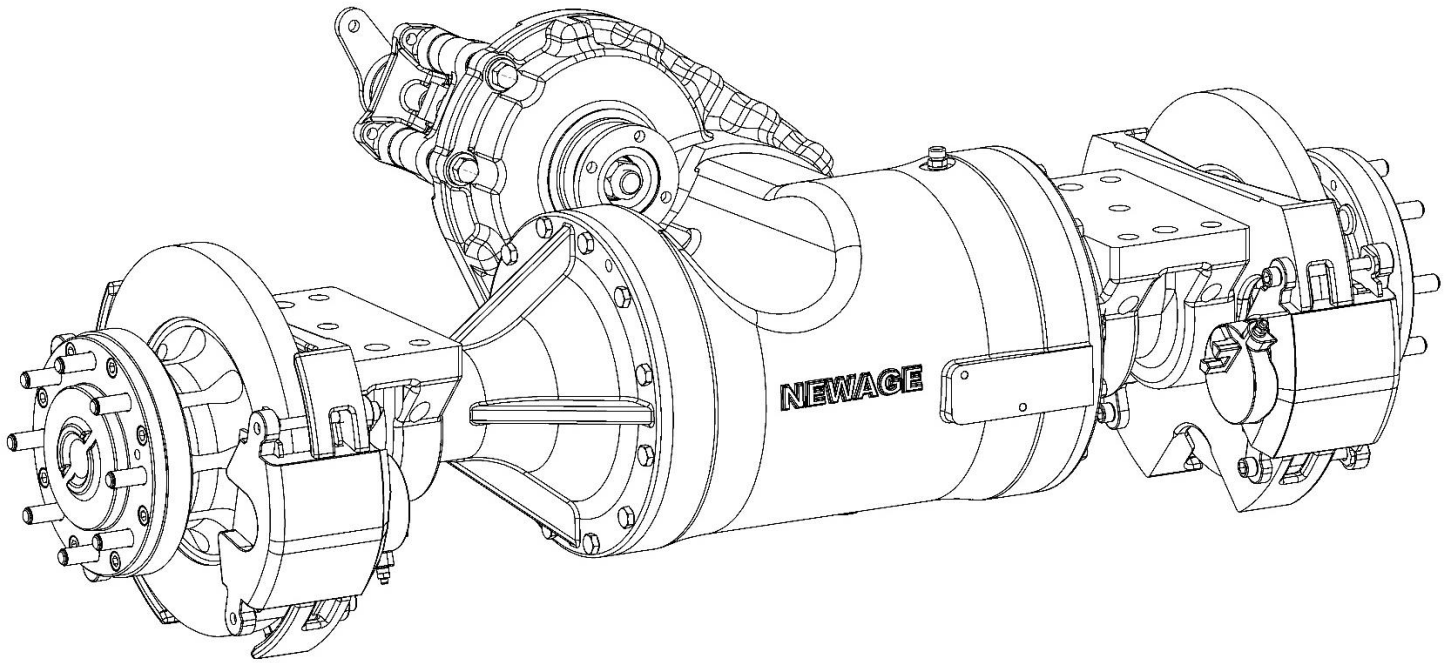
512
WORKSHOP
MANUAL



NEWAGE

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512 Manual

Issue: 4.2
Created By: M. Crane
Date: September 2019

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

CONTENTS

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'.

As clarification in our Manuals where there is a designation of a Number followed by the word “off”, *for example “8 off”*, this indicates that there are a quantity of the designated part as a multiple of 8.

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 512 series axle is a triple reduction unit featuring a Hydraulic Disc Braking system.

The Transfer Casing houses the 1st reduction Input Pinion and Wheel. This is fixed to the 2nd reduction Spiral Bevel Pinion and Crown Wheel driving a 4 Pinion Differential. Final drive is transmitted via the 3rd 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

9.24:1 / 12.33:1 / 14.4:1 /15.79:1 / 19.90:1

Input Flange

To suit Hardy Spicer 1310 Coupling

Wheel Fixing

8 studs: 9/16” x 18 UNF-3A on 165.1mm (6.5”) PCD

Dynamic Axle Load Rating

Maximum load rating 3,000Kg (6600 lbs) based on 1219mm (48”) wheel track

Service Brake

See Torque/Pressure Graph

Park Brake

Optional (disc mounted). See Torque / Lever Force Graph

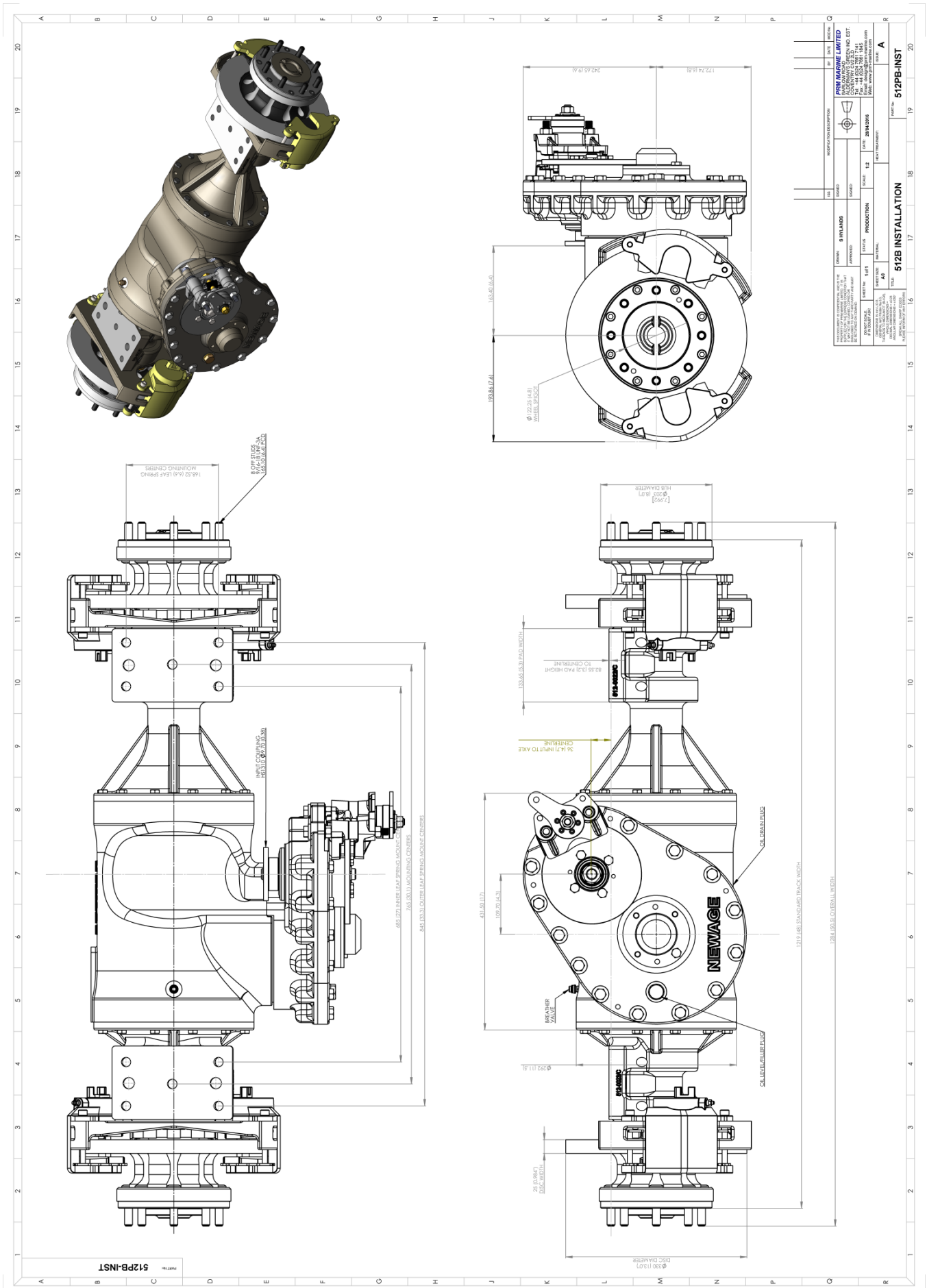
Approximate weight

300kg (661lb) dry

Oil Capacity

10 litres (2.6 US Gallons)

Installation Drawing (512PB – Revision 2 onwards)

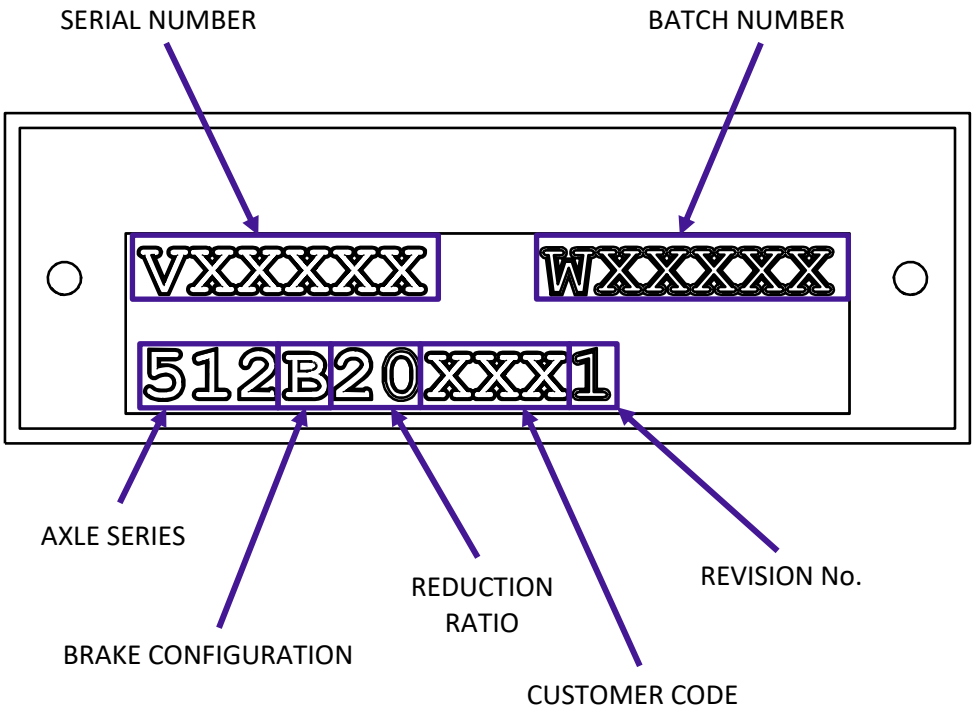


IDENTIFICATION

If spares are required, please quote the axle model, the vehicle/machine model and serial number from the blue plate. 512 Axles are produced in a variety of configurations for individual customer requirements; therefore it is important to identify the Axle correctly.

THIS MANUAL COVERS BOTH EARLIER BRAKED VERSIONS (REVISION No. 512BXXXXX1), PARK BRAKE READY VERSIONS (REVISION No. 512BXXXXX2 AND UPWARDS) AND PARK BRAKE VERSIONS (REVISION No. 512PBXXXXX2 AND UPWARDS).

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 Nut	Monthly

Lubricants

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

- SAE 80W-90 Q8 T55 Heavy Duty Gear oil for operation in ambient temperatures as low as -25°C (32-86°F) ambient.

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 Transfer Case. Apply P-80 oil seal lubricant to clean wheel hub stub axle when installing new hub Seals.

Greases

Smear grease between Oil Seal lips and 'O' Rings at major overhauls, 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/Transfer Case/End Cover 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 (N.m)	Torque (lbf.ft)
	Across Flats	Newton Metres	Pounds Force Feet
Main Case Assembly			
Axle Arm/Main Case High Tensile Bolts (M12)	19	146	107
Axle Shaft/Wheel Hub Cap Bolt (M10) + Loctite 243	8	80	59
Brake Calliper mounting Grade S Cap Bolt (7/16" UNF)	5/16"	54	40
Calliper Carrier Cap Bolts (M16)	14	230	170
Differential Adjuster Cap Bolts (M6)	5	21	15
Differential assembly Nut (M10)	17	77	57
Differential Bearing Adjuster Nut – *(Special Tool required)*	---	20	15
Differential Bearing Housing Bolt (M8)	13	30	22
Drain and Level Plug (1/2" BSP)	10	16	12
Hub Assembly Lock Nut (M70) – *(Special Tool required for KM14 Nut see TOOLING) Speed Brace & Back off 1 Tab – see page 31*	---	135	100
Wheel Nuts (9/16" x 18 UNF)	7/8"	230	170
Transfer Box Assembly			
Coupling Nut (M20) + Loctite 243 *(Input Flange and 512PB Park Brake Disc)*	30	271	200
Coupling Nut (M20) Drag Torque Plus Loctite 243 *(Without Transfer Gear & Spiral Bevel Gear in mesh)*	30	1.92/2.48	17/22 (lbf.in)
Lower End Cover Bolt (M10)	17	59	43
Lower Pinion Nut + Loctite 243 (M24)	36	340	250
Park Brake Calliper Mounting Grade S Nut (1/2" UNC) ***(512PB Only)***	19 (3/4")	115	85
Park Brake Disc (M10) ***(512PB Only)***	17	59	43
T'Case Mounting Bolts (M12)	19	96	72
T'Case Upper End Cover Bolt (M8) ***(512B REVISION 1 Only)***	13	30	22
T'Case Upper Seal Housing Cap Bolt (M8) ***(512B AND 512PB REVISION 2 AND UPWARDS Only)***	6	51	38

Axle Backlash

Assembly	Pinion/Wheel	Drive Flange	P.C.D	Backlash
513-9820	513-2000 619-2010	512-2180 (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.

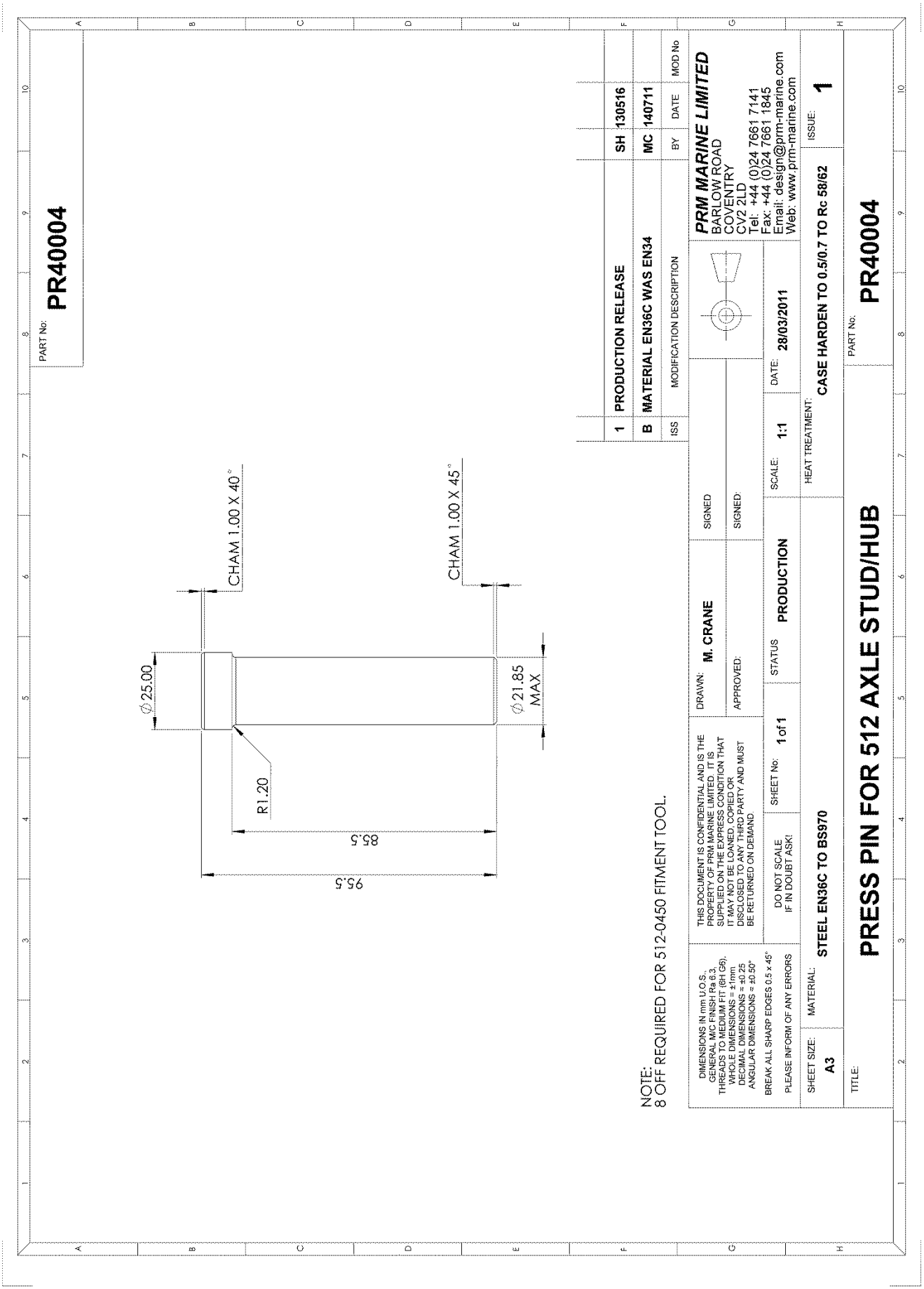
PR40004 Press Pin for Wheel Studs

PR40005 Support Plate for use with Press Pins PR40004

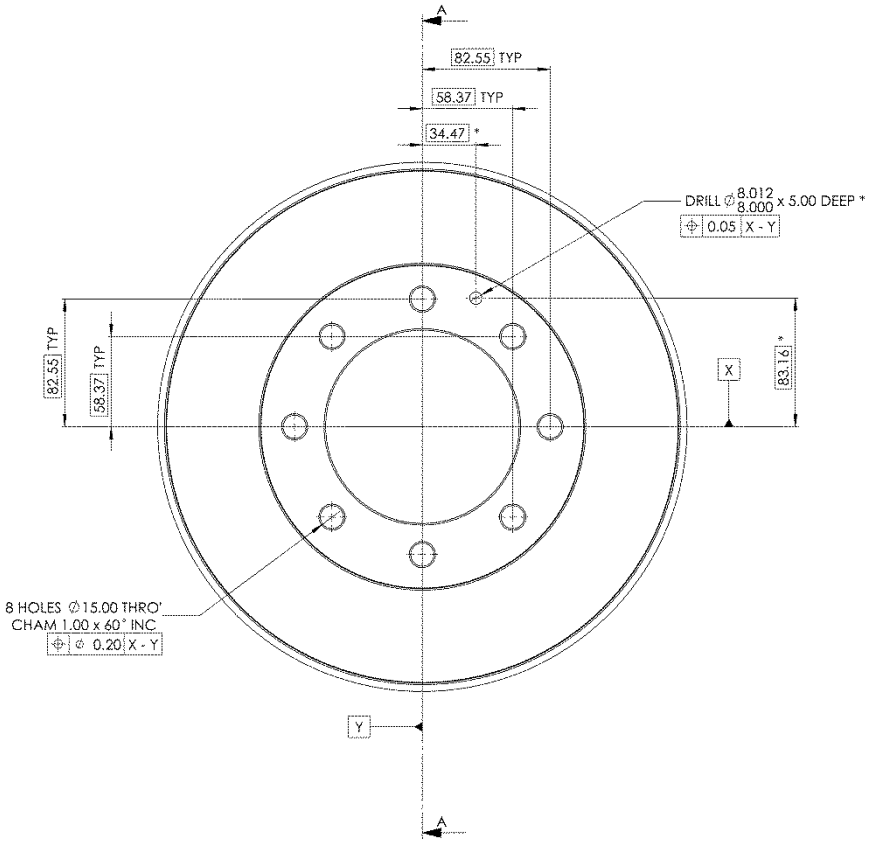
PR40118 Pin Socket Spanner for Diff Adjuster 512-2151 (B2)

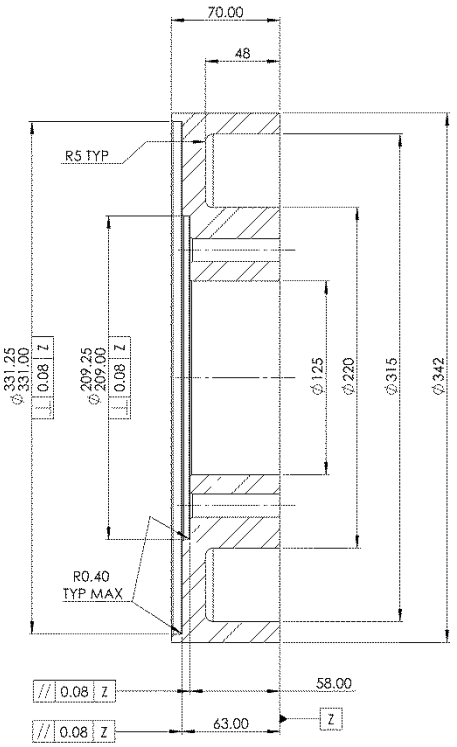
PR30178 Pin Socket Spanner for Diff Adjuster 512-2150 (B5)

PR40119 Socket Spanner for Wheel Hub Bearing Lock Nut 007-0260 - Alternative to PR40119 is **TMFS14** available from SKF stockists (M70 Stub Axle Locknut socket 19mm (3/4") drive)



PART No: **PR40005**





1	PRODUCTION RELEASE	SH	130516	
C	ADD ON 10MM TO BOTTOM FACE TO SUIT LONGER WHEEL BOLTS	SH	220416	
B	REDESIGNED AS PREVIOUS CAUSED FITMENT ISSUES. SPIGOT DIAMETERS ADDED FOR 512-0040 HUB DIM	DM	130514	
ISS	MODIFICATION DESCRIPTION	BY	DATE	MOD No

DIMENSIONS IN mm U.O.S., GENERAL M/C FINISH Ra 6.3, THREADS TO MEDIUM FIT (6H 0/6), WHOLE DIMENSIONS = ±1mm, DECIMAL DIMENSIONS = ±0.25, ANGULAR DIMENSIONS = ±0.50°
BREAK ALL SHARP EDGES 0.5 x 45°
PLEASE INFORM OF ANY ERRORS

DRAWN: M.CRANE | SIGNED

APPROVED: | SIGNED:

DO NOT SCALE. IF IN DOUBT ASK! | SHEET No: 1 of 1 | STATUS: PRODUCTION | SCALE: 1:2 | DATE: 28/03/2011

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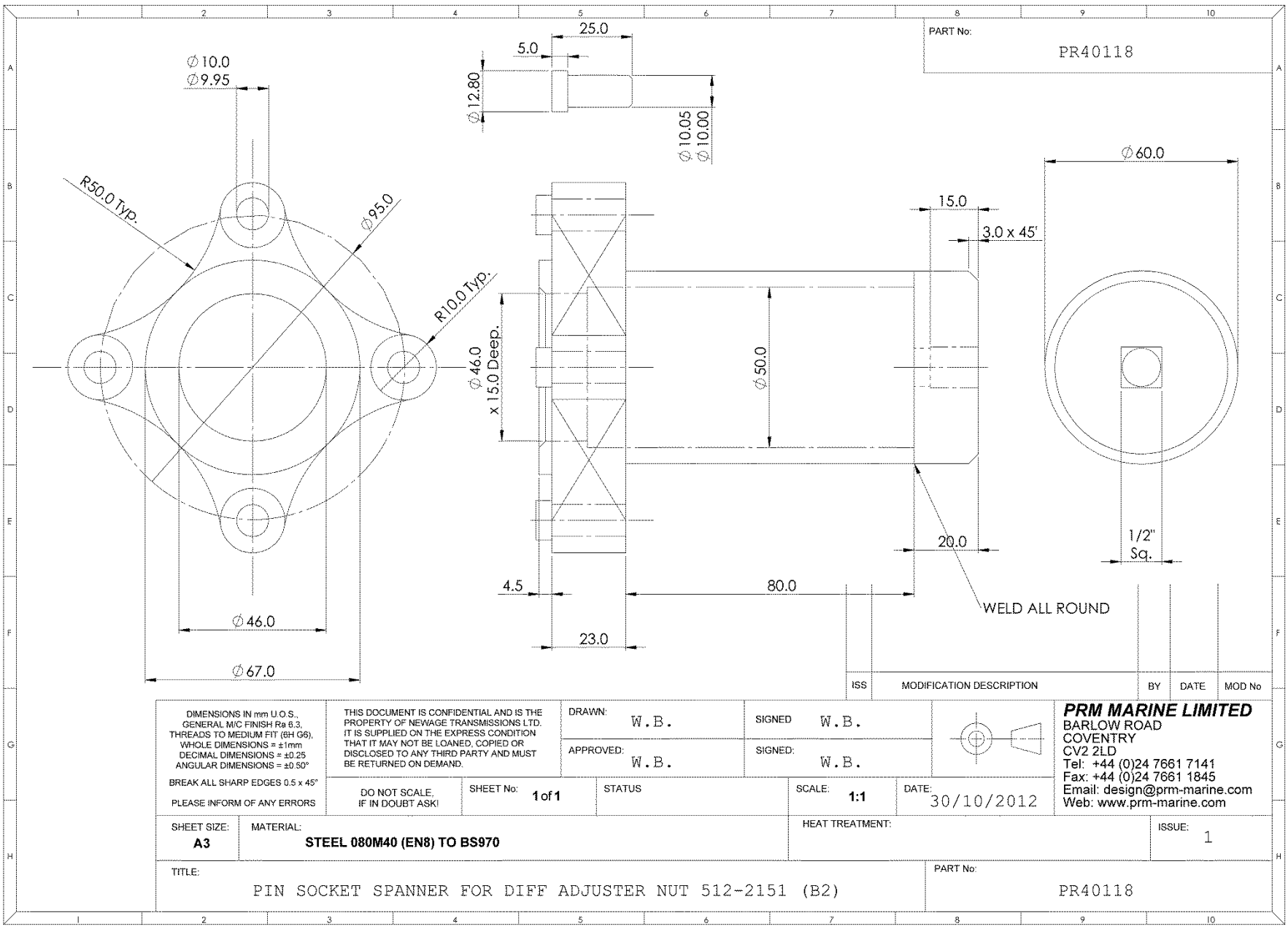
SHEET SIZE: A2 | MATERIAL: STEEL 070M20 OR EN3A TO BS970 | HEAT TREATMENT: | ISSUE: 1

TITLE: **STUD PRESS BASE PLATE FOR 512-0040 HUB** | PART No: **PR40005**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5.0
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Ø95.0
R10.0 Typ.
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3.0 x 45°
20.0
1/2" Sq.
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BY
DATE
MOD No
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SIGNED: W.B.
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STATUS
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PART No:
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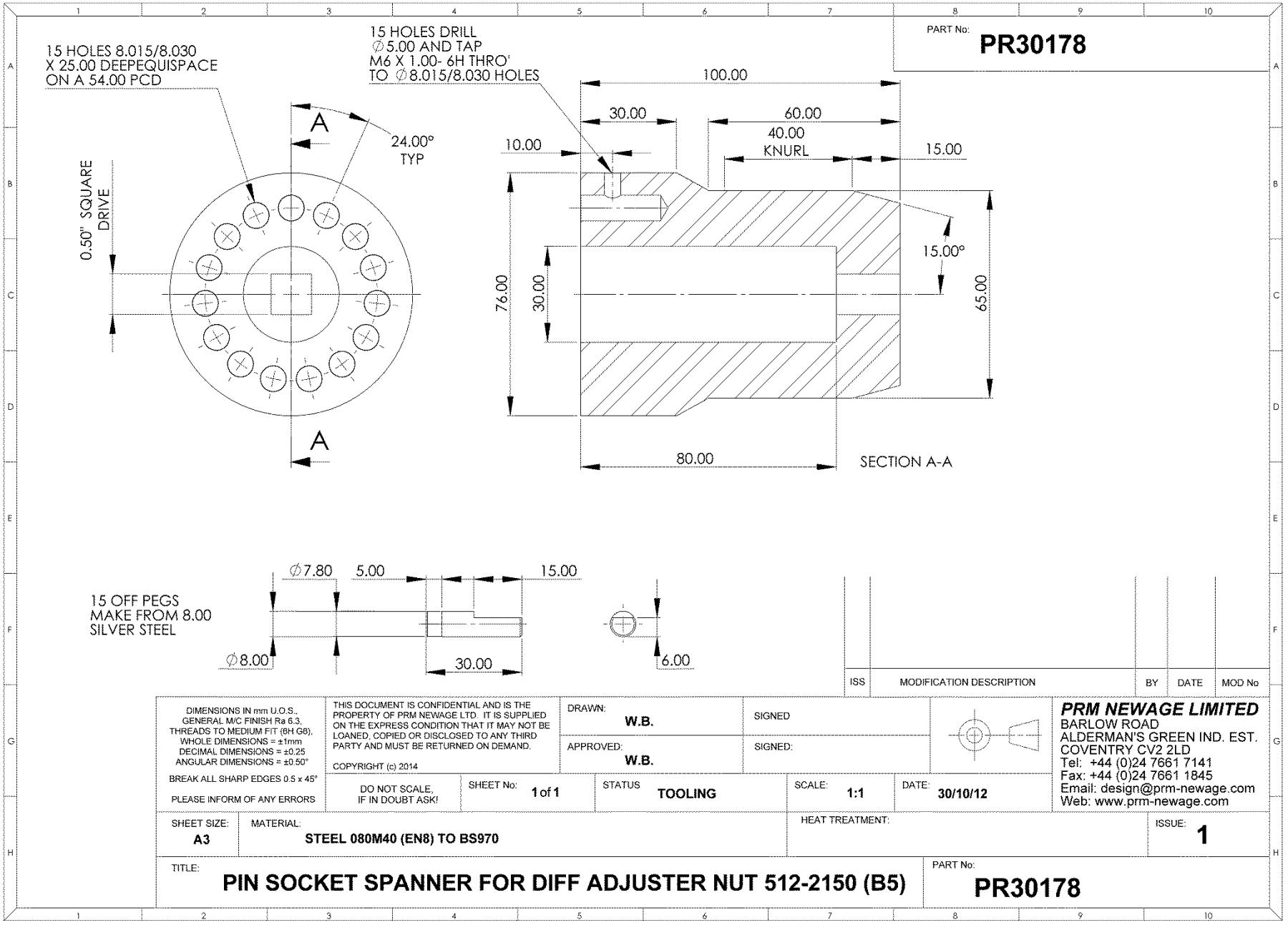
15 HOLES 8.015/8.030
X 25.00 DEEPEQUISPACE
ON A 54.00 PCD
15 HOLES DRILL
∅5.00 AND TAP
M6 X 1.00- 6H THRO'
TO ∅8.015/8.030 HOLES
PART No:
PR30178
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PART No:
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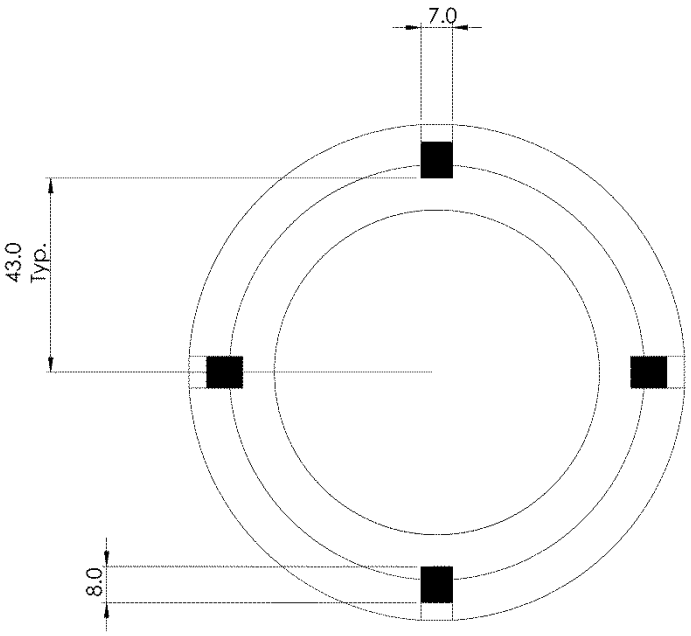
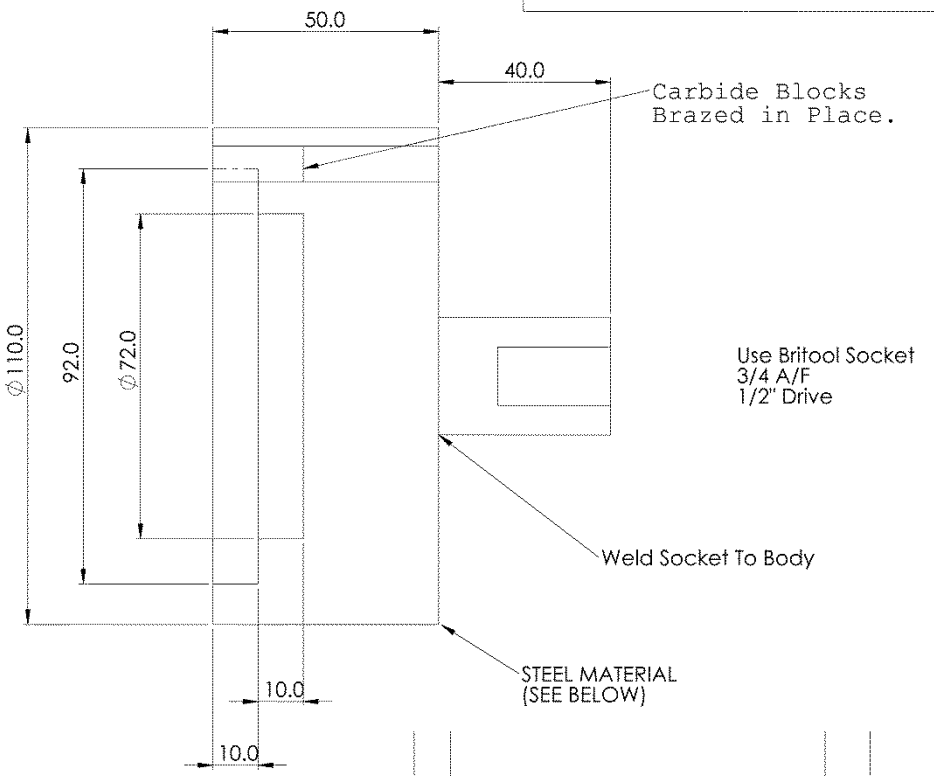
PART No: PR40119



4 Off Carbide Blocks
7.0 x 8.0 x 20.0 long.



ISS	MODIFICATION DESCRIPTION	BY	DATE	MOD No

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DATE: 30/10/2012

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SHEET SIZE: A3

MATERIAL: STEEL 080M40 (EN8) TO BS970

HEAT TREATMENT:

ISSUE: 1

TITLE: WHEEL HUB LOCKNUT SOCKET FOR USE ON 007-0260 (D1)

PART No: PR40119

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: All operations should be carried out by suitably qualified personnel and strictly in accordance with the procedures detailed in the workshop 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 solid spacer shim thickness to pre-load the Bearings correctly, see Procedures for more information.

Threaded Parts

Inspect for stripped or damaged threads.

PROCEDURES

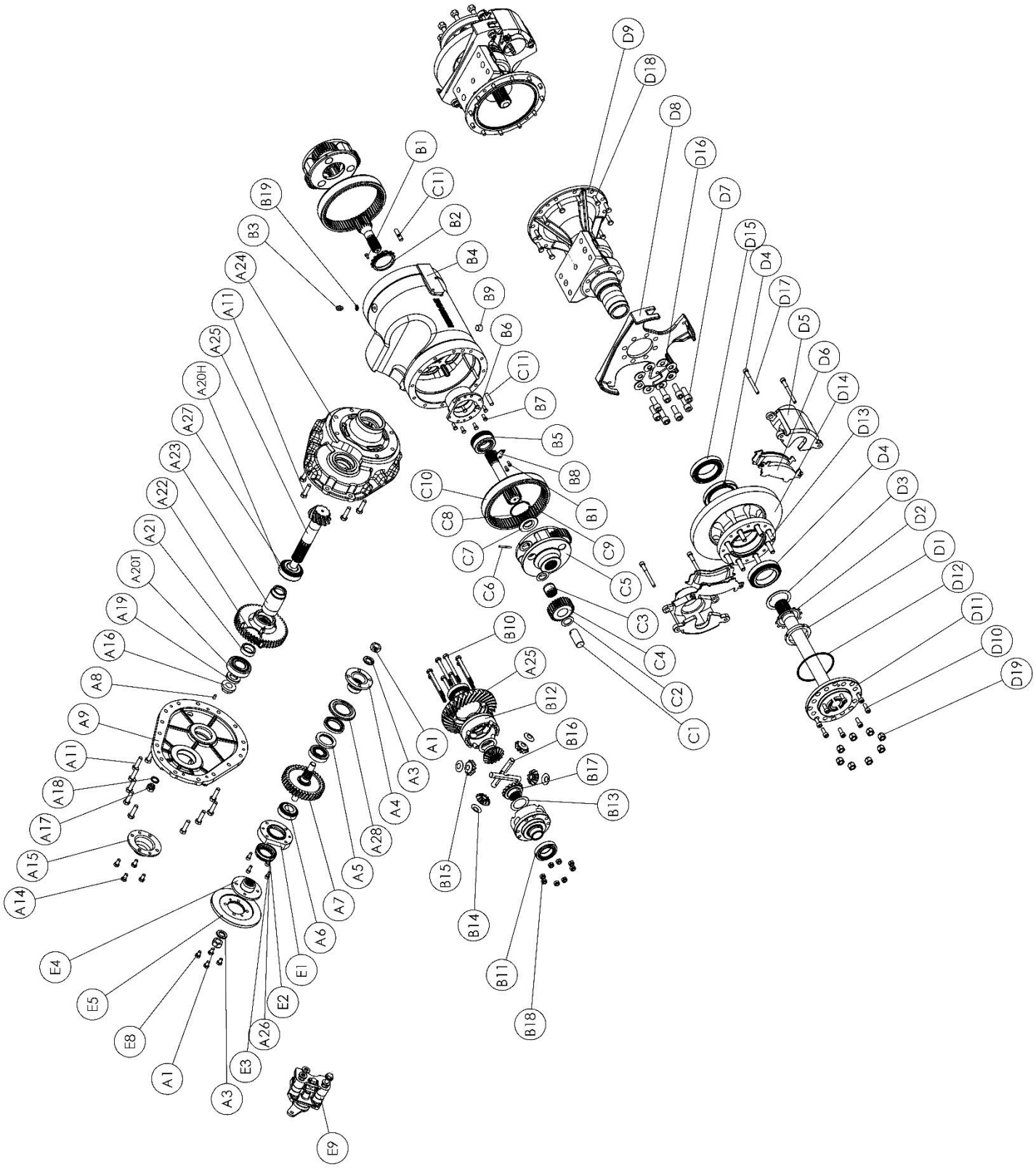
CAUTION: When re-assembling the Axle all threaded fasteners must be tightened to the specified torques to prevent premature failure. Refer to Fastner Tightening Torque on page 9.

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.

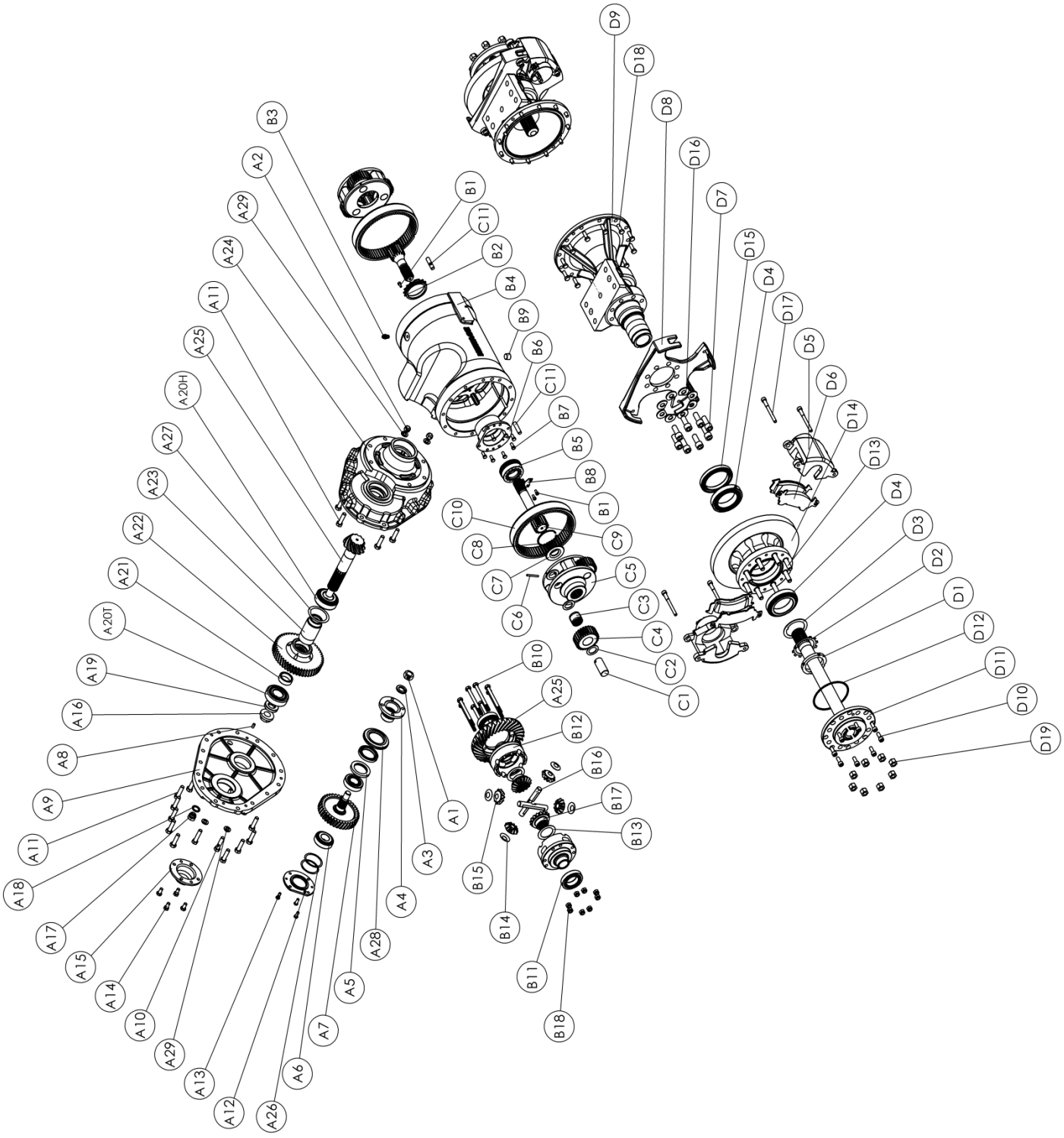
If the details outlined below are carefully followed no difficulty will be found in stripping and rebuilding the Axle. It is most important that all components are perfectly clean and in good condition before reassembly.

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 number of Shims 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.

512 Axle Assembly - Park Brake and Park Brake Ready Versions (Revision No. 512Bxxxxx2 and 512PBxxxxx2 and Upwards) Park Brake Version Shown below.



512 Axle Assembly – Earlier Service Brake Version Only (Revision No. 512Bxxxxx1 ONLY)

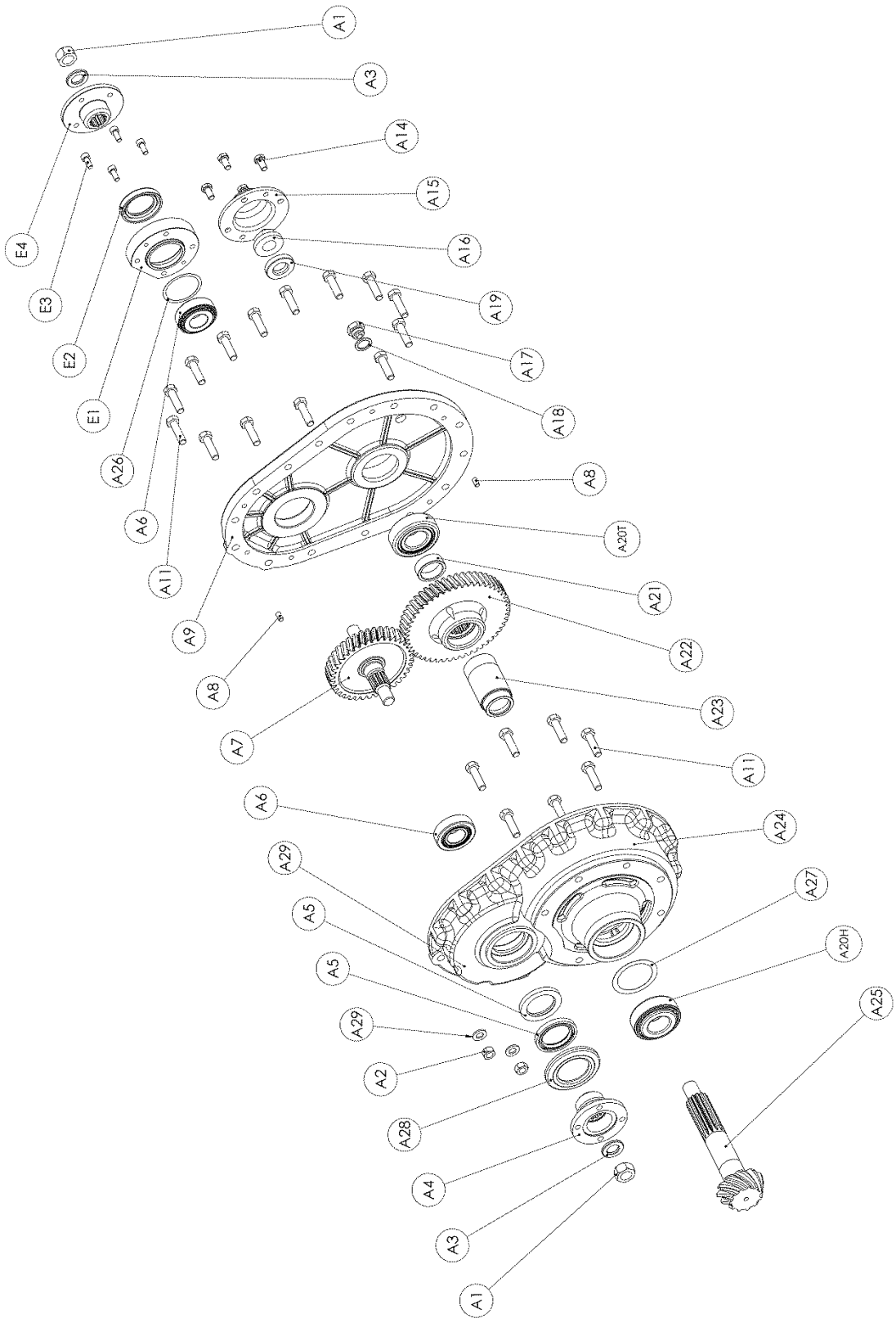


Section 'A' – Transfer Case Assembly

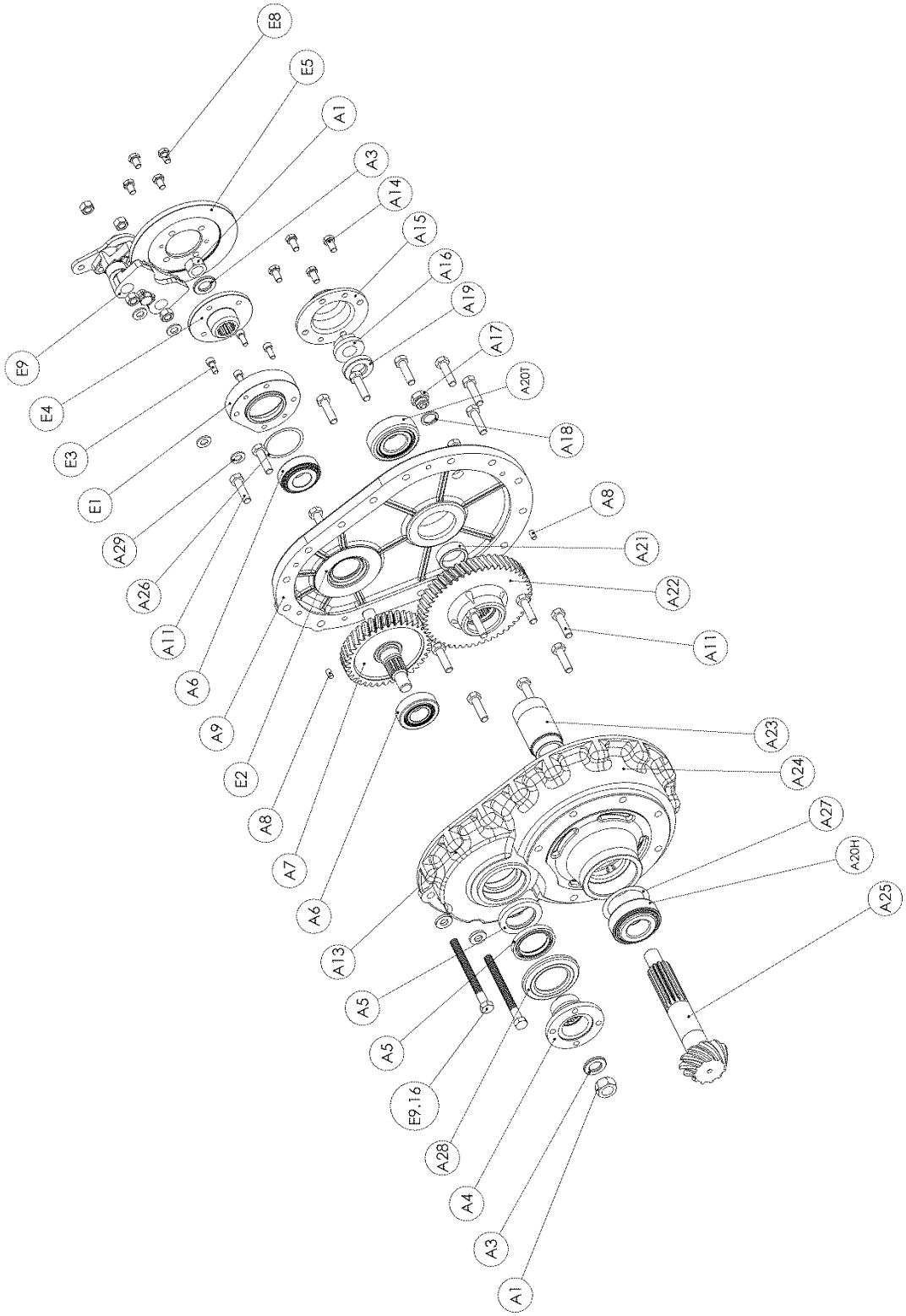
Item	Part No	Qty	Description
A1	007-0130	2#	M20 Nut *# 512Bxxxxx1 Qty 1 off Only*
A2	0051205	2	M12 Nut *512Bxxxxx1 Only*
A3	512-2191	2#	Coupling Washer *# 512Bxxxxx1 Qty 1 off Only*
A4	512-2180	1	HS1310 Input Coupling
A5	002-0030V	2	Oil Seal Viton
A6	055CO20UO43H	2	Taper Roller Bearing
A7	512-2331 512-2351 512-2352 512-2330 512-2350	1	1:1 Input Pinion *512B16xxx2 & 512PB16xxx2* 1.26:1 Input Pinion *512B20xxx2 & 512PB20xxx2* 0.91:1 Input Pinion *512B14xxx2 & 512PB14xxx2* 1:1 Input Pinion *512B16xxx1 & 512PB16xxx1* 1.26:1 Input Pinion *512B20xxx1 & 512PB20xxx1*
A8	0210815	2	Dowel
A9	512-2312	1	Transfer Case Rear
A10	0041219	2	M12 x 80mm Bolt *512Bxxxxx1 Only*
A11	0041212P	22	M12 x 45mm Bolt
A12	512-2371	1	End Cover *512Bxxxxx1 Only*
A13	0040807P	4	M8 x 20mm Bolt *512Bxxxxx1 Only*
A14	0041007P	4	M10 x 20mm Bolt
A15	512-2360	1	Lower End Cover
A16	512-2200	1	M24 Flange Nut
A17	CP1331	1	Level/Filler Plug
A18	0201714	1	Dowty Washer
A19	512-2190	1	Pinion washer
A20T A20H	055CU024T *(small int radius)* 055CU024H *(large int radius)*	1 1	Rear Pinion Taper Roller Bearing Front Pinion Taper Roller Bearing
A21	512-2891	1	Solid Spacer Shim
A22	512-2320 512-2340 512-2342	1	1:1 Input Wheel 512B16/PB16 1.26:1 Input Wheel 512B20/PB20 0.91:1 Input Wheel 512B14/PB14
A23	512-2890	1	Pinion Spacer • Drawing Issue 2 must be used with axles delivered pre June 2014 ***** • Drawing Issue 3 must be used with axles delivered post June 2014 *****
A24	512-2302	1	Transfer Case Front
A25	513-9820	1	Crown Wheel & Pinion • Drawing Issue 1 must be used with axles delivered pre June 2014 ***** • Drawing Issue 2 must be used with axles delivered post 2014 *****
A26	360-2350 360-2290 360-2210	As Required	Shim 0.25 mm (0.010") Shim 0.40mm (0.016") Shim 0.30 mm (0.012")
A27	057313A 057313B 057313C	As Required	Shim 0.05 mm (0.002") Shim 0.08mm (0.003") Shim 0.25 mm (0.010")
A28	250-0910	1	Oil Seal Cover
A29	0191010	4	M12 Washer

*** NOTE: DRAWING ISSUES ARE FOR INTERNAL USE ONLY. (SERIAL NUMBER IDENTIFIES THESE PARTS)**

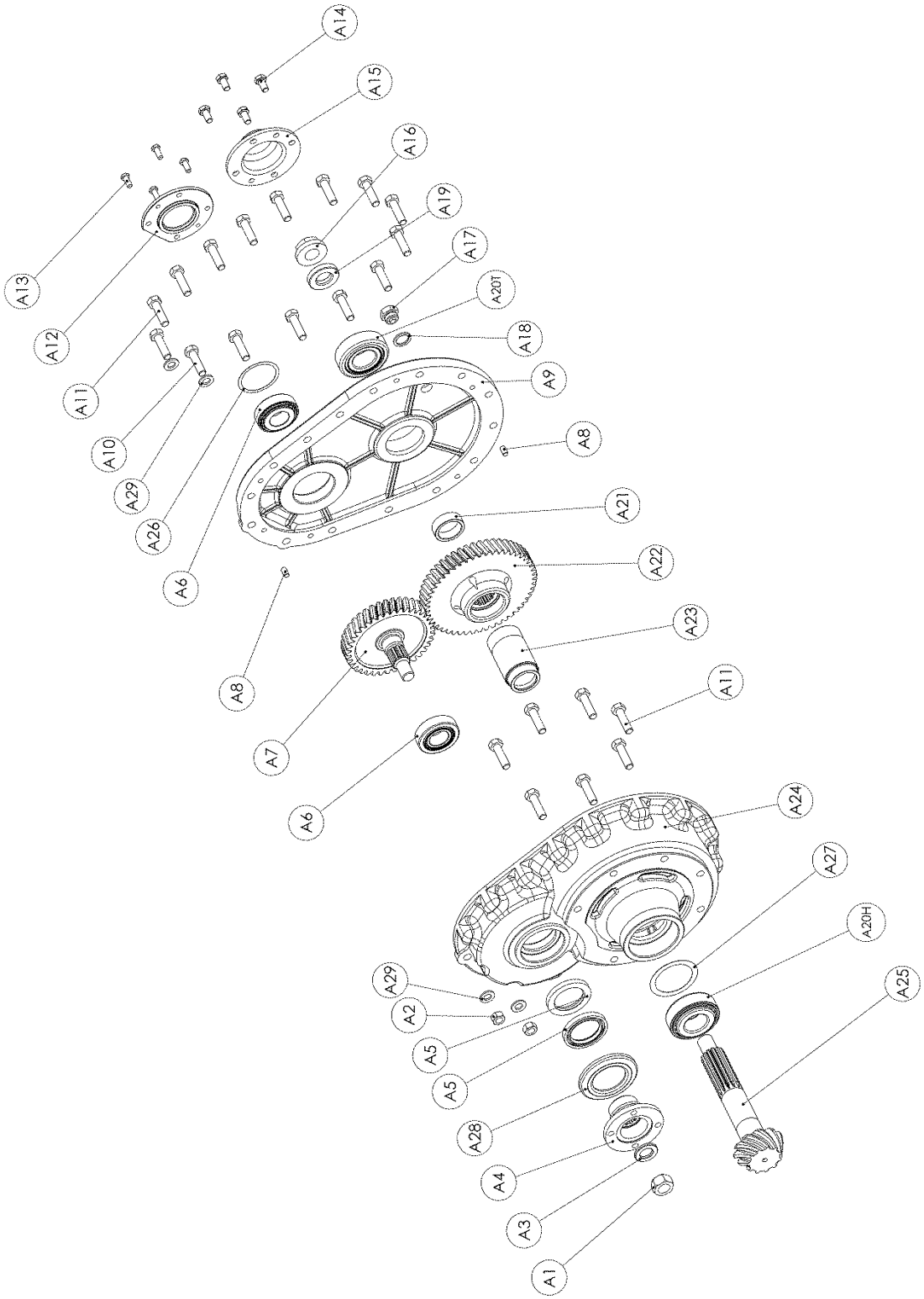
Transfer Case Assembly - Park Brake Ready Versions (Revision No. 512Bxxxxx2 and Upwards)



Transfer Case Assembly - Park Brake Versions (512PBxxxxx2 and Upwards)



Transfer Case Assembly – Early Brake Version (Revision No. 512PBxxxxx1 ONLY)



Removing and Servicing the Transfer Case Assembly

NOTE: This procedure details the Removal and Servicing of the 512B Transfer Case Assembly. For 512PB axles, the process stated in Section E (page 33) must first be completed prior to starting this procedure.

1. Remove the Drain Plug (B9) and drain the oil into a tray placed under the axle Main Case.

NOTE: Oil capacity approx. 10 litres. Once fully drained, refit plug.

For the following steps, it is advisable to have the Transfer Case mounted in a horizontal position to retain the internals within the Transfer Case.

2. Remove Nut (A1) and Washer (A3). Gently pull the Coupling (A4) off of the Input Gear spline (A7). Examine the 2 Oil Seals (A5) within the front Transfer Case (A24) bore for damage.
3. Remove Nut (E7) and Washer (E6). Gently pull the Coupling (E4) off of the Input Gear spline (A7). Examine the Oil Seal (A7) for damage.
4. Remove 4 Bolts (E3) and Seal Housing (E1) using the 2off M8 extraction holes.

NOTE: Keep the shims separate and note from where they came within the axle.

5. Remove 4 Bolts (A14) and remove the Lower End Cover (A15) using the 2off M8 extraction holes.
6. **512B Only -** Remove 2 Bolts (A10) and 2 Nuts (A2).
7. Remove 13 Bolts (A11), Flange Nut (A16) and Spacer (A19) from the end of the Pinion (A25).

NOTE: Bolts A10 are longer than A11 and so should be kept separate to avoid confusion during reassembly (512B only)

8. Remove the Transfer Case half (A9) using the 2off M10 extraction holes. This will force the Lower Rear Bearing (A20H) off of the Pinion by being retained in the Transfer Case. Check the Bearing for signs of damage.

⚠ **CAUTION: 055CU024T and 055CU024H ARE NOT interchangeable. Mixing these bearings could severally damage the axle. Ensure that these are marked and kept separate to avoid confusion.**

9. Remove the Input Pinion (A7) with it's respective Bearing cones. Remove the Solid Spacer Shim (A21), Input Wheel (A22) and Pinion Spacer (A23).
10. Loosen and remove the seven bolts which clamp the Transfer Case to the Main Case (A11).
11. The Transfer Case (A24), Pinion (A25) with Bearing (A20T) can then be retracted from the Maincase mounting along with the Shims.
12. If the Oil Seals (A5) were damaged, drift out from inside of the Transfer Case (A24) bore.

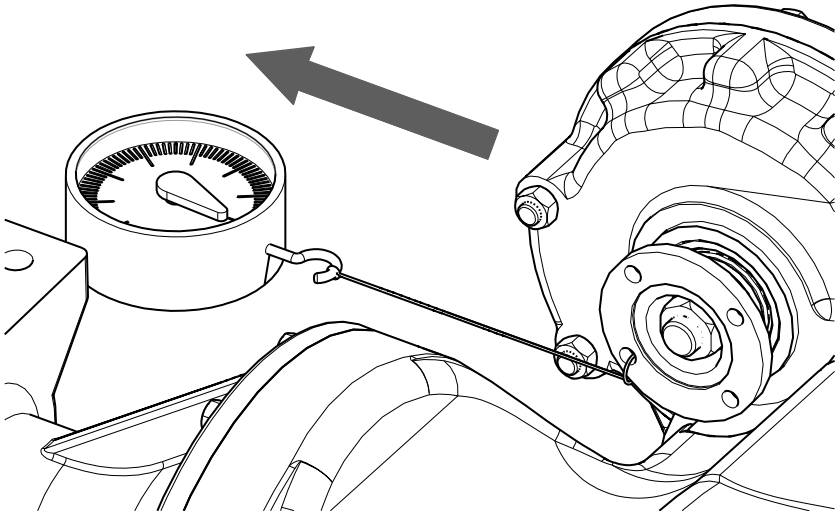
Reassembling the Transfer Case Assembly

NOTE: This procedure assumes that the same parts have been reused. If any of A20, A21, A22, A23 or A25 have been replaced, then the Shimming for the Spiral Bevel Mounting & Bearing pre-load must be recalculated. This is detailed on page 24.

To reassemble the Transfer Case Assembly, follow the stated procedure in reverse order

1. Use a new Pinion Nut (A1) & bead of Loctite 243 on the male thread and tighten to 340Nm (250lbft). This should give 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 (A4) 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). This should be checked prior to any shimming carried out on the upper shaft assembly.

2. To reset backlash:
    i. Refit Crown Wheel (A25) and Differential assembly (B10-B18) and screw new Differential Bearing Adjuster Nuts (B2 & B5) 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 0.22/0.30mm backlash at the flange specified for a HS1310 drive flange on page 9.
    iii. Tighten the Adjuster Nut (B5) opposite the Crown Wheel (A25) to 20 Nm (15lbft) and fit new lock plate (B8) via 2off Cap Bolts (B1) tightened to 21Nm (15lbft) & pein tab into hole in Adjuster Nut (B6). Check the opposing Bearing Adjuster Nut (B2) & tighten to 20Nm (15lbft). Lock in position using 1off Cap Screw (B1) tightened to 21Nm (15lbft).



Pinion Shimming Procedure

NOTE: The below procedures assume the Axle is stripped down following the above Service Procedures, and details the reassembly and shimming of the Input Pinion (A7), Input Wheel (A22) and Bevel Pinion (A25) Assemblies into the Main Case.

If the Crown Wheel and Pinion (A25) or Pinion Head Bearing (A13) are replaced, the following procedure needs to be carried out for correct contact of the Bevel Gear set:

1. Note the new Bevel Pinion (A25) Mounting Distance (etched as MD) on the bottom of the head. (Approximately 102.00mm)
2. Measure the new overall width of Pinion Head Bearing (A13). (Approximately 29.37mm)
3. Note the Case Constant, which is 132.27mm .
4. The required Shim thickness can then be calculated by using the following calculation:
   = Case Constant – (Mounting Distance + Bearing Width)
   = 132.27mm - (1. + 2.)

   e.g. For theoretical normal shims:
   = Case Constant – (Mounting Distance (MD) + Bearing Width)
   = 132.27mm – (102.00mm + 29.37mm
   = 0.90mm required

CAUTION: If the components are therefore replaced, a new Solid Spacer Shim (A23) must be used and the Crown Wheel/Pinion Bearing pre-load reset as detailed below:

Solid Spacer Shimming Procedure

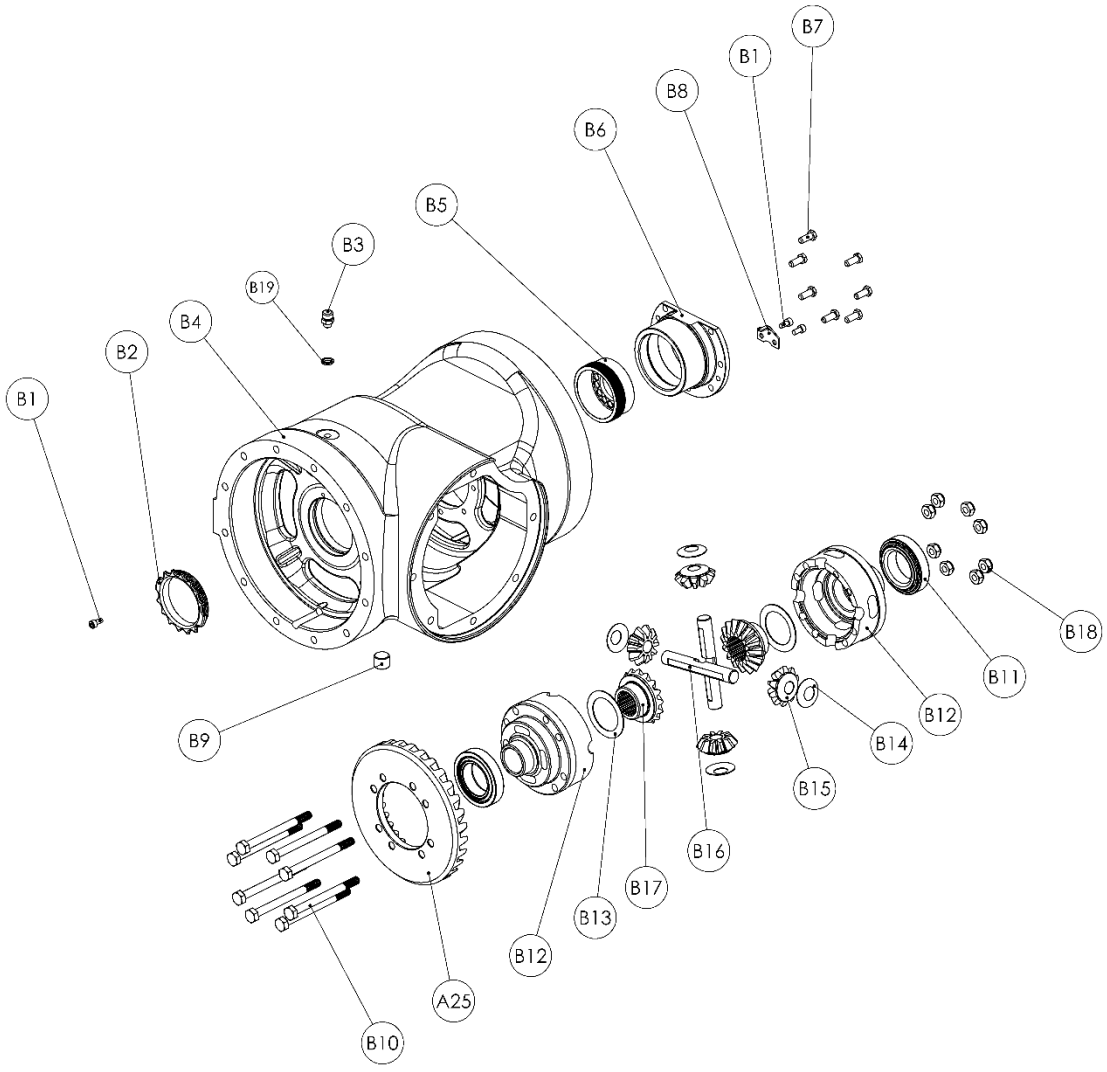
If the Crown Wheel and Pinion (A25), Pinion Head Bearing (A20H) or Input Wheel (A22) are replaced then the following procedure needs to be carried out:

1. The Transfer Case (A24) must not be built on the axle Maincase (B4)
2. With the Shims for the tooth contact for the Bevel Pinion (A25) set in place, fit the Pinion Spacer (A23), Input Wheel (A22) & Slave Solid Spacer Shim (A21) of pre-determined length of 17.10mm & Bearing (A20H) fitted into the Rear Transfer Case (A9).
3. Clamp both Transfer Case halves (A9 & A24) together using bolts (A11) M12 x 45 to a specified tightening torque of 96Nm (72lb.ft) without sealant & without the mating Input Pinion (A7).
4. Fit Pinion Washer (A19) and used Flange Nut (A16). Tighten to recommend tightening torque.
5. Magnetise a Dial Test Indicator (DTI) base to the Transfer Case & position the plunger to the end of the Spiral Bevel Pinion (A25).
6. Push & pull the Spiral Bevel Pinion (A25) to record the max movement of the Spiral Bevel Pinion between the bearings.
7. Remove this amount from the Slave Solid Spacer (A21) +0.05mm to obtain the required Bearing pre-load.
8. Strip & rebuild with the sealant & a new Flange Nut (A16) and the mating Input Pinion (A7).
9. The Input Pinion shimming is carried out by fitting excessive shims, for example 1.9mm thick.
10. For Earlier Axle Models 512Bxxxxx1: clamp End Cover (A12) with 4 off Bolts (A13) and uniformly tightened to 7 Nm, and for All Park Brake Ready/ Park Brake models (512Bxxxxx2 and upwards and 512PBxxxxx2 and upwards) clamp the Seal Housing (E1) with 4 off Bolts (E3) uniformly and tighten to 7 Nm.
11. Measure gap between Transfer Case face (A9) and End Cover (A12) or Seal Housing (E1) with Feeler Gauge.
12. Subtract this distance from the shims fitted and refit the current shim stack.
13. Turn the axle input round using the socket wrench to ensure free rotational movement of the drive flange with no excessive drag. If there are too many shims fitted it will result in an axle difficult to turn due to excessive drag. This will result in the bearings and axle running excessively hot causing premature failure. If there are too little shims fitted it will result in an axle that will have an easier rotational movement of the drive flange. This will result in bearing damage, internal misalignments of the gears causing excessive noise and vibration which would lead to premature failure.

CAUTION: If any components are replaced a new Spacer (A21) must be used and the Crown Wheel/Pinion marking and backlash reset.

Section ‘B’ – Main Case and Differential Assembly

Item	Part No	Qty	Description
B1	0081312P	3	M6 x 12mm Cap Bolt
B2	512-2151	1	Bearing Adjuster Nut
B3	CP1498S/A	1	Breather
B4	512-0010	1	Main Case
B5	512-2150	1	Bearing Adjuster Nut
B6	512-0730	1	Bearing Housing
B7	0040807P	7	M8 x 20mm Bolt
B8	616-2160	1	Bearing Adjuster Lock Plate
B9	0150250	1	½” BSP Drain Plug
B10	0041024HT	8	M10 x 120mm Bolt
B11	055C028U049H	2	Taper Roller Bearing
B12	615-9521	1	Differential Case
B13	400-2110	2	Diff Wheel Thrust Washer
B14	400-2120	4	Diff Pinion Thrust Washer
B15	410-2100	4	Diff Pinion
B16	413-2130	2	Diff Spider
B17	410-2090	2	Diff Wheel
B18	0051006HT	8	M10 Nut
B19	Part of CP1498S/A	1	Sealing Washer



Servicing the Main Case and Differential Assemblies

Removing the Differential

1. Remove the Axle Arm Assemblies – see Section D.
2. Remove the Axle Arm Planetary Assemblies and Sun Gear - see Section C.
3. Remove the Transfer Case assembly – see Section A.
4. Remove Bolts (B1), Bearing Adjuster Nut Lock Plate (B8) and 7off Bolts (B7).
5. Unscrew and remove Adjuster Nuts (B2 & B5) and Bearing Housing (B6) using extractor screw holes (M8 X 1.25). The Differential is now free and can be retracted.

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

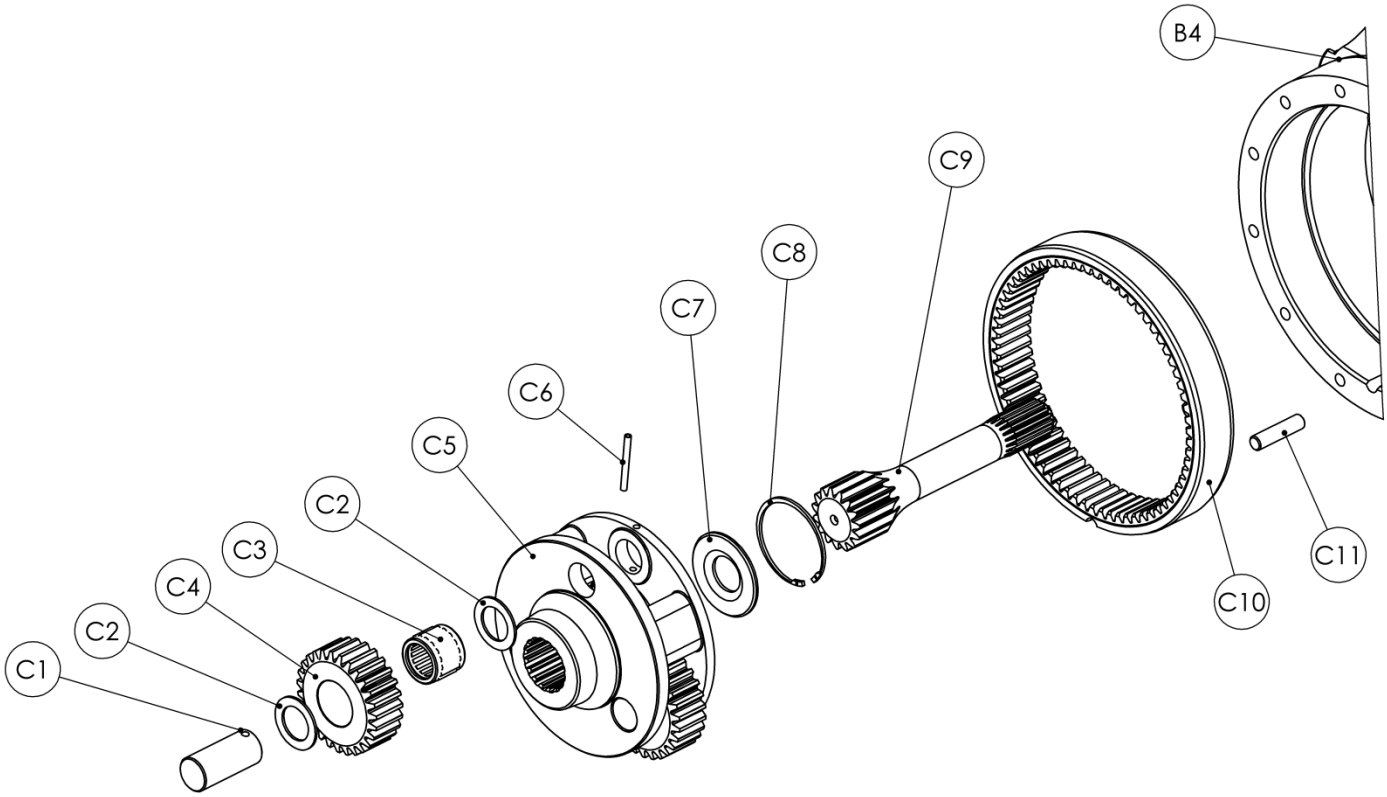
1. Remove Nuts (B18) and Bolts if necessary (B10). The Crown Wheel (A25) is now loose and the Differential assembly will split into 2 halves.
2. Remove the Differential Spider 2off (B16) with the respective Differential Wheels (B17), Pinions (B15), Wheel Washers (B13) & Pinion Washers (B14).
3. Inspect all Differential Wheels (B17), Pinions (B15), Spiders (B16), Bearings (B11), Wheel Washers (B12) and Pinion Washers (B14) for damage and wear, replace if necessary.
4. To assemble, reverse the above procedure.
5. If new Differential Bearings (B11) are fitted, it will be necessary to reset the Bearing pre-load and Crown Wheel/Pinion backlash.

NOTE: To reset the backlash, see page 23 for the procedure. The acceptable range can be found on page 9.

Section ‘C’ – Planet Carrier Assembly

Item	Part No	Qty	Description
C1	400-0250	3	Planet Pin
C2	400-0270	6	Thrust Washer
C3	0562005	3	Needle Roller Bearing
C4	400-0080	3	Planet Gear
C5	512-0060	1	Planet Carrier
C6	010-0030	3	Spring Pin
C7	400-1320	1	Spacer
C8	003-0120	1	Circlip
C9	512-0091 512-0093	1	Short Arm Sun Gear Long Arm Sun Gear
C10	512-0070	1	Annulus
C11	0211250	1	Dowel

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 can now be removed from the Centre Casing. Take care not to withdraw the floating Sun Gear (C9).
2. 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 on 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.

Dowels are replaced together.

3. 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 with a soft faced mallet the Planet Pin (C6) 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.

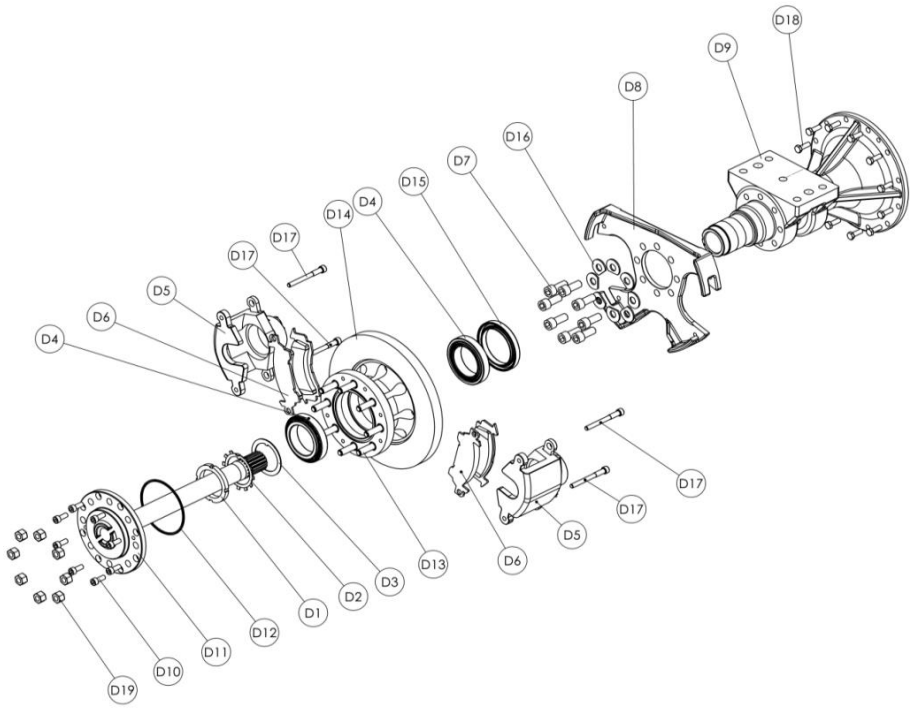
Removing the Annulus Gear

1. To remove Annulus (C10), use a special purpose extractor tool or pinch bars, located behind the Annulus (C10) diametrically opposed, in a scissor fashion to prise (lever apart) the Annulus clear of the Maincase bore (B4).
2. To refit, reverse procedure ensuring that the Dowel (C11) is aligned with the slot at the bottom of the Annulus (C10).

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

Item	Part No	Qty	Description
D1	007-0260	1	M70 Lock Nut
D2	009-0230	1	Locking Washer
D3	435-1440	1	Thrust Washer
D4	0540751H	2	Taper Roller Bearing
D5	512-2500	2	Brake Calliper (includes D6 & D17)
D6	512-2510	4	Brake Pad
	order 512-2510-KIT (8 Brake Pads) and replace all pads on the axle at the same time.		
D7	0081740P	8	M16 x 40mm Cap Bolt
D8	512-2400	1	Calliper Carrier
D9	512-0020 512-0021 512-0024 512-0025 513-0020 (Batch W15455 Onwards) 513-0021 (Batch W15455 Onwards) 513-0024 (Batch W15455 Onwards) 513-0025 (Batch W15455 Onwards)	1	Long Axle Arm (Narrow Pad) Short Axle Arm (Narrow Pad) Long Axle Arm (Common Pad) Short Axle Arm (Common Pad) Long Axle Arm (Narrow Pad) Short Axle Arm (Narrow Pad) Long Axle Arm (Common Pad) Short Axle Arm (Common Pad)
D10	0081525P	8	M10 x 25mm Cap Bolt
D11	512-0102 512-0103	1	Short Axle Shaft Long Axle Shaft
D12	0431303V	1	VITON "O" Ring
D13	512-0452	8	9/16 UNF x 18 Wheel Stud
D14	512-0040 515-0040 (ALL AXLES SERIAL No. V018402 BUILD No. W15455 ONWARDS)	1	Wheel Hub / Brake Disc
D15	417-2850 613-2850 (ALL AXLES SERIAL No. V018402 BUILD No. W15455 ONWARDS)	1	Hub Seal
D16	512-2192	8	Calliper Carrier Washer
D17	SEE D5	4	Calliper Mounting Bolt
D18	0041210HTP	12	M12 x 35mm Bolt
D19	007-0400	8	9/16 UNF x 18 Wheel Nut

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



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 8off Bolts (D10) that secures the Axle Shaft (D11) to the Wheel Hub/Brake Disc. Withdraw the Axle Shaft (D11) using the extractor screws, and inspect the Spline form for damage and wear.
2. Straighten locking tab ears on Lockwasher (D2), unscrew & remove the Lock Nut (D1) using tool PR40119. 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).
3. 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.

4. Examine all Bearing Cups & Cones for wear or damage, replace as necessary.

NOTE: We recommend the Hub Oil Seals are always changed when the Hub has been removed.

5. The Bearing Cup (D4) can be drifted out of the Hub (D14) if they need replacing. When fitting new Bearing cups (D4) ensure that they are aligned squarely to the bores before pressing in.

NOTE: If the Rear Bearing (D4) is replaced Oil Seal (D15) will also need replacing.

6. To reassemble the Hub assembly, reverse the above procedure using a new Lockwasher (D2).
7. To adjust the Hub Bearings:

i. Tighten the Lock Nut (D1) using tool PR40119 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 Calliper needs to be removed to service the Pads.

1. Remove Calliper Mounting Bolts (D17) and pull the Calliper assembly away from the Calliper Carrier (D8).
2. Remove the Brake Pads (D6) by depressing the clips within the Calliper body.
3. Inspect for Pad wear and replace where necessary. Recommended minimum Pad Thickness 3.18mm (0.125 in)
4. Inspect for Wheel Hub/ Brake Disc (D14) for wear and replace where necessary. Recommended minimum Disc Thickness 20mm (0.787 in)

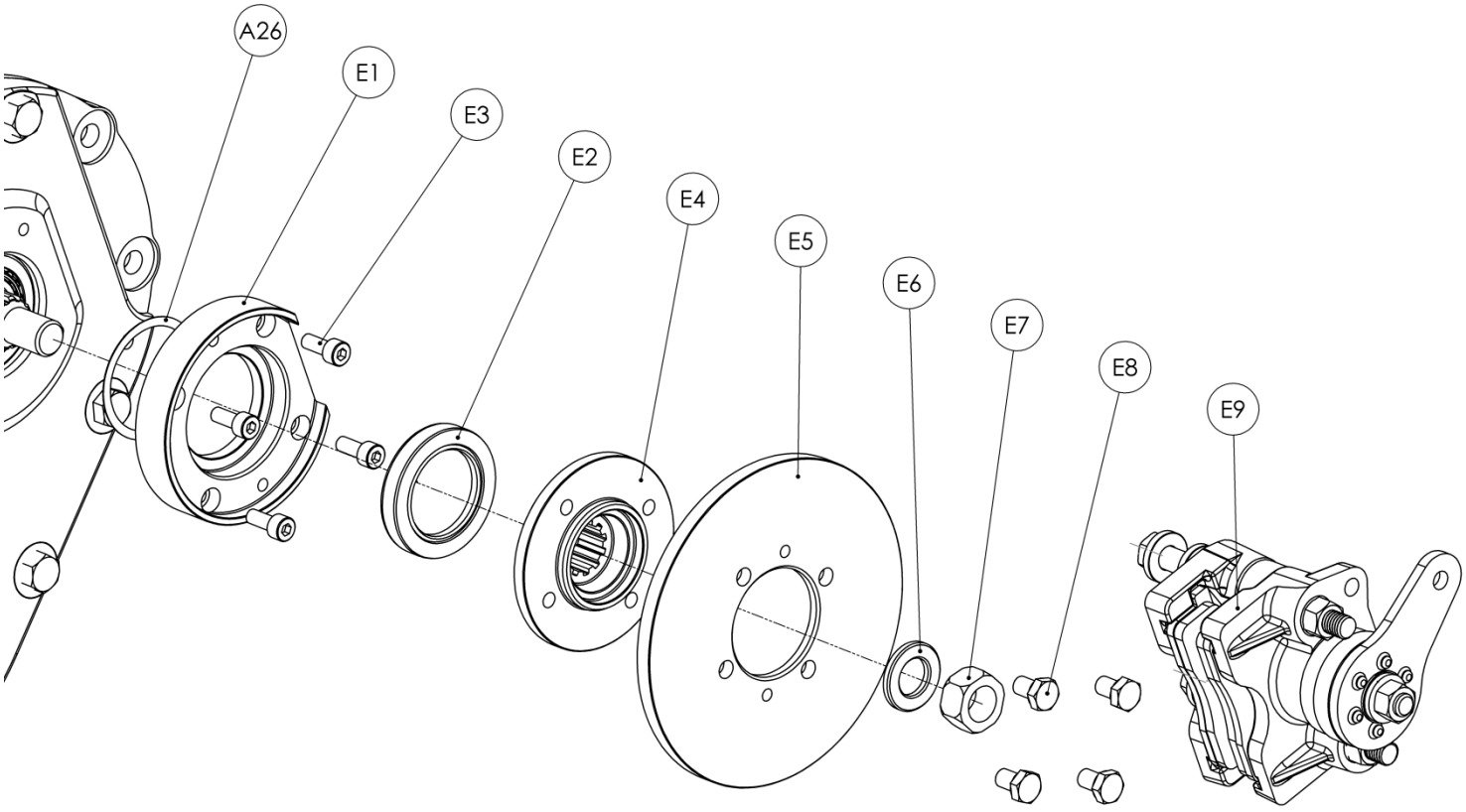
NOTE: 512-2510-KIT consists of 2 Brake Pads, and we recommend replacing all the Brake Pads (D6) at the same time.

Section ‘E’ – Park Brake Assembly

NOTE: This only applies to 512PB specification axles from Revision 2 upwards (512Bxxxxx2 / 512PBxxxxx2).

Item	Part No	Qty	Description	Park Brake
E1	512-2372	1	Seal Housing	
E2	0400483V	1	Oil Seal Viton	
E3	0081420P	4	M8 x 20mm Cap Screw	
E4	512-2181	1	Park Brake Flange	
E5 *	512-0750	1	Park Brake Disc	PB ONLY
E6	512-2191	1	Flange Washer	
E7	007-0130	1	M20 Nut	
E8 *	0041006	4	M10 x 16mm Screw	PB ONLY
E9 *	512-2520	1	Park Brake Calliper	PB ONLY
A26	360-2350 360-2290 360-2210	As Required	Shim 0.25 mm (0.010”) Shim 0.40mm (0.016”) Shim 0.30 mm (0.012”)	

*** NOTE: 512Bxxxxx2 and upwards - PARK BRAKE READY AXLES DO NOT REQUIRE PARTS E5, E8 AND E9**



Servicing the Park Brake Assembly

1. Remove the Nuts and Washers from the Park Brake Calliper Bolts (E9) from the Input Flange (A4) side of the Axle.
2. Slide the Bolt assembly through the Transfer Case (A9 & A24) and Calliper (E9) holes towards the back of the Axle. The Calliper (E9) is now free to be removed radially away from the Park Brake Disc (E5).

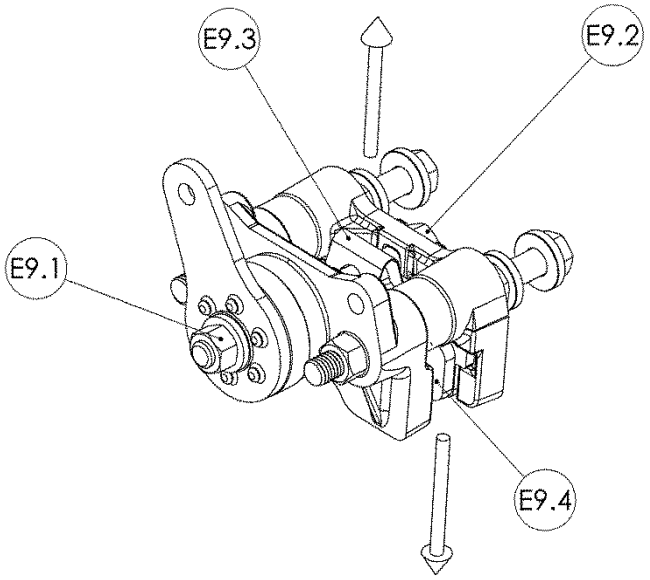
NOTE: These bolts are used to clamp the Transfer Case halves (A9 & A24) together and so removing these Bolts could potential cause minor oil seepage from the joint.

To replace the Park Brake Disc (E5), remove the Bolts (E8) and slide the Park Brake Disc (E5) off the Park Brake Flange (E4) spigot. This may need a gentle tap with a soft mallet.

3. To gain access to the Oil Seal (E2), remove the Nut (E7), Flange Washer (E6) and Park Brake Flange (E4). Inspect the Oil Seal (E2) for any damage that could affect it's performance.
4. To remove the Seal Housing (E1), remove the Cap Bolts (E3) and use the M8 extraction holes to break the sealed joint.
5. If the Oil Seal (E2) looks damaged, this can be pressed or drifted out of the Oil Seal Housing (E1).
6. To reassemble, follow procedure in reverse.

CAUTION: Great care must be taken when realigning the Calliper with the Park Brake Disc. The Calliper is self-positioning and so should have sufficient movement to slide along the Bolts.

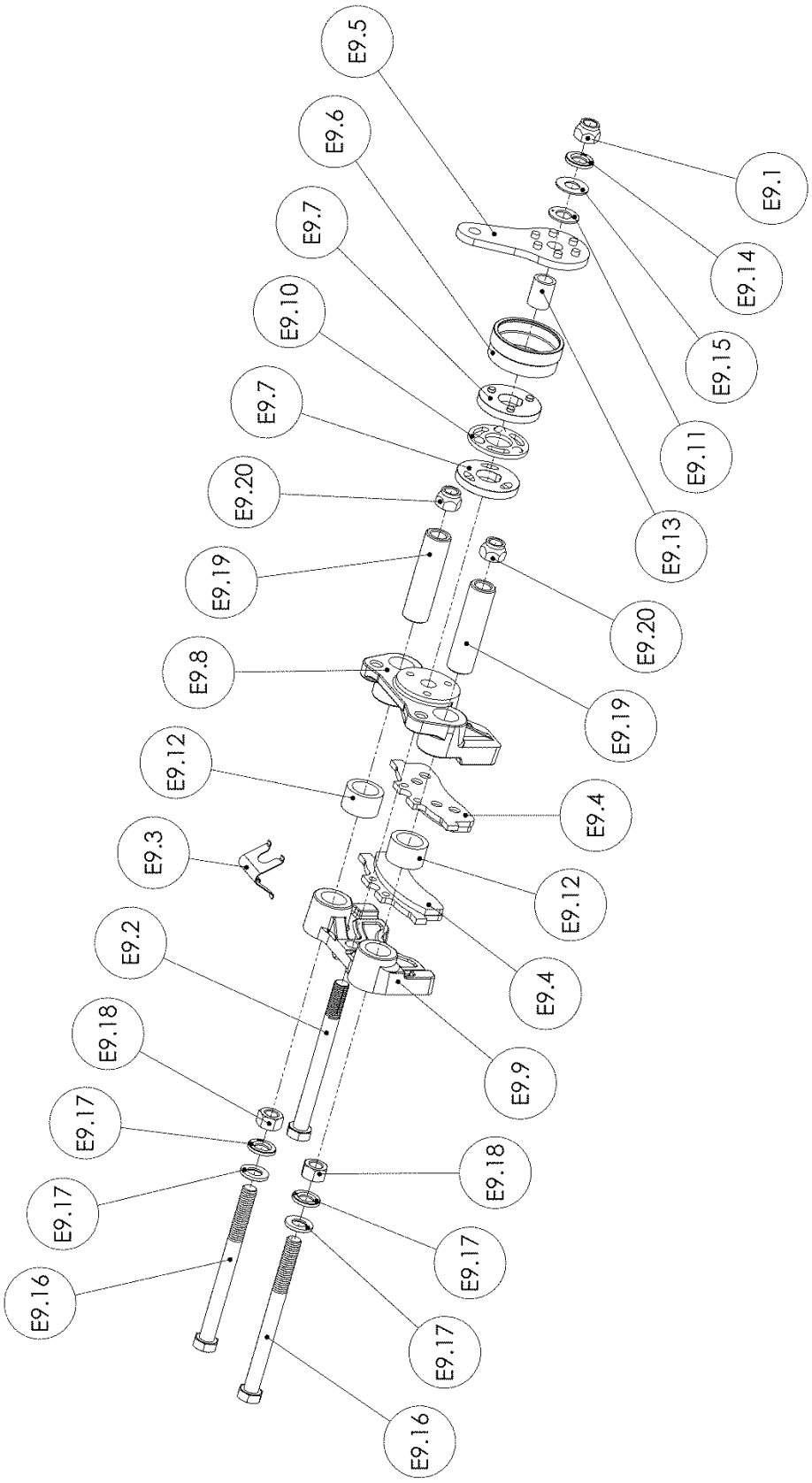
Replacing the Park Brake Calliper Pads



1. Remove the Nut (E9.1) and slide the Bolt (E9.2) out through the Calliper body.
2. Remove the Spring (E9.3) once the Bolt (E9.2) has pass all the through the body.
3. The Pads (E9.4) will slide out of the Calliper body.
4. Replace the Pads if they have worn down to 2.3mm (0.090 in). Recommended minimum Thickness.
5. Insert the new Pads and reposition the Spring (E9.3) so that it is reacting on the inside face of both Pads.
6. Reinsert the Bolt (E9.2) and tighten the Nut (E9.1).

Section ‘F’ – Park Brake Overhaul

The Park Brake assembly is a ball and ramp, sliding Calliper brake designed for use as a Park Brake. The Park brake has an open Calliper design to facilitate changing the linings, along with a retraction spring to reduce parasitic drag. It is sealed from the environment to provide a long and trouble free service life.



PARK BRAKE ASSEMBLY – PART No. 512-2520		
Item	Description	Qty
E9.1	NUT ½" X 20 UNF NYLOC	1
E9.2	BOLT ½" X 20 UNF X 5.5" LONG	1
E9.3	SPRING FLAT	1
E9.4 *	LINING AND CARRIER ASSEMBLY – Part No. 613-2530	2
E9.5	LEVER	1
E9.6	BOOT	1
E9.7	CAM	2
E9.8	TORQUE PLATE FRONT	1
E9.9	TORQUE PLATE REAR	1
E9.10	BALL/ RETAINER SUB ASSEMBLY	1
E9.11	GARLOCK THRUST BEARING	1
E9.12	SEAL SLEEVE	2
E9.13	ID SEAL	1
E9.14	WASHER HARDENED	1
E9.15	WASHER	1
E9.16	BOLT ½" X 13 UNC X 5.75" LONG	2
E9.17	WASHER	4
E9.18	NUT ½" X 13 UNC	2
E9.19	SPACER SLEEVE	2
E9.20	NUT ½" X 13 UNC NYLOC	2

NOTE: THE PARTS ABOVE ARE NOT AVAILIABLE INDIVIDUALLY AND ARE SHOWN FOR ILLUSTRATION PURPOSES ONLY EXCEPT FOR THE * E9.4 REPLACEMENT BRAKE LINING AND CARRIER ASSEMBLY SUPPLIED AS 613-2530-KIT.

Mounting Procedure

1. Feed the Bolts (E9.16) together with a Washer (E9.17) through the Transfer Cases (A9 & A24).
2. Once just through the Case feed another Washer (E9.17), Nut (E9.18) and the Assembled Calliper (E9) pre-aligned with the Park Brake Disc (E5) and continue to tighten the Nut (E9.18) to clamp the Tranfer Cases together.
3. Thread onto the Bolt (E9.16) the Locking Nuts (E9.20) until a 0.040" to 0.080" (1.00 mm to 2.00 mm) gap exists between the Sleeves (E9.19) and the Locking Nuts (E9.20).

Adjustment Procedure

1. Tighten Nut (E9.1) until firm contact is made between the Disc and the Linings. Torque to 35 N.m (25 lbf.ft), making sure the Lever (E9.5) is in the correct operating position for application.
2. Back off Nut (E9.1) 1 to 1.5 turns and check that the Disc is free to rotate.

Lining Replacement

1. Replace both linings when either has worn to 2.3mm (0.090") remaining thickness.
2. Loosen the Nut (E9.1) enough to slide each of the Torque Plates (E9.8 & E9.9) away from the Disc and far enough to provide clearance to remove the old Carrier/ Lining assemblies (E9.4) and install new ones.
3. Collapse the Lining Reaction Spring (E9.3) and remove from the brake head assembly.

4. Slide the Torque Plates (E9.8 & E9.9) away from the Disc and move the Carrier/ Lining assemblies (E9.4) out of the pockets and remove from the Brake Head Assembly from the side.

   NOTE: PRIOR TO THE INSTALLATION OF THE NEW LININGS IT IS RECOMMENDED THAT "ALFA 2000" GREASE (ANTI-SEIZE & LUBRICATING COMPOUND) MANUFACTURED BY CHEMTOOL BE APPLIED TO THE INTERFACE OF THE SLEEVE (E9.19) AND THE TORQUE PLATES (E9.8 & E9.9). AFTER GREASE HAS BEEN APPLIED SLIDE THE TORQUE PLATES BACK AND FORTH ON THE SLEEVE AS FAR AS POSSIBLE TO ENSURE THAT GREASE HAS BEEN INTRODUCED INTO THE BORES OF THE TORQUE PLATES

5. Install new Carrier/ Lining assemblies (E9.4) in each of the Torque Plates (E9.8 & E9.9)

6. Install Lining Reaction Spring (E9.3) into the Brake Head Assembly, making sure that the feet on the springs locate securely into the holes in both Carrier/ Lining assemblies (E9.4)

7. Adjust Brake as per the ADJUSTMENT PROCEDURE.

SPARES KITS – FOR ALL AXLE MODELS (REVISION NO. 512BXXXXX1, 512BXXXXX2 AND UPWARDS AND 512PBXXXXX2 AND UPWARDS)

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:

512-9630-KIT Differential Kit (1 kit per axle)			
Item	**Part No**	**Qty**	**Description**
B8	616-2160	1	Lock Plate
B10	0041024HT	8	M10 x 120mm Bolt
B11	055C028U049H	2	Taper Roller Bearing
B12	615-9521	1	Differential Case
B13	400-2110	2	Diff Wheel Thrust Washer
B14	400-2120	4	Diff Pinion Thrust Washer
B15	410-2100	4	Diff Pinion
B16	413-2130	2	Diff Spider
B17	410-2090	2	Diff Wheel
B18	0051006HT	8	M10 Nut

512-9820-KIT Differential Kit inc. Crown Wheel & Pinion (1 kit per axle)			
Item	**Part No**	**Qty**	**Description**
B8	616-2160	1	Lock Plate
B10	0041024HT	8	M10 x 120mm Bolt
B11	055C028U049H	2	Taper Roller Bearing
B12	615-9521	1	Differential Case
B13	400-2110	2	Diff Wheel Thrust Washer
B14	400-2120	4	Diff Pinion Thrust Washer
B15	410-2100	4	Diff Pinion
B16	413-2130	2	Diff Spider
B17	410-2090	2	Diff Wheel
B18	0051006HT	8	M10 Nut
A25	513-9820	1	Crown Wheel & Pinion
	512-2891-KIT	1	Transfer Case Shim Kit

512-9580-KIT Long Arm Planet Kit (1 kit per axle)			
Item	**Part No**	**Qty**	**Description**
C1	400-0250	3	Planet Pin
C2	400-0270	6	Thrust Washer
C3	0562005	3	Needle Roller Bearing
C4	400-0080	3	Planet Gear
C5	512-0060	1	Planet Carrier
C6	010-0030	3	Spring Pin
C7	400-1320	1	Spacer
C8	003-0120	1	Circlip
C9	512-0093	1	Sun Gear (Long Arm)
C10	512-0070	1	Annulus

512-9581-KIT Short Arm Planet Kit (1 kit per axle)			
Item	**Part No**	**Qty**	**Description**
C1	400-0250	3	Planet Pin
C2	400-0270	6	Thrust Washer
C3	0562005	3	Needle Roller Bearing
C4	400-0080	3	Planet Gear
C5	512-0060	1	Planet Carrier
C6	010-0030	3	Spring Pin
C7	400-1320	1	Spacer
C8	003-0120	1	Circlip
C9	512-0091	1	Sun Gear (Short Arm)
C10	512-0070	1	Annulus

512-2500 Service Brake Assembly			
Item	**Part No**	**Qty**	**Description**
D5	512-2500	4	Brake Calliper

512-2510-KIT Service Brake Pad Kit (2 kits per axle)			
Item	**Part No**	**Qty**	**Description**
D6	512-2510	4	Service Brake Pads

512-2891-KIT Transfer case Shim Kit(1 kit per axle)			
Item	**Part No**	**Qty**	**Description**
	057313A	2	.002” Shim
	057313B	2	.005” Shim
	057313C	4	.010” Shim
	360-2350	2	0.25mm Shim
	360-2210	2	0.30mm Shim
	360-2290	2	0.40mm Shim
A21	512-2891/Q1	1	Solid Spacer Shim
	NOTE: 512-2891/Q1 must be machined to length to achieve 17/22 lbin Bearing Preload		

512-0102-KIT SHORT AXLE SHAFT (1 kit per axle)		
Part No	**Qty**	**Description**
512-0102	1	Short Axle Shaft
0081525P	8	Screw M10 x 25mm Cap Screw
0431303V	1	Viton “O” Ring
0041210HTP	12	M12 X 35mm BOLT

512-0103-KIT LONG AXLE SHAFT (1 kit per axle)		
Part No	**Qty**	**Description**
512-0103	1	Long Axle Shaft
0081525P	8	Screw M10 x 25mm Cap Screw
0431303V	1	Viton “O” Ring
0041210HTP	12	M12 X 35mm BOLT

SPARES KITS – SPECIFICALLY FOR PARK BRAKE AND PARK BRAKE READY VERSIONS (REVISION NO. 512BXXXXX2 AND 512PBXXXXX2 AND UPWARDS)

613-2530-KIT Park Brake Pad Kit (1 kit per axle)			
Item	**Part No**	**Qty**	**Description**
E9.4	613-2530	2	Parking Brake Pads

515-0040-KIT Wheel Hub Kit (2 kits per axle) (All Axles with part no. 512Bxxxxx2 and upwards and 512PBxxxxx2 and upwards)			
Item	**Part No**	**Qty**	**Description**
D2	009-0230	1	Lock Washer
D4	0540751H	2	Taper Roller Bearing
D12	0431303V	1	Viton "O" Ring
D13*	512-0452	8	9/16 UNF x 18 Wheel Stud
D14	515-0040	1	Wheel Hub / Brake Disc
D15	613-2850	1	Oil Seal

***Recommend these are fitted prior to supply**

512-2520-KIT Park Brake Conversion Kit (1 kit per axle) (All Axles with part no. 512Bxxxxx2 and upwards and 512PBxxxxx2 and upwards)			
Item	**Part No**	**Qty**	**Description**
E5	512-0750	1	Park Brake Disc
E8	0041006	4	M8x16 Bolt
E9	512-2520	1	Park Brake Assembly

512-9675-KIT Conversion Kit to 15.8:1 (1 kit per axle) (All Axles with part no. 512Bxxxxx2 and upwards and 512PBxxxxx2 and upwards)			
Item	**Part No**	**Qty**	**Description**
A1	007-0130	1	Nut M20 x 2.5 Nyloc Type P
A3	512-2191	2	Flange Washer
A5	002-0030V	2	Oil Seal Viton
A6	055C020U043H	2	Taper Roller Bearing
A7	512-2331	1	Input Pinion Helical 43T
A11	0041212P	22	Bolt M12 x 45mm Es'k Patch
A13	0040807P	4	Screw M8 x 20mm Patch
A14	0041007P	4	Screw M10 x 20mm Patch
A16	512-2200	1	M24 Flange Nut
A20H	055CU024H	1	Taper Roller Bearing
A20T	055CU024T	1	Taper Roller Bearing
A22	512-2320	1	Input Wheel Helical 43T
A21	512-2891/Q1	1	Pinion Spacer (16.600/16.613)
A26	360-2350	2	Shim .25mm
A26	360-2210	2	Shim .3mm
A26	360-2290	2	Shim .4mm
E2	0400483V	1	Oil Seal Viton

512-9676-KIT Conversion Kit to 14.4:1 (1 kit per axle) (All Axles with part no. 512Bxxxxx2 and upwards and 512PBxxxxx2 and upwards)			
Item	**Part No**	**Qty**	**Description**
A1	007-0130	1	Nut M20 x 2.5 Nyloc Type P
A3	512-2191	2	Flange Washer
A5	002-0030V	2	Oil Seal Viton
A6	055C020U043H	2	Taper Roller Bearing
A7	512-2352	1	Input Pinion Helical 45T
A11	0041212P	22	Bolt M12 x 45mm Es'k Patch
A13	0040807P	4	Screw M8 x 20mm Patch
A14	0041007P	4	Screw M10 x 20mm Patch
A16	512-2200	1	M24 Flange Nut
A20H	055CU024H	1	Taper Roller Bearing
A20T	055CU024T	1	Taper Roller Bearing
A22	512-2342	1	Input Wheel Helical 41T
A21	512-2891/Q1	1	Pinion Spacer (16.600/16.613)
A26	360-2350	2	Shim .25mm
A26	360-2210	2	Shim .3mm
A26	360-2290	2	Shim .4mm

512-9677-KIT Conversion Kit to 19.9:1 (1 kit per axle) (All Axles with part no. 512Bxxxxx2 and upwards and 512PBxxxxx2 and upwards)			
Item	**Part No**	**Qty**	**Description**
A1	007-0130	1	Nut M20 x 2.5 Nyloc Type P
A3	512-2191	2	Flange Washer
A5	002-0030V	2	Oil Seal Viton
A6	055C020U043H	2	Taper Roller Bearing
A7	512-2351	1	Input Pinion Helical 38T
A11	0041212P	22	Bolt M12 x 45mm Es'k Patch
A13	0040807P	4	Screw M8 x 20mm Patch
A14	0041007P	4	Screw M10 x 20mm Patch
A16	512-2200	1	M24 Flange Nut
A20H	055CU024H	1	Taper Roller Bearing
A20T	055CU024T	1	Taper Roller Bearing
A22	512-2340	1	Input Wheel Helical 48T
A21	512-2891/Q1	1	Pinion Spacer (16.600/16.613)
A26	360-2350	2	Shim .25mm
A26	360-2210	2	Shim .3mm
A26	360-2290	2	Shim .4mm

512-2331-KIT Input Pinion Kit 15.8:1 (1 kit per axle) Park Brake Variant (All Axles with part no. 512Bxxxxx2 and upwards and 512PBxxxxx2 and upwards)			
Item	**Part No**	**Qty**	**Description**
A7	512-2331	1	Input Pinion
A6	055C020U043H	2	Taper Roller Bearing
A1	007-0130	2	Nyloc Nut
A3	512-2191	1	Coupling Washer
A26	360-2350	3	Shim 0.010” to be fitted as required
A26	360-2290	3	Shim 0.016” to be fitted as required
A26	360-2210	3	Shim 0.012” to be fitted as required
A14	0041007P	4	M10 x 20 long patch screw
A11	0041212P	13	M12 x 45 long patch bolt
A10	0041209	2	M12 x 80 long bolts
A2	0051205	2	Nyloc Nuts
A16	512-2200	1	M24 Flange Nut
A4	512-2180	1	Input Coupling

512-2352-KIT Input Pinion Kit 14.4:1 (1 kit per axle) (All Axles with part no. 512Bxxxxx2 and upwards and 512PBxxxxx2 and upwards)			
Item	**Part No**	**Qty**	**Description**
A7	512-2352	1	Input Pinion
A6	055C020U043H	2	Taper Roller Bearing
A1	007-0130	2	Nyloc Nut
A3	512-2191	2	Coupling Washer
A26	360-2350	3	Shim 0.010” to be fitted as required
A26	360-2290	3	Shim 0.016” to be fitted as required
A26	360-2210	3	Shim 0.012” to be fitted as required
A14	0041007P	4	M10 x 20 long patch screw
A11	0041212P	13	M12 x 45 long patch bolt
A10	0041209	2	M12 x 80 long bolts
A2	0051205	2	Nyloc Nuts
A16	512-2200	1	M24 Flange Nut
A4	512-2180	1	Input Coupling

512-2351-KIT Input Pinion Kit 19.9:1 (1 kit per axle) (All Axles with part no. 512Bxxxxx2 and upwards and 512PBxxxxx2 and upwards)			
Item	**Part No**	**Qty**	**Description**
A7	512-2351	1	Input Pinion
A6	055C020U043H	2	Taper Roller Bearing
A1	007-0130	2	Nyloc Nut
A3	512-2191	2	Coupling Washer
A26	360-2350	3	Shim 0.010” to be fitted as required
A26	360-2290	3	Shim 0.016” to be fitted as required
A26	360-2210	3	Shim 0.012” to be fitted as required
A14	0041007P	4	M10 x 20 long patch screw
A11	0041212P	13	M12 x 45 long patch bolt
A10	0041209	2	M12 x 80 long bolts
A2	0051205	2	Nyloc Nuts
A16	512-2200	1	M24 Flange Nut
A4	512-2180	1	Input Coupling

SPARES KITS – SPECIFICALLY FOR EARLIER SERVICE BRAKE ONLY VERSIONS (REVISION NO. 512BXXXXX1 ONLY)

512-0040-KIT Wheel Hub & Brake Rotor Kit (2 kits per axle) (All Axles with part no. 512Bxxxxx1)			
Item	**Part No**	**Qty**	**Description**
D2	009-0230	1	Lock Washer
D4	0540751H	2	Taper Roller Bearing
D12	0431303V	1	Viton “O” Ring
D13*	512-0452	8	9/16 UNF x 18 Wheel Stud
D14	512-0040	1	Wheel Hub / Brake Disc
D15	417-2850	1	Oil Seal

***Recommend these are fitted prior to supply**

512-2330-KIT Input Pinion Kit 15.8:1 (1 kit per axle) (All Axles with part no. 512Bxxxxx1)			
Item	**Part No**	**Qty**	**Description**
A7	512-2330	1	Input Pinion
A6	055C020U043H	2	Taper Roller Bearing
A1	007-0130	1	Nyloc Nut
A3	512-2191	1	Coupling Washer
A26	360-2350	3	Shim 0.010” to be fitted as required
A26	360-2290	3	Shim 0.016” to be fitted as required
A26	360-2210	3	Shim 0.012” to be fitted as required
A14	0041007P	4	M10 x 20 long patch screw
A11	0041212P	13	M12 x 45 long patch bolt
A10	0041209	2	M12 x 80 long bolts
A2	0051205	2	Nyloc Nuts
A16	512-2200	1	M24 Flange Nut
A4	512-2180	1	Input Coupling

512-2350-KIT Input Pinion Kit 19.9:1 (1 kit per axle) (All Axles with part no. 512Bxxxxx1)			
Item	**Part No**	**Qty**	**Description**
A7	512-2350	1	Input Pinion
A6	055C020U043H	2	Taper Roller Bearing
A1	007-0130	1	Nyloc Nut
A3	512-2191	1	Coupling Washer
A26	360-2350	3	Shim 0.010” to be fitted as required
A26	360-2290	3	Shim 0.016” to be fitted as required
A26	360-2210	3	Shim 0.012” to be fitted as required
A14	0041007P	4	M10 x 20 long patch screw
A11	0041212P	13	M12 x 45 long patch bolt
A10	0041209	2	M12 x 80 long bolts
A2	0051205	2	Nyloc Nuts
A16	512-2200	1	M24 Flange Nut
A4	512-2180	1	Input Coupling

512-2850-KIT Hub Seal & Breather Kit (1 kit per axle)			
Item	**Part No**	**Qty**	**Description**
B3	CP1498S-A	1	Breather
D2	009-0230	2	Locking Washer
D10	0081525P	16	Cap Bolt M10 x 25
D12	0431303V	2	“O” Ring – Viton
D15	613-2850	2	Hub Oil Seal - Viton

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

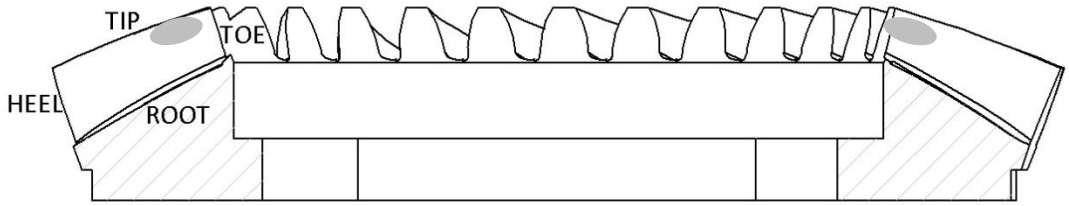
Contact may vary, but generally is approximately in the tooth centre, equi-spaced between root and tip. The marking may be towards toe on some gears on both flanks, or marking crossed slightly i.e. towards toe on convex flank and heel on concave flank or vice versa.

Apply gear marking compound on both sides of 7 to 10 teeth on the ring gear.
While applying resistance to the pinion shaft, rotate the crown wheel back and forth (not full revolutions) until a clear contact pattern is shown. Compare the contact pattern to the illustration on the following page and re-shim the pinion housing or adjust the backlash as indicated on the illustration. If the pinion housing is re-shimed the backlash must be reset. Go back and repeat ALL procedures in setting the backlash.

If, compared to the factory tooth contact, the contact appears as shown below, then corrective action should be taken as follows:

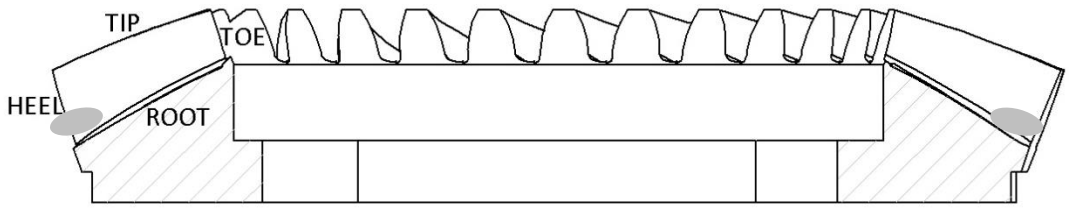
Error 1: Pinion too far out of Mesh

CONVEX FLANK



Contact further to toe and tip than factory marking.

CONCAVE FLANK

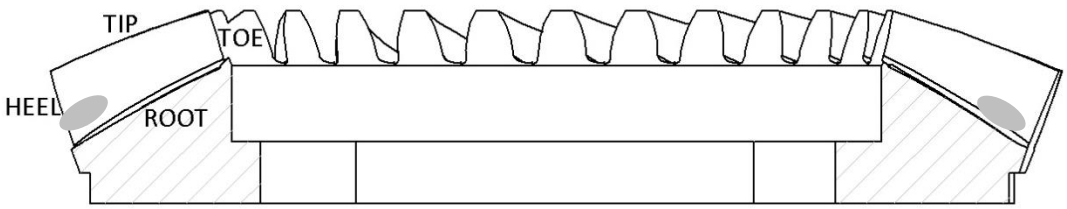


Contact further to heel and tip than factory marking.

ACTION: Recheck and decrease shims behind Pinion Head Bearing (A20H).

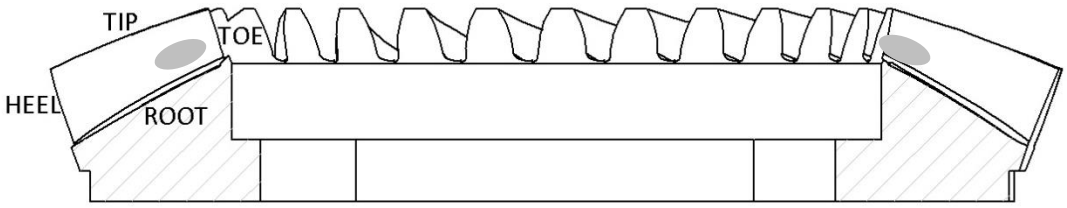
Error 2: Pinion too far into Mesh

CONVEX FLANK



Contact further to heel and root rather than factory marking.

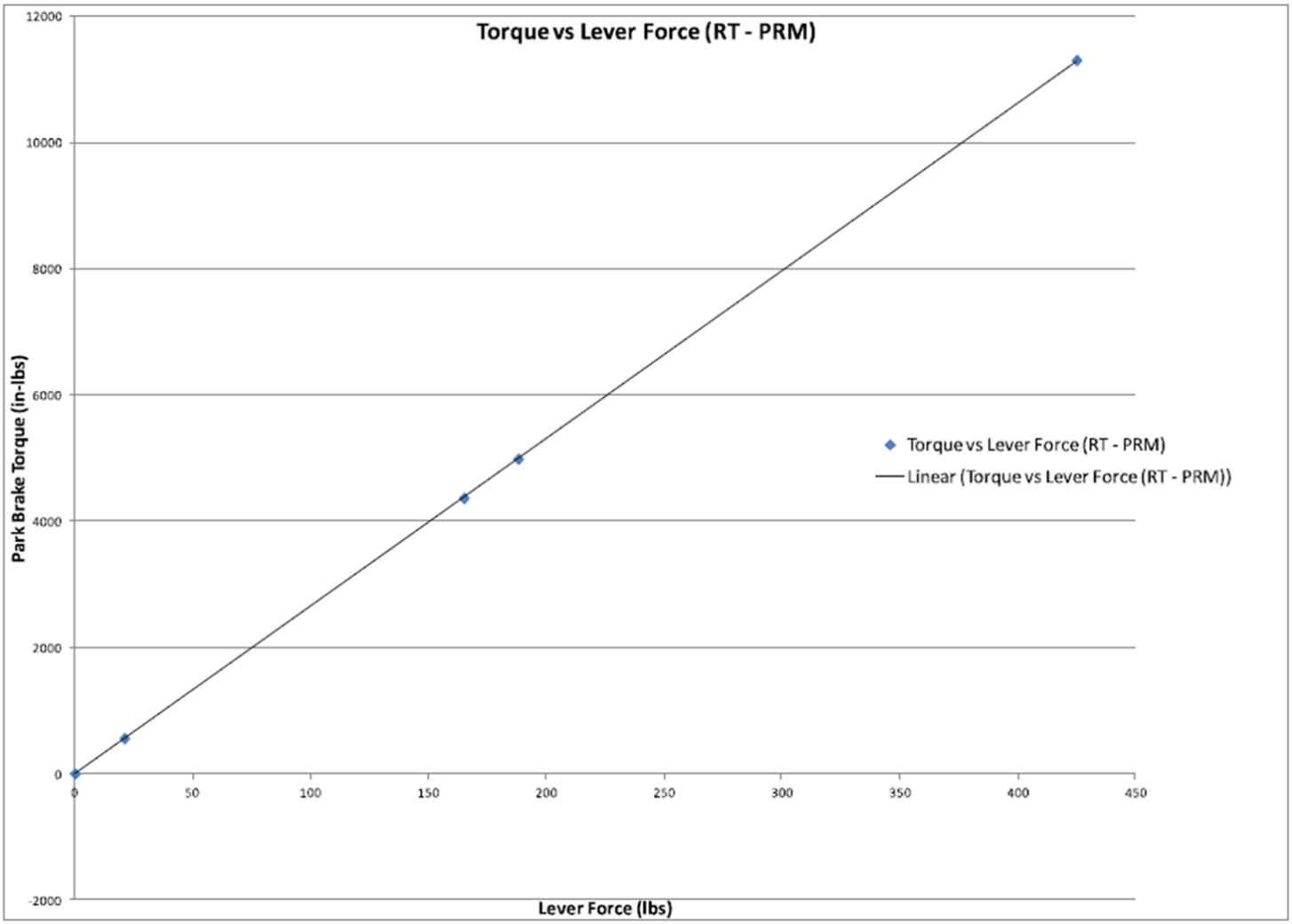
CONCAVE FLANK



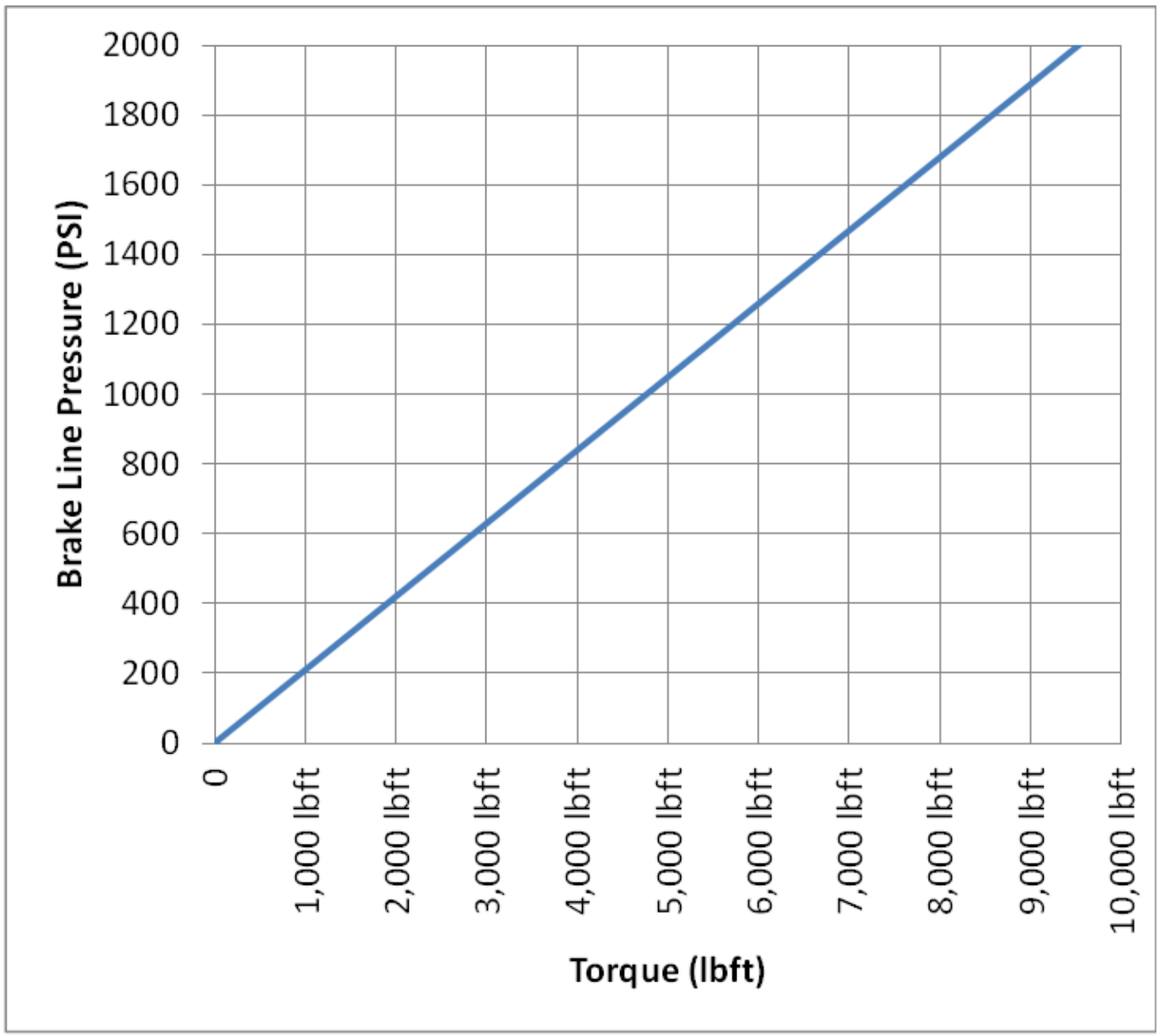
Contact further to toe and root than factory marking.

ACTION: Recheck and increase shims behind Pinion Head Bearing (A20H).

Appendix 1 – Park Brake



Appendix 2- Service Brake



NOTES