PUMP SPECIFICATIONS BY SERIES

BROCHURE	PUMP SERIES	FLOW* GPM	(LPM)	DISPLACEMENT cu.in.	(cm³)	MAX PRESSURE** PSI	(BAR)	MAX RPM	MIN RPM
	Single Pumps (Note: PF Series pumps are cast iron and aluminum construction) PF & PH pumps may be used as clutch pumps.								
MP98-02	PF1-160	1.60	(6)	.37	(6)	4000	(276)	4000	900
	PF1-212	2.12	(8)	.49	(8)	4000	(276)	4000	900
	PF1-264	2.64	(10)	.61	(10)	4000	(276)	3600	800
	PF1-290	2.90	(11)	.67	(11)	4000	(276)	3600	800
	PF1-368	3.68	(14)	.85	(14)	4000	(276)	3300	600
	PF1-424	4.24	(16)	.98	(16)	4000	(276)	3000	600
	PF1-502	5.02	(19)	1.16	(19)	4000	(276)	3000	600
	PF1-606	6.06	(23)	1.40	(23)	3400	(235)	2800	600
	PF1-714	7.14	(27)	1.65	(27)	2900	(200)	2500	600
	PF1-818	8.18	(31)	1.89	(31)	2850	(196)	2300	600
	PF1-870	8.70	(33)	2.01	(33)	2700	(186)	2200	600
MP89-14	PH3	.03	(10)	.62	(10)	3500	(241)	3500	1000
	PH5	.05	(20)	1.24	(20)	3500	(241)	3500	800
	PH7	.07	(25)	1.55	(25)	3500	(241)	3250	800
	PH8	.08	(30)	1.86	(30)	3250	(224)	3000	800
	PH9	.09	(36)	2.17	(36)	2900	(200)	3000	800
	PH11	.11	(41)	2.48	(41)	2500	(172)	3000	800
MP89-12	PK4	.04	(16)	.98	(16)	3000	(207)	3600	600
	PK6	.06	(24)	1.47	(24)	3000	(207)	3600	600
	PK8, PKS8	.08	(32)	1.97	(32)	3000	(207)	3000	600
	PK11, PKS11	.11	(42)	2.46	(42)	3000	(207)	3000	600
	PK13, PKS13	.13	(48)	2.96	(48)	3000	(207)	2500	600
	PK15, PKS15	.15	(57)	3.45	(57)	2500	(172)	2500	600
	PK17, PKS17	.17	(65)	3.94	(65)	2500	(172)	2500	600
MP89-13	PL14	.14	(52)	3.18	(52)	3000	(207)	3000	600
	PL16	.16	(63)	3.82	(63)	3000	(207)	3000	600
	PL19	.19	(73)	4.46	(73)	3000	(207)	3000	600
	PL23	.23	(85)	5.20	(85)	2500	(172)	3000	600
	PL25	.25	(94)	5.73	(94)	2500	(172)	2500	600
	PL27	.27	(104)	6.37	(104)	2500	(172)	2500	600
	PL30	.30	(115)	7.01	(115)	2000	(138)	2500	600
MP89-15/ MP92-05	PM27	.27	(100)	6.10	(100)	3000	(207)	3000	600
	PM31	.31	(116)	7.11	(116)	3000	(207)	3000	600
	PM35	.35	(134)	8.20	(134)	2500	(172)	3000	600
	PM40	.40	(152)	9.27	(152)	2500	(172)	2500	600
MP98-03	PV1-033	8.7	(33)	2.01	(33)	4060	(280)	2800	600
	PV1-051	13.5	(51)	3.11	(51)	4060	(280)	2500	600
	PV1-068	18.0	(68)	4.15	(68)	4060	(280)	2200	600
	PV1-087	23.0	(87)	5.31	(87)	4060	(280)	2000	600
	PV1-111	29.3	(111)	6.77	(111)	4060	(280)	NA	600
	PV1-140	36.9	(140)	8.54	(140)	4060	(280)	NA	600
	Dump Pumps					Intermittent Cycles Only			
MP93-01	S3LD6	.06	(24)	1.47	(24)	2500	(172)	2500	600
	S3LD11	.11	(40)	2.46	(40)	2500	(172)	2500	600
	S3LD15	.15	(57)	3.45	(57)	2500	(172)	2500	600
MP94-01	E3XL23	.23	(85)	5.20	(85)	2500	(172)	2500	600
	E3XL27	.27	(104)	6.37	(104)	2500	(172)	2500	600
	EH3XL28	.28	(105)	6.42	(105)	2500	(172)	2500	600
	EH3XL36	.36	(135)	8.25	(135)	2500	(172)	2500	600
	Load Sense Pumps								
MP92-07	MLSA6	.06	(23)	1.41	(23)	4000	(275)	3600	1000
	MLSA8	.08	(30)	1.79	(29)	4000	(275)	3400	800
	MLSA9	.09	(34)	2.18	(36)	4000	(275)	3200	600
	MLSA11	.11	(42)	2.60	(43)	4000	(275)	3000	600
	MLSA13	.13	(49)	2.94	(48)	4000	(275)	2800	600
	MLSA14	.14	(53)	3.33	(55)	3600	(248)	2700	600
	MLSA16	.16	(61)	3.77	(62)	3200	(221)	2500	600
	MLSA18	.18	(68)	4.13	(68)	3000	(207)	2500	600
	MLSA20	.20	(76)	4.71	(77)	2800	(193)	2500	600
	MLSA23	.23	(87)	5.30	(87)	2500	(172)	2300	600
	Live Pak Pumps								
MP97-06	MLSM22	.22	(83)	5.12	(83)	3000	(207)	2500	800
	MLSM27	.27	(102)	6.10	(102)	3000	(207)	2500	800
	MLSM31	.31	(117)	7.11	(117)	3000	(207)	2500	800
	MLSM35	.35	(132)	8.20	(132)	2750	(190)	2400	800
	MLSM40	.40	(151)	9.27	(151)	2750	(190)	2300	800
	MLSM44	.44	(166)	10.25	(166)	2500	(170)	2200	800

Pumps are cast iron, three piece construction, with heavy duty roller or sleeve bearings, and pressure balanced wear plates.
Call Muncie or an authorized Muncie Independent Master Warehouse for detailed specifications, complete part no.s or application assistance.

*Theoretical Flow @ 1000 RPM. **Maximum pressure implies less than 10% of operating time. To calculate torque requirement, use formula: T = c.i.d. x p.s.i. ÷ 75.5287

SIMPLE TROUBLESHOOTING: REPLACING A FAILED COMPONENT

When any hydraulic product fails, the failure is generally caused from contamination, aeration, cavitation, or the wrong oil. Otherwise, failures are caused from overload and abuse. Although mechanical components are affected by fatigue, hydraulic components seldom "just wear out" without contributing factors. If there are manufacturing defects, they are attributed to tolerances, surface finishes, or torque values.

Replacing a failed component may not necessarily correct your performance problem. The problem may have been caused by improper installation, poor maintenance, incorrect component selection, or unfamiliarity with requirements (poor training). **When a failed component is replaced, the system must be thoroughly flushed, and the oil replaced with new clean oil. Never operate components without oil.**

There are three major requirements an equipment troubleshooter must know to properly and profitably manage equipment:

1. Understand flow and pressure.
2. Understand system components and their functions.
3. Understand hydraulic symbology (schematics) and circuit logic.

In addition to the knowledge, the troubleshooter must have a systematic approach to problem solving, record keeping, and a means of knowing each piece of equipment as if it were part of one's family.

There are several test sequences which can be used to examine a system. Time, pressure, heat, sound, and smell are ways of gaining familiarity. What's the normal sequencing time and pressure? What's the operating temperature? What's the operating time period between filter change requirements as indicated by the gauge?

Leaks are too often assumed to be a mere nuisance, when actually they are a warning of more serious problems. If oil can leak out, then air can get in, right? So can dirt and water, and concern must be directed toward the **air** breather/filter as well as the **oil** filtering system.

COMMON ERRORS

HERE ARE THE TYPICAL AND CHRONIC HYDRAULIC PROBLEMS

I. Systems are not adequately protected from dirt (contamination), causing excessive wear, hydraulic inefficiency & premature failure. STILL the most frequent cause of hydraulic system failure.

II. Systems often have the wrong oil, causing oil to…
   - A. Be replaced more often.
   - B. Create heat from high viscosity (oil too thick) sluggishness, or from cavitation.
   - C. Create heat from low viscosity (oil too thin), causing excessive slippage, poor efficiency, and component wear.

III. System operators are not trained to recognize…
   - A. When the system requires servicing.
   - B. When they are damaging the system by forcing flow over relief.
   - C. How much damage they can inflict.
   - D. When systems should be disengaged.

IV. Replacement pumps are often larger in displacement than they need to be. As a result, they…
   - A. Require higher torque loads than necessary.
   - B. Operate at less efficient speeds.
   - C. Create more heat.
   - D. May cause transmission torque converter slippage.

V. Hydraulic lines and hoses are usually too small, or are the wrong type. Because of this, they…
   - A. Require additional horsepower to compensate for the pressure losses in the system.
   - B. Create heat, which damages hoses and oil, requiring both to be replaced more often than would be necessary if they were sized according to flow.
   - C. Restrict the amount of oil which can flow without turbulence, causing cavitation, aeration and heat.
   - D. Collapse or burst, making the system fail.
   - E. Create higher system neutral pressure and higher operating pressure.

VI. Systems are not calibrated, and are often set up improperly.
   - A. Relief valve set either too high, not protecting components, or too low, cycling unnecessarily.
   - B. Relief valve isolated by quick disconnect, eliminating protection.
   - C. Incorrect circuit continuity.

VII. Improperly installed drivelines cause vibration, noise, seal leakage, contamination, and pump shaft damage.
   - A. Allows dirt to invade seal area by distorting seal.
   - B. Allows dirt to abrade the shaft seal area, requiring shaft replacement.

VIII. Systems are operated without any oil, or with the supply valve closed.

IX. Systems are not disengaged after use, causing excessive heat.

X. System Breathers become clogged or are inadequate, causing cavitation or allowing large amounts of contamination.