Carriage(cargo box) Operation and Maintenance Manual

I Product Overview

Special dump truck chassis for CNHTC are used for the dump trucks manufactured by us and the compartment floors and side plates are made of high quality steels by welding, so our dump trucks are especially suitable for transporting such goods as stones, ores, steel blocks and earth. The lifting mechanisms and hydraulic components are of advanced technology and reasonable structures and easy to operate. The excellent performances make the products be widely applied in the engineering environments, such as mining, water conservancy construction, tunnel construction and urban construction.

II Main Structure and Operating Principle

This truck is assembled by installing compartments, lifting mechanism, etc. on the chassis of Class II and the compartments, lifting mechanisms and hydraulic components are described as follows:

1 Compartment

The compartment is a square structure completely welded with metal and it's formed by pressing and welding the good quality steel sheets, so it has enough rigidity and strength. The user can also customize it by bringing up with his or her special requirements which, however, shall conform to the related national regulations and standards.

2 Subframe (secondary beam)

The Subframe is the basic component to install the lifting mechanisms and compartment and is also the

fixed reinforcement connected with the truck chassis. The dump trucks of different models produced by us are all made of cross beams and longitudinal beams with the channel sections (formed by pressing the good quality alloy steel plates) by welding and the triangular structure to enlarge distances between the compartment bases are used for the subframe tail, which ensures the stability of the compartment when the truck is running or when it's lifted. The subframe is fixed and integrated to the vehicle chassis, which also reinforces the rigidity and strength of the cross beam of the truck chassis.

The subframe is equipment with safety strut bars in the postmedian position, which can be put up when the vehicle is repaired to prevent dangers from happening when the compartment descends by gravity.

3 Dumping mechanism

There are two kinds of dumping mechanisms, i.e. the dumping mechanism with a directly-pushed and front-mounted multisection hydraulic cylinder and the enlarged and combined dumping mechanism with a bottom-mounted connecting rod of the triangular arm.

Dumping mechanism with a directly-pushed and front-mounted multisection hydraulic cylinder

Its basic components include the multisection telescopic hydraulic cylinder, high pressure pipe, oil tank, oil pump, distribution valve and drive shaft. Output the high pressure oil through the oil pump and the oil cylinder will drive the compartment to ascend to dump the goods under the action of the high pressure oil.

Structure of the enlarged and combined dumping mechanism with a bottom-mounted connecting rod of the triangular arm:

It mainly consists of the triangular am, tension rod, single acting piston hydraulic cylinder, high pressure oil pipe, oil pump (with a distribution valve), oil tank (to be equipped according to the vehicle model), etc. and it dumps the goods by lifting the compartment under the action of the oil cylinder.

(1) Multisection telescopic hydraulic cylinder:

Its basic model is 4TG180x4210 with 4 sections, a stroke of 4,210 mm. And a rated pressure of 16 MPa and different models are available according to the vehicle models and users.

(2) Single acting piston hydraulic cylinder (basic model):

Its model is HG-F220x910EZ with a cylinder diameter of φ220 mm, a stroke of 910 mm and a rated pressure of 20 MPa. Retarders are provided at both the bottom of the hydraulic cylinder and the lower end of the piston rod. Different models are available according to the vehicle models and the requirements from users.

(3) Oil pump: basic model: CBD-F100 and rated pressure: 20 MPa

(4) Hydraulic pipeline: it consists of the high pressure oil pipe and low pressure oil pipe, usually including three types, i.e. φ19×31, φ25×39.3 and φ45.

The length specifications and using quantity of the hydraulic pipelines shall accord to requirements of the specific vehicle models.

(5) Hydraulic oil: it's the working medium in the hydraulic system and it changes with the using place of the vehicle, season and temperature. For general areas, machine oil N46 and N32 shall be used in summer and in

winter respectively and for the extremely cold areas, the hydraulic oil suitable for the ambient temperatures shall be selected according to the actual situations.

(6) Distribution valve: its basic model is 34QHF-000 and has the function of descending slowly with heavy load.

4 Power output and control system

Power for the hydraulic system is taken from the gearbox of the vehicle chassis which output the power through the power takeoff to drive the oil pump.

The control system consists of the manual air valve and distribution valve, which make the distribution valve stem move upwards and downwards through the piston on the distribution valve so as to change the flow direction of the hydraulic oil from the high pressure oil pump and make the hydraulic cylinder ascend and descend.

5 Spare wheel lifting mechanism

We supply three kinds of spare wheel lifting mechanisms of different structures which can be used for dump trucks of different models.

(1) Manual sprocket spare wheel carrier: It's usually installed in the middle of the truck beam and mainly used for dump trucks of such modes as K32 and K38.The spare wheel is connected with the sprocket hook and the spare wheel will be lifted, lowered and fixed by manually operating the sprocket.

(2) Manual block spare wheel carrier: Pull the guide chain of block manually to lift up or lower down the spare wheel to make it ascend or descend.

(3) Hydraulic manual spare wheel carrier: operate the manual hydraulic pump to drive the piston rod to move and flap the swing arm fixed with the spare wheel by rotating the parallelogram connecting rod so as to make the spare wheel ascend and descend. This kind of spare wheel carriers is widely used for many kinds of vehicles.

6 VIN

The VIN is printed on the product nameplate of the dump truck.

III Operation

Our products are operated differently due to the different chassis and lifting mechanisms, so the user should read the instruction carefully and operate the vehicle according to its model.

Special note: The user must attach great importance to the prompts below:

a The compartment can only be lifted and unloaded when the vehicle is static horizontally and the vehicle can be started only when the compartment is in place.

b The vehicle shall be loaded evenly and in a standard way to avoid being over loaded and loaded in an unbalanced way.

c When the compartment descends with heavy load, be sure to use the “function of descending slowly with heavy load” and do not stop suddenly when it descends with heavy loaded so as

to avoid damages and vehicle accidents caused by dramatic rise of the pressure within the components of the hydraulic system.

d Do not drive the vehicle when the power takeoff is closed and do not open it when the vehicle is running, ether.

e When the manual air valve stem is changed to the “ascend” or “descend” position from the middle position, the valve stem must be lifted up first to make it leave the limit groove before change the position to the “ascend” or “descend” position. Otherwise, the valve stem may be fractured due to the improper operation, leading to operating accidents.

1 Compartment lifting and load tilting (HW series gearbox)

Vehicle state: The engine operates normally, the air pressure is above 0.6 Mpa and the circuit is free of faults when the gearbox is at the neutral position.

(1) Press the clutch (see Figure 1); (2) press the rocker switch of power takeoff on the instrument panel (see Figure3) (note: unlock and press it); (3) lift the manual air valve stem slowly to make it leave the limit groove and the push it in the “ascend” direction; 4. Press the accelerator pedal to loosen the clutch pedal slowly. Then the compartment can ascend. When the compartment ascends to the highest position, pull the handle to the “stop” position.

2 Compartment lifting and load tilting (Fuller gearbox)

Vehicle state: The engine operates normally, the air pressure is above 0.6 Mpa and the circuit is free of faults.

(1) Press the clutch (see Figure 1); (2) press the neutral rocker switch on the instrument panel (see Figure2) (note: unlock and press it); (3) press the rocker switch of power takeoff on the instrument panel (see Figure3) (note: unlock and press it); (4) put into a low gear of the gearbox (Gear 1 or Gear 2); (5) lift the manual air valve stem slowly to make it leave the limit groove and then push it in the “ascend” direction (see Figure 4); (6) press the accelerator pedal to loosen the clutch pedal slowly. When the compartment ascends to the highest position, pull the handle to the “stop” position.

Figure 1

Figure 2

Figure 3

Figure 4

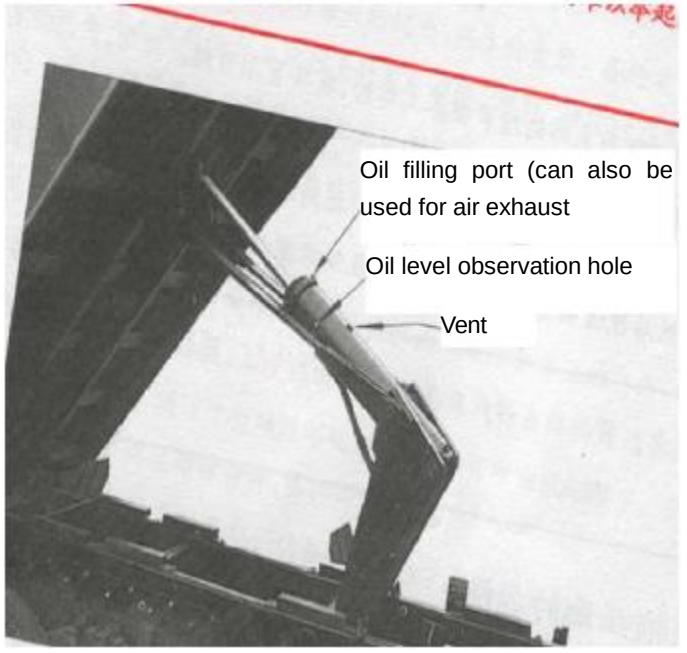

Figure 5

2 Stop during lifting

To stop the lifting the compartment to make it stop moving during lifting, you can press the clutch pedal and pull the control handle to the “stop” position and then the compartment will stop moving.

3 Startup after lowering the compartment

3.1When both the engine and power takeoff operate, pull the control handle to the “descend” position, and then the compartment can descend; while if pulling the control handle to the “stop” position, the compartment will stop moving. When the compartment is in place, pull the control handle to the “stop” position and press the clutch pedal to reset the power takeoff switch (see Figure 3), neutral switch, etc. Release the clutch pedal slowly and then the vehicle is started up.

3.2When the engine doesn't operate and the air pressure is above 0.6 Mpa, the compartment can also descend by pulling the control handle to the “descend” position and if the control handle is pulled to the “stop” position, the compartment will stop moving. Before starting up the engine for startup, you must make sure that the control handle has been pulled to the “stop” position; the power takeoff switch and neutral switch are off before pressing the clutch pedal to start it up.

Note: The goods have not been dumped when the vehicle is lifted, so they are not allowed to fall down. Otherwise, it will damage the vehicle. If the user must use it, please use the “function of descending slowly with heavy load” and pull the red switch on the manual air valve to the “descend

slowly" position.

IV Repair and Maintenance

Note: Maintain the truck as specified in the Operating Instruction for Chassis for the first time to ensure your rights for warranty.

It's very important to conduct the daily and regular service and maintenance, which is of great significance to the using life and safety operation of the vehicle. **If it's necessary to lift the compartment during repairing, the vehicle shall be parked on the flat ground so as to ensure safety and that other protection measures can be taken when necessary.**

For more information on the daily maintenance, please see the table below.

Type	Maintenance content	Object to be maintained	Maintenance cycle		
			Very day	Weekly	Every half a year
General maintenance	Air circuit system	Air tube	Check it for damages and leakage.	Check it for damages and leakage.	
		Pneumatic control valve	Check whether it operates normally and whether there is any damage and leakage.		
	Hydraulic system	Hydraulic cylinder	Check it for damages and leakage.	Clean the external surface of the hydraulic cylinder.	
		Hydraulic pump	Check it for oil leakage.	Check it for oil leakage.	
		Hydraulic oil pipe	Check it for damages and leakage		
			Check it for extrusion,		

			scraping and hitting.		
		Lifting valve	Check it for damages and leakage		
	Oil tank assembly	Oil level	Check the oil level and add oil when necessary.		
		Oil filter element		Check and clean the hydraulic oil filter element.	Replace the oil filter element.
		Air filter element		Check and clean the air filter element.	Replace the air filter element.
		Hydraulic oil		According to seasons and the time	Change the hydraulic oil.
		Oil tank			Clean the inside of the oil tank.
	Bolts and nuts	Bolts and nuts		Check the bolts and nuts for looseness and tighten them in the case of looseness.	
Lubricating point	Lifting system	Hydraulic cylinder	the hydraulic cylinder.	Lubricate axle pins of	
		Amplifier rack		Lubricate the rack axle pin holes.	
	Compartment body	All models		Lubricate the rear turnover shafts.	
		Machinery at the back door		Lubricate the mechanical lock of the back door.	
		Side dumper		Lubricate the hinges.	

1 Filling of the hydraulic oil

The machine oil of N32 (in winter) or N46 (in summer) with a filter precision of 25 μm is used for the hydraulic

system. The user should check the hydraulic system assembly, pipe fittings and hydraulic pipelines for leakage at all times and check the hydraulic oil level when lifting it every 100 times or operating it every 1,000 miles. The hydraulic oil shall be added in time when necessary and must be changed twice every year. The hydraulic oil to be used must be pure, normal and clean, or it will damage the seals, making the system fail to operate.

For the vehicle of the hydraulic system with an oil tank, oil can be filled in the oil tank directly. Note: do not lift the compartment in advance when filling the oil or it will be easy for the air to enter the oil cylinder or the oil in the oil tank to be sprayed out.

For the vehicle without an oil tank, the compartment must be lifted by at least 35^{o} when filling or changing the oil. There is an oil filling port, vents and an oil level observation hole on the hydraulic cylinder. Their bolts shall be screwed off when the hydraulic oil is filled and then the power transfer pump or oil container shall be used for filling the hydraulic oil into the hydraulic cylinder through the oil filling port on it. Stop filling the hydraulic oil when it flows out of the vents. Tighten the vent bolts and then lift the compartment slowly. Continue filling the hydraulic oil as lifting the compartment (slowly) at the moment. When the compartment is lifted to the largest angle, pull the operating valve to the “stop” position, screw off the plug for the oil level observation hole to continue filling the oil until there is hydraulic oil flowing out of the oil level observation hole and then tighten its plug and continue to fill the oil for at most 2 L before stopping filling it and tightening the oil filling port plug finally. Now the oil filling is completed. (see Figure 5)

2 Filling of hydraulic oil for the hydraulic manual spare wheel carrier

The hydraulic oil of the same model is used for the hydraulic system of the spare wheel carrier. Screw off the oil filling port plug of the manual oil pump and fill the hydraulic oil into it slowly. The pump is full when the oil flows out of the oil filling port, and then the plug shall be tightened.

When replacing the gear pump and repairing the hydraulic distribution valve, pull the manual control valve to the “descend” position and then the compartment will be static in the trend of descending. Otherwise, it will waste the hydraulic oil.

3 Exhaust of the hydraulic system

If there is air in the hydraulic medium, it will influence the normal operation of the lifting system, so it shall be exhausted in time. When it's exhausted, the control valve stem shall be pulled to the “stop” position after the compartment has been lifted to the largest angle to make the engine operate slowly. Loosen the vent plug on the hydraulic cylinder and the air can be exhausted after leaving it for several minutes. The air in the hydraulic medium can be completely exhausted by repeating this operation for several times, i.e. lower the compartment after the vent plug is tightened when necessary and then re-lift it to the largest angle before loosening the vent plug for re-exhaust.

Note: if it's found that the creeping phenomenon still exists, loosen the oil level observation hole plug to check whether there is oil flowing out. If there is, it indicates that the hydraulic oil is insufficient and shall be filled

Turnover hinge	The connection point of the	one for both left and right	Injection with the grease

Part to be lubricated	Location	Places	Injection method

in time. The hydraulic oil must be filled through the oil filling port until there is oil flowing out of the vents and the observation hole.

The hydraulic cylinder of the directly-pushed and front-mounted hydraulic system isn't equipped with any vent bolt. Loosen the oil pipe connected to the hydraulic pump a little when it's exhausted, which can exhaust the air in the oil pipe and hydraulic pump; loosen the high pressure oil pipe connected to the hydraulic pump and oil cylinder a little, make the hydraulic pump operate slowly and set the pneumatic control valve to the lifting position, which can completely exhaust the remaining air within the system after some time. The oil pipe shall be tightened when the air is completed exhausted.

V. Lubrication

All parts of the product to be lubricated shall be lubricated with the 3# calcium base grease by injecting it with a grease gun through the grease nipple or smearing it with tools. The lubricating grease shall be checked and supplemented in time after the vehicle has been lifted for 100 times or has run 1,000 miles. Satisfactory lubrication on schedule is the guarantee of normal products and their extended lives.

Parts to be lubricated are as follows:

	compartment foundation end and the secondary beam and on the turnover hinge shaft		gun
Pulling arm	The connection shafts at both ends of the left and right pulling arms	4	Injection with the grease gun
Hydraulic lifting cylinder	The articulated shaft at the end of the piston rod and the support shaft of the oil cylinder base	3 for the oil cylinder floating type and 4 for the triangular arm floating type	Injection with the grease gun
Triangular arm	The connection shaft of the compartment foundation or secondary beam	4	Injection with the grease gun
Guide plate	The inside of the guide plate	2	Smearing it with a tool
Support frame	Located at the two hinge axes on the subframe	Totally 2	Smearing it with a tool
Hanging board at the back door	Two hanging board hinge axes over the back door	Totally 2	Smearing it with a tool
Opening and closing mechanism at the back door	The hinge axes of the looking hooks and both ends of the tension rod	3 for both left and right, totally 6	Smearing it with a tool
Spare wheel carrier	Each rotation hinge axle	10	Smearing it with a tool
Locking hook and locking plate	Contact surface	2	Smearing it with a tool
Support shaft of	Oil cylinder base and oil cylinder casing	2 for both the up and down	Injecting it with the

the directly-pushed oil cylinder	rotating shaft		grease gun through the grease nipple
Limit valve	At the valve stem head and the contacted object	1	Smearing it with a tool

VI Troubleshooting

S/N	Description	Causes	Troubleshooting	Remarks
1	The vehicle moves upon power taking	The neutral switch fails.	To be serviced by the service station.	
2	The compartment body can't be lifted.	No output from the power takeoff	The power takeoff mechanism to be serviced by the service station	
		Movement of the limit valve stem is blocked.	The intake and outtake manifolds of the selector valve fail.	Front lifting-up dump truck
			Service the motion limit valve stem	Front lifting-up dump truck
			Adjust the pressure plate of the limit valve.	

			Replace the limit valve.	Front lifting-up dump truck
		Oil leakage in the pipeline and blocked pipeline	Service the pipeline	
		Air leakage of the manual valve	Service or replace it.	
		Air leakage of the selector valve	Replace the sealing ring.	
		Movement of the selector valve stem is blocked.	Dismantle and service it.	
		Insufficient hydraulic oil	Supplement it.	
		Fractured piston of the oil cylinder	Replace it.	
		Damaged oil pump	Replace it.	
3	The compartment body is lifted slowly or jitters.	The piston of the oil cylinder is matched too tightly.		
		Insufficient hydraulic oil	Supplement it.	

		Foreign articles in the selector valve or check valve.	Dismantle and service it.	
		The piston ring of the oil cylinder is worn.	Replace it.	
		Gears of the oil pump are seriously worn.	Replace the gear pump.	The lifting is slow in the case of heavy load.
		There is air in the hydraulic system.	Exhaust the air.	
4	The compartment can't descend after being lifted.	The manual valve is damaged.	Dismantle it for repair or replacement.	
		The air tube is blocked.	Service it.	
		Movement of the selector valve stem is blocked.	Dismantle and clean it.	
5	The oil flows over the oil tank.	Too much oil	The oil level shall be kept at the middle oil level scale.	
		The return oil filter element of the oil tank is damaged.	Replace the filter element.	
		There is air in the system.	Lift the tank body to the safety	

			height and open the vent hole bolt for exhaust. Repeat the operation for several times.	
6	High oil temperature	It's lifted too frequently.	Add radiating oil tanks.	
		Insufficient hydraulic oil	Add the hydraulic oil.	
		The hydraulic pump is damaged.	Replace it.	
7	The upper cylinder cover cracked.	There is air in the system.		Type F
		The oil return tube is blocked.		
		Start up the vehicle quickly when being lifted to the top.		

8	The compartment slides down by gravity after being lifted or it can be lifted at a fast speed but it descends on the contrary at a slow speed.	Foreign articles in the selector valve or check valve.	Dismantle it for cleaning or replacement.	
		Movement of the selector valve stem is blocked.	Dismantle it for cleaning or replacement.	
		The piston of the oil cylinder is not tightly sealed.	Replace the piston ring.	
		The oil cylinder diameter becomes large.	Replace the oil cylinder (caused when being seriously loaded or its lifting is blocked)	
9	Oil seals of the oil pump are damaged	High oil temperature	Add radiating oil tanks.	
		The hydraulic oil thins out.	Change the hydraulic oil.	
		The oil pump output shaft	Replace the pump.	

	frequently.	bends.		
		There is air in the system.	Exhaust the air.	
10	The compartment descends fast.	The check valve of the hydraulic cylinder is damaged.	Replace it.	
11	The ascending and descending of the oil cylinder are out of order.	The oil cylinder diameter becomes large.	Replace it.	Front lifting-up cylinder
12	Noise production	The pipeline is blocked, there is air in the hydraulic medium and the viscosity of the hydraulic oil is too large.	Clear off the stemming for the pipeline, exhaust the air, inject the hydraulic oil and change for the hydraulic oil with a smaller viscosity.	

VII. Spare parts

1 List of the vulnerable spare parts for the single acting hydraulic oil cylinders (only for the Dezhou cylinders)

S/N	Drawing No.	Name	Material	Specification	Qty.
1	CB4-692-67	Self tightening oil seal		PG32*52*12	2
2	CB1235-76	O-type seal ring	Oil resistant rubber	D1403.1	2
3	CBG-9	Seal ring	Rubber 1-3		4

2 Vulnerable spare parts for oil tubes.

S/N	Name	Material	Specification	Qty.
1	High pressure oil outlet hose assembly	Oil resistant rubber	2-19×31-18Mp, the length is determined according to actual conditions.	1
2	High pressure oil outlet hose assembly	Oil resistant rubber	2-19×31-18Mpa, the length is determined according to actual conditions.	1
3	Oil return hose assembly	Oil resistant rubber	1-25×39.3-8Mpa, the length is determined according to actual conditions.	1
4	Oil return hose assembly	Oil resistant rubber	1-25×39.3-8Mpa, the length is determined according to actual conditions.	1

5	O-type seal ring		To be determined according to the vehicle models.	2
6	O-type seal ring		φ36×3.5	2
7	O-type seal ring		φ40×4.02	2

3 Vulnerable spare parts for oil pumps.

Code	Name	Specification	Material	Qty. for each set
GB3452.1-82	O-type seal ring	190×5.3	Rubber 1-4	2
GB3452.1-82	O-type seal ring	43.7×3.55	Rubber 1-4	1
LJX-03-89	YX-type seal ring	φ70	PU1-3	1
LJY-07-89	Dust ring	φ70	PU1-3	1

The user can provide the plan for the vulnerable spare parts to us according to the needs and we will provide you with sufficient spare parts.

VIII Recommendation of Optional Configurations According to the Medium to Be Transported

1. When the loess and yellow sand are transported, it's suggested that the compartment floor be 8 mm thick at least and the side plates of the compartment be 6 mm thick.
2. When the construction wastes and ores are transported, it's suggested that the compartment floor for scum be 12 mm thick at least and the side plates of the compartment be 8 mm thick.
3. For the ore bucket, it's suggested that the floor and the side plates of the compartment be 16 mm and 10 mm thick respectively or more than these recommended sizes.
4. For special orders, it shall be customized according to the contract.

IX Safety Precautions:

1 When the compartment of the front lifting-up dump truck is lifted to a certain angle, the limit plate welded at the oil cylinder bottom will touch the limit valve stem which will move downwards and cut off the working air circuit, making the oil cylinder stop being lifted.(See Figure 6)

Note: please check whether the lock bolt of the valve stem gets loose. The position for the limit valve stem has been set when being delivered from the factory, so please do not adjust it casually. Otherwise, for the problem caused by it produced in the application, we undertake no responsibilities.

Figure 6

Figure 7

2 The safety support is installed at the back of the compartment to prevent the lifting system from failing and prevent the damages caused by the rear turnover of the vehicle due to the overlarge angle the compartment is lifted to. Do not use it as a limiting device for the compartment lifting. The limiting device has been set when being delivered from the factory, so please do not change the distances between it and the two cross beams at the compartment bottom casually. (See Figure 7)

3 The compartment shall be repaired and maintained after being lifted, so please be sure that the safety support is in good state and has been put into use properly.

X Documents and Tools Provided with the Vehicle

1 Documents provided with the vehicle

Operating Instruction for Chassis

Quality Certificate for Chassis

Operating Instruction for Dump Truck

Quality Certificate for Dump truck

Product warranty card (provided by the chassis manufacturer)

2 Tools provided with the vehicle

A set of chassis tools accompanying the vehicle

A spare wheel carrier handle

A tow hook (pin)

3 Spare parts provided with the vehicle