey KT 12 2QF
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Tel: (44) 1932 89 8000
Fax: (44) 1932 22 8769

United States

Varian, Inc.

121 Hartwell Avenue
Lexington, MA 02421
USA
Tel: (781) 861 7200
Fax: (781) 860 5437

Other Countries

Varian, Inc.

Via F.lli Varian 54
10040 Leini, (Torino)
Italy
Tel: (39) 011 997 9 111
Fax: (39) 011 997 9 350

Customer Support and Service:

North America

Tel: 1 (800) 882-7426 (toll-free)
vtl.technical.support@varianinc.com

Europe

Tel: 00 (800) 234 234 00 (toll-free)
vtl.technical.support@varianinc.com

Japan

Tel: (81) 3 5232 1253 (dedicated line)
vtj.technical.support@varianinc.com

Korea

Tel (82) 2 3452 2452 (dedicated line)
vtk.technical.support@varianinc.com

Taiwan

Tel: 0 (800) 051 342 (toll-free)
vtw.technical.support@varianinc.com

Worldwide Web Site, Catalog and On-line Orders:

www.varianinc.com

Representatives in most countries



VARIAN