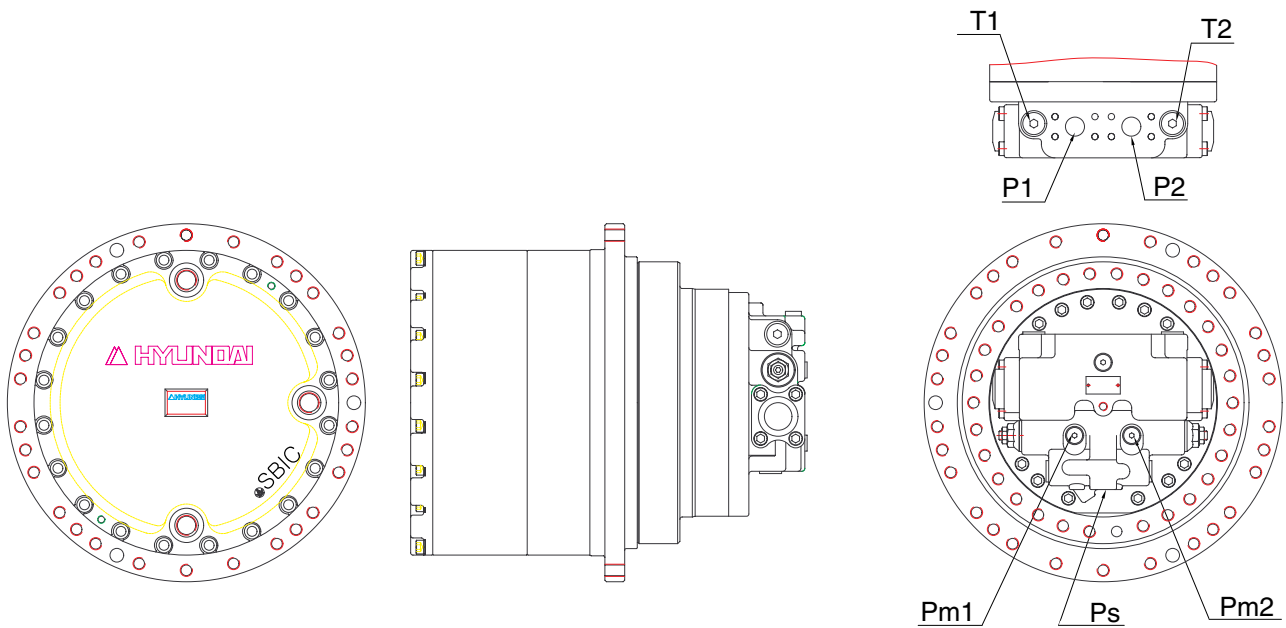


## GROUP 4 TRAVEL DEVICE

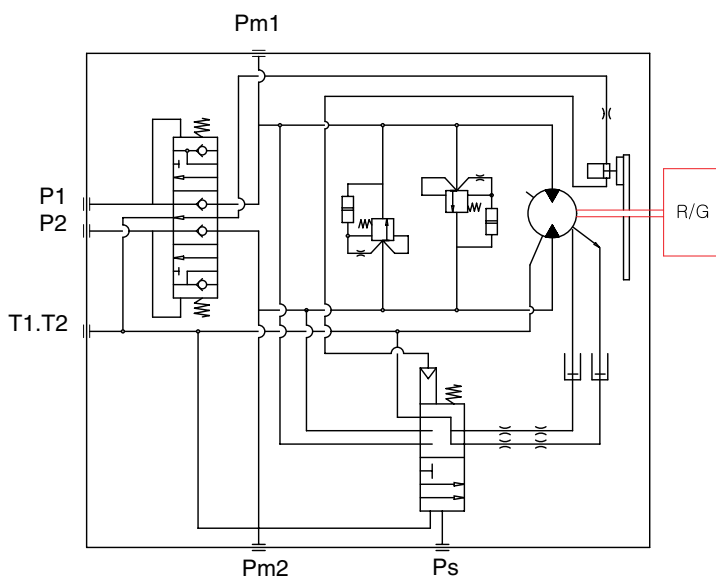
### 1. STRUCTURE

A hydraulic motor includes five followings.

- Part of rotary generating turning force
- Part of a valve of relief
- Part of Brake
- Part of a valve of counterbalance
- Part of plowing changeover
- Part of auto changeover



21078TM12



Port	Port name	Port size
P1, P2	Main port(IN)	SAE 4694psi
P2, P1	Main port(OUT)	SAE 4694ps
Pm1, Pm2	Gauge port	PF 1/4
T1, T2	Prain port	PF 1/2
Ps	2 speed control port	PF 1/4

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## 2. PRINCIPLE OF DRIVING

### 2.1 Generating the turning force

The high hydraulic supplied from a hydraulic pump flows into a cylinder(10) through valve casing of motor(29), and valve plate(77).

The high hydraulic is built as flowing on one side of Y-Y line connected by the upper and lower sides of piston(18).

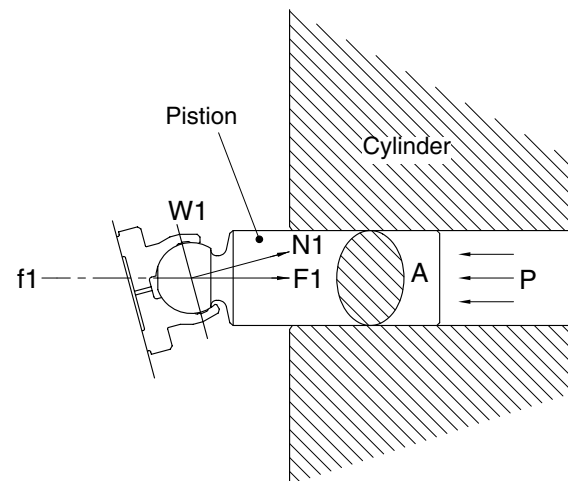
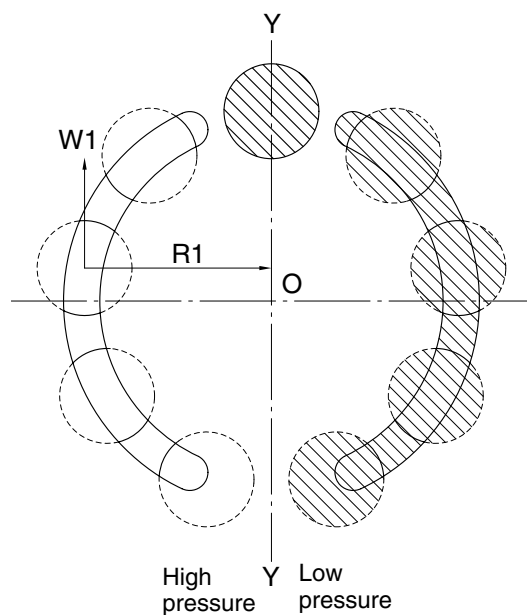
The high hydraulic can generate the force,  $F1 = P \times A$  (P : Supplied pressure, A : water pressure area), like following pictures, working on a piston.

This force, F1, is divided as N1 thrust partial pressure and W1 radial partial pressure, in case of the plate(09) of a tilt angle,  $\alpha$ .

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(10) through a piston; because a cylinder is combined with a turning axis and spline, a turning axis rotates and a turning force is sent.



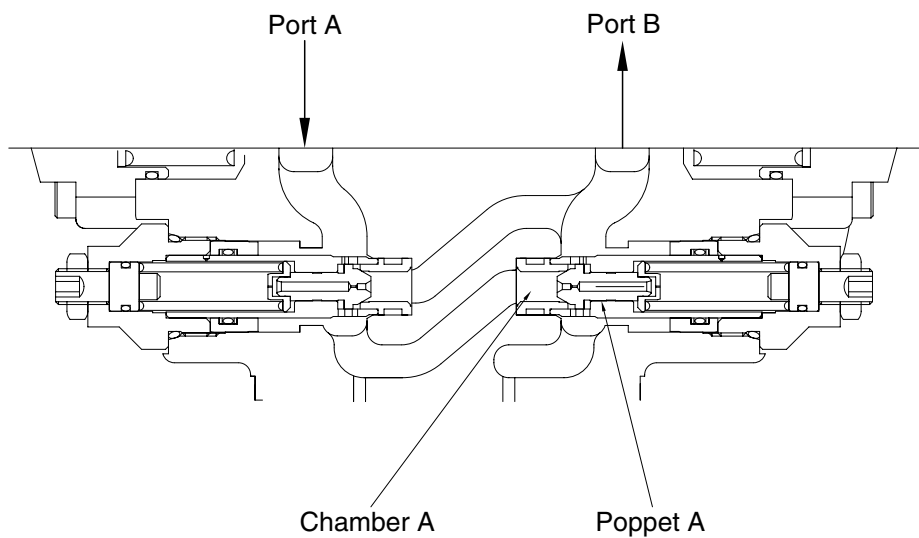
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## 2.2 Working of relief valve

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 A. 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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### 2.3 Working of negative brake

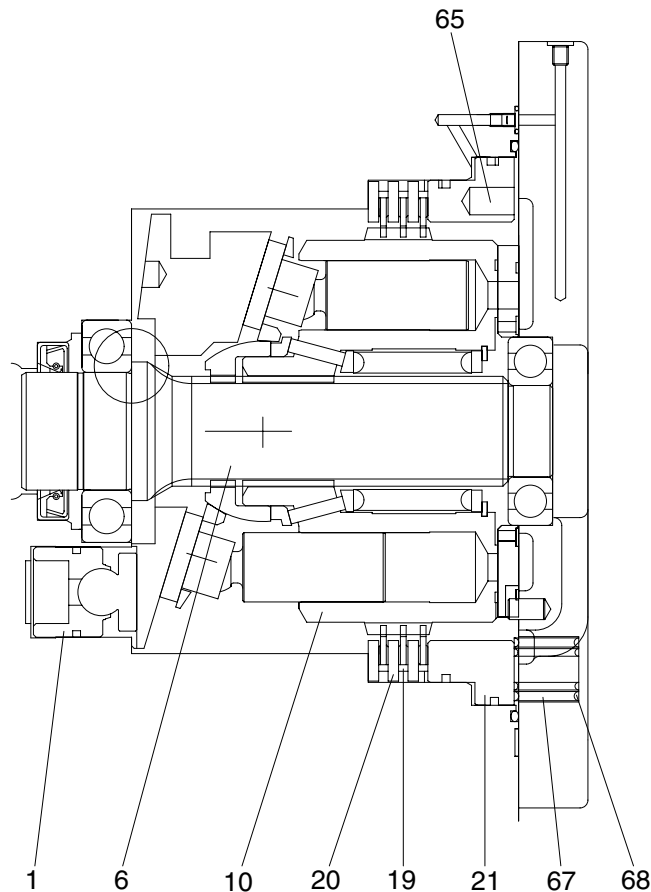
Negative brake operates the pressure supplied through SPOOL(simultaneous peripheral operation online) installed in valve casing(29) to the part of brake piston(21) and releases a brake.

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

The force of a brake is generated by the frictional force among a plate(20) fixed by shaft casing, brake piston(21) and a frictional plate(19) connected through spline outside a cylinder(10).

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 and a detached plate in the middle of shaft casing and brake piston according to the force that presses 10 pieces of brake springs(68, 67); finally, it makes a frictional force.

This frictional force helps the brake fixing a turning axis(06) connected by a cylinder and spline operated.



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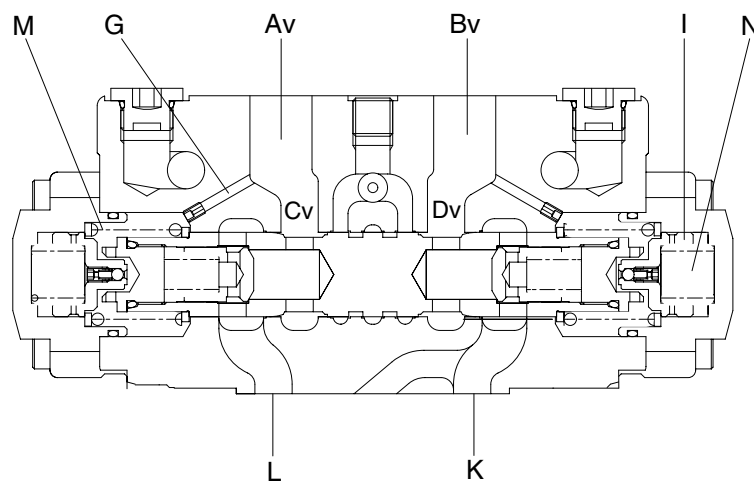
## 2.4 Counterbalance valve

Av port is connected into a hydraulic pump; Bv port is into a tank.

An oil supplied to a hydraulic pump presses check valve on Av → Cv; through L port, is provided to a hydraulic motor. It makes a hydraulic motor circulated. However, the oil pressure out of a pump is increased and transferred to spring room, M, through the path, G, because negative brake is working on. If the pressure of room M is over the power of spring that keeps spool medium, spool moves to the right side.

An oil in room N is sent to room M by orifice I and discharged from G line to a tank.

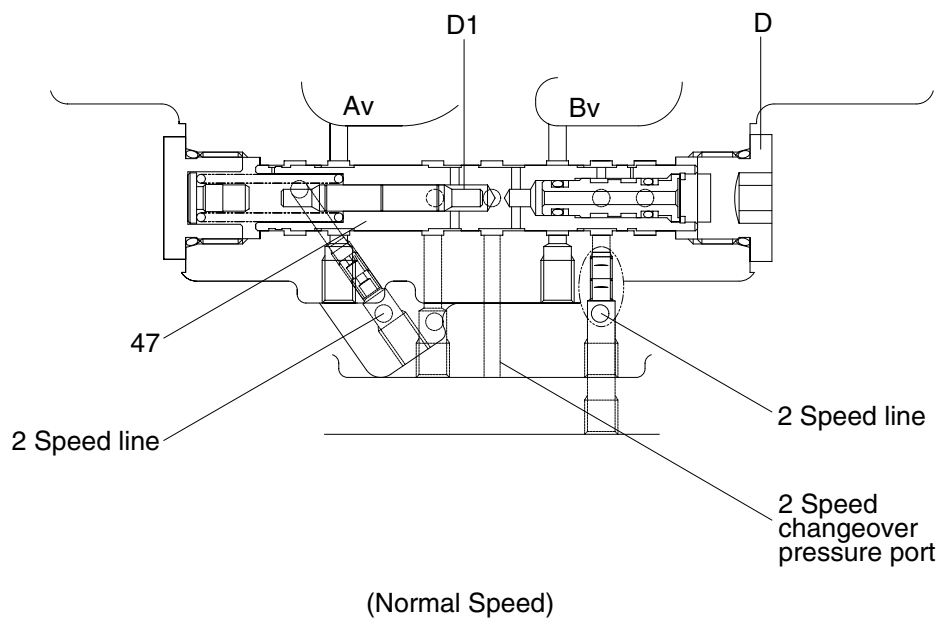
So spool moves to the right. The oil flows as the way of K → Bv.



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## 2.5 Working description of automatic switch(at normal speed)

Due to no pressure on pilot now, spool(47) is not working.

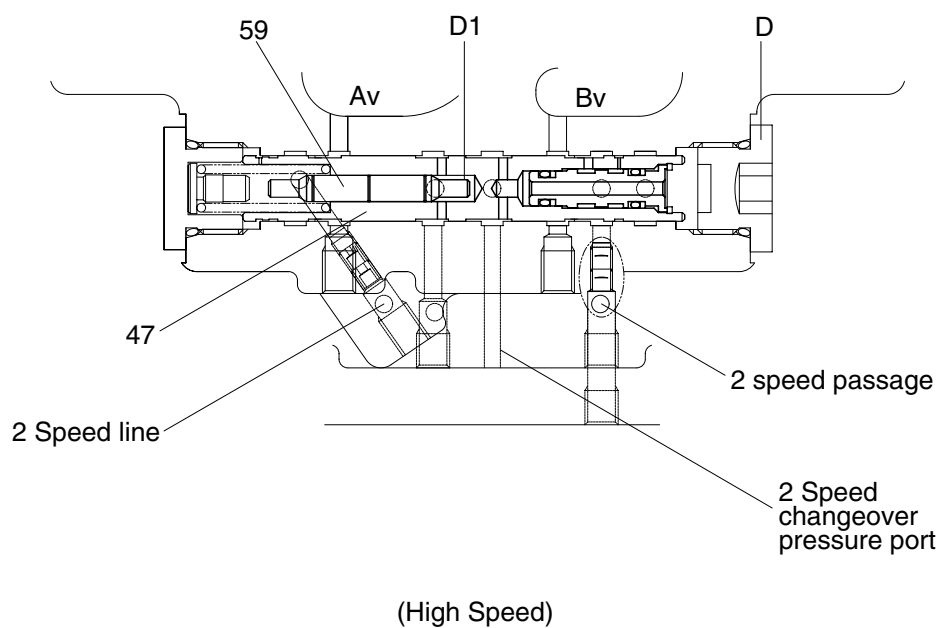


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## 2.6 Working description of automatic switch(at high speed)

At normal speed, once the hydraulic oil which is through the inner path of spool(47) flows into high speed switching pressure port(The pressure of external pilot :  $P_i = 35\text{kgf/cm}^2$ ) spool(47) moves from right to left.

At high speed, turning pressure of motor(D1) is over  $250\text{kgf/cm}^2$ , when the power forcing to spool(59) (Pressure,  $P_1$ ) is stronger than spool(47) and spool(59) is pushed out, after then spool(47) moves from left to right. So it is switched.



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