

PUTTING TECHNOLOGY TO WORK....

WORLDWIDE!



®



Commercial Shearing (Pty) Ltd

P3-P11-P17 HYDRAULIC PUMPS

P3 HYDRAULIC PUMPS



***Superior
Performance.
High Efficiency.
High Pressure
Operation.***

The Advantage At One Glance

- **UP TO 4000 PSI/276 BAR CONTINUOUS OPERATION**
High strength materials and large journal diameters provide low bearing loads for high pressure operation.
- **LOW NOISE**
9-tooth gear profile and optimised flow metering provide reduced pressure pulsations and exceptionally quiet operation.
- **HIGH EFFICIENCY**
Pressure balanced bearing blocks assume maximum efficiency under all operating conditions.
- **APPLICATION FLEXIBILITY**
International mounts and connections, integrated valve capabilities and common inlet multiple pump configurations, provide unmatched design and application versatility.

The "P" series of gear pumps are an advanced-performance version of the international "bushing block" style pumps. The "P" pump series offers superior performance, high efficiency and low noise operation at high operating pressures. They are produced in four frame sizes (P3, P11 and P17) with displacements ranging from 0.8 to 52 cm³/rev. A wide variety of standard options are available to meet specific application requirements, worldwide.

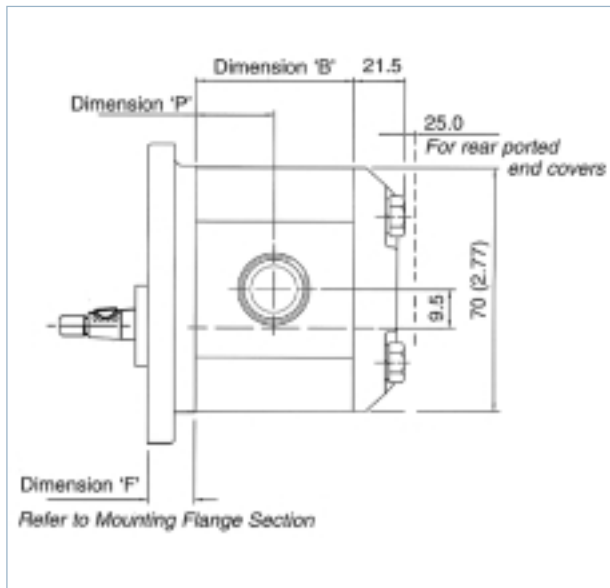
P3 Pump Specifications

Pump Displacements*	cm ³ /rev in ³ /rev	0.8 0.5	1.2 0.7	1.6 .10	2.1 .13	2.5 .15	3.3 .20	3.6 .22	4.3 .25	4.8 .29	5.8 .35	6.2 .38	7.9 .49
Continuous Pressure*	bar	275	275	275	275	275	275	250	210	160	160	150	120
Intermittent Pressure	bar	300	300	300	300	300	300	280	230	180	180	170	140
Minimum Speed @ Max. Outlet Pressure	rpm	500	500	500	500	500	500	500	500	500	500	500	500
Maximum Speed @ 0 Inlet & Max. Outlet Pressure	rpm	4000	4000	4000	4000	4000	4000	4000	3500	3000	3000	3000	3000
Pump Input Power 1500 rpm @ Max. Pressure and 1800 rpm	kw hp	0.7 1.7	1.0 1.6	1.3 2.1	1.7 2.7	2.0 3.2	2.7 4.3	2.8 4.5	2.7 4.3	2.4 3.8	2.8 4.5	2.9 4.6	3.0 4.8



DIMENSIONS AND WEIGHTS

Single Unit



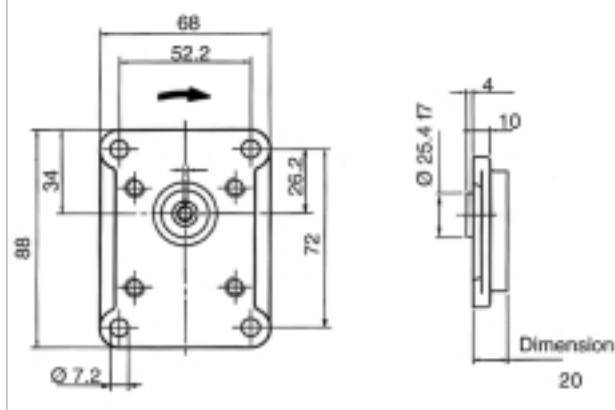
DIMENSIONS AND WEIGHTS

Displacements (per rev.)	"B" Dimension (overall length)	"P" Dimension (to port C/L)	Approximate Weight
0.8 cm ³	35.3 mm	17.6 mm	1.1 kg
1.2 cm ³	36.8 mm	18.4 mm	1.1 kg
1.6 cm ³	38.3 mm	19.1 mm	1.1 kg
2.1 cm ³	39.9 mm	19.9 mm	1.1 kg
2.5 cm ³	41.5 mm	20.7 mm	1.2 kg
3.3 cm ³	44.5 mm	22.2 mm	1.2 kg
3.6 cm ³	45.6 mm	22.8 mm	1.2 kg
4.3 cm ³	48.5 mm	24.2 mm	1.3 kg
4.8 cm ³	50.0 mm	25.0 mm	1.4 kg
5.8 cm ³	53.8 mm	26.9 mm	1.4 kg
6.2 cm ³	55.3 mm	27.6 mm	1.5 kg
7.9 cm ³	61.6 mm	30.8 mm	1.6 kg

Mounting Flange Options

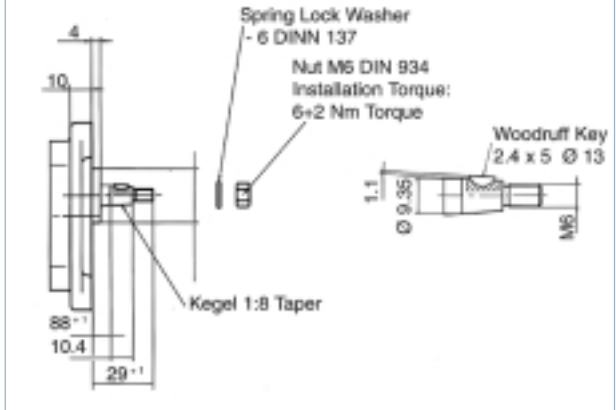
RECTANGULAR – CODE 80

(72.0 x 52.2 mm w/25.4 mm Pilot)



EUROPEAN 1:8 TAPERED – CODE 64

(Key 2.4 x 5 Ø 13)



P3 HYDRAULIC PUMPS



Shaft Load Capacity

Code	Description	Torque Rating
64	1:8 European Tapered (Key width 2/4 mm)	30 nm/266.4 in-lb

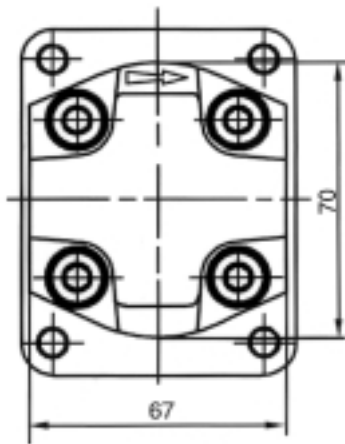
$$\text{Torque (in-lb)} = \frac{\text{Displacement (in}^3\text{/rev)} \times \text{Pressure (psi)}}{5.72}$$

$$\text{Torque (nm)} = \frac{\text{Displacement (cc/rev.)} \times \text{Pressure (bar)}}{57.2}$$

End Cover Options

Side ports are standard in the P3 product family, with port connections located in the gear housing. Rear ported versions however are also available, with 1/4 BSP or 9/16 UNF "O" ring port connections in the end cover.

STANDARD END COVER – CODE BE (None Ported)



	Cover Code	Inlet Port	Outlet Port
Standard End Cover (Connections in Housing)	BE	None	None
Rear Ported Cover	AG	G 1/4	None
Rear Ported Cover	XE	G 1/4	G 1/4
Rear Ported Cover	ZE	9/16-18 UNF	9/16-18 UNF

Housing Port connections

Standard side port connections are available in a wide range of internationally acceptable configurations and sizes (see model code).

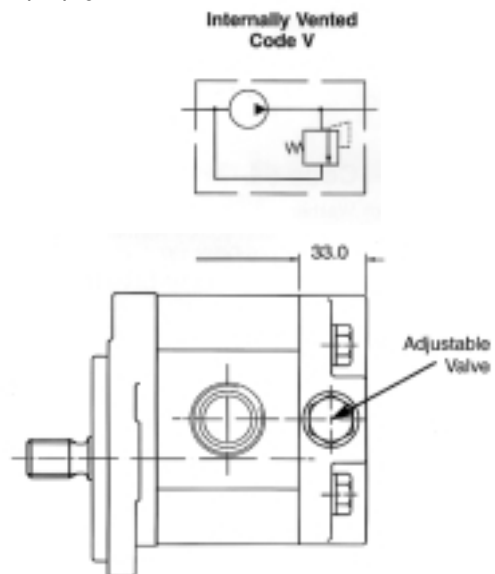
Code	Port Connections	Inlet	Outlet
AB	No Ports	For Rear Ported Covers	
GA	Metric Straight Thread	M 18 x 1	M 14 x 1.5
BF	BSP Straight Thread	G 14	None
BG	BSP Straight Thread	G 3/8	G 1/4
BD	BSP Straight Thread	G 3/8	G 3/8
BH	BSP Straight Thread	G 1/2	G 3/8
BJ	BSP Straight Thread	G 1/2	G 1/2
AD	SAE Straight Thread	3/4 - 16 UNF	9/16 - 18 UNF
EN	26 mm Pilot Flange	10 mm	8 mm
EM	30 mm Pilot Flange	12 mm	8 mm

Integrated Valve Options

The P3 range is available with a variety of integrated Relief and Priority Flow valve options. A small selection is shown below.

For further information, please contact our Technical Services Department.

RELIEF VALVES





ORDERING INFORMATION

Sample Part Number

For Single Section Pumps						
Code 1	Code 2	Code 3	Code 4	Code 5	Code 6	Code 7
P3 B	2	80	BE	BQ	25	64

CODE 1: SERIES/TYPE

P3 A Single Pump

CODE 2: ROTATION

1 Clockwise
2 Counter Clockwise

CODE 3: MOUNTING

80 Rectangular
(72.0 x 52.2 mm w/25.4 mm Pilot)

CODE 4: END COVERS

Standard End Covers

BE No Ports (Connections in Housing)

Ported End Covers	Inlet	Outlet
AG	G 1/4"	None
XE	G 1/4"	G 1/4"
ZE	9/16-18 UNF	9/16-18 UNF

End Covers with Integrated Relief Valves

(Choose Code for Relief Valve Settings from Tables Below)

R_ Externally Vented Relief Valve
V_ Internally Vented Relief Valve

Code Relief Valve Setting

07	70 bar/1000 psi	15	155 bar/2250 psi
09	86 bar/1250 psi	17	170 bar/2500 psi
10	103 bar/1500 psi	19	190 bar/2750 psi
12	120 bar/1750 psi	21	210 bar/3000 psi
14	138 bar/2000 psi	23	228 bar/3300 psi

CODE 5 : HOUSING/PORT OPTIONS

Port	Connections	Inlet	Outlet
AB	No Ports (For Rear Ported Covers)		
GA	Metric Straight Thread	M 18 x 1	M 14 x 1.5
*BF	BSP Straight Thread	G 1/4"	None
*BG	BSP Straight Thread	G 3/8"	G 1/4"
*BD	BSP Straight Thread	G 3/8"	G 3/8"
BH	BSP Straight Thread	G 1/2"	G 3/8"
BJ	BSP Straight Thread	G 1/2"	G 1/2"
AD	SAE Straight Thread	3/4-16U	9/16-18
EN	26mm Pilot Flange	10 mm	UMF
EM	30 mm Pilot Flange	12 mm	8 mm

*10 mm @ 7.9cm³/rev

CODE 6 : DISPLACEMENT

	cm ³ /rev.	in ³ /rev.
08	0.8	0.05
12	1.2	0.07
16	1.6	0.10
21	2.1	0.13
25	2.5	0.15
33	3.3	0.20
36	3.6	0.22
43	4.3	0.27
48	4.8	0.30
58	5.8	0.36
62	6.2	0.38
79	7.9	0.49

CODE 7 : SHAFT EXTENSIONS

64 European 1:8 Tapered (key 2.4 x 5 Ø 13)

P11 HYDRAULIC PUMPS



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Pressure balanced bearing blocks assure maximum efficiency under all operating conditions.
- **APPLICATION FLEXIBILITY**
International mounts and connections, integrated valve capabilities and common inlet multiple pump configurations, provide unmatched design and application versatility.

ALPHA series gear pumps are an advanced-performance version of the international "bushing block" style pumps. ALPHA series pumps offer superior performance, high efficiency and low noise operation at high operating pressures. They are produced in four frame sizes (P3, P11 and P17) with displacements ranging from 0.8 to 52 cm³/rev. (.048 to 3.05 in³/rev.) A wide variety of standard options are available to meet specific application requirements, worldwide.

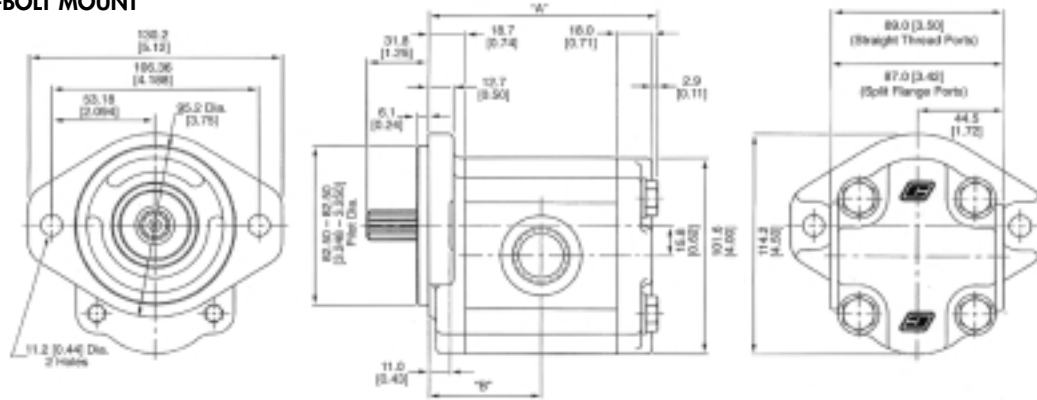
P11 Pump Specifications

Pump Displacements*	cm ³ /rev in ³ /rev	6 .37	8 .49	10 .61	11 .67	14 .85	16 .98	19 1.16	23 1.40	27 1.65	31 1.89	33 2.01
Continuous Pressure*	bar	276	276	276	276	276	276	276	234	200	196	185
	psi	4000	4000	4000	4000	4000	4000	4000	3400	2900	2850	2700
Intermittent Pressure	bar	300	300	300	300	300	300	300	255	221	217	210
	psi	4400	4400	4400	4400	4400	4400	4400	3700	3200	3150	3000
Minimum Speed @ Max. Outlet Pressure	rpm	500	500	500	500	500	500	500	500	500	500	500
Maximum Speed @ 0 Inlet & Max. Outlet Pressure	rpm	4000	4000	3600	3600	3300	3000	3000	2800	2400	2300	2200
Pump Input Power 1500 rpm @ Max. Pressure and 1800 rpm	kw	4.5	6.0	7.5	8.3	10.5	12.0	14.3	14.7	14.9	16.7	17.3
	hp	7.2	9.7	12.1	13.3	16.9	19.3	22.9	23.6	23.9	26.8	27.9

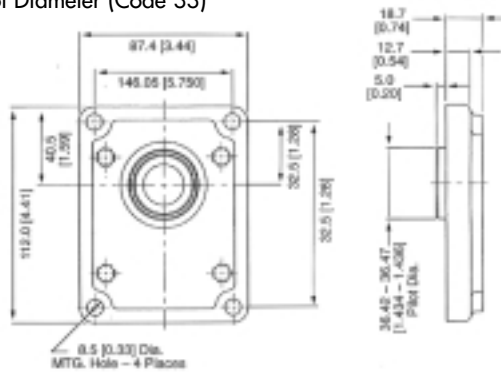


DIMENSIONS, MOUNTING FLANGES AND WEIGHTS

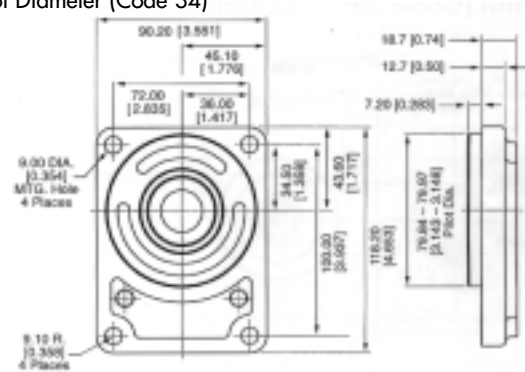
SAE "A" 2-BOLT MOUNT
(Code 93)



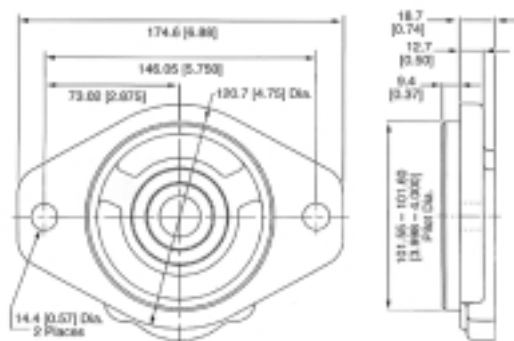
"EURO" RECTANGULAR MOUNT 36.5 MM
Pilot Diameter (Code 33)



"EURO" RECTANGULAR MOUNT 80.0 MM
Pilot Diameter (Code 34)



SAE "B" 2-BOLT MOUNT
(Code 96)



DIMENSIONS AND WEIGHTS (CODES 33,34,93,96)

Displacements (per rev.)	"A" Dimension (overall length)	"B" Dimension (to port C/L)	Approximate Weight
6 cm ³ / .37 in ³	91.4 mm/3.60 in	44.6 mm/1.76 in	3.49 kg/ 7.69 lb
8 cm ³ / .49 in ³	94.5mm/3.72 in	46.1 mm/1.82 in	3.56 kg / 7.86 lb
10 cm ³ / .61 in ³	97.5 mm/3.84 in	47.6 mm/1.88 in	3.64 kg / 8.02 lb
11 cm ³ / .67 in ³	99.0 mm/3.90 in	48.4 mm/1.91 in	3.68 kg / 8.12 lb
14 cm ³ / .85 in ³	103.6 mm/4.08 in	50.7 mm/2.00 in	3.80 kg / 8.38 lb
16 cm ³ / .98 in ³	106.6mm/4.20 in	52.2 mm/2.06 in	3.88 kg / 8.55 lb
19 cm ³ /1.16 in ³	111.2 mm/4.38 in	54.5 mm/2.14 in	4.00 kg / 8.81 lb
23 cm ³ /1.40 in ³	117.2 mm/4.61 in	57.5 mm/2.26 in	4.15 kg / 9.15 lb
27cm ³ /1.65 in ³	123.3 mm/4.85 in	60.5 mm/2.38 in	4.30 kg / 9.49 lb
31 cm ³ /1.89 in ³	129.4 mm/5.09 in	63.6 mm/2.50 in	4.46 kg / 9.84 lb
33 cm ³ /2.01 in ³	132.4 mm/5.21 in	65.1 mm/2.56 in	4.54 kg /10.01 lb

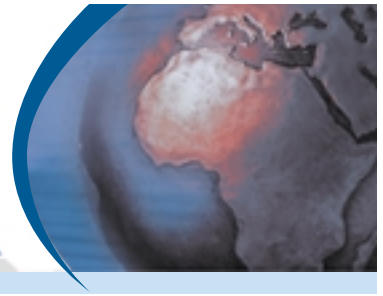
Add for Relief Valve

9.1 mm/0.36 in

-

0.49 kg/1.08 lb

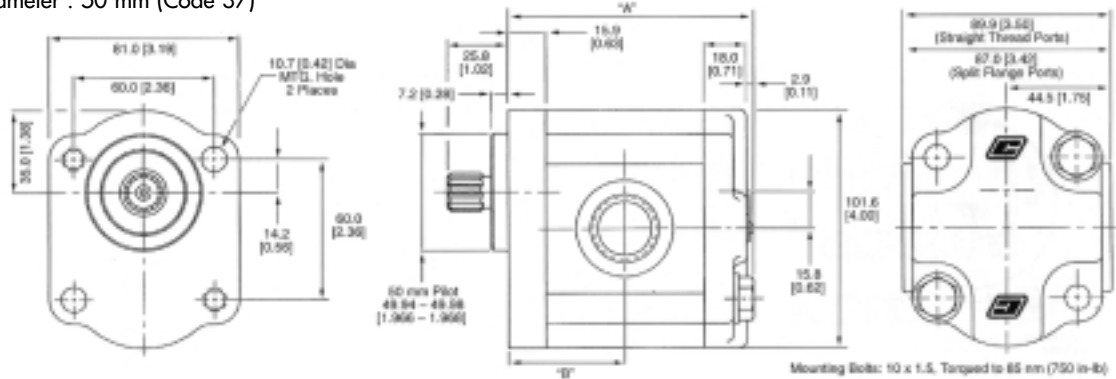
P11 HYDRAULIC PUMPS



DIMENSIONS, MOUNTING FLANGES AND WEIGHTS

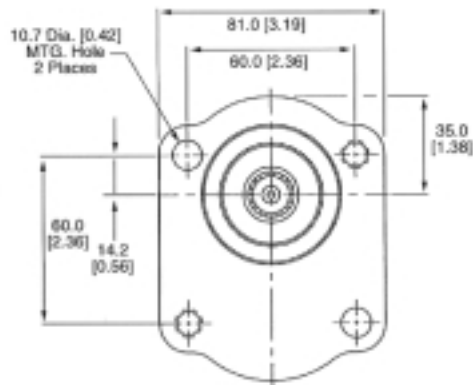
THROUGH-BOLT MOUNT WITH SHAFT SEAL

Pilot Diameter : 50 mm (Code 37)



OPPOSITE MOUNTING BOLT LOCATION

Pilot Diameter: 50 mm (Code 39) or 52 mm (Code 38)



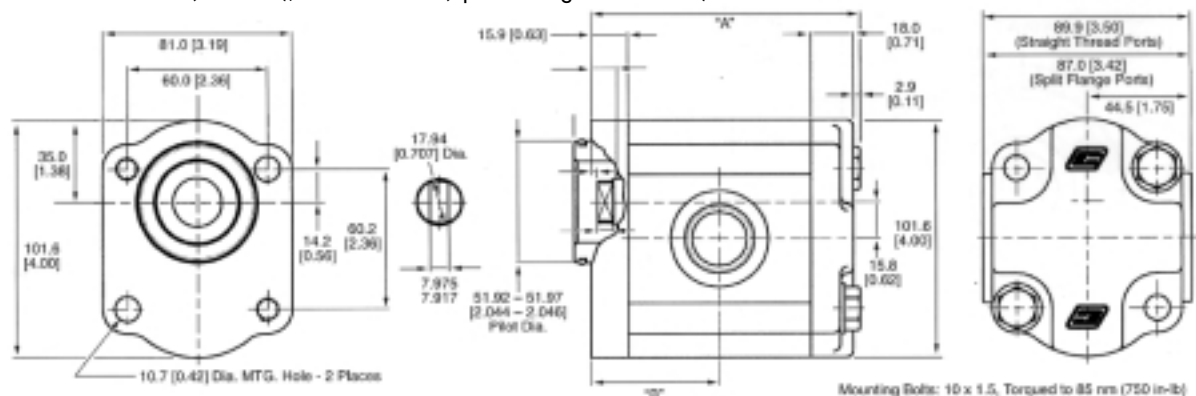
DIMENSIONS AND WEIGHTS (CODES 33,34,93,96)

Displacements (per rev.)	"A" Dimension (overall length)	"B" Dimension (to port C/L)	Approximate Weight
6 cm ³ / .37 in ³	88.6 mm/3.49 in	41.8 mm /1.65 in	3.40 kg/ 7.49 lb
8 cm ³ / .49 in ³	91.7 mm/3.61 in	43.3 mm /1.70 in	3.47 kg/ 7.66 lb
10 cm ³ / .61 in ³	94.7 mm/3.73 in	44.8 mm /1.76 in	3.55 kg/ 7.82 lb
11 cm ³ / .67 in ³	96.2 mm/3.79 in	45.6 mm /1.80 in	3.57 kg/ 7.92 lb
14 cm ³ / .85 in ³	100.8 mm/3.97 in	47.9 mm /1.89 in	3.71 kg/ 8.18 lb
16 cm ³ / .98 in ³	103.8 mm/4.09 in	49.4 mm /1.94 in	3.79 kg/ 8.35 lb
19 cm ³ /1.16 in ³	108.4 mm/4.27 in	51.7 mm /2.04 in	3.91 kg/ 8.61 lb
23 cm ³ /1.40 in ³	114.4 mm/4.50 in	54.7 mm /2.15 in	4.06 kg/ 8.95 lb
27cm ³ /1.65 in ³	120.5 mm/4.74 in	57.7 mm /2.27 in	4.21 kg/ 9.29 lb
31 cm ³ /1.89 in ³	126.6 mm/4.98 in	60.8 mm /2.39 in	4.37 kg/ 9.64 lb
33 cm ³ /2.01 in ³	129.6 mm/5.10 in	62.3 mm /2.45 in	4.45 kg/ 8.81 lb

For codes 36, 37, 38, 39

THROUGH-BOLT MOUNT

Pilot Diameter: 52 mm (Code 36); No Shaft Seal (Special Tang Shaft Shown)



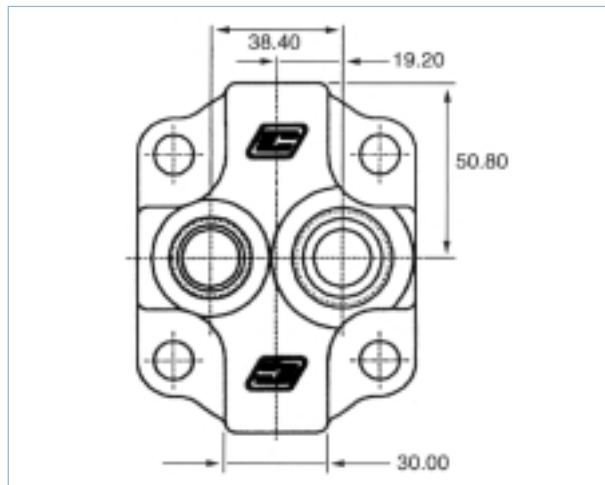


End Cover Options

Side ports are standard in the P11 product family. Port connections are located in the gear housing. Rear ported versions are also available with port connections in the end cover.

	Cover Code	Inlet Port	Outlet Port	
Standard End Cover	BE	None	None	Ports in Housing
Ported End Cover	NE	1"-1/16-12	7/8"-14	SAE Straight Thread
Ported End Cover	YE	G 3/4"	G 1/2"	BSP Straight Thread

Note: See tables on previous pages for pump lengths



Housing Port Connections

Standard side port connections are available in a wide range of internationally acceptable configurations and sizes. Flange connections or rear ports are recommended for operation over 3500 psi/241 bar.

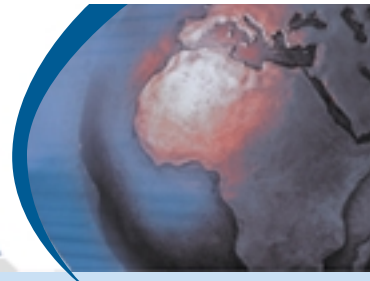
Code	Port Connections	Inlet	Outlet
AE	SAE Straight Thread	7/8"-14	3/4"-16
AQ	SAE Straight Thread	1"-1/16-12	7/8"-14
AZ	SAE Straight Thread	1"-5/16-12	1"-1/16-12
BA	BSP Straight Thread	G 3/4"	G 1/2"
BB	BSP Straight Thread	G 1"	G 3/4"
AB	No Ports (For Rear Ported Covers)	None	None
AS	SAE Thread w/Integrated Valves	1"-1/16	None
AT	SAE Thread w/Integrated Valves	1"-5/16	None
AF	SAE Straight Thread	1"-1/16-12	3/4"-16
AR	SAE Straight Thread	1"-5/16-12	7/8"-14

Code	Flange Port Connections	A Inlet	B Bolt Circle	C Bolt	A Outlet	B Bolt Circle	C Bolt
FA	SAE Split Flange	3/4" Dia.	-	3/8"-16	1/2" Dia.	-	5/16"-19
FB	SAE Split Flange	1" Dia.	-	3/8"-16	3/4" Dia.	-	3/8"-16
MA	SAE Metric Flange	19 mm	-	M 10 x 1.5	13 mm	-	M8 x 1.25
DA	European Flange	19 mm	40 mm	M 8 x 1.25	13 mm	30 mm	M 6 x 1
DB	European Flange	13 mm	30 mm	M 6 x 1	13 mm	30 mm	M 6 x 1
EJ	European Flange	20 mm	40 mm	M 6 x 1	15 mm	35 mm	M 6 x 1
EK	European Flange	26 mm	55 mm	M 8 x 1.25	18 mm	55 mm	M8 x 1.25

EUROPEAN FLANGE CONFIGURATIONS

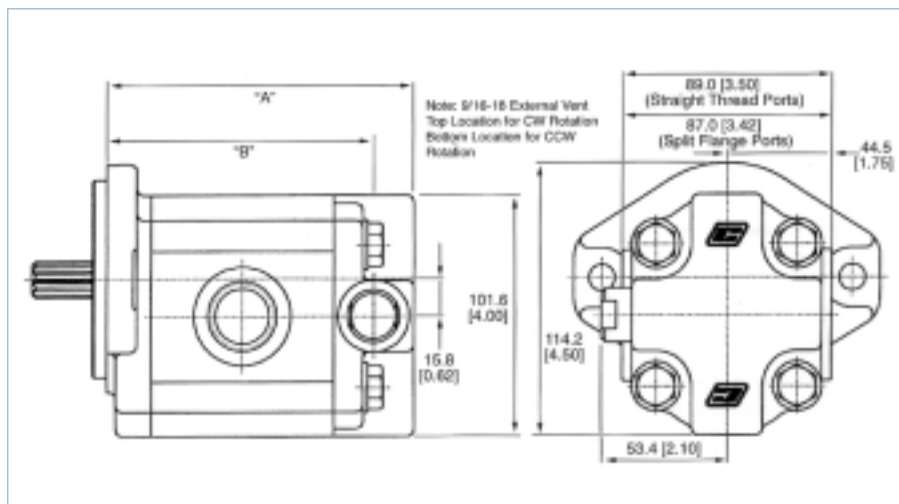
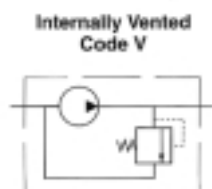


P11 HYDRAULIC PUMPS



Integrated Valve Options

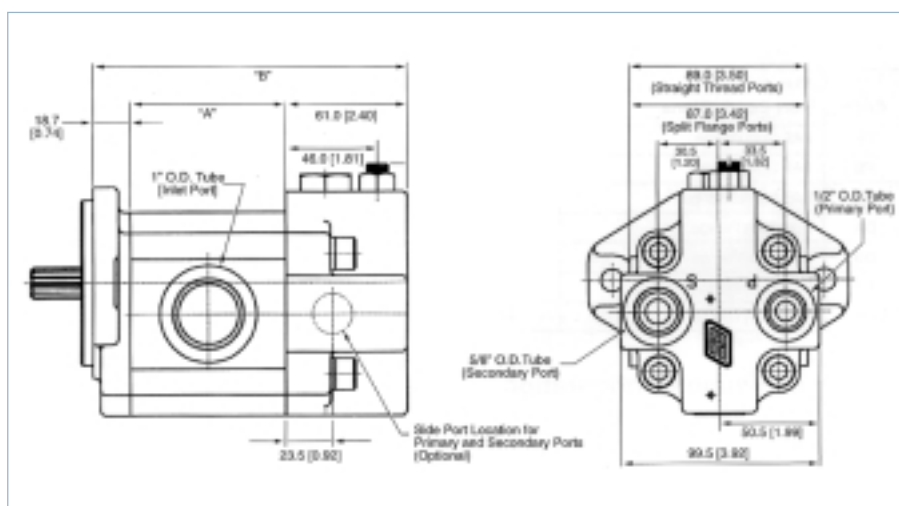
RELIEF VALVES



Pump Code		06	08	10	11	14	16	19	23	27	31	33
"A" Dim.	mm	100.5	103.6	106.6	108.1	112.7	115.7	120.3	126.3	132.4	138.5	141.5
	inches	3.96	4.08	4.26	4.26	4.44	4.56	4.74	4.97	5.21	5.45	5.57
"B" Dim	mm	114.3	88.6	91.6	93.1	97.7	100.7	105.3	111.3	117.4	123.5	126.5
	inches	4.50	3.49	3.61	3.67	3.85	3.96	4.15	4.38	4.62	4.86	4.98

For SEC codes 33,34,93,96. For SEC codes 36,37,38,39 dimensions "A" and "B" to be decreased by 2.8mm.

PRIORITY FLOW & RELIEF VALVES



Pump Code		06	08	10	11	14	16	19	23	27	31	33
"A" Dim.	mm	51.8	54.9	57.9	59.4	64.0	67.0	71.6	77.6	83.7	89.8	92.8
	inches	2.04	2.16	2.28	2.36	2.52	2.64	2.82	3.06	3.29	3.53	3.65
"B" Dim	mm	131.5	134.6	137.6	139.1	143.7	146.7	151.2	157.3	163.4	169.5	172.5
	inches	5.18	5.30	5.42	5.48	5.66	5.78	5.95	6.19	6.43	6.67	6.79

For SEC codes 33,34,93,96. For SEC codes 36,37,38,39 dimensions "B" to be decreased by 2.8 mm.



Shaft Extensions

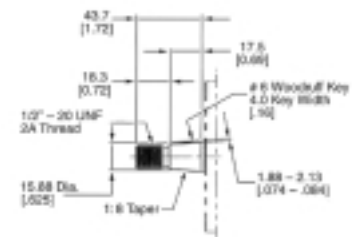
SAE "A" SPLINE (CODE 96)



DIN 5480 SPLINE (CODE 80)



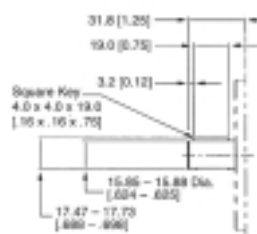
SAE "A" TAPERED KEYED (CODE 41)



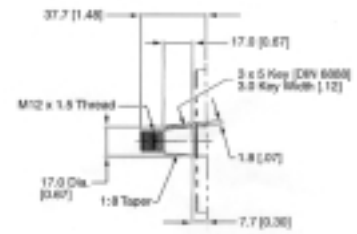
SAE 19-4 SPLINE (CODE 92)



SAE "A" STRAIGHT KEYED (CODE 97)



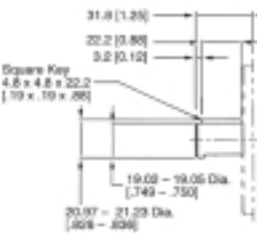
"EURO" 1:5 TAPERED KEYED (CODE 85)



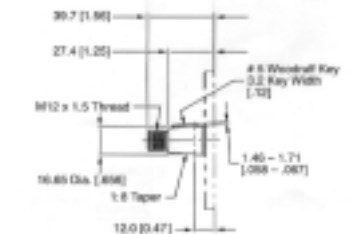
DIN 5482 SPLINE (CODE 81)



SAE 19-1 STRAIGHT KEYED (CODE 24)



"EURO" 1:8 TAPERED KEYED (CODE 86)



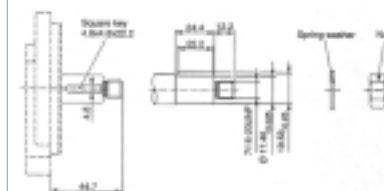
Code	Description	Torque Rating
96	SAE "A" 9T Spline	121 nm/1074 in-lb
92	SAE "19-4" 11T Spline	222 nm/1961 in-lb
97	SAE "A" 5/8" Dia. Keyed	75 nm/7665 in-lb
24	SAE "19-1" 3/4" Dia. Keyed	145 nm/1285 in-lb
85	1:5 European Tapered	193 nm/1707 in-lb
86	1:8 European Tapered	198 nm/1752 in-lb
41	SAE "A" Tapered	156 nm/1379 in-lb
80	DIN 5480 Spline	223 nm/1973 in-lb
81	DIN 5482 Spline	124 nm/1100 in-lb
1	Multiple Pump Connection Shaft	110 nm/972 in-lb

Contact Commercial product support for side and thrust load applications.

Note: Above shaft extensions are increased by 2.8mm (.11 in.) with Through-Bolts Mounts (Codes 36,37,38,39).

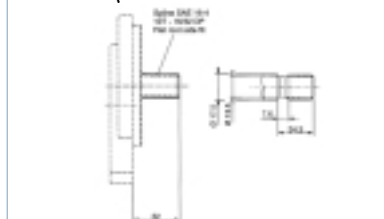
Ø .6875 EUROPEAN PARALLEL

Square Key, 7/16" UNF external thread



SAE SPLINE, 16/32 DP

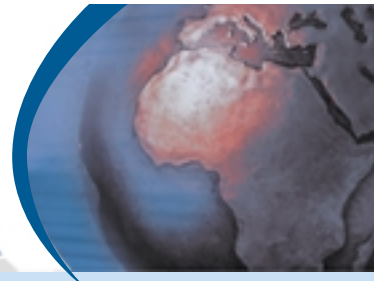
No thread (10 tooth - SAE 16-4 stand out)



$$\text{Torque (in-lb)} = \frac{\text{Displacement (in}^3/\text{rev)} \times \text{Pressure (psi)}}{5.72}$$

$$\text{Torque (nm)} = \frac{\text{Displacement (cc/rev.)} \times \text{Pressure (bar)}}{57.2}$$

P11 HYDRAULIC PUMPS



Multiple Pumps

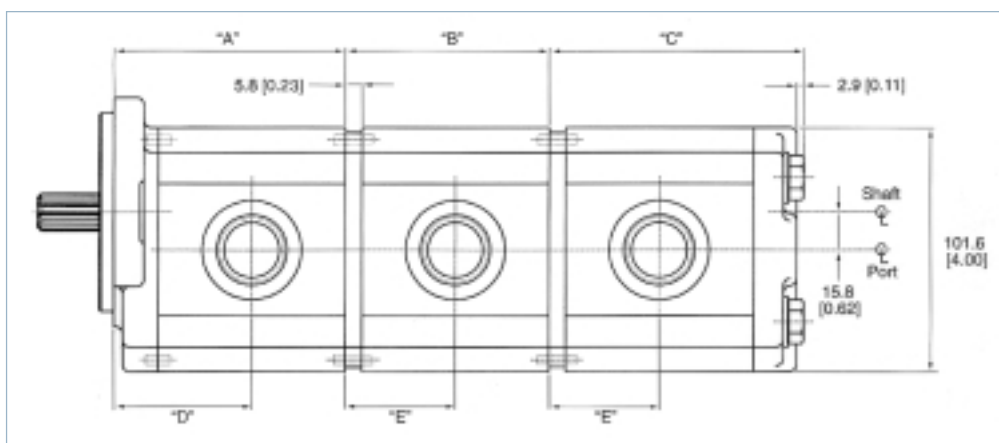
Pumps are available in two, three or four section configurations. In applying multiple section pumps, maximum shaft loading must conform to the limitations shown in the Shaft Load Rating table in this catalogue. The maximum load is determined by adding the torque values for each pumping section that will be simultaneously loaded.

In addition, the loading of the second, third and fourth sections must not exceed the connector shaft torque capacity. This is determined by the sum of the calculated, simultaneously loaded values for each of the second through fourth sections.

Separate or Common Inlet Capability

Multiple pumps are available in either common inlet or separate inlet configurations. In the separate inlet configuration each gear housing has individual inlet and outlet ports. In the common inlet configuration, two gear sets share a common inlet, which is located in the front (and third for triple and quad constructions) gear housing section.

The maximum recommended combined inlet flow for the 1-5/16-12 common inlet port is 75 lpm/20 GPM, whereby the max. inlet flow needed by the secondary pumping section should not exceed 34 lpm/9GPM. Consult product support for requirements in excess of the recommended level.



MULTIPLE PUMP DIMENSIONS (FOR SEC 33,34,93,96)

Pump Code	Section Length			Port Centerline	
	"A" Front	"B" Middle	"C" End	"D" Front	"E" Add'l Secs
06	70.5 mm/2.78 in	57.6 mm/2.27 in	78.5 mm/3.09 in	44.6 mm/1.76 in	31.7 mm/1.25 in
08	73.6 mm/2.90 in	60.6 mm/2.39 in	81.5 mm/3.21 in	46.1 mm/1.82 in	33.2 mm/1.31 in
10	76.6 mm/3.02 in	63.7 mm/2.51 in	84.6 mm/3.33 in	47.6 mm/1.88 in	34.7 mm/1.37 in
11	78.1 mm/3.08 in	65.2 mm/2.57 in	86.1 mm/3.39 in	48.4 mm/1.91 in	35.5 mm/1.40 in
14	82.7 mm/3.25 in	69.7 mm/2.75 in	90.6 mm/3.57 in	50.7 mm/2.00 in	37.8 mm/1.49 in
16	85.7 mm/3.37 in	72.8 mm/2.87 in	83.7 mm/3.69 in	52.2 mm/2.06 in	40.3 mm/1.55 in
19	90.2 mm/3.55 in	77.3 mm/3.05 in	98.2 mm/3.87 in	54.5 mm/2.14 in	42.5 mm/1.64 in
23	96.3 mm/3.79 in	83.4 mm/3.29 in	104.3 mm/4.11 in	57.5 mm/2.26 in	44.6 mm/1.76 in
27	102.4 mm/4.03 in	89.5 mm/3.53 in	110.4 mm/4.35 in	60.5 mm/2.38 in	47.6 mm/1.88 in
31	108.5mm/4.27 in	95.5 mm/3.76 in	116.4 mm/4.59 in	63.6 mm/2.50 in	50.7 mm/2.00 in
33	111.5 mm/4.39 in	98.6 mm/3.88 in	119.5 mm/4.71 in	65.1 mm/2.56 in	52.2 mm/2.06 in

For SEC codes 36,37,38,39 dimensions "A" and "D" to be decreased by 2.8 mm or 0.11 inches.

Double Pump Overall Length = A + C

Triple Pump Overall Length = A + B + C

First Section Port Centreline = D

Second Port Centreline = A + E

Third Port Centreline = A + B + E



ORDERING INFORMATION

Sample Part Number



For Single Section Pumps										
Code 1	Code 2	Code 3	Code 4	Code 5	Code 6	Code 7	Code 8	Code 9	Code 10	Code 11
P11 B	1	93	BE	AQ	11	96	C	AC	08	1

CODE 1: SERIES/TYPE

P11 A	Single Pump
P11 B	Multiple Section Pump

CODE 2: ROTATION

1	Clockwise
2	Counter Clockwise

CODE 3: MOUNTING

93	SAE "A" 2-Bolt
96	SAE "B" 2-Bolt
33	Rectangular (96.0 x 71.4 mm w/36.5 mm Pilot)
36/38	Through Bolt (60 x 60 mm w/52 mm Pilot)
37/39	Through Bolt (60 x 60 mm w/50 mm Pilot)
34	Rectangular (100 x 72mm w/80 mm Pilot)

CODE 4: END COVERS

Standard End Covers

BE	No Ports (Connections in Housing)
----	-----------------------------------

Ported End Covers

	Inlet	Outlet
NE	SAE Straight thread 1"-1/16-12	7-8"-14
YE	BSP Straight Thread G 3/4"	G 1/2"

End Covers with Integrated Relief Valves

(Choose Code for Relief Valve Settings from Tables Below)

R_	Externally Vented Relief Valves
V_	Internally Vented Relief Valves
P/_	Priority Flow Divider (Flow Code/Relief Code)
LR/_	150 psi Load Sensing Priority Flow Divider (Relief Code)
LS/_	100 psi Load Sensing Priority Flow Divider (Relief Code)
LT/_	75 psi Load Sensing Priority Flow Divider (Relief Code)
LU/_	50 psi Load Sensing Priority Flow Divider (Relief Code)

Code	Relief Valve Setting	Code	Relief Valve Setting
A	7.5 lpm/2.0 gpm	07	70 bar/1000 psi
C	11 lpm/3.0 gpm	09	86 bar/1250 psi
E	15 lpm/4.0 gpm	10	103 bar/1500 psi
F	17 lpm/4.5 gpm	12	120 bar/1750 psi
G	19 lpm/5.0 gpm	14	138 bar/2000 psi
H	21 lpm/5.5 gpm	15	155 bar/2250 psi
J	23 lpm/6.0 gpm	17	170 bar/2500 psi
K	25 lpm/6.5 gpm	19	190 bar/2750 psi
L	26 lpm/7.0 gpm	21	210 bar/3000 psi
		23	228 bar/3300 psi

CODE 5 : HOUSING/PORT OPTIONS

Port Connections	Inlet	Outlet
AE	SAE Straight Thread 7/8"-14	3/4"-16
AQ	SAE Straight Thread 1"-1/16-12	7/8"-14
AZ	SAE Straight Thread 1"-5/16-12	1"-1/16-12

FA	SAE Split Flange	3/4" Dia.	1/2" Dia.
FB	SAE Split Flange	1" Dia.	3/4" Dia.
MA	Metric Flange	19 mm	13 mm
EJ	European Flange	20 mm	15 mm
EK	European Flange	26 mm	18 mm
DA	European Flange	19 mm	13 mm
DB	European Flange	13 mm	13 mm
BA	BSP Straight Thread	G 3/4"	G 1/2"
BB	BSP Straight Thread	G 1	G 3/4"
AB	No Ports (For Rear Ported Covers)		
AS	SAE Thread w/integrated Valves	1"-1/16	none
AT	SAE Thread w/integrated Valves	1"-5/16	none
AF	SAE Straight Thread	1"-1/16-12	3/4"-16
AR	SAE Straight Thread	1"-5/16-12	7/8"-14

CODE 6 : DISPLACEMENT

	cm ³ /rev.	in ³ /rev.		cm ³ /rev.	in ³ /rev.
06	6	0.37	19	19	1.16
08	8	0.49	23	23	1.40
10	10	0.61	27	27	1.65
11	11	0.67	31	31	1.89
14	14	0.85	33	33	2.01
16	16	0.98			

CODE 7 : SHAFT EXTENSIONS

97	5/8" Dia. Straight keyed	41	SAE "A" 1.8
24	3/4" Dia. Straight Keyed	81	DIN 5482 Spline
96	SAE "A" 9-Tooth Spline	85	European 1:5 Tapered
92	SAE 11-Tooth Spline	86	European 1:8 Tapered
80	DIN 5480 Spline		

* For Tang Shaft contact product support

CODE 8 : CENTRE SECTION (FOR MULTIPLE SECTION PUMPS)

B	Multiple Pump with Separate Inlets
C	Multiple Pump with Common Inlets
D	Multiple Pump sealed between Sections

CODE 9 : GEAR HOUSING (FOR MULTIPLE SECTION PUMPS)

Side Inlet and Outlet Ports:

Choose from options listed under Code 5.

	Common Inlet	Inlet	Outlet
AC	SAE Straight Thread	None	3/4" - 16
AM	SAE Straight Thread	None	7/8" - 14

CODE 10 : DISPLACEMENT (FOR MULTIPLE SECTION PUMPS)

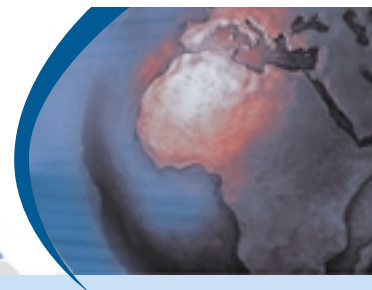
Choose from options listed under Code 6.

CODE 11 : CONNECTING SHAFT (FOR MULTIPLE SECTION PUMPS)

1	Multiple Pump Connecting Shaft
---	--------------------------------

Note: For Triple and Quad Pumps, Repeat Codes 8-11.

P17 HYDRAULIC PUMPS



**High
Performance.
High Efficiency.
High Pressure
Operation.**

The Advantage At One Glance

- **UP TO 3625 PSI/250 BAR CONTINUOUS OPERATION**
High strength materials and large journal diameters provide low bearing loads for high pressure operation.
- **LOW NOISE**
13-tooth gear profile and optimised flow metering provide reduced pressure pulsations and exceptionally quiet operation.
- **HIGH EFFICIENCY**
Pressure balanced bearing blocks assure maximum efficiency under all operating conditions.
- **APPLICATION FLEXIBILITY**
International mounts and connections, integrated valve capabilities and common inlet multiple pump configurations, provide unmatched design and application versatility.

ALPHA series gear pumps are an advanced performance version of the international "bushing block" style pumps. ALPHA series pumps offer superior performance, high efficiency and low noise operation at high operating pressures. They are produced in four frame sizes (P3, P11 and P17) with displacements ranging from 0.8 to 52 cm³/rev. (.048 to 3.17 in³/rev). A wide variety of standard options are available to meet specific application requirements, worldwide.

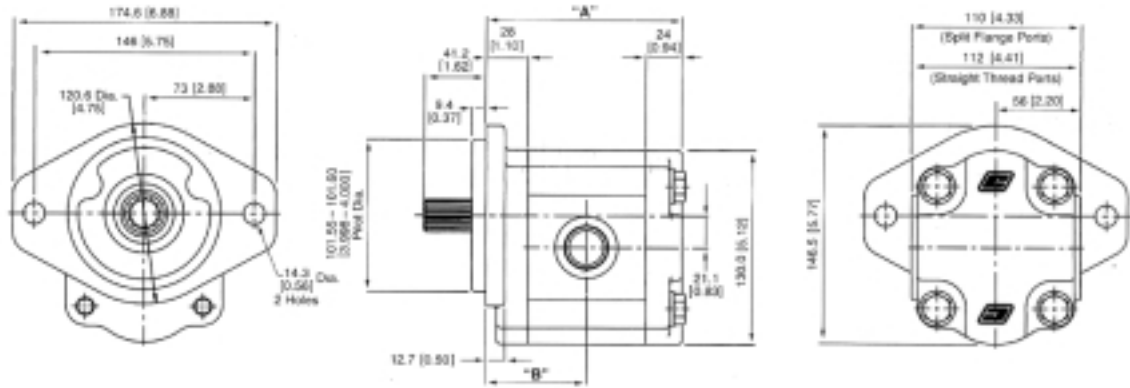
P17 Pump Specifications

Pump Displacements*	cm ³ /rev in ³ /rev	14 .85	16 .98	19 1.16	23 1.40	25 1.53	28 1.71	33 2.02	38 2.32	44 2.67	52 3.17
Continuous Pressure*	bar	250	250	250	250	250	250	250	250	250	200
	psi	3600	3600	3600	3600	3600	3600	3600	3600	3200	2900
Intermittent Pressure	bar	275	275	275	275	275	275	275	275	245	220
	psi	4000	4000	4000	4000	4000	4000	4000	4000	3500	3200
Minimum Speed @ Max. Outlet Pressure	rpm	500	500	500	500	500	500	500	500	500	500
Maximum Speed @ 0 Inlet & Max. Outlet Pressure	rpm	3400	3400	3300	3300	3100	3100	3000	3000	2800	2700
Pump Input Power 1500 rpm @ Max. Pressure and 1800 rpm	kw	9.6	11.0	13.1	15.8	17.2	19.3	22.7	26.1	27.0	28.6
	hp	15.4	17.7	21.1	25.	27.7	31.1	36.5	42.0	43.4	46.0

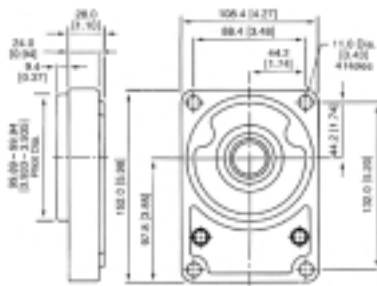


DIMENSIONS, MOUNTING FLANGES AND WEIGHTS

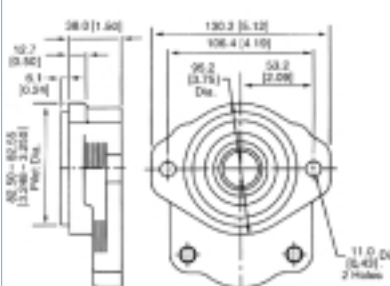
SAE "B" 2-BOLT MOUNT
(Code 99)



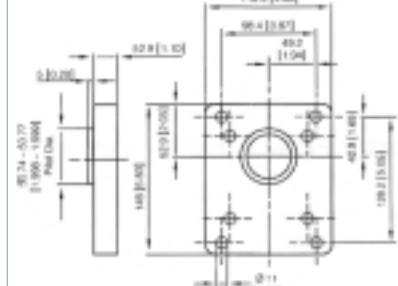
RECTANGULAR 4-BOLT MOUNT
(Code 35)



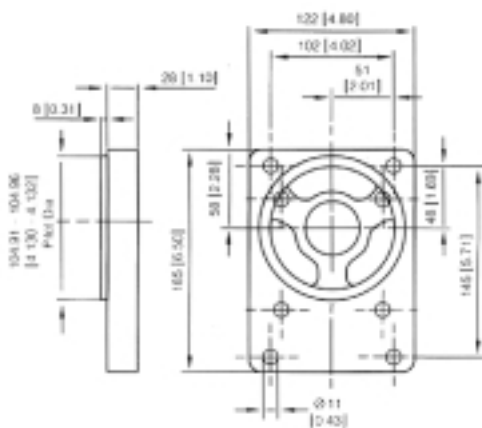
SAE "A" 2-BOLT MOUNT
(Code 93)



RECTANGULAR 4-BOLT MOUNT
(Code 87)



RECTANGULAR 4-BOLT MOUNT
(Code 86)

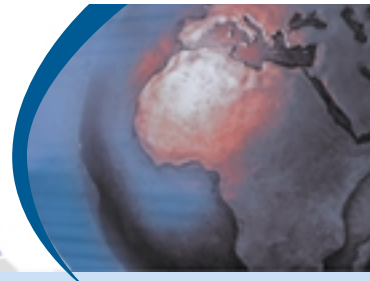


DIMENSIONS AND WEIGHTS

Displacements (per rev.)	"A" Dimension (overall length)	"B" Dimension (to port C/L)	Approximate Weight
14 cm ³ / .85 in ³	120.3 mm/4.74 in	62.1 mm/2.44 in	7.92 kg/17.5 lb
16 cm ³ / .98 in ³	122.3 mm/4.81 in	63.1 mm/2.48 in	8.00 kg/17.6 lb
19 cm ³ / 1.16 in ³	125.3 mm/4.93 in	64.6 mm/2.54 in	8.12 kg/ 17.9 lb
23 cm ³ / 1.40 in ³	129.4 mm/5.09 in	66.7 mm/2.63 in	8.29 kg/ 18.3 lb
25 cm ³ / 1.53 in ³	131.4 mm/5.17 in	67.7 mm/2.66 in	8.37 kg/ 18.5 lb
28 cm ³ / 1.71 in ³	134.4 mm/5.29 in	69.2 mm/2.72 in	8.50 kg/ 18.7 lb
33 cm ³ / 2.02 in ³	139.5 mm/5.49 in	71.7 mm/2.82 in	8.70 kg/ 19.2 lb
38 cm ³ / 2.32 in ³	144.5 mm/5.69 in	74.2 mm/2.92 in	8.91 kg/ 19.6 lb
44 cm ³ / 2.67 in ³	150.6 mm/5.93 in	77.3 mm/3.04 in	9.16 kg/ 20.2 lb
52 cm ³ / 3.67 in ³	158.7mm/6.25 in	81.4 mm/3.20 in	9.49 kg/ 20.9 lb

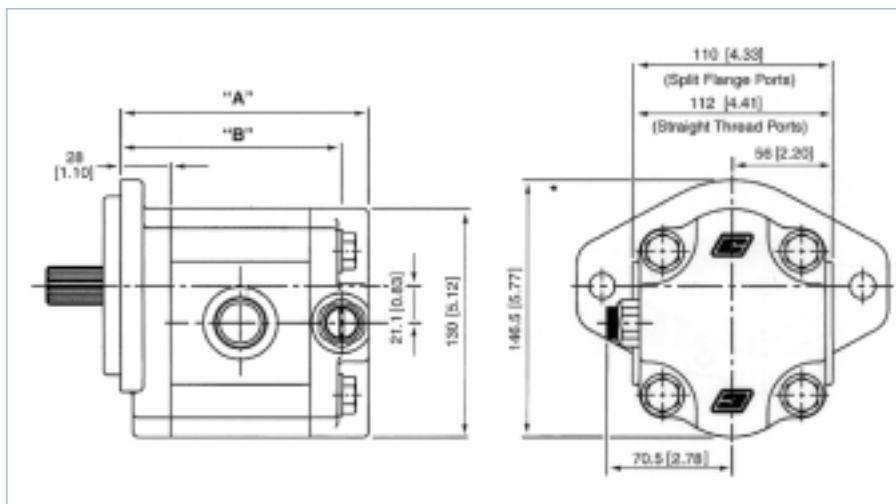
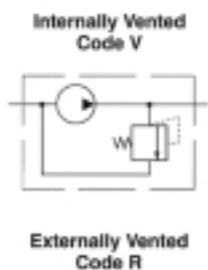
Adjustment for SAE "A" 2-Bolt Mount	+10.0 mm/0.39 in	+10.0 mm/0.39 in	- .77 kg/-1.3 lb
Adjustment for Rectangular 4-Bolt Mount	-	-	-1.62 kg/ - 3.7 lb

P17 HYDRAULIC PUMPS



Integrated Valve Options

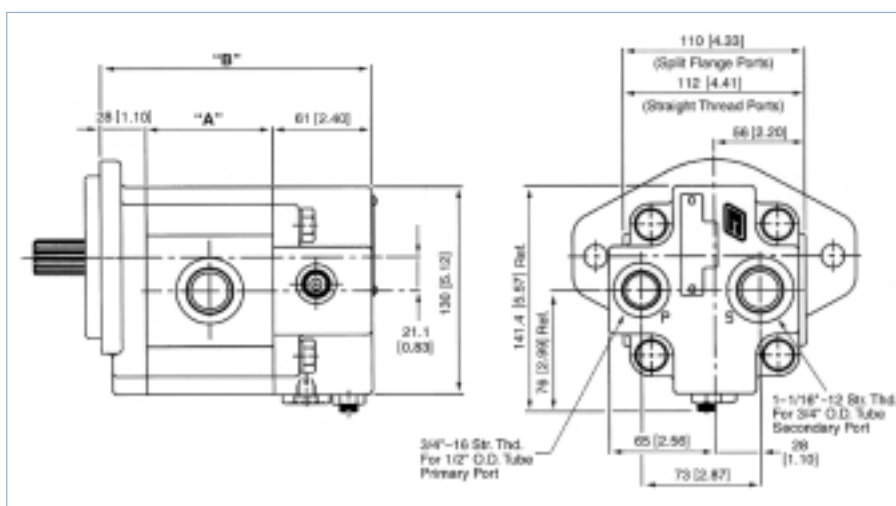
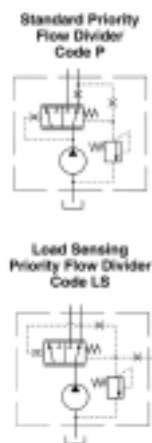
RELIEF VALVES



Pump Code		14	16	19	23	25	28	33	38	44	52
"A" Dim.	mm	129.3	131.3	134.3	138.4	140.4	143.4	148.5	153.5	159.6	167.7
	inches	5.09	5.17	5.29	5.45	5.53	5.65	5.85	6.04	6.28	6.60
"B" Dim	mm	114.3	116.3	119.3	123.4	125.4	128.4	133.5	138.5	144.6	152.7
	inches	4.50	4.58	4.70	4.86	4.94	5.06	5.26	5.45	5.69	6.01

Adjustment for SAE "A" 2-Bolt Mount is + 10.0 mm/0.39 in for dimensions "A" and "B" only

PRIORITY FLOW & RELIEF VALVES



Pump Code		14	16	19	23	25	28	33	38	44	52
"A" Dim.	mm	63.8	70.3	73.3	77.4	79.4	82.4	87.5	92.5	98.6	106.7
	inches	2.69	2.77	2.89	3.05	3.13	3.24	3.44	3.64	3.88	4.20
"B" Dim	mm	157.3	159.3	162.3	166.4	168.4	171.4	176.5	181.5	187.6	195.7
	inches	6.19	6.27	6.55	6.55	6.63	6.75	6.95	7.15	7.39	7.70

Adjustment for SAE "A" 2-Bolt Mount is + 10.0 mm/0.39 in for dimensions "B" only

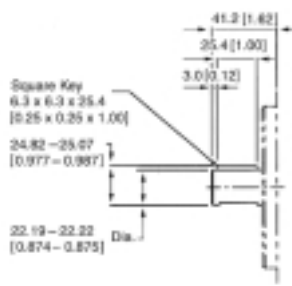


Shaft Extensions

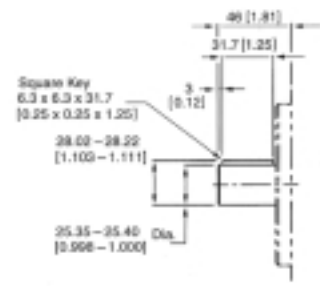
SAE "B" SPLINE (CODE 65)



SAE "B" STRAIGHT KEYED (CODE 66)



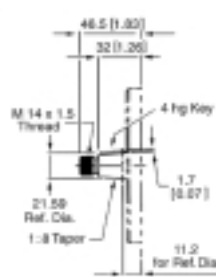
SAE "B-B" STRAIGHT KEYED (CODE 67)



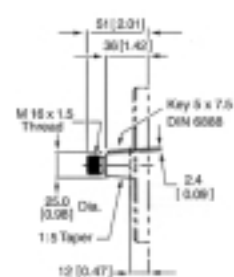
SAE "B-B" SPLINE (CODE 100)



EUROPEAN 1:8 TAPERED KEYED (CODE 59)



EUROPEAN 1:5 TAPERED KEYED (CODE 85)



$$\text{Torque (in-lb)} = \frac{\text{Displacement (in}^3/\text{rev)} \times \text{Pressure (psi)}}{57.2}$$

$$\text{Torque (nm)} = \frac{\text{Displacement (cc/rev.)} \times \text{Pressure (bar)}}{57.2}$$

Code	Description	Torque Rating
65	SAE "B" 13Tspline	345 nm/3052 in-lb
66	SAE "B: 7/8" Dia. Keyed	251 nm/2221 in-lb
67	SAE "B-B" 1" Dia. Keyed	395 nm/3493 in-lb
57	1:5 European Tapered	250 nm/2210 in-lb
59	1:8 European Tapered	250 nm/2210 in-lb
100	SAE "B-B" 15T Spline	530 nm/4695 in-lb
1	Multiple Pump Connection Shaft	228 nm/2021 in-lb

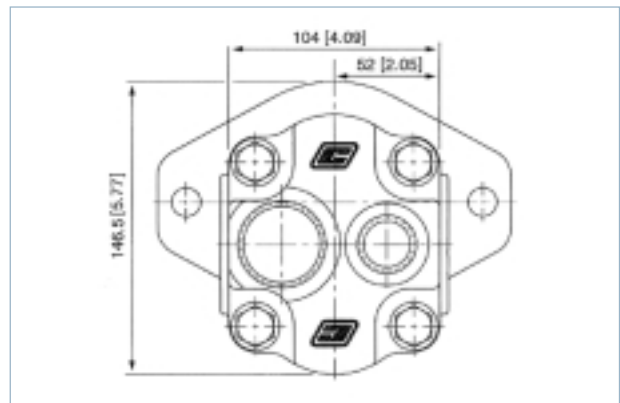
End Cover Options

Side ports are standard in the P17 product family. Port connections are located in the gear housing. Rear ported versions are also available, with port connections on the end cover.

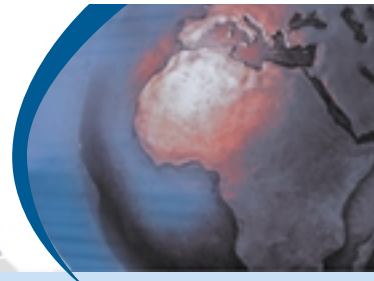
	Cover Code	Inlet Port	Outlet Port	
Standard End Cover	BE	None	None	Ports in Housing
Ported End Cover	ME	1-5/16-12	1-1/16-12	SAE Straight Thread
Ported End Cover	VE	G 1	G 1/2	BSP Straight Thread

Note: See table on page 15 for pump lengths

Contact Commercial Intertech product support for side and thrust load applications.



P17 HYDRAULIC PUMPS



Multiple Pumps

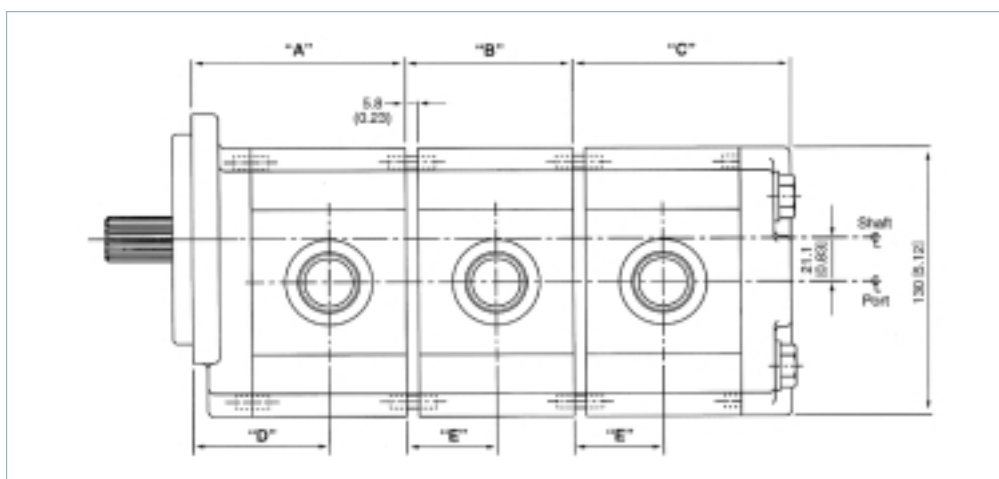
Pumps are available in two, three or four section configurations. In applying multiple section pumps, maximum shaft loading must conform to the limitations shown in the Shaft Load Rating table in this catalogue. The maximum load is determined adding the torque values for each pumping section that will be simultaneously loaded.

In addition, the loading of the second, third and fourth sections must not exceed the connector shaft torque capacity. This is determined by the sum of the calculated, simultaneously loaded values for each of the second through fourth sections.

Separate or Common Inlet Capability

Multiple pumps are available in either common inlet or separate inlet configurations. In the separate inlet configuration each gear housing has individual inlet and outlet ports. In the common inlet which is located in the front (and third for triple and quad constructions) gear housing section.

The maximum recommended combined inlet flow for the 1-7/8-12 common inlet port is 159 lpm/42 gpm, whereby the max. inlet flow needed by the secondary pumping section should not exceed 83 lpm/22 GPM. Consult product support for additional assistance.



MULTIPLE PUMP DIMENSIONS

Pump Code	Section Length			Port Centerline	
	"A" Front	"B" Middle	"C" End	"D" Front	"E" Add'l Secs
14	96.3 mm/2.79 in	74.1 mm/2.92 in	92.3 mm/3.63 in	62.1 mm/1.76 in	40.0 mm/1.57 in
16	98.3 mm/3.87 in	76.1 mm/3.00 in	94.3 mm/3.71 in	63.1 mm/1.82 in	41.0 mm/1.61 in
19	101.3 mm/3.99 in	79.1 mm/3.11 in	97.3 mm/3.83 in	64.6 mm/1.88 in	42.5 mm/1.67 in
23	105.4 mm/4.15 in	83.2 mm/3.28 in	101.4 mm/3.99 in	66.7 mm/1.91 in	44.5 mm/1.75 in
25	107.4 mm/4.23 in	85.2 mm/3.35 in	103.4 mm/4.07 in	67.7 mm/2.00 in	45.5 mm/1.79 in
28	110.4 mm/4.35 in	88.2 mm/3.47 in	106.4 mm/4.19 in	69.2 mm/2.06 in	47.0 mm/1.85 in
33	115.2 mm/4.55 in	93.3 mm/3.67 in	111.5 mm/4.39 in	71.7 mm/2.14 in	49.6 mm/1.95 in
38	120.3 mm/4.74 in	98.3 mm/3.87 in	116.5 mm/4.59 in	74.2 mm/2.26 in	52.1 mm/2.05 in
44	126.6 mm/4.98 in	104.4 mm/4.11 in	122.6 mm/4.83 in	77.3 mm/2.38 in	55.1 mm/2.17 in
52	134.7 mm/5.30 in	112.5 mm/4.43 in	130.7 mm/4.83 in	81.46 mm/2.50 in	59.2 mm/2.33 in

For SAE "A" 2-Bolt Mount (Code 93), add 10mm/.39 in to both "A" and "D" dimensions.

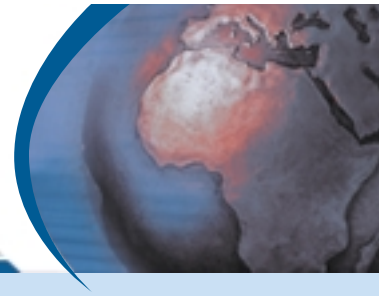
For "ported-PEC" add 9 mm/.35 in to dimension "C"

Double Pump Overall Length = A + C

Triple Pump Overall Length = A + B + C

First Section Port Centreline = D

Second Port Centreline = A + E



ORDERING INFORMATION

Sample Part Number



For Single Section Pumps										
Code 1	Code 2	Code 3	Code 4	Code 5	Code 6	Code 7	Code 8	Code 9	Code 10	Code 11
P17 A	1	93	PE/10	AQ	11	96	C	AC	08	1

CODE 1: SERIES/TYPE

- P17 A** Single Pump
P17 B Multiple Section Pump

CODE 2: ROTATION

- 1** Clockwise
2 Counter Clockwise

CODE 3: MOUNTING

- "A"** 2-Bolt
96 SAE "B" 2-Bolt
35 Rectangular (132.0 x 88.4 mm w, 100 mm Pilot)
86 Rectangular (145 x 102 mm w, 105 mm Pilot)
87 Rectangular (128.2 x 98.4 mm w, 50.8 mm Pilot)

CODE 4: END COVERS

Standard End Covers

- BE** Side Ports (Connections in Housing)

Ported End Covers

- | | Inlet | Outlet |
|-------------------------------|-----------|-----------|
| ME SAE Straight thread | 1-5/16-12 | 1-1/16-12 |
| VE BSP Straight Thread | G 3/4" | G 1/2" |

End Covers with Integrated Relief Valves

(Choose Code for Relief Valve Settings from Tables Below)

- R_** Externally Vented Relief Valves
V_ Internally Vented Relief Valves
P_/_ Priority Flow Divider (Flow Code/Relief Code)
LR/_ 150 psi Load Sensing Priority Flow Divider (Relief Code)
LS/_ 100 psi Load Sensing Priority Flow Divider (Relief Code)
LT/_ 75 psi Load Sensing Priority Flow Divider (Relief Code)
LU/_ 50 psi Load Sensing Priority Flow Divider (Relief Code)

Code	Relief Valve Setting	Code	Relief Valve Setting
C	11 lpm/ 3.0 gpm	07	70 bar/1000 psi
E	15 lpm/ 4.0 gpm	09	86 bar/1250 psi
G	19 lpm/ 5.0 gpm	10	103 bar/1500 psi
J	23 lpm/ 6.0 gpm	12	120 bar/1750 psi
L	26 lpm/ 7.0 gpm	14	138 bar/2000 psi
N	30 lpm/ 8.0 gpm	15	155 bar/2250 psi
R	34 lpm/ 9.0 gpm	17	170 bar/2500 psi
T	38 lpm/10.0 gpm	19	190 bar/2750 psi
		21	210 bar/3000 psi
		23	228 bar/3300 psi

CODE 5 : HOUSING/PORT OPTIONS

Port Connections	Inlet	Outlet
AG SAE Straight Thread	1-5/8-12	1-5/16-12
AZ SAE Straight Thread	1-5/16-12	1-1/16-12
AO SAE Straight Thread	1-7/8-12	1-5/16-12
AU SAE Straight Thread	1-7/8-12	none
FB SAE Split Flange	1" Dia.	3/4" Dia.
FC SAE Split Flange	1-1/4" Dia.	1" Dia.
FE SAE Split Flange	1-1/4" Flange	none
MB Metric Flange	25 mm	19 mm
MC European Flange	32 mm	25 mm
BB BSP Straight Thread	G 1	G 3/4"
BC BSP Straight Thread	G 1-1/4	G 1
AB No Ports (for Rear Ported Covers)		
AT SAE Thread w/integrated Valves	1-5/16-12"	none
DC European Flange	27 mm	19 mm

CODE 6 : DISPLACEMENT

	cm ³ /rev.	in ³ /rev.		cm ³ /rev.	in ³ /rev.
14	14	0.85	28	28	1.71
16	16	0.98	33	33	2.01
19	19	1.16	38	38	2.32
23	23	1.40	44	44	2.67
25	25	1.53	52	53	3.17

CODE 7 : SHAFT EXTENSIONS

- 66** SAE "B" 7/8" Dia. Straight keyed
65 SAE "B" 13-Tooth Spline
100 SAE "B-B" 15-Tooth Spline
67 1" Dia. X 1.81" Straight Keyed
57 European 1:5 Tapered
59 European 1:8 Tapered * For Tang Shaft contact product support

CODE 8 : CENTRE SECTION (FOR MULTIPLE SECTION PUMPS)

- B** Multiple Pump with Separate Inlets
C Multiple Pump with Common Inlets

CODE 9 : GEAR HOUSING (FOR MULTIPLE SECTION PUMPS)

Side Inlet and Outlet Ports:

Choose from options listed under Code 5.

	Common Inlet	Inlet	Outlet
AM	SAE Straight Thread	None	1-1/16-12

CODE 10 : DISPLACEMENT (FOR MULTIPLE SECTION PUMPS)

Choose from options listed under Code 6.

CODE 11 : CONNECTING SHAFT (FOR MULTIPLE SECTION PUMPS)

- 1** Multiple Pump Connecting Shaft

Note: For Triple and Quad Pumps, Repeat Codes 8-11.

PUTTING TECHNOLOGY TO WORK....

WORLDWIDE!

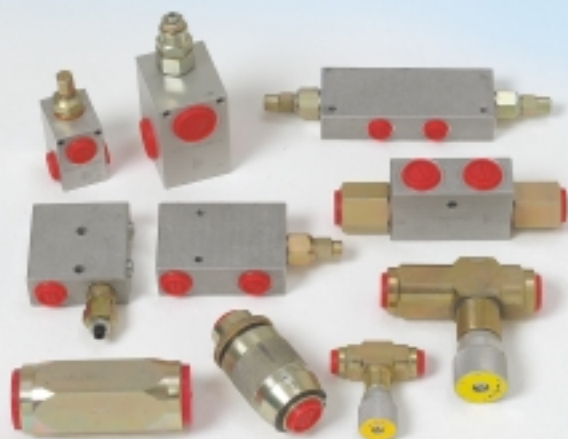
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Pressure up to 320 BAR Continuous
Various Control Options Available

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