



Technical Bulletin / Safety Alert

Unique ID No: TBS2010-TBSA-01

Rev: 0

(This document supersedes all previous versions of the above TBSA and TSB06)

Subject: Driftrunner Transport Braking System (211/111 Axles)

Date: 31/03/10

Applicable to: Design Registered Transport Braking System (MDR 083991 TBS)

Note: Minimum PPE required to carry out any inspections contained in this TBSA shall be protective clothing & footwear, safety glasses, hearing protection & any site specific requirements. A JSA or equivalent should be carried out prior to performing these tasks.

General Information:

The 211/111 Series Axle Assemblies have been fitted to the Driftrunner since late 2008 as the alternative to the original 278/171 Series Assemblies. Industry feedback and our own internal investigations have led to the following product information including recommendations in regards to maximising component life and performance.

System Description:

Service braking is applied by use of the foot brake pedal and controls two (2) independent braking circuits (1 front and 1 rear).

Park/Emergency braking is applied by a spring compressing the brake disc pack and in turn applying braking torque to each wheel. To release the brake so the vehicle may move hydraulic pressure is applied to compress the spring. The park/emergency brakes will automatically apply in the event of:

- Low system air pressure (below 1.7 BAR (25 psi))
- Engine shutdown
- Low hydraulic oil level
- Damaged hydraulic brake hoses
- Driver's door (passenger doors if fitted) is opened
- Rear Emergency brake valve is selected

Each wheel brake unit shares common components to provide Service and Park/Emergency braking but are activated mechanically by fully independent means.

Figure 1. below indicates the axle connection ports including the Service brake and Park/Emergency brake bleed screws.

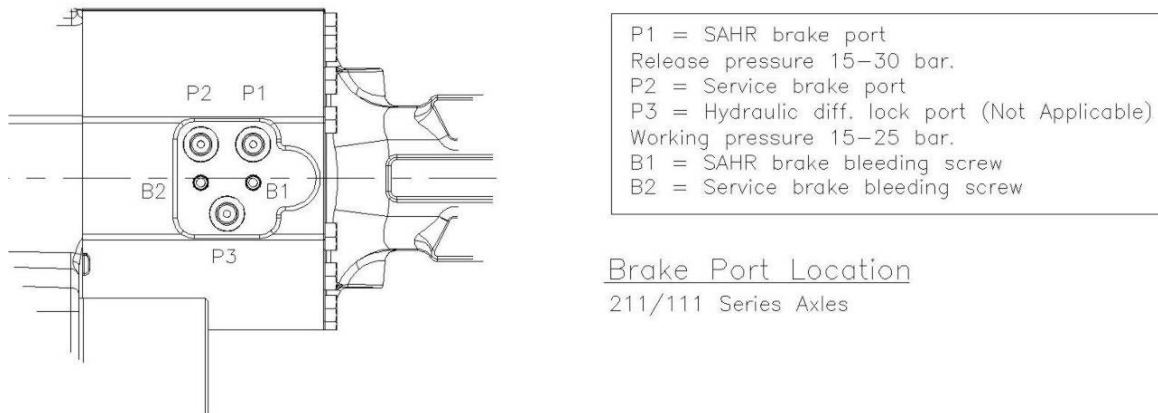


Figure 2. below indicates the Park/Emergency brake applied condition.

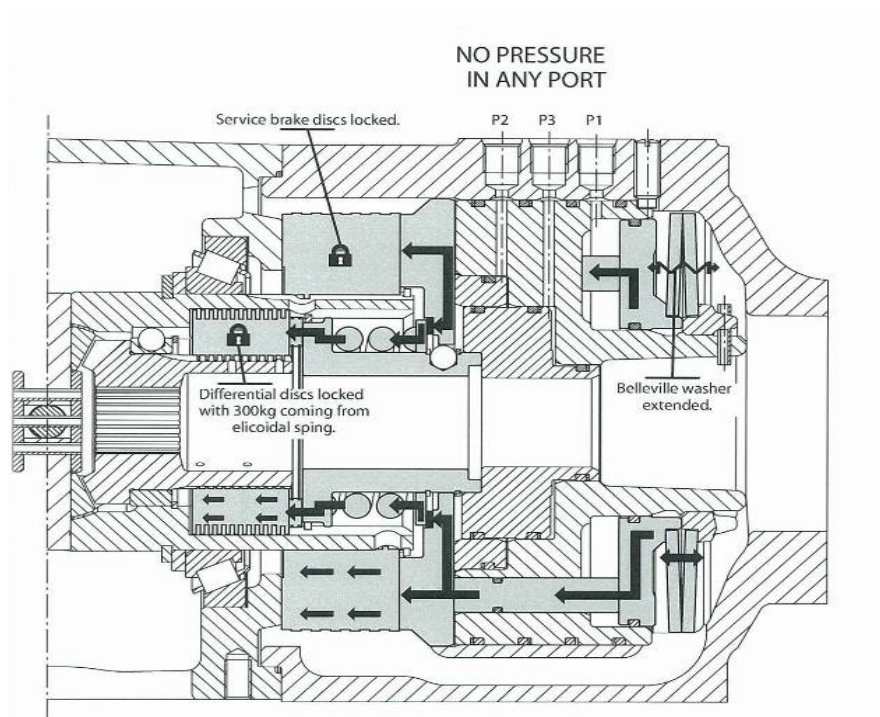


Figure 3. below indicates the Park/Emergency brake release condition.

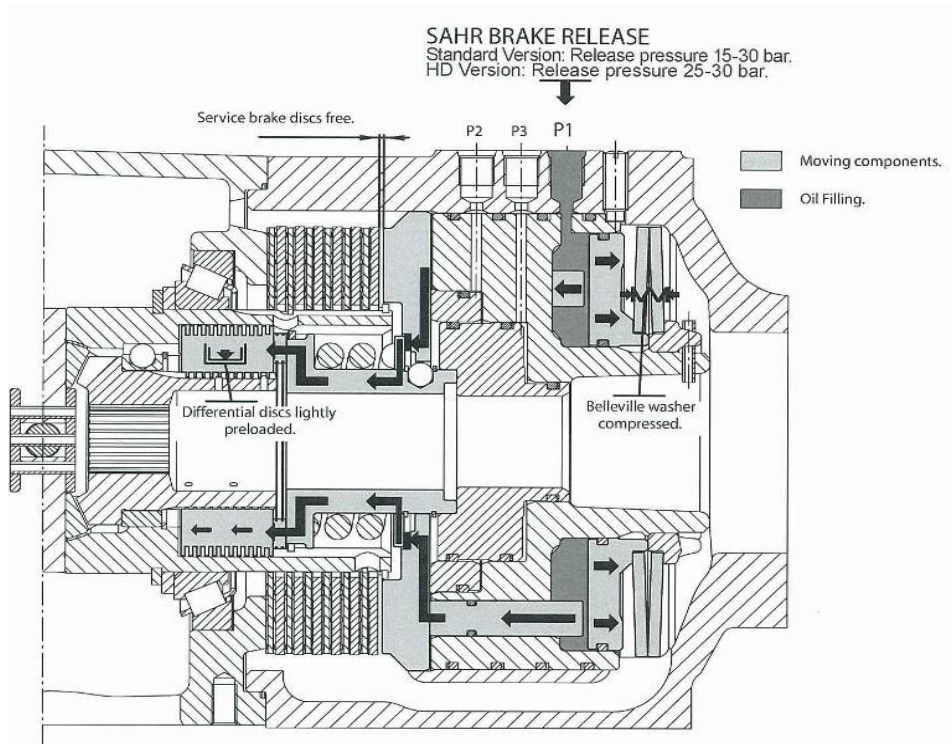
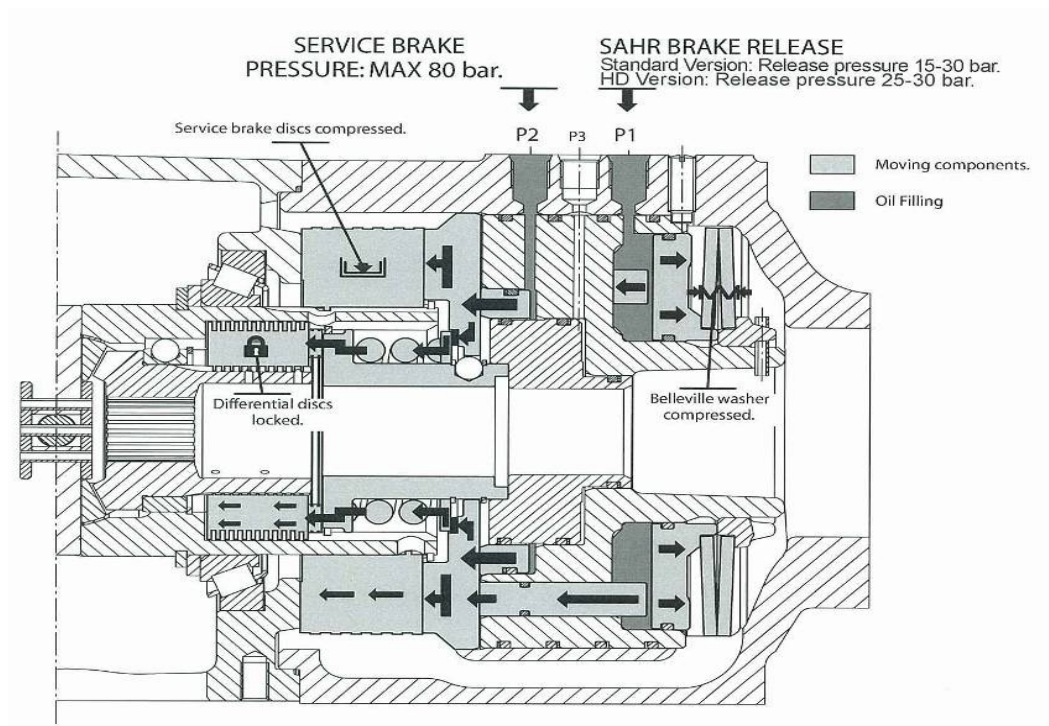


Figure 4. below indicates the Service brake applied condition.



General Operation:

The owner or operator of the equipment must ensure personnel are fully trained and competent to operate the equipment.

- Service brakes are activated by using the foot brake pedal (as in a typical motor car, truck etc). Caution must be observed when applying brakes whilst descending down a steep grade at speed as this can result in high brake wear.
- A Service Brake Air Pressure Gauge is provided to monitor available air pressure to the Service Brake System.
 - GREEN ZONE indicates safe operating range.
- Park/Emergency brakes must be applied using the main select valve located in the operator's compartment. A large brake pressure gauge located on the dashboard must read Zero pressure before the driver opens the door to exit the vehicle.
 - Zero pressure Park/Emergency brakes are applied.
 - GREEN ZONE indicates the Park/Emergency brakes are fully released.

The vehicle must not be driven when the brake gauge indicator is in the RED ZONE, as this may cause component damage, brake drag and additional brake wear.

NB. The Park/Emergency Brake select valve located in the operator's compartment is the primary means provided to apply the Park Brake under normal operation. The door brake interlock valve is provided as a secondary means of applying the Park/Emergency brake in the event of the door opening inadvertently or the operator forgetting to apply the main Park/Emergency select valve when exiting the vehicle.

Brake Testing:

The owner/operator of the equipment must ensure appropriate policies and procedures are in place to conduct and monitor routine brake testing.

Pre-Shift Testing (recommended by VLI Diesel Division)

Park/Emergency Brake Test. Must be carried out in a safe place with engine running

- select park/emergency brake ON (brake pressure gauge must read ZERO)
- select 2nd gear
- select FWD
- select 4WD
- accelerate to full RPM for one (1) second

VEHICLE MUST NOT MOVE

Service Brake Test. must be carried out in a safe place with engine running

- ensure service brake pressure reads in GREEN ZONE
- fully apply service brakes via foot brake pedal
- select 2nd gear
- select FWD
- select 4WD
- accelerate to full RPM for one (1) second

VEHICLE MUST NOT MOVE

Door Interlock Test. Must be carried out in a safe place with engine running.

- Select Park/Emergency brake OFF (brake pressure gauge must read in GREEN zone)
- Open operator's door
- Park/Emergency brake valve must select ON [< 1 second] (brake pressure gauge must read ZERO)

In the event of failure of any of the above tests the vehicle must be correctly isolated and reported as per the appropriate mine site procedure.

In Service Testing Using a Brake Performance Meter

It is the responsibility of the owner/operator to designate their preferred period between each test. VLI Diesel Division recommends a maximum operating period of 250 operating hours. Brake performance criteria are:

Service Brakes - minimum 0.32 g de-acceleration

Park/Emergency Brakes - minimum 0.29 g de-acceleration

If the minimum requirement cannot be achieved, the most probable cause is excessive brake wear and may require the brake plates to be renewed.

BRAKE ADJUSTMENT (211/111 Axles Only)

The axle brake design compensates for brake wear. Regular brake testing must be carried out to ensure the recommended performance criteria are met. There is no facility for external adjustment. (Refer Recommendations for brake wear monitoring)

Dump Valve Testing

Secondary/Automatic Brake Circuit (5-041668 Item 5A/5B)

Installed in the Drifrunner are two dump valves. These valves release the park/emergency hydraulic pressure applying the axle brakes.

The second dump valve is an added safety feature in the possible event of a single unit failing. It is therefore essential the units are tested and inspected at regular periods. It is recommended the dump valves are replaced at least every 5000 operating hours.

***Test Procedure** (to be carried out by maintenance personnel only)

(Recommended every 500 operating hours)

Test 1st Dump Valve

1. Open transmission cover. The two red push button/spring return test valves (refer drawing 5-041668, item 19) are located on the O.D.S. firewall of the transmission tunnel.
2. Ensure the vehicle is parked on level ground, in a safe place with the wheels chocked and neutral gear selected.
3. Start the vehicle with the operator's door fully closed.
4. Release park/emergency brakes.
 - gauge to indicate the GREEN ZONE (released).
5. Push and hold RHS test valve.

NOTE: On activation of the test valve the Park/Emergency brake air/oil intensifier (item 6) should begin to cycle and the brake gauge release pressure will fluctuate.

This indicates the dump valve connected to the corresponding test valve is releasing hydraulic fluid back into the tank.

6. Push the main park/emergency select valve in.

Brake Pressure gauge must reduce to zero pressure within one second

Release test valve when park/emergency brake pressure has reached zero.

Test 2nd Dump Valve

7. With the engine running and the operator's door fully closed.

8. Release park/emergency brakes.

- gauge to indicate GREEN ZONE (released)

9. Push and hold LHS test valve

NOTE: On activation of the test valve the Park/Emergency brake air/oil intensifier (item 6) should begin to cycle and the brake gauge release pressure will fluctuate. This indicates the dump valve connected to the corresponding test valve is releasing hydraulic fluid back into the tank.

10. Push main park/emergency select valve in.

Brake pressure gauge must reduce to zero pressure within one second

Release test valve when park/emergency brake pressure has reached zero.

Failure of the park/emergency brake pressure to release during either test indicates a faulty dump valve(s) (Item 5A/5B). It is essential that both units are replaced followed by a full function test to be repeated (as above) prior to operating.

NOTE: All testing and maintenance activity must be recorded.

Maintenance:

As part of the vehicle service plan the oil levels in the centre of the axles should be checked weekly and the front hub oil reservoirs every 24 hours. SMV recommends that the oil in the axles is to be drained and replaced every 250 hours as a minimum. Frequency subject to mine specific conditions.

Recommendations:

A number of modifications are now available for the 211/111 Axle Assemblies. These include:

- **Brake Wear Check**

Facility to carry out a brake wear check is provided via modification of the axle brake housing. Removal of the BSP Plug and insertion of a graduated tool provides indication of low, medium and high brake wear condition.

Brake wear inspection plugs are located at 4 and 8 O'Clock when brake housing is viewed end on.

Wear check should be carried out and recorded at 250 Hour intervals as a minimum.

- **Manual Park Brake Release Pin**

The manual park brake release pins enable release of the Park Brake through removal of the horseshoe clip and winding in each pin. For additional safety these pins have been removed and replaced with Socket Headed Cap Screws. In the event the vehicle requires towing the brakes are released via supply of adequate air pressure to the Park Brake System. (Refer Driftrunner Towing Procedure)

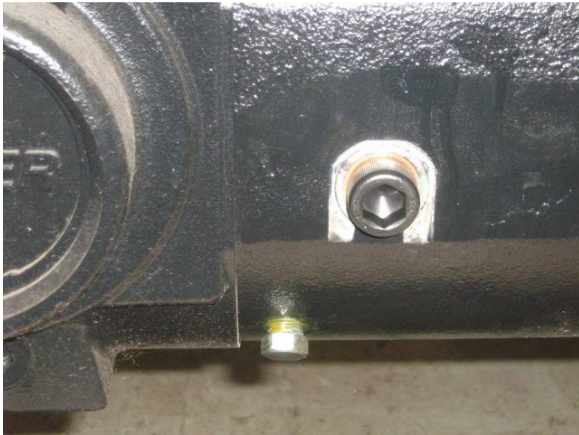


Figure 5.
Brake wear inspection plug and SHCS release pin replacement



Figure 6.
Brake wear check tool fully inserted indicates low brake wear.



Figure 7.
Tool at 5mm protrusion indicates medium wear.



Figure 8.
Tool at >5mm protrusion indicates high wear. Brake replacement required.

- **New Service Brake Boosters**

TBS Design Registration now allows New Service Brake Boosters (T12) specifically for use with the 211/111 Axles to improve brake feel without sacrificing performance. Change out can be performed at VLI Service Centres or on site by VLI qualified personnel.

211/111 Booster Upgrade Kit (T12) Part No. 9-04207103

- **Pressures and Settings**
Park/Emergency Brake Release Pressure 20-25 BAR (290-360 psi)
Service Brake System Minimum Air Pressure 3.4 BAR (50 psi)
- **Lubrication**
Recommended lubricant (hubs and centres) – SAE 80W90 GL5/GL4 with LS additive.
Anti-squawk Additive as required – CAT 1U9891 (Refer Technical Bulletin TBS2008-TBSA-03)
- **Mechanical (CAT) Seals**
Replacement for original 211/111 hub seals
- **Greasable CV Joints**
Replacement of original CV Joint Cage facilitates greasing of joints

Summary:

All systems require routine maintenance to operate correctly to ensure a high level of safety – especially braking systems on mobile diesel powered equipment. It is therefore essential that:-

- the owner/operator has correct policy and procedures in place to test and maintain the transport braking system
- personnel are adequately trained and competent to operate and maintain the equipment
- genuine parts only are used

Supporting Documentation:

- Driftrunner TBS Design Registration Documents: MDR 083991 TBS-1
- Technical Service Bulletin TBS2008-TBSA-03: Anti squawk additive

Please ensure this document is circulated to all relevant personnel within your organisation.

Should you have any further queries please contact your VLI Diesel Representative.

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