

NSP Series Information Sheet



Working Principle

NSP pumps are a line of positive displacement, dry running pumps, where a key feature is the isolation of the pumped material, and a deep vacuum capability. The pump is capable of ultimate vacuums as high as 1Pa at ultimate vacuum capacity. The pumps are dry running, hence dry screw. All processes and pumped material are isolated from any outside fluids and lubricants using oil and mechanical seals. This makes these pumps ideal for industries where clean operations are required, as well as industries where toxic and highly corrosive gases are used.

NSP units use a pair of helical screw rotors rotating against each other to axially move the process material to the outlet port. The Variable pitch design of the rotors leads to a significantly greater energy efficiency compared to other constant pitch designs, where most of the compression of the process gas is done at the outlet end plate. The variable pitch rotors compress the gas throughout the body of the pump, leading to more effective cooling and significantly reduces energy requirements to run the pump.

The pump can be driven though with a belt or coupling transmission. The power from the motor is then used to drive the screws which turn against one another by a geared connection. The opposing directions of rotation cause the screws to drive process gas inside the chamber of the pump axially down the pump towards the outlet port.

Features

- Efficiency: The variable pitch screws lead to lower overall energy consumption by the pump system.
- Clean: No contact between the process gas and any oil or water in the pump.
- Low Maintenance: Only requires simple oil changes on regular, lengthy intervals.
- Access to Parts: NES Company stands alone in the industry by offering spare parts for DIY repair.
- Pressure ranges from atmospheric (760 torr) to 5×10^{-2} torr.



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- Versatility: Usable in a very wide range of industries with very different pumping needs.
- Reliability under even the harshest pumping loads and conditions.

Parameter	Unit	NSP-150	NSP-300	NSP-400	NSP-800	NSP-1500
Exhaust Volume	CFM	76	176	235	471	883
	GPM	575	1320	1761	3522	6603
Ultimate Vacuum Pressure	torr	5×10^{-2}	5×10^{-2}	7.5×10^{-3}	7.5×10^{-3}	5×10^{-2}
	psi	10×10^{-4}	1.45×10^{-4}	1.45×10^{-4}	1.45×10^{-4}	10×10^{-4}
Motor Power	HP	5.5	10	15	25	50
Power Consumption at 7.5 torr	BHP	4.5	8	9	16.5	41
RPM		3600	3500	3500	3500	1750
Flange Connections	Inlet	1-1/2 in.	2 in.	2-1/2 in.	4 in.	5 in.
	Outlet	1-1/2 in.	1-1/2 in.	2 in.	2-1/2 in.	3 in.
Cooling Water Flow	GPM	1.25 - 2.5	2.5 - 4	2.5 - 4	4 - 5.25	7.25 - 10.5
Cooling Water Connection	NPT	3/8 in.	1/2 in.	1/2 in.	1/2 in.	1 in.
Gearbox Oil	qt	1	2	2	2.5	8.5

Product Parameters

Contact NES Company with any questions or inquiries about values listed not listed in the table.

Oil

Location	Suction End	Exhaust End
Lubricated Parts	Gearbox	Bearing
Change Interval	6 months	6 months
Quantity	1-10 qt	10-15cc
Oil Type	Shell Turbo Oil T-46	Mobil 1 synthetic Grease
Alternatives	Bottom alternatives in Table 4. suitable for semiconductor applications	Shell Gadus S2 V100 2 Fomblin RT 15

Seal Purge Gas	psi	18.5-22.5	18.5-22.5	18.5-22.5	18.5-22.5	18.5-22.5
	GPM	1.25-4	1.25-4	1.25-4	4-6.5	4-6.5
Length	Inches	28	37	38.5	45	64.25
Height	Inches	10.75	13	14.25	16.25	20.5
Width	Inches	11.25	14.75	15.75	18.25	25.25
Weight	Pounds	342	750	993	1279	2528
Cooling Gas	GPM	8	10.5	10.5	13.25	42.25

Change intervals in Table 4 must be shortened when project involves use of solvents

Clean pump and replace grease and oil in the event of liquid spillage in the pump

Pump Model	Bottom Exhaust	Side Exhaust
NSP-150	X	X
NSP-300	X	X
NSP-400	X	X
NSP-800	X	X
NSP-1500	-	X
NSP-3000	-	X
Seal End	Seal Options	

Materials of Construction

Suction	2 Double Lip Seals
Exhaust	2 Double Lip Seals or Double Lip Seal and Mechanical Seal

Seal Options

Each pump comes with 2 seals built in. The type of seal can be requested by the customer and adapted to the specific application needs.

Available Configurations

The desired configuration of your pump can and should be specified when placing an order.

Also available with variable frequency drive.

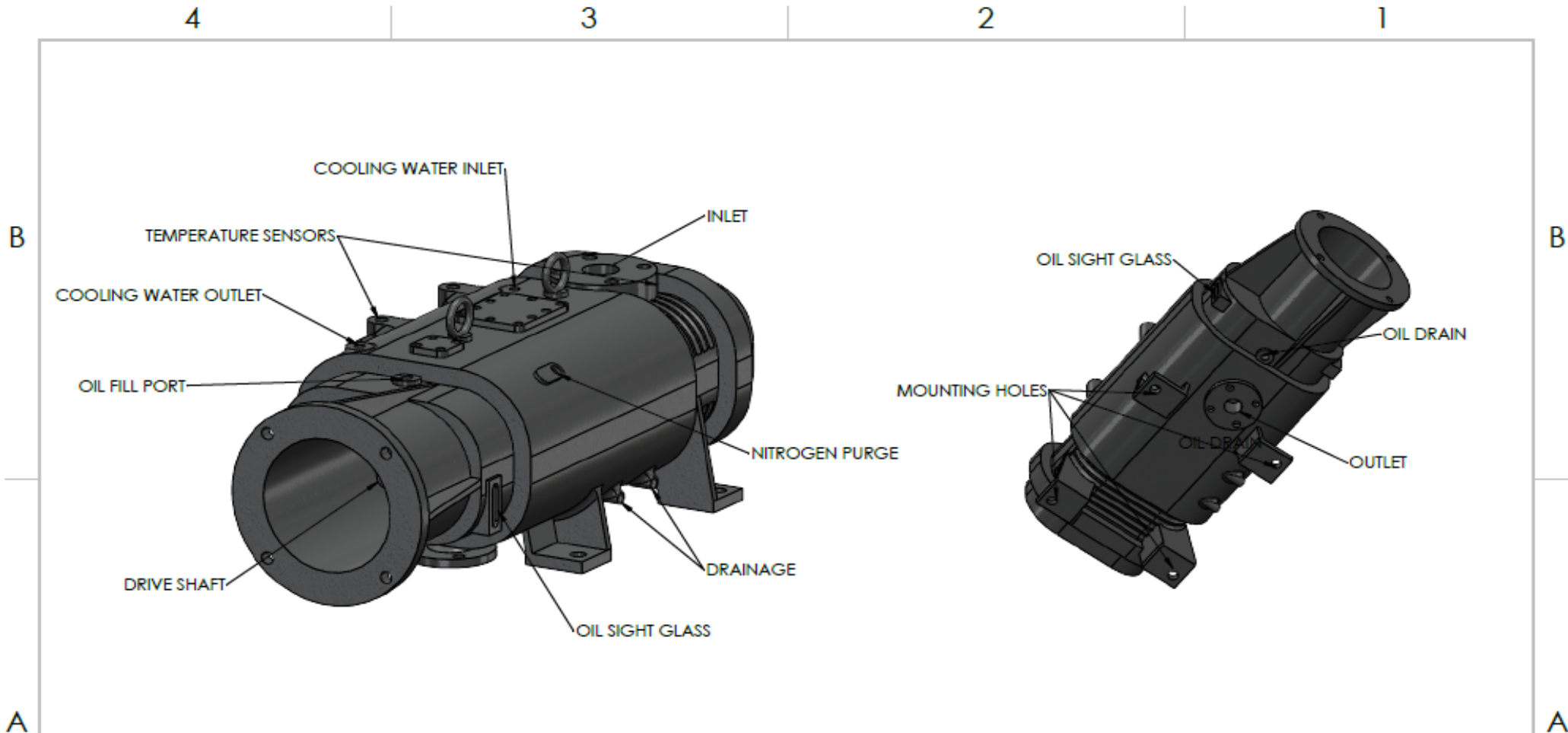
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TITLE: **NSP GENERAL DRAWING**

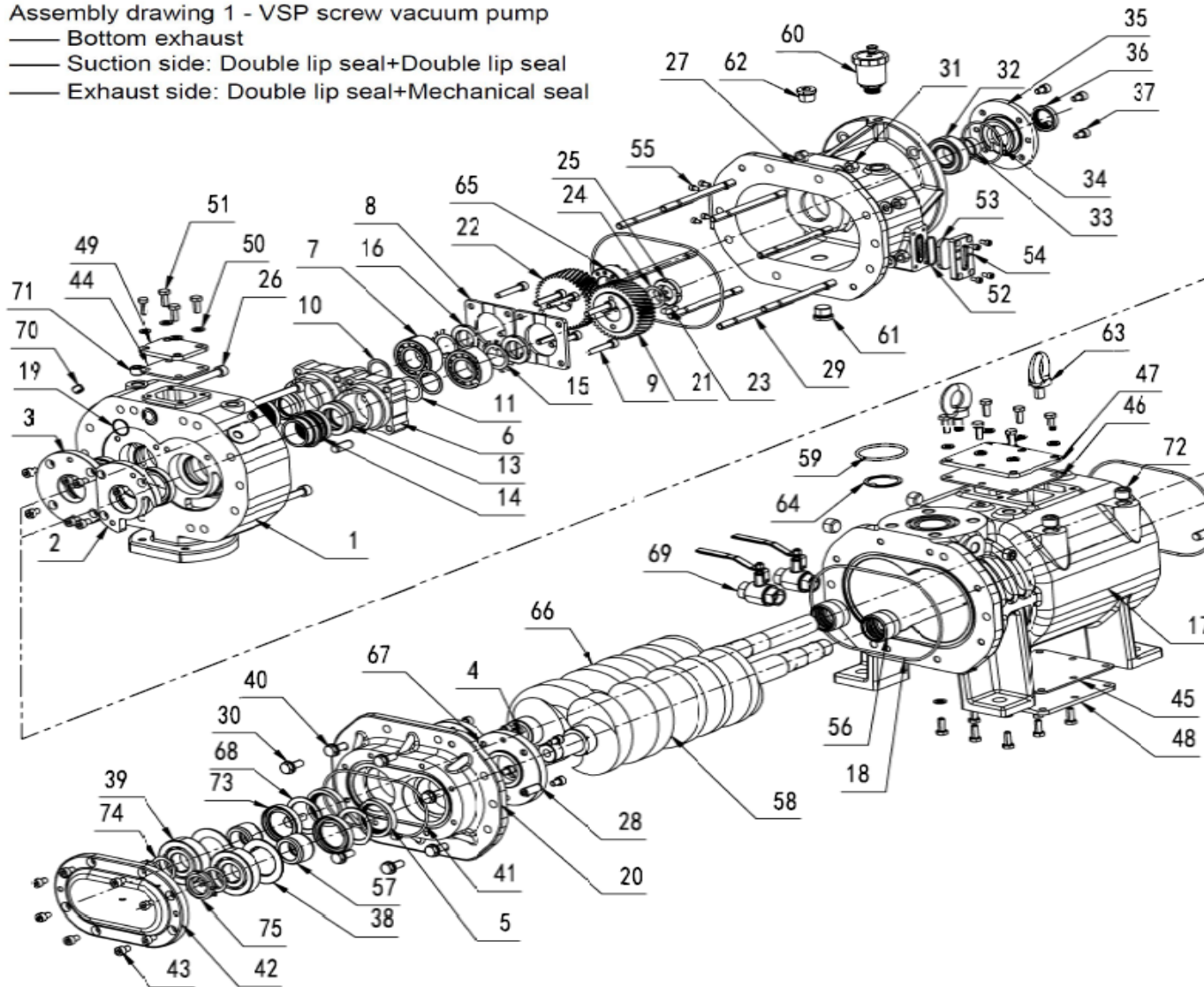
UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 TOLERANCES:
 FRACTIONAL ±
 ANGULAR: MATCH ± BEND ±
 TWO PLACE DECIMAL ±
 THREE PLACE DECIMAL ±

NAME	DATE	MATERIAL	UNITS	INCHES
DRAWN: R.KANYARO	AUGUST 3 2023	SIZE B	DWG. NO.	REV
CHECKED:				
APPROVED:			SCALE: 1:5	WEIGHT:

SHEET 1 OF 1	
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Assembly drawing 1 - VSP screw vacuum pump

- Bottom exhaust
- Suction side: Double lip seal+Double lip seal
- Exhaust side: Double lip seal+Mechanical seal



75	Locknut - suction side	2
74	Stop washer - suction side	2
73	Double lip seal - suction side	4
72	Hexagon socket screw plug - pump body	4
71	Hexagon socket screw plug - end cover	2
70	Hexagon socket screw plug - purge port	2
69	Manual drain valve	2
68	Washer	2
67	Suction end plate guide	2
66	Drive rotor	1
65	Gear expansion sleeve	1
64	Inlet filter	1
63	Lifting ring screw	2
62	Hexagon socket screw plug	1
61	Hexagon socket magnetic screw plug Automatic exhaust valve	1
59	O ring - suction port	1
58	Driven rotor	1
57	Suction end bushing	2
56	Exhaust end bushing	2
55	Hexagon Socket Head Bolt - sight glass platen	8
54	Sight glass platen	2
53	Oil window glass	2
52	O ring - sight glass window	2
51	Hex bolt	18
50	Flat Washer C	18
49	End cap upper cover plate	1
48	Pump body lower cover plate	1
47	Pump body upper cover plate	1
46	Pump body upper cover plate-rubber pad	1
45	Pump body lower cover plate-rubber pad	1
44	End cap upper cover plate-rubber pad	1
43	Hexagon Socket Head Bolt - back cover	8
42	Back cover	1
41	O ring - back cover	1
40	Hex bolt - suction end cover	8
39	Cylindrical Roller Bearing	2
NO.	Part Name	Quantity

38	Retaining ring	2
37	Hexagon Socket Head Bolt - oil seal seat	4
36	Skeleton Oil Seal	1
35	Oil seal seat	1
34	O ring - oil seal seat	1
33	Bushing	1
32	Deep groove ball bearing	1
31	Hex nut	8
30	Flat Washer A	16
29	Stud	8
28	Cylindrical pin with female thread	6
27	Front cover	1
26	Hexagon Socket Head Bolt - exhaust end cover	4
25	Round nut	1
24	Stop washer for round nut	1
23	Gear key	1
22	Drive gear	1
21	Driven gear	1
20	Suction end cover	1
19	O ring - water hole	1
18	O ring - pump body	3
17	Pump body	1
16	Locknut - exhaust side	2
15	Stop washer - exhaust side	2
14	Mechanical seal static ring	2
13	Mechanical seal dynamic ring	2
12	Adjusting washer - 0.3	2
11	Adjusting washer - 0.1	2
10	Adjusting washer - 1.2	2
9	Hexagon Socket Head Bolt - Bearing Platen	8
8	Bearing Platen	2
7	Double-row Angular Contact Ball Bearing	2
6	Bearing seat	2
5	Double lip seal - exhaust side	2
4	Hexagon Socket Head Bolt - S316	16
3	Exhaust end plate guide B	1
2	Exhaust end plate guide A	1
1	Exhaust end cover - bottom exhaust	1
NO.	Part Name	Quantity

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