Installation and Maintenance Manual

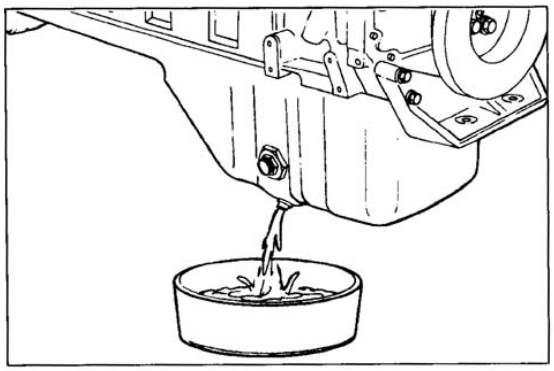
Change of Engine Oil and Engine Oil Cartridge

- The engine oil will become dirt and the engine oil additive will reduce after the engine is used.

  The content of pollutant is in direct proportion to the total loss of fuel and engine oil.

★ The period of changing the engine oil, in any case, should not exceed 8000 km, 250 hours or above three months for the engine under normal operation.

- Change the engine oil and engine oil cartridge to remove the impurities suspended inside the engine oil.



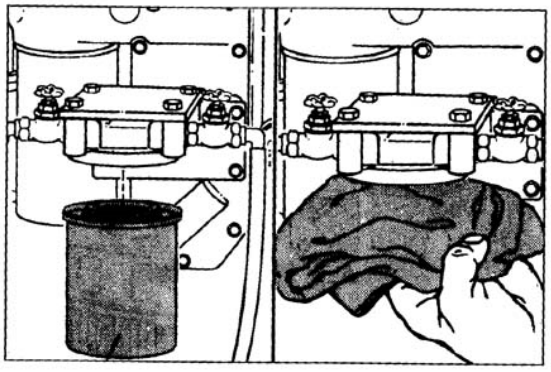
★ Discharging the oil when the engine oil is hot and the pollutant is under suspension status.

- Stop the machine when the engine running until the water temperature is reaches to 60℃ and dismantle the discharging oil screw plug.

⚠ Hot engine oil will result in hurt to persons.

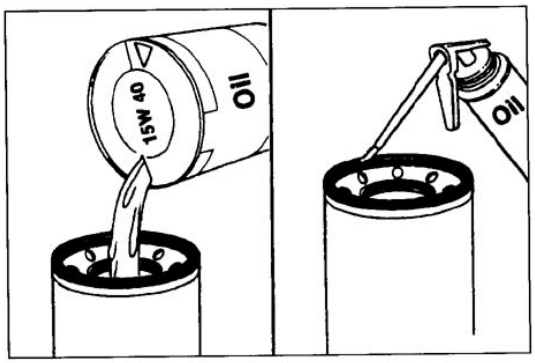
- Clean the around head of the engine oil cartridge. Dismantle the cartridge.

  Clean the surface of washer on the head of cartridge.

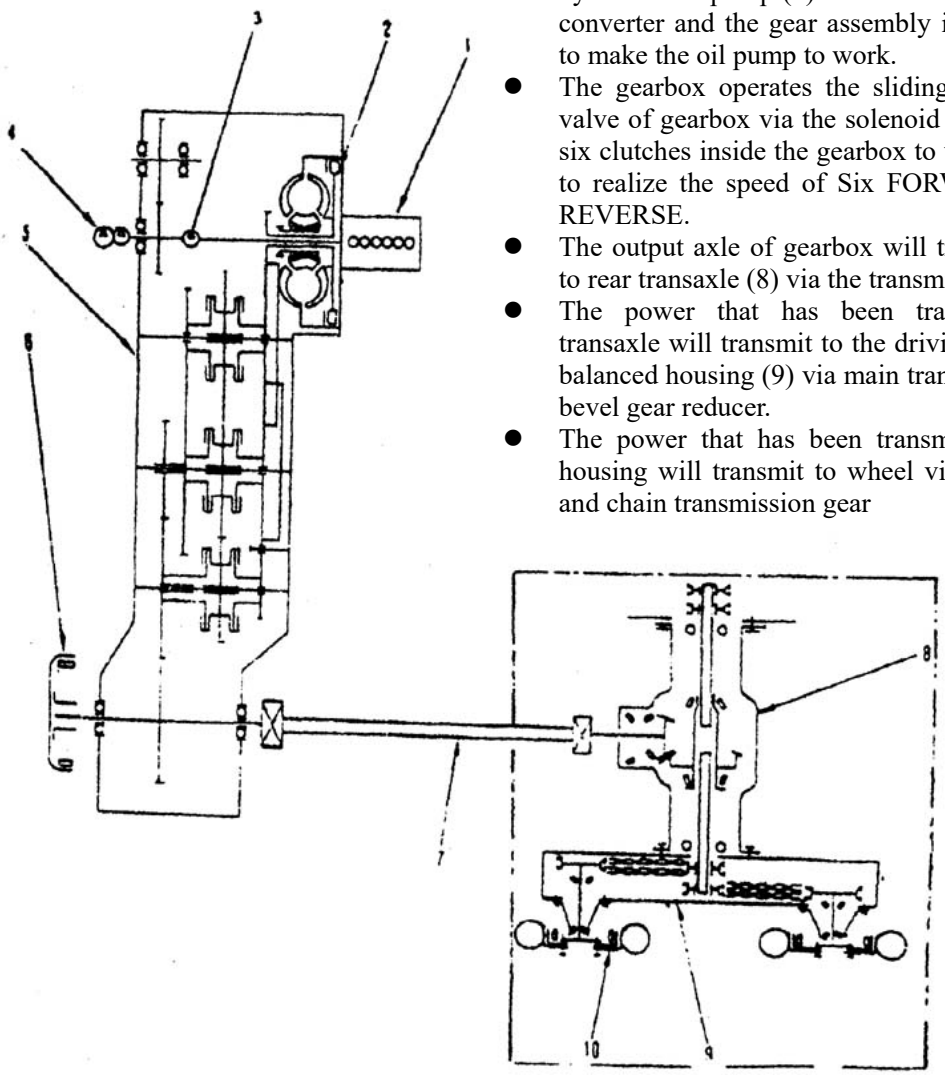


★ O sealing ring will clog into the head of the cartridge, so it should be removed.

- Apply one thin layer of engine oil on the sealing surface of washer before assemble the cartridge.



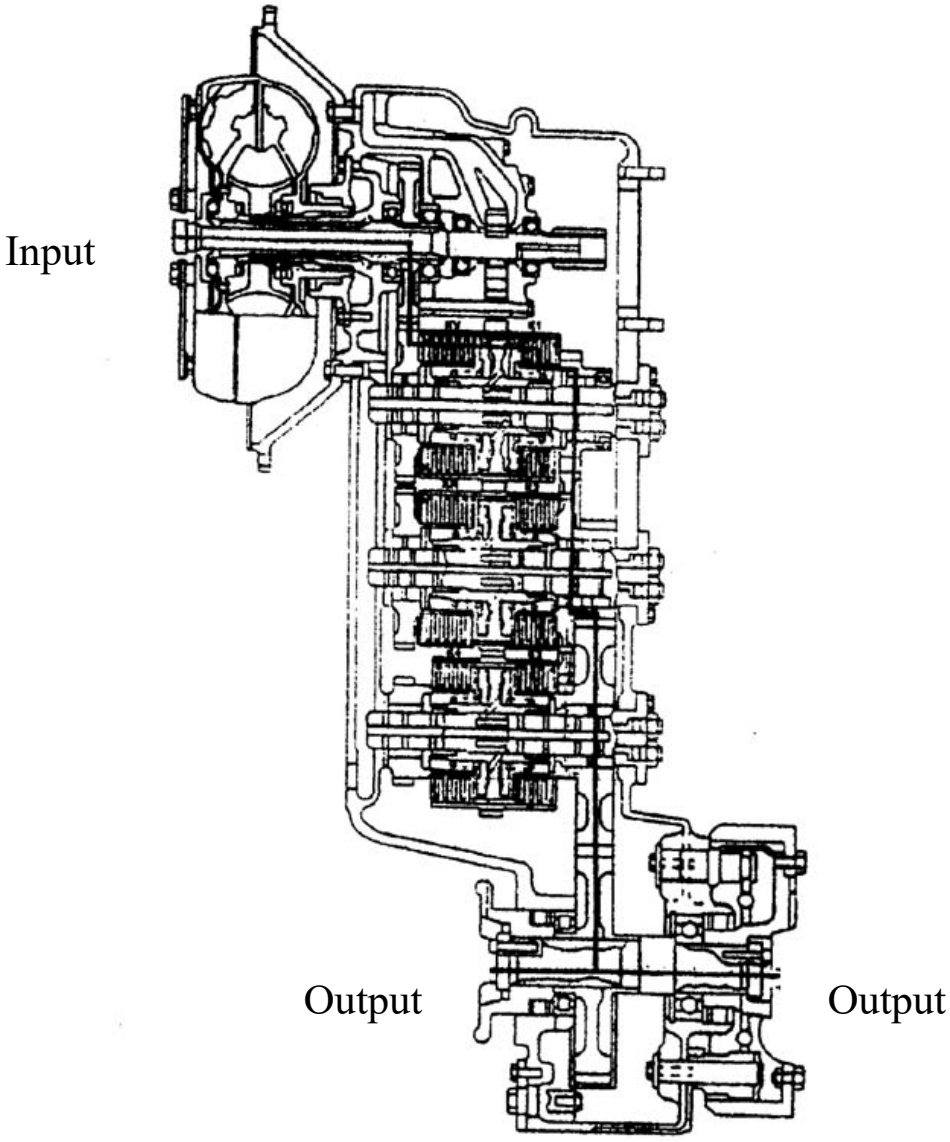
Transmission System



- The power of engine (1) was transmitted to torque converter via the flywheel, connecting plate (2) of flywheel and elastic connecting plate.
- The torque converter takes the oil as medium. The torque converter will convert the transmitted torque based on the variation of load, and then the torque was transmitted to the driving gear of gearbox.
- In additional, the power of engine was transmitted to hydraulic oil pump (4) via the axle inside the torque converter and the gear assembly inside the gearbox to make the oil pump to work.
- The gearbox operates the sliding valve of control valve of gearbox via the solenoid valve to make the six clutches inside the gearbox to work, respectively to realize the speed of Six FORWARD and Three REVERSE.
- The output axle of gearbox will transmit the power to rear transaxle (8) via the transmission shaft (7).
- The power that has been transmitted to rear transaxle will transmit to the driving chain wheel of balanced housing (9) via main transmission gear and bevel gear reducer.
- The power that has been transmitted to balanced housing will transmit to wheel via the chain wheel and chain transmission gear

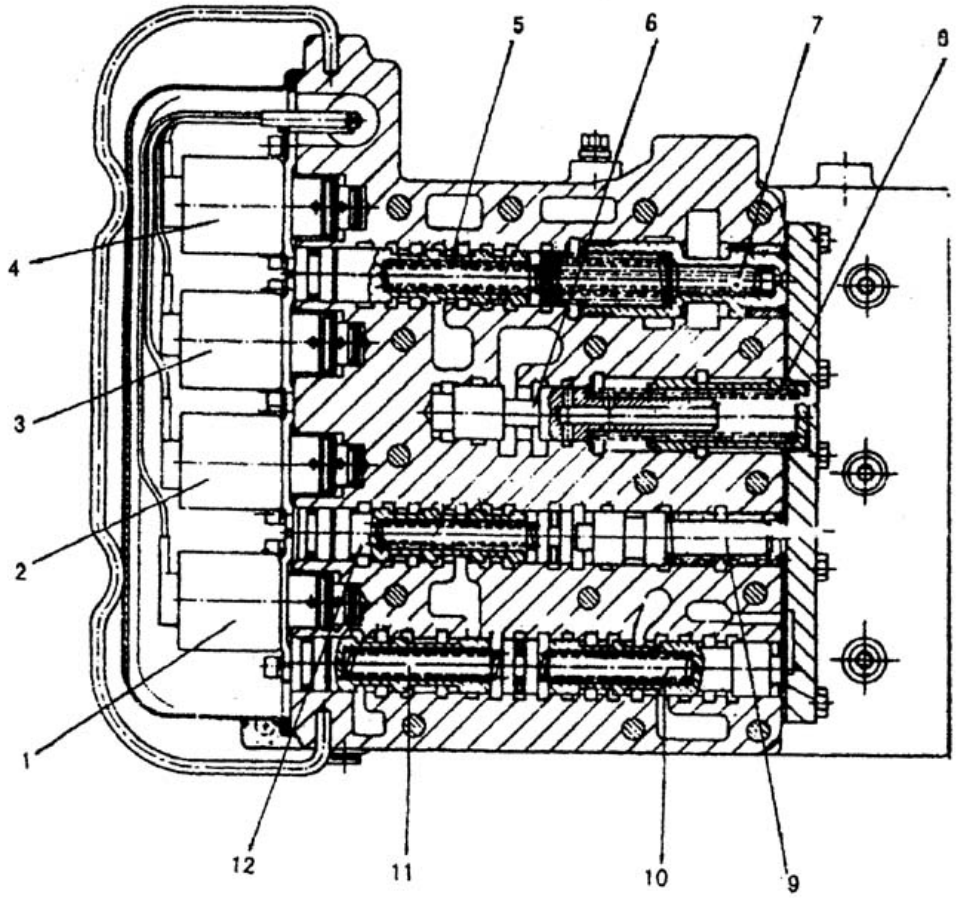
1.Engine	2. Connecting Plate	3. Variable Pump	4. Steering and Hydraulic Pump	5. Torque Converter
6. Parking Brake	7. Drive Shaft	8. Rear Transaxle	9. Balanced Housing	10. Driving Brake

Forward 1st Shift



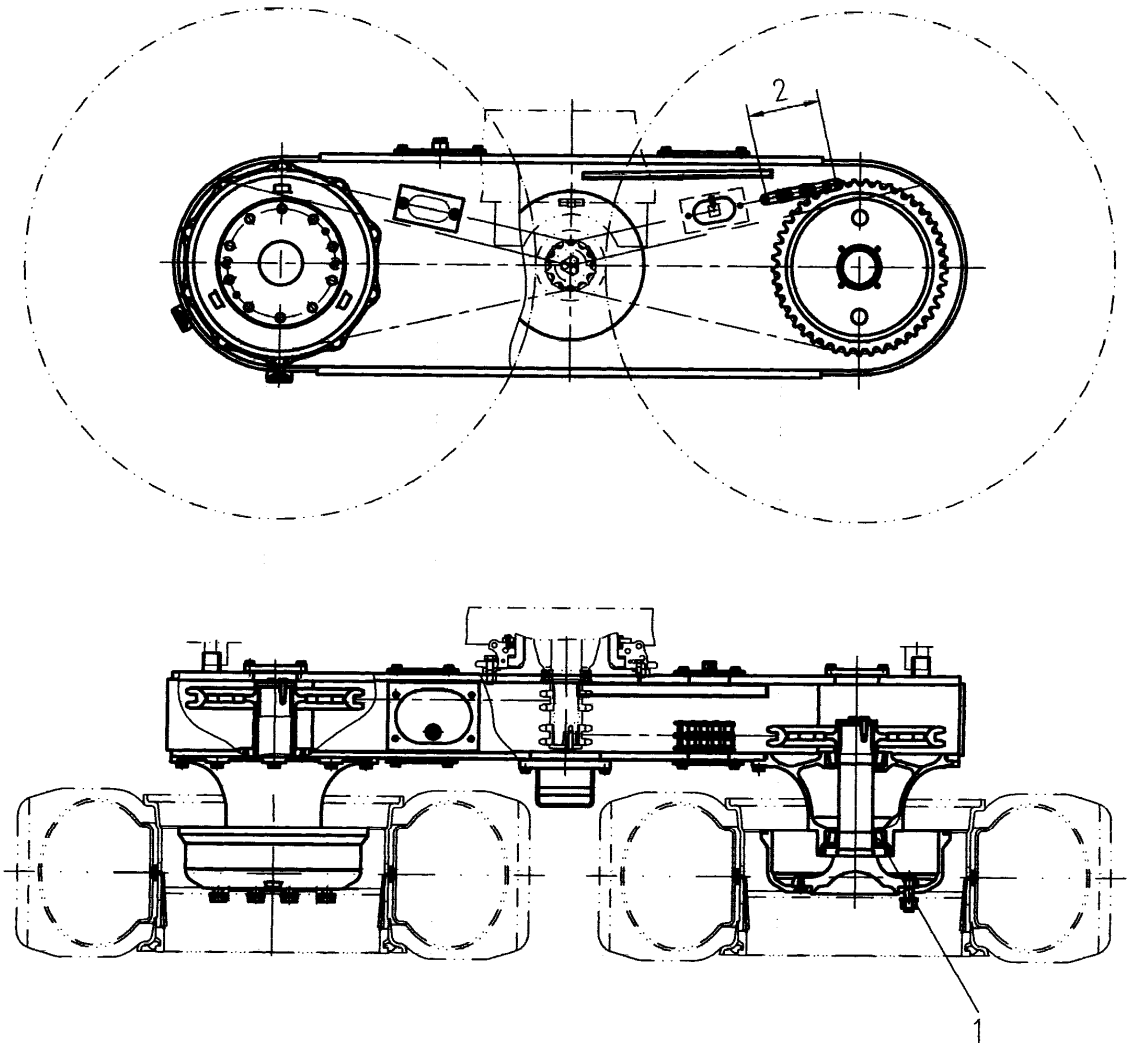
Operation

- When conduct the operation of forwarding 1st shift, KV and K1 clutches are engaged. The power transmitted from torque converter to driving gear was transmitted to the output shaft.
- The main and auxiliary friction discs inside the KV shift and K1 shift clutches are compacted by the oil pressure applied into their cylinder block via the piston.
- The power from torque converter is transmitted from driving gear to KV, K1clutch case via the KV shift clutch.
- Because the K1 shift clutch is engaged, so the power transmitted to the KV, K1 clutch case is transmitted from K1 clutch gear to K2 clutch gear, K3 clutch gear and output shaft gear via the K1 shift clutch, then is transmitted to output shaft.



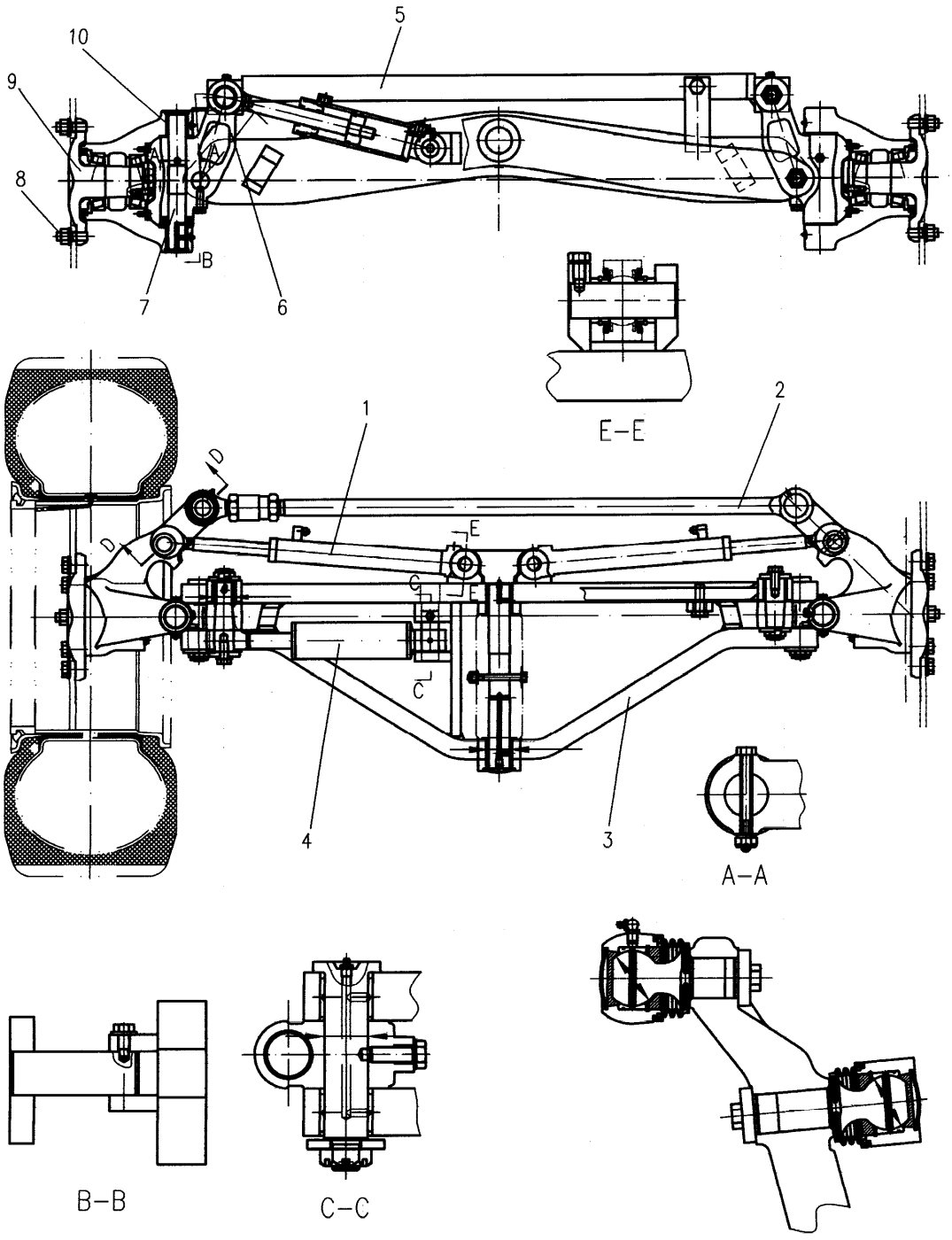
1. Solenoid Valve (M1)
2. Solenoid Valve (M2)
3. Solenoid Valve (M3)
4. Solenoid Valve (M4)
5. Shift Valve
6. Regulator Valve
7. Main Pressure Control Valve
8. Accumulator
9. Quick Return Valve
10. Shift Valve
11. Shift Valve
12. Shift Valve

Balanced Housing



Serial No.	Inspection Items	Requirements		Action
1	Preload of hub bearing	Rotation torque: 11.5～16.5 N·m		Adjustment
2	The extension of chains (10 knots)	Standard Dimension	Repair Limit	Replacement
		317.5	322.3	

Front Axle



Ir
O
Shaft

Main Pin Incline Angle: 0°

3. Front Axle
4. Incline Cylinder
5. Incline Rod
8. Hub Nut
9. Hub Axle
10. Sleeve

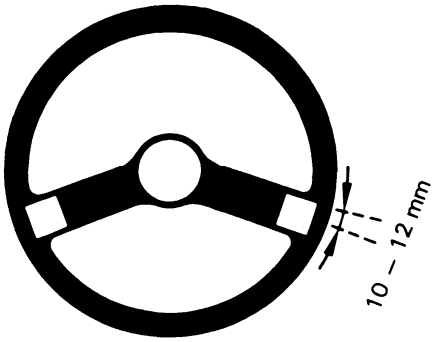
Check Steering Wheel

Special Tools

Serial No.	Part Description	Quantity
1	Push-and-pull Balance	1
2	Tape	1

Steering Wheel Neutral Travel

When the travel of steering wheel is over the standard value, or steering wheel produces vibration, or the steering wheel bumps hands, please reassemble (replace) the steering gear assembly.



Manipulation Force

Use the push-and-pull balance A to measure the manipulation force of steering wheel.
Measure the manipulation force when the engine is idle and all tires have contacted the ground.

☆**System pressure has been set before leaving factory, alteration while used is not allowed.**

Working principles are as follow:

1、Service brake

Service brake is using for speed control and pulling up during working and traveling. The principles of this system are: engine starts and drives double pump to work, prefill valve fulfills hydraulic oil into 2 accumulators. And after that the charge pressure of accumulators reaches rated value, prefill valve will stop charging, and hydraulic oil flows into oil tank.

When grader needs to decelerate, step on brake pedal, and it'll connect to brake oil support oil-way, both prefill valve and accumulators will feed oil to pedal valve and then pass to brake bridge. Brake oil enters into the brake and oil pressure oppress release spring, enmesh active friction plate and slave friction plate and integrate rotary drive hub with still bridge, means to stop drive hub from rolling to pull down grader. After the pressure of brake reaches set value, pedal valve will stop to feed oil to brake to protect it. Also when loosen pedal, pedal valve will stop to feed oil to brake, and oil in brake will flow back to tank through brake valve, thus decelerate brake stopped.

When grader needs to stop, please step on brake pedal to make pedal connected to brake oil-way, and then press T1 brake switch to control gear selection to make gearbox unpowered, videlicet as cut off the power to stop machine.

Brake pedal valve is a proportional servo valve, it'll control oil supply value according to the range of pedal been trod. Accumulators's role is to support 6 more steps on brake pedal after engine stopped. According to pictures above, this system is comprised of duplicate gear pump, prefill valve, accumulators, pedal brake valve, pressure-control switch, tube and joint etc.

2、Parking brake

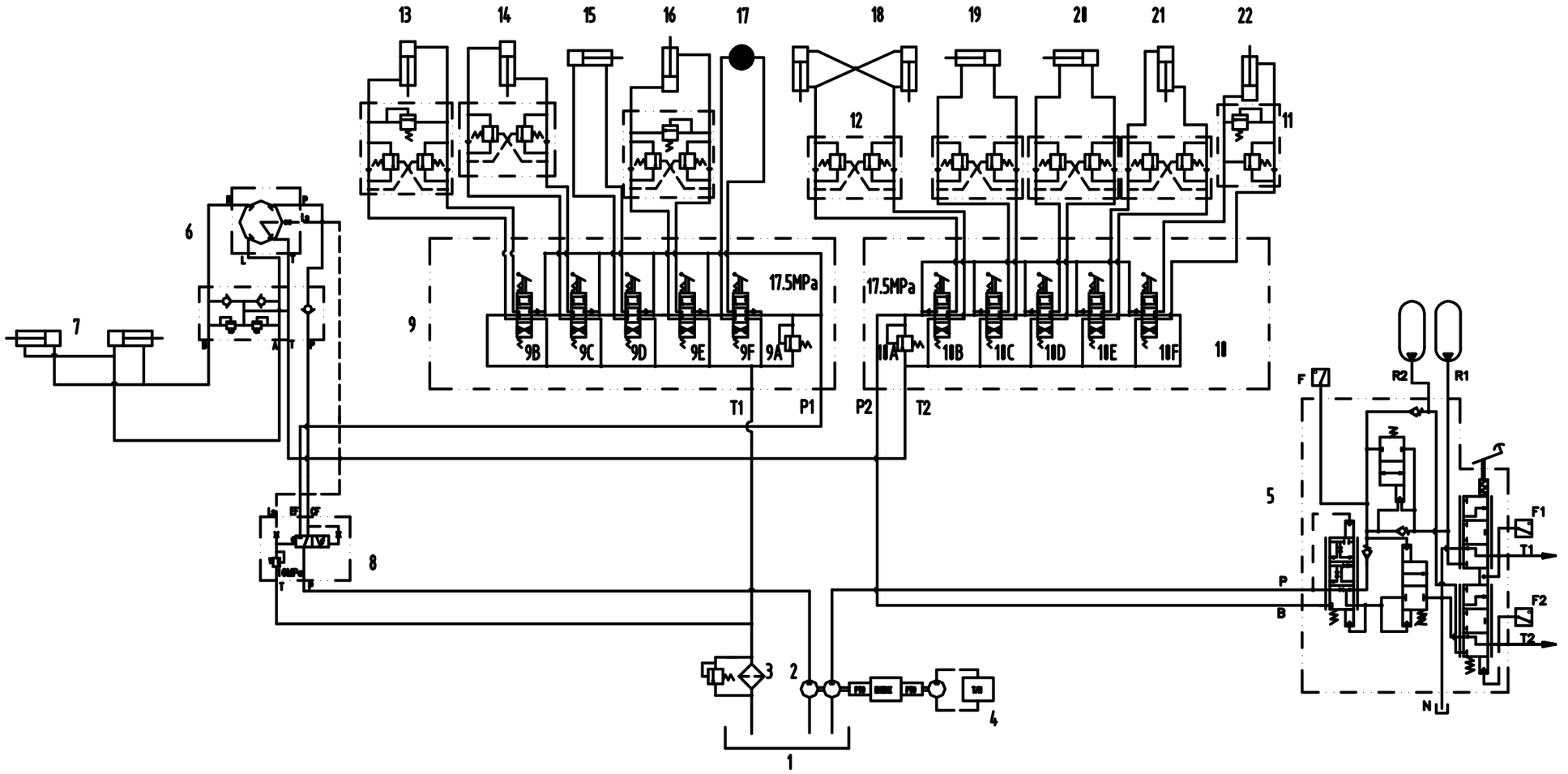
Hand braking is mainly used for parking safety even when driver leaves the cab. Hand brake uses the type of caliper disc-flexible shaft control. Brake disc connected to gearbox output shaft, drum brake fasten to gearbox, so when tensioning hand brake, the tension will pass to brake crank through flexshaft, and to skid drive shaft to stop machine.

This system suitable for use within 15% parking gradient.

Hydraulic System

1. Structure and Functions

The principle of hydraulic system



1、Hydraulic oil tank
2、Hydraulic and steering pump
3、Hydraulic oil filter
4、Hydraulic pump (gearbox)
5、Brake valve
6、Steering gear
7、Turning cylinder
8、Pilot valve
9、Left control valve
9A、Overflow valve
9B、Rear ripper control valve (optional)
9C、Lifting cylinder (left) control valve
9D、Scraper Blade side moving control valve
9E、Power incline control valve
9F、Turning control valve
10、Right control valve
10A、Overflow valve
10B、Hinge control valve
10C、Traction frame side swing control valve
10D、Incline control valve
10E、Lifting cylinder (right) control valve
10F、Scarifier control valve (optional)
11、Hydraulic-control check valve(with safety valve)
12、Hydraulic-control check valve
13、Rear ripper cylinder(optinal)
14、Lifting cylinder (left)
15、Scraper blade side moving cylinder
16、Power incline cylinder
17、Turning motor
18、Hinge cylinder
19、Traction frame side swing cylinder
20、Front wheel incline cylinder
21、Lifting cylinder (right)
22、Scarifier cylinder (optional)

▲ Exhaust the air in the hydraulic circuit

When replace the hydraulic pump or replace the hard pipe and hose near the pump, or replace the hard pipe and hose of the working system or steering system, exhaust the air in the working system and steering system according to the following methods:

(1) Open the cap of oil refill hole on the hydraulic oil tank;

(2) Start the engine;

(3) Make the engine running under idle speed, and extend and retract all cylinders of working system and steering system starting from the bottom of travel for 2～3 times（about 50～60 mm）.

(4) Run the engine with high speed and extend and retract all cylinders of working system and steering system under full travel for 3～5 times to exhaust the air in the pipeline.

(5) After exhaust the air, set the machine and work equipment on the standard position (park the wheels in line, the front and rear frame is in the same line, the scraper blade and frame is of 90° and put them on the ground and drop the ripper to approach the ground), then check the oil volume and tight the cap of oil refill hole;

(6) Stop the engine and check the hard pipe and hose for leakage.

(7) Notes during exhaust the air

7.1) When exhaust the air of steering oil cylinder, the scraper should be dropped and support the front frame to lift the front wheel off the ground;

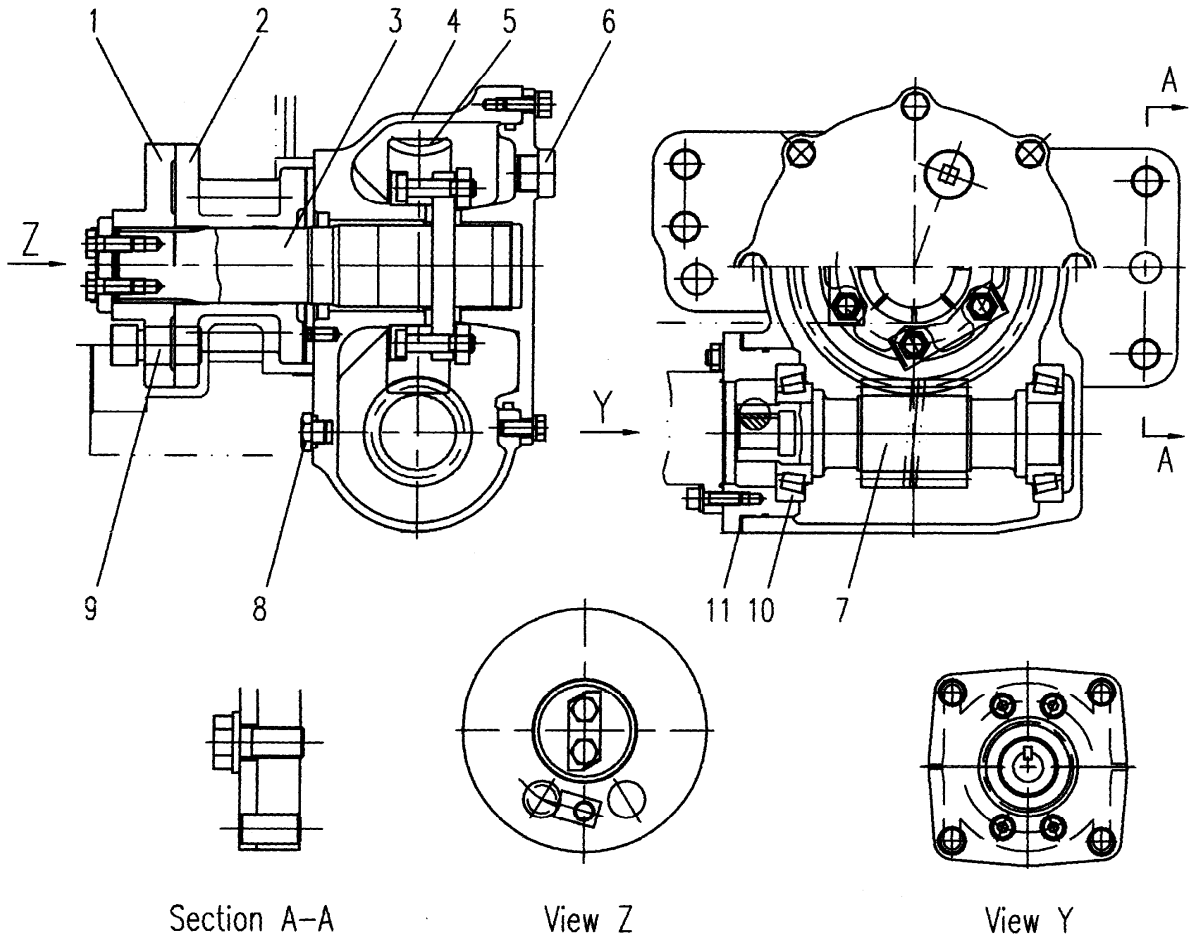
7.2) When exhaust the air in the such hydraulic system as scraper blade turning, scraper side moving and scraper incline, the scraper blade should be raised;

7.3) When exhaust the air in the traction frame side incline system, the scraper should be dropped slightly;

7.4) When exhaust the air in the hinge steering system, the shift should be in Neutral position;

7.5) When the scraper is lifted and the oil cylinder of ripper is extended, the machine has been off ground. Care should be paid when conduct this operation.

Turning Gear



The turning gear is driven by motor through the splineway on the worm shaft (7).

The connector (1) and gear (2) is connected through the safety pin (9). If abnormal torque is transmitted from the scraper blade, the safety pin (9) will be sheared to prevent the scraper blade system from cracking due to overload.

1. Connector
2. Pinion
3. Shaft
4. Housing
5. Worm Wheel
6. Screw Plug
7. Worm
8. Drain Plug
9. Safety Pin
10. Bearing
11. Shim

Adjust the hydraulic oil pressure

★ Adjust according to the steps below if the hydraulic oil pressure can't reach to standard value (20 MPa)

1. Remove cover (3), loose nut (4), and turn adjusting screw (5) to adjust the pressure of interior spring (6).
   ★ Clockwise turn for increasing oil pressure.
   ★ Counterclockwise turn for decreasing oil pressure.
2. After finish the adjustment, repeat commissioning and check if it has reached the standard value.