TO THE READER

This Workshop Manual shows the altered points of new T1700H·T1700HX (Serial No.: above 50000) which is installed with Eaton's hydrostatic transaxle, from T1700H·T1700HX (Serial No.: up to 50000). It is divided into two parts, "MECHANISM" and "DISASSEMBLING AND SERVICING".

As for the items which are not explained in this Workshop Manual, refer to the description of the T1700H·T1700HX Workshop Manual (Code No. : 97897-11260) issued before.

All information, illustrations and specifications contained in this manual are based on the latest production information available at the time of publication.
The right is reserved to make changes in all information at any time without notice.

April '93

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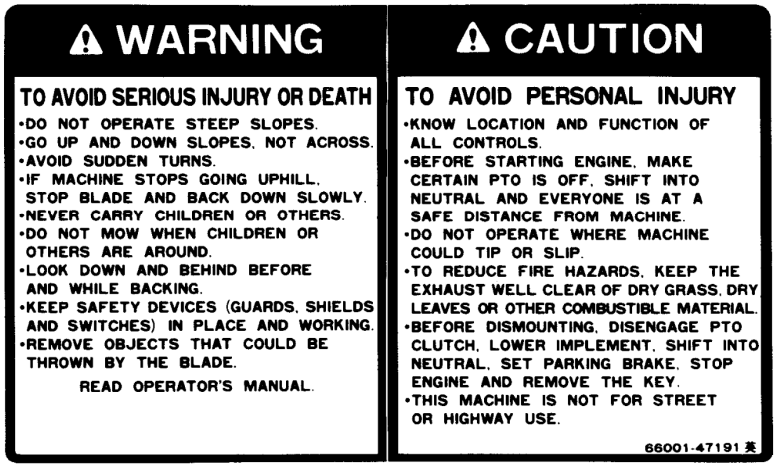
SAFETY DECALS

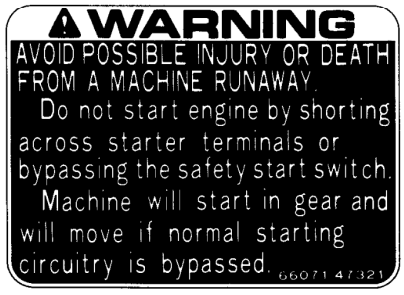
- **The following safety decals are installed on the vehicle and mower.**
  If a decal becomes damaged, illegible or is not on the vehicle and mower, replace it. The decal part number is listed in the parts list.

❶ Code No. 66001-4719-1

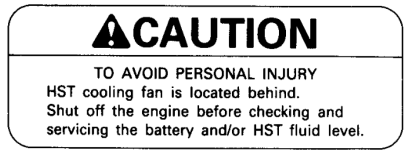


❷ Code No. 66071-4752-1 (HST only)

❸ Code No. 66071-4732-1



❹ Code No. 66001-4713-3



❺ Code No. 66071-6179-1

❻ Code No. 66071-6178-1

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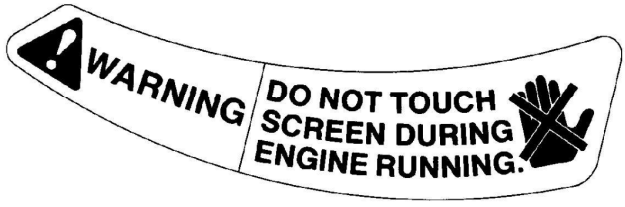
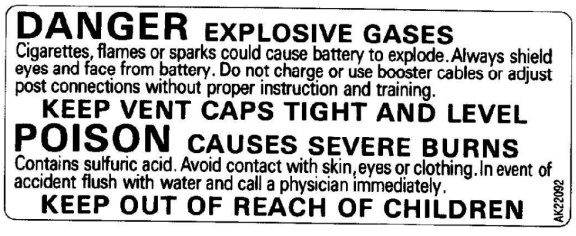
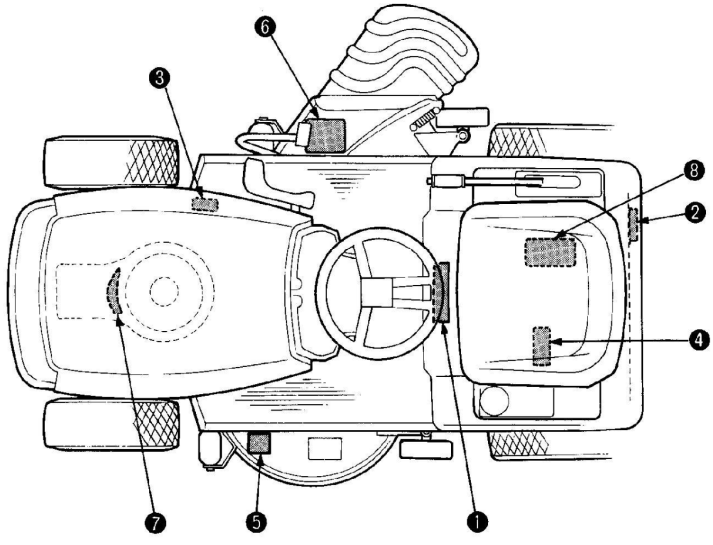
❼ Code No. 12499-4711-1



❽ Label, Battery





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SPECIFICATIONS

Engine

Model		GH540V
Type		Forced air-cooled, Vertical shaft OHV, 4-stroke gasoline engine
Number of Cylinders		1
Bore x Stroke		89 x 86 mm (3.50 x 3.39 in.)
Total Displacement		535 cc (32.64 cu. in)
Maximum Horsepower (Gross)		17 HP / 3600 rpm
Maximum Torque		3.75 N·m / 2000 rpm (3.82 kgf·m / 2000 rpm, 27.6 ft-lbs / 2000 rpm)
Maximum Bare Speed		3350 ± 50 rpm
Minimum Bare Idling Speed		1550 ± 75 rpm
Compression Ratio		8.3 : 1
Cooling System		Forced air cooling
Ignition System		Transistorized flywheel magneto
Ignition Timing		0.40 rad. (23°C) B.T.D.C.
Spark Plug		CHAMPION RN 11 YC.
Carburetor		Float type fixed main jet
Air Cleaner		Semi-cyclone type with dual element
Governor		Mechanical flyweight
Lubricating System		Forced lubrication by trochoid pump
Starting System		Electric starter with battery
Starting Motor		12V - 0.8 kW, Shift type
Recommended Battery Capacity		28A19R (12V, 21Ah at 5 H.R.)
Fuel	Type	Automobile unleaded gasoline
	Capacity	9.5 ℓ 2.51 U.S.gals. 2.09 Imp.gals.
Engine Oil	Type	Engine oil: API service SE or SD class
	Capacity	1.6 ℓ 1.7 U.S.qts. 1.41 Imp.qts.
Weight (Dry)		43.5 kg (95.8 lbs)

Vehicle

Model		T1700H	T1700HX
Overall Length		1705 mm (67.13 in.)	1732 mm (68.19 in.)
Overall Height		1025 mm (40.35 in.)	1050 mm (41.34 in.)
Overall Width		875 mm (34.45 in.)	935 mm (36.81 in.)
Wheel Base		1190 mm (46.85 in.)	
Minimum Ground Clearance		144 mm (5.7 in.)	152 mm (6.0 in.)
Tread	Front	650 mm (25.59 in.)	655 mm (25.79 in.)
	Rear	660 mm (25.98 in.)	690 mm (27.17 in.)
Transmission		Hydrostatic transmission	
Traveling Speed	Forward	0 to 9 km / h (0 to 5.6 mph)	0 to 10 km / h (0 to 6.2 mph)
	Reverse	0 to 5 km / h (0 to 3.1 mph)	0 to 5 km / h (0 to 3.1 mph)
PTO Clutch		Electromagnetic clutch	
Steering System		Sector gear type	
Brake (Parking Brake)		Wet disc type	
Tire Size	Front	14 x 5.00 - 6	15 x 6.00 - 6
	Rear	18 x 8.50 - 8	20 x 10.0 - 8
Weight (with mower)		258 kg (568.8 lbs)	273 kg (601.9 lbs)

Mower

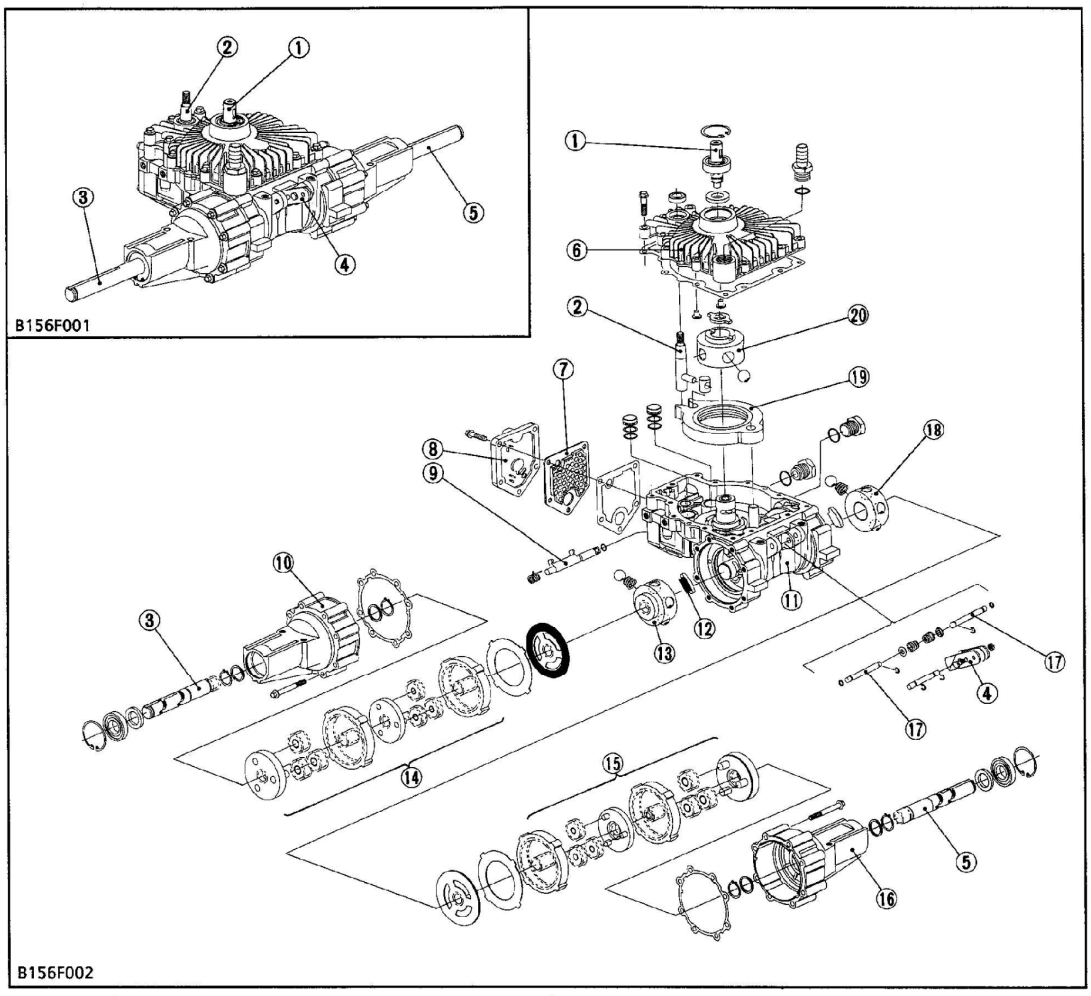
Model	RC40LT-17	RC44LT-17	RC48LT-17
Overall Length	835 mm (32.87 in.)	825 mm (32.48 in.)	937 mm (36.89 in.)
Overall Height	260 mm (10.24 in.)	282 mm (11.10 in.)	
Overall Width	1320 mm (51.97 in.)	1430 mm (56.30 in.)	1535 mm (60.43 in.)
Mounting Method	Parallel linkage		
Adjustment of Cutting Height	Gauge wheel		
Cutting Width	1016 mm (40 in.)	1118 mm (44 in.)	1224 mm (48 in.)
Cutting Height	24 to 102 mm (1 to 4 in.)	26 to 102 mm (1 to 4 in.)	
Weight (Approx.)	43 kg (94.8 lbs)	58 kg (127.9 lbs)	66 kg (145.5 lbs)
Number of Blades	2	3	
Discharge	Right side		

M. MECHANISM

2 CLUTCH AND TRANSMISSION

[3] HYDROSTATIC TRANSAXLE

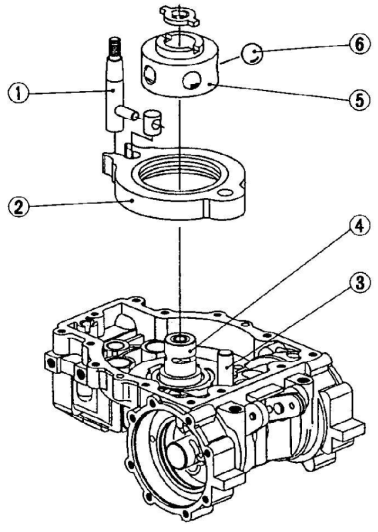
T1700H is installed with Eaton's hydrostatic transaxle for easy changeover between forward and reverse travelings and speed control by one foot pedal. Clutch operation and shift lever operation are unnecessary. The hydrostatic transaxle, in its compact package, has the hydrostatic transmission, rear axle case with reduction gear and parking brake mechanism. The hydrostatic transmission block adopts a simple design consisting of one ball piston pump and two ball piston motors, attaining excellent durability requiring least maintenance.



(1) Input Shaft
(2) Control Shaft
(3) Rear Axle (Left)
(4) Brake Lever
(5) Rear Axle (Right)
(6) Cover
(7) Filter
(8) Valve Cover
(9) Dump Valve Bracket
(10) Axle Housing (Left)
(11) Housing
(12) Friction Pad
(13) Ball Piston Motor (Left)
(14) Reduction Gear (Left)
(15) Reduction Gear (Right)
(16) Axle Housing (Right)
(17) Push Rod
(18) Ball Piston Motor (Right)
(19) Cam Ring
(20) Ball Piston Pump

(1) Ball Piston Pump

[Ball Piston Pump]



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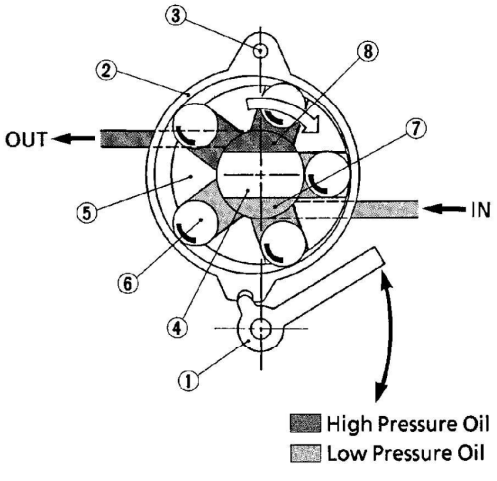
[Operation]



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The ball piston pump driven by the input shaft is of the variable displacement type in which the delivery rate and direction are changed by the cam ring.

The ball piston pump consists of pump shaft (4) having two ports (7), (8), pump rotor (5) having five ball pistons (6) installed on the pump shaft, and cam ring (2) whose position around the pump rotor is changed by the speed control pedal operation.

When the input shaft drives the pump rotor, the ball pistons move along the inner circumference of the cam ring because of the centrifugal force.

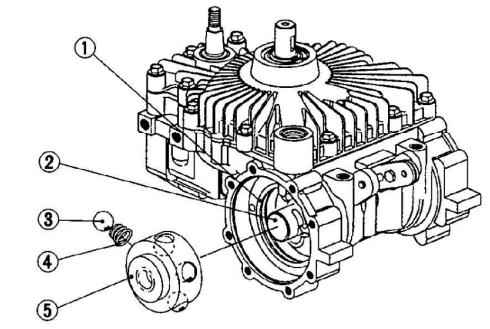
When the cam ring is in an eccentric position as against the pump rotor, ball pistons also move in the up and down direction as against the cylinder to effect oil suction and discharge through two ports on the pump shaft.

Speed control pedal operation causes control shaft (1) to be rotated via the link mechanism to oscillate the cam ring around fulcrum (3). As a result, the cam ring is placed concentrically or eccentrically with the rotor. As the cam ring eccentricity increases, the oil suction and discharge rates increase.

(1) Control Shaft
(2) Cam Ring
(3) Fulcrum
(4) Pump Shaft
(5) Pump Rotor
(6) Ball Piston
(7) Port
(8) Port

(2) Ball Piston Motor

[Ball Piston Motor]



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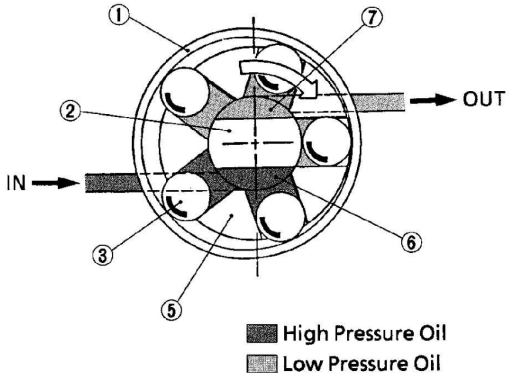
[Operation]



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Two fixed displacement type ball piston motors are provided.

Each motor is driven by the oil fed under pressure from the pump to drive the rear axle LH or RH.

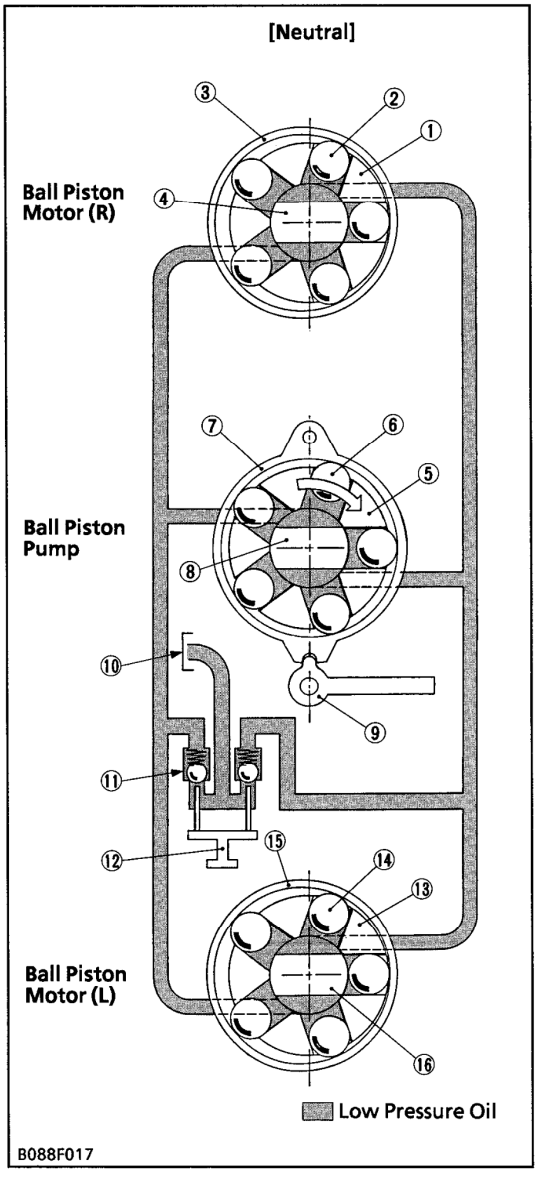
Each ball piston motor consists of motor shaft (2) having two ports (6), (7), motor rotor (5) having five ball pistons (3) and installed on the motor shaft, and motor race (1) installed eccentrically with the motor rotor to limit the ball piston movement.

When the oil fed under pressure from the ball piston pump enters the cylinder through port (6) on the motor shaft, ball pistons are pushed in the direction to increase the cylinder capacity, the motor rotor starts rotation in the direction of the arrow in the illustration.

The motor rotor revolving speed increases as the incoming oil flow rate increases. When the oil inlet port is reversed, the motor rotor revolving direction is reversed.

(1) Motor Race
(2) Motor Shaft
(3) Ball Piston
(4) Spring
(5) Motor Rotor
(6) Port
(7) Port

(3) Oil Flow



Each two ports of the ball piston motor (R) and (L) and the ball piston pump are connected to form a closed oil circuit as illustrated.

■ Neutral

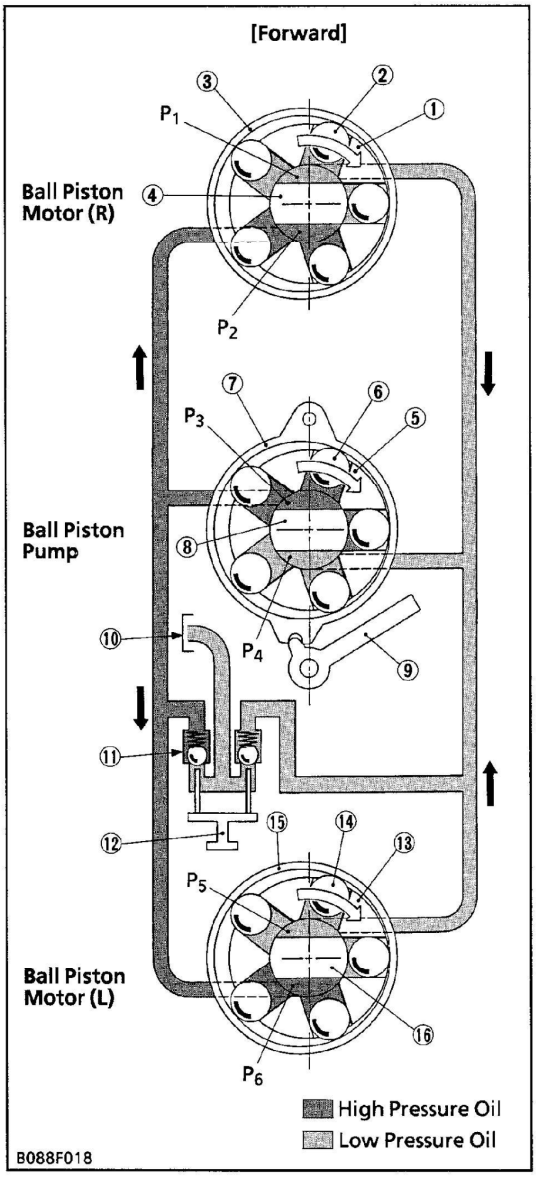
When the speed control pedal is in its neutral position, control shaft (9) sets cam ring (7) concentrically with the pump rotor (5) to effect no oil delivery when the pump rotor rotates. Therefore no oil pressure generates in the oil circuit to keep ball piston motors stopped to cause no traveling.

■ By-pass Lever

When the engine is stopped or in the neutral state, ball piston motors (R), (L) are locked to effect rear wheel braking because of the closed oil circuit.

Operating by-pass lever (12) opens the check valve (11) to free ball piston motors, enabling the vehicle to be moved by manual pushing.

(1) Motor Rotor (R)
(2) Ball Piston
(3) Motor Race (R)
(4) Motor Shaft (R)
(5) Pump Rotor
(6) Ball Piston
(7) Cam Ring
(8) Pump Shaft
(9) Control Shaft
(10) Oil Tank
(11) Check Valve
(12) By-pass Lever
(13) Motor Rotor (L)
(14) Ball Piston
(15) Motor Race (L)
(16) Motor Shaft (L)

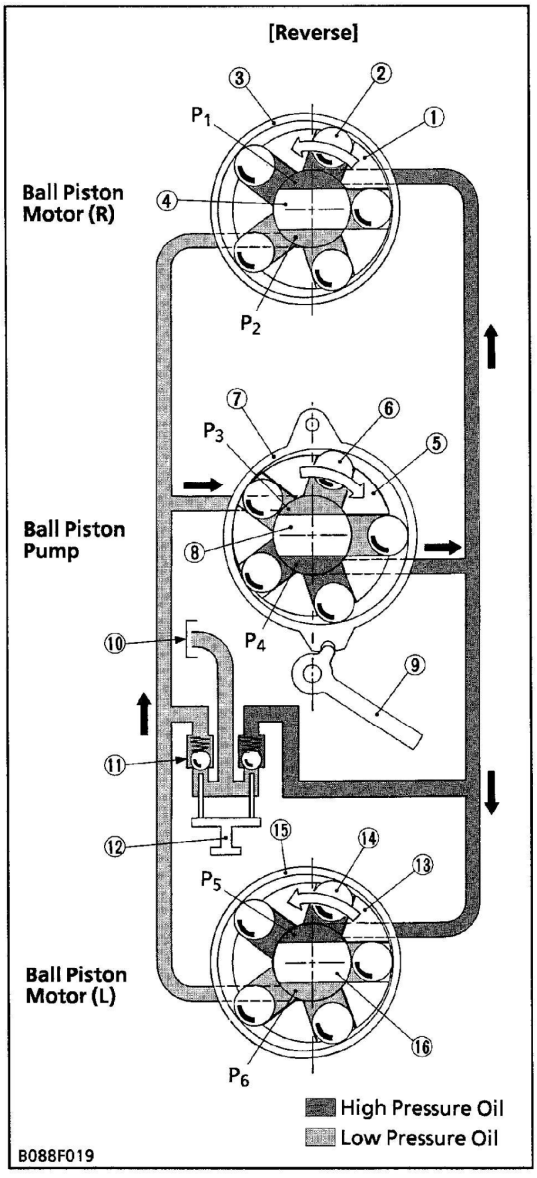


■ Forward

When the speed control lever is operated in the forward direction, control shaft (9) sets cam ring (7) eccentrically with pump rotor (5). Pressurized oil fed through the **P3** port flows to ball piston motors (R) and (L) through the **P2** and **P6** ports to drive the motors (R) and (L) for forward traveling of the vehicle.

As the speed control pedal movement increases, the cam ring eccentricity and the resultant pump discharge rate increase to increase the traveling speed.

(1) Motor Rotor (R)
(2) Ball Piston
(3) Motor Race (R)
(4) Motor Shaft (R)
(5) Pump Rotor
(6) Ball Piston
(7) Cam Ring
(8) Pump Shaft
(9) Control Shaft
(10) Oil Tank
(11) Check Valve
(12) By-pass Lever
(13) Motor Rotor (L)
(14) Ball Piston
(15) Motor Race (L)
(16) Motor Shaft (L)



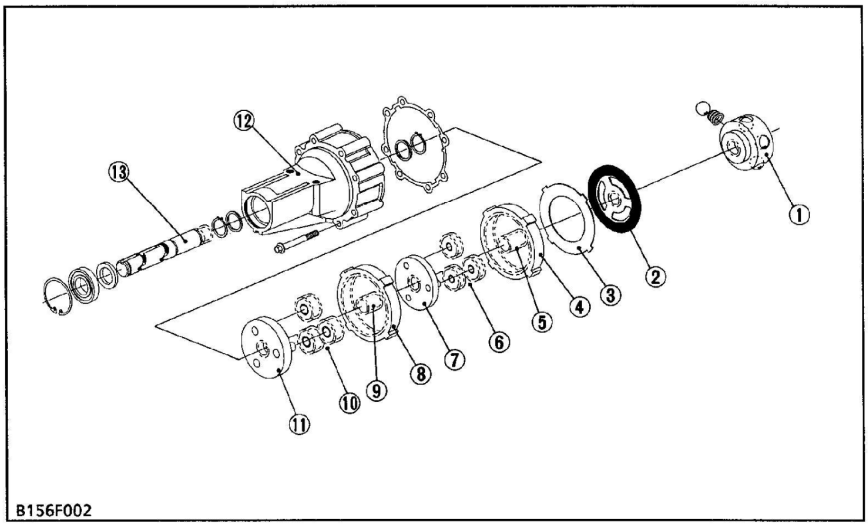
■ **Reverse**

When the speed control pedal is operated in the reverse direction, control shaft (9) sets cam ring (7) eccentrically with pump rotor (5) in the direction opposite to that for forward traveling.

The pressurized oil is fed through the **P4** port and flows through the **P1** and **P5** ports to the ball piston motor (R) and (L). As a result, ball piston motors (R) and (L) rotate in the reverse direction to cause reverse traveling of the vehicle.

(1) Motor Rotor (R)
(2) Ball Piston
(3) Motor Race (R)
(4) Motor Shaft (R)
(5) Pump Rotor
(6) Ball Piston
(7) Cam Ring
(8) Pump Shaft
(9) Control Shaft
(10) Oil Tank
(11) Check Valve
(12) By-pass Lever
(13) Motor Rotor (L)
(14) Ball Piston
(15) Motor Race (L)
(16) Motor Shaft (L)

(4) Reduction Gear

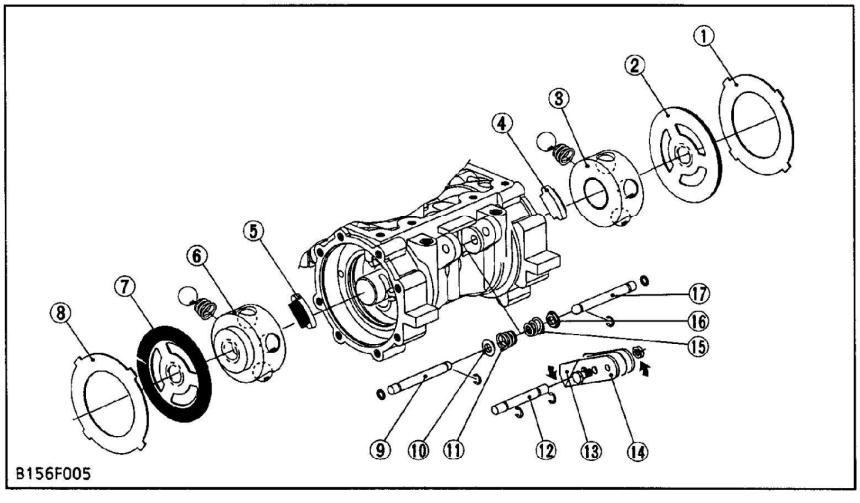


(1) Ball piston Motor
(2) Reaction Plate
(3) Backup Plate
(4) 1st Ring Gear
(5) 1st Sun Gear
(6) 1st Planetary Gear
(7) 1st Carrier
(8) 2nd Ring Gear
(9) 2nd Sun Gear
(10) 2nd Planetary Gear
(11) 2nd Carrier
(12) Axle Housing
(13) Axle Shaft

The revolving speed of ball piston motor (1) is reduced by the reduction gear system consisting of two stages of planetary gears and ring gears, then transmitted to axle shaft (13).

The transmission sequence is as follows:
Ball piston motor (1) → 1st sun gear (5) → 1st planetary gear (6) → 1st carrier (7) → 2nd sun gear (9) → 2nd planetary gear (10) → 2nd carrier (11) → Axle shaft (13)

(5) Parking Brake



(1) Backup Plate (R)
(2) Reaction Plate (R)
(3) Ball Piston Motor (R)
(4) Friction Pad (R)
(5) Friction Pad (L)
(6) Ball Piston Motor (L)
(7) Reaction Plate (L)
(8) Backup Plate (L)
(9) Push Rod (L)
(10) Spring Base (L)
(11) Spring (L)
(12) Brake Shaft
(13) Bend
(14) Brake Lever
(15) Spring (R)
(16) Spring Base (R)
(17) Push Rod (R)

When the brake pedal is depressed , the force is conveyed through the linkage to the brake lever (14), which is rocked around the shaft (12).

Now the bend (13) of the brake lever presses the push rods (9) and (17) against the springs (11) and (15). The push rods are thus forced into the housing.

As a result, the friction pads (4) and (5) in the housing are pressed by the push rods into contact with the ball piston motors (3) and (6) in order to produce the braking force between the backup plates (1), (8) and the reaction plates (2), (7).