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Agilent Technologies

Diffusion Pumps for Applied Film Coating Systems

INSTRUCTION MANUAL SUPPLEMENT

R1330-529 HS-16

R1797-301 HS-20

R1333-539 NHS-35

R1333-543 NHS-35

Manual Number 699950040

Revision A

March 2003

Diffusion Pumps for Applied Film Coating Systems

VacuSolv is a trademarks of Varian Vacuum Technologies.

Apiezon is a registered trademark of M&I Materials Ltd.

Alconox is a registered trademark of Alconox, Inc.

Warranty

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

Reasonable care must be used to avoid hazards. Seller expressly disclaims responsibility for loss or damage caused by use of its Products other than in accordance with proper operating procedures.

Except as stated herein, Seller makes no warranty, express or implied (either in fact or by operation of law), statutory or otherwise; and, except as stated herein, Seller shall have no liability under any warranty, express or implied (either in fact or by operation of law), statutory or otherwise. Statements made by any person, including representatives of Seller, which are inconsistent or in conflict with the terms of this warranty shall not be binding upon Seller unless reduced to writing and approved by an officer of Seller.

Warranty Replacement and Adjustment

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

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

3/1/00

Hazard and Safety Information

This manual uses the following standard safety protocols:

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.

Operators and service personnel must be aware of all hazards associated with this equipment. They must know how to recognize hazardous and potentially hazardous conditions, and know how to avoid them. The consequences of unskilled, improper, or careless operation of the equipment can be serious. This product must only be operated and maintained by trained personnel. Every operator or service person must read and thoroughly understand operation/maintenance manuals and any additional information provided by Varian Vacuum Technologies. All warning and cautions should be read carefully and strictly observed. Consult local, state, and national agencies regarding specific requirements and regulations. Address any safety, operation, and/or maintenance questions to your nearest Varian Vacuum Technologies office.

Vacuum Equipment and Cleanliness

Cleanliness is vital when servicing any vacuum equipment.

CAUTION



Do not use silicone oil or silicone grease.

Use powder-free butyl or polycarbonate gloves to prevent skin oils from getting on vacuum surfaces.

Do not clean any aluminum parts with Alconox[®]. Alconox is not compatible with aluminum and will cause damage.

NOTE



Normally, it is unnecessary to use vacuum grease. However, if it must be used, avoid silicone types, and use it sparingly. Apiezon[®] L grease is recommended (Varian Part Number 695400004).

O-ring Care

When removing, checking, or replacing O-rings, keep in mind the following:

NOTE



Varian Vacuum Technologies recommends replacing all O-rings during routine maintenance or during any maintenance procedure requiring that O-rings be removed.

CAUTION



Remove O-rings carefully with your fingers. Do not use metal tools for this task. Follow these guidelines to prevent scratching of any sealing surfaces:

- ☐ *Wipe all O-rings clean with a lint-free cloth before installation to ensure that no foreign matter is present to impair the seal.*
- ☐ *Do not use grease or use other substances on O-rings that will come in contact with the spectrometer tube.*
- ☐ *Do not use alcohol, methanol, or other solvents on O-rings. To do so causes deterioration and reduces the O-ring's ability to hold a vacuum.*
- ☐ *In allowable situations, apply a small amount of Apiezon[®] L grease and wipe the O-rings "shiny" dry.*

NOTE



Included in the Varian Vacuum Technologies' Component and Spectrometer Tube Cleaning Kit (p/n 670029096), VacuSolv is recommended for cleaning the spectrometer tube components.

VacuSolv can also be used for fine cleaning of other parts in the leak detector's vacuum system, such as valves and fittings. No rinsing steps or high-temperature drying is required following cleaning with VacuSolv. Although appropriate precautions are advised, VacuSolv is compatible with most materials and does not contain toxic chemicals or CFCs (chlorofluorocarbons).

Contacting Varian Vacuum Technologies

In the United States, you can contact Varian Vacuum Technologies 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.

General

This document supplements the standard instruction manuals for the HS-16, HS-20, and NHS-35 diffusion pumps, which are customized for Applied Films coating systems. Please refer to the standard instruction manuals for general information regarding safety considerations, installation, operation and maintenance. This supplement contains information regarding special spare parts and electrical wiring schematics that are unique to these pumps. The standard instruction manual can be purchased through Varian Vacuum Technologies Inc. if needed. Please use the following part numbers when ordering:

Table 1 Diffusion Pump Instruction Manual Part Number

Diffusion Pump	Instruction Manual Part Number
HS-16 (R1330-529)	699901116
HS-20 (R1797-301)	699901120
NHS-35 (R1333-539 & -543)	699901135

Replacement Parts

Table 2 on page 2 lists the replacement parts that are not covered by the standard instruction manual. Please refer to the standard instruction manual for any part that is not shown on this list, or contact the factory for technical assistance. Figure 1 on page 3 shows the location of the replacement parts on the diffusion pump.

Electrical Wiring

Electrical power is supplied to the pump through a power module mounted on the side panel of the electrical box. The connector manufacturer and part number is:

Wieland Electric Inc.
Housing P/N 70.320.1628.0
Plug Insert P/N 72.210.0653.0

Output from the PT-100 oil temperature measurement device and the thermal switch (mounted above the electrical box) is fed through connectors mounted on the side panel of the electrical box. The thermostat switch leads are also run through a connector. The connector manufacturer and part number is:

Schaltbau GMBH
Receptacle with Flange P/N 1-1401-594-050
6 Pole + PE Pin Insert P/N 1-1401-119-648

Diffusion Pumps for Applied Film Coating Systems

Figure 2 on page 4, Figure 3 on page 5, and Figure 4 on page 6 show the electrical wiring schematics of the various diffusion pumps within the electrical box. For the wiring schematic of the heaters to the terminal strip, please refer to the standard instruction manual or the wiring label on the inside cover of the electrical box. Figure 5 on page 7, Figure 6 on page 7 and Figure 7 on page 7 show the pin assignments for each of the wiring harnesses called out in the wiring schematics.

Table 2 Supplemental Replacement Parts List

1	HS-16	647316033	HEATER (480 VOLTS, 3200 WATTS)	3
	HS-20	647320020	HEATER (415 VOLTS, 2000 WATTS)	6
	NHS-35	647335010	HEATER (480 VOLTS, 4000 WATTS) R1333-539	6
2	HS-16	K4919-001	HEATER CRUSH PLATE	3
	HS-20	K7108-001	HEATER CRUSH PLATE	6
	NHS-35	N/A	N/A	N/A
3	HS-16	K4917-001	HEATER CLAMPING PLATE	3
	HS-20	K7107-001	HEATER CLAMPING PLATE	6
	NHS-35	F1749-001	HEATER CLAMPING PLATE	6
4	HS-16	79309-001	HEATER INSULATOR	1
	HS-20	L6514-001	HEATER INSULATOR	1
	NHS-35	L9699-001	HEATER INSULATOR	1
5	HS-16	K9050-001	UPPER THERMOSTAT	1
	HS-20	K9050-001	UPPER THERMOSTAT	1
	NHS-35	K9050-005	UPPER THERMOSTAT	1
6	HS-16	K9050-002	LOWER THERMOSTAT	1
	HS-20	K9050-002	LOWER THERMOSTAT	1
	NHS-35	K9050-006	LOWER THERMOSTAT	1
7	HS-16	K8475-001	FLUID LEVEL GLASS	1
	HS-20	L9223-001	FLUID LEVEL GLASS	1
	NHS-35	L9223-001	FLUID LEVEL GLASS	1
8	HS-16	77261-001	FLUID DRAIN PLUG	2
	HS-20	77261-001	FLUID DRAIN PLUG	2
	NHS-35	77261-001	FLUID DRAIN PLUG	2
9	HS-16	642906040	PT-100 THERMOCOUPLE	1
	HS-20	642906040	PT-100 THERMOCOUPLE	1
	NHS-35	642906040	PT-100 THERMOCOUPLE	1
10	HS-16	642906030	JUMO SURFACE MOUNT THERMOSTAT	1
	HS-20	642906030	JUMO SURFACE MOUNT THERMOSTAT	1
	NHS-35	642906030	JUMO SURFACE MOUNT THERMOSTAT	1
11	HS-16	N/A	N/A	0
	HS-20	L8691-001	O-RING A-L8691 (PART OF KIT R1828-020)	1
	NHS-35	78536-002	O-RING A-78536 (PART OF KIT R1828-035)	1
12	HS-16	660892213	O-RING PARKER 2-213 (PART OF KIT R1828-016)	2
	HS-20	660892213	O-RING PARKER 2-213 (PART OF KIT R1828-020)	2
	NHS-35	660892213	O-RING PARKER 2-213 (PART OF KIT R1828-035)	2
13	HS-16	K8478-001	GASKET B-K8478 (PART OF KIT R1828-016)	1
	HS-20	L9228-001	GASKET B-L9228 (PART OF KIT R1828-020)	1
	NHS-35	L9228-001	GASKET B-L9228 (PART OF KIT R1828-035)	1
14	HS-16	660892232	O-RING PARKER 2-232 (PART OF KIT R1828-016)	1
	HS-20	660892240	O-RING PARKER 2-240 (PART OF KIT R1828-020)	1
	NHS-35	660892240	O-RING PARKER 2-240 (PART OF KIT R1828-035)	1
15	HS-16	660811494	GASKET 1" X 1/2" X 3/8" (PART OF KIT R1828-016)	1
	HS-20	660811494	GASKET 1" X 1/2" X 3/8" (PART OF KIT R1828-020)	1
	NHS-35	660811494	GASKET 1" X 1/2" X 3/8" (PART OF KIT R1828-035)	1
16	HS-16	N/A	N/A	0
	HS-20	10160V	O-RING VITON NW160	1
	NHS-35	N/A	N/A	0
17	HS-16	624301415	COPPER GAGE ADAPTER GASKET	10
	HS-20	624301415	COPPER GAGE ADAPTER GASKET	8
	NHS-35	624301415	COPPER GAGE ADAPTER GASKET	2

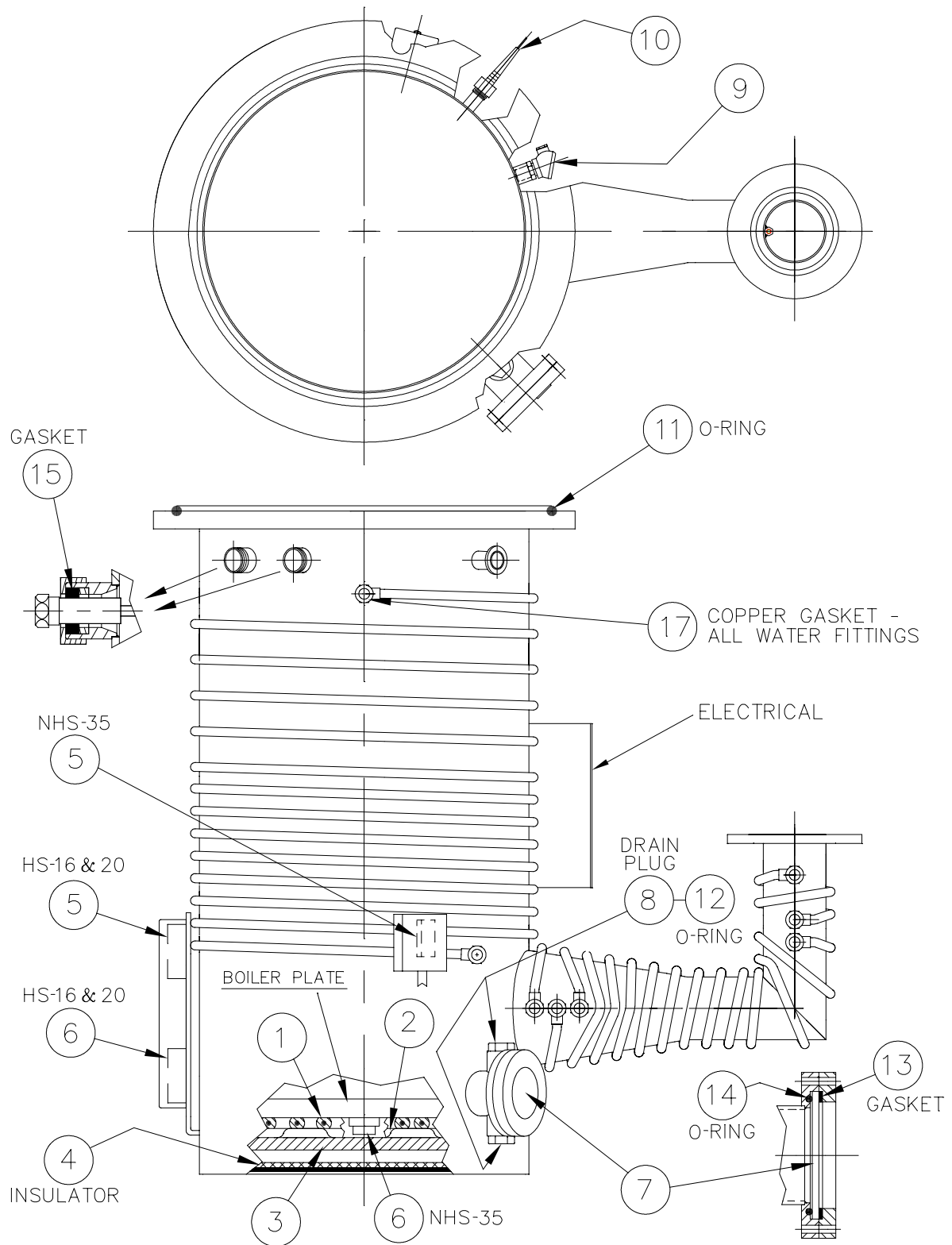


Figure 1 Supplemental Replacement Part Location

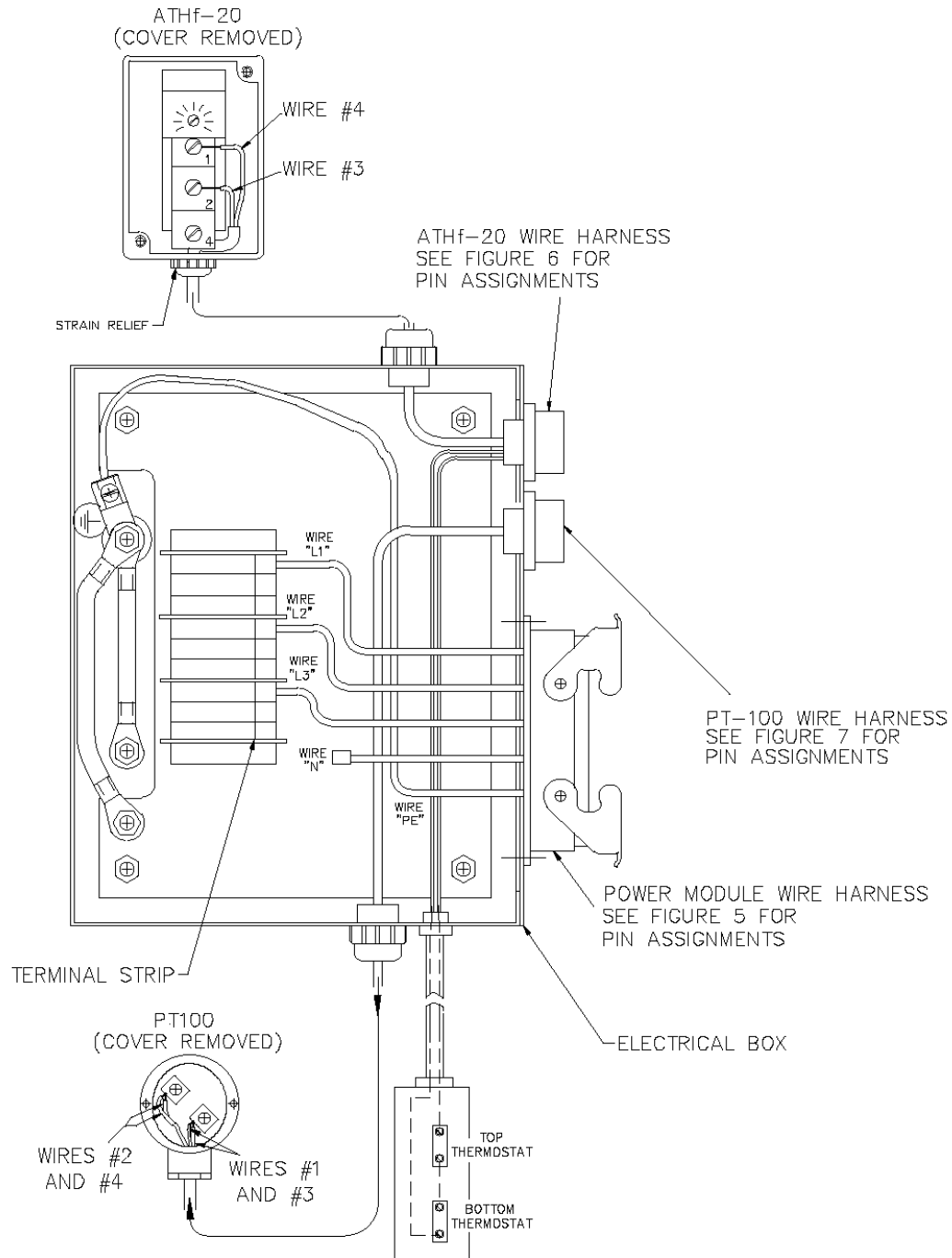


Figure 2 HS-16 Wire Schematic

Diffusion Pumps for Applied Film Coating Systems

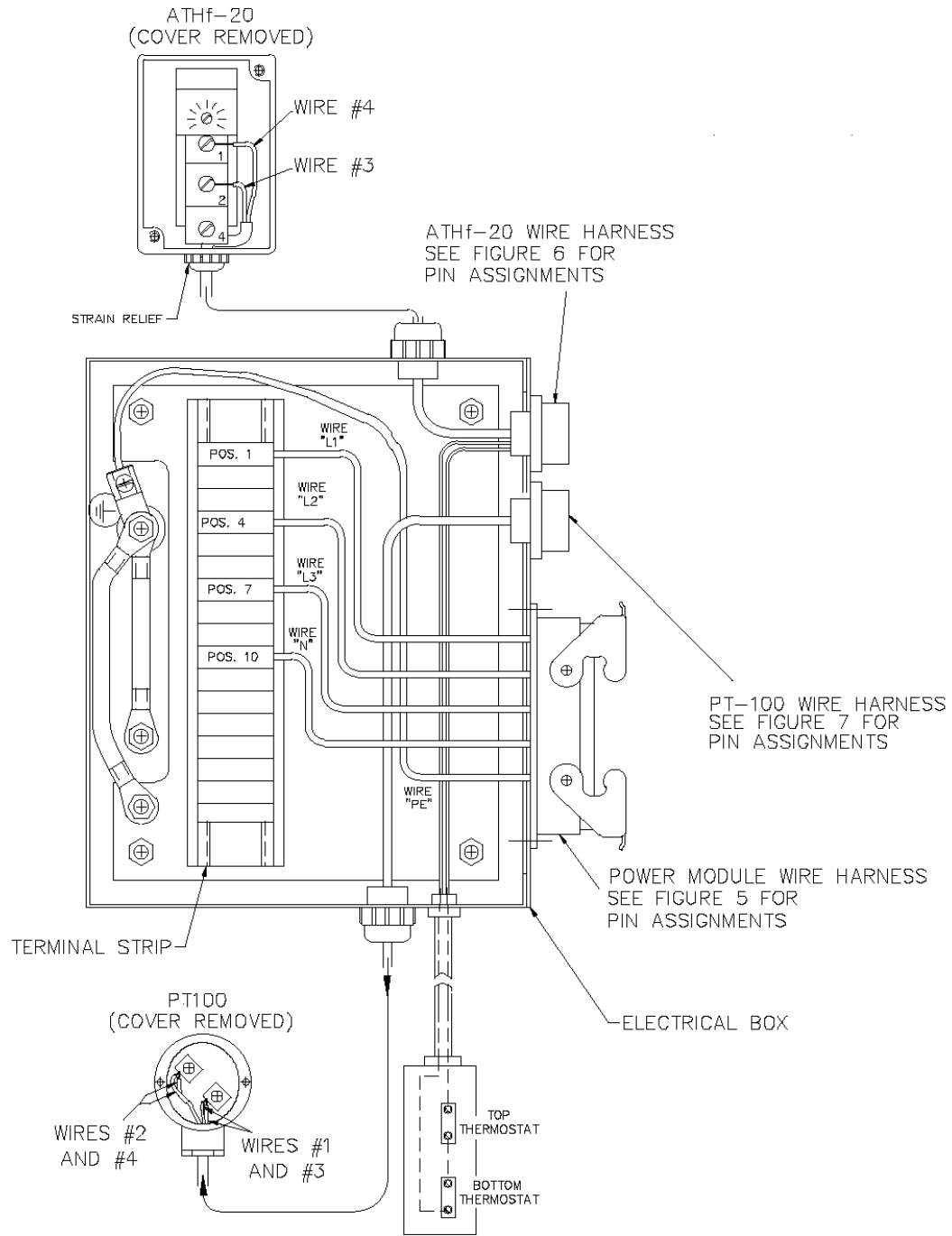


Figure 3 HS-20 Wire Schematic



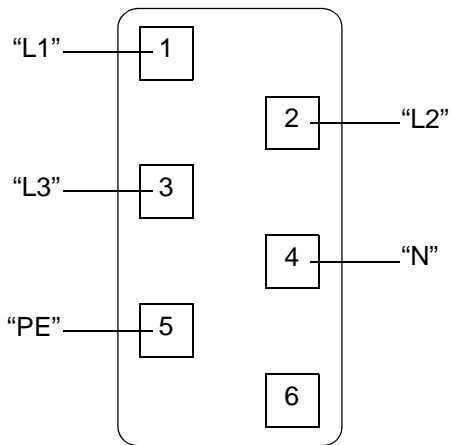


Figure 5 Power Module Pin Assignments

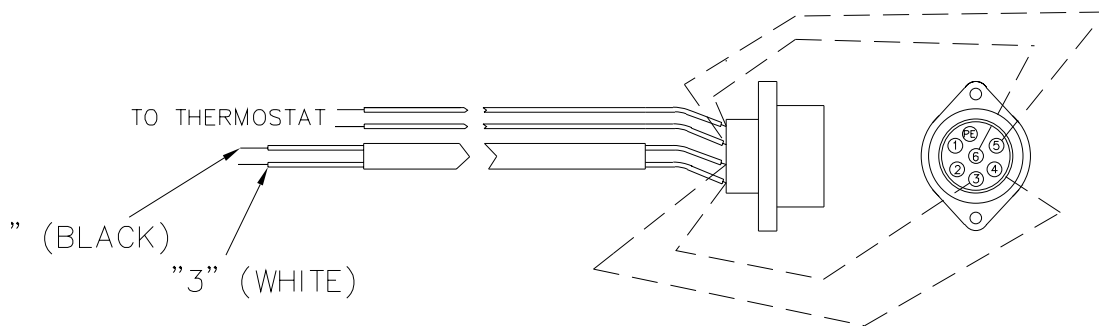


Figure 6 ATHf-20 Switch and Thermostat Wire Harness Pin Assignments

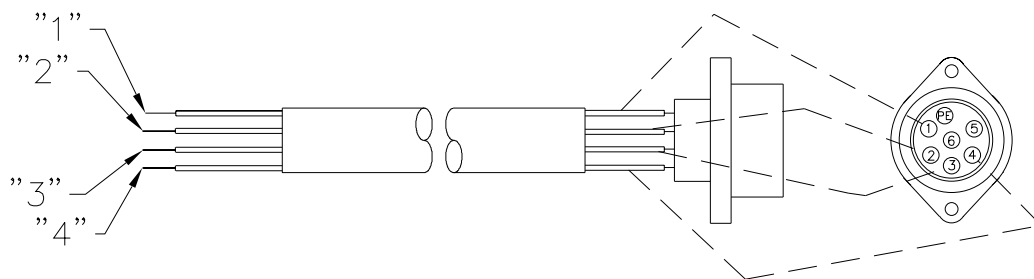


Figure 7 PT-100 Wire Harness Pin Assignments

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Request for Return Health and Safety Certification



1. Return authorization numbers (RA#) **will not** be issued for any product until this Certificate is completed and returned to a Varian 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 Vacuum Technologies
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 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 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.#:	
<u>Europe only:</u> VAT Reg. Number:	<u>USA only:</u> <input type="checkbox"/> Taxable <input type="checkbox"/> Non-taxable
Customer Ship To:	Customer Bill To:
.....
.....

PRODUCT IDENTIFICATION

Product Description	Varian P/N	Varian S/N

TYPE OF RETURN (check appropriate box)

<input type="checkbox"/> Paid Exchange	<input type="checkbox"/> Paid Repair	<input type="checkbox"/> Warranty Exchange	<input type="checkbox"/> Warranty Repair	<input type="checkbox"/> Loaner Return
<input type="checkbox"/> Credit	<input type="checkbox"/> Shipping Error	<input type="checkbox"/> Evaluation Return	<input type="checkbox"/> Calibration	<input type="checkbox"/> Other

HEALTH and SAFETY CERTIFICATION

VARIAN VACUUM TECHNOLOGIES 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 <input type="checkbox"/> Does not start <input type="checkbox"/> Noise <input type="checkbox"/> Does not spin freely <input type="checkbox"/> Vibrations <input type="checkbox"/> Does not reach full speed <input type="checkbox"/> Leak <input type="checkbox"/> Mechanical Contact <input type="checkbox"/> Overtemperature <input type="checkbox"/> Cooling defective <input type="checkbox"/> Clogging	POSITION <input type="checkbox"/> Vertical <input type="checkbox"/> Horizontal <input type="checkbox"/> Upside-down <input type="checkbox"/> Other:	PARAMETERS Power: Rotational Speed: Current: Inlet Pressure: Temp 1: Foreline Pressure: Temp 2: Purge flow: <hr/> OPERATION TIME:
Describe Failure :		
TURBOCONTROLLER ERROR MESSAGE:		

ION PUMPS/CONTROLLERS

<input type="checkbox"/> Bad feedthrough <input type="checkbox"/> Poor vacuum <input type="checkbox"/> Vacuum leak <input type="checkbox"/> High voltage problem <input type="checkbox"/> Error code on display <input type="checkbox"/> Other	Describe failure: <hr/> Customer application:
--	--

VALVES/COMPONENTS

<input type="checkbox"/> Main seal leak <input type="checkbox"/> Bellows leak <input type="checkbox"/> Solenoid failure <input type="checkbox"/> Damaged flange <input type="checkbox"/> Damaged sealing area <input type="checkbox"/> Other	Describe failure: <hr/> Customer application:
--	--

LEAK DETECTORS

<input type="checkbox"/> Cannot calibrate <input type="checkbox"/> No zero/high background <input type="checkbox"/> Vacuum system unstable <input type="checkbox"/> Cannot reach test mode <input type="checkbox"/> Failed to start <input type="checkbox"/> Other	Describe failure: <hr/> Customer application:
--	--

INSTRUMENTS

<input type="checkbox"/> Gauge tube not working <input type="checkbox"/> Display problem <input type="checkbox"/> Communication failure <input type="checkbox"/> Degas not working <input type="checkbox"/> Error code on display <input type="checkbox"/> Other	Describe failure: <hr/> Customer application:
--	--

ALL OTHER VARIAN PUMPS

<input type="checkbox"/> Pump doesn't start <input type="checkbox"/> Noisy pump (describe) <input type="checkbox"/> Doesn't reach vacuum <input type="checkbox"/> Overtemperature <input type="checkbox"/> Pump seized <input type="checkbox"/> Other	Describe failure: <hr/> Customer application:
---	--

DIFFUSION PUMPS

<input type="checkbox"/> Heater failure <input type="checkbox"/> Electrical problem <input type="checkbox"/> Doesn't reach vacuum <input type="checkbox"/> Cooling coil damage <input type="checkbox"/> Vacuum leak <input type="checkbox"/> Other	Describe failure: <hr/> Customer application:
--	--

VPD Service Operation

Returned Material Report

This report must accompany all products returned for repair, replacement, or warranty evaluation. Full information regarding reasons for return of the product will expedite repair or adjustment. Please fill in all blanks below and furnish any other information which will help identify the nature and cause of failure.

Reason for Return (check appropriate box)

- | | | | |
|--|---|--|---------------------------------|
| <input type="checkbox"/> Paid Repair | <input type="checkbox"/> Advance Exchange | <input type="checkbox"/> Shipping Error | <input type="checkbox"/> Credit |
| <input type="checkbox"/> Warranty Evaluation | <input type="checkbox"/> Loaner Return | <input type="checkbox"/> Shipping Damage | |

Product Information (use separate forms if more than one model no.)

Varian Model No. _____ Serial No. _____ Quantity _____

Part Description _____

Purchase Information (if product is being returned for warranty evaluation, show your original purchase order number and date purchased)

Varian Sales Order No. (if available) _____ Machine # _____

Original Purchase Order No. _____ Purchase Order Date _____

Company Name _____ **Contact** _____

Address _____

City _____ **State** _____ **Zip** _____

Telephone _____

Failure Report (describe in detail suspected cause or nature of malfunction)

Returned Products

All products returned to Varian/VPD Service Operation for warranty evaluation must be sent **prepaid** and customer must comply with the **warranty replacement and adjustment** provision set forth in the warranty.

Ship directly to: Varian Vacuum Products
Vacuum Products Service Center
121 Hartwell Avenue
Lexington, MA 02421

All products sold by Varian and returned by customer are subject to Varian Vacuum Products standard terms and conditions of sale including, but not limited to, the warranty and damages and liability provisions set forth in the warranty.

Varian Vacuum Technologies Sales and Service Offices

Argentina

Varian Argentina Ltd.

Sucursal Argentina
Av. Ricardo Balbin 2316
1428 Buenos Aires
Argentina
Tel:(54) 1 783 5306
Fax:(54) 1 786 5172

Benelux

Varian Vacuum Technologies

Rijksstraatweg 269 H,
3956 CP Leersum
The Netherlands
Tel:(31) 343 469910
Fax:(31) 343 469961

Brazil

Varian Industria e Comercio Ltda.

Avenida Dr. Cardoso de Mello 1644
Vila Olimpia
Sao Paulo 04548 005
Brazil
Tel:(55) 11 3845 0444
Fax:(55) 11 3845 9350

Canada

Central coordination through:

Varian Vacuum Technologies
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 6641 1530
Fax:(86) 10 6641 1534

France and Wallonie

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

India

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 Vacuum Technologies

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

Japan

Varian Vacuum Technologies

Sumitomo Shibaura Building, 8th Floor
4-16-36 Shibaura
Minato-ku, Tokyo 108
Japan
Tel:(81) 3 5232 1253
Fax:(81) 3 5232 1263

Korea

Varian Technologies Korea, Ltd.

Shinsa 2nd Building 2F
966-5 Daechi-dong
Kangnam-gu, Seoul
Korea 135-280
Tel:(82) 2 3452 2452
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

Taiwan

Varian Technologies Asia Ltd.

14F-16 No.77, Hsin Tai Wu Road Sec. 1,
Hsi Chih, Taipei Hsien
Taiwan, R.O.C.
Tel:(886) 2 2698 9555
Fax:(886) 2 2698 9678

UK and Ireland

Varian Ltd.

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

United States

Varian Vacuum Technologies

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

Other Countries

Varian Vacuum Technologies

Via F.lli Varian, 54
10040 Leini, (Torino)
Italy
Tel:(39) 011 997 9111
Fax:(39) 011 997 9350

Internet Users:

Customer Service and Technical Support:

vpl.customer.support@varianinc.com

Worldwide Web Site:

www.varianinc.com/vacuum

Order On-line:

www.evarian.com

Representatives in most countries



VARIAN