



**Agilent Technologies**

*Vacuum Products Division*

***TriScroll In-line  
Exhaust Silencer and  
Vibration Isolation***

*INSTRUCTION MANUAL*

Part No. 699904410

Rev. A

May 2008

# ***TriScroll In-line Exhaust Silencer and Vibration Isolation***

# 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, replacement, or refund 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.

When products are used with toxic chemicals, or in an atmosphere that is dangerous to the health of humans, or is environmentally unsafe, it will be the responsibility of the Customer to have the product cleaned by an independent agency skilled and approved in handling and cleaning contaminated materials before the product will be accepted by Agilent, Inc. for repair and/or replacement.

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. 3/1/00

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# Preface

## Documentation Conventions

This manual uses the following documentation conventions:

**WARNING**



*Warnings indicate a particular procedure or practice, which if not followed correctly, could lead to serious injury.*

**CAUTION**



*Cautions indicate a particular procedure or practice, which if not followed, could cause damage to the equipment.*

**NOTE**



*Notes contain important information.*

Before operating or servicing equipment, read and thoroughly understand all operation/maintenance manuals provided by Agilent. 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 Agilent office.

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# TriScroll Vibration Isolation Kit

This document details the installation of Vibration Isolation Kits and optional Exhaust Silencer and Exhaust Muffler Kits for use with TriScroll pumps.

The Vibration Isolation Kit reduces vibration transmitted to the structure on which the rough pump is mounted. This kit, P/N PTSVIBISOKIT, consists of four (4) vibration isolation mounts that replace the standard feet supplied with the pump.

## Installation Specific Issues

The *Exhaust Silencer Kit - Dry Pump Conversions*, P/N PTSREXSLRAB1, uses a cylindrical resonator chamber selected to attenuate the frequencies associated with the exhaust gas pulsation noise. The resonator is then plumbed to the exhaust line. The associated hardware for this connection is included in the kit. This kit generally provides all the noise reduction needed. The cylindrical resonator is installed in the flexible exhaust line included in the standard dry pump conversion kit.

The *Exhaust Silencer Kit - Dry Pump Options*, P/N PTSREXSLRAB2, also uses the cylindrical resonator but provides additional hardware allowing it to be mounted to instruments originally fitted with dry pumps.

The *Exhaust Muffler Kit*, P/N PTSREXMUFLAB1, is intended for use in installations where the exhaust line is routed to the inlet of a duct or fume hood. In these installations, a further reduction in exhaust pulsation is often required. This kit includes a filter/muffler, which is installed downstream of the resonator, and then plumbed to the exhaust line. Use the Muffler Kit in conjunction with the Silencer Kit for the maximum possible noise reduction. For maximum noise reduction it is important to make sure the exhaust line supplied with the instrument is replaced with the grey tube supplied with the dry pump conversion kit.

### CAUTION



*The muffler is intended for noise reduction only, not gas containment (not warranted vacuum tight). If hazardous materials are to pass through the exhaust, route it directly to a house exhaust collection system.*

When two rough pumps are used and their exhausts are teed together, install the Silencer Kit(s) and (if used) the Muffler Kit(s) upstream of the tee that joins the two pump exhaust lines. Replace the exhaust line downstream of the tee with the grey hose as above.

### TriScroll Vibration Isolation Kit

Table 1-1 list the kits parts.

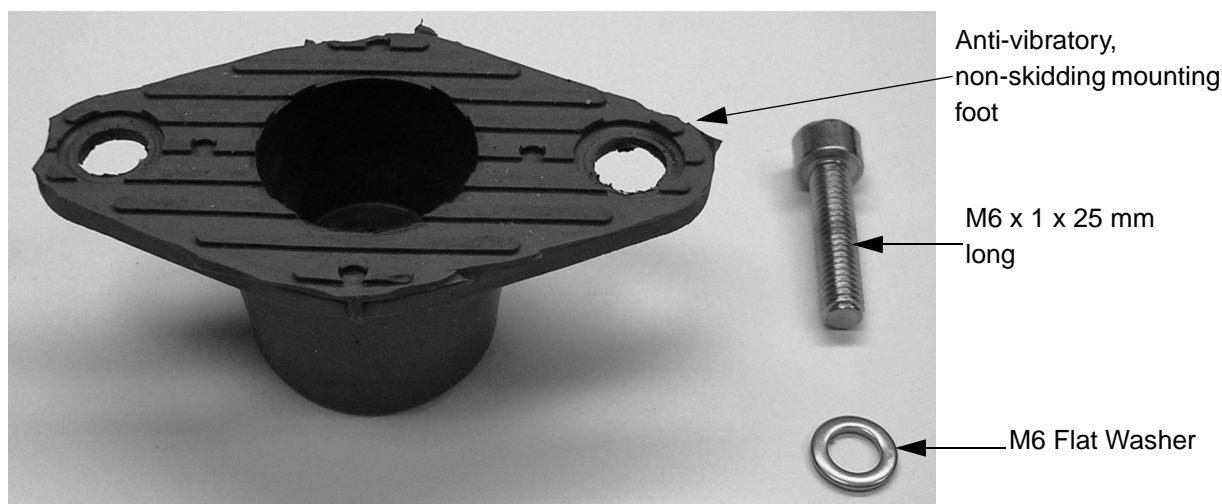
**Table 1-1 TriScroll Vibration Isolation Kit, P/N: PTSVIBISOKIT**

Part Name	Qty. Used
Anti-vibratory, non-skidding mount	4
Screw, M6 x 1.0 x 25 mm long, SHC, SS	4
Washer M6 Flat, S/S	4

### Installation

*To install the unit:*

1. Unscrew the M6 screws that secure the standard feet. If the standard feet are not present, go to step 2.
2. Position the flat washer under the screw's head and place the M6 screw through the mount hole (Figure 1-1).



**Figure 1-1 Vibration Isolation Kit Components**

3. Position the mount with the round surface against the pump's base and using a 5 mm wrench, screw in the M6 screw into the threaded hole in the base.
4. Carefully position the pump inside instrument cabinet.
5. If two pumps are used, and the inlet tubing between the pumps is a bellows, replace the bellows with the clear reinforced vacuum tubing included in the standard installation kit (1.5" or 1.25" ID depending on the installation). This prevents the pumps from shifting excessively due to compression of the bellows during system evacuation.



## TriScroll In-line Exhaust Silencer and Vibration Isolation

### NOTE



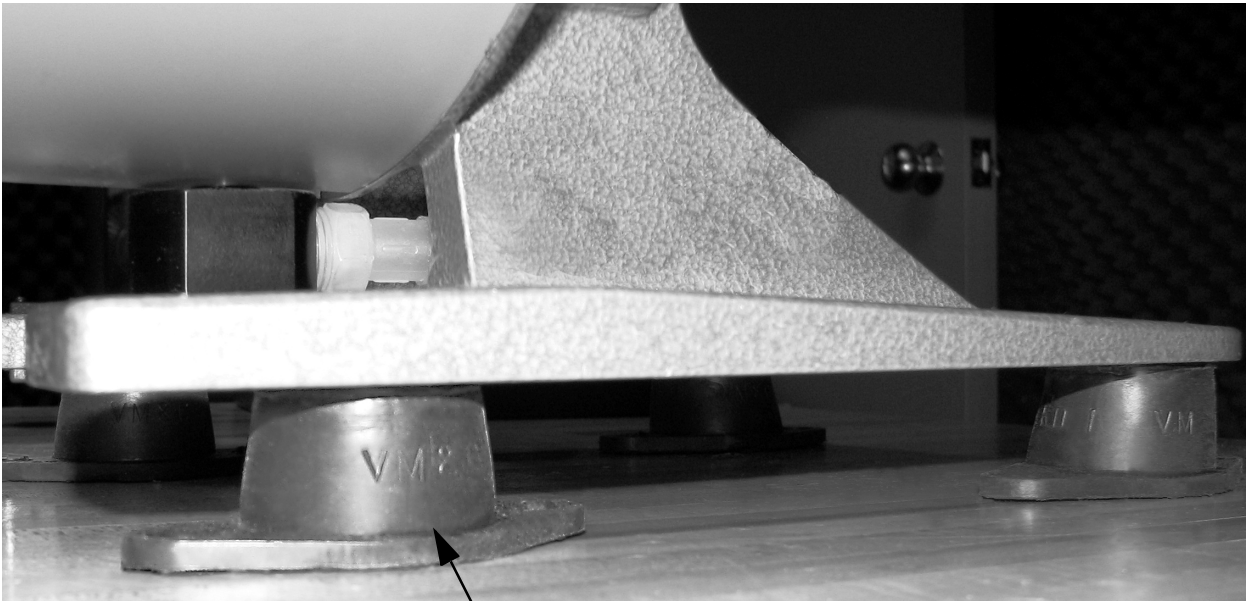
Ensure that:

- ❑ The pump is vertical during operation and that the mounts are not subjected to side loading once the pump is installed.
- ❑ No component of the installation is stretched or compressed so as to prevent free movement of the pump on the mounts.

### NOTE



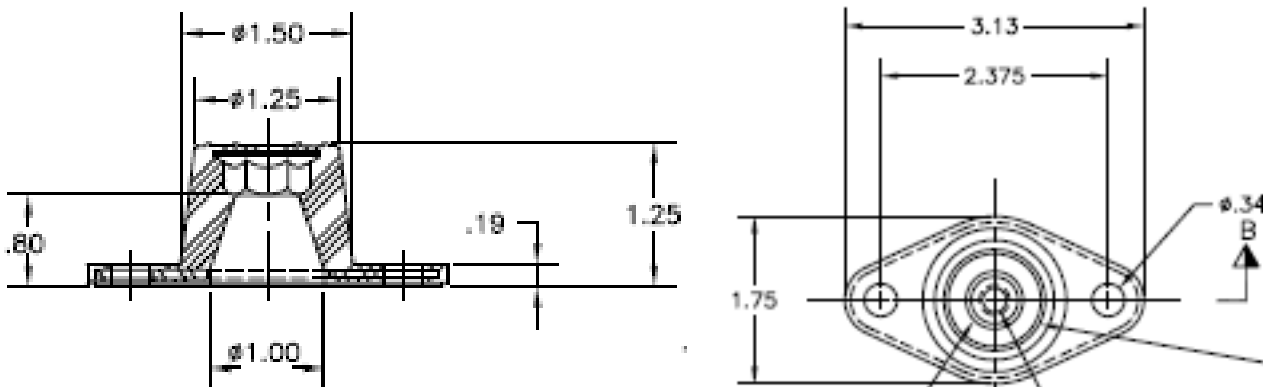
- ❑ Although the rubber-covered mount is non-skidding (Figure 1-2), if the application requires additional security, use the two holes in the mount's flange, using additional screws - not included with this kit.
- ❑ Anti-vibratory mounts increase pump height by  $\frac{3}{4}$ " (19 mm).



Anti-vibratory  
mounting foot

**Figure 1-2 Vibration Isolation Kit Installed**

Figure 1-3 shows the foot dimensions.



**Figure 1-3 Dimensions of Anti-vibratory, Non-skidding Mount**

## TriScroll In-line Exhaust Silencer and Vibration Isolation

### Performance

Vibration level in every direction (axis), transmitted to the surface the pump sits on, is significantly reduced. Typical vibration reduction levels are 75% for the TriScroll 600 pump.

### TriScroll Exhaust Silencer Kit

Table 1-2 list the kits parts.

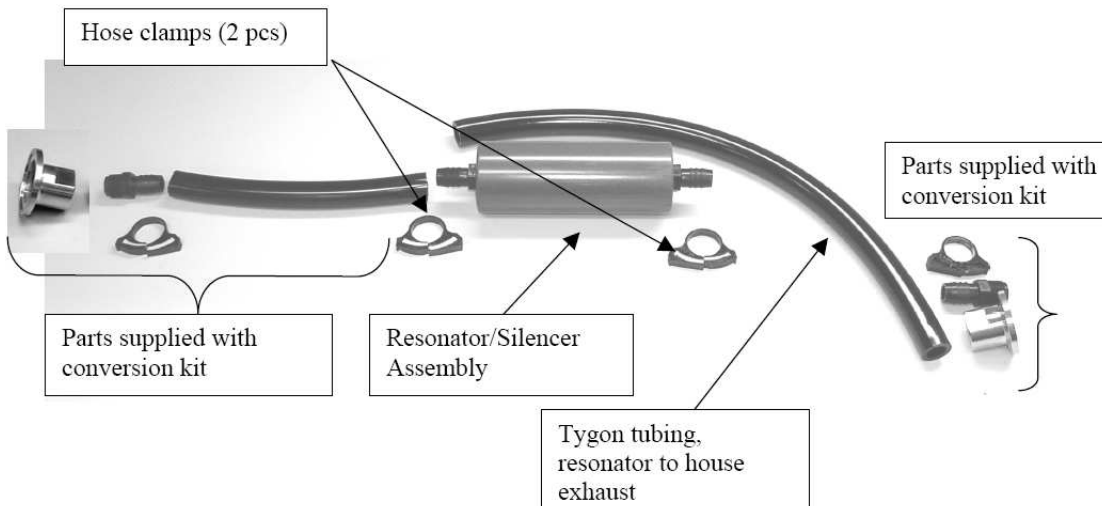
**Table 1-2 Exhaust Silencer Kit for Triscroll Pump Conversions: P/N PTSREXSLRAB1**

Part Name	Qty. Used
Tygon hose black .75" OD x .125" w x 36" long	1
Exhaust Silencer/Resonator Assembly	1
Hose Clamp	2
Mount, Adhesive Backed	4
Tie Wrap	4

### Installation

*To install the unit:*

1. If 1/2" Tygon tubing from pump exhaust is installed from a previous conversion, loosen it at the end away from the pump.
2. Insert the resonator into the exhaust line (Figure 1-4) and attach the included additional 1/2" Tygon tubing to the other end of the resonator. The resonator may be installed in either direction.



**Figure 1-4 Exhaust Silencer Kit: Exploded View - For Systems Converted to Triscroll Pumps**

## TriScroll In-line Exhaust Silencer and Vibration Isolation

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3. Cut the 36" supplied 1/2" Tygon tubing to a length convenient for the installation.
4. Reinstall the 1/2" hose barb x 3/8" NPT fitting and the 3/8" NPT x NW25 flange (Figure 1-4).
5. Secure all connections with hose clamps.
6. Reconnect the NW25 flange on the 1/2" Tygon tubing to the NW25 flange on the grey tubing supplied with the conversion kit.
7. Secure the resonator with the supplied mounts and cable ties, if desired.

## TriScroll Exhaust Silencer Kit

Table 1-3 list the kits parts.

**Table 1-3 Exhaust Silencer Kit for Triscroll Original Installations: P/N PTSREXSLRAB2**

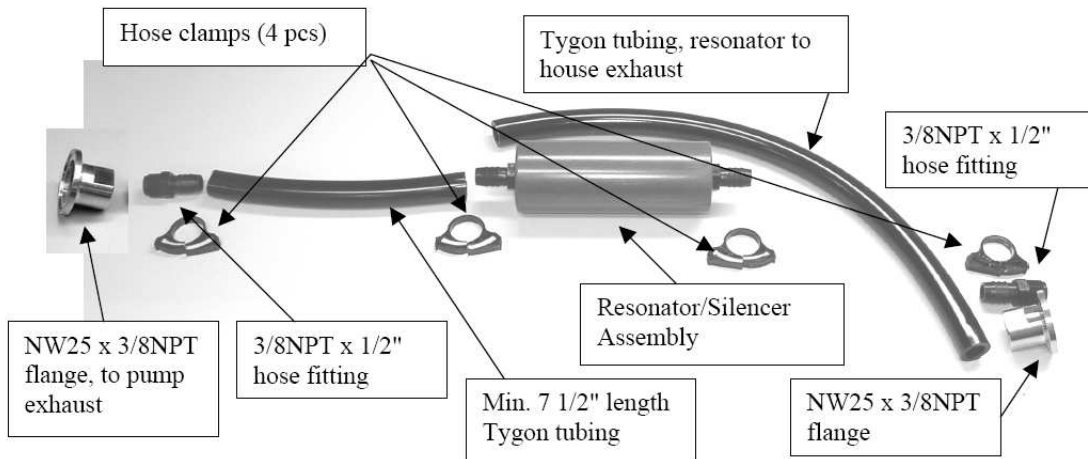
Part Name	Qty. Used
Tygon hose black .75" OD x .125" w x 36" long	1
Exhaust Silencer/Resonator Assembly	1
Hose Clamp	4
Mount, Adhesive Backed	4
Tie Wrap	4
NW25 Clamp	2
NW25 Centering Ring	2
Flange, NW25 x 3/8" NPTF	2
Fitting, 3/8" NPTM x 1/2" hose	2

## TriScroll In-line Exhaust Silencer and Vibration Isolation

### Installation

To install the unit:

1. Disconnect the house exhaust from the pump exhaust at the NW25 flange.
2. Cut one length of 1/2" Tygon tubing to at least 7 1/2" to go between the pump exhaust and the resonator (Figure 1-5). Cut the remaining length of tubing to any length convenient for the installation.



**Figure 1-5 Exhaust Silencer Kit: Exploded View - Systems Originally with Triscroll Pumps**

3. Install the NW25 flange that leads to the resonator to the pump exhaust; connect the other end of the assembly to the house exhaust NW25 flange.
4. Secure the resonator with the supplied mounts and cable ties, if desired.

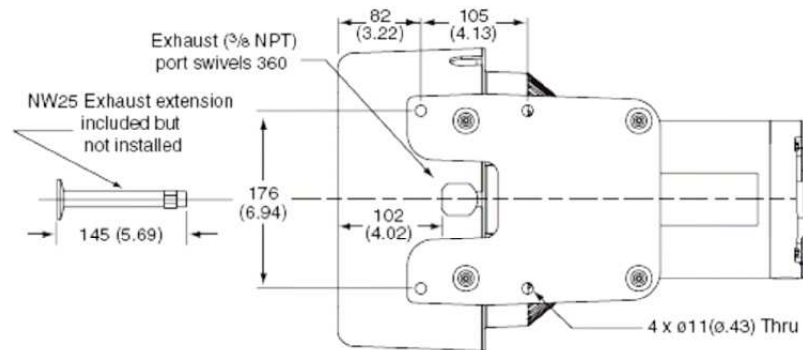
Figure 1-6 shows the Silencer Kit installed.



**Figure 1-6 Triscroll Pump with Silencer Kit Installed Toward Rear of Pump**

## TriScroll In-line Exhaust Silencer and Vibration Isolation

Figure 1-7 gives pump interface dimensions.



**Figure 1-7 Pump Interface with NW25 Exhaust Extension**



*The TriScroll 300 has an 1/4" NPT on the exhaust fitting, and an NW16 on the extension.*

## TriScroll Exhaust Muffler Kit

This procedure consists of:

- "1. Installation - Clamp Installation to House Exhaust"
- "2. Installation - Tubing from Exhaust Muffler to House Exhaust" on page 1-9

Table 1-4 list the kits parts.

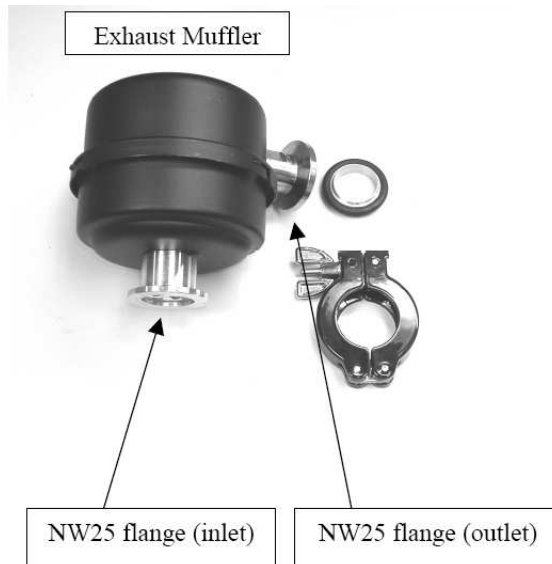
**Table 1-4 Exhaust Muffler Kit for Triscroll Pumps:  
P/N PTSREXMUFLAB1**

Part Name	Qty. Used
Barb Fitting 3/8" NPT x 1/2" hose	2
KF25 clamp	2
KF25 center ring	2
NW25 to 3/8" NPT adaptor	2
Exhaust Muffler	1
Hose Clamp	2
Mount, Adhesive Backed	4
Tie Wrap	4

### 1. Installation - Clamp Installation to House Exhaust

*To install the unit:*

1. Clamp the inlet of the muffler (NW25) to the NW25 flange on the outlet of the 1/2" Tygon tubing downstream from resonator. The inlet of the muffler has three small holes in the flange (Figure 1-8).



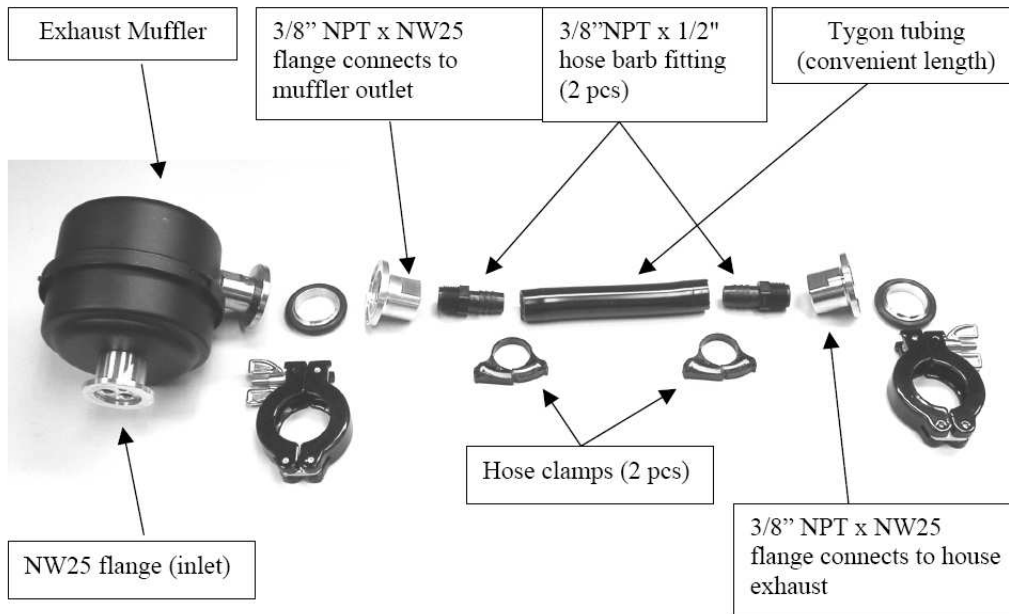
**Figure 1-8 Exhaust Muffler Kit: Exploded View**

2. Clamp the outlet of the muffler (NW25) to the NW25 flange on the exhaust tubing leading to the house exhaust (replace tubing using tubing provided in standard installation kit); or to the exhaust line tee for installations where two pumps discharge into one exhaust tube.
3. If two pumps discharge into one house exhaust tube, fit each pump with one muffler, and join the lines downstream of the mufflers. This prevents restriction in the exhaust lines during pumpdown of the system.
4. Secure the muffler using adhesive mounts and cable ties.

## 2. Installation - Tubing from Exhaust Muffler to House Exhaust

To install the unit:

1. Clamp the inlet of the muffler (NW25) to the NW25 flange on the outlet of 1/2" Tygon tubing downstream from resonator. The inlet of the muffler has three small holes in the flange (Figure 1-9).



**Figure 1-9 Exhaust Muffler Kit: Exploded View - Tubing Between Muffler and House Exhaust**

2. Clamp the outlet of the muffler (NW25) to the NW25 x 3/8" NPT fitting. Screw the 1/2" hose barb x 3/8" NPT fitting into the NW25 x 3/8" NPT fitting. Attach the remaining length of Tygon tubing and secure with a hose clamp.
3. Screw the second 1/2" hose barb x 3/8" NPT fitting into the second NW25 x 3/8" NPT fitting. Insert this into Tygon tubing and secure with a hose clamp.
4. Proceed as in steps (2) ~ (4) in "1. Installation - Clamp Installation to House Exhaust" on page 1-8.

**CAUTION**



*The muffler is designed for noise reduction only (not warranted gas tight). If hazardous gas containment is required, do not use this part.*

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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](mailto:vpt-customer@agilent.com)

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

<b>Company Name:</b>		<b>Contact Name:</b>	
<b>Tel:</b>	<b>Email:</b>	<b>Fax:</b>	
<b>Customer Ship To:</b>		<b>Customer Bill To:</b>	
Europe only: <b>VAT reg. Number:</b>		USA/Canada only: <input type="checkbox"/> <b>Taxable</b> <input type="checkbox"/> <b>Non-taxable</b>	

**2) PRODUCT IDENTIFICATION**

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:**

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):

<b>I understand and agree to the terms of Section 6, Page 3/3.</b>		
<b>Print Name:</b>	<b>Authorized Signature:</b> .....	<b>Date:</b>



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

**VALVES/COMPONENTS**

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

**LEAK DETECTORS**

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

**INSTRUMENTS**

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

**SCROLL AND ROTARY VANE PUMPS**

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

**DIFFUSION PUMPS**

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