Oilgear

PVWH

OPEN LOOP

PUMPS

Bulletin 47015-C

PERFORMANCE ASSURANCE IS STANDARD WITH EVERY OILGEAR PUMP

Each Oilgear Pump manufactured is shipped with a corporate commitment to stay with the installation until the unit performs as specified.

This total dedication to performance is based upon experience gained since 1921 in matching fluid power systems to a tremendous range of machines and applications.

Oilgear's Performance Assurance is made possible because of the many hydraulic techniques learned over the years in supplying machinery builders and users with unique solutions to hundreds of unusual fluid power problems.

Historically, Oilgear has concentrated all of its energies on hydraulic equipment and systems. Every Oilgear facility is staffed with factory trained and field experienced application engineers. These men are backed by a headquarters engineering staff who has access to the records and knowledge generated from these historically successful solutions.

Performance Assurance doesn't stop with the design of the system or the sale of a component. It guarantees that Oilgear engineers will be there— when they are needed—supplying the education, field service, parts and repairs, to make sure each system runs smoothly—and keeps on running.

Art-250

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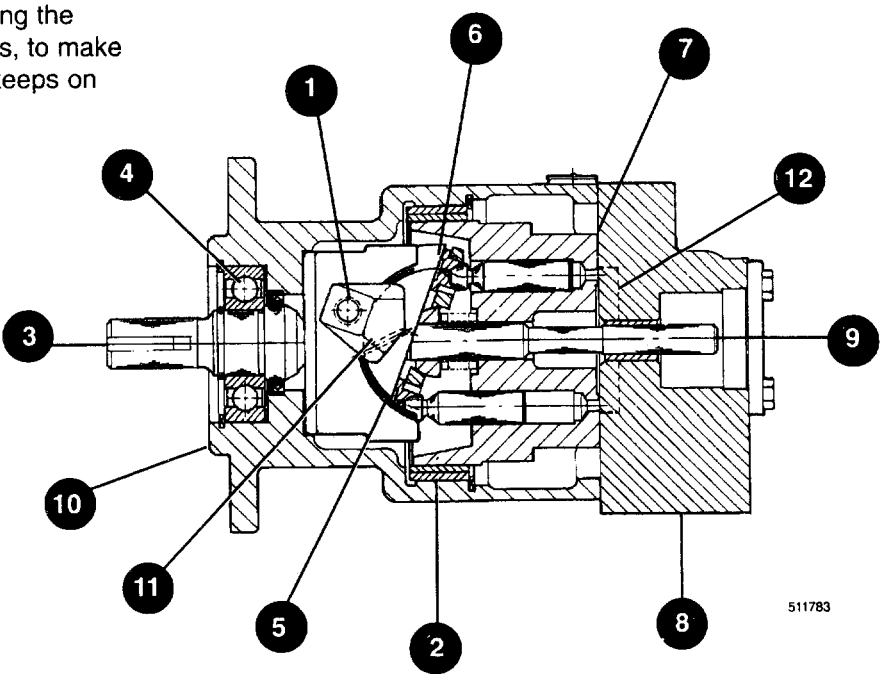


PVWH
OPEN LOOP PUMPS

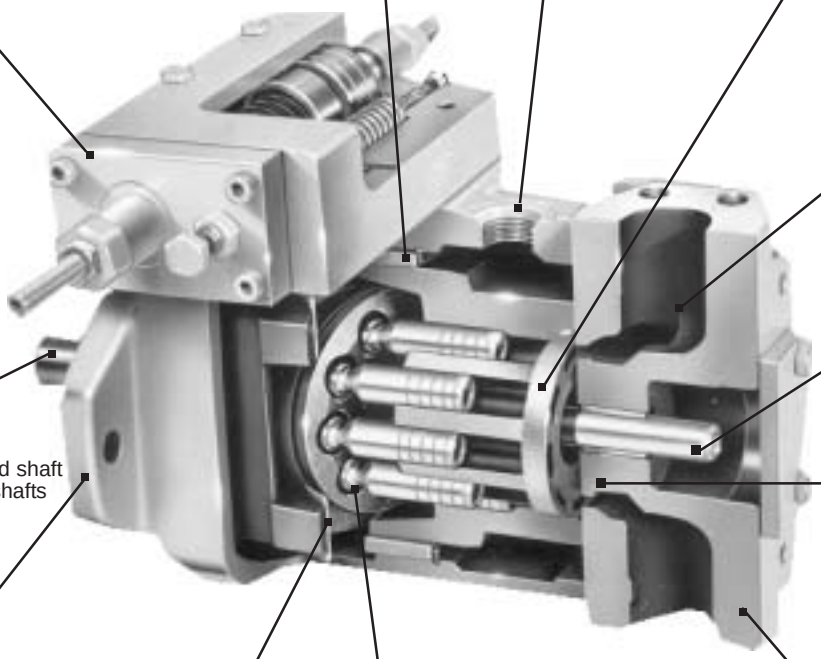
Cylinder mounted in polymerous journal bearings
- Allows operation with special fluids
- Provides infinite bearing life
- Provides compact design

Patented presure lubricated swashblock design
- Provides high peformance for high pressure high cylinder operation

The industries large control selection
- 21 different types
- Field interchangeability without disconnecting from drive or system piping

Hardened cylinder surface running on hardened valve plate ("hard-on-hard")
- Provides greater resistance to contamination
- Provides longer life
- Allows operation special fluids

Valve plate selections
- Rear or side port connections available



Thru-shaft availability
- Allows for multiple pump installation from a single drive shaft
- Allows pumps to drive auxiliary devices

SAE keyed or SAE splined shaft
- Heavy duty belt drive shafts available

- Quite valve plate design Minimizes noise at typicalelectric motor speeds

88050R

Sealed front shaft bearing
- Allows operation with special fluids
- Allows side loading

Three frame sizes with seven capacity ranges allowing greater flexibility to selectively match pressure and capacity.
- Low flow/high pressure to low pressure/high flow from the same frame sizes.

Swashblock and saddle with special polymerous bearings
- Allows running on water base, low viscosity or other special fluids
- Permits consistent control reaction
- Eliminates troublesome yoke bearings
- Provides long life

Steel shoes with specially treated faces for increased fluid retention, running on hardened swashblock surface.
- Allows a higher degree of contaminate resistance
- Allows higher pressure operation with long life
- Allows operation with water base, viscosity or other special fluids
- Provides longer life

SPECIFICATIONS

Based on 150—300 ssu viscosity fluid

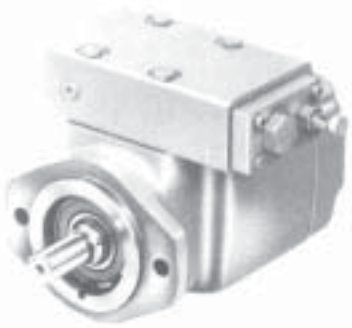
FRAME SIZE	UNIT SIZE	THEORETICAL MAXIMUM DISPLACEMENT		RATED CONTINUOUS PRESSURE		MAXIMUM PRESSURE		FLOW RATE at 1800 rpm, rated continous pressure & 14.7 psia (1 bar $_{abs}$) inlet condition		MINIMUM INLET PRESSURE * psia (bar $_{abs}$)			MAXIMUM SPEED *	POWER INPUT at rated continuous pressure & 1800 rpm	
		in³/rev.	ml/rev	psi	bar	psi	bar	gpm	l/min	1200 rpm	1500 rpm	1800 rpm	rpm	hp	kw
A	04	0.66	10,8	5000	344,8	5800	400,0	4.2	15,9	5.4 (,37)	5.7(,39)	6.1 (,42)	3000	16,3	12,2
	06	0.86	14,1	4000	275,9	4500	310,3	5.9	22,4	5.5 (,38)	5.9 (,41)	6.4 (,44)	3000	17,7	13,2
	10	1.35	22,1	3000	206,9	3500	241,4	9.5	36,0	5.5 (,38)	6.0 (,41)	7.0 (,48)	3000	20.2	15,1
B	11	1.55	25,4	5000	344,8	5800	400,0	10.9	41,3	7.0 (,48)	7.3 (,50)	8.2 (,57)	3000	36.5	27,2
	15	2.06	33,8	3500	241,4	4000	275,9	14.7	55,7	7.0 (,48)	7.6 (,52)	8.4 (,58)	3000	35.5	26,5
	20	2.83	46,4	2500	172,4	3000	206,9	20.6	78,1	7.2 (,50)	7.9 (,54)	9.0 (,62)	2400	35.0	26,1
C	25	3.88	63,6	5000	344,8	5800	400,0	27.4	103,8	7.6 (,59)	8.5 (,59)	9.5 (,66)	2400	95.1	70,9
	34	4.67	76,5	3500	241,4	4000	275,9	33.7	127,7	8.0 (,55)	8.6 (,59)	9.6 (,66)	2400	80.4	60,0
	45	6.00	98,3	2500	172,4	3000	206,9	43.3	164,1	7.6 (,52)	8.6 (,59)	9.8 (,68)	2400	74.1	55,3
	60	7.94	130,2	1500	103,4	2000	137,9	58.2	220.3	8.0 (,55)	9.3 (,64)	14.5 (1,00)	1800	64.0	47,8

* For higher speeds see suction curves on Page 11.
Higher speeds available — consult factory.

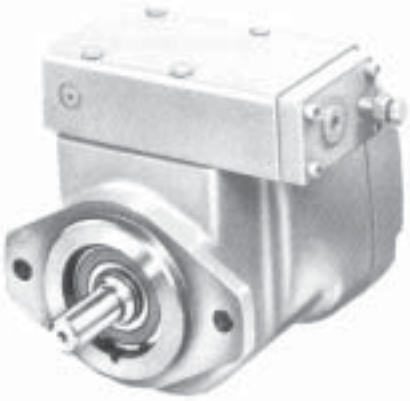
Note: Minimum speed 600 rpm.

These units are designed to run with fluids in the 65 to 2000 SSU range.

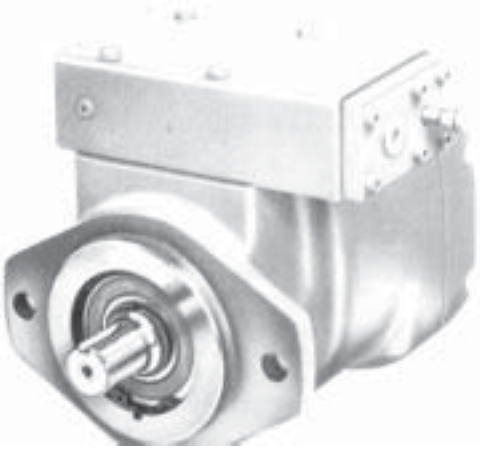
Frame
Size
A



Frame
Size
B



Frame
Size
C

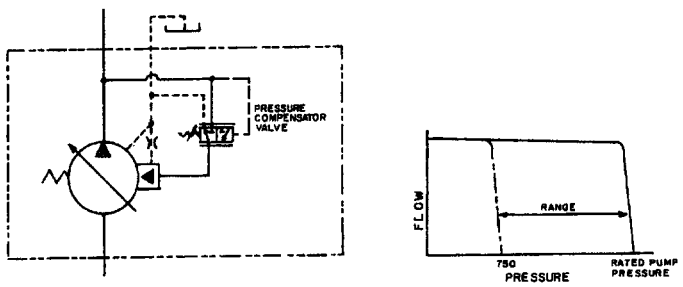


PUMP CONTROLS

PRESSURE*

Pressure Compensator "CN"

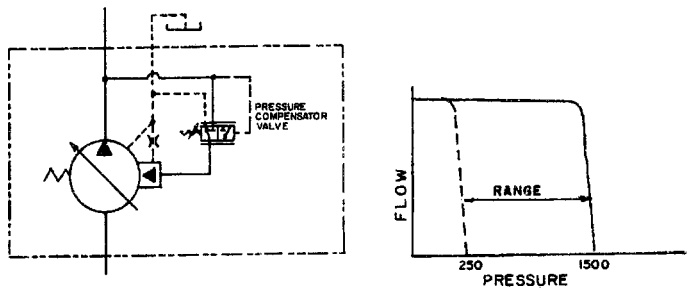
Ensures maximum pump flow until unit reaches preset control pressure setting then regulates output flow to match the requirements of the system while maintaining preset output pressure. Can be adjusted from 750 psi working pressure up to the maximum pressure rating of applicable pump. A remote control module "VSR" can be used to adjust the "CN" Control.



5V-12076-L

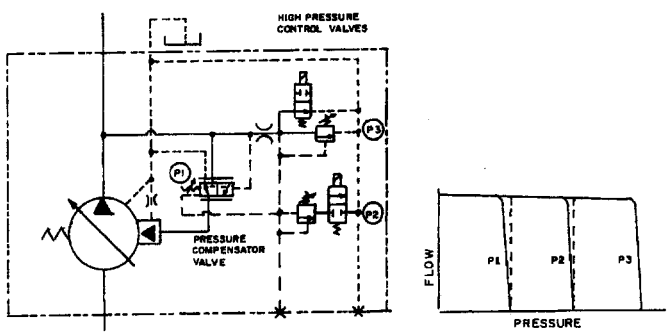
Low Pressure Compensator "CL"

Works the same as the CN Control except it provides a lower minimum pressure. Can be adjusted from 250 psi working pressure up to a maximum of 1500 psi. A remote control module "VSR" can be used to adjust the "CL" Control.



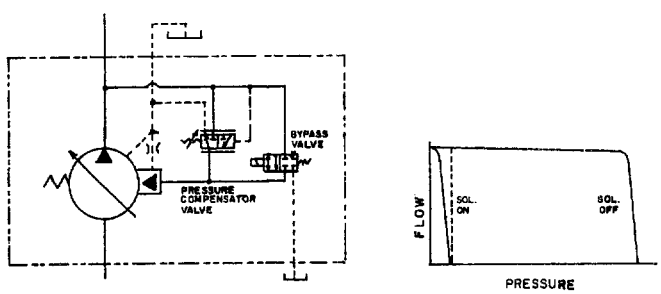
Triple Pressure Compensator "C3"

Provides three independently adjustable pressure compensated deliveries as selected by integral solenoids.



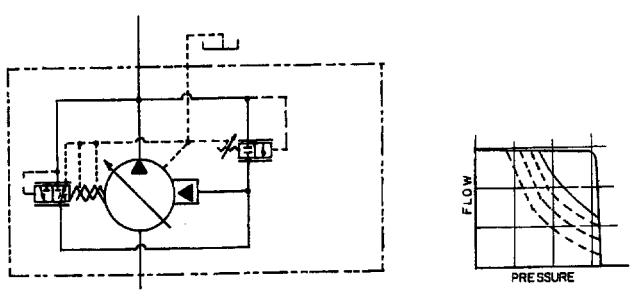
Soft Start Pressure Compensator "CU"

Pump starts "softly" by going quickly at low pressure to a reduced flow setting, thereby reducing start up torque requirements. While a standard compensator adjustor is supplied, a remote control module "VSR" can also be used to adjust the "CU" Control.



Horsepower Limiter "HP"

Automatically reduces delivery, as unit pressure rises, to limit horsepower consumption. Remote control module "VSR" can also be used to adjust pressure compensator action of the "HP" horsepower limiter controlled pumps.

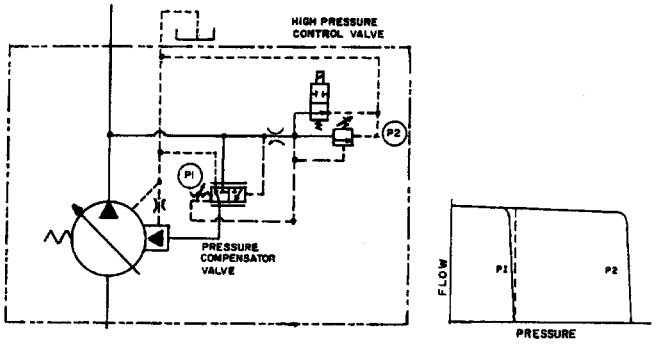


*Be sure system and pumps are protected against overloads with a high pressure relief valve.

VOLUME/PRESSURE SENSING*

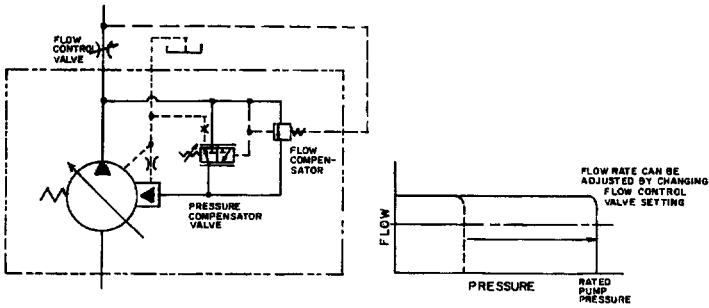
Dual Pressure Compensator "C2"

Provides two independently adjustable pressure compensated deliveries as selected by an integral solenoid.



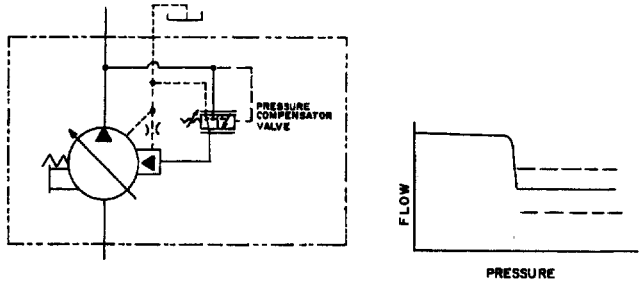
Load Sensing "CF"

A constant flow output is maintained for a given flow control valve setting regardless of changes in drive speed and/or working pressure. Remote control module "VSR" can also be used to adjust the pressure compensator action of "CF" controlled pumps.



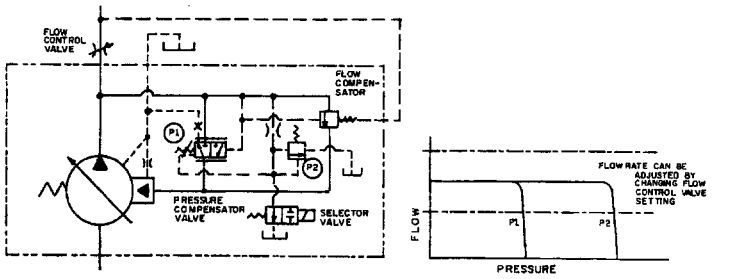
High-Low Pressure Compensator "CH"

Ensures maximum pump flow until unit reaches preset control pressure setting, then partially de-strokes the pump to provide a minimum variable adjustment preset flow rate regardless of system pressure. Requires a system relief valve for low flow/high pressure setting. Remote control module "VSR" can also be used to adjust the pressure compensator action of "CH" controlled pumps.



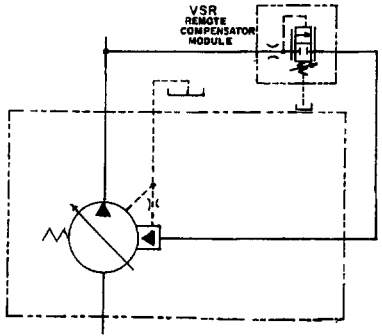
Dual Pressure Compensator with Load Sensing "2F"

Maintains a constant flow rate at up to either of two independent adjustable pressures as selected by an integral solenoid.



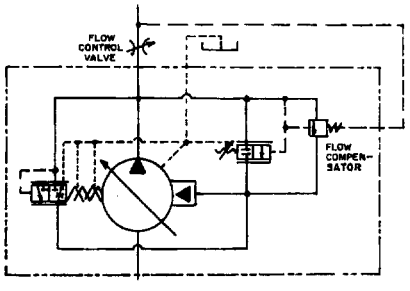
Remote Operator "VSR"

Remote control module to adjust "CF", "CH", "CL" ,"CN", "CU", HF and HP controlled pumps. When system pressure reaches the setting of the remote control module, the control then regulates output to match the requirements of the system while maintaining preset output pressure.



Horsepower Limiter with Load Sensing "HF"

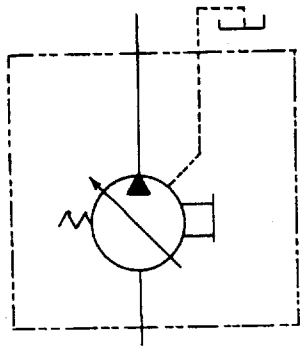
Load sensing control matches flow and pressure to load demand until (limiter) horsepower setting is reached. Control then automatically reduces delivery as unit pressure rises. A remote control module "VSR" can be used to adjust the "HF" control.



PUMP CONTROL
VOLUME*

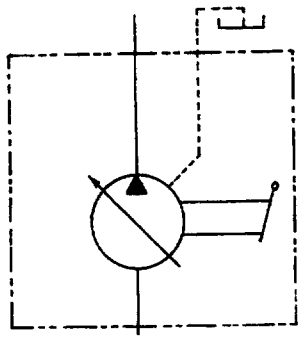
Handwheel "HN"

Provides simple manual handwheel adjustment of delivery.



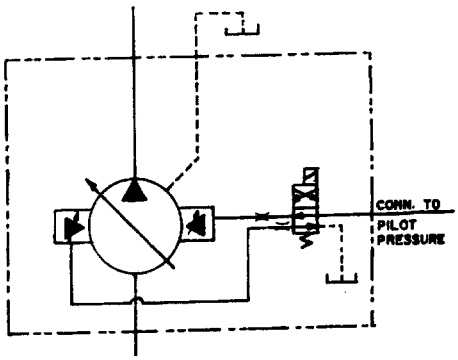
Lever Operated "MN"

Varies displacement proportional to the rotation of a pintle.



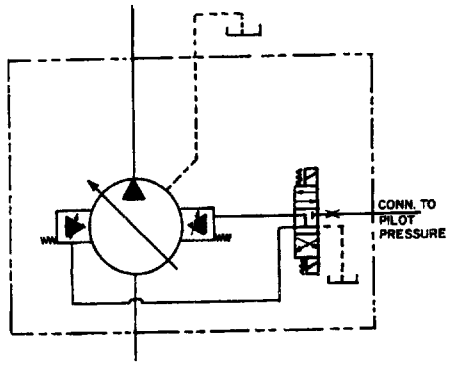
Solenoid Operated Dual Position "RU"

Two adjustable deliveries as selected by an integral solenoid operated valve.



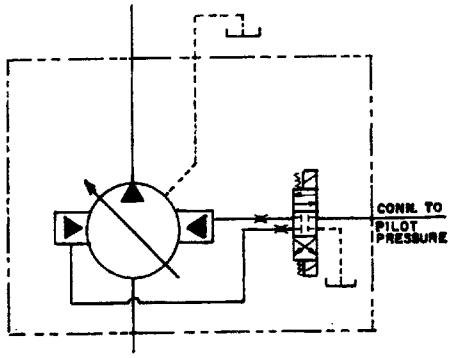
Solenoid Operated/Two Position/Spring Centered Without Neutral Bypass "RY"

Provides two adjustable deliveries as selected by integral selector valve, plus spring centered position when selector valve is de-energized.



Solenoid Operated/Infinite Position "RR"

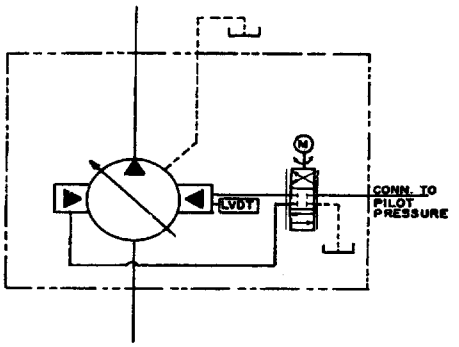
Provides infinite variable displacement settings as selected by an integral closed centered solenoid valve.



*Be sure system and pumps are protected against overloads with a high pressure relief valve.

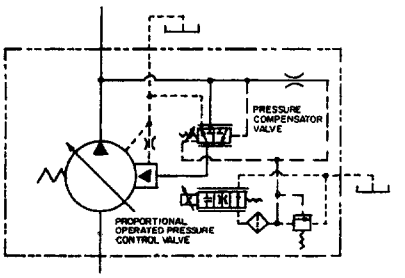
Electronic Servo Valve "VV"

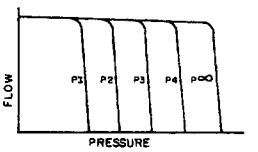
An electrohydraulic servo valve positions the swashplate mechanism with a closed loop position control (with LVDT feed back) providing high accuracy remote variable delivery control.



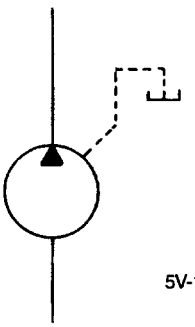
Electronic Proportional Pressure Compensator "ER"

Provides an infinite number of independent remotely adjustable pressure settings in response to an electrical command. Normally open shown but, also available as normally closed.





Fixed Displacement "NN"



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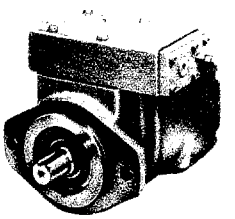
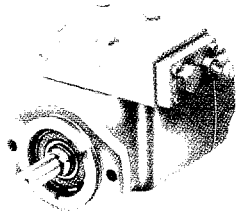


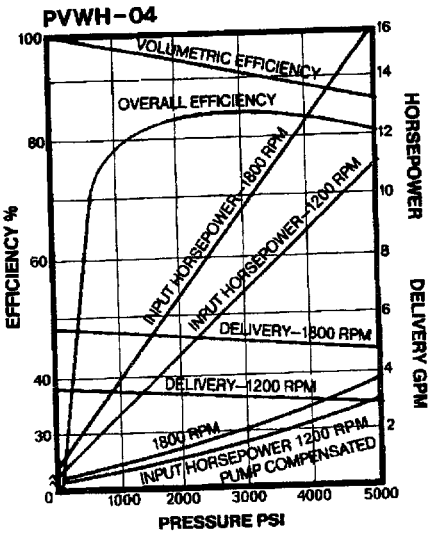
PERFORMANCE CURVES

The following single pump curves are based on an oil temperature of 125°F (160 SSU) and 14.7 psia (1 bar $_{abs}$).

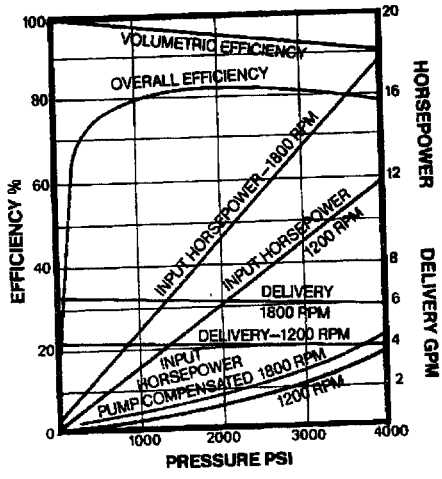
Frame Size **A**



PVWH-04



PVWH-06



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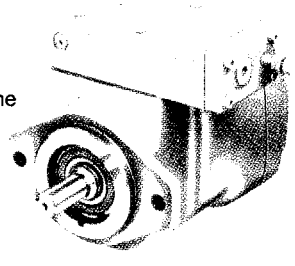

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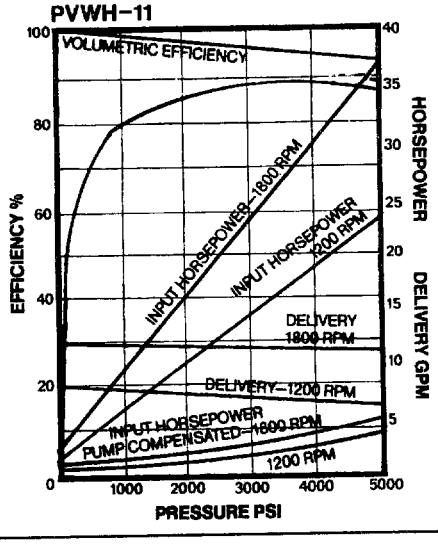
PVWH-11



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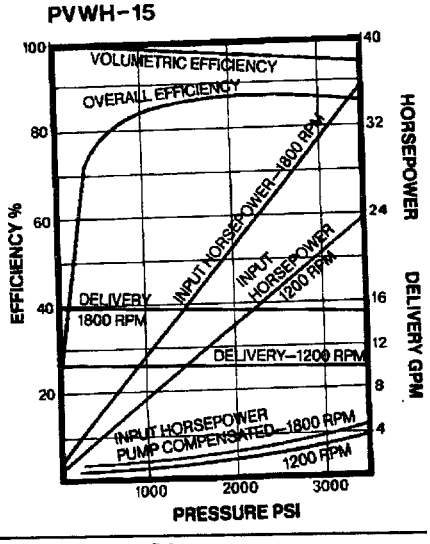

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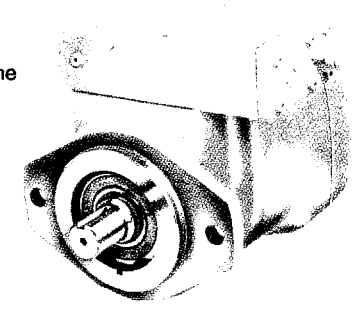

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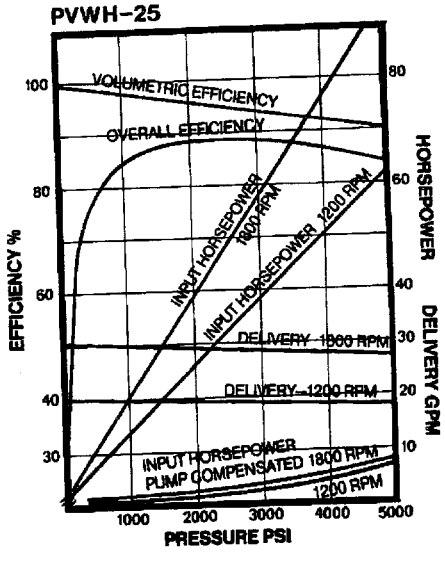

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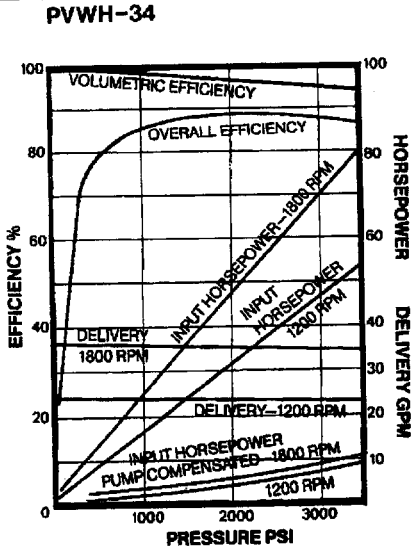

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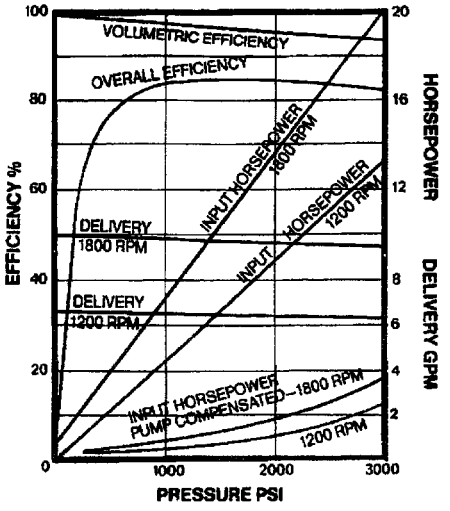
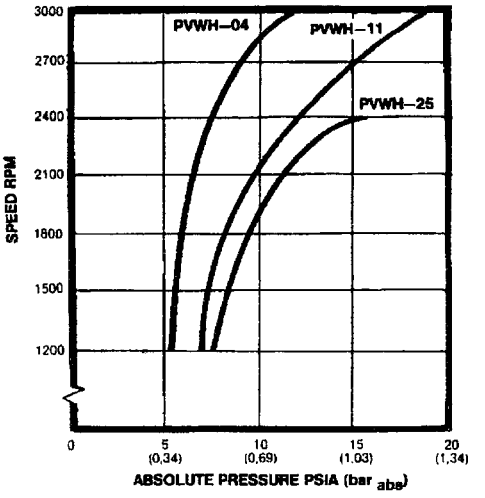
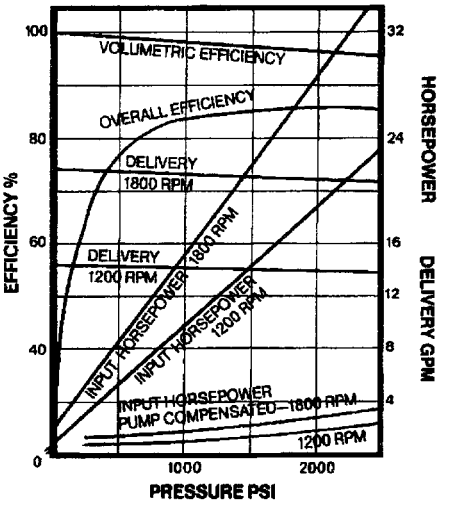
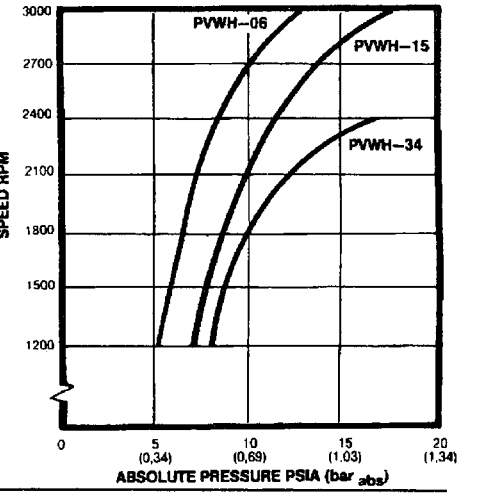


INLET SUCTION/SUPERCHARGE



PVWH-20





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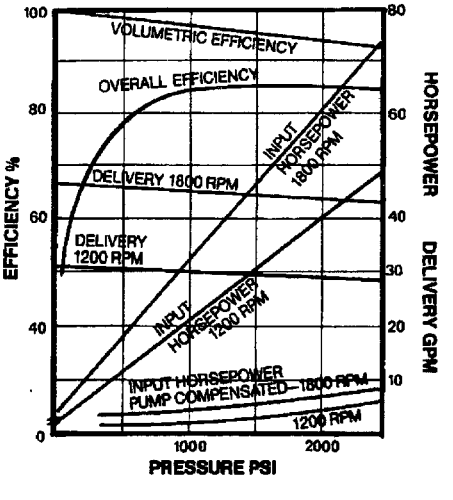
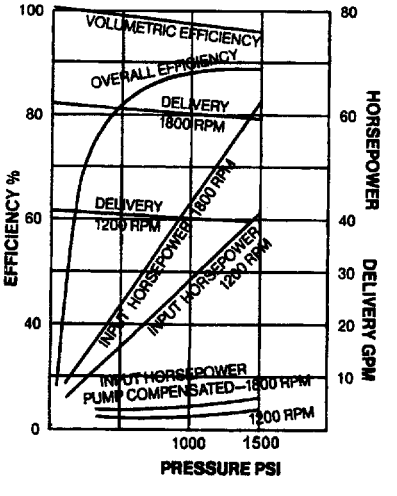
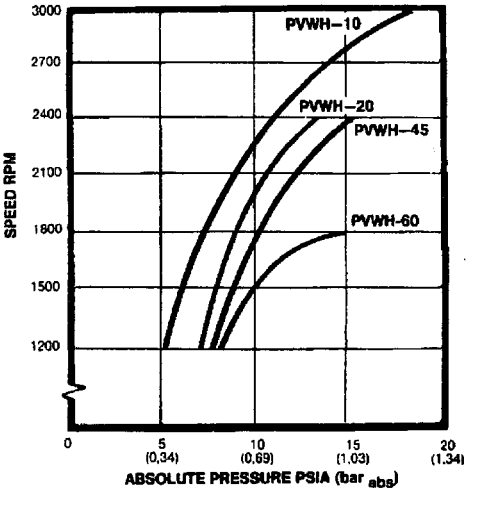


PVWH-60

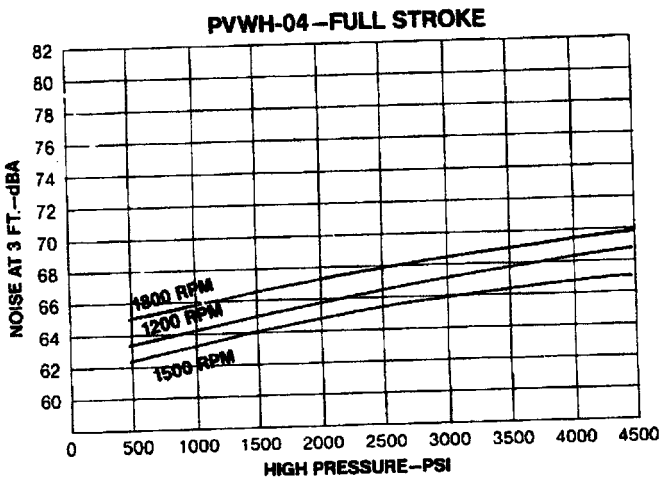




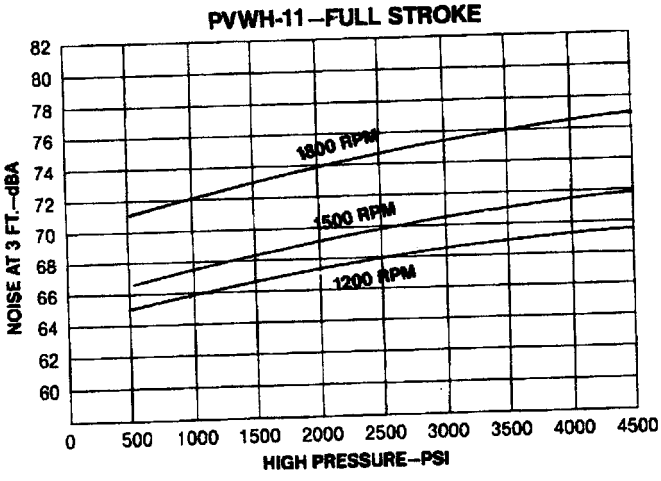
SOUND CURVES

All of the following sound curves are based on pump delivering full volume from port "A". Single microphone noise taken in semi-reverberant room at three feet from pump surface. Tolerance on curves is + 3 dBa.

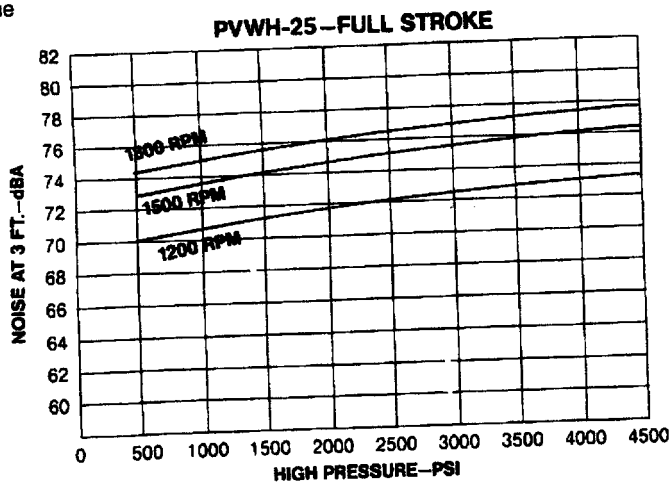
Frame Size
A

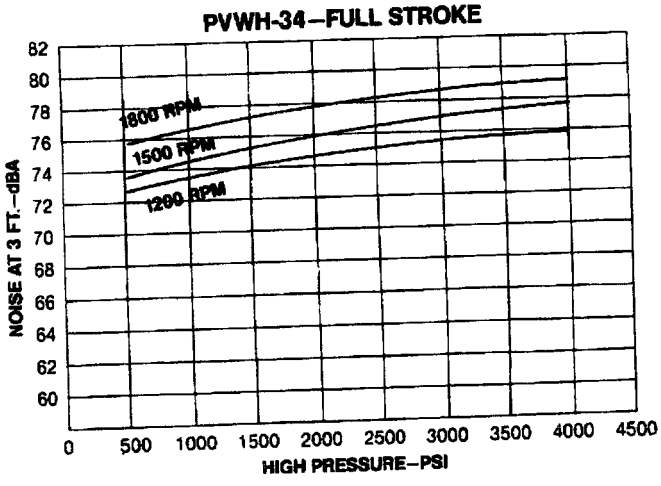


Frame Size
B

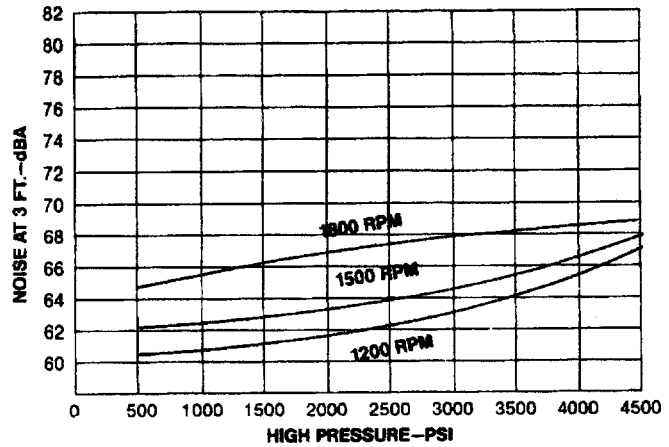


Frame Size
C

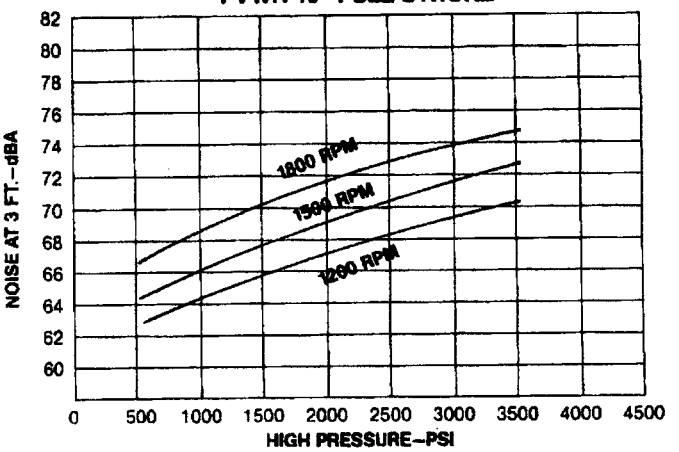




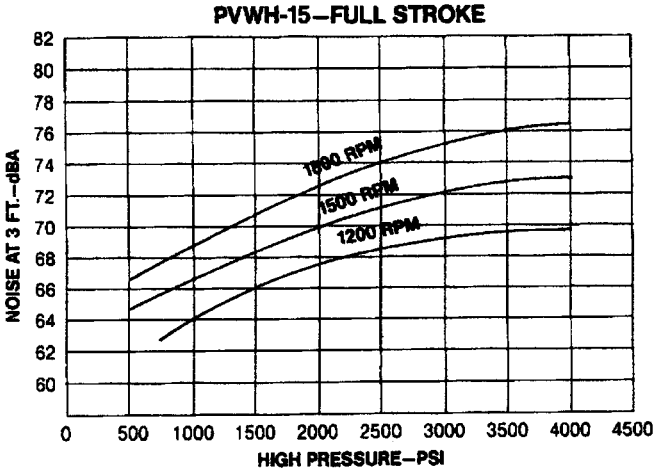
PVWH-06—FULL STROKE



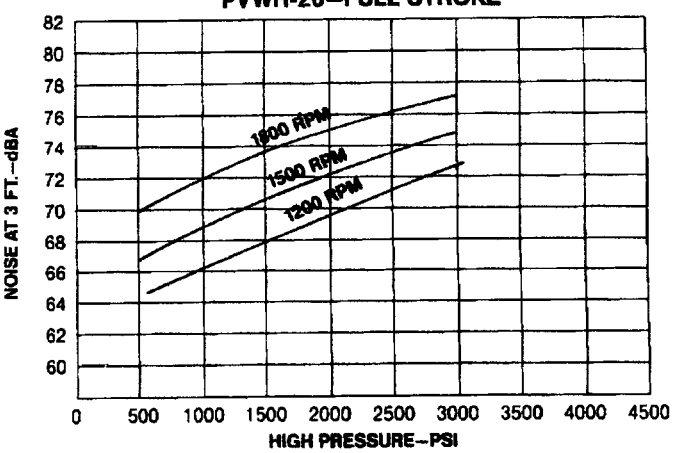
PVWH-10—FULL STROKE



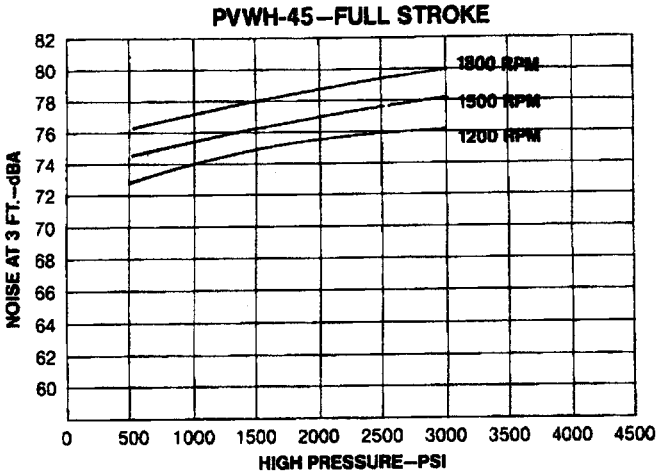
PVWH-15—FULL STROKE



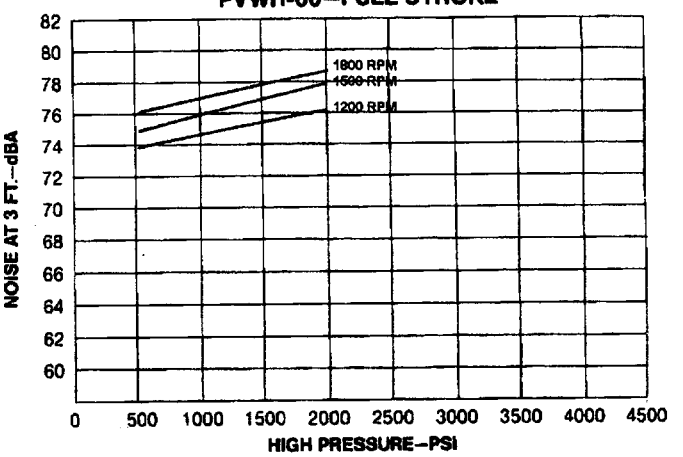
PVWH-20—FULL STROKE



PVWH-45—FULL STROKE



PVWH-60—FULL STROKE



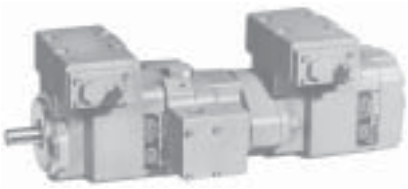
MULTIPLE PUMPS
PUMP COMBINATIONS

Two or more Oilgear axial piston variable delivery pumps can be integrally coupled together and driven from a single shaft.

Pump deliveries can be combined for large volume circuits or deliveries can be used individually. See page 4 for individual pump ratings.

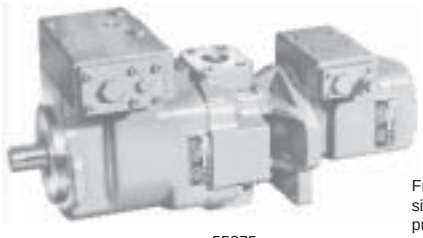
The front pump can be used at full rated output while the rear pumps are governed by the thru shaft torque listed in the table, on page 15.

89031



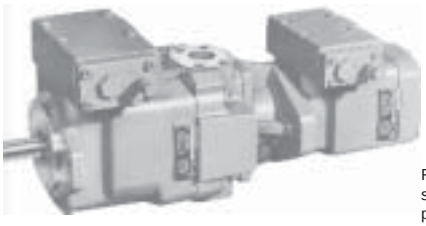
Front pump frame size A with second pump frame size A

55269



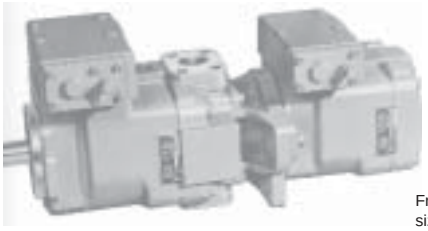
Front pump frame size C with second pump frame size A

55275



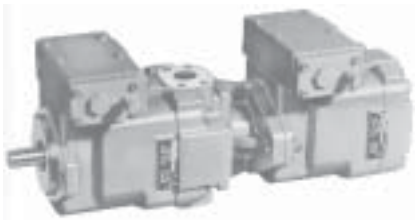
Front pump frame size B with second pump frame size A

55271



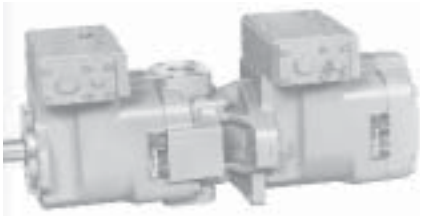
Front pump frame size C with second pump frame size B

55277



Front pump frame size B with second pump frame size B

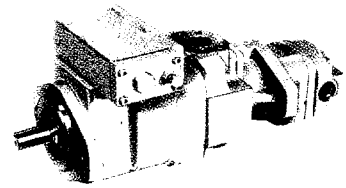
55273



Front pump frame size C with second pump frame size C

55279

GEAR PUMPS



SPECIFICATIONS

Based on 150—300 SSU viscosity fluids.

GEAR PUMP SIZE	THEORETICAL DISPLACEMENT		OPERATING SPEED		RATED CONTINUOUS PRESSURE		DELIVERY at 1800 rpm and rated pressure		POWER INPUT at rated pressure & 1800 rpm (add to piston pump)		WEIGHT (add to piston pump)		INPUT TORQUES (at rated pressure)	
	in^3/rev	ml/rev	rated	max	psi	bar	gpm	l/min.	hp	kw	lbs	kg	in-lbs	Nm.
01	0.100	1,6	1800	3000	1500	103,4	0.7	2,6	0.8	0,6	4.0	1,8	28.0	3,1
02	0.203	3,3	1800	3000	1500	103,4	1.4	5,3	1.6	1,2	4.5	2,0	57.0	6,4
04	0.465	7,2	1800	3000	2000	137,9	3.0	11,4	5.0	3,7	12.0	5,5	174.0	19,7
05	0.501	8,2	1800	3000	1000	68,9	3.5	13,2	2.7	2,0	6.5	3,0	94.0	10,6
07	0.698	11,44	1800	3000	1500	103,4	4.5	17,0	5.5	4,1	13.0	5,9	193.0	21,8
10	0.930	12,37	1800	3000	1000	68,9	5.9	22,3	5.0	3,7	14.0	6,4	174.0	19,7
15	1.500	24,58	1800	3000	750	51,7	9.6	36,3	6.0	4,5	15.5	7,0	210.6	23,8

THRU SHAFT SIZING/COMPATIBILITY

PISTON PUMP FRAME SIZE	INPUT TORQUE								ALLOWABLE THRUSHAFT TORQUE			
	PUMP SIZE	RATED PRESSURE		INPUT TORQUE (T_R) @ RATED PRESSURE		PEAK PRESSURE		INPUT TORQUE @ PEAK PRESSURE		STANDARD "TK" SHAFT NOTES (1 & 2)		HI-STRENGTH "TH" SHAFT NOTE (3)	
		psi	bar	in-lb.	Nm.	psi	bar	in-lb.	Nm.	in-lb.	Nm.	in-lb.	Nm
A	04	5000	344,8	570.7	64,3	5800	400,0	662.0	74,6	200	22,5	1290	145,1
	06	4000	275,9	612.7	70,0	4500	310,3	689.3	77,6				
	10	3000	206,9	717.8	80,8	3500	241,4	837.4	94,3				
B	11	5000	344,8	1306.0	147,1	5800	400,0	1515.0	170,6	500	56,3	2250	253,1
	15	3500	241,4	1278.0	143,9	4000	275,9	1460.6	165,5				
	20	2500	172,4	1243.0	140,0	3000	206,9	1450.2	163,3				
C	25	5000	344,8	3263.3	367,5	5800	400,0	3785.3	426,3	900	101,4	6400	720,0
	34	3500	241,4	2871.1	323,3	4000	275,9	3281.3	369,5				
	45	2500	172,4	2661.0	299,7	3000	206,9	3104.5	349,6				
	60	1500	103,4	2100.8	236,6	2000	137,9	2801.1	315,4				

ACTUAL INPUT TORQUE CALCULATION

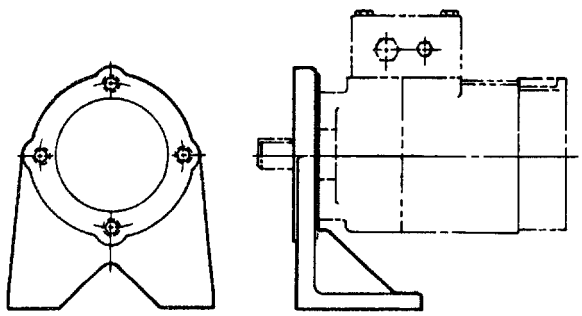
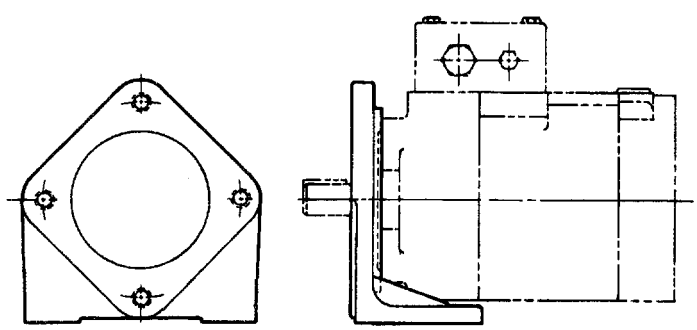
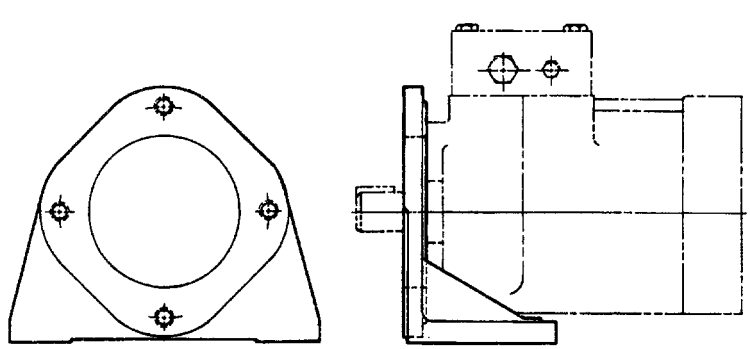
$$T_A = T_R \times \frac{\text{ACTUAL OPERATING PRESSURE}}{\text{RATED PRESSURE}} \times \frac{\%\ \text{FULL DELIVERY}}{100\%}$$

NOTE (1): When applying a thru shaft driven Oilgear pump or a thru shaft driven pump from other manufacturers, it must be determined that its actual input torque does not exceed the allowable thru shaft torque given in the table above. Use the formula given to determine actual input torque if the pump is applied at other than rated values.

NOTE (2): If more than one pump is to be thru shaft driven, their combined actual input torques must not exceed the above valves if their highest loads are experienced simultaneously.

NOTE (3): Total input torque to the front unit with the high strength shaft may not exceed the values given in the table. The torque may be divided between the units in any fashion as long as the total does not exceed the table value. If a triple pump is use, with the second and third units equipped with standard shafts, see notes (1) and (2) for second and third unit limitations on transmitted torque.

MOUNTING BRACKETS FOR PVWH PUMPS

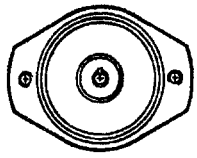
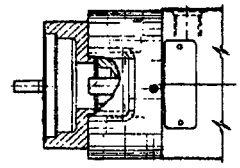
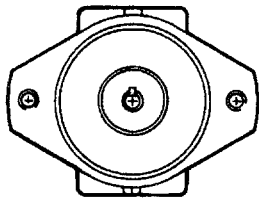
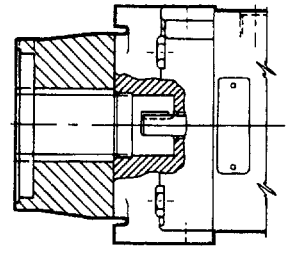
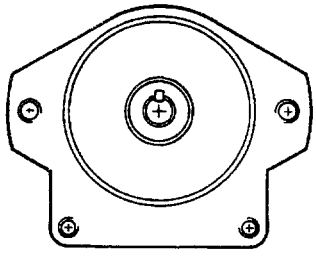
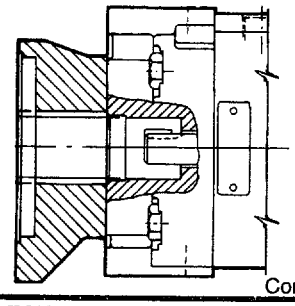
Piston Pump Frame Size	Pump Size	Order Code No.
A 	04, 06, 10	A
B  E60202	11, 15, 20	B
C 	25, 34, 45, 60	C

Contact your Oilgear Representative for detailed dimensions.

PLEASE FOLD OUT

SAE ADAPTERS FOR PVWH PUMPS

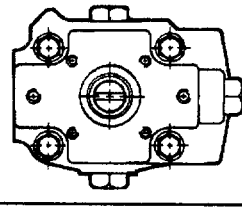
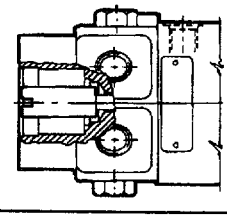
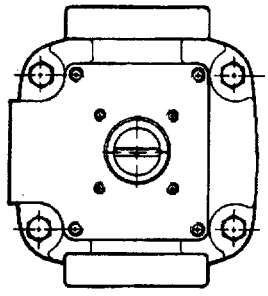
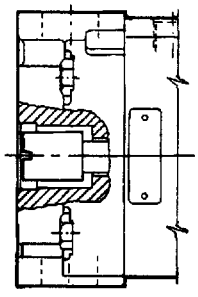
Installation adapters for single pumps with thru shaft and side ports.

Piston Pump Frame Size			For Mounting the Following	To Piston Pump Size	Order Code No.
A			04, 06, 10 Piston Pump	04, 06, 10	AA
			04, 07, 10, 15 Gear Pump	04, 06, 10	AG
B			04, 06, 10 Piston Pump	11,15, 20	AA
			11, 15, 20 Piston Pump	11, 15, 20	AB
			04, 07, 10, 15 Gear Pump	11, 15, 20	AG
C			04, 06, 10 Piston Pump	25, 34, 45, 60	AA
			11, 15, 20 Piston Pump	25, 34, 45, 60	AB
			25, 34, 45, 60 Piston Pump	25, 34, 45, 60	AC
			04, 07, 10, 15 Gear Pump	25, 34, 45, 60	AG

Contact your Oilgear Representative for detailed dimensions

TANG COUPLINGS FOR PVWH PUMPS

Couplings for low torque applications on pumps with thru shaft and side ports.

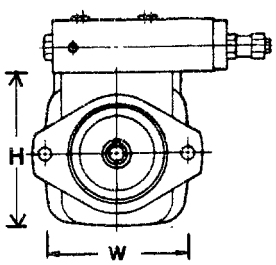
For Frame Size			For Mounting Gear Pump Sizes	To Piston Pump Size	Order Code No.
A			01, 02, 05	04, 06, 10	AT
A/C			01, 02, 05	11, 15, 20, 25, 34, 45, 60	AT

Contact your Oilgear Representative for detailed dimensions

PLEASE FOLD OUT

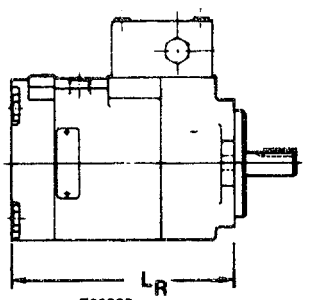
SIZE AND WEIGHTS
SINGLE PUMPS

ALL PUMPS



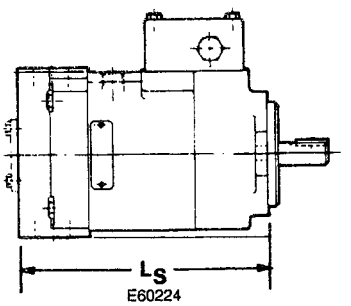
E60223

SINGLE PUMP W/REAR PORTS



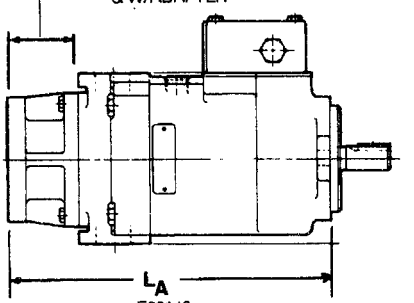
E60223

SINGLE PUMP W/SIDE PORTS W/OR W/O THRU SHAFT



E60224

SINGLE PUMP W/SIDE PORTS W/THRU SHAFT & W/ADAPTER



E60143

DIMENSIONS AND WEIGHTS W/O CONTROLS

FRAME SIZE	PVWH PUMP SIZE	HEIGHT H		WIDTH W		LENGTH L_R		L_S		L_A W/PISTON PUMPS ADAPTER		L_A * 01, 02, 05		L_A W/GEAR PUMP ADAPTER 04, 07, 10 & 15		WEIGHT SINGLE PUMP W/REAR PORTS	
		inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
A	04, 06 & 10	4.50	114,3	4.32	109,7	7.20	182,9	9.62	244,3	10,94	277,9	9.62	244,3	10.92	277,9	32	14,5
B	11, 15 & 20	6.11	155,2	5.80	147,3	8.50	215,9	9.63	244,6	12.36	313,9	9.93	244,6	12.36	313,9	68	30,9
C	25, 34, 45 & 60	7.18	182,4	6.76	171,7	10.44	265,2	11.50	292,1	14.00	355,6	11.50	292,1	14.00	355,6	103	46,8

All dimensions are approximate, for detailed dimensions contact your Oilgear Representative.
*01, 02 & 05 gear pumps mount on rear of pump without an adapter and are Tang Driven. Therefore length dimensions is the same as L_S plus L_G

Length Example
SINGLE PUMP
*With rear ports.
PVWH-15-RSAY-CNNN
Size 15 (L_R) length = 8.50 inches (215,9 mm)

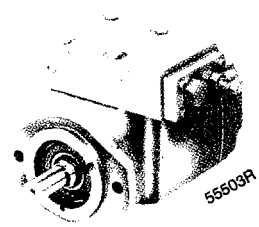
*With side ports, with or without thru shaft
PVWH-15-RDFY-VVNNTK
Size 15 (L_S) length = 9.63 inches (244,6 mm)
*With side ports, with thru shaft and adapter
PVWH-15-RDFY-VVNNTK-AG
Size 15 (L_A) length = 12.36 inches (313,9 mm)

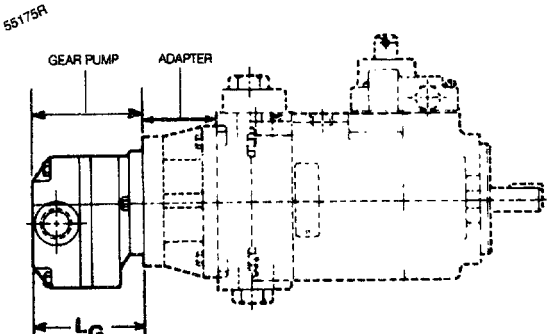
STANDARD AUXILARY
GEAR PUMPS

DIMENSIONS & WEIGHTS

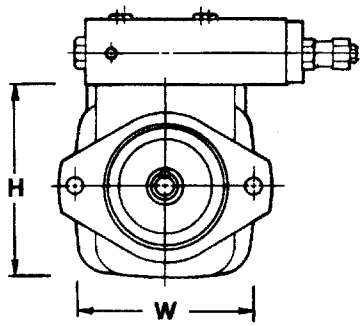
GEAR PUMP SIZE	LENGTH L_G inch	LENGTH L_G mm	WEIGHT lb	WEIGHT kg
TANG DRIVEN (Add to L_S)				
02	3.05	77,5	4.5	2,0
05	3.71	94,3	12.0	5,5
KEY DRIVEN (Add to L_A)				
04	4.41	112,0	6.5	3,0
07	4.58	116,3	13.0	5,9
10	4.82	122,4	14.0	6,4
15	5.15	130,8	15.5	7,0


55175R

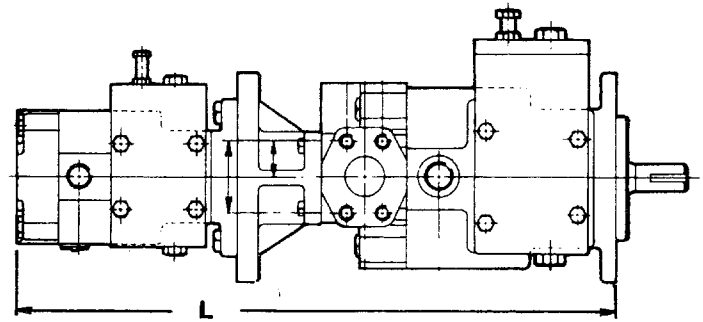

55503R



MULTIPLE PUMPS



E60143



E60143

DIMENSIONS AND WEIGHTS W/O CONTROLS

FRAME SIZE	PVWH DUAL PUMP SIZES	W WIDTH		L LENGTH		H HEIGHT		WEIGHT	
		inch	mm	inch	mm	inch	mm	lb.	kg
A/A	04, 06 or 10 & 04, 06 or 10	4-1/4	107	18 - 1/4	464	4-1/4	113	72	33
B/A	11, 15 or 20 & 04, 06 or 10	5-3/4	146	19 -1/2	495	6	155	108	49
B/B	11, 15 or 20 & 11, 15 or 20	5-3/4	146	21	533	6	155	144	66
C/A	25, 34, 45 or 60 & 04, 06 or 10	7-1/8	181	21-1/4	539	7-1/4	184	143	65
C/B	25, 34, 45 or 60 & 11, 15 or 20	7-1/8	181	22 -1/2	572	7-1/4	182	179	82
C/C	25, 34, 45 or 60 & 25, 34, 45 or 60	7-1/8	181	24 -1/2	622	7-1/4	182	214	97

All dimensions are approximate, for detailed dimensions of these or other multiple combinations including other types of auxiliary pumps, contact your Oilgear Representative.

Length Example:

DUAL PUMP
Two variable delivery pumps
PVWH-45-LDFS-CHSATK-/PVWH-20-LSAY-ERSNNN
Size 45 pump (L_A) length = 14 inches (355,6 mm) plus
Size 20 pump (L_B) length = 8.50 inches (215,9 mm) = 22.50 inches (571,5 mm)
One variable delivery pump and a gear pump
PVWH-45-LDFS-CHSATK-10
Size 45 piston pump (L_A) length = 14.00 inches (355,6 mm) plus
Size 10 gear pump (L_G) length = 4.82 inches (122,4 mm) = 18.82 inches (478,0 mm)
TRIPLE PUMP
Three variable delivery pumps
PVWH-45-LDFS-CNSNTK-/PVWH-20-LDFY-ER
SNTK-/PVWH-10-LDAY-RUSBTK-CP
Size 45 pump (L_A) length = 14.00 inches (355,6 mm) plus
Size 20 pump (L_A) length = 12.36 inches (313,9 mm) plus
Size 10 pump (L_S) length = 9.62 inches (244,3 mm) = 35.98 inches (913,9 mm)

HOW TO ORDER

BLOCK NUMBER EXPLANATION	1	2	3	—	4	—	5	6	7	—	8	9	10	11	12	13	14
DUAL PUMP EXAMPLE	P	V	WH	—	45	—	L	DF	S	—	CN	SN	TK	—	—	—	—
SINGLE PUMP W/THRU-SHAFT EXAMPLE	P	V	WH	—	34	—	R	DF	S	—	VV	NN	TK	—	CP	—	—
SINGLE PUMP WITH SIDE PORTS EXAMPLE	P	V	WH	—	10	—	L	DA	Y	—	CU	SB	TK	—	AT	V115	N.O.
SINGLE PUMP WITH REAR PORTS EXAMPLE	P	V	WH	—	06	—	L	SA	Y	—	RU	SB	—	—	—	V115	

Continued on next page

1 = UNIT
- P = Pump

2 = TYPE
- F = Fixed
- V = Variable

3 = DESIGN SERIES
- WH = Pump Series

4 = SIZE (1800 rpm)
- 04 = 04 gpm
- 06 = 06 gpm
- 10 = 10 gpm
- 11 = 11 gpm
- 15 = 15 gpm
- 20 = 20 gpm
- 25 = 25 gpm
- 34 = 34 gpm
- 45 = 45 gpm
- 60 = 60 gpm

5 = ROTATION (from shaft end)
- L = Left Hand (CCW)
- R = Right Hand (CW)

6 = PORT TYPE & LOCATIONS
- DA = Side Location w/SAE St. Thread Ports (for sizes 04, 06, 10)
- DF = Top & Botom w/SAE Flanged Ports (for sizes 11, 15, 20, 25, 34, 45, 60)
- DR = Flanged/Top & Bottom with Relief Valve (for sizes 11, 15, 20, 25, 34, 45 & 60) See Bulletin RV-1 for dimensions.
- GA = Top & Bottom w/SAE St. Thread Ports for non-thru shafted for sizes (04, 06 & 10)
- SA = Rear Location w/SAE St. Threads (for sizes 04, 06, 10, 11, 15, 20) w/SAE St. Thread (Pressure Port) & w/SAE Flanged (Suction Port) (for sizes 25, 34, 45, 60). Rear Ports cannot be used with thru-shaft (multiple) units.
- TA = Top & Bottom w/SAE St. Thread Ports (for thru shafted sizes 04, 06 & 10)

7 = INPUT SHAFT END
- Y = Keyed (SAE)
- S = Splined (SAE)
- B = Keyed (belt driven, size 04 thru 20)
- C = Splined (belt driven, size 04 thru 20)

8 = CONTROL TYPES

Pressure
- *CN = Pressure Compensator
- *CL = Low Pressure Compensator
- C2 = Dual Pressure Compensator
- C3 = Triple Pressure Compensator
- *CU = Soft Start Pressure Compensator
- *#CH = High-Low Pressure Compensator
- *HP = Horsepower Limiter

Volume/Pressure Sensing
- *CF = Load Sensing
- 2F = Dual Pressure Compensator with Load Sensing
- *HF = Horsepower Limiter w/Load Sensing

Volume
- #HN = Handwheel
- MN = Lever Operated
- #RU = Solenoid Operated Dual Position
- #RY = Solenoid Operated/Two Position/Spring Centered/ w/o Neutral Bypass w/Neutral Bypass
- #RR = Solenoid Operated/ Infinite Position
- NN = Fixed Displacement

Electronic
- ER = Electronic Proportional Pressure Compensator
- VV = Electronic Servo Valve

#The following controls are standard with the designated volume stops (which must be listed in block 9). If additional stops are required, use "SB" in block 9 instead.

Control	Standard Stop	Optional Stop
CH	SA (min.)	SB (both)
HN	SN (max.)	SB (both)
RR, RU, RY	SB (min./max.)	##

RR, RU and RY controls are available only with "SB" volume stops (which must be listed in block 9).

*For REMOTE "VSR" OPERATOR (optional)

Order line mounted "VSR" sequence valve as a separate item.

For additional information on this module, see Bulletin DS-82318.

9 = VOLUME STOPS
- SA = Minimum Volume Stop (not available with HP, HF, HN, RU,RY, or RR controls)
- **SB = Minimum & Maximum Volume Stop (not available with CU, HP, CF, 2F, HF or VV controls)
- **SN = Maximum Volume Stop (not available with CU, CH, CF, 2F, HF, RU, RY, or RR controls)
- NN = No stops (not available with CH, HN, RU, RY, or RR controls)

**Consult factory if stop is necessary for CU or CF controls.

1	2	3		4		5	6	7		8	9	10	11	12	13	14
P	V	WH	—	10	—	L	DA	Y	—	CU	SB	TK	—	CP	V12	NO

10 = THRU SHAFT TYPE

TK = Mounting for Key or Tang Driven Auxiliary Devices

TH = Mounting for Spline Driven Auxiliary w/high strength shaft Note: when using high strength shaft "TH", next pump requires splined input shaft

11 = HYDROSTATIC MODULE

— = Not Available in "PVWH" Series

12 = COUPLINGS, and ADAPTERS

(Used only when ordering coupling and adapter)

AA = For mounting PVWH-04,06, 10 (SAE A 2-bolt) to "TK" shaft.
AB = For mounting PVWH-11, 15, 20 (SAE B 2-bolt) to "TK" shaft.
AC = For mounting PVWH-25, 34, 45, 60 (SAE C 2-bolt) to "TK" shaft.
AT = Tang driven (only) for size 01, 02, 05 gear pump
AG = Key (only) for size 04, 07, 10, 15 gear pump
CP = Cover plate
VA = For mounting PVWH-04, 06 or 10 (SAE A 2-bolt) to "TH" shaft
VB = For mounting PVWH-11, 15 or 20 (SAE B 2-bolt) to "TH" shaft
VC = For mounting PVWH-25, 34, 45 or 60 (SAE C 2 bolt) to "TH" shaft

13 = CONTROL MODIFIERS (use only for pumps w/listed controls)

C2, C3, CU, 2F, RR, RS, RU, RY CONTROLS ONLY

V115 = 115/60 - 110/50 VAC
V220 = 230/60 - 220/50 VAC
V12 = 12 VDC
V24 = 24 VDC

CF CONTROL ONLY

P*** = Load Sense
*** = Load Sense Differential psi
170 = Standard Differential psi

HF, HP CONTROL ONLY

H** = Horsepower Lilmt
** = Hp. Setting at 1800 rpm

ER CONTROL ONLY

N.O. = Normally Open Valve
N.C. = Normally Closed Valve

14 = ADDITIONAL CONTROL MODIFIERS

(use only for pumps w/listed controls)

CU CONTROL ONLY

N.O. = Normally Open Sol. Valve
N.C. = Normally Closed Sol. Valve

2F, HF CONTROL ONLY

P*** = Load Sense
*** = Load Sense Differential psi
170 = Standard Differential psi

GEAR PUMPS

Optional Gear Pumps for tang Couplings

01 = 0.10 cipr (1,6 ml/rev)
02 = 0.20 cipr (3,3 ml/rev)
05 = 0.501 cipr (8,2 ml/rev)

Optional Gear Pumps for "TK" shafts

04 = 0.548 cipr (8,98 ml/rev)
07 = 0.765 cipr (12,54 ml/rev)
10 = 0.930 cipr (12,33 ml/rev)
15 = 1.500 cipr (24,58 ml/rev)

Optional Gear Pumps for "TH" shafts

05 = 0.488 cipr (8 ml/rev)
*07 = 0.672 cipr (11 ml/rev)
*10 = 0.976 cipr (16 ml/rev)
*14 = 1.403 cipr (23 ml/rev)
20 = 2.015 cipr (33 ml/rev)

*May restrict maximum pump rpm.

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