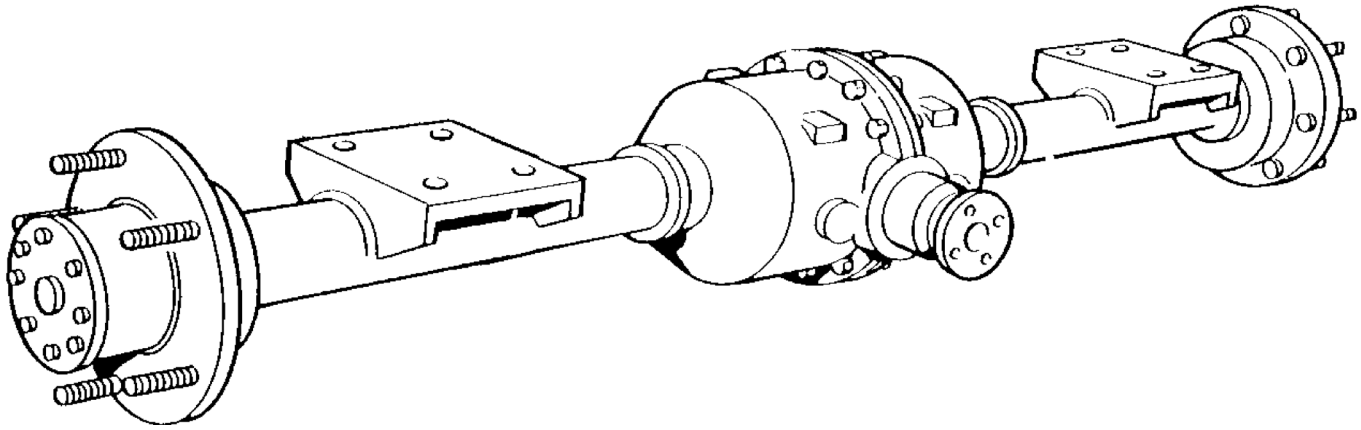
WINGET



NEWAGE 175 SERIES AXLE SERVICE MANUAL

WINGET LIMITED
PO BOX 41
EDGEFOLD INDUSTRIAL ESTATE
PLODDER LANE
BOLTON
LANCS BL4 OLS
U.K.
Tel:++44(0)1204 854650
Fax:++44(0)1204 854663
E-mail service@winget.co.uk
www.winget.co.uk

CONTENTS

Section 1

INTRODUCTION

Introduction

Winget Limited gratefully acknowledge the assistance given by Newage Transmissions Limited in the preparation of this manual, however neither Winget Limited or Newage Transmissions can be held responsible for any errors or ommissions.

The procedures described within this manual should enable experienced service personnel to strip, repair and re-build Newage 175 series axles fitted to Winget 4B and 4S range site dumpers in a safe and competent manner. The procedures are not intended to be used by personnel who are unfamiliar with the product or mechanically inexperienced.

It is assumed that personnel are aware of the Health and Safety Regulations which should be applied but the following should act as a reminder.

Whenever possible any repairs or service should be carried out in a clean environment. If work must be carried out on site or in the field steps should be taken to ensure that dort or foreign materials cannot enter the assembly.

Ensure all work tools are in good condition and only use the correct tool for the job in hand.

Always wear safety spectacles when using soft or hard faced hammers, chisels, drifts or when using air tools. Wear safety spectacles when cleaning components or when grinding.

Do not misuse air lines and be aware of the damage compressed air can cause if misused.

Always make sure lifting equipment is in good condition and the Safe Working Load exceeds the weight of the component to be lifted.

Always use suitable supports i.e. axle stands or baulks of timber in conjunction with hydraulic jacks etc. Never rely on hydraulic jacks alone to support a machine.

Be aware of hot surface temperatures and take care when draining hot oils. Always dispose of waste oils in accordance with local and national regulations.

Whenever possible always disconnect the battery or battery isolator when working on the machine to prevent electrical shorts and unauthorised starting.

Refer to the operators handbook for a guide to the correct sequence for assembling components and sub-assemblies.

Oils, fuels, silicone sealer etc can cause skin diseases if allowed to contaminate the skin. Always apply barrier creams, wear suitable protective clothing or when contamination is unavoidable clean the area with soap and water as soon as possible. Do not use thinners or other solvents to clean skin.

Health and Safety is a matter of common sense. If common sense is applied correclty the risk of accidents can be reduced.

Spares of Newage Axles fitted to Winget Equipment can only be obtained from Winget Limited or one of our authorised distributors and not from Newage Transmissions

Limited. Always quote your machines serial number and model together with axle serial number and model when ordering spare parts.

175 Series axles are designed to operate under arduous conditions and providing they are regularly and correctly maintained they will provide long trouble free service.

Whilst every effort is made to ensure the contents of this manual are accurate Winget Limited and Newage Transmissions reserve the right to alter specification without prior notification and certain sections of this manual may then no longer apply.

Section 2

GENERAL DESCRIPTION

General Description

The 175 series is a double reduction non braked axle intended to be used as the rear axle on four wheel drive dumpers where braking on both front and rear axle is not required.

Housed within the split centre casing are the planetary reduction gears and the spiral bevel crownwheel and pinion, the crownwheel being mounted on a two pinion differential.

The axle half shafts are fully floating and the wheel hubs run on opposed taper roller bearings.

The approximate weight is 95KG (210lb).

Section 3

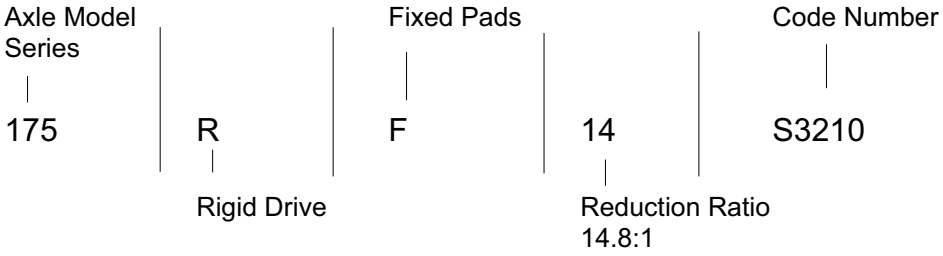
IDENTIFICATION

Identification

A plate is attached to the centre housing of each axle on which are stamped details of the axle specification (see illustration below) and the axle serial number.

If you require spares, both numbers on the plate should be quoted together with the machine model and serial number.

The model number allocated to each axle describes the basic specification as follows:-



Section 4

GENERAL SERVICE INFORMATION

General Service Information

Routine maintenance

Check	Interval
For oil leaks around joints and seals	Weekly/50 hours
Wheel nut tightness	Daily/8 hours
Hub bearing adjustment	12 Monthly/1000 hours
Centre Case nuts and bolts	Weekly/50 hours
Half shaft securing nuts	Weekly/50 hours
Propshaft nuts and bolts	Weekly/50 hours

Lubricants

The oils used must have the correct additives and therefore only those lubricants shown below or their direct equivalents must be used.

Mobil Fluid 422
Agricastrol As Special
Esso Torque Fluid 56 or 62
Gulf Universal Tractor Oil
Total Universal Plant Oil
Total Transmission Mp

The oil is added via the combined filler/level plug located in the face of the centre housing.

The oil capacity is approximately 2.5 Litres (4.4 pints)

Greases

The areas listed below should be lubricated and packed with grease during overhauls or repairs.

1) Hub oil seals, between the V ring seal and hub oil seal.

2) Input pinion oil seals.

Using one of the following greases or their equivalents:-

Mobil grease MP
Esso Beacon 2
Total Multis EP2

Liquid Sealants

On assembly the following mating surfaces should be coated as indicated. Under no circumstances should Silicone RTV Compound be used on the Pinion Housing/Cartridge or the Axle Arm to Case Joints.

Pinion Housing/Cartridge to Maincase	Hermatite
Axle Arm to Main Centre Housing	Hermatite
Stub Axle Arm to Axle Arm (Where applicable)	Hermatite
Halfshaft to Hub	Silicone RTV Cmpound

Tightening Torques

Description	Torque	
	Kpm	(Ibft)
Differential Assembly Nuts	5.6	40
Main Case Joint nuts and bolts	5.6	40
Pinion Cartridge Main Case screws	5.6	40
Halfshaft - Hub nuts	5.6	40
Wheel Nuts $^{5}/_{8}$ BSF	25	180
Wheel Nuts 18mm	28	200

NEWAGE TRANSMISSIONS: TORQUE VALUES FOR FASTENERS WITH CLEAN & DRY THREADS

IMPERIAL IN POUNDS-FEET (LBF-FT) PLAIN THREADS									
	GRADE S			GRADE V			GRADE X		
SIZE	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.
1/4	8	10	7	11	13	10	14	16	12
5/16	17	19	14	23	26	19	28	32	23
3/8	30	35	26	41	47	35	50	58	43
7/16	48	55	40	65	75	55	79	91	67
1/2	73	84	62	100	115	85	121	140	103
5/8	146	168	124	200	230	170	243	279	206
3/4	255	294	217	349	402	297	423	487	360
1"	606	696	515	829	953	704	1004	1155	853

METRIC IN NEWTON/METRES (Nm) PLAIN THREADS									
	GRADE 8.8			GRADE 10.9			GRADE 12.9		
SIZE	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.
5	6	7	5	8	9	7	10	11	8
6	10	11	8	14	16	12	17	19	14
8	24	28	20	33	37	29	40	47	34
10	48	56	40	67	77	57	80	92	68
12	83	96	72	115	130	100	140	161	119
16	206	210	160	280	320	240	347	399	295
20	401	450	340	560	640	480	677	779	576
24	694	770	570	920	1040	800	1171	1347	995

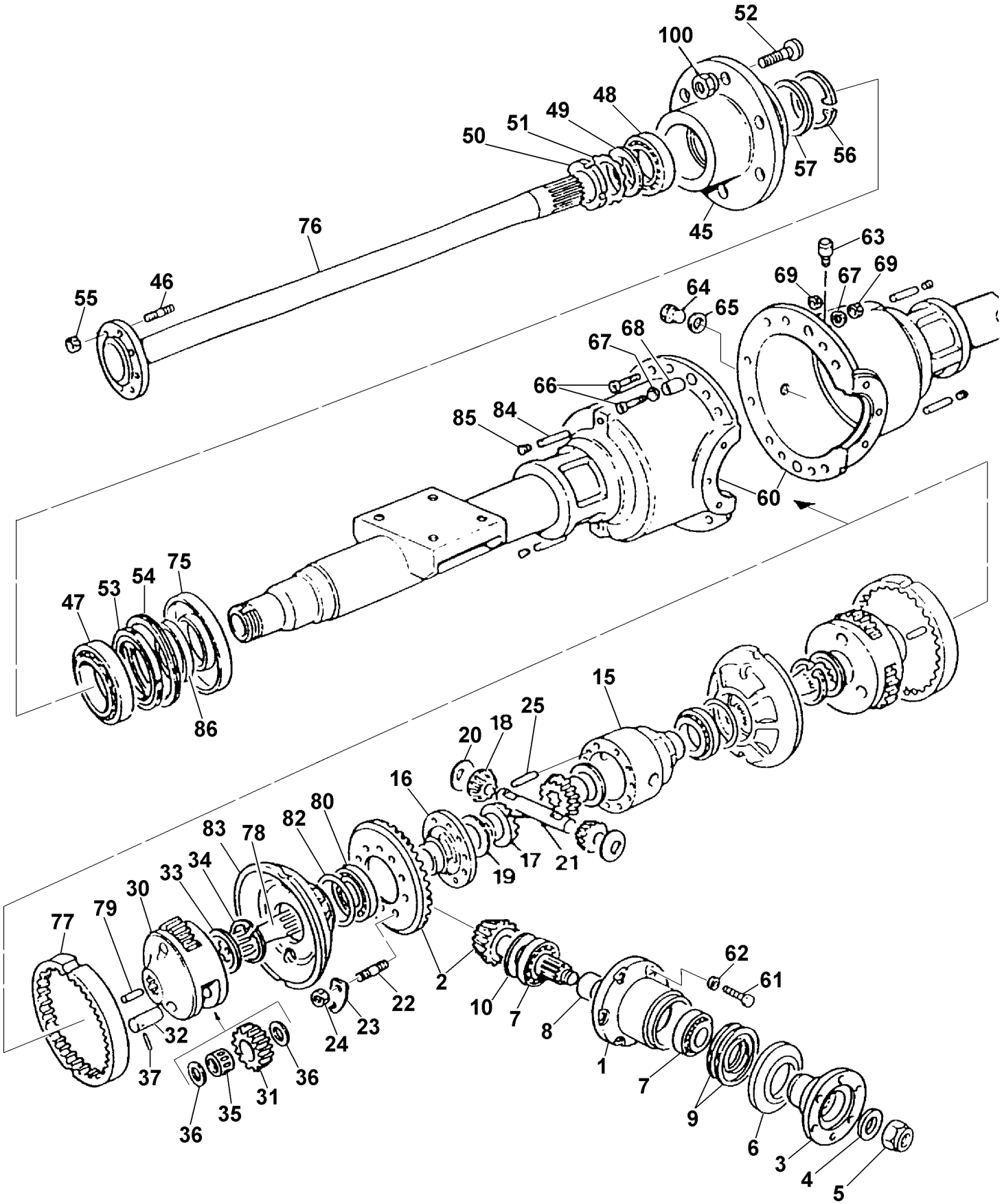
IMPERIAL IN POUNDS-FEET (LBF-FT) COATED THREADS, ZINC & ZINC PASSIVATED									
	GRADE S			GRADE V			GRADE X		
SIZE	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.
1/4	10	12	9	14	16	12	17	20	15
5/16	21	24	18	28	33	24	35	40	29
3/8	38	43	32	52	59	44	63	72	53
7/16	59	68	51	81	94	69	99	113	84
1/2	91	105	78	125	144	106	152	174	129
5/8	183	210	156	250	288	213	303	349	258
3/4	319	367	271	437	502	371	529	609	450
1"	757	871	643	1036	1191	881	1255	1443	1067

METRIC IN NEWTON/METRES (Nm) COATED THREADS, ZINC & ZINC PASSIVATED									
	GRADE 8.8			GRADE 10.9			GRADE 12.9		
SIZE	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.	MIN.
5	7	8	6	10	12	9	12	14	10
6	12	14	10	17	20	15	21	24	18
8	30	34	25	42	48	36	51	58	43
10	59	68	50	84	96	71	100	115	85
12	104	119	88	146	168	124	175	201	149
16	257	296	219	362	416	307	434	499	369
20	502	577	426	706	811	600	847	974	720
24	868	998	737	1220	1403	1037	1464	1684	1244

Section 5

EXPLODED VIEWS

AXLE 175RF

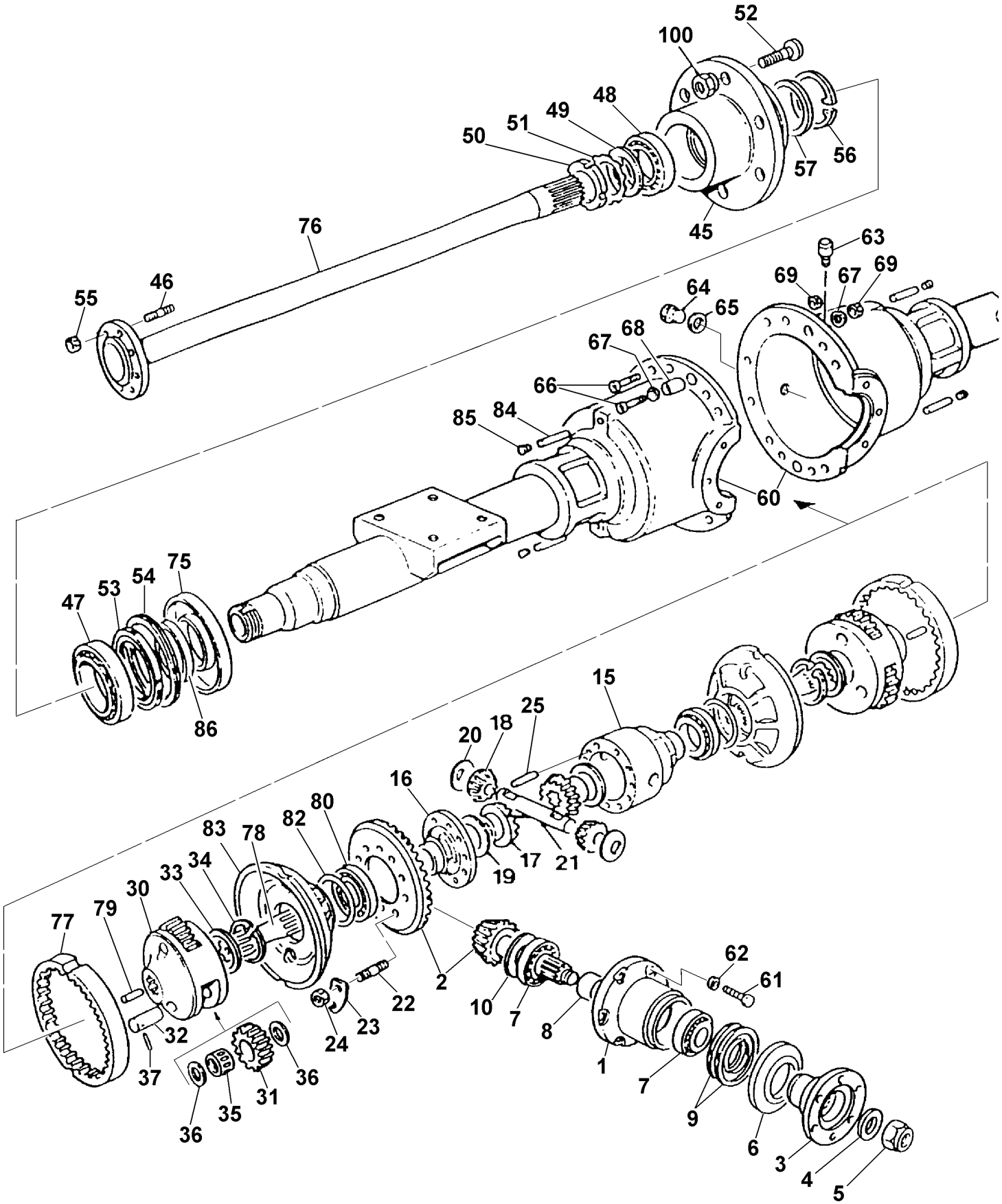

52
100
48
49
51
50
56
57
45
76
63
69
67
69
64
65
55
46
68
67
66
85
84
60
47
53
54
75
86
15
25
18
20
16
80
82
83
78
34
33
30
79
77
17
19
21
2
10
7
8
62
61
1
7
9
6
3
4
5
22
23
24
32
37
36
35
31
36

AXLE 175RF

Item No	Description	Qty
	AXLE, type 175RF14S3210 shown	
	Bevel Wheel & Pinion Assembly	
1	HOUSING, pinion	1
2	BEVEL WHEEL & PINION	1
3	FLANGE, input drive	1
4	WASHER	1
5	NUT	1
6	COVER, seal	1
7	BEARING	2
8	SPACER	1
9	SEAL, oil	2
10	SHIM, 0.25mm	AR
10	SHIM, 0.30mm	AR
10	SHIM, 0.40mm	AR
	Differential assembly	
15	CASING, L.H. differential	1
16	CASING, R.H. differential	1
17	WHEEL, differential	2
18	PINION, differential	2
19	WASHER, thrust, differential wheel	2
20	WASHER, thrust, differential pinion	2
21	SPIDER	1
22	STUD	8
23	STRIP, tab	4
24	NUT	8
25	PIN, spirol	2
	Planet Carrier assemblies	
30	CARRIER, planet gears	2
31	GEAR, planet	4
32	PIN, planet gear	4
33	SPACER, axle shaft	2
34	CIRCLIP	2
35	BEARING, needle roller	4
36	WASHER, thrust	8
37	DOWEL	4
	Hub assemblies	
45	HUB	6
46	STUD, wheel	16
47	BEARING, hub inner	2
48	BEARING, hub outer	2
49	SPACER	2
50	LOCKNUT	2
51	WASHER, locking	2

FOR PART NUMBERS REFER TO RELEVANT PARTS MICROFICHE OR OPERATORS HANDBOOK

AXLE 175RF


52
100
48
49
51
50
56
57
45
76
63
69
67
69
64
65
55
46
68
67
66
85
84
60
47
53
54
75
86
15
25
18
20
16
80
82
83
78
34
33
30
79
77
17
19
21
2
10
7
8
62
61
1
7
9
6
3
4
5
22
23
24
32
37
36
35
31
36

AXLE 175RF

Item No	Description	Qty
	AXLE, type 175RF14S3210 shown	
	Hub assemblies, *continued*	
52	STUD, wheel	10
53	SEAL, oil	2
54	SEAL, 'V' ring	2
55	NUT	16
56	CIRCLIP	2
57	SPACER	2
	Main casing	
60	CASING, main	1
61	SCREW	6
62	WASHER, plastic	6
63	VALVE, breather	1
64	PLUG	1
65	SEAL, bonded	1
66	BOLT	12
67	WASHER, plastic	4
68	DOWEL	2
69	NUT, nylon insert	12
	General parts	
75	COVER, oil seal	2
76	SHAFT, axle	2
77	ANNULUS	2
78	GEAR, sun	2
79	DOWEL	2
80	BEARING, cup & cone kit	2
82	SHIM, 0.002	AR
82	SHIM, 0.01	AR
83	HOUSING, bearing	2
84	DOWEL	4
85	PLUG	4
86	SLEEVE	2
100	NUT, wheel	10

FOR PART NUMBERS REFER TO RELEVANT PARTS MICROFICHE OR OPERATORS HANDBOOK

Section A

PINION HOUSING

Servicing the Pinion Cartridge Assembly

Section A

Place a suitable container below the axle and underneath the pinion cartridge.

Remove the setscrews securing the pinion cartridge assembly to the centre casing. The cartridge is a tight fit and will require carefully prising from the centre casing using a pry bar or other suitable tool.

Allow the axle oil to slowly drain into the container as the cartridge is removed. Dispose of the oil safely and in accordance with local bylaws and national regulations.

Prevent the flange from turning, undo and remove the self locking nut and flat washer securing the flange to the pinion, using a suitable puller or drift, remove the flange and gently drift the pinion shaft out through the housing. Take care to avoid damaging the gear teeth, splines or threads. Prise the oil seals out of the housing, slide the old collapsed spacer off the shaft and discard the spacer.

Note:- A new spacer should always be fitted.

Inspect the bearings for wear or damage, check the teeth on both the crownwheel and pinion and make a visual check through the differential of the “wheels”. If the front bearing race on the pinion shaft needs replacing use a suitable bearing puller to avoid damaging either the shaft or the shim pack sandwiched between the pinion head and bearing. If the outer cones require replacing thay can easily be drifted out of each end of the housing.

Important:- If new pinion bearings are fitted check the crownwheel/pinion backlash, see Section F “Crownwheel/Pinion Set up” If a new pinion or housing is being fitted refer to Section F before proceeding any further.

To reassemble the cartridge reverse the above procedure fitting a new collapsible spacer, install the pinion shaft through the innermost bearing cone and fit the rear bearing over the pinion shaft. Carefully fit the new oil seals and pack with one of the recommended greases. Refit the flange, coat the inner surface of the flat washer with silicone sealer and loosely refit the washer and self locking nut.

Prevent the flange from turning and tighten the nut until the spacer begins to collapse and all the end float between the pinion bearings is taken up, but without pre-loading the bearings.

Slowly continue to tighten the nut, frequently checking the preload, until a preload of 6-10kg (13.2-22lbs) for new bearings or 3-6Kg (6.61-13.2lbs) for used bearings is obtained. The preload is measured by winding a length of string round the flange and measuring the load required to turn the flange with a spring balance. Care should be exercised when tightening the pinion nut otherwise the required preload will quickly be exceeded.

If the old bearings have been reused coat the mating surfaces of the centre casing and pinion cartridge with the recommended sealant and refit the cartridge to the axle.

If new bearings have been fitted refer to Section F making a note of the pinion preload setting as it will be required later

Remove the combined filler/level plug located midway up the face of the centre housing and fill the axle with one of the recommended oils. Refit and tighten the level plug.

Section B

DIFFERENTIAL ASSEMBLY

Servicing the Crownwheel and Differential Assembly

Section B

Refer to section A and remove the pinion cartridge.

Remove the nuts and bolts securing the two halves of the main case and carefully split the main case.

Lift out the differential assembly and the sun gears. Take care that the dowels located in the ends of the axle sungears and which centralise the sun gears and axle shaft are not dislodged or damaged. Do not disturb the bearing housings, bearing cones and shims, planet carrier assemblies or annulus.

Mark the case so the differential is re-fitted with the crownwheel on the same side, usually opposite the case breather. (Assembling the crownwheel into the opposite side of the centre casing from which it was removed will result in the rotation of the axle being reversed).

Free the locking washers and undo the nuts securing the crownwheel to the differential, remove the crownwheel and pull the two halves of the differential apart. To strip the differential gears drift out the dowel pin and push out the spider.

Inspect all the gears, bearings, thrust washers and crownwheel for damage or wear and replace as necessary.

Assemble in reverse order ensuring that no dirt or foreign objects enter the assembly and replace the spring dowel. Align any indent marks on the differential casing halves, refit the crownwheel fitting new lockwashers, torque up the nuts and bend over the lockwashers.

Note:- If new differential bearings have been fitted it will be necessary to check both the bearing pre-load and the crownwheel/pinion backlash as described in section F.

When re-assembling the differential assembly into the casing insert the sun gears fully into the planet carriers. The sun gears must be precisely in the centre of the planetary when meshed, this is achieved by installing the dowels into the recess in the end of the sun gears before the sun gears are installed. When the sun gears are correctly in mesh with the planetary assembly the dowels will locate into the corresponding recess in the end of the axle shafts.

Locate the differential onto one of the sun gears (ensuring the crownwheel is re-fitted opposite the case breather. The mating surface of the two halves of the casing should be coated with the recommended sealant. Lift the opposite casing half and locate over the differential engaging the sun gear into the differential. Torque up the nuts and bolts.

Refit the pinion cartridge as described in section A.

Remove the combined filler/level plug and top up the axle oil.

Section C

PLANET CARRIER ASSEMBLY

Servicing the Planet Carrier Assembly

Section C

To gain access to the planet carrier remove the pinion cartridge and differential assembly as described in sections A and B.

Mark the bearing housings and main case so the housings can be re-fitted in their respective case halves on re-assembly.

The bearing housing and annulus (which is behind the housing) are a tight fit in the maincase and are prevented from rotating within the case by two dowels. These dowels, which are visible through two “cutouts” are retained in the maincase by grub screws. To remove the dowels, remove the grubscrews then using a suitable drift, knock out the dowels from within the maincase.

Using a suitable puller carefully withdraw the bearing housing and lift out the planet carrier.

Check the teeth on the sun gears and annulus for wear or damage. Also check the spring dowels in the ends of the sun gears.

Check the planet gears within the planet carrier, the gears should run freely on the planet pins without exhibiting excessive radial play.

To replace the planet gears, pins or bearings, drift the small spring dowels (which retain the planet pins) through the carrier into the planet pins. Lightly drift the planet pins out of the carrier and remove the gears, bearings and thrust washers.

The axle shaft thrust washers are retained in the carrier by a circlip which can be removed to allow inspection of the washer.

Before re-assembling the carrier assembly remove the small spring dowels from the planet pins and ensure new spring dowels are fitted on re-assembly.

If necessary the annulus can be removed from the maincase, remove the grubscrews and dowels as described previously, then using a suitable drift entered through the dowel holes carefullly drift the annulus out of the maincase.

Note: If the annulus is renewed then the dowels should also be renewed.

To re-assemble refit the two dowels and retaining grubscrews then ensure the annulus is fitted back squarely into the case.

Re-assemble the planet carriers and bearing housings into their respective halves of the case. Ensure the dowels are correctly fitted in the ends of the sun gears, then insert the sun gears into the planet carriers ensuring the sun gears are both fully in mesh and correctly aligned with the axle shafts.

Complete the re-assembly as described in sections A and B.

Section D

AXLE ARM & HUB ASSEMBLY

Servicing the Axle Arm and Hub Assembly

Section D

The hub assembly and axle shaft can be serviced with the axle still in situ on the machine.

The Hub Assembly

Remove the self locking nuts securing the half shaft to the hub and withdraw the shaft. (A drip tray placed below the hub will catch any oil which runs from the hub). Inspect the splines for wear or damage and the shaft for twist and distortion.

Note: In order to ensure that the sun and planetary gears are correctly aligned, a dowel is fitted into the ends of the sungears which engages into the end of the halfshaft on assembly thereby ensuring correct alignment. In isolated cases these dowels may be withdrawn with the halfshaft and will be found protruding from the splined end of the shaft. It is important that they are not mislaid and must be refitted on re-assembly.

Straighten the locking tabs on the lockwasher securing the ring nut, undo the the ring nut and remove the nut, lockwasher and spacer. The hub can now be withdrawn off the opposed taper roller bearings.

Remove the V seal on the circumference of the rear of the hub, prise out the oil seal and lift out the rear most bearing race, inspect the bearings for damage or wear and replace if necessary. The cones can simply be drifted out of the hub, however, ensure that replacements are square to the bores before re-fitting. The replacement oil seal must be packed with grease and the “V” ring seal lubricated with a little oil or grease. (A new oil seal must be fitted regardless of visual condition).

If the oil seal housing is damaged or the seal contact area is worn it can be drifted off the axle arm. When fitting the replacement care must be taken not to damage the seal contact area or distort the housing. Apply “loctite” grade 601 or equivalent to both the axle arm and seal housing mating surfaces before assembly.

To re-assemble the hub reverse the procedure, lightly oil the V seal and bearings before re-assembly, fit a new lockwasher.

To Adjust the Hub Bearings

Tighten the ring nut upto a torque of 14Kpm (100lbft). Turn the hub in each direction at least three times to ensure the bearings have correctly “seated” in and re-check the torque (This operation should be repeated until the lock nut no longer turns when re-checking the torque). Slacken the ring nut back a distance equal to one tab of the lockwasher then turn down a tab into the nut to secure the ring nut in place.

Coat the mating surfaces of the hub and half shaft with the recommended sealant. Ensure the dowel (if removed with the half shaft) is refitted in the end of shaft.

Carefully refit the halfshaft ensuring the dowel correctly engages with both the sun gear and halfshaft. It may be necessary to turn the hub slightly to engage the splines on the halfshaft with the planet carrier.

Torque up the self locking nuts.

Remove the combined filler/level plug and top up the axle oil.

Section E

BRAKES

Blank

Section E

Section F

SETTING PROCEDURE CROWNWHEEL & PINION

Setting up the Crownwheel and Pinion

Section F

A) If Pinion Bearings ONLY are replaced.

Paint “Engineers Blue” on a few crownwheel teeth and refit the pinion cartridge onto the case retaining with two setscrews, check the backlash between the teeth on the crownwheel and pinion:-

1310 Hardy spicer 4 bolt flange 0.22-0.30mm

The backlash is best checked via a dial gauge indicator clock located against a drive flange hole or located against the head of a nut and bolt which is secured in one of the holes within the flange.

Rotate the pinion flange a few complete revolutions in both directions, remove the pinion cartridge and examine the contact marking on both flanks of the crownwheel teeth and compare the markings to the illustrations in section G or the original factory markings.

If the backlash is reduced and the contact is incorrect, remove shims (approximately 0.1mm, 0.004 thou) from behind the head of the pinion and re-test.

If the backlash is increased and the contact is incorrect, add shims (0.1mm-0.004 thou) behind the pinion head and re-test.

B) If differential bearings ONLY are replaced:-

Re-build the assembly as described in section B and check the crownwheel/pinion backlash as described above.

Check the differential bearing pre-load, the pre-load is measured by winding a length of string round the pinion flange and measuring the load required to turn the flange with a suitable spring balance. The pre-load for the differential bearings must be added to the pre-load figures obtained for the pinion bearings in Section A.

Additional Differential Bearing Pre-load	New Bearings 1.0-2.0kg (2.20-4.4lbs)	Old Bearings 0.5-1.0kg (1.10-2.20lbs)

If the backlash is correct, but the pre-load requires adjustment, split the main case as described in sections B, C and D and add or remove shims behind each differential bearing . Shims should be added to increase pre-load and removed to decrease the pre-load in 0.025mm (0.001 thou) increments at each bearing and re-check the pre-load.

If the pre-load is correct but the backlash requires adjustment, split the main case as described in sections B, C, D and maintaining the total thickness of shims within the differential, increase backlash by taking shims from behind the bearing adjacent to the crownwheel and adding them behind the opposite bearing, or reduce backlash by taking

shims from behind the bearing opposite the crownwheel and adding them behind the bearing adjacent to the crownwheel.

C) If both Crownwheel and Pinion are replaced:-

Make a note of the mounting distance MD stamped on the front face of the new and old crownwheels and pinions.

The shim thickness used with the old crownwheel and pinion must be adjusted to suit the new assembly as follows:-

For the Crownwheel:- If the MD is greater than the old, decrease the shims by the difference from behind the bearing adjacent to the crownwheel and add this difference in shims behind the opposite bearing. If the MD is less than the old then reverse the above procedure.

For the Pinion:- If the new MD is greater than the old decrease the shims behind the head of the pinion by the difference, if the new MD is less increase shims by the difference. Assemble the pinion cartridge and adjust the pre-load as described in section A.

Assemble the axle as described in sections B, C and D, re-check the contact markings using “Engineers Blue” as described at the beginning of this section.

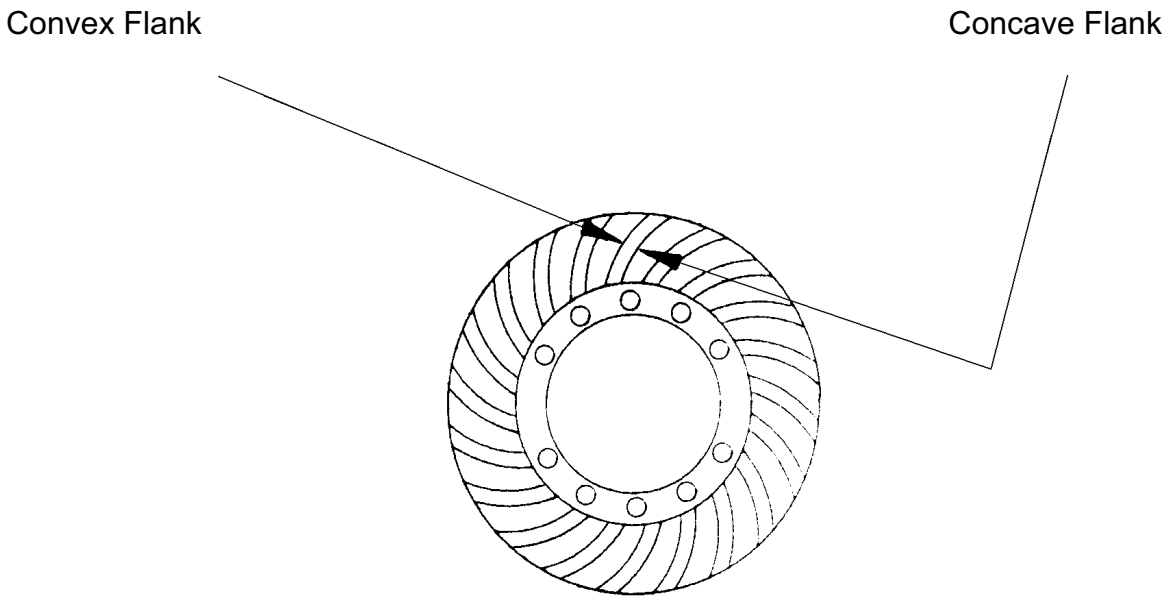
Section G

SPIRAL BEVEL GEAR TOOTH CONTACT

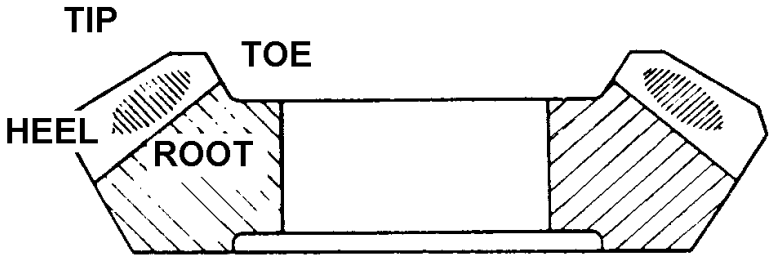
Spiral Bevel Gear Tooth Contact

Section G

The illustration shown below is intended as a reminder to those who are unfamiliar with the terminology applied to Spiral Bevel Gear Teeth



The markings on a crownwheel which is correctly meshed with the pinion should resemble those shown on the illustration below:-

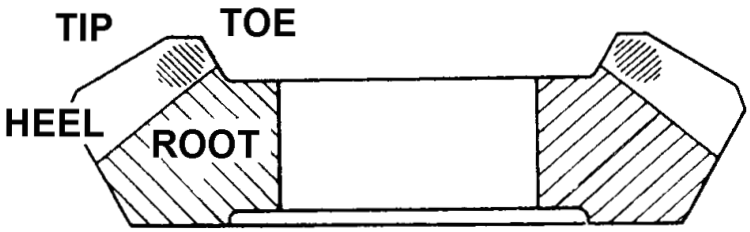


Although the contact point on both flanks of the teeth may vary slightly, generally speaking when correctly setup the markings on both the convex and concave flanks will be in the centre of the tooth form and can still be considered to be correct if, on both flanks, the markings are towards the toe or if crossed slightly e.g. towards the toe on the convex flank and the heel on the concave flank or vice-versa.

If when comparing the contact markings they appear similar to the illustrations below the corrective action indicated is required.

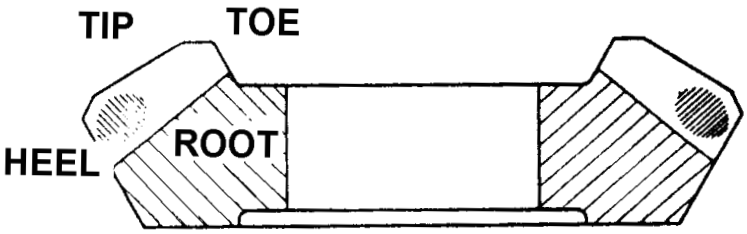
Pinion Too Far Out of Mesh

Convex Flank



Contact markings closer to toe and tip than factory markings

Concave Flank



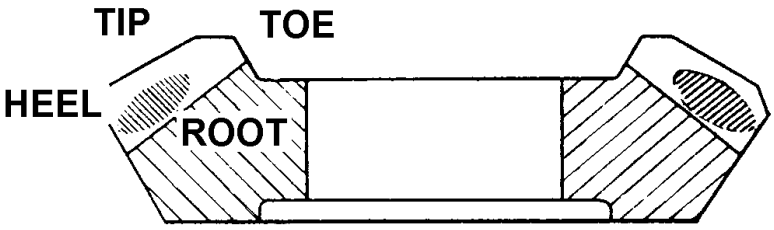
Contact markings closer to heel and tip than factory markings.

Remedy:-

175 series	Re-check and increase shims behind head of pinion.
200 series	Re-check and increase shims behind head of pinion.
210 series	Re-check and increase shims behind head of pinion.
220 series	Re-check and increase shims behind head of pinion.
360 series	Re-check and increase shims behind pinion front bearing cone.
410 series	Re-check and decrease shims between pinion cartridge and axle case.

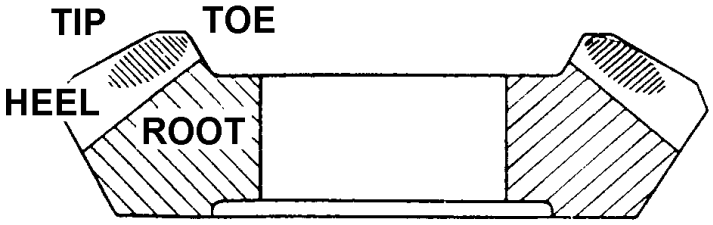
Pinion Too Far into Mesh

Convex Flank



Contact markings closer to heel and root than factory markings

Concave Flank



Contact markings closer to toe and root than factory markings.

Remedy:-

175 series Re-check and decrease shims behind head of pinion.

200 series Re-check and decrease shims behind head of pinion.

210 series Re-check and decrease shims behind head of pinion.

220 series Re-check and decrease shims behind head of pinion.

360 series Re-check and decrease shims behind pinion front bearing cone.

410 series Re-check and increase shims between pinion cartridge and axle case.