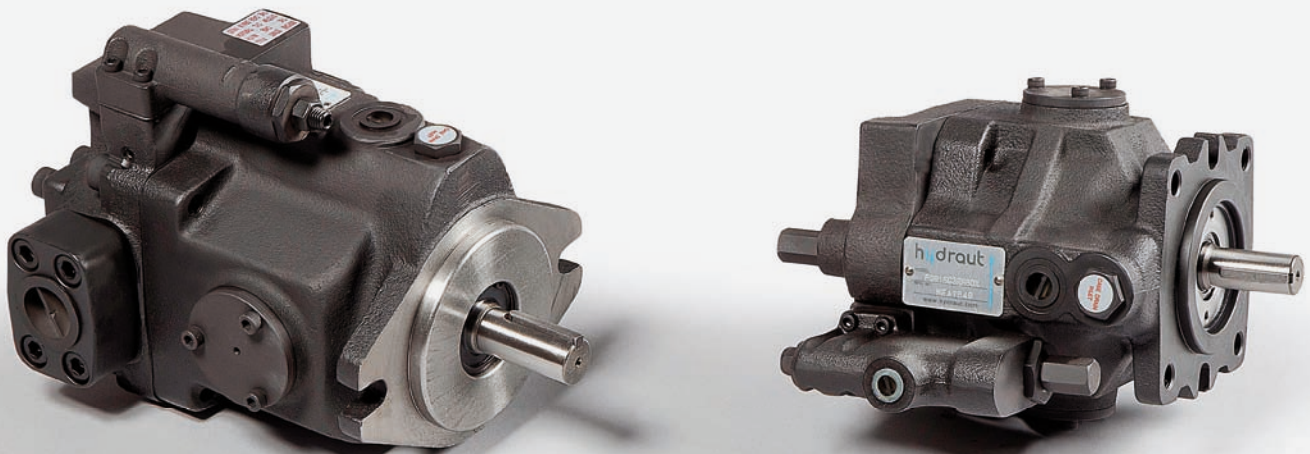


VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

PQ-SERIES



- Working pressure: up to 250 bar
- Peak pressure: up to 280 bar
- Displacements from 8 cc to 70 cc
- Wide range of controls
- Pressure compensator (also remote and proportional controls options)
- Standard ISO and SAE mounting and porting
- Through drive options
- Torque limit available (constant power)
- Load-sensing
- Suitable for multiple pump assembly
- Totally interchangeable to **Vickers** pumps PVQ and PVB series
- All standard configurations on stock

PUMPS

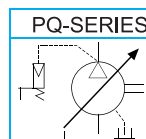
VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

PQ SERIES

FEATURE

1. Combining special internal designs and strict engineering disciplines has reduced noise level to new lows in whole pressure zones.
2. Depending on variety of application needs multiple optional unique control methods are available. It does not only reduce a number of unnecessary hoses, pipes and control valves but also increase efficiency and save horsepower, and cost.
3. Less capacity reservoirs can be selected and applied because of performances of low pressure loss and less head generation.
4. Wide application ranges: it is very suitable for machine tools, plastic injection molding machines, forging machines and other industrial machines etc..
5. Mounting flanges are made to SAE A or B 2-bolt (PQ 8,15, 18, 23, 38 types) and SAE-C 2 & 4-bolt (PQ50, PQ70 types).

GRAPHIC SYMBOL



SPECIFICATION

Model	Max. Pressure bar (PSI)	Displacement cc/rev(in ³ /rev)	Displacement Under Unloading Conditions ϵ_{pm} (USgpm)		Pressure Adj. Range bar (PSI)	Input Speed Range (rpm)		Weight kg(lb)
			1500 rpm	1800 rpm		Min	Max	
PQ-8/15	250 (3500)	8/15	22.5 (5.78)	27.0 (7.05)	1: 8~70 (115~1000) 2: 15~140 (210~2000) 3: 20~210 (280~3000) 4: 20~250 (280~3500)	500	1800	11.5 (25.3)
PQ-18	250 (3500)	17.8 (1.09)	26.7 (7.05)	32.0 (8.45)				11.5 (25.3)
PQ-23	250 (3500)	23.0 (1.40)	35.4 (9.11)	41.4 (10.94)				20.0 (50.7)
PQ-38		37.8 (2.31)	56.7 (14.98)	68.0 (17.96)				23.0 (50.7)
PQ-50		51.5 (3.14)	77.2 (20.37)	92.7 (24.49)				50.0 (110)
PQ-70		69.7 (4.25)	104.5 (27.60)	125.4 (33.13)				55.0 (121)
PQ-15-15		15/15	22.5/22.5	27/27				24.0 (52.8)
PQ-23-23		23/23	35.4/35.4	41.4/41.4				40.0 (88.0)
PQ-15-38		15/37.8	22.5/56.7	27/68				36.5 (80.3)
PQ-38-38		37.8/37.8	56.7/56.7	68/68				49.0 (107)
PQ-15-70		15/69.7	22.5/104.5	27/125.4				69.5 (153)
PQ-38-70		37.8/69.7	56.7/104.5	68/125.4				78.0 (172)

MODEL NUMBER DESIGNATION

PQ-	38-	A-	4-	R-	B-	S-	(90)																															
I	II	III	IV	V	VI	VII	VIII																															
I : Series No. II : Displacement cc/rev(in ³ /rev) 15(0.9), 18(1.1), 23(1.4), 25(1.5) 38(2.3), 42(2.6)50(3.1), 70(4.3)				IV : Pressure Compensating Range bar(PSI) 1. 8~70 (115~1000) 3. 20~210 (280~3000) 2. 15~140 (210~2000) 4. 20~250 (280~3500)																																		
III : Control Type A : Pressure Compensator Control B : Multi-stage Flow & Single-stage Pressure Compensator Control C : 2-stage Pressure & Flow Control Type C G : 2-stage Pressure & Flow Control Type D : Solenoid Controlled Pressure Compensating Type With Unloading Device D G : Pressure Compensator with Unloading Type E : Dual Pressure Control E G : Dual & Remote Pressure Control F : 2 Flow-2 Pressure p.c by Solenoid Operated Valve F G : 2 Flow-2 Pressure p.c by Solenoid Remoted Valve G : Remoted Pressure Compensator Control G J : Proportional Pressure Compensator H : Power matching Control H L : Load-sensing Compensator H J : Load-sensing Proportional Elector Pallor Relief Valve H K : Proportional Electro-hydraulic Load sensing Type H Q : Proportional Flow Control Load sensing Type				V : Shaft Rotation(View from Shaft End) R: Clockwise(CW) L: Counter-Clockwise(CCW) VI : Direction of Pipe Connections Omit: Side port B: Axial(Rear) Port B2: 4 Connections for Axial(Rear) Port VII : Shaft Type Omit: Straight Key S: Splined, SAE.J498b																																		
				<table border="1"> <thead> <tr> <th>Code</th> <th>Type</th> <th>No. of Teeth</th> <th>Pitch</th> </tr> </thead> <tbody> <tr> <td>S</td> <td>PQ8</td> <td>13</td> <td rowspan="3">16/32 D.P.</td> </tr> <tr> <td>S1</td> <td>PQ15</td> <td>9</td> </tr> <tr> <td>S2</td> <td>PQ18</td> <td>11</td> </tr> <tr> <td>S</td> <td>PQ23,PQ25,</td> <td>13</td> <td rowspan="3">16/32 D.P.</td> </tr> <tr> <td>S1</td> <td>PQ38, PQ42</td> <td>15</td> </tr> <tr> <td>S2</td> <td>PQ38, PQ42</td> <td>13 Lengthening</td> </tr> <tr> <td>S</td> <td>PQ50, PQ70</td> <td>14</td> <td rowspan="2">12/24 D.P.</td> </tr> <tr> <td>S1</td> <td>PQ50, PQ70</td> <td>17</td> </tr> </tbody> </table>				Code	Type	No. of Teeth	Pitch	S	PQ8	13	16/32 D.P.	S1	PQ15	9	S2	PQ18	11	S	PQ23,PQ25,	13	16/32 D.P.	S1	PQ38, PQ42	15	S2	PQ38, PQ42	13 Lengthening	S	PQ50, PQ70	14	12/24 D.P.	S1	PQ50, PQ70	17
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				VIII : Thread Type 10: PT(Rc) 40: BSPP, PF(G) 90: NPT																																		

PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

CAUTION

● Fluid Recommendations

1. In case hydraulic pressure is under 70 bar, use hydraulic oil which is corresponding to ISO VG32-60 in viscosity grade or wear resisting hydraulic oil.
2. In case hydraulic pressure is over 70 bar, use wear resisting hydraulic oil which is corresponding to ISO VG32-68 in viscosity grade.

● Viscosity and Operating Temperature

1. Oil viscosity ranging from 15 cSt to 400 cSt and oil temperature from 0°C to 60°C are recommended.

● Installation and Mounting

1. Electricity between the driving shaft and pump shaft should be under 0.05 TIF, and operate the pump in such a way that the pump shaft is not subjected to orthogonal force. If centering between the driving shaft and pump shaft is incorrect, the bearing and oil seal may be damaged, noise and vibration may occur, which cause trouble with the pump.
2. Avoid driving the pump in the lateral direction by belt, chain or gears.(This may cause noise and damage the bearing.)
3. The pump can be operated with its shaft mounted perpendicularly.

● Piping Work

1. use parallel thread pipe joints for the suction inlet and discharge outlet. Do not use taper thread piping joints or air may intrude or abnormal noise be produced.
2. In case where steel pipes are used, lay the piping with care so as not to put force on the pump.
3. Electricity of a pump being forced by piping may cause serious trouble with noise.

● Drain Piping

1. Lay the drain piping independently not joined with other return lines. In such a way that the pump internal pressure is under 0.35 bar.
2. Lay the oil return piping under the oil level of the tank and as far as possible from suction piping.(Refer to under table)

● Start-Up

1. Before starting the pump, fill the pump case with hydraulic oil using the drain charging port on the pump body.
2. Do not operate the pump at full speed right away. Instead, turn the motor input switch on and off several times so as to extract air from the piping, then operate it continuously.
At the start, be sure to reduce the pressure or operate it unloaded.

● Shaft Rotation

1. Shaft rotation is clockwise viewed from the end of pump shaft. In case revolution is required, indicate it by Model No.

● Suction Pressure

1. Adjust suction pressure to within -16.7kPa(125mmHg.)
high suction pressure may cause cavitation, damage of parts, noise and vibrator
2. which greatly shorten the life of pumps.

● Filtration

1. Deterioration of the hydraulic oil may cause trouble with the pump and shorten its life. Carefully control the quality of the oil so as to maintain the deterioration of the oil within Grade NAS9.
2. Be sure to attach a suction filter of 150 mesh to the suction side and a line filter of 25 to the return line of the discharge side.

● Max. Working Pressure

1. Operation period at maximum working pressure should be under 10% of one cycle and the retaining period should be under 6 seconds.

CONTROL TYPE

Type	JIS Symbol	Characteristic	Feature
A			<ol style="list-style-type: none"> 1. When the pressure reaches the value set with the compensator, the flow is reduced automatically and the set pressure is maintained. 2. The pressure and flow are controlled manually.
B			<ul style="list-style-type: none"> ● Multistage Flow & Single-Stage Pressure Ctrl. Type (With Cylinder) <ol style="list-style-type: none"> 1. Flow could be Adjusted from 0 to Max. and pressure can be maintained steady. 2. Absorbing impact and vibration which are caused by up and down motion of actuator. It's suitable for lifting equipment and etc.
C			<ul style="list-style-type: none"> ● 2 Stage Pressure & Flow Control Type <ol style="list-style-type: none"> 1. Low consumption electric motor can be selected to save energy because of functions of high flow at low pressure and low flow at high pressure 2. When pressure increase and reach preset pressure "PH", flow is reduced to "QL" 3. Pressure "PH", "PL", and flow "QH", "QL" can be adjusted optionally. 4. It's applied to actuators requiring long unloaded or short loaded strokes. Speedy and horsepower efficient.
CG			<ul style="list-style-type: none"> ● 2 Stage Remote Pressure & Flow Control Type <ol style="list-style-type: none"> 1. Similar to "C" type control. 2. Pressure setting could be controlled by remote controller. 3. When combined with proportional pressure valves, pressure setting could be electronic controlled.
D			<ul style="list-style-type: none"> ● Solenoid Control Pressure Compensating Type With Unloading Device. <ol style="list-style-type: none"> 1. Same as "A" type and unloading function added. 2. It's applied to systems requiring long term unloading operation. 3. When solenoid is turned off, pump operation under unloading conditions to keep less noise and heat generation.
DG			<ul style="list-style-type: none"> ● Solenoid Control Pressure Compensating Type With Unloading & Remote Device. <ol style="list-style-type: none"> 1. Same as "C" type function. 2. The pressure and the range can be adjusted remotely by being integrating remote pressure control valve. 3. Proportional Electro-Hydraulic pressure control can be applied with SOLTECH proportional valve.

PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

Type	JIS Symbol	Characteristic	Feature
E			<ul style="list-style-type: none"> ● Dual Pressure Control <ol style="list-style-type: none"> 1. High and low pressure can be controlled by switching direction of solenoid control valves. 2. This type is applied to actuator requiring 2-stage pressure with single speed. 3. One of "PL" and "PH" relief valves can be optionally be high pressure.
EG			<ul style="list-style-type: none"> ● Dual and Remote Pressure Control <ol style="list-style-type: none"> 1. Similar to to "E" type control. 2. Pressure setting could be controlled by remoter controller. 3. When combined with proportional pressure valves, pressure setting could be electronic controlled.
F			<ul style="list-style-type: none"> ● 2 Flow, 2 Pressure Control by Solenoid Operated Vavles <ol style="list-style-type: none"> 1. Aculators can be shafted slowly(high pressure & low flow) or quickly(high flow & low pressure) by switching direction of solenoid valve. 2. Pressure "PL", "PH" and flow "QL", "QH" could be adjusted manually. 3. This type is applied to aculator need operation to shaft speed from high to low or low to high.
FG			<ul style="list-style-type: none"> ● 2 Flow, 2 Pressure Control by Solenoid Operated Vavles & Remote Valve <ol style="list-style-type: none"> 1. Same as function of "F" type. 2. The Pressure and the range can be adjusted remotely by integrating remote pressure control valve. 3. Proportional Electro-Hydraulic pressure control can be applied with HYDRAUT proportional control valve.
G			<ul style="list-style-type: none"> ● Remote Pressure Compensating Type <ol style="list-style-type: none"> 1. Same as "A" type. 2. Pressure can be adjusted remotely by integrating remote pressure control valve.
GJ			<ul style="list-style-type: none"> ● Proportional Pressure With NG6 Interface <ol style="list-style-type: none"> 1. Same as "GM" type and proportional valve added. 2. The proportional valve is installed on the NG6 interface to reach Porportional Electro-Hydraulic control to save energy.
GM			<ul style="list-style-type: none"> ● Remote Pressure Compensator(without Pilot valve) <ol style="list-style-type: none"> 1. GM control with a NG6 interface, supply an installation for pilot valve to prove the operating pressure. The pressure setting can be set directly from the control panel of the machine. 2. The remote pressure compensator responds faster and offer more stable pressure. 3. The adjustment can also be manual or proportional pressure control.
HL			<ul style="list-style-type: none"> ● Load Sensing Compensator <ol style="list-style-type: none"> 1. The type will let the the pump deliver a constant flow rate to the circuit by providing an adjustable ΔP acroww the customers orifice or valve. An idea energy conservation system can be configurated by combining the proportional directional control. 2. When setting pressure value, the sensing flow feedback function can reach to low oil heat generation and saving energy.
HK			<ul style="list-style-type: none"> ● Proportional Electro-Hydraulic Load Sensing Type <ol style="list-style-type: none"> 1. This is an energy-saving type control which regulates the pump flow and load pressure to be at absolute minimum necessary level to operate the actuator. 2. Pump flow rate and cut-off pressure are controlled proportional to the input current to the control device on the pump and the input current is regurated by the specific amplifier.

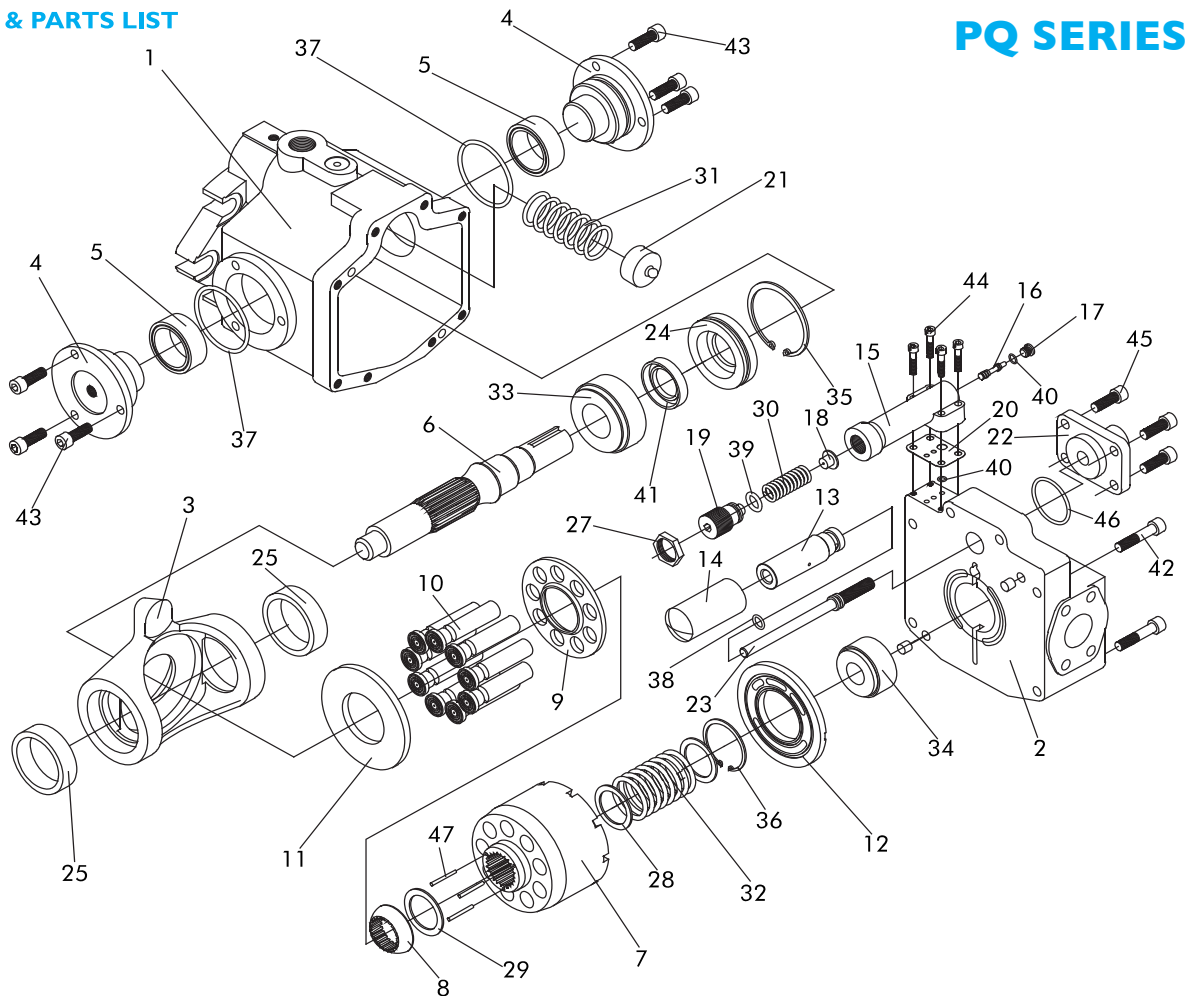
PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

Type	JIS Symbol	Characteristic	Feature
HJ			<ul style="list-style-type: none"> ● Load Sensing & Proportional Electro-Hydraulic Pilot Relief Valve 1. Same as type "HL" and proportional pressure function added. 2. Supplied with Proportional Electro-Hydraulic Pilot Relief Valve can reach to horse-saving and energy-saving.
HQ			<ul style="list-style-type: none"> ● Load Sensing Proportional Flow Control 1. Same as type "HL" and proportional flow function added. 2. The proportional flow control allows the adjustment of the pumps output flow with an electrical input signal. Supplied and adjusted the displacement by the electronic control module.

ASSEMBLY & PARTS LIST

PQ SERIES



PARTS LIST							
NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION
1	Pump Body	13	Sleeve Piston	25	Sleeve(Swash Plate)	37	O-Ring
2	End Cover	14	Servo Piston Sleeve	26	Bolt	38	O-Ring
3	Swash Plate	15	Pressure Compensator	27	Lock Nut	39	O-Ring
4	Swash Shaft	16	Compensator Spool	28	Washer(Cylinder)	40	O-Ring
5	Sleeve, (Swash Plate)	17	Port Plug	29	Washer(Cylinder)	41	Shaft Seal
6	Shaft	18	Spring Seat	30	Control Spring	42	Bolt(End Cover)
7	Cylinder Block	19	Screw	31	Servo Spring	43	Bolt(Side Cover)
8	Cylinder Block Holder	20	Gasket	32	Retainer Spring	44	Bolt(Compensator)
9	Slipper Retainer	21	Servo Spring Seat	33	Bearing(Needle Bearing)	45	Bolt(Flow Control)
10	Piston and Slipper, Crimped	22	Cover(Flow Control)	34	Bearing(Ball Bearing)	46	O-ring
11	Slipper Plate	23	Flow Adjusting Screw	35	Snap Ring	47	PIN(Cylinder Block)
12	Valve Plate	24	Pilot Cover	36	Snap Ring for Bore	48	

PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

PQ-15-SERIES

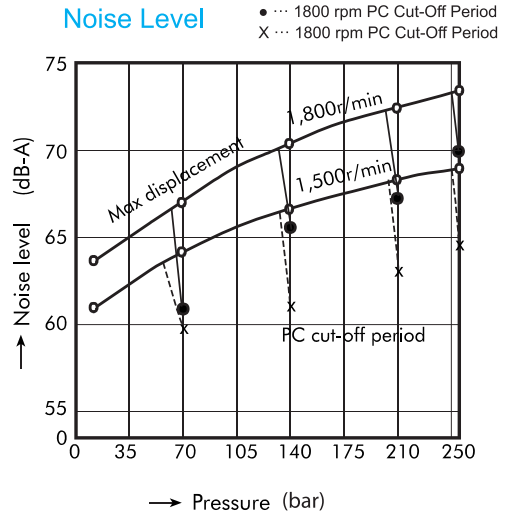
PERFORMANCE CHARACTERISTICS



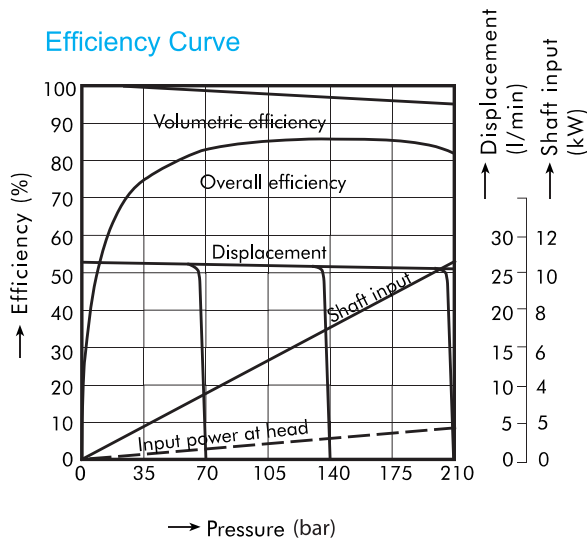
Condition

Drive Speed: 1800 rpm
 Fluid Temperature: 50°C(122°F)
 Hydraulic Oil: ISO VG32

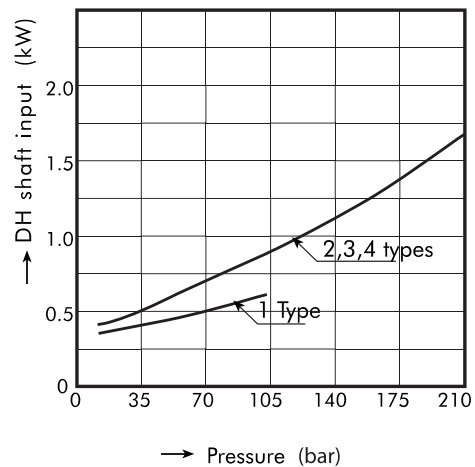
Noise Level



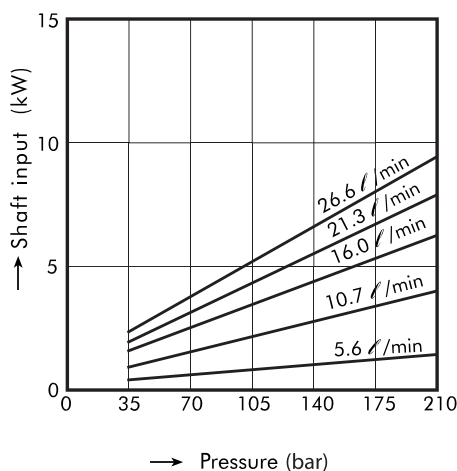
Efficiency Curve



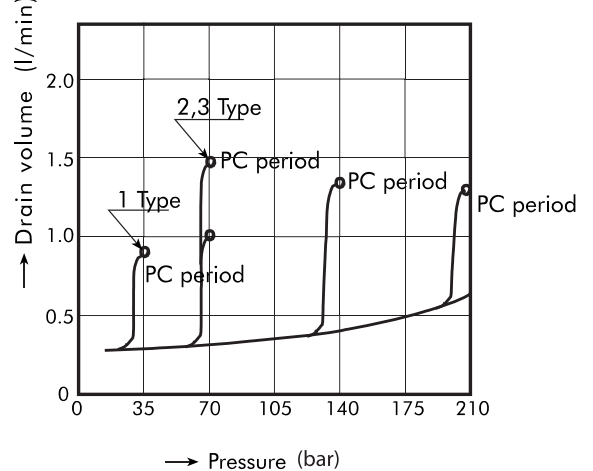
Input Power at Full Cut-Off



Input Power Curves



Drain Curve



PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

PQ-23-SERIES

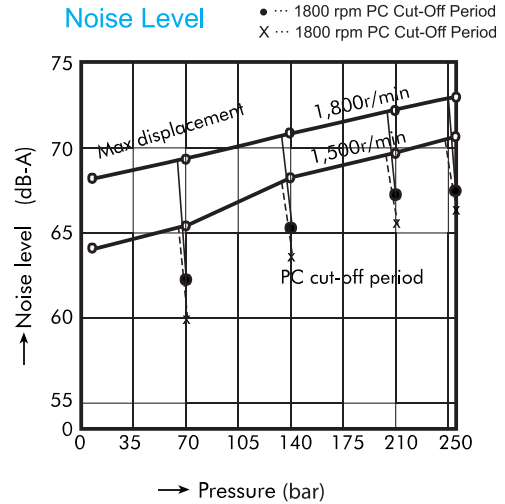
PERFORMANCE CHARACTERISTICS



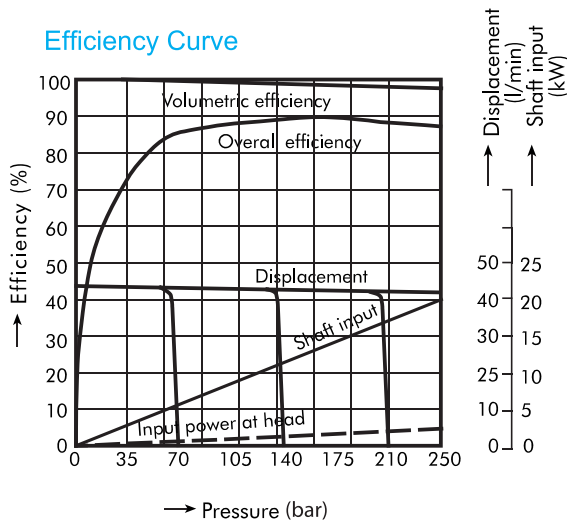
Condition

Drive Speed: 1800 rpm
 Fluid Temperature: 50°C(122°F)
 Hydraulic Oil: ISO VG32

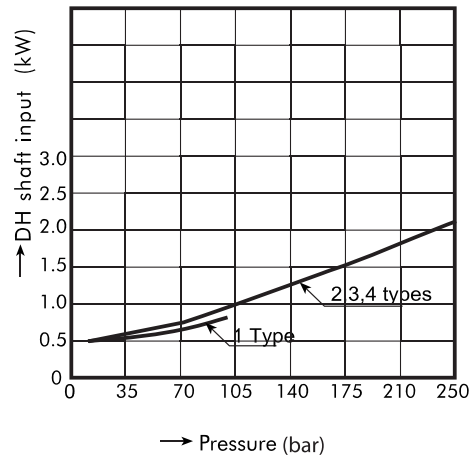
Noise Level



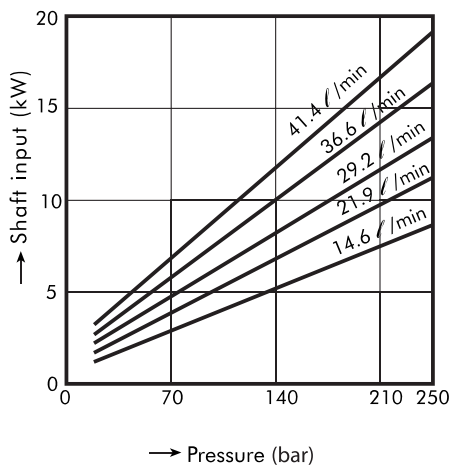
Efficiency Curve



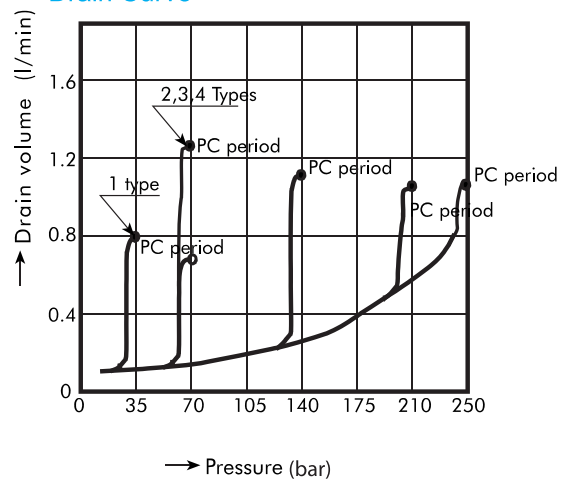
Input Power at Full Cut-Off



Input Power Curves



Drain Curve



PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

PQ-38-SERIES

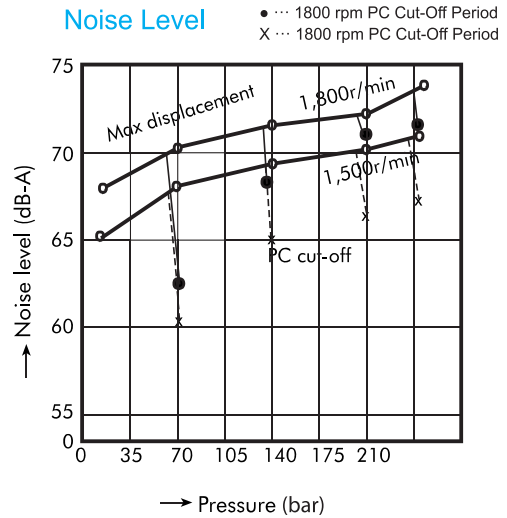
PERFORMANCE CHARACTERISTICS



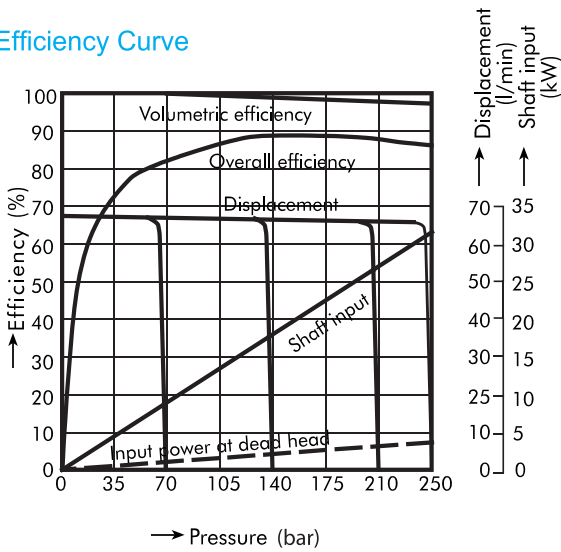
Condition

Drive Speed: 1800 rpm
 Fluid Temperature: 50°C(122°F)
 Hydraulic Oil: ISO VG32

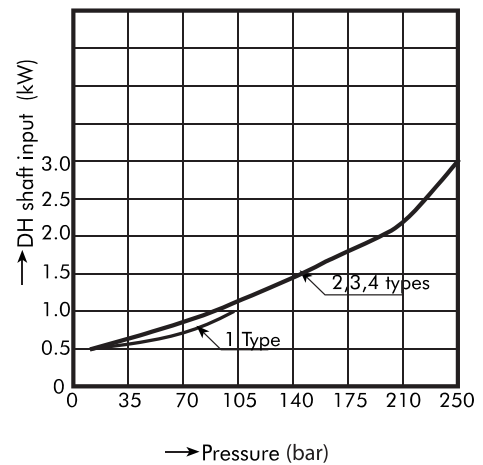
Noise Level



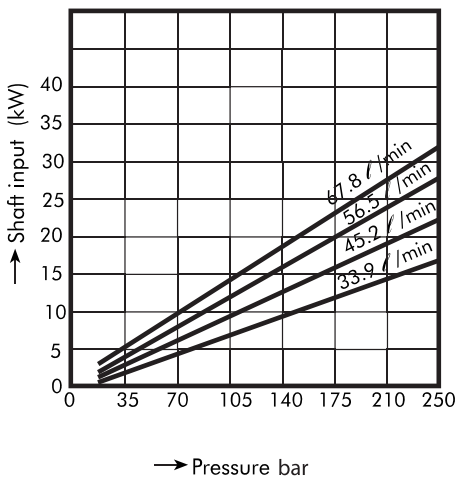
Efficiency Curve



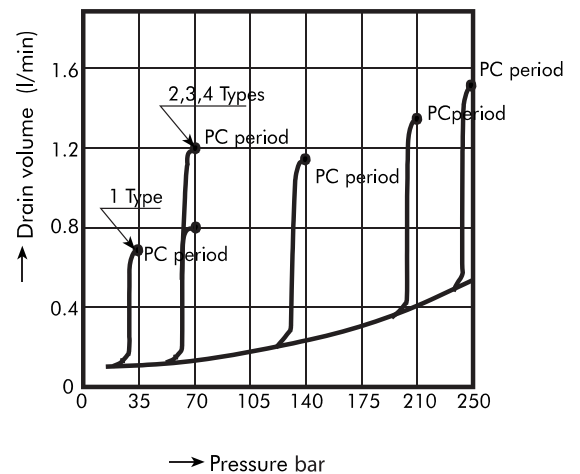
Input Power at Full Cut-Off



Input Power Curves



Drain Curve



PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

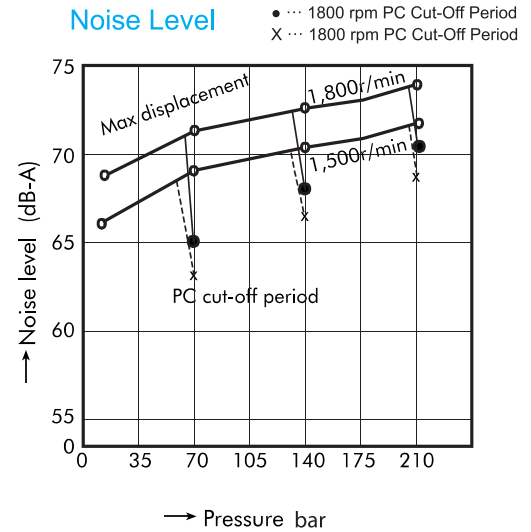
PQ-50-SERIES

PERFORMANCE CHARACTERISTICS

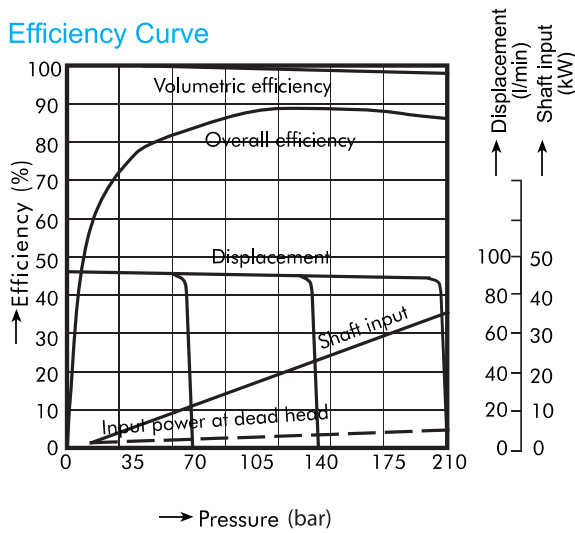


Condition

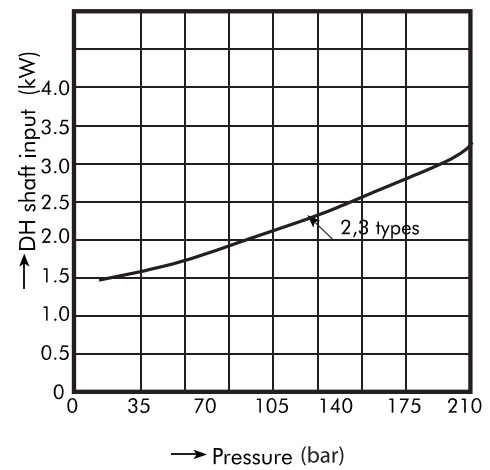
Drive Speed: 1800 rpm
 Fluid Temperature: 50°C(122°F)
 Hydraulic Oil: ISO VG32



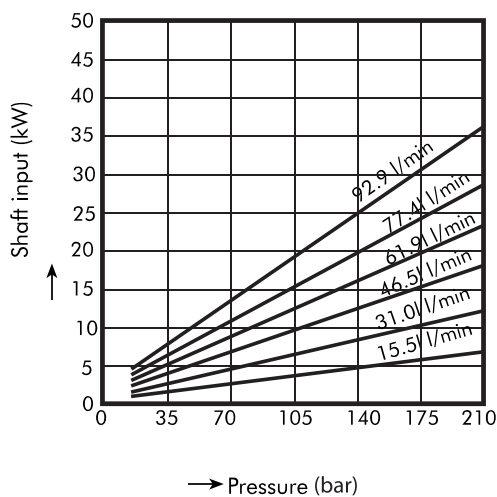
Efficiency Curve



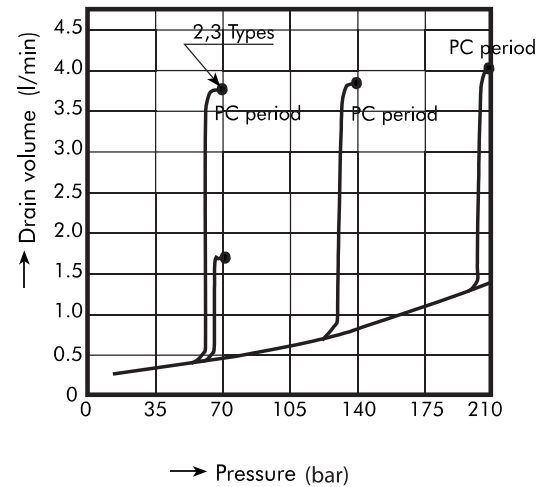
Input Power at Full Cut-Off



Input Power Curves



Drain Curve



PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

PQ-70-SERIES

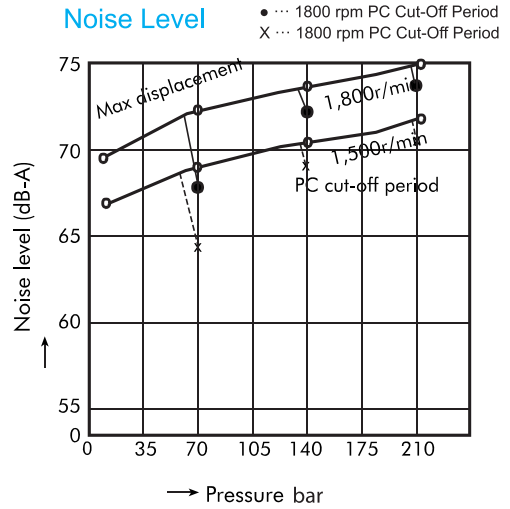
PERFORMANCE CHARACTERISTICS



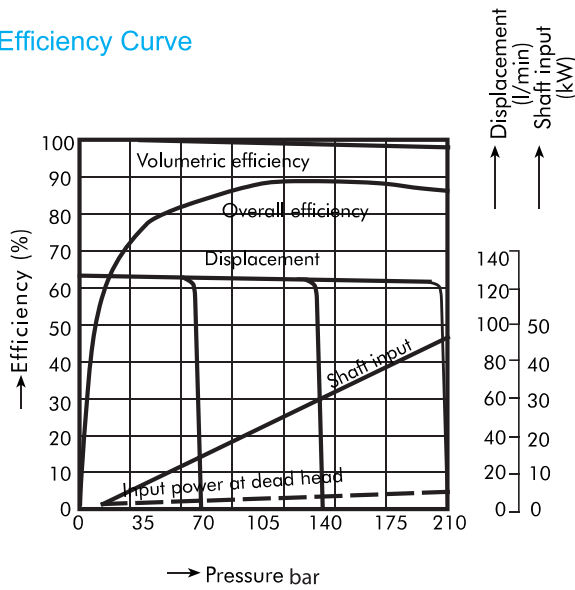
Condition

Drive Speed: 1800 rpm
 Fluid Temperature: 50°C(122°F)
 Hydraulic Oil: ISO VG32

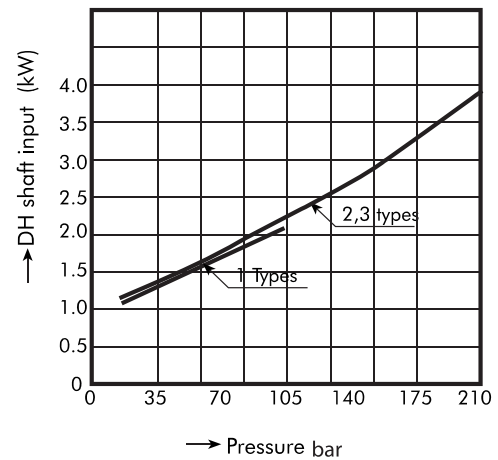
Noise Level



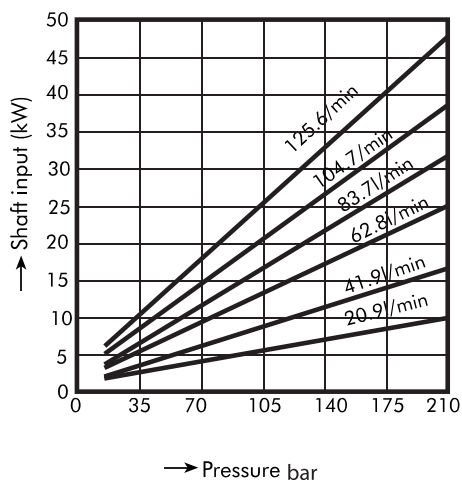
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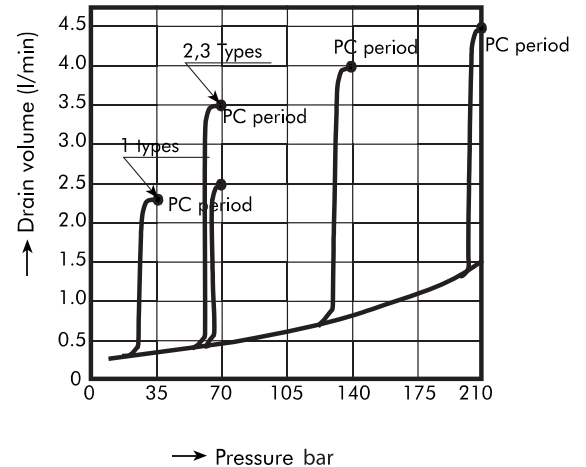
Input Power at Full Cut-Off



Input Power Curves



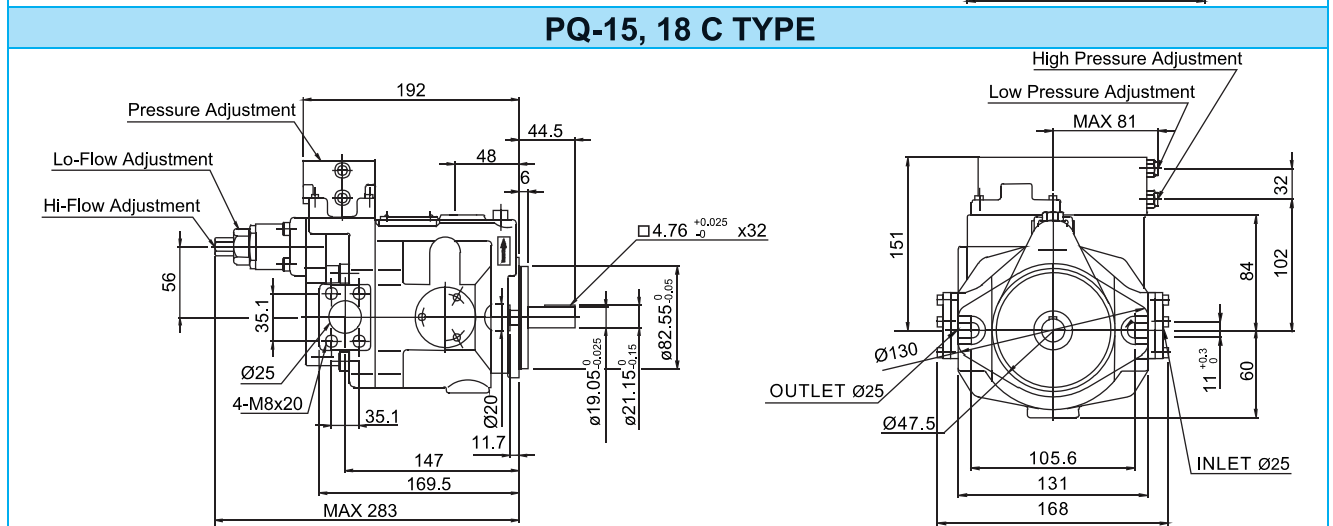
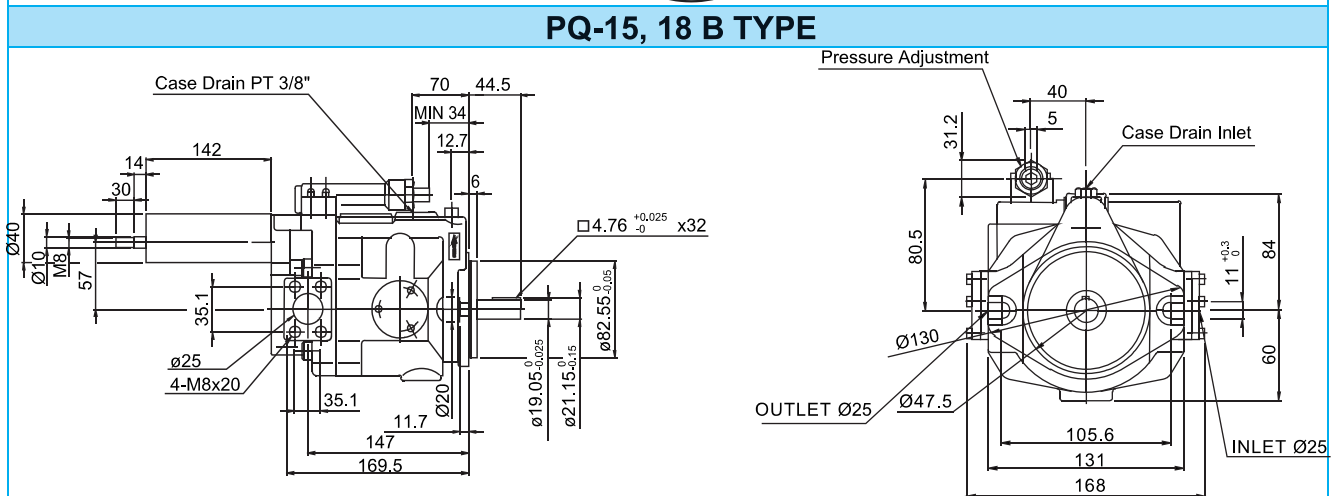
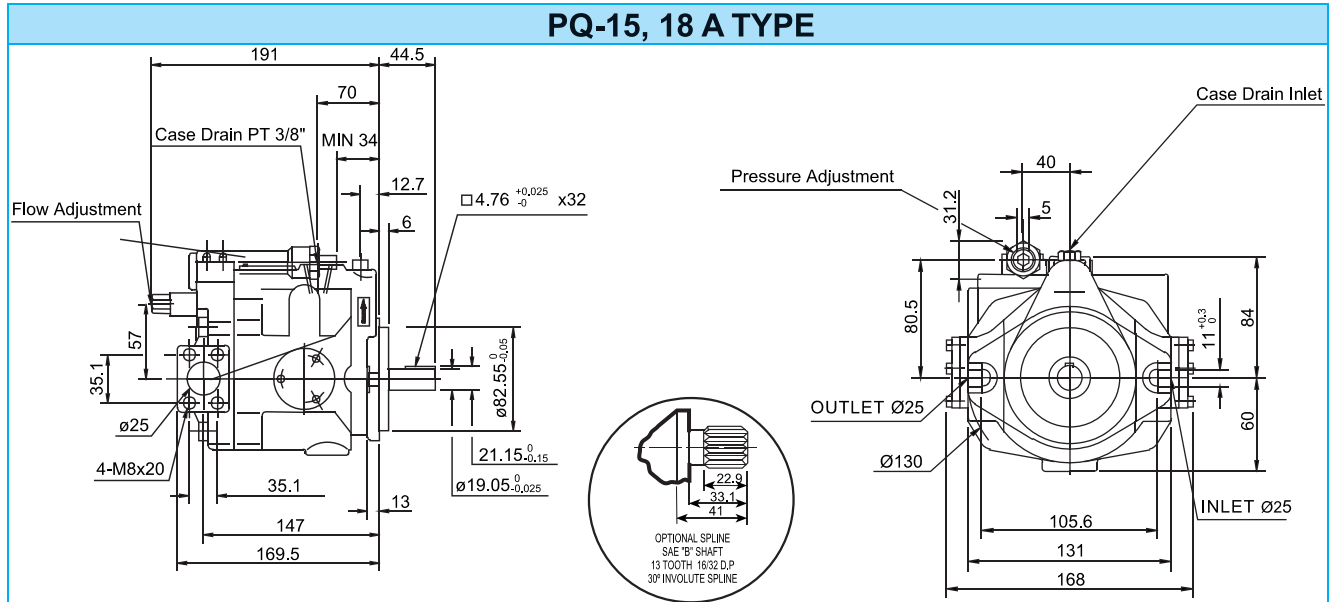
Drain Curve



PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

DIMENSIONS



Mounting Surface: SAE "A" 2-Bolts

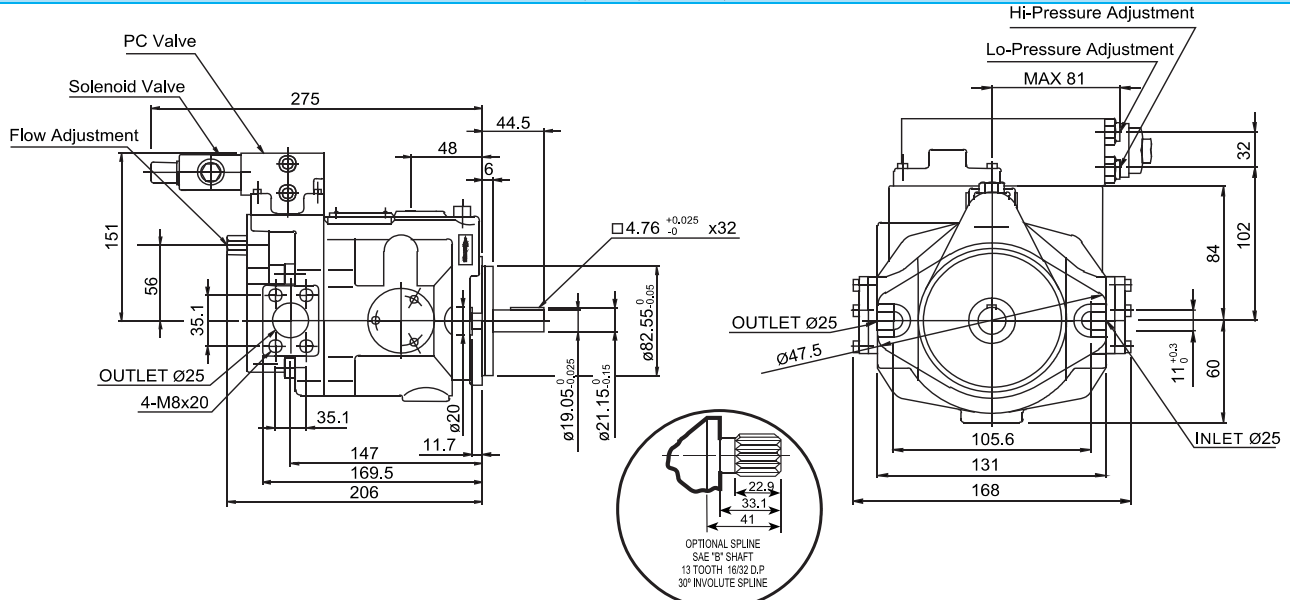
UNIT: M.M.(INCH)

PUMPS

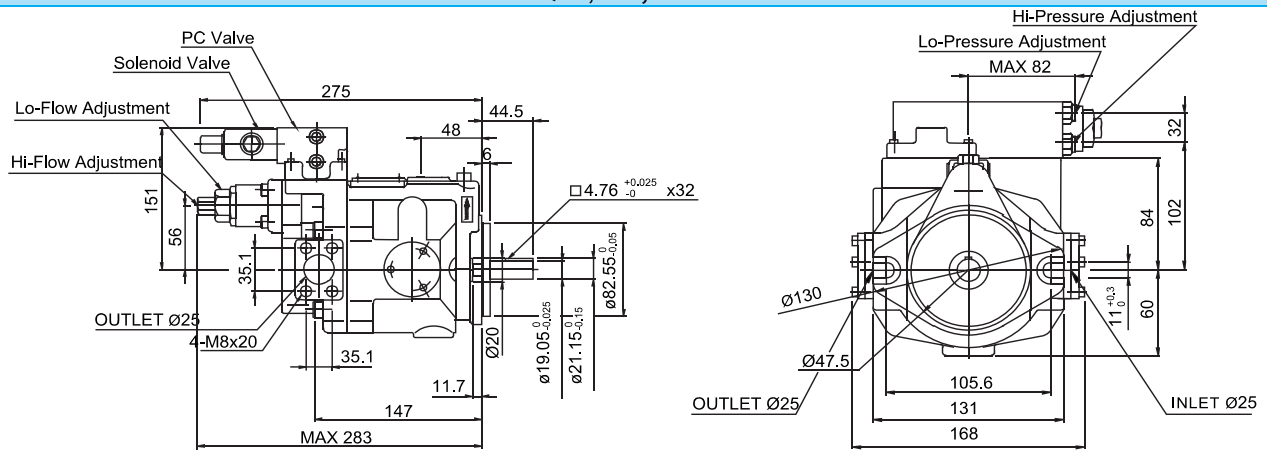
VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

DIMENSIONS

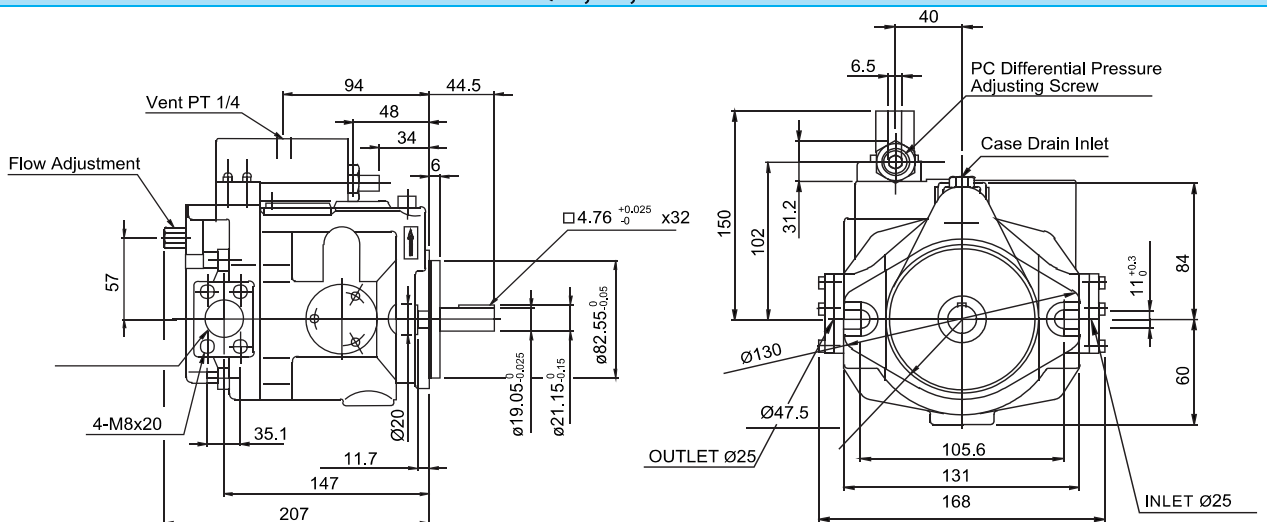
PQ-8, 15, 18 D,E TYPE



PQ-8, 15, 18 F TYPE



PQ-8,15, 18 G TYPE



Mounting Surface: SAE "A" 2-Bolts

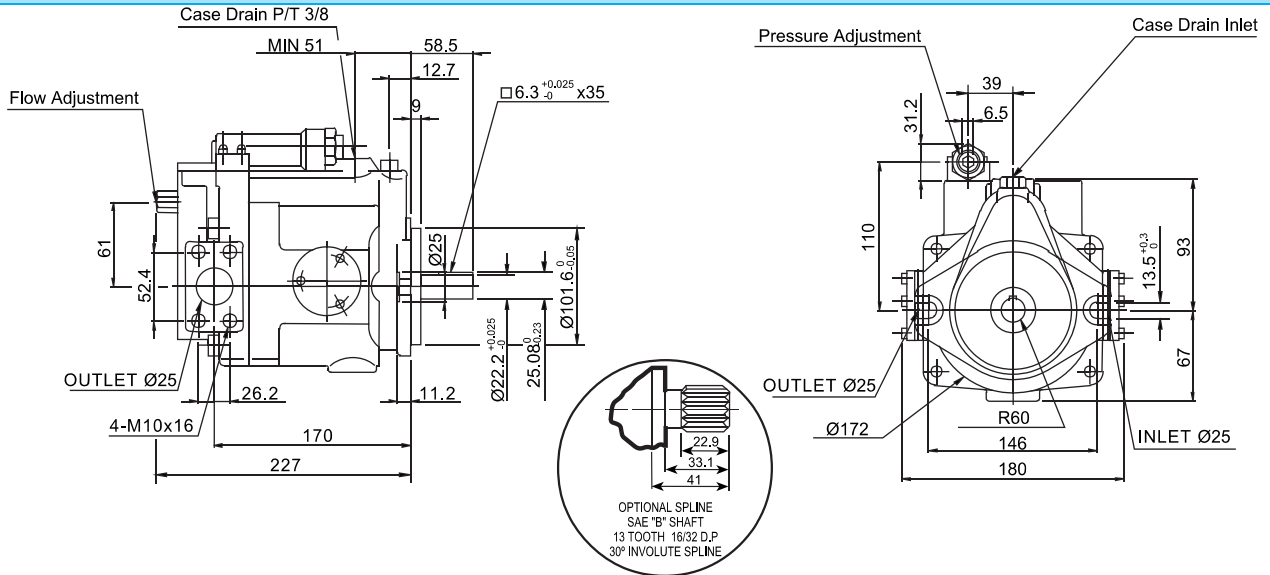
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PUMPS

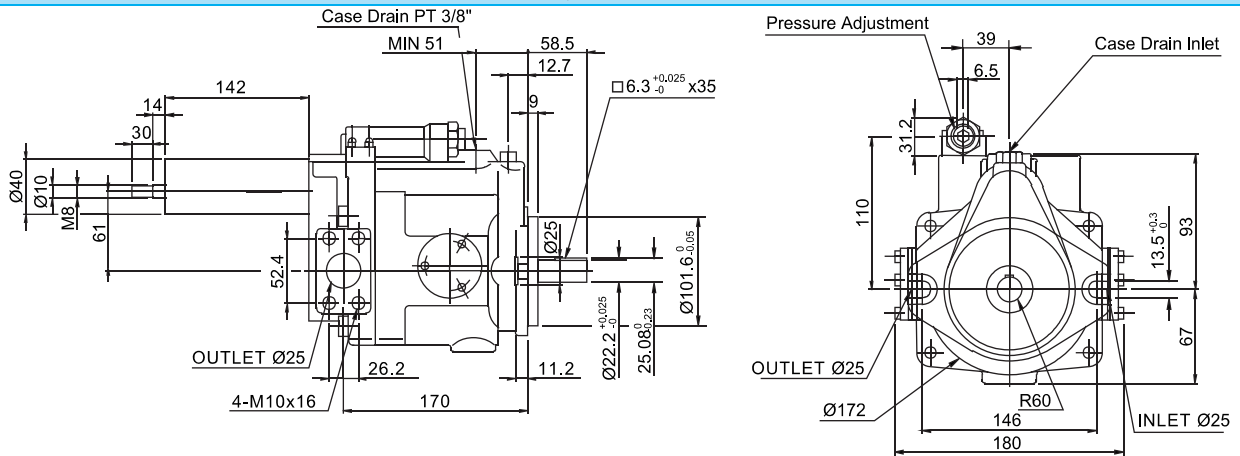
VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

DIMENSIONS

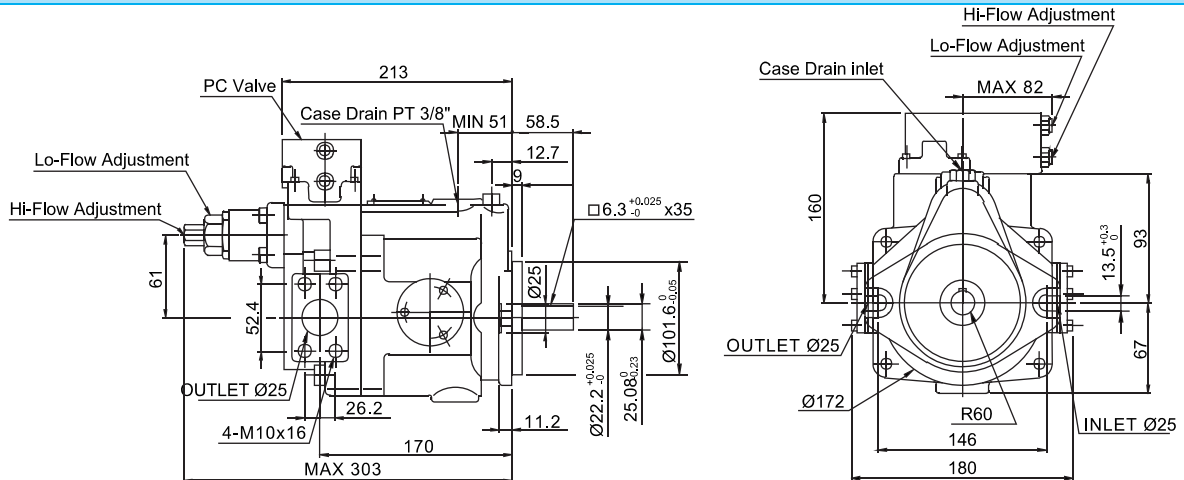
PQ-23 A TYPE



PQ-23 B TYPE



PQ-23 C TYPE



Mounting Surface: SAE "A" 2-Bolts

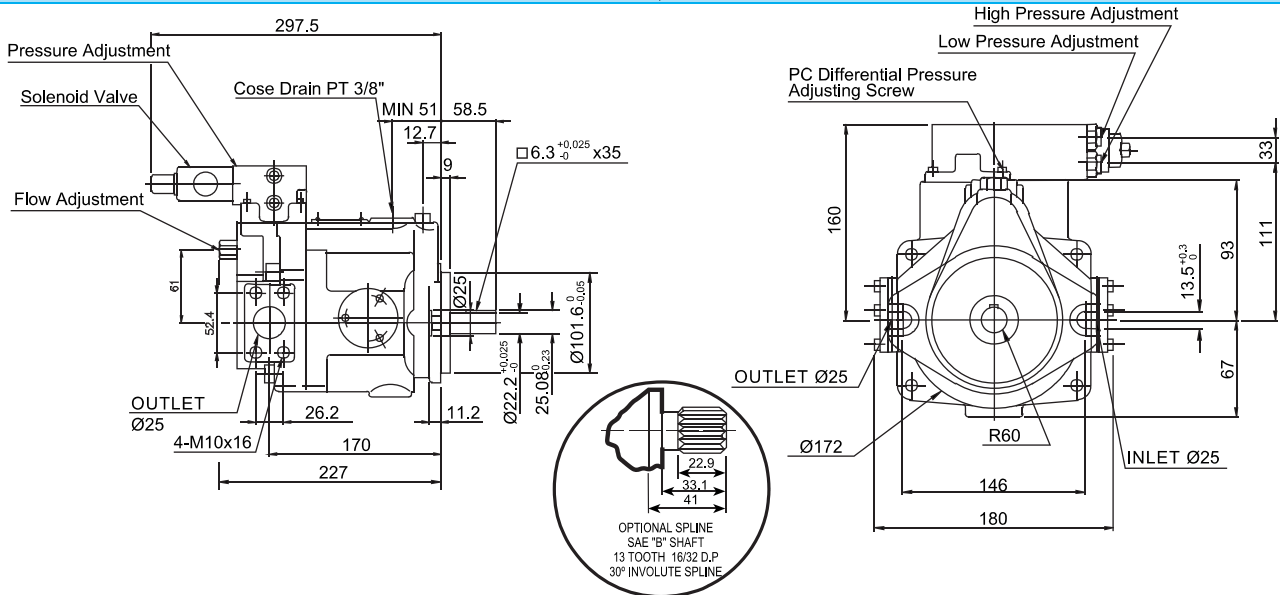
UNIT: M.M.(INCH)

PUMPS

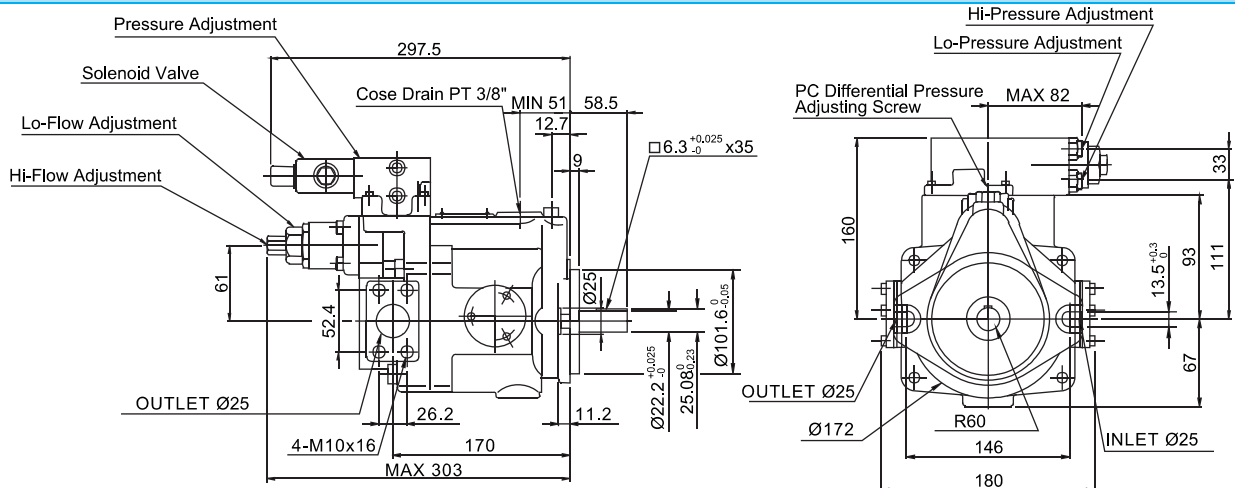
VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

DIMENSIONS

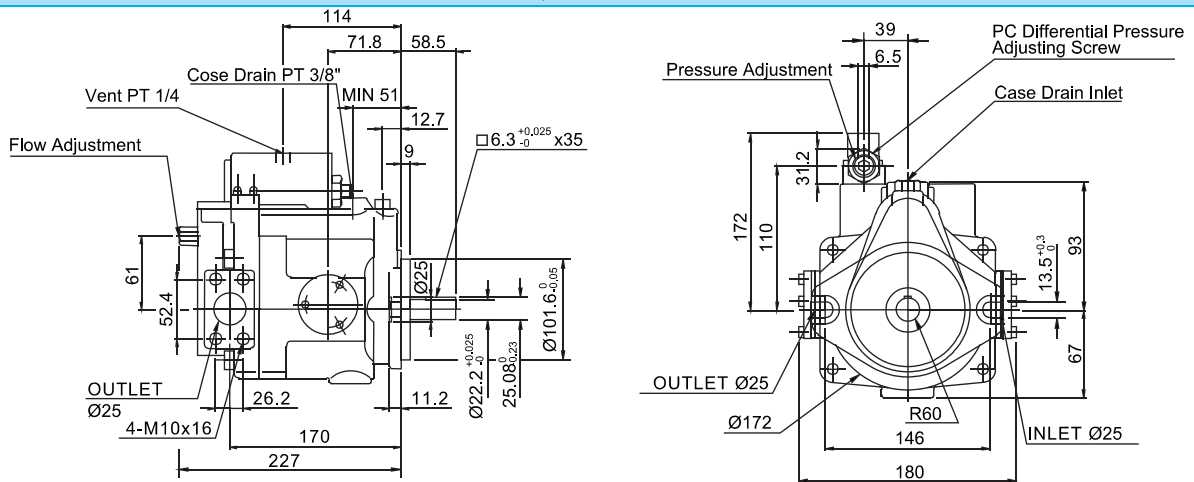
PQ-23 D,E TYPE



PQ-23 F TYPE



PQ-23 G TYPE



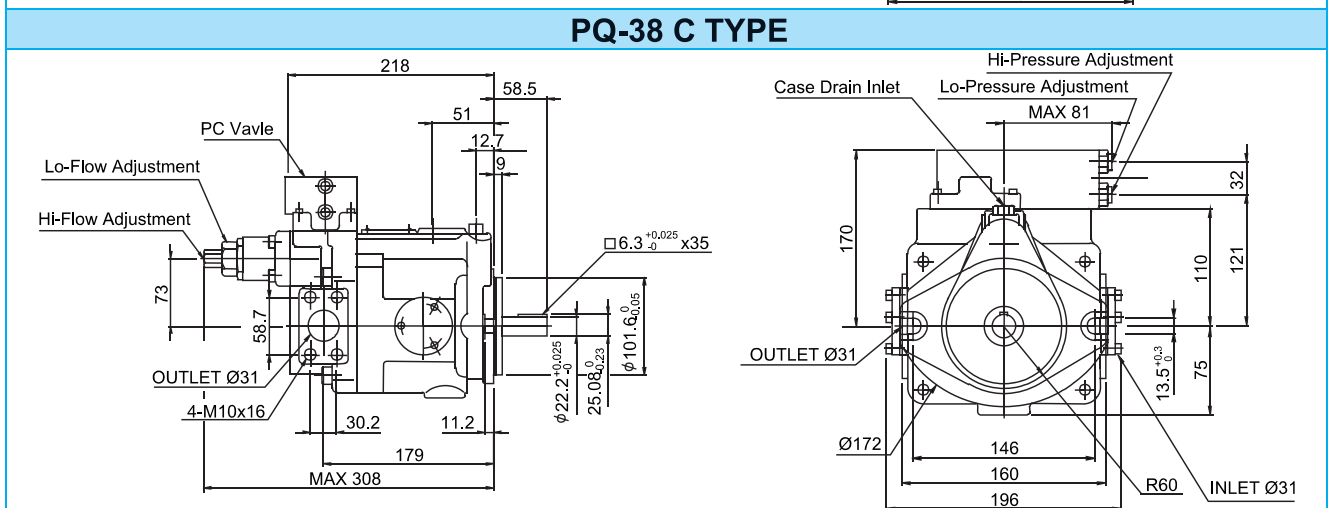
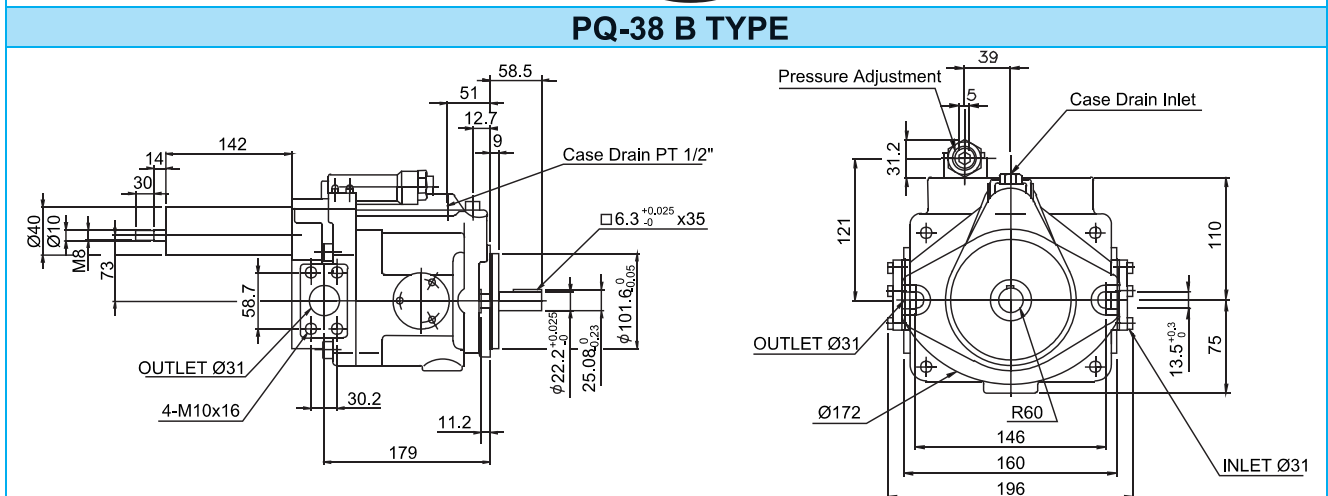
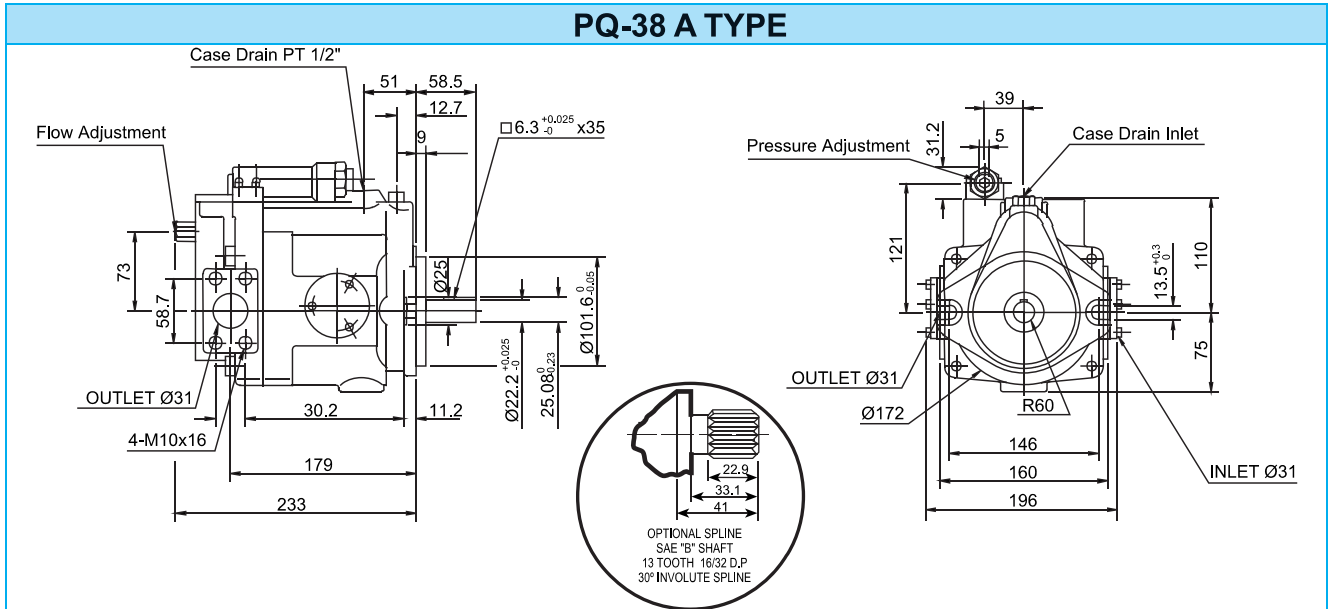
Mounting Surface: SAE "A" 2-Bolts

UNIT: M.M.(INCH)

PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

DIMENSIONS



Mounting Surface: SAE "A" 2-Bolts

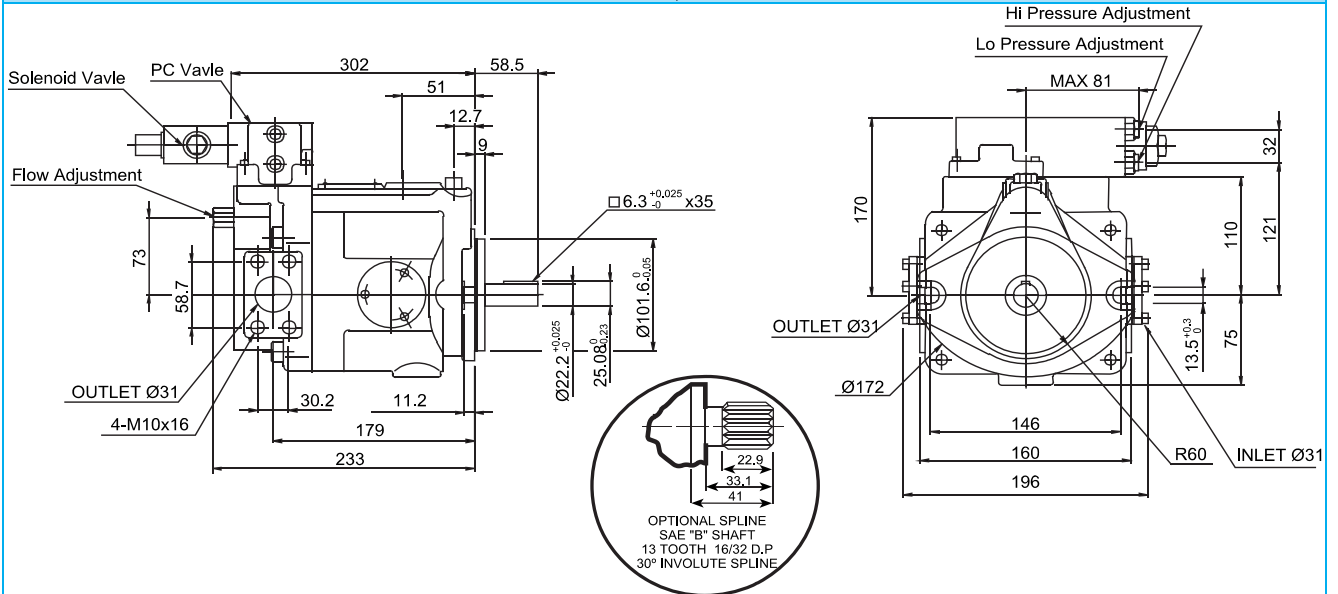
UNIT: M.M.(INCH)

PUMPS

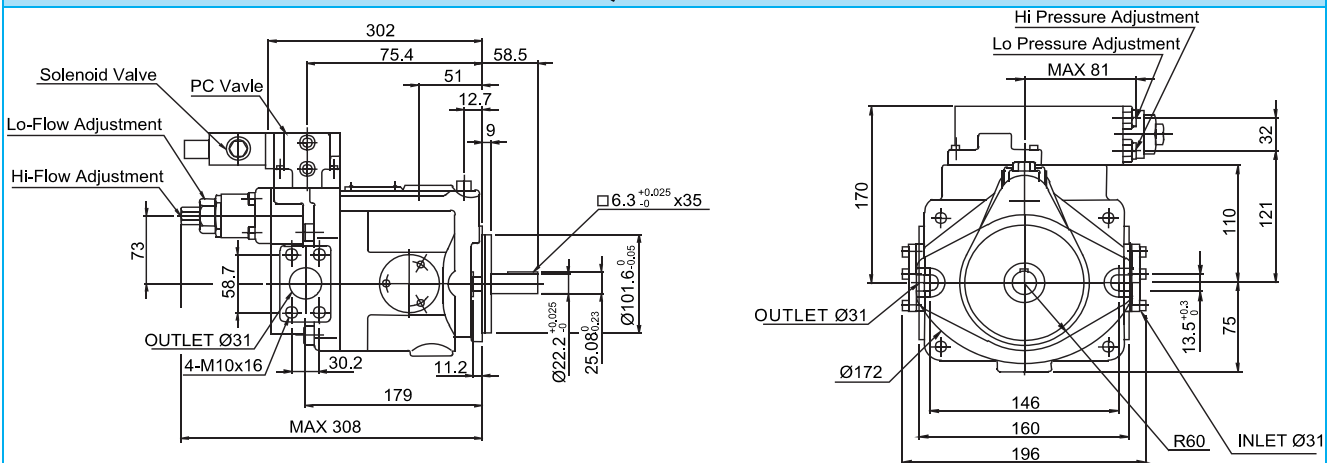
VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

DIMENSIONS

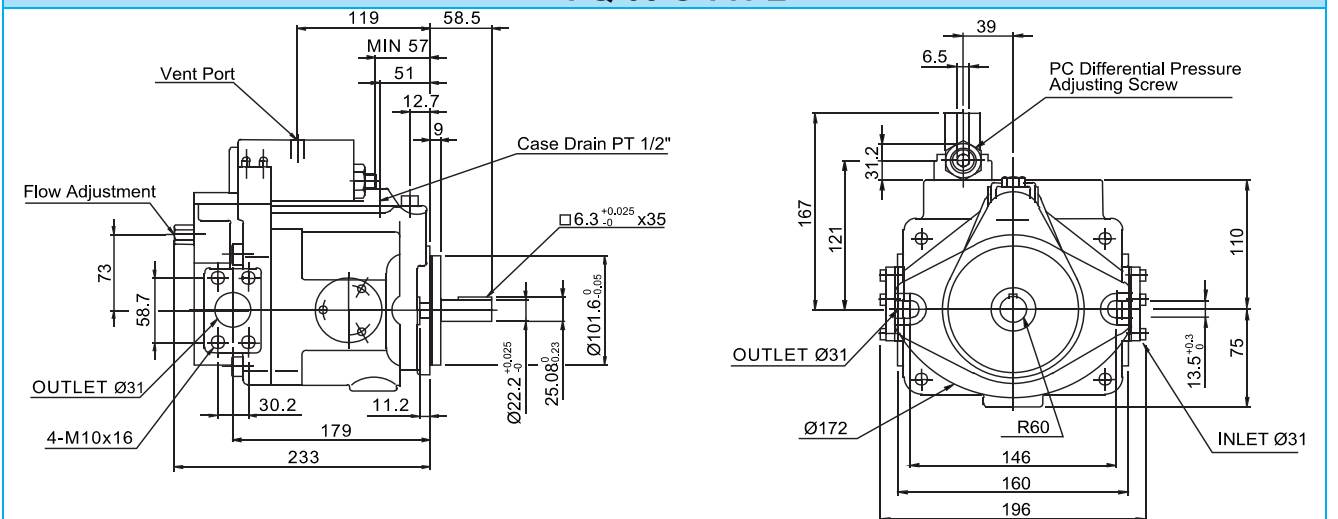
PQ-38 D, E TYPE



PQ-38 F TYPE



PQ-38 G TYPE



Mounting Surface: SAE "A" 2-Bolts

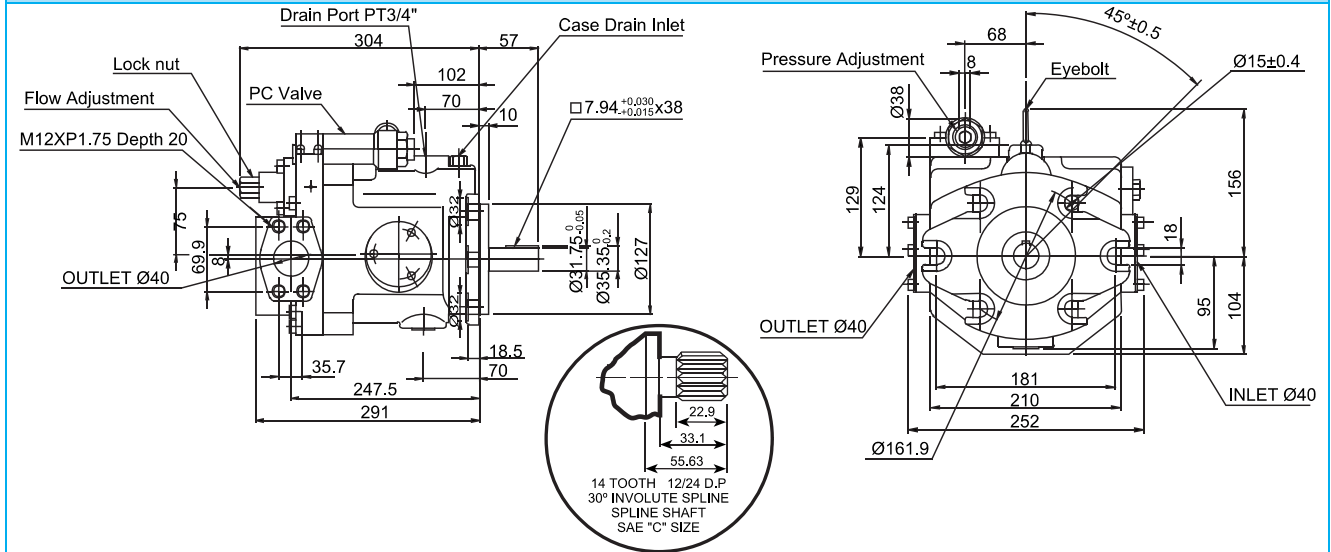
UNIT: M.M.(INCH)

PUMPS

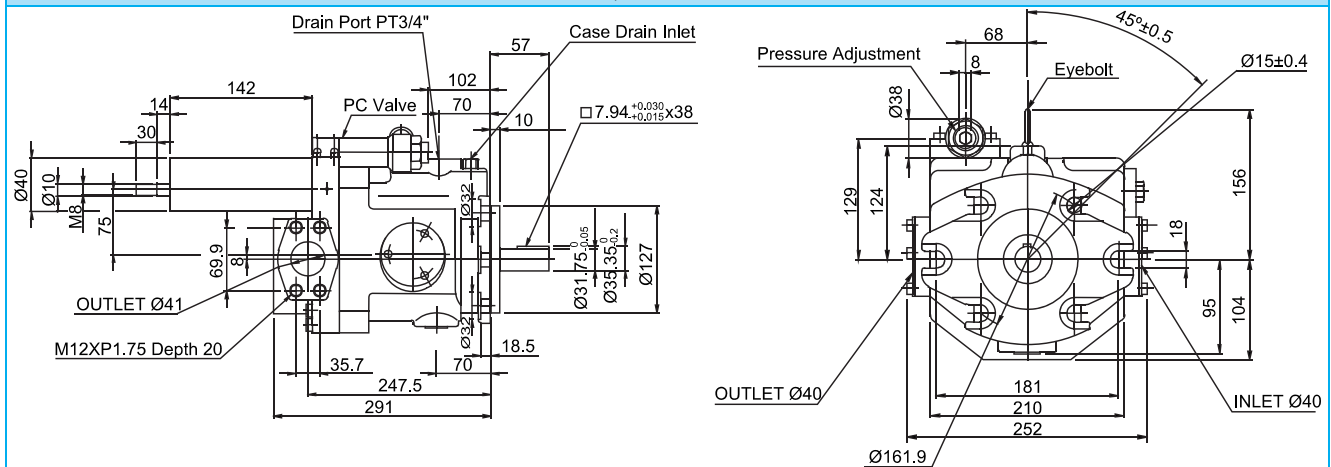
VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

DIMENSIONS

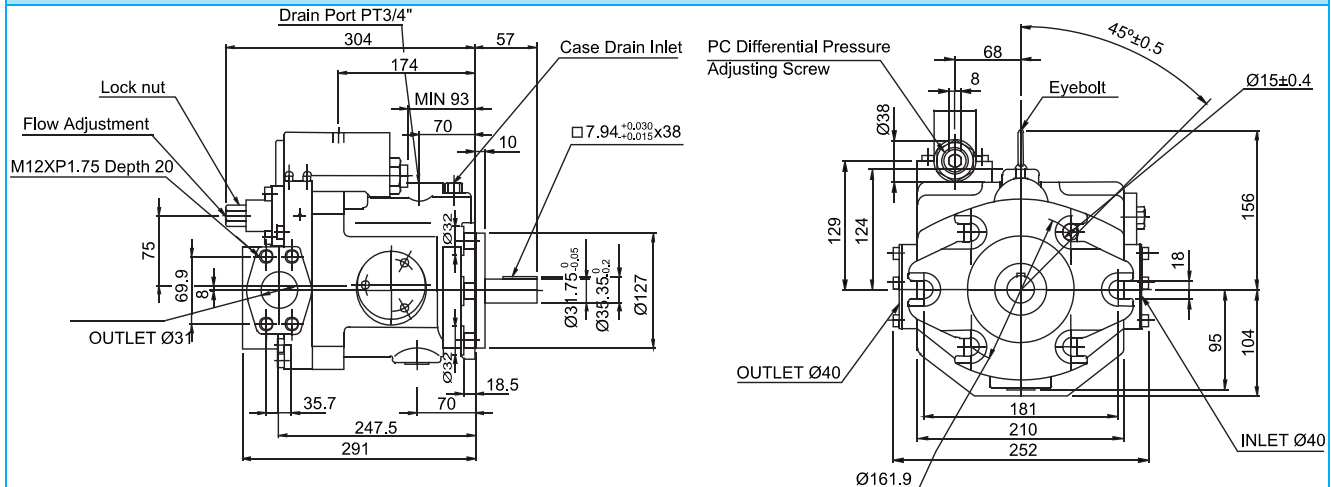
PQ-50 A TYPE



PQ-50 B TYPE



PQ-50 G TYPE



Mounting Surface: SAE "A" 2-Bolts

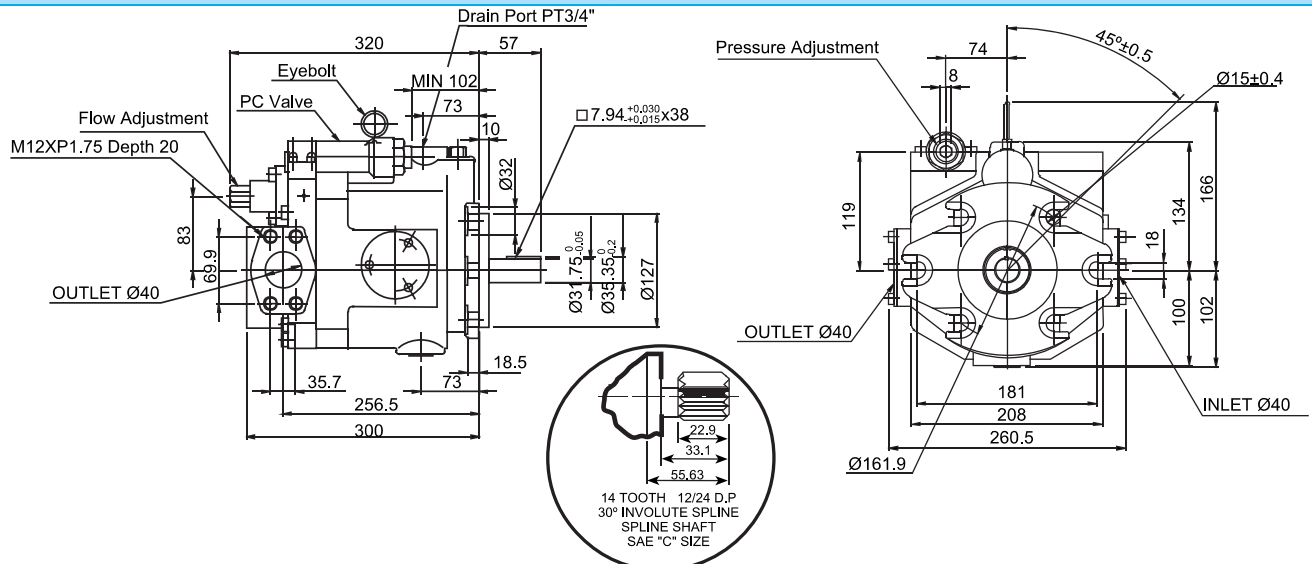
UNIT: M.M.(INCH)

PUMPS

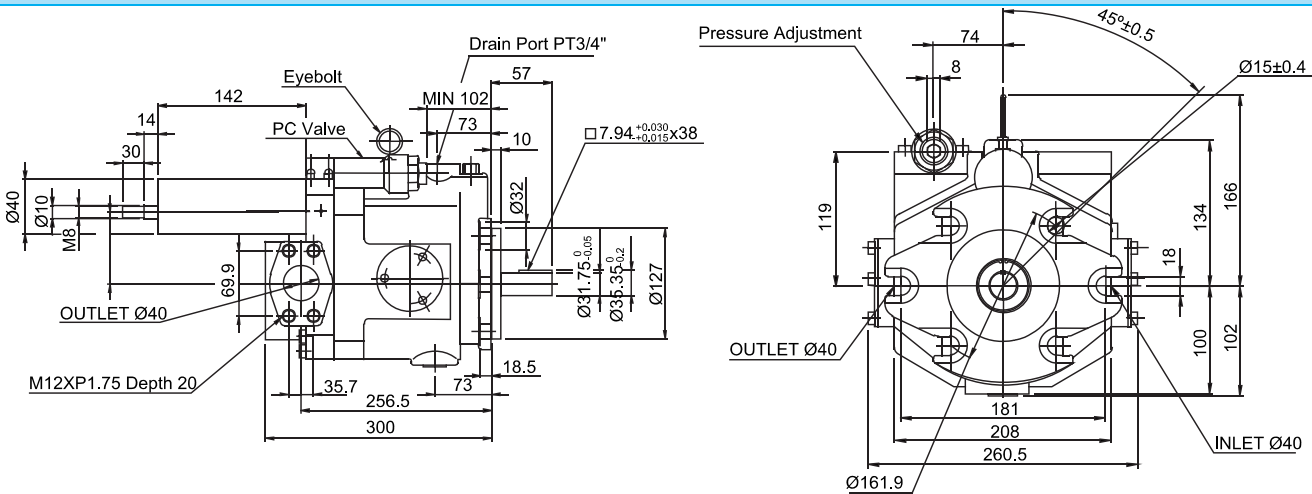
VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

DIMENSIONS

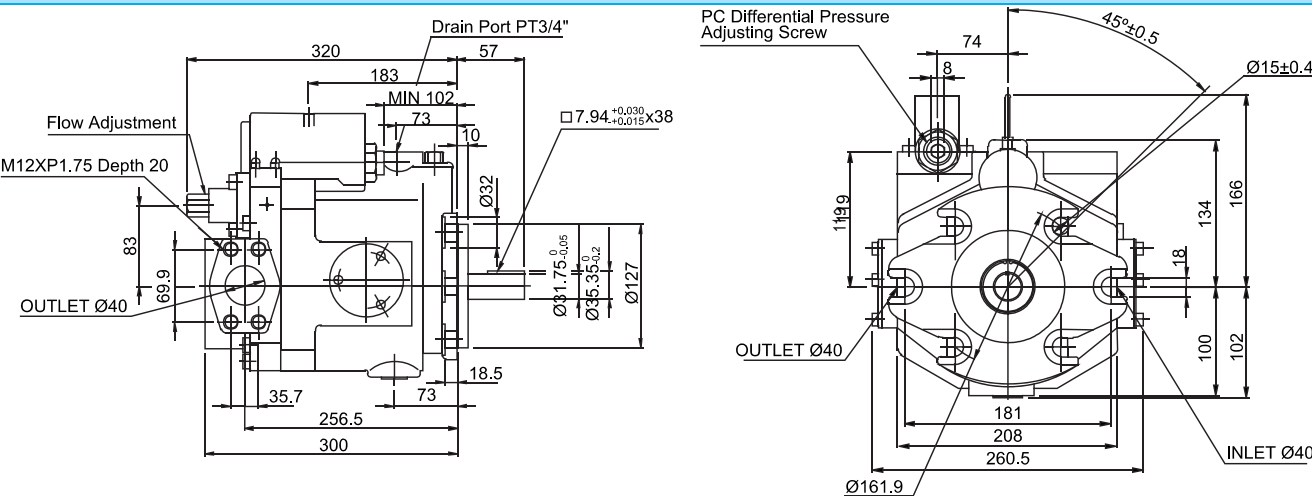
PQ-70 A TYPE



PQ-70 B TYPE



PQ-70 G TYPE



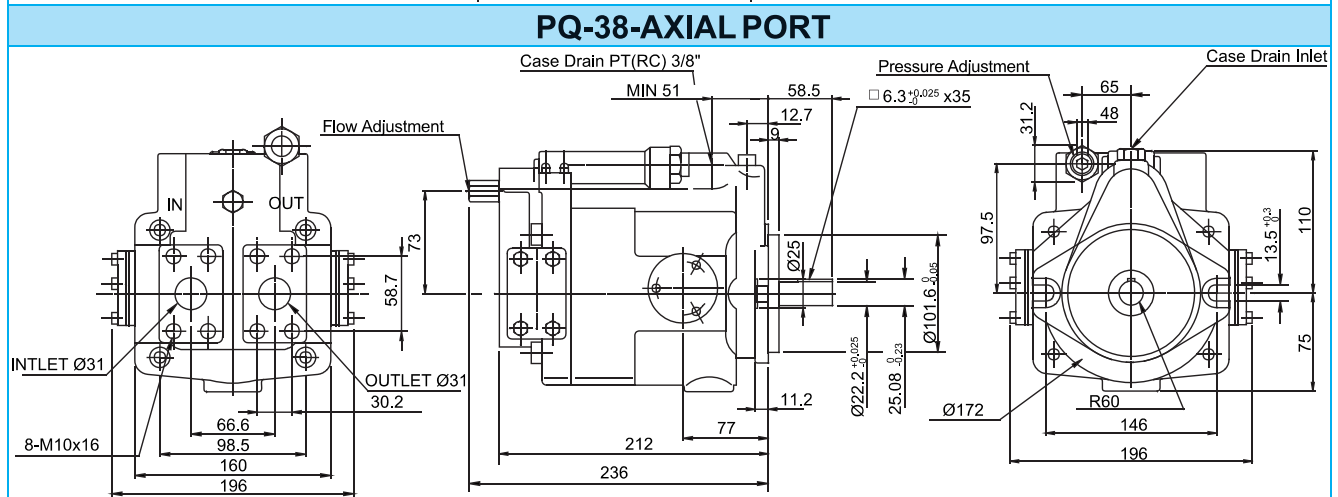
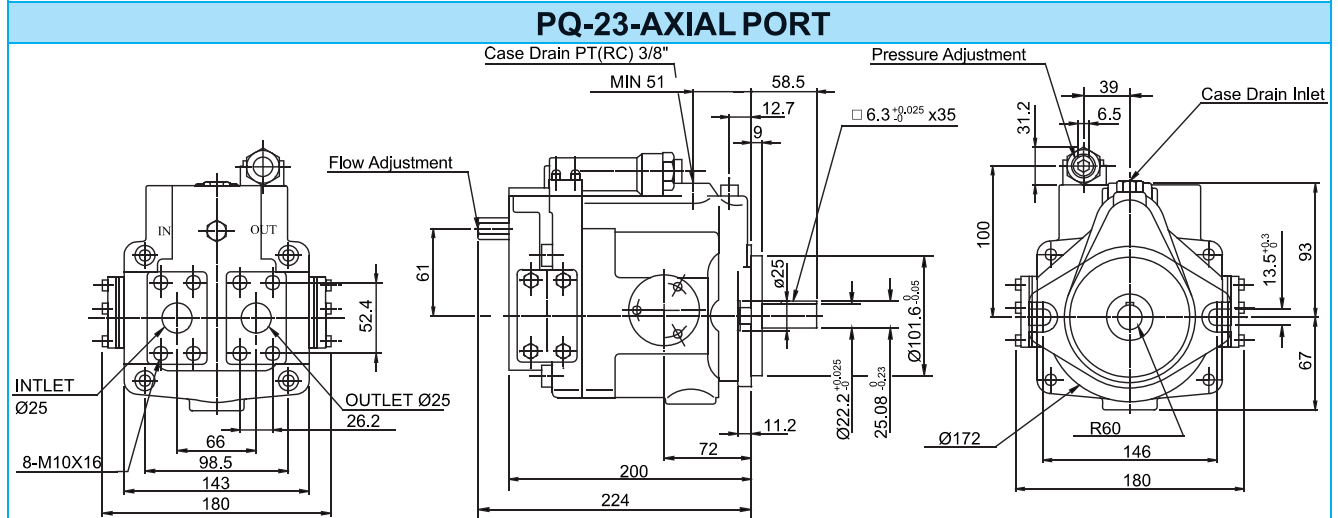
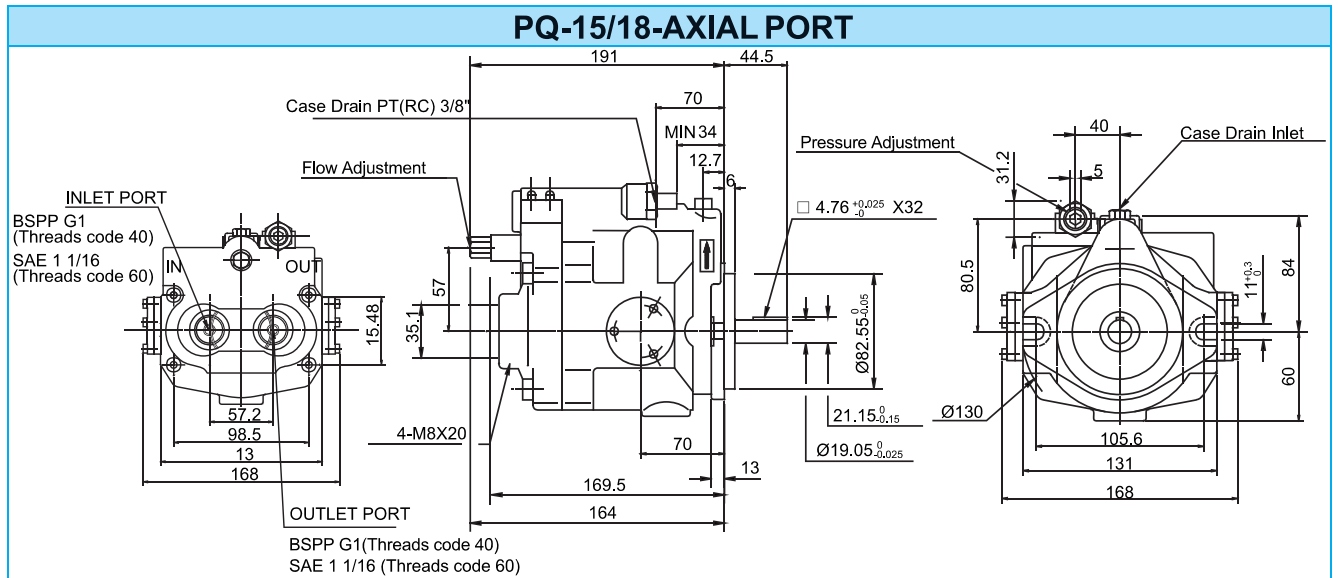
Mounting Surface: SAE "A" 2-Bolts

UNIT: M.M.(INCH)

PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

DIMENSIONS



Mounting Surface: AXIAL PORT

UNIT: M.M.(INCH)

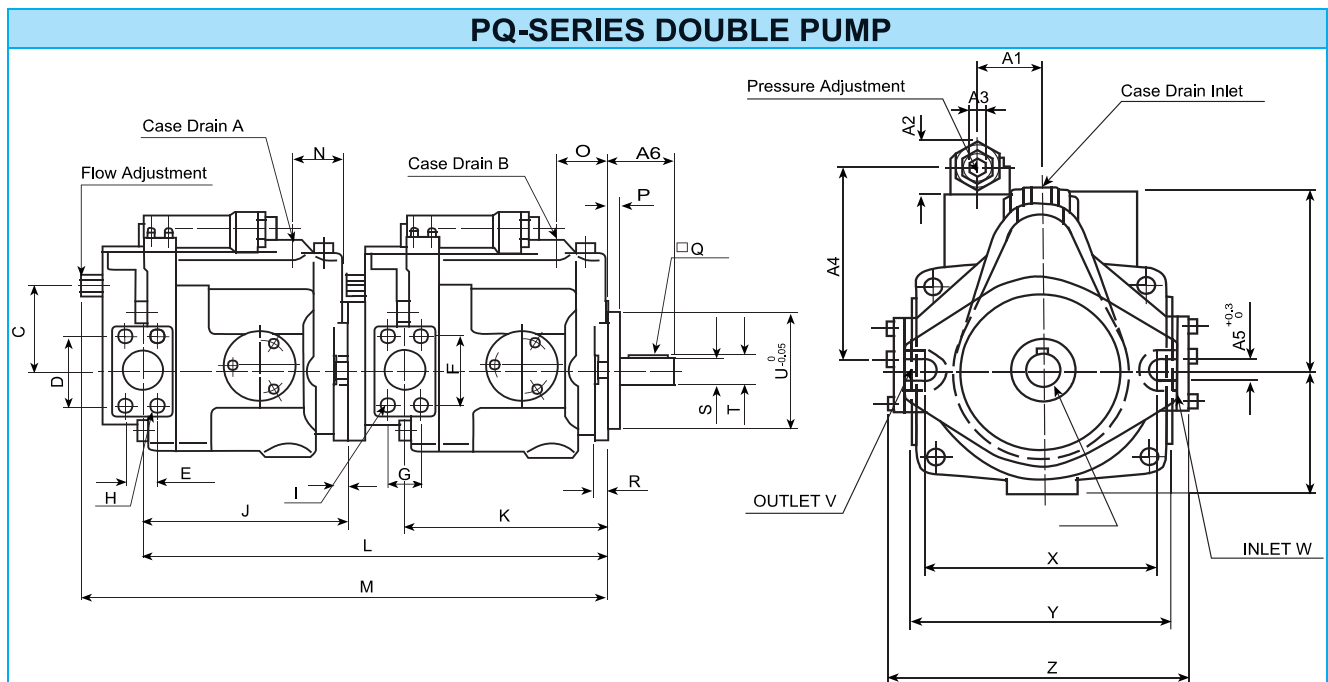
PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

PQ-SERIES DOUBLE PISTON PUMP

Model	PQ15+15	PQ23+23	PQ15+38	PQ23+38	PQ38+38	PQ15+70	PQ23+70	PQ38+70
A	3/8-PT	3/8-PT	3/8-PT	3/8-PT	1/2-PT	3/8-PT	3/8-PT	1/2-PT
B	3/8-PT	3/8-PT	1/2-PT	1/2-PT	1/2-PT	3/4-PT	3/4-PT	3/4-PT
C	57	61	57	61	73	57	61	73
D	35.1	52.4	35.1	52.4	58.7	35.1	52.4	58.7
E	35.1	26.2	35.1	26.2	30.2	35.1	26.2	30.2
F	35.1	52.4	58.7	58.7	58.7	69.9	69.9	69.9
G	35.1	26.2	30.2	30.2	30.2	35.7	35.7	35.7
H	M8X20	M10X16	M8X20	M10X16	M10X16	M8X20	M10X16	M10X16
I	M8X20	M10X16	M10X16	M10X16	M10X16	M12X20	M12X20	M12X20
J	147	170	147	170	170	147	170	179
K	147	170	179	179	179	256.5	256.5	256.5
L	335	393	373	404	413	447	470	479
M	381	443	419	454	465	493	520	531
N	34	51	34	34	51	34	51	51
O	34	51	51	51	51	73	73	73
P	6	9	9	9	9	10	10	10
Q	4.76X32	6.5X35	6.5X35	6.5X35	3.5X35	7.94X38	7.94X38	7.94X38
R	13	13	13	13	13	18.5	18.5	18.5
S	ø19.05	ø22.22	ø22.22	ø22.22	ø22.22	ø31.75	ø31.75	ø31.75
T	21.15	25.08	25.08	25.08	25.08	35.35	35.35	35.35
U	ø82.55	ø101.6	ø101.6	ø101.6	ø101.6	ø127	ø127	ø127
V	ø24	ø25	ø31	ø31	ø31	ø40	ø40	ø40
W	ø24	ø25	ø31	ø31	ø31	ø40	ø40	ø40
X	106	146	146	146	146	181	181	181
Y	131	145.5	160	160	160	208	208	208
Z	168	180	196	196	196	260.5	260.5	260.5
AA	40	39	39	39	39	74	74	74
AB	31.2	31.2	31.2	31.2	31.2	40	40	40
AC	5	5	5	5	5	8	8	8
AD	80.5	110	121	121	121	119	119	119
AE	11	16.5	16.5	16.5	16.5	18	18	18
AF	44.5	58.5	58.5	58.5	58.5	57	57	57

DIMENSIONS



UNIT: M.M.(INCH)

PUMPS

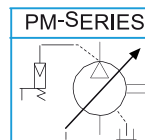
VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

PM SERIES

FEATURE

1. For the control section, a unique cartridge structure is incorporated.
2. The internal sliding surfaces, made of a wear resistant, seizure proof material, have been surfaced treated.
3. As the main internal parts, such as the cylinder blocks and piston assemblies are used, are from the PM8, PM16 and PM22 pumps, the reliability is well-known and outstanding.
4. A specially designed semi-cylindrical swash plate bearing structure, effectively reduces vibration and noise, whilst being more compact.
5. The Housing is a compact and light mass design.

GRAPHIC SYMBOL



SPECIFICATION

Model	Max. Pressure bar	Displacement cc/rev	Shaft Speed rpm		Pressure Adj. Range bar	Weight kg
			Max.	Min.		
PM-8	163	8	1800	600	B:12~70 C:12~210	9.8
PM-16		15.8				9.8
PM-22		22.2				9.8

MODEL NUMBER DESIGNATION

PM-	16-	F-	R-	01-	C-	(S) -	(90)
1	2	3	4	5	6	7	8
1 – Series No. 2 – Displacement cc/rev(in³/rev) 8: 8.54 16: 15.8 22: 22.2 3 – Mounting F: Flange Mounting 4- Direcion of Rotation (View from Shaft End) R: Clockwise(CW) L: Counter-Clockwise(CCW) 5 – Control Type 0 1 : Pressure Compensator Control D : Solenoid Controlled Pressure Compensating Type With Unloading Device E : Dual Pressure Control G : Remoted Pressure Compensator Control HL : Load-sensing Compensator				6- Pressure Compensating Range bar(PSI) B. 12~70(174~1015) C. 12~210(174~3045) 7 – Port Position None: Axial Port S: Side Port 8 – Design No. Port & Shaft Option None: PT(Rc) Flange Kits, Straight Key 80: PF(G) Flange Kits, Straight Key 90: NPT Flange Kits, Straight Key 30: PT(Rc) Flange Kits, SAE B(13 Tooth) 3080: PF(G) Flange Kits, SAE B(13 Tooth) 3090: NPT Flange Kits, SAE B(13 Tooth)			

INSTRUCTION

1. Hydraulic Fluids

Use petroleum base oils such as anti-wear type hydraulic oils or R & O (Rust and Oxidation inhibitor) type hydraulic oils equivalent to ISO VG-32 or 46. The recommended viscosity range is from 20 to 400 mm²/s (98 to 1800 SSU) and temperature range is from 0 to 60°C (32 to 140°F), both of which have to be satisfied for the use of the above hydraulic oils.

2. Control of Contamination

Due caution must be paid to maintaining control over contamination of the operating oil which can otherwise lead to breakdowns and shorten the life of the unit. Please maintain the degree of contamination within NAS Grade 10. The suction port must be equipped with at least a 100 μm (150 mesh) reservoir type filter and the return line must have a line filter of under 10 μm.

3. Mounting

When installing the pump the filling port should be positioned upwards.

4. Drain Piping

Install drain piping according to the chart and ensure that pressure within the pump housing should be maintained at a normal pressure of less than 0.1 MPa (14.5 PSI) and surge pressure of less than 0.5 MPa (72.5 PSI). Length of piping should be less than 1 m (3.3 ft.), and the pipe end should be submerged in oil. In case AR16 and AR22 pump, a screw-in torque of fitting is 40 to 50 Nm (354 to 443 IN.lbs.). Do not apply bending and thrust torque to the fitting.

5. Starting

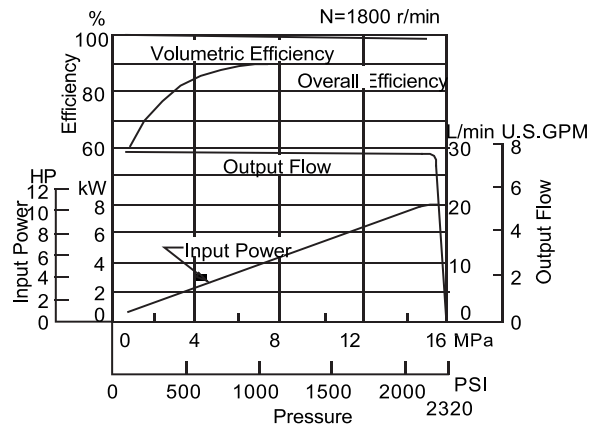
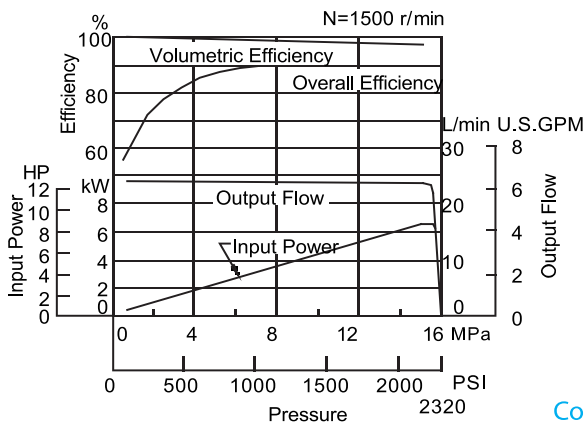
Before first starting, fill pump case with clean operating oil via the fill port. In order to avoid air blockage when first starting, adjust the control valves so that the discharged oil from the pump is returned direct to the tank or the actuator moves in a free load.

PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

PMI6

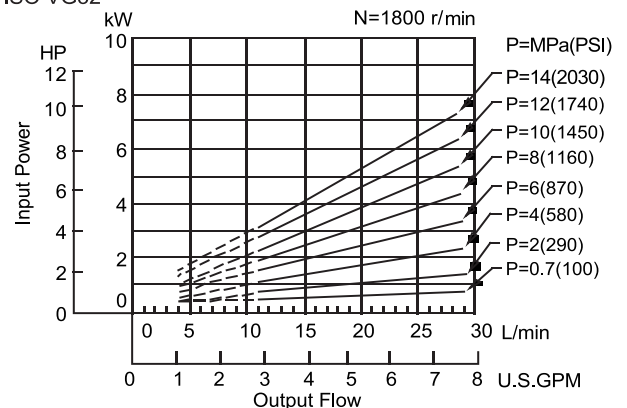
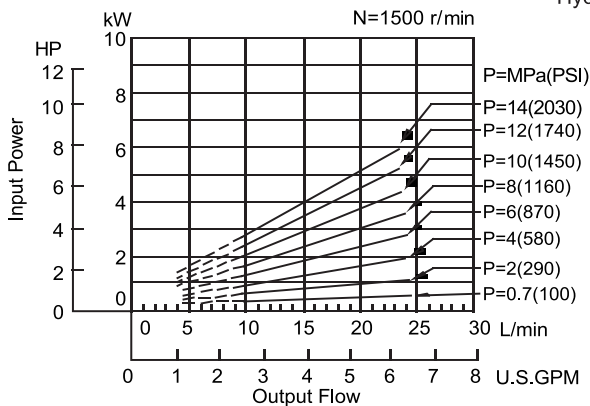
PERFORMANCE CHARACTERISTICS CURVE



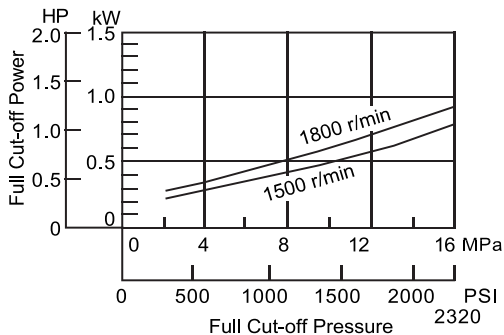
Condition

Viscosity 20 mm²/s(100SSU)
 Fluid Temperature: 50°C(122°F)
 Hydraulic Oil: ISO VG32

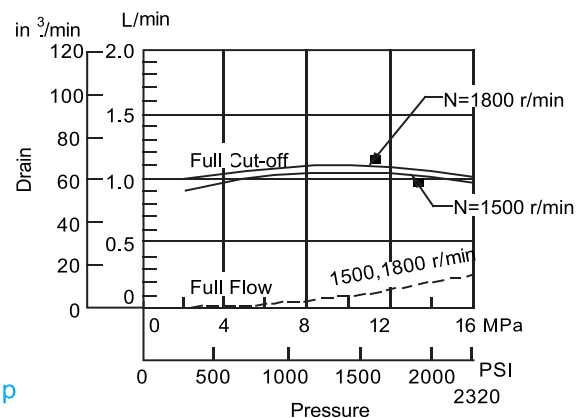
Input Power



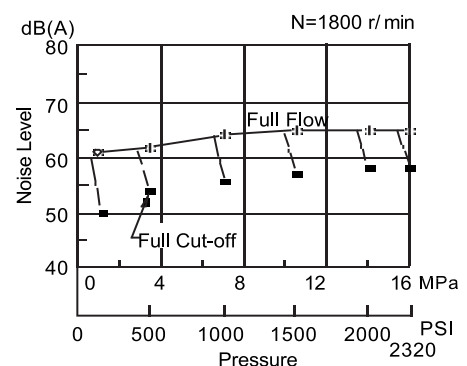
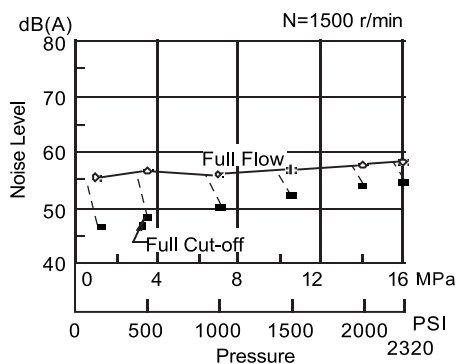
Full Cut-off Power



Drain Curve



Noise Level [One metre (3.3 ft.) horizontally away from pump head cover]

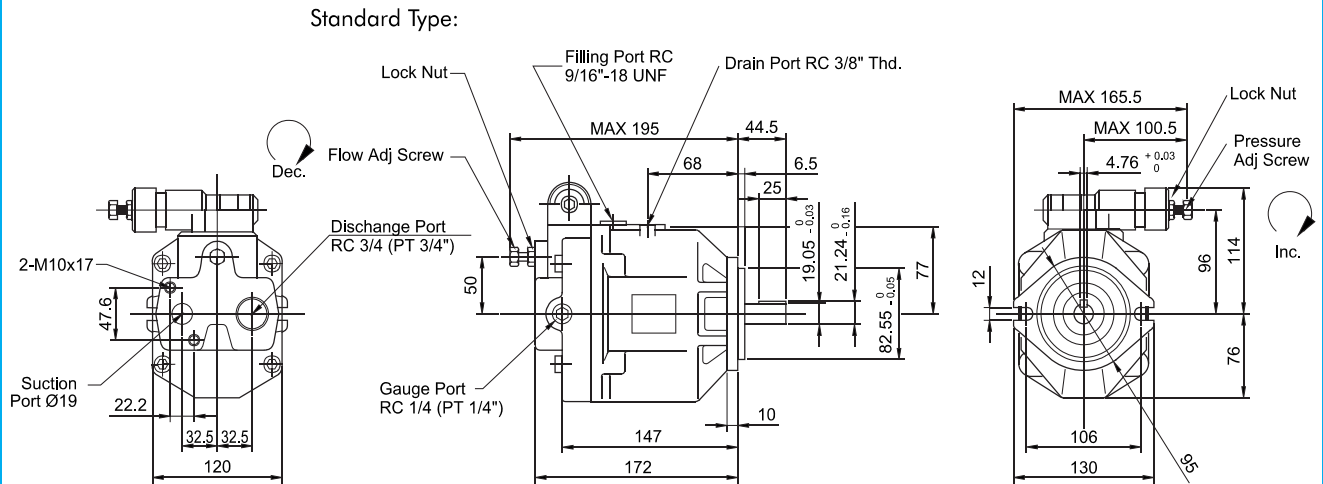


PUMPS

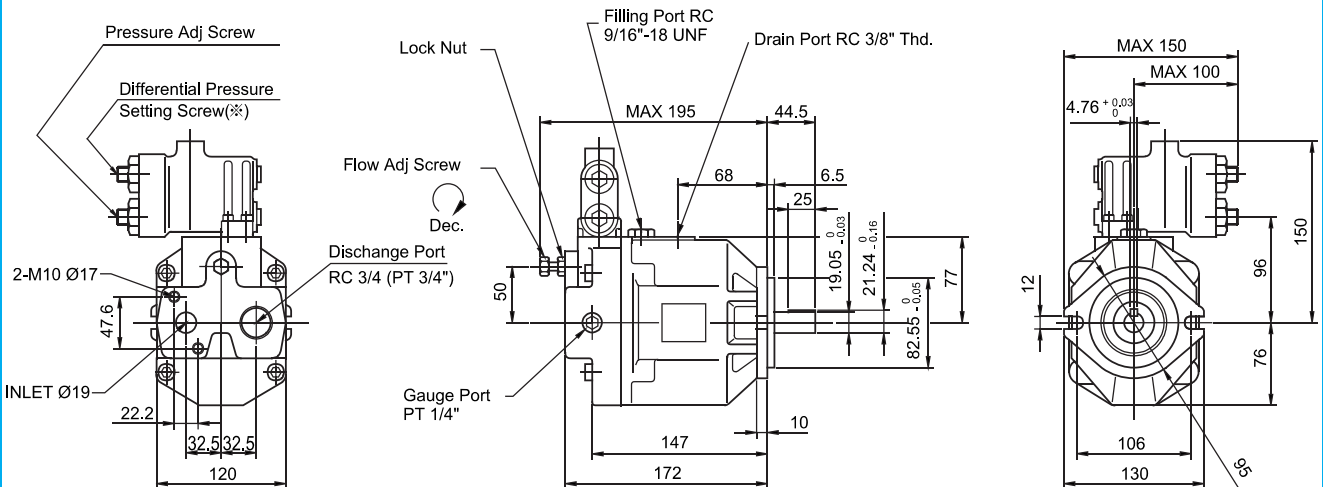
VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

DIMENSIONS

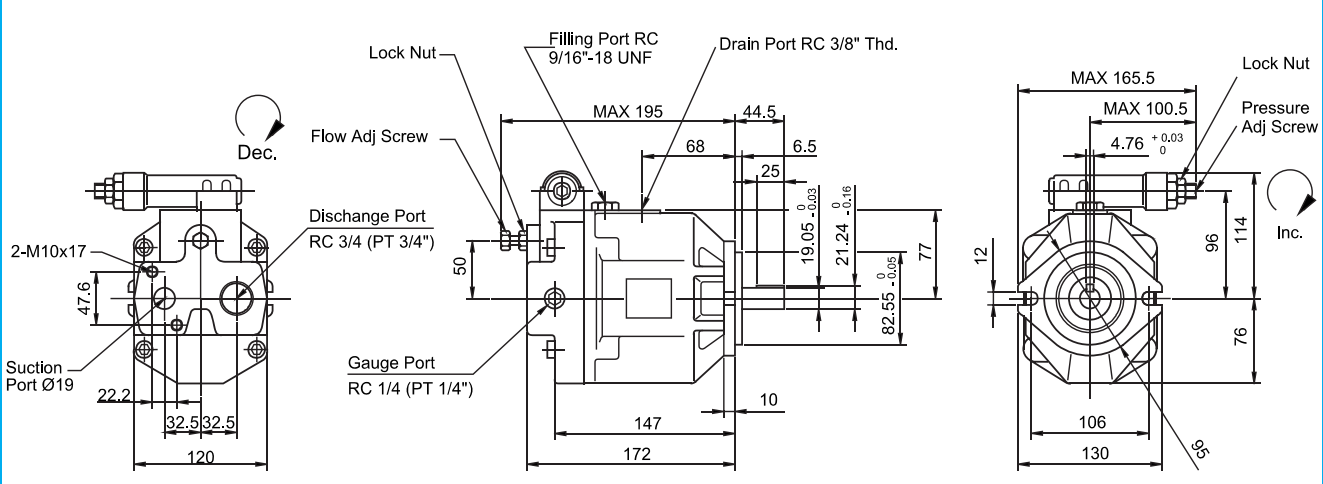
PM16/22 01 TYPE



PM16/22 G TYPE



PM16/22 HL TYPE

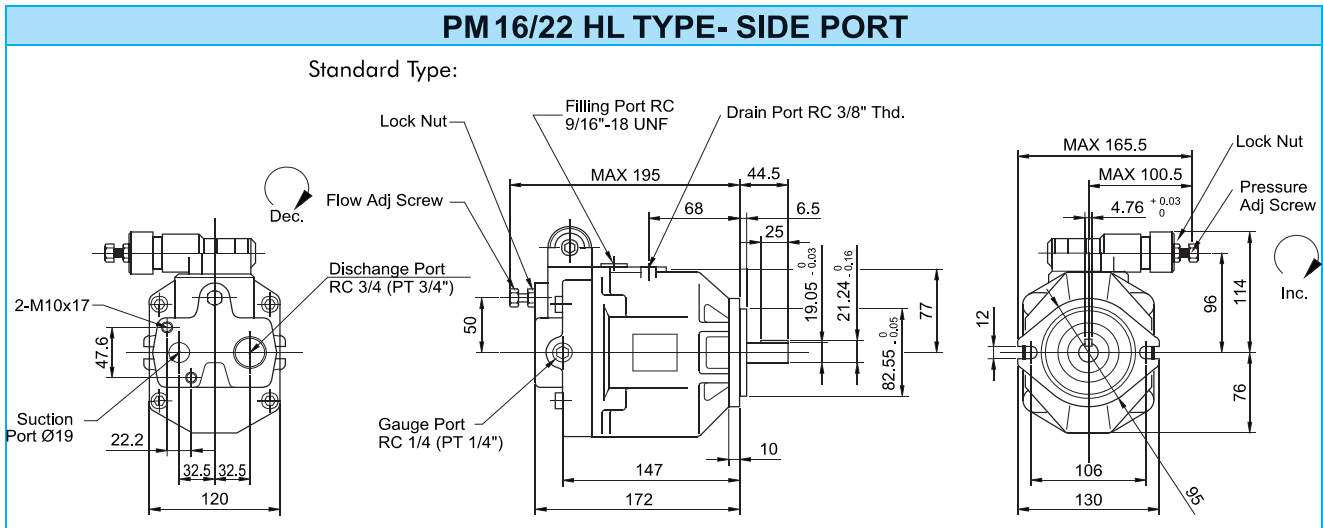


UNIT: M.M.(INCH)

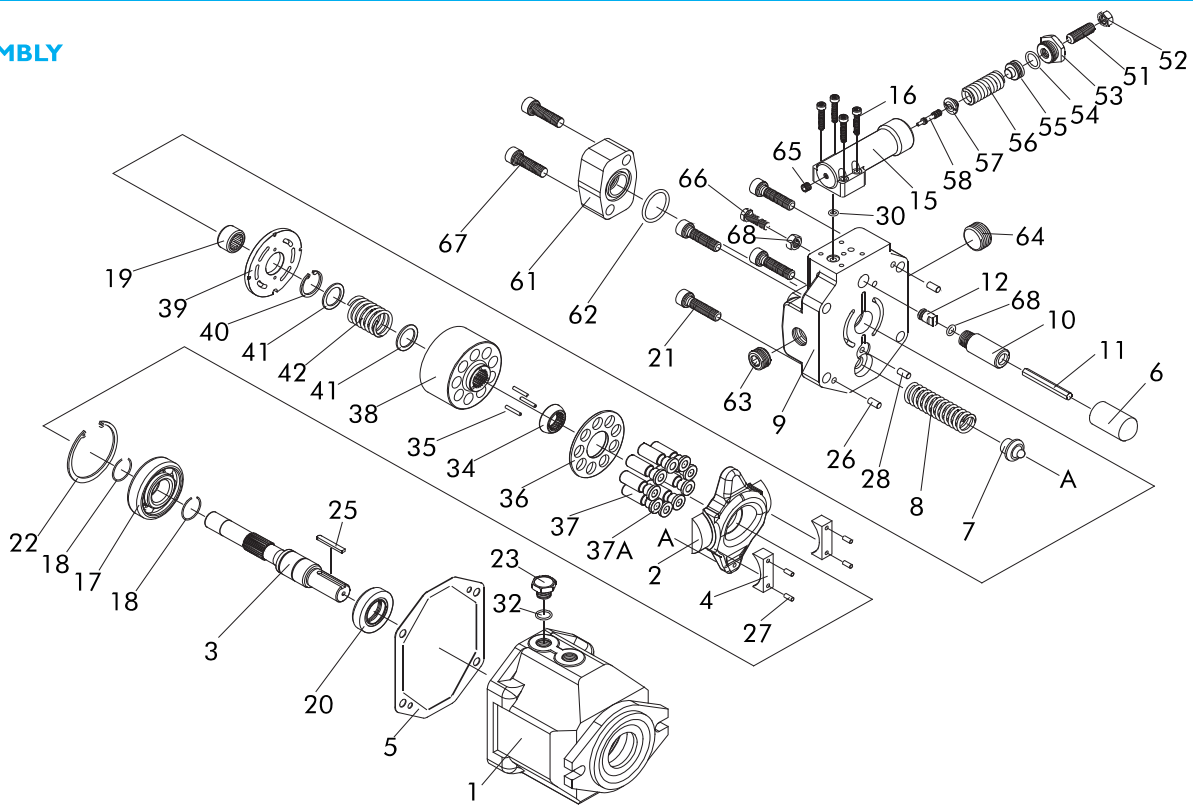
PUMPS

VARIABLE DISPLACEMENT AXIAL PISTON PUMPS

DIMENSIONS



ASSEMBLY



PARTS LIST

NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION	NO.	DESCRIPTION
1	Pump Body	16	Screw M5x25	32	O-Ring	54	O-Ring P14 70°
2	Swash Plate	17	Bearing 6350	34	Cylinder Block Holder	55	Spring Seat
3	Shaft	18	Snap Ring 1-1/2"	35	Pin Cylinder Block	56	Pressre Spring
4	Swash Plate Seats	19	Bearing 1715	36	Slipper Retainer	57	Spring Seat
5	Gasket	20	Shaft Seal	37	Piston and Slipper	58	Compenstator Spool
6	Servo Piston Sleeve	21	Screw M10x40	38	Cylinder Block	61	Flange
7	Spring Seat	22	Snap Ring R62	39	Swash Plate	62	O-Ring
8	Spring	23	Plug Filling Port	40	Snap Ring R28	63	Plug Gauge Port 1/4"
9	End Cover	25	Paralle Shaft Key	41	Washer	64	Plug Side Port 3/4"
10	Sleeve Position	26	Lock Pin-Body	42	Retainer Spring	65	Plug NPT 1/16"
11	Flow Adj. Rod	27	Lock Pin-Swash Plate Seat	51	Hex Bolt M10x30	66	Screw M8x35
12	Flow Control Spool	28	Pin	52	Nut M10	67	Screw M10x35
15	Pressure Compensator	30	O-Ring p7	53	Screw Cap	68	Nut M8

ALL PRODUCTS

CONTROL VALVES

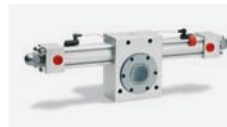


Electrical Operated Directional Control Valve

HYDRAULIC CYLINDERS



Tie-Rods Iso 6020/2 Hydraulic Cylinders
Counter Flanges Iso 6020/2 Hydraulic Cylinders
Iso 6020/2 Servocylinders



Rotary Actuators



Iso 6022 Hydraulic Cylinders
Iso 6022 Hydraulic Servocylinders
Accessories For Iso Hydraulic Cylinders



Light Compact Hydraulic Cylinders
Heavy Duty Compact Hydraulic Cylinders

PUMPS



Single • Double • Thru-Drive Vane Pumps
Hs Series
Hq Series
Vh Series



Variable Displacement Axial Piston Pumps
Ph Series
Pq Series



Variable Displacement Pump (A)A10V
Series 31
Frame Sizes 18/28/45/71/100/140

REPLACEMENT PUMPS & PARTS



Hpvh • Hpvb • Hpvq • Hpv
Piston Pumps & Parts



Hy-A10v • Vso18/28/45/71/100/140
Replacement Parts

hydraut

[hydraut.com](https://www.hydraut.com)