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VANE PUMPS

Pump Type	Graphic Symbols	Output Flow at 1200 r/min at No-Load		Maximum Operating Pressure MPa (PSI)	Page	
		L/min	U.S.GPM			
Fixed Displacement	"PV2R" Series Single Pumps			21 (3050)	163	
	"PV2R4A" Series Single Pumps			17.2 (2500)	177	
	"PV2R" Series Double Pumps	Small Volume			21 (3050)	181
		Large Volume				
"PV2R24A/34A" Series Double Pumps		Small Volume			21 (3050) 17.2(2500)	196
	Large Volume					

Hydraulic Fluids

1. Type of hydraulic fluids

Any type of hydraulic fluids listed in the Table 1 below can be used. However, the specifications of the pumps such as maximum pressure and maximum pump speed may be changed according to the type of hydraulic fluids to be used. For details, please refer to the specifications of the pump concerned.

Hydraulic fluids

(Table 1)

Petroleum Base Oils		Use anti-wear type oils or R & O (Rust and Oxidation inhibitor) type oils (equivalent to ISO VG32 or 46).
Synthetic Fluids		Use phosphate ester type fluids. When phosphate ester type fluid is used, prefix "F-" to the model number because the special seals (fluororubber) are required to be used.
Water Containing Fluids	Water-Glycols	Standard pumps can be used without conditions. However, if any type other than those in Table 2 is used, the maximum operating pressure is limited.
	Water in Oil Emulsions	Standard pumps can be used without conditions.

Anti-wear type water-glycols

(Table 2)

Fluid Manufacturer	Commercial Trade Name
Exxon Mobil	Mobil Nybac FR 200 D
JAPAN ENERGY CORP.	JOMO Hydria G
NIPPON OIL CORPORATION	HYRANDO FRX 46
Showa Shell Sekiyu K. K.	Shell HFC Fluid 46
MATSUMURA OIL RESEARCH CORP.	HYDOL HAW
COSMO OIL LUBRICANTS CO. , LTD.	COSMO FLUID HQ 46
	COSMO FLUID GS 46

2. Fluid viscosity and temperature

Use the hydraulic fluids which satisfy the recommended viscosity and oil temperature given in the Table 3 below. However, please note that if any of the pumps listed in the table 4 is started at low speed, the maximum fluid viscosity is limited.

Fluid viscosity and temperature

(Table 3)

Fluid	Temperature °C (°F)	Viscosity mm ² /s(SSU)
Petroleum Base Oils	0-70 (32-158)	20-400 (100-1800)
Phosphate Esters		
Water Glycols	0-50 (32-122)	
Water in Oil Emulsions	5-50 (41-122)	

Maximum viscosity for low start-up speed

(Table 4)

Pump Type	Start-up Speed r/min	Max. Viscosity mm ² /s (SSU)
PV2R1 PV2R12 PV2R13 PV2R14	750	100 (455)
	950	200 (910)
	600	100 (455)
PV2R2 PV2R23 PV2R24 PV2R24A	950	200 (910)

3. Control of contamination

Contamination of hydraulic fluids results in pump failures and reduced pump lives. Carry out sufficient contamination control for hydraulic fluids and keep contamination level within NAS class 12.

Also, use a 100 μm (150-mesh) tank filter on the suction side, more than 50 mm (2 in.) away from the tank bottom.



Instructions

1. Alignment of shaft

Employ a flexible coupling whenever possible, and avoid any stress from bending or thrust.

Maximum permissible misalignment is less than 0.1 mm (.004 inches) TIR and maximum permissible misangular is less than 0.2°.

2. Suction pressures

Set the suction pressure at pump inlet port at the value given in the table below. Furthermore, use the pipes in the suction side having the diameter as indicated on the installation drawings. In case where the pump is installed on the tank or at the position higher than the tank top cover, the height of the suction port of the pump should be less than 1 metre (3.3 ft.) from the oil level {less than 0.8 metre (2.6 ft.) in case of using phosphate ester fluids or water containing fluids}.

Pump Type		Suction Pressure		
		Minimum		Maximum
		Petroleum base oil	Phosphate ester type fluid Water containing fluid	
"PV2R" Series Single Pumps	PV2R1 PV2R2	-20 kPa (5.9 in. Hg Vacuum)	-16 kPa (4.7 in. Hg Vacuum)	+30 kPa (+4.3 PSIG)
	PV2R3 PV2R4 PV2R4A	-20 kPa* (5.9 in. Hg Vacuum)*		
"PV2R" Series Double Pumps	PV2R12	-20 kPa (5.9 in. Hg Vacuum)		
	PV2R13 PV2R23 PV2R33 PV2R14 PV2R24 PV2R34 PV2R24A PV2R34A	-20 kPa* (5.9 in. Hg Vacuum)*		

★ In relation to the rotating speed of the pump, the minimum suction pressure may be restricted for a certain nominal displacement. For details, please refer to the specifications of the pump concerned.

3. Precautions at starting

At an initial operation or at an operation after a long rest, the pump may have difficulty in sucking up fluid. In such cases, an air bleed valve should be installed beforehand on the discharge side (model No. ST1004-*-10*, see [page 820](#)), or discharge air by slightly slackening the connection on the discharge side. At starting, operate the pump intermittently as far as possible with no load.

For fluid viscosity at starting, see the item of "Hydraulic Fluids".

4. Other precautions

If a pump is used at speed below 1200 r/min, install the pump with the suction port upside so that the pump can suck up fluid easily at starting.

Interchangeability in Installation between Current and New Design

The models shown below have been changed in design.

Name	Model Numbers		Interchangeability in Installation	Major Changes
	Current	New		
"PV2R1" Series Single Pumps	PV2R1-**-*-RAA- ^{40*} / _{41*}	PV2R1-**-*-RAA-42*	Yes	● Lower noise level
"PV2R2" Series Single Pumps	PV2R2-**-*-RAA-40*	PV2R2-**-*-RAA-41*	Yes	● Lower noise level
"PV2R3" Series Single Pumps	PV2R3-**-*-RAA-30*	PV2R3-**-*-RAA-31*	Yes	● Lower noise level
"PV2R12" Series Double Pumps	PV2R12-**-*-REAA- ^{40*} / _{41*}	PV2R12-**-*-REAA-42*	Yes	● Lower noise level
"PV2R13" Series Double Pumps	PV2R13-**-*-RAAA- ^{40*} / _{41*}	PV2R13-**-*-RAAA-42*	Yes	● Lower noise level
"PV2R14" Series Double Pumps	PV2R14-**-*-RAAA- ^{30*} / _{31*}	PV2R14-**-*-RAAA-32*	Yes	● Lower noise level
"PV2R23" Series Double Pumps	PV2R23-**-*-REAA-40*	PV2R23-**-*-REAA-41*	Yes	● Lower noise level
"PV2R33" Series Double Pumps	PV2R33-**-*-RAAA-30*	PV2R33-**-*-RAAA-31*	Yes	
"PV2R24" Series Double Pumps	PV2R24-**-*-RAAA-30*	PV2R24-**-*-RAAA-31*	Yes	
"PV2R34" Series Double Pumps	PV2R34-**-*-REAA-30*	PV2R34-**-*-REAA-31*	Yes	