SERVICE MANUAL

JCB Transmission

EN - 9813/4750 - ISSUE 2 - 12/2017

This manual contains original instructions, verified by the manufacturer (or their authorized representative).

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Foreword

The Operator's Manual

⚠

You and others can be killed or seriously injured if you operate or maintain the machine without first studying the Operator's Manual. You must understand and follow the instructions in the Operator's Manual. If you do not understand anything, ask your employer or JCB dealer to explain it.

Do not operate the machine without an Operator's Manual, or if there is anything on the machine you do not understand.

Treat the Operator's Manual as part of the machine. Keep it clean and in good condition. Replace the Operator's Manual immediately if it is lost, damaged or becomes unreadable.

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03 - Safety - Yours and Others

Health and Safety

All machinery can be hazardous. When a machine is correctly operated and maintained, it is a safe machine to work with. When it is carelessly operated or poorly maintained it can become a danger to you (the operator) and others.

In this manual and on the machine you will find warning messages, you must read and understand them. They inform you of potential hazards and how to avoid them. If you do not fully understand the warning messages, ask your employer or JCB dealer to explain them.

Safety is not just a matter of responding to the warnings. All the time you are working on or with the machine you must be thinking of what hazards there might be and how to avoid them.

Do not work with the machine until you are sure that you can control it.

Do not start any work until you are sure that you and those around you will be safe.

If you are not sure of anything, about the machine or the work, ask someone who knows. Do not assume anything.

Remember:

- Be careful
- Be alert
- Be safe.

06 - Safety Warnings

Health and Safety

In this manual there are safety notices. Each notice starts with a signal word. The signal word meanings are given below.

The signal word 'DANGER' indicates a hazardous situation which, if not avoided, will result in death or serious injury.

The signal word 'WARNING' indicates a hazardous situation which, if not avoided, could result in death or serious injury.

The signal word 'CAUTION' indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

The signal word 'Notice' indicates a hazardous situation which, if not avoided, could result in machine damage.

The safety alert system symbol (shown) also helps to identify important safety messages in this manual. When you see this symbol your safety is involved, carefully read the message that follows.

Figure 1. The safety alert system symbol

09 - General Safety

Health and Safety

Training

To operate the machine safely you must know the machine and have the skill to use it. You must abide by all relevant laws, health and safety regulations that apply to the country you are operating in. The operator's manual instructs you on the machine, its controls and its safe operation; it is not a training manual. If you are a new operator, get yourself trained in the skills of using a machine before trying to work with it. If you don't, you will not do your job well, and you will be a danger to yourself and others. In some markets and for work on certain jobsites you may be required to have been trained and assessed in accordance with an operator competence scheme. Make sure that you and your machine comply with relevant local laws and jobsite requirements - it is your responsibility.

Care and Alertness

All the time you are working with or on the machine, take care and stay alert. Always be careful. Always be alert for hazards.

Clothing

You can be injured if you do not wear the correct clothing. Loose clothing can get caught in the machinery. Keep cuffs fastened. Do not wear a necktie or scarf. Keep long hair restrained. Remove rings, watches and personal jewellery.

Alcohol and Drugs

It is extremely dangerous to operate machinery when under the influence of alcohol or drugs. Do not consume alcoholic drinks or take drugs before or while operating the machine or attachments. Be aware of medicines which can cause drowsiness.

Feeling Unwell

Do not attempt to operate the machine if you are feeling unwell. By doing so you could be a danger to yourself and those you work with.

Mobile Phones

Switch off your mobile phone before entering an area with a potentially explosive atmosphere. Sparks in such an area could cause an explosion or fire resulting in death or serious injury.

Switch off and do not use your mobile phone when refuelling the machine.

Lifting Equipment

You can be injured if you use incorrect or faulty lifting equipment. You must identify the weight of the item to be lifted then choose lifting equipment that is strong enough and suitable for the job. Make sure that lifting equipment is in good condition and complies with all local regulations.

Raised Equipment

Never walk or work under raised equipment unless it is supported by a mechanical device. Equipment which is supported only by a hydraulic device can drop and injure you if the hydraulic system fails or if the control is operated (even with the engine stopped).

Make sure that no-one goes near the machine while you install or remove the mechanical device.

Raised Machine

Never position yourself or any part of your body under a raised machine which is not correctly supported. If the machine moves unexpectedly you could become trapped and suffer serious injury or be killed.

Lightning

Lightning can kill you. Do not use the machine if there is lightning in your area.

Machine Modifications

This machine is manufactured in compliance with prevailing legislative requirements. It must not be altered in any way which could affect or invalidate its compliance. For advice consult your JCB dealer.

12 - Maintenance Safety

Health and Safety

Raised Machine

Never position yourself or any part of your body under a raised machine which is not correctly supported. If the machine moves unexpectedly you could become trapped and suffer serious injury or be killed.

Air Conditioning Maintenance

The air conditioning system is a closed loop system and contains pressurised refrigerant. No part of the system should be disconnected until the system has been discharged by a refrigeration engineer or a suitably trained person. You can be severely frostbitten or injured by escaping refrigerant.

Compressed Air

Compressed air is dangerous. Wear personal protective equipment. Never point a compressed air jet at yourself or others.

Springs

Always wear personal protective equipment when dismantling assemblies containing components under pressure from springs. This will protect against eye injury from components accidentally flying out.

Metal Splinters

You can be injured by flying metal splinters when driving metal pins in or out. Use a soft faced hammer or copper drift to remove and install metal pins. Always wear personal protective equipment.

Communications

Bad communications can cause accidents. If two or more people are working on the machine, make sure each is aware of what the others are doing. Before starting the engine make sure the others are clear of the danger areas. Examples of danger areas are: the rotating blades and belt on the engine, the attachments and linkages, and anywhere beneath or behind the machine. People can be killed or injured if these precautions are not taken.

Repairs

If your machine does not function correctly in any way, get it repaired straight away. Neglect of necessary repairs could result in an accident or affect your health. Do not try to do repairs or any other type of maintenance work you do not understand. To avoid injury and/or damage get the work done by a specialist engineer.

Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before connecting or removing any hydraulic hose, residual hydraulic pressure trapped in the service hose line must be vented. Make sure the hose service line has been vented before connecting or removing hoses. Make sure the engine cannot be started while the hoses are open.

'O' rings, Seals and Gaskets

Badly installed, damaged or rotted 'O' rings, seals and gaskets can cause leakages and possible accidents. Renew whenever disturbed unless otherwise instructed. Do not use Triochloroethane or paint thinners near 'O' rings and seals.

Arc Welding

To prevent the possibility of damage to electronic components, disconnect the battery and the alternator before arc-welding on the machine or attached implements.

If the machine is equipped with sensitive electrical equipment, i.e. amplifier drivers, electronic control units (ECUs), monitor displays, etc., then disconnect them before welding. Failure to disconnect the sensitive electrical equipment could result in irreparable damage to these components.

Parts of the machine are made from cast iron, welds on cast iron can weaken the structure and break. Do not weld cast iron. Do not connect the welder cable or apply any weld to any part of the engine.

Always connect the welder earth (ground) cable to the same component that is being welded to avoid damage to pivot pins, bearings and bushes. Attach the welder earth (ground) cable a distance from the part being welded no more than 0.6m.

Counterweights

Your machine may be installed with counterweights. They are extremely heavy. Do not attempt to remove them.

Accumulators

The accumulators contain hydraulic fluid and gas at high pressure. Prior to any work being carried out on systems incorporating accumulators, the system pressure must be discharged by a JCB dealer, as the sudden release of the hydraulic fluid or gas may cause serious injury or death.

Hot Components

Touching hot surfaces can burn skin. The engine and machine components will be hot after the unit has been running. Allow the engine and components to cool before servicing the unit.

Soft Ground

A machine can sink into soft ground. Never work under a machine on soft ground.

Working Under the Machine

Make the machine safe before getting beneath it. Make sure that any attachments on the machine are correctly attached. Engage the park brake, remove the ignition key, disconnect the battery. If the machine has wheels use blocks to prevent unintentional movement.

Lifting the Machine

Under no circumstances must the engine be run with the transmission in gear and only one driving wheel jacked clear of the ground, since the wheel on the ground will move the machine.

Chemicals

Certain seals and gaskets (e.g. crankshaft oil seal) on JCB machines contain fluoroelastomeric materials such as Viton®, FluorelTM and Technoflon®. Fluoroelastomeric materials subjected to high temperatures can produce highly corrosive hydrofluoric acid. This acid can severely burn. New fluoroelastomeric components at ambient temperature require no special safety precautions. Used fluoroelastomeric components whose temperatures have not exceeded 300°C (571.6°F) require no special safety precautions. If evidence of decomposition (e.g. charring) is found, refer to the next paragraph for safety instructions. Do not touch component or surrounding area. Used fluoroelastomeric components subjected to temperatures greater than 300°C (571.6°F) (e.g. engine fire) must be treated using the following safety procedure. Make sure that heavy duty gloves and special safety glasses are worn: Thoroughly wash contaminated area with 10% calcium hydroxide or other suitable alkali solution, if necessary use wire wool to remove burnt remains. Thoroughly wash contaminated area with detergent and water. Contain all removed material, gloves etc. used in this operation in sealed plastic bags and dispose of in accordance with Local Authority Regulations. Do not burn fluoroelastiometric materials.

Hydraulic Hoses

Never re-use hydraulic hose end crimps or use reusable hose end crimps.

Personal Protective Equipment

Use the appropriate personal protective equipment before performing maintenance on the machine, otherwise you could be injured.

Working at Height

Use appropriate access equipment such as ladders or a working platform if it is necessary to work at height to perform maintenance tasks on the machine. If you do not use suitable access equipment there is a risk of falling, resulting in personal injury or death.

18 - Operating Safety

Health and Safety

Training

Make sure that you have had adequate training and that you are confident in your ability to operate the machine safely before you use it. Practice using the machine and its attachments until you are completely familiar with the controls and what they do. With a careful, well trained and experienced operator, your machine is a safe and efficient machine. With an inexperienced or careless operator, it can be dangerous. Do not put your life, or the lives of others, at risk by using the machine irresponsibly. Before you start to work, tell your colleagues what you will be doing and where you will be working. On a busy site, use a signalman.

Before doing any job not covered in this manual, find out the correct procedure. Your local JCB distributor will be glad to advise you.

Fuel

Fuel is flammable, keep naked flames away from the fuel system. Stop the engine immediately if a fuel leak is suspected. Do not smoke while refuelling or working on the fuel system. Do not refuel with the engine running. Completely wipe off any spilt fuel which could cause a fire. There could be a fire and injury if you do not follow these precautions.

Machine Condition

A defective machine can injure you or others. Do not operate a machine which is defective or has missing parts. Make sure the maintenance procedures in this manual are completed before using the machine.

Machine Limits

Operating the machine beyond its design limits can damage the machine, it can also be dangerous. Do not operate the machine outside its limits. Do not try to upgrade the machine performance with unapproved modifications or additional equipment.

Engine/Steering Failure

If the engine or steering fails, stop the machine as quickly as possible. Do not operate the machine until the fault has been corrected.

Exhaust Gases

Machine exhaust gases can harm and possibly kill you or bystanders if they are inhaled. Do not operate the machine in closed spaces without making sure there is good ventilation. If possible, install an exhaust extractor. If you begin to feel drowsy, stop the machine at once and get into fresh air.

Worksites

Worksites can be hazardous. Examine the site before working on it. You could be killed or injured if the ground gives way under your machine or if piled material collapses onto it. Check for potholes and hidden debris, logs, ironwork etc. Any of these could cause you to lose control of your machine. Check for utilities such as electric cables (overhead and underground), gas and water pipes etc. Mark the positions of the underground cables and pipes. Make sure that you have enough clearance beneath overhead cables and structures.

Communications

Bad communications can cause accidents. Keep people around you informed of what you will be doing. If you will be working with other people, make sure any hand signals that may be used are understood by everybody. Worksites can be noisy, do not rely on spoken commands.

Parking

An incorrectly parked machine can move without an operator. Follow the instructions in the Operator's Manual to park the machine correctly.

Banks and Trenches

Banked material and trenches can collapse. Do not work or drive too close to banks and trenches where there is danger of collapse.

Safety Barriers

Unguarded machines in public places can be dangerous. In public places, or where your visibility is reduced, place barriers around the work area to keep people away.

Sparks

Explosions and fire can be caused by sparks from the exhaust or the electrical system. Do not use the machine in closed areas where there is flammable material, vapour or dust.

Hazardous Atmospheres

This machine is designed for use in normal out door atmospheric conditions. It must not be used in an enclosed area without adequate ventilation. Do not use the machine in a potentially explosive atmosphere, i.e. combustible vapours, gas or dust, without first consulting your JCB dealer.

Regulations

Obey all laws, worksite and local regulations which affect you and your machine.

Electrical Power Cables

You could be electrocuted or badly burned if you get the machine or its attachments too close to electrical power cables.

You are strongly advised to make sure that the safety arrangements on site comply with the local laws and regulations concerning work near electric power lines.

Before you start using the machine, check with your electricity supplier if there are any buried power cables on the site.

There is a minimum clearance required for working beneath overhead power cables. You must obtain details from your local electricity supplier.

Working Platform

Using the machine as a working platform is hazardous. You can fall off and be killed or injured. Never use the machine as a working platform unless with approved man-basket or man-crate (if applicable).

Machine Safety

Stop work at once if a fault develops. Abnormal sounds and smells can be signs of trouble. Examine and repair before resuming work.

Hot Components

Touching hot surfaces can burn skin. The engine and machine components will be hot after the unit has been running. Allow the engine and components to cool before servicing the unit.

Travelling at High Speeds

Travelling at high speeds can cause accidents. Always travel at a safe speed to suit working conditions.

Hillsides

Operating the machine on hillsides can be dangerous if the correct precautions are not taken. Ground conditions can be changed by rain, snow, ice etc. Check the site carefully. When applicable, keep all attachments low to the ground.

Visibility

Accidents can be caused by working in poor visibility. Use your lights to improve visibility. Keep the road lights, windows, mirrors and cameras clean (when fitted).

Do not operate the machine if you cannot see clearly.

Modification of the machine's configuration by the user (e.g. the fitting of large and non-approved attachments) may result in a restriction of the machine visibility.

Hands and Feet

Keep your hands and feet inside the machine.

When using the machine, keep your hands and feet clear of moving parts. Keep your hands and feet within the operator compartment while the vehicle is in motion.

Controls

You or others can be killed or seriously injured if you operate the control levers from outside the machine. Operate the control levers only when you are correctly seated.

Passengers

Passengers in or on the machine can cause accidents. Do not carry passengers.

Fires

If your machine is equipped with a fire extinguisher, make sure it is checked regularly. Keep it in the correct machine location until you need to use it.

Do not use water to put out a machine fire, you could spread an oil fire or get a shock from an electrical fire. Use carbon dioxide, dry chemical or foam extinguishers. Contact your nearest fire department as quickly as possible.

Roll Over Protection

If the machine starts to roll over, you can be crushed if you try to leave the cab. If the machine starts to roll over, do not try and jump from the cab. Stay in the cab, with your seat belt fastened.

Confined Areas

Pay extra attention to proximity hazards when operating in confined areas. Proximity hazards include buildings, traffic and bystanders.

Safe Working Loads

Overloading the machine can damage it and make it unstable. Study the specifications in the Operator's Manual before using the machine.

Lightning

If you are inside the machine during a lightning storm stay in the machine until the storm has passed. If you are outside of the machine during a lightning storm stay away from the machine until the storm has passed. Do not attempt to mount or enter the machine.

If the machine is struck by lightning do not use the machine until it has been checked for damage and malfunction by trained personnel.

06 - About this Manual

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00 - General

Introduction

This manual is built up in a modular way to include procedures for disassembling, inspection and assembly of JCB axles and gearboxes. It should be noted that procedures given in this manual are for transmission assemblies only. Service procedures specific to machine transmission installations are given in the relevant machine service manual.

When applicable, procedures in this manual are referred to in the JCB machine service manual. To check the cross reference see the transmission Technical Data pages in the machine service manual. There are many transmission variants, ensure that you are referencing the correct procedures for the applicable transmission assembly.

06 - Using the Manual

Introduction

Information in this manual conforms to a standard JCB service manual format. The format uses section headings taken from a PIL (Parts Identification List). These headings are assigned numerical identification references.

Table 1.

Example	Section	Main Assembly / Heading	Component / Sub-heading
PIL reference	27	06	09
Heading	Driveline	Semi automatic gearbox	Clutch- mainshaft

Information within each PIL reference is included under a set of standard headings such as Introduction, Component Identification, Technical Data and Operation for example. Where additional relevant information is contained within another PIL reference a cross reference is provided.

Diagnostics

Information in this manual can help you diagnose machine faults.

Before attempting to diagnose possible faults check the following.

- Ensure that the operator understands the machine controls, functions and use. Refer to the applicable Operator Manual.
- Check that the maintenance record complies with the applicable schedule for the operating environment. Refer to PIL 78-24.
- Check that the fluids in use comply with the standards specified. Refer to PIL 75-00.
- Ensure that the machine electronic set-up is applicable. Use the applicable Servicemaster vehicle set-up tool. Refer to PIL 33-57-03.
- Use the applicable Servicemaster diagnostics tools. Refer to PIL 33-57-03.

Torque Tightening

When you replace components, always tighten the applicable fixings to the correct torque value. Use the torque tightening values contained in the individual procedures (Remove and Install, Disassemble and Assemble etc.). If no torque values are specified, use the standard torque tightening values. Refer to Fasteners and Fixings, Screws, Bolts, Nuts, Technical Data (PIL 72-00). For the torque setting to be effective, do the following before you install the fixings.

- Make sure that all the applicable component assemblies are correct.
- Make sure that the applicable fixings are to the correct specification. If necessary discard the original fixings and replace them with new ones. The relevant procedures indicate when this is necessary.
- Make sure that the applicable fixings and threaded holes are free from contamination. This includes dirt, debris, old sealants and compounds, fluids and lubricants.

06 - Body and Framework

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63 - Identification Label

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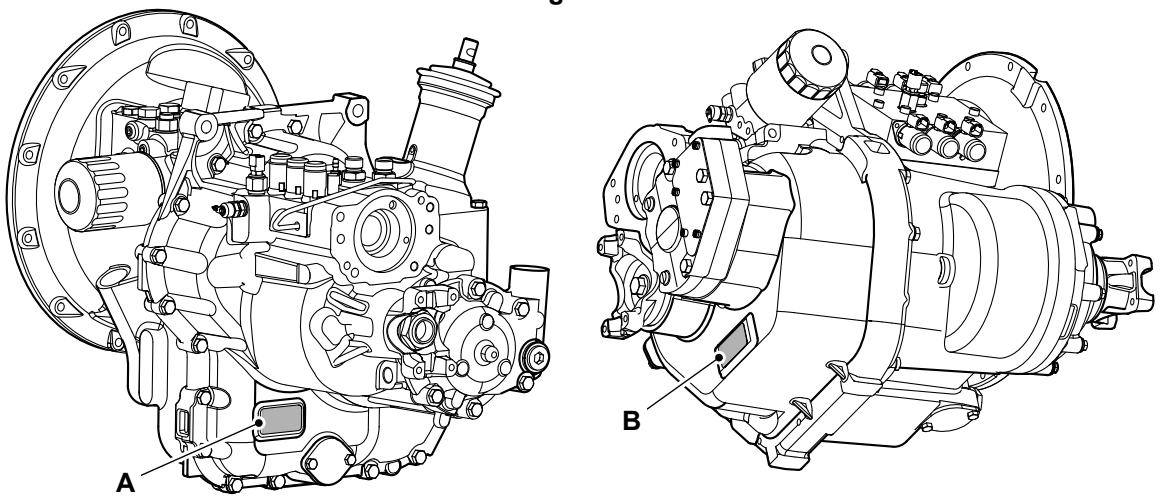
12 - Gearbox

Introduction

(For: PS750 MK4, PS760, PS766)

The gearbox has a serial number stamped on a data plate as shown.

Figure 2.



A Data plate- Synchro shuttle transmission

B Data plate- Powershift transmission

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24 - Brake System

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18 - Park Brake

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00 - General

Introduction

(For: HS750)

The park brake also called the hand brake is a latching brake usually used to keep the vehicle stationary. It is also used to prevent a vehicle from rolling when there is no operator in the cab.

The park brake system consists of an actuator cylinder which is operated hydraulically to release the park brake. The cylinder moves the actuator rod which turns the actuator lever. The actuator lever on the calliper withdraws the brake pads from the disc mounted on the output of the gearbox allowing drive to be restored to the propshaft and axles.

For details of disc procedures refer to (PIL 24-18-21).

For details of actuator and calliper procedures refer to (PIL 24-18-48).

(Otherwise)

The park brake also called the hand brake is a latching brake usually used to keep the vehicle stationary. It is also used to prevent a vehicle from rolling when the operator needs both feet to operate the clutch and throttle pedals.

The park brake usually consists of a cable directly connected to the brake mechanism on one end, and to a hand-operated lever, on the floor at the side of the driver.

Technical Data

(For: HS750)

Table 2. Park Brake

Description	Acceptable Tolerances
Disc minimum thickness	8.9mm
Pad minimum thickness	1mm

(Otherwise)

Table 3. Park Brake Multi-pack Brakes (If Installed)

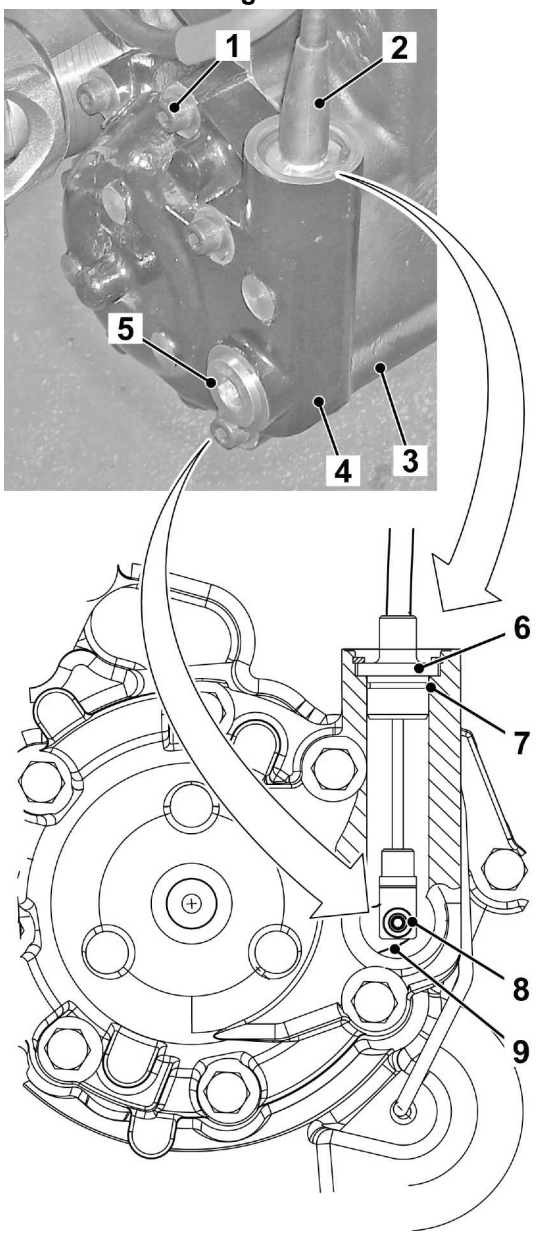
Description	Acceptable Tolerances (mm)
Friction pack assembly thickness	37.1 to 39.6

Component Identification

For: HM560 Variable Transmission, SS750 ..... Page 24-5
For: HS750 ..... Page 24-6

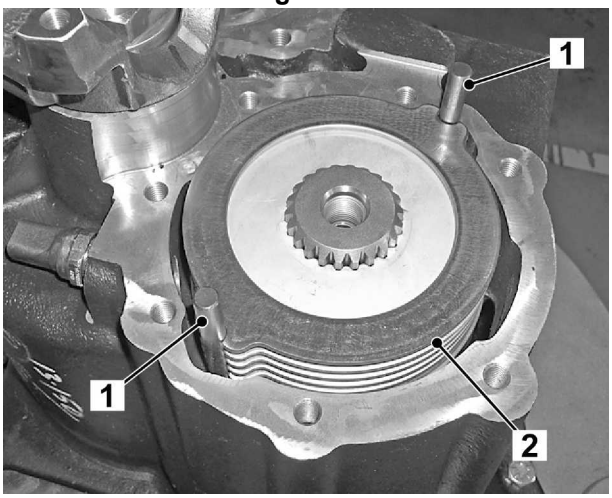
(For: HM560 Variable Transmission, SS750)

Figure 3.



1 Capscrews
2 Park brake cable
3 Rear case
4 Brake actuator housing
5 Plug
6 Collar
7 O-ring
8 Special clevis pin
9 Brake actuator

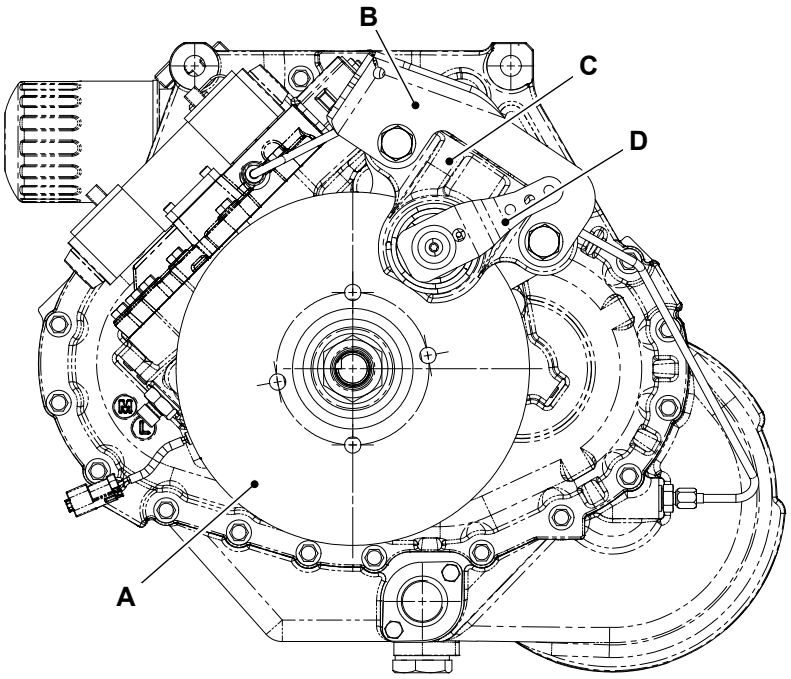
Figure 4.



1 Reaction pins
2 Brake multi-pack plates

(For: HS750)

Figure 5.



A Park brake disc
B Calliper mounting bracket
C Calliper
D Actuator lever

Operation

(For: HS750)

The park brake is Independent of the service brakes. It operates on the drive to the axle by means of a disc mounted on the gearbox output shaft.

When the park brake is operated the actuator pulls the caliper reaction lever and pressure is applied to the caliper mounted brake pads to hold the brake disc.

Check (Condition)

For: HM560 Variable Transmission, PS764, PS766, SS750 ..... Page 24-7
For: 40 Series (3 Piece Axle and Dropbox) ..... Page 24-8
For: HS750 ..... Page 24-8

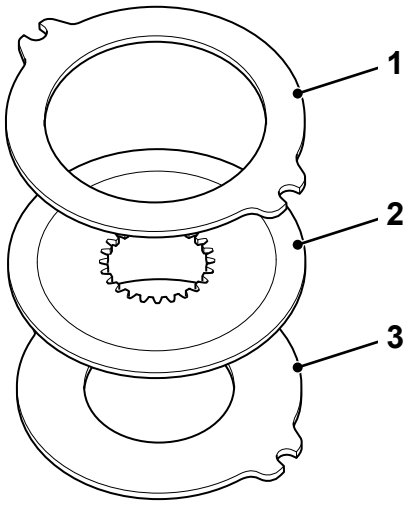
(For: HM560 Variable Transmission, PS764, PS766, SS750)

Before inspecting the brake components carefully remove all traces of sealing compound from component mating faces. Use a suitable degreaser, clean the brake components including the brake housing in the gearbox rear case.

Multi-Plate Pack

1. Carefully inspect the friction plates and counter plates. If any of the plates show signs of damage or distortion, renew the complete plate pack.

Figure 6.



1 Thrust plate
2 Counter plates
3 Friction plates

2. Assemble the friction and counter plates (including the thrust plate) on a suitable datum table. Measure the overall thickness of the assembled friction pack. The thickness X must be between the recommended tolerances, refer to Technical Data.

Figure 7.

X Friction pack assembly thickness

2.1. If the friction pack is outside these limits, the complete friction pack assembly must be renewed.

Note: The friction pack may be outside the maximum thickness value if the plates are distorted, typically after the brake has performed an emergency stop.

(For: 40 Series (3 Piece Axle and Dropbox))

Before inspecting the brake components carefully remove all traces of sealing compound from component mating faces. Use a suitable degreaser, clean the brake components including the brake housing in the gearbox rear case.

Multi-Plate Pack

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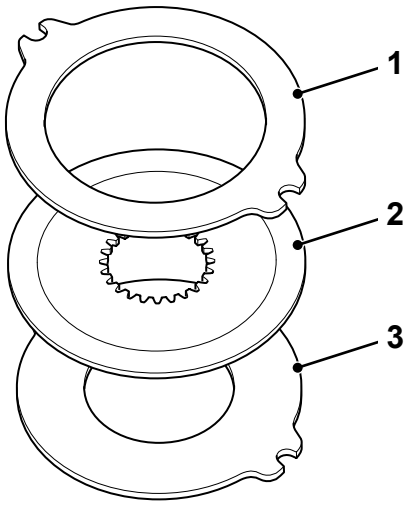
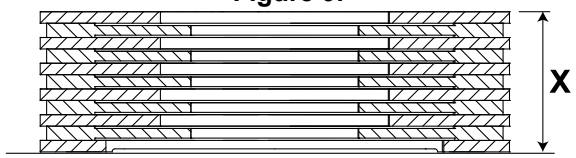
Figure 8.



1 Thrust plate
2 Counter plates
3 Friction plates

2. Assemble the friction and counter plates (including the thrust plate) on a suitable datum table. Measure the overall thickness of the assembled friction pack. The thickness X must be between the recommended tolerances, refer to Technical Data.

Figure 9.



X Friction pack assembly thickness

2.1. If the friction pack is outside these limits, the complete friction pack assembly must be renewed.

Note: The friction pack may be outside the maximum thickness value if the plates are distorted, typically after the brake has performed an emergency stop.

(For: HS750)

⚠ **WARNING** Oil on the brake disc will reduce brake effectiveness. Keep oil away from the brake disc. Remove any oil from the disc with a suitable solvent. Read and understand the solvent manufacturer's safety instructions. If the pads are oily, install with the new pads.

1. Follow the brake pad removal instructions. refer to (PIL 24-03).
2. Make sure that the minimum thickness of the friction material on either pad is 1mm (0.04 in), but it is recommended to install new pads as it may not be possible to adjust pads worn to this limit.
3. Check the condition of the disc surface. Install a new disc if the surface is badly warped, pitted or worn.
4. Make sure the actuator is adjusted correctly.

Remove and Install

(For: HS750)

Safety Critical Installation

This is a safety critical installation. Do not attempt to do this procedure unless you are skilled and competent to do so.

Installation and mounting of the park brake caliper requires tightening of the mounting bolts to a specific torque figure. Do not attempt to do this job unless you have the correct tools available.

WARNING! *Before working on the brake system, make sure that the machine is on solid level ground. Put blocks on all wheels to prevent the machine rolling.*

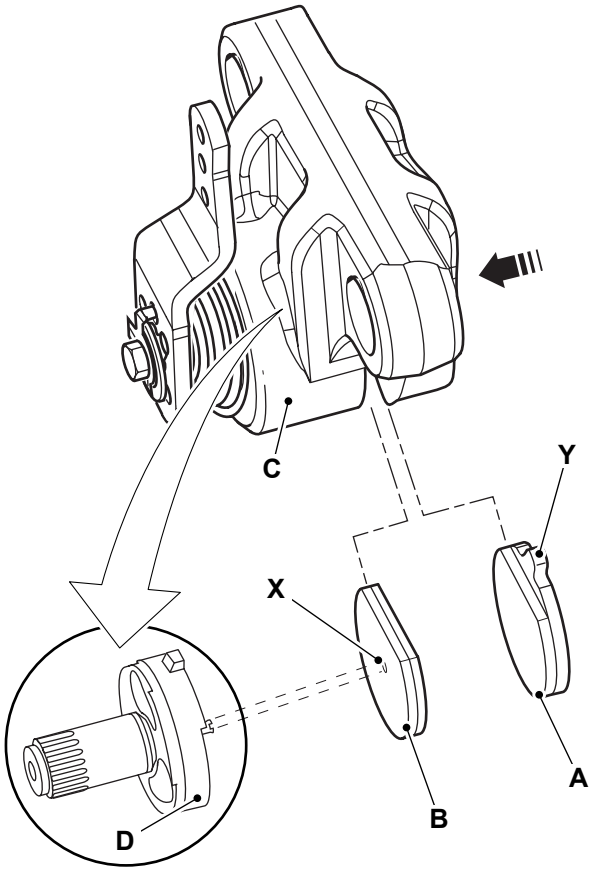
CAUTION! *Brake pads generate dust which if inhaled, may endanger health. Wash off the caliper assemblies before commencing work. Clean hands thoroughly after work.*

WARNING! *Oil on the brake disc will reduce brake effectiveness. Keep oil away from the brake disc. Remove any oil from the disc with a suitable solvent. Read and understand the solvent manufacturer's safety instructions. If the pads are oily, install with the new pads.*

Remove

1. Make the machine safe. Refer to (PIL 01-03).
2. Remove the parking brake calliper from the axle mounting bracket. Refer to brakes- park brake, refer to (PIL 24-18).
3. Press carrier side pad into the housing and remove it. Make sure that any residual silicone used for pad retention during assembly is removed.
4. Carefully lever the pad from the rotor inside the housing using a flat blade screwdriver. Take care not to damage to the plastic clip in the centre of the rotor (there is no need to remove the rotor from the calliper).
5. Inspect the pads, please see (PIL 18-15).

Figure 10.



A Side pad
B Lever pad
C Housing
D Rotor
X Hole
Y Anti-rattle pad

Install

1. Install the pad to the lever side of the calliper.
2. Position the pad inside the housing.
3. Put the plastic clip in the centre of the rotor into the hole and press the pad into place.
4. Make sure that the plastic anti-rattle pad is placed correctly.
5. Install the pad to the carrier side of the calliper.
6. Add a small amount of silicone sealant to the back outer edge of the backing plate to hold the pad in place within the housing.
7. Install the calliper. Refer to brakes- park brake, refer to (PIL 24-18).

Disassemble and Assemble

(For: HM560 Variable Transmission, SS750)

Consumables

Description	Part No.	Size
JCB Multi-Gasket	4102/1212	0.05L

The integral park brake consists of a wet multi-plate pack and a mechanical brake actuator assembly.

Brake Actuator

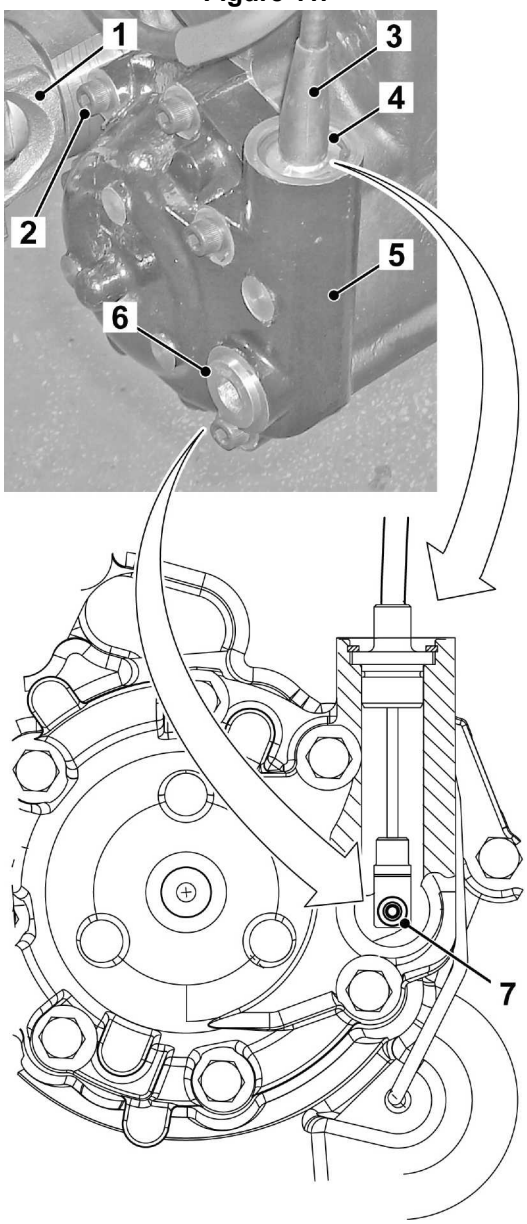
1. Refer to Park Brake, Actuator - Disassemble and Assemble (PIL 24-18-48).

Multi-Plate Pack

Remove

1. Position the output yoke as shown.

Figure 11.



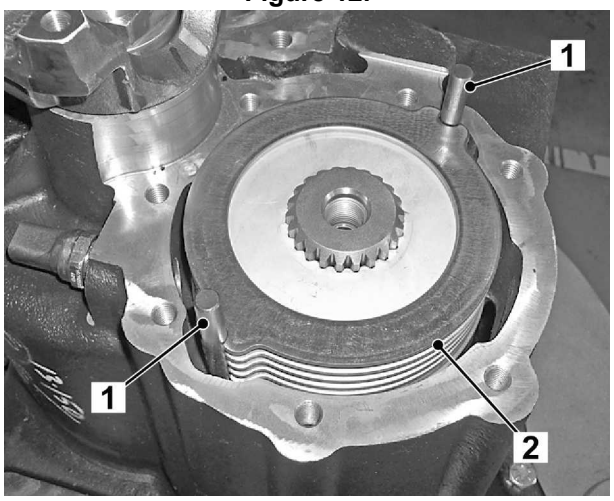
1 Output yoke
2 Capscrews
3 Park brake cable
4 Circlip
5 Brake actuator assembly
6 Plug
7 Clevis screw

2. Remove the plug.
3. Remove the clevis screw.
4. Remove the circlip.
5. Remove the park brake cable from the gearbox.

6. Remove the six capscrews. Lift off the brake housing together with the brake actuator assembly.

7. Remove the reaction pins and brake pack plates.

Figure 12.



1 Reaction pins
2 Brake multi-pack plates

Before replacement of the multi-plate pack inspect the components for wear and damage, refer to Check Condition (PIL 24-18).

Replacement is the opposite of the removal procedure. During the replacement procedure do the following work:

Install

1. Remove all traces of sealant from the brake actuator housing and rear case mating faces.

2. Apply a bead of JCB Multigasket sealant to the rear casing mating face.

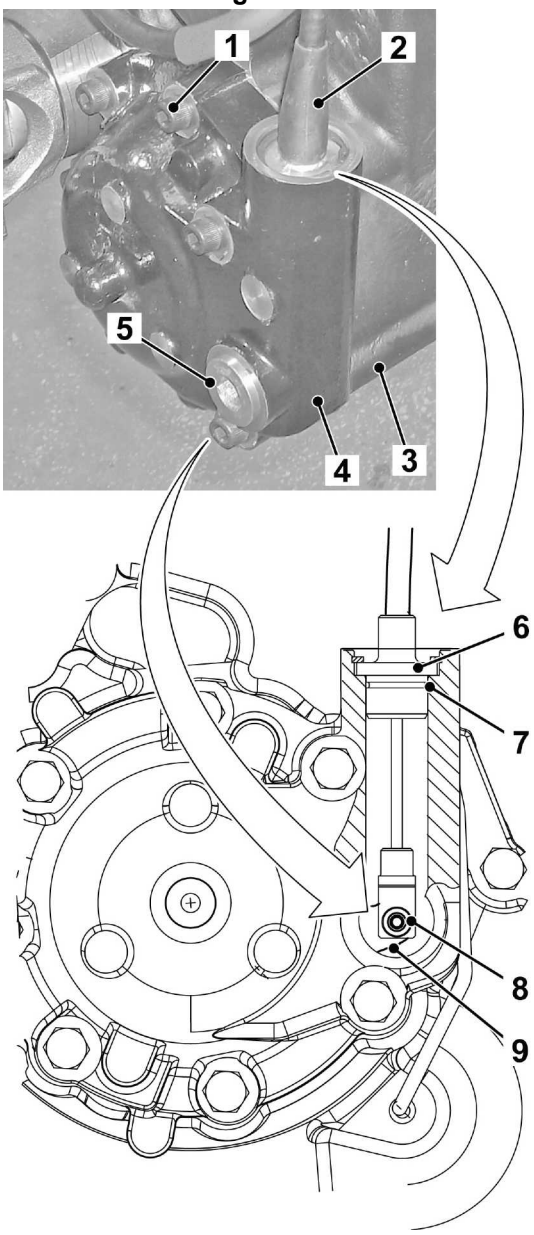
   Consumable: JCB Multi-Gasket

3. Make sure that the brake actuator needle roller thrust bearing is installed correctly.

4. If removed during the disassembly, install the park brake cable. Feed the cable into the brake actuator housing and connect the fork end to the brake actuator with the screw. Make sure that the O-ring is undamaged and correctly installed on the collar.

Note: Item 8 is a special clevis pin. DO NOT install a standard bolt or screw.

Figure 13.



1 Capscrews
2 Park brake cable
3 Rear case
4 Brake actuator housing
5 Plug
6 Collar
7 O-ring
8 Special clevis pin
9 Brake actuator

Table 4. Torque Values

Item	Nm
1	56
8	9

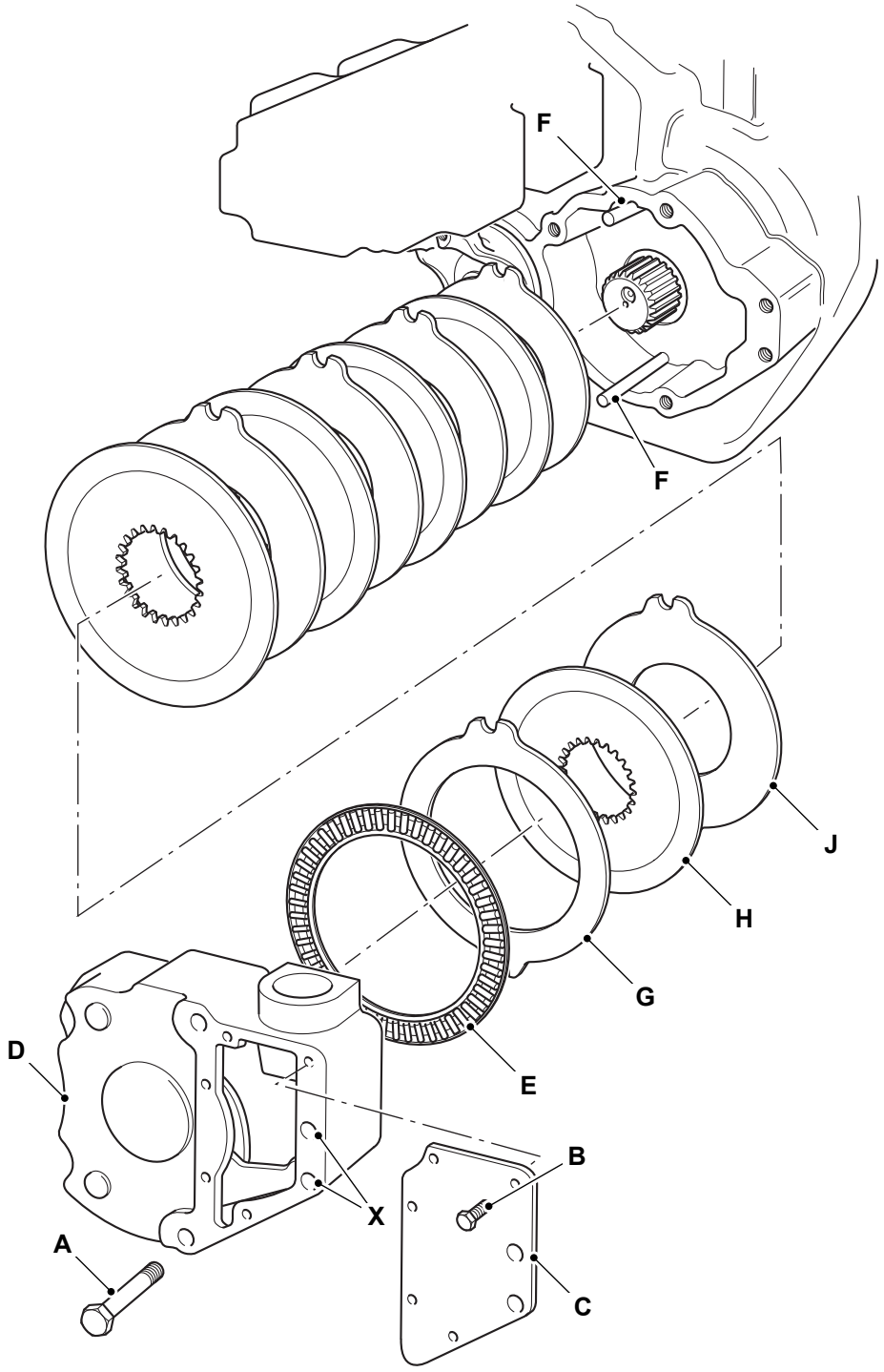
(For: PS764, PS766)

Consumables

Description	Part No.	Size
JCB Multi-Gasket	4102/1212	0.05L

Disassemble

Figure 14.

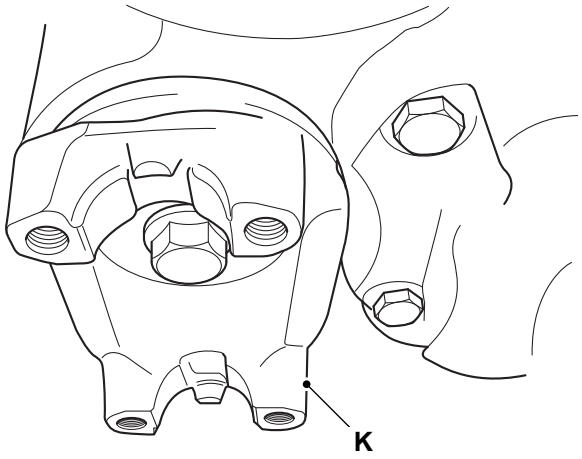


A Bolt (x2)
B Screw (x5)
C Cover plate
D Cover
E Needle roller thrust bearing.
F Reaction pins

G Thrust plate
J Counter plate

1. Position the output yoke as shown. Refer to Figure 15.

Figure 15.



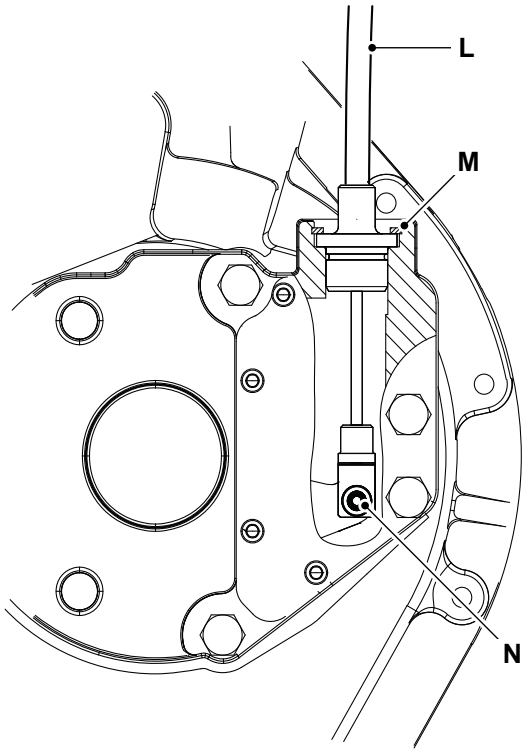
K Output yoke

2. Remove the cover plate as follows: Refer to Figure 14.
   2.1. Remove only two bolts from location1 and location 2.
   2.2. Remove the screws.
   2.3. Before the cover plate is removed, place a container below to collect the gearbox oil.
   2.4. Remove the cover plate with a flat bladed screwdriver.
3. Remove the remaining bolts (x4) and carefully remove the cover, keeping it parallel to the mating face of the gearbox. Refer to Figure 14.
4. Be aware that the needle roller thrust bearing and the reaction pins may come away with the cover. Refer to Figure 14.
5. Remove the following: Refer to Figure 14.
   5.1. Needle roller thrust bearing.
   5.2. Thrust plate

H Friction plate
X Location1 and Location 2 for bolt removal

   5.3. Friction plates.
   5.4. Counter plates.
6. If the brake assembly is being removed before you disassemble the gearbox, then remove the reaction pins. Refer to Figure 14.
7. If the brake actuator is to be disassembled, or the cable is to replaced, then remove the park brake cable as follows: Refer to Figure 16.

Figure 16.

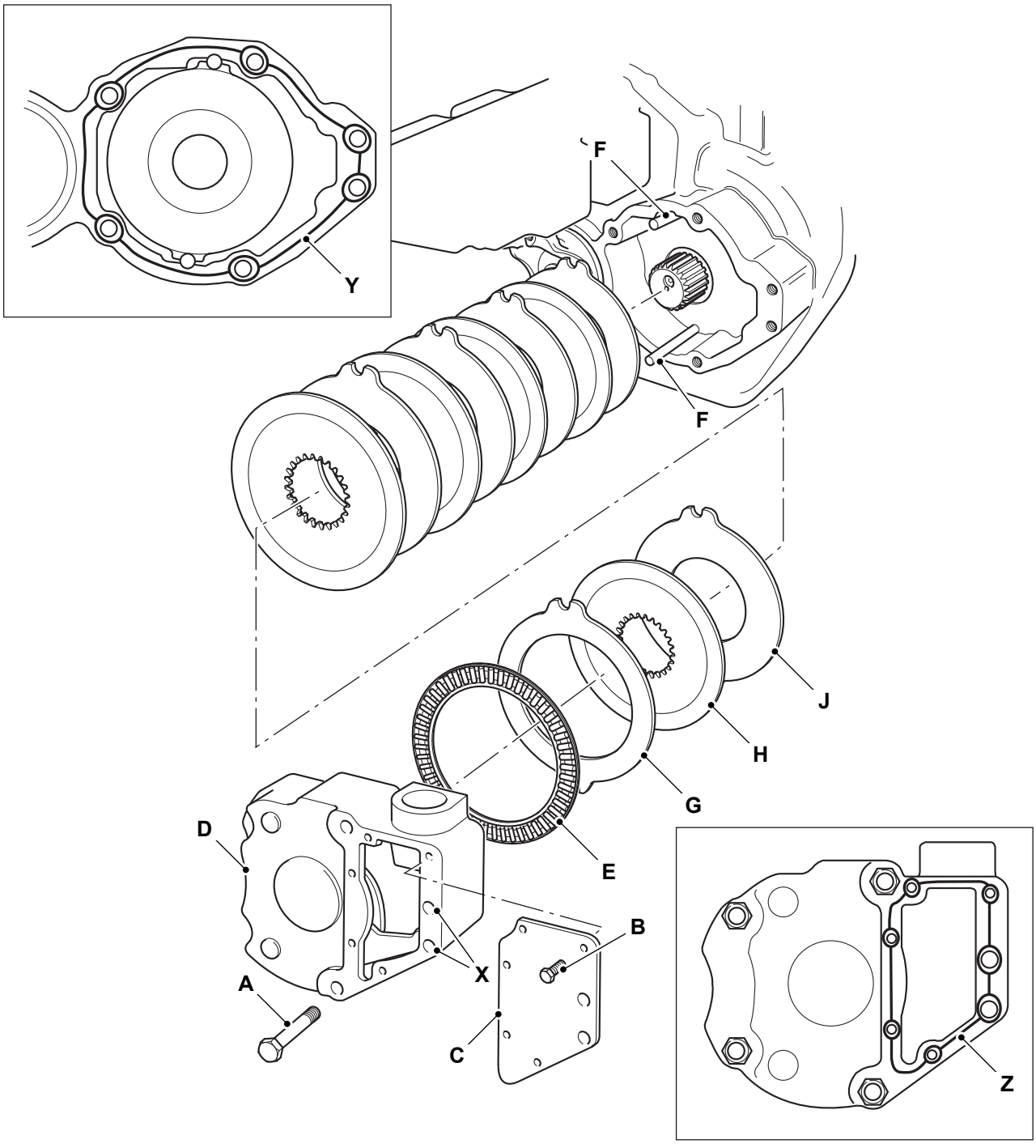


L Brake cable
M Circlip
N Clevis pin

   7.1. Remove the clevis pin.
   7.2. Remove the circlip and then remove the cable from the cover.

Assemble

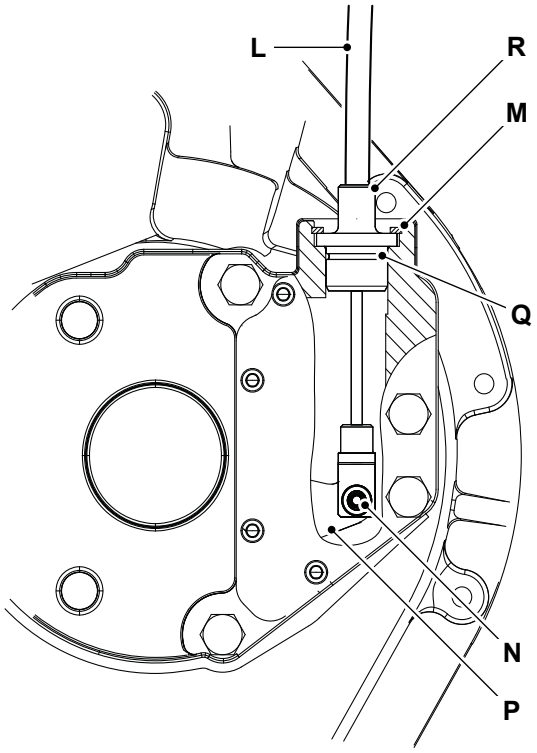
Figure 17.



A Bolt (x2)
B Screw (x5)
C Cover plate
D Cover
E Needle roller thrust bearing.
F Reaction pins
G Thrust plate
H Friction plate
J Counter plate
X Location 1 and Location 2 for bolt installation
Y Sealant location on gearbox case
Z Sealant location on cover

1. Inspect the brake pack.
2. Assemble the reaction pins and then install the friction pack in the gearbox case. Refer to Figure 17.
   2.1. Note that a counter plate is installed first followed by a friction plate and so on.
   2.2. Install the thrust plate last.
3. If removed during disassembly install the park brake cable as follows: Refer to Figure 18.

Figure 18.



L Brake cable
M Circlip
N Clevis pin
P Brake actuator
Q O-ring
R Collar

   3.1. Put the cable into the housing and connect the fork end to the brake actuator with clevis pin.
   3.2. Never replace the clevis pin with a normal bolt or screw.
   3.3. Make sure that the O-ring is not damaged and correctly installed on the collar.
   3.4. Locate the collar inside the brake housing and secure with the circlip.
4. Make sure that the needle roller thrust bearing is correctly installed on the actuator assembly.
5. Apply a bead of sealant to the mating face on the gearbox case. Refer to Figure 17.

   Consumable: JCB Multi-Gasket
6. Attach the cover with the bolts (x4). Refer to Figure 17.
   6.1. Note that 2 bolts at location 1 and location 2 are not installed at this stage.
7. Tighten the bolts to the correct torque value. Refer to Figure 17.
8. Apply a bead of sealant to the mating face on the cover. Refer to Figure 17.

   Consumable: JCB Multi-Gasket
9. Attach the cover plate with screws (x5) and the bolts (x2). Refer to Figure 17.
10. Tighten the screws and bolts to the correct torque value. Refer to Figure 17.

It is essential that the park brake cable is adjusted correctly when the gearbox is installed into the machine. Incorrect adjustment of the cable can result in damage to the brake components and excessive overheating of the brake assembly. See the applicable machine Service Manual for the cable adjustment procedure.

Table 5. Torque Values

Item	Nm
A	56
B	16
N	9

(For: P/Tronic 6x4 Smoothshift)

To get access to the park brake remove the front case clutch pack shafts and the idler gear shafts.

Disassembly

1. Remove the brake plates that consist of two friction plates and one counter plate.
   1.1. Check the plates for wear or distortion, discard the plates if the wear is below the serviceable limits.
2. Remove the actuator piston from the housing, if necessary compressed air may be applied to the supply gallery to remove the piston.
3. Remove and discard the piston O-ring 1 and O-ring 2.

4. When you lift the brake piston plates from the case, locking dowels may become dislodged from the housing.

   4.1. Collect the dowels and replace in their respective bores, make sure that they are pushed fully home.

5. Counter plate drive dowels may also become dislodged.

   5.1. Collect the dowels and install in the lower face of the hub gear of the clutch and push fully down in their respective bores.

Figure 19.

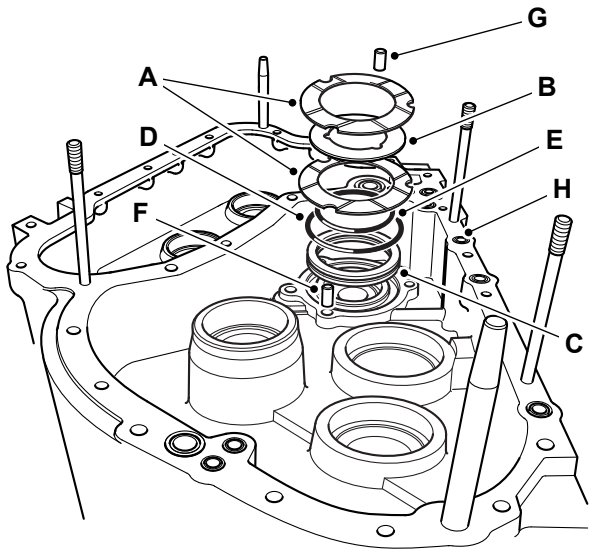


Table 6.

Item	Description
A	Friction plates
B	Counter plates
C	Actuator piston
D	O-ring 1
E	O-ring 2
F	Locking dowels
G	Counter plate drive dowels
H	Supply gallery

Assembly

1. Before you assemble, lubricate the new O-ring 1 and O-ring 2 with the correct transmission oil for your machine.

2. Install the new O-rings to the brake piston.

3. Replace the piston into the bore of the brake housing, make sure it is installed in the correct orientation with the plate lubrication/pressure vent holes uppermost.

4. Position first friction brake plate with cutouts located over the dowels followed by the counter plate and second friction plate positioned on the top.

5. Make sure that the cutouts in the counter plate engage with the dowels when the clutch is rebuilt and assembled into the case.

(For: 40 Series (3 Piece Axle and Dropbox))

Special Tools

Description	Part No.	Qty.
Park Brake Lockup Tool	892/01237	1

The integral park brake is installed inside the drop-box rear case and cannot be disassembled with the drop-box installed to the axle.

The park brake consists of a dry multi-plate friction pack and a mechanical actuator assembly.

Disassemble

1. Remove the cover plate as follows:

   1.1. Remove only the two bolts from location 1 and location 2.

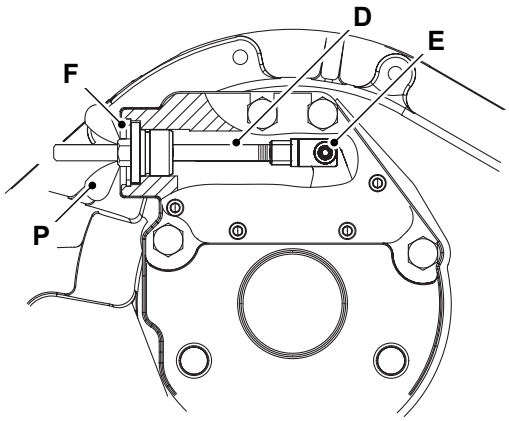
   1.2. Remove the capscrews.

   1.3. Remove the cover plate.

2. Disconnect and remove the park brake lock-up tool.

   2.1. Remove the clevis pin and then remove the tool from the cover.

Figure 20.



D Park brake lock-up tool
E Clevis pin

3. Remove the remaining bolts (x4) and carefully remove the cover, keep it parallel to the mating face of the drop-box case.

   3.1. If the cover does not get loosen easily, one or more reaction pins will have remained in the cover. Use a pair of long nosed pliers to push the pins back into the drop-box case. Make sure that you do not damage the surface of the pins.

4. Remove the components that follow:

   4.1. Needle roller thrust bearing.

   4.2. Thrust plate.

   4.3. Friction plates.

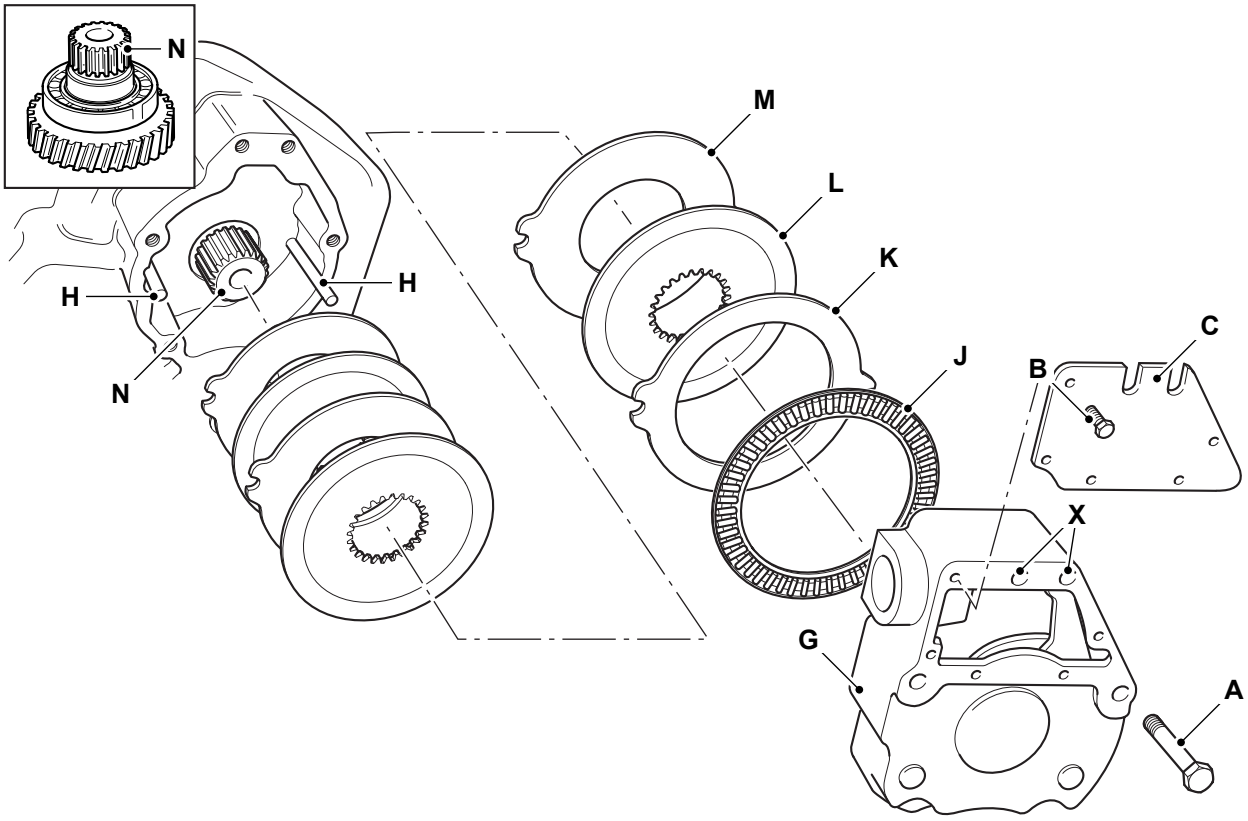
   4.4. Counter plates.

5. Disassemble the brake actuator.

6. Inspect the friction plate pack for damage.

7. Inspect the brake actuator for damage.

Figure 21.

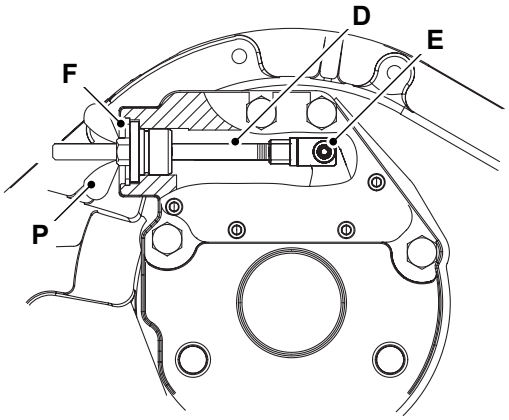


A Bolt (x6)
B Capscrew (5)
C Cover plate
G Cover
H Reaction pins
J Needle roller thrust bearing
K Thrust plate
L Friction plate
M Counter plate
N Hydraulic motor drive gear
X Location 1 and Location 2 for bolt installation

Assemble

1. Assemble the brake actuator.
2. To make sure of proper alignment of the brake pack plates, the hydraulic motor drive gear and its bearing must be installed to the drop-box rear case.
   2.1. The gear must be removed from the motor before you install it to the cover. To remove the hydraulic motor refer to the applicable procedure.
3. Install the reaction pins and then install the friction pack into the drop-box rear case.
   3.1. Note that a counter plate is installed first followed by a friction plate and so on.
   3.2. Install the thrust plate last.
4. Make sure that the needle roller thrust bearing is correctly installed on the actuator assembly.
5. Attach the cover with the bolts (x4).
   5.1. Note that the 2 bolts at location1 and location2 are not installed at this stage.
   5.2. View the brake friction pack through the cover aperture and check its operation.
   5.3. Movement in the plates will be easily felt when the brake is off.
6. Install the park brake lock-up tool.
   Special Tool: Park Brake Lockup Tool (Qty.: 1)
7. Connect the fork end to the brake actuator with the clevis pin. Refer to Figure 22.
8. Put the collar inside the brake housing and attach it with the circlip.

Figure 22.



D Par brake lock-up tool
E Clevis pin
F Circlip
P Wing nut

9. Tighten the wing-nut sufficiently to hold the plates together. Refer to Figure 22.
10. Remove the hydraulic motor drive gear from the case.
11. Loosely install the cover plate with the capscrews (x5) and the remaining two bolts.
12. Do not torque tighten these bolts at this stage.

Note: The final stages of the brake assembly must be completed after the axle has been installed to the machine. See the applicable machine service manual.

Important: Do not remove the park brake lock-up tool until the hydraulic motor has been installed.

Table 7. Torque Values

Item	Description	Nm
A	Bolt	56

21 - Disc

Introduction

A disc brake is a wheel brake that slows the rotation of the wheel by the friction caused by pushing brake pads against a brake disc with a set of calipers.

Check (Condition)

(For: HS750, PS750 MK4)

1. Inspect the thickness of the park brake disc. Renew the disc if it is below the minimum thickness. Refer to (PIL 24-18-00).
2. Inspect the condition of the disc. If the disc is deeply pitted or scored, replace it with a new one.

Remove and Install

(For: HS750, PS750 MK4)

Special Tools

Description	Part No.	Qty.
Flange Spanner	992/04800	1

Remove

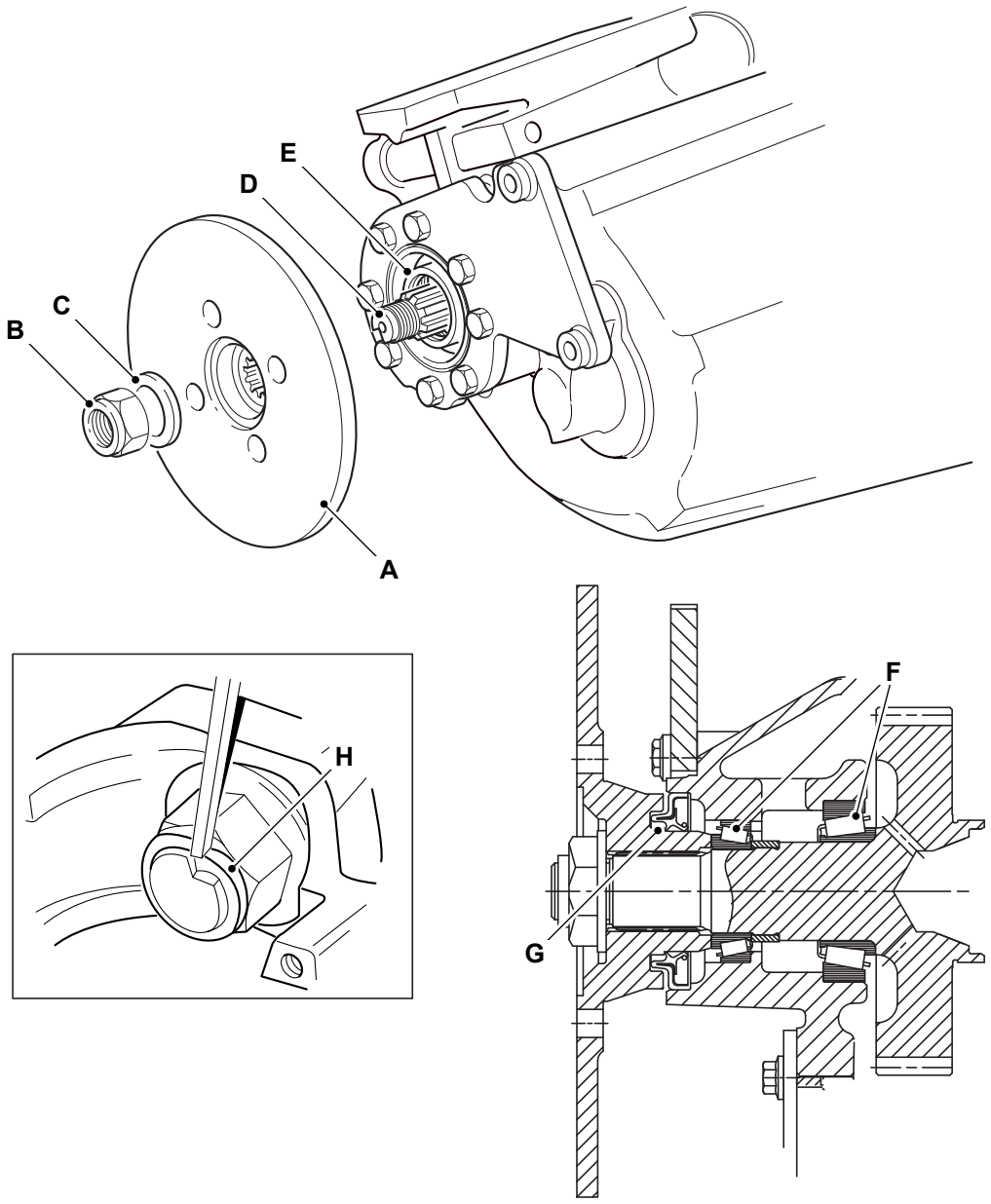
1. If installed remove the park brake caliper.
2. Bend back the stake nut locking ring.
3. Clean the brake disc and the gearbox around the brake disc. Make sure no contamination enters the gearbox when the brake disc is removed.
4. Hold the brake disc with the service tool and remove the output shaft stake nut. Discard the stake nut.

   Special Tool: Flange Spanner (Qty.: 1)
5. Remove the washer.
6. Lift off the brake disc. If necessary use a soft faced mallet to remove the brake disc.
7. Do not use a steel hammer, damage can occur to the output shaft bearing.
8. If necessary remove the oil seal. Do not damage the seal housing.

Install

1. Make sure that the oil seal interface on the brake disc is clean and free from wear or damage.
2. If necessary install a new oil seal. Lubricate the lips of the seal.
3. Install the brake disc onto the output shaft.
4. Install the washer.
5. Hold the brake disc with the service tool.
6. Install a new stake nut.
7. Progressively tighten the nut to the correct torque value.
8. Stake the nut to the shaft with a square ended staking tool.

Figure 23.



A Brake disc
B Stake nut
C Washer
D Output shaft
E Oil seal
F Bearings
G Oil seal interface
H Stake nut locking ring

Table 8. Torque Values

Item	Nm
B	300

48 - Actuator

Check (Condition)

For: SS750 ..... Page 24-23
For: 40 Series (3 Piece Axle and Dropbox), PS764, PS766 ..... Page 24-24

(For: SS750)

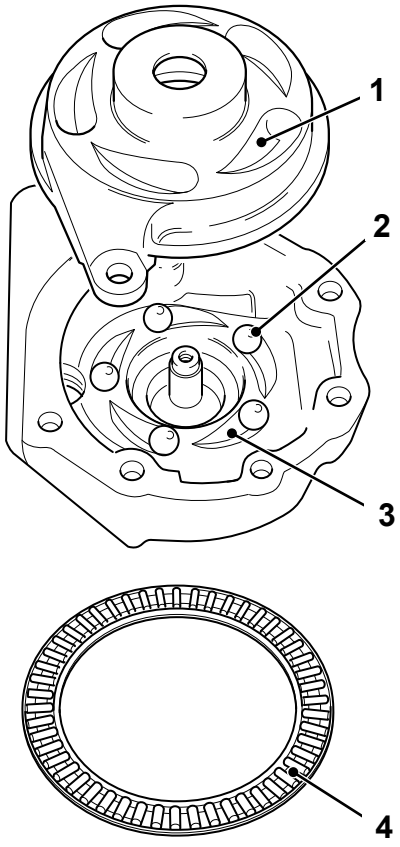
Before inspecting the brake components use a suitable degreaser to clean the brake components.

Inspect the following components for signs of excessive wear or damage:

- Ball bearings and their tapered locating slots.
- Needle roller thrust bearing and the corresponding bearing surfaces.

Note: Some discolouration of the needle rollers is acceptable providing the surface of the rollers is otherwise undamaged.

Figure 24.



1 Tapered locating slots
2 Ball bearings
3 Tapered locating slots
4 Needle roller thrust bearing

(For: 40 Series (3 Piece Axle and Dropbox), PS764, PS766)

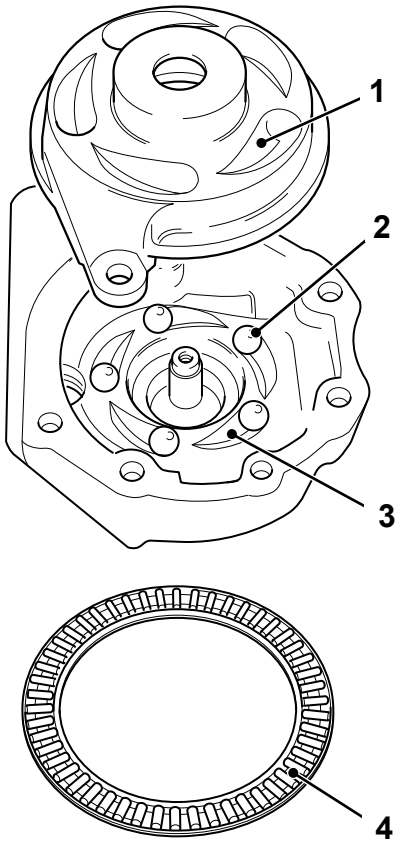
Before you check the brake components use a suitable degreaser to clean the brake components.

Check the following components for signs of excessive wear or damage:

- Ball bearings and their tapered locating slots.
- Needle roller thrust bearing and the corresponding bearing surfaces.

Note: Some discolouration of the needle rollers is acceptable providing the surface of the rollers is otherwise undamaged.

Figure 25.



1 Tapered locating slots
2 Ball bearings
3 Tapered locating slots
4 Needle roller thrust bearing

- Make sure that the park brake cable is smooth and free in operation. Check the cable outer for signs of damage. Replace the cable if it is damaged or hard to operate.