

315 | 330 | 350 | 365

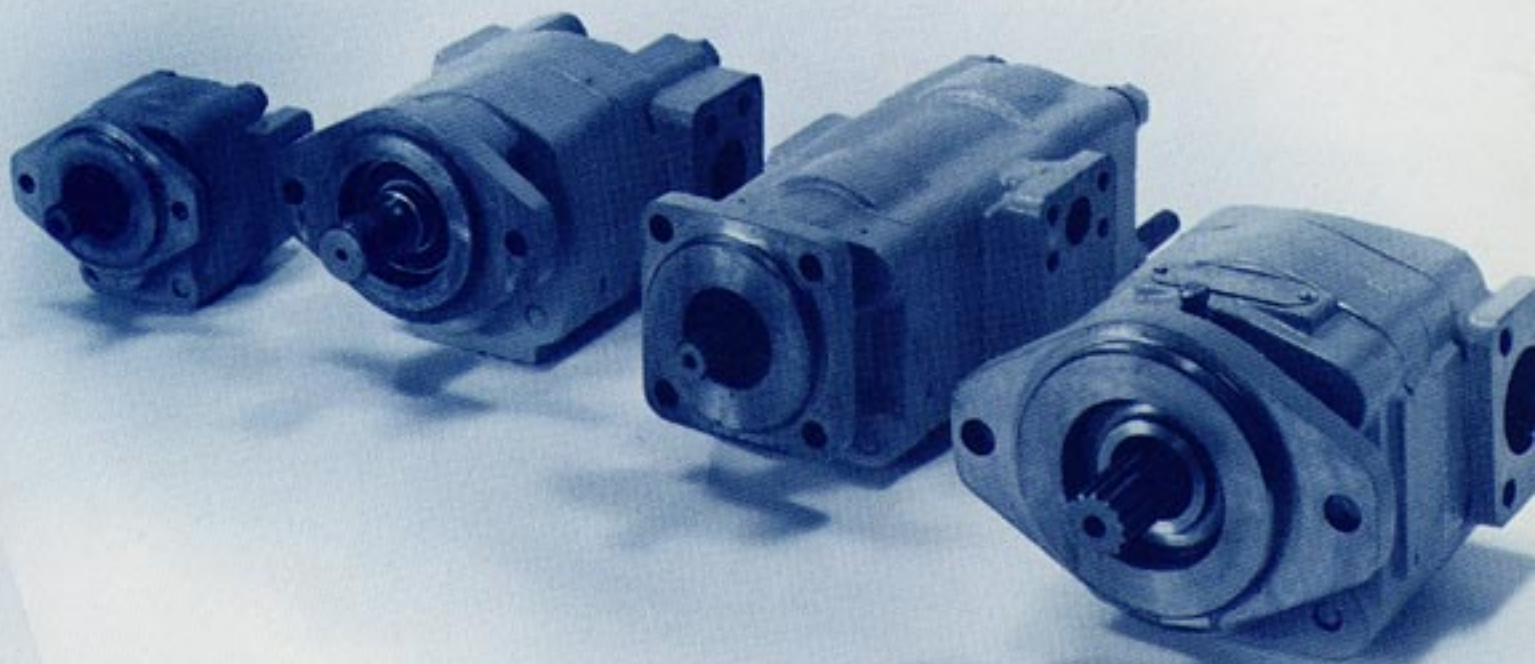
**OIL HYDRAULIC
SINGLE & MULTIPLE
PUMPS & MOTORS**

PRESSURE TO 3500 PSI
PUMPS TO OVER 90 GPM
MOTORS TO OVER 150 HP

®



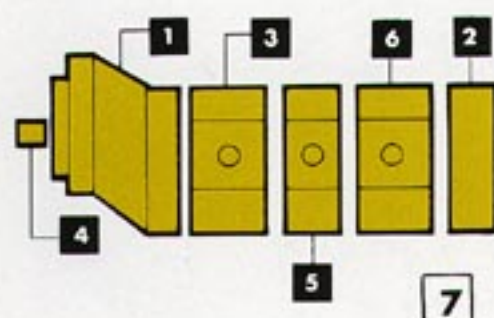
**Commercial
Intertech**



Multiple Units

Coding is the same as single units except that codes for added components must be included. Each gear unit added also requires a code for a bearing carrier, the additional gear housing and a connecting shaft. An example of an assembly code for a two-section pump follows:

Sample Code Multiple Pump P 51B 278 BY OM20-11 D UG10-1



Pump	P
Series	51
Model (tandem)	B
1 Shaft End Cover	278
2 Port End Cover	BY
3 Gear Housing	OM20
4 Drive Shaft	11
5 Bearing Carrier	D
6 Gear Housing	UG10
7 Connecting Shaft	1

4 Drive Shafts



Style	Type	Code	PL Factor
Straight Keyed	SAE BB Type 1 - 1" d - 1/4" Key		6,600
	SAE C Type 1 - 1-1/4" d - 5/16" Key	11	13,000
Involute Splined	SAE B - 13 Teeth-Type 1	25	6,400
	SAE C - 14 Teeth-Type 1	7	13,850
	SAE C - 14 Teeth-Type II	53	13,850

5 Bearing Carriers (Multiple Units Only)



	Port Size		Split Flange	Straight Thread	NPT*
	Left	Right			
	—	—	C†	C†	C†
	—	—	D†	D†	D†
	1 1/2	—	NB	FB	WB
	—	1 1/2	BN	BF	BW
	1	3/4	SR	KJ	ZX
	3/4	1	RS	JK	XZ
	Motors Only				
	1 1/4	1 1/4"	MM	BB	VV
	1 1/2	1 1/2"	NN	FF	WW

For Series 51 * NPT Ports are not available in series 51 units.

† It may be necessary to feed a small gear section through the bearing carrier from an adjacent section. If so, code A or U bearing carriers MUST be used in place of code C or D.

7 Connecting Shaft (Multiple Units Only)



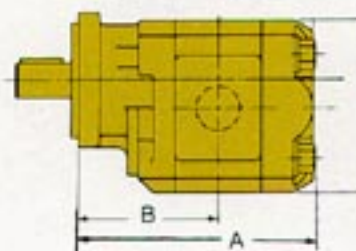
One connecting shaft and one bearing carrier are required for each additional gear section in multiple assemblies.

Code	PL Factor
1	8000

50 and 51 units are available with gear sections ranging from 1/2" to 2 1/2" in 1/4" increments which provide displacements from 1.27 to 6.37 cu. in. per revolution. Two or more gear sections can be assembled on one drive shaft to provide larger flows, supply other circuits or make smoother, more powerful motors.

When specifying multiple units you must consider the drive shaft's strength. This is called a PL factor in which P = operating pressure and L = sum of gear widths. The recommended PL factors for various shafts are shown with the shaft codes and are offered as a guide to shaft selection. A PL of 8000 means a maximum of 4" of gear can be operated at 2000 psi (2000 psi X 4" = 8000) without overloading the shaft. The gear widths can be divided many ways, eg. (2"-1"-1", 1"-1"-1"-1", 1 1/2"-1 1/4"-1 1/2") to provide the output you need for several circuits.

Dimensional Data, Inches



Single Units

A = 5.88" plus gear width (Type 1)
B = 3.75" plus 1/2" gear width
C = 5.44" for gear widths thru 2"
6.75" for 2 1/4" and 2 1/2" gears
D = 6.00"

Multiple Units

A = 5.88" plus first gear width + (3.62" + gear width) for each additional gear section.

Example:

Overall length of a 3-section unit with 2" - 1" - 3/4" gears with straight thread ports is determined as follows:

"A" dimension with 2" gear	= 7.88"
Bearing carrier and 1" gear	= 4.63
Bearing carrier and 3/4" gear	= 4.38
Overall length	= 16.89"



application considerations

To ensure optimum service life and efficiency, certain design criteria should be considered when applying any hydraulic pump or motor.

Operating pressure, pump flow requirements, engine power and speed available, reservoir location in relation to the pump, inlet and outlet line size, duty cycle frequency and physical space limitations all must be considered when selecting the best pump for your particular application.

pressure and flow

When selecting a gear width to produce the flow required, be sure it is rated for the pressure at which the machine will operate. Narrow gear widths in a larger pump model produce approximately the same flow as wide gears in a small pump at the same speed and can generally operate at a higher pressure, i.e.:

1800 rpm — 25 gpm — P330 — 1 $\frac{3}{4}$ " gear — 3250 psi

1800 rpm — 23 gpm — P350 — 1 $\frac{1}{4}$ " gear — 3500 psi

1800 rpm — 24.5 gpm — P365 — 1" gear — 3500 psi

If the duty cycle is severe, a larger pump with a narrower gear will generally live longer.

feed conditions

A flow of 8 fps is the maximum generally recommended for inlet lines. Higher flow velocities tend to starve the pump and create cavitation. Inlet vacuum should not exceed 5" hg at operating temperature.

Flow velocities under 18 fps are recommended for the pumps' discharge lines. Faster flows simply cause unnecessary pressure in the pump which creates heat, wastes energy and shortens pump life.

oil specifications

Commercial's pumps and motors work well on most good hydraulic mineral oils as well as synthetic and fire resistant fluids. Please check with our product support department before using any fire resistant or non-petroleum base fluid. Some of these products require special seals.

recommended oil characteristics

Viscosity — 50 SUS minimum @ operating temperature, 7500 SUS maximum @ starting temperature

Viscosity Index — 90 minimum

Aniline Point — 175 minimum

Additives — Foam depressant
Rust/Oxidation inhibitors

Maximum recommended system temperature is 180°F (82°C).

For complete oil information, ask for our oil specification sheet and check with your oil supplier.

filtration

Clean oil is as important as the right oil. 10 micron nominal filtration is recommended for maximum service life. We generally recommend installing the filter in the return line. The filter should be sized to your system and cleaned on a regular schedule. A warning device which signals a dirty filter is an excellent idea. For maximum component life and efficiency, the filter should never be allowed to go into a bypass condition.

Commercial's model 315, 330, 350 and 365 pumps and motors are external spur gear, fixed displacement units designed for continuous operation at pressures up to 3500 psi. They combine a practical high pressure capability with the economy and durability of gear equipment. The performance charts for each model show maximum pressure ratings for the various gear sizes.

high efficiency

Advances in our thrust plate designs and seal material contribute to pump volumetric efficiency as high as 95% of theoretical, even with fluid viscosity as low as 50 SUS. Longer gear journals present a large effective area to the sleeve bearings and provide excellent load distribution. Internal passages supply a constant flow of lubrication from the pump's inlet to all bearing surfaces. This ensures a film of clean, cool oil on all moving parts at all times. These features greatly extend service life.

315 330 350 365

OIL HYDRAULIC SINGLE & MULTIPLE PUMPS & MOTORS

multiple units

Commercial's model 315, 330, 350 and 365 pumps and motors are available in single or multiple assemblies. The obvious saving in multiple units is in combining two or more pumps on a single drive shaft. The flow from the pump sections can be plumbed to separate circuits or can be combined to produce flows greater than that available from a single pump.

Multiple section motors offer up to double the torque of a single motor. And, with the gears assembled out-of-phase, they give a smoother torque ripple.

By mounting one or more P330 pump sections on the rear of a P365 pump, you can produce a very wide range of flow. The limiting factor on the size of piggyback units is the strength of the drive shaft, the same as other multiple units.

Each section of a multiple pump or motor should be regarded as a single unit with corresponding delivery and power input requirements. Since the entire input is fed through a common drive shaft, the power delivered to or from the unit is limited by the physical strength of the shaft. To define this power limitation, we use a "PL" factor, "P" being the operating pressure and "L" the summation of gear widths.

In multiple units the "PL" must be calculated for the first connecting shaft as well as the drive shaft. Each style or type of shaft has a unique "PL" factor as noted in the tables below.

Pressure X Total Gear Width = PL

PL MUST NOT EXCEED NUMBER SHOWN IN CHART FOR APPROPRIATE SHAFT.

shaft style P315	integral shaft & gear	two-piece style
SAE "A" Spline (up to 1" GW)	4400	--
SAE "A" Key	3400	--
SAE "B" Spline	13200	--
SAE "B" Key	9100	--
Connecting Shaft	4900	--

shaft style P330	integral shaft & gear	two-piece style
SAE "B" Spline	8300	5500
SAE "B" Key	5700	5500
SAE "B-B" Spline	12700	5500
SAE "B-B" Key	8600	5500
SAE "C" Spline	--	5500
SAE "C" Key	--	5500
Connecting Shaft	--	5500

Shaft Style P350	Integral shaft & gear	two-piece style
SAE "B" Spline	6400	6400
SAE "B" Key	4400	4400
SAE "B-B" Spline	9800	8000
SAE "B-B" Key	6600	6600
SAE "C" Spline	18000	8000
SAE "C" Key	13000	8000
Connecting Shaft	--	8000

Shaft Style P365	Integral shaft & gear	two-piece style
SAE "B" Spline	4500	4500
SAE "B" Key	3100	3100
SAE "B-B" Spline	6900	6900
SAE "B-B" Key	4700	4700
SAE "C" Spline	13200	10000
SAE "C" Key	9300	9300
Connecting Shaft	--	10000

Where there are three or more operating sections in a multiple assembly, the application must be reviewed with Commercial's engineers

NOTE: All splines shafts are made to SAE flat root, side-fit specifications.

NOTE: Installations involving pump speeds below 400 rpm or exceeding 2000 rpm and/or above 3500 psi should be approved by our product support department through your Commercial representative.

Model P315, P330, P350 and P365 pumps are available with O.D. tube or SAE split flange porting.

All four model units can be assembled for CW or CCW rotation.

maximum port sizes

model	unit type	inlet	outlet
P315	single	1" SF 1 1/4" ODT	3/4" SF 1" ODT
	multiple single outlet	1 1/4" SF 1 1/2" ODT	1 1/4" SF 1 1/4" ODT *
	multiple dual outlet	1 1/4" SF 1 1/2" ODT	3/4" SF 1" ODT *
P330	single	1 1/4" SF 1 1/2" ODT	1 1/4" SF 1" ODT
	multiple single outlet	2" SF 2" ODT	1 1/2" SF 1 1/4" ODT
	multiple dual outlet	2" SF 2" ODT	1 1/4" SF 1" ODT
P350	single	2" SF 2" ODT	1 1/2" SF 1 1/4" ODT
	multiple single outlet	2" SF 2" ODT	1 1/2" SF 1 1/4" ODT
	multiple dual outlet	2 1/2" SF 2" ODT	1 1/4" SF 1 1/4" ODT
P365	single	2" SF 2" ODT	1 1/2" SF 1 1/4" ODT
	multiple single outlet	2 1/2" SF 2" ODT	1 1/2" SF 1 1/4" ODT
	multiple dual outlet	2 1/2" SF 2" ODT	1 1/2" SF 1 1/4" ODT

* Some pressure restrictions may apply. Contact product support department for maximum port sizes allowable out the rear of the pump.

piggybacks

For systems requiring the same hydraulic fluid to be pumped at widely varying displacement levels, piggybacking a P330 to a P365 can offer significant savings. The P365/P330 combination offers displacement ratios of up to 6:1. A single casting serves as port end for the P365 and shaft end of the P330. This simplifies assembly and provides a common inlet for both units while maintaining the advantage of single shaft drive.

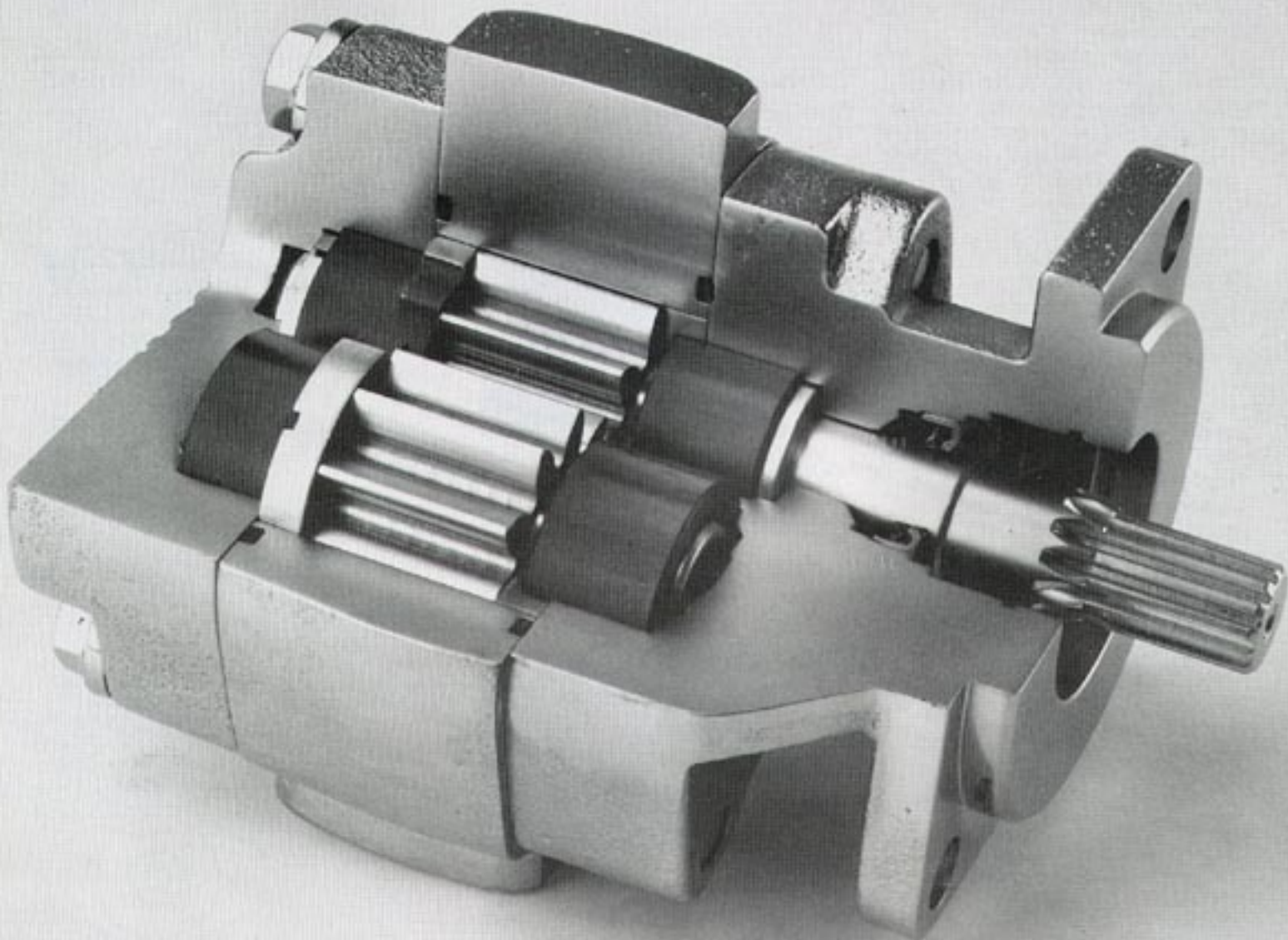
P20™

Single and multiple hydraulic
PUMPS AND MOTORS

to 3000 psi • up to 39 gpm
motors to over 40 hp



Commercial Intertech



P20™

Oil Hydraulic Pumps and Motors
Single and Multiple Units

Pressures to 3000 psi
Up to 39 gpm
Speeds to 2400 rpm

Big Performance In A Small Package

Commercial's new P20 gear pumps and motors offer ideal power for application in the truck industry. A P20 with 1/2" gears measures just under 6" from mounting flange to port end and weighs less than 25 lbs.

The cast iron P20 produces up to 2.96 cir at 3000 psi; output of up to 3.94 cir is available at 2500 psi. Maximum speed is 2400 rpm. Both pump and motor units are bi-rotational.

A variety of shaft and mounting styles is offered to match most requirements. Standard features include rigid one-piece drive shaft and gears. Pressure-loaded thrust plates assure top efficiency.

Multiple Units

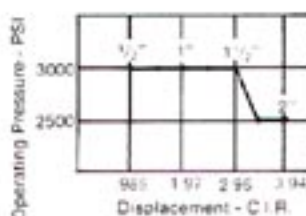
P20 pumps and motors can be ordered as tandem units to provide additional pump flow or more motor torque. In either case a single input drive shaft supplies the power. However, each subsequent section must be connected to the drive shaft or preceding gear section by a connecting shaft. The strength of this shaft, called the PL factor, determines the maximum gear width the shaft can turn.

The PL factor is calculated by multiplying operating pressure (P) times the sum of the gear widths (L) so that a P20 operating at 3000 psi with 1" and 1/2" gear sections would have a PL of 4500 ($3000 \times 1.5 = 4500$). Its drive shaft must be rated for a PL of 4500 or more.

NOTE: In accordance with our policy of continuing product development, we reserve the right to change specifications shown in this catalog without notice.

Pressure Ratings

Maximum Operating Pressure by Gear Width



Displacement

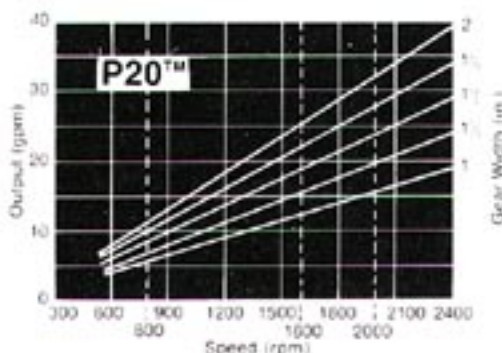
The P20 displaces 1.97 cubic inches per inch of gear width. Maximum operating pressure is 3000 psi for 1/2" through 1 1/2" gears and 2500 psi for 1 3/4" and 2" gears. Gear widths are graduated in 1/4" increments.

Performance Data

Pump Performance (GPM)

Average Output

U.S. Gallons at 175 bar/2500 psi

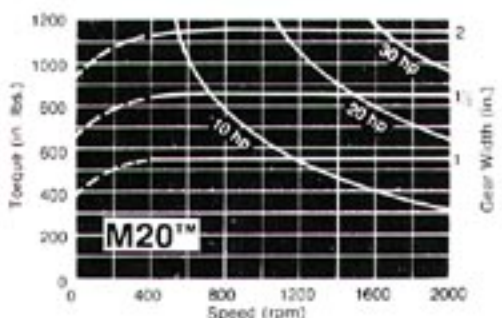


Pump Speed	Gear Width				
	1"	1 1/4"	1 1/2"	1 3/4"	2"
900	6.5	8.0	10.0	12.0	13.5
1200	9.0	11.5	14.0	16.0	18.5
1500	11.5	14.5	17.5	20.5	23.5
2100	16.5	21.0	25.0	29.5	34.0

Motor Performance

Average Torque Output

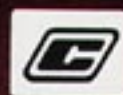
(in. lbs.) at 140 bar/2000 psi



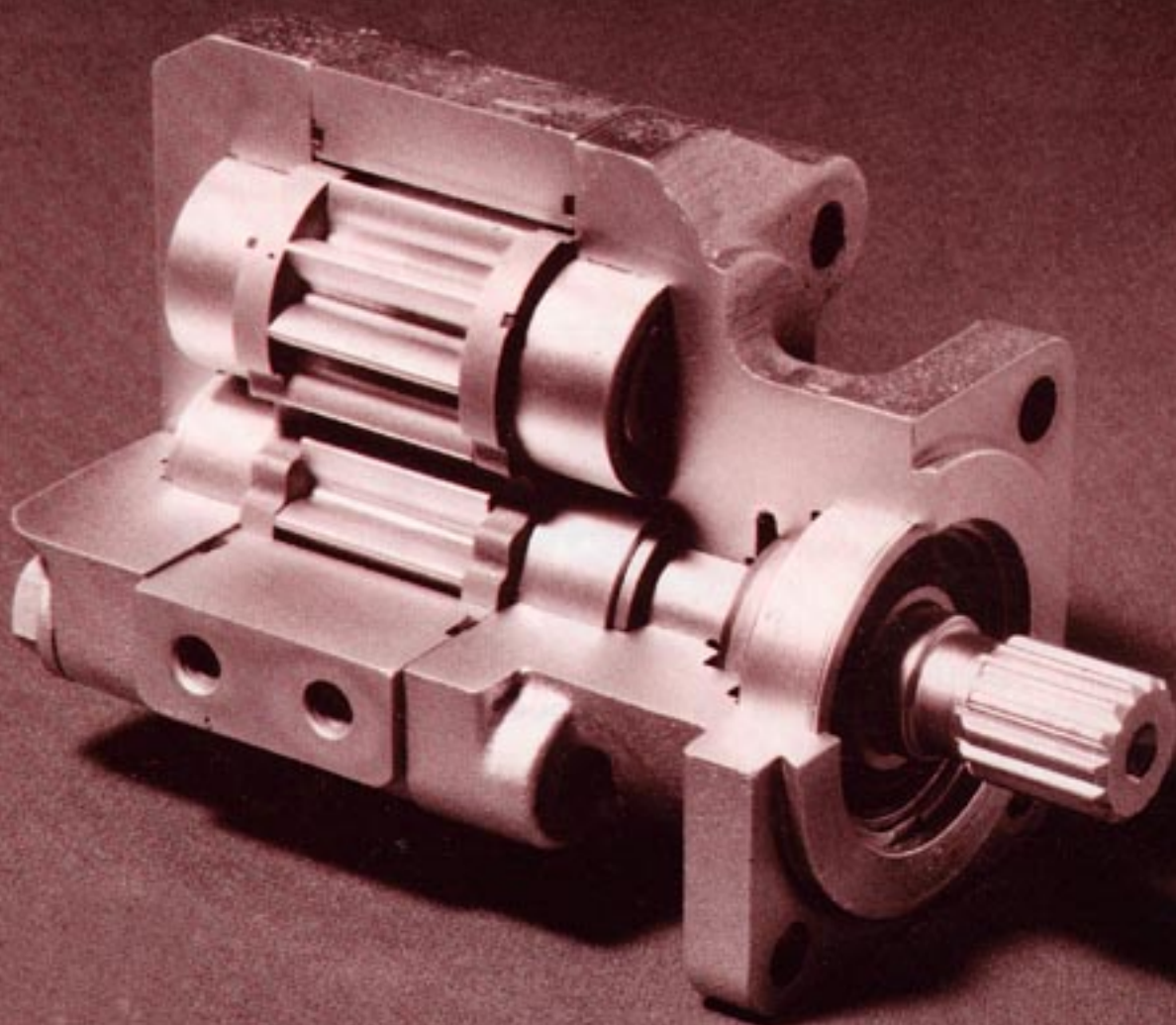
Motor Speed	Gear Width					
	1"		1 1/2"		2"	
	Torque in. lbs.	GPM	Torque in. lbs.	GPM	Torque in. lbs.	GPM
800	500	9.0	800	13.0	1150	17.0
1200	550	13.0	870	18.0	1150	23.5
1600	550	16.0	800	23.0	1140	30.5
2000	550	19.5	850	28.0	1125	37.0

Series **30 • 31**

Single and multiple hydraulic
PUMPS AND MOTORS
to 3000 psi • up to 39 gpm
motors to over 40 hp



Commercial Intertech



30/31 High Performance Gear Pumps and Motors

Series 30 and 31 pumps and motors are quite similar except that series 31 units have steel alignment dowels which allow them to be rated for 500 psi higher pressure operation. Both series are cast from hi-tensile gray iron and offer a wide variety of drive shafts designed for high torque input/output. Unique pressure balanced thrust plates contribute to operating efficiencies of over 90%.

These units are designed for continuous operation in heavy-duty implement circuits. They're equally at home on lift trucks, auto wreckers and small dump body applications where their service life is often longer than that of the vehicle itself.

We can supply new pumps or motors or repair/rebuild your existing units. We use only genuine Commercial Intertech replacement parts. They're made on the same machines, to the same tolerances as those in production pumps and motors.

With clean, modern assembly areas and a full stock of parts, we're ready to give you fast service. Give us a call.

Performance Data

Performance data shown are the average results based on a series of laboratory tests of production units and are not necessarily representative of any one unit. Tests were run with the oil reservoir temperature at 120°F and viscosity 150 SSU at 100°F.

Pressure Ratings

Series 30 1/2" thru 1-1/2" gears - 2500 psi
1-3/4" and 2" gears - 2250 psi
Series 31 1/2" thru 1-1/2" gears - 3000 psi
1-3/4" and 2" gears - 2500 psi

Pump Performance (gpm) @ 2000 psi

Speed RPM	Gear Width				
	1"	1-1/4"	1-1/2"	1-3/4"	2"
900	6.5	8.0	10.0	12.0	13.5
1200	9.0	11.5	14.0	16.0	18.5
1500	11.5	14.5	17.5	20.5	23.5
2100	16.5	21.0	25.0	29.0	34.0

Motor Performance @ 2000 psi

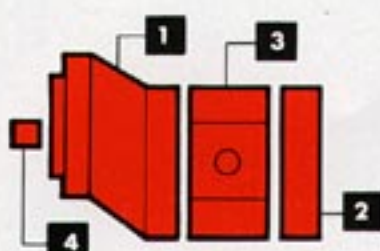
Speed RPM	1"		1-1/2"		2"	
	HP	GPM	HP	GPM	HP	GPM
800	7.0	9.0	11.0	13.0	14.5	17.0
1200	10.5	13.0	16.5	18.0	22.0	23.5
1600	14.0	16.0	22.0	23.0	29.0	30.5
2000	17.5	19.5	27.0	28.0	36.0	37.0

How to Specify and Code

This catalog contains codes for our most popular models. Complete codes for all configurations are readily available upon request.

Single Units

Full assembly codes for single units combine shaft end cover, port end cover, gear housing and drive shaft codes. They are preceded by the letter P or M for pump or motor — and by the number and letter to designate the series and model. An example of an assembly code follows:



Sample Code Single Motor M 30A 942 BE YF15-30

Motor	M
Series	30
Model (single unit)	A
1 Shaft End Cover	942
2 Port End Cover	BE
3 Gear Housing	YF15
4 Drive Shaft	30

1 Shaft End Covers



	Rotation			Motors Double
	Pumps CW	CCW	Double*	
SAE A 2-Bolt	194	294	394	994
SAE B 2-Bolt	197	297	397	997
SAE B 2-Bolt Type 2	196	296	396	—
SAE B 4-Bolt	142	242	342	942
SAE C 4-Bolt	178	278	378	978
Pad Mounting	400	500	600	800
Round Flange 6-Bolt	105	205	305	905

*P31 units are assembled for single direction rotation only.

2 Port End Covers



	CODES		
	No Ports	W/O Extended Studs	With Extended Studs
Single Units		BE	BY
Multiple Units		BI	BY

Straight Thread Ports		Back	Side
Left	Right		
1 1/4	1	GU	TU
1	1 1/4	HU	XU

3 6 Gear Housings



	Port Size		Gear Widths (inches)				
	Left	Right	1	1 1/4	1 1/2	1 3/4	2
NPT*	None	None	AB10	AB12	AB15	AB17	AB20
	3/4	3/4	IF10	YF12	YF15		
	1	1				YL17	YL20
Split Flange	1 1/4	1 1/4					
	3/4	3/4	UF10				
	3/4	1	UG10				
	1	3/4	UJ10				
	1	1 1/4		OG12	OG15	OG17	
	1 1/4	1		OJ12	OJ15	OJ17	
SAE Straight	1 1/4	1 1/2				OM17	OM20
	1 1/2	1 1/4				OP17	OP20
	3/4	3/4		EF12	EF15		
	3/4	1		EG12	EG15		
	1	3/4		EJ12	EJ15		
	1	1			AF15	AF17	AF20
	1 1/4	1 1/4					AL20

1/2" and 3/4" gear sections are available as codes AB05 and AB07.

*NPT ports are not available in series 31 units.

50/51

High Performance Gear Pumps and Motors

Series 50 and 51 pumps and motors are quite similar except that series 51 units have steel alignment dowels which allow them to be rated for 500 psi higher pressure operation. Both series are cast from hi-tensile gray iron and offer a wide variety of drive shafts designed for high torque input/output. Unique pressure balanced thrust plates contribute to operating efficiencies of over 90%.

These units are designed for continuous operation in heavy-duty implement circuits. They're equally at home on lift trucks, auto wreckers and small dump body applications where their service life is often longer than that of the vehicle itself.

We can supply new pumps or motors or repair/rebuild your existing units. We use only genuine Commercial Intertech replacement parts. They're made on the same machines, to the same tolerances as those in production pumps and motors.

With clean, modern assembly areas and a full stock of parts, we're ready to give you fast service. Give us a call.

Performance Data

Performance data shown are the average results based on a series of laboratory tests of production units and are not necessarily representative of any one unit. Tests were run with the oil reservoir temperature at 120°F and viscosity 150 SSU at 100°F.

Pressure Ratings

Series 50 1/2" thru 1 1/2" gears — 2500 psi
 1 3/4" thru 2 1/2" gears — 2000 psi
 Series 51 1/2" thru 1 3/4" gears — 3000 psi
 2" - 2 1/4" - 2 1/2" gears — 2500 psi

Pump Performance (gpm) @ 2000 psi

Speed RPM	Gear Width (inches)			
	1"	1 1/2"	2"	2 1/2"
900	8.5	13.0	17.5	22.0
1200	12.0	15.0	24.0	30.0
1800	18.0	27.5	37.5	47.0
2100	21.5	32.5	44.0	55.0

Motor Performance @ 2000 psi

Speed RPM	1"		1 1/2"		2"		2 1/2"	
	HP	GPM	HP	GPM	HP	GPM	HP	GPM
800	8.5	10.5	13.5	15.5	18.0	21.0	23.5	26.0
1200	13.0	15.5	20.5	22.5	27.5	30.5	35.0	37.5
1600	17.0	20.0	26.5	30.0	36.5	40.0	44.5	49.5
2000	21.0	25.0	32.5	37.0	44.5	49.0	54.5	61.5

How to Specify and Code

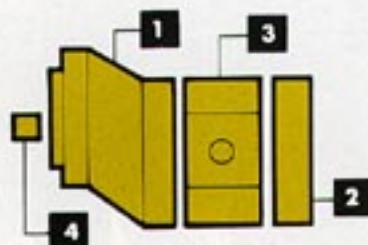
This catalog contains codes for our most popular models. Complete codes for all configurations are readily available upon request.

Single Units

Full assembly codes for single units combine shaft end cover, port end cover, gear housing and drive shaft codes. They are preceded by the letter P or M for pump or motor — and by the number and letter to designate the series and model. An example of an assembly code follows:

Sample Code Single Motor M 50A 942 BE YF15-7

Motor	M
Series	50
Model (single unit)	A
1 Shaft End Cover	942
2 Port End Cover	BE
3 Gear Housing	YF15
4 Drive Shaft	7



1 Shaft End Covers



	Rotation			
	CW	Pumps CCW	Double*	Motors Double
SAE B 2-Bolt	197	297	397	997
SAE B 2-Bolt Type 2	196	296	396	—
SAE B 4-Bolt	142	242	342	942
SAE C 4-Bolt	178	278	378	978
Pad Mounting	400	500	600	800

*P51 units are assembled for single direction rotation only.

2 Port End Covers



		CODES W/O Extended Studs	With Extended Studs
No Ports			
Single Units		BE	BY
Multiple Units		BI	BY
Straight Thread Ports			
Left	Right		
3/4"	3/4" Single	FE	FY
	Multiple	FI	FY

3 6 Gear Housings



	Port Size		Gear Widths (inches)							
	Left	Right	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	
NPT	None	None	AB10	AB12	AB15	AB17	AB20	AB22	AB25	
	3/4	3/4	IF10	YF12	YF15					
	1	1				YL17	YL20	YL22	YL25	
	1 1/4	1 1/4								
Split Flange	1	1			OF15	OF17	OF20	OF22	OF25	
	1	1 1/4			OG15	OG17	OG20			
	1 1/4	1			OJ15	OJ17	OJ20			
	1 1/4	1 1/2					OM20	OM22	OM25	
	1 1/2	1 1/4					OP20	OP22	OP25	
	1 1/2	1 1/2						OR22	OR25	
SAE Straight	3/4	3/4			EF15	EF17				
	3/4	1				EG17				
	1	3/4				EJ17				
	1	1					AF20			
	1 1/4	1 1/4						AL22	AL25	

1/2" and 3/4" gear sections are available as codes AB05 and AB07.

*NPT ports are not available in series 51 units.