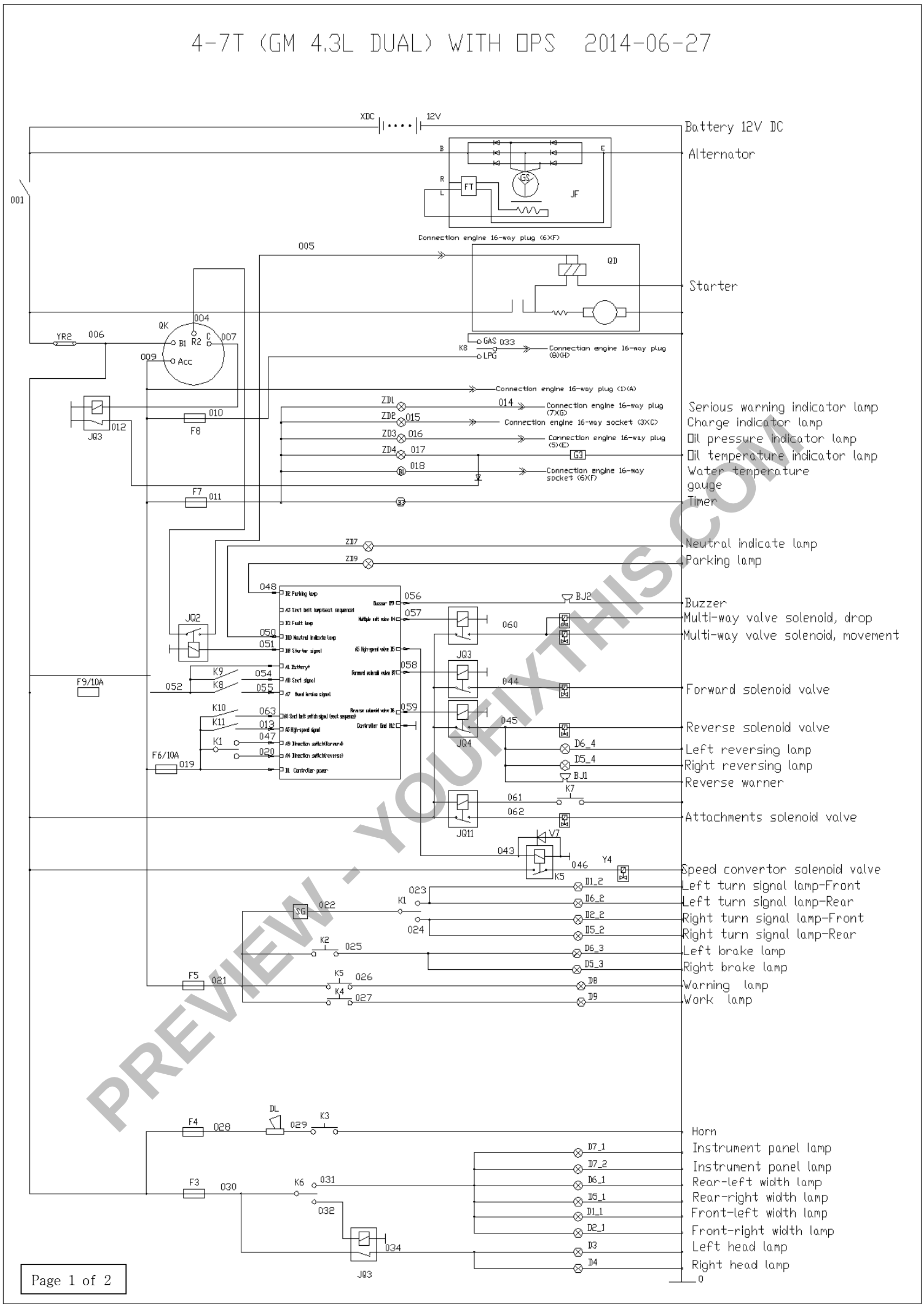
## 1. Schematics




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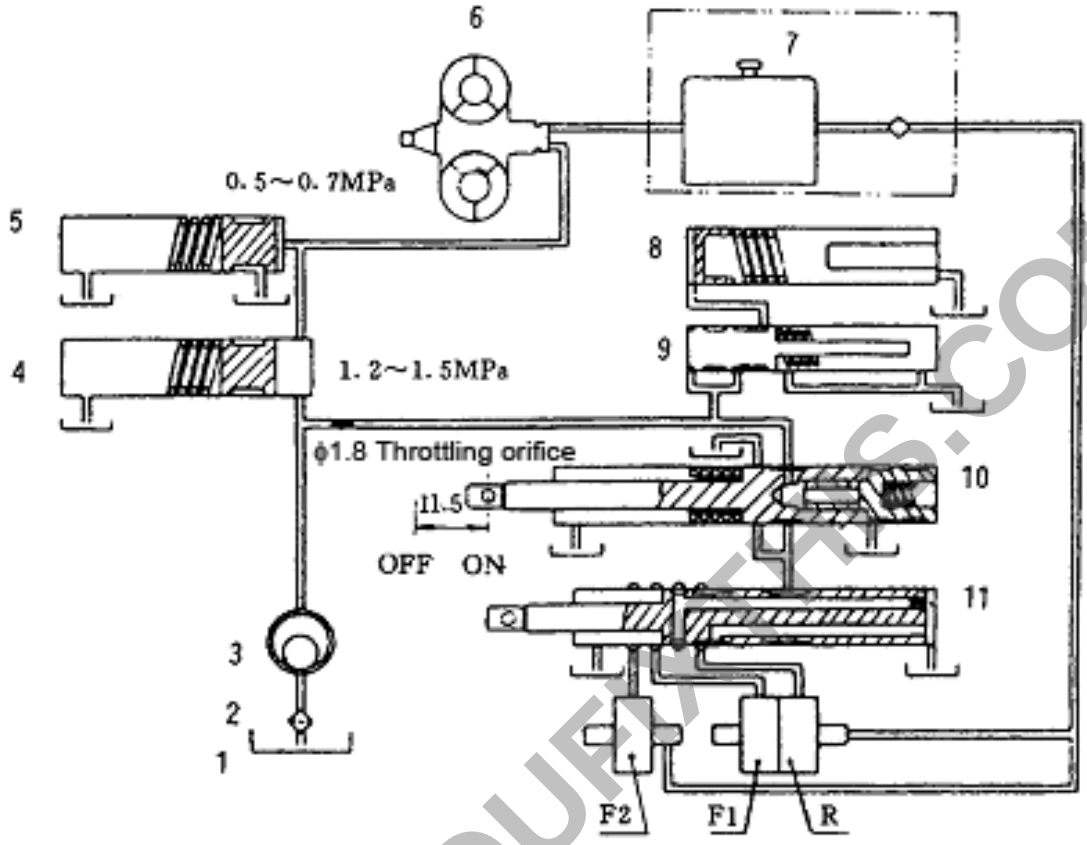



**Figure 2-2:**
**Diagram of YQX45 II H-Type Hydraulic Transmission Fluid Circuit Principles**

| | | | | | |
|---|---|---|---|---|---|
| 1. Fluid Reservoir | 2. Oil Filter | 3. Oil Pump | 4. Main Pressure Regulator Valve | 5. Torque Converter Fluid Inflow Relief Valve | 6. Torque Converter |
| 7 Radiator | 8. Cushion Valve | 9. Changeover Valve | 10. Inching Valve | 11. Shift Control Valve | |

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**4.1 Transmission of Power (See Figure 2-1)**

Forward Gear I: When the forklift truck is shifted into forward gear I, the forward gear I clutch operates, and the forward gear II and reverse gear clutches are idle. The transmission sequence is:

Part 25 → part 5 → part 8 → part 18 → part 19 → part 11 → part 13, driving differential 15 output.

Forward Gear II: When the forklift truck is shifted into forward gear II, the forward gear II clutch operates, and the forward gear I and reverse gear clutches are idle. The transmission sequence is:

Part 25 → part 5 → part 23 → part 22 → part 19 → part 11 → part 13, driving differential 15 output.

Reverse Gear I: When the forklift truck is shifted into reverse gear I, the reverse gear I clutch operates, and the forward gear I and forward gear II clutches are idle. The transmission sequence is:

Part 25 → part 5 → part 3 → part 19 → part 11 → part 13, driving differential 15 output.

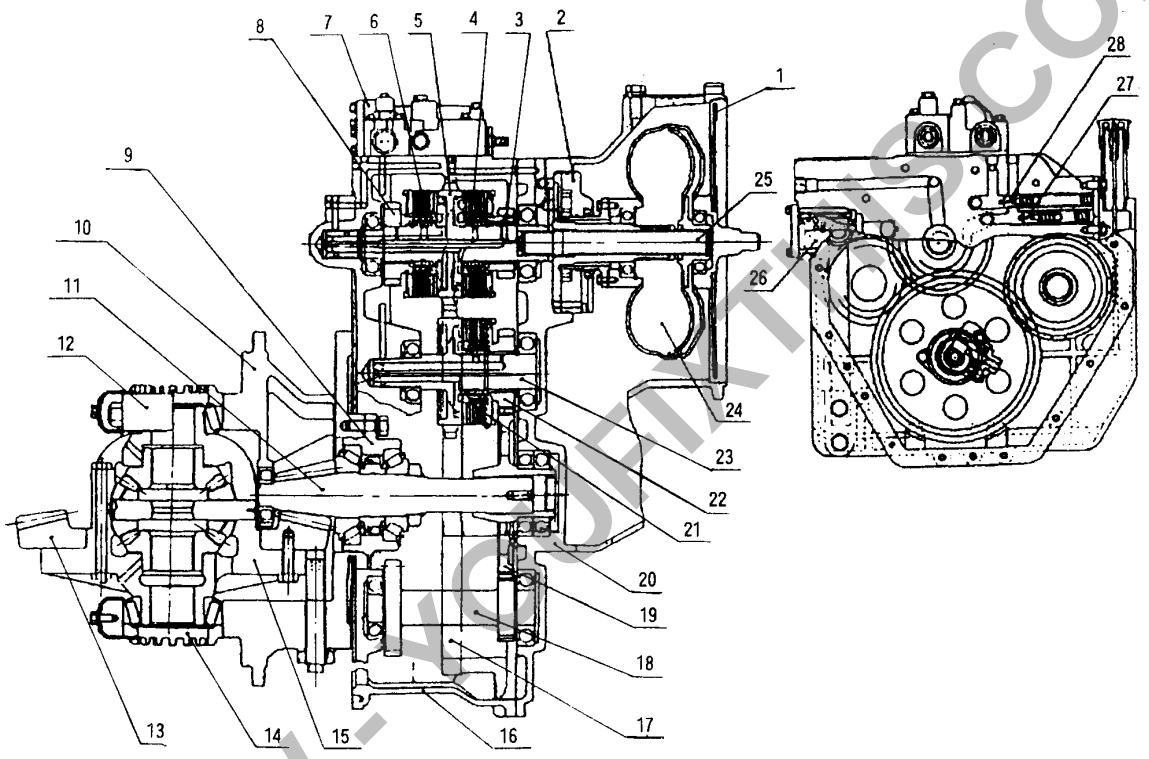


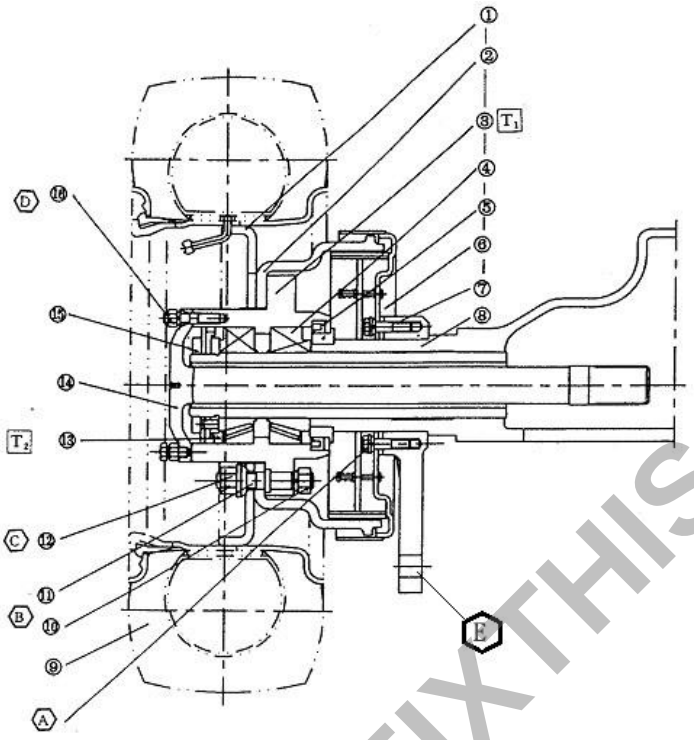

**FIGURE 2-1: Transmission Details**

| | | | | |
|---|---|---|---|---|
| 1. Flex Plate | 2. Oil Pump Assy | 3. Reverse Gear | 4. Reverse Clutch | 5. Two-Way Clutch Drum Assembly |
| 6. Forward I Clutch | 7. Control Valve Assembly | 8. Forward I Gear | 9. Bearing Support | 10. Differential |
| 11. Active Spiral Bevel Gear | 12. Bearing Cover | 13. Passive Spiral Bevel Gear | 14. Nut | 15. Differential Housing Assembly |
| 16. Housing | 17. Fluid Suction Hose | 18. Idler Shaft | 19. Output Gear | 20. Torque Converter Housing |
| 21. Forward II Clutch | 22. Forward II Gear | 23. One-Way Clutch Drum Assembly | 24. Hydraulic Torque Converter | 25. Turbine Shaft |
| 26. Fluid Filter | 27.Relief Valve | 28. Main Pressure Regulator Valve | | |

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**III. Drive Axle**

| | | | | | |
|---|---|---|---|---|---|
| 1. Wheel Rim | 2. Brake Drum | 3. Wheel Hub | 4. Tapered Roller Bearing | 5. Fluid Seal | 6. Brake |
| 7. Support Sleeve | 8. Axle Housing | 9. Wheel | 10. Nut | 11. Wheel Bolt | 12. Tire Nut |
| 13. Lock Nut | 14. Axle Shaft | 15. Lock Nut | 16. Nut | | |

$T_1$: Wheel Hub Turning Torque 10N - 29N  $T_2$: After Tightening, Turn Back 1/8 - 1/4 Turn

| Tightening torque N·m | A | B | C | D | E |
|---|---|---|---|---|---|
| | 157-176 | 324-373 | 441-588 | 73.5-88.3 | 638-850 |

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### 3. Removing and Installing the Drive Axle Assembly

> ⚠ **WARNING**
> The drive axle is very heavy. Be very careful when removing or installing it.

1) Raise the front end of the forklift truck. Use wood blocks to support the truck frame.
2) Remove the Mast.
3) Use a hoist crane to gently hoist the axle housing, and place supporting wood blocks under the differential housing and the gearbox.
4) Place a drain pan under the axle housing. Loosen and remove the drain plug, and drain out all the fluid in the housing.
5) Remove the brake connecting nuts from the brake cylinders for the left and right brakes (See Figure 3-1).

> ⚠ **Note:** Insert a plug into the brake line port to prevent brake fluid from flowing out.

6) Remove the brake cable from the parking brake lever.
7) Remove the front wheels.
8) Remove the half axle.
9) Support the drive axle with a steel cable and lifting device.
10) Remove the mounting bolts between the drive axle support sleeve and the truck frame (seeFigure 3-2).
11) On hydraulic trucks, remove the mounting nuts between the axle housing and the differential (See Figure 3-3).
12) Remove the drive axle assembly.

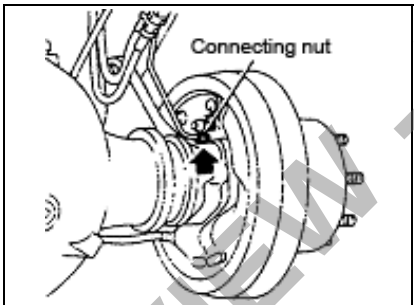



**Figure 3-1**

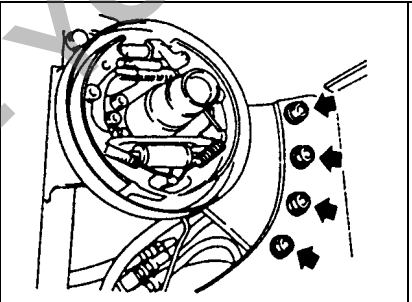


**Figure 3-2**

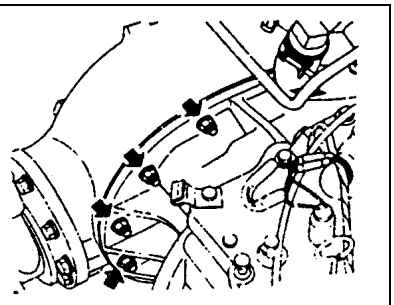


**Figure 3-3**

13) Remove the brake drum; remove the wheel hub.
14) Remove the support sleeve and the brake assembly from the drive axle tube.
15) Remove the fluid seal from the drive axle tube.
16) The installation sequence for the drive axle assembly is the opposite of the removal sequence. However, pay attention to the following points

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## 2. Fault Diagnosis and Correction

| Situation | Cause of Fault | Method of Eliminating Fault |
|---|---|---|
| Efficiency dropping and fluid pressure too high | 1. Friction disc stuck or worn | Check the separator plates for binding, uneven contact, or warping. |
| | 2. Torque converter fluid supply insufficient | Check the oil pump for wear and tear and whether expansion fluid level is at the normal position |
| | 3. Bearing damage | Replace bearings |
| | 4. Check lubricating oil lines for clogging | Clear oil channels |
| | 5. Torque converter one-way wheel stuck | Replace torque converter |
| Leaking fluid | 1. Seal damaged | Replace seal |
| | 2. Rubber parts aged or damaged | Replace parts |
| | 3. Parts cracked | Replace |
| Clutch pressure low and excessive rocking | 1. Fluid level low | Check fluid level; increase fluid volume to normal fluid level |
| | 2. Wear and tear of rotating seal ring on clutch shaft and pistons or wedging at hasp during assembly | Replace rotating seal ring and ensure correct position when assembling |
| | 3. Wear and tear of oil pump | Replace oil pump |
| | 4. Fluid filter mesh clogged | Wash or replace fluid filter |

## 3. Transmission Overview

The hydraulic transmission is composed of a hydraulic torque converter and power shift transmission having three gears: two forward gears and one reverse. (See Figure 2-1) It has the advantages described below:

1) The hydraulic torque converter endows this hydraulic transmission with automatically adaptive hydraulic transmission output. It can change its output torque and rotating speed in accordance with changes in the external load.

2) It can absorb and eliminate impact vibrations from the engine and external loads that would otherwise affect the transmission system.

3) The inching valve enables the forklift truck engine to carry out inching operations at low speeds or high speeds, making operation simple and convenient and starting smooth. It enables the operator to work with much less effort.

## 4. Principles of Operation

The hydraulic torque converter is driven by the engine by means of a flexible connecting plate, driving the rotation of the pump wheel, causing the fluid to flow at a high speed in the direction of the fins into the turbine, and impelling turbine rotation. The guide wheel causes the torque converter to generate a torque effect. By means of the turbine shaft (25), torque is transmitted to the hydraulic transmission two-way clutch drum assembly (5).

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# I. Powertrain

See the chart below for the powertrain configuration of the 4T-5TS forklift trucks. For detailed information on technical parameters, structure, and specific maintenance services for the engine, see the engine maintenance or service manuals.

| Engine / Parameter | Diesel | |
|---|---|---|
| | Perkins 1104D-44 | Perkins 1104D-44T |
| Rated power kW | 56 | 57.5 |
| Rated engine speed r/min | 2200 | 2200 |
| Maximum torque N·m/engine speed r/min | 265/1700 | 309/1400 |
| Forklift truck model | ⒺⒻ | |

| Engine / Parameter | Dual-Fuel | LPG single-fuel |
|---|---|---|
| | GM4.3L Dual Fuel | GM4.3L LPG |
| Rated power kW | 74 | 74 |
| Rated engine speed r/min | 2300 | 2300 |
| Maximum torque N·m/engine speed r/min | 301/1600 | 324/1700 |
| Forklift truck model | ⒶⒷ | ⒸⒹ |

After the engine has been serviced, emissions values should be checked. Emission values should comply with the corresponding stipulations. See the table below for exhaust emissions values.

GB20891-2007 Limits for exhaust pollutants from diesel engines of non-road mobile machinery （CHINA Ⅱ）

| Engine Power kW | CO (g/kWh) | HC (g/kWh) | $NO_2$ (g/kWh) | HC+ $NO_2$ (g/kW•h) | PT Particles (g/kWh) |
|---|---|---|---|---|---|
| 37≦P <75 | 5.0 | 1.3 | 7 | — | 0.40 |

GB20891-2014 Limits for exhaust pollutants from diesel engines of non-road mobile machinery （CHINA Ⅲ）

| Engine power (Pmax) (kW) | CO (g/kW•h) | HC (g/kW•h) | $NO_2$ (g/kW•h) | HC+ $NO_2$ (g/kW•h) | PT(Particles) (g/kW•h) |
|---|---|---|---|---|---|
| 37≤P<75 | 5.0 | — | — | 4.7 | 0.40 |

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# 4-7T (GM 4.3L DUAL) WITH □PS 2014-06-27

042 + → Fuel pump → − 035

Connection engine 16-way plug (4)(D)

Connection engine 16-way plug (3)(C)

## Head lamp & signal lamp switch

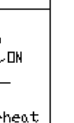
| Position \ Contact | 1 | 3 | 4 | 5 |
|---|---|---|---|---|
| ○ (□FF) | ○ | | | |
| I (Width lamp) | ○ | ○ | | ○ |
| II (Head lamp) | ○ | | ○ | ○ |

| | | |
|---|---|---|
| 3-way socket (1)(C) | 036 VCC1 | Connection engine 16-way plug (12)(M) |
| 3-way socket (2)(B) | 037 APS1 | Connection engine 16-way plug (10)(K) |
| 3-way socket (3)(A) | 038 GND1 | Connection engine 16-way plug (11)(L) |
| 3-way plug (1)(C) | 039 VCC2 | Connection engine 16-way plug (16)(S) |
| 3-way plug (3)(A) | 040 APS2 | Connection engine 16-way plug (9)(J) |
| 3-way plug (2)(B) | 041 GND2 | Connection engine 16-way plug (15)(R) |

| | | |
|---|---|---|
| 048 | B2 Parking lamp | Buzzer B9 → 056 |
| | A3 Seat belt lamp(seat sequence) | Multiple unit valve B4 → 057 |
| | B3 Fault lamp | |
| 050 | B10 Neutral indicate lamp | |
| 051 | B8 Starter signal | A5 High-speed valve B5 |
| | A1 Battery+ | Forward solenoid valve B7 → 058 |
| 054 | A8 Seat signal | |
| 055 | A7 Hand brake signal | |
| | | Reverse solenoid valve B6 → 059 |
| 063 | A8 Seat belt switch signal (seat sequence) | |
| 013 | A5 High-speed signal | Controller Gnd B12 |
| 047 | A9 Direction switch(forward) | |
| 020 | A4 Direction switch(reverse) | |
| | B1 Controller power | |

## preheat start switch QK

| connector / position | B1 | B2 | Acc | C | R1 | R2 | Explain |
|---|---|---|---|---|---|---|---|
| preheat | ○ | ○ | | | ○ | | |
| close | ○ | ○ | | | | | |
| run | ○ | ○ | ○ | | | | |
| start | ○ | ○ | ○ | ○ | | ○ | |




start and preheat are short working,automatically return.

Note: "□" means □N.

| Number | Sign | Instruction |
|---|---|---|
| 1 | | Fuse |
| 2 | | Banked battery |
| 3 | | Relay |
| 4 | | Normally open switch |
| 5 | | Normally closed switch |
| 6 | | Monopole double throw switch |
| 7 | SG | Flasher |
| 8 | | Solenoid |
| 9 | | Horn |
| 10 | | Sensor |
| 11 | | Bulb |
| 12 | | Buzzer |
| 13 | | Resistance |
| 14 | | Glow plug |
| 15 | | Diode |
| 16 | | Pointer gauge |
| 17 | | Control box |
| 18 | | Pre-heat & start switch |

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