
WORKSHOP MANUAL OF PUMP MODEL "VSP"

VENUS PUMP & ENGINEERING WORKS (Pump Unit)

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**S/O NO. :- 51023-GeM/05 x Centrifugal Water Pump /22HP/
IMB/GS2025-26/ SO-42/DGBR/E3ES Date. 03.02.2026**

GEM Contract No. :- GEMC-511687711969192 Date. 03.02.2026

**Skid mounted Single Stage, Horizontal Spindle Self Priming,
Non Clogging CENTRIFUGAL PUMP Model VSP-4 Capacity
30 Liters/ sec at 18mtrs total Hd. coupled with "EICHER"
Model 323ES air cooled Diesel Engine
developing 26 HP at 1500 RPM.**

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"VENUS" "VSP" pump sets are SELF PRIMING Centrifugal Pump coupled with Diesel Engine. After installation and operation for 12 months the pumpset should be Inspected thoroughly and overhauled If needed. For detail please refer our Installation and Operation Manual.

A. DISMANTLING PROCEDURE OF PUMP

- a) First remove suction and delivery pipe connections. Drain water from the pump by unscrewing Drain plug (36). Remove grease cups, pipe nipples then separate pump from engine and base plate. Remove suction flange (17) and delivery flange (18) and Flap Valve assembly from pump casing (1)
 - b) All nuts to be removed from the studs fixing casing cover with pump casing.
 - c) Pull the bracket (8) for taking out the Impeller, Shaft, Bracket casing cover assembly from the pump casing.
 - d) Impeller lock nut (15) & M.S. Washer, Bearing cover (5), Bearing Lock Nut (6), The Grease Cup (21) & Grease Nipple to be removed.
 - e) At the stuffing box area, gland nuts to be removed from the gland. Gland to be pulled out to-wards bearing side to release pressure on the gland packing as well as to ensure proper clearance for removing internal packing & lantern ring.
 - f) The gland packing (11), lantern rings (22) to be removed.
 - g) Puller legs to be placed on outside of the Pump Casing Cover & pressure to be exerted through the puller spindle to the Impeller shaft & as a result of which Impeller Shaft will travel towards the driving side of the shaft & the impeller will come out with the key. After taking out the Impeller (13) Shaft Sleeve (12) Should be removed.
 - h) After, Dismantling the impeller, the wearing plate to be removed by unscrewing the counter shank screws from the casing cover.
 - i) The Casing Cover to be removed by opening the nuts from the bracket now the bracket will consist of Shaft (7), Bearings (4 & 9), water deflector. After pulling out the shaft, the bearings, water deflector to be opened one after the other.
 - j) The suction side wearing plate will be taken out by unscrewing the counter shank screw fitted with pump casing.
 - k) After dismantling the suction side flange the check valve (flapper) to be taken out.
 - l) For routine checkup the hole cover at pump suction casing may be opened by removing the bolts fitted with pump casing for checking entrapped foreign particles / debris.
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WEARING ALLOWANCE TABLE

The Clearances which are to be maintained between some of the critical parts are as follows :

SL. No.	Components fitted With each other	Clearance in new condition	Permissible Wear
1.	Between Impeller & Wearing Plate	0.2 mm.	0.3 mm.
2.	Between Shaft Sleeve & Packing Gland	-----	0.5 mm.
3.	Bearing Bore to Shaft	Standard Fit-J5 Standard Tolerance $30+0.005/-0.000$ mm	0.005 mm. below 30 mm
4.	Bearing to Bearing Housing	Standard Fit -J6 $72+0.0013/-0.006$ mm	0.013 Above 62 & 0.006 Below 62 mm

A. ASSEMBLY PROCEDURE :

- a) Apply a thin layer of grease to all surfaces that have to be airtight.
 - b) Clean re-circulating port in casing (1)
 - c) Complete the flap valve assembly (19) and fix it with pump suction flange (17), fix wearing plate non-driving end side (14) with pump casing (1) and wearing plate driving end side (3) with casing cover (2).
 - d) Fit Bearing inner (9) Bearing outer (4) with shaft (7) so that the bearing rest against the steps provided on the shaft. Apply grease between the two recess of the bearings. Ball bearings should be press fitted, if it is not possible, then hammer gradually the inner recess of the ball bearings by putting suitable spacer on it.
 - e) Insert the shaft (7) into the bracket (8) from driving end.
 - f) Insert the bearing cap Non Driving End (10), Gland Packing (11) and gland (38) and washer for stuffing box packing, on the shaft (7) from non-driving end side.
 - g) Fit sub-assembly of casing covers (2) on bracket (8).
 - h) Insert the shaft sleeve (12) over the shaft (7). Take care that shaft sleeve slot/keyway matches with shaft-keyway.
 - i) Fit bearing cover Driving end (5) to bearing housing.
 - j) insert impeller key (30) into the shaft and shafts sleeves and mount impeller (13) on the shaft. Lock it by Left hand threaded Impeller Lock nut (15) alongwith its washer, tighten the bearing locknut (6) on the shaft. Check clearance between impeller and wearing plate Driving end (3). It should be 0.2 to 0.3 mm.
 - k) Fit the sub-assembly of casing cover comprising bracket, bearing shaft, impeller etc. to the pump casing (1) putting gasket between the machined mating parts and tighten it with nuts. The clearance between impeller and wearing plate Non-Driving End. (14) should be 0.2 to 0.3 mm. This should be. adjusted by inserting required thickness of Leatheroid paper gasket, between casing cover (2) and pump casing (1). After fitting the driving unit check, impeller rotates freely.
 - l) Insert Stuffing Box Gland packing (11), Lantern ring (22) duly filled with grease and again two stuffing Box packing.
 - m) Insert coupling Key (24) on the shaft and mount the pump coupling on the shaft (7) and tighten it by grub screw/Bolt.
 - n) Fix up Grease Cups (21) for Bearing Driving End, Non-Driving End and Stuffing Box.
 - o) Tighten Sub-assembly of suction flange (17) and Check valve Flaps (19) with pump casing (1) and then tighten the Delivery Flange (18) and Suction Flange (17) Tighten the plug (36) with Pump Casing.
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**RECOMMENDED LUBRICATING OIL WITH CAPACITY AND
PERIODICITY OF REFILLING**

- 1) Lubricate the two antifriction bearings grease cups Red Painted, once every month.
2. Lubricate the stuffing box Lantern ring by screwing the Grease cup Red Painted, once every week before starting the pump.
3. Use Grease, type SERVO GEM -II Indian oil make or equivalent.
4. Control volume of the surrounding space of the bearing housing inclusive of each grease cup is 50 grams approx.

FASTNERS TIGHTENING TORQUE DURING ASSEMBLY OF PUMP SET

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|---|---------------|
| 1. Pump Casing (1) with Suction Flange (17) /
Delivery Flange (18) | 100 ft. lb. |
| 2. Pump Casing (1) with pump Casing Cover (2) | 150 ft. lb. |
| 3. Bracket (8) with pump Casing cover (2) | 150 ft. lb. |
| 4. Bearing cover (5) with Bracket (8) | 50-60 ft. lb. |
| 5. Lock Nut (15) with Impeller (13) | 150 ft. lb. |
| 6. Bearing Lock Nut (6) with shaft (7) | 100 ft. lb. |
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RECOMMENDED LIST OF TOOLS

1. Double Ended spanner (8/9mm)	2 Nos.
2. Slide wrench (0-1" capacity) with arm length 12"	1 No.
3. Ring spanner 16/17 MM.	2 Nos.
4. Screw Driver 12"	1 No.
5. Screw Driver 6"	1 No.
6. Hammer 1/2 lbs.	1 No.
7. Hammer 2 lbs.	1 No.
8. Pliers (cutting)	1 No.
9. Pliers (nose)	1 No.
10. Pipe wrench size 24"	1 No.
11. Pipe wrench size 18"	1 No.
12. Box Spanner Size 16mm	1 No.
13. Filler Gauge	1 Set.
14. Torque wrenches (Range 0-20 ft.lb.)	1 Set.
15. Adopter (8 to 16 mm size) For Hex Nuts	1 Set.
16. Puller (12" long)	1 No.
17. Chisel	1 No.
18. Measuring Steel Tape (2mtr)	1 No.
19. Measuring Steel Scale 12" length	1 No.
