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•Due to continuous improvement, specification and design of our product may change without prior notice.

PERFORMANCE:

Colt has a range of GEAR PUMPS for mobile and industrial use, Colt developed these pumps with 100% indegineous raw material and proven manufacturing process.

COMPLETE RANGE:

Colt GEAR PUMPS are available in different displacement from 0.8 cm^3/Rev to 151.33 cm^3/Rev @ 1500 RPM pumps are also available in different flanges, shafts, inlet and pressure ports pumps are also available in taudem, triple, foweth combination in different sizes and the company specializes in supplying units to special order instructions (subject to quantom order) including multiple section pumps.

SPECIAL VERSIONS : Please call our technical and sales depts for your application requirements and any special use not included in this catalouges.

TECHNICAL INFORMATION : Please strictly follow assembly and use indications given in this catalogue for top performance and longer life of Marzocchi products.

Some general considerations should be made on the hydraulic system, in which the pump must be fitted. Special attention shall be devoted to hydraulic system design and assembly, especially to intake, delivery and return pipes and position of system parts (valves, filters, tanks, heat exchangers and accumlators). Proper safety devices and reliable instruments to avoid fluid turbulence, especially in return pipe to the tank, and prevent air, water of foreign bodies from entering into the system are of major importance. It is also very important to equip the hydraulic system will a proper filtering unit.

INSTALLATION NOTES :

Before starting the system on a continuous basis, we suggest to adopt some simple precautions

- Check for the direction of rotation of the pump to be consistent with the drive shaft one (in case of single roration pump).
- Check for the proper alignment of pump shaft and motor shaft : it is necessary that the connection does not induce axial or radial loads.
- Protect drive shaft seal during pump painting. Check if contact area between seal ring and shaft is clean : dust could proveke quicker wear and leakage.
- Remove all dirt, cips and all foreign bodies from flanges connecting inlet and delivery parts.
- Ensur that intake and return pipes end are always below fluid level and as far from each other as possible
- Install the pump below head, if possible.
- Fill the pump with fluid, and turn it by hand.
- Disconnect pump drain during startup to bleed air off the circuit.
- At first startup, set pressure limiting valves at min. Value possible
- Avoid lower ratation speed than min. allowed with pressure higher than P1.
- Do not start the system at low temperatures and load conditions of after long stops (always avoid or limit load starting for pump longer life);
- Start the system for a few minutes and turn on all components; bleed air off the circuit to check its proper filling.
- Check fluid level in the tank after loading all components.
- At last gradually increase pressure, continuously check fluid and moving parts temperature, check rotation speed until you reach set operating values that shall be within the limtis indicated in this catalogue.

CLEANING AND FILTERNING THE SYSTEM :

It is widely known that most pumps early failures are due to controminated fluids. The extreme reduction of the tolerances for the small parts fillted onto pumps and the following operation with minimum clearance, could be damaged if fluid is not perfectly clean. It is proved that particles circulating in the fluid act as abrasive agents, damaging the surfaces they touch and increasing the quantity of contaminant.

For this reason,, ensure that system is perfectly clean during startup and keep it clean for its whole operating life

Necessary interventions to check and limit contamination should be performed in a preventive and corrective way.

Preventive actions included; proper cleaning of the system during assembly, deburring, eliminating the welding scum and fluid filetring before filling up.

Starting contamination level of system fluid should not exceed class 18.15 (ref. ISO 4406) Even fresh fluids might exceed this contamination level; therefore always pre-filter the fluid when filling up or toppping up the system. Fit a proper tank; Its capacity shoud be at least twice the flow rate per working minute.

Fluid contamination level check and correction during operation can be obtained through filters that retain the particles in the fluid.

The paramters tell which filter is most suitable absolute filtering power and β filtering. Low absolute filtering power and high * filtering ratio for small particles help ensuring good filtration. It is then very important to limit not only max, dimensions, but also the number of smaller particles that pass through the filter.

It goes without saying that with an operting pressure increase and according to the system sophistication degree, filtering should become more and more efficient.

The filtering system shall always ensure contamination levels not esxceeding the values indicated below :

HIGH EFFICIENT GEAR PUMPS:

High quality of gears to minimizes leakage across gear tips, high precise geometrical tolerance of body and bearing blocks with seals for high volumetric efficiency and specially designed thurst bearing / bush gives low noise, Du-lined/bi-metal bearings for jerkless operation and working against High mechanical Loads operating up to 200 bar and up to 3000 rpm.

Low pressure bearing lubrication is feature of all COLT GEAR PUMPS, this is achieved by utilising the action generated when the gear teeth separate to draw lubricating fluid from the inlet port and along each bearing journal by way of passage in the composite bush.This proven system ensures efficient cooling and lubrication of the bearing with a constant supply of fluid independent of operating condition.

DURABILITY

ALL COLT GEAR PUMPS are backed by full 3 months warranty.

High tensile aluminium alloy are used to ensure maximum fatigue strength. Through body bores enable precise alignment of the bearings and hence maximums bearing load capacity. Careful attention to machining details and surface finishes, holds wear rates to a minimum and promotes extended operating life.

COLT GEAR PUMPS have been designed to perform with a wide range of fluids and can be supplied with nitrile and viton seals as required.

DRIVES:

Use of a flexible coupling is recommended to accomodate any slight misalignment of shaft and to dampen vibration. Splines must allow sufficient radial movement.Two couplings are necessary to

ensure radial alignment.

Both parallel and taper shaft units are supplied with *a* shaft key, the parallel shaft keys must be hand fitted when the coupling is assembled. On no account must the key of coupling be fitted, or removed by hammering or levering, this will damage the pump internally.

MOUNTING :

The pump may be mounted in any position. The units are supplied with either two or four bolt flanges and with a spigot for location. The fixture that receives the mounting flange spigot should have 1 mm 45° chamfer to ensure proper installation. To minimize vibration, which can be transmitted to the pump by rigid runs, it is good practice to use flexible hose immediately connected to the unit ports.

ROTATION:

Inlet and Rotation arrows are stamped on the unit body, adjacent to drive shaft rotation.

PUMP SUCTION LINE:

The suction line must be as large as possible and should be free from sharp bands to prevent excessive suction head, which should in no case exceed 190 mm of Mercury (0.24 bar) below atmospheric pressures. The system should be designed to prevent entry of air and a positive head of oil should be maintained wherever possible. Lower pressures during cold start-up conditions are permissible for short periods.

As a general guide, fluid velocity in the pump suction line should not exceed 2m/sec. for pipe lengths up to 2 meters.

OIL RESERVOIR:

As a general, the reservoir capacity for industrial applications should be three to five times the open loop-flow per minute being drawn from the reservoir. For mobile applications the reservoir should be sized for not less than 0.75 times the open loop flow (of course, the volume for rams and actuators must be allowed for by providing adequate air space and breathing.) The pump suction line should draw oil from a point not less than 100 mm above the tank bottom to avoid sludge deposits from entering the pump. The return line should be submerged to limit frothing of oil. The suction and return connections should be positioned as far apart as possible and separated by baffles, so that oil circulations promoted within the tank to assist convection cooling and allow air entrained in the oil to dissipate.

FILTERATION :

The fluid should be filtered during top-up and continuously during operation to achieve and maintain a cleanliness level of ISO 17~/14. The recommendation should be considered a minimum. Better Cleanliness levels will significantly increase component life.

Each systems should be analyzed to determine the proper method of filtration needed to maintain the required cleanliness levels, depending on the configuration and complexity of the system.

FLUIDS

Most premium grade mineral oil based hydraulic fluids are suitable for use with VBC Gear Pumps. A primary consideration in the selection of Hydraulic Fluid is expected oil temperature extremes that will

be experienced in service. When choosing the Hydraulic fluid, these temperature extremes must be considered to obtain the most suitable temperature-viscosity characteristic. For optimum performance, the viscosity should be maintained in the 97-456 SUS(20 -100 - cST) Cange. Limiting viscosities of 4545 SUS (1000 cST) maximum and 52 SUS (8 cST) minimum should not be exceeded. It may be possible in some application to run on other types of special fluids Contact VBC for more details.

HYDRULIC FLUIDS :

Use specific mineral oil based hydralic fluids having good anti-wear, anti-foaming (rapid de-aeration), antioxidant, anti-corrosion and lubricating properties. Fluids should also comply with DIN 51525 and VDMA 24317 standards and get through 11th stage of FZG test

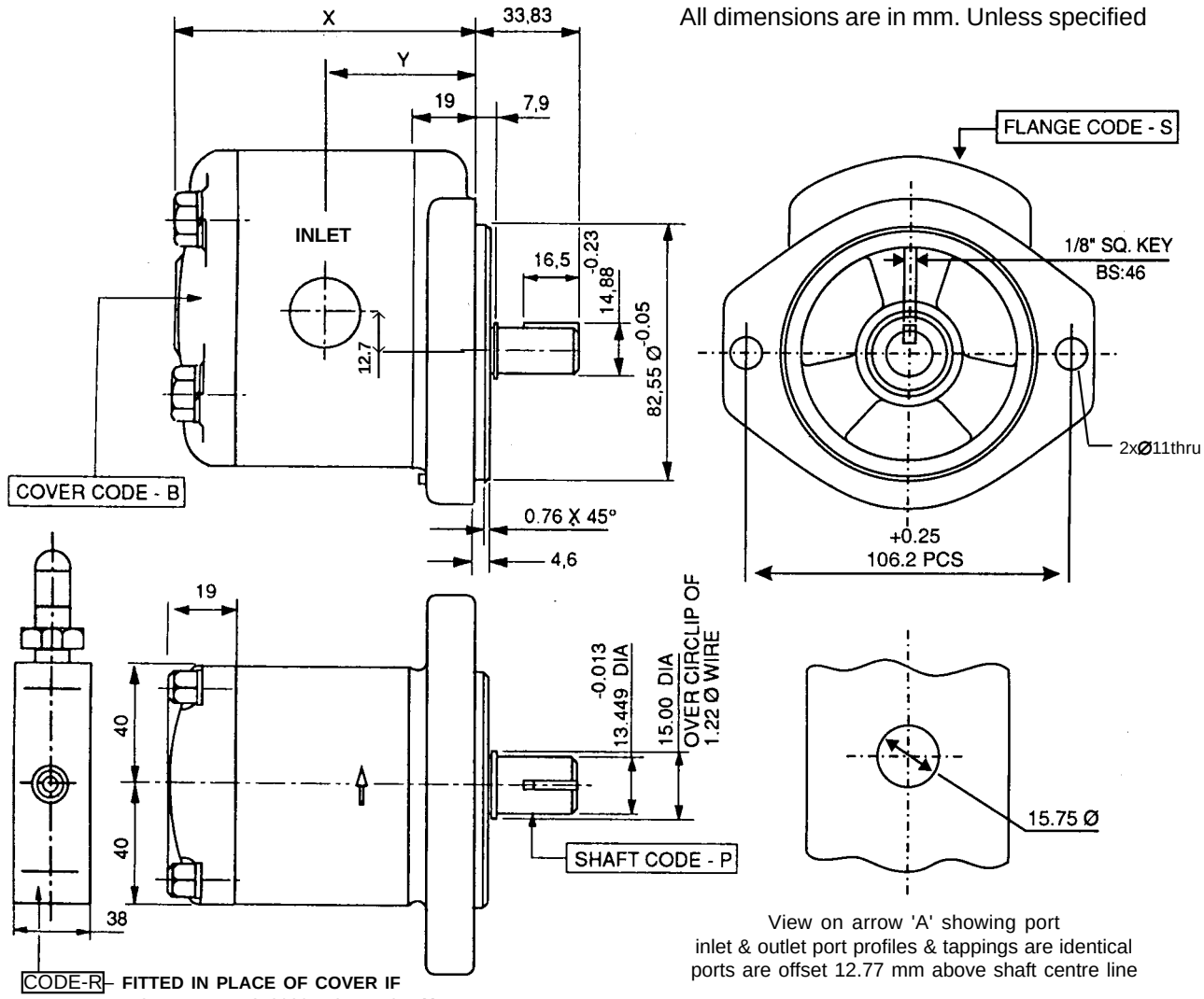
Pump operating temperature should range between :

OPERATINGTEMPERATURE RANGE:

The pumps are designed to operate between 0° and 80° C intermittent temperatures may very between -20° to 100° C if the fluid being pumped is suitable for such operations.

GROUP 0P

All dimensions are in mm. Unless specified



View on arrow 'A' showing port
inlet & outlet port profiles & tappings are identical
ports are offset 12.77 mm above shaft centre line

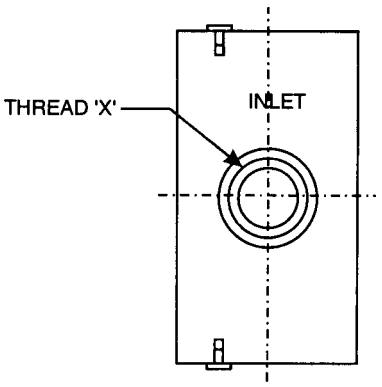
CLOCKWISE ROATION SHOWN

CODE - C CLOCKWISE

CODE - A ANTI CLOCKWISE

BODY PORTS CODE-T

Pump Type	Dimension X -1.27	Dimension Y -0.25	Thread X	Full Thread Depth
OP 3003	76.2	38.4	3/8" BSPF	11.5
OP 3004	77.2	38.6	3/8" BSPF	11.5
OP 3006	78.8	39.1	3/8" BSPF	11.5
OP 3008	79.8	39.9	3/8" BSPF	11.5
OP 3011	81.9	40.9	3/8" BSPF	11.5
OP 3013	83.1	41.7	1/2" BSPF	14
OP 3015	84.6	42.4	1/2" BSPF	14



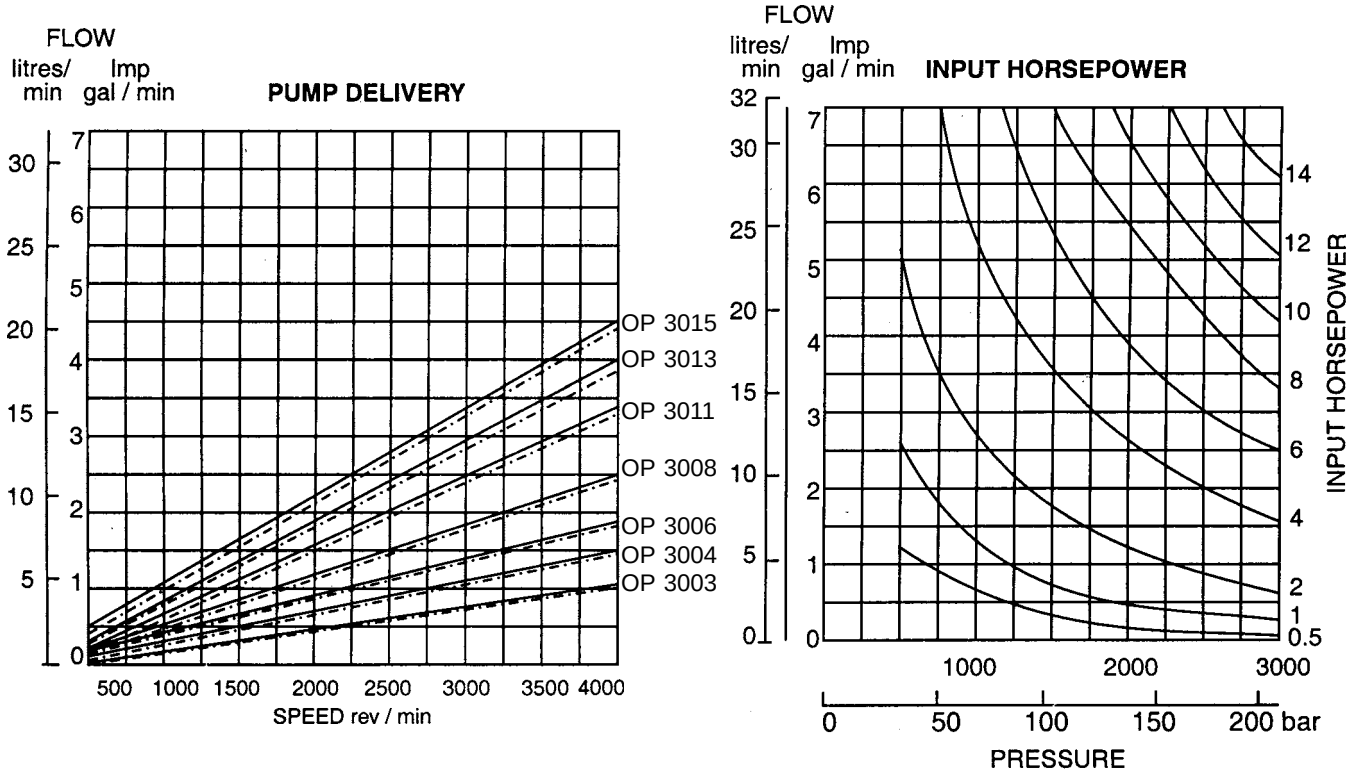
GROUP 0P

PERFORMANCE DATA

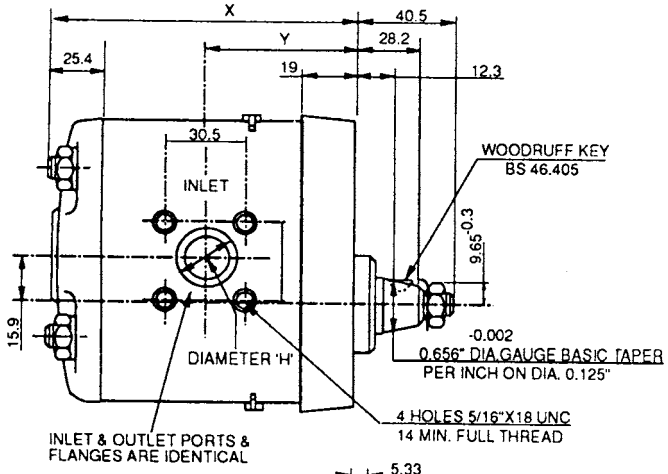
Pump Type	Theoretical Displacement		Nominatl Delivery at 1500 rev/min.		Maximum Pressure		Max Speed at max Pressure rev / min.	Min Speed at max. Continuous Pressure rev / min.
	in^3 / rev	cm^3 / rev	Imp gal / min	1/min	psi	bar		
OP 3003	0.08	1.23	0.26	1.2	3000	210	4000	500
OP 3004	0.10	1.64	0.39	1.8	3000	210	4000	500
OP 3006	0.13	2.18	0.56	2.5	3000	210	4000	500
OP 3008	0.18	2.87	0.75	3.4	3000	210	4000	500
OP 3011	0.23	3.81	1.06	4.8	3000	210	4000	500
OP 3013	0.27	4.46	1.28	5.8	3000	210	4000	500
OP 3015	0.31	5.14	1.50	6.8	3000	210	4000	600

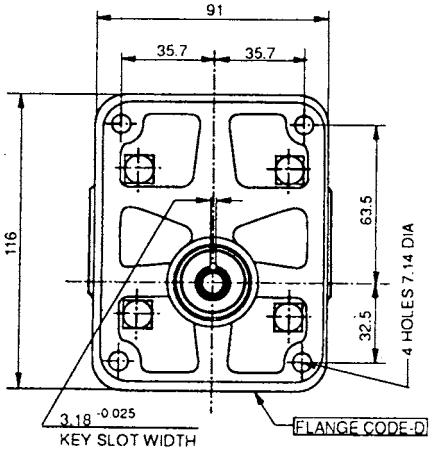
Pressure with ENCLO 68 oil at 50° C
Pressure quoted are relief valve maximum by - pass

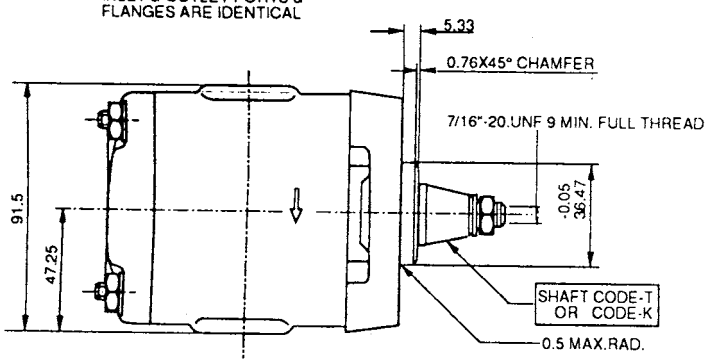
PERFORMANCE

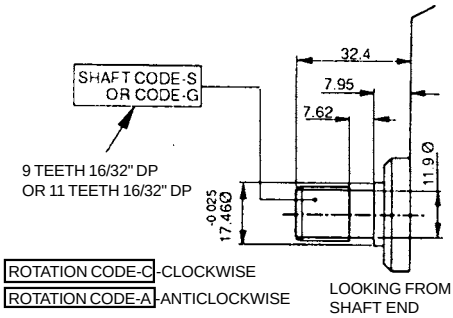


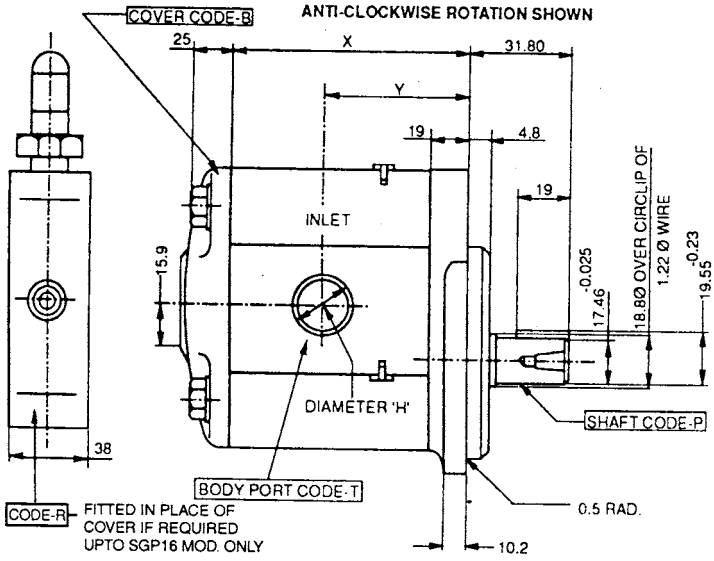
GROUP 1P

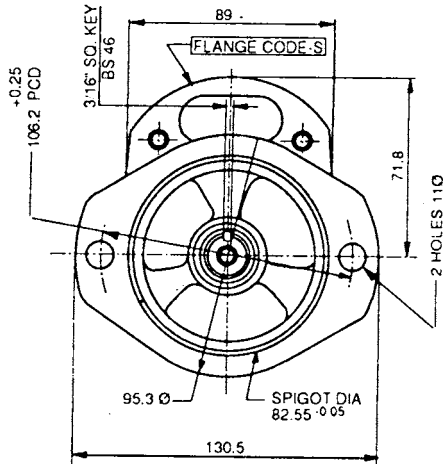












PUMP TYPE	DIMENSION X -1.27 (TOL.)	DIMENSION Y -0.76 (TOL.)	DIMENSION H + 0.5 (TOL.)	INLET (CODE-T)	OUTLET (CODE-T)
1P 3017	84.52	41.8	17.3	1/2" BSPF	1/2" BSPF
1P 3020	86.10	42.5	17.3	1/2" BSPF	1/2" BSPF
1P 3028	89.14	44.07	17.3	1/2" BSPF	1/2" BSPF
1P 3036	92.20	45.60	17.3	3/4" BSPF	3/4" BSPF
1P 3044	110.30	54.64	20.3	3/4" BSPF	3/4" BSPF
1P 3052	113.35	56.20	20.3	3/4" BSPF	3/4" BSPF
1P 3060	116.42	57.70	20.3	3/4" BSPF	3/4" BSPF
1P 3072	121.02	60.00	20.3	3/4" BSPF	3/4" BSPF
1P 3090	127.70	63.34	20.3	3/4" BSPF	3/4" BSPF

GROUP 1A

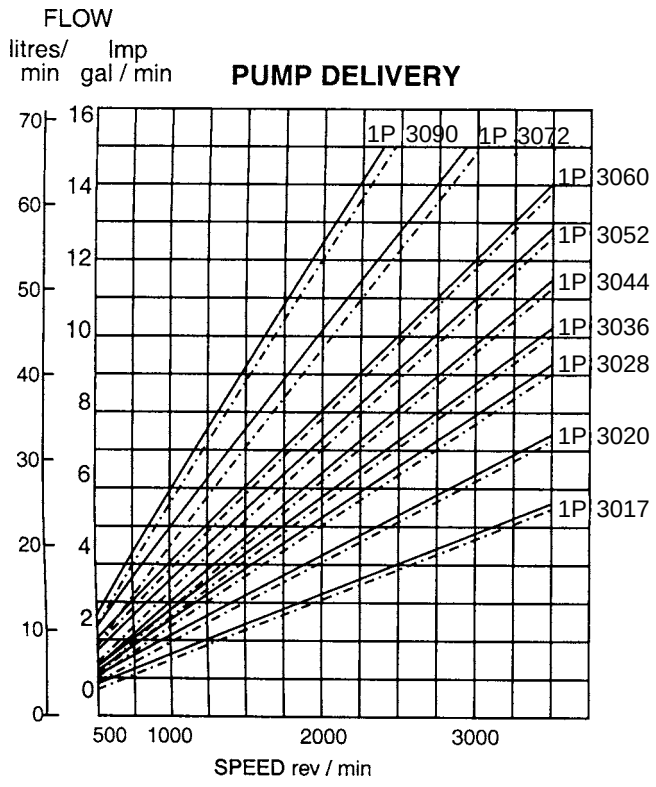
PERFORMANCE DATA

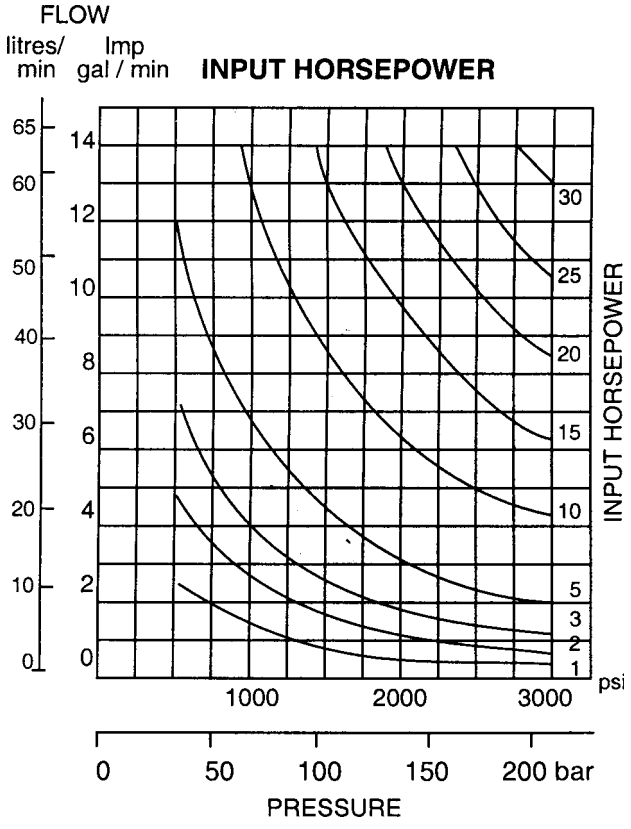
Pump Type	Theoretical Displacement		Nominatl Delivery at 1500 rev/min.		Maximum Pressure		Max Sped at max Pressure rev / min.	Min Speed at max Continuous Pressure rev / min.
	in^3 / rev	cm^3 / rev	Imp gal / min	l/min	psi	bar		
1P 3017	0.31	5.14	1.70	7.70	3000	210	3500	500
1P 3020	0.43	7.03	2.00	9.10	3000	210	3500	500
1P 3028	0.58	9.46	2.80	12.70	3000	210	3500	500
1P 3036	0.73	11.90	3.60	16.40	3000	210	3500	600
1P 3044	0.88	14.33	4.40	20.00	3000	210	3500	500
1P 3052	1.02	16.77	5.20	23.60	3000	210	3500	600
1P 3060	1.17	19.20	6.00	27.30	3000	210	3500	650
1P 3072	1.40	22.84	7.20	32.70	2470	170	3500	650
1P 3090	1.72	28.12	9.00	40.90	2030	140	2400	650

Pressure with ENCLO 68 oil at 50° C
Pressure quoted are relief valve maximum by - pass

PERFORMANCE

Theoretical Flow ———————
Flow at max Pressure – – – – – – – – –



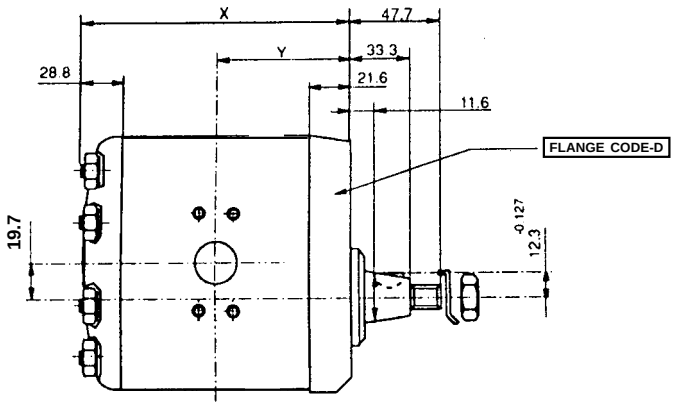


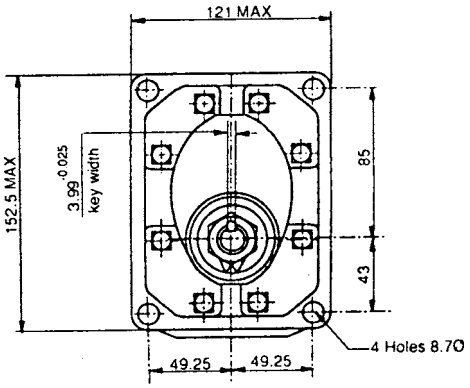
GROUP 2P

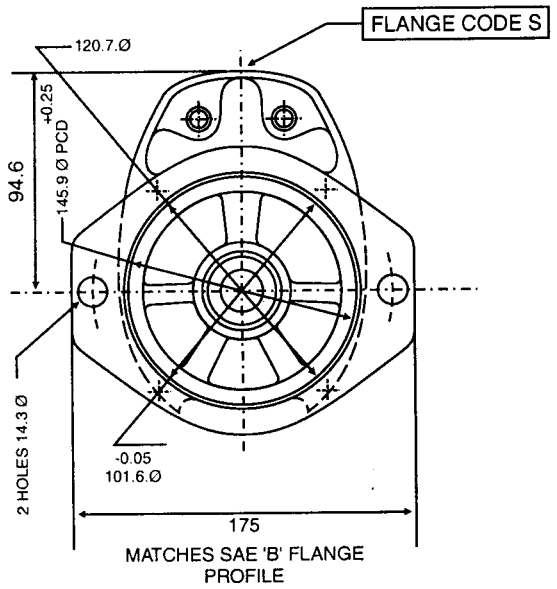
Pump Type	Dimension X -1.27 (tol)	Dimension Y -1.0 (tol)
2P 3050	112.7	54.30
2P 3070	117.5	56.70
2P 3090	122.3	59.13
2P 3105	140.0	67.90

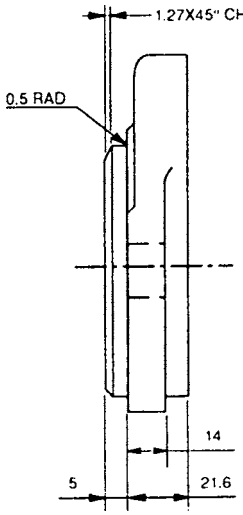
Pump Type	Dimension X -1.27 (tol)	Dimension Y -1.0 (tol)
2P 3120	143.5	69.73
2P 3146	149.6	72.80
2P 3158	152.7	74.32
2P 3220	155.84	74.32

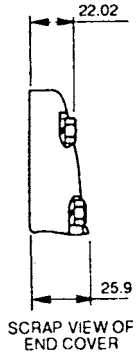
ROTATION CODE-C -CLOCK WISE
ROTATION CODE-A -ANTI CLOCK WISE

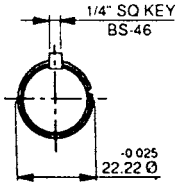


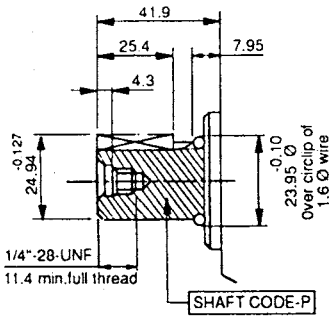


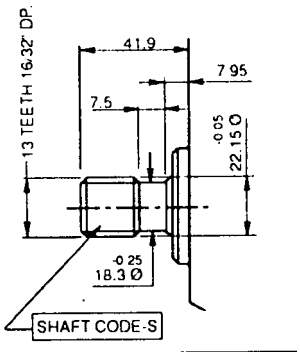












GROUP 2P

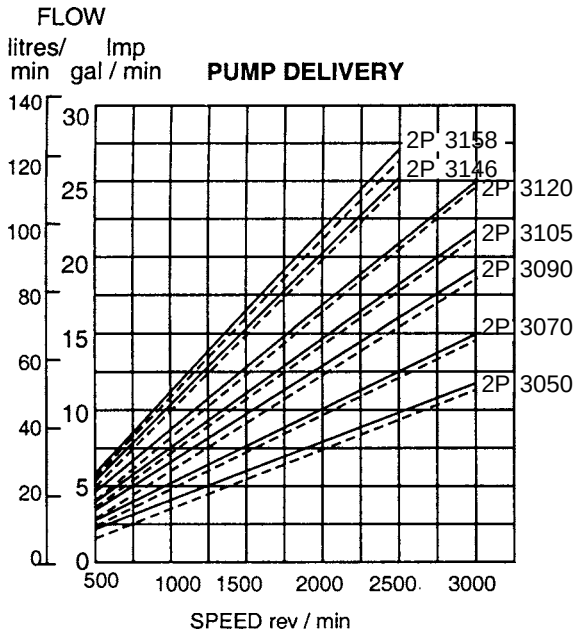
PERFORMANCE DATA

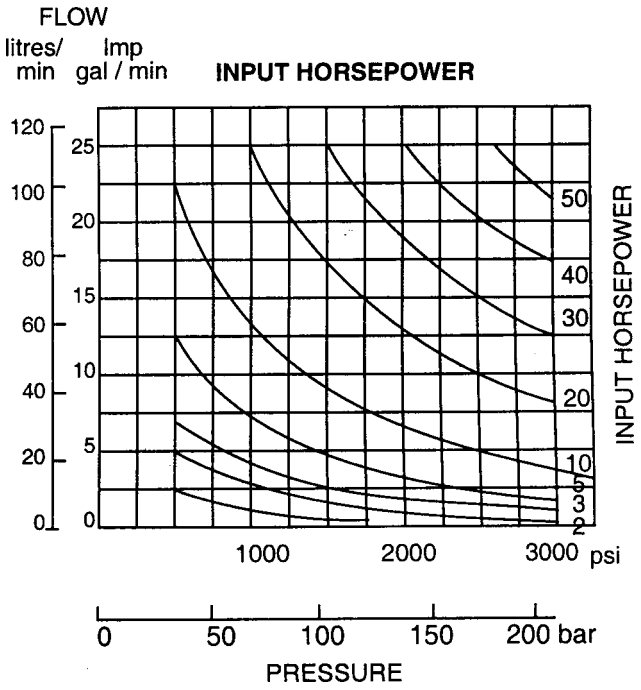
Pump Type	Theoretical Displacement		Nominatl Delivery at 1450 rev/min.		Maximum Pressure		Max Speed at max Pressure rev / min.	Min Speed at max Continuous Pressure rev / min.
	in^3 / rev	cm^3 / rev	Imp gal / min	1/min	psi	bar		
2P 3050	1.02	16.67	5.0	22.7	3000	210	3500	550
2P 3070	1.39	22.73	7.0	32.0	3000	210	3500	550
2P 3090	1.76	28.79	9.0	41.0	3000	210	3500	650
2P 3105	2.03	33.34	10.5	47.7	3000	210	3500	600
2P 3120	2.31	37.88	12.0	54.5	3000	210	3500	650
2P 3146	2.78	45.46	14.6	66.5	3000	210	3500	650
2P 3158	3.01	49.40	15.8	71.8	2470	170	2500	650
2P 3220	4.07	66.67	22.0	100	2030	140	2500	650

Pressure with ENCLO 68 oil at 50° C
Pressure quoted are relief valve maximum by - pass

PERFORMANCE

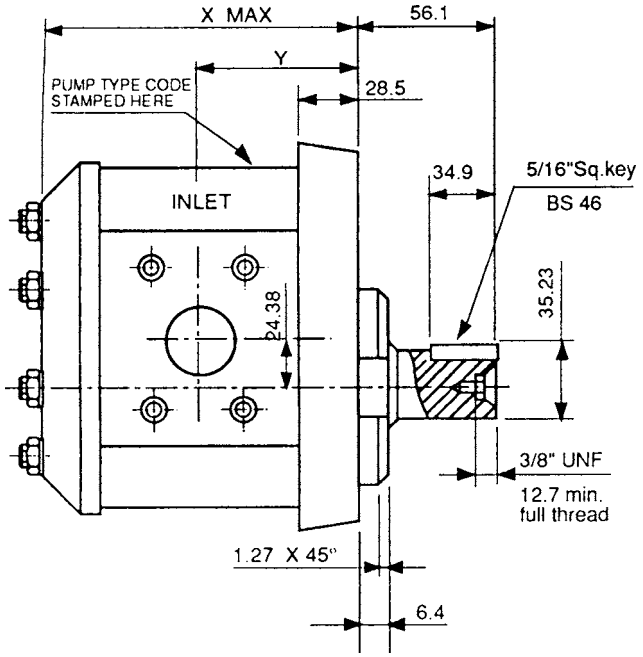
Theoretical Flow _____
Flow at max Pressure _ _ _ _ _ _ _ _ _

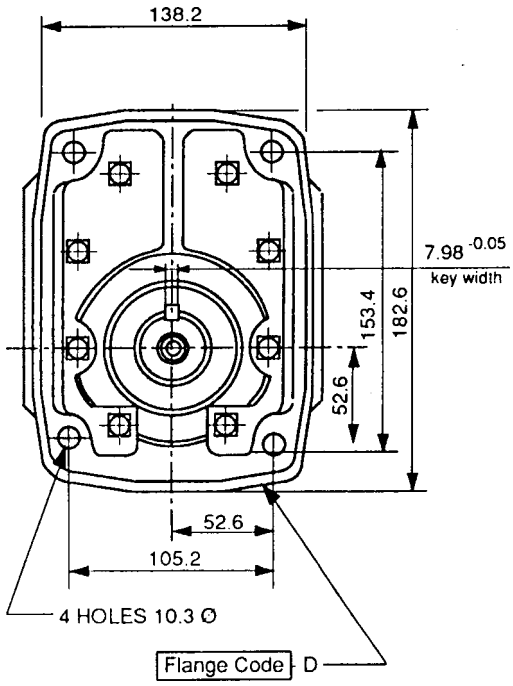


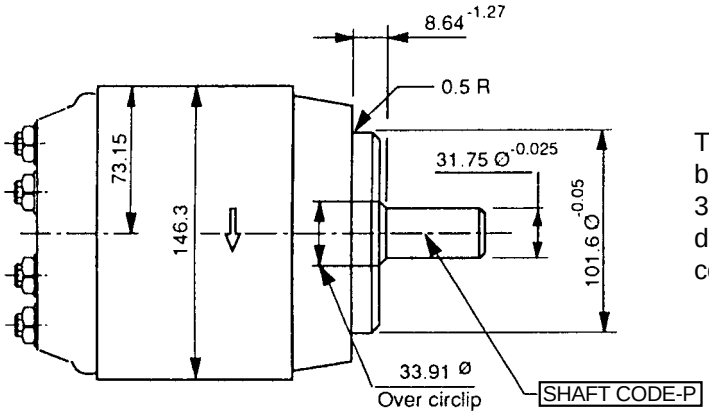


GROUP 3P

All dimensions are in mm. Unless specified
Pump rotation Anti - clockwise as shown.







The variable Dimensions X and Y are tabulated below. All other Dimensions are common to group 3P pumps. Design improvements may lead to dimensional changes and these figures should be confirmed before use.

PUMP Type	FLANGE CODE			
	Dimension X		Dimension Y(-0.76)	
	Code-D&S	Code-B&C	Code-D&S	Code-B&C
3P 3150	145.2	180.2	70.3	105.1
3P 3180	150.0	185.0	72.5	107.5
3P 3210	155.0	190.0	74.9	109.9
3P 3250	161.0	196.2	78.0	113.0
3P 3300	169.0	204.0	82.0	117.0
3P 3330	174.3	209.3	84.7	119.7
3P 3380	182.3	217.3	88.7	123.7
3P 3440				
3P 3500				

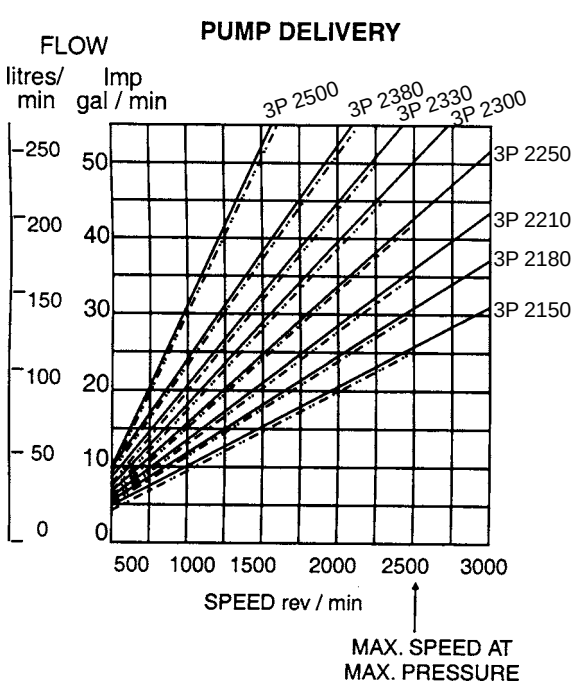
GROUP 3P

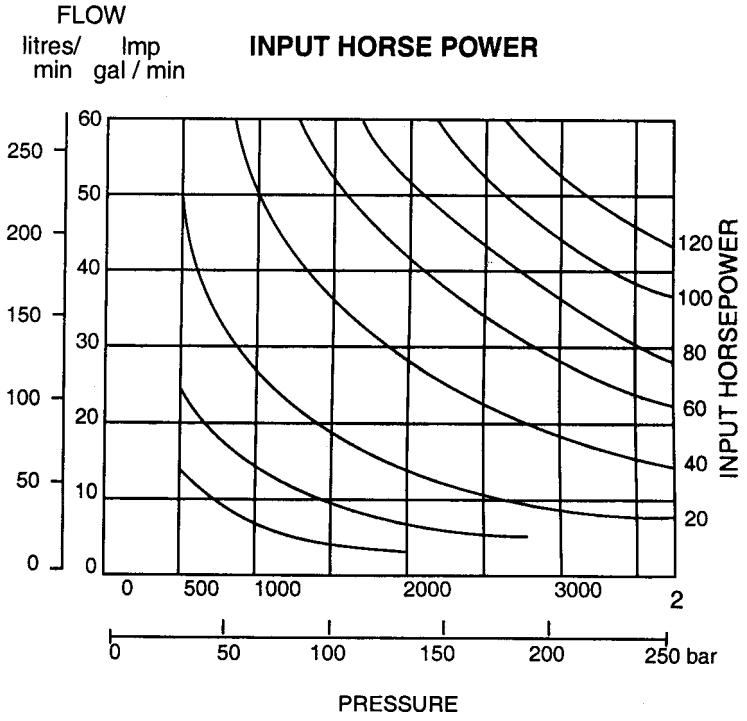
SPECIFICATION DATA

Pump Type	Theoretical Displacement		Nominatl Delivery at 1450 rev/min.		Maximum Pressure		Max Speed at max Pressure rev / min.	Min Speed at max Continuous Pressure rev / min.
	in^3 / rev	cm^3 / rev	Imp gal / min	l/min	psi	bar		
3P 3150	2.88	47.07	15	68.0	3000	210	2500	550
3P 3180	3.43	56.17	18	81.5	3000	210	2500	600
3P 3210	3.99	65.23	21	95.5	3000	210	2500	700
3P 3250	4.71	77.15	25	113.5	3000	210	2500	700
3P 3300	5.62	92.03	30	136.0	2500	174	2000	700
3P 3330	6.21	101.71	33	150.00	2300	159	3500	700
3P 3380	7.14	116.78	38	173.00	2000	138	2500	700
3P 3440								
3P 3500	9.24	151.32	50	227.0	2000	138	2500	700

Pressure with ENCLO 68 oil at 50° C

PERFORMANCE



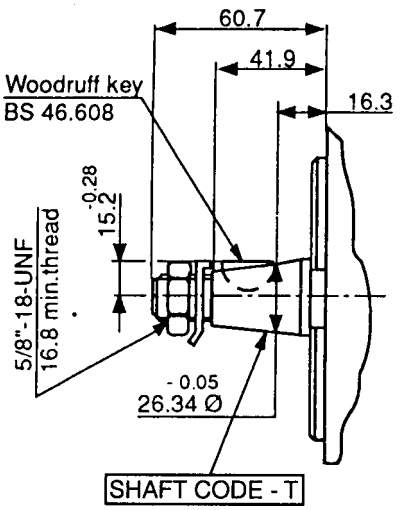


To widen the range of application of Group 3A pumps Variants are available embodying the features illustrated below. Each feature is identified by a code letter and this must be used in conjuction with the Coding chart when ordering.

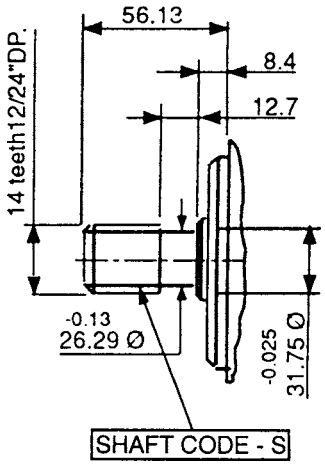
ALL DIMS. ARE IN MM UNLESS SPECIFIED.

DRIVE SHAFTS

Taper Shaft Code - T



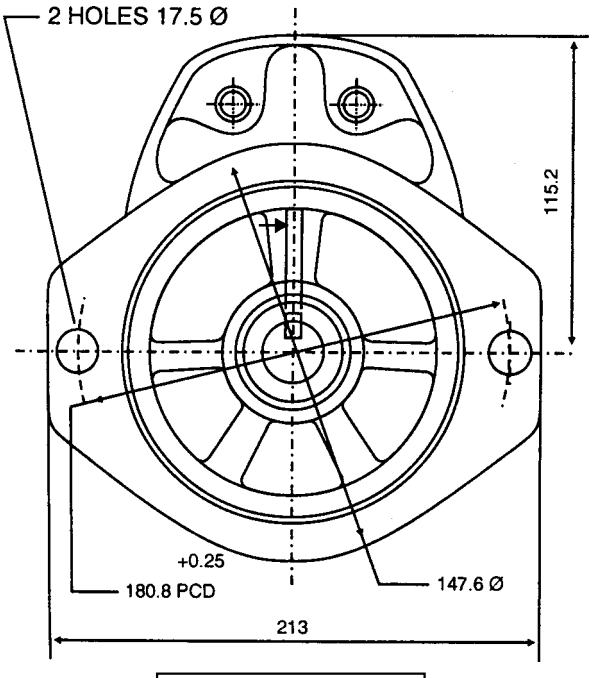
Splined Shaft Code - T



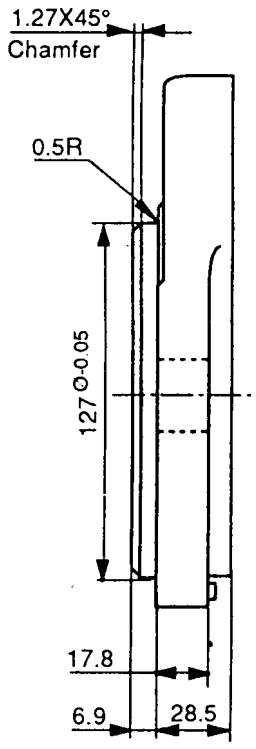
ROTATION CODE-C -CLOCK WISE
ROTATION CODE-A -ANTI CLOCK WISE

MOUNTING FLANGES

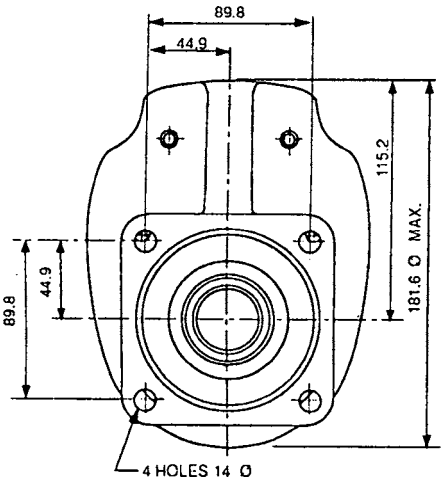
2-Bolt SAE C Mounting Flange Code S

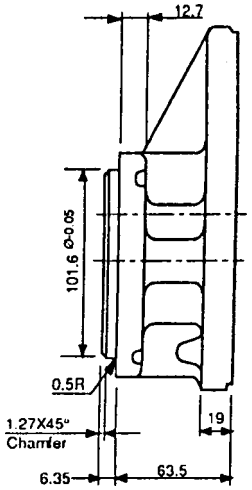


FLANGE CODE - S



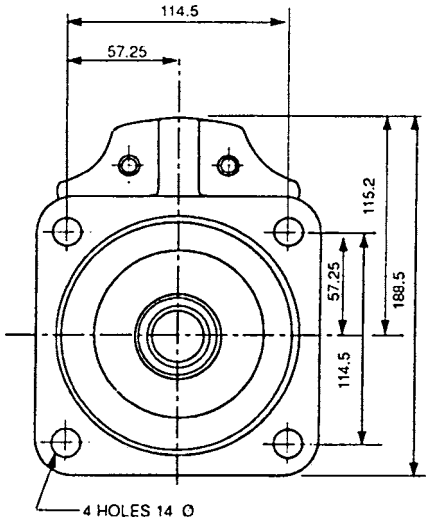
4-Bolts SAE B Mounting Flange Code B
Available with shaft code P and S only

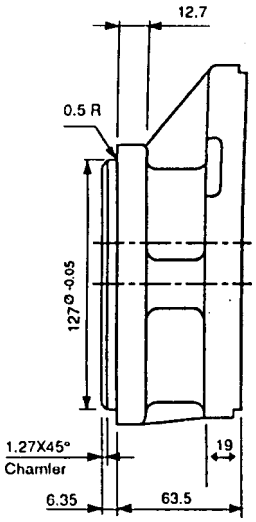




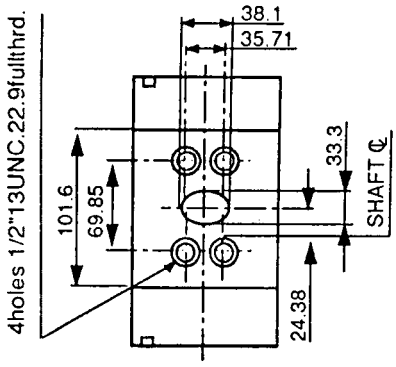
4-Bolts SAE C Mounting Flange Code C
Available with shaft code P and S only

ALL DIMNS. ARE IN MM
UNLESS SPECIFIED

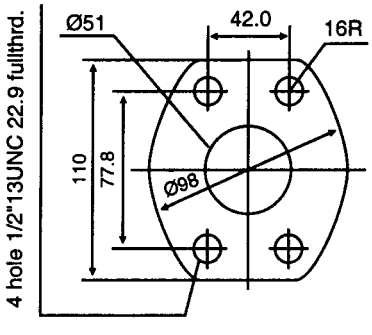




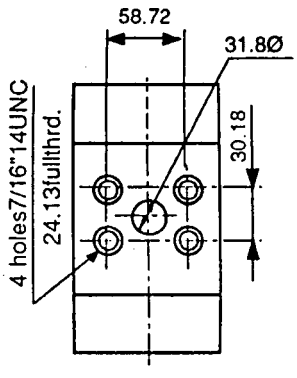
BODY PORTS
Body Ports Code S



INLET PORT
(11/2" SAE J5 18c)
UPTO SGP-113

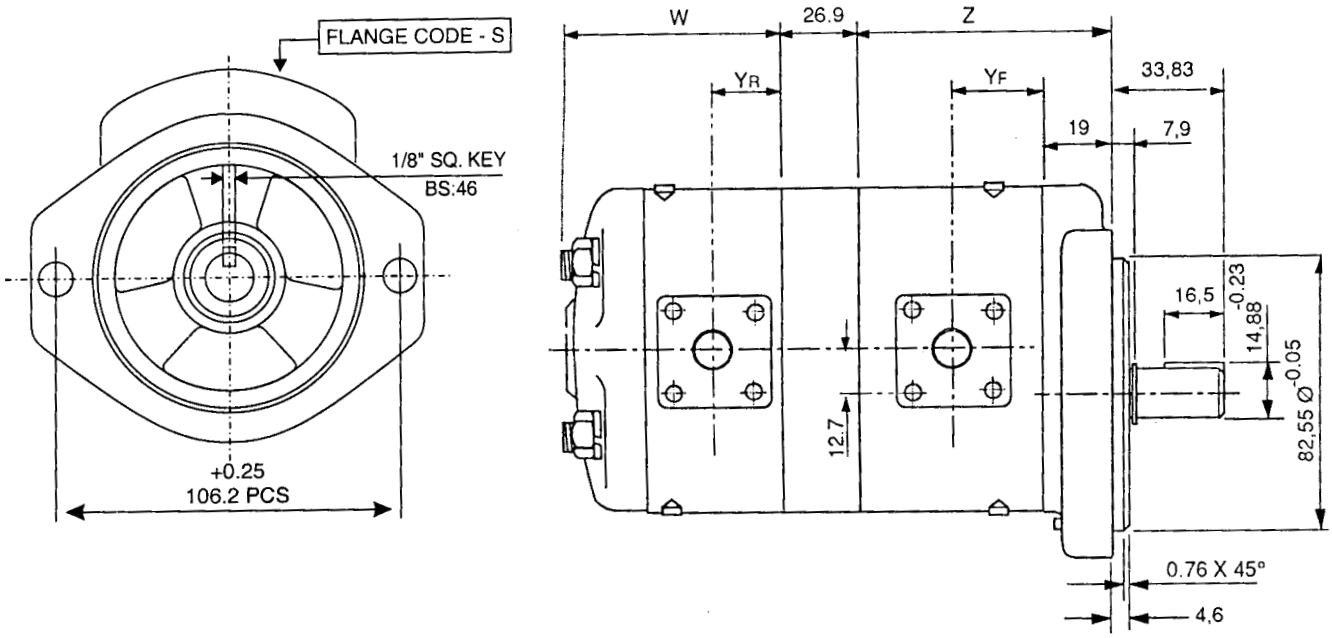


INLET PORT
(2" SAE J5 18c)
UPTO SGP-225



OUTLET PORT
(11/4" SAE J5 18c)
Pump type 3A ALL TYPE

TANDEM 0P - 0P

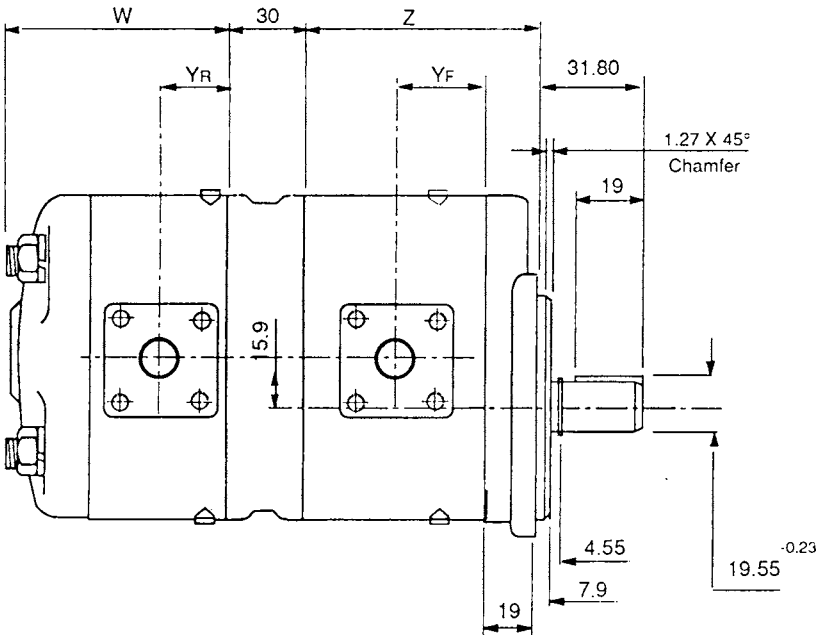


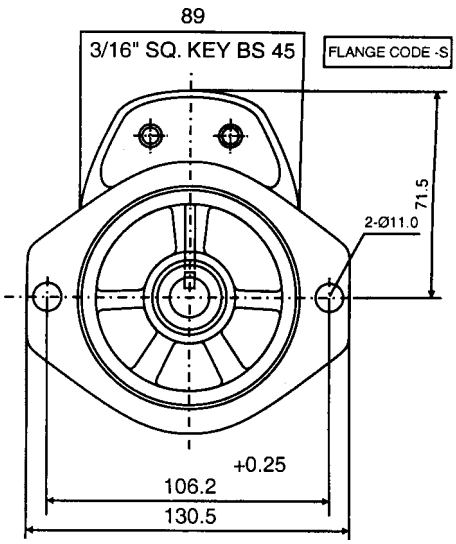
ALL DIMNS, ARE IN MM UNLESS SPECIFIED

PUMP TYPE	DIMENSIONS			
	Z	Y FRONT	Y REAR	W
2015-2015	65.50	23.24	23.24	68.5
-2013	65.50	23.24	22.60	67.0
-2011	65.50	23.24	21.85	65.7
-2008	65.50	23.24	20.80	63.7
-2006	65.50	23.24	20.00	62.2
-2003	65.50	23.24	19.10	60.3
2013-2013	65.10	22.60	22.60	64.1
-2011	65.10	22.60	21.85	65.7
-2008	64.10	22.60	20.80	63.7
-2006	64.10	22.60	20.00	62.2
-2003	64.10	22.60	19.10	60.3
2011-2011	62.29	21.85	21.85	65.7
-2008	62.29	21.85	20.80	63.7
-2006	62.29	21.85	20.00	62.2
-2003	62.29	21.85	19.10	60.3
2008-2008	60.80	20.80	20.80	63.7
-2006	60.80	20.80	20.00	62.2
-2003	60.80	20.80	19.10	60.3
2006-2006	59.20	20.00	20.00	62.2
-2003	59.20	20.00	19.10	60.3
2003-2003	57.20	19.10	19.10	60.3

TANDEM 1P - 1P

ALL DIMNS ARE IN MM
UNLESS SPECIFIED



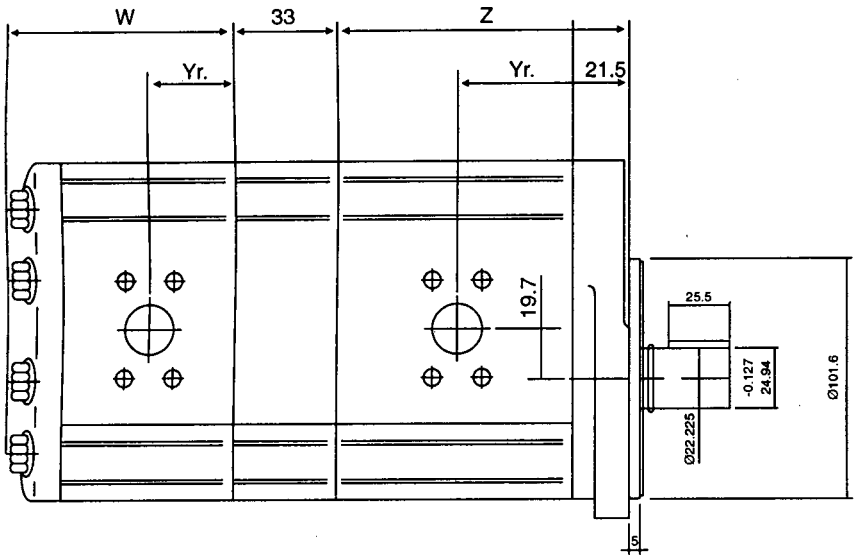


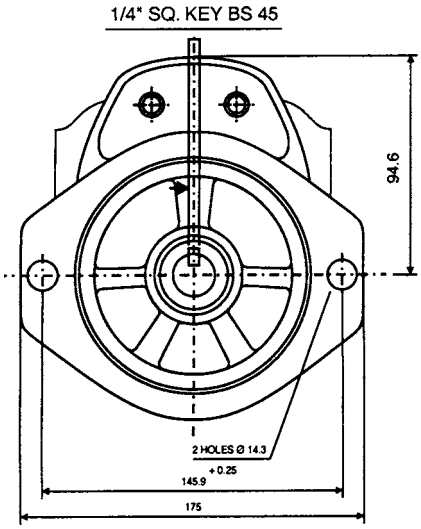
PUMP TYPE 1A-1A	DIMENSIONS			
	Z	Y FRONT	Y REAR	W
2090-2090	107.7	44.5	44.5	112.2
-2072	107.7	44.5	41.0	104.6
-2060	107.7	44.5	38.7	100.0
-2052	107.7	44.5	37.2	96.9
-2044	107.7	44.5	35.5	93.8
-2036	107.7	44.5	26.6	75.8
-2028	107.7	44.5	25.1	72.7
-2020	107.7	44.5	23.6	69.6
2072-2072	101.0	41.0	41.0	104.6
-2060	101.0	41.0	38.7	100.0
-2052	101.0	41.0	37.2	96.9
-2044	101.0	41.0	35.5	93.8
-2036	101.0	41.0	26.6	75.8
-2028	101.0	41.0	25.1	72.7
-2020	101.0	41.0	23.6	69.6
2060-2060	96.4	38.7	38.7	100.0
-2052	96.4	38.7	37.2	96.9
-2044	96.4	38.7	35.5	93.8
-2036	96.4	38.7	26.6	75.8
-2028	96.4	38.7	25.1	72.7
-2020	96.4	38.7	23.6	69.6
2052-2052	93.3	37.2	38.7	100.0
-2044	93.3	37.2	37.2	96.9
-2036	93.3	37.2	35.5	93.8
-2028	93.3	37.2	26.6	75.8
-2020	93.3	37.2	25.1	72.7
-2044-2044	90.2	35.2	23.6	69.6
-2036	90.2	35.2	35.5	93.9
-2028	90.2	35.2	35.5	93.8
-2020	90.2	35.2	26.6	69.8
2036-2036	53.2	26.6	26.6	75.8
-2028	53.2	26.6	25.1	72.7
-2020	53.2	26.6	23.6	69.6
2028-2028	72.1	25.1	25.1	72.7
-2020	72.1	25.1	23.6	69.6
2020-2020	66.0	23.6	23.6	69.6

TANDEM 2P - 2P

ALL DIMNS ARE IN MM
UNLESS SPECIFIED

3P FLANGE CODE - S

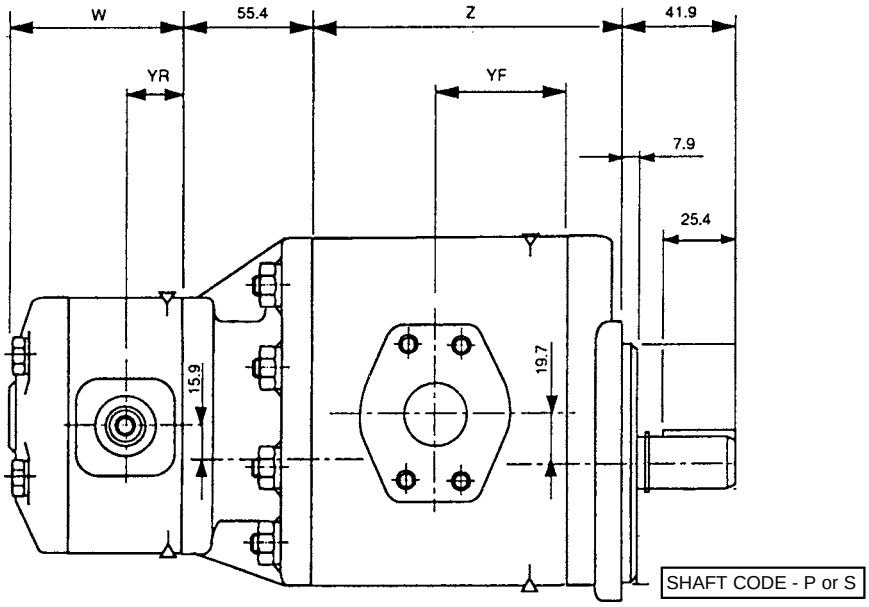


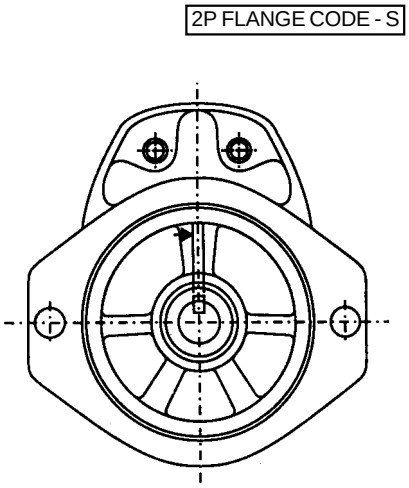


PUMP TYPE	DIMENSIONS			
	Z	Y FRONT	Y REAR	W
2220-2220	127.0	52.7	54.4	131.0
-2146	127.0	52.7	51.3	128.0
-2120	127.0	52.7	48.3	122.3
-2105	127.0	52.7	46.5	118.6
-2090	127.0	52.7	37.6	101.0
-2070	127.0	52.7	35.0	96.2
-2050	127.0	52.7	32.8	91.5
2146-2146	124.0	51.3	51.3	128.5
-2120	124.0	51.3	48.3	122.3
-2105	124.0	51.3	46.5	118.6
-2090	124.0	51.3	37.6	101.0
-2070	124.0	51.3	35.0	96.2
-2050	124.0	51.3	32.8	91.5
2120-2120	117.8	48.3	48.3	122.3
-2105	117.8	48.3	46.5	118.6
-2090	117.8	48.3	37.6	101.0
-2070	117.8	48.3	35.0	96.2
-2050	117.8	48.3	32.8	91.5
2105-2105	114.2	46.3	46.3	118.6
-2090	114.2	46.3	37.6	101.0
-2070	114.2	46.3	35.0	96.2
-2050	114.2	46.3	32.8	91.5
2090-2090	110.6	37.5	37.5	101.0
-2070	110.6	37.5	35.0	96.2
-2050	110.6	37.5	32.8	91.5
2070-2070	91.8	35.0	35.0	96.0
-2050	91.8	35.0	32.8	91.0
2050-2050	87.0	32.8	32.8	91.0

TANDEM 2P - 1P

ALL DIMNS. ARE IN MM
UNLESS SPECIFIED

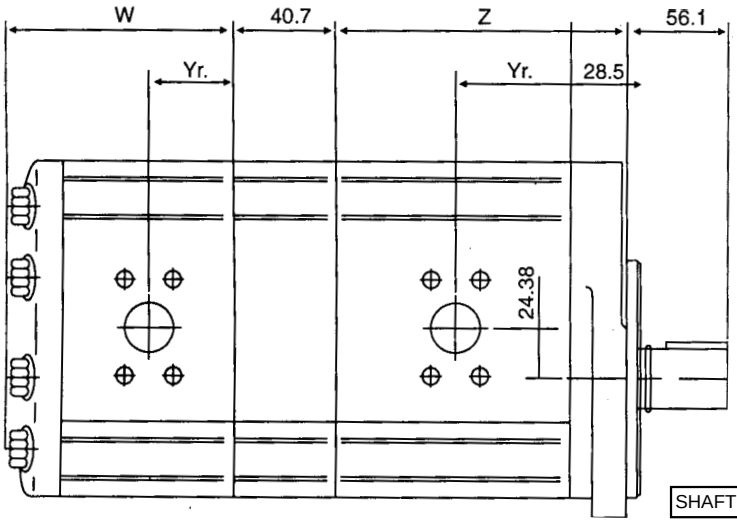




PUMP TYPE	DIMENSIONS			
	Z	Y FRONT	Y REAR	W
2146-2072	124.0	51.3	41.0	104.6
-2052	124.0	51.3	37.2	96.9
-2036	124.0	51.3	26.6	75.8
-2028	124.0	51.3	25.1	72.7
2120-2072	117.8	48.3	41.0	104.6
-2052	117.8	48.3	37.2	96.9
-2036	117.8	48.3	26.6	75.8
-2028	117.8	48.3	25.1	72.7
2090-2072	96.7	37.5	41.0	104.6
-2052	96.7	37.5	37.2	96.9
-2036	96.7	37.5	26.6	75.8
-2028	96.7	37.5	25.1	72.7

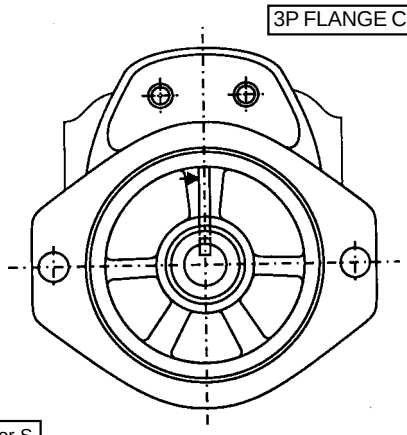
TANDEM 3P - 3P

ALL DIMNS. ARE IN MM
UNLESS SPECIFIED



SHAFT CODE - P or S

3P FLANGE CODE - S



PUMP TYPE	DIMENSIONS			
	Z	Y FRONT	Y REAR	W
2500-2500	169.3	70.4	70.4	174.33
-2380	169.3	70.4	60.15	153.83
-2330	169.3	70.4	56.14	145.81
-2300	169.3	70.4	53.55	140.63
-2250	169.3	70.4	49.6	132.73
-2210	169.3	70.4	46.42	126.37
-2180	169.3	70.4	44.0	121.53
-2150	169.3	70.4	41.58	116.69
2380-2380	148.79	60.15	60.15	153.83
-2330	148.79	60.15	56.14	145.81
-2300	148.79	60.15	53.55	140.63
-2250	148.79	60.15	49.6	132.73
-2210	148.79	60.15	45.42	126.37
-2180	148.79	60.15	44.0	121.53
-2150	148.79	60.15	41.58	116.69
2330-2330	140.77	56.14	56.14	145.81
-2300	140.77	56.14	53.55	140.63
-2250	140.77	56.14	49.6	132.73
-2210	140.77	56.14	46.42	126.37
-2180	140.77	56.14	44.0	121.53
-2150	140.77	56.14	41.58	116.69
2300-2300	135.6	53.55	53.55	140.63
-2250	135.6	53.55	49.6	132.73
-2210	135.6	53.55	46.42	126.37
-2180	135.6	53.55	44.0	121.53
-2150	135.6	53.55	41.58	116.69
2250-2250	127.7	49.6	49.6	132.73
-2210	127.7	49.6	46.42	126.37
-2180	127.7	49.6	44.0	121.53
-2150	127.7	49.6	41.58	116.69
2210-2210	121.34	46.42	46.42	126.37
-2180	121.34	46.42	44.0	121.53
-2150	121.34	46.42	41.58	116.69
2180-2180	116.5	44.0	44.0	121.53
-2150	116.5	44.0	41.58	116.69
2150-2150	116	41.58	41.58	116.69

REQUIRED MOTOR HORSE POWER (AVERAGE VALUES)

PUMP TYPE	25 BAR	50 BAR	75 BAR	100 BAR	125 BAR	150 BAR	175 BAR	200 BAR
0P 2003	0.1	0.2	0.3	0.4	0.5	0.6	0.8	0.9
0P 2004	0.2	0.3	0.4	0.6	0.8	0.9	1.0	1.2
0P 2006	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6
0P 2008	0.3	0.5	0.8	1.1	1.3	1.5	1.8	2.0
0P 2011	0.4	0.7	1.0	1.4	1.7	2.0	2.4	2.7
0P 2013	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.1
0P 2015	0.5	0.9	1.4	1.8	2.3	2.8	3.2	3.7

PUMP TYPE	25 BAR	50 BAR	75 BAR	100 BAR	125 BAR	150 BAR	175 BAR	200 BAR
1P 2017	0.5	1.0	1.6	2.2	2.7	3.3	3.8	4.4
1P 2020	0.6	1.2	1.9	2.5	3.1	3.8	4.4	5.0
1P 2028	0.9	1.7	2.5	3.4	4.2	5.0	5.9	6.7
1P 2036	1.0	2.1	3.2	4.2	5.3	6.3	7.4	8.4
1P 2044	1.3	2.5	3.8	5.0	6.3	7.6	8.9	10.0
1P 2052	1.5	3.0	4.5	6.0	7.5	8.9	10.4	11.9
1P 2060	1.7	3.4	5.1	7.0	8.5	10.2	11.9	13.6
1P 2072	2.0	4.0	6.0	8.5	10.0	12.0	14.1	
1P 2090	2.5	5.0	7.5	10.0	12.4			

PUMP TYPE	25 BAR	50 BAR	75 BAR	100 BAR	125 BAR	150 BAR	175 BAR	200 BAR
2P 2050	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0
2P 2070	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0
2P 2090	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0
2P 2105	3.0	6.0	9.0	12.0	15.0	18.0	21.0	24.0
2P 2120	3.5	7.0	10.5	14.0	17.5	21.0	24.5	28.0
2P 2146	4.0	8.0	12.0	16.0	20.0	24.0	28.0	32.0
2P 2158	4.5	9.0	13.5	18.0	22.5	27.0	31.5	
2P 2220	5.5	11.0	16.5	22.0				

PUMP TYPE	25 BAR	50 BAR	75 BAR	100 BAR	125 BAR	150 BAR	175 BAR	200 BAR
3P 2150	4	8	12	16	20	24	28	32
3P 2180	5	10	15	20	25	30	35	40
3P 2210	6	12	18	24	30	36	42	48
3P 2250	7	14	21	28	35	42	48	56
3P 2300	8	16	24	32	40	48	56	
3P 2330	9	18	27	36	45	54		
3P 2380	10	20	30	40	50			
3P 2500	13	26	39	52				