Maintenance Manual

H625/H735/H933/H1440/H1840
HR2150

Telescopic Handler

WARNING

Before operation and maintenance, the drivers and maintenance personnel are required to read this manual thoroughly. Otherwise, fatal accident may occur.

This manual shall be kept properly for future reference by the personnel concerned.

LINGONG HEAVY MACHINERY CO., LTD.

Telescopic Handler
Maintenance Manual

880*1230 mm Sextodecimo 8 sheets

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Foreword

Thanks for purchasing the telescopic handler produced by Lingong Heavy Machinery Co., Ltd. This machine is designed according to EN 1459-1:2017+A1:2020. This manual introduces the maintenance of the telescopic handler for safety guidelines and correct operation and maintenance of the machine.

How to get the best out of your machine is a goal we pursue together with you, and it depends to a large extent on how familiar you are with the machine and how carefully and thoroughly it is maintained. We sincerely hope that you will read through this manual before starting and operating the machine for the first time and before repairing and maintaining the machine, and that you will master the operation and maintenance described therein.

The illustrations and descriptions in this manual are correct at the time of publication, but due to the continuous improvement of the structure and performance of our products, the design as well as operation and maintenance instructions of the product may be subject to change without notice. For the latest information of the machine or any question about this manual, please consult us.

This manual applies to telescopic handlers. Users should strictly follow the maintenance interval in the maintenance schedule to maintain the machine.

This manual should always be kept at the specified location so that it can be read at any time. This manual is an integral part of the machine and should be handed over when ownership or use of the machine is transferred. If the manual is lost, damaged or illegible, please replace it promptly!

This manual is the property of Lingong Heavy Machinery Co., Ltd., and may not be duplicated or reprinted without our written permission.

⚠ WARNING

Only the personnel who have been professionally trained and qualified are allowed to operate and maintain the machine.

Incorrect operation, maintenance and repair are dangerous and may lead to personal injury or death.

Before operation or maintenance, please read this manual thoroughly. Otherwise, do not operate, maintain or repair this machine.

Please load the machine in strict accordance with the rating; otherwise all the consequences arising from overloading or unauthorized modification will be borne by the user.

The operation instructions and precautions in this manual apply only to the intended use of the machine. If the machine is used for an operation that is out

of the specification herein but not prohibited, always make sure that this operation will not cause personal injury to yourself or others.

Please operate the machine in strict accordance with the safety requirements in the manual. The user is responsible for all consequences caused by non-compliance with the safety requirements of the machine.

Safety Notices

The operator shall understand and abide by the current national and local safety regulations. If such regulations are not available, the safety instructions in this manual shall prevail.

Most accidents are caused by failure to obey operation and maintenance specifications of the machine. To avoid unnecessary accident, please read and follow all warnings and precautions in this manual and on the machine before operation or maintenance.

Considering the fact that not all possible hazards are foreseeable, it is impossible for safety notices in this manual and on the machine to cover all safety precautions. If it is necessary to take steps and operations not recommended herein, always protect the safety of yourself and others, and keep the machine from any damage. If the safety of some operations remains uncertain, please consult us or dealers.

The operation and maintenance precautions referred to herein apply only to the intended use of this machine. If the machine is to be used for other purposes than those listed herein, it is the user or operator instead of us that shall take the safety liabilities therefrom.

In no case shall any operations expressively prohibited herein be performed.

For the purpose of this manual, the following signal words are applied to identify safety instructions:

DANGER - Indicating any existing dangers that, if not avoided, will cause serious injury or even death, and also serious machine damage.

WARNING - Indicating any potential dangers that, if not avoided, may cause death or serious injury, and also serious machine damage.

CAUTION - Indicating situations that, if not avoided, may cause minor or moderate injury, and also machine damage or shortened machine service life.

Contents

Chapter 1 Maintenance

1.1 Checking the safety manual

It is essential to keep the operation and maintenance manuals in good condition to achieve safe operation of the equipment. If the manual is illegible or missing, the safety and operation information necessary for safe running cannot be provided.

1) Confirm that the Operation Manual and the Maintenance Manual are kept intact in the cab.
2) Check that every page of the manual is legible and intact.
3) Put the manual in the cab after use.

⚠ To replace any manual, please contact the service personnel of LGMG.

1.2 Checking the labels and signs

It is essential to keep all safety and description labels and signs in good condition to achieve safe operation of the equipment. Labels are used to remind the operation and maintenance personnel of potential hazards during operation of the equipment and provide operation and maintenance information for users. Illegible labels cannot remind the maintenance personnel of procedures or hazards and may also lead to unsafe operation.

Check whether all labels are in proper positions with reference to the label section in this manual and based on the label menu and description. Check the legibility and condition of all labels, and replace the damaged or illegible labels promptly if any.

⚠ To replace the labels, please contact the service personnel of LGMG.

1.3 Checking for damaged, loose or missing parts

This procedure shall be implemented once every 8h or every day.

It is essential to check the equipment condition regularly to achieve safe operation and superior performance of the equipment. Incorrect positioning or maintenance and part damage, looseness or loss may lead to unsafe operation.

1) Check the equipment for damage, incorrect installation or part loss, including:
   - Electrical component, wire and cable
   - Hydraulic hose, connector, valve block and hydraulic cylinder
   - Fuel tank and hydraulic tank
   - Boom chains and sliders
   - Tires and hubs
   - Engine and its relevant parts
   - Limit switch and horn
   - Nuts, bolts and other fasteners
   - Outrigger mechanism
   - Brake pedal and parking brake
   - Indicator light and alarm
   - Drive shaft

Inspect the entire machine to check:

- the welds or structural parts for cracks
- the chassis for deformation or open weld
- the machine for dent or damage
- that all structural parts and other key components are intact and all relevant fasteners and pins are installed in correct positions and tightened

Regular maintenance

In a working environment where is extremely cold, dusty or humid, more frequent lubrication and maintenance than that is specified in "Regular Maintenance" is required. During maintenance, the maintenance items listed in the original requirements shall be carried out repeatedly.

For example, when carrying out maintenance items for 250 working hours, the maintenance items for 50 working hours or weekly and every 8 working hours or daily shall be carried out at the same time.

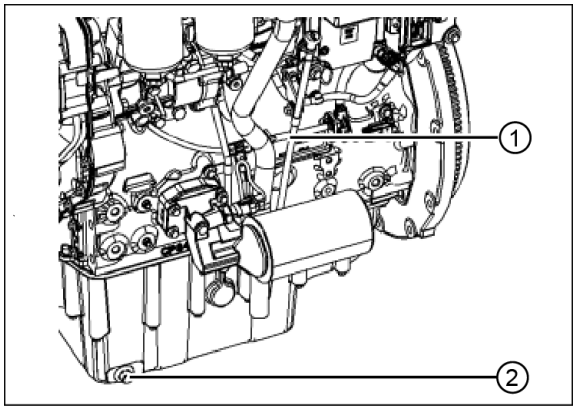
During maintenance, the engine shall be stopped, the machine shall be parked on a solid level ground, the gear selector shall be set to N gear, the parking brake handle shall be pulled up, and the padding block shall be placed under the tires to prevent the machine from moving.

1.4 Daily or every 8 hours

1.4.1 Checking the engine oil level

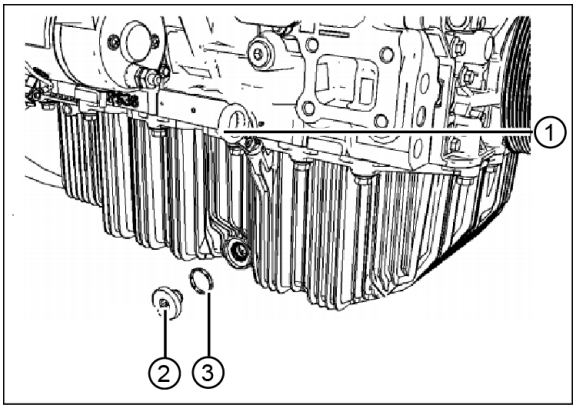
Insufficient or excessive oil will cause engine damage. The oil level can be checked only when the engine is placed horizontally and shut down. If the engine is hot, shut it down and check the oil level after 10 minutes so that the engine oil can be discharged into the oil pan. If the engine is cold, check the oil level immediately.

Perkins 1104D:



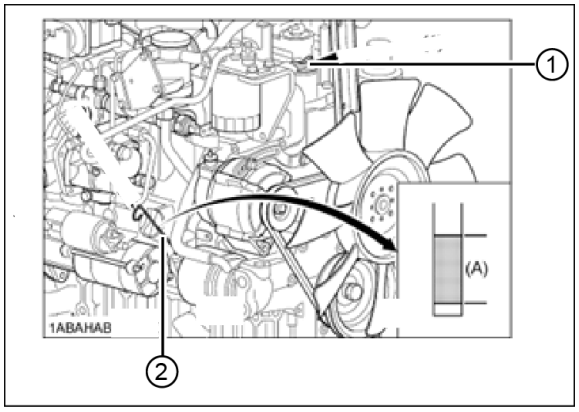
1. Oil dipstick
2. Oil drain plug

Perkins 904J:



1. Oil dipstick
2. Oil drain plug
3. Sealing ring

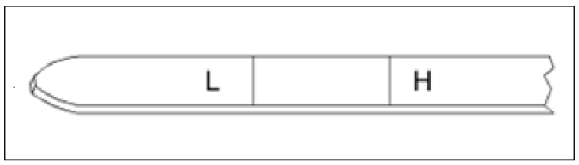
Kubota V3307:



1. Oil filler plug

2. Oil dipstick

1) Pull out the oil dipstick and wipe it with a clean cloth, re-insert it into the engine oil level port to the end, and then pull it out for inspection. The oil level should be between the "L" mark and the "H" mark of the oil dipstick.



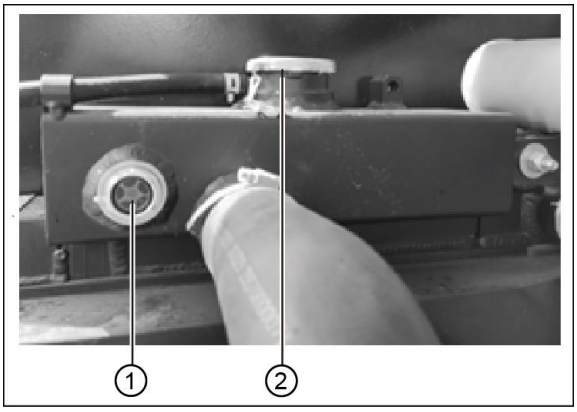
2) If the oil level is below the "L" scale, please add oil through the filler port; If the oil level is above the "H" mark, unscrew the drain plug at the bottom of the oil pan to discharge some oil.

⚠ CAUTION: Too much or too little engine oil will cause engine damage.

1.4.2 Checking the coolant level

H1840 is used as an example. For other models, please refer to this picture:

Check the coolant level every 8 hours or every day, whichever comes first.



1. Sight hole

2. Filler

1) Place the telescopic handler on the horizontal ground, stop the engine and wait till it is cool.

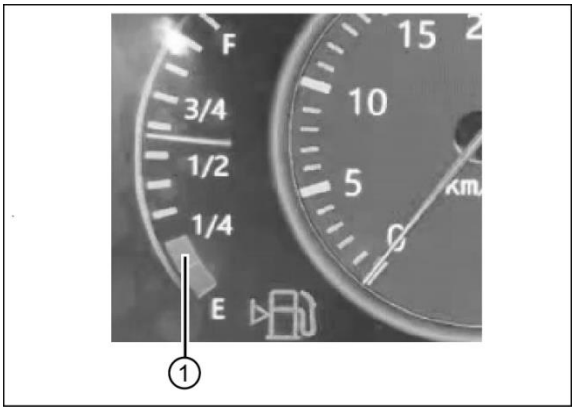
2) The coolant level shall not be lower than the middle position of the sight hole (1).

3) If necessary, add coolant through the filler (2).

⚠ In order to avoid the risk of scalding, wait until the engine is cool enough before removing the cooling circuit filler cap 2.

1.4.3 Checking the fuel level

Check every 8 hours or every day, whichever comes first.



1. Fuel level gauge

1) Check the fuel level via the fuel level gauge on the instrument panel.

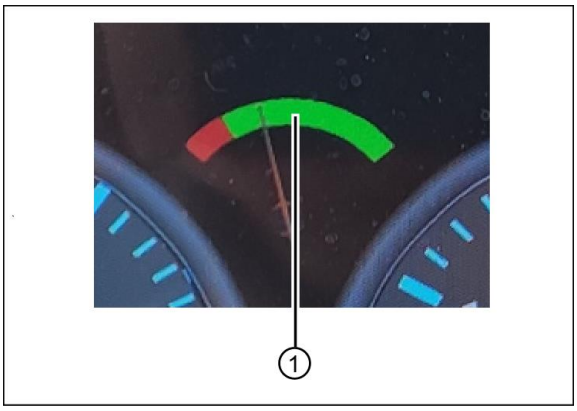
2) Keep the fuel tank full to minimize any condensation due to atmospheric conditions.

⚠ CAUTION: Adding should be always carried out before the diesel in the diesel tank is used up, or, the engine will stall and the diesel at the bottom of the diesel tank will contain more water and impurities, which will affect the normal operation of the engine.

⚠ CAUTION: The fuel shall be selected according to the lowest local temperature when the machine is in use.

1.4.4 Checking the DEF level (If equipped)

Check every 8 hours or every day, whichever comes first.



1. DEF level gauge

1) Check the DEF level via the DEF level gauge on the instrument panel.

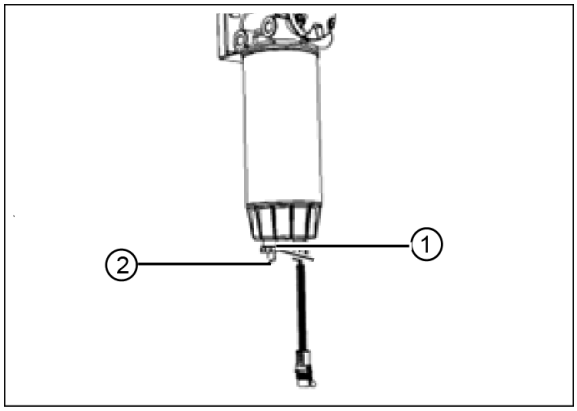
1.4.5 Draining water from the fuel filter-Perkins engines

Drain it every 8 hours or every day, whichever comes first.

⚠ Explosion and fire hazard. Engine fuel is combustible. Check the location of the equipment. This step shall be performed in open and well-ventilated areas away from heaters, sparks, flames, and burning tobacco. A conforming fire extinguisher should be placed in an easily accessible place.

⚠ This step shall be performed when the engine is shut down.

Perkins 1104D:



1. Drain valve

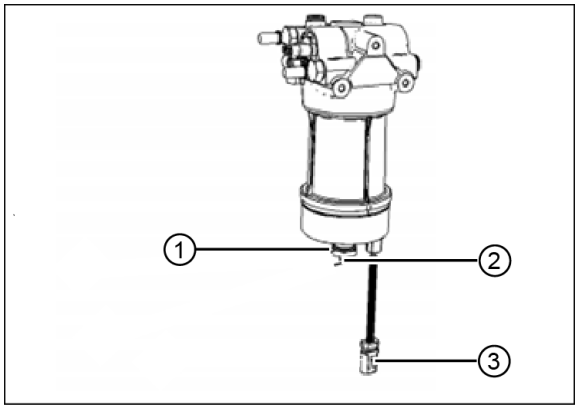
2. Connector

1) Place the container under the drain valve.

2) Install a suitable tube on the connector (2), then open the drain valve (1) to drain the liquid from the filter and close the drain valve immediately when the clean fuel is drained.

3) Wipe away the spilled fuel oil.

Perkins 904J:



1. Drain valve

2. Connector

3. Electric connector

1) Place the container under the drain valve.

2) Install a suitable tube on the connector (2), then open the drain valve (1) to drain the liquid from the filter and close the drain valve immediately when the clean fuel is drained.

3) Wipe away the spilled fuel oil.

1.4.6 Checking the tire pressure and wheel nut torque

Drain it every 8 hours or every day, whichever comes first.

1) Check treads and sides of tires for scratches, cracks, punctures, and other abnormal wear.

2) Check if the hubs are damaged, bent or cracked.

3) Check and adjust the tire pressure if necessary:

Model	Speed (km/h)	Single tire load (Kg)	Tire pressure (kpa)
H625	10	2865	550
	40	1891	550
H735	40	4750	500
H933	40	4750	500
H1440	40	5600	500
H1840	40	5600	500
HR2150	40	6900	750

Tightening torque of wheel nut:

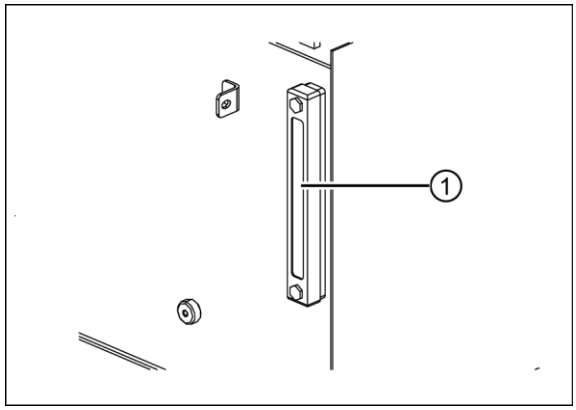
Model	Front axle	Rear axle
H625	450N.m	450N.m
H735	540-650N.m	540-650N.m
H933	540-650N.m	540-650N.m
H1840	780-880N.m	780-880N.m
H1840	780-880N.m	780-880N.m
HR2150	780-880N.m	780-880N.m

⚠ CAUTION: Check whether the air hose is properly connected to the tire valve before inflation and keep a certain distance from everyone during inflation.

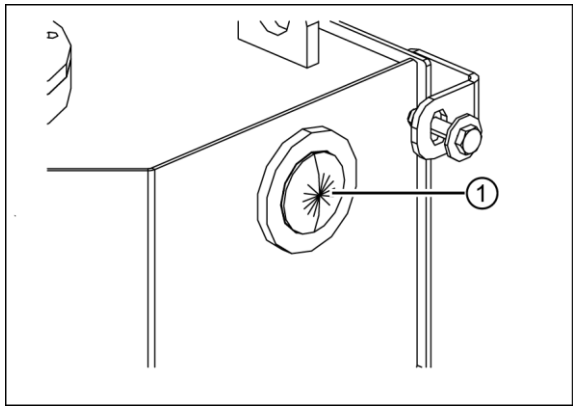
1.4.7 Checking the hydraulic oil level

Check every 8 hours or every day, whichever comes first.

Type 1



Type 2



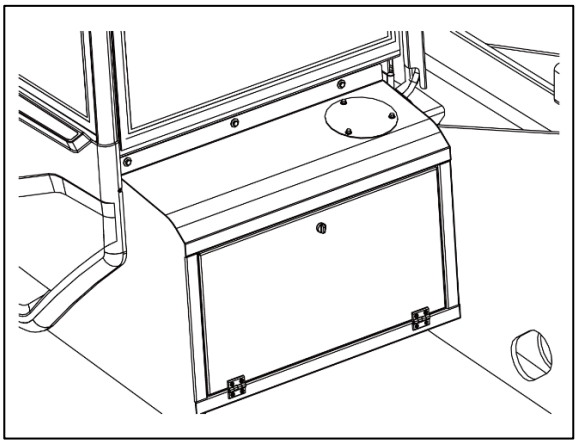
1) When checking the hydraulic oil level, park the handler on a flat ground. The hydraulic oil level for storage shall be not less than 1/2 of the level meter.

1.4.8 Checking the coolant level and the fuel level of the water heater in the cab-HR2150 only

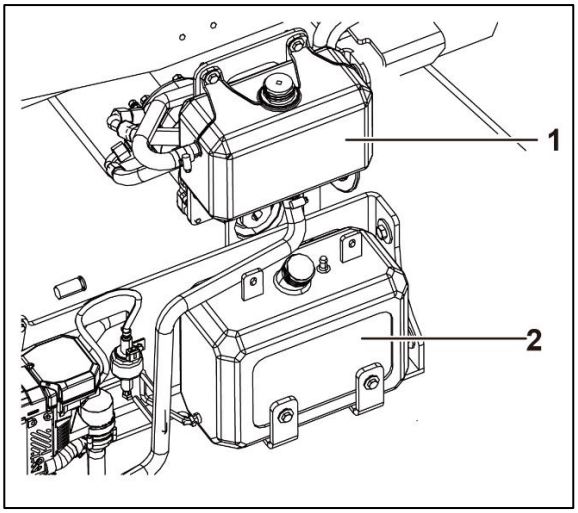
Check every 8 hours or every day, whichever comes first.

Stop the engine, park the machine on a level ground, set the gear selector to N gear, pull up the parking brake handle, and chock the tire to prevent the machine from moving.

1) Open the rear side cover of the cab.



2) Check the coolant level and the fuel level, and add when the level is too low.



1. Coolant tank

2. Fuel tank

Note: The specifications of the coolant and fuel of the A/C system shall be consistent with that of the machine, and shall be selected according to the lowest local temperature. Please refer to ***1.11.3 Selection of oils.***

1.5 Every 50 hours or weekly

1.5.1 Cleaning radiator

This item is performed every 50 hours or weekly, whichever comes first.

Clean and flush the cooling system before the recommended maintenance interval if the following conditions occur:

- The engine overheats frequently.
- Coolant foaming was observed.
- The oil has entered the cooling system and the coolant is contaminated.
- The diesel fuel has entered the cooling system and the coolant is contaminated.

⚠ CAUTION:

Cleaning radiator should always be carried out when the engine is shut down.

⚠ CAUTION：

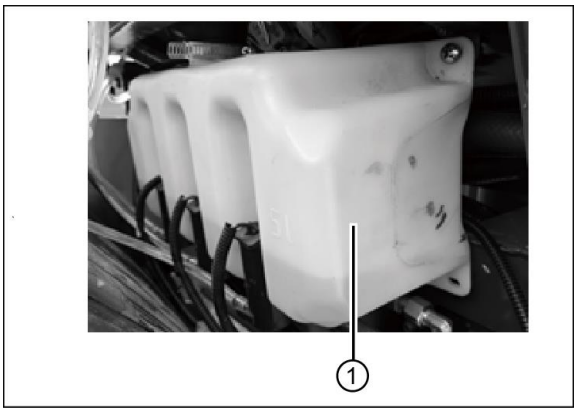
If the operation isn't performed carefully, the radiator core will be prone to damage.

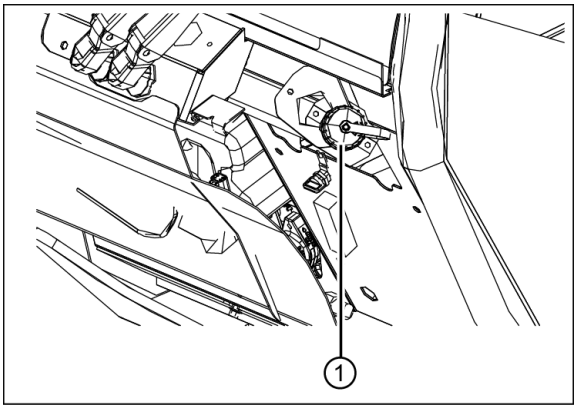
1) Clean the radiator through blowing from the air outlet side of the radiator with compressed air.
2) Clean the inside of the radiator with a soft cloth.

1.5.2 Checking washer fluid level

This item is performed every 50 hours or weekly, whichever comes first.

H1840 is used as an example. For other models, please refer to this picture:





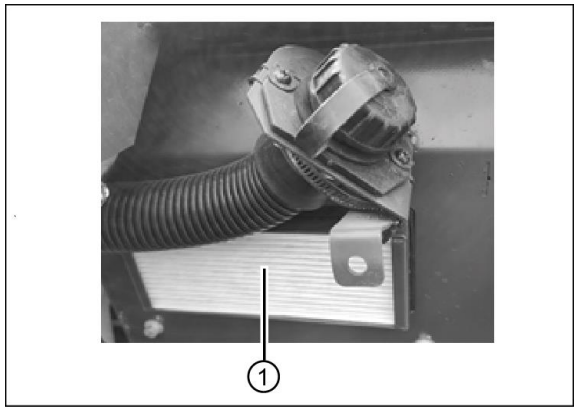
1) Remove protective cover.
2) Check the level in the water tank (1).
3) If necessary, add washer fluid by filler (2).

1.5.3 Cleaning the cab A/C filter

This item is performed every 50 hours or weekly, whichever comes first.

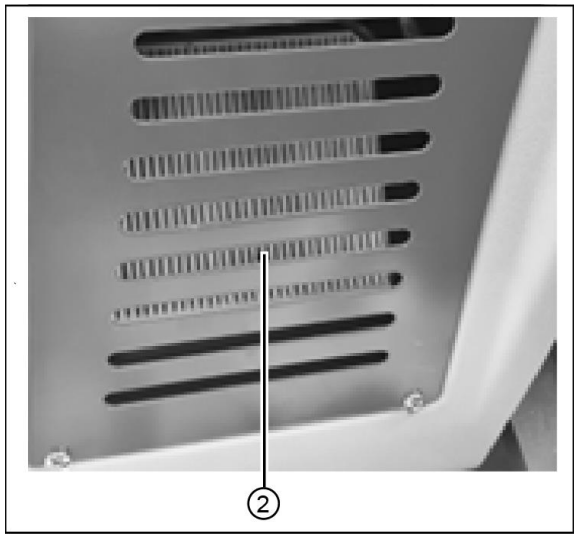
H1440/H1840/HR2150:

A. Cab outer filter element



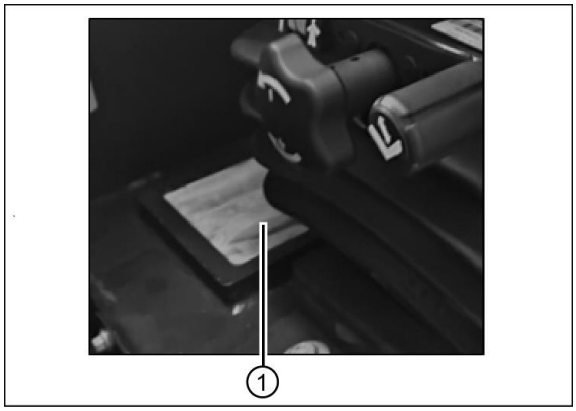
1) Remove the protective cover.
2) Take out the A/C filter element (1) and clean it with compressed air. If the filter element is damaged, replace it.
3) Install the filter element (1) and housing.

B. Cab inner filter element



1) Remove the shield.
2) Take out the A/C filter element (2) and clean it with compressed air. If the filter element is damaged, please replace it.
3) Install the filter element and the shield.

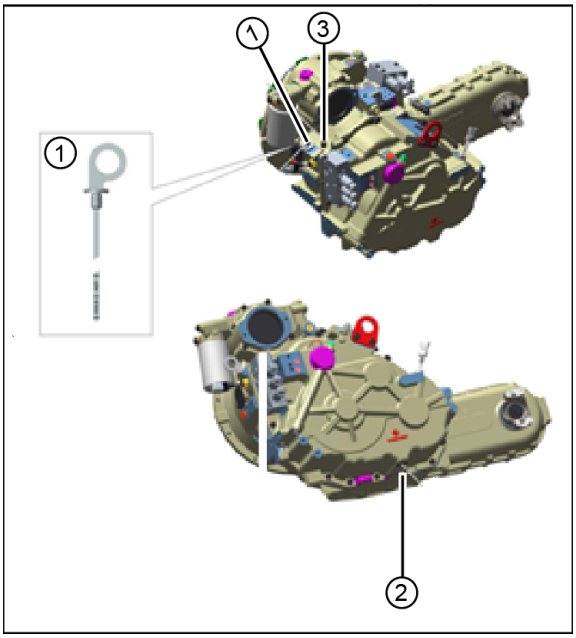
H735/H933:



A/C filter

1.5.4 Checking the transmission fluid level (If equipped)

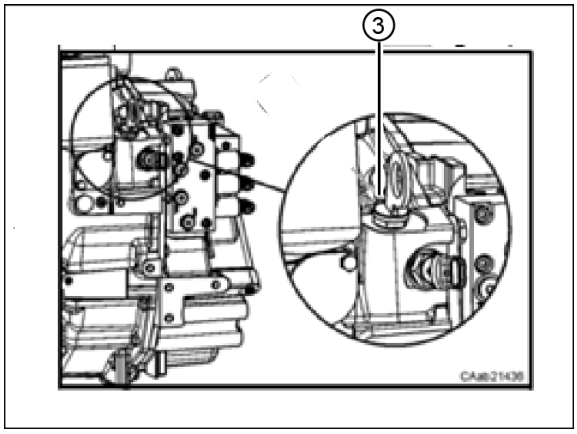
This item is performed every 50 hours or weekly, whichever comes first.



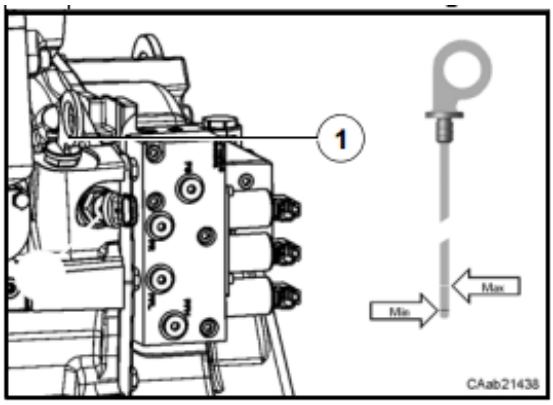
No.	Description
1	Oil filler/oil dipstick
2	Oil outlet
3	Breather

1. Stop the engine, park the machine on a level ground, set the gear selector to N gear, pull up the parking brake handle, and chock the tire to

prevent the machine from moving.



2. Carefully clean the breather (3) and surrounding area.



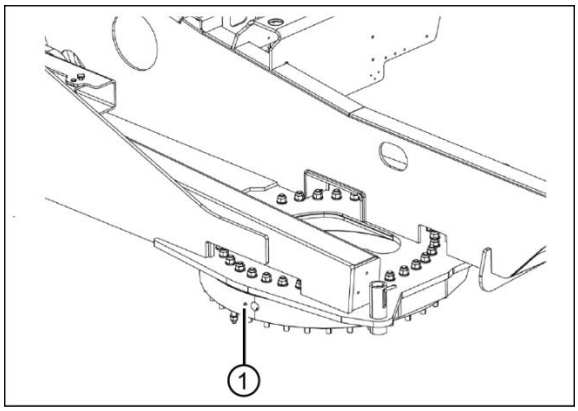
3. Unscrew the oil dipstick (1), wipe it with a cloth, insert it back to the original place, and pull it out again to check the oil stain. The oil level shall be between the maximum and minimum limits on the oil dipstick (hot range or cold range). If the oil level is above the maximum of the hot/cold range, drain the oil and if the level is below the minimum, add the oil according to the standard.

⚠ CAUTION: High/low transmission fluid level will cause damage to the transmission. Please keep the transmission fluid level in the correct position.

⚠ CAUTION: During the process of checking the transmission fluid level and replacing the transmission fluid, pay attention to cleanliness to avoid entering of dirt into the transmission system and damaging the transmission.

1.5.5 Lubricating the slewing bearing-HR2150 only

This item is performed every 50 hours or weekly, whichever comes first.



1. Grease filler port

Fill the slewing bearing and slewing gear with grease every 50 hours. Regular lubrication for slewing bearing is necessary to the good performance and service life of the equipment. Incorrect lubrication will lead to component damage.

1) Find the grease filler next to the slewing reducer, connect the grease dosing machine, and rotate the turret several times while

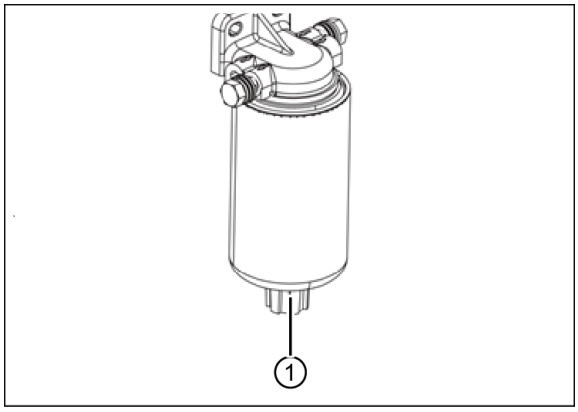
adding the grease until the grease overflows from the upper and lower fixing surfaces of the slewing bearing . Grease Grade: Lithium-based grease 2#.

2) Check the lubrication of the slewing bearing gear and the slewing reducer gear, clean the gear surface if necessary, and apply the grease again.

⚠ CAUTION: If there is too much dust in the working environment, increase the frequency of lubrication.

1.5.6 Draining water from the fuel filter-Kubota engines

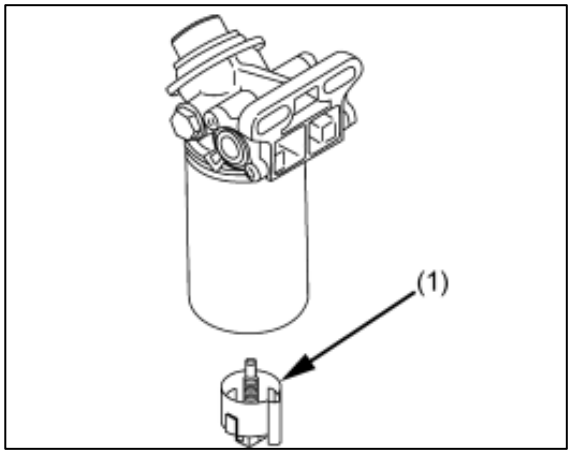
Kubota V3307-E3:



1. Drain valve

1) Place the container under the drain valve.
2) Open the drain valve (1) to drain the liquid from the filter and close the drain valve immediately when the clean fuel is drained.
3) Wipe away the spilled fuel oil.

Kubota V3307-CR-E5:



1) Shut down the engine, and find the water separator.
2) Disconnect cable connection.
3) Loosen the drainage plug located at the bottom of the filter cartridge, allowing the water drained to an appropriate container.
4) Reinstall the fuel filter, and prevent dust and dirt from entering.
5) Finally be sure to air-bleed the fuel system before getting the engine restarted.
6) Wipe up any fuel that may be splashed.
7) Start the engine to inspect whether or not there is leakage in the fuel filter.

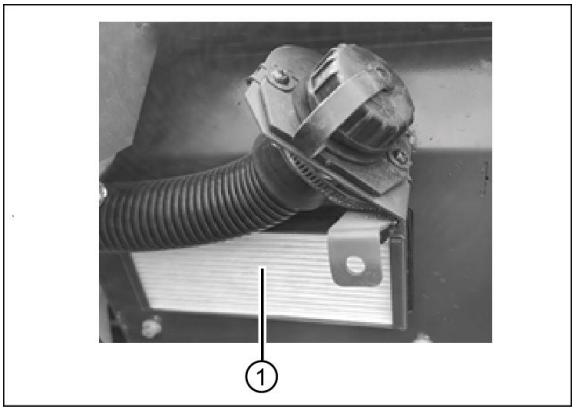
1.6 Every 250 hours

1.6.1 Replacing cab A/C filter

This item is performed every 250 hours or quarterly, whichever comes first.

H1440/H1840/HR2150:

A. Replace the cab outer filter element

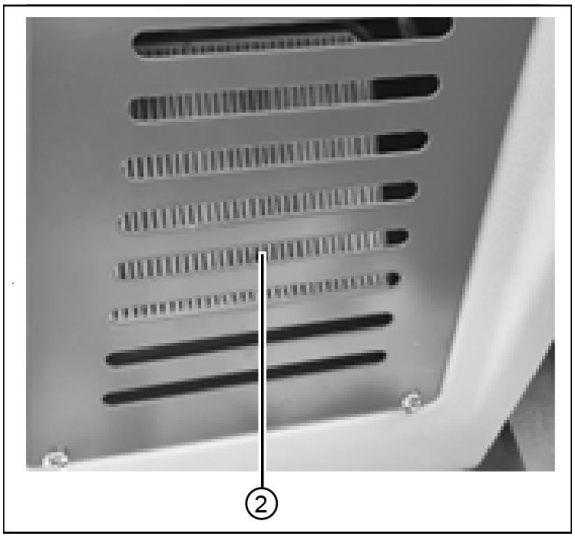


1) Remove the protective cover.

2) Take out the A/C filter element and replace with a new filter element (1).

3) Install the protective cover.

B. Replace the cab inner filter element

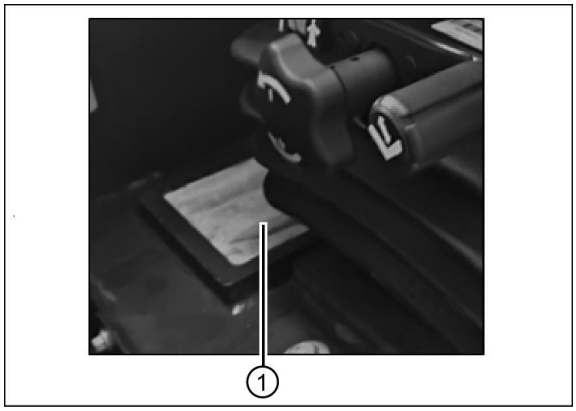


1） Remove the shield.

2） Take out the A/C filter element and replace it with a new one.

3） Install the protective cover.

H735/H933:



1. A/C filter

1.6.2 Check the drive axle final drive and wheel reducer oil level

This item is performed every 250 hours or quarterly, whichever comes first.

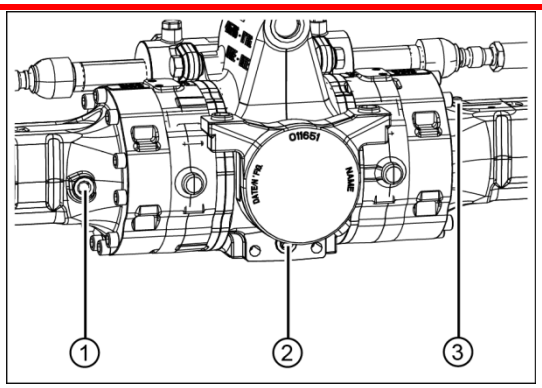
⚠ CAUTION: Before the operation, the engine shall be stopped, the vehicle shall be parked on a level surface, the parking brake handle shall be pulled up, and the tire shall be blocked to prevent the machine from moving.

⚠ CAUTION: To discharge, fill and check the oil level, the drive axle must be horizontal and mounted on the vehicle.

Check the reducer oil level every 250 hours or quarterly. Improper reducer oil level will lead to equipment performance degradation, and continuous use will lead to component damage.

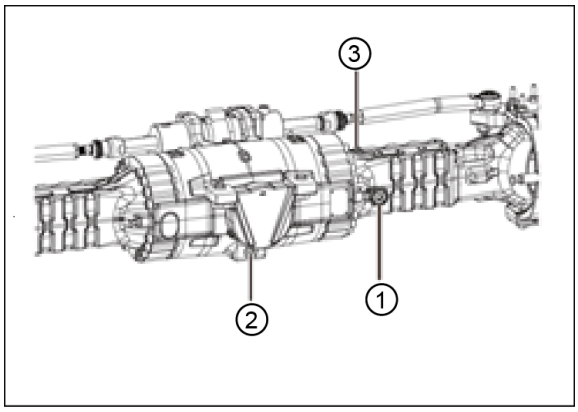
Check the oil level of the final drive

H625:



1. Oil filler plug
2. Oil drain plug
3. Breather

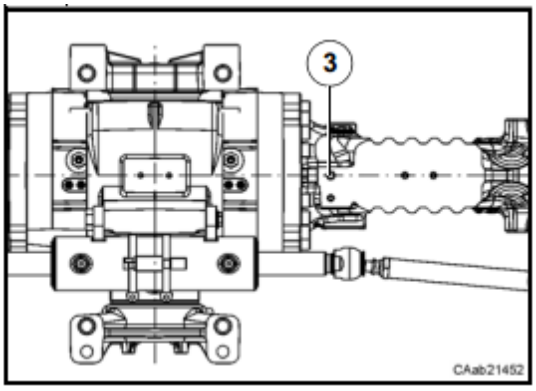
H735/H933:



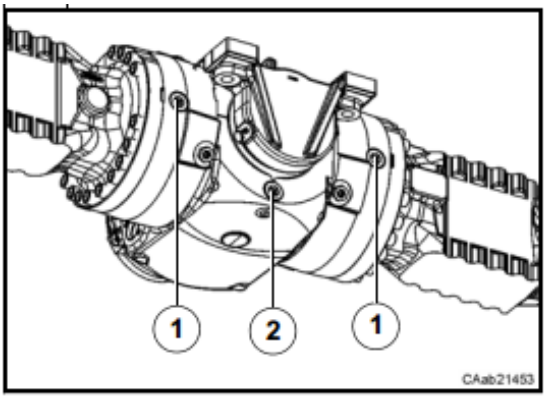
1. Oil filler plug
2. Oil drain plug
3. Breather

1) Carefully clean the breather (3) and surrounding area.
2) Check the oil level: remove the oil filler plug (1) and check whether the oil level is at the lower edge of the filler. Otherwise, add oil and tighten the plug.

H1440/H1840/HR2150:



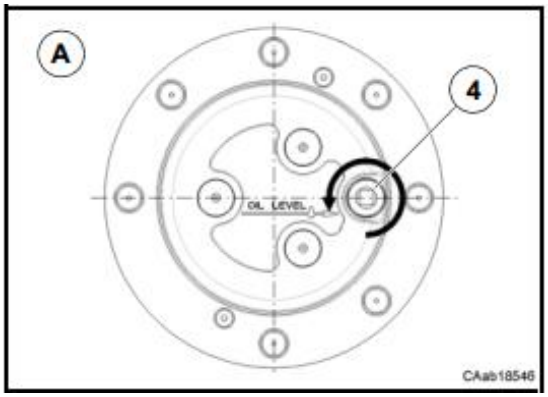
1) Carefully clean the breather (3) and surrounding area.



2) Check the oil level: remove the oil filler plug (1) and check whether the oil level is at the lower edge of the filler. Otherwise, add oil and tighten the plug.

Check drive axle wheel reducer oil

H1840 is used as an example. For other models, please refer to this picture:



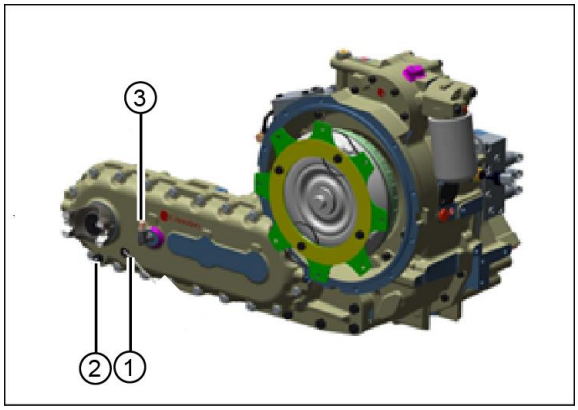
1. Turn the wheel so that the plug (4) is in the highest position and unscrew it to some extent

to release the possible pressure.

2. Turn the wheel so that the plug (4) is in the horizontal position, remove the plug to check whether the oil level is at the lower edge of the oil filler , otherwise add oil and tighten the plug.

1.6.3 Checking transfer box oil level (If equipped)

This item is performed every 250 hours or quarterly, whichever comes first.



No.	Description
1	Oil filler
2	Oil outlet
3	Breather

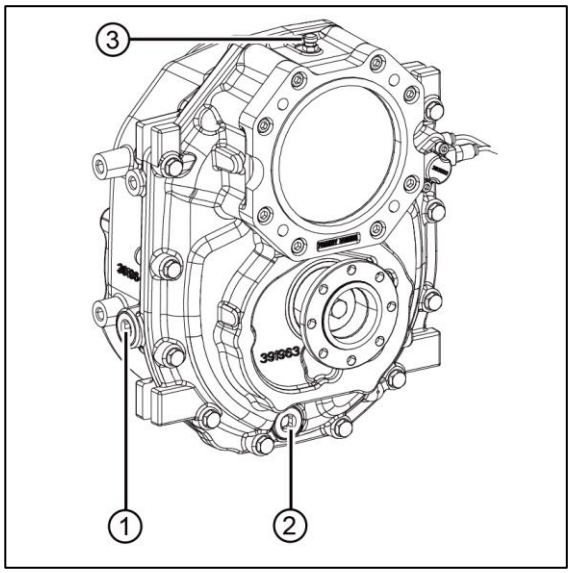
Check the transfer box oil level

1) Stop the engine, park the machine on a level ground, set the gear selector to N gear, turn off the engine, pull up the parking brake handle, and chock the tire to prevent the vehicle from moving.
2) Carefully clean the breather (3) and surrounding area.
3) Remove the oil filler plug (1), and check whether the level is at the lower edge of the oil filler. Otherwise, fill the oil to the specified position and install the plug (1).

1.6.4 Checking transfer box oil level (If equipped)

This item is performed every 250 hours or quarterly, whichever comes first.

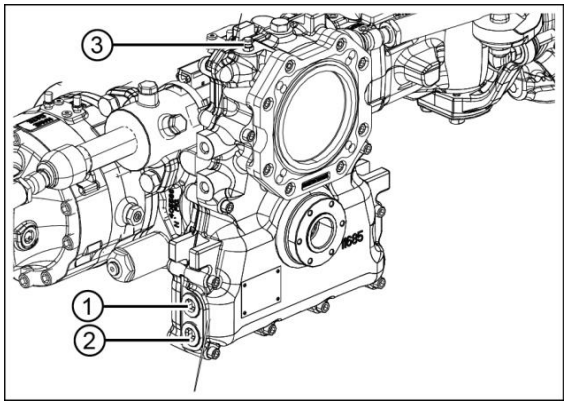
Type 1



1. Oil filler \ Oil level sight glass
2. Oil outlet
3. Breather

1) Stop the engine, park the machine on a level ground, set the gear selector to N gear, pull up the parking brake handle, and chock the tire to prevent the machine from moving.
2) Carefully clean the breather (3) and surrounding area.
3) Oil level inspection: remove the oil filler plug (1) and check whether the oil level is on the lower edge of the filler, otherwise add oil.
4) Tighten the plug.

Type 2

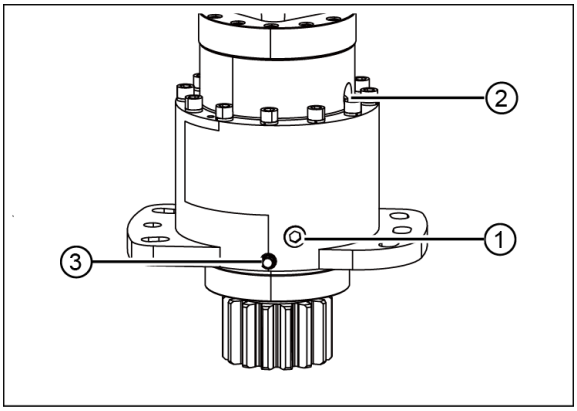


1. Oil filler \ Oil level sight glass
2. Oil outlet
3. Breather

1) Stop the engine, park the machine on a level ground, set the gear selector to N gear, pull up the parking brake handle, and chock the tire to prevent the machine from moving.
2) Carefully clean the breather (3) and surrounding area.
3) Oil level inspection: remove the oil filler plug (1) and check whether the oil level is on the lower edge of the filler, otherwise add oil.
4) Tighten the plug.

1.6.5 Checking slewing reducer oil level-HR2150 only

Check the reducer oil level every 250 hours or quarterly. Improper reducer oil level will lead to equipment performance degradation, and continuous use will lead to component damage.



1. Oil filler \ Oil level sight glass
2. Oil drain plug
3. Breather

Remove the plug on the reducer side and check the oil level as shown in the figure.

Result: the oil level shall be the same as the height of the sight hole 1.

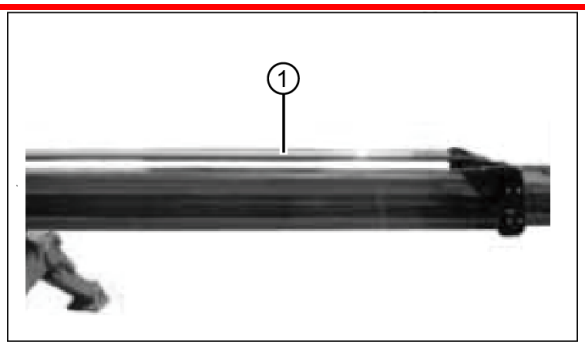
- If necessary, add gear oil through the filler port 1 until the oil level is the same height as the bottom of the sight hole 1.
- Apply the pipe thread sealant to the plug and install the plug into reducer.

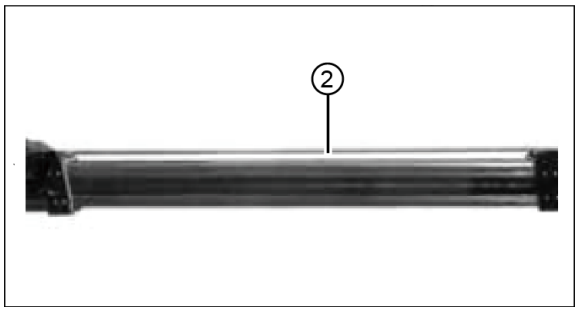
Replace the lubricating oil of the reducer every 50 hours for the first time and then every 1000 hours or every year.

1.6.6 Checking boom chain (If equipped)

This item is performed every 250 hours or quarterly, whichever comes first.

Cleaning and lubricating boom chain

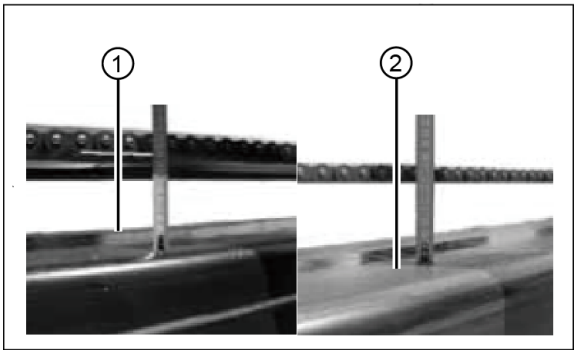




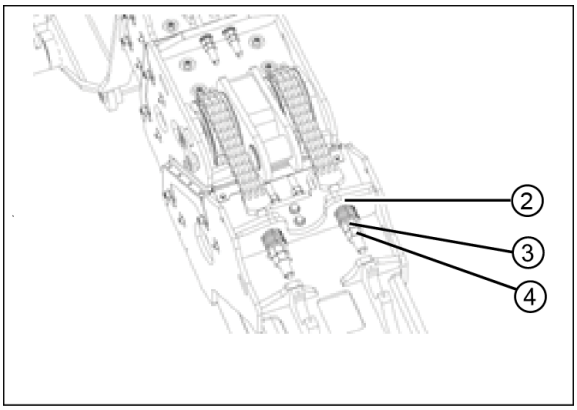
1) Raise the outrigger and keep the boom level.
2) Fully extend the boom.
3) Wipe the chain outside the boom with a clean lint-free cloth, and then check carefully of any wear.
4) Brush the chain with a hard nylon brush and clean diesel fuel to remove any foreign matter.
5) Brush the chain with a paint brush soaked in cleaning diesel fuel and blow dry it with compressed air.
6) Lubricate the chain with lubricant, extend and retract the boom several times to check the performance of the chain.

Check chain tension

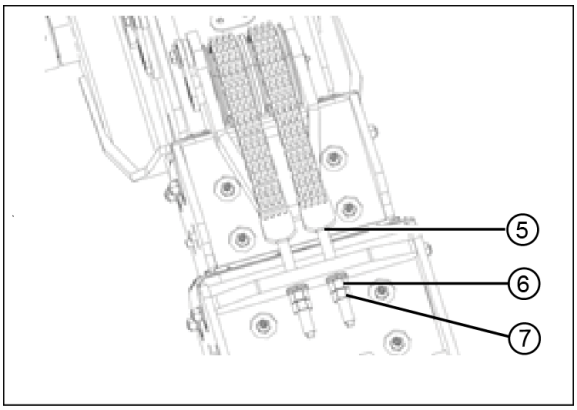
1) Fully extend the boom and retract the boom by 200 mm.



2) Measure the distance between the bottom of the chain and the top of the boom with a ruler. The distance of the two same chain must be consistent.



3) Boom 1: The distance shall be between 97 mm and 117 mm, and if necessary, adjust it with tensioner “2”. Loosen lock nut “3” and tighten nut 4 until the desired distance is reached. Retighten the lock nut “3” while limiting the nut “4”.



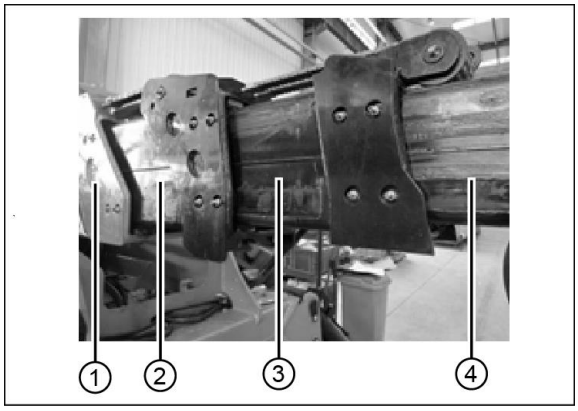
4) Boom 2: The distance shall be between 65

mm and 85 mm. If necessary, adjust with tensioner “5”. Loosen lock nut “6” and tighten nut “7” until the desired distance is reached. Retighten the lock nut “6” while limiting the nut “7”.

⚠ CAUTION: If the Chain is too long to adjust the tension, replace it in pairs. If one of the chain is damaged, the two chains shall also be replaced together.

1.6.7 Lubricating boom slider

Carry it out every 10 hours for the first 50 hours and every 250 hours thereafter.



1. 1st boom
2. 2nd boom
3. 3rd boom
4. 4th boom

1) Raise the outrigger (If equipped with outrigger).
2) Extend the boom as much as possible.
3) Apply grease evenly around the boom with a brush (molybdenum disulfide is recommended).
4) Remove excess grease and retract the boom.

1.6.8 Checking hydraulic oil

This item is performed every 250 hours or quarterly, whichever comes first.

Collect a hydraulic oil sample, place it in a transparent container, and visually inspect the hydraulic oil as follows:

- Color: the oil shall be transparent and appear in light honey color.
- Appearance: the oil shall be clear, not cloudy, and free of particles, foreign matters or other contaminants.
- Check the hydraulic oil through the smell (the heat can be smelled, but there is no "burnt" smell) or the friction between the fingers (there shall be a sticky feeling, no rough feeling of any particles). If all hydraulic oil pass the above inspection, continue to service at predetermined intervals. If the hydraulic oil does not comply with any of the above inspections, the hydraulic oil must be tested or replaced.

1) Replacement or testing of hydraulic oil is critical to the performance and service life of the equipment. Contaminated hydraulic oil may affect equipment performance, and continuous use will cause equipment damage. For harsh working environment, the inspection should be carried out more

frequently.

2) Before replacing the hydraulic oil, the oil stain separator can be used to test whether it is necessary.

3) If the hydraulic oil has not been replaced for two years, it shall be tested quarterly. If it fails to pass the test, replace the hydraulic oil.

Note: when replacing the hydraulic oil, it is recommended to replace all hydraulic filters at the same time.

1.6.9 Check for Batteries

This check item is performed every 250 hours or quarterly, whichever comes first.

Keep away from fireworks and remove all rings, watches and other accessories. Wear goggles, protective gloves and protective clothing if necessary. Avoid touching the spilled electrolyte with hands or other parts of the body. Neutralize with baking soda and the spilled electrolyte.

Good battery condition is essential for machine performance and safe operation. Improper voltage or damaged cables and wiring may cause component damage and dangerous situations.

Maintenance-free lead-acid battery inspection:

- Check that the battery locking lever is secure
- Check the wiring of the battery cable. The wiring is firm and free from corrosion.
- Check whether the battery fluid leaks and whether the battery is dry and clean.
- Check the color of the battery hydrometer as shown in the figure:

Battery

Hydrometer color	Meaning and treatment
White	Lack of battery fluid. Please shut down the machine and stop using it
Black	Power loss or damage
Green	Measure the voltage of each battery. If the voltage is lower than 11V, it indicates that the battery is damaged; The voltage is between 12.4v-12.7, indicating that the battery is in good condition

- If the color of the battery hydrometer is green and the voltage is above 12V, but the starter cannot be driven, please ask the personnel trained and qualified for the maintenance of the machine to further test the battery.

⚠ Note: If an external power

supply is required to charge the battery, only the charger approved by the LGMG can be used.

- Do not replenish the battery with white eyes. Replace the battery.
- When wiring after charging, connect the positive wire first and then the negative wire.

⚠ Notice: Adding a terminal protector and an anti-corrosion sealant will help remove corrosion caused to battery terminals and cables.

1.6.10 Cleaning air filter element

Clean the main filter element every 250 hours or when the air cleaner blocking alarm sounds or the maintenance indicator turns red.

It is forbidden to clean the safety filter element.

For detailed steps, please refer to ***1.8.1 Replacing air filter element***.

1.7 Every 500 hours

1.7.1 Replacing engine oil and oil filter

First 50 hours, and then change it every 500 hours or every half a year, whichever comes first.

⚠ Do not work on the running engine!

No smoking and open fire!

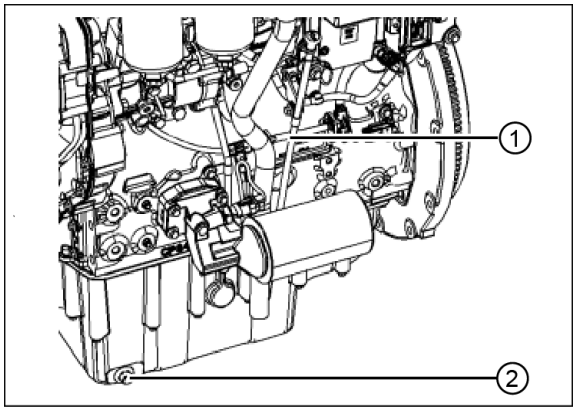
Be careful when handling high temperature engine oil. Risk of burning!

⚠ When working on the oil system, pay attention to the cleanliness of the outer surface. Carefully clean all areas involved. Dry the wet parts with compressed air.

⚠ Please abide by the oil safety provisions and local regulations. Dispose of spilled oil and filter elements as specified. Ensure that waste oil doesn't drip to the ground.

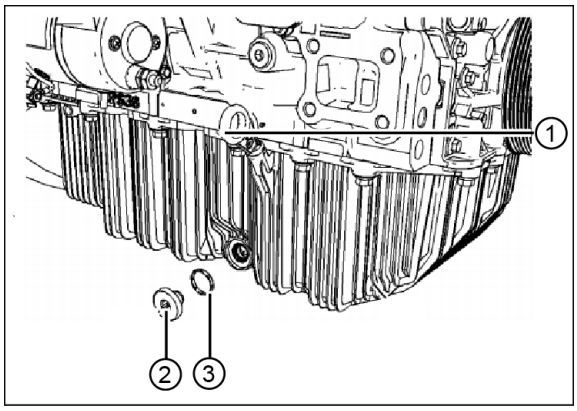
Draining engine oil

Perkins 1104D:



1. Oil dipstick
2. Oil drain plug

Perkins 904J:

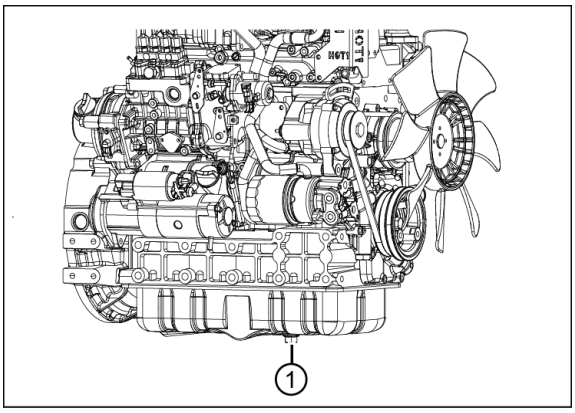


1. Oil dipstick

2. Oil drain plug

3. Sealing ring

Kubota V3307:



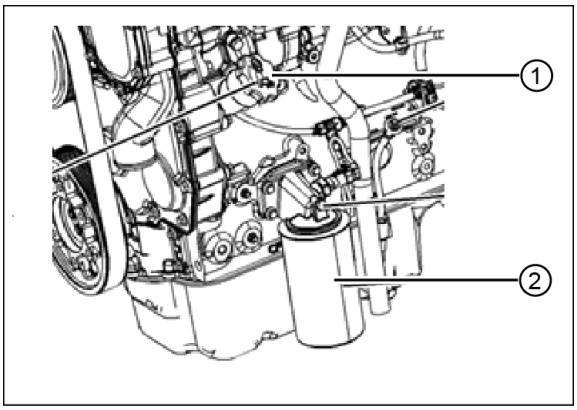
1. Oil drain plug

1) Warm up the engine.
2) Place the engine horizontally.
3) Shut down the engine.
4) Place a container under the oil drain plug.
5) Unscrew the oil drain plug, and drain the old oil.
6) Install a new seal ring on the oil drain plug, screw the oil drain plug in and tighten it.

Replacing the oil filter

⚠ CAUTION: Each time the oil is changed, the oil filter element should also be replaced.

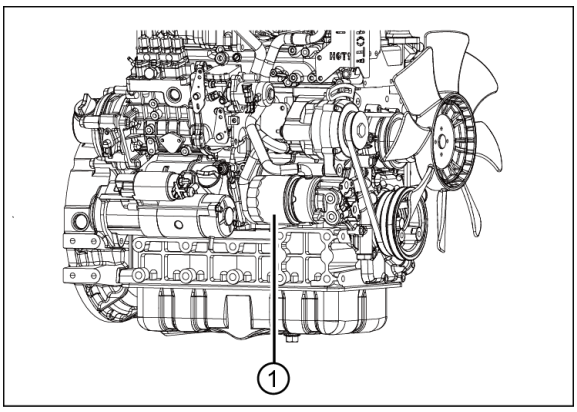
Perkins 1104D:



1. Oil filler plug

2. Oil filter

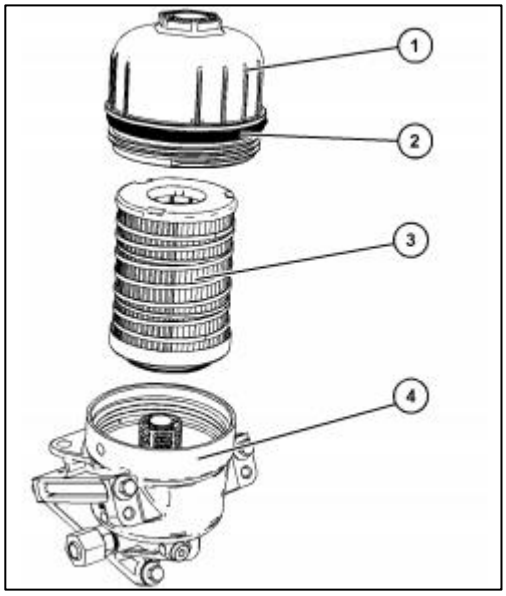
Kubota V3307:



1. Oil filter

1) Clean the area near the oil filter mounting seat.
2) Remove the oil filter with the belt wrench.
3) Clean the gasket contact surface of the mounting with a clean cloth.
4) Apply a clean coat of oil to the new oil filter O-ring.
5) Screw in the new oil filter until the O-ring contacts the oil filter base and rotate the oil filter for 3/4 full turns.

Perkins 904J:

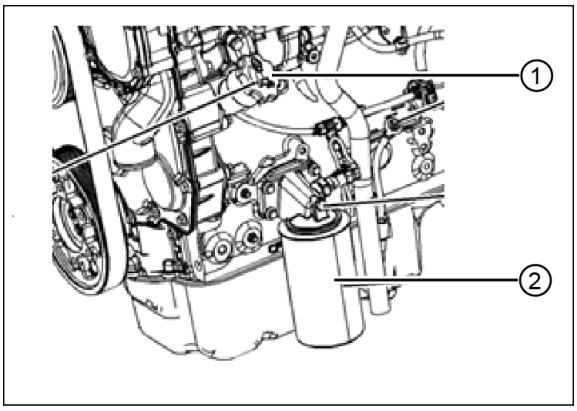


1. Cover
2. Seal ring
3. Filter element
4. Filter housing

1) Clean the area near the oil filter mounting seat.
2) Remove the cover (1) from the filter housing (4).
3) Remove the filter element (3) from the cover (1).
4) Remove the seal ring (2) from the cover (1).
5) Install a new seal ring (2) on cover (1). Install a new filter (3) to cover (1). Install the cover (1) and filter (3) to cover (4).
6) Torque of cover (1):24N.m.

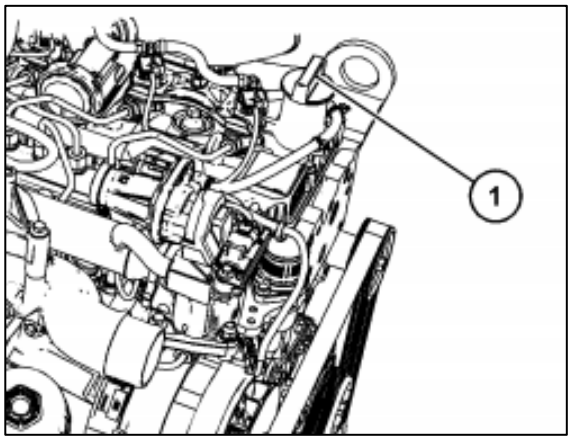
⚠ CAUTION: Excessive mechanical tightening may damage the thread or damage the seal of the oil filter element. Adding oil.

Perkins 1104D:



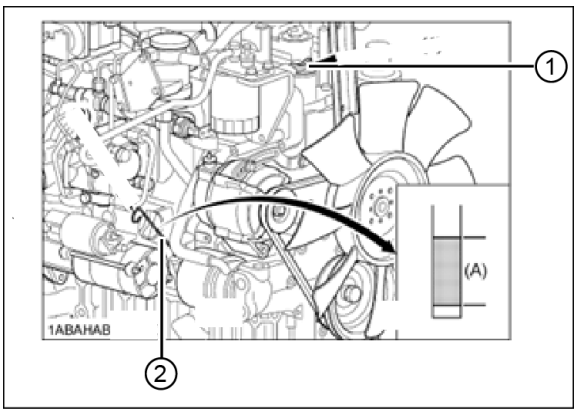
1. Oil filler plug
2. Oil filter

Perkins 904J:



1. Oil filler plug

Kubota V3307:



1. Oil filler plug
2. Oil dipstick

1) Add oil through the oil filter.
2) Wait a few minutes for oil to flow into the oil pan.

3) Warm up the engine and run it at low speed for 3 minutes to check the drain plug and the filter for leakage.

4) Turn off the engine, wait a few minutes, check the oil level and refill if necessary.

1.7.2 Replacing primary fuel filter element

Replace every 500 hours or every six months, whichever comes first.

⚠ Engine must be turned off!

No smoking and open fire!

Be careful when handling hot fuel!

⚠ Do not loosen the fuel injection pipeline or high pressure fuel pipeline while the engine is running.

⚠ Carefully clean all areas involved. Dry the wet parts with compressed air.

⚠ Please observe safety regulations on fuel and relevant local laws and regulations. Dispose of spilled fuel and filter elements according to regulations. Fuel must not leak to the ground.

⚠ After the operation on the fuel system is completed, bleed the system, conduct a trial run and check the tightness.

⚠ Explosion and fire hazard. Engine fuel is combustible. Check the location of the machine. This step shall be performed in open areas away from heaters, sparks, flames, and burning tobacco. A conforming fire extinguisher should be placed in an easily accessible place.

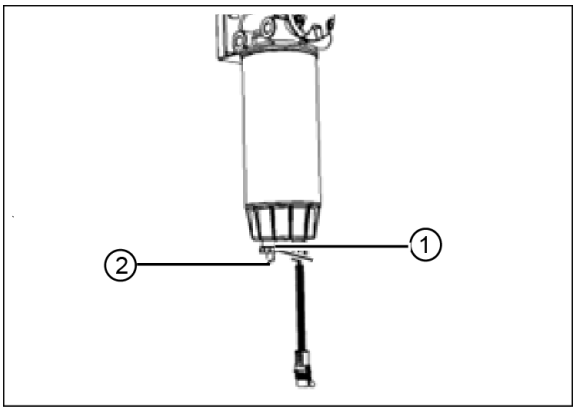
Perkins 1104D:

⚠ The secondary fuel filter element must be replaced at the same time as the primary fuel filter element.

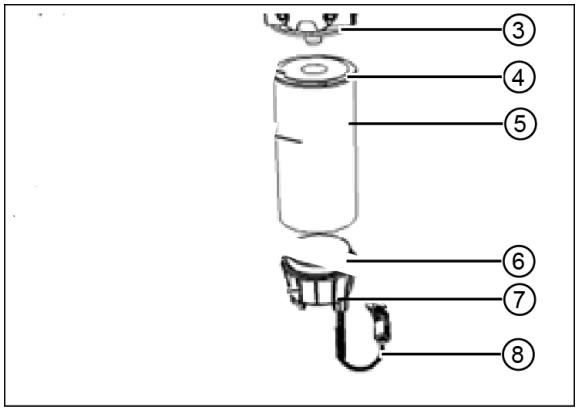
1) Turn the fuel supply valve (if equipped) to the OFF position.

2) Clean the mounting and the area around the filter.

3) Place the container under the drain valve.



4) Connect a suitable tube to the connector (2), then open the drain valve (1) to drain the filter. Allow the liquid to flow into the container.

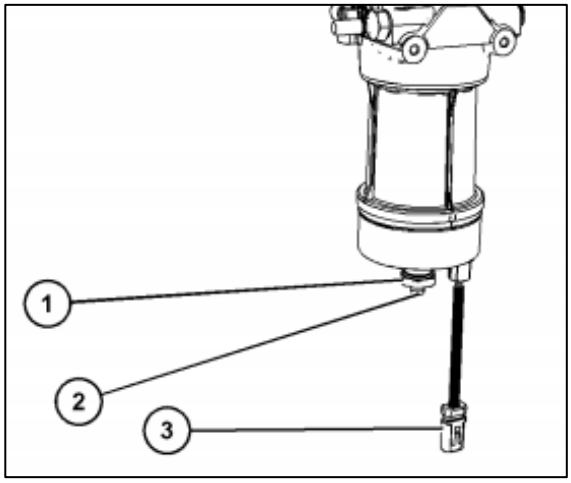


5) Disconnect the electrical connector (8), then manually remove the connecting oil cup (7) and remove the old O-ring (6). Clean the oil cup (7).
6) Remove the fuel filter (5) with the belt wrench.
7) Apply a thin layer of diesel fuel to the new filter seal ring.
8) Reinstall the fuel filter and rotate it 3/4 of a full turn after the O-ring touches the filter base (3).
9) Install the electrical connector (8). Take out the container and dispose the fuel in accordance with local regulations, and if necessary, switch on the fuel supply valve.
10) Bleed the fuel system.

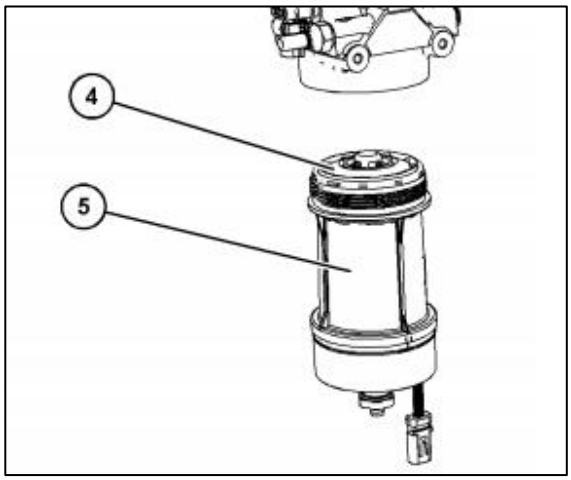
Perkins 904J:

⚠ The secondary fuel filter element must be replaced at the same time as the primary fuel filter element.

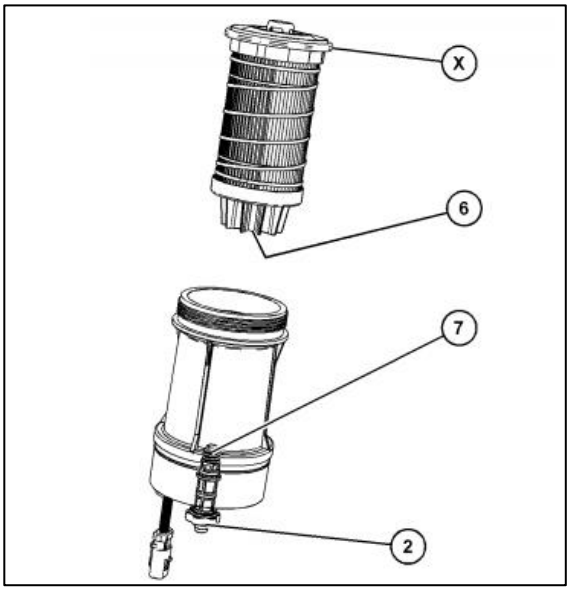
1) Turn the fuel supply valve (if equipped) to the OFF position.
2) Clean the mounting and the area around the filter.
3) Place the container under the drain valve.



4) Connect a suitable tube to the connector (2), then open the drain valve (1) to drain the filter. Allow the liquid to flow into the container.

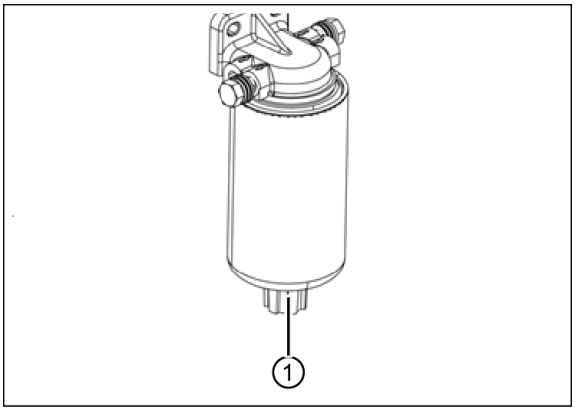


5) Disconnect the electrical connector (3), then manually remove the connecting oil cup (5)
6) Remove the fuel filter (4).
7) Clean the filter cap



8) Lubricate the top(X) with clean engine oil. Do not fill the filter cup with fuel before installing the assembly.
9) Align the filter cup (5) with the assembly, and turn the filter cup (5) clockwise by hand until there is no obvious gap between the filter element and the filter cup and the assembly.
10) Install the electrical connector (3). Take out the container and dispose the fuel in accordance with local regulations, and if necessary, switch on the fuel supply valve.

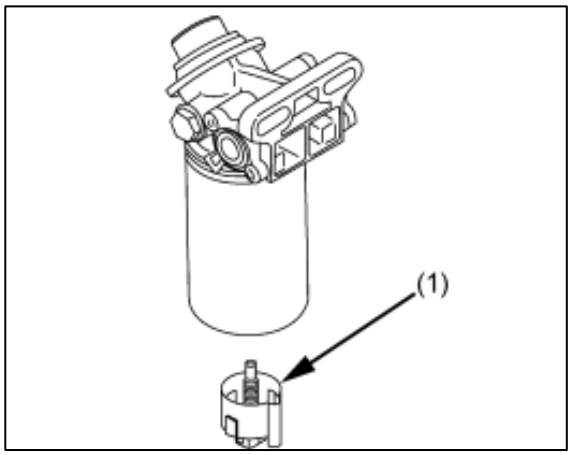
Kubota V3307-E3:



1. Drain valve

1) Clean the mounting and the area around the filter.
2) Place the container under the drain valve.
3) Open the drain valve to drain the filter. Allow the liquid to flow into the container.
4) Remove the fuel filter with the belt wrench.
5) Wipe the sealing surface of the filter holder with a clean fiber-free cloth.
6) Apply a thin layer of oil to the new filter seal ring.
7) Reinstall the fuel filter and rotate it 3/4 of a full turn after the O-ring touches the filter base.
8) Take out the container and dispose the fuel in accordance with local regulations.
9) Bleed the fuel system.
10) Clean any fuel that may spill.
11) Start the engine to check for fuel leaks.

Kubota V3307-CR-E5:



1. Drain valve

1) Clean the mounting and the area around the filter.
2) Disconnect the cable.
3) Place the container under the drain valve.
4) Remove the fuel filter with the belt wrench.

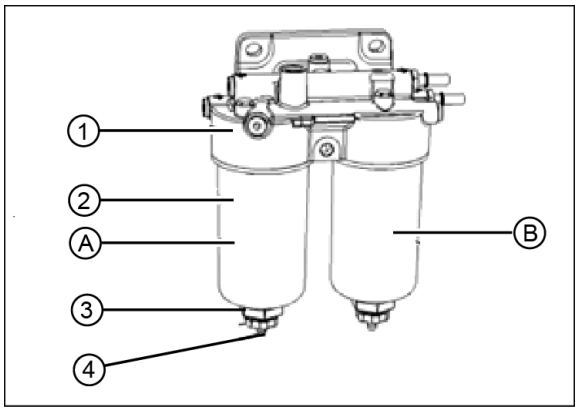
5) Wipe the sealing surface of the filter holder with a clean fiber-free cloth.
6) Apply a thin layer of oil to the new filter seal ring.
7) Reinstall the new filter by hand until the seal fits, and then tighten it fully.
8) Connect the cable.
9) Take out the container and dispose the fuel in accordance with local regulations.
10) Bleed the fuel system.
11) Clean any fuel that may spill.
12) Start the engine to check for fuel leaks.

1.7.3 Replacing secondary fuel filter

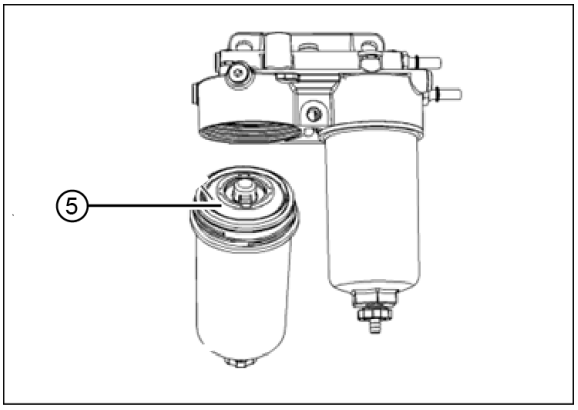
Perkins 1104D:

Note: The two fuel filter elements must be replaced.

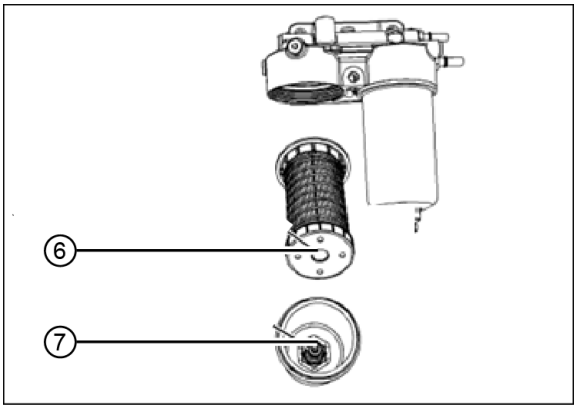
1) Ensure that the fuel supply valve (if equipped) is in the OFF position.
2) Place a suitable container under the fuel filter to collect all spilled fuel.



3) Install a suitable tube on the connector (4). Rotate the drain valve (3) counterclockwise to discharge the fuel and remove the hose.
4) Rotate the filter fuel cup (2) counterclockwise to remove it from the filter housing (1).



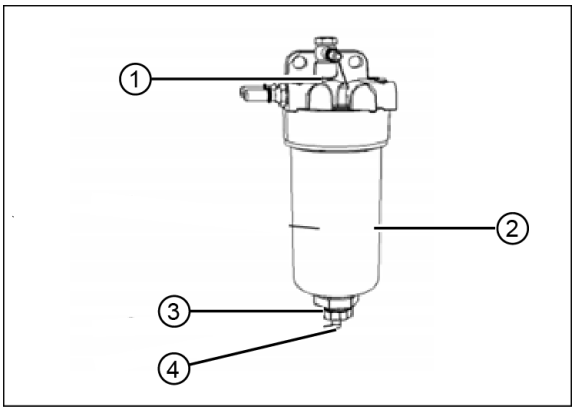
5) Rotate the filter element (5) counterclockwise and remove the filter element. Clean the filter fuel cup.



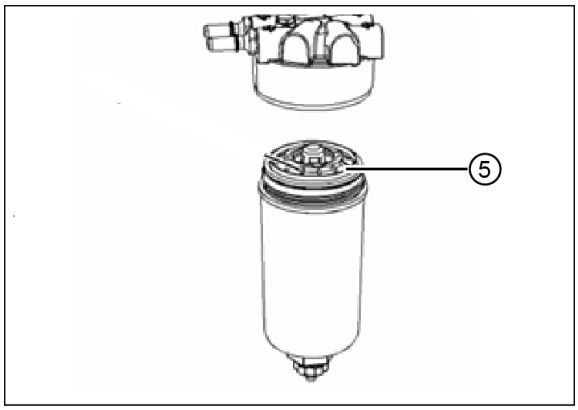
6) Replace with a new filter element and position the thread (7) on the thread (6). Rotate the new filter element and manually tighten the drain valve (3).
7) Apply a thin layer of fuel to the new filter seal ring. Do not add fuel to the filter fuel cup (2).
8) Do not use tools to install the filter assembly. Install the filter fuel cup (2): Turn the filter fuel cup clockwise until the oil cup is locked in place against the stop block.
9) Bleed the fuel system.

Perkins 904J:

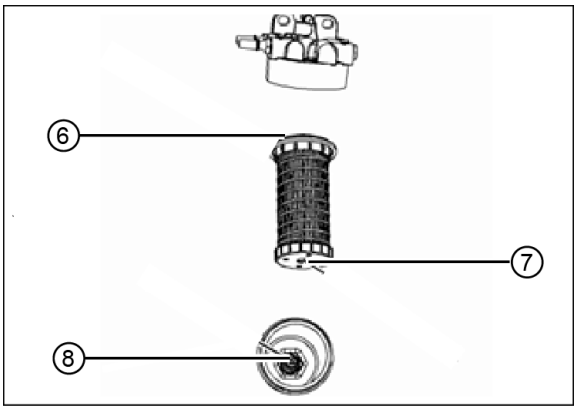
1) Ensure that the fuel supply valve (if equipped) is in the OFF position.
2) Place a suitable container under the fuel filter to collect all spilled fuel.



3) Install a suitable tube on the drain port (4). Rotate the drain valve (3) counterclockwise to discharge the fuel and loose the vent screw (1).
4) Remove the drain tube and tight the vent screw.
5) Rotate the filter fuel cup (2) counterclockwise to remove it from the filter housing.

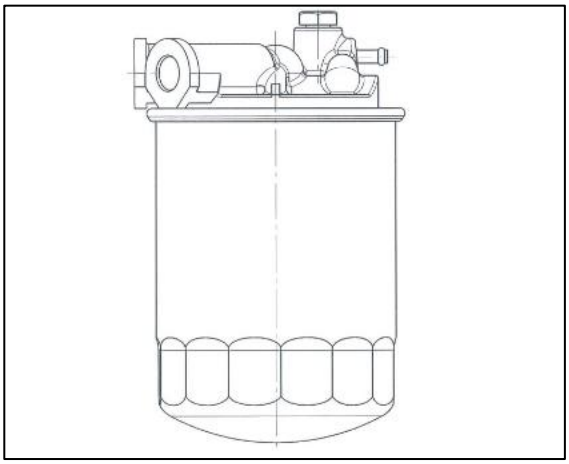


6) Rotate the filter element (5) counterclockwise and remove the filter element. Clean the filter fuel cup.



7) Replace with a new filter element and position the thread (7) on the thread (6). Rotate the new filter element and manually tighten the drain valve (3).
8) Apply a thin layer of oil to the new filter seal ring. Do not add fuel to the filter fuel cup (2).
9) Do not use tools to install the filter assembly. Install the filter fuel cup (2): Turn the filter fuel cup clockwise until the oil cup is locked in place against the stop block.
10) Switch on the fuel supply valve.
11) Bleed the fuel system.

Kubota V3307:



1) Remove the fuel filter with the belt wrench.
2) Contain the diesel fuel drained.
3) Clean the sealing surface of the filter holder

with a clean fiber-free wiper.

4) Apply a thin layer of diesel to the seal ring of the new filter.

5) Screw in a new filter manually until seal fit and tighten it.

6) Exhaust the fuel system.

1.7.4 Bleeding the fuel system

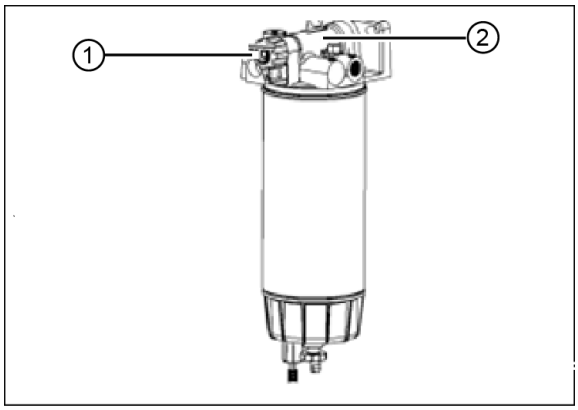
⚠ To avoid personal injury:

Do not bleed a hot engine, as this can cause fuel to spill on the hot exhaust manifold and cause fire hazard.

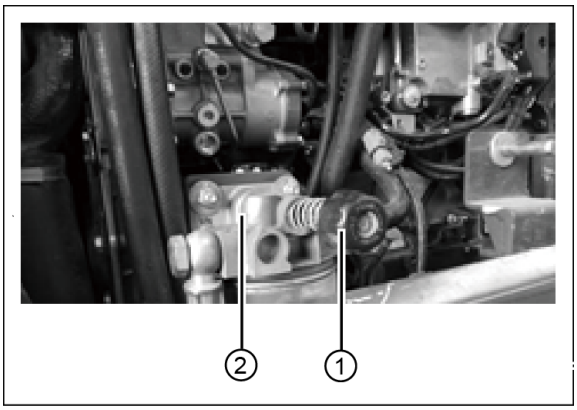
The fuel system needs to be bled under the following conditions:

- The fuel tank is empty or some fuel is discharged from the fuel tank.
- Disconnect the low-pressure fuel pipe.
- The low-pressure fuel system is leaking.
- Replace the fuel filter.
- Engine not used for a long time.

Perkins 1104D:



1. Check the fuel supply valve in the ON position (if equipped).



2. Press in and rotate the charge pump handle (1) counterclockwise to unlock it.

⚠ CAUTION: Press the handle (1) repeatedly for filling. During filling, the manual pressure required for filling fuel system will increase.

3. Locking handle (1): Press in the handle and turn it clockwise to lock it.

⚠ CAUTION: Ensure that the filling handle (1) is correctly locked in place. If the filling handle is not locked in place, the fuel to the fuel system will be blocked.

4. Start the engine and run it at idle speed for 5 minutes, and exhaust the air in the fuel system.
5. If the engine fails to start, repeat steps 2 to step 5.

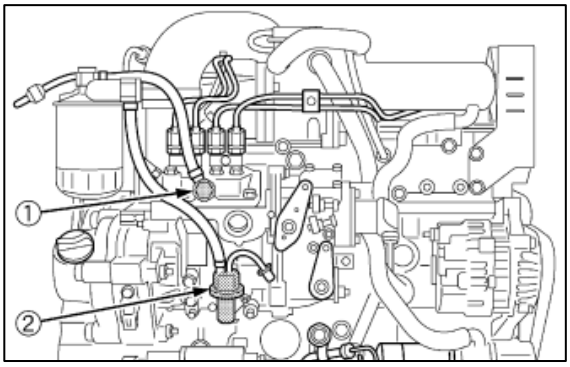
Perkins 904J:

1. Check the fuel supply valve in the ON position (if equipped).
2. Turn the key switch to RUN position to run the

electric fuel injection pump for 1-2 min.

3. Turn the key switch to OFF position.
4. Start the engine and run it at a low idle speed for about 5 min, and check that the fuel system does not leak.

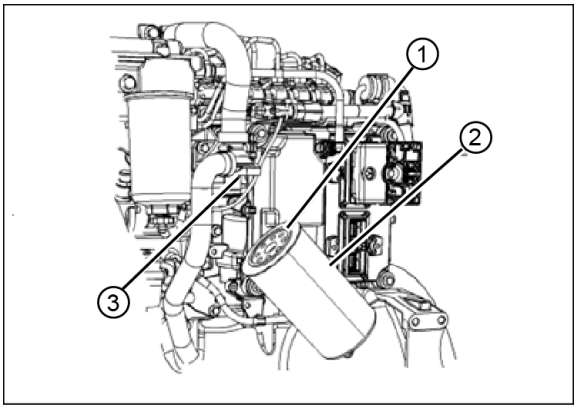
Kubota V3307:



1) Turn on the exhaust bolt on the top of fuel jet pump.
2) Start the engine and run for 10 seconds.
3) Turn off the exhaust bolt on the top of fuel jet pump.

1.7.5 Replacing crankcase breather filter element (If equipped)

⚠ CAUTION: Be sure to shut down the engine before performing any maintenance or repair work.



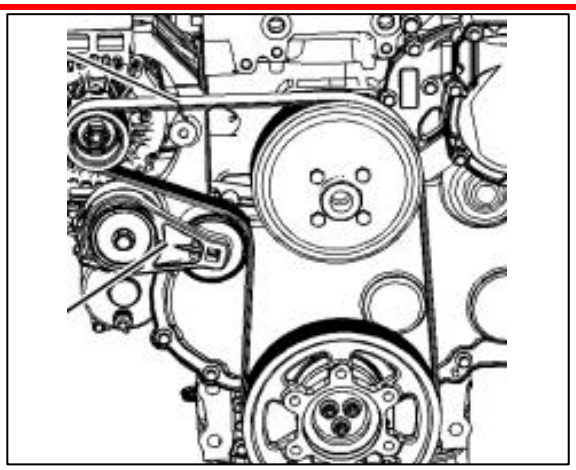
1) Place a suitable container under filter (2).
2) Clean the outside of the filter and remove the filter with a belt wrench.
3) Lubricate the new filter O-ring (1) with clean engine oil.
4) Install a new filter. Screw in the filter until the O-ring contacts the base (3). Tighten the filter by hand for 3/4 full turn.
5) Take away the container. Discard old filter and any surplus oil in accordance with local regulations.

1.7.6 Checking belt

In order to obtain the highest performance of the engine, check the belt for wear and crack. If the belt is worn or damaged, replace the belt.

Check the belt for cracks, splits, wear, grease, misalignment of the wire core and signs of liquid contamination.

Perkins 1104D:

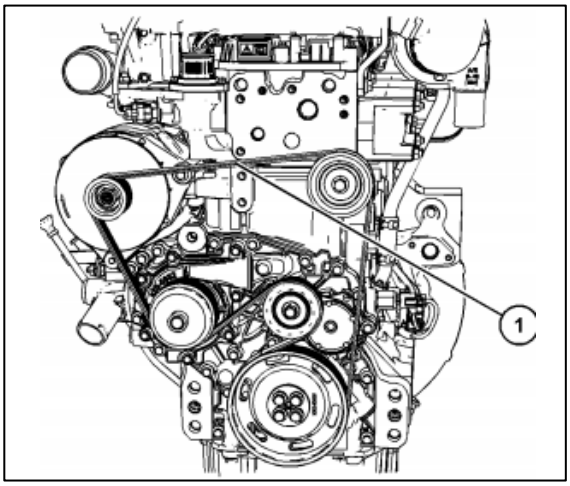


The belt must be replaced if the following conditions occur.

- There are cracks in at least two belt ribs.
- There is at least one segment of belt misalignment with a maximum length of 50.8 mm on one rib. Replace the belt,

Check the belt tensioner for looseness, damage, replace the belt tensioner if necessary.

Perkins 904J:



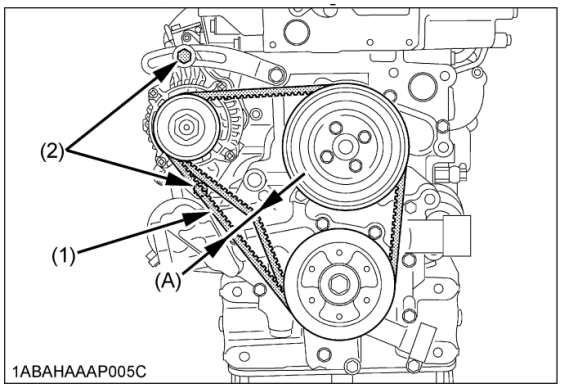
The belt must be replaced if the following conditions occur.

- There are cracks in at least two belt ribs.
- There is at least one segment of belt misalignment with a maximum length of 50.8 mm on one rib.

Replace the belt,

Check the belt tensioner for looseness, damage, replace the belt tensioner if necessary.

Kubota V3307:



1. Fan belt
2. Bolt and nut

1) Stop the engine.
2) Apply moderate thumb pressure to belt between the pulleys.
3) If tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine block, pull the alternator out until the deflection of the belt falls within acceptable limits.

Replace fan belt if it is damaged.

Proper fan belt tension	A deflection when the belt is pressed in the middle of span.
10 to 12mm	under load of 10 kg

1.7.7 Replacing filter element of hydraulic system

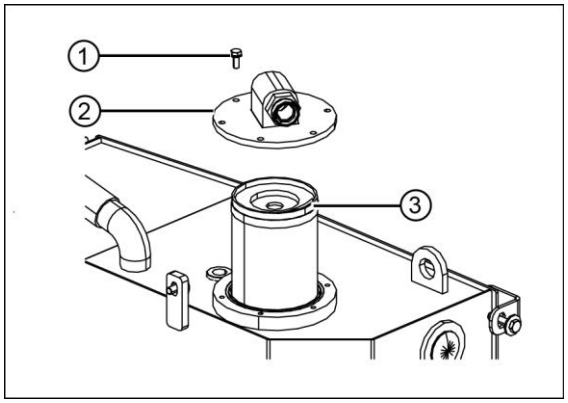
Replace every 500 hours or six months, whichever comes first.

It is necessary to change the hydraulic return filter element and hydraulic high-pressure filter element every 500 hours. Regular changing of filters is necessary for good machine performance and long service life. Dirty or blocked filter may cause the hydraulic component performance degradation, and continuous use may cause component damage. Extreme operating conditions require increased filter replacement.

Retract the boom and park the machine on a level ground, shut down the engine.

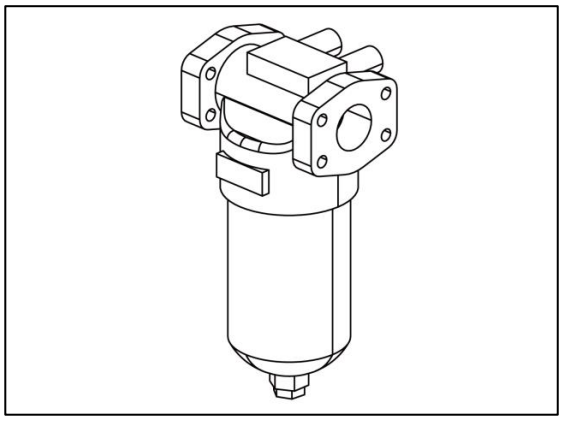
Replace the hydraulic oil tank return filter element

H625:



1) Shut down the engine and release the pressure in the hydraulic system.
2) Remove the oil return flange assembly.
3) Replace the filter element.
4) Reset to the original state.

H735/H933:

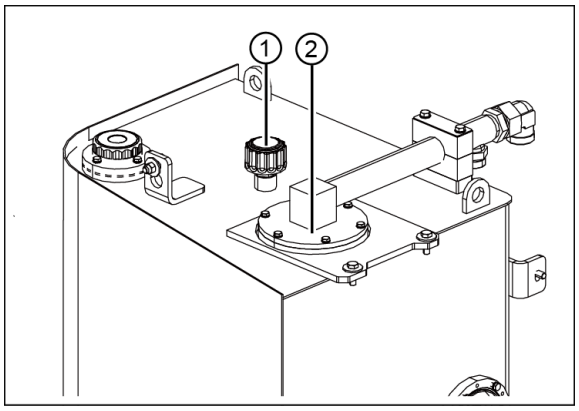


1) Shut down the engine and release the pressure in the hydraulic system.
2) Place a suitable container under the filter.
3) Remove the nut at the bottom of the filter cover with a wrench and remove the filter cover.
4) Remove the filter element from the filter cover.
5) Check the seal of the filter cover and replace it if necessary.
6) Install a new filter element and tighten it.
7) Scrub off any oil droplets splashed during installation.
8) Inspect the filter housing and associated elements to make sure there is no leakage.

H1440/H1840/HR2150:

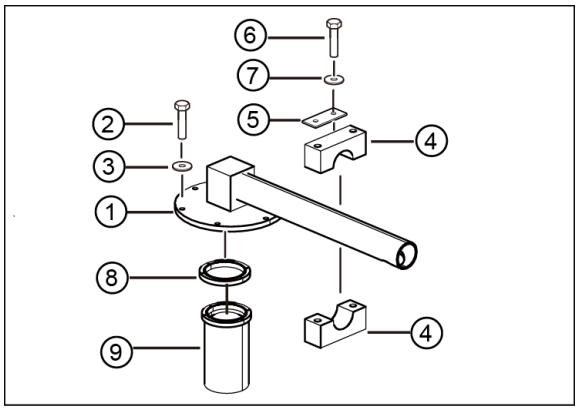
H1840 is used as an example. For other models, please refer to this picture:

1) Shut down the engine and release the pressure in the hydraulic system.



1. Breather

2. Oil return filter assembly



1. Oil return cover plate

2. Bolt

3. Washer

4. Pipe clamp

5. Press plate

6. Bolt

7. Washer

8. O-ring

9. Return filter element

2) Remove the pipe clamp first, and then remove the oil return cover plate assembly.

3) Replace the filter element.

4) Reset to the original state.

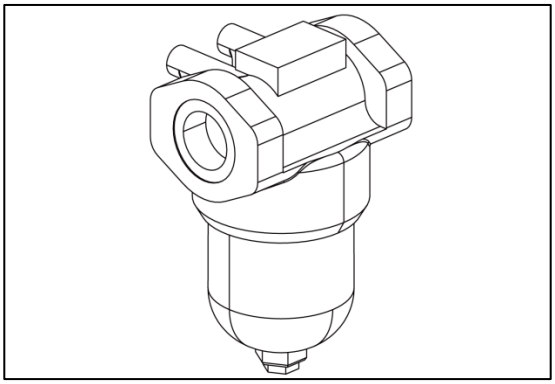
Replace high-pressure filter element

HR2150:

Replace every 500 hours or six months, whichever comes first.

Regular filter replacement is necessary for good machine performance and long service life. Dirty or blocked filter may cause the hydraulic component performance degradation, and continuous use may cause component damage. Extreme operating conditions require increased filter replacement.

Retract the boom and park the machine on a level ground, shut down the engine.



1) Shut down the engine and release the pressure in the hydraulic system.

2) Place a suitable container under the filter.

3) Remove the nut at the bottom of the filter cover with a wrench and remove the filter cover.

4) Remove the filter element from the filter cover.

5) Check the seal of the filter cover and replace it if necessary.

6) Install a new high-pressure filter element and tighten it.

7) Scrub off any oil droplets splashed during installation.

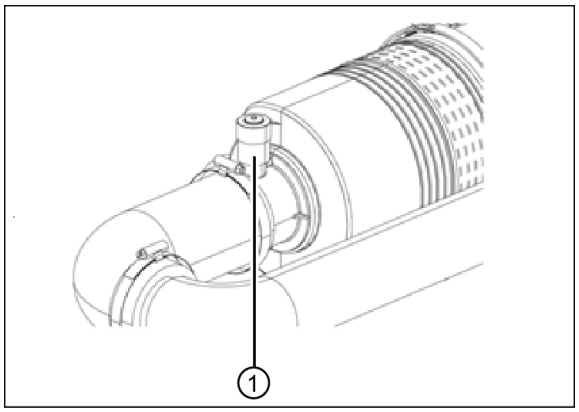
8) Inspect the filter housing and associated elements to make sure there is no leakage.

1.8 Every 1000 hours

1.8.1 Replacing air filter element

Check the dust discharge valve every day, replace the cracked and deformed dust discharge valve, and cleat the dust in it.

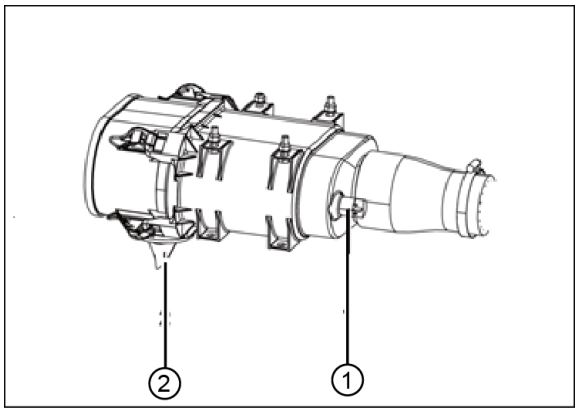
H625/H735/H933:



Check the maintenance indicator of the air cleaner.

H1440/H1840/HR2150:

H1840 is used as an example. For other models, please refer to this picture:



1. Electronic differential pressure sensor

2. Dust discharge valve

When the intake resistance reaches the maximum intake resistance of the engine, the main filter element shall be cleaned.

⚠ Perform this step when the engine is turned off.

Clean the air cleaner primary element

Clean the main filter element every 250 hours or when the air cleaner blocking alarm sounds or the maintenance indicator turns red.

The main filter element needs to be replaced only when the air cleaner primary element is cleaned 5-6 times or the regular maintenance time is reached.

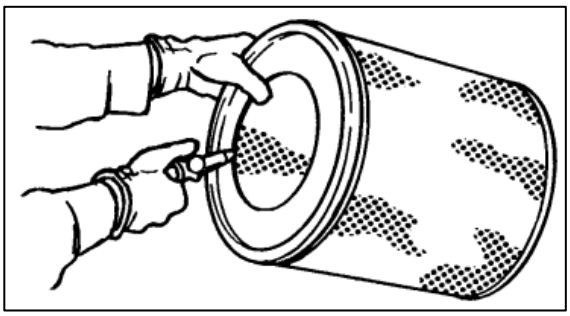
When replacing the main filter element, replace the safety filter element together.

It is forbidden to clean the safety filter element.

1) Turn off the engine and open the hood.

2) Remove the A/C filter element cover.

3) The radial sealed main filter element is tightly installed on the air outlet pipe. The removal of the filter element has a little resistance, so it is recommended to rotate the filter element while pulling it out to avoid knocking the housing and the filter element.



4) Clean the filter element from the inside out with a low pressure compressed air (up to 207Kpa) at least 30mm from the filter element.

5) When replacing the safety filter element, clean the inside of the air outlet pipe with a clean damp cloth and check the sealing surface for damage. Avoid the air inlet of the engine (i.e. the air cleaner outlet) exposed as much as possible. If there is no proper safety filter element, you can replace one immediately.

6) Check whether new filter elements are in good condition, especially on the sealing surface and clean sides, and avoid installing damaged filter element. Do not wipe the sealing surface because the surface of the filter element is coated with a layer of lubricant to facilitate easier installation of the filter element.

7) If the safety filter element has just been replaced, it is necessary to confirm whether the safety filter element is installed correctly before the installation of the main filter element, then push the edge of the filter element by hand, carefully install the main filter element, and confirm that the main filter element is fully installed in the housing. The main filter element cannot be pushed in by the pressure of the end cap, which will damage the housing and the buckle. If the end cap cannot be installed in place due to the filter element, remove the end cap and continue to push in the main filter element to install the main filter element in place.

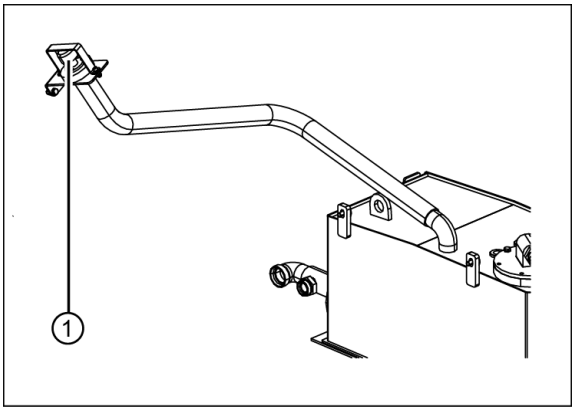
8) Check all fasteners including hoops, clamps, nuts and connections for tightening, check the pipeline for leaks, and repair them. Any leakage will cause dust to bypass the air cleaner and enter the engine directly, and finally reset the alarm indicator.

The air cleaner of the HR2150 engine is located under the rear of the machine chassis: rotate the turret, open the cover plate of the air cleaner and carry out the maintenance in the same way as H1840.

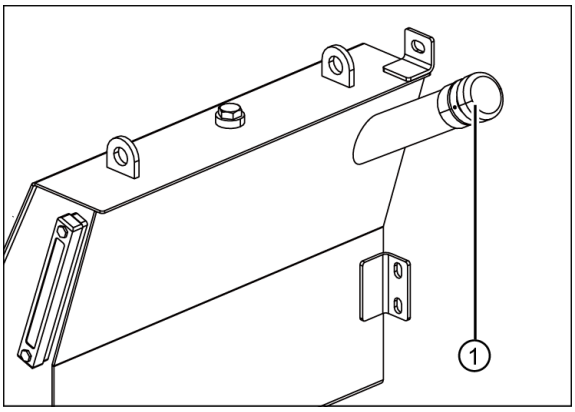
1.8.2 Replacing hydraulic oil tank breather

Park the machine on level ground and turn off the engine.

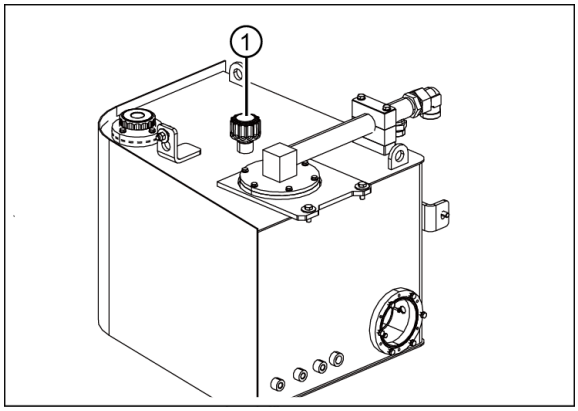
H625:



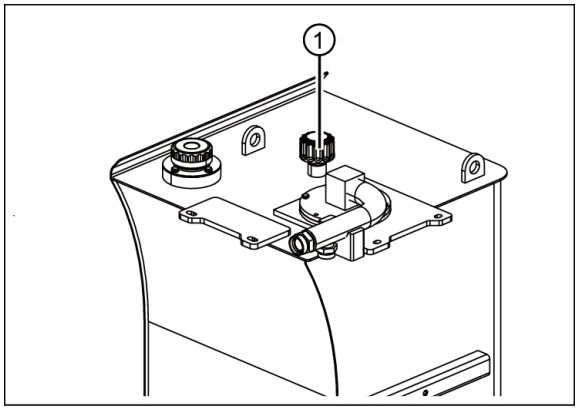
H735/H933:



H1440/H1840:



HR2150:



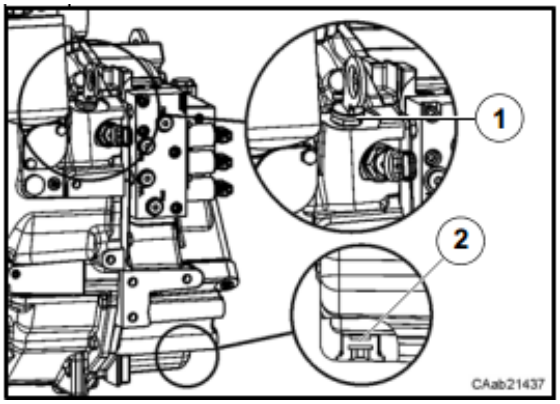
1) Remove the old breather and replace it with a new one.

1.8.3 Replacing the transmission fluid, transfer box oil and filter (If equipped)

First maintenance after 250 h, then maintain the vehicle every 1000 h.

Drain the transmission fluid

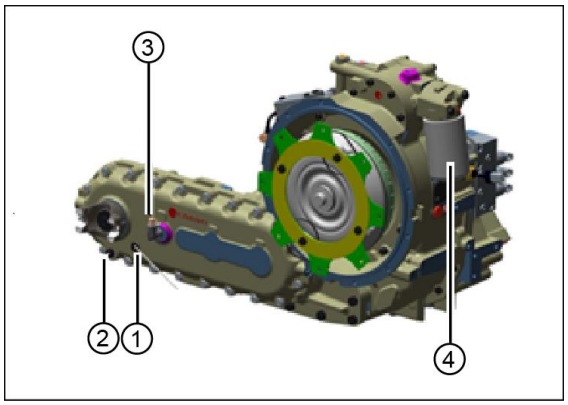
1) Stop the engine, park the machine on a level ground, set the gear selector to N gear, shut down the engine, pull up the parking brake handle, and chock the tire to prevent the machine from moving.



2) Place a suitable container under the drain plug (2), pull off the oil dipstick (1), unscrew the drain plug (2), drain all oil, clean carefully and assemble the plug (2).

Danger of scalding at high temperature: wear protective equipment and operate carefully to avoid personal damage.

Discharging transfer box oil



1) Place a suitable container under the drain plug (2), remove the oil filler plug (1) and drain plug (2), drain all oil, clean and install the plug (2).

No.	Description
1	Oil filler
2	Oil outlet
3	Breather
4	Filter

Replacing filter

1) Remove the filter and seal.
2) Clean the gasket contact surface of the mounting with a clean cloth.
3) Apply a clean layer of lubricating oil to the O-ring of the new filter.
4) Reinstall the new filter on the mounting.

Adding transmission fluid

1) Add the specified oil to the level between the max, and min. of the oil dipstick (1) (following the rules of reference range based on the transmission oil temperature), and check the oil level again after 5 minutes or add to the specified level if necessary.
2) Install the oil dipstick (1).

Adding the transfer box oil

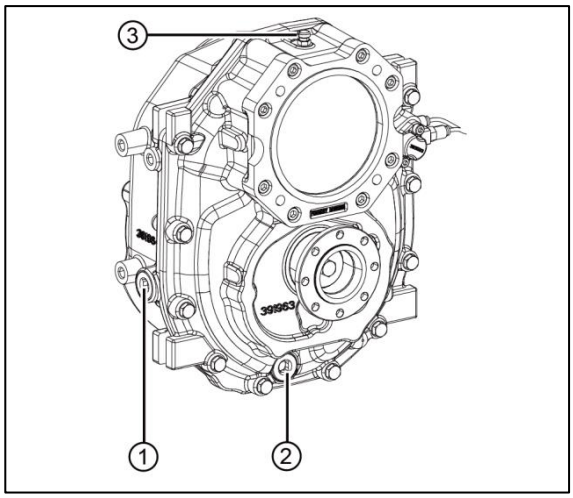
1) Add the lubricating oil through the oil filler (1) to the lower edge of the oil filler, wait for 5 minutes, check the oil level again, and add it if necessary.
2) Install the upper oil filler plug.

1.8.4 Replacing transfer box oil (If equipped)

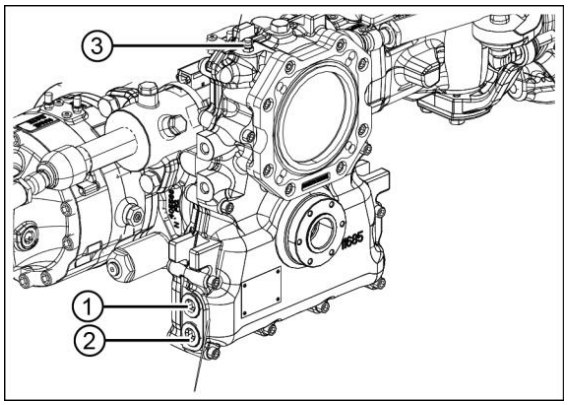
First maintenance after 250 h, then maintain the vehicle every 1000 h.

Stop the engine, park the machine on a level ground, set the gear selector to N gear, shut down the engine, pull up the parking brake handle, and chock the tire to prevent the machine from moving.

Type 1



Type 2



1. Oil filler \ Oil level sight glass

2. Oil outlet

3. Breather

1) Place a suitable container under the drain plug (2), remove the oil filler plug (1) and drain plug (2), drain all oil, clean and install the plug (2).

2) Add the lubricating oil through the oil filler (1) to the lower edge of the oil filler, wait for 5 minutes, check the oil level again, and add it if necessary.

3) Install the oil filler plug.

1.9 Every 1500 hours

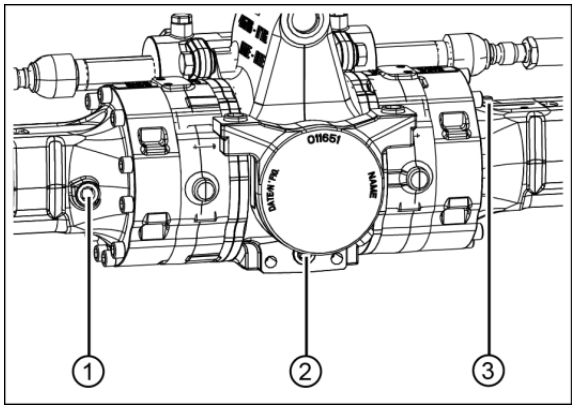
1.9.1 Replacing the drive axle reducer oil

The first maintenance is 150h, and then the maintenance is carried out every 1500h.

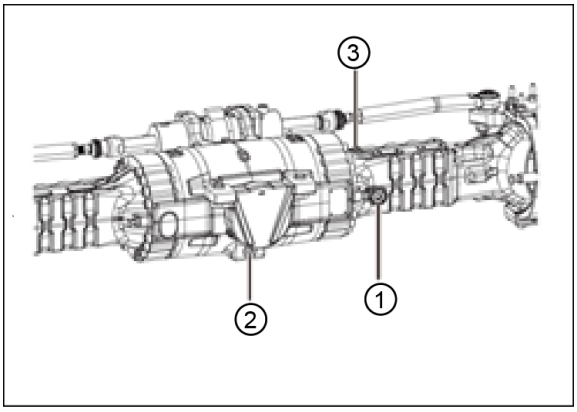
Stop the engine, park the machine on a level ground, set the gear selector to N gear, pull up the parking brake handle, and chock the tire to prevent the machine from moving.

Replacing the drive axle final drive oil

H625:



H735/H933:

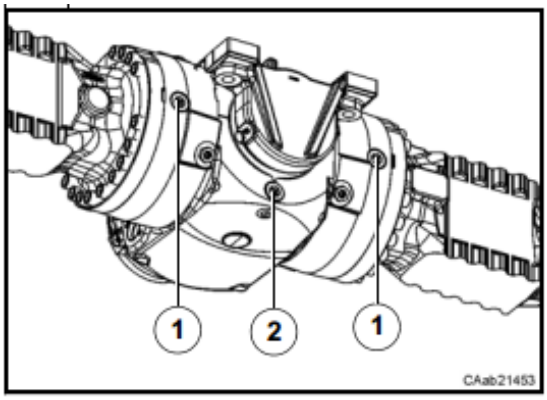


1. Filler plug
2. Drain plug
3. Breather

1) Place a suitable container under the drain plug (2), first remove the oil filler plug (1) and then remove the drain plug (2). Drain all oil. Install and tighten the drain plug (2).

2) Add the specified drive axle oil to the lower edge of the oil filler plug hole (1). Wait for 5 minutes, then check the oil level and add it to the specified level if necessary. Install and tighten the oil filler plug (1).

H1440/H1840/HR2150:



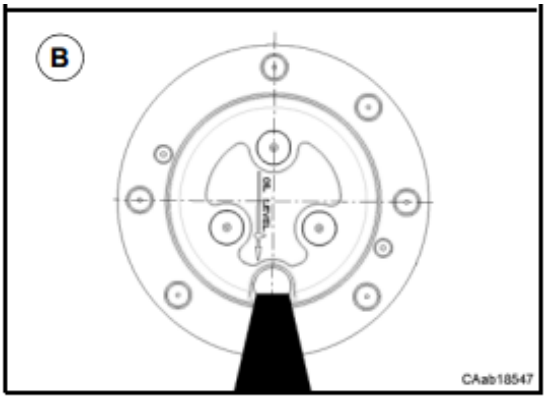
1. Filler plug
2. Drain plug

1) Place a suitable container under the drain plug (2), first remove the oil filler plug (1) and then remove the drain plug (2). Drain all oil. Install and tighten the drain plug (2).

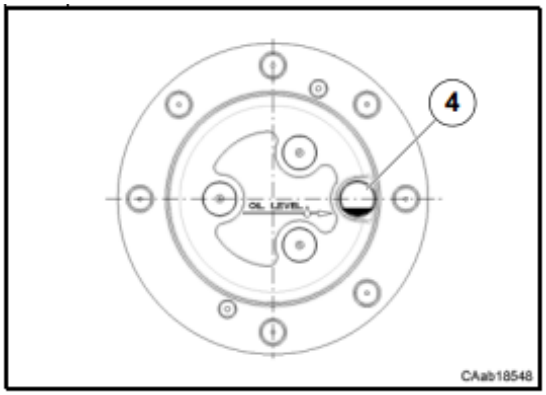
2) Add the specified drive axle oil to the lower edge of the oil filler plug hole (1). Wait for 5 minutes, then check the oil level and add it to the specified level if necessary. Install and tighten the oil filler plug (1).

Replacing the drive axle wheel reducer oil

1. Turn the wheel so that the plug (4) is in the highest position and unscrew it to some extent to release the possible pressure.



2. Rotate the wheel so that the drain plug is in the lowest position and place a suitable container underneath. Remove the screw plug and drain oil.

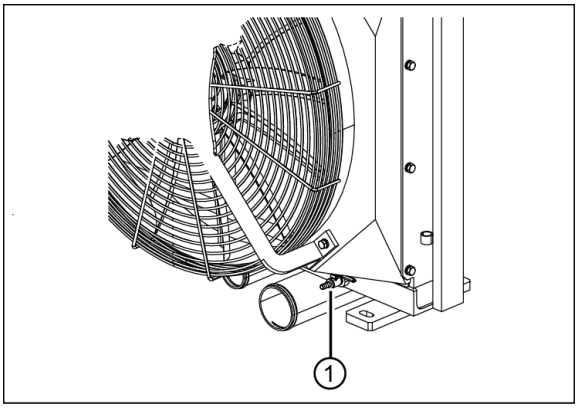


3. Turn the wheel so that the plug (4) is in a horizontal position. Add the specified oil to the lower edge of the filling hole.
4. Tighten the plug.

1.10 Every 2000 hours

1.10.1 Replacing coolant

The coolant in the cooling system shall be completely replaced every 2000 working hours or two years (whichever comes first). Before that, if the coolant is contaminated, the engine is overheated or the radiator is foamed, it should be replaced in advance.



2. Outlet of radiator coolant

1) Close the engine and allow it to cool.

2) Remove the coolant filler cap from radiator.

3) Open the water drain valve of the radiator

and the drain valve of the engine coolant (if equipped) as well as the coolant drain valve of the transmission (if equipped), discharge the coolant and hold it with a container.

4) After the engine and transmission coolant is drained thoroughly, close the drain valve (if equipped) for radiator, engine and transmission.
5) Check all water pipes and clamps of cooling system for damage and replace them if necessary. Check the water radiator for leakage, damage and dirt accumulation, and clean and repair it as required.
6) Fill slowly by the filler until the maximum allowable level of the Radiator.
7) Install the coolant filler cap.
8) Run the engine at idle speed, check for level and leakage, and refill if necessary.

1.10.2 Checking boom chain for wear (If equipped)

Chain wear can occur in the following locations

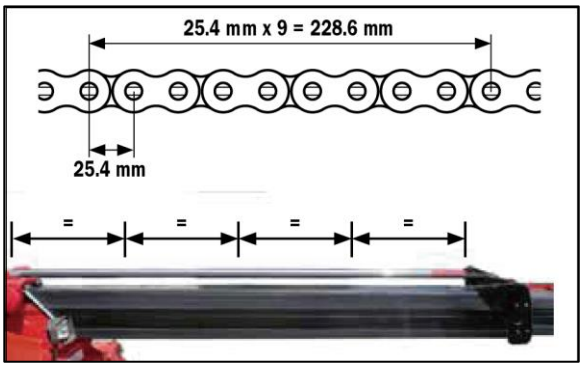
- On the joint, resulting in chain elongation.
- By contact with the pulley, on the edge of the connecting plate.
- By contact with the belt pulley flange, on the surface of the plate and extension pin.
- On the plane where the extension pins are aligned.

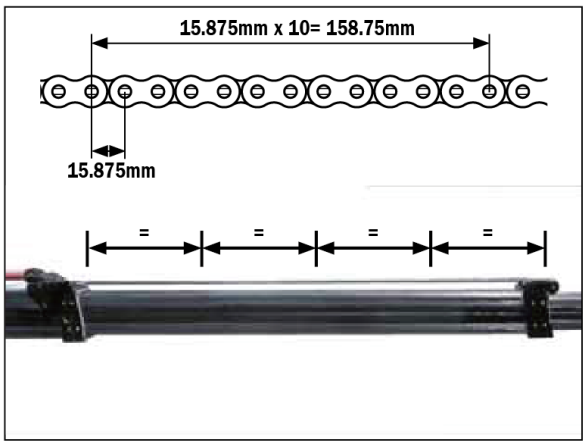
Check Chain elongation

It is recommended to do this with a Chain check gauge.

1) Raise the Outrigger (If equipped with outrigger) to keep the Boom level.
2) Fully extend the Boom and continue for a few minutes to properly tension the Chain.
3) Since the chain may wear unevenly over its length, split the chain into 4 aliquots and check with a gauge at the center of each section.
4) Chain specification varies with model. Blow are some models' chain specifications.

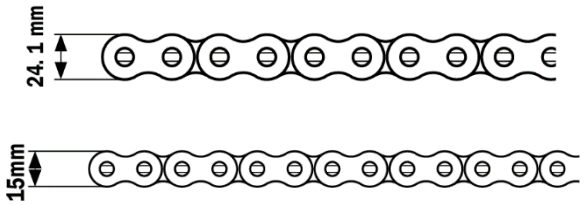
Model	Spec	Pitch	Width	Thickness
H933	BL588	15.875	42.2	15
H1440	BL588	15.875	42.2	15
H1840	BL866	25.4	52.2	24.1
HR2150	BL688	19.05	55.5	18.1
	BL888	25.4	68.2	24.1





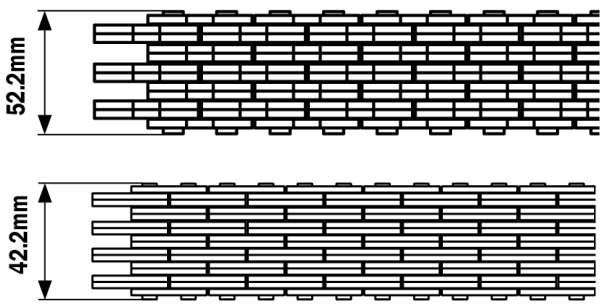
CAUTION: If the maximum size is exceeded (228.6 mm +228.6 × 2%=233.2 mm; 158.75+158.75 × 2%= 161.925), replace a pair of chain.

Check the side steel plate for wear



CAUTION: If the size is less than the minimum size (24.1 mm-24.1 × 2%= 23.618 mm; 15.5 mm-15.5 × 2%= 15.19 mm), replace the chain.

Extension pin wear

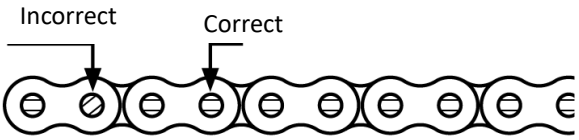


CAUTION: If the size is less than the minimum size (52.2 mm-52.2 × 2%= 51.156 mm; 42.2 mm-42.2 × 2%= 41.356mm), replace the chain.

In addition to wear, the high pressure between the side plate and the pulley may cause joint jamming. In this case, a pair of chains should also be replaced.

Extension pin plane alignment

Check the entire chain.



The friction between the plate and the extension pin may cause the pin to rotate in the outer plate, thus resulting the pin falling off the housing.

CAUTION: If the plane is not aligned longitudinally with the chain, replace it with a pair of chain.

1.10.3 Replacing hydraulic oil

It is required to be replaced every 2000 h or every two years, whichever comes first.

Before replacing the hydraulic oil, a hydraulic oil test can be performed to confirm whether it is necessary to replace it. If the hydraulic oil is not replaced during the 2000 h test, the hydraulic oil is tested quarterly. Replace the hydraulic oil until the test fails.

⚠ CAUTION: The hydraulic suction filter should be replaced when the hydraulic oil is replaced.

Park the vehicle on the level ground so that the vehicle is in the storage position.

1) Close the ball valve located on the hydraulic oil tank (if equipped with ball valve).

⚠ Danger of component damage. Do not start the engine when the hydraulic oil tank ball valve is closed, otherwise the components will be damaged. If the ball valve is turned off, take the key from the key switch and hang a warning sign on the device.

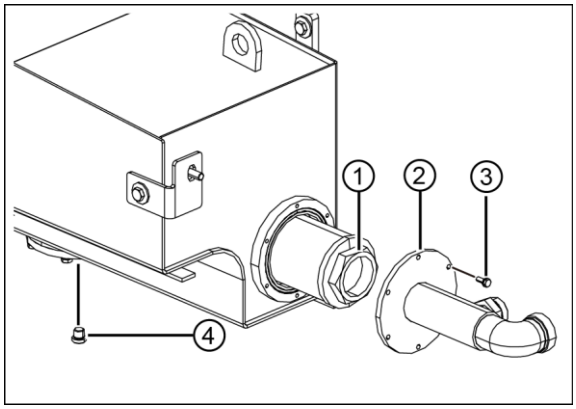
⚠ Danger of physical injury. The splashed hot oil can penetrate and burn the skin.

2) Remove the drain plug from the hydraulic oil tank.
3) Drain the hydraulic oil from the hydraulic oil tank completely into a suitable container. To speed up the oil drain, open the oil tank filler cap.
4) Remove the suction filter from the hydraulic oil tank.
5) Flush the inside of the hydraulic oil tank with a mild solvent. (Clean one side with chemical cleaning agent first. After drying, rinse with clean hydraulic oil to release cleaning oil. ）
6) Clean the foreign matter absorbed by the ring magnet.
7) Install a new suction filter.
8) Install the upper drain plug.
9) Add the hydraulic oil to the hydraulic oil box until it reaches 1/2 level of the observation meter. No overflow is allowed. Wipe and wash off Hydraulic oil that may splash out.
10) Open the Ball valve on the Hydraulic oil tank (if equipped with Ball valve).

⚠ CAUTION: When installing drain plug and filter, please be sure to use pipe thread sealant.

11) Check all functions of the machine and check for oil leakage through one full cycle.
12) After a working cycle, recheck the level of the fuel tank and add oil to the 1/2 of the tank. It is strictly prohibited for the oil to overflow.

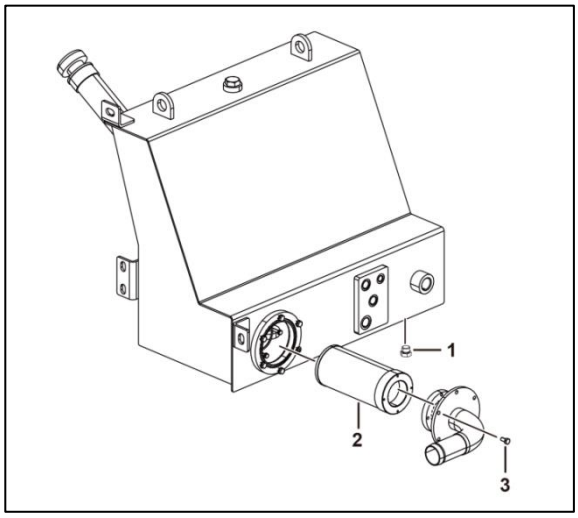
H625:



No.	Name
1	Suction filter
2	Suction oil flange
3	Connecting bolt of suction oil

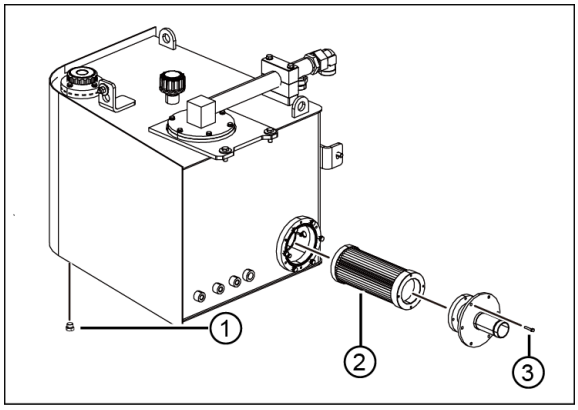
	flange and tank
4	Drain plug

H735:



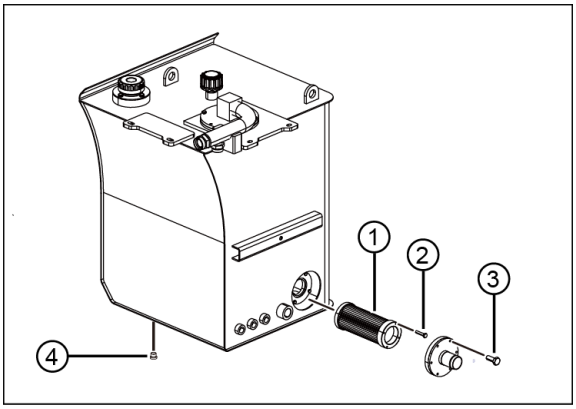
No.	Name
1	Drain plug
2	Suction filter
3	Connecting bolt of suction oil flange and tank

H1440/H1840:



No.	Name
1	Drain plug
2	Suction filter
3	Connecting bolt of suction oil flange and tank

HR2150:



No.	Name
1	Suction oil filter
2	Connecting bolt of suction oil flange and filter
3	Connecting bolt of suction oil flange and tank
4	Drain plug

1.11 Appendix

1.11.1 Maintenance instructions

1. General instructions

Before starting the Telescopic handler, ensure that the area is well ventilated.

Wear suitable clothes and avoid jewelry and loose and comfortable clothes. If necessary, tie and protect your hair.

If necessary, stop the engine and remove the ignition key.

Read the operation manual carefully.

Carry out all repairs immediately, even if the relevant repairs are minor.

Repair all leaks immediately, even if the relevant leaks are small.

Ensure that old materials and spare parts are handled in a completely safe and ecological manner.

Be careful of the danger of burning and splashing (exhaust, radiator, internal combustion engine, etc.).

2. Lubricating oil and fuel

Use the recommended lubricating oil (never use contaminated lubricating oil).

Never fill the primary fuel filter element while the engine is running.

Fill the primary fuel filter element only in the area specified for this purpose.

Never fill the fuel tank to the upper limit.

When the fuel tank is open or being filled, do not smoke or use flames around the telescopic handler.

3. Hydraulic system

Do not attempt to loosen joints, hose or any hydraulic component while the circuit is under pressure.

⚠ Balance valve: It is dangerous to change and remove balance valve or safety valves that may be installed on telescopic handler cylinder. These operations can only be performed by approved technicians.

⚠ Hydraulic accumulator: These hydraulic accumulator that may be installed on the telescopic handler are pressurized devices. Disassembling these accumulators and their piping systems is a dangerous operation and must be performed by an approved technician.

Release the accumulator pressure of the brake system before service: park the

machine on solid level ground, retract the boom to the stowed position, stop the engine, and place pads under the wheels. Repeatedly press and release the travel brake pedal (foot brake); repeatedly pull and release the parking brake handle (hand brake).

4. Electrical system

Never Short circuit the starter to start the Engine. If the forward / N gear / reverse selector is not in the position of N gear and the parking brake is not engaged, the Telescopic handler may move abruptly.

Do not touch the battery with metal objects.

Disconnect the battery before operating the circuit

5. Welding operation

Disconnect the battery before performing any welding operations on the telescopic handler.

Do not perform welding work on the assembled tire, which will increase the pressure and cause the tire to explode.

Disconnect the electronic control unit to avoid irreparable damage to electronic components.

6. Cleaning vehicle

Close and lock all doors, windows, etc.

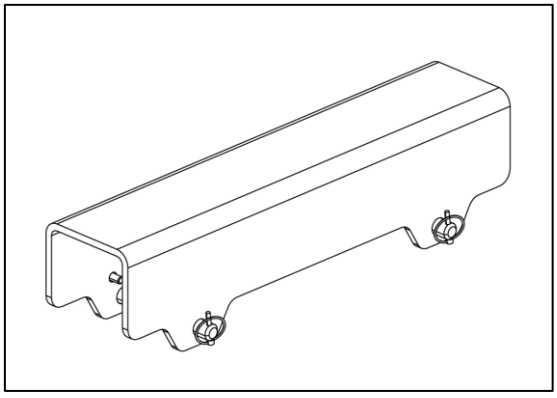
Avoid contacting with joints, electrical components and connectors during cleaning.

If necessary, prevent water, steam or detergent from entering vulnerable parts, especially electrical components.

7. Use of safety support

Safety support instructions

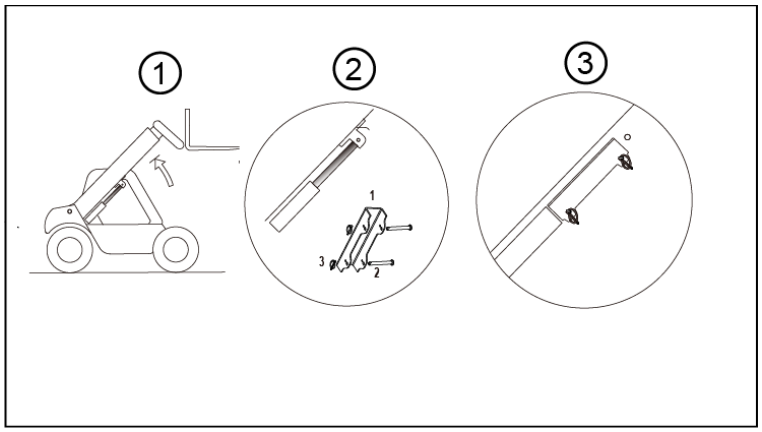
Boom safety support



The telescopic handler is equipped with safety support, which must be installed on the lift cylinder

connecting rod when working in the area below the boom.

The installation of safety support



1) Fully raise the boom.
2) Fit the safety support on the lift cylinder connecting rod and secure it with axis pin.
3) Slowly lower the boom and stop before coming into contact with the safety support.

Remove the safety support

1) Fully raise the boom.
2) Remove the axis pin.
3) Put the safety support back in place.

1.11.2 Maintenance List

H625 (H06025001K3R1000) (EU stageⅢ-Kubota V3307 engine) Maintenance List							
Maintenance Period	Material code	Name		Specification	Unit	(Q'TY)	Remark
50h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
150h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	12.2	Front axle:6.1L Rear axle:6.1L
250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	1.3	Transfer box
500h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel filter element	FILTER	HH166-43560	SET	1	
	4110001638007	Primary fuel filter element	FILTER	FS1212-B-AM	SET	1	
	4120711698	Return filter	FILTER	TL368BD	SET	1	Hydraulic system
1000h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel filter element	FILTER	HH166-43560	SET	1	
	4110001638007	Primary fuel filter element	FILTER	FS1212-B-AM	SET	1	
	4120711698	Return filter	FILTER	TL368BD	SET	1	Hydraulic system
	4110001730	Air breather	FILTER	QUQ1-40*1.0	SET	1	
	4110001498009	A/C filter element Safety filter element	FILTER	CF 206	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110001498008	Air cleaner primary element	FILTER	C 14 206	SET	1	
1250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	1.3	Transfer box
1500h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel filter element	FILTER	HH166-43560	SET	1	
	4110001638007	Primary fuel filter	FILTER	FS1212-B-AM	SET	1	

		element					
	4120711698	Return filter	FILTER	TL368BD	SET	1	Hydraulic system
1650h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	12.2	Front axle:6.1L Rear axle:6.1L
2000h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel filter element	FILTER	HH166-43560	SET	1	
	4110001638007	Primary fuel filter element	FILTER	FS1212-B-AM	SET	1	
	4110001498009	A/C filter element Safety filter element	FILTER	CF 206	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110001498008	Air cleaner primary element	FILTER	C 14 206	SET	1	
	4120711697	Suction filter	FILTER	WF-16CX100	SET	1	When replacing the hydraulic oil, replace
	4120711698	Return filter	FILTER	TL368BD	SET	1	Hydraulic system
	4110001730	Air breather	FILTER	QUQ1-40*1.0	SET	1	

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H735 (H07035001K3R1000) (EU stageⅢ-Kubota V3307 engine) Maintenance List							
Maintenance Period	Material code	Name		Specification	Unit	(Q'TY)	Remark
50h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
150h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	19.2	Final drive: 8L; Single-side wheel reducer: 0.8L
250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	4	Transfer box
500h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel filter element	FILTER	HH166-43560	SET	1	
	4110001638007	Primary fuel filter element	FILTER	FS1212-B-AM	SET	1	
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
1000h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel filter element	FILTER	HH166-43560	SET	1	
	4110001638007	Primary fuel filter element	FILTER	FS1212-B-AM	SET	1	
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
	4120001427	Air breather	FILTER	EF2-32	SET	1	
	4110001498009	A/C filter element Safety filter element	FILTER	CF 206	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110001498008	Air cleaner primary element	FILTER	C 14 206	SET	1	
1250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	4	Transfer box
1500h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel	FILTER	HH166-43560	SET	1	

		filter element					gauge
	4110001638007	Primary fuel filter element	FILTER	FS1212-B-AM	SET	1	
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
1650h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	19.2	1. Final drive: 8 L; Single-side wheel reducer: 0.8 L;
2000h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel filter element	FILTER	HH166-43560	SET	1	
	4110001638007	Primary fuel filter element	FILTER	FS1212-B-AM	SET	1	
	4110001498009	A/C filter element Safety filter element	FILTER	CF 206	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110001498008	Air cleaner primary element	FILTER	C 14 206	SET	1	
	4120710780	Suction filter	FILTER	WU-400*100F-J	SET	1	When replacing the hydraulic oil, replace
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
	4120001427	Air breather	FILTER	EF2-32	SET	1	

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H735 (H07035001K5C1000) (EU stage Ⅴ-Kubota V3307 engine) Maintenance List							
Maintenance Period	Material code	Name		Specification	Unit	(Q'TY)	Remark
50h	5301000138	Engine oil	Engine oil	CJ-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
150h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	19.2	Final drive: 8L; Single-side wheel reducer: 0.8L
250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	4	Transfer box
500h	5301000138	Engine oil	Engine oil	CJ-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110703293006	Primary fuel filter element	FILTER	1E786-43060	SET	1	
	4110705288001	Secondary fuel filter element	FILTER	1K947-43172	SET	1	
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
1000h	5301000138	Engine oil	Engine oil	CJ-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110703293006	Primary fuel filter element	FILTER	1E786-43060	SET	1	
	4110705288001	Secondary fuel filter element	FILTER	1K947-43172	SET	1	
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
	4120001427	Air breather	FILTER	EF2-32	SET	1	
	4110001498009	A/C filter element Safety filter element	FILTER	CF 206	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110001498008	Air cleaner primary element	FILTER	C 14 206	SET	1	
1250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	4	Transfer box
1500h	5301000138	Engine oil	Engine oil	CJ-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110703293006	Primary fuel filter	FILTER	1E786-43060	SET	1	

		element					gauge
	4110705288001	Secondary fuel filter element	FILTER	1K947-43172	SET	1	
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
1650h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	19.2	1. Final drive: 8 L; Single-side wheel reducer: 0.8 L;
2000h	5301000138	Engine oil	Engine oil	CJ-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110703293006	Primary fuel filter element	FILTER	1E786-43060	SET	1	
	4110705288001	Secondary fuel filter element	FILTER	1K947-43172	SET	1	
	4110001498009	A/C filter element Safety filter element	FILTER	CF 206	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110001498008	Air cleaner primary element	FILTER	C 14 206	SET	1	
	4120710780	Suction filter	FILTER	WU-400*100F -J	SET	1	When replacing the hydraulic oil, replace
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
	4120001427	Air breather	FILTER	EF2-32	SET	1	

H933

H933 (H09033001K3R1000) (EU stageⅢ-Kubota V3307 engine) Maintenance List							
Maintenance Period	Material code	Name		Specification	Unit	(Q'TY)	Remark
50h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
150h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	19.2	Final drive: 8L; Single-side wheel reducer: 0.8L
250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	4	Transfer box
500h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel filter element	FILTER	HH166-43560	SET	1	
	4110001638007	Primary fuel filter element	FILTER	FS1212-B-AM	SET	1	
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
1000h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel filter element	FILTER	HH166-43560	SET	1	
	4110001638007	Primary fuel filter element	FILTER	FS1212-B-AM	SET	1	
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
	4120001427	Air breather	FILTER	EF2-32	SET	1	
	4110001498009	A/C filter element Safety filter element	FILTER	CF 206	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110001498008	Air cleaner primary element	FILTER	C 14 206	SET	1	
1250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	4	Transfer box
1500h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel	FILTER	HH166-43560	SET	1	

		filter element					gauge
	4110001638007	Primary fuel filter element	FILTER	FS1212-B-AM	SET	1	
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
1650h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	19.2	1. Final drive: 8 L; Single-side wheel reducer: 0.8 L;
2000h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	The oil filling amount is subject to the oil level gauge
	4110703186002	Oil filter element	FILTER	HH1C0-32430	SET	1	
	4110001809001	Secondary fuel filter element	FILTER	HH166-43560	SET	1	
	4110001638007	Primary fuel filter element	FILTER	FS1212-B-AM	SET	1	
	4110001498009	A/C filter element Safety filter element	FILTER	CF 206	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110001498008	Air cleaner primary element	FILTER	C 14 206	SET	1	
	4120710780	Suction filter	FILTER	WU-400*100F-J	SET	1	When replacing the hydraulic oil, replace
	4120704125001	Return filter	FILTER	LH0160D010 BN3HC	SET	1	Hydraulic system
	4120001427	Air breather	FILTER	EF2-32	SET	1	

H1440

H1440 (H14040000P3G10) (EU stageⅢ-Perkins 1104D engine) Maintenance List							
Maintenance Period	Material code	Name		Specification	Unit	Q'TY	Remark
50h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110703313001	Oil filter element 2654407	FILTER	2654407	SET	1	
150h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.2	Final drive: 8L; Single-side wheel reducer: 1.3L
250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.75	1. Transmission: Power shift part: 20L; Drive part: 1.75 L
	4110703302001	Transmission fluid filter	Oil filter	40701	SET	1	
500h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110703313001	Oil filter element	FILTER	2654407	SET	1	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
1000h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
	4120002915	Air breather	FILTER	D-G3/4	SET	1	
	4190001459	A/C filter element Safety filter element	FILTER	P780523	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4190001460	Air cleaner primary element	FILTER	P780522	SET	1	
1250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.75	1. Transmission: Power shift part: 20L; Drive part: 1.75 L
	4110703302001	Transmission fluid filter	Oil filter	40701	SET	1	Transmission

1500h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
1650h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.2	1. Final drive: 8 L; Single-side wheel reducer: 1.3 L;
2000h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4190001459	A/C filter element Safety filter element	FILTER	P780523	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4190001460	Air cleaner primary element	FILTER	P780522	SET	1	
	4120001706	Suction filter	FILTER	WU-630*100F-J	SET	1	When replacing the hydraulic oil, replace
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
	4120002915	Air breather	FILTER	D-G3/4	SET	1	

H1840

H1840 (H18040000P3G10) (EU stageⅢ-Perkins 1104D engine) Maintenance List							
Maintenance Period	Material code	Name		Specification	Unit	Q'TY	Remark
50h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110703313001	Oil filter element	FILTER	2654407	SET	1	
150h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.2	Final drive: 8L; Single-side wheel reducer: 1.3L
250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.75	1. Transmission: Power shift part: 20L; Drive part: 1.75 L
	4110703302001	Transmission fluid filter	Oil filter	40701	SET	1	
500h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110703313001	Oil filter element	FILTER	2654407	SET	1	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
1000h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
	4120002915	Air breather	FILTER	D-G3/4	SET	1	
	4190001459	A/C filter element Safety filter element	FILTER	P780523	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4190001460	Air cleaner primary element	FILTER	P780522	SET	1	
1250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.75	1. Transmission: Power shift part: 20L; Drive part: 1.75 L
	4110703302001	Transmission fluid filter	Oil filter	40701	SET	1	Transmission

1500h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
1650h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.2	1. Final drive: 8 L; Single-side wheel reducer: 1.3 L;
2000h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4190001459	A/C filter element Safety filter element	FILTER	P780523	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4190001460	Air cleaner primary element	FILTER	P780522	SET	1	
	4120001706	Suction filter	FILTER	WU-630*100F-J	SET	1	When replacing the hydraulic oil, replace
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
	4120002915	Air breather	FILTER	D-G3/4	SET	1	

H1840

H1840 (H18040001P3G1000) (EU stageⅢ-Perkins 1104D engine) Maintenance List							
Maintenance Period	Material code	Name		Specification	Unit	Q'TY	Remark
50h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110703313001	Oil filter element	FILTER	2654407	SET	1	
150h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.2	Final drive: 8L; Single-side wheel reducer: 1.3L
250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	4	Transfer box
500h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110703313001	Oil filter element	FILTER	2654407	SET	1	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
1000h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
	4120002915	Air breather	FILTER	D-G3/4	SET	1	
	4190001459	A/C filter element Safety filter element	FILTER	P780523	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4190001460	Air cleaner primary element	FILTER	P780522	SET	1	
1250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	4	Transfer box
1500h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel	FILTER	3611274	SET	2	

		filter element					
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
1650h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.2	1. Final drive: 8 L; Single-side wheel reducer: 1.3 L;
2000h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4190001459	A/C filter element Safety filter element	FILTER	P780523	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4190001460	Air cleaner primary element	FILTER	P780522	SET	1	
	4120001706	Suction filter	FILTER	WU-630*100F-J	SET	1	When replacing the hydraulic oil, replace
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
	4120002915	Air breather	FILTER	D-G3/4	SET	1	

H1840

H1840 (H18040000P5C1000) (EU stage Ⅴ-Perkins 904J engine) Maintenance List							
Maintenance Period	Material code	Name		Specification	Unit	Q'TY	Remark
50h	5301000138	Engine oil	Engine oil	CJ-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110705047001	Oil filter element	FILTER	5698037	SET	1	
150h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.2	Final drive: 8L; Single-side wheel reducer: 1.3L
250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.75	1. Transmission: Power shift part: 20L; Drive part: 1.75 L
	4110703302001	Transmission fluid filter	Oil filter	40701	SET	1	
500h	5301000138	Engine oil	Engine oil	CJ-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110705047001	Oil filter element	FILTER	5698037	SET	1	
	4110705047003	Primary fuel filter element	FILTER	5181459	SET	1	
	4110705047002	Secondary fuel filter element	FILTER	3611274	SET	1	
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
1000h	5301000138	Engine oil	Engine oil	CJ-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110705047001	Oil filter element	FILTER	5698037	SET	1	
	4110705047003	Primary fuel filter element	FILTER	5181459	SET	1	
	4110705047002	Secondary fuel filter element	FILTER	3611274	SET	1	
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
	4120002915	Air breather	FILTER	D-G3/4	SET	1	
	4110703633002	A/C filter element Safety filter element	FILTER	P600975	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110703633003	Air cleaner primary element	FILTER	P609490	SET	1	
1250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.75	1. Transmission: Power shift part: 20L; Drive part: 1.75 L
	4110703302001	Transmission fluid filter	Oil filter	40701	SET	1	Transmission

1500h	5301000138	Engine oil	Engine oil	CJ-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110705047001	Oil filter element	FILTER	5698037	SET	1	
	4110705047003	Primary fuel filter element	FILTER	5181459	SET	1	
	4110705047002	Secondary fuel filter element	FILTER	3611274	SET	1	
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
1650h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.2	1. Final drive: 8 L; Single-side wheel reducer: 1.3 L;
2000h	5301000138	Engine oil	Engine oil	CJ-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110705047001	Oil filter element	FILTER	5698037	SET	1	
	4110705047003	Primary fuel filter element	FILTER	5181459	SET	1	
	4110705047002	Secondary fuel filter element	FILTER	3611274	SET	1	
	4110703633002	A/C filter element Safety filter element	FILTER	P600975	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110703633003	Air cleaner primary element	FILTER	P609490	SET	1	
	4120001706	Suction filter	FILTER	WU-630*100F-J	SET	1	When replacing the hydraulic oil, replace
	4120706735	Return filter	FILTER	TL368E/5	SET	1	Hydraulic system
	4120002915	Air breather	FILTER	D-G3/4	SET	1	

HR2150

HR2150 (H21050011P3G1000) (EU stageⅢ-Perkins 1104D-E44TA engine) Maintenance List							
Maintenance Period	Material code	Name		Specification	Unit	Q'TY	Remark
50h	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	Engine (The oil filling amount is subject to the oil level gauge)
	4110703313001	Oil filter element	FILTER	2654407	SET	1	
	5304000039	Gear oil	Gear oil	L-CKD220	Liter (L)	2.2	Slewing reducer
150h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.2	Final drive: 8L; Single-side wheel reducer: 1.3L
250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	4	Transfer box
500h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4110703313004	Breather filter element	FILTER	2654A104	SET	1	
	4120002095004	High-pressure filter element	FILTER	GFX-100*5	SET	1	Hydraulic system
	4120703941001	High-pressure filter element	FILTER	LH0160D005BN3HC	SET	1	
	4120708507	Return filter	FILTER	TL235A/5	SET	1	
1000h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4110703313004	Breather filter element	FILTER	2654A104	SET	1	
	4110705258002	Safety filter element of A/C filter element	FILTER	CF 500	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110705258001	Air cleaner primary element	FILTER	C 20 500	SET	1	

	4120002095004	High-pressure filter element	FILTER	GFX-100*5	SET	1	Hydraulic system
	4120703941001	High-pressure filter element	FILTER	LH0160D005BN3HC	SET	1	
	4120708507	Return filter	FILTER	TL235A/5	SET	1	
	4120002631	Air breather	FILTER	PAF1-0.02-0.45-10L	SET	1	
	5304000039	Gear oil	Gear oil	L-CKD220	Liter (L)	2.2	Slewing reducer
1250h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	4	Transfer box 4L
1500h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4110703313004	Breather filter element	FILTER	2654A104	SET	1	
	4120002095004	High-pressure filter element	FILTER	GFX-100*5	SET	1	Hydraulic system
	4120703941001	High-pressure filter element	FILTER	LH0160D005BN3HC	SET	1	
	4120708507	Return filter	FILTER	TL235A/5	SET	1	
1650h	5301000361	Gear oil	Gear oil	SAE J306: 75W-80	Liter (L)	21.2	Final drive: 8 L; Single-side wheel reducer: 1.3 L;
2000h	4110703313001	Oil filter element	FILTER	2654407	SET	1	Engine (The oil filling amount is subject to the oil level gauge)
	5301000045	Engine oil	Engine oil	CH-4 15W/40	Liter (L)	8.5	
	4110703313002	Primary fuel filter element	FILTER	4395038	SET	1	
	4110703313003	Secondary fuel filter element	FILTER	3611274	SET	2	
	4110703313004	Breather filter element	FILTER	2654A104	SET	1	
	4110705258002	Safety filter element of A/C filter element	FILTER	CF 500	SET	1	Air cleaner, clean every 250h; Clean 4-5 times Replace.
	4110705258001	Air cleaner primary element	FILTER	C 20 500	SET	1	
	4120002095004	High-pressure filter element	FILTER	GFX-100*5	SET	1	Hydraulic system

	4120703941001	High-pressure filter element	FILTER	LH0160D005BN3HC	SET	1	
	4120708507	Return filter	FILTER	TL235A/5	SET	1	
	4120002631	Air breather	FILTER	PAF1-0.02-0.45-10L	SET	1	
	4120001706	Suction filter	FILTER	WU-630*100F-J	SET	1	Replace when replacing hydraulic oil
	5304000039	Gear oil	Gear oil	L-CKD220	Liter (L)	2.2	Slewing reducer

1.11.3 Selection of oils

Type	Recommended types and standards	Oil parts
Engine oil API CH-4	Lowest ambient temperature ≥-10℃ ,SAE 15W-40	Engine (EU StageⅢ engines)
	Lowest ambient temperature <-10℃ , SAE 10W-30	
Engine oil API CJ-4	Lowest ambient temperature ≥-10℃ , SAE 15W-40	Engine (EU StageⅤ engines)
	Lowest ambient temperature <-10℃, SAE 10W-30	
Gear oil	API GL-4, SAE 75W or API GL-4, SAE 80W-90	Axle
	Mobil fluid 424	
Gear oil	API GL-4, SAE 75W	Transmission. Transfer box
	Mobil fluid 424	
Gear oil	L-CKD 220	Slewing reducer
Hydraulic oil	Minimum temperature > -25℃, L-HV46 low temperature hydraulic oil	Hydraulic oil tank
	-40℃ < minimum temperature ≤ -25℃, L-HS32 ultra-low temperature hydraulic oil	
	Minimum air temperature ≤ -40℃, 10 aviation hydraulic fluid	
Fuel	Ambient temperature ≥ 4 ℃, No. 0 Light diesel fuel	Fuel tank EN590 and ASTM D975 ULSD
	Ambient temperature ≥-5 ℃,-No. 10 Light diesel fuel	
	Ambient temperature ≥-14 ℃,-No. 20 Light diesel fuel	
	Ambient temperature ≥-29 ℃,-No. 35 Light diesel fuel	
Grease	No. 2 or No. 3 lithium-based grease Molybdenum disulfide	Working device hinge point axis pin
Antifreeze	Antifreeze -25℃ ethylene glycol content 40%	Cooling system
	Antifreeze -35℃ ethylene glycol content 50%	
	Antifreeze -45℃ ethylene glycol content 60%	
Diesel exhaust fluid (DEF)	ISO22241-1，urea content 32.5%	DEF tank
Air conditioner	R134a	

1.11.4 Maintenance items

Maintenance item	Operation content	Maintenance level						
		Every day	Weekly	Quarterly	Every six months	Every year		
		8h	50h	250h	500h	1000h	2000h	4000h
Engine	Check engine oil level	●						
	Check the coolant level	●						
	Check the fuel level	●						
	Check the DEF level		●					
	Check the primary fuel filter	●						
	Clean radiator core		●					
	Replace engine oil and filter				●			
	Discharge the water and impurities from the primary fuel filter	Perkins engines(Every day or every 8h);Kubota engines(Every week or every 50h)						
	Replace the secondary fuel filter element				●			
	Replace the primary fuel filter element				●			
	Replace crankcase breather filter element (if equipped)				●			
	Clean the fuel tank					●		
	Replace air cleaner primary element					●		
	Replace air cleaner safety filter element					●		
	Replace the coolant						●	
	Tighten cooling pipe clamp			●				
	Tighten intake pipe hose			●				
	Check air cleaner maintenance indicator		●					
	Clean air cleaner dust cup	●						
	Check generator and fan belt tension			●				
	Check engine fan clearance and drive Belt			●				
	Check electrical components and electronic control system wiring harness		●					
	Clean the DEF filler filter.						●	
	Replace the DEF manifold filter.						●	
	Replace the DEF pump filter.							●

Maintenance item	Operation content	Maintenance level						
		Every day	Weekly	Quarterly	Every six months	Every year		
		8h	50h	250h	500h	1000h	2000h	4000h
Transmission	Check transmission fluid level			●				
	Replace the transmission lubricating oil (at least once a year)					●		
	Replace the transmission filter					●		
Front axle	Check the final drive and the wheel reducer oil level			●				
	Replace the final drive lubricating oil (at least once a year)	The first maintenance is 150h, and then the maintenance is carried out every 1500h.						
	Replace wheel reducer lubricating oil (at least once a year)	The first maintenance is 150h, and then the maintenance is carried out every 1500h.						
	Check tire pressure	●						
	Check the fixing of wheel nut	●						
	Clean oil breather			●				
Rear axle	Check the final drive and the wheel reducer oil level			●				
	Replace the final drive lubricating oil (at least once a year)	The first maintenance is 150h, and then the maintenance is carried out every 1500h.						
	Replace wheel reducer lubricating oil (at least once a year)	The first maintenance is 150h, and then the maintenance is carried out every 1500h.						
	Check tire pressure	●						
	Check the fixing of wheel nut	●						
	Clean oil breather			●				
Slewing mechanism	Check slewing reducer oil level			●				
	Slewing bearing lubrication		●					
Drive shaft	Retighten the propeller shaft bolt		●					
	Check the connection and wear of propeller shaft		●					
	Universal joint lubrication		●					
	Propeller shaft lubrication		●					
Cab	Check the action of the wiper	●						
	Clean the cab A/C filter		●					
	Replace the cab A/C filter			●				
	Check the washer fluid level		●					
	Check whether the throttle adjustment, brake joystick, the travel and operation of the	●						

Maintenance item	Operation content	Maintenance level						
		Every day	Weekly	Quarterly	Every six months	Every year		
		8h	50h	250h	500h	1000h	2000h	4000h
	variable-speed joystick are flexible							
	Check the seat belt	●						
	Check the coolant level and the fuel level of the water heater in the cab (if equipped)	●						
Boom	Check boom chain wear			●				
	Check boom padding block wear				●			
	Boom and padding block lubrication			●				
Electrical system	Check the operation of electrical system (signal lamps, headlamps, warning lamps, wiper, heating and ventilation devices)			●				
	Check the fixing of the battery terminal, and apply grease to the electrodes					●		
	Check the working condition of the instrument	●						
	Check the condition of wiring harnesses and cables					●		
	Check the starter and alternator							
Steering system	Check the function of the steering system	●						
Hydraulic system	Check hydraulic oil level	●						
	Replace return filter element				●			
	Replace the high-pressure filter element (if equipped)				●			
	Replace the hydraulic oil tank breather					●		
	Check the working conditions of the hose and cylinder					●		
	Replace the brake accumulator filter (if equipped)					●		
	Clean hydraulic oil tank						●	
	Replace hydraulic oil						●	
	Replace suction filter						●	
	Check hydraulic circuit pressure						●	
	Check hydraulic circuit output						●	

Maintenance item	Operation content	Maintenance level						
		Every day	Weekly	Quarterly	Every six months	Every year		
		8h	50h	250h	500h	1000h	2000h	4000h
Brake system	Check brake system pressure					●		
	Adjust brake					●		
	Check brake pads and brake discs for wear							●
	Check the clearance of the front and rear axle reducers							●
Complete vehicle	Check the fork wear				●			
	Fill each propeller shaft with grease		●					

1.11.5 Engine DTC

Perkins 1104D:

S/N	DTC	Description	Impact on the machine			
			Engine does not start	Low power	Engine speed decreases	Engine shutdown
1	111	No. 1 Fuel injector fault	√	√		
2	112	No. 2 Fuel injector fault	√	√		
3	113	No. 3 fuel injector fault	√	√		
4	114	No. 4 fuel injector fault	√	√		
5	133	Intake manifold air temperature sensor fault	√			
6	141	Main engine speed/timing sensor fault			√	
7	142	Auxiliary engine speed/timing sensor fault				
8	143	Engine timing calibration fault	√			
9	144	Engine operation mode selector switch fault		√		
10	151	Intake pressure sensor		√		
11	154	Throttle position sensor fault			√	
12	155	Auxiliary throttle position sensor fault			√	
13	157	Engine oil pressure sensor fault		√		
14	159	Fuel rail pressure sensor failure		√		
15	162	Fuel rail pressure solenoid valve failure		√	√	
16	168	Engine coolant temperature sensor fault				
17	169	Low engine coolant				√
18	177	Turbine exhaust bypass valve actuator fault			√	
19	185	High exhaust temperature		√		
20	197	Intake manifold supercharging fault		√		
21	199	Glow plug starter relay fault				
22	233	Ether injection control solenoid valve				
23	245	Idle effective switch 1				
24	246	Idle effective switch 2				
25	253	Engine oil supply pump relay				
26	415	Software mismatch			√	√

27	426	Machine security module				
28	429	Ignition key switch fault				
29	511	ECM supply voltage fault	√	√		
30	514	SAE J1939 data link failure			√	
31	516	5V sensor DC power supply fault		√		√
32	517	8-volt sensor DC power supply failure		√		
33	527	Customer/system parameter failure		√	√	
34	551	No fault detected by the system				

Perkins 904J:

J1939 codes	Description
27–3	EGR #1 Valve Position: Voltage Above Normal
27–4	EGR #1 Valve Position: Voltage Below Normal
29–2	Accelerator Pedal Position #2: Data Erratic, Intermittent, or Incorrect
29–3	Accelerator Pedal Position #3: Voltage Above Normal
29–4	Accelerator Pedal Position #3: Voltage Below Normal
29–8	Accelerator Pedal Position #2: Abnormal Frequency, Pulse Width or Cycle
51–3	Engine Throttle Position: Voltage Above Normal
51–4	Engine Throttle Position: Voltage Below Normal
91–2	Accelerator Pedal Position #1: Data Erratic, Intermittent, or Incorrect
91–3	Accelerator Pedal Position #1: Voltage Above Normal
91–4	Accelerator Pedal Position #1: Voltage Below Normal
91–8	Accelerator Pedal Position #1: Abnormal Frequency, Pulse Width or Cycle
97–3	Water-in-fuel Indicator: Voltage Above Normal
97–15	Water-in-fuel Indicator: High - Least Severe Level (1)
97–16	Water-in-fuel Indicator: High - Moderately Severe Level (2)
98–1	Engine Oil Level: Low - Most Severe Level (3)
98–17	Engine Oil Level: Low - Least Severe Level (1)
98–18	Engine Oil Level: Low - Moderately Severe Level (2)
100–1	Engine Oil Pressure: Low - Most Severe Level (3)
100–2	Engine Oil Pressure - Data Erratic, Intermittent, or Incorrect
102–16	Engine Intake Manifold #1 Pressure: High - Medium Severe Level (2)
102–18	Engine Intake Manifold #1 Pressure: Low - Moderately Severe Level (2)
105–0	Engine Intake Manifold #1 Temperature: High - Most Severe Level (3)
105–3	Engine Intake Manifold #1 Temperature: Voltage Above Normal
105–4	Engine Intake Manifold #1 Temperature: Voltage Below Normal
105–15	Engine Intake Manifold #1 Temperature: High - Least Severe Level (1)
105–16	Engine Intake Manifold #1 Temperature: High - Moderately Severe Level (2)
107–3	Engine Air Cleaner 1 Pressure Difference: Voltage Above Normal
107–4	Engine Air Cleaner 1 Pressure Difference: Voltage Below Normal
107–15	Engine Air Cleaner 1 Pressure Difference: High - Least Severe Level (1)
107–16	Engine Air Cleaner 1 Pressure Difference: High - Moderately Severe Level (2)
108–12	Atmospheric Pressure: Fault
110–0	Engine Coolant Temperature: High - Most Severe Level (3)
110–3	Engine Coolant Temperature: Voltage Above Normal
110–4	Engine Coolant Temperature: Voltage Below Normal
110–15	Engine Coolant Temperature: High - Least Severe Level (1)
110–16	Engine Coolant Temperature: High - Moderately Severe Level (2)
111–1	Engine Coolant Level: Low - Most Severe Level (3)
111–17	Engine Coolant Level: Low - Least Severe Level (1)

111–18	Engine Coolant Level: Low - Moderately Severe Level (2)
157–3	Engine Fuel Injector Metering Rail #1 Pressure: Voltage Above Normal
157–4	Engine Fuel Injector Metering Rail #1 Pressure: Voltage Below Normal
157–12	Engine Fuel Injector Metering Rail #1 Pressure: Fault
157–16	Engine Fuel Injector Metering Rail #1 Pressure: High - Medium Severe Level (2)
157–18	Engine Fuel Injector Metering Rail #1 Pressure: Low - Medium Severe Level (2)
168–15	Battery Potential/Power Input #1: High - Least Severe Level (1)
168–17	Battery Potential/Power Input #1: Low - Least Severe Level (1)
168–31	Battery Potential/Power Input #1
172–3	Engine Intake Air Temperature: Voltage Above Normal
172–4	Engine Intake Air Temperature: Voltage Below Normal
174–3	Engine Fuel Temperature 1: Voltage Above Normal
174–4	Engine Fuel Temperature 1: Voltage Below Normal
174–16	Engine Fuel Temperature 1: High - Moderately Severe Level (2)
177–0	Transmission Oil Temperature: High - Most Severe Level (3)
177–3	Transmission Oil Temperature: Voltage Above Normal
177–4	Transmission Oil Temperature: Voltage Below Normal
177–15	Transmission Oil Temperature: High - Least Severe Level (1)
177–16	Transmission Oil Temperature: High - Moderately Severe Level (2)
190–0	Engine Speed: High - Most Severe Level (3)
190–8	Engine Speed: Abnormal Frequency, Pulse Width or Cycle
190–10	Engine Speed: Abnormal Rate of Change
190–15	Engine Speed: High - Least Severe Level (1)
411–3	EGR Pressure Difference: Voltage Above Normal
411–4	EGR Pressure Difference: Voltage Below Normal
411–13	EGR Pressure Difference: Out of Calibration
412–3	EGR Temperature: Voltage Above Normal
412–4	EGR Temperature: Voltage Below Normal
412–15	EGR Temperature: High - Least Severe Level (1)
412–16	EGR Temperature: High - Moderately Severe Level (2)
441–0	Auxiliary Temperature #1: High - Most Severe Level (3)
441–3	Auxiliary Temperature #1: Voltage Above Normal
441–4	Auxiliary Temperature #1: Voltage Below Normal
441–15	Auxiliary Temperature #1: High - Least Severe Level (1)
441–16	Auxiliary Temperature #1: High - Moderately Severe Level (2)
558–2	Accelerator Pedal #1 Low Idle Switch: Data Erratic, Intermittent, or Incorrect
593–31	Engine Idle Stop OFF
594–0	Engine Idle Stop Operator Reminder Mode: High - Most Severe Level (3)
594–31	Engine Idle Stop Drive Warning Mode
626–5	Engine Start Activation Device 1: Current Below Normal
626–6	Engine Start Activation Device 1: Current Above Normal
630-2	Calibration Memory: Data Erratic, Intermittent, or Incorrect

631–2	Custom Module: Data Erratic, Intermittent, or Incorrect
637–11	Engine Timing Sensor: Other Failure Modes
639–9	J1939 Network #1: Abnormal Update Rate
639–14	J1939 Network #1: Special Instructions
651–2	Engine #01 Cylinder Fuel injector: Data Erratic, Intermittent, or Incorrect
651–5	Engine #01 Cylinder Fuel injector: Current Below Normal
651–6	Engine #01 Cylinder Fuel Injector: Current Above Normal
652–2	Engine #02 Cylinder Fuel injector: Data Erratic, Intermittent, or Incorrect
652–5	Engine #02 Cylinder Fuel injector: Current Below Normal
652–6	Engine #02 Cylinder Fuel Injector: Current Above Normal
653–2	Engine #03 Cylinder Fuel injector: Data Erratic, Intermittent, or Incorrect
653–5	Engine #03 Cylinder Fuel injector: Current Below Normal
653–6	Engine #03 Cylinder Fuel Injector: Current Above Normal
654–2	Engine #04 Cylinder Fuel injector: Data Erratic, Intermittent, or Incorrect
654–5	Engine #04 Cylinder Fuel injector: Current Below Normal
654–6	Engine #04 Cylinder Fuel Injector: Current Above Normal
676–5	Engine Glow Plug Relay: Current Below Normal
676–6	Engine Glow Plug Relay: Current Above Normal
677–5	Engine Starter Motor Relay: Current Above Normal
677–6	Engine Starter Motor Relay: Current Below Normal
723–8	Engine Speed Sensor #2: Abnormal Frequency, Pulse Width or Cycle
977–5	Fan Drive Status: Current Below Normal
977–6	Fan Drive Status: Current Above Normal
1075–5	Electric Fuel Delivery Pump for Engine Fuel Supply: Current Below Normal
1075–6	Electric Fuel Delivery Pump for Engine Fuel Supply: Current Above Normal
1076–5	Engine Fuel Injection Pump Fuel Control Valve: Current Below Normal
1076–6	Engine Fuel Injection Pump Fuel Control Valve: Current Above Normal
1188–3	Engine Turbocharger #1 Wastegate Drive: Current Above Normal
1188–4	Engine Turbocharger #1 Wastegate Drive: Current Below Normal
1188–7	Engine Turbocharger #1 Wastegate Drive: Incorrect Response
1235–9	J1939 Network #3: Abnormal Update Rate
1387–0	Auxiliary Pressure #1: High - Most Severe Level (3)
1387–1	Auxiliary Pressure #1: Low - Most Severe Level (3)
1387–3	Auxiliary Pressure #1: Voltage Above Normal
1387–4	Auxiliary Pressure #1: Voltage Below Normal
1387–15	Auxiliary Pressure #1: High - Least Severe Level (1)
1387–16	Auxiliary Pressure #1: High - Moderately Severe Level (2)
1387–17	Auxiliary Pressure #1: Low - Least Severe Level (1)
1387–18	Auxiliary Pressure #1: Low - Moderately Severe Level (2)
1639–17	Fan Speed: Low - Least Severe Level (1)
1664–31	Engine Auto Start Failure
1761–1	EGR #1 DEF Tank Capacity #1: Low - Most Severe Level

1761–2	EGR #1 DEF Tank Capacity #1: Data Erratic, Intermittent, or Incorrect
1761–12	EGR #1 DEF Tank Capacity #1: Fault
1761–17	EGR #1 DEF Tank Capacity #1: Low - Least Severe Level (1)
1761–18	EGR #1 DEF Tank Capacity #1: Low - Moderately Severe Level (2)
2630–3	Engine Filling Air Cooler Outlet Temperature: Voltage Above Normal
2630–4	Engine Filling Air Cooler Outlet Temperature: Voltage Below Normal
2659–7	EGR Mass Flow: Incorrect Response
2791–5	EGR Valve Control: Current Below Normal
2791–6	EGR Valve Control: Current Above Normal
2791–7	EGR Valve Control: Incorrect Response
2882–2	Engine Spare Rating Selection: Data Erratic, Intermittent, or Incorrect
2970–2	Accelerator Pedal #2 Low Idle Switch: Data Erratic, Intermittent, or Incorrect
3031–7	EGR #1 DEF Tank Temperature: Incorrect Response
3031–12	EGR #1 DEF Tank Temperature: Fault
3031–16	EGR #1 DEF Tank Temperature: High - Moderately Severe Level (2)
3031–18	EGR #1 DEF Tank Temperature: Low - Moderately Severe Level (2)
3216–7	EGR #1 Inlet NOx: Incorrect Response
3216–12	EGR #1 Inlet NOx: Fault
3217-16	EGR #1 Inlet O2: High - Moderately Severe Level (2)
3226–12	EGR #1 Outlet NOx: Fault
3227-16	EGR #1 Outlet O2: High - Moderately Severe Level (2)
3242–18	EGR #1 DPF Inlet Temperature: Low - Moderately Severe Level (2)
3251–1	EGR #1 DPF Pressure Difference: Low - Most Severe Level (3)
3251–3	EGR #1 DPF Pressure Difference: Voltage Above Normal
3251–4	EGR #1 DPF Pressure Difference: Voltage Below Normal
3251–13	EGR #1 DPF Pressure Difference: Out of Calibration
3251–16	EGR #1 DPF Pressure Difference: High - Moderately Severe Level (2)
3251–18	EGR #1 DPF Pressure Difference: Low - Moderately Severe Level (2)
3358–3	EGR Inlet Pressure: Voltage Above Normal
3358–4	EGR Inlet Pressure: Voltage Below Normal
3358–13	EGR Inlet Pressure: Out of Calibration
3361–5	EGR #1 DEF Metering Unit: Current Below Normal
3361–6	EGR #1 DEF Metering Unit: Current Above Normal
3361–7	EGR #1 DEF Metering Unit: Incorrect Response
3362–14	EGR #1 DEF Metering Unit Input Line: Special Instructions
3363–5	EGR #1 DEF Tank Heater: Current Below Normal
3363–6	EGR #1 DEF Tank Heater: Current Above Normal
3464–5	Engine Throttle Actuator 1 Control Command: Current Below Normal
3464–6	Engine Throttle Actuator 1 Control Command: Current Above Normal
3464–7	Engine Throttle Actuator 1 Control Command: Incorrect Response
3509–3	Sensor Power Supply Voltage 1: Voltage Above Normal
3509–4	Sensor Power Supply Voltage 1: Voltage Below Normal.

3510–3	Sensor Power Supply Voltage 2: Voltage Above Normal
3510–4	Sensor Power Supply Voltage 2: Voltage Below Normal.
3516–2	EGR #1 DEF Concentration: Data Erratic, Intermittent, or Incorrect
3516–11	EGR #1 DEF Concentration: Other Failure Modes
3516–12	EGR #1 DEF Concentration: Fault
3516–15	EGR #1 DEF Concentration: High - Least Severe Level (1)
3516–18	EGR #1 DEF Concentration: Low - Moderately Severe Level (2)
3563–3	Engine Intake Manifold #1 Absolute Pressure: Voltage Above Normal
3563–4	Engine Intake Manifold #1 Absolute Pressure: Voltage Below Normal
3563–13	Engine Intake Manifold #1 Absolute Pressure: Out of Calibration
3609–3	DPF #1 Inlet Pressure: Voltage Above Normal
3609–4	DPF #1 Inlet Pressure: Voltage Below Normal
3609–13	DPF #1 Inlet Pressure: Out of Calibration
3714–31	DPF Active Regeneration Suppressed due to Temporary System Lock
3715–31	DPF Active Regeneration Suppressed due to Permanent System Lock
3719–0	DPF #1 Soot Load Percent: High - Most Severe Level (3)
3719–16	DPF #1 Soot Load Percent: High - Moderately Severe Level (2)
4334–3	EGR 1 DEF Metering Valve Absolute Pressure: Voltage Above normal
4334–4	EGR 1 DEF Metering Valve Absolute Pressure: Voltage Below Normal
4334–7	EGR 1 DEF Metering Valve Absolute Pressure: Incorrect Response
4334–15	EGR #1 DEF #1 Pressure (Absolute): High - Least Severe Level
4334–16	EGR #1 DEF #1 Pressure (Absolute): High - Moderately Severe Level (2)
4334–18	EGR #1 DEF #1 Pressure (Absolute): Low - Moderately Severe Level (2)
4337–8	EGR #1 DEF Metering Valve #1 Temperature: Abnormal Frequency, Pulse Width or Cycle
4354–5	EGR #1 DEF Line Heater #1: Current Below Normal
4354–6	EGR #1 DEF Line Heater #1: Current Above Normal
4355–5	EGR #1 DEF Line Heater #2: Current Below Normal
4355–6	EGR #1 DEF Line Heater #2: Current Above Normal
4356–5	EGR #1 DEF Line Heater #3: Current Below Normal
4356–6	EGR #1 DEF Line Heater #3: Current Above Normal
4360–10	EGR #1 SCR Catalyst Inlet Temperature: Abnormal Rate of Change
4360–16	EGR #1 SCR Catalyst Inlet Temperature: High - Moderately Severe Level
4360–17	EGR #1 SCR Catalyst Inlet Temperature: Low - Least Severe Level (1)
4360–18	EGR #1 SCR Catalyst Inlet Temperature: Low - Moderately Severe Level (2)
4364–2	EGR #1 SCR Catalyst Conversion Efficiency: Data Erratic, Intermittent, or Incorrect
4364–18	EGR #1 SCR Catalyst Conversion Efficiency: Low - Moderately Severe Level (2)
4374–3	EGR #1 DEF Pump #1 Motor Speed: Voltage Above Normal
4374–4	EGR #1 DEF Pump #1 Motor Speed: Voltage Above Normal
4374–5	EGR #1 DEF Pump #1 Motor Speed: Voltage Below Normal
4374–6	EGR #1 DEF Pump #1 Motor Speed: Current Below Normal
4374–8	EGR #1 DEF Pump #1 Motor Speed: Current Above Normal
4376–5	EGR #1 DEF Pump #1 Motor Speed: Abnormal Frequency, Pulse Width or Cycle

4376–6	EGR #1 DEF Return Valve: Current Below Normal
4376–7	EGR #1 DEF Return Valve: Current Above Normal
4376–14	EGR #1 DEF Return Valve: Incorrect Response
4750–3	EGR #1 DEF Return Valve: Special Instructions
4750–4	EGR Cooler Inlet Temperature: Voltage Above Normal
4765–17	EGR Cooler Inlet Temperature: Voltage Below Normal
5246–0	EGR #1 DOC Inlet Temperature: Low - Least Severe Level (1)
5246–15	EGR SCR Operator Induction Severity: High - Most Severe Level (3)
5246–16	EGR SCR Operator Induction Severity: High - Least Severe Level (1)
5298–17	EGR SCR Operator Induction Severity: High - Moderately Severe Level (2)
5392–31	EGR 1 DOC Conversion Efficiency: Low - Least Severe Level (1)
5421–5	EGR #1 DEF Metering Unit #1: Charge Loss
5421–6	Engine Turbocharger Wastegate Actuator #1: Current Below Normal
5571–0	Engine Turbocharger Wastegate Actuator #1: Current Above Normal
5742–12	High-pressure Common Rail Fuel Pressure Relief Valve: High - Most Severe Level (3)
5743–12	EGR DPF Temperature Sensor Module: Fault
5758–11	EGR 1 SCR Temperature Sensor Module: Fault
5759–11	EGR #1 Inlet Gas Sensor Power Supply: Other Failure Modes
5798–7	EGR #1 Outlet Gas Sensor Power Supply: Other Failure Modes
5965–5	EGR #1 DEF Metering Unit Heater Temperature: Incorrect Response
5965–6	EGR #1 DEF Control Module Relay Control: Current Below Normal
7105–31	EGR #1 DEF Control Module Relay Control: Current Above Normal
7343–31	EGR #1 Configuration Inconsistency Detected
8631–17	SCR Operator Induction Override Update Required
8631–18	Engine Turbocharger #1 Efficiency: Low - Least Severe Level

Kubota V3307-E3:

DTC	SPN	FMI	Detection item	DTC set parameter
Oil Pressure Error	100	1	Oil pressure switch	Despite rpm，oil pressure switch is on
Engine overheat	110	0	Overheat of engine water temperature	Engine water temperature ≥110 °C
Water temperature sensor: High	110	3	Open circuit of sensor / harness, + B short circuit	Voltage of coolant temperature sensor is 4.9 V or above
Water temperature sensor: Low	110	4	Ground short circuit of sensor / harness	Voltage of coolant temperature sensor is 0.1 V or less
Battery voltage: High	158	3	Open circuit, short circuit, or damage of harness. Failure of battery	ECU recognition of battery voltage is above 18 V.
Engine overrun	190	0	Engine speed exceeds threshold speed	Engine speed >(1.15*speed)min-1 (rpm)
Sensor supply voltage 1: Low	3509	4	Sensor supply voltage 1	Voltage to sensor is below 4.00 V
Actuator Abnormal	523771	2	Open circuit, short circuit, or damage of harness.	Actuator current >3.0A or < 80mA
Engine Speed Sensor Abnormal	523772	2	Open circuit, short circuit, or damage of harness.	Engine speed = 0 min-1 (rpm) and alternator L terminal has voltage, after engine start.
Starter error	523736	2	Starter running time exceed threshold time	Starter running time is above 12 sec
Alternator L, terminal Abnormal	523737	2	Open circuit，short circuit, or damage of harness	Alternator L terminal has voltage while engine 0 rpm （after key on）
Charging failure	523738	2	Open circuit，short circuit, or damage of harness	Alternator L terminal is 0V while engine is running
Speed sensor pulse abnormal	523740	2	Engine speed sensor pulse abnormal	Less than correct gear tooth number
CAN Communication Abnormal	523774	2	CAN bus	CAN bus off
Emergency stop	-	-	Emergency stop switch	Emergency stop CAN signal into ECU
+B disconnection	523749	2	+B disconnection	+B disconnection before key off

Kubota V3307-CR-E5:

DTC Description	SPN	FMI	Inspection Item	DTC Set Parameter
NE-G Phase Shift	636	7	Large phase shift between NE (crankshaft position sensor) pulse and G (camshaft position sensor) pulse	Phase difference between NE pulse and G pulse within +30 ~-20°
IAT Sensor Integrated MAF Sensor: Low	171	4	Sensor / harness shorted to ground	IAT sensor integrated MAF sensor voltage: Below 0.2 V
IAT Sensor Integrated MAF Sensor: High	171	3	Sensor/harness open or shorted to +B	IAT sensor integrated MAF sensor voltage: Above 4.85 V
PLV Emergency Open	633	7	PLV emergency open	PLV is opened in emergency; Engine speed is greater than 700 min-1 (rpm)
High Rail Pressure	157	0	Actual pressure above the command pressure	Rail pressure sensor is normal; Sensor supply voltage VCC # is normal
SCV (MPROP) Stuck	1347	7	SCV stuck in the open position (the actual rail pressure stays higher than the command pressure)	The drain request of the fuel supply pump drops below -730 mm^3/st, and the actual rail pressure is 20 MPa (100 kgf/cm^2, 1400 psi) higher than the command pressure
Fuel Leak (in High Pressure Fuel System)	1239	1	Fuel leak in high pressure fuel system (This fault will be detected when the fuel consumption is too high, which is calculated from the fuel pressure difference before and after the fuel injection)	The pump fully supplies fuel; The deviation between the actual rail pressure and the target pressure is greater than 20 MPa
Intake Air Flow: Low	132	1	Low engine intake air mass flow (with turbo-blower intake hose disconnected)	Engine intake air mass flow: Below 50% of the target value
MAF Sensor: Low	132	4	Sensor/harness open or shorted to ground	MAF sensor voltage: Below 0.1 V
MAF Sensor: High	132	3	Sensor/harness shorted to +B	MAF sensor voltage: Above 4.9 V under normal operating conditions
Intake Air Temperature Error: Low	172	4	Sensor/harness shorted to ground	IAT sensor voltage: Below 0.2 V
Intake Air Temperature Error: High	172	3	Sensor/harness open or shorted to +B	IAT sensor voltage: Above 4.95 V
Coolant Temperature Sensor: Low	110	4	Sensor/harness shorted to ground	Coolant temperature sensor voltage: Below 0.176 V
Coolant Temperature Sensor: High	110	3	Sensor/harness open or shorted to +B	Coolant temperature sensor voltage: Above 4.870 V
Rail Pressure Sensor: Low	157	4	Sensor/harness shorted to ground; Sensor failure	Rail pressure sensor voltage: Below 0.065 V
Rail Pressure Sensor: High	157	3	Sensor/harness open or shorted to +B; Sensor failure	Rail pressure sensor voltage: Above 3.235 V
Injector Charge Voltage: High	523535	0	Injector Charge Voltage: High	Injector Charge Voltage: High

No.1 Cylinder Injector Harness/Coil Open Circuit	651	3	Harness open circuit; Injector coil open circuit	Harness or injector coil open circuit
No.3 Cylinder Injector Harness/Coil Open Circuit	653	3	Harness open circuit; Injector coil open circuit	Harness or injector coil open circuit
No.4 Cylinder Injector Harness/Coil Open Circuit	654	3	Harness open circuit; Injector coil open circuit	Harness open circuit; Injector coil open circuit
No.2 Cylinder Injector Harness/Coil Open Circuit	652	3	Harness or injector coil open circuit	Harness or injector coil open circuit
Engine Overheat	110	0	Engine coolant overtemperature	Engine coolant temperature ≥ 120℃ (248℉)
Engine Overrun	190	0	Engine speed above threshold	Engine speed ≥ 3500 min^{-1} (rpm)
Boost Pressure Sensor: Low	102	4	Sensor/harness shorted to ground; Sensor failure	Boost pressure sensor voltage below 0.2 V
Boost Pressure Sensor: High	102	3	Sensor/harness open or shorted to +B; Sensor failure	Boost pressure sensor voltage above 4.9 V
No Pulse Input from NE Sensor (Crankshaft Position Sensor)	636	8	Sensor/harness open circuit or short circuit; Sensor failure	Failure to recognize NE sensor pulse
NE Sensor (Crankshaft Position Sensor) Pulse Number Error	636	2	Sensor/harness open circuit or short circuit; Sensor failure	Pulse count per revolution is not 58 teeth
No Pulse Input from G Sensor (Camshaft Position Sensor)	723	8	Sensor/harness open circuit or short circuit; Sensor failure	Sensor/harness open circuit or short circuit; Sensor failure
G Sensor (Camshaft Position Sensor) Pulse Number Error	723	2	Failure to recognize G sensor pulse	Pulse count per revolution is not 3 teeth
Glow Plug Relay Drive Circuit Open	676	5	Intake air glow plug relay open circuit	Harness open circuit, or relay coil open circuit
Drive Circuit Shorted to +B	523544	3	Drive circuit shorted to +B	Harness shorted to +B
Glow Plug Relay Drive Circuit Shorted to Ground	523544	4	Intake air glow plug relay drive circuit shorted to ground	Harness shorted to ground
Glow Heater Relay Drive Circuit Overheat	676	0	Glow plug drive circuit overheat	Glow plug relay coil resistance or load above the specified value in ECU
EGR Actuator Open Circuit	523574	3	EGR actuator open circuit	EGR actuator open-circuit error signal received via CAN
EGR Actuator Coil Short Circuit	523574	4	EGR actuator coil short circuit	EGR actuator coil short-circuit error received via CAN
EGR Position Sensor Failure	523572	4	EGR position sensor failure	EGR position sensor error signal received via CAN
Oil Pressure Error	100	1	Oil pressure switch	Oil pressure switch ON: ＞ 1 s
Exhaust Gas Temperature Sensor 1: Low	3242	4	Sensor/harness shorted to ground	Diesel particulate filter (hereinafter referred to as the "DPF") inlet temperature sensor (T1) voltage: Below 0.08 V
Exhaust Gas Temperature Sensor	3242	3	Sensor/harness open or shorted	DPF inlet temperature

1: High			to +B	sensor (T1) voltage: Above 4.92 V
Exhaust Gas Temperature Sensor 0: Low	4765	4	Sensor/harness shorted to ground	DOC inlet temperature sensor (T0) voltage: Below 0.08 V
Exhaust Gas Temperature Sensor 0: High	4765	3	Sensor/harness open or shorted to +B	DOC inlet temperature sensor (T0) voltage: Above 4.92 V
Battery Voltage: Low	168	4	Harness open circuit, short circuit or damage; Battery failure	The battery voltage identified by the ECU in the 12 V system is below 8 V, and is not monitored during startup.
Battery Voltage: High	168	3	Harness open circuit, short circuit or damage; Battery failure	The battery voltage identified by ECU in the 12 V system is above 16 V.
QR (IQA) Data Error	523538	2	QR Data Read Error	Read error of QR data from EEPROM
No QR (IQA) Data	523538	7	QR data not written	Area of QR data on EEPROM is vacant
ECU Flash-ROM Error	628	2	Flash ROM error	● Checksum error ● Delete error ● Write error ● Read error
ECU CPU (Master IC) Error	1077	2	CPF and/or IC failure	Critical CPU and/or IC errors
ECU CPU (Monitoring IC) Error	523527	2	CPU Monitor IC Failure	CPU monitor IC failure
Injector Charge Voltage: Low	523525	1	Injector charge voltage: Low ECU charge circuit failure	Injector charge voltage: Low ECU charge circuit failure
SCV (MPROP) Open Circuit	1347	5	SCV open circuit	SCV open circuit
SCV (MPROP) Drive System Failure	1347	4	SCV open or shorted to ground	SCV open or shorted to ground
SCV (MPROP) Shorted to +B	1347	3	SCV shorted to +B	SCV shorted to +B
Injector Driver IC Error or Open Circuit	1077	12	Injector driver IC error, or No. 1 & No. 4 cylinder injector open circuit, or No. 2 & No.3 cylinder injector open circuit	Injector driver IC error, or No. 1 & No. 4 cylinder injector open circuit, or No. 2 & No.3 cylinder injector open circuit
Injector Driver IC Short Circuit	523605	6	Intake air glow plug relay open circuit	Injector IC error reported
Sensor Supply Voltage 1: Low	3509	4	Sensor supply voltage 1 error or recognition error	Sensor supply voltage below 4.75 V
Sensor Supply Voltage 1: High	3509	3	Sensor supply voltage 1 error or recognition error	Sensor supply voltage above 5.25 V
Sensor Supply Voltage 2: Low	3510	4	Sensor supply voltage 2 error or recognition error	Sensor supply voltage below 4.75 V
Sensor Supply Voltage 2: High	3510	3	Sensor supply voltage 2 error or recognition error	Sensor supply voltage above 5.25 V
Sensor Supply Voltage 3: Low	3511	4	Sensor supply voltage 3 error or recognition error	Sensor supply voltage below 4.75 V
Sensor Supply Voltage 3: High	3511	3	Sensor supply voltage 3 error or recognition error	Sensor supply voltage above 5.25 V
Main Relay Locked in Closed Position	1485	2	Main relay failure	The main relay stays on for more than 1 s with no

				command given
Starter Motor Relay Drive Circuit Shorted to Ground	677	4	Starter motor relay drive circuit shorted to ground	Harness shorted to ground
EEPROM Checksum Error	523700	13	KBT-EEPROM checksum error	EEPROM checksum error
Intake Throttle Feedback Error	523580	2	Intake throttle feedback error	Throttle position deviation is not corrected after 20 load error recovery operations
Accelerator Position Sensor 1: Low	91	4	Sensor/harness shorted to ground or open	Accelerator position sensor 1 voltage below 0.3 V
Accelerator Position Sensor 1: High	91	3	Short circuit to ground outside sensor/harness	Accelerator position sensor 1 voltage below 4.8 V
Accelerator Position Sensor 2: Low	29	4	Sensor/harness shorted to ground or open	Accelerator position sensor 2 voltage below 0.3V
Accelerator Position Sensor 2: High	29	3	Short circuit to ground outside sensor/harness	Accelerator position sensor 2 voltage below 4.8V
Accelerator Position Sensor Error (CAN)	523543	2	Accelerator position sensor error signal (sensor/harness open or shorted to ground, etc.)	Accelerator position sensor error signal received via CAN
Accelerator Position Sensor Association Error	91	2	Deviation with two designed sensor associations	Deviation with two designed sensor associations
No.1 & No.4 Cylinder Injector Shorted to Ground, or All Cylinder Injectors Shorted to Ground	523523	3	Harness shorted to ground	Harness shorted to ground
No.1 & No.4 Cylinder Injector Shorted to +B, or All Cylinder Injectors Shorted to +B	523523	3	Harness shorted to +B	Harness shorted to +B
No.2 & No.3 Cylinder Injector Shorted to Ground, or All Cylinder Injectors Shorted to Ground	523524	3	Harness shorted to ground	Harness shorted to ground
No.2 & No.3 Cylinder Injector Shorted to +B, or All Cylinder Injectors Shorted to +B	108	4	Harness shorted to +B	Harness shorted to +B
Barometric Pressure Sensor Failure (Low Side)	108	3	Sensor/ECU internal circuit shorted to ground	Barometric pressure sensor voltage: Below 0.2 V
Barometric Pressure Sensor Failure (High Side)	679	7	Sensor/ECU internal circuit shorted to +B	Barometric pressure sensor voltage: Above 4.850 V
PLV Not Opened	679	16	PLV not opened as the rail pressure remains unchanged or the engine power is not high enough	The opened PLV responds, but the rail pressure is still too high or too low
Rail Pressure Error After PLV Opening	523575	7	Rail pressure above 160 MPa after PLV is opened by error	PLV is opened (with open response detected); The rail pressure is within 50 MPa ~ 120 MPa
EGR (DC Motor) Overheat	523576	2	EGR (DC Motor) overheat	EGR (DC motor) temperature error signal (thermistor: 125℃) received via CAN
EGR (DC Motor) Temperature Sensor Failure	523577	2	EGR (DC Motor) temperature sensor failure	EGR (DC motor) temperature sensor error signal received via CAN
Exhaust Gas Temperature Sensor 2: Low	3246	4	Sensor/harness shorted to ground	DPF outlet temperature sensor (T2) voltage: Below 0.08 V

Exhaust Gas Temperature Sensor 2: High	3246	3	Sensor/harness open or shorted to +B	DPF outlet temperature sensor (T2) voltage: Above 4.92 V
Differential Pressure Sensor 1: Low	3251	4	Sensor/harness shorted to ground	DPF differential pressure sensor voltage: Below 0.2 V
Differential Pressure Sensor 1: High	3251	3	Sensor/harness open or shorted to +B	DPF differential pressure sensor voltage: Above 4.8 V
Intake Throttle Lift Sensor: Low	523582	4	Intake throttle lift sensor low	Intake throttle lift sensor voltage: Below 0.151 V
Intake Throttle Lift Sensor: High	523582	3	Intake throttle lift sensor high	Intake throttle lift sensor voltage: Above 4.848 V
Emission Deterioration	3252	0	DOC is heated up due to unburned fuel	T1 - T0 ≥ 250℃ (482℉)
Exhaust Gas Temperature Sensor 0: Emergency High	4765	0	DOC inlet temperature (T0) high	DOC inlet temperature (T0): Above 700℃ (1292℉)
Exhaust Gas Temperature Sensor 1: Emergency High	3242	0	DPF inlet temperature (T1) high	DPF inlet temperature (T1): Above 715℃ (1319℉)
Exhaust Gas Temperature Sensor 2: Emergency High	3246	0	DPF outlet temperature (T2) high	DPF outlet temperature (T2): Above 820℃ (1508℉)
Excessive PM3	3701	15	PM accumulation level 3	PM accumulation above trigger level Regeneration level = 3
Excessive PM4	3701	16	PM accumulation level 4	PM accumulation above trigger level Regeneration level = 4
Excessive PM5	3701	0	PM accumulation level 5	PM accumulation above trigger level Regeneration level = 5
Low Boost Pressure	132	15	Hose between turbo-blower outlet and inlet flanges disconnected Boost pressure sensor failure	Boost pressure sensor output below the target in high air flow operating condition
Low Coolant Temperature During Shutdown Regeneration	523589	17	Engine warm-up conditions not met during regeneration mode (Low coolant temperature)	Engine coolant temperature stays below 65℃ (149℉) for more than 1500 s during shutdown regeneration
Shutdown Regeneration Timeout	523590	16	Timeout error: Incomplete regeneration due to low DPF temperature	Regeneration not completed in 2700 s
All Exhaust Temperature Sensors Failure	523599	0	Simultaneous failure of all exhaust temperature sensors	Simultaneous failure of all exhaust temperature sensors (sensor low)
Emergency High Temperature: DTC Downstream Exhaust Gas Temperature High	523601	0	Outputs of exhaust temperature sensors 0, 1, 2	All exhaust gas temperatures (T0, T1 and T2) reduced to 300℃ (572℉)
High Regeneration Frequency	523602	0	Time interval from the end time to the start time of the regeneration	The regeneration time interval occurs three times continuously within 30 min
Overheat Prevention	523603	15	Coolant temperature	Engine coolant temperature ≥ 110℃ (230℉)
CAN2 Bus Off	523547	2	CAN2 shorted to +B/GND, or high traffic error	CAN2 Bus Off

No Communication with EGR	523578	2	No communication with EGR	CAN off
CAN1 Bus Off	523604	2	CAN1 shorted to +B/GND, or high traffic error	CAN1 Bus Off
CAN-KBT Frame Error	523548	2	CAN-KBT original frame open circuit	CAN2 KBT frame open circuit
CAN CCVS (Stop Switch and Vehicle Speed) Frame Error	523591	2	CAN_CCVS communication interruption	CAN CCVS frame timeout
CAN CM1 (Regeneration Switch) Frame Error	523592	2	CAN_CM1 communication interruption	CAN CM1 frame timeout
CAN ETC5 (Neutral Switch) Frame Error	523595	2	CAN_ETC5 communication interruption	CAN ETC 5 frame timeout
CAN TSC1 Frame Error	523596	2	CAN_TSC1 communication interruption	No “C1 cache" request initiated for 3 consecutive times after the override control request (non-0x00) is issued
CAN EBC1 Frame Error	523598	2	CAN_EBC1 communication interruption	CAN EBC1 frame timeout

1.11.6 Lubrication points indication

Lubrication point of the whole machine:

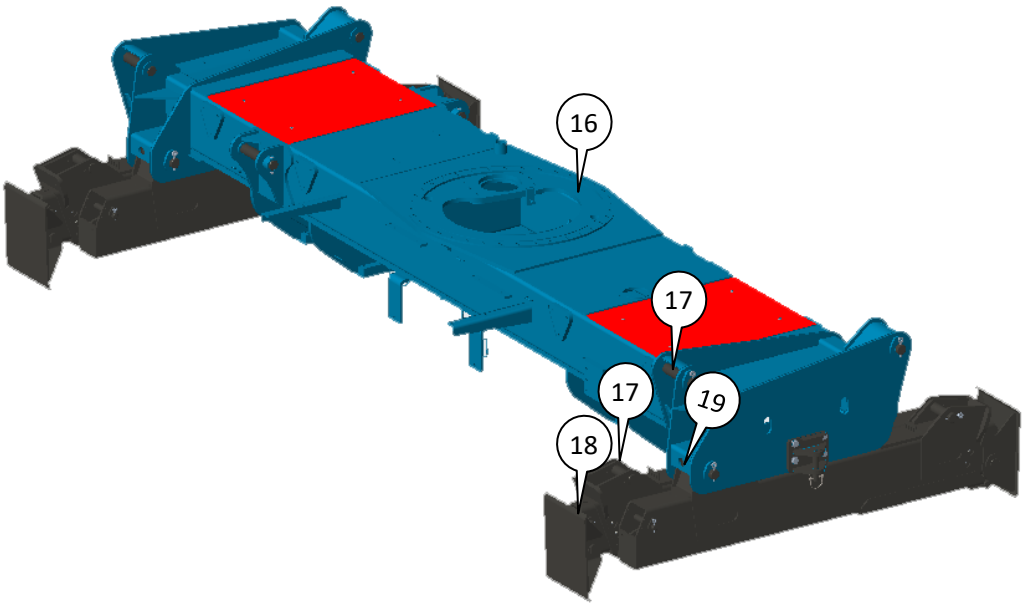
1. If work time is less than 50 h per week, then maintain it once a week.

2. If work continuously for a long time, the lubrication period is reduced to every 10 hours or every day.

No.	Location	Clockwise rotation joystick
1	Boom hinge lubrication point	2
2	Lower leveling cylinder lubrication point	2
3	Luffing cylinder lubrication point	2
4	Large roller axis pin lubrication point	2
5	Small roller axis pin lubrication point	1
6	Elevated flat cylinder lubrication point	2
7	Rotating lubrication point of auxiliary rack	2
8	Double axis pin lubrication point	1
9	Nylon axis pin shaft lubrication point	1
10	Body leveling cylinder lubrication point (If equipped)	2
11	Front outrigger cylinder lubrication point (If equipped)	4
12	Front outrigger swing lubrication point (If equipped)	2
13	Tire steering lubrication point	8
14	Swing lubrication points of front and rear axles	4
15	Propeller shaft lubrication point	6
16	Slewing mechanism lubrication point (If equipped)	1
17	Rear outrigger cylinder lubrication point (If equipped)	4
18	Rear outrigger swing lubrication point (If equipped)	2
19	Front / rear outrigger telescopic cylinder lubrication point (If equipped)	4

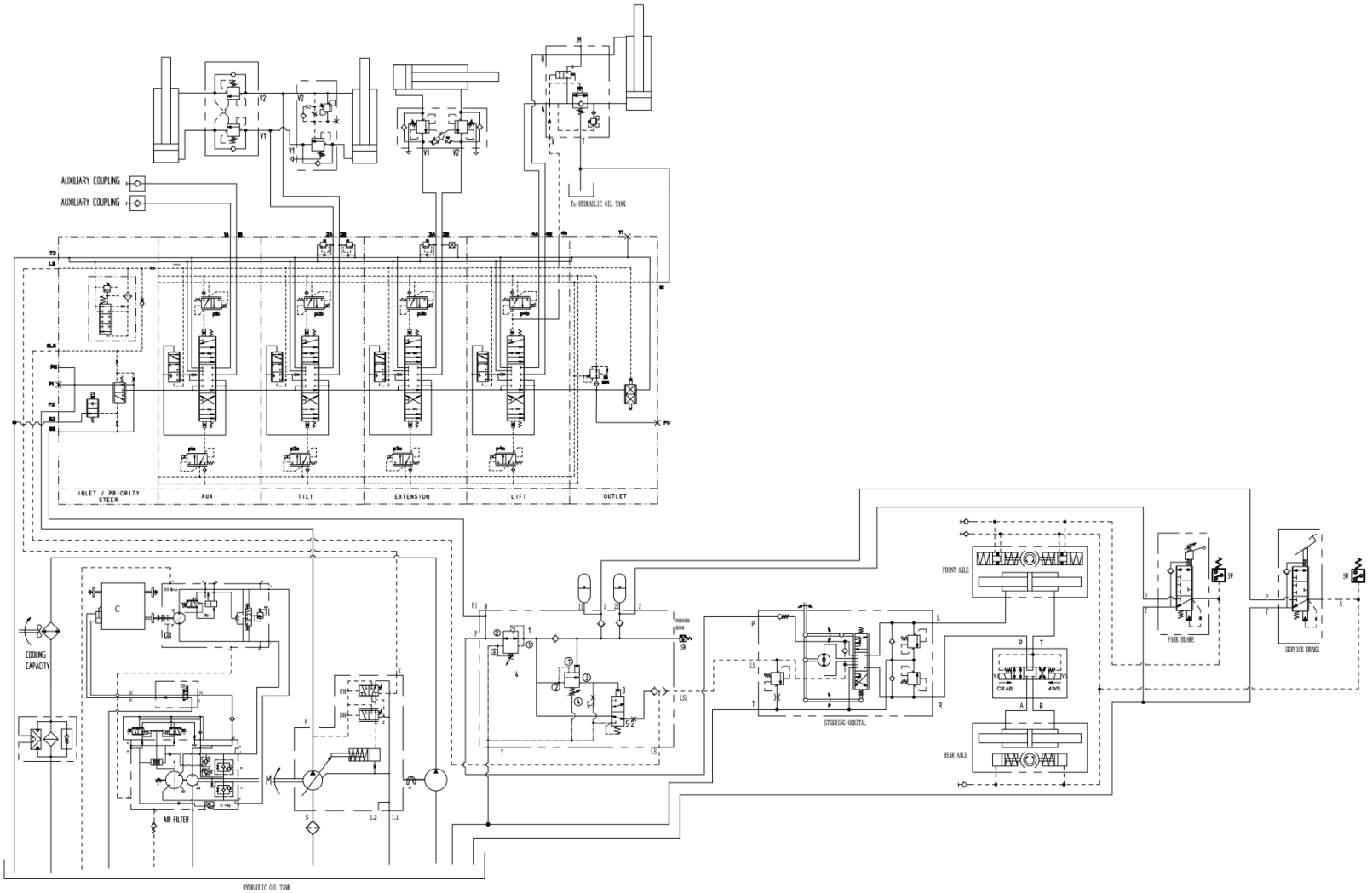
Take H1840 as an example

Only HR2150

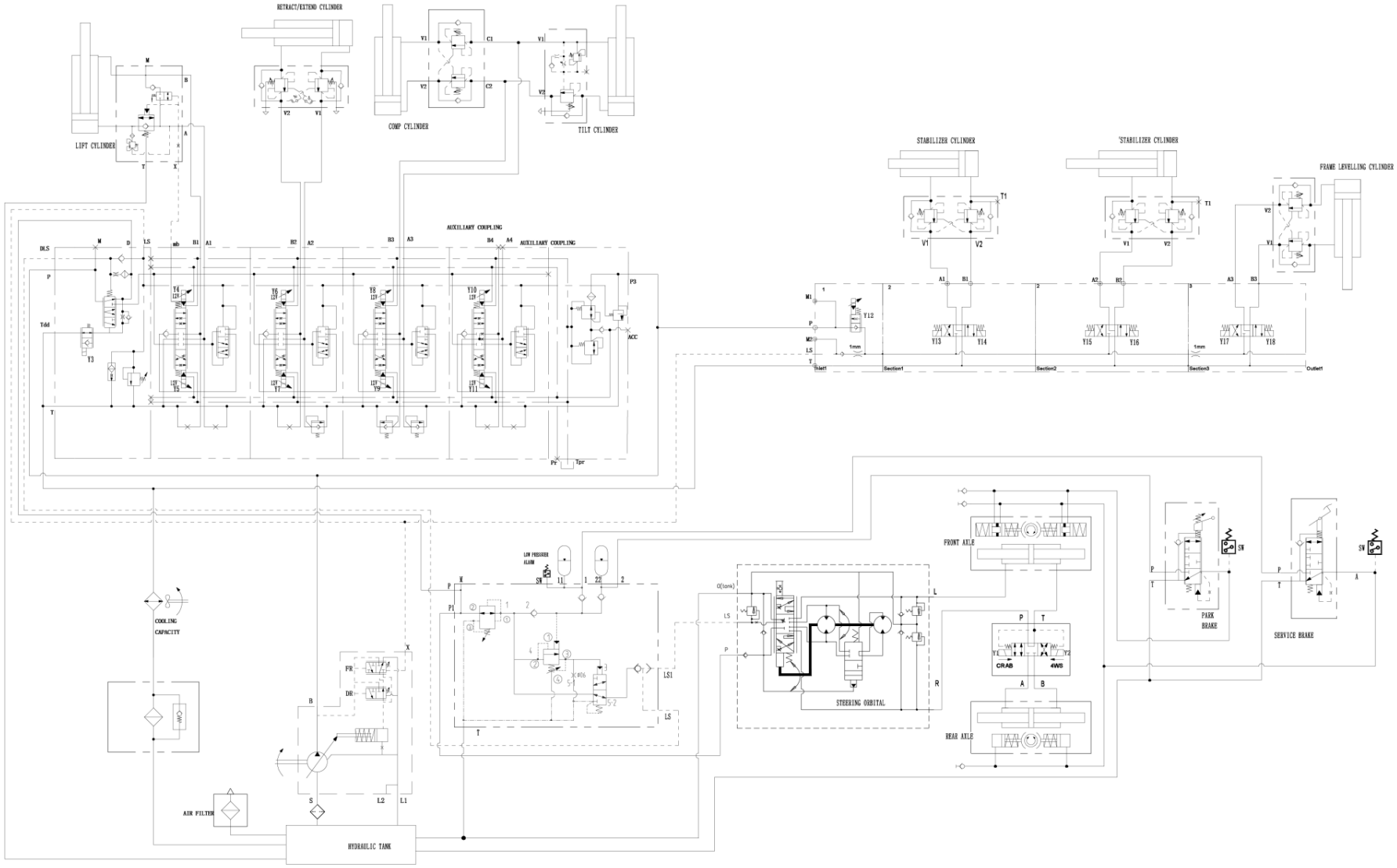


1.11.7 Hydraulic schematic diagram

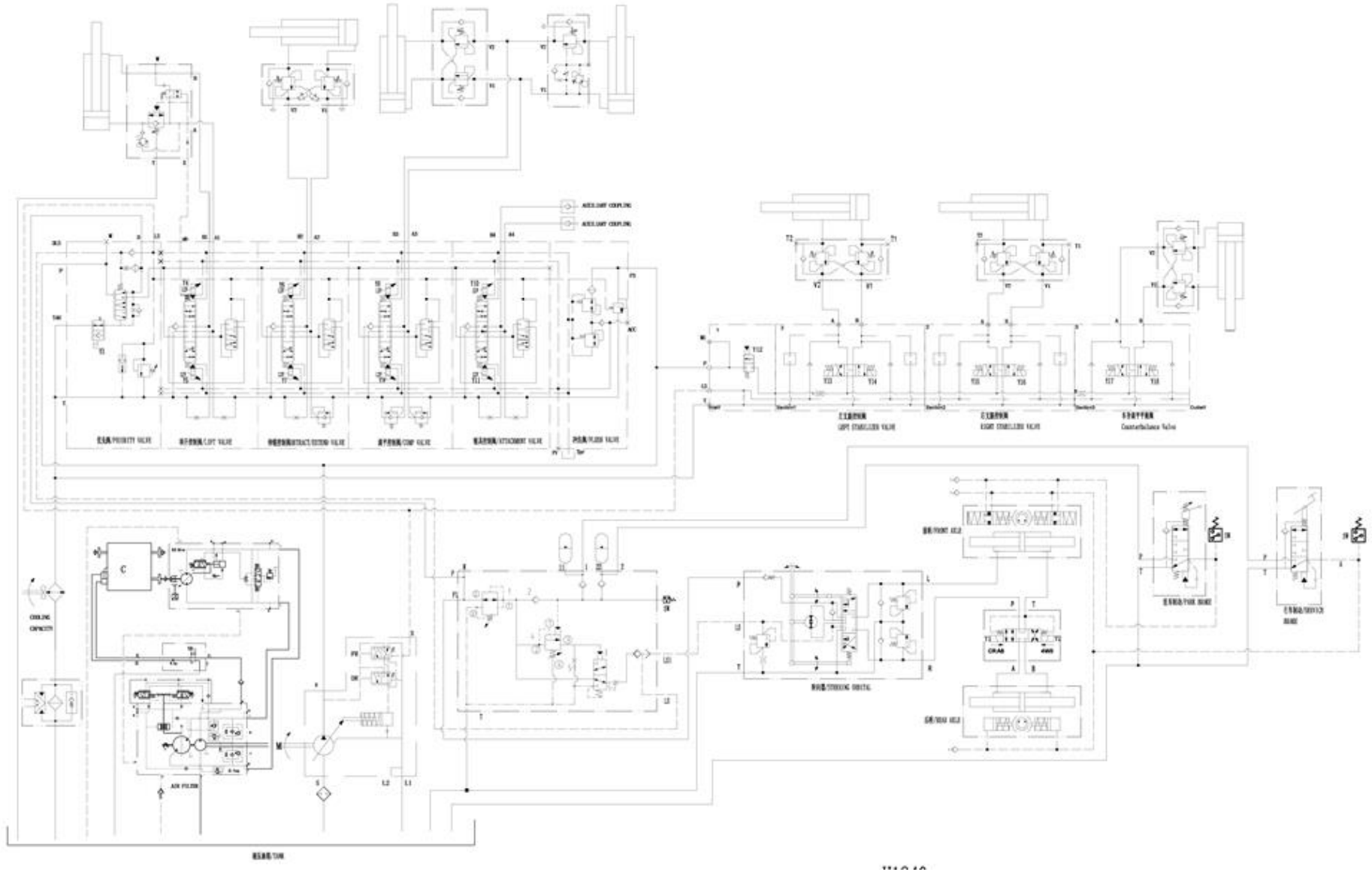
H735 Hydraulic schematic diagram

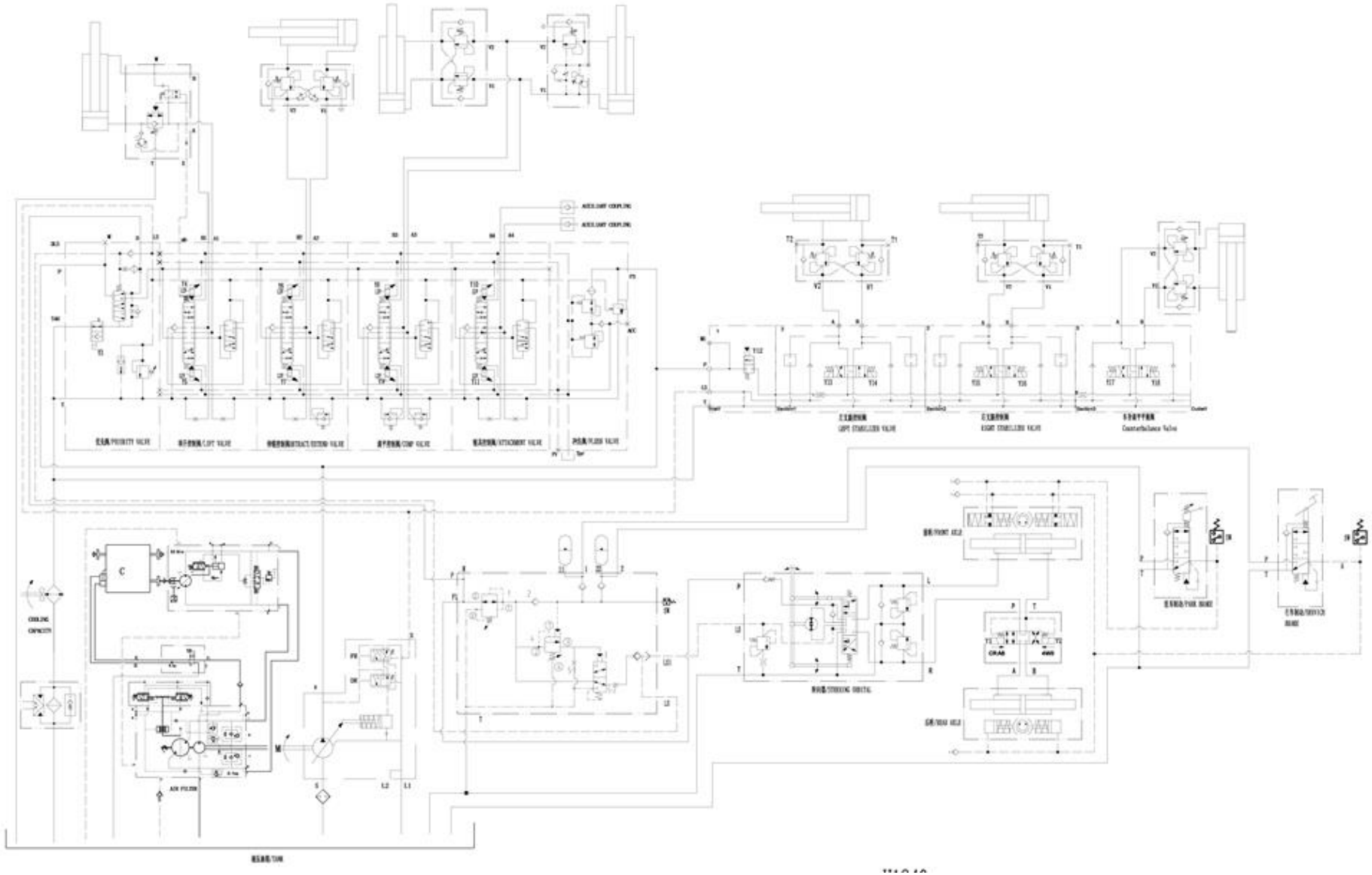


H1440/H1840 Hydraulic schematic diagram



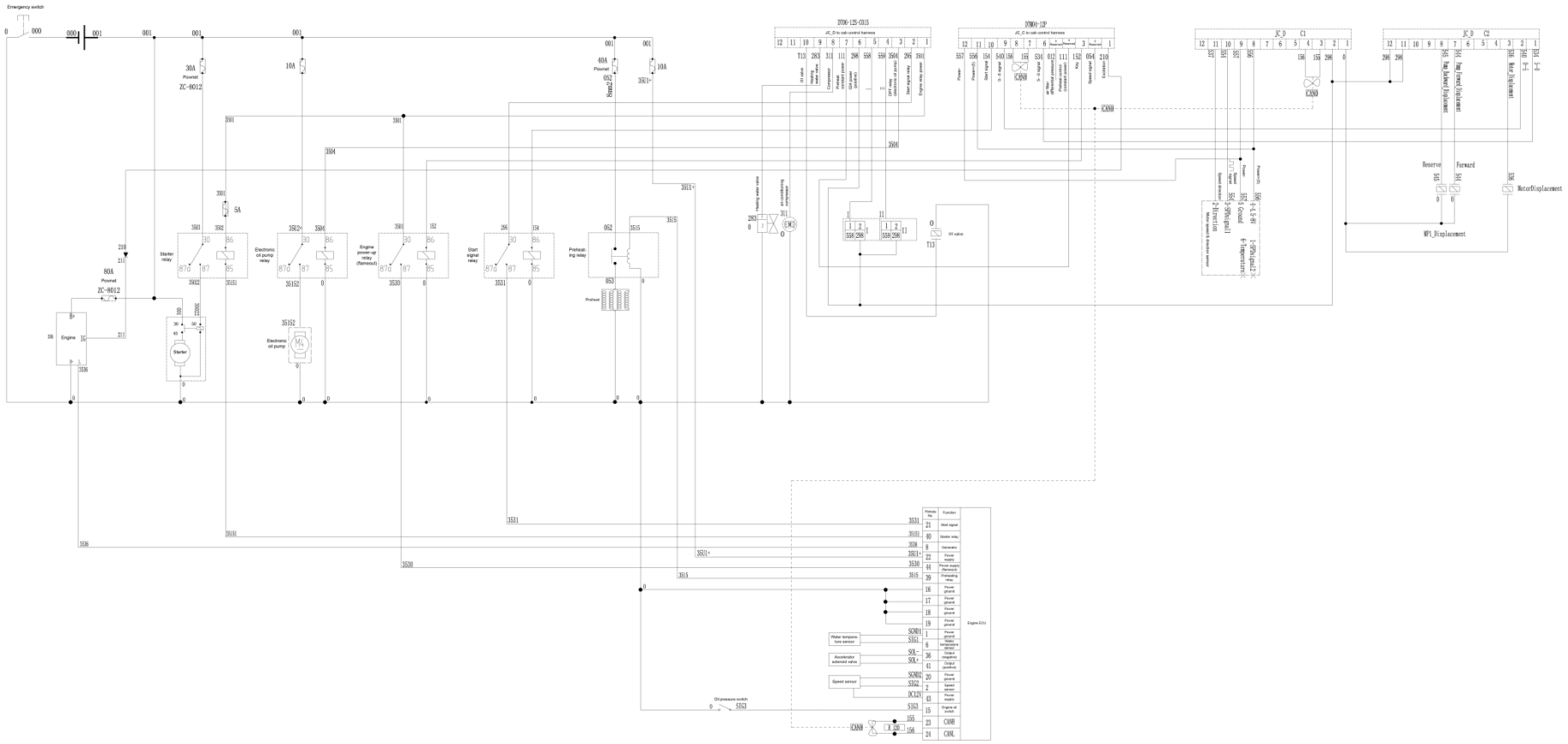
H1840 Hydraulic schematic diagram (If equipped)

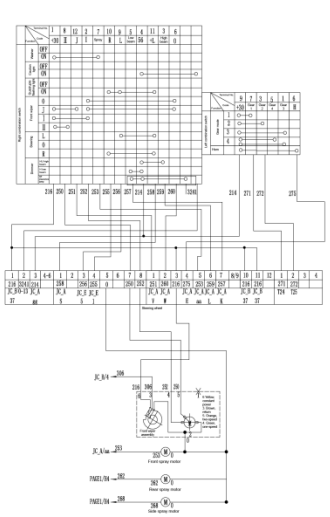


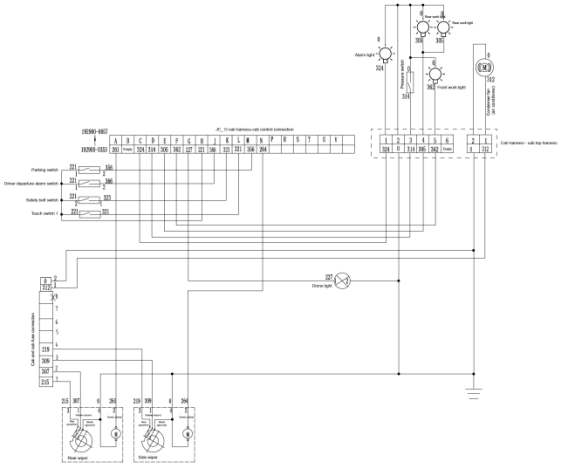


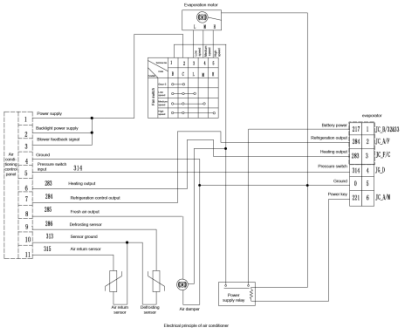
1.11.8 Electrical schematic diagram

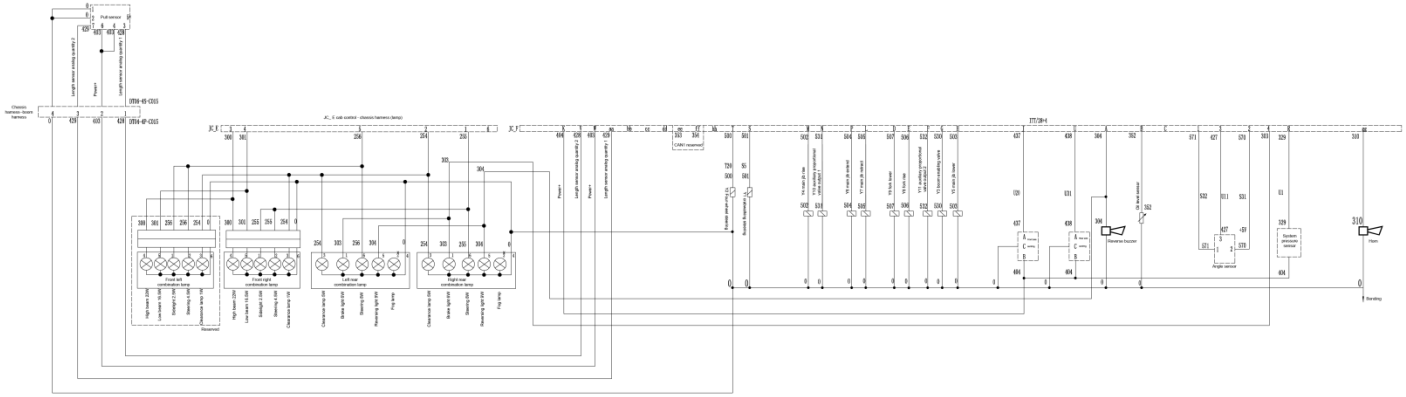
H735-EU stage Ⅲ:

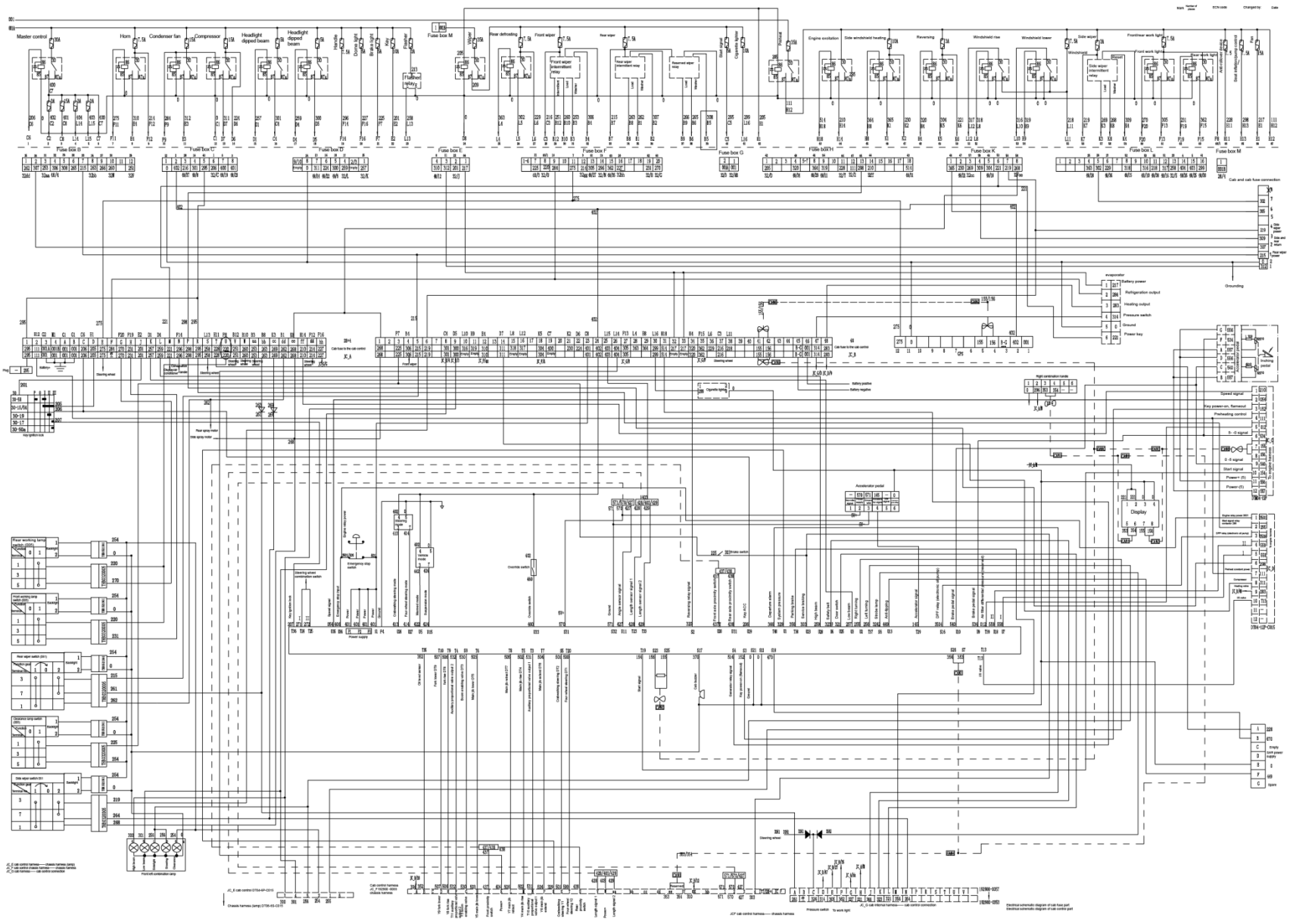




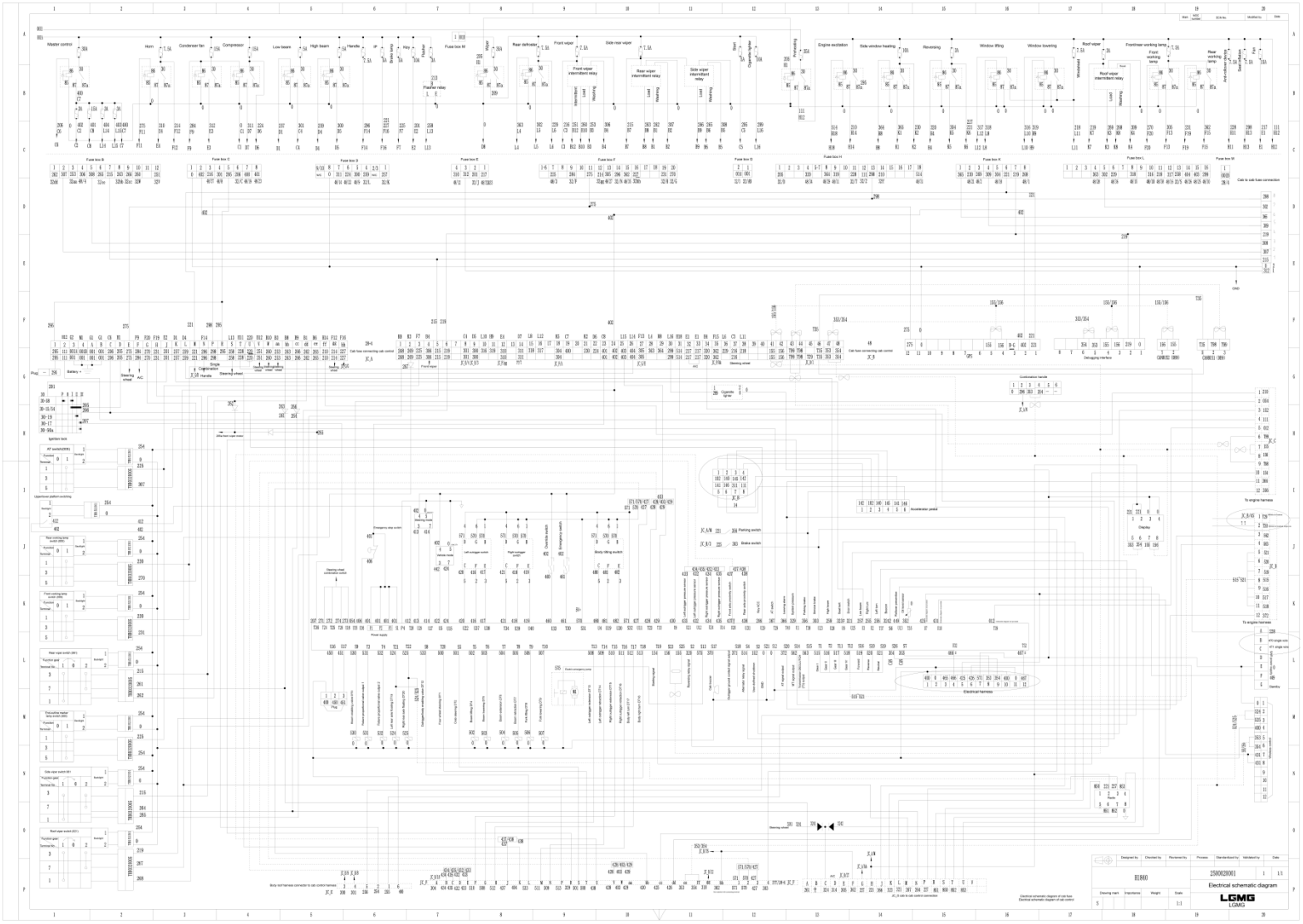


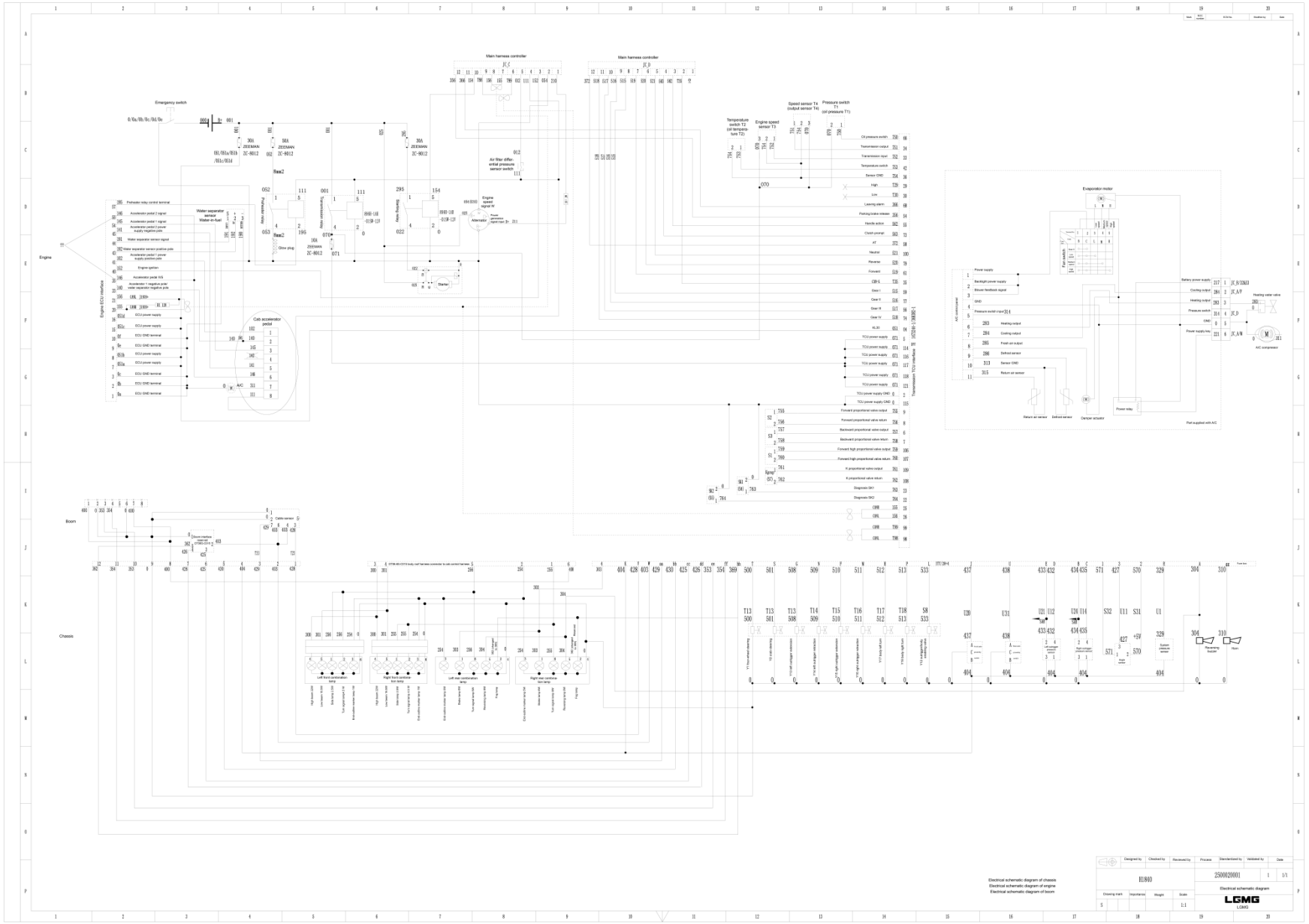


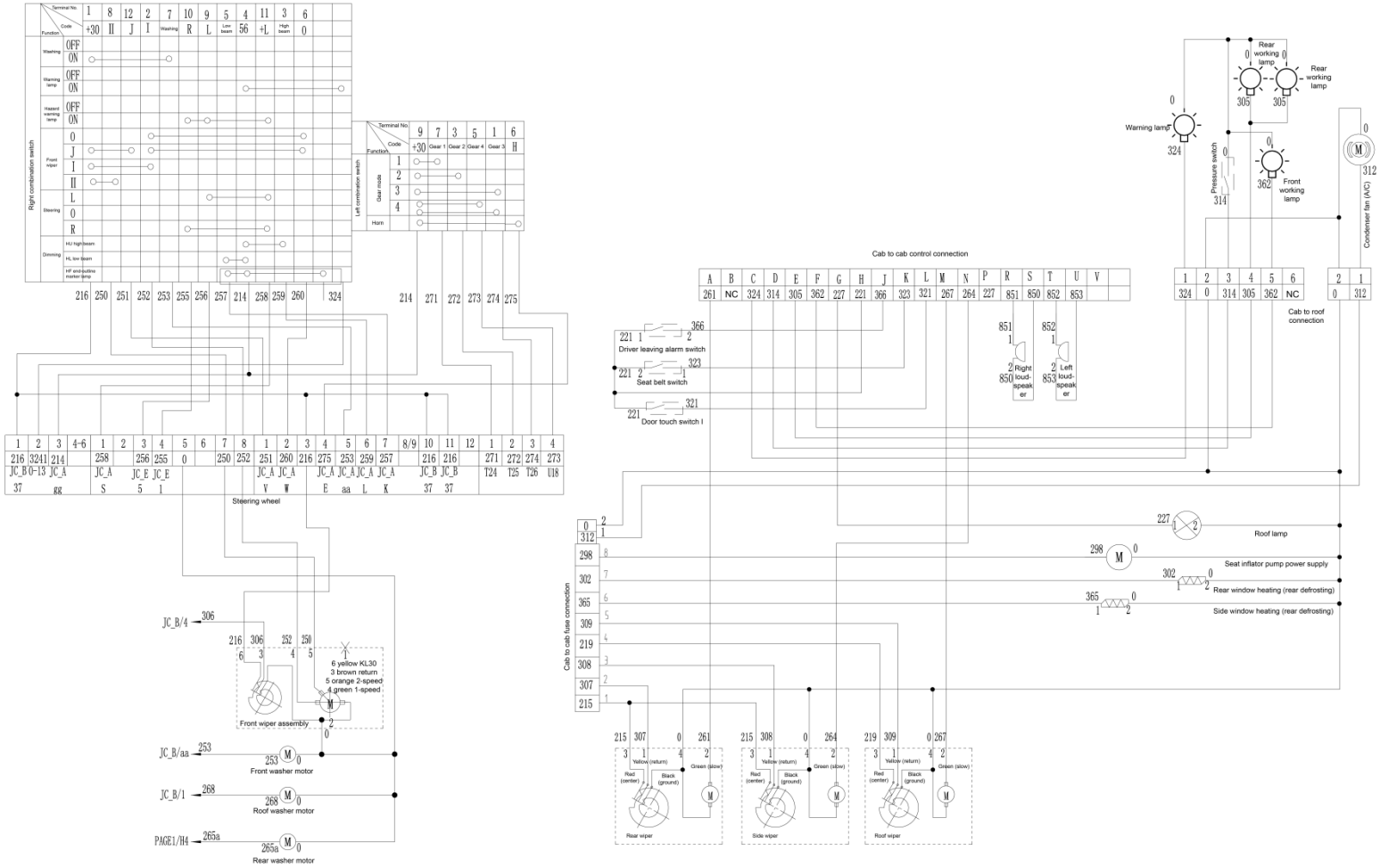




H1440/H1840-EU stage Ⅲ:

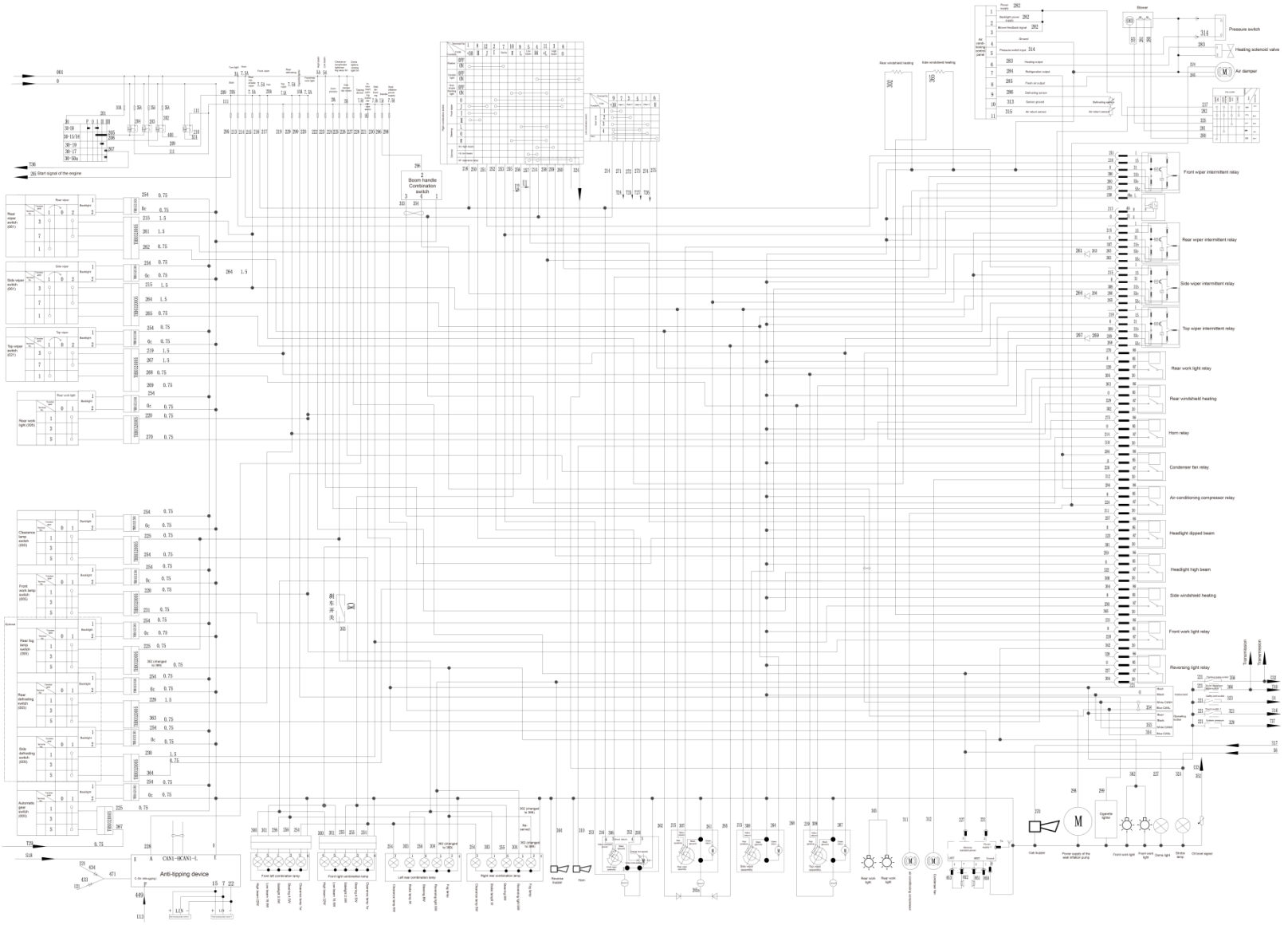


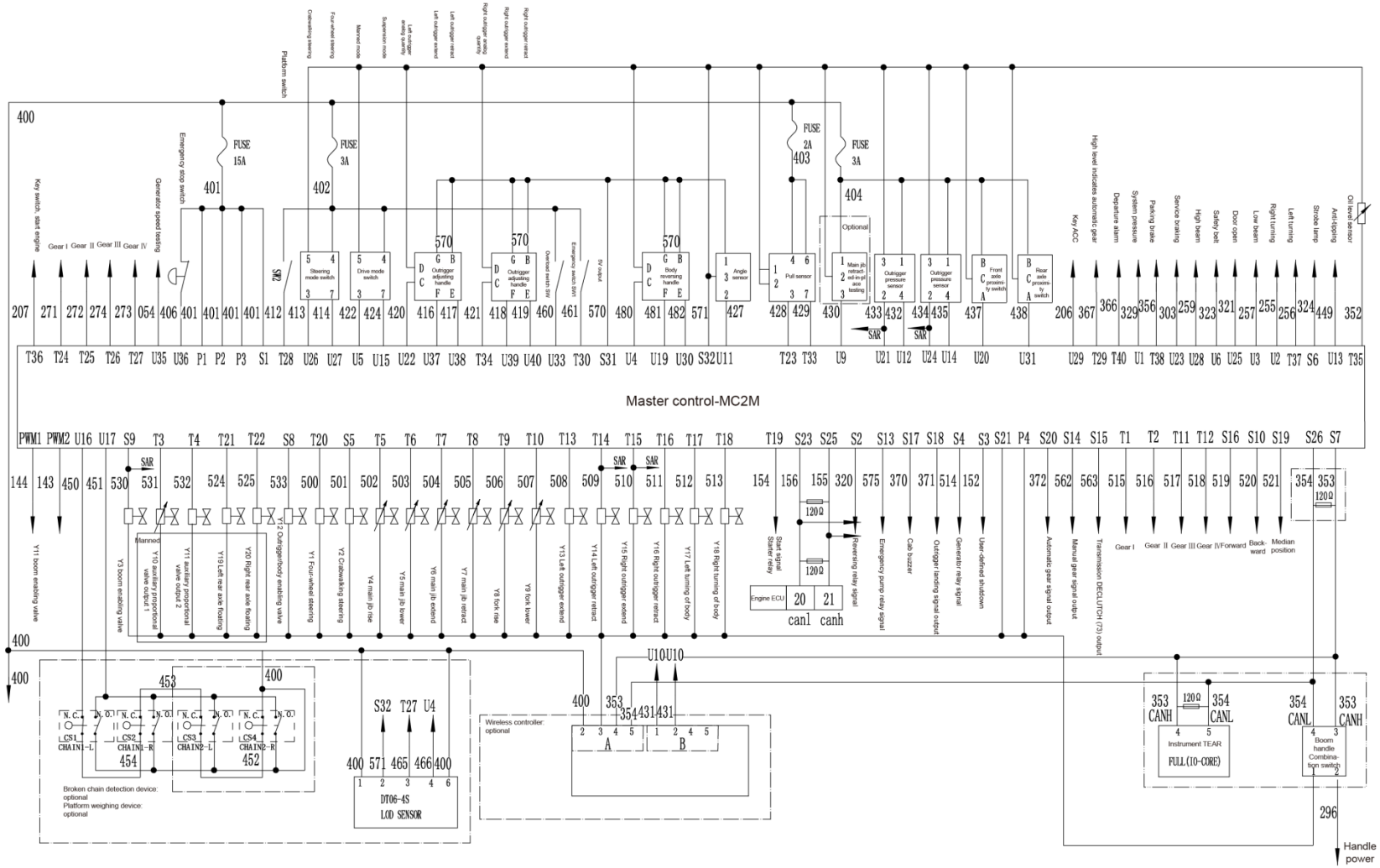

Main harness controller
Emergency switch
Engine
Chassis
Boom
Cab accelerator pedal
Evaporator motor
Electrical schematic diagram of chassis
Electrical schematic diagram of engine
Electrical schematic diagram of boom
H1840
250092N01
Electrical schematic diagram
LGMG

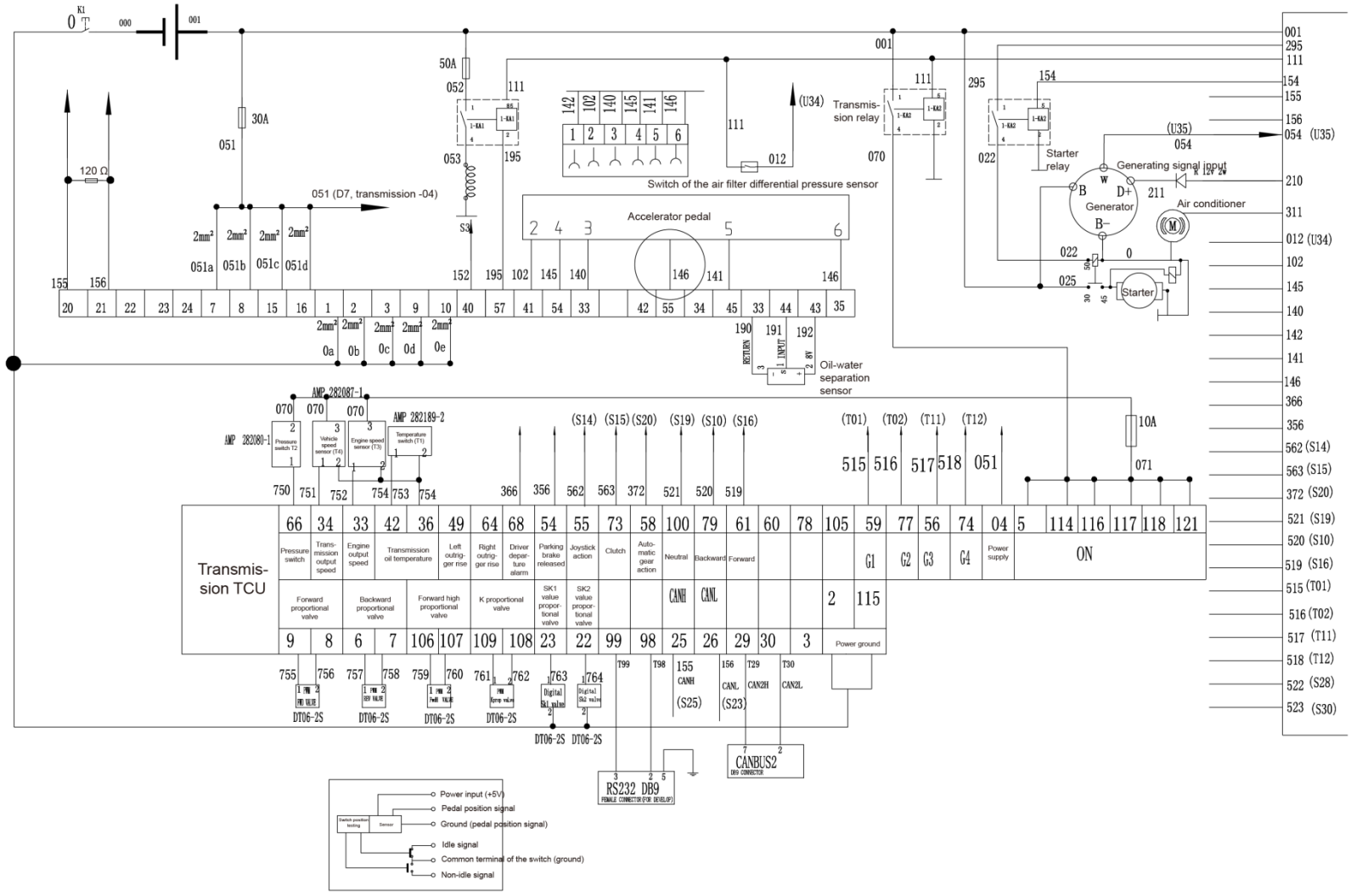


Electrical schematic diagram of cab control
Electrical schematic diagram of cab
Electrical schematic diagram of cab roof

H1840-EU stage Ⅴ:




Master control-MC2M
Key switch, start engine
Gear I Gear II Gear III Gear IV
Generator speed testing
Emergency stop switch
FUSE 15A
FUSE 3A
FUSE 2A
Platform switch
Crabwalking steering
Four-wheel steering
Manned mode
Suspension mode
Left outrigger analog quantity
Left outrigger retract
Left outrigger extend
Right outrigger analog quantity
Right outrigger extend
Right outrigger retract
Steering mode switch
Drive mode switch
Outrigger adjusting handle
Body reversing handle
Angle sensor
Pull sensor
Main jib retract-and-in-place testing
Optional
Outrigger pressure sensor
Front axle proximity switch
Rear axle proximity switch
Key ACC
High level indicates automatic gear
Departure alarm
System pressure
Parking brake
Service braking
High beam
Safety belt
Door open
Low beam
Right turning
Left turning
Strobe lamp
Anti-tipping
Oil level sensor
Manned
Start signal Starter relay
Engine ECU
canl canh
Reversing relay signal
Emergency pump relay signal
Cab buzzer
Outrigger landing signal output
Generator relay signal
User-defined shutdown
Automatic gear signal output
Manual gear signal output
Transmission DECLUTCH (73) output
Gear I
Gear II Gear III Gear IV/Forward
Back-ward
Median position
Broken chain detection device: optional
Platform weighing device: optional
DT06-4S
LOD SENSOR
Wireless controller: optional
Instrument TEAR
FULL(10-CORE)
Boom handle Combination switch
Handle power


Transmis-
sion TCU
Switch of the air filter differential pressure sensor
Accelerator pedal
Transmis-
sion relay
Starter
relay
Generator
Air conditioner
Starter
Oil-water
separation
sensor
Power input (+5V)
Pedal position signal
Ground (pedal position signal)
Idle signal
Common terminal of the switch (ground)
Non-idle signal
RS232 DB9
CANBUS2
DT06-2S
120 Ω
30A
50A
10A
051 (D7, transmission -04)