

## GROUP 2 OPERATIONAL CHECKS AND TROUBLESHOOTING

### 1. OPERATIONAL CHECKS

This procedure is designed so the mechanic can make a quick check of the system using a minimum amount of diagnostic equipment. If you need additional information, read **structure and function**, Group 1.

A location will be required which is level and has adequate space to complete the checks.

The engine and all other major components must be at operating temperature for some checks.

Locate system check in the left column and read completely, following the sequence from left to right. Read each check completely before performing.

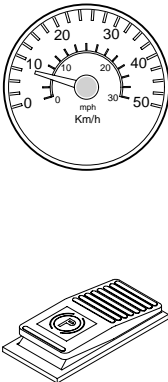
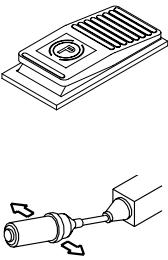
At the end of each check, if no problem is found(OK), that check is complete or an additional check is needed. If problem is indicated(NOT OK), you will be given repair required and group location.

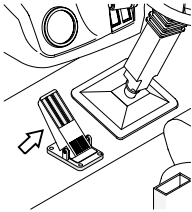

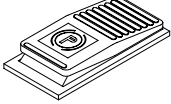
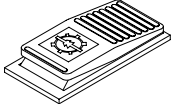
If verification is needed, you will be given next best source of information:

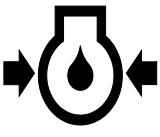



Chapter 2 : Troubleshooting

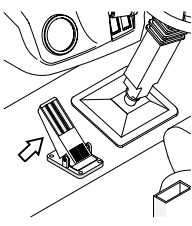
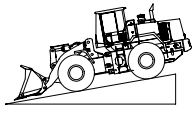
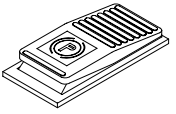
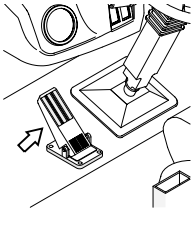
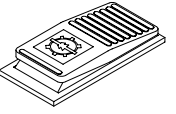
Group 3 : Tests and adjustments

Hydraulic oil must be at operating temperature for these checks(Refer to page 6-50).

Item	Description	Service action
<p><b>Parking brake capacity check</b> Seat belt must be worn while doing this check to prevent possible injury when machine stops suddenly.</p>	 <p>Start engine. Fasten seat belt. Release parking brake and put transmission in 2nd gear forward. Drive machine at 8 km/hr and switch parking brake ON. <b>LOOK/FEEL</b> : Machine must come to a stop within 2 meters(6 feet) when parking brake is engaged at 8 km/hr. Transmission must shift to neutral.</p>	<p><b>OK</b> Check completed. <b>NOT OK</b> Inspect parking brake. Go to group 3.</p>
<p><b>Parking brake transmission lockout check</b> Engine running.</p>	 <p>Turn parking brake to ON. Place transmission in 1st forward. Slowly increase engine speed to high idle. <b>LOOK</b> : Machine must not move.</p>	<p><b>OK</b> Check completed. <b>NOT OK</b> Go to transmission control circuit in section 3.</p>

Item	Description	Service action
<p><b>Service brake pump flow check</b> Hydraulic oil must be at operating temperature for the check. Engine OFF.</p>	 <p>Stop engine. Operate brake pedal approximately 20 times. Start engine and run at low idle. Record number of seconds required for low brake pressure indicator lamp to go out.</p>  <p><b>LOOK</b> : Indicator lamp must go out in less than 4 seconds from time engine starts. <b>NOTE</b> : Indicator will not come on approximately 1 second after starting engine.</p>	<p><b>OK</b> Check completed.</p> <p><b>NOT OK</b> Check for brake circuit leakage. Go to next page.</p> <p><b>IF OK</b> Install a cap on line connected to inlet of brake valve and repeat pump flow check. If time does not decrease, check for worn brake pump. Go to brake pump flow test, in section 3.</p>
<p><b>Service brake capacity check</b> Engine running.</p>	 <p>Turn clutch cut-off switch OFF. Apply service brakes, release park brake and put transmission in 2nd forward. Increase engine speed to high idle.</p>  <p><b>LOOK</b> : Machine may not move or move at a very slow speed. Repeat check three times to ensure accurate results.</p>	<p><b>OK</b> Check completed.</p> <p><b>NOT OK</b> Check brake pressure in group 3.</p> <p><b>IF OK</b> Inspect brake disk, see group 3.</p>

Item	Description	Service action
<p><b>Brake accumulator precharge check</b> The axles and hydraulic oil must be at operating temperature for this check.</p>	 <p>Start and run engine for 30 seconds.</p> <p>Stop engine and turn start switch to ON and wait 5 seconds.</p> <p><b>NOTE</b> : Engine oil pressure lamp will be on due to no engine oil pressure.</p>  <p>Count the number of times the brake pedal can be fully depressed before the low brake pressure warning lamp comes ON.</p> <p><b>LOOK</b> : Warning lamp must come on in 1-5 applications.</p> <p>Start engine and operate at low idle.</p> <p>Observe cluster while applying brake pedal with maximum force.</p> <p><b>LOOK/LISTEN</b> : Brake pressure indicator must not come ON.</p>	<p><b>OK</b> Check completed.</p> <p><b>NOT OK</b> Make sure brake pedal is not binding and keeping brakes partially engaged.</p> <p>Bleed brakes in group 3.</p> <p>Check brake system pressure in group 3.</p> <p><b>NOT OK</b> If light comes on with engine running, accumulator has lost it's charge. Inspect and recharge accumulator, group 3.</p>
<p><b>Brake system leakage check</b></p>	 <p>Start engine and wait 30 seconds.</p> <p>Stop engine.</p> <p>Wait 2 minutes.</p> <p>Turn start switch to ON and wait 5 seconds.</p> <p><b>LOOK</b> : Brake oil pressure warning lamp must not come on within 2 minutes after stopping engine.</p> 	<p><b>OK</b> Check completed.</p> <p><b>NOT OK</b> If brake leakage is indicated with brakes released, check leakage at accumulator inlet check valve and brake valve. If brake leakage is indicated with brakes applied, check for leakage at brake valve and brake pistons.</p> <p>Check individual component leakage.</p>

Item	Description	Service action
<b>Service brake pedal check</b>	 <p>Slowly depress brake pedal.</p> <p>Listen for a hissing noise that indicates oil is flowing to brake pistons.</p> <p><b>LISTEN/FEEL</b> : A hissing noise must be heard when pedal is depressed.</p>	<p><b>OK</b> Check completed.</p> <p><b>NOT OK</b> Inspect for debris under brake pedal. Inspect clutch cut-off linkage.</p>
<b>Service and parking brake system drag checks</b> Engine running	 <p>Position machine on gradual slope.</p> <p>Lower bucket approximately 50mm(2 in) from ground.</p> <p>Release parking and service brakes.</p>  <p><b>LOOK</b> : Machine must move or coast.</p> <p><b>NOTE</b> : If machine does not move, check brake pedals to be sure they fully release when feet are removed from pedals.</p> <p>Drive machine at high speed for about 5 minutes.</p> <p>Brake drag is indicated if brake areas in differential case are hot.</p> <p><b>NOTE</b> : Observe parking brake.</p> <p>If disk is hot, parking brake drag is indicated.</p>	<p><b>OK</b> Check completed.</p> <p><b>NOT OK</b> Adjust park brake, go to group 3.</p> <p><b>NOT OK</b> Check floor mat interference to pedal or debris build-up.</p> <p><b>IF OK</b> Check for brake pressure when brake is released.</p> <p>Go to brake pressure test on group 3.</p>
<b>Clutch cut-off check</b>	 <p>Place clutch cut-off switch in ON position.</p> <p>Release parking brake.</p> <p>Run engine at half speed in 1st forward.</p> <p>Firmly depress brake pedal.</p>  <p><b>FEEL</b> : Transmission must disengage when brake pedal is depressed at 30% of pedal stroke.</p> <p><b>NOTE</b> : Clutch cut-off pressure switch can be adjusted to operator preference to match your loading needs.</p>	<p><b>OK</b> Check completed.</p> <p><b>NOT OK</b> Adjust clutch cut-off switch, see group 3.</p>

## 2. TROUBLESHOOTING

### 1) SERVICE BRAKE

Diagnose malfunction charts are arranged from most probable and simplest to verify, to least likely, more difficult to verify. Remember the following steps when troubleshooting a problem :

Step 1. Operational check out procedure(See section 1)

Step 2. Operational checks(In this group)

Step 3. Troubleshooting

Step 4. Tests and adjustments(See group 3)

Problem	Cause	Remedy
<b>Poor or no brakes</b>	Brake accumulator charge low Brake pump standby pressure low Brake pressure low Air in system Worn brake surface material Leakage in brake valve Leakage in brake piston seal	Do brake accumulator check. Do brake pump standby pressure test. Do brake valve pressure test. Bleed brakes. Inspect brake surface material. Do brake valve leakage test. Check for an over filled differential. Apply brakes and check for leakage from check plug. <b>It is normal for the oil level to be slightly above the check plug.</b>
<b>Aggressive brakes</b>	Internal restriction in circuit Clutch cut-off switch out of adjustment Brake valve malfunction Low oil level	Remove lines and components. Adjust switch. Disassemble and inspect. Check oil level.
<b>Brakes drag</b>	Brake pedal not returning properly Debris holding valve partially open in brake valve Warped brake disk Stuck brake piston	Inspect floor mat and pedal. Do brake valve pressure test. Inspect brake disk. Repair.
<b>Brakes lock up</b>	Brake valve malfunction	Clean or replace brake valve.

Problem	Cause	Remedy
<b>Brakes chatter</b>	Air in brake system Worn brake surface material Wrong oil in differential	Do brake bleed procedure. Inspect brake surface material. Drain. Refill.
<b>Hissing noise when brake pedal is held with engine stopped</b>	Leakage in brake valve, or brake piston	Do brake system leakage test.
<b>Brake pressure warning light will not go out or stays on excessively long after start-up</b>	Malfunction in brake low pressure warning switch Brake accumulator pressure too low Low brake pump standby pressure setting. Leakage in pressure reducing manifold block Leakage in brake system Worn brake pump Leakage in parking brake solenoid	Replace switch. Recharge accumulator. Do brake pump standby pressure test. Do pressure reducing valve manifold leakage test. Do brake system components leakage tests. Do brake pump flow test. Do parking brake pressure test.

## 2) PARKING BRAKE MALFUNCTIONS

Problem	Cause	Remedy
<b>Brake will not hold</b>	<p>Pads not adjusted correctly</p> <p>Malfunctioning parking brake solenoid</p> <p>Worn brake disk and / or brake pads</p> <p>Brake piston hangs up in bore</p>	<p>Adjust parking brake.</p> <p>Inspect and replace.</p> <p>Disassemble, inspect, repair.</p> <p>Remove and inspect. Repair.</p>
<b>Brake disk overheats</b>	<p>Pads out of adjustment</p> <p>Brake not released</p>	<p>Adjust parking brake.</p> <p>Release parking brake.</p> <p>Disassemble, inspect brake.</p> <p>Repair if necessary.</p> <p>Inspect for loosen or broken lines between brake pressure switch and indicator on dash.</p>
<b>Parking brake indicator in monitor does not come on when brake applied</b>	<p>Faulty wiring or switch</p>	<p>Inspect for loose or broken lines between brake pressure switch and indicator on dash.</p> <p>Inspect for a faulty indicator on dash. Replace if necessary.</p>
<b>Brake will not apply</b>	<p>Pads out of adjustment</p> <p>Malfunctioning wiring, switch, or solenoid</p> <p>Restriction between brake valve and brake</p>	<p>Adjust parking brake.</p> <p>Check electric circuit.</p> <p>Remove hose and inspect. Replace.</p>