

MS40+ Single Stage Rotary Vane Pumps

Models:

9499225, 9499240, 9499241

**Manuale di Istruzioni
Bedienungshandbuch
Notice de Mode D'Emploi
User Manual**

87-901-008-01 (H.00)

02/2021



Agilent Technologies

Notices

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CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

MS40+ Single Stage Rotary Vane Pumps



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Contents

1 Istruzioni per l'uso 9

Informazioni Generali	10
Immagazzinamento	12
Preparazione per l'installazione	12
Installazione	14
Uso	17
Manutenzione	17
Smaltimento	20

2 Gebrauchsanleitung 21

Allgemeine Hinweise	22
Lagerung	24
Vor der Installation	24
Installation	26
Gebrauch	29
Wartung	29
Entsorgung	32

3	Mode d'emploi	34
	Indications générales	35
	Emmagasinage	37
	Préparation pour l'installation	37
	Installation	39
	Utilisation	42
	Maintenance	42
	Mise au rebut	45
4	Instructions for Use	47
	General Information	48
	Storage	50
	Preparation for Installation	50
	Installation	52
	Use	55
	Maintenance	55
	Disposal	58
5	Technical Information	60
	Section I	62
	Technical Description	62
	Vacuum Seals	63
	Anti-Suckback Device	63
	Technical Data	64

Safety Precautions	66
Transport and Installation	66
Section II	69
Connection to the Electric Supply	69
Inlet and exhaust connections	69
Starting and Running the Pump	71
Stopping the Pump	72
Safety Rules	72
Warning Notes	73
Caution Notes	75
Maintenance Actions	76
Oil and Filter Cartridge Replacement Procedures	78
Lubricants	80
Pump Electronic Controller	83
RS 232/RS 485 Communication Description	87
Troubleshooting	94
Accessories	98



1

Istruzioni per l'uso

Informazioni Generali	10
Simboli usati	11
Immagazzinamento	12
Preparazione per l'installazione	12
Installazione	14
Uso	17
Manutenzione	17
Smaltimento	20

Traduzione delle istruzioni originali



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 Agilent prima dell'utilizzo dell'apparecchiatura. La Agilent 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, controllate da un'unità elettronica.

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:

AVVERTENZA!



I messaggi di avvertenza 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.

Simboli usati

I seguenti simboli sono utilizzati in modo coerente in tutte le illustrazioni:

Simboli	Descrizione
	Superficie calda “Pericolo di scottature se vengono toccate le parti calde”
	Pericolo “Vedere istruzioni di installazione/Modi d’uso”
	Conduttore di protezione (PE)
	ON - Accensione (Alimentazione)
	OFF - Spegnimento (Alimentazione)
	Pericolo, rischio di scossa elettrica

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 "sub-D" a 9 contatti per I/O (femmina) (escluso il modello 9499241)
- 1 connettore "sub-D" a 9 contatti per RS232 (maschio) (escluso il modello 9499241)

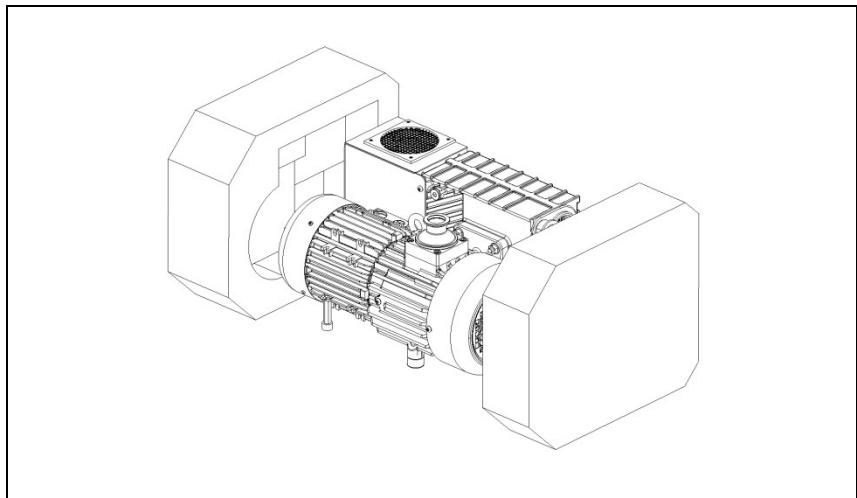


Figura 1

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)

ATTENZIONE! Prima di avviare la pompa, occorre procedere al rifornimento di olio lubrificante, poichè la pompa viene fornita scarica.

NOTA

È importante che il livello dell'olio rimanga tra i valori MIN e MAX visualizzati dall'indicatore di livello posto sul lato della pompa.

ATTENZIONE! È obbligatorio lasciare ampio spazio libero tutto intorno alla pompa al fine di consentire una corretta circolazione d'aria; inserire la pompa in un volume chiuso senza ricircolo d'aria non è consentito. Per un sistema di sicurezza interno, la pompa superata la temperatura ambiente di 40 °C, potrebbe manifestare un errore.

AVVERTENZA! **Mantenere i tappi posti sulle flange di aspirazione e scarico e non accendere la pompa finchè gli stessi non vengono appropriatamente collegati rispettivamente allo strumento ed alla linea di exhaust.**



AVVERTENZA!



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. L'inosservanza di queste precauzioni può causare danni alla macchina ed all'operatore.

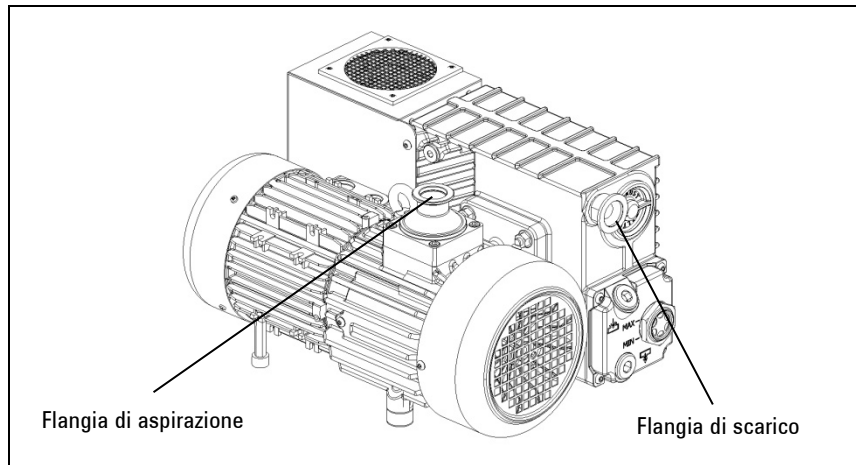


Figura 2

ATTENZIONE!

Controllare che la tensione di alimentazione corrisponda al campo di valori indicati sui dati di targa.

Collegare la pompa all'alimentazione.

AVVERTENZA!



La pompa deve essere installata in modo tale da permettere una facile interruzione della linea d'alimentazione elettrica.

La pompa dev'essere utilizzata con il cavo di alimentazione fornito insieme alla pompa (disponibile anche come accessorio).

Uso

Attivando l'interruttore di alimentazione, dopo una breve fase di autotest, la pompa si avvia automaticamente. Per arrestarla è necessario spegnere l'interruttore. In alternativa è possibile gestire l'avviamento e l'arresto della pompa da remoto mediante comunicazione seriale.

AVVERTENZA!



La pompa è progettata per operare con gas inerti 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.

AVVERTENZA!



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

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



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



AVVERTENZA! 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.



AVVERTENZA! 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.

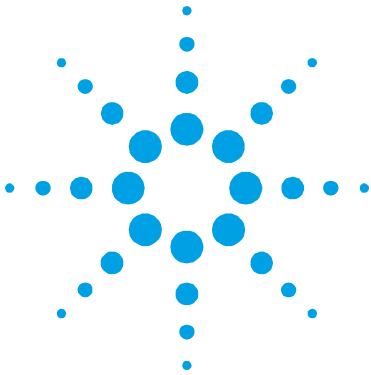
Il simbolo qui sotto riportato è applicato in ottemperanza alla direttiva CE denominata "WEEE".

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.



Per maggiori informazioni riferirsi a:

<http://www.agilent.com/environment/product/index.shtml>



2 Gebrauchsanleitung

Allgemeine Hinweise	22
Verwendete Symbole	23
Lagerung	24
Vor der Installation	24
Installation	26
Gebrauch	29
Wartung	29
Entsorgung	32

Übersetzung der Originalanleitungen



Allgemeine Hinweise

Dieses Gerät ist für den professionellen Gebrauch bestimmt. Vor dem Gebrauch soll der Benutzer dieses Handbuch sowie alle weiteren von Agilent 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 Agilent keinerlei Haftung.

Die MS40+ Single Stage Rotary Vane Pumps sind ölbadeschmierte, dichte, einstufige Flügelzellenpumpen, die von einer elektronischen Steuereinheit betätigt werden

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:

WARNUNG!



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

VORSICHT!







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

HINWEIS

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

Verwendete Symbole

Folgende Symbole wurden durchgängig in allen Illustrationen verwendet:

Symbole	Beschreibung
	Heiße Oberfläche –Verbrennungsgefahr bei Berührung
	Gefahr – siehe Installations- und Gebrauchsanleitung
	Schutzleiter (PE)
	ON - Einschalten (Versorgung)
	OFF - Ausschalten (Versorgung)
	Gefahr von Stromschlägen

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.

HINWEIS

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.

HINWEIS

Die Pumpe wird mit einigen Standardzubehörteilen geliefert:

- 1 9-Stift-Stecker "sub-D" für I/O (Steckbuchse)
(außer Modell 9499241)
- 1 9-Stift-Stecker "sub-D" für RS232 (Stecker)
(außer Modell 9499241)

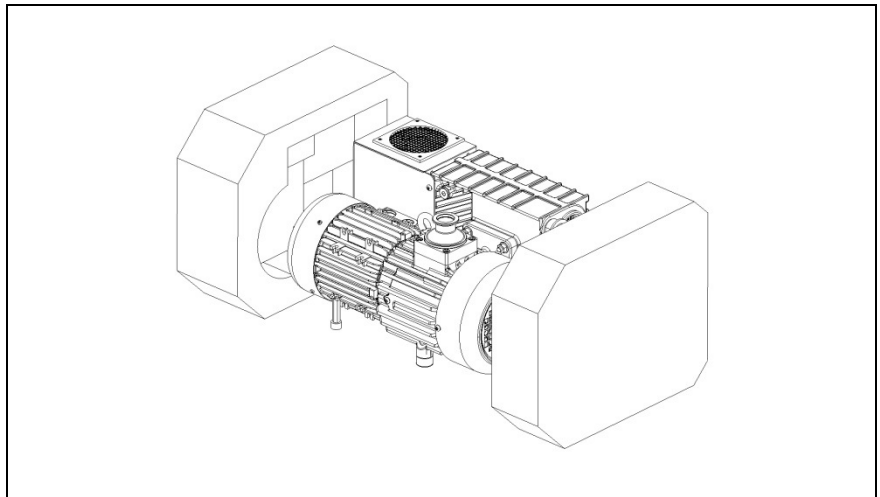


Abbildung 1

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)

VORSICHT!

Die Pumpe ist vor ihrer Inbetriebnahme mit Schmieröl zu füllen, da sie leer geliefert wird.

HINWEIS

Es ist wichtig, dass der Ölstand zwischen der MIN- und MAX-Werte auf der Füllstandsanzeige auf der Seite der Pumpe angezeigt bleibt.

VORSICHT!

Um eine korrekte Luftzirkulation zu gewährleisten, sorgen Sie dafür, dass der Raum um die Pumpe herum frei ist. Die Pumpe darf nicht in einem geschlossenen Raum ohne Luftzirkulation aufgestellt werden. Wegen eines internen Sicherheitssystems könnte die Pumpe bei Überschreiten von 40 °C Umgebungstemperatur eine Fehlermeldung anzeigen.

WARNUNG!



Lassen Sie die Stopfen auf den Saug- und Auslassflanschen und schalten Sie die Pumpe erst ein, wenn diese ordnungsgemäß an das Gerät bzw. an die Auslassleitung angeschlossen wurden.

WARNUNG!



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

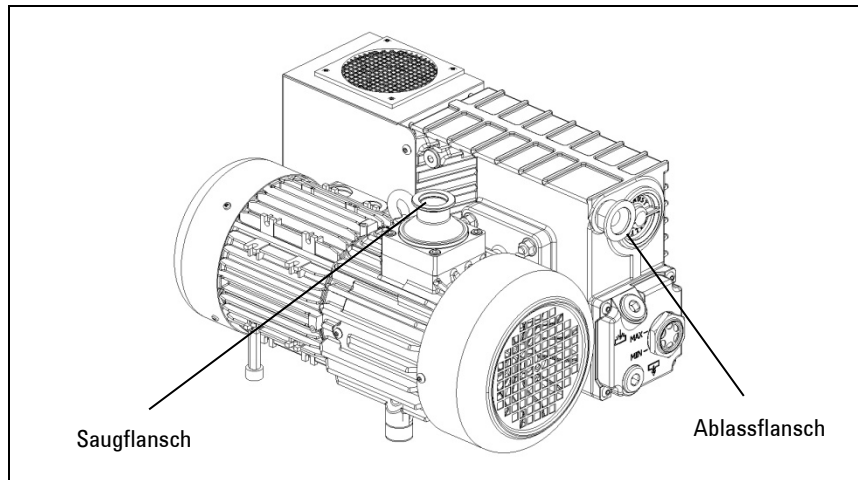


Abbildung 2

VORSICHT!

Vergewissern Sie sich, dass die Versorgungsspannung in dem auf dem Typenschild angegebenen Wertebereich liegt.

Die Pumpe an das Versorgungsnetz anschließen.

WARNUNG!

Die Pumpe muss so installiert werden, dass die Stromversorgung leicht unterbrochen werden kann.



Die Pumpe muss mit dem mitgelieferten Netzkabel (auch als Zubehör erhältlich) betrieben werden.

Gebrauch

Beim Einschalten des Netzschalters wird die Pumpe nach einer kurzen Selbsttestphase automatisch in Betrieb genommen. Zum Anhalten der Pumpe muss der Schalter ausgeschaltet werden. Optional kann das Ein- und Ausschalten der Pumpe über die serielle Kommunikation ferngesteuert werden.

WARNUNG!



Die Pumpe ist für den Betrieb mit Inertgas oder nicht korrosiven Gasen konzipiert. Der Einsatz mit potenziell 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.

WARNUNG!



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

WARNUNG!

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



WARNUNG!

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.



WARNUNG!

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.



WARNUNG!

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



HINWEIS

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.



Für weitere Informationen:

<http://www.agilent.com/environment/product/index.shtml>



3 Mode d'emploi

Indications générales	35
Symboles utilisés	36
Emmagasinage	37
Préparation pour l'installation	37
Installation	39
Utilisation	42
Maintenance	42
Mise au rebut	45

Traduction de la mode d'emploi originale



Indications générales

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 Agilent avant de l'utiliser. Agilent 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.

Les MS40+ Single Stage Rotary Vane Pumps sont des pompes rotatives monoétages, à palettes, étanches en bain d'huile, contrôlées par une unité électronique.

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:

AVERTISSEMENT!



Les messages d'avertissement 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.

Symboles utilisés

Les symboles suivants sont utilisés dans les différentes illustrations:

Symboles	Description
	Surface chaude "Risque de brûlure en cas de contact"
	Danger "Voir instructions d'installation/Mode d'emploi"
	Conducteur de protection (Terre)
	ON - Marche (Alimentation)
	OFF - Arrêt (Alimentation)
	Danger, risque d'électrisation

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 "sub-D" à 9 broches pour E/S (femelle)
(exclus le modèle 9499241)
- 1 connecteur "sub-D" à 9 broches pour RS232 (mâle)
(exclus le modèle 9499241)

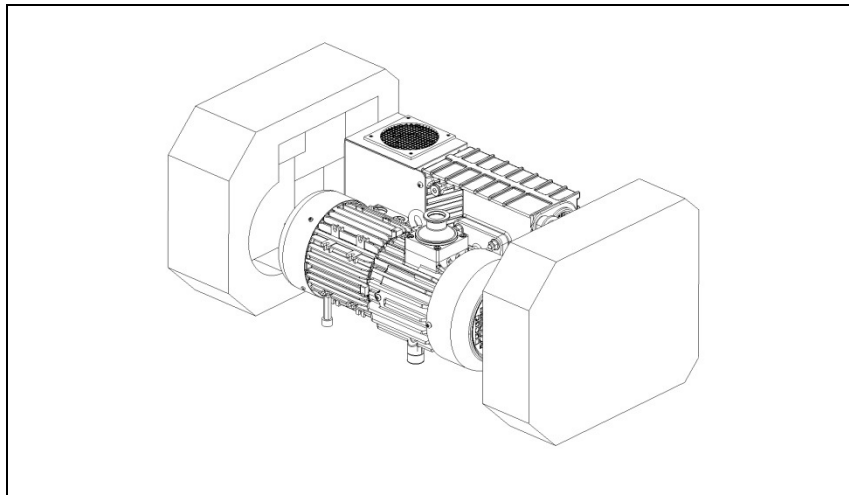


Figure 1

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)

ATTENTION!

Avant toute utilisation de la pompe, il est impératif de procéder à son remplissage en huile de lubrification car elle est livrée vide.

NOTE

Il est important que le niveau d'huile reste entre les valeurs MIN et MAX affichée sur l'indicateur de niveau sur le côté de la pompe.

ATTENTION!

Il est obligatoire de laisser un vaste espace libre tout autour de la pompe pour permettre à l'air de circuler correctement ; il est interdit de monter la pompe dans un lieu clos sans renouvellement de l'air. Du fait de la présence d'un système de sécurité interne à la pompe, il se peut qu'une erreur se déclenche si la température ambiante dépasse 40 °C.

AVERTISSEMENT!



Laisser les bouchons en place sur les brides d'aspiration et de vidange et ne pas mettre la pompe en marche tant que ceux-ci n'ont pas été raccordés respectivement à l'instrument et à la ligne d'évacuation (exhaust).

AVERTISSEMENT!



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. Le non-respect de ces précautions peut entraîner un danger pour l'opérateur et endommager la machine.

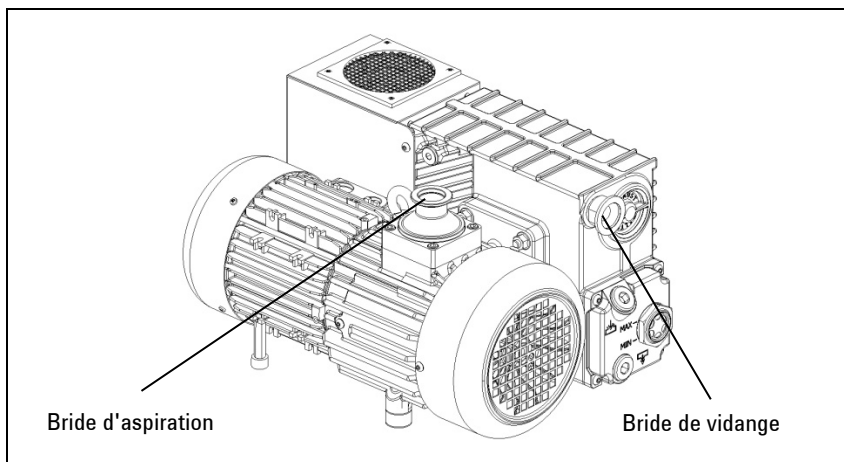


Figure 2

ATTENTION!

Vérifier que la tension d'alimentation correspond à la plage de valeurs reportées sur la plaque des données techniques.

Brancher la pompe à la source d'alimentation.

AVERTISSEMENT!



La pompe doit être installée de manière à permettre une interruption facile du circuit d'alimentation électrique.

La pompe doit être utilisée avec le câble d'alimentation fourni en même temps que la pompe (disponible également comme accessoire).

Utilisation

Une fois l'interrupteur d'alimentation activé, la pompe démarre automatiquement après une brève phase d'autotest. Pour l'arrêter, il faut actionner l'interrupteur. A la place, il est possible de gérer la mise en marche et l'arrêt de la pompe à distance par le biais d'une communication série.

AVERTISSEMENT!



La pompe est conçue pour fonctionner avec des gaz inertes 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.

AVERTISSEMENT!



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.

AVERTISSEMENT!

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



AVERTISSEMENT!

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



AVERTISSEMENT!

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.



AVERTISSEMENT!

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".

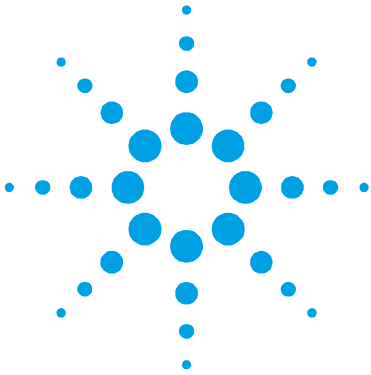
Ce symbole (**uniquement valide pour les pays de la Communauté européenne**) indique que le produit sur lequel il est appliqué NE doit PAS être mis au rebut avec les ordures ménagères ou les déchets industriels ordinaires, mais passer par un système de collecte sélective.

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.



Pour plus d'informations, rendez-vous à l'adresse:

<http://www.agilent.com/environment/product/index.shtml>



4 Instructions for Use

General Information	48
Symbols used	49
Storage	50
Preparation for Installation	50
Installation	52
Use	55
Maintenance	55
Disposal	58

Original Instructions



General Information

This equipment is destined for use by professionals. The user should read this instruction manual and any other additional information supplied by Agilent before operating the equipment. Agilent will not be held responsible for any events 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.

MS40+ Single Stage Rotary Vane Pumps are single-stage oil-sealed rotary vane pumps controlled by an electronic module.

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.

Symbols used

The following symbols are used consistently throughout in all illustration:

Symbols	Description
	Caution, hot surface: “Danger of burns if hot parts are touched”
	Warning “see installation/operating mode instruction”
	Protective conductor terminal
	ON - Power on (Power Supply)
	OFF - Power off (Power Supply)
	Caution, risk of electric shock

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 "sub-D" connector for I/O (female) (excluding model 9499241)
- 1 9 pin "sub-D" connector for RS232 (male) (excluding model 9499241)

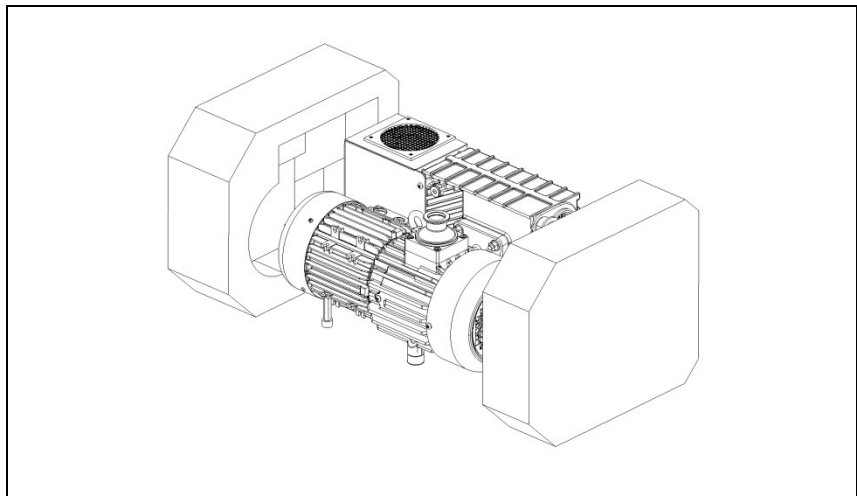


Figure 1

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).

CAUTION!

Before starting the pump, fill up with lubricating oil as the pump is delivered empty.

NOTE

It is important that the oil level stays within the range MIN and MAX that is indicated by the level gauge on the side of the pump.

CAUTION!

It is mandatory to leave ample free space all around the pump to allow for correct air circulation; it is forbidden to insert the pump into a closed space that restricts air circulation. The internal security system may notify of an error condition when the environmental operating temperature of the pump exceeds 40 °C.

WARNING!



Keep the caps in place on the suction and exhaust flanges and do not switch the pump on until the flanges are appropriately connected respectively to the exhaust instrument and to the exhaust line.

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. Non-observance of these precautions may be dangerous for the machine and the operator.

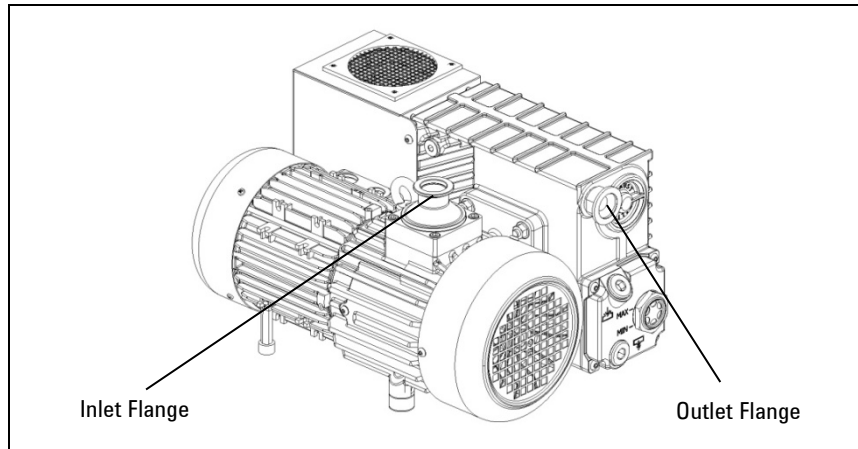


Figure 2

CAUTION!

Check that your electrical mains voltage corresponds to the range indicated on the data plate.

Connect the pump to the power supply.

WARNING!



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

The pump must be used with the power supply cable supplied with the pump (available also as an accessory).

Use

On turning the power switch on, a brief autotest phase is executed, after which the pump starts to run automatically. To stop the pump, turn off the power switch. As an alternative, pump starting and stopping can be controlled remotely over a serial connection.

WARNING!



The pump is designed to operate with inert or non-corrosive gases. It is categorically forbidden to use it with 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

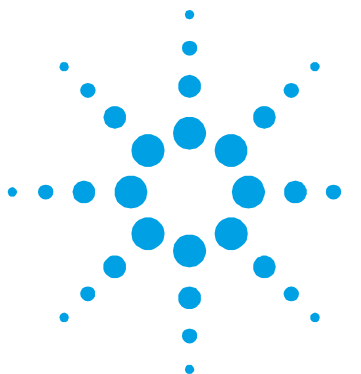
The following symbol is applied in accordance with the EC WEEE (Waste Electrical and Electronic Equipment) Directive. This symbol (**valid only in countries of the European Community**) indicates that the product it applies to must NOT be disposed of together with ordinary domestic or industrial waste 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.



For more information refer to:

<http://www.agilent.com/environment/product/index.shtml>



5 Technical Information

Section I	62
Technical Description	62
Vacuum Seals	63
Anti-Suckback Device	63
Technical Data	64
Dimensions	65
Safety Precautions	66
Transport and Installation	66
Preliminary Operations	68
Section II	69
Connection to the Electric Supply	69
Inlet and exhaust connections	69
Starting and Running the Pump	71
Stopping the Pump	72
Safety Rules	72
Warning Notes	73
Caution Notes	75
Maintenance Actions	76
Oil and Filter Cartridge Replacement Procedures	78
Oil Change Procedure	78
Filter Cartridge Replacement Procedure	79
Lubricants	80
AVF 60 Gold Oil Description	82

Original Instructions



Pump Electronic Controller	83
Technical Specifications	83
Input/Output Communications	85
P1 – I/O	85
RS 232/RS 485 Communication Description	87
J1 – Serial Port	87
Communication Format	87
Window Protocol Description	88
Examples	90
Window Meanings	91
Operational Limits	93
Status LED	93
Troubleshooting	94
Electronic Self-Test	94
Rotor Lock Test	97
Oil Level Check	97
Accessories	98

Original Instructions

Section I

Technical Description

The MS40+ Single Stage Rotary Vane Pumps are rotary vane pumps oil sealed, driven by an electrical motor.

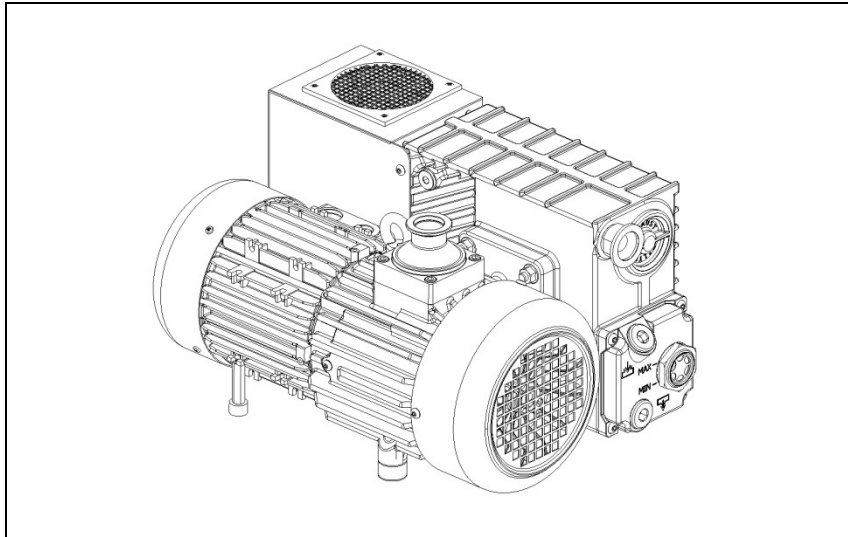


Figure 3

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.

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 FKM 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 back-flow towards the evacuated chamber 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.

Tab. 1

TECHNICAL DATA	RPM	UNITS	9499225	9499240	9499241
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
ROTATIONAL FREQUENCY min/max		Hz	40-60	40-60	40-60
NOISE LEVEL		dB(A)	≤ 62	≤ 62	≤ 62
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
Indoor Use Only					
Max Altitude 2000m					

* According to PNEURO P 6602

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

Dimensions

The following figure shows the pumps layout and dimensions:

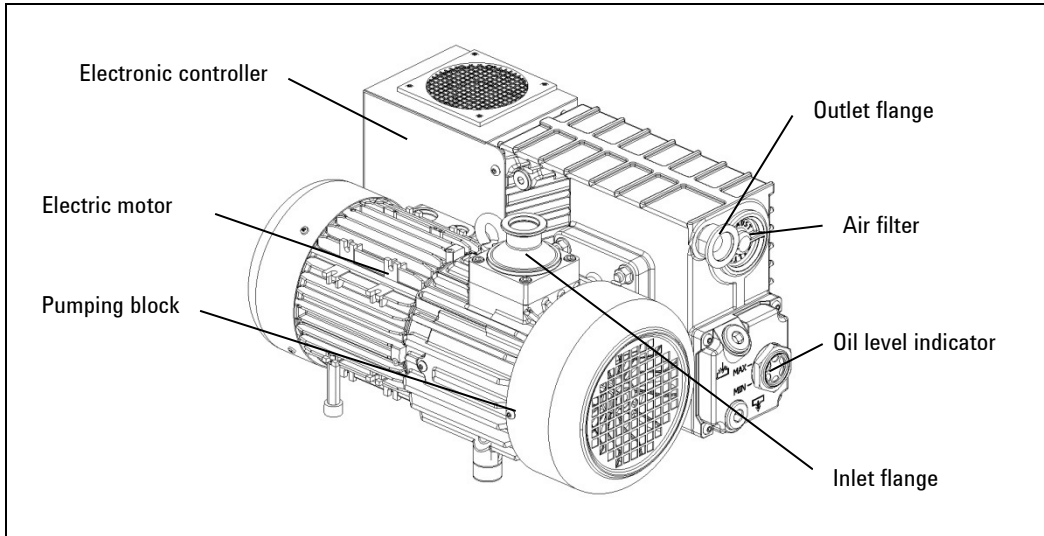


Figure 4 MS40+ Single Stage Rotary Vane Pumps layout

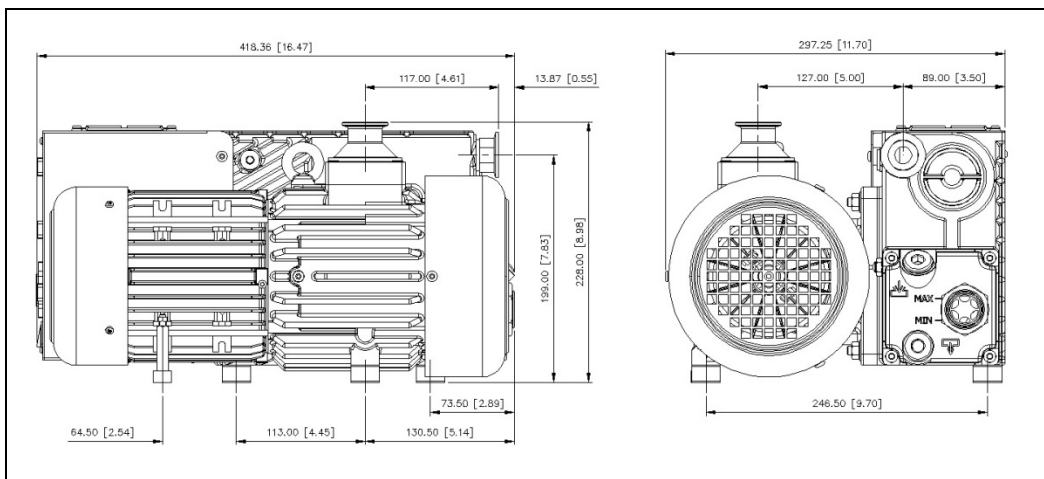


Figure 5 MS40+ Single Stage Rotary Vane Pumps dimensions

Safety Precautions

- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- 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 Agilent 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 plughole 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.

Inlet and exhaust connections

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

NOTE

For guaranteed reliable sealing, use an OR gasket in FKM.

The inlet duct is equipped with a sieve filter preventing solid parts 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

After switching off the pump using the main switch, wait at least 10 s before switching it back on.

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 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. To switch the pump off, act on the mains switch. It's recommended not to disconnect the power cord from the mains supply. 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

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 cord 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 protection 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 CO₂ extinguishers.**
- h **Carefully inspect the flanges to ensure that there is 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.**

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** Always check the lubricant and that it is properly distributed through the pump; inadequate lubrication may damage the pump seriously.
- d** Give the parts some form of marking as you strip them down to ensure that you reassemble them again in the proper order.
- e** 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.
- f** 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

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

Tab. 2

Oil level checking	Daily (before every starting)
Oil change	8.000 hours (light applications)
Anti such-back valve checking	6 months
Fan cover cleaning	6 months

NOTE

The scheduled maintenance for oil change is supported by an automatic timer provided by the electronic controller (available only on controllers equipped with serial interface). After 8000 h of operation the status led starts blinking orange. To switch off the alarm it's 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).

CAUTION!

Do not clean with Alcohol the plastic or rubber components 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 local 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.

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

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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. Remove the inlet and outlet pipes before opening the oil drain cap.
2. Place a tank for waste oil under the oil drain plug.

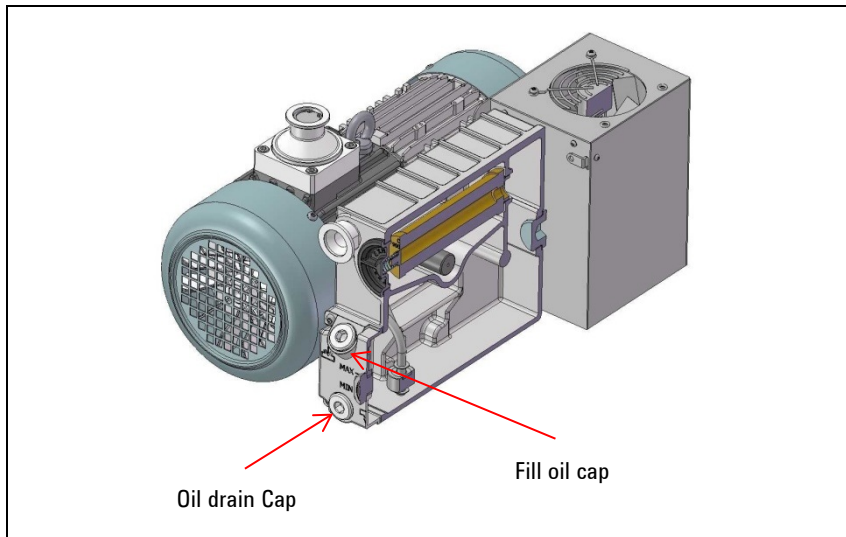


Figure 6

3. 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.
4. 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.
5. 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.

6. Open the fill oil cap using a 10 mm hex key and add AVF 60 Gold oil until reaching the maximum level on the sight glass.
7. Close the oil fill cap tight.
8. Replace the cartridge filter as per following slide.
9. The seam of the filter material must be oriented downwards.

Filter Cartridge Replacement Procedure

1. Unscrew the cap rotating it anti-clock wise, by hand or socket wrench with size 19 mm.
2. Pull out the cartridge filter.

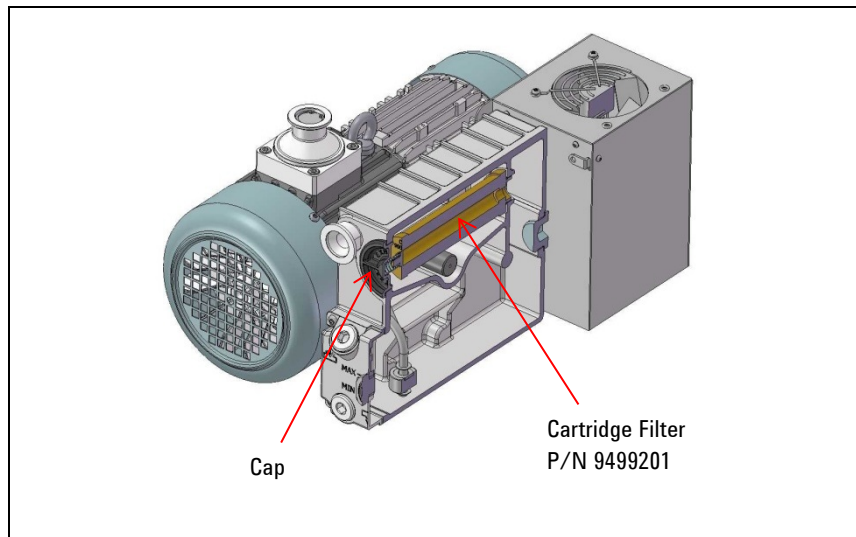


Figure 7

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, by hand or socket wrench with size 19 mm.

Lubricants

It will be readily understood how important adequate lubrication is to high technology pumps like the Agilent 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 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 Agilent AVF 60 Gold oil. The AVF 60 Gold 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.

Tab. 3 AVF 60 Gold oil characteristics

Property	Unit of measure	AVF60M
Vapour Pressure @ 25 °C	Torr	5x10 ⁻⁸
Viscosity @ 40 °C	cSt	55
Max Temperature	°C	150
Flash point	°C	220

AVF 60 Gold Oil Description

AVF 60 Gold 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 AVF 60 Gold 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

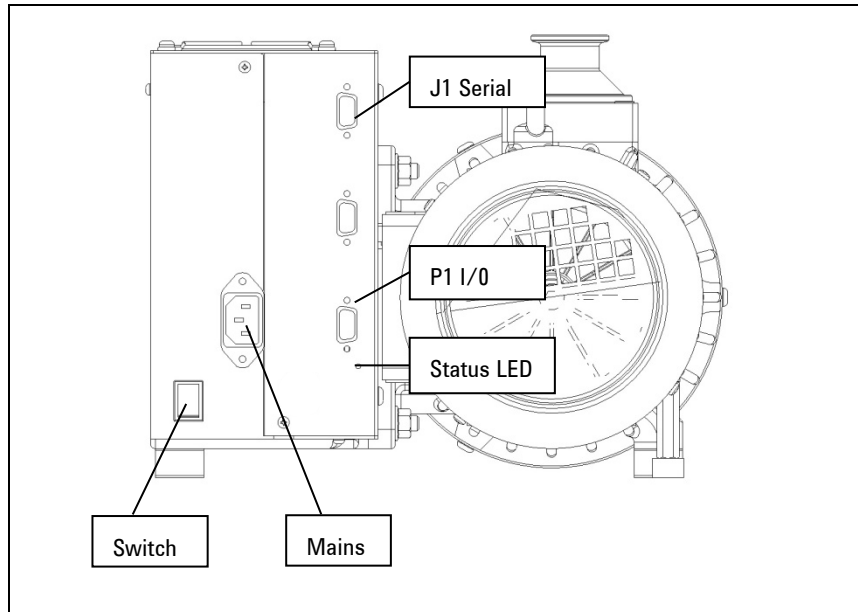


Figure 8

Technical Specifications

- Input voltage: 200V-240V 50/60 Hz
- Max input power: 1200 VA
- Maximum ambient temperature: 40 °C
- Ingress protection level: IP 20

- CE mark:

Tab. 4

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

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

Input/Output Communications

P1 – I/O

Tab. 5

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 command (24V-)	in
5	Ground	out
6	Interlock Status (N.O. relay contact)	out
7	Oil level (relay contact)	out
8	Start command (24+)	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).
- Speed setting: Pump speed setting – linear setting between 1V=15 Hz and 9 V= Win.120 setting:
 - High speed (60 Hz): Vin>9 V
 - Low speed (40 Hz): Vin<1 V

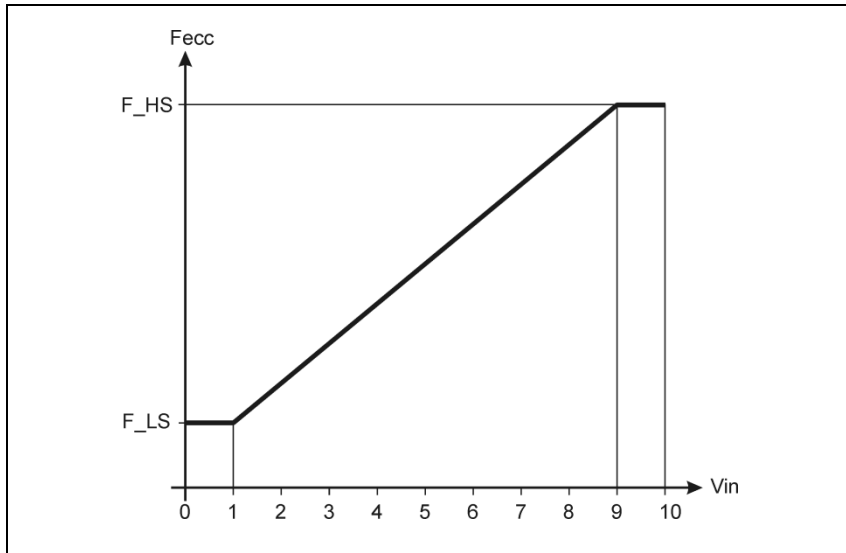


Figure 9

- Oil level: N.O. Relay contact – It is open as soon as the oil level comes down under the minimum level.
- 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 (using a 24V external source or connecting pin 8 to 9 and pin 4 to 5).
- Rotational speed setting by analog input (0-10 V).

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

J1 – Serial Port

Tab. 6

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 A-plus software.

NOTE

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

Communication Format

- 8 data bit
- no parity
- 1 stop bit
- baud rate: 600/1200/2400/4800/9600 programmable

Window Protocol Description

Communication Format

The communication protocol is a MASTER/SLAVE type where:

- 8 data bit
- no parity
- 1 stop bit
- baud rate: 600/1200/2400/4800/9600/19200/38400 programmable

Communication Protocol

The communication protocol is a MASTER/SLAVE type where:

- Host = MASTER
- Controller = 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:

Tab. 7

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.

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.

The controller can answers with the following response types:

Tab. 8

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
Alphanumeric	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

Type	Length	Value	Description
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 (for example you can't write the Soft Start when the 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	

Window Meanings

Tab. 9

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)

WIN	TYPE	R/W	DESCRIPTION
206	N	R	ERROR CODE: 128: Rotor blocked; 64: shortcircuit; 32: Undervoltage/Overvoltage; 16: Motor overtemp; 8: Verify line; 4: Controller overtemp; 2: Bus Undervoltage; 1: overcurrent
207	N	R	OUTPUT FREQUENCY [rpm]
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	R	CONTROLLER MODEL NUMBER
320	A	R	PUMP MODEL NUMBER
321	A	R	PUMP SPECIAL MODEL NUMBER
322	A	R	PUMP SERIAL NUMBER
323	A	R	CONTROLLER SERIAL NUMBER
358	N	R	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 TEMPERATURE DURING PUMP LIFE (°C)
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

Tab. 10

INPUT VOLTAGE (V)	CONTROLLER STATUS
200 – 264	Operative with full performance
180 – 200	Operative with reduced performance
< 180 or > 264	Non operative condition

Status LED

Tab. 11

LED STATUS	PUMP STATUS	MEANING
Off	Stop	The pump is in stand-by and ready to start.
Green blinking	Ramp or Autotuning	The pump has not yet reached its nominal speed. The pump is decreasing its speed due to a gas load that needs power over the available limit.
Green	Normal	The pump is running at its nominal speed.
Red	Fail	The pump is in fail. Check the error from A-plus software and follow the actions described in the table below.
Red blinking	Oil level warning	The oil level is under the limit. The led stops the red blinking only when the oil level is over the limit.
Orange	Starting self-test	At the start the pump is performing a self-test for few seconds.
Orange blinking	Required maintenance	The maintenance counter overcomes 8000 hours. To reset the counter, use the window 358 from A-plus software.

Troubleshooting

Tab. 12

ERROR CODE	FAIL	MEANING	POSSIBLE CAUSES	ACTIONS
1	Overcurrent	Required current from the motor over the current limit.	Reversed inlet and outlet connections.	Check that pump inlet port is connected to the instrument and that pump exhaust is connected to the exhaust line.
2	Internal undervoltage	Voltage level under the lower limit with the pump in a running status.	Malfunction of control unit or electrical motor part (intermittent failure due to resistor degradation). Voltage drop caused by a not proper power supply.	Reset the error and restart the pump monitoring it. With pump in a running status, check that the mains supply is between 200-240 V and there are not voltage drops.
4	Controller overtemp	Temperature sensor inside the controller unit over the temperature limit	Occluded controller grids. Ambient temperature over the limit (see the limits below). Not enough free space around the pump for correct air circulation.	Check if the controller grids are plugged by external elements (sheets of paper, foam of the packaging, dust, etc.) and unplug them. Check ambient temperature. Check that the pump has enough free space to allow air circulation and that is not inside a closed box.
8	Verify supply line	Switching on the pump, the voltage level is not valid. Used to detect that the mains supply is at 220 V and not at 110 V or 380 V.	Wrong mains supply. High distortion on mains voltage.	Before switching on the pump, check that the main supply is between 200-240 V. Before switching on the pump, check that the main supply has no fluctuations outside the operative voltage range 200-240 V.

ERROR CODE	FAIL	MEANING	POSSIBLE CAUSES	ACTIONS
16	Motor overtemp	Temperature sensor inside the motor unit over the temperature limit.	Occluded motor and pump grids.	Check if the grids are plugged by external elements (sheets of paper, foam of the packaging, dust, etc.) and unplug them.
			Ambient temperature over the limit.	Check ambient temperature.
			Not enough free space around the pump for correct air circulation.	Check that the pump has enough free space to allow air circulation and that is not inside a closed box.
			Reversed inlet and outlet connections.	Check that pump inlet port is connected to the instrument and that pump exhaust is connected to the exhaust line.
32	Supply undervoltage or overvoltage	With the pump in stop or in a running status, the voltage level is out of the valid voltage range.	Voltage drop or overvoltage caused by a not proper power supply.	With pump in a running status, check that the mains supply is in the range 200-240 V and there are not voltage drops and over voltages.
64	Short circuit	Required current from the motor over the current limit or short circuit.	Reversed inlet and outlet connections.	Check that pump inlet port is connected to the instrument and that pump exhaust is connected to the exhaust line.
128	Rotor blocked	The pump rotor is not able to start rotating	Reversed inlet and outlet connections	Check that pump inlet port is connected to the instrument and that pump exhaust is connected to the exhaust line.
			Pump without oil	Check if there is oil inside the oil tank.
			Unknown	Remove the fan cover and manually rotate the plastic fan.

- MS40+ ambient temperature limit → 40°C

To reset the errors described above, you must switch off the pump from the main supply button.

Before switching on again the pump from the same button, you must wait at least 10 seconds, but it is strongly recommended to wait about 10 minutes if the pump is hot.

If, after the actions described in the table above and after the reset, the fail status and the error are still present, please contact our service.

On the A-Plus, in the diagnostic section, you can visualize the last four error codes and the related parameters recorded when the fail happened. On this section you visualize also extended error codes, used for Agilent internal analysis.

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 few 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 60 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 start 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.

Accessories

Tab. 13

PART NUMBER	DESCRIPTION
9499201	MS40+ Exhaust filter
9499202	MS40+ 1 Litre Oil Tank
9499203	Maintenance kit
9499396	Power cable EU
9499400	208Vac US Power cable
9499398	Power cable UK
9499399	Power cable IEC320
9699883	A-PLUS Navigator SW (w/serial cable)



Vacuum Products Division

Dear Customer,

Thank you for purchasing an Agilent vacuum product. At Agilent Vacuum Products Division 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 products. 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,

A handwritten signature in black ink, appearing to read "Giampaolo LEVI".

Giampaolo LEVI

*Vice President and General Manager
Agilent Vacuum Products Division*

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

CUSTOMER REQUEST FOR CORRECTIVE / PREVENTIVE / IMPROVEMENT ACTION

TO: AGILENT VACUUM PRODUCTS DIVISION TORINO – QUALITY ASSURANCE FAX

N°: XXXX-011-9979350

ADDRESS: AGILENT TECHNOLOGIES ITALIA S.p.A. – Vacuum Products Division –
Via F.lli Varian, 54 – 10040 Leini (TO) – Italy

E-MAIL: vpd-qualityassurance_pdl-ext@agilent.com

NAME	COMPANY	FUNCTION
<p>ADDRESS:</p> <p>TEL. N° : FAX N° :</p> <p>E-MAIL:</p>		
<p>PROBLEM / SUGGESTION :</p> <p>REFERENCE INFORMATION (model n°, serial n°, ordering information, time to failure after installation, etc.):</p> <p style="text-align: right;">DATE</p>		
CORRECTIVE ACTION PLAN / ACTUATION (by AGILENT VPD)		LOG N°

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

Vacuum Products Division Instructions for returning products

Dear Customer,

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

Complete the attached **Request for Return form** and send it to Agilent Technologies (see below), taking particular care to include the completed **Health and Safety** declaration Section. No work can be started on your unit until we receive a completed copy of this form.

After evaluating the information, Agilent Technologies will provide you with a **Return Authorization (RA) number** via email or fax, as requested. Note: Depending on the type of return, a Purchase Order may be required at the time **the Request for Return is submitted**. We will quote any necessary services (evaluation, repair, special cleaning, eg).

Product preparation

- Remove all accessories from the core product (e.g. inlet screens, vent valves).
- Prior to shipment and if applicable for your product, drain any oils or other liquids, purge or flush all gasses, and wipe off any excess residue.
- If ordering an Advance Exchange product, please use the packaging from the Advance Exchange to return the defective product.
- Seal the product in a plastic bag, and package product carefully to avoid damage in transit. You are responsible for loss or damage in transit.
- Include a copy of the Health and Safety Declaration in the shipping documentation on the outside of the shipping box of your returning product.
- Clearly label package with RA number. Using the shipping label provided will ensure the proper address and RA number are on the package. Packages shipped to Agilent without a RA clearly written on the outside cannot be accepted and will be returned.
- Return only products for which the RA was issued.

Shipping

- Ship to the location specified on the printable label, which will be sent, along with the RA number, as soon as we have received all of the required information. Customer is responsible for freight charges on returning product.
- Return shipments must comply with all applicable Shipping Regulations (IATA, DOT, ADR, etc.) and carrier requirements.

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

EUROPE:

Fax: 00 39 011 9979 330
Fax Free: 00 800 345 345 00
Toll Free: 00 800 234 234 00

NORTH AMERICA:

Fax: 1 781 860 9252
Toll Free: 800 882 7426, Option 3

PACIFIC RIM:

Please visit our website for individual office information

vpt-customer@agilent.com

vpl-ra@agilent.com

<http://www.agilent.com>




TERMS AND CONDITIONS

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

- Unless otherwise pre-negotiated, customer is responsible for the freight charges for the returning product. Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.
- Agilent Technologies is not responsible for returning customer provided packaging or containers.
- Customers receiving an Advance Exchange product agree to return the defective, rebuildable part to Agilent Technologies **within 15 business days**. Failure to do so, or returning a non-rebuildable part (crashed), will result in an invoice for the non-returned/non-rebuildable part.
- Returns for credit toward the purchase of new or refurbished Products are subject to prior Agilent approval and may incur a restocking fee. Please reference the original purchase order number.
- Units returned for evaluation will be evaluated, and a quote for repair will be issued. If you choose to have the unit repaired, the cost of the evaluation will be deducted from the final repair pricing. A Purchase Order for the final repair price should be issued within 3 weeks of quotation date. Units without a Purchase Order for repair will be returned to the customer, and the evaluation fee will be invoiced.
- Products returned that have not been drained from oil will be disposed.
- A Special Cleaning fee will apply to all exposed products.
- If requesting a calibration service, units must be functionally capable of being calibrated.

Customer information		
Company :	Contact Name:	
Address:	Tel:	Fax:
	Email:	

Equipment			
Product description	Agilent PartNo	Agilent Serial No	Original Purchasing Reference
Failure description		Type of process (for which the equipment was used)	

Type of return
<input type="checkbox"/> Non Billable <input type="checkbox"/> Billable  New PO # (hard copy must be submitted with this form): _____ <input type="checkbox"/> Exchange <input type="checkbox"/> Repair <input type="checkbox"/> Upgrade <input type="checkbox"/> Demo <input type="checkbox"/> Calibration <input type="checkbox"/> Evaluation <input type="checkbox"/> Return for Credit

Health and safety	Substances (please refer to MSDS forms)			
The product has been exposed to the following substances: (by selecting 'YES' you MUST complete the table to the right)	* Agilent will not accept delivery of any product that is exposed to radioactive, biological, explosive substances or dioxins, PCB's without written evidence of decontamination.			
	Trade name	Chemical name	Chemical Symbol	CAS Number
Toxic	<input type="checkbox"/> YES <input type="checkbox"/> NO			
Harmful	<input type="checkbox"/> YES <input type="checkbox"/> NO			
Corrosive	<input type="checkbox"/> YES <input type="checkbox"/> NO			
Reactive	<input type="checkbox"/> YES <input type="checkbox"/> NO			
Flammable	<input type="checkbox"/> YES <input type="checkbox"/> NO			
Explosive (*)	<input type="checkbox"/> YES <input type="checkbox"/> NO			
Radioactive (*)	<input type="checkbox"/> YES <input type="checkbox"/> NO			
Biological (*)	<input type="checkbox"/> YES <input type="checkbox"/> NO			
Oxidizing	<input type="checkbox"/> YES <input type="checkbox"/> NO			
Sensitizer	<input type="checkbox"/> YES <input type="checkbox"/> NO			
Other dangerous substances	<input type="checkbox"/> YES <input type="checkbox"/> NO			

Goods preparation
If you have replied YES to one of the above questions. Has the product been purged? <input type="checkbox"/> YES <input type="checkbox"/> NO If yes, which cleaning agent/method: _____
Has the product been drained from oil? <input type="checkbox"/> YES <input type="checkbox"/> NOT APPLICABLE I confirm to place this declaration on the outside of the shipping box. <input type="checkbox"/>

I declare that the above information is true and complete to the best of my knowledge and belief. I understand and agree to the terms and conditions on page 2 of this document.	
Name:	Authorized Signature:
Position:	
Date:	

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