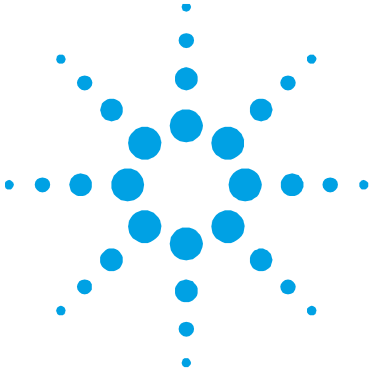

MS 120 Major Maintenance

Model:
X3702-64000
X3702-64010
X3702-64100
G2571-64000

Service and Repair Manual

87-900-155-01 (B.00)
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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.

MS 120 Major Maintenance

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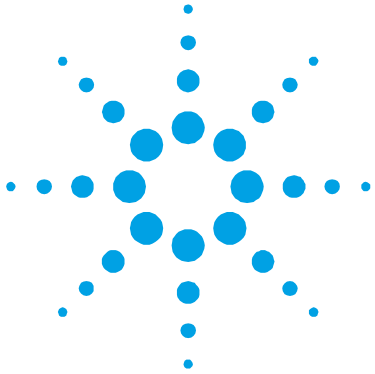


1 Introduzione

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.

Nessun altro tipo di operazione dovrà essere fatto senza aver prima contattato il Servizio Assistenza Agilent. Le informazioni fornite non intendono sostituire, integrare o modificare qualsiasi norma, prescrizione, decreto, direttiva o legge a carattere specifico in vigore nel luogo in cui avviene l'installazione.

I consigli rivolti al personale addetto all'installazione e alla manutenzione presuppongono che lo stesso sia esperto e preparato nell'affrontare qualsiasi problematica di manutenzione, sia meccanica che elettrica. Per qualsiasi dubbio o informazioni non riportate su questo manuale si prega di contattare il nostro servizio assistenza, comunicando sempre: modello (Model), numero di serie (Serial), anno di costruzione, riportati sulla targhetta di identificazione.

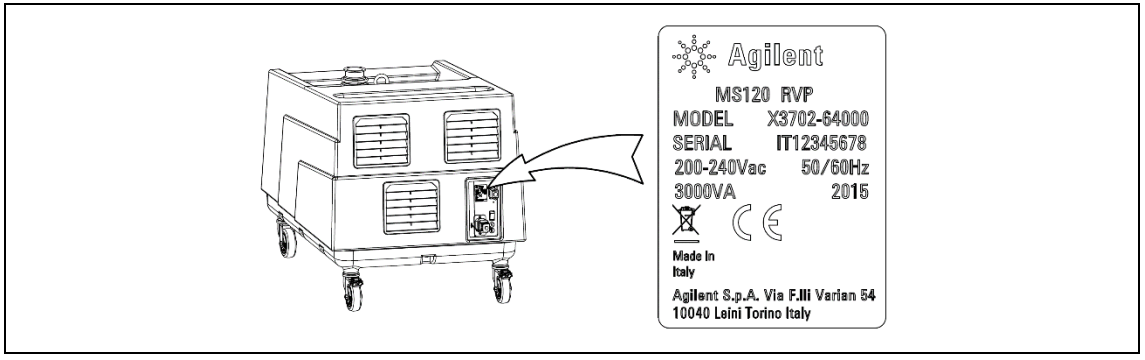


Figura 1 Targhetta di identificazione

Le MS120 Single Stage Rotary Vane Pumps sono delle pompe rotative monostadio a palette, a tenuta in bagno d'olio, azionate da motore elettrico pilotato da inverter. Queste pompe da alto vuoto sono adatte esclusivamente al pompaggio di aria e piccole quantità di vapor d'acqua. L'aspirazione di altri tipi di gas o di vapori deve essere preventivamente dichiarata alla Agilent che, se del caso, rilascerà la conformità all'impiego specifico.

Il motore elettrico flangiato è accoppiato a mezzo di giunto elastico. Il raffreddamento viene assicurato da una potente ventola centrifuga.

In aspirazione è presente un filtro a rete per proteggere la pompa da corpi solidi di diametro maggiore di 4,7 mm. Inoltre, una valvola di ritegno integrata impedisce la risalita dell'olio ed il rientro dell'aria nella camera da svuotare durante la fase d'arresto.

Nel serbatoio è inserito un sistema di separazione delle nebbie d'olio dall'aria di scarico (residuo max. 2PPM/ peso equivalenti a 2,4 mg/m^3).

L'olio abbattuto viene recuperato in modo automatico dalla pompa.

Lo zavorratore, impedisce la condensazione all'interno della pompa quando si aspirano piccole quantità di vapore.

Nei paragrafi seguenti sono riportate tutte le informazioni necessarie a garantire la sicurezza dell'operatore durante l'utilizzo dell'apparecchiatura.

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	Simboli	Descrizione
	Superficie calda “Pericolo di scottature se vengono toccate le parti calde”		Sicurezza elettrica
	Emissione di sostanze nocive		Pericolo di incendio
	Non disperdere nell’ambiente		Leggere il manuale d’uso
	Attacco in aspirazione		Attacco allo scarico

Prescrizioni di sicurezza

AVVERTENZA!

Nonostante le precauzioni prese in fase di progetto, esistono elementi di rischio che si presentano durante le operazioni che si eseguono in fase di uso e manutenzione.

AVVERTENZA!

SUPERFICI CALDE.

Durante le operazioni di manutenzione si toccano superfici che possono superare la temperatura di 80°C. Adottare idonei mezzi di protezione in modo da evitare scottature da contatto fortuito.

È buona norma, prima di effettuare qualsiasi intervento sulla pompa, attendere il suo raffreddamento.

AVVERTENZA!

EMISSIONI DI SOSTANZE NOCIVE

L'aria di scarico della pompa contiene tracce di nebbie d'olio (residuo max. 2PPM/ peso equivalenti a 2,4 mg/m³). Verificare la compatibilità con l'ambiente di lavoro. Garantire un corretto ricambio d'aria oppure portare lo scarico della pompa all'esterno. Un guasto o l'usura delle tenute possono provocare perdite d'olio lubrificante. Evitare la dispersione nel terreno e l'inquinamento di altri materiali.

Nel caso di aspirazione d'aria contenente sostanze pericolose (esempio agenti biologici o microbiologici), adottare dei sistemi di abbattimento prima della pompa per vuoto.

ATTENZIONE!

NON DISPERDEFE NELL'AMBIENTE

Gli oli esausti provenienti dalla pompa devono essere smaltiti secondo le normative vigenti nel Paese d'utilizzo della pompa.

AVVERTENZA!

PERICOLO GENERATO DA DEPRESSIONE

Il contatto con punti in depressione può essere causa di infortuni. Evitare il contatto con l'attacco aspirazione della pompa durante il funzionamento. Immettere aria nel circuito di aspirazione prima di ogni intervento.

AVVERTENZA!

PERICOLO GENERATO DA PRESSIONE

Il serbatoio della pompa è pressurizzato.
Non aprire e non dimenticare aperti i tappi di carico o scarico durante il funzionamento.

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!

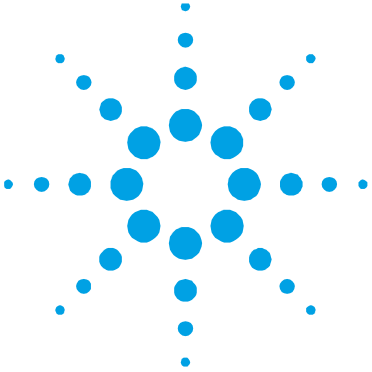
SICUREZZA ELETTRICA

Nell'equipaggiamento elettrico esistono parti sottoposte a tensione che, al contatto, possono provocare gravi danni a persone e cose.

AVVERTENZA!

PERICOLO DI INCENDIO

L'utilizzo della pompa per impieghi non previsti o proibiti da questo manuale, oppure la mancanza di una corretta manutenzione, possono provocare anomalie di funzionamento con rischio di surriscaldamento e incendio. In caso di incendio non usare acqua per spegnere le fiamme. Utilizzare estintori a polvere o CO_2 od altri mezzi compatibili con la presenza di equipaggiamenti elettrici ed oli lubrificanti.



2 Gebrauchsanleitung

Allgemeine Hinweise

Das Gerät ist für den professionellen Gebrauch bestimmt. Das Bedienungspersonal muss das vorliegende Handbuch und alle zusätzlichen Informationen von Agilent aufmerksam lesen, bevor das Gerät in Betrieb genommen wird. Agilent übernimt keinerlei Verantwortung für Schäden, die durch die vollständige oder partielle Nichtbeachtung der Instruktionen entstanden sind, durch unsachgemäße Bedienung durch nicht geschultes Personal, durch nicht autorisierte Eingriffe oder durch eine Verwendung, die den vor Ort geltenden Vorschriften zuwiderläuft.

Ein abweichender Betrieb ist nur nach vorheriger Rücksprache mit dem Kundendienst von Agilent zulässig. Die bereitgestellten Informationen stellen keine Ersetzung, Ergänzung oder Abänderung von Vorschriften, Richtlinien oder Gesetzen dar, die am Betriebsort gelten.

Die Ratschläge für das mit Installation und Wartung betraute Personal setzen voraus, dass dieses Personal kompetent und darauf vorbereitet ist, bei Problemen, wie sie bei der Wartung von Mechanik und Elektrik auftreten können, angemessen zu reagieren. Bei Unklarheiten oder wenn festgestellt wird, dass bestimmte Informationen in diesem Handbuch fehlen, wenden Sie sich bitte an unseren Kundendienst. Nennen Sie dabei immer Modell, Seriennummer und Baujahr. Sie finden diese Angaben auf dem Typenschild.

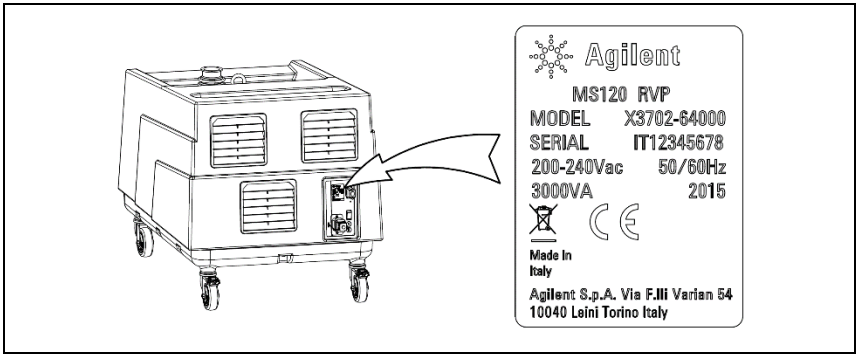


Abbildung 1 Typenschild

Die Pumpe Modell MS120 Single Stage Rotary Vane Pump ist eine Einstadium-Rotationsflügelpumpe im Ölbad, die von einem Elektromotor inverter angetrieben. Die Pumpe Modell MS120 Single Stage Rotary Vane Pump ist eine Einstadium-Rotationsflügelpumpe im Ölbad, die von einem durch einen Inverter gesteuerten Elektromotor angetrieben wird. Die Ansaugung anderer Arten von Gas oder Dämpfen muss zuvor Agilent gemeldet werden. Agilent kann dann die entsprechende Verwendung gestatten.

Der geflanschte Elektromotor ist über eine elsatische Verbindung angeschlossen. Die Kühlung erfolgt über ein starkes Lüfterrad.

An der Ansaugung befindet sich ein Netzfilter zum Schutz der Pumpe vor festen Fremdkörpern mit Durchmessern über 4,7 mm. Außerdem verhindert ein integriertes Rückhalteventil das Aufsteigen des Öls und das Eintreten der Luft in die beim Anhalten zu leerende Kammer.

Im Tank sitzt ein System zur Trennung der Ölnebel von der ausgestoßenen Luft (max. 2 PPM, entsprechend einem Gewicht von 2,4 mg/m^3).

Das aufgefangene Öl wird von der Pumpe automatisch zurückgeführt.

Der Gas-Ballast verhindert die Kondensationin der Pumpe, wenn kleine Mengen von Wasserdampt angesaugt werden.

In den folgenden Abschnitten finden Sie alle Informationen, die nötig sind, um die Sicherheit während des Betriebs zu gewährleisten.

Dieses Handbuch verwendet folgende Symbole::

WARNUNG!

Diese Warnung weist auf gefährliche Arbeitsschritte hin, die bei unsachgemäßer Durchfüh-rung 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	Symbole	Beschreibung
	Heiße Oberfläche “Gefahr von Verbrennungen beim Berühren der heißen Teile”		Elektrische Sicherheit
	Emission von schädlichen Substanzen		Brandgefahr
	Nicht in die Umwelt gelangen lassen		Betriebshandbuch lesen
	Anschluss an die Ansaugung		Anschluss an den Ausgang

Sicherheitsvorschriften

WARNUNG!

Trotz allen in der Planungsphase ergriffenen Vorsichtsmaßnahmen sind Betrieb und Wartung noch mit einigen Risikofaktoren behaftet.

WARNUNG!

HEISSE OBERFLÄCHEN.

Bei den Wartungsarbeiten müssen Oberflächen berührt werden, deren Temperatur über 80 °C betragen kann. Schützen Sie sich angemessen, um Verbrennungen durch versehentlichen Kontakt zu vermeiden.

Es ist üblich, vor allen Eingriffen an der Pumpe abzuwarten, bis diese sich abgekühlt hat.

WARNUNG!

EMISSIONEN SCHÄDLICHER SUBSTANZEN

Die aus der Pumpe austretende Luft enthält Spuren von Ölnebel (max. 2 PPM, entsprechend einem Gewicht von 2,4 mg/m³). Vergewissern Sie sich, dass das mit den Umständen der Arbeitsumgebung vereinbar ist. Sorgen Sie für einen geeigneten Luftaustausch oder leiten Sie die aus der Pumpe austretende Luft nach außen. Ein Defekt oder Verschleiß an den Dichtungen kann zum Austritt von Schmieröl führen. Dieses darf nicht in den Boden gelangen oder zu anderen Formen von Verschmutzung führen.
Wenn Luft mit gefährlichen Substanzen angesaugt wird (beispielsweise biologische oder mikrobiologische Wirkstoffe), bauen Sie vor der Pumpe Systeme ein, die diese unschädlich machen.

VORSICHT!

NICHT IN DIE UMWELT GELANGEN LASSEN

Das Altöl aus der Pumpe muss nach den in dem jeweiligen Land geltenden Vorschriften entsorgt werden.

WARNUNG!

GEFAHR DURCH UNTERDRUCK

Der Kontkt mit Unterdruck kann Ursache von Unfällen sein.
Vermeiden Sie den Kontakt mit der Ansaugöffnung, während die Pumpe läuft.
Leiten Sie vor jedem Eingriff Luft in den Ansaugkreislauf.

WARNUNG!

GEFAHR DURCH DRUCK

Der Tank der Pumpe steht unter Druck.
Öffnen Sie die Deckel zum Laden und Entladen nicht während des Betriebs und lassen Sie sie nicht versehentlich unverschlossen.

WARNUNG!

Klemmen Sie die Pumpe immer von der Versorgung ab, bevor Sie Wartungsarbeiten durchführen. Stellen Sie beim Stromversorgungsschalter Warnschilder auf: GERÄT WIRD GEWARTET – STROM NICHT EINSCHALTEN! Aktivieren Sie die Sicherheitsvorrichtungen nach dem Ende der Wartungsarbeiten wieder.

WARNUNG!

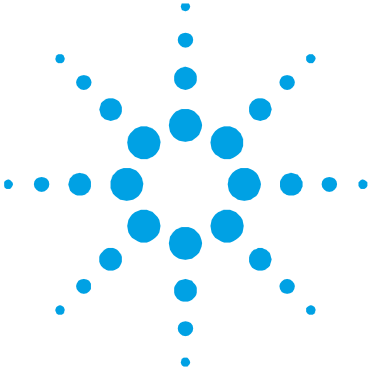
ELEKTRISCHE SICHERHEIT

Einige Teile der Elektrik stehen unter Strom. Bei Kontakt kann es zu schweren Sach- und Personenschäden kommen.

WARNUNG!

BRANDGEFAHR

Die Verwendung der Pumpte für andere als die in diesem Handbuch genannten oder für verbotene Zwecke sowie eine nicht ausreichende Wartung können zu Funktionsstörungen führen und bergen die Gefahr von Überhitzung und Brand. Verwenden Sie im Brandfall kein Wasser zum Löchen. Nehmen Sie Feuerlöscher mit Pulver oder CO_2 oder andere Löschmittel, die mit elektrischen Komponenten oder mit Schmieröl verträglich sind.



3
Mode d'emploi

Indications générales

Cet appareil est destiné à un usage industriel. Utilisateur doit lire attentivement ce manuel d'instruction et tout autre information supplémentaire fournie par la société Agilent avant l'utilisation de l'appareil. La société Agilent décline toute responsabilité éventuelle en cas de non-observation totale ou partielle des instructions, d'usage impropre de la part d'un personnel non formé, d'interventions non-autorisées ou d'un usage contraire aux réglementations nationales spécifiques.

Aucun autre type d'opération ne devra être effectué sans avoir préalablement contacté le Service d'Assistance Agilent. Les informations fournies ne peuvent en aucun cas remplacer, compléter ou modifier toute norme, prescription, décret ou loi à caractère spécifique, en vigueur sur le lieu d'installation.

Les conseils s'adressent à un personnel préposé à l'installation et à l'entretien expert et préparé pour affronter tout problème d'entretien, mécanique et électrique. En cas de doute ou d'informations ne figurant pas dans ce manuel, veuillez contacter notre service d'assistance en communiquant toujours le modèle (Model), le numéro de série (Serial), l'année de construction indiqués sur la plaque d'identification.

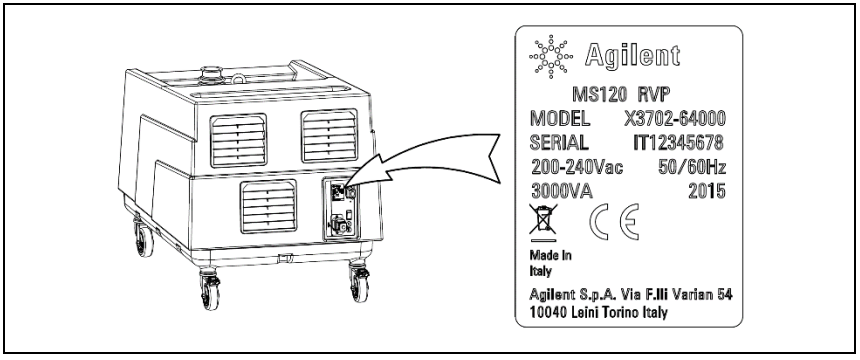


Figure 1 Plaques d'identifications

Les MS120 Single Stage Rotary Vane Pumps sont des pompes rotatives à simple étage à palettes, étanches à bain d'huile, actionnées par un moteur électrique commandé par inverter. Ces pompes à vide poussé sont exclusivement indiquées pour le pompage de l'air et de petites quantités de vapeur d'eau. L'aspiration d'autres types de gaz ou de vapeur doit être préalablement déclarée à la société Agilent qui délivrera au besoin la conformité à l'usage spécifique.

Le moteur électrique bridé est accouplé par l'intermédiaire d'un joint élastique. Le refroidissement est assuré par un ventilateur centrifuge puissant.

À l'aspiration, un filtre à crépine protège la pompe contre les corps solides d'un diamètre supérieur à 4,7 mm. En outre, un clapet de retenue intégré empêche la remontée de l'huile et le retour de l'air dans la chambre à vide au cours de la phase d'arrêt.

Dans le réservoir, un système de séparation des brouillards d'huile de l'air d'extraction (résidu max. 2PPM/ poids équivalant à 2,4 mg/m^3).

L'huile éliminée est automatiquement récupérée par la pompe.

Le dispositif de lest empêche la condensation à l'intérieur de la pompe lorsqu'on aspire de petites quantités de vapeur.

Les paragraphes suivants fournissent toutes les informations nécessaires pour garantir la sécurité de l'opérateur durant l'utilisation de l'appareil.

Ce manuel utilise les conventions suivantes:

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	Symboles	Description
	Surface chaude “Danger de brûlure en cas de contact avec les parties chaudes”		Sécurité électrique
	Émission de substances nocives		Danger d'incendie
	Ne pas déverser dans l'environnement		Lire le manuel d'utilisation
	Raccord d'aspiration		Raccord d'évacuation

Prescriptions de sécurité

AVERTISSEMENT!

Malgré les précautions prises en phase de projet, il existe des éléments de risque qui se présentent durant les opérations effectuées durant l'utilisation et l'entretien.

AVERTISSEMENT!

SURFACES CHAUDES.

Durant les opérations d'entretien, on touche des surfaces dont la température peut dépasser 80°C. Adopter des moyens de protection appropriés pour éviter les brûlures dues à un contact fortuit.

On recommande d'attendre le refroidissement de la pompe avant toute intervention sur cette dernière.

AVERTISSEMENT!

ÉMISSIONS DE SUBSTANCES NOCIVES

L'air d'extraction de la pompe contient des traces de brouillards d'huile (résidu max. 2PPM/ poids équivalant à 2,4 mg/m^3). Vérifier la compatibilité avec le milieu de travail. Garantir un renouvellement correct de l'air ou amener l'évacuation de la pompe à l'extérieur. Une défaillance ou l'usure des garnitures peut provoquer des fuites du huile lubrifiante. Éviter le déversement sur le terrain et la pollution d'autres matériaux.

En cas d'aspiration d'air contenant des substances dangereuses (comme des agents biologiques ou microbiologiques), prévoir des systèmes de captage avant la pompe à vide.

ATTENTION!

NE PAS DÉVERSER DANS L'ENVIRONNEMENT

Les huiles usées provenant de la pompe doivent être éliminées conformément aux réglementations en vigueur dans le pays d'utilisation.

AVERTISSEMENT!

DANGER GÉNÉRÉ PAR LA DÉPRESSION

Le contact avec des points en dépression peut provoquer des accidents. Éviter le contact avec le raccord d'aspiration de la pompe durant le fonctionnement. Injecter de l'air dans le circuit d'aspiration avant toute intervention.

AVERTISSEMENT!

DANGER GÉNÉRÉ PAR LA PRESSION

Le réservoir de la pompe est pressurisé.
Ne pas ouvrir et ne pas oublier de fermer les bouchons de remplissage et de vidange durant le fonctionnement.

AVERTISSEMENT!

Toujours exclure l'alimentation de la pompe avant d'effectuer des opérations d'entretien. Appliquer des pancartes spécifiques d'avertissement : ENTRETIEN EN COURS SUR L'APPAREIL - NE PAS METTRE SOUS TENSION, au niveau de l'interrupteur d'alimentation. Rétablir les dispositifs de sécurité au terme de l'opération.

AVERTISSEMENT!

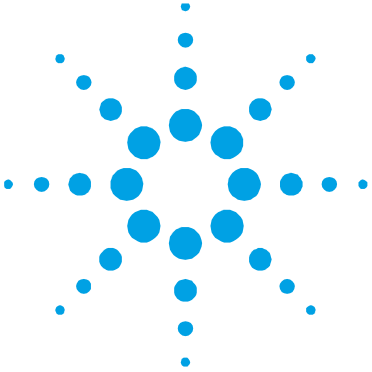
SÉCURITÉ ÉLECTRIQUE

L'équipement électrique comprend des pièces sous tension qui, en cas de contact, peuvent provoquer des dommages corporels et matériels graves.

AVERTISSEMENT!

DANGER D'INCENDIE

L'utilisation de la pompe pour des usages non prévus ou interdits dans ce manuel ou un entretien incorrect peuvent provoquer des anomalies de fonctionnement et générer un risque de surchauffe et d'incendie. Ne pas éteindre les flammes avec de l'eau en cas d'incendie. Utiliser des extincteurs à la poudre ou au CO_2 ou d'autres moyens compatibles avec la présence d'équipements électriques et d'huiles lubrifiantes.



4
Instructions for Use

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.

Do not attempt any other type of operation without having first contacted our Service Department. The information provided herewith does not intend to replace, integrate or change any rules, regulations, law by decree, directive or law of specific character in force in the Country where the installation takes place.

The suggestions given to the staff engaged in the installation and servicing assumes that the personnel is expert and prepared in facing any problem of servicing, both mechanical and electrical. For any questions or information not included in this manual, please contact our Service Department, always providing: model (Model), serial number (Serial), year of manufacture, stated on the pump name plate.

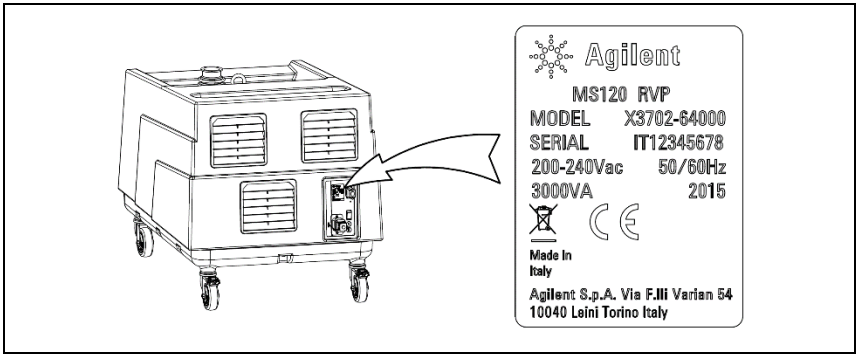


Figure 1 Plate

The MS120 Single Stage Rotary Vane Pumps are single-stage, rotary vane pumps oil sealed, driven by an electric motor controlled by an inverter. These high vacuum pumps are suitable for pumping air and small quantity of water vapour only. Pumping of other types of gas or vapours must be declared in advance to Agilent Technologies that will give the conformity to the specific use.

The flanged electric motor is coupled by means of an elastic coupling. The cooling is ensured by a powerful centrifugal fan.

At the pump inlet there is a mesh filter in order to protect it from solid parts having diameter larger than 4.7 mm. Furthermore, an integrated non-return valve prevents the oil coming back and the return of air in the chamber to be pumped down during the stop phase.

In the tank there is a system of oil smokes separation from the discharged air (maximum residual 2PPM/weight corresponding to 2.4 mg/m^3).

The separated oil is recovered automatically by the pump.

The gas ballast valves prevent condensation inside the pump when pumping down small quantity of vapour.

The following paragraphs contain all the information necessary to guarantee the safety of the operator when using the equipment.

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	Symbols	Description
	Hot surfaces “Danger of burns if hot parts are touched”		Electric safety
	Harmful substances emissions		Fire hazard
	Do not dispose into the environment		Read the operating instructions
	Inlet port		Exhaust port

Safety rules

WARNING!

Despite of all the precautions adopted when designing the equipment, there are some risk elements that arise during operation and servicing.

WARNING!

HOT SURFACES.

The pump surfaces may exceed the temperature of 80°C. Adopt the necessary safeguards to avoid burns due to chance contact..

Before carrying out any maintenance on the pump, be sure the pump is cool.

WARNING!

HARMFUL SUBSTANCES EMISSIONS

The discharged air contains part of traces of oil mist (maximum residual 2PPM/weight corresponding to 2.4 mg/m^3). Check the compatibility with the environment. Make sure a correct air change is allowed otherwise convey the pump discharge outside. A failure or the seals wear can cause an oil leakage. Avoid the dispersion to the ground and the pollution of other materials.

In case that any air containing dangerous substances must be pumped down (for example, biological or microbiological agents), make sure to adopt filtering systems before introducing air in the work environment.

CAUTION!

DO NOT DISPOSE INTO THE ENVIRONMENT

Used discharged oil from the pump must be disposed in accordance with the regulations in force in the Country of use.

WARNING!

HAZARD CAUSED BY VACUUM

Any contact with parts under vacuum can cause injuries.
Avoid any contact with the pump inlet port during the pump operation.
Introduce air in the inlet circuit before every operation cycle.

WARNING!

HAZARD CAUSED BY PRESSURE

The pump tank is pressurized.
Do not open the oil filling and discharge plugs during operation.

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!

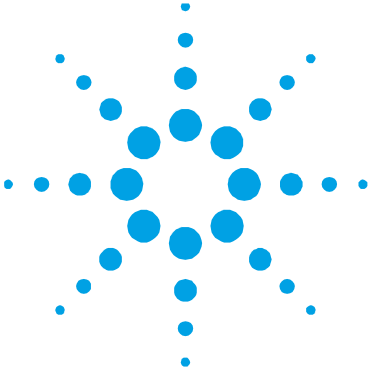
ELECTRIC SAFETY

Some components of the electric equipment are electrically charged during operation. Any contact may cause serious injuries to persons or objects.

WARNING!

FIRE HAZARD

The use of the pump in situations unforeseen or not recommended by this manual, as well as lack of correct maintenance, may create high risks for overheating or fire. In case of a fire do not use water to extinguish but use a powder CO_2 extinguisher or other means compatible with the electrical equipment and lubricating oil.



5
Major Maintenance

Necessary Tooling

NOTE Weight of the pump 106 kg.

To perform technical activities on MS120 following standard tools are suggested:

- Crane (minimum load 200 Kg)
- Allen key 2.5 mm
- Allen key 3 mm
- Allen key 4 mm
- Allen key 5 mm
- Allen key 8 mm
- Allen key 10 mm
- Phillips screwdriver
- Flat-blade screwdriver
- 7 mm Wrench Hex
- 8 mm Wrench Hex
- 10 mm Wrench Hex
- 13 mm Wrench Hex
- 15 mm Wrench Hex
- 17 mm Wrench Hex
- 19 mm Wrench Hex
- 35 mm Wrench Hex
- 40 mm Wrench Hex
- Two arms extractor
- MS120 Special Maintenance Tool Kit P/N X3702-67000
- Tongs
- Torque wrench 5/35 Nm
- Internal extractor (30 mm)
- Plastic hammer
- Pliers for seeger

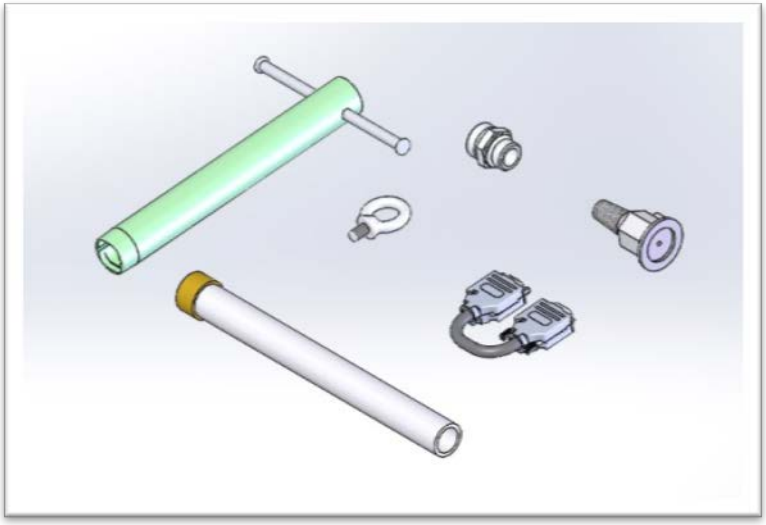
Troubleshooting

TROUBLE	CAUSE	REMEDY
Drop in perfomances	Inlet pipes or machine are leaking	Identify leaking point and seal it
	No lubrication	Check oil level and oil conditions. Fill with oil to the right oil level or change the oil
	Supply Voltage too low (< 200 Vac)	Connect the pump to a mains with the correct voltage and use a cable with the appropriate size
Anomalous noise	No lubrication	See previous point
	Coupling element worn	Replace
	Motor bearings damaged	Replace
	Pump Bushing damaged	Pump overhaul (Customer Service)
	Damaged vanes	Pump overhaul (Customer Service)
	Damaged contact surfaces	Pump overhaul (Customer Service)
Oil leak	Shaft oil seal rings worn	Pump overhaul (Customer Service)
	Oil filling/discharge plugs are leaking	Check the plug has been closed / replace the gasket
	Inefficient oil recovery system	Pump overhaul (Customer Service)
Motor protection is tripping	Blocked exhaust filters	Replace exhaust filters
	No lubrication	Oil level filling up
	Pump seizure and jam	Pump overhaul (Customer Service)
	Broken vane	Pump overhaul (Customer Service)

TROUBLE	CAUSE	REMEDY
Discharge oil mist	Inefficient exhaust filters	Replace exhaust filters
	High temperature due to polluted oil	Oil change
	High operating temperature due to high ambient temperature	Decrease room temperature by allowing a better air exchange
Oil is found in the inlet	Inefficient inlet valve	Check the inlet valve is tight
		Clean the valve and change any damaged parts
Pump doesn't start	Supply Voltage out of the range	Connect the pump to a mains with the correct voltage
	Pump in REMOTE without START command	Connect pin 7 to pin 9 on J1 - I/O connector

MS120 Special Maintenance Tool Kit

- Floating Valve Extractor
- M8 Eyebolt
- Interlock adapter
- Oil drain hose
- Oil drain connection
- Flange for Final Test



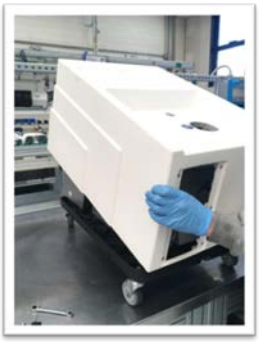
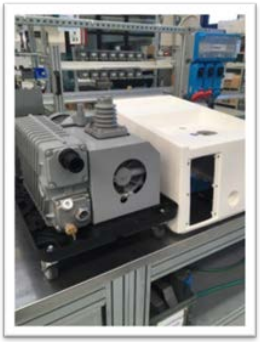
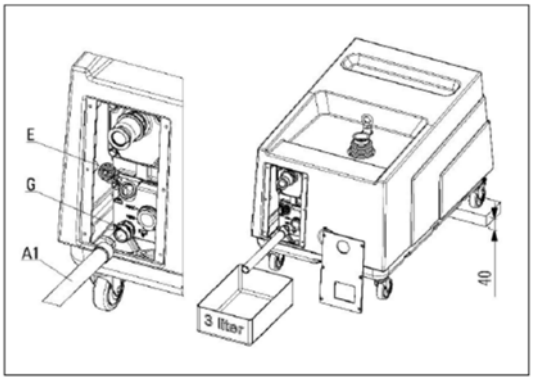
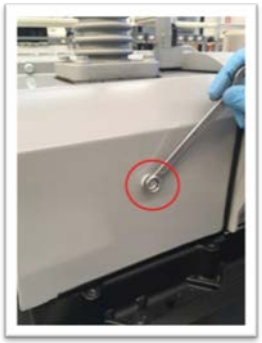
Procedure

Step	Description / Photo
1.	Make sure that the pump is switched off, unplugged and cooled down. Using a crane, put the pump on a work bench and block the wheels using their brake. **CAUTION!** Heavy weight lifting. 

Step	Description / Photo
2.	Disassemble the plastic cover plate (Allen key 3 mm).  
3.	Disassemble the gas ballast lever (Phillips screwdriver). 

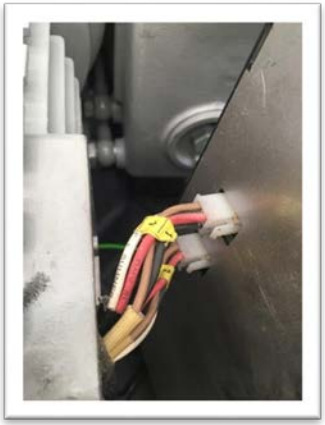
Procedure

Step	Description / Photo
4.	Unscrew the 6 nuts on the bottom of the basement (10 mm Wrench Hex). 
5	Remove the lifting eyebolt. 

Step	Description / Photo
6.	Remove the plastic cover and reassemble the M10 eyebolt.  
7.	Using the special device supplied with the pump, discharge the oil.  
8.	Remove the internal metallic cover (10 and 13 mm Wrench Hex).   

Procedure

Step	Description / Photo
9.	Disconnect the grounding cable from the electrical motor (Phillips screwdriver). 
10.	Remove the four screws on the bottom of controller (8 mm wrench).  

Step	Description / Photo
11	Move the controller gently and disconnect the two power cables from the controller making sure the cables are properly labeled (see below, #1 up and #2 down), then remove the controller.  
12.	Remove the two screws of pump fixing brackets from the basement (13 mm Wrench Hex).  

Step	Description / Photo
13.	Remove the four pump body nuts on the bottom of basement (16 mm Wrench Hex).  
14.	Using a crane, lift up the pump from the basement. **CAUTION!** Heavy weight lifting.   

Step	Description / Photo
15.	Turn the pump by 90° with the oil tank on the down side.  
16.	Remove the four screws of the electrical motor flange and remove the motor (13 mm Wrench Hex).  

Procedure

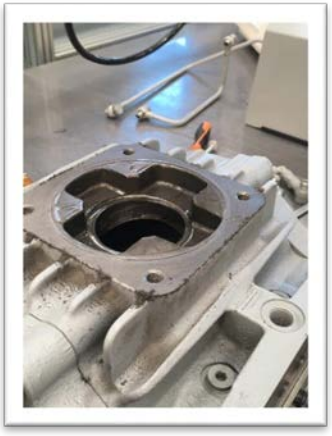
Step	Description / Photo
17.	Remove the pump fan cover (Allen key 8 mm). 
18.	Remove the oil pipes (19 mm Wrench Hex). 

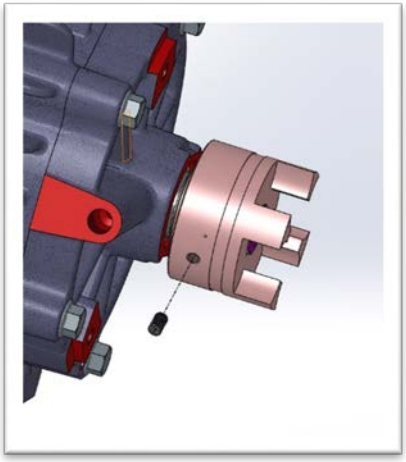
Step	Description / Photo
19.	Remove the gas ballast valve from the external cover (17 and 19 mm Wrench Hex). 
20.	Loosen and remove the four nuts of the connection between the pump body and tank (19 mm Wrench Hex). 

Step	Description / Photo
21.	Screw the M8 eyebolt in to M8 hole on the upper side of bump body. Using a crane, lift up the pump body and remove it from the tank (eyebolt M8). **CAUTION!** Heavy weight lifting.  

Step	Description / Photo
22.	Put the complete pump body on a bench. 
23.	Loosen and remove the four screws of inlet port (13 mm Wrench Hex). 

Step	Description / Photo
24.	Based on production date, pumps have been provided with two different versions of Inlet valve (a or b). Based on Inlet valve version, please follow dedicated step **24a** or **24b**
24a.	For pumps provided with this anti-suck back valve system, remove the inlet valve assy (Figure 1) that is composed by the following components: • Inlet port • Inlet thermal insulation • Inlet valve • Inlet spring • Inlet support plate (with pin) • O-Rings. 

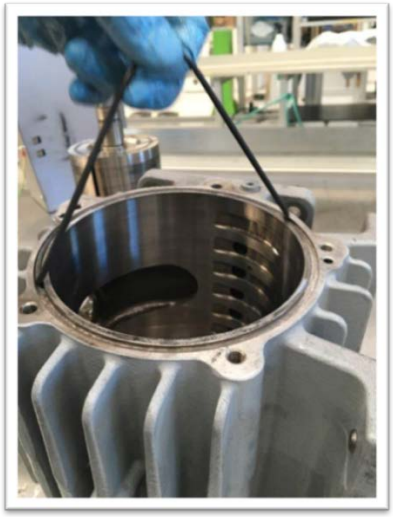
Step	Description / Photo
24b.	For pumps provided with this anti-suck back valve system, remove the inlet valve assy (Figure 2, 3 and 4) that is composed by the following components. For pumps provided with this anti-suck back valve system, remove the inlet valve assy (Figure 1) that is composed by the following components: • Inlet port • Inlet thermal insulation • Inlet disc • Inlet spring • O-Rings   

Step	Description / Photo
25.	Loosen and remove the five screws of the plate support then remove the valve plate (Allen key 3 mm).  
26.	Remove the socket set stud from the pump body half coupling and then using a suitable two-arms extractor remove the pump body half coupling. (Allen key 3 mm Two arms extractor)  

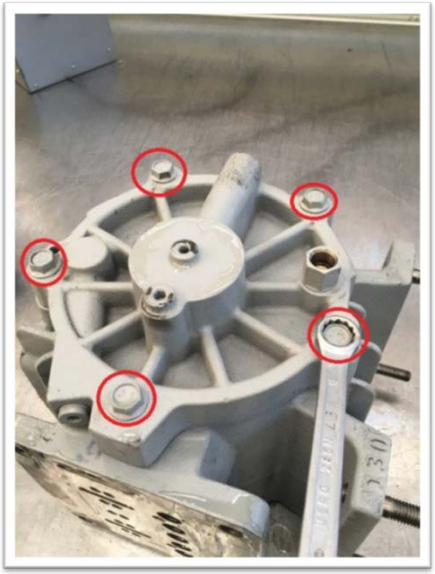
Step	Description / Photo
27.	Loosen and remove the four screws of the front cover (13 mm Wrench Hex). 
28.	Remove the key from the shaft (Tongs). 

Procedure

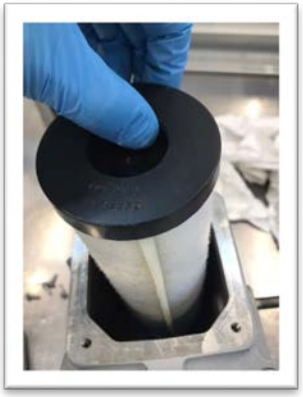
Step	Description / Photo
29.	Remove the front cover by gently using a plastic hammer. 
30.	Pull out the vanes. 

Step	Description / Photo
31.	Use the M8 eyebolt included in the tool kit and screw it on the rotor shaft. Using a crane pull out the rotor (M10 eyebolt).  
32.	Remove the O-Ring. 

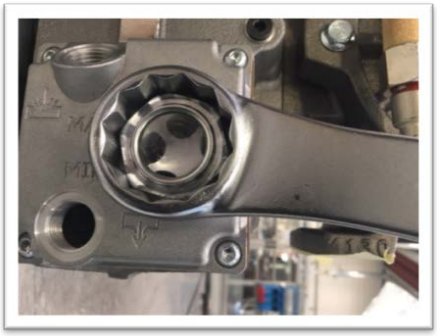
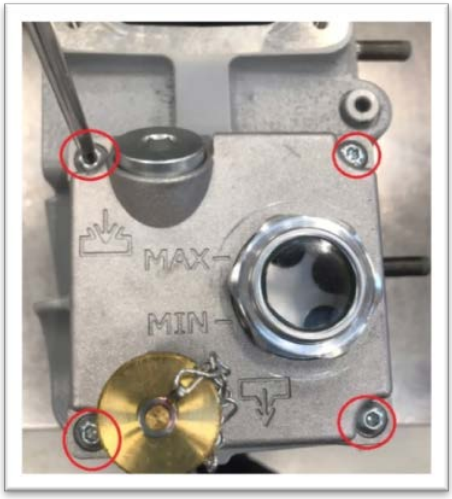
Procedure

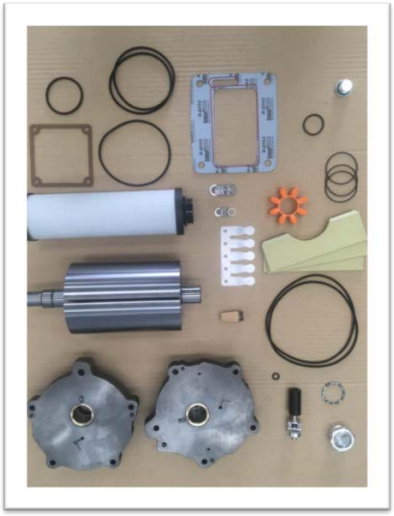
Step	Description / Photo
33.	Turn the pump body upside down. Loosen and remove the five screws of the external cover (13 mm Wrench Hex). 
34.	Remove the external cover by gently using a plastic hammer and remove the O-ring.  

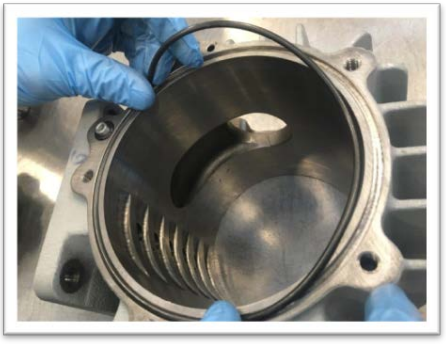
Step	Description / Photo
35.	Remove the centering ring and its O-Ring from the pump body.. 
36.	Take the oil tank, unscrew the outlet port manually..  
37.	Loosen and remove the four screws of the outlet cover (10 mm Wrench Hex). 

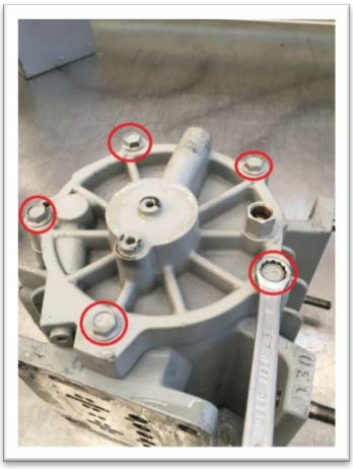
Step	Description / Photo
38.	Remove the outlet cover, the O-Ring and extract the exhaust filter.  
39.	Remove the front oil tank plug (Allen key 19 mm).  

Step	Description / Photo
40.	Using floating valve extractor to remove the floating valve.   

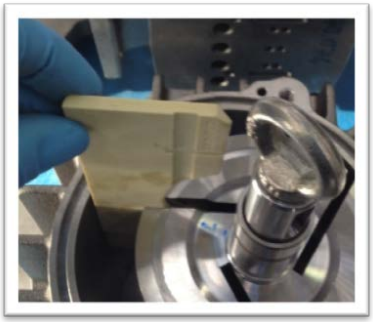
Step	Description / Photo
41.	Remove the oil level indicator (Wrench Hex 40 mm). 
42.	Remove the oil tank cover and gasket (Allen key 4 mm).  

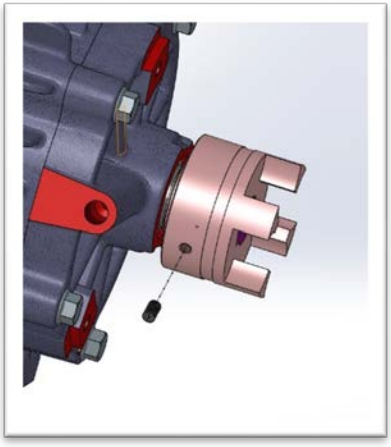
Step	Description / Photo
43.	Remove the two oil tank plugs. 
44.	Before reassembling the pump, make sure that all parts and surfaces are clean. The cleaning can be done with compressed air and Alcohol or water-based solvents, to remove oil residues. All consumables like gaskets and O-rings are contained in the major maintenance kit. All used consumables should be disposed off following local rules and regulations.
45.	Take the Major Maintenance Kit P/N X3702-68202. 

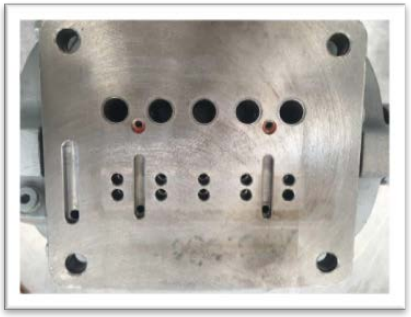
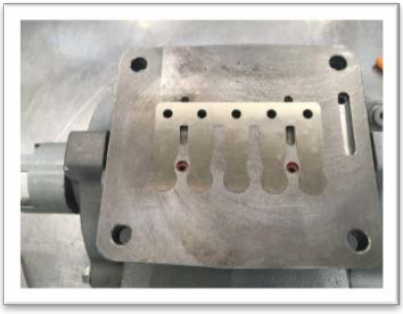
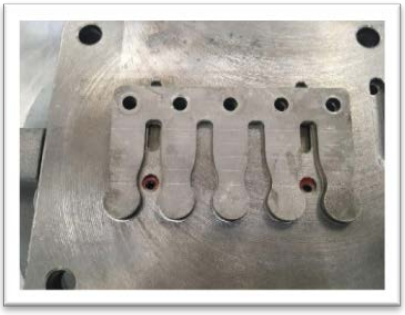
Step	Description / Photo
46.	Take the pump body front cover. 
47.	Insert the centering ring and its O-Ring (OR ORM0080-25 Viton) in the pump body.  
48.	Insert the O-Ring (0R 4587 FKM) on the housing. 

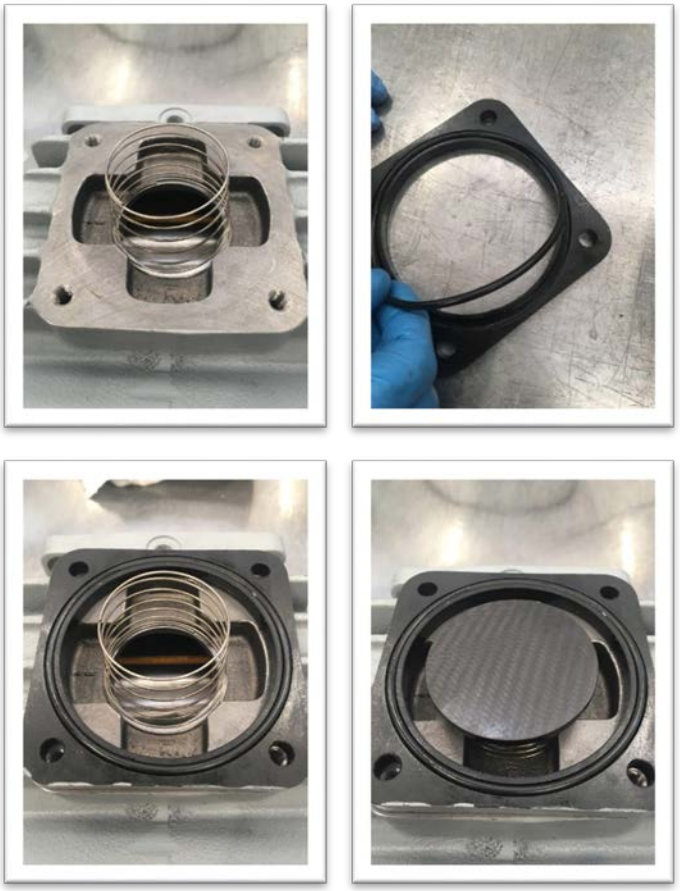
Step	Description / Photo
49.	Assemble the external cover on the pump body and close the five Hex screws at 25 Nm torque (Torque Wrench 13 mm Hex).   

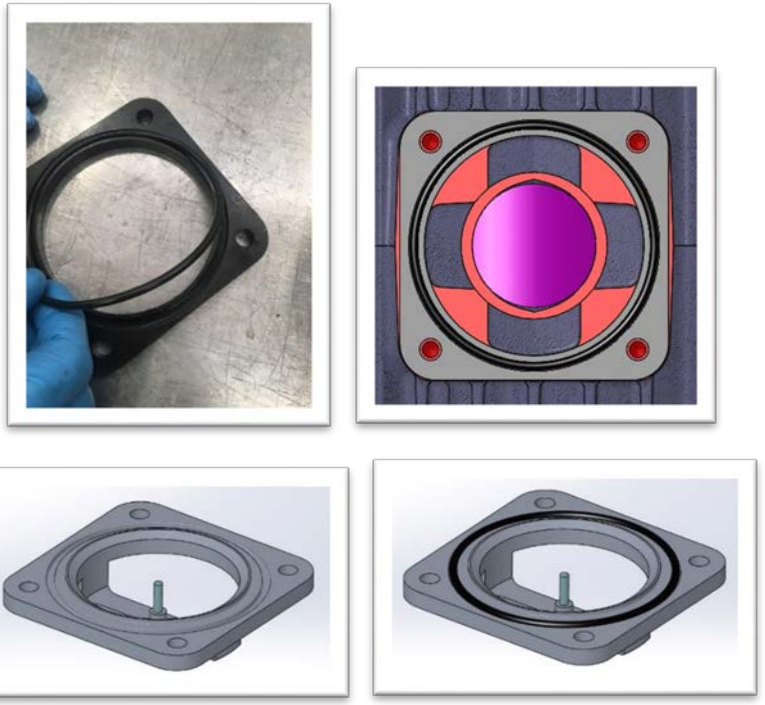
Step	Description / Photo
50.	Turn the pump body, lubricate the bushing using a small quantity of new pump lubricant. Screw the M8 eyebolt onto the motor side rotor shaft, insert the new rotor gently with a crane and remove the eyebolt once procedure is finished. (M8 Eyebolt). **CAUTION!** Heavy weight lifting.   

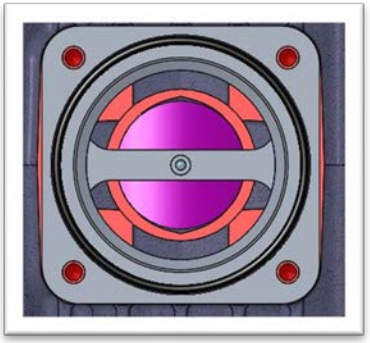
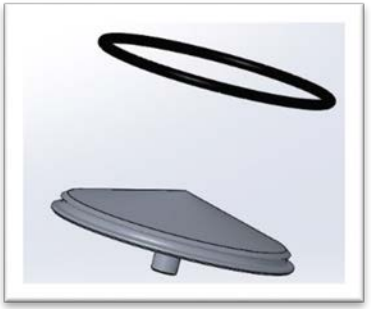
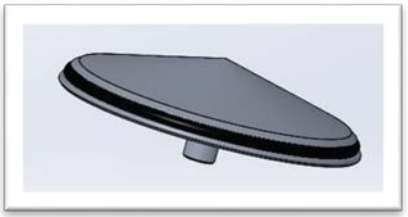
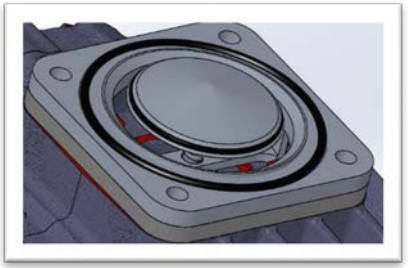
Step	Description / Photo
51.	Insert the vanes in the rotor slots, ensure that the vanes are properly inserted watching the beside figures.  
52.	Cover the key housing with one layer of commercially available elastic tape in order to avoid damages on the new lip seal. Put a small quantity of synthetic grease (like Synthy Polymer 402 or similar) on the external lip of lip seal and proceed to assemble the motor side cover, after inserting its O-Ring (OR 4587 FKM) in its housing.   

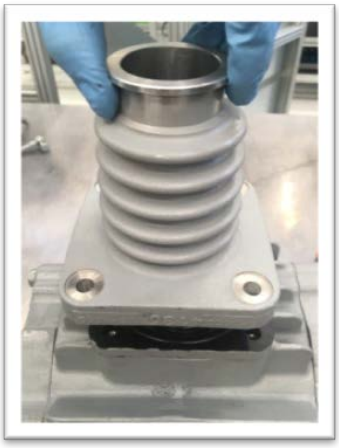
Step	Description / Photo
53.	Remove the plastic tape, insert the key on the shaft housing using a plastic hammer and close the four screws on the motor side cover at 25 Nm using a suitable torque wrench (Torque Wrench 13 mm Hex).  
54.	Insert the pump body hul coupling and then insert the socket set stud on the pump body half coupling. (Allen key 3 mm).  

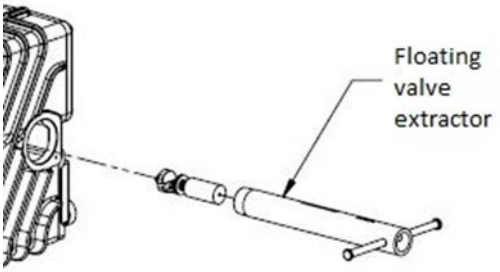
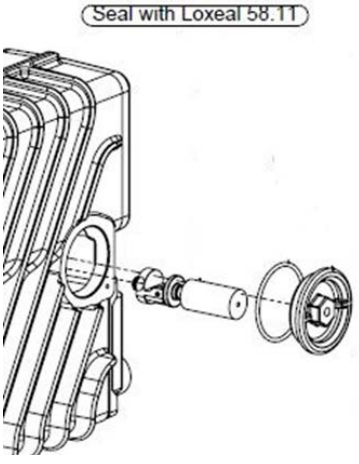
Step	Description / Photo
55.	Take the pump body and assemble the new valve plate following the procedure in pictures (1 to 4) (Allen key 3 mm).    

Step	Description / Photo
56.	Based on version of Inlet valve available (a or b), please, follow dedicated assembly step **56a** or **56b**.
56a.	For the pumps with the anti-suck back valve system composed by a spring and a plate, mount the system in this way: Put the inlet spring in the inlet housing. Insert the two O-Rings (OR 4375 Viton) on both sides of the Inlet Thermal Insulation. Put the inlet disc over the spring. 

Step	Description / Photo
56b.	For the pumps with the anti-suck back valve system composed by a support plate, a spring, a valve and a plate, mount the system in this way: Insert the two O-Rings (OR 4375 Viton) on both sides of the Inlet Thermal Insulation. Take the Support Plate with the pin inserted in it (verify if it is well inserted, if not use a hummer to insert it) and insert it on the Inlet Thermal Insulation. Insert the O-Ring OR 4375 Viton on the support plate. Take the Inlet Valve. Insert the consumable O-ring 2-141 VITON on the valve. Then insert spring on the valve, inserting the stem on the spring on the hole on the valve (encircled in red in the figure). Then place the spring plus the plate on the support plate on the pump body 

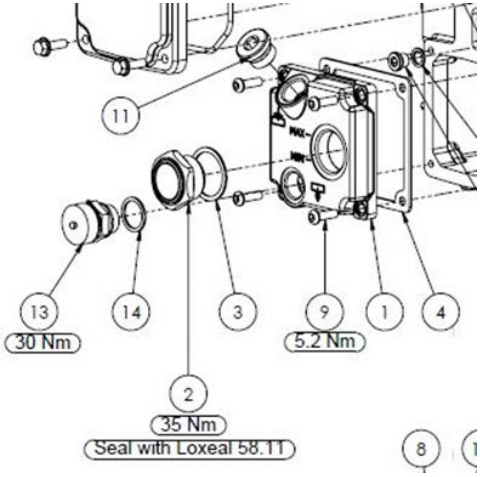
Step	Description / Photo
56b.	    

Step	Description / Photo
57.	Position the inlet port after positioning its O-Ring (OR 158 Viton) in the housing on it and close the four screws at 20 Nm (Torque Wrench 13 mm Hex). **IMPORTANT!** Note: remember to add the new plastic washer on the screws.    

Step	Description / Photo
58.	Take the new floating valve, put the liquid sealant on the thread.    

Step	Description / Photo
59.	Turn the Floating Valve Extractor until the referral sign will be on the top of tank. Remove the extractor, fit the new O-Ring (OR 12086 Viton) and assemble the front oil tank plug. Close the plug at 20 Nm (torque wrench 19 mm Hex).   
60.	Turn the oil tank, insert the new MS120 Exhaust filter as shown in the picture.  

Step	Description / Photo
61.	Insert the new O-Ring (OR 4425) in the exhaust cover. Position the discharge cover on the oil tank closing the four screws at 10 Nm (torque wrench 10 mm Hex).    

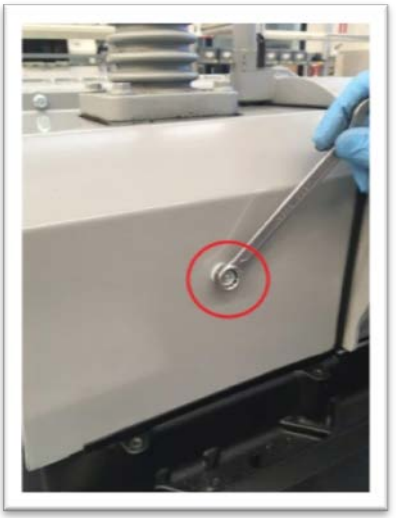
Step	Description / Photo
62.	Using the new cork oil cover gasket, assemble the oil cover on the tank. Use new oil level sight glass with its new washer, new fill plugs during the assembly Torque 20 Nm (Allen torque key 4 mm).    

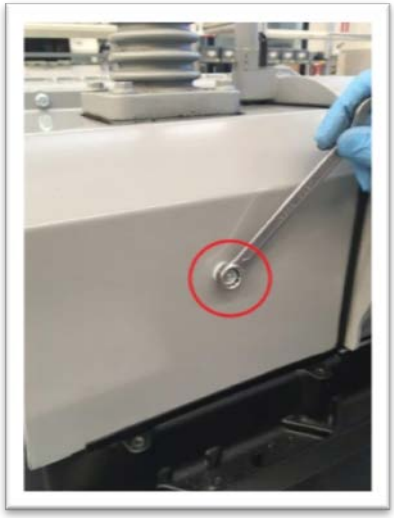
Step	Description / Photo
63.	Insert the new O-Rings (OR 12086 Viton) and assemble the two oil-tank plugs. Close the plastic plugs at 20 Nm (torque wrench 19 mm Hex).  
64.	Screw the M8 eyebolt onto the pump body. Insert the new gasket on the tank, Using a crane, position the pump body on the tank. **CAUTION!** Heavy weight lifting.  

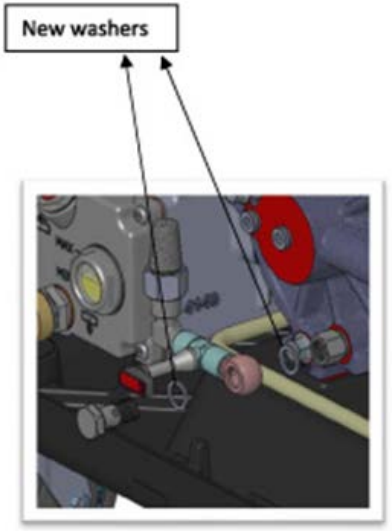
Step	Description / Photo
65.	Close the four nuts fixing the pump body on the tank. Mounting Sequence: 1 plain washer 2 split washer 3 nut  
66.	Assemble the two oil pipes. New aluminum washer (wrench hex 19 mm). 

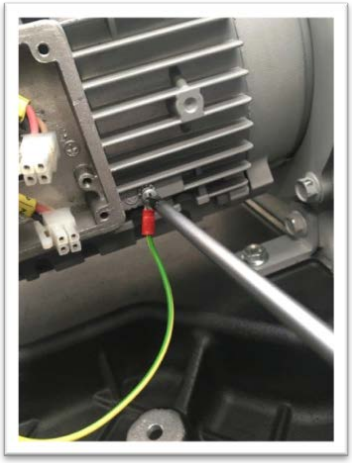
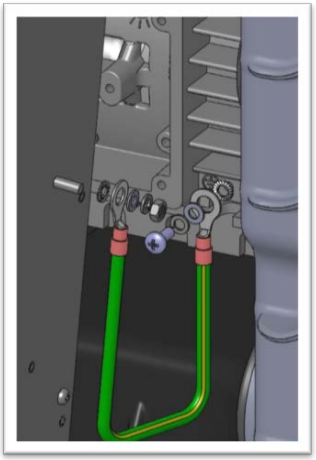
Step	Description / Photo
67.	Assemble the fan cover and the new elastic coupling insert (Allen key 8 mm).  
68.	Assemble the electric motor aligning the two half couplings and using a crane turn 90° the pump (wrench hex 13 mm). **CAUTION!** Heavy weight lifting.  

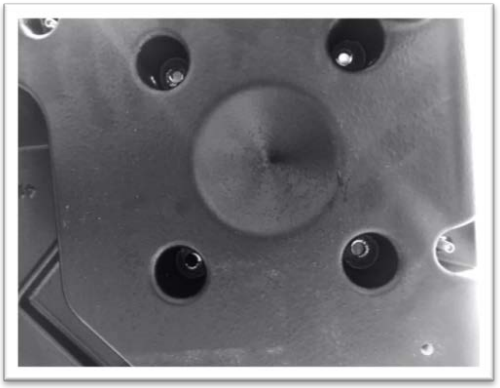
Step	Description / Photo
69.	Using a crane, put the pump on the basement, close the four nuts under the basement. **CAUTION!** Heavy weight lifting.   

Step	Description / Photo
70.	Assemble the two screws of pump fixing brackets on the basement.   

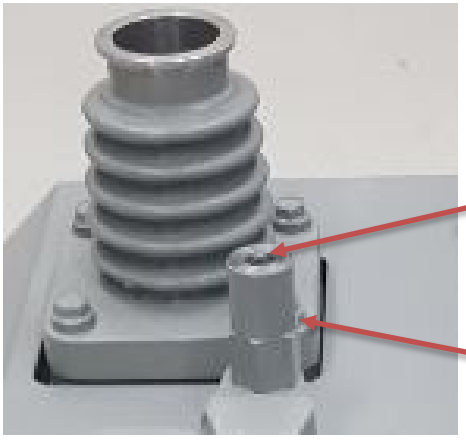
Step	Description / Photo
71.	Assemble the internal metallic cover positioning the new plastic washers below the three screws (M6 and M8) highlighted in the picture (wrench hex 10 mm and 13 mm).   

Step	Description / Photo
72.	Replace the gas ballast filter manually. 
73.	Assemble the gas- ballast pipeline using two new washers.  

Step	Description / Photo
74.	Bring the controller near the electric motor and connect the ground wire onto it. Verify that the right sequence of the fixing parts is properly done. 1. Serrated lock washer 2. Earth ground eyelet terminal 3. Plain washer 4. Groover washer 5. Nut for controller side/Screw for electrical motor side  
75.	Bring the controller near the electric motor and connect the two power cables. 

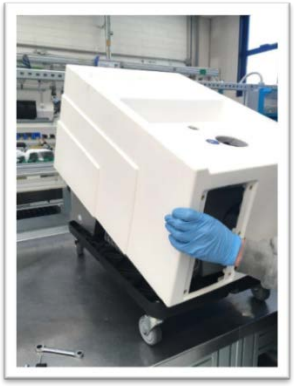
Step	Description / Photo
76.	Fix the controller in its position and close the four screws on the bottom of basement.  

Step	Description / Photo
77.	**Protective Earth continuity test** **CAUTION!** Using a tester/ohmmeter verify that the isolation is provided between the protective (earthing) conductor terminal and the accessible conductive parts of the unit that are required to be connected to the protective conductor terminal is below 0.1 Ohm. One probe (terminal pin) of the tester must be in contact with the middle pin of control socket (earth connection) [1], the other probe (terminal pin) of the tester must be in contact with a not painted part of the pump like the upper side of the eyebolt fixing adapter [2] (highlighted in the second picture). 

Step	Description / Photo
77.	
78.	Open the oil refill cap, insert the adapter and then the oil drain hose.

Step	Description / Photo
	Close the oil refill cap. Assemble the exhaust port manually using the new O-Ring (OR 3118 FKM).   

Step	Description / Photo
79.	Connect the main cable, insert the interlock cable as per the instructions in the user manual and blank off the inlet. Switch on the pump for few minutes.  

Step	Description / Photo
80.	Switch off the pump and reassemble the plastic cover, close the nut on the bottom. Reassemble the gas ballast knob and the plastic cover.     

Final Test

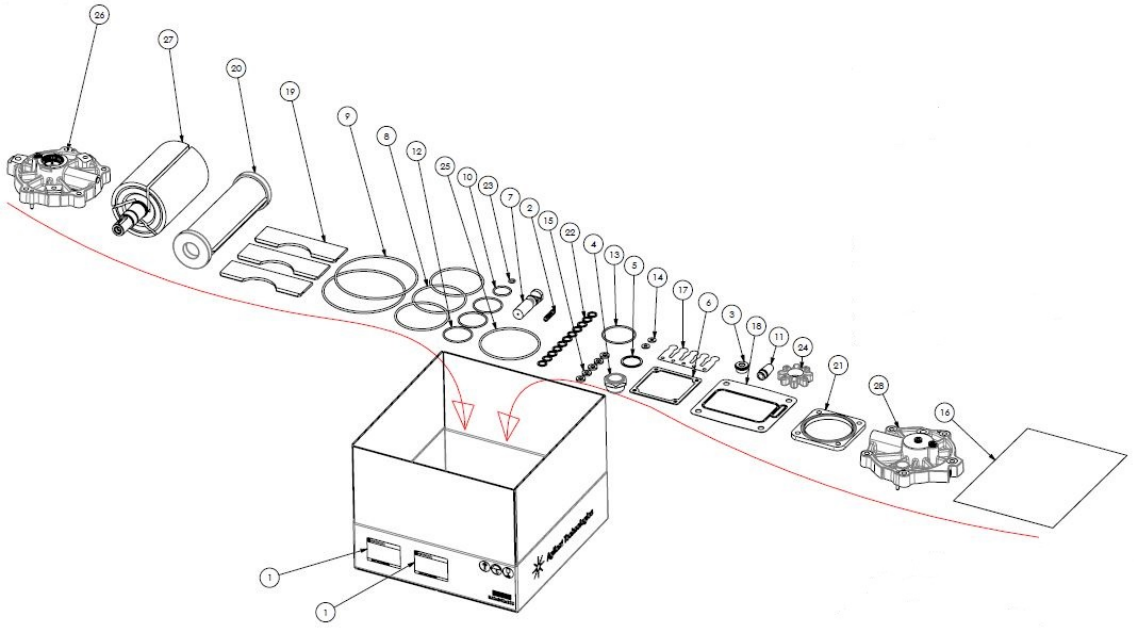
Step	Description / Photo
81.	Connect the main cable, insert the interlock cable (supplied in the MS120 Special Maintenance Tool Kit) as per the instructions in the user manual. Install the calibrated orifice valve supplied in the major maintenance tool kit on the inlet in closed position, open the gas ballast valve and switch on the pump for 30 minutes. Close the gas ballast and open the orifice valve, leave the pump running for 2 hours. Stop the pump, remove the orifice valve and install a low vacuum range gauge and measure the final vacuum.   The limit values for the ultimate pressure, for the pressure with gas ballast, for the pressure with the orifice and for the power are reported in the table on the right. ***Limits for MS120 pumps***

MS Model	PN Inverter.	Ultimate P	P gas ballast	P with orifice	P(W)	f(Hz)
G2571-69000	X3702-60022	≤9,0E-02mbar	2,0E-01 mbar	≤1,6mbar	1850	58
X3702-69000	X3702-60002	≤8,0E-02mbar	2,0E-01 mbar	≤1,8mbar	1700	50
X3702-69100	X3702-60002	≤8,0E-02mbar	2,0E-01 mbar	≤2,1mbar	1400	41
X3702-69010	X3702-60042	≤9,0E-02mbar	2,0E-01 mbar	≤1,6 mbar	2020	55

Step	Description / Photo
82.	Before to assemble the front panel assy, screw again the four screws (highlighted in red in the figure at right) on the tank low plate at 5.2 Nm. (Allen torque key 4 mm Allen key 3 mm)  

Spare Parts List

Object description	Part Number	Notes
MS120 Major Maintenance Kit	X3702-68202	
N° 2 Oil charge	X3760-64005	
MS120 Special Maintenance Tool Kit	X3702-67000	
User Manual	87-900-150-01	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ITEM	Q.TY	DESCRIPTION OR MATERIAL	PART NUMBER
1	2	Packaging Adhesive Label	NA
2	1	RVP MS40+ Spring	NA
3	1	RVP MS40+ 1/2G Male Plug	NA
4	1	RVP MS40+ Level Oil Indicator 1G	NA
5	1	RVP MS40+ Fasit Washer	NA
6	1	RVP MS40+ Gasket Oil Cover	NA
7	1	Float valve	NA
8	3	O-Ring 4375 FKM	NA
9	2	O-Ring 4587 FKM	NA
10	1	O-Ring 3118 FKM	NA
11	1	3/8" Gas Silencer	NA
12	3	O-Ring Parker 12086 FKM	NA
13	1	O-Ring Parker 2-141 FKM	NA
14	2	Plastic Washer for M6 screw	NA
15	5	Plastic Washer for M8 screw	NA
16	1	MS 120 Rebuild. Procedure	NA
17	1	Plate	X3702-00211
18	1	MS 120 Pump-Tank gasket	X3702-00222
19	3	MS 120 Vane	X3702-20213
20	1	MS 120 Exhaust filter	X3702-20217
21	1	MS 120 Inlet Thermal Insulation	X3702-20229
22	11	1/4"G Al Washer 1.5TK	X3702-20257
23	1	O-Ring ORM0080-25 FKM	X3702-40251
24	1	Elastic Coupling Insert	X3702-40262
25	1	O-Ring 4425	X3702-40264
26	1	MS 120 Motor side cover assy for pump rebuid	X3702-60210
27	1	MS 120 Rotor + bushings	X3702-60211
28	1	MS 120 Ext. cover + bushing	X3702-60213

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