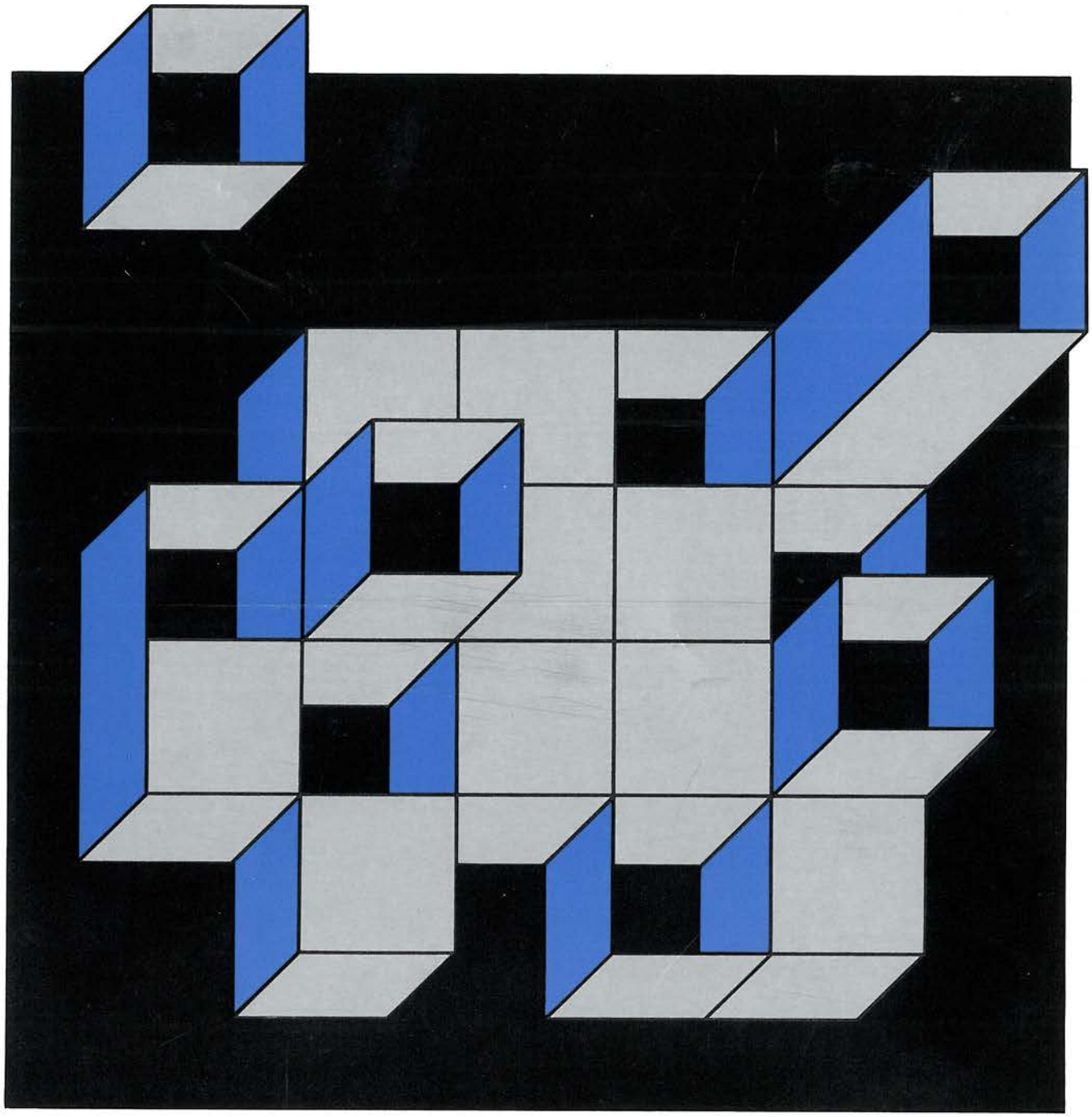
Oilgear

Type "L" Pumps and System Designed Modules



Bulletin 47077

5000 PSI Type "PVL" & "PFL" Pumps

Briefly Told

1—7.5, 17.0 and 25.0 cipr sizes available (page 10)
2—5000 psi for two-way or one-way delivery (page 6)
3—Variable or fixed delivery (page 6)
4—For open or closed circuits (page 6)
5—Foot, flange or in-tank mounting
6—90% overall efficiency (page 11)
7—85 dBA sound level (page 11)
8—49,000 hr (at 3500 psi) or 13,000 hr (at 5000 psi) B_{10} life (page 10)
9—Seals compatible with petroleum oil or phosphate ester fluids
10—Long life cradle bearings (page 4)
11—Variety of manual, hydraulic, pneumatic or electric controls available (page 7)
12—0.1 second control shift (zero to full) (page 7)
13—Tandem pump modules (page 14)
14—Suction/Supercharge modules (page 12)
15—High pressure relief valve modules (page 13)
16—Plus many more

For more definitive information, read on

Please Note:—Special, modified or custom made units not described in this bulletin are also available. Changes in the equipment described in this bulletin may be made without notice. For further information, detailed installation, drawings, etc., contact your nearest Oilgear Representative.

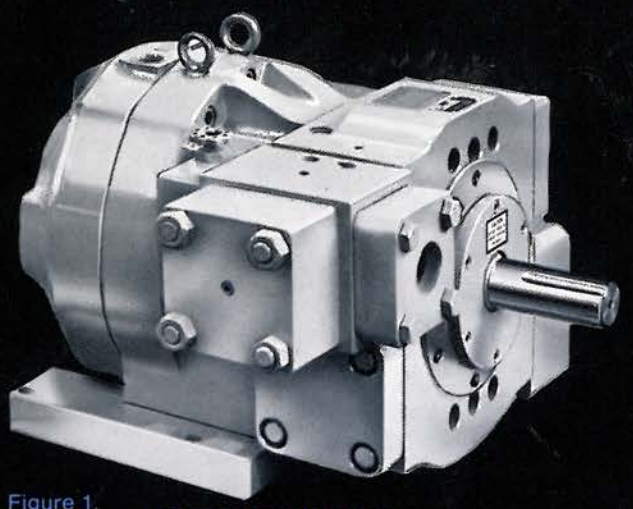


Figure 1.
Oilgear Type "PFLFFR-250-NNA-NE" Fixed Delivery Pump (55156).

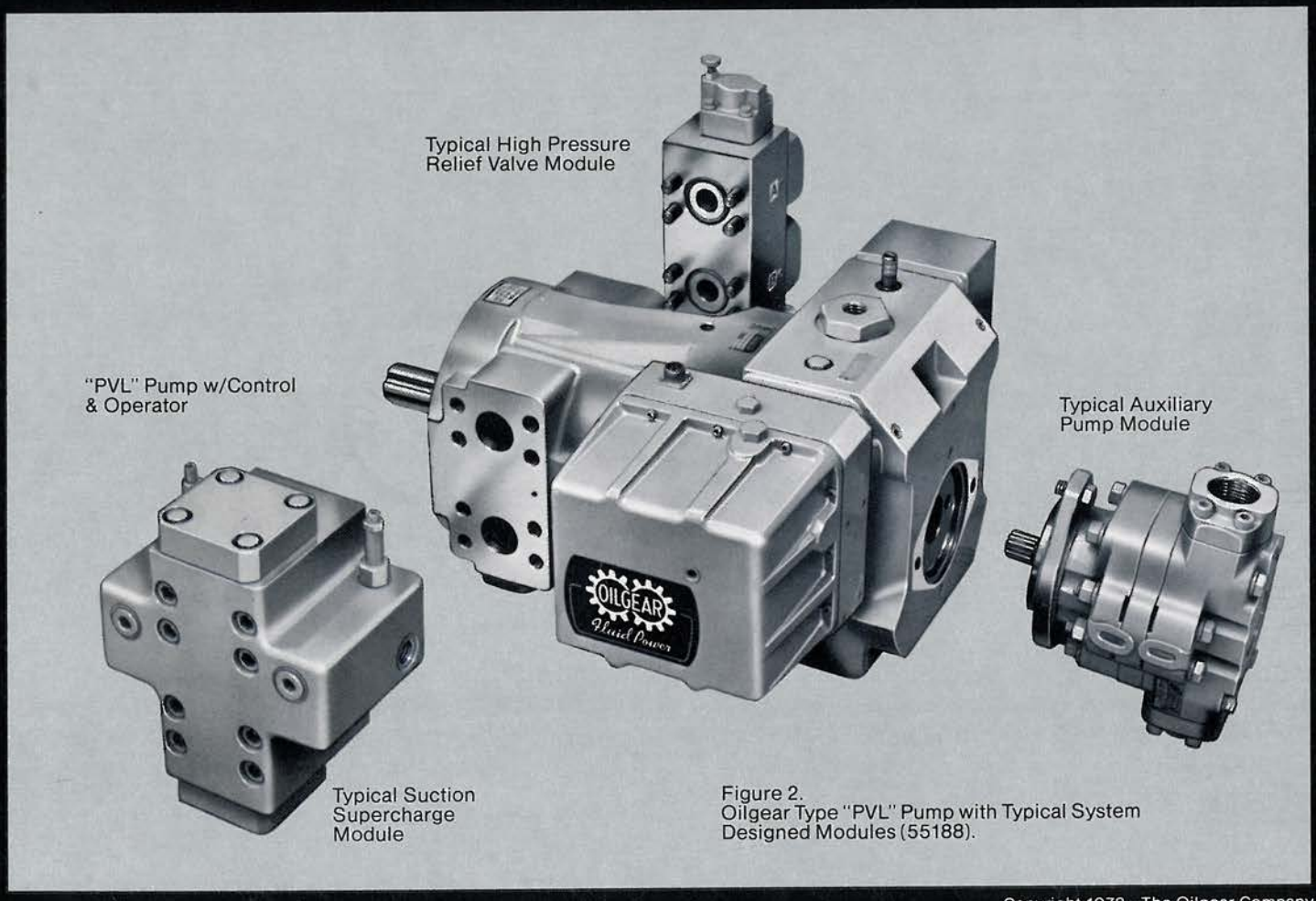
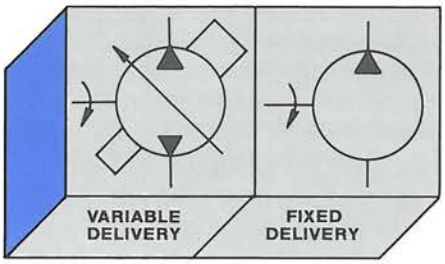


Figure 2.
Oilgear Type "PVL" Pump with Typical System Designed Modules (55188).



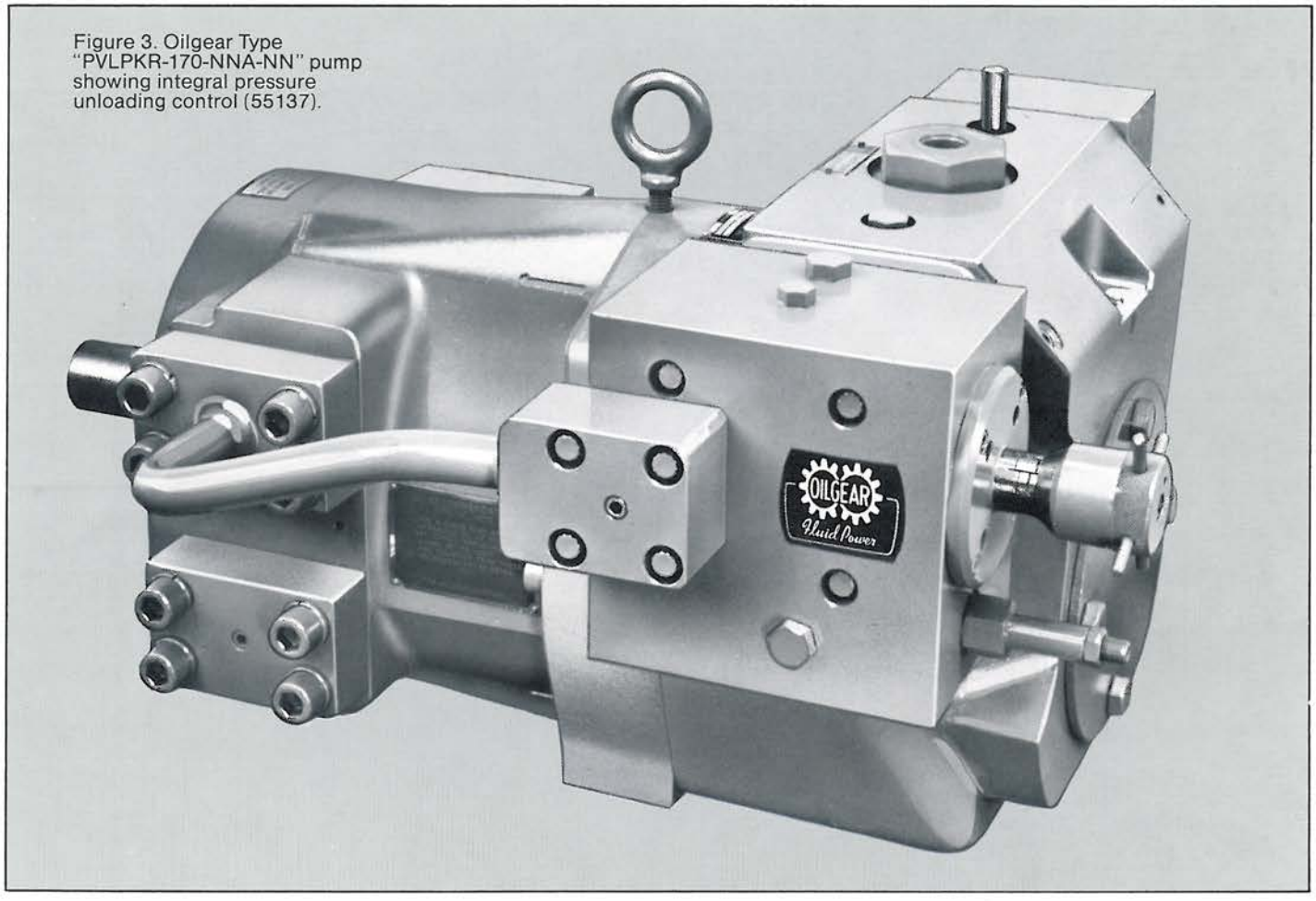
Oilgear, a builder of hydraulic equipment since 1921, offers you these building block concepts.

You pay only for as much system as you need. The Oilgear "PVL" pump line is a basic high pressure variable delivery two-way pump to which the auxiliary components necessary for your particular application can be easily manifolded or added. Fixed delivery "PFL" pumps are also available.

Your design and installation problems are reduced. The compact Type "L" Pump configuration allows foot, flange or in-tank mounting. Controls and optional modules can be mounted on either side of pump as dictated by your application and machine configuration.

Your maintenance problems are simplified. The Oilgear Type "L" Pumps are easy to disassemble and assemble—all three sizes are similar in construction. Controls are interchangeable (even between sizes in many cases). The high pressure pump or control assemblies can be removed for inspection without disconnecting the drive motor or high pressure piping from the rest of the machine or system. Maintenance is simplified because it is built to last.

Figure 3. Oilgear Type "PVLPKR-170-NNA-NN" pump showing integral pressure unloading control (55137).



Rugged Construction

A *high torque through driveshaft* forms the centerline for the heavy-duty pump housing. Additional pumps or other high torque elements can be coupled to the rear of the driveshaft. Thus, without a double-ended electric motor, etc., a package can be built to provide a high/low pressure system for horsepower conservation or multiple independent pumping sources for complex systems.

The driving (front) half of pump cylinder is splined to the driveshaft. This unique split cylinder design transmits torque and piston head reaction forces to the large cylinder roller bearing without transmitting them to the pumping (rear) half of the cylinder. The pumping half is a floating cylinder that is hydrostatically loaded to hold it and the replaceable *hardened tool steel wear plate* against the *replaceable port plate.*

Hydrostatic balancing minimizes wear loads on the cylinder/wear plate/port plate assembly and insures a positive seal of these elements during either rapid flow reversals or continuous operation. The bearings are rigidly located to eliminate bearing shift and edge loading found in other manufacturers' designs. Design bearing B_{10} life for these units is selected for full load, heavy-duty, continuous service (see design data on page 10).

The pumping pistons are held against a *replaceable cradle thrust plate* by a harness plate. The cradle is swivelled smoothly in arc shaped heavy-duty long life *replaceable saddle segment bearings*. The "PVL" design eliminates highly loaded control yoke bearings found in other designs.

The cradle is swivelled by push rods, that are operated by integral controls (not shown), to vary pump delivery on command. A *stroke indicator* rides on one of the push rods to give you a visual indication of cradle position and pump delivery.

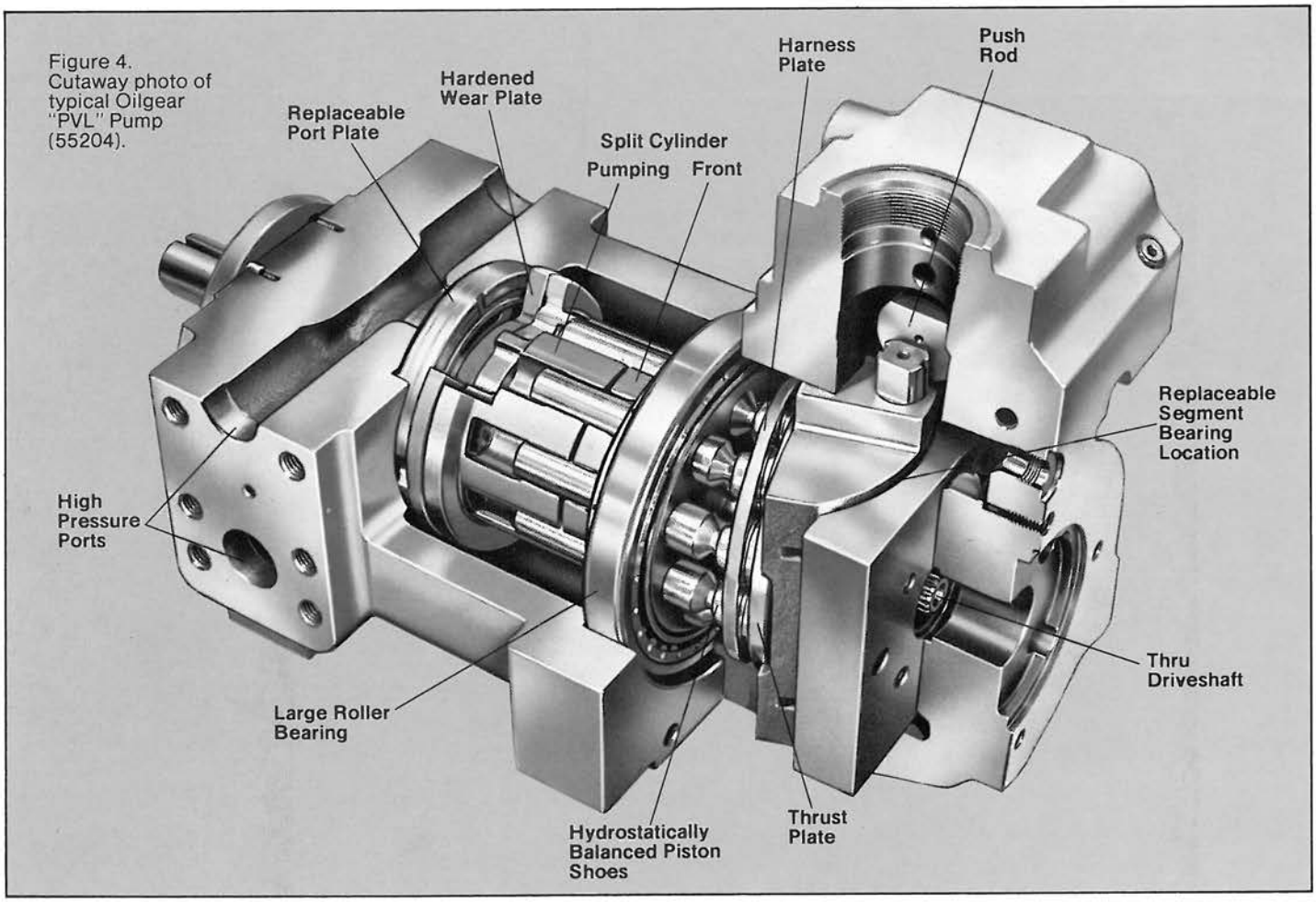


Figure 4. Cutaway photo of typical Oilgear "PVL" Pump (55204).

To help you understand some of the Oilgear "PVL" and optional module features and how you can obtain the fullest benefits from these units, we have diagrammed a unit with typical modules.

High Pressure Pump
The driveshaft rotates the cylinder containing the pumping pistons. A harness plate holds piston shoes against cradle. Therefore, when the cradle face is not parallel to the face of the cylinder, an in-out pumping motion is imparted to the pistons as the cylinder revolves. A study of the diagram will show the degree of cradle angle determines the amount of piston stroke and therefore the amount of pump delivery.

If the cradle angle is reversed, pump delivery ports are reversed. NOTE:—pump delivery reversal entails passing through a "neutral" position (cradle and cylinder faces parallel) where no fluid is delivered. This is an important feature—it cushions fluid flow reversal.

Optional Auxiliary Pump Modules
These pumps are offered with a standard gear pump as illustrated —but, the auxiliary pump could be any other type of gear pump, vane pump or another high pressure piston pump with still another low pressure gear pump. For further information on these auxiliary pumps, see page 14.

Optional Suction/ Supercharge Modules
A type "A" Module is illustrated—the large check valves allow full volume suction by the piston pump from either port while automatically blocking the other port. For further information on these modules, see page 12.

Optional High Pressure Relief Valve Modules
A Type "A" Module is illustrated—the relief valves remain closed as long as pressure on the seat and spring end (connected by axial slot) are balanced. When pressure forces the pilot valve open, the relief valve is unbalanced and opens to relieve pressure and thus protects the pump and system from overloads. For further information on the modules, see page 13.

Many Other Optional Modules Available
If you need only some of the features described for these selected modules—remember—other modules that are a variation on these are described elsewhere in this bulletin.

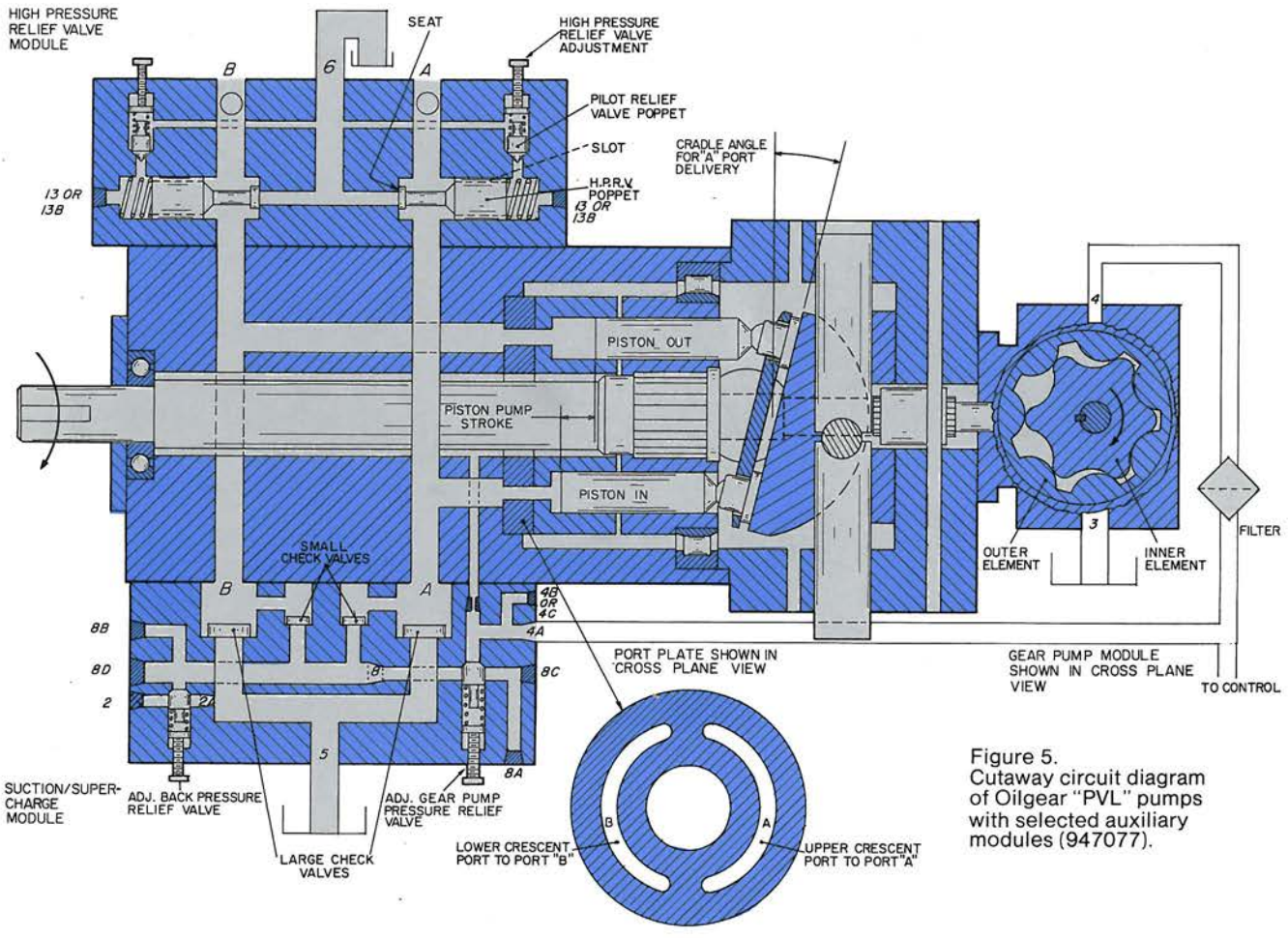


Figure 5.
Cutaway circuit diagram of Oilgear "PVL" pumps with selected auxiliary modules (947077).

Improve Your Design

With Oilgear Type "PVL" variable delivery pumps, you use power only in proportion to work performed. The volume can be controlled to match the work rate selected while the pressure (force) responds to the resistance met—lower volume and/or pressure out = lower input power to drive the pump. Power is not wasted in the form of heat through bleed off orifices, throttle valves, relief valves, etc. You reduce the need for heat dissipating devices and you save power.

By controlling pump delivery, you can steplessly control linear or rotary output motor velocity, direction, acceleration/deceleration or position. In addition, the working pressure can be controlled and adjusted (see high pressure relief valve modules on page 13) to suit the work performed in terms of force or torque. This also will minimize your input horsepower requirements.

Large internal passages in the pump (and modules) reduce hydraulic friction. Automatic pressure and flood lubrication of the internal parts combined with quality anti-friction bearing mounting of rotary parts, minimizes mechanical friction. The entire unit is enclosed to protect it from dust, dirt and even washdowns by high pressure hoses.

All these features, plus the OILGEAR name will improve the sales appeal of your design.

Two-Way Flow Pluses

Dollars/Appearance/Maintenance
Oilgear "PVL" Pumps improve your machine appearance while reducing maintenance. You can eliminate directional valves, flow control valves, simplify your circuits and piping. Thus you save money normally spent for these components—you simplify and enhance machine appearance—you reduce components and simplify maintenance.

Controlled/Cushioned Reversal
The delivery rate is steplessly variable from either port and reversal is cushioned. On reversing, flow from one port reduces to zero (as unit approaches neutral) and then increases (from zero) out of the other port. The rate of reversal can be accurately controlled to eliminate shock and save wear and tear on your machine or process.

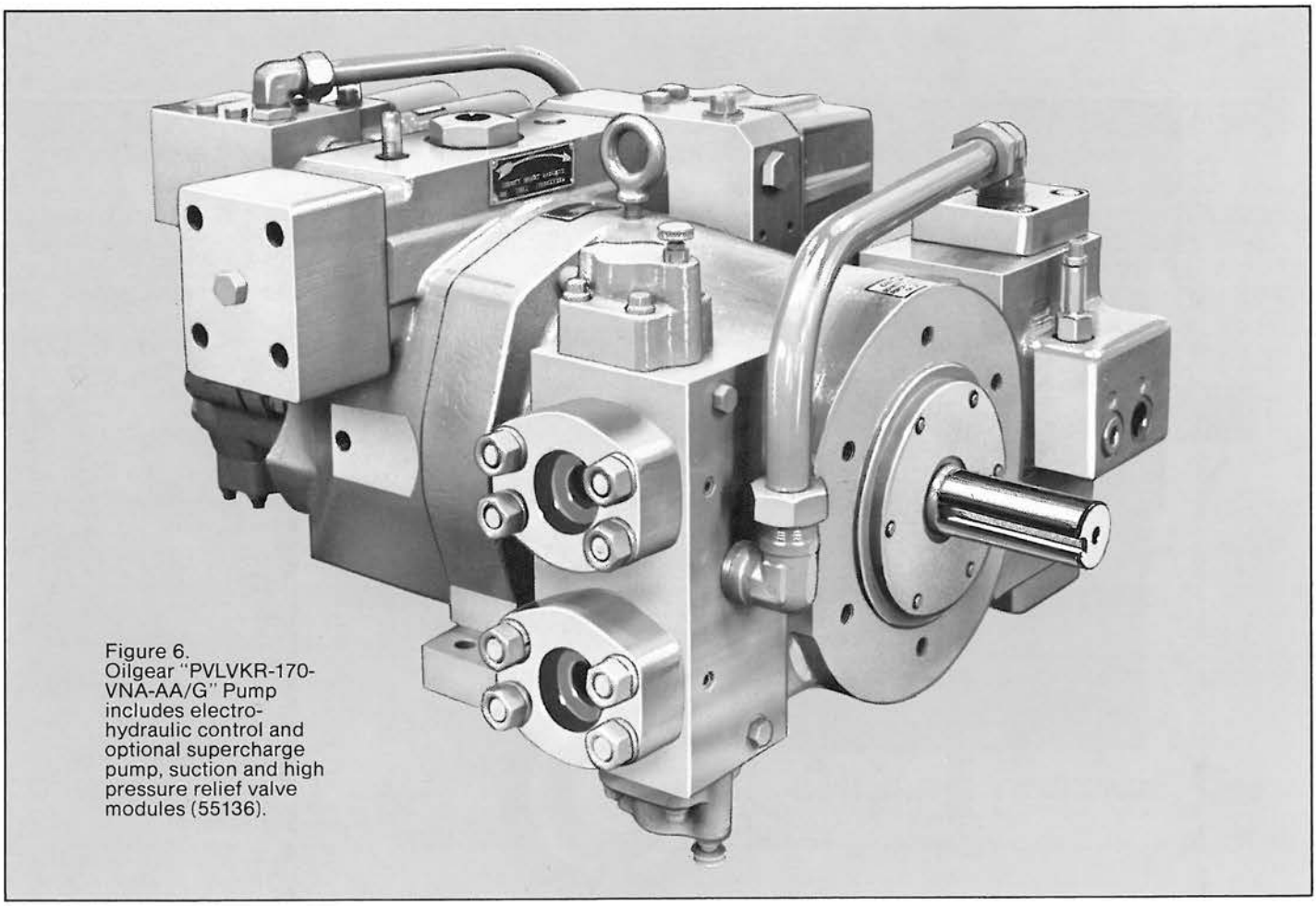
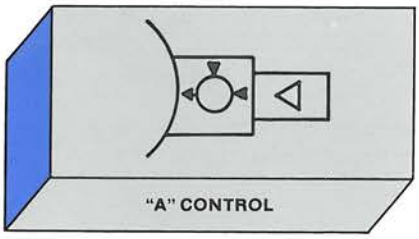


Figure 6.
Oilgear "PVLVKR-170-VNA-AA/G" Pump includes electro-hydraulic control and optional supercharge pump, suction and high pressure relief valve modules (55136).

Controls Operators and Modifications

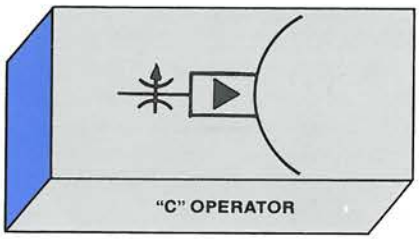
A wide variety of direct or remote operated controls to vary delivery are available to you. These integral controls and operators can be mounted on either side of the pump. One control assembly, normally, fits all three sizes of PVL Pumps. The correct control selection can optimize your system's performance characteristics (some can command zero to full delivery in less than a tenth of a second), save input power, increase machine flexibility and greatly reduce your process control link-up problems.



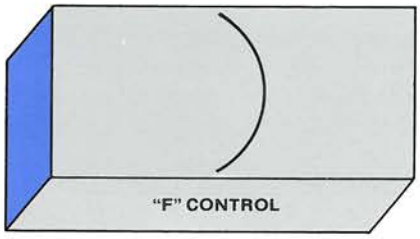
Type "A". An instrument air signal of 6 to 30 psi can provide you with remote (explosion proof) control of volume acceleration, deceleration, and/or reversal. The air control includes a hydraulic force amplifier, air proportional actuator plus air filter and main pressure regulator. You must supply a 35 to 100 psi dry air source in addition to the signal air pressure circuit consisting of instrument air pressure regulators, solenoid selectors, etc.

Type "A" (Modification) means a minimum control pressure signal moves the cradle away from the control.

Type "B" (Modification) means a minimum control pressure signal moves the cradle towards the control.

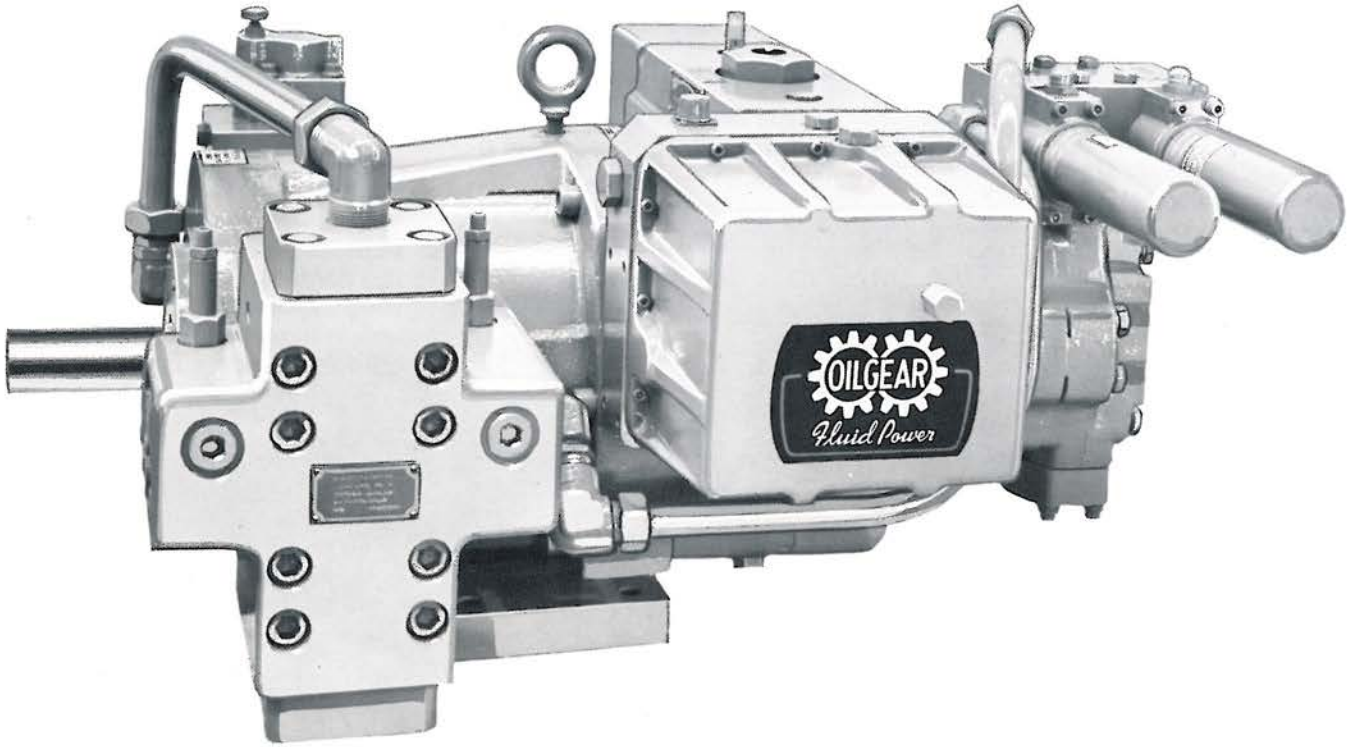


Type "C". Acceleration/Deceleration Operator governs the rate at which the delivery can be changed. It controls pump stroke and it prevents accelerating or braking pressure from exceeding a preset value, thus conserving input power for optimum efficiency.

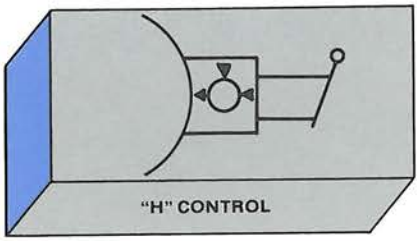


TYPE "F". Designation used only with "PFL" fixed pumps indicates *no variable* control adjustment.

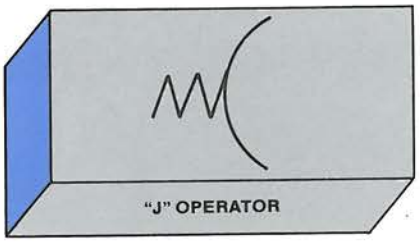
Figure 7.
Oilgear "PVL" Pump with integral Electrohydraulic servo valve control (55135).



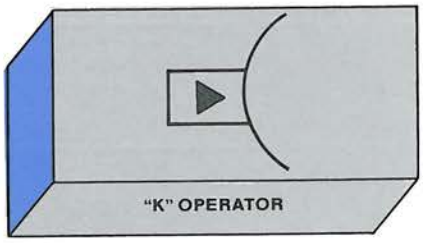
Controls Operators and Modifications



TYPE "H". Hydraulic servo-motor control requires only a light push-pull force on the control stem to provide you with controlled acceleration, follow-up, quick reversal of volume. Control includes a hydraulic force amplifier.

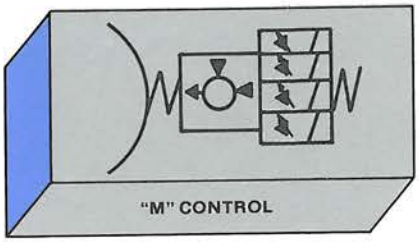


TYPE "J". Spring operator is sometimes used opposite a control to provide a bias (opposing) force to hold cradle against control.



TYPE "K". Non-adjustable *hydraulic operator* is usually used opposite a control to provide a bias (opposing) force to hold cradle against control.

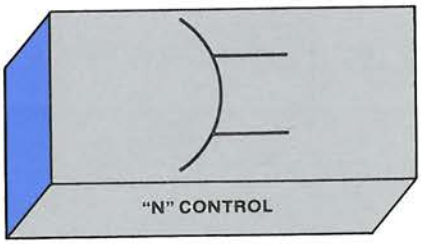
TYPE "C" (Modification) a choke can be installed in opposing operator to control rate of volume change (specify size of choke).



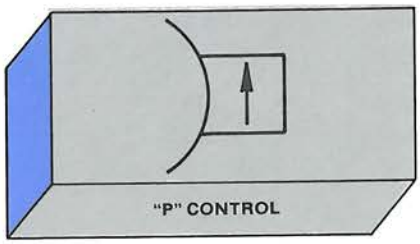
*TYPE "M". Multiple adjustable volumes and neutral are selected by integral solenoid valves that you can operate from remote devices such as limit switches, pushbuttons, relays, etc. You can adjust deliveries with integral micrometer preset knobs. A spring centering device returns control to neutral when no solenoids are energized. Control includes a hydraulic force amplifier and can also be furnished (specify) with an optional integral power limiting device.

TYPE "M" (Modification) designates controls for four preset deliveries and neutral.

TYPE "Y" (Modification) designates controls for two preset deliveries and neutral.

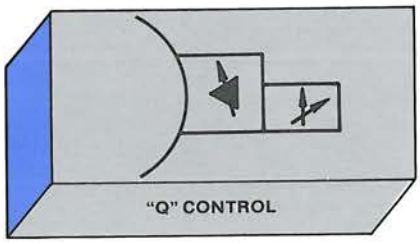


TYPE "N". Used with "PVL" Variable pumps when pumps are ordered with no control (replacement stock etc.).

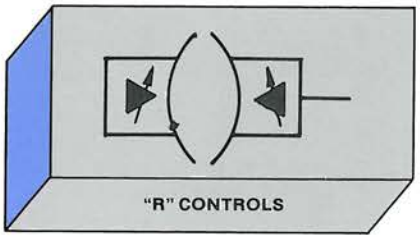


TYPE "P". Pressure unloading controls are used on one-way units or in combination with other controls on two-way units. They automatically reduce displacement while holding a preset pressure indefinitely to conserve power. Adjustment for presetting holding pressure is provided. Unloading time with this control is approximately .15 to .25 seconds. Higher response pressure unloading controls are considered special, but are available.

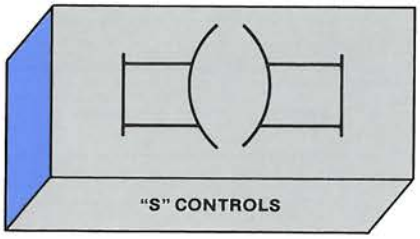
TYPE "R" (Modification) designates remote adjustable holding pressure controls that can be used with single or dual pressure systems.



TYPE "Q". Horsepower limiting control. Due to the large variety of types of horsepower limiting (plus acceleration/deceleration) features, a special description of requirements should be submitted to Oilgear so we can select the best control for your requirements. In general, the horsepower limiting controls involve a mechanical feedback from the stroking mechanism to vary the unloading pressure in relation to the pump stroke.

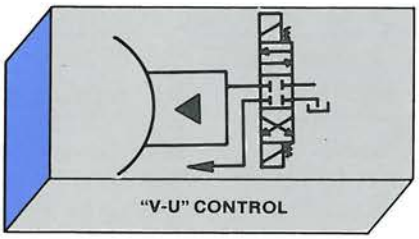


TYPE "R". Remote hydraulic control provides two adjustable preset displacements as selected by a hydraulic control valve. Usually a type "R" control is required on both sides of pump to provide two preset deliveries.

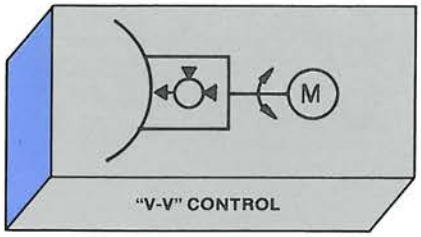


TYPE "S". Screw shaft controls are supplied to both sides of pump. The adjusting screws are used to preset (and lock) delivery volumes.

*TYPE "V". Controls are electrohydraulic positioning systems with electrical position feedback from the control push rods. (Used with type "K" operator).



TYPE "U" Modification utilizes an on/off system. This control includes a Linear Variable Differential Transformer for electrical feedback to your control signal panel. The control provides an inexpensive solution for remote volume control of the pump. Zero to full delivery response is 0.2 to 0.3 of a second with control accuracy of ±1%.



TYPE "V" Modification is a proportional control utilizing an electrohydraulic servo valve to operate the control plus a Linear Variable Differential Transformer for feedback. This is a high performance, high speed control utilized in closed loop electrical control applications. The control, when furnished with 2.4"servo valve is capable of zero to full delivery response in a tenth of a second, or less, with control accuracy of 0.1%.

TYPE "Z". Special controls for very specific applications have been developed by Oilgear. If none of the aforementioned controls seem to satisfy your needs—consult your Oilgear representative.

Dual Controls

In some cases, standard controls can be mounted on both sides of the pumps to provide additional control functions. Consult your Oilgear representative for these combinations.

Notes

1. Type "A", "H", "K", "M", "Q", "R" and "V" controls require a 450 to 600 psi (31 to 41 bar) pilot pressure to operate them. See Auxiliary gear pump module.

2. Type "V-V" controls require 3 micron filtration of control pilot volume. Optional gear pump modules can be provided with integral filters.

*Oilgear can furnish complete digital and analog control systems that are compatible with these pumps and can be tailored to your application.

Oilgear/Servocontrol can furnish these systems in standard racks with electronic modules that include amplifiers, pre-amplifiers, power supplies, ramp generators, relay/preset units, limiters, comparators, oscillators, manual presets, etc.

Specifications

Pressure Rating

All sizes—5000 psi (345 bar)

Size 250—5000 psi, or 6500 psi (448 bar) on application approved by The Oilgear Company

Full Delivery Ratings

UNIT SIZE	PVL & PFL PUMPS Rated Drive Speed																Starting Torque	
	60 Hertz								50 Hertz									
	1200 r.p.m.				1800 r.p.m.				1000 r.p.m.				1500 r.p.m.					
	gal/min	liters/min	input hp	input kw	gal/min	liters/min	input hp	input kw	gal/min	liters/min	input hp	input kw	gal/min	liters/min	input hp	input kw	in. lbs.	N.m
075	36.6	139	121	90,3	55.0	209	185	138	30.0	115	98	73.1	95.6	173	151	113	204	23
170	82.0	310	270	202,0	126.0	477	420	313	68.0	258	222	166	102,0	387	340	254	300	34
250	122.0	462	414	299,0	—	—	—	—	101.0	383	334	249	152	576	503	375	755	85

†Output volumes are given at synchronous speed specified. Volume losses due to pump slip have been deducted, volume losses due to loaded speeds will have to be calculated. Higher speeds can be used on applications approved by The Oilgear Company.

STANDARD (TYPE "G") AUXILIARY PUMP					
for Size	at rpm	Pressure psi	Pressure bar	Input (add) hp	Input (add) kw
075	1200	450	31	4	3
170	1200	450	31	7	5
250	1200	600	41	15	11

Pump B_{10} Bearing Life

It should be noted that pumps will usually be operated at varying load levels (pressure and/or delivery) during operation of the powered machines. Consequently, the life will be greatly extended from those arrived at for these severe operating conditions. Bearing B_{10} life for pumps run *continuously* at *1200 rpm*, *5000 psi*, and at *full delivery* are 8,600 hours for size 075; 12,000 hours for size 170; and 13,000 hours for size 250. Bearing life is an indirect ratio to speeds, and an indirect ratio to pressure and/or delivery to 3.33 power. Therefore, life expectancy for typical duty cycles is usually much greater than the figures given here.

The B_{10} expectancy of a PVL-075 pump running at 1800 rpm and delivering 75% of full delivery at 3500 psi for 50% of the cycle, 10% of full delivery at 5000 psi for 25% of the cycle and at neutral for the remaining 25% of cycle would calculate to be 97,800 hours.

However, bearing design life is only one criteria in determining over all pump life. Proper fluid and fluid conditioning as well as application are equally important criteria.

Dimensions (without controls or optional modules).

UNIT SIZE	Dimensions length in	length mm	width in	width mm	height in	height mm	weight lbs	weight kg
075	23	582	11	267	14	359	600	273
170	30	762	15	381	17	432	785	350
250	31	787	17	432	21	533	1300	590

For more detailed dimensions, contact your Oilgear representative for applicable data sheets.

Type "B" Through Shaft Modification Torque Limits

UNIT SIZE	Maximum Torque Limit In. Lbs.	Maximum Torque Limit N.m	Will accept ANSI B 93.6-1972 2 bolt Mounting Flange	Will accept ANSI B 93.6-1972 Spline Shaft
075	700	79	101-2	22-4
170	2360	266	127-2	32-4
250	2360	266	127-2	32-4

Suction Curves

NOTE:—data based on measurements made at suction port of pump—FLOODED SUCTION PREFERRED.

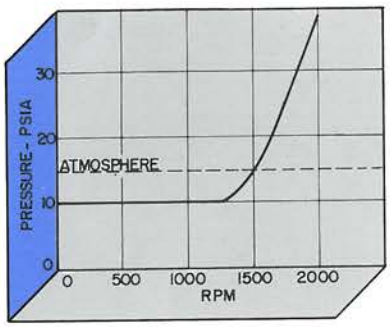


Figure 8.
PVL-075, Based on oil SG 0.88 at 230 SSU. Oilgear standard full volume suction valve modules add approximately 2 psi pressure drop to suction system.

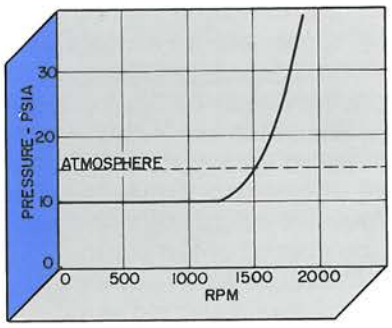


Figure 9.
PVL-170, Based on oil SG 0.88 at 230 SSU. Oilgear standard full volume suction valve modules add approximately 2 psi pressure drop to suction system.

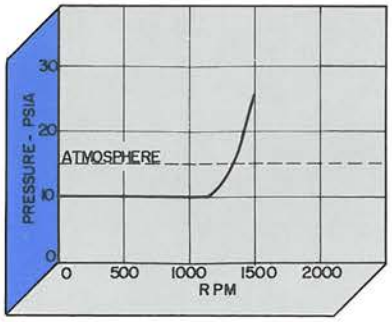


Figure 10.
PVL-250, Based on oil SG 0.88 at 230 SSU. Oilgear standard full volume suction valve modules add approximately 2 psi pressure drop to suction system.

Performance Curves

The following data is for units without auxiliary pumps. For delivery or horsepower at other speeds, multiply by ratio of desired speed to 1200 rpm.

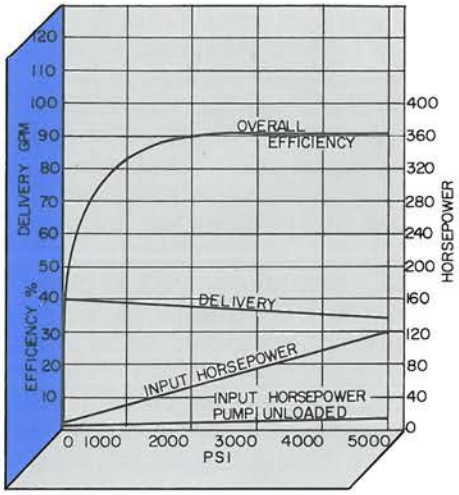


Figure 11.
PVL-075 Performance Characteristics. Based on oil temperature of 127°F (230 SSU) 1200 rpm input, 50 psi fully supercharged.

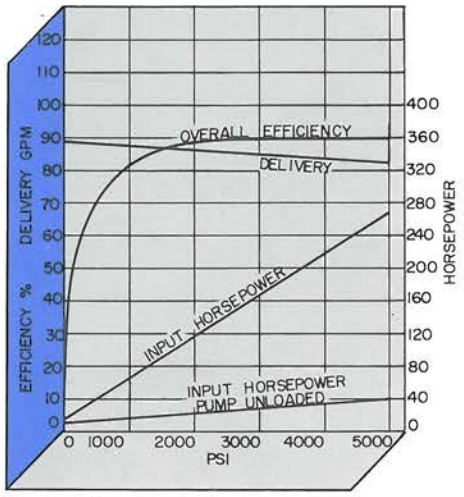


Figure 12.
PVL-170 Performance Characteristics. Based on oil temperature of 127°F, (230 SSU), 1200 rpm input, 50 psi fully supercharged.

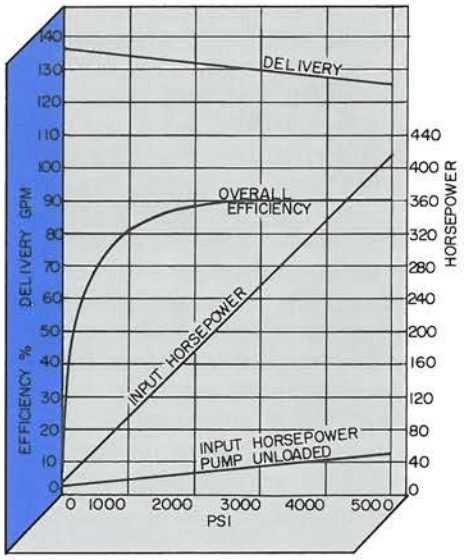


Figure 13.
PVL-250 Performance Characteristics. Based on oil temperature of 127°F, (230 SSU) 1200 rpm input, 50 psi fully supercharged.

Noise Curves

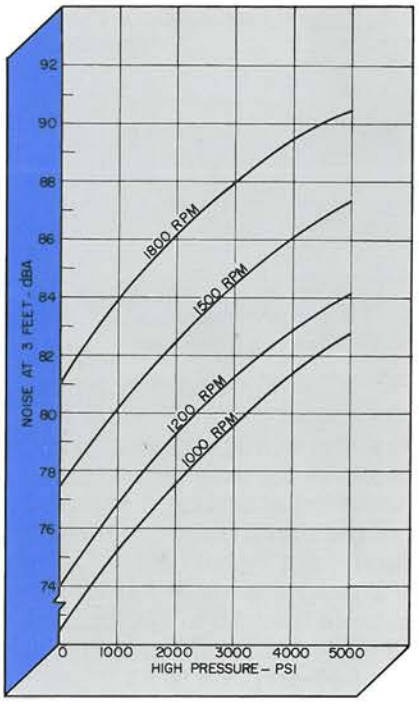


Figure 14.
PVL-075, Noise vs. Line Pressure. Based on pump delivering full volume of oil from either port, single microphone noise taken in semi reverberant room at 3 feet from pump surface. Tolerance on curve ± 3 dBA. Pump is supercharged with non-aerated oil.

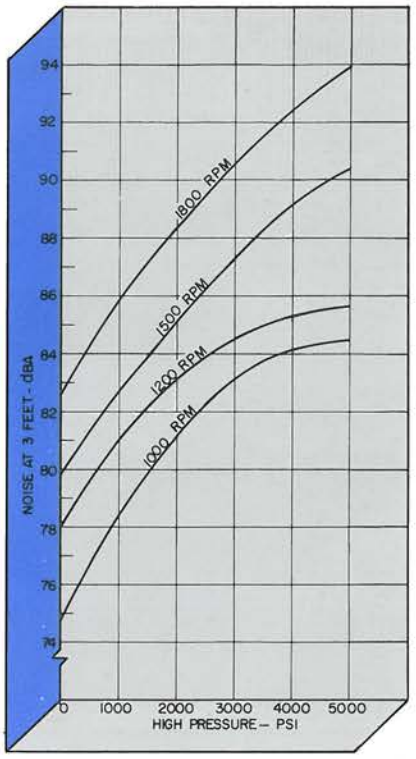


Figure 15.
PVL-170 Pump. Noise vs. Line Pressure. Based on pump delivering full volume of oil from either port, single microphone noise taken in semi reverberant room at 3 feet from pump surface. Tolerance on curve ± 3dBA. Pump is supercharged with non-aerated oil.

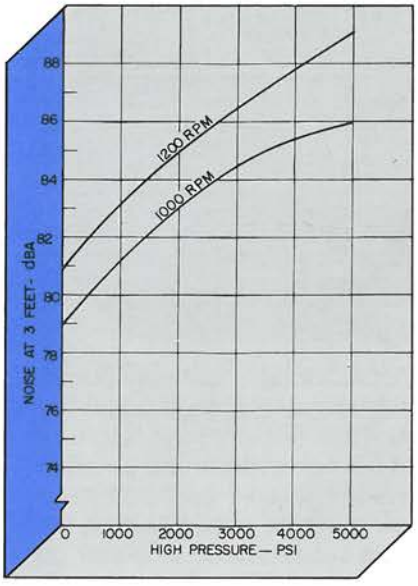
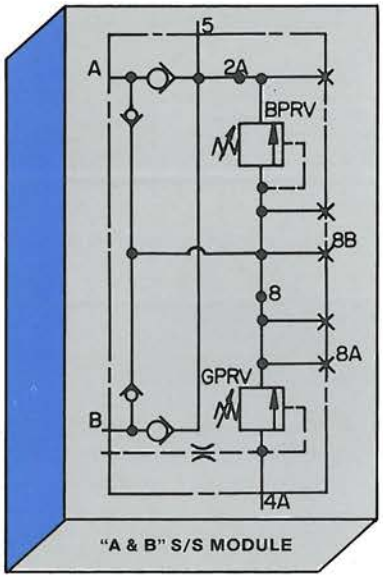


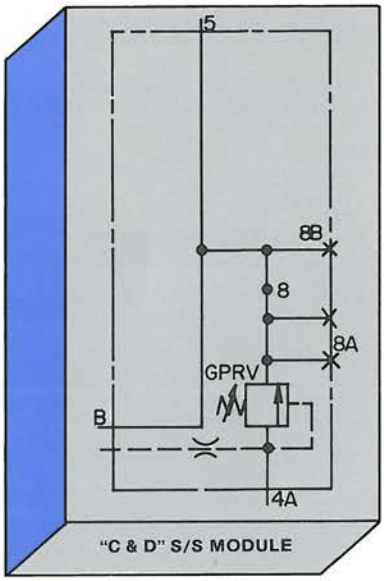
Figure 16.
PVL-250 Pump. Noise vs. Line Pressure. Based on pump delivering full volume of oil from either port, single microphone noise taken in semi reverberant room at 3 feet from pump surface. Tolerance on curve ± 3 dBA. Pump is supercharged with non-aerated oil.

Suction/Supercharge Modules

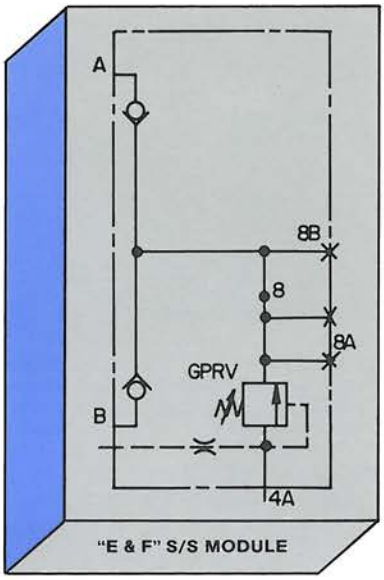
Figure 17.
Typical (type "A" or "B")suction supercharge module for Oilgear "type PVL" pumps (55185).



TYPE "A" or "B". Two-way pump suction/supercharge module for differential circuits (can also be used for non-differential circuits) allows full volume *suction* by the piston pump to either port or, full volume *supercharge* to either port while automatically blocking the other port. The gear pump relief valve (GPRV) is adjustable from 20 to 600 psi (1,4 to 42 bar) for size 075 and 170, or 200 to 800 psi (13,8 to 55,2 bar) for the size 250 to protect the pilot pump, controls or any auxiliary components connected to that system from overloads. GPRV exhaust can partially supercharge the high pressure pump through the two smaller check valves. The back pressure relief valve (BPRV) is adjustable from 20 to 350 psi (1,4 to 25 bar) or, in the case of size 250 fixed for 60 psi (4,1 bar). The BPRV will bypass the GPRV exhaust when not used for supercharge. Provisions are also made in the module to bleed about 2 gpm of pilot pump volume into case for forced lubrication. Provisions are also made so GPRV exhaust can be diverted through a cooler before entering the supercharge circuit.



TYPE "C" or "D". One-way pump suction/supercharge module for differential or non-differential circuits allows full volume suction or full volume supercharge to port "B" of the pump (specify in writing if you require this at port "A"). The gear pump relief valve (GPRV) is adjustable from 20 to 600 psi (1,4 to 42 bar) for size 075 and 170, or 200 to 800 psi (13,8 to 55,2 bar) for size 250 to protect the pilot pump, controls or any auxiliary components connected to that system from overloads. Provisions are made for forced lubrication of the high pressure pump by 2 gpm of pilot pump volume.



TYPE "E" or "F". Two-way pump supercharge module for non-differential circuits allows only pilot pump to provide supercharge (make up volume) through two small check valves to the high pressure pump. Module also provides a gear pump relief valve (GPRV) that is adjustable from 20 to 600 psi (1,4 to 42 bar) for size 075 to 170, or 200 to 800 psi (13,8 to 55,2 bar) for size 250, to protect pilot pump, controls or any auxiliary components connected to that system. Provision is also made for forced lubrication of the high pressure pump by 2 gpm of pilot pump volume. This module is intended for hydrostatic drive circuits.

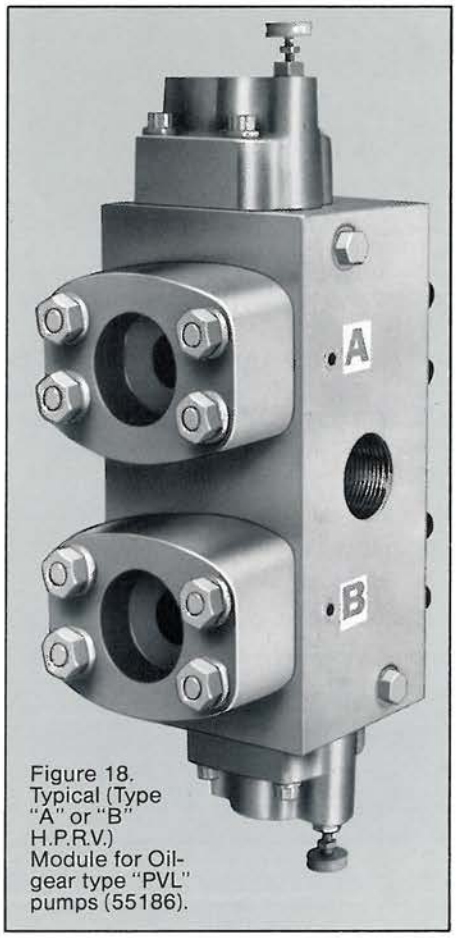
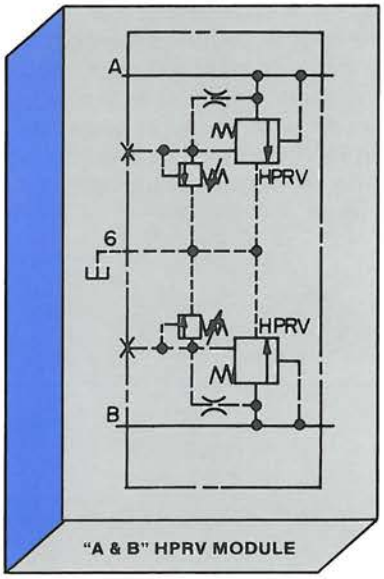
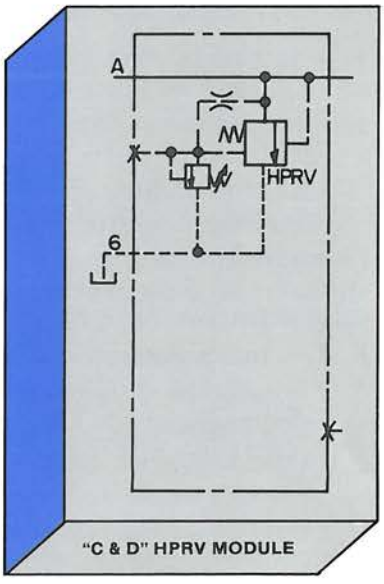


Figure 18. Typical (Type "A" or "B" H.P.R.V.) Module for Oilgear type "PVL" pumps (55186).

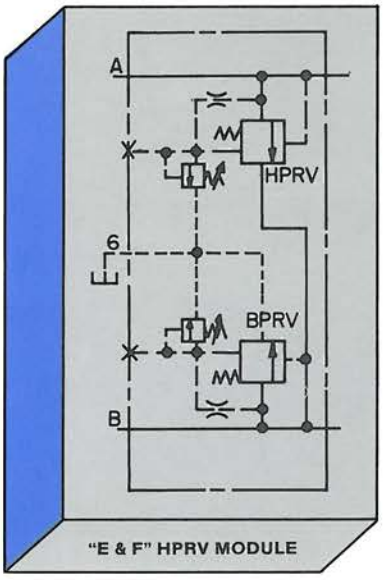
These modules provide excellent pressure/volume characteristics with minimal peaking. The large full flow (sized to by-pass total flow from the pump) relief valves are pilot operated and are easily adjusted by simple screw mechanisms. "Vent" ports are provided so relief valves can be used to by-pass flow at a minimum pressure. Another option (must be specified in writing when ordering) is the dual pressure operator for high/low pressure systems. Construction provisions are made to dampen the opening and closing action to prevent "chattering" or unstable pressure action.



TYPE "A" or "B". A two-way pump module that provides high pressure relief valve protection for both A and B ports. The large relief valve exhaust port can be piped to reservoir or to the suction/supercharge module.



TYPE "C" or "D". A one-way pump module that provides high pressure relief valve protection for port A. The large relief valve exhaust port can be piped to reservoir or to the suction/supercharge module. If port "B" (only) protection is necessary, this requirement will have to be specified in writing.



TYPE "E" or "F". A one-way pump module that provides high pressure relief valve protection for port A. The high pressure relief valve (HPRV) exhausts to the other port (B) which is equipped with a back pressure relief valve (BPRV) to exhaust any excess pressure (volume) to that port. This module provides excellent circulation of supercharge fluid in non-differential one-way hydrostatic drive circuits—in this case, there is no braking pressure. If port "B" (only) HPRV protection is necessary, this requirement will have to be specified in writing.

Auxiliary Pump Modules

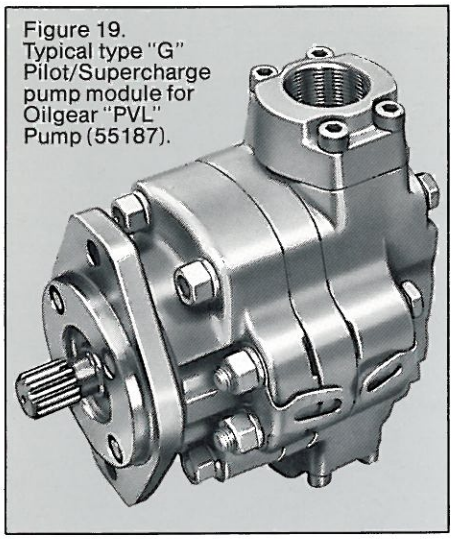
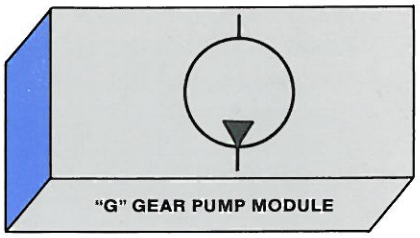


Figure 19.
Typical type "G" Pilot/Supercharge pump module for Oilgear "PVL" Pump (55187).

The variety of auxiliary pump modules is almost limitless—there are many varieties of gear pumps and vane pumps as well as many varieties of piston pumps (such as our own Hydura Product line) that (with type "B" shaft modification) can be used.



TYPE "G". Standard pilot pumps are of the internal gear type. Standard for 075 size is 2.54 cipr (41,6 ccipr)—for 170 size is 3.90 cipr (63,9 ccpr)—for size 250 is 6.45 cipr (105,7 ccpr). Other sizes are available (but must be specified in writing).

How To Order

Block Number Explanation

Examples—Variable Pump

Fixed Pump

1	2	3	4	5	6	–	7	–	8	9	10	–	11	12	13	14
P	V	L	V	K	R	–	170	–	V	N	A	–	A	A	/	G
P	F	L	F	F	R	–	170	–	N	N	A	–	C	C	/	G

1 = **Unit** (see page 3)
- P = Pump

2 = **Type** (see page 3)
- F = Fixed delivery
- V = Variable delivery

3 = **Model** (see page 3)
- L = Axial Piston

4 = **Control (std. side) or Operator, Right Side (facing driveshaft)** (see page 7)
- A = Air motor control
- C = Acceleration/deceleration operator
- F = Used with "PFL" fixed delivery pumps only
- H = Hydraulic force amplifier control
- J = Spring Operator
- K = Hydraulic (non-adjustable) operator
- M = Multi-solenoid/preset control
- N = No control/operator
- P = Pressure unloading control
- Q = Horsepower limiter control
- R = Remote hydraulic operated control
- S = Screw shaft control (both sides)
- V = Electrohydraulic (w/ feedback) control

5 = **Operator (std. side) or Control, Left Side (facing driveshaft)** (see page 7)
- A = Air motor control
- C = Acceleration/deceleration operator
- F = Used with "PFL" fixed delivery pumps only
- H = Hydraulic force amplifier control
- J = Spring operator
- K = Hydraulic (non-adjustable) operator
- M = Multi-solenoid/preset control
- N = No control/operator
- P = Pressure unloading control
- Q = Horsepower limiter control
- R = Remote hydraulic operated control
- S = Screw shaft control (both sides)
- V = Electrohydraulic (w/ feedback) control

6 = **Shaft Rotation**
- R = Right hand (clockwise)
- L = Left Hand (counterclockwise)

7 = **Unit Size** (see page 10)
- 075 = 7.5 cipr (123 ccpr)
- 170 = 17.0 cipr (279 ccpr)
- 250 = 25.0 cipr (410 ccpr)

8 = **Right Control or Operator Modification** (see page 7)
- A = Direct acting "A" control
- B = Reverse acting "A" control
- C = Choke orifice (specify)
- M = Five position "M" control
- N = No modification
- R = Remote "P" control
- U = On/off servo control
- V = D. C. Servo valve control
- Y = Three position "M" control
- Z = Special (describe in detail)

9 = Left Operator Or Control Modification (see page 7)

A = Direct acting "A" control

B = Reverse acting "A" control

C = Choke orifice (specify)

M = Five position "M" control

N = No modification

R = Remote "P" control

U = On/off servo control

V = D. C. Servo valve control

Y = Three position "M" control

Z = Special (describe in detail)

10 = Driveshaft Modification (see page 10)

A = For use with or without standard pilot and/or supercharge (partial) pump.

B = For through-shaft driving of other auxiliary pumps, components, etc.—includes splined coupling and adapter.

11 = Suction/Supercharge Module (see page 12)

A = For two-way differential (or non-differential) pump circuits, mounted on right side (standard) facing shaft.

B = For two-way differential (or non-differential) pump circuits, mounted on left side facing shaft.

C = For one-way differential or non-differential circuits, mounted on right side (standard) facing shaft.

D = For one-way differential or non-differential circuits, mounted on left side facing shaft.

E = For two-way non-differential (hydrostatic drive) circuits, mounted on right side (standard) facing shaft.

F = For two-way non-differential (hydrostatic drive) circuits, mounted on left side facing shaft.

N = No suction/supercharge module

Z = Special (describe in detail).

12 = High Pressure Relief Valve Module (see page 13).

A = Two-way pump module (dual relief valves), mounted on left side, (standard) facing shaft.

B = Two-way pump module (dual relief valves), mounted on right side facing shaft.

C = One-way pump module (port A) mounted on left side (standard) facing shaft.

D = One-way pump module (port A) mounted on right side facing shaft.

E = One-way (hydrostatic drive) pump module—HPRV at port A, BPRV at port B, mounted on left side (standard) facing shaft.

F = One-way (hydrostatic drive) pump module—HPRV at port A, BPRV at port B, mounted on right side facing shaft.

N = No high pressure relief valve module

Z = Special (describe in detail)

13 = Divider

End of first pump designation which is followed by the next pumps complete designation or other letters if standard auxiliary pumps are used.

14 = Auxiliary Pump Description (see page 14)

G = Standard pilot/supercharge (partial) pump.
2.54 cipr (41,6 ccpr) for 075
3.90 cipr (63,0 ccpr) for 170
6.45 cipr (105,7 ccpr) for 250

N = No auxiliary pump

Z = Special (describe in detail)

Additional Information

1. Customer's connection flanges are not included (as standard). If required, describe.

2. For pump controls requiring electrical input, specify electrical voltage and frequency.

3. Any specifications or modifications not included in type designation—such as special paint, additional hydraulic components, relief valve settings, mechanical stroke limits, etc. that are other than standard must be described in writing.

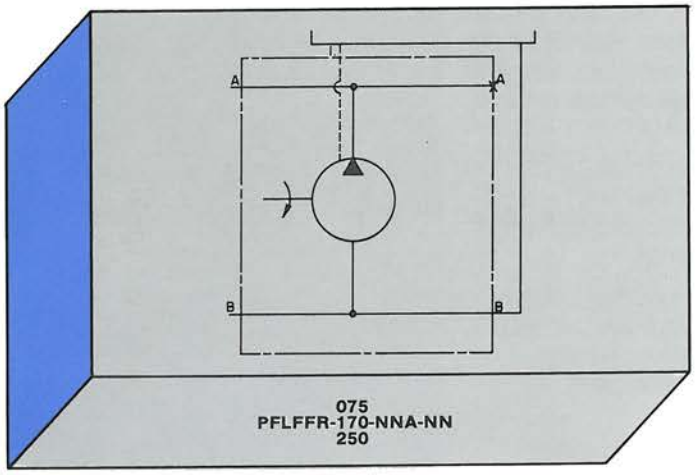


Figure 20.
Basic "PFL" fixed delivery pump.

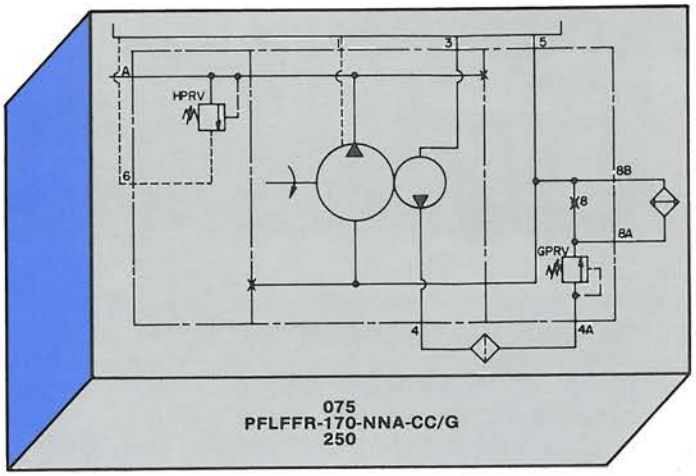


Figure 21.
"PFL" fixed delivery pump with suction/supercharge, HPRV, and auxiliary pump modules.

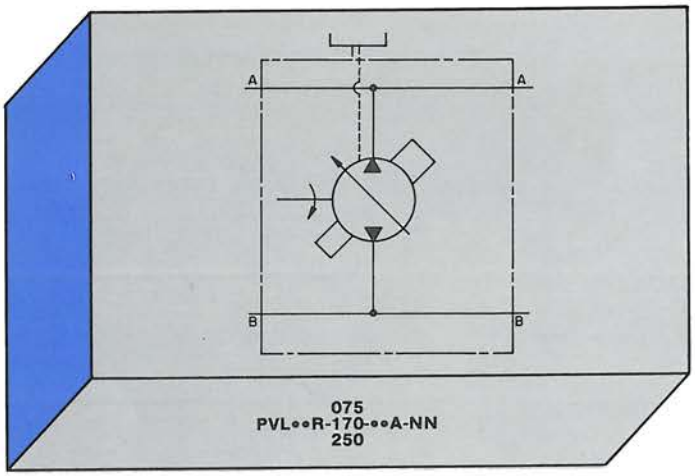


Figure 22.
Basic "PVL" variable delivery, two-way pump.

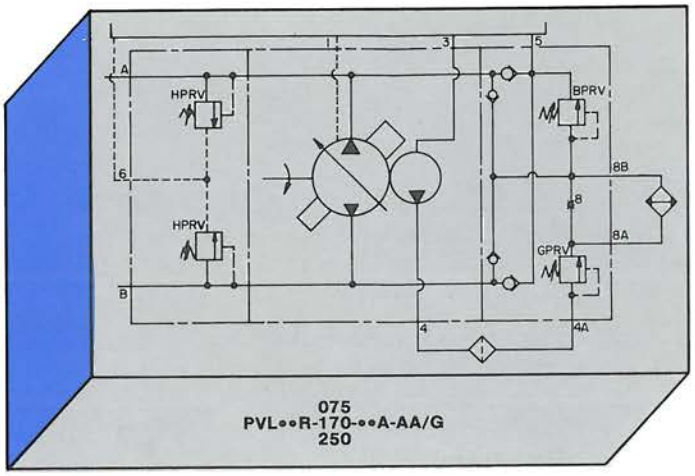


Figure 23.
"PVL" variable delivery two-way differential pump with suction/supercharge, HPRV and auxiliary pump modules.

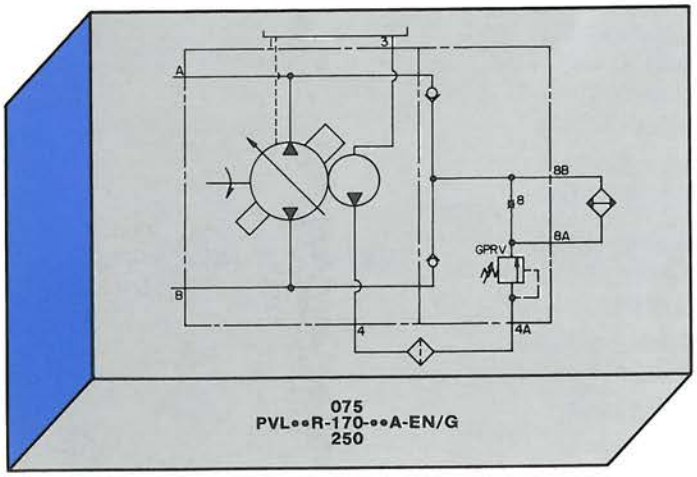


Figure 24.
"PVL" variable delivery two-way non-differential pump with suction/supercharge and auxiliary pump modules.

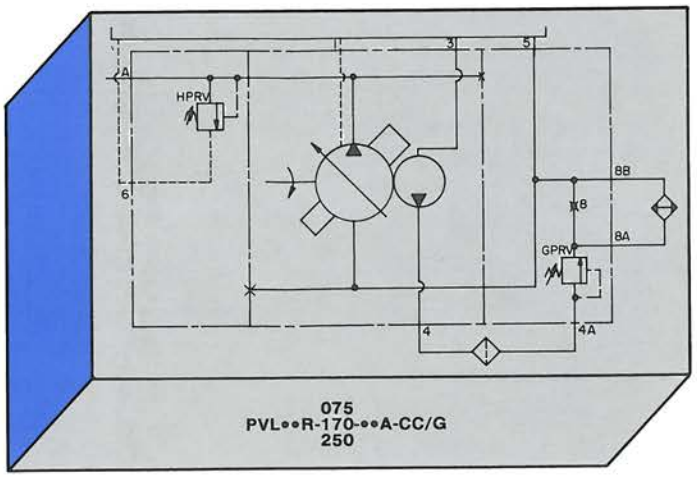


Figure 25.
"PVL" Variable delivery one-way differential pump with suction/supercharge, HPRV and auxiliary pump modules.

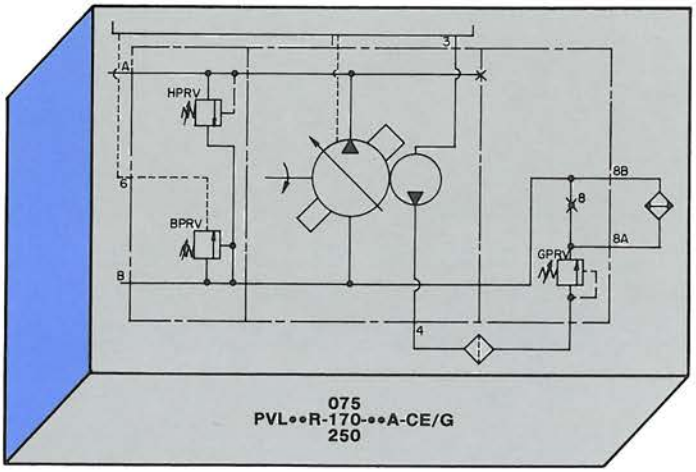


Figure 26.
"PVL" Variable delivery one-way non-differential pump with suction/supercharge, HPRV and auxiliary pump modules.

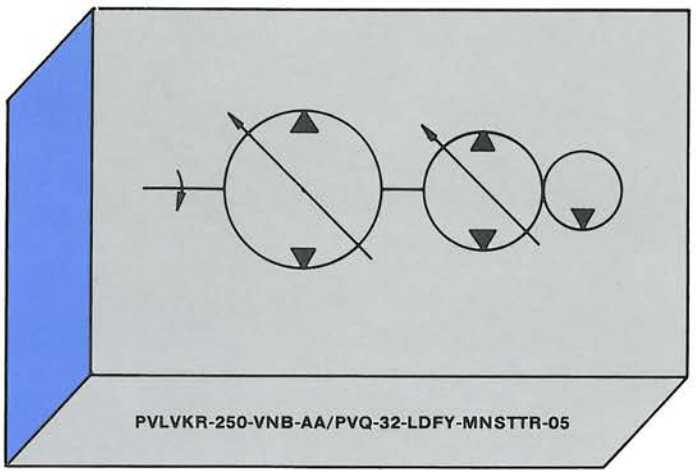


Figure 27.
Simplified symbol for tandem pumps utilizing Type "B" shaft modification.

Application-Engineering

Since 1921, the Oilgear Company has maintained a position of leadership in its field. We have devoted our energies to the development, application and manufacture of Oilgear Fluid Power Pumps, Motors, Electrohydraulic Servo Controls, Cylinders and Valves. By concentrating our engineering, research, sales and service staff on Oilgear Hydraulic Components and Systems, we can better assist you in solving straight-line or rotary power transmission problems and provide equipment to best meet your power transmission needs.

In designing hydraulic systems, take advantage of Oilgear's background of specialized hydraulic experience and realize the full values inherent in 100% Oilgear Systems. Eliminate the divided responsibility and risks of piecemeal designs.

Detailed evaluation of your straight-line or rotary power transmission problems, followed by specific recommendations and a quotation, will be given gladly by our nearest representative.

Oilgear Specializes In "Custom-Built" Paks

Oilgear takes the "L" type pump building block concept another step. We will custom package an entire hydraulic system for you. In many cases, all you'll have to do is connect the pressure and return lines (and a drain line if necessary) to your powered device. All major and auxiliary system components can be incorporated into an Oilgear "Custom-built Power Pak." Oilgear's experienced hydraulic system and power unit designers will custom design a system to fit your requirements and optimize performance.

Oilgear has the necessary inventory of steel, pipe, fittings, etc. to build "Power-Paks." Oilgear has the modern machine tools and fabricating equipment necessary to construct "Power-Paks." Oilgear has the trained welders, installers and assemblers to put "Power-Paks" together correctly. Plus, Oilgear has *system* test facilities to completely test your "Power-Pak" before shipment.

For the name of your nearest Oilgear representative or additional information, please contact:—

THE OILGEAR COMPANY
2300 S. 51st St.
Milwaukee, Wisconsin, USA 53219
Phone: (414) 327-1700

Figure 28.
Type "PVLVLR-250-VNA-AA/G." Pump is used to power and control a closed die forging press (55151).

Figure 29.
Type "PVLQZR-075-NNA-AA/G" Pump on a standard pump and motor base reservoir (54970).

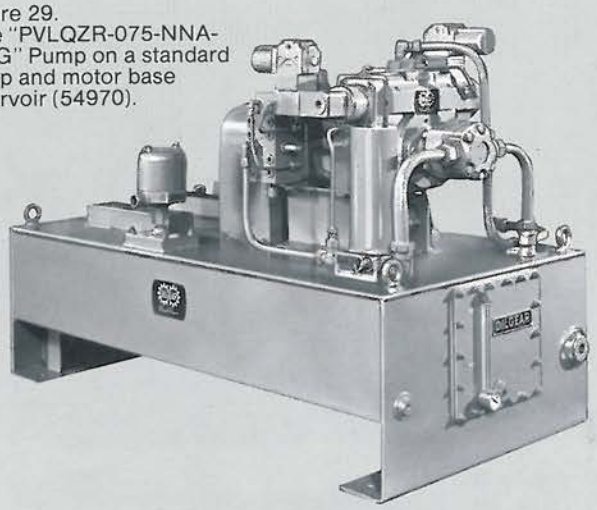
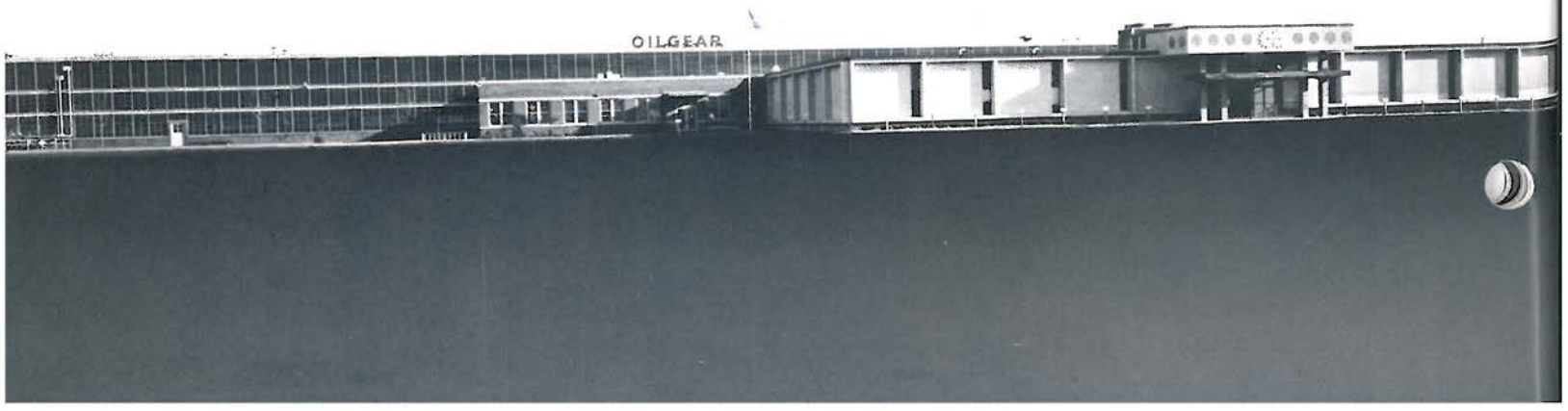


Figure 30.
Type "PVLVLR-170-VNB-NN/PFQ-20-RDFY-F3/PVQ-06-RSAYCN-F3" using Oilgear's Hydura Product dual pump as auxiliary pumps (55215).

Figure 31.
Type "PVLVNR-250-ZZA-NN" Pump for in-tank mounting. Note, V-V Control is located on top of tank plate (55190).



Bulletin 47077