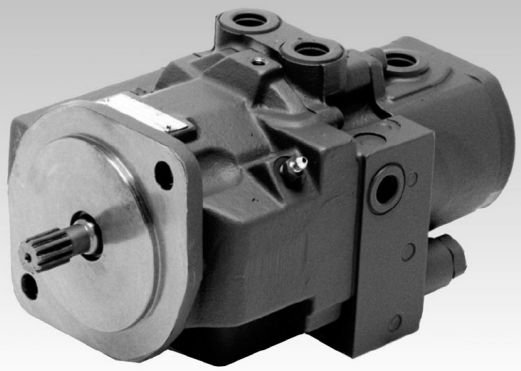
RJ B1015E/12.04 1/12

Variable double pump AP2D

Open Circuit



Size 12...36
Series 20 / 30
Axial piston swashplate design
Nominal pressure 24.5 / 31.4 [1]) MPa
[1]) size 36 only

Contents

Features

- Variable displacement pump AP2D for mini excavator has many regulatots available to special needs of this application.
- Double pump with one cylinder block
- Compact design
- Constant power control regulator for effective use of input power
- Optional :
  with power shift depend on third pump's pressure
- Through drive possibility for mounthing third pump or pilot pump
- Optional :
  Built in solenoid valve for pilot line or low pressure relief valve

Ordering code / Standard Program

AP2D		LV		R	S	7

Axial piston unit
double pump by one cylinder-block swashplate design for open circuits

Size

Displacement Vgmax		
	12.0 cm^3 X 2	**12**
	18.0 cm^3 X 2	**18**
	25.0 cm^3 X 2	**25**
	37.0 cm^3 X 2	**36**

Control device

Constant power control (direct control type)	**LV**

Series

	12	18	25	36	
Series 20	-	-	●	-	**2**
Series 30	●	●	-	●	**3**

Direction of rotation

viewed on shaft end	clockwise	**R**

Shaft end

SAE splined shaft	**S**

Port plate

Side port and through drive [1])	**7**

[1]) suction port : SAE flange connection, pressure ports : G thread(JIS B2351) connection

● : available − : not available

If a third pump and or pilot pump are factory mounted,
both ordering codes must be combind with "+".

Ordering example

"AP2D"ordering code + GSP2-□ + trochoid pump(or G1) -□

□ pump size for GSP2 gear pump

□ pump size for trochoid pump(or G1)

Require data for Ordering (Customer information : example)

No. of pumps		P_1, P_2	P_3	P_4
Type		AP2D18LV3RS7	GSP2-08	Trochoid pump
Displacement	cm^3	16 X 2	8.6	5.1
Operating pressure	MPa	24.5	20.0	3.4
Speed	min^{-1}	2400		
Flow	L/min	38.4 X 2	20.6	12.2
Power	kW	19		
Torque	Nm	77		

Technical Data

Fluid

Prior to project design, please see our data sheets RE 90220 (mineral oil) for detailed information on fluids and application conditions. When using ecologically acceptable fluids attention must be paid to possible limitations of the technical data.
If necessary please contact us.

Operating viscosity range

For optimum efficiency and service life we recommend that the operating viscosity (at oprating temperature) be selected in the range

vopt = opt. operating viscosity 16...36 mm^2/s

depending on the circuit temperature(open loop circuit).

Limits of viscosity range

The following limits are valid for extreme operating conditions:

vmin = 10 mm^2/s
short term

at a max. permissible oil temperature of 90 °C.
Please note, that the max. fluid temperature of 115 °C is also not exceeded in certain areas (for instance bearing area). The temperature in the bearing area is approx. 5 K higher than average leakage fluid temperature.

vmax = 1000 mm^2/s
short term
on cold start
(tmin = p ≤ 3 MPa, n ≤ 1000 min^{-1}, – 40 °C).

At temperatures between -25 °C and -40 °C special measures may be required for certain installation positions. Please contact us for further information.

Notes on the selection of hydraulic fluid

In order to select the correct fluid, it is necessary to know the operating temperature in the tank (open circuit) in relation to the ambient temperature.
The hydraulic fluid should be selected so that within the operating temperature range, the viscosity lies within the optimum range (vopt.); see shaded section of the selection diagram. We recommend that the higher viscosity grade is selected in each case.
Example: at an ambient temperature of X°C the operating temperature in the tank is 60 °C. In the optimum viscosity range vopt (shaded area), this corresponds to viscosity grades VG 46 or VG 68, VG 68 should be selected.
Important: The leakage oil temperature is influenced by pressure and speed and is typically higher than the tank temperature.However max. temperature at any point in the system may not exceed 90 °C.

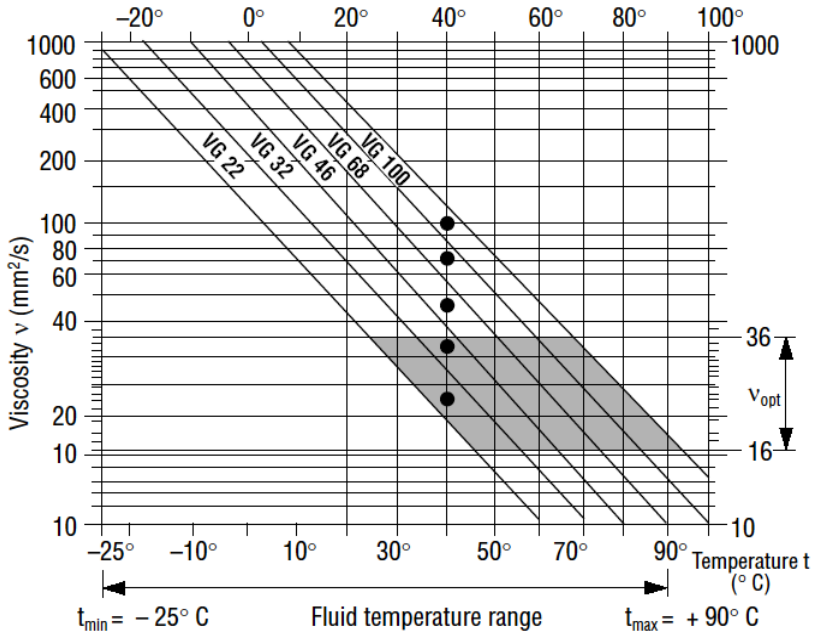
Filtration of fluid

The finer the filtration, the better the achieved cleanliness of the fluid and the longer the life of the axial piston unit.
To ensure a reliable functioning of the axial piston unit, a minimum cleanliness of
20/18/15 acc. to ISO 4406 is necessary.
If the above cleanliness classes cannot be met please consult us.

Installation

Before commissioning, fill axial piston pump via the highest leakage oil port

Selection diagram



Technical data

Operating pressure range

Nominal pressure p max 31.4 MPa (Size 36)
24.5 MPa (Size 12, 18, 25)

Table of values (theoretical values, without considering ηmh and ηv : values rounded)

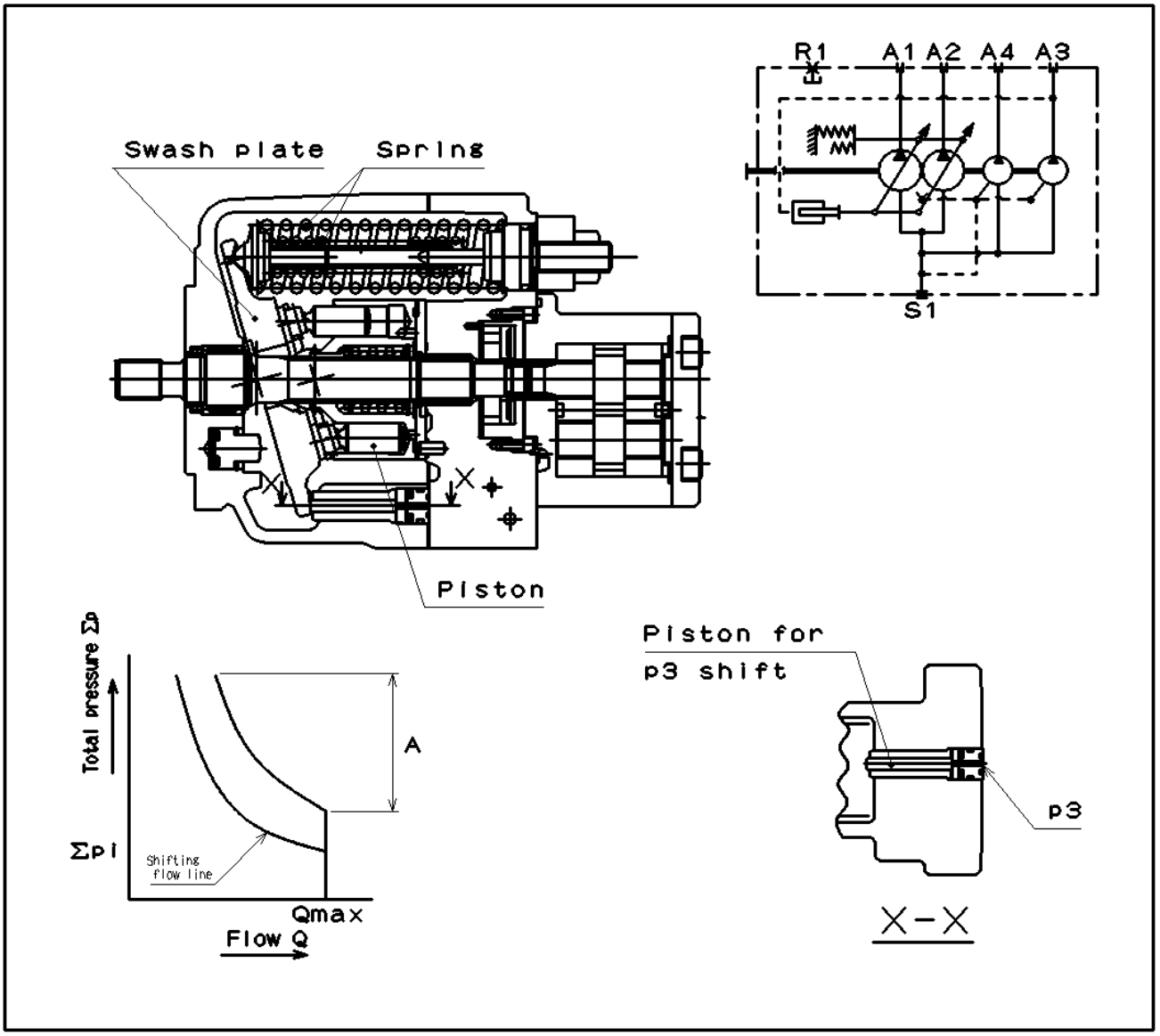
Size			**12**	**18**	**25**	**36**
Series			30	30	20	30
Displacement	$V_{g\,max}$	cm^3	2X12	2X18	2X25	2X37
Speed	n_{max}	min^{-1}	2800	2600	2600	2200
Flow	q_{max}	L/min	2X33.6	2X46.8	2X65.0	2X81.4
Power	P_{max}	kW	16	19	36	37
Torque	T_{max}	Nm	61.9	75.5	154.9	160.6
Approx. weight [1])	m	kg	14	19	27	45

[1]) without additional function, without gear pump

Third pump, pilot pump (gear pump)

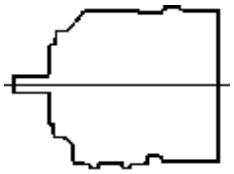
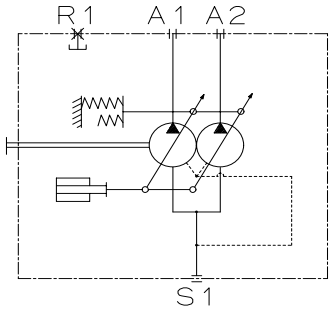
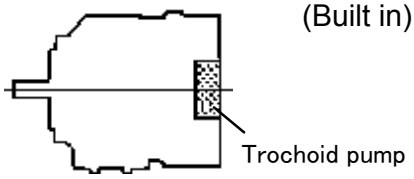
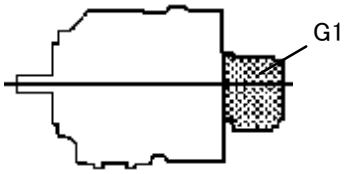
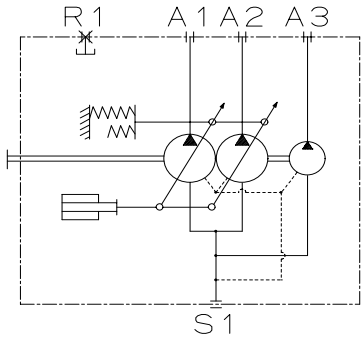
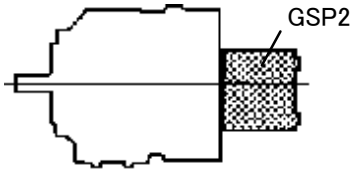
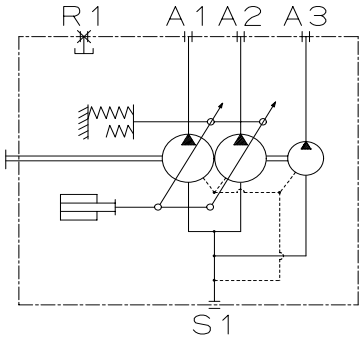
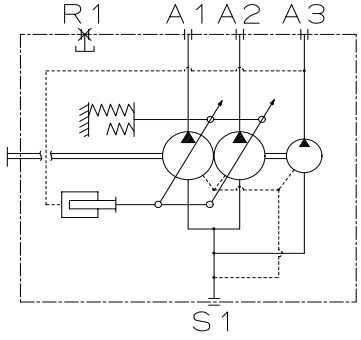
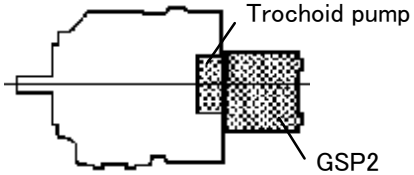
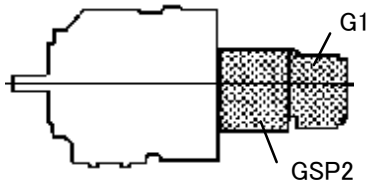
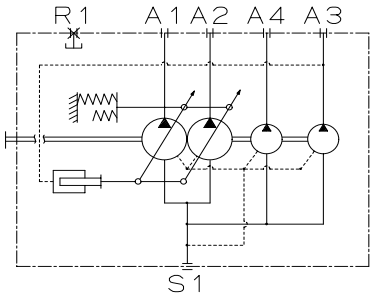
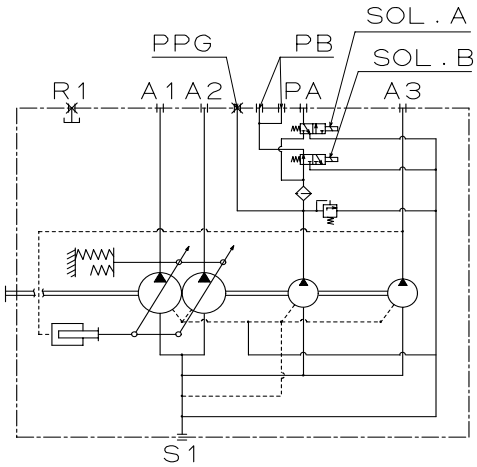
Type GSP2 for all AP2D	Size		**04**	**06**	**08**	**12**	**16**	**22**
	Displacement	cm^3	4.5	6.5	8.6	12	16	22
	Norminal Pressure	MPa	25	25	25	25	25	17
	Weight kg	without front flame	3.6	3.6	3.6	4.2	4.2	4.7
		with front flame	4.6	4.6	4.6	5.2	5.2	5.7
Trochoid pump for size 12, 18, 25	Size		**5.1**	**6.5**				
	Displacement	cm^3	5.1	6.5				
	Norminal Pressure	MPa	3.9	3.9				
	Weight kg	without front flame	-	-				
		with front flame	(built in type)					
Type G1 for size 36	Size		**6**	**9**	**10**			
	Displacement	cm^3	6.5	8.9	10.7			
	Norminal Pressure	MPa	4.9	4.9	4.9			
	Weight kg	without front flame	0.7	0.9	0.9			
		with front flame	1.0	1.2	1.2			

LV - Constant power control with power shift



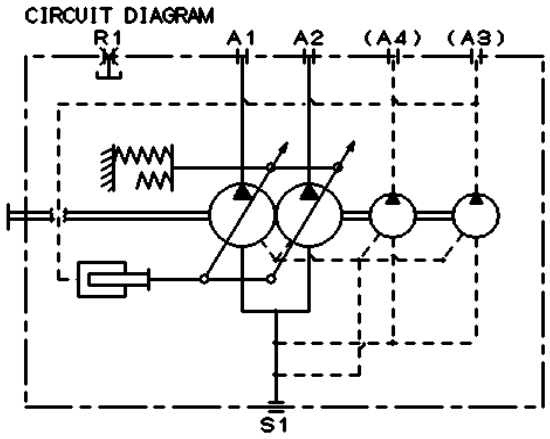
- The delivery pressure p1 and p2 are directed to the piston which slides on the swash plate, and acts on the swash plate.
- The spring is provided to act against the delivery pressure.
- When the oil pressure via piston acting on the swash plate is less than the installation load of the spring, the swash plate is fixed to the maximum tilting position.
- When the oil pressure via piston acting on the swash plate exceeds the installation load of the spring, the swash plate is tilted and kept tilted at a position where the oil pressure is balanced with the spring force. (Region A in above figure)
- When the p3 oil pressure acts on the shift piston, the control shifting line is shifted.

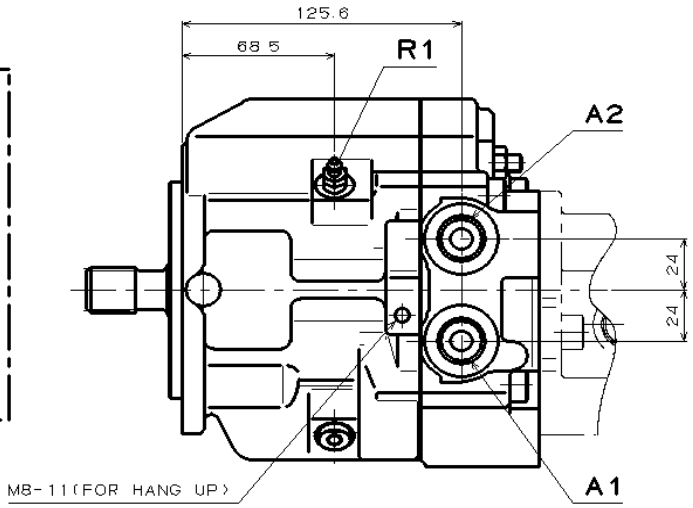
Description & Symbols

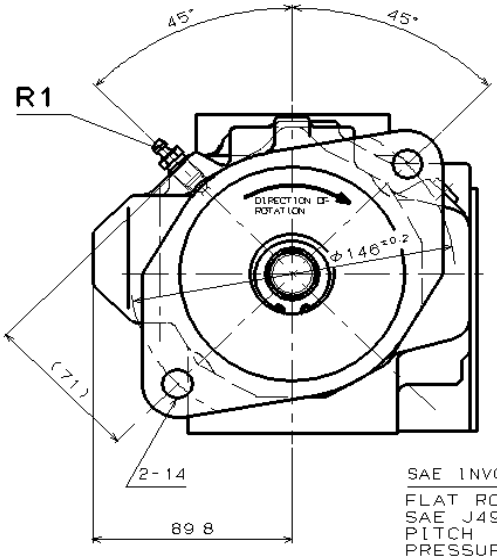
Description	Symbol
AP2D (double pump only) 	
AP2D + Trochoid pump (Built in)  AP2D + G1 gear pump 	
AP2D + GSP2 gear pump 	with power shift  
AP2D (Built in) + GSP2 + Trochoid pump  AP2D + GSP2 + G1 	with power shift  Full equipments type 

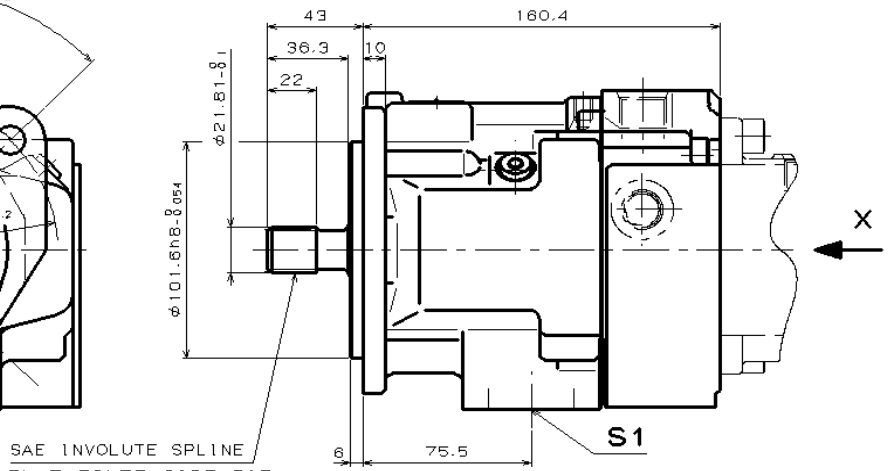
Unit dimensions size 12

Please request a certified installation drawing before finalizing your design.

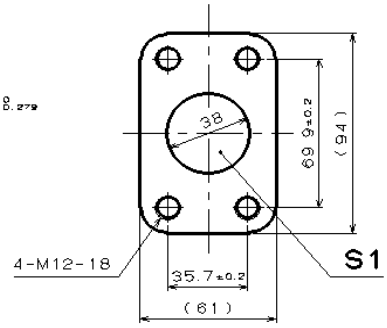


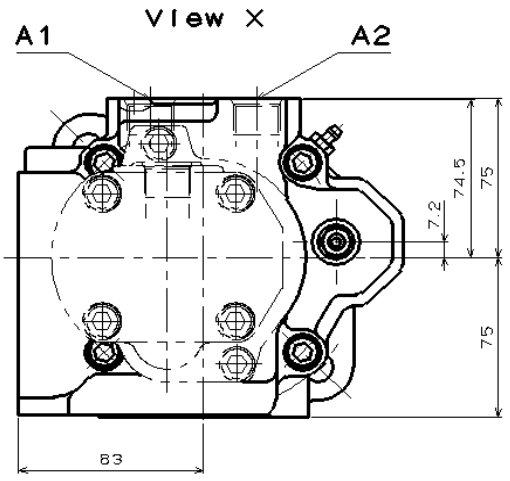






FLAT ROUTE SIDE FIT
SAE J498b.CLASS 1
PITCH : 16/32
PRESSURE ANGLE : 30°
NO.OF TEETH : 13
MAJOR DIA : 21.8
MINOR DIA : 18.631





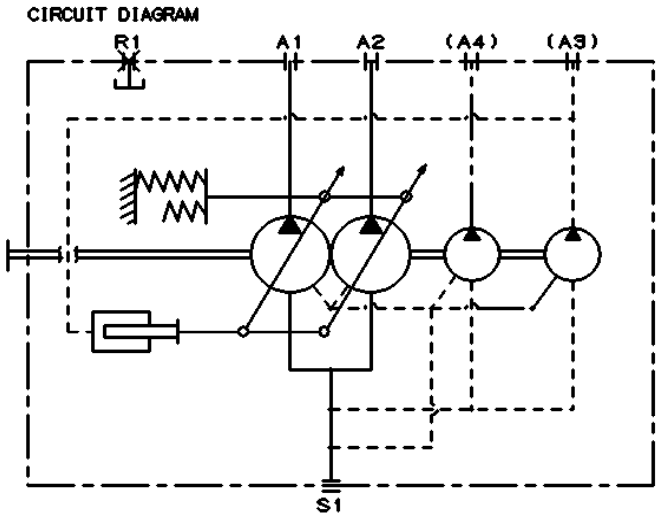
Ports

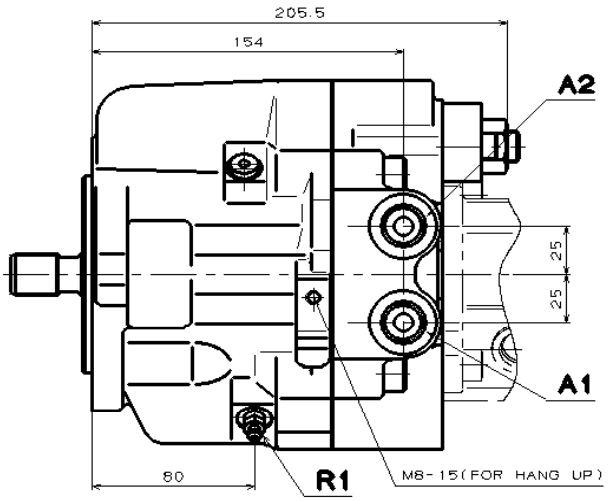
A1, A2	Pressure ports	G1/2-17 (JIS B2351 Type O)
S1	Suction port	SAE 1 1/2 (Standard pressure range)
R1	Air vent port	M10 X 1.0 (with air bleeder valve)

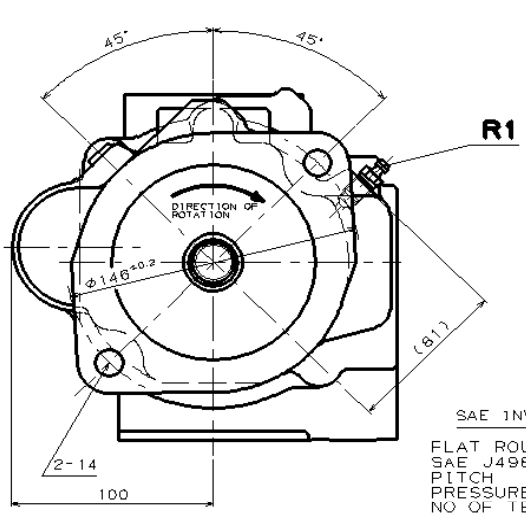
[1]) Unit dimension is same regardless of trochoid pump because of built in.

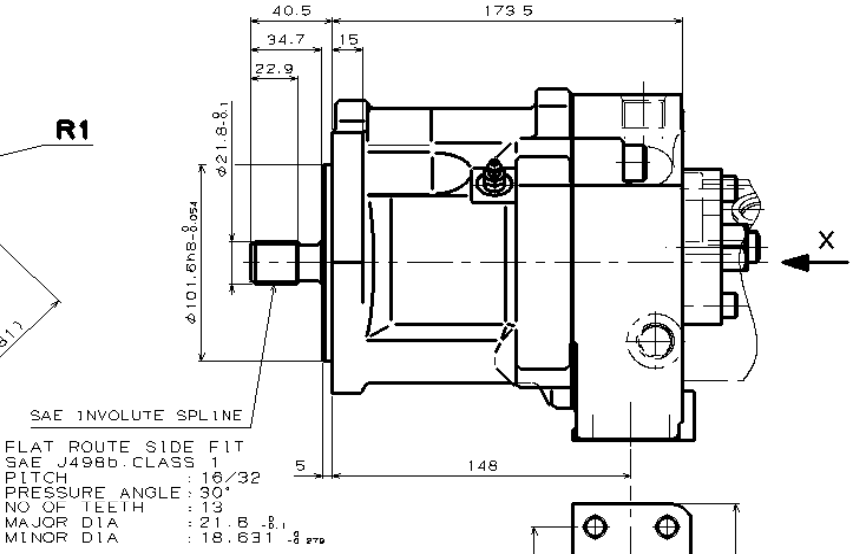
Unit dimensions size 18

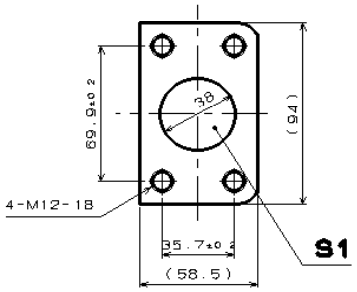
Please request a certified installation drawing before finalizing your design.

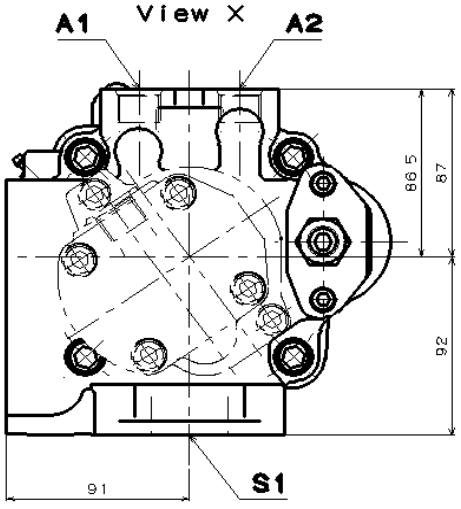












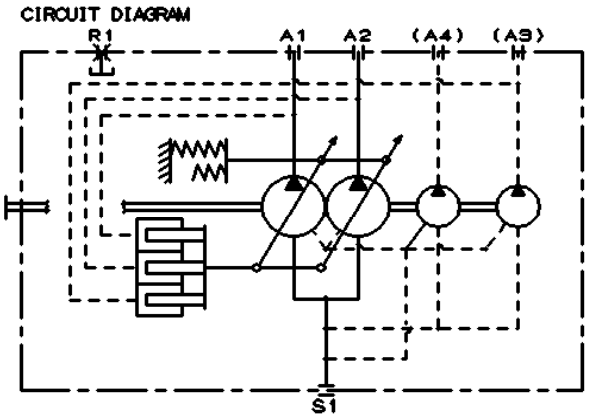
Ports

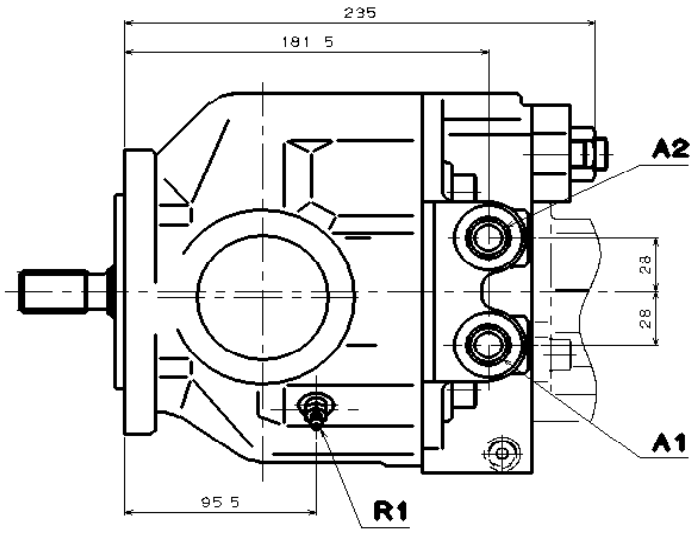
A1, A2	Pressure ports	G1/2–17 (JIS B2351 Type O)
S1	Suction port	SAE 1 1/2 (Standard pressure range)
R1	Air vent port	M10 X 1.0 (with air bleeder valve)

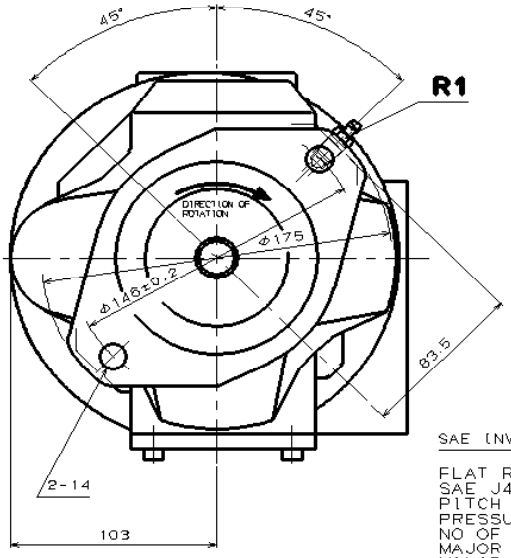
[1]) Unit dimension is same regardless of trochoid pump because of built in.

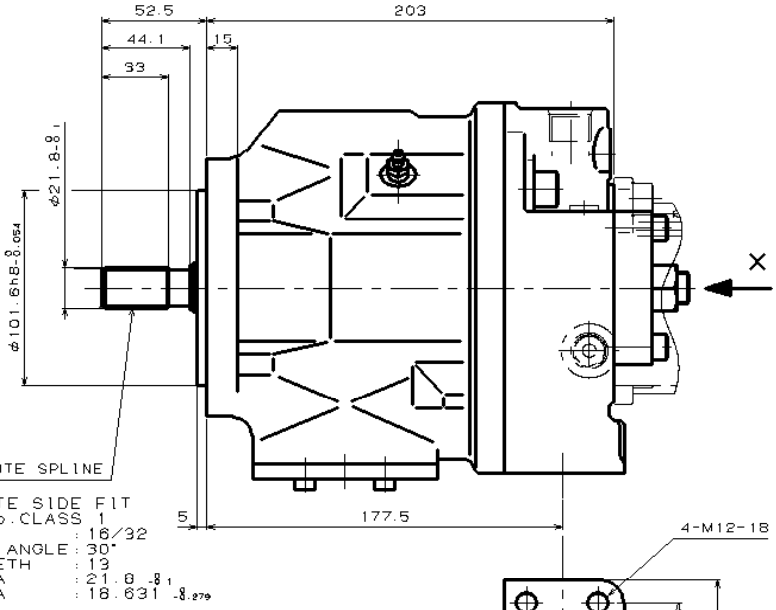
Unit dimensions size 25

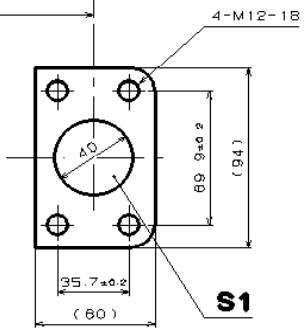
Please request a certified installation drawing before finalizing your design.

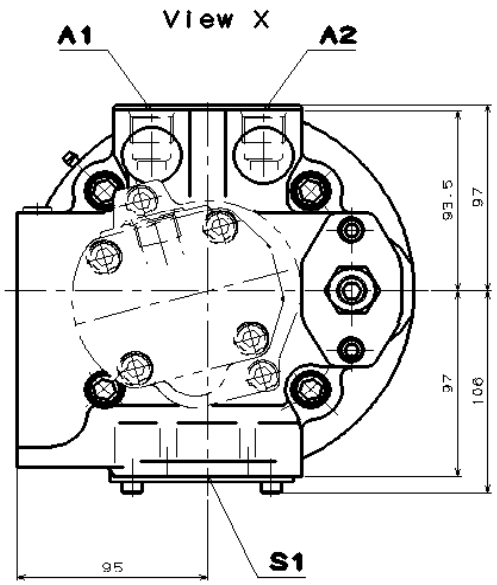












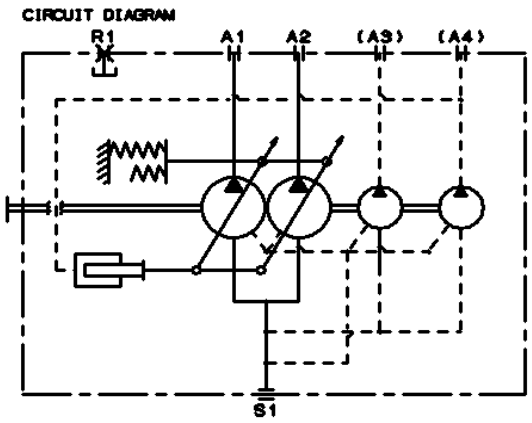
Ports

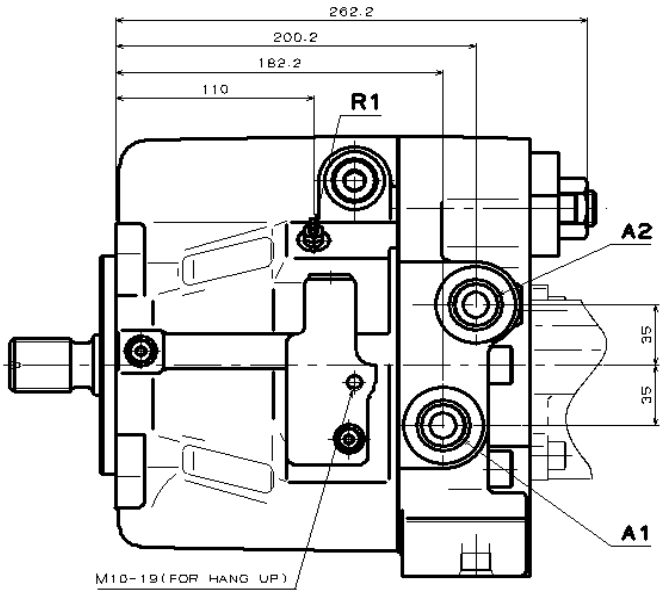
A1, A2	Pressure ports	G1/2-17 (JIS B2351 Type O)
S1	Suction port	SAE 1 1/2 (Standard pressure range)
R1	Air vent port	M10 X 1.0 (with air bleeder valve)

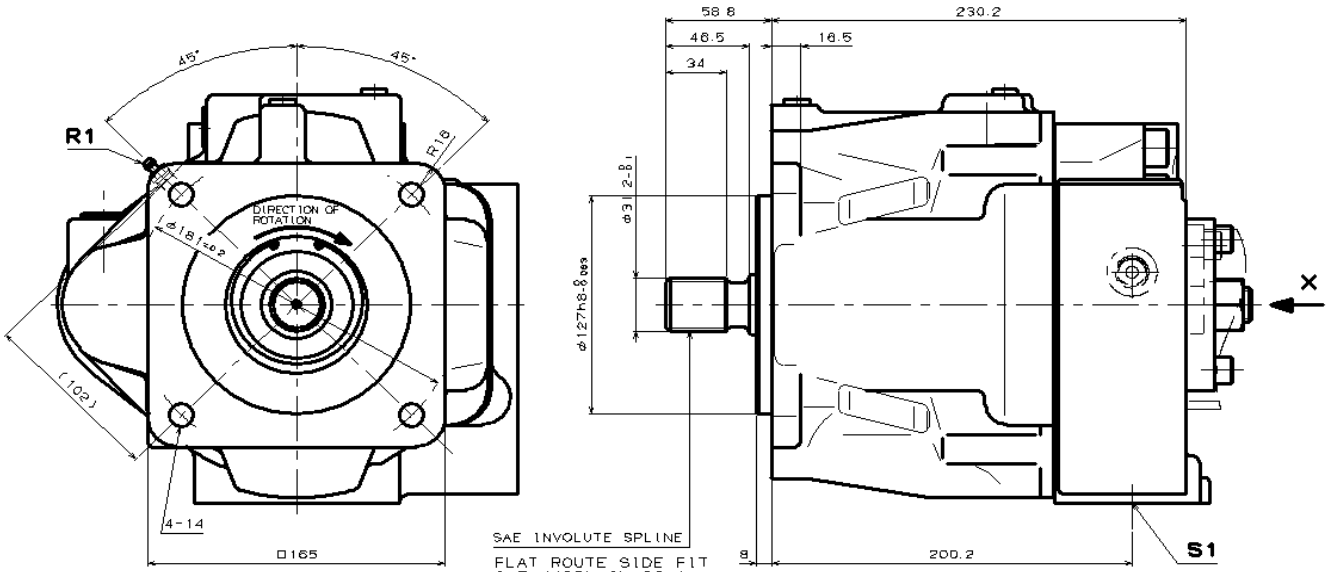
[1]) Unit dimension is same regardless of trochoid pump because of built in.

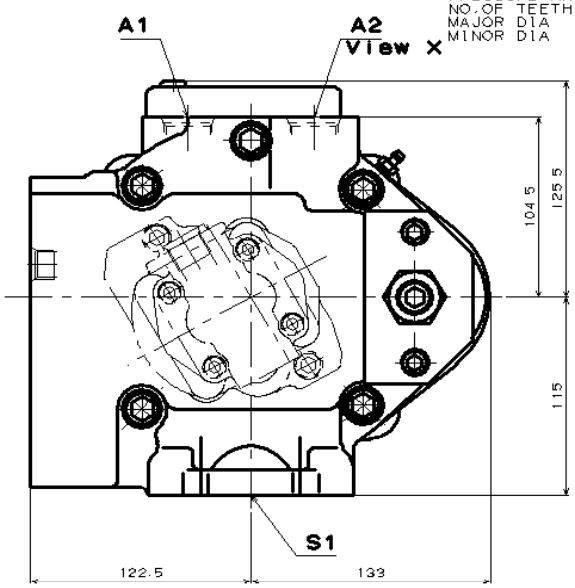
Unit dimensions size 36

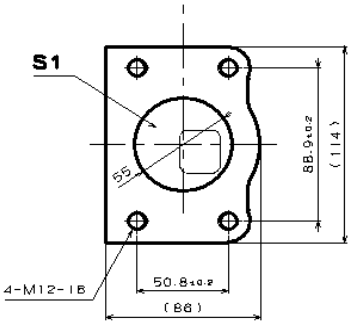
Please request a certified installation drawing before finalizing your design.











Ports

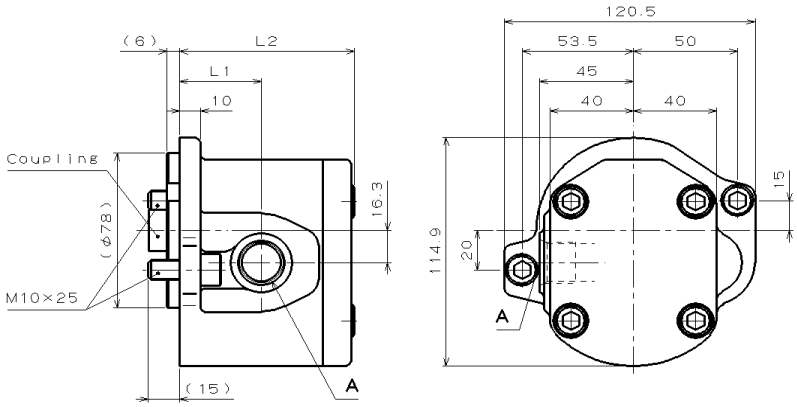
A1, A2	Pressure ports	G3/4-18 (JIS B2351 Type O)
S1	Suction port	SAE 2 1/2 (Standard pressure range)
R1	Air vent port	M10 X 1.0 (with air bleeder valve)

[1]) Unit dimension is same regardless of trochoid pump because of built in.

Unit dimensions gear pumps

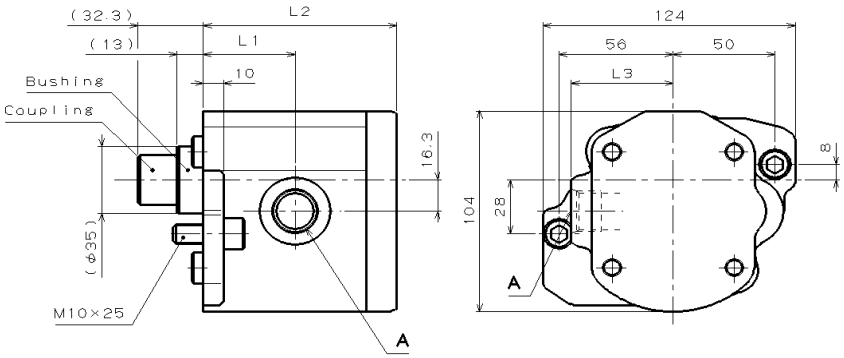
Please request a certified installation drawing before finalizing your design.

GSP2 type third gear pump for size 12, 18, 25



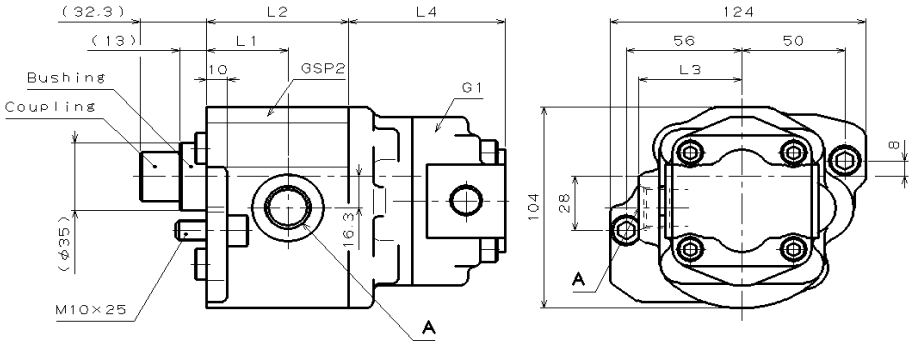
size	L1	L2
04	39.5	83.9
06		
08		
12	45	95
16		
22	49.5	104

GSP2 type third gear pump for size 36



size	L1	L2	L3
04	39.5	83.9	48
06			
08			
12	45	95	50
16			
22	49.5	104	

GSP2 + G1 combination gear pump for size 36



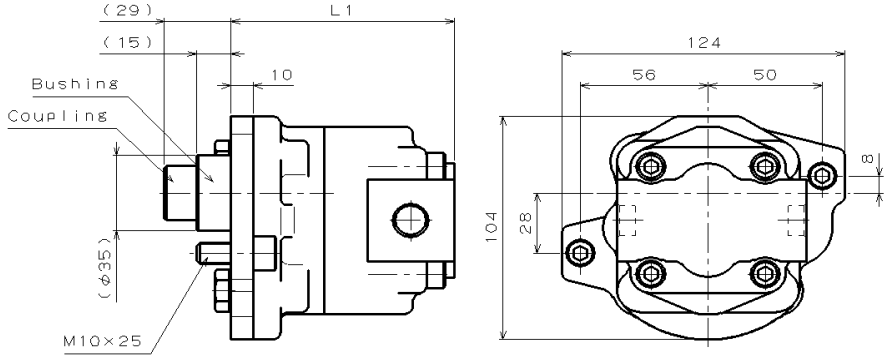
GSP2

size	L1	L2	L3
04	39.5	68.9	48
06			
08			
12	45	80	50
16			
22	49.5	89	

G1

size	L4
06	76
09	83
10	88

G1 type gear pump for size 36



size	L1
06	86
09	93
10	98

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