D5 & 10-5 SERIES AIR OPERATED LIQUID PUMPS

PRESSURE RATIO OLD & NEW PART NUMBERS

In the mid 1990's with the advent of a new inventory and computer system, SC Hydraulic Engineering was forced to change the part numbering system for better control and understanding.

Prior to that time, a typical part number stated the basic series number, a ratio reference number, and a suffix if there were any modifications. Typically, a call out might be 10-500-1.5 or perhaps 10-600-20BA. The biggest change, and where some confusion may occur, is in the pressure ratio model call out for the various sizes available.

The chart below can be used as an aid in determining the correct number. Take careful note to similar call outs such as .5 (now 005) and 5 (now 050). At the time of the change, it was decided that all new products would use actual pressure ratios for hydraulic section call outs. Hence, with the D5 and D6 Series the model suffix is just that. Note however, the actual physical size of the unit is identical to the 10 Series model.

Additional changes of the part numbers from the old model numbers and the new numbers are shown on the 'How to Order Table'.

10-4 SERIES			10-5 & D5 SERIES			10-6 & D6 SERIES		
HYDRAULIC SECTION MODEL			HYDRAULIC SECTION MODEL			HYDRAULIC SECTION MODEL		
OLD	NEW	RATIO	OLD	NEW	D5 / RATIO	OLD	NEW	D6 / RATIO
0.25	003	5	0.24	003	5	.35QR	003	5
0.5	005	10	0.5	005	10	.5QR	005	10
1	010	15	0.65	007	12	1	010	20
1.5	015	30	1	010	20	1.5	015	25
2	020	35	1.5	015	25	2	020	35
3	030	55	1.75	018	30	3	030	55
5	050	100	2	020	35	5	050	95
8	080	140	3	030	55	8	080	145
12.5	125	220	4	040	70	10	100	180
			4.5	045	85	15	151	240
			6	060	105	20	201	330
			8	080	140	30	301	460
			10	100	195	40	402	740
			16	160	280			
			25	250	440			
			35	350	555			

NO OTHER PUMPS OFFER ALL THESE ADVANTAGES

Simple operating principle – SC air operated hydraulic pumps operate on the simple but efficient principle of pressure intensification through the use of differential areas. Fulfilling Boyle's Law, a larger air-driven piston delivers pressure to a proportionally lesser diameter hydraulic piston, providing fluid flow at relatively higher pressures.

High output capacity and outstanding performance provided at very low cost.

Guaranteed performance – All SC Hydraulic pumps will give years of low cost, trouble free service when properly installed and maintained to manufacturer's instruction.

Wide range of operating pressures is provided by all models. For example, the D5000B55 operates efficiently when delivering from 400 to 5800 psi (see D5 Series specifications).

Wide range of output capacities – Only 100 psi air pressure is required for all models to attain maximum rate of flow (see performance charts for data).

Complete flexibility – SC Hydraulic pumps adapt to a wide variety of applications, from simple manual controls to fully automatic operation. Air motors are interchangeable for most models within each series.

Automatic restart – Whenever an SC Hydraulic pump is idle, the pilot valve is designed to re-position the pump on the power stroke for the next cycle of operation.

Smooth operation – The air piston actuating valve is precision fit to close tolerances for maximum efficiency and long service life.

Both pressure and volume of flow are easily and accurately controlled by a pressure regulator installed in the air supply line.

Fluid Compatibility – Pumps can operate with almost any type fluid service (specify when ordering).

Hydraulic cylinders are constructed from aluminum-bronze, stainless steel, or carbon steel.

Hydraulic pistons are constructed from stainless steel, hard chrome-plated.

Materials incorporated in the hydraulic assembly vary depending upon type of service and pump model.

Designed for easy maintenance – Costly down time is reduced to a minimum when service is required. "D" Dry Lube Series pumps are packed at the factory with valve lubricant and may be operated without a lubricator in air supply. Hydraulic cylinder packing may be replaced without dismantling the air motor.

Three Series available – choose from:

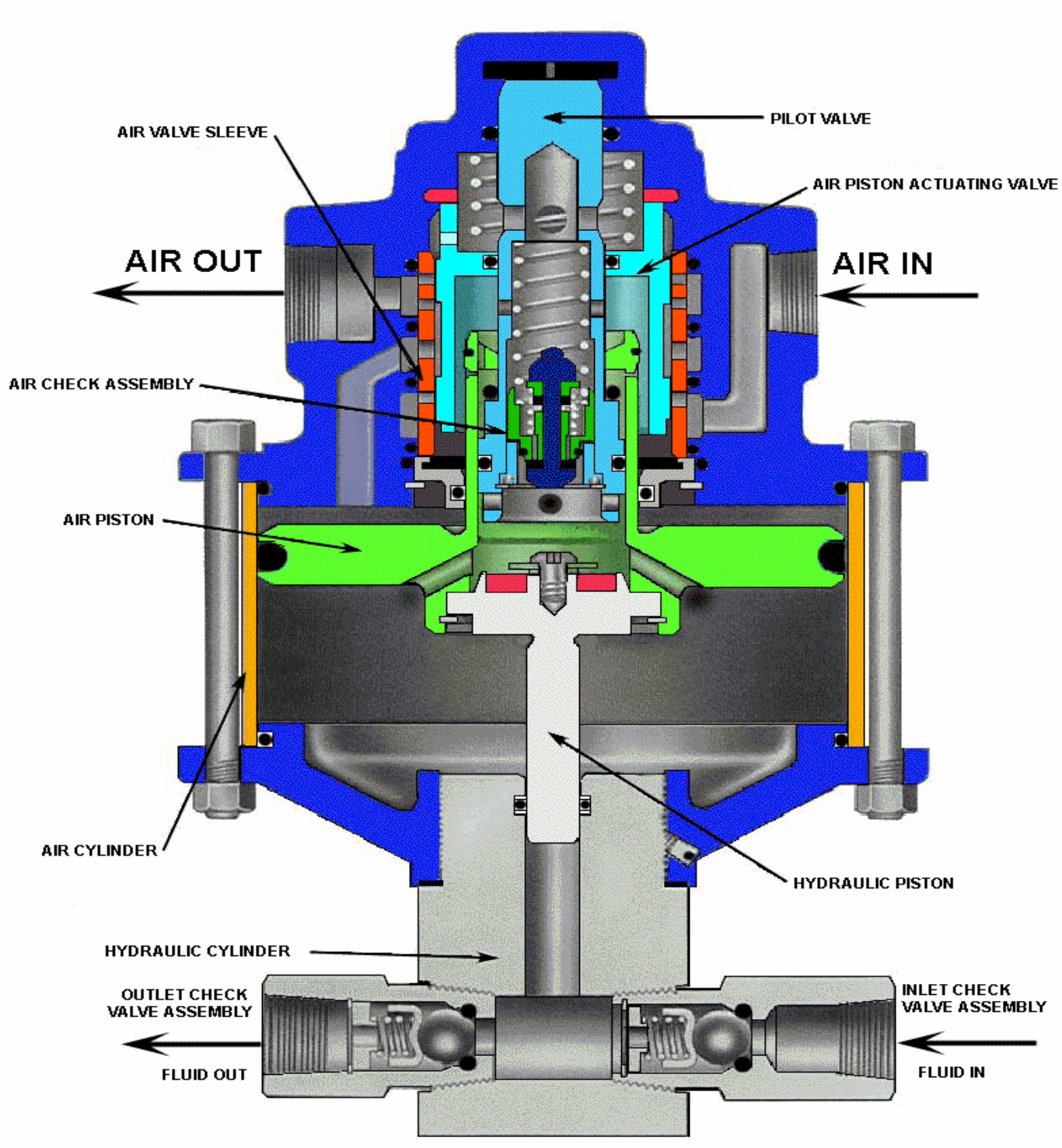
10-4 Series • 9 models • to 22,000 psi

D5/10-5 Series • 16 models • to 55,000 psi

/D6/10-6 Series • 13 models • to 65,000 psi

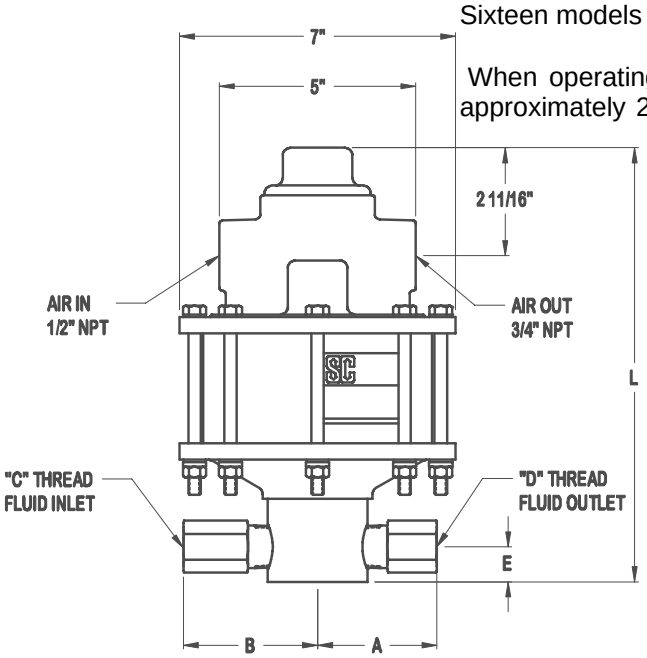
Applications include static and burst testing, flow testing requiring relatively low flows at high pressures, operation of hydraulic presses, clamping, pressing, metal forming, piercing, blanking, staking, etc. Applications requiring extreme intermittent pressure and velocity commonly associated with water blasting and jetting.

Liquid Pump Cut-a-way



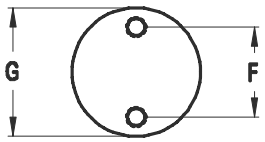
D5 & 10-5 SERIES

D5 & 10-5 Series pumps have a 5 ½“ diameter air piston and a 1 ¼” stroke. Sixteen models are available with pressures up to 55,000 psig.



When operating from 0 to rated hydraulic pressure, air consumption will be approximately 28 scfm of free air at 100 psi output. At lower air pressures and higher hydraulic pressures air consumption will be reduced proportionately to flow rates indicated.

Mounting may be in any position, vertical preferred. When mounting in an inverted position, a drain cock should be provided to drain off any liquid that may accumulate in the pilot valve air chamber.



The D5 Series “Dry Lube” pump is identical to the 10-5 Series except it is pre-lubricated and therefore does not require an air line lubricator. The part number distinguishes it from the 10-5 Series by the D5 prefix and using the actual ratio rather than a numerical code in the model suffix.

Mounting Dimensions in Inches

D5 Series Model (Ratio)	10-5 Series Model	L	A	B	NPT/HF4 (Std)		SAE/HF4 (Optional)		E	F	G
					C Thread	D Thread	C Thread	D Thread			
5	-003	13.125	3.500	4.750	1"	1/2"	-	-10 SAE	1.125	2.375	3.125
10 thru 20	-005 thru -010	12.313	3.000	4.000	1"	1/2"	-	-10 SAE	1.000	1.750	2.500
25 thru 105	-015 thru -060	10.875	3.000	3.375	1/2"	1/2"	-10 SAE	-10 SAE	0.875	1.750	2.500
140 thru 440	-080 thru -250	11.250	2.500	2.313	3/8"	3/8"	-	9/16-18 *	0.875	1.750	2.500
555	-350	11.188	3.750	2.313	3/8"	9/16-18 *	-	-	.0875	1.750	2.500

*Coned and Threaded High Pressure Connection for ¼” O.D. Tubing

Measurements & Approximate Air to Hydraulic Pressure Ratios – Static Conditions

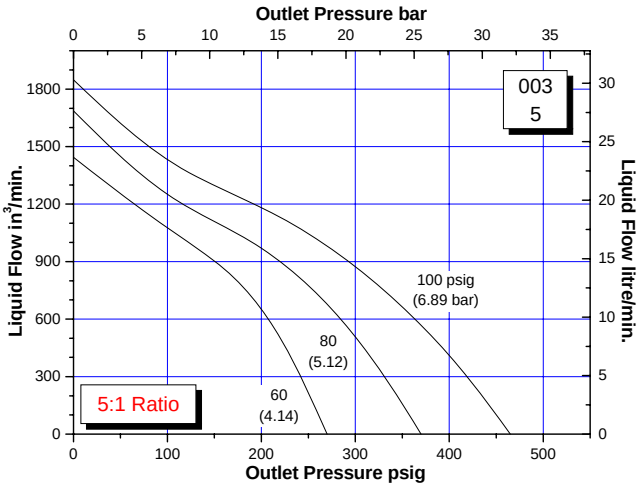
D5 Series Model (Ratio)	10-5 Series Model	Hydraulic Piston Diameter (in)	Hydraulic Piston Area (in^2)	Volume per Stroke (in^3)	Air Pressure (PSI)									
					10	20	30	40	50	60	70	80	90	100
5	-003	2.3750	4.430	5.540	30	75	130	175	220	270	320	370	415	465
10	-005	1.6250	2.070	2.590	80	180	285	385	490	590	690	795	900	1000
12	-007	1.5000	1.770	2.210	90	200	340	450	560	700	850	980	1100	1225
20	-010	1.1875	1.110	1.390	145	330	525	700	925	1100	1300	1500	1700	1900
25	-015	1.0000	0.785	0.981	200	475	750	1000	1300	1550	1800	2000	2350	2625
30	-018	0.9375	0.689	0.861	225	525	875	1150	1500	1775	2050	2350	2700	3075
35	-020	0.8750	0.601	0.751	250	600	1000	1400	1775	2125	2475	2825	3200	3625
55	-030	0.6875	0.371	0.464	400	1000	1700	2200	2900	3400	4000	4600	5200	5800
70	-040	0.6250	0.307	0.384	500	1175	1950	2600	3350	4100	4900	5600	6350	7000
85	-045	0.5625	0.248	0.310	800	1700	2600	3400	4400	5100	6000	6900	7800	8600
105	-060	0.5000	0.196	0.245	900	2000	3150	4200	5400	6400	7450	8500	9700	10700
140	-080	0.4375	0.150	0.188	1100	2400	3900	5400	6900	8300	9800	11200	12600	14000
195	-100	0.3750	0.110	0.138	1400	3250	5250	7250	9250	11250	13250	15000	17000	18750
280	-160	0.3125	0.077	0.096	2250	4000	7750	10500	13500	16250	18750	21500	24500	27500
440**	-250**	0.2500	0.049	0.061	5000	8000	12500	16500	21000	25500	30000	34000	38000	42500
555**	-350**	0.2187	0.038	0.048	6250	12500	18750	25000	31250	37500	43750	47500	51250	55000

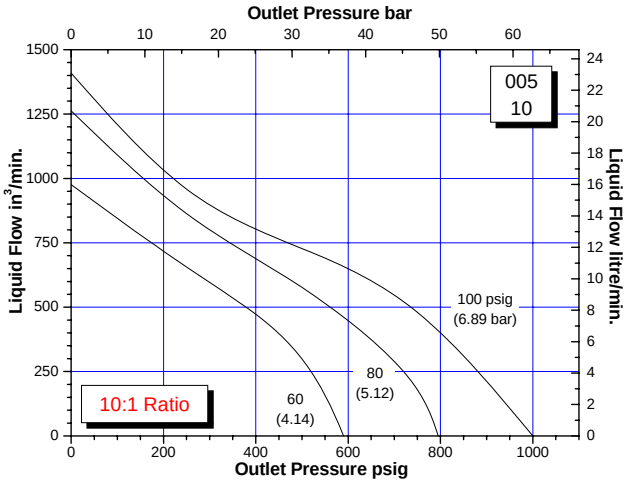
** Recommended for continuous duty at pressures up to 30,000 psi. Intermittent duty above 30,000 psi.

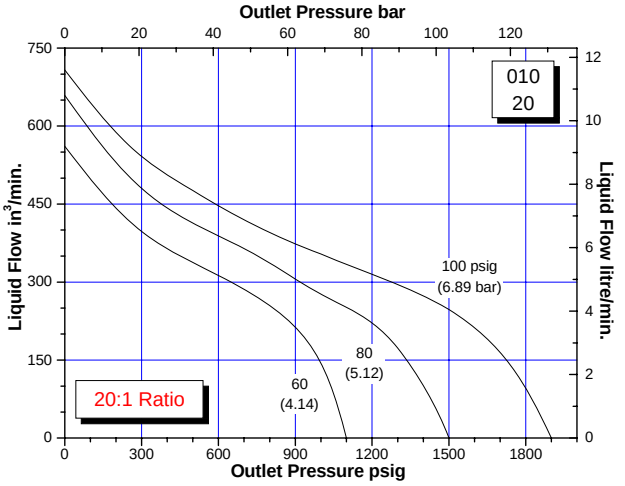
D5 & 10-5 SERIES

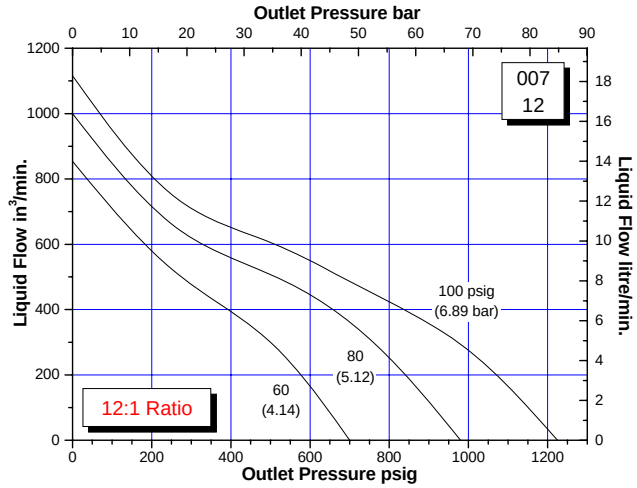
APPROXIMATE RATE OF DISCHARGE

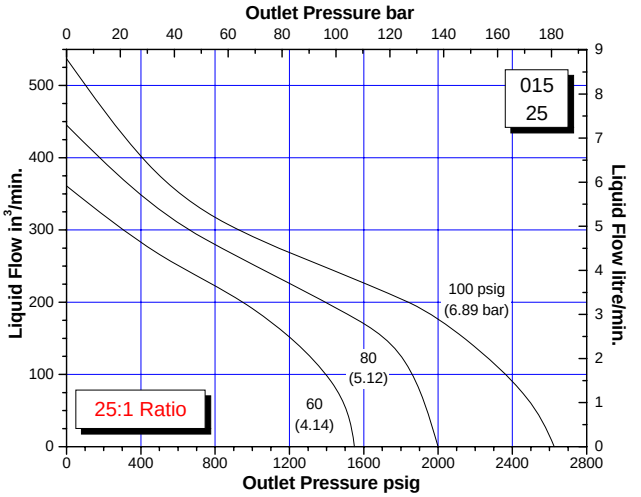
Model Code
Use Top for 10-5
Use Bottom for D5

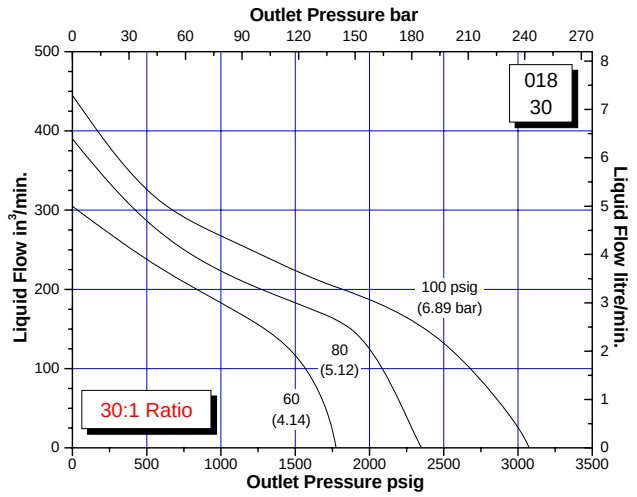








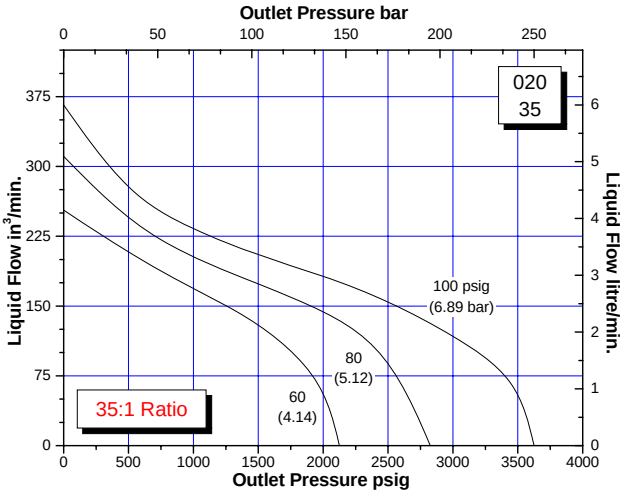


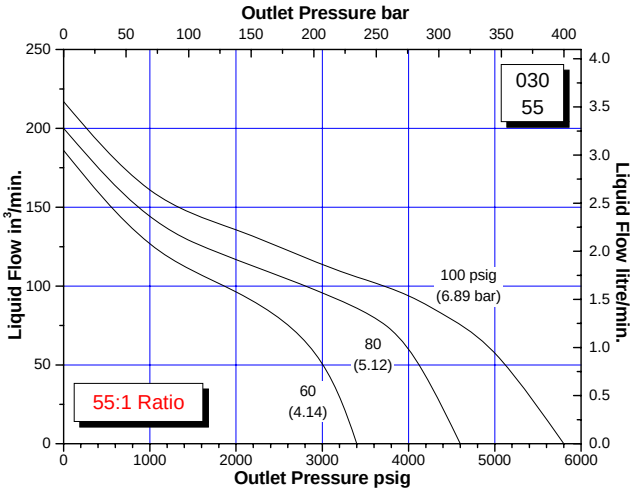


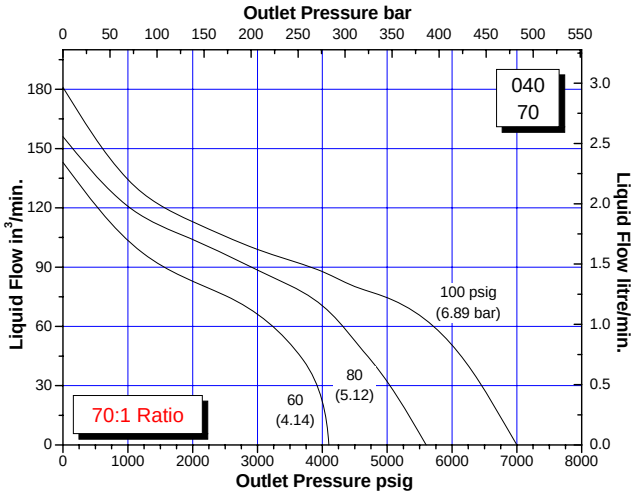
D5 &10-5 SERIES

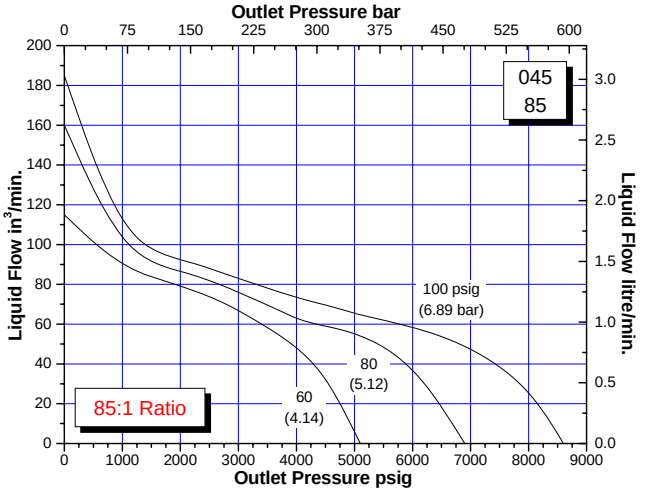
APPROXIMATE RATE OF DISCHARGE

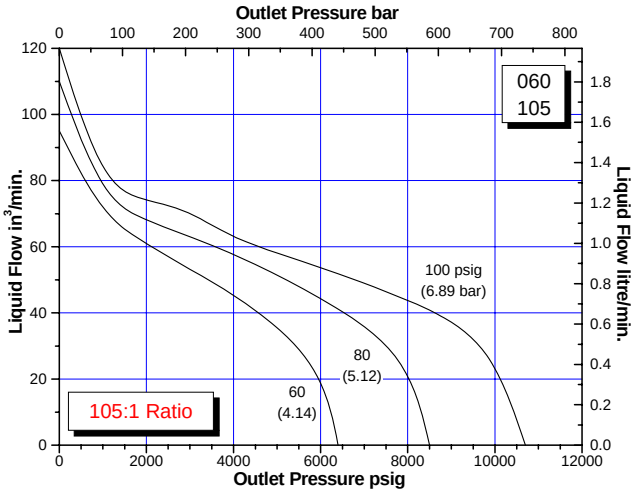
Model Code
Use Top for 10-5
Use Bottom for D5

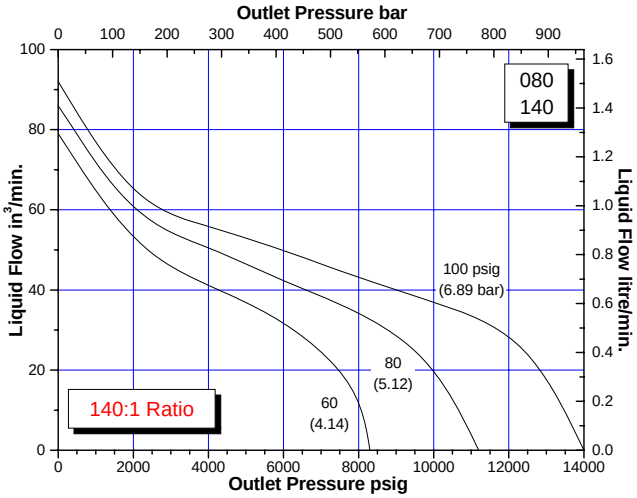








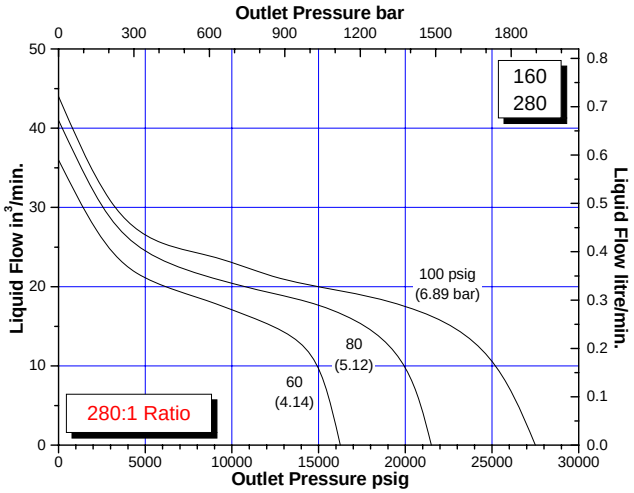


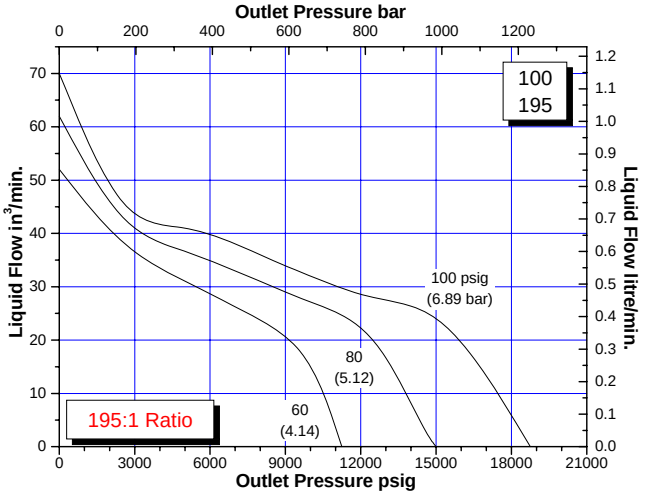


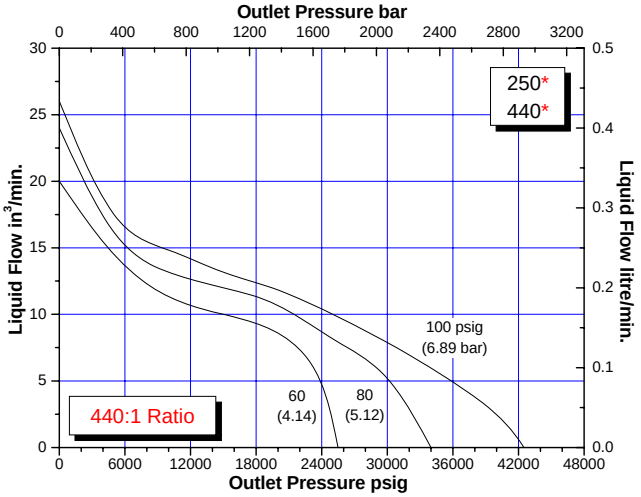
D5 & 10-5 SERIES

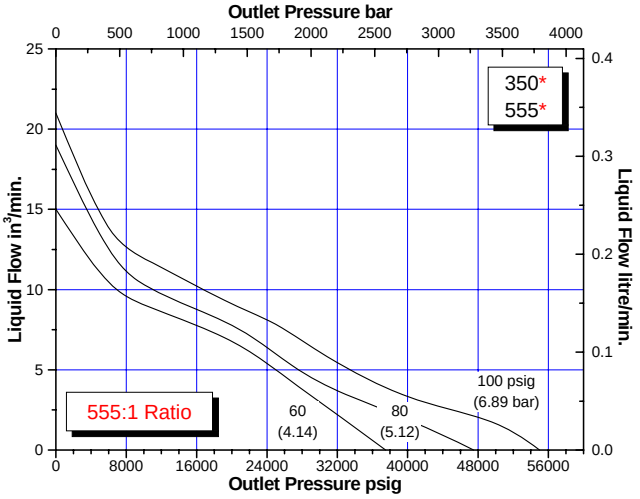
APPROXIMATE RATE OF DISCHARGE

Model Code
Use Top for 10-5
Use Bottom for D5









* Recommended for continuous duty at pressure up to 30,000 psi. Intermittent duty above 30,000 psi.

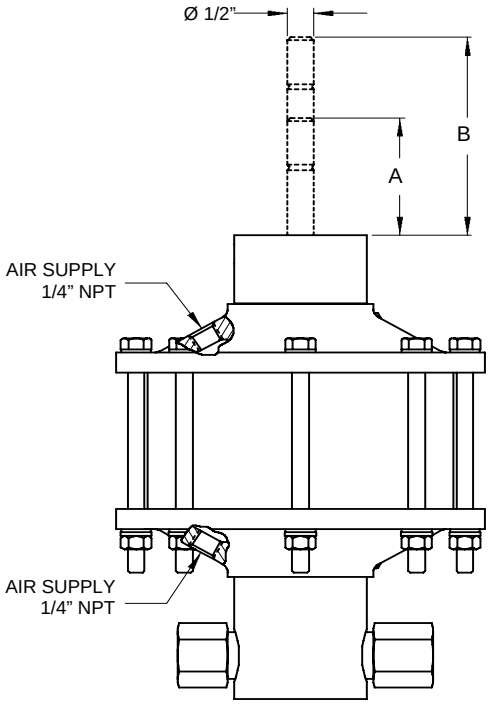
80-5 & 80-6 SERIES INTENSIFIERS

SC Hydraulic Engineering 80-5 and 80-6 Intensifiers operate on the same principle as our air operated liquid pumps with one distinctive difference — the air motor is modified so that it operates as a double-acting cylinder. Instead of automatically reciprocating until the stall pressure is reached, the 80 Series Intensifiers require an external four-way air valve to operate the unit.

POSITION ROD INDICATOR		
MODEL	"A" RETRACT	"B" EXTEND
80-5	1.188	3.937
80-6	2.362	3.987

The end caps have 1/4" NPT air supply port connections and the unit can be supplied with a position indicator rod at the top of the intensifier if required. All ratios and options available on the intensifiers are the same as on our D5 and D6 Series pumps. The units can be mounted in any position however upright is preferred. The air cylinder does not require lubrication.

Refer to the "How to Order" and performance data sheets of the D5 and D6 Series pumps for additional information.

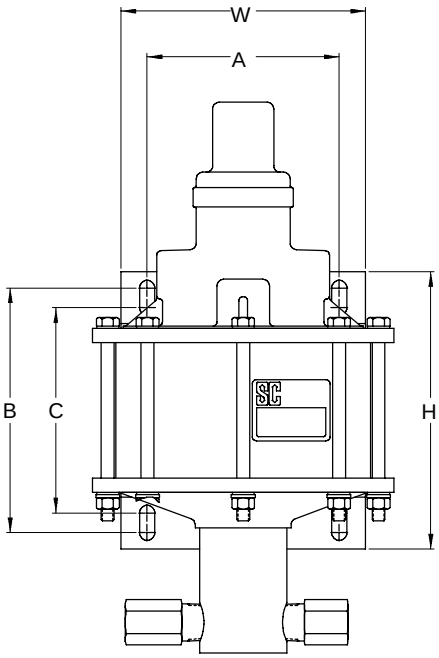


D5/10-5 & D6/10-6 SERIES MOUNTING BRACKETS

MOUNTING BRACKET DIMENSIONS						
Pump Series	Part No.	W	H	A	B	C
D5/10-5	11-5162S000	7.00	6.83	5.50	5.89	4.77
D6/10-6	11-6172S000	7.00	7.94	5.50	7.00	5.88

Mounting brackets can be ordered with a pump by adding an "M-105" modification as a suffix on the model number for the D5/10-5 or D6/10-6 pumps. If ordered as separate parts use the numbers above. One or two brackets can be used for each pump depending on the application.

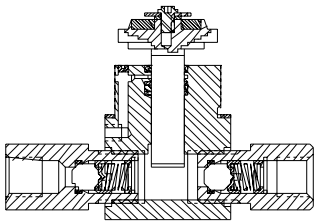
The brackets are installed by removing the three bolts for the bracket position and loosening the remaining tie rod bolts. The tie rod bolts should then be drawn up gradually in a cross sequence for uniform tightening to 15-17 ft-lb. Refer to the "Servicing Instructions" for additional information.



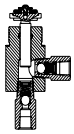
PUMP MODIFICATIONS

A combination of any of the modifications shown can be supplied upon request. Consult factory for additional information and dimensional data if required.

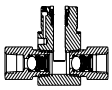
“A” Modification – Available on all models
This modification utilizes dual seals in the hydraulic assembly with a bleed-off between the seals to atmosphere, thus providing a visual indication of hydraulic seal leakage. Used where contamination of the air motor from the hydraulic fluid being pumped is objectionable



”K” Modification – Available on D5/10-5 and D6/10-6
This modification utilizes a special air piston in the air motor assembly which decreases the stroke of the pump, thus minimizing the internal forces and increasing air motor life. Used in applications exhibiting rapid pressure losses, such as burst testing.

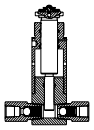


“B” Models – Available on D5/10-5 and D6/10-6
The “B” models have a bottom inlet connection for convenient tank top installation or alternate mounting configuration.



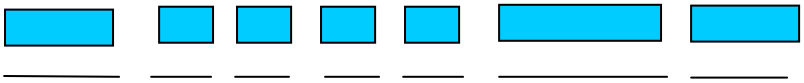
“H” Models – Available on D5/10-5 and D6/10-6
The “H” Models utilize special packing in the hydraulic assembly for maximum performance where hydraulic fluid media is contaminated with foreign matter, thus providing for a much greater life expectancy from the hydraulic seals than with standard o-ring seals. The “A” modification is included on all “H” models and the check valves have PTFE o-rings

“C” Models – Available on D5/10-5 and D6/10-6
The “C” Models utilize PTFE chevron packing in the hydraulic assembly for ultimate performance when other packing material is not compatible with the fluid used or because of extreme temperature conditions. The “A” modification is included on all “C” models and the check valves have PTFE o-rings.



“R” Modification – Available on D5/10-5 and D6/10-6. The “R” Models are furnished with an isolator attachment which prevents the hydraulic piston retracting into the air motor during operation, thus providing for 100% non-contamination of the hydraulic assembly from the air motor. The isolator also acts as a heat barrier.

HOW TO ORDER TABLE



1 2 3 4 5 6 7 **Table Reference**

Example #1 Pump Selection

10-5 Series air operated hydraulic pump
Viton Seals in air motor assembly
Viton Seals in hydraulic assembly
Bottom inlet/Heavy duty
Aluminum Bronze
060 Model hydraulic section
105:1 pressure ratio
SAE Outlet

10-5 V V D W 060 - SAE

Example #2 Pump Selection

D5 Series air operated hydraulic pump
Buna-N Seals in air motor assembly
EPR Seals in hydraulic assembly
Bottom inlet/ "K" modification
Stainless Steel
105 Model hydraulic section
105:1 pressure ratio

D5 0 E J S 105

TABLE 1 [4] **Pump Series Designation**

10-4	Series Lubricated pump
10-5	Series Lubricated pump
D5	D5 Series "Dry Lube" pump
10-6	Series Lubricated pump
D6	D6 Series "Dry Lube" pump
80-5	5 1/2" Bore Intensifier
83-5	5 1/2" Intensifier with Position Indicator Rod
80-6	7 " Bore Intensifier
83-6	7" Intensifier with Position Indicator Rod

TABLE 2 Seal Compound - Air Motor

0	Buna-N (standard)
V	Viton

TABLE 3 Seal Compound – Hydraulic Section

0	Buna-N nitrile (standard)
E	EPR - ethylene propylene
V	Fluorocarbon
*****	Consult factory for special compounds

TABLE 4 Modifications

0	Standard pump
A	"A" modification
B	Bottom inlet [1]
C	Chevron Seals
D	Bottom inlet – heavy duty [1,3]
E	Bottom inlet – "A" modification [1]
F	Isolator – Chevron Seals [1,3]
G	Isolator – heavy duty [1,3]
H	Heavy duty [1]
J	Bottom inlet – "K" modification [1]
K	"K" modification [1]
M	Bottom inlet – "A" and "K" modification [1]

TABLE 4 Modifications (continued)

N	Isolator – "A" modification [1]
P	Isolator – "K" modification [1]
Q	Isolator – "A" and "K" modification [1]
R	Isolator [1]
S	Heavy duty – "K" modification [1,3]
U	Heavy duty – bottom inlet – "K" mod. [1,3]
V	Heavy duty – isolator – "K" modification [1,3]

TABLE 5 Material of Construction – Hyd. Section

W	Aluminum bronze & stainless steel (10-4, 10-5, 10-6 Series) standard
B	Aluminum bronze & stainless steel (D5, D6 Series) standard
S	All stainless steel
C	Cad plate carbon steel, stainless steel [2]

TABLE 6 Model designation –Pressure ratio

Refer to pressure ratio charts for proper selection

TABLE 7 Port option

Blank	Standard
SAE	Straight thread as indicated on chart
HF4	9/16-18 x ¼" OD tube 60K psi

Additional Special Modifications may be included with an "M" suffix at the end of the model number.

Notes:
(1) Not available for 10-4 Series
(2) 25 piece minimum order
(3) "A" modification included with all Chevron and Heavy Duty seal modifications.
(4) Do not fill gap on a two digit description. Refer to Example #2