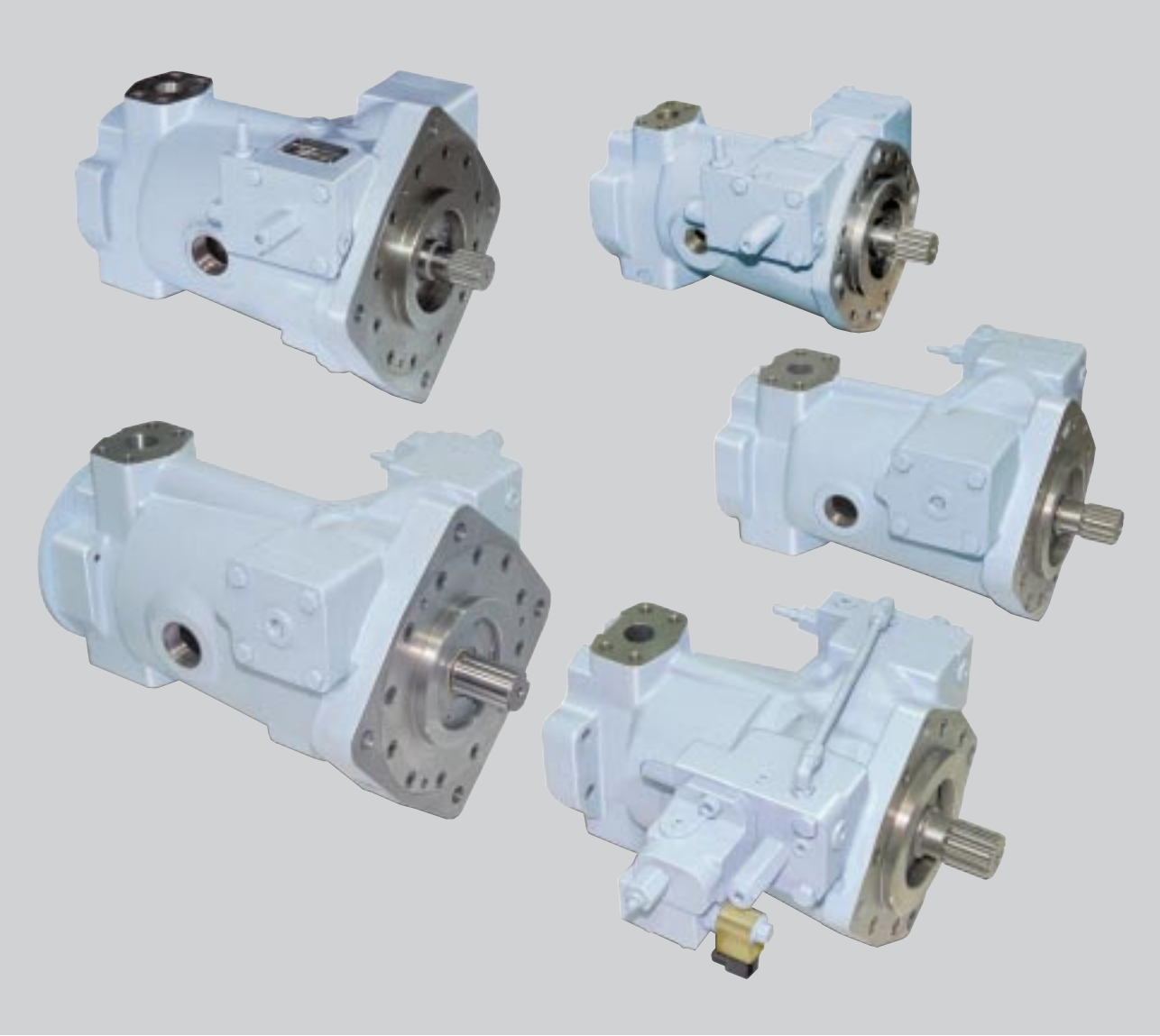
DENISON HYDRAULICS

Premier Series

piston pumps for open circuits

SAE, ISO & DIN



Publ.1- AM0037A *Replaces 1-AM0037*

DENISON Hydraulics

Internet: http://www.denisonhydraulics.com E-mail: denison@ denisonhydraulics.com

CONTENTS

Series		Terms	**P05**/080	**P07**/110	**P09**/140	**P12**/200	**P16**/260
Displacement	Max. displacement	**in³/rev.**	**4.9**	**6.7**	**8.6**	**12.2**	**16.0**
		cm³/rev.	80,3	109,8	140,9	200,0	262,2
Pressure	Continuous	**psi**	**6000**	**6000**	**6000**	**6000**	**6000**
		bar	420	420	420	420	420
	Intermittent	**psi**	**7250**	**7250**	**7250**	**7250**	**7250**
		bar	500	500	500	500	500
Speed	@ atmospheric inlet	rpm	2550	2450	2300	2100	1850
	max. with boost	rpm	3200	3000	2800	2700	2500*
Mounting	Flange-4 bolt	**SAE**	**152-4 (D)**	**152-4 (D)**	**152-4 (D)**	**165-4 (E)**	**165-4 (E)**
		ISO3019/2B4HW	180	180	180	224	250
	Shaft - *keyed*	**SAE**	**44-1 (D)**	**44-1 (D)**	**44-1 (D)**	**44-1 (E)**	**44-1 (E)**
		ISO 3019/2	G40N	G40N	G50N	G50N	G50N
		DIN 6885	40mm K6	40mm K6	50mm K6	50&60mm K6	60mm K6
	Shaft - *splined*	**SAE**	**44-4 (D)**	**44-4 (D)**	**44-4 (D)**	**44-4 (E)**	**44-4 (E)**
		ISO 4156	K40N	K40N	K50N	K50N	K50N
		DIN 5480	40mm	40mm	50mm	50&60mm	60mm
	Shaft - *splined* (Hi-Torque **P16** only)	**SAE**	**N/A**	**N/A**	**N/A**	**N/A**	**50-4 (F)**
Weight		**lbs**	**156**	**177**	**220**	**300**	**325**
Mass		kg.	71	80	100	136	147
Rotating inertia		**lbs/in²**	**65**	**92**	**152**	**245**	see below
		kg.m²	0,019	0,027	0,044	0.072	see below
Rotating inertia	**(P16/260H)**	**lbs/in²**	**-**	**-**	**-**	**-**	**349**
		kg.m²	-	-	-	-	0,102
Rotating inertia	**(P16/260Q)**	**lbs/in²**	**-**	**-**	**-**	**-**	**360**
		kg.m²	-	-	-	-	0,105
Case pressure: maximum allowable	continuous	**psi**	**25**	**25**	**25**	**25**	**25**
		bar	1,7	1,7	1,7	1,7	1,7
	intermittent	**psi**	**50**	**50**	**50**	**50**	**50**
		bar	3,4	3,4	3,4	3,4	3,4

Controls

Compensator response (per SAE J497 @ **5000 psi**, 345 bar)							
	off-stroke	sec.	0.06	0.07	0.06	0.09	0.10
	on-stroke	sec.	0.11	0.13	0.11	0.15	0.15
Compensator adjustment		**psi/turn**	**2000**	**2000**	**2000**	**2000**	**2000**
		bar/turn	138	138	138	138	138
Minimum compensating pressure		**psi**	**250**	**250**	**250**	**250**	**250**
(compensator, torque limiter, or load sensing)		bar	17,2	17,2	17,2	17,2	17,2
Minimum servo pressure		**psi**	**800**	**800**	**700**	**700**	**700**
		bar	55	55	48	48	48
Maximum servo pressure		**psi**	**1500**	**1500**	**1500**	**1500**	**1500**
		bar	103	103	103	103	103
Min. comp. override pressure at above listed min.		**psi**	**1500**	**1500**	**1050**	**1050**	**1050**
servo. (servo, electric & hydraulic stroker)		bar	103	103	72,4	72,4	72,4
Handwheel turns, full to zero stroke		turns	9.0	9.3	8.1	9.5	10.2
Torque to turn handwheel at **1000 psi,** 70 bar		**in.-lbs**	**75**	**100**	**125**	**140**	**150**
		Nm	9	11	15	16	17
Torque to turn handwheel at **7250 psi,** 500 bar		**in.-lbs**	**175**	**225**	**275**	**315**	**350**
		Nm	20	25	32	36	40
Servo shaft rotation, 0 to full stroke		degrees	47-52°	47-52°	52-57°	60-65°	65-70°
Torque to turn rotary servo shaft		**in.-lbs**	**20**	**20**	**20**	**20**	**20**
		Nm	2,3	2,3	2,3	2,3	2,3

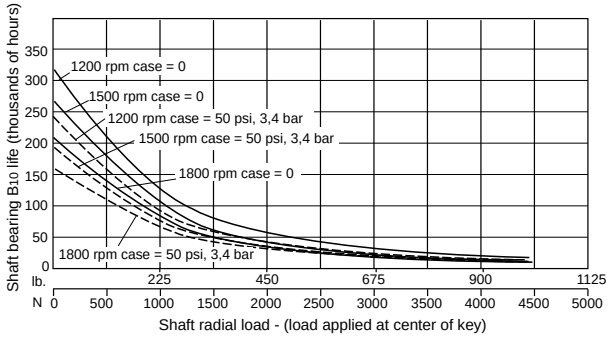
*P16H, P260H only

REAR DRIVE TORQUE CAPACITY

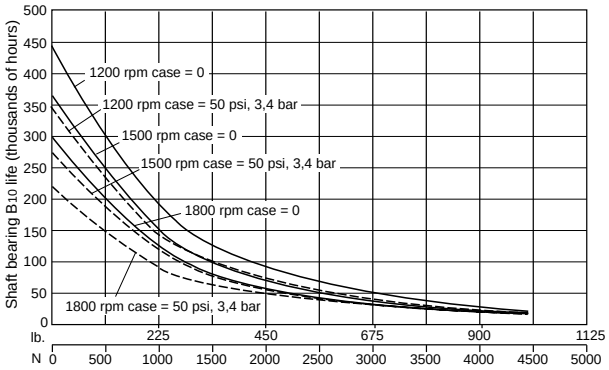
SERIES	FRONT INPUT SHAFT TYPE	FRONT INPUT SHAFT TORQUE CAPACITY	REAR MOUNTINGS SAE A	B	C	D	E	ISO 100	125	160	180	200	224	250	REAR OUTPUT SHAFT TORQUE CAPACITY
P05	**Keyed SAE 44-1(D)**	**11300 in-lbs.**	•	•	•	•		•	•	•	•				**5650 in-lbs.**
	Spline SAE 44-4(D)	(1278 Nm)	•	•	•	•		•	•	•	•				(639 Nm)
P080	Keyed ISO G40N		•	•	•	•		•	•	•	•				
	Keyed DIN 40mm	1292 Nm	•	•	•	•		•	•	•	•				646 Nm
	Spline ISO K40N	(11435 in-lbs.)	•	•	•	•		•	•	•	•				(5718 in-lbs.)
	Spline DIN 40mm		•	•	•	•		•	•	•	•				
P07	**Keyed SAE 44-1(D)**	**15924 in-lbs.**	•	•	•	•		•	•	•	•				**7962 in-lbs.**
	Spline SAE 44-4(D)	(1800 Nm)	•	•	•	•		•	•	•	•				(900 Nm)
P110	Keyed ISO G40N		•	•	•	•		•	•	•	•				
	Spline ISO K40N	1800 Nm	•	•	•	•		•	•	•	•				900 Nm
	Keyed DIN 40mm	(15924 in-lbs.)	•	•	•	•		•	•	•	•				(7962 in-lbs.)
	Spline DIN 40mm		•	•	•	•		•	•	•	•				
P09	**Keyed SAE 44-1(D)**	**19800 in-lbs.**	•	•	•	•		•	•	•	•				**9900 in-lbs.**
	Spline SAE 44-4(D)	(2237 Nm)	•	•	•	•		•	•	•	•				(1118 Nm)
P140	Keyed ISO G50N		•	•	•	•		•	•	•	•				
	Spline ISO K50N	2237 Nm	•	•	•	•		•	•	•	•				1118 Nm
	Keyed DIN 50mm	(19800 in-lbs.)	•	•	•	•		•	•	•	•				(9900 in-lbs.)
	Spline DIN 50mm		•	•	•	•		•	•	•	•				
P12	**Keyed SAE 44-1(D)**	2288 Nm (20250 in-lbs)	•	•	•	•	•	•	•	•	•	•	•		**13800 in-lbs.**
	Spline SAE 44-4(D)	2825 Nm (25000 in-lbs)	•	•	•	•	•	•	•	•	•	•	•		(1559 Nm)
P200	Keyed ISO G50N	2288 Nm (20250 in-lbs)	•	•	•	•	•	•	•	•	•	•	•		
	Spline ISO K50N	3163 Nm (27996 in-lbs)	•	•	•	•	•	•	•	•	•	•	•		1559 Nm
	Keyed DIN 50mm	2288 Nm (20250 in-lbs)	•	•	•	•	•	•	•	•	•	•	•		(13800 in-lbs.)
	Spline DIN 50mm	3163 Nm (27994 in-lbs)	•	•	•	•	•	•	•	•	•	•	•		
	Keyed DIN 60mm	2288 Nm (20250 in-lbs)	•	•	•	•	•	•	•	•	•	•	•		
	Spline DIN 60mm	4384 Nm (38800 in-lbs)	•	•	•	•	•	•	•	•	•	•	•		
P16	**Keyed SAE 44-1(E)**	**20250 in-lbs.** (2288 Nm)	•	•	•	•	•	•	•	•	•	•	•	•	**13600 in-lbs.** (1537 Nm)
	Spline SAE 44-4(E)	**25000 in-lbs.** (2825 Nm)	•	•	•	•	•	•	•	•	•	•	•	•	**13600 in-lbs.** (1537 Nm)
	Spline SAE 50-4(F)	**38800 in-lbs.** (4384 Nm)	•	•	•	•	•	•	•	•	•	•	•	•	**19400 in-lbs.** (2192 Nm)
P260	Keyed ISO G50N	2288 Nm (20250 in-lbs)	•	•	•	•	•	•	•	•	•	•	•	•	1537 Nm (13600 in-lbs)
	Spline ISO K50N	4384 Nm (38800 in-lbs)	•	•	•	•	•	•	•	•	•	•	•	•	2192 Nm (19400 in-lbs)
	Keyed DIN 60mm	2288 Nm (20250 in-lbs)	•	•	•	•	•	•	•	•	•	•	•	•	1537 Nm (13600 in-lbs)
	Spline DIN 60mm	4384 Nm (38800 in-lbs)	•	•	•	•	•	•	•	•	•	•	•	•	2192 Nm (19400 in-lbs)

SHAFT BEARING LIFE

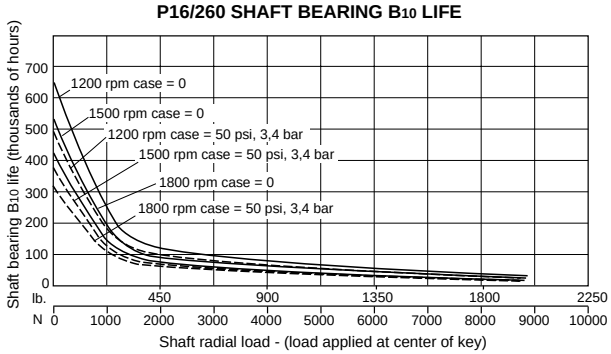
P05/080 and P07/110 SHAFT BEARING B_{10} LIFE

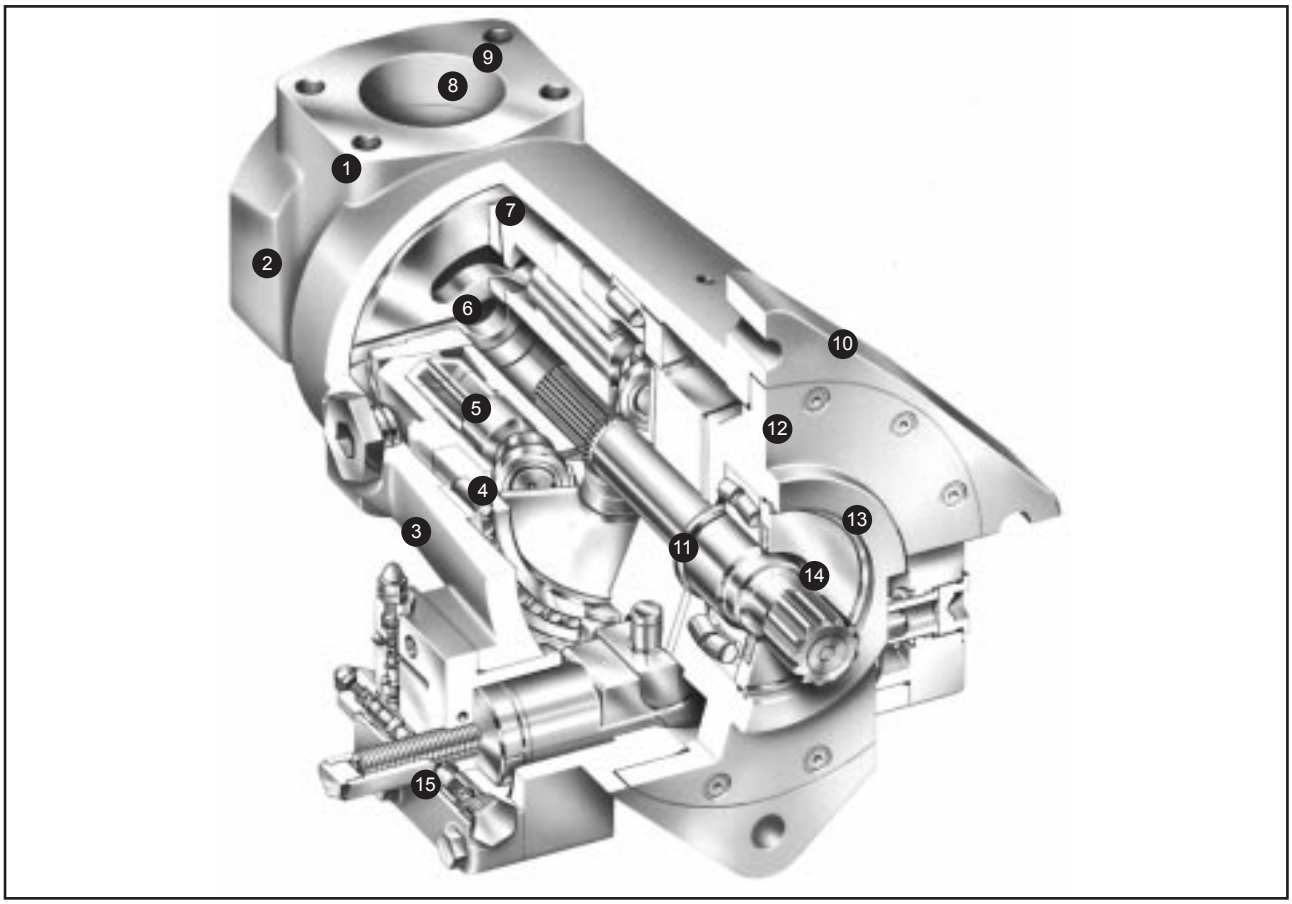


P09/140 and P12/200 SHAFT BEARING B_{10} LIFE



P16/260 SHAFT BEARING B_{10} LIFE





1. **Highest rated pressure** of any comparable pump available in the market place today.

2. **Full power through drive capability** allows two (2) pumps of the same displacement to be run in tandem at full rated pressure and flow, simultaneously.

3. **Fast, compensator** response minimizes pressure overshoot. Two stage, pilot operated compensator provides sharp pressure cutoff at compensator setting, typically regulating pressure within 50 psi (3.5 bar). Compensator may easily be remotely controlled or used in load sensing circuits.

4. **Precision barrel bearing** absorbs radial forces, allowing longer operation at higher pressure and higher speeds.

5. **Piston design** minimizes trapped oil volume to maximize efficiency.

6. **Angled barrel ports** reduce the piston circle diameter, which allows oil to enter at reduced velocity. This allows the pump to run faster, with atmospheric inlet pressure.

7. **Spherical port plate and barrel face** provides support to barrel to offset forces from angled ports.

8. **Large suction port** reduces inlet flow velocity to allow the pumps to run at higher speeds with atmospheric inlet.

9. **Standard SAE split flange with inch or metric bolts, depending on pump version (SAE or metric)**

10. **Conforms to SAE or ISO mounting standards**.

11. **Damped low inertia rocker cam** allows very quick compensation, resulting in more stable and quieter pump.

12. **Heavy duty shaft bearing** to absorb side and thrust loads.

13. **High pressure shaft seal** allows higher case pressure without external leakage. Note: it is always advisable to maintain the lowest possible case pressure.

14. **Drive shaft options** include keyed or splined in SAE, ISO and DIN.

15. **Optional controls**
A wide variety of optional controls are available and are designed with simplicity and a maximum of common elements.

GENERAL

The open loop Premier Series pumps are variable displacement piston pumps with emphasis on superior design with few maintenance requirements. Low inlet velocity requirements allow the pumps to run faster than competitive models without the added expense of boosting the inlet. Modified pistons that reduce the amount of trapped fluid volume result in improved efficiency.

The Premier Series pumps have been designed to operate in a wide range of industries where variable flow, high pressure and/or high speeds are required; such as: presses, construction machinery, injection molding, wood, aircraft, drilling, mining, steel and cranes.

MOUNTING

This pump is designed to operate in any position. For vertical mounting with shaft upward, it is recommended that a 5 psi (0,3 bar) check valve be installed in the case drain port and that the air bleed port (DG on page 36) be connected to the reservoir in order to circulate oil past the shaft bearing. The mounting hub and four bolt mounting flange are in full conformance with SAE/ISO standards. The pump shaft must be in alignment with the shaft of the source driver and should be checked with a dial indicator. The mating pilot bore and coupling must be concentric.

INPUT SHAFT INFORMATION

Splined: The shafts must be aligned within a max. 0.006" , 0,15 mm TIR relative to pilot diameter. Angular misalignment at the external and internal spline axis must be less than ± .002" per inch , .002 mm per mm radius relative to pilot face. The coupling interface must be lubricated. Denison recommends lithium molydisulfide or similar grease. The internal coupling should be hardened to 27-34 Rc. and must conform to SAE J498B (1971) class 1 flat root side fit, ISO 4156 and DIN 5480.

Keyed: High strength heat treated keys must be used. Replacement keys must be hardened to 27-34 Rc. The key corners must be chamfered .030" - .040", 075 - 1 mm at 45° to clear radii that exist in the keyway. If a flexible coupling is not used, the alignment of keyed shafts must be within tolerances given for splined shafts.

CASE PRESSURE/PLUMBING

The case drain line should be as large as the drain port on the pump. The return to the reservoir must be below the surface of the oil and as far from the suction as possible.

The maximum case pressure is 25 psi (1,7 bar) continuous, 50 psi (3,4 bar) intermittent. Case pressure must never exceed inlet pressure by more than 25 psi (1,7 bar).

When connecting the case drain line, make certain that the drain plumbing passes above the highest point of the pump before returning to the reservoir. If not, install a 5 psi, 0,3 bar case pressure check valve to ensure the case is filled with oil at all times.

All fluid lines, whether pipe, tubing, or hose, must be of adequate size and strength to assure proper operation.

Caution: Do not use galvanized pipe. The coating can flake off with continued use.

MAINTENANCE & SERVICE

Make sure the entire hydraulic system is free of dirt, lint, or other foreign material. This pump is self-lubricating and preventative maintenance is limited to keeping system fluid clean. Do not operate at pressures and speeds in excess of the recommended limit.

Denison Service manuals provide customer support in troubleshooting, installation, and assembly/disassembly and reworking of parts. For additional support, your local Denison Hydraulics representative is available.

RECOMMENDED FLUIDS

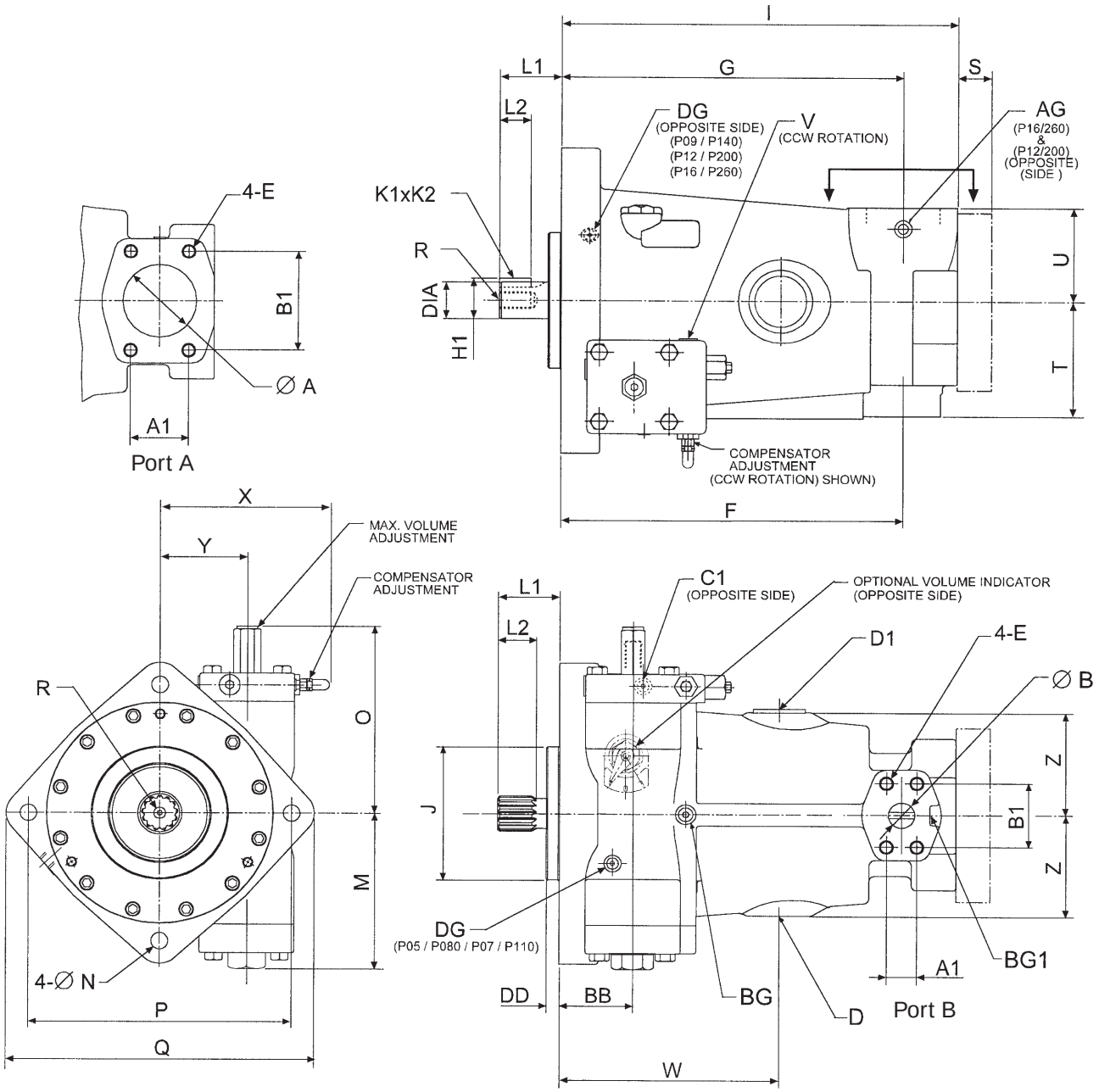
See DENISON HYDRAULICS bulletin **SPO-AM305** for more information

TEMPERATURE

Maximum temperature is limited by the viscosity characteristics of the fluid used. Because high temperatures degrade seals, reduce the service life of the fluid, and create hazards, fluid temperatures should not exceed 180° F, 82° C at the case drain.

FLUID CLEANLINESS

Fluid must be cleaned before adding to the system, and continuously during operation by filters that maintain a cleanliness level of NAS 1638 Class 8. This approximately corresponds to ISO 17/14.



CCW PUMP

Dimensions

	F	G	I -w/o*	I -w**	J	M	N	O	P	Q
P05	**11.36**	**11.60**	**13.58**	**13.40**	**6.000-5.998**	**6.23**	**∅ .81**	**8.18**	**9.00**	**10.50**
P080	*288,5*	*294,6*	*349,5*	*340,4*	*180,00-179,93*	*158,2*	*∅ 18,0*	*207,8*	*224,0*	*266,7*
P07	**11.88**	**11.68**	**14.89**	**14.71**	**6.000-5.998**	**6.26**	**∅ .81**	**8.22**	**9.00**	**10.50**
P110	*302,0*	*296,7*	*378,2*	*373,6*	*180,00-179,93*	*159,2*	*∅ 18,0*	*208,8*	*224,0*	*266,7*
P09	**13.24**	**13.66**	**16.09**	**15.91**	**6.000-5.998**	**6.79**	**∅ .81**	**8.59**	**9.00**	**11.9**
P140	*336,2*	*347,0*	*408,7*	*404,1*	*180,00-179,93*	*172,3*	*∅ 18,0*	*218,2*	*224,0*	*302,2*
P12	**14.11**	**14.79**	**17.26**	**17.15**	**6.500-6.498**	**7.13**	**∅ .81**	**8.72**	**12.50**	**14.66**
P200	*358,4*	*375,7*	*438,4*	*436,0*	*224,00-223,94*	*1,81*	*∅ 22,0*	*221,5*	*280,0*	*376,0*
P16	**16.17**	**16.17**	**19.02**	**18.75**	**6.500-6.498**	**7.39**	**∅ .81**	**9.11**	**12.50**	**14.66**
P260	*420,1*	*420,1*	*489,2*	*482,3*	*250,00-249,96*	*187,7*	*∅ 25,4*	*231,3*	*315,0*	*372,4*

* Without reardrive

** With reardrive

Items in **bold** are SAE version and inches

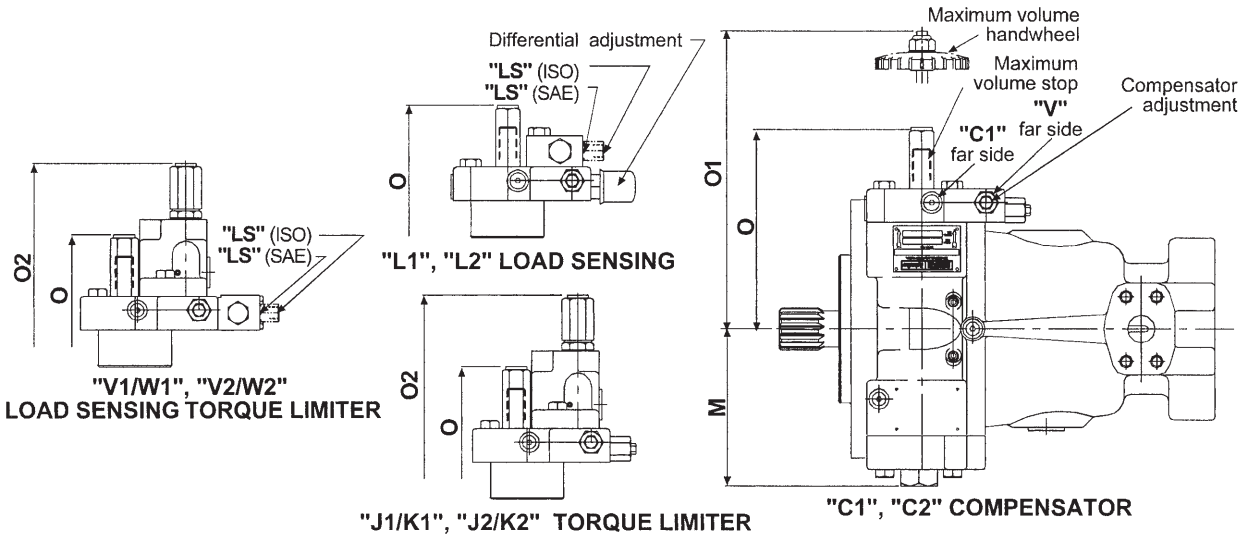
Items not bold are ISO version and millimeters in *italics*

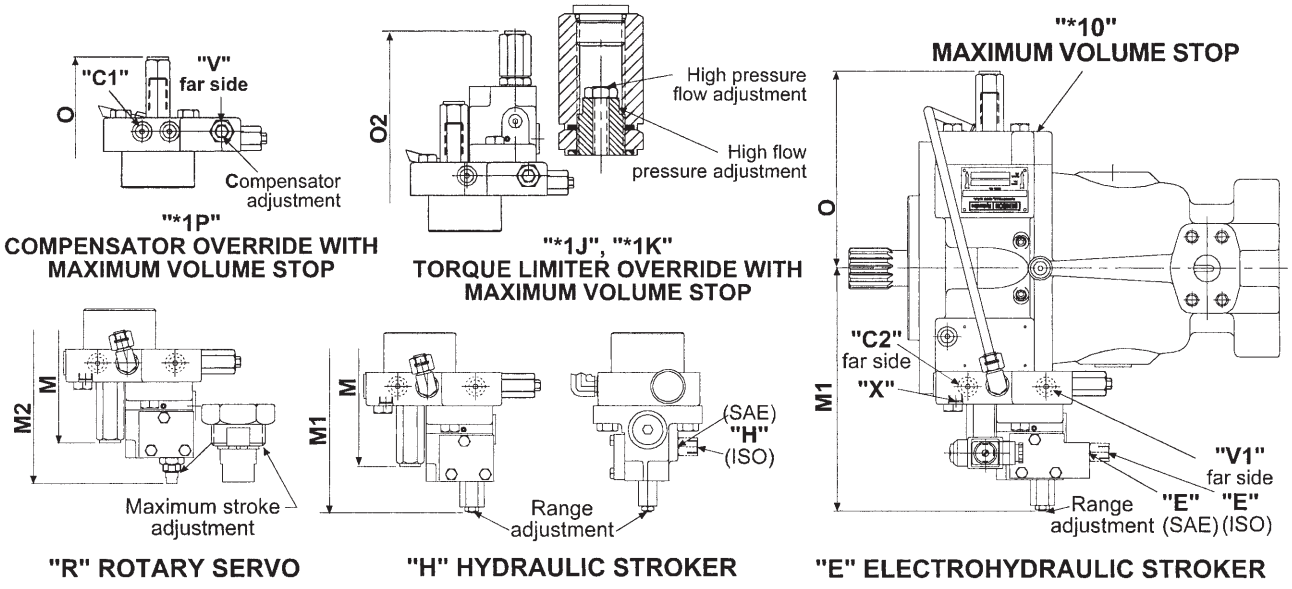
NOTE: For port identification see page 36.

code	Shafts / Pumps	05	080	07	110	09	140	12	200	16	260	L1	L2	DIA	K1 x K2	H1	R
	Keyed SAE44-1 (D&E)	●		●		●		●		●		**2.94**	**1.75**	**1.7500-1.7494**	**7/16**	**1.943**	**3/8-16 x.65**
												74,7	*44,5*	*44,450-44,435*	*11,1*	*49,4*	*9,5-16 x 16,5*
02	Keyed ISO 3019/2 G40N		●		●		●					*92,0*	*63*	*40,018-40,002*	*12 x 8*	*42,9*	*M12 x 28*
	Keyed ISO 3019/2 G50N								●		●	*83,3*	*41*	*50,018-50,002*	*14 x 9*	*53,8*	*M10 x 16.5*
06	Keyed DIN 6885 40mm		●		●							*80*	*63*	*40,017-40,002*	*12 x 8*	*42,9*	*M12 x 28*
	Keyed DIN 6885 50mm						●		●			*92*	*70*	*50,017-50,002*	*14 x 9*	*53,3*	*M16 x 32*
	Keyed DIN 6885 60mm								●		●	*113*	*100*	*60,000-59,984*	*18 x 11*	*64,0*	*M20 x 42*
	Splined SAE44-4 (D)	●		●		●						**2.94**	**1.62**	**side fit, 30º, class 1, 8/16p,13 teeth**			**3/8-16 x.65**
												74,7	*44,1*				*9,5-16 x 16,5*
	Splined SAE44-4 (E)							●		●		**2.94**	**1.50**	**side fit, 30º, class 1, 8/16p,13 teeth**			**3/8-16 x.65**
												74,7	*38,1*				*9,5-16 x 16,5*
03	Splined ISO 4156 K40N		●		●		●					*92,0*	*53,6*	*side fit, 30º, mod.1,0 - 39 teeth*			*M10 x 16.5*
	Splined ISO 4156 K50N								●		●	*83,3*	*53,3*	*side fit, 30º angle, mod.2,5 -19 teeth*			*M10 x 16.5*
07	Splined DIN 5480 40mm		●		●							*55*	*30*	*side fit, 30º angle, mod.2,0 -18 teeth*			*M12 x 28*
	Splined DIN 5480 50mm						●		●			*65*	*40*	*side fit, 30º angle, mod.2,0 -24 teeth*			*M16 x 32*
	Splined DIN 5480 60mm								●		●	*66*	*47*	*side fit, 30º, mod.2,0 - 28 teeth*			*M20 x 42*
05	**Splined SAE 50-4 (F)**									●		**3.44**	**2.21**	**side fit, 30º, class 1, 8/16p,15 teeth**			**3/8-16 x.65**
	Hi-Torque											*87,4*	*56,1*				*9,5-16 x 16,5*

Ports		Dimensions				Threads	Ports						
		∅ A/B	A1	B1	T/U	E	V	D/D1	AG	BG	BG1	C1	DG
P05	**A**	**2.50**	**2.00**	**3.50**	**4.37**	**1/2-13 x 1.19**	**SAE - 8**	**SAE - 12**	**SAE - 4**	**SAE - 4**	**SAE - 6**	**SAE - 4**	**SAE - 4**
	B	**1.25**	**1.25**	**2.63**	**4.37**	**1/2-13 x 1.19**							
P080	**A**	*64*	*50,8*	*88,9*	*111,1*	*M12 x 30,2*	3/8 BSPP	3/4 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP	3/8 BSPP
	B	*32*	*31,8*	*66,7*	*111,1*	*M14 x 50*							
P07	**A**	**3.00**	**2.44**	**4.19**	**4.37**	**5/8-11 x 1.19**	**SAE - 8**	**SAE - 16**	**SAE - 4**	**SAE - 6**	**SAE - 6**	**SAE - 4**	**SAE - 4**
	B	**1.25**	**1.25**	**2.63**	**4.52**	**1/2-13 x 1.19**							
P110	**A**	*76*	*61,9*	*106,4*	*111,1*	*M16 x 38,1*	3/8 BSPP	1 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP
	B	*32*	*31,8*	*66,7*	*114,9*	*M14 x 50*							
P09	**A**	**3.00**	**2.44**	**4.19**	**4.50**	**5/8-11 x 1.50**	**SAE - 8**	**SAE - 20**	**SAE - 4**	**SAE - 4**	**SAE - 6**	**SAE - 4**	**SAE - 4**
	B	**1.50**	**1.44**	**3.13**	**4.83**	**5/8-11 x 1.50**							
P140	**A**	*76*	*61,9*	*106,4*	*114,3*	*M16 x 38,1*	3/8 BSPP	1-1/2 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP	1/8 BSPP
	B	*38*	*36,5*	*79,37*	*122,7*	*M16 x 38,1*							
P12	**A**	**3.50**	**2.76**	**4.75**	**4.50**	**5/8-11 x 1.38**	**SAE - 8**	**SAE - 24**	**SAE - 4**	**SAE - 6**	**SAE - 6**	**SAE - 4**	**SAE - 4**
	B	**1.50**	**1.44**	**3.13**	**5,37**	**5/8-11 x 1.50**							
P200	**A**	*89*	*70,0*	*120,65*	*114,3*	*M16 x 38,1*	3/8 BSPP	1-1/2 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP
	B	*38*	*36,5*	*79,37*	*136,4*								
P16	**A**	**3.50**	**2.76**	**4.75**	**4.50**	**5/8-11 x 1.38**	**SAE - 8**	**SAE - 24**	**SAE - 4**	**SAE - 6**	**SAE - 6**	**SAE - 4**	**SAE - 4**
	B	**1.50**	**1.44**	**3.13**	**5.50**	**5/8-11 x 1.38**							
P260	**A**	*89*	*70,0*	*120,65*	*114,3*	*M16 x 38,1*	3/8 BSPP	1-1/2 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP	1/4 BSPP
	B	*38*	*36,5*	*79,37*	*146,0*	*M16 x 38,1*							

NOTE: For port identification see page 36.





COUNTER-CLOCKWISE ROTATION SHOWN

For clockwise rotation, the top and bottom control caps are interchanged.

	"C1"	"C2"	"E"	"H"	"R"	"V"	"V1"	"X"	M	M1	M2	O	O1	O2
P05	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-8**	**SAE-4**	**SAE-6**	**6.27**	**10.09**	**9.87**	**8.18**	**13.44**	**11.08**
P080	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	3/8" BSPP	1/4" BSPP	3/8" BSPP	*159,3*	*256,2*	*250,8*	*207,8*	*341,3*	*281,4*
P07	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-8**	**SAE-4**	**SAE-6**	**6.29**	**10.11**	**9.89**	**8.22**	**13.48**	**11.14**
P110	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	3/8" BSPP	1/4" BSPP	3/8" BSPP	*159,8*	*256,8*	*251,2*	*208,8*	*342,4*	*282,9*
P09	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-8**	**SAE-4**	**SAE-8**	**7.00**	**10.85**	**10.63**	**8.59**	**14.19**	**11.84**
P140	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	3/8" BSPP	1/4" BSPP	3/8" BSPP	*177,8*	*275,8*	*270,0*	*218.2*	*360,4*	*300,7*
P12	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-8**	**SAE-4**	**SAE-8**	**7.13**	**10.98**	**10.76**	**8.72**	**14.32**	**11.97**
P200	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	3/8" BSPP	1/4" BSPP	3/8" BSPP	*181,1*	*278,9*	*273,3*	*221,5*	*363,7*	*304,0*
P16	**SAE-4**	**SAE-8**	**SAE-4**	**SAE-4**	**SAE-4**	**SAE-8**	**SAE-4**	**SAE-8**	**7.17**	**11.24**	**11.02**	**9.11**	**14.58**	**12.23**
P260	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	1/4" BSPP	3/8" BSPP	1/4" BSPP	3/8" BSPP	*182,1*	*285,5*	*279,9*	*231,4*	*370,3*	*310,6*

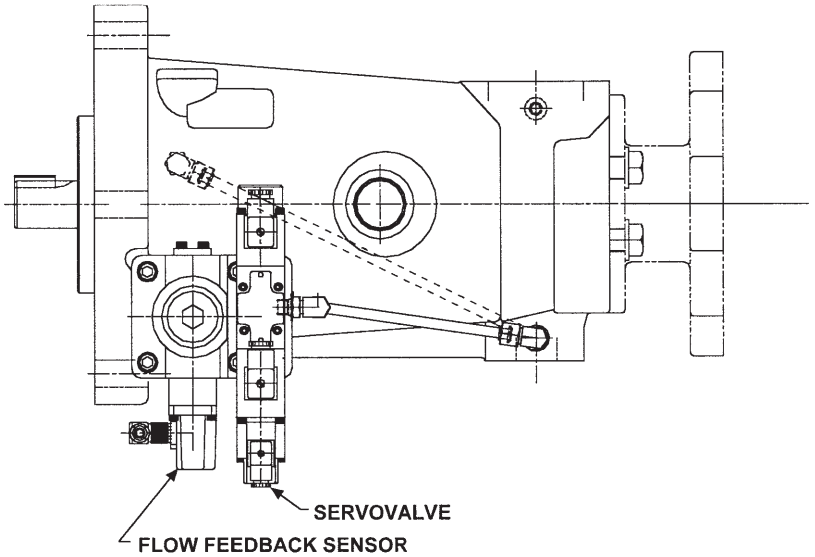
Items in **bold** are SAE version and inches.
Italic dimensions are in millimeters

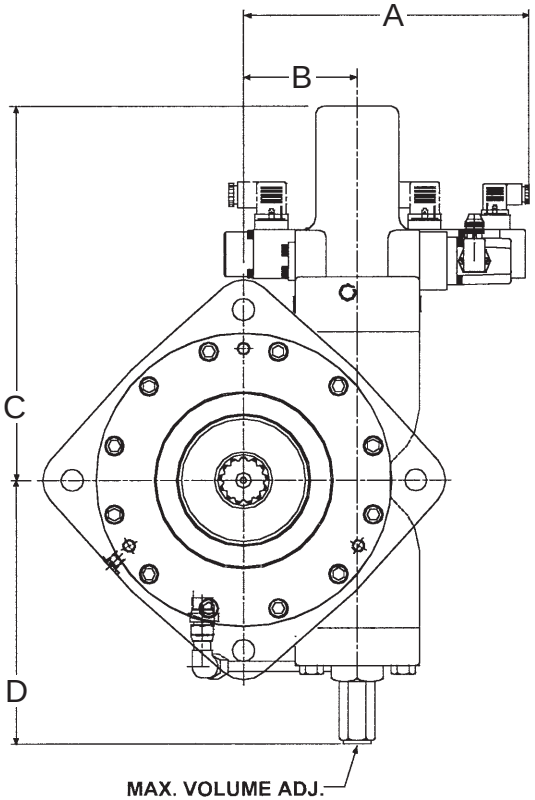
NOTE: For more detail informance refer to the individual pump installation drawings. These are available on CD contact your nearest sales representative or distributor.

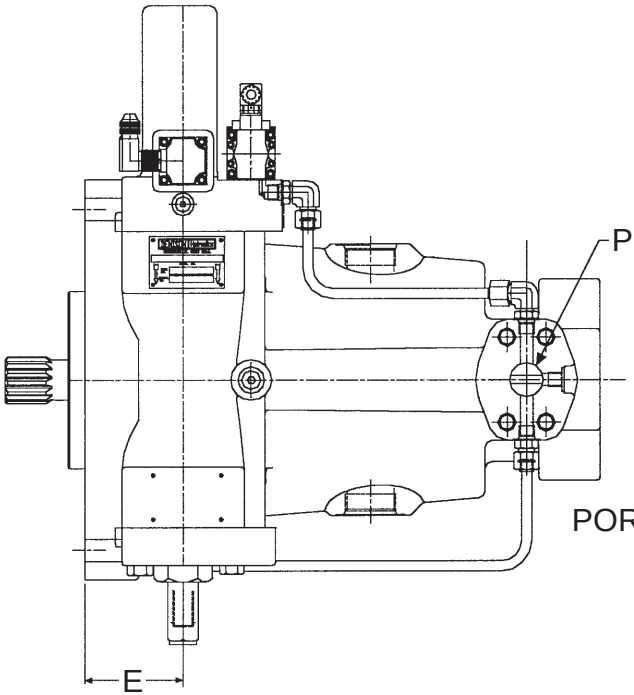
DIMENSIONS

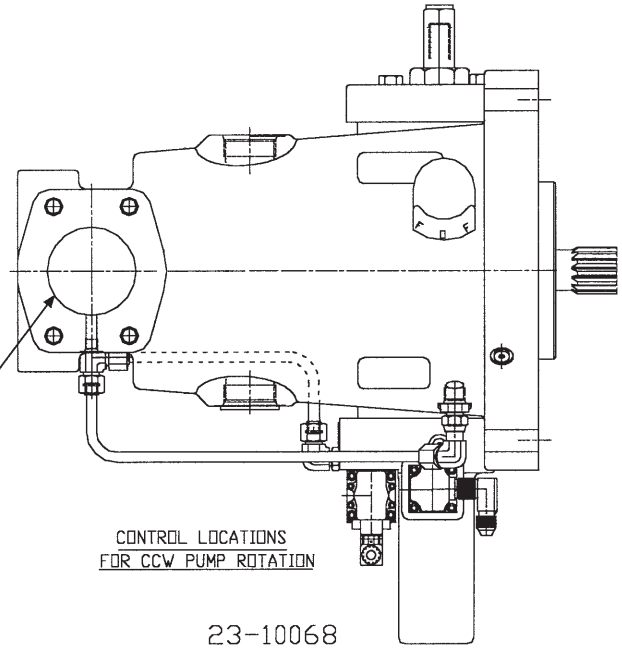
	A	B	C	D	E
P05	8.86	2.68	10.73	8.54	2.98
P080	225.0	68.1	272.5	216.9	79.7
P07	9.29	3.11	10.84	8.54	2.51
P110	235.9	78.9	275.4	216.9	63.8
P09	9.57	3.30	13.30	9.30	3.42
P140	243.1	83.8	337.8	236.2	86.8
P12	9.98	3.70	13.45	9.42	3.38
P200	253.5	94.1	341.6	239.3	85.9
P16	10.39	4.13	13.67	9.65	3.60
P260	264.0	104.8	347.2	246.0	91.4

PQ Control
(available soon on all models)





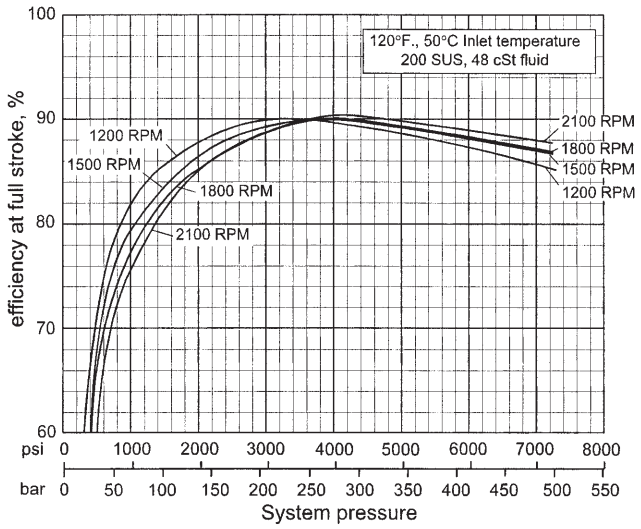




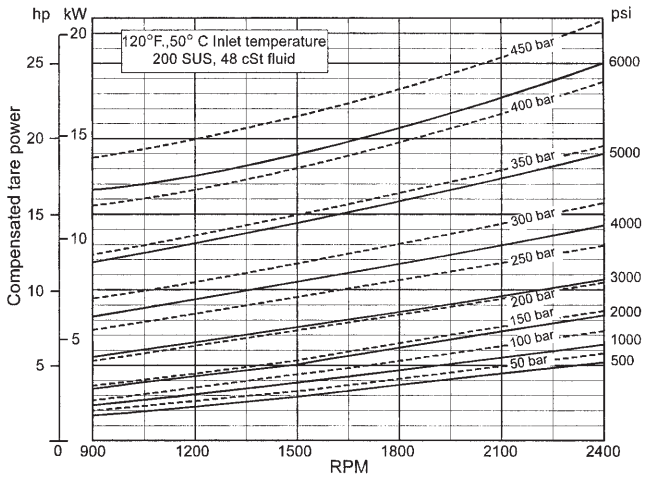
Ordering Code

Back to Content

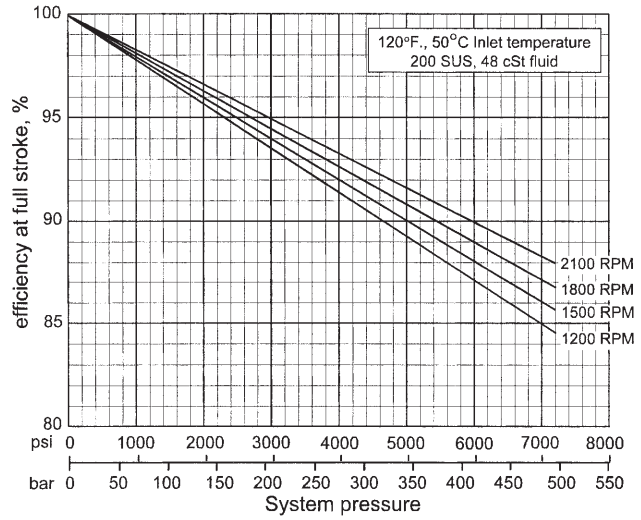
OVERALL EFFICIENCY @ FULL STROKE



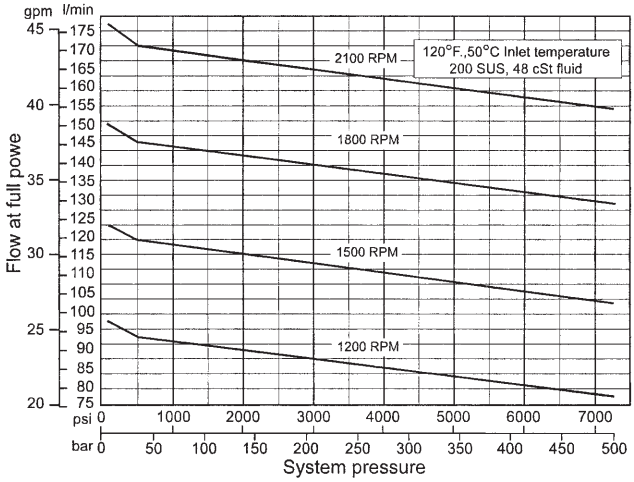
COMPENSATED TARE POWER



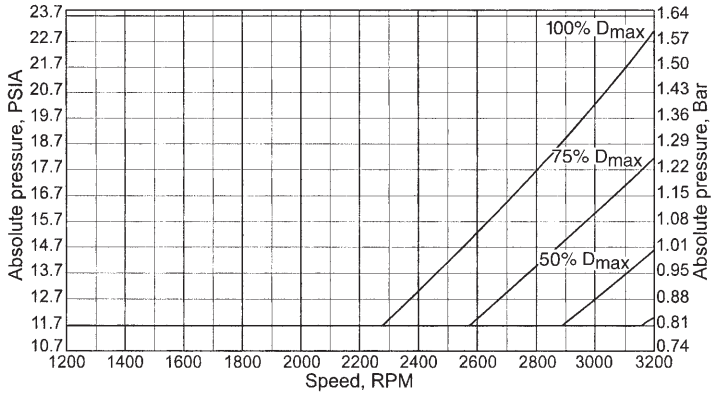
VOLUMETRIC EFFICIENCY @ FULL STROKE



FLOW VS PRESSURE @ FULL STROKE

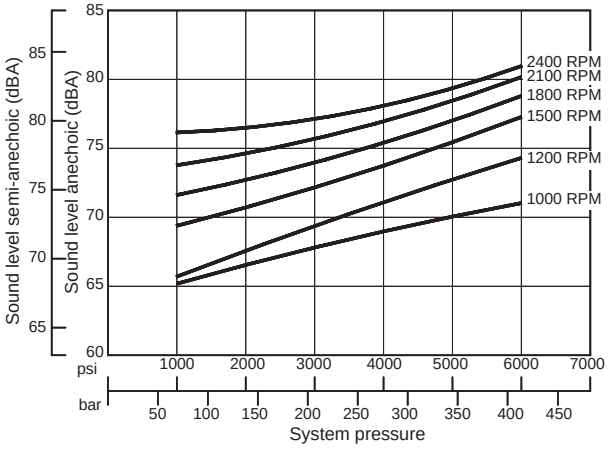


INLET CONDITIONS

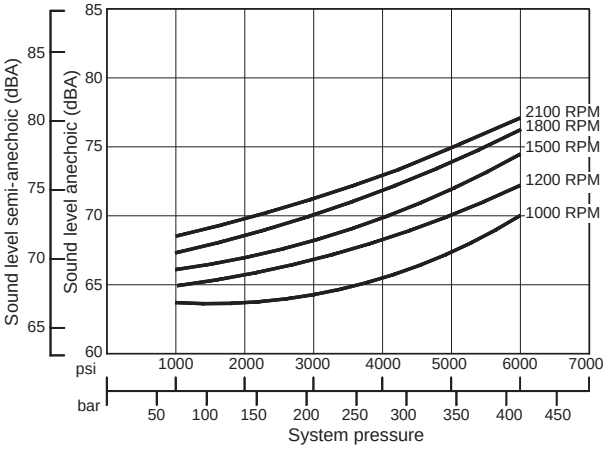


Note: The absolute inlet pressure is the pressure required to fill the pump with petroleum based fluids. The maximum pressure in the inlet port is 200 psi, 14 bar. For unboosted systems, the diameter of the suction line must be sized to allow a maximum velocity not higher than 4 ft/sec., 1,22 m/sec. A coarse screen may be considered in the suction line, no filter. For water in oil invert emulsions and water glycols increase the inlet absolute pressure by 25%, for phosphate ester increase the absolute inlet pressure by 35%. Any inlet pressures above atmospheric may increase noise levels and decrease efficiencies noted in this literature. Please consult your nearest Denison Office for further details.

SOUND PRESSURE LEVEL (dBA) @FULL STROKE

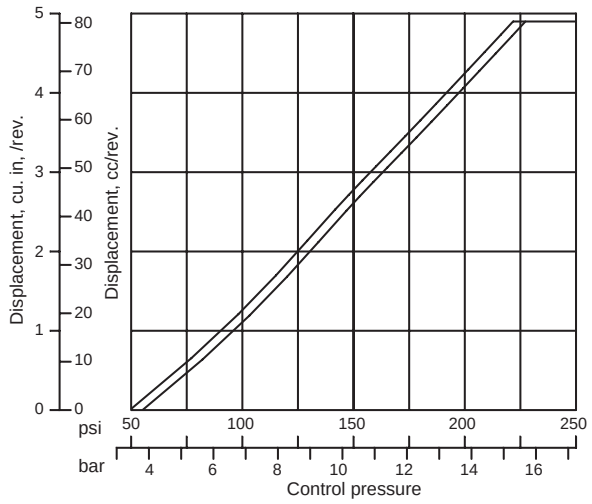


SOUND PRESSURE LEVEL (dBA) COMPENSATED

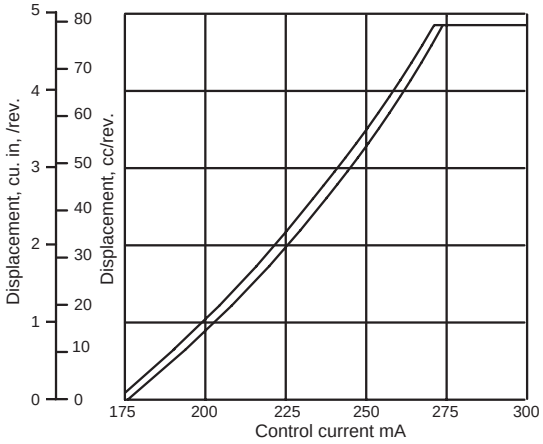


Note: Pump acoustical data was determined in accordance with ANSI/B93.71M, Hydraulic Fluid Power Pumps test code for the determination of airborne noise levels. Semi-anechoic values are presented according to the standard. Anechoic values are calculated for comparison with DIN 45635, part 1. The DIN standards measures sound levels over different surface areas so comparisons are not exact.

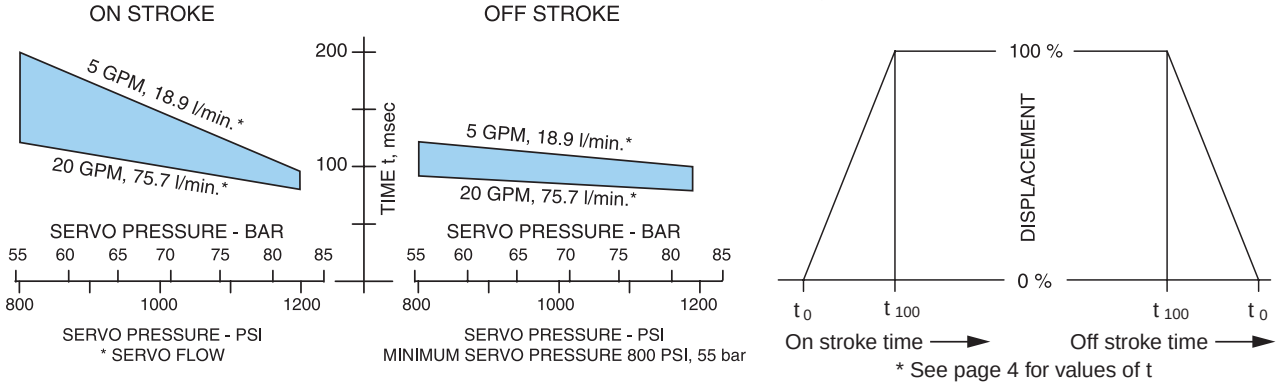
HYDRAULIC STROKER



ELECTROHYDRAULIC STROKER (24 VOLT)

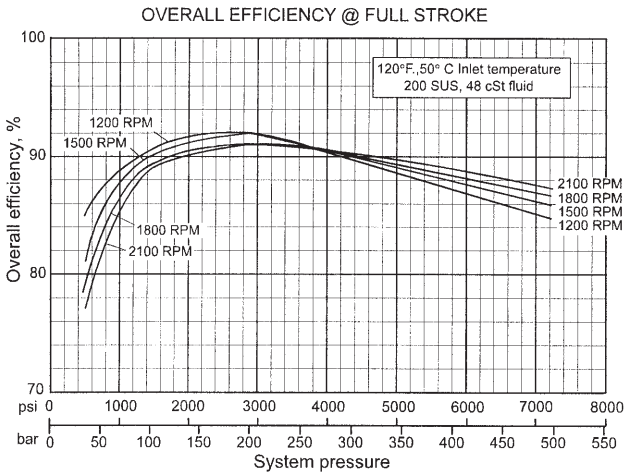


STROKER RESPONSE VS SERVO PRESSURE, SERVO FLOW

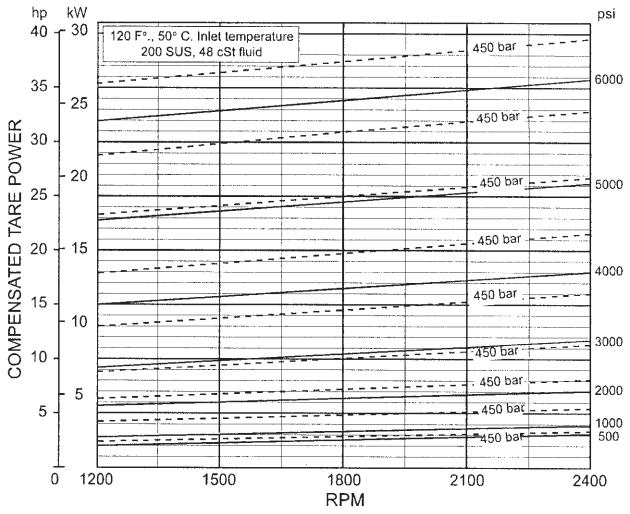


* See page 4 for values of t

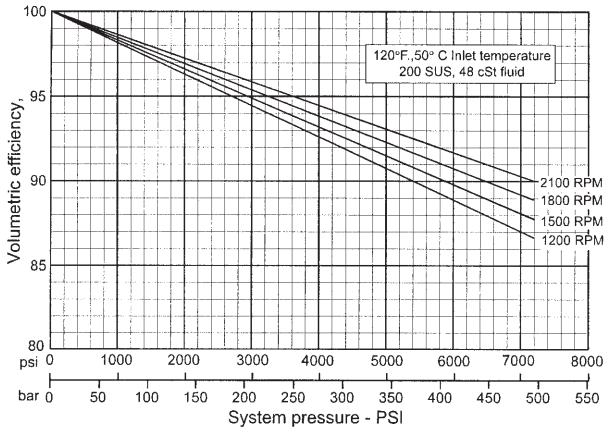
OVERALL EFFICIENCY @ FULL STROKE



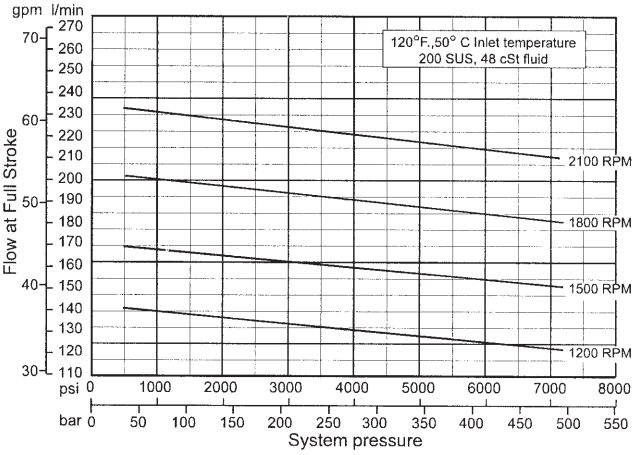
COMPENSATED TARE POWER



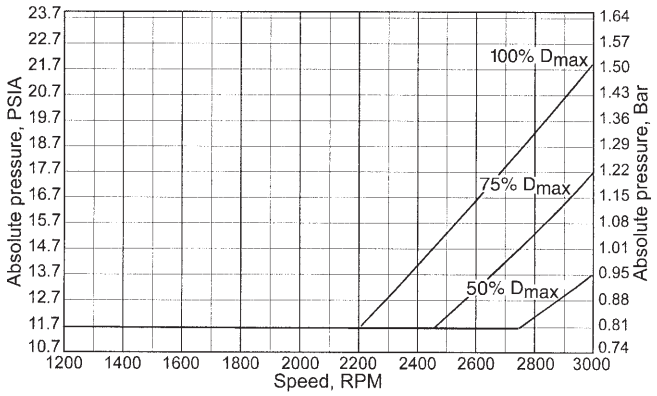
VOLUMETRIC EFFICIENCY @ FULL STROKE



FLOW VS PRESSURE @ FULL STROKE

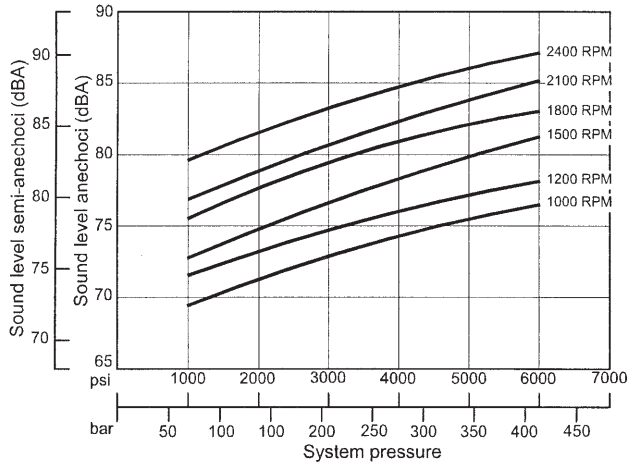


INLET CONDITIONS

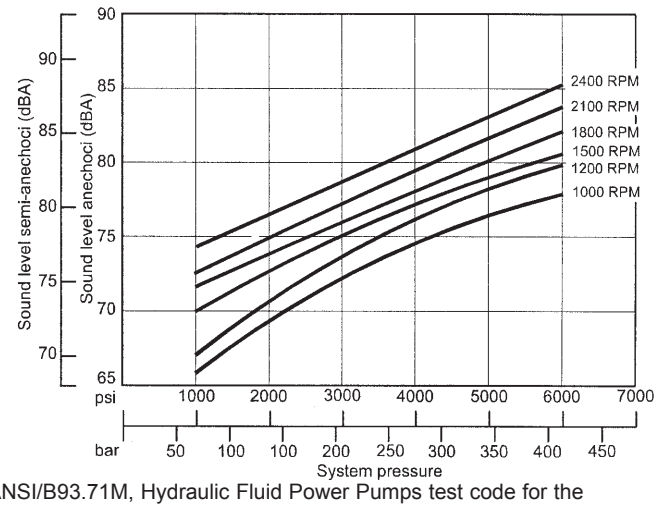


Note: The absolute inlet pressure is the pressure required to fill the pump with petroleum based fluids. The maximum pressure in the inlet port is 200 psi, 14 bar. For unboosted systems, the diameter of the suction line must be sized to allow a maximum velocity not higher than 4 ft/sec., 1,22 m/sec. A coarse screen may be considered in the suction line, no filter. For water in oil invert emulsions and water glycols increase the inlet absolute pressure by 25%, for phosphate ester increase the absolute inlet pressure by 35%. Any inlet pressures above atmospheric may increase noise levels and decrease efficiencies noted in this literature. Please consult your nearest Denison Office for further details.

SOUND PRESSURE LEVEL (dBA) @FULL STROKE

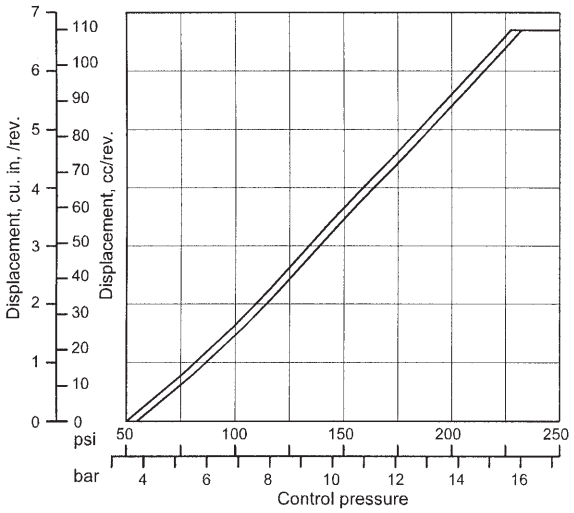


SOUND PRESSURE LEVEL (dBA) COMPENSATED

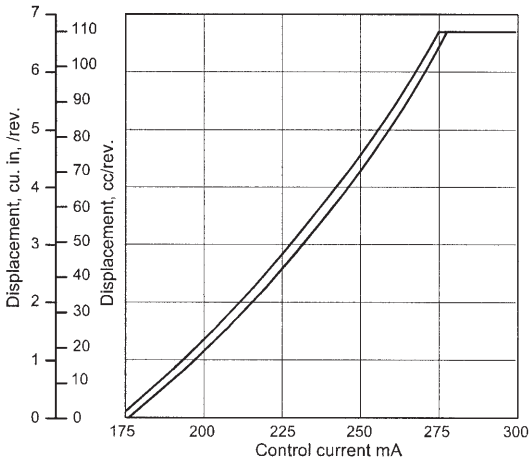


Note: Pump acoustical data was determined in accordance with ANSI/B93.71M, Hydraulic Fluid Power Pumps test code for the determination of airborne noise levels. Semi-anechoic values are presented according to the standard. Anechoic values are calculated for comparison with DIN 45635, part 1. The DIN standards measures sound levels over different surface areas so comparisons are not exact.

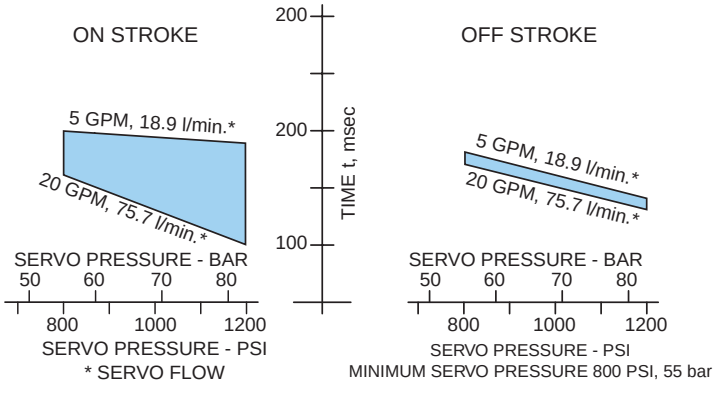
HYDRAULIC STROKER

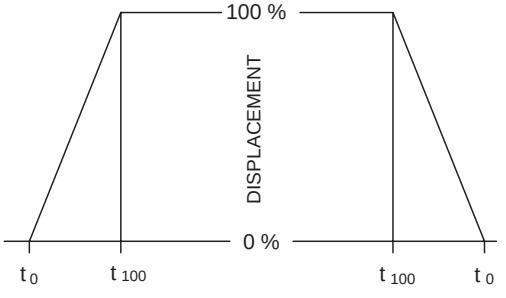


ELECTROHYDRAULIC STROKER (24 VOLT)



STROKER RESPONSE VS SERVO PRESSURE, SERVO FLOW

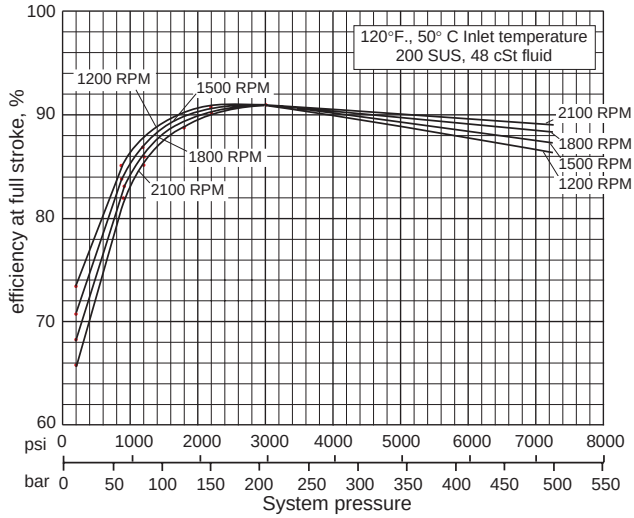




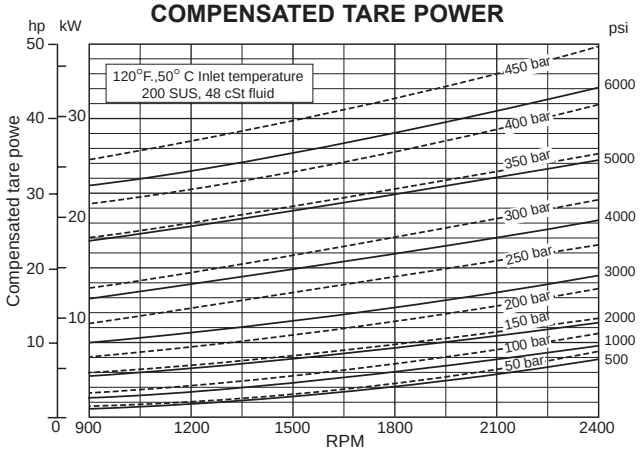
* See page 4 for values of t

Ordering Code | Back to Content

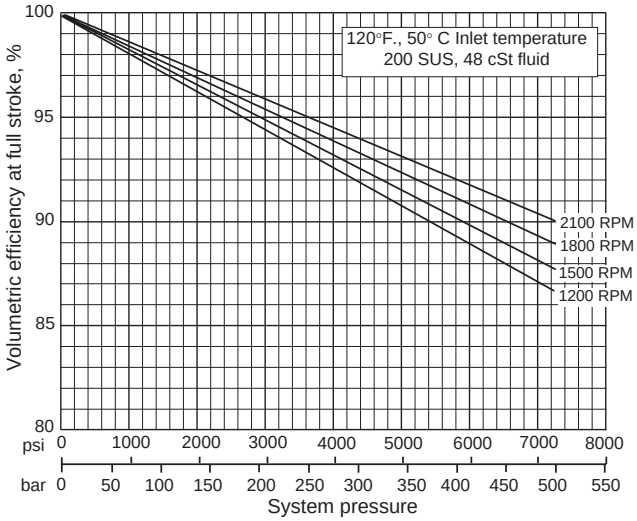
OVERALL EFFICIENCY @ FULL STROKE



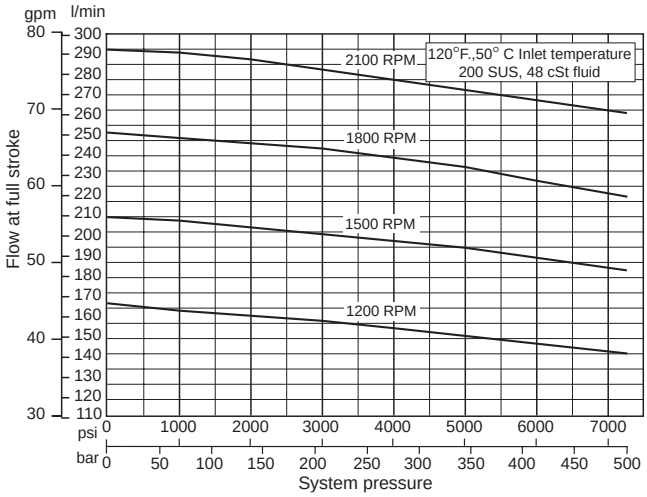
COMPENSATED TARE POWER



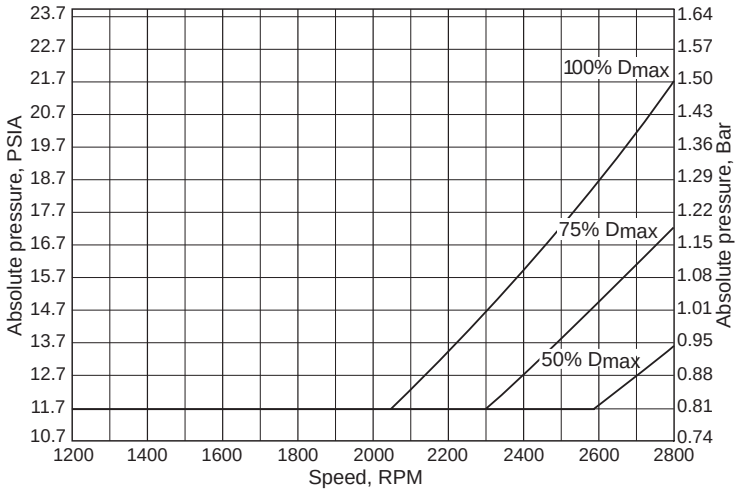
VOLUMETRIC EFFICIENCY @ FULL STROKE



FLOW VS PRESSURE @ FULL STROKE

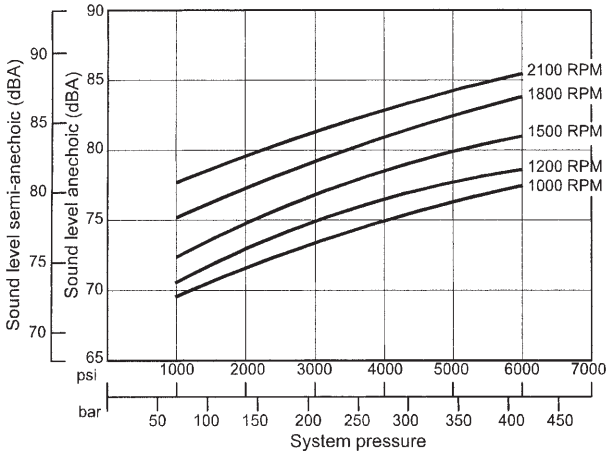


INLET CONDITIONS

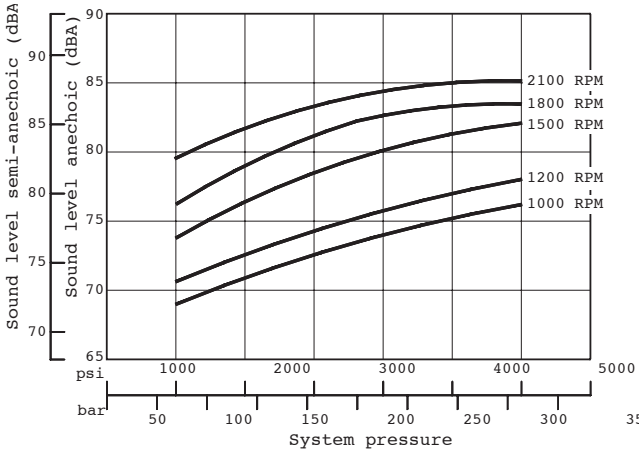


Note: The absolute inlet pressure is the pressure required to fill the pump with petroleum based fluids. The maximum pressure in the inlet port is 200 psi, 14 bar. For unboosted systems, the diameter of the suction line must be sized to allow a maximum velocity not higher than 4 ft/sec., 1,22 m/sec. A coarse screen may be considered in the suction line, no filter. For water in oil invert emulsions and water glycols increase the inlet absolute pressure by 25%, for phosphate ester increase the absolute inlet pressure by 35%. Any inlet pressures above atmospheric may increase noise levels and decrease efficiencies noted in this literature. Please consult your nearest Denison Office for further details.

SOUND PRESSURE LEVEL (dBA) @FULL STROKE

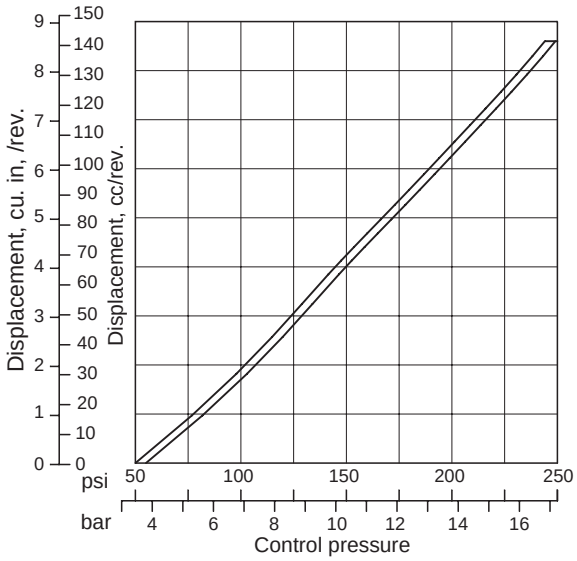


SOUND PRESSURE LEVEL (dBA) COMPENSATED

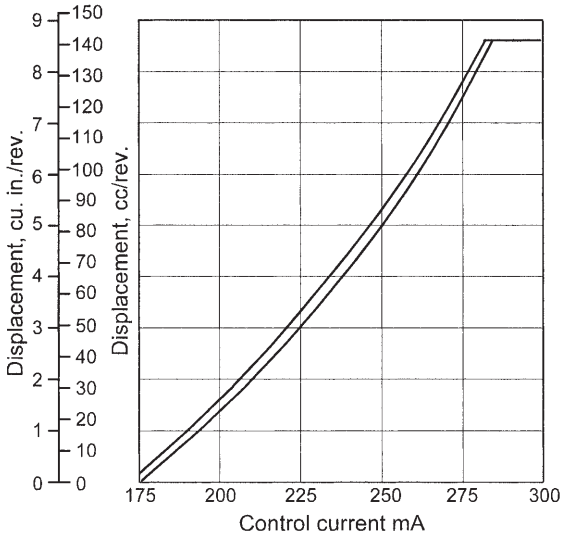


Note: Pump acoustical data was determined in accordance with ANSI/B93.71M, Hydraulic Fluid Power Pumps test code for the determination of airborne noise levels. Semi-anechoic values are presented according to the standard. Anechoic values are calculated for comparison with DIN 45635, part 1. The DIN standards measures sound levels over different surface areas so comparisons are not exact.

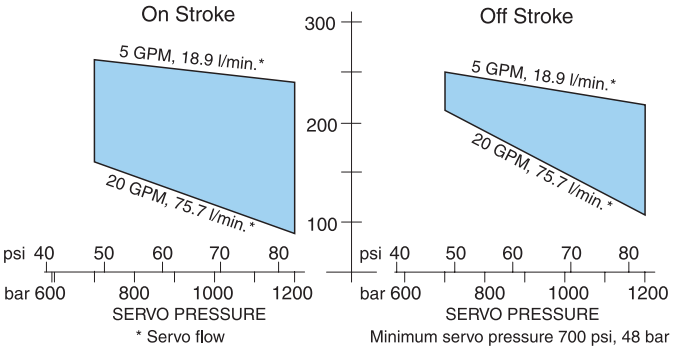
HYDRAULIC STROKER

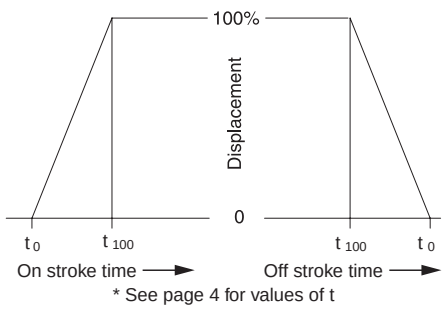


ELECTROHYDRAULIC STROKER (24 VOLT)



STROKER RESPONSE VS SERVO PRESSURE, SERVO FLOW

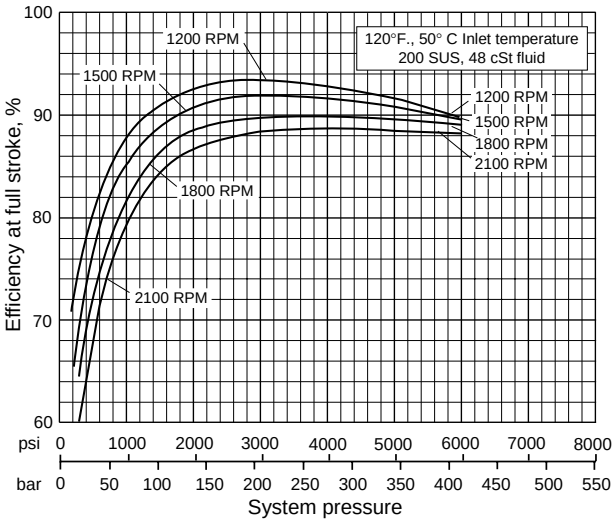




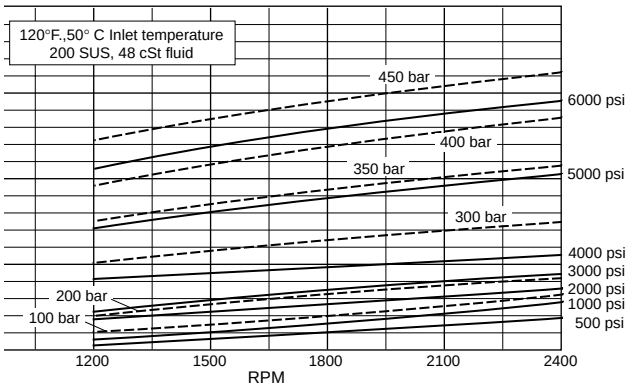
* See page 4 for values of t

Ordering Code | Back to Content

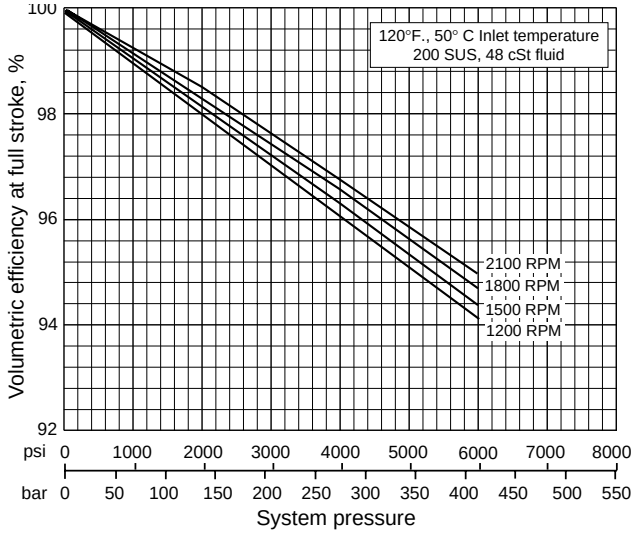
OVERALL EFFICIENCY @ FULL STROKE



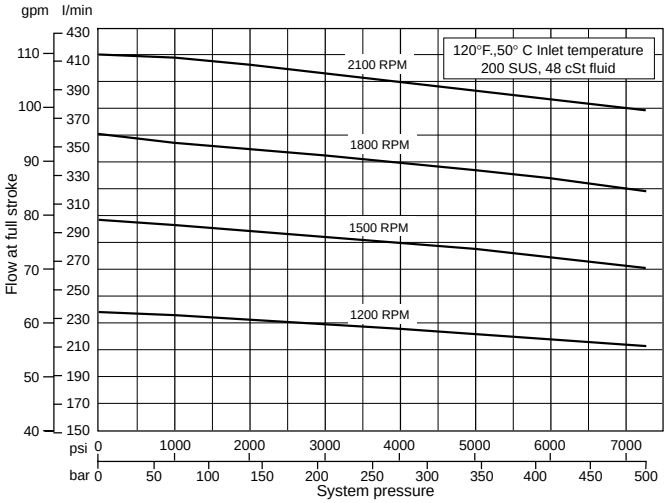
COMPENSATED TARE POWER



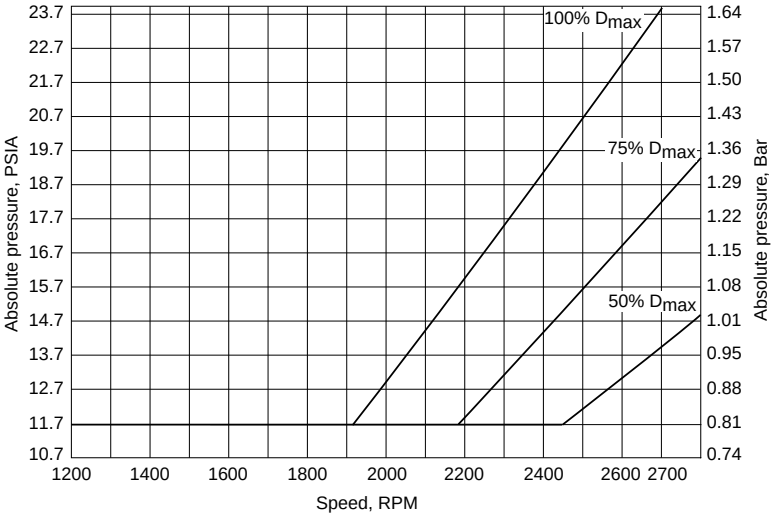
VOLUMETRIC EFFICIENCY @ FULL STROKE



FLOW VS PRESSURE @ FULL STROKE

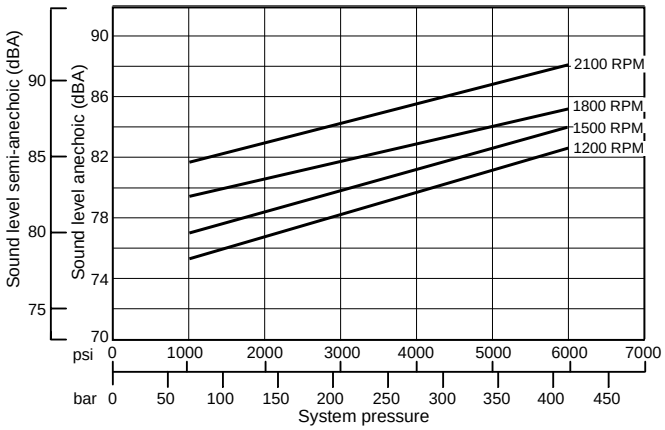


INLET CONDITIONS

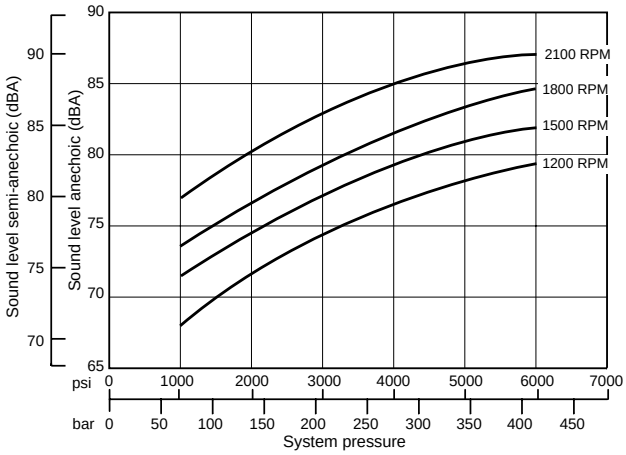


Note: The absolute inlet pressure is the pressure required to fill the pump with petroleum based fluids. The maximum pressure in the inlet port is 200 psi, 14 bar. For unboosted systems, the diameter of the suction line must be sized to allow a maximum velocity not higher than 4 ft/sec., 1,22 m/sec. A coarse screen may be considered in the suction line, no filter. For water in oil invert emulsions and water glycols increase the inlet absolute pressure by 25%, for phosphate ester increase the absolute inlet pressure by 35%. Any inlet pressures above atmospheric may increase noise levels and decrease efficiencies noted in this literature. Please consult your nearest Denison Office for further details.

SOUND PRESSURE LEVEL (dBA) @FULL STROKE

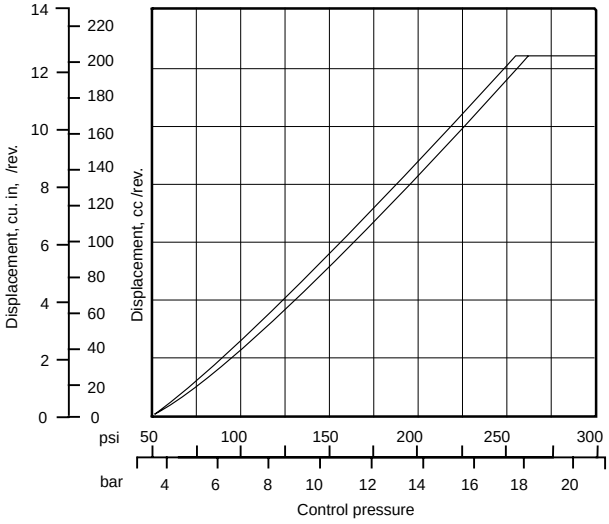


SOUND PRESSURE LEVEL (dBA) COMPENSATED

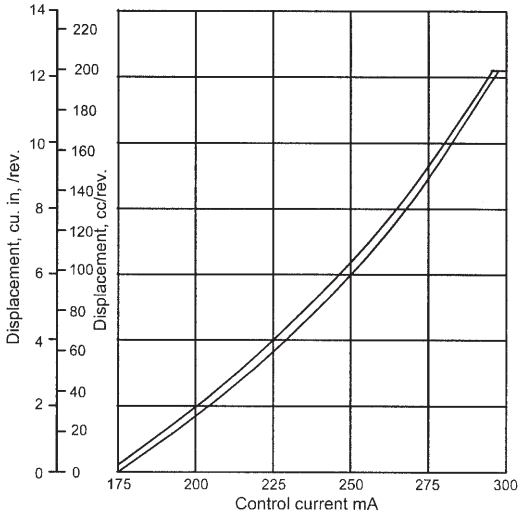


Note: Pump acoustical data was determined in accordance with ANSI/B93.71M, Hydraulic Fluid Power Pumps test code for the determination of airborne noise levels. Semi-anechoic values are presented according to the standard. Anechoic values are calculated for comparison with DIN 45635, part 1. The DIN standards measures sound levels over different surface areas so comparisons are not exact.

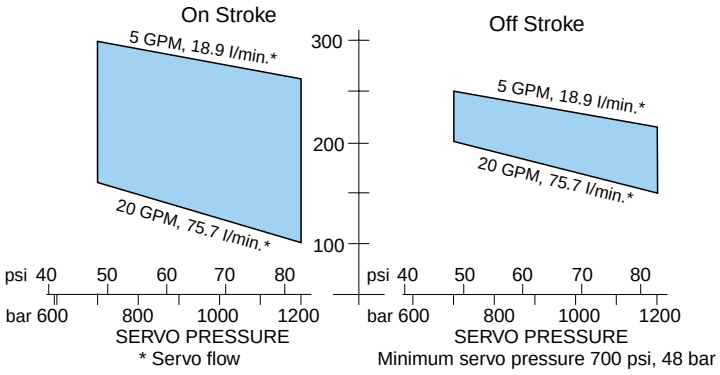
HYDRAULIC STROKER



ELECTROHYDRAULIC STROKER (24 VOLT)

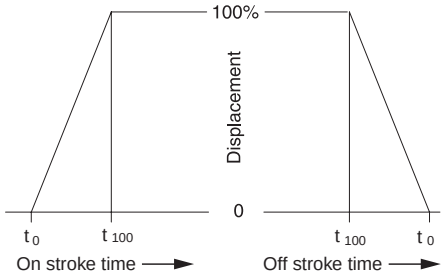


STROKER RESPONSE VS SERVO PRESSURE, SERVO FLOW



* Servo flow

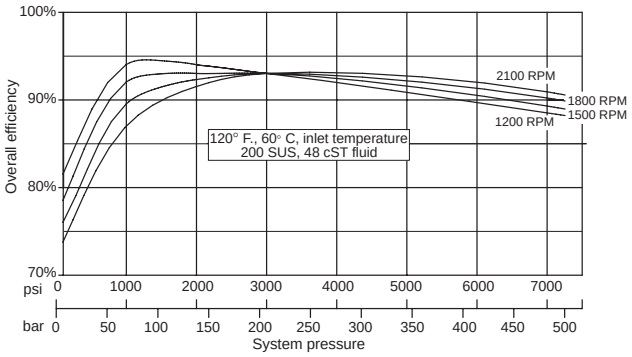
Minimum servo pressure 700 psi, 48 bar



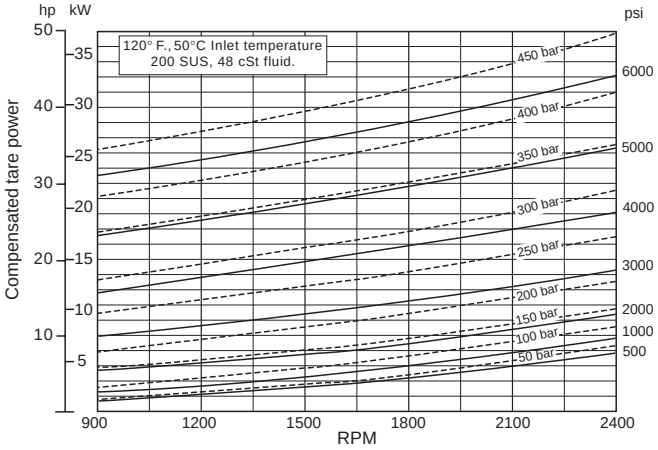
* See page 4 for values of t

Ordering Code | Back to Content

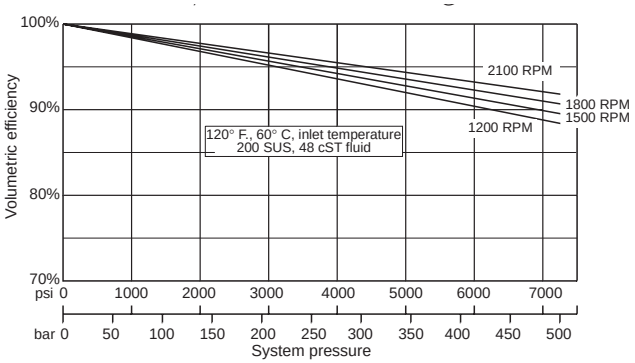
OVERALL EFFICIENCY @ FULL STROKE



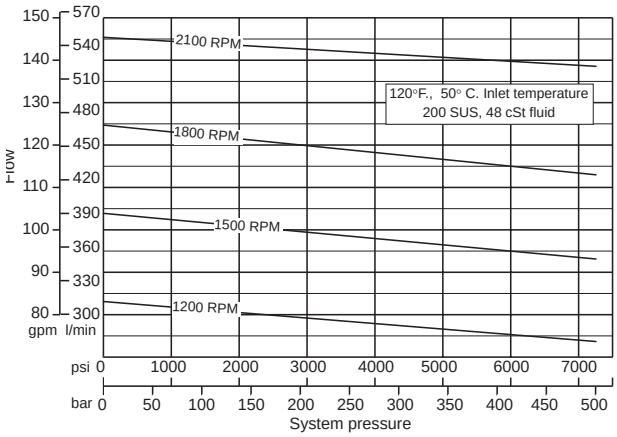
COMPENSATED TARE POWER



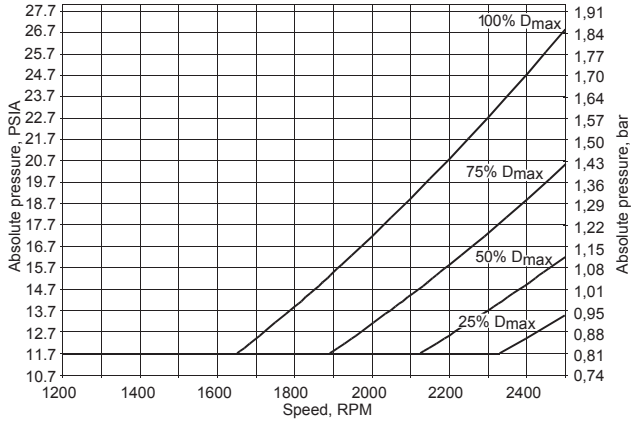
VOLUMETRIC EFFICIENCY @ FULL STROKE



FLOW VS PRESSURE @ FULL STROKE

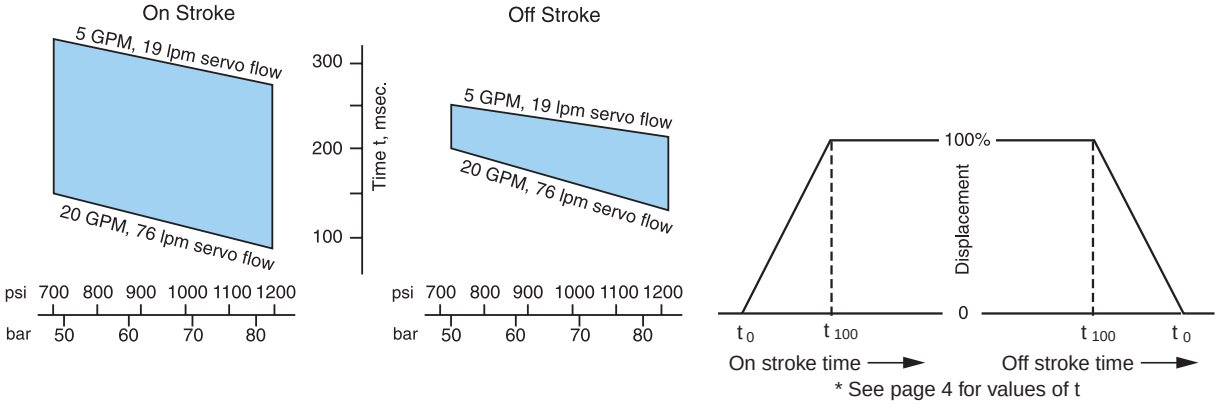


INLET CONDITIONS



Note: The absolute inlet pressure is the pressure required to fill the pump with petroleum based fluids. The maximum pressure in the inlet port is 200 psi, 14 bar. For unboosted systems, the diameter of the suction line must be sized to allow a maximum velocity not higher than 4 ft/sec., 1,22 m/sec. A coarse screen may be considered in the suction line, no filter. For water in oil invert emulsions and water glycols increase the inlet absolute pressure by 25%, for phosphate ester increase the absolute inlet pressure by 35%. Any inlet pressures above atmospheric may increase noise levels and decrease efficiencies noted in this literature. Please consult your nearest Denison Office for further details.

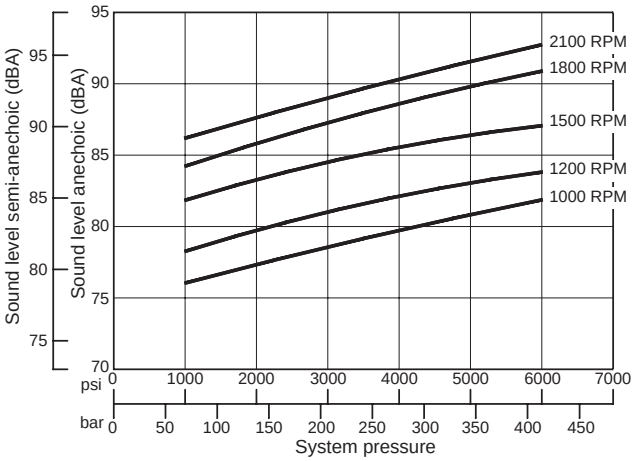
STROKER RESPONSE VS SERVO PRESSURE, SERVO FLOW



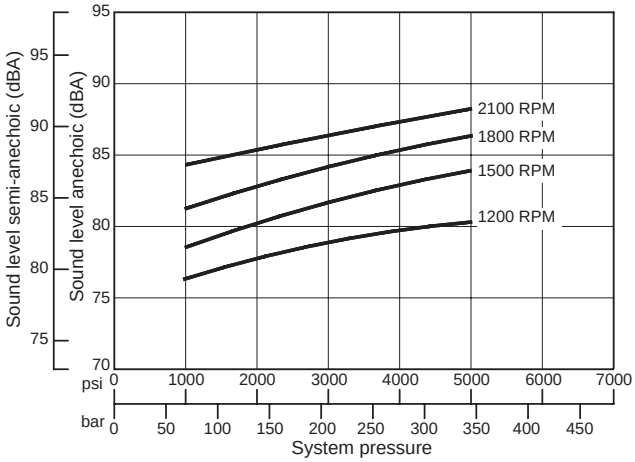
* See page 4 for values of t

Ordering Code | Back to Content

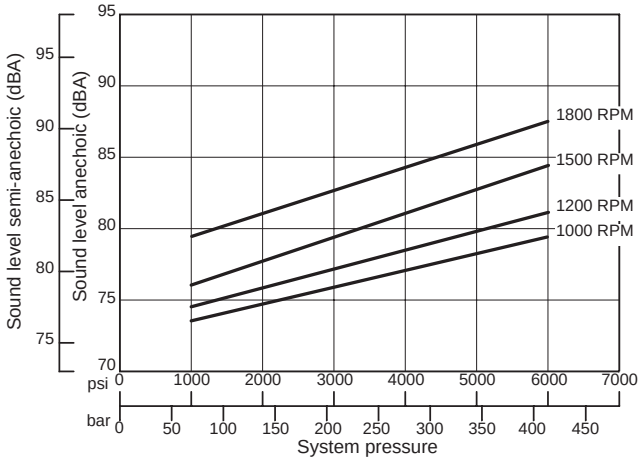
SOUND PRESSURE LEVEL (dBA) @FULL STROKE P16 H



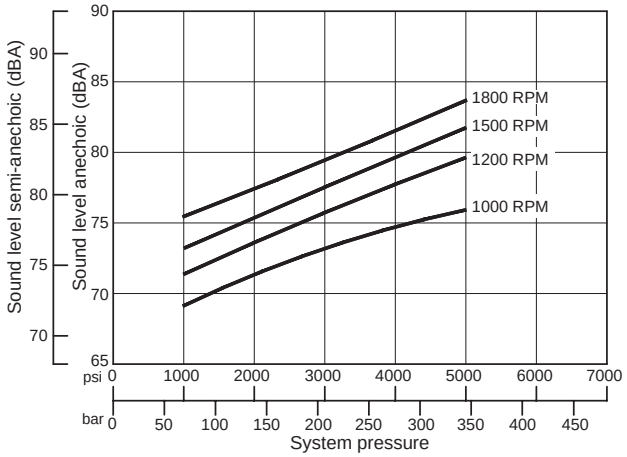
SOUND PRESSURE LEVEL (dBA) COMPENSATED P16H



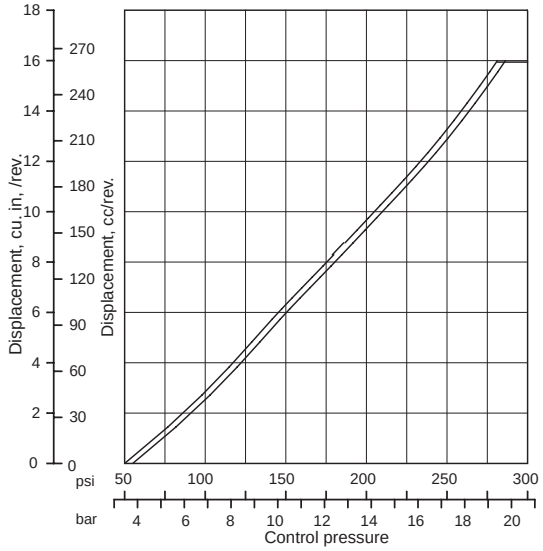
SOUND PRESSURE LEVEL (dBA) @FULL STROKE P16Q



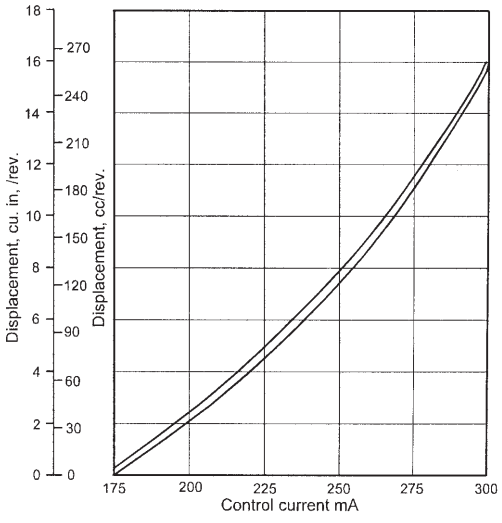
SOUND PRESSURE LEVEL (dBA) COMPENSATED P16Q



HYDRAULIC STROKER

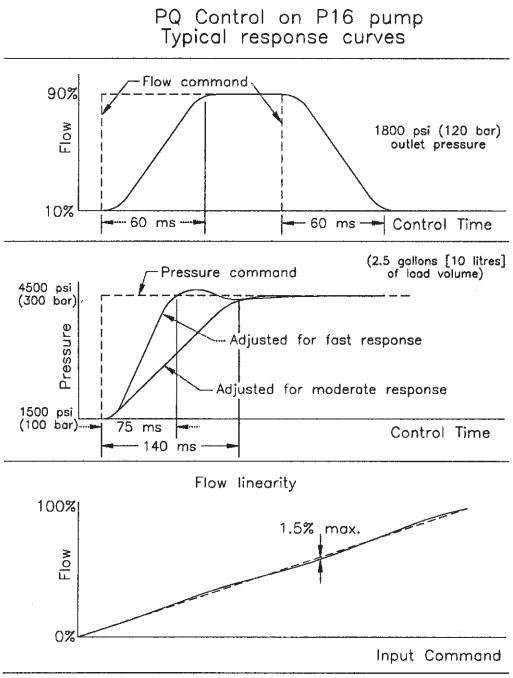


ELECTROHYDRAULIC STROKER (24 VOLT)



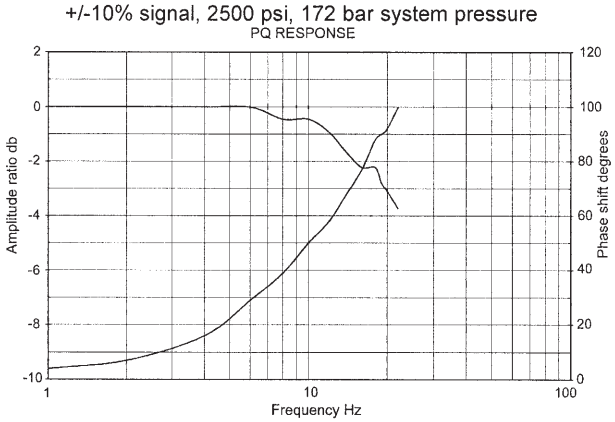
Ordering Code | Back to Content

TYPICAL RESPONSE CURVES



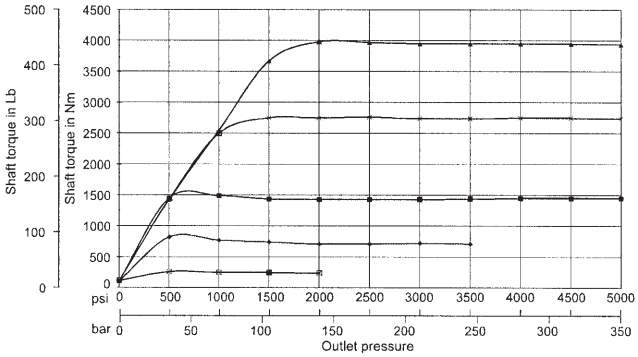
FREQUENCY RESPONSE

+/-10% signal, 2500 psi, 172 bar system pressure

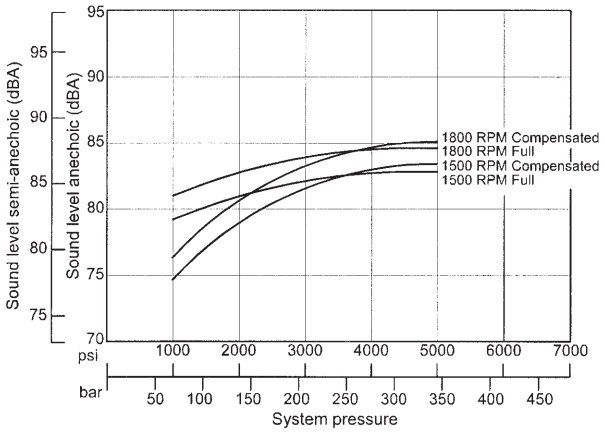


CONTROL FLOW OF 20 GPM (80 LPM) IS REQUIRED FOR OPTIMAL FREQUENCY RESPONSE.

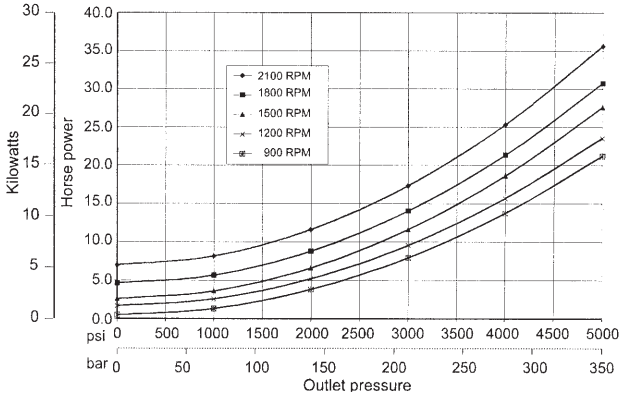
PQ CONTROL WITH TORQUE LIMITING



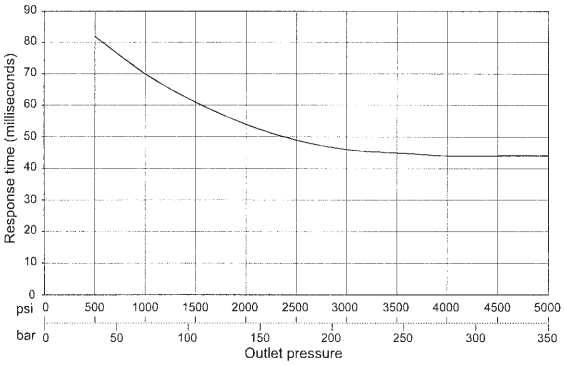
SOUND PRESSURE LEVEL



COMPENSATED TARE POWER

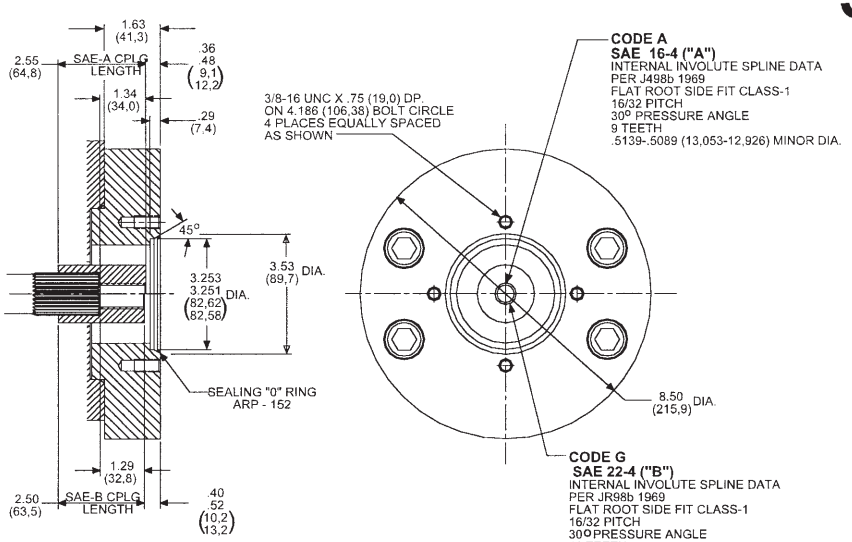


RESPONSE TIME VS OUTLET PRESSURE

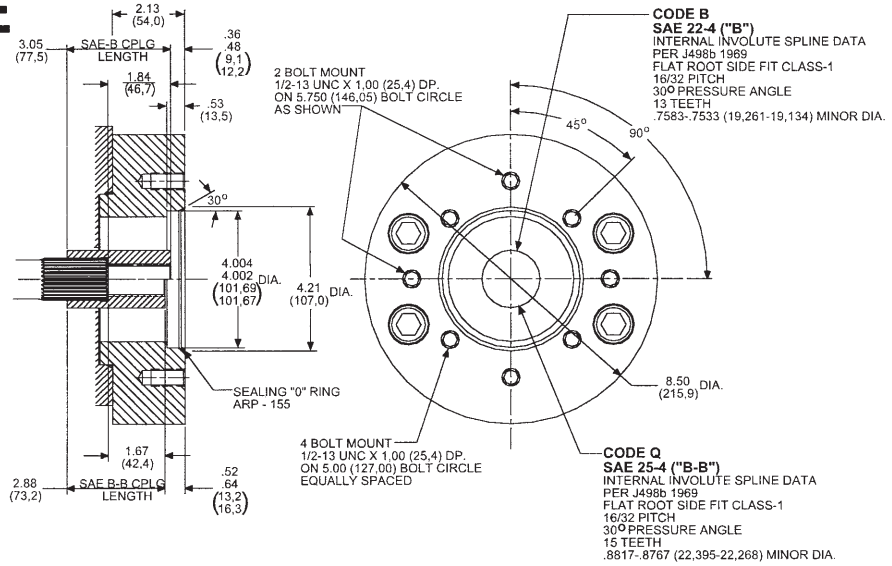


Ordering Code
Back to Content

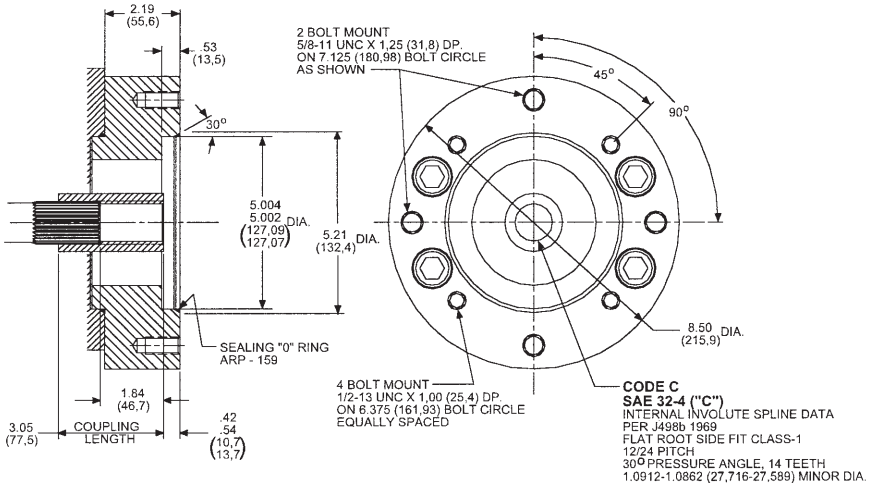
SAE



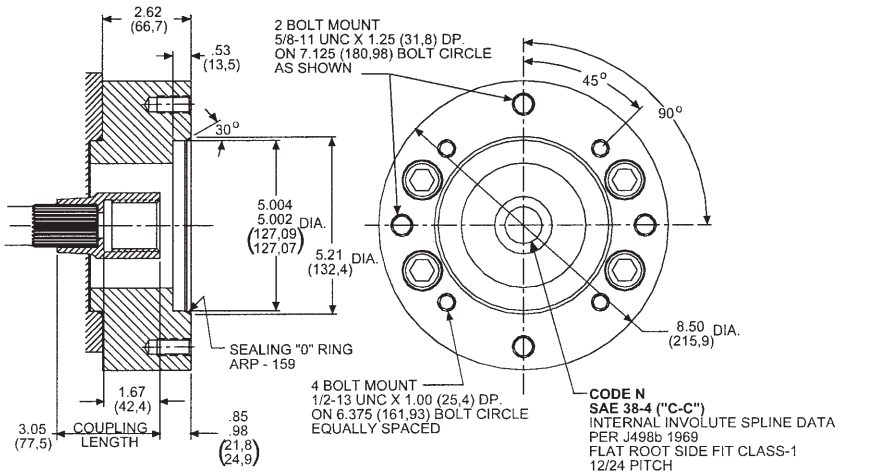
SAE 82-2 ("A" 2 bolt)
SAE 82-2 ("A" with "B" coupling)



SAE 101-2 ("B" & "B-B" 2 bolt)
SAE 101-4 ("B" & "B-B" 4 bolt)

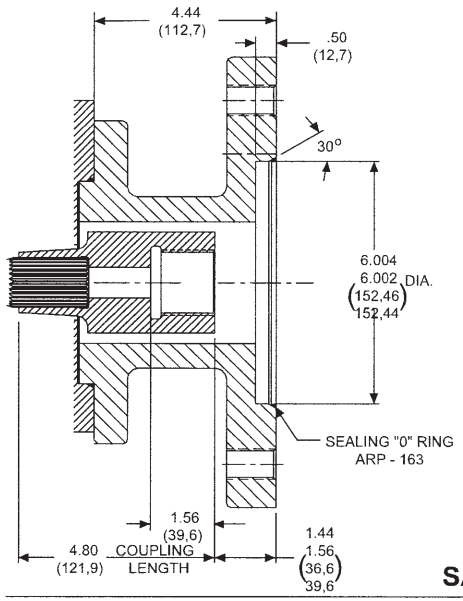


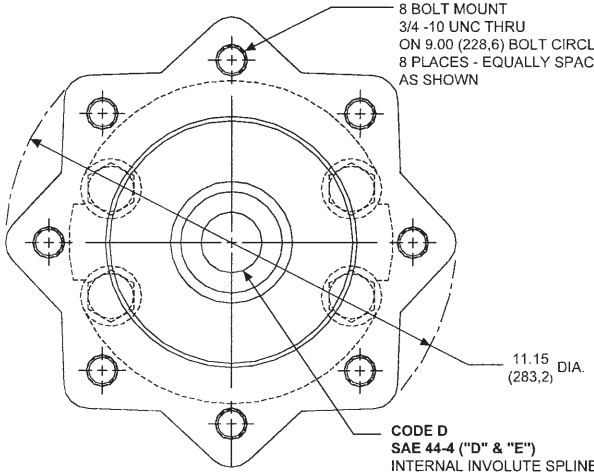
SAE 127-2 ("C" 2 bolt)
SAE 127-4 ("C" 4 bolt)



SAE 127-2 ("C-C" 2 BOLT)
SAE 127-4 ("C-C" 4 BOLT)

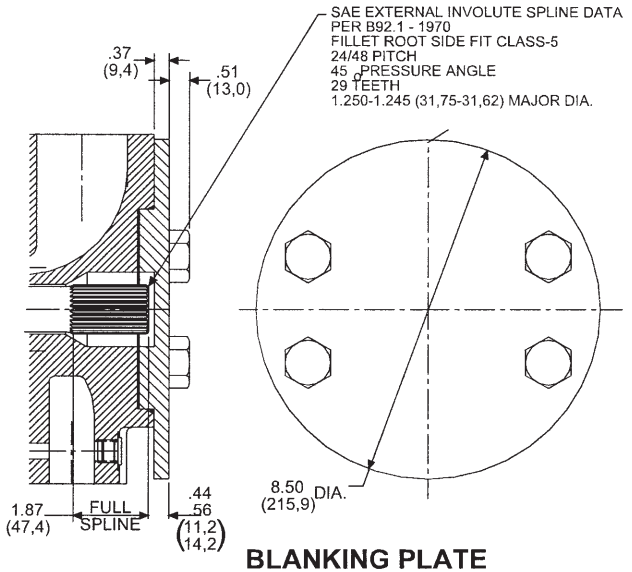
SAE



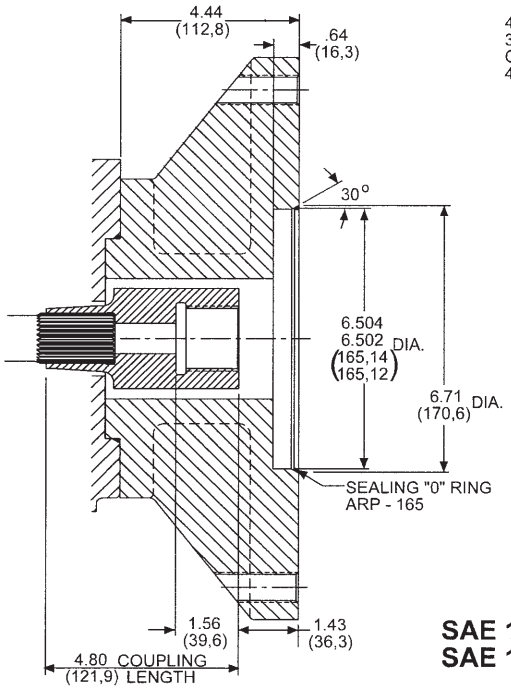


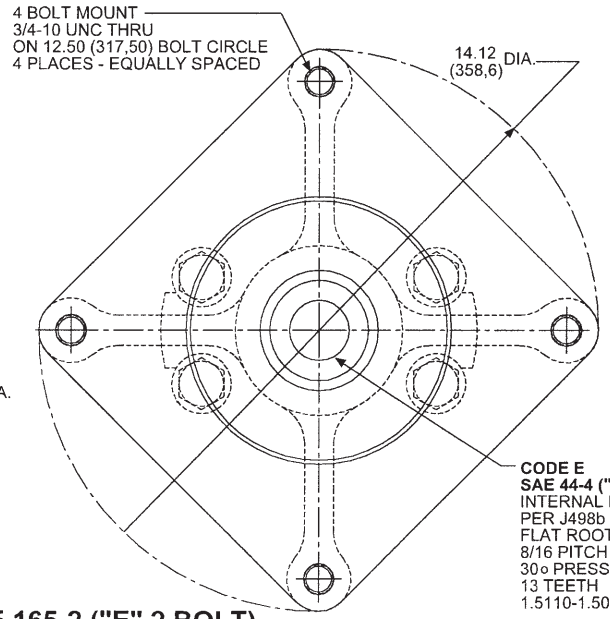
CODE D
SAE 44-4 ("D" & "E")
INTERNAL INVOLUTE SPLINE DATA
PER J498b 1969
FLAT ROOT SIDE FIT CLASS 1, 8/16 PITCH
30° PRESSURE ANGLE, 13 TEETH
1.5110-1.5060 (38,379-38.252) MINOR DIA.

SAE 152-4 ("D" 4 BOLT)



BLANKING PLATE

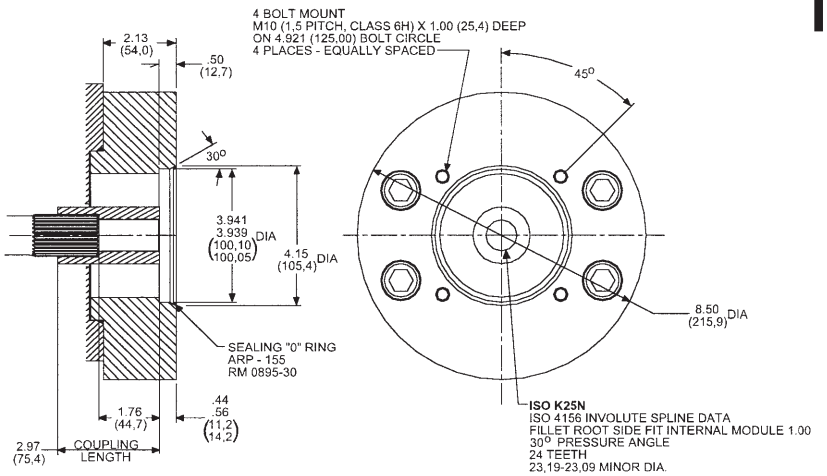




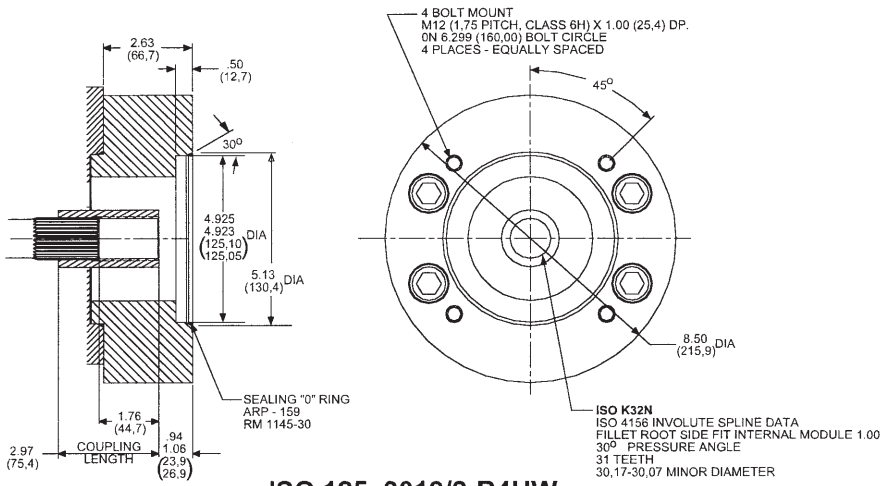
CODE E
SAE 44-4 ("D" & "E")
INTERNAL INVOLUTE SPLINE DATA
PER J498b 1969
FLAT ROOT SIDE FIT CLASS-1
8/16 PITCH
30o PRESSURE ANGLE
13 TEETH
1.5110-1.5060 (38,379-38,252) MINOR DIA.

SAE 165-2 ("E" 2 BOLT)
SAE 165-4 ("E" 4 BOLT)

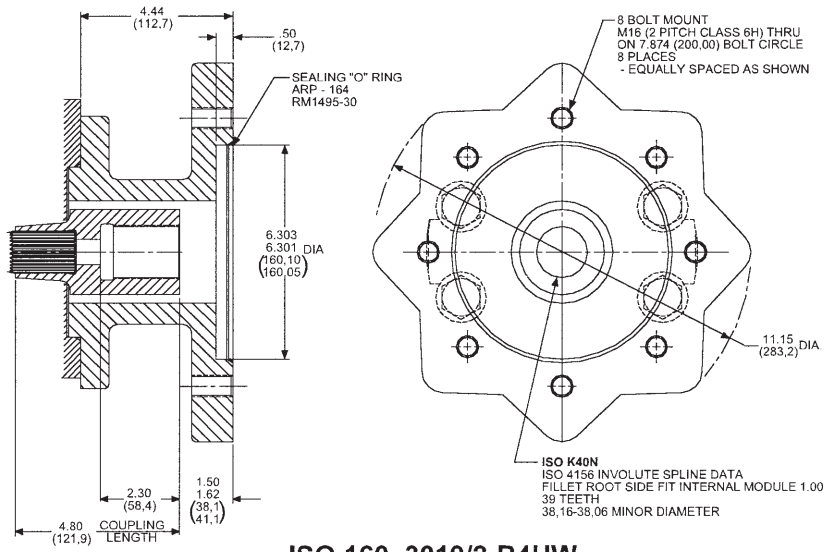
ISO



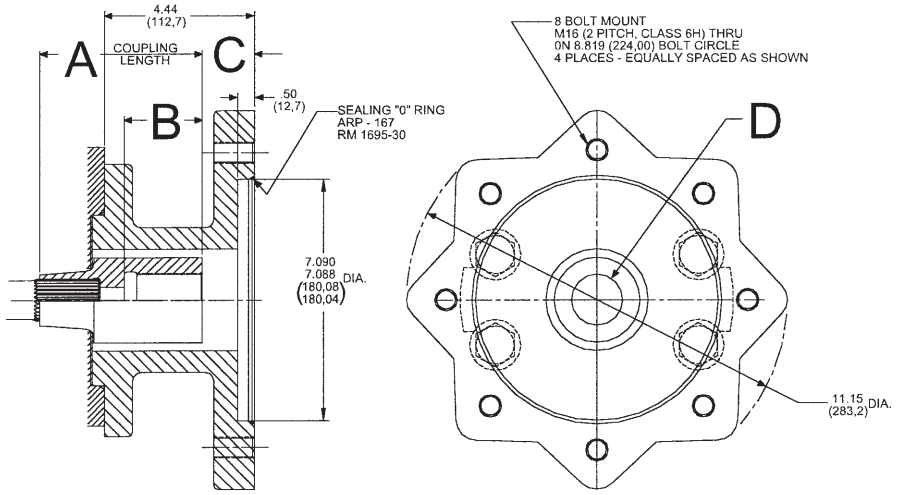
ISO 100 3019/2-B4HW



ISO 125 3019/2-B4HW



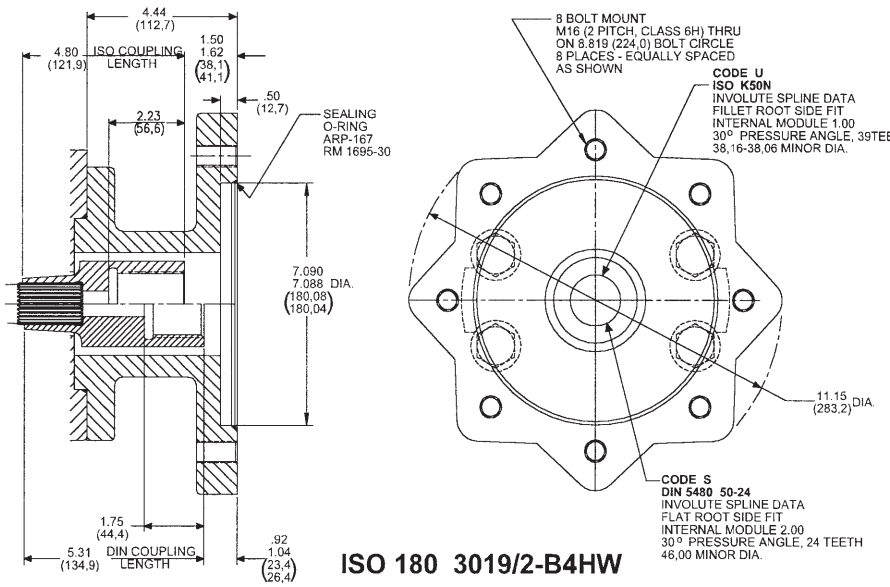
ISO 160 3019/2-B4HW



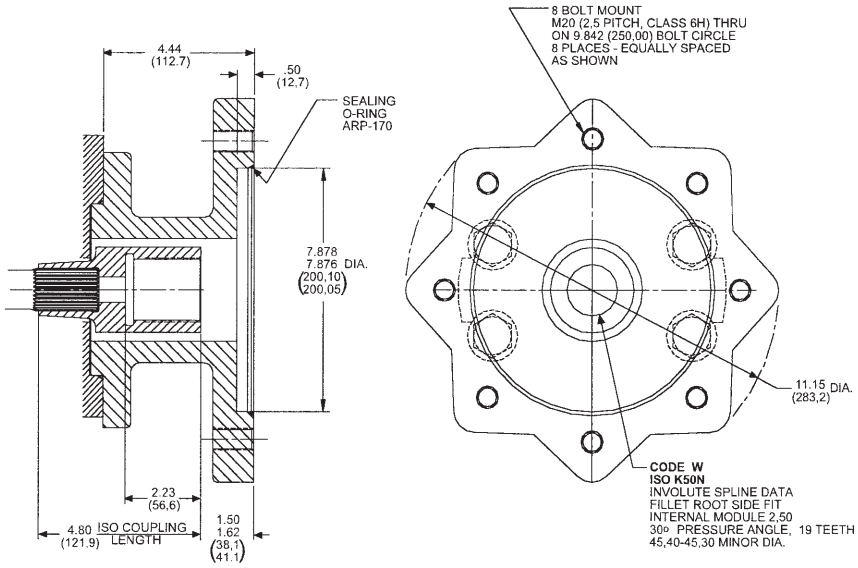
SHAFT	A	B	C	D
ISO K40N CODE "T"	4.80 (121,9)	2.30 (58,4)	1.50/1.62 (38,1/41,1)	**ISO 4156** INVOLUTE SPLINE FILLET ROOT SIDE FIT MOD. 1 30° PRESSURE ANGLE 39 TEETH 38,16-38,06 MINOR DIA.
DIN 5480 40-18 CODE "L"	5.15 (130,8)	1.19 (30,2)	1.14/1.26 (29,0/32,0)	**DIN 5480** INVOLUTE SPLINE FLAT ROOT SIDE FIT INTERNAL MOD. 2 30° PRESSURE ANGLE 18 TEETH 36,00 MINOR DIA.

ISO 180 3019/2-B4HW

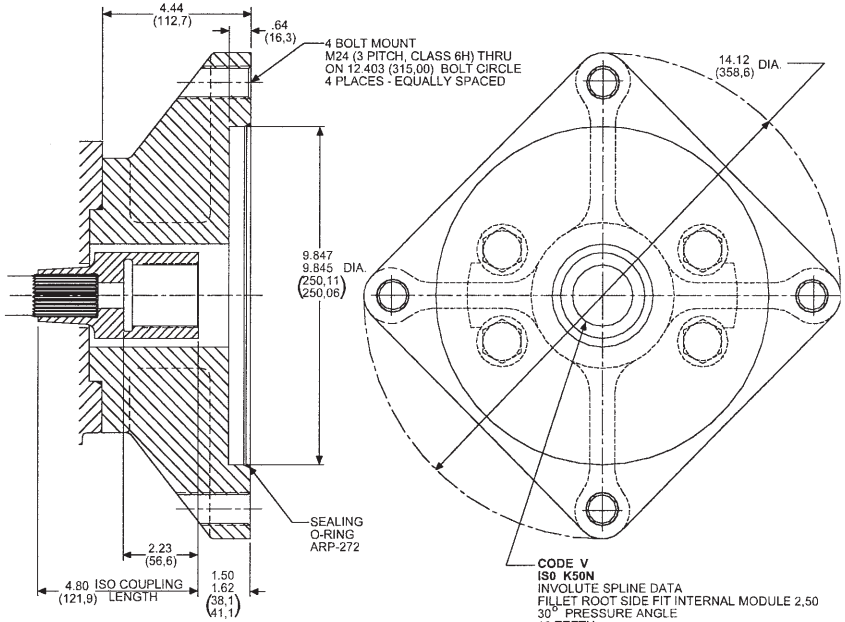
ISO



ISO 180 3019/2-B4HW



ISO 200 3019/2-B4HW

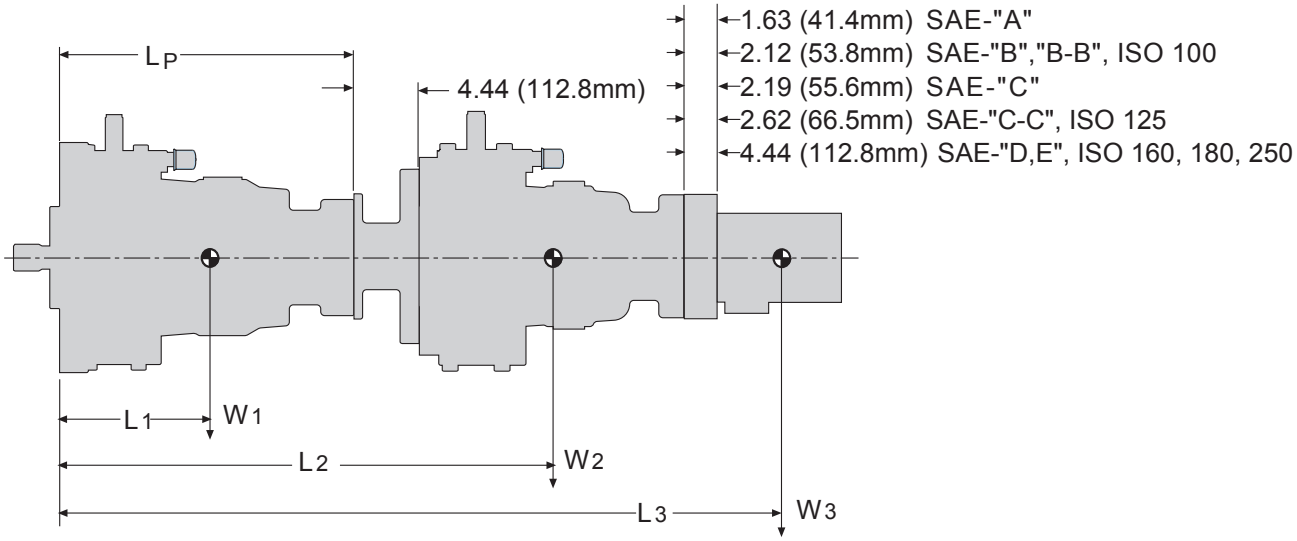


ISO 250 3019/2-B4HW

Ordering Code

Back to Content

MAXIMUM PERMISSIBLE BENDING MOMENT AT MOUNTING FLANGE



M={(L1•W1)+(L2•W2)+(L3•W3)---}•units of acceleration "g"

SERIES	P16	P12	P09	P07	P05
MAXIMUM MOMENT (lb.in.)	14400	10100	8300	6300	5000
WEIGHT - W (pounds)	325	300	220	177	156
DISTANCE - L1 (inches to C/G)	10.4	8.6	8.5	8.0	7.0
DISTANCE - Lp (inches)	18.8	17.2	15.9	14.7	13.4

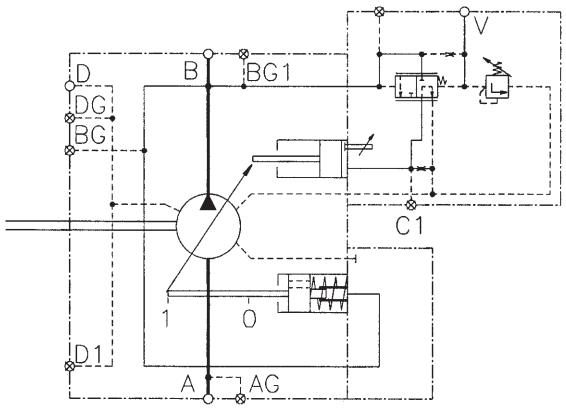
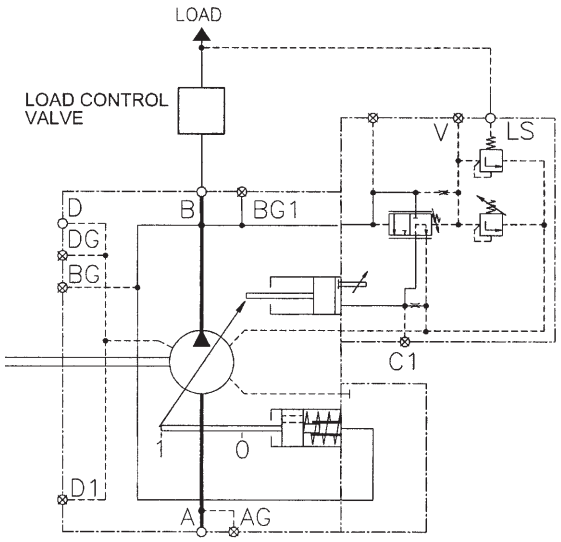
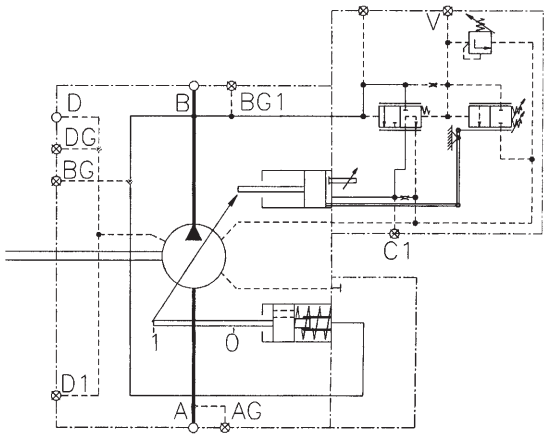
SERIES	P260	P200	P140	P110	P080
MAXIMUM MOMENT (Nm)	1627	1141	938	712	565
WEIGHT - W (Newtons)	1446	1335	981	798	696
DISTANCE - L1 (mm to C/G)	264	218	216	203	178
DISTANCE - Lp (mm)	478	437	404	373	340

VALUES EXCEEDING MAXIMUM MOMENT MUST HAVE ADDITIONAL SUPPORT ON MOUNTED PUMP(S)

Rear drives ordering code options .....(P05-02R1C-C10-**0**0-M2

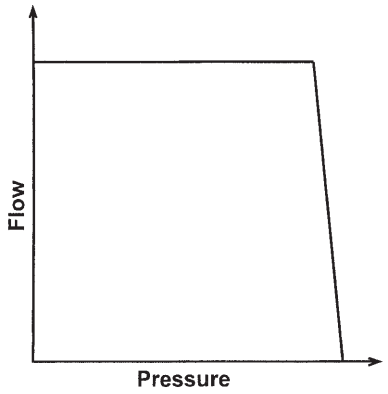
		SAE mounting & coupling								ISO & DIN mounting & coupling									
Mounting coupling	None / plugged	A A	A B	B B	B B/B	C C	C CC	D D/E	E DE	100B4 K25N	125B4 K32N	160B4 K40N	180B4 K40N	180B4 K50N	180B4 DIN40-18	180B4 DIN50-24	200B4 K50N	224B4 K50N	250B4 K50N
P05/P080	0 / M	A	G	B	Q	C	N	D	-	Z	Y	X	T	-	L	-	-		-
P07/P110	0 / M	A	G	B	Q	C	N	D	-	Z	Y	X	T	-	L	-	-		-
P09/P140	0 / M	A	G	B	Q	C	N	D	-	Z	Y	X	T	U	L	S	-		-
P12/P200	0 / M	A	G	B	Q	C	N	D	E	Z	Y	X	T	U	L	S	W	R	-
P16/P260	0 / M	A	G	B	Q	C	N	D	E	Z	Y	X	T	U	L	S	W	R	V
S	**.88**	**1.63**		**2.13**		**2.19**	**2.62**	**4.44**		**2.13**	**2.63**	**4.44**							
S	*22,4*	*41,4*		*54,0*		*55,6*	*66,6*	*112,7*		*54,0*	*66,8*	*112,7*							

NOTE: Items in **bold** are SAE version and inches, ***Italic*** dimensions are in millimeters
For more detailed information refer to the individual pump installation drawings. These are available on CD, contact your nearest sales representative or distributor.

CODE	DESCRIPTION	HYDRAULIC CIRCUIT
C	PRESSURE COMPENSATOR	
L	LOAD SENSING CONTROL	
J & K	TORQUE LIMITER WITH PRESSURE COMPENSATOR	

TYPICAL PERFORMANCE

Minimum compensating pressure 250 PSI, 17,2 bar, pilot flow 115 in^3/min. (1.9 L/min).

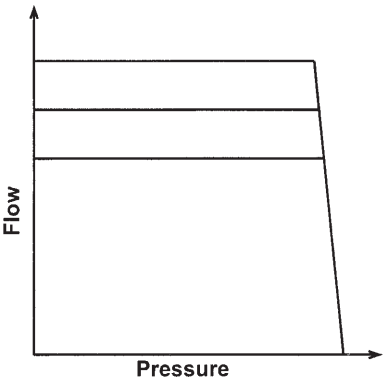


DESCRIPTION OF OPERATION

When the pump operating pressure is below the compensator setting, a spring plus a piston pushes the stroking piston and the hanger toward full stroke. The stroking cylinder is connected to the case drain via the compensator spool. When the pump operating pressure reaches the compensator pressure setting, the pilot valve opens and a pressure drop is created over the orifice, causing the compensator spool to move against the spring force, directing pump discharge pressure to the stroking cylinder. The pump will destroke to maintain set pressure.

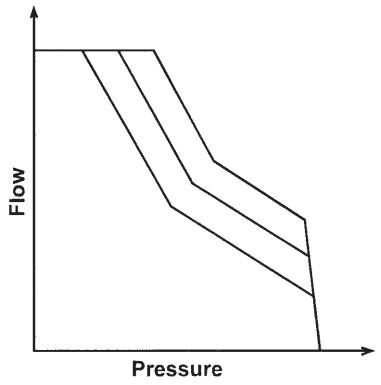
When the pump operating pressure decreases below the compensator setting, the pilot valve will close and the compensator spool will move under spring force to its offset position, connecting the stroking cylinder to case. The spring plus the piston will move the stroking piston toward full displacement.

RESPONSE TIMES		
	Off stroke time	on stroke time
P05/P80	0.06	0.11
P07/P110	0.07	0.13
P09/P140	0.06	0.11
P12/P200*	0.09	0.15
P16/P260	0.10	0.15



The "L" compensator utilizes a modulating valve to isolate the load from compensator pilot flow. The load sensing port detects the load pressure and establishes the pressure on the vent port of the compensator at 50 psi, 3,4 bar above the load pressure. By adjusting the differential pressure across the compensator spool, the compensator establishes pump outlet pressure at 200 to 350 psi, 13,8 to 24,1 bar above the load pressure.

The customer valve, by metering pump flow at a fixed pressure drop, becomes a flow control. The pump supplies only the required flow, at 200 to 350 psi, 13,8 to 24,1 bar above the load pressure.



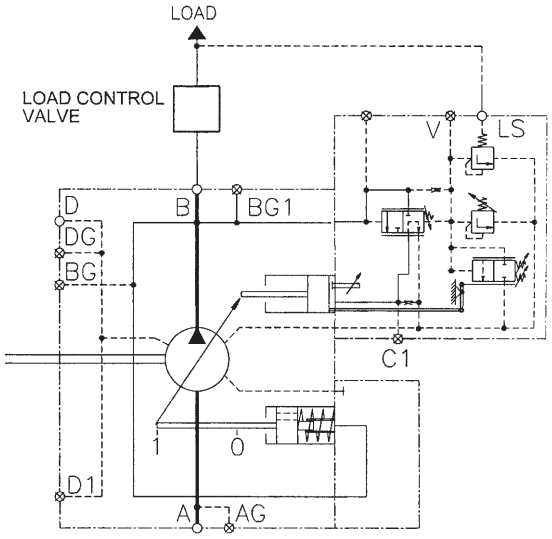
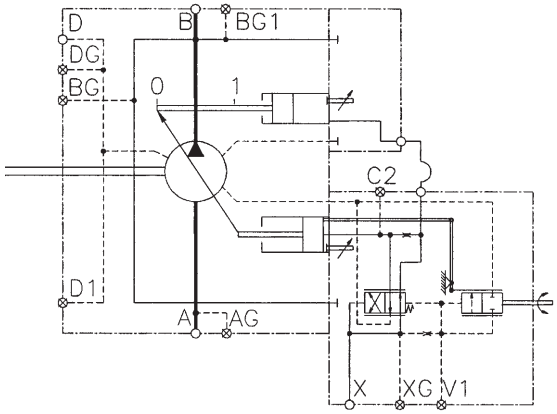
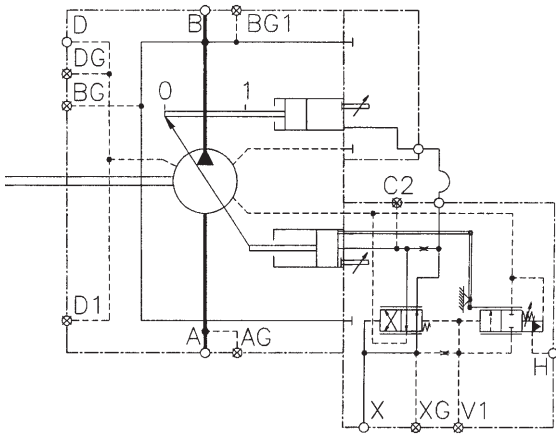
The torque limiter is mounted on the control piston cap, full stroke side. One side of the spool is connected to the vent port of the compensator, the other to case. As system pressure increases, force on the spool overcomes the spring force shifting the spool to allow the flow to bleed off to case. This maintains the pressure and spring forces on the compensator spool. Once the system pressure overcomes the pressure plus spring force the compensator spool shifts and the pump begins to reduce displacement.

Once the displacement is reduced, a higher pressure is required to overcome the compensator spring load at this new position. Thereby, pressure and pump stroke are inversely related.

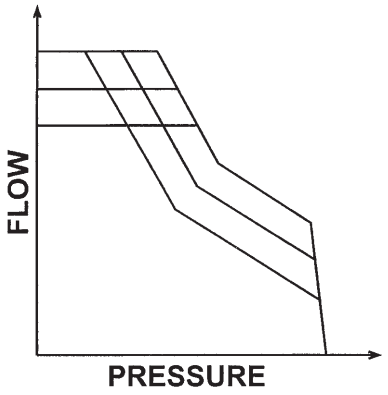
The slope of the pressure/stroke curve is determined by the spring rate. At low pressure a single spring is in contact with the spool. As pressure increases, a second spring joins the first to increase the rate of change of pressure vs. stroke. To cover a range of torques, two versions are offered, "J" for low torque values and "K" for high. Maximum pressure limits are controlled by the compensator settings.

Torque values for Torque Limiter and Torque Limiter Override controls

Model	J or V				K or W			
	Min.		Max.		Min.		Max.	
	lb.-in.	Nm	lb.-in.	Nm	lb.-in.	Nm	lb.-in.	Nm
P05/080	800	90	1500	170	1500	170	3500	396
P07/110	1100	124	1850	209	1850	209	5300	599
P09/140	1400	158	2200	249	2200	249	6000	678
P12/200	1850	209	3400	384	3400	384	8000	905
P16/260	2500	283	6000	678	6000	678	10000	1129

CODE	DESCRIPTION	HYDRAULIC CIRCUIT
V & W	TORQUE LIMITER WITH LOAD SENSING PRESSURE COMPENSATOR	
R	MANUAL ROTARY SERVO	
H	HYDRAULIC STROKER	

TYPICAL PERFORMANCE



DESCRIPTION OF OPERATION

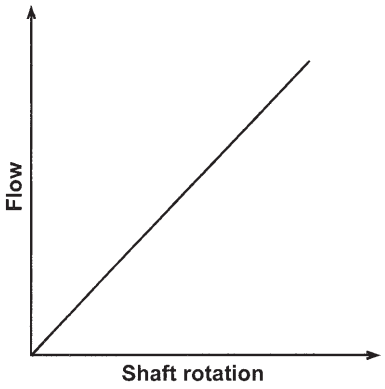
The V and W control offers the ability to control the torque and still operate as load sensing. The control operates as a load sense up to the point where pressure and flow cause torque to exceed the torque limiter setting. At this point the torque limiter destrokes the pump to the given setting. A modulating valve on the vent line isolates the load from compensator pilot flow; therefore protecting any sensitive valves that may be in the system.

The V control is for low torque, and the W control is for high torque. Remote control of the pressure compensator of the torque limiter is also possible. The maximum pressure limit is controlled by the compensator setting.

Torque values for Torque Limiter and Torque Limiter Override controls

Model	J or V				K or W			
	Min.		Max.		Min.		Max.	
	lb.-in.	Nm	lb.-in.	Nm	lb.-in.	Nm	lb.-in.	Nm
P05/080	800	90	1500	170	1500	170	3500	396
P07/110	1100	124	1850	209	1850	209	5300	599
P09/140	1400	158	2200	249	2200	249	6000	678
P12/200	1850	209	3400	384	3400	384	8000	905
P16/260	2500	283	6000	678	6000	678	10000	1129

Maximum servo pressure 1500 psi, 103 bar

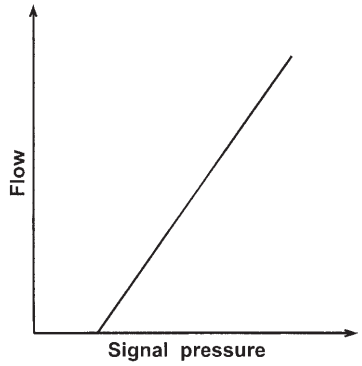


The manual rotary servo control is located on the control piston cap, minimum stroke side. A shaft, when rotated, causes linear motion on a spool. The spool contains a passage which is opened or blocked by a sleeve. This passage meters pilot flow on one end of a four-way valve. The sleeve is connected by a linkage to the control piston. The four-way valve connects servo and tank to the control piston, causing motion in the direction to follow the motion of the spool.

Backlash is minimized by spring loading on the linkages. Stroke time is affected by servo pressure, system pressure, and servo flow. Maximum servo pressure is 1500 psi, 103 bar.

Servo shaft rotation, zero to full stroke

P05/080	P07/110	P09/140	P12/200	P16/260
47-52º	47-52º	52-57º	60-65º	65-70º

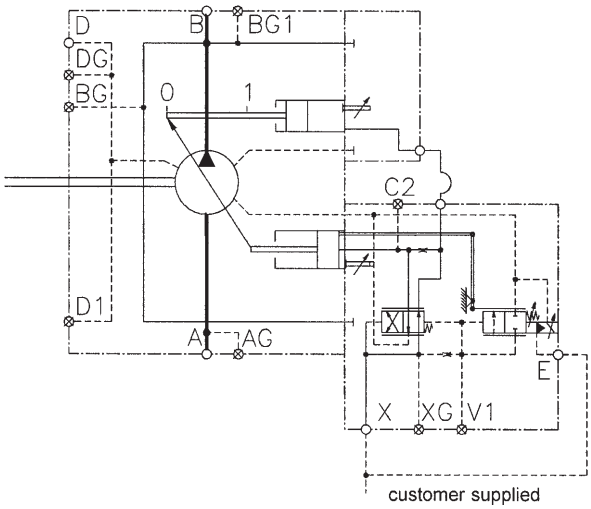
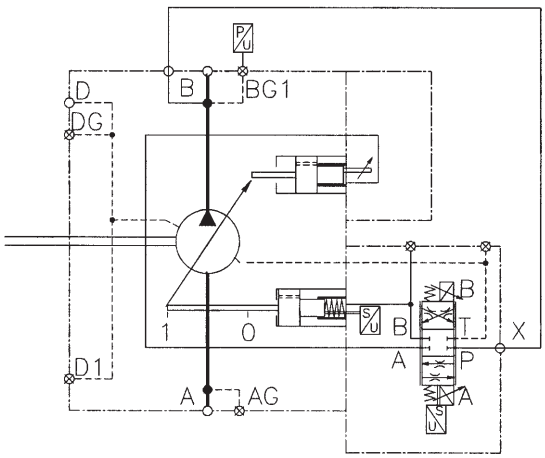


The hydraulic stroker control is located on the control piston cap, minimum stroke side. The hydraulic stroker is obtained by replacing the rotary servo shaft and cam mechanism of the rotary servo configuration with a spring loaded hydraulic piston coupled to the spool. The piston is spring biased to initially stroke the pump to zero displacement. Pilot pressure applied to the piston causes the spool to move in proportion to pressure, thereby causing the pump to go on stroke in proportion to pilot pressure. Typical hysteresis is 7%.

Maximum pilot pressure in the control port is 1000 psi, 70 bar. Maximum servo pressure is 1500 psi, 103 bar.

Hydraulic stroker signal pressure vs stroke

	P05/080	P07/110	P09/140	P12/200	P16/260
zero stroke psi	**50**	**50**	**50**	**50**	**50**
zero stroke bar	*3,4*	*3,4*	*3,4*	*3,4*	*3,4*
full stroke psi	**225**	**232**	**245**	**272**	**283**
full stroke bar	*15,4*	*16*	*16,9*	*18,8*	*19,5*

CODE	DESCRIPTION	HYDRAULIC CIRCUIT
E	**ELECTRIC STROKER**	
X	**PQ CONTROL** **(available soon on all models)**	

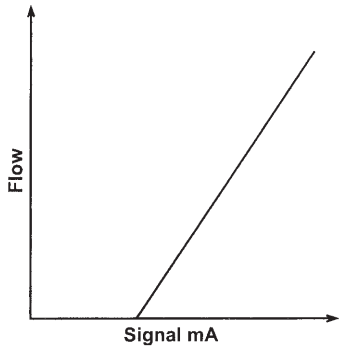
PRIMARY CONTROL OPTIONS
MAXIMUM VOLUME SCREW
code 1

The standard maximum volume stop is an adjustment screw. To reduce volume, remove the plug on the end of the cover, loosen the cover, and turn the adjusting screw clockwise.

HANDWHEEL MAXIMUM VOLUME STOP
code 2

An optional handwheel maximum volume stop is available on the pressure compensator, load sensing and torque limiter controls. To reduce volume, loosen the locknut below the handwheel and turn the handwheel clockwise.

TYPICAL PERFORMANCE	DESCRIPTION OF OPERATION



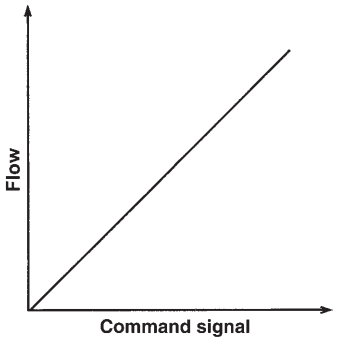
The electric stroker consists of the hydraulic stroker with an electrically modulated pressure control valve mounted. Pump stroke may be controlled with an electrical signal which con trols the pressure to the control port of the hydraulic stroker.

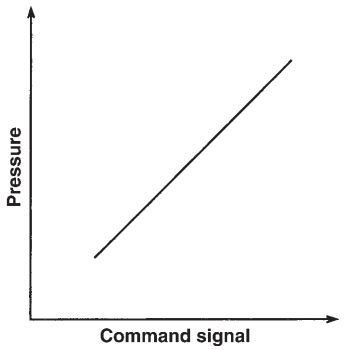
Servo pressure, not to exceed 1500 psi, (103 bar) is supplied to the inlet port on the electri cally modulated pressure control valve. The Jupiter Driver card, S20-14078 or the Micro Proportional Driver plug, S20-14116 may be used to control the electric stroker. A 12 Volt coil is also available.

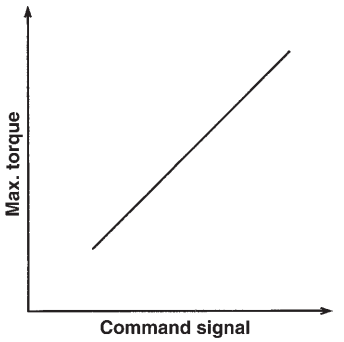
Typical hysteresis 5%.

Electrohydraulic stroker signal mA vs stroke

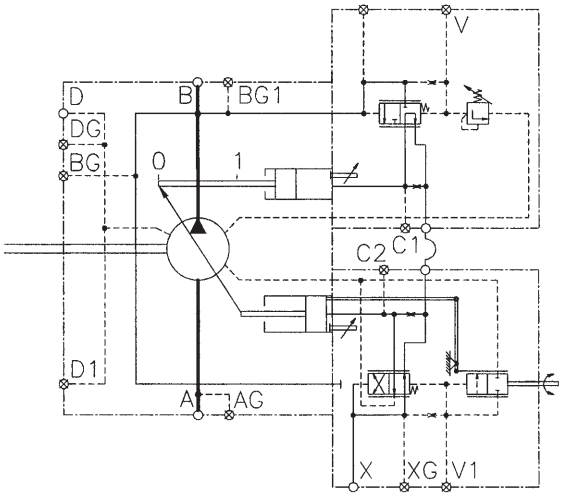
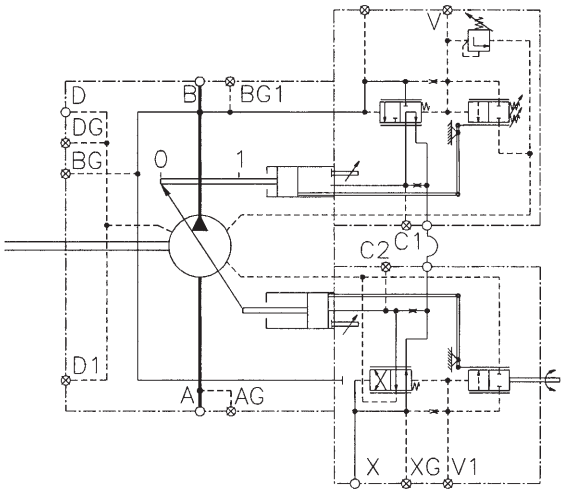
	P05/080	P07/110	P09/140	P12/200	P16/260
zero stroke mA, 24 vdc	175	175	175	175	175
zero stroke mA, 12 vdc	350	350	350	350	350
full stroke mA, 24 vdc	273	276	283	295	300
full stroke mA, 12 vdc	546	552	566	590	600



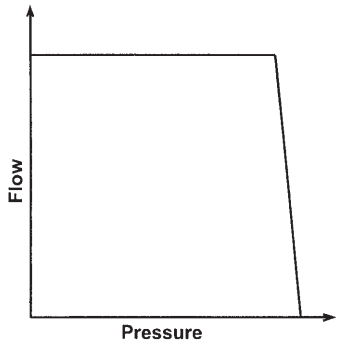


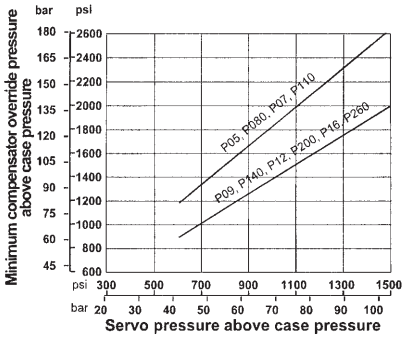


The PQ Control provides very rapid electronic control of displacement for high performance requirements. A proportional valve directs oil from the pump outlet to the control piston, and from the opposite end of the control piston to reservoir. The PQ Driver card S22-14133 has been designed to control the PQ control. Feedback signals of valve position, pump dis-placement, and system pressure are compared with set values to limit pump displacement, pressure and input torque to the set values. A flange mounted preload valve and system relief valve, S26-86840, has been designed to maintain the required minimum control pressure of 300 psi, 20,7 bar and to also provide pressure control in case of electrical malfunction. Control pressure may also be provided from an external source to port “X”.

CODE	DESCRIPTION	HYDRAULIC CIRCUIT
E1P H1P R1P	COMPENSATOR OVERRIDE	
E1J E1K H1J H1K R1J R1K	TORQUE LIMITER OVERRIDE, INCLUDING PRESSURE COMPENSATOR OVERRIDE	

TYPICAL PERFORMANCE

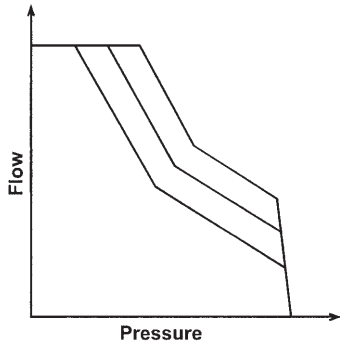


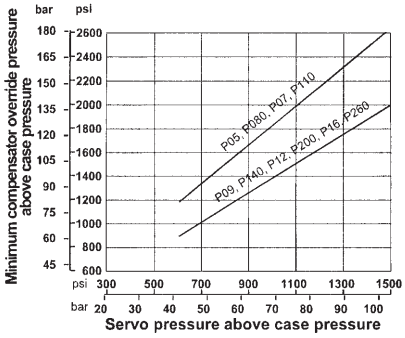


DESCRIPTION OF OPERATION

The pressure compensator override is located in the control piston cap, full stroke side. It may be installed with any of the three position controls, (servo, hydraulic, or electrohydraulic stroker). When pressure exceeds compensator setting, the compensator override ports system pressure into the off-stroke side of the control cylinder and blocks that flow path to the servo, hydraulic or electrohydraulic stroker. When system pressure is below the compensator override setting, the primary control functions to control pump stroke. Compensator override pressure must be sufficient to overcome servo pressure applied to the opposite side of the control piston.

RESPONSE TIMES, sec. at 800 psi (55 bar) servo pressure	Off stroke time	on stroke time
P05/P80	0.06	.20
P07/P110	0.07	.20
P09/P140	0.06	.25
P12/P200		
P16/P260	0.10	.30





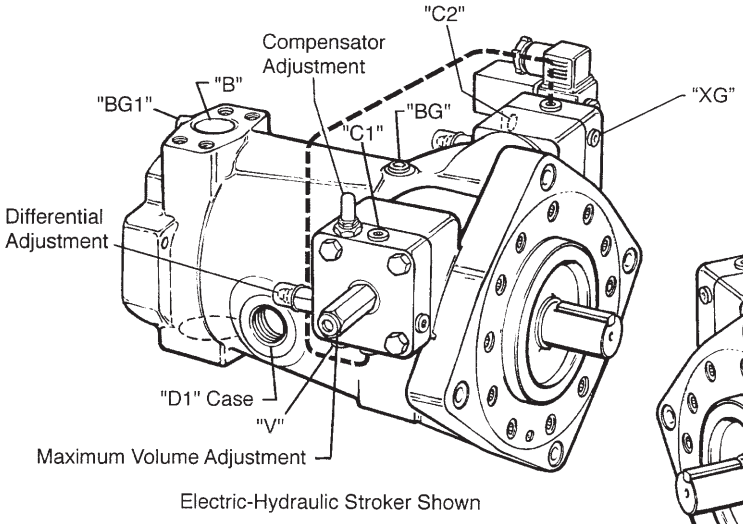
The torque limiter override is located in the control piston cap, full stroke side. It may be installed with any of the three position controls, (servo, hydraulic or electrohydraulic stroker). As with the pressure compensator override, the torque limiter override directs oil into the cylinder to overcome the servo pressure signal on the opposite side, causing the control cylinder to reduce stroke when the torque limiter setting is reached.

Torque values for Torque Limiter and Torque Limiter Override controls

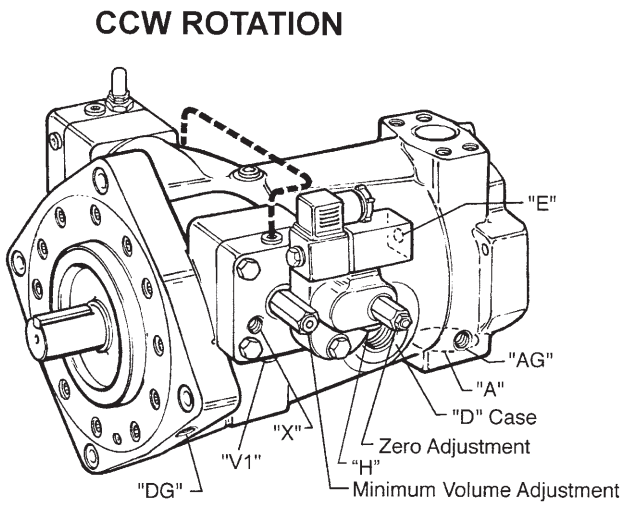
Model	J or V				K or W			
	Min.		Max.		Min.		Max.	
	lb.-in.	Nm	lb.-in.	Nm	lb.-in.	Nm	lb.-in.	Nm
P05/080	800	90	1500	170	1500	170	3500	396
P07/110	1100	124	1850	209	1850	209	5300	599
P09/140	1400	158	2200	249	2200	249	6000	678
P12/200	1850	209	3400	384	3400	384	8000	905
P16/260	2500	283	6000	678	6000	678	10000	1129

Minimum torque limiter override settings as a function of servo pressure

Servo pressure (psi)	P05/080	P07/110	P09/140	P12/200	P16/260	Minimum torque
700			1800	2500	3100	lb.-in
800	1400	1800				lb.-in
1500	2700	3500	3400	4800	6200	lb.-in
Servo pressure (bar)	**P05/080**	**P07/110**	**P09/140**	**P12/200**	**P16/260**	**Minimum torque**
48			203	283	350	Nm
55	158	203				Nm
103	305	396	384	542	701	Nm



Electric-Hydraulic Stroker Shown



Electric-Hydraulic Stroker Shown

FLUID CONNECTIONS

DESCRIPTION

PORT A .....INLET

PORT B .....SYSTEM

PORT C1 .....OFF-STROKE CYL. GAGE

PORT C2 .....ON-STROKE CYL. GAGE

PORT D .....CASE DRAIN

PORT D1 .....CASE DRAIN

PORT DG.....DRAIN GAGE, AIR BLEED PORT

PORT AG.....INLET GAGE

PORT BG.....SYSTEM GAGE

PORT BG1.....ALT. SYS. GAGE

PORT E .....ELECTROHYDRAULIC STROKER SERVO SUPPLY

PORT H .....HYDRAULIC STROKER SIGNAL

PORT LS .....LOAD SENSING LINE (SEE PAGE 10)

PORT V .....COMPENSATOR, TORQUE LIMITER, LOAD SENSING VENT

PORT V .....OVERRIDE COMP, OVERRIDE TORQUE LIMITER VENT

PORT V1 .....SERVO VENT

PORT X .....SERVO SUPPLY

PORT XG.....SERVO GAGE

Series	(**P**05-02R1C-C10-00-M2)			
	P	Pump		
Max. Displacement, cu.in./rev.	(P**05**-02R1C-C10-00-M2)			
	05/080	4.9 in³/rev. / 80,3 cc/rev.		
	07/110	6.7 in³/rev. / 109,8 cc/rev.		
	09/140	8.6 in³/rev, / 140,9 cc/rev.		
	12/200	12.2 in³/rev, / 200,0 cc/rev.		
	16/260	16.0 in³/rev, / 262,2 cc/rev.		
Model (P16 & 260 only)	(P16/260**H**-02R1C-C10-00-M2)			
	H	High speed (for greater than 1800 rpm)		
	Q	Quiet (for 1800 rpm and below)		
Shaft	(P05-**02**R1C-C10-00-M2)			
	02	Keyed SAE 44-1(D&E) (*P05, P07, P09, P12, P16)*		
		ISO 3019/2 G40N (*P080, P110)*		
		ISO 3019/2 G50N (*P140, P200, P260)*		
	03	Splined SAE 44-4 (D&E) (*P05, P07, P09, P12, P16)*		
		ISO 4156 K40N (*P080, P110)*		
		ISO 4156 K50N (*P140, P200, P260)*		
	05	Splined SAE 50-4 (F) Hi-Torque (*P16, P260 only)*		
	06	Keyed DIN 6885 40mm K6 (*P080, P110)*		
		DIN 6885 50mm K6 (*P140)*		
		DIN 6885 60mm K6 (*P260)*		
	07	Splined DIN 5480 40mm (*P080, P110)*		
		DIN 5480 50mm (*P140)*		
		DIN 5480 60mm (*P260)*		
Shaft rotation	(P05-02**R**1C-C10-00-M2)			
	R	Clockwise		
	L	Counter-clockwise		
Seals	(P05-02R**1**C-C10-00-M2)			
	1	Nitrile - Buna N		
	4	Ethylene Propylene Rubber - EPR		
	5	Flourocarbon - Viton		
Design letter	(P05-02R1**C**-C10-00-M2)			
	C			
Primary controls	(P05-02R1C-**C**10-00-M2)			
	C	Pressure compensator	J	Low torque limiter
	L	Load sensing pressure compensator	K	High torque limiter
	R	Manual rotary servo	V	Low torque limiter with load sensing
	H	Hydraulic stroker	W	High torque limiter with load sensing
	E	Electric stroker	X	PQ high response
Primary control options	(P05-02R1C-C**1**0-00-M2)			
	1	Standard maximum volume screw, without indicator		
	2*	Handwheel maximum volume control, without indicator		
	5	Maximum volume screw with cam position indicator		
	8*	Handwheel maximum volume control with cam position indicator		
		**Available on C, J, K. L, V, W primary controls only*		
Secondary controls (E, H, R primary controls only)	(P05-02R1C-C1**0**-00-M2)			
	0	None		
	P	Pressure compensator override		
	J	Torque limiter override (low)		
	K	Torque limiter override (high)		
Rear drive	(P05-02R1C-C10-**0**0-M2)			
	0	None	Z	ISO 100, 3019/2 B4HW with coupling ISO K25N
	M	Blanking plate	Y	ISO 125, 3019/2 B4HW with coupling ISO K32N
	A	SAE A, 82-2, with coupling SAE A, 16-4	X	ISO 160, 3019/2 B4HW with coupling ISO K40N
	G	SAE A, 82-2, with coupling SAE B, 22-4	T	ISO 180, 3019/2 B4HW with coupling ISO K40N
	B	SAE B, 101-2/4, with coupling SAE B, 22-4	U	ISO 180, 3019/2 B4HW with coupling ISO K50N
	Q	SAE B, 101-2/4, with coupling SAE BB, 25-4	L	ISO 180, 3019/2 B4HW with coupling DIN 40-18
	C	SAE C, 127-2/4, with coupling SAE C, 32-4	S	ISO 180, 3019/2 B4HW with coupling DIN 50-24
	N	SAE C, 127-2/4, with coupling SAE CC, 38-4	W	ISO 200, 3019/2 B4HW with coupling K50N
	D	SAE D, 152-2/4, with coupling SAE D,E, 44-4	R	ISO 224, 3019/2 B4HW with coupling K50N
	E	SAE E, 165-4, with coupling SAE D,E, 44-4	V	ISO 250, 3019/2 B4HW with coupling K50N
Mounting external pump	(P05-02R1C-C10-0**0**-M2)			
	0	No external pump mounted		
Modification	(P05-02R1C-C10-00-**M2**)			
	M2	Designates special model		
	NP	No paint		
Allowable controls	C10, C20, C30, C40, C50, C60, C70, C80			
	E10, E30, E40, E50, E1J, E3J, E4J, E5J, E1K, E3K, E4K, E5K, E1P, E3P, E4P, E5P			
	H10, H30, H40, H50, H1J, H3J, H4J, H5J, H1K, H3K, H4K, H5K, H1P, H3P, H4P, H5P			
	J10, J20, J30, J40, J50, J60, J70, J80			
	K10, K20, K30, K40, K50, K60, K70, K80			
	L10, L20, L30, L40, L50, L60, L70, L80			
	R10, R30, R40, R50, R1J, R3J, R4J, R5J, R1K, R3K, R4K, R5K, R1P, R3P, R4P, R5P			
	V10, V20, V30, V40, V50, V60, V70, V80			
	W10, W20, W30, W40, W50, W60, W70, W80			
	X10			

Ordering Code | Back to Content

SALES & SERVICE LOCATIONS WORLDWIDE

International Distributors

In Europe :
Cyprus
Czech Republic
Hungary
Poland
Rumania
Russia
Slovakia
Slovenia (Croatia, Bosnia, Macedonia)
The Faroe Islands
Greece
Iceland
Norway
Portugal
Switzerland
Turkey
Yugoslavia (Serbia)

In Africa :
Algeria
Egypt
Ivory Coast
Morocco
South Africa
Tunisia

In Middle East :
Iran
Israel
Lebanon
Pakistan
Qatar
Saudi Arabia
Kuwait
United Arab Emirates
State of Bahrain
Jordan Kingdom

In Far East :
Indonesia
Korea
Malaysia
New Zealand
Philippines
Thailand

Other European, Middle East, African countries, contact:
Denison Hydraulics S.A.
14 route du bois blanc
BP 539
18105 Vierzon, France
Tel : +33 (2) 48 53 01 20
Fax : +33 (2) 48 53 01 46

Asia-Pacific

Australia
Denison Hydraulics PTY
41-43 St Hilliers Road
P.O.Box 192
Auburn N.S.W. 2144, Australia
Tel : +61 (2) 9646 5200
Fax : +61 (2) 9643 1305

Hong Kong
Denison Hydraulics Ltd.
Unit 6A, 33/F Cable TV Tower
9 Hoi Shing Road, Tsuen Wan
NT, Hong Kong
Tel : +852 2498 8381
Fax : +852 2499 1522

Japan
Denison Japan Inc.
4-2-1 Tsujido-Shinmachi
Fujisawa 251, Japan
Tel : +81 (466) 35-3050
Fax : +81 (466) 35-2019

People Republic of China
Shanghai Denison Hydraulics Engineering Ltd.
3F, No. 1 Mao Jia Zhai, Bai Lian Jing, Pudong New Area
Shanghai 200126, China
Tel : +86 (21) 5886 6599
Fax : +86 (21) 5886 7018

Singapore
Denison Hydraulics PTE LTD
11 Lorong Tukang Dua,
Singapore 2261
Tel : +65 268 7840
Fax : +65 268 7847

Europe

Austria
Denison Hydraulics GmbH
Zweigneiderlassung Linz
Haibachstraße 69
4061 Pasching, Austria
Tel : +43 (72 29) 48 87
Fax : +43 (72 29) 6 30 92

Benelux
Denison Hydraulics Benelux B.V.
Pascalstraat 100
3316 GR Dordrecht, Holland
Tel : +31 (78) 6179 900
Fax : +31 (78) 6175 755

Denmark
Denison Hydraulics Denmark A/S
Industrikrogen 2
2635 Ishöj, Denmark
Tel : +45 (4371) 15 00
Fax : +45 (4371) 15 16

Finland
Denison Lokomec
Polunmäenkatu 22
P.O.Box 116
33721 Tampere, Finland
Tel : + 358 (3) 3575 100
Fax : + 358 (3) 3575 111

France
Denison Hydraulics S.A.
14 route du bois blanc
BP 539
18105 Vierzon, France
Tel : +33 (2) 48 53 01 20
Fax : +33 (2) 48 75 02 91

Great Britain
Denison Hydraulics UK LTD
Kenmore Road
Wakefield 41, Industrial Park
Wakefield, WF2 OXE
West Yokshire, England
Tel : +44 (1924) 826 021
Fax : +44 (1924) 826 146

Germany
Denison Hydraulics GmbH.
Herderstrasse 26
40721 Hilden, Germany
Tel : +49 (2103) 940 600
Fax : +49 (2103) 940 888

Italy
Denison Hydraulics Srl
Via Le Europa 68
20090 Cusago (MI) Milanese, Italy
Tel : +39 (02) 90330-1
Fax : +39 (02) 90390694/5/6

Spain
Denison Hydraulics S.A.
Gomis 1
08023 Barcelona, Spain
Tel : +34 (93) 418 4887
Fax : +34 (93) 211 6507

Sweden
Denison Hydraulics Svenska AB
Sporregatan 13
213 77 - Malmö, Sweden
Tel : +46 (40) 21 04 40
Fax : +46 (40) 21 47 26

North America

Canada
Denison Hydraulics Canada Inc.
2320-1 Bristol Circle, Unit 1
Oakville, ON L6H 5S3, Canada
Tel : +1 (905) 829-5800
Fax : +1 (905) 829-5805

Mexico, Central America, South America, Caribbean countries
Denison Hydraulics Inc.
7850 N.W. 146 St., Ste. 512
Miami, FL 33016, USA
Tel : +1 (305) 362-2246
Fax : +1 (305) 362-2246

USA
Denison Hydraulics Inc.
14249 Industrial Parkway
Marysville, OH 43040, USA
Tel : +1 (937) 644-3915
Fax : +1 (937) 642-3738

USA - Literature Request
Denison Literature Support
1100 W. Bagley Rd., Ste. 101
Berea, OH 44017 USA
Tel : +1 (800) 551-5956
Fax : +1 (440) 824-2005
E-mail:
literature@denisonhydraulics.com

Contact your local distributor or call toll-free for the distributor nearest you at **800-551-5956**

DENISON Hydraulics

http://www.denisonhydraulics.com

Printed in U.S.A. 07-00