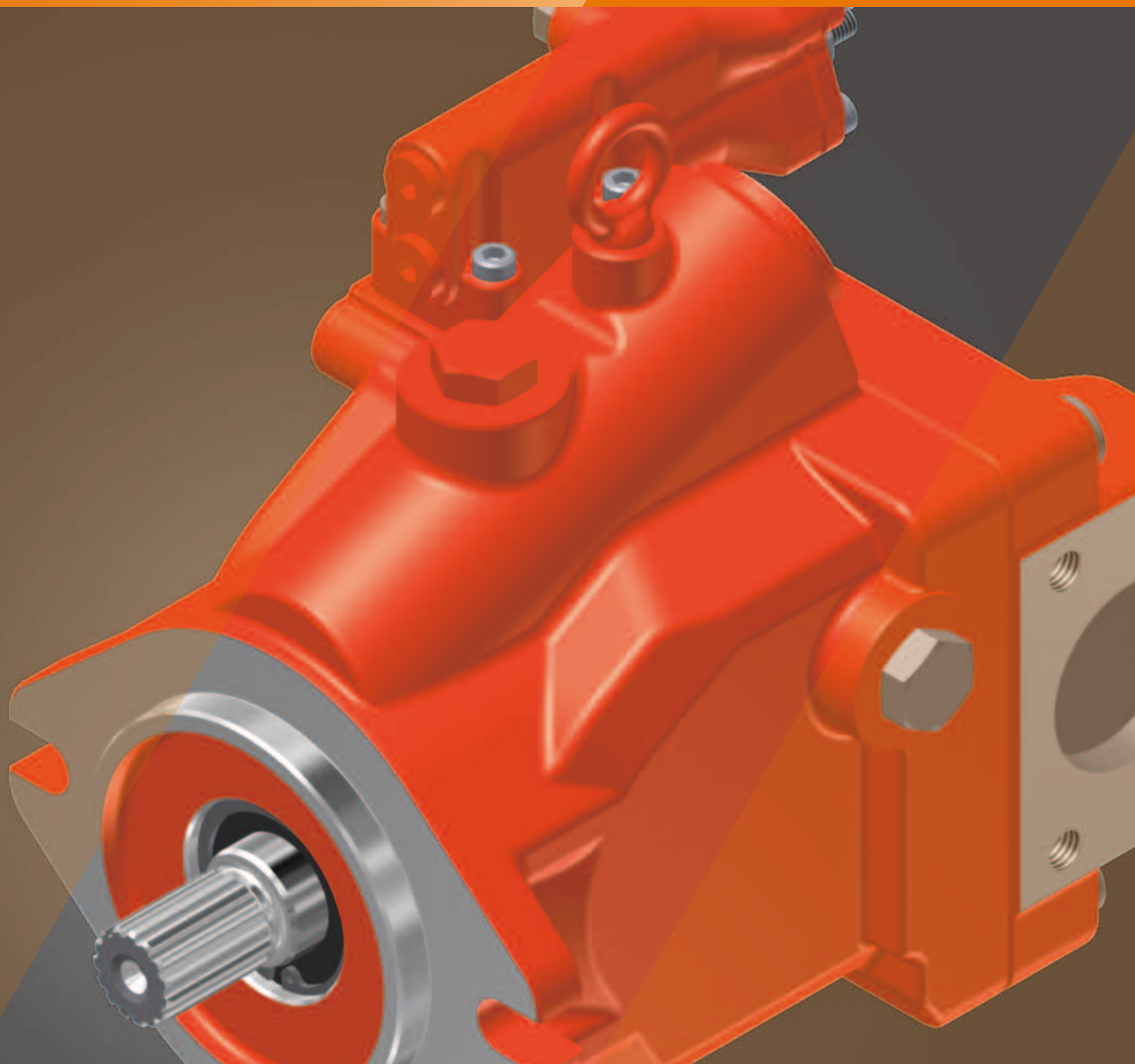


# Swash Plate Type Axial Piston Pump **K3VLS series**



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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 rotating parts, such as the motor and pump shaft, to avoid injuries.



- 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.

## III. Handling Precautions

### 1. Operating Fluid and Temperature Range

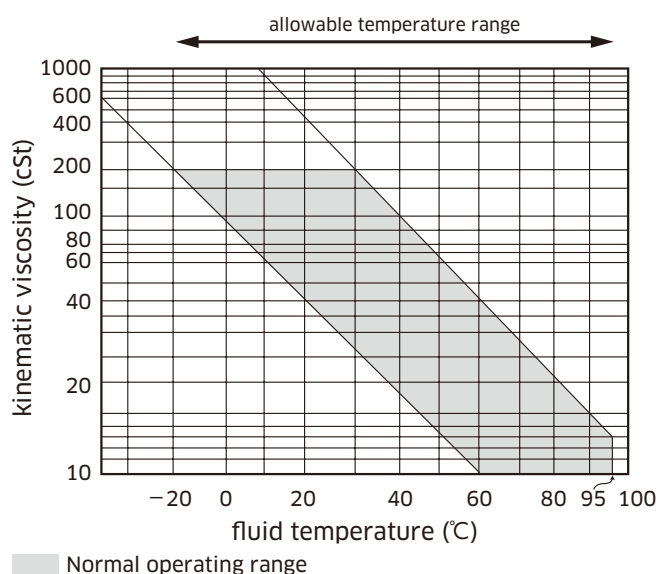
#### 1) Operating fluid

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 <sup>2</sup> /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

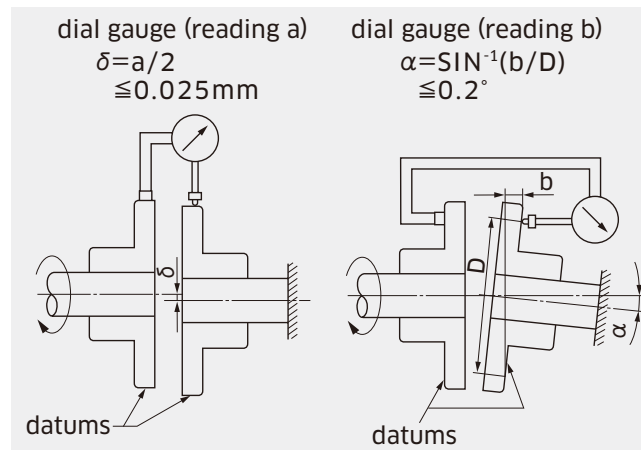
The relationship between contamination level and pump life is very difficult to predict as it depends on the type and nature of the contaminant present in the system. Sand or Silica in particular, due to its abrasive nature, does significantly reduce the expected life of a pump. Based on the precondition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

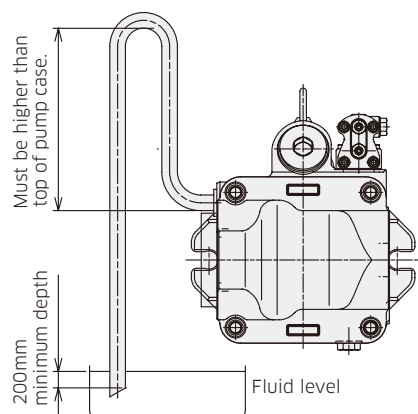
It is undesirable to leave the pump out of use for a long period e.g. a year or more. In such a situation it is recommended that the pump is run for a short period on a more frequent basis even if it is just unloaded. With regard to a pump held in storage then rotating the shaft on a frequent basis is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

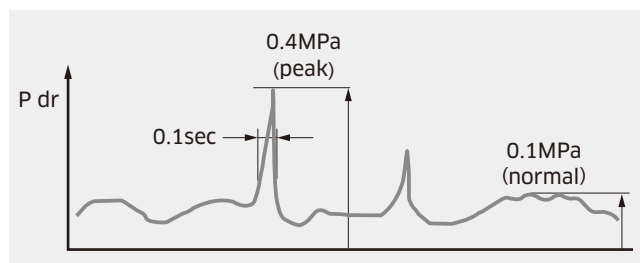
It is the preferred option to mount the pump with the case drain piping initially rising above the pump before continuing to the tank. Do not connect the drain line to the inlet line.



#### 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 should be equal or larger in size than the drain port to minimise pressure in the pump case. The pump case pressure should not exceed 0.1MPa as shown in the illustration below. (Peak pressure should never exceed 0.4MPa.)



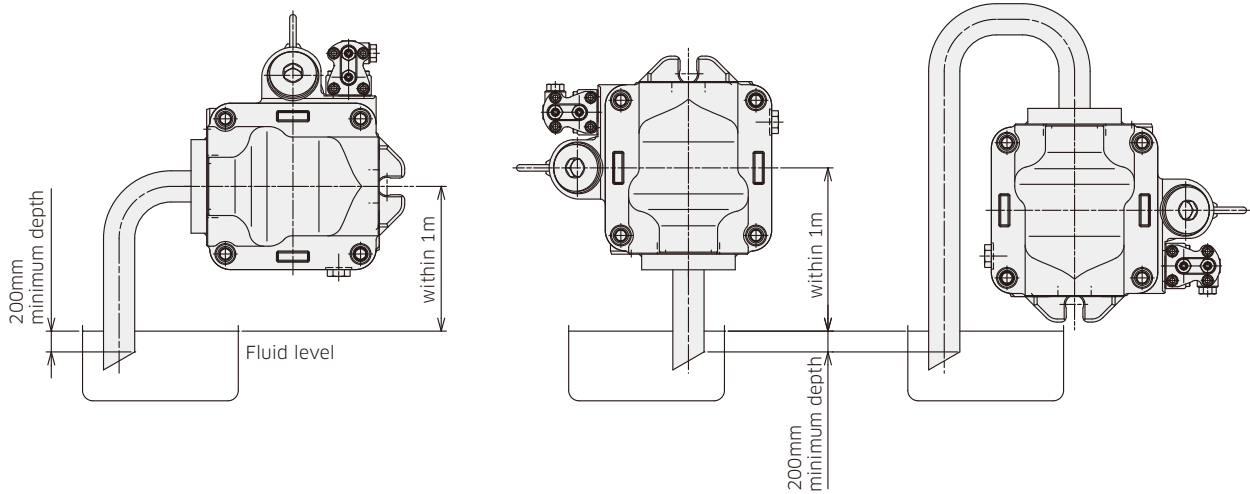
#### 2) Size of drain hose or drain pipe

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

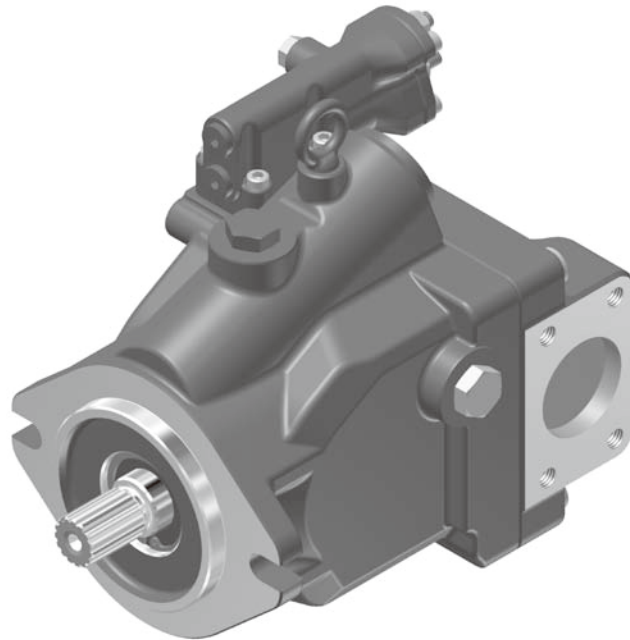
## ◆ Definition

q	= Pump displacement / rev.	cm <sup>3</sup> (in <sup>3</sup> )
L	= Input power	kW (hp)
N	= Speed	min <sup>-1</sup> (rpm)
$\Delta P$	= $P_d - P_s$	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)
$\eta_v$	= Pump volumetric efficiency	
$\eta_m$	= Pump mechanical efficiency	
$\eta_t$	= 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

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

	65	85	105
Maximum Displacement	●	●	●

#### 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

		65	85	105
0	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

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

#### 7. Mounting Flange and Shaft

		65	85	105
B	SAE B Mount & SAE B Spline	●	—	—
BB	SAE B Mount & SAE BB Spline	●	—	—
C	SAE C Mount & SAE C Spline (Only SEA C-4 mount for K3VLS65)	●	●	●
CC	SAE C Mount & SAE CC Spline	—	—	●
D	SAE D Mount & SAE D Spline	—	—	—

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

		65	85	105
S	SAE 4-bolt Flange, UNC Threaded	●	●	●
H	SAE 4-bolt Flange, Metric Threaded	●	●	●

● : Available

— : Not available

# 1. Ordering Code

## 1-2 Regulator Options

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

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

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

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

### 11. Additional Control Options

		65	85	105
Blank	Without Any Additional Control	●	●	●
	Torque Limit Control			
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)

**	For Torque Limiting Refer To Horsepower Setting Code
----	--

- : Available
- : Under development

# 2

## Technical Information

### 2-1 Specifications

Size			65	85	105
Displacement	cm <sup>3</sup>		65	85	105
Pressure	Rated	MPa	28		
	Peak	MPa	35		
Allowable case pressure	MPa	0.1 continuous / 0.4 peak			
Speed	Self prime* <sup>1</sup>	min <sup>-1</sup>	2,600	2,500	2,300
	Maximum* <sup>2</sup>	min <sup>-1</sup>	3,000	3,000	2,640
Case volume	L		1.0	1.2	1.7
Temperature range	°C	-20 to +95			
Viscosity range	cSt	10 to 1,000			
Maximum contamination level	ISO 4406 -/18/15				
Allowable through drive torque	SAE A	Nm	123	123	123
	SAE B		380	380	380
	SAE BB		435	435	435
	SAE C		435	435	558
Mass	kg		22	30	37
Moment of Inertia (GD <sup>2</sup> )	kg·m <sup>2</sup>		1.64×10 <sup>-2</sup>	2.21×10 <sup>-2</sup>	3.33×10 <sup>-2</sup>
Torsional Stiffness	Nm/rad		5.26×10 <sup>4</sup>	6.74×10 <sup>4</sup>	1.32×10 <sup>5</sup>
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

	SAE B	SAE BB	SAE C	SAE CC
Spline specification	13T DP= 16/32	15T DP= 16/32	14T DP= 12/24	17T DP= 12/24
Allowable maximum input torque (Nm)	200	315	630	1,060
Pump size	K3VLS65	K3VLS65	K3VLS65/85/105	K3VLS105

\* 3 : Maximum pressure must be reduced to operate within the allowable maximum input torque when an SAE B spline is used.

K3VLS65: 18MPa    K3VLS50: 24MPa

Input spline specification is based on SAE J744.

The shaft surface will have a finite life due to wear unless adequate lubrication is provided.

## 2. Technical Information

### 2-2 Functional Description of Regulator

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

(Ordering Code [9]: L0 / L1)

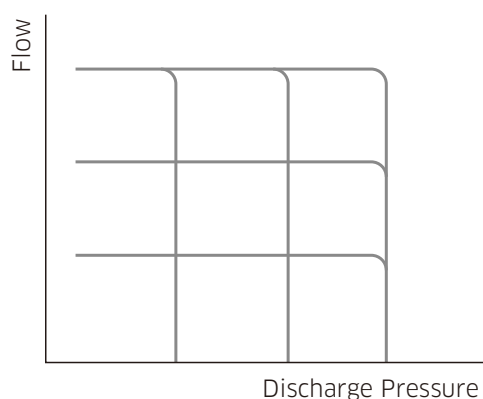
This regulator has function of flow and pressure control (i.e. load sensing control and pressure cut-off control.)

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 range

Load sensing differential pressure range can be selected from two setting ranges. The factory setting of the differential pressure is 1.5 MPa.

unit: MPa

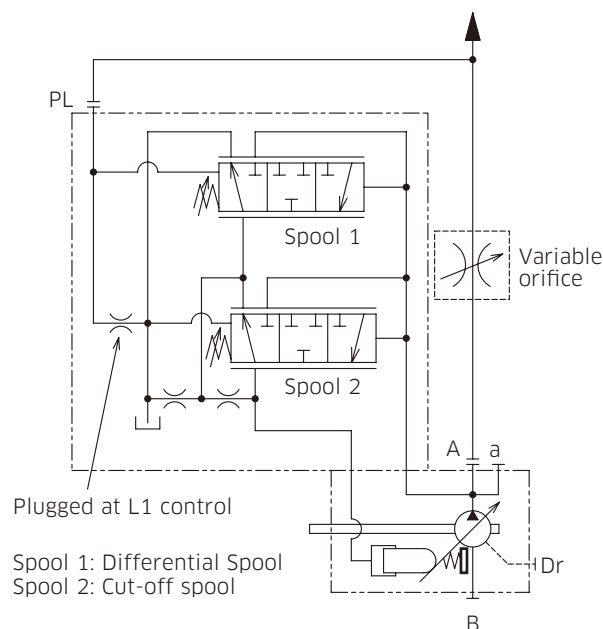
Code	Adjustment range	Adjustment sensitivity
A	1.0 to 3.0	1.3 / turn
C	1.5 to 4.0	2.5 / turn

#### ■ Pressure cut-off setting range

The pressure cut-off setting range is from 5 MPa to 28 MPa, as shown below. The factory setting of the cut-off pressure is 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

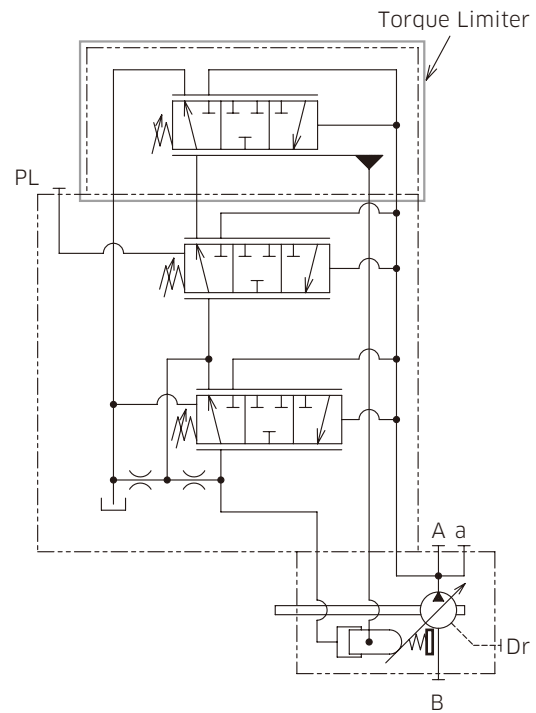
### ◆ Torque Limiter

(Ordering Code [11]: A)

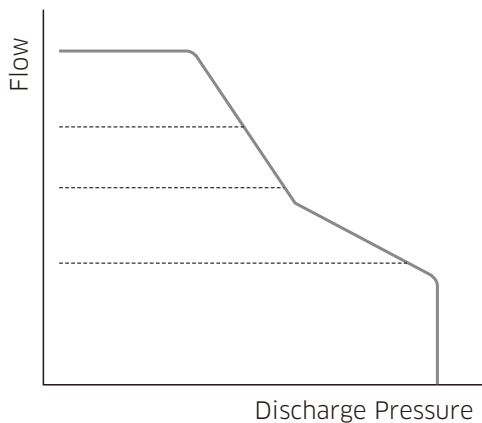
L0/L1 control functions as previously noted. In response to a rise in delivery pressure the swash plate angle is decreased, restricting the input torque. This regulator prevents excessive load against the prime mover.

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

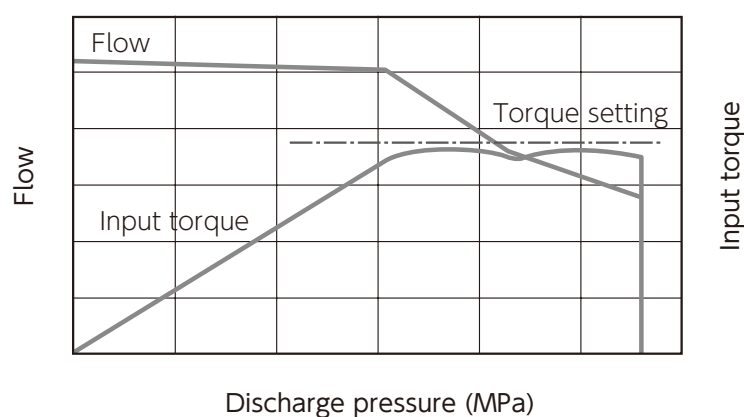


## 2. Technical Information

### 2-2 Functional Description of Regulator

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

**Pump Control Curve (sample)**



■ Table. Torque Setting

Pump Size	Ordering code [12]				
	M1	M2	M3	M4	M5
K3VLS65	245	215	185	150	120
K3VLS85	320	280	240	200	160
K3VLS105	395	345	295	245	200

Unit : Nm

## 2. Technical Information

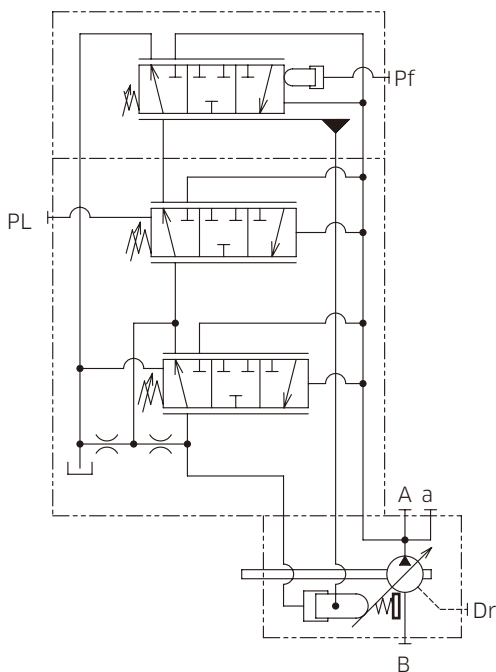
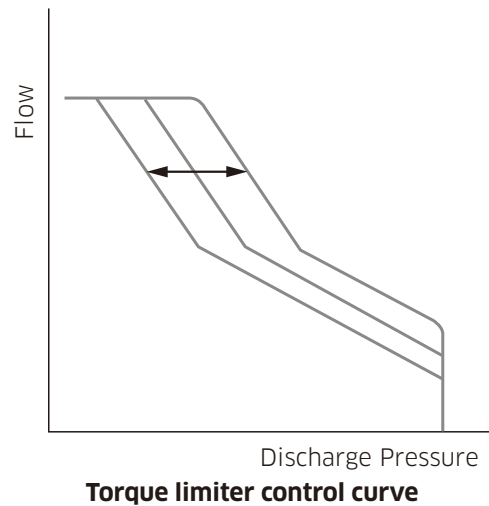
# 2-2 Functional Description of Regulator

### ◆ 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.

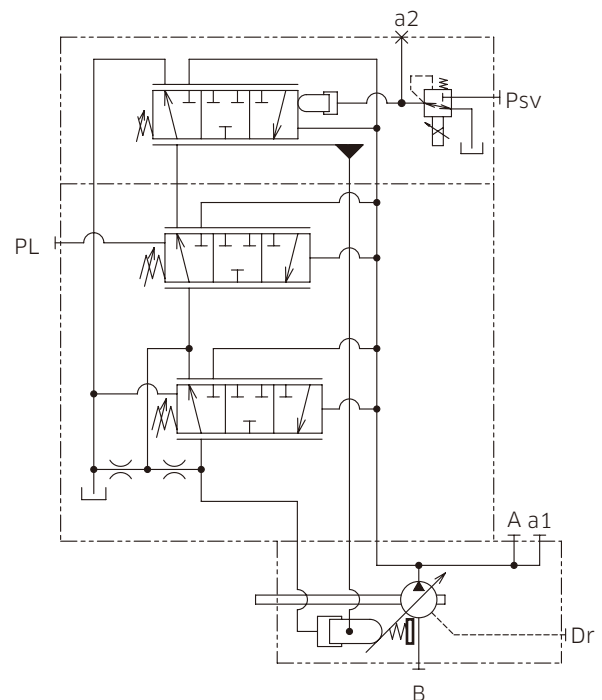
See the table for torque setting according to the external pilot pressure or the input current to the integrated proportional valve. Minimum required servo pressure to the solenoid is 3.5 MPa.

(\*) : 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

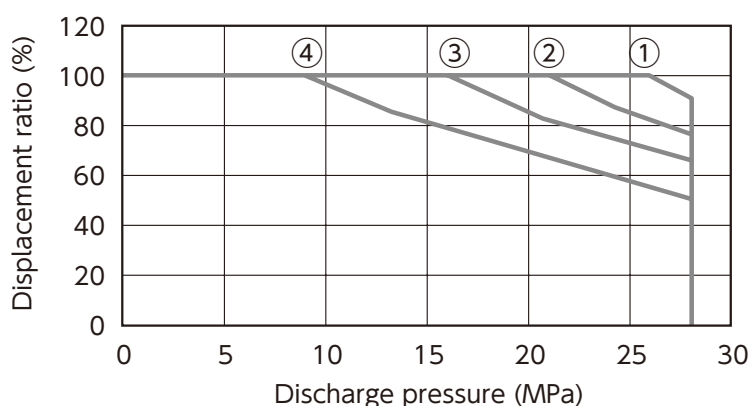
### 2-2 Functional Description of Regulator

#### ◆ Torque Limiter and Power Shift Settings

(Ordering Code [11]: B, C)

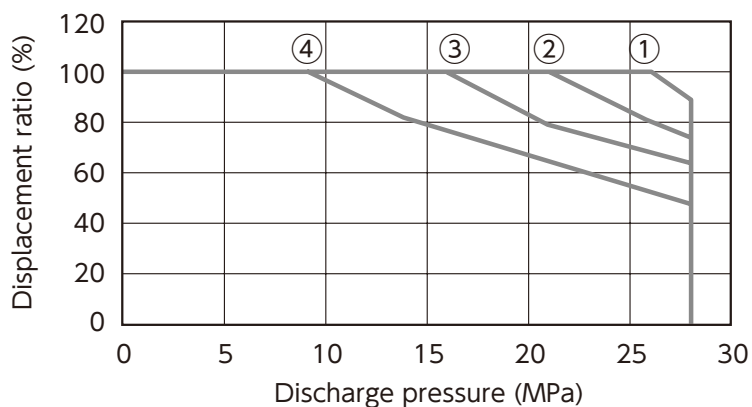
#### ■ Pump Control Curve with Power Shift

##### K3VLS65



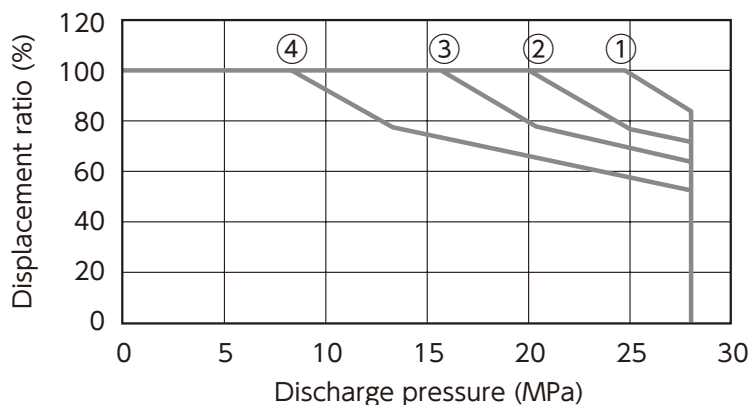
	Ordering code : B	Ordering code : C1, C2, C3	
	Pf (MPa)	Current (mA) 24V / 12V	Input torque (Nm)
①	0	0	290
②	1.0	330 / 830	240
③	2.0	460 / 1,120	210
④	3.3	640 / 1,480	180

##### K3VLS85



	Ordering code : B	Ordering code : C1, C2, C3	
	Pf (MPa)	Current (mA) 24V / 12V	Input torque (Nm)
①	0	0	390
②	1.0	330 / 830	320
③	2.0	460 / 1,120	280
④	3.3	640 / 1,480	240

##### K3VLS105



	Ordering code : B	Ordering code : C1, C2, C3	
	Pf (MPa)	Current (mA) 24V / 12V	Input torque (Nm)
①	0	0	420
②	1.0	330 / 830	350
③	2.0	460 / 1,120	310
④	3.3	640 / 1,480	250

Input torque in the above table is planned valve and for reference.  
Displacement ratio (%) = Displacement / Max. Displacement

# 3

## Dimensions

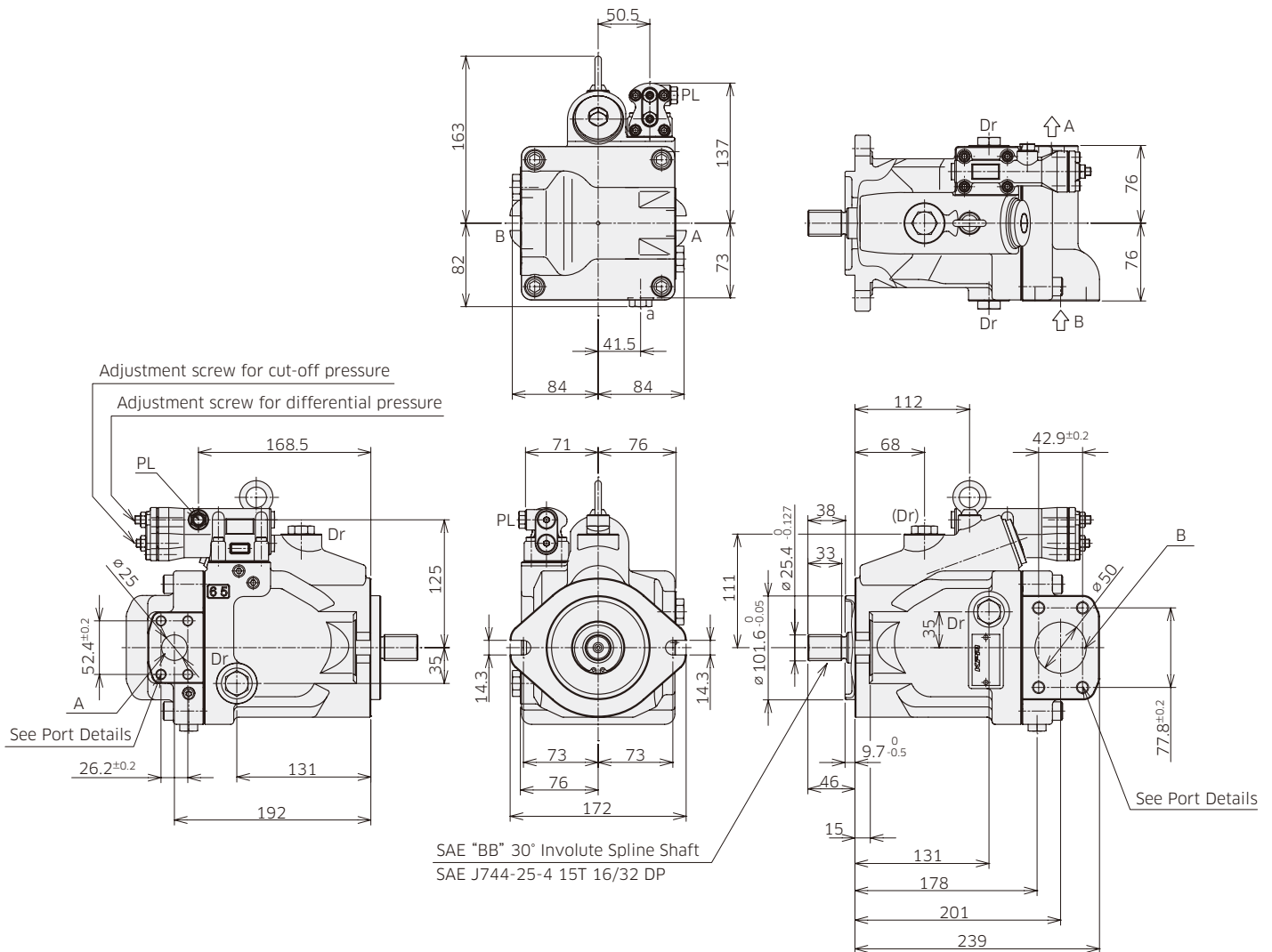
### 3-1 Installation Dimensions

\* 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 \* - LO A



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

### 3. Dimensions

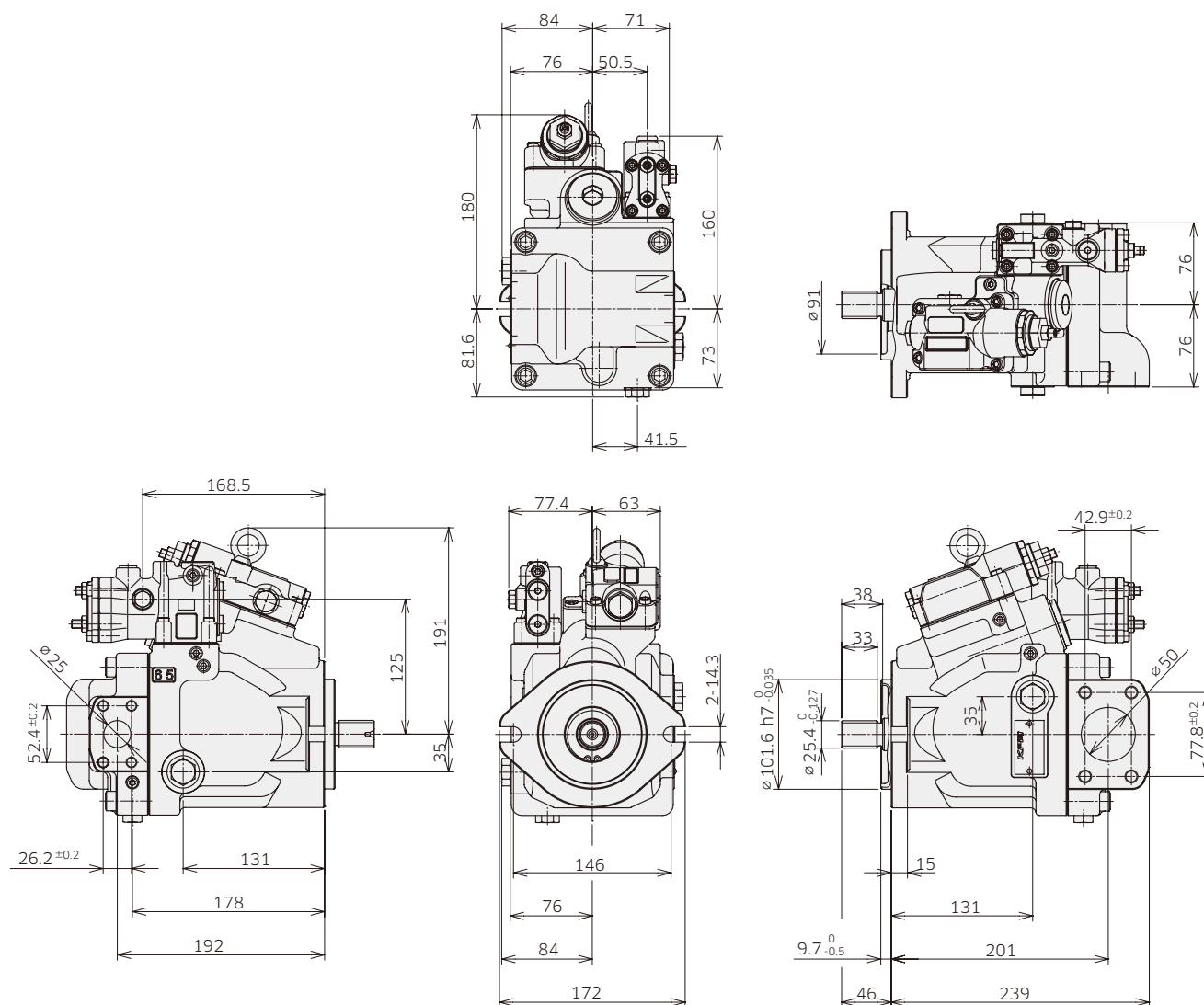
## 3-1 Installation Dimensions

\*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

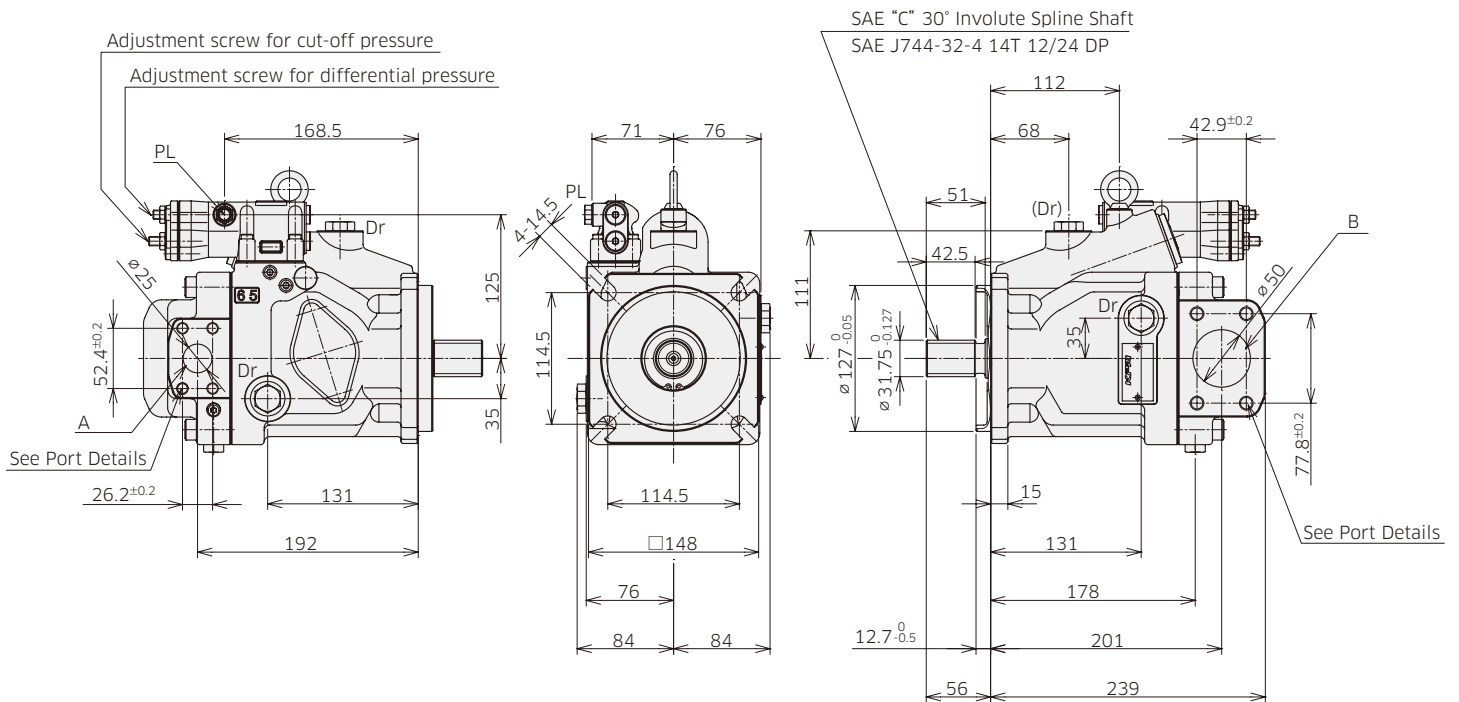
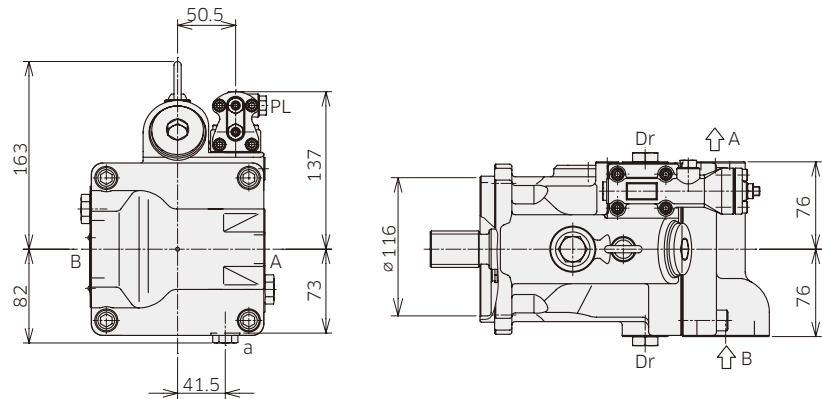
## 3-1 Installation Dimensions

\* 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 \* - LO A



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

### 3. Dimensions

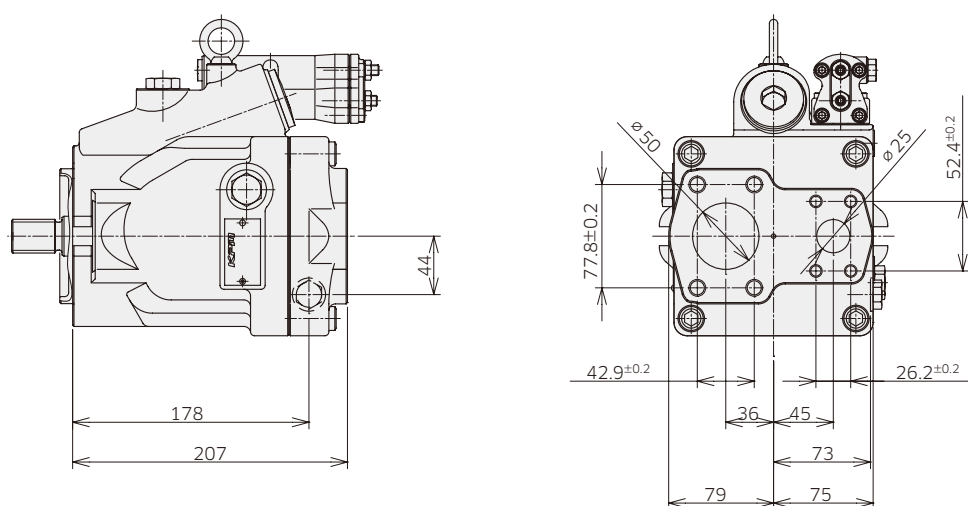
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS65 Rear Port (Clockwise Rotation)

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

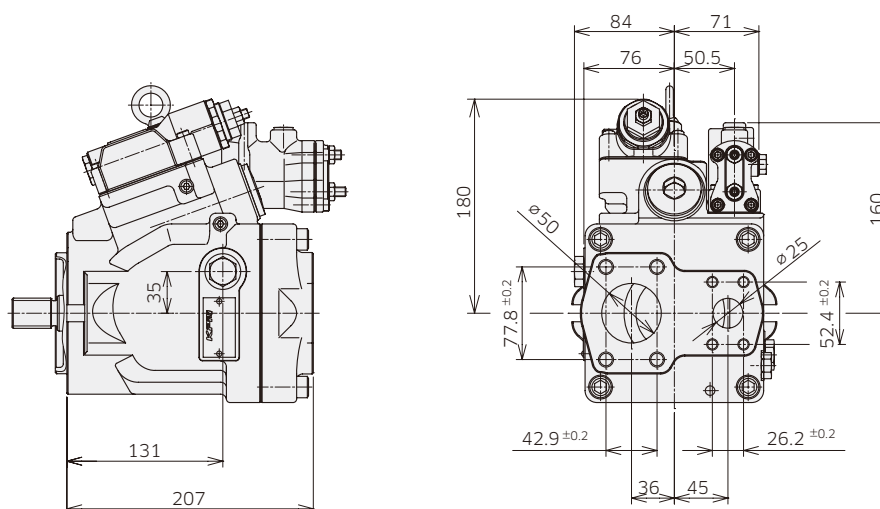
Model Code : K3VLS 65 - 1 R R BB \* - L0 A



### ◆ 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

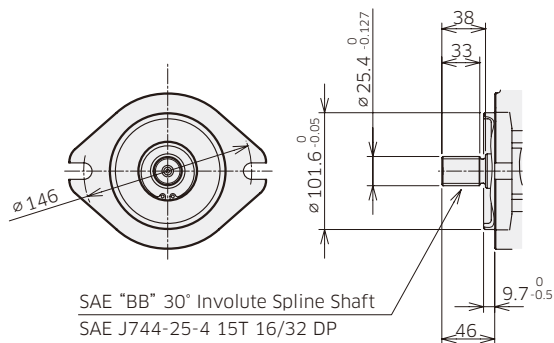
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS65 Mounting Flange and Shaft Options

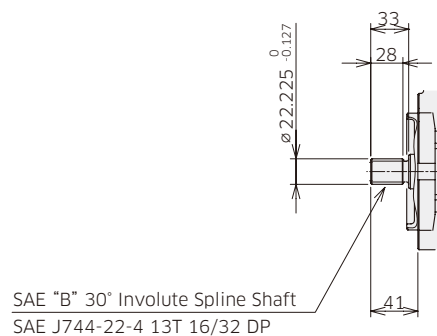
#### SAE BB Spline Shaft

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	9/16-18UNF-2B-12.7 (ISO 11926-1: 1995)	59
Pf	Power shift pressure port	9/16-18UNF-2B-12.7 (ISO 11926-1: 1995)	59



### 3. Dimensions

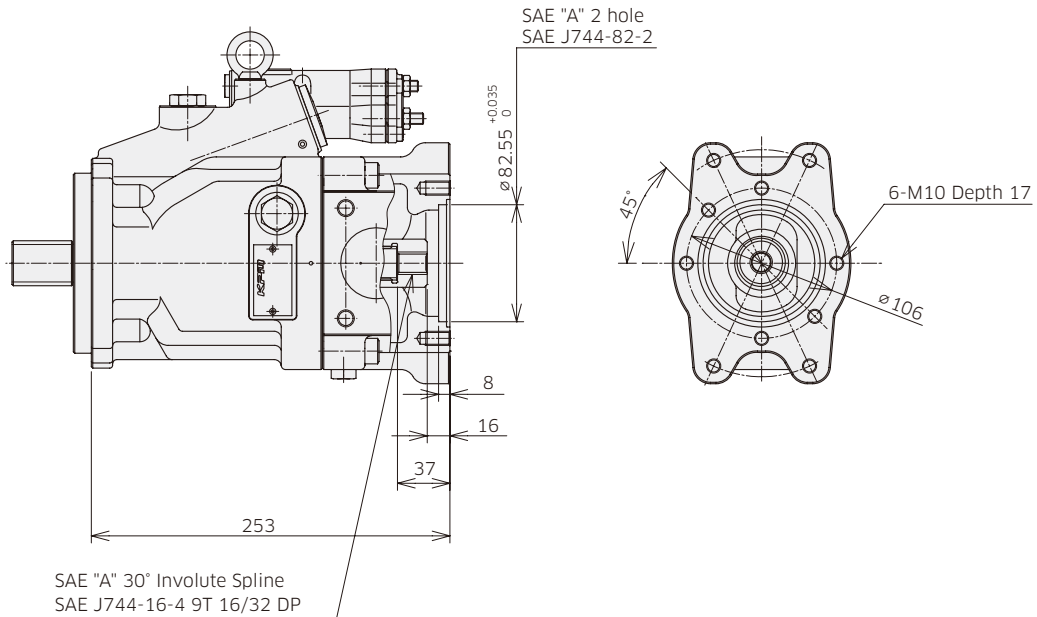
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS65 Through Drive Options

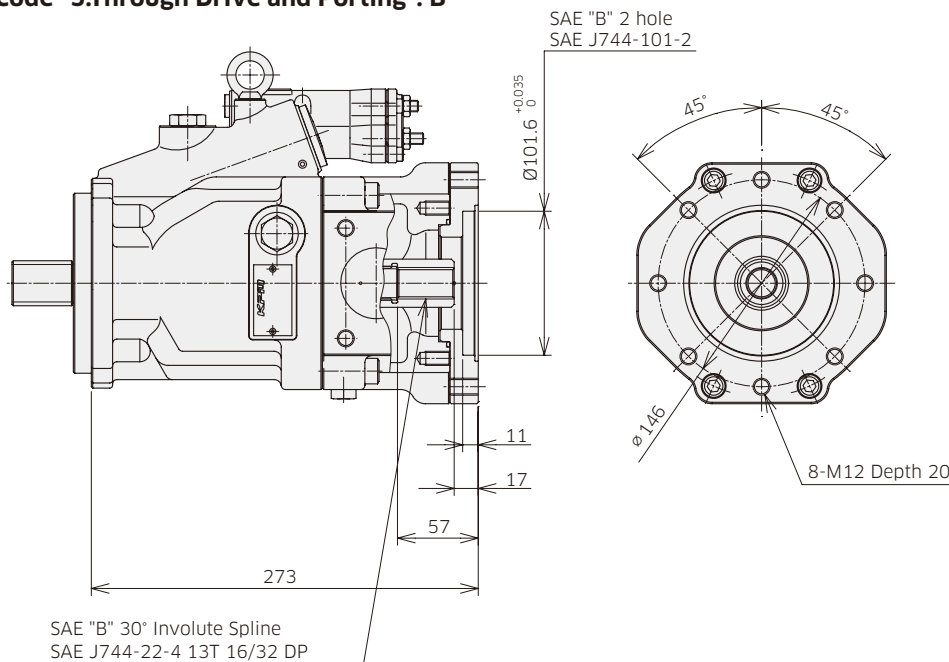
#### Through Drive SAE A

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

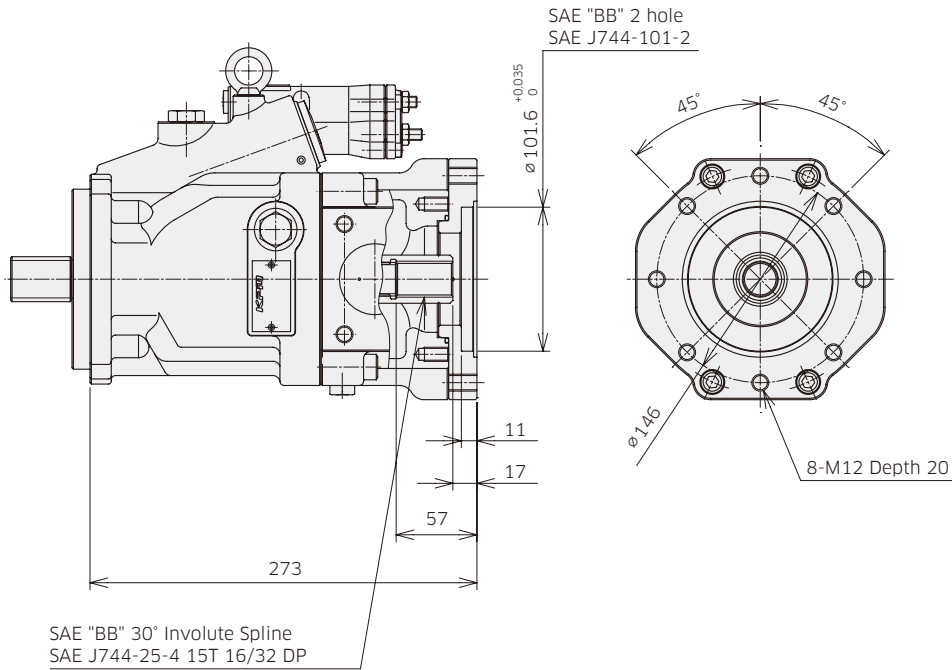
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS65 Through Drive Options

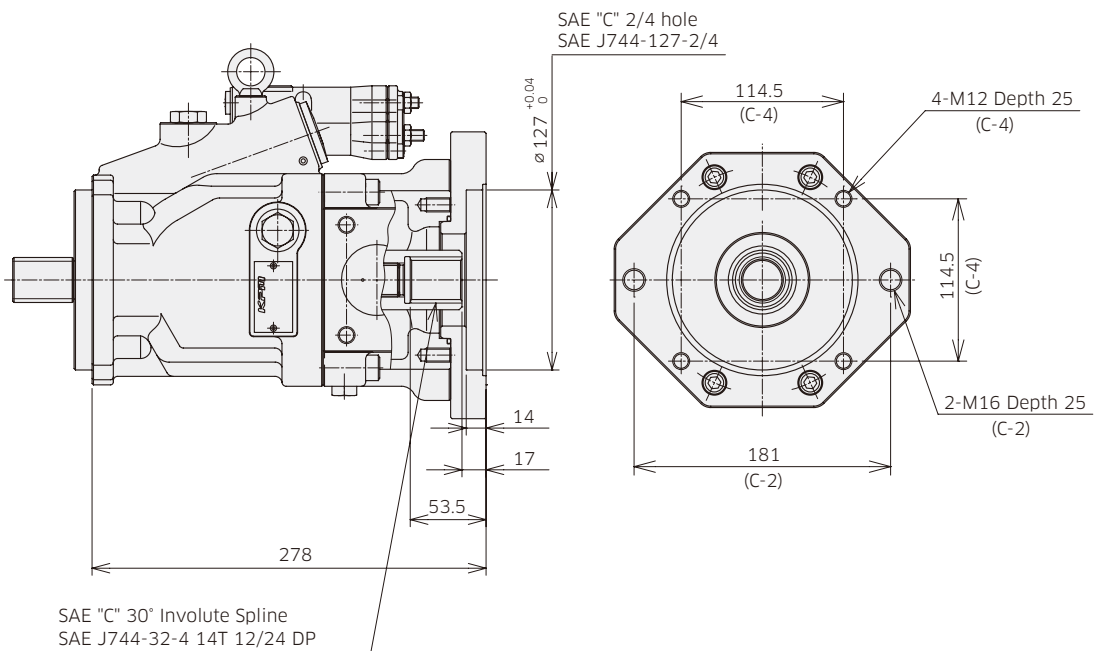
**Through Drive SAE BB**

**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

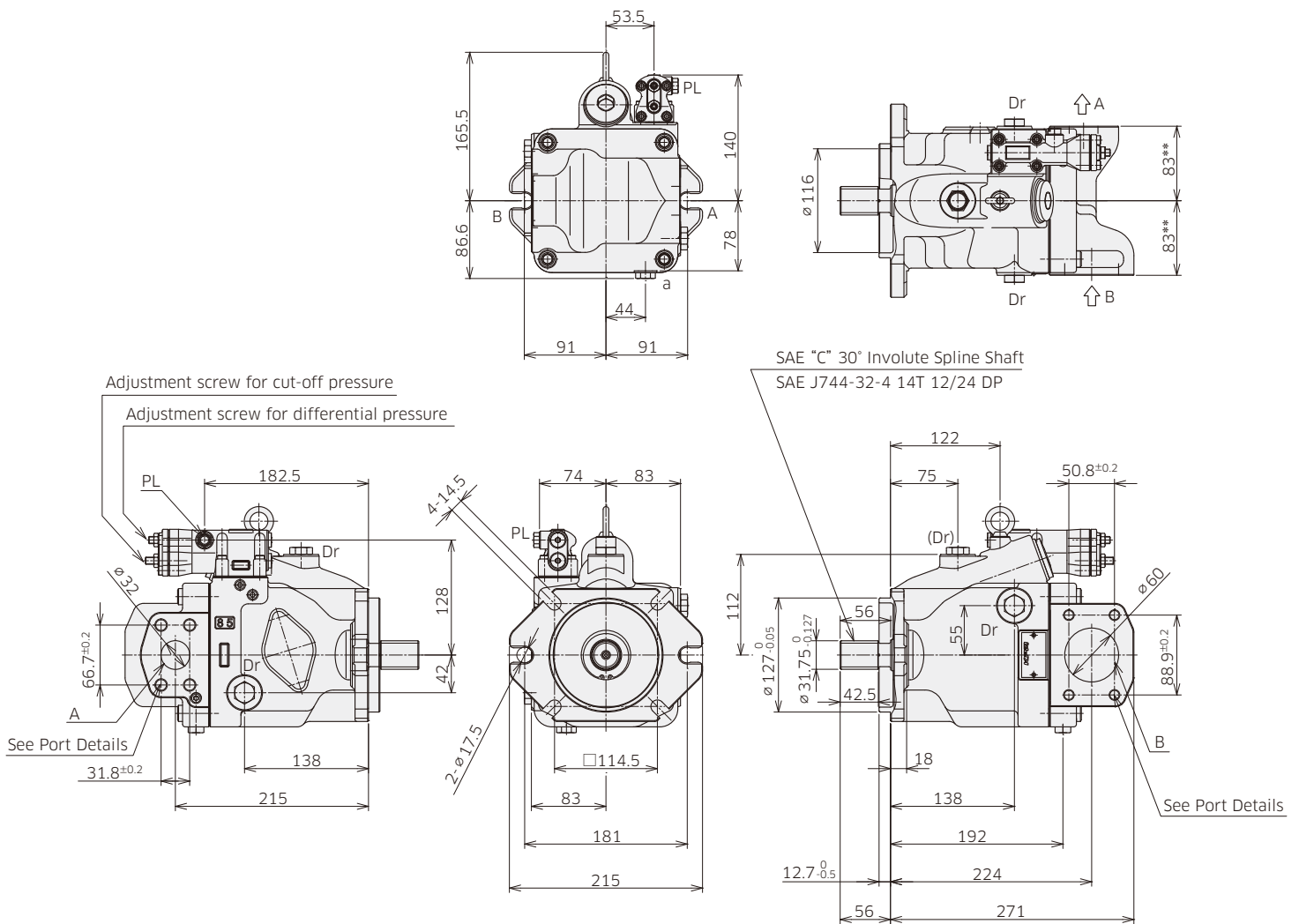
## 3-1 Installation Dimensions

\*Dimensions in mm.

### ◆ K3VLS85 with Cut-off/Load Sense Control (Clockwise Rotation)

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

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



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

(\*\*) With a through drive is 86 mm

### 3. Dimensions

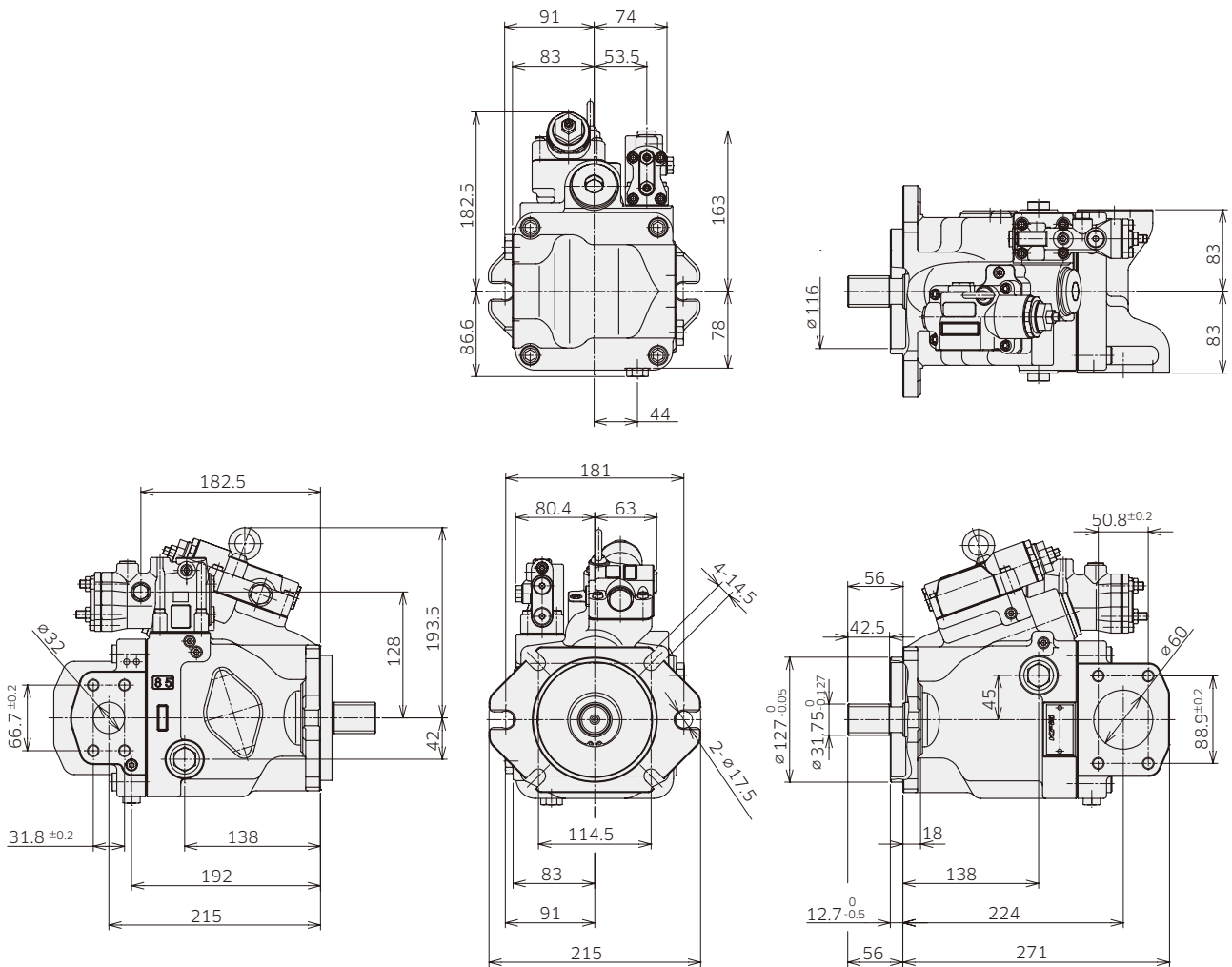
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS85 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

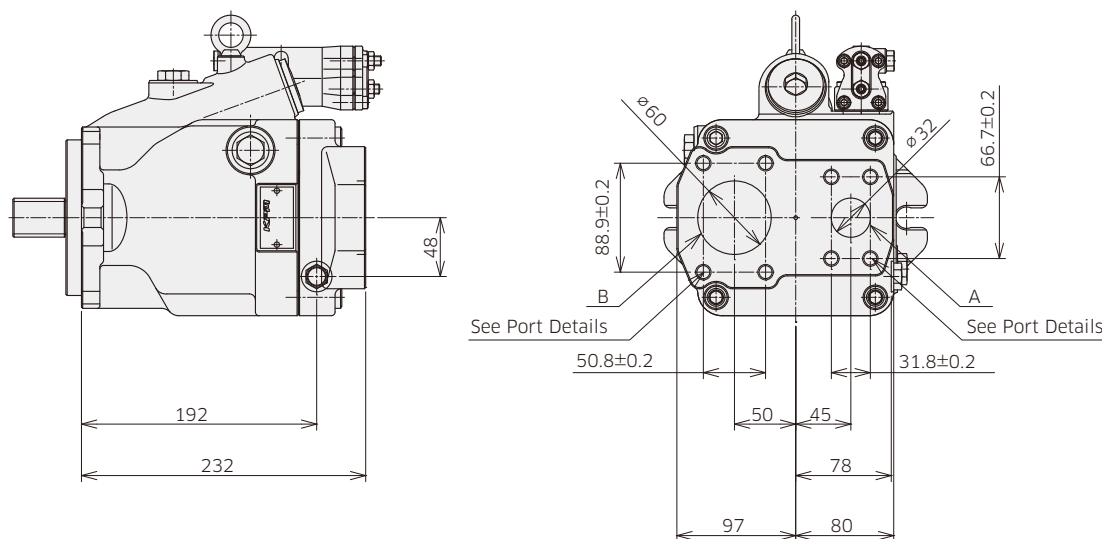
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS85 Rear Port (Clockwise Rotation)

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

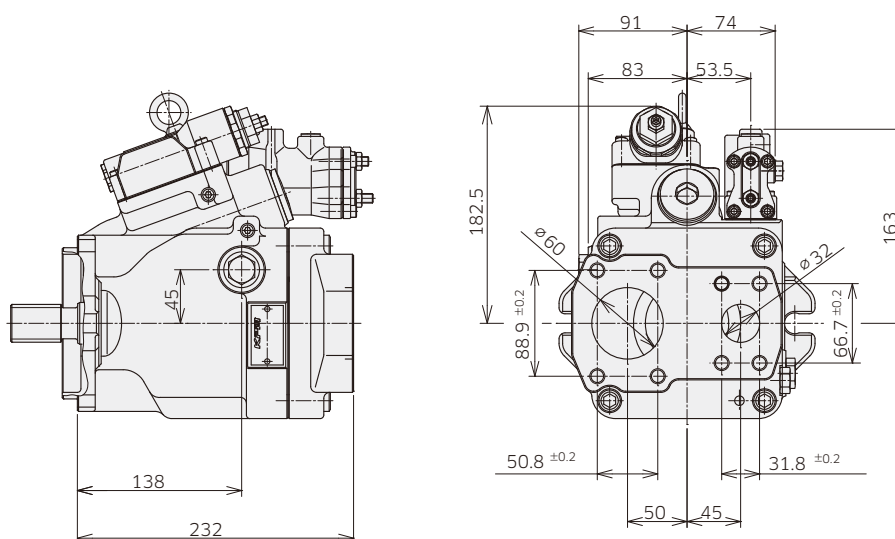
Model Code : K3VLS 85 - 1 R R C \* - L0 A



### ◆ K3VLS85 with Torque Limiter, 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	7/16-20UNF2B-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	9/16-18UNF-2B-12.7 (ISO 11926-1: 1995)	59
Pf	Power shift pressure port	9/16-18UNF-2B-12.7 (ISO 11926-1: 1995)	59

### 3. Dimensions

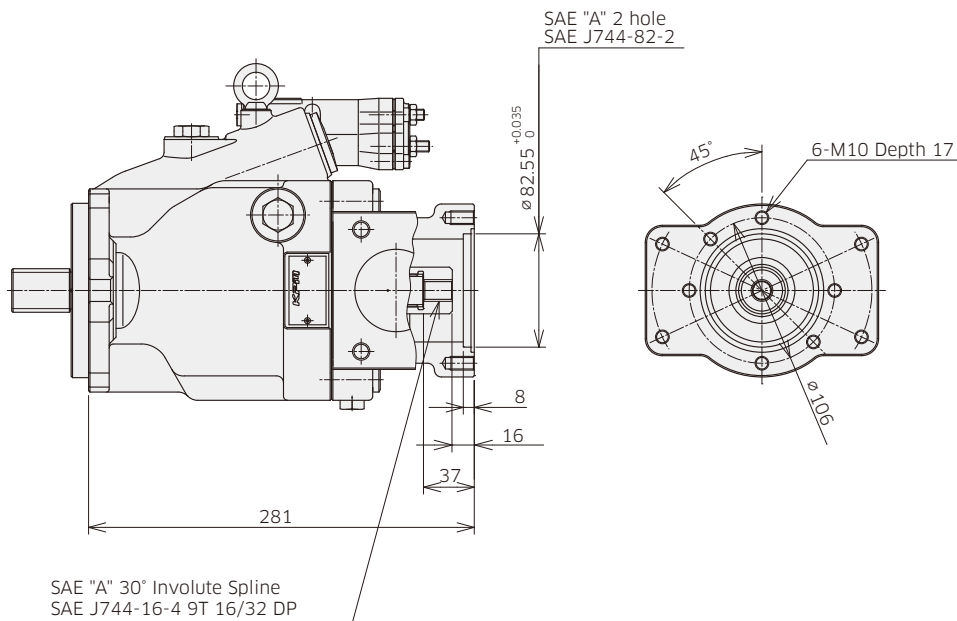
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS85 Through Drive Options

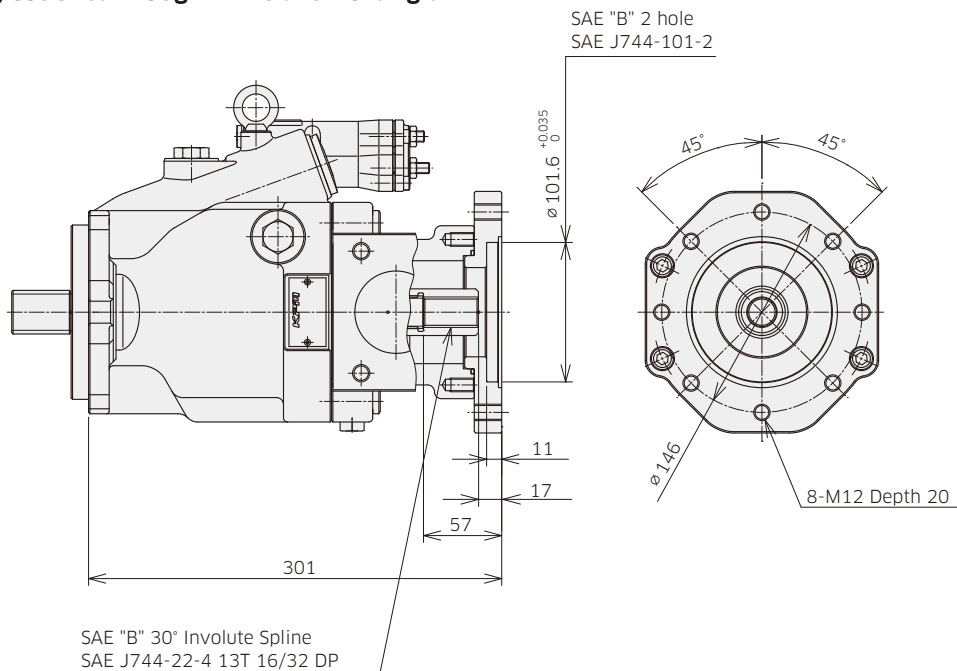
**Through Drive SAE A**

**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

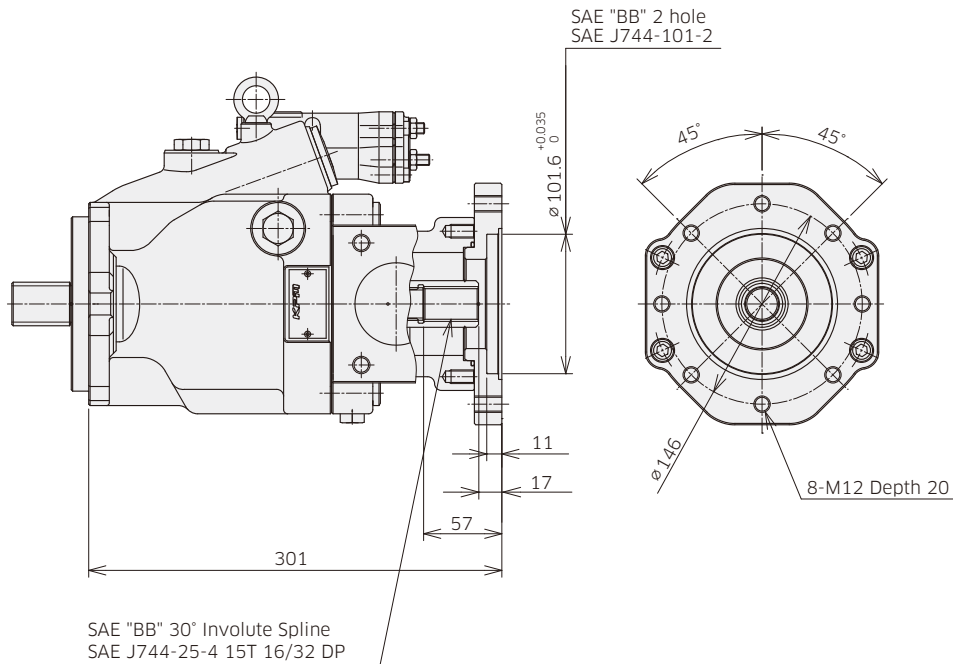
## 3-1 Installation Dimensions

\*Dimensions in mm.

### ◆ K3VLS85 Through Drive Options

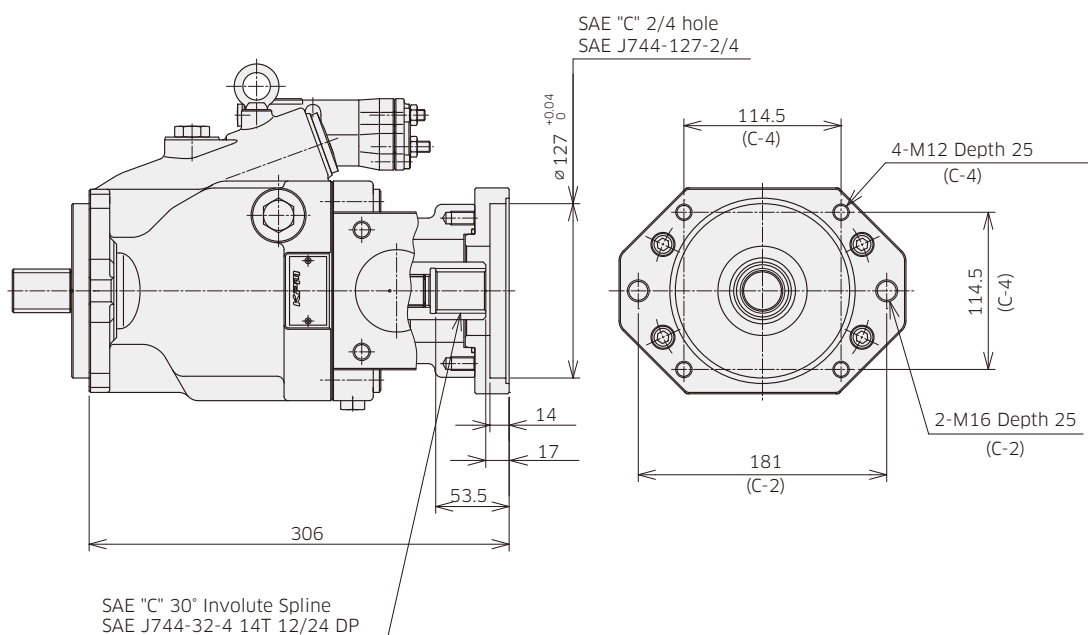
**Through Drive SAE BB**

**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

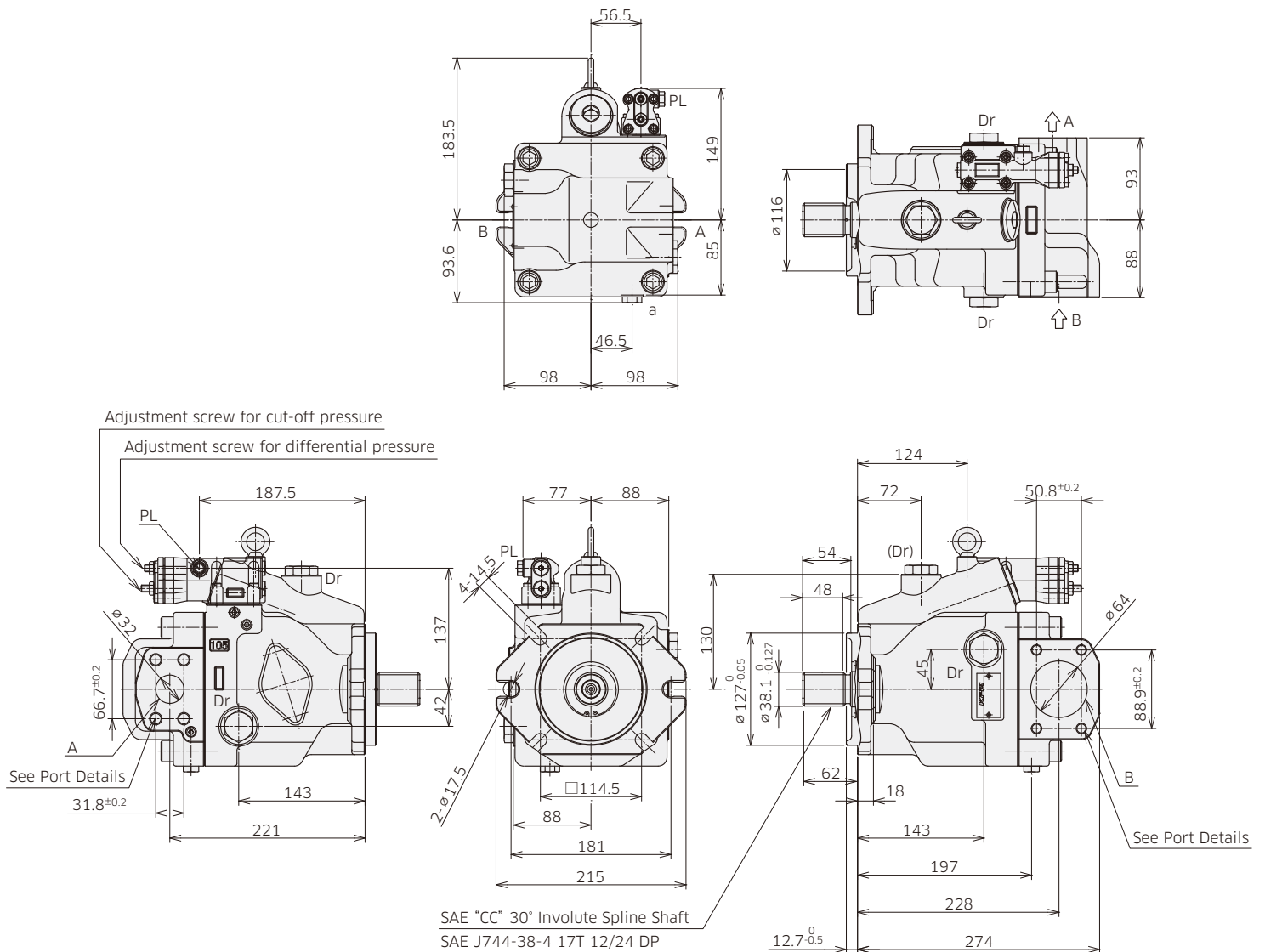
## 3-1 Installation Dimensions

\* 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

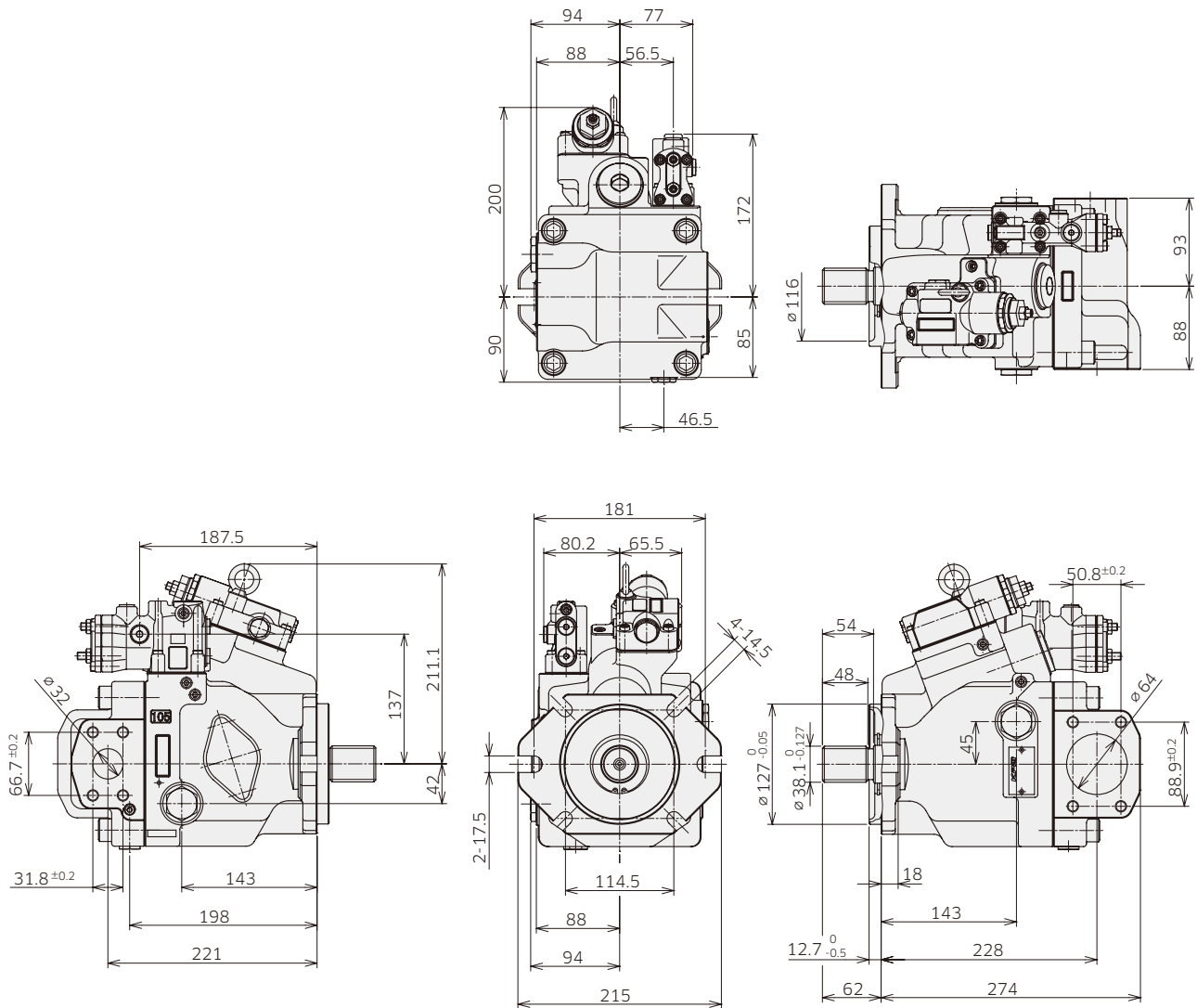
## 3-1 Installation Dimensions

\* 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

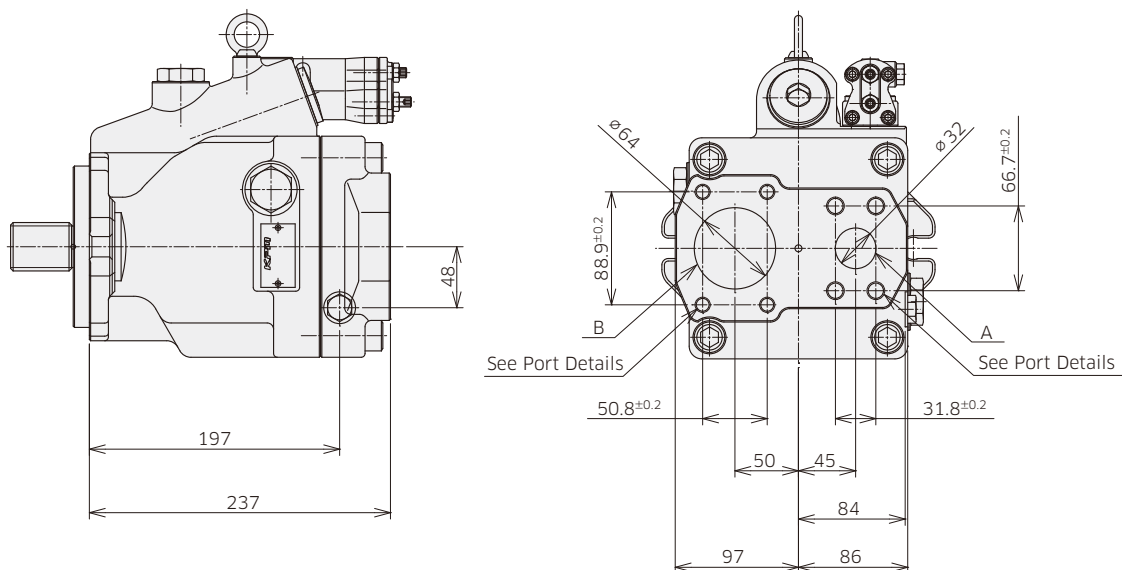
## 3-1 Installation Dimensions

\* Dimensions in mm.

### ◆ K3VLS105 Rear Port (Clockwise Rotation)

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

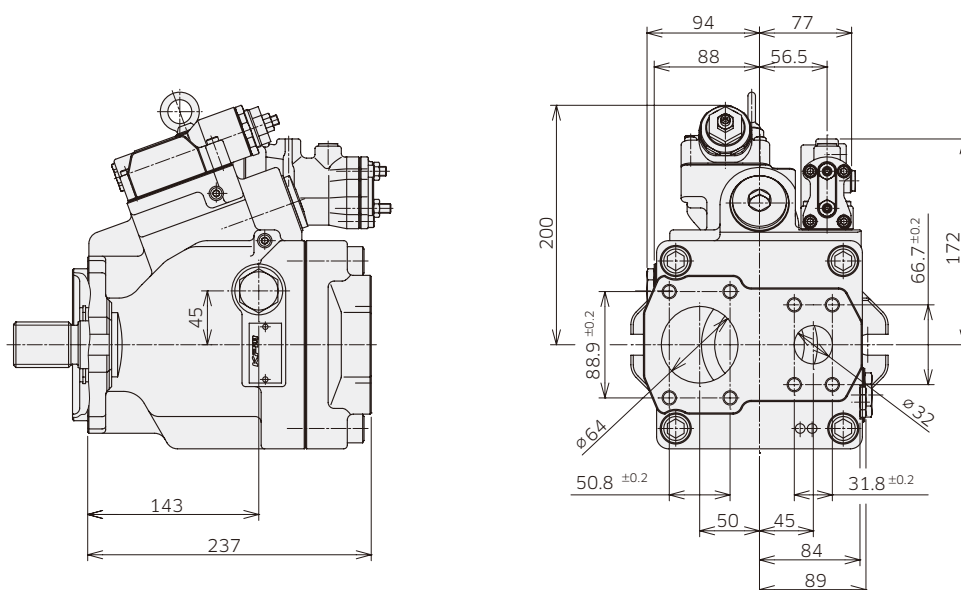
Model Code : K3VLS 105 - 1 R R CC \* - L0 A



### ◆ 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.

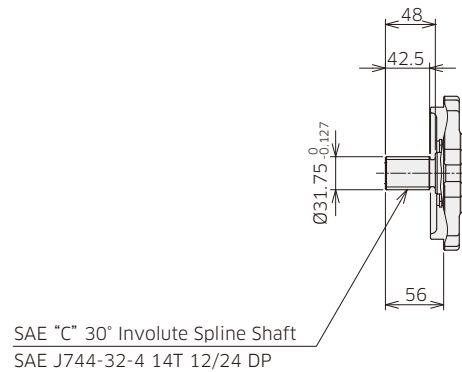
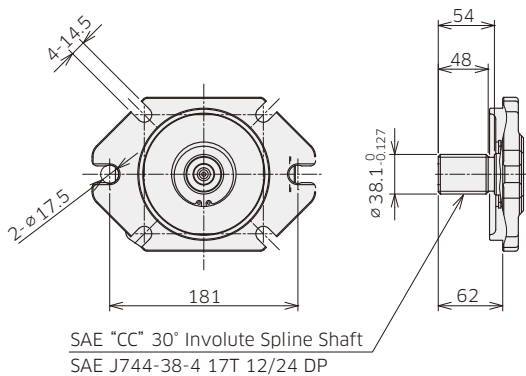
### ◆ K3VLS105 Mounting Flange and Shaft Options

#### 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	157
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	9/16-18UNF-2B-12.7 (ISO 11926-1: 1995)	59
Pf	Power shift pressure port	9/16-18UNF-2B-12.7 (ISO 11926-1: 1995)	59

### 3. Dimensions

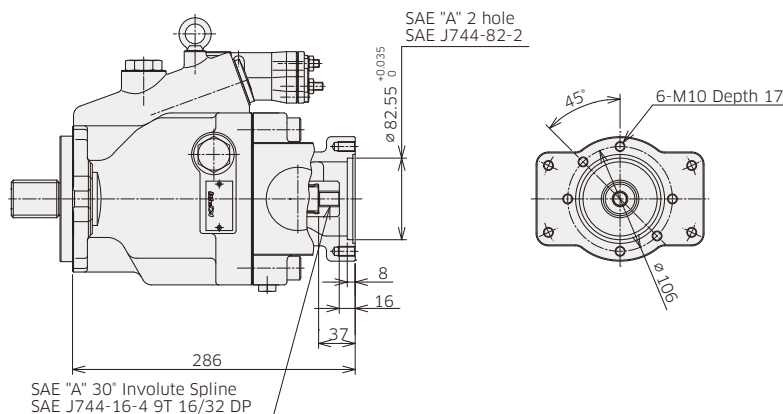
## 3-1 Installation Dimensions

\*Dimensions in mm.

### ◆ K3VLS105 Through Drive Options

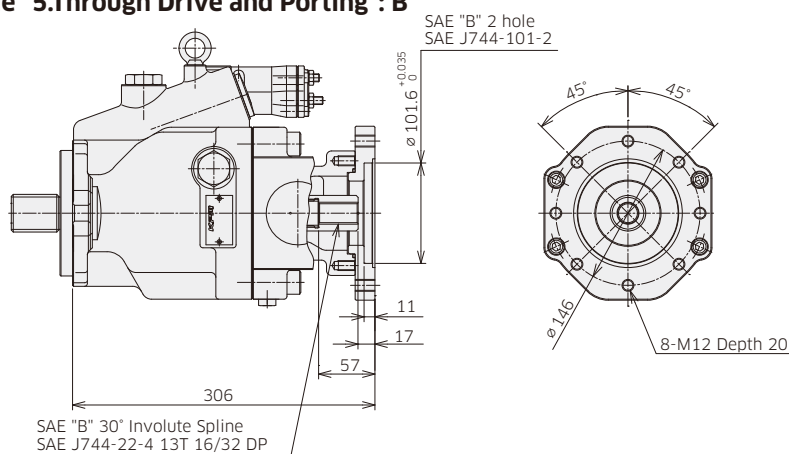
#### Through Drive SAE A

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



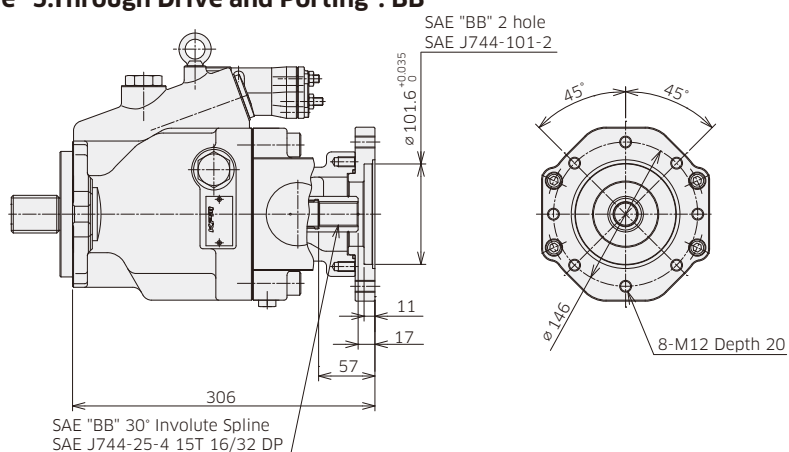
#### Through Drive SAE B

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

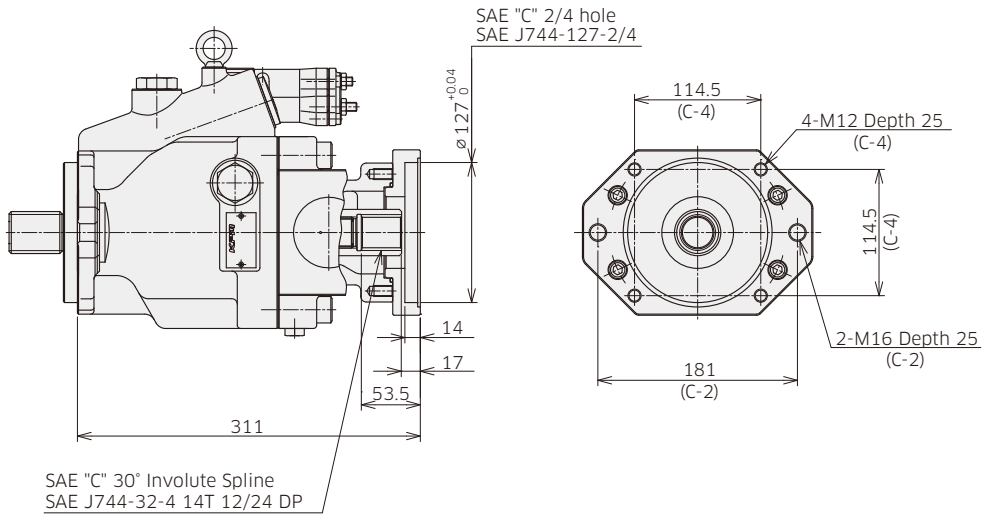
## 3-1 Installation Dimensions

\*Dimensions in mm.

### ◆ K3VLS105 Through Drive Options

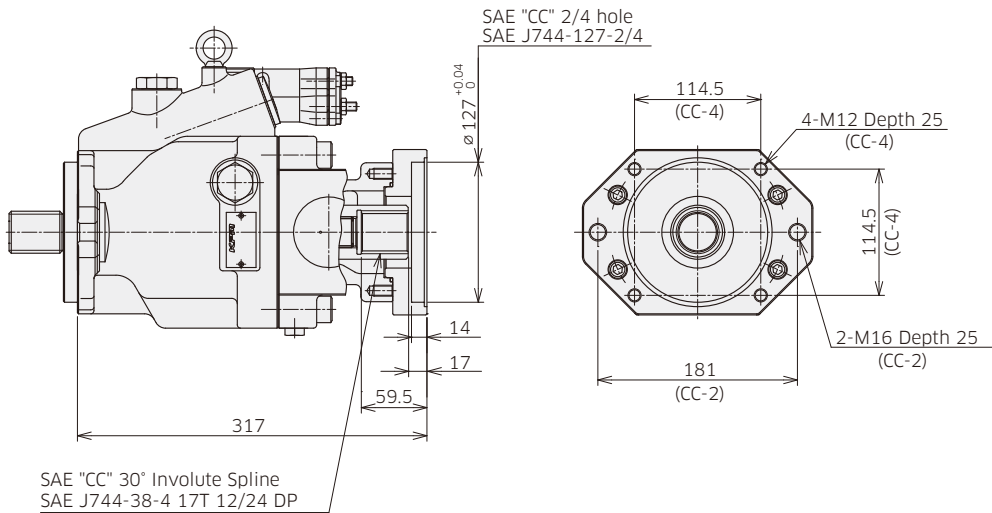
**Through Drive SAE C**

**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.

	K3VLS65		K3VLS85		K3VLS105	
	SAE B mount	SAE C mount	SAE C-2 mount	SAE C-4 mount	SAE C-2 mount	SAE C-4 mount
Allowable mass moment $T_m$ (Nm) (dynamic acceleration of 10G)	301	463	408	378	419	394

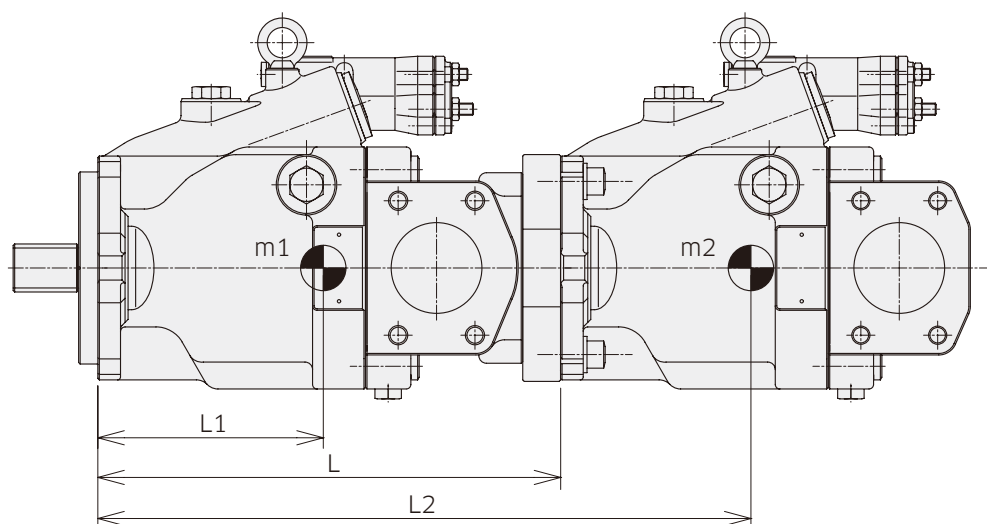
#### ■ Calculation formula for mass moment

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

$m_1, m_2, m_3 \dots$  : 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		65 SAE B mount	65 SAE C mount	85	105
Without through drive, side ported	Total length L (mm)		239	239	271	274
	Center of gravity L1 (from mounting face: mm)		117	113	126	131
	Weight (kg)	with torque limiter	28	29	35	41
		without torque limiter	25	26	31	37
Without through drive, rear ported	Total length L (mm)		207	207	232	237
	Center of gravity L1 (from mounting face: mm)		111	108	120	124
	Weight (kg)	with torque limiter	27	28	33	39
		without torque limiter	24	25	29	35
SAE A	Total length L (mm)		253	253	281	286
	Center of gravity L1 (from mounting face: mm)		129	126	137	138
	Weight (kg)	with torque limiter	31	32	38	43
		without torque limiter	28	29	34	39
SAE B SAE BB	Total length L (mm)		273	273	301	306
	Center of gravity L1 (from mounting face: mm)		143	143	150	150
	Weight (kg)	with torque limiter	34	35	41	46
		without torque limiter	31	32	37	42
SAE C SAE CC	Total length L (mm)		–	278	306	311
	Center of gravity L1 (from mounting face: mm)		–	138	149	149
	Weight (kg)	with torque limiter	–	35	41	46
		without torque limiter	–	32	37	42



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	Kawasaki feed back
Pump Size	2	65 <input type="checkbox"/>	
		85 <input type="checkbox"/>	
		105 <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 C 2/4 bolt Through Drive, Side Ported <input type="checkbox"/>	
		CC : SAE CC 2/4 bolt Through Drive, Side Ported (for K3VLS105) <input type="checkbox"/>	
		N : With Through Drive Shaft, Without Coupling, Closed with Steel Cover, Side 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 K3VLS65) <input type="checkbox"/>	
		BB : SAE B Mount & SAE BB Spline (for K3VLS65) <input type="checkbox"/>	
		C : SAE C Mount & SAE C Spline (for K3VLS65 / 85 / 105) <input type="checkbox"/>	
		CC : SAE C Mount & SAE CC Spline (for K3VLS105) <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 - off	
		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 14)	10	A : Standard Setting Range (1.0 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	** : For Torque Limiting Refer To Horsepower Setting Code	

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

Request Volume	Request Delivery Date	Note





## **Kawasaki Heavy Industries, Ltd.**

### **Precision Machinery Company**

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