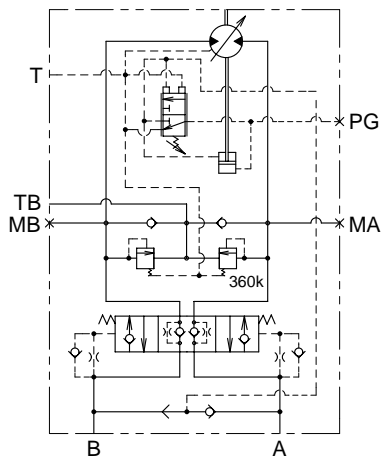
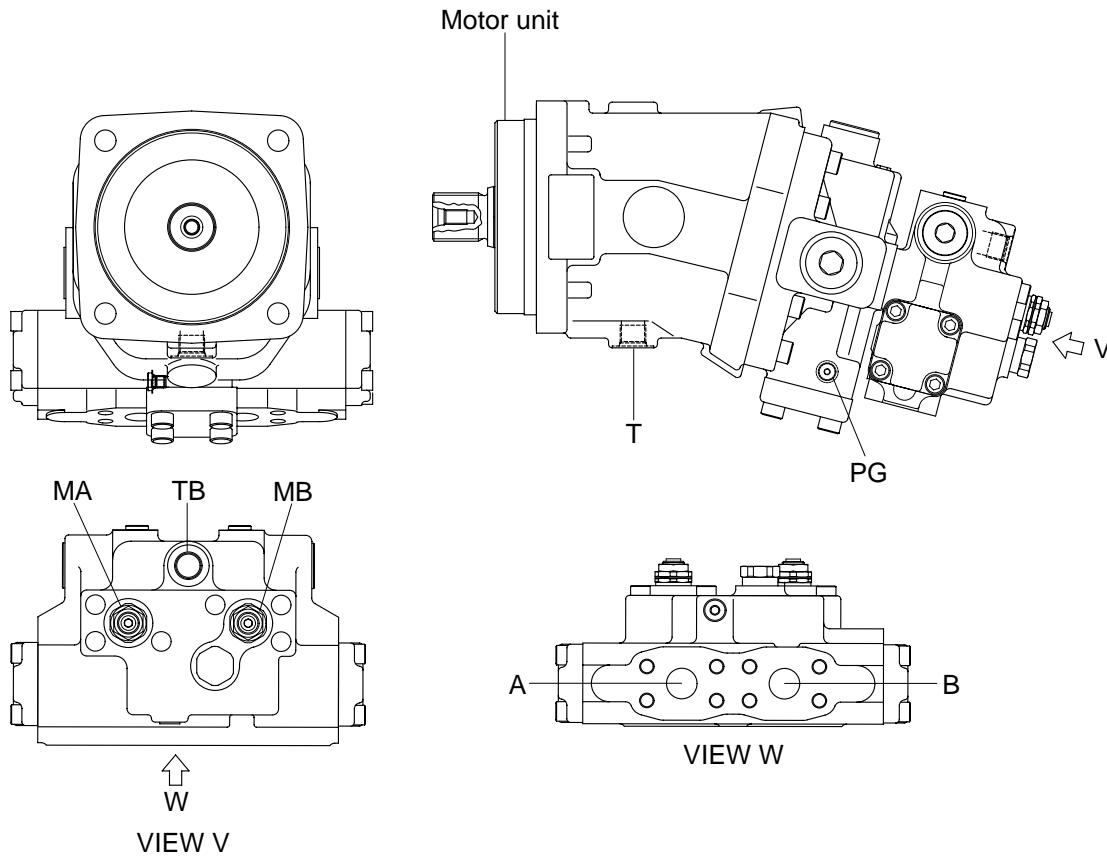


GROUP 4 TRAVEL MOTOR

1. CONSTRUCTION

Travel motor consists motor unit, regulator and counter balance valve.



Hydraulic circuit

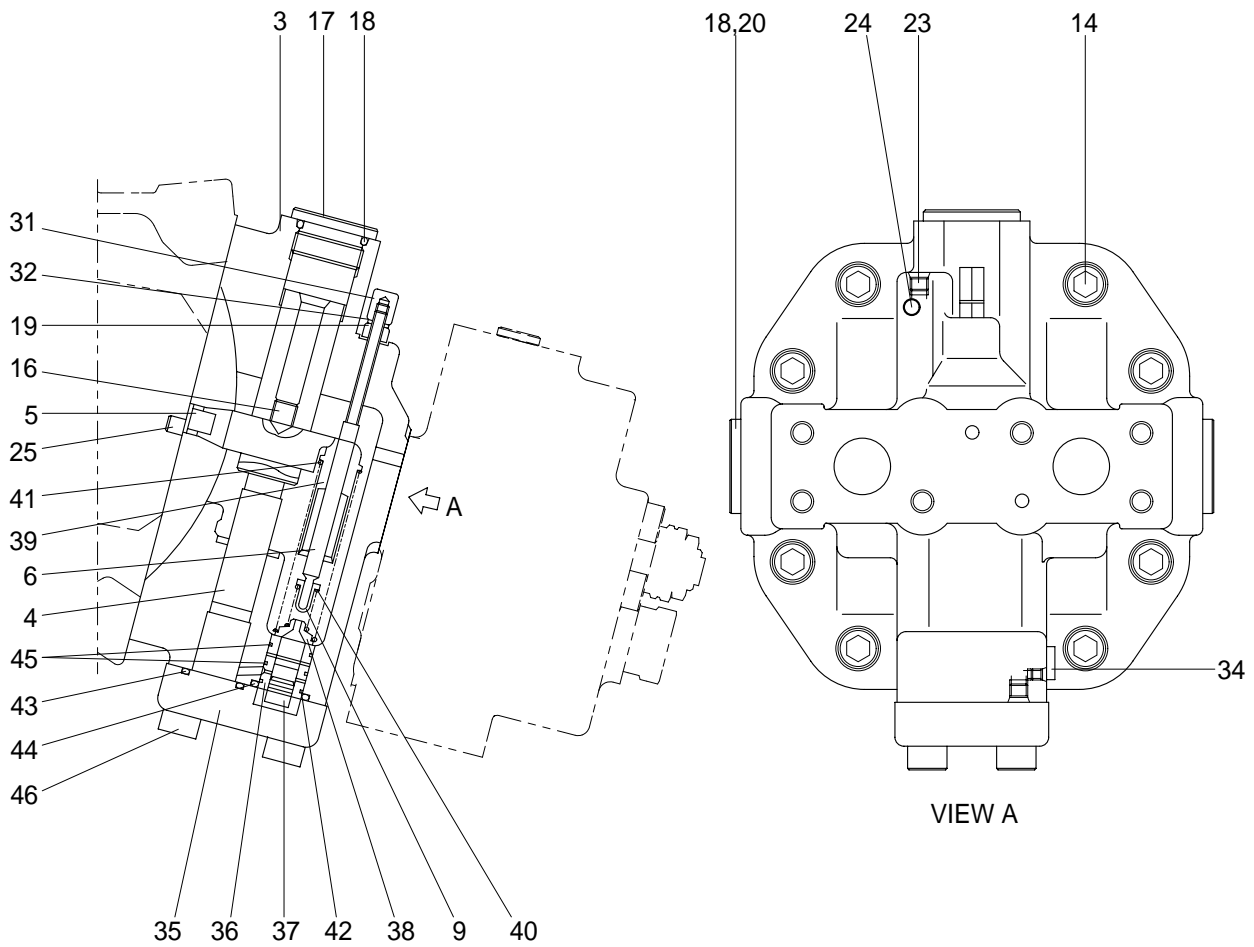
Port	Port name	Port size
A	Main port	SAE 1
B	Main port	SAE 1
MA	Gauge port	G 1/4
MB	Gauge port	G 1/4
PG	Gauge port	G 1/8
T	Drain port	G 1/2
TB	Drain port	G 3/4

1) MOTOR UNIT



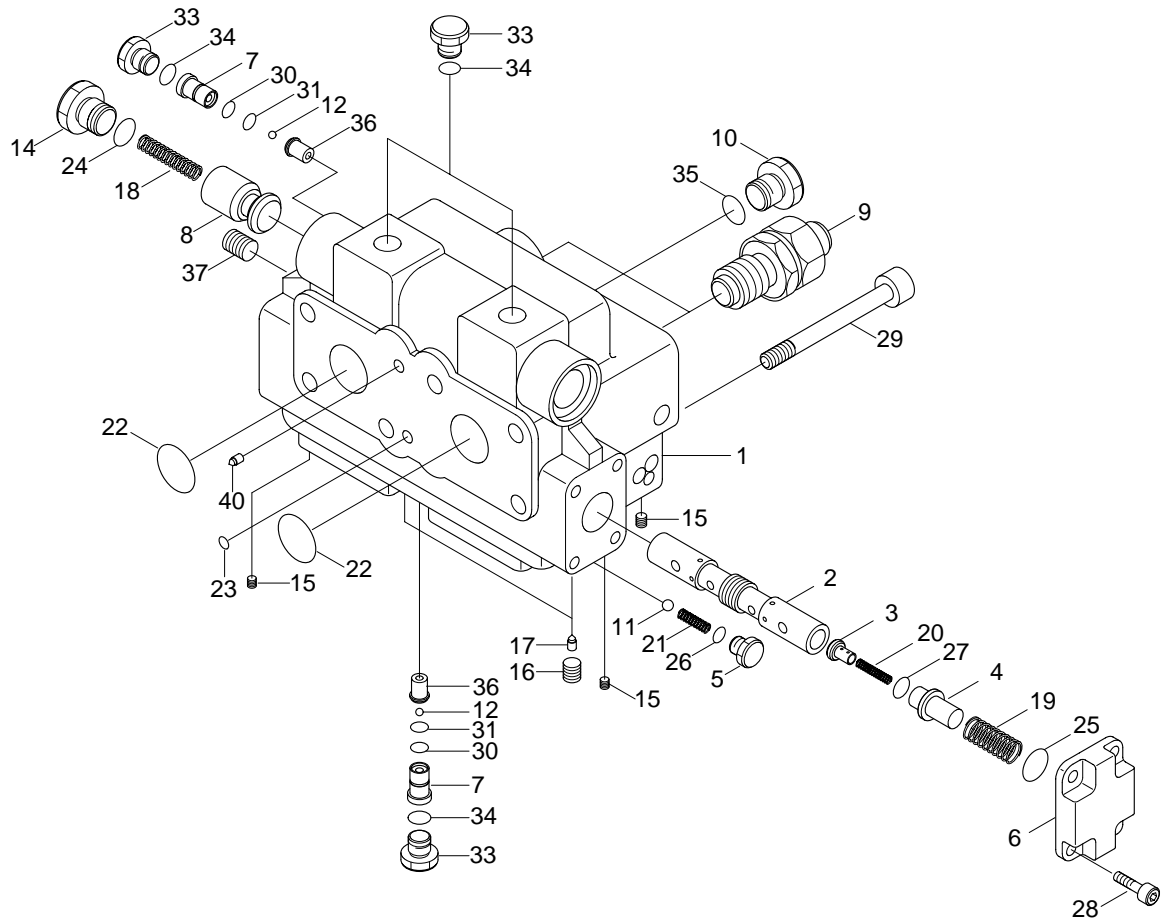
1	Shaft	11	Bearing	21	Shim
2	Cylinder block	12	Bearing	22	Shim
3	Center pin	13	Piece	23	Shim
4	Piston	14	Nut	30	Shim
5	Piston ring	16	Seal case	31	Shim
7	Spring seat	17	Oil seal	33	Shim
8	Spring	18	Retaining	34	Housing
9	Plate	19	O-ring	35	Control plate
10	Screw	20	Shim		

2) REGULATOR



3	Control body	20	Plug	38	Spring seat
4	Piston	23	Plug	39	Spring seat
5	Rod	24	Plug	40	Spring
6	Adjust screw	25	Pin	41	Spring
9	Spring seat	31	Cap nut	42	O-ring
14	Bolt	32	Seal	43	O-ring
16	Screw	34	Plug	44	O-ring
17	Plug	35	Cover	45	Piston ring
18	O-ring	36	Barrel	46	Bolt
19	Lock nut	37	Spool		

3) COUNTER BALANCE VALVE

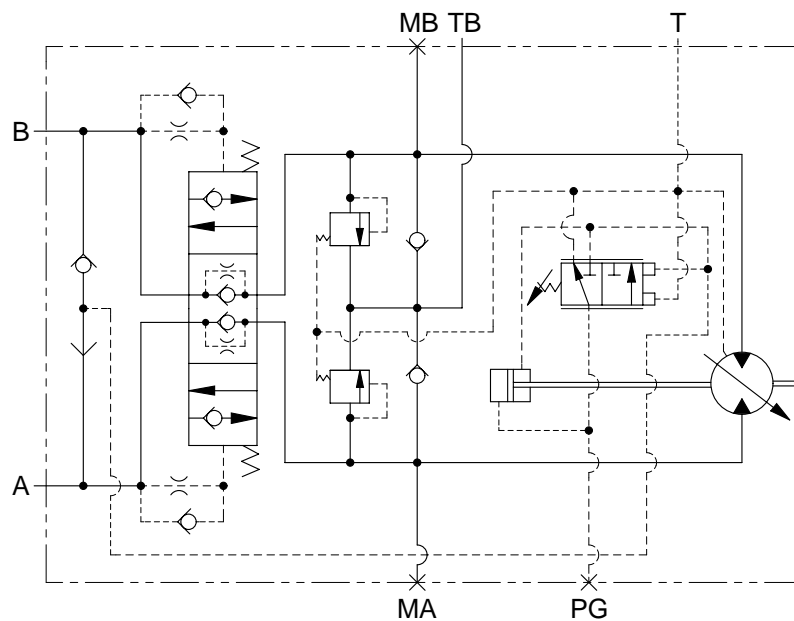


1	Body	14	Plug	26	O-ring
2	Spool	15	Plug	27	O-ring
3	Plunger	16	Plug	28	Bolt
4	Plug	17	Orifice	29	Bolt
5	Plug	18	Spring	30	Back up ring
6	Cover	19	Spring	31	O-ring
7	Guide	20	Spring	33	Plug
8	Plunger	21	Spring	34	O-ring
9	Relief valve	22	O-ring	35	O-ring
10	Plug	23	O-ring	36	Valve seat
11	Steel ball	24	O-ring	37	Plug
12	Steel ball	25	O-ring	40	Orifice

2. DESCRIPTION

This oil hydraulic motor has the following function, as a motor for traveling of wheel hydraulic excavator.

- 1) Automatic control of traveling torque corresponding to traveling resistance(HA regulator)
- 2) The function of control to prevent the negative pressure at the inlet of the motor, in order to avoid reckless driving at downhill road.(Counter balance valve)
- 3) The function of supplying oil to the inlet of the motor, in order to prevent any cavitation.(Anti-cavitation check valve which is built in the counter balance valve)



Hydraulic circuit

3. FUNCTION

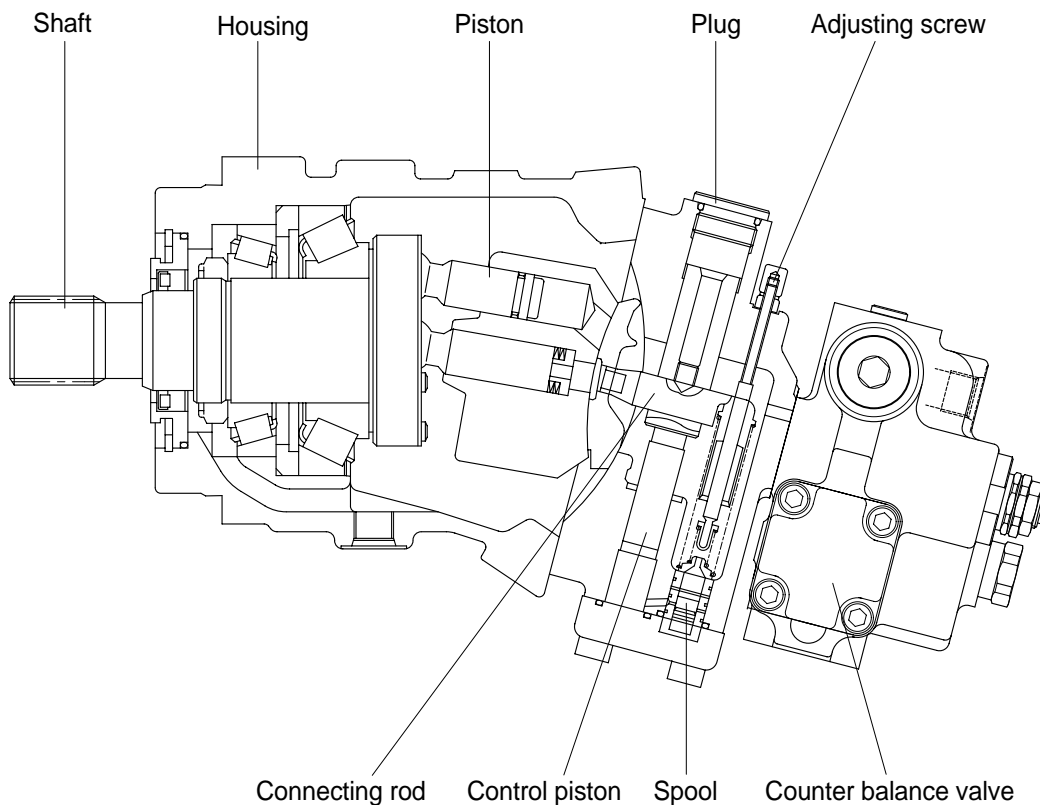
1) HYDRAULIC MOTOR

The direction of shaft rotation is dependent on which is the port, A port or B port, the pressure oil shall be connected to.

When pressure oil is led into the cylinder block in which seven pistons are flexibly mounted in a circular formation, piston presses the shaft and sets it in rotation. One piston travels one stroke during one rotation, which results in that oil is sucked and discharged. As each seven piston acts such movement, in turn, continuously, the shaft can do rotary movement smoothly. The component of hydraulic forces acting on the piston produces turning effect, therefore, as the swivel angle is big, the turning effect is bigger.

In addition, as the swivel angle is big, the displacement is bigger, which result in the frequency of rotation is less.

The control plate is connected to the control piston by means of the connecting rod, and the swivel angle is dependent on the position of the control piston.



2) HA REGULATOR

The higher pressure at the either side of A port or B port is selected by the shuttle valve fitted in the counter balance valve, and it is led into the side of small diameter of control piston and the spool.

If circuit pressure value is lower than the pressure value at the start of swivel, the control pressure acting on the side of the big diameter of control piston becomes zero, and thus the swivel angle is the minimum. On the contrary, if the circuit pressure value is higher than the pressure value at the start of swivel, the spool is shifted and the control pressure increases, which result in the control piston moves toward to bigger swivel angle.

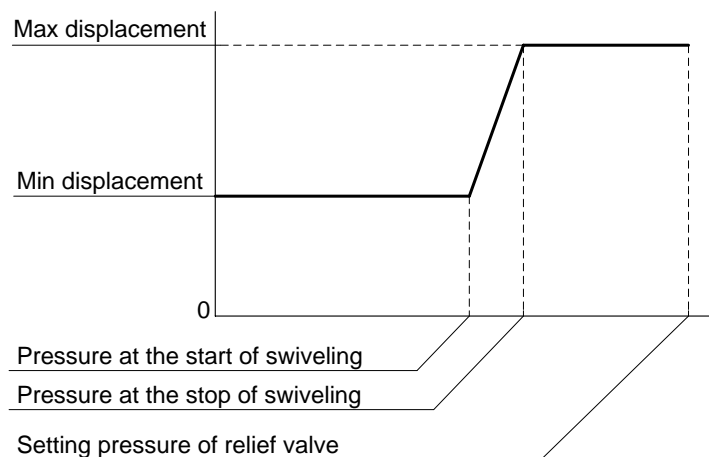
The control piston is feedback to the spool by means of the feedback spring, and it balances swivel angle corresponding to the load pressure.

The traveling speed is steplessly variable in proportion to the load pressure, by means of the function as above. When the load pressure is high, for example, at starting and or at climbing a slope, swivel angle is set to be maximum, and torque is be maximum. And as the load pressure drops down, the swivel angle is smaller, which result in higher speed of traveling. When the load pressure is low, for example, traveling at level ground, the swivel angle is set to be minimum value, which result in maximum speed of traveling.

The setting of this motor is as follows :

The pressure at start of swiveling can be controlled by the adjusting screw.

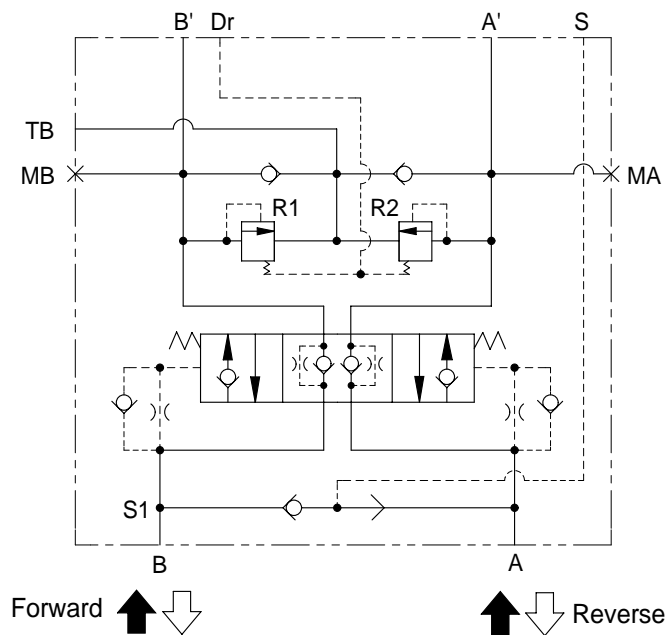
Turn right the adjusting screw, and the pressure at the start of swiveling rises up. Turn left the adjusting screw, and the pressure at start of swiveling drops down. 27.1Mpa(276kgf/cm²) is adjustable by one rotation of the screw. The pressure difference is dependent on the spring constant of feedback spring. The adjustment, however, is not possible.



3) COUNTER BALANCE VALVE

(1) Outline

This counter balance valve is attached to the hydraulic motor(A6V115HA6.2) which is used for the running operation of the wheel excavator. The valve functions as a double counterbalance valve and prevents the excavator from overrunning when the machine runs either forwards or backwards.



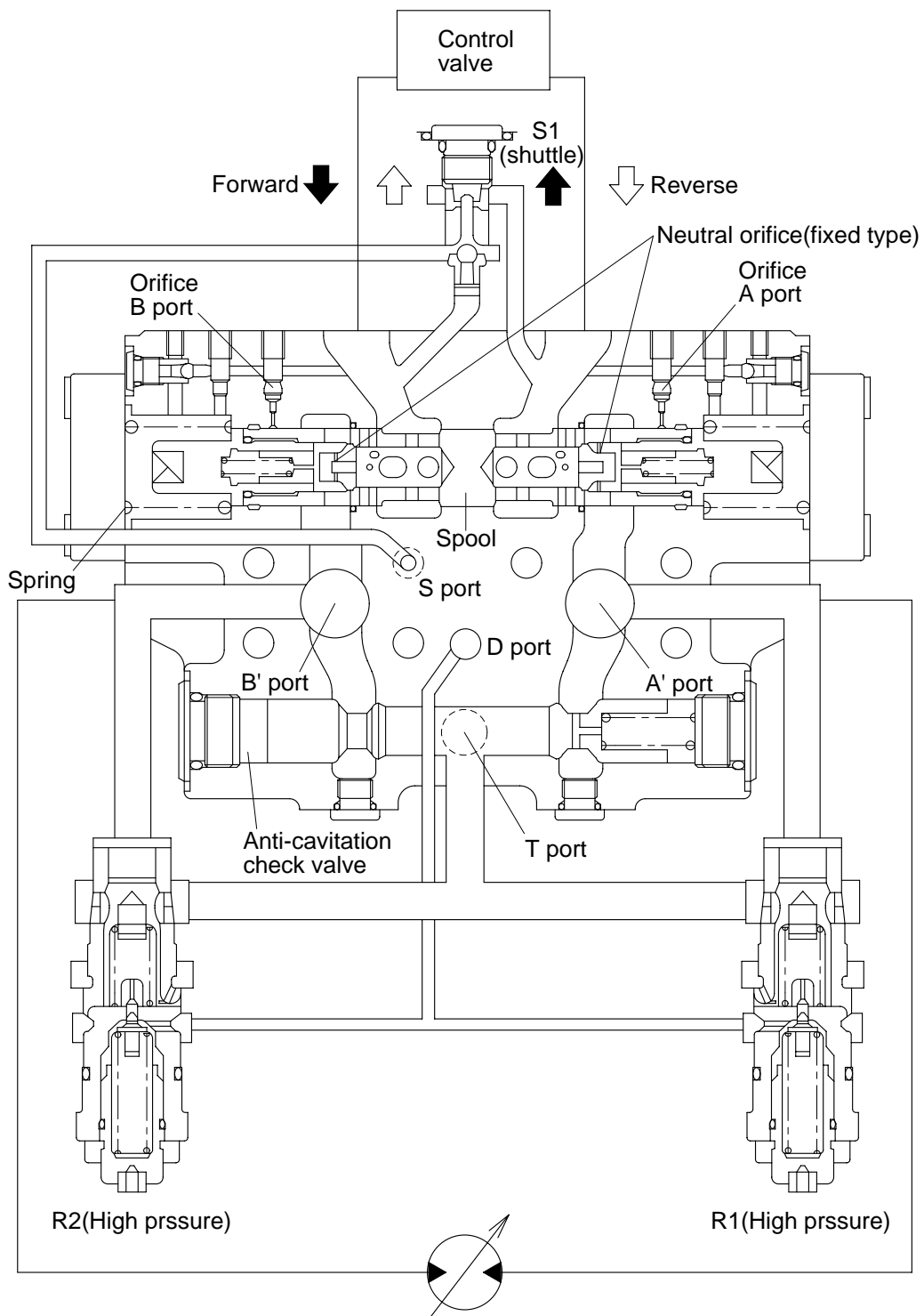
Hydraulic circuit

(2) Function

When the machine moves forwards

When the machine is accelerating, going uphill, or running on the level land, the force which is created by the pressure activating at the left end of the spool overcomes the spring force and thus makes the spool fully open. The direction of this free flow is illustrated as $B \rightarrow B' \rightarrow \text{Hyd. motor} \rightarrow A' \rightarrow A$.

And when the machine is decelerating or going downhill, the machine tends to run, due to inertia, at the speed which is greater than the one which the hydraulic pump can afford to supply. This decreases the pressure acting on the port B, and at the same time weakens the force which presses the spring to the right, so that the spool moves towards the direction which closes the flow. This movement generates the counterbalance pressure at A' port, which works so that the pressure at B port may not become vacuum. Because the position of the spool is determined by the flow from the pump and also by the counterbalance pressure, the pressure at B port also corresponds to the spring force depending on the spool position.



Functioning diagram

When the machine is stopped

When an operator stops the machine, B port pressure gets low so that the spool moves back to the neutral position where only the central throttle functions. This preset throttle generates the counterbalance pressure at A' port, which in turns becomes hydraulic brake and the machine is thus stopped. The relief valve regulates the brake-pressure and is actuated when the pressure which is created at the neutral position(i.e. counterbalance pressure) reaches the set value. Also the relief valve functions so as to cut off the surge pressure at A' port when the operator carries out rapid operation. The anti-cavitation valves, which supply the flow from the T port, are fitted on both sides of the valve in order that cavitation may not be generated both on A' and B' ports.

When the machine moves backwards

As with the case of the forward operation, counterbalancing function works when the machine runs backwards.

When the machine is accelerating, going uphill, or running on the level land, the spool moves to the left, and the direction of the free flow is illustrated as $A \rightarrow A' \rightarrow \text{Hyd. motor} \rightarrow B' \rightarrow B$.

And when the machine is decelerating or going downhill, the counterbalancing pressure is generated this time at B' port and controls the machine. When the spool moves back to the neutral position, the machine is stopped by means of counterbalancing pressure(B' port) which is generated by the central throttle and of the brake-pressure of the relief valve.

(3) Adjustment of the relief valve(R1, R2)

Unscrew the hexagon nut. Pressure rises when turning the adjusting screw to the right. Pressure drops when turning the screw to the left. One complete turn of the screw equals to the pressure change of about 80kgf/cm².

