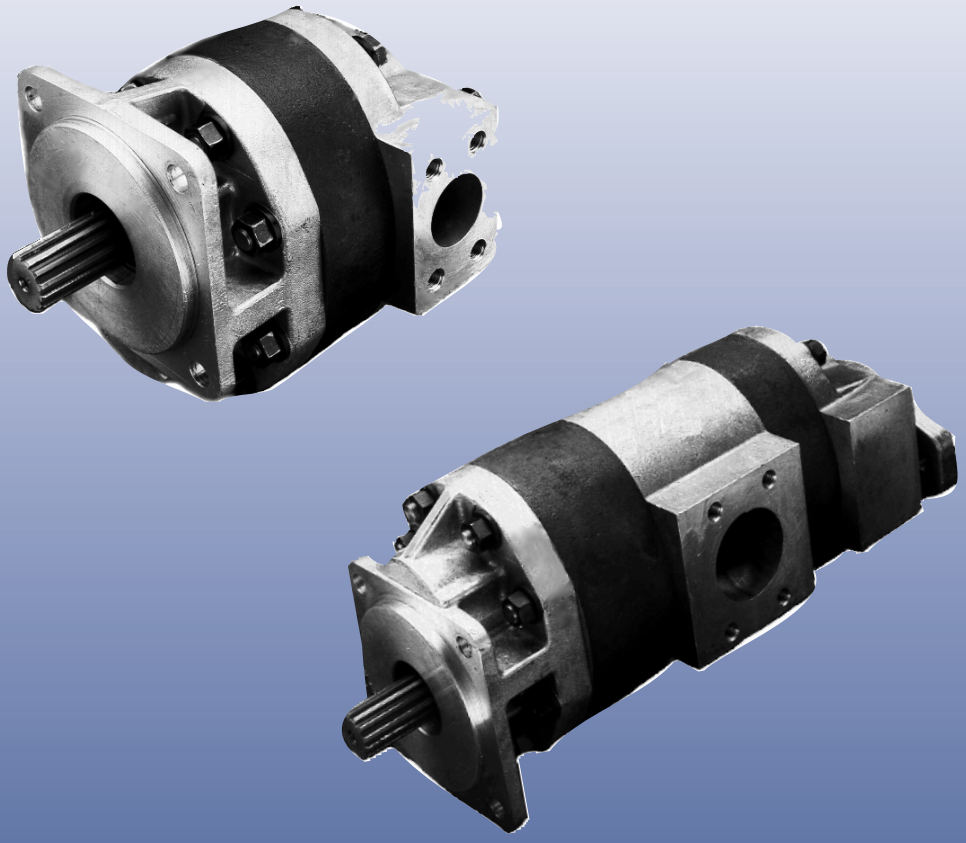
quality control corp

CP Series 222



Gear Pumps

Technical Information

Pumps		Motors	
	B Series Pumps Combination 2/4 Bolt Mounting 4F17 or “AA” 9 models 1.80-12.13 cm^3 (0.11-0.74 in^3) Speeds to 3500 rpm Pressures to 240 bar (3500 psi)		B Series Bidirectional Motors Combination 2/4 Bolt Mounting 4F17 or “AA” 8 models 1.80-9.67 cm^3 (0.11-0.59 in^3) Speeds to 5000 rpm Pressures to 172 bar (2500 psi)
	YB Series Pumps Combination 2/4 Bolt Mounting 4F17 or “AA” 6 models 2.39-12.0 cm^3 (0.146-0.73 in^3) Speeds to 4000 rpm Pressures to 172 bar (2500 psi) Internal and externally drained relief valves and output checks		MYB Series Unidirectional Motors Combination 2/4 Bolt Mounting 4F17 or “AA” 4 models 4.8-12.00 cm^3 (0.29-0.73 in^3) Speeds to 5000 rpm Pressures to 172 bar (2500 psi)
	YC Series Pumps SAE "A" 2-Bolt Mounting 6 models 9.5-31.8 cm^3 (0.58-1.94 in^3) Speeds to 3000 rpm Pressures to 172 bar (2500 psi) Priority Flow Divider Covers		MYC Series Unidirectional Motors SAE "A" 2 & 4-Bolt Mounting 6 models 2.39-12.0 cm^3 (0.146-0.73 in^3) Speeds to 5000 rpm Pressures to 172 bar (2500 psi)
	CP180 Pumps SAE "B" Flanges & Shafts 11 models 31.79-95.7 cm^3 (1.94-5.38 in^3) Speeds to 3200 rpm Pressures to 310 bar (4500 psi) Priority Flow Divider Covers		
	CP222 Pumps SAE "C" 2 & 4-Bolt Flanges & Shafts 7 models 64.8-162.0 cm^3 (3.95-9.89 in^3) Speeds to 3000 rpm Pressures to 275 bar (4000 psi)		

CP 222 Gear Pump Features

- World class sales and service is part of the package for every QCC gear product customer.
- Proven brand name reliability and experience in gear products for mobile and industrial applications.
- System pressures to 4000 psi (275 bar) peak and speeds to 3,000 rpm allow high performance in system design.
- Pressure balanced design for high efficiency and long life.
- Low cost design and manufacturing for the requirements of fixed displacement systems.
- Variety of flexible installation options available:
  - SAE "C" flanges, shafts and ports
  - Convenient side or rear porting options
  - Auxiliary through drive SAE mounting pads
  - Integral relief valve, priority flow control, and priority flow divider covers
  - High temperature viton seals optional
  - Multiple pump configurations

The Family of QCC Gear Pumps and Motors

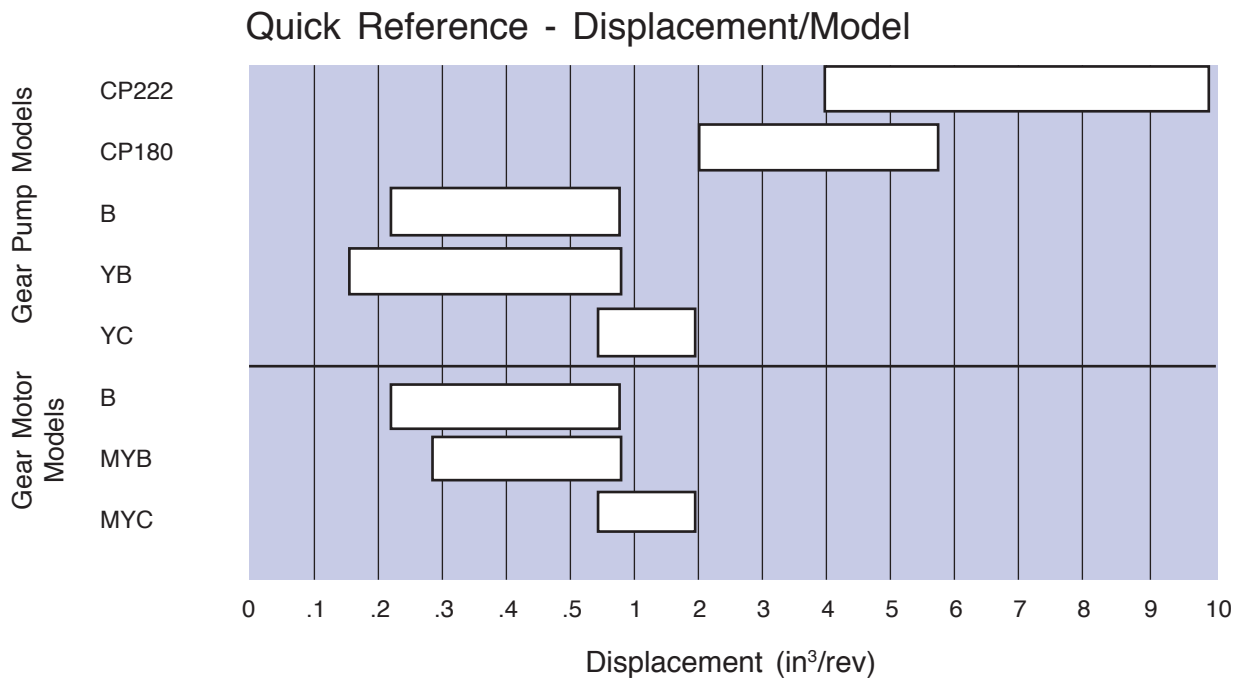


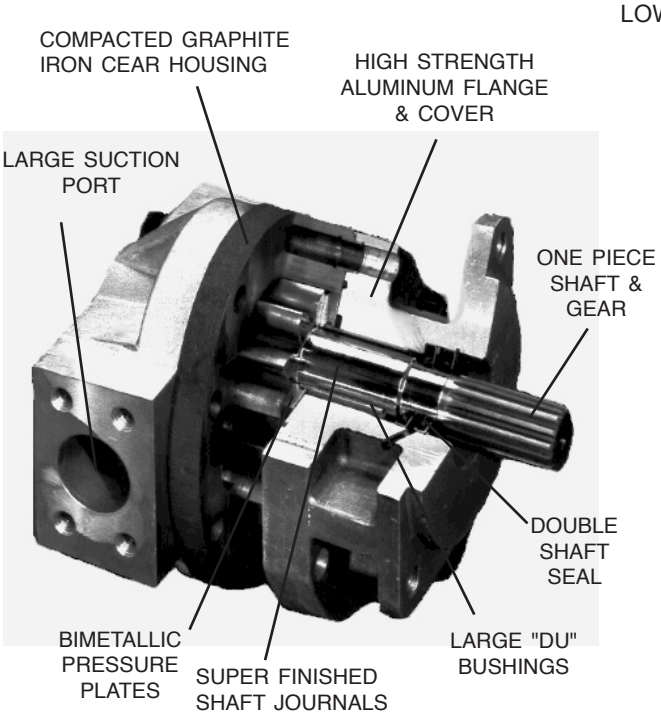
Table of Contents

Technical Features

DESIGN

QCC CP Series gear pumps utilize an external spur gear, positive displacement, and pressure balanced design, providing superior efficiency. These "heavy duty cycle" pumps are three-piece construction utilizing an aluminum flange and cover with Compacted Graphite Iron gear housings. This design offers superior resistance to contamination and excellent strength to survive in the harsh "construction type" environments but are light in weight. Oversized journal bearings (DU) are utilized to provide maximum life. By design, the gears of this pump on initial running track into the gear housing and create their own radial tip seal for high volumetric efficiency.

Figure 1.



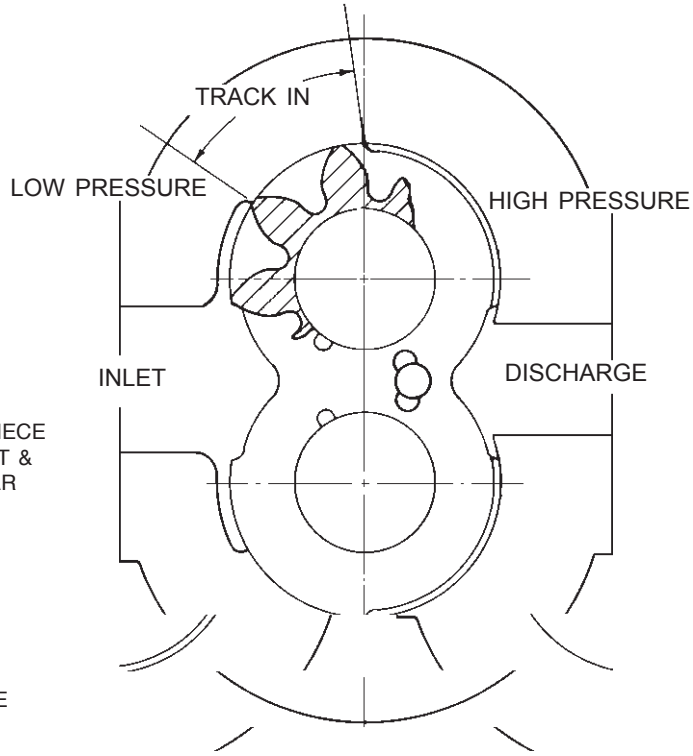
DELAYED INLET

All QCC CP Series pumps are manufactured to maximize efficiency and to enhance performance. The "Delayed Inlet" feature provides a number of advantages.

(1) Because more gear teeth are exposed to the inlet, the dwell time to fill the gear teeth is improved, thus allowing the pump to perform better at low temperatures and with more viscuous fluids.

(2) The gears are directed to "track in" at a zone further up the circle from the inlet than in a conventional pump. This "Delayed Track" increases low speed efficiency by providing a better low pressure to high pressure area ratio than conventional designs.

Figure 2.



LEAK PROTECTION

Various seals are available to meet specific applications. Standard are dual Buna seals to prevent leakage and migration of fluids from the hydraulic circuit to the gear box.

An optional weep hole between the seals is available to further protect the gear box and show leakage if any should occur. Section seal rings are exposed to inlet to reduce the risk of external leakage.

Technical Features, Continued

INLET OIL BUSHING LUBRICATION

The design of the CP Series is such that cooler inlet oil is routed to "flood" the DU Bushings with oil. This principle eliminates the need to force high pressure leakage to the journals. This allows the pump to run cooler, with higher volumetric efficiency.

THERMAL EXPANSION OF ALUMINUM MEMBERS THERMAL EXPANSION OF IRON BODY

As the oil temperature increases and oil viscosity goes down, the CP Series pump changes its tip clearance to compensate for this increased leakage. By using dissimilar materials (i.e., aluminum covers and iron gear housings), the difference in their coefficients of expansion causes the pump components to move in a manner which maintains volumetric efficiency as temperature increases.

LESS DEBRIS IN THE EVENT OF BEARING FAILURE

In the unlikely event of a bearing failure the CP pump offers, by design, release of less downstream contaminant to your systems than conventional pumps. Because the "track" is essentially tangent to the induced load, in the event of a failure, the gear (idler) tends to move into the pre-cut "delayed inlet slot." Failure detection is the same as a conventional pump but the volume of debris ingested is significantly less.

Figure 3.
The DU® Bearing

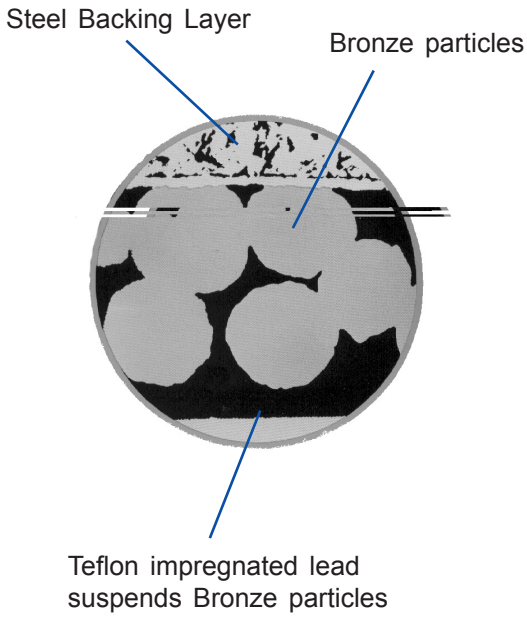
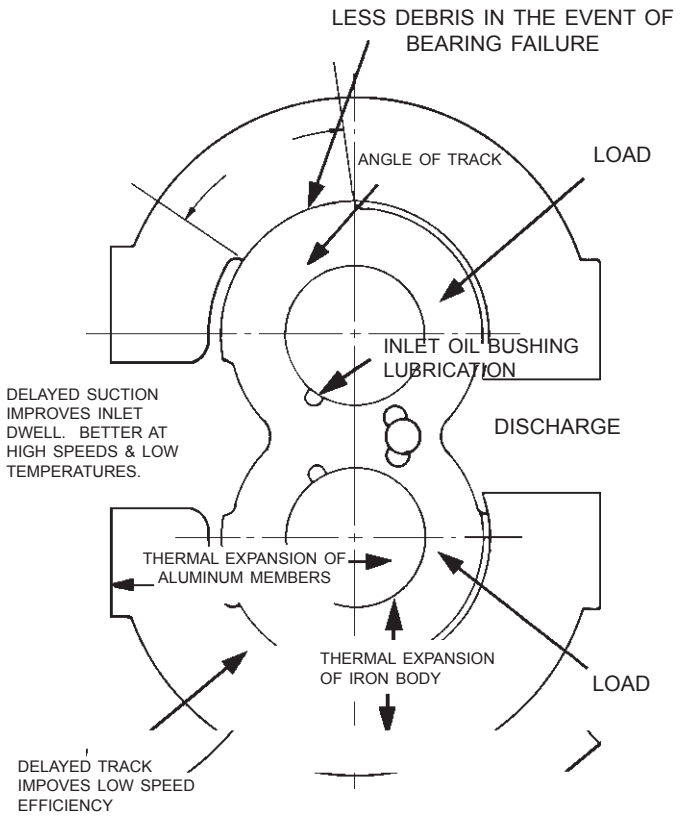


Figure 4.



DU® is a trademark of the Garlock Bearing Company

Technical Features, Continued

DRIVE CONDITIONS

Standard SAE flanges and shafts are available for direct or indirect drive methods. Direct drives should be aligned within .002 in. (.05 mm) on center [.004 (.10 mm) TIR].

Overhung load drives (chain, belt, or gear) are permissible. Contact QCC for assistance.

FILTRATION

With the CP Series no inlet filtration or strainer is recommended. Installation with clean hoses and reservoir with 10 micron full flow return line filtration will provide the best system.

OPERATING TEMPERATURES

With Buna seals and normal operating conditions, the system temperature should not exceed 180° F (82°C) except for short periods to 200° F (93° C).

With optional Viton elastomers, the system may be operated at continuous temperatures up to 225° F (107° C) without damage to the pump.

CAUTION: Operation in excess of 225° F may cause external leakage or premature unit failure.

FLUIDS

Optimum fluid is a mineral based oil with additives to resist corrosion, oxidation, and foaming. The viscosity at running conditions should be between 45 SSU and 250 SSU for best performance and life.

Synthetic and water base fluids can be used successfully in this series. Consult QCC for assistance.

SUCTION

For maximum pump life, vacuum should not exceed 5 inches (127 mm Hg.) at the pump inlet. On cold starts a vacuum of 18 inches (460 mm) can be tolerated for short durations.

CAUTION: Continuous operation at vacuums in excess of 5 inches Hg. may cause premature unit failure.

MAXIMUM SPEED

Maximum speed is limited by gear tooth filling and surface speeds. Maximum speed for the C Series pumps is up to 3200 RPM, based on operation at sea level using SAE oil with a viscosity of 130 SSU at 120° F (49° C). Speed limits for a particular application depend on inlet pressure and oil viscosity. Consult QCC for operation outside these limits.

MINIMUM SPEED

Minimum speed for the CP Series is 600 rpm. This is the minimum speed at which the pump will operate continuously at rated pressure.

INPUT TORQUE RATINGS

The following table gives the maximum continuous input torque for specific SAE shafts.

When applying pumps in tandem or multiple, observe that input torque limitations must be met for each section and cumulative sections.

Shaft	Allowable Shaft Torque In. Lb.
13 tooth 16/32	2200
15 tooth 16/32	4100
14 tooth 12/24	8000
1" Straight Key	4100
1 1/4" Straight Key	8000

Tandem and Auxiliary Pads	Allowable Shaft Thru Torque In. Lb.
CP 180	2900
CP 222	4000

CAUTION: Torques in excess of those shown may cause premature input shaft or unit failure.

Technical Features, Continued

PRESSURE RATINGS

CP Series pumps are designed to operate continuously at rated pressure. In most applications this maximum pressure should be considered the maximum relief valve setting. Lower operating pressure will extend the life of the unit.

MOUNTING

The pump mount/drive should be designed to minimize axial and radial loads on the shaft. When using indirect (chain, belt, or gear) drive, contact QCC to determine permissible load limits and direction of installation.

PIPING

The choice of piping size and installation should always be consistent with maintaining minimum velocity. This will reduce system noise, pressure drops and overheating, thereby adding to cost savings for both the construction and operation of the system.

Inlet piping should be designed to prevent continuous pump inlet vacuums in excess of 5 in. (127 mm) Hg. or 18 in. (460 mm) Hg. during start-up when measured at the inlet port.

RESERVOIR

The reservoir should be designed to accommodate maximum volume changes during all system operating modes and prevent aeration of the fluid as it passes through the tank. Return and inlet lines should be positioned below the reservoir low oil level and be located as far as possible from each other. A baffle plate located between the pump inlet and return line is desirable to allow the oil to deaerate before it enters the pump.

Reservoirs are normally sized for at least one-half the maximum pump flow for adequate oil deaeration.

COOLING

Depending on duty cycle and reservoir/line construction, an oil cooler may be required. This is sized based on typical power losses in the hydraulic circuit. The oil cooler is usually placed in the return line.

CAVITATION

Hydraulic oil used in the majority of systems contains about 10% dissolved air by volume. This air under certain conditions of vacuum within the system is released from the oil causing air bubbles. These air bubbles collapse if subjected to pressure, and this collapse creates erosion of the adjacent metal.

Because of this, it becomes obvious that the greater the air content within the oil, or the greater the vacuum in the inlet line, the more severe will be the resultant erosion.

The main causes of over-aeration of the oil are air leaks, particularly on the inlet side of the pump, and flow line restrictions such as inadequate pipe sizes, elbow fittings and sudden changes in flow line cross sectional area.

Providing these defects are avoided; pump inlet pressure and rated speed requirements are maintained; and reservoir size and location is adequate, no cavitation problems should occur with QCC pumps and motors.

PRESSURE PROTECTION

The pump, as well as other system components, has pressure limitations. Thus a relief valve must be installed in the system, preferably as close to the pump as possible, to protect it from excessive pressure. If the relief valve is set at or near the maximum pressure rating for the pump, the operating characteristics of the valve should be known so that common relief valve overshoot does not allow system pressure to exceed the pump rating.

CAUTION: Failure to install this relief valve may result in premature unit failure.

LIFE EXPECTANCY

All QCC gear pumps utilize pressure balanced journal bearings which have an oil film maintained between the gear/shaft and bearing surfaces at all times. If this oil film is sufficiently sustained through proper system maintenance and operating limits are adhered to, a high life can be expected.

NOTE: A B-10 type life expectancy number is generally associated with anti-friction bearings and does not exist for journal bearings.

CP222 Gear Pumps

- 7 Sizes from 3.95 to 9.89 cu.in./Rev. (64.80 to 162.02 cc/Rev.)
- SAE 4-Bolt "C" Mounting Flange
- Spline or Keyed Shaft
- SAE 4-Bolt Split Flange Side Ported, Code 61
- Buna "Nitrile" - Std.
- "Viton" - Optional
- Auxiliary Pad Rear Cover - SAE 2 Bolt "A" & "B" Pad Mounts
- Clockwise or Counterclockwise Rotation
- Pressure - 3000 PSI Rated (4000 PSI Peak)
- Speeds to 3000 RPM

SPECIFICATIONS

MODEL	DISPLACEMENT		CONTINUOUS PRESSURE		INTERMITTENT PRESSURE*		"PEAK" PRESSURE**	
	cu.in./Rev.	cc/Rev.	PSI	BAR	PSI	BAR	PSI	BAR
040	3.95	64.80	3000	207	3600	250	4000	275
050	4.94	81.00	3000	207	3600	250	4000	275
060	5.93	97.20	3000	207	3600	250	4000	275
070	6.92	113.40	3000	207	3600	250	4000	275
080	7.91	129.61	3000	207	3600	250	4000	275
090	8.89	145.69	2750	190	3300	230	3700	255
100	9.89	162.02	2500	173	3000	210	3300	230

MODEL	MAX. RPM***	MIN. RPM	WEIGHTS	
			lbs	kgs
040	3000	600	33.5	15.23
050	3000	600	35.0	15.91
060	2900	600	36.5	16.59
070	2900	600	38.0	17.27
080	2800	600	39.5	17.95
090	2700	600	41.0	18.64
100	2600	600	42.5	19.32

* Intermittent is defined as less than 15% of the duty cycle.

** Peak is defined as relief valve maximum overshoot.

*** For speeds above those shown, consult QCC.

Performance Curves

[ν = 34.4 mm²/s (160 SSU), ϑ = 50° C (122°F)]

Figure 5: CPA 040

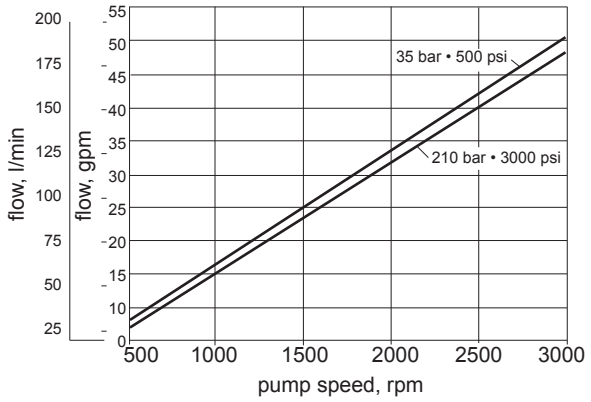


Figure 6: CPA 040

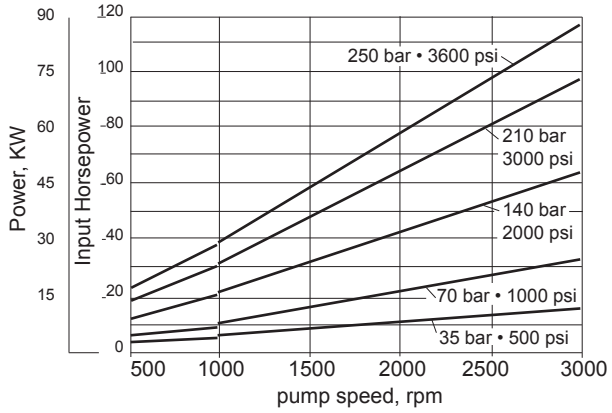


Figure 7: CPA 050

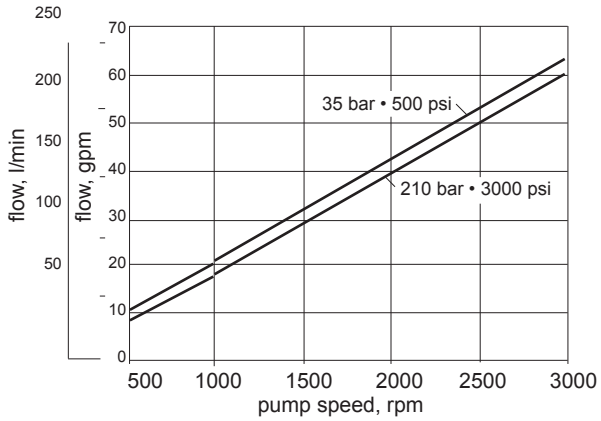


Figure 8: CPA 050

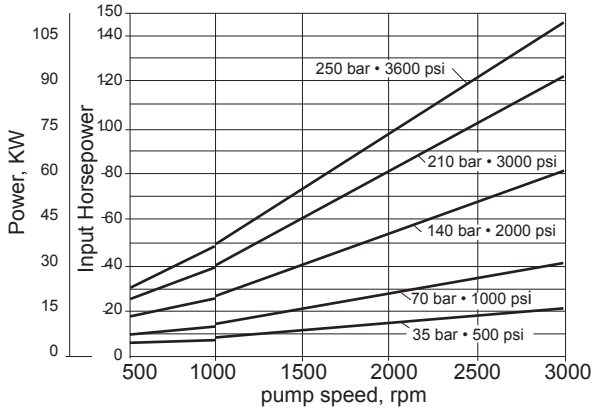


Figure 9: CPA 060

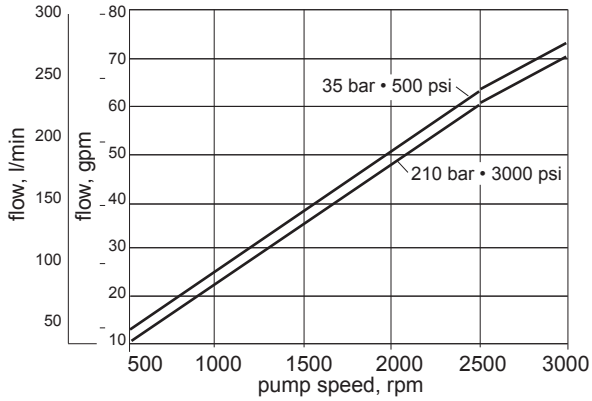
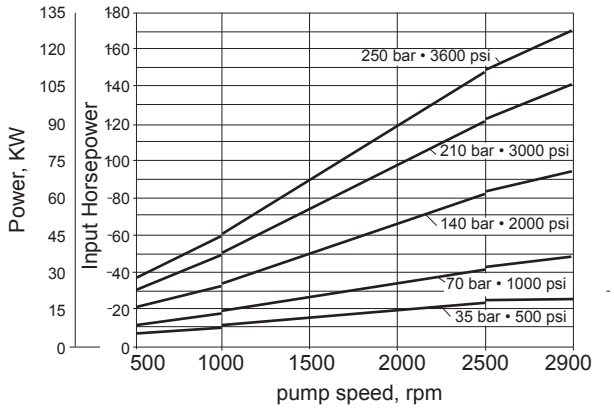


Figure 10: CPA 060



Performance Curves (Continued)

[ν = 34.4 mm²/s (160 SSU), ϑ = 50° C (122°F)]

Figure 11: CPA 070

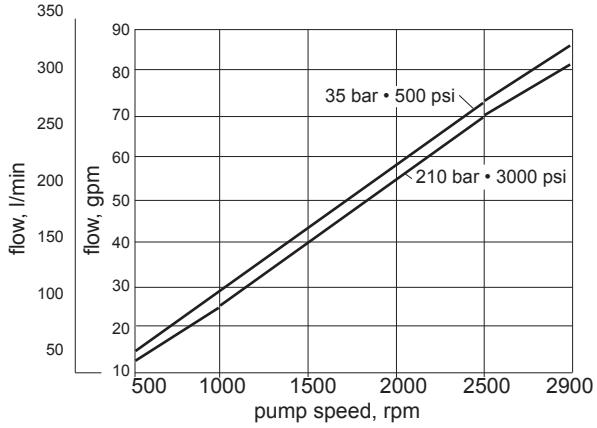


Figure 12: CPA 070

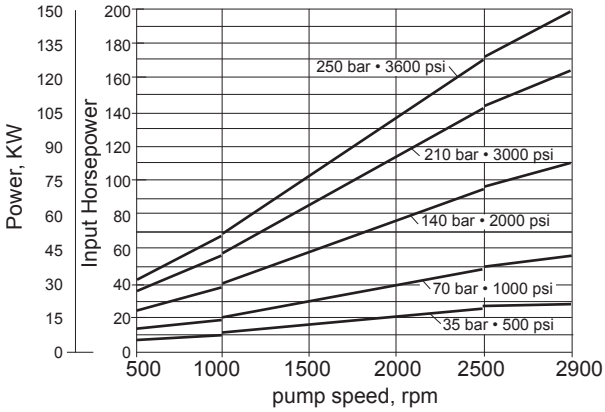


Figure 13: CPA 080

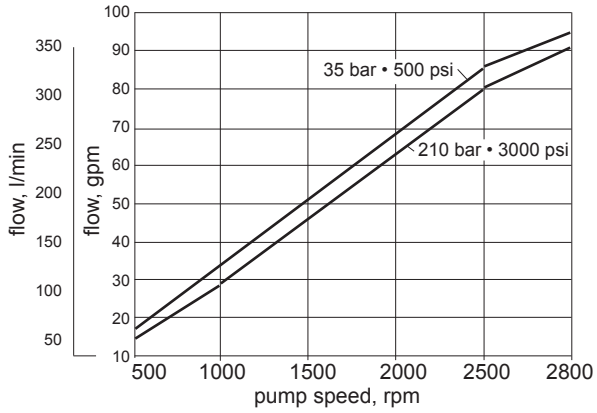
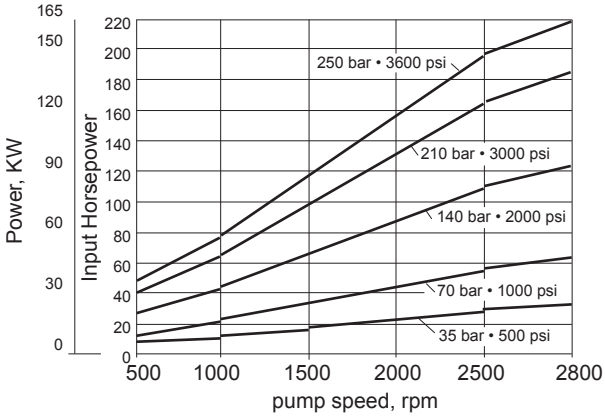


Figure 14: CPA 080



Performance Curves (Continued)

[ν = 34 mm²/s (160 SSU), ϑ = 50° C (122°F)]

Figure 15: CPA 090

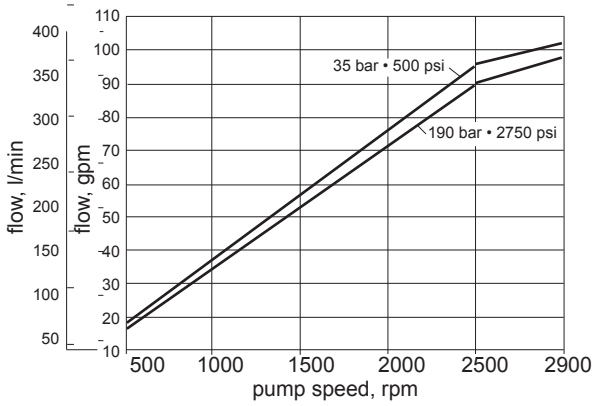


Figure 16: CPA 090

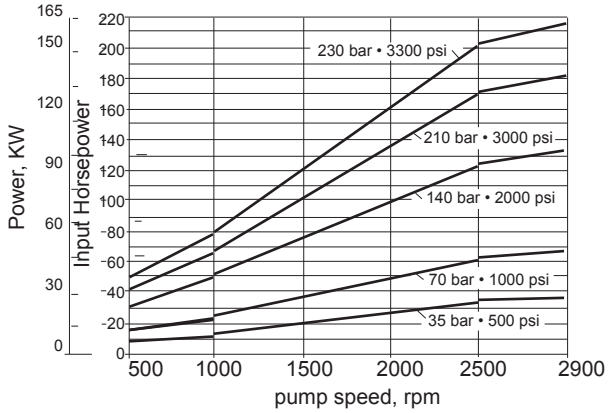


Figure 17: CPA 100

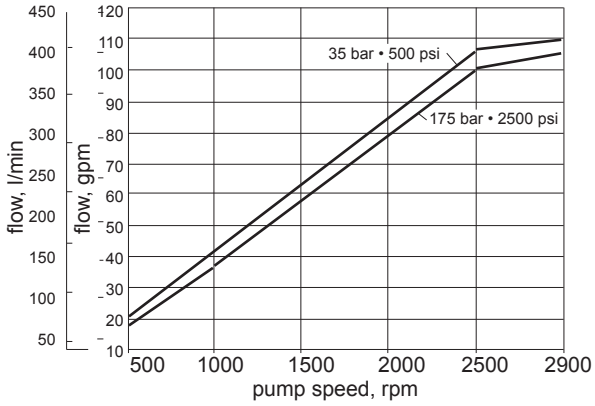


Figure 18: CPA 100

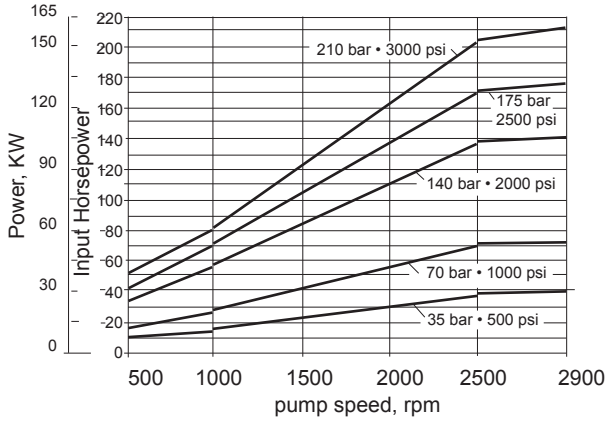
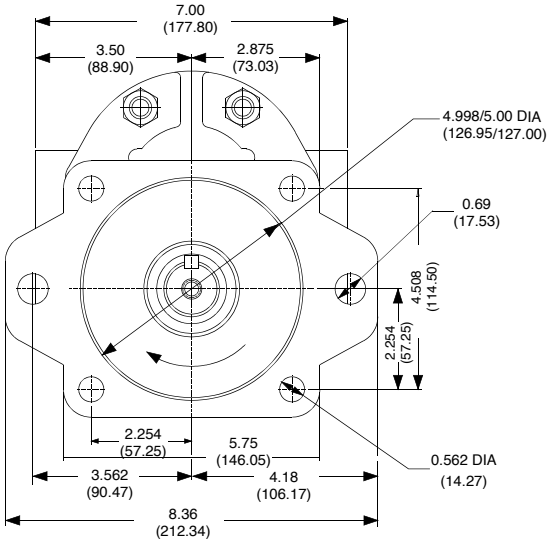
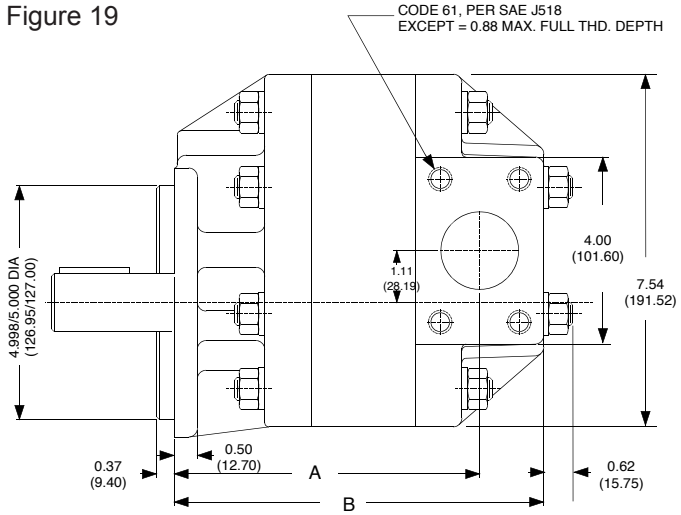
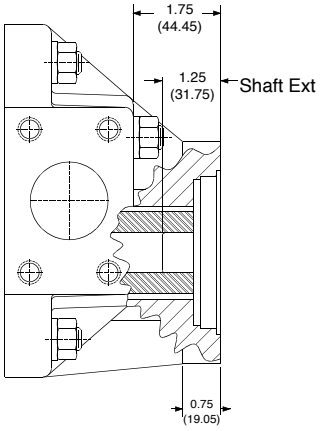


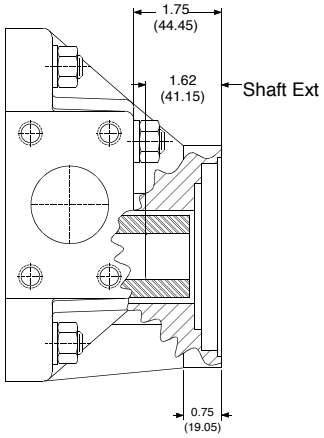
Figure 19





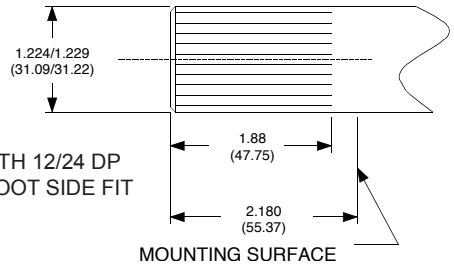


DETAIL FOR AUXILIARY PAD 'A'



DETAIL FOR AUXILIARY PAD 'B'

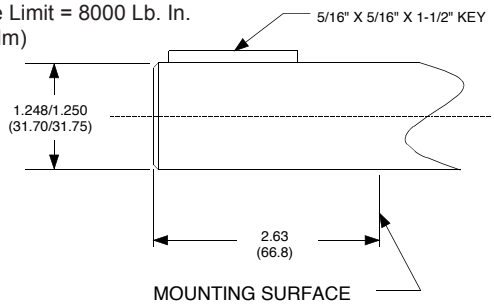
Torque Limit = 8000 Lb. In.(904 Nm)



14 TOOTH 12/24 DP
FLAT ROOT SIDE FIT
30° P.A.

SAE "C" Splined Shaft Option

Torque Limit = 8000 Lb. In.
(904 Nm)



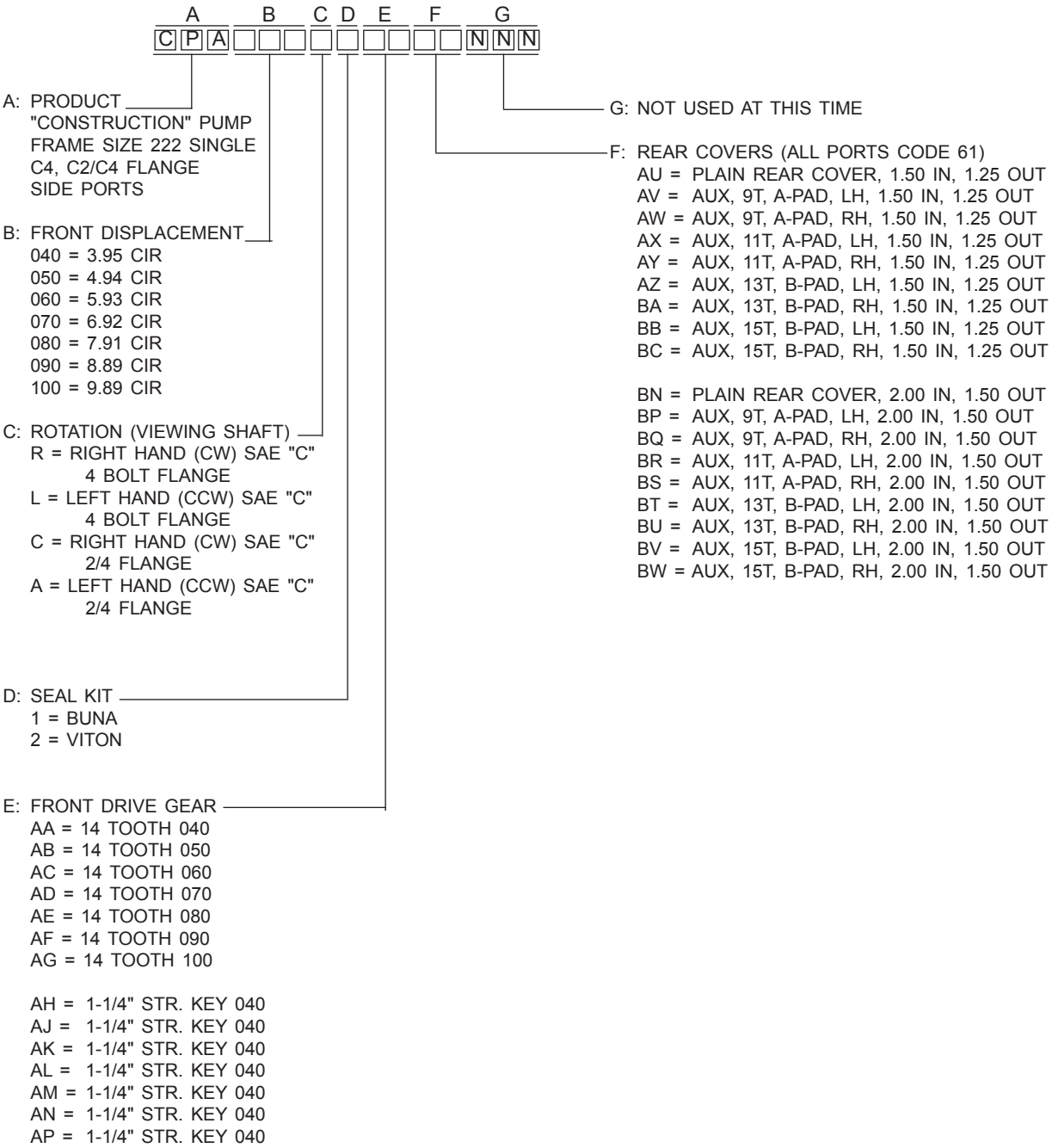
SAE "C" Straight Keyed Shaft Option

MOUNTING DIMENSIONS

DISPLACEMENT CODE	A		B	
	IN	MM	IN	MM
040	5.86	148.84	7.23	183.64
050	6.09	154.69	7.46	189.48
060	6.32	160.53	7.69	193.33
070	6.54	166.70	7.91	200.91
080	6.77	171.96	8.14	206.76
090	7.00	177.80	8.37	212.60
100	7.22	183.39	8.60	218.44

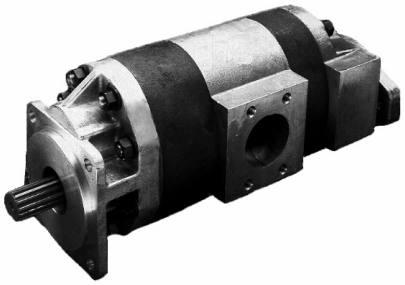
CP 222 Gear Pumps Ordering Information

CPA (CP 222 Single, C4 or C2/C4 Flange, Side Ports) Modular Ordering Code



CP 222 Tandem Gear Pumps

- 7 Sizes from 3.95 to 9.89 cu.in./Rev. (64.80 to 162.02 cc/Rev.)
- SAE 4-Bolt "C" Mounting Flange
- Spline or Keyed Shaft
- SAE 4-Bolt Split Flange Side Ported, Code 61
- BUNA,"Nitrile" - Std.
- "Viton" - Optional
- Single Inlet
- Clockwise or Counterclockwise Rotation
- Pressure - 3000 PSI Rated (4000 PSI Peak) Speeds to 3000 RPM
- Auxiliary Pad Rear Cover - SAE 2 Bolt "A" & "B" Pad Mounts



SPECIFICATIONS

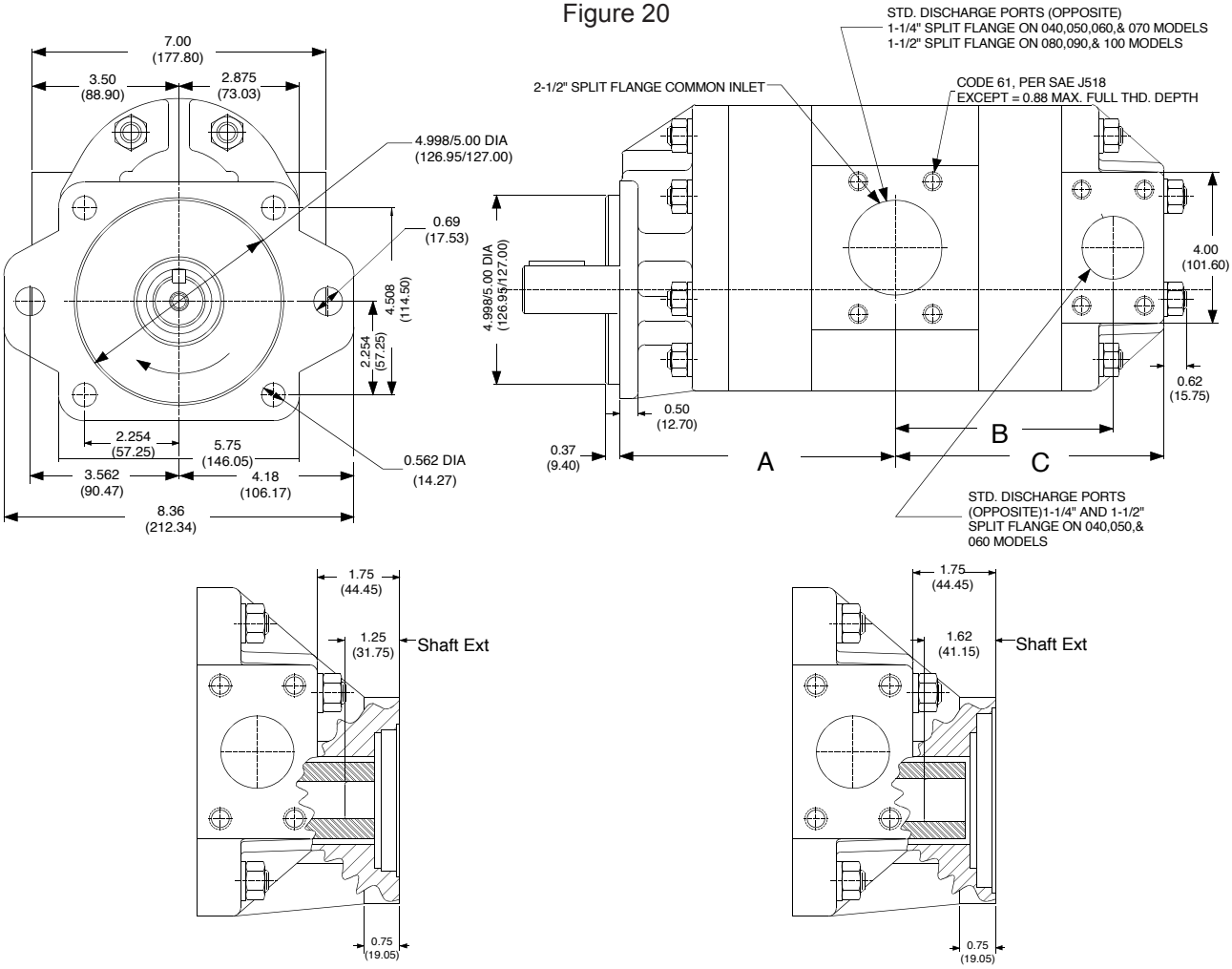
MODEL	DISPLACEMENT		CONTINUOUS PRESSURE		MAX.	MIN.
	Cu. In./Rev.	cc/Rev.	PSI	BAR	RPM	RPM
040	3.95	64.80	3000	207	3000	600
050	4.94	81.00	3000	207	3000	600
060	5.93	97.20	3000	207	2900	600
070	6.92	113.40	3000	207	2900	600
080	7.91	129.61	3000	207	2800	600
090	8.89	145.69	2750	190	2700	600
100	9.89	162.02	2500	173	2600	600

★ AVAILABLE COMBINATIONS

FRONT \ REAR	040	050	060
040	★	★	★
050	★	★	★
060	★	★	★
070	★	★	★
080	★	★	★
090	★	★	★
100	★	★	★

* For combinations other than those shown, contact QCC.

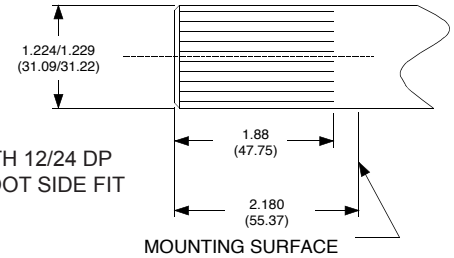
Figure 20



DETAIL FOR AUXILIARY PAD 'A'

DETAIL FOR AUXILIARY PAD 'B'

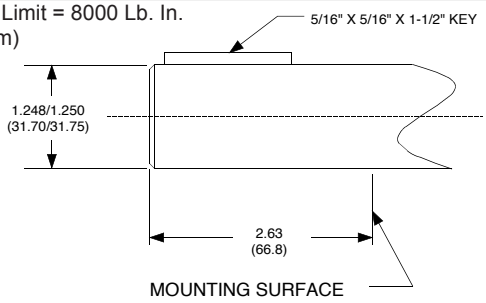
Torque Limit = 8000 Lb. In.(904 Nm)



14 TOOTH 12/24 DP
FLAT ROOT SIDE FIT
30° P.A.

SAE "C" Splined Shaft Option

Torque Limit = 8000 Lb. In.
(904 Nm)



SAE "C" Straight Keyed Shaft Option

MOUNTING DIMENSIONS

DISPLACEMENT CODE	IN A	MM	IN B	MM	IN C	MM
040-040	6.73	170.94	5.17	131.32	6.54	166.12
050-050	6.96	176.78	5.40	137.16	6.78	172.21
060-060	7.19	182.63	5.63	143.00	7.00	177.80
070-060	7.41	188.21	↓	↓	↓	↓
080-060	7.64	194.06				
090-060	7.87	199.90				
100-060	8.09	205.49				

CP 222 Tandem Gear Pumps Ordering Information

CPH (CP 222 Tandem, C4 or C2/C4 Flange, Side Ports) Modular Ordering Code

A	B	C	D	E	F	G	H	I	J	K
C P H	□ □ □	□ □ □	□	□	□ □	□	□ □	□	□ □	N N N

A: PRODUCT
"CONSTRUCTION" PUMP
FRAME SIZE 222 TANDEM
C4 FLANGE
SIDE PORTS

B: FRONT DISPLACEMENT
040 = 3.95 CIR
050 = 4.94 CIR
060 = 5.93 CIR
070 = 6.92 CIR
080 = 7.91 CIR
090 = 8.89 CIR
100 = 9.89 CIR

C: REAR DISPLACEMENT
040 = 3.95 CIR
050 = 4.94 CIR
060 = 5.93 CIR

D: ROTATION (VIEWING SHAFT)
R = RIGHT HAND (CW) SAE "C"
4 BOLT FLANGE
L = LEFT HAND (CCW) SAE "C"
4 BOLT FLANGE
C = RIGHT HAND (CW) SAE "C"
2/4 FLANGE
A = LEFT HAND (CCW) SAE "C"
2/4 FLANGE

E: SEAL KIT
1 = BUNA
2 = VITON

F: FRONT DRIVE GEAR
AA = 14 TOOTH 040
AB = 14 TOOTH 050
AC = 14 TOOTH 060
AD = 14 TOOTH 070
AE = 14 TOOTH 080
AF = 14 TOOTH 090
AG = 14 TOOTH 100

AH = 1-1/4" STR. KEY 040
AJ = 1-1/4" STR. KEY 040
AK = 1-1/4" STR. KEY 040
AL = 1-1/4" STR. KEY 040
AM = 1-1/4" STR. KEY 040
AN = 1-1/4" STR. KEY 040
AP = 1-1/4" STR. KEY 040

G: REAR DRIVE GEARS
1 = AUXILIARY DRIVE 040
2 = AUXILIARY DRIVE 050
3 = AUXILIARY DRIVE 060

H: REAR COVERS (ALL PORTS CODE 61)
AA = PLAIN REAR COVER,**,1.25 OUTLET
AB = AUX, 9T, A-PAD,LH,**,1.25 OUTLET
AC = AUX, 9T, A-PAD,RH,**,1.25 OUTLET
AD = AUX, 11T, A-PAD,LH,**,1.25 OUTLET
AE = AUX, 11T, A-PAD,RH,**,1.25 OUTLET
AF = AUX, 13T, B-PAD,LH,**,1.25 OUTLET
AG = AUX, 13T, B-PAD,RH,**,1.25 OUTLET
AH = AUX, 15T, B-PAD,LH,**,1.25 OUTLET
AJ = AUX, 15T, B-PAD,RH,**,1.25 OUTLET

AK = PLAIN REAR COVER,**,1.50 OUTLET
AL = AUX, 9T, A-PAD,LH,**,1.50 OUTLET
AM = AUX, 9T, A-PAD,RH,**,1.50 OUTLET
AN = AUX, 11T, A-PAD, LH,**,1.50 OUTLET
AP = AUX, 11T, A-PAD,RH,**,1.50 OUTLET
AQ = AUX, 13T, B-PAD,LH,**,1.50 OUTLET
AR = AUX, 13T, B-PAD,RH,**,1.50 OUTLET
AS = AUX, 15T, B-PAD,LH,**,1.50 OUTLET
AT = AUX, 15T, B-PAD,RH,**,1.50 OUTLET
** = NO INLET PORT ON REAR COVER (SINGLE INLET TANDEM). For Dual Inlet Tandems use the "CPA" single pump rear cover code (See page 13)

I: CENTER PLATE (ALL PORTS CODE 61)
1 = L.H., 2.50 INLET, 1.25 OUTLET
2 = R.H., 2.50 INLET, 1.25 OUTLET
3 = L.H., 2.50 INLET, 1.50 OUTLET
4 = R.H., 2.50 INLET, 1.50 OUTLET

J: ASSEMBLY STUD KITS

AA =	040-040	AK =	050-070
AB =	040-050	AL =	050-080
AC =	040-060	AM =	050-090
AD =	040-070	AN =	050-100
AE =	040-080	AP =	060-060
AF =	040-090	AQ =	060-070
AG =	040-100	AR =	060-080
AH =	050-050	AS =	060-090
AJ =	050-060	AT =	060-100

K: NOT USED AT THIS TIME

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