NOTICE: This document contains references to Varian. Please note that Varian, Inc. is now part of Agilent Technologies. For more information, go to **www.agilent.com/chem.**

Agilent Technologies

MS40+ Single Stage Rotary Vane Pumps

Model 949-9225
Model 949-9240
Model 949-9241

(I) MANUALE DI ISTRUZIONI

(D) BEDIENUNGSHANDBUCH

(F) NOTICE DE MODE D'EMPLOI

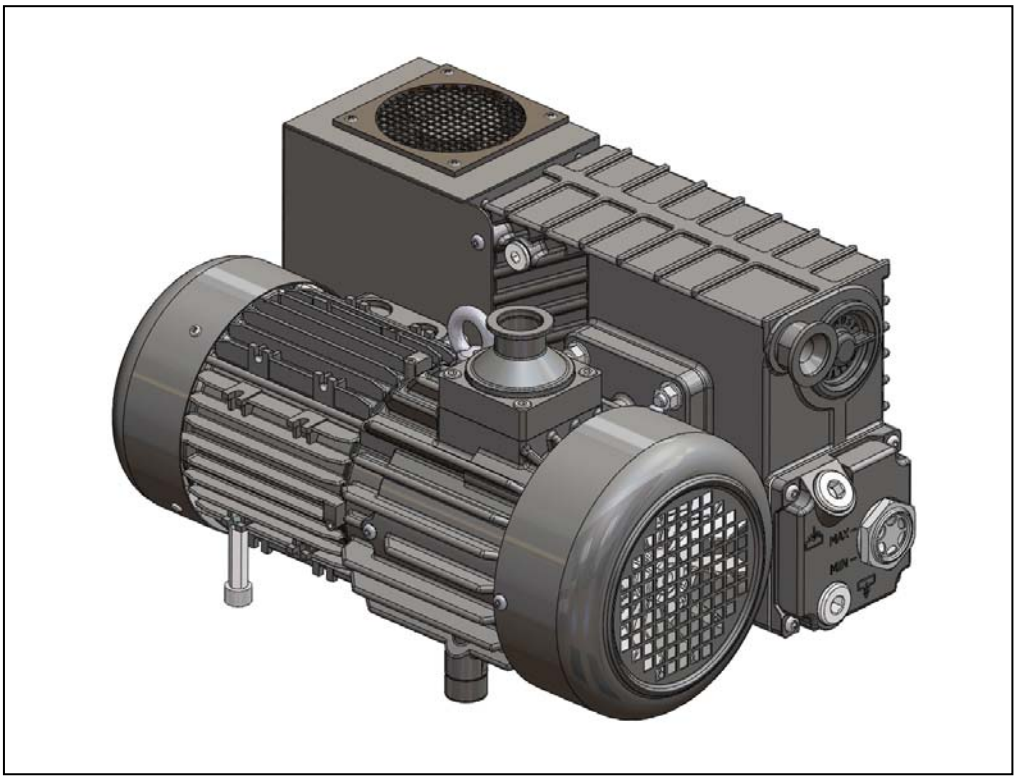
(GB) INSTRUCTION MANUAL

87-901-008-01(A)
NOVEMBER 2008

MS40+

SINGLE STAGE

ROTARY VANE PUMPS



VARIAN
vacuum technologies

Dear Customer,

Thank you for purchasing a VARIAN vacuum product. At VARIAN Vacuum Technologies we make every effort to ensure that you will be satisfied with the product and/or service you have purchased.

As part of our Continuous Improvement effort, we ask that you report to us any problem you may have had with the purchase or operation of our product. On the back side you find a Corrective Action Request form that you may fill out in the first part and return to us.

This form is intended to supplement normal lines of communications and to resolve problems that existing systems are not addressing in an adequate or timely manner.

Upon receipt of your Corrective Action Request we will determine the Root Cause of the problem and take the necessary actions to eliminate it. You will be contacted by one of our employees who will review the problem with you and update you, with the second part of the same form, on our actions.

Your business is very important to us. Please, take the time and let us know how we can improve.

Sincerely.

Sergio PIRAS
Vice President and General Manager
VARIAN Vacuum Technologies

Note: Fax or mail the Customer Request for Action (see backside page) to VARIAN Vacuum Technologies (Torino) - Quality Assurance or to your nearest VARIAN representative for onward transmission to the same address.

CUSTOMER REQUEST FOR CORRECTIVE / PREVENTIVE / IMPROVEMENT ACTION

TO : VARIAN VACUUM TECHNOLOGIES TORINO - QUALITY ASSURANCE

FAX N° : XXXX - 011 - 9979350

ADDRESS: VARIAN S.p.A. - Via F.lli Varian, 54 - 10040 Leinì (Torino) - Italy

E-MAIL : marco.marzio@varianinc.com

NAME	COMPANY	FUNCTION

ADDRESS :

TEL. N° : _____ FAX N° : _____

E-MAIL : _____

PROBLEM / SUGGESTION :

REFERENCE INFORMATION (model n°, serial n°, ordering information, time to failure after installation, etc.) :

DATE _____

CORRECTIVE ACTION PLAN / ACTUATION (by VARIAN VTT) LOG N° _____

XXXX = Code for dialing Italy from your country (es. 01139 from USA; 00139 from Japan, etc.)

VARIAN

INFORMAZIONI GENERALI

Questa apparecchiatura è destinata ad uso professionale. L'utilizzatore deve leggere attentamente il presente manuale di istruzioni ed ogni altra informazione addizionale fornita dalla Varian prima dell'utilizzo dell'apparecchiatura. La Varian si ritiene sollevata da eventuali responsabilità dovute all'inosservanza totale o parziale delle istruzioni, ad uso improprio da parte di personale non addestrato, ad interventi non autorizzati o ad uso contrario alle normative nazionali specifiche.
Le MS40+ Single Stage Rotary Vane Pumps sono delle pompe rotative monostadio a palette, a tenuta in bagno d'olio, azionate da motore elettrico trifase.
Queste pompe da alto vuoto sono adatte al pompaggio di gas non corrosivi.
Nei paragrafi seguenti sono riportate tutte le informazioni necessarie a garantire la sicurezza dell'operatore durante l'utilizzo dell'apparecchiatura. Informazioni dettagliate sono fornite nell'appendice "Technical information".
Questo manuale utilizza le seguenti convenzioni:

⚠ PERICOLO!

I messaggi di pericolo attirano l'attenzione dell'operatore su una procedura o una pratica specifica che, se non eseguita in modo corretto, potrebbe provocare gravi lesioni personali.

☞ ATTENZIONE!

I messaggi di attenzione sono visualizzati prima di procedure che, se non osservate, potrebbero causare danni all'apparecchiatura.

NOTA

Le note contengono informazioni importanti estrapolate dal testo.

IMMAGAZZINAMENTO

Durante il trasporto e l'immagazzinamento delle pompe non devono essere superate le seguenti condizioni ambientali:

- temperatura: da -20 °C a +70 °C
- umidità relativa: 0 - 95% (non condensante)

PREPARAZIONE PER L'INSTALLAZIONE

La pompa viene fornita in un imballo protettivo speciale; se si presentano segni di danni, che potrebbero essersi verificati durante il trasporto, contattare l'ufficio vendite locale.
Il peso dell'imballo, comprensivo della pompa, è, al massimo, di circa 35 Kg.
Durante l'operazione di disimballaggio, prestare particolare attenzione a non lasciar cadere la pompa e a non sottoporla ad urti o vibrazioni.
Non disperdere l'imballo nell'ambiente. Il materiale è completamente riciclabile e risponde alla direttiva CEE 85/399 per la tutela dell'ambiente.

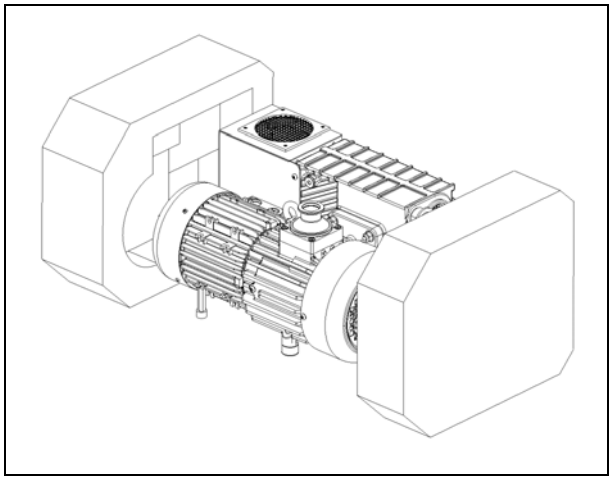
NOTA

La pompa non può essere danneggiata rimanendo semplicemente esposta all'atmosfera. Si consiglia comunque di mantenerla chiusa fino al momento dell'installazione sul sistema onde evitare eventuale inquinamento da polvere.

NOTA

La pompa è fornita con alcuni accessori standard:

- *1 connettore "D" a 9 contatti per I/O (femmina) (escluso il modello 949-9241)*
- *1 connettore "D" a 9 contatti per RS232 (maschio) (escluso il modello 949-9241)*
- *Molla di ritenuta per presa IEC320*



INSTALLAZIONE

Non installare e/o utilizzare la pompa in ambienti esposti ad agenti atmosferici (pioggia, gelo, neve), polveri, gas aggressivi, in ambienti esplosivi o con elevato rischio di incendio.
Durante il funzionamento è necessario che siano rispettate le seguenti condizioni ambientali:

- temperatura: da +12 °C a +40 °C
- umidità relativa: 0 - 95% (non condensante)
- valore di IP.

⚠ PERICOLO!

Per proteggere contro corto-circuiti o sovraccarichi, si deve installare un interruttore automatico sulla linea d'alimentazione principale verso i dispositivi Varian, di capacità adeguata (vedere la tabella seguente):

P/N	Capacità Interruttore
949-9225	10A
949-9240	10A
949-9241	10A

☞ ATTENZIONE!

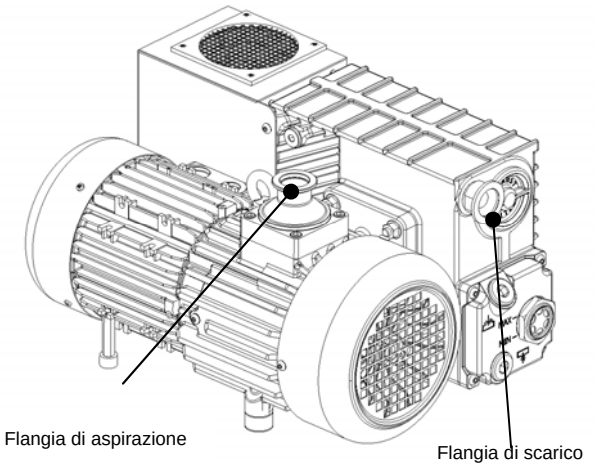
Prima di avviare la pompa, verificare il livello dell'olio.

⚠ PERICOLO!

Togliere i tappi di protezione posti sulle flange di aspirazione e scarico prima di ogni successiva operazione. L'aria contenuta all'interno della pompa, in caso di accensione involontaria, può proiettarli violentemente contro l'operatore e ferirlo.

PERICOLO!

Durante l'installazione, prestare la massima attenzione che la flangia di aspirazione sia collegata alla camera da evacuare e che la flangia di scarico non sia tappata (vedere la figura seguente).
La pompa non deve essere usata come compressore.
La massima pressione interna al contenitore dell'olio non deve superare 1,5 bar (abs).
L'inosservanza di queste precauzioni può causare danni alla macchina ed all'operatore.



ATTENZIONE!

Controllare che la tensione di alimentazione corrisponda al campo di valori indicati sulla targhetta del controller.

Collegare la pompa all'alimentazione.

USO

L'accensione della pompa non richiede particolari manovre; è sufficiente collegarla all'alimentazione elettrica agendo sull'interruttore bipolare.

PERICOLO!

La pompa è progettata per operare con fluidi neutri o non corrosivi. È assolutamente vietato l'impiego con sostanze potenzialmente esplosive o infiammabili.

MANUTENZIONE

Il personale addetto alla condotta ed alla manutenzione della pompa deve essere ben addestrato e deve avere un'approfondita conoscenza delle norme antinfortunistiche.

PERICOLO!

Le alte tensioni possono causare morte al contatto. Operare sempre con la massima cautela e secondo le norme antinfortunistiche in vigore.

PERICOLO!

Quando la macchina è alimentata prestare attenzione per la presenza di parti in movimento e di alta tensione.

PERICOLO!

Nel caso si debba procedere ad operazioni di manutenzione della pompa al termine di un prolungato periodo di esercizio, è necessario lasciarla raffreddare, poichè la temperatura esterna può superare i 60 °C.

PERICOLO!

Escludere sempre l'alimentazione della pompa prima di compiere operazioni di manutenzione. Apporre specifici cartelli di avvertenza: APPARECCHIATURA IN MANUTENZIONE - NON INSERIRE L'ALIMENTAZIONE, in corrispondenza dell'interruttore di alimentazione. Al termine ripristinare i dispositivi di sicurezza.

PERICOLO!

Non effettuare la sostituzione dell'olio subito dopo l'arresto della macchina, in quanto la temperatura dello stesso può essere elevata.

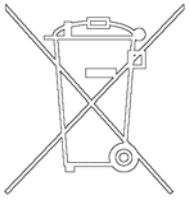
NOTA

Prima di rispedire al costruttore una pompa per riparazioni è indispensabile compilare e far pervenire al locale ufficio vendite la scheda "Health and Safety Certification" allegata al presente manuale di istruzioni. Copia della stessa deve essere inserita nell'imballo della pompa prima della spedizione.

Qualora una pompa dovesse essere rottamata, procedere alla sua eliminazione nel rispetto delle normative nazionali specifiche.

SMALTIMENTO

Significato del logo "WEEE" presente sulle etichette
Il simbolo qui sotto riportato applicato in ottemperanza alla direttiva CE denominata "WEEE".
Questo simbolo **(valido solo per i paesi della Comunità Europea**) indica che il prodotto sul quale è applicato, NON deve essere smaltito insieme ai comuni rifiuti domestici o industriali, ma deve essere avviato ad un sistema di raccolta differenziata.
Si invita pertanto l'utente finale a contattare il fornitore del dispositivo, sia esso la casa madre o un rivenditore, per avviare il processo di raccolta e smaltimento, dopo opportuna verifica dei termini e condizioni contrattuali di vendita.



ALLGEMEINE HINWEISE

Dieses Gerät ist für den professionellen Gebrauch bestimmt. Vor dem Gebrauch soll der Benutzer dieses Handbuch sowie alle weiteren von Varian mitgelieferten Zusatzinformationen genau lesen. Bei vollständiger bzw. teilweiser Nichtbeachtung der enthaltenen Hinweise, unsachgemäßem Gebrauch durch ungeschultes Personal, nicht autorisierten Eingriffen und Benutzung unter Missachtung der nationalen Bestimmungen übernimmt Firma Varian keinerlei Haftung.
Die Pumpen MS40+ Single Stage Rotary Vane Pumps sind dichte ölbadgeschmierte einstufige Flügelzellenpumpen, die von einem Dreiphasenstrommotor betätigt werden.
Diese Hochvakuumpumpen eignen sich für das Pumpen von nicht korrosiven Gasen.
In den folgenden Abschnitten sind alle erforderlichen Informationen für die Sicherheit des Bedieners bei der Verwendung des Geräts aufgeführt. Detaillierte technische Informationen sind im Anhang "Technical Information" enthalten.
In dieser Gebrauchsanleitung werden Sicherheitshinweise folgendermaßen hervorgehoben:

⚠ **GEFAHR!**

Diese Warnung weist auf gefährliche Arbeitsschritte hin, die bei unsachgemäßer Durchführung das Risiko von Personenschäden bergen.

☞ **ACHTUNG!**

Diese Warnung weist auf Arbeitsschritte hin, die das Risiko von Schäden am Gerät bergen.

ANMERKUNG

Die Anmerkungen enthalten wichtige Informationen, die aus dem Text hervorgehoben werden.

LAGERUNG

Während des Transports und der Lagerung der Pumpen sollen die folgenden Umgebungsbedingungen gegeben sein:

- Temperatur: -20 °C bis +70 °C
- Relative Feuchtigkeit: 0 – 95 % (niederschlagsfrei)

VOR DER INSTALLATION

Die Pumpe wird in einer speziellen Schutzverpackung geliefert. Eventuelle Transportschäden sind der zuständigen örtlichen Verkaufsstelle zu melden.
Das Verpackungsgewicht beträgt, einschließlich der Pumpe, maximal 36 kg.
Beim Auspacken ist darauf zu achten, dass die Pumpe nicht fallengelassen oder Stößen oder Vibrationen ausgesetzt wird.
Das Verpackungsmaterial ist ordnungsgemäß zu entsorgen. Es ist vollständig recyclebar und entspricht der EG-Richtlinie 85/399 für den Umweltschutz.

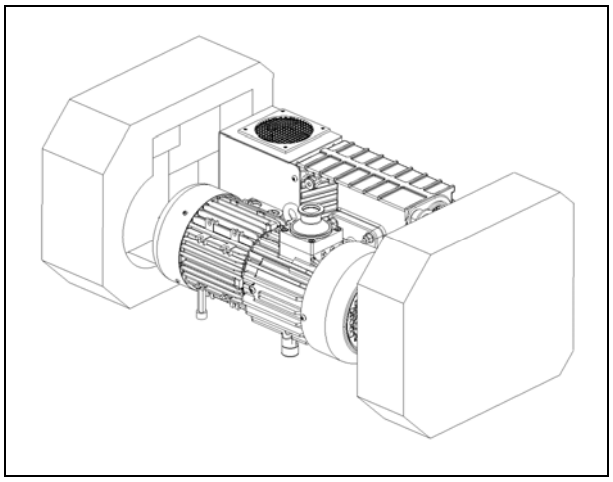
ANMERKUNG

Die Pumpe kann, wenn sie einfach der Atmosphäre ausgesetzt ist, nicht beschädigt werden. Sie sollte jedoch bis zur Installation an der Anlage geschlossen bleiben, um Verunreinigungen durch Staub zu vermeiden.

ANMERKUNG

Die Pumpe wird mit einigen Standardzubehörteilen geliefert:

- *1 9-Stift-Stecker "D" für I/O (Steckbuchse) (mit Ausnahme der 949-9241-model)*
- *1 9-Stift-Stecker "D" für RS232 (Stecker) (mit Ausnahme der 949-9241-model)*
- *Rückhaltefeder für Anschluss IEC320*



INSTALLATION

Die Pumpe darf nicht in Umgebungen installiert und/oder benutzt werden, die ungeschützt vor Witterungsbedingungen (Regen, Frost, Schnee), Staub und aggressiven Gasen sind und in denen Explosions- oder erhöhte Brandgefahr besteht.
Während des Betriebs sollen die folgenden Umgebungsbedingungen gegeben sein:

- Temperatur: +12 °C bis +40 °C
- Relative Feuchtigkeit: 0 - 95% (niederschlagsfrei)
- IP Wert.

⚠ **GEFAHR!**

Zum Schutz vor Kurzschlüssen oder Überlastungen muss ein automatischer Schalter in die Hauptspeisungsleitung zu den Varian-Vorrichtungen installiert werden (siehe folgende Tabelle):

P/N	Leistung des Schutzschalters
949-9225	10A
949-9240	10A
949-9241	10A

☞ **ACHTUNG!**

Vor Inbetriebnahme der Pumpe muss der Ölstand kontrolliert werden.

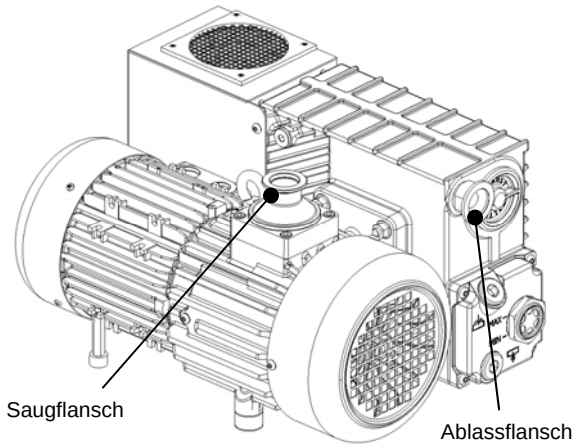
⚠ **GEFAHR!**

Vor Aufnahme jeglicher Arbeiten sind die Schutzkappen an den Saug- und Druckflanschen zu entfernen. Die im Pumpeninnern enthaltene Luft könnte diese bei unbeabsichtigter Einschaltung gegen den Bediener schleudern.

GEFAHR!

Bei der Installation ist unbedingt darauf zu achten, dass der Saugflansch an die zu entleerende Kammer angeschlossen ist und der Ablassflansch nicht verschlossen ist (siehe nachstehende Abbildung).
Die Pumpe darf nicht als Verdichter verwendet werden.
Der Druck im Ölbehälter darf nicht größer als 1,5 bar (abs) sein.

Bei Nichtbeachtung dieser Anweisungen besteht Schadensgefahr für das Gerät und die Bedienperson.



ACHTUNG!

Vergewissern Sie sich, dass die Versorgungsspannung mit dem Wertbereich auf dem Typenschild des Kontrollers übereinstimmt.

Die Pumpe an das Versorgungsnetz anschließen.

GEBRAUCH

Die Einschaltung der Pumpe erfordert keine speziellen Schritte, sie braucht nur durch Betätigung des zweipoligen Schalters an den Strom angeschlossen zu werden.

GEFAHR!

Die Pumpe ist für den Betrieb mit neutralen und nicht korrosiven Fluiden konzipiert. Der Einsatz mit potentiell explosions- oder feuergefährlichen Substanzen ist streng verboten.

WARTUNG

Das für den Betrieb und die Wartung zuständige Personal soll geschult sein und über eine solide Kenntnis der Unfallschutzvorschriften verfügen.

GEFAHR!

Hochspannungen können bei Kontakt tödliche Folgen haben. Es ist stets mit größter Vorsicht und gemäß den geltenden Unfallschutzvorschriften vorzugehen.

GEFAHR!

Bei eingeschaltetem Gerät ist auf Bewegungs- und Hochspannungsteile zu achten.

GEFAHR!

Falls die Pumpe im Anschluss an den Betrieb gewartet werden soll, ist abzuwarten, bis sie abgekühlt ist, da ihre Oberfläche eine Temperatur von 60 °C überschreiten kann.

GEFAHR!

Vor Wartungsarbeiten ist die Pumpe stets energiefrei zu schalten. Am Netzschalter sind spezielle Warnschilder “INSTANDHALTUNG AM GERÄT – NICHT EINSCHALTEN” anzubringen. Nach Abschluss der Arbeiten sind die Sicherheitseinrichtungen wieder zu aktivieren.

GEFAHR!

Keine Ölwechsel unmittelbar nach Stillsetzung des Gerätes vornehmen, da die Öltemperatur sehr hoch sein kann.

ANMERKUNG

Bevor dem Hersteller eine Pumpe zur Reparatur zurückgesandt wird, ist das Formular “Sicherheit und Gesundheit” in der Anlage zum vorliegenden Handbuch auszufüllen und der lokalen Verkaufsstelle zuzustellen. Eine Kopie des Formulars ist der Pumpenverpackung vor dem Versand beizulegen.

Bei eventueller Verschrottung einer Pumpe ist diese entsprechend der einschlägigen nationalen Vorschriften zu entsorgen.

ENTSORGUNG

Bedeutung des "WEEE"-Logos auf den Etiketten
Das folgende Symbol ist in Übereinstimmung mit der EU-Richtlinie WEEE (Waste Electrical and Electronic Equipment) angebracht.
Dieses Symbol (**nur in den EU-Ländern gültig**) zeigt an, dass das betreffende Produkt nicht zusammen mit Haushaltsmüll entsorgt werden darf sondern einem speziellen Sammelsystem zugeführt werden muss.
Der Endabnehmer sollte daher den Lieferanten des Geräts – d. h. die Muttergesellschaft oder den Wiederverkäufer – kontaktieren, um den Entsorgungsprozess zu starten, nachdem er die Verkaufsbedingungen geprüft hat.

INFORMATION GÉNÉRALE

Cet appareil a été conçu en vue d'une utilisation professionnelle. Il est conseillé à l'utilisateur de lire attentivement cette notice ainsi que toute autre information fournie par Varian avant de l'utiliser. Varian décline toute responsabilité en cas de non-respect total ou partiel des instructions fournies, d'utilisation incorrecte de la part du personnel non formé, d'opérations non autorisées ou d'un emploi contraire aux réglementations nationales spécifiques.

MS40+ Single Stage Rotary Vane Pumps sont des pompes rotatives monoétages, à palettes, étanches en bain d'huile, actionnées par un moteur électrique triphasé.

Ces pompes à haut vide sont adaptées au pompage de gaz non corrosifs.

Les paragraphes suivants fournissent toute l'information nécessaire pour garantir la sécurité de l'opérateur pendant l'utilisation de l'appareil. Des renseignements plus détaillés se trouvent dans l'appendice «Technical information».

Cette notice utilise les signes conventionnels suivants:

⚠ DANGER!

Les messages de danger attirent l'attention de l'opérateur sur une procédure ou une manœuvre spéciale dont la mauvaise exécution risque de provoquer de graves lésions.

☞ ATTENTION!

Les messages d'attention apparaissent avant certaines procédures dont le non-respect pourrait endommager sérieusement l'appareil.

NOTE

Les notes contiennent des renseignements importants, isolés du texte.

EMMAGASINAGE

Pendant le transport et l'emmagasinage des pompes, veiller à respecter les conditions environnementales suivantes:

- température: de -20 °C à +70 °C
- humidité relative: 0 - 95 % (sans condensation)

PRÉPARATION POUR L'INSTALLATION

La pompe est fournie dans un emballage de protection spécial; si l'on constate des marques de dommages pouvant s'être produites pendant le transport, contacter aussitôt le bureau de vente local.

Le poids total de l'emballage avec la pompe est d'environ 35 kg maximum.

Pendant l'opération d'ouverture de l'emballage, veiller tout particulièrement à ne pas laisser tomber la pompe et à ne lui faire subir aucun choc ni aucune vibration.

Ne pas jeter l'emballage dans la nature. Le matériel est entièrement recyclable et il est conforme à la directive CEE 85/399 en matière de protection de l'environnement.

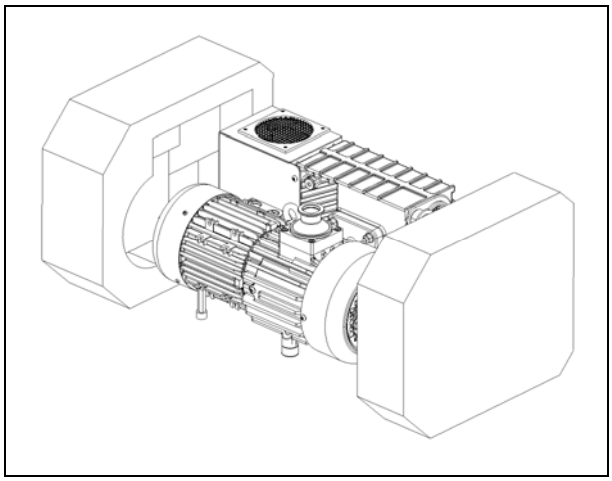
NOTE

La pompe ne peut être endommagée en restant simplement exposée à l'atmosphère. Il est de toute façon conseillé de la garder dans son emballage jusqu'au moment de sa mise en place sur le système afin d'éviter toute pollution due à la poussière.

NOTE

La pompe est équipée de certains accessoires standard:

- *1 connecteur "D" à 9 broches pour E/S (femelle) (l'exclusion du modèle 949-9241)*
- *1 connecteur "D" à 9 broches pour RS232 (mâle) (l'exclusion du modèle 949-9241)*
- *Ressort de maintien pour prise IEC320*



INSTALLATION

Ne pas installer et/ou utiliser la pompe dans des milieux exposés aux agents atmosphériques (pluie, gel, neige), à des poussières, à des gaz agressifs ainsi que dans des milieux explosifs ou à risque élevé d'incendie.

Pendant le fonctionnement, il est nécessaire de respecter les conditions environnementales suivantes:

- Température: de +12 °C à +40 °C
- Humidité relative: 0 - 95 % (sans condensation)
- Valeur d'IP.

⚠ DANGER!

Pour protéger contre les courts-circuits ou les surintensités, il faut installer un disjoncteur automatique sur la ligne d'alimentation principale vers les dispositifs Varian, de capacité adéquate (voir tableau ci-dessous):

P/N	Ampérage du disjoncteur
949-9225	10A
949-9240	10A
949-9241	10A

☞ ATTENTION!

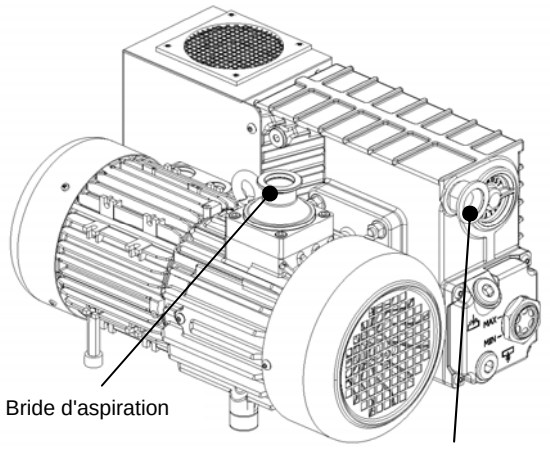
Avant toute utilisation de la pompe, vérifier le niveau de l'huile.

⚠ DANGER!

Avant toute autre opération, retirer les bouchons de protection placés sur les brides d'aspiration et de vidange. En cas de mise en marche inopinée de l'appareil, l'air contenu à l'intérieur de la pompe peut les projeter contre l'opérateur et le blesser.

DANGER!

Pendant l'installation, faire très attention à ce que la bride d'aspiration soit reliée à la chambre à vider et que la bride de vidange ne soit pas bouchée (voir la figure ci-après).
La pompe ne doit pas être utilisée comme un compresseur.
La pression maximale à l'intérieur du réservoir d'huile ne doit pas dépasser 1,5 bar (abs).
Le non-respect de ces précautions peut entraîner un danger pour l'opérateur et endommager la machine.



ATTENTION!

Contrôler que la tension d'alimentation correspond à la gamme de tensions indiquées sur la plaquette du contrôleur.

Brancher la pompe à la source d'alimentation.

UTILISATION

La mise en marche de la pompe ne requiert aucune manœuvre particulière; il suffit de la brancher à l'alimentation électrique et d'actionner l'interrupteur bipolaire.

DANGER!

La pompe a été conçue pour fonctionner avec des fluides neutres ou non corrosifs. L'emploi de substances potentiellement explosives ou inflammables est strictement interdit.

MAINTENANCE

Le personnel chargé de la conduite et de la maintenance de la pompe doit avoir la formation nécessaire et posséder une connaissance approfondie des normes de prévention des accidents du travail.

DANGER!

Les hautes tensions peuvent entraîner la mort par contact. Veiller à toujours opérer avec le maximum de prudence et dans le respect des normes de prévention des accidents du travail en vigueur.

DANGER!

Lorsque la machine est sous tension, faire attention à la présence d'organes en mouvement et de haute tension.

DANGER!

En cas de devoir procéder à des opérations de maintenance de la pompe au terme d'une longue période de fonctionnement, il est indispensable de la laisser refroidir car sa température extérieure peut dépasser 60 °C.

DANGER!

Avant toute opération de maintenance, il est impératif de toujours couper l'alimentation de la pompe. Placer les panneaux spécifiques d'avertissement: APPAREIL EN COURS DE MAINTENANCE – NE PAS BRANCHER L'ALIMENTATION, près de l'interrupteur d'alimentation. Au terme des opérations de maintenance, restaurer les dispositifs de sécurité.

DANGER!

Ne pas effectuer la substitution d'huile immédiatement après l'arrêt de la machine car la température de celle-là peut être élevée.

NOTE

Avant de retourner une pompe au constructeur pour réparation, il est indispensable de remplir et d'adresser au bureau local de vente la fiche "Health and Safety Certification" jointe à la présente notice. Une copie de celle-ci devra être mise dans l'emballage de la pompe avant expédition.

En cas de mise au rebut de la pompe, procéder à son élimination conformément aux réglementations nationales en la matière.

MISE AU REBUT

Signification du logo "WEEE" figurant sur les étiquettes
Le symbole ci-dessous est appliqué conformément à la directive CE nommée "WEEE".
Ce symbole **(uniquement valide pour les pays de la Communauté européenne)** indique que le produit sur lequel il est appliqué NE doit PAS être mis au rebut avec les ordures ménagères ou les déchets industriels ordinaires, mais passer par un système de collecte sélective.
Après avoir vérifié les termes et conditions du contrat de vente, l'utilisateur final est donc prié de contacter le fournisseur du dispositif, maison mère ou revendeur, pour mettre en œuvre le processus de collecte et mise au rebut.

GENERAL INFORMATION

This equipment is destined for use by professionals. The user should read this instruction manual and any other additional information supplied by Varian before operating the equipment. Varian will not be held responsible for any events occurring due to non-compliance, even partial, 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 MS40+ Single Stage Rotary Vane Pumps are single-stage, rotary vane pumps oil sealed, driven by a three-phase electric motor.
These high vacuum pumps are suitable for pumping non corrosive 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 the appendix "Technical Information".
This manual uses the following standard 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 pumps, the following environmental requirements should not be exceeded:
- temperature: from -20° to +70 °C
- relative humidity: 0 - 95% (non-condensing)

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 pack, including the pump, is approx. 35 Kg.
When unpacking the pump, be sure not to drop it and avoid any kind of sudden impact or shock vibration to it.
Do not dispose of the packing materials in an unauthorized manner. The material is 100% recyclable and complies with EEC Directive 85/399.

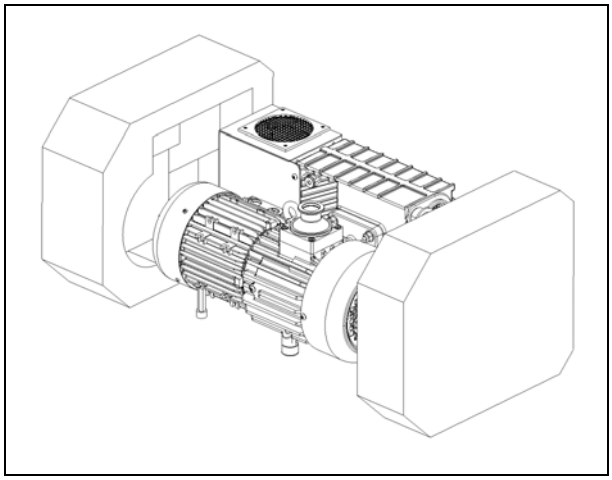
NOTE

Normal exposure to the environment cannot damage the pump. Nevertheless, it is advisable to keep it closed until it is installed in the system, thus preventing any form of pollution by dust.

NOTE

The pump is provided with some standard accessories:

- *1 9 pin "D" connector for I/O (female) (excluding model 949-9241)*
- *1 9 pin "D" connector for RS232 (male) (excluding model 949-9241)*
- *IEC320 retention spring*



INSTALLATION

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: from +12 °C to +40 °C
- relative humidity: 0 - 95% (non-condensing)
- IP value.

⚠ WARNING!

Protect against short circuits and overload by installing on Varian Device electrical main line an automatic circuit breaker of proper capacity (see table here below):

P/N	Circuit Breaker capacity
949-9225	10A
949-9240	10A
949-9241	10A

☞ CAUTION

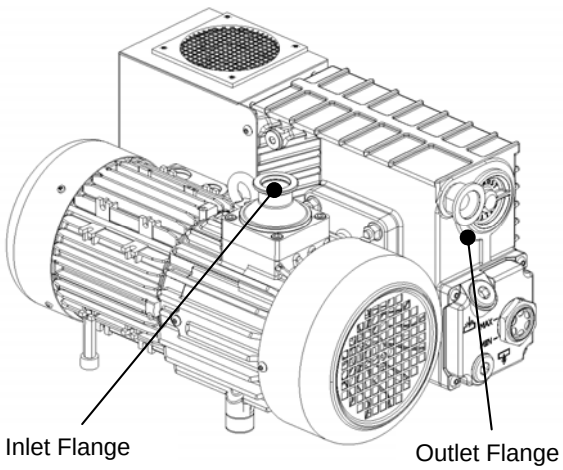
Before starting the pump, check the oil level.

⚠ WARNING!

Take out the protective caps on the suction and exhaust flanges before doing anything else. In the event of an accidental start-up, the air inside the pump could violently expel the protective caps and harm the operator.

WARNING!

During installation, pay maximum attention that the suction flange is connected to the vacuum chamber and the exhaust flange is not closed (see the following figure).
The pump must not be used as a compressor.
Maximum pressure inside the oil container must not exceed 1.5 bar (abs.)
Non-observance of these precautions may be dangerous for the machine and the operator.



CAUTION

Check that your electrical mains voltage corresponds to the range indicated on controller label.

Connect the pump to the power supply.

USE

There are no special procedures for switching the pump on; it needs only to be connected to the electric power by means of the bipolar switch.

WARNING!

The pump is designed for operation with neutral or non-corrosive fluids. It is absolutely forbidden to use potentially explosive or flammable substances.

MAINTENANCE

Personnel responsible for pump operation and maintenance must be well-trained and must be 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.

WARNING!

When machine is powered take care on account of moving parts and high voltages.

WARNING!

If you have to perform maintenance on the pump after a considerable time in operation, leave it to cool as temperature of the outer surface may be in excess of 60 °C.

WARNING!

Always disconnect the power supply to the pump before starting maintenance work. Place a special warning signs over the power supply breaker switch: MACHINE UNDERGOING MAINTENANCE - DO NOT POWER ON. When finished, remove the safety warning.

WARNING!

Do not change the oil immediately after stopping the machine as the oil temperature may still be high.

NOTE

Before returning the pump to the constructor for repairs the "Health and Safety Certification" sheet attached to this instruction manual must be filled-in 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 scrapped, it must be disposed of in accordance with the specific national standards.

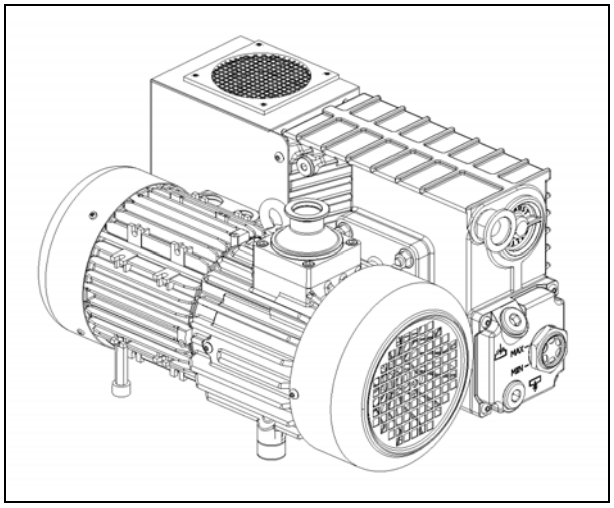
DISPOSAL

Meaning of the "WEEE" logo found in labels
The following symbol is applied in accordance with the EC WEEE (Waste Electrical and Electronic Equipment) Directive.
This symbol (**valid only in countries of the European Community**) indicates that the product it applies to must NOT be disposed of together with ordinary domestic or industrial waste but must be sent to a differentiated waste collection system.
The end user is therefore invited to contact the supplier of the device, whether the Parent Company or a retailer, to initiate the collection and disposal process after checking the contractual terms and conditions of sale.

SECTION I

TECHNICAL DESCRIPTION

The MS40+ Single Stage Rotary Vane Pumps are rotary vane pumps oil sealed, driven by a three-phase electric motor.



These vacuum pumps are suitable for pumping non corrosive gases.

The main features are:

- all parts in direct contact with the fluid pumped are free of copper alloys;
- all materials are carefully selected to provide extended life;
- due to its design features and low number of gaskets, the pump requires little maintenance, disassembly and reassemble are easy and require minimal time.

The oil guarantees perfect sealing of the discharge valves, enters the pump to ensure lubrication and sealing of the parts inside, facilitates heat dissipation and reduces pump noise.

The pump is equipped with a special anti-suckback device which automatically isolates the vacuum system when the pump stops. This avoids rises in pressure or oil flow in the vacuum system while air is allowed back into the stator chambers.

The air entering the pump after the anti-suckback device has closed prevents the oil in the casing from filling the stator chambers.

VACUUM SEALS

A special feature of this pump is the low number of gaskets that are employed.

The seals in the circuit are obtained by means of VITON gaskets.

Sealing of the rotor shaft is guaranteed by a rotating gasket with dust-guard lip.

The suction flange and duct are sealed by mean of OR gaskets.

ANTI-SUCKBACK DEVICE

The pump is equipped with a special anti-suckback device to avoid air pressure rises and/or oil backflow towards the evacuated vessel when the pump is switched off. This device has a shutter which automatically closes the suction duct.

In this way the pump and vacuum system are completely isolated from each other and air can enter the pump without any risk for the vacuum produced in the system.

The device includes some special features, namely:

- drive obtained avoiding any form of contamination of the inlet duct by fluids (oil and/or air). Thanks to this, when the pump is started again, the pumpdown to vacuum conditions is extremely fast as these contaminants are not present and no degassing is therefore required.

TECHNICAL DATA

The following table lists the main technical data of the MS40+ Single Stage Rotary Vane Pumps.

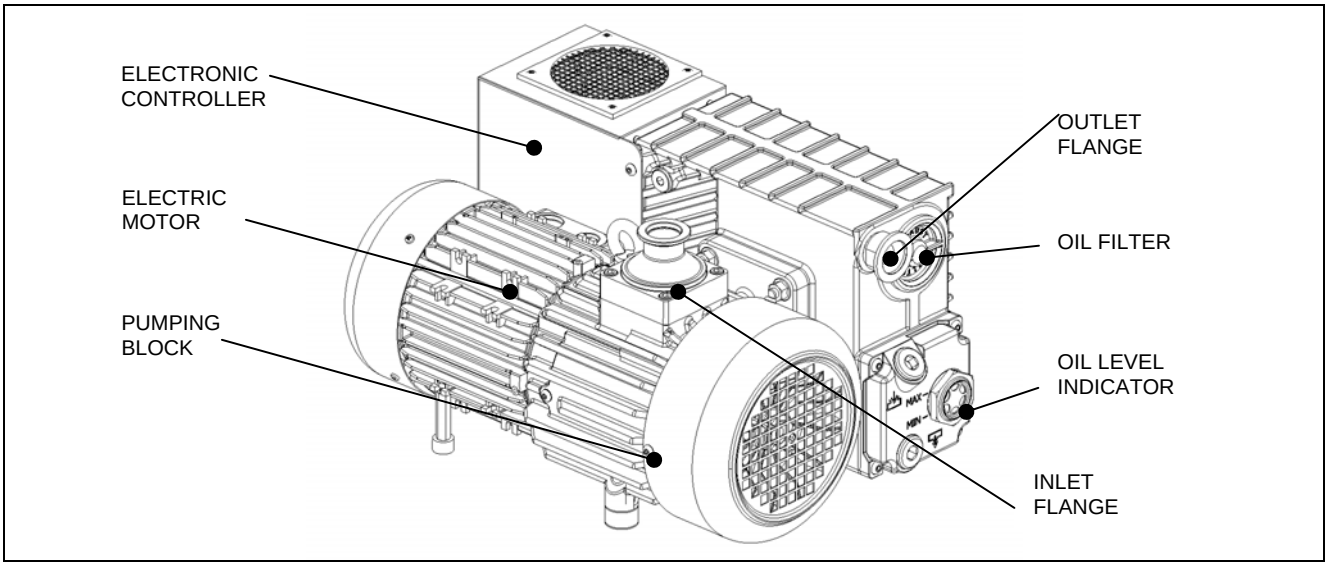
TECHNICAL DATA	RPM	UNITS	949-9225	949-9240	949-9241
PUMPING SPEED (at 5 mbar inlet pressure)	1450	m^3/h	40	40	40
ULTIMATE TOTAL PRESSURE *		mbar	$5x10^{-2}$	$5x10^{-2}$	$5x10^{-2}$
OIL CAPACITY min/max		l	1	1	1
MOTOR RATING 3ph		Kw	0.75	0.75	0.75
ROTATIONAL FREQUENCY min/max		Hz	40-60	40-60	40-60
NOISE LEVEL with gas ballast closed		dB(A)	≤ 62	≤ 62	≤ 62
OIL TEMPERATURE		°C	60	60	60
(pump operating) **		°F	140	140	140
IP Value	20				
Installation category	II				
Pollution degree	2				
OPERATING TEMPERATURE RANGE		°C	12 – 40	12 – 40	12 – 40
WEIGHT		Kg	33	33	33
		lb	72.7	72.7	72.7
INLET FLANGE		DN	25KF	40KF	40KF
EXHAUST FLANGE		DN	25KF	25KF	25KF
Main Dimensions:					
- length		mm	418	418	418
- width		mm	297	297	297
- height		mm	228	228	228
Nominal Input Voltage		V	200-240	200-240	200-240
Input frequency		Hz	50 / 60	50 / 60	50 / 60
Max input power		VA	1200	1200	1200
Internal Main Fuse (TT type)		A	12.5	12.5	12.5

* According to PNEUROP 6602

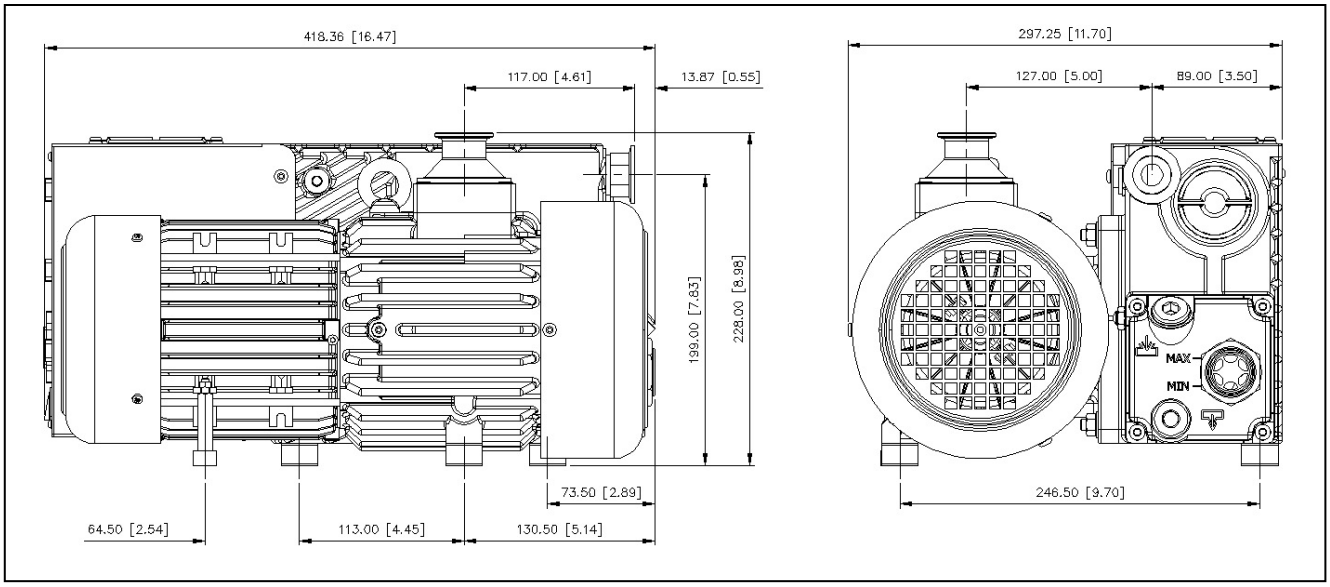
** At ultimate total pressure, 20 °C (68 °F) room temperature

Dimensions

The following figure shows the pumps layout and dimensions:



MS40+ Single Stage Rotary Vane Pumps layout



MS40+ Single Stage Rotary Vane Pumps dimensions

SAFETY PRECAUTIONS

- Always carry the pump by means of the ring-bolt provided.
- The pump must be set in position taking the upmost care in order to avoid accidental falls.

⚠ WARNING!

In case of a need to handle the pump after a period of operation, it must be left to cool first as the external surface temperature may be in excess of 60 °C.

TRANSPORT AND INSTALLATION

The pumps are shipped to the customer inside cardboard boxes.

Total weight of the pack, including the pump, is about 35 Kg.

The case must be handled with care, using appropriate lifting equipment.

☞ CAUTION

When moving the case, ensure that it is securely bound to the lifting equipment and that the equipment is strong enough to support the weight.

The pump's working environment is a traditional industrial environment. Naturally sites with corrosive vapors or excessive heat are best avoided.

Room temperature should ideally be between 12 °C and 40 °C.

If the temperature is not inside this range, consult Varian technical service for the changes required.

Setting the pump in position should be performed as follows:

- Pump laid on the ground. There are no special instructions for this type of installation, except that the floor should be as flat as possible and suited to bear the weight of the pump (it should ideally be a concrete floor) and of any accessories mounted on it. Note that the pump is stable on its base plate and it should not be necessary to anchor it to the floor with bolts and screws; also vibrations to and from the pump are greatly reduced by the use of rubber feet.
- Pump off the ground. In this case, the user must design a suitable support structure, remembering the following points:
  * the plane supporting the pump must be perfectly horizontal;
  * the structure should be adequately rigid;
  * the relevant safety precautions should be applied.

  Note also that the pump should be attached to the supporting structure after replacing the rubber feet with special anti-vibration feet, which should be screwed to the pump base and to the supporting plane.

After taking the pump out of its packing case, you are advised to make the following checks:

a. Ensure that the pump has not suffered any damage during shipping.

b. Check that there are no uncovered or loose parts.

PRELIMINARY OPERATIONS

Before starting the pump, check for oil level.

☞ CAUTION

Oil must be poured into the casing through the special threaded plug hole and NOT through the suction line.

⚠ WARNING!

Take out the protective caps on the suction and exhaust flanges before doing anything else. In the event of an accidental start-up, the air inside the pump could violently expel the protective caps and harm the operator.

SECTION II

CONNECTION TO THE ELECTRIC SUPPLY

CAUTION

It is recommended to connect the pump to the power supply through a dedicated safety switch on the main electrical panel of the installation, or in proximity of the power supply connection point.

CONNECTIONS TO THE INLET AND EXHAUST FLANGES

Remove the protective caps from both flanges. Connect the system to be evacuated to the inlet flange, using a centering ring with OR and a locking collar.

NOTE

For guaranteed reliable sealing, use an OR gasket in Perbunan or Viton.

The inlet duct is equipped with a sieve filter preventing solid particles from entering and damaging the pump.

NOTE

When the gases to be pumped out contain dust, it is advisable to insert a dust filter before the inlet flange.

NOTE

When the gases to be pumped out contain large quantities of vapor, it is advisable to include a condense separator before the inlet flange.

To make best use of the pump's capacity, use only short, straight piping, with a diameter not smaller than that of the inlet flange.

NOTE

If rigid piping is used, it is good practice to use a flexible joint in order to avoid undue forcing of the connection on the pump.

The exhaust duct must be connected to a pipe that will take away the pumped out gases.

NOTE

An internal oil mist eliminator avoids pollution of the surrounding atmosphere by the oil present in the exhaust duct during pump operation.

CAUTION

Never block the pump exhaust line. This would cause overpressure in the casing with the risk of breaking the oil tank.

STARTING AND RUNNING THE PUMP

WARNING!

The pump is designed for operation with neutral or non-corrosive fluids. It is absolutely forbidden to use potentially explosive or flammable substances.

NOTE

If the pump is started with cold oil, initially more than normal noise will be heard; this will last for a few minutes only until the oil reaches its working temperature.

There are no special instructions for normal operation of the pump, which is delivered to you after completion of a running-in cycle in the factory.

NOTE

To allow the pump starting you have to wire properly the interlock pins by connecting the mating connector provided with the pump.

NOTE

For repetitive work cycles, with brief time intervals in between, it is better not to stop the pump.

STOPPING THE PUMP

There are no special procedures for switching the pump off; it needs only to be disconnected from the electric power by means of the bipolar switch.

When the pump is stopped, the anti-suckback device makes it possible to maintain vacuum in the vessel connected on the inlet flange of the pump.

SAFETY RULES

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

The accident prevention precautions contained in this section must be respected at all times during operation and maintenance of the pump to avoid damage to operators and to the pump.

These precautions are provided in the form of WARNING and CAUTION notes.

WARNING!

Operating procedures, technical information and precautions which, if not respected and/or implemented correctly may cause body harm to operators.

NOTE

Before connecting the IEC320 mains cable, install the Retention Spring provided with the MS40+.
The Retention Spring has to be fastened to IEC320 connector lateral screws.

NOTE

Use the Retention Spring to secure the mains cable into the IEC320 socket.

☞ **CAUTION**

Operating procedures, technical information and precautions which, if not respected and/or implemented correctly may cause damage to the pump.

WARNING Notes ⚠

a. Death may result from contact with high voltages. Always take extreme care and observe the accident prevention regulations in force.

b. Always disconnect the power supply to the pump before maintenance work. Place a special warning signs over the power supply breaker switch: MACHINE UNDERGOING MAINTENANCE - DO NOT POWER ON.

c. If you are performing maintenance after the pump has been operating for a considerable time, allow sufficient time for it to cool as the external surface temperature may be in excess of 60 °C.

d. Failure to provide the pump with an earth connection may cause serious damage to operators. Always ensure that there is an earth connection and that it complies with the standards.

e. When cleaning the pump and its component parts, avoid the use of flammable or toxic solvents, such as benzin, benzol, ether or alcohol. The recommendation is to use a soap and water solution, preferably in ultrasound washing machines, taking care to dry all the cleaned parts at temperatures under 100 °C in order to eliminate residual moisture.

f. Prolonged overloads or breakdowns may cause the electric motor to overheat, and to release noxious smoke; remove the power immediately as a precaution and do not approach the pump at least until you have provided ventilation to drive out the smoke. Take care not to breathe in the fumes remaining inside the pump in the course of repair work.

g. In case of fire, do not throw water on the pump. Switch the power off and use CO_2 extinguishers.

h. Carefully inspect the flanges to ensure that there are no dust, oil, dirt or defects of the mating surfaces, before making the required connections.

i. Ensure that all joints and couplings are locked correctly before starting the pump again after repair work.

j. Do not wear any objects that may become entangled in the mechanisms and/or act as conductors (chains, bracelets, etc.).

k. Ensure that the tools to be used are in perfect working condition and have insulating grips, where necessary. Check that the insulating material of the cables and that the conductors of the test equipment do not show any signs of damage.

l. Do not replace the oil immediately after stopping the machine as the oil may still be at high temperature.

m. Perform repairs in clean and, where possible, dust-free areas. Protect all the clearances of connection points with suitable plastic caps and cover the machined surface areas of all parts stripped down until they are put back on the pump again.

CAUTION Notes ☞

a. Before putting the pump back into operation after a breakdown, inspect it and check carefully for any other signs of damage.

b. Use only tools that are in perfect working order and specially designed for the job; use of inappropriate or ineffective tools may cause serious damage.

c. Perform repairs in clean and, where possible, dust-free areas. Protect all the clearances of connection points with suitable plastic caps and cover the machined surface areas of all parts stripped down until they are put back on the pump again.

d. Always check the lubricant and that it is properly distributed through the pump; inadequate lubrication may damage the pump seriously.

e. Give the parts some form of marking as you strip them down to ensure that you reassemble them again in the proper order.

f. Check that there are no scratches or grooves on the machined shafts, in their seats inside the pump or on machine-ground surfaces. Slight scratches and abrasions may be eliminated with very fine emery paper or by a little light grinding.

g. Before putting a group together, always spread a little oil over inner parts and mating surfaces. Replace all seals with original spare parts before reassembling components.

MAINTENANCE ACTIONS

Maintenance may be seen as the totality of all scheduled and unscheduled maintenance work.

- **SCHEDULED MAINTENANCE:** Maintaining the nominal state of operation.

• Oil level checking	Daily (before every starting)
• Oil change	8.000 hours (light applications)
• Exhaust filter replacement	If oil mist at exhaust or yearly
• Anti such-back valve checking	6 months
• Fan cover cleaning	6 months

NOTE

The scheduled maintenance is supported by an automatic timer provided by the electronic controller. After 8000 h of operation the status led starts blinking (400ms period) orange. The led blinking highlights that is necessary to change the oil. To switch off the alarm its necessary to use the serial interface (see window list in the following pages).
It is possible to read the Scheduled Maintenance timer by using the serial interface.

- **UNSCHEDULED MAINTENANCE:** Restoring the nominal state of operation.

NOTE

The frequency with which repairs are performed depends on the process and presence of substances that shorten pump life (dust, abrasives, solvents, water, chemically aggressive substances).

The pump must be cleaned at regular intervals of time.

☞ **CAUTION**

Do not clean with Alcohol the plastic or rubber components of the pump.

Use only the strictly necessary amount of lubricant; an excess of lubricating oil, like when there is none, may sometimes compromise proper operation of the pump.

Only the recommended lubricants, or lubricating oils with similar characteristics and known and experimented quality, should be used.

Oil changes must be made with the oil at a sufficiently high temperature, after leaving the pump to cool for a few minutes following operation.

The drain and filler plugs must not be left open any longer than is strictly necessary.

When performing maintenance, look out for all signals that may precede a breakdown, in particular:

- traces of corrosion;
- oil leaks;
- slack joints or couplings.

Maintenance technicians must:

- be aware of all applicable national directives concerning accident prevention during work on motor-driven pumps and should know how to apply them;
- have read and understood all the sections on “Safety Rules";
- be familiar with the essential design features and operation of the pump;
- know how to use and consult the pump documentation;
- be concerned about proper operation of the pump;
- make a note of any irregularities in operation of the pump and take the necessary action, where appropriate.

Use original spare parts wherever possible and repair a broken part as best as possible on site or send it back to the manufacturer for repairs.

For all problems arising, or to order spare parts, refer to our service department.

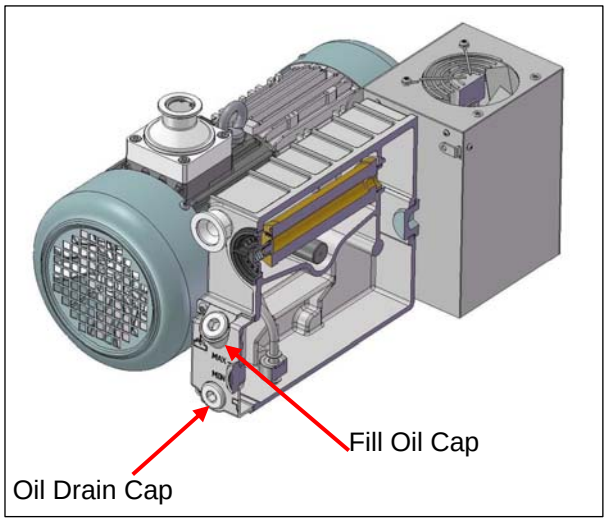
Varian S.p.A. - Vacuum Technologies
Via Varian 54
10040 Leinì (Torino) - Italy
Telephone: (39) 011.9979111
Fax: (39) 011.9979344

Here following the correct procedures for MS40+ Oil Change and Filter Cartridge Replacement are described.

OIL AND FILTER CARTRIDGE REPLACEMENT PROCEDURES

Oil Change Procedure

1) Place a tank for waste oil under the oil drain plug.



2) Unscrew slowly the oil drain cap rotating it anti-clock wise using a 10mm hex key. Let the oil flow out. In the meantime clean the inside of the drain plug.

3) After closing the drainage hole with its plug make the pump perform a number of turns, giving it a brief current pulse, so as to let residual oil in the pump chambers flow out. Then drain off the residual oil again.

4) After the oil has been drained, close the drain plug tight; take the tank of waste oil away and clean thoroughly, using rags of cotton or other suitable material to dry.

5) Open the fill oil cap using a 10mm hex key and add 1 liter of SW60 oil.

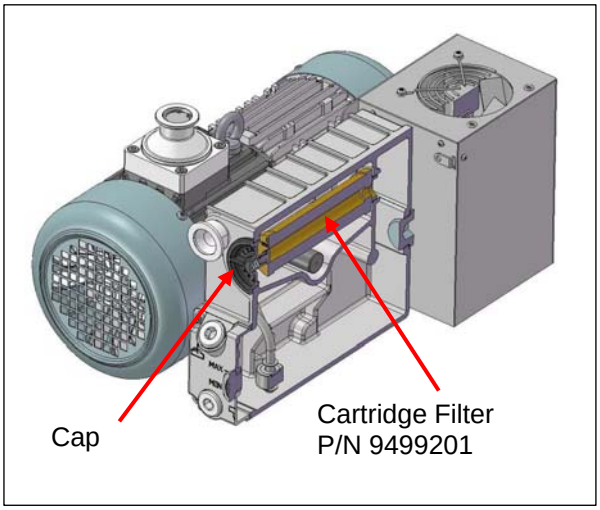
6) Close the oil fill cap tight.

7) Replace the cartridge filter as per following slide.

Filter Cartridge Replacement Procedure

1) Unscrew the cap rotating it anti-clock wise.

2) Pull out the cartridge filter.



3) Insert new cartridge filter and double check it is in the right position (inserted in the appropriate hole).

4) Tighten the cap rotating clock wise.

LUBRICANTS

It will be readily understood how important adequate lubrication is to high technology pumps like the Varian vacuum pumps. Correct use of appropriate lubricants makes a significant contribution to achieving best performance and warding off defects.

When handling lubricants, the following sanitary protection measures should be observed at all times:

- Avoid prolonged, excessive or repeated contact of the skin with products for lubrication, and also avoid directly inhaling the fumes or vapors of such products.
- Protect the skin by wearing appropriate clothes and equipment (e.g. special suits, glasses or, where permitted by the safety regulations, gloves) or by applying a special protective product.
- Clean the skin carefully after contact with the lubricants by washing freely with water and soap.
- Apply a skin cream after washing.
- Take off and change clothes or shoes on which oil has been spilled.
- Never put rags dripping with oil into the pockets of your clothes.

When disposing of waste lubricants, observe the following environment protection regulations:

- The lubricants risk contaminating the water and the ground! Therefore never pour lubricating products on to the ground, into water or in the sewage system. All violations of these

rules are liable to persecution as provided for by law. When using lubricants always keep an oil can nearby.

- Take care in draining off waste oils. In disposal of these products respect all regulations in force concerning waste oil disposal.

The recommended lubricating oil is the Varian SW60 oil. The SW60 oil is a general purpose mechanical pump fluid specifically engineered to provide superior performance in high speed direct drive mechanical pumps.

These precisely distilled fluids (100% solvent refined neutral paraffinic oil) deliver lower base pressure capability, faster pump-down cycles, and reduced maintenance requirements on both the pump and the fluid.

It is absolutely necessary to continue using the lubricants initially used to fill the tank. If this is not possible for organizational or business reasons, use only products with the same characteristics as the previous oils.

Only use of lubricants of suitable quality will guarantee safe operation of the pumps.

☞ CAUTION

Mineral oils and the PFPE oil are incompatible. To change from one type to another, the pump must be stripped down completely and all parts washed carefully to eliminate all oil residues.

If you expect to have to use other lubricants, first find out if the two products are compatible. In cases of doubt, the lubricant used up to that time must be flushed out by way of a pump flushing procedure.

☞ CAUTION

To avoid the risk of contaminating the oil, absolute cleanliness of the pump and surrounding area must be ensured during the lubrication procedures.

SW60 oil characteristics

PROPERTY	UNIT OF MEASURE	SW60
Vapour Pressure @ 25°C	Torr	$5x10^{-8}$
Viscosity @ 40 °C	cSt	55
Max Temperature	°C	150
Flash point	°C	220

SW60 Oil Description
SW oil have superior features;

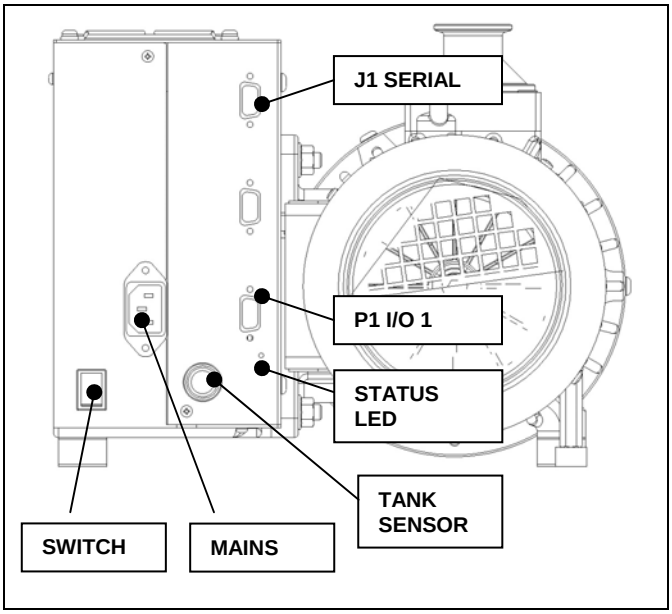
- Reduced deposits, thanks to the absence of heavy metals (ashless);
- Odorless;
- Exceptional lubricating properties and protection against the most common solvents, and high oxidation resistance;
- High anti-emulsifying power with water;
- Minimal variations in viscosity according to temperature;
- Very low volatility (vapor tension) and thus suitable for use on high vacuum pumps;
- Resistance to aging under the effect of atmospheric agents (ozone, water, light);
- Chemical and physiological inertia of primary importance, and extremely high anti-emulsifying properties.

This special type of oil is suitable for use in environments containing noble or inert gases.

The SW60 oil described is combustible. If during normal use the vacuum pump should take in mixtures with an oxygen content greater than 21% or pure oxygen, this should cause:

- Oxidation of the oil and thus the loss of its lubricating properties, with serious damage to the pump itself;
- Formation of conditions favorable to explosion in the pump tank.

PUMP ELECTRONIC CONTROLLER



Technical Specifications

- Input voltage: 200V-240V 50/60 Hz
- Max input power: 1200 VA
- Output voltage: 240 Vrms 3ph;
  Max frequency: 64 Hz (factory setting)
- Starting phase maximum power: 950 W
- Normal Operation maximum power: 950 W
- Maximum room temperature: 40 °C
- Protection level: IP 20
- CE mark:

- EN55011 cat "B"	- EN61000-4-5
- EN61000-3-2	- RF EN61000-4-6
- EN61000-3-3	- EN61000-4-8
- ESD EN61000-4-2	- EN61000-4-11
- EN61000-4-3	- EN61010-1
- EN6100-4-4	

- CSA mark:
  - EN61010-1, Installation category II, pollution degree 2
  - EN60950

NOTE

Before connecting the IEC320 mains cable, install the Retention Spring provided with the MS40+.
The Retention Spring has to be fastened to IEC320 connector lateral screws.

NOTE

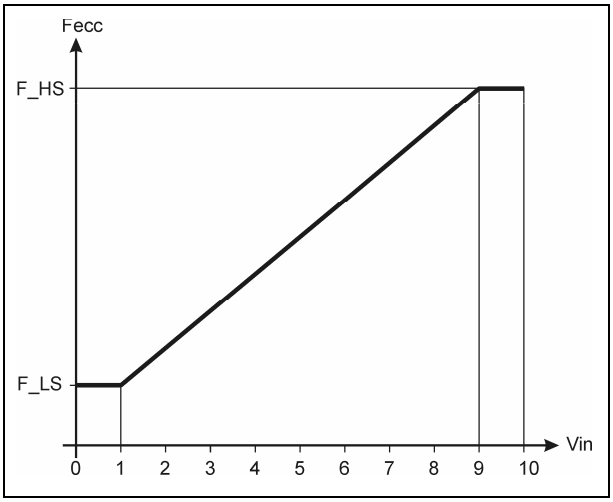
Use the Retention Spring to secure the mains cable into the IEC320 socket.

Input/Output Communications:

P1 – I/O

PIN N.	SIGNAL NAME	IN / OUT
1	Interlock. Status (N.O. relay contact)	out
2	Speed setting (0-10V)	in
3	Oil level (relay contact)	out
4	Start (-)	in
5	Ground	out
6	Interlock. Status (N.O. relay contact)	out
7	Oil level (relay contact)	out
8	Start (+)	in
9	24V	out

- Interlock: N.O. Relay contact – It is closed as soon as the rotational frequency exceed the threshold defined with window no.102 (plus histerisys defined by window 105). Factory set 40Hz.
- Speed setting: Electric motor speed setting – linear setting between 1V=15Hz and 9V= Win.120 setting:
  - High speed (60 Hz): Vin>9V
  - Low speed (40 Hz): Vin<1V



- Oil level: N.O. Relay contact – It is closed as soon as the oil level comes down under the minimum level – The pump is not stopped but the following starting is disabled.
- Start/stop: If the inverter is managed by remote port it manage the pump starting – if you are operating in serial mode it enables the starting. (pin 8 to pin 9 / pin 4 to pin 5).
- Rotational speed setting by analog input (0-10V).

NOTE

The pump operation is I/O signals dependent so you must always plug-in the provided mating connector to start the pump.

RS 232/RS 485 COMMUNICATION DESCRIPTION

Both the RS 232 and the RS 485 interfaces are available on the connector J2

J2 – Serial Port

PIN N.	SIGNAL NAME
1	+ 5 V out
2	TX (RS232)
3	RX (RS232)
4	Spare
5	GND
6	A+ (RS485)
7	Spare
8	B- (RS485)
9	Spare

The communication protocol is the same (see the structure below), but only the RS 485 manages the address field. Therefore to enable the RS 485 is necessary to select the type of communication as well as the device address by means of the T-plus software.

NOTE

The RS-485 is a 2-wire (gnd optional) half-duplex communication link.

Communication Format

- Physical level: both RS232 e RS485
- 8 data bit
- no parity
- 1 stop bit
- baud rate: 600/1200/2400/4800/9600 programmable

Communication Protocol

The communication protocol is a MASTER/SLAVE type where:

- Host = MASTER
- Pump = SLAVE

The communication is performed in the following way:

1. the host (MASTER) send a `MESSAGE + CRC` to the controller (SLAVE);
2. the controller answer with an `ANSWER + CRC` to the host.

The `MESSAGE` is a string with the following format:

`<STX>+<ADDR>+<WIN>+<COM>+<DATA>+<ETX>+<CRC>`

where:

NOTE

When a data is indicated between two quotes ('...') it means that the indicated data is the corresponding ASCII character.

- `<STX>` (Start of transmission) = 0x02
- `<ADDR>` (Unit address) = 0x80 (for RS 232) `<ADDR>` (Unit address) = 0x80 + device number (0 to 31) (for RS 485)
- `<WIN>` (Window) = a string of 3 numeric character indicating the window number (from '000' to '999'); for the meaning of each window see the relevant paragraph.
- `<COM>` (Command) = 0x30 to read the window, 0x31 to write into the window
- `<DATA>` = an alphanumeric ASCII string with the data to be written into the window. In case of a reading command this field is not present. The field length is variable according to the data type as per the following table:

DATA TYPE	FIELD LENGTH	VALID CHARACTERS
Logic (L)	1	'0' = OFF '1' = ON
Numeric (N)	6	'-', '.', '0' . . . '9' right justified with '0'
Alphanumeric (A)	10	from blank to '_' (ASCII)

- `<ETX>` (End of transmission) = 0x03
- `<CRC>` = XOR of all characters subsequent to `<STX>` and including the `<ETX>` terminator. The value is hexadecimal coded and indicated by two ASCII character.

The addressed SLAVE will respond with an `ANSWER` whose structure depends from the `MESSAGE` type.

When the `MESSAGE` is a reading command, the SLAVE will respond transmitting a string with the same structure of the `MESSAGE`.

The controller can answers with the following response types:

TYPE	LENGTH	VALUE	DESCRIPTION
Logic	1 byte	-	After a read instruction of a logic window
Numeric	6 bytes	-	After a read instruction of a numeric window
Alpha-numeric	10 bytes	-	After a read instruction of an alphanumeric window
ACK	1 byte	(0x6)	The command execution has been successfully completed
NACK	1 byte	(0x15)	The command execution has been failed
Unknown Window	1 byte	(0x32)	The specified window in the command is not a valid window
Data Type Error	1 byte	(0x33)	The data type specified in the command (Logic, Numeric or Alphanumeric) is not accorded with the specified Window
Out of Range	1 byte	(0x34)	The value expressed during a write command is out of the range value of the specified window
Win Disabled	1 byte	(0x35)	The specified window is Read Only or temporarily disabled (some values cannot be changed while pump is running)

NOTE

Using the RS 485 interface, the message structure remains identical to the one used for the RS 232 interface, the only difference being that the value assigned to the ADDRESS `<ADDR>`

Examples:

Command: START
Source: PC
Destination: Pump

02	80	30	30	30	31	31	03	42	33
STX	ADDR	WINDOW			WR	ON	ETX	CRC	

Source: Pump
Destination: PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

Command: STOP
Source: PC
Destination: Pump

02	80	30	30	30	31	30	03	42	32
STX	ADDR	WINDOW			WR	OFF	ETX	CRC	

Source: Pump
Destination: PC

02	80	06	03	38	35
STX	ADDR	ACK	ETX	CRC	

Command: READ PUMP STATUS
Source: PC
Destination: Pump (with address = 3)

02	83	32	30	35	30	03	38	37
STX	ADDR	WINDOW			RD	ETX	CRC	

Source: Pump (with address = 3 in stop status)
Destination: PC

02	83	32	30	35	30	30	30	30	30	30	03	38	37
STX	ADDR	WINDOW			DATA (STATUS)						ETX	CRC	

Windows Meaning

WIN	TYPE	R/W	DESCRIPTION
000	L	RW	START/STOP (1= START ; 0= STOP)
008	L	RW	REMOTE/SERIAL CONFIGURATION (1= Remote ; 0= Serial)
102	N	RW	SET POINT VALUE [Hz] (0 – 100)
105	N	RW	SET POINT HYSTERESIS [%] (0 – 100)
108	N	RW	BAUD RATE (0-4) [600, 1200, 2400, 4200, 9600]
120	N	RW	ROTATIONAL FREQUENCY SETTING [Hz] (40 - 60)
127	N	R	ROTATIONAL FREQUENCY SETTING [rpm] (read only)
200	N	R	BUS CURRENT [mA]
201	N	R	3PHASE VOLTAGE [Vrms]
202	N	R	POWER [W]
203	N	R	DRIVING FREQUENCY [Hz]
205	N	R	STATUS (0=stop; 1=wait interlock; 2=start; 3=autotuning; 5=normal; 6=fail)
206	N	R	ERROR CODE: Bit 7: Motor blocked; Bit 6: shortcircuit; Bit 5: Undervoltage/Overvoltage; Bit 4:Motor overtemp; Bit 3: Verify line; Bit 2: Controller overtemp; Bit 1: Bus Undervoltage; Bit 0: overcurrent
207	N	R	OUTPUT FREQUENCY [rpm]
211	N	R	JGBT TEMPERATURE [°C]
216	N	R	CONTROLLER TEMPERATURE [°C]
222	N	R	POWER SUPPLY TEMPERATURE [°C]
225	N	R	OIL LEVEL (0=level ok; Bit 0: underlevel; Bit 1: maintenance)
233	N	R	ROTATIONAL FREQUENCY [rpm]
300	N	R	CYCLE TIME [min]
301	N	R	CYCLE NUMBER
302	N	R	PUMP LIFE [h]
305	N	R	TIME WITH OIL UNDER LEVEL [min]
306	N	R	TIME WITH DIRTY FILTER [min]
307	N	R	TIME CONTROLLER STAND BY
319	A	RW	CONTROLLER MODEL NUMBER
320	A	RW	PUMP MODEL NUMBER
321	A	RW	PUMP SPECIAL MODEL NUMBER
322	A	RW	PUMP SERIAL NUMBER
323	A	RW	CONTROLLER SERIAL NUMBER
358	N	RW	MAINTENACE TIMER [hours]
362	N	R	LAST HOUR TEMPERATURE AVERAGE [°C]
364	N	R	LAST HOUR AVERAGE POWER [W]
365	N	R	LAST HOUR AVERAGE FREQUENCY [Hz]
382	N	R	LAST HOUR AVERAGE TEMPERATURE [°C]
384	N	R	AVERAGE POWER [W]
400	A	R	PROGRAM LISTING CRC
402	A	R	PARAMETER LISTING CRC
406	A	R	PROGRAM LISTING CODE & REVISION
407	A	R	PARAMETER LISTING CODE & REVISION
503	N	RW	RS485 SERIAL ADDRESS SETTING [0-31]
504	L	RW	SERIAL TYPE SELECT (0=RS232; 1=RS485)

Operational limits:

INPUT VOLTAGE (V)	CONTROLLER STATUS
< 180	Power fail
180 – 264	Operative
> 264	Power fail

Status Led

LED STATUS	CONTROLLER STATUS
Off	Stop
Green blinking	Ramp – Autotuning
Green	Normal Operation
Red	Fail
Red blinking	Oil level fail
Orange + Off	Reset + selftest
Orange blinking	Maintenance required

NOTE:

When you switch the controller on an electronic self-test is performed, during such phase you'll see the led Orange for 1 sec. And turned off for two other seconds.
Immediately after the first phase the controller perform a specific test on the pump rotor in order to be sure that it isn't locked.

Electronic Self-test

When you switch the pump on with the main On/Off switch the pump doesn't start immediately but it starts only after about two seconds.
This test time isn't required if the pump is already powered as when it is operated in remote or serial mode.

Rotor Lock Test

The rotational frequency is checked continuously. If the rotor remains still for more than 20 sec. the pump status is changed to "Fail".

Oil Level Check

The oil level is continuously checked even when the pump is in Stop status. If the oil level check highlights at low level while the pump is OFF, it won't starts again. If the oil level check highlights at low level during the pump operation, it will continue to run but, if you switch the pump off it will be impossible to start again.

NOTE:

If the electronic controller status is "Oil Under-level" the pump starting is not allowed.

NOTE

If the oil level check fails (low level) the pump doesn't stop. The test only activates the output described above.

An Oil level sensor fail is highlighted by means of quick status led blinking and RS232 window (see "Status led" and "Window meaning" tables).

ACCESSORIES

PART NUMBER	DESCRIPTION
949-9201	MS40+ Exhaust filter
949-9202	MS40+ 1 Litre Oil Tank
949-9203	Maintenance kit
949-9396	Power cable EU
949-9400	208Vac US Power cable
949-9398	Power cable UK
949-9399	Power cable IEC320
969-9883	T-PLUS Navigator SW (w/serial cable)

Request for Return

1. A Return Authorization Number (RA#) **WILL NOT** be issued until this Request for Return is completely filled out, signed and returned to Varian Customer Service.
2. Return shipments shall be made in compliance with local and international **Shipping Regulations** (IATA, DOT, UN).
3. The customer is expected to take the following actions to ensure the **Safety** of workers at Varian: (a) Drain any oils or other liquids, (b) Purge or flush all gasses, (c) Wipe off any excess residues in or on the equipment, (d) Package the equipment to prevent shipping damage, (for Advance Exchanges please use packing material from replacement unit).
4. Make sure the shipping documents clearly show the RA# and then return the package to the Varian location nearest you.

North and South America
Varian Vacuum Technologies
121 Hartwell Ave
Lexington, MA 02421
Phone : +1 781 8617200
Fax: +1 781 8609252

Europe and Middle East
Varian SpA
Via Flli Varian 54
10040 Leini (TO) – ITALY
Phone: +39 011 9979111
Fax: +39 011 9979330

Asia and ROW
Varian Vacuum Technologies
Local Office

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 P/N	Varian S/N	Purchase Reference

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 Vacuum Technologies **CAN NOT ACCEPT** any equipment which contains **BIOLOGICAL HAZARDS** or **RADIOACTIVITY**. Call Varian Customer Service to discuss alternatives if this requirement presents a problem.

The equipment listed above (check one):

☐ **HAS NOT** been exposed to any toxic or hazardous materials

OR

☐ **HAS** been exposed to any toxic or hazardous materials. In case of this selection, check boxes for any materials that equipment was exposed to, check all categories that apply:

☐ Toxic ☐ Corrosive ☐ Reactive ☐ Flammable ☐ Explosive ☐ Biological ☐ Radioactive

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

………..

Print Name: …………………………………. Customer Authorized Signature: ……………...…………………….

Print Title: …………………………………... Date: ..…../..…../……

NOTE: If a product is received at Varian 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 Varian employees as well as to any third party occurring as a result of exposure to toxic or hazardous materials present in the product.

Do not write below this line

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

VARIAN

Request for Return

ISO 9001 REGISTERED

FAILURE REPORT

TURBO PUMPS and TURBOCONTROLLERS

☐ Does not start	☐ Noise	POSITION	PARAMETERS		
☐ Does not spin freely	☐ Vibrations	☐ Vertical	Power:	Rotational Speed:	
☐ Does not reach full speed	☐ Leak	☐ Horizontal	Current:	Inlet Pressure:	
☐ Mechanical Contact	☐ Overtemperature	☐ Upside-down	Temp 1:	Foreline Pressure:	
☐ Cooling defective		☐ Other:	Temp 2:	Purge flow:	
		…….	OPERATION TIME:		
TURBOCONTROLLER ERROR MESSAGE:					

ION PUMPS/CONTROLLERS

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

VALVES/COMPONENTS

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

LEAK DETECTORS

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

INSTRUMENTS

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

PRIMARY PUMPS

☐ Pump doesn't start	☐ Noisy pump (describe)
☐ Doesn't reach vacuum	☐ Over temperature
☐ Pump seized	☐ Other
Customer application:	

DIFFUSION PUMPS

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

FAILURE DESCRIPTION

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

NOTA: Su richiesta questo documento è disponibile anche in Tedesco, Italiano e Francese.
REMARQUE : Sur demande ce document est également disponible en allemand, italien et français.
HINWEIS: Auf Aufrage ist diese Unterlage auch auf Deutsch, Italienisch und Französisch erhältlich.

Sales and Service Offices

France and Benelux
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 84
Fax: (33) 1 69 86 29 88
From Benelux Tel: (31) 118 67 15 70
From Benelux Fax: (31) 118 67 15 69

Canada
Central coordination through:
Varian Vacuum Technologies
121 Hartwell Avenue
Lexington, MA 02421
USA
Tel: (781) 861 7200
Fax: (781) 860 5437
Toll Free # 1 (800) 882 7426

China
Varian Technologies - Beijing
Rm 1648 Central Tower South Wing
Beijing Junefield Plaza
No. 10 XuanWuMenWai Street
Beijing 100052
P.R. China
Tel: (86) 10 63108550
Fax: (86) 10 63100141
Toll Free: 800 820 6556

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 28521171
Fax: (91) 11 28521173

Italy
Varian Inc.
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
Toll Free: 0120 655 040

Korea
Varian Technologies Korea, Ltd
Shinsa 2nd Bldg. 2F
966-5 Daechi-dong
Kangnam-gu, Seoul
Korea 135-280
Tel: (82) 2 3452 2452
Fax: (82) 2 3452 2451
Toll Free: 080 222 2452

Mexico
Varian, S. de R.L. de C.V.
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-6, No.77, Hsin Tai Wu Rd., Sec. 1
Hsi chih, Taipei Hsien
Taiwan, R.O.C.
Tel: (886) 2 2698 9555
Fax: (886) 2 2698 9678
Toll Free: 0800 051342

UK and Ireland
Varian Ltd.
6 Mead Road
Oxford Industrial Park - Yarnton
Oxford OX5 1QU - England
Tel: (44) 1865 291570
Fax: (44) 1865 291571

United States
Varian Vacuum Technologies
121 Hartwell Avenue
Lexington, MA 02421
USA
Tel: (781) 861 7200
Fax: (781) 860 5437

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

Customer Support & Service:

North America
Toll-Free: 1 800 882 7426
vtl.technical.support@varianinc.com

Europe
Tel: 00 800 234 234 00
vtt.technical.support@varianinc.com

China
Toll-Free: 800 820 8266
vtc.technical.support@varianinc.com

Japan
Toll-Free: 0120 655 040
vtj.technical.support@varianinc.com

Korea
Toll-Free: 080 222 2452
vtk.technical.support@varianinc.com

Taiwan
Toll-Free: 0 800 051 342
vtw.technical.support@varianinc.com

Worldwide Web Site, Catalog and Order On-line:
www.varianinc.com

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03/06