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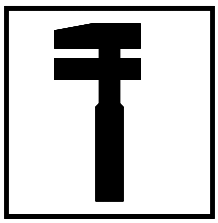


DISASSEMBLY AND ASSEMBLY INSTRUCTIONS FOR LIQUID RING VACUUM PUMP SINGLE STAGE WITH MECHANICAL SEAL

TRVB 32-25

CE

INTRODUCTION

These instructions are for the maintenance staff to repair the following pump:

TRVB 32-25

These instructions are supplied together with the manual of “INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS FOR LIQUID RING VACUUM PUMPS”.
They provide a reference for safe operation, installation, maintenance and repairing of the pumps.
Prior to working on the pump it is recommended to follow the instructions of safety listed in chapters 2 and 15 of the above manual, as well is absolutely important to:

- wear safety clothing, hard hat, safety shoes, safety eyeglasses
- disconnect the electrical power
- close suction valves and service liquid valves
- remove pump from installation without damaging other system components
- assume all safety measures if pump has been handling hazardous fluids
- drain pump casings through the draining connections and flush the pump with clean liquid, if required.

When requesting spare parts or technical information for the pump, always quote the pump model number and serial number which is printed on the pump nameplate: therefore, it is recommended not to remove the pump nameplate or, in case this action will be necessary, write the serial number on the pump (for example on the flange).

Should additional information be required, please do not hesitate to contact POMPETRAVAINI or the closest representative. Should there be any difficulties in repairing the pump, it is recommended to send the pump for repair to POMPETRAVAINI or the local authorised representative.
Any pump repairs and/or system work carried out by others will not be guaranteed by POMPETRAVAINI.

NOTE: VDMA numbers identify all pump components.
Refer to parts list in chapter 4 and to the section drawing in chapter 5.
All drawings are schematic only and are not certified for construction.
For further information please consult POMPETRAVAINI or its closest representative.
Torque values for various bolt sizes and tie-bolts are listed on fig. 4.

INDEX

1 - Pump disassembly
2 - Pump assembly
3 - Recommended spare parts
4 - Parts list
5 - Typical sectional drawings

The liquids and the gases handled by the pumps and also their parts could be potentially dangerous for persons and environment: provide their eventual disposal in conformity with the laws into force and a proper environment management.

The present manual is not assigned for pumps subjected to the ATEX 94/9/CE directive. In case the pump is assigned in environments subjected to the application ATEX 99/92/CE directive or in case the pump is provided with a nameplate indicating the ATEX stamp, it strictly forbidden proceed to start up the pumps but necessary to consult POMPETRAVAINI for clarifications.
For pumps subjected to the ATEX 94/9/CE directive it is available a dedicated integrative manual.

In preparing this manual, every possible effort has been made to help the customer and operator with the proper installation and operation of the pump. Should you find errors, misunderstandings or discrepancies please do not hesitate to bring them to our attention.

1 - PUMP DISASSEMBLY

Disconnect the pump from the electrical motor VDMA 801 unscrewing the screws VDMA 901.3.
Place the pump in the vertical position resting on the lantern VDMA 341, remove the screws VDMA 914 and then remove the pump casing VDMA 101 from the rest of the pump.
Remove the screws VDMA 914.1 that hold the metal cover VDMA 180.6 on the inspection port of the pump.
Check that the components of the special valve VDMA 180.5 and Teflon flapper VDMA 400.9 are in good working conditions.
Verify that the internals of suction/discharge casing VDMA 101 are free of defects (wear, corrosion, cracks, etc.).
Remove the shaft nut(s) VDMA 923 or 923.1 and then the impeller VDMA 230. Verify that the impeller is also free from defects and wear.
Remove the shaft key VDMA 940.1 and the spacer VDMA 485.
Remove the rear casing VDMA 120 by removing the screws VDMA 901.1.
The rotating part of the mechanical seal VDMA 433.2 will also slide out of the shaft.
The stationary part of the mechanical seal can now be removed from the rear cover. Note the threaded anti-rotating pin VDMA 904 for the mechanical seal stationary part.
Remove the thrower VDMA 507 from the shaft VDMA 210, remove the circlip VDMA 932.3 from the lantern VDMA 341.
Now remove the shaft VDMA 210 with the ball bearings VDMA 320, remove the circlip VDMA 932. With a proper puller remove the ball bearings VDMA 320 from the shaft and, if necessary, remove also the elastic ring VDMA 935 placed at the bottom of the lantern VDMA 341.
Proceed with the inspection of all components, replace bad and/or worn parts with POMPETRAVAINI's original parts.
It is good practice to replace, as a minimum, all wear parts such as mechanical seal, gaskets, etc.

2 - PUMP ASSEMBLY

Begin the assembly by placing the lantern VDMA 341 in the vertical position resting on the larger flange. Place the elastic ring VDMA 935 at the bottom of the lantern (if previously removed).
Insert on the shaft VDMA 210 the 2 ball bearings VDMA 320 type 6006-2RS (30x55x13) locking the ball bearing on the pump side by the circlip VDMA 932, insert the sub-assembly (shaft and bearings) into the lantern VDMA 341 pushing it compressing the elastic ring VDMA 935, fit the circlip VDMA 632.3.
Insert on the shaft the thrower VDMA 507.
Insert the stationary part of the mechanical seal VDMA 433.2 in the rear casing VDMA 120.
Lubricate the seal O-Ring with compatible liquid, (mechanical seal dimensions are listed in fig. 1).
Be sure that the seal stationary seat does not come out of its seat.
Insert on the shaft VDMA 210 the rear casing VDMA 120 and connect it to the flange of the lantern VDMA 341 with the screws VDMA 901.
Do not tighten the screws VDMA 901.
Check the impeller length against the depth of casing VDMA 101 in which the impeller must fit (see fig. 2 for allowed tolerance). In the event the impeller is too long it will be required to machine it down.
A **pre-assembly** of spacer VDMA 485 and impeller VDMA 230 on the shaft is required.
If needed, add shims between the spacer and the impeller so that the latter is 0,05 to 0,10 mm from the rear casing VDMA 120 (this will provide an even clearance on both sides of the impeller) see fig. 3.
Remove the impeller and the spacer with the shims, if previously added.

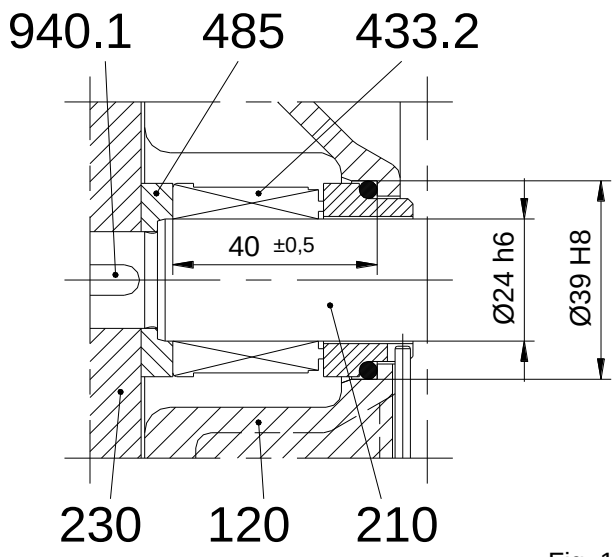


Fig .1

Proceed with the final pump assembly: lubricate the O-ring and shaft then insert on the shaft the rotating part of the mechanical seal VDMA 433.2.
Be sure to keep both seal faces clean. Insert on the shaft the spacer VDMA 485 with shims (if needed).

Push the spacer to compress the seal spring and insert the shaft key VDMA 940.1 in the keyway.
Insert the impeller and lock it on the shaft with the impeller nut(s) VDMA 923 or 923.1.
Torque values are listed in fig. 4.

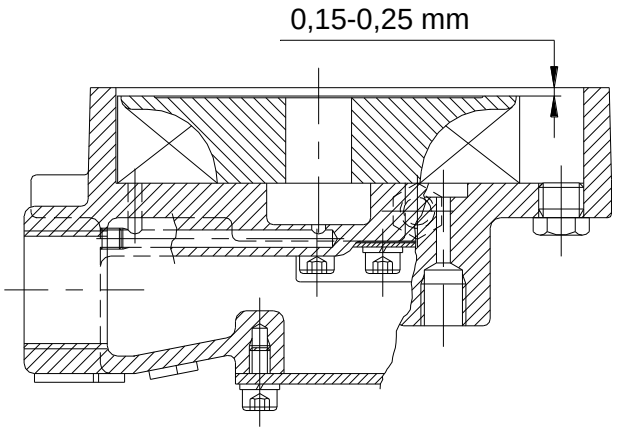


Fig. 2

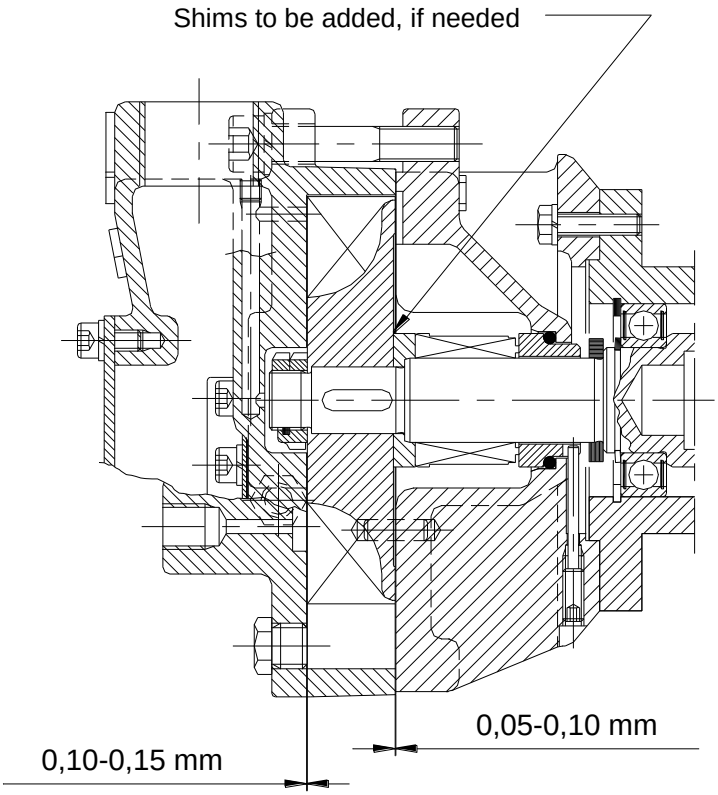


Fig. 3

Fit the 2 locating pins VDMA 562 in their respective seats (if previously removed).
Apply on the face of the pump casing VDMA 101, a coat of “Loctite 510” gasket material. Place the pump casing on the rear casing VDMA 120 using the locating pins for guide.
Insert the screws VDMA 914 with lock washers VDMA 554.5 and adjust torque to the values given in fig. 4.
Connect the pump to the electrical motor VDMA 801 with the screws VDMA 901.3 but without over tightening, insert with precaution the motor shaft key into the slot of the shaft VDMA 210.
Place the pump assembly in the horizontal position and, using a level, check the ports on the suction/discharge casing for horizontal accuracy.
Then torque the screws VDMA 901 that attach the rear casing to the lantern VDMA 341 and the screws VDMA 901.3 that attach the lantern to the electric motor VDMA 801.
Check the free rotation of the pump impeller by inserting a temporary screw on the motor shaft at the fan side.
Allow the pump gasket to cure for approximately 2 hours after assembly, apply then hydrostatic pressure to a max of 3 bar to see if there are any leaks.

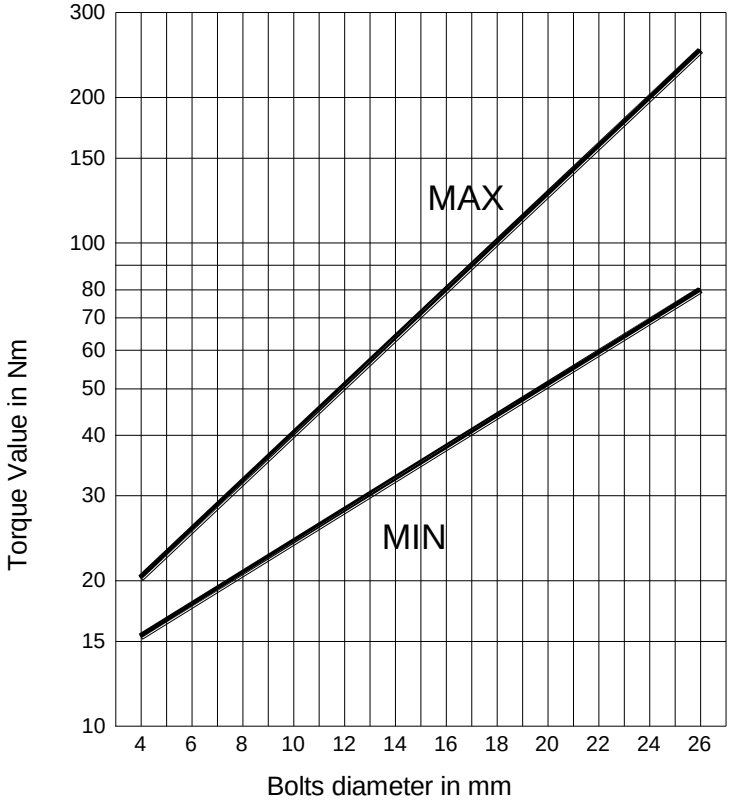


Fig. 4 - TORQUE VALUES FOR BOLTS AND NUTS OF VARIOUS DIAMETERS

3 - RECOMMENDED SPARE PARTS

When ordering the pump it is good practice to also order the necessary spare parts, especially when there are no stand-by pumps in the installation.
This will minimise unnecessary down times in the event of pump failures or routine maintenance.
It is therefore, recommended to stock the following spare parts for each pump size:

1 Impeller
1 Shaft assembly
2 Ball bearings
1 Mechanical seal
1 Gasket compound
1 Electric motor

For better parts management, the VDMA 24296 standards suggest to stock the number of parts as a function of the number of pumps being used in the plant.
On the pump nameplate are printed the pump model, year of manufacture and pump serial number. When ordering spare parts always refer to this information.
Pump type, parts item number (VDMA) and description (from the parts list on chapter 3 and pump sectional drawing on chapter 4) is useful information that helps us supplying the correct spare parts for your pump.
We recommend the use of original parts: in case of deviation, POMPETRAVAINI declines any responsibility for damages that may be derived from the use of non-original spare parts.

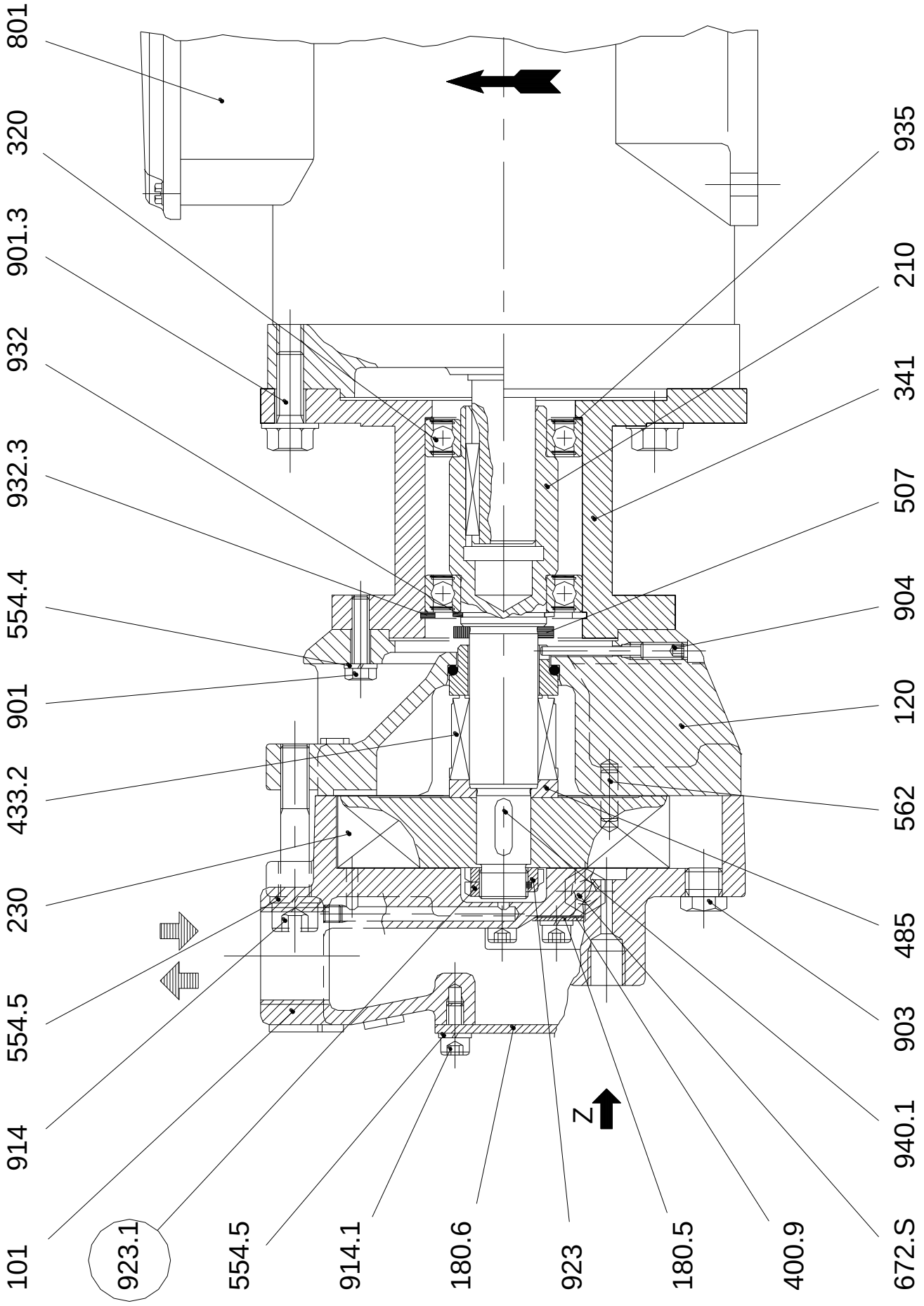
4 - PARTS LIST

VDMA NO	DESCRIPTION
101	Suction/discharge casing
120	Rear casing
180.5	Valve plate
180.6	Metal cover
210	Shaft
230	Impeller
320	Ball bearing
341	Motor lantern
400.9	Flapper
433.2	Mechanical seal
485	Impeller and mechanical seal spacer
507	Thrower
554.4	Lock washer
554.5	Lock washer

VDMA NO	DESCRIPTION
562	Locating pin
672.S	Anti-cavitation valve
801	Electric motor
901…	Screw
903	Plug
904	Threaded lock pin
914…	Screw
923…	Bearing nut
932…	Circlip
935	Elastic ring
940.1	Key
Z	Liquid supply inlet

According to what expected from 2012/19/UE Directive on Waste Electric and Electronic Equipment the electrical pump assembly from us supplied (pump coupled with an electrical motor of Pompetravaini supply or customer supply) placed on the market after the 15th of August 2018 fell within the limits of application of the Directive. As a consequence, conforming to article 14 of the 2012/19/UE Directive of the European Parliament of the 4th of July 2012, Pompetravaini Spa is registered on the Italian list of EEE manufacturer.
The electrical pump assembly supplied by Pompetravaini Spa that should be discontinued from use must not be disposed with common waste because it is composed of different materials that can be recycled at the appropriate facilities. If it is not intended to proceed autonomously at the management of the electrical pump assembly at authorized disposal companies it is possible to contact the Pompetravaini branch closer to you that will give you the necessary information on a proper disposal in accordance with mandatory laws.
The pump unit must be previously cleaned up by the pumped product upon disposal.
After reclamation the electrical pump assembly is not potentially dangerous for human health and environment, not containing harmful substances according to 2011/65/UE (RoHs) Directive, but if abandoned in the environment will have a negative impact on the ecosystem.
Sending the electrical pump assembly to an adequate process of disposal and recovery of materials protect the environment and help to limits consumption of available resources with effective recycling of materials.
The abandonment in the environment of the apparatus or the illegal disposal of the same are punished by law.

5 - TYPICAL SECTIONAL DRAWING



TRVB 32-25 (with NEMA electric motor - type D143TCZ – 2 poles – kW 1,1 – Hz 60 – V 415)

○ Applicable only for Stainless steel material

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Continuing research of POMPETRAVAINI results in product improvements: therefore any specifications may be subject to change without notice.

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