



HYDRAULIC COMPONENTS  
HYDROSTATIC TRANSMISSIONS  
GEARBOXES - ACCESSORIES



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Via M. L. King, 6 - 41122 MODENA (ITALY)

Tel: +39 059 415 711

Fax: +39 059 415 730

INTERNET: <http://www.hansatmp.it>

E-MAIL: [hansatmp@hansatmp.it](mailto:hansatmp@hansatmp.it)

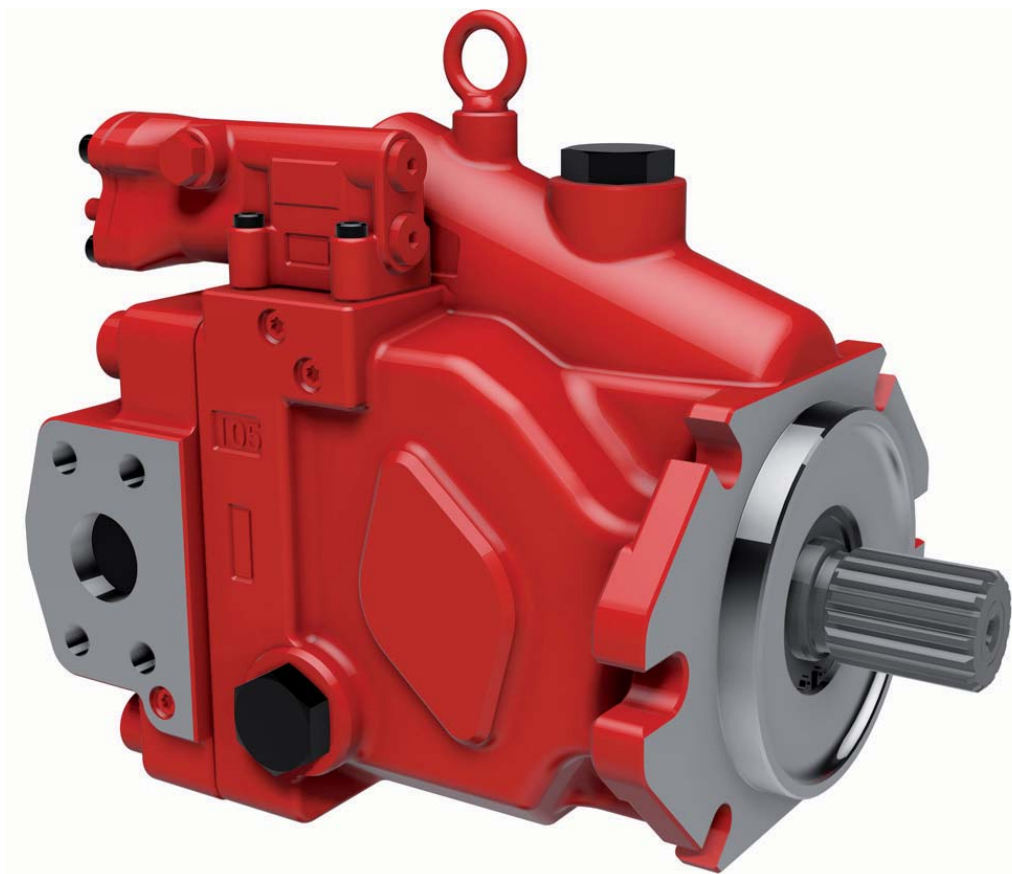
HT 16 / F / 1003 / 1218 / E

## Variable Displacement Open Loop System Swash Plate Axial Piston Pump

# Kawasaki

## Hydraulic Products

### K3VLS





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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 our Tech. Dept. 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.

## 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 our Tech. Dept.



- 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

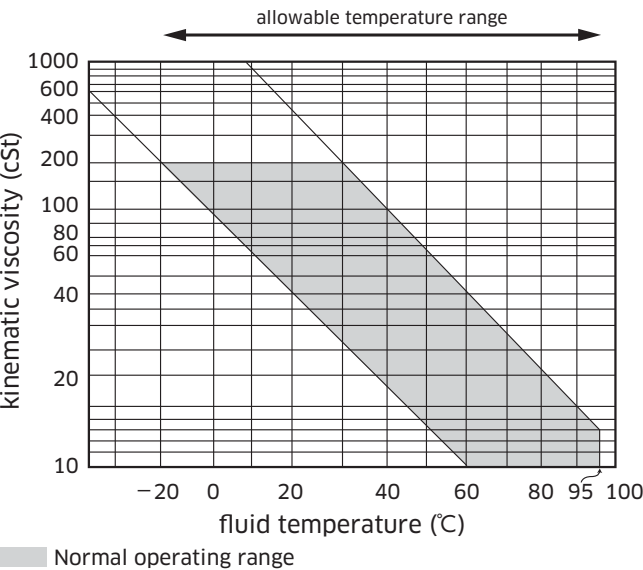
### 1) Operating fluid

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 [mm²/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

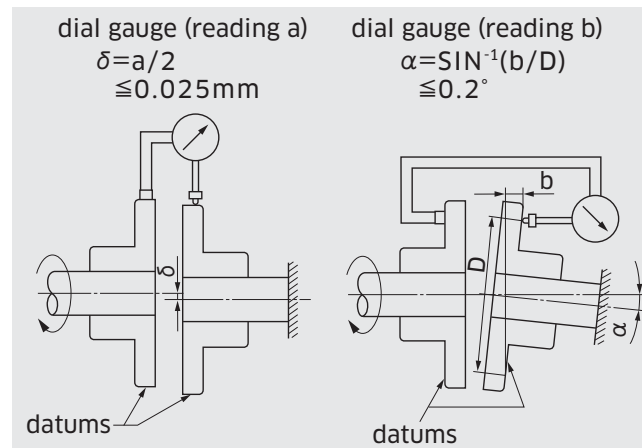
The relationship between contamination level and pump life is very difficult to predict as it depends on the type and nature of the contaminant present in the system. Sand or Silica in particular, due to its abrasive nature, does significantly reduce the expected life of a pump. Based on the precondition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

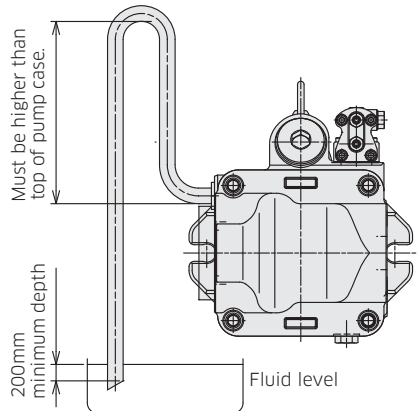
It is undesirable to leave the pump out of use for a long period e.g. a year or more. In such a situation it is recommended that the pump is run for a short period on a more frequent basis even if it is just unloaded. With regard to a pump held in storage then rotating the shaft on a frequent basis is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

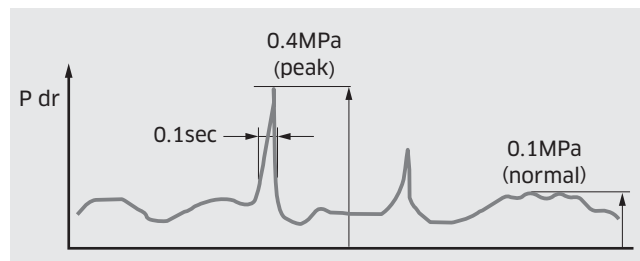
It is the preferred option to mount the pump with the case drain piping initially rising above the pump before continuing to the tank. Do not connect the drain line to the inlet line.



##### 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

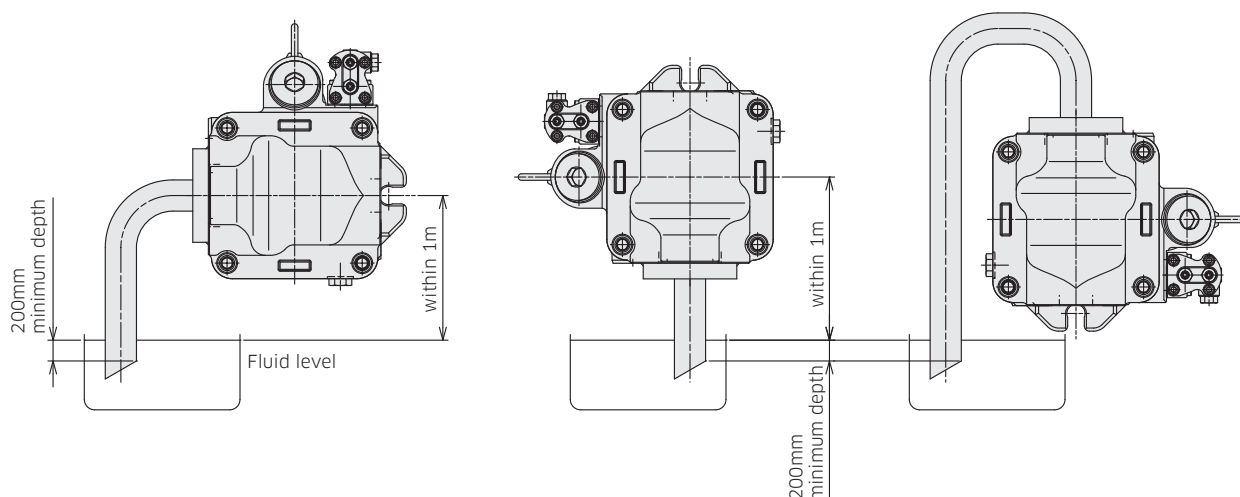
The internal bore size of the drain hose or drain pipe must be larger than that of the drain port. Arrange the drain line as short as possible.



### 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 <sup>3</sup> = 0.061 in <sup>3</sup>	
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	
<b>Output flow</b>	$Q = q \times N \times \eta_v / 1000$	L/min	$Q = q \times N \times \eta_v / 231$	gal/min
<b>Input torque</b>	$T = q \times \Delta P / 2\pi / \eta_m$	Nm	$T = q \times \Delta P / 24\pi / \eta_m$	lbf ft
<b>Input power</b>	$L = T \times N / 9550 = Q \times \Delta P / 60 / \eta_t$	kW	$L = T \times N / 5252 = Q \times \Delta P / 1714 / \eta_t$	hp

### ◆ Definition

q	= Pump displacement / rev.	cm <sup>3</sup> (in <sup>3</sup> )
L	= Input power	kW (hp)
N	= Speed	min <sup>-1</sup> (rpm)
ΔP	= P <sub>d</sub> - P <sub>s</sub>	MPa (psi)
P <sub>d</sub>	= Pump delivery pressure	MPa (psi)
P <sub>s</sub>	= Pump suction pressure	MPa (psi)
P <sub>L</sub>	= Load sensing pressure	MPa (psi)
P <sub>dr</sub>	= Pump case pressure	MPa (psi)
P <sub>f</sub>	= Power shift pressure	MPa (psi)
P <sub>sv</sub>	= Servo pressure	MPa (psi)
T	= Input torque	Nm (lbf-ft)
T <sub>max</sub>	= Maximum input torque	Nm (lbf-ft)
η <sub>v</sub>	= Pump volumetric efficiency	
η <sub>m</sub>	= Pump mechanical efficiency	
η <sub>t</sub>	= Pump total efficiency	

# K3VLS Series

## Swash Plate Type Axial Piston Pump



### ■ Specifications

Size: 50, 65, 85, 105, 125\*, 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 cm<sup>3</sup>/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

(\*) means under development

# 1 Ordering Code

## 1-1 Pump Options

Please fill in the Inquiry Form on page 47 in order to specify the requirement .

Model Code      1                      2                      3                      4                      5                      6                      7                      8                      9                      10                      11                      12

**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	125	150
Maximum Displacement      cm <sup>3</sup>	●	●	●	●	○	○

**3. O-ring Material** (Oil seal in Fluororubber only)

- NBR (nitrile rubber) O-ring seals

**4. Series Type Code**

1 Standard Type

**5. Through Drive and Porting**

	50	65	85	105	125	150
O Without 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 With Through Drive Shaft, Without Coupling, Closed with Steel Cover, Side Ported	●	●	●	●	○	○
R Without Through Drive, Rear Ported	●	●	●	●	○	○

**6. Direction of Rotation**

	50	65	85	105	125	150
R Clockwise	●	●	●	●	○	○
L Counterclockwise	●	●	●	●	○	○

**7. Mounting Flange and Shaft**

	50	65	85	105	125	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, 125 & 150)	—	●	●	●	○	○
CC SAE C Mount & SAE CC Spline (Only SAE C-4 mount for K3VLS125 & 150)	—	—	—	●	○	○
D SAE D Mount & SAE D Spline	—	—	—	—	○	○

**8. Flange Fixing Thread** (Suction/Delivery)

	50	65	85	105	125	150
S SAE 4-bolt Flange, UNC Threaded	●	●	●	●	○	○
H SAE 4-bolt Flange, Metric Threaded	●	●	●	●	○	○

● : Available  
○ : Under development  
— : Not available

### 1. Ordering Code

## 1-2 Regulator Options

Please fill in the Inquiry Form on page 47 in order to specify the requirement .

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

#### 9. Flow Control

	Load Sense & Pressure Cut-Off	50	65	85	105	125	150
L0	with LS Bleed-off Orifice	●	●	●	●	○	○
L1	without LS Bleed-off Orifice	●	●	●	●	○	○

#### 10. Differential Pressure Setting Range (For the details see page 15)

		50	65	85	105	125	150
A	Standard Setting Range (1.0 to 3.0MPa)	●	●	●	●	○	○
C	High Setting Range (1.5 to 4.0MPa)	●	●	●	●	○	○

#### 11. Additional Control Options

		50	65	85	105	125	150
Blank	Without Any Additional Control	●	●	●	●	○	○
	Torque Limit Control	50	65	85	105	125	150
A	without Power Shift Control	●	●	●	●	○	○
B	with Power Shift Control, Pilot Operated	●	●	●	●	○	○
	with Electric Proportional Reducing Valve						
C1	Voltage:24V, AMP Connector	○	○	○	○	○	○
C2	Voltage:24V, Deutsch Connector	○	○	○	○	○	○
C3	Voltage:12V, Deutsch Connector	○	○	○	○	○	○

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

		50	65	85	105	125	150
Blank	Without 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", "C1", "C2", and "C3")

Code M1 to M5: for torque limit control without power shift control (Additional Control Option Code [11]: "A")

● : Available  
○ : Under development  
— : Not available

# 2 Technical Information

## 2-1 Specifications

Size			50	65	85	105	125*1	150*1
Displacement cm <sup>3</sup>			50	65	85	105	125	150
Pressure	Rated	MPa	28					
	Peak	MPa	35					
Allowable case pressure MPa			0.1 continuous / 0.4 peak					
Speed	Self prime*2	min <sup>-1</sup>	2,700	2,600	2,500	2,300	2,200	2,200
	Maximum*3	min <sup>-1</sup>	3,250	3,000	3,000	2,640	2,475	2,475
Case volume L			0.8	1.0	1.2	1.7	2.3	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	123
	SAE B		380	380	380	380	380	380
	SAE BB		435	435	435	435	435	435
	SAE C		–	435	435	558	435	435
	SAE CC		–	–	–	702	899	899
	SAE D		–	–	–	–	899	899
Mass kg			20	22	30	37	52	52
Moment of inertia (GD <sup>2</sup> ) kg•m <sup>2</sup>			0.86×10 <sup>−2</sup>	1.64×10 <sup>−2</sup>	2.21×10 <sup>−2</sup>	3.33×10 <sup>−2</sup>	7.37×10 <sup>−2</sup>	7.27×10 <sup>−2</sup>
Torsional stiffness Nm/rad			4.56×10 <sup>4</sup>	5.26×10 <sup>4</sup>	6.74×10 <sup>4</sup>	1.32×10 <sup>5</sup>	1.99×10 <sup>5</sup>	1.99×10 <sup>5</sup>
Coating			Red synthetic resin primer					

\*1 : Size 125 and 150 are under development.

\*2 : 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.

\*3 : Maximum speed is the maximum operating speed that can run without damage to the pump under restriction of operating conditions.

### ■ Allowable maximum input torque

	SAE B	SAE BB	SAE C	SAE CC	SAE D
Spline specification	13T DP=16/32	15T DP=16/32	14T DP=12/24	17T DP=12/24	13T DP=8/16
Allowable maximum input torque (Nm)	200	315	630	1,060	1,490
Pump size	K3VLS50 K3VLS65	K3VLS50 K3VLS65	K3VLS65 K3VLS85 K3VLS105 K3VLS125 K3VLS150	K3VLS105 K3VLS125 K3VLS150	K3VLS125 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

### 2-2 Functional Description of Regulator

#### ◆ Load Sensing and Pressure Cut-off

(Ordering Code [9]: L0 / L1)

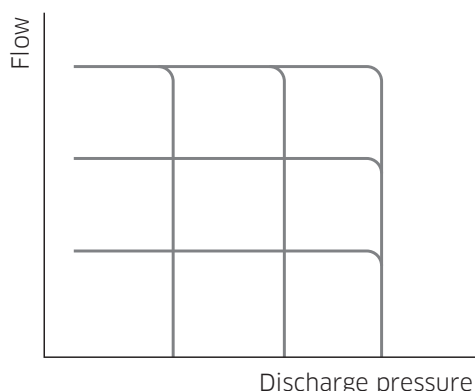
This regulator has function of flow and pressure control (i.e. load sensing control and pressure cut-off control.)

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

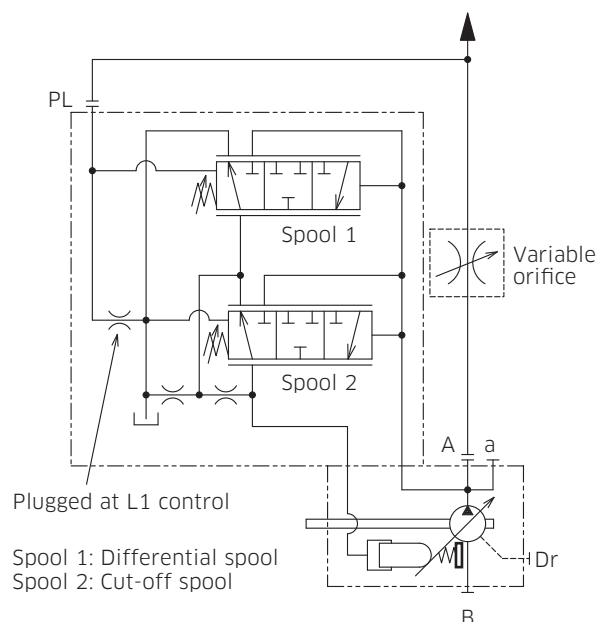
#### ■ Pressure cut-off setting

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



Hydraulic circuit



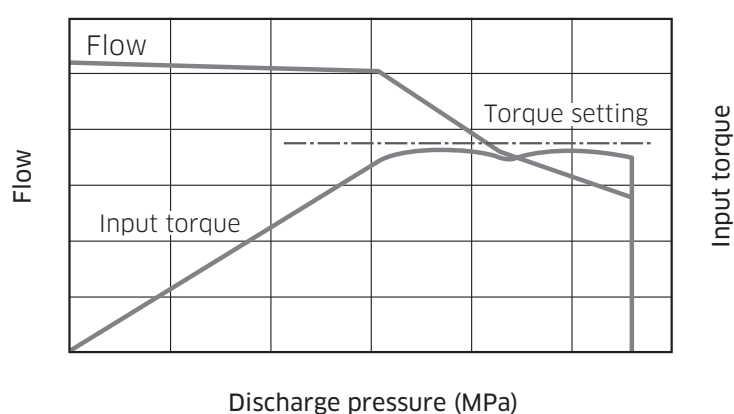


## 2. Technical Information

### 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

Unit : Nm

## 2. Technical Information

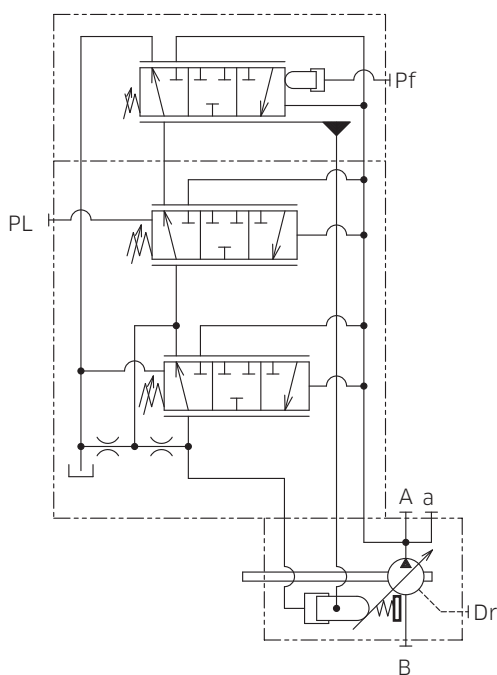
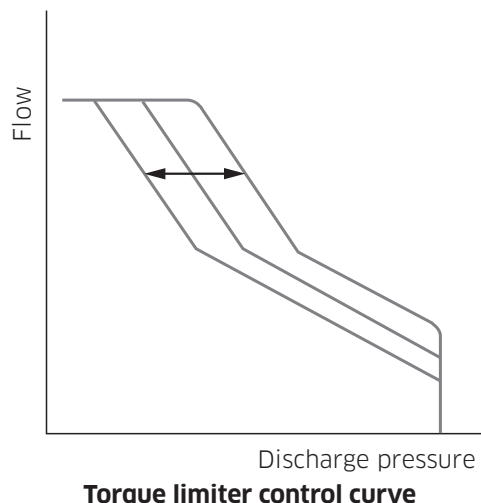
### 2-2 Functional Description of Regulator

#### ◆ Torque Limiter with Power Shift (Ordering Code [11]: B, C1\*, 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.

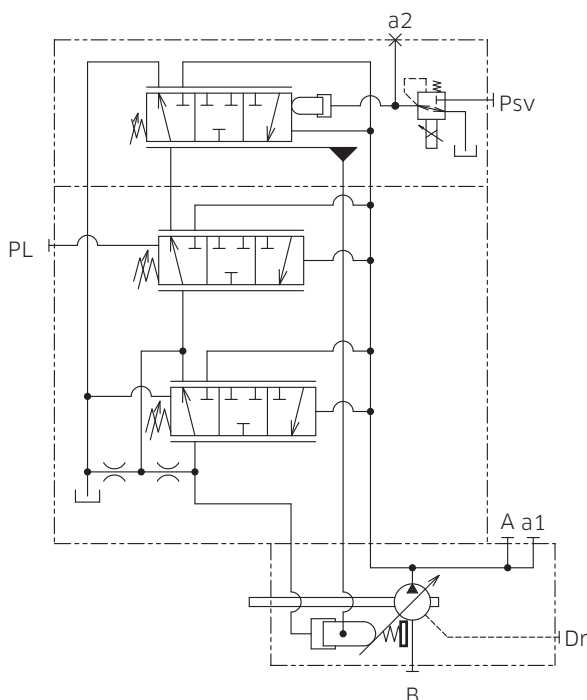
See the table for torque setting according to the external pilot pressure or the input current to the integrated proportional valve. Minimum required servo pressure to the solenoid is 3.5 MPa.

(\*) : Ordering code C1, C2, C3 are under development.



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

**Hydraulic circuit, code B**



Minimum required servo pressure (Psv): 3.5 MPa

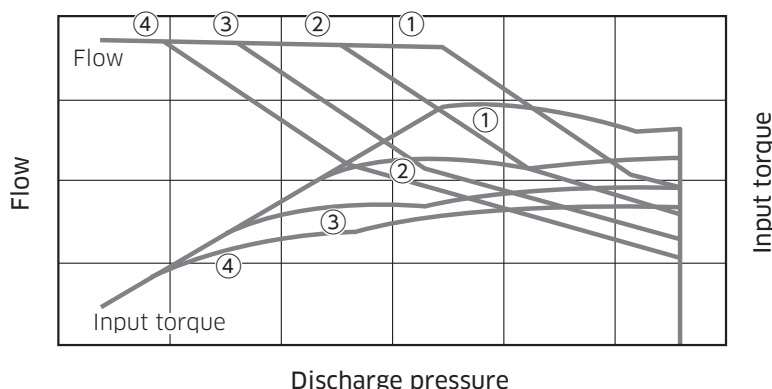
**Hydraulic circuit, code C**

## 2. Technical Information

### 2-2 Functional Description of Regulator

#### ◆ Torque Limiter and Power Shift Settings (Ordering Code[11] : B, C1\*, C2\*, C3\*)

#### ■ Pump control curve with power shift (sample)



#### ■ Torque setting with power shift function

Ordering code [11]		Code : B	Code : C1, C2, C3					
			Current (mA)		Ordering code [12]			
Pump size		Pf (MPa)			Max. Input torque (Nm)			
			24V C1, C2	12V C3	H1	H2	H3	H4
K3VLS50	①	0.00	0		219	197	170	148
	②	0.75	290	720	190	170	145	125
	③	2.00	460	1,100	163	142	119	101
	④	3.30	620	1,450	134	115	94	78
K3VLS65	①	0.00	0		283	249	217	190
	②	0.75	290	720	245	215	185	160
	③	2.00	460	1,100	210	181	151	129
	④	3.30	620	1,450	175	146	120	100
K3VLS85	①	0.00	0		375	331	287	244
	②	0.75	290	720	325	285	245	205
	③	2.00	460	1,100	279	239	200	164
	④	3.30	620	1,450	231	193	159	127
K3VLS105	①	0.00	0		455	406	357	308
	②	0.75	290	720	395	350	305	260
	③	2.00	460	1,100	338	293	250	209
	④	3.30	620	1,450	279	236	198	162

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

# 3 Dimensions

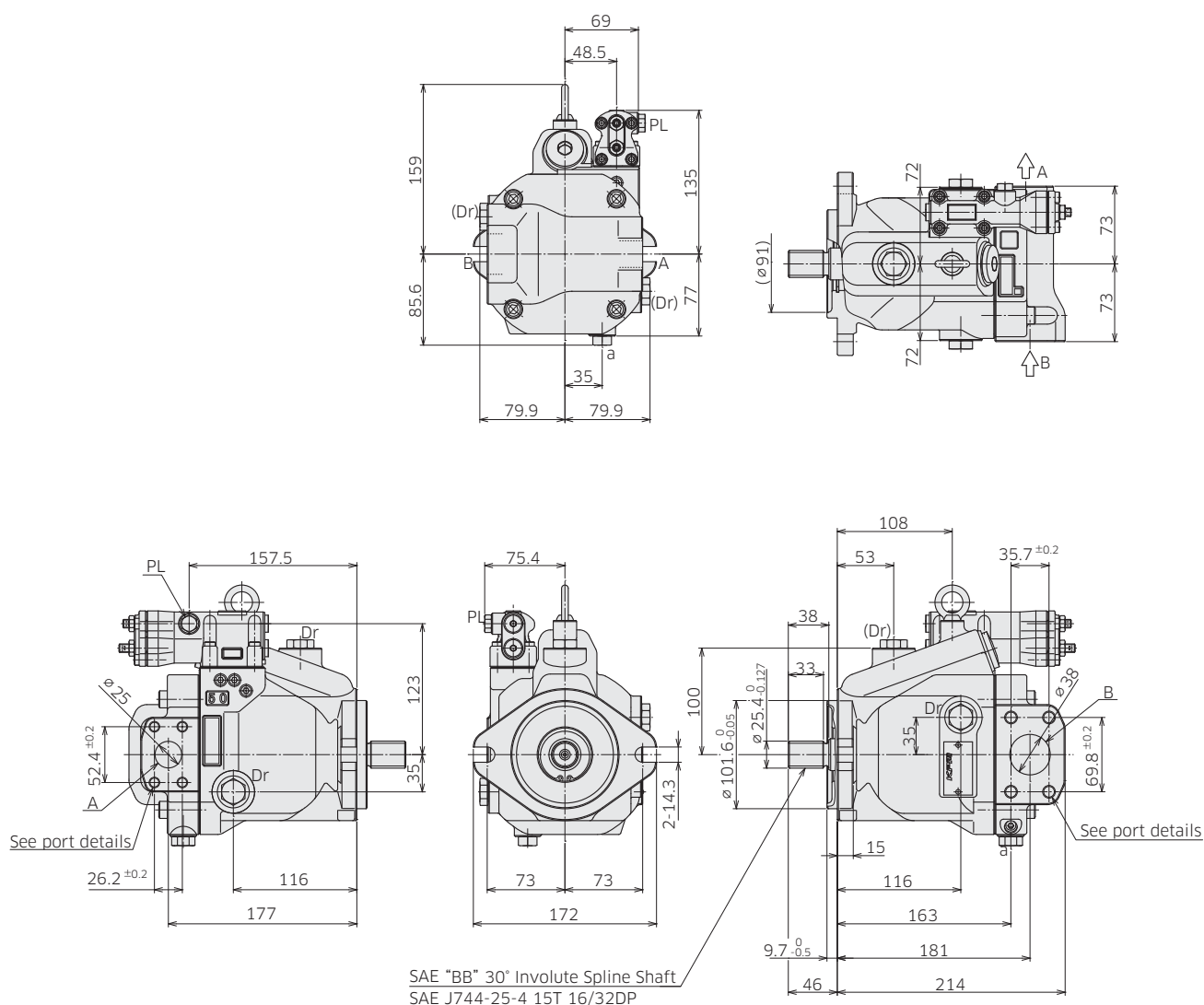
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS50 with Cut-off/Load Sense Control (Clockwise Rotation)

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

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



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

## 3. Dimensions

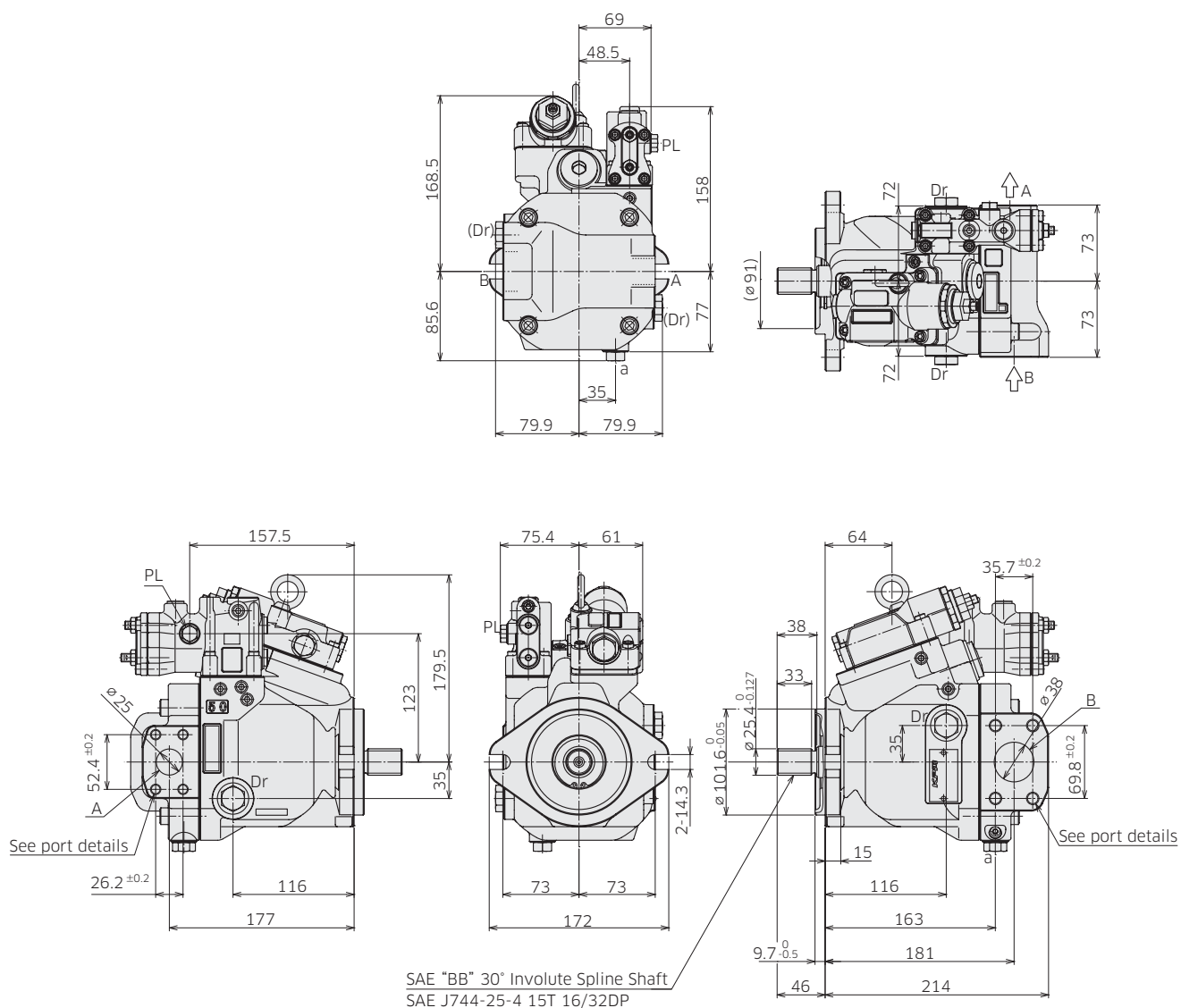
### 3-1 Installation Dimensions

\* Dimensions in mm.

#### ◆ K3VLS50 with Torque Limit Control (Clockwise Rotation)

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

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



### 3. Dimensions

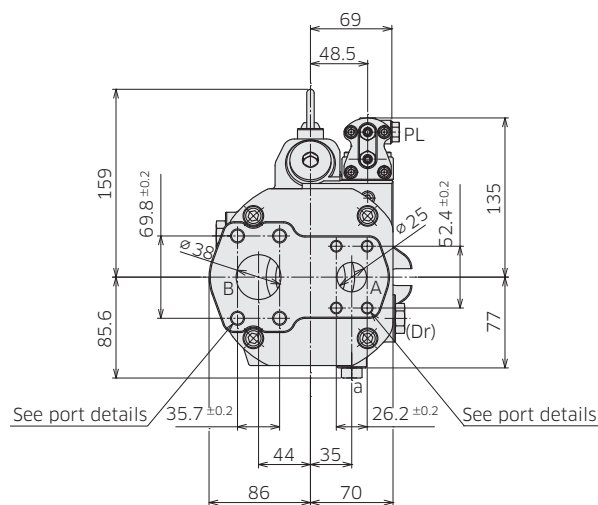
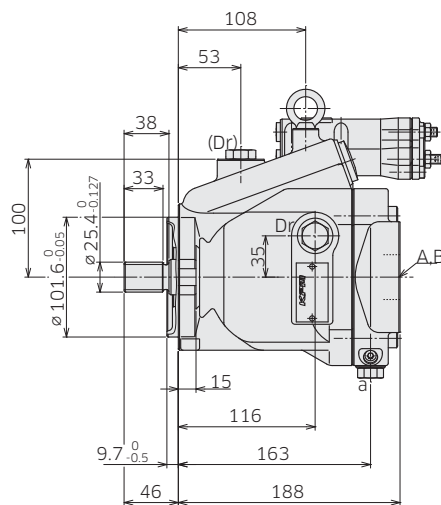
### 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS50 Rear Port (Clockwise Rotation)

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

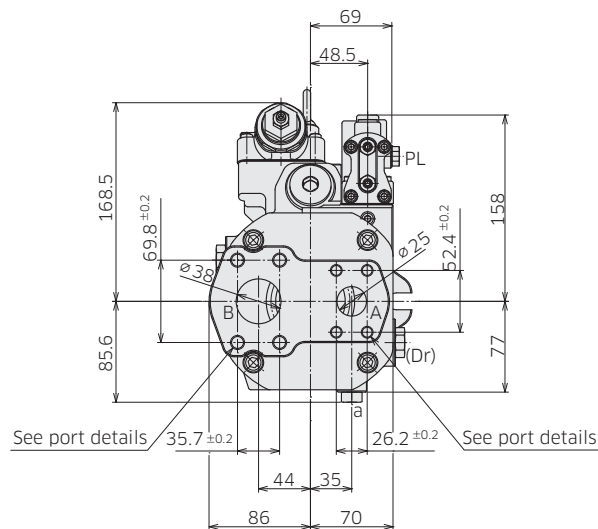
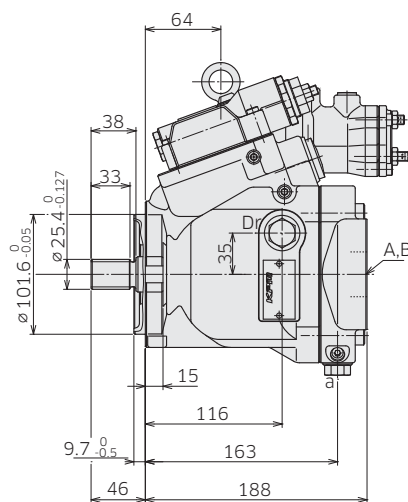
Model Code : K3VLS 50 - 1 R R BB \* - L0 A



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

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

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



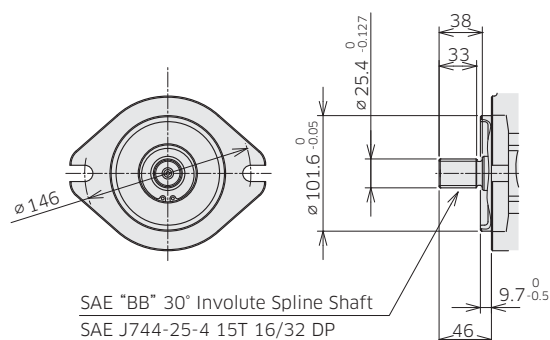
### 3. Dimensions

## 3-1 Installation Dimensions

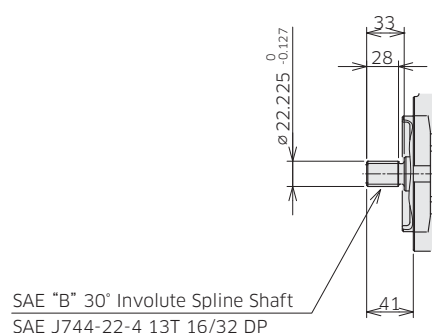
\*Dimensions in mm.

### ◆ 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

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	95

#### 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
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 (ISO 11926-1: 1995)	12

### 3. Dimensions

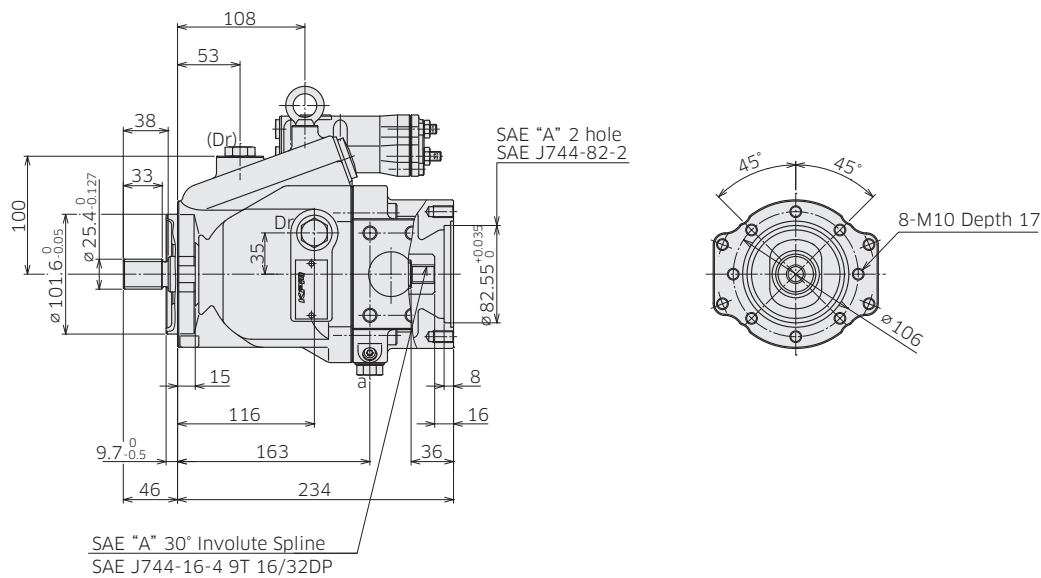
### 3-1 Installation Dimensions

\* Dimensions in mm.

## ◆ K3VLS50 Through Drive Options

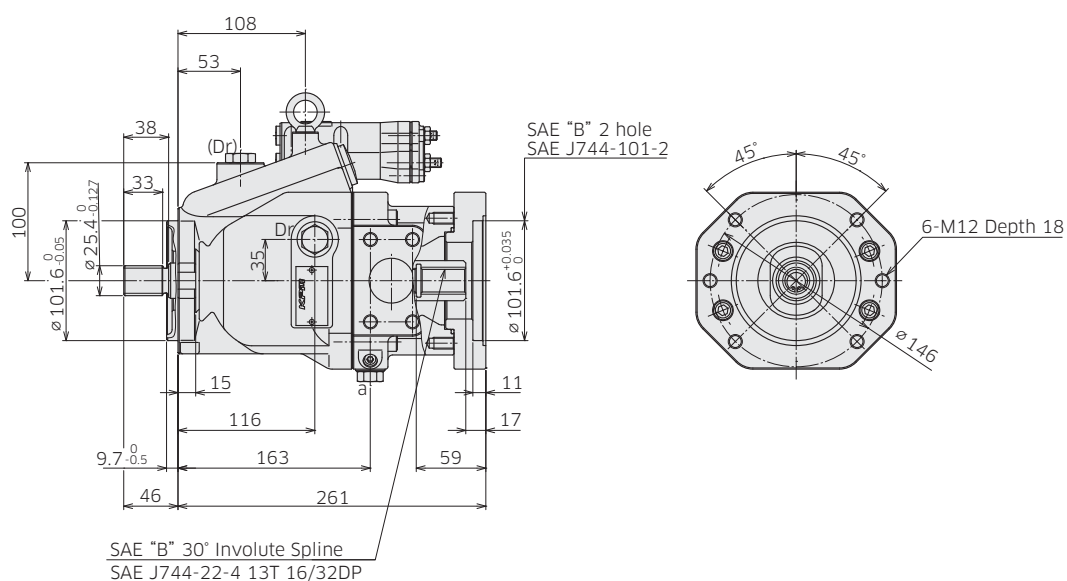
### Through Drive SAE A

## 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

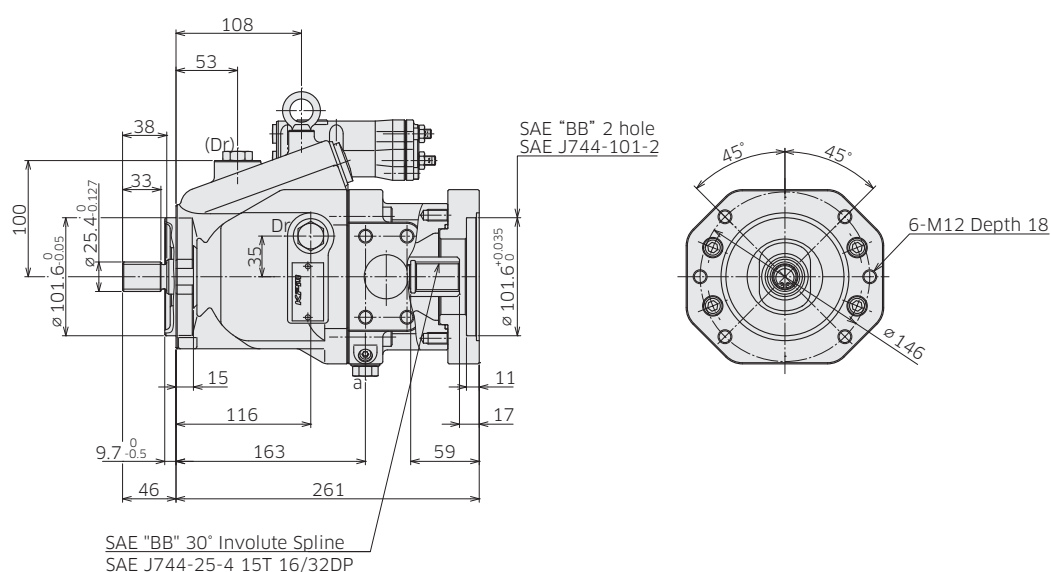
### 3-1 Installation Dimensions

\* 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

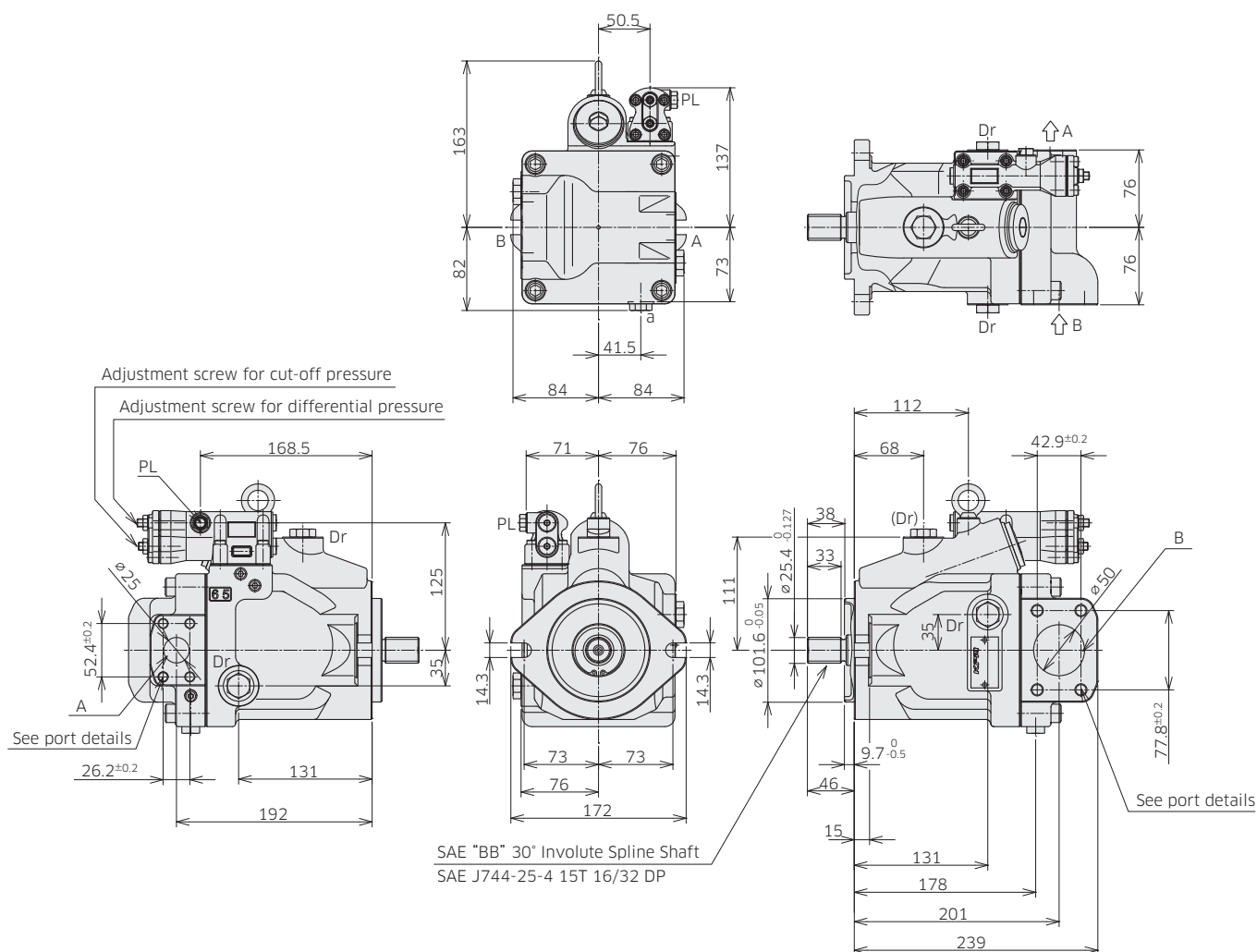
#### 3-1 Installation Dimensions

\*Dimensions in mm.

##### ◆ K3VLS65 with Cut-off/Load Sense Control (Clockwise Rotation)

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

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



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

### 3. Dimensions

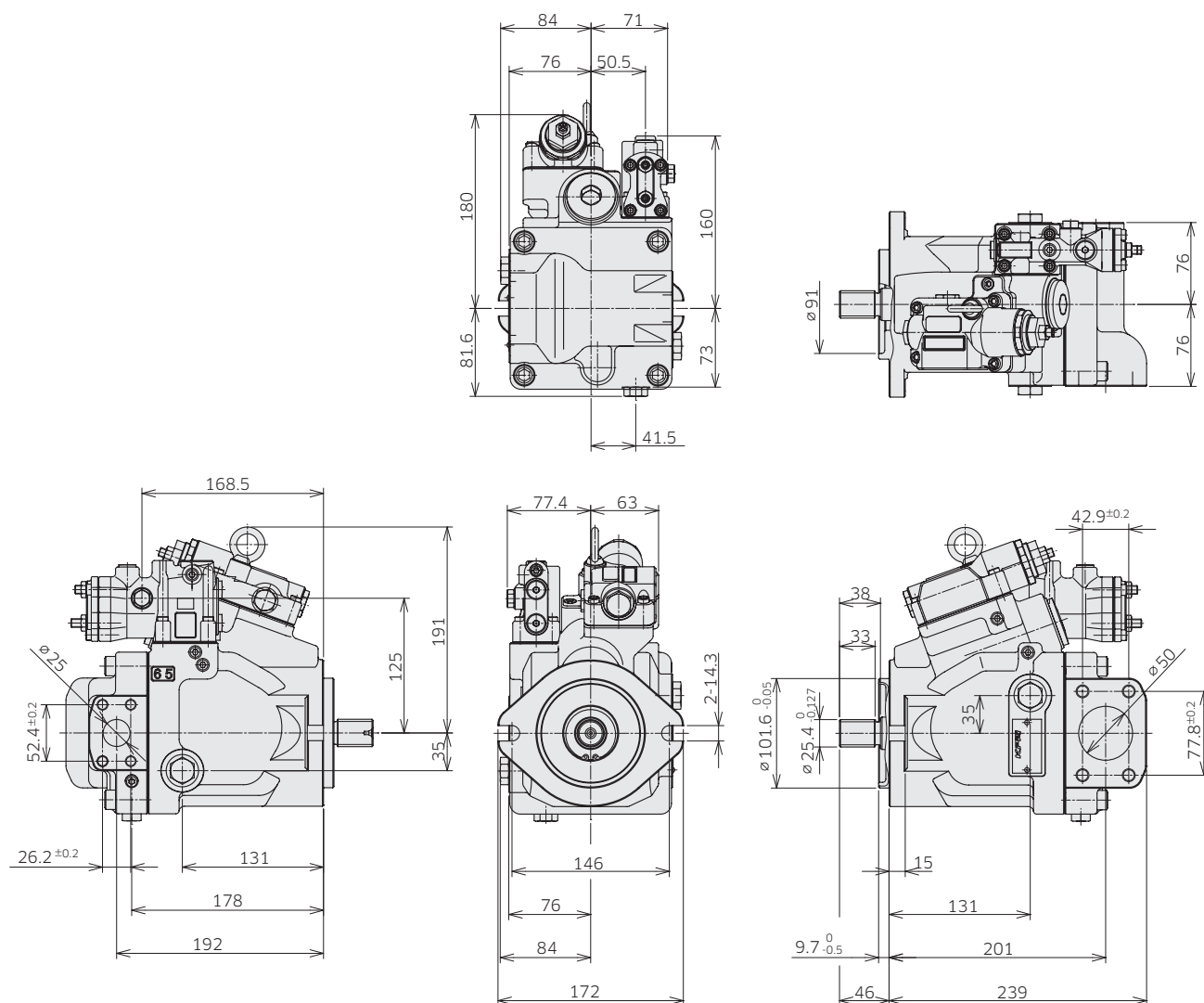
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS65 with Torque Limit Control (Clockwise Rotation)

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

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



### 3. Dimensions

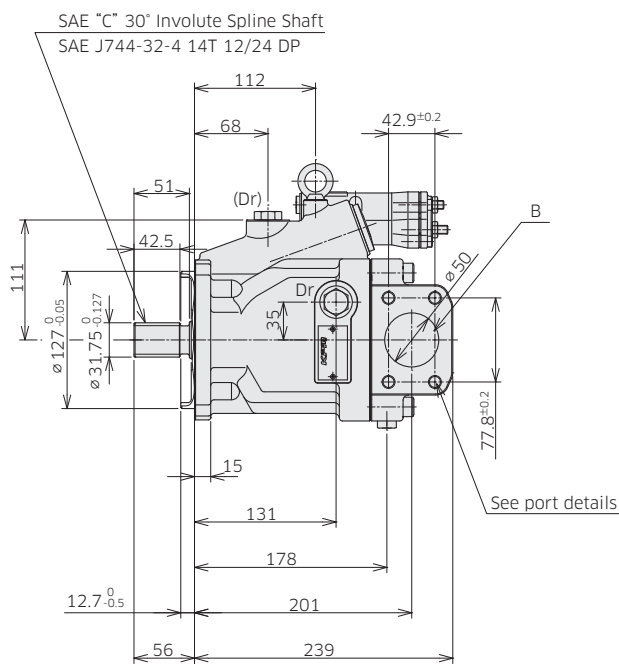
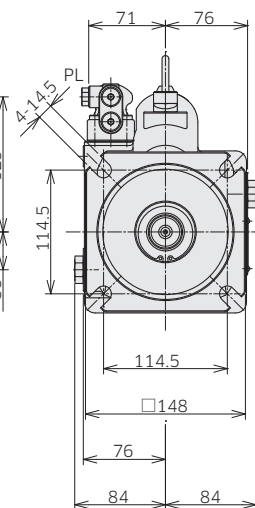
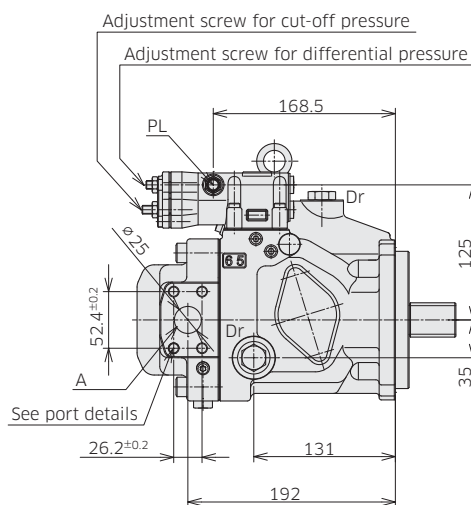
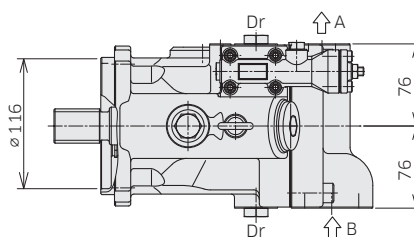
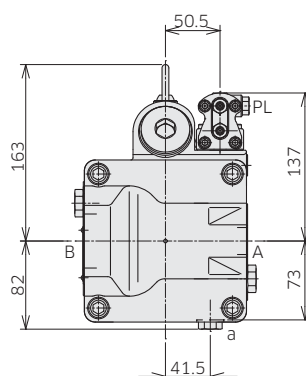
## 3-1 Installation Dimensions

\* Dimensions in mm.

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

Model Code : K3VLS 65 - 1 0 R C \* - L1 A

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



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

### 3. Dimensions

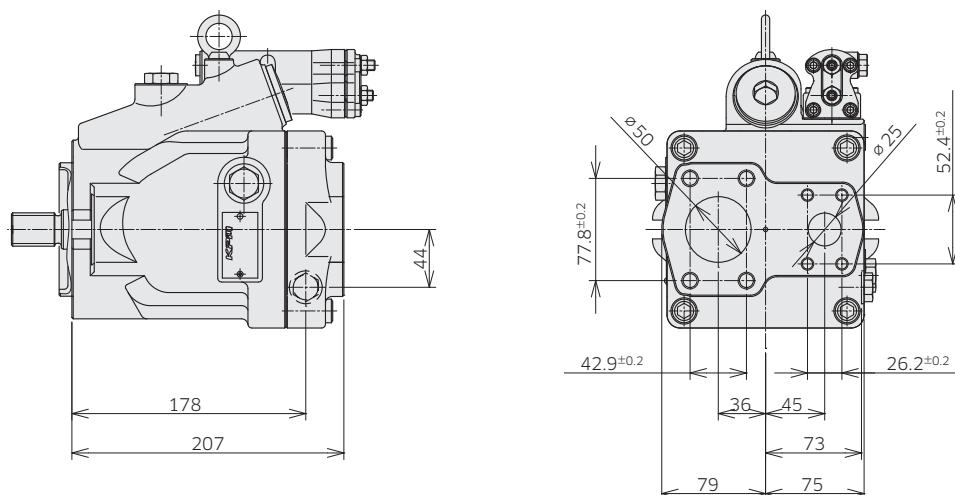
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS65 Rear Port (Clockwise Rotation)

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

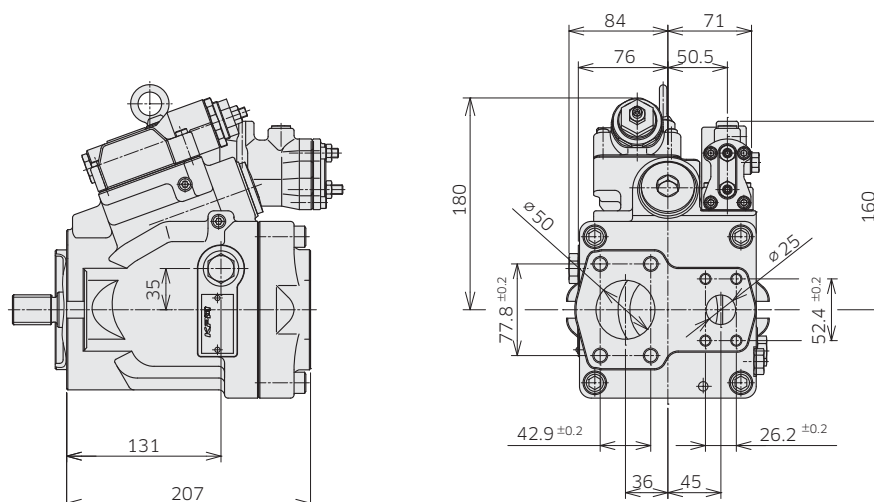
Model Code : K3VLS 65 - 1 R R BB \* - L0 A



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

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

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



### 3. Dimensions

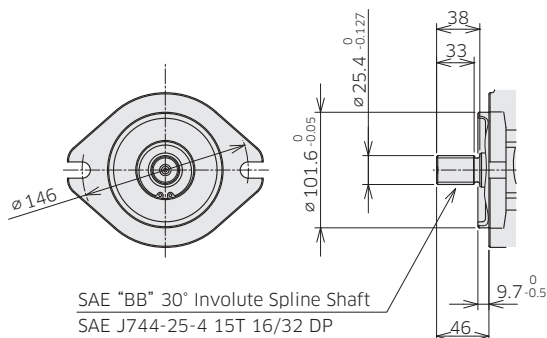
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS65 Mounting Flange and Shaft Options

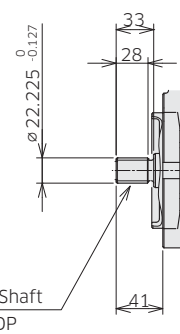
#### SAE BB Spline Shaft

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



#### SAE B Spline Shaft

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



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
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 (ISO 11926-1: 1995)	12

## 3. Dimensions

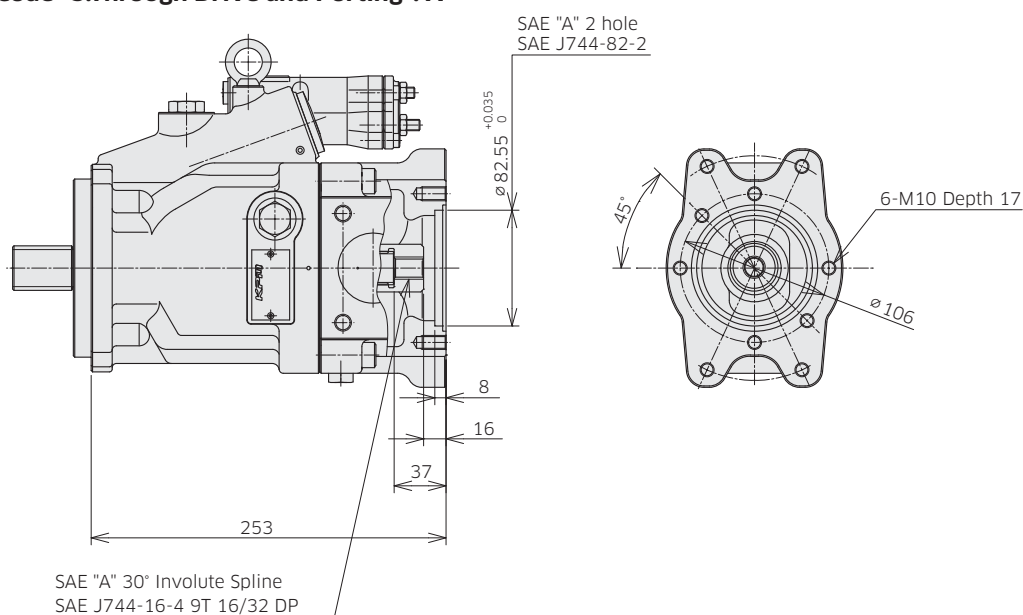
### 3-1 Installation Dimensions

\*Dimensions in mm.

#### ◆ K3VLS65 Through Drive Options

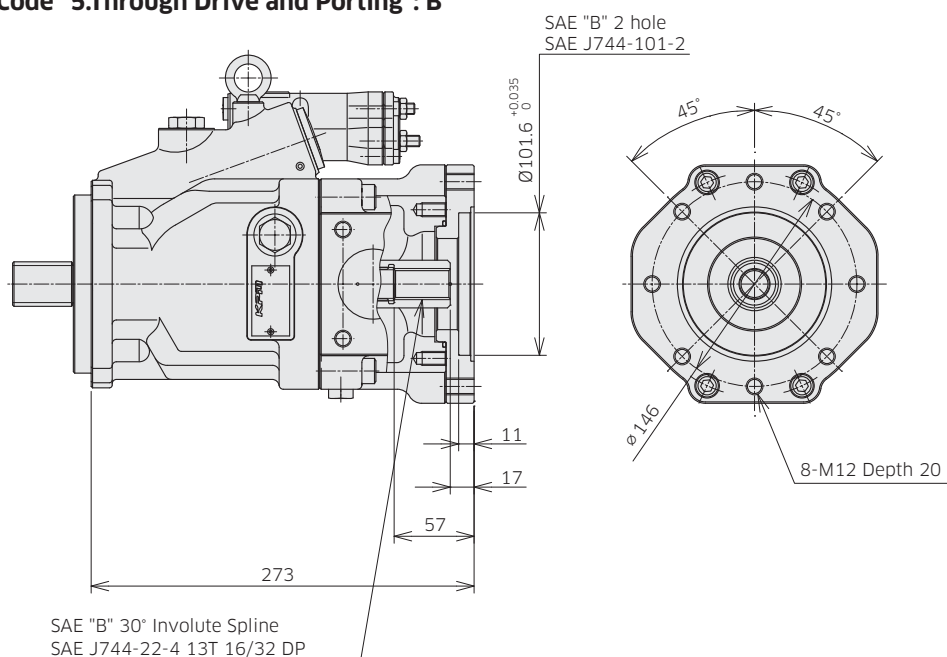
**Through Drive SAE A**

**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

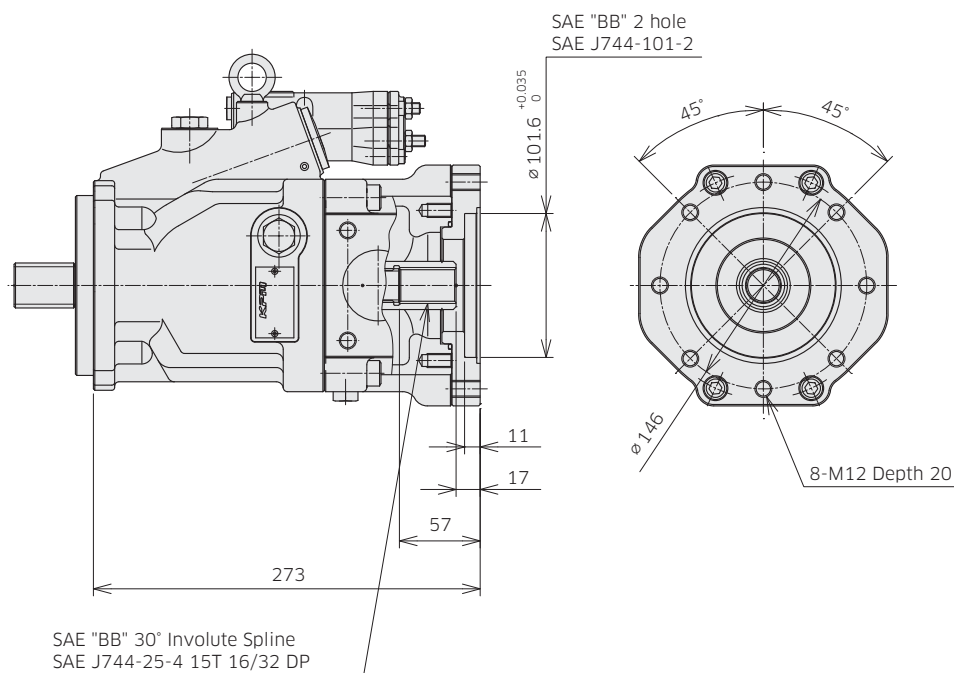
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS65 Through Drive Options

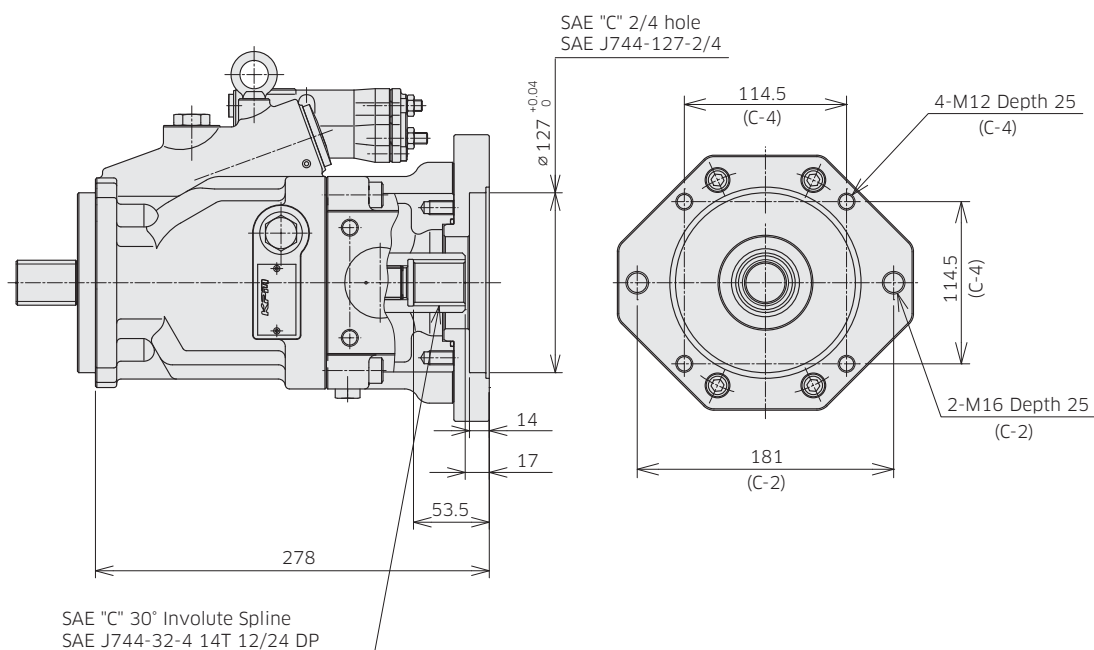
**Through Drive SAE BB**

**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

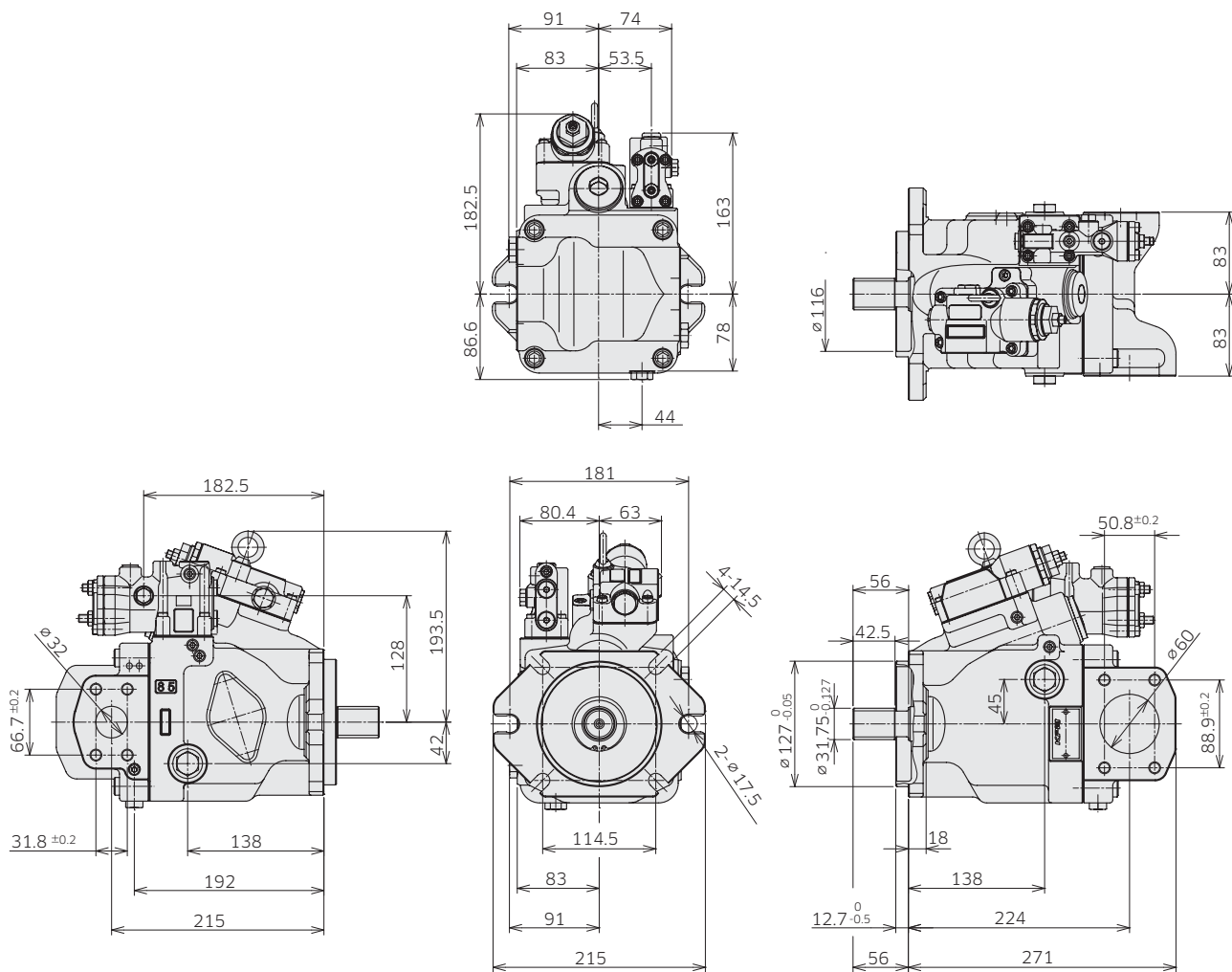
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS85 with Torque Limit Control (Clockwise Rotation)

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

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



### 3. Dimensions

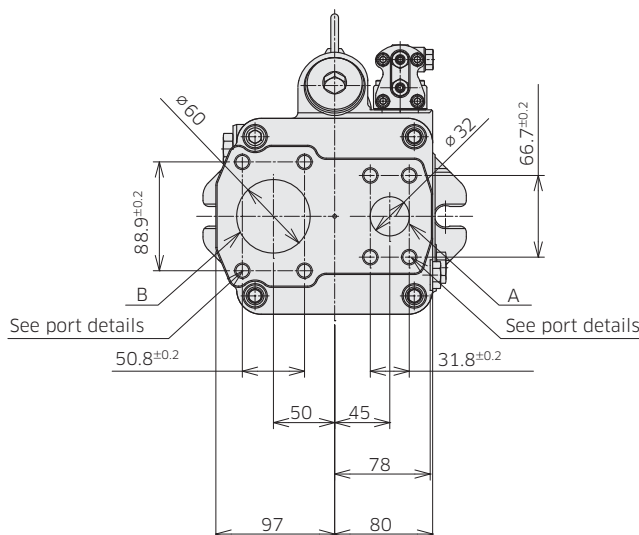
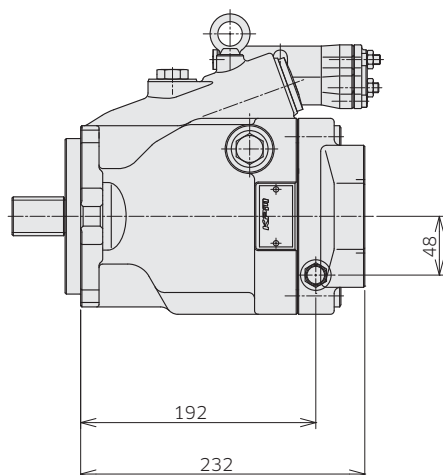
### 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS85 Rear Port (Clockwise Rotation)

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

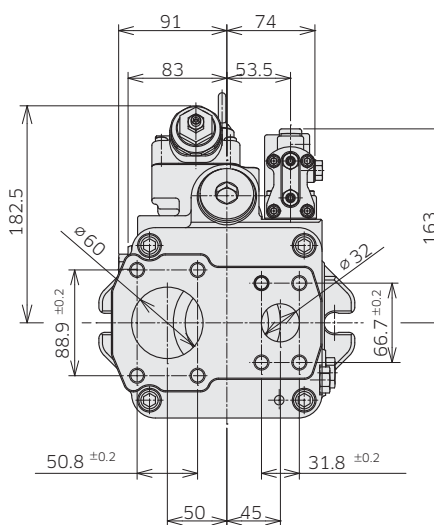
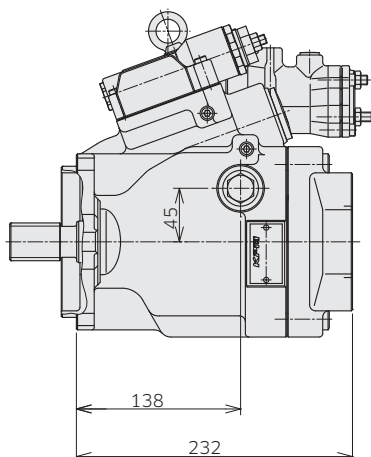
Model Code : K3VLS 85 - 1 R R C \* - L0 A



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

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

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



### 3. Dimensions

## 3-1 Installation Dimensions

### ◆ K3VLS85 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	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
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 (ISO 11926-1: 1995)	12

### 3. Dimensions

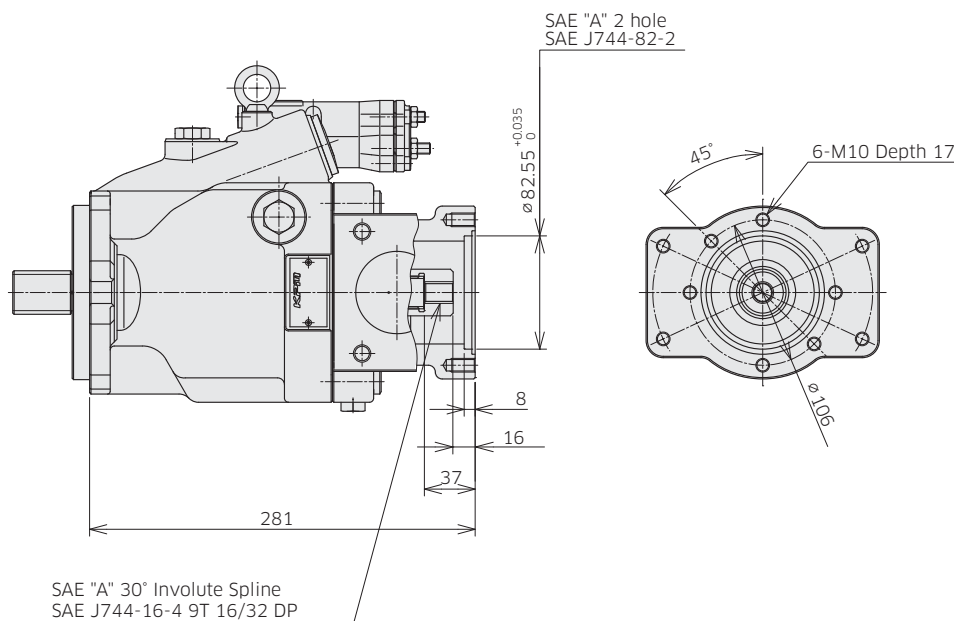
## 3-1 Installation Dimensions

\*Dimensions in mm.

### ◆ K3VLS85 Through Drive Options

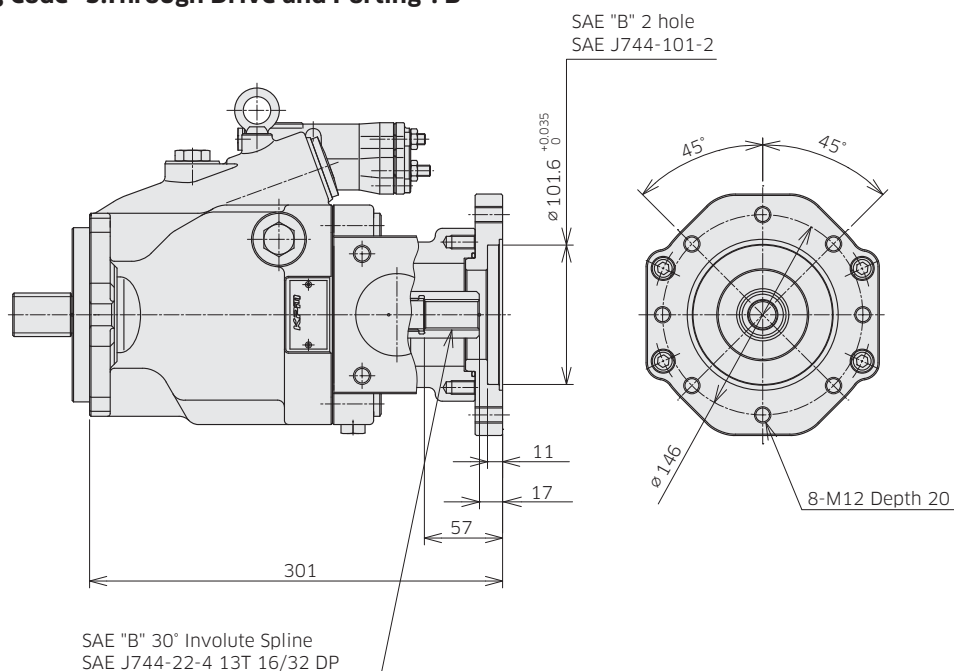
Through Drive SAE A

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

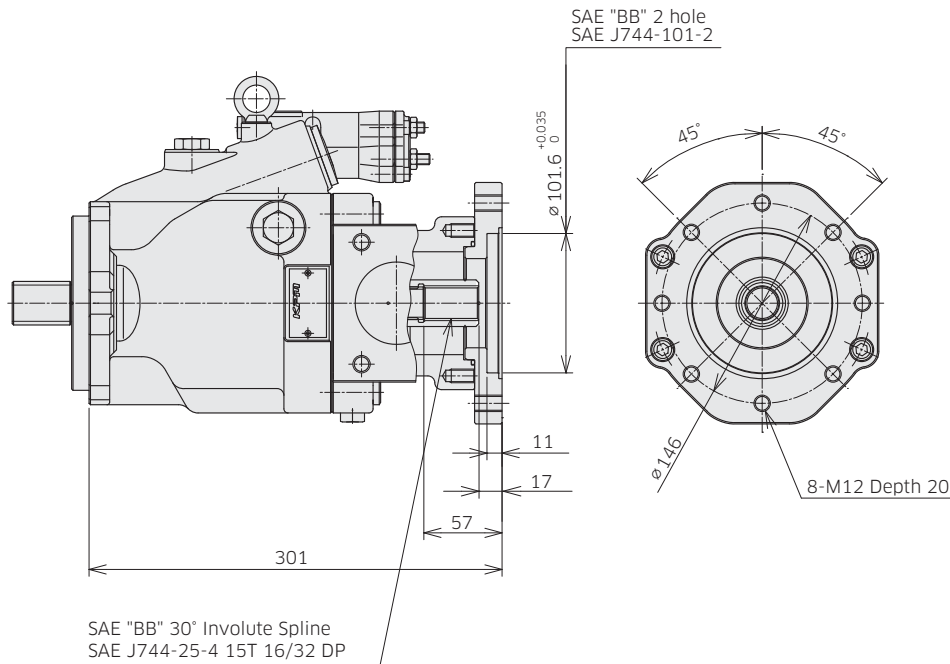
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS85 Through Drive Options

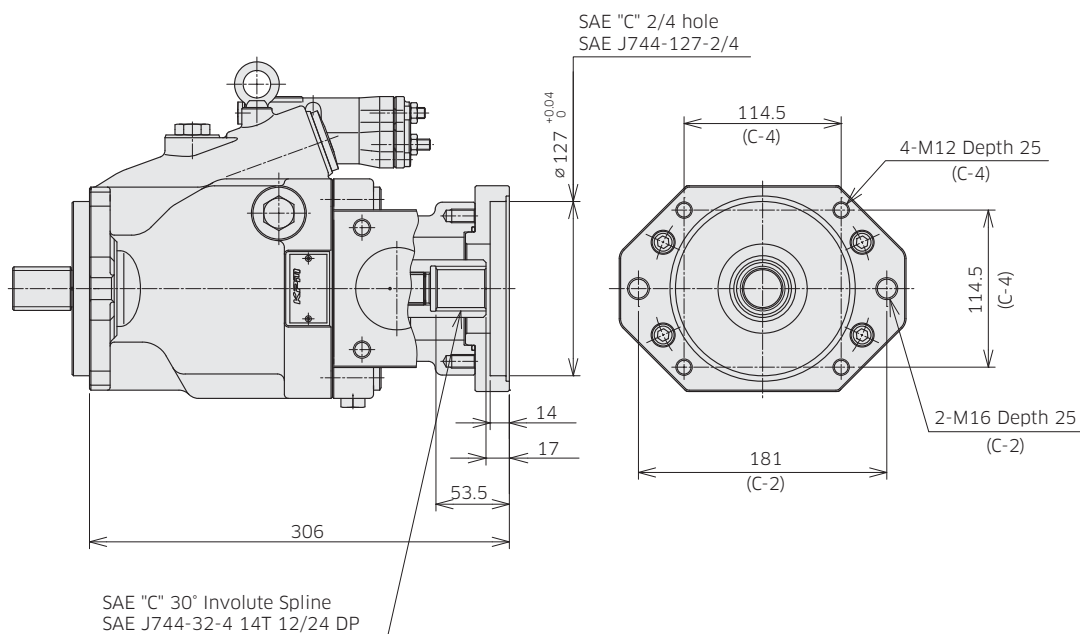
**Through Drive SAE BB**

**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

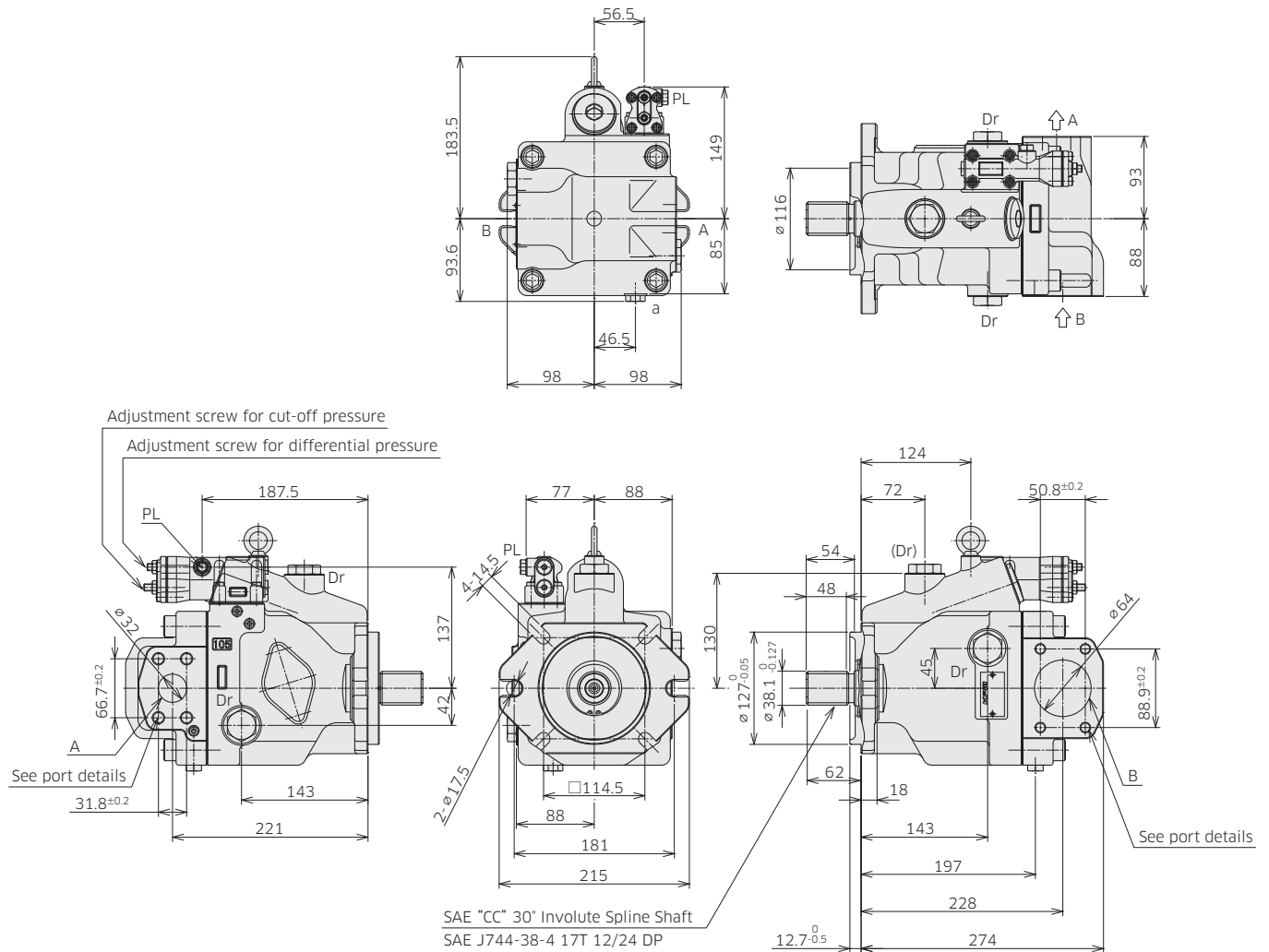
### 3-1 Installation Dimensions

\*Dimensions in mm.

#### ◆ K3VLS105 with Cut-off/Load Sense Control (Clockwise Rotation)

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

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



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

### 3. Dimensions

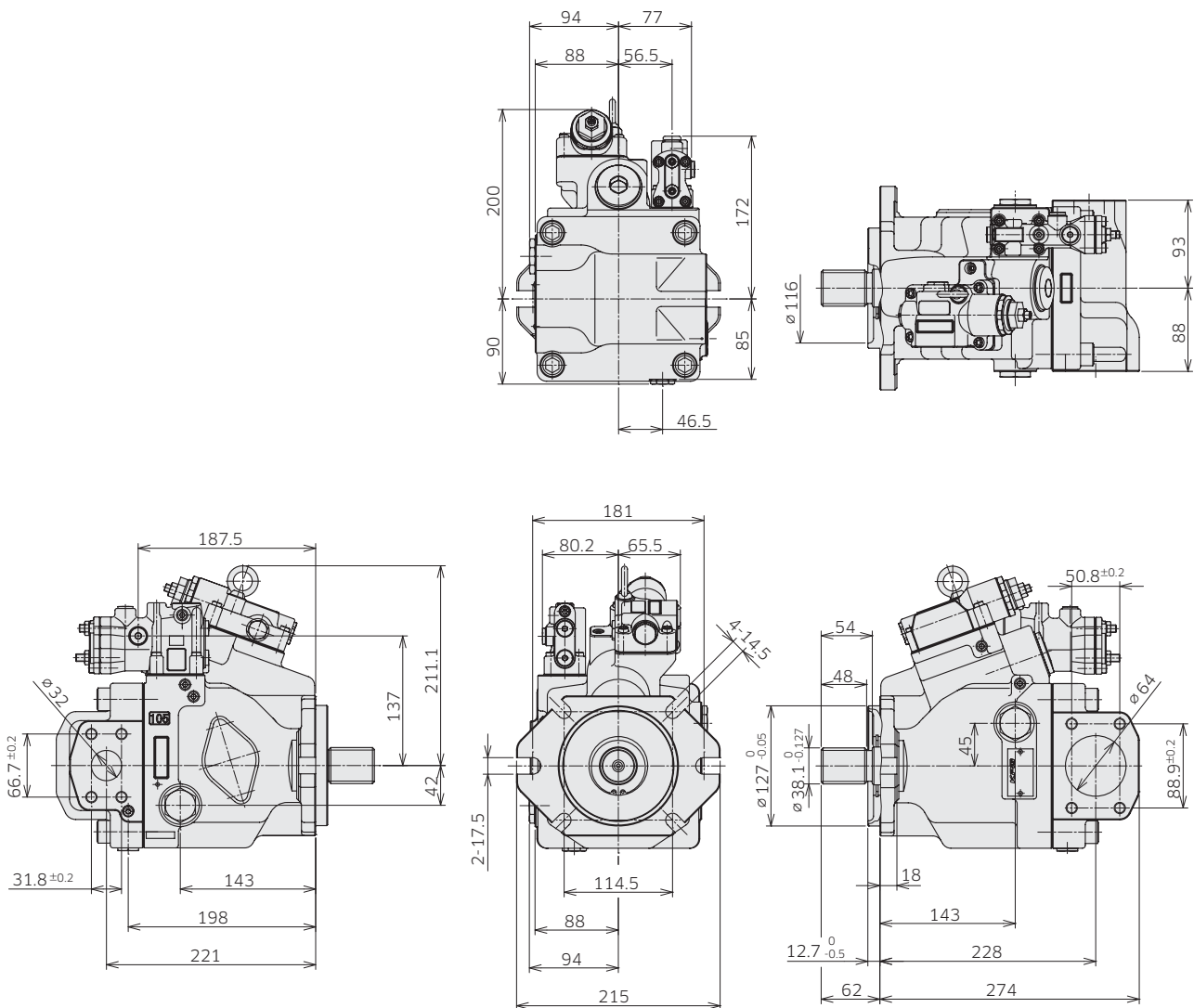
## 3-1 Installation Dimensions

\*Dimensions in mm.

### ◆ K3VLS105 with Torque Limit Control (Clockwise Rotation)

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

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





### 3. Dimensions

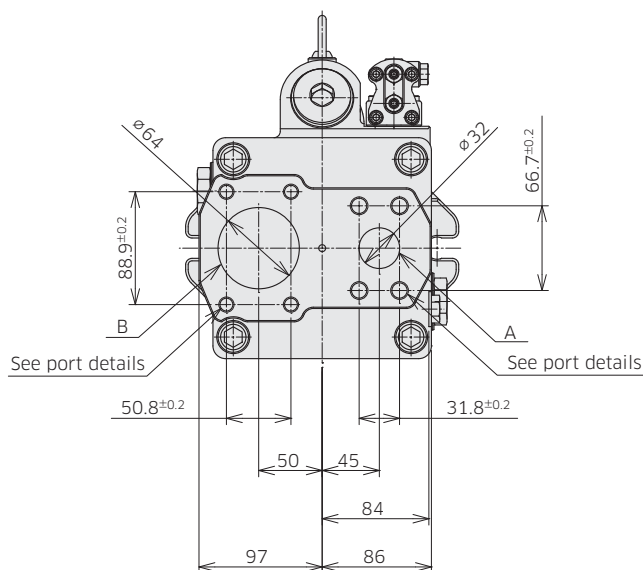
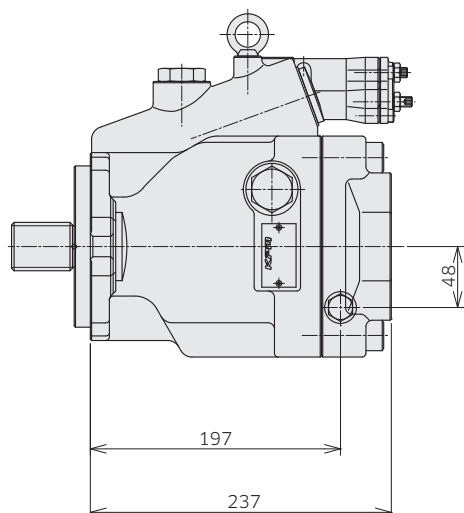
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS105 Rear Port (Clockwise Rotation)

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

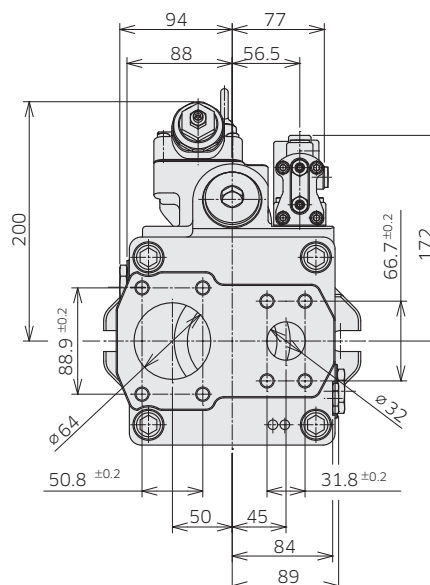
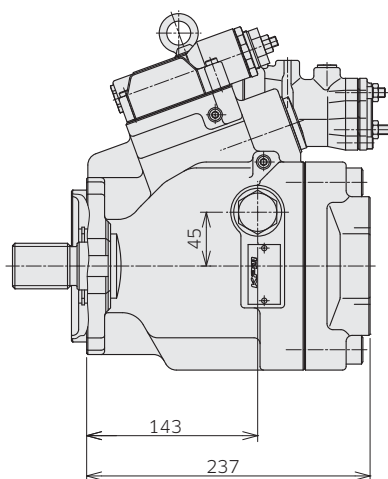
Model Code : K3VLS 105 - 1 R R CC \* - L0 A



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

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

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



### 3. Dimensions

## 3-1 Installation Dimensions

\*Dimensions in mm.

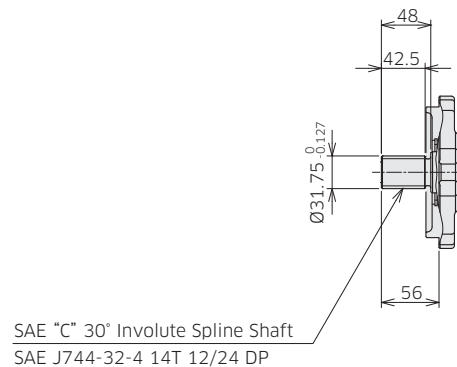
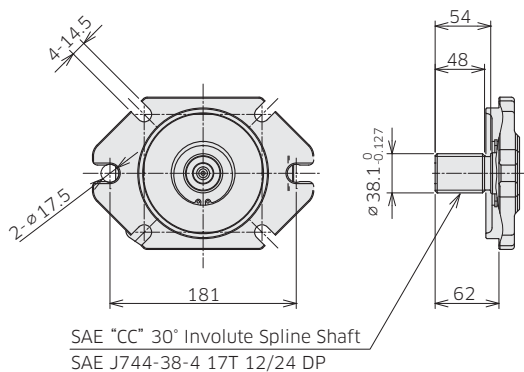
### ◆ K3VLS105 Mounting Flange and Shaft Options

#### SAE CC Spline Shaft

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

#### SAE 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.

### ◆ 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 6162-2: 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
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 (ISO 11926-1: 1995)	12

## 3. Dimensions

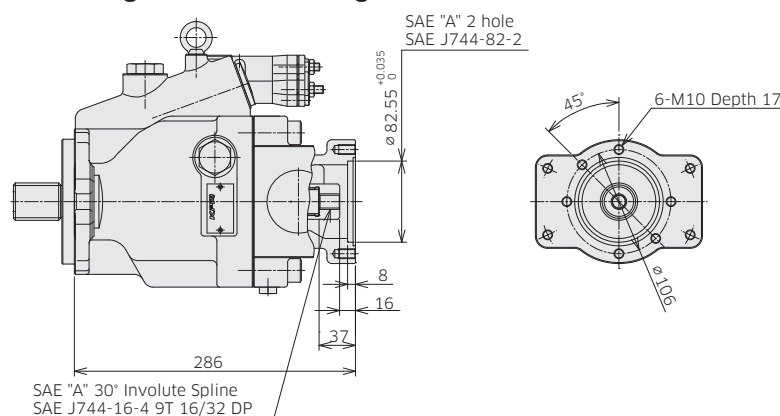
### 3-1 Installation Dimensions

\*Dimensions in mm.

#### ◆ K3VLS105 Through Drive Options

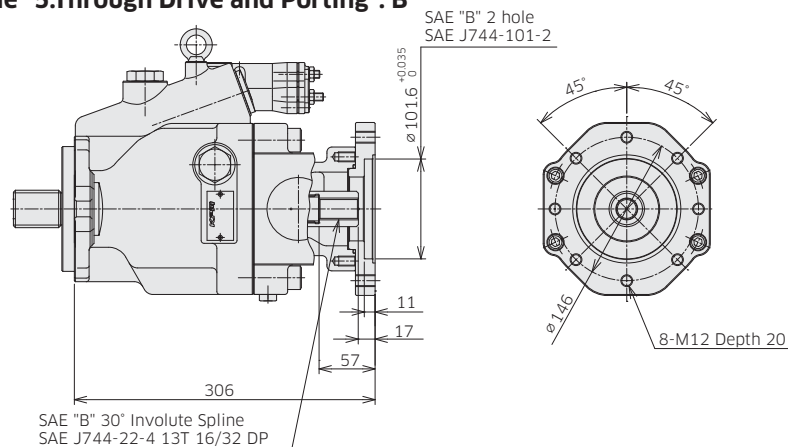
**Through Drive SAE A**

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



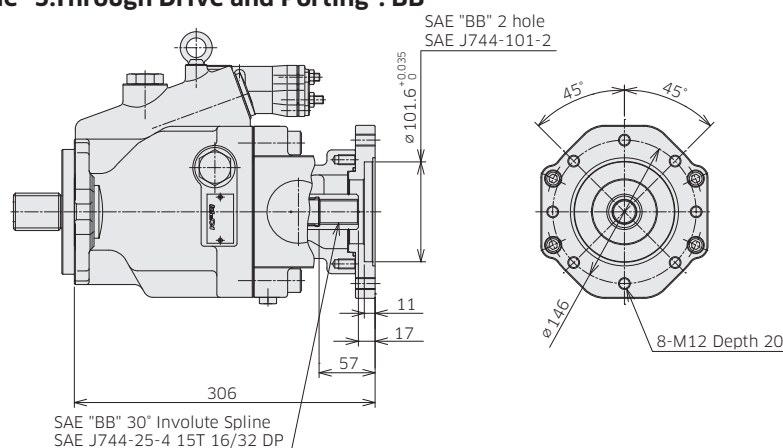
**Through Drive SAE B**

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



**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

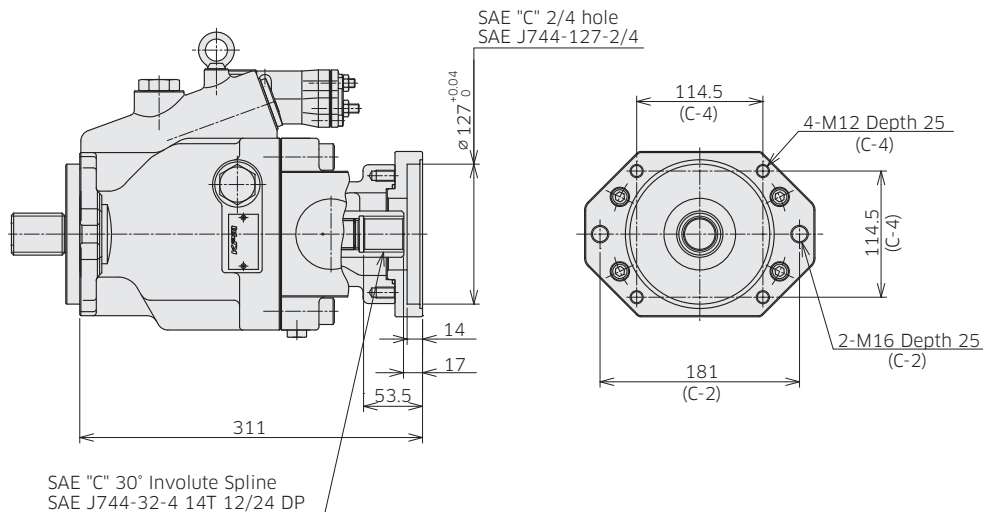
### 3-1 Installation Dimensions

\* Dimensions in mm.

## ◆ K3VLS105 Through Drive Options

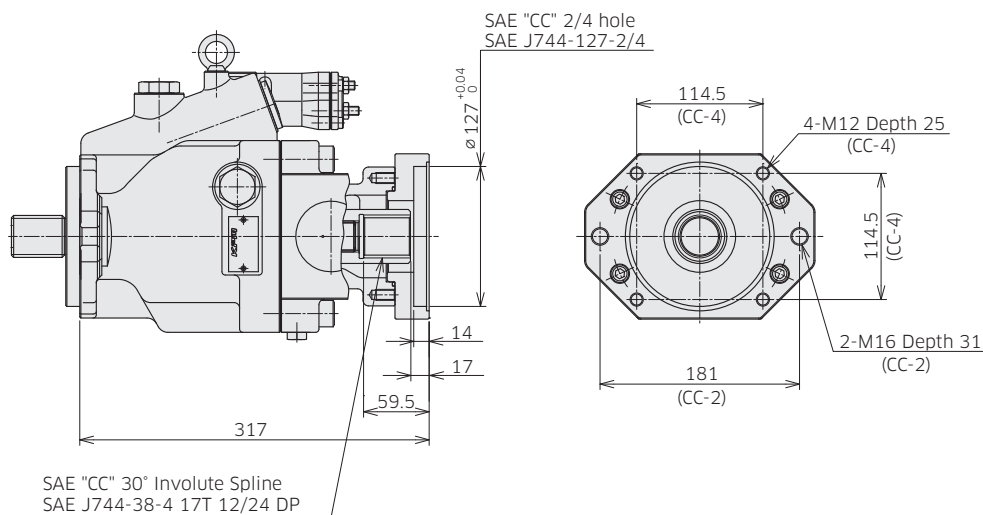
## Through Drive SAE C

**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		K3VLS 125/150*1	K3VLS 125/150*1
	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)	220	301	463	408	378	419	394	—	—

\* 1 : Size 125 and 150 are under development.

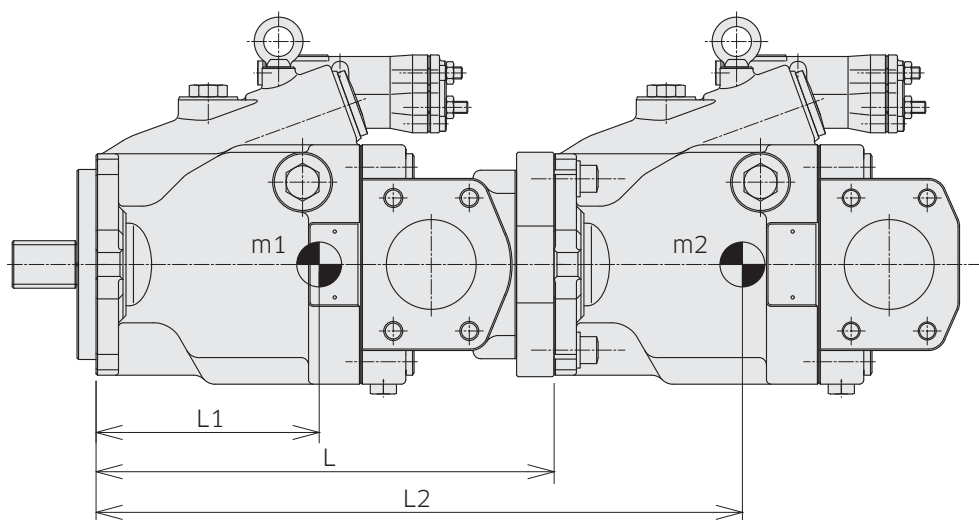
#### ■ Calculation formula for mass moment

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

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

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

See next page for values.



### 3. Dimensions

■ Values for calculation of mass moment

Through drive size	Length, weight		50	65 SAE B mount	65 SAE C mount	85	105	125/150*1 SAE C mount	125/150*1 SAE D mount
Without through drive, side ported	Total length L (mm)		214	239	239	271	274	—	—
	Center of gravity (from mounting face: mm)		107	117	113	126	131	—	—
	Weight (kg)	with torque limiter	24	28	29	35	41	—	—
		without torque limiter	21	25	26	31	37	—	—
Without through drive, rear ported	Total length L (mm)		188	207	207	232	237	—	—
	Center of gravity (from mounting face: mm)		101	111	108	120	124	—	—
	Weight (kg)	with torque limiter	23	27	28	33	39	—	—
		without torque limiter	20	24	25	29	35	—	—
SAE A	Total length L (mm)		234	253	253	281	286	—	—
	Center of gravity (from mounting face: mm)		117	129	126	137	138	—	—
	Weight (kg)	with torque limiter	26	31	32	38	43	—	—
		without torque limiter	23	28	29	34	39	—	—
SAE B SAE BB	Total length L (mm)		261	273	273	301	306	—	—
	Center of gravity (from mounting face: mm)		133	143	143	150	150	—	—
	Weight (kg)	with torque limiter	29	34	35	41	46	—	—
		without torque limiter	26	31	32	37	42	—	—
SAE C SAE CC	Total length L (mm)		—	—	278	306	311	—	—
	Center of gravity (from mounting face: mm)		—	—	138	149	149	—	—
	Weight (kg)	with torque limiter	—	—	35	41	46	—	—
		without torque limiter	—	—	32	37	42	—	—
SAE D	Total length L (mm)		—	—	—	—	—	—	—
	Center of gravity (from mounting face: mm)		—	—	—	—	—	—	—
	Weight (kg)	with torque limiter	—	—	—	—	—	—	—
		without torque limiter	—	—	—	—	—	—	—

\* 1 : Size 125 and 150 are under development.

Please fill the table to specify the requirements.  
Please contact us for any questions.

## K3VLS Series Inquiry Form



Please tick the box for options.  
Options with ★ are under development.

Date: \_\_\_\_\_ Machine Model: \_\_\_\_\_  
Application: \_\_\_\_\_  
Customer Name: \_\_\_\_\_

### Swash Plate Type Axial Piston Pump

Model Code	1	2	3	4	5	6	7	8		9	10	11	12
	K3VLS		-	1					-				

Items	Model Code No.	Requirements	Feed back
Pump Size	2	50 <input type="checkbox"/> 65 <input type="checkbox"/> 85 <input type="checkbox"/> 105 <input type="checkbox"/> 125 <input type="checkbox"/> ★ 150 <input type="checkbox"/> ★	
Series Type Code	4	1 : Standard Type	
Through Drive and Porting	5	0 : Without Through Drive, Side Ported <input type="checkbox"/> A : SAE A Through Drive, Side Ported <input type="checkbox"/> B : SAE B Through Drive, Side Ported <input type="checkbox"/> BB : SAE BB Through Drive, Side Ported <input type="checkbox"/> C : SAE C2/4 bolt Through Drive, Side Ported <input type="checkbox"/> CC : SAE CC2/4 bolt Through Drive, Side Ported (for K3VLS105/125/150) <input type="checkbox"/> D : SAE D Through Drive, Side Ported (for K3VLS125/150) <input type="checkbox"/> ★ N : With Through Drive Shaft, Without Coupling, Closed with Steel Cover, Side Ported <input type="checkbox"/> R : Without Through Drive, Rear Ported <input type="checkbox"/>	
Direction of Rotation	6	R : Clockwise <input type="checkbox"/> L : Counterclockwise <input type="checkbox"/>	
Mounting Flange and Shaft	7	B : SAE B Mount & SAE B Spline (for K3VLS50/65) <input type="checkbox"/> BB : SAE B Mount & SAE BB Spline (for K3VLS50/65) <input type="checkbox"/> C : SAE C Mount & SAE C Spline (for K3VLS65/85/105/125/150) <input type="checkbox"/> CC : SAE C Mount & SAE CC Spline (for K3VLS105/125/150) <input type="checkbox"/> D : SAE D Mount & SAE D Spline (for K3VLS125/150) <input type="checkbox"/> ★	
Flange Fixing Thread (Suction/Delivery)	8	S : SAE 4 - bolt Flange, UNC Threaded <input type="checkbox"/> H : SAE 4 - bolt Flange, Metric Threaded <input type="checkbox"/>	
Flow Control	9	Load Sense & Pressure Cut L0 : With LS Bleed off Orifice <input type="checkbox"/> L1 : Without LS Bleed off Orifice <input type="checkbox"/>	
Differential Pressure Setting Range (For the details see page 5)	10	A : Standard Setting Range (0 to 3.0 MPa) <input type="checkbox"/> C : High Setting Range (1.5 to 4.0 MPa) <input type="checkbox"/>	
Additional Control Options	11	Blank : Without Any Additional Control <input type="checkbox"/> Torque Limit Control A : Without Power Shift Control <input type="checkbox"/> B : With Power Shift Control, Pilot Operated <input type="checkbox"/> C1 : With Power Shift Control, Electric Proportional Reducing Valve (Voltage : 24V, AMP Connector) <input type="checkbox"/> ★ C2 : With Power Shift Control, Electric Proportional Reducing Valve (Voltage : 24V, Deutsch Connector) <input type="checkbox"/> ★ C3 : With Power Shift Control, Electric Proportional Reducing Valve (Voltage : 12V, Deutsch Connector) <input type="checkbox"/> ★	
Torque Limit Setting (Available only with the attachment of Torque Limiter)	12	Blank : Without Any Torque Limit Setting <input type="checkbox"/> H1 : H Spring, Corner Torque 5% <input type="checkbox"/> H2 : H Spring, Corner Torque 7.5% <input type="checkbox"/> H3 : H Spring, Corner Torque 10% <input type="checkbox"/> H4 : H Spring, Corner Torque 15% <input type="checkbox"/> M1 : M Spring, Corner Torque 20% <input type="checkbox"/> M2 : M Spring, Corner Torque 30% <input type="checkbox"/> M3 : M Spring, Corner Torque 40% <input type="checkbox"/> M4 : M Spring, Corner Torque 50% <input type="checkbox"/> M5 : M Spring, Corner Torque 60% <input type="checkbox"/>	

Comments (Other requirements)	Operating condition, Duty cycle etc. (Describe your detail)

Request Volume	Request Delivery Date	Note











As HANSA-TMP has a very extensive range of products and some products have a variety of applications, the information supplied may often only apply to specific situations.

If the catalogue does not supply all the information required, please contact HANSA-TMP.

In order to provide a comprehensive reply to queries we may require specific data regarding the proposed application.

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Via M. L. King, 6 - **41122 MODENA (ITALY)**  
Tel: +39 059 415 711  
Fax: +39 059 415 730  
INTERNET: <http://www.hansatmp.it>  
E-MAIL: [hansatmp@hansatmp.it](mailto:hansatmp@hansatmp.it)