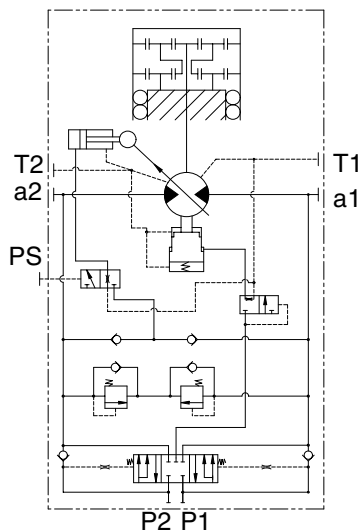
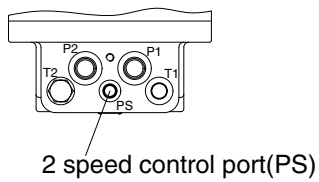
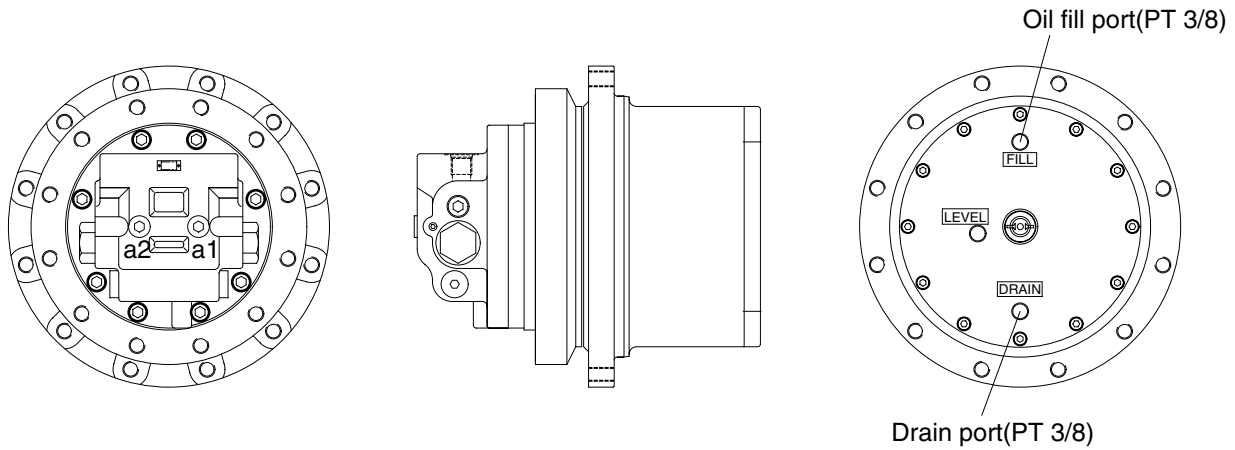


GROUP 4 TRAVEL DEVICE

1. CONSTRUCTION

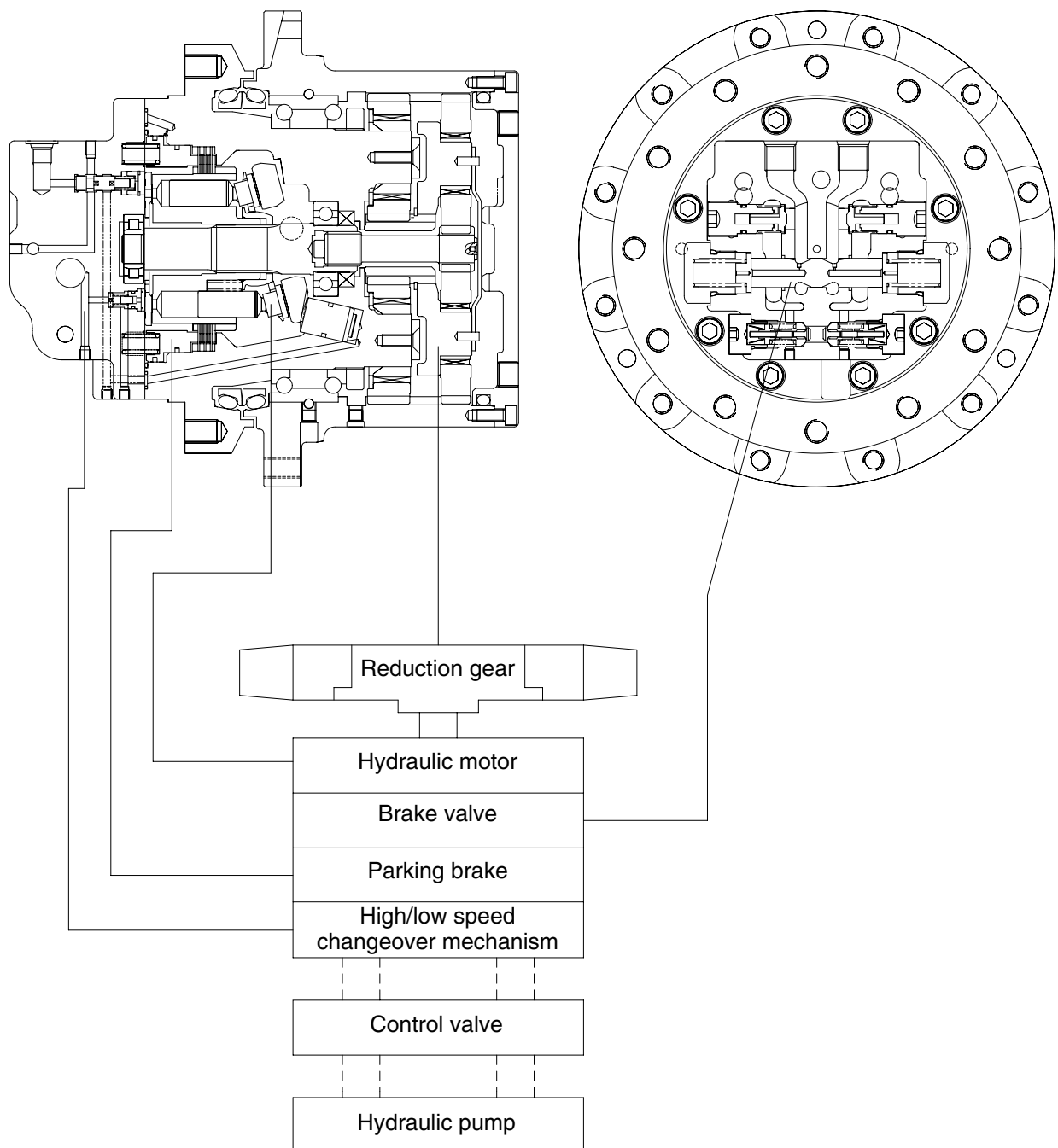
Travel device consists travel motor and gear box.

Travel motor includes brake valve, parking brake and high/low speed changeover mechanism.



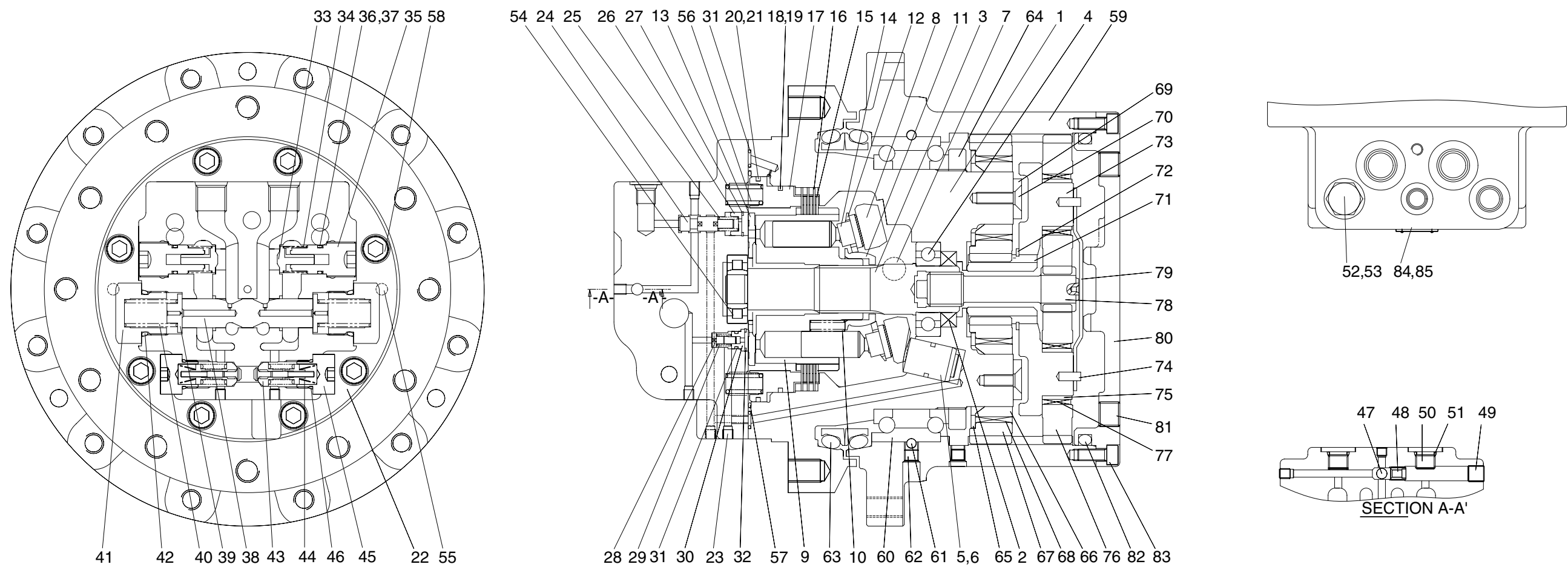
Port	Port name	Port size
P1	Main port	PF 1/2
P2	Main port	PF 1/2
a1, a2	Gauge port	PT 1/4
T1, T2	Drain port	PF 3/8
PS	2 speed control port	PF 1/4

1) BASIC STRUCTURE



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2) STRUCTURE



- 1 Shaft casing
- 2 Oil seal
- 3 Shaft
- 4 Bearing
- 5 Swash piston
- 6 Piston ring
- 7 Swash steel ball
- 8 Swash plate
- 9 Cylinder block
- 10 Spring
- 11 Ball guide
- 12 Set plate
- 13 Valve plate
- 14 Piston assembly
- 15 Friction plate

- 16 Parking plate
- 17 Parking piston
- 18 O-ring
- 19 Back up ring
- 20 O-ring
- 21 Back up ring
- 22 Rear cover
- 23 Plug
- 24 Spool
- 25 Spring
- 26 Stopper
- 27 Snap ring
- 28 Check
- 29 Spring
- 30 Seat

- 31 O-ring
- 32 Snap ring
- 33 Check
- 34 Spring
- 35 Plug
- 36 O-ring
- 37 Back up ring
- 38 Main spool
- 39 Spring seat
- 40 Spring
- 41 Plug
- 42 O-ring
- 43 Relief valve assembly
- 44 Spring

- 45 Plug
- 46 O-ring
- 47 Steel ball
- 48 Check seat
- 49 Plug
- 50 Plug
- 51 O-ring
- 52 Roller bearing
- 53 O-ring
- 54 Hex plug
- 55 Parallel pin
- 56 Spring
- 57 O-ring
- 58 Wrench bolt

- 59 Ring gear
- 60 Angular bearing
- 61 Steel ball
- 62 Plug
- 63 Floating seal
- 64 Nut
- 65 Washer
- 66 Collar
- 67 Planetary gear(A)
- 68 Needle bearing
- 69 Plate
- 70 Bolt
- 71 Sun gear
- 72 Snap ring

- 73 Carrier
- 74 Spring pin
- 75 Collar
- 76 Planetary gear(B)
- 77 Needle bearing
- 78 Drive gear
- 79 Thrust plate
- 80 Ring gear cover
- 81 Plug
- 82 O-ring
- 83 Wrench bolt
- 84 Name plate
- 85 Rivet
- 86 Seal kit

2. PRINCIPLE OF DRIVING

1) GENERATING THE TURNING FORCE

The high hydraulic supplied from a hydraulic pump flows into a cylinder(9) through valve casing of motor(22), and valve plate(13).

The high hydraulic is built as flowing on one side of Y-Y line connected by the upper and lower sides of piston(14).

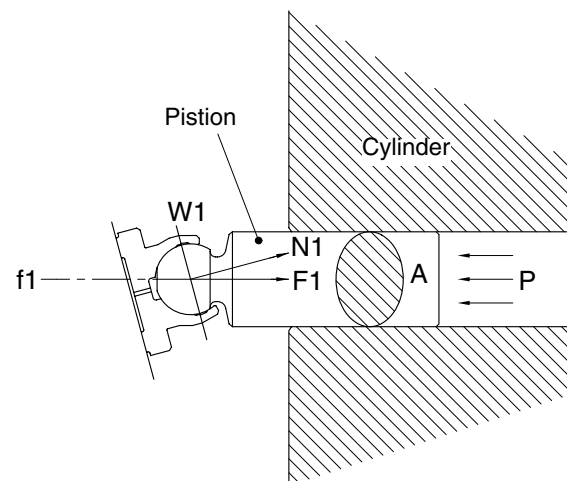
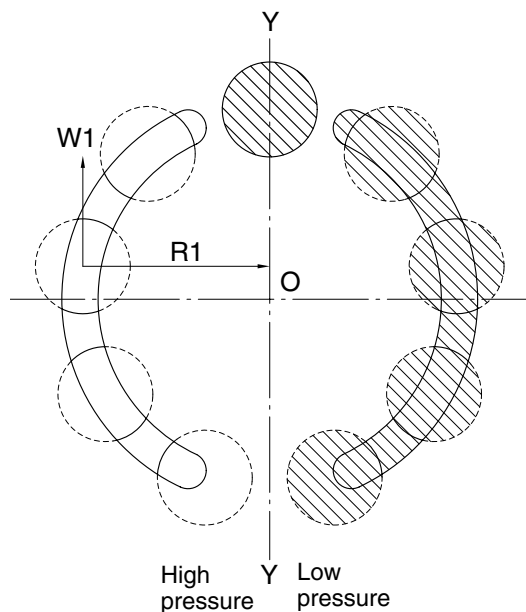
The high hydraulic can generate the force, $F1 = P \times A$ (P : Supplied pressure, A : water pressure area), like following pictures, working on a piston.

This force, F1, is divided as N1 thrust partial pressure and W1 radial partial pressure, in case of the plate(8) of a tilt angle, α .

W1 generates torque, $T = W1 \times R1$, for Y-Y line connected by the upper and lower sides of piston as following pictures.

The sum of torque ($\sum W1 \times R1$), generated from each piston(4~5pieces) on the side of a high hydraulic, generates the turning force.

This torque transfers the turning force to a cylinder(9) through a piston; because a cylinder is combined with a turning axis and spline, a turning axis rotates and a turning force is sent.



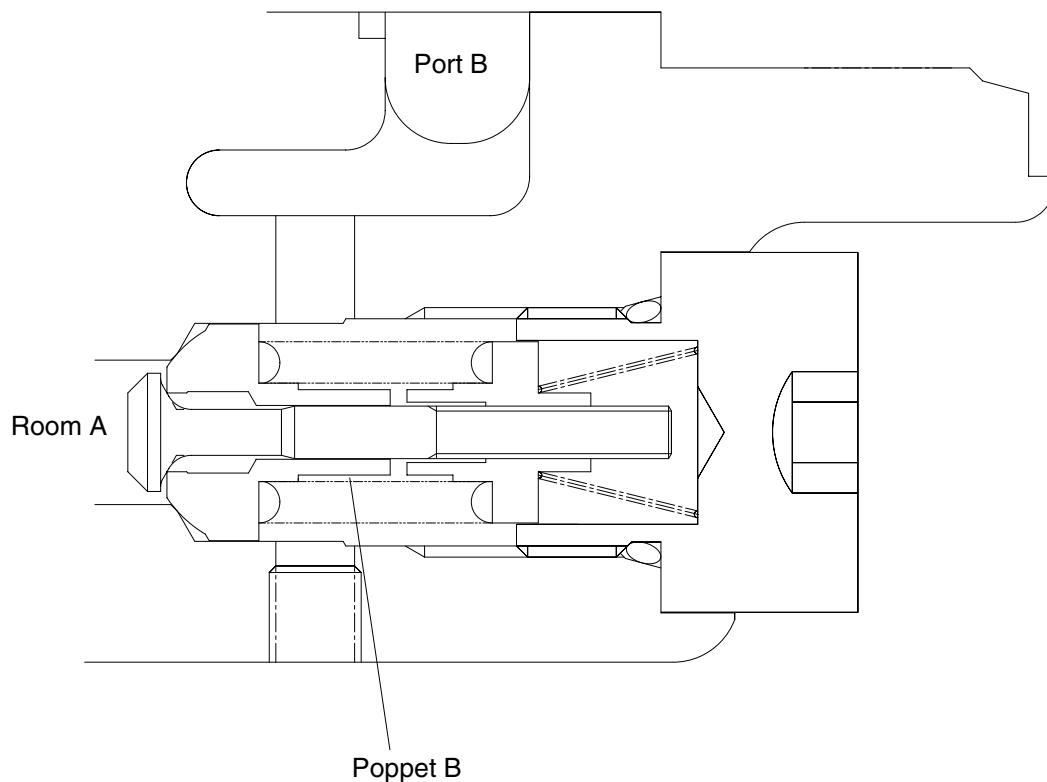
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2) WORKING OF RELIEF VALVE

Relief valve carries on two functions of followings.

- (1) It standardizes a pressure in case of driving a hydraulic motor ; bypasses and extra oil in a motor inlet related to acceleration of an inertia to an outlet.
- (2) In case of an inertia stopped, it forces an equipment stopped, according to generating the pressure of a brake on the projected side.

Room A is always connected with port A of a motor. If the pressure of port is increased, press poppet B. And if it is higher than the setting pressure of a spring, the oil of an hydraulic flows from room A to port B, because poppet A is detached from the contact surface of seat A.



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3) WORKING OF BRAKE

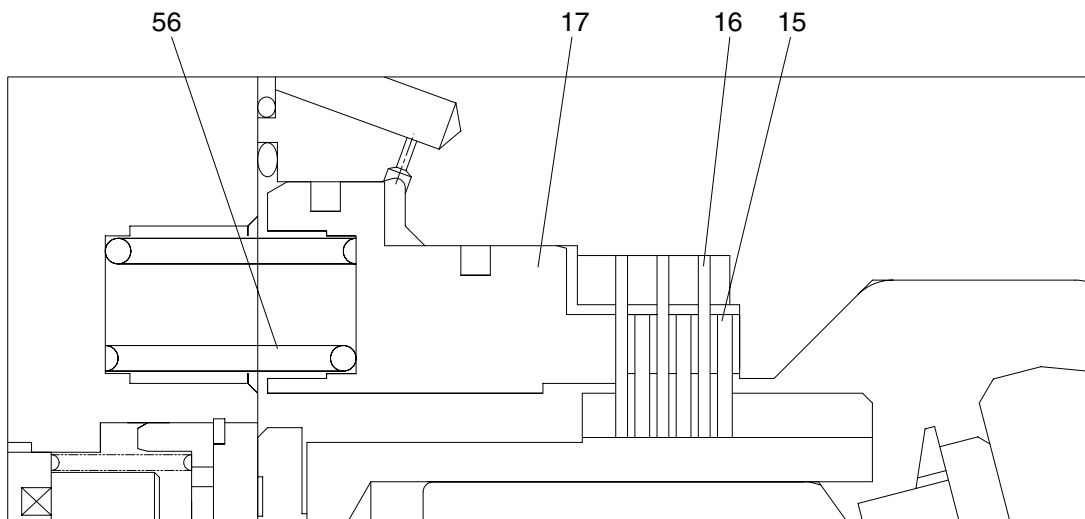
Brake operates the pressure supplied through SPOOL(simultaneous peripheral operation online) installed in rear cover(22) to the part of parking piston(17) and releases a brake.

When the pressure does not work, the brake always runs.

The force of a brake is generated by the frictional force among a plate(16), brake piston(17) and a cylinder block(9) connected through spline which are fixed by shaft casing(1) with friction plate(15).

When a pressure does not work on the part of piston, brake spring presses brake piston; oil in a brake room flows into the drain of a motor through an orifice; in that time, brake piston compresses a frictional plate(15) and a detached plate in the middle of shaft casing and brake piston according to the force plate springs(56); finally, it makes a frictional force.

This frictional force helps the brake fixing a turning axis(3) connected by a cylinder and spline operated.

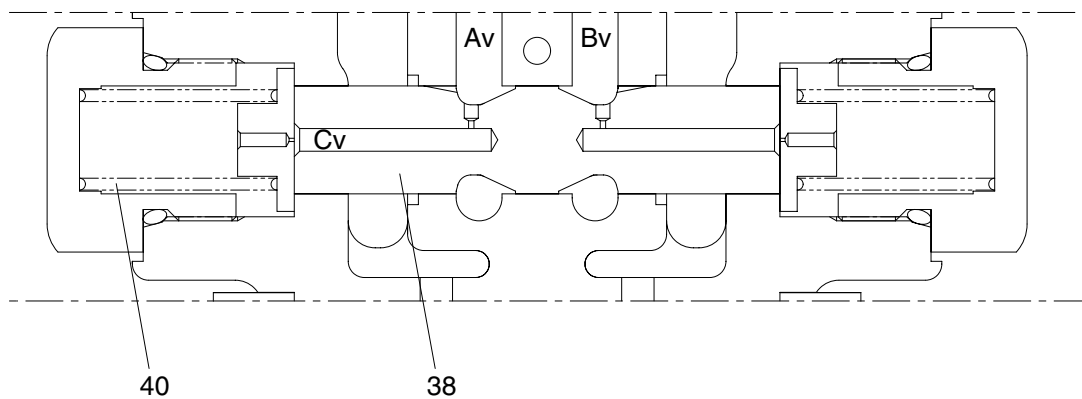


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4) COUNTERBALANCE VALVE

Av port is connected into a hydraulic pump and Bv port is into a tank. Hydraulic pump supplying oil is come into Av → Cv room. In accordance with SPRING FORCE(40) that is working on the spool's side it moves to the SPOOL(38) on the right side which is medium position and that time MOTOR is turning.

When the SPOOL(38) is come back to the medium position that time hydraulic motor is stopped. In accordance with SPOOL's returning speed and shape control the working oil that is returning from hydraulic motor smoothly stopping the motor.



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