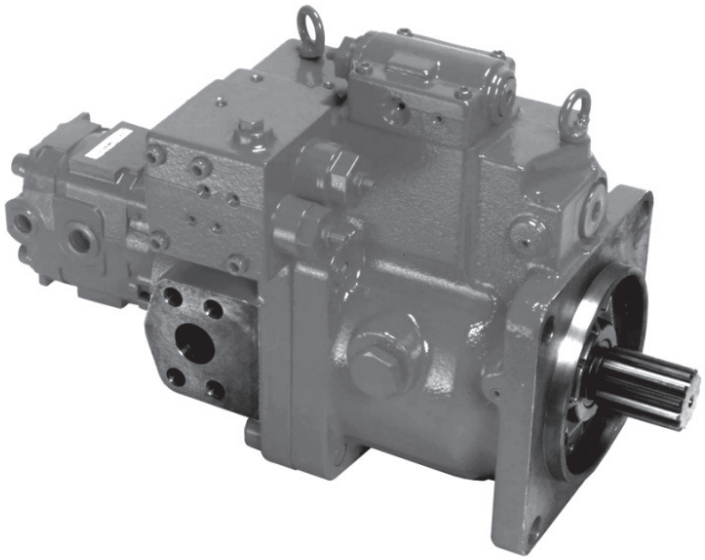
Sizes 45, 80, 112, 140 and 200 Up to 203 kW and 320bar	Swash-plate Axial Piston Pump B Series K3VL	Data Sheet P-1002/04.11 GB



Features

◊ SAE and ISO mount.
◊ Small installation envelope.
◊ Through drive.
◊ SAE and metric ports.
◊ Side and rear porting.
◊ Vertical mount capability.
◊ Multiple drain ports.
◊ CW and CCW rotation.
◊ Opposed stroking pistons.
◊ Rated pressure 320 bar.
◊ Swash plate pillow support.
◊ Maximum displacement stop.
◊ Servo assist springs.
◊ Hydrostatic pillow bearing.
◊ Overcentre bleed.
◊ Pressure compensation.
◊ Integral proportional pressure.
◊ Load sensing.
◊ Integral unload.
◊ Torque limiter.
◊ Rigid construction.
◊ Long life roller bearings.
◊ Various sealing options.
◊ Low pulsation.
◊ Proven rotating group.
◊ Separate swash plate.
◊ Spherical valve plate.
◊ Super-finished bores.
◊ Solid pistons.

ATP HYDRAULIK

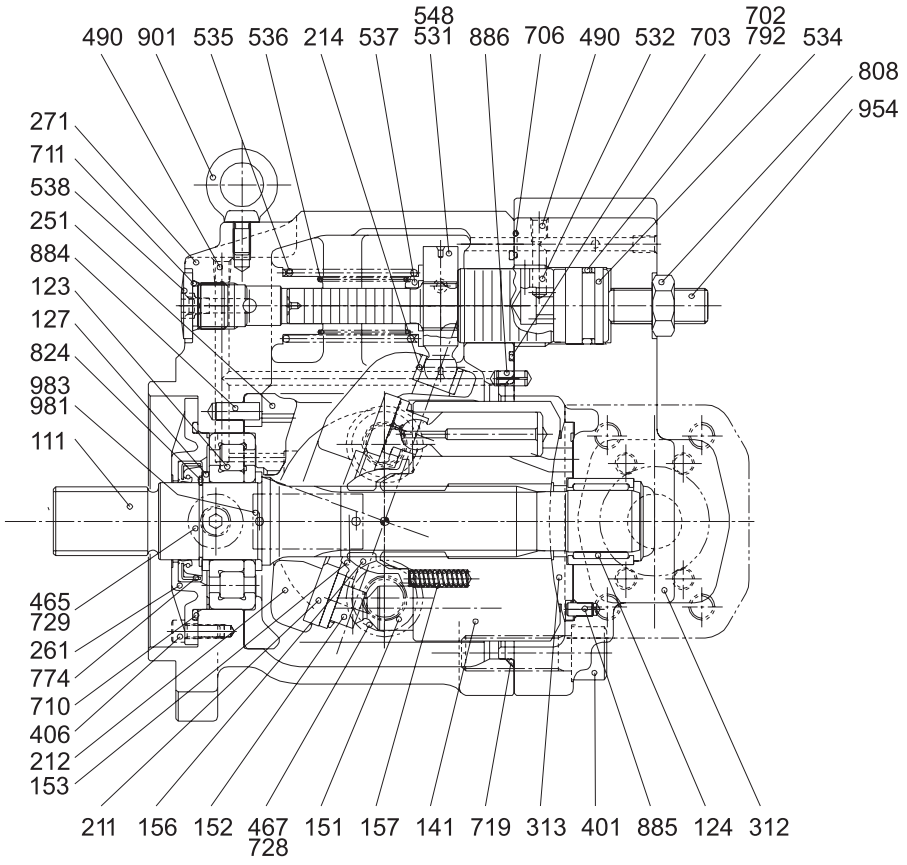
General Description

The K3VL Series Swash Plate Type Axial Piston Pumps are designed to satisfy the marine and mobile industrial machinery market where a medium/high pressure variable displacement pump is required. K3VL Pumps are available in nominal displacements ranging from 45 to 200 cm3/rev with various pressure, torque limiter, and a combination of load sensing control options.

Technical Description

The components of the K3VL pump can be divided into three sub-groupings:

Rotating Group – Providing the main rotary pumping action.
Swash Plate Group – To vary the pump's delivery flow rate.
Valve Cover Group – Providing the switching of oil between suction and delivery ports.



K3VL80 Cross Section

Technical Description (continued)

The Rotating Group

The Rotating Group comprises:

(a) Valve plate 313
(b) Cylinder block, 141
(c) Pistons, 9 x 151 + Shoes, 9 x 152
(d) Setting plate, 153
(e) Spherical bush, 156
(f) Cylinder springs, 9 x 157

The drive shaft is coupled to the cylinder block through a splined section and supported at both of its ends by bearings. The shoe is swaged over the end of the piston forming a ball joint.
Additionally the shoe has a hydrostatic pocket to balance the hydraulic thrust developed by the piston pressure allowing the shoe to lightly slide against the shoe plate.

The subgroup consisting of the pistons and shoes are pressed against the shoe plate by the cylinder springs acting through the setting plate and the spherical bush. The force developed by these cylinder springs also press the cylinder block against the valve plate. Only the K3VL45 units use a single centralised spring with individual push pins to provide the shoe and cylinder block hold down force.

Swash Plate Group
The Swash Plate Group comprises:

(a) Swash plate, 212
(b) Shoe plate, 211
(c) Swash plate support, 251
(d) Tilting bush, 214
(e) Tilting pin, 531
(f) Servo piston and Springs, 532, 535, 536

The swash plate on the reverse side to the shoe location is a cylindrical form which is a “pillow” supported by the hydrostatic bearing provided by the swash plate support. The tilting bush is inserted into the swash plate and into this is installed the spherical portion of the tilting pin which is coupled to the servo piston.

Any linear movement of the servo piston produced by the regulator pressure applied to either end is translated through the tilting pin into an angular movement of the swash plate which varies the tilting or swash angle of the pump. A screw adjuster and lock nut is available to adjust the maximum tilting angle condition. The servo assist springs are provided to ensure good on stroking response particularly at low operating pressures.

Technical Description (continued)

Valve Cover Group

The Valve Cover Group comprises:

(a) Valve cover, 312
(b) Valve pin, 885

The valve plate with its two “kidney” shaped ports is installed onto the valve cover located by the valve plate pin. These two ports serve to supply and exhaust oil to and from the cylinder block. The oil passage switched by the valve plate is connected to the externally piped inlet and outlet pressure ports through the valve cover. This valve plate is spherical in form for all but the smallest 45cc unit.

Pump Operation

When the pump’s drive shaft is driven by a prime mover (Electric motor, Engine etc.), the cylinder block being spline coupled to the shaft will also rotate. If the swash plate has been tilted, the pistons arranged in the cylinder block due to the shoe being retained on the swash plate surface will both rotate with the cylinder block and reciprocate once per revolution. Paying attention to one such piston then it will move away from the valve plate for half a rotation (inlet stroke) and move towards the valve plate for the second half of rotation (oil delivery stroke). The larger the tilt angle, the longer the piston stroke and the higher is the pump’s displacement. As the swash plate tilting angle approaches zero so the piston makes no stroke and thereby delivers no oil.

Through Drive Option

By suitable use of adaptors and splined couplings a wide variety of through drive mounting capabilities are available. The formation of these kits and their relevant part numbers will be found in the installation section.

Technical Data

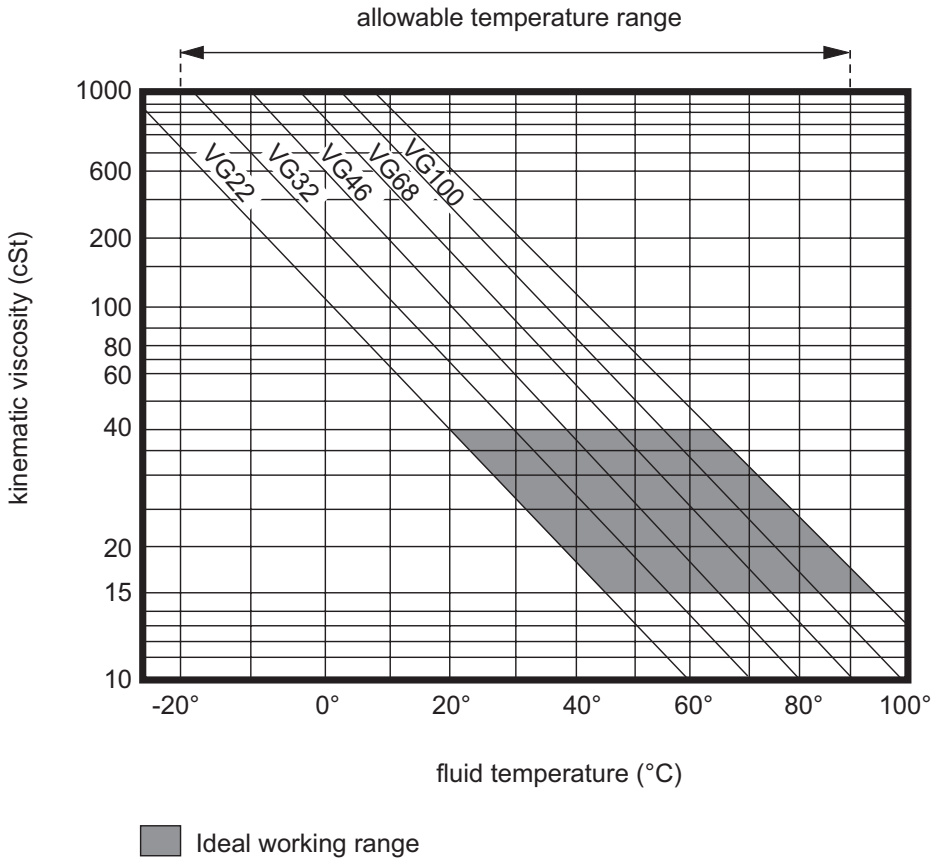
For applications outside the following parameters, please consult Kawasaki Precision Machinery (UK) Ltd.

Hydraulic Data

Pressure Fluid — Mineral oil, polyol ester and water glycol.

Use a high quality, anti-wear, mineral based hydraulic fluid when the pressure exceeds 206 bar. In applications where fire resistant fluids are required consult Kawasaki Precision Machinery (UK) Ltd.

Fluid selection



Technical Data (continued)

Filtration & Contamination Control

Filtration

The most important means to prevent premature damage to the pump and associated equipment and to extend its working life, is to ensure that hydraulic fluid contamination control of the system is working effectively.

This begins by ensuring that at the time of installation that all piping, tanks etc. are rigorously cleaned in a sanitary way. Flushing should be provided using an off line filtration system and after flushing the filter elements should be replaced.

A full flow return line filter of 10 micron nominal should be utilised to prevent contaminant ingress from the external environment, a 5 to 10 micron filter within the tank's breather is also recommended.

Suggested Acceptable Contamination Level

The relationship between contamination level and pump life is very difficult to predict as it depends on the type and nature of the contaminant present in the system. Sand or Silica in particular, due to its abrasive nature, does significantly reduce the expected life of a pump. Based on the precondition that there is no significant presence of Silica type substances then a minimum Cleanliness level of -/18/15 ISO 4406 or SAE AS 4059E Table 1 Class 9 (NAS 1638 Class 9).

Working Fluid Types

Anti-Wear Type Hydraulic fluid

It is generally recommended to use an anti-wear hydraulic fluid like mineral oil when the operating pressure exceeds 206 bar.

Fire-resistant Fluids

Some kind of fire-resistant fluids require special materials for seals, paint and metal finishing. Please consult Kawasaki Precision Machinery (UK) Limited and provide details of the particular fluid specification and the working conditions so that any special requirements can be ascertained.

In general, fire-resistant fluids have a low viscosity index and their viscosity also changes significantly with operating temperature and service life. For this reason, the circuit should be provided with an adequately sized cooler or forced cooling so that temperatures can be stabilised. Due to the inherent water content of some of these fluids the minimum allowable suction pressure will be higher than that of an equivalent mineral oil and so needs to be fully evaluated by Kawasaki Precision Machinery (UK) Limited. The following table provides an overview of the precautions and characteristics that can be expected with these types of fluids.

Technical Data (continued)

Fire-resistant Fluids (continued)

parameter:- / fluid type:-	mineral oil	polyol ester	water glycol
Maximum Pressure (bar)	320	320	210
Recommended Temperature Range (deg C)	20 ~ 60	20 60	10 ~ 50
Cavitation susceptability	○	△	△
Expected life expectancy compared to mineral oil	100%	< 100%	20%

○ recommended △ usable (higher density)

Technical Data (continued)

Pump Start Up Precautions

Pump Case Filling

Be sure to fill the pump casing with oil through the drain port, filling only the suction line with oil is totally in sufficient. The pump contains bearings and high-speed sliding parts including pistons with shoes and spherical bushes that need to be continuously lubricated. Part seizure or total premature failure will occur very quickly if this procedure is not rigidly followed.

Piping & Circuit Checking

Check to see that the piping and full hydraulic circuit is completed and that any gate valves etc. are open.

Direction of Rotation

Check to ensure that direction of rotation is correct and that the inlet and delivery lines are connected correctly.

Start Up

Jog start the motor and check once more for correct rotation. Run the pump unloaded for a period to ensure that all residual air within the system is released. Check for external leakage, abnormal noise and vibrations.

Case Drain Pressure

Please ensure, that the maximum steady state drain line pressure at the pump casing does not exceed 1 bar. (Maximum peak pressure 4 bar). A suitable drain line hose must be selected and return directly back to the tank and terminate below the oil level.

Long Term Out of Usage

It is undesirable to leave the pump out of use for a long period e.g. a year or more. In such a situation it is recommended that the pump is run for a short period on a more frequent basis even if it is just unloaded. With regard to a pump held in storage then rotating the shaft on a frequent basis is sufficient. If the pump is left out for more than the suggested time it will require a service inspection.

Technical Data (continued)

Specifications

The following table indicates all of the specifications for the complete K3VLpump range from 45-200cc.
More detailed efficiency curves and other related information will be found in a later section.

pump model			**45**				**80**			
capacity		cc/rev	45				80			
pressure ratings	rated	bar								
	peak	bar								
speed ratings	self prime	rpm	2,700				2,400			
	max. boosted	rpm	3,250				3,000			
minimum operating speed		rpm								
case drain pressure	max. continuous	bar								
	peak	bar								
weight		kg	25				35			
case fill capacity		L	0.6				0.8			
maximum allowable input torque #1 (basic coupling arrangement)		Nm	140	225	225	225	400	400	400	400
mounting flange		type	SAE B	SAE B-B		ISO100	SAE C		ISO125	
		bolts	2				2			
input shaft		type	SAE B-B			ISO 25mm	SAE C		ISO 32mm	SAE C
		form	Spline	Spline	Key	Key	Spline	Key	Key	Spline
allowable through drive torque #2	SAE “A”	Nm								
	SAE “B”		290							
	SAE “B-B”		290				400			
	SAE "C" / "C4"						400			
	SAE “C-C”									
	SAE “D”									
	SAE “E”									
temperature range		°C								
viscosity range		cSt								
maximum allowable contamination level			20 / 18 / 15							

#1 Maximum allowable shaft torques are based on achieving an infinite life for a coupling assembly that is lubricated and completely clamped and utilises the full spline/key length as engagement.

The following points therefore need to be fully considered:-

(i) Lubrication of shaft couplings should be in accordance with the coupling manufacturers instructions.

(ii) The maximum allowable input shaft torque is based on ensuring an infinite life condition by limiting the resultant combined shaft bending and torsional stress.

(iii) This allowable input shaft torque can be further increased dependant on the resultant surface stress at the spline interface which is highly dependant on coupling selection and the provision of adequate spline lubrication.

If you have an application that requires higher input torque please consult Kawasaki.

#2 Allowable through drive torques are based on the achieving an infinite life for a fully lubricated coupling and full spline engagement with a mineral oil based anti-wear hydraulic fluid.

112	140	200
112	140	200
320		
350		
2,200	2,100	1,900
2,700	2,500	2,200
600		
1		
4		
65	65	95
1.5	1.5	2
765 / 980 / 980 / 980	400 / 765 / 980 / 980 / 980	980 / 980 / 1800
SAE D / ISO180	SAE D / ISO180	SAE E
2 / 4	2 / 4	4
SAE C-C / SAE D / ISO 45mm	SAE C / SAE C-C / SAE D / ISO 45mm	SAE D / SAE F
Spline / Spline / Key / Key	Spline / Spline / Spline / Key / Key	Spline / Key / Spline
123		
340		
550		
700		990
700		990
700		990
		990
-20 to +95		
10 to 1,000		
ISO/DIS 4406 or SAE AS 4059E Table 1 Class 9 (NAS1638 Class 9)		

Technical Data (continued)

Specifications

Notes:

Rated Pressure
Pressure at which life and durability will not be affected.

Peak Pressure
The instant allowable surge pressure as defined by BS ISO 2944:2000. Life and durability however will be shortened.

Maximum Self Priming Speed
Values are valid for an absolute suction pressure of 1 bar. If the flow is reduced and the inlet pressure is increased the speed may also be increased.

Maximum Boosted Speed
Values stated are the absolute maximum permitted speed for which an increased inlet pressure will be required.

Weight
Approximate dry weights, dependant on exact pump type.

Hydraulic Fluid
Mineral anti wear hydraulic fluid – for other fluid types please consult KPM.

Viscosity Range
If viscosity is in range 200 to 1,000 cSt, then warming up is necessary before commencing full scale running.

Ordering Code – K3VLSeries

K3VL	80	/	B	-	1	0	R	S	S	-	L	0	12D	-	/1-H*

K3VL Series Pump

Maximum displacement

45	45 cm3/rev
80	80 cm3/rev
112	112 cm3/rev
140	140 cm3/rev
200	200 cm3/rev

Design series

B

Hydraulic Fluid Type

–	Mineral oil
W	Water glycol (not K3VL 200)

All other fluids contact Kawasaki

Circuit Type

1	Open Circuit

Through drive & porting

0	Single pump, side ported
A	SAE-A through drive, side ported
B	SAE-B through drive, side ported
BB	SAE-B-B through drive, side ported
C	SAE-C through drive, side ported
CC	SAE-C-C through drive, side ported
C4	SAE-C4 through drive, side ported
D	SAE-D through drive, side ported
E	SAE-E (K3VL 200 only)
R	Single pump, rear ported
N	Single pump with Steel cover, side ported

Direction of rotation

R	Clockwise rotation
L	Counter-clockwise rotation

Mounting flange & shaft

S	SAE spline & mount (see drawing for detail)
M	ISO key & mount (see drawing for detail) (not 200)
F	SAE-E mount with SAE-F spline shaft
K	SAE key & mount (see drawing for detail)
T*	SAE-B spline & SAE- B 2 bolt mount for 45 (not 80) SAE- CC spline & SAE- D 4 bolt mount for 112/140 (not 200)
U*	45 only, SAE-B key & SAE-B 2 bolt mount
C*	112/140 only, SAE-C spline & SAE- C 2 bolt mount
R*	112/140 only, SAE- C spline & SAE- D 4 bolt mount
X*	112/140 only, SAE- C key & SAE- C 2 bolt mount
W*	112/140 only, SAE -CC spline & SAE- C 2 bolt mount
Y*	112/140 only, SAE -CC key & SAE- C 2 bolt mount

(*Non standard options)

Porting threads

M	Metric threaded
S	UNC threaded

Control device configuration

P	Remote pressure compensator
L	Load sensing & pressure control

Additional pressure control

0	No additional control
N	With integrated unloading valve N.C
V	With integrated remote control valve
M	With integrated unloading control valve N.O
1	Load sensing only (R4 plugged)

Unloader solenoid (Type N below)

blank	For all other options except PN/LN & PM/LM
115A	115V AC, 50.60Hz, DIN 43550 Plug
235A	230V AC, 50.60Hz, DIN 43550 Plug
12D	12V DC, DIN 43550 Plug
24D	24V DC, DIN 43550 Plug

Additional control options

Blank	Without additional limiter

Torque limit control

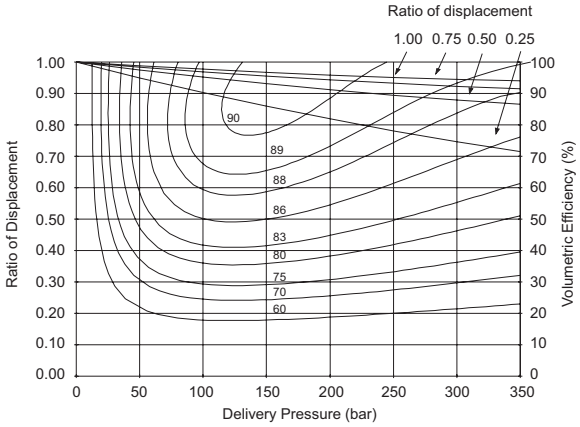
/1-S*	Special low setting contact Kawasaki
/1-L*	Low setting range
/1-M*	Medium setting range
/1-H*	High setting range

Displacement control (Without torque limit)

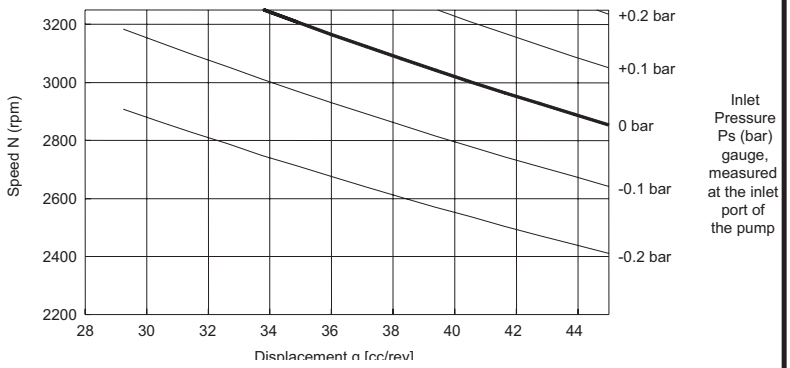
/1-E0	Electrical displacement control (pilot pressure required)
/1-Q0	Pilot operated displacement control

Performance K3VL45

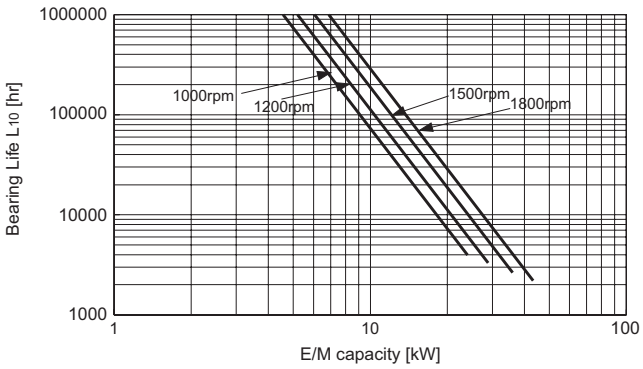
Pump Efficiency (%)



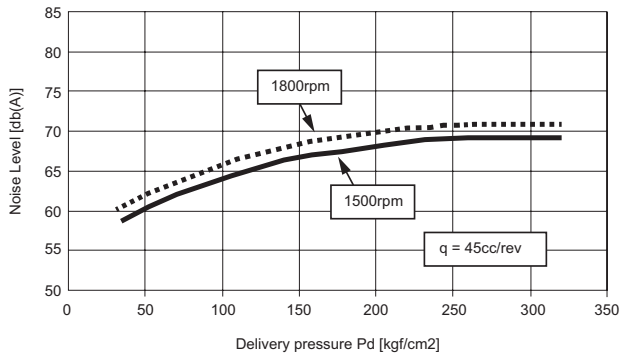
Self Priming Capability



Bearing Life

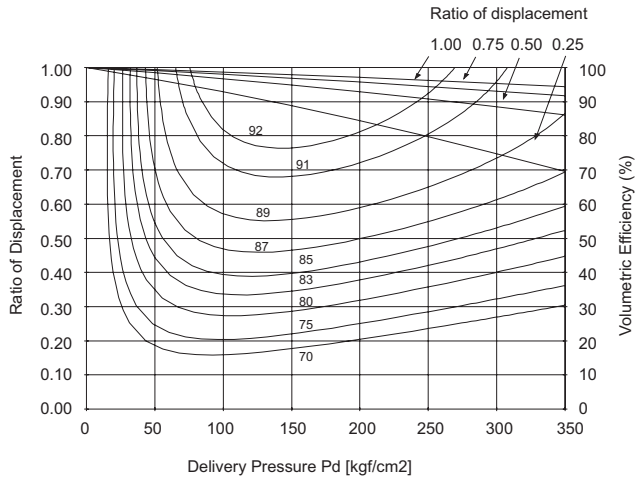


Noise Level

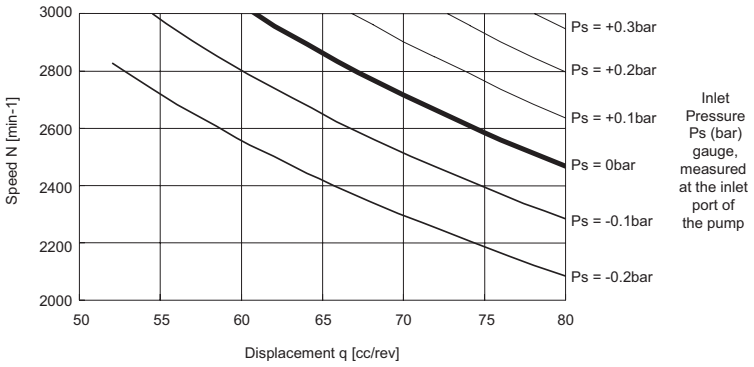


Performance K3VL80

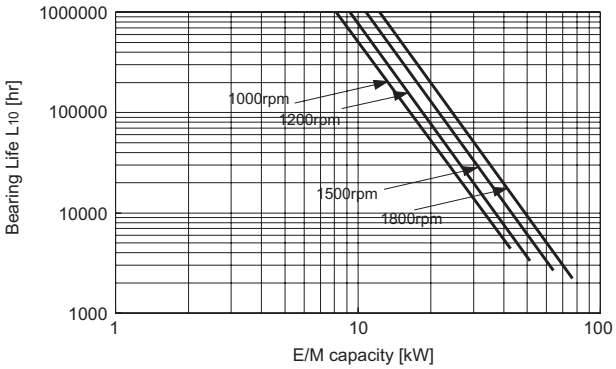
Pump Efficiency (%)



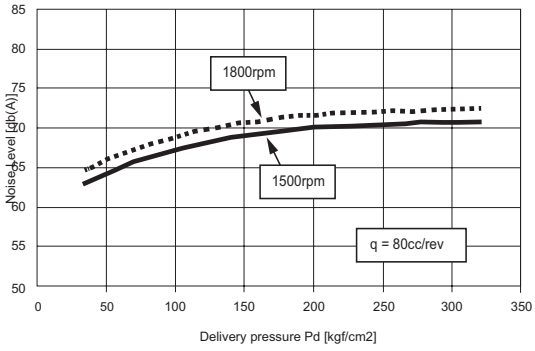
Self Priming Capability



Bearing Life

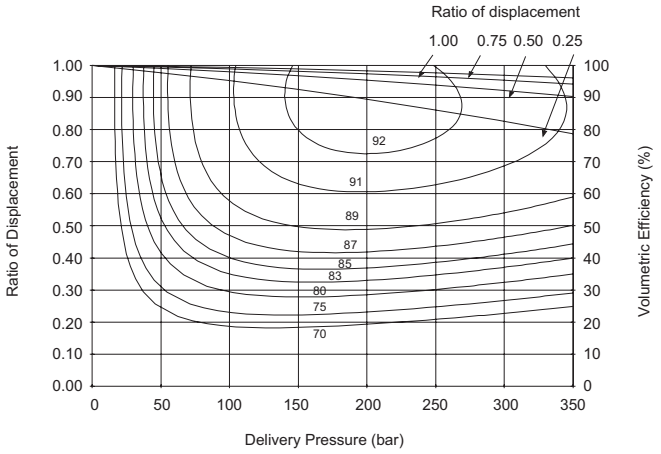


Noise Level

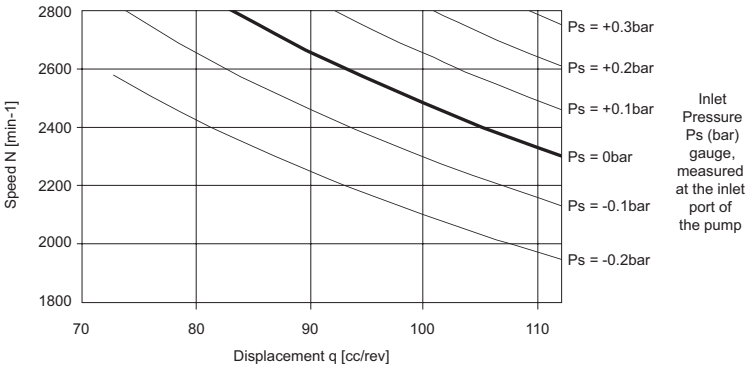


Performance K3VL112

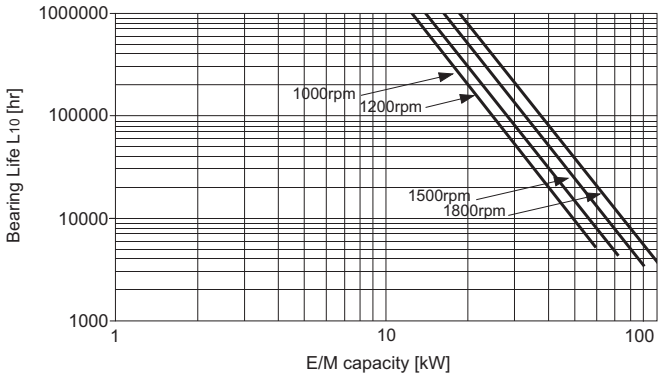
Pump Efficiency (%)



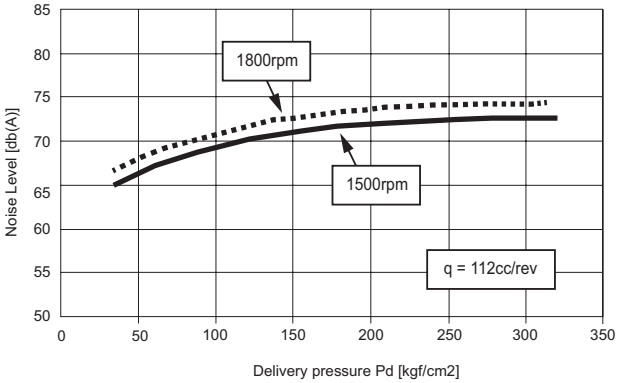
Self Priming Capability



Bearing Life

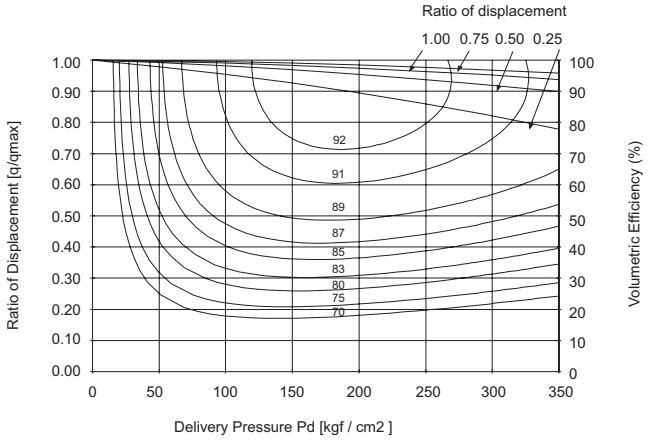


Noise Level

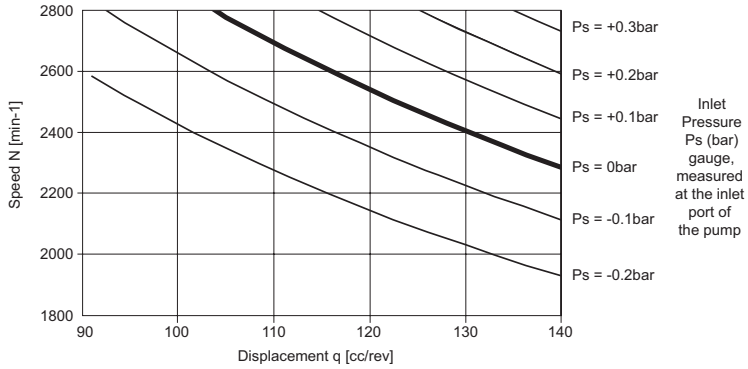


Performance K3VL140

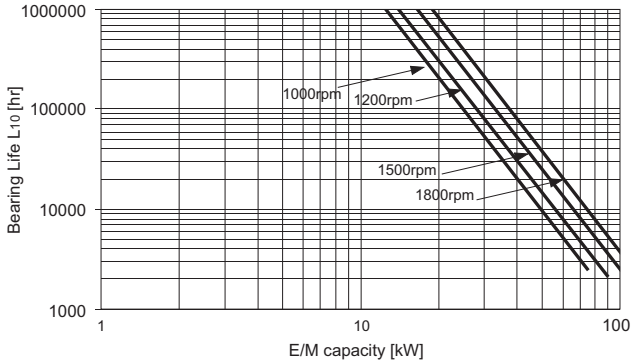
Pump Efficiency (%)



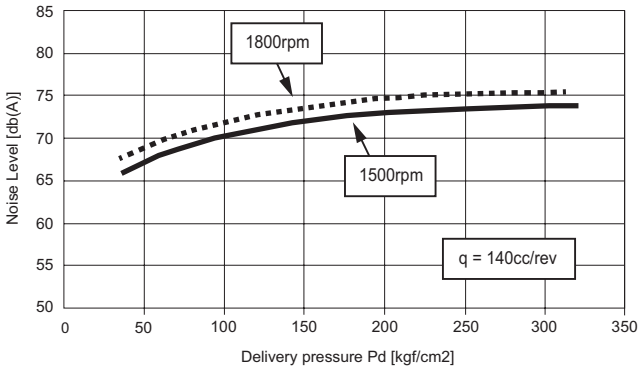
Self Priming Capability



Bearing Life

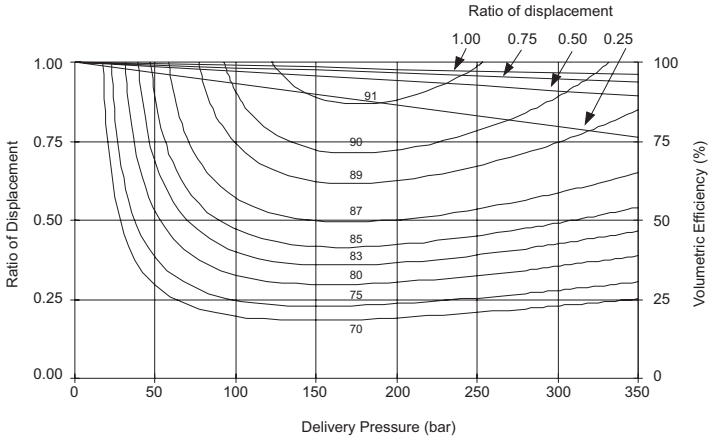


Noise Level

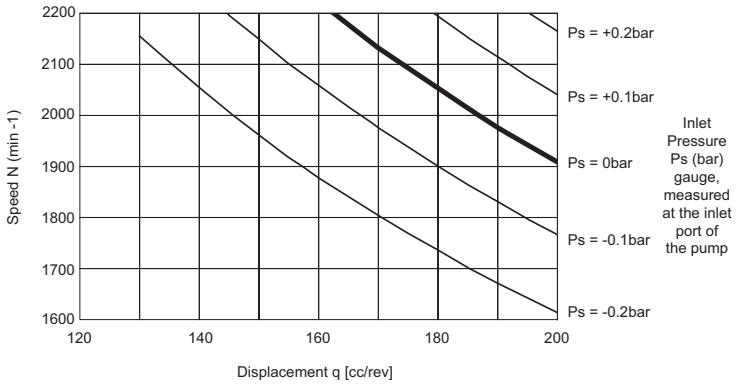


Performance K3VL200

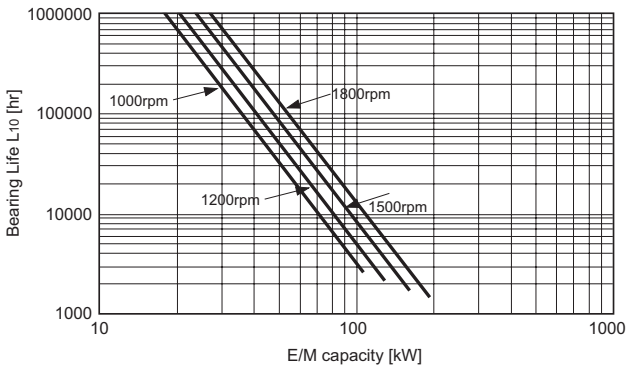
Pump Efficiency (%)



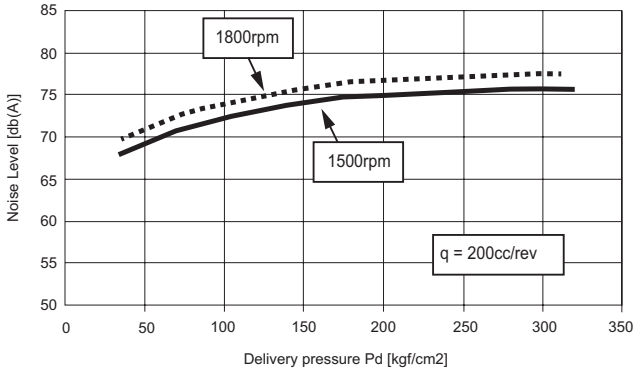
Self Priming Capability



Bearing Life

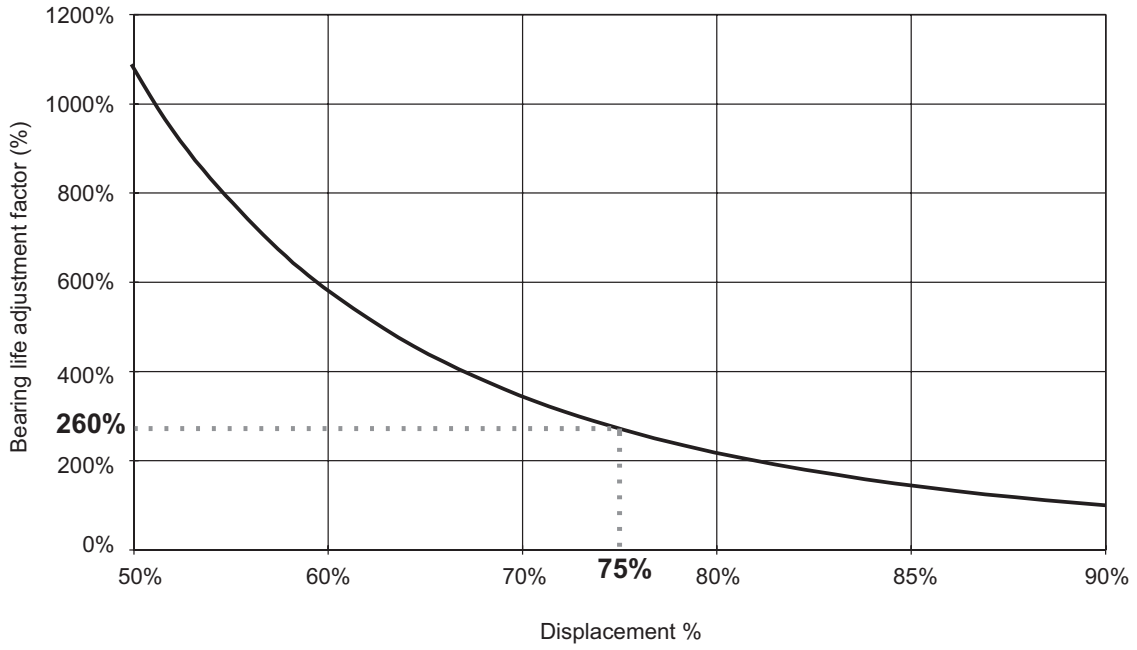


Noise Level



Bearing Life (continued)

Bearing Life Correction Factors for Partial Displacement



All bearing life curves on the previous pages refer to L10 life at full displacement. The foregoing curve is therefore to be used where duty cycle considerations require one to compute weighted life, which include partial displacement conditions.

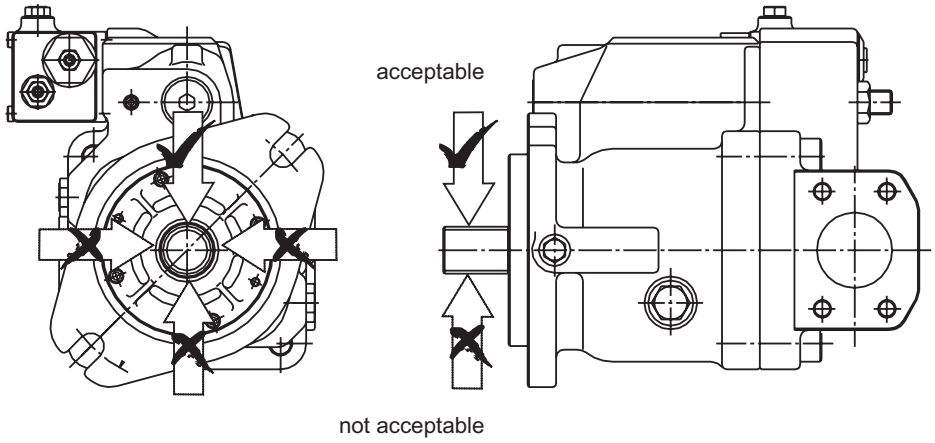
For example as shown above if the bearing life at full displacement from the previous graphs was say 50,000 hours, then at the same operating condition with only 75% displacement the bearing life would be 260% of 50,000 hours or 130,000 hours.

Radial Loading Capacity

No axial shaft loading possible Radial loading is achievable but in specific orientation:-

In addition because of the high bearing capacity of the front bearing, radial shaft loading can be allowed provided that its orientation is such that the front bearing takes the additional load (See diagram below).

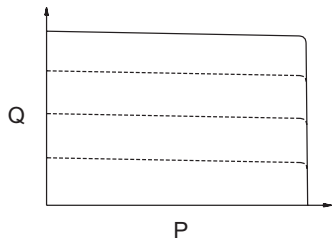
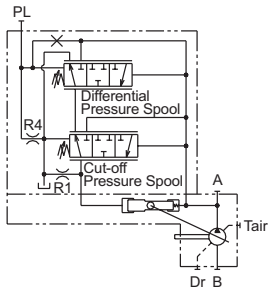
Note: In this case bearing life will be reduced.



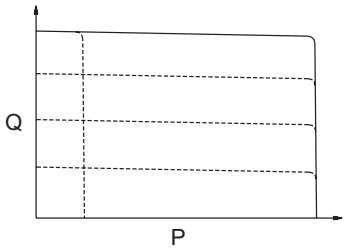
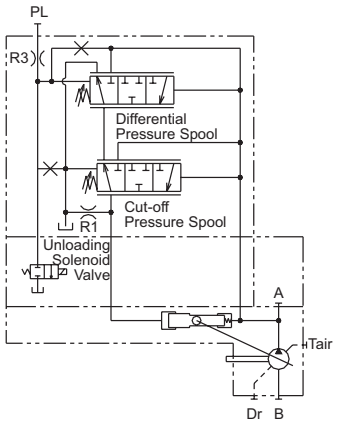
Functional Description of Regulator

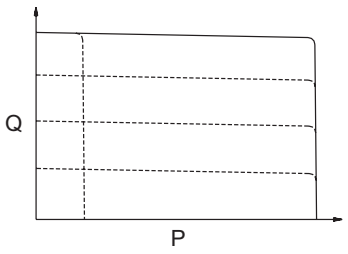
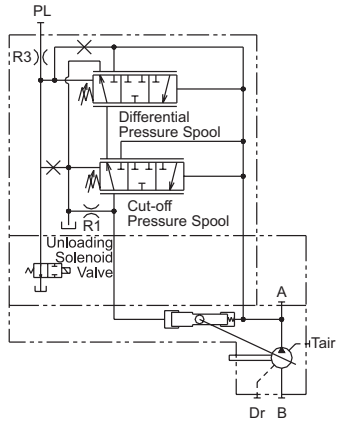
Key to Hydraulic Circuit Annotations	
Annotations	**Description**
A	Main pump delivery
A_1	Auxiliary pump delivery
B_1	Gear pump inlet
B	Main pump inlet
Dr	Drain
Pc	Remote pilot port, Pressure compensator
Pi	Pilot port displacement control
P_L	Load sense port
Tair	Air bleed port

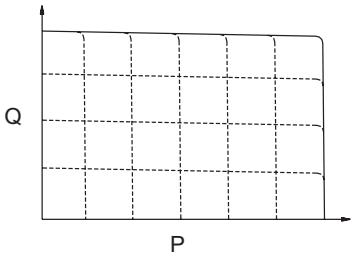
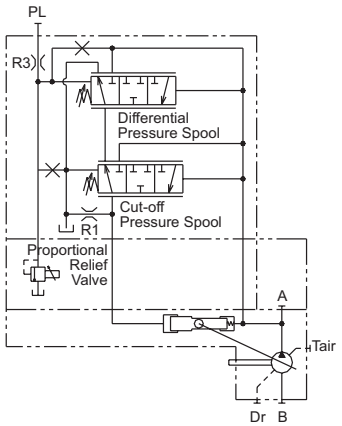
Notes: The optional attached gear pump is recommended for all displacement control options. Hydraulic circuit diagrams illustrate the attached gear pump when required.

Regulator Code	Control Curves	Hydraulic Circuit
L0/L1 Load Sense and Pressure Cut-off Pump displacement is controlled to match the flow requirement as a function of the system differential pressure (load pressure vs delivery pressure). In addition, there is a pressure cut off function incorporated into the control. With the L1 option,the bleed-off orifice R4 is plugged.		

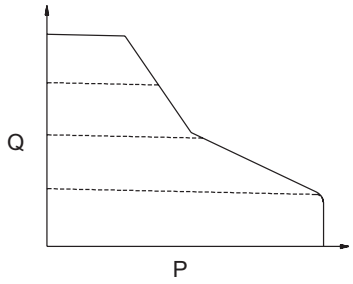
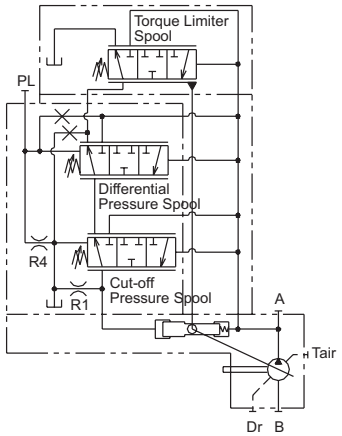
Functional Description of Regulator (continued)

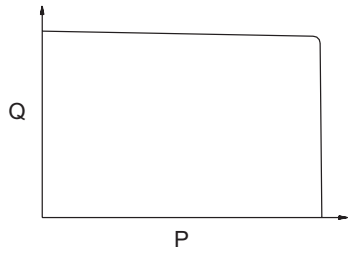
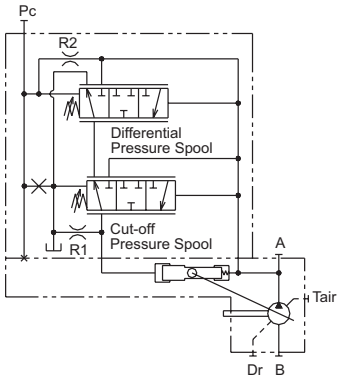
Regulator Code	Control Curves	Hydraulic Circuit
LN Load Sense and Pressure Cut-off with Integrated Unloading Valve (Normally Closed) An integrated unloading valve is sandwiched between the Load Sense regulator and pump to effectively de-stroke the swashplate when an electric signal is provided.		

Regulator Code	Control Curves	Hydraulic Circuit
LM Load Sense and Pressure Cut-off with Integrated Unloading Valve (Normally Open) An integrated unloading valve is sandwiched between the Load Sense regulator and the pump. An electrical signal must be provided to prevent the Load Sense line from draining.		

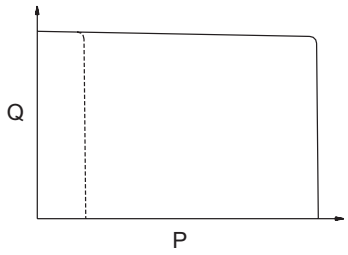
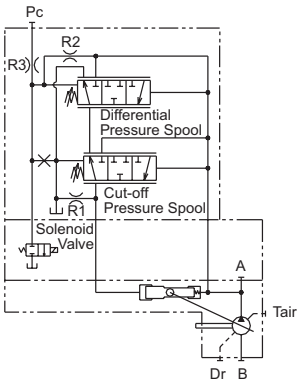
Regulator Code	Control Curves	Hydraulic Circuit
LV Load Sense and Pressure Cut-off with Integrated Proportional Relief Valve An integrated proportional relief valve is sandwiched between the Load Sense regulator and pump to control the maximum pressure setting by varying an electric signal to the valve. A separate amplifier is required.		

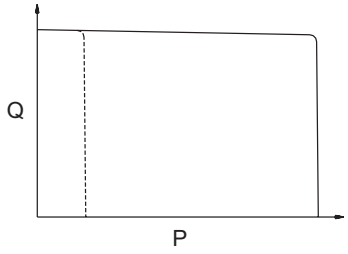
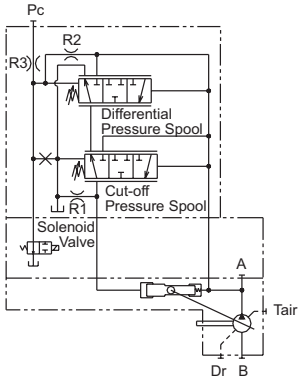
Functional Description of Regulator (continued)

Regulator Code	Control Curves	Hydraulic Circuit
L0/1 Load Sense and Pressure Cut-off with Torque Limiting L0/L1 control functions as previously noted. In response to a rise in delivery pressure the swashplate angle is decreased, restricting the input torque. This regulator prevents excessive load against the prime mover. The torque limit control module is comprised of two springs that oppose the spool force generated by the system pressure. By turning an outer and inner spring adjustment screw, the appropriate input torque limit can be set.		

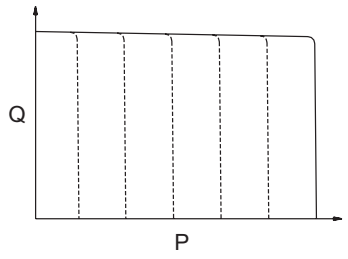
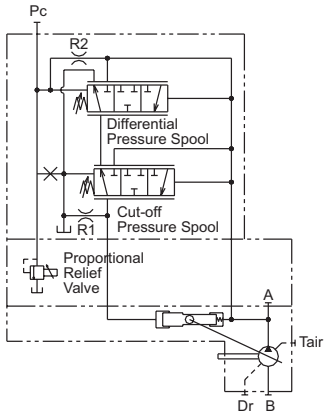
Regulator Code	Control Curves	Hydraulic Circuit
P0 Pressure Cut-off As system pressure rises to the cut-off setting, the swashplate de-strokes to prevent the system pressure from exceeding the compensator setting. It is imperative that a safety relief valve be installed in the system. *Note:* By connecting the Pc port to a remote pressure control, variable pump pressure control can be achieved.		

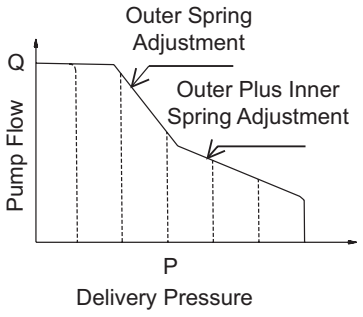
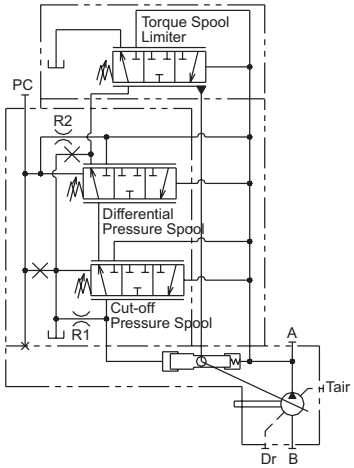
Functional Description of Regulator (continued)

Regulator Code	Control Curves	Hydraulic Circuit
PN Pressure Cut-off with Integrated Unloading Valve (Normally Closed) An integrated unloading valve is sandwiched between the Pressure Cut-off regulator and pump to effectively de-stroke the swashplate when an electric signal is provided.		

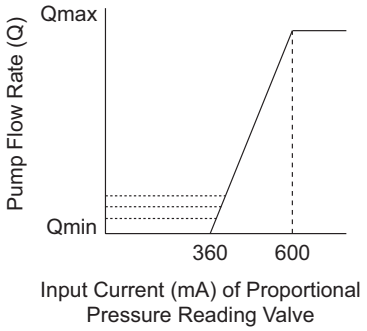
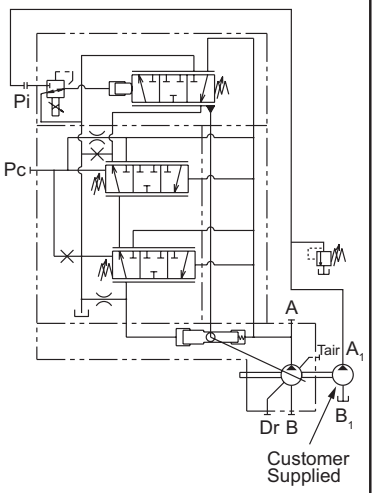
Regulator Code	Control Curves	Hydraulic Circuit
PM Pressure Cut-off with Integrated Unloading Valve (Normally Open) An integrated unloading valve is sandwiched between the Pressure Cut-off regulator and the pump. An electrical signal must be provided to prevent the Pc line from draining.		

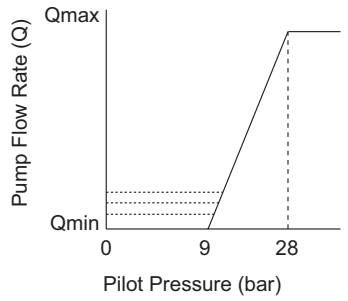
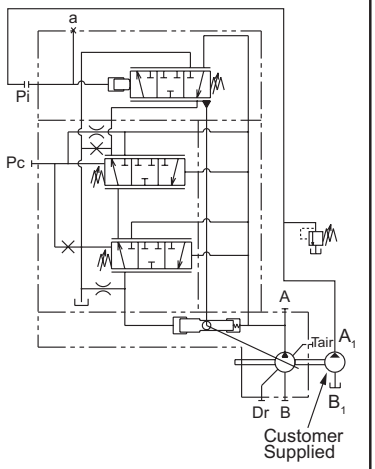
Functional Description of Regulator (continued)

Regulator Code	Control Curves	Hydraulic Circuit
PV Pressure Cut-off with Integrated Proportional Relief Valve An integrated proportional relief valve is sandwiched between the Pressure Cut-off regulator and the pump to control the maximum pressure setting by varying an electric signal to the valve. A separate amplifier is required.		

Regulator Code	Control Curves	Hydraulic Circuit
P0/1 Pressure Cut-off with Torque Limiting P0/1 control functions as previously noted. In response to a rise in delivery pressure the swashplate angle is reduced, restricting the input torque. This regulator prevents excessive load against the prime mover. The torque limit control module is comprised of two springs that oppose the spool force generated by the system pressure. By turning an outer and inner spring adjustment screw, the appropriate input torque limit can be set. Note: By connecting the Pc port to a remote pressure control, variable pump pressure control can be achieved.		

Functional Description of Regulator (continued)

Regulator Code	Control Curves	Hydraulic Circuit
/1-E0 Electrical Displacement Control Varying the input current signal to the pump controller's electronic proportional pressure reducing valve (PPRV) allows the user to control the pump displacement. As the current signal to the PPRV increases, the pump displacement increases proportionally. *Note:* An external pressure supply of 40 bar is required at the Pi Port (50bar max).		

Regulator Code	Control Curves	Hydraulic Circuit
/1-Q0 Pilot Operated Displacement Control Varying the input pressure signal to the Pi port allows the user to control the pump displacement. As the pressure signal to the Pi increases, the pump displacement increases proportionally.		

Torque Limiter Settings

The following tabulations show the power limitation at various electric motor speeds for a specific pump. When selecting a control setting please ensure that the power limitation of a particularly sized electric motor to your national standard is not exceeded.

K3VL45				
KW	**970**	**1150**	**1450**	**1750**
3.7	S3	S4		
5.5	L3	S1	S3	S4
7.5	L1	L2	L4	S2
11	M1	M3	L1	L2
15	H3	H4	M2	M4
18.5		H2	H4	M2
22			H3	H4
30				H1
37				
45				
55				
75				
90				

K3VL80				
KW	**970**	**1150**	**1450**	**1750**
3.7				
5.5	S2	S4		
7.5	L6	S1	S3	
11	L2	L4	L6	S1
15	M4	L1	L3	L5
18.5	M1	M3	L1	L3
22	H3	M1	M4	L1
30	H1	H2	H4	M2
37			H2	H4
45			H1	H2
55				H1
75				
90				

K3VL112				
KW	**970**	**1150**	**1450**	**1750**
3.7				
5.5				
7.5	S5	S6		
11	S1	S3	S5	S6
15	L3	L4	S2	S4
18.5	M4	L2	L4	S2
22	M2	M4	L3	L4
30	H4	M1	M3	L1
37	H2	H3	M1	M3
45		H2	H4	M1
55			H2	H4
75				H1
90				

K3VL140				
KW	**970**	**1150**	**1450**	**1750**
3.7				
5.5				
7.5				
11	S2	S4		
15	L6	S1	S3	
18.5	L3	L5	S1	S3
22	L1	L3	L6	S1
30	M2	M3	L2	L4
37	H4	M1	M3	L2
45	H2	H4	M2	M3
55		H2	H4	M2
75			H1	H3
90				H1

K3VL200				
KW	**970**	**1150**	**1450**	**1750**
3.7				
5.5				
7.5				
11				
15				
18.5	S1			
22	L4	S1		
30	L2	L3	L5	S2
37	M3	L1	L3	L5
45	M1	M3	L2	L3
55	H5	M1	M3	L2
75	H1	H3	H6	M2
90		H1	H4	H6
110			H2	H4
132				H2

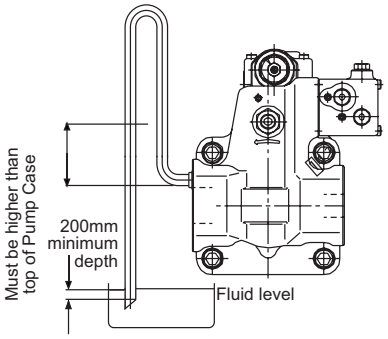
S-rating Springs
Please contact Kawasaki

Installation

Pump Mounting Options

Drain line

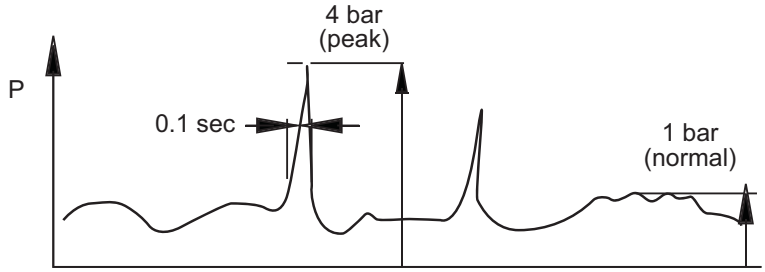
It is the preferred option to mount the pump with the case drain piping initially rising above the pump before continuing to the tank. Do not connect the drain line to the inlet line.



Cautions

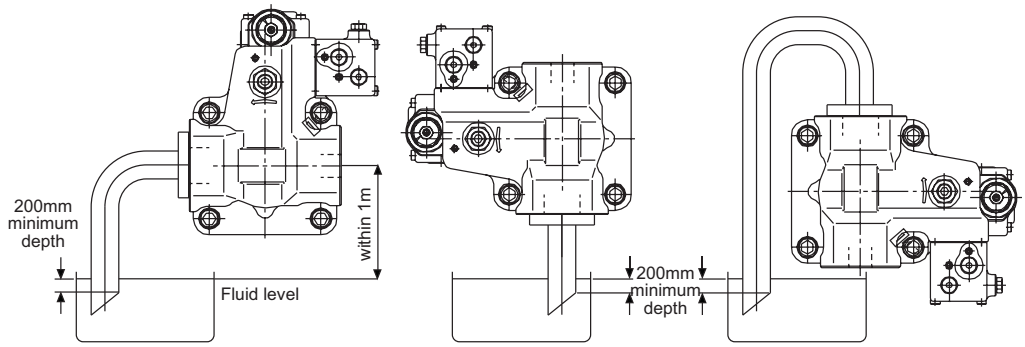
A) Inlet and drain pipes must be immersed by 200mm minimum from the lowest oil level under operating conditions.
B) Height from the oil level to the centre of the shaft must be within 1 meter maximum. (consult Kawasaki).
C) The oil in the pump case must be refilled when the pump has not been operated for one month or longer.

The uppermost drain port should be used and the drain piping should be equal or larger in size than the drain port to minimise pressure in the pump case. The pump case pressure should not exceed 1 bar as shown in the illustration below. (Peak pressure should never exceed 4 bar.)



Mounting the Pump Above the Tank

Suction line



Installation (continued)

Mounting the Pump Vertically (shaft up)

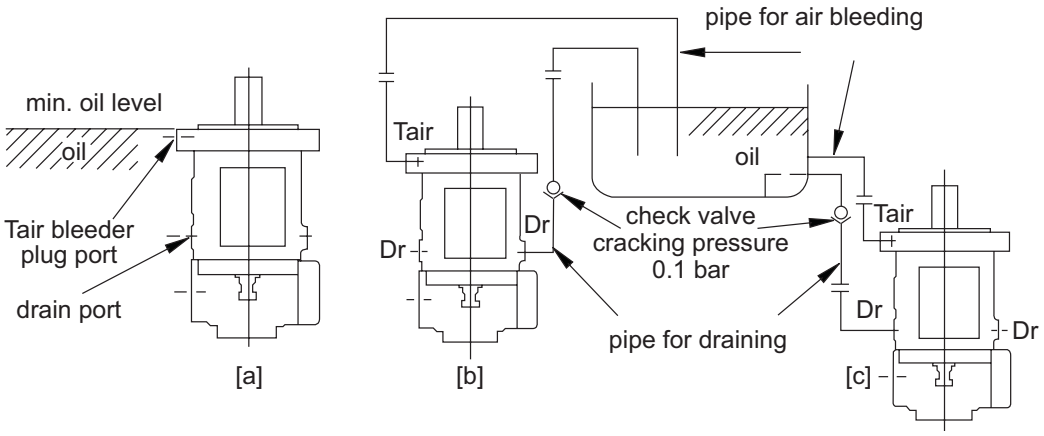
Note: Both the Tair and one case drain port must be used.

For applications requiring vertical installation (shaft up) please remove the Tair bleed plug and connect piping as shown in the illustration below.

When installing the pump in the tank and submerged in the oil, open the drain port and Tair bleed port to provide adequate lubrication to the internal components. See illustration [a].

The oil level in the tank should be higher than the pump-mounting flange as shown in illustration [a] below. If the oil level in the tank is lower than the pump mounting flange then forced lubrication is required through the Tair bleed port 1 ~ 2 l/min.

When installing the pump outside the tank run piping for the drain and Tair bleed ports to tank (see illustration [c]). If the drain or Tair bleed piping rise above the level of oil (see illustration [b]) fill the lines with oil before operation.motor to your national standard is not exceeded.



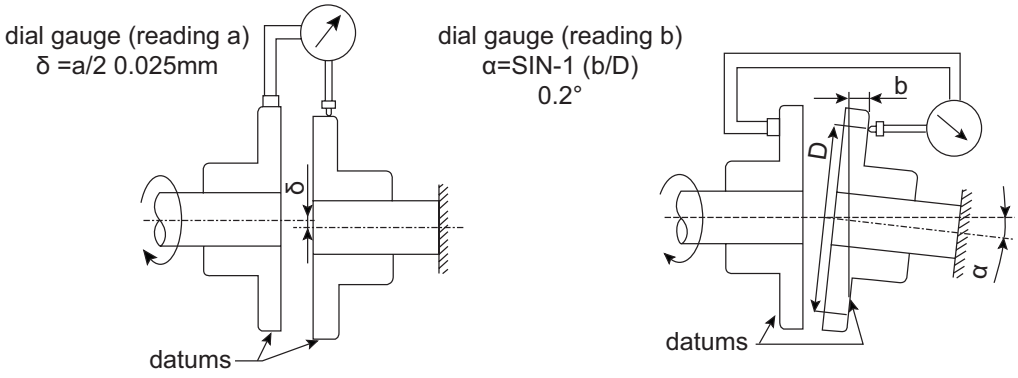
A check valve with cracking pressure of 0.1 bar should be fitted to the case drain line as shown.

Drive Shaft Coupling

Use a flexible coupling to connect the pump shaft to an engine flywheel or electric motor shaft. Alignment should be within 0.05mm TIR as shown in the illustration below.

Do not apply any radial or axial loading to the pump shaft. For applications where radial or side loads exist please contact Kawasaki Precision Machinery (UK) Ltd. for recommendations.

Do not force the coupling on or off the pump shaft. Use the threaded hole in the end of the pump shaft to fix or remove the coupling.



For engine drives a split type pinch bolt drive flange and flexible coupling is recommended.

Moment of Inertia and Torsional Stiffness

	Moment of Inertia GD^2 ($kgf \cdot m^2$)	**Torsional Stiffness** ($N \cdot m/rad$)
K3VL45	1.54×10^{-2}	3.59×10^{4}
K3VL80	2.92×10^{-2}	4.83×10^{4}
K3VL112	8.06×10^{-2}	9.33×10^{4}
K3VL140	8.06×10^{-2}	9.33×10^{4}
K3VL200	1.83×10^{-1}	1.54×10^{5}

Through Drive Limitations (continued)

Pump over all length mm	
Frame size	Single pump type N
45	244
80	272
112/140	307.5
200	359

Pump Size	Maximum Permisable Bending Moment (Nm)
45	137
80	244
112/140	462
200	930

Pump approx weight Kg	
Single pump type N	
Without Torque limitor	With Torque limitor
28	30
38	40
69	71
103	105

Pump CofG from mount mm	
Frame size	Single pump type N
45	120
80	130
112/140	150
200	190

Adaptor Kits Weight & Width			
Pump size	Adaptor Kit	Weight Kg	Width mm
45	SAE “A”	0	0
	SAE “B” & “BB”	2	20
80	SAE “A”	0	0
	SAE “B” & “BB”	3	20
	SAE “C” & “C4”	4	24.5
112 & 140	SAE “A”	0	0
	SAE “B” & “BB”	3	25
	SAE “C”, “CC” & “C4”	5	30
	SAE “D”	10	43
200	SAE “A”	1	6
	SAE “B” & “BB”	8	25
	SAE “C”, “CC” & “C4”	8	30
	SAE “D”	10	38
	SAE “E”	15	38

Through Drive Limitations

Apart from predefined maximum throughput limitations, one must also ensure that to prevent a possible excessive bending moment occurring that the maximum combined bending moment of the combination is not exceeded as determined in the following expression

Electrical and Pilot Operated Displacement Control (Type E0, Q0)

Type E0 - Typical minimum flow setting for the K3VL pump is 0.5-3.0% of the maximum pump delivery. In order for the electronic displacement control to function, a minimum pilot pressure of 40 bar must be supplied to the Pi port on the regulator. A gear pump attached to the rear of the K3VL pump or an external pressure source can be used to provide the required pilot pressure.

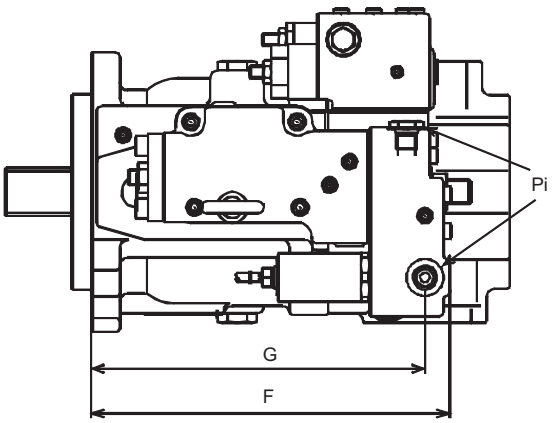
Type Q0 - In order for the Q0 displacement control to function, a varible pilot pressure between 0 and 40 bar is required.

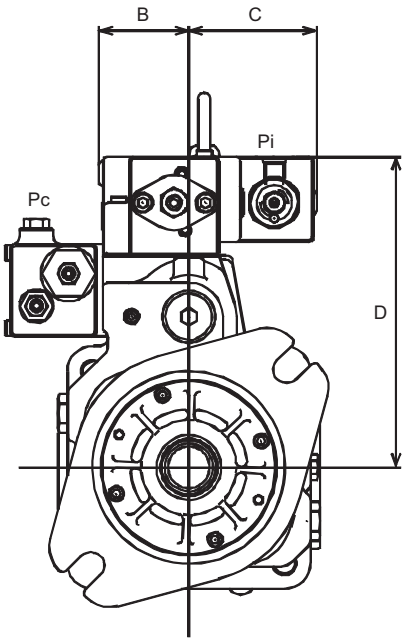
Proportional Pressure Reducing Valve Specification

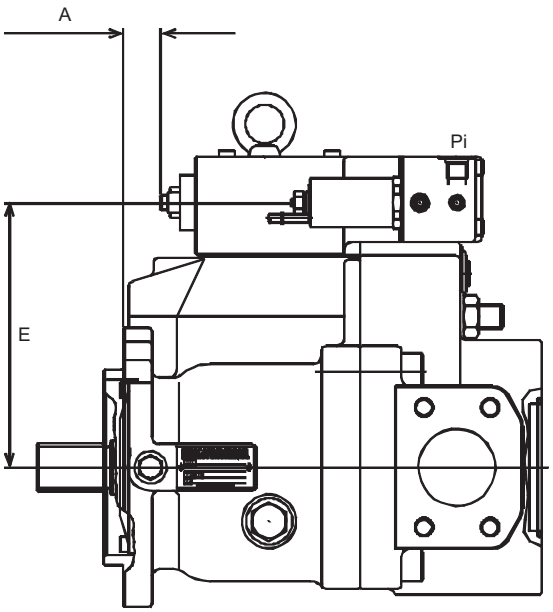
Maximum Pilot Pressure	:	50 bar (If higher pressure required contact KPM)
Max Flow	:	10 l/min
Hydraulic oil	:	Mineral oil
Oil temp range	:	-20~+90°C
Viscosity range	:	5~500 cst
Allowable contamination	:	NAS grade 10 and below
Electrical specifications,		
Rated current	:	700 mA
Recommended dither	:	80 Hz / 200 mAp-p
Coil resistance	:	17.5 Ω(at 20°C)
Ambient temperature range	:	-30~+80°C
Water resistance	:	According to JIS D 0203 S2

Unit Dimensions (continued)

Electrical Displacement Control







Installation Dimensions (mm)

Pump Size	A	B	C	D	E	F	G
K3VL45	21	52	90	187	157	226	210
K3VL80	25	59	83	202	172	233	217
K3VL112/140	38	64	78	244	214	247	231
K3VL200	57	61	80	258	229	257	249

Unit Dimensions (continued)

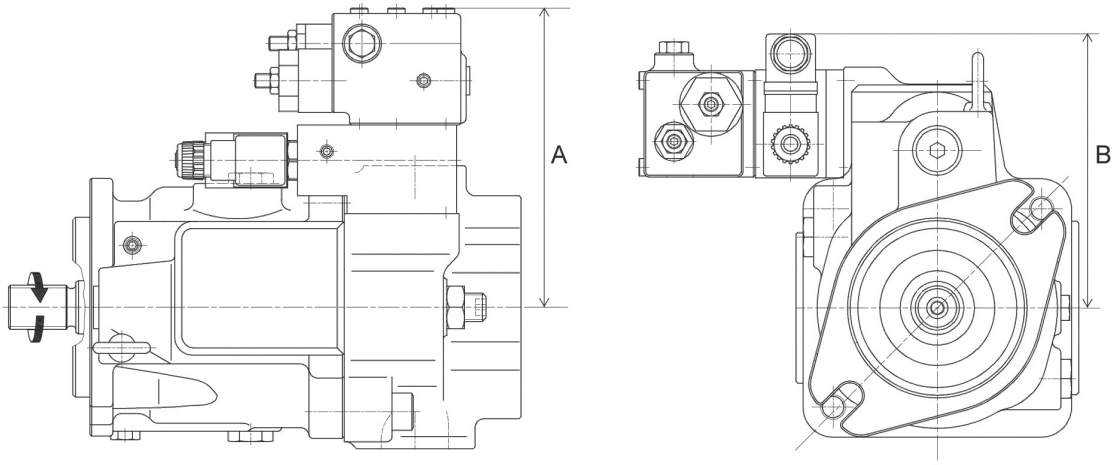
Unloading valve module (Type N,M)

	A	B
K3VL45	169	155
K3VL80	169	166
K3VL112/140	202	190
K3VL200	212	205

Proportional pressure module (*V)

	A	B
K3VL45	179	233
K3VL80	179	244
K3VL112/140	212	280
K3VL200	222	295

A: Distance between the centre line of the pump and the top of the bolt head for the cut off regulator.
B: Distance between the centre line of the pump and top of the solenoid valve.

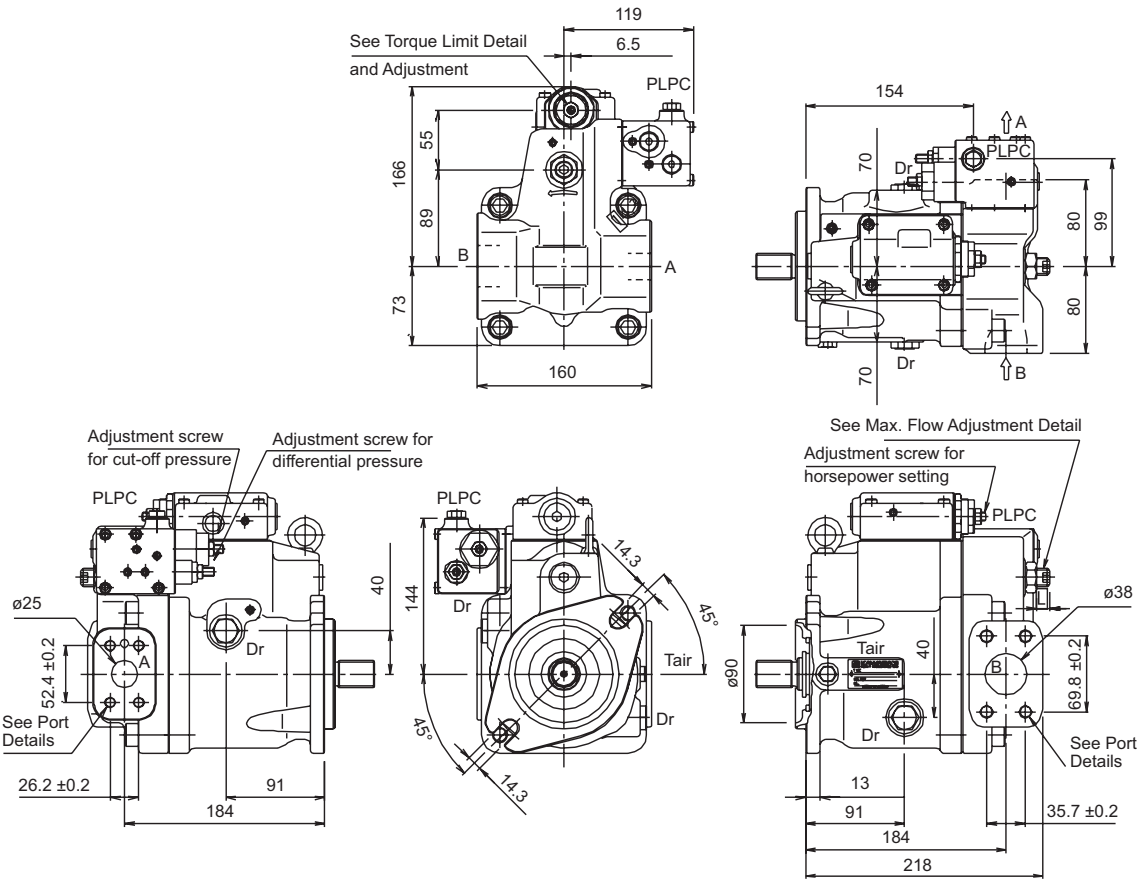


Unit Dimensions

K3VL45 Installation

K3VL45 with Cut-Off / Load Sense Control
& Torque Limit Module (Clockwise Rotation)

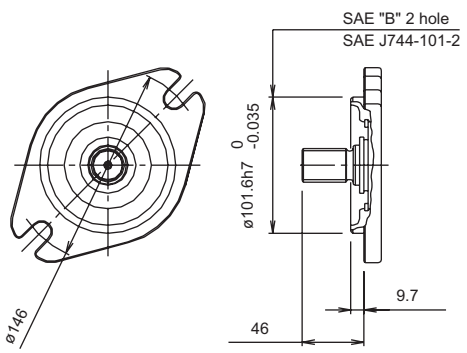
Note:
for counter clockwise rotation,
the inlet port “B” and the
delivery port “A” are reversed



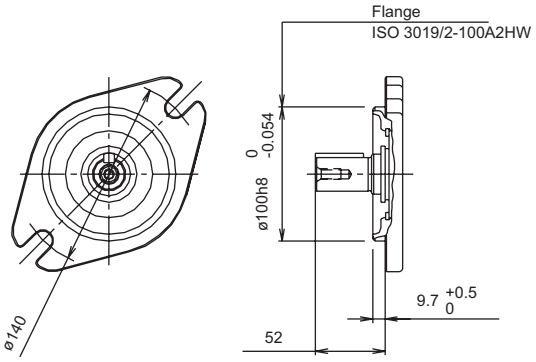
Unit Dimensions (continued)

K3VL45 Mounting Flange and Shaft Options

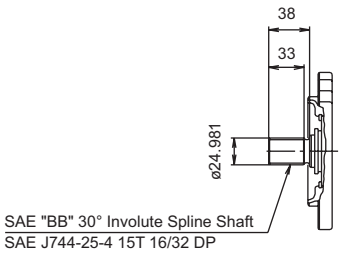
SAE Type



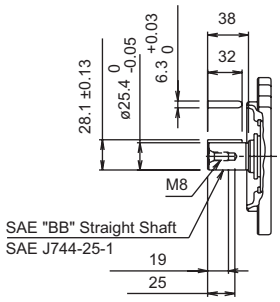
ISO Type



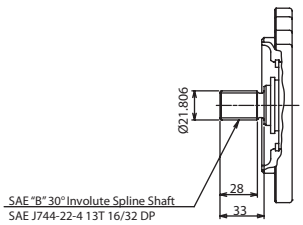
SAE “BB” Spline Shaft



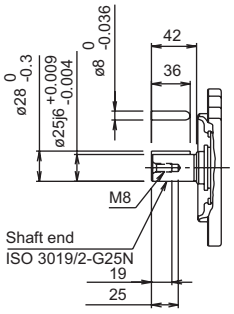
SAE “BB” Straight Shaft



SAE “B” Spline Shaft

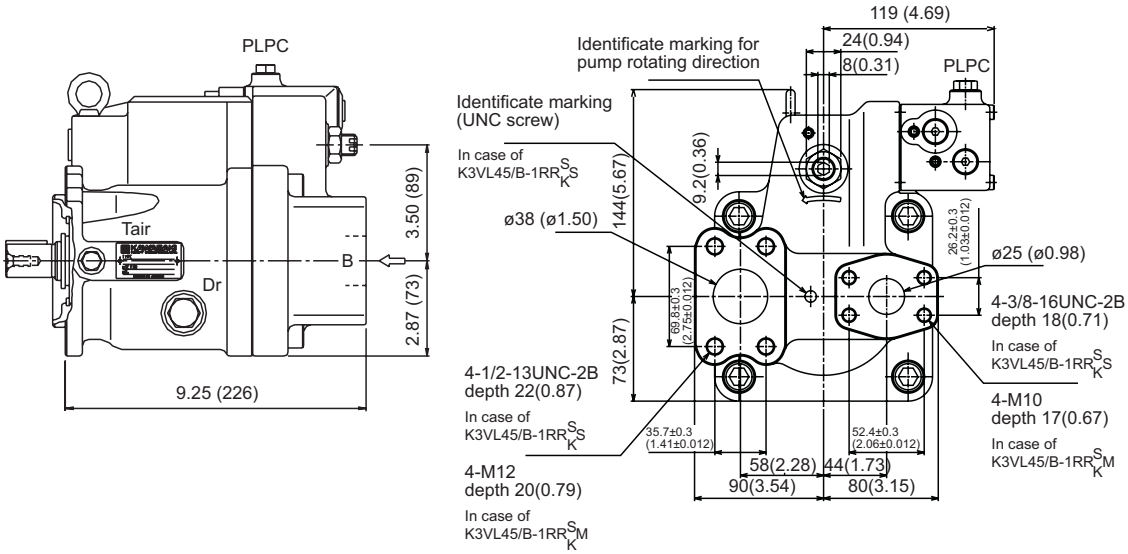


ISO Straight Shaft



Unit Dimensions (continued)

K3VL45 Rear Port



K3VL45 Porting Details

Main SAE Flanged Ports

Des.	Port Name	Port Size	Tightening Torque (Nm)	Flange Threads
UNF Threaded Version ("S" in position 9 of model code)				
A	Delivery Port	SAE J518C Std pressure (code 61) 1"	57	3/8-16UNC-2B x 18mm
B	Suction Port	SAE J518C Std pressure (code 61) 1 1/2"	98	1/2-13UNC-2B x 22mm
Metric Version ("M" in position 9 of model code)				
A	Delivery Port	SAE J518C Std pressure (code 61) 1"	57	M10 x 17
B	Suction Port	SAE J518C Std pressure (code 61) 1 1/2"	98	M12 x 20

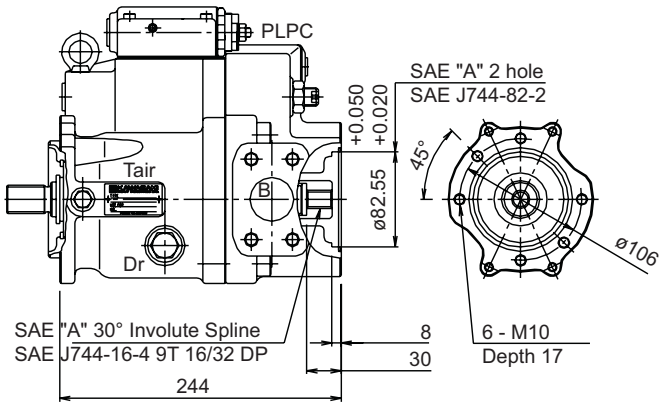
Auxiliary Ports

Des.	Port Name	Port Size	Tightening Torque (Nm)
SAE Version ("S", "K", "U" or "T" in position 8 of model)			
Dr	Drain Port (x2)	SAE J1926/1 Straight thread O ring boss 1/2" OD Tube 3/4-16UNF-2B	98
PLPC	Load Sensing Port Pressure Control Port	SAE J1926/1 Straight thread O ring boss 1/4" OD Tube 7/16-20UNF-2B	12
Tair	Air Bleeder Port	SAE J1926/1 Straight thread O ring boss 1/4" OD Tube 7/16-20UNF-2B	12
ISO Version ("M" in position 8 of model code)			
Dr	Drain Port (x2)	M22 x 1.5 DIN 3852	98
PLPC	Load Sensing Port Pressure Control Port	M14 x 1.5 DIN 3852	25
Tair	Air Bleeder Port	M14 x 1.5 DIN 3852	25

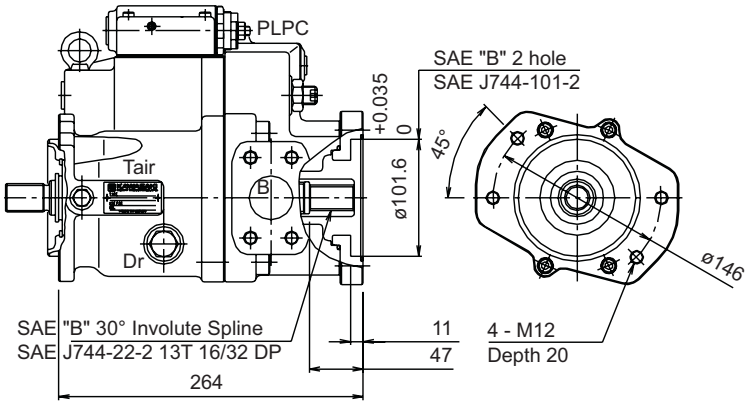
Unit Dimensions (continued)

K3VL45 Through Drive Options

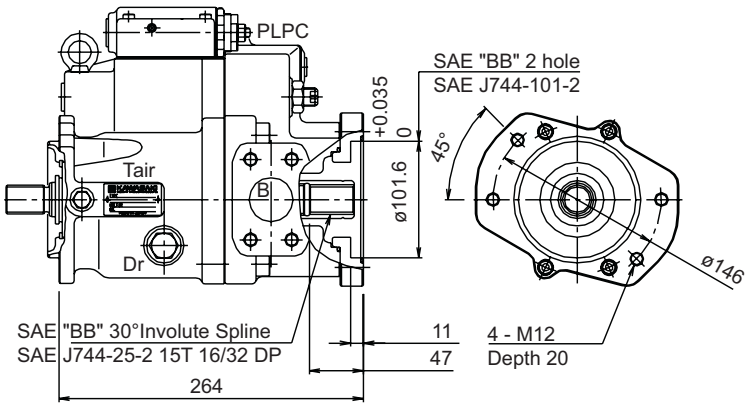
Through Drive "A"



Through Drive "B"

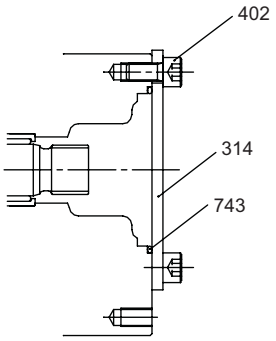


Through Drive "BB"

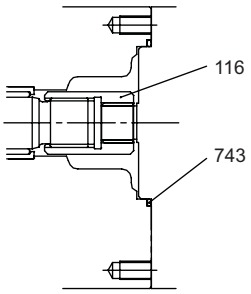


Unit Dimensions (continued)

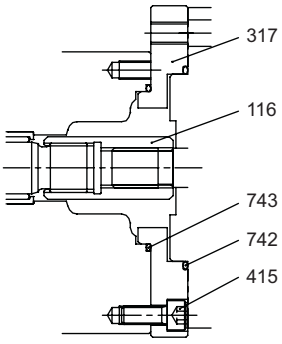
K3VL45 Adaptor Kits



Cover Kit



SAE “A”
T/D Kit



SAE “B” & “BB”
T/D Kit

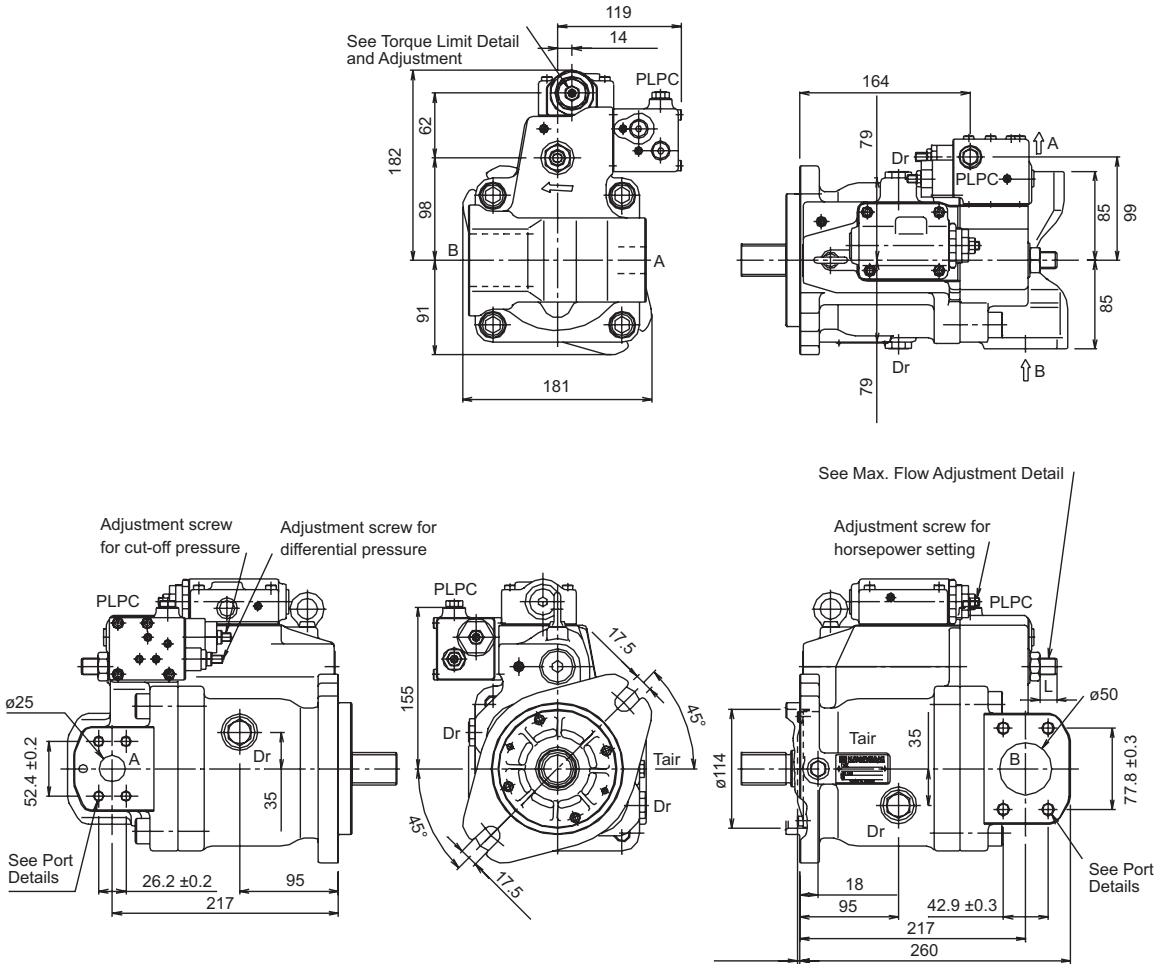
No.	Part Name	QTY	Cover Kit	SAE "A" T/D Kit	SAE "B" T/D Kit	SAE "BB" T/D Kit
—	T/D Kit		29L8TN	29L4TA	29L4TB	29L4T2
743	O-Ring	1	00RBG85	00RBG85	00RBG85	00RBG85
742	O-Ring	1			00RBG105	00RBG105
415	Screw Hex SHC	4			0SBM825	0SBM825
402	Screw Hex SHC	2	0SBM1020			
317	Subplate	1			2924750-0358	2924750-0358
314	Cover	1	2923150-0316			
116	Coupling	1		2903150-0264	2903150-0265	2903150-0266

Unit Dimensions (continued)

K3VL80 Installation

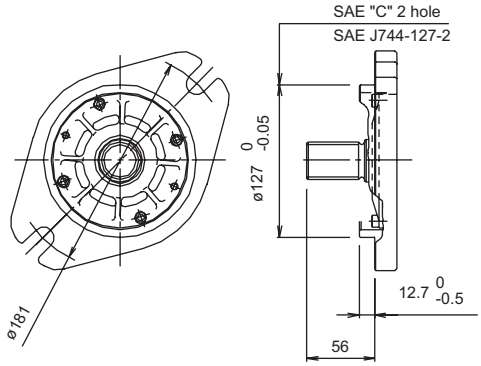
K3VL80 with Cut-Off / Load Sense Control
& Torque Limit Module (Clockwise Rotation)

Note
for counter clockwise rotation,
the suction port “B” and the
delivery port “A” are reversed

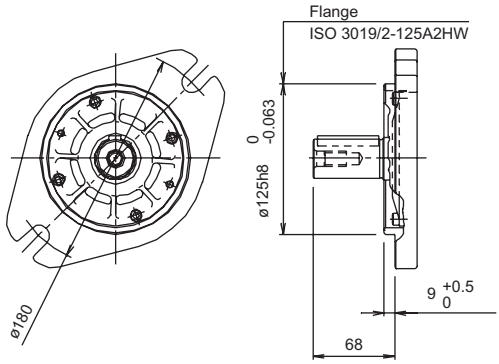


Unit Dimensions (continued)
K3VL80 Mounting Flange and Shaft Options

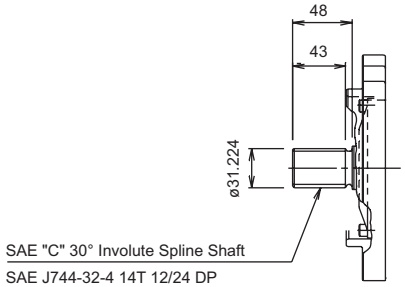
SAE Type



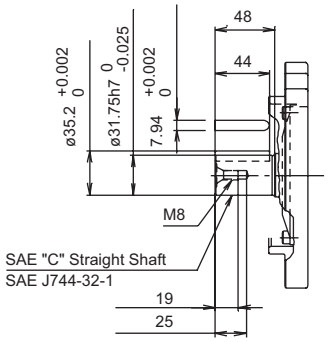
ISO Type



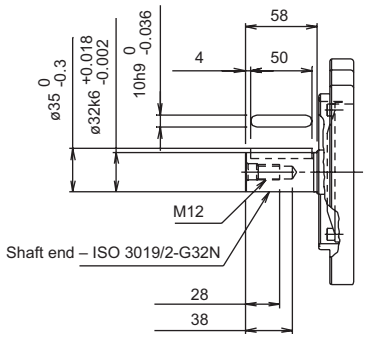
SAE “C” Spline Shaft



SAE “C” Straight Shaft

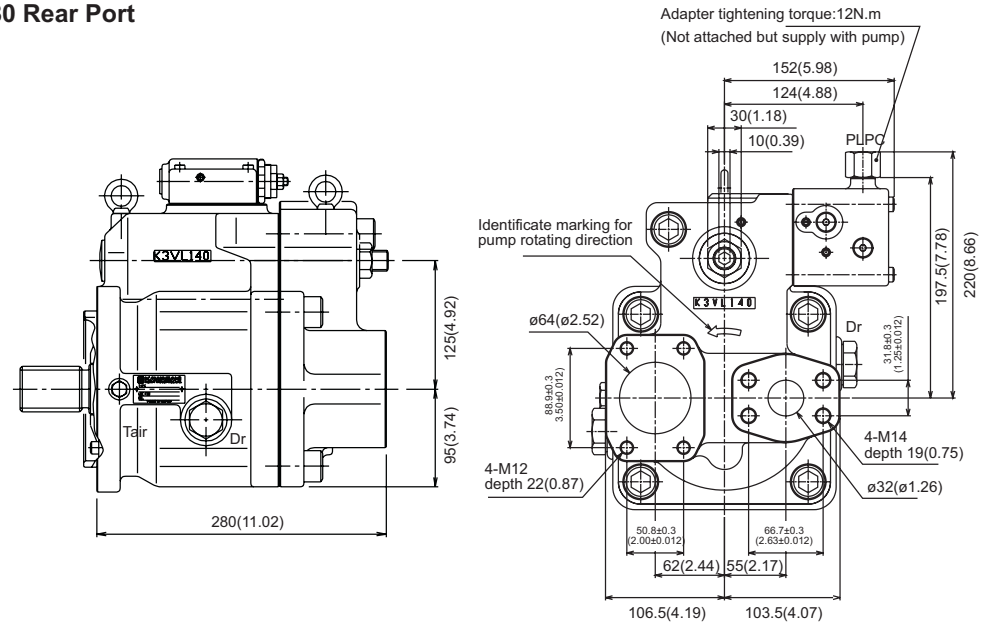


ISO Straight Shaft



Unit Dimensions (continued)

K3VL80 Rear Port



K3VL80 Porting Details

Main SAE Flanged Ports

Des.	Port Name	Port Size	Tightening Torque (Nm)	Flange Threads
UNF Threaded Version ("S" in position 9 of model code)				
A	Delivery Port	SAE J518C Std pressure (code 61) 1"	57	3/8-16UNC-2B x 18mm
B	Suction Port	SAE J518C Std pressure (code 61) 2"	98	1/2-13UNC-2B x 22mm
Metric Version ("M" in position 9 of model code)				
A	Delivery Port	SAE J518C Std pressure (code 61) 1"	57	M10 x 17
B	Suction Port	SAE J518C Std pressure (code 61) 2"	98	M12 x 20

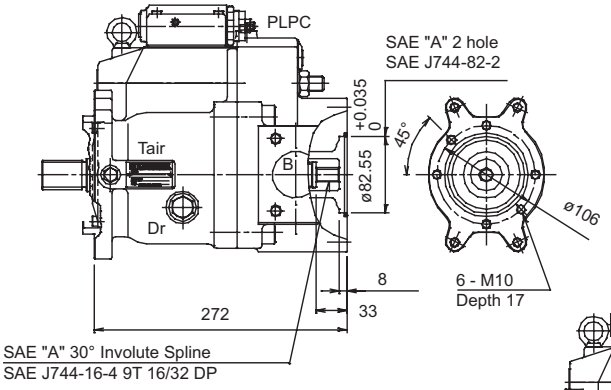
Auxiliary Ports

Des.	Port Name	Port Size	Tightening Torque (Nm)
SAE Version ("S", "K", or "T" in position 8 of model)			
Dr	Drain Port (x2)	SAE J1926/1 Straight thread O ring boss 1/2" OD Tube 3/4-16UNF-2B	98
PLPC	Load Sensing Port Pressure Control Port	SAE J1926/1 Straight thread O ring boss 1/4" OD Tube 7/16-20UNF-2B	12
Tair	Air Bleeder Port	SAE J1926/1 Straight thread O ring boss 1/4" OD Tube 7/16-20UNF-2B	12
ISO Version ("M" in position 8 of model code)			
Dr	Drain Port (x2)	M22 x 1.5 DIN 3852	98
PLPC	Load Sensing Port Pressure Control Port	M14 x 1.5 DIN 3852	25
Tair	Air Bleeder Port	M14 x 1.5 DIN 3852	25

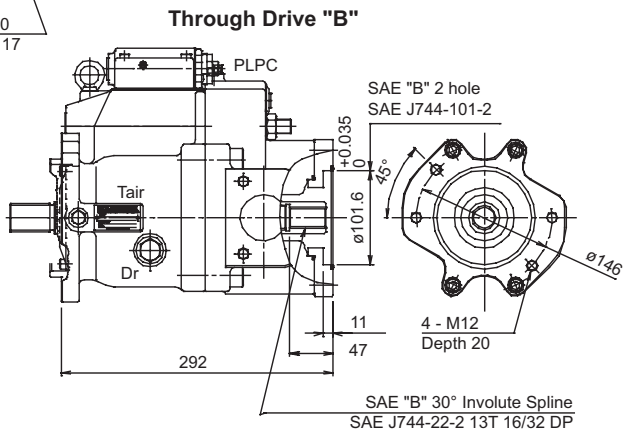
Unit Dimensions (continued)

K3VL80 Through Drive Options

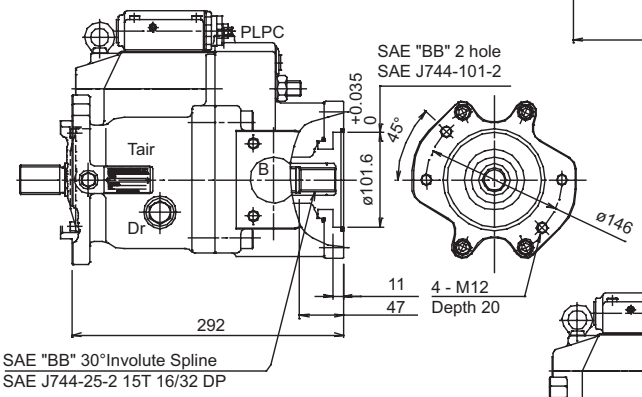
Through Drive "A"



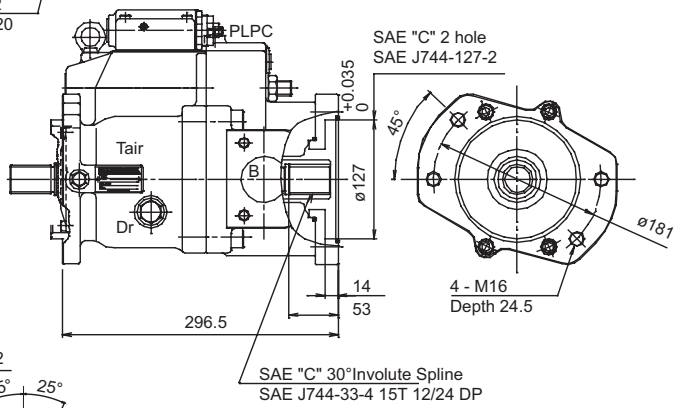
Through Drive "B"



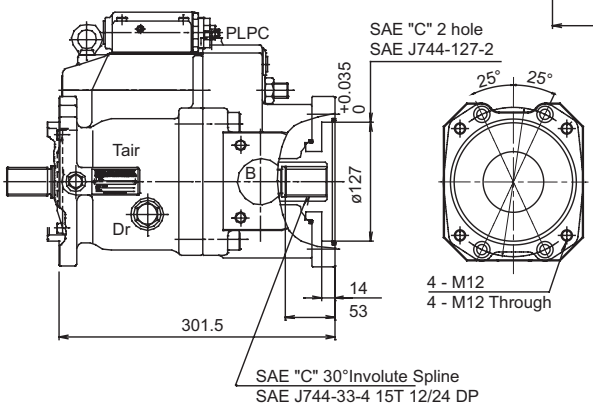
Through Drive "BB"



Through Drive "C"

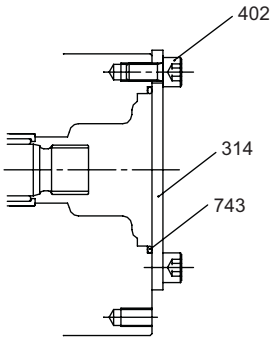


Through Drive "C4"

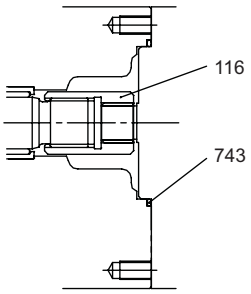


Unit Dimensions (continued)

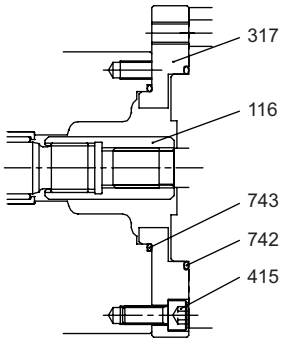
K3VL80 Adaptor Kits



Cover Kit



SAE “A”
T/D Kit



SAE “B”, “BB”, “C” & “C4”
T/D Kit

No.	Part Name	QTY	Cover Kit	SAE "A" T/D Kit	SAE "B" T/D Kit	SAE "BB" T/D Kit
—	T/D Kit		29L8TN	29L8TA	29L8TB	29L8T2
743	O-Ring	1	00RBG85	00RBG85	00RBG85	00RBG85
742	O-Ring	1			00RBG105	00RBG105
415	Screw Hex SHC	4			0SBM1025	0SBM1025
402	Screw Hex SHC	2	0SBM1020			
317	Subplate	1			2924750-0354	2924750-0354
314	Cover	1	2923150-0316			
116	Coupling	1		2903150-0241	2903150-0262	2903150-0267

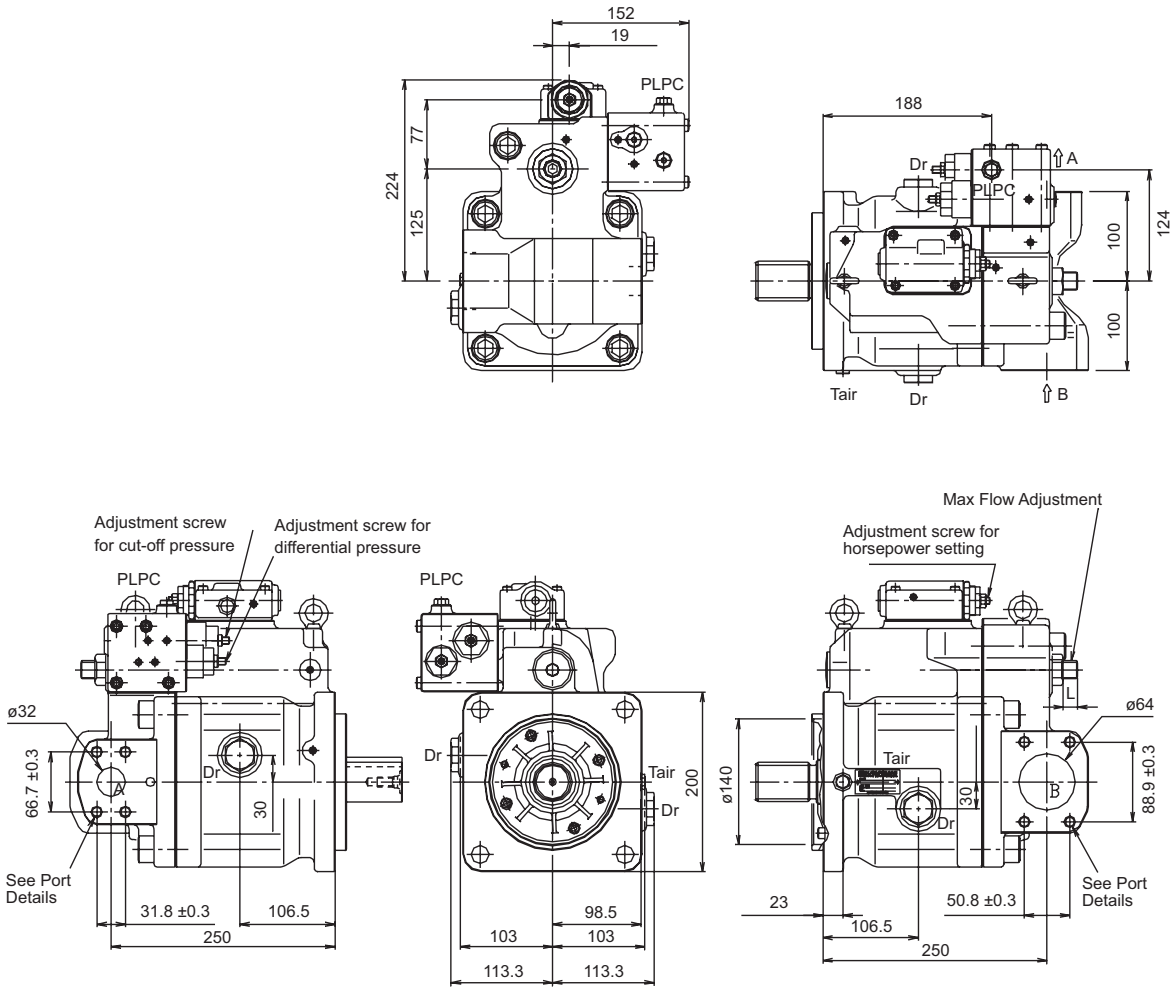
No.	Part Name	QTY	SAE "C" T/D Kit	SAE "C4" T/D Kit
—	T/D Kit		29L8TC	29L8TC4
743	O-Ring	1	00RBG85	00RBG85
742	O-Ring	1	00RBG130	00RBG130
415	Screw Hex SHC	4	0SBM1030	0SBM1030
402	Screw Hex SHC	2		
317	Subplate	1	2924750-0355	2924750-0439
314	Cover	1		
116	Coupling	1	2903150-0263	2903150-0263

Unit Dimensions (continued)

K3VL112/140 Installation

K3VL112/140 with Cut-Off / Load Sense Control
& Torque Limit Module (Clockwise Rotation)

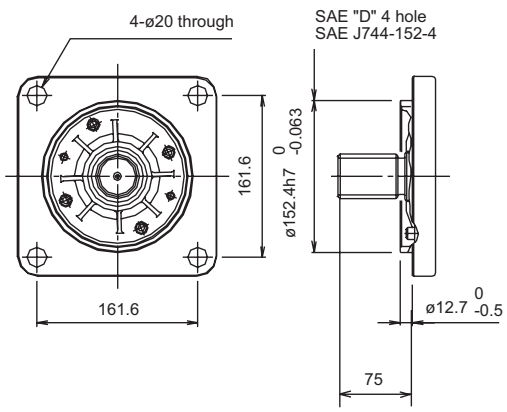
Note
for counter clockwise rotation,
the suction port “B” and the
delivery port “A” are reversed



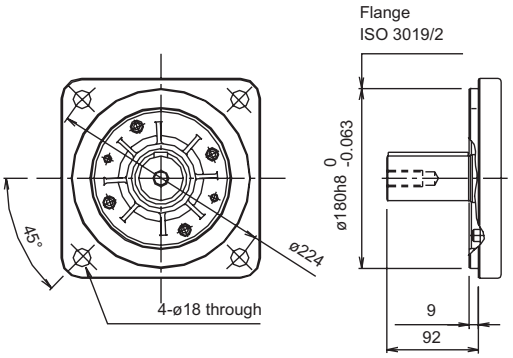
Unit Dimensions (continued)

K3VL112/140 (SAE D 4 BOLT) Mounting Flange & Shaft Options

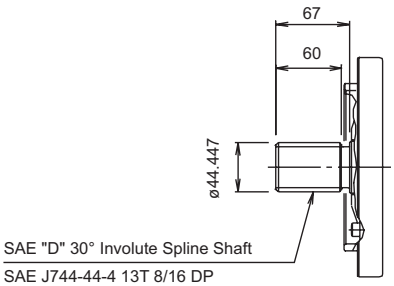
SAE “D” Type



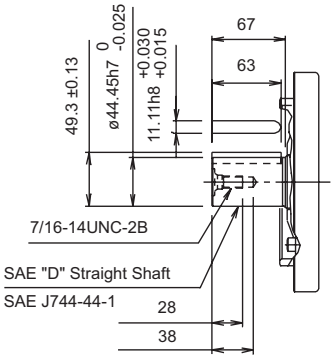
ISO Type



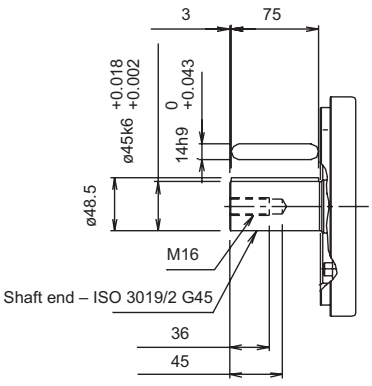
SAE “D” Spline Shaft



SAE “D” Straight Shaft

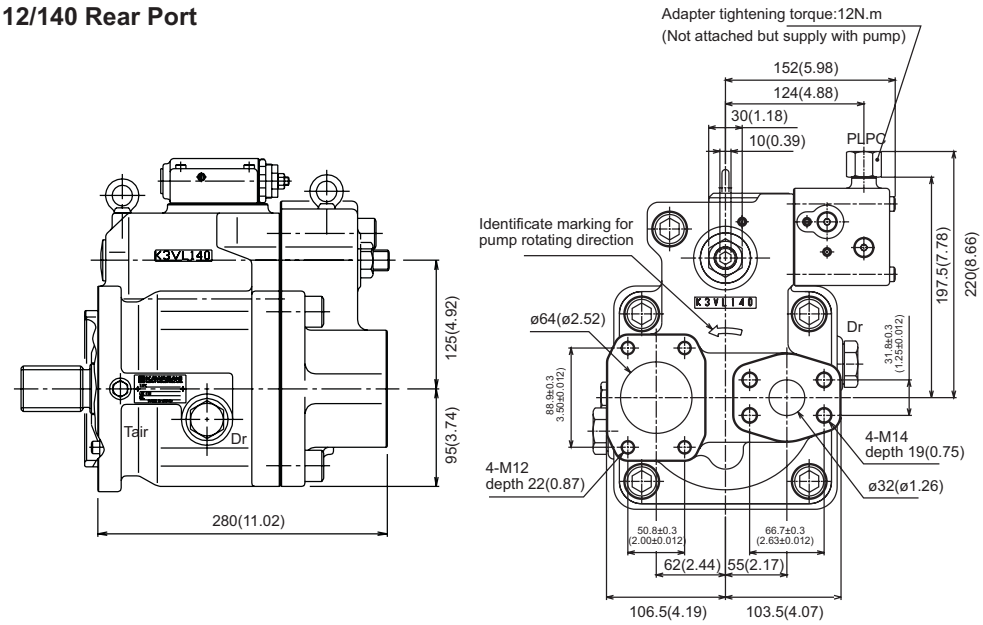


ISO Straight Shaft



Unit Dimensions (continued)

K3VL112/140 Rear Port



K3VL112/140 Porting Details

Main SAE Flanged Ports

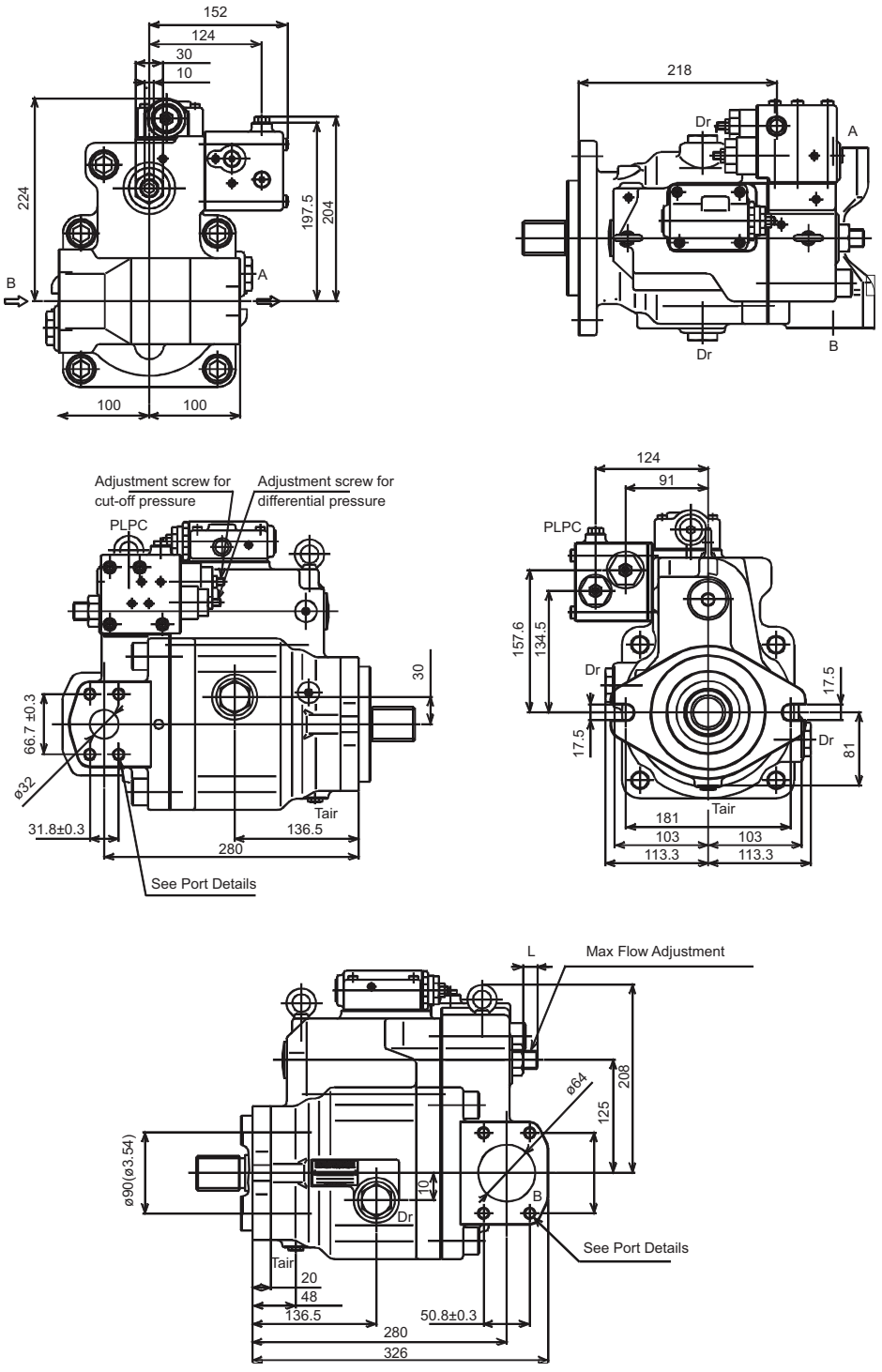
Des.	Port Name	Port Size	Tightening Torque (Nm)	Flange Threads
UNF Threaded Version ("S" in position 9 of model code)				
A	Delivery Port	SAE J518C high pressure (code 62) 1 1/4"	157	1/2-13UNC-2B x 22mm
B	Suction Port	SAE J518C Std pressure (code 61) 2 1/2"	98	1/2-13UNC-2B x 22mm
Metric Version ("M" in position 9 of model code)				
A	Delivery Port	SAE J518C high pressure (code 62) 1 1/4"	157	M14 x 19
B	Suction Port	SAE J518C Std pressure (code 61) 2 1/2"	98	M12 x 17

Auxiliary Ports

Des.	Port Name	Port Size	Tightening Torque (Nm)
SAE Version ("S", "K", "C", "R", "U", "X" or "T" in position 8 of model)			
Dr	Drain Port (x2)	SAE J1926/1 Straight thread O ring boss 3/4" OD Tube 1 1/16-12UN-2B	167
PLPC	Load Sensing Port Pressure Control Port	SAE J1926/1 Straight thread O ring boss 1/4" OD Tube 7/16-20UNF-2B	12
Tair	Air Bleeder Port	SAE J1926/1 Straight thread O ring boss 1/4" OD Tube 7/16-20UNF-2B	12
ISO Version ("M" in position 8 of model code)			
Dr	Drain Port (x2)	M27 x 2 DIN 3852	167
PLPC	Load Sensing Port Pressure Control Port	M14 x 1.5 DIN 3852	25
Tair	Air Bleeder Port	M14 x 1.5 DIN 3852	25

Unit Dimensions (continued)

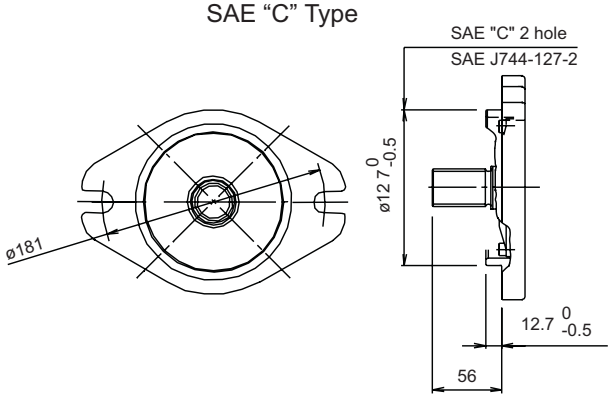
K3VL112/140 (2 Bolt) Installation



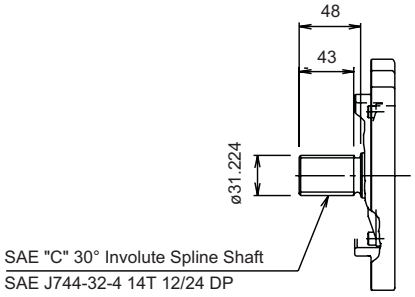
Unit Dimensions (continued)

K3VL112/140 Mounting Flange (2 Bolt) and Shaft Options

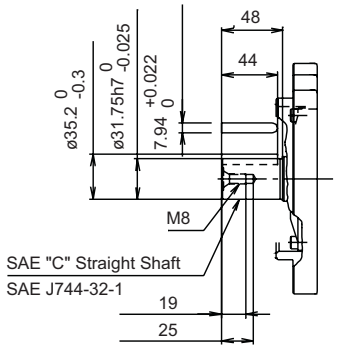
SAE “C” Type



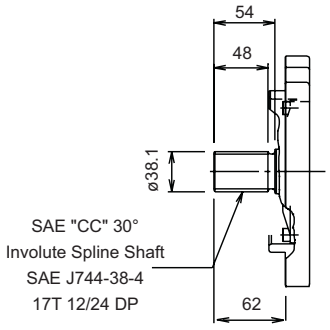
SAE “C” Spline Shaft



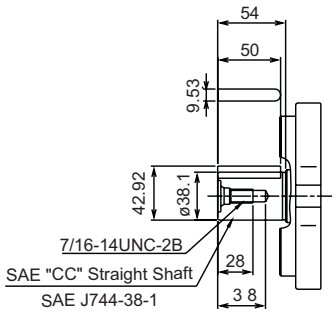
SAE “C” Straight Shaft



SAE “CC” Spline Shaft



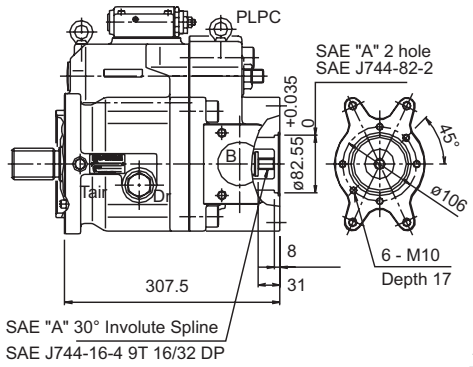
SAE “CC” Straight Shaft



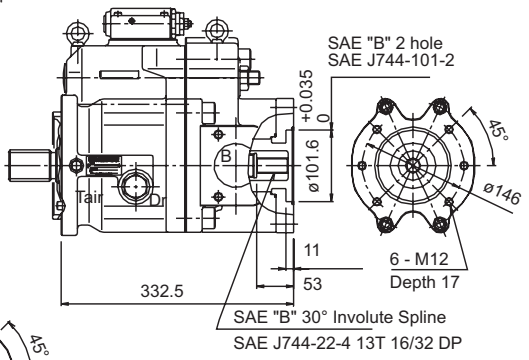
Unit Dimensions (continued)

K3VL112/140 Through Drive Options

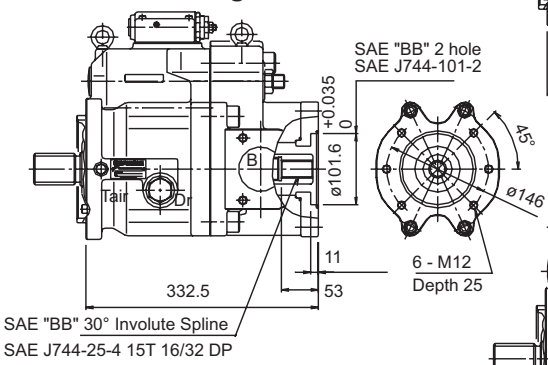
Through Drive "A"



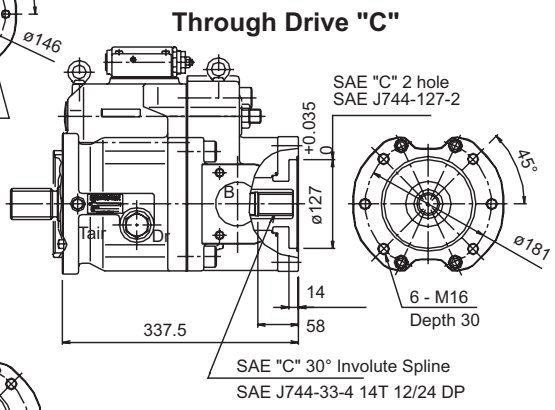
Through Drive "B"



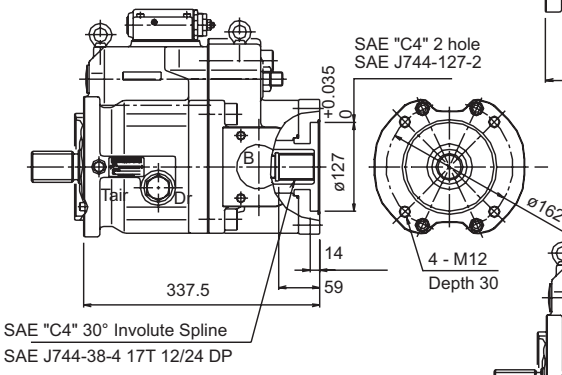
Through Drive "BB"



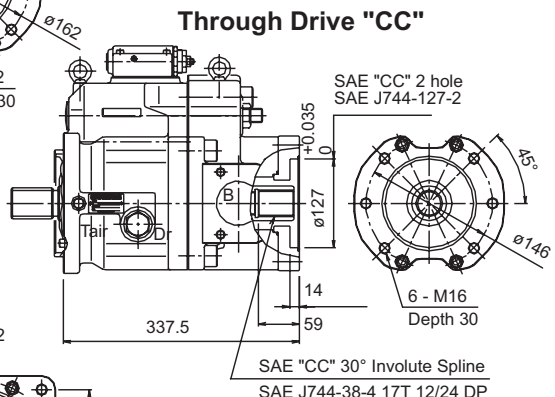
Through Drive "C"



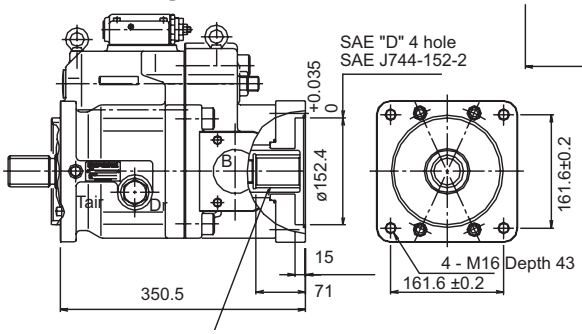
Through Drive "C4"



Through Drive "CC"

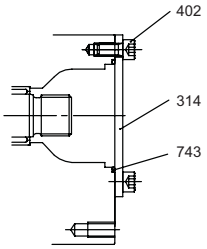


Through Drive "D"

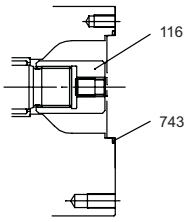


Unit Dimensions (continued)

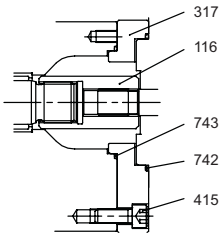
K3VL112/140 Adaptor Kits



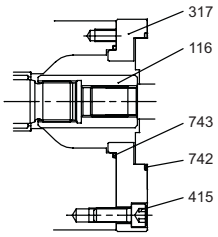
Cover Kit



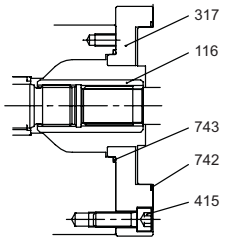
SAE "A" T/D Kit



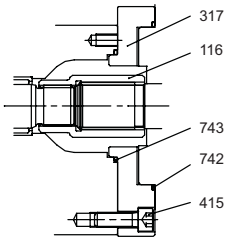
SAE "B" T/D Kit



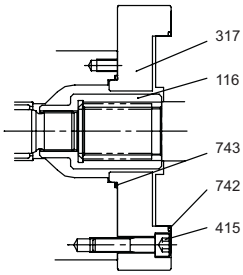
SAE "BB" T/D Kit



SAE "C" & "C4" T/D Kit



SAE "CC" T/D Kit



SAE "D" T/D Kit

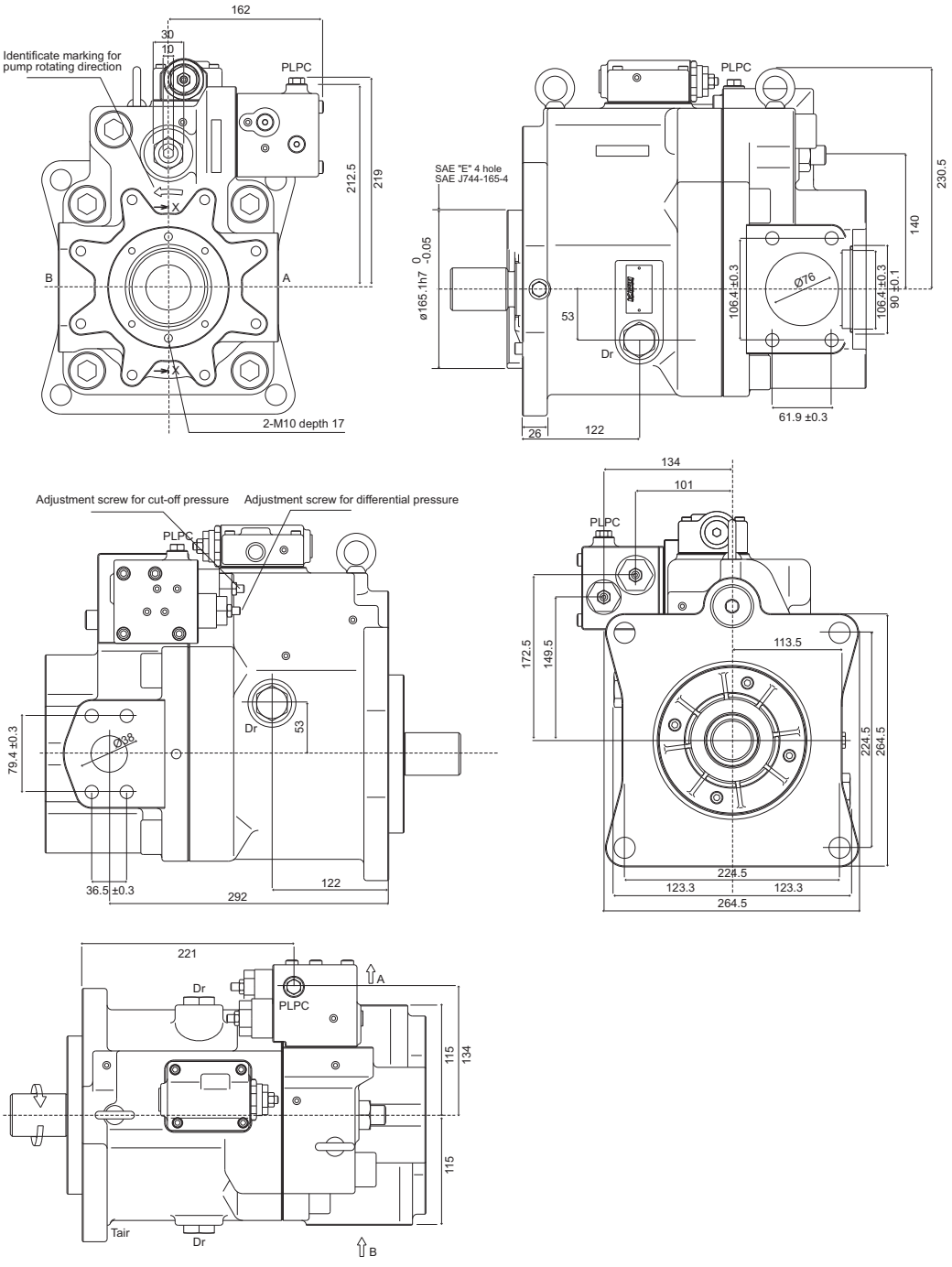
No.	Part Name	QTY	Cover Kit	SAE "A" T/D Kit	SAE "B" T/D Kit	SAE "BB" T/D Kit
—	T/D Kit		29L8TN	29LHTA	29LHTB	29LHT2
743	O-Ring	1	00RBG85	00RBG85	00RBG85	00RBG85
742	O-Ring	1			00RBG105	00RBG105
415	Screw Hex SHC	4			0SBM1230	0SBM1230
402	Screw Hex SHC	2	0SBM1020			
317	Subplate	1			2924750-0360	2924750-0360
314	Cover	1	2923150-0316			
116	Coupling	1		2903150-0268	2903150-0269	2903150-0270

No.	Part Name	QTY	SAE "C" T/D Kit	SAE "C4" T/D Kit	SAE "CC" T/D Kit	SAE "D" T/D Kit
—	T/D Kit		29LHTC	29LHT4	29LHT3	29LHTD
743	O-Ring	1	00RBG85	00RBG85	00RBG85	00RBG85
742	O-Ring	1	00RBG130	00RBG130	00RBG130	00RBG150
415	Screw Hex SHC	4	0SBM1235	0SBM1235	0SBM1235	0SBM1250
	Screw Hex SHC	2				
317	Subplate	1	2924750-0361	2924750-0603	2924750-0361	2924750-0362
314	Cover	1				
116	Coupling	1	2903150-0271	2903150-0272	2903150-0272	2903150-0273

Unit Dimensions (continued)

K3VL200 Installation

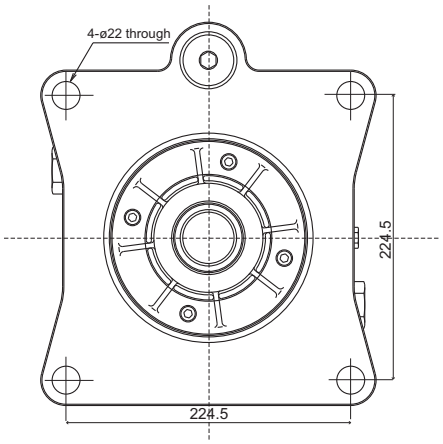
K3VL with Cut-Off / Load Sense Control
& Torque Limit Module (Clockwise Rotation)



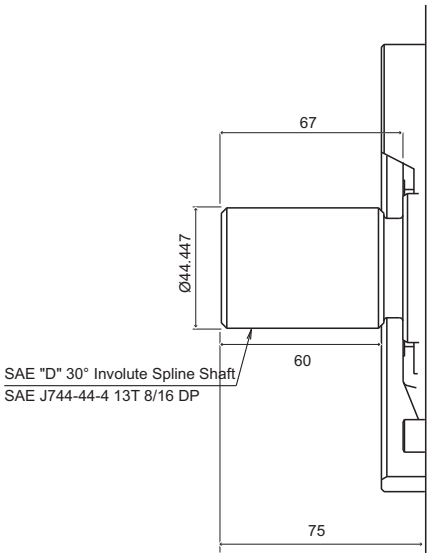
Unit Dimensions (continued)

K3VL200 Mounting Flange and Shaft Options

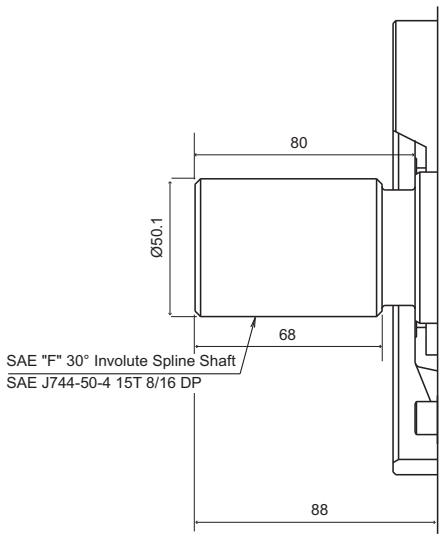
SAE Type



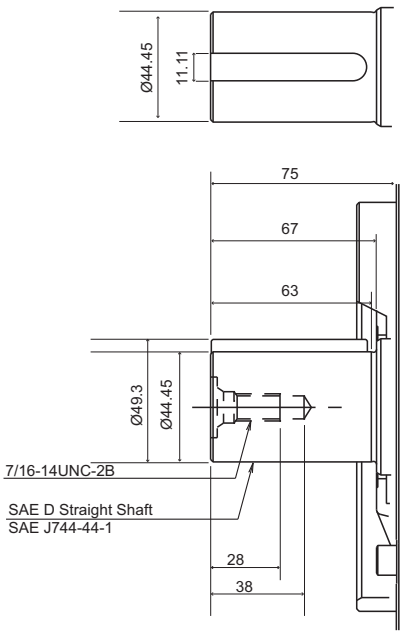
SAE Spline “D” Shaft



SAE Spline “F” Shaft



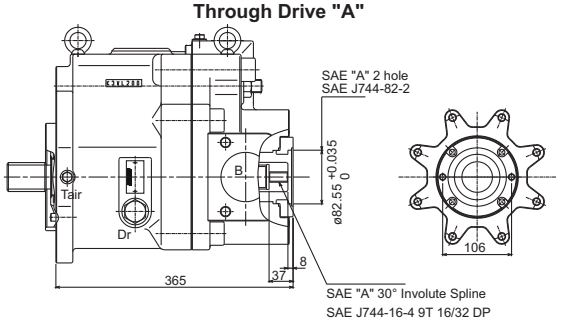
SAE “D” Straight Shaft



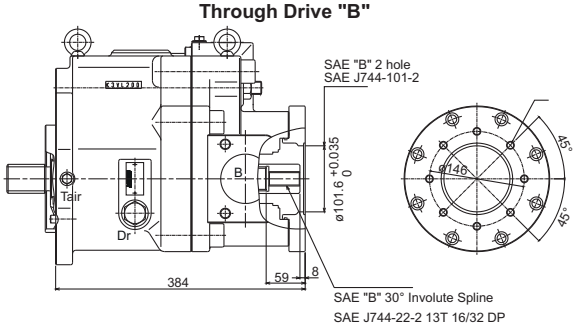
Unit Dimensions (continued)

K3VL200 Mounting Flange and Shaft Options

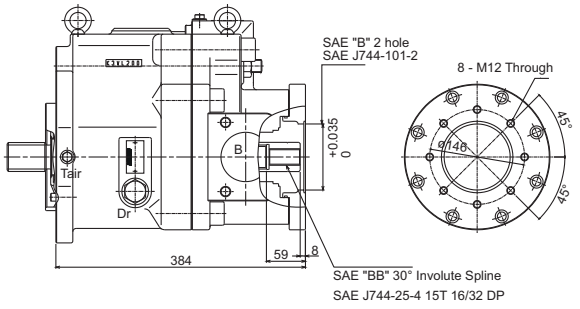
Through Drive "A"



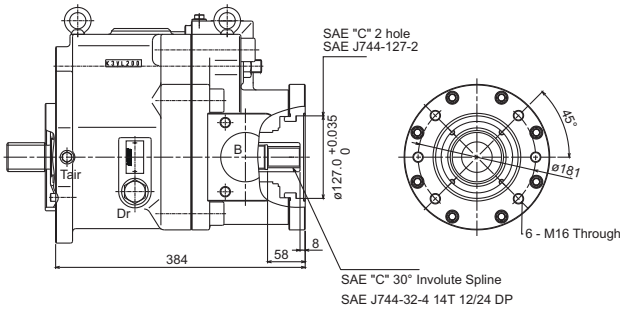
Through Drive "B"



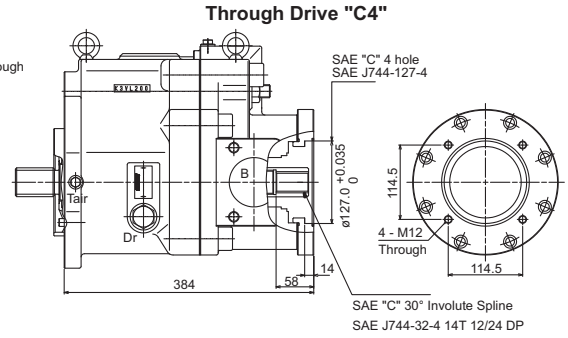
Through Drive "BB"



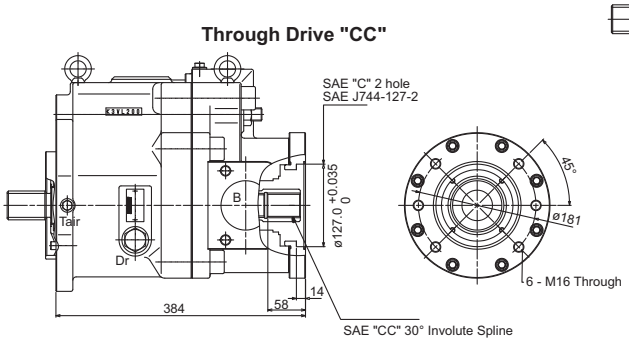
Through Drive "C"



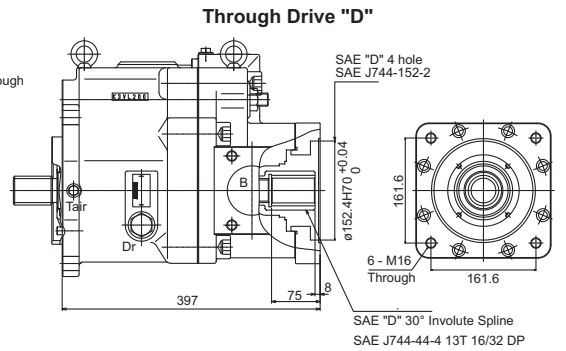
Through Drive "C4"



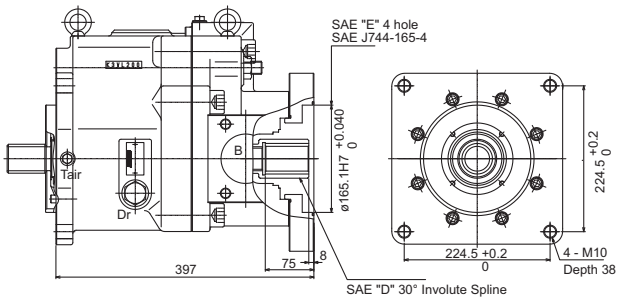
Through Drive "CC"



Through Drive "D"



Through Drive "E"



Unit Dimensions (continued)

K3VL200

No.	Part Name	QTY	SAE "A"	SAE "B"	SAE "BB"	SAE "C"
—	T/D Kit		29LKTA	29LKTB	29LKT2	29LKTC
116	Coupling K3VL 200	1	2903150-0761	2903150-0762	2903150-0804	2903150-0763
317	Sub Plate K3VK 200	1	2924750-0674	2924750-0675	2924750-0675	2924750-0667
407	SHCS	8	(4 off) 0SBM825	0SBM1230	0SBM1230	0SBM1230
712	O-Ring	1	0SBM85	00RBG120	00RBG120	00RBG125
742	O-Ring	1	00RBG85	00RBG105	00RBG105	00RBG130

No.	Part Name	QTY	SAE "C4"	SAE "CC"	SAE "D"	SAE "E"
—	T/D Kit		29LKTC4	29LKT3	LKTD	29LKTE
116	Coupling K3VL 200	1	2903150-0763	2903150-0805	2903150-0764	2903150-0764
317	Sub Plate K3VK 200	1	2924750-0677	2924750-0667	2924750-0677	2924750-0686
407	SHCS	8	0SBM1230	0SBM1230	0SBM1245	0SBM1245
712	O-Ring	1	00RBG125	00RBG125	00RBG125	00RBG125
742	O-Ring	1	00RBG130	00RBG130	PCPP155	PCPP170

Main SAE Flanged Ports

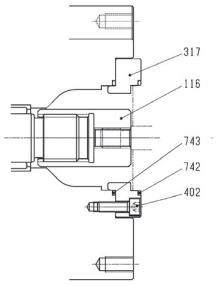
Des.	Port Name	Port Size	Tightening Torque (Nm)	Flange Threads
UNC Threaded Version ("S", “K” in position 9 of model code)				
A	Delivery Port	SAE J518C high pressure (code 62) 1 1/2"	235	5/8-11UNC-2B
B	Suction Port	SAE J518C Std pressure (code 61) 3"	235	5/8-11UNC-2B
Metric Version ("M" in position 9 of model code)				
A	Delivery Port	SAE J518C high pressure (code 62) 1 1/2"	235	M16
B	Suction Port	SAE J518C Std pressure (code 61) 3"	235	M16

Auxiliary Ports

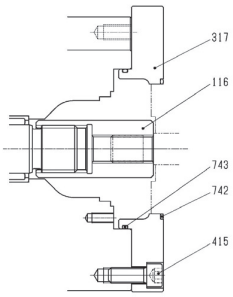
Des.	Port Name	Port Size	Tightening Torque (Nm)
SAE Version ("S", "K" in position 8 of model)			
Dr	Drain Port (x2)	SAE J1926 Straight thread O ring boss 3/4" O.D Tube 1.1/16-12UNF-2B	167
PLPC	Load Sensing Port Pressure Control Port	SAE J1926 Straight thread O ring boss 1/4" O.D Tube 7/16-20UNF-2B	12
Tair	Air Bleeder Port	SAE J1926 Straight thread O ring boss 1/4" O.D Tube 7/16-20UNF-2B	12

Unit Dimensions (continued)

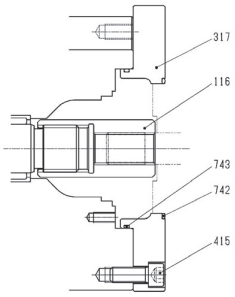
K3VL200 Through drive kits



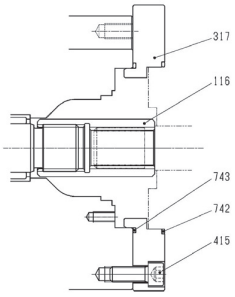
SAE "A" T/D Kit



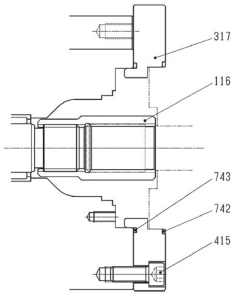
SAE "B" T/D Kit



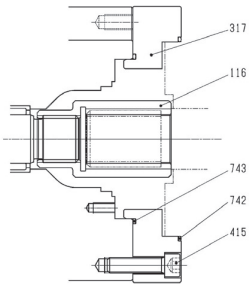
SAE "BB" T/D Kit



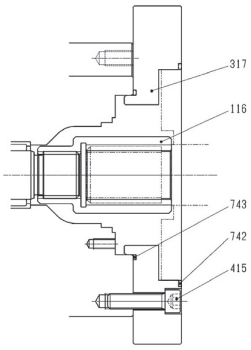
SAE "C" & "C4" T/D Kit



SAE "CC" T/D Kit



SAE "D" T/D Kit



SAE "E" T/D Kit

available at:

ATP HYDRAULIK AG
Aahusweg 8
CH-6403 Küssnacht am Rigi

ATP Hydraulik GmbH
Haldenstrasse 18
D-79790 Küssaberg

info@atphydraulik.ch
www.atphydraulik.com

KAWASAKI PRECISION MACHINERY (UK) LTD
Ernesettle, Plymouth, Devon, PL5 2SA, England
Tel: +44 1752 364394
Fax: +44 1752 364816
E Mail:info@kpm-uk.co.uk
Web site: http://www.kpm-eu.com

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