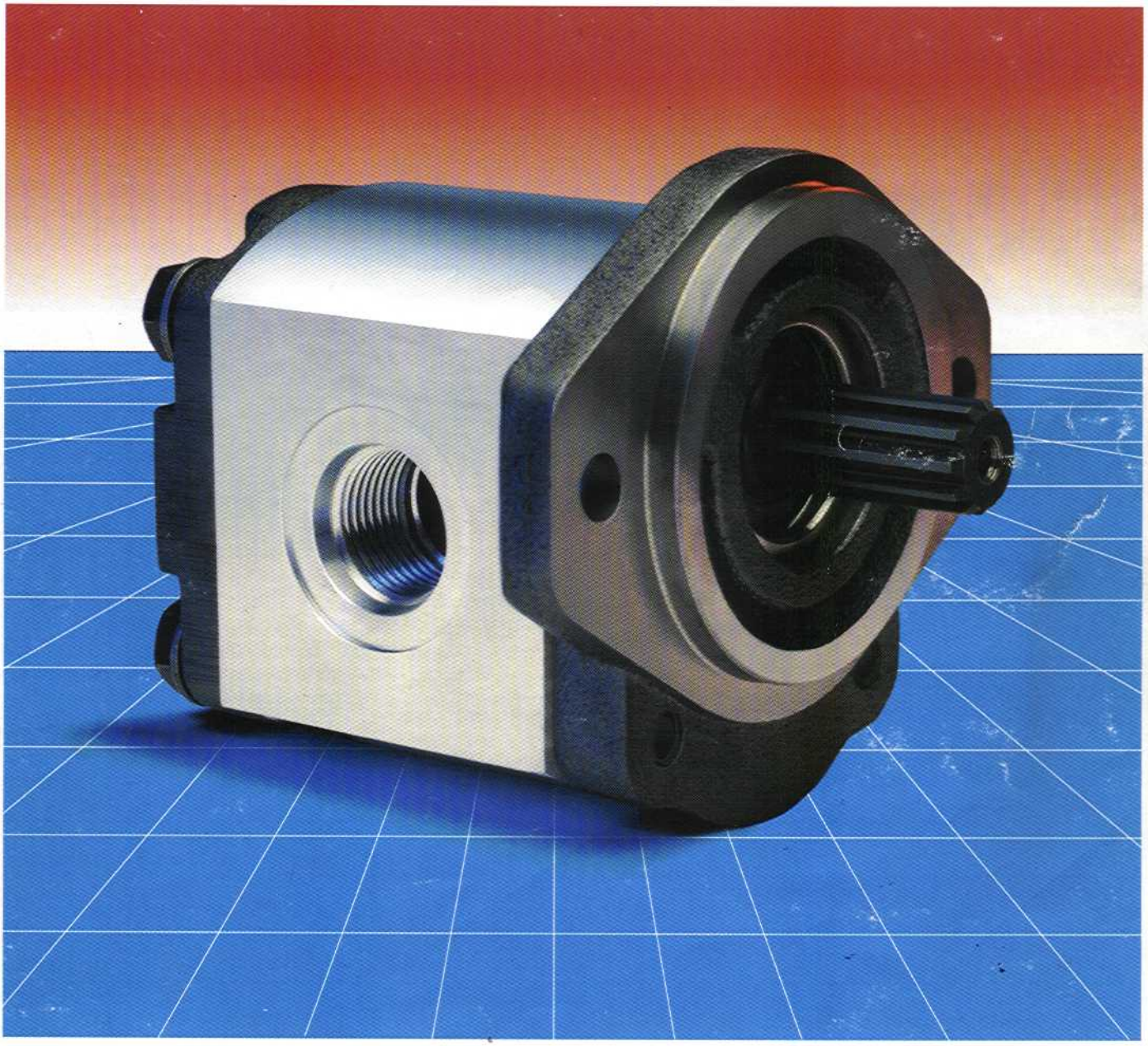
alpha series

P11 HYDRAULIC PUMPS

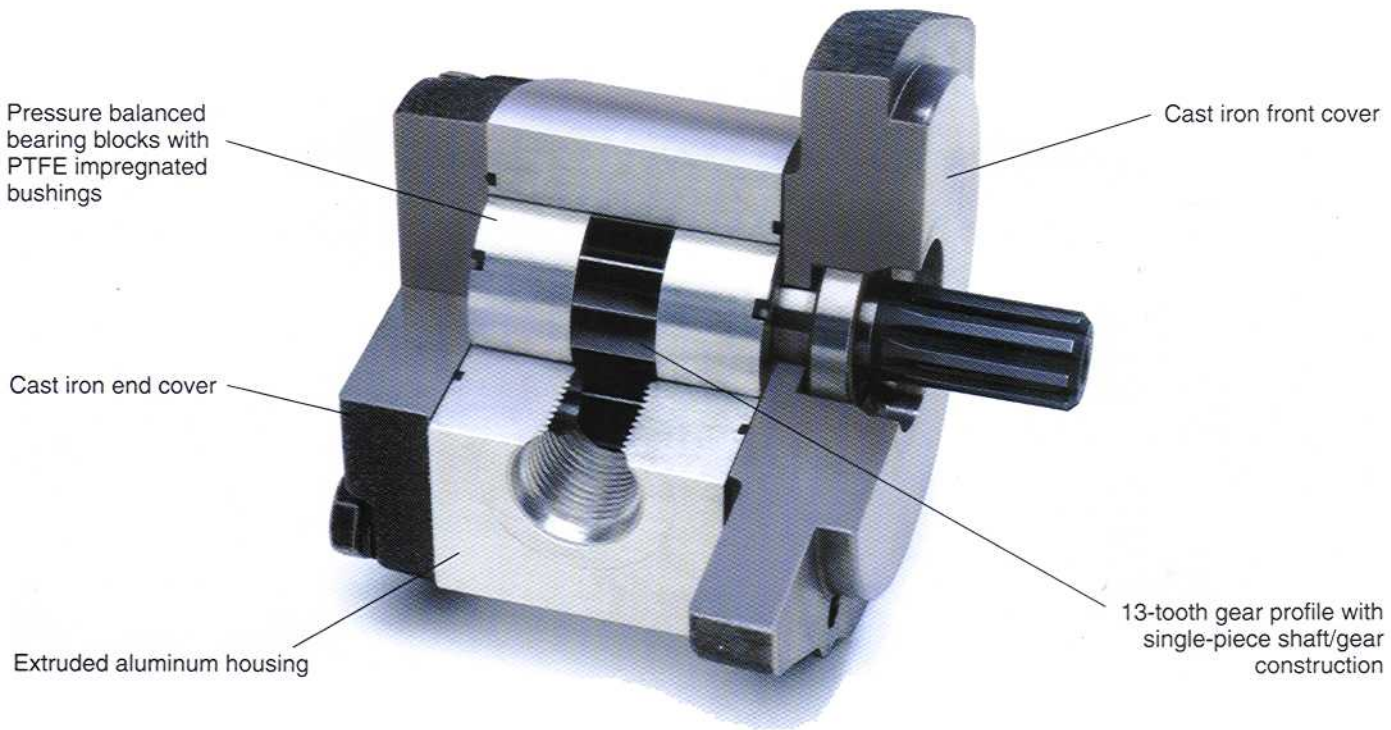
Displacements from 6 to 33 cm³/rev. (.37 to 2.01 in³/rev.)

Designed for High Efficiency, High Pressure Operation



Commercial Intertech

P11 HYDRAULIC PUMPS



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, P5, P11, and P17) with displacements ranging from 0.8 to 50 cm^3/rev. (.048 to 3.05 in^3/rev.) A wide variety of standard options are available to meet specific application requirements, worldwide.

Design Features

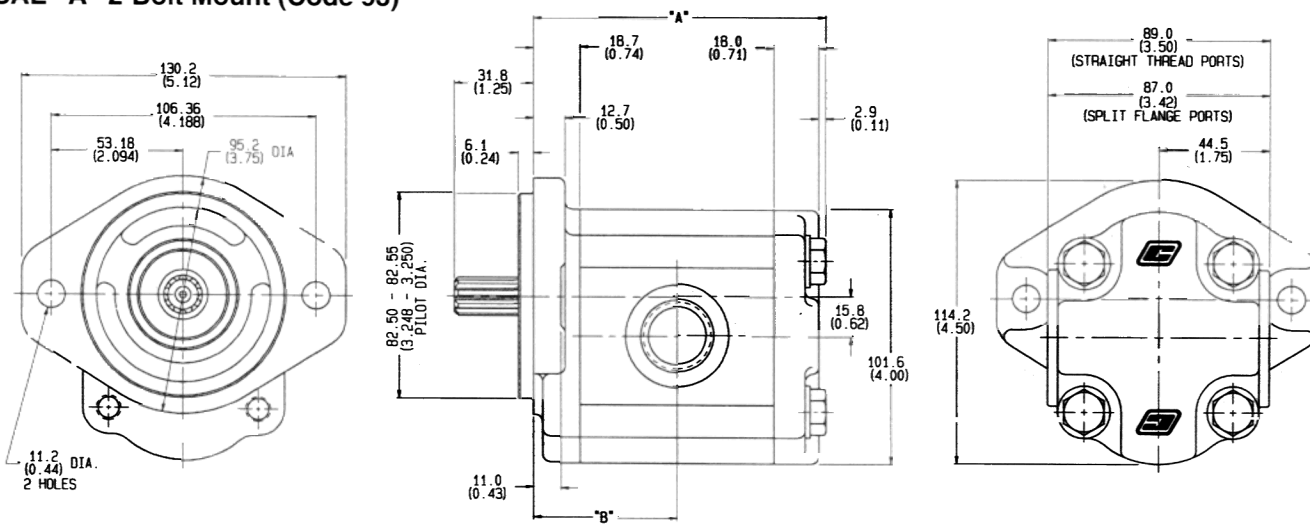
- **Up to 4000 psi/276 bar continuous operation.** High strength materials and large journal diameters provide low bearing loads for high pressure operation.
- **Low noise.** 13-tooth gear profile and optimized flow metering provide reduced pressure pulsations and exceptionally quiet operation.
- **High 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.

P11 PUMP SPECIFICATIONS

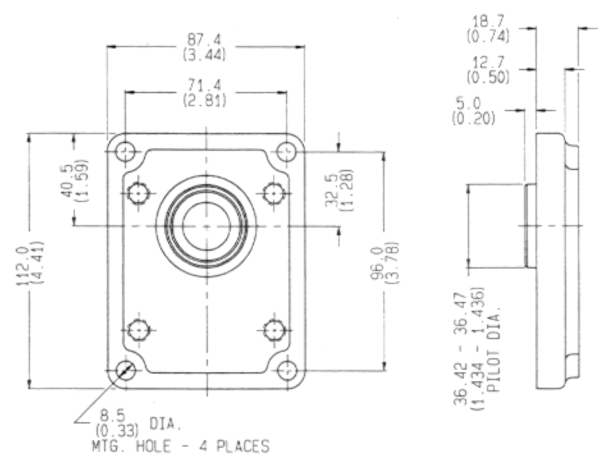
Pump Displacements*	cm³/rev. in³./rev.	6 .37	8 .49	10 .61	11 .67	14 .85	16 .98	19 1.16	23 1.40	27 1.65	31 1.89	33 2.01
Continuous Pressure*	bar psi	276 4000	276 4000	276 4000	276 4000	276 4000	276 4000	276 4000	234 3400	200 2900	196 2850	185 2700
Intermittent Pressure	bar psi	300 4400	300 4400	300 4400	300 4400	300 4400	300 4400	300 4400	255 3700	221 3200	217 3150	210 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 @ Max. Pressure & 1800 rpm	kw hp	5.6 7.5	7.4 9.9	9.2 12.3	10.1 13.5	12.8 17.2	14.8 19.8	17.4 23.4	17.9 24.0	18.1 24.2	20.3 27.2	20.4 27.4

DIMENSIONS, MOUNTING FLANGES, WEIGHTS

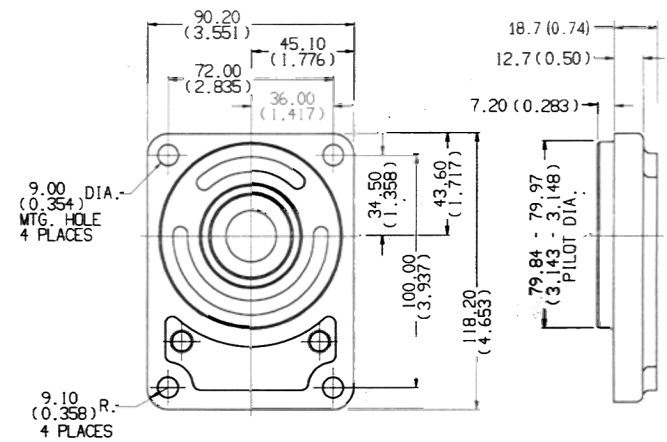
SAE "A" 2-Bolt Mount (Code 93)



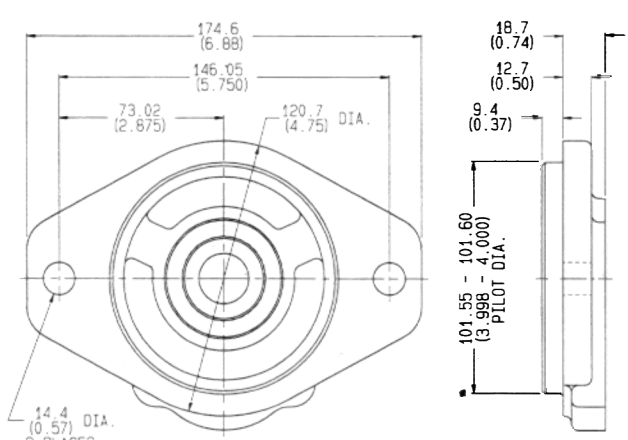
"Euro" Rectangular Mount 36.5mm Pilot Dia. (Code 33)



"Euro" Rectangular Mount 80.0mm Pilot Dia. (Code 34)



SAE "B" 2-Bolt Mount (Code 96)



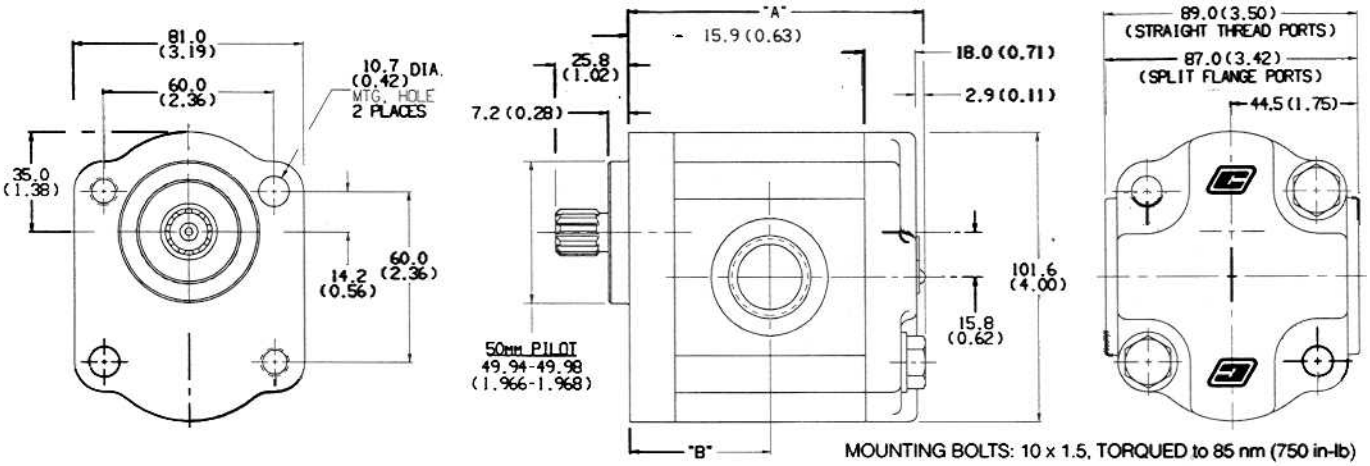
Dimensions & Weights (Codes 33, 34, 93, 96)

Displacements (per rev.)	"A" Dimension (overall length)	"B" Dimension (to port C/L)	Approximate Weight
6 cm³/.37 in³	91.4 mm/3.60 in	44.6 mm/1.76 in	3.49 kg/7.69 lb
8 cm³/.49 in³	94.5 mm/3.72 in	46.1 mm/1.82 in	3.56 kg/7.86 lb
10 cm³/.61 in³	97.5 mm/3.84 in	47.6 mm/1.88 in	3.64 kg/8.02 lb
11 cm³/.67 in³	99.0 mm/3.90 in	48.4 mm/1.91 in	3.68 kg/8.12 lb
14 cm³/.85 in³	103.6 mm/4.08 in	50.7 mm/2.00 in	3.80 kg/8.38 lb
16 cm³/.98 in³	106.6 mm/4.20 in	52.2 mm/2.06 in	3.88 kg/8.55 lb
19 cm³/1.16 in³	111.2 mm/4.38 in	54.5 mm/2.14 in	4.00 kg/8.81 lb
23 cm³/1.40 in³	117.2 mm/4.61 in	57.5 mm/2.26 in	4.15 kg/9.15 lb
27 cm³/1.65 in³	123.3 mm/4.85 in	60.5 mm/2.38 in	4.30 kg/9.49 lb
31 cm³/1.89 in³	129.4 mm/5.09 in	63.6 mm/2.50 in	4.46 kg/9.84 lb
33 cm³/2.01 in³	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

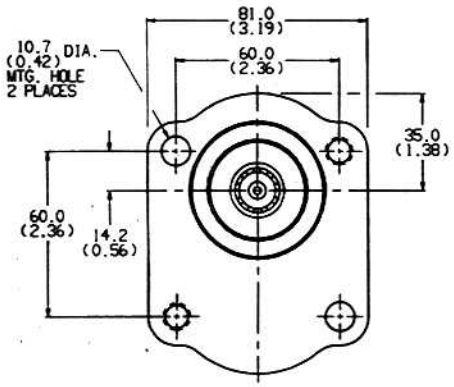
DIMENSIONS, MOUNTING FLANGES, WEIGHTS

Through-Bolt Mount with Shaft Seal—Pilot Diameter: 50mm (Code 37)



MOUNTING BOLTS: 10 x 1.5, TORQUED to 85 nm (750 in-lb)

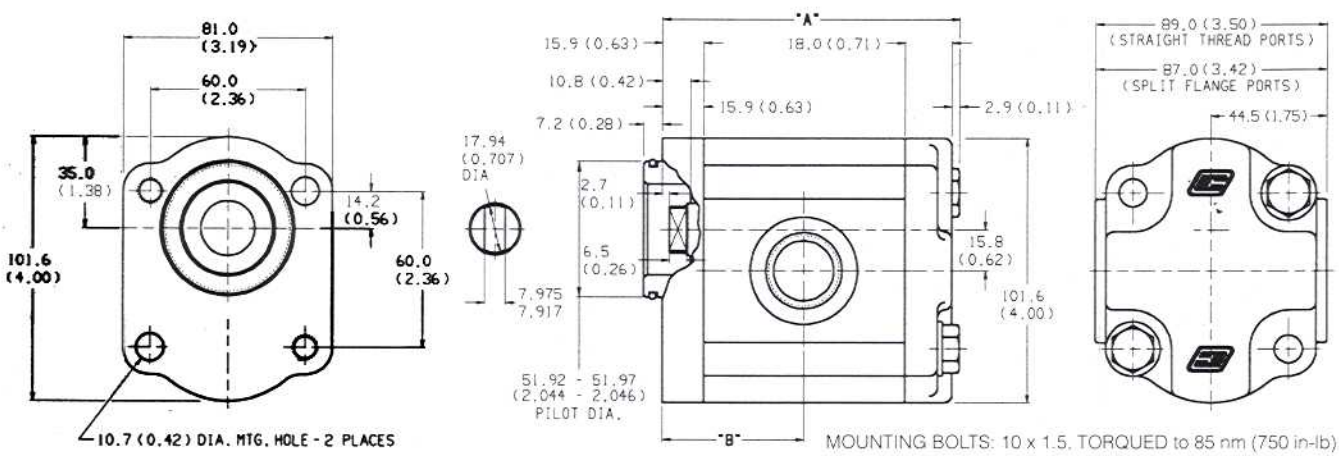
Opposite Mounting Bolt Location
Pilot Dia.: 50mm (Code 39) or 52 mm (Code 38)



Dimensions & Weights (Codes 36, 37, 38, 39)

Displacements (per rev.)	"A" Dimension (overall length)	"B" Dimension (to port C/L)	Approximate Weight
6 cm³/.37 in³	**88.6 mm/3.49 in**	**41.8 mm/1.65 in**	**3.40 kg/7.49 lb**
8 cm³/.49 in³	**91.7 mm/3.61 in**	**43.3 mm/1.70 in**	**3.47 kg/7.66 lb**
10 cm³/.61 in³	**94.7 mm/3.73 in**	**44.8 mm/1.76 in**	**3.55 kg/7.82 lb**
11 cm³/.67 in³	96.2 mm/3.79 in	45.6 mm/1.80 in	3.57 kg/7.92 lb
14 cm³/.85 in³	100.8 mm/3.97 in	47.9 mm/1.89 in	3.71 kg/8.18 lb
16 cm³/.98 in³	103.8 mm/4.09 in	49.4 mm/1.94 in	3.79 kg/8.35 lb
19 cm³/1.16 in³	108.4 mm/4.27 in	51.7 mm/2.04 in	3.91 kg/8.61 lb
23 cm³/1.40 in³	114.4 mm/4.50 in	54.7 mm/2.15 in	4.06 kg/8.95 lb
27 cm³/1.65 in³	120.5 mm/4.74 in	57.7 mm/2.27 in	4.21 kg/9.29 lb
31 cm³/1.89 in³	126.6 mm/4.98 in	60.8 mm/2.39 in	4.37 kg/9.64 lb
33 cm³/2.01 in³	129.6 mm/5.10 in	62.3 mm/2.45 in	4.45 kg/8.81 lb

Through-Bolt Mount—Pilot Diameter: 52mm (Code 36); No Shaft Seal (Special Tang Shaft Shown)



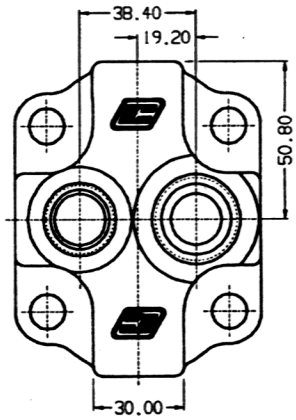
MOUNTING BOLTS: 10 x 1.5, TORQUED to 85 nm (750 in-lb)

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 on 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.



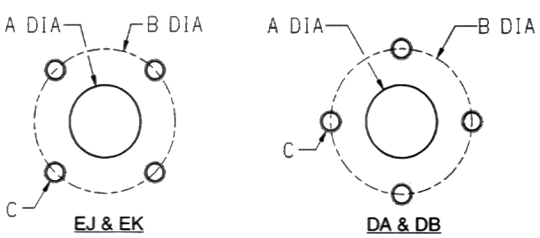
HOUSING PORT CONNECTIONS

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

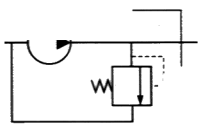
Code	Flange Port Connections	A Inlet	B Bolt Circle	C Bolt	A Outlet	B Bolt Circle	C Bolt
FA	SAE Split Flange	3/4" Dia.	—	3/8-16	1/2" Dia.	—	5/16-18
FB	SAE Split Flange	1" Dia.	—	3/8-16	3/4" Dia.	—	3/8-16
MA	SAE Metric Flange	19 mm	—	M10 x 1.5	13 mm	—	M8 x 1.25
DA	European Flange	19 mm	40 mm	M8 x 1.25	13 mm	30 mm	M6 x 1
DB	European Flange	13 mm	30 mm	M6 x 1	13 mm	30 mm	M6 x 1
EJ	European Flange	20 mm	40 mm	M6 x 1	15 mm	35 mm	M6 x 1
EK	European Flange	26 mm	55 mm	M8 x 1.25	18 mm	55 mm	M8 x 1.25

European Flange Configurations

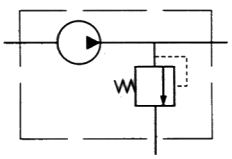


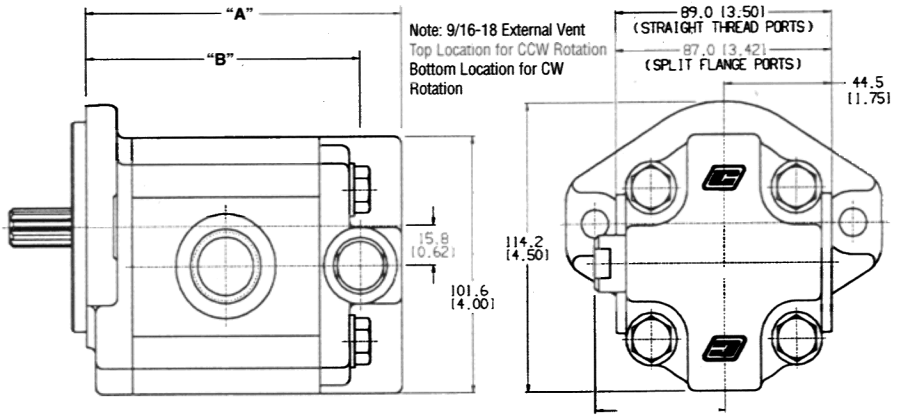
INTEGRATED VALVE OPTIONS

Relief Valves



Externally Vented Code R

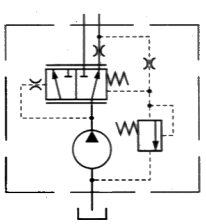




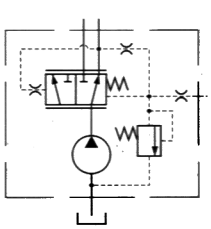
Pump Code		06	08	10	11	14	16	19	23	27	31	33
"A" Dim.	mm	100.5	103.6	106.6	108.1	112.7	115.7	120.3	126.3	132.4	138.5	141.5
	inches	3.96	4.08	4.20	4.26	4.44	4.56	4.74	4.97	5.21	5.45	5.57
"B" Dim.	mm	76.4	79.5	82.5	84.0	88.6	91.6	96.2	102.2	108.3	114.4	117.4
	inches	3.01	3.13	3.25	3.31	3.49	3.61	3.79	4.02	4.26	4.50	4.62

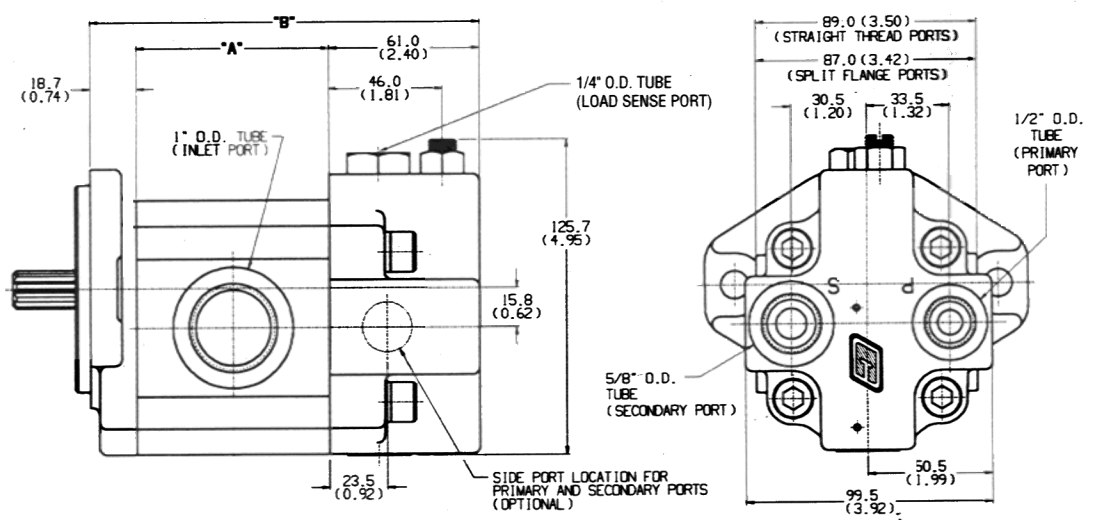
Priority Flow & Relief Valves

Standard Priority Flow Divider Code P



Load Sensing Priority Flow Divider Code LS

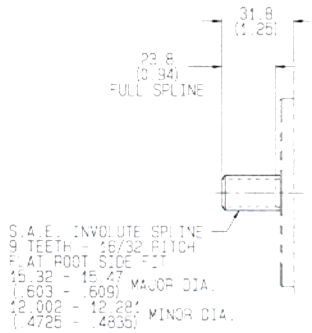




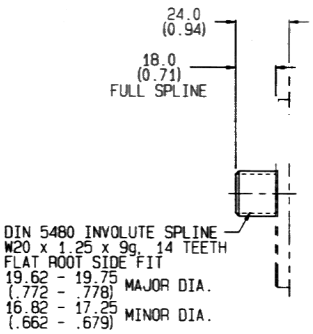
Pump Code		06	08	10	11	14	16	19	23	27	31	33
"A" Dim.	mm	51.8	54.9	57.9	59.4	64.0	67.0	71.6	77.6	83.7	89.8	92.8
	inches	2.04	2.16	2.28	2.34	2.52	2.64	2.82	3.06	3.29	3.53	3.65
"B" Dim.	mm	131.5	134.6	137.6	139.1	143.7	146.7	151.2	157.3	163.4	169.5	172.5
	inches	5.18	5.30	5.42	5.48	5.66	5.78	5.95	6.19	6.43	6.67	6.79

SHAFT EXTENSIONS

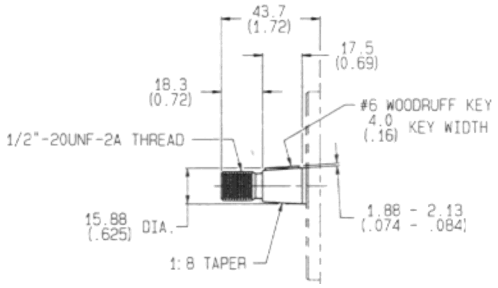
SAE "A" Spline (Code 96)



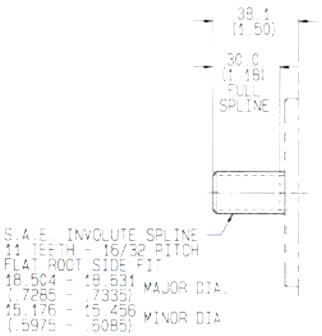
DIN 5480 Spline (Code 80)



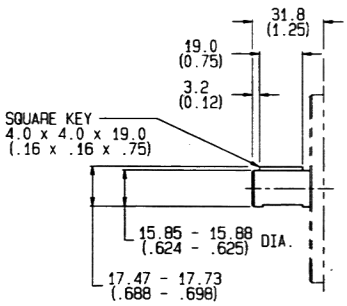
SAE "A" Tapered Keyed (Code 41)



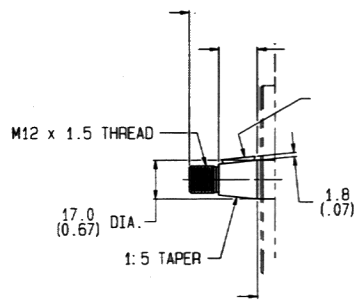
SAE 19-4 Spline (Code 92)



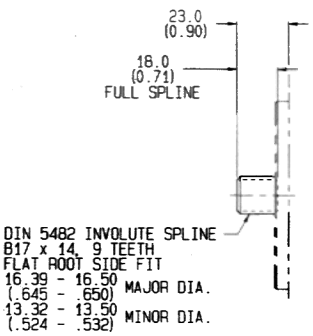
SAE "A" Straight Keyed (Code 97)



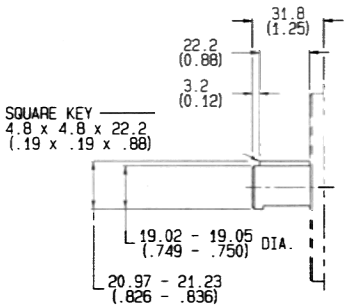
"Euro" 1:5 Tapered Keyed (Code 85)



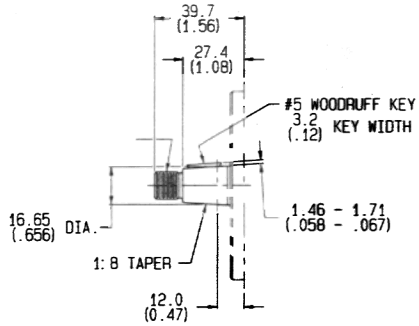
DIN 5482 Spline (Code 81)



SAE 19-1 Straight Keyed (Code 24)



"Euro" 1:8 Tapered Keyed (Code 86)



Shaft Load Capacity

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 Connecting Shaft	110 nm/972 in-lb

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

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

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

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

MULTIPLE PUMPS

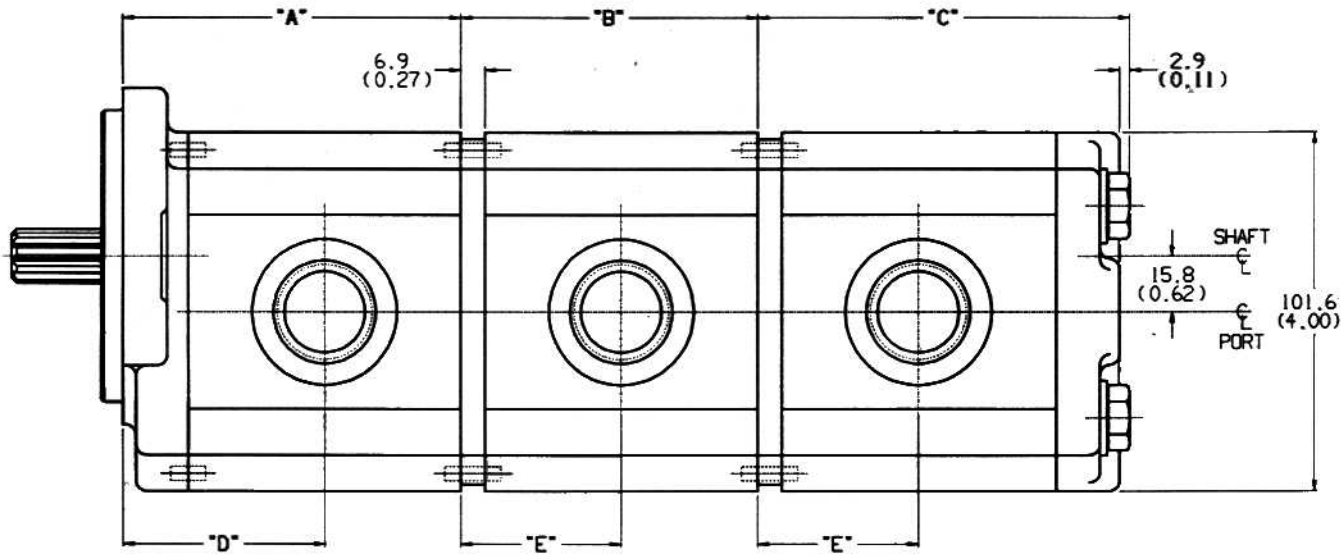
Pumps are available in two, three or four section configurations. In applying multiple section pumps, maximum shaft loading must conform to the limitations shown in the Shaft Load Rating table in this catalog. The maximum load is determined by adding the torque values for each pumping section that will 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. The maximum recommended inlet flow to the secondary pumping section, using a common inlet port connection, is 38 lpm/10 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.
06	70.5 mm/2.78 in	58.7 mm/2.31 in	79.6 mm/3.13 in	44.6 mm/1.76 in	32.8 mm/1.29 in
08	73.6 mm/2.90 in	61.7 mm/2.43 in	82.6 mm/3.25 in	46.1 mm/1.82 in	34.3 mm/1.35 in
10	76.6 mm/3.02 in	64.8 mm/2.55 in	85.7 mm/3.37 in	47.6 mm/1.88 in	35.8 mm/1.41 in
11	78.1 mm/3.08 in	66.3 mm/2.61 in	87.2 mm/3.43 in	48.4 mm/1.91 in	36.6 mm/1.44 in
14	82.7 mm/3.25 in	70.8 mm/2.79 in	91.7 mm/3.61 in	50.7 mm/2.00 in	38.9 mm/1.53 in
16	85.7 mm/3.37 in	73.9 mm/2.91 in	84.8 mm/3.73 in	52.2 mm/2.06 in	40.4 mm/1.59 in
19	90.2 mm/3.55 in	78.4 mm/3.09 in	99.3 mm/3.91 in	54.5 mm/2.14 in	42.6 mm/1.68 in
23	96.3 mm/3.79 in	84.5 mm/3.33 in	105.4 mm/4.15 in	57.5 mm/2.26 in	45.7 mm/1.80 in
27	102.4 mm/4.03 in	90.6 mm/3.57 in	111.5 mm/4.39 in	60.5 mm/2.38 in	48.7 mm/1.92 in
31	108.5 mm/4.27 in	96.6 mm/3.80 in	117.5 mm/4.63 in	63.6 mm/2.50 in	51.8 mm/2.04 in
33	111.5 mm/4.39 in	99.7 mm/3.92 in	120.6 mm/4.75 in	65.1 mm/2.56 in	53.3 mm/2.10 in

Double Pump Overall Length = A + C
Triple Pump Overall Length = A + B + C

First Section Port Centerline = D
Second Port Centerline = A + E
Third Port Centerline = A + B + E

alpha series P11 HYDRAULIC PUMPS

ORDERING INFORMATION

								For Multiple Section Pumps			
	Code 1	Code 2	Code 3	Code 4	Code 5	Code 6	Code 7	Code 8	Code 9	Code 10	Code 11
Sample Part Number:	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 72 mm w/80 mm Pilot)

Code 4: End Covers

Standard End Cover

BE Side 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 Valves

(Choose Codes for Valve Settings from Tables Below)

R__ Externally Vented Relief Valve
V__ Internally Vented Relief Valve
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	Flow Control Setting
A	7.5 lpm/2.0 gpm
C	11 lpm/3.0 gpm
E	15 lpm/4.0 gpm
F	17 lpm/4.5 gpm
G	19 lpm/5.0 gpm
H	21 lpm/5.5 gpm
J	23 lpm/6.0 gpm
K	25 lpm/6.5 gpm
L	26 lpm/7.0 gpm

Code	Relief Valve Setting
07	70 bar/1000 psi
09	86 bar/1250 psi
10	103 bar/1500 psi
12	120 bar/1750 psi
14	138 bar/2000 psi
15	155 bar/2250 psi
17	170 bar/2500 psi
19	190 bar/2750 psi
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

	cm³/rev.	in³/rev.		cm³/rev.	in³/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: Drive Shaft*

97 5/8" Dia. Straight Keyed
24 3/4" Dia. Straight Keyed
96 SAE "A" 9-Tooth Spline
92 SAE 11-Tooth Spline
80 DIN 5480
81 DIN 5482
41 SAE "A" Tapered
85 European 1:5 Tapered
86 European 1:8 Tapered
* For Tang Shaft contact product support

Code 8: Center 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
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

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