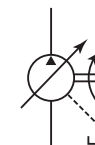


NACHI VDR Series Variable Volume Vane Pump



VDR13 Design Series Variable Volume Vane Pump

5.2 to 11.8 gpm
870 psi

The new design number 13 was created by modifying some of the components of old design numbers 11 and 12, and the new design installation is compatible with the old design.

Features

Energy efficient, economical operation

Built-in high-precision temperature compensation mechanism

The ring is displaced by a spring, and a rise in pressure automatically moves it to the center to make the discharge rate zero.

Relief valve and unloading valve can be eliminated from the circuit.

It was possible to reduce the size of the unit because there was no increase of proportional input to pressure which prevented increases in the temperature of the fluid.

New design for lower noise and improved durability

- Handling
- 1 Rotation Direction The direction of rotation is always is clockwise (rightward) when viewed from the shaft side.
- 2 Drain Drain piping must be direct piping up to a point that is below the tank fluid level, and back pressure due to pipe resistance should not exceed 4.35 psi.

Specifications

Single Pump

Model No.	Capacity in ³ /rev	No-load Discharge Rate (gpm)				Pressure Adjustment Range kgf/cm ² (psi)	Allowable Peak Pressure kgf/cm ² (psi)	Revolution Speed min ⁻¹		Weight lbs
		1000min ⁻¹	1200min ⁻¹	1500min ⁻¹	1800min ⁻¹			Min.	Max.	
VDR-1A(B) -1A1-13	.84	3.6	4.3	5.5	6.6	10.2 ~ 20.6 (145 ~ 290)	143 (2030)	800	1800	17.6
-1A2-	.84	3.6	4.3	5.5	6.6	15.3 ~ 35.7 (217 ~ 507)				
-1A3-	.67	2.9	3.9	4.5	5.2	30.6 ~ 61.2 (435 ~ 870)				
VDR-2A(B) -1A1-13	1.5	6.6	7.9	10	11.8	10.2 ~ 20.6 (145 ~ 290)	143 (2030)	800	1800	46
-1A2-	1.5	6.6	7.9	10	11.8	15.3 ~ 35.7 (217 ~ 507)				
-1A3-	1.3	5.8	7.0	8.9	10.5	30.6 ~ 61.2 (435 ~ 870)				

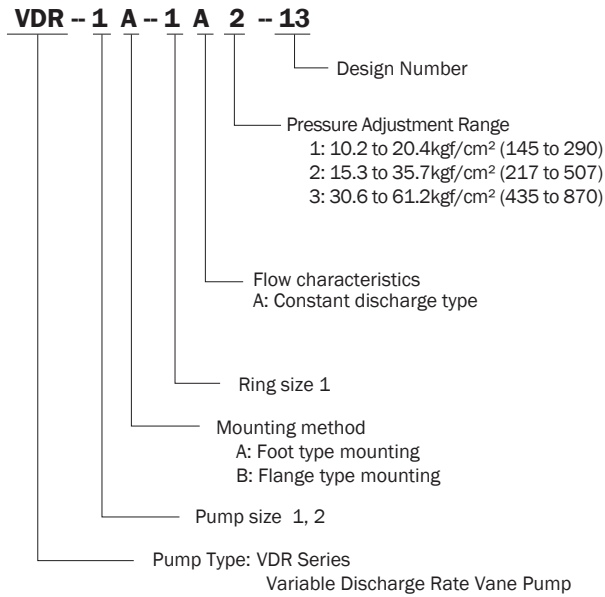
Double Pump

Model No.	Vent Side		Shaft Side		Vent Side	Shaft Side	Revolution Speed min ⁻¹		Weight lbs
	Discharge Rate gpm	Pressure Adjustment Range kgf/cm ² (psi)	Discharge Rate gpm	Pressure Adjustment Range kgf/cm ² (psi)	Allowable Peak Pressure kgf/cm ² (psi)		Min.	Max.	
VDR-11A(B)-1A1-1A1-13	6.6	10.2 ~ 20.6 (145 ~ 290)	6.6	10.2 ~ 20.6 (145 ~ 290)	143 (2030)	800	1800	A : 30 B : 30	
VDR-11A(B)-1A1-1A2-13			5.2	15.3 ~ 35.7 (217 ~ 507)					
VDR-11A(B)-1A1-1A3-13				30.6 ~ 51 (435 ~ 725)					
VDR-11A(B)-1A2-1A2-13	5.2	15.3 ~ 35.7 (217 ~ 507)	6.6	15.3 ~ 35.7 (217 ~ 507)	143 (2030)	800	1800		
VDR-11A(B)-1A3-1A3-13			5.2	30.6 ~ 51 (435 ~ 725)					5.2

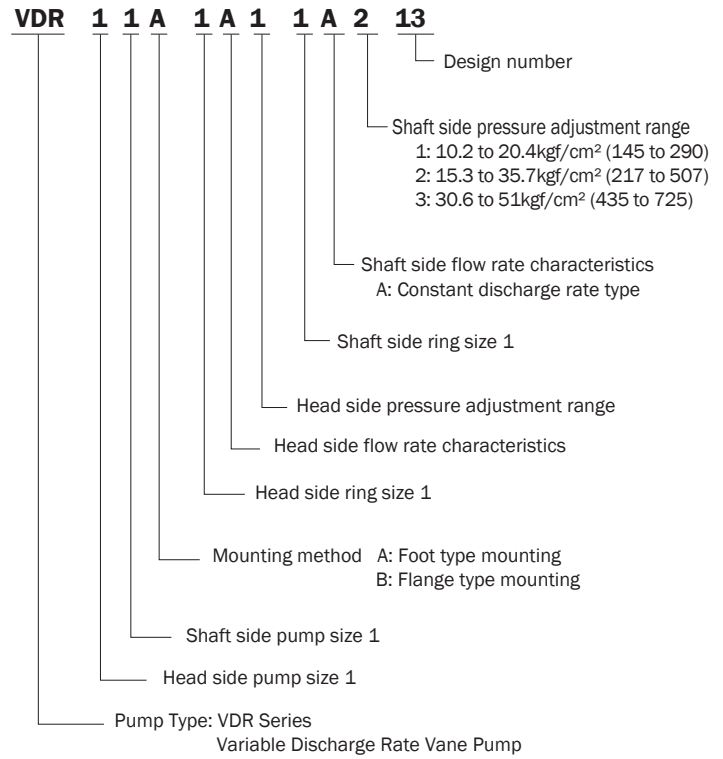
- Note: 1. The discharge rate is the value at 1800min⁻¹ no-load.
 2. In addition to this model, the VDC Series (maximum working pressure: 2030 psi) high-pressure variable vane pump is also available. See page B-25 for more information.
 3. The change from VDR-1 Series design number 11 to design number 12 represents a change in the shaft key width from .125 in. to .187 in. This means that when using a .125 in. key coupling, you need to use a stepped key (VD31J-302000) or add a new key groove at .187 in.
 4. There is no change in the mounting method with the change from the VDR-1 size design number 12 and VDR-2 design number 11 to design number 13.

Understanding Model Numbers

Single Pump



Double Pump

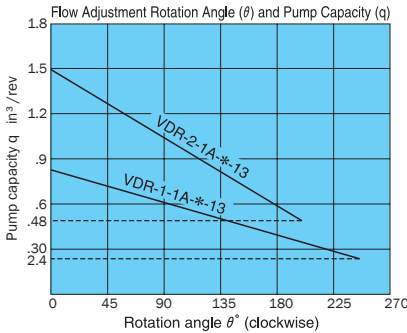


3 Discharge Volume Adjustment
 The discharge flow rate is decreased by clockwise (rightward) rotation of the discharge rate adjusting screw, and increased by counterclockwise (leftward) rotation. Loosen the lock nut before making adjustments. After adjustment is complete, re-tighten the lock nut. The graph below provides general guidelines for the relationship between the rotation angle of the flow rate adjusting screw and the no-load discharge rate.

However:

$$Q: \text{Flow rate gpm} = \frac{\text{in}^3 \times \text{rpm}}{231}$$

4 Pressure Adjustment
 Pressure is decreased by clockwise (rightward) rotation of the discharge rate adjusting screw, and increased by counterclockwise (leftward) rotation.



- 5 Factory Default P-Q Settings (Standard Model)**
 - Flow Rate Setting = Maximum flow rate for model as indicated in the catalog
 - Pressure Setting = Pressure shown in table to the right
- 6 Initial Operation**
 Before operating the pump for the first time, put the pump discharge side into the no-load state and then repeatedly start and stop the motor to bleed all air from inside the pump and the suction piping. After confirming that the pump is discharging oil, continue the no-load operation for at least 10 minutes to discharge all the air from the circuit. Provide an air bleed valve in circuits where it is difficult to bleed air before startup.
- 7 Sub Plate**
 When a sub plate is required, specify a sub-plate type from the table in the installation dimension diagram.
- 8 For the hydraulic operating fluid, use an R&O type and wear-resistant type of ISO VG32 to 68 or equivalent (viscosity index of at least 90). Use hydraulic operating**

Factory Default Pressure Settings kgf/cm ² (psi)
1: 20.4 (290)
2: 35.7 (507)
3: 30.6 (435)

Note) The values indicated above are at maximum pump discharge volume with the flow volume adjusting screw at the 0° position. The broken line shows the flow volume adjustment range lower limit value.

- fluid that provides kinematic viscosity during operation in the range of 20 to 150 centistokes.
- 9** The operating temperature range is 59 to 140 °F. When the oil temperature at startup is 59 °F or less, perform a warm-up operation at low pressure and low speed until the oil temperature reaches 59 °F. Use the pump in an area where the temperature is within the range of 32 to 140 °F.
- 10** Suction pressure is 4.35 psi, and the suction port flow rate should be to greater than 6 ft/sec.

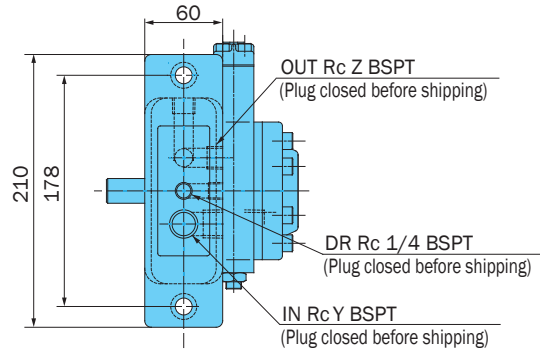
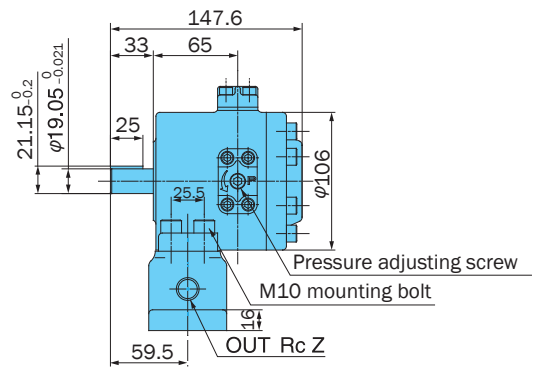
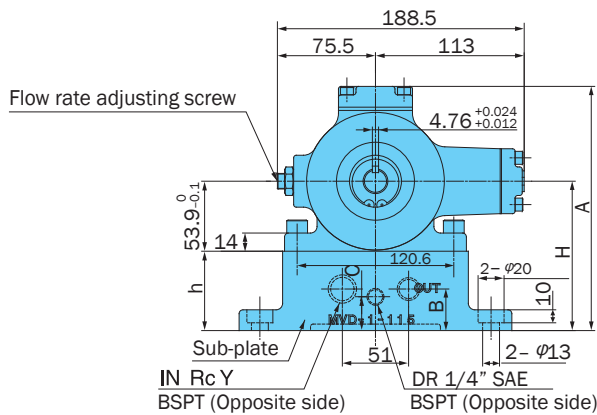
- 11 Avoid pulley, gear, and other drive systems that impart a radial or thrust load on the end of the pump shaft. Mount the pump so its pump shaft is oriented horizontally.
- 12 Provide a suction strainer with a filtering grade of about 100µm (150 mesh). For the return line to the tank, use a 10µm line filter.
- 13 Manage hydraulic operating fluid so contamination is maintained at class NAS10 or lower. Take care to avoid contamination with water and other foreign matter, and watch out for

- discoloration. Whitish fluid indicates that air has contaminated the fluid, and brownish fluid indicates the fluid is dirty.
- 14 At startup, repeat the inching operation (start-stop) to bleed air from the pump and pipes.
- 15 Equip an air bleed valve in circuits where it is difficult to bleed air before startup. See page C-13 for more information.
- 16 To ensure proper lubrication of the pump's rubbing surfaces, supply oil to the interior of the pump before

- starting operation.
- 17 When centering the pump shaft, eccentricity with the motor shaft should be no greater than 0.05mm. Use a pump mounting base of sufficient rigidity. The angle error should be no greater than 1°.

Installation Dimension Drawings

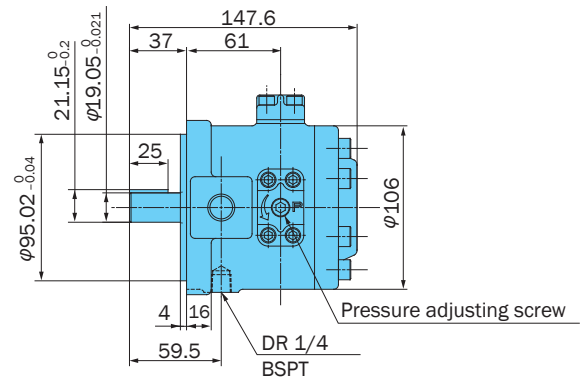
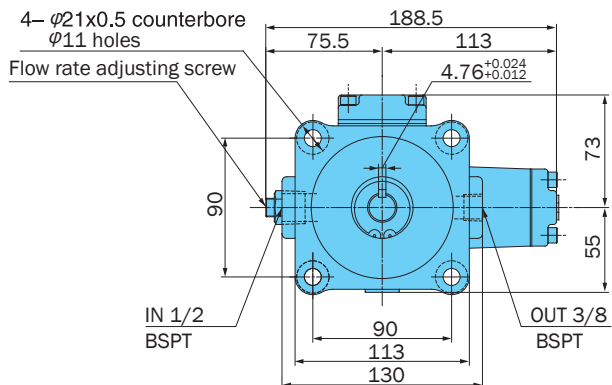
VDR-1A-*-13 (Foot Mounting)



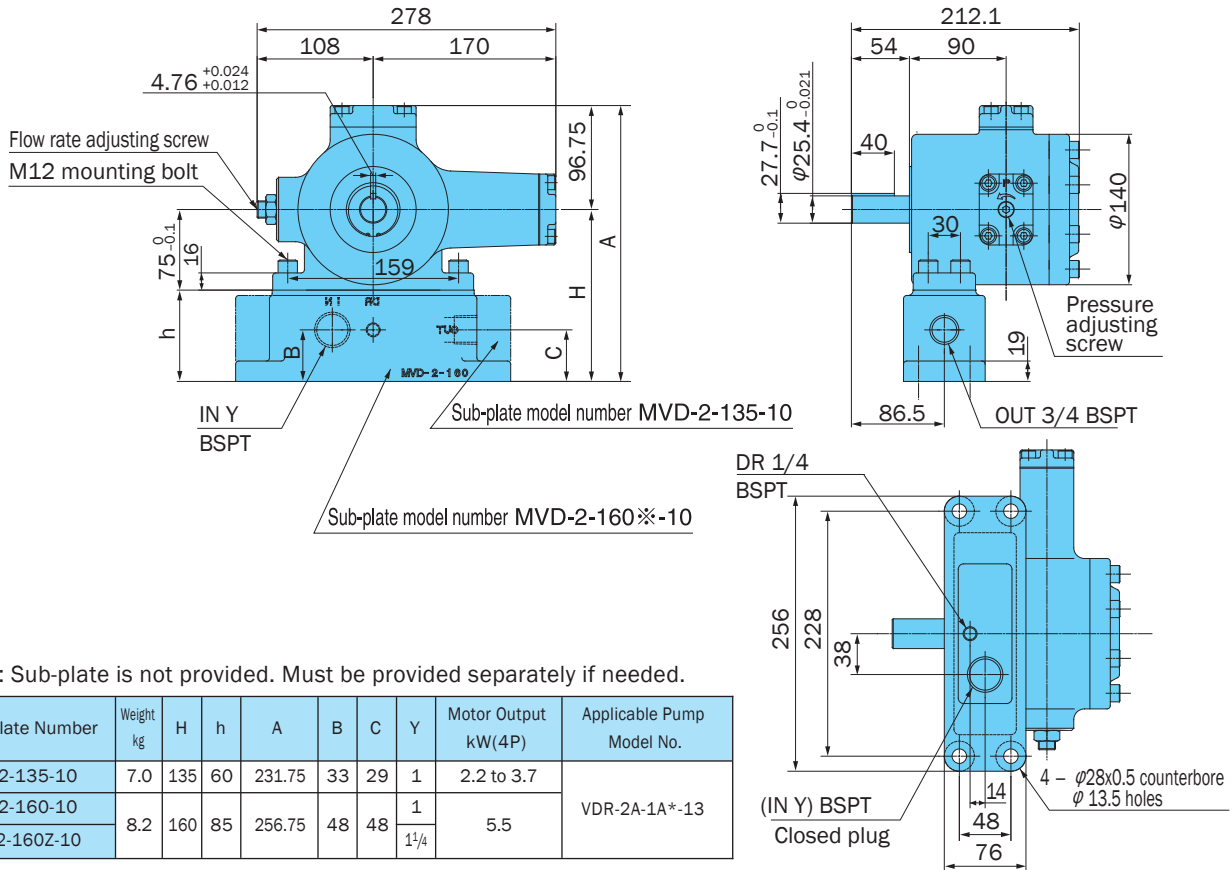
Note: Sub-plate is not provided. Must be provided separately if needed.

Sub Plate Number	Weight lb	H	h	A	B	C	Y	Z	Motor Output hp (4P)
MVD-1-115-10	8	115	61.1	188	32	26	1/2	3/8	1 to 2
MVD-1-115Y-10							3/4	1/2	
MVD-1-135-10	10.8	135	81.1	208	40	40	1/2	3/8	3 to 5
MVD-1-135Y-10							3/4	1/2	

VDR-1B-*-13 (Flange Mounting) Not SAE Mount



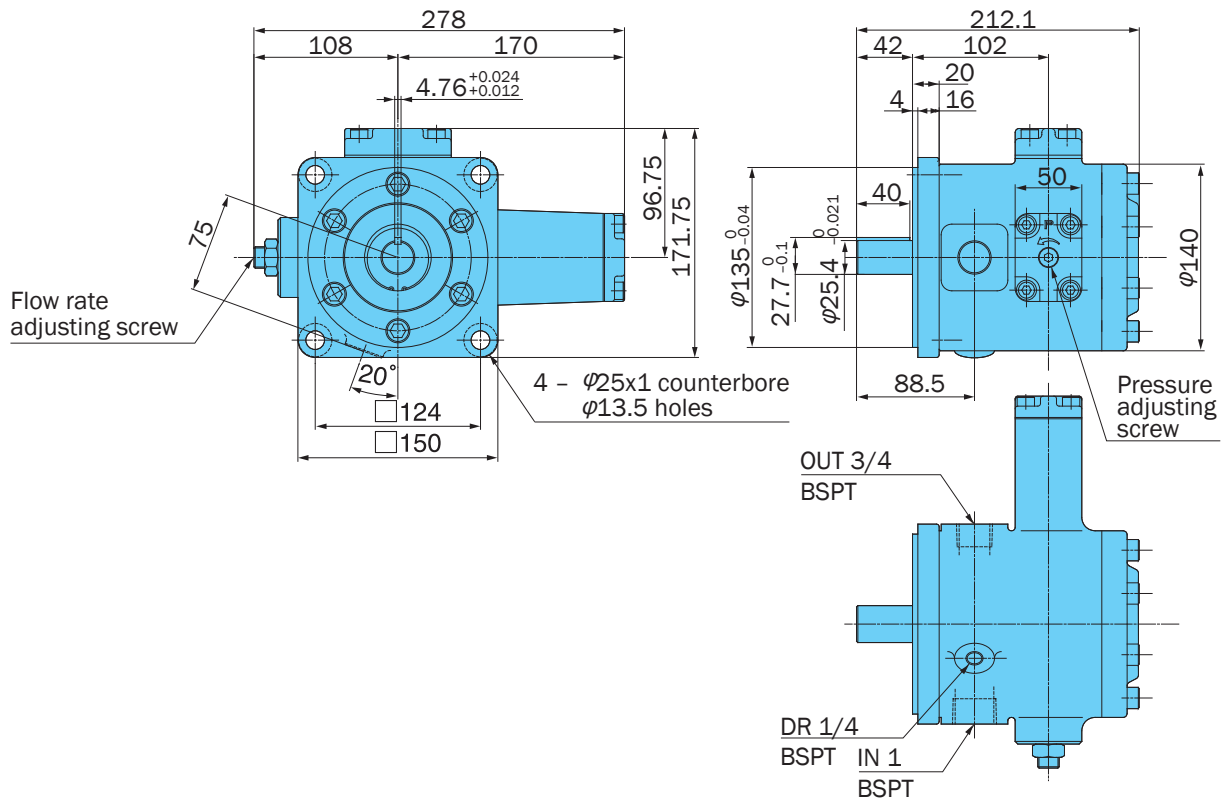
VDR-2A-*-13 (Foot Mounting)



Note: Sub-plate is not provided. Must be provided separately if needed.

Sub Plate Number	Weight kg	H	h	A	B	C	Y	Motor Output kW(4P)	Applicable Pump Model No.
MVD-2-135-10	7.0	135	60	231.75	33	29	1	2.2 to 3.7	VDR-2A-1A*-13
MVD-2-160-10	8.2	160	85	256.75	48	48	1	5.5	
MVD-2-160Z-10							1 1/4		

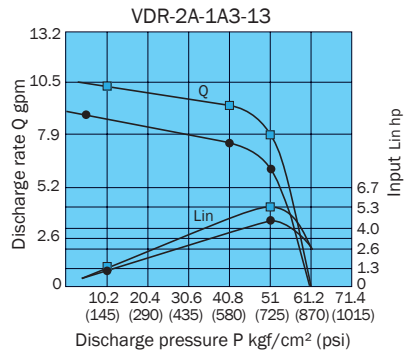
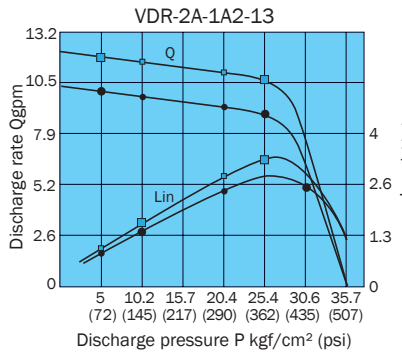
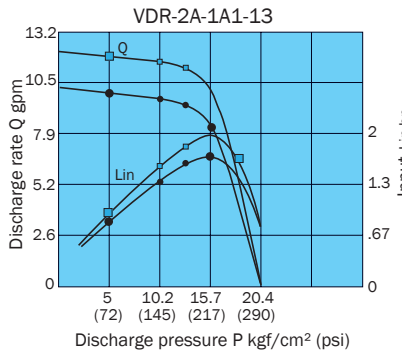
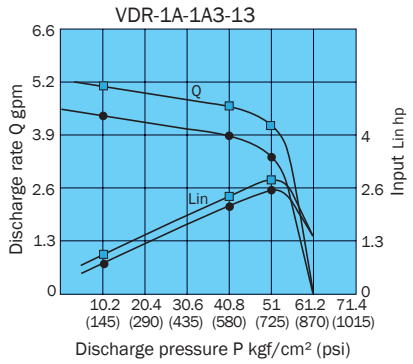
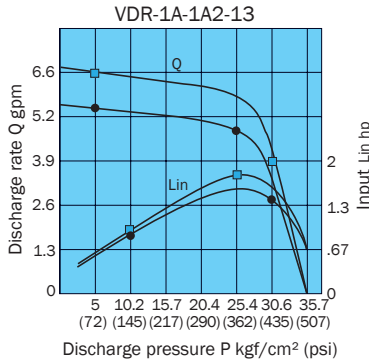
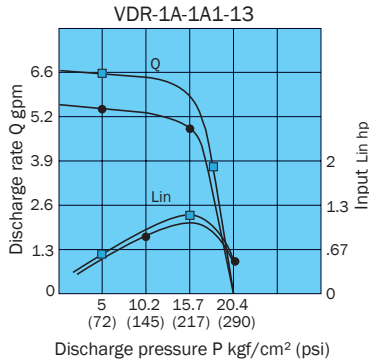
VDR-2B-*-13 (Flange Mounting) Not SAE Mount



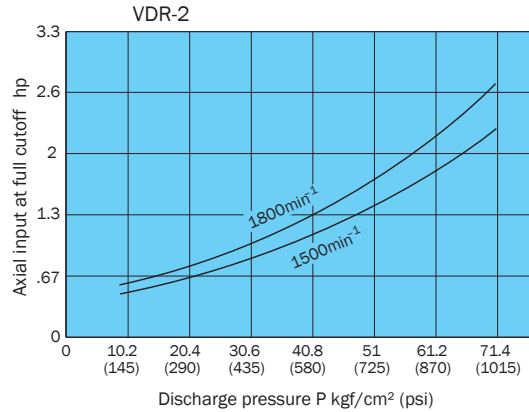
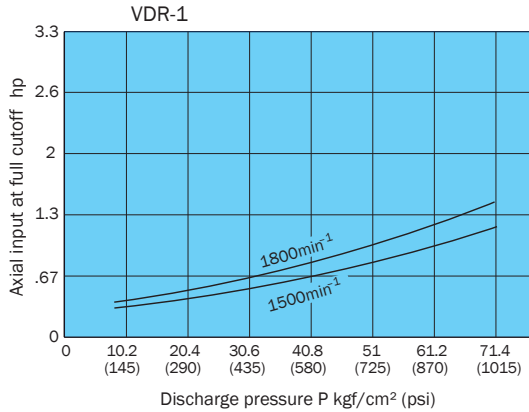
Performance Curves

Typical characteristics at hydraulic operating fluid kinematic viscosity of 32 centistokes.

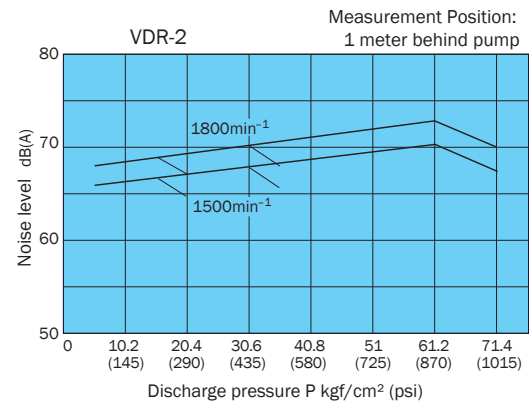
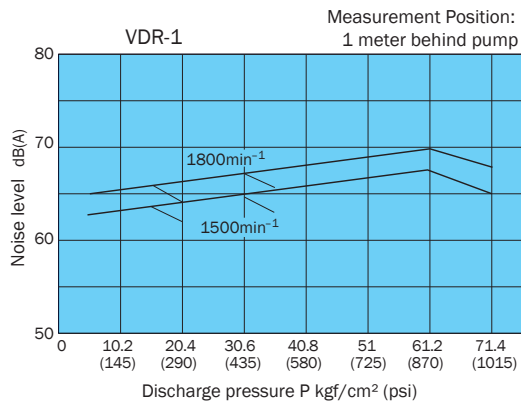
Revolution Speed 1500min⁻¹ —●—
1800min⁻¹ —□—



Axial Input At Full Cutoff

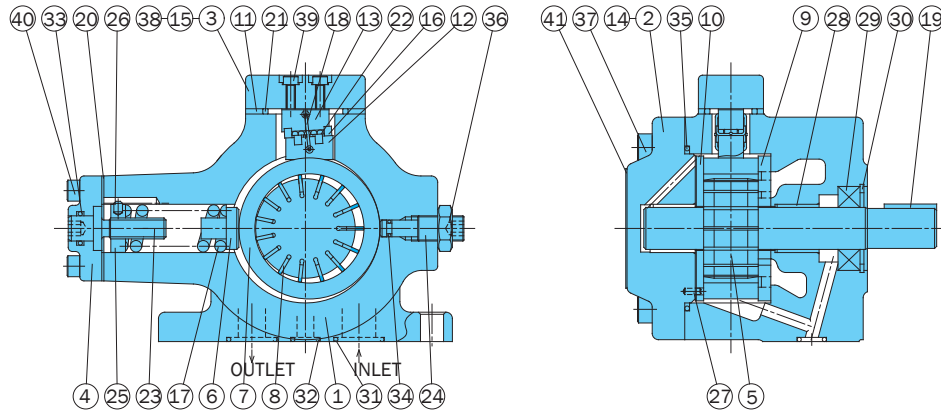


Noise Characteristics



Cross-sectional Drawing

VDR-1A-*-13
VDR-2A-*-13



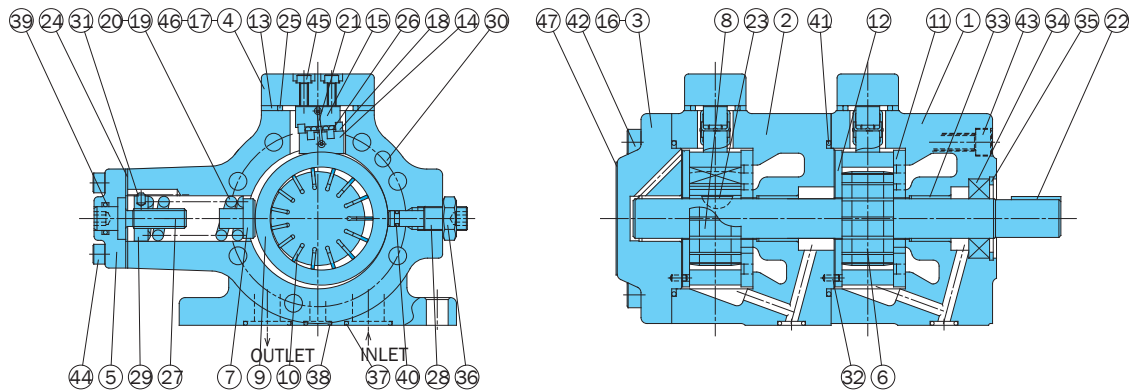
List of Sealing Parts

Part No.	Applicable Pump Model No.	VDR-1A-*-13		VDR-2A-*-13	
	Seal Kit Number	VDAS-101A00		VDAS-102A00	
	Part Name	Part Number	Q'ty	Part Number	Q'ty
20	Packing	VD32J-101000	1	VD32J-102000	1
21	Square ring	VD33J-101000	1	1A-G45	1
29	Oil seal	ISRD-204010	1	ISP-284811	1
31	O-ring	1A-P20	2	1A-G30	2
32	O-ring	1A-P10A	1	1A-P12	1
33	O-ring	1A-P12	1	1A-P14	1
34	O-ring	1A-P5	1	1A-P9	1
35	O-ring	1A-G70	1	1A-G100	1

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
1	Body	15	Shim	29	Oil seal
2	Cover	16	Retainer	30	Snap ring
3	Cover	17	Spring	31	O-ring
4	Cover	18	Spring	32	O-ring
5	Shaft	19	Key	33	O-ring
6	Piston	20	Packing	34	O-ring
7	Ring	21	Square ring (O-ring)	35	O-ring
8	Vane	22	Needle	36	Nut
9	Plate (S)	23	Screw	37	Screw
10	Plate (H)	24	Screw	38	Screw
11	Plate	25	Nut	39	Screw
12	Holder	26	Pin	40	Screw
13	Holder	27	Pin	41	Nameplate
14	Shim	28	Bearing		

Note: 1. Oil seals are manufactured by Nippon Oil Seal Industry Co. Ltd. (NOK)
2. O-ring 1A-** refers to JIS B2401-1A-**.
3. For VDR-*B-*-13, the seal kit number becomes VDBS-10*B00, without the 31 and 32 O-rings.

VDR-11A-*-13



List of Sealing Parts

Part No.	Applicable Pump Model No.	VDR-11A-*-13	
	Seal Kit Number	VDAS-111A00	
	Part Name	Part Number	Q'ty
24	Packing	VD32J-101000	2
25	Square ring	VD33J-101000	2
34	Oil seal	ISRD-204010	1
37	O-ring	1A-P20	4
38	O-ring	1A-P10A	2
39	O-ring	1A-P12	2
40	O-ring	1A-P5	2
41	O-ring	1A-G70	2

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
1	Body	11	Plate (S)	21	Spring	31	Pin
2	Body	12	Plate (H)	22	Key	32	Pin
3	Cover	13	Plate	23	Key	33	Bearing
4	Cover	14	Holder	24	Packing	34	Oil seal
5	Cover	15	Holder	25	Square ring	35	Snap ring
6	Shaft	16	Shim	26	Needle	36	Nut
7	Piston	17	Shim	27	Screw	37	O-ring
8	Rotor	18	Retainer	28	Screw	38	O-ring
9	Ring	19	Spring	29	Nut	39	O-ring
10	Vane	20	Spring	30	Pin	40	O-ring
						41	O-ring
						42	Screw
						43	Screw
						44	Screw
						45	Screw
						46	Screw
						47	Nameplate

Note: 1. Oil seals are manufactured by Nippon Oil Seal Industry Co. Ltd. (NOK).
2. O-ring 1A-** refers to JIS B2401-1A-**.
3. For VDR-11B-*-13, the seal kit number becomes VDBS-111B00, without the 37 and 38 O-rings.

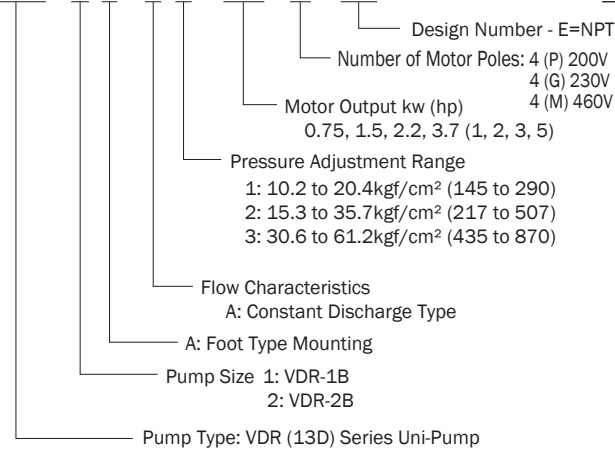
Performance Curves

(CE mark standard compliant)

Understanding Model Numbers

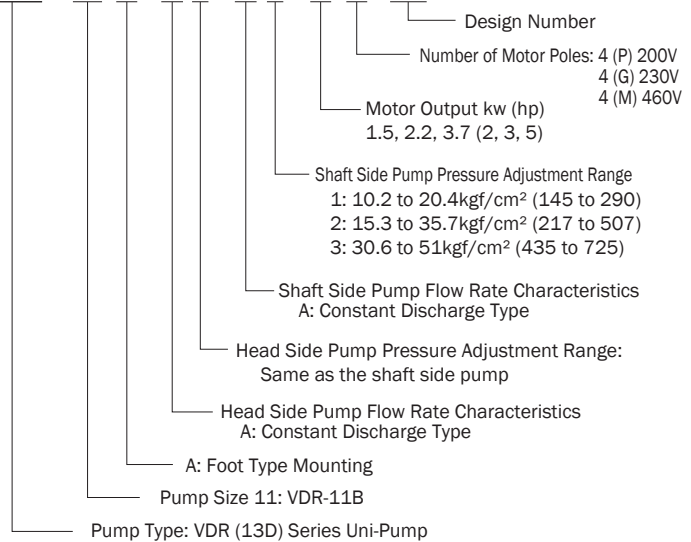
Single Pump

UVD - 1 A - A 2 - 1.5 - 4 - 30



Double Pump

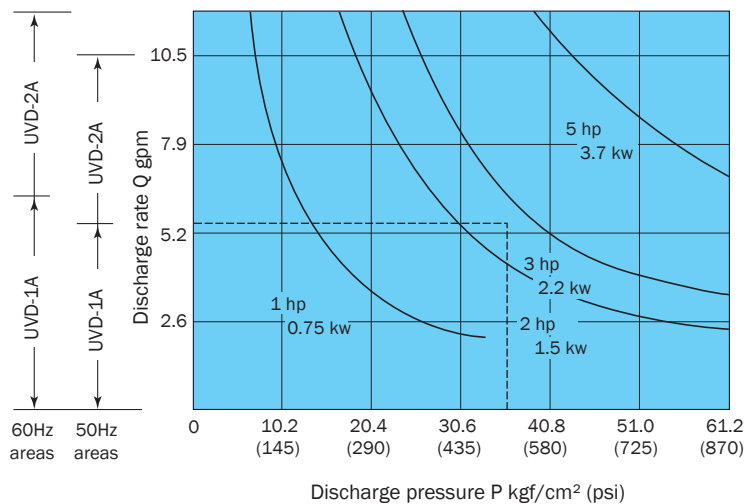
UVD - 11 A - A * - A * - * - 4 - 30



Specifications

Model No.	Maximum Working Pressure kgf/cm ² (psi)	Maximum Flow Rate gpm	
		50Hz	60Hz
UVD- 1A	61.2 (870)	5.5	6.6
UVD- 2A	51.0 (725)	10	11.8
UVD- 11A	51.0 (725)	5.5	6.5-6.6

Motor Selection Curves

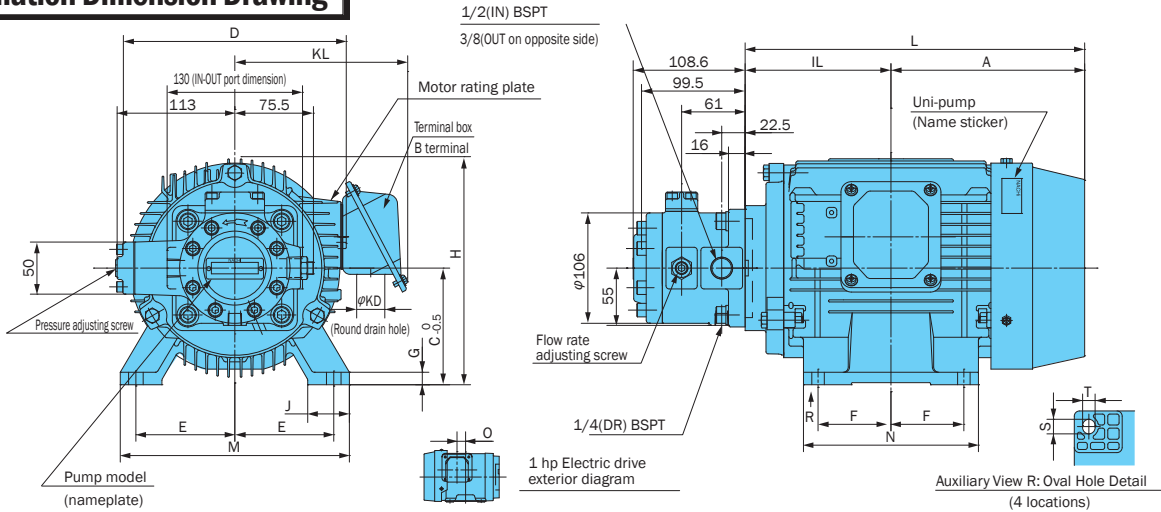


- Selecting a motor
The area under a motor output curve in the graph to the left is the operating range for that motor under the rated output for that motor.
Example:
To find the motor that can produce pressure of 507 psi and a discharge rate of 5.5 gpm.
Selection Process:
Since the intersection of the two broken lines from a pressure of 507 psi and discharge rate of 5.5 gpm intersect in the area under the 3 hp curve, it means that a 3 hp motor should be used. In the case of a double pump configuration, select a motor that is larger than the total power required by both pumps.

*Select a uni-pump that has a pressure and flow rate that is within the range of the drive so that the drive will not overload.

Installation Dimension Drawing

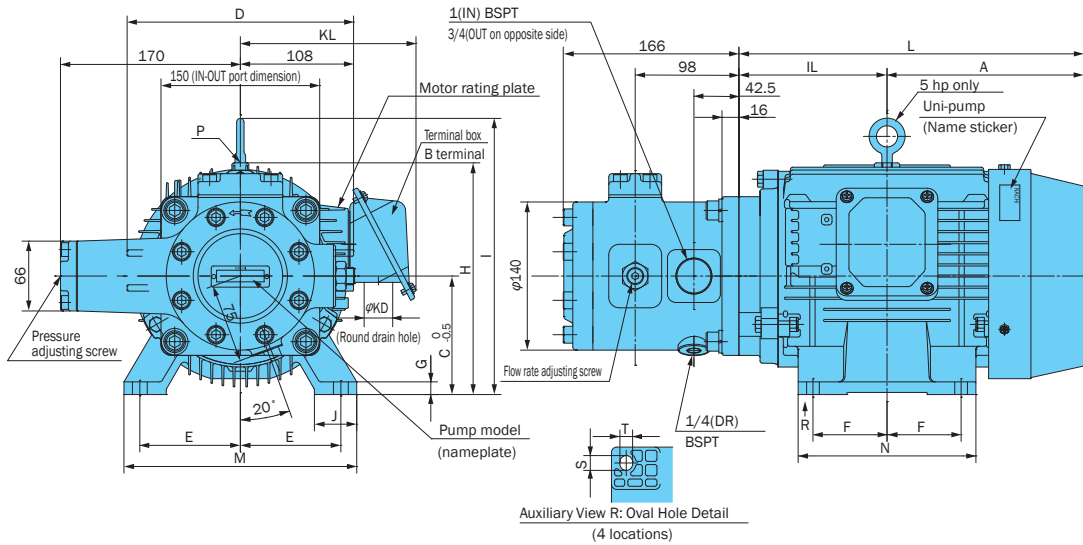
UVD-1A



Uni-pump	Motor Dimensions mm																Frame No.	Output hp (4poles)	Weight lbs	
	A	IL	C	D	E	F	G	H	J	L	M	N	S×T	KD	KL	O				
UVD-1A-A1-0.75-4-30	133	105	80	170	62.5	50	4.5	165	35	238	165	130	18×10	φ27	157	27.5	80M	1	50	
UVD-1A-A2-0.75-4-30																				
UVD-1A-A2-1.5-4-30	143	118.5	90	198	70	62.5	10	190	40	261.5	176	150	12×10	φ27	159	-	90L	2	53	
UVD-1A-A3-1.5-4-30																				
UVD-1A-A3-2.2-4-30	157.5	133	100	198	80	70	12	200	40	290.5	200	168	14×12	φ27	159	-	100L	3	64	

- No hanger.
 1. Standard drive motor is the fully enclosed fan-cooled B type.
 2. Standard voltage for drive motor is 200 VAC, 50/60 Hz or 220 VAC, 60 Hz.
 3. Standard terminal box is B terminal (right side viewed from pump).
 4. See page A-21 for the characteristics of the drive motor for the unipump (domestic standard 3 rating).

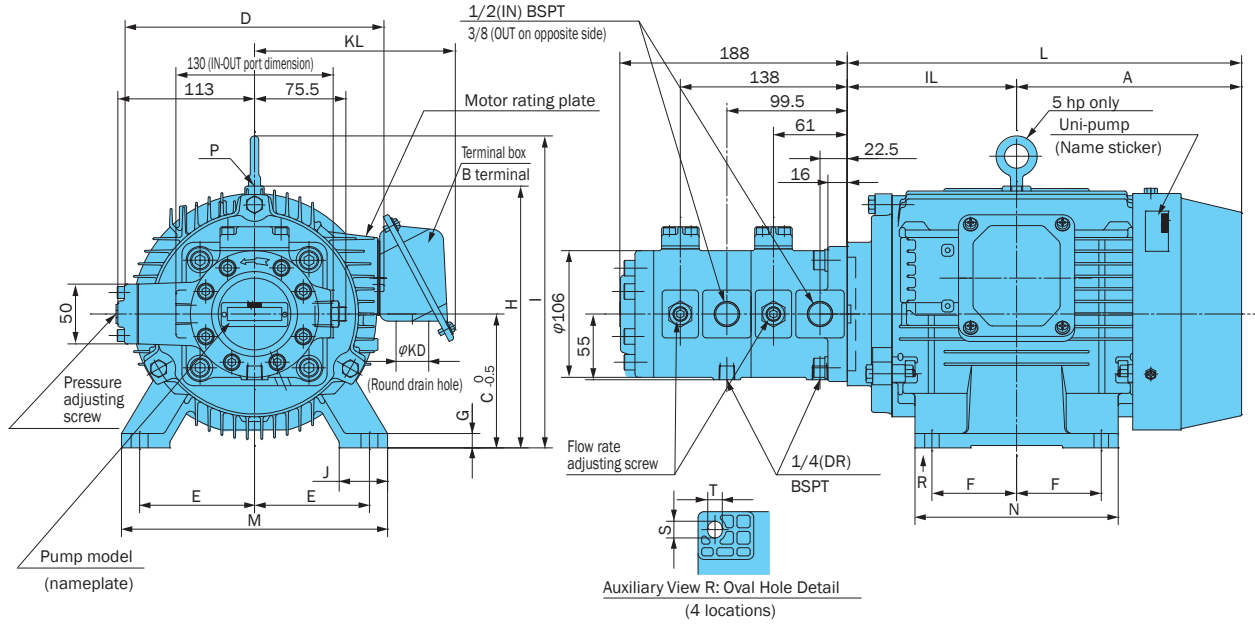
UVD-2A



Uni-pump	Motor Dimensions mm																Frame No.	Output hp (4poles)	Weight lbs		
	A	IL	C	D	E	F	G	H	I	J	L	M	N	S×T	KD	KL				O	
UVD-2A-A1-1.5-4-30	143	118.5	90	198	70	62.5	10	190	-	40	261.5	176	150	12×10	φ27	159	-	90L	2	84	
UVD-2A-A2-1.5-4-30																					
UVD-2A-A2-2.2-4-30	157.5	133	100	198	80	70	12	200	-	40	290.5	200	168	14×12	φ27	159	-	100L	3	95	
UVD-2A-A3-2.2-4-30																					
UVD-2A-A2-3.7-4-30	186	140	112	214	95	70	12	-	261	40	326	220	168	14×12	φ27	166	-	112M	5	108	
UVD-2A-A3-3.7-4-30																					

- 2 to 3 hp model does not have hangers.
 1. Standard drive motor is the fully enclosed fan-cooled B type.
 2. Standard voltage for drive motor is 200 VAC, 50/60 Hz or 220 VAC, 60 Hz.
 3. Standard terminal box is B terminal (right side viewed from pump).
 4. See page A-21 for the characteristics of the drive motor for the unipump (domestic standard 3 rating).

UVD-11A



Uni-pump	Motor Dimensions mm																Frame No.	Output hp (4poles)	Weight lbs	
	A	IL	C	D	E	F	G	H	I	J	L	M	N	S×T	KD	KL				O
UVD-11A-A1-A1-1.5-4-30	143	118.5	90	198	70	62.5	10	190	40	261.5	176	150	12×10	φ27	159	-	90L	2	66	
UVD-11A-A1-A2-1.5-4-30																				
UVD-11A-A1-A3-1.5-4-30																				
UVD-11A-A2-A2-1.5-4-30																				
UVD-11A-A2-A3-1.5-4-30																				
UVD-11A-A1-A2-2.2-4-30	157.5	133	100	198	80	70	12	200	-	40	290.5	200	168	14×12	φ27	159	-	100L	3	77
UVD-11A-A1-A3-2.2-4-30																				
UVD-11A-A2-A2-2.2-4-30																				
UVD-11A-A2-A3-2.2-4-30																				
UVD-11A-A3-A3-2.2-4-30																				
UVD-11A-A1-A3-3.7-4-30	186	140	112	214	95	70	12	-	261	40	326	220	168	14×12	φ27	166	-	112M	5	90
UVD-11A-A2-A2-3.7-4-30																				
UVD-11A-A2-A3-3.7-4-30																				
UVD-11A-A3-A3-3.7-4-30																				

No hanger on 2 and 3 hp models.

1. Standard drive motor is the fully enclosed fan-cooled B type.
2. Standard voltage for drive motor is 200 VAC, 50/60 Hz or 220 VAC, 60 Hz.
3. Standard terminal box is B terminal (right side viewed from pump).
4. See page A-21 for the characteristics of the drive motor for the unipump (domestic standard 3 rating).