

Forklift

User Manual



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Foreword

The forklift manual serves as a guide for the correct use and maintenance of the equipment. It primarily addresses potential issues you may encounter during normal operation and maintenance, and provides effective solutions to help you use the machine safely and efficiently. Therefore, please read it carefully before starting and operating the machine or performing regular inspections.

The forklift manual includes information on technical performance and parameters, operation and usage, maintenance, safety, common faults, and troubleshooting. Due to continuous improvements and updates in product design, some content may differ from the configuration required by the user. Please contact Shandong Hengwang Group Co., Ltd. or an authorized distributor for the latest information.

The section on technical performance and parameters introduces the machine's applications, features, overall configuration, dimensions, and specifications.

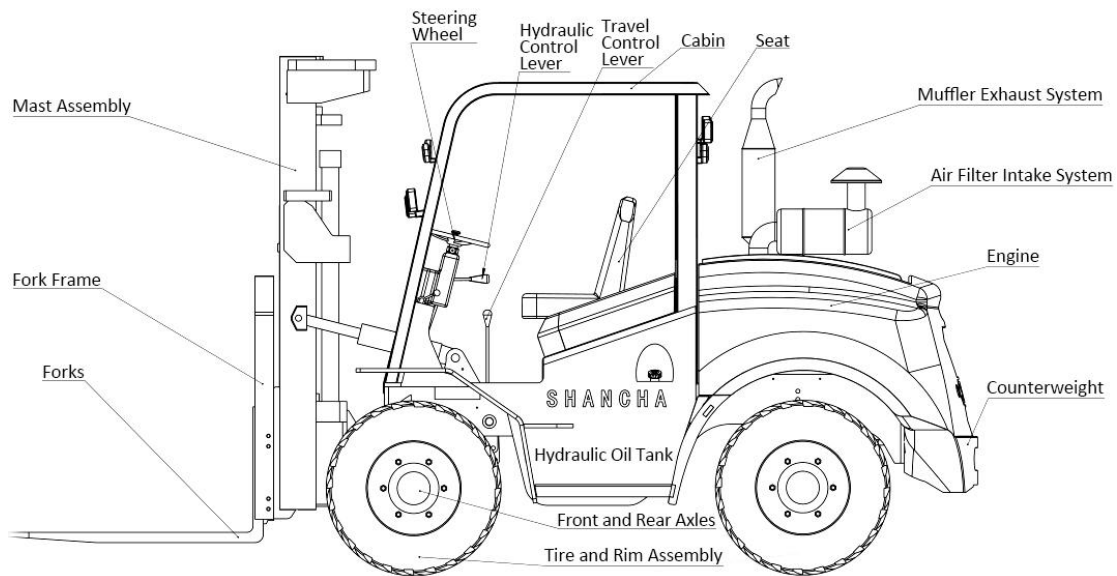
The section on operation, usage, and maintenance provides basic operating techniques and guidelines for daily maintenance, as well as instructions for operators to familiarize themselves with the proper procedures for inspection, starting, operation, shutdown, and maintenance cycles.

The safety section highlights the safety precautions to be observed during machine operation, daily maintenance, and repairs.

The section on common faults and troubleshooting outlines some common issues that may occur during machine operation and methods for resolving them.

We are committed to continuously improving our products by modifying designs to make them more efficient. We reserve the right not to apply these improvements to products already sold. We also reserve the right to change parameters, equipment, and usage or maintenance instructions without prior notice.

Description of External Components



Description of External Components of the Vehicle

Forklift Safety Precautions

Operators should be familiar with and adhere to relevant national and local safety regulations. The safety instructions in the forklift manual apply only in the absence of national and local regulations.

Most accidents during machine operation, maintenance, and repair occur due to failure to follow basic safety rules and precautions. Recognizing potential hazards in advance often helps to prevent accidents from occurring.

Before operating, maintaining, or repairing the machine, always read and understand all safety measures and warnings.

Basic safety precautions are outlined in the "Safety Operating Procedures" section of the forklift manual, and dangerous areas during operation are highlighted. Warning signs are also installed on the machine to identify areas of specific danger. Failure to heed these warnings could result in injury or death to the operator or others. These warnings are represented with graphical symbols on both the forklift manual and the machine's warning labels.

Our company cannot foresee all potential hazards. Therefore, the warnings provided in the forklift manual and on the machine do not cover every possible situation. If the procedures, tools, working methods, or operating techniques used are not specifically recommended by our company, you must ensure that they are safe for both yourself and others. Additionally, you must ensure that the chosen operating methods or maintenance procedures do not damage the machine or create unsafe conditions.

Product Introduction

The CPCDY series 4WD forklift is equipped with the YCD4N23T8-100D series engine, which is economical,

fuel-efficient, environmentally friendly, powerful, low in noise, highly reliable, and easy to maintain.

The forklift is equipped with an operating device that allows the operator to easily switch between low and high speeds based on usage and transfer conditions. This results in simple, lightweight, and flexible operation, significantly reducing fuel consumption and tire wear.

The air filter is designed at the top of the machine, ensuring cleaner air intake from the vehicle's roof, reducing dust intake, and increasing the engine's lifespan.

The step design is grid-like, which increases foot friction when the driver enters the cabin, making it safer and cleaner under muddy conditions. Additionally, the forklift is equipped with a newly designed cast iron counterweight, enhancing the vehicle's aesthetic appeal and increasing its stability during operation and handling. This feature improves performance, especially on steep slopes, making the machine quieter and smoother compared to previous models, greatly enhancing operational comfort.

The forklift uses an air-over-oil braking system, which provides a lightweight pedal and strong braking effect.

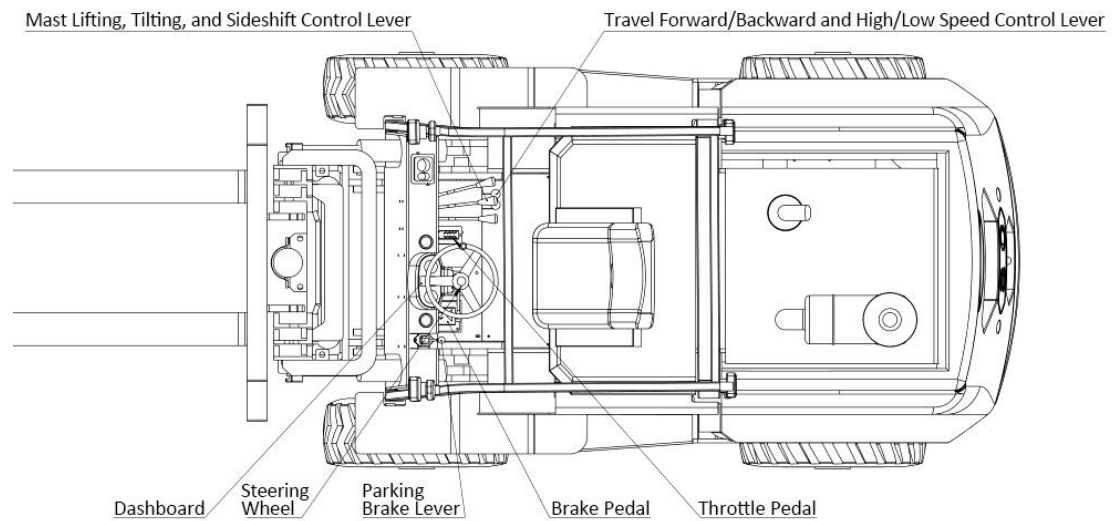
The vehicle is powered by a 24-volt electrical system, with an installed electromagnetic main power switch that automatically turns the power on and off, significantly reducing battery leakage issues.

The mast is designed to provide the operator with excellent visibility. The infinitely variable transmission system is easy to operate, reducing operator fatigue and increasing handling speed. This ensures a clean and tidy operating environment, enhancing the overall quality and efficiency of operations.

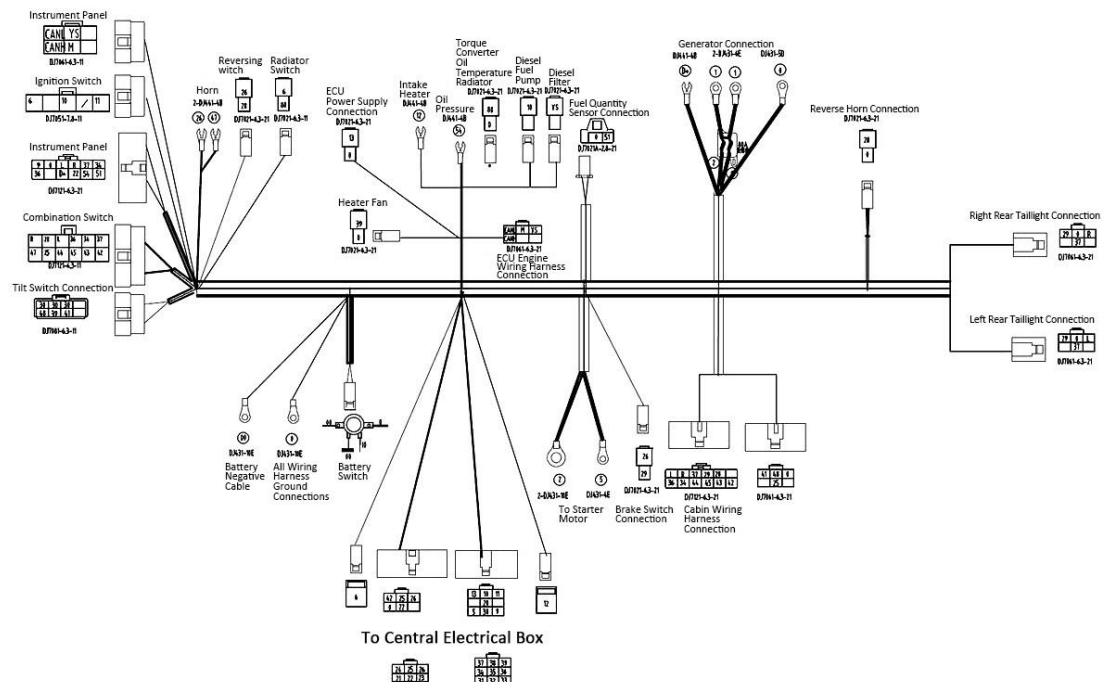
Main Technical Parameters (for reference only)

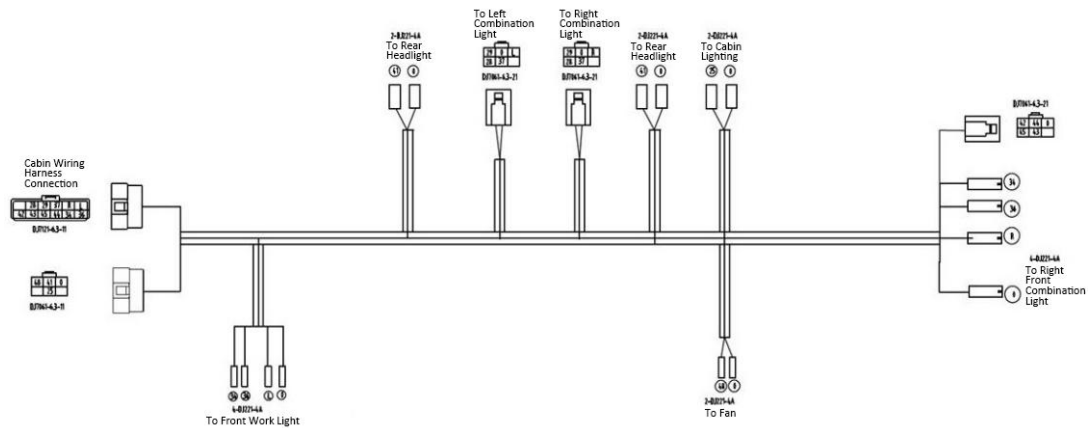
Model	HWC-35C
Engine Brand	Yunnan 490
Power	36.8kW
Axle	Small Wheel Side Axle
Transmission	265 Dual High-Low Speed Torque Converter
Tires	12-16.5 Tires
Standard Lifting Height (Fork Width)	3 meters (16 cm) Low Profile
Counterweight	Enlarged Counterweight
Maximum Speed (Km/h)	25
Number of Gears	Front 2, Rear 2
Type	Hydraulic Steering
Wheelbase (mm)	2070
Track Width (mm)	1475
Minimum Ground Clearance (mm)	250
System Pressure (MPa)	16
Overall Dimensions (excluding forks)	4100/1800/2150 mm
Machine Weight (Kg)	3900 kg

Schematic Diagram of the Control Mechanism



Schematic Diagram of the Control System





Wiring Number	Name	Wiring Number	Name
R	Right Turn Signal	80	Torque Converter Cooling
L	Left Turn Signal	41	Rear Headlights
20	Flasher Output	00	Battery Negative
51	Fuel Level	0	Ground Cable
54	Oil Temperature	42	Wiper Power
YS	Oil-Water Separator	43	Wiper High Speed
M	Engine Fault	44	Wiper Park Position
26	Horn Power	45	Wiper Low Speed
28	Reversing	10	Electric Lock ON
39	Heater	5	Starter Motor
D+	Charging	11	Start
48	Fan	12	Preheat
34	Low Beam	25	Light Power
36	High Beam	22	Preheat Indicator
37	Position Lights	30	Switch Power
13	ECU Output	9	Instrument Power
47	Horn	6	Main Power
29	Brake		

Forklift Operating Procedures

The forklift operating procedures are designed to ensure that forklift operators can operate the forklift safely, accurately, properly, and effectively. These procedures outline the operating standards for forklift drivers during starting, driving, loading and unloading, and other operations.

Purpose: To standardize safe forklift operation and safe driving

Scope: Forklift operators

Forklift Safe Driving Rules:

1. Operators must pass the relevant departmental exams and obtain the special operator certificate issued by the government before driving the forklift. They must strictly follow the safety operating procedures outlined below.
2. Operators must carefully study and strictly adhere to the operating procedures, familiarize themselves with vehicle performance and road conditions in the operating area, and master basic maintenance knowledge and skills for forklift care. Operators must perform vehicle maintenance and upkeep according to regulations.
3. Carrying passengers while driving is strictly prohibited. Drunk driving is forbidden; eating, talking, or using a mobile phone while driving is not allowed.

4. Before using the forklift, a thorough inspection should be conducted. Driving with a malfunction is prohibited, and dangerous or potentially dangerous routes must not be forcefully navigated.

Forklift Safety Operation Requirements:

1. Inspecting the Vehicle

- (1) Before operation, check the appearance of the forklift, and ensure sufficient fuel, lubricating oil, and coolant.
- (2) Check the starting, operation, and braking performance.
- (3) Check that lights and audio signals are fully functional.
- (4) During operation, monitor pressure and temperature to ensure they are normal.
- (5) After operation, check for any leaks and replace seals as needed.
- (6) Inspect the forklift's electrical system.

2. Starting

- (1) Before starting, observe the surroundings, ensure there are no obstacles that would hinder safe driving, sound the horn, and then start the vehicle.
- (2) For vehicles with air brakes, the brake air pressure gauge must reach the specified value before starting.
- (3) When starting with a load, ensure the load is stable and secure.

(4) Start the forklift slowly and steadily.

3. Driving

(1) During driving, the bottom of the forks should remain 300-400mm above the ground, and the mast should be tilted backward.

(2) Do not raise the forks too high during operation. Be aware of potential overhead obstacles when entering or leaving the work area. Raising the forks too high increases the vehicle's center of gravity, which may reduce stability.

(3) After unloading, lower the forks to the normal driving position before moving the forklift.

(4) When turning, signal and avoid making sharp turns at high speeds if there are pedestrians or other vehicles nearby. Sharp turns at high speed can cause the vehicle to lose lateral stability and tip over.

(5) For internal combustion forklifts, coasting downhill with the engine off is prohibited.

(6) Sudden braking while carrying a load is prohibited except in special circumstances.

(7) When driving with a load on a slope greater than 7 degrees, the use of the brake is prohibited unless absolutely necessary.

- (8) Follow internal traffic rules while operating the forklift and maintain a safe distance from vehicles ahead.
- (9) While driving, the load must be at its lowest position, and the mast should be appropriately tilted backward. When exiting a stack or loading area, do not raise the load. When transporting large items that block the operator's view, drive the forklift in reverse.
- (10) The forklift is rear-wheel-steered, so always be aware of the swing of the rear wheels. Avoid sharp turns that are common among novice operators.
- (11) Turning on ramps is prohibited, and forklifts should not drive horizontally across ramps.
- (12) When driving a forklift downhill with a load, reverse the vehicle to prevent the load from falling.

4. Loading and Unloading

- (1) When loading, adjust the fork spacing as needed to ensure the load is balanced and does not tilt. The load should rest against the load backrest, and the weight should be within the capacity curve marked on the load center plate.
- (2) The height of the load should not obstruct the operator's line of sight.

- (3) Always use the brake to stop the forklift during loading and unloading.
- (4) When approaching or withdrawing from a load, the vehicle speed should be slow and steady. Be mindful not to run over the load, wooden pallets, or other objects to avoid causing debris to fly and injure others.
- (5) When using the forks to lift a load, insert the forks as deeply as possible under the load and avoid contacting other items. Use the minimum mast tilt to stabilize the load and prevent it from sliding backward. When unloading, slightly tilt the mast forward to facilitate placing the load and removing the forks.
- (6) High-speed loading and unloading, or using the forks to collide with hard objects, is prohibited.
- (7) Do not allow people to stand on the forks during operation.
- (8) Do not allow people to stand around the forks while loading and unloading to prevent injury from falling loads.
- (9) Do not use the forks to lift personnel for elevated work to prevent falls.
- (10) Do not use braking inertia to coast with round or easily rolling objects.
- (11) Do not use the forks to lift or flip pallets during unloading.
- (12) Single-fork operation is prohibited.

(13)Overloading is strictly prohibited.

5. Leaving the Forklift

(1) Never leave the forklift while the load is suspended on the forks.

The load must be removed or the forks lowered before leaving the vehicle.

(2) Apply the parking brake and engage the handbrake switch before leaving the forklift.

(3) Turn off the engine and disconnect the power (except in special circumstances, such as when the operator is not leaving the vehicle's line of sight and the duration is less than 1 minute).

(4) Remove the key.

Safety Operating Procedures

1. Only drivers who have received training and hold a special driving license are allowed to operate the vehicle.
2. Before driving, check all controls and alarm devices. If any damage or defects are found, operation should only proceed after repairs are made.
3. During handling, do not exceed the specified load capacity.
The forks must be fully inserted beneath the load, and the

load should be evenly placed on the forks. Do not use a single fork tine to lift the load.

4. Start, steer, drive, brake, and stop smoothly. When driving on wet or slippery surfaces, reduce speed when turning.
5. When transporting goods, lower the load, and tilt the mast backward.
6. Exercise caution when driving on ramps. When driving on a slope greater than 10%, drive forward when going uphill and backward when going downhill. Avoid turning when going uphill or downhill. Do not perform loading or unloading operations while driving.
7. While driving, be aware of pedestrians, obstacles, and potholes on the road, and check for overhead clearance.
8. Do not allow anyone to stand on the forks, and do not carry passengers on the vehicle.
9. Do not allow anyone to stand under the forks or walk beneath the forks.
10. Do not operate the vehicle or its attachments from outside the driver's seat.
11. Do not handle unstable or loosely stacked materials. Be cautious when handling oversized loads.

12. For forklifts with a lifting height greater than 3 meters, be cautious of falling loads from above, and take protective measures when necessary. When working, try to keep the mast tilted backward and limit forward and backward tilting to the minimum.
13. When refueling, the driver should not be on the vehicle and the engine should be turned off. Do not ignite the vehicle when checking the battery or fuel tank levels.
14. When leaving the vehicle, lower the forks to the ground, place the gear lever in the neutral position, turn off the engine and disconnect the power, engage the parking brake, and, when parking on a slope, use wheel chocks to prevent movement.

Forklift Daily Maintenance and Care

I. Before Operation

- (1) Before starting, the driver should check whether the engine coolant and oil levels meet the required standards and inspect all connections and joints for oil seepage or leaks.
- (2) Check the fuel level, hydraulic oil level, and inspect oil pipe joints for any leakage.

- (3) Check if the battery's bottom terminal wires are tightly fastened and ensure that other wires are secure and not loose.
- (4) Check the tire pressure, steering wheel, and the free travel of the brake pedal to ensure they are properly adjusted.
- (5) Check the lights, horn, and other signal devices to ensure they are functioning correctly.
- (6) Any issues discovered during inspection should be resolved before operating the vehicle.
- (7) After starting the engine, check if all instruments are functioning normally. If any abnormalities are found, immediately turn off the engine, inspect and resolve the issue, and only resume operation once the problem is fixed.
- (8) Before starting forklift operation, release the parking brake, then begin driving. Check the effectiveness of the foot brake, ensure the mast's lifting and tilting actions are normal, and verify that the steering is smooth and responsive. Only begin work when everything is confirmed to be operating properly.

II. During Operation

- (1) While driving the forklift, the operator should listen for any abnormal noises.
- (2) When driving the forklift on factory premises or workshop aisles, the speed should be maintained within the range

specified by the factory's safety department, and the horn should be used to alert pedestrians at all times.

(3) The forklift should only change direction after coming to a complete stop. Simultaneous lifting and tilting operation, as well as overloading, are strictly prohibited.

(4) If any abnormal conditions occur, the forklift should be stopped immediately for inspection and any issues should be resolved promptly.

III.After Work

1. Before shutting down the engine, let it idle for 2-3 minutes before turning off.
2. After turning off the engine and parking, engage the parking brake.
3. In cold weather (below freezing), drain the coolant.
4. When the temperature is below -15°C , remove the battery and store it indoors to prevent freezing and cracking.
5. Rotate the oil filter handle 1-2 turns, check if any bolts or nuts are loose, and address any abnormal issues promptly.
6. Clean the forklift thoroughly, perform routine maintenance, and park it in the garage or designated location.

Forklift Maintenance Knowledge

To ensure the forklift operates normally and reliably, and to fully utilize its potential, regular maintenance measures and technical upkeep are necessary.

1. Daily Maintenance — After each shift.
2. Level 1 Technical Maintenance — After a cumulative 100 hours of work, equivalent to about 2 weeks of a single shift.
3. Level 2 Technical Maintenance — After a cumulative 500 hours of work, equivalent to one quarter of a single shift.

(1) Daily Maintenance

- 1) Clean the dirt and mud from the forklift, with particular attention to: the forks and mast rails, generator and starter, battery terminals, radiator, and air filter.
- 2) Check the tightness of each part, especially: fork frame supports, lifting chain tightening bolts, wheel bolts, wheel fasteners, brakes, and steering mechanism bolts.
- 3) Check the reliability and flexibility of the steering mechanism.
- 4) Check for leaks, focusing on: pipe joints, fuel tank, oil tank, brake pump, lift cylinder, tilt cylinder, water tank, water pump, engine oil sump, torque converter, transmission, drive axle, final drive, hydraulic steering mechanism, and steering cylinder.

- 5) Check tire pressure: if low, refill to the specified value and ensure there are no leaks. Inspect the tire surface and sidewall for damage and check if the wheel axle is deformed.
- 6) Check brake fluid and water levels: ensure brake fluid is within the marked range and check for air in the brake lines. When adding brake fluid, prevent dust and water from entering. Use clean tap water when adding water to the radiator, and if using antifreeze, add the same type of antifreeze. Do not open the radiator cap when the water temperature exceeds 70°C. If the cap needs to be opened, use a clean cloth and avoid using gloves when loosening the cap.
- 7) Check engine oil level, hydraulic oil, and electrolyte levels: remove the oil dipstick, wipe it clean, reinsert it, and check if the oil level is between the two marks. The oil level in the working tank should be between the two marks; too little oil will cause air in the pipes, and too much will overflow from the cover. For the battery, the electrolyte should also be between the upper and lower marks; if it's insufficient, add distilled water to the upper line.

- 8) Check the brake pedals: press each pedal to check for any unusual stiffness or blockage.
- 9) Check the belts, horn, lights, and gauges: ensure the belt tension meets the requirements, and if there is no adjustment space or if it is damaged, it should be replaced; the horn, lights, and gauges should all function normally.
- 10) Drain sediment from the oil filter.

(2) Level 1 Technical Maintenance

Perform the "Daily Maintenance" tasks and add the following work:

- 1) Check cylinder pressure or vacuum.
- 2) Check and adjust the valve clearance.
- 3) Check if the thermostat is functioning properly.
- 4) Check the multi-way valve, lift cylinder, tilt cylinder, steering cylinder, and gear pump to ensure they are working correctly.
- 5) Check the shifting operation of the transmission.
- 6) Check and adjust the gap between the foot brake pads and the brake drum.
- 7) Change the engine oil in the oil sump, inspect the crankcase ventilation hose for damage, and clean the oil filter and diesel filter elements.

- 8) Check the engine and starter motor installation for tightness, ensure the wiring terminals are clean and secure, and check for any wear on the carbon brushes and commutator.
- 9) Check the fan belt tension.
- 10) Check if the wheels are installed securely, if the tire pressure meets the requirements, and clear any debris embedded on the platform.
- 11) After disassembling parts for maintenance, perform a road test after reassembly.
 - ① The braking performance should not show deviation or swerving at any intensity. On steep slopes, the parking brake should be able to hold the forklift reliably.
 - ② Listen to the engine while accelerating, decelerating, under load or without load, and check for any abnormal sounds.
 - ③ After a test run, check for overheating in the brakes, transmission, front axle housing, and gear pump.
 - ④ Check if the lift speed of the forks is normal and if there is any shaking.
- 12) Check if the fuel tank inlet filter is clogged or damaged, and clean or replace the filter as needed.

(3) Level 2 Technical Maintenance

In addition to the items in Level 1 Maintenance, add the following tasks:

- 1) Clean all oil tanks, filters, and pipes, and inspect for corrosion or cracks. After cleaning, do not use cloths with fibers for wiping.
- 2) Clean the torque converter, transmission, check for part wear, and replace the oil with new oil.
- 3) Check the drive shaft bearings and, if necessary, adjust the direction of the universal joint cross shaft.
- 4) Check the tightness of all parts of the drive axle and inspect for oil leaks; clear any ventilation holes. Disassemble and inspect the main reduction gear, adjust the axial gap of the bearings, and add or replace lubrication oil.
- 5) Disassemble, adjust, and lubricate the front and rear wheel hubs, and swap the half-axes.
- 6) Clean the brakes and adjust the friction plate gaps.
- 7) Clean the steering mechanism and check the free rotation of the steering wheel.
- 8) Disassemble and clean the gear oil pump, checking the wear of the gears, housing, and bearings.
- 9) Disassemble the multi-way valve and inspect the gap between the valve stem and valve body. Do not disassemble

the safety valve unless necessary.

10) Check the steering knuckles for damage or cracks, inspect the fit between the steering bridge main pin and steering knuckle, and check the wear of the connections on the longitudinal and transverse tie rods and steering arms.

11) Disassemble the tires, remove rust from the rims and repaint, inspect the inner and outer tires, and swap positions while inflating them to the specified pressure.

Common Forklift Faults and Troubleshooting Methods

I. Engine Section

A. Engine Starts but Shows No Signs of Running

This phenomenon is usually caused by an issue with the fuel system, which consists of low-pressure and high-pressure circuits. When inspecting, you should first determine which part of the fuel system is faulty. Start by bleeding the fuel injection pump, loosening the bolts, and manually pumping the hand pump to check the fuel flow. If no fuel or foam-like diesel flows out, it indicates a low-pressure circuit fault; otherwise, it's a high-pressure circuit fault.

1. Low-pressure Circuit Faults

- (1) No fuel in the tank: Solution: Add fuel.
- (2) Fuel pipe blockage: Solution: Clean and clear the pipe.
- (3) Fuel pump filter clogged: Solution: Clean.
- (4) Fuel pipe aging and air leaks: Solution: Replace the pipe.
- (5) Dirty diesel filter: Solution: Replace.
- (6) Fuel pump piston damage: Solution: Replace the fuel pump.

2. High-pressure Circuit Faults

- (1) Fuel injection pump not working: Solution: Calibrate the pump.
- (2) Fuel injectors not working: Solution: Calibrate or replace the injectors.

B. Injection Timing Too Early

1. Symptoms

- (1) A rhythmic, sharp “knocking” sound in the cylinder.
- (2) Engine overheating, lack of power, black smoke.
- (3) Poor idle performance.
- (4) Difficult to start.

2. Solution

Loosen the fixing screws on the fixed plate, slowly delay the injection timing until the injection condition improves. Alternatively, remove the high-pressure pipe from cylinder one, rotate the crankshaft, and observe the fuel level in the fuel

injection pump's outlet valve pressure seat. When the fuel surface shows a slight fluctuation, check if the timing mark on the flywheel coincides with the scale line, ensuring the advance angle is correct. If the angle is incorrect, make further adjustments.

C. Injection Timing Too Late

1. Symptoms

- (1) A deep, unclear knocking sound in the cylinder.
- (2) Engine speed does not increase with throttle input.
- (3) Engine overheating, lack of power, white smoke.

2. Solution

Check if the fixing screws on the connection plate are loose or misaligned. You can loosen the screws and slowly advance the injection timing until the injection condition improves. If adjustments are ineffective, check if the timing adjustment screw on the plunger rod of the injection pump is out of alignment. If misaligned, recalibrate it.

D. Engine Power Loss

1. Fault Causes

- (1) Insufficient supply from the low-pressure circuit, blocked fuel tank vent, clogged or ruptured fuel lines, loose joints, or

- poor gasket sealing: Solution: Identify and clear the faults in the fuel system, replace damaged parts.
- (2)Air filter clogged, restricting air intake: Solution: Clean or replace the air filter.
- (3)Diesel filter clogged: Solution: Replace the filter.
- (4)Insufficient fuel supply from the fuel pump: Solution: Repair or replace the fuel pump.
- (5)Air or water in the fuel system: Solution: Remove air or water.
- (6)Injection timing too early or too late: Solution: Adjust the timing.
- (7)Exhaust pipe or muffler clogged: Solution: Clean.
- (8)Insufficient fuel injection from the pump: Solution: Calibrate the fuel pump.
- (9)Poor atomization from some injectors: Solution: Identify the faulty cylinder and replace or repair the injector.
- (10)High engine temperature: Solution: Check the cooling system, identify and eliminate the fault.
- (11)Improper throttle cable adjustment: Solution: Adjust the cable.
- (12)Mechanical factors causing low cylinder pressure: This could be due to valves not closing properly or severe wear

on the piston, piston rings, and cylinder sleeve: Solution: Adjust valve clearance, regrind the valves, or replace the piston, piston rings, and recondition or hone the cylinder sleeve.

E. Sudden Stalling During Operation

1. Symptoms

- (1) The engine is running.
- (2) Suddenly stalls.
- (3) No abnormal symptoms before stalling.

2. Fault Causes and Solutions

- (1) No fuel in the tank: Solution: Add fuel.
- (2) Water or air mixed in the diesel: Solution: Remove water or air.
- (3) Fuel line clogged or ruptured: Solution: Clear or replace the fuel line.
- (4) Fuel filter clogged: Solution: Replace the filter.
- (5) Loose fuel line connections causing air intake: Solution: Tighten the connections and bleed the air from the fuel system.
- (6) Fuel pump not supplying fuel: Solution: Repair or replace the fuel pump.

II. Transmission System Section

A. Efficiency Drop

1. Torque Converter Section

- (1) Engine speed drops: Solution: Increase engine speed.
- (2) Air bubbles in the fluid: Check the piping seals and whether the hydraulic fluid has deteriorated.
- (3) Oil temperature is too high or too low.

2. Gearbox Section

- (1) Clutch plates are stuck or worn: Check if the clutch plates have adhesive, uneven contact, or warping.
- (2) Seal ring or O-ring wear: Check if the seal ring and groove width are worn or damaged.

B. Oil Temperature Too High

1. Torque Converter Section

- (1) The torque converter operates in the low-speed ratio zone for too long, leading to low converter efficiency, or it stays in a stall condition for too long. Solution: Change the operating conditions and avoid the above situations.
- (2) The one-way clutch locks up at high-speed ratios and loses control: Solution: Inspect and fix this issue.
- (3) Insufficient oil level or air bubbles in the system: Solution: Increase oil level and adjust valve pressure.

(4) Poor oil quality: Solution: Replace with new oil.

2. Gearbox Section

Bearing damage: Check if the mating surfaces are damaged.

C. Transmission Not Working

1. Check if the control valve has any spring lockups or breakages.
2. Check if the main oil pressure is normal. If not, inspect the three-way pump for excessive wear or damage.
3. Check if the torque converter oil pressure is normal. If not, inspect the torque converter.

D. Transmission Jumping Gears

Jumping gears occurs when the gear lever automatically returns to the neutral position due to increased load or severe vehicle vibration. The main causes of this issue are:

1. Excessive wear on the gears and meshing teeth: Solution: Replace the gears and meshing teeth.
2. Self-locking device spring too soft or broken: Solution: Replace the spring.
3. Excessive wear between the synchronizing coupling sleeve, synchronizer ring, and gears: Solution: Replace the relevant parts.

4. Bent or worn shift fork: Solution: Replace or straighten the shift fork.
5. The steel ring of the self-locking device cannot fully engage with the groove of the shift fork shaft: Check if the connection pins and pin holes are loose, and whether the shift lever and the ball joint or socket of the shift fork are loose. If loose, update or repair.

III. Brake System

1. How to Diagnose and Eliminate One-Sided Braking Faults

- (1) If the brake pads on the left and right wheels are not aligned with the brake drums, adjust them.
- (2) If individual brake pads are contaminated with oil, excessively worn, or the materials of the two brake pads are different, repair or replace the brake pads.
- (3) If one side's brake pad does not make proper contact with the brake drum, or if the return spring's tension on one side differs too much from the other, repair or replace the relevant components.
- (4) If the tire pressure or wheel hub bearing tightness on both sides is not consistent, adjust accordingly.

2. How to Diagnose Drive Axle Noise

- (1) If the drive axle produces continuous and irregular noise that increases with speed and decreases or disappears when coasting, it is generally caused by bearing wear. Inspect and replace the bearings, and adjust accordingly.
- (2) If a rhythmic metallic knocking sound is heard from the drive axle during operation, especially when there are sudden changes in vehicle speed or the sound is particularly noticeable during starting, this is likely due to excessive clearance in the planetary gear meshing. Adjust the gear meshing clearance.
- (3) If a continuous “buzzing” sound is heard, and the drive axle becomes overheated, this could be due to the bearings being too tight or insufficient gear clearance, or poor lubrication. Stop the vehicle, check and add lubrication, and if the issue persists, inspect and adjust the bearing tightness or gear clearance.
- (4) If the vehicle suddenly emits a “crunch” or “grating” sound during operation, it is likely that the planetary gear set is damaged or the bearing has fallen apart. Immediate inspection and repair are required.

IV. Hydraulic System

1. No Lifting

- (1) Check if the oil pump is outputting enough oil pressure. If not, inspect whether the hydraulic oil in the oil tank is sufficient. Solution: Add hydraulic oil and repair the oil pump and intake piping.
- (2) Check if the relief valve is severely leaking internally. If so, replace it.
- (3) Check if the hydraulic cylinder is leaking internally or damaged. If so, replace the seals or the hydraulic cylinder.

2. Unable to Lift After the Cylinder Reaches Halfway

The following conditions could cause this phenomenon:

- (1) There are air bubbles in the hydraulic oil in the tank.
- (2) Check and replace the hydraulic oil filter element.
- (3) If there are no air bubbles in the hydraulic oil, inspect and replace the oil pipe from the oil tank to the oil pump.
- (4) There is internal leakage in the hydraulic cylinder. Replace the seals.

3. Heavy Steering

- (1) The oil pressure is too low. Adjust the hydraulic oil flow and increase the pressure.
- (2) There is internal leakage in the steering cylinder. Replace the seals.

(3) The steering gear is severely worn or damaged. Replace the steering gear.

(4) The bearing in the steering wheel system is damaged. Replace the bearing.

V. Internal Combustion Engine Electrical System

1. Simple Troubleshooting Method for Generator Not Generating Power

(1) Check if the fuse is damaged and replace it.

(2) Check if the electronic regulator has normal voltage input and output. If there is no input voltage, check the wiring from the ignition switch to the electronic regulator. If there is no output, replace the electronic regulator.

(3) Check if the generator's carbon brushes and diodes are damaged. Replace them if necessary.

2. Horn Not Sounding

(1) Check if there is a break in the power line from the source to the horn switch and repair it.

(2) Check if the horn switch is burned out or has poor contact. Repair it if necessary.

(3) Test the horn directly on the power source to see if it is damaged. Replace it if necessary.

3. Unable to Preheat

- (1) Check if the preheating relay and timer are damaged and replace them.
- (2) Check if the glow plugs are burned out and replace them.
- (3) Check if the preheating circuit is open or shorted. Repair it if necessary.

4. Troubleshooting Methods for Lighting System Failure

- (1) Check if the bulbs are damaged and replace them.
- (2) Check if the switches are burned out and replace or repair them.
- (3) Check if the fuse or wiring is shorted. Replace or repair as necessary.

Warnings:

1. Incorrect operation, maintenance, and repair are dangerous and can lead to personal injury or death.
2. Never operate this machine unless you have read and understood the operation and maintenance manuals.
3. Never perform maintenance or repairs on this machine unless you have read and understood the operation and maintenance manuals.



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