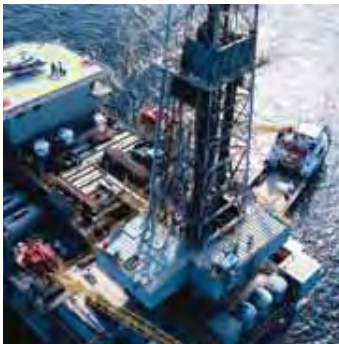




aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Denison GOLD CUP® Product Catalog Piston Pumps & Motors

For Open & Closed Circuits

HY28-2667-01/GC/NA,EU
Effective: March 01, 2010



ENGINEERING YOUR SUCCESS.

Series	Terms	P6	P7	P8	P11	P14	P24	P30
Displacement	Max. displacement	in ³ /rev.	6.00	7.25	8.00	11.00	14.00	30.60
		cm ³ /rev.	98,3	118,8	131,1	180,3	229,5	501,5
Pressure	Continuous	psi	5000	5000	3600	5000	5000	5000 ¹⁾
		bar	350	350	250	350	350 ¹⁾	350 ¹⁾
	Intermittent	psi	6000 ⁷⁾	6000 ⁷⁾	4500 ⁷⁾	6000 ⁷⁾	5500 ¹⁾⁷⁾	5500 ¹⁾⁷⁾
		bar	420 ⁷⁾	420 ⁷⁾	310 ⁷⁾	420 ⁷⁾	370 ¹⁾⁷⁾	370 ¹⁾⁷⁾
Speed (Pump)	max. @ full stroke	rpm	3000	3000	2100	2400	2100 ²⁾	1800
	(Motor) max. @ full stroke	rpm	3000	3000	NA	2400	2100 ²⁾	1800
	(Motor) max. @ 50% stroke	rpm	3600	3600	NA	2800	2100 ²⁾	1800
Mounting	Flange -2 bolt	SAE	127-2 (C)	127-2 (C)	127-2 (C)	-	-	-
	Flange -4 bolt (opt. on 6,7 & 8)	SAE	152-4 (D)	152-4 (D)	152-4 (D)	165-4 (E)	165-4 (E)	177-4 (F)
	Shaft - keyed	SAE	32-1 (C)	32-1 (C)	32-1 (C)	44-1 (E)	44-1 (E)	50-1 (F)
	keyed	SAE	44-1 (D)	44-1 (D)	44-1 (D)	-	-	-
	Shaft - splined	SAE	32-4 (C)	32-4 (C)	32-4 (C)	44-4 (E)	44-4 (E)	50-4(F)
	splined	SAE	44-4 (D)	44-4 (D)	44-4 (D)	-	-	-
Weight (Pump) less controls		lbs	175-300	175-300	175-300	325-530	325-530	750-835
	Mass	kg.	80-135	80-135	80-135	145-240	145-240	340-375
Weight (Motor Fixed)		lbs	110	110	N/A	250	250	510
	Mass	kg.	50	50	N/A	110	110	230
Weight (Motor Variable) less controls		lbs	110	110	N/A	300	300	650
	Mass	kg.	50	50	N/A	135	135	290
Rotating inertia		lbs-in ²	92	92	92	290	290	821
		kg.m ²	0,027	0,027	0,027	0,085	0,085	0,240
Torque (Motor) theo. max.	per 100 psi	lbs-in	95,5	115,4	NA	175	222	392
	per 100 bar	Nm	157	189	NA	287	362	623
	at 5000 psi	lbs-in	4774	5769	NA	8750	11100	19576
	at 350 bar	Nm	539,5	651,9	NA	990	1250	2158
Power (Motor) theo. max.at 5000 psi, 350 bar								
	per 100 rpm	hp	7.6	9.2	NA	13.8	17.6	31.1
		kW	5,7	6,8	NA	10,3	13,1	23,1
	at 2000 rpm	hp	151.5	183.1	NA	277.8	353.5	621.3
Torque (Motor) efficiency - approx. stalled								
	running	% theo.	81	81	NA	81	81	81
Case pressure: max. allowable continuous		psi	75	75	75	75	75	75
	bar	5,2	5,2	5,2	5,2	5,2	5,2	5,2
	intermittent	psi	125	125	125	125	125	125
	bar	8,6	8,6	8,6	8,6	8,6	8,6	8,6
(Not to exceed 25 psi, 1,7 bar above inlet in open circuit units)								
Flow (Pump) theo.at max.displ. @ 1500 rpm		gpm	39	47	52	71	91	160
		lpm	148	178	197	269	344	606
	@ 1800 rpm	gpm	47	57	62	86	109	192
		lpm	178	216	235	326	413	727
Displacement (Internal aux. pump)			P6,7,8P,S,V	P11,14P,S	P11,14V	P24P	P24S ³⁾	P30P
		in ³ /rev.	1.07	(2) 1.07 ⁴⁾	1.07 ⁵⁾	2.81 ⁶⁾	2.81 ⁶⁾	2.81 ⁶⁾
		cm ³ /rev.	17,5	(2) 17,5	17,5	46,1	46,1	46,1
Flow (Internal aux. pump)	@ 1500 rpm	gpm	6.9	(2) 6.9	6.9	18.2	6.5	18.2
		lpm	26,1	(2) 26,1	26,1	68,9	24,6	69,1
	@ 1800 rpm	gpm	8.3	(2) 8.3	8.3	21.9	7.8	21.9
		lpm	31,4	(2) 31,4	31,4	82,9	29,5	82,9

1) Max. pressure 5000 psi, (350 bar) for M24 and 30 series variable motors. Higher servo pressure may be required - consult Parker.

2) On HF-1 fluids, 1800 RPM Max. on HF-0 fluids.

3) Internal cartridge provides servo flow and must be supercharged from external replenishing flow, from external auxiliary pump.

4) One servo cartridge and one replenishing cartridge.

5) Servo cartridge only.

6) Standard, other sizes available, see ordering code.

7) 10% of operation time, not exceeding 6 successive seconds.



Replenishing pressure (Internal aux. pump)		P6,7,8,11,14,24P	P6,7,8,11,14,24S	P30P	P30S
<i>Replenish pressure minus case pressure</i>		psi	*180-220	180-220	*180-220
		bar	12,4-15,2	12,4-15,2	12,4-15,2
Servo pressure (Internal aux. pump)					
<i>Servo pressure minus case pressure</i>		psi	308-420	308-420	308-420
<i>at 0 psi, 0 bar discharge pressure</i>		bar	21,2-29,0	21,2-29,0	21,2-29,0
Servo pressure (Internal aux. pump) ^(Above repl.)					
<i>for HI-IQ control units. Servo pressure minus</i>		psi	500-650	500-650	500-650
<i>case pressure at 5000 psi, 350 bar discharge pressure - at system pressure range 0 to 5000 psi, 350 bar.</i>		bar	34,5-44,8	34,5-44,8	34,5-44,8

*Note: Nominal setting, may be increased if required.

Series	Terms	P6	P7	P8	P11	P14	P24	P30
Controls								
Compensator response (per SAE J497 @ 5000 psi , 350 bar)	off-stroke sec.	0.05	0.05	0.05	0.07	0.07	0.10	0.10
	on-stroke sec.	0.9	0.9	0.9	1.5	1.5	1.8	1.8
Compensator adjustment	psi/turn	2000	2000	2000	2000	2000	2000	2000
	bar/turn	138	138	138	138	138	138	138
Torque to turn rotary servo shaft	in.-lbs	20	20	20	20	20	20	20
	Nm	2,3	2,3	2,3	2,3	2,3	2,3	2,3

The maximum inlet at the auxiliary pump inlet is 200 psi. (13,8 bar)

Minimum compensating pressure will always be 100-200 psi. (6,9-13,8 bar) over servo pressure.

Any inlet pressures above atmospheric will increase noise levels and decrease efficiencies noted in this literature. Exact measurements depend on each application and operating conditions. Please consult your nearest Parker Office for further details.

*Standard factory compensating pressure is 1,000 psi. (69,0 bar).

REAR DRIVE TORQUE CAPACITY

SERIES	FRONT INPUT SHAFT		REAR MOUNTINGS SAE						REAR OUTPUT SHAFT TORQUE CAPACITY
	TYPE	TORQUE CAPACITY	A	B	C	D	E	F	
P6,7,8 P,S,V,X	Keyed SAE 32-1(C) Spline SAE 32-4(C)	6920 in-lbs. (780 Nm)	● ●	● ●					1750 in-lbs. (195 Nm)
P6,7,8 P,S,V,X	Keyed SAE 44-1(D) Spline SAE 44-4(D)	6920 in-lbs. (780 Nm)	● ●	● ●					1750 in-lbs. (195 Nm)
P6,7,8 R,L,D only	Keyed SAE 32-1(C)* Spline SAE 32-4C	13,845 in-lbs. (1565 Nm)	● ●	● ●	● ●				6920 in-lbs. (780 Nm)
P11,14 P,S,V,X	Keyed SAE 44-1(E) Spline SAE 44-4(E)	13,370 in-lbs. (1510 Nm)	● ●	● ●	● ●				2400 in-lbs. (270 Nm)
P11,14 R,L only	Keyed SAE 44-1(E)* Spline SAE 44-4(E)	26735 in-lbs. (3020 Nm)	● ●	● ●	● ●	● ●	● ●		13,370 in-lbs. (1510 Nm)
P24,30 P,S,X	Keyed SAE 50-1(F) Spline SAE 50-4(F)	24350 in-lbs. (2750 Nm)		● ●	● ●				2700 in-lbs. (305 Nm)
P24,30 R,L only	Keyed SAE 50-1(F) Spline SAE 50-4(F)	48,700* in-lbs. (5,500 Nm)		● ●	● ●	● ●	● ●	● ●	24,350 in-lbs (2750 Nm)

* Coupling for keyed shaft must be pressed fit for full torque capability.

P6/7/8 SAE 127-2 Mtg., 32-1, 4 Shaft Bearing 230-82140 (6007)

Speed (rpm)	1000	1000	1000	1000	1200	1200	1200	1200	1500	1500	1500	1500	1800	1800	1800	1800
Shaft Load (lbs) *	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000
Shaft Load (N) *	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448
Case Pressure (psi)	0	25	0	25	0	25	0	25	0	25	0	25	0	25	0	25
Case Pressure (bar)	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7
B-10 Life (hours x 1000)	8E+08	1833	0.778	0.778	6E+08	1528	0.648	0.648	5E+08	1222	0.518	0.518	4E+08	1018	0.432	0.432

P6/7/8 SAE 152-4 Mtg., 44-1, 4 Shaft Bearing 230-00207-0 (6207)

Speed (rpm)	1000	1000	1000	1000	1200	1200	1200	1200	1500	1500	1500	1500	1800	1800	1800	1800
Shaft Load (lbs) *	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000
Shaft Load (N) *	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448
Case Pressure (psi)	0	25	0	25	0	25	0	25	0	25	0	25	0	25	0	25
Case Pressure (bar)	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7
B-10 Life (hours x 1000)	3E+09	7394	3.136	3.136	3E+09	6161	2.613	2.613	2E+09	4929	2.09	2.09	2E+09	4170	1.742	1.742

P11/14 SAE 165-4 Mtg., 44-1, 4 Radial Shaft Bearing 230-82148-0 (6010) (2 & 3 Shaft Codes)

Speed (rpm)	1000	1000	1000	1000	1200	1200	1200	1200	1500	1500	1500	1500	1800	1800	1800	1800
Shaft Load (lbs) *	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000
Shaft Load (N) *	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448
Case Pressure (psi)	0	25	0	25	0	25	0	25	0	25	0	25	0	25	0	25
Case Pressure (bar)	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7
B-10 Life (hours x 1000)	2E+09	535	1.907	1.907	2E+09	446	1.589	1.589	1E+09	356	1.272	1.272	1E+09	297	1.06	1.06

P11/14 SAE 165-4 Mtg., 44-1, 4 Spherical Roller Shaft Bearing 230-82214-0 (22208) (7 & 8 Shaft Codes)

Speed (rpm)	1000	1000	1000	1000	1200	1200	1200	1200	1500	1500	1500	1500	1800	1800	1800	1800
Shaft Load (lbs) *	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000
Shaft Load (N) *	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448
Case Pressure (psi)	0	25	0	25	0	25	0	25	0	25	0	25	0	25	0	25
Case Pressure (bar)	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7
B-10 Life (hours x 1000)	16856	2452	275	172	14046	2043	230	143	11237	1635	184	114.8	9364	1363	153	95.7

P24 SAE 177-4 Mtg., 50-1, 4 Shaft Bearing 230-82213-0 (22311)

Speed (rpm)	1000	1000	1000	1000	1200	1200	1200	1200	1500	1500	1500	1500	1800	1800	1800	1800
Shaft Load (lbs) *	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000
Shaft Load (N) *	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448
Case Pressure (psi)	0	25	0	25	0	25	0	25	0	25	0	25	0	25	0	25
Case Pressure (bar)	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7
B-10 Life (hours x 1000)	591.6	428.5	276.7	213.5	493	357	230.5	178	394.4	991.6	184.4	142.3	328.7	238	153.7	118.6

P30 SAE 177-4 Mtg., 50-1, 4 Shaft Bearing 230-82213-0 (22311)

Speed (rpm)	1000	1000	1000	1000	1200	1200	1200	1200	1500	1500	1500	1500	1800	1800	1800	1800
Shaft Load (lbs) *	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000	0	0	1000	1000
Shaft Load (N) *	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448	0	0	4448	4448
Case Pressure (psi)	0	25	0	25	0	25	0	25	0	25	0	25	0	25	0	25
Case Pressure (bar)	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.7
B-10 Life (hours x 1000)	227	177.7	126.4	102.8	189.2	148	105.3	85.6	151.3	118.4	84.2	68.5	126.1	98.7	70.2	57.1

*radial load at center of key or spline

Note: Variation in life is due to variations in tolerances within the pump.
 Contact Parker Hydraulics for B-10 with other operating conditions and with other case pressure values.
 Consult Parker Hydraulics for shaft side loads of P*R units.

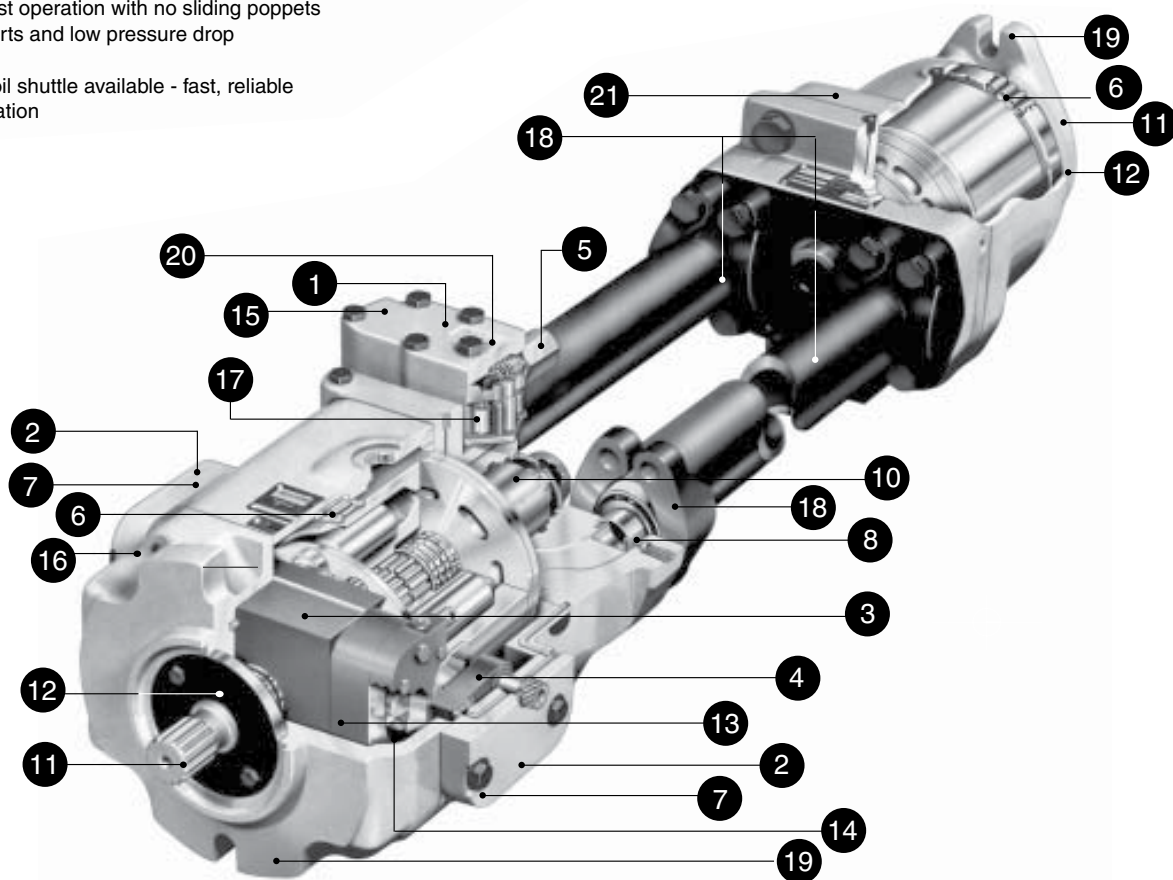


Features

Hydrostatic Transmission Piston Pumps GOLD CUP® Series - Open & Closed Circuits

- 1 Quick change valve block - easy to service or replace
- 2 Quick change controls - easy to service and change
- 3 Dampened low inertia rocker cam - more stable, quieter and faster than other designs
- 4 Exclusive zero-backlash rotary servo design - lifetime accuracy
- 5 Field adjustable compensator override - easily adjusted without removing from machinery
- 6 Precision barrel bearing, a distinctive Denison Hydraulics feature for over 30 years - permits high speeds, high pressure and provides long life
- 7 Versatile controls - can be located on either side of pump or motor for maximum freedom of design
- 8 Patented ring style replenishing checks fastest operation with no sliding poppets or parts and low pressure drop
- 9 Hot oil shuttle available - fast, reliable operation
- 10 Auxiliary pump can be changed without disassembling the transmission
- 11 Standard SAE keyed or splined drive shafts are available
- 12 High pressure mechanical shaft seals can be changed without disassembling the transmission. Double lip seals are also available
- 13 One piece stroking vane/cam means no lost motion, zero backlash, better control, and no linkages to wear out
- 14 Stroking vane seals are pressure loaded for longer life
- 15 Standard compensator vent ports allow for a wide variety of controls (See Applications Manual)
- 16 Rocker cam displacement indicator helps troubleshoot the system
- 17 Modulated servo pressure saves power
- 18 Standard Code 62 SAE split flange connections
- 19 Conforms to SAE mounting standards.
- 20 Fast compensator response. See page 5
- 21 Variable motors available for multiple speed ranges or constant power

Note: 1. These products, with exception of 8 cubic inch units, are qualified to meet Military specifications MIL-P-17869A and MIL-S-901-C Grade A.
2. All GOLD CUP® Pumps and Motors* have ATEX approval.
*See ordering code for availability.
3. Consult factory for other approvals such as ABS and Lloyd's Registry.



CLOSED HYDRAULIC CIRCUIT

Variable Pump/Fixed Motor. This combination provides for a constant torque output at a fixed maximum pressure over the full speed range. Speed and direction are controlled with a variable displacement over-center pump. Power from overhauling loads is regenerated back into the pump prime mover. Motor speed is limited to the maximum speed permitted by full pump displacement. System is capable of full power only at maximum pump displacement.

**POWER CHARACTERISTICS OF
HYDROSTATIC TRANSMISSIONS**

Variable Pump/Variable Motor. This combination provides for an extended range of motor speeds. The motor, at full displacement, delivers maximum torque while its speed and direction respond to displacement changes of the crossover center pump. Power is proportional to motor speed.

This transmission system has the capability of constant torque and rising power until the pump reaches full displacement and full power at elevated speeds as motor displacement and torque are reduced.

PACKAGE PUMP

The package pump contains the circuit elements shown in the hydraulic schematic on pgs. 72-74. These include the axial piston over-center variable displacement pump which controls the speed and direction of the motor, the auxiliary pump which supplies servo pressure (for controlling the displacement of the variable pump) and replenishment pressure, the servo pressure relief valve, the replenishment pressure relief valve and the replenishment check valves for ports A and B. The pump package also includes the displacement control valves as well as an external arm which shows actual displacement. The various control features are described below.

PACKAGE MOTOR

The package motor, shown in schematic pgs. 72-74, contains the axial piston fluid motor, the shuttle valve that continuously removes hot oil from the low pressure side of the loop and a relief valve to establish minimum hydraulic loop pressure at the motor. The fluid motor is available with fixed displacement or with the variable displacement option. The standard variable motors include an external indicator which shows displacement.

OPEN CIRCUIT PUMP

The open circuit pump contains the circuit elements shown on pages 75,76. These include a cross-center variable displacement pump which is normally limited to one side of center. The auxiliary pump supplies only servo pressure to control the main pump displacement and inlet porting is enlarged to improve the pump's inlet characteristics. As the open loop pump operates on one side of center only, not all controls are available.

AUXILIARY REAR DRIVE

Additional auxiliary flow is available with the rear drive pump option. The rear drive may also be utilized for servo and other purposes. See ordering code for additional detail.

"R" & "L" style pumps have no rear shaft seal, so any pump driven must be able to withstand case pressure of the pump driving it.

AUXILIARY PUMP

Integral to the package pump's envelope is the gerotor auxiliary pump. (P24P, P24S, P30P & P30S have vane integral pump). It provides servo and replenishing pressure. See page 5 for factory settings.
NOTE: Auxiliary pump inlet must be connected directly to the reservoir. Customer must supply external line from integral auxiliary pump back into main pump for filtering servo and/or replenishing oil. (see installation drawings starting on pg 10.)

Description

**Hydrostatic Transmission Piston Pumps
GOLD CUP® Series - Open & Closed Circuits**

MOUNTING	<p>The pump or motor is designed to operate in any position. For vertical mounting it is recommended that the shaft bearing be drained via the drain port provided. The mounting hub and mounting flange are in full conformance with SAE standard. The shaft must be in alignment with the shaft of the driven load and should be checked with a dial indicator. The mounting pad or adapter into which the fluid pump pilots must be concentric with the pump shaft within 0.006 in., 0,152 mm to prevent bearing failure. This concentricity is particularly important if the shaft is rigidly connected to the driving load without a flexible coupling. The shaft-coupling interface must be lubricated with lithium molydisulfide or similar grease.</p>										
INLET PRESSURES, PORTS A & B	<p>In a closed hydraulic loop the pump inlet or the fluid motor inlet (during dynamic braking) are supercharged by the integral replenishment system. Consult Parker in cases where fluid viscosity or dynamics or line size may cause inlet pressure at either port A or B to be less than the 150 psi, 10,3 bar maintained by the integral replenishment system. For operation in open loop or combination open-closed loops, consult Parker.</p>										
DRAIN PORT	<p>Drain the package pump from the higher drain port. If drain port is above the fluid level in the tank install a 5 psi, 0,3 bar relief of suitable size in the drain line to tank. For vertical mounting it is recommended that the shaft bearing be drained via the drain port provided.</p> <p>For pump speeds intermittently below 1000 rpm, install a back pressure relief 40 psi, 2,8 bar of suitable size in the drain line from the higher port to tank. Motor case drain must be connected to pump case.</p> <p>Motor: Drain the motor from the higher drain ports into the lower pump drain port or tank. Make provision that the motor drain port pressure will not exceed the maximum limits specified above.</p>										
RETURN LINE FILTER	<p>Relatively inexpensive low pressure filters are recommended for installation in the return lines and drain lines from circuits using these pumps or motors. Consider the possibility of decompression surges and intensified flow in cylinder circuits as well as the factors above in selecting return line filters.</p>										
AUXILIARY FLOW FILTERS	<p>It is recommended the auxiliary pump fluid be filtered to aid in maintaining acceptable cleanliness levels. For good filtration and reasonable maintenance intervals the filter capacity must be at least twice the auxiliary pump flow. To use this feature, install the isolation plug and connect the filter between ports G&H, (P6,P7,P8,P24,P30), or J&K (P11,P14). See detailed schematics and drawings pages 10-22 for location of these ports.</p>										
RECOMMENDED FLUIDS	<p>The fluid recommended for use in these pumps and motors has a petroleum base and contains agents which provide oxidation inhibition and anti-rust, antifoam and de-aerating properties as described in Parker Denison standard HF-1. These preferred fluids do not contain anti-wear additives. Fluids containing anti-wear additives that meet Parker Denison standard HF-0 are acceptable.</p>										
VISCOSITY	<table><tr><td>Max. at cold start</td><td>7500 SUS, 1600 cSt</td></tr><tr><td>at low pressure, low flow and if possible, low speed</td><td></td></tr><tr><td>Max. at full power</td><td>750 SUS, 160 cSt</td></tr><tr><td>Optimum for max. life</td><td>140 SUS, 30 cSt</td></tr><tr><td>Minimum at full power</td><td>60 SUS, 10cSt</td></tr></table>	Max. at cold start	7500 SUS, 1600 cSt	at low pressure, low flow and if possible, low speed		Max. at full power	750 SUS, 160 cSt	Optimum for max. life	140 SUS, 30 cSt	Minimum at full power	60 SUS, 10cSt
Max. at cold start	7500 SUS, 1600 cSt										
at low pressure, low flow and if possible, low speed											
Max. at full power	750 SUS, 160 cSt										
Optimum for max. life	140 SUS, 30 cSt										
Minimum at full power	60 SUS, 10cSt										
CLEANLINESS	<p>Particle contamination to meet ISO 20/17/14 or better. Water content < 500 ppm for mineral based fluids. For detail on fluid recommendations see bulletin SPO-AM305.</p>										





For a copy of the full catalogue and further support
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Fluid Power Solutions