7. Filter in Cooling System

Cleaning interval: 1,200 hours or 12 months, whichever comes first. Replace earlier if badly contaminated.

Cleaning procedure:
1. Remove the hoses from the filter inlet and outlet, and shut off the water.
2. Remove the cooling water filter case below the rotary joint, and clean the element.

Caution:
- The cooling water is very hot immediately after halting operation. Hot water may be released when removing the case, with danger of burns. Commence work after the water has cooled.

Cleaning interval:
- Applicable models vary depending on GR Series
- New
- Replace

If contamination can be filtered, the filter can be used as new.
If contamination cannot be filtered, or is damaged, replace the filter.

Replacement interval:
- If contamination cannot be filtered, replace.

8. Winch Rotary Joint

Replacement interval: 2,400 hours or 2 years, whichever comes first.

Accident may occur if used for long period of time without replacement. Internal damage will prevent from maintaining optimal clutch pressure, this may result in slung load to fall.

Internal damage will prevent from maintaining optimal clutch pressure; this may result in slung load to fall.

For inquiries please contact:
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1. Return Filter for Hydraulic Oil

Upgrade
- Filter material: Upgraded from paper to glass fiber
- Replacement interval: 600 hours (or 6 months) → 1,200 hours (or 12 months)

Upgrading from paper to glass fiber resulted in a filter less susceptible to damage and doubled the replacement interval. Changes in hydraulic pressure deteriorate and damage the filter when filter was used for a long period of time without replacement.

1.200 hours or 12 months, whichever comes first.
Replace immediately if warning lamp is lit.

Replacement interval
1,200 hours or 12 months, whichever comes first.

Replacement interval
600 hours (or 6 months)

Upgrade
- Filter material: Upgraded from paper to glass fiber
- Replacement interval: 600 hours (or 6 months)

2. Air Breather

Replacement interval
600 hours or 6 months, whichever comes first.

If used for a long period of time without replacement, clogging will occur. This will interfere with the passage of air into and out of the tank, and possibly resulting in cracking and deformation of the hydraulic oil tank, and leaks.

Upgrade
- Filter material: Upgraded from paper to glass fiber
- Replacement interval: 250 hours

3. Fuel Filter & Water Separator (pre-fuel filter)

Replacement interval
6 months

If used for a long period of time without replacement, clogging will occur. This will result in engine damage, may cause the crane to no longer run normally.

Engine fuel filter
Water separator
Using new filter

4. PCV Valve Element

Replacement interval
250 hours

If used for a long period of time without replacement, clogging will occur. This will increase internal pressure resulting in leakage from engine oil seals.

PCV valve element

5. Filter for Steering Circuit

Replacement interval
1,200 hours or 12 months, whichever comes first.

If water is collected and remains in the air tank, the tank will rust. If rust enters the circuit, problems will develop in equipment in the pneumatic system (e.g. brakes), possibly resulting in a serious accident.

Accident may occur if used for long period of time without replacement.

Accident may occur if used for long period of time without replacement.

Replace the desiccant if a large amount of water (i.e. condensation) is discharged when the air tank drain cock is opened.

Accident may occur if used for long period of time without replacement.

6. Air Dryer

Replacement interval
1,200 hours or 12 months, whichever comes first.

If used for a long period of time without replacement, clogging will occur. This will result in engine damage, may cause the crane to no longer run normally.

Filter material

Upgrade
- Filter material: Glass fiber
- Replacement interval: 600 hours (or 6 months) → 1,200 hours (or 12 months)

If used for a long period of time without replacement, clogging will occur. This will result in engine damage, may cause the crane to no longer run normally.

Contamination in the hydraulic oil (e.g., sludge due to deterioration over time, particles generated by wear of valves) will no longer be removed by the filter. This may result in subsequent steering problems. The steering filter plays a very important role in steering of the vehicle.

Changes in hydraulic pressure deteriorate and damage the filter when filter was used for a long period of time without replacement.
1. Return Filter for Hydraulic Oil

- Upgrade: Filter material upgraded from paper to glass fiber
- Replacement interval: 600 hours or 6 months, whichever comes first

Upgrading from paper to glass fiber resulted in a filter less susceptible to damage and doubled the replacement interval. Changes in hydraulic pressure detectable and damage the filter when filter was used for a long period of time without replacement.

2. Air Breather

- Replacement interval: 600 hours or 6 months, whichever comes first

If used for a long period of time without replacement, clogging will occur. This will interfere with the passage of air into and out of the tank, and possibly resulting in cracking and deformation of the hydraulic oil tank and leaks.

3. Fuel Filter & Water Separator (pre-fuel filter)

- Replacement interval: 6 months

If used for a long period of time without replacement, clogging will occur. This will result in engine damage, and damage to the crane if it no longer runs normally.

4. PCV Valve Element

- Replacement interval: 250 hours

If used for a long period of time without replacement, clogging will occur. This will increase internal pressure resulting in leakage from engine oil seals.

5. Filter for Steering Circuit

- Replacement interval: 1,200 hours or 12 months, whichever comes first

Accident may occur if used for a long period of time without replacement.

6. Air Dryer

- Replacement interval: 1,200 hours or 12 months, whichever comes first

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2. Air Breather

- **Replacement interval**
  - 600 hours or 6 months, whichever comes first.

If used for a long period of time without replacement, clogging will occur.

This will interfere with the passage of air into and out of the tank, and possibly resulting in cracking and deformation of the hydraulic oil tank, and leaks.

3. Fuel Filter & Water Separator (pre-fuel filter)

- **Replacement interval**
  - 6 months

If used for a long period of time without replacement, clogging will occur.

This will result in engine damage, may cause the crane to no longer run normally.

Engine fuel filter

Water separator

4. PCV Valve Element

- **Replacement interval**
  - 250 hours

If used for a long period of time without replacement, clogging will occur.

This will increase internal pressure resulting in leakage from engine oil seals.

5. Filter for Steering Circuit

- **Replacement interval**
  - 1,200 hours or 12 months, whichever comes first.

Replace immediately if warning lamp is lit.

Accident may occur if used for long period of time without replacement.

Contamination in the hydraulic oil (e.g. sludge due to deterioration over time, particles generated by wear of valve) will no longer be filtered, leading to reduced performance and consequent steering problems. The steering filter plays a very important role in steering of the vehicle.

6. Air Dryer

- **Replacement interval**
  - 1,200 hours or 12 months, whichever comes first.

Replace the desiccant if a large amount of water (i.e. condensation) is discharged when the air tank drain cock is opened.

Accident may occur if used for long period of time without replacement.

If water is collected and remains in the air tank, the tank will rust. If rust enters the circuit, problems will develop in equipment in the pneumatic system (e.g. brakes), possibly resulting in a serious accident.
During crane operation
Falling accident actually occurred during crane operation

Caution
- Check that there are no objects or obstacles around the crane at the time of use.
- Ensure that starting lines are appropriate and clear of obstacles.

Cleaning procedure
1. Remove the hoses from the filter inlet and outlet, and shut off the water.
2. Remove the cooling water filter case below the rotary joint, and clean the element.

Caution
- The cooling water is very hot immediately after halting operation. Hot water may be released when removing the case, with danger of burns. Commence work after the water has cooled.

Cleaning interval
1,200 hours or 12 months, whichever comes first.
Replace earlier if badly contaminated.

Heater performance will deteriorate if used for a long period of time without cleaning or replacement.
Clogging will occur, and contamination in the cooling water will no longer be filtered. This will result in scaling and malfunction of equipment in the warm water circuit, and may result in water leaks.

Cleaning procedure
1. Remove the hoses from the filter inlet and outlet, and shut off the water.
2. Remove the cooling water filter case below the rotary joint, and clean the element.

Caution
- The cooling water is very hot immediately after halting operation. Hot water may be released when removing the case, with danger of burns. Commence work after the water has cooled.

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Cleaning procedure
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Caution
- The cooling water is very hot immediately after halting operation. Hot water may be released when removing the case, with danger of burns. Commence work after the water has cooled.
During crane operation

Cabling accident actually occurred during crane operation

Maintenance

1. Remove the hoses from the filter inlet and outlet, and shut off the water.
2. Remove the cooling water filter case below the rotary joint, and clean the element.

**Caution**

The cooling water is very hot immediately after halting operation. Hot water may be released when removing the case, with danger of burns. Commence work after the water has cooled.

Cleaning interval

1,200 hours or 12 months, whichever comes first. Replace earlier if badly contaminated.

Heater performance will deteriorate if used for a long period of time without cleaning or replacement.

Clogging will occur, and contamination in the cooling water will no longer be filtered. This will result in scaling and malfunction of equipment in the warm water circuit, and may result in water leaks.

Cleaning procedure

1. Ensure that there is no play in the shaft, and that no abnormal sounds are emitted.
2. Ensure that hydraulic oil leaks (mounting bolts and rotating unit) do not occur.
3. Ensure that tightening torque is appropriate (49.0 N·m (5 kgf·m))
4. Ensure that hydraulic oil level in tank (replace if oil level is high)

Hydraulic oil level in tank

* Replace if oil level is high

Heater performance will deteriorate if used for a long period of time without cleaning or replacement.

Clogging will occur, and contamination in the cooling water will no longer be filtered. This will result in scaling and malfunction of equipment in the warm water circuit, and may result in water leaks.

During crane operation

Ensure that there are no play in the shaft, and that no abnormal sounds are emitted.

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1,200 hours or 12 months, whichever comes first. Replace earlier if badly contaminated.

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