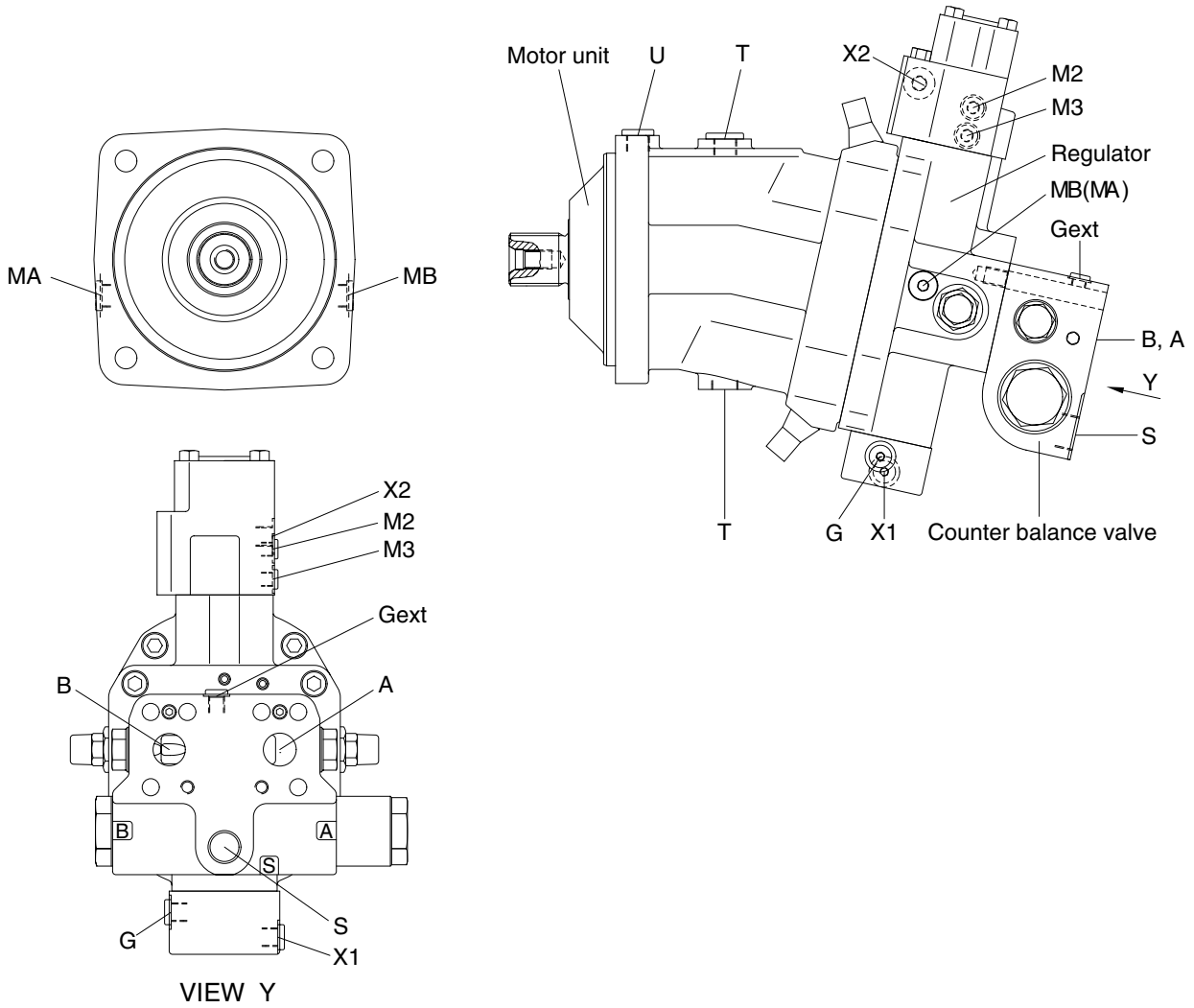


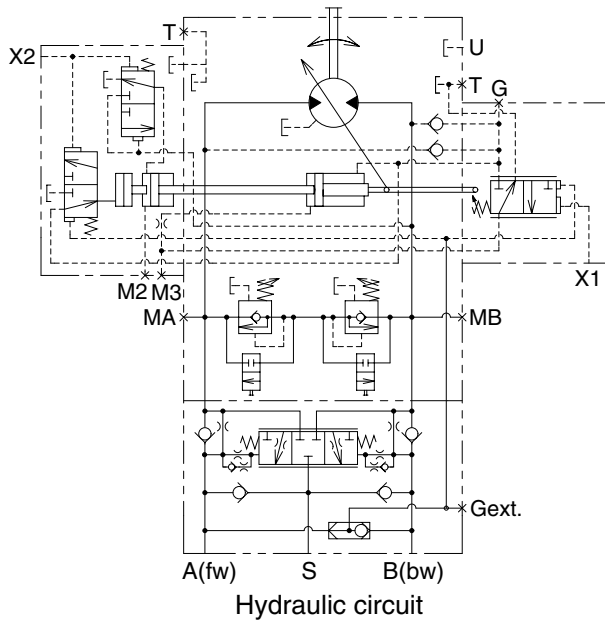
# GROUP 4 TRAVEL MOTOR

## 1. CONSTRUCTION

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

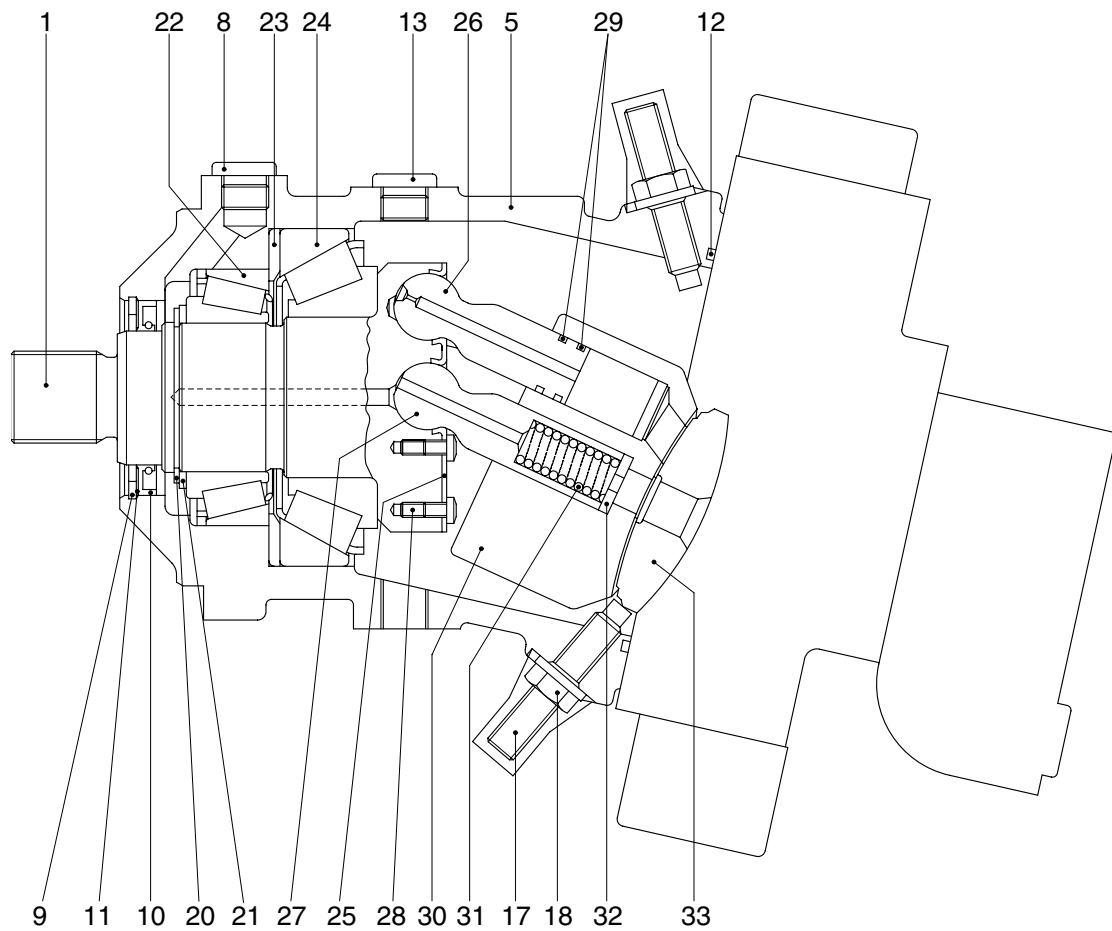


14W92TR01



Port	Port name	Port size
A, B	Main port	SAE 6000psi 1"
G	N.A	M14 × 1.5-12
X1	Pilot pressure port	M14 × 1.5-12
X2	Pilot pressure port	M14 × 1.5-11.5
T	Drain port	PF 3/4-18
U	Flushing port	PF 1/2-17
S	Make up port	M27 × 2.0-16
MA, MB	Gauge port	M18 × 1.5-12
M2, M3	Gauge port	M10 × 1.0-8
Gext	Brake release port	M12 × 1.5-12.5

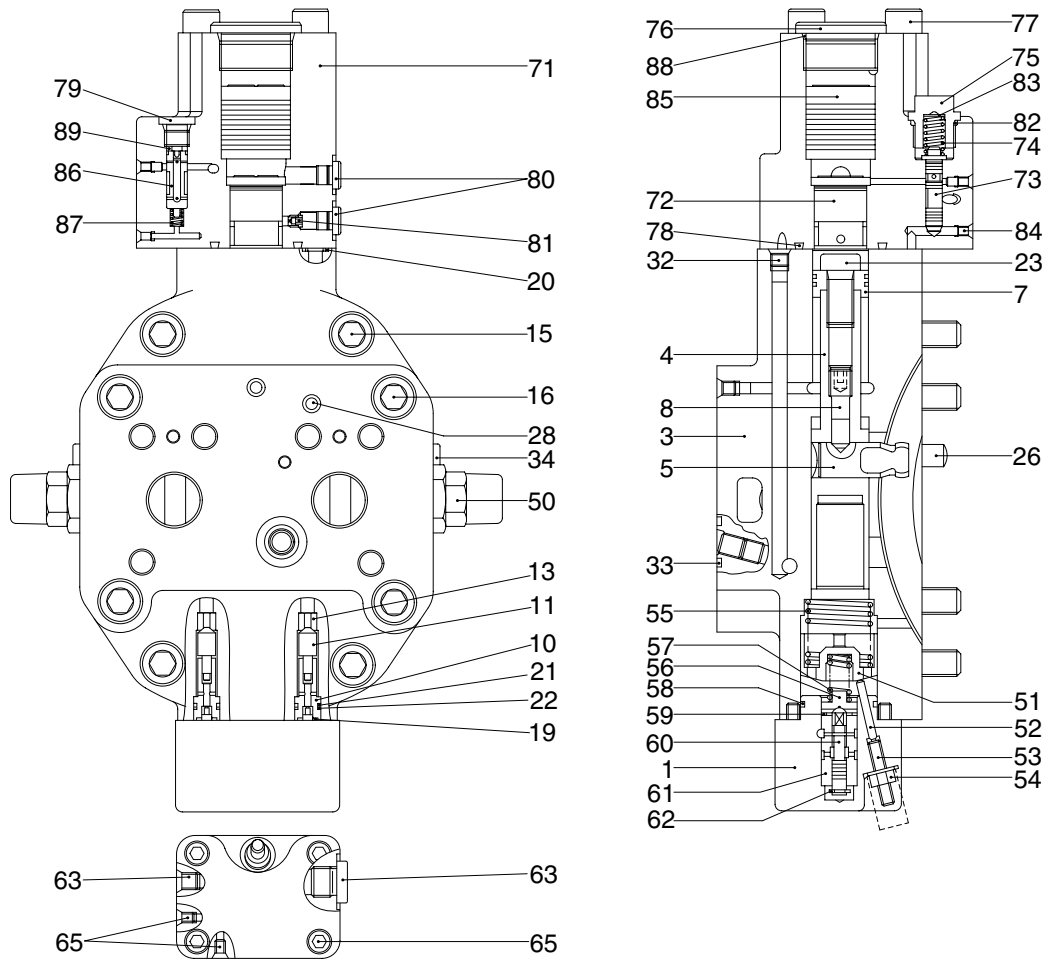
# 1) MOTOR UNIT



200W34TM02

- |    |                 |    |                      |    |                    |
|----|-----------------|----|----------------------|----|--------------------|
| 1  | Drive shaft     | 17 | Threaded pin         | 26 | Piston             |
| 5  | Housing         | 18 | Seal lock nut        | 27 | Center pin         |
| 8  | Locking screw   | 20 | Retaining ring       | 28 | Pan head screw     |
| 9  | Retaining ring  | 21 | Back up plate        | 29 | Steel sealing ring |
| 10 | Shaft seal ring | 22 | Taper roller bearing | 30 | Cylinder block     |
| 11 | Back up plate   | 23 | Shim                 | 31 | Pressure spring    |
| 12 | O-ring          | 24 | Taper roller bearing | 32 | Adjustment shim    |
| 13 | Locking screw   | 25 | Retaining plate      | 33 | Control lens       |

## 2) REGULATOR



20W92TR01

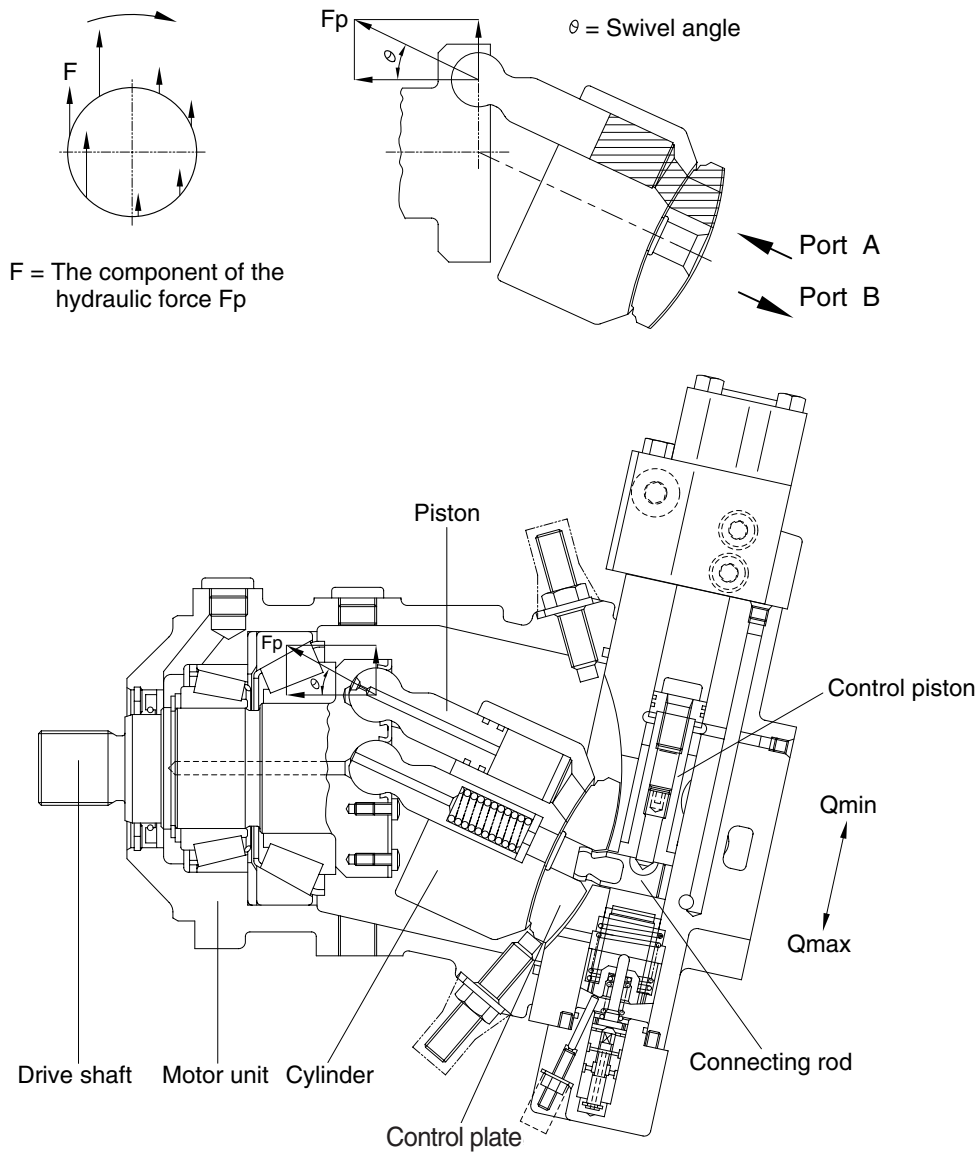
1	Control housing	32	Double break off pin	71	Housing
2	Stroke limiter	33	O-ring	72	Piston
3	Port plate	34	Locking screw	73	Control piston
4	Positioning piston	50	Relief valve	74	Pressure spring
5	Positioning trunnion	51	Adjusting bushing	75	Locking screw
7	Piston	52	Cylinder pin	76	Locking screw
8	Threaded pin	53	Threaded pin	77	Socket head screw
10	Valve guide	54	Seal lock nut	78	O-ring
11	Bolt	55	Pressure spring	79	Locking screw
12	Throttle screw	56	Spring collar	80	Locking screw
13	Bushing	57	Pressure spring	81	Orifice
15	Socket head screw	58	O-ring	82	O-ring
16	Socket head screw	59	Retaining ring	83	Shim
19	O-ring	60	Control piston	84	Double break off pin
20	O-ring	61	Control bushing	85	Piston
21	O-ring	62	Retaining disc	86	Control piston
22	Back up ring	63	Locking screw	87	Pressure spring
23	Socket head screw	64	Double break off pin	88	O-ring
26	Cylinder pin	65	Double break off pin	89	Shim
28	Double break off pin	66	Socket head screw		

## 2. TRAVEL MOTOR FUNCTION

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

When the pressure oil is led into the cylinder in which seven pistons are flexibly mounted in a circular formation, pistons press the shaft and set it in rotation. One piston travels one stroke during one rotation, which results in that oil is sucked and discharged. As each of seven pistons continuously acts such movement in turn, the drive shaft can do rotary movement smoothly. The component of the hydraulic force acting on the piston produces turning effect. Therefore, as the swivel angle becomes larger, the turning effect becomes larger. In addition, as the travel angle becomes larger, the displacement becomes larger, which results in that the operating speed becomes slower.

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.



14W92TR05

### 3. REGULATOR FUNCTION

#### HA function

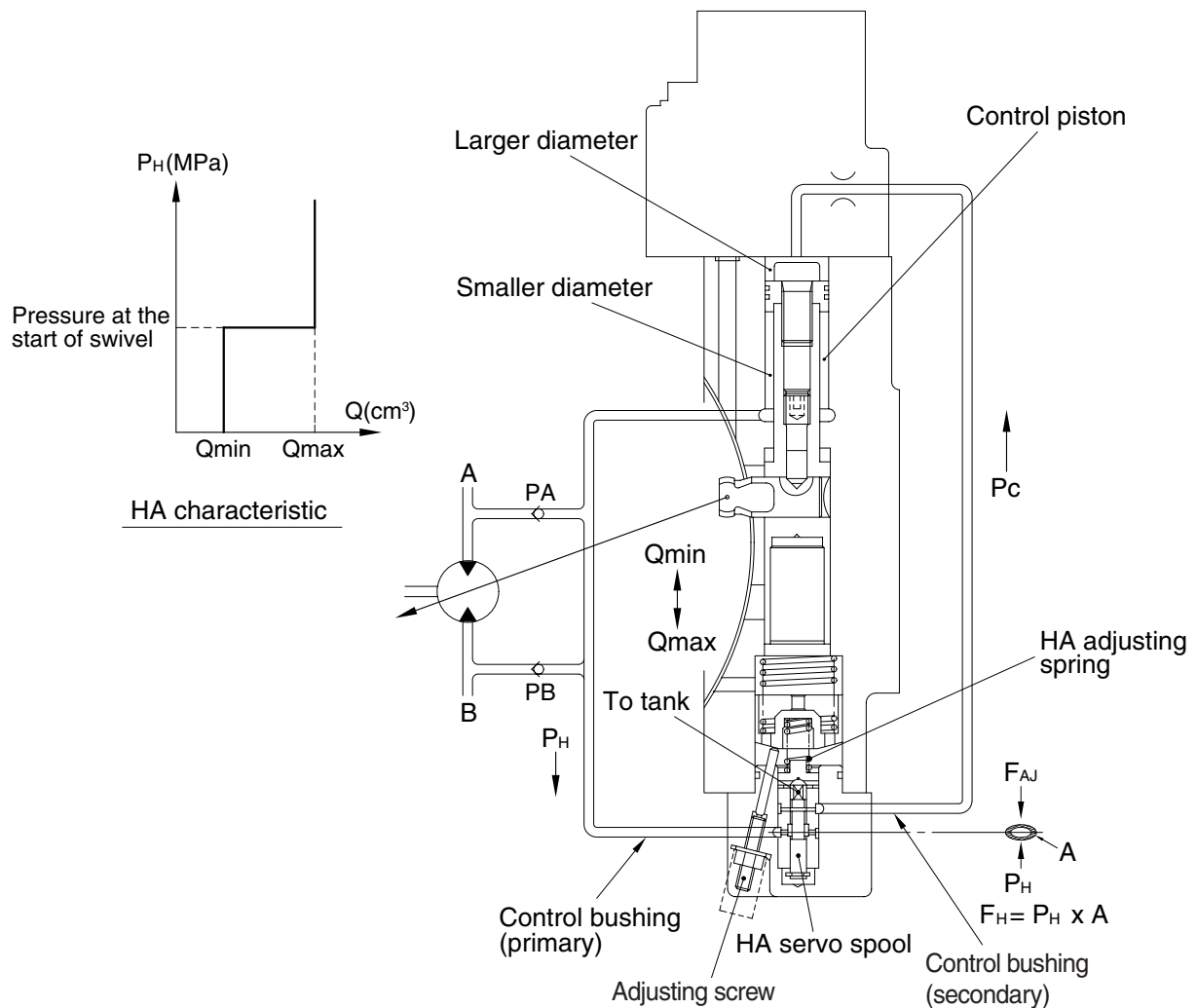
By sensing the load, the displacement varies.

#### HA operation

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

If the circuit pressure value is lower than the pressure value at the start of swivel, the control pressure  $P_c$  acting on the larger diameter of the 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 causes the control piston to move toward the larger swivel angle.

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



#### 4. RETARDING FUNCTION

When the travel motor operates as a pump at putting on a brake or going down a hill, it causes braking pressure (counter pressure). By using this braking pressure, the displacement will be a little bit larger, which results in a better braking performance. We call that retarding function.

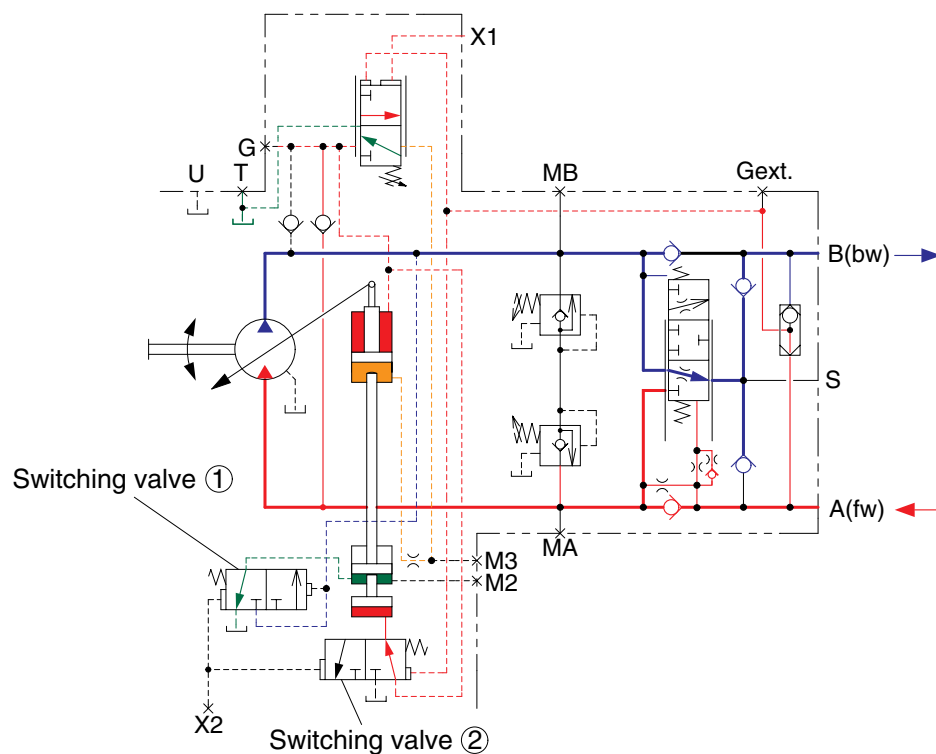
Because there are some concerns that the cavitation occurs when the variation of the displacement is large, it is necessary to select the proper displacement ( $Q_{mid}$ ) with considering the conditions and the feeling over the real machine.

In running at port A pressurized (Fig TR07), the pressure at port MB becomes a high pressure at the brake. When that pressure exceeds the setting pressure of the switching valve ①, the switching valve ① shifts and the high pressure line connects with port M2. This causes the control piston to move toward the larger swivel angle and thus the displacement becomes a middle displacement ( $Q_{mid}$ ) (Fig TR08). In this case, the pressure at port X2 is unloaded.

We recommend that the pressure at the start of swivel be about 2 MPa lower than the setting pressure of the switching valve ① and the setting pressure of relief valve be about 4 MPa higher than the setting pressure of the switching valve ①. Furthermore, by pressurizing port X2, the switching valve ① is kept off-state and the displacement doesn't changes (Fig TR09).

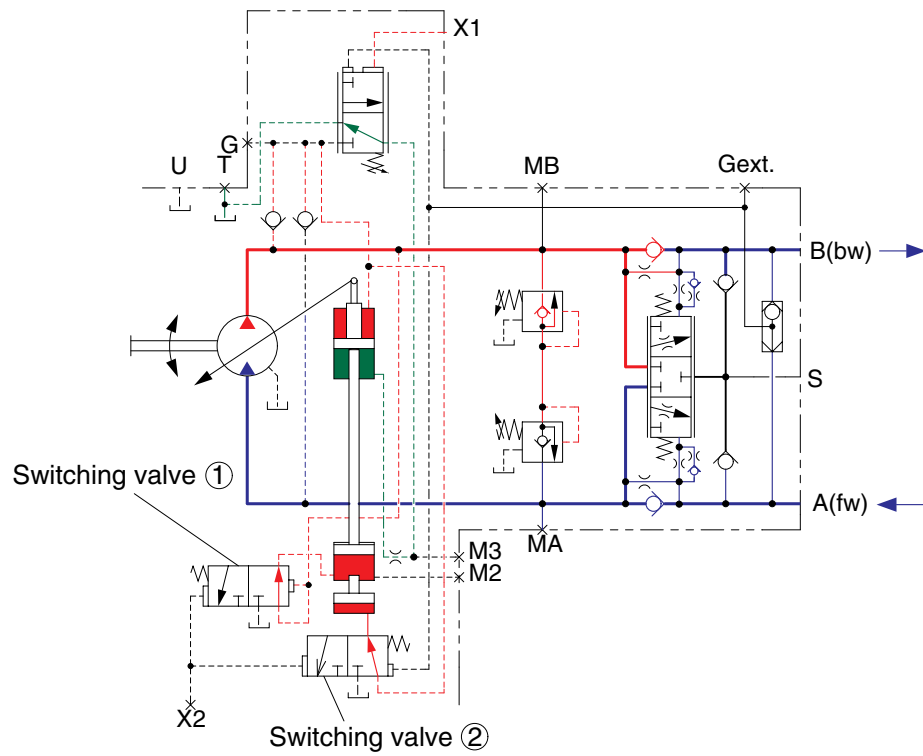
※ : The switching valve ② has the function to select the displacement in proportion to the gear ratio (first gear or second gear), by pressurizing port X2, the switching valve ② becomes on-state and the minimum displacement at first gear is selected.

##### 1) IN RUNNING : Port X2 : unloaded



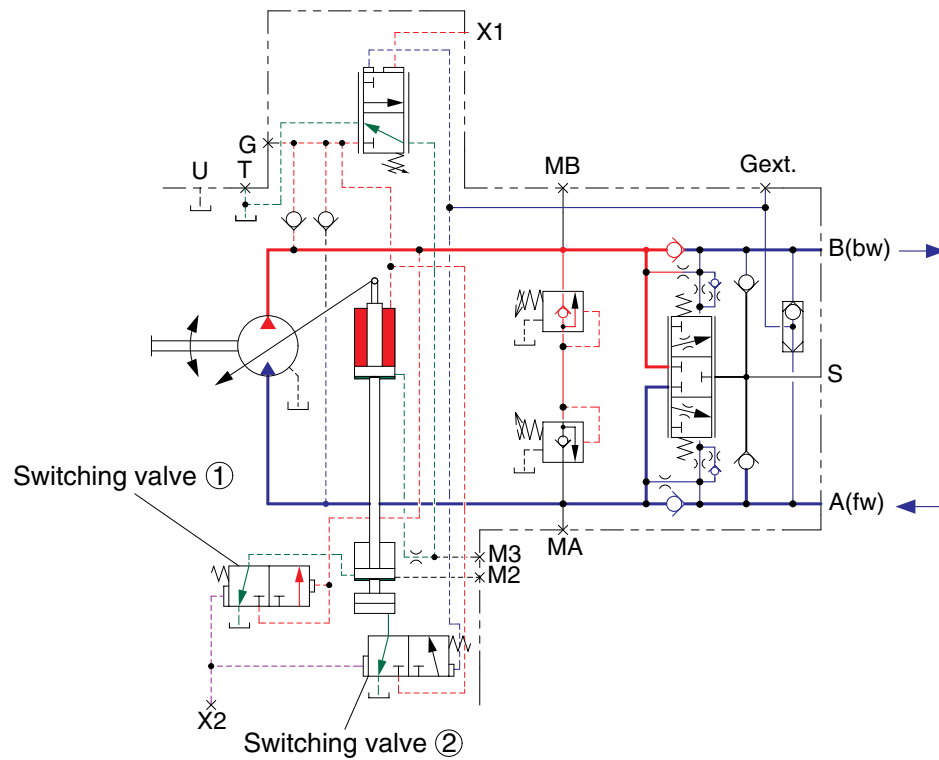
14W92TR07

2) IN BRAKING : Port X2 : unloaded



14W92TR08

3) IN BRAKING : Port X2 : pressurized



14W92TR09