



Agilent Technologies

Vacuum Products Division

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***TriScroll™ 620 INV
Series
Dry Scroll
Vacuum Pump***

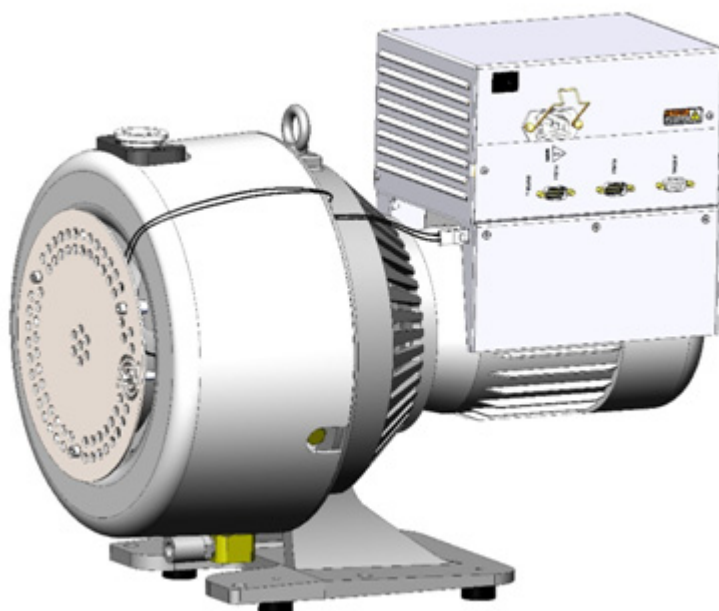
*INSTALLATION AND
OPERATION MANUAL*

Manual No. X3828-90620

Revision A

September 2016

TriScroll™ 620 INV Dry Scroll Vacuum Pump



TriScroll is a trademark of Agilent, Inc.

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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 its expense; in addition, a charge for testing and examination may be made on Products so returned.

TriScroll 620 INV Series Vacuum Pump

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Instructions for Use

General Information

This equipment is designed for use by professionals. The user should read this instruction manual and any other additional information supplied by Agilent before operating the equipment. Agilent will not be held responsible for any events that occur due to non-compliance with these instructions, improper use by untrained persons, non-authorized interference with the equipment, or any action contrary to that provided for by specific national standards.

The TriScroll™ 620 INV is a dry scroll vacuum pump specifically optimized for helium leak detection equipment. This pump is suitable for pumping air or inert gases. The pump is not intended to pump toxic, corrosive, explosive, or particulate-forming gases.

The following paragraphs contain all the information necessary to guarantee the safety of the operator when using the equipment. Detailed information is supplied in “Technical Information” on page 10.

This manual uses the following standard safety protocol:

WARNING



The warning messages are for attracting the attention of the operator to a particular procedure or practice which, if not followed correctly, could lead to serious injury.

CAUTION



The caution messages are displayed before procedures, which if not followed, could cause damage to the equipment.

NOTE



The notes contain important information taken from the text.

Storage

When transporting and storing the pump, the following environmental requirements should not be exceeded:

Temperature: -20 °C to 60 °C (-4 °F to 140 °F)

Relative humidity: 0 to 95% (non-condensing)

Pump Safety Symbols

The following symbols are used to designate pump parts, operations and hazards:



Caution, Hot surface: *Danger of burns if hot parts are touched.*



Warning: See *Installation/Operating mode instructions.*



Caution: *Risk of electrical shock.*

Preparation for Installation

The pump is supplied in a special protective packing. If this shows signs of damage, which may have occurred during transport, contact your local sales office.

Total weight of the packing, including the pump, is approximately 40 kg (87 lbs).

WARNING



When unpacking the pump, be sure not to drop it, and avoid any kind of sudden impact or shock vibration to it.

WARNING



The TriScroll 620 INV weighs 32 kg (70 lbs). Use extreme caution when handling heavy parts. A two person lift is recommended. Failure to perform a two person lift may result in personal injury.

WARNING



The System must be installed in a way that allows an easy interruption of the line voltage.

WARNING



Power supply cord: The correct cable for electrical wiring is a three wires (Ph+N+Earth) cable. The wire section has to be at least 0.75 mm² (AWG18).

CAUTION



Assure a free space all around the system at minimum of 20 cm () to allow proper air circulation.

NOTE



Normal exposure to the environment cannot damage the pump. Nevertheless, it is advisable to keep the pump inlet closed until the pump is installed in the system.

Installation Requirements

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 respected:

Temperature: +5 °C to +40 °C (41 °F to 104 °F)
Relative humidity: 0 to 95% (non-condensing)

Operation

In order to reach ultimate vacuum, the pump must be left running for about an hour with the inlet sealed.

Unlike conventional oil-sealed pumps, Agilent's dry scroll pumps do not have fluid to cleanse them of accumulated dust and debris. Run the pump periodically at atmosphere for a minute or two to flush out the pump. Flush the pump regularly and adjust this schedule according to your specific conditions.

WARNING



During operation the outer surface of the motor housing can become hot. Avoid touching the motor housing during pump operation.

WARNING



When employing the pump for pumping toxic, flammable, or radioactive gases, please follow the required procedures for each gas disposal. Do not use the pumping system in presence of explosive gases.

CAUTION



Use inert gas free from dust, particles or humidity (like Nitrogen) for venting the pump. The pressure at the vent port must be less than 2 bar (above atmospheric pressure).

Start up Procedure

1. Be sure that the vacuum system isolation valve is closed.
2. Turn on power to the pump.
3. Open the isolation valve.

Shutdown Procedure

1. Close the vacuum system isolation valve. This prevents debris in pump from being transported into the vacuum system.
2. Turn off power to the pump.

WARNING



The pump is designed for operation with neutral or noncorrosive fluids. It is absolutely forbidden to use it with potentially explosive, inflammable or poisonous substances.

Maintenance

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

WARNING



- Death may 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 the pump to cool as the temperature of the outer surface may be in excess of 55 °C (131 °F).*
- Always disconnect your power supply to the pump before beginning maintenance work.*

NOTE



Before returning the pump to the factory for repair, the "Health and Safety" sheet attached to this instruction 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.

If a pump is to be discarded, it must be disposed of in accordance with specific national and local standards.

Technical Information

Table 1 Specifications

Model	TriScroll™ 620 INV Dry Scroll Vacuum Pump
Interface dimensions	See Figure 2
Peak pumping speed	50 Hz: 420 l/m, 25.2 m ³ /hr (14.8 cfm) 60 Hz: 500 l/m, 30 m ³ /hr (17.7 cfm)
Media	Clean air. No toxic, corrosive, explosive or particulate forming gases
Ultimate pressure (Torr)	7.0 x 10 ⁻³ Torr (9.3 x 10 ⁻³ mbar)
Maximum inlet pressure	1.0 atmosphere (0 psig)
Maximum continuous inlet pressure	100 Torr
Maximum outlet pressure	1.1 atmosphere (1.5 psig)
Inlet connection	NW40
Exhaust connection	Female 3/8" National Pipe Thread (NW25 adapter provided)
Gas ballast	Female 1/4" National Pipe Thread (40 Micron sintered filter provided)
Ambient operating temperature	5 °C to 40 °C (41 °F to 104 °F)
Storage temperature	-20 °C to 60 °C (-4 °F to 140 °F)
Motor rating	1.0 HP (0.75 kW)
Operating voltages	50-60 Hz/100-200 VAC
Motor thermal protection	Automatic
Operating speed	35-64 Hz Factory setting: 62 Hz
Cooling system	Air-cooled
Weight	Pump only: 32 kg (71 lbs) Shipping weight: 42 kg (92 lbs)
Noise level (per ISO 11201)	Variable with frequency, 58-71 dB(A)
Vibration level at inlet (per ISO 10816-1)	6.3 mm/sec
Installation	Pollution Degree: 2

TriScroll 620 INV Series Vacuum Pump

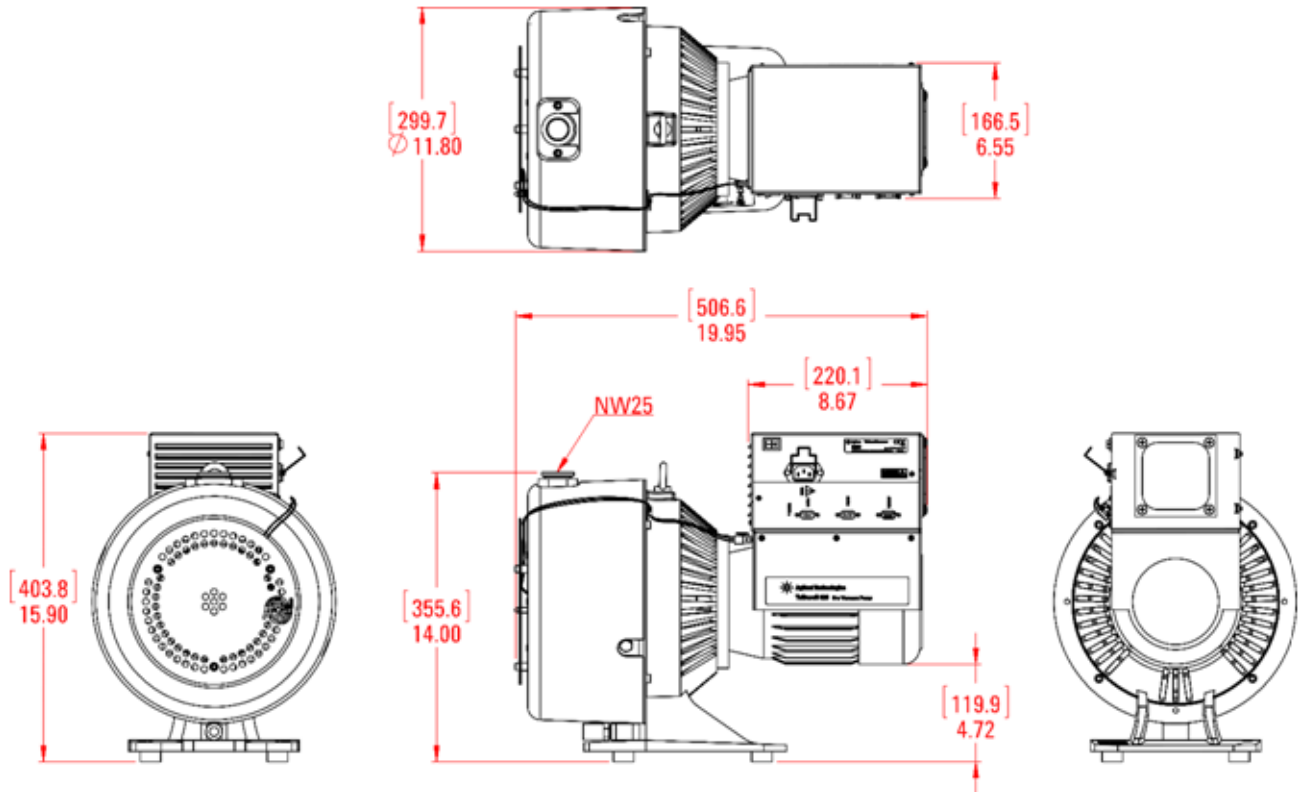


Figure 1 Interface Drawing with Dimensions

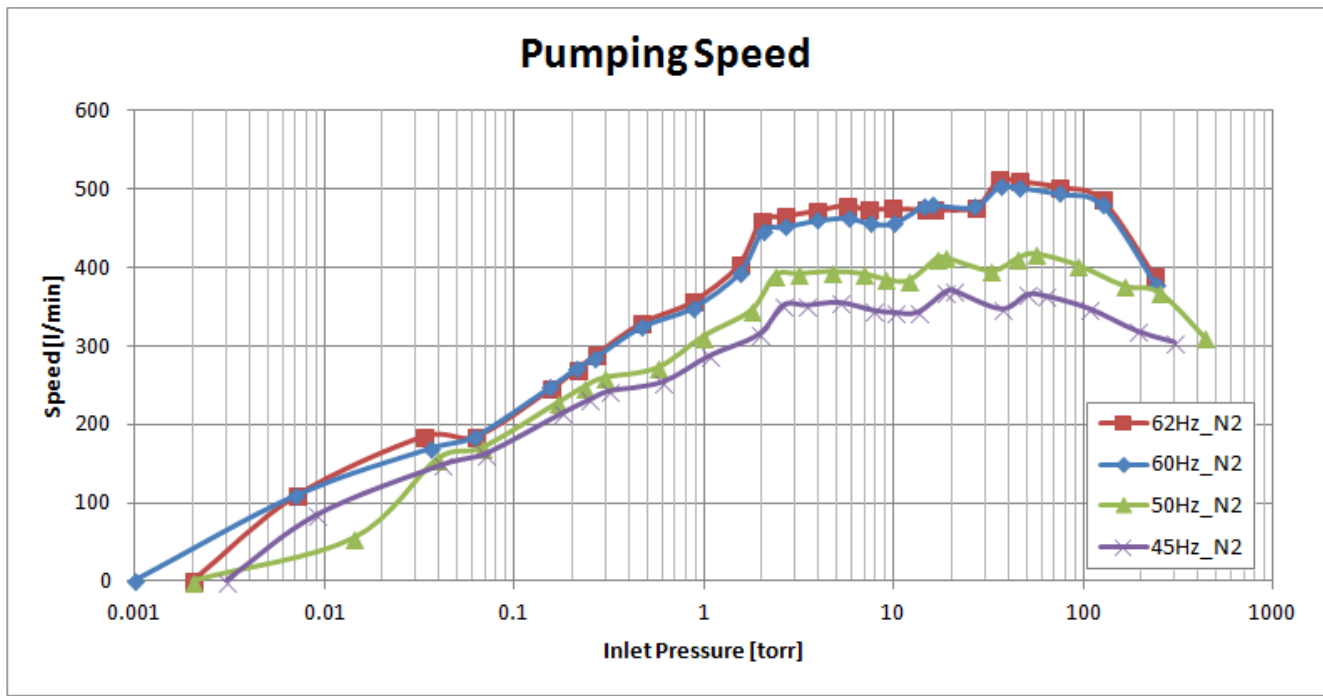


Figure 2 Pumping Speed Curves

Pump Electrical Controller

The pump is powered by an inverter that converts single phase line power into 3-phase power that drives an induction motor at a user selectable frequency.

Several operational variables are modifiable through the J2 serial port when using Agilent T-Plus software. A number of additional system variables are also viewable.

Pump operation is interlocked through the P1 connector. Pins 4 and 5, and Pins 8 and 9, must be connected together to enable operation. A prewired connector is supplied with the pump and should be plugged into P1. The maximum power output of the inverter is 950 Watts. At pump inlet pressures above approximately 20 Torr, the pump will be power limited and the output frequency will be reduced. This mode is known as *autotuning*.

At pump start, the drive frequency is ramped up over several seconds. This provides for smooth starting and eliminates large in-rush currents.

Technical Specifications

- Input voltage: 100 V-240 V / 50-60 Hz
- Max frequency: 64 Hz, factory set @ 62Hz
- Normal Operation maximum power: 850 W
- Protection level: IP 20

Table 2 P1 I/O-1 Interlock

PIN #	SIGNAL NAME	IN/OUT
1	Interlock contact 1	Out
2	0-10Vdc, with reference to pin 5 remote control	In

Table 2 P1 I/O-1 Interlock

PIN #	SIGNAL NAME	IN/OUT
3	No Connection	
4	Start/Stop (-): Connect to Pin 5	In
5	Groundout	Out
6	Interlock contact 2	Out
7	No Connection	
8	Start/Stop (+): Connect to Pin 9	In
9	+24V \pm 5% 50mA, with reference to pin 5	Out

Remote speed setting allows you to control rotational speed using a 0-10 V analog input:

- $V_{in} > 9$ V: Driving frequency will be the full speed (factory set @62 Hz)
- $V_{in} < 1$ V: Driving frequency will be the minimum speed (35 Hz)

NOTE



Pump operation is interlock dependent. The provided mating connector must be plugged into P1 to start the pump.

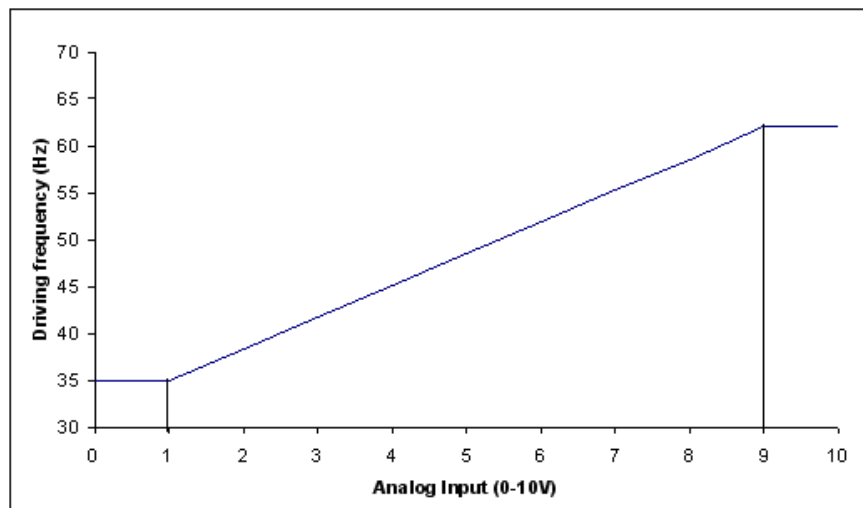


Figure 3 Driving Frequency vs. Analog Input

TriScroll 620 INV Series Vacuum Pump

Serial Interface Specification RS485 and RS232

Table 3 J1 - Serial Port

PIN #	SIGNAL NAME
1	+5V \pm 5%, 50mA, with reference to pin 5
2	RS232 TX
3	RS232 RX
4	No Connection
5	GND
6	RS485 A
7	No Connection
8	RS485 B
9	No Connection

Physical level: RS232 or RS485

Maximum baud: 9600, 8 data bit, no parity, 1 stop bit.

Table 4 P2 I/O-2 Port on DB9 Male Connector

PIN #	SIGNAL NAME
1	No Connection
2	No Connection
3	No Connection
4	No Connection
5	GND
6	No Connection
7	No Connection
8	No Connection
9	VPI output +24V \pm 5% 400mA, with reference to pin 5

Table 5 T-Plus Software Variables

WIN	TYPE	DESCRIPTION
000	Logical	Start/Stop (1=START; 0=STOP)
001	Logical	Low Speed [0=OFF / 1=ON]
008	Logical	Remote/Serial Configuration (1=REMOTE; 0=SERIAL)
102	Numerical	Set Point Value (Hz)
105	Numerical	Set Point Hysteresis (%) [0-100]
108	Numerical	Baud Rate (0-4) [600-1200-2400-4200-9600]
117	Numerical	Low Speed Adjust (Hz)
120	Numerical	Rotational Frequency Setting [Hz] (High speed adjust)
200	Numerical	Bus Current [mA]
201	Numerical	3 Phase Voltage [Vrms]
202	Numerical	Power [W]
203	Numerical	Driving Frequency [Hz]: (current driving frequency)
205	Numerical	Status: <input type="checkbox"/> 0=stop <input type="checkbox"/> 2=ramp <input type="checkbox"/> 3=autotuning <input type="checkbox"/> 5=normal <input type="checkbox"/> 6=fail

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Table 5 T-Plus Software Variables (Continued)

WIN	TYPE	DESCRIPTION
206	Numerical	Error Code: <input type="checkbox"/> Bit 7: motor block <input type="checkbox"/> Bit 6: short circuit <input type="checkbox"/> Bit 5: undervoltage <input type="checkbox"/> Bit 4: spare <input type="checkbox"/> Bit 3: power fail <input type="checkbox"/> Bit 2: controller overt <input type="checkbox"/> Bit 1: pump overt <input type="checkbox"/> Bit 0: spare
211	Numerical	Controller Temperature [°C]
216	Numerical	Environment Temperature [°C]
300	Numerical	Cycle Time [min]
301	Numerical	Cycle Number
302	Numerical	Pump Life [h]
319	Alphanumeric	Controller Model
323	Alphanumeric	Controller Serial Number
325	Alphanumeric	Electrical Modification Level
500	Logical	Monitor Mode (write only)
503	Numerical	RS485 Serial Address Setting [0-31]
504	Logical	Serial Type Select (0=RS323; 1=RS485)

Table 6 Status LEDs

LED STATUS	CONTROLLER STATUS
Off	Stop
Green flashing	Ramp or Autotuning
Green	Normal Operation
Red	Fail
Orange + Off	Reset + selftest

NOTE



When the controller is switched on, an electronic self-test occurs, during which an orange LED illuminates for one second and the turns off for two seconds. During this time, the pump will not start.

This self-test time is not required if the pump is already powered, as when remotely or serially operated.

Using T-Plus Software To Change The Target Frequency

1. Install T-Plus software on your PC by running setup.exe.
2. Using a 9-pin serial cable, connect your PC to the J2 serial port on the inverter (Figure 4).
3. Start the pump using the On/Off switch. The provided Interlock Connector must be installed in P1.
4. Start the T-Plus software and Figure 4 appears.

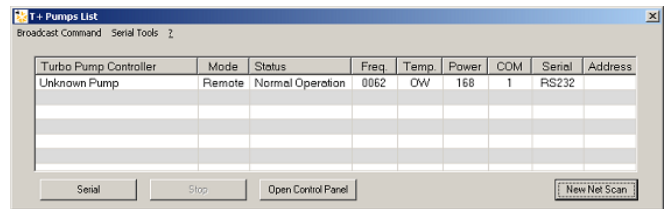


Figure 4 T+ Pumps List

5. Click **Open Control Panel** and Figure 5 appears.
6. Open the *Speed Settings* directory, and click **Target Frequency**.

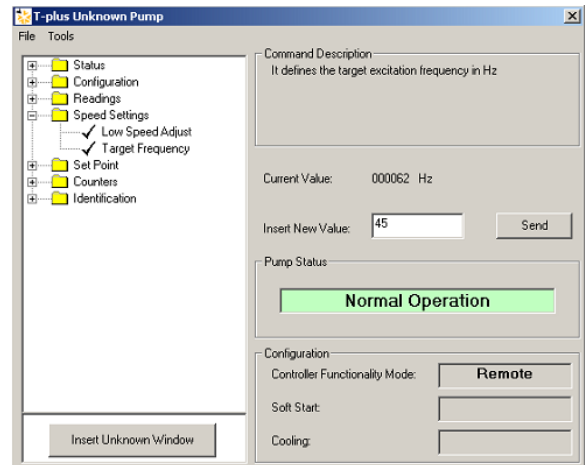


Figure 5 T-Unknown Pump

7. Enter the desired operating frequency into *Insert New Value*. This must be an integer between 35 and 65.
8. Click **Send**. The pump immediately tries to change to the new target frequency. If the pump requires more than 750 Watts to attain the target frequency, the

pump is power limited and will run at a lower frequency (auto-tuning mode). This condition continues until the power required drops below 750 Watts.

The target frequency is stored in the inverter even when power to the pump is removed.

Connect the Serial and I/O Ports to an External Cable

Figure 6 shows the correct procedure to connect a cable to the I/O or to the serial port.

Use a shielded cable of 30 m (98.5') maximum length for both serial and I/O port connections.

NOTE



Ensure a good contact between the metallic case and the external shield of the wire. This operation must be done at least on the controller side.

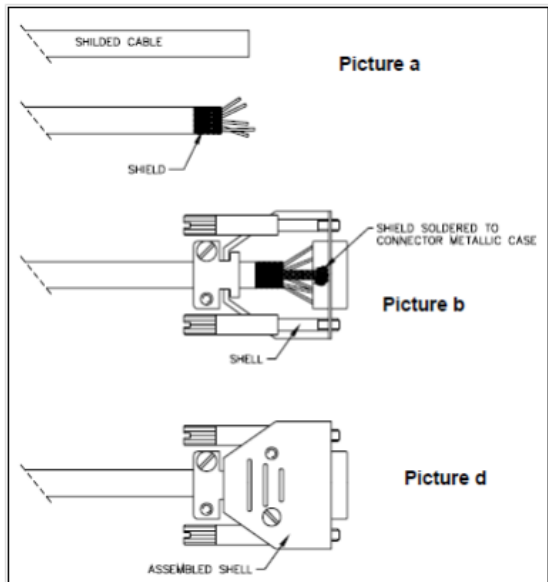


Figure 6 Serial and I/O Ports to External Cable

In this way, you will be sure to reduce the influence of the external noise and to accomplish the EMC requests. In picture d is showed the cable assembled.

Purge Kit

A purge kit (Agilent part number PTSPURGEKIT) is available to properly purge either the bearing purge or the gas ballast. This kit contains a flowmeter and all necessary valving and tubing.

Exhaust Silencer Kit

In certain applications it is desired to lower the noise level emitted by the pump. For these cases, Agilent offers Exhaust Silencer Kits (P/N EXSLRTRISCRROLL, Manual P/N: 699904380), which breaks up noise pulsation in the discharge line.

The Exhaust Silencer Kits contain two basic components, as well as installation hardware. A cylindrical resonator chamber has been selected to attenuate the frequencies associated with the exhaust gas pulsation noise. The resonator is then plumbed to an exhaust muffler/filter. This muffler provides the majority of the actual noise reduction. It also contains an integral 5-micron paper filter element to capture any tip seal debris. This paper filter is replaceable; the recommended service interval is whenever the pump tip seal or module maintenance is performed.

Replacement polyester filter element rated 99% efficient at the 5-micron particle size, P/N: REPLSLRFILTER,

Vibration Isolation Kit

A set of vibration isolation mounts (P/N PTSVIBISOKIT, Manual P/N: 699904385) are available for Agilent scroll pumps. These are used in place of the standard feet installed on the pump for applications that require minimal vibration transmission from the pump to the installation. They can be used alone, or with inlet flexible bellows to provide pump isolation.

The vibration isolation mounts in the Vibration Isolation Kit have been designed to ensure the lowest vibration level transmitted at the base of the pump.

Vibration level in every direction (axis), transmitted to the surface the pump sits on, is reduced by a significant amount. Typical vibration reduction levels are 75% for the TriScroll 620 INV pump.

The TriScroll Vibration Isolation Kit consists of (4) vibration isolation mounts. They have a M6 metric threaded screw to attach to the TriScroll frame; the screw is provided.

These mounts increase the height of the TriScroll pumps by 0.75" compared to the standard mounting feet.

HEPA Inlet filter

Agilent now offers inlet filters for the scroll pumps, which protect the pump from ingested particles, and keep particles from migrating out of the pump. These HEPA filters provide a rated 99.97% efficiency in trapping particles > 0.3 microns.

NW 40 Inlet Trap with HEPA filter insert: P/N#: SCRINTRPNW40.

Replacement HEPA filter element P/N#: RPLHEPAFILTER1

Cleaning

Exterior: The exterior surfaces of the TriScroll may be cleaned with mild detergents only.

Interior: Internal dry scroll pumps do not contain fluid for the cleansing of accumulated dust and debris. Run the pump periodically at atmosphere for a minute or two to flush it out.

TriScroll 620 INV Series Vacuum Pump

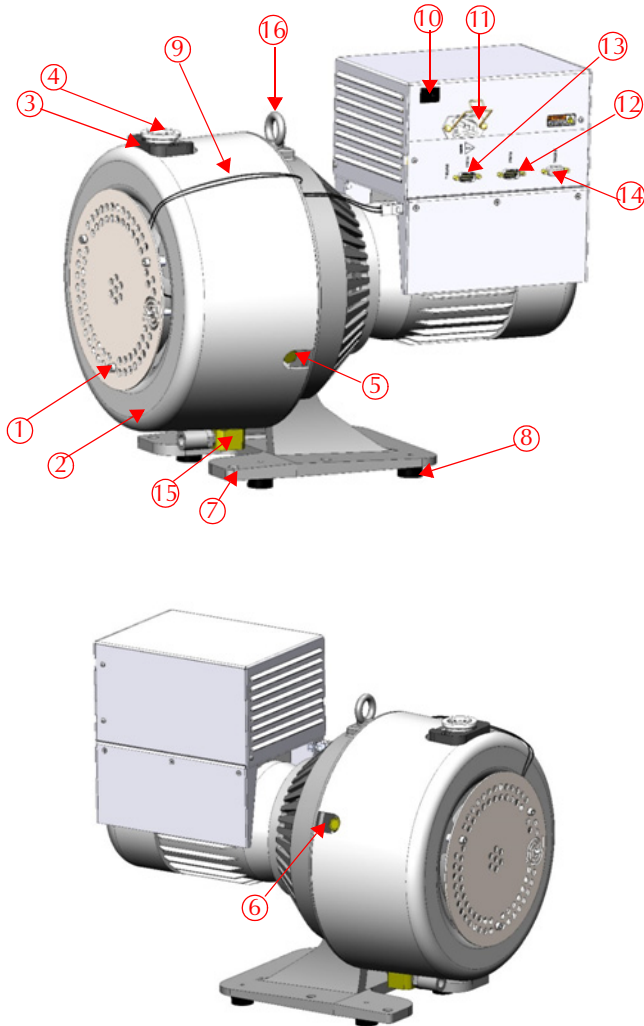


Figure 7 TriScroll 620 INV Vacuum Pump

- ① Cowling Screws; M5 (3)
- ② Cowling
- ③ Inlet (NW40)
- ④ Inlet Screen
- ⑤ Bearing Purge Port (1/4" NPT)
- ⑥ Gas Ballast Port (1/4" NPT)
- ⑦ Mounting Holes; 11 mm diameter thru (4)
- ⑧ Rubber Feet (4)
- ⑨ Thermal Protection Switch Cable
- ⑩ Power Connector (IEC 320)
- ⑪ On/Off Switch
- ⑫ Serial Port J1
- ⑬ Interlock Port P1 I/O-1
- ⑭ Interlock Port P2 I/O-2
- ⑮ Exhaust Adapter
- ⑯ Lifting Ring

Unpacking and Inspection

The shipping container is a double carton.

1. After opening the outer box, remove the foam packing.
2. Slit open the inner box.
3. Lift the pump with the plywood base out of the inner box.
4. Remove the four bolts securing the pump frame to the plywood base.
5. Locate the NW25 exhaust fitting and set it aside.
6. Inspect the pump for damage. If there is shipping damage, contact the freight carrier and your local Agilent sales office immediately.
7. Save the carton and packing materials.

Installation Requirements

Safety

Do not remove or modify any safety or insulating equipment from the pump. To do so may create a serious safety hazard and may void the warranty.

WARNING



- ❑ *This pump is designed to pump and exhaust air and inert gases only; it is not designed to pump explosive, flammable, toxic, or corrosive gases. They can cause bodily injury, explosion, or fire.*
- ❑ *Install in an area that is not exposed to rain, steam, or excessive humidity. They can cause electric shock, short circuits, and severe bodily injury.*
- ❑ *Before inspecting or servicing the pump, be sure the electrical supply is disconnected.*
- ❑ *Consult a qualified electrician whenever wiring the pump.*
- ❑ *An exhaust silencer option is available for those applications in which it is desirable to diminish the sound level produced by the pump.*
- ❑ *To prevent bodily injury, avoid exposing any part of the human body to vacuum.*
- ❑ *The pump is a heavy object. To avoid muscle strain or back injury, use lifting aides and proper lifting techniques when removing or replacing.*

CAUTION



Although the pump can pump trace particulates normally found in the atmosphere, it is not designed for process solids, chemicals, powders, solvents, condensates, or other particulates. They can damage the equipment, degrade its performance, or shorten its useful life.

The pump operates in a clockwise direction when viewed from the motor end. (Note the arrow on the pump frame.) Improper rotation can cause permanent damage to the pump.

During operation, the following environmental conditions should not be exceeded:

Temperature: +5 °C to +40 °C (41 °F to 104 °F)

Relative humidity: 0 to 95% (non-condensing)

CAUTION



Do not block the fan ducts because the pump can become overheated. A pump surface temperature in excess of 55 °C (131 °F) is potentially damaging. If such conditions are observed, turn pump off and allow to cool. Disassemble, inspect for damage, and repair if necessary.

CAUTION



To reduce the risk of electric shock, do not expose to rain; store indoors.

TriScroll 620 INV Series Vacuum Pump

Power Cord

Several power cord options are available from your Agilent dealer.

NOTE



The pump must be connected to the power supply using a high voltage IEC-320 type power cord of at least 15 A capacity.

Grounding Instructions

This product should be grounded. In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current. This pump is equipped with a power cord that has a grounding wire with an appropriate grounding plug. The plug must be inserted into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

WARNING



Check with a qualified electrician or serviceman if the grounding instructions are not completely understood, or if you are in doubt as to whether the product is properly grounded.

Do not modify the plug provided; if it does not fit the outlet, have the proper outlet installed by a qualified electrician.

Connect the product only to an outlet that has the same configuration as the plug.

Do not use an adapter with this product.

Extension Cords

If you must use an extension cord with this product:

- Agilent recommends using only extension cords with a minimum of 16-gauge wire and a maximum length of 25' (7.6 m).
- Use only a 3-wire extension cord that accepts the plug.
- Ensure the extension is in good condition.
- Ensure the extension cord is rated high enough to carry the current the products draws. An undersized cord causes a drop in line voltage, resulting in loss of power and overheating.

Circuit Breakers

Table 7 lists the circuit breaker capacity recommended for the pump. Locate the switch or circuit breaker near the pump.

Table 7 Circuit Breaker Requirements

PTS08001INV	100-240 VAC 50/60 Hz
Breaker capacity	15 Amperes

Mechanical Connections

Pump Location

Locate the pump on a firm, level surface.

Clearance mounting holes provided in the frame can be used to provide permanent attachment. Attach the provided rubber mounts to the threaded holes at the frame base to minimize vibration.

Do not position the equipment so that it is difficult to operate the disconnecting device.

Vacuum Pump Isolation Valve

Scroll pumps return to atmospheric pressure quickly when shut off. Thus, an integrated fast acting, automatic, normally closed isolation valve is standard equipment to prevent pump debris from being transported back into the vacuum chamber when the pump is turned off:

- The opening of this valve must occur ≥ 350 ms after pump startup.
- Valve closing must occur ≤ 250 ms after pump shut off.
The VPI Valve status is controlled by motor operation. The VPI Valve:
 - Opens when the pump is running and
 - Closes when it is stopped due to switch off or overload protection.

This TriScroll 620 INV Inverter Scroll pump includes the necessary communication cable, needed to operate the pump.

Pump Inlet

Use NW40, or larger, clean vacuum hardware with as short a length as practical between the pump inlet and the vacuum chamber.

Use a bellows to provide both vibration isolation and strain relief between the pump and vacuum chamber.

Pump Exhaust

A female 3/8 National Pipe Thread exhaust fitting is located underneath the scroll module. This fitting swivels 360°. Additionally, a NW25 adapter is provided with a 3/8 National Pipe Thread male thread.

Gas Ballast

The pump incorporates an automatic gas ballast to prevent water and other condensates from accumulating within the pump. The standard configuration is a sintered filter installed in the 1/4" National Pipe Thread gas ballast port (item 8 on Figure 7 on page 17). This allows enough atmospheric air to enter the pump in order to purge condensates while not affecting pump ultimate pressure or pumping speed.

For applications where the ingress of atmospheric air is undesirable, dry nitrogen at a flow rate of ≈ 5 lpm can be bled into the gas ballast port. See item 8 on Figure 7 on page 17. Blocking of the gas ballast port is not recommended.

Bearing Purge

A 1/4" National Pipe Thread bearing purge port (item 5 on Figure 7 on page 17) protects the main crankshaft bearings in applications where large amounts of water are being pumped. In the standard configuration, this port is sealed.

To enable the bearing purge, dry nitrogen at a flow rate of ≈ 5 lpm can be bled into the bearing purge port. This gas supply should be maintained at 2 psig or less and must be kept below 5 psig.

See "Purge Kit" on page 21.

Gas Ballast

The gas ballast port (item 9 on Figure 7 on page 17) is sealed on the TriScroll 620 INV.

For applications where a lot of water is being pumped, dry nitrogen at a flow rate of ≈ 5 lpm can be bled into the gas ballast port. See “Purge Kit” below.

Bearing Purge

The bearing purge port (item 6 on Figure 7 on page 17) is sealed on the TriScroll 620 INV and must not be opened or used.

CAUTION



The bearing purge port has been disabled on the TriScroll 620 INV model. Use of this port could cause internal damage to the pump.

Purge Kit

A purge kit (Agilent part number PTSPURGEKIT) to properly purge the gas ballast is available. This kit contains a flow meter and all necessary valving and tubing.

Troubleshooting

Table 8 contains a list of possible problems, their probable causes, and corrective actions.

Table 8 Troubleshooting Chart

Problem	Probable Cause	Corrective Action
Pump won't start	P1 interlock missing	Plug in connector (provided).
	Wrong input voltage	Plug inverter into 200-240 VAC 50/60 Hz.
	Circuit breaker open	Close breaker. Identify cause of overload.
	Motor thermal protector open	Allow motor to cool. Identify cause of overload.
	Main fuse open	Inspect and replace fuse (Type H, 10 A, 250 V (Littlefuse 0216010.HxP or equivalent)).
	Wiring loose or cut	Repair or replace.
	Excessive voltage drop	Check size and length of power supply cable.
	Pump head thermal protector open	Allow pump to cool. Then switch off for 10 seconds. Identify cause of overload
	Pump head thermal protector disconnected	Connect thermal protector then switch off for 10 seconds to restart
	Defective motor	Inspect. Contact Agilent.
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 Agilent.
	Solvent in pump	Flush pump with air or dry nitrogen. Install trap or filter.
	Seals worn out	Replace tip seals. (Table 9 and Table 10 on page 24 list maintenance kits and service options.)
	Poor conductance to pump	Replumb with shorter and/or larger diameter tubing.

TriScroll 620 INV Series Vacuum Pump

Table 8 Troubleshooting Chart (Continued)

Problem	Probable Cause	Corrective Action
Pump makes hammering noise	Pump overheated	Check ambient temperature. Check ventilation to pump.
	Debris in pump	Check inlet screen. Flush pump. Disassemble pump and inspect. (Table 9 and Table 10 on page 24 list maintenance kits and service options.)

Maintenance

General Information

Agilent TriScroll 600 series pumps are designed to provide years of trouble-free service if maintenance procedures and intervals are observed. Bearing grease replenishment and tip seal replacement is recommended when pump base pressure has risen to an unacceptably high level for your application. Bearings, rotary seals and o-rings should also be replaced if the pump exhibits humming or grinding noises from the bearings.

Maintenance should be performed in accordance with procedures, tooling and materials specified in the manuals listed below.

Related TriScroll Manuals

Other manuals related to tip seal replacement, pump module replacement, and major maintenance of the TriScroll 600 series pumps are listed in Table 9.

Table 9 Other Related Manuals

Title	Applicable TriScroll Model	Part Number
Tip Seal Replacement Manual	All TriScroll 600 Series models	699904310
Pump Module Replacement Manual	All TriScroll 600 Series models	699904305
Major Maintenance Manual	All TriScroll 600 Series models	699904300

Maintenance and Tooling Kits

Material and tooling required to perform maintenance on TriScroll pumps is provided in kit form. A description of each kit and ordering information is provided in Table 10.

Table 10 Maintenance and Tooling Kits

Description	Contents	Applicable TriScroll Model	Part Number
Major Maintenance Kit	All bearings, bearing seals, bearing lubricant, O-rings, and tip seals required to rebuild TriScroll 600 series pumps.	All TriScroll 600 Series models	PTSS0600MK
Maintenance Tool Kit	All fixtures and tools required to perform any maintenance on TriScroll 600 Series pumps.	All TriScroll 600 Series models	PTSS0600TK
Replacement Tip Seal Set	Replacement tip seals and static O-rings for TriScroll 600 Series pumps. <i>NOTE: The Maintenance Tool Kit is also required for tip seal replacement.</i>	All TriScroll 600 Series models	PTSS0600TS

TriScroll 620 INV Series Vacuum Pump

Accessories

The accessories listed in Table 11 are available for use with the TriScroll 600 series pump. Contact your local Agilent office to place an order. A list of offices is included on the rear cover of this manual.

Table 11 Accessories

Purge Kit	PTSPURGEKIT
Exhaust Extension	S4807001
Exhaust Filter Kit	PTS600EXFIL

Contacting Agilent

In the United States, you can contact Agilent Customer Service at 1-800-882-7426. See the back cover of this manual for a listing of our sales and service offices.

Visit our web site at: <http://www.chem.agilent.com/en-US/Products/Instruments/vacuum/pages/default.aspx>.

TriScroll 620 INV Series Vacuum Pump

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**Vacuum Products Division
Instructions for returning products**

Dear Customer:

Please follow these instructions whenever one of our products needs to be returned.

- 1) Complete the attached Request for Return form and send it to Agilent Technologies (see below), taking particular care to identify all products that have pumped or been exposed to any toxic or hazardous materials.
- 2) After evaluating the information, Agilent Technologies will provide you with a Return Authorization (RA) number via email or fax, as requested.
Note: Depending on the type of return, a Purchase Order may be required at the time the Request for Return is submitted. We will quote any necessary services (evaluation, repair, special cleaning, eg).
- 3) **Important steps for the shipment of returning product:**
 - Remove all accessories from the core product (e.g. inlet screens, vent valves).
 - Prior to shipment, drain any oils or other liquids, purge or flush all gasses, and wipe off any excess residue.
 - If ordering an Advance Exchange product, **please use the packaging from the Advance Exchange to return the defective product.**
 - Seal the product in a plastic bag, and package product carefully to avoid damage in transit. You are responsible for loss or damage in transit.
 - Agilent Technologies is not responsible for returning customer provided packaging or containers.
 - **Clearly label package with RA number.** Using the shipping label provided will ensure the proper address and RA number are on the package. Packages shipped to Agilent without a RA clearly written on the outside cannot be accepted and will be returned.
- 4) Return only products for which the RA was issued.
- 5) **Product being returned under a RA must be received within 15 business days.**
- 6) **Ship to the location specified on the printable label, which will be sent, along with the RA number, as soon as we have received all of the required information.** Customer is responsible for freight charges on returning product.
- 7) Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.

RETURN THE COMPLETED **REQUEST FOR RETURN** FORM TO YOUR NEAREST LOCATION:

EUROPE:
Fax: 00 39 011 9979 330
Fax Free: 00 800 345 345 00
Toll Free: 00 800 234 234 00
vpt-customer@agilent.com

NORTH AMERICA:
Fax: 1 781 860 9252
Toll Free: 800 882 7426, Option 3
vpl-ra@agilent.com

PACIFIC RIM:
please visit our website for individual office information
<http://www.agilent.com>



Please read important policy information on Page 3 that applies to all returns.

1) CUSTOMER INFORMATION

Form with fields: Company Name, Contact Name, Tel, Email, Fax, Customer Ship To, Customer Bill To, Europe only: VAT reg. Number, USA/Canada only: Taxable, Non-taxable

2) PRODUCT IDENTIFICATION

Table with 4 columns: Product Description, Agilent P/N, Agilent S/N, Original Purchasing Reference

3) TYPE OF RETURN (Choose one from each row and supply Purchase Order if requesting a billable service)

- 3A. [] Non-Billable [] Billable [] New PO # (hard copy must be submitted with this form):
3B. [] Exchange [] Repair [] Upgrade [] Consignment/Demo [] Calibration [] Evaluation [] Return for Credit

4) HEALTH and SAFETY CERTIFICATION

AGILENT TECHNOLOGIES CANNOT ACCEPT ANY PRODUCTS CONTAMINATED WITH BIOLOGICAL OR EXPLOSIVE HAZARDS, RADIOACTIVE MATERIAL, OR MERCURY AT ITS FACILITY.

Call Agilent Technologies to discuss alternatives if this requirement presents a problem.

The equipment listed above (check one):

- [] HAS NOT pumped or been exposed to any toxic or hazardous materials. OR
[] HAS pumped or been exposed to the following toxic or hazardous materials. If this box is checked, the following information must also be filled out. Check boxes for all materials to which product(s) pumped or was exposed:

- [] Toxic [] Corrosive [] Reactive [] Flammable [] Explosive [] Biological [] Radioactive

List all toxic/hazardous materials. Include product name, chemical name, and chemical symbol or formula:

NOTE: If a product is received at Agilent which is contaminated with a toxic or hazardous material that was not disclosed, the customer will be held responsible for all costs incurred to ensure the safe handling of the product, and is liable for any harm or injury to Agilent employees as well as to any third party occurring as a result of exposure to toxic or hazardous materials present in the product.

Print Name: Authorized Signature: Date:

5) FAILURE INFORMATION:

Form with fields: Failure Mode (REQUIRED FIELD. See next page for suggestions of failure terms); Detailed Description of Malfunction: (Please provide the error message); Application (system and model):

I understand and agree to the terms of Section 6, Page 3/3.

Print Name: Authorized Signature: Date:



**Vacuum Products Division
Request for Return Form
(Health and Safety Certification)**

Please use these Failure Mode to describe the concern about the product on Page 2.

TURBO PUMPS and TURBO CONTROLLERS

APPARENT DEFECT/MALFUNCTION	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: OPERATING TIME:

ION PUMPS/CONTROLLERS

- Bad feedthrough	- Poor vacuum
- Vacuum leak	- High voltage problem
- Error code on display	- Other

VALVES/COMPONENTS

- Main seal leak	- Bellows leak
- Solenoid failure	- Damaged flange
- Damaged sealing area	-Other

LEAK DETECTORS

- Cannot calibrate	-No zero/high background
- Vacuum system unstable	- Cannot reach test mode
- Failed to start	- Other

INSTRUMENTS

- Gauge tube not working	- Display problem
- Communication failure	- Degas not working
- Error code on display	- Other

SCROLL AND ROTARY VANE PUMPS

- Pump doesn't start	- Noisy pump (describe)
- Doesn't reach vacuum	- Over temperature
- Pump seized	- Other

DIFFUSION PUMPS

- Heater failure	- Electrical problem
- Doesn't reach vacuum	- Cooling coil damage
- Vacuum leak	- Other

Section 6) **ADDITIONAL TERMS**

Please read the terms and conditions below as they apply to all returns and are in addition to the Agilent Technologies Vacuum Product Division – Products and Services Terms of Sale.

- Customer is responsible for the freight charges for the returning product. Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.
- Customers receiving an Advance Exchange product agree to return the defective, rebuildable part to Agilent Technologies **within 15 business days**. Failure to do so, or returning a non-rebuildable part (crashed), will result in an invoice for the non-returned/non-rebuildable part.
- Returns for credit toward the purchase of new or refurbished Products are subject to prior Agilent approval and may incur a restocking fee. Please reference the original purchase order number.
- Units returned for evaluation will be evaluated, and a quote for repair will be issued. If you choose to have the unit repaired, the cost of the evaluation will be deducted from the final repair pricing. A Purchase Order for the final repair price should be issued within 3 weeks of quotation date. Units without a Purchase Order for repair will be returned to the customer, and the evaluation fee will be invoiced.
- A Special Cleaning fee will apply to all exposed products per Section 4 of this document.
- If requesting a calibration service, units must be functionally capable of being calibrated.

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