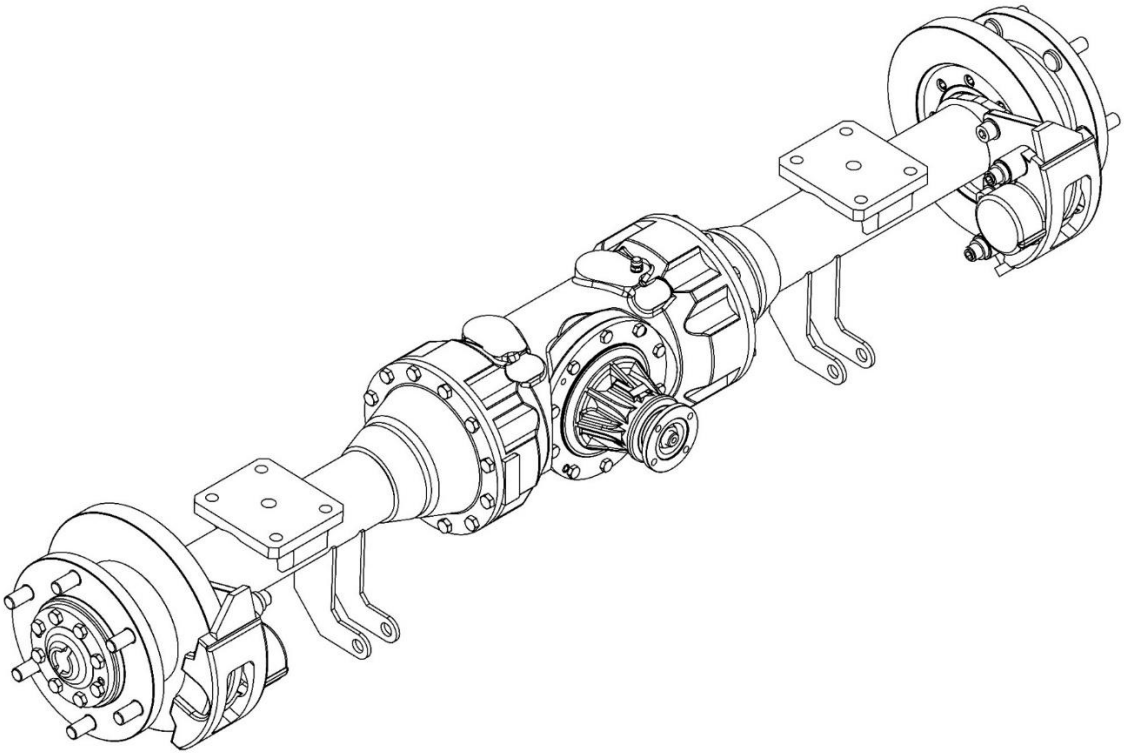
415B12L062 WORKSHOP MANUAL



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415B12L062 Manual
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PRM Newage Ltd operates a policy of product improvement and therefore reserves the right to change specifications without prior notification. Whilst every effort is made to ensure complete accuracy of the information in this manual no liabilities for inaccuracies or the consequences thereof can be accepted by the manufacturer or the distributor who supplied the manual.

The following international symbols are used in this service manual:

WARNING! THIS SYMBOL WARNS OF POSSIBLE PERSONAL INJURY

CAUTION! THIS SYMBOL WARNS OF POSSIBLE DAMAGE TO TRANSMISSION

CONTENT

INTRODUCTION

Spare parts for Newage axles may only be obtained from the original equipment manufacturer and not directly from Newage. Always quote your vehicle/machine serial number and axle serial number – see section titled 'Identification'.
If possible, the repair/service should be carried out in a clean environment. Where this is not possible, and the work must be completed on site, appropriate measures must be taken to ensure that dirt or foreign matter does not enter the unit. Newage axles are designed to operate in the arduous conditions found in the construction industry; providing they are maintained regularly they will provide the service our customers expect from Newage products.

GENERAL DATA

Description

The 415 series axle is a double reduction unit featuring a Hydraulic Disc Braking system.

The 1st reduction Spiral Bevel Pinion and Crown Wheel driving a 4 Pinion Differential. Final drive is transmitted via the 2nd reduction in-board Planetary Assemblies. The Axle Shafts are fully floating (i.e. not subjected to wheel loads) with each Wheel Hub supported on opposed taper Roller Bearings.

Specification

Overall Ratio
12.33:1

Input Flange
To suit Hardy Spicer 1310 Coupling

Wheel Fixing
6 studs: 3/4” x 16 UNF-3A on 222.25 mm (8.75”) PCD

Dynamic Axle Load Rating
Maximum load rating 5200 Kg (11440 lbs) based on 1793.75 mm (70.62”) wheel track

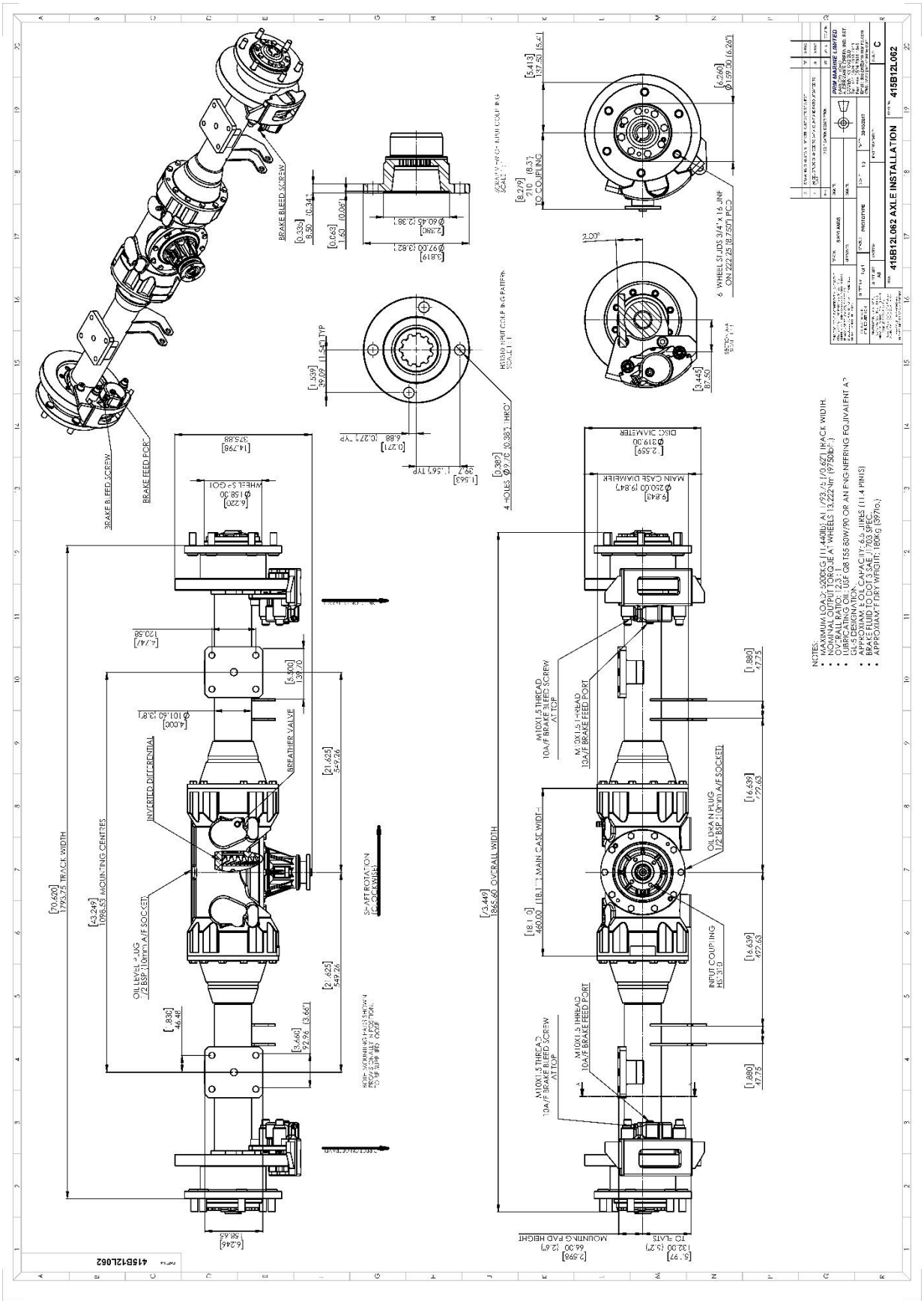
Service Brake
See Torque/Pressure Graph

Park Brake
Not Applicable.

Approximate weight
180 kg (397 lb) dry

Oil Capacity
6.5 litres (11.4 Pints)

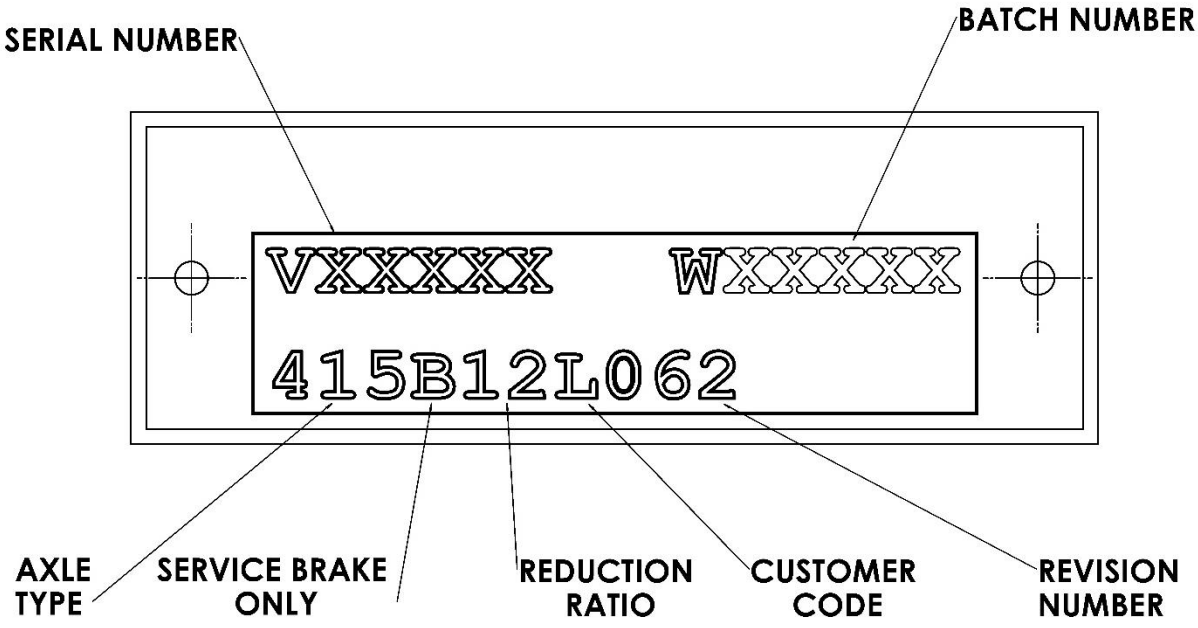
Installation Drawing



IDENTIFICATION

If spares are required, please quote the axle model, the vehicle/machine model and serial number from the blue plate. 415 Axles are produced in a variety of configurations for individual customer requirements; therefore, it is important to identify the Axle correctly.

The part number allocated to each Axle describes the basic specification as below:



GENERAL SERVICE INFORMATION

Routine Maintenance

Check	Frequency
Axle Oil change	After initial 300 Hrs then every 1,000 Hrs
Axle Oil Level check	Monthly
Axle Shaft Bolts	Monthly
Brake Fluid change	Annually
Brake Fluid Level check	Monthly
Check Axle Arm/Main Case joint securing Bolts	Monthly
Check Wheel Hub Bearing adjustment	1,000 Hrs
Check Wheel Nut	Weekly
Visual check for oil leaks around joints and Seals	Weekly
Prop Shaft Bolts	Monthly

Lubricants

Only those lubricants shown below, or their direct equivalents must be used:

SAE 80W-90 Gear oil for operation in ambient temperatures between 0°C and 30°C (32°F -86°F)

NOTE: An alternative engineering approved Gear oil may be used. Consult 'PRM Newage' before filling the axle.

The oil is added via the combined Filler/Level Plug positioned on the rear of the axle Main Case.

When installing new Unitized Hub Seals, ensure the outer surface of the seal and the inner diameter bore of the Hub is free from grease. Use Loctite SF7063 Solvent Cleaner to degrease both before fitment of the seal.

Greases

Smear grease between Oil Seal lips and 'O' Rings at major overhauls (with exception to the Wheel Hub seals), or whenever a repair to these areas is performed.

Only those greases shown below, their direct equivalents or alternative engineering approved grease must be used: Texaco Multifak EP2

Brake Fluid

The Axle Brakes operate with the fluid specification: FMVSS 116 DOT 4, SAEJ1703 and ISO4925 Brake Fluid

NOTE: An ISO VG32 Mineral Hydraulic Fluid Should NOT be used under any circumstance.

Liquid Sealant

The Main Case/Axle Arm joint faces must be sealed with either of the following:

- Threebond 1207D Silicone Liquid Gasket

NOTE: An alternative engineering approved silicon sealant may be used.

For locking features, the following compound must be used:

- Loctite 243

NOTE: An alternative engineering approved locking compound may be used.

Fastener Tightening Torques

Fastener	A/F (mm)	Torque (Nm.)	Torque (lb. Ft)
	Across Flats	Newton Me-tres	Pounds Force Feet
Main Case Assembly			
Axle Arm/Main Case High Tensile Bolts (M12)	19	146	107
Axle Shaft/Wheel Hub High Tensile Bolts (M12)	19	146	107
Brake Calliper mounting Grade S Cap Bolt (M16)	14	230	170
Calliper Carrier Cap Bolts (M16)	14	257	190
Differential assembly Nut (M10)	17	77	57
Pinion Housing Bolt (M10)	17	84	62
Drain and Level Plug (1/2" BSP)	10	16	12
Hub Assembly Lock Nut (M65) – *(Special Tool required TMFS13*)	---	135	100
Input Drive Flange Drag Torque after collapsing Spacer	30	1.92/2.48	17/22 lbin

Axle Backlash

Assembly	Pinion/Wheel	Drive Flange	P.C.D	Backlash
416-9820	416-2000 416-2010	415-9810 (415-2180 & 250-0910) (HS 1310)	79.40mm (3.125")	0.22-0.30mm (0.009-0.012")

Tooling

The following tooling is used to aid in the servicing of the axle. These are available from the Original Equipment Manufacturer.

TMFS13 Socket Spanner for Wheel Hub Bearing Lock Nut 010N651. The **TMFS13** tool is available from SKF stockists (M65 Stub Axle Locknut socket 19mm (3/4") drive)

SERVICING AND REPAIRS

WARNING: Before carrying out any service work always ensure that the engine is switched off

Before removal of the Axle for repair or overhaul, carefully study the following procedures. Use proper hand tools, slings and hoists for the job. WORK SAFELY

Keep all work areas, tools and Axle clean. All oil should be drained into a suitable container. Wipe up any spilled oil or fluids to prevent accidents. Wear correct safety equipment I.e. safety glasses and safety shoes to guard against personal injury

IMPORTANT NOTICE: ONLY REMOVE BREATHER, OIL DRAIN PLUG OR OIL LEVEL PLUG ONCE THE AXLE IS AT AMBIENT TEMPERATURE. REMEMBER HOT OIL CAN CAUSE BURNS – WORK SAFELY.

CAUTION: The above operations should be carried out by suitably qualified personnel and strictly in accordance with the procedures detailed in the workshop manual.

Drawings showing all internal components are contained in the parts lists at the back of this manual.

Seals

Remove Oil Seals carefully to prevent damage if they are to be re-used, however to prolong the life of the axle, it is best to replace these items.

Bearings

If removing taper roller Bearings for re-use keep them in matched sets and protect all Bearings from contamination.

Cleaning

WARNING: If using cleaning solvents these can be toxic, flammable, a skin irritant or give off harmful fumes. Avoid prolonged contact, vapour inhalation, or smoking. Failure to take care can result in injury or death.

Rinse all metal parts in solvent to remove dirt, grease and oil.

Be careful to remove solvent from items before re-fitting.

INSPECTION

Main Case and Arms

Inspect for cracks. Check sealing surfaces for any imperfections, damage, etc. which will lead to oil leaks. Check all threads for damage.

Gears

Inspect for any chipped, broken or cracked gear teeth, also for any excessive wear i.e. initial or progressive gear pitting.

Bearings

Inspect for any damage, denting, initial or progressive pitting and over-heating. Each time a Bearing is removed for inspection, or replacement it will be necessary to recalculate the required shim thickness to pre-load the Bearings correctly, see Procedures for more information.

Threaded Parts

Inspect for stripped or damaged threads.

PROCEDURES

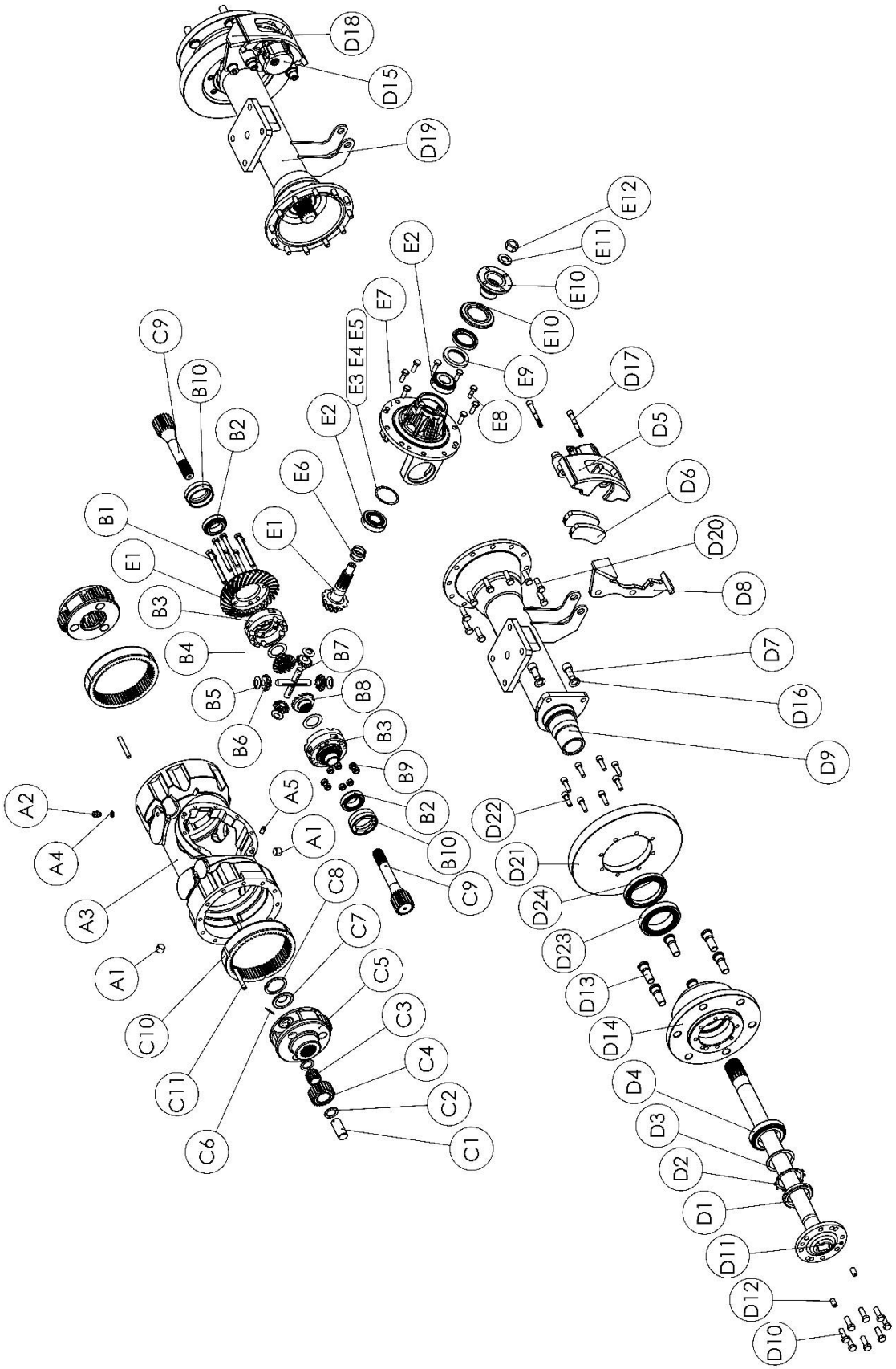
CAUTION: When re-assembling the Axle all threaded fasteners must be tightened to the specified torques to prevent premature failure. Refer to Fastner Tightening Torque on page 9.

Some servicing operations can be carried out with the Axle still mounted to the vehicle (provided, of course, that there is sufficient space); an example of this is the replacement or repair of the brake assemblies. The repair or replacing the Differential, Planetaries or Arm assemblies however will require the complete removal of the Axle from the vehicle.

If the details outlined below are carefully followed no difficulty will be found in stripping and rebuilding the Axle. It is most important that all components are perfectly clean and in good condition before reassembly.

CAUTION: All gears are supported by taper roller Bearings. Each time a bearing has been removed for inspection, component repair or replacement it will be necessary to recalculate the Shim thickness or adjust the Wheel and Differential Bearing to give the required pre-load. Re-Shimming of the Axle is detailed under the Axle Shimming procedure.

Section ‘A’ – 415B12L062 Axle Assembly



Item	Part No	Qty	Description
A1	0150250	2	½" BSP Level / Drain Plug
A2	CP1488	1	Breather
A3	415-0013	1	Main Case
A4	CP1224	1	Sealing Washer
A5	010-0040	2	Dowel
B1	0041023	8	Bolt M10 x 110 Long
B2	055C024U041H	2	Taper Roller Bearing
B3	350-9520	1	Differential Case
B4	250-2110	2	Thrust Washer
B5	250-2120	4	Thrust Washer
B6	360-2100	4	Diff. Pinion Wheel
B7	251-2130	2	Diff. Spider (Half)
B8	360-2090	2	Diff. Wheel
B9	0051006HT	8	Nyloc Nut M10
B10	415-2151	2	Bearing Adjuster Nut
C1	415-0250	6	Plannet Pin
C2	410-0271	12	Thrust Washer
C3	0562530	6	Needle Bearing
C4	418-0080	6	Planet Gear
C5	416-0060	2	Planet Carrier
C6	010-0070	6	Spring Dowel Ø 3 x 40
C7	410-1321	2	Spacer
C8	003-0100	2	Circlip Ø 60
C9	418-0090	2	Sun Gear
C10	418-0070	2	Annulus
C11	010-0190	2	Dowel Pin Ø 10 X 70
D1	010N651	2	Nut M65
D2	010W651	2	Lock Washer M65
D3	415-1440	2	Spacer
D4	0540604H	2	Taper Roller Bearing
D5	418-2500	1	Service Brake (LH) (Includes Brake Pad D6)
D6	418-2510	4	Brake Pad
D7	0081730	4	M16 x 30 Cap Head Bolt
D8	415-2401-LH	1	Brake Mounting Bracket (LH) (Includes Bolts D17 - 2 off)
D9	415-0035-LH	1	Welded Axle Arm Assy (LH)
D10	0041210HTP	16	M12 x 35 Long Bolt
D11	421-0100	2	Axle Shaft
D12	0211225	4	Dowel Ø 12 x 25
D13	415-0450	12	Wheel Stud ¾" x 16 UNF
D14	415-0041	2	Wheel Hub
D15	418-2540	1	Service Brake (RH) (Includes Brake Pads D6)
D16	0191013H	4	Hardened Washer M16 x 4 Wide
D17	See D8/ D18	4	Mounting Bracket Bolt (not available separately)
D18	415-2401-RH	1	Brake Mounting Bracket (RH) (Includes Bolts D17 - 2 off)
D19	415-0035-RH	1	Welded Axle Arm Assy (RH)
D20	0041210HTP	24	M12 x 35 Long Bolt
D21	415-0753	2	Brake Disc
D22	0081535L	16	M10 x 35 Long Cap Head Bolt
D23	0540751H	2	Taper Roller Bearing
D24	417-2850V	2	Oil Seal - Viton

E1	416-9820	1	Crown Wheel and Pinion (Matched Lapped Set)
E2	055C020U043H	2	Taper Roller Bearing
E3	360-2210	As Req.	Shim 0.30 mm
E4	360-2290	As Req.	Shim 0.40 mm
E5	360-2350	As Req.	Shim 0.25 mm
E6	250-1050	1	Spacer
E7	415-2300	1	Input Pinion Cartridge
E8	0041009HTP	10	M10 x 30 Long Bolt
E9	002-0030V	2	Oil Seal - Viton
E10*	415-9810	1	Input Drive Flange Assembly (Includes 415-2180 & 250-0910)
E11	009-0090	1	M20 Hardened Washer
E12	007-0130	1	M20x 2.5 Nyloc Nut

*NOTE: E10 can only be supplied as Assembly 415-9810 and comprises of Input Drive Flange 415-2180 & Oil Seal Cover 250-0910.

REMOVING & SERVICING THE CROWN WHEEL AND PINION.

1. Remove the Drain Plug (A1) and drain the Axle Oil.

2. Remove both Axle Arm assemblies by removing 12 Bolts per side (D20). Withdraw the Planet Carrier Assembly (see Section C), and Sun Gear (C9).

3. Remove 10 Bolts (E8) around the Pinion Cartridge. Using two M10 extraction Bolts (not supplied), remove the Crown Wheel/Differential assembly through the Pinion Cartridge aperture.

4. Remove the Pinion Nut (E12) from the Pinion Shaft (E1), along with the Washer (E11), and the Coupling (E10).

5. Unpein 2 Adjuster Nuts (B10) and remove. Differential assembly will now be free to remove from the Pinion Cartridge.

6. Drift Pinion (E1) through Cartridge and Inspect the Bearings (E2) for wear and damage. If the inner Bearing on the Pinion head needs replacing, use a Bearing puller to extract the cone. If the Bearing Cups or Oil Seals need replacing, they can be pressed or drifted out of the Cartridge housing. Take care not to damage the Shims positioned behind the Bearing Cup.

IMPORTANT: If any components are replaced a new Collapsible Spacer (E6) & Pinion Nut (E12) must be used and the Crown Wheel/Pinion marking and backlash reset.

7. If the Crown Wheel and Pinion or Pinion Head Bearing (E2) are replaced, the following procedure needs to be carried out:

8. To check Shim size
   (a) Note the new Pinion (E1) mounting distance (M.D.) on the head. (Approximately 87.5mm)
   (b) Measure the new overall width of Pinion Head Bearing (E2). (Approximately 22.2mm)
   (c) Note Pinion Cartridge (E7) mounting distance (Constant for 415 = 110.35mm).
   (d) Shim thickness (E3, E4, E5) = 110.35 -(a)-(b) e.g. For theoretical normal shims:
   110 - 22.2 - 87.5 = 0.65mm

9. Reassemble and tighten the Pinion Nut (E12) until the Collapsible Spacer (E6) collapses and all the end float between the Pinion Bearings is removed. Note, the initial collapsed torque on wrench should not be less than 245 Nm (180 lb.ft).

10. Continue to tighten the Pinion Nut until a pre-load of 59-98N (22lbf) for new Bearings, or 29.5-59N (6.6-13.2lbf) for used Bearings is obtained. The pre-load can be measured by binding a piece of string around the Coupling (E10) and measuring the load to turn the Coupling

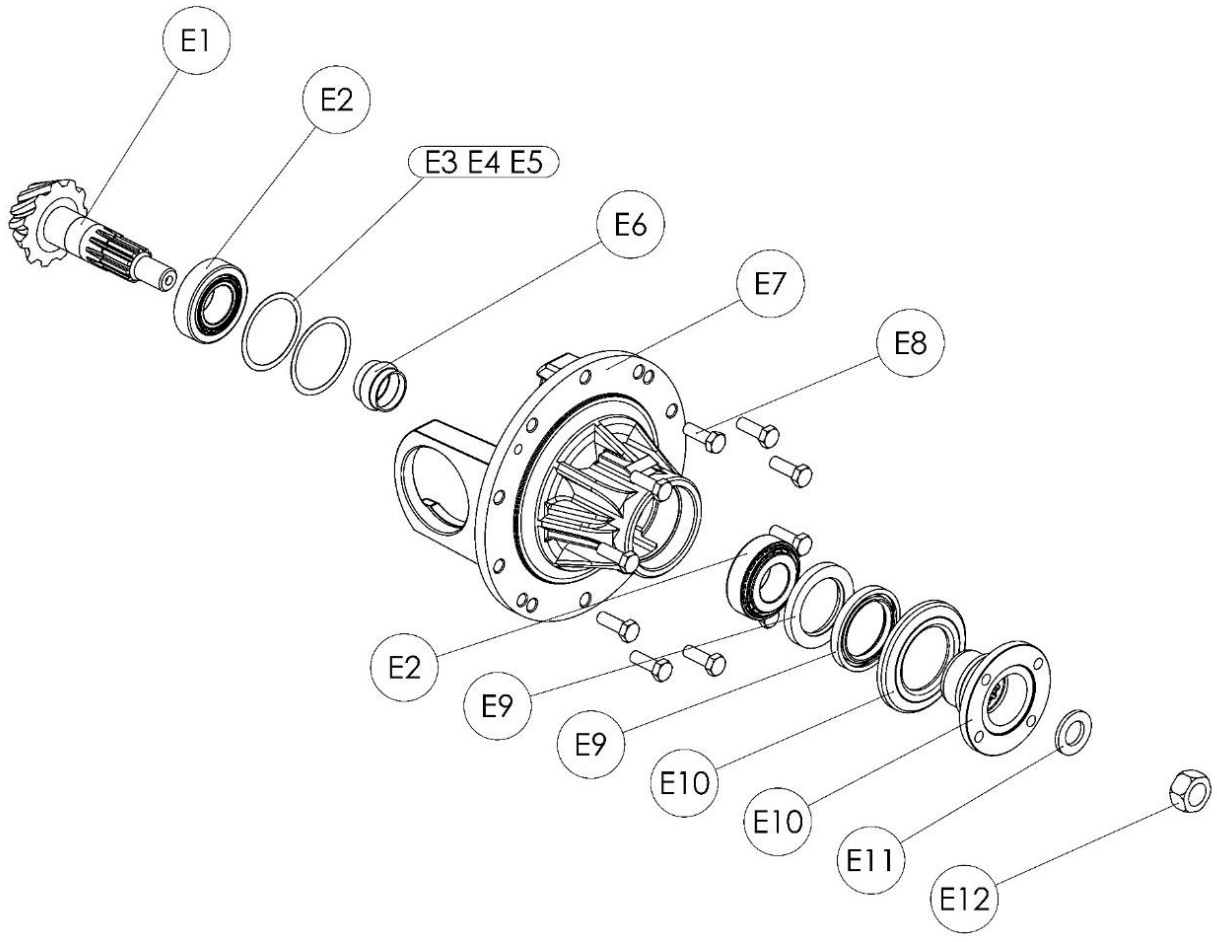
with a Spring Balance (See diagram below). Alternatively use a Torque Wrench to achieve a measured drag torque of 1.92/4.48 Nm (17/22 lbin).

11. To reset backlash:
    i. Refit Crown Wheel and Differential assembly into the Pinion Cartridge and screw new Differential Bearing Adjuster Nuts into position to remove all backlash from the gear mesh.
    ii. Adjust the Nuts to move the Crown Wheel out of mesh to achieve a backlash at the flange specified on page 5.
    iii. Tighten the Adjuster Nut opposite the Crown Wheel to 20 Nm (15lbft) and pein both Differential Adjuster Nuts into the recess.

12. Clean the joint faces and refit the Cartridge assembly into the Main Case ensuring the recommended sealing agent is uniformly applied to the Flange faces and tighten to M10 Bolts tightening torque.

13. To assemble the unit, reverse the above procedure.

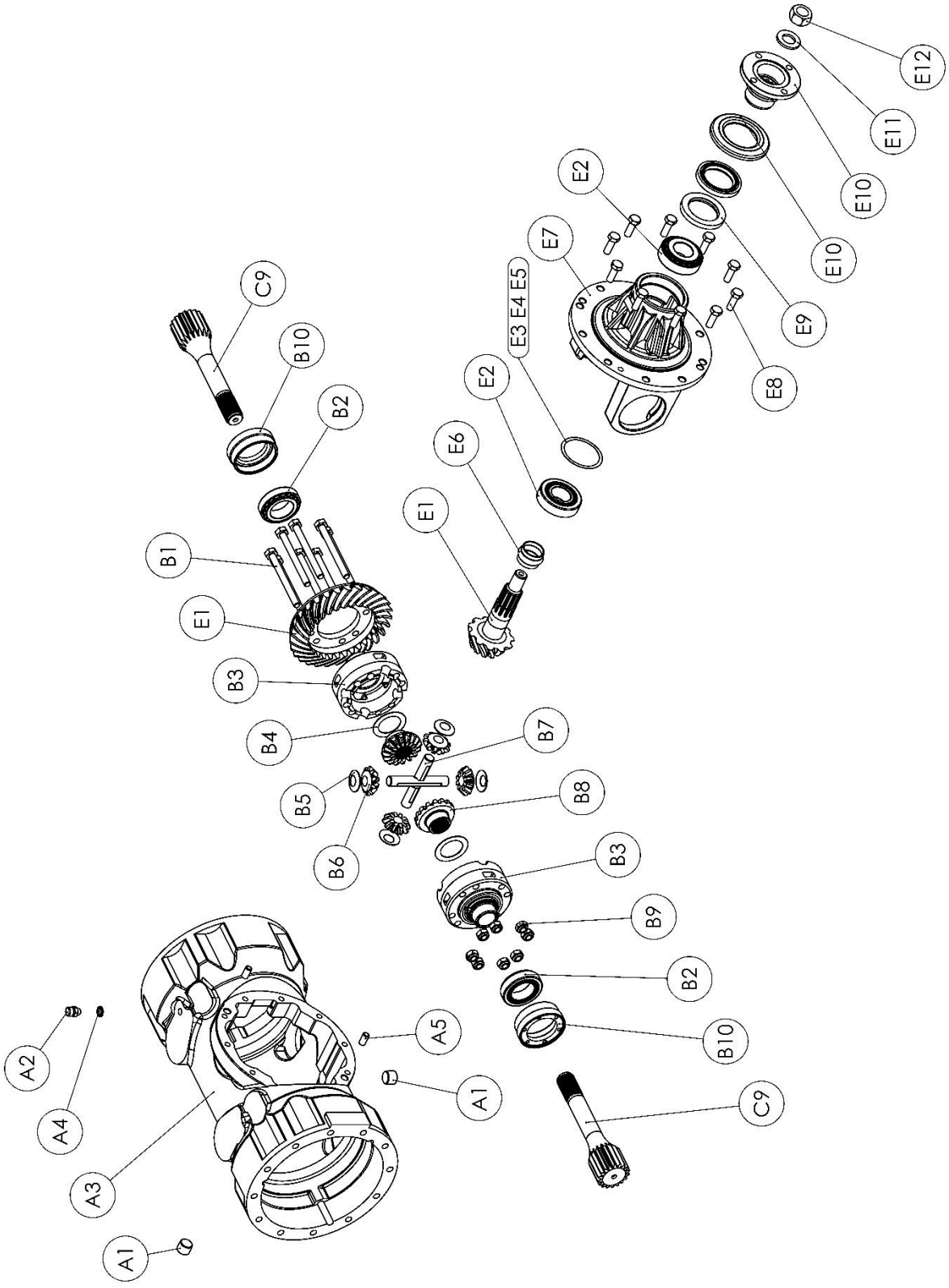
14. Refill the Axle with the recommended Oil (See Page 5).



Section 'B' – Main Case and Differential Assembly

Item	Part No	Qty	Description
A1	0150250	2	½" BSP Level / Drain Plug
A2	CP1488	1	Breather
A3	415-0013	1	Main Case
A4	CP1224	1	Sealing Washer
A5	010-0040	2	Dowel
B1	0041023	8	Bolt M10 x 110 Long
B2	055C024U041H	2	Taper Roller Bearing
B3	350-9520	1	Differential Case
B4	250-2110	2	Thrust Washer
B5	250-2120	4	Thrust Washer
B6	360-2100	4	Diff. Pinion Wheel
B7	251-2130	2	Diff. Spider (Half)
B8	360-2090	2	Diff. Wheel
B9	0051006HT	8	Nyloc Nut M10
B10	415-2151	2	Bearing Adjuster Nut
C9	418-0090	2	Sun Gear
E1	416-9820	1	Crown Wheel and Pinion (Matched Lapped Set)
E2	055C020U043H	2	Taper Roller Bearing
E3	360-2210	As Req.	Shim 0.30 mm
E4	360-2290	As Req.	Shim 0.40 mm
E5	360-2350	As Req.	Shim 0.25 mm
E6	250-1050	1	Spacer
E7	415-2300	1	Input Pinion Cartridge
E8	0041009HTP	10	M10 x 30 Long Bolt
E9	002-0030V	2	Oil Seal - Viton
E10*	415-9810	1	Input Drive Flange Assembly (Includes 415-2180 & 250-0910)
E11	009-0090	1	M20 Hardened Washer
E12	007-0130	1	M20x 2.5 Nyloc Nut

*NOTE: E10 can only be supplied as Assembly 415-9810 and comprises of Input Drive Flange 415-2180 & Oil Seal Cover 250-0910.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Servicing the Main Case and Differential Assemblies

Removing the Differential

1. Remove the Axle Arm Assemblies and Sun Gears (C9) – see Section D.
2. Remove the Axle Arm Planetary Assemblies - see Section C.
3. Remove 10 off Bolts (E8).
4. The Input Cartridge Pinion Assembly (E1 – E12) with the Differential Assembly (B1 – B9) can be removed from Main Case (A3), ensuring that the 2 Dowels (A5) are either removed or remain in the Main Case (A3)
5. The Adjuster Nuts (B10) are "peined" into the Input Pinion Cartridge Housing (E7).
6. Carefully "Un-pein" and removed the Adjuster Nuts (B10), using PR30332 tool.
7. The Differential Assembly (B1 – B9) can now be removed from the Input Pinion Cartridge Housing (E7).

CAUTION: Great care must be taken when removing the Differential Assembly from Main Case. Any damage to the Crown Wheel would be detrimental to the axles' performance.

WARNING: The space constraints around the differential are very tight. The Differential Assembly weights 20Kg, so ensure that you have a good grip on the casing before attempting to remove the assembly from the case.

Servicing the Differential Assembly

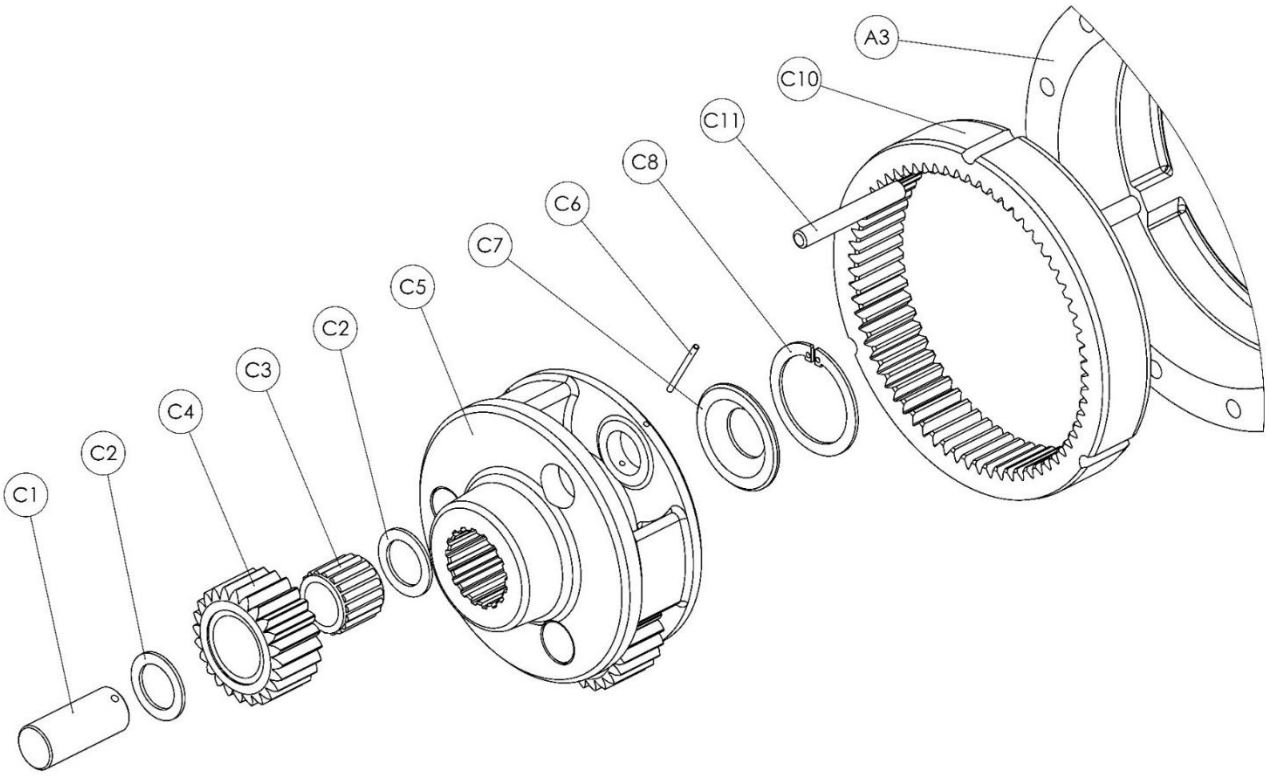
1. Remove Nuts (B9) and Bolts if necessary (B1). The Crown Wheel (E1) is now loose and the Differential assembly will split into 2 halves.
2. Remove the Differential Spider 2 off (B7) with the respective Differential Wheels (B8), Pinions (B6), Wheel Washers (B4) & Pinion Washers (B5).
3. Inspect all Differential Wheels (B8), Pinions (B6), Spiders (B7), Bearings (B2), Wheel Washers (B4) and Pinion Washers (B5) for damage and wear, replace if necessary.
4. To assemble, reverse the above procedure.
5. If new Differential Bearings (B2) are fitted, it will be necessary to reset the Bearing pre-load and Crown Wheel/Pinion backlash.

NOTE: To reset the backlash, see page 13 for the procedure. The acceptable range can be found on page 9.

Section ‘C’ – Planet Carrier Assembly

Item	Part No	Qty	Description
C1	415-0250	3	Plannet Pin
C2	410-0271	6	Thrust Washer
C3	0562530	3	Needle Bearing
C4	418-0080	3	Planet Gear
C5	416-0060	1	Planet Carrier
C6	010-0070	3	Spring Dowel Ø 3 x 40
C7	410-1321	1	Spacer
C8	003-0100	1	Circlip Ø 60
C9	418-0090	1	Sun Gear
C10	418-0070	1	Annulus
C11	010-0190	1	Dowel Pin Ø 10 X 70

NOTE: Quantities stated per side (2 Assemblies per Axle)



Servicing the Planet Carrier Assemblies

NOTE: This procedure assumes the Axle has had both arms removed - see section D.

1. The Planet Carrier assembly (C1 – C8) can now be removed from the Main Case (A3). Take care not to withdraw the Sun Gears (C9).
2. Remove the Sun Gears (C9) carefully so as not to allow to drop and damage, from either side.
3. Check the Planet Gears (C4) and the mating gear teeth on the Annulus (C10) and Sun Gear (C9) for damage and wear. The Planet Gears (C4) should run free in the Planet Pins (C1), without excessive radial "play". Replace if worn.

   NOTE: When servicing the Planet assembly, we recommend all three Planet Gears (C4), Planet Pins (C1), Needle Roller Bearings (C3), Spring Dowels (C6), Annulus (C10) & Sun Gear (C9) are replaced together.

4. To replace the Planet Gears, Pins or Bearings, drift each Spring Dowel (C6) through its hole, which locates the Planet Pins (C1) through the Planet Carrier (C5). Once the Dowels have been removed, lightly drift each Planet Pin (C1) through the Planet Gear (C4) and Planet Carrier (C5). Remove the loose Planet Gears (C4), Thrust Washers (C2) and Needle Roller Bearings (C3). Remove Circlip (C8), which secures the Spacer (C7).

NOTE: The Spacer (C7) is fitted with the large central chamfer facing outwards towards the Spline in the Planet Carrier (C5).

To reassemble:

1. Replace the Spacer & Circlip (C7 & C8) and slide the Needle Roller Bearings (C3) into the Planet Gears (C4). Fit the bottom Thrust Washer (C2) over the machined boss within the Planet Carrier (C5), place the Planet Gear (C4) with the Needle Roller Bearing (C3) on top of the bottom Thrust Washer and from the underside gently tap the Planet Pin (C1) through the Carrier (C5), bottom Thrust Washer (C2) & Planet Gear (C4).

   NOTE: When you begin this procedure, the cross hole in the Planet Pin (C1) must be aligned with the cross hole in the Planet Carrier (C5).

2. When part way through fit the top Thrust Washer (C2) and continue to drift the Planet Pin (C1) all the way through the Planet Carrier until it is flush with the Planet Carrier machined face (C5).
3. Secure by fitting a new Spring Dowel (C1) in the Planet Carrier (C5). To prevent the Spring Dowel (C1) from drifting out of position. The end should be peined into the Planet Carrier (C5). Failure to do this can cause the Planet Gear (C4) to work loose.
4. Check for free rotation of the Planet Gears (C4) & their respective Planet Pin (C1).
5. This process is repeated for all three Planet Gear fitment (C4).
6. To refit, engage the Teeth of the Sun Gear (C9) with those of the Planet Gears (C4). Mesh the Planet Gears with the Annulus (C10) and push into position.

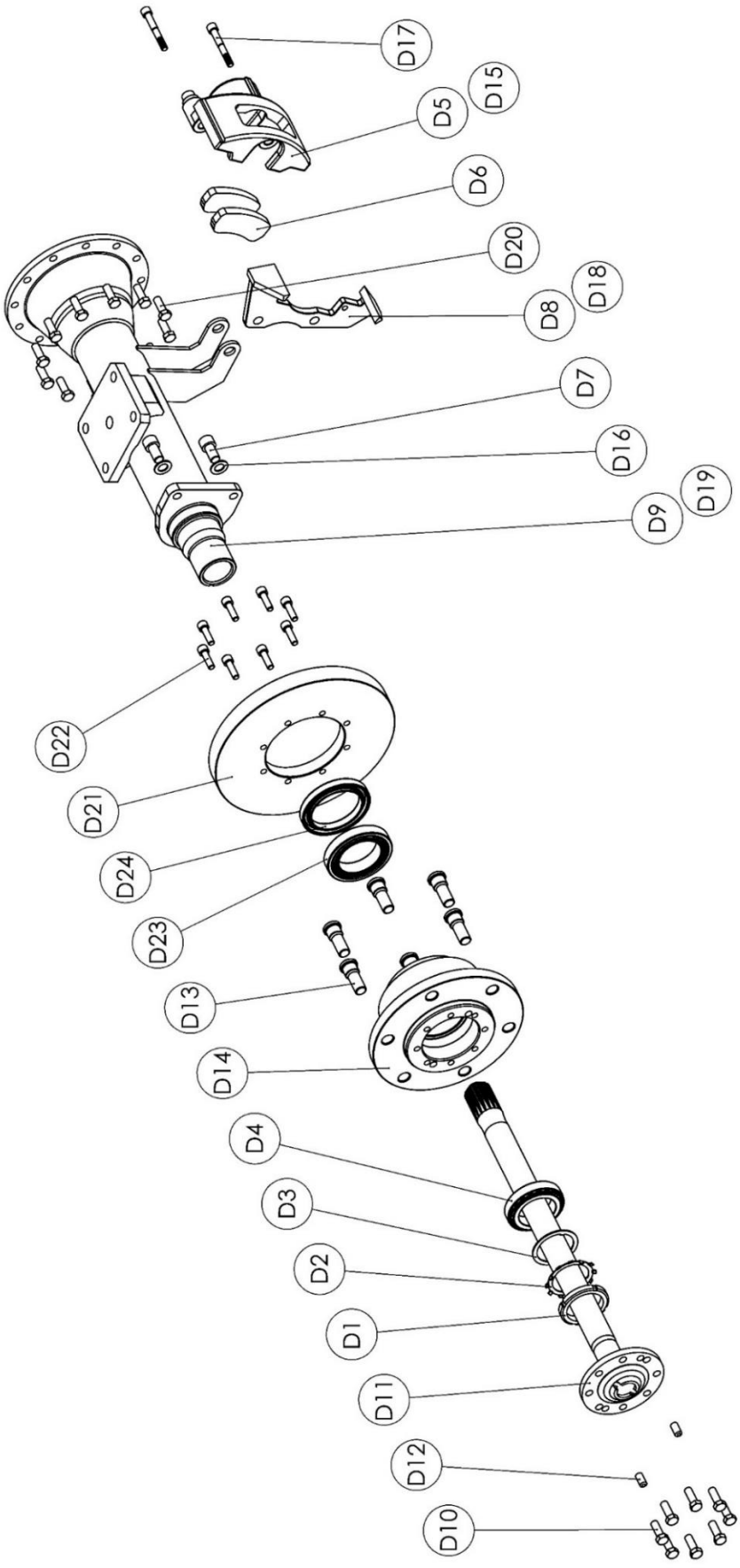
Removing the Annulus Gear

1. To remove Annulus (C10), use a pair of pinch bars, located behind the Annulus (C10) diametrically opposed, in a scissor fashion to prise the Annulus clear of the Main Case bore (A3).
2. To refit, reverse procedure ensuring that the Dowel (C11) is aligned with the slot at the Top of the Annulus (C10).

Section 'D' – Axle Arm, Hub and Brake Assemblies

Item	Part No	Qty	Description
D1	010N651	2	Nut M65
D2	010W651	2	Lock Washer M65
D3	415-1440	2	Spacer
D4	0540604H	2	Taper Roller Bearing
D5	418-2500	1*	Service Brake (LH) (Includes Pad D6)
D6	418-2510	4	Brake Pad
D7	0081730	4	M16 x 30 Cap Head Bolt
D8	415-2401-LH	1*	Brake Mounting Bracket (LH) (Includes Bolt D17)
D9	415-0035-LH	1*	Welded Axle Arm Assy (LH)
D10	0041210HTP	16	M12 x 35 Long Bolt
D11	421-0100	2	Axle Shaft
D12	0211225	4	Dowel Ø 12 x 25
D13	415-0450	12	Wheel Stud ¾" x 16 UNF
D14	415-0041	2	Wheel Hub
D15	418-2540	1*	Service Brake (RH) (Includes Pads D6)
D16	0191013H	4	Hardened Washer M16 x 4 Wide
D17	See D8/ D18	4	Mounting Bracket Bolt (not available separately)
D18	415-2401-RH	1*	Brake Mounting Bracket (RH) (Includes Bolt D17)
D19	415-0035-RH	1*	Welded Axle Arm Assy (RH)
D20	0041210HTP	24	M12 x 35 Long Bolt
D21	415-0753	2	Brake Disc
D22	0081535L	16	M10 x 35 Long Cap Head Bolt
D23	0540751H	2	Taper Roller Bearing
D24	417-2850V	2	Oil Seal - Viton

NOTE: Quantities stated per Axle (* Denotes Left-Hand or Right-Hand Assembly parts)


D17
D15
D5
D6
D20
D18
D8
D7
D16
D19
D9
D22
D21
D24
D23
D13
D14
D4
D3
D2
D1
D11
D12
D10

Servicing the Axle Arm, Hub and Brake Assemblies

The Hub assembly can be serviced with the Axle Arm still connected to the Main Case. Procedure is as follows:

1. Remove Bolts (D17) and remove the Service Brake (D5 or D15)
2. Remove 8 off Bolts (D10) that secures the Axle Shaft (D11) to the Wheel Hub/Brake Disc. Withdraw the Axle Shaft (D11) using 2 off Bolts (D10) as extractor screws and inspect the Spline form for damage and wear.
3. Straighten locking tab ears on Lockwasher (D2), unscrew & remove the Lock Nut (D1) using a special tool. A gentle tap with a soft mallet on opposing sides of the Brake Disc will assist on pulling the assembly off the axle arm stub. Remove Lockwasher (D2) (note the keyway lines) and Bearing Spacer (D3).
4. The Wheel Hub (D14) can now be withdrawn from the Axle Arm stub.
   NOTE: Care must be taken not to drop the loose Bearing Cones.
5. Examine all Bearing Cups & Cones (D4 & D23) for wear or damage, replace as necessary.
   NOTE: We recommend the Hub Oil Seals are always changed when the Hub has been removed.
6. The Bearing Cups (D4 & D23) can be drifted out of the Hub (D14) if they need replacing. When fitting new Bearing cups (D4 & D23) ensure that they are aligned squarely to the bores before pressing in.
   NOTE: If the Rear Bearing (D23) is replaced Oil Seal (D24) will also need replacing.
7. To reassemble the Hub assembly, reverse the above procedure using a new Lockwasher (D2).
8. To adjust the Hub Bearings:
   i. Tighten the Lock Nut (D1) to the tightening torque of 135 Nm (100 lb.ft). When checking the torque setting, rotate the Wheel Hub 3 turns in each direction to ensure the Bearings have "seated" correctly and recheck tightening torque. Repeat this procedure 3 times.
   ii. Slacken the Lock Nut (D1) back a distance equal to 1 tab of the new Lock Washer (D2).
   iii. Bend ear of Lock Washer over to secure the Nut.

NOTE: Never re-use a Lock Washer (D2).

Servicing the Brake Assemblies

Each Brake Assembly consists of two sliding callipers per side, which run along the length of the Mounting Bolt (D17), and so the Caliper needs to be removed to service the Pads.

1. Remove Caliper Mounting Bolts (D17) and pull the Brake Calliper (D5 or D15) away from the Calliper Carrier (D8 or D18).
2. Remove the Brake Pads (D6) by depressing the clips within the Calliper body.
3. Inspect for Pad wear and replace where necessary.

NOTE: 418-2510-KIT consists of 4 Brake Pads (2 Pairs) as we recommend replacing all the Brake Pads (D6) at the same time.

SPARES KITS

To ease the procurement of spares, we offer a catalogue of Kits that group common parts together to simplify the ordering process. These Kits are detailed below:

415-9630-KIT Differential Kit (1 kit per axle)			
Item	**Part No**	**Qty**	**Description**
B1	0041023	8	Bolt M10 x 110 Long
B2	055C024U041H	2	Taper Roller Bearing
B3	350-9520	1	Differential Case
B4	250-2110	2	Thrust Washer
B5	250-2120	4	Thrust Washer
B6	360-2100	4	Diff. Pinion Wheel
B7	251-2130	2	Diff. Spider (Half)
B8	360-2090	2	Diff. Wheel
B9	0051006HT	8	Nyloc Nut M10

427-9620-KIT Crown Wheel & Pinion Kit (1 kit per axle)			
Item	**Part No**	**Qty**	**Description**
E1	416-9820	1	Crown Wheel and Pinion (Matched Lapped Set)
E2	055C020U043H	2	Taper Roller Bearing
E3	360-2210	As Req.	Shim 0.30 mm
E4	360-2290	As Req.	Shim 0.40 mm
E5	360-2350	As Req.	Shim 0.25 mm
E6	250-1050	1	Spacer
E7	415-2300	1	Input Pinion Cartridge
E8	0041009HTP	10	M10 x 30 Long Bolt
E9	002-0030V	2	Oil Seal - Viton
E10*	415-9810	1	Input Drive Flange Assembly (Includes 415-2180 & 250-0910)
E11	009-0090	1	M20 Hardened Washer
E12	007-0130	1	M20x 2.5 Nyloc Nut

*NOTE: E10 can only be supplied as Assembly 415-9810 and comprises of Input Drive Flange 415-2180 & Oil Seal Cover 250-0910.

418-9585-KIT Planet Kit (2 kits per axle)			
Item	**Part No**	**Qty**	**Description**
C1	415-0250	3	Plannet Pin
C2	410-0271	6	Thrust Washer
C3	0562530	3	Needle Bearing
C4	418-0080	3	Planet Gear
C5	416-0060	1	Planet Carrier
C6	010-0070	3	Spring Dowel Ø 3 x 40
C7	410-1321	1	Spacer
C8	003-0100	1	Circlip Ø 60
C9	418-0090	1	Sun Gear
C10	418-0070	1	Annulus

418-2510-KIT Service Brake Pad Kit (1 kit per axle)			
Item	**Part No**	**Qty**	**Description**
D6	418-2510	2	Pair of Service Brake Pads

421-9540-KIT Wheel Hub Kit (2 kits per axle)			
Item	**Part No**	**Qty**	**Description**
D1	010N651	1	Nut M65
D2	010W651	1	Lock Washer M65
D3	415-1440	1	Spacer
D4	0540604H	1	Taper Roller Bearing
D10	0041210HTP	8	M12 x 35 Long Bolt
D12	0211225	2	Dowel Ø 12 x 25
D13	415-0450	6	Wheel Stud ¾" x 16 UNF
D14	415-0041	1	Wheel Hub
D21	415-0753	1	Brake Disc
D22	0081535L	8	M10 x 35 Long Cap Head Bolt
D23	0540751H	1	Taper Roller Bearing
D24	417-2850V	1	Oil Seal - Viton

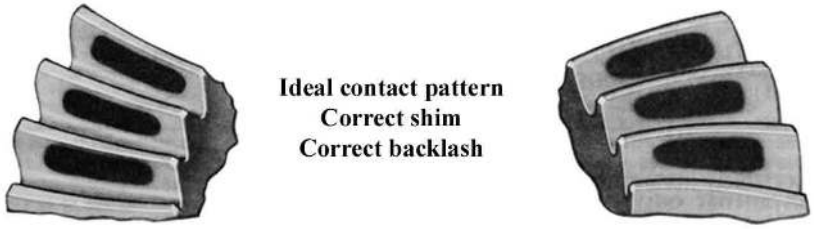
All spares are available from your local Newage distributor. Check our website www.newage-prm.com to find your closest distributor.

Other spares are available upon request; however, these may not be carried by the distributor as standard stock and may incur a delivery lead-time.

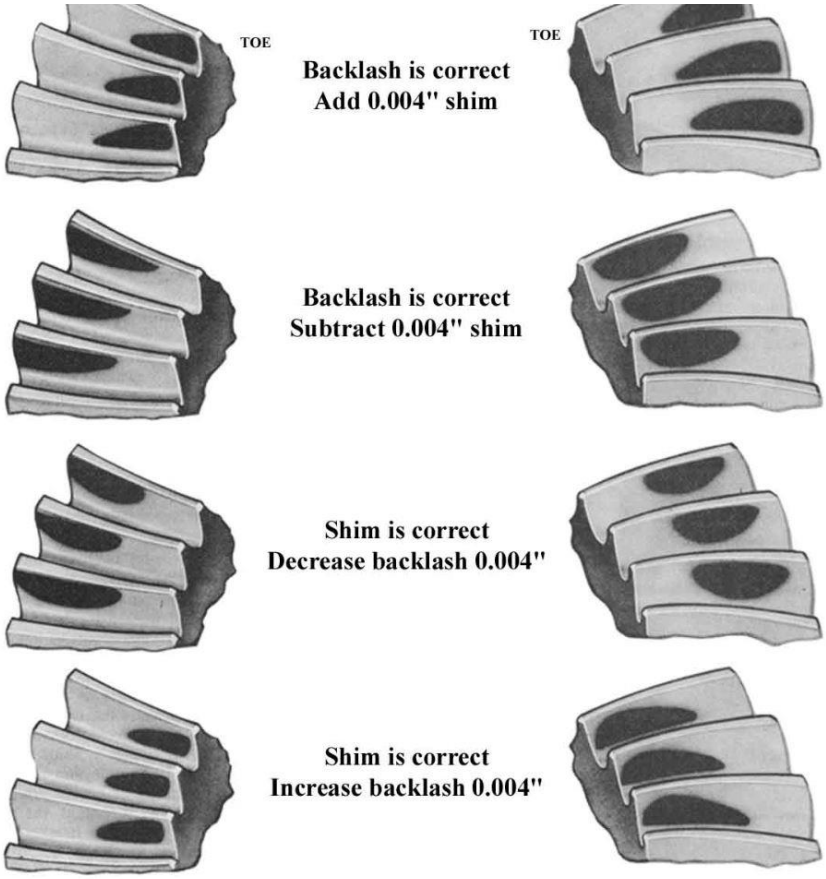
SPIRAL BEVEL GEAR TOOTH CONTACT

Contact may vary, but generally is approximately in the tooth centre, equi-spaced between root and tip. The marking may be towards toe on some gears on both flanks or marking crossed slightly i.e. towards toe on convex flank and heel on concave flank or vice versa.
Apply gear marking compound on both sides of 7 to 10 teeth on the Crown Wheel (B10). Whilst applying resistance to the Pinion (B10) rotate the Crown Wheel back and forth (Not Full revolutions) until a clear contact pattern is shown. Compare the contact pattern to the illustrations below and re-shim the Pinion Bearing bore in the Main Case (B19).
If the Pinion Bearing (B9) is Re-shimmed (B18) the backlash must be re-set between the Crown Wheel and Pinion.
Go back and repeat all procedures in setting the backlash.

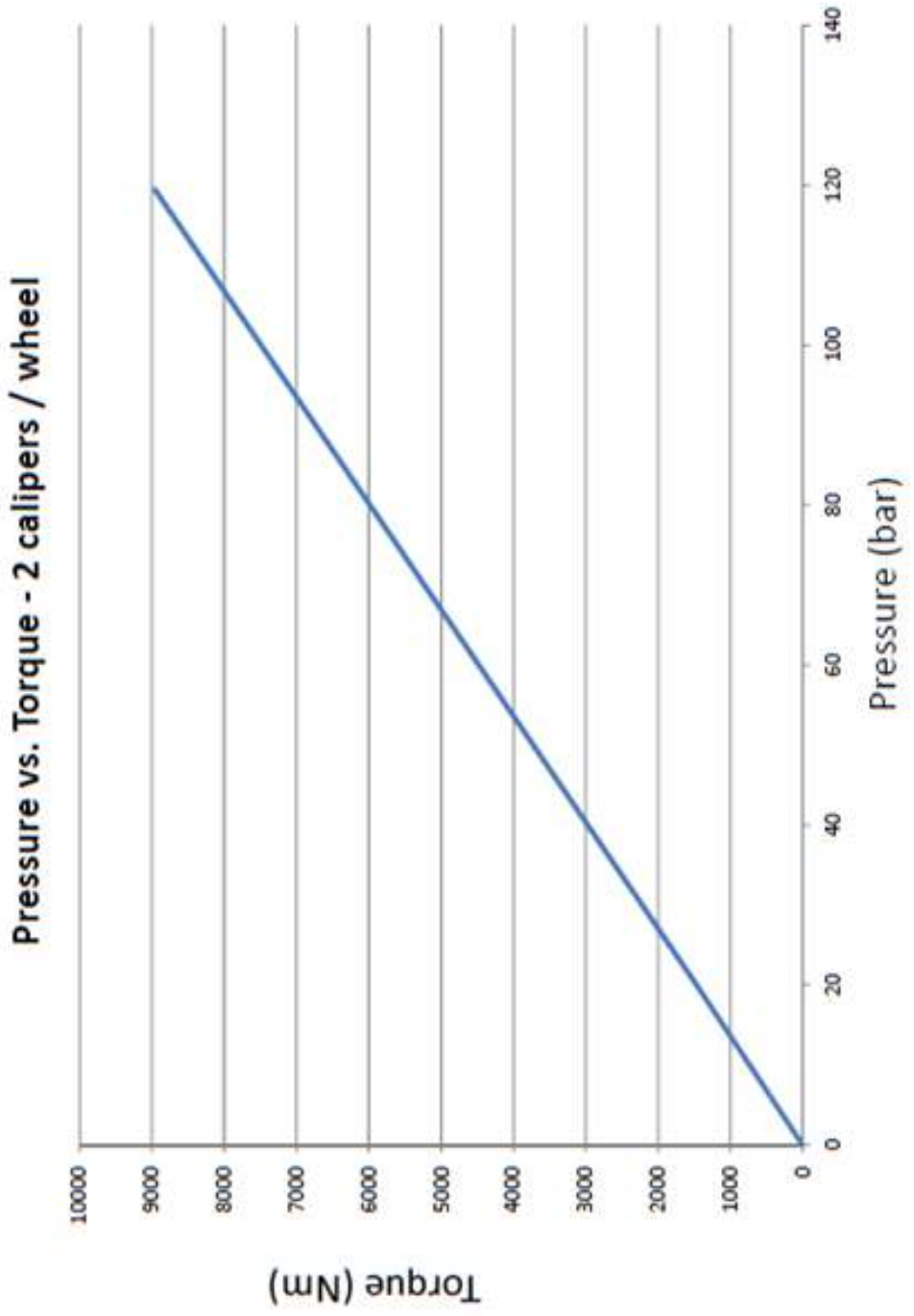
Correct Pattern



Incorrect Pattern



Appendix 1 :- Service Brake Graph



NOTES