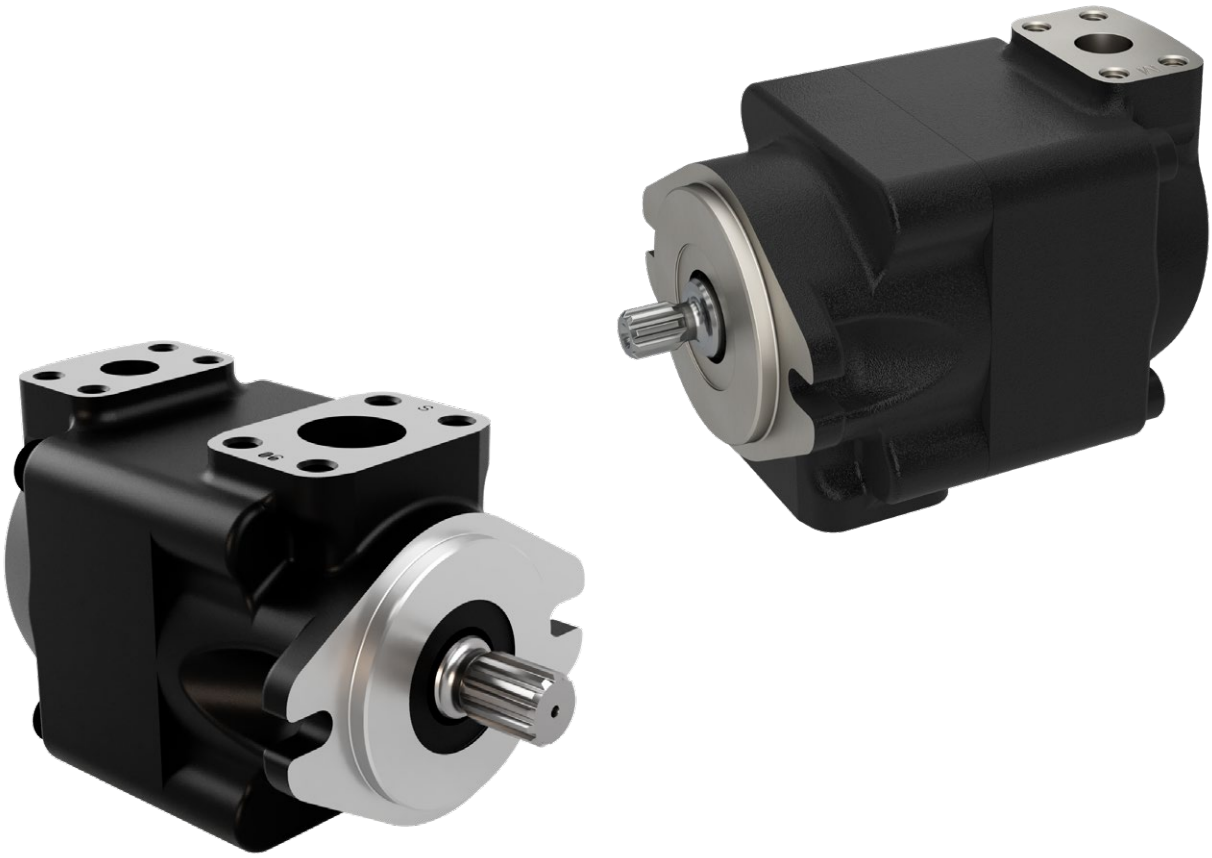
Visit our homepage for additional support **parker.com/pmde**



Hydraulic Pumps
T7AS Design C

Denison Vane Technology

ENGINEERING YOUR SUCCESS.

The T7AS hydraulic pumps

Introduction

We are very pleased to present you with the T7AS hydraulic pumps of Parker Hannifin, a range of high-quality products designed for the heavy-duty applications.

This new design of SAE A hydraulic pumps is offering a wide range of displacements in a single body size. Its pumping unit is of the same “cartridge kit” style as our other bigger size hydraulic vane pumps : build friendly, mod friendly, service friendly.

Whether used on a mobile or industrial equipment, the T7AS hydraulic pump will bring all the benefits of our well known Denison Vane Technology.

Product key features

Long lifetime
The fully pressure balanced concept increases the pump lifetime and the double lip vanes reduce its sensitivity to fluid pollution.

Low noise
The Denison Vane Technology allows very low noise levels over the entire operating range and during the whole life of the pump.

Reliable performance
The T7AS hydraulic pumps are offering a wide operation speed range, and like all our T7 Series vane pumps, their performances do remain very stable over time, making these pumps an ideal solution for modern hydraulically operated machines.

Environment friendly
In addition to being almost fully recyclable, the T7AS hydraulic pumps may also run with HEES Bio oils, helping the planet to stay clean.

Versatility and compactness
With 14 different displacements for the same installation size, the T7AS hydraulic pumps are a clever, powerful and compact solution for your equipment.

Speed and pressure ratings

Type	Ring size	Theoretical Displacement Vi [cm³/rev.]	Minimum Speed [rpm]	Maximum Speed		Maximum Pressure			
				HF0, HF1 HF2, HF6a, HF6b [rpm]	HF4, HF5 [rpm]	HF0, HF2, HF6a, HF6b		HF1, HF4, HF5	
						Int. [bar]	Cont. [bar]	Int. [bar]	Cont. [bar]
T7AS	**B06**	5.8	600	3600	1800	300	275	240	210
	B10	9.8							
	B11	11.0							
	B13	12.8							
	B17	17.2							
	B20	19.8							
	B22	22.5							
	B26	26.0							
	B28	28.0		3400					
	B30	30.0		3100					
	B32	31.8		3000					
	B34	34.0		2800		280	240		
	B36	36.0		2600					
	B40	40.0		2300					

HF0, HF2 = Antiwear Petroleum Base
HF1 = Non Antiwear Petroleum Base
HF4 = Water Glycols Solutions
HF5 = Synthetic Fluids
HF6a = HEES saturated Bio fluids
HF6b = HEES partially saturated Bio fluids
Note : For further information or if the performance characteristics outlined in the table do not meet your particular requirements, please consult your local Parker office.

Fluid power formulas

Pump output flow : $Q_{eff} = Q_{theo} - Q_{loss}$

$$Q_{theo} = \frac{Vi \times n}{1000}$$

Pump input power : $P_{eff} = P_{theo} + P_{loss}$

$$P_{theo} = \frac{Q_{theo} \times p}{600}$$

Pump input torque : $T_{eff} = T_{theo} + T_{loss}$

$$T_{theo} = \frac{p \times Vi}{20 \times \pi}$$

n = Speed [rpm]
Vi = Displacement [cm³/rev]
p = Pressure [bar]
Q*eff* = Flow rate [l/min]
Q*loss* = Internal leakage [l/min] *(see curves)*
P*eff* = Power [kW]
P*loss* = Power loss [kW] *(see curves)*
T*eff* = Torque [Nm]
T*loss* = Torque loss [Nm] *(see curves)*

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Vierzon - France

Inlet pressure range

- Minimum inlet pressure : Read the minimum inlet pressure requirement in the below table, depending on the pump type, ring size and its maximum operating speed. Never go under 0.8 bar Absolute (11.6 psi Absolute).

Cartridge		Speed rpm													
	Ring	1200	1500	1800	2100	2200	2300	2500	2600	2700	2800	3000	3100	3400	3600
T7AS	**B06**	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	B10														
	B11														
	B13														
	B17														
	B20														
	B22											0.82	0.85	0.92	0.98
	B26														
	B28											0.85	0.88	0.98	
	B30														
	B32											0.90			
	B34														
	B36														
	B40														

Inlet pressure is measured at inlet flange with petroleum base fluids at viscosity between 10 and 65 cSt. The difference between inlet pressure at the pump flange and atmospheric pressure must not exceed 0.2 bar to prevent aeration.

Multiply absolute pressure by 1.1 for HF6a and HF6b, 1.25 for HF4 fluid and by 1.35 for HF5 fluid.

- Maximum inlet pressure : Read the information on the product key sheet page. Standard shaft seals are limited to 0.7 bar (10 psig) but some allow 7 bar (100 psig).

Outlet pressure range

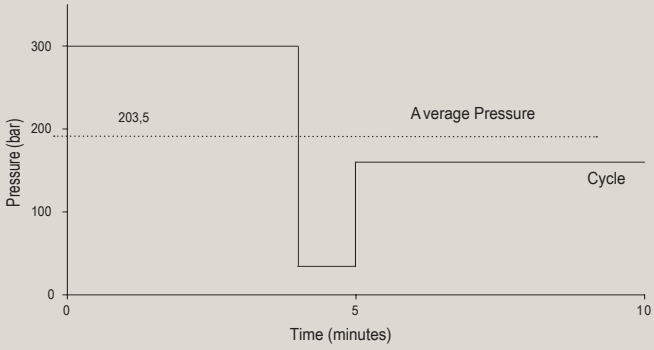
- Minimum outlet pressure : It is recommended to always keep at least 5 bar (22 psi) differential between inlet and outlet.

- Maximum outlet pressure : Please read the charts in this catalogue for the Max continuous and the Max intermittent pressure ratings. Depending on the average pressure in cycle, either the continuous or the intermittent will be the limit.

- Average pressure in cycle : These Pumps may be operated intermittently at pressures higher than the recommended continuous rating when the time weighted average of pressure is less than or equal to the continuous duty pressure rating.

This intermittent pressure rating calculation is only valid when the other parameters : speed, fluid, viscosity and contamination level are respected.

For total cycle time longer than 15 minutes, please consult your Parker Hannifin representative.



Example : T7AS - B10
Duty cycle 4 min. at 300 bar
1 min. at 35 bar
5 min. at 160 bar

$$\frac{(4 \times 300) + (1 \times 35) + (5 \times 160)}{10} = 203{,}5 \text{ bar}$$

203.5 bar is lower than 275 bar allowed as continuous pressure for T7AS - B10 with HF0 fluid.

Hydraulic Fluids

Recommended fluids

Petroleum base anti-wear, anti-rust and anti-oxydation fluids (covered by Parker Denison HF0 and HF2 specifications).
Maximum catalogue ratings and performance data are based on operation with these fluids.

Acceptable alternate fluids

The use of fluids other than petroleum base anti-wear R & O fluids requires that the maximum ratings of the motor will be reduced. In some cases, the minimum replenishment pressure must be increased.

HF1 : non antiwear petroleum base
HF4 : water glycols solutions
HF5 : synthetic fluids
HF6a, HF6b : HEES Bio fluids

Fluids viscosity

The minimum Viscosity Index is 90. The kinematic viscosity range is as below. Over or under these values, please contact Parker Hannifin.

Max. (cold start, low speed & pressure) ..... 860 cSt
Max. (full speed & pressure) ..... 108 cSt
Optimum (max. lifetime) ..... 30 cSt

Min. (full speed & pressure for HF1, HF4 & HF5 fluids) ..... 18 cSt
Min. (full speed & pressure for HF0, HF2 & HF6a,b fluids)... 10 cSt

Fluids temperatures

The usual limitating factor of temperature (low or high) comes from the obtained viscosity. The seals are sometimes the limit.

Maximum fluid temperature (also depends on min. viscosity).

	C	° F
HF0, HF1, HF2	+ 100	(+ 212)
HF4	+ 50	(+ 122)
HF5	+ 70	(+ 158)
HF6a, HF6b	+ 80	(+ 176)

Minimum fluid temperature (also depends on max. viscosity).

	C	° F
HF0, HF1, HF2, HF5, HF6a, HF6b	- 1	(- 0.4)
HF4	+ 10	(+ 50)

Filtration requirement

The fluid must be cleaned before and during operation to maintain a contamination level of ISO 19 / 17 / 14 or NAS 1638 class 8 or better. No inlet strainer or inlet filter is allowed on these fixed displacement vane pumps.

Water contamination in fluid

The maximum acceptable content of water shall be limited to 0.10 % for mineral base fluids, and 0.05 % for synthetic fluids, crankcase oils, and biodegradable fluids. The eventual excess of water must be drained off the circuit.

Types of seals

NBR seals S1 : Use this seal type for standard applications : with mineral oil and fluid temperature less than + 90° C (+ 194° F).
S1 seals temperature range : - 40°C to + 107° C (- 40° F to + 225° F).
FPM seals S5 : Use this seal type with some fire resistant fluids and/or fluid temperature higher than + 90° C (+194° F).
S5 seal temperature range : - 29° C to + 204°C (- 20° F to + 400°F).

Model No. **T7AS B11 4R00 C1M6**

T7AS series - SAE A 2 bolts
J744 mounting flange

Displacement
Volumetric displacement (cm^3/rev.)

B06 = 5.8	B26 = 26.0
B10 = 9.8	B28 = 28.0
B11 = 11.0	B30 = 30.0
B13 = 12.8	B32 = 31.8
B17 = 17.2	B34 = 34.0
B20 = 19.8	B36 = 36.0
B22 = 22.5	B40 = 40.0

Type of shaft
1 = keyed (non SAE) Ø 19.05
3 = splined 16/32 (SAE B) 13 teeth
4 = splined 16/32 (SAE A) 9 teeth

Direction of rotation (shaft end view)
R = Clockwise
L = Counter-clockwise

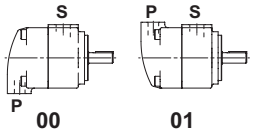
Ports

	4 bolts SAE Flanges		BSPP Threads	SAE Threads
Code	**06** UNC	**M6** metric	**05**	**02**
S	1.1/4”			SAE 20
P	3/4”			SAE 12

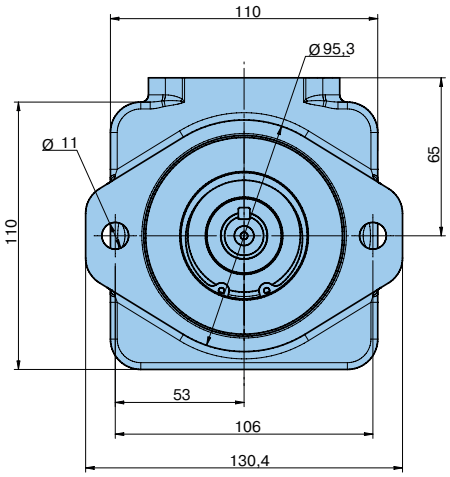
Seal class
1 = S1 BUNA N - 0.7 bar max. (for mineral oil)
5 = S5 VITON® - 7 bar max.
(for mineral oil and fire resistant fluids)

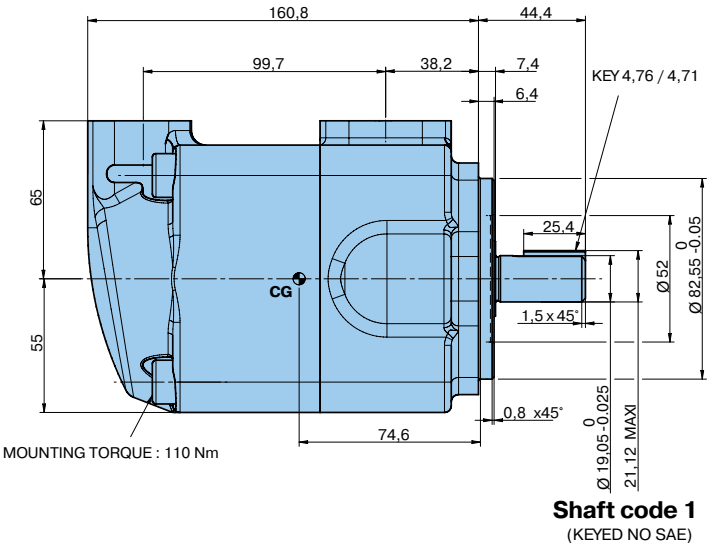
Design letter

Porting combination
00 = standard

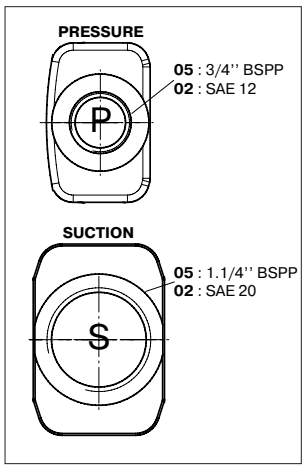


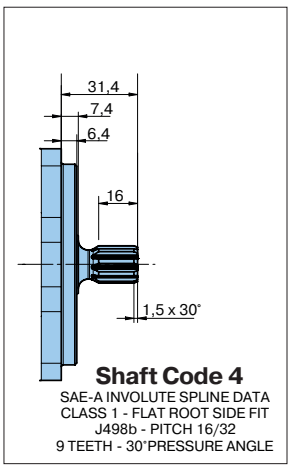
P = Pressure
S = Suction



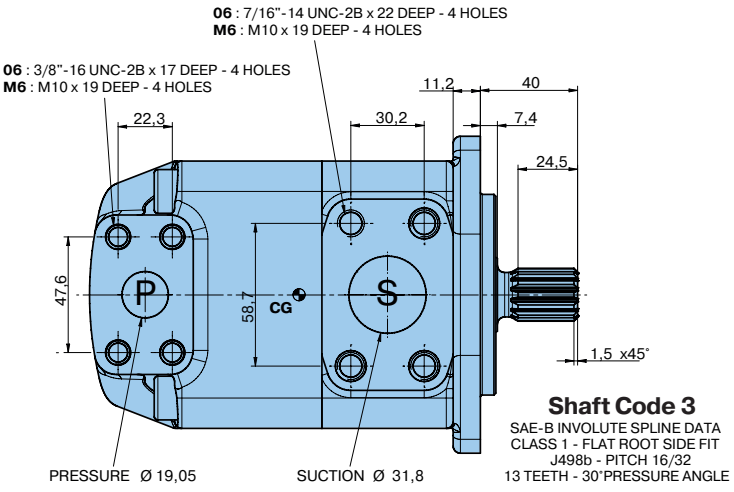


Shaft code 1
(KEYED NO SAE)





Shaft Code 4
SAE-A INVOLUTE SPLINE DATA
CLASS 1 - FLAT ROOT SIDE FIT
J498b - PITCH 16/32
9 TEETH - 30°PRESSURE ANGLE



Shaft Code 3
SAE-B INVOLUTE SPLINE DATA
CLASS 1 - FLAT ROOT SIDE FIT
J498b - PITCH 16/32
13 TEETH - 30°PRESSURE ANGLE

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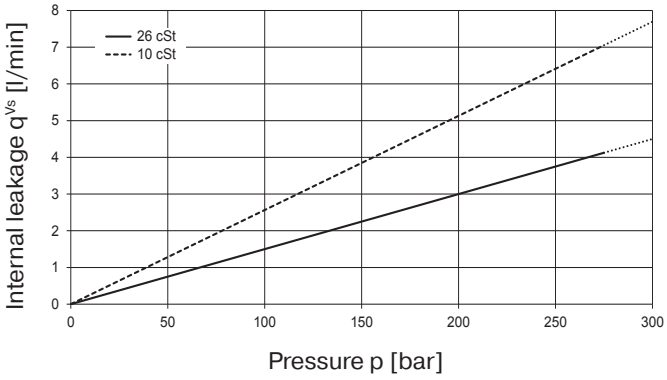
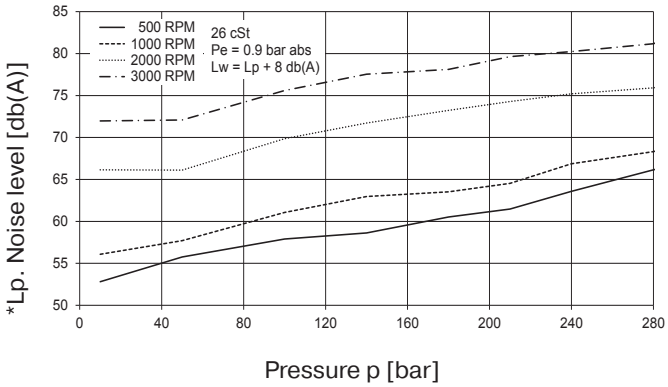
T7AS

INTERNAL LEAKAGE (TYPICAL)



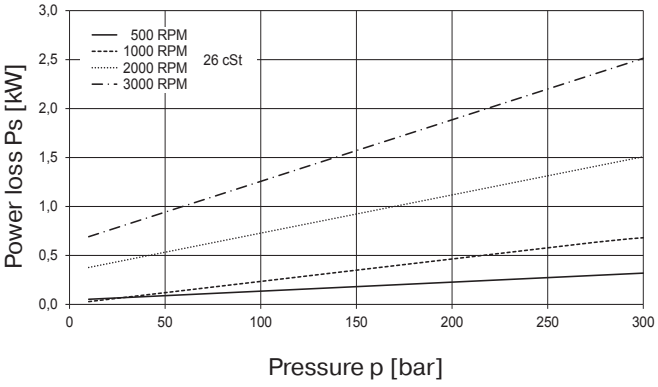
Do not operate pump more than 5 seconds at any speed or viscosity if internal leakage is higher than 50 % of theoretical flow.

NOISE LEVEL (TYPICAL) T7AS - B40

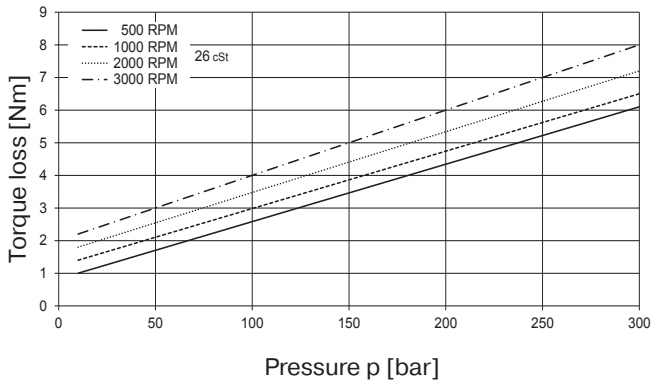


**1m ISO 4412*

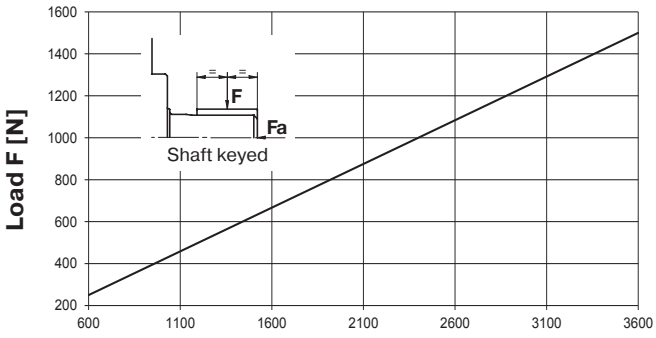
POWER LOSS HYDROMECHANICAL (TYPICAL)



TORQUE LOSS HYDROMECHANICAL (TYPICAL)



PERMISSIBLE RADIAL LOAD



Maximum permissible axial load Fa = 800 N

PUMP INFORMATION

Pump type : T7AS
Weight : 11.3 kg
Moment of inertia : 3,7 Kgm^2 x 10^{-4}
Input torque limit :

Shaft	Vi [cm^3/rev] x p max. [bar]	Nm
1	18530	294
3	18530	294
4	6550	85

Pump installation

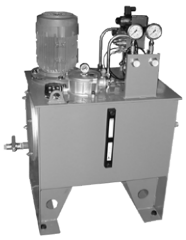
Pump mounting

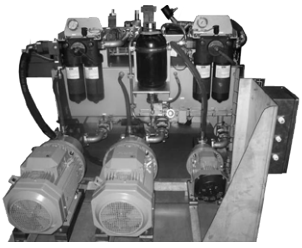
The environment of the pump has to be taken into consideration as to avoid noise reflection, pollution and shocks. These pumps are designed to operate in any position. Always prefer an installation with a flooded inlet or with the pump inside the oil tank.

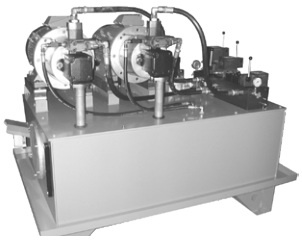
The installation of the pump on the top of the tank or above the tank should be restricted to operation with moderate dynamic requirements. In such a case the inlet pipe of the pump must be sized according to the max discharge flow in order to keep the inlet velocity between 1.0 and 1,5 m/s. and the inlet pressure within acceptable values.

d [mm]	Inner diameter of the inlet pipe or hose
v [m/s]	Average velocity
Q [L/min]	Inlet flow

$$d = \sqrt{\frac{400}{6\Pi} \cdot \frac{Q}{v}} \approx 4.61 \cdot \sqrt{\frac{Q}{v}}$$







Shaft and coupling data

- Shaft loads : These products are primarily designed for coaxial drives which do not impose axial or side loading on the shaft. The max. permissible load values are indicated on the pump technical data page. Contact Parker for specific applications.

- Keyed shafts : Parker supplies its keyed shaft pumps with high strength heat-treated keys. Therefore, when installing or replacing these pumps, the heat-treated keys must be used in order to ensure maximum life in the application. If the key is replaced, it must be a heat-treated key between 27 and 34 R.C. hardness. The corners of the keys must be chamfered by 0.76 mm to 1.02 mm (0.03 to 0.04) at 45° to clear the radii in the key way.

The alignment of the keyed shafts must be within the tolerances given for the splined shafts here below.

- Couplings and female splines : The coupling must be selected to minimize the load on the shaft (weight, misalignment). The female spline must be made to conform to the Class 1 fit as described in SAE-J498b (1971). This is described as a Flat Root Side Fit.

The mating female spline should be free to float and find its own center. If both members are rigidly supported, they must be aligned within 0.15 TIR (0.006" TIR) or less to reduce fretting. The angular alignment of two splines axes must be less than ± 0,05 per 25,4 radius (± 0.002" per 1" radius).

The coupling must be hardened to a hardness between 29 and 45 HRC.

The coupling spline must be lubricated with a lithium molydisulfide grease, disulfide of molybdenum or a similar lubricant.

Fluid connections

Keep a maximum distance between the suction pipe and the return lines in the tank. A bevel of min 45° on suction and return lines is recommended in order to lower the fluid velocity.

Fluid lines must be adequate size and strength to assure free flow through the pump. An undersized inlet pipe will prevent the pump from operating properly at full rated speed. An undersized outlet line will cause back pressure, heat generation and noise increase. If the pump is inside the tank, use a short inlet pipe. The maximum inlet fluid velocity is 1.9 m/s.

Flexible hose lines are recommended. If rigid piping is used, the workmanship must be accurate to eliminate strain on the pump ports or to the fluid connections. Sharp bends in the lines must be eliminated wherever possible. All system piping must be cleaned and flushed before installing the pump.

Start-up instructions

All Parker vane pumps are individually factory tested to provide the best quality & reliability. They are to be used within the design limits indicated in our documentation. Only qualified personnel who is competent and familiar with the installation and operation of hydraulic drives and has hydraulic circuits and hydraulic equipment knowledge is allowed to put the equipment into operation. Make sure to have all necessary documentation available and always conform yourself to the valid regulations (safety, electrical, environment...).

Rotation way and ports indication

The rotation way and ports orientation are viewed from the shaft end.

CW stands for clockwise = Right-hand rotation.

CCW stands for counter-clockwise = Left-hand rotation.

Pre-start checks

Before initial starting of the pump, the following checks should be made :

a. Check the rotation of the power source to be sure the pump shaft will rotate in the direction indicated by the arrow on the pump nameplate.

b. Check inlet and discharge lines to be sure all connections are tight and properly connected.

c. Check fluid type, its cleanliness and level. Make sure it can freely reach the pump inlet.

Filling, air removing & priming

The pressure relief valve should be backed off to its minimum setting value so the pump is unloaded when started. Circuit priming and air bleed off have to be performed before resetting the pressure relief valve. For priming, a minimum pump shaft speed of 600 rpm is recommended. To prevent possible damage to the internal parts, the pump should never be started dry or without internal lubrication.

- Pump with positive head : allow the fluid to flow to the pump inlet, loosen the discharge port(s) fitting(s) until the fluid comes out and re-tighten the discharge line(s). Then start the pump which should prime quite instantly. Purge the air off the circuit, preferably using air bleed off valves or pressure test points. Let the pump discharge several minutes unloaded.
- Pump mounted above fluid level : fill the pump through outlet port(s) with suitable and clean fluid and start rotation in jog mode. Purge the air off the circuit, preferably using air bleed off valves or pressure test points. Let the pump discharge several minutes unloaded.

Notes

If the pump does not prime properly or pressure cannot be obtained within seconds, it should be shut down and conditions corrected. Refer to the machine/vehicle manufacturer instructions and pump catalogue.

Maintenance

The pump is self- lubricating and its preventive maintenance is limited to keeping the hydraulic fluid clean and maintaining its viscosity within the acceptable limits. Keep all fittings and screws tight. Do not operate at pressures or speeds in excess of the recommended limits. If the pump does not operate properly, check the troubleshooting chart before attempting to overhaul the unit. The pump is fully serviceable.

⚠ WARNING – USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalogue and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

Offer of Sale

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www.parker.com

European Headquarters
La Tuilière 6, 1163 Etoy,
Switzerland
Tel: +41 21 821 85 00

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