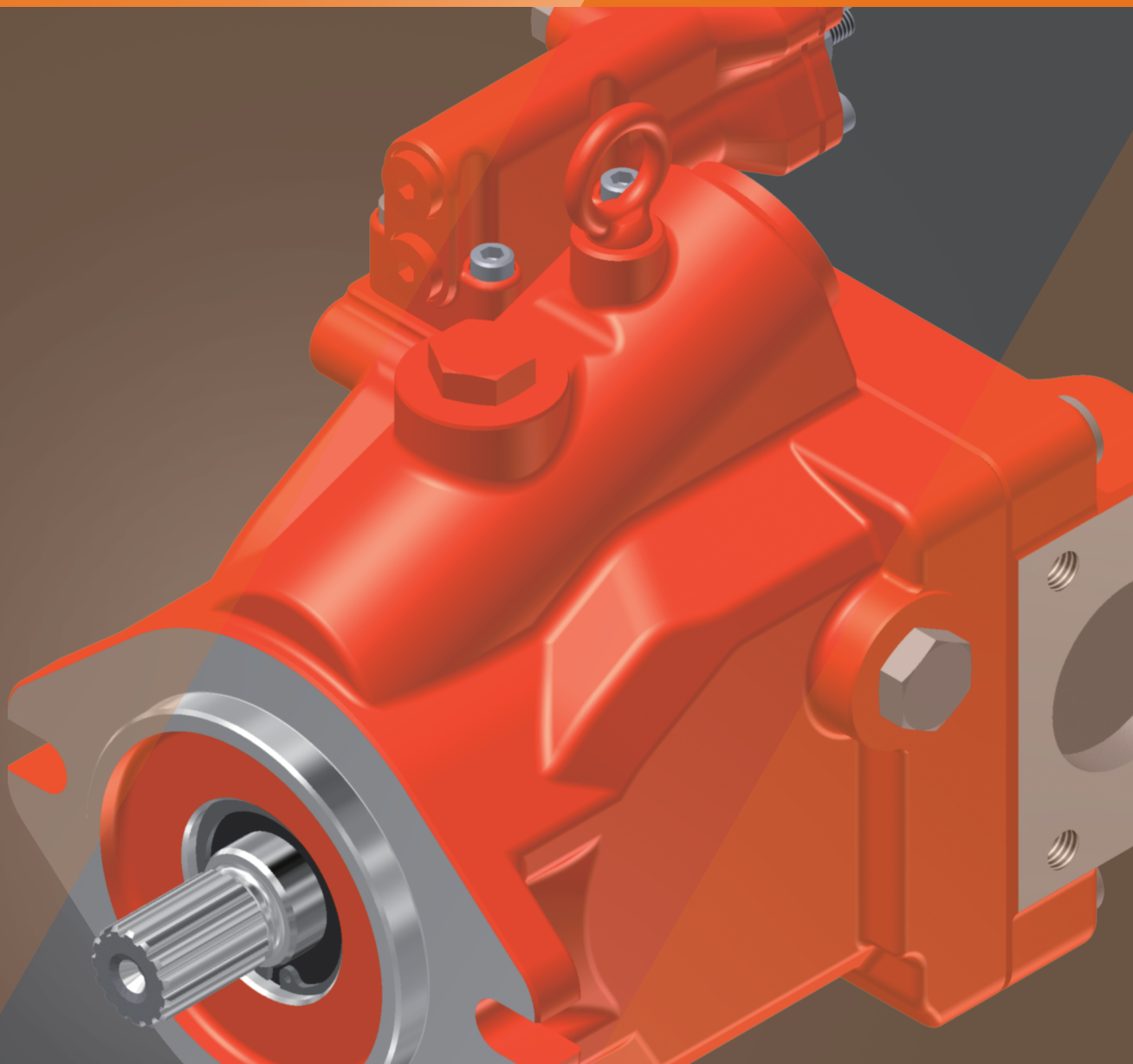


Swash Plate Type Axial Piston Pump **K3VLS Series**



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I . Applications / Product Usage

The following must be taken into consideration before use.

1. The operating condition of the products shown in this catalog varies depending upon each application. Therefore, the product suitability must be judged by the designer of the hydraulic system and/or the person who finalizes the technical specifications of the machine after analysis and testing. The product specification shall be determined based on the latest catalog and technical documents. The system must be designed taking into account the possibility of machine failure to ensure that all safety, warning, and application requirements are met.
2. For the proper use of the products, descriptions given in the SAFETY PRECAUTIONS must be observed.
3. The technical information in this catalog represents typical characteristics and performance of the products as of the published date.
4. If the intended use of the products is included in the following, please consult with Kawasaki in advance.
 - (1) Use the product in the operating conditions or environments other than those described in the technical documents.
 - (2) Use the product in the nuclear sector, aviation sector, medical sector, and/or food sector.
 - (3) Use the product in applications which may cause substantial harm to others and their property, and especially in applications where ensuring safety is a requirement.
5. The information described in this catalog is subject to change without notice. For the latest information, please contact Kawasaki.

II. Safety Precautions

Before using the product, you **MUST** read this catalog and **MUST** fully understand how to use the product. To use the product safely, you **MUST** carefully read all **Warnings and Cautions** in this catalog.

1. Cautions related to operation



- Use the personal protective equipment to prevent injury when the product is in operation.



- Some components are heavy. Handle the product carefully not to hurt your hands and lower back.



- Do not step on, hit or drop, or apply strong force to the product, as these actions may cause operation failure, product damage, or oil leakage.



- Wipe off any oil on the product or the floor completely, as oil can create slippery conditions that may cause drop of the product and personal injury.

2. Warnings and cautions related to installation and removal of the product



- Installation, removal, piping, and wiring must be done by a qualified technician.



- Make sure that the hydraulic power unit is turned off and that the electric motor or engine has completely stopped before starting installation or removal. You must also check that the system pressure has dropped to zero.



- Make sure that the power source is turned off before installing electric components to reduce the risk of electric shock.



- Clean the threads and the mounting surface to prevent damage or oil leakage. Inadequate cleaning may cause insufficient torque and broken seals.



- Use the designated bolts and fasten them with prescribed torque when installing the product. Use of undesignated bolts, and excessive or insufficient tightening torque may induce operation failure, damage, or oil leakage.

3. Warnings and cautions for operation



- Always equip the product with explosion or ignition protection if it is used in potentially explosive or combustible atmospheres.



- Shield rotary parts, such as the motor and pump shaft, to avoid injury.



- Stop operation immediately, and take proper measures when the abnormality such as unusual noise, oil leakage, and smoke is found. Continuing operation under such condition may bring about damage, a fire hazard, or injury.



- Make sure that all pipes, hoses, and connecting points with pipes or hoses, are correctly connected and tightened before starting operation.



- Use the product under the operating conditions and limitations described in the catalog, drawings, and specification sheets.



- Do not touch the product in operation. to reduce the risk of skin burn.



- Use the proper hydraulic oil and maintain the filtration at the recommended level to prevent premature wear and damage.

4. Cautions related to maintenance



- Never modify the product without approval from Kawasaki.



- Disassembly of the product may void the warranty.



- Keep the product clean and dry when storing or transporting.



- The seals may need to be replaced if the product has been stored for an extended period of time.



- Making adjustments of this product will result in the warranty being null and void.

III. Handling Precautions

1. Operating Fluid and Temperature Range

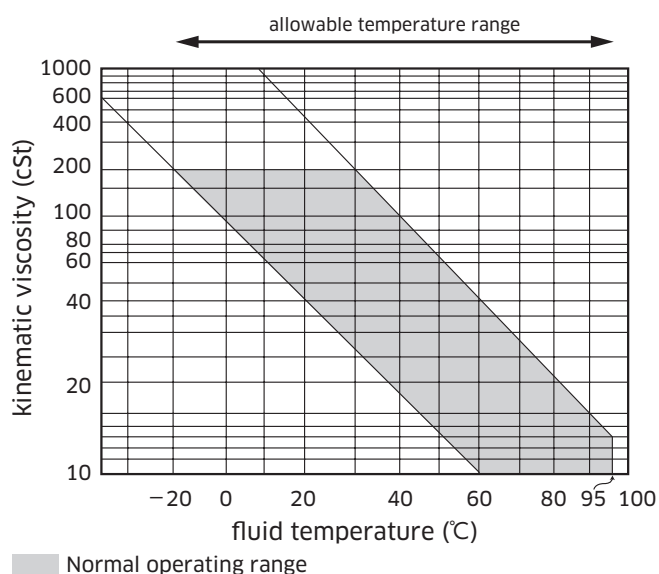
1) Operating fluid

Values shown in this catalog are based upon using mineral oil based anti-wear hydraulic fluid. To ensure optimal performance use of mineral oil based anti-wear hydraulic fluid is recommended.

2) Viscosity and temperature range

To minimize both oil and seal deterioration, a maximum operating temperature of 60°C should be considered. Please note that the regulator may become slow to respond when operating at low temperatures (below 20°C) in extreme cold environments. At such low temperature it is strongly suggested that a warm up cycle is introduced until an operating temperature of 20°C is achieved.

	Normal operating range	Allowable range
Viscosity [mm ² /s(cSt)]	10 to 200	10 to 1,000
Fluid temperature [°C (°F)]	-20 to +95 (-4 to +203)	



2. Filtration and Contamination Control

1) Filtration of working oil

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 with the tank's breather is also recommended.

2) Suggested acceptable contamination level

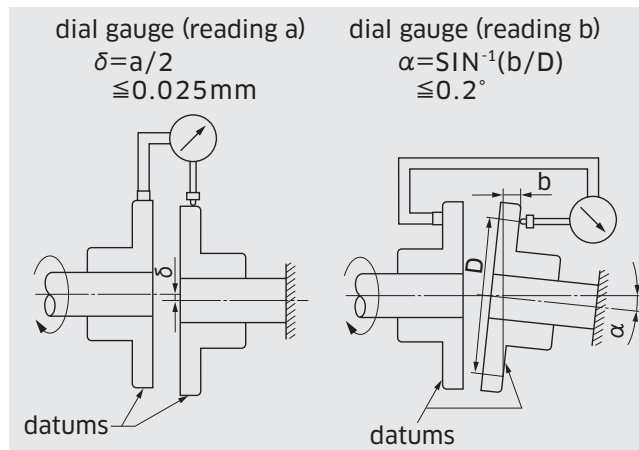
The relationship between contamination level and pump life is very difficult to predict as it depends on the type and nature of the contaminant present in the system. Sand or Silica in particular, due to its abrasive nature, does significantly reduce the expected life of a pump. Based on the precondition 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).

III. Handling Precautions

3. Drive Shaft Coupling

Alignment between the prime mover and the pump shaft should be within 0.05 mm TIR*. In case the pump is directly coupled to the engine flywheel, use a flexible coupling.

*TIR = Total Indicator Reading



4. Oil Filling and Air Bleeding

1) 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 insufficient. The pump contains bearings and high-speed sliding parts including pistons with shoes and a spherical bush that need to be continuously lubricated. Part seizure or total premature failure will occur very quickly if this procedure is not rigidly followed.

2) Air bleeding

Run the pump unloaded for a period to ensure that all residual air within the system is released.

3) Long term out of usage

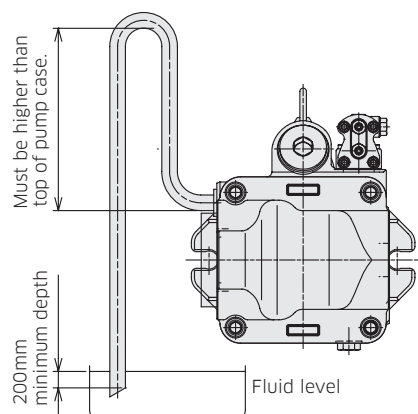
It is undesirable to leave the pump out of use for a long period e.g. a year or more. In such a situation it is recommended that the pump is run for a short period on a more frequent basis even if it is just unloaded. With regard to a pump held in storage then rotating the shaft on a frequent basis is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

III. Handling Precautions

5. Drain Piping

1) Installation of drain line

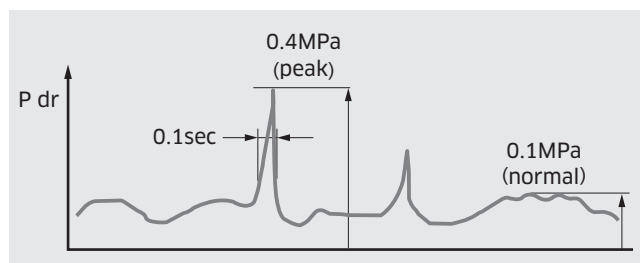
It is the preferred option to mount the pump with the case drain piping initially rising above the pump before continuing to the tank. Do not connect the drain line to the inlet line.



Cautions

- A)** Inlet and drain pipes must be immersed by 200 mm minimum from the lowest level under operating conditions.
- B)** Height from the oil level to the centre of the shaft must be within 1 meter maximum.
- 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 must be larger in size than the drain port to minimise pressure in the pump case. The pump case pressure must not exceed 0.1 MPa as shown in the illustration below. (Peak pressure must never exceed 0.4 MPa.)



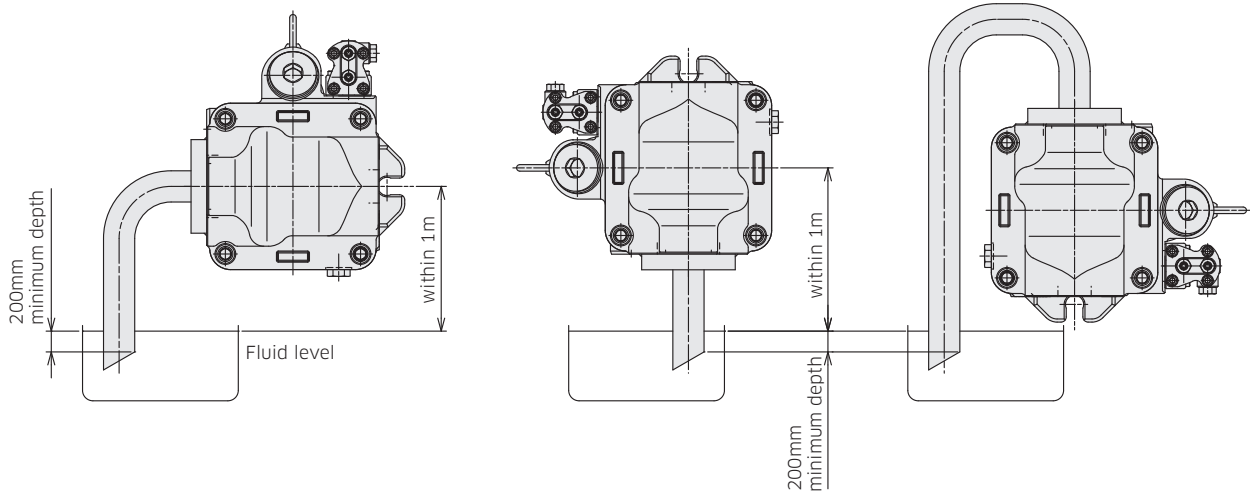
2) Size of drain hose or drain pipe

The internal bore size of the drain hose or drain pipe must be larger than that of the drain port. Arrange the drain line as short as possible.

III. Handling Precautions

6. Mounting the Pump Above the Tank

Suction line



7. Shaft Loading and Bearing Life

Although K3VLS pumps are equipped with bearings that can accept some external thrust and radial forces, application of such loads will affect bearing life. Depending on the load magnitude, the load position, and the load orientation, bearing life may be significantly reduced.

IV. Conversion Factors, Formula and Definition

◆ Conversion Factors

	Formula	Note
Displacement	1 cm ³ = 0.061 in ³	
Pressure	1 MPa = 145 psi	
Flow	1 L/min = 0.264 gpm	US gallon
Torque	1 Nm = 0.74 lb ft	
Power	1 kW = 1.341 hp	
Weight	1 kg = 2.205 lb	

◆ Formula

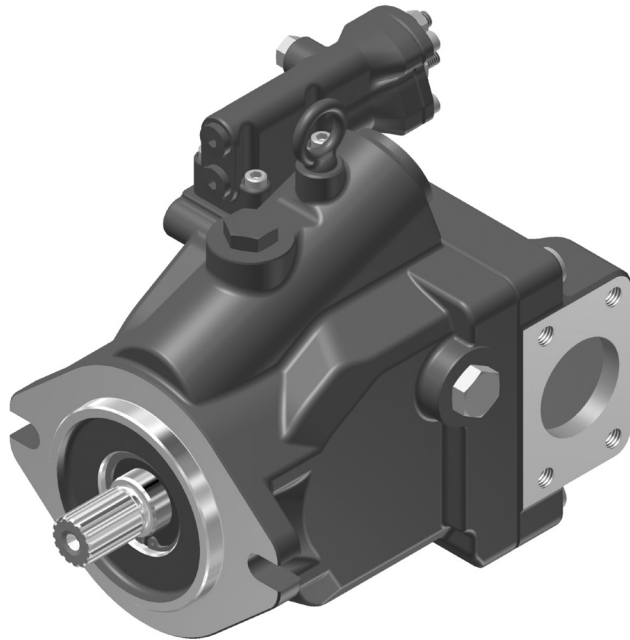
	Metric system		Imperial system	
Output flow	$Q = q \times N \times \eta_v / 1000$	L/min	$Q = q \times N \times \eta_v / 231$	gal/min
Input torque	$T = q \times \Delta P / 2\pi / \eta_m$	Nm	$T = q \times \Delta P / 24\pi / \eta_m$	lbf ft
Input power	$L = T \times N / 9550 = Q \times \Delta P / 60 / \eta_t$	kW	$L = T \times N / 5252 = Q \times \Delta P / 1714 / \eta_t$	hp

◆ Definition

q	= Pump displacement / rev.	cm ³ (in ³)
L	= Input power	kW (hp)
N	= Speed	min ⁻¹ (rpm)
ΔP	= $P_d - P_s$	MPa (psi)
P_d	= Pump delivery pressure	MPa (psi)
P_s	= Pump suction pressure	MPa (psi)
P_L	= Load sensing pressure	MPa (psi)
P_{dr}	= Pump case pressure	MPa (psi)
P_f	= Power shift pressure	MPa (psi)
P_{sv}	= Servo pressure	MPa (psi)
T	= Input torque	Nm (lbf-ft)
T_{max}	= Maximum input torque	Nm (lbf-ft)
η_v	= Pump volumetric efficiency	
η_m	= Pump mechanical efficiency	
η_t	= Pump total efficiency	

K3VLS Series

Swash Plate Type Axial Piston Pump



■ Specifications

Size : 50, 65, 85, 105, 150
Rated Pressure : 28 MPa
Peak Pressure : 35 MPa

■ General Descriptions

The K3VLS are variable displacement axial piston pumps of swash plate design, suitable for use in mobile applications and industrial vehicles with medium pressure hydraulic systems.

The K3VLS pumps enable flexible configuration in a wide range of applications with their compact size and light weight design.

The K3VLS series pumps are available in size (rated displacement) ranging from 50 to 150 cm³/rev with various control options, such as load sensing, pressure cut-off, and horsepower controls.

■ Features

- Variable axial piston pump of swash plate design in open circuits
- High overall efficiency
- Compact size
- Light weight
- Excellent reliability
- Numerous control options
- High stability
- Highly responsive controls

1

Ordering Code

1-1 Pump Options

Model Code **K3VLS 105 - 1 BB R CC S - L1 A A M1**

1. K3VLS Series Pump

K3VLS Series, Variable Displacement, Axial Piston, Open Loop Pump

2. Pump Size

	50	65	85	105	150
Maximum Displacement cm ³	●	●	●	●	●

3. O-ring Material

-	NBR (Orings:Nitrile rubber, Oil Seal: Fluoro rubber)
V	Viton (Orings: Fluoro rubber, Oil Seal: Fluoro rubber)

4. Series Type Code

1	Standard Type
---	---------------

5. Through Drive and Porting

		50	65	85	105	150
0	w/o Through Drive, Side Ported	●	●	●	●	●
A	SAE-A Through Drive, Side Ported	●	●	●	●	○
B	SAE-B Through Drive, Side Ported	●	●	●	●	●
BB	SAE-BB Through Drive, Side Ported	●	●	●	●	●
C	SAE-C, 2/4 bolt, Through Drive, Side Ported	—	●	●	●	●
CC	SAE-CC, 2/4 bolt, Through Drive, Side Ported	—	—	—	●	●
D	SAE-D Through Drive, Side Ported	—	—	—	—	○
N	w/ Through Drive Shaft, w/o Coupling, Closed w/ Steel Cover, Side Ported	●	●	●	●	●
R	w/o Through Drive, Rear Ported	●	●	●	●	●

6. Direction of Rotation

		50	65	85	105	150
R	Clockwise	●	●	●	●	●
L	Counterclockwise	●	●	●	●	●

7. Mounting Flange and Shaft

		50	65	85	105	150
B	SAE-B Mount & SAE B Spline	●	●	—	—	—
BB	SAE-B Mount & SAE BB Spline	●	●	—	—	—
C	SAE-C Mount & SAE C Spline (Only SAE C-4 mount for K3VLS65 & 150)	—	●	●	●	●
CC	SAE-C Mount & SAE CC Spline (Only SAE C-4 mount for K3VLS150)	—	—	—	●	●
D	SAE-D Mount & SAE D Spline	—	—	—	—	●
K	SAE Mount & SAE Key Shaft	◆	◆	◆	◆	—

8. Flange / Mounting Fixing Thread (Suction-Delivery, Through Drive)

	Flange Thread Suction- Delivery	Mounting Thread Through Drive	50	65	85	105	150
S	Unified	Metric	●	●	●	●	●
H	Metric	Metric	●	●	●	●	●

- : Available
- : Under development
- : Not available
- ◆ : Only available in Europe/US

1. Ordering Code

1-2 Regulator Options

Model Code 1 2 3 4 5 6 7 8 9 10 11 12 13
K3VLS 105 - 1 BB R CC S - L1 A A M1 - T***

9. Flow Control

	Load Sense	Pressure Cut-Off Control	50	65	85	105	150
L0	w/ LS, w/ Bleed-off Orifice	w/ Pressure Cut-Off	●	●	●	●	●
L1	w/ LS, w/o Bleed-off Orifice	w/ Pressure Cut-Off	●	●	●	●	●
PO	w/o LS	w/ Pressure Cut-Off	●	●	●	●	●
	Electric Inverse Proportional Pressure Control		50	65	85	105	150
PR2	PR2 : w/o LS, w/ Pressure Cut-Off - Electric Inverse Proportional Pressure Control (24V, Deutsch Connector)		●	●	●	●	●

10. Differential Pressure Setting Range (For the details see page 14)

		50	65	85	105	150
Blank	In case PR2 is chosen at "9"	●	●	●	●	●
A	Standard Setting Range (1.0 - 3.0MPa)	●	●	●	●	●
C	High Setting Range (1.5 - 4.0MPa)	●	●	●	●	●

11. Additional Control Options

(For the additional control options "11", only one option per column is acceptable.)

		50	65	85	105	150
Blank	w/o Any Additional Control or in case PR2 is chosen at "9"	●	●	●	●	●
	Torque Limit Control	50	65	85	105	150
00	w/o Any Additional Control, w/ cover plate for Torque Limit	◆	◆	◆	◆	◆
A	w/o Power Shift Control	●	●	●	●	●
B	w/ Power Shift Control Pilot Operated	●	●	●	●	●
C2	w/ Electric Proportional Reducing Valve, Voltage:24V, Deutsch Connector	○	○	○	○	○
C3	Voltage:12V, Deutsch Connector	○	○	○	○	○
	Electric Displacement Control (Positive Control)	50	65	85	105	150
E2	w/ Fail-safe Function Voltage:24V, Deutsch Connector	●	●	-	-	-
E3	Voltage:12V, Deutsch Connector	●	●	-	-	-
F2	w/o Fail-safe Function, Voltage:24V, Deutsch Connector	●	●	-	-	-
F3	Voltage:12V, Deutsch Connector	●	●	-	-	-

- : Available
- : Under development
- : Not available
- ◆ : Only available in Europe/US

1. Ordering Code

1-2 Regulator Options

Model Code 1 2 3 4 5 6 7 8 9 10 11 12 13
K3VLS 105 - 1 BB R CC S - L1 A A M1 - T***

12. Torque Limit Setting (Available only with the attachment of Torque Limiter)

		50	65	85	105	150
Blank	w/o Any Torque Limit Setting	●	●	●	●	●
H1	H Spring, Corner Torque 85%	●	●	●	●	●
H2	H Spring, Corner Torque 75%	●	●	●	●	●
H3	H Spring, Corner Torque 65%	●	●	●	●	●
H4	H Spring, Corner Torque 55%	●	●	●	●	●
M1	M Spring, Corner Torque 70%	●	●	●	●	●
M2	M Spring, Corner Torque 60%	●	●	●	●	●
M3	M Spring, Corner Torque 50%	●	●	●	●	●
M4	M Spring, Corner Torque 40%	●	●	●	●	●
M5	M Spring, Corner Torque 30%	●	●	●	●	●

Code H1 to H4: for torque limit control with power shift control (Additional Control Option Code [11]: "B", "C2", and "C3")
 Code M1 to M5: for torque limit control without power shift control (Additional Control Option Code [11]: "A")

13. Special Suffix

T***	Special Suffix
------	----------------

- : Available
- : Under development
- : Not available
- ◆ : Only available in Europe/US

2 Technical Information

2-1 Specifications

Size		50	65	85	105	150
Displacement	cm ³	50	65	85	105	150
Pressure	Rated MPa	28				
	Peak MPa	35				
Allowable case pressure	MPa	0.1 continuous / 0.4 peak				
Speed	Self prime* ¹ min ⁻¹	2,700	2,600	2,500	2,300	2,200
	Maximum* ² min ⁻¹	3,250	3,000	3,000	2,640	2,400
Case volume	L	0.8	1.0	1.2	1.7	2.3
Temperature range	°C	-20 to +95				
Viscosity range	cSt	10 to 1,000				
Maximum contamination level		ISO 4406 -/18/15				
Allowable through drive torque Nm	SAE A	123	123	123	123	123
	SAE B	380	380	380	380	380
	SAE BB	435	435	435	435	435
	SAE C	-	435	435	558	435
	SAE CC	-	-	-	702	899
	SAE D	-	-	-	-	899
Mass	kg	21	25	31	37	52
Moment of inertia	kg m ²	2.89×10^{-3}	5.30×10^{-3}	6.77×10^{-3}	9.85×10^{-3}	1.82×10^{-2}
Torsional stiffness	Nm/rad	4.56×10^4	5.26×10^4	6.79×10^4	1.32×10^5	1.99×10^5
Coating		Red synthetic resin primer				

* 1 : Self prime speed is the maximum operating speed under the self priming condition at maximum displacement. Steady state inlet pressure should be greater or equal to 0 MPa gauge.

* 2 : Maximum speed is the maximum operating speed that can run without damage to the pump under restriction of operating conditions.

■ Allowable maximum input torque

1. SAE spline shaft

	SAE B	SAE BB	SAE C	SAE CC	SAE D
Spline specifications	13T 16/32 DP	15T 16/32 DP	14T 12/24 DP	17T 12/24 DP	13T 8/16 DP
Allowable maximum input torque (Nm)	200	315	630	1,060	1,490
Pump size	K3VLS50 K3VLS65	K3VLS50 K3VLS65	K3VLS65 K3VLS85 K3VLS105 K3VLS150	K3VLS105 K3VLS150	K3VLS150

(Note) Maximum pressure must be reduced to operate within the allowable maximum input torque as below when the torque limit control is not used.

SAE B spline K3VLS50: 24 MPa K3VLS65: 18 MPa

SAE C spline K3VLS150: 25 MPa

For above options, if 28 MPa is needed, use the torque limit control.

2. Technical Information

2-1 Specifications

2. SAE keyed shaft

	SAE BB	SAE C	SAE CC
Keyed Width (mm)	6.35	7.94	9.53
Allowable maximum input torque (Nm)	230	430	700
Pump size	K3VLS50	K3VLS65 K3VLS85	K3VLS105

2. Technical Information

2-2 Functional Description of Regulator

◆ Load Sensing and Pressure Cut-off (Ordering Code [9]: L0 / L1)

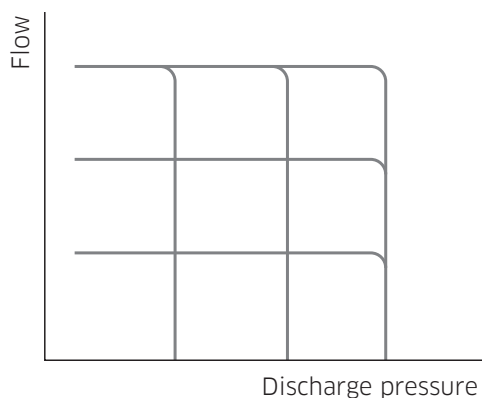
This regulator has function of flow and pressure control (i.e. load sensing control and pressure cut-off control.)

To control flow a variable orifice is used. (A variable orifice is not included in the pump and shall be prepared separately.) Pump displacement is controlled to maintain the differential pressure across the orifice constant. The flow is controlled to a required flow regardless of pump delivery pressure. In addition, there is a pressure cut off function incorporated into the control. The pressure cut-off function overrides the flow control function.

L0 control: with a bleed off orifice

L1 control: without a bleed off orifice

Releasing the pressure at port PL results in standby condition, which provides zero flow at unloading condition. The unloading pressure is typically 0.1 to 0.2 MPa higher than differential pressure setting.



Flow, Pressure control curve

■ Differential pressure setting

Standard setting at factory : 1.5 +0.3/-0.2 MPa

Load sensing differential pressure range can be selected from two setting ranges.

unit: MPa

Code	Adjustment range	Adjustment sensitivity
A	1.0 to 3.0	1.3 / turn
C	1.5 to 4.0	2.5 / turn

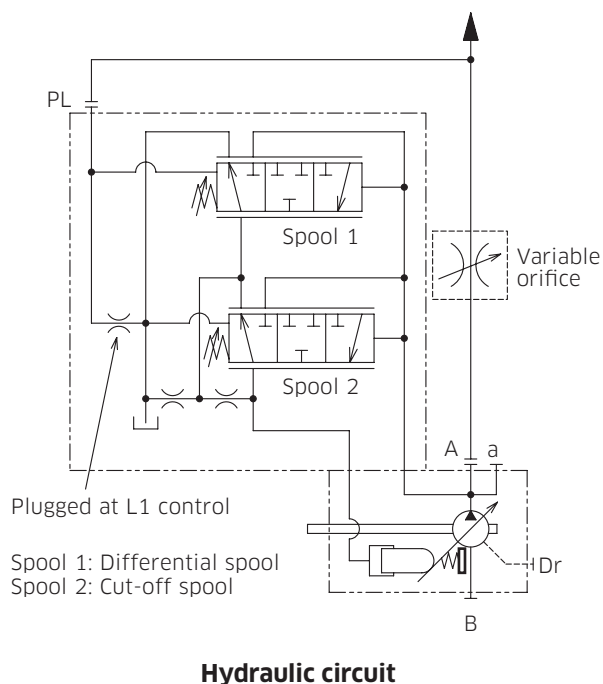
■ Pressure cut-off setting

Standard setting at factory : 28 0/-1.5 MPa

Pressure cut -off setting range is from 5 MPa to 28 MPa.

unit: MPa

Adjustment range	Adjustment sensitivity
5.0 to 28.0	8.0 / turn



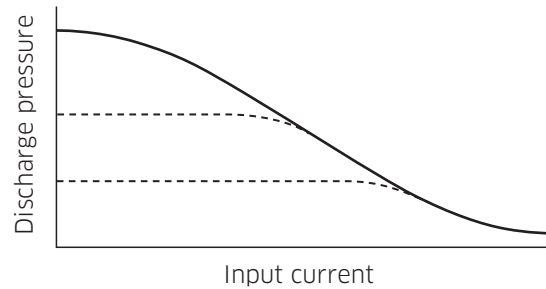
2. Technical Information

2-2 Functional Description of Regulator

◆ Electric Inverse Proportional Pressure Control -Voltage:24V, Deutsch Connector (Ordering Code [9]: PR2)

This regulator is Electro-hydraulic pressure control type of regulator. A current is input from the controller to the solenoid of the regulator, and the pressure is controlled by the inverse proportional solenoid valve. Since the regulator tries maintaining the pressure which is set by the valve, the pump discharge is controlled according to the load of the actuator. Thus, the pump supplies only the amount of hydraulic oil required by the actuator. Even if the input current to the solenoid becomes zero at the electric failure of the machine, the pressure set will be maximum, and the pump displacement will be also maximum, so it functions as electric fail-safe.

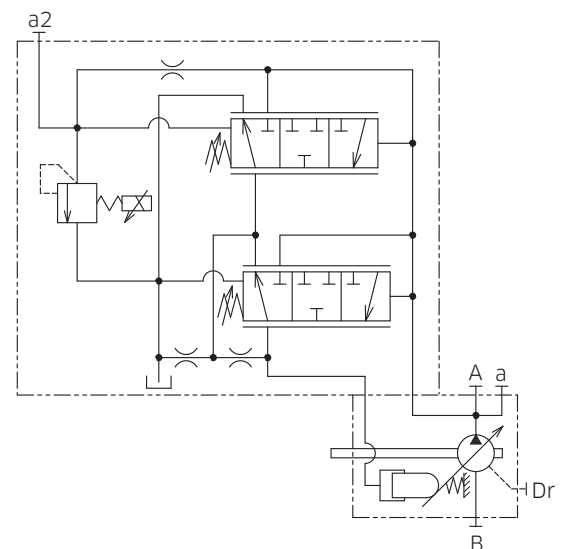
The pressure of cut-off valve can be set between 28MPa and 10MPa. The control effective range of the solenoid is decided by the cut-off valve setting. (e.g. in case the cut-off setting is 20MPa, the control range is 230mA - 500mA.)



Input current - Discharge pressure curve

Max. pressure setting	Input current control range
28 MPa	120 - 500 mA
26 MPa	150 - 500 mA
24 MPa	180 - 500 mA
22 MPa	210 - 500 mA
20 MPa	230 - 500 mA
18 MPa	250 - 500 mA
16 MPa	275 - 500 mA
14 MPa	300 - 500 mA
12 MPa	325 - 500 mA
10 MPa	350 - 500 mA

Control effective range



Hydraulic circuit

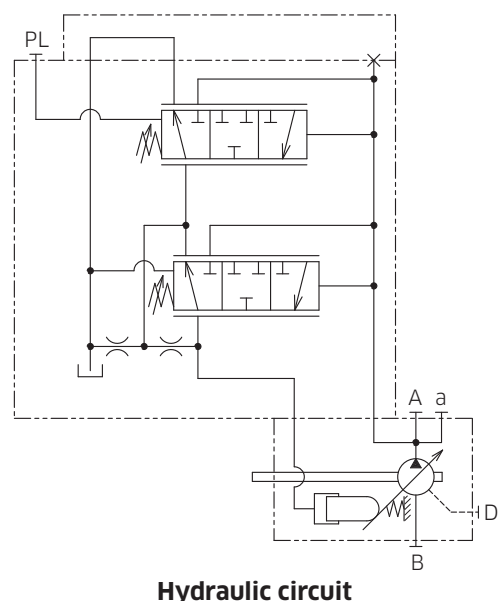
2. Technical Information

2-2 Functional Description of Regulator

◆ w/o Any Additional Control, w/cover plate for Torque Limit (Ordering Code [11]: 00)

When the "00" option is selected in section 11 of the model code the K3VLS pump is supplied as a torque limit ready pump. The pump has a blanking plate fitted instead of the torque limiter. This offers better flexibility to configure the pump as required.

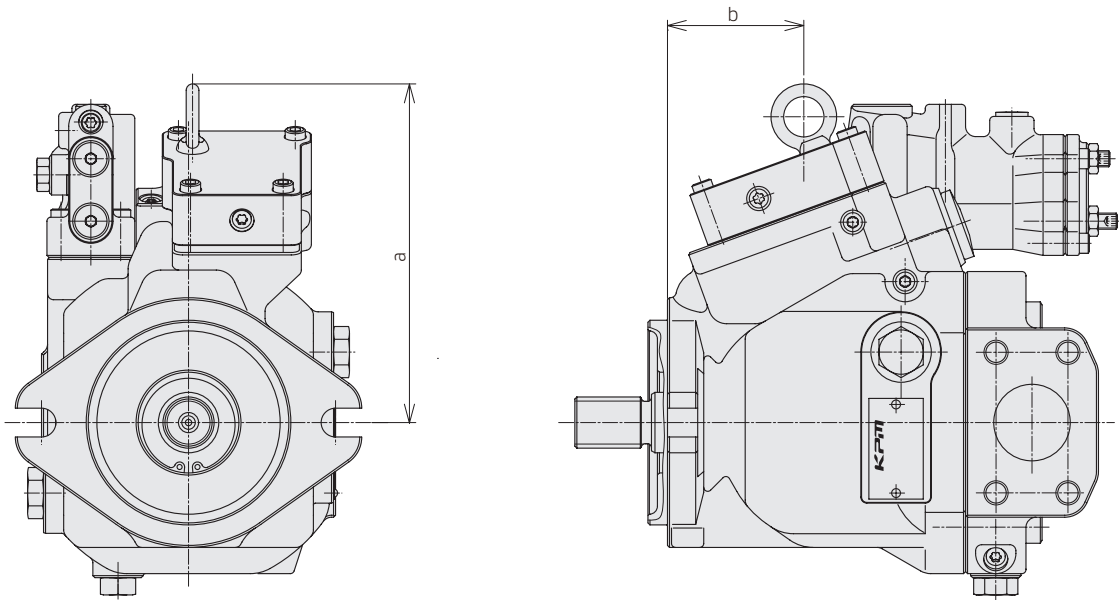
The pump as ordered will function as a load sense or pressure compensated pump depending on your selection of flow control in section 9 of the model code. If the torque limit blanking cover is then replaced with a torque limit regulator the pump has the torque limit control functionality. Note that the torque limit regulator would need to be set.



2. Technical Information

2-2 Functional Description of Regulator

- ◆ w/o Any Additional Control,
w/cover plate for Torque Limit
(Ordering Code [11]: 00)



	a	B
K3VLS50	168	68
K3VLS65	180	74
K3VLS85	182	81
K3VLS105	200	81
K3VLS150	210	94

2. Technical Information

2-2 Functional Description of Regulator

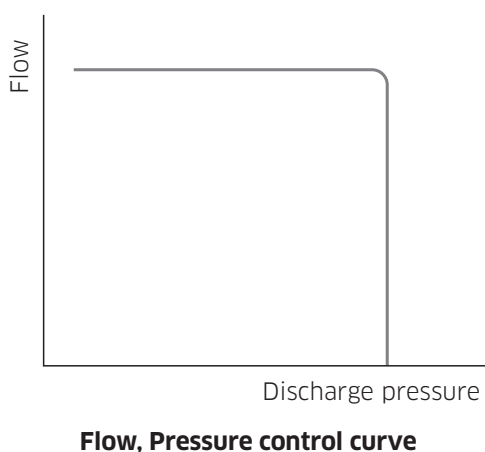
◆ Pressure Cut-off (Ordering Code [9]: P0)

This regulator has function of pressure control. As discharge pressure rises to the cut-off setting, the pump displacement is reduced to prevent the discharge pressure from exceeding and keep the set pressure. It is imperative that a safety relief valve be installed in the system.

By connecting the Pc port to a remote pressure control relief valve, variable pump pressure control can be achieved.

The remote pressure control relief valve is to be set to 1.5 MPa below to the required system pressure.

The remote control relief valve is out of scope of supply.



■ Differential pressure setting

Standard setting at factory : 1.5 +0.3/-0.2 MPa

Load sensing differential pressure range can be selected from two setting ranges.

unit: MPa

Code	Adjustment range	Adjustment sensitivity
A	1.0 to 3.0	1.3 / turn
C	1.5 to 4.0	2.5 / turn

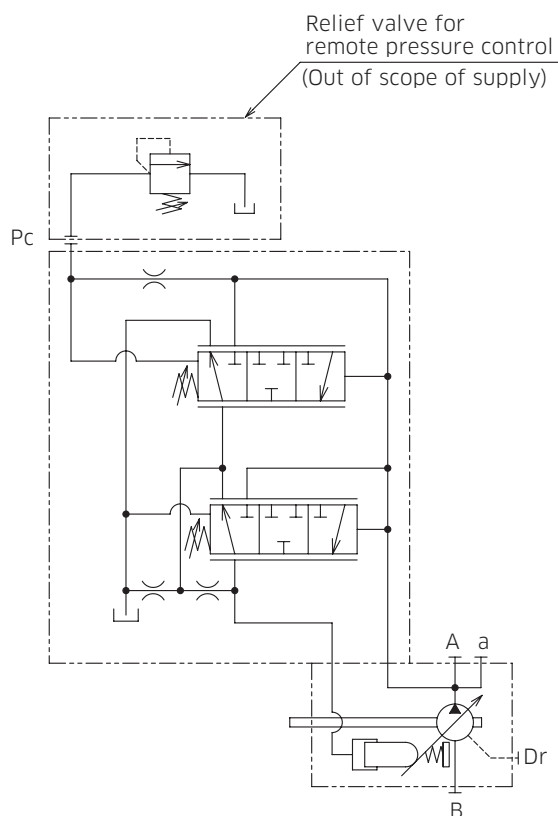
■ Pressure cut-off setting

Standard setting at factory : 28 0/-1.5 MPa

Pressure cut -off setting range is from 5 MPa to 28 MPa.

unit: MPa

Adjustment range	Adjustment sensitivity
5.0 to 28.0	8.0 / turn



Hydraulic circuit

2. Technical Information

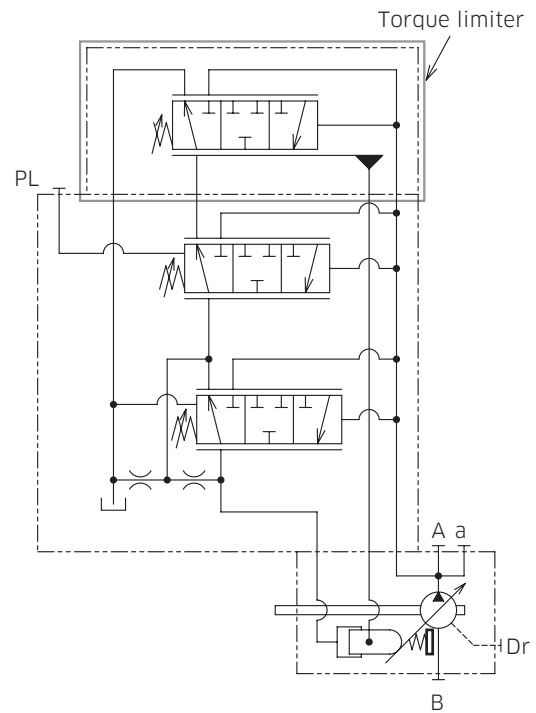
2-2 Functional Description of Regulator

◆ Torque Limiter (Ordering Code [11]: A)

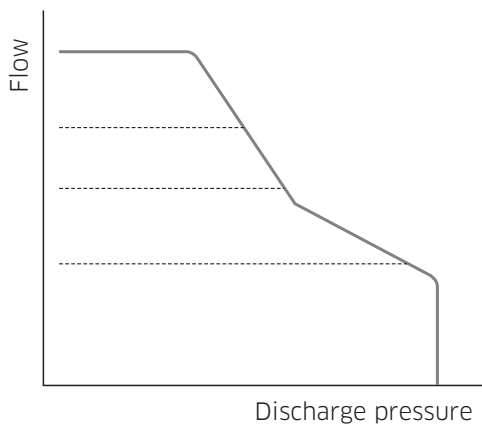
L0/L1 control functions as previously noted. In response to a rise in delivery pressure the swash plate angle is decreased, restricting the input torque. This regulator prevents excessive load against the prime mover.

The torque limiter is comprised of two springs that oppose the spool force generated by the system pressure. By turning the adjustment screws, the appropriate input torque limit can be set.

Torque limiter control setting is shown in the attached table, and the torque limiter can be adjusted by the torque value of the table. Refer to the instruction manual for adjustment.



Hydraulic circuit



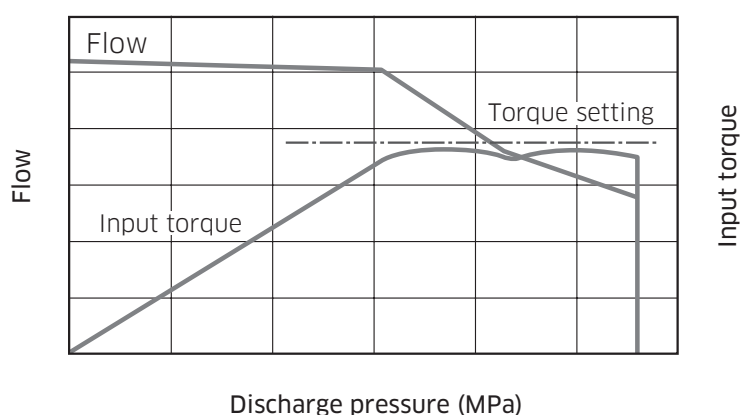
Torque limiter control curve

2. Technical Information

2-2 Functional Description of Regulator

◆ Torque Limiter Settings (Ordering Code [11]: A)

■ Pump control curve (sample)



■ Torque setting without power shift function

Pump size	Ordering code [12]				
	M1	M2	M3	M4	M5
K3VLS50	155	135	110	90	65
K3VLS65	200	175	145	115	85
K3VLS85	265	227	190	150	115
K3VLS105	330	281	235	190	140
K3VLS150	470	400	335	265	-

Unit : Nm

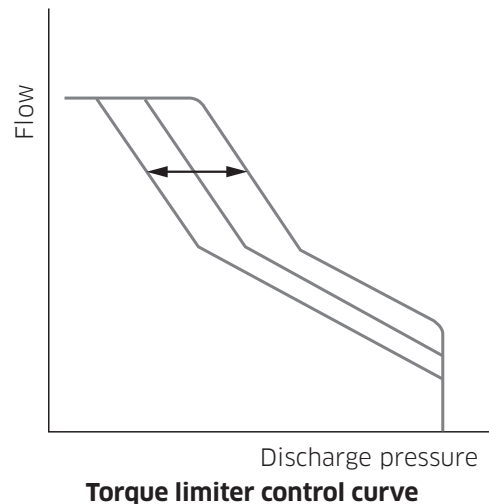
2. Technical Information

2-2 Functional Description of Regulator

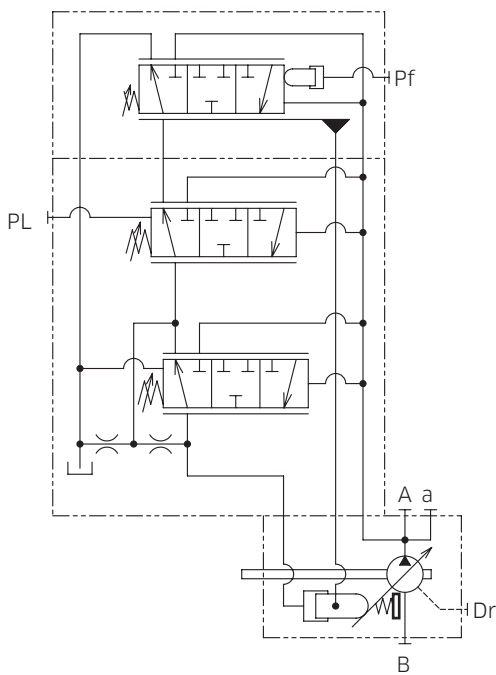
◆ Torque Limiter with Power Shift (Ordering Code [11]: B, C2*, C3*)

Torque limiter is available with variable torque limit control. Torque limit setting can be varied by the external pilot pressure supply (code "B") or the integrated electric proportional control valve with the external servo pressure supply (code "C"). Code "B" and "C" enable to shift the power control setting as shown in the following torque limiter control characteristic curve.

See the table (page 19) for torque setting according to the external pilot pressure or the input current to the integrated proportional valve. Required servo pressure to the solenoid is 3.5 to 4.5 MPa.

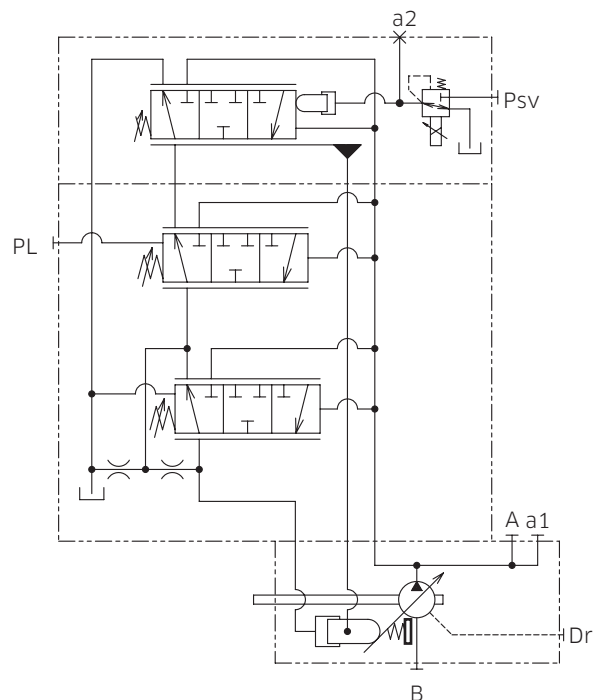


(*) : Ordering code C2, C3 are under development.



External pilot pressure (Pf) range: 0 to 4.0 MPa

Hydraulic circuit, code B



Required servo pressure (Psv): 3.5 to 4.5 MPa

Hydraulic circuit, code C

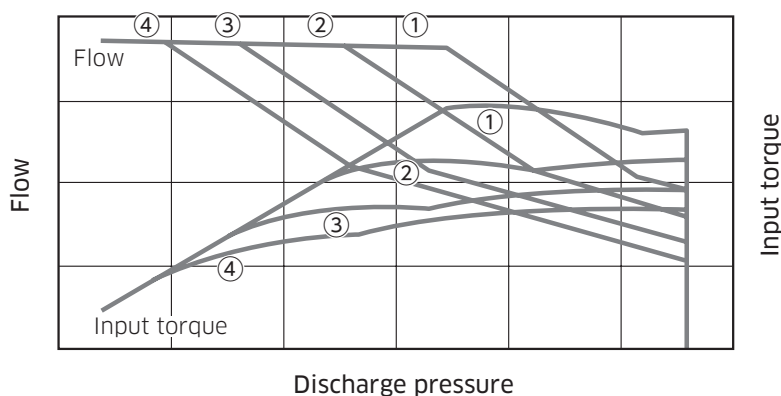
2. Technical Information

2-2 Functional Description of Regulator

◆ Torque Limiter and Power Shift Settings

(Ordering Code[11] : B, C2*, C3*)

■ Pump control curve with power shift (sample)



■ Table. Torque Setting with power-shift function

Ordering code [11]	Code : B	Code : C2, C3						
		Pf (MPa)	Current (mA)		Ordering code [12]			
			24V C2	12V C3	Max. Input torque (Nm)			
Pump size				H1	H2	H3	H4	
K3VLS50	①	0.00	0		220	200	170	150
	②	0.75	290	570	190	170	145	125
	③	2.00	490	970	165	140	120	100
	④	3.30	690	1,370	135	115	95	80
K3VLS65	①	0.00	0		285	250	220	190
	②	0.75	290	570	245	215	185	160
	③	2.00	490	970	210	180	150	130
	④	3.30	690	1,370	175	145	120	100
K3VLS85	①	0.00	0		375	330	290	245
	②	0.75	290	570	325	285	245	205
	③	2.00	490	970	280	240	200	165
	④	3.30	690	1,370	230	195	160	125
K3VLS105	①	0.00	0		455	405	360	310
	②	0.75	290	570	395	350	305	260
	③	2.00	490	970	340	295	250	210
	④	3.30	690	1,370	280	235	200	160
K3VLS150	①	0.00	0		655	585	510	440
	②	0.75	290	570	570	500	435	370
	③	2.00	490	970	475	410	355	295
	④	3.30	690	1,370	385	330	275	225

Input torque in the above table is planned value and for reference.

Displacement ratio (%) = Displacement / Max. Displacement

2. Technical Information

2-2 Functional Description of Regulator

◆ Electric Displacement Control (Positive Control)

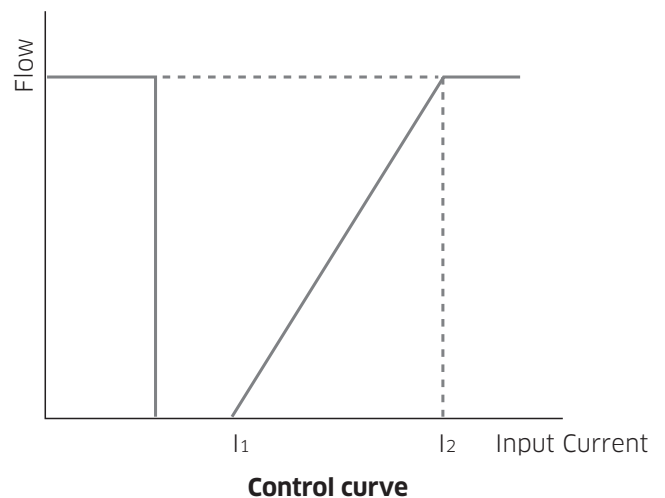
- With Fail-safe Function (Ordering Code[11]: E2, E3)
- Without Fail-safe Function (Ordering Code[11]: F2, F3)

The electric displacement control enables the pump displacement to be changed according to the change of input current to the solenoid. The pump displacement can be adjusted in proportion to the input current between the input current of I_1 and I_2 (refer to control curve).

With fail-safe function, at loss of input current in such case of brakage of electric wires, the pump displacement becomes maximum automatically. Even under this condition the load sensing and pressure cut-off control can be operated.

The fail-safe function is designed only for usage in short period for emergency. Necessary repair is to be made in the soonest opportunity.

For the hydraulic circuit refer to page 26.



Unit: mA

Ordering code	I_1	I_2
E2, F2	200	600
E3, F3	400	1,200

■ Note for pumps with fail-safe

■ Note for start up

Due to its structure, the electric displacement control requires larger input current than I_2 at start up, then normal proportional control can be achieved between I_1 and I_2 .

■ Minimum operating pressure

With fail-safe function, in order to ensure safety and repeatability of control the minimum operating pressure of 5 MPa is to be secured. This avoids switching the pump to fail-safe mode unexpectedly.

■ Input current ramp time requirement

With fail-safe function (Ordering code: E2, E3), ramp time of 200 msec or larger is to be secured.

■ Recommended dither condition for the input current

Dither frequency: 150 Hz

Dither amplitude: for E2, F2 200 mA_{p-p}
for E3, F3 400 mA_{p-p}

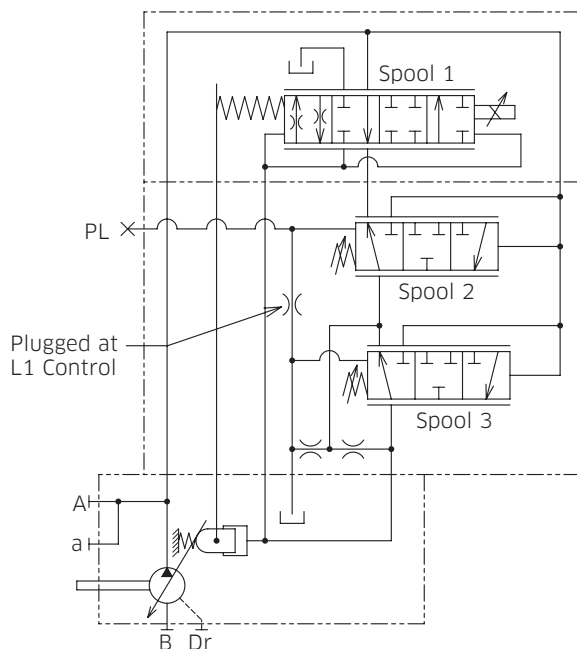
	E2, F2	E3, F3
Rated current [mA]	700	1,400
Coil resistance (at 20°C) [Ω]	22.6	5.7
Power consumption (at 20°C) [W]	11.2	11.2
Connector type	Ladd Distribution DT04-2P	
Water proof	IP67	

2. Technical Information

2-2 Functional Description of Regulator

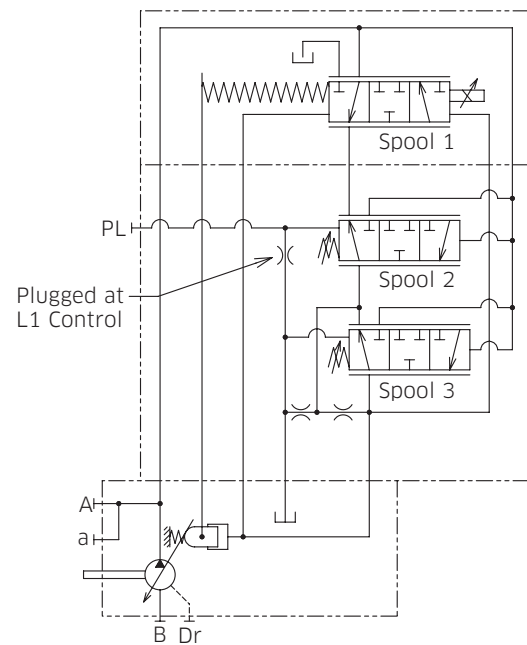
◆ Electric Displacement Control (Positive Control)

- With Fail-safe Function (Ordering Code[11]: E2, E3)
- Without Fail-safe Function (Ordering Code[11]: F2, F3)



Spool 1: Electric Flow Control Valve
 Spool 2: Differential Spool
 Spool 3: Cut-off Spool

Hydraulic Circuit With Fail-safe Function



Spool 1: Electric Flow Control Valve
 Spool 2: Differential Spool
 Spool 3: Cut-off Spool

Hydraulic Circuit Without Fail-safe Function

2. Technical Information

2-3 Functional Description of Pump

◆ Change Pump Maximum Displacement (Ordering Code : None)

Pump Maximum displacement can be changed to the below list by the replacement of the Qmax. stopper. It can be applied to Standard type and with Horsepower control. Refer to the instruction manual for replacement procedures.

Pump Size	Qmax. Stopper (for Standard type · with Horsepower control)					
	Default	- 5 cm ³	- 10 cm ³	- 15 cm ³	- 20 cm ³	- 25 cm ³
K3VLS50	50	45	40	35	-	-
K3VLS65	65	60	55	-	-	-
K3VLS85	85	80	75	70	-	-
K3VLS105	105	100	95	90	-	-
K3VLS150	150	145	140	-	130	125

Unit : cm³

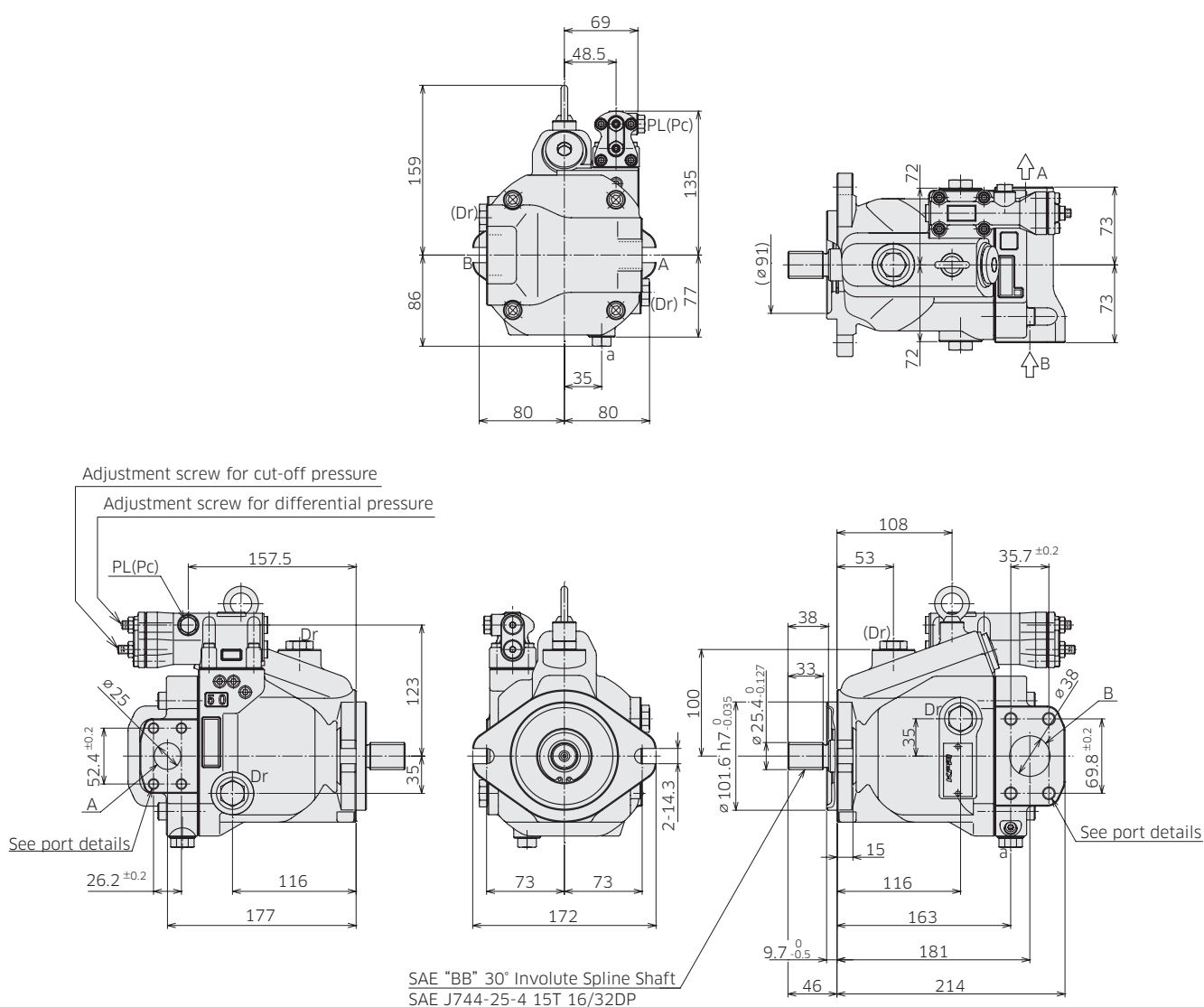
3 Dimensions

3-1 Installation Dimensions

*Dimensions in mm.

◆ K3VLS50 with Cut-off/Load Sense Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 50 - 1 0 R BB * - L0 A
 : K3VLS 50 - 1 0 R BB * - L1 A
 : K3VLS 50 - 1 0 R BB * - P0 A



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

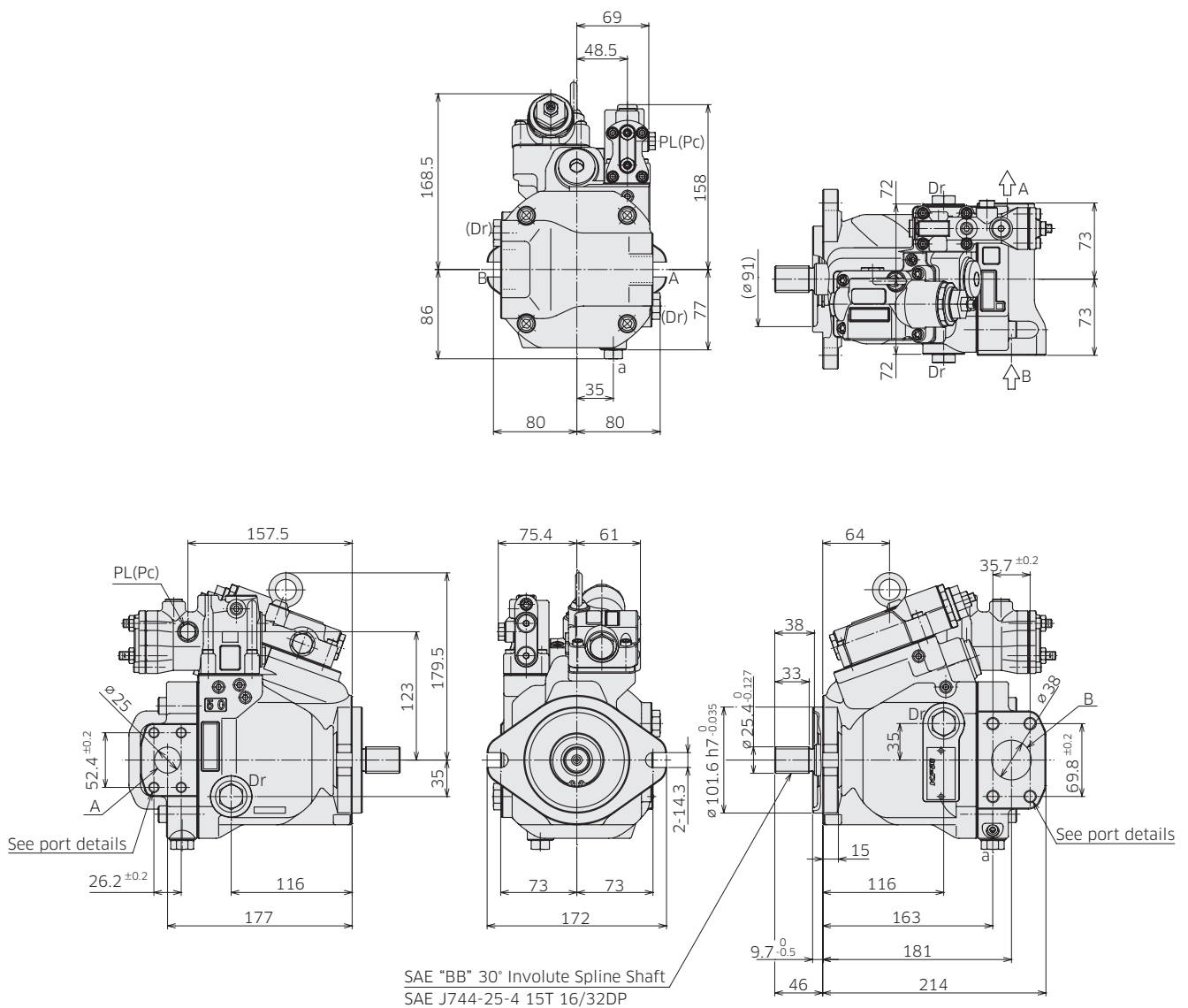
3. Dimensions

3-1 Installation Dimensions

*Dimensions in mm.

◆ K3VLS50 with Torque Limit Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 50 - 1 0 R BB * - L0 A A
 : K3VLS 50 - 1 0 R BB * - L1 A A
 : K3VLS 50 - 1 0 R BB * - P0 A A



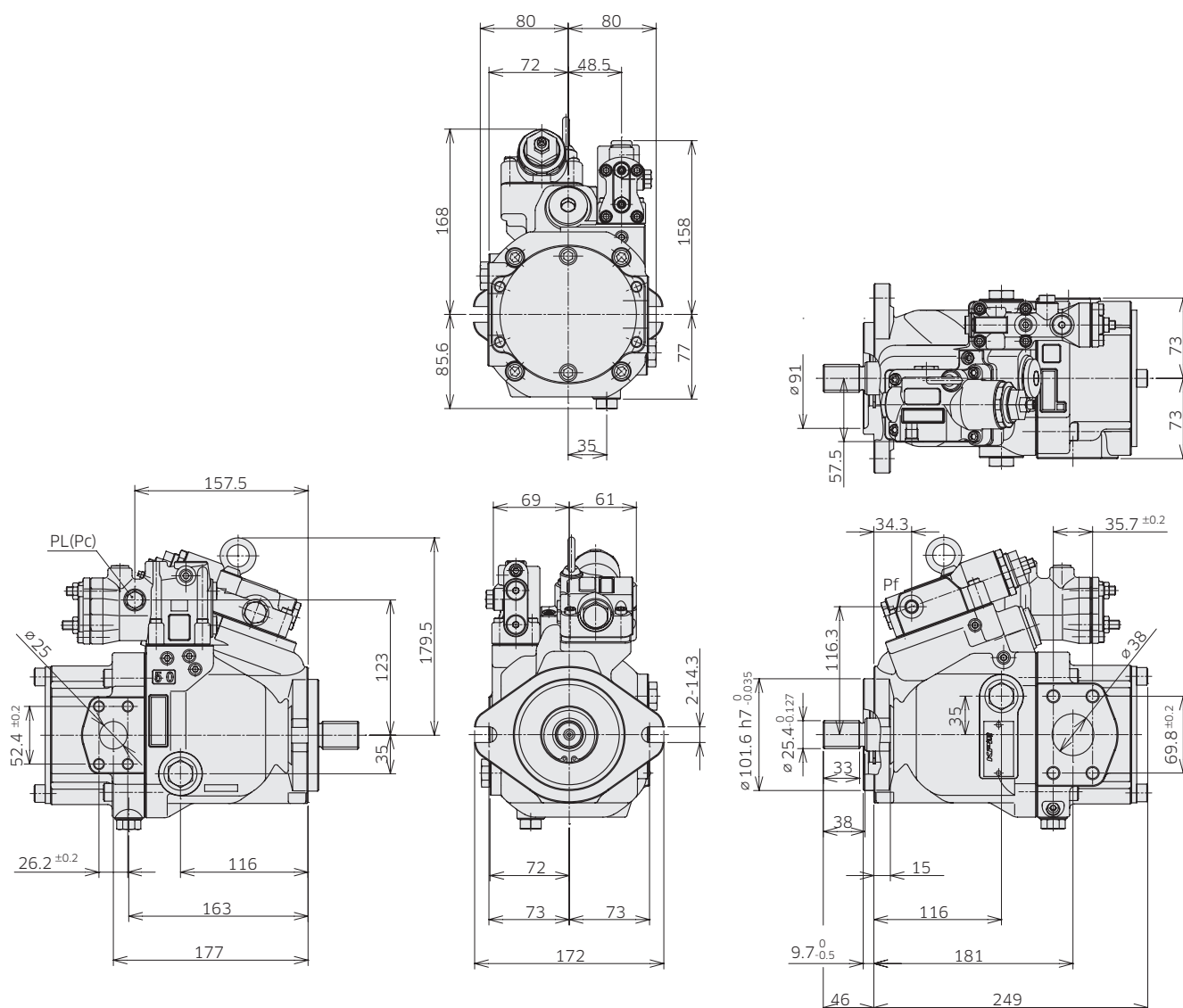
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS50 Torque Limit with Power Shift Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 50 - 1 N R BB * - L0 A B
 : K3VLS 50 - 1 N R BB * - L1 A B
 : K3VLS 50 - 1 N R BB * - P0 A B



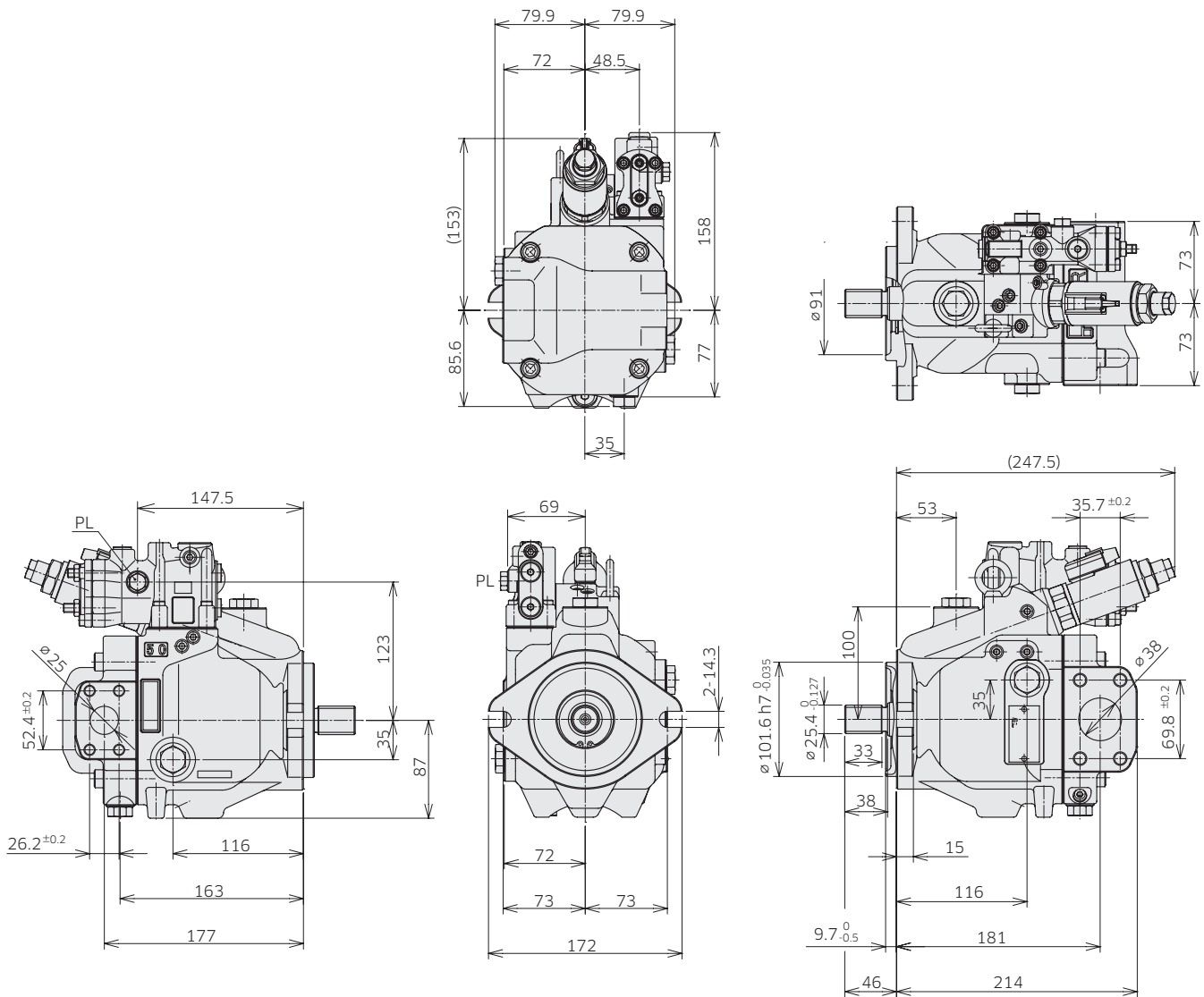
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS50 Electric Displacement Control , Side Port (Clockwise Rotation)

Model Code : K3VLS 50 - 1 0 R BB * - LO A E or - LO A F
 : K3VLS 50 - 1 0 R BB * - L1 A E or - L1 A F
 : K3VLS 50 - 1 0 R BB * - PO A E or - PO A F



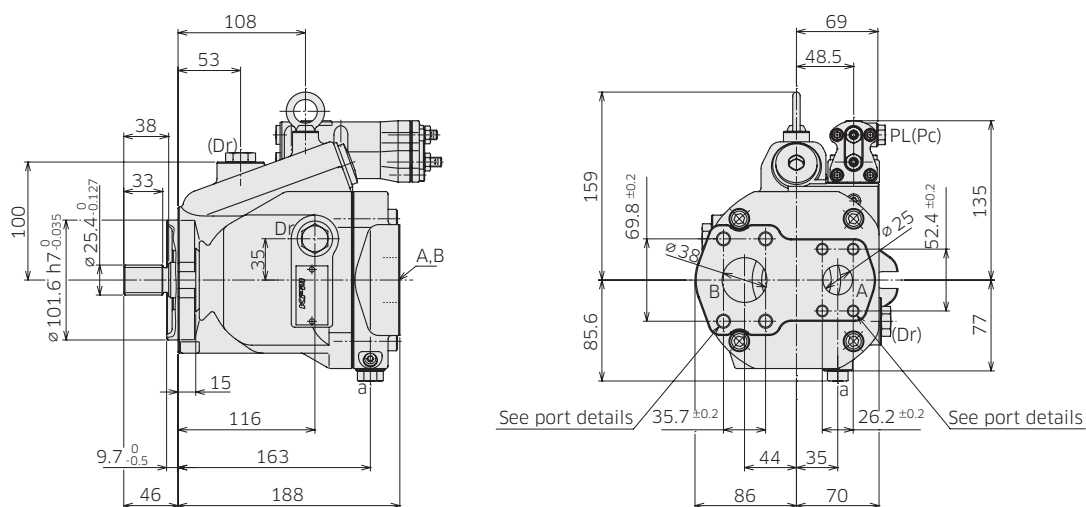
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

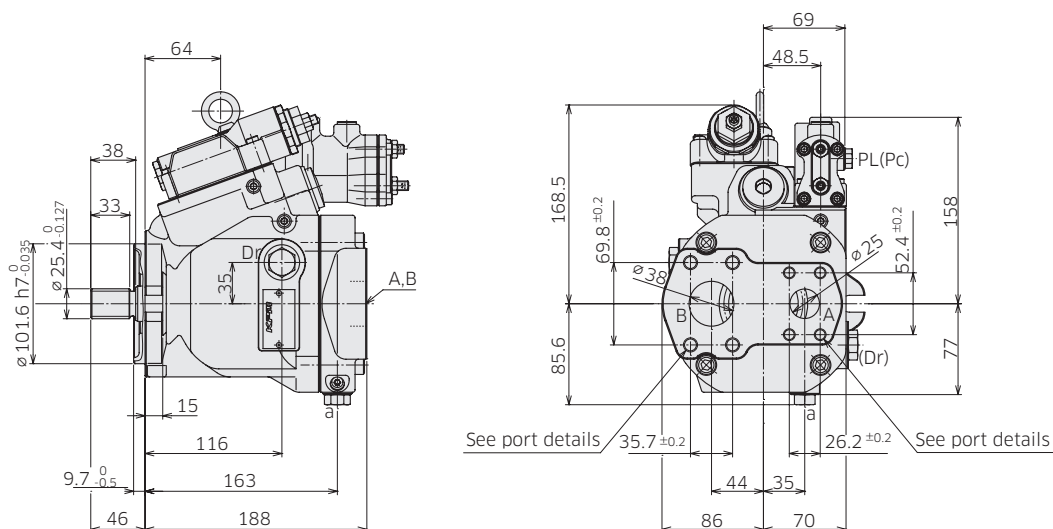
◆ K3VLS50 Rear Port (Clockwise Rotation)

Model Code : K3VLS 50 - 1 R R BB * - L0 A
 : K3VLS 50 - 1 R R BB * - L1 A
 : K3VLS 50 - 1 R R BB * - P0 A



◆ K3VLS50 Torque Limit Control, Rear Port (Clockwise Rotation)

Model Code : K3VLS 50 - 1 R R BB * - L0 A A
 : K3VLS 50 - 1 R R BB * - L1 A A
 : K3VLS 50 - 1 R R BB * - P0 A A



3. Dimensions

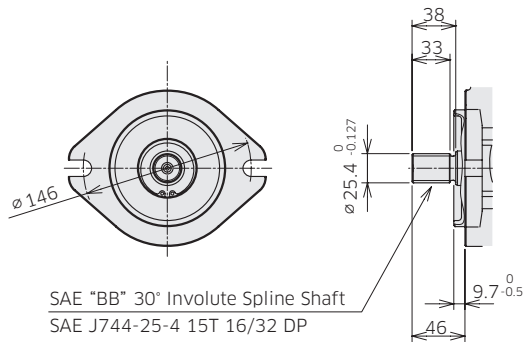
3-1 Installation Dimensions

*Dimensions in mm.

◆ K3VLS50 Mounting Flange and Shaft Options

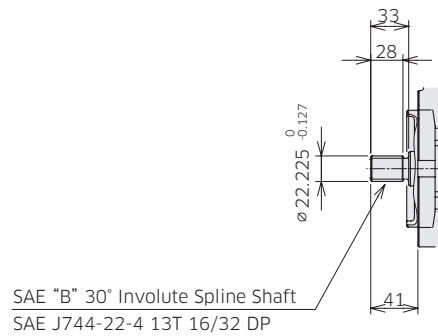
SAE BB Spline Shaft

Ordering Code "7. Mounting Flange and Shaft": BB



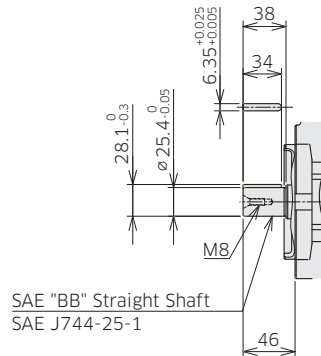
SAE B Spline Shaft

Ordering Code "7. Mounting Flange and Shaft": B



SAE BB Keyed Shaft

Ordering Code "7. Mounting Flange and Shaft": K



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

◆ K3VLS50 Porting Details

Main SAE Flanged Ports

Des	Port name	Port size	Flange threads	Tightening torque (Nm)
-----	-----------	-----------	----------------	------------------------

UNF Threaded Version ('S' in position 8 of model code)

A	Delivery port	SAE J518C std pressure (code 61) 1"	3/8-16UNC-2B-18	57
B	Suction port	SAE J518C std pressure (code 61) 1-1/2"	1/2-13UNC-2B-22	98

Metric Version ('H' in position 8 of model code)

A	Delivery port	PORT ISO 6162-1: 2012 P25M	M10-17	57
B	Suction port	PORT ISO 6162-1: 2012 P38M	M12-20	98

Auxiliary Ports

Des	Port name	Port size	Tightening torque (Nm)
-----	-----------	-----------	------------------------

SAE Version

Dr	Drain port	3/4-16UNF-2B-14.3 (ISO 11926-1: 1995)	98
PL	Load sensing port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
Pc	Pressure control port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
a	Gauge port	9/16-18UNF-2B-12.7 (ISO 11926-1: 1995)	59
Psv	Servo pressure port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
Pf	Power shift pressure port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12

3. Dimensions

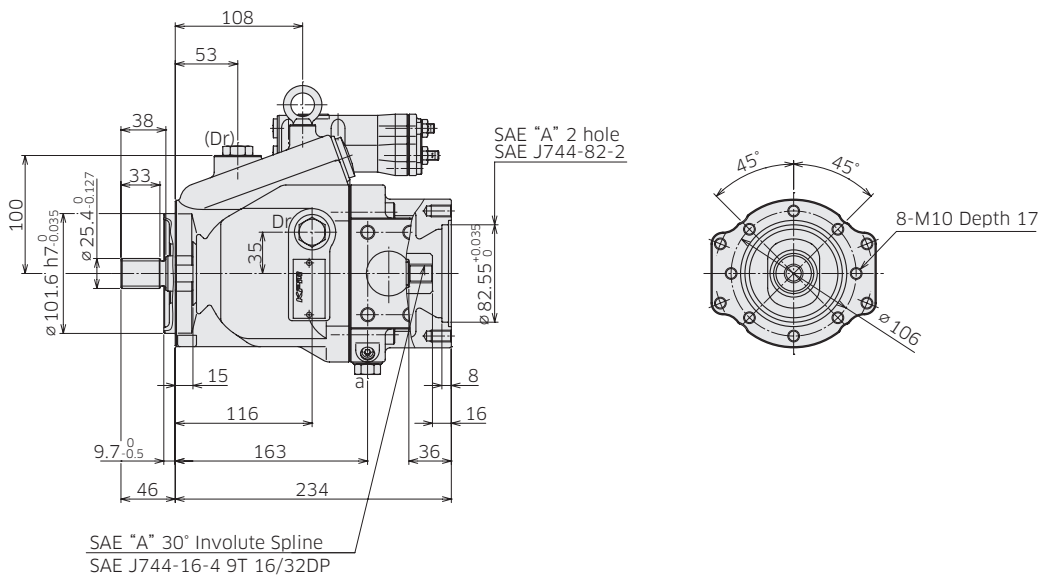
3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS50 Through Drive Options

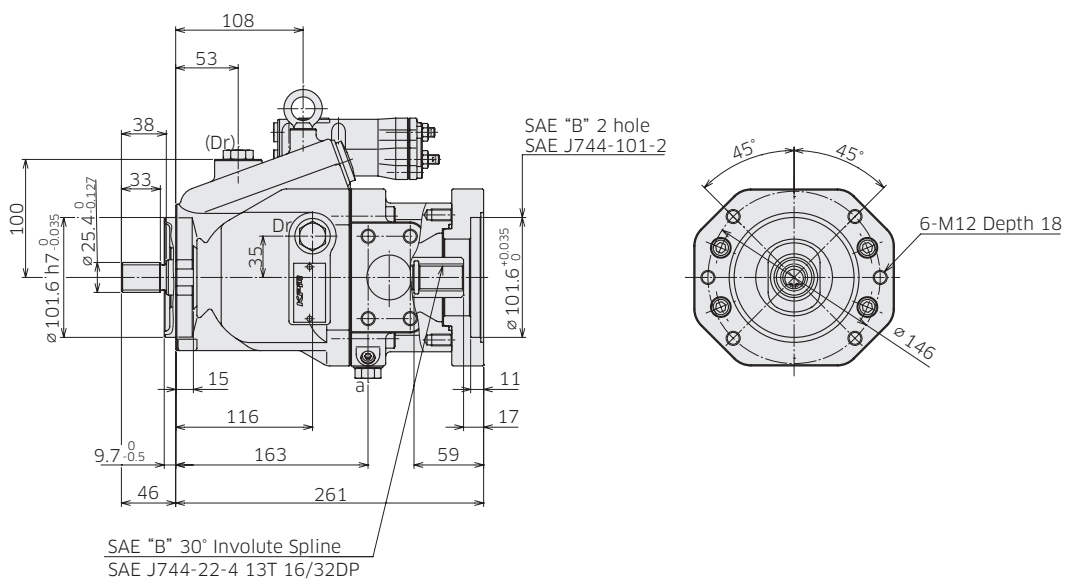
Through Drive SAE A

Ordering Code "5. Through Drive and Porting": A



Through Drive SAE B

Ordering Code "5. Through Drive and Porting": B



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

3. Dimensions

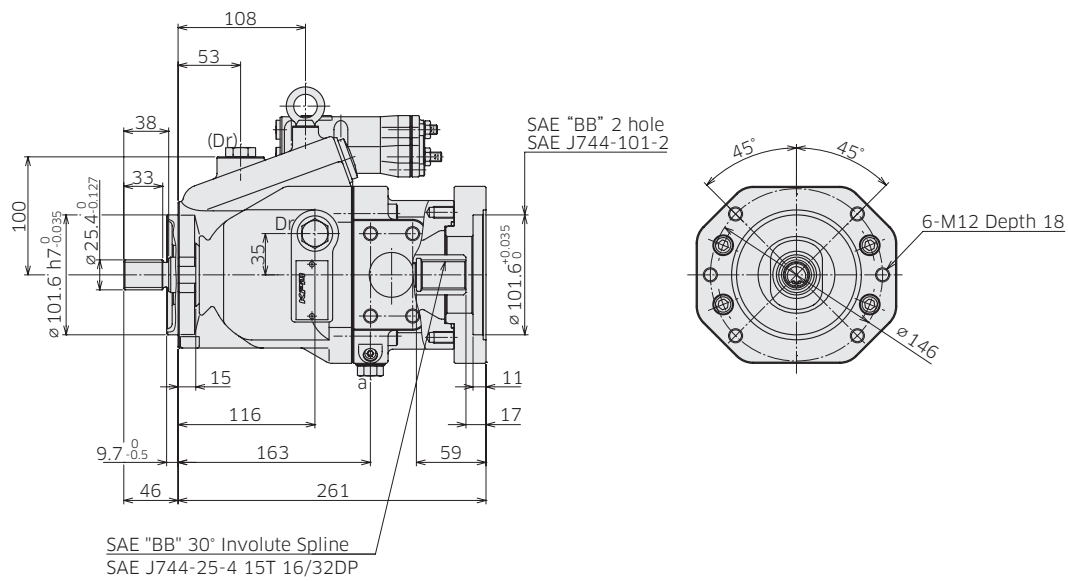
3-1 Installation Dimensions

*Dimensions in mm.

◆ K3VLS50 Through Drive Options

Through Drive SAE BB

Ordering Code "5. Through Drive and Porting": BB



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

3. Dimensions

3-1 Installation Dimensions

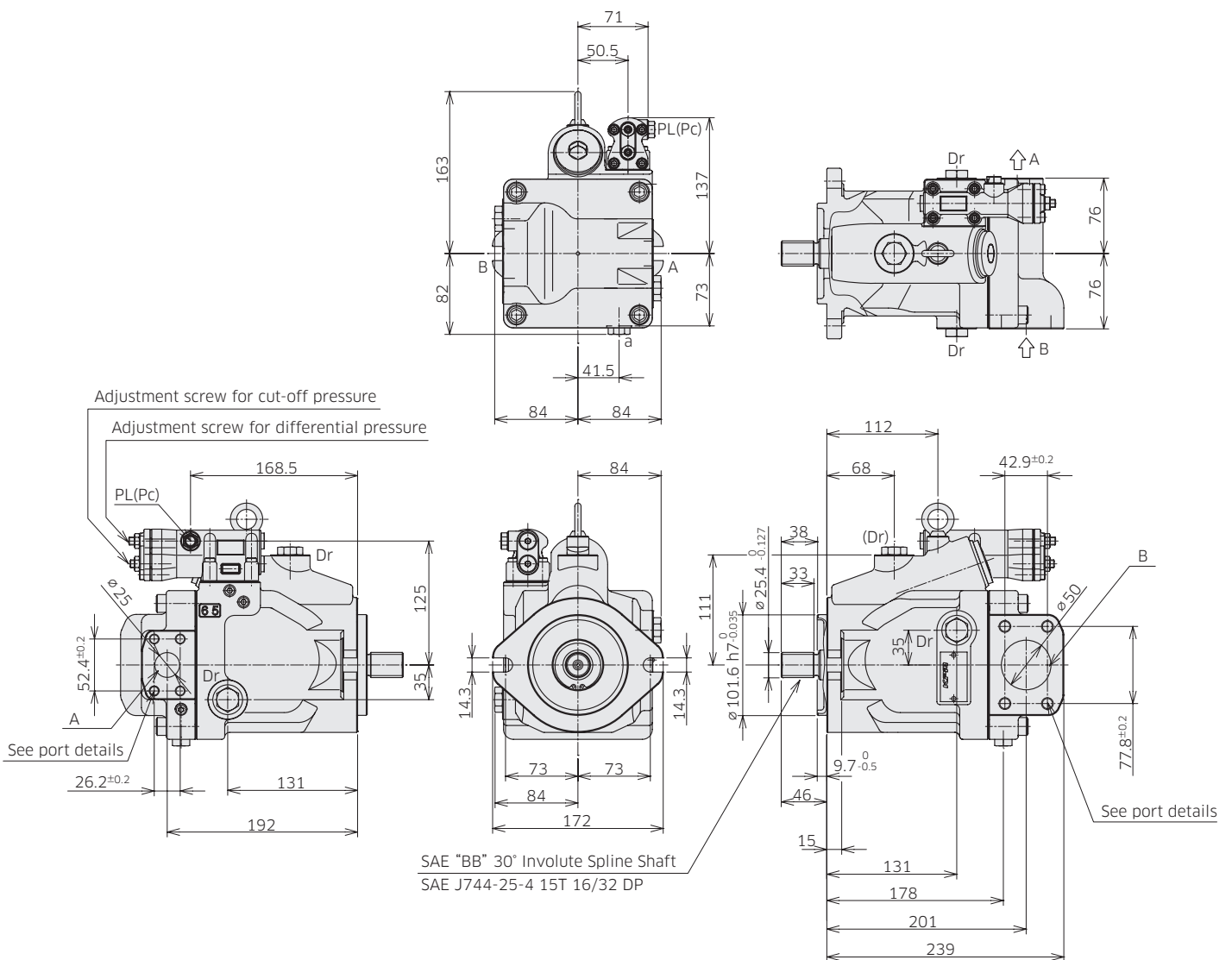
*Dimensions in mm.

◆ K3VLS65 with Cut-off / Load Sense Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 65 - 1 0 R BB * - L0 A

: K3VLS 65 - 1 0 R BB * - L1 A

: K3VLS 65 - 1 0 R BB * - P0 A



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

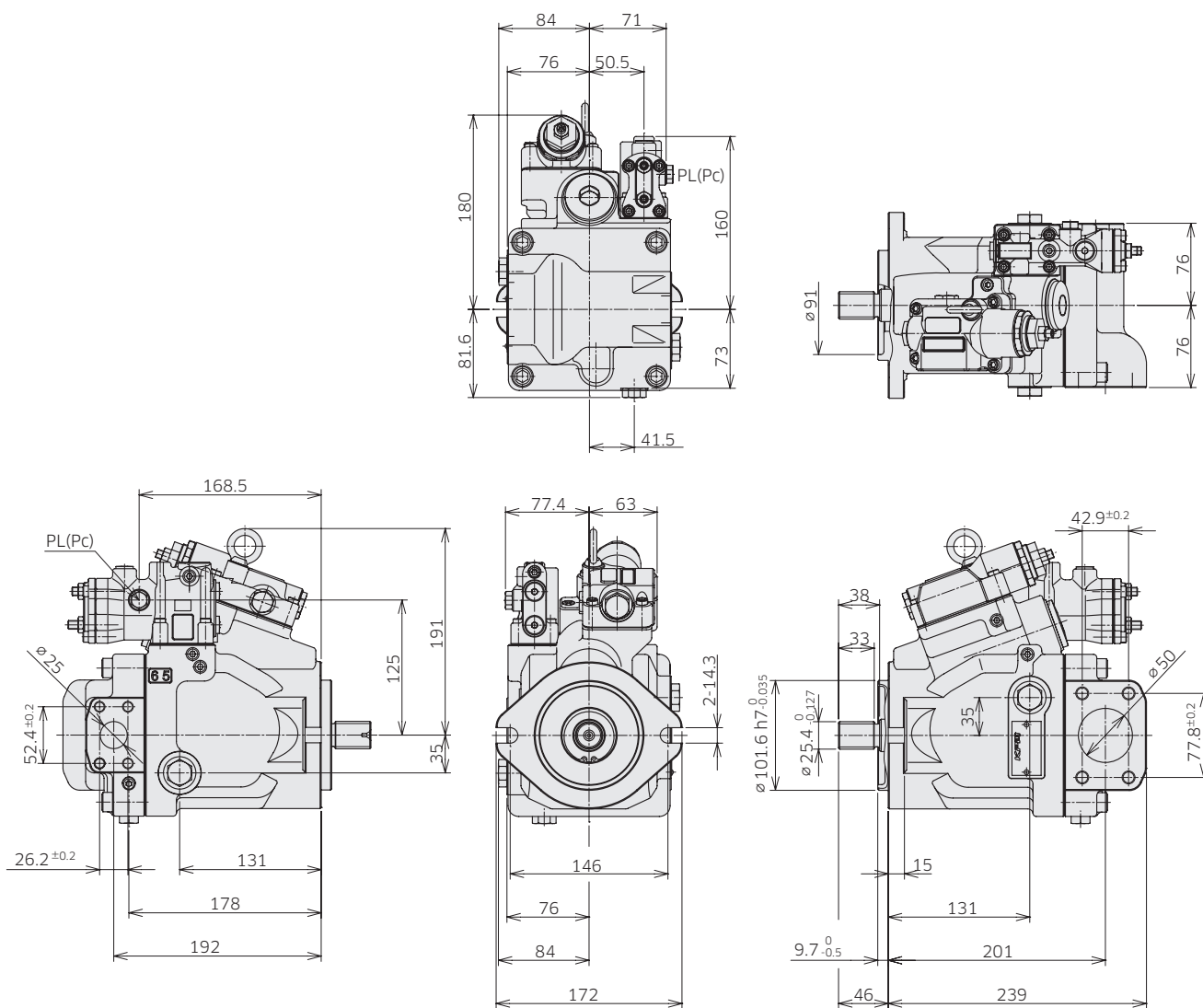
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS65 Torque Limit Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 65 - 1 0 R BB * - L0 A A
 : K3VLS 65 - 1 0 R BB * - L1 A A
 : K3VLS 65 - 1 0 R BB * - P0 A A



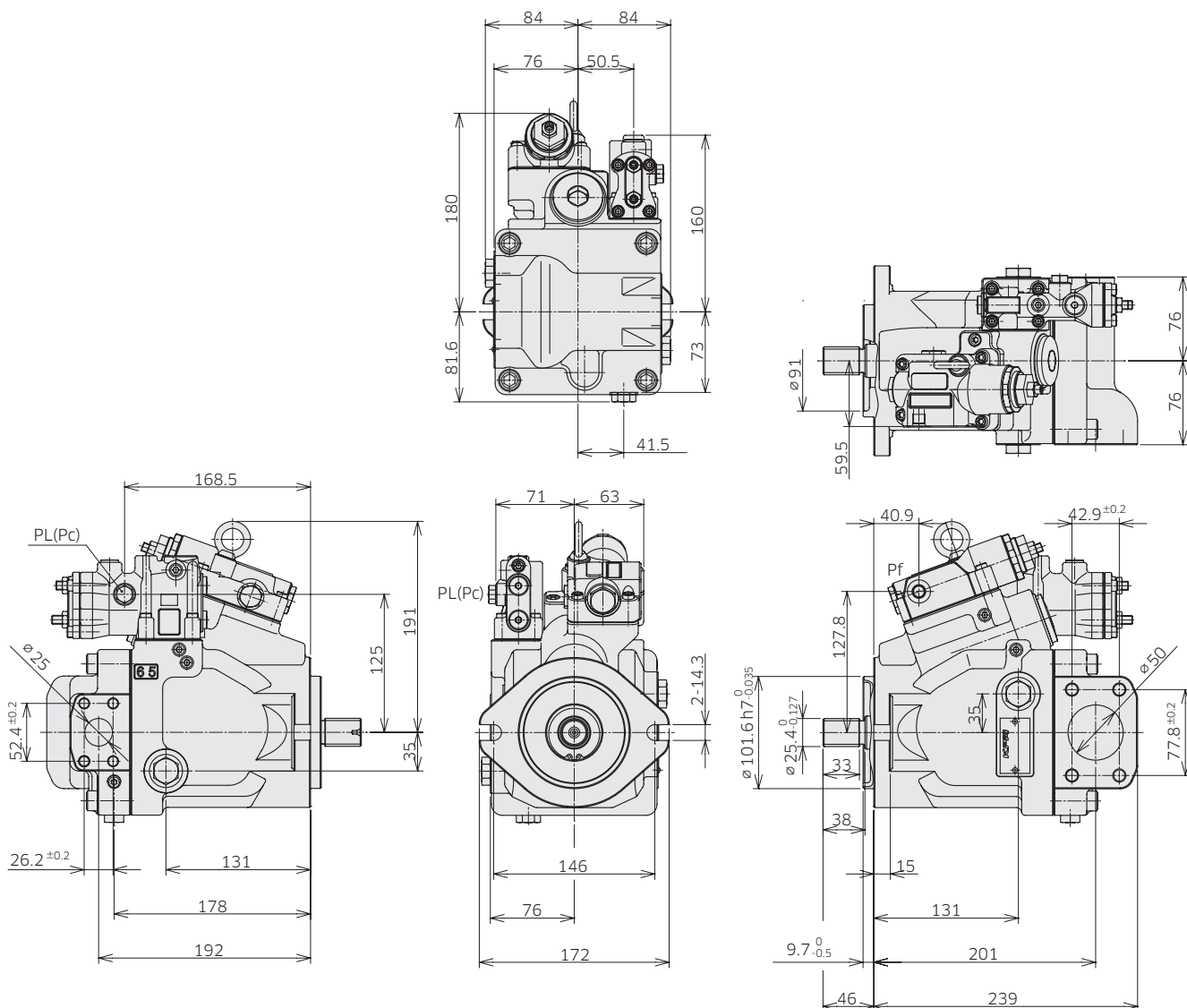
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS65 Torque Limit with Power Shift Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 65 - 1 0 R BB * - L0 A B
 : K3VLS 65 - 1 0 R BB * - L1 A B
 : K3VLS 65 - 1 0 R BB * - P0 A B



3. Dimensions

3-1 Installation Dimensions

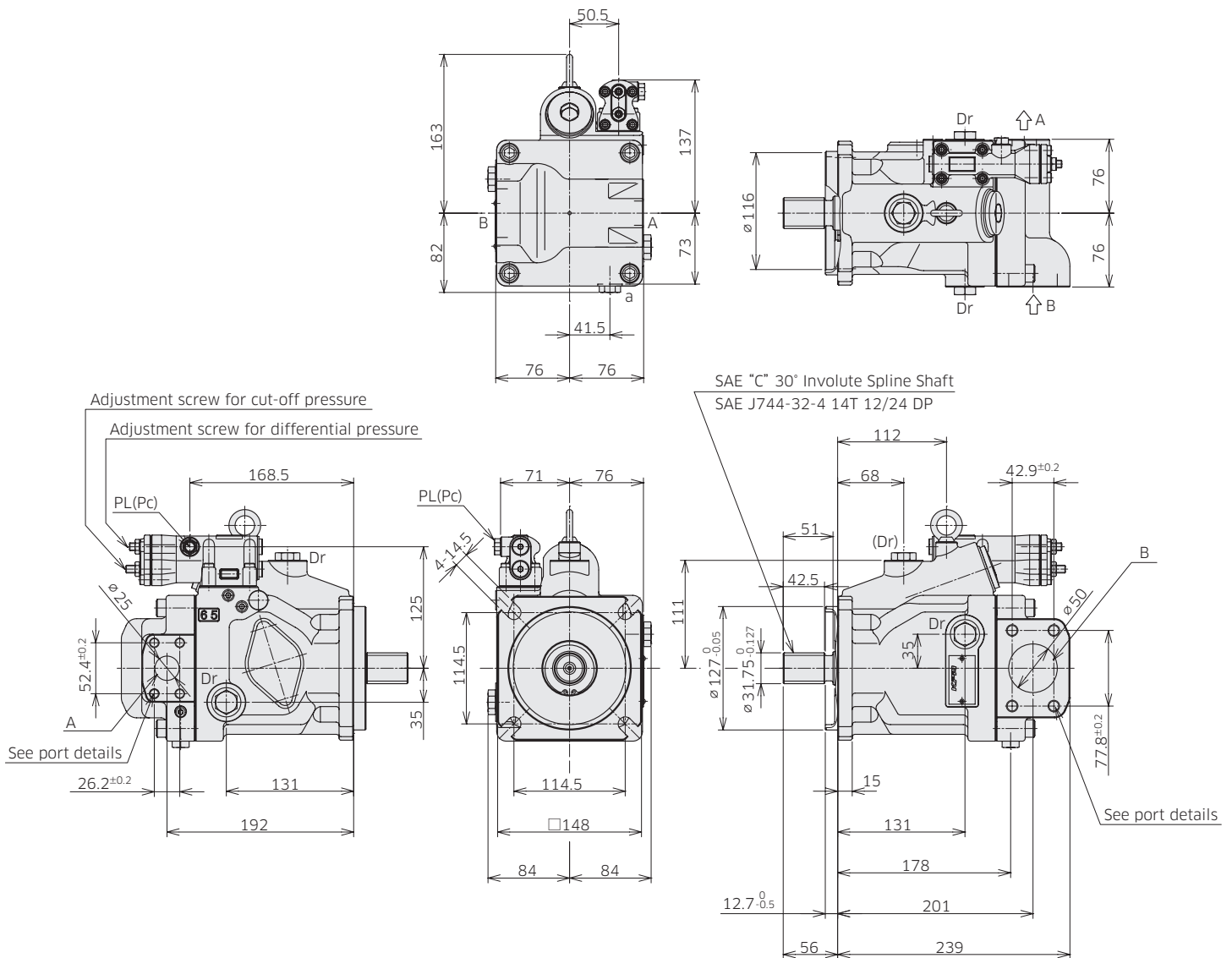
*Dimensions in mm.

◆ K3VLS65 with Cut-off Load Sense Control, Side Port (Clockwise Rotation, SAE C-4 Mount Type)

Model Code : K3VLS 65 - 1 0 R C * - L0 A

: K3VLS 65 - 1 0 R C * - L1 A

: K3VLS 65 - 1 0 R C * - P0 A



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

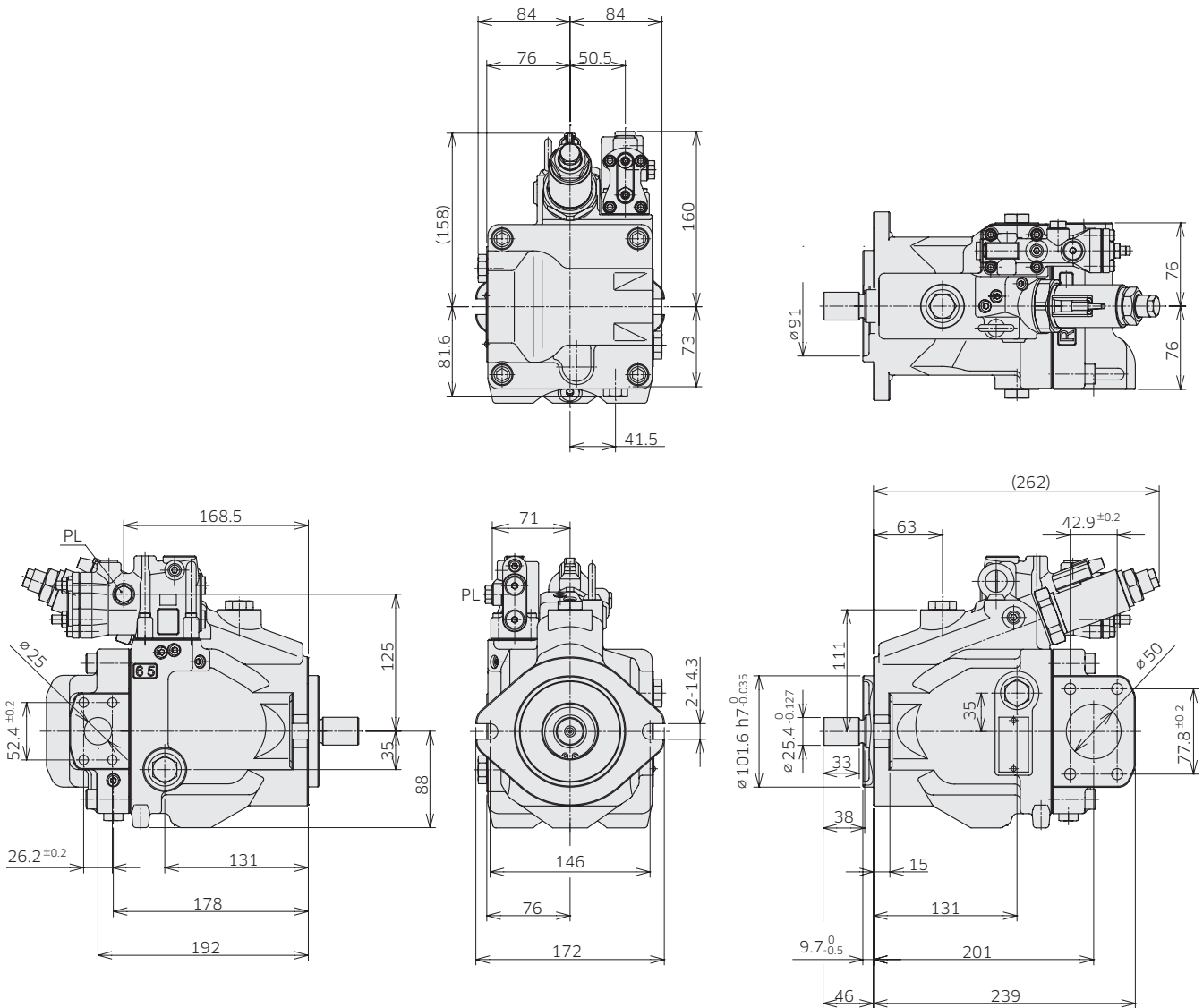
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS65 Electric Displacement Control , Side Port (Clockwise Rotation)

Model Code : K3VLS 65 - 1 0 R BB * - L0 A E or - L0 A F
 : K3VLS 65 - 1 0 R BB * - L1 A E or - L1 A F
 : K3VLS 65 - 1 0 R BB * - P0 A E or - P0 A F



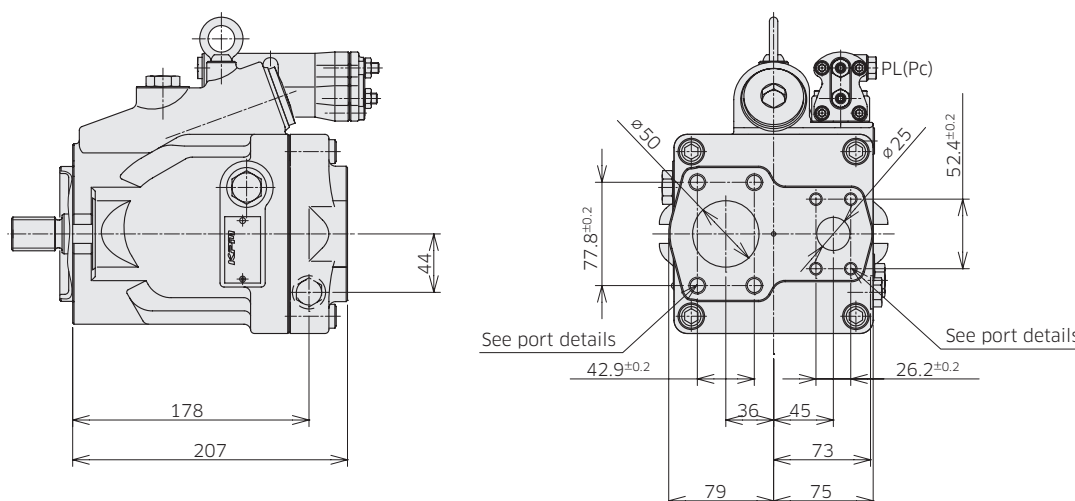
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

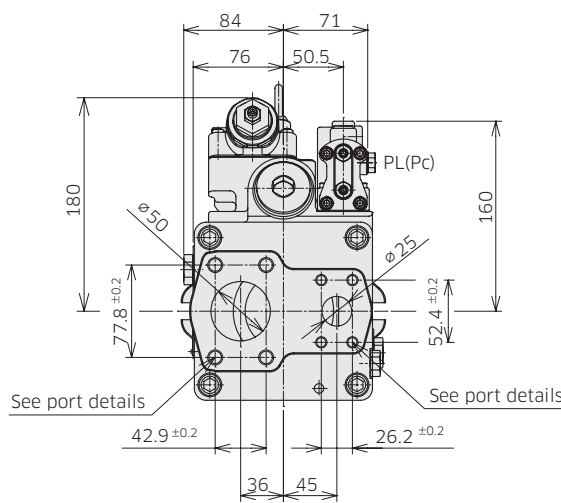
◆ K3VLS65 Rear Port (Clockwise Rotation)

Model Code : K3VLS 65 - 1 R R BB * - L0 A
 : K3VLS 65 - 1 R R BB * - L1 A
 : K3VLS 65 - 1 R R BB * - P0 A



◆ K3VLS65 Torque Limit Control, Rear Port (Clockwise Rotation)

Model Code : K3VLS 65 - 1 R R BB * - L0 A A
 : K3VLS 65 - 1 R R BB * - L1 A A
 : K3VLS 65 - 1 R R BB * - P0 A A



3. Dimensions

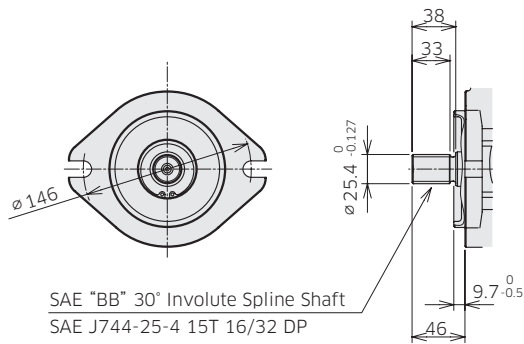
3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS65 Mounting Flange and Shaft Options

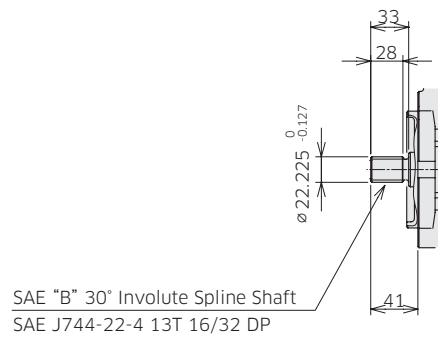
SAE BB Spline Shaft

Ordering Code "7. Mounting Flange and Shaft": BB



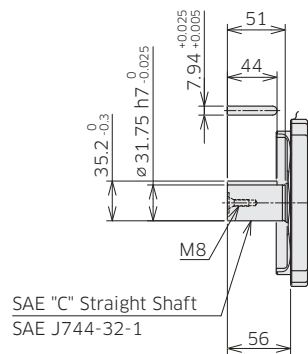
SAE B Spline Shaft

Ordering Code "7. Mounting Flange and Shaft": B



SAE C Keyed Shaft

Ordering Code "7. Mounting Flange and Shaft": K



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

◆ K3VLS65 Porting Details

Main SAE Flanged Ports

Des	Port name	Port size	Flange threads	Tightening torque (Nm)
-----	-----------	-----------	----------------	------------------------

UNF Threaded Version ('S' in position 8 of model code)

A	Delivery port	SAE J518C std pressure (code 61) 1"	3/8-16UNC-2B-18	57
B	Suction port	SAE J518C std pressure (code 61) 2"	1/2-13UNC-2B-22	98

Metric Version ('H' in position 8 of model code)

A	Delivery port	PORT ISO 6162-1: 2012 P25M	M10-17	57
B	Suction port	PORT ISO 6162-1: 2012 P51M	M12-20	98

Auxiliary Ports

Des	Port name	Port size	Tightening torque (Nm)
-----	-----------	-----------	------------------------

SAE Version

Dr	Drain port	3/4-16UNF-2B-14.3 (ISO 11926-1: 1995)	98
PL	Load sensing port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
Pc	Pressure control port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
a	Gauge port	9/16-18UNF-2B-12.7 (ISO 11926-1: 1995)	59
Psv	Servo pressure port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
Pf	Power shift pressure port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12

3. Dimensions

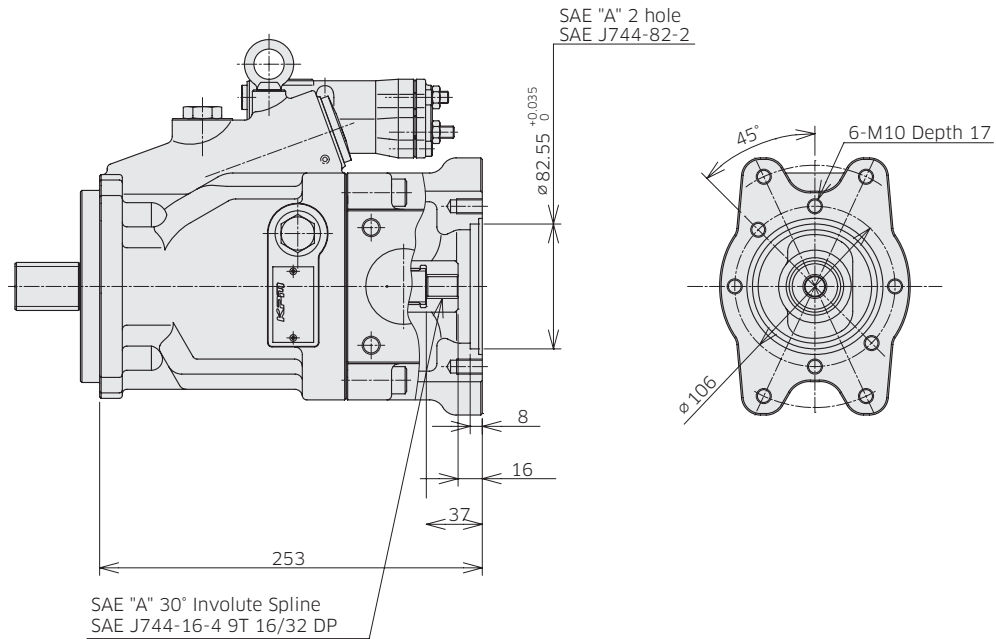
3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS65 Through Drive Options

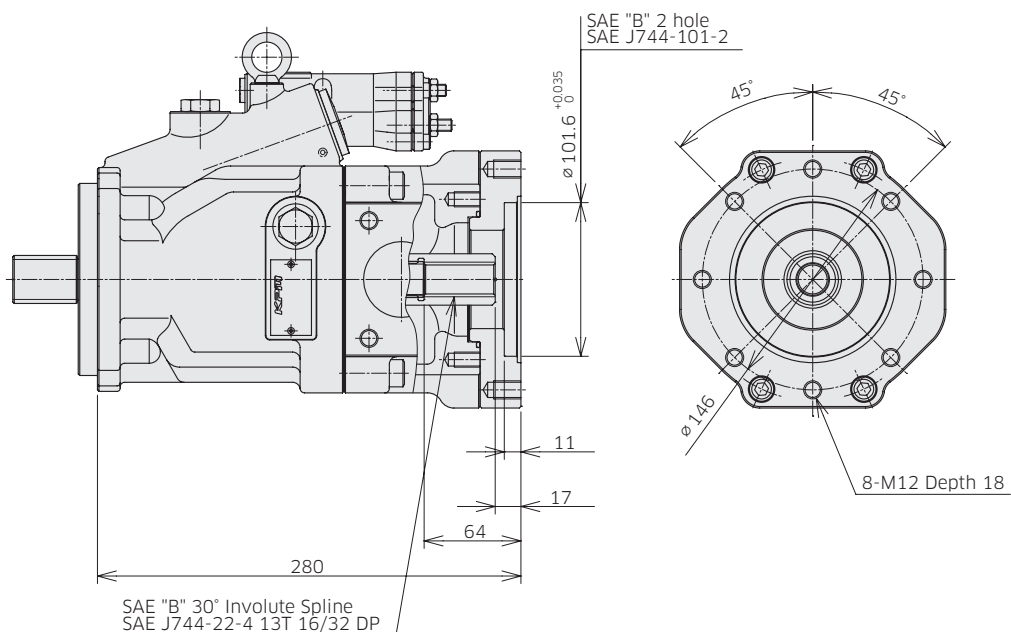
Through Drive SAE A

Ordering Code "5. Through Drive and Porting": A



Through Drive SAE B

Ordering Code "5. Through Drive and Porting": B



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

3. Dimensions

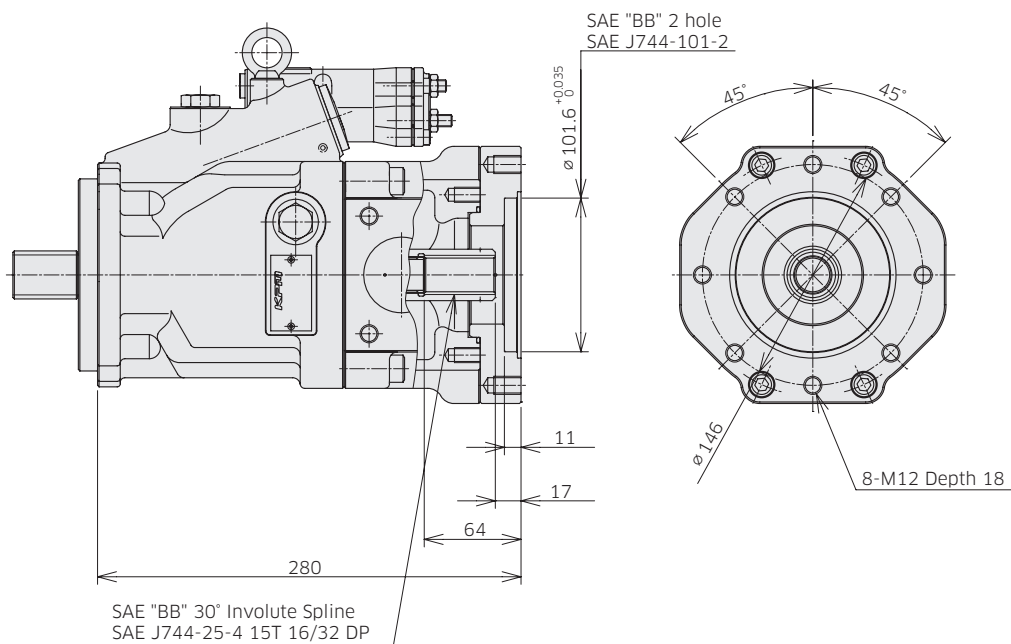
3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS65 Through Drive Options

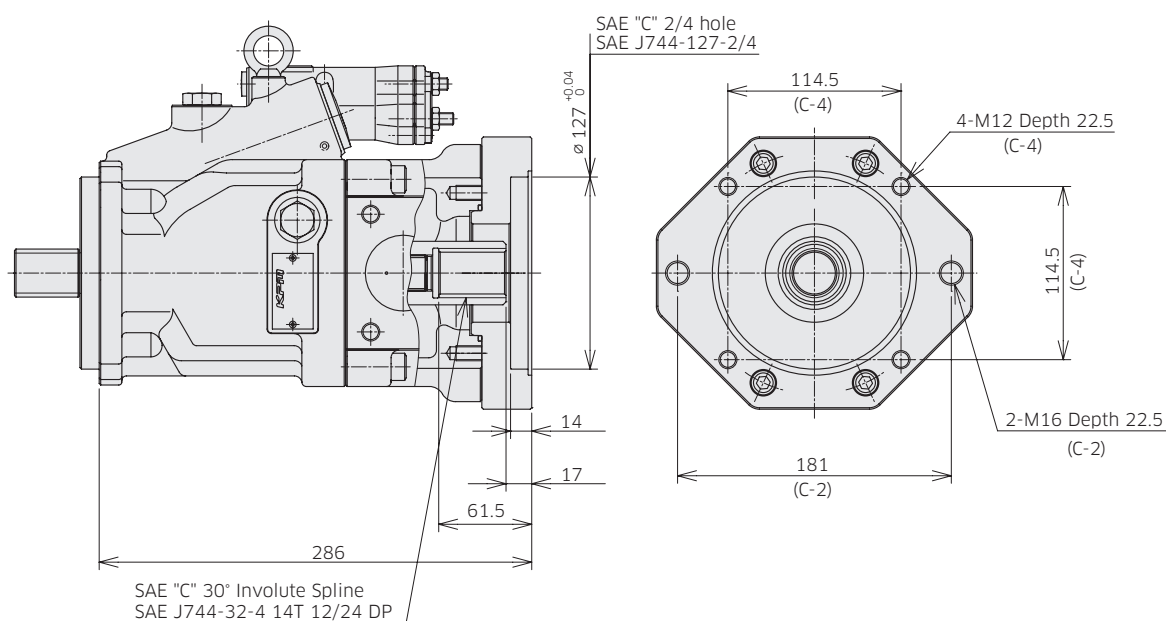
Through Drive SAE BB

Ordering Code "5. Through Drive and Porting": BB



Through Drive SAE C

Ordering Code "5. Through Drive and Porting": C



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

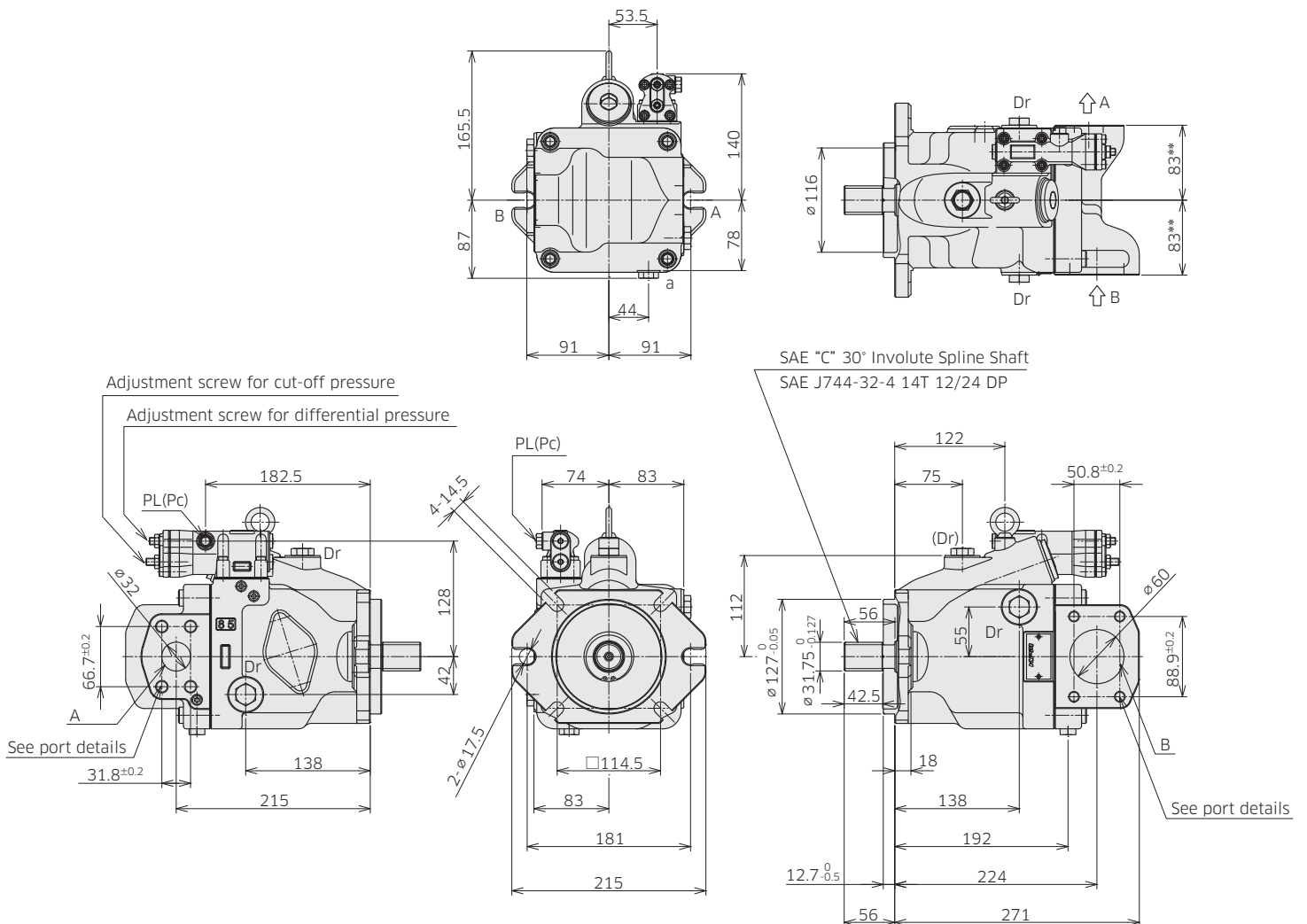
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS85 with Cut-off / Load Sense Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 85 - 1 0 R C * - L0 A
 : K3VLS 85 - 1 0 R C * - L1 A
 : K3VLS 85 - 1 0 R C * - P0 A



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.
 (***) With a through drive is 86 mm

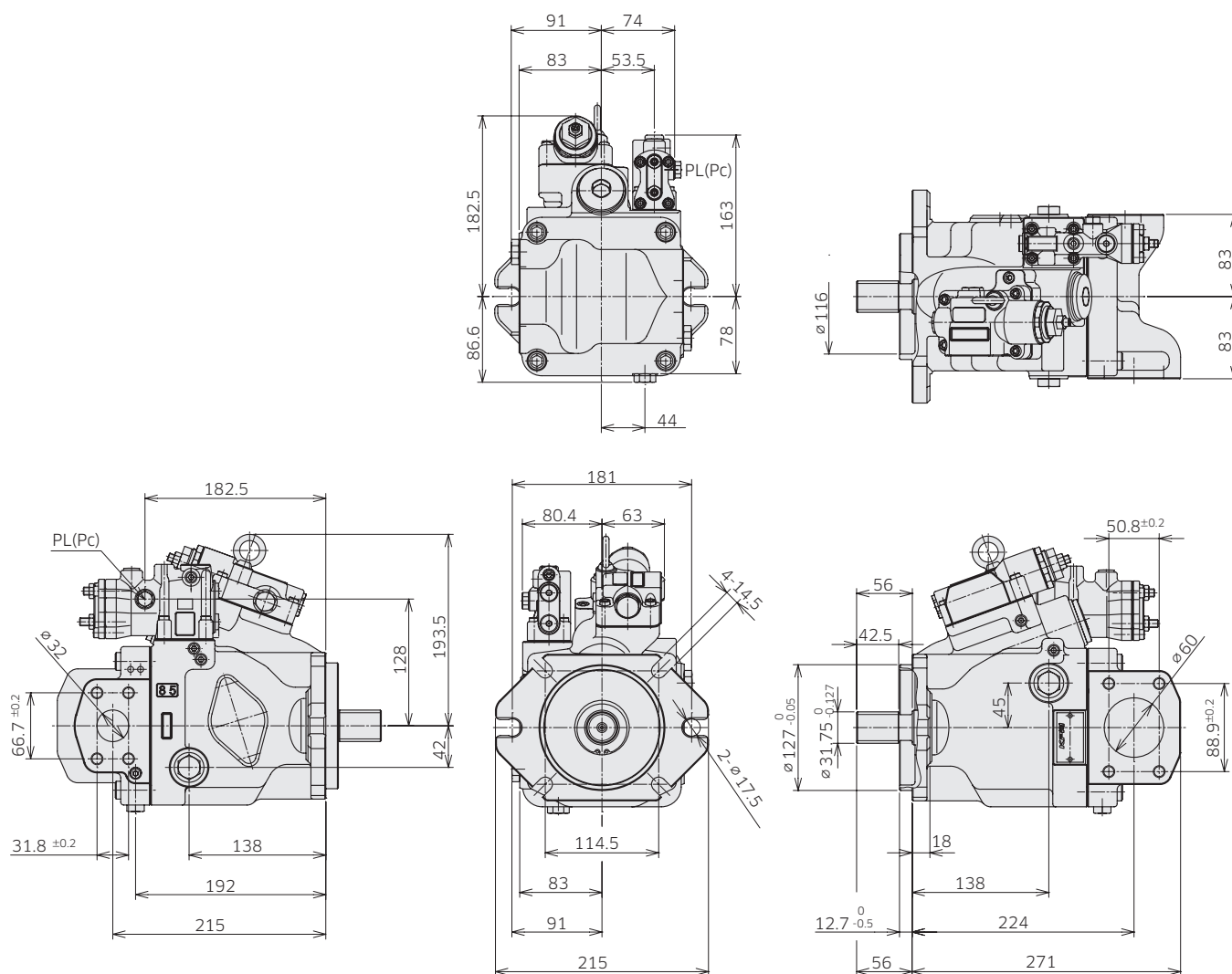
3. Dimensions

3-1 Installation Dimensions

*Dimensions in mm.

◆ K3VLS85 Torque Limit Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 85 - 1 0 R C * - L0 A A
 : K3VLS 85 - 1 0 R C * - L1 A A
 : K3VLS 85 - 1 0 R C * - P0 A A



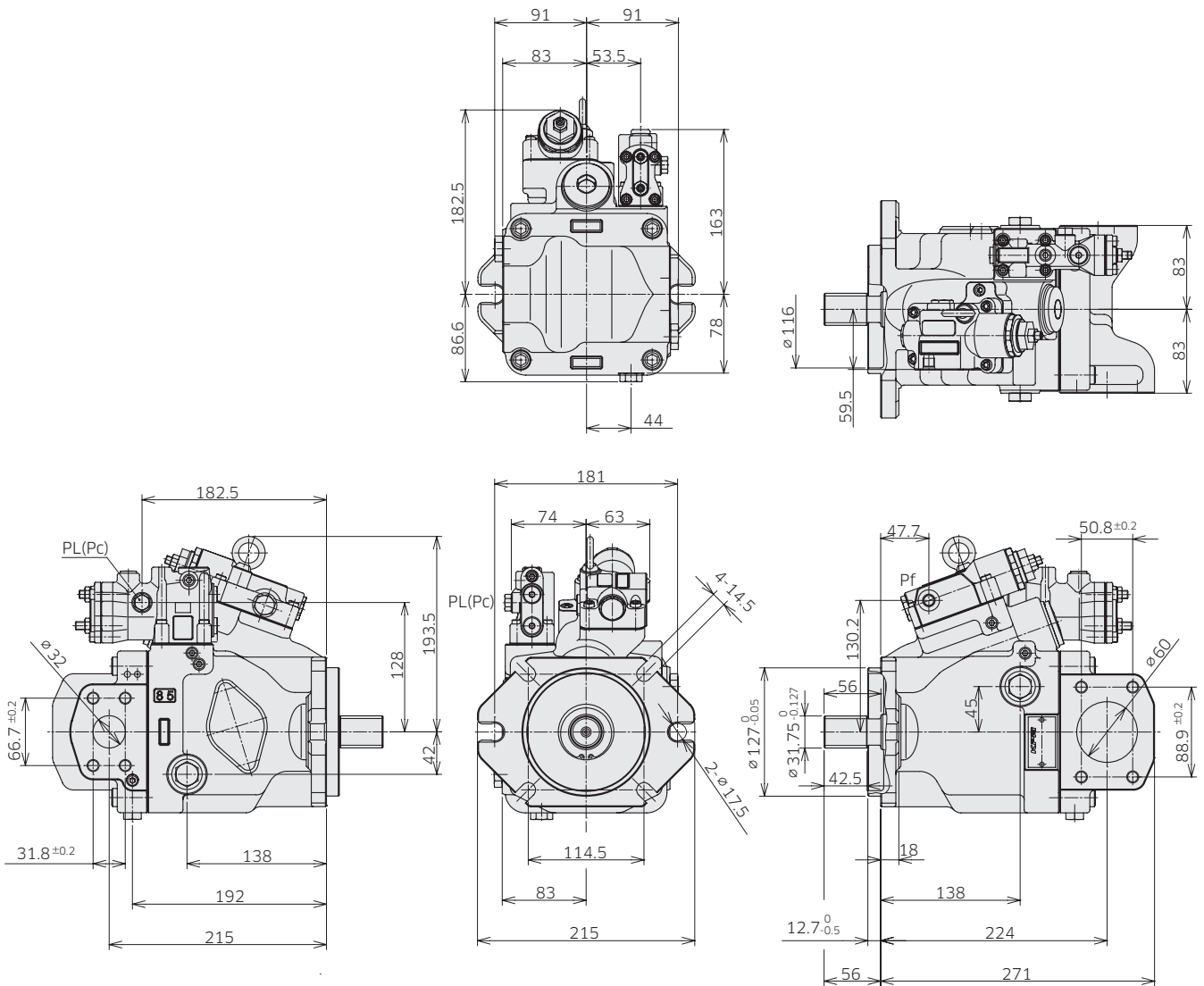
3. Dimensions

3-1 Installation Dimensions

*Dimensions in mm.

◆ K3VLS85 Torque Limit with Power Shift Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 85 - 1 0 R C * - L0 A B
 : K3VLS 85 - 1 0 R C * - L1 A B
 : K3VLS 85 - 1 0 R C * - P0 A B



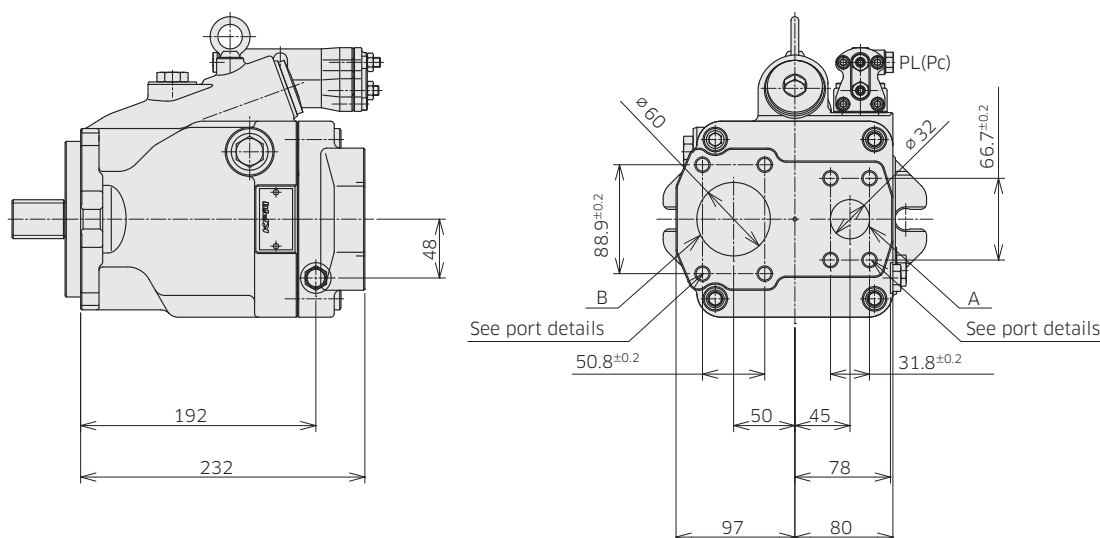
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

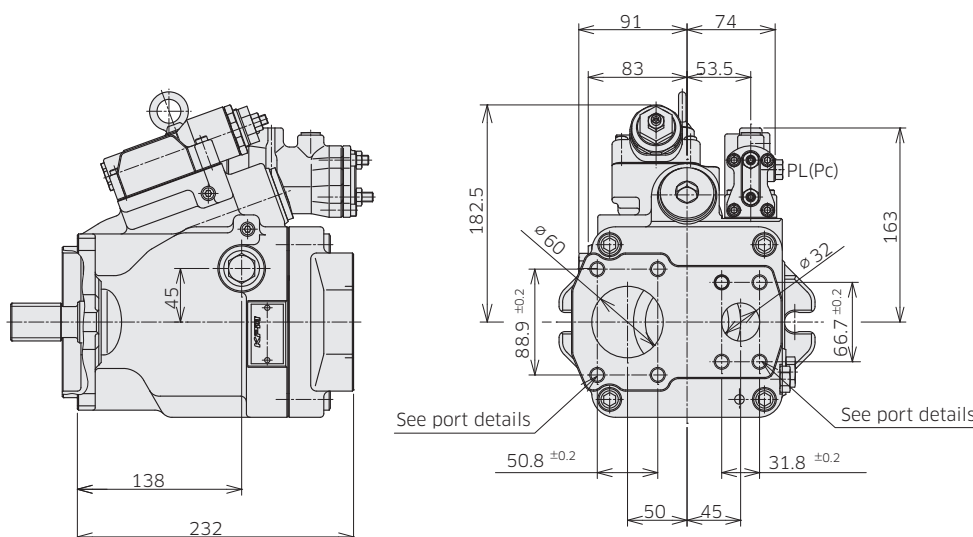
◆ K3VLS85 Rear Port (Clockwise Rotation)

Model Code : K3VLS 85 - 1 R R C * - L0 A
 : K3VLS 85 - 1 R R C * - L1 A
 : K3VLS 85 - 1 R R C * - PO A



◆ K3VLS85 Torque Limit Control, Rear Port (Clockwise Rotation)

Model Code : K3VLS 85 - 1 R R C * - L0 A A
 : K3VLS 85 - 1 R R C * - L1 A A
 : K3VLS 85 - 1 R R C * - PO A A



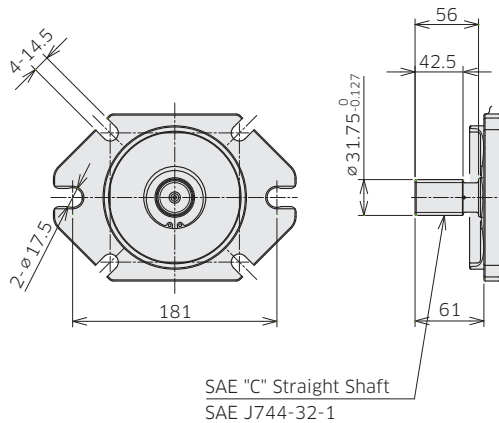
3. Dimensions

3-1 Installation Dimensions

◆ K3VLS85 Mounting Flange and Shaft Options

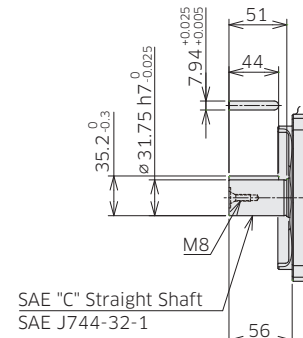
SAE C Spline Shaft

Ordering Code "7. Mounting Flange and Shaft": C



SAE C Keyed Shaft

Ordering Code "7. Mounting Flange and Shaft": K



◆ K3VLS85 Porting Details

Main SAE Flanged Ports

Des	Port name	Port size	Flange threads	Tightening torque (Nm)
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UNF Threaded Version ('S' in position 8 of model code)

A	Delivery port	SAE J518C high pressure (code 62) 1-1/4"	1/2-13UNC-2B-22	98
B	Suction port	SAE J518C std pressure (code 61) 2-1/2"	1/2-13UNC-2B-22	98

Metric Version ('H' in position 8 of model code)

A	Delivery port	PORT ISO 6162-2: 2012 P32M	M12-23	98
B	Suction port	PORT ISO 6162-1: 2012 P64M	M12-22	98

Auxiliary Ports

Des	Port name	Port size	Tightening torque (Nm)
-----	-----------	-----------	------------------------

SAE Version

Dr	Drain port	3/4-16UNF-2B-14.3 (ISO 11926-1: 1995)	98
PL	Load sensing port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
Pc	Pressure control port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
a	Gauge port	9/16-18UNF-2B-12.7 (ISO 11926-1: 1995)	59
Psv	Servo pressure port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
Pf	Power shift pressure port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12

3. Dimensions

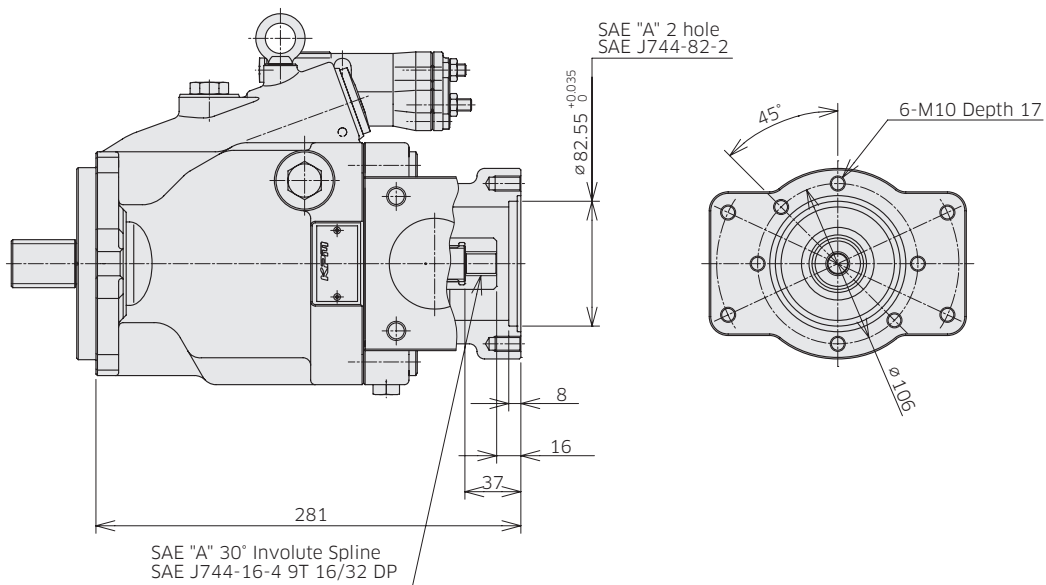
3-1 Installation Dimensions

*Dimensions in mm.

◆ K3VLS85 Through Drive Options

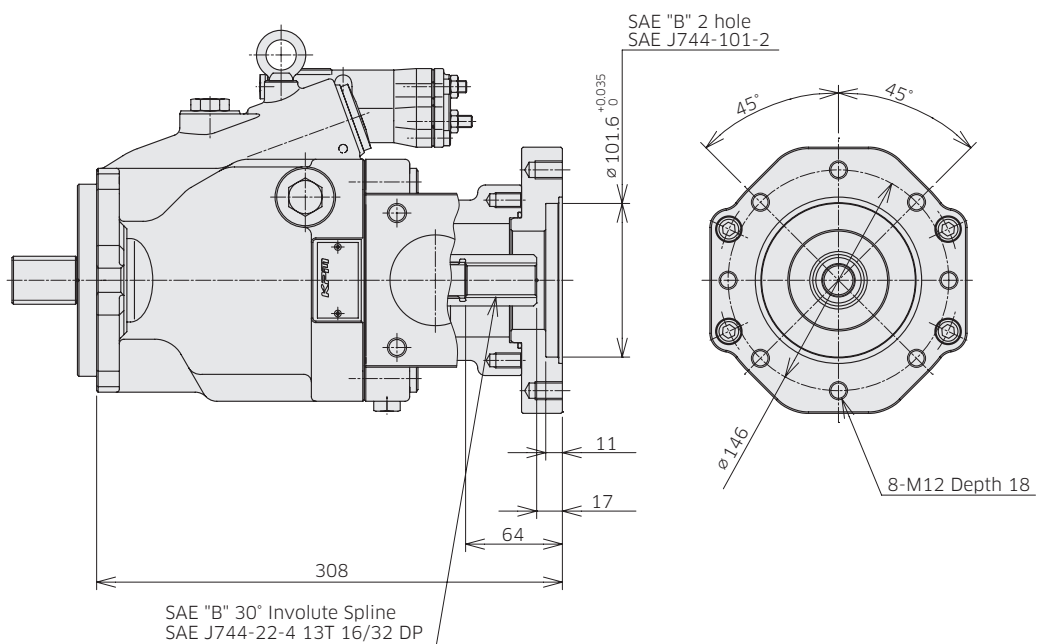
Through Drive SAE A

Ordering Code "5. Through Drive and Porting": A



Through Drive SAE B

Ordering Code "5. Through Drive and Porting": B



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

3. Dimensions

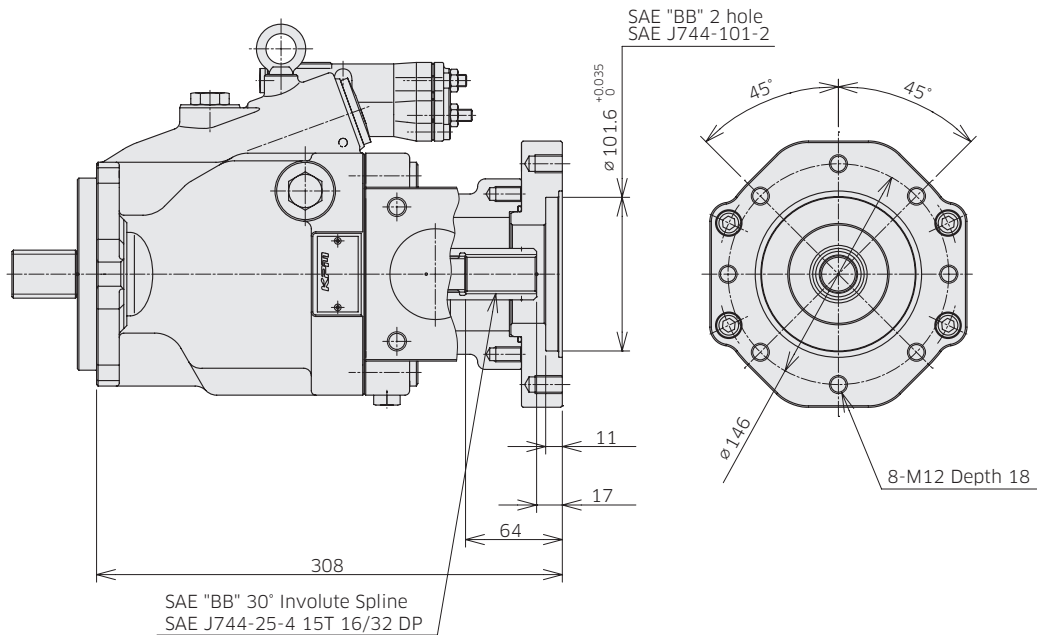
3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS85 Through Drive Options

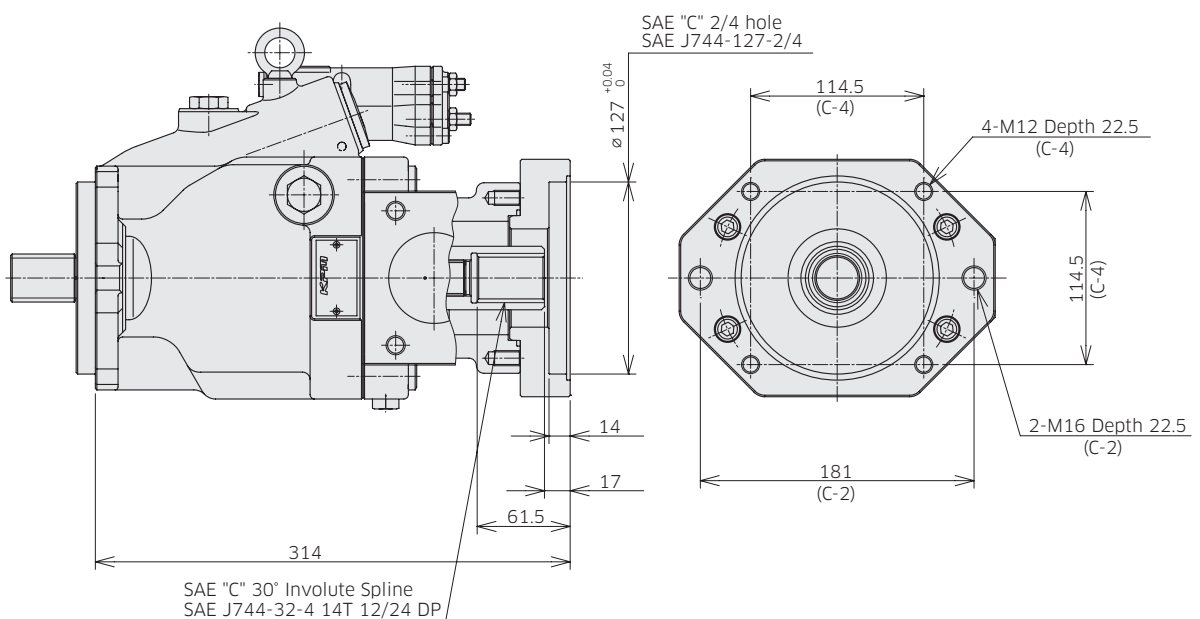
Through Drive SAE BB

Ordering Code "5. Through Drive and Porting": BB



Trough Drive SAE C

Ordering Code "5. Through Drive and Porting": C



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

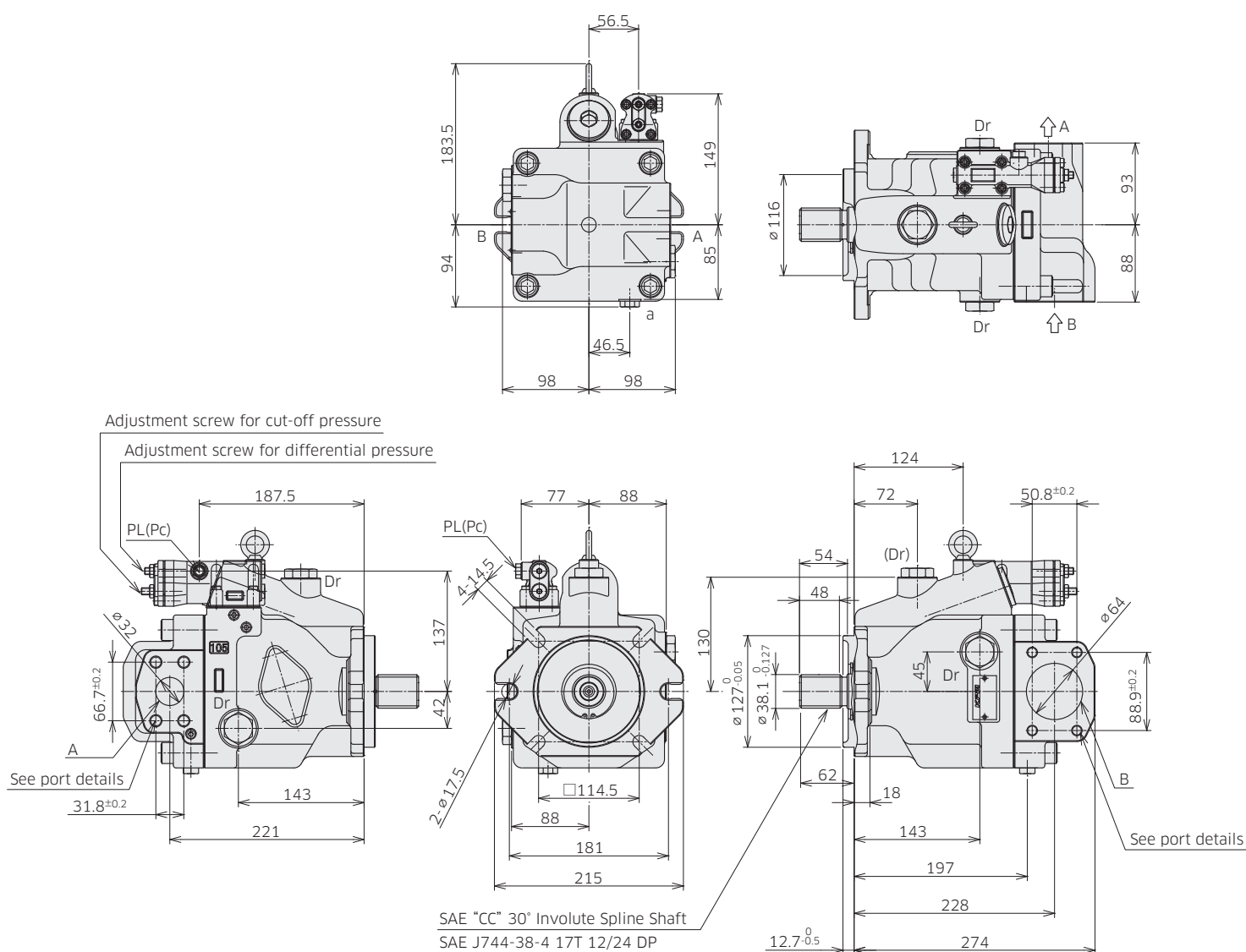
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS105 with Cut-off / Load sense Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 105 - 1 0 R CC * - L0 A
 : K3VLS 105 - 1 0 R CC * - L1 A
 : K3VLS 105 - 1 0 R CC * - P0 A



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

3. Dimensions

3-1 Installation Dimensions

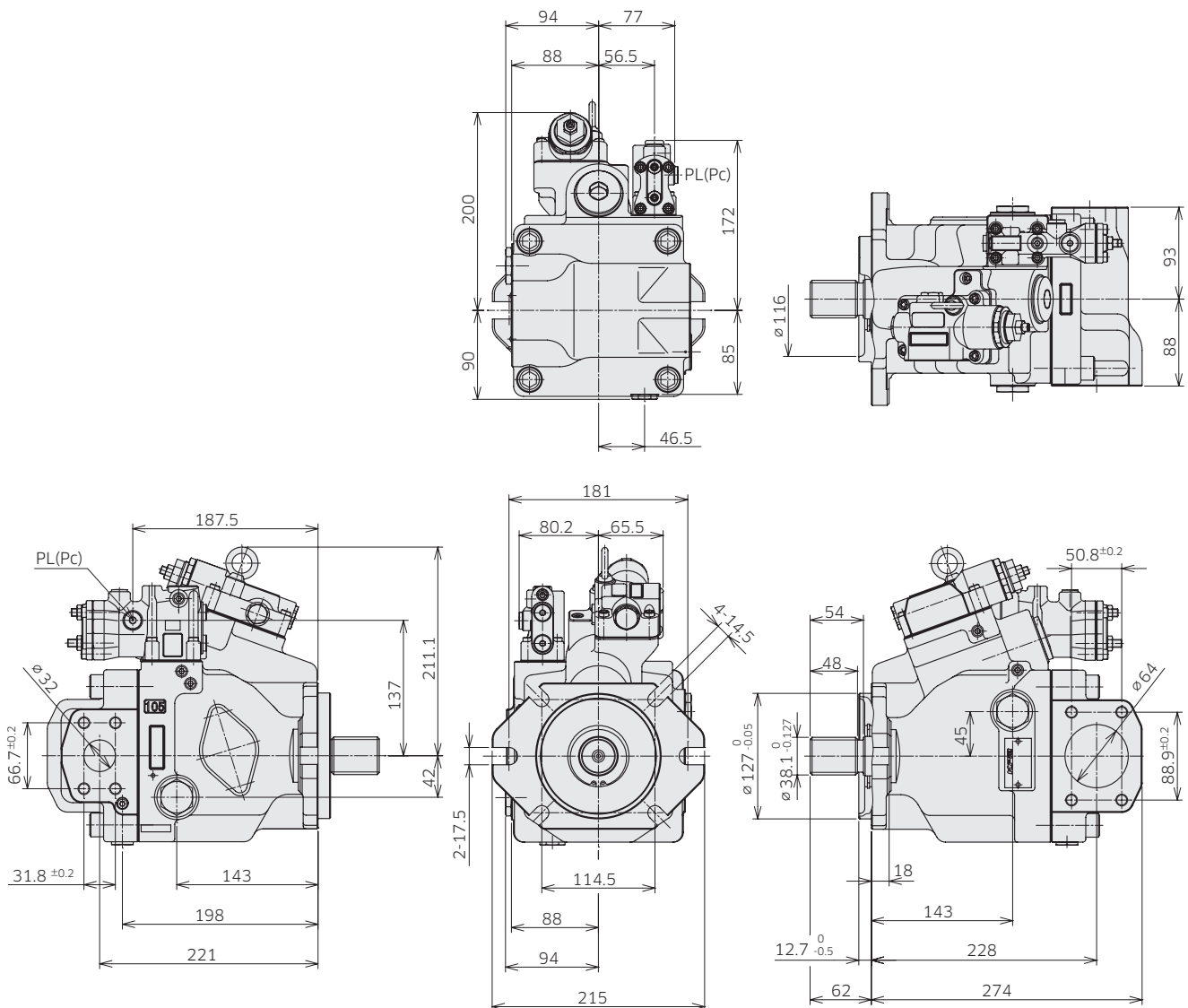
* Dimensions in mm.

◆ K3VLS105 Torque Limit Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 105 - 1 0 R CC * - L0 A A

: K3VLS 105 - 1 0 R CC * - L1 A A

: K3VLS 105 - 1 0 R CC * - P0 A A



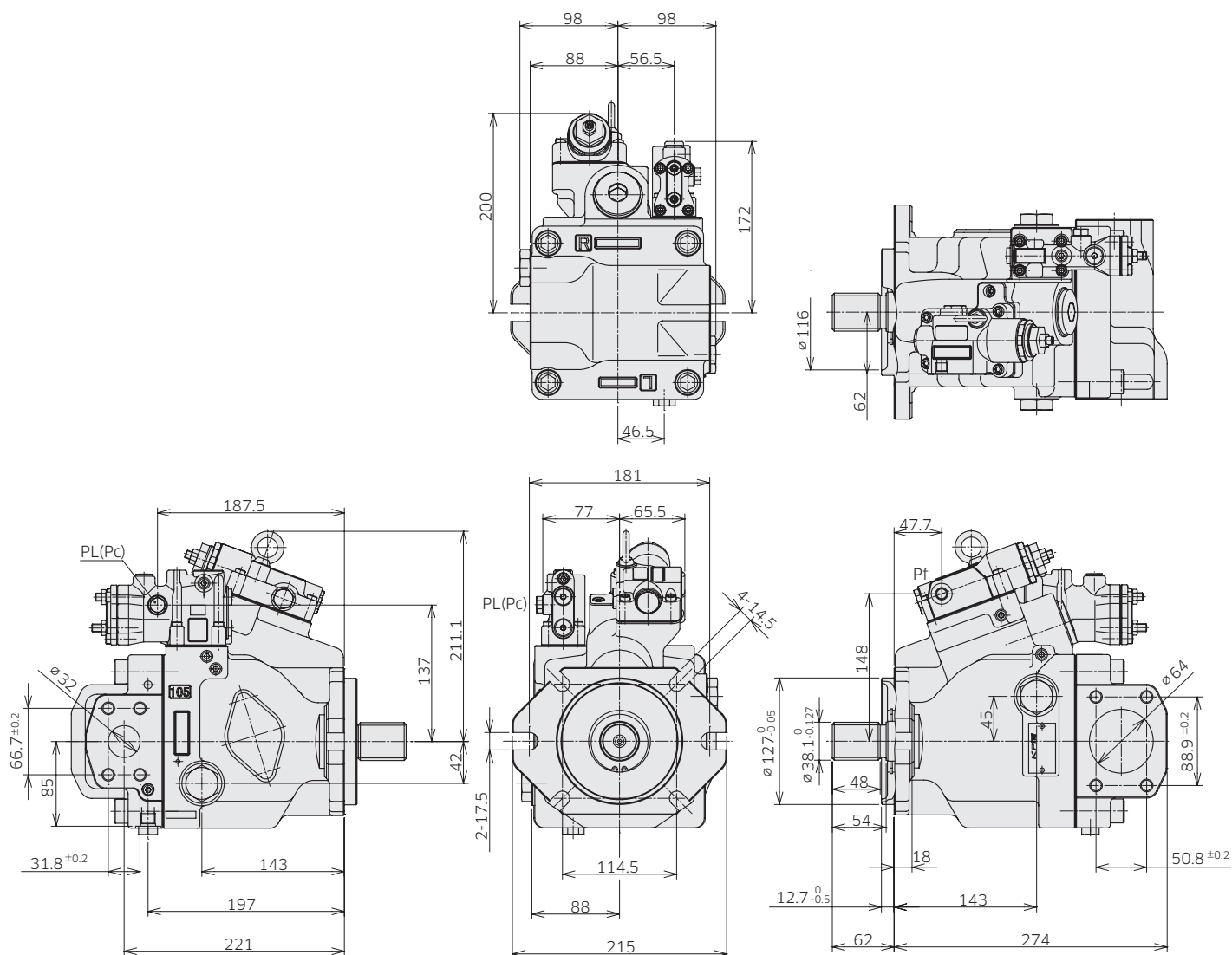
3. Dimensions

3-1 Installation Dimensions

*Dimensions in mm.

◆ K3VLS105 Torque Limit with Power Shift Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 105 - 1 0 R CC * - L0 A B
 : K3VLS 105 - 1 0 R CC * - L1 A B
 : K3VLS 105 - 1 0 R CC * - P0 A B



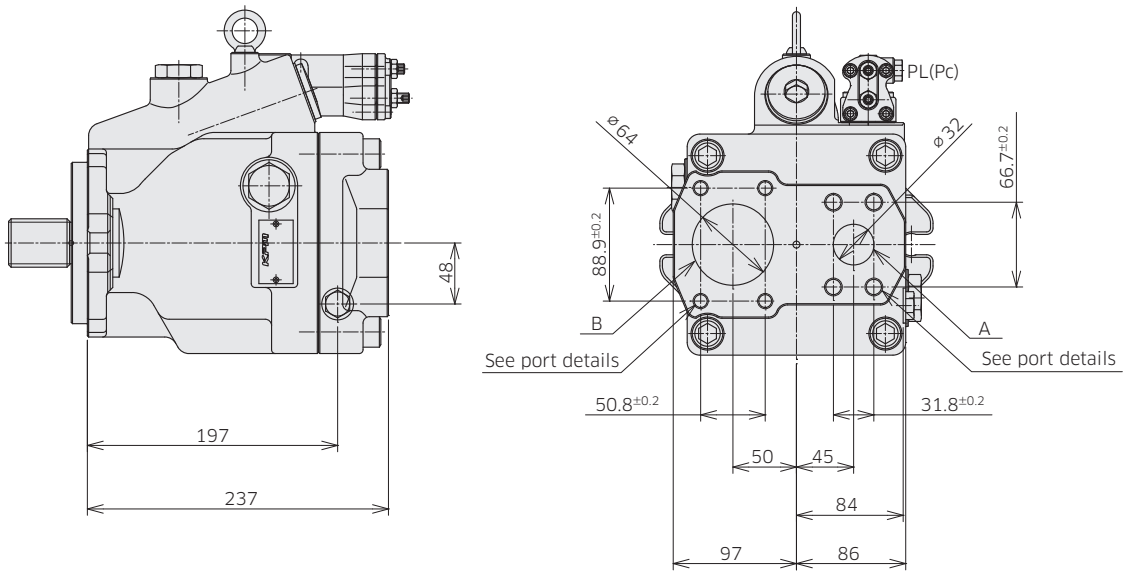
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

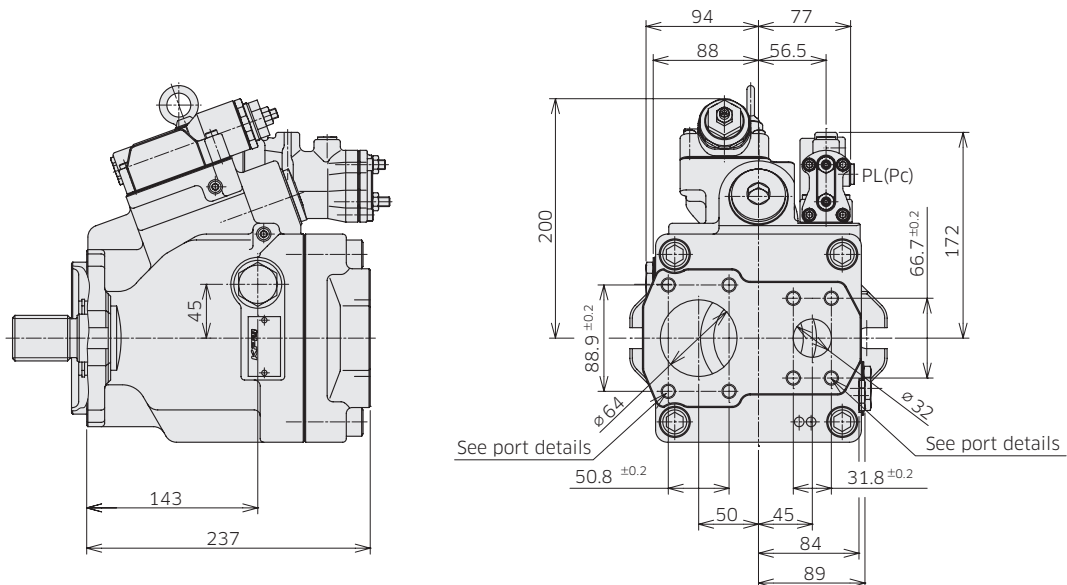
◆ K3VLS105 Rear Port (Clockwise Rotation)

Model Code : K3VLS 105 - 1 R R CC * - L0 A
 : K3VLS 105 - 1 R R CC * - L1 A
 : K3VLS 105 - 1 R R CC * - P0 A



◆ K3VLS105 Torque Limit Control, Rear Port (Clockwise Rotation)

Model Code : K3VLS 105 - 1 R R CC * - L0 A A
 : K3VLS 105 - 1 R R CC * - L1 A A
 : K3VLS 105 - 1 R R CC * - P0 A A



3. Dimensions

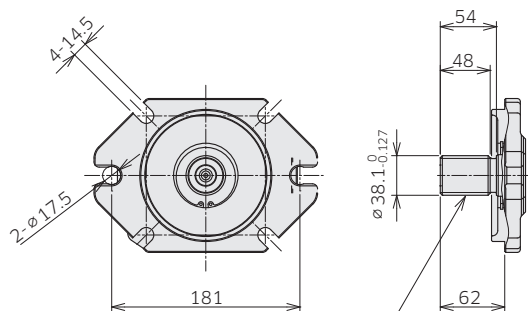
3-1 Installation Dimensions

*Dimensions in mm.

◆ K3VLS105 Mounting Flange and Shaft Options

SAE CC Spline Shaft

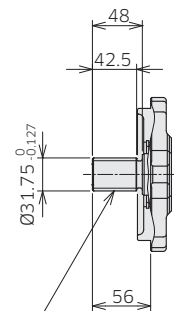
Ordering Code "7.Mounting Flange and Shaft": CC



SAE "CC" 30° Involute Spline Shaft
SAE J744-38-4 17T 12/24 DP

SAE C Spline Shaft

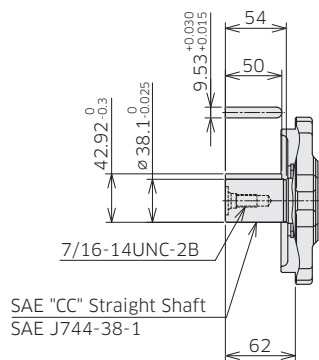
Ordering Code "7.Mounting Flange and Shaft": C



SAE "C" 30° Involute Spline Shaft
SAE J744-32-4 14T 12/24 DP

SAE CC Keyed Shaft

Ordering Code "7. Mounting Flange and Shaft": K



SAE "CC" Straight Shaft
SAE J744-38-1

Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

3. Dimensions

3-1 Installation Dimensions

◆ K3VLS105 Porting Details

Main SAE Flanged Ports

Des	Port name	Port size	Flange threads	Tightening torque (Nm)
-----	-----------	-----------	----------------	------------------------

UNF Threaded Version ('S' in position 8 of model code)

A	Delivery port	SAE J518C high pressure (code 62) 1-1/4"	1/2-13UNC-2B-22	98
B	Suction port	SAE J518C std pressure (code 61) 2-1/2"	1/2-13UNC-2B-22	98

Metric Version ('H' in position 8 of model code)

A	Delivery port	PORT ISO 6162-2: 2012 P32M	M12-23	98
B	Suction port	PORT ISO 6162-1: 2012 P64M	M12-22	98

Auxiliary Ports

Des	Port name	Port size	Tightening torque (Nm)
-----	-----------	-----------	------------------------

SAE Version

Dr	Drain port	1-1/16-12UN-2B-19 (ISO 11926-1: 1995)	167
PL	Load sensing port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
Pc	Pressure control port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
a	Gauge port	9/16-18UNF-2B-12.7 (ISO 11926-1: 1995)	59
Psv	Servo pressure port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
Pf	Power shift pressure port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12

3. Dimensions

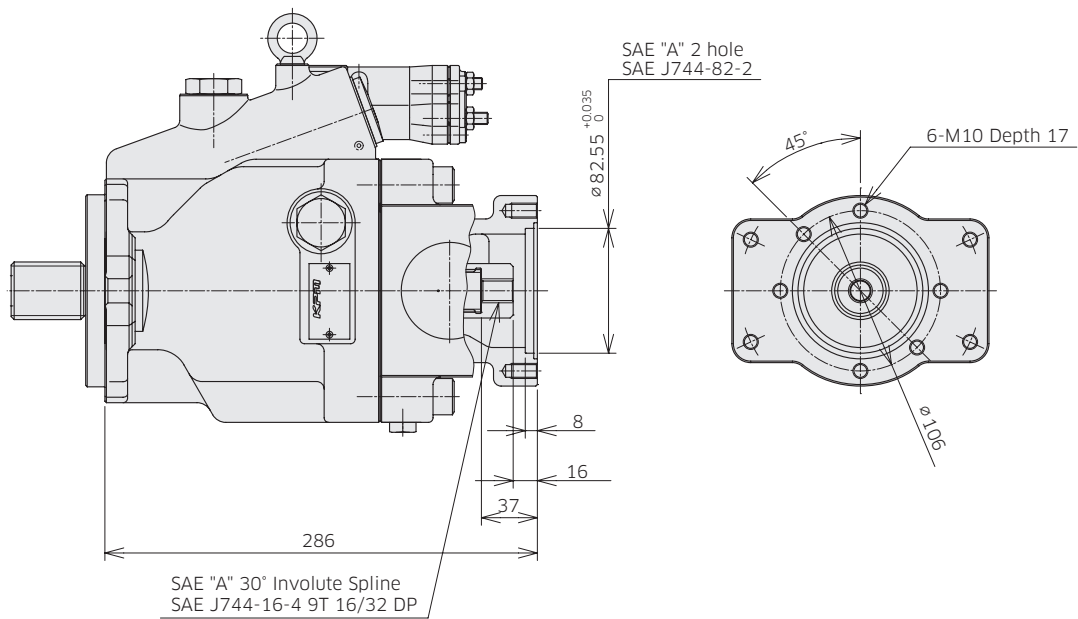
3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS105 Through Drive Options

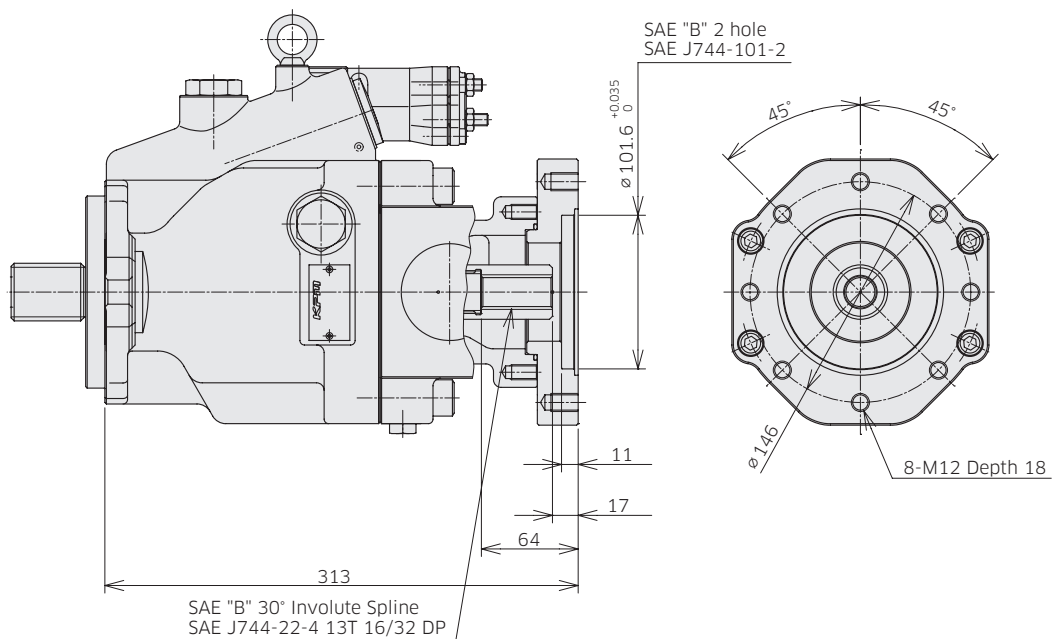
Through Drive SAE A

Ordering Code "5. Through Drive and Porting": A



Through Drive SAE B

Ordering Code "5. Through Drive and Porting": B



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

3. Dimensions

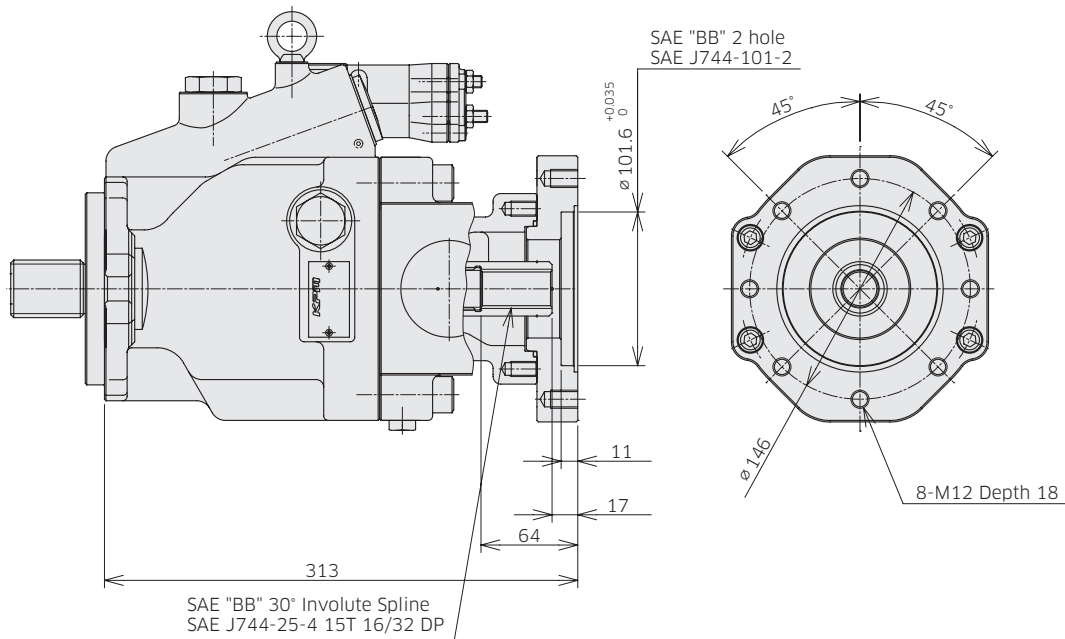
3-1 Installation Dimensions

*Dimensions in mm.

◆ K3VLS105 Through Drive Options

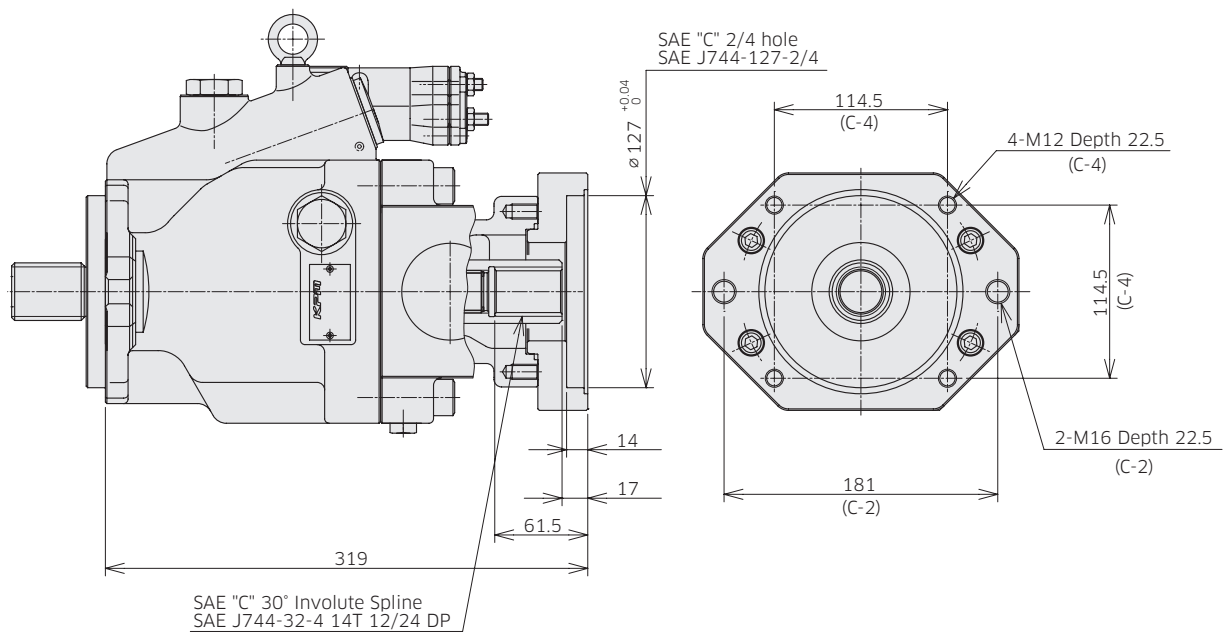
Through Drive SAE BB

Ordering Code "5. Through Drive and Porting": BB



Through Drive SAE C

Ordering Code "5. Through Drive and Porting": C



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

3. Dimensions

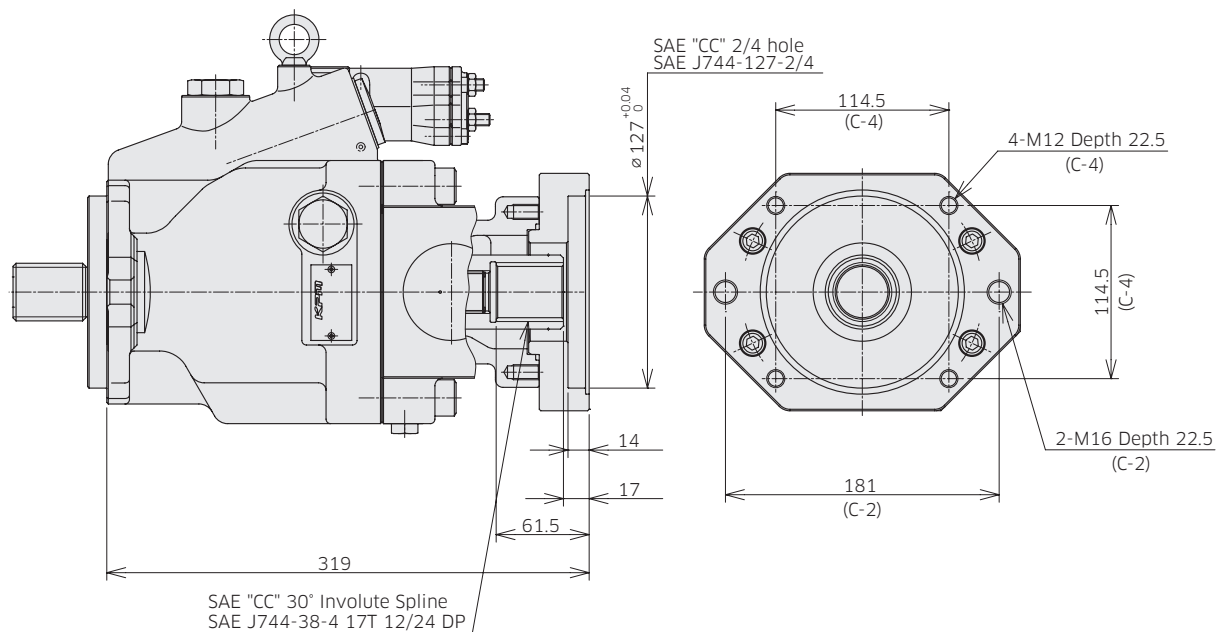
3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS105 Through Drive Options

Through Drive SAE CC

Ordering Code "5. Through Drive and Porting": CC



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

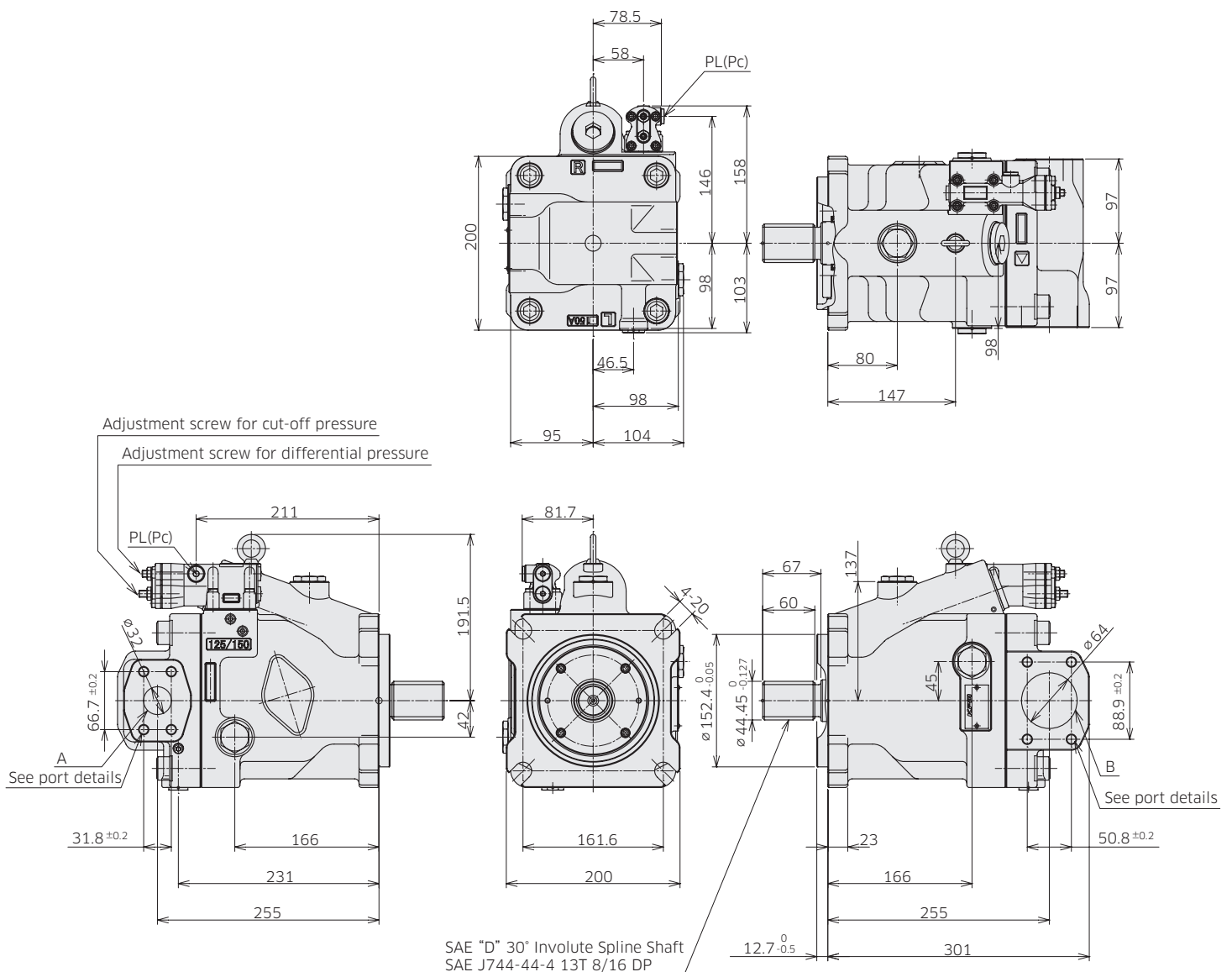
3. Dimensions

3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS150 with Cut-off/Load Sense Control, Side Port (Clockwise Rotation)

Model Code : K3VLS 150 - 1 0 R D * - L0 A
 : K3VLS 150 - 1 0 R D * - L1 A
 : K3VLS 150 - 1 0 R D * - P0 A



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

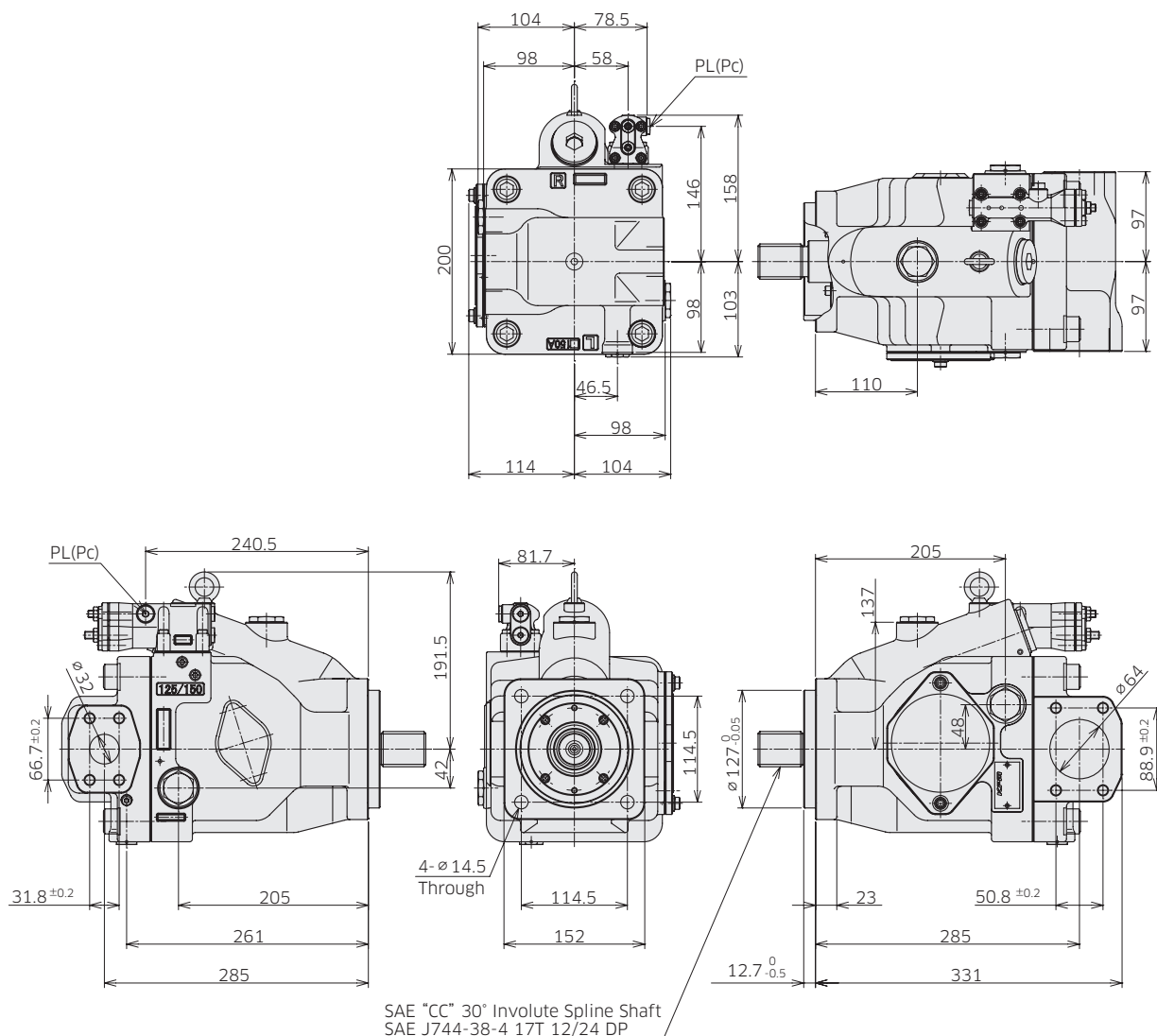
3. Dimensions

3-1 Installation Dimensions

*Dimensions in mm.

◆ K3VLS150 with Cut-off/Load Sense Control, Side Port (Clockwise Rotation, SAE C-4 Mount Type)

Model Code : K3VLS 150 - 1 0 R CC * - L0 A
 : K3VLS 150 - 1 0 R CC * - L1 A
 : K3VLS 150 - 1 0 R CC * - P0 A



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

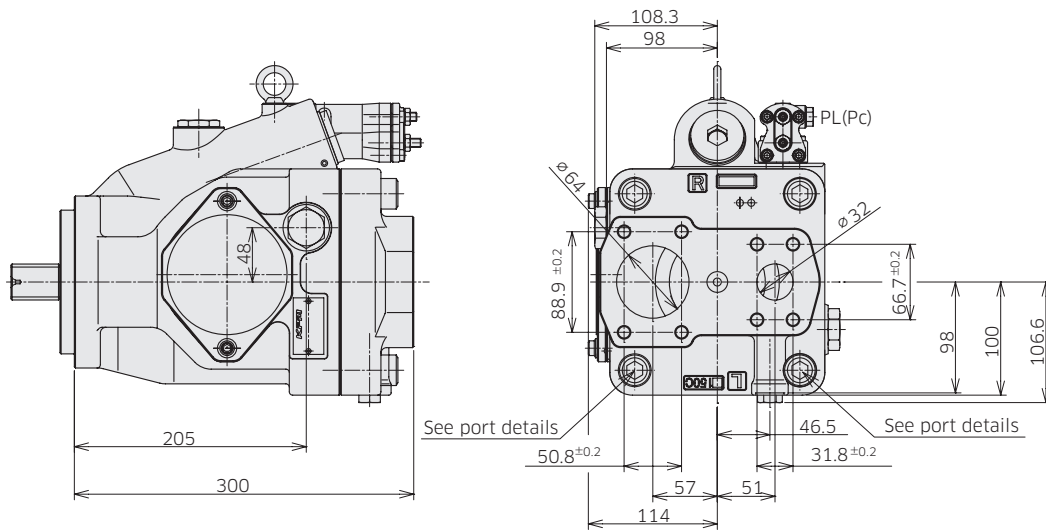
3. Dimensions

3-1 Installation Dimensions

*Dimensions in mm.

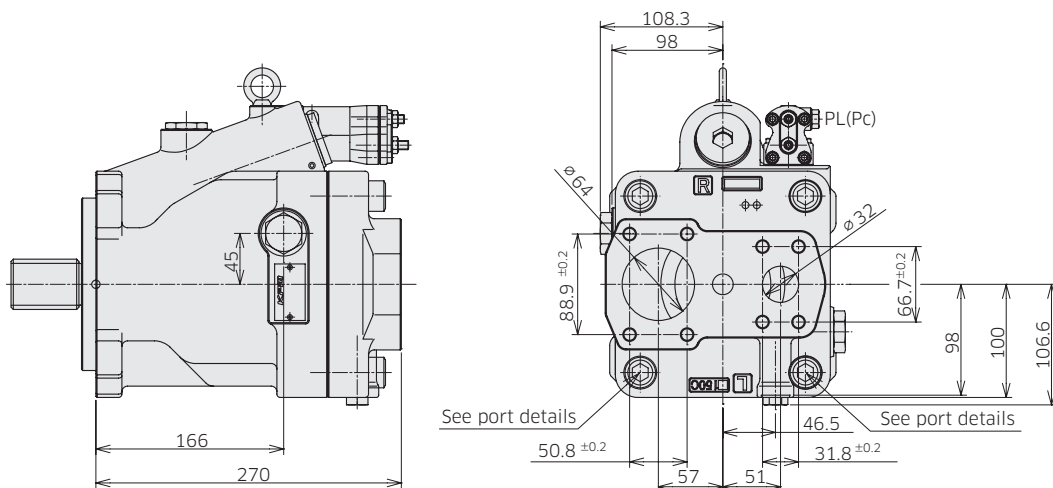
◆ K3VLS150 Rear Port (Clockwise Rotation, SAE C-4 Mount Type)

Model Code : K3VLS 150 - 1 R R C * - L0 A
 : K3VLS 150 - 1 R R C * - L1 A
 : K3VLS 150 - 1 R R C * - P0 A



◆ K3VLS150 Rear Port (Clockwise Rotation, SAE D Mount Type)

Model Code : K3VLS 150 - 1 R R D * - L0 A
 : K3VLS 150 - 1 R R D * - L1 A
 : K3VLS 150 - 1 R R D * - P0 A



3. Dimensions

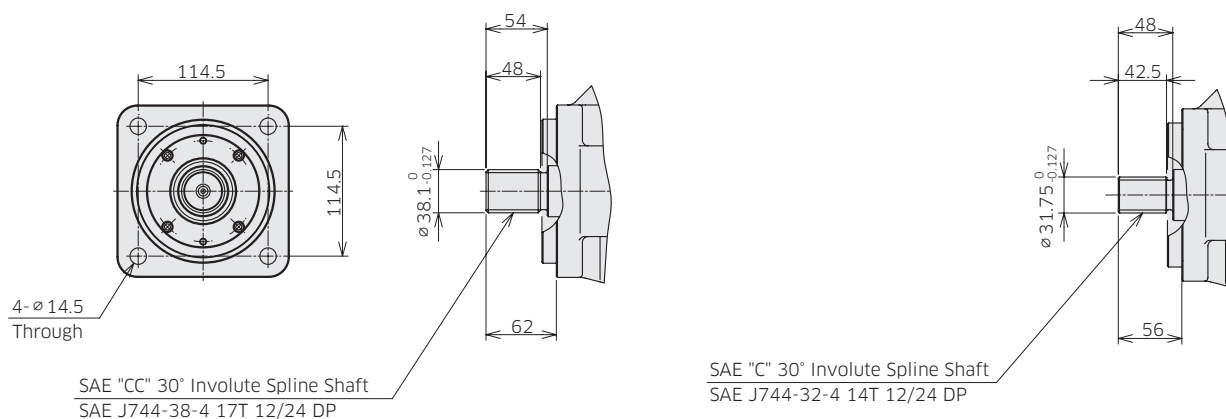
3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS150 Mounting Flange and Shaft Options

SAE CC Spline Shaft
Ordering Code "7. Mounting Flange and Shaft": CC

SAE C Spline Shaft
Ordering Code "7. Mounting Flange and Shaft": C



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

◆ K3VLS150 Porting Details

Main SAE Flanged Ports

Des	Port name	Port size	Flange threads	Tightening torque (Nm)
-----	-----------	-----------	----------------	------------------------

UNF Threaded Version ('S' in position 8 of model code)

A	Delivery port	SAE J518C high pressure (code 62) 1-1/4"	1/2-13UNC-2B-22	98
B	Suction port	SAE J518C std pressure (code 61) 2-1/2"	1/2-13UNC-2B-22	98

Metric Version ('H' in position 8 of model code)

A	Delivery port	PORT ISO 6162-2:2012 P32M	M12-23	98
B	Suction port	PORT ISO 6162-1:2012 P64M	M12-23	98

Auxiliary Ports

Des	Port name	Port size	Tightening torque (Nm)
-----	-----------	-----------	------------------------

SAE Version

Dr	Drain port	1-1/16-12UN-2B-19 (ISO 11926-1: 1995)	167
PL	Load sensing port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
Pc	Pressure control port	7/16-20UNF-2B-11.5 (ISO 11926-1: 1995)	12
a	Gauge port	9/16-18UNF-2B-12.7 (ISO 11926-1: 1995)	59
Psv	Servo pressure port	7/16-20UNF-2B-11.5 (ISO 11926-1:1995)	12
Pf	Power shift pressure port	7/16-20UNF-2B-11.5 (ISO 11926-1:1995)	12

3. Dimensions

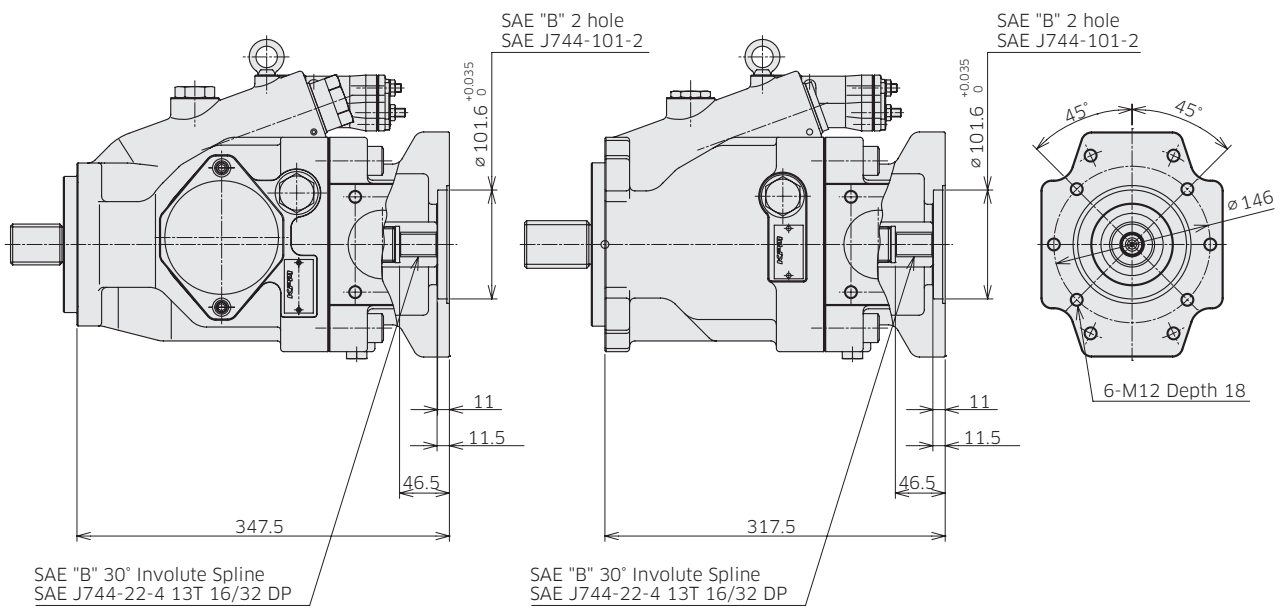
3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS150 Through Drive Options

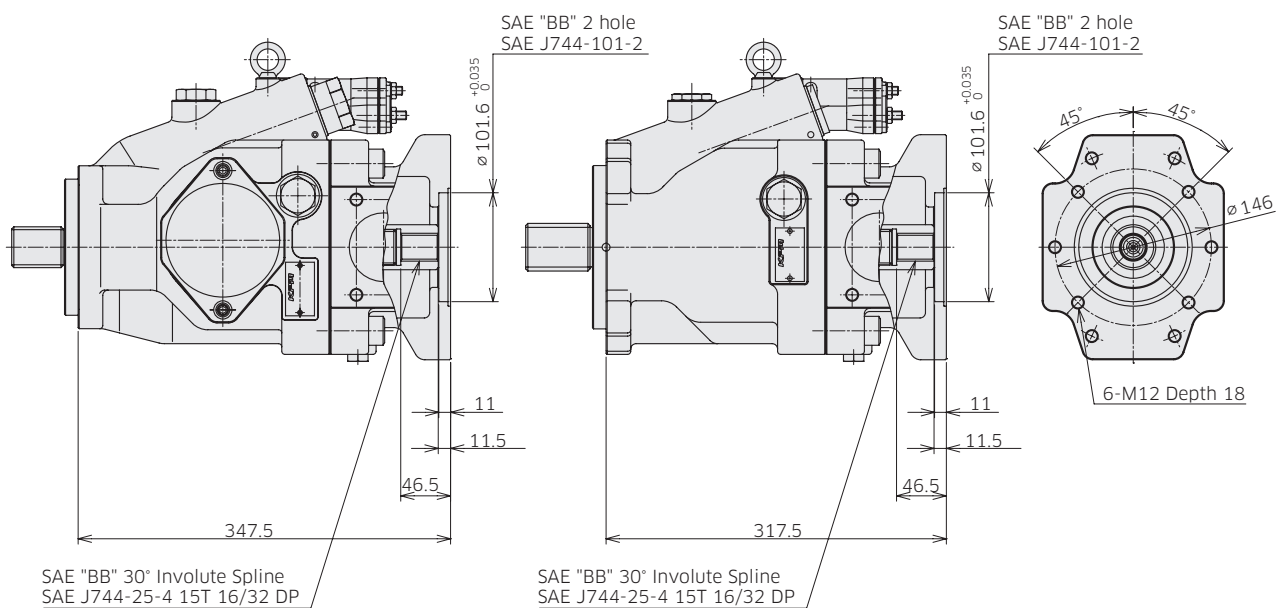
Through Drive SAE B

Ordering Code "5. Through Drive and Porting": B



Through Drive SAE BB

Ordering Code "5. Through Drive and Porting": BB



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

3. Dimensions

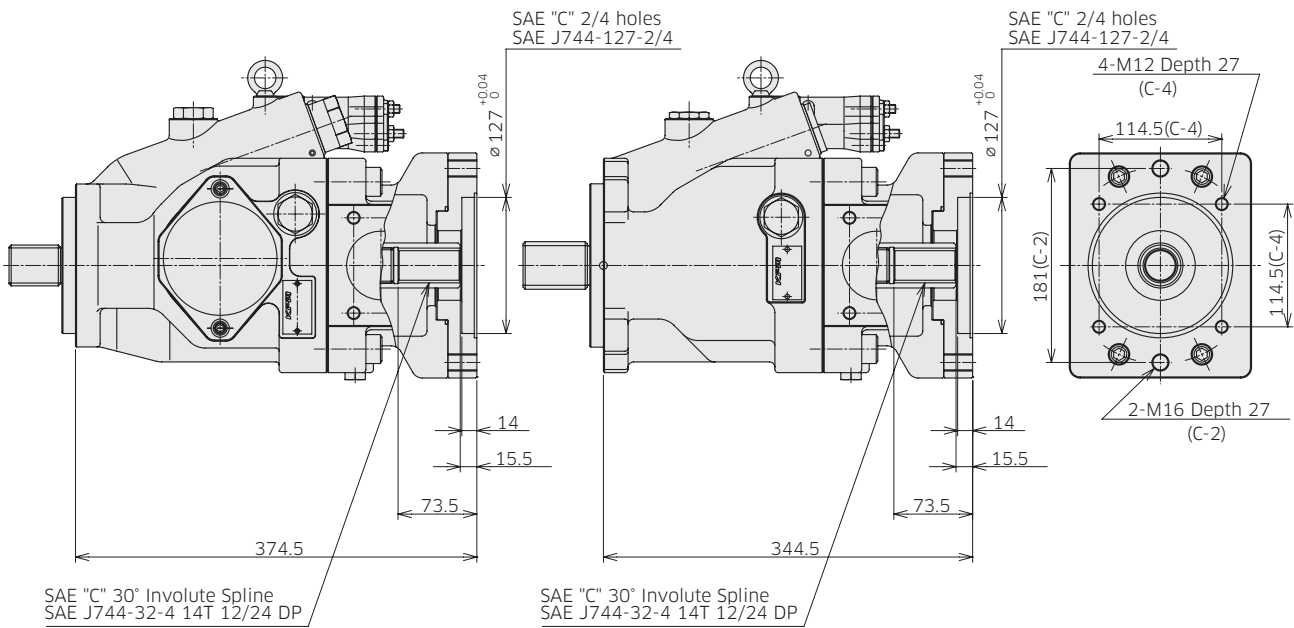
3-1 Installation Dimensions

* Dimensions in mm.

◆ K3VLS150 Through Drive Options

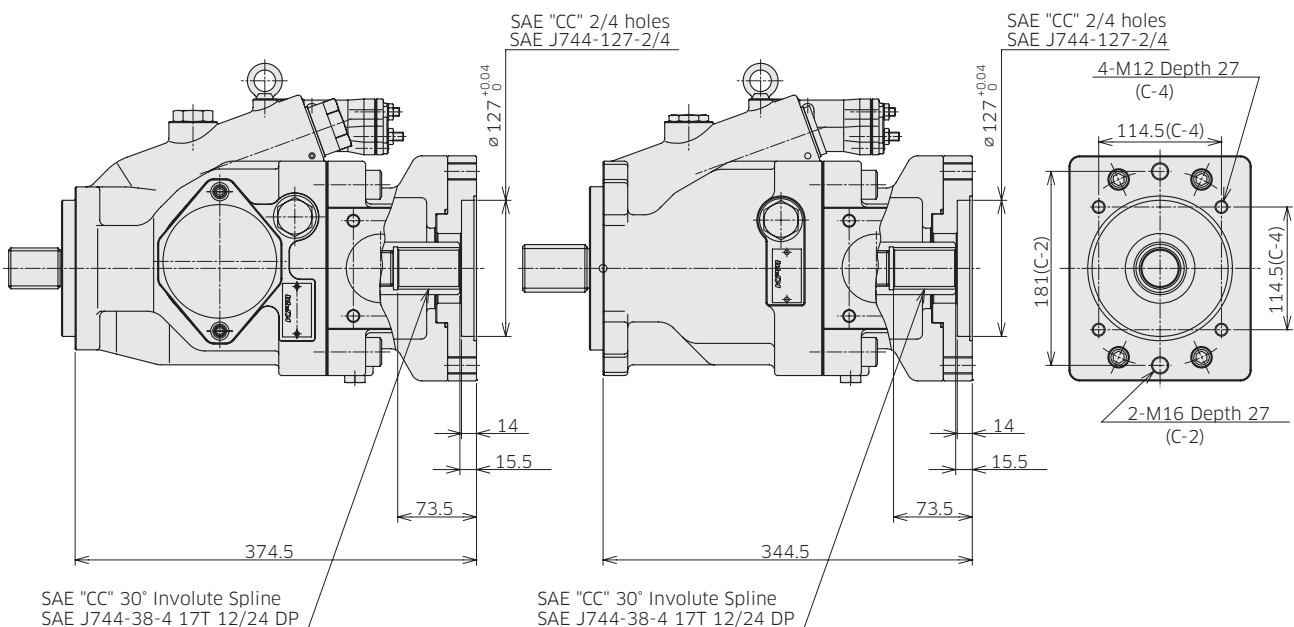
Through Drive SAE C

Ordering Code "5. Through Drive and Porting": C



Through Drive SAE CC

Ordering Code "5. Through Drive and Porting": CC



Involute spline according to ANSI B92.1a, 30° pressure angle, flat root, side fit.

3. Dimensions

3-2 Installation of Auxiliary Pumps

■ Allowable mass moment for combination pump

K3VLS series can consist of multiple pumps using through drive mounting. The second pump can be attached up to the same size of the first pump. The table below shows the maximum allowable mass moment to the mounting flange of the first pump under the dynamic acceleration of 10G. The moment can be calculated by the formula shown below.

	K3VLS50	K3VLS65		K3VLS85		K3VLS105		K3VLS150	
	SAE B mount	SAE B mount	SAE C mount	SAE C-2 mount	SAE C-4 mount	SAE C-2 mount	SAE C-4 mount	SAE C mount	SAE D mount
Allowable mass moment T_m (Nm) (dynamic acceleration of 10G)	180	210	330	280	410	280	410	500	680

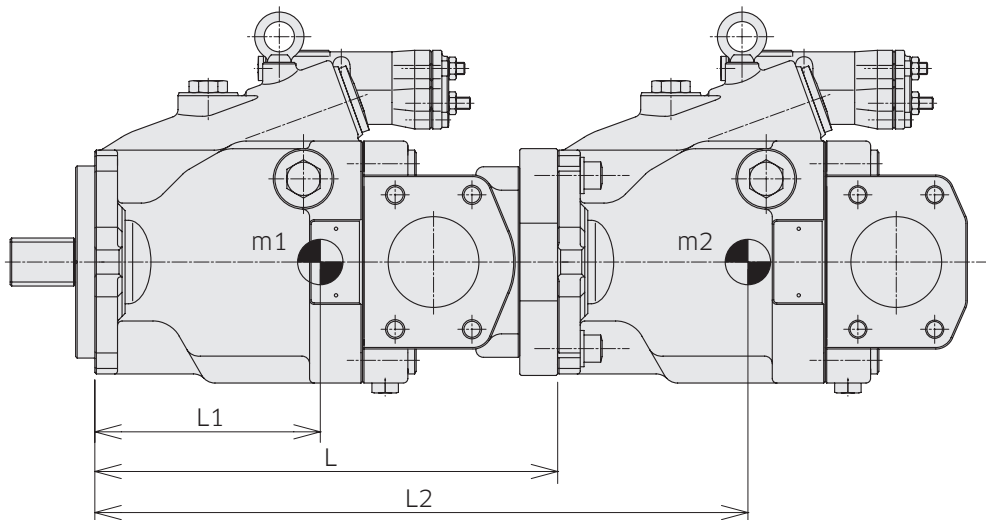
■ Calculation formula for mass moment

$$T_m = (m_1 \times L_1 + m_2 \times L_2 + m_3 \times L_3 + \dots) \times 1 / 102$$

$m_1, m_2, m_3 \dots$: Weight of pump [kg]

$L_1, L_2, L_3 \dots$: Center of gravity [mm]

See next page for values.



3. Dimensions

3-2 Installation of Auxiliary Pumps

■ Values for calculation of mass moment

Through drive size ported	Length, weight		50	65 SAE B mount	65 SAE C mount	85	105	150 SAE C mount	150 SAE D mount
Without through drive, side ported	Total length L (mm)		214	239	239	271	274	331	301
	Center of gravity L1 (from mounting face: mm)		107	117	113	126	131	166	139
	Weight (kg)	with torque limiter	24	28	29	34	40	57	55
		without torque limiter	21	25	26	31	37	54	52
Without through drive, rear ported	Total length L (mm)		188	207	207	232	237	300	270
	Center of gravity L1 (from mounting face: mm)		101	111	108	120	123	161	134
	Weight (kg)	with torque limiter	23	27	28	33	39	56	54
		without torque limiter	20	24	25	29	35	53	51
SAE A	Total length L (mm)		234	253	253	281	286	* 1	* 1
	Center of gravity L1 (from mounting face: mm)		116	129	126	136	137	* 1	* 1
	Weight (kg)	with torque limiter	26	31	32	37	42	* 1	* 1
		without torque limiter	23	28	29	33	39	* 1	* 1
SAE B SAE BB	Total length L (mm)		261	280	280	308	313	348	318
	Center of gravity L1 (from mounting face: mm)		133	146	142	152	152	182	155
	Weight (kg)	with torque limiter	29	35	35	41	46	63	61
		without torque limiter	26	31	32	37	43	60	58
SAE C SAE CC	Total length L (mm)		–	–	278	314	319	375	345
	Center of gravity L1 (from mounting face: mm)		–	–	150	157	156	198	171
	Weight (kg)	with torque limiter	–	–	37	42	47	69	67
		without torque limiter	–	–	35	38	44	66	64
SAE D	Total length L (mm)		–	–	–	–	–	* 1	* 1
	Center of gravity L1 (from mounting face: mm)		–	–	–	–	–	* 1	* 1
	Weight (kg)	with torque limiter	–	–	–	–	–	* 1	* 1
		without torque limiter	–	–	–	–	–	* 1	* 1

* 1 : Under development

K3VLS Inquiry Form

Please go to the page below link. An Inquiry Form which is formed by excel is available at the download section.
https://global.kawasaki.com/en/industrial_equipment/hydraulic/pumps/k3vls.html

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