

Mechanical Front-Wheel-Drive Axles 1100 Series



JOHN DEERE

COMPONENT TECHNICAL MANUAL Mechanical Front-Wheel-Drive Axles 1100 Series

CTM 17 (01 APR89) English

John Deere Waterloo Works
CTM 17 (01 AP R89)

Introduction

This component technical manual contains necessary instructions to repair John Deere Mechanical Front Wheel-Drive Axles (or MFWD). This manual also includes theory of operation.

Use this component technical manual in conjunction with the machine technical manual. See the machine technical manual for axle removal and installation.

ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!

When you see this symbol on the machine or in this manual, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

All information, illustrations and specifications in this manual are based on the latent product information available at the time of publication. The right is reserved to make changes at any time without notice.

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U23;INTRO 1 220888

MFWD Axies CTM-17 (4-89)

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manual**

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click on it.**

**Have any questions please write to me:
admin@servicemanualperfect.com**

JOHN DEERE ENGINE OWNER:

Don't wait until you need warranty or other service to meet your local John Deere Engine Distributor or Service Dealer.

Learn who he is and where he is. At your first convenience, go meet him. He'll want to get to know you and to learn what your needs might be.

UTILISATEURS DE MOTEURS JOHN DEERE:

N'attendez pas d'être obligé d'avoir recours à votre Concessionnaire ou Point de Service le plus proche pour vous adresser à lui.

Renseignez-vous dès que possible pour l'identifier et le localiser. À la première occasion, prenez contact avec lui et faites-vous connaître. Il sera lui aussi heureux de faire votre connaissance et de savoir que vous pourrez compter sur lui le moment venu.

AN DEN BESITZER DES JOHN DEERE MOTORS:

Warten Sie nicht auf einen evtl. Reparaturfall um den nächstgelegenen John Deere Händler kennen zu lernen.

Machen Sie sich bei ihm bekannt und nutzen Sie sein "Service Angebot".

PROPRIETARIO DEL MOTORE JOHN DEERE:

Non aspetti fino a quando ha bisogno della garanzia o di un altro tipo di assistenza per incontrarsi con il Suo Concessionario che fornisce l'assistenza tecnica.

Impari a conoscere chi è e dove si trova. Alla Sua prima occasione cerchi d'incontrarlo. Egli desidera farsi conoscere e conoscere le Sue necessità.

PROPIETARIO DE EQUIPO JOHN DEERE:

No espere hasta necesitar servicio de garantía o de otro tipo para conocer a su Distribuidor de Motores John Deere o al Concesionario de Servicio.

Entérese de quién es, y dónde está situado. Cuando tenga un momento, vaya a visitarlo. A él le gustará conocerlo, y saber cuáles podrían ser sus necesidades.

JOHN DEERE MOTORÄGARE:

Vänta inte med att besöka Din John Deere återförsäljare till dess att Du behöver service eller garanti reparation.

Bekanta Dig med var han är och vem han är. Tag första tillfälle att besöka honom. Han vill också träffa Dig för att få veta vad Du behöver och hur han kan hjälpa Dig.



MFWD Axles CTM-17 (4-89)

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Front Axle Application

FRONT AXLE APPLICATION CHART

Tractor Model

Waterloo Tractors

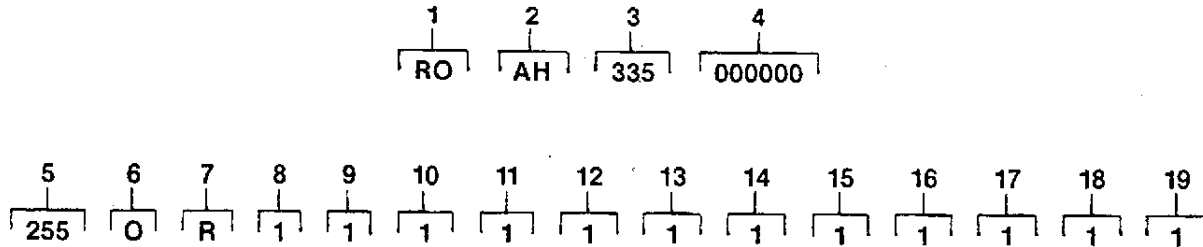
4050 4555
4055 4650
4250 4755
4255 4850
4450 4955
4455

John Deere Mechanical Front Axles were first used at the following Tractor Serial Numbers:

POWER SHIFT		QUAD RANGE		
4050—	(007907-)	(008452-)
4250—	(013982-)	(014591-)
4450—	(026630-)	(028729-)
4650—	(015937-)		
4850—	(012320-)		

U22,J15 310389

JOHN DEERE MECHANICAL FRONT WHEEL DRIVE SERIAL NUMBER



- | | |
|---|---|
| <p>1. Designates Manufacturing Unit</p> <p>2. Designates Component Identification</p> <p>3. Designates Configuration Identity</p> <p>4. Designates Serial Number</p> <p>5. Designates Master Machine Code</p> <p>6. Designates Family Code</p> <p>7. Designates Manufacturing Unit</p> <p>8. Designates Primary Input Rotation and Axle Travel</p> <p>9. Designates Spiral Bevel Reduction</p> <p>10. Designates Input Yoke</p> <p>11. Designates Flange to Flange Dimension</p> <p>12. Designates Steering System</p> <p>13. Designates Mounting Type</p> <p>14. Designates Brake Type</p> <p>15. Designates Differential Type</p> <p>16. Designates Wheel Mounting Configuration</p> <p>17. Designates Final Drive Reduction</p> <p>18. Designates Paint</p> <p>19. Designates Shipping Container</p> | <p>RO—John Deere Waterloo Works</p> <p>AH—Outboard Axles</p> <p>335—Wheel Bolt Circle Diameter</p> <p>425—Wheel Bolt Circle Diameter</p> <p>255</p> <p>256</p> <p>0</p> <p>R—John Deere Waterloo Works</p> <p>2—CW Away From Input</p> <p>4—CCW Away From Input</p> <p>1—1.933:1</p> <p>2—2.588:1</p> <p>3—3.071:1</p> <p>5—3.727:1</p> <p>2—Dana 1480</p> <p>1—1831MM</p> <p>2—Steerable Steering Arms Only-
Input Side-13 Degree Caster</p> <p>4—Oscillating-Top Pivot-Center Drive</p> <p>1—No Brakes</p> <p>3—Limited Slip Differential</p> <p>1—Type 1</p> <p>1—5.2:1</p> <p>2—John Deere Green</p> <p>i1—Pallet</p> |
|---|---|

RECOGNIZE SAFETY INFORMATION

This is the safety-alert symbol. When you see this symbol on your machine or in this manual, be alert to the potential for personal injury.

Follow recommended precautions and safe operating practices.



AB6;T81369 053;ALERT 160687

UNDERSTAND SIGNAL WORDS

A signal word—DANGER, WARNING, or CAUTION—is used with the safety-alert symbol. DANGER identifies the most serious hazards.

Safety signs with signal word DANGER or WARNING are typically near specific hazards.

General precautions are listed on CAUTION safety signs. CAUTION also calls attention to safety messages in this manual.

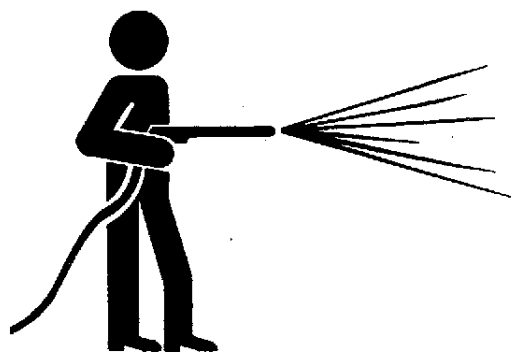


AB6;TS187 053;SIGNAL 071085

WORK IN CLEAN AREA

Before starting a job:

- Clean work area and machine.
- Make sure you have all necessary tools to do your job.
- Have the right parts on hand.
- Read all instructions thoroughly; do not attempt shortcuts.

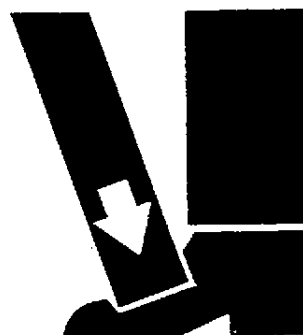


AB6;T6642E J 053;CLEAN 190188

USE PROPER LIFTING EQUIPMENT

Lifting heavy components incorrectly can cause severe injury or machine damage.

Follow recommended procedure for removal and installation of components in the manual.

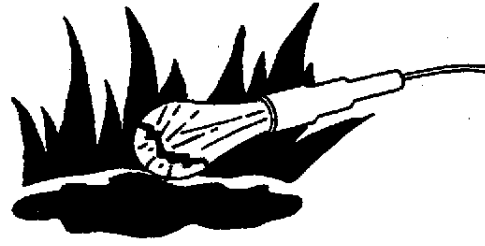


AB6;TS226 053;LIFT 050188

UNDERSTAND CORRECT SERVICE

Illuminate your work area adequately but safely. Use a portable safety light for working inside or under the machine. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.

Catch draining fuel, oil, or other fluids in suitable containers. Do not use food or beverage containers that may mislead someone into drinking from them. Wipe up spills at once.

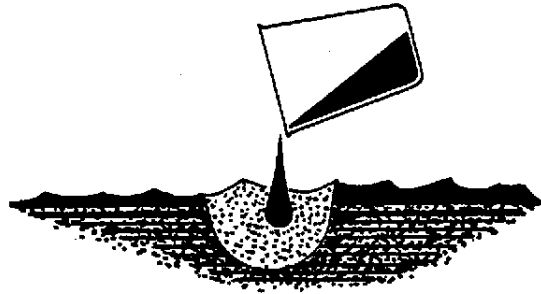


AB6;TS223 053;LIGHT 230288

DISPOSE FLUIDS PROPERLY

Be mindful of the environment and ecology. Before you drain fluids, find out the proper way to dispose of the oil.

Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.



AB6;TS222 053;DRAIN 211287

LIVE WITH SAFETY

Before returning machine to customer, make sure machine is functioning properly, especially the safety systems. Install all guards and shields.



AB6;TS231 053;LIVE 050188

Capacity

Axle Housing	11.4 L (12 qt)
Wheel Hub (4850 and 4650)	5.7 L (6 qt)
(4050, 4250 and 4450	3.8 L (4 qt)

Lubrication of Grease Fittings

King-Pins and U-Joints (normal conditions)	200 hours
(wet and dusty conditions)	10 hours
Pivot Pin and Bushing	200 hours

U23;E394 070389

GEAR OIL

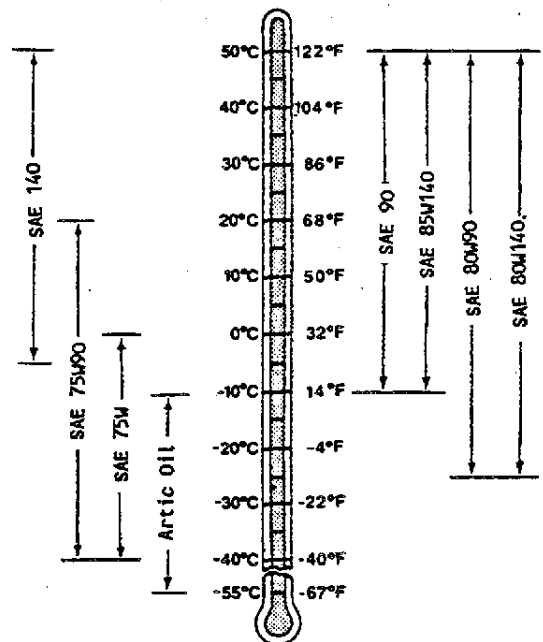
Use oil viscosity based on the expected air temperature range during the period between oil changes.

John Deere GL-5 Gear Lubricant is recommended.

Other oils may be used if they meet one or more of the following:

- API Service Classification GL-5
- Military Specification MIL-L-2105D
- Military Specification MIL-L-2105C
- Military Specification MIL-L-2105B

Oils meeting Military Specification MIL-L-10324A may be used as arctic oils.



AB6;TS245 053;GE01L 230288

METRIC SERIES TORQUE CHART

CAUTION: Use only metric tools on metric hardware. Other tools may not fit properly. They may slip and cause injury.

DO NOT use these values if a different torque value or tightening procedure is listed for a specific application. Torque values listed are for general use only.





















Check tightness of cap screws periodically.

Shear bolts are designed to fail under predetermined loads. Always replace shear bolts with identical grade.

Fasteners should be replaced with the same or higher grade. If higher grade fasteners are used, these should only be tightened to the strength of the original.

Make sure fastener threads are clean and you properly start thread engagement. This will prevent them from failing when tightening.

Tighten cap screws with plastic insert or crimped steel-type lock nuts to approximately 50 percent of amount shown in chart. Tighten toothed or serrated-type lock nuts to full torque value.

Property Class	Head Markings	Property Class	Nut Markings
4.6	  No Mark	5	  No Mark
4.8	  No Mark		
8.8	 	8	 
9.8	 		
10.9	 	10	 
12.9	 	12	 

DIA.	WRENCH SIZE	4.6		4.8		8.8		9.8		10.9		12.9	
		OIL	DRY	OIL	DRY	OIL	DRY	OIL	DRY	OIL	DRY	OIL	DRY
		N·m(lb-ft)	N·m(lb-ft)	N·m(lb-ft)	N·m(lb-ft)	N·m(lb-ft)	N·m(lb-ft)	N·m(lb-in)	N·m(lb-in)	N·m(lb-ft)	N·m(lb-ft)	N·m(lb-ft)	N·m(lb-ft)
M5	8mm	1.5(1)	2.5(1.5)	2.5(1.5)	3.0(2)	4.5(3.5)	6.0(4.5)	5.0(3.5)	7.0(5)	6.5(4.5)	9.0(6.5)	7.5(5.5)	10.0(7.5)
M6	10mm	3.0(2)	4.0(3)	4.0(3)	5.5(4)	7.5(5.5)	10.0(7.5)	8.5(6)	12.0(9)	11.0(8)	15.0(11)	13.0(9.5)	18.0(13)
M8	13mm	7.0(5)	9.5(7)	10.0(7.5)	13.0(10)	18.0(13)	25(18)	21.0(15)	30(22)	25(18)	35(26)	30(22)	45(33)
M10	16mm	14.0(10)	19.0(14)	20.0(15)	25(18)	35(26)	50(37)	40(30)	55(41)	55(41)	75(55)	65(48)	85(63)
M12	18mm	25(18)	35(26)	35(26)	45(33)	65(48)	85(63)	70(52)	100(74)	95(70)	130(97)	110(81)	150(111)
M14	21mm	40(30)	50(37)	55(41)	75(55)	100(74)	140(103)	115(85)	155(114)	150(111)	205(151)	175(129)	240(177)
M16	24mm	60(44)	80(59)	85(63)	115(85)	160(118)	215(159)	180(133)	245(180)	235(173)	315(232)	275(203)	370(273)
M18	27mm	80(59)	110(81)	115(85)	160(118)	225(166)	305(225)			320(236)	435(321)	375(277)	510(376)
M20	30mm	115(85)	160(118)	165(122)	225(166)	320(236)	435(321)			455(356)	620(457)	535(395)	725(535)
M22	33mm	160(118)	215(159)	225(167)	305(225)	435(321)	590(435)			620(457)	840(620)	725(535)	985(726)
M24	36mm	200(148)	275(203)	285(210)	390(288)	555(409)	750(553)			790(583)	1070(789)	925(682)	1255(926)
M27	41mm	295(218)	400(295)	415(306)	565(417)	810(597)	1100(811)			1155(852)	1565(1154)	1350(996)	1835(1353)
M30	46mm	400(295)	545(402)	565(417)	770(568)	1100(811)	1495(1103)			1570(1158)	2130(1571)	1835(1353)	2490(1837)
M33	51mm	545(402)	740(546)	770(568)	1050(774)	1500(1106)	2035(1500)			2135(1575)	2900(2139)	2500(1844)	3390(2500)
M36	55mm	700(516)	950(700)	990(730)	1345(992)	1925(1420)	2610(1925)			2740(2021)	3720(2744)	3205(2364)	4355(3212)

AB6/TS234, TS235 053/TORQ4, 090888

INCH SERIES TORQUE CHART

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SAE Grade	Head Markings	SAE Grade	Nut Markings
SAE GRADE 1 SAE GRADE 2	 No Mark	2	 No Mark
SAE GRADE 5		5	
SAE GRADE 5.1			
SAE GRADE 5.2			
SAE GRADE 8 SAE GRADE 8.2	 	8	

DIA.	WRENCH SIZE	SAE GRADE 1		SAE GRADE 2		SAE GRADE 5		SAE GRADE 8	
		OIL	DRY	OIL	DRY	OIL	DRY	OIL	DRY
		N-m(lb-in)	N-m(lb-in)	N-m(lb-in)	N-m(lb-in)	N-m(lb-in)	N-m(lb-in)	N-m(lb-in)	N-m(lb-in)
#6		0.5 (4.5)	0.7 (6)	0.8 (7)	1 (10)	1.4 (12)	1.7 (15)		
#8		0.9 (8)	1.2 (11)	1.5 (13)	2 (18)	2.4 (21)	3.2 (28)		
#10		1.4 (12)	1.8 (16)	2 (19)	2.8 (25)	3.4 (30)	4.6 (41)		
#12		2 (19)	2.8 (25)	3.4 (30)	4.5 (40)	5.4 (48)	7.3 (65)		
		N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)	N-m(lb-ft)
1/4	7/16	3.5(2.5)	4(3.0)	5(4.0)	7(5.0)	8(6.0)	11(8.0)	12(8.5)	16(12)
5/16	1/2	7(5.0)	9(6.5)	10(7.5)	14(10.0)	16(12.0)	23(17.0)	24(18.0)	33(24)
3/8	9/16	12(8.5)	16(12.0)	19(14.0)	24(18.0)	30(22.0)	41(30)	41(30)	54(40)
7/16	5/8	19(14.0)	26(19.0)	30(22.0)	41(30)	47(35)	68(50)	68(50)	95(70)
1/2	3/4	24(21.0)	41(30)	47(35)	61(45)	75(55)	102(75)	102(75)	142(105)
9/16	13/16	41(30)	54(40)	68(50)	88(65)	108(80)	142(105)	149(110)	203(150)
5/8	15/16	54(40)	75(55)	88(65)	122(90)	149(110)	197(145)	203(150)	278(205)
3/4	1-1/8	102(75)	136(100)	163(120)	217(160)	258(190)	353(260)	366(270)	495(365)
7/8	1-5/16	163(120)	224(165)	163(120)	224(165)	414(305)	563(415)	590(435)	800(590)
1	1-1/2	244(180)	332(245)	244(180)	332(245)	624(460)	848(625)	881(650)	1193(880)
1-1/8	1-11/16	346(255)	468(345)	346(255)	468(345)	780(575)	1058(780)	1248(920)	1695(1250)
1-1/4	1-7/8	488(360)	664(490)	488(360)	665(490)	1098(810)	1492(1100)	1763(1300)	2393(1765)
1-3/8	2-1/16	637(470)	868(640)	637(470)	868(640)	1438(1061)	1953(1440)	2312(1705)	3140(2315)
1-1/2	2-1/4	848(625)	1153(850)	848(625)	1153(850)	1912(1410)	2590(1910)	3065(2260)	4163(3070)

A56/TS236, TS237 053;TORQ3, 090888

General

SPECIAL TOOLS

Number	Name	Use
DFRW 4	MFWD Assembly Removal Tool	Remove planetary carrier from axle housing. (See Section 199 to make tool.)
DFRW 12	Wheel Hub & Ring Gear Clamp	Make sure wheel hub oil seal is installed correctly. (See Section 199 to make tool.)
D01217AA	Puller	Remove planet pinion inner race.
OTC-27508 (1-9/16 in.) ...	Disk	Remove planet pinion inner race.
JDG618	Disk	Install wheel hub bearing cups.

U23;E360 070389

SPECIFICATIONS

Item	Measurement	Specification
Planet Pinion Retaining Screws	Torque	310 N·m (229 lb-ft)
Planet Pinion Carrier-to-Hub Cap Screws ...	Torque	125 N·m (92 lb-ft)

U23;E361 080988

REMOVE PLANETARY CARRIER

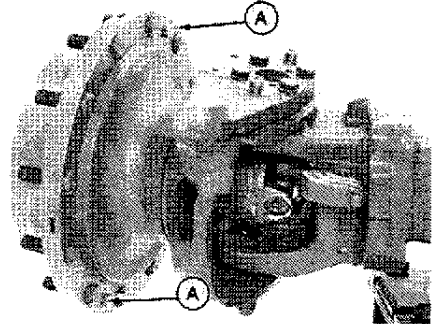
IMPORTANT: If ring gear retainer is removed and the hub is allowed to tip away from knuckle shoulder, a new hub oil seal must be installed.

NOTE: All three contact-velocity and knuckle-spindle oil seals must be replaced at the same time. All four oil seals should be replaced if the axle has many hours of usage and there is leakage.

U23;110005 A 040188

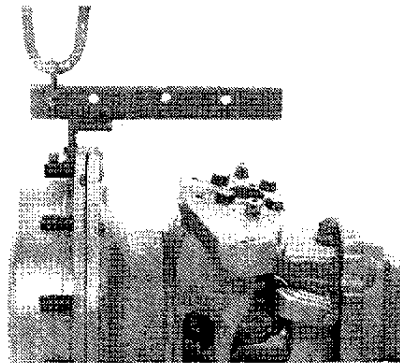
Planetary Carrier/Planetary Carrier

1. Remove tire and wheel.
2. Drain planetary oil.
3. Remove two cap screws (A) holding planetary carrier to wheel hub.



AK7;RW1291 6 U23;110005 B 031287

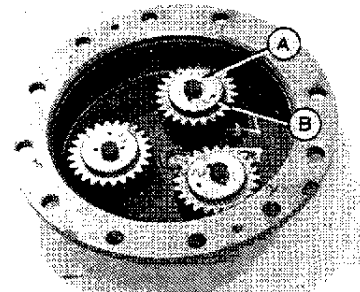
4. Attach fabricated tool DFRW 4 to carrier and pry carrier from wheel hub using pry slots. (See Group 199 to make tool.)



AK7;RW1291 7 U23;110005 C 040188

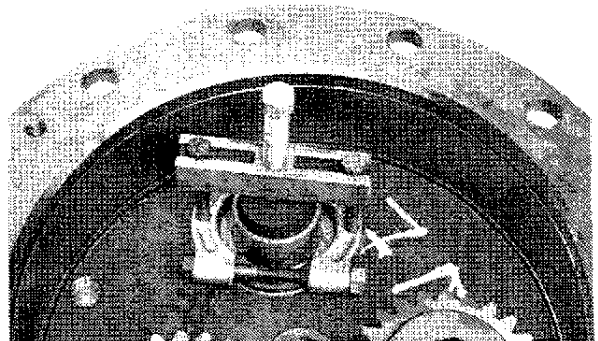
REMOVE PLANETARY GEARS

1. Mark planet pinions, retainers and housing so parts are returned to original location.
2. Remove cap screw (A) and retainer (B).
3. Remove planet pinions, needle bearings and thrust washers.



AK7;RW1291 8 U23;110005 D 080988

4. Use D01217AA Puller and 27508, 1-9/16 In. Disk, to remove needle bearing inner race.

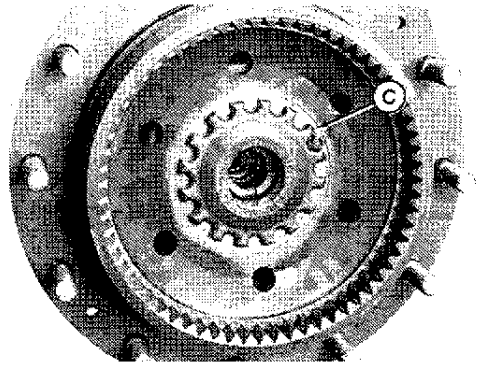


AK7;RW1291 9 U23;110005 E 040188

REMOVE AND INSTALL RING GEAR

1. Inspect planetary carrier ring gear for wear and damage.

IMPORTANT: If retainer (C) is removed and wheel hub is allowed to tip, damage to hub oil seal may occur—requiring replacement.



AK7;RW1293 2 U23;110005 F 080988

2. Ring gear may be removed by prying snap ring from rear of ring gear. Snap ring is notched on ends.

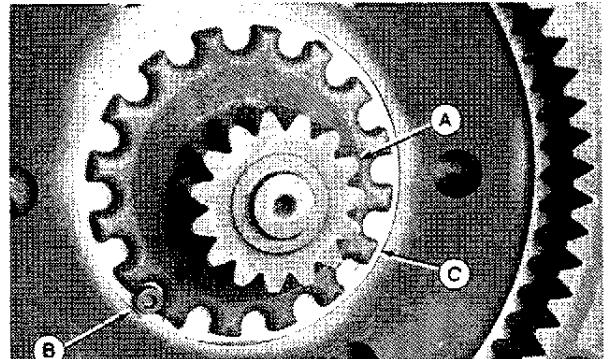
3. Install ring gear making sure the snap ring is in the proper location.



AK7;RW1302 4 U23;110005 G 080988

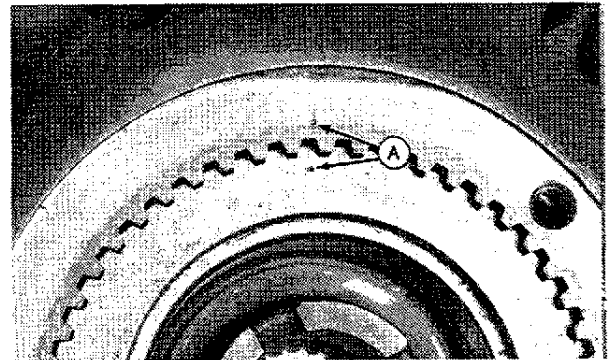
REPLACE WHEEL HUB, OIL SEAL AND BEARINGS

1. Remove sun gear, shaft (A) and thrust washer.
2. Remove allen head screw (B) and turn out retainer (C).



AK7;RW1292 0 U23;E351 080988

3. Mark knuckle-spindle and ring gear hub at 12 O'clock position (A).



AK7;RW1342 9 U23;E352 080988

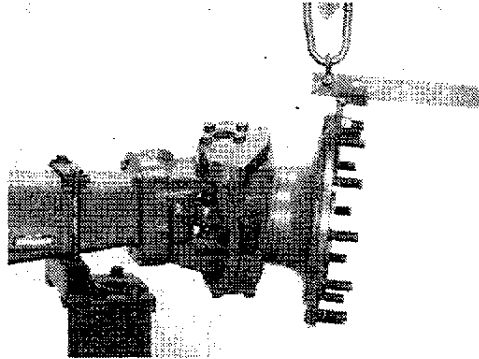
Planetary Carrier/Planetary Carrier

4. Attach fabricated tool to wheel hub stud. (See Section 199 to make tool.)

5. Remove ring gear hub. Be careful ring gear hub bearing does not fall to floor when hub is removed.

6. Remove wheel hub from knuckle-spindle.

7. Remove oil seal and bearing from wheel hub.



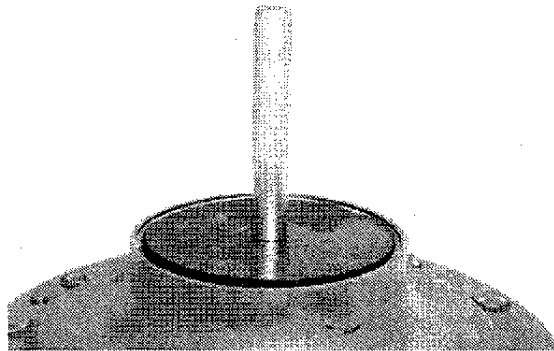
AK7;RW1342 8 U23;E353 220888

8. Remove bearing cups from wheel hub.

9. Clean and inspect all parts for wear and damage.

10. Clean sealing and bearing surfaces of knuckle-spindle.

11. Install bearing cups into wheel hub with JDG618.

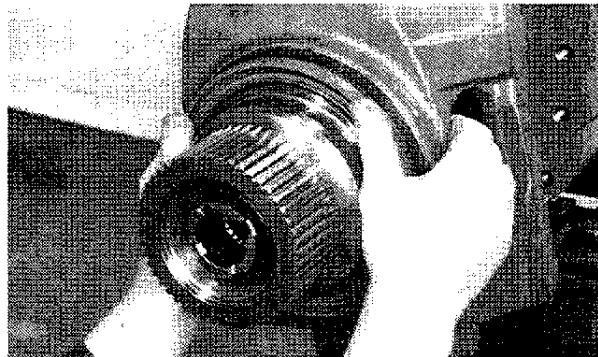


AK7;RW1294 5 U23;E354 080988

12. Apply a light film of oil to hub seal ID.

13. Install seal onto knuckle-spindle by hand ONLY, DO NOT drive on seal. Apply force at 180 degrees with both hands, working around seal until it is bottomed on knuckle-spindle.

14. Clean wheel hub inner bearing cone. Install onto knuckle-spindle next to wheel hub oil seal.

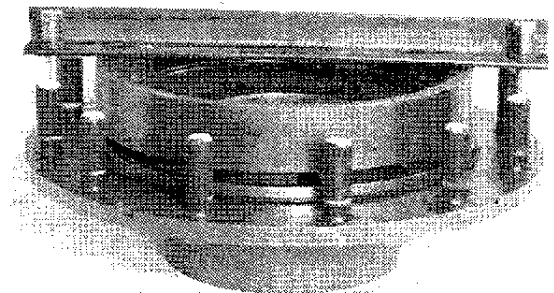


AK7;RW1343 0 U23;E355 080988

15. Install ring gear hub with outer bearing cone into wheel hub.

16. Install fabricated tool DFRW 12 to wheel hub. (See Group 199 to make tool.)

17. Use DFRW 12 fabricated tool to hold wheel hub and ring gear together squarely. (See Group 199 to make tool.) After both nuts are finger tight, alternately tighten each nut a half turn to obtain one complete turn.



AK7;RW1343 1 U23;E356 070389

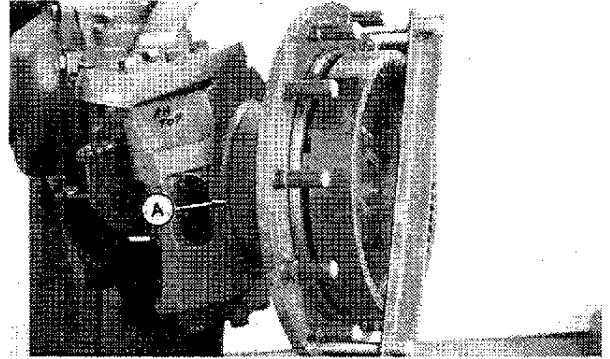
18. Install fabricated lifting tool DFRW 4 to stud closest to mark made in Step 3. (See Group 199 to make tool.) Clean seal bore of wheel hub. Apply a thin film of oil to outside diameter of oil seal and bore of wheel hub.

19. Position wheel hub next to knuckle-spindle and align marks on knuckle-spindle and ring gear hub.

20. Install wheel hub onto knuckle-spindle. Keep wheel hub and ring gear clamped together. Remove lifting tool only.

21. Install ring gear retainer and tighten until the gap between wheel hub and knuckle-spindle (A) is approximately 3 mm (1/8 in).

IMPORTANT: Once wheel hub has contacted the oil seal, the wheel hub cannot be moved away from oil seal without damaging seal.



AK7;RW1343 2 U23;E357 070389

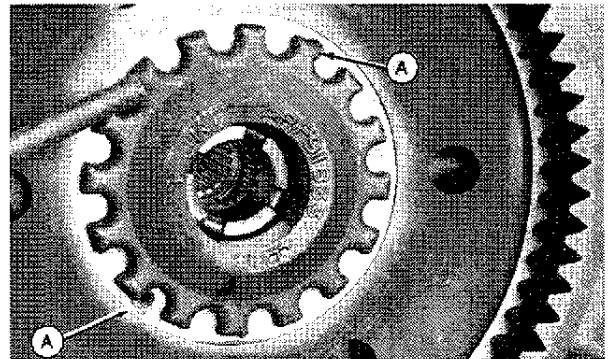
22. Remove fabricated clamping tool from wheel hub.

23. Rotate wheel hub to seat bearings, strike ring gear with a hammer weighing approximately 0.9 kg (2 lb) and tighten ring gear retainer until there is zero end play.

24. After zero end play has been reached, tighten ring gear to align retainer notch with either allen screw hole (A) and tighten one additional notch using the same hole.

25. Install allen head screw and tighten to 50 N·m (37 lb-ft).

NOTE: Retainer is tightened at factory to 135—220 N·m (100—160 lb-ft).



AK7;RW1292 2 U23;E359 070389