Service

General
The best way to prevent unplanned stoppages and breakdowns is to carry out daily checks and regular services.

| NB! These are general instructions, certain check items may not be found on your machine. |

Most machine accidents occur during fault-tracing, service and maintenance because personnel must be within the risk zone to carry out the work. Personal injury can be avoided by strict awareness of the risk.

Read and understand the safety chapter, section "Risk factors during service and maintenance work" and carry out "Preparations for service and maintenance" before starting service work.

Service schedule
The service schedule is based upon the operation time of the machine. Because the working conditions can vary, it may be necessary to adapt the service interval to the relevant working conditions and environment.

• For further information on how to carry out checks and service, see the instructions that follow the service schedule.

• For information about diesel engine maintenance, also see the engine supplier's instructions and recommendations.

• For information about tool maintenance, see the manufacturer's instructions and recommendations.

Checks
After carrying out checks, failures must be remedied immediately through replacement, adjustment, repair etc.
Service schedule

Daily check
Daily checks must also be carried out after transportation

Symbol descriptions

<table>
<thead>
<tr>
<th>Function</th>
<th>With reference to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lubrication</td>
</tr>
<tr>
<td>Symbol</td>
<td>1</td>
</tr>
<tr>
<td>Undercarriage and Outriggers, containing cylinders and shafts</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td>Arm system and Tool mounting, containing cylinders and shafts</td>
<td>● ● ● ● ●</td>
</tr>
<tr>
<td>Hoses, visible hoses, for example, arm system outriggers</td>
<td>● ●</td>
</tr>
<tr>
<td>Power cable, connection socket</td>
<td>● ●</td>
</tr>
<tr>
<td>Hydraulic fluid</td>
<td>●</td>
</tr>
<tr>
<td>Diesel</td>
<td>Engine oil</td>
</tr>
<tr>
<td>Coolant</td>
<td>●</td>
</tr>
<tr>
<td>Pre-filter</td>
<td>●</td>
</tr>
<tr>
<td>Diesel</td>
<td>●</td>
</tr>
<tr>
<td>Warning lights</td>
<td>●</td>
</tr>
<tr>
<td>Breaker lubrication</td>
<td>●</td>
</tr>
<tr>
<td>Tools</td>
<td>● ● ● ●</td>
</tr>
</tbody>
</table>

For maintenance of tools, extra equipment etc. also see other manuals.
# Weekly service

<table>
<thead>
<tr>
<th>Function</th>
<th>With reference to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Function</strong></td>
<td><strong>Lubrication</strong></td>
</tr>
<tr>
<td>Symbol</td>
<td>1</td>
</tr>
<tr>
<td>Entire machine</td>
<td>Clean the machine</td>
</tr>
<tr>
<td>Daily check</td>
<td>Carry out</td>
</tr>
<tr>
<td>Undercarriage, outriggers, containing cylinders and shafts</td>
<td>•</td>
</tr>
<tr>
<td>Drive and track frames, including track tensioning</td>
<td>•</td>
</tr>
<tr>
<td>Power unit (engine, fan, fan housing)</td>
<td>•</td>
</tr>
<tr>
<td>Radiator</td>
<td>Clean</td>
</tr>
<tr>
<td>Hoses</td>
<td>•</td>
</tr>
<tr>
<td>Other hydraulic components</td>
<td>•</td>
</tr>
<tr>
<td>Slew motor, slew gear</td>
<td>•</td>
</tr>
<tr>
<td>Gear ring slew</td>
<td>•</td>
</tr>
<tr>
<td>Diesel</td>
<td>Air filter, pre-filter, hoses</td>
</tr>
<tr>
<td>Water separator</td>
<td>Draining</td>
</tr>
<tr>
<td>Fuel filter</td>
<td>Draining</td>
</tr>
<tr>
<td>Fan belt</td>
<td>•</td>
</tr>
<tr>
<td>Water separator, forced air cooling</td>
<td>Draining</td>
</tr>
<tr>
<td>Breaker lubrication</td>
<td>•</td>
</tr>
</tbody>
</table>
| Crusher                                       | •                                       | •                           | •                           | Check jaws |}

*For maintenance of tools, extra equipment etc. also see other manuals*
## Service / 250 hours

<table>
<thead>
<tr>
<th>Function</th>
<th>With reference to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lubrication</td>
</tr>
<tr>
<td>Symbol 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td><strong>Weekly service</strong></td>
<td></td>
</tr>
<tr>
<td>Hydraulic pump</td>
<td></td>
</tr>
<tr>
<td>Drive motor, drive gear</td>
<td>•</td>
</tr>
<tr>
<td>Slew motor, slew gear</td>
<td>• •</td>
</tr>
<tr>
<td>Gear ring slew</td>
<td>• •</td>
</tr>
<tr>
<td>Hydraulic breaker</td>
<td>• •</td>
</tr>
<tr>
<td>Return filter and air filter</td>
<td>•</td>
</tr>
<tr>
<td>for hydraulic tank</td>
<td></td>
</tr>
<tr>
<td>Servo filter</td>
<td>•</td>
</tr>
<tr>
<td>Diesel Engine oil</td>
<td>•</td>
</tr>
<tr>
<td>Oil filter</td>
<td>•</td>
</tr>
<tr>
<td>Fuel filter</td>
<td>•</td>
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</table>

## Service / 500 hours or at least once a year

<table>
<thead>
<tr>
<th>Function</th>
<th>With reference to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lubrication</td>
</tr>
<tr>
<td>Symbol 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td><strong>Service / 250 hours</strong></td>
<td></td>
</tr>
<tr>
<td>Hydraulic fluid</td>
<td>•</td>
</tr>
<tr>
<td>Air filter (hydraulic tank)</td>
<td>•</td>
</tr>
<tr>
<td>Pressure control filter</td>
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<tr>
<td>Diesel Air filter</td>
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</tr>
<tr>
<td>Fuel filter</td>
<td>•</td>
</tr>
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</table>

## Service / 1000 hours

<table>
<thead>
<tr>
<th>Function</th>
<th>With reference to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lubrication</td>
</tr>
<tr>
<td>Symbol 1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td><strong>Service / 500 hours</strong></td>
<td></td>
</tr>
<tr>
<td>Slew motor, slew gear</td>
<td>•</td>
</tr>
<tr>
<td>Slew gear, only applies to Brokk 330</td>
<td>•</td>
</tr>
<tr>
<td>Drive motor, drive gear</td>
<td>•</td>
</tr>
<tr>
<td>Diesel Coolant</td>
<td>•</td>
</tr>
</tbody>
</table>

*For maintenance of tools, extra equipment etc. also see other manuals*
Preparations for service and maintenance

The greatest risk of an accident when working with a Brokk machine is during troubleshooting, when service and maintenance as personnel must be inside the risk zone of the machine. Personal injury can be avoided by strict awareness of the risk. Prevent accidents by planning and preparing work.

General

- Move the machine to a safe area if it is found to be within a dangerous area.
- Position clear markings, for example, a sign, to inform people in the surrounding area that service and maintenance is in progress.
- Ensure that there is satisfactory work lighting and that it is correctly positioned. Supplement the machine lighting with free standing work lights if necessary.
- Be aware of the location of the fire extinguisher, first aid kit and emergency telephone. In the event of machine fire, initially use an ABE powder fire extinguisher, alternatively a BE carbon dioxide fire extinguisher.

Protective equipment

- Always use the necessary personal protective equipment and do not wear loose clothing, when carrying out service and maintenance.
- Ensure that you have access to lifting equipment, approved to lift a minimum of 500 kg on site to secure and lift machine components. Ensure that safety equipment is available to mechanically secure machine components.
Work environment during service

- The area surrounding the machine must be clean and clear due to the risk of falling or slipping.

- Ensure that there is a sufficiently large work area.
- Clean the machine. Dirt in the hydraulic system quickly leads to damage and operational break downs. See Cleaning the machine.

Raising the machine

- Raise the machine as level as possible, deploy the arm system and outriggers. If necessary, trestle the machine. See Trestling the machine.
- Always allow a hot machine to cool down before starting carrying out service and maintenance.
Relieve any stored energy

- Remove any power sources so that the machine cannot started by mistake. Electrical components with stored energy can cause shocks.
  - Switch off the motor.
  - Position the phase switch S1/Q1 to position 0.
  - During service work where the machine is not required to be started, disconnect the power cable and position it where it cannot be connected by mistake. If service work requires the motor to be running, note the risks when working with or near to moving parts.
- Disconnect the battery if the machine is equipped with a diesel engine.

- Release pressure from the hydraulic tank:
  - Detach the air filter to release the overpressure in the tank.
  - Relieve the pressure in the hydraulic cylinders by relieving the arm system against the ground.
  - If the machine is equipped with hand levers on the main valve, release the pressure by moving the levers to their limit positions.
  - If the machine is not equipped with hand levers on the main valve, wait until the pressure has dropped via internal leakage.
Removal

- Always mechanically secure moving parts before slackening off bolted joints or hydraulic hoses. This is to prevent heavy machine parts from being set in motion or falling during removal.
- Never remove a hydraulic hose without first checking that it is depressurised. Pipe and hose couplings can remain pressurised despite the motor being switched off. Always disconnect any connections carefully.
- Ensure that all cables and hoses which are removed during service and maintenance are marked. This is necessary to ensure correct re-connection.

Test driving the machine

- Be vigilant when test driving. If any of the connectors, cables or hoses are incorrectly installed the movements of the machine can be incorrect.
- If there is noise on start up read "Fault symptoms quick guide" in "Troubleshooting".
Hydraulic fluid and lubricants

Hydraulic fluid

The grade of hydraulic fluid supplied with the machine is specified on the sticker positioned on the hydraulic tank of the machine.

<table>
<thead>
<tr>
<th>Grade/Type</th>
<th>Standard</th>
<th>Lowest starting temperature</th>
<th>Operating temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral oil ISO VG46</td>
<td>ISO-L-HV DIN 51524 / 3 HVLP</td>
<td>-17°C</td>
<td>+10°~+85°C (Ideally 50-75°C)</td>
</tr>
<tr>
<td>Water glycol UltraSafe 620S*</td>
<td>ISO HFC DIN 51524 / HFC</td>
<td>-10°C</td>
<td>max +50°C</td>
</tr>
<tr>
<td>Biological oil HF-E46/ Shell Naturelle HF-E46</td>
<td>DIN 51524 / HVLD ISO 15380 HEES</td>
<td>-17°C</td>
<td>0°~+75°C (Ideally 40-75°C)</td>
</tr>
</tbody>
</table>

Hydraulic fluids must meet the following standards: DIN 51524 HVLP, ISO 6743-4 HV and SS 15 54 34 AV.

NB! The surface treatment can be damaged if different types of hydraulic fluids are mixed. Check the hydraulic grade of the fluid in the hydraulic system of the machine before filling or changing the fluid.

The machine manufacturer must be consulted before any type of hydraulic fluid other than those stated in the table above are used in the machine.

* When water glycol is used as hydraulic fluid, the service life of the cylinder seals and pump are reduced. Extra coolant must be used.

Lubricant

<table>
<thead>
<tr>
<th>Component</th>
<th>Grade</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slew transmission</td>
<td>SAE 80W-90</td>
<td>API GL 5</td>
</tr>
<tr>
<td>Drive wheel transmission</td>
<td>SAE 80W-90</td>
<td>API GL 5</td>
</tr>
<tr>
<td>All lubrication points with lubrication nipples</td>
<td>NLGI 2</td>
<td></td>
</tr>
</tbody>
</table>

Tool and extra equipment

See documentation from respective tool supplier to obtain the correct quality of the lubricant so that any guarantee from the supplier is applicable.
Checking instructions

Lubrication

General

The service schedule indicates where the machine requires lubrication and how frequently. The service schedule is based on the operating hours of the machine, it may be necessary to adapt the service interval to the relevant working conditions and environment.

Lubricate the machine more frequently if the machine is exposed to:

- Dusty or dirty environments
- High ambient or operating temperatures
- High loads, for example, continuous chipping using a hydraulic breaker

Caution!

Ensure that no one starts the machine while servicing is underway. When the machine has been moved to the desired position, switch off the motor. Remove the power supply cable and position it so that it cannot be reconnected by mistake.

1. Clean the nipple before lubrication.
2. Replace damaged or blocked nipples immediately.
3. Use a grease gun and pump until new grease is forced out. Use greases recommended by Brokk in “Hydraulic fluid and lubricants”.

Tip! Make a routine of always greasing the nipples in the same order in order to remember where all the nipples are located more easily.

Outriggers and arm system

Lubricate all joints and cylinder brackets. Operate to a position which allows lubrication.

The inner pipe of the telescopic arm must be lubricated. Operate the telescopic arm to the outer limit position. Apply grease to the sliding surfaces of the arm as illustrated.
**Gear ring**

The gear ring has separate grease nipples for bearings and gears. To distribute the grease evenly, lubricate then rotate and lubricate again.

1. Connect the grease gun and lubricate both the grease nipples.
2. Retreat a safe distance, start the machine, swivel the upper section through 90° and then shut off the motor.
3. Repeat points 1 and 2 three times so that the swivel bearing and swivel bearing gears are lubricated in four locations.

| NB! | If the instructions are not followed there is a great risk that the gear ring seal will be pressed out. The gear ring bearing will be exposed to dirt and the seal must be replaced. |

**Slew motor - Brokk 330**

The slew motor bearings are lubricated at the lubrication point. The symbol to the right is replicated on the sticker on the lubrication point.

| NB! | Lubricate according to the service schedule. Excessive lubrication can cause damage. |

**Fulcrum - Brokk 40**

- Move cylinder 1 of the arm system to the outer limit position.
- Lubricate nipple (A).
Cracks

General
A clean machine will facilitate the tracing of cracks. The largest risk of cracks is at the joins to weld holes and sharp edges, or where mechanical damage has occurred to the machine. The largest risk of cracking at a welded join is at the end of the weld.

From a safety perspective, it is important that cracks are remedied as quickly as possible. Crucial safety components such as the tool mounting, link, support strut, wedge, mounting plate or cylinders must not be repaired but must be replaced. For welding instructions, see section: "Welding on the machine".

Undercarriage
Particularly check for cracks around the outrigger mountings both on the undercarriage and on the outriggers, also check the slew ring mounting and the welds between the machine body and track frame.

Arm system
Particularly check for cracks on the arm system guide, the mounting for the cylinders and weld joins.
Securing

General

To prevent machine damage it is important that the components are correctly and precisely secured. Pull and feel to see if components are loose. Look for signs of wear which could be caused by loose components.

**NB!** See the spare parts list for information about tightening torques, grades of adhesive and other installation instructions.

Check that bolted joints are securely tightened.

**NB!** A bolted joint which is bonded using adhesive must not be checked by post tightening. If a bonded bolted joint has become loose, clean the threads before applying new adhesive.

- Check that shafts are secure/locked. Check expander shafts by post tightening using a torque wrench.
- Check that lock pins are secure and not damaged.

The joints of the machine must be checked according to the service schedule. The following lists the joints it is most important to check.

**Shafts**

- The design of the expander shafts means that they are never loose as long as they are regularly post tightened. A new expander shaft must be regularly post tightened until it is worn in. Signs of wear on the expander shaft sleeve is a typical indication that it has not been post tightened correctly or regularly.

**NB!** If an expander shaft has slid out of position, it must be centred before being retightened.

- If the machine shafts are locked by lock pins, check that the lock pins are installed on both sides of the shafts.

**Bolted joints**

- Outrigger mounting with bolted joints to the chassis.
- Track frames with bolted joints to the chassis.
- Bolted joints for the drive motor.
- Bolted joints for the slew motor.
- Upper and lower bolted joints for the slew ring
- For swivel functions with cylinders, check the cylinder support, the gear ring against the cylinder and the cylinder mounting.
- Bolted joints for the tool mounting
- The bolted joints for the tool to the mounting plate.
Level check

General
The level plugs, dipsticks, sight glass or level indicator lines on the holder indicate the highest and lowest permitted levels. If any level is low, check for leakage and remedy if necessary.

Position the machine on a flat surface. Before opening a component for reading off or topping up, clean to prevent dirt from entering. If the level is low, top up with the type and grade of fluid specified in the Hydraulic fluid and lubricants section.

Caution!
Risk of allergic reaction. Repeated chemical contact with the skin can cause allergies. Avoid skin contact. Use protective equipment.
Hydraulic fluid

- Operate the arm system inwards.
- Locate the sight glasses, they can be read without removing the cover. If necessary, use the spare parts list as an aid.

Slew gear

Checks only apply to machines with slew functions equipped with a slew gear. Locate and remove the dipstick. Wipe the dipstick, lower it and read off the level.

Drive gear

Checks only apply to machines with drive functions equipped with a drive gear.

- Operate the machine until one of the plugs moves to the same level as the centre of the hub and the other plug is in the uppermost position.
- Unscrew the level plug (A), the oil level should reach the top of the hole.

Breaker lubrication

The holder for lubricant is transparent. Check that the holder contains lubricant.

Transparent holder allows the lubricant level to be checked.
Engine oil, diesel engine

Caution!
Risk of burns. The machine becomes hot during operation. Allow the machine to cool before servicing.

Check the oil level before starting or at least five minutes after finishing work. The oil must run down into the oil trough for a correct level reading to be made. The oil level can be checked without having to remove the cover.

- Remove the dipstick (1), wipe clean and reinsert.
- Remove the dipstick again and check the oil level. The oil level should be between the level lines (A).

Coolant, diesel engine

The level is checked on the expansion tank of the cooling system, it can be read without having to remove the cover. Check that at least 1/3 of the expansion tank is filled with coolant.
Wear and damage

General
The risk of machine breakdown resulting in expensive repair costs increases if the machine is used despite the fact that components are damaged or worn out. Rectify worn out components as soon as possible.

Wear shafts and plain bearings
When the play in the joints and the cylinder brackets becomes so great that the tool becomes difficult to control it is time to replace bearings and, if necessary, shafts.

When there is play in the joints, the bearings must always be replaced. Check that the bearing races are not damaged. If the bearing races are damaged the component must be replaced or repaired. All bearing positions have H7 tolerance.

Shafts must be replaced if they have abrasion damage.

- If an expander sleeve has abrasion damage it indicates that it has not been correctly tightened.
- It is important that the line joints are well lubricated to be able to push out dirt which comes in and to minimise wear on the shafts and bearings.

Wear of rubber components
Check that the tracks and outrigger pads are intact. They must be replaced if they are worn to the metal.

Wear hydraulic hoses
Check the hydraulic hoses regularly. Check that the hoses are not damaged. Check that the cord in the hose is not visible. Check that none of the hoses rub against sharp edges. Note the risk from radiated heat. Replace any damaged hoses.

Wear electrical cables
Risk of electric shock. When the electrical cables are checked the power supply cable must be disconnected. Check that the insulating sleeves of the cables are not damaged. Replace any damaged cables immediately.

Check that the hydraulic hoses and electrical cables do not rub against sharp edges.
Leakage

General
Leakage can cause serious machine breakdown. It increases the risk of slippage at the site and is damaging to the environment. The chances of detecting leakage early can be improved by washing the machine regularly. Rectify leakage as soon as possible and top up as necessary.

Hydraulic fluid
Leakage of hydraulic fluid increases the risk of dirt penetrating the hydraulic system which can lead to malfunctions and damage to the machine.

If hydraulic fluid is detected under the machine, on the turntable or undercarriage, there is leakage somewhere. Check hose connections, connections and cylinders particularly carefully. Leakage can also occur from other hydraulic components and can then be detected by a line of dirt. After correct action the machine must be washed.

Engine oil
Engine oil leakage will first become apparent on the turntable. There is a risk of engine breakdown in the event of leakage. Do not use the engine until the leak has been rectified. Check if the electric cabinet display indicates that the oil pressure is low.
Function

General
The function check ensures that the machine functions as it should, i.e. that the direction of operation, speed and operating characteristics are correct.

Brake functions
The function of the driving brake is checked by operating the machine at an angle. Release the control lever, the machine should brake to a stop and remain stationary.

The slew brake function is checked by swinging the arm on an inclined surface. Release the control lever, the arm must then stop.

Radiator
To function satisfactorily the radiator must not be blocked or clogged by dirt. The service life and operational reliability of electric and hydraulic components are diminished in the event of overheating. If necessary, clean according to the instructions in section “Handling”.

Cylinders
When checking cylinder barrels and piston rods, the cylinders must be at the end limit position. Ensure that there are no kinks or cracks in the cylinder barrels. In the event of damage, replace immediately.

Tool mounting
The task of the tool mounting is to secure the tool to the carrier. The tool must not, under any circumstances, become detached unintentionally. Worn, defective or missing components can cause the tool mounting to function incorrectly. Check that the tool mounting is complete, that all parts are intact and are correctly mounted.

SECURE THE TOOL MOUNTING
Check for cracks and secure installation.

MECHANICAL QUICK HITCH

Warning!
The wedge and pin for tool mounting are important safety components. A worn or damaged wedge must be replaced with a Brokk original replacement part. Do not manufacture your own wedges.

Check the tool mounting components for cracks and secure installation. Check that the wedge locks the joint securely. The wedge must not be worn that it can hit against the mounting. Check that the pin secures the wedge so that it does not vibrate loose during operation.

Check for damage on the cylinder barrels and piston rods
Check that the piston rods are undamaged and straight. If the surface of the piston rod is slightly damaged try to rub out the damage using a fine polishing cloth before the cylinder is moved in. If damage is more serious or the piston rod is bent - replace immediately. A damaged piston rod can cause a contaminated hydraulic system resulting in damage to the machine.
Track tension

Track tension tensions the track so that it does not come loose during operation. Over tightening increases the load and can cause break down.

- Ensure that the track is not slacker than 10-15 mm play and that it only just lies against the carriage wheel.

If demolition material or similar enters the side of the track during operation, a spring function prevents machine damage and breakdown. The spring function consists of either a hydraulic accumulator or a spring. Lighter models of machine are not equipped with the spring function.

**AUTOMATIC HYDRAULIC TRACK TENSIONING**

Automatic hydraulic track tensioning means that it is activated when the outriggers of the machine are deployed. Operate the outriggers up so that the pressure in the accumulator increases. Deploy the outriggers down to the end limit position. Wait 15 minutes before checking. If the track is slack this could be due to a restrictor valve (A) or check valve (B) of the track tensioning function being blocked or defective.

By operating the outriggers upwards, with the restrictor valve open, the hydraulic fluid is pumped around the system and the accumulator valve is cleaned.

- Release the pressure in the accumulator and cylinder for track tensioning by opening the restrictor valve anticlockwise. Operate the outriggers upwards. Close the restrictor valve. Do not over tighten, this can damage the restrictor valve. Operate the outriggers up so that the pressure in the accumulator increases.

**MANUAL TRACK TENSIONING**

Deploy the outriggers to their limit position and check to see if the track slackens.

Grease filled cylinders and springs can be adjusted to achieve track tensioning by connecting a grease gun to the cylinder nipple (1) and pumping to the required track tension.

**Nipple for adjusting track tension**

Track tensioning using the adjustment screw is carried out by slackening off the lock nut (A) and turning the adjustment screw (B) until the track is correctly tensioned. Tighten the lock nut.

**A Restrictor valve, B Check valve**

**Track tensioning using the adjustment screw (B) and the lock nut (A)**
Swivel function with cylinder, adjusting

Ensure that there is no play between the gearwheel and rack in the limit position. Swing the arm to one limit position and rock the arm. If there is play in the arm, slacken off the lock nut (C) and adjust using screw (B). Then lock using the lock nut. Carry out the same check in the other limit position.

During the entire rotational movement the cylinder support (A) must lie against the cylinder barrel, if it does not, adjust the cylinder support.

Telescopic arm

Check for play between the outer and inner barrel of the telescopic arm. Check the cylinder and check that the movement of the arm is smooth. Worn slide plates cause increased play. Extremely worn slide plates can cause damage to the outer and inner barrels due to the screws that hold the slide plates scratching the sliding surfaces. If the sliding surfaces of the outer or inner barrels are damaged, they must be repaired before new sliding plates are installed. Before replacing the sliding plates, the arm system of the machine must be secured using lifting equipment. The cylinder bracket must be heated when being removed.

When reinstalling the inner barrel in the outer barrel, a press or other aid is required.
Air supply, diesel engine
For the engine to function correctly and not become damaged, it must be supplied with sufficient amounts of filtered air.
Check to see if the electric cabinet display indicates that the air filter is sealed. Replace the filter/filter insert if necessary.
Check that the engine does not draw unfiltered air due to leakage, damage or defective installation.

Fuel supply, diesel engine
See manufacturer’s manual.

Fan belt, diesel engine
See manufacturer’s manual.

Coolant
Check the freezing point of the coolant using a glycol tester. See Technical Data for recommended values.

Breaker lubrication
Check that lubrication reaches the breaker by removing the lubrication hose by the breaker and activating the breaker function. If the function is driven by a hydraulic pump, the machine must be started. Observe great caution when carrying out checks to prevent personal injury.

Tools
Check that the tool can be used in such a way that neither the operator nor surrounding people are exposed to danger.
Other checks - see the supplier’s manual.
Replacement

General

Regular replacement according to the service schedule increases service life and operational safety. Replace fluids and filters in a manner that does not contaminate the hydraulic system or surrounding environment. Collect and dispose of any used material according to local regulations.

Position the machine on a flat surface. Before opening a component for reading off or topping up, clean to prevent dirt from entering. Relieve the load from the machine and allow the machine to cool before replacement. If the level is low, top up according to the following instructions.

Caution!
Risk of allergic reaction. Repeated chemical contact with the skin can cause allergies. Avoid skin contact. Use protective equipment.

Hydraulic fluid

DRAIN THE HYDRAULIC FLUID

Operate the machine so that the arm system cylinders are drawn in and swivel the arm system to the side. Detach the air filter to release the overpressure in the hydraulic tank.

Place a container under the drain plug of the tank and open the plug.

Tip: Use a cut down bottle as a funnel when draining.

• Tighten the drain plug once all the fluid has been drained.
• Replace the return filter.
• Tighten the air filter.

NB! Do not start the engine when the hydraulic tank is empty. This damages the hydraulic pump.

TOP UP THE HYDRAULIC FLUID

Use the same type and grade of fluid as used before draining or change according to the instructions “Switching to another type”. The type of hydraulic fluid used in the machine when supplied is indicated on the sticker on the tank of the machine. A list of hydraulic fluids recommended by Brokk AB can be found in the “Machine data” section.

Fluid must be filled using a filling pump if the machine is equipped with one.

Operate the machine so that the arm system cylinders are drawn in.

• Press the stop button in the electric cabinet.
• Clean the intake hose of the filling pump. Remove the plug and insert the hose into the fluid reservoir.
• Open the shut off valve.
• Start the pump by pressing button S20 and pumping to the correct level.
• Close the shut-off valve and reinstall the plug in the intake hose.
• Start the machine and operate the cylinders between the outer and inner limit positions a few times to expel air that may have entered the hydraulic system when filling.

Shut-off valve in the closed position

If the machine is not equipped with a filling pump, filling must be carried out with the air filter removed. There is a large risk of dirt penetrating the hydraulic system. Clean before removing the filter. Ensure that the funnel or similar used is thoroughly clean.
SWITCHING TO ANOTHER TYPE

When changing from mineral based to environmentally friendly hydraulic fluid, remember that the fluids are poor mixers. The residue of the older fluid in the system must be less than 10% and therefore the fluid is changed in 3 steps.

To ensure optimum function when using environmentally friendly hydraulic fluid it is important to always use the same product, even when topping up a small amount. Do not connect any tool with different hydraulic fluid than that found in the machine.

Environmentally friendly hydraulic fluid has a greater ability to “absorb” and mix water than mineral based hydraulic fluids. Check the water content through regular condition analyses.

Machines that have worked many operating hours can have deposits inside the hydraulic system. When switching to environmentally friendly hydraulic fluid, these deposits can be loosened. Therefore check and replace the return filter additionally several times after hydraulic fluid replacement.

A Existing hydraulic fluid, destroyed.
B Environmentally friendly oil, used as flushing oil in step 1, destroyed.
C Environmentally friendly oil used as flushing oil. Can be used as flushing oil 3 times.
* Flushing oil, new environmentally friendly oil or flushing oil type C.
N New environmentally friendly oil.

STEP 1
• Run the machine to operating temperature (40-50°C) and then operate the piston rods of the hydraulic cylinders in. Place a container under the drain tap of the hydraulic tank and open the plug.
• Replace the return filter.
• Clean the hydraulic tank according to the instructions. Install the drain plug.
• Fill with flushing oil or new environmentally friendly hydraulic fluid. Use the machine and its functions with flushing oil for a maximum of 50 hours.

STEP 2
• Drain the fluid. Replace the return filter. Fill the hydraulic system with new environmentally friendly hydraulic fluid.
• Use the machine and its functions with flushing oil for a maximum of 100 hours.

STEP 3
• Drain the fluid. Replace the return filter. Fill the hydraulic system with new environmentally friendly hydraulic fluid.
Return oil filter

- Thoroughly clean the outside of the filter and the surrounding components. Remove the air filter.
- Remove the filter cover (A). Lift the filter holder (B) together with the filter insert (C). Remove the overflow valve (D) or spring from the filter insert.
- Remove the filter insert from the filter holder. Remove the O-rings on both sides of the filter. O-rings must be replaced.

Check for unusually large amounts of, and unusually large, metal particles or sealing material in the filter holder. If this is the case, troubleshoot the hydraulic system of the machine.

- Thoroughly clean the filter holder. Use degreasing agent, flush using hot water and blow clean using compressed air.
- Install new O-rings.
- Press the filter insert into the filter holder. Install the overflow valve.
- Install the filter holder in the filter housing, positioned in the tank, without damaging the O-rings.
- Screw the cover into place and tighten so that it is sealed.
- Install the air filter.

Air filter

Locate the air filter using the spare parts list. Clean around the filter before unscrewing and replacing with a new filter.
Servo filter
See “Checking the filter for servo pressure” in Troubleshooting.

Pressure control filter
Remove the filter. Drain the fluid from the filter holder and clean if necessary. Replace the filter insert.

Slew gear – replacing oil.
When replacing the oil in the slew gear Brokk 330 the bearing must also be lubricated.
• Relieve the load from the machine
• Place a container under the drain plug.
• Remove the slew gear drain plug and dipstick.
• Screw the drain plug back in once all the oil has been drained.
• Top up the oil. After 10 minutes check that the correct level has been achieved using the dipstick.
Drive gear

- Operate the machine until one of the plugs moves to the same level as the centre of the hub and the other plug is in the lowermost position.
- Place a container under the hub and unscrew the drain plugs. Drain and then screw the drain plugs back into place.

Tip: Use a cut down bottle as a funnel when draining.

- Operate the machine until one of the plugs moves to the same level as the centre of the hub and the other plug is in the uppermost position.
- Remove both plugs. Fill with oil in the upper hole until oil runs out through the lower hole. Wait approximately 10 minutes and refill. Repeat until the correct oil level is achieved.
- Screw the plugs back into place.

Engine oil, diesel engine

- Operate the arm system and the turntable to the side. Take out a 20 litre container.
- Remove the cover and insert the oil draining hose into the drain container. Unscrew the oil filler cap. Open the drain plug of the hose and drain the oil into the container.
- Place a container under the filter before unscrewing. Hand tighten a new original filter in place.
- Reinstall the drain plug and position the hose in the relevant place. Place a clean funnel in the filling hole and fill with oil. Volume and grade, see Technical Data.
Air filter, diesel engine

If the electric cabinet display indicates that the air filter is blocked, the filter insert must be replaced and the filter element cleaned or replaced. The secondary element must be replaced at every fifth service for the filter element or every two years.

- Remove the filter element by slackening the wires and pulling out the holder.
- Turn and pull the filter element from the holder.

If necessary, the filter element can be cleaned using compressed air up to five times. It must be replaced after a maximum of two years. Using a pen, make a mark every time the filter element is cleaned.

Use a pipe, secured to the compressed air gun, to blow clean the filter element. The pipe must be bent to an angle of 90° at one end and must be long enough to reach the bottom of the filter element.

- Blow clean using dry compressed air, max. 5 bar, by pulling the pipe up and down inside the filter element until no more dust comes out.

**NB!** First ensure that the paper element and rubber seals are not damaged.

Cracks and holes in the paper element can be detected using fluorescent light from a fluorescent lamp.

| **NB!** | Risk of engine failure. Never use a damaged filter element. Always replace with a new one. |

Blow clean using compressed air, max 5 bar
The seal of the secondary element must only be broken when replacing, it must not be reused.

- Use a screwdriver to penetrate the secondary element seal, from the inside out. Pull both loops upwards.
- Use both loops to obtain a hold on the secondary element and then pull out using a slight twisting motion.
- Push in a new secondary element.
- Press the open side of the filter element into the holder.
- Install the holder securely. Make a note of the position of the dust emptying valve. It must be pointing downwards ± 15° to the right or left of vertical.
- Place the wires in the groove and tighten.
Fuel filter, diesel engine

NB! Dust and dirt in the fuel filter holder can cause malfunctions in the fuel pump and the injector nozzle. Replace the filter and clean the fuel filter holder.

Bleed the fuel system after replacement.

Bleed the fuel system, diesel

Bleeding the fuel system can be required if any of its components have been removed or before the engine is used after being out of commission for a long time.

- Fill the fuel tank as full as possible.
- Slacken off the fuel filter bleed valve (A) a few turns. Pump fuel using pump (B) until fuel comes out of the bleed valve. Tighten the valve again when no more bubbles are seen.
- Check that the fuel system does not leak. If the engine runs unevenly after bleeding, see the manufacturer’s manual.

Coolant, diesel engine

Caution!

The engine must be cold when the radiator cap is opened. When the engine is hot the cooling system is pressurized causing hot steam to spray out when the radiator cap is opened. Steam causes serious burns. The coolant contains glycol and is poisonous.

- Remove the right-hand rear end of the machine. Use lifting equipment.
- Place a container under the radiator drain plug. Open the radiator cap, the radiator drain plug and the drain plug on the right-hand side of the engine.
- Tighten the drain plug.
- Fill with water and glycol via the expansion tank.
Other

Drain valve for air filter, diesel

Under normal conditions the drain valve must be opened once a week to remove large dirt and dust particles. In dusty environments this should be carried out daily.

Remove the rubber holder and empty it or hold a hand under it and squeeze it so that it empties.

Water separator

The water separator must be drained to prevent water and dirt entering the fuel system.

- Switch off the engine
- Slacken off the drain screw (A) so that water starts to run out. Wait until diesel starts to run out instead of water before tightening the drain screw.

Cleaning the fuel tank

Water and sediment collect at the bottom of the fuel tank. Drain the tank when the tank is nearly empty and when the machine has been stationary on an incline for a period so that the water and sediment has gathered near the drain plug.

Take care that not all the fuel runs out when draining. The fuel tank is drained through the drain plug in the bottom of the fuel tank. Slacken off the plug. Drain the water and sediment until only diesel fuel runs out from the plug. Screw the plug into place again. Collect any fluids in a container and dispose according to local authority regulations.
Welding work on the machine

Only qualified welders may carry out welding work on the machine.

Risk of fire. The machine contains flammable fluids and components. Do not weld immediately adjacent to flammable liquids such as tanks, fuel lines or hydraulic pipes. Ensure that there is a fire extinguisher on site, do not work alone, check after working that sparks or heat will not start a fire.

Risk of inhalation of hazardous substances. Poisonous gases can build up. Use extraction fans to remove welding fumes when welding indoors. Never weld near rubber or plastic materials. Use a breathing mask.

Before welding

- The surface to be welded must be bare metal. Clean off any dirt or surface treatment. Use a grinder, wire brush or sand blasting.
- Grind down any defective welds before a new welded joint is made.
- Attach the earth clamp to the object to be welded or as near as possible. If the earthing is carried out incorrectly, bearings, valves and electrical components can be damaged by high current.
- Disconnect the battery negative terminal and all the electrical connections to the generator when electrical welding on diesel powered machines.
- Disconnect the electronic unit by disconnecting all cables from it.
- Remove the battery on diesel machines. Place the battery at a safe distance from the machine.
- If welding work must be carried out near the diesel tank, minimise the amount of diesel fumes by ensuring that the tank is full.
Recommended welding wire

Use welding wire suitable for the material. Welding electrodes must be dry according to the manufacturer’s instructions.

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<th>Type</th>
<th>Recommended material</th>
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<tr>
<td>Pipe</td>
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</table>

Advice when welding

- When welding cracks, drill a hole in the end of the crack before starting to weld.
- Never start or finish a weld in a corner.
- If the combined plate thickness exceeds 30 mm, preheat the material to 150˚C.

Components which should not be welded

The following components should not be repaired, but should be replaced:

- tool mounting
- link
- support strut
- wedge
- mounting plate
- cylinders
- hydraulic tank
- diesel tank
- cast components