TERRA DURA

TERRA DURA® WORKSHOP MANUAL
TOYOTA LANDCRUISER

1. Revision History

Revision	Issue Date	Author	Comments
1	24 May 2018	M. O'Driscoll	Initial Release (Installation only).
2	28 Jun 2018	M. O'Driscoll	Service regime and servicing procedures added.
3	22 Nov 2018	M. Cornelius	Updated section 5 (MOD). Updated sections 14-23.
4	10 July 2019	G. Hainsworth	Terra Dura 1.3 updates
5	23 September 2020	G. Hainsworth	Assembly Updates
6	20 October 2020	G. Hainsworth	Exploded View and Service Kit Update

2. Table of Contents

3. Important Information

This manual applies to the Terra Dura® braking system for the Toyota LandCruiser. The manual details how to install the Terra Dura® system correctly to ensure optimum safety and performance. All information contained in this manual is based on the latest Terra Dura® product information available at the time of publication.

This manual should be read in conjunction with the appropriate Toyota vehicle manual for further information on removal and installation of any standard Toyota components.

While every effort has been made to address all aspects of installation, please advise Advanced Braking of any omissions or suggestions on how this manual may be improved.

Advanced Braking Pty Ltd reserves the right to change the manual at any time without prior notice.

The most up to date version of the manual can be obtained by contacting the ABT Customer Service Manager.

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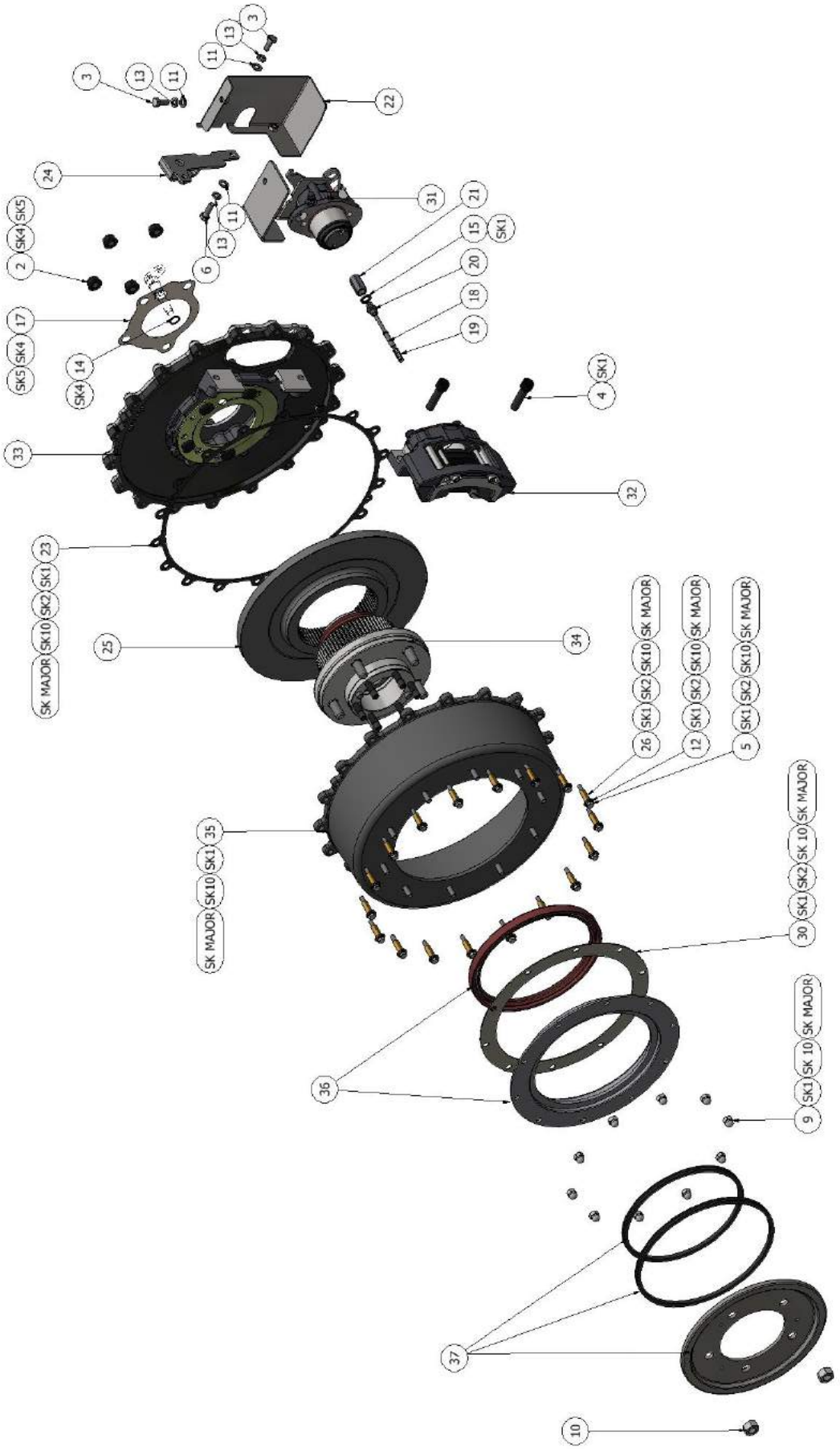
WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

4. Terminology

ABS	Anti-lock braking system
LH	Left-hand
OEM	Original equipment manufacturer
Park-Brake	Brakes applied independently of the service-brake
PWI	Pad wear indicator
RH	Right-hand
Service Brake	Brakes applied when driving via the foot pedal
Disc	Vehicles originally equipped with disc rear brakes
Drum	Vehicles originally equipped with drum rear brakes

5. Exploded Views & Parts Lists - Rear Brake

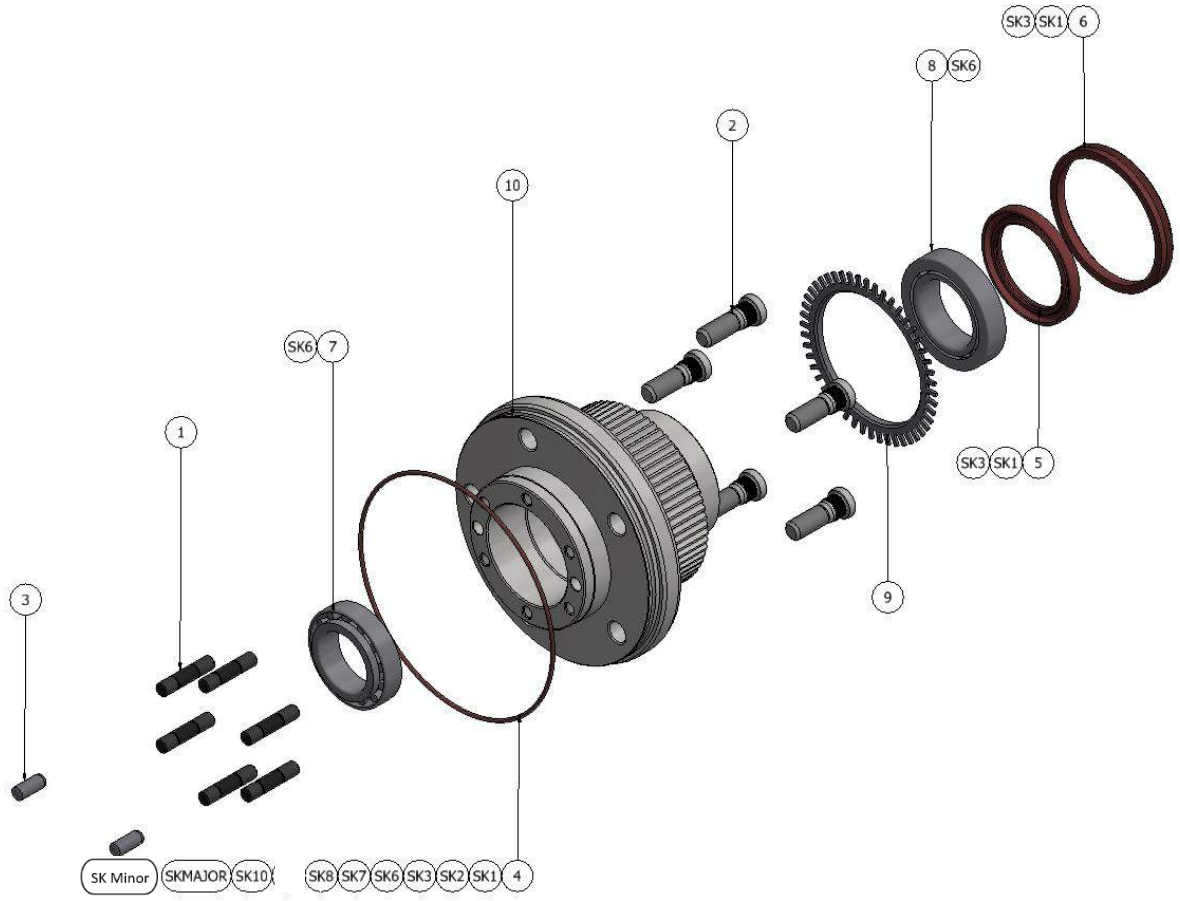
1. Rear Brake Assembly 51-4093 (Disc LH), 51-4094 (Disc RH), 51-4095 (Drum LH) & 51-4096 (Drum RH)



ITEM	PART NO.	DESCRIPTION	QTY/KIT (2 BRAKES)		TORQUE
			OEM DISC BRAKES	OEM DRUM BRAKES	(Nm)
2	25-9000	NUT MOUNTING BRAKE REAR	8	8	80
3	30-0046	BOLT MOUNTING PARK BRAKE BRACKET (SHORTER)	4	4	10
4	30-0060	BOLT MOUNTING CALIPER	4	4	100
5	30-0090	BOLT OUTER COVER	36	36	7
6	30-0093	BOLT MOUNTING PARK BRAKE BRACKET (LONGER)	2	2	10
9	30-1011	NUT DOME HEAD SHAFT SEAL FLANGE	20	20	10
10	30-1016	NUT FLANGE V-LIP SEAL FLANGE	4	4	5
11	30-2012	WASHER FLAT PARK BRAKE BRACKET	6	6	-
12	30-2033	WASHER OUTER COVER	36	36	-
13	30-2034	WASHER SPRING PARK BRAKE BRACKET	6	6	-
14	31-2033	O-RING ABS SENSOR	2	0	-
15	31-4018	WASHER SEALING PAD WEAR INDICATOR	2	2	-
17	51-2044	GASKET SPINDLE DISC	2	0	-
	25-2050	GASKET SPINDLE DRUM	0	2	-
18	51-2056	PLUNGER PAD WEAR INDICATOR	2	2	-
19	51-2057	SPRING PAD WEAR INDICATOR	2	2	-
20	51-2058	GLAND PAD WEAR INDICATOR	2	2	15
21	51-2059	CAP PAD WEAR INDICATOR	2	2	10
22	51-2100	SHROUD PARK BRAKE ASSEMBLY LH	1	1	-
	51-2099	SHROUD PARK BRAKE ASSEMBLY RH	1	1	-
23	51-2124	OUTER COVER GASKET (RUBBER)	2	2	-

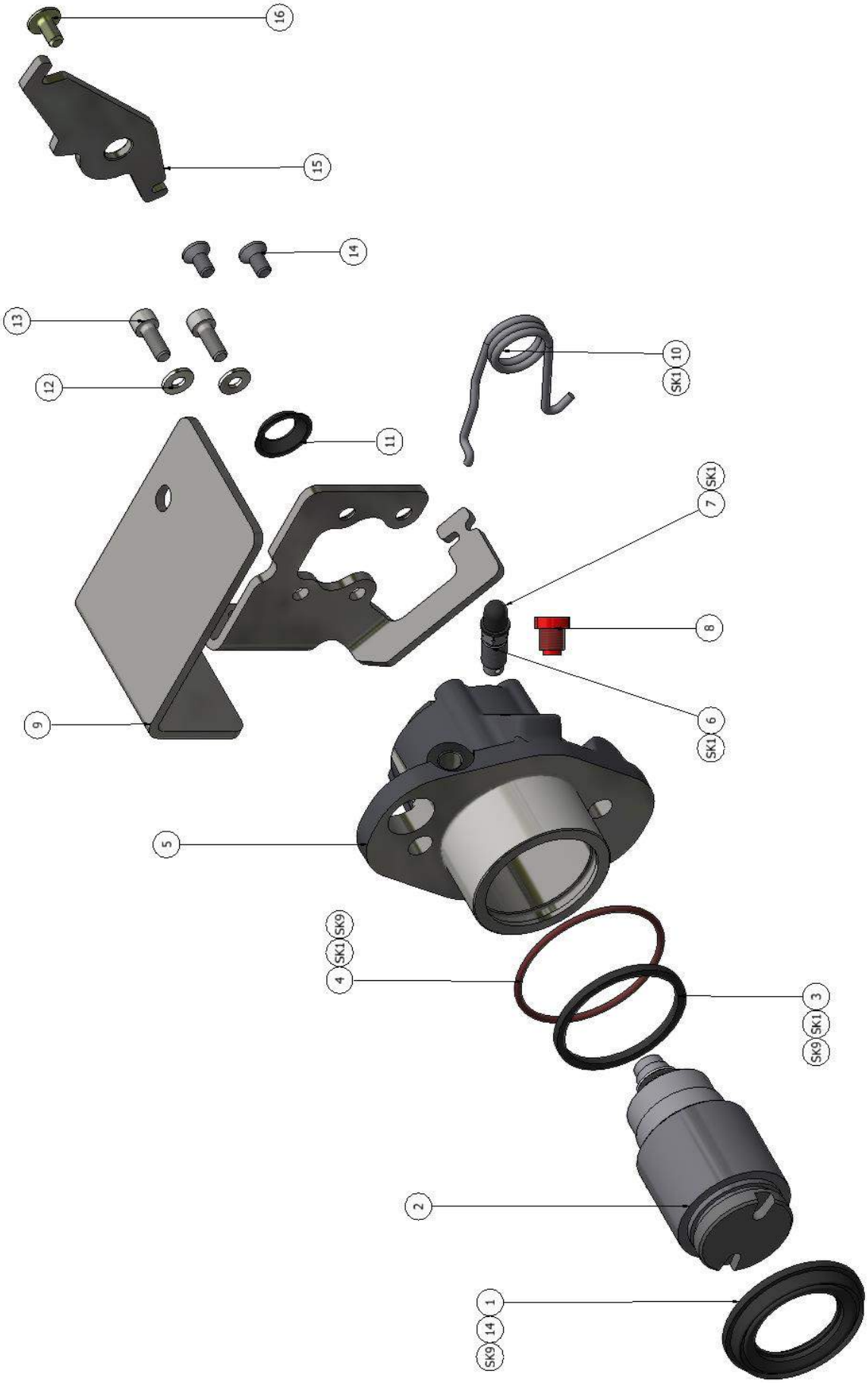
24	51-2131	CABLE BRACKET SPACER FABRICATION LH	1	1	-
	51-2132	CABLE BRACKET SPACER FABRICATION RH	1	1	-
25	51-2134	ROTOR BRAKE	2	2	-
26	51-2141	COVER COMPRESSION LIMITER	36	36	-
30	51-2173	GASKET SEAL CARRIER	2	2	-
31	51-4072	HOUSING PISTON MECHANISM ASSEMBLY LH	1	1	-
	51-4073	HOUSING PISTON MECHANISM ASSEMBLY RH	1	1	-
32	51-4074	CALIPER ASSEMBLY REAR LH	1	1	-
	51-4075	CALIPER ASSEMBLY REAR RH	1	1	-
33	51-4078	COVER AND BRACKET ASSEMBLY DISC LH	1	0	-
	51-4079	COVER AND BRACKET ASSEMBLY DISC RH	1	0	-
	51-4076	COVER AND BRACKET ASSEMBLY DRUM LH	0	1	-
	51-4077	COVER AND BRACKET ASSEMBLY DRUM RH	0	1	-
34	51-4098	HUB ASSEMBLY REAR	2	2	-
35	51-4099	OUTER COVER HOUSING AND STUD CARRIER ASSEMBLY	2	2	-
36	51-4101	SHAFT SEAL CARRIER ASSEMBLY	2	2	-
37	51-4102	V-LIP SEAL CARRIER ASSEMBLY	2	2	-

2. Rear Hub Assembly 51-4098



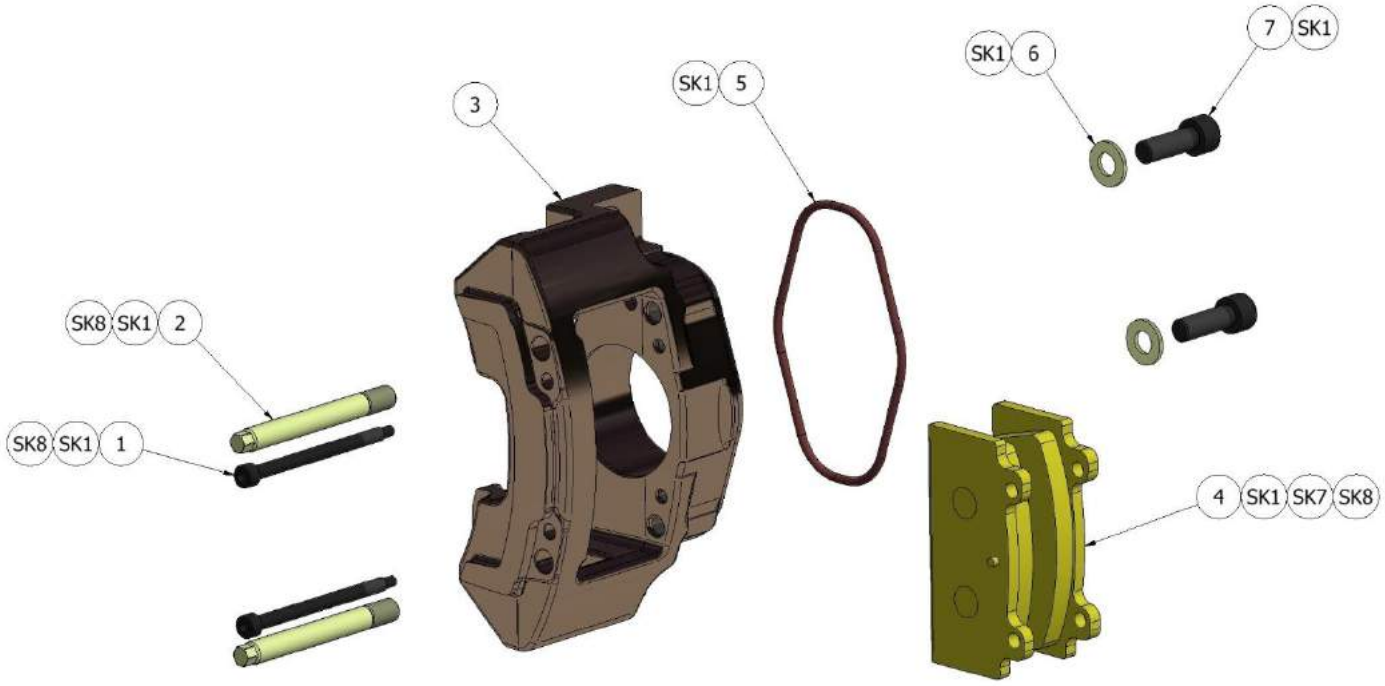
ITEM	PART NO.	DESCRIPTION	QTY/KIT (2 BRAKES)		TORQUE (Nm)
			OEM DISC BRAKES	OEM DRUM BRAKES	
1	25-9001	STUD DOUBLE END AXLE DRIVE	12	12	17.2
2	25-9002	STUD WHEEL	10	10	-
3	30-3000	PIN DOWEL	4	4	-
4	31-2036	O-RING	2	2	-
5	31-4001	SEAL HUB	2	2	-
6	31-4002	SEAL V-LIP INNER	2	2	-
7	31-6000	BEARING WHEEL OUTER	2	2	-
8	31-6001	BEARING WHEEL INNER	2	2	-
9	51-2034	ROTOR ABS	2	0	-
10	51-2174	HUB	2	2	-

3. Rear Housing Piston Mechanism Assembly 51-4072 (LH) & 51-4073 (RH)



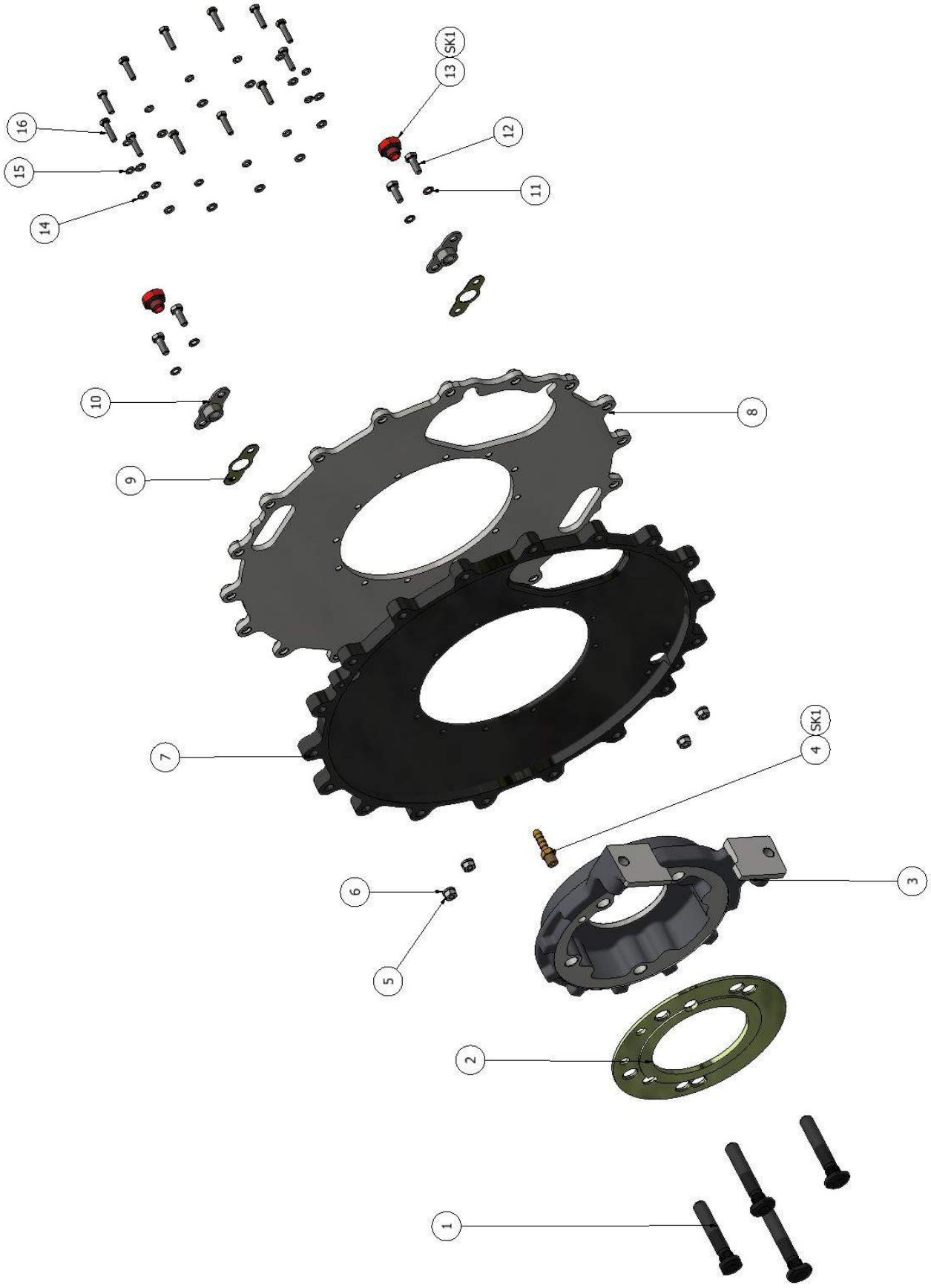
ITEM	PART NO.	DESCRIPTION	QTY/KIT (2 BRAKES)		TORQUE (Nm)
			OEM DISC BRAKES	OEM DRUM BRAKES	
1	51-9033	BOOT DUST PISTON	2	2	-
2	51-9031	PISTON & MECHANISM ASSEMBLY RHS	1	1	-
	51-9032	PISTON & MECHANISM ASSEMBLY LHS	1	1	-
3	51-9036	SEAL PISTON SERVICE	2	2	-
4	31-2026	O-RING MECHANISM HOUSING	2	2	-
5	51-2068	HOUSING PISTON LH	1	1	-
	51-2069	HOUSING PISTON RH	1	1	-
6	31-5001	BLEED NIPPLE	2	2	15
7	31-9000	CAP BLEED NIPPLE	4	4	-
8	31-9039	PLUG THREADED M10X1	2	2	-
9	51-2098	BRACKET CABLE PARK BRAKE LH	1	1	-
	51-2097	BRACKET CABLE PARK BRAKE RH	1	1	-
10	51-9015	SPRING LEVER PARK BRAKE LH	1	1	-
	51-9016	SPRING LEVER PARK BRAKE RH	1	1	-
11	51-9034	SEAL PARK BRAKE LEVER SHAFT	2	2	-
12	30-2036	WASHER LEVER STOP	4	4	-
13	30-0088	BOLT LEVER STOP	4	4	10
14	30-0073	BOLT MOUNTING BRACKET CSK	4	4	10
15	51-2011	LEVER ARM PARK BRAKE	2	2	-
16	30-0079	BOLT MOUNTING LEVER ARM	4	4	10

4. Rear Caliper Assembly 51-4074 (LH) & 51-4075 (RH)



ITEM	PART NO.	DESCRIPTION	QTY/KIT (2 BRAKES)		TORQUE (Nm)
			OEM DISC BRAKES	OEM DRUM BRAKES	
1	51-2146	BOLT RETAINING BRAKE PAD	4	4	15
2	51-2049	PIN RETAINING BRAKE PAD	4	4	15
3	51-2136	CALIPER LH	1	1	-
	51-2137	CALIPER RH	1	1	-
4	51-2046	BRAKE PAD	4	4	-
5	31-2035	O-RING CALIPER	2	2	-
6	30-2000	WASHER MOUNTING MECHANISM HOUSING	2	2	-
7	30-0077	BOLT MOUNTING MECHANISM HOUSING	2	2	71

5. Inner Cover and Bracket Assembly 51-4076 (Drum LH), 51-4077 (Drum RH), 51-4078 (Disc LH) & 51-4079 (Disc RH)



ITEM	PART NO.	DESCRIPTION	QTY/KIT (2 BRAKES)		TORQUE (Nm)
			OEM DISC BRAKES	OEM DRUM BRAKES	
1	25-2058	STUD MOUNTING REAR BRAKE	0	8	-
	51-2006	STUD MOUNTING REAR BRAKE DISC	8	0	-
2	51-2045	SEAL CARRIER INNER DISC	2	0	-
	51-2050	SEAL CARRIER INNER DRUM	0	2	-
3	51-2072	BRACKET MOUNTING CALIPER DRUM LH	0	1	-
	51-2073	BRACKET MOUNTING CALIPER DRUM RH	0	1	-
	51-2075	BRACKET MOUNTING CALIPER DISC LH	1	0	-
	51-2076	BRACKET MOUNTING CALIPER DISC RH	1	0	-
4	31-5048	CONNECTOR BARB BREATHER HOSE	2	2	-
5	30-1013	NUT MOUNTING INSPECTION PORT	8	8	8
6	30-2033	WASHER MOUNTING INSPECTION PORT	8	8	-
7	51-2067	COVER INNER REAR	2	2	-
8	51-4104	BASH PLATE	2	2	-
9	51-2085	GASKET INSPECTION PORT	4	4	-
10	51-2084	FLANGE INSPECTION PORT	4	4	-
11	30-2037	WASHER SEALING INSPECTION PORT	8	8	
12	30-0085	BOLT MOUNTING INSPECTION PORT	8	8	Ref. item 5
13	31-5043	PLUG INSPECTION PORT	4	4	-
14	30-2031	WASHER MOUNTING INNER COVER	24	24	-
15	30-2038	WASHER SPRING MOUNTING INNER COVER	24	24	-
16	30-0099	BOLT MOUNTING INNER COVER	24	24	8

6. V-Lip Seal Carrier Assembly (51-4102)

ITEM	PART NO.	DESCRIPTION	QTY/KIT (2 BRAKES)		TORQUE (Nm)
			OEM DISC BRAKES	OEM DRUM BRAKES	
1	31-4020	V-LIP SEAL LARGER I.D.	2	2	-
2	31-4006	V-LIP SEAL SMALLER I.D	2	2	-
3	51-4112	FLANGE V-LIP SEAL CARRIER	2	2	-

7. Shaft Seal Carrier Assembly (51-4101)

ITEM	PART NO.	DESCRIPTION	QTY/KIT (2 BRAKES)		TORQUE (Nm)
			OEM DISC BRAKES	OEM DRUM BRAKES	
1	31-4021	SHAFT SEAL	2	2	-
2	51-4111	SHAFT SEAL CARRIER	2	2	-

6. Spare Parts/Service Kits

ITEM	PART NO.	DESCRIPTION	QTY/KIT (2 BRAKES)	
			OEM DISC BRAKES	OEM DRUM BRAKES
SK1	51-5002	KIT SERVICE OVERHAUL REAR SET	1	1
SK2	51-5003	KIT SERVICE INSPECTION REAR SET	1	1
SK3	51-5004	KIT SEAL HUB REAR SET	1	1
SK4	51-5005	KIT MOUNTING REAR SET DISC	1	0
SK5	25-5006	KIT MOUNTING REAR SET DRUM	0	1
SK6	25-5004	KIT WHEEL BEARING PAIR	1	1
SK7	51-5000	KIT BRAKE PAD SET REAR	1	1
SK8	51-5007	KIT BRAKE PAD AND PIN SET REAR	1	1
SK9	51-5008	KIT SEAL PISTON SERVICE SET REAR	1	1
SK10	51-5010	KIT OUTER COVER KIT	1	1
SK MINOR	51-5011	MINOR SERVICE KIT	1	1
SK MAJOR	51-5009	MAJOR SERVICE KIT	1	1

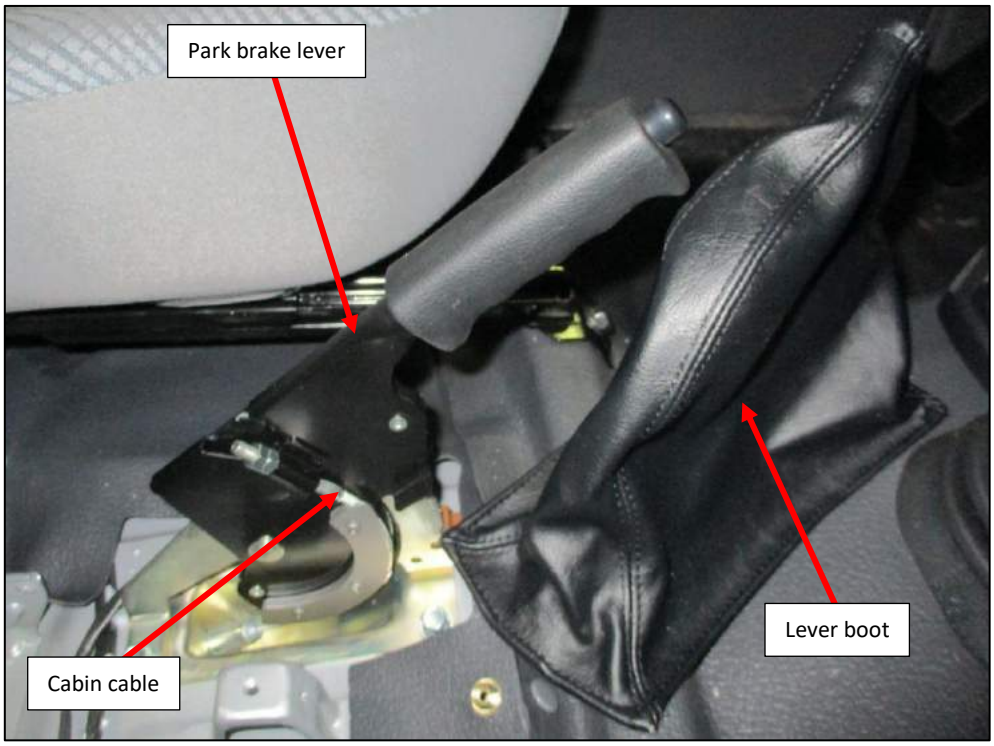
ITEM	ITEM NO. & ASSEMBLY LOCATION (AS PER EXPLODED VIEWS ABOVE)	PART NO.	QTY/ SERVICE KIT											
			51-5002 (SK1)	51-5003 (SK2)	51-5004 (SK3)	51-5005 (SK4)	25-5006 (SK5)	25-5004 (SK6)	51-5000 (SK7)	51-5007 (SK8)	51-5008 (SK9)	51-5009 (SK MAJOR)	51-5010 (SK10)	51-5011 (SK MINOR)
1	ITEM 1 -V-LIP SEAL CARRIER ASSEMBLY	31-4020 (V-Seal Larger)	2									2		2
2	ITEM 2 – V-LIP SEAL CARRIER ASSEMBLY	31-4006 (V-Seal Smaller)	2									2		2
3	ITEM 9 - BRAKE ASSEMBLY	30-1011 (Dome Nut)	20									20	4	
4	ITEM 35 - BRAKE ASSEMBLY	51-2173 (Shaft Seal Gasket)	2	2								2	2	
5	ITEM 5 - BRAKE ASSEMBLY	30-0081 (Outer Housing Bolt)	36									36	8	
6	ITEM 12 - BRAKE ASSEMBLY	30-2033 (Outer Housing Washer)	36									36	8	
7	ITEM 26 – BRAKE ASSEMBLY	51-2141 (Cover Compression Limiter)	36									36	8	
8	ITEM 23 - BRAKE ASSEMBLY	51-2124 (Outer Housing Gasket)	2	2								2	2	
9	ITEM 20 - BRAKE ASSEMBLY	51-2044 (Mounting Gasket Disc)				2								
		25-2050 (Mounting Gasket Drum)					2							
10	ITEM N/A - BRAKE ASSEMBLY	25-2047 (Drum Mounting Spacer)					8							
11	ITEM 2 - BRAKE ASSEMBLY	25-9000 (Mounting Nut)				8	8							
12	ITEM 16 - BRAKE ASSEMBLY	31-4018 (Pad wear indicator washer)	2											
13	ITEM 4 - BRAKE ASSEMBLY	30-0060 (Caliper Mounting Bolt)	4											

14	ITEM 14 - BRAKE ASSEMBLY	31-2033 (ABS Sensor O-Ring)				2									
14	ITEM 1 -SHAFT SEAL CARRIER ASSEMBLY	31-4021 (Shaft Seal)	2									2		2	
15	ITEM 41 -BRAKE ASSEMBLY(IN ASSEMBLY 51-4099)	51-4099 (Outer Cover Assembly)	2									2	2		
16	ITEM 7 - HUB ASSEMBLY	31-6000 (Outer Bearing)						2							
17	ITEM 8 - HUB ASSEMBLY	31-6001 (Inner Bearing)						2							
18	ITEM 5 - HUB ASSEMBLY	31-4001 (Inner Hub Shaft Seal)	2		2										
19	ITEM 6 - HUB ASSEMBLY	31-4002 (Outer Hub V-lip Seal)	2		2										
20	ITEM 4 – HUB ASSEMBLY	31-2036 (Hub O-Ring)	2	2	2							2		2	
21	ITEM 1 - H.P.M. ASSEMBLY	51-9033 (Piston Boot)	2								2				
22	ITEM 7 - H.P.M. ASSEMBLY	51-9036 (Piston Seal)	2								2				
23	ITEM 8 - H.P.M. ASSEMBLY	31-2026 (Piston Housing O-Ring)	2								2				
24	ITEM 11– H.P.M ASSEMBLY	31-5001 (Bleed nipple)	2												
25	ITEM 12 – H.P.M ASSEMBLY	31-9000 (Bleed nipple cap)	2												
26	ITEM 15 – H.P.M ASSEMBLY	51-9015 (Spring lever park brake LHS)	1												
		51-9016 (Spring Lever Park Brake RHS)	1												
27	ITEM 1 - CALIPER ASSEMBLY	51-2146 (Bolt Retainer Brake Pad)	4							4					
28	ITEM 2 - CALIPER ASSEMBLY	51-2049 (Pin Retainer Brake Pad)	4							4					

29	ITEM 4 - CALIPER ASSEMBLY	51-5000 (Brake Pad Set)	1						1	1				
30	ITEM 5 – CALIPER ASSEMBLY	31-2035 (Caliper Mounting Bracket (O-ring)	2											
31	ITEM 6 – CALIPER ASSEMBLY	30-2000 (Piston Housing Washer)	4											
32	ITEM 7 – CALIPER ASSEMBLY	30-0077 (Piston Housing Washer)	4											
33	ITEM 4 – I.C & B. ASSEMBLY	31-5048 (Breather Fitting)	2											
34	ITEM 13 – I.C & B. ASSEMBLY	31-5043 (Inspection Plug)	4											

7. Installation – Rear Brakes

1. Ensure all OEM Toyota rear brake equipment has been removed from the vehicle:
   a. Remove both rear brake assemblies.
   b. Remove the two hydraulic brake lines across the rear axle.
   c. Remove the handbrake cables and brackets.
   d. Remove Centre Console
   e. Remove park brake lever boot



   f. Disconnect park brake lever light
   g. Remove the park-brake lever
      i. Bend Tabs up as per image below **Note:** Tabs to remain bent until new cable fitted

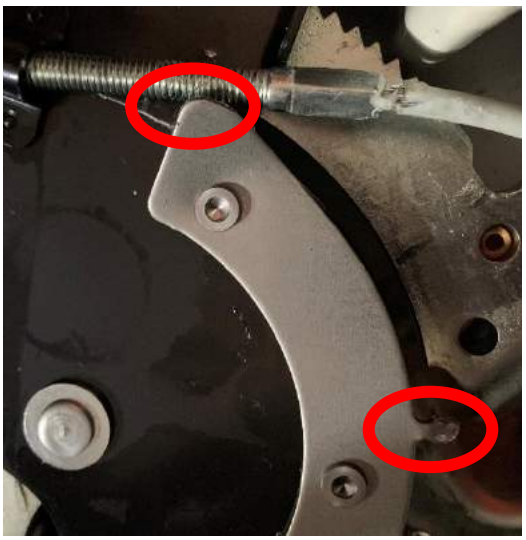


Figure x

2.

i. Undo park brake cable adjusting nuts and retain for new cable

3.

a. Remove the ABS sensors from the axle flange and keep for later re-installation.

4. Clean the axle flange and spindle to remove any grease, dirt and gasket remains (Figure 1). If the flange is damaged or corroded it must be cleaned thoroughly with abrasive paper.

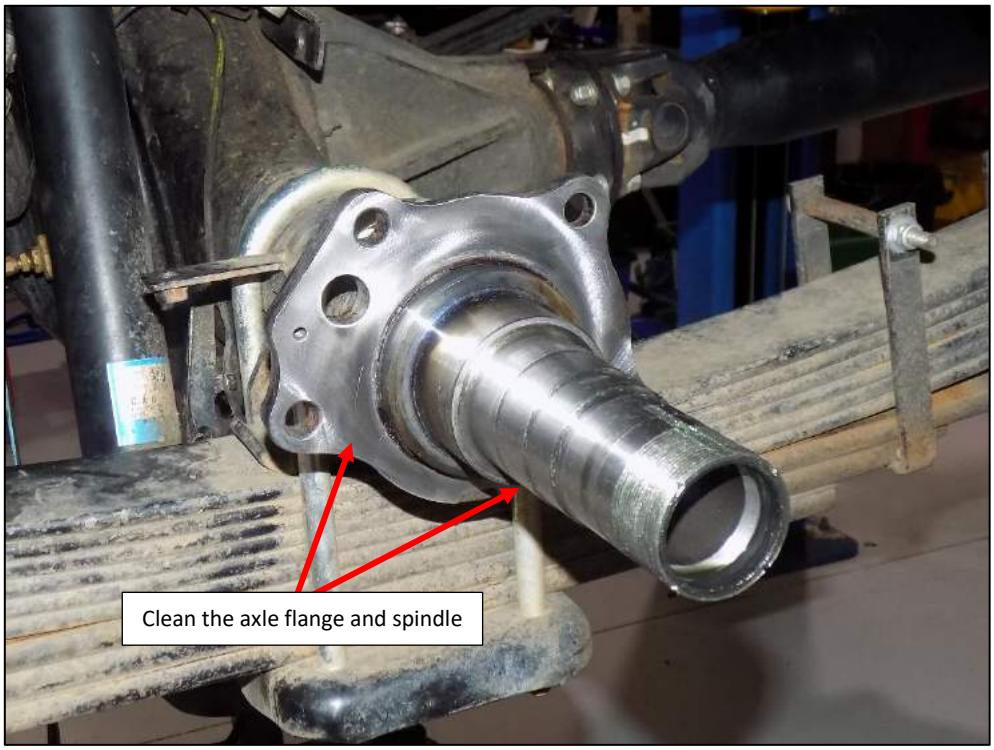


Figure 1

5. Check the condition of the wheel bearing seal running surface. If the surface shows signs of degradation (e.g. corrosion or wear) repair using a speed-sleeve.

6. The packaging for each brake unit is marked with its corresponding position on the vehicle and must be installed accordingly:

a. LH = Left-Hand

b. RH = Right-Hand

7. Remove and keep any loosely packaged items from the box. Keep the parts with the corresponding LH or RH assembly.

8. Carefully remove the Terra Dura® wheel-end assembly from its packaging and place hub down (as packaged) on a clean bench. Note: the assembly weighs approximately 40 kg. NOTE: A two-man lift may be required.

NOTE: a lifting lug may be attached to the thread of the transport bolt to assist removal of the brake from its packaging.

9. Ensure zip tie on park brake lever is in place and tight. If zip tie is broken or missing fit a new zip tie and tighten to prevent the rotor from moving.

NOTE: Do not remove until after step 28

10. Rotate wheel-end brake on its side as positioned on the vehicle.

11. Remove and keep the 4x brake mounting nuts. On Terra Dura® brake assemblies for drum brake equipped vehicles, remove and keep the 4x spacers located under each mounting nut also. Along with this, remove transport plate and nut.
12. Remove the transport spacers from the brake unit.
13. **IMPORTANT**: Lay wheel-end brake down with hub is facing upwards.
14. Fill the hub cavity with high temperature bearing grease (Castrol LMX recommended).
15. Apply Loctite 515 to both sides of the gasket provided and attach to the brake (Figure 2). The gasket can be found in the brake assembly box.

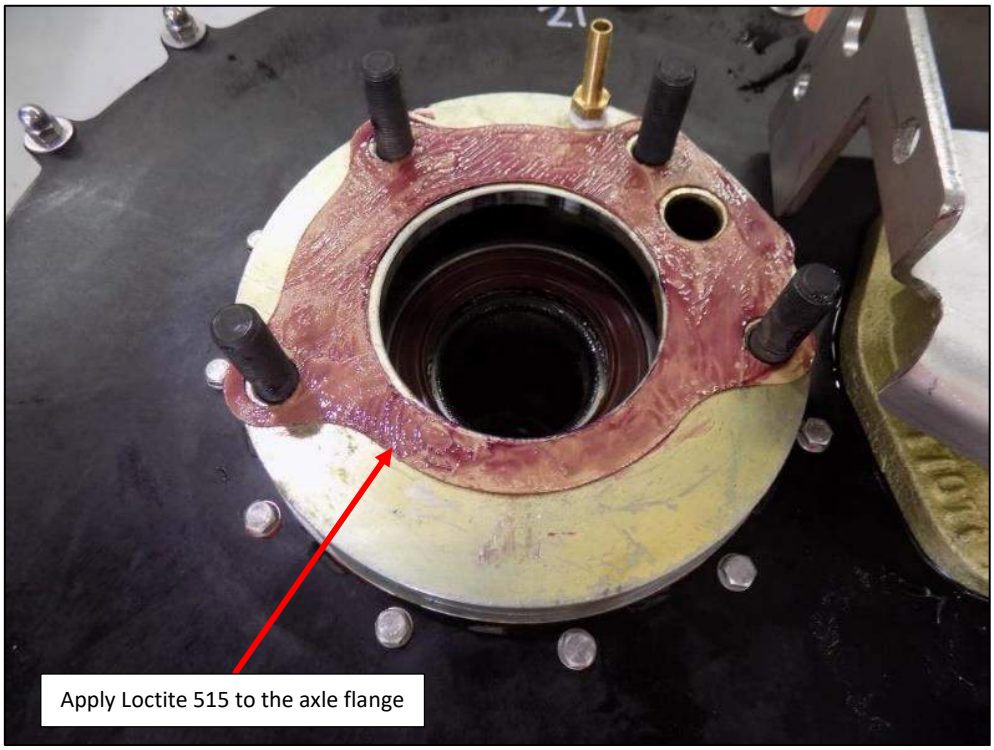


Figure 2

16. Fit the Terra Dura® brake unit over the stub axle (Figure 3). Align the mounting holes and locate the housing evenly and firmly against the axle flange. Ensure the hub stays in position in the brake unit while locating on the stub axle.

Figure 3

17. Fit the 4x brake mounting nuts hand-tight (Figure 4). For drum brake equipped vehicles, firstly fit the 4x spacers under each mounting nut.

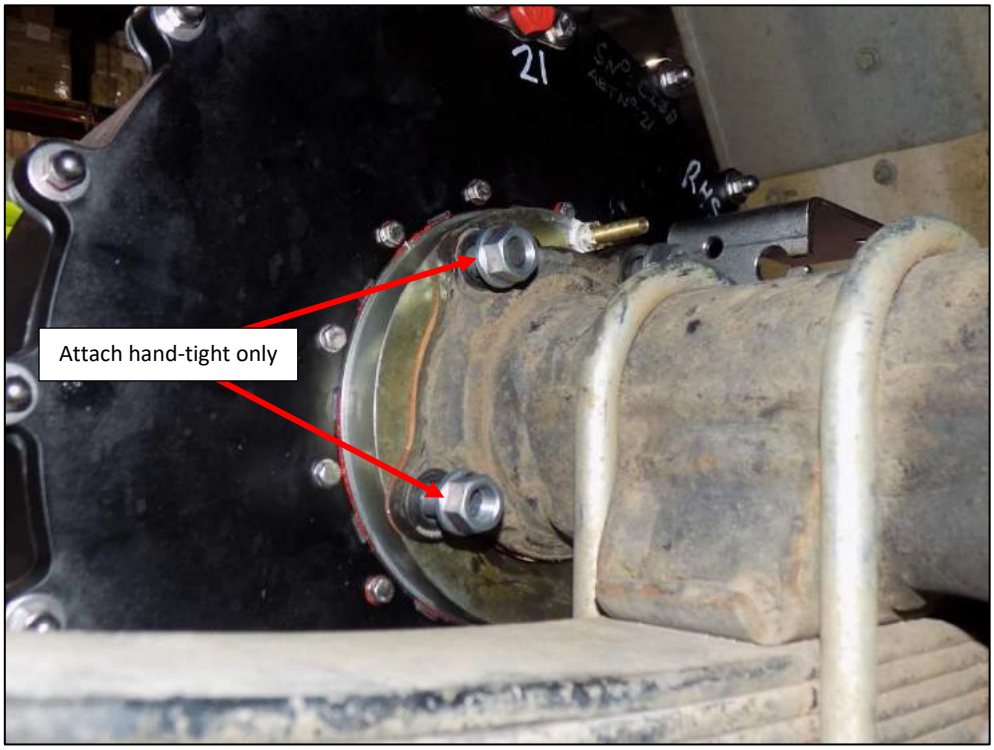


Figure 4

8. Grease the outer bearing and fit to the hub (Shown in figure 5)

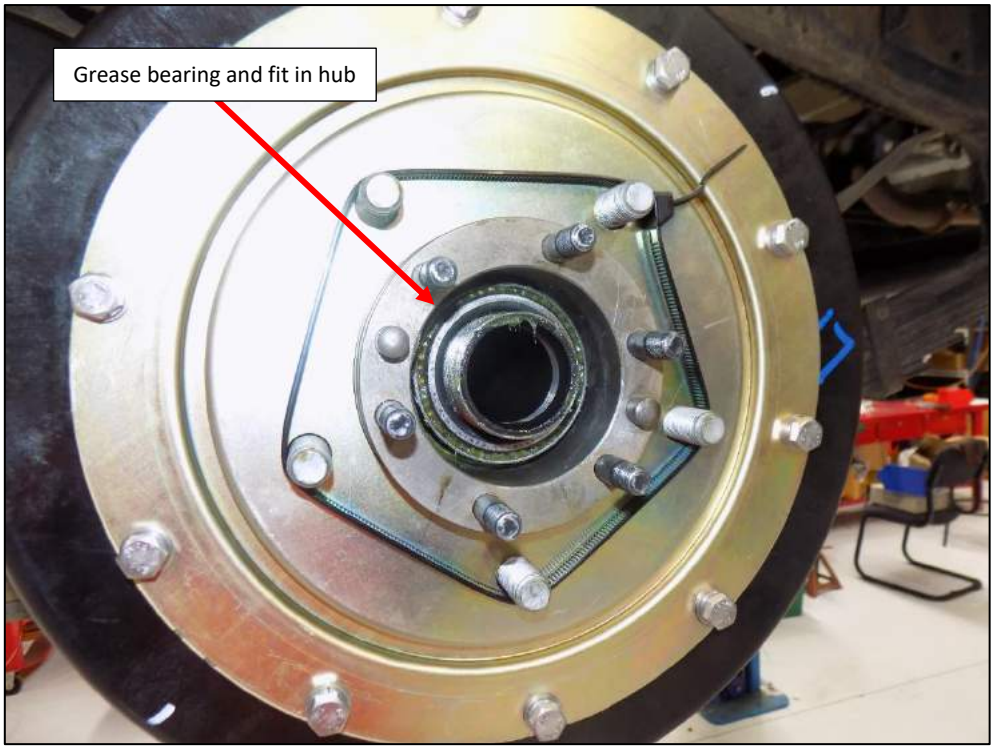


Figure 5

17. Fit the lock washer and hub nut then temporarily tighten the hub nut hand-tight (Figure 6). Do not adjust or fit the locking screws.

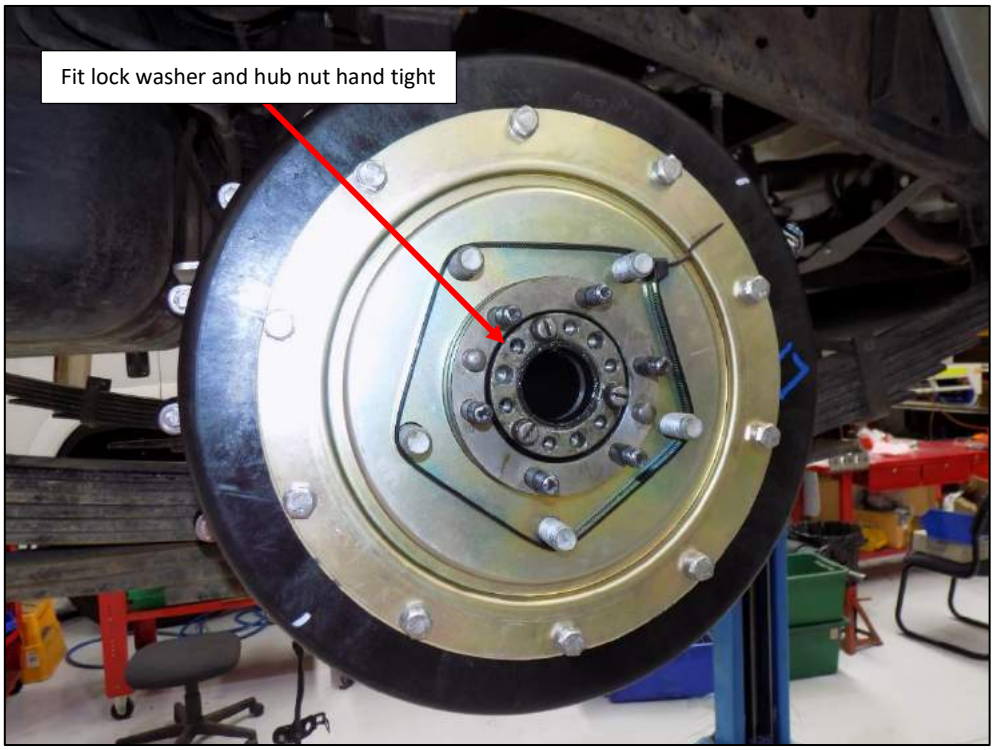


Figure 6

18. ***[ABS equipped vehicles only].*** Clean the ABS sensor if required (Figure 7).

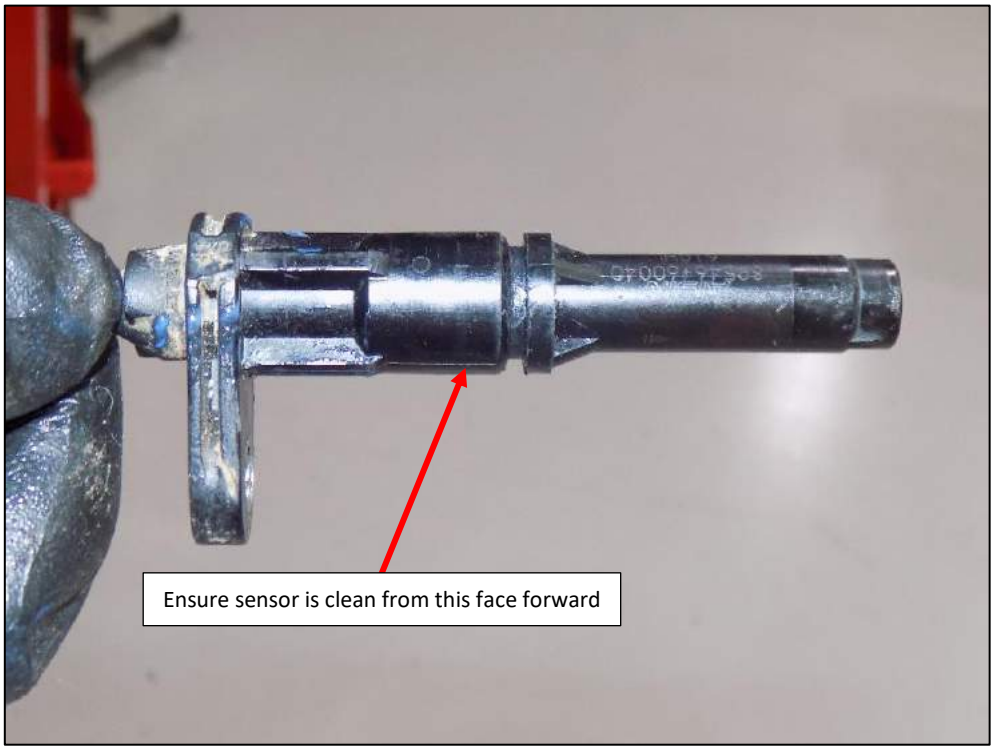


Figure 7

19. ***[ABS equipped vehicles only]***. Apply a light smear of silicone grease to the small O-ring provided and attach it to the ABS sensor (Figure 8).

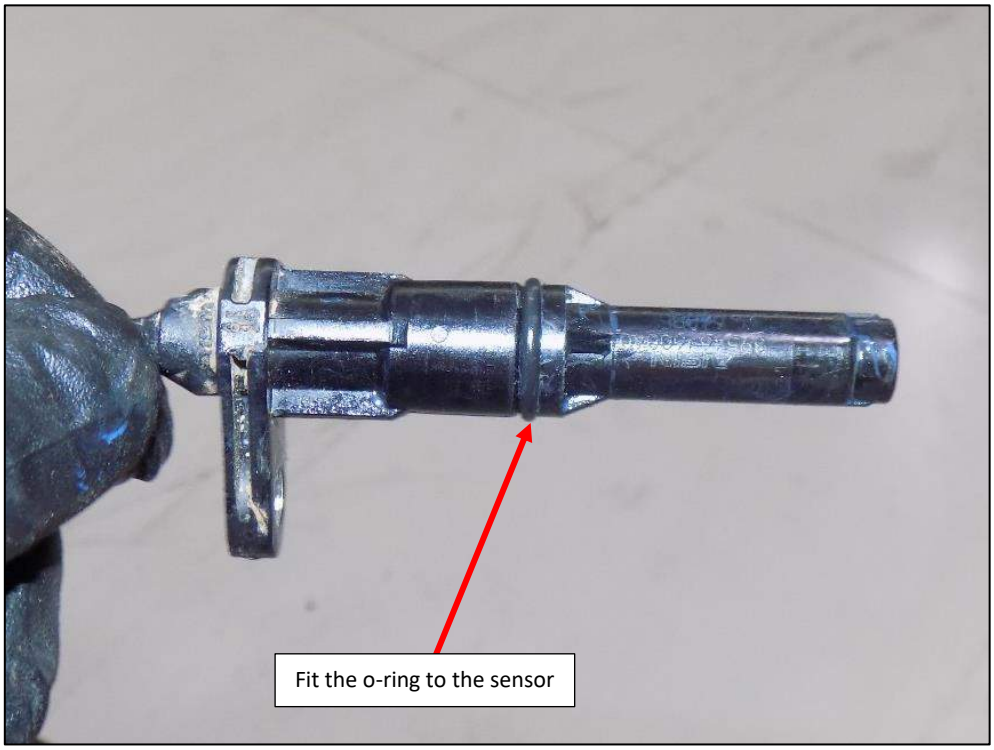


Figure 8

20. ***[ABS equipped vehicles only].*** Carefully push the ABS sensor into position in the axle flange (Figure 9). The brake may need to be rotated forward by hand to align the holes for the ABS sensor.

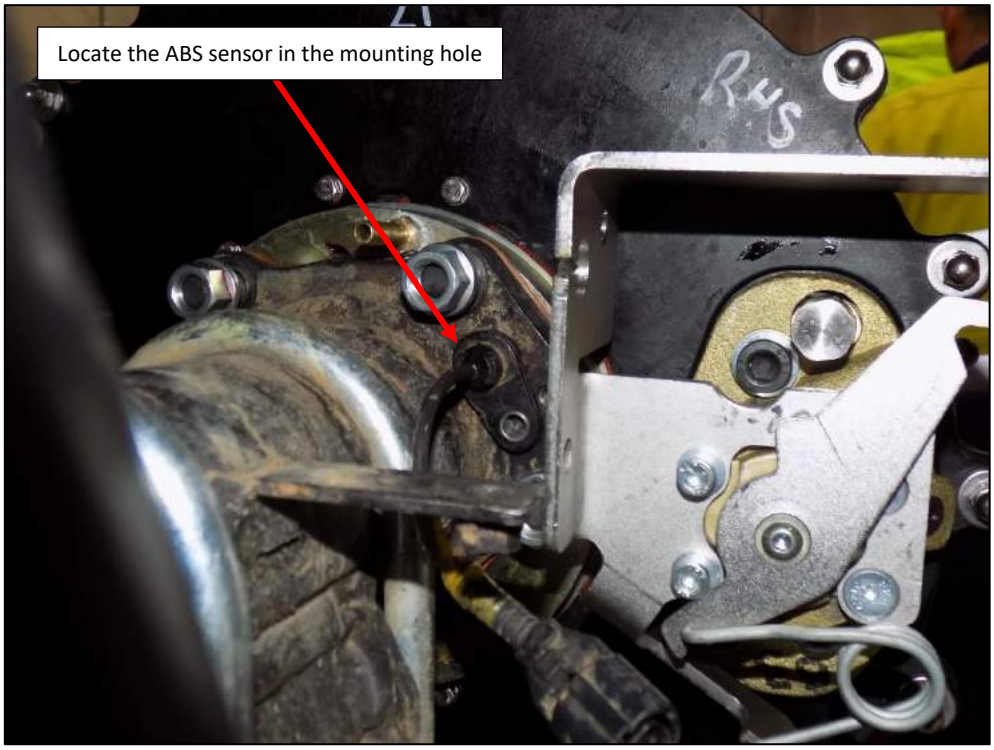


Figure 9

21. ***[ABS equipped vehicles only].*** Secure the ABS sensor using the OEM fastener (Figure 10).

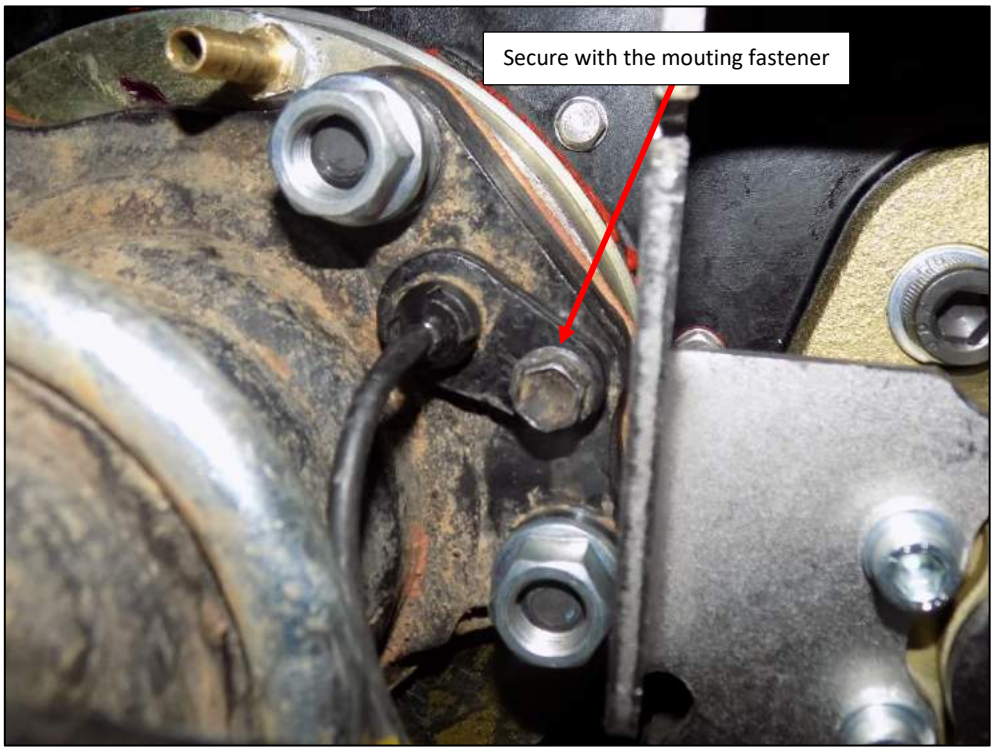


Figure 10

22. Remove the 2 front mounting nuts (Figure 11).

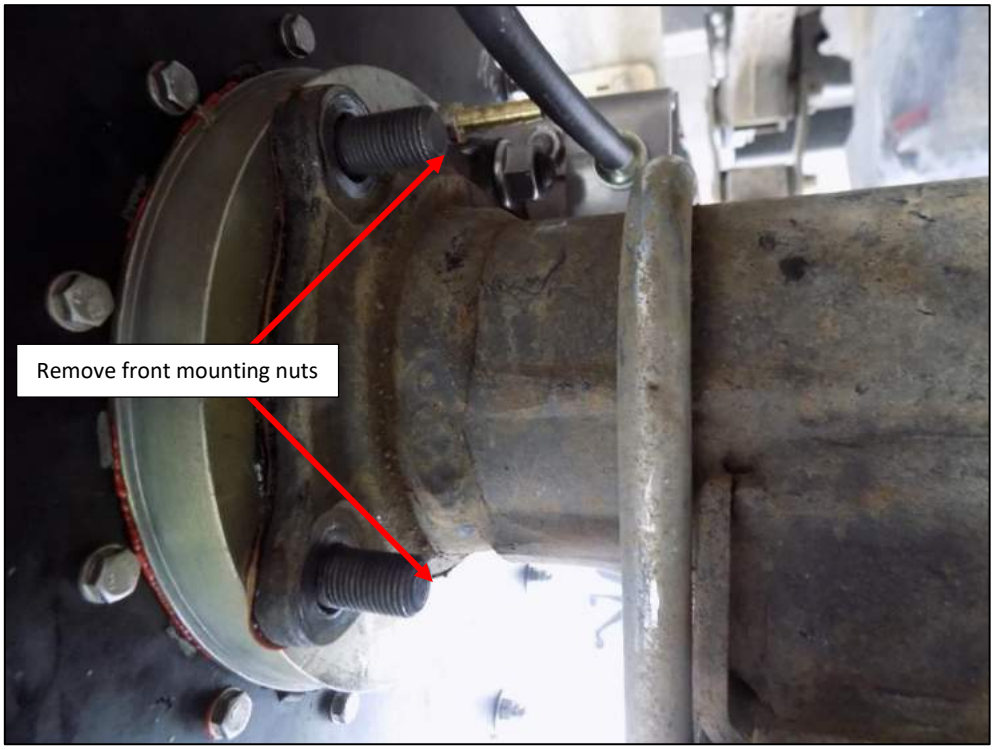


Figure 11

23. Fit the spacer washers to the two front mounting studs (Figure 12 DISC only). For Drum use the D shaped washer as supplied in the kit.

Figure 12

24. Fit the park-brake cable bracket to the mounting studs (Figure 13).

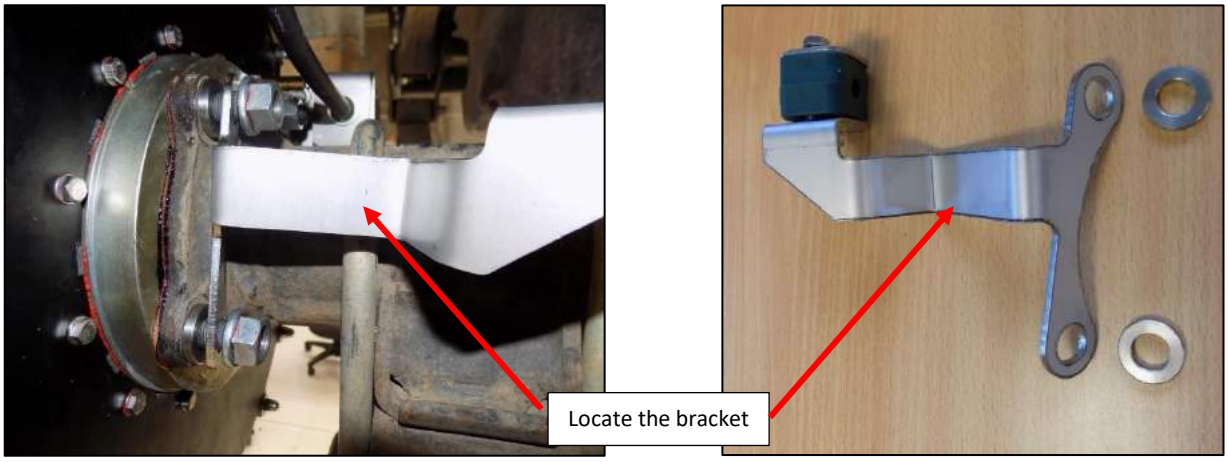


Figure 13

25. Torque the 4 by brake mounting nuts to 80 Nm in a diagonal pattern (Figure 14). Repeat this procedure 3 times over a 5-minute period.

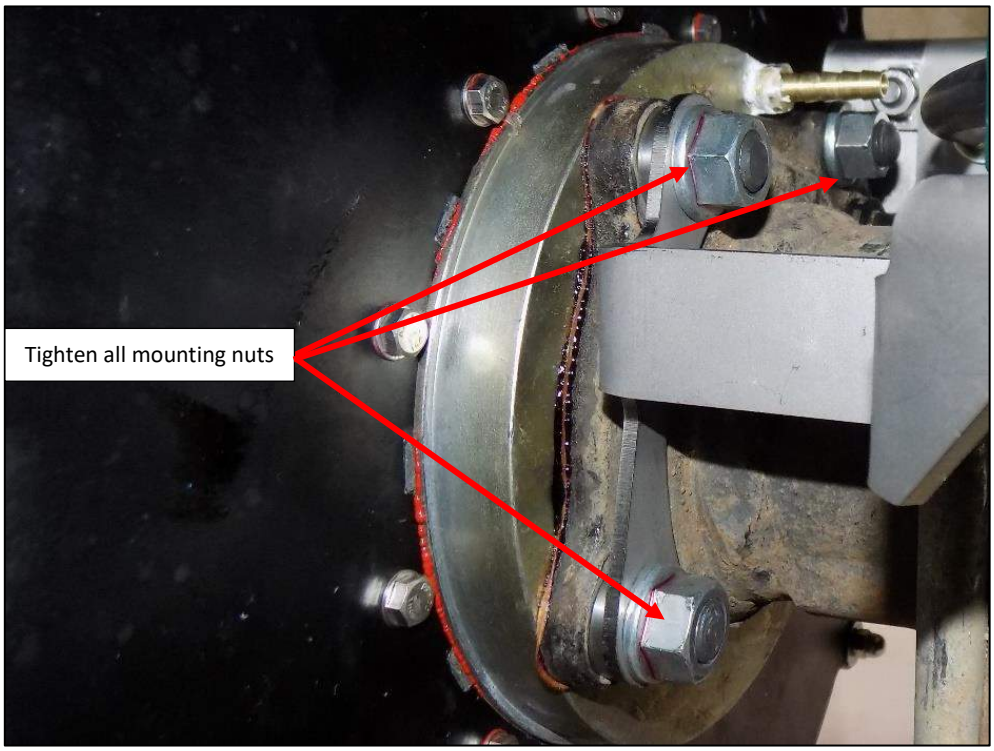


Figure 14

26. Carefully remove the locking cable tie from the park-brake lever on the brake unit (Figure 15).

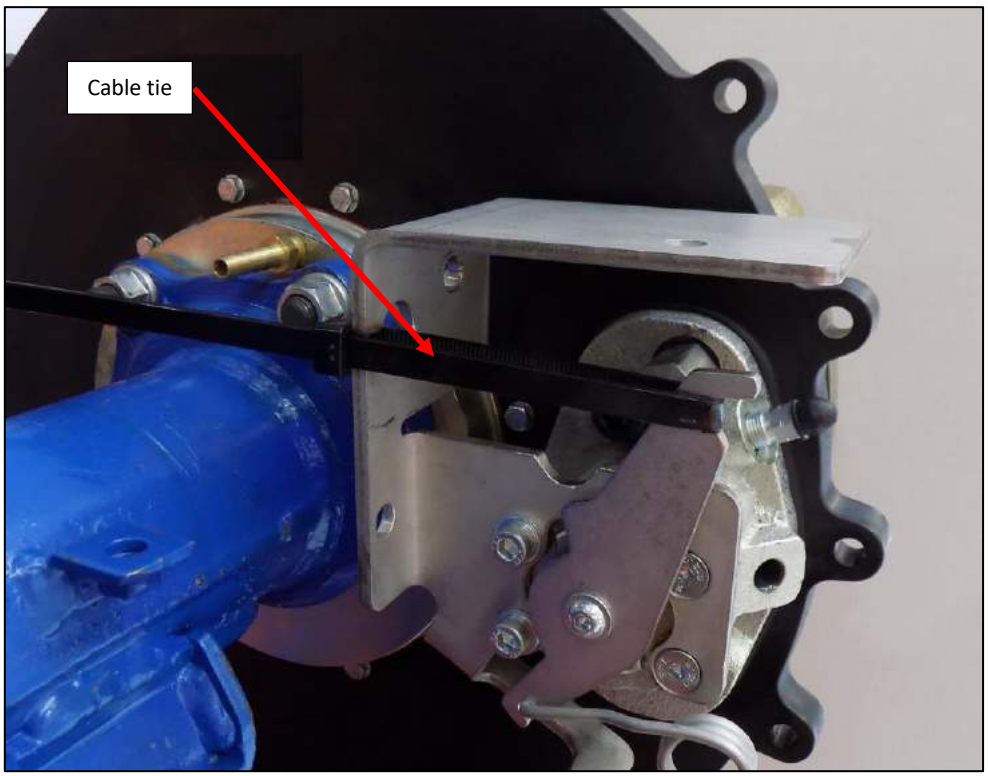


Figure 15

27. Tighten the hub nut up to pre-load the bearing
28. Rotate the brake several times to ensure it is free.
29. Adjust the outer wheel bearing, hub nut to Toyota specifications and then fit the locking screws (Figure 16).
30. **NOTE:** the spring balance reading will be higher than quoted in the Toyota manual due to the sealed arrangement of the Terra Dura® brake system.

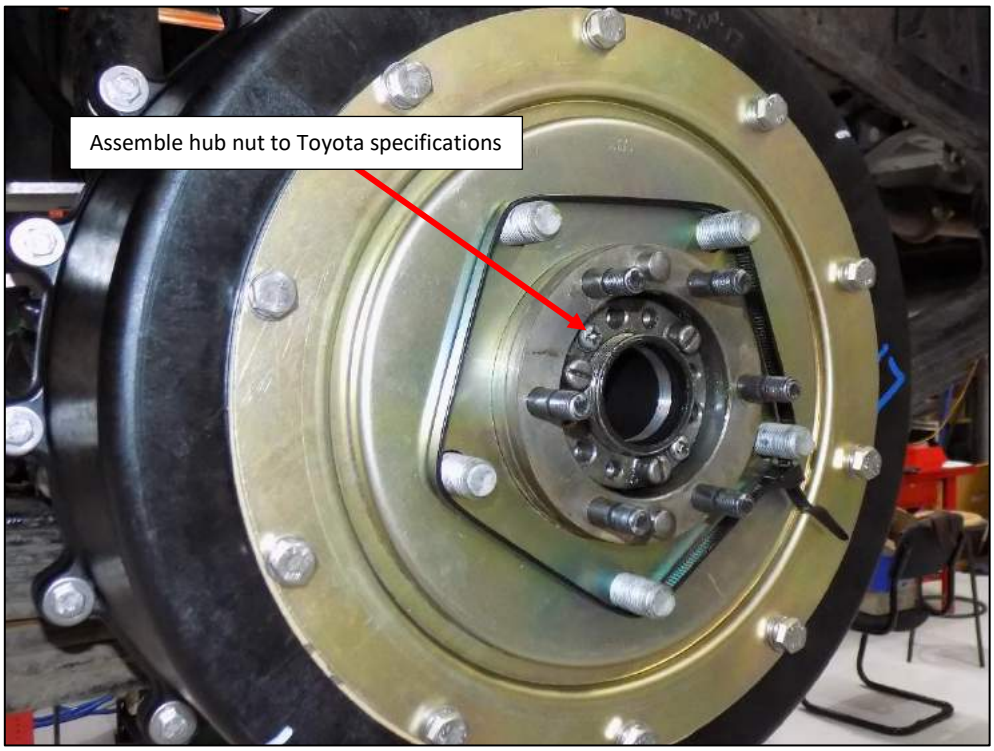


Figure 16

31. Install the OEM gasket and axle half shafts in accordance with the Toyota manual specifications
32. Repeat all steps for the opposing brake unit.

8. Installation – Park-Brake Cables

1. Remove the park-brake cable assembly parts from the kit and identify where each component will be installed on the vehicle (Figure 17). Brackets may vary depending on vehicle type. Ensure the correct steps are followed to suit the bracket types supplied in the kit.

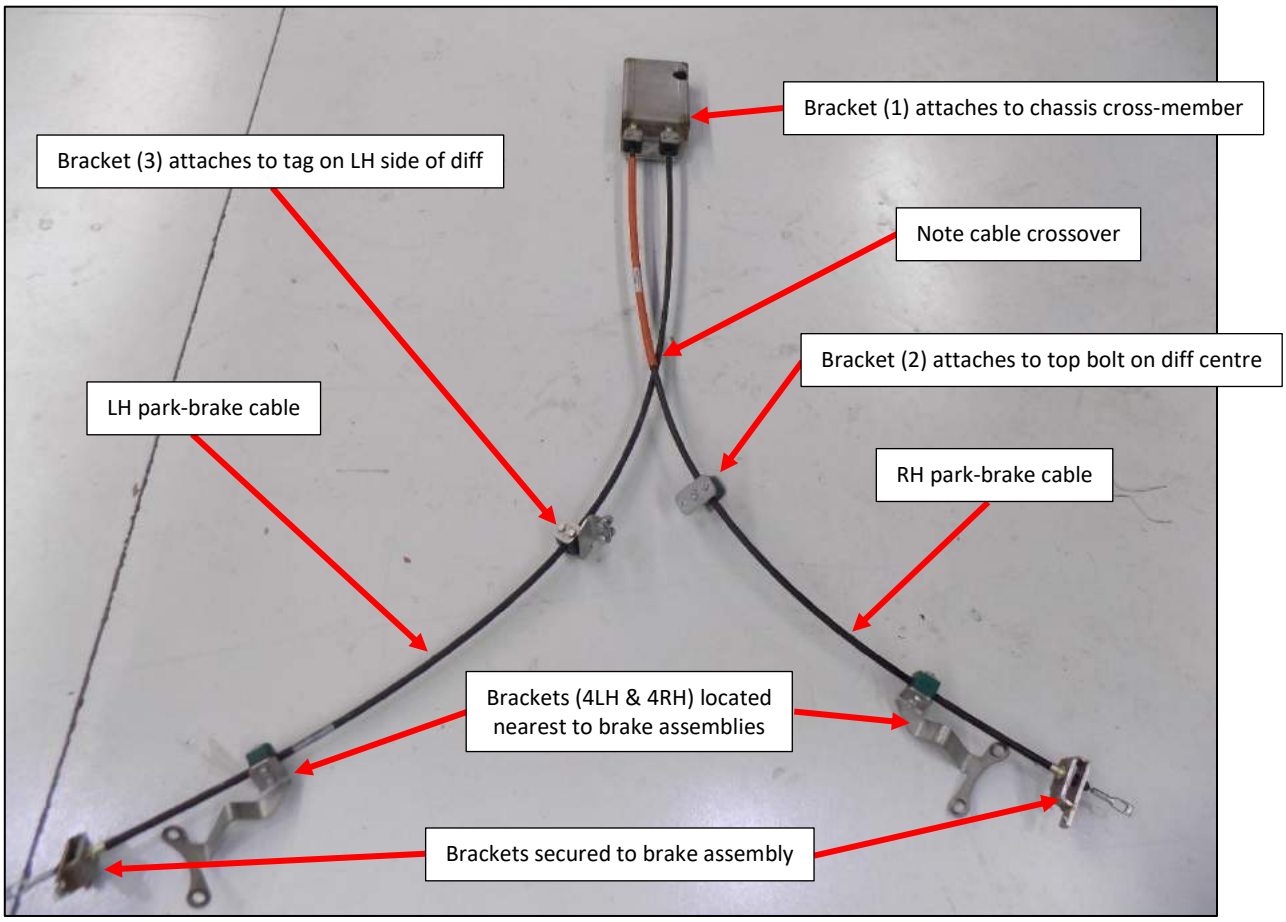


Figure 17

2. There are different versions of bracket used to suit various vehicle models (Figure 18 to **Error! Reference source not found.**).

3.

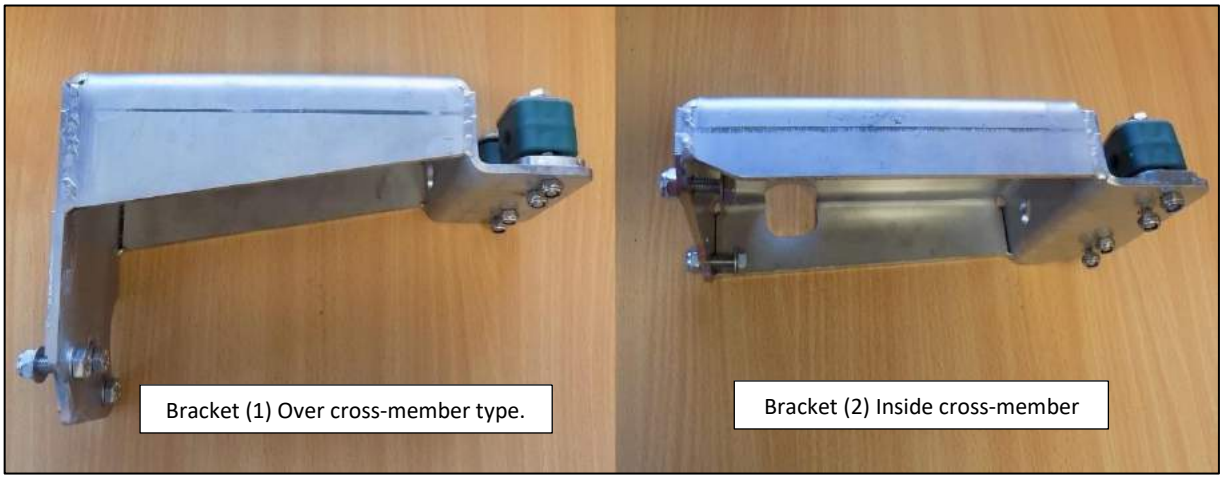


Figure 18

4.

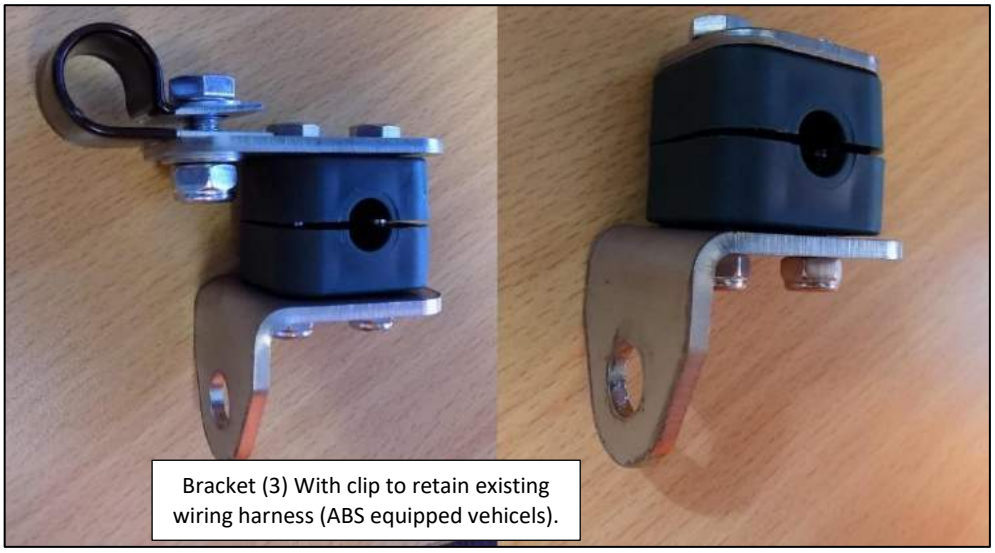


Figure 19

5.

Figure 20

6. ***[Inside cross-member type bracket (2) only].*** Drill the marked hole in the chassis cross-member to allow clearance for the cabin-cable (Figure 21). A minimum hole diameter of 19mm is required. Finish the hole with a rust-prevention paint or equivalent.

Figure 21

7. Mount the park-brake splitter bracket to the chassis cross-member using the supplied mounting hardware (
8.
9.
10. Figure 22 and Figure 23). Torque the fasteners to 20 Nm.

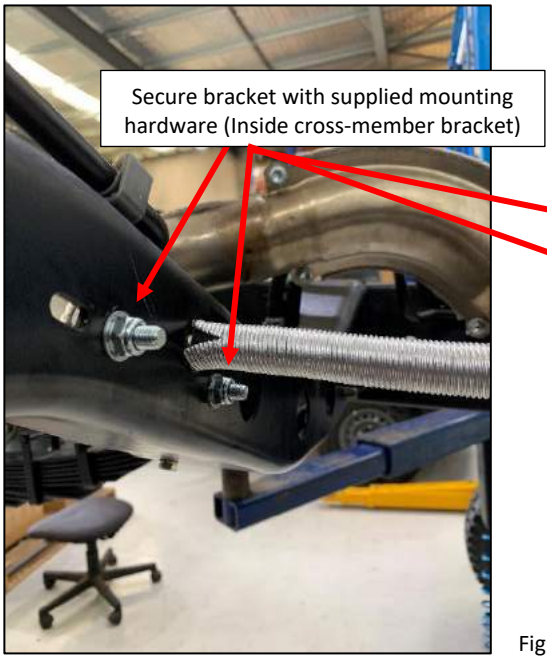


Figure 22 A & B

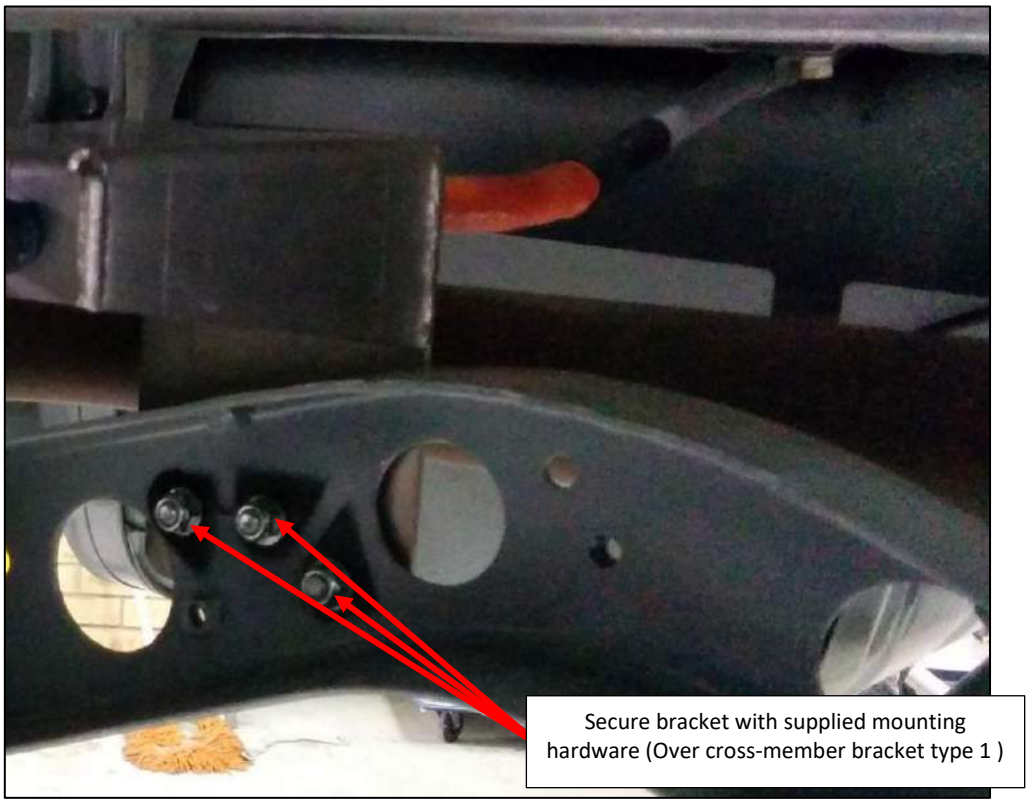


Figure 23

11. ***[Inside cross-member type bracket (2) only].*** Feed the cabin-cable through the enlarged cross-member hole and into the bracket (Figure 24). **Note:** Make sure this is the sheathed end.

Figure 24

12. ***[Over cross-member type bracket (2) only].*** Feed the cabin-cable through the hole in the bracket (Figure 25).

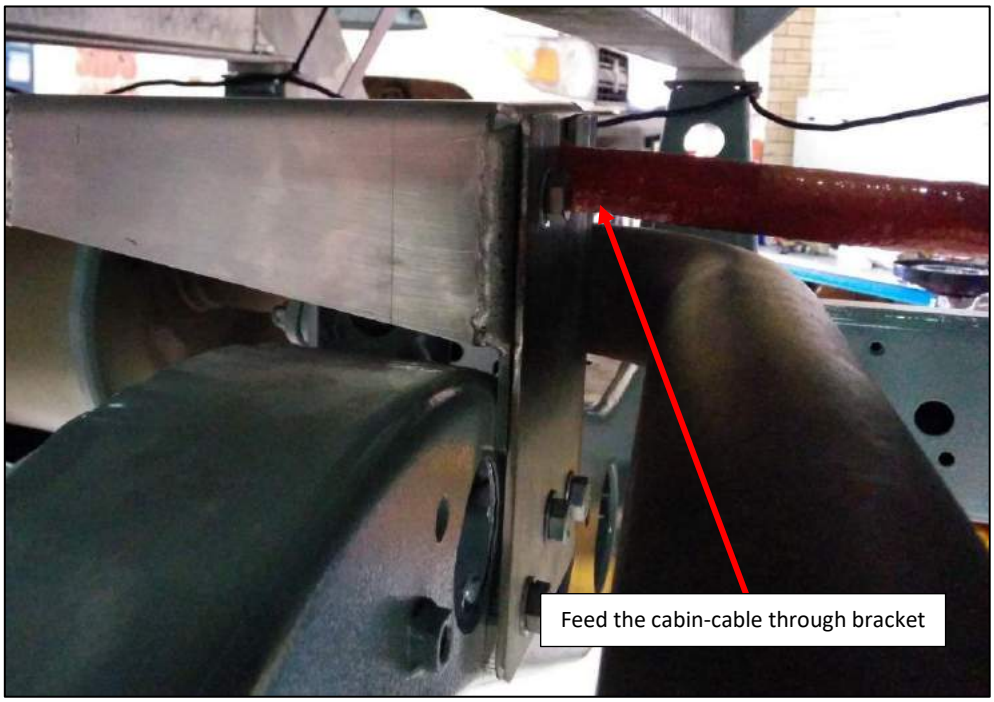


Figure 25

13. Secure the cabin-cable in position using the cable clip (Figure 26).

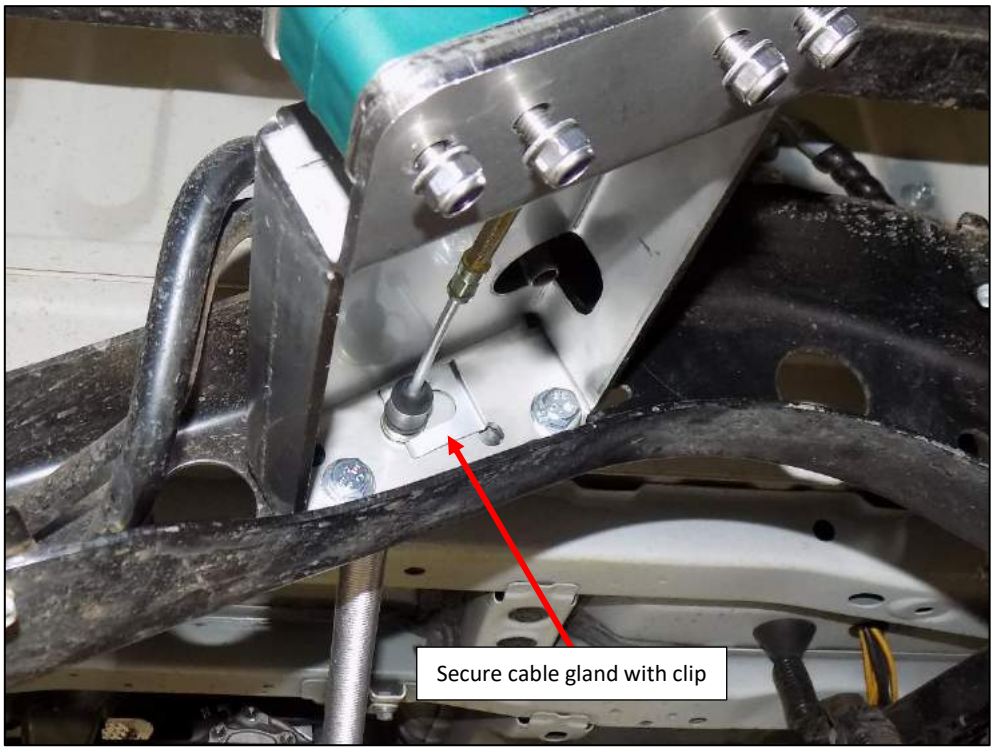


Figure 26

14. Feed the other end of the cabin-cable into the opening where the OEM cable was removed and ensure it is correctly clipped into position (Figure 27). **Note:** Before feeding make sure that the locking prongs are in the spread position.

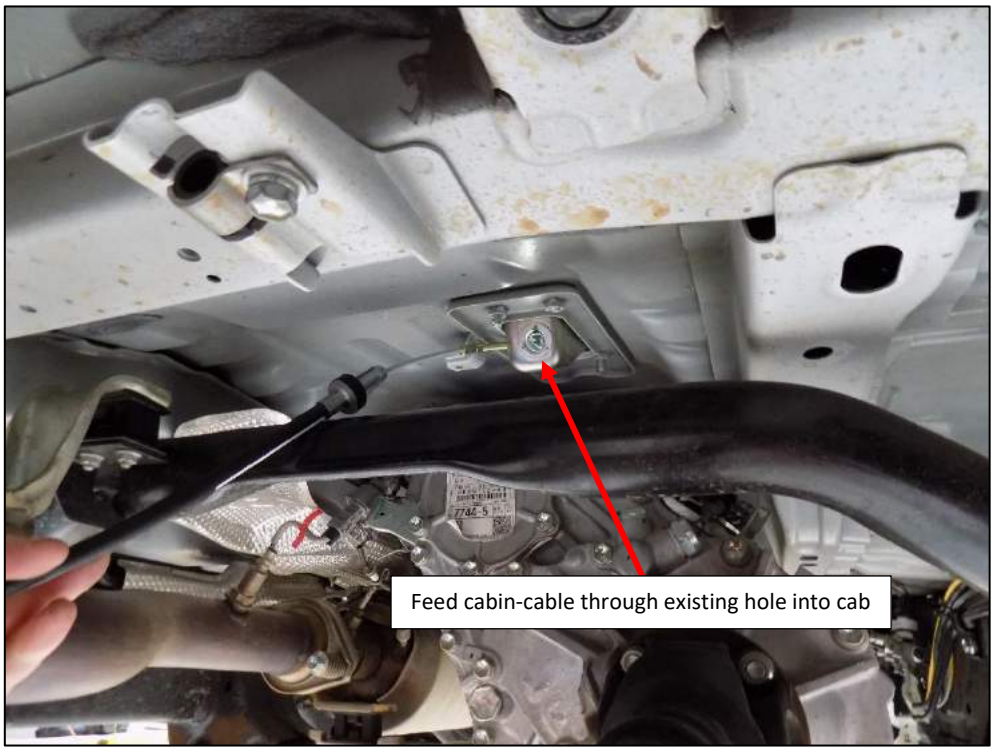


Figure 27

15. Secure the cabin-cable using the existing OEM cable clip and the rubber sleeve removed from the OEM cable (Figure 28).

16. **NOTE:** this bracket and clip may vary depending on vehicle model.

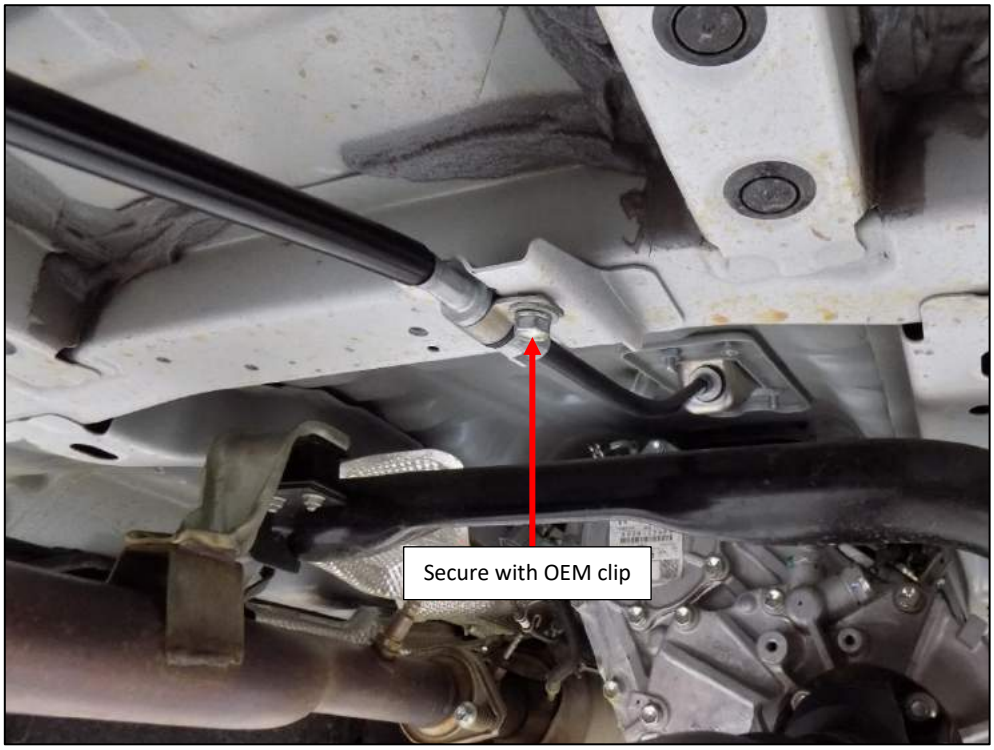


Figure 28

17. Feed the cabin-cable into the balance bar and thread the two adjusting nuts onto the end (Figure 29). Do not tighten the adjusting nuts yet.

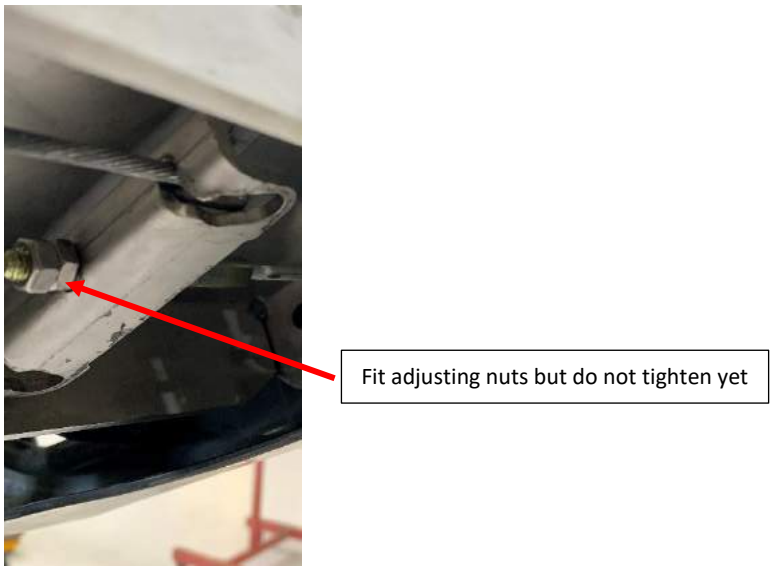


Figure 29

18. Hook the end of the wheel-end-cable onto the park-brake lever (Figure 30). **Note:** The eye-end of the cable is slightly curved. Attach to the lever with the curve side facing down.

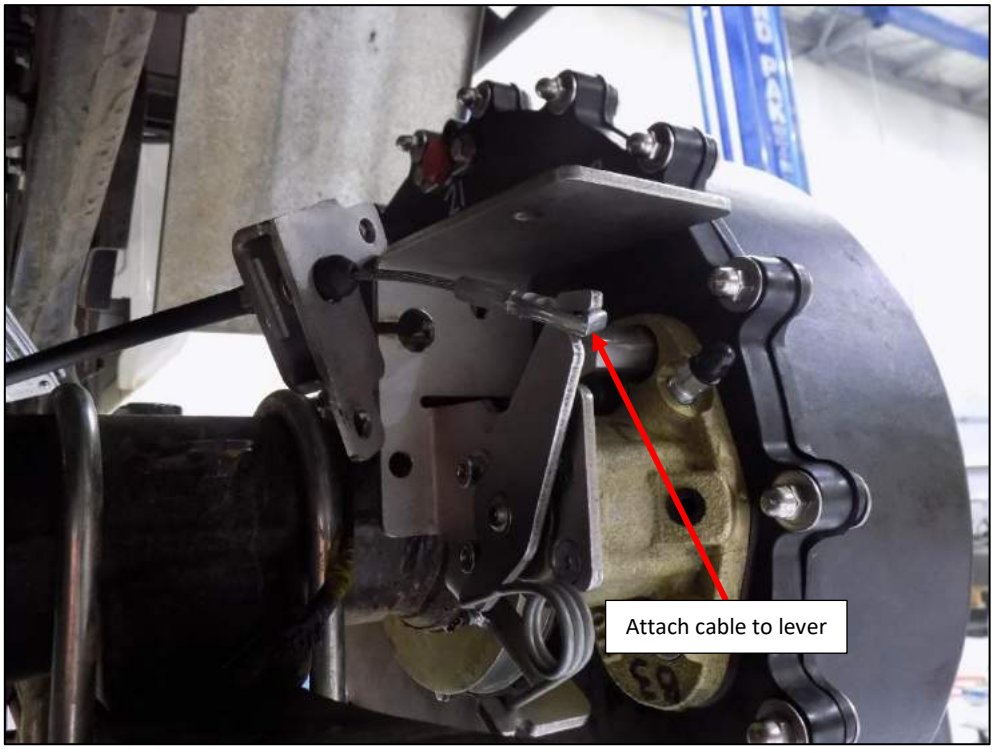


Figure 30

19. Feed the cable through the slot in the bracket (Figure 31).

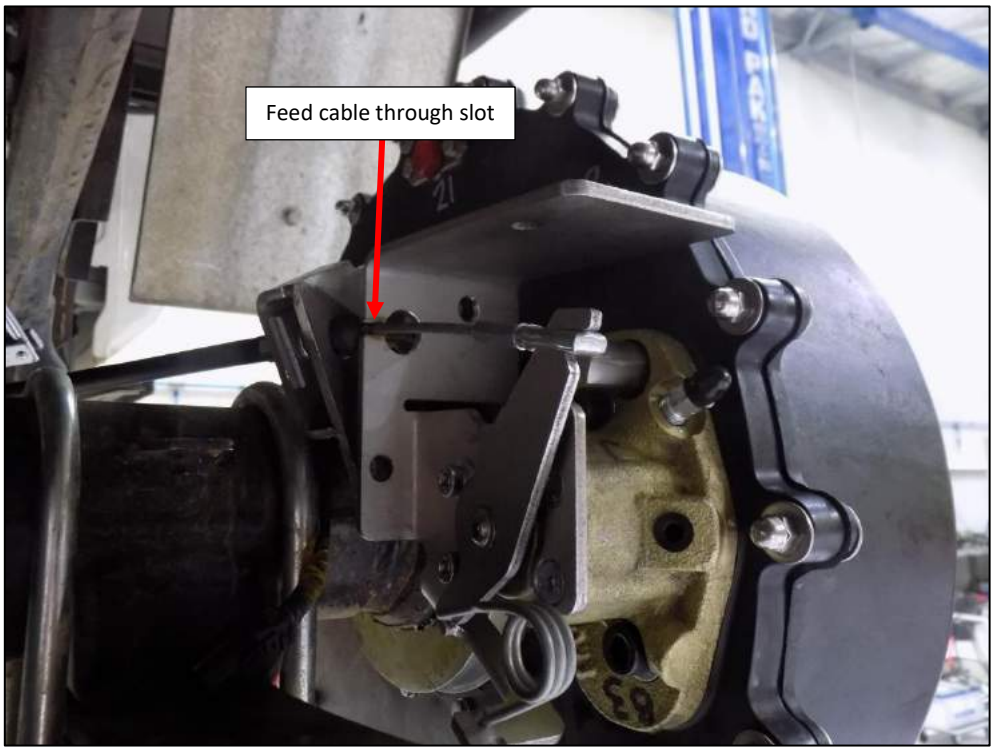


Figure 31

20. Lock the cable gland in position with the supplied cable clip (Figure 32).

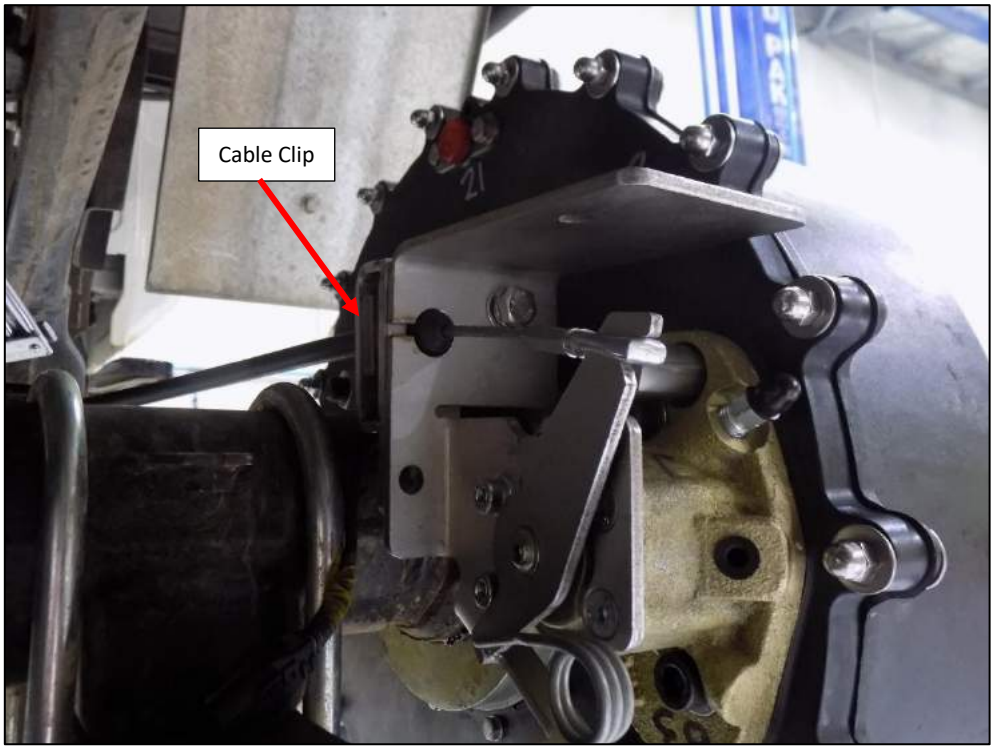


Figure 32

21. **Note** the different lengths of the park-brake shroud fasteners (Figure 33). The longer fastener secures the bottom of the brake shroud and spacer, the two shorter bolts secure the top of the shroud.

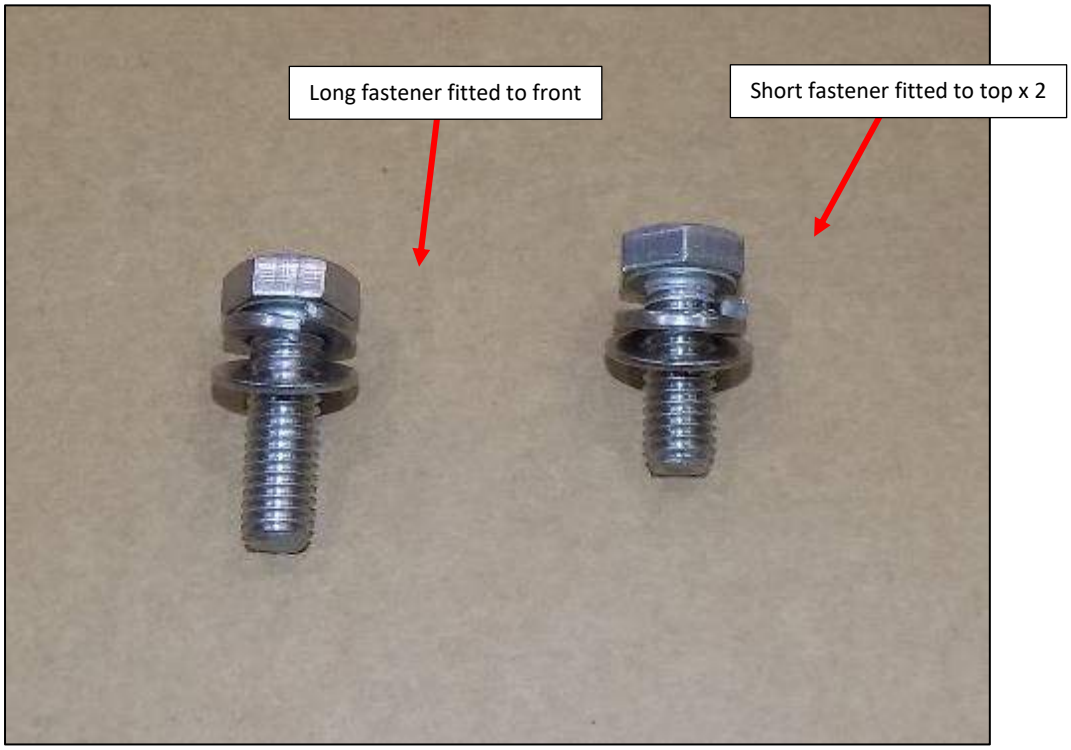


Figure 33

22. Attach the park-brake shroud and install the two (short) mounting fasteners (Figure 34).

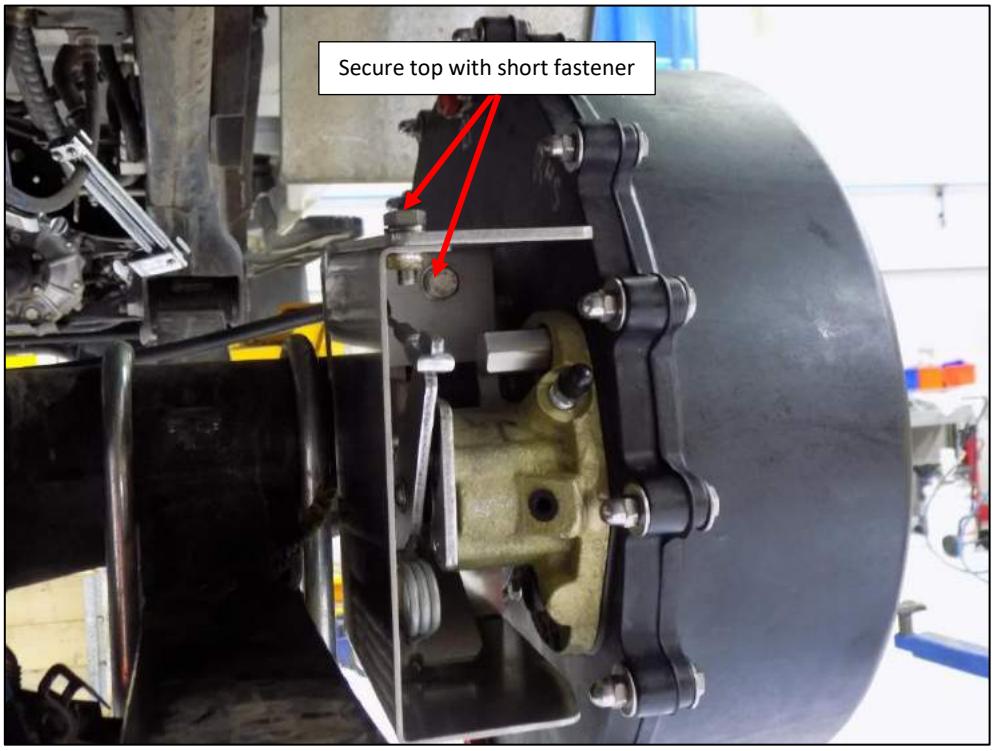


Figure 34

23. Install the front (longer) mounting fastener (**Error! Reference source not found.**).

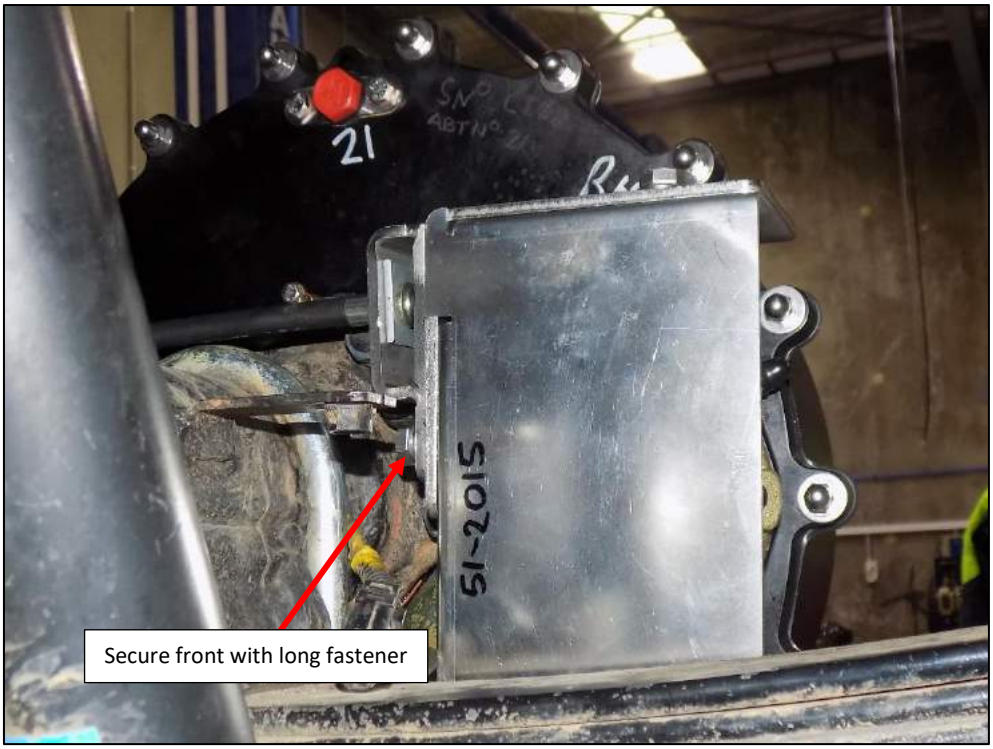


Figure 35

24. Torque all three bolts to 10Nm (2 short 1 long)

25. The image below shows the recommended park-brake cable routing and required mounting points (Figure 36). Note the cable cross-over.

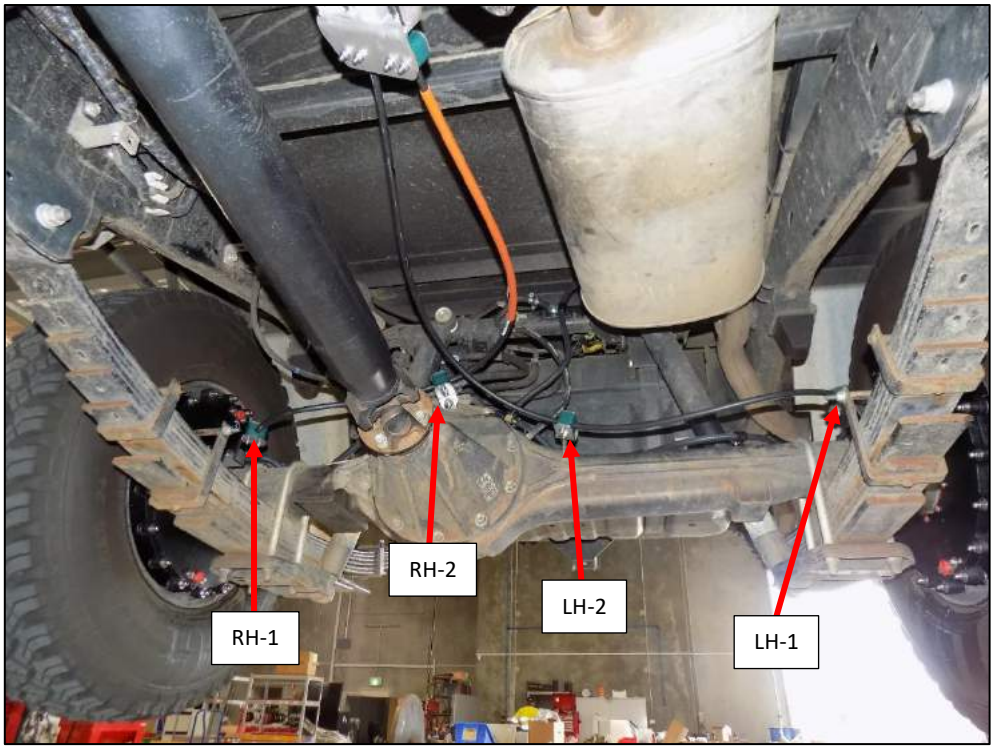


Figure 36

26.

27. ***[Axle Flange mount type bracket]***. The RH-1 cable clamp attaches to the bracket mounted off the brake mounting studs (Figure 37). Do not tighten at this stage.

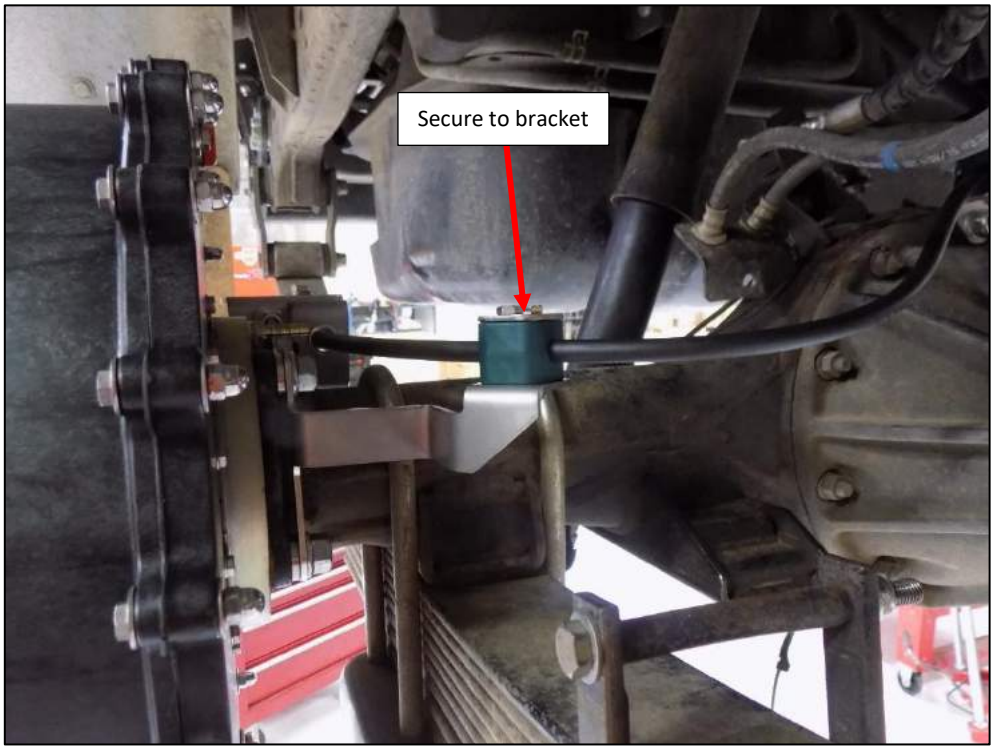


Figure 37

28. The RH-2 cable clamp is attached to the top diff-centre stud (Figure 38). Unclip the harness from the OEM plastic cable clamp. Remove the bracket attached to the differential and discard the bracket and plastic cable clamp. **Note:** The OEM nut securing the diff-housing should not be removed.

Note: The OEM cable bracket is attached to ABS equipped vehicles only.

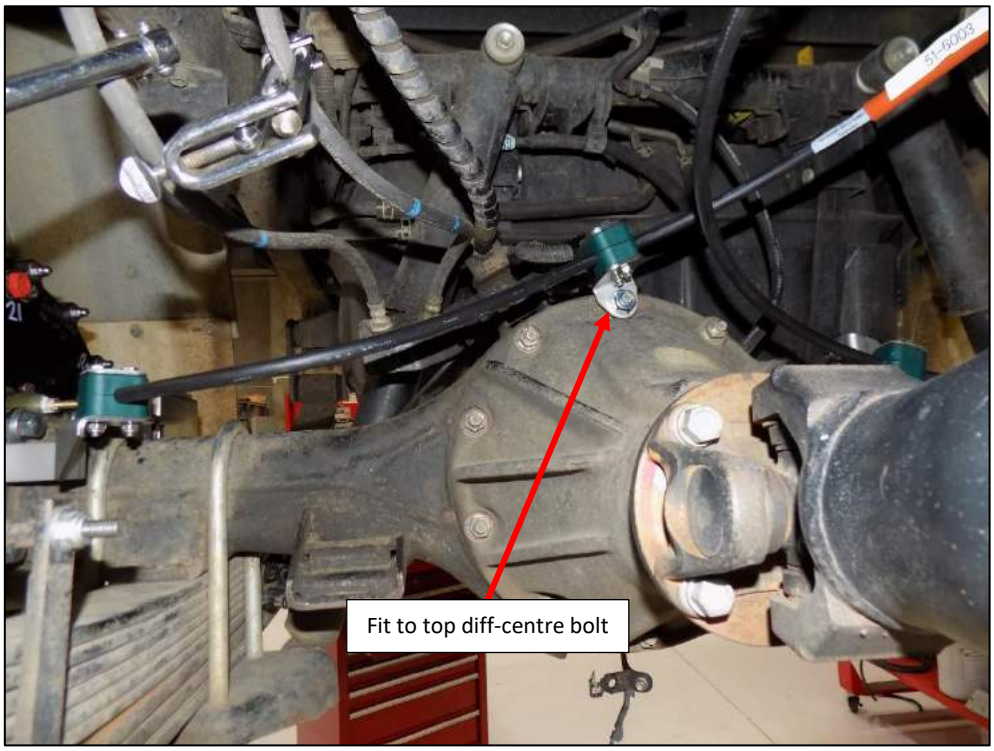


Figure 38

29. There is also a P-clip attached to the RH-2 bracket that is used to secure the OEM ABS harness (Figure 39). Do not tighten at this stage.

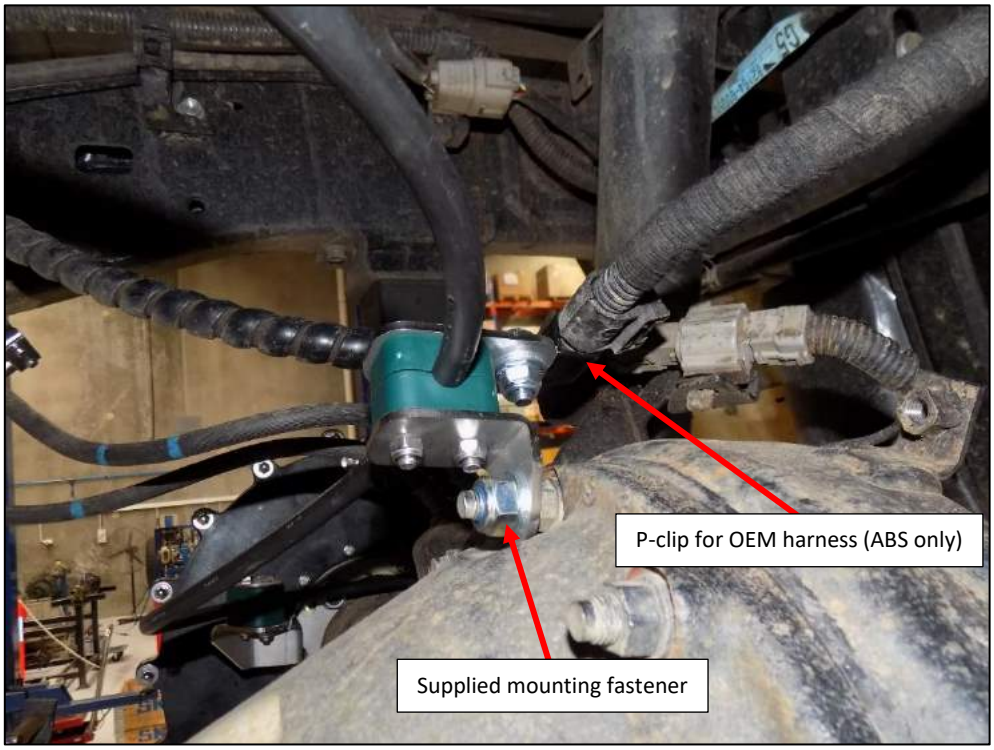


Figure 39

30. ***[Axle Flange mount type bracket].*** The LH-1 clamp is a mirror of the RH-1 clamp. The LH-1 cable clamp attaches to the bracket mounted off the brake mounting studs (Figure 40). Do not tighten

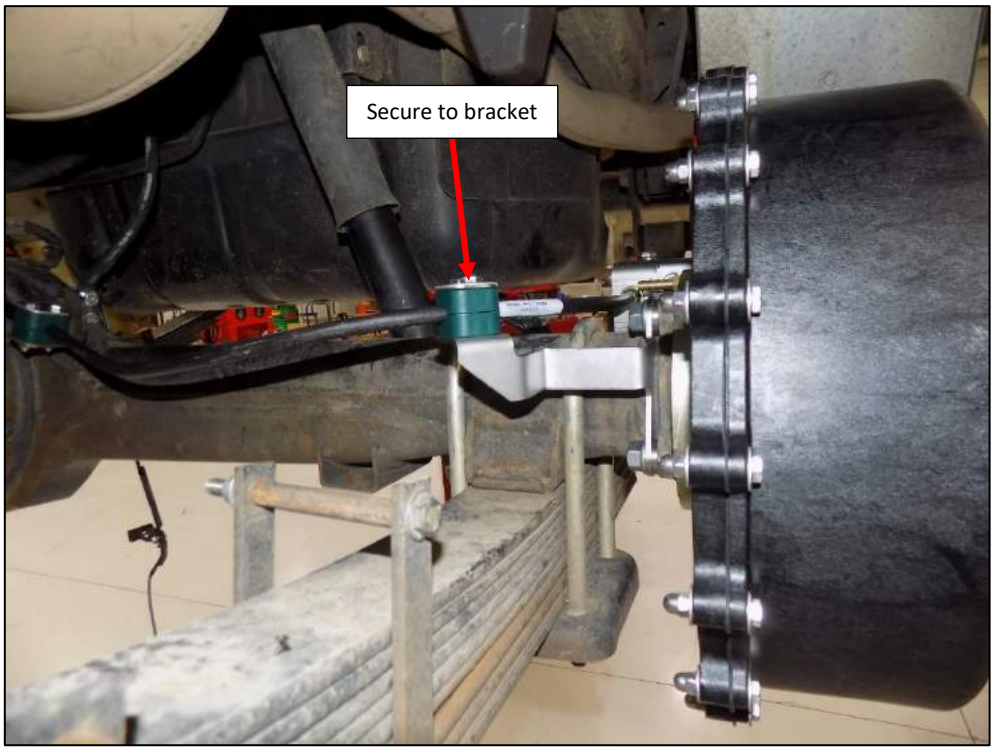


Figure 40

31. The LH-2 cable clamp attaches to the tab on top of the axle (**Error! Reference source not found.**). Torque the cable c lamp fasteners to 8 Nm.

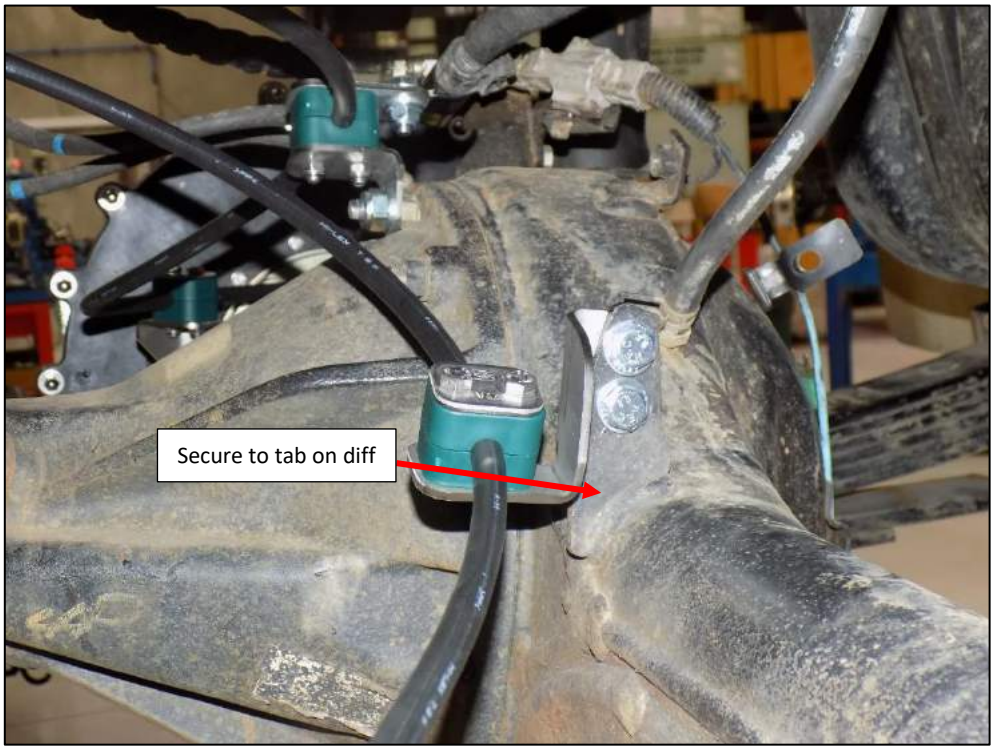


Figure 41

32. Ensure brake cables are in their final position, then torque all saddle clamps to 8Nm.

33. The completed park-brake cable layout should look like the figures below (Figure 42 & 44).

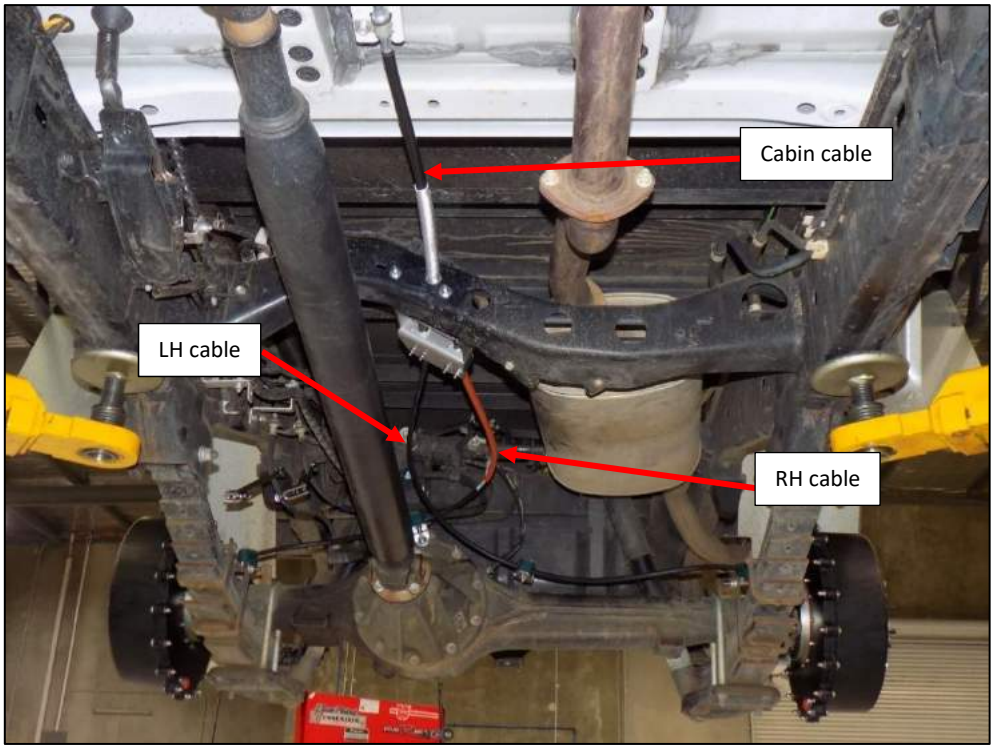


Figure 42 Below View

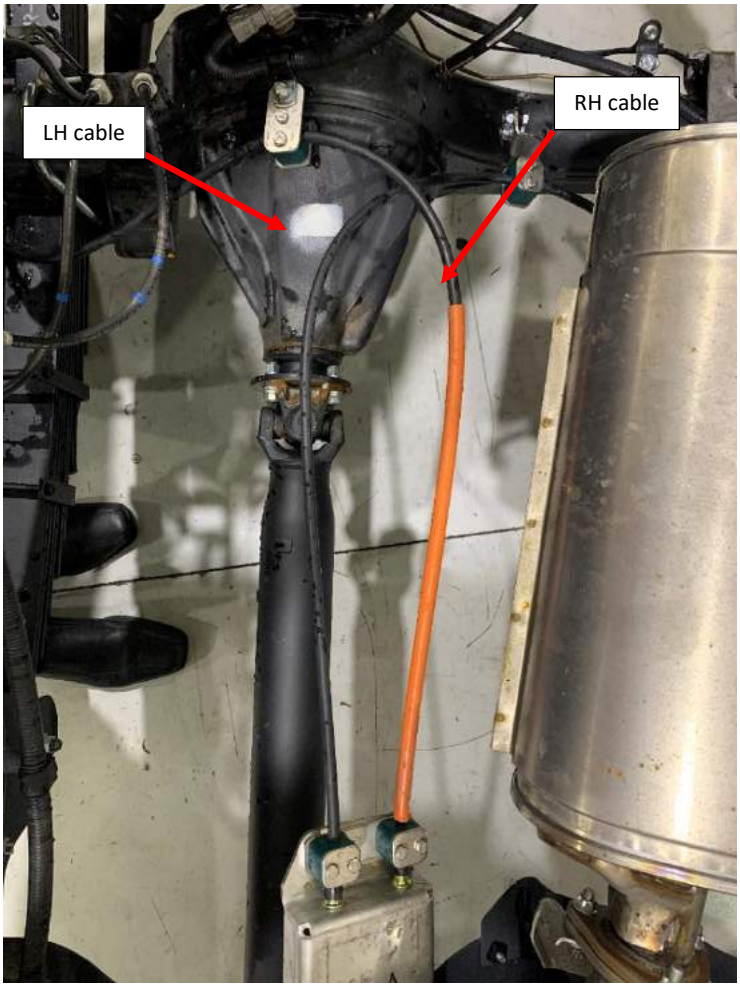


Figure 43 Above View

34. Attach the cabin cable to the parking brake control lever as per the OEM cable (Figure 44). The tabs on the cable guide will need to be bent back after fitting the cable in original position. This must be done prior to securing the handbrake to the floor. Ensure some thread is showing above the 2 locknuts do not tighten and do not fit the console.

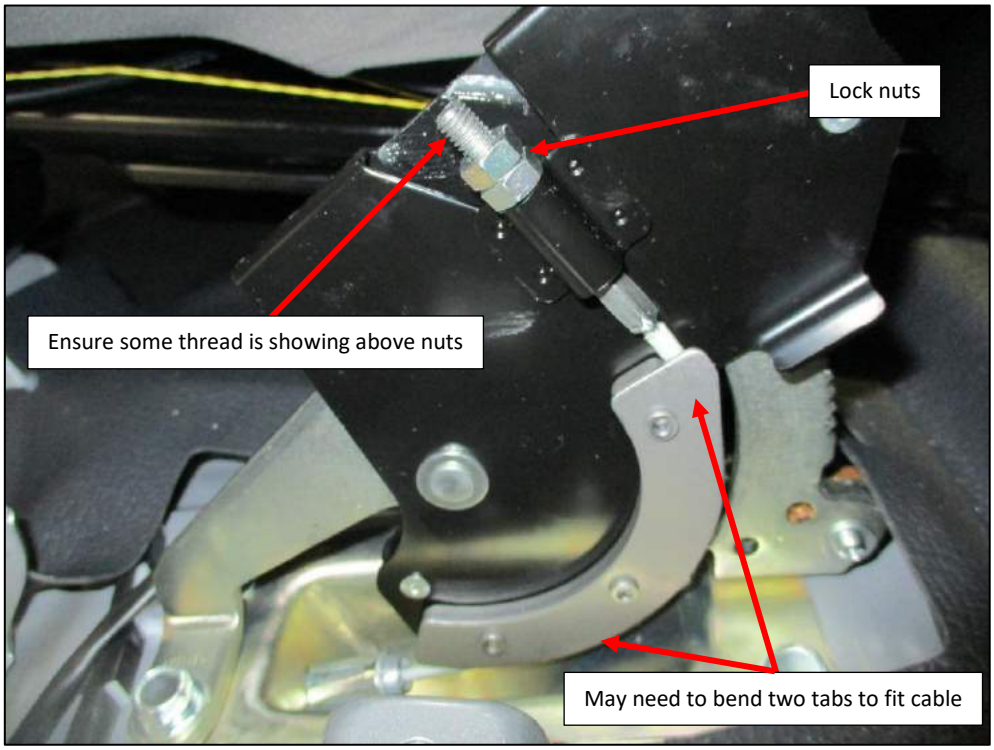


Figure 44

9. Installation – Brake Lines and Breather System

35. The service-brake lines attach to the OEM feed pipes (Figure 45). Fig 47 shows vehicles equipped with stability control. Vehicles without stability control fitted use a tee-fitting style.

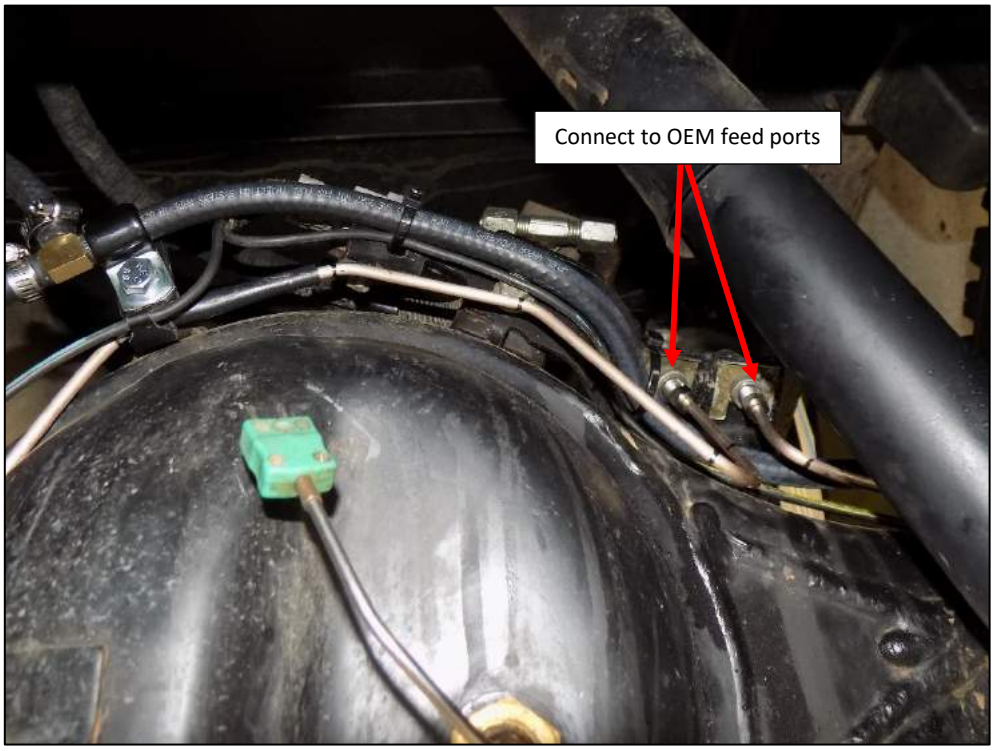


Figure 45

36. Connect the LH service-brake line to the LH-brake feed port (Figure 46).

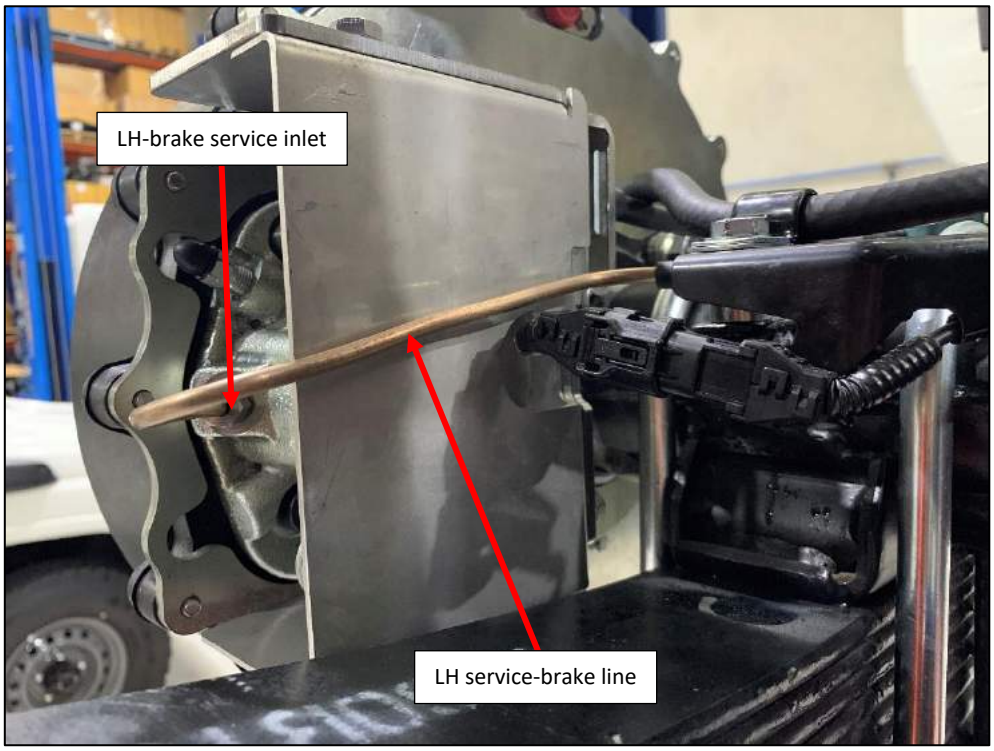


Figure 46

37. Connect the RH service-brake line to the RH-brake feed port (Figure 47).

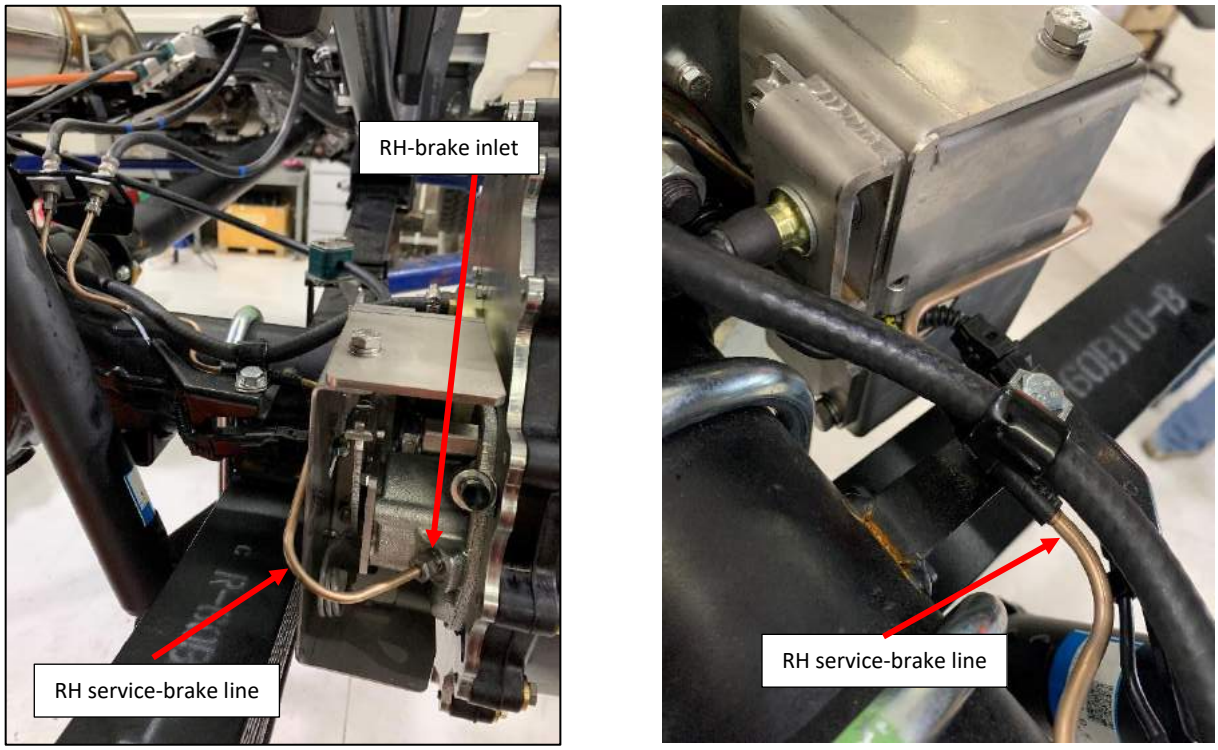


Figure 47

38. The brake lines should be secured across the rear axle using the OEM mounting points and P-clips (Figure 48).

Figure 48

39. Connect breather hose to the barb fitting on the RH-brake and secure with a hose clamp (Figure 49). Route the hose across the axle toward the diff centre.

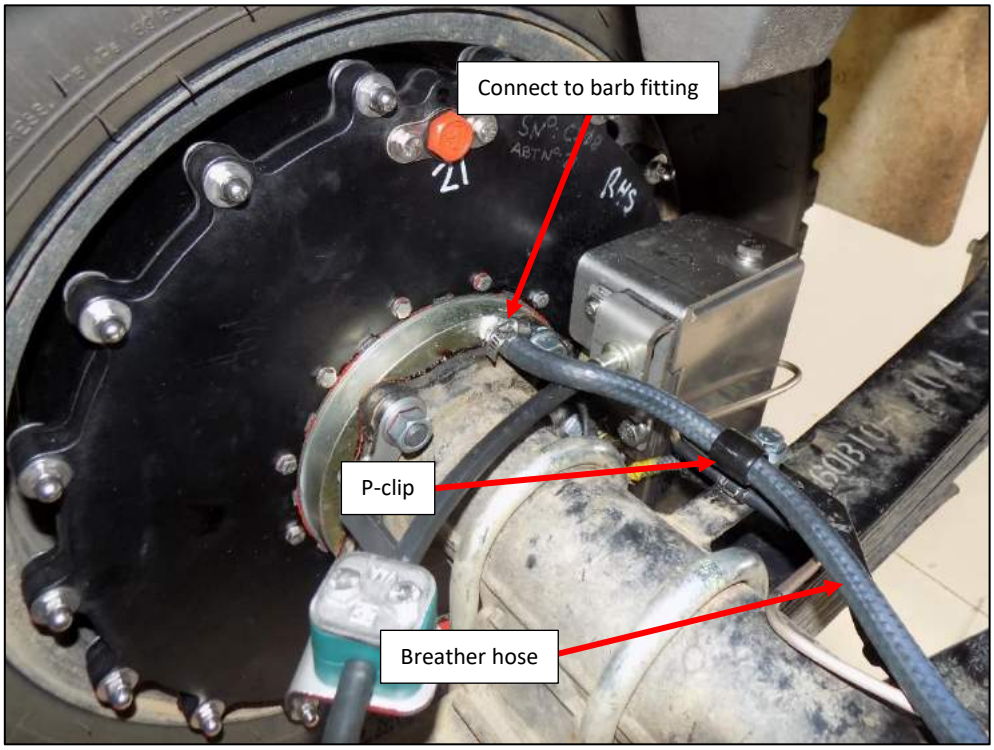


Figure 49

40. Connect breather hose to the barb fitting on the LH-brake and secure with a hose clamp (Figure 50). Route the hose across the axle toward the diff centre.

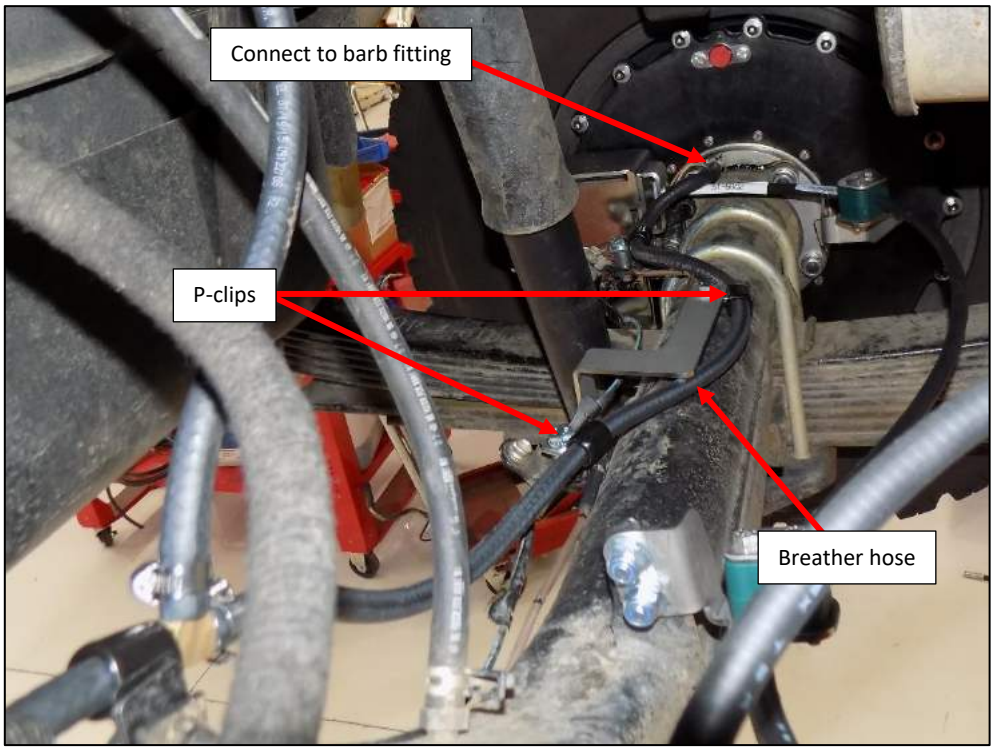


Figure 50

41. The breather hose should be secured using P-clips, the stainless bracket and the supplied mounting hardware (Figure 51). Use the same mounting pipes as the brake lines but add a spacer between the P-clips.

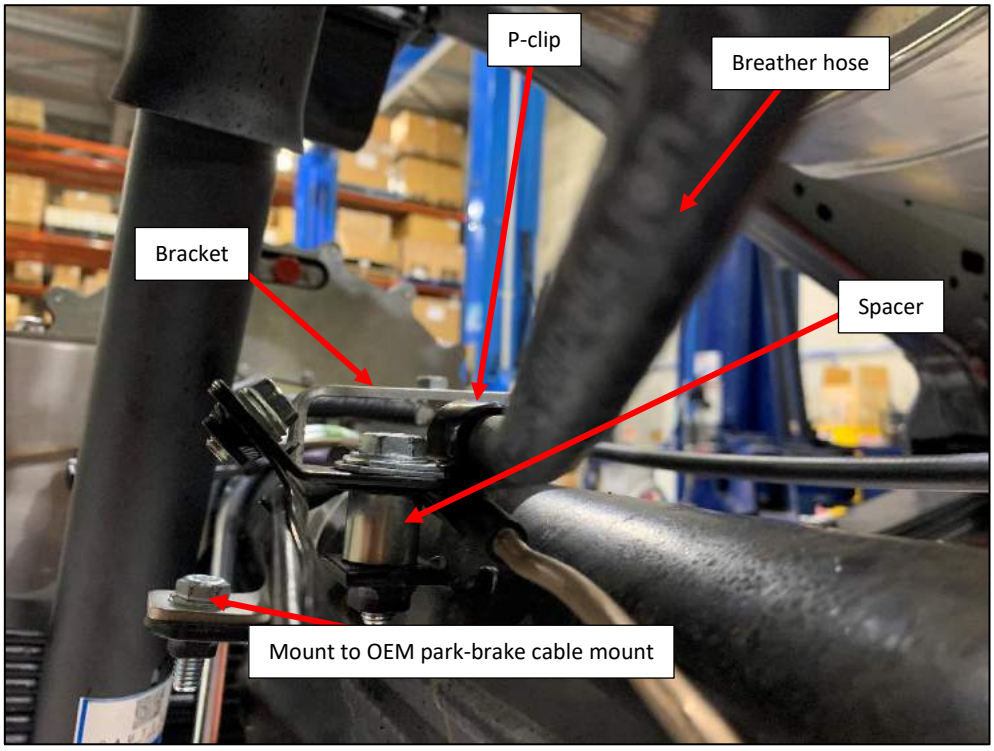


Figure 51

42. Route the breather hoses to the top of the diff centre and join with a T-junction (Figure 52). Use hose-clamps to secure the connections.

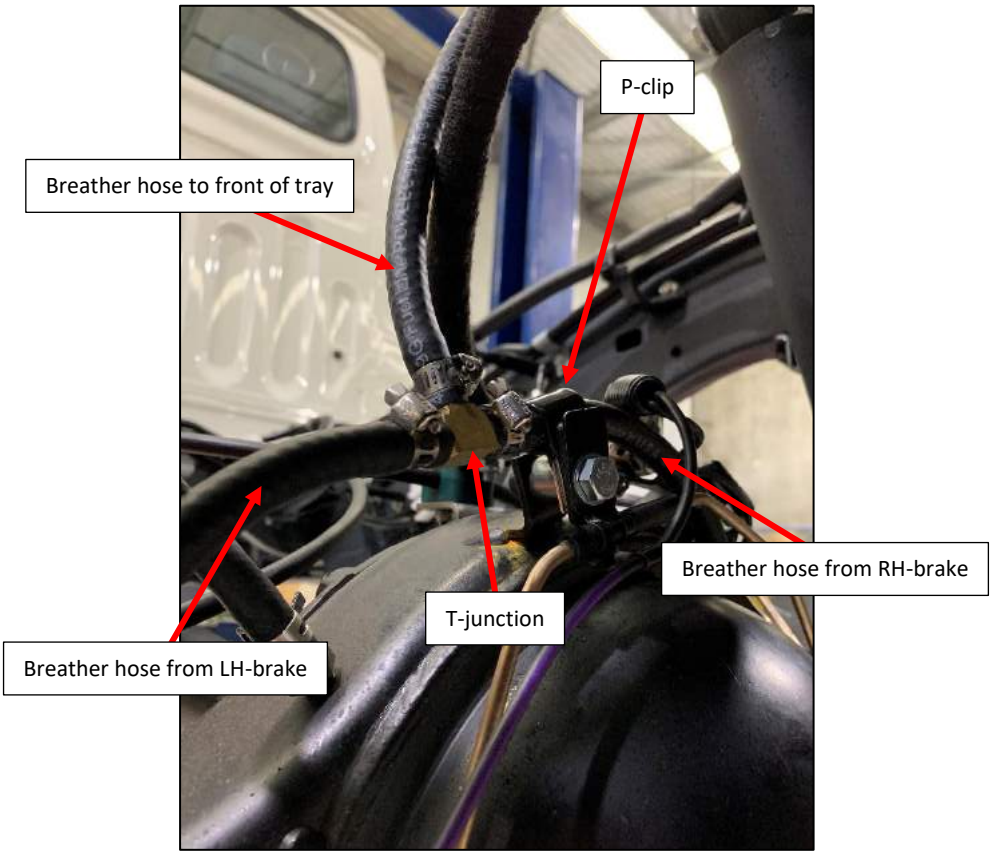
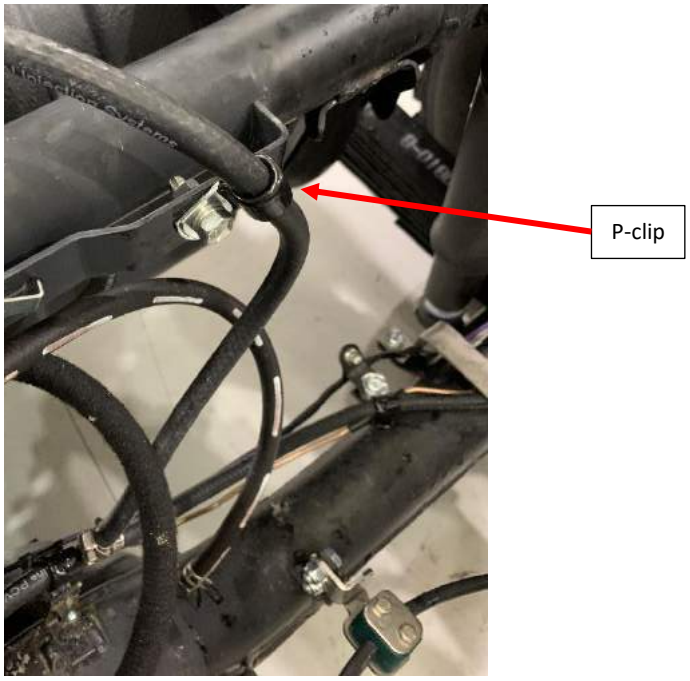


Figure 52

43. Use P-Clip provided in kit to restrain breather hose as shown in figure below



44. Run a hose from the T-junction up to the front of the tray (or other suitable location) and attach the barb adapter and breather cap (Figure 53). Secure the hose with P-clips ensuring it cannot contact any moving parts or the exhaust and there is no potential for kinks.

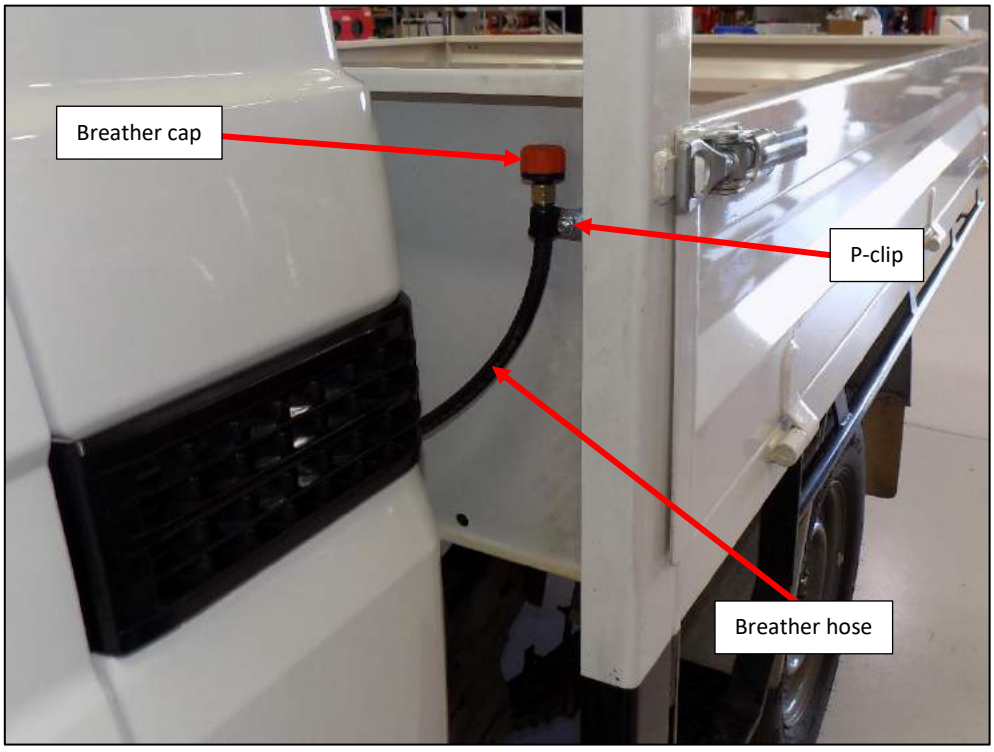


Figure 53

10. Bleed the Brake System

1. Top-up master cylinder reservoir with DOT 3 brake fluid.
2. Apply the service brake several times to ensure the service pistons are fully adjusted.
3. Bleed the service-brake system in the following sequence:
   a. LPSV (if fitted, this is the highest point apart from the master cylinder in the system).
   b. Rear left-hand brake (wheel end with the longest hydraulic line).
   c. Rear right-hand brake.
4. Repeat the entire process several times if necessary to ensure all air is removed from the system.

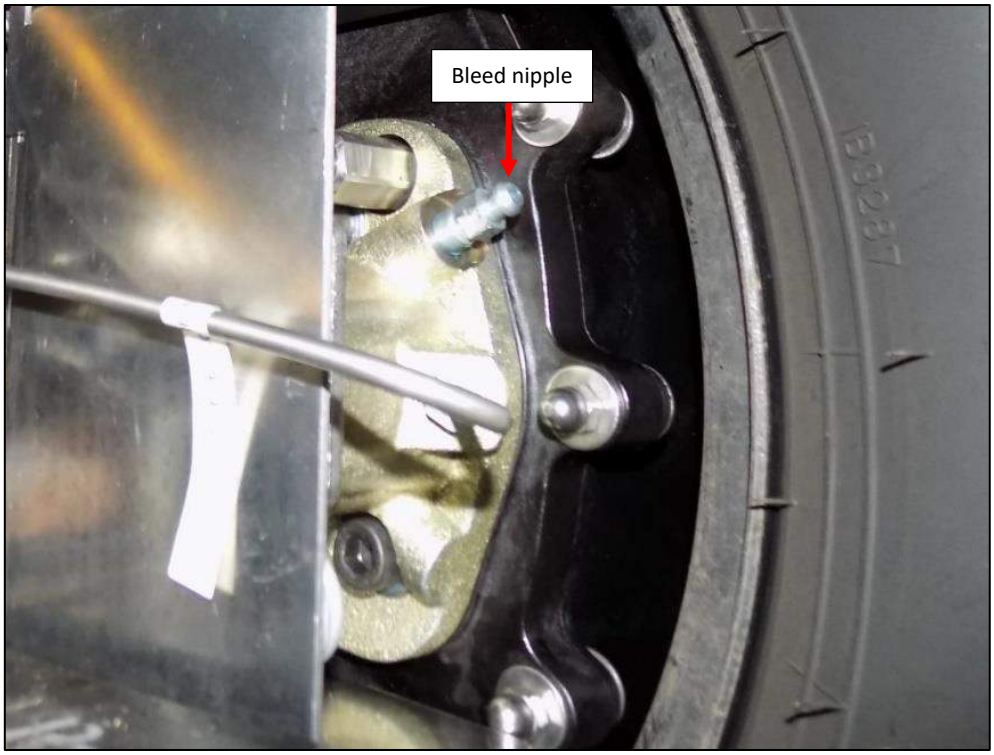


Figure 54

11. Adjust the Park-Brake Cables

1. The park-brake can be adjusted after the service-brake has been fully bled.
2. Apply and release the park-brake several times to allow the cables to settle.
3. With the park-brake released, wind in the adjusting nut to take up any slack in the cables (Figure 55). Confirm both wheel-ends are still free. A correctly adjusted park-brake should apply firmly at approximately 5 to 6 ratchet clicks on the park-brake lever.

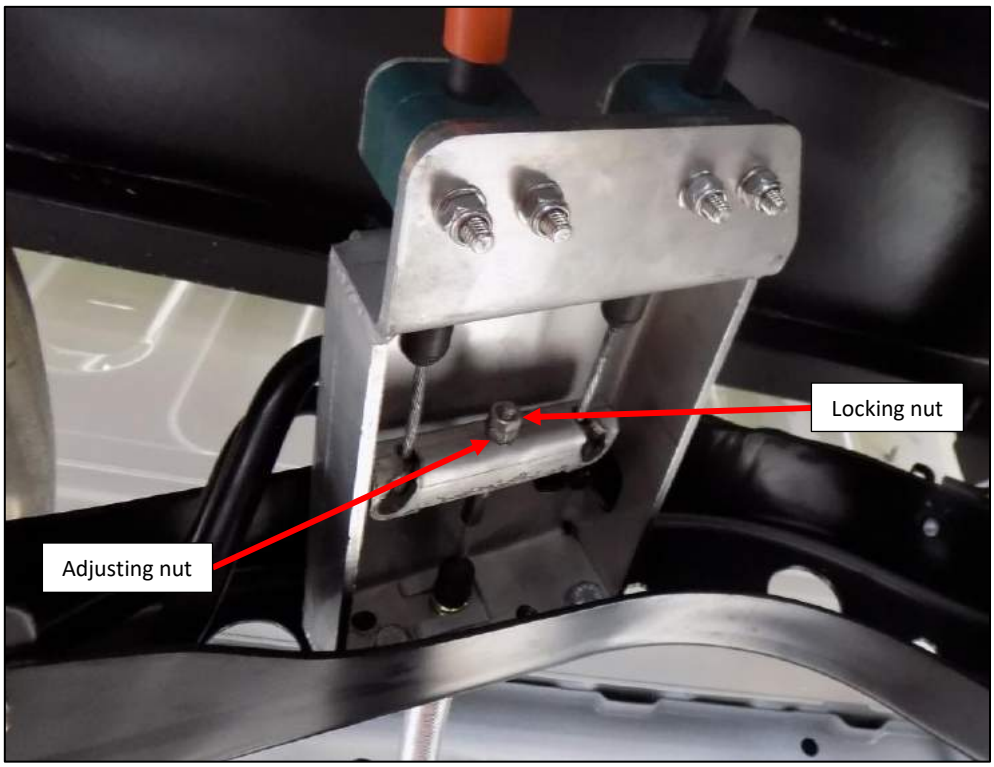


Figure 55

4. Once the adjusting nut is correctly positioned, secure in place with the lock nut.
5. Complete a vehicle pre-start check.
6. Please contact ABT customer service for details regarding Terra Dura® equipped vehicles requiring approval for road-use.

12. Service Schedule

The following table shows the recommended service intervals for Terra Dura® brake systems. ABT recommends each site undertake a review of the service intervals and adjust to suit their specific conditions.

	Frequency
Pre-Start Check	Daily
Minor Service	Monthly (Minor Service Kit (51-5011) is advised to be replaced every 3 months)
Major Service: Rear	6 months or When rear brake pad wear reaches minimum (as indicated by the pad wear indicator) or excessive water ingress (whichever occurs first)

The pre-start check involves a quick check of the fluid levels and confirms proper brake system operation.

The minor service involves a general system inspection and replacement of the grease around the main seal in the wheel-ends.

The major service involves a system inspection and replacement of any worn components to ensure continued reliable operation of the Terra Dura® braking system.

WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

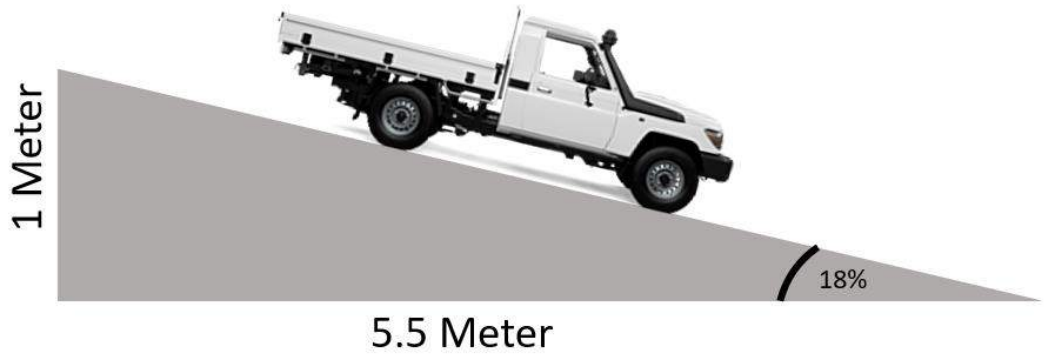
13. Pre-Start Check

WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

1. Check brake master cylinder reservoir level. If low, top up with DOT3 brake fluid and check system for leaks (see section 13).
2. Apply the brake pedal (foot) and confirm it firmly applies the service-brake.
3. Pull the park brake lever and confirm it firmly applies the park-brake.

   Note: When operating the park make sure the service brake pedal is depressed prior to pulling up the handbrake lever.
4. Check excessive build-up of dirt between the wheel rim and brake assembly. Clean if necessary.
5. Carry out a park-brake performance test:
   a. Park the vehicle in the reverse position on a 18% gradient slope.
   b. Firmly apply the foot service-brake.
   c. With the service-brake still firmly applied, firmly apply the park-brake.
   d. Release the service-brake.
   e. The vehicle should hold on the 18% incline without moving for a 5-minute period (Australian Design Rule 35/06)

   Note 18% is equal to: Height (m) = 0.18 x Length (m) or Length (m) = 5.5 x Height (m)



6. Note:
   - The pre-start check does not replace the visual inspection of the pad wear indicators.
   - Every two weeks,
     - Inspection plugs to be removed to check water ingress.
     - Remove both inspection ports from top and bottom of the brake. Blow air through brake at top of inspection port, allowing moisture out of the bottom of the brake. NOTE , while completing this operation the operator **MUST** wear a PPE including a mask to alleviate the risk of inhaling brake dusk particles

14. Minor Service (Monthly)

WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

1. Check the brake fluid level in the master cylinder. Top up if necessary.
2. Check service brake units for leaks:
   a. Engine running
   b. Press the brake pedal firmly for 30 seconds
   c. The pedal should not creep/drop
   d. Replace any piston seals if necessary (Section 23). If the Terra Dura brake is found to be the cause of issue.
3. Check hydraulic lines for cracks or damage.
4. Check the parking brake cables for damage or wear.
5. Check the parking brake cable adjustment.
6. Check the breather hose for cracks or damage.
7. Check the breather caps are clear.
8. Check for water ingress (Section 17).
9. Check Outer and Inner Cover for excessive wear and cracking (Section 20) . Replace covers if necessary (Service kit 51-1010 under assembly 51-4099)
10. Check the wheel bearing play. Replacing the wheel bearings and hub seals if necessary.
11. Check rear brake pad wear (Section 22).
12. Check humidity vapour ingress through inspection ports at rear of brake. Remove both inspection ports from top and bottom of the brake. Blow air through brake at top of inspection port, allowing moisture out of the bottom of the brake. NOTE , while completing this operation the operator **MUST** wear a PPE including a mask to alleviate the risk of inhaling brake dusk particles
13. If brake pad wear is ok:
    a. Regrease around the main housing seal (Section 19)
    b. Carry out a pre-start check (Section 13)
14. If brake pad wear is on or below its limit:
    a. Perform a major service (Section 15)
15. Inspect and Re-grease V-lip seal(s) using high temperature grease (Must be Viton and NBR compliant)
16. Note: Every 3 months on a minor service, the V-seal(s) and shaft seal should be replaced. (Minor Service Kit 51-5011)

15. Major Service

NOTE: Major Service Kit 51-5009 should be attained prior to commencing service (if necessary)

WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

1. A major service is performed directly following a minor service where the pad wear indicator has shown a brake pad change is required.
2. Disassemble the brake (Section 20, steps 1 to 8).
3. Perform a brake cover inspection and replace if necessary (Service kit 51-1010 (SK10) under assembly 51-4099)
4. Visually Check spline wear of the rotor and hub
5. Perform a brake pad replacement if necessary (Section 22).
6. Check the service brake piston seals for leaks and perform a piston seal replacement if necessary (Section 23).
7. Check the brake rotors thickness and for cracking and replace if necessary (Section 24). If thickness is below 13.5mm the rotor should be replaced.
8. Check the ABS sensor (abs equipped vehicles only) for damage and replace along with its O-ring if necessary.
9. Check the shaft seal for ingress, replace if necessary (Section 19).
10. Reassemble the brake as per brake outer cover disassembly/assembly procedure (Section 20).

NOTE:
Ensure the brake fluid level in the master cylinder reservoir remains between the MIN and MAX level during brake bleed.

11. Ensure all the air has been completely removed from the brake lines.

NOTE:
A brake system bleed is required if the master cylinder has been disassembled or the reservoir becomes empty.

12. Bleed the brake system in the following order:
    a. Master Cylinder
    b. Load Sensing Proportioning Valve (if fitted)
    c. Front right
    d. Front left
    e. Rear right
    f. Rear left
13. Ensure all the air has been completely removed from the brake system.
14. Check the fluid level in the master cylinder reservoir and top up to the MAX line if necessary.
15. Test drive the vehicle.

16. Brake Pad Wear Check

1. Apply the park brake.
2. Remove the protective cap from the pad wear indicator assembly (Figure 56).

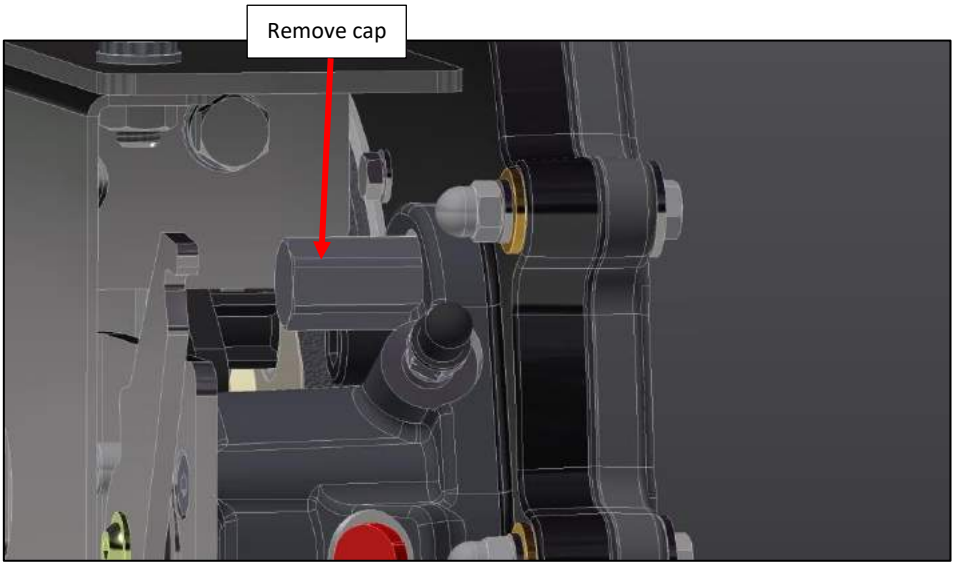


Figure 56

3. The plunger should project out from the gland fitting 14mm approx. (Figure 57).
4. Push the plunger into the gland fitting until it stops.
5. The distance the plunger projects shows the remaining brake pad wear available. (New pads = 10 mm approx.).
6. NOTE: Ensure the plunger is operating correctly. The plunger should move 4mm minimum and spring back to its original position once released.
7. If the plunger pushes all the way into the gland fitting until flush or beyond, the brake pads must be replaced.
8. Check the sealing (dowty) washer and replace if necessary.

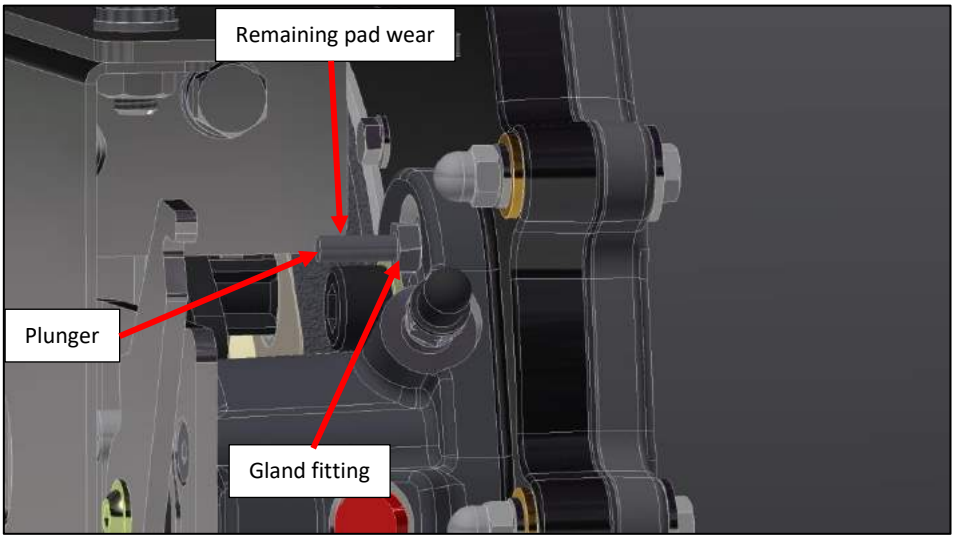


Figure 57

9. Refit the protective cap.
10. If the brake pads have worn beyond the wear limit, then a major service must be completed.

17. Brake Inspection Port Check

WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

1. Place a small jug or similar underneath the brake assembly inspection port.
2. Remove the inspection plug from the brake assembly (Figure 58).

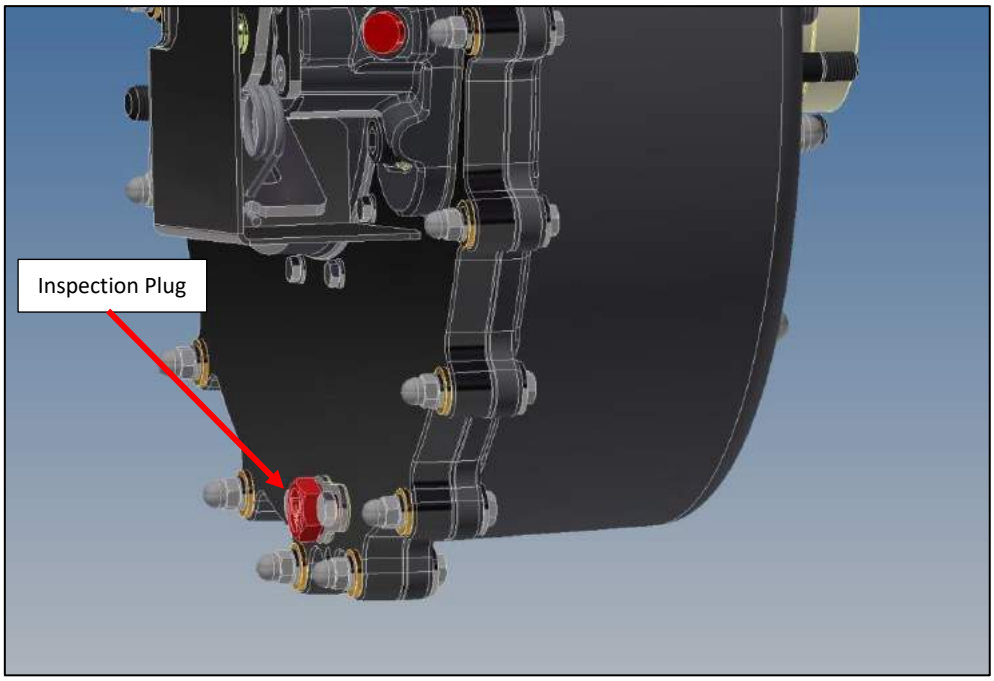


Figure 58

3. There should be no fluid inside the brake.
4.
   a. If a small quantity (up to 100 ml) of clear fluid is present, ensure it is drained fully and replace the plug. Remove the upper inspection plug and using air hose/ source blow out brake internally, to dry out brake from any condensation . NOTE , while completing this operation the operator **MUST** wear a PPE including a mask to alleviate the risk of inhaling brake dusk particles
   b. If any amount of contaminated fluid is present, further inspection is required.
5. Re-attach both inspection plugs.

18. Replacing/Greasing V-Seals

WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

9. Remove V-lip flange

Figure A

10. Replace V-Seal if needed

11. Grease V-lip seals as shown below high/extreme temperature grease/lubricant (Must be Viton and NBR compliant) .
Note: This lubricant must not have properties that degrade the nitrile/viton v-seals and shaft seal

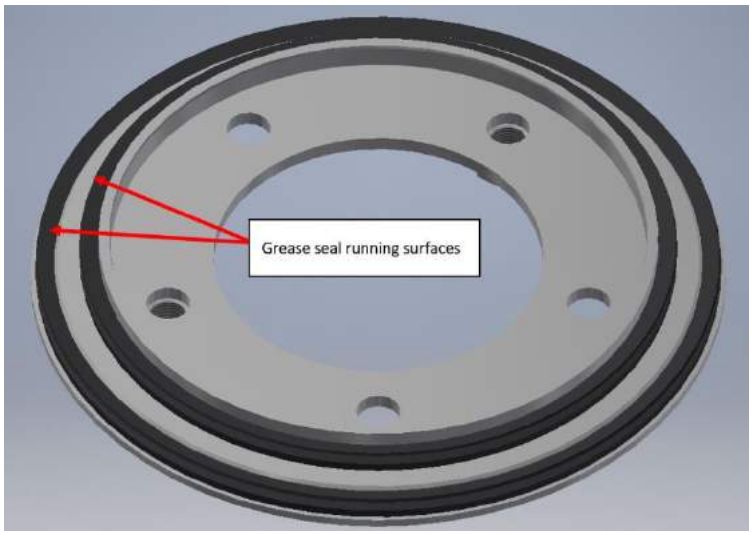


Figure B

12. Grease V-seal flange with high/extreme temperature grease/lubricant (Must be Viton and NBR compliant) same as V-seal grease applied in step 3 (Highlighted surfaces below) . Note: The image below is for illustration purposes only. There is no need to remove the flange from the brake for greasing.

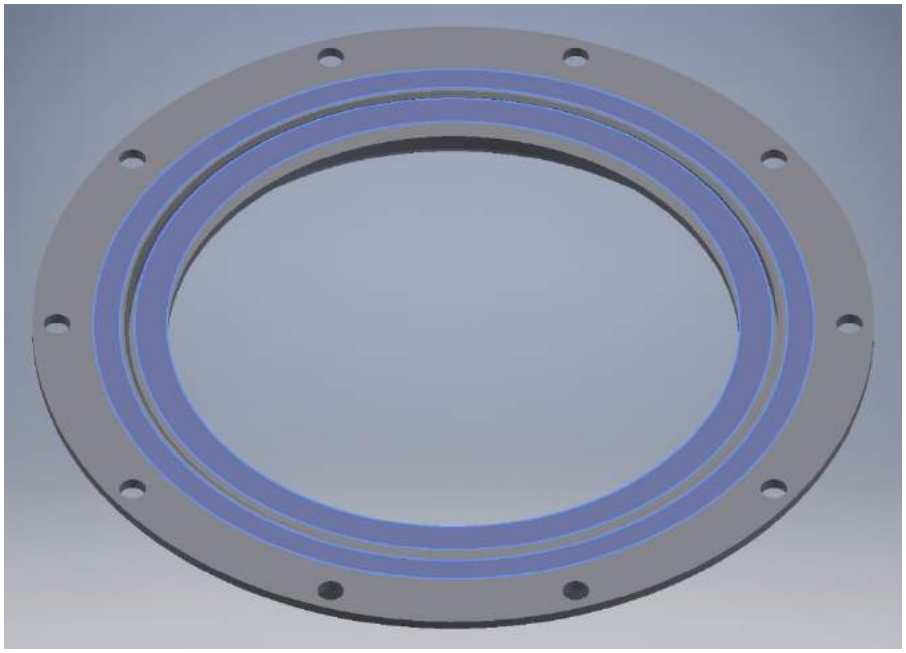


Figure C

19. Greasing / Replacing the Main Housing Shaft Seal

WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

1. Remove and keep the flange plate and V-lip seals from the flange (Figure 59).

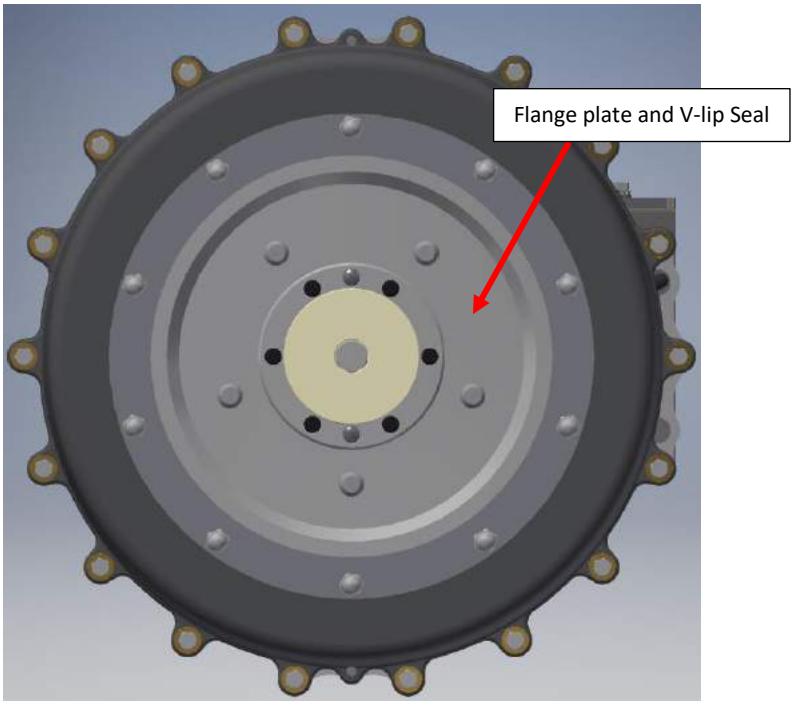


Figure 59

2. Remove and keep the 10x domed nuts holding the shaft seal carrier in place (Figure 60).

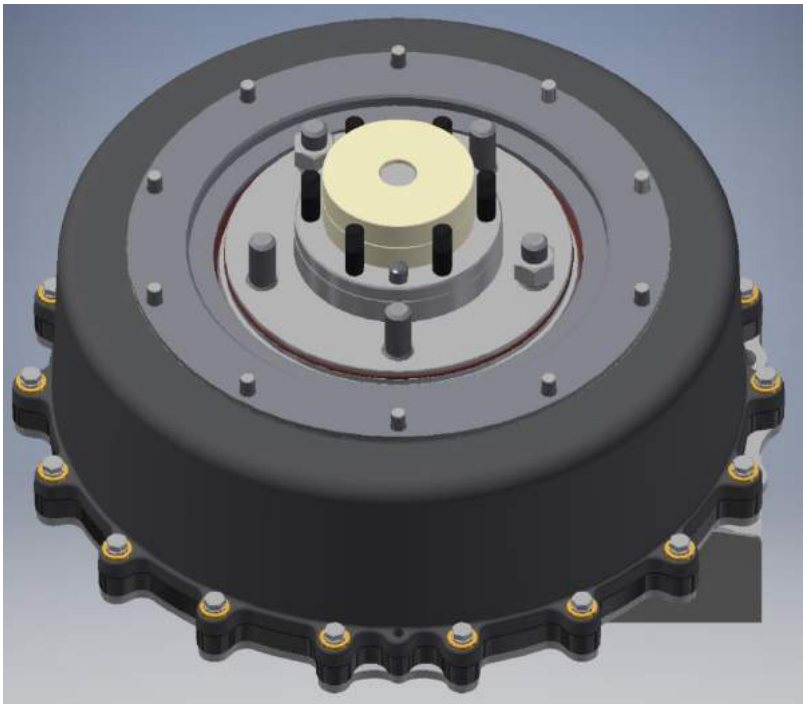


Figure 60

3. Remove Shaft Seal Carrier and Shaft seal from brake assembly

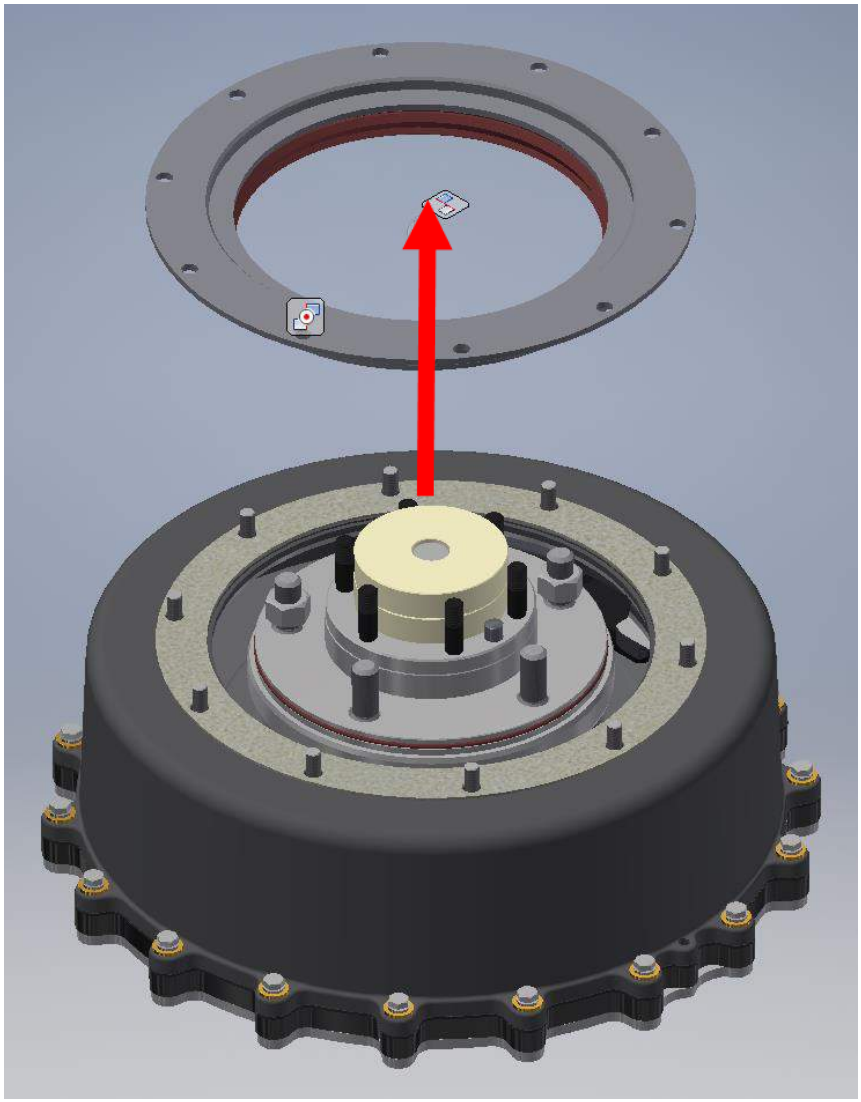


Figure 63

4. For New Shaft Seal Fitment Only: Remove used Shaft seal from seal carrier. NOTE: Do not remove shaft seal if the seal is to only be greased and re-used. If removed seal damage could occur

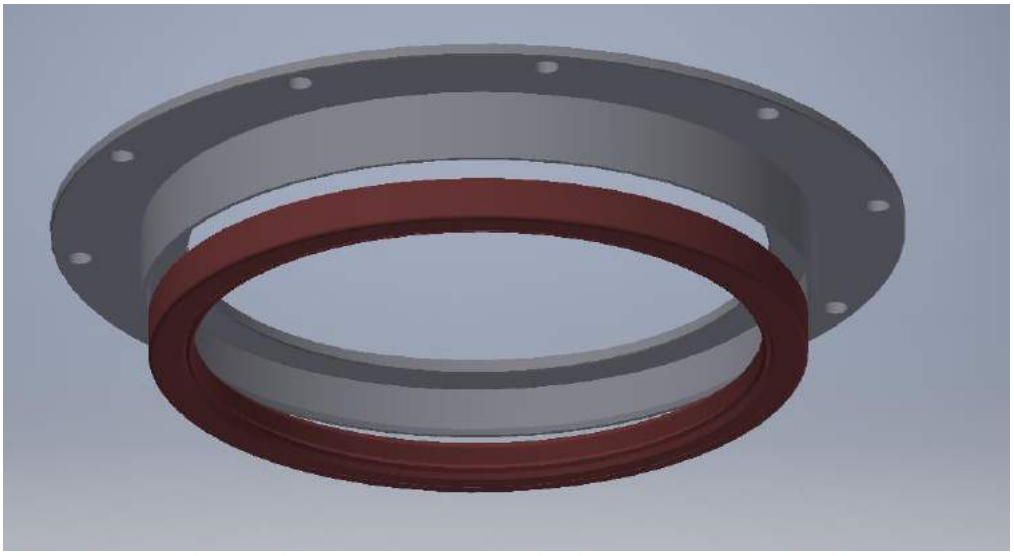
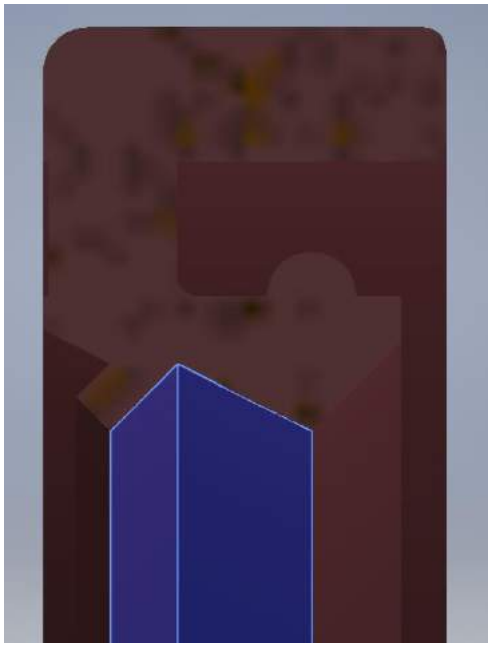


Figure 64

5. Grease seal running surfaces and shaft seal void with high/extreme temperature grease/lubricant (Must be Viton and NBR compliant) . Note: This lubricant must not have properties that degrade the nitrile/viton v-seals and shaft seal.



(figure 65)

Figure 65

6. For New Shaft Seal Fitment Only : Fit new Shaft seal (31-4021) into shaft seal carrier (after inspecting outer cover found in section 20) making sure the seal direction is the same as below (figure 66) . A small amount of lubricant (NBR and Viton compliant) should be applied to the outer diameter of the seal to allow for easy installation. Note Shaft Seal should be carefully pressed in, to avoid damage to the seal.

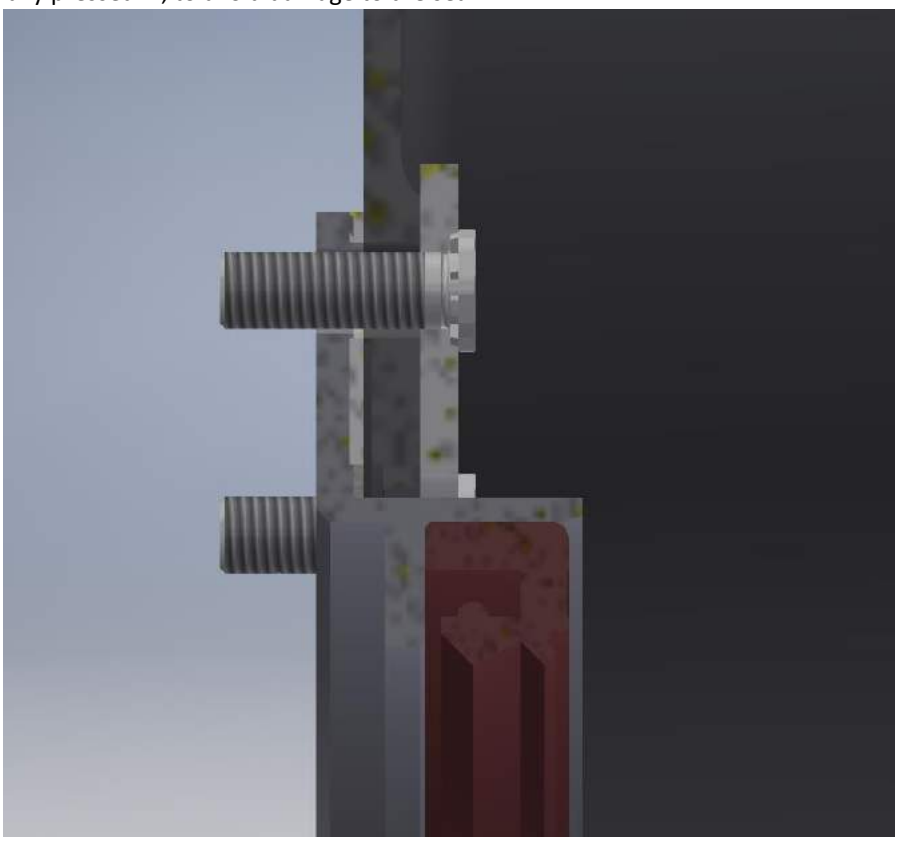


Figure 66

7. Grease Shaft with seal running surface on hub with high/extreme temperature grease/lubricant (Must be Viton and NBR compliant) . Note : This lubricant must not have properties that degrade the nitrile/viton v-seals and shaft seal (figure 67)

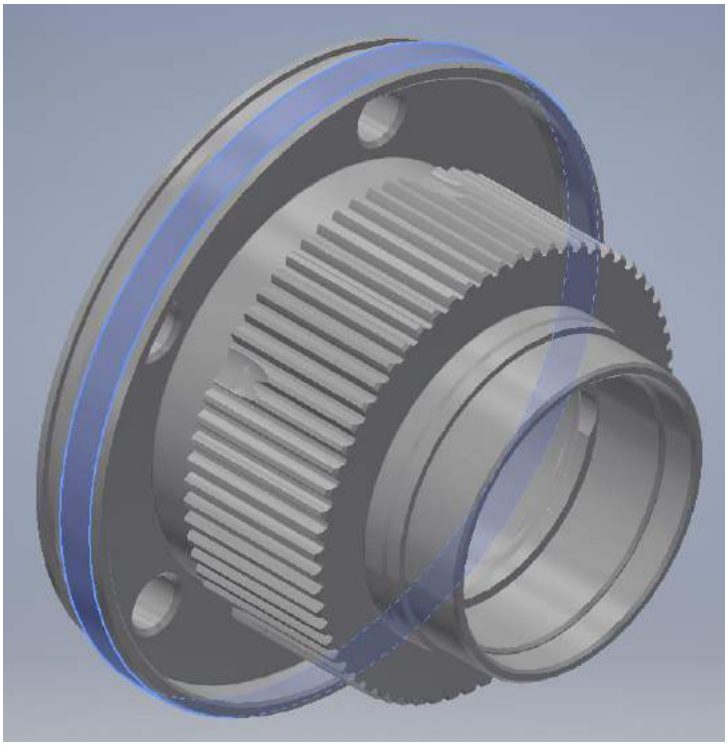


Figure 67

8. Replace Shaft seal carrier including the greased shaft seal to 10x studs on the front of the outer cover (figure 68)

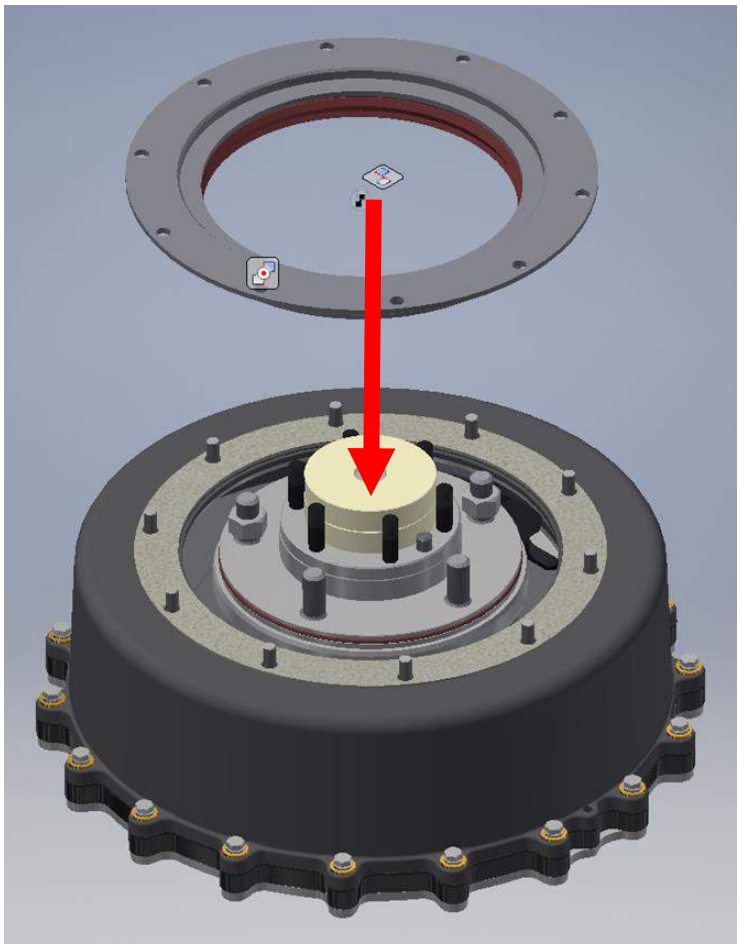


Figure 68

9. Apply Loctite 243 to threads of studs.

10. Secure 10x domed nuts to studs. Securing to 10Nm

11. Apply a smear of high/extreme temperature grease/lubricant (Must be Viton and NBR compliant) to one side of the Shaft seal carrier on the V-Lip. Note : This lubricant must not have properties that degrade the nitrile/viton v-seals and shaft seal to one side of the Shaft seal carrier on the V-Lip seals running surface. (figure 69)

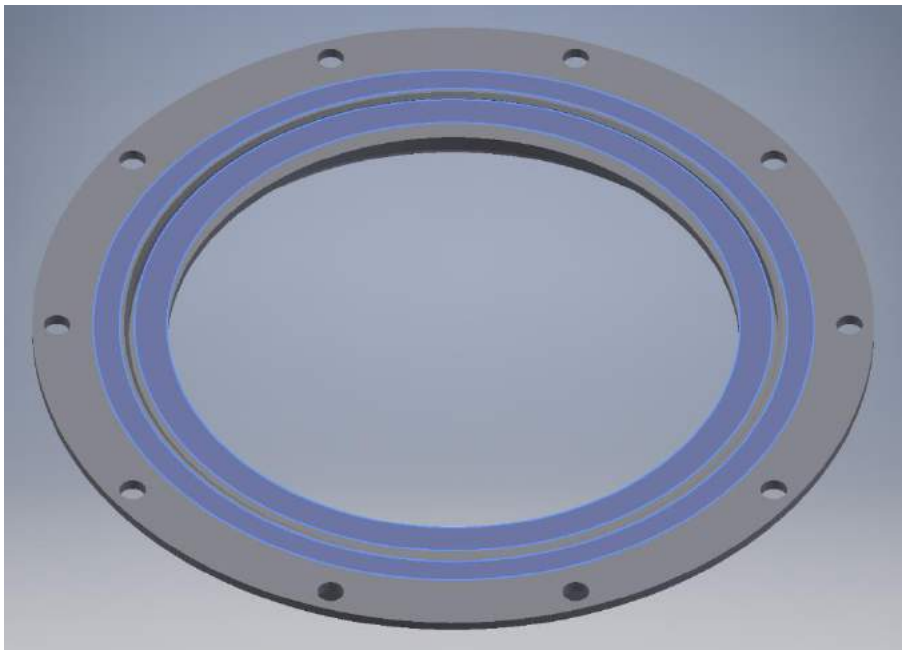


Figure 69

12. Apply high/extreme temperature grease/lubricant (Must be Viton and NBR compliant) (figure 70) Note : This lubricant must not have properties that degrade the nitrile/viton v-seals and shaft seal

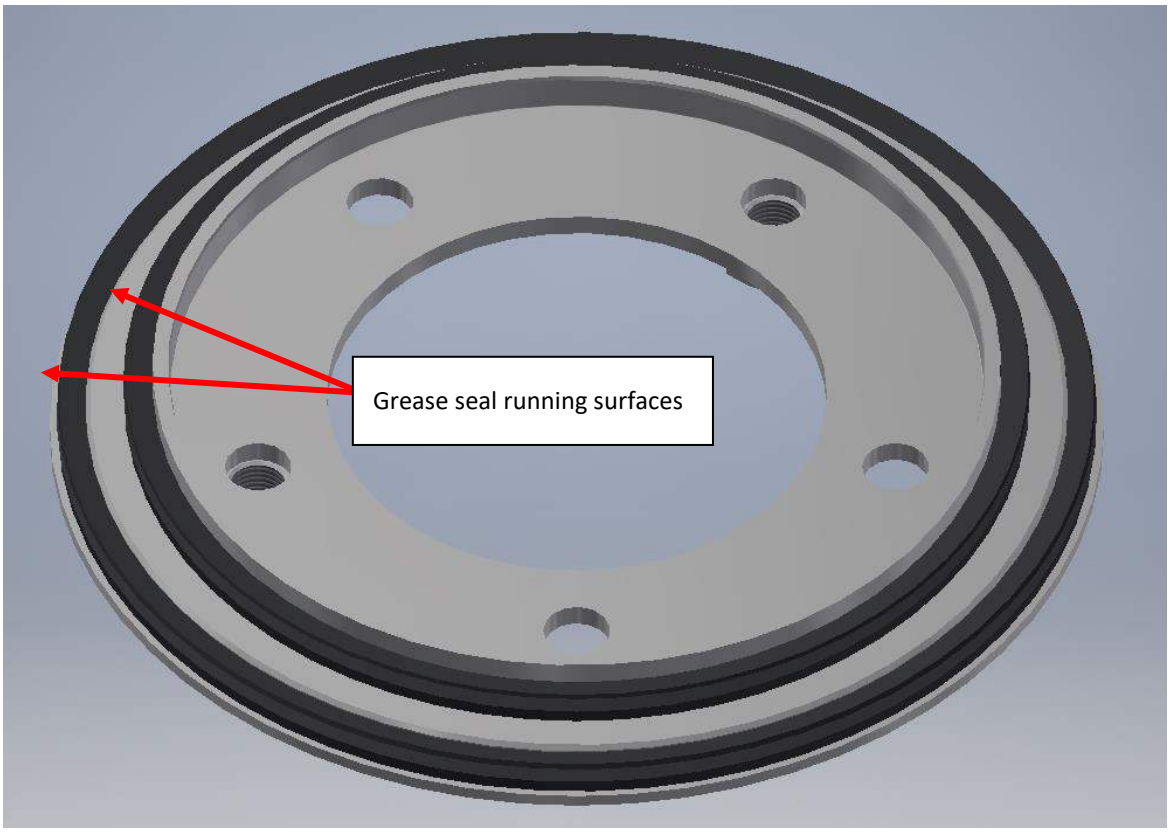


Figure 70

13. Apply Forch Anti-Seize 6510-5005 to the v-lip flange mounting (blue surface in below image). Fit the V-lip seal flange (including V-lip seals to the hub), carefully pressing the flange on to not pinch the O-ring,

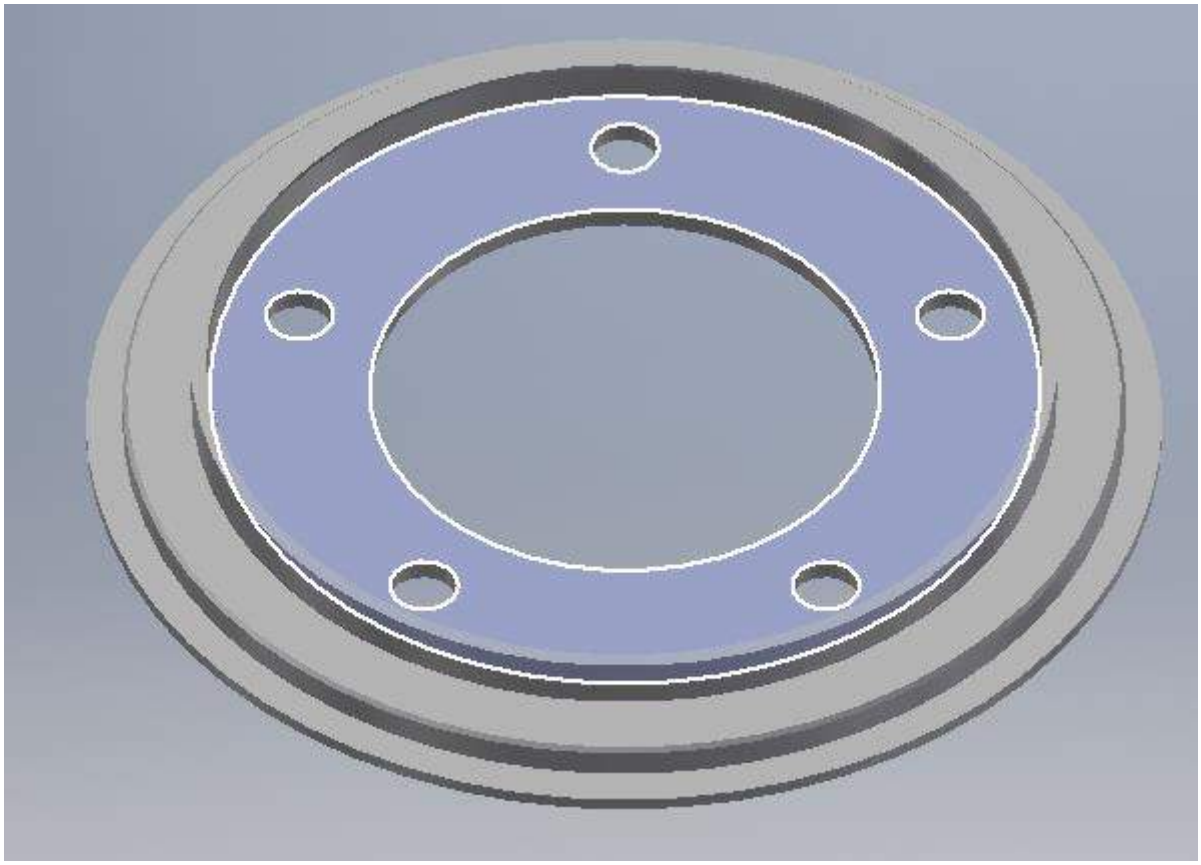


Figure 71

20. Brake Outer Cover Disassembly/Assembly

WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

1. Remove and keep the flange plate and V-lip seal from the hub.
2. Loosen the 18x cover bolts.
3. Remove the outer brake cover (figure 72).

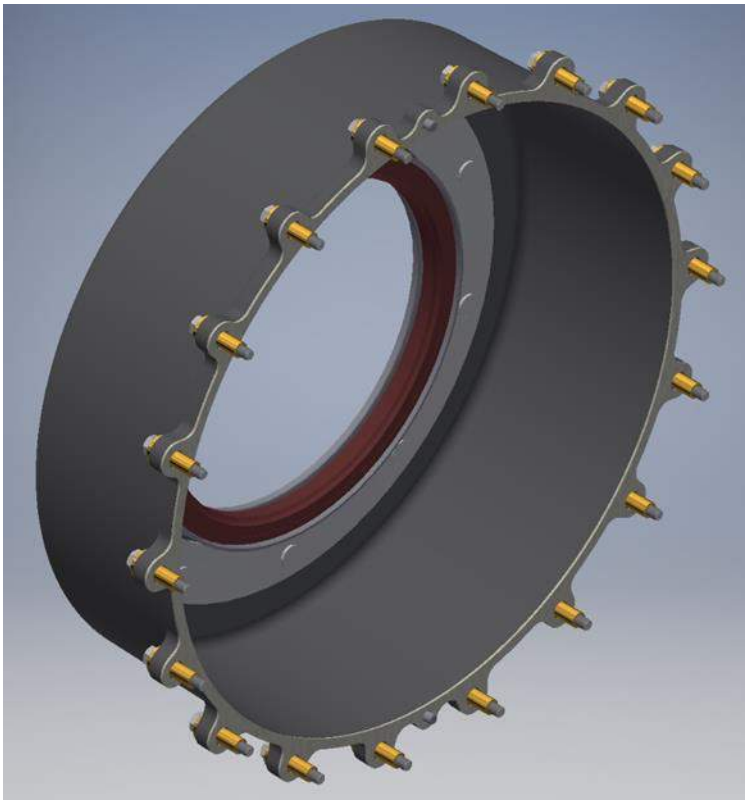


Figure 72

4. Remove and check condition of the rubber cover gasket and discard if torn, split or cracked.
5. Remove and keep the 18x cover compression limiters.
6. Disassembly complete.
7. Carry Out a brake internal part inspection
8. Use the outer cover to align the seal carrier. This can be done by lining up the top stud of the seal carrier with the top hole in the front of the cover. Ensure the lugs line up so the top of the cover is in the right position.
9. Fit the (18x) compression limiters to the outer housing. Slide through from the front.
10. Find the 18x bolt and 18x washer Apply Loctite 243 to thread of bolt (18x). insert through outer cover mounting holes.
11. Fit a rubber gasket over the compression limiters to the outer housing.
12. Align the (18x) compression limiters with the corresponding holes in the inner cover.

13. The smaller lugs on the cover should be top and bottom of the brake assembly. Install the outer housing to the rest of the brake assembly ensuring the rubber cover gasket is correctly located.

NOTE: Care must be taken to avoid pushing the compression limiters off the outer housing.

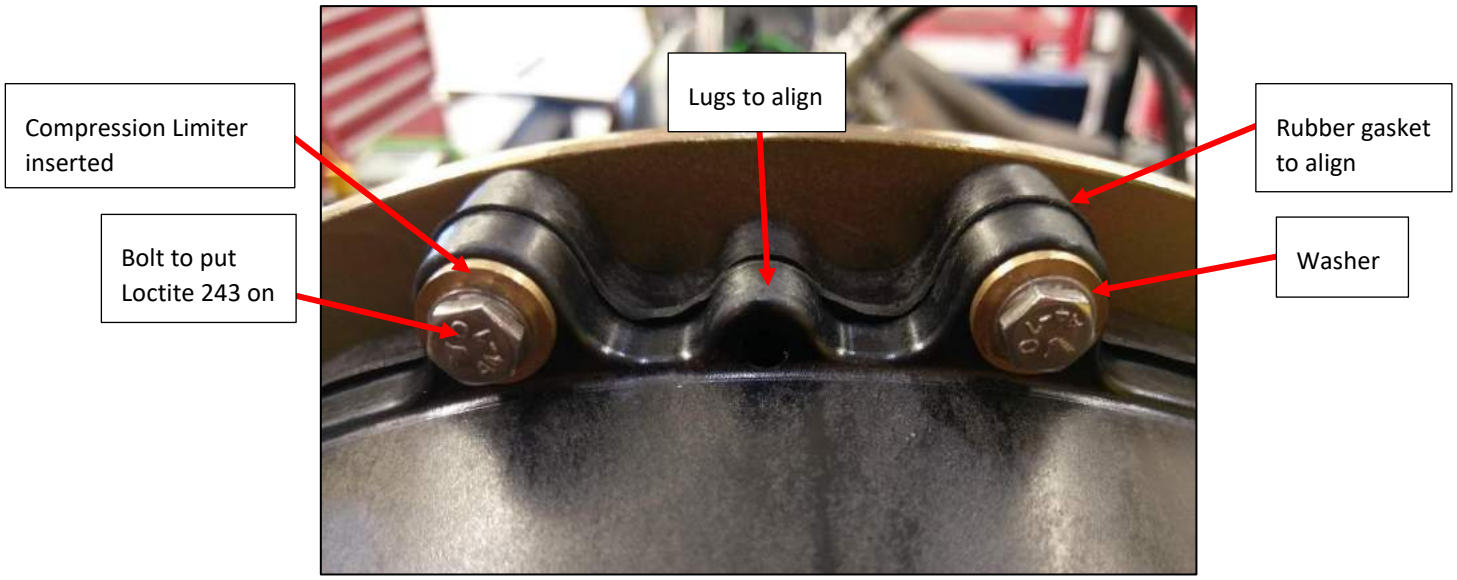


Figure 73

14. Hand start 18x Bolts to hold the outer cover in place.
15. Refer to Section 18 for greasing of the housing seal.
16. Tighten the 18x cover bolts in a star pattern to 7Nm.
17. If the hub has been removed, attach the following to Toyota specifications:
    a. Fit the outer wheel bearing. If the bearing needs replacing do so now.
    b. Fit the hub nut and retaining collar.
    c. Fit the hub nut locking screws.
    d. Fit the axle half-shaft.

21. Brake Cover Inspection

WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

1. Wash down the outer brake cover with water. Use a soft bristle brush if necessary.
2. Inspect the cover for cracks or damage. Replace if necessary, under assembly 51-4099.

WARNING:	
	Do not allow commercially available brake cleaners to come into contact with piston seals, boots or pistons.

3. Gently wash down the internal parts of the brake assembly.
4. Use isopropyl alcohol or denatured alcohol only to clean any grease or oily residue.
5. Inspect the inner brake cover for cracks or damage. Replace if necessary.
6. Inspect all other internal parts and replace if necessary.

NOTE:
If the brake assembly was contaminated with fluid internally the shaft seal must be replaced (Section 17).

7. Reassemble the brake as per brake outer cover disassembly/assembly procedure (Section 20).

22. Brake Pad Replacement

1. Disassemble the brake as per Section 20, steps 1 to 8.

WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

WARNING:	
	Pads that have been contaminated with grease, oil, solvents or other foreign material must be replaced. Pads that exhibit excessive crumbling, cracking, corrosion or have less than 80% contact with the rotor must be replaced.

2. Check all parts inside the brake assembly and clean as necessary. Carefully use a hand-held wire or brass brush on any machined surfaces if any rust or corrosion is present.

WARNING:	
	Do not allow commercially available brake cleaners to come into contact with piston seals, boots or pistons.

NOTE:
When replacing brake pads, it is recommended to replace all the disc brake pads at the same time. This will maintain brake balance. At a minimum, change all pads on one axle at the same time. Never change pads at one wheel end only.

3. Remove the brake pad retaining pins and cap head bolts from the caliper (Figure 61).

NOTE:
In the event the original disc brake pads are to be reused, be sure to mark them in some manner (i.e. left rear outer, left rear inner, etc.) so that they are reinstalled in the same location. Do not mark on pad face.

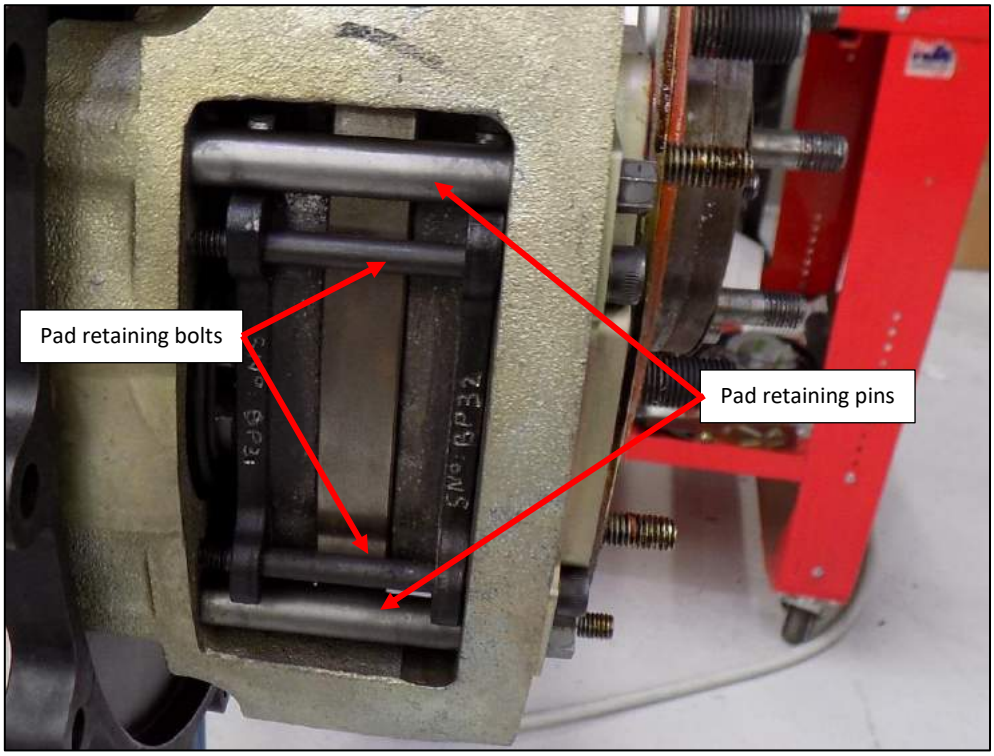


Figure 61

4. Remove the inner brake pad (Figure 62).

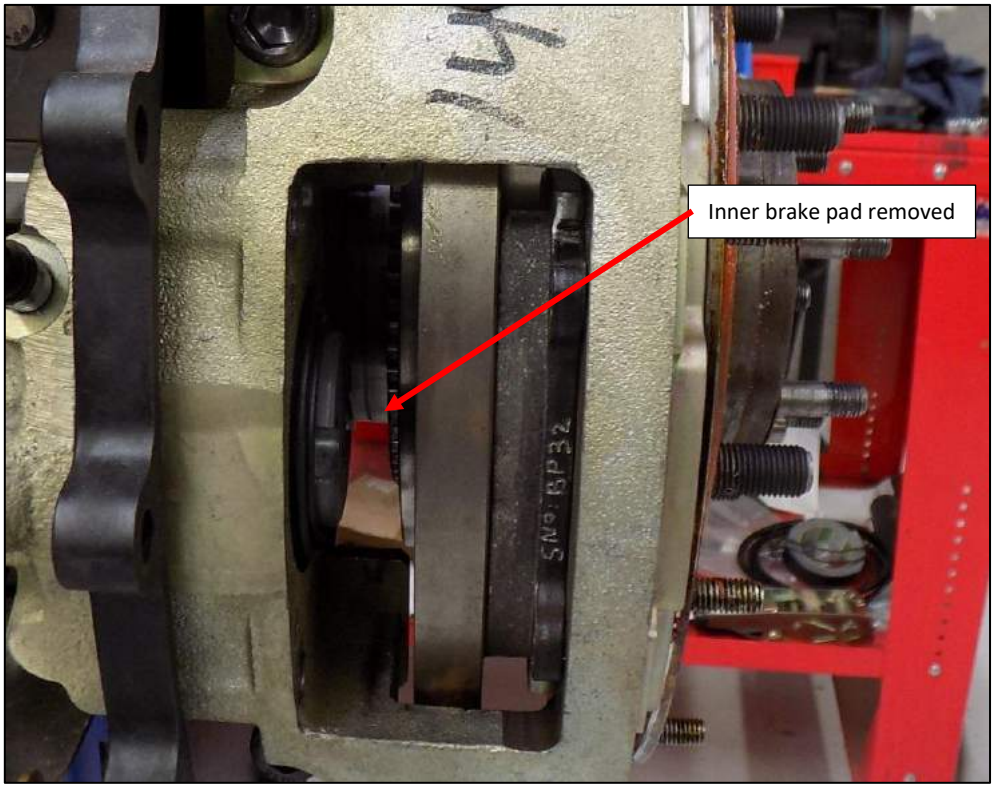


Figure 62

5. Slide the brake rotor evenly along the spline towards the service piston to allow access to the outer brake pad (Figure 63).

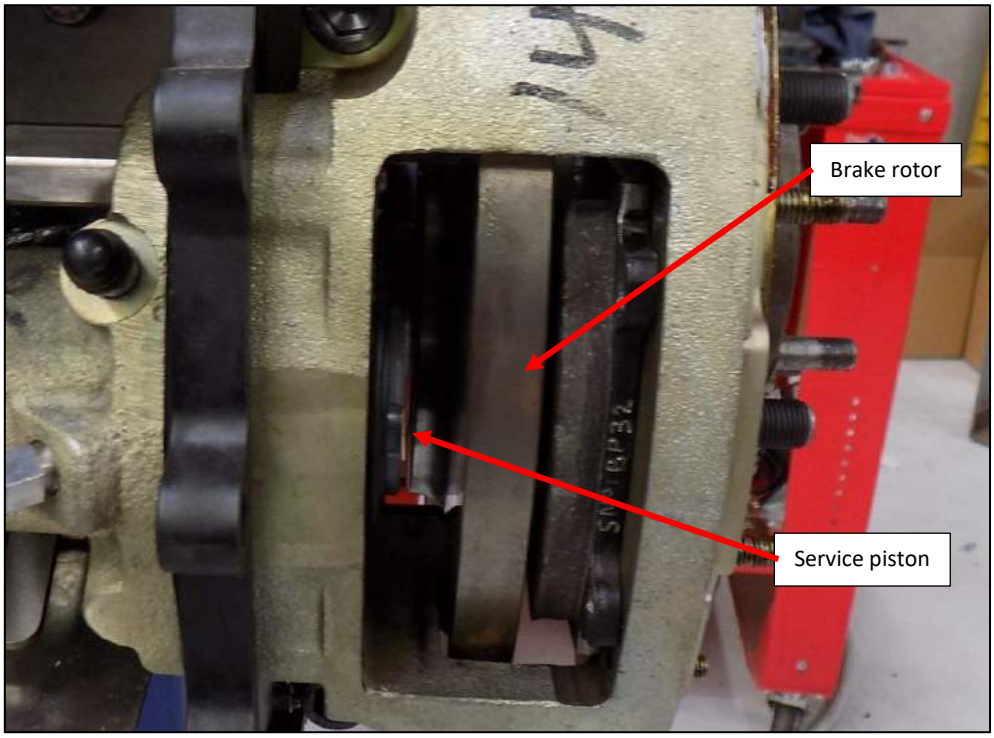


Figure 63

6. Remove the outer brake pad. NOTE: Location pin on brake pad backing plate (Figure 64).

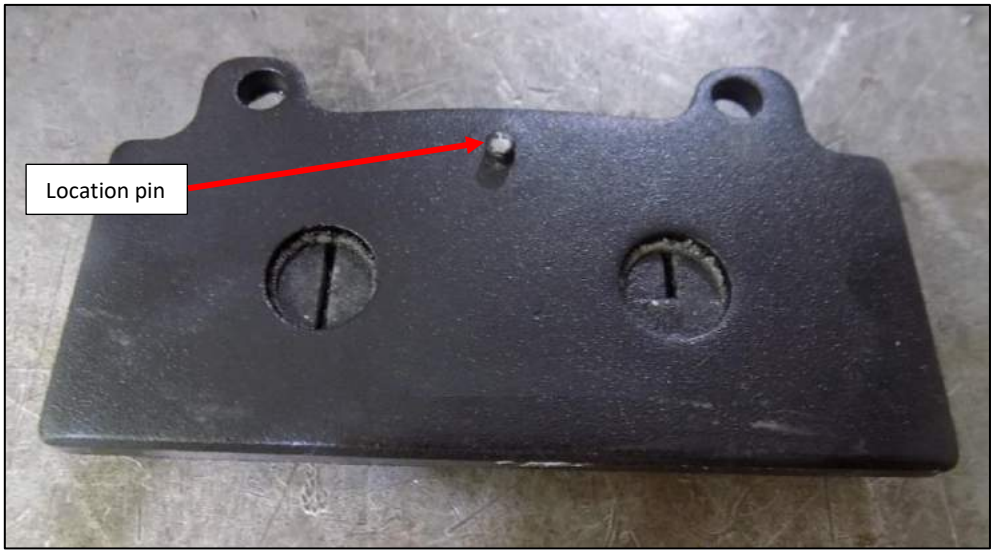


Figure 64

7. Slide the brake rotor evenly along the spline away from the service piston (Figure 65).

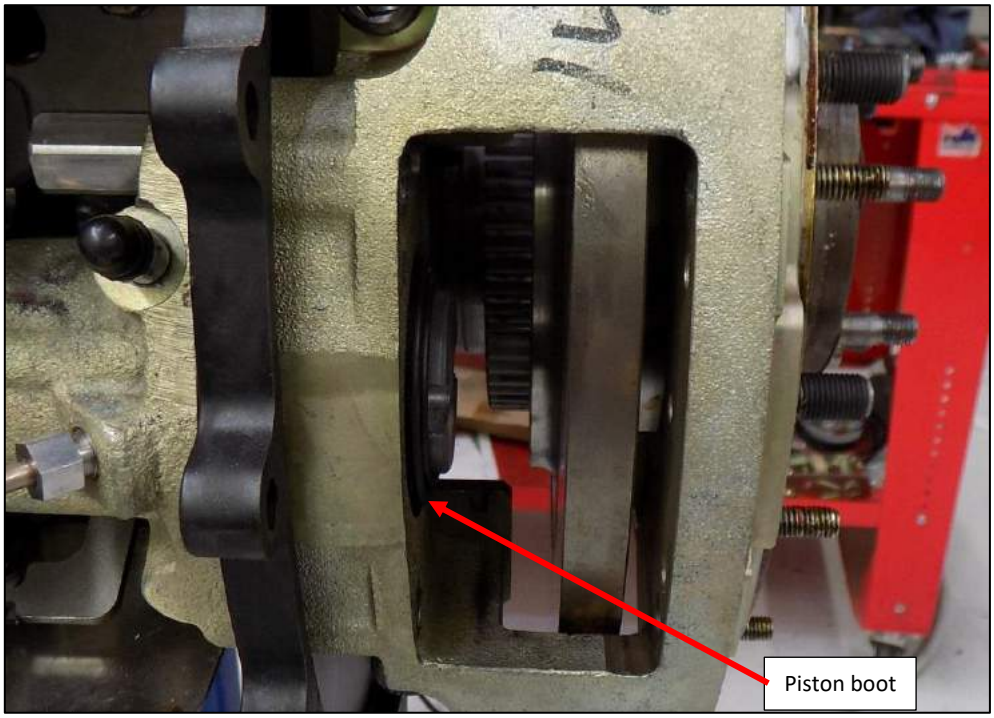


Figure 65

8. Clean around the inside of the caliper and piston boot with isopropyl alcohol or denatured alcohol only.

9. The piston boot is retained at its outside diameter in the housing and at its inside diameter by a groove in the piston. Visually inspect the piston boot and replace if necessary (Figure 65).

NOTE:
Never reuse old piston boots. Visually inspect new piston boots for any cuts, tears or damage. Replace as required. Verify they are fully seated in the caliper housing.

10. If replacing the piston boot refer to Section 21.

11. Carefully wind the piston into the piston bore using special tool (Figure 66).

    a. Right-hand pistons must be wound in a clockwise direction

    b. Left-hand pistons must be wound in an anti-clockwise direction

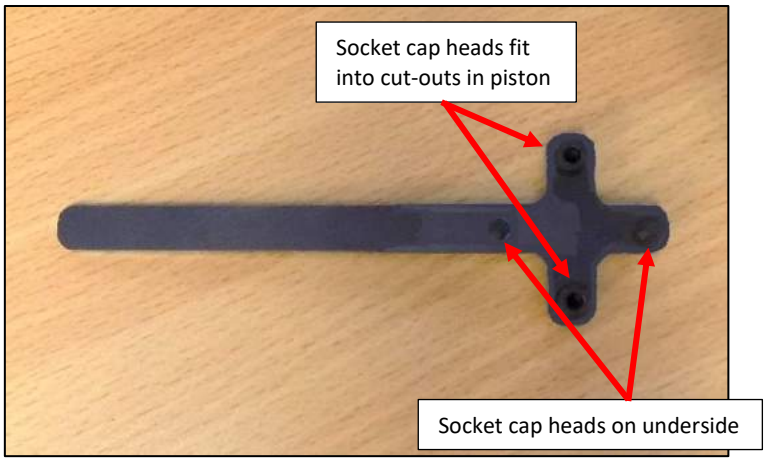


Figure 66

WARNING:	
	Ensure the brake fluid in the brake master cylinder reservoir is evacuated until the fluid level is reduced to approximately half-full. This will prevent fluid overflow when retracting the service piston into the piston bore.

12. Wind the piston in until it is fully retracted.

NOTE:
The piston will rotate even when fully retracted and bottomed out in the bore.

13. Once the piston has bottomed out in the bore, leave the piston grooves in the horizontal position (Figure 67).

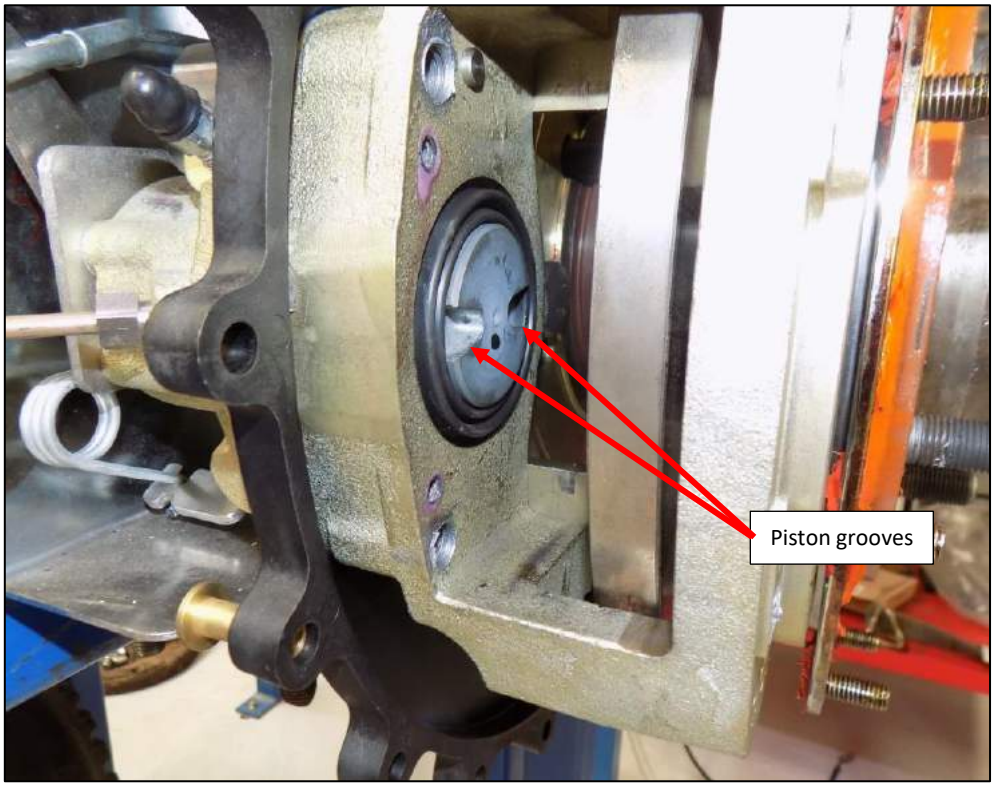


Figure 67

14. To install the brake pads, slide the brake rotor evenly along the spline towards the service piston.

15. Install the outer brake pad, ensuring the location pin is aligned with the hole in the caliper. The brake pad backing plate should be fully and evenly against the reaction face of the caliper (Figure 68).

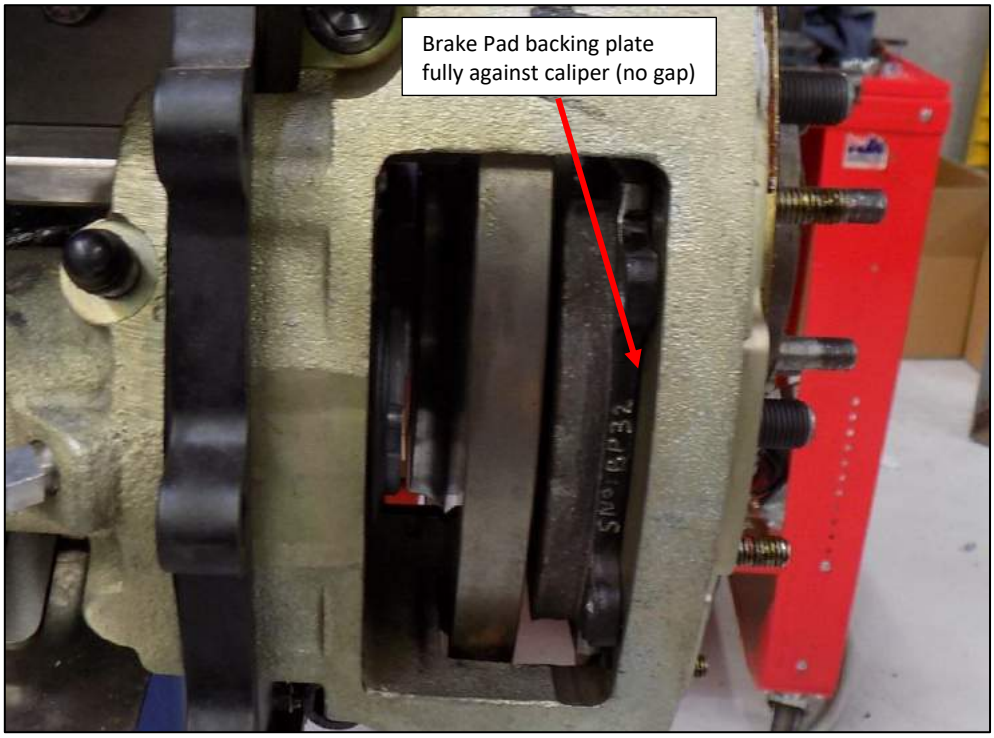


Figure 68

16. Slide the brake rotor evenly along the spline away from the service piston to the outer brake pad.

17. Install the inner brake pad. Ensure the location pin in the brake pad is aligned with the cut-out in the piston (Figure 69). Readjust the service piston by winding with the special tool if required.

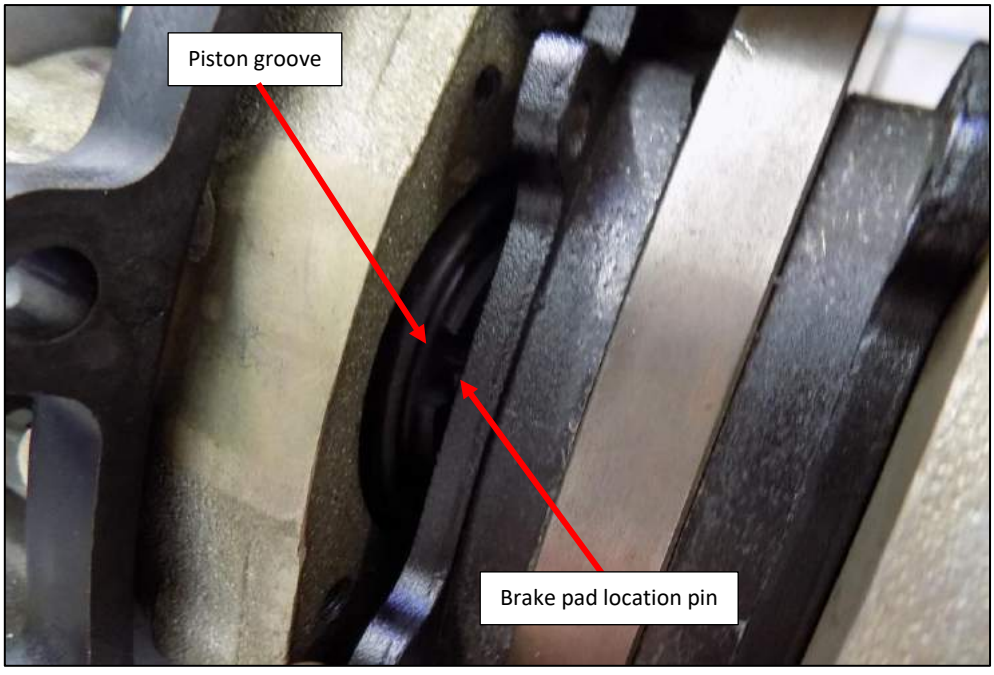


Figure 69

18. Clean and inspect the brake pad retaining pins and cap head retaining bolts for scoring. Replace if necessary.

19. Apply Loctite 243 to the first 5 threads of the cap head retaining bolts (Figure 70).

20. Apply a smear of disc brake corrosion control grease (Bendix Ceramasil BBL20 recommended) to the shank of the cap head retaining bolt (Figure 70).

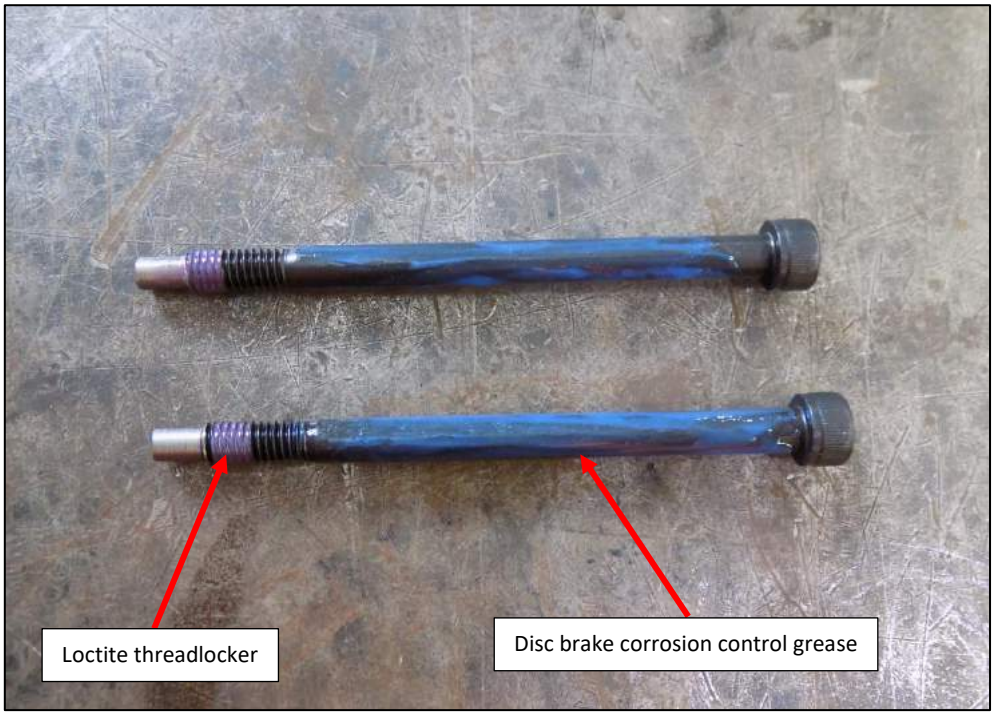


Figure 70

21. Install the cap head retaining bolts into the caliper through the holes in the brake pad backing plates. Torque to 15 Nm
22. Apply a smear of disc brake corrosion control grease (Bendix Ceramasil BBL20 recommended) to the thread and shank of the brake pad location pins.
23. Install the pins into the caliper and torque to 15 Nm. The disc brake corrosion control grease may require respreading along the shank of the pins after installation.
24. Wipe away any excess grease from the caliper assembly.

WARNING:	
	Keep grease and other foreign material away from brake pad friction surfaces, rotor and external surfaces of the hub.

25. Check the position of the brake rotor and ensure it is firmly against the outer brake pad.
26. Refill the brake master cylinder reservoir to the max level.
27. Apply the service brake several times to ensure the service pistons are fully adjusted.
28. Check the brake pads and brake rotor are seated ok.
29. Recheck for fluid leaks from the service pistons.
30. Reassemble the brake as per brake outer cover disassembly/assembly procedure (Section 20).

23. Piston Seal Replacement

1. Remove the park brake shroud from the brake assembly (Figure 71).

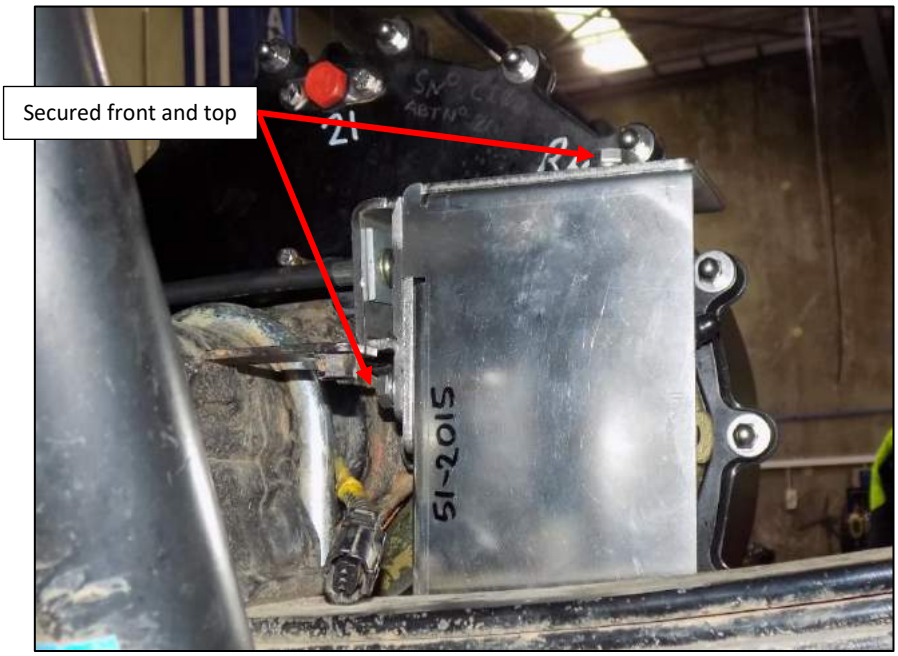


Figure 71

CAUTION:	
	Parking Brake Lever Spring under load.

2. Remove the bolt from the intimidate bracket.

3. Slide the cable out the slot and remove from the brake lever. Some slack may need to be given in the cable in order to remove the brake cable. Do not remove the intermediate bracket from the park brake cable.

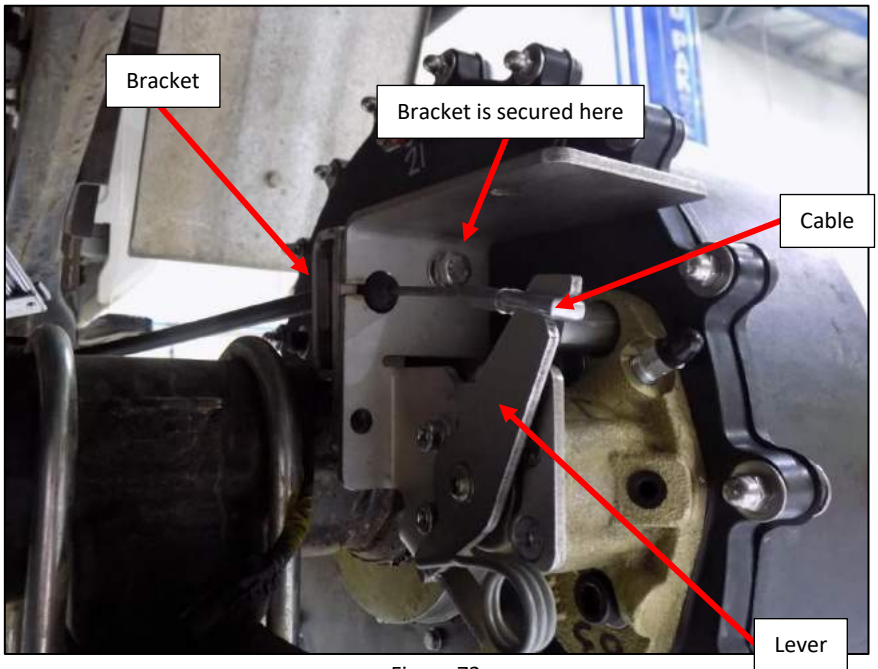


Figure 72

NOTE:
Do not remove the lever.

4. Disconnect the brake pipe from the piston housing and cap to prevent brake fluid leakage.
5. Remove and keep the pad wear indicator cap.
6. Remove the piston housing mounting bolts and washers.
7. Carefully slide the piston housing out of the caliper and place on a clean bench.
8. Remove the piston boot.
9. Remove the outer O-ring.
10. Clean the piston housing and exposed area of the piston.
11. Note: Use White Spirit or Methylated Spirits only for all cleaning requirements.
12. Carefully wind the piston out of the piston bore using special tool.
    a. Right-hand pistons must be wound in an anti-clockwise direction
    b. Left-hand pistons must be wound in a clockwise direction
13. Clean the service piston.
14. Remove the service piston O-ring.
15. Clean the piston bore.
16. Ensure the piston bore and internal hydraulic holes are clean and dry prior to reassembly.
17. Apply a light smear of disc brake corrosion control grease (Bendix Ceramasil BBL20) to the piston seal and the piston bore.
18. Fit the service piston seal into the groove in the piston housing. Run a finger around the seal to ensure it is seated correctly and not twisted (Figure 73).
19. Attach the outer O-ring to the piston housing (Figure 73).

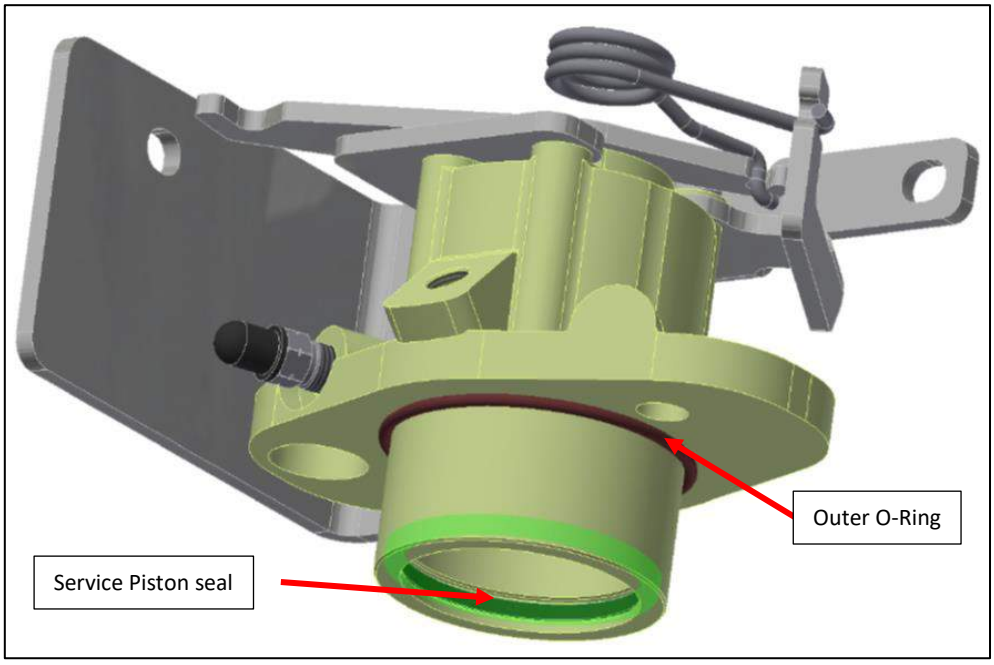


Figure 73

20. Wind the piston into the piston bore. Apply downward force while turning to feed the piston into the park brake mechanism

21. Apply disc brake corrosion control grease (Bendix Ceramasil BBL20) to the piston boot inner bead and outer ring to ease assembly if required. Also apply it to the piston mechanism housing around the service piston to ease the boot sliding.

WARNING:	
	Use only Disc Brake Corrosion Control Grease on seal land. Other greases may cause seals or boots to swell (grow) and affect proper brake operation.

22. Position the piston boot on top of the piston with the boot flange properly oriented. The small dimples on the boot should be toward the mechanism housing (Figure 74).

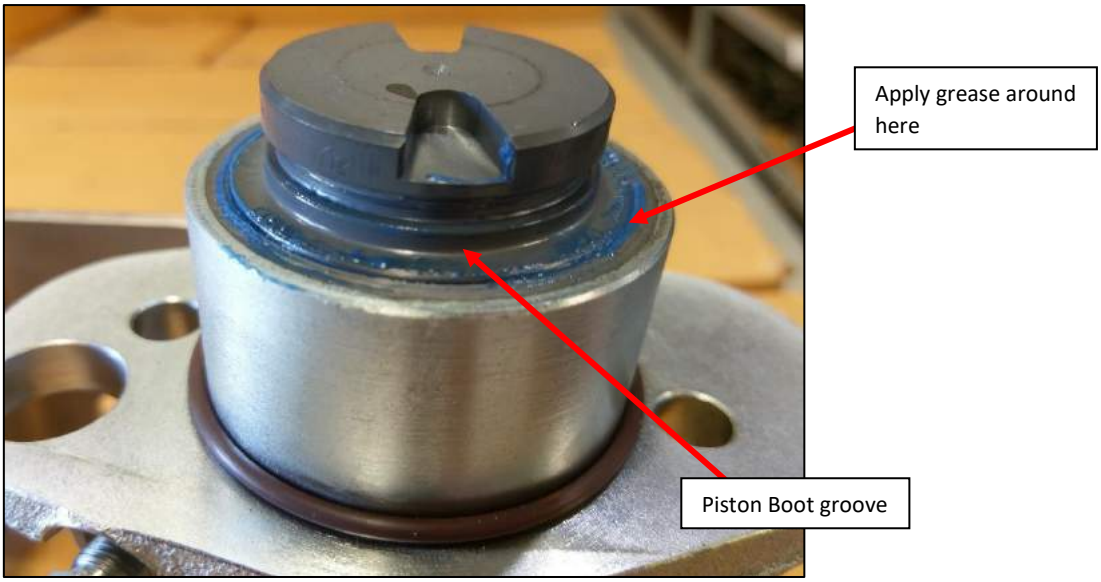


Figure 74

23. Carefully push the piston boot over the top of the piston toward the mechanism housing until the inner bead of the boot is seated in the piston boot groove.

Figure 75

NOTE:
Ensure the boot is fully seated in the piston groove by rotating the piston boot back and forth.

24. Check the condition of the sealing washer on the pad wear indicator assembly. Replace if necessary.
25. Carefully attach the piston housing to the caliper.

NOTE:
Apply a light smear of disc brake corrosion control grease (Bendix Ceramasil BBL20) to the caliper bore. If the assembly does not push into the caliper easily, please check the piston boot as it may have become detached.

26. Inspect the piston housing mounting bolts and washers and replace if necessary.
27. Secure the piston housing assembly to the caliper. Torque the bolts to 71 Nm.
28. Ensure the piston boot is seated correctly if the cover has been removed.
29. Refit the intermediate bracket, park brake cable, park brake shroud, brake pipe, pad wear indicator cap and retighten the park brake cable. When installing the park brake cable make sure the concave curved side is facing the lever centre.
30. Check for air in the brake system and bleed if necessary.

24. Brake Rotor Inspection and Replacement

WARNING:	
	Always wear a respirator when working around brakes or brake lining dust. Always wear eye and hand protection.

1. Remove the outer brake cover (Section 20).
2. Inspect the rotor and hub splines for damage or wear.
   a. If there is no movement between the splines (the rotor is stuck in position) the splines must be cleaned to allow the rotor to slide freely on the hub. Replace the rotor and hub if the spline cannot be freed.
   b. If there is excessive movement between the splines, replace the rotor and hub.
3. Inspect the friction surfaces of the brake rotor.
   a. If there are signs of scouring covering more than 50% of the friction surfaces, the brake rotor should be replaced.
   b. If there are signs of deep scratches or impact damage on the friction surfaces, the brake rotor should be replaced.
4. Measure the thickness of the friction surface using a micrometre or brake disc Vernier calliper at four evenly spaced positions around the brake rotor. If thickness is below 13.5mm the rotor should be replaced.
5. If the rotor doesn't need to be replaced, skip to the last step of this section.
6. Apply the parking brake and ensure the brake rotor is firmly clamped.
7. Remove the axle half-shaft, hub nut, locking ring and outer wheel bearing.
8. Remove the hub assembly, shaft seal and seal carrier as one piece.
9. Hold the brake rotor to prevent it from falling.
10. Release the parking brake.
11. Remove and discard the old brake rotor.
12. Retract the service piston. Refer to Section 20 steps 11 to 13.
13. Slide a new brake rotor onto the axle in the correct orientation, positioning it between the brake pads.
14. Carefully slide the hub onto the axle until it almost contacts the brake rotor.
15. While holding the hub, lift the rotor to align the splines.
16. Once the splines are aligned, slide the hub full into position.
17. Reassemble the brake as per brake outer cover disassembly/assembly procedure (Section 20).

25. Wheel Bearing Replacement

1. Apply the parking brake to hold the brake rotor in position.
2. Remove the axle half-shaft.
3. Remove the hub nut locking screws.
4. Remove the hub nut and retaining collar.
5. Remove the outer wheel bearing rollers.
6. Place the hub assembly with studs facing upwards on a bench.
7. Remove the seals and wheel bearings from the hub.
8. Clean the hub thoroughly. Ensure the hub is dry prior to installing the new wheel bearings.
9. Using a hammer and wheel bearing assembly tool, install the inner and outer bearing races into the hub. Ensure the bearing races are aligned with the hub prior to fitment.
10. Grease the inside of the hub with Castrol LMX grease.
11. Lubricate the inner hub bearing (larger bearing) with Castrol LMX grease and place into the bearing race.
12. Using a hammer and hub seal assembly tool, install the hub seal. Ensure the seal is aligned with the hub prior to fitment.
13. Install the hub and inner bearing assembly onto the rear axle housing.
14. Replace hub nut retaining collar
15. Replace hub nut locking screws
16. Replace the axle half-shaft

CAUTION:	
	Do not damage the hub wheel bearing seal during installation.