

WORKSHOP MANUAL

DANA axle 09.24 Wheel ends

nr. 613508D

0606

DD001300

DANA axle 09.24 Wheel ends

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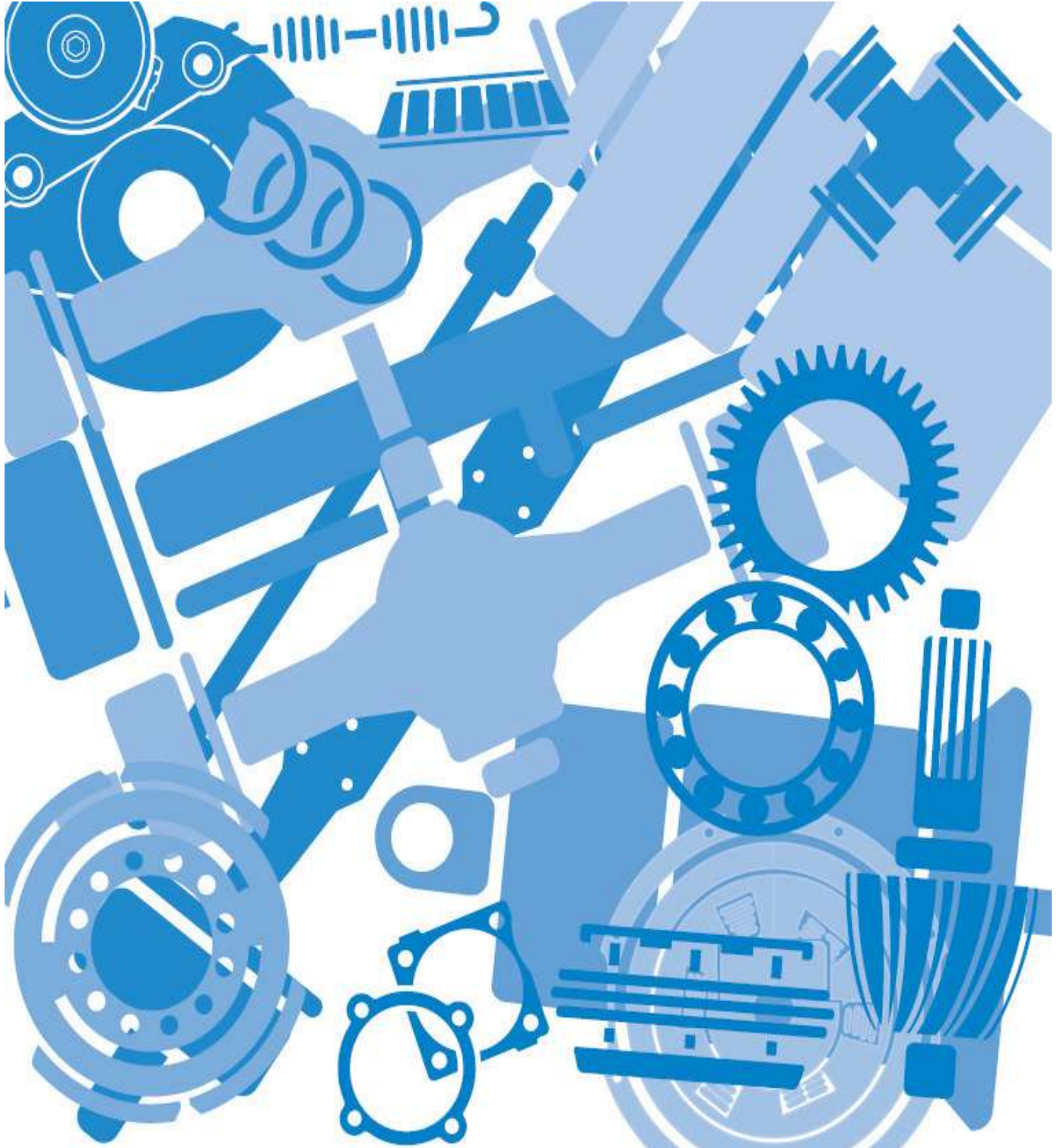
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Dana® Spicer®



SERVICE MANUAL - WHEEL ENDS

Single Drive Axles



People Finding A Better Way

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Single Drive Axles



Last Modification	Date	Approved by	Date	Level	Reference	Eng. Change
O. Maraña	13.02.06	V. Badiola	14.02.06	A	613508	NC 06657
O. Maraña	21.04.06	V. Badiola	26.04.06	B	613508	NC 06755
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SERVICE MANUAL - WHEEL ENDS

Single Drive Axles



Non Unitized Wheel End Adjustment

1. Identify the wheel nut system being installed. Three systems are available:
 - Three piece Dowel-type wheel nut system - Fig. 1
 - Three piece Tang-type wheel nut system - Fig. 2
 - Four piece Tang/Dowel-type wheel nut system - Fig. 3



WARNING: Do not mix spindle nuts and lock washers from different systems. Mixing spindle nuts and lock washers can cause wheel separation.

NOTE: The lock washer for a four piece tang/dowel-type wheel nut system is thinner than the lock washer for a three piece tang-type wheel nut system and is not designed to bear against the inner nut.

2. Inspect the spindle and nut threads for corrosion and clean thoroughly or replace as required.

NOTE: Proper assembly and adjustment is not possible if the spindle or nut threads are corroded.

- Inspect the tang-type washer (if used). Replace the washer if the tangs are broken, cracked, or damaged.

3. Install the hub and drum on the spindle with care to prevent damage or distortion to the wheel seal.



CAUTION: A wheel dolly is recommended during installation to make sure that the wheel seal is not damaged by the weight of the hub and drum. Never support the hub on the spindle with just the inner bearing and seal. This can damage the seal and cause premature failure.

- Completely fill the hub cavity between the inner and outer bearing races with the same lubricant used in the axle sump.

NOTE: Lubricate only with **clean** axle lubricant of the same type used in the axle sump. Do not pack the bearings with grease before installation. Grease will prevent the proper circulation of axle lubricant and may cause wheel seal failure.

4. Install the outer bearing on the spindle.
 - Install the inner nut on the spindle.
 - Tighten the inner nut to 200 lbs-ft. (271 N•m) while rotating the wheel hub.

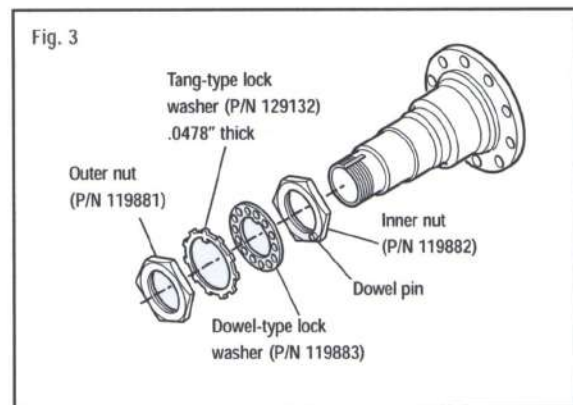
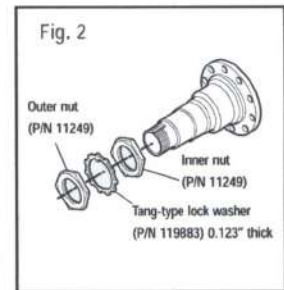
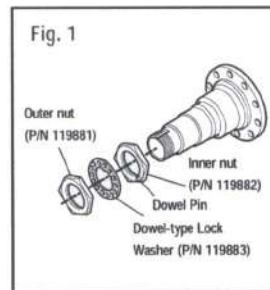


CAUTION: Never use an impact wrench to adjust wheel bearings. A torque wrench is required to assure that the nuts are properly tightened.

5. Back-off the inner nut one full turn. Rotate the wheel hub.
6. Re-tighten the inner nut to 100 lbs-ft. (135 N•m) while rotating the wheel hub.
7. Back-off the inner nut 45° to 60° of a full turn.

NOTE: This adjustment procedure allows the wheel to rotate freely with 0.001" - 0.005" (0.025 mm - 0.127 mm) end play.

8. Install the correct lock washer for the wheel nut system being used.



SERVICE MANUAL - WHEEL ENDS

Single Drive Axles



Three Piece Dowel-Type Lock Washer System (Fig. 1)

- Install the dowel-type lock washer on the spindle.

NOTE: If the dowel pin and washer are not aligned, remove washer, turn it over and reinstall. If required, **loosen** the inner nut just enough for alignment.



IMPORTANT: Never tighten the inner nut for alignment. This can preload the bearing and cause premature failure.

- Install the outer nut on the spindle and tighten to 350 lbs-ft. (475 N•m).
- Verify end-play (see End Play Verification Procedure).
- Go to Step 9.

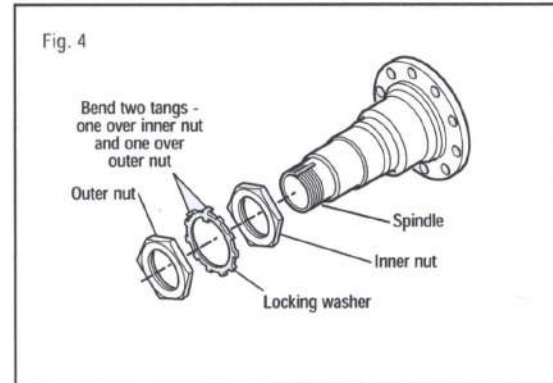
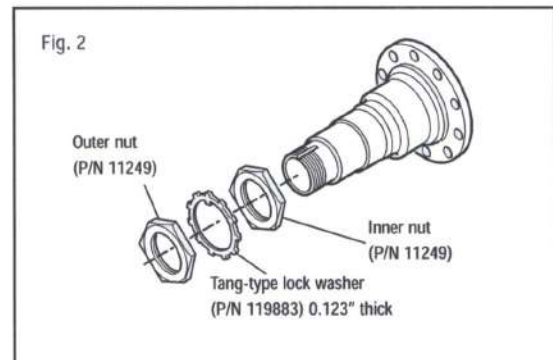
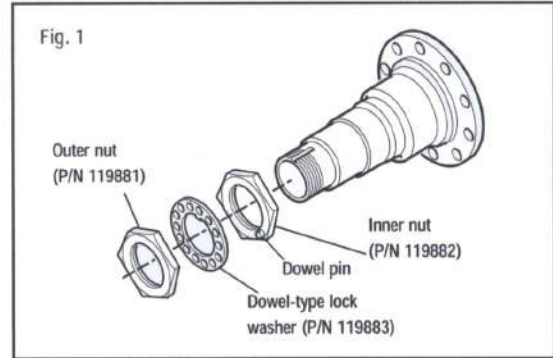
Three Piece Tang-Type Lock Washer System (Fig. 2 and 4)

- Install the tang-type lock washer on the spindle.



IMPORTANT: Never tighten the inner nut for alignment. This can preload the bearing and cause premature failure.

- Install the outer nut on the spindle and tighten to 250 lbs-ft. (339 N•m).
- Verify end-play (see End Play Verification Procedure).
- After verifying end play, secure wheel nuts by bending one of the locking washer tangs over the outer wheel nut and another tang over the inner wheel nut as shown in Fig. 4.
- Go to Step 9.



SERVICE MANUAL - WHEEL ENDS

Single Drive Axles



Four Piece Tang/Dowel-Type Lock Washer System (Fig. 3 and 5)

- First, install the dowel-type lock washer on the spindle.

NOTE: If the dowel pin and washer are not aligned, remove washer, turn it over and reinstall. If required, **loosen** the inner nut just enough for alignment.



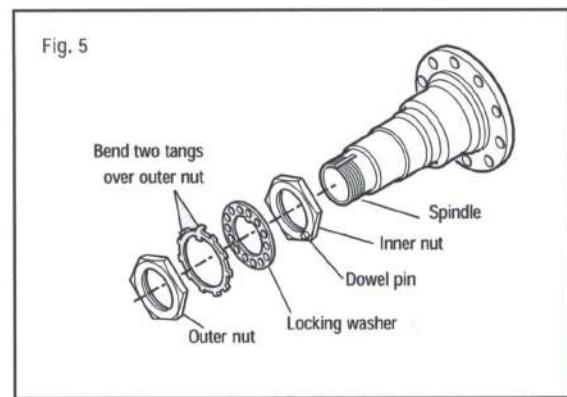
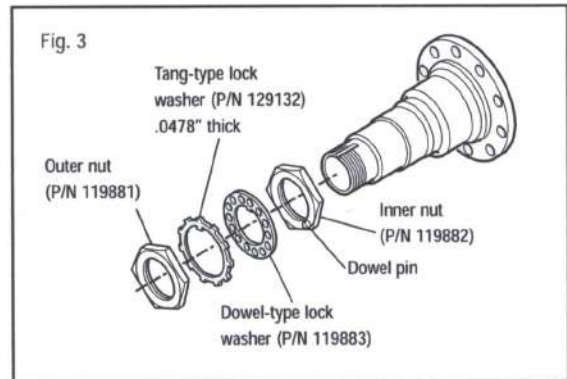
IMPORTANT: Never tighten the inner nut for alignment. This can preload the bearing and cause premature failure.

- Install the Tang-type lock washer on the spindle.
- Install the outer nut on the spindle and tighten to 250 lbs-ft. (339 N•m).
- Verify end-play (see End Play Verification Procedure).
- After verifying end play, secure outer nut by bending two opposing (180° apart) tangs of the locking washer over the outer nut as shown in Fig. 5.

9. Install:

- New gasket or sealant at axle shaft flange
- Axle shaft
- Axle flange nuts and tighten to specified torque. See fastener torque specifications on Torque Chart.

10. Lubricate axle wheel ends (see Wheel End Lubrication Procedure).

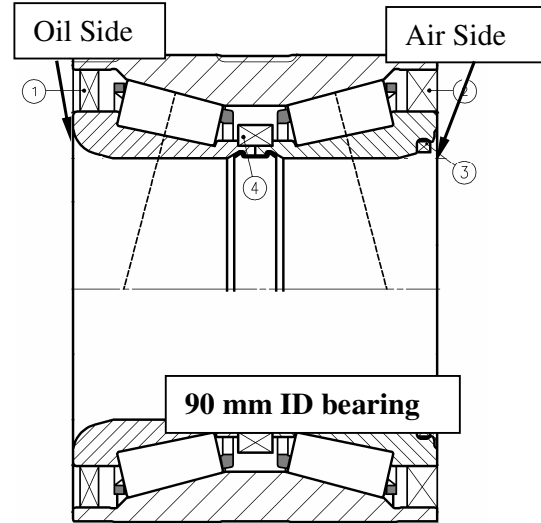
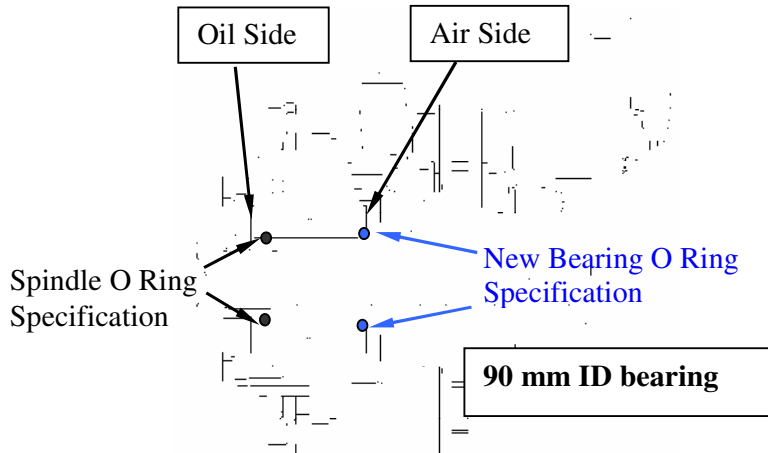


SERVICE MANUAL - WHEEL ENDS Single Drive Axles



Unitized Bearing Wheel End Adjustment

1. Make sure that all parts are clean before the assembly process.
2. Place the bearing against the hub. With the 90mm ID bearing identify the correct orientation as shown on the diagrams. **NOTE:** There is no bearing orientation on the other bearing sizes.



CAUTION: Incorrect orientation of the 90mm ID bearing may cause oil leakage.

3. Fit Unitised Bearing into the hub by using a press, (necessary force is between 29 and 43 kN), until bearing faces hub inner diameter shoulder. Keep pressing until reaching 80 kN of axial force. For assembly or disassembly, press only the outer cone using the proper tool. (See picture and chart).

CAUTION: Never press the inner cone as this could cause damage to the bearing.

4. Fit the Rotor to the Hub (see below bolt chart).

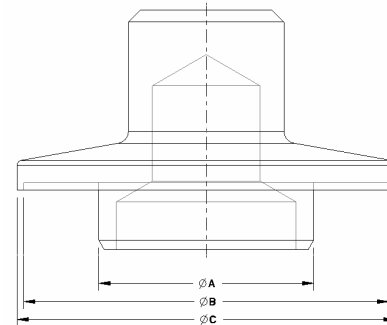
Bolt	Standard	Max. Torque (Nm)	Min. Torque (Nm)
M12 x 1.5	Din-En-Iso-4762	120	107
M12 x 1.75	Une-En-1662	132	117
M14 x 1.5	Une-En-1662	216	193
M16 x 1.5	Din-En-Iso-4762	305	273

NOTE: Din-En-Iso-4762 are Allen and Une-En-1662 are exagonal flanged bolts, 10.9, 6g, phosphated.

5. Fit "O-ring" on spindle.

CAUTION: Do not fit this "O ring" on the spindle with 90mm ID bearing axles because the "O ring" is already included into the bearing.

6. Apply anticorrosive grease onto the Spindle bearing diameter. Grease shall be applied between spindle O-ring and bearing shoulder area. In case of 90mm ID bearing, apply grease in all bearing contact race.
 - Optimol past T White (Castrol), (Ref. 613402).
 - Molycote TP 42 (Dow Corning)
 - Altemp Q NB 50 (Klüber)
 - Nomyrol VI 1200 BF (Reiner/Fuchs)



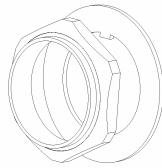
Tool	Dia A	Dia B	Dia C
67 Bearing	66.9 – 66.7	108.5	112
78 Bearing	77,9 - 77,7	122.5	128
82 Bearing	81,9 - 81,7	131,5	138
90 Bearing	89,9 - 89,7	152,5	158

SERVICE MANUAL - WHEEL ENDS

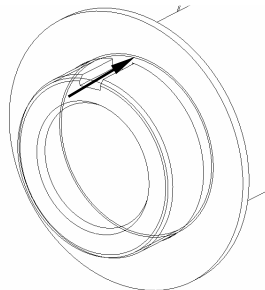
Single Drive Axles



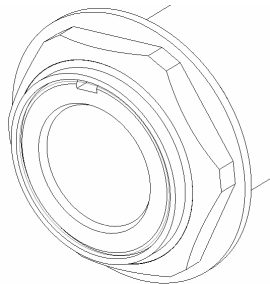
- Fit the Rotor & Hub Set onto the Spindle.
- Design corresponding to Staked Nut + Tang Washer.



- Assemble tang washer onto the spindle guided by the key way.



- Assemble new spindle nut and tighten it to initial torque as follows:

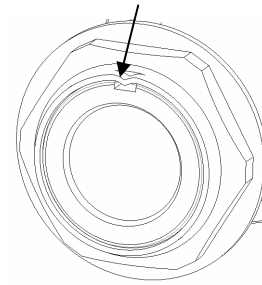


NUT SIZE	MAX. TORQUE (Nm)	MIN. TORQUE (Nm)
M58 x 1.5	120	109
M75 x 1.5	175	159
M86 x 2.0	250	225

- Spin Rotor & Hub set 10 revolutions.
- Tighten nut up to final torque values showed in the chart below:

NUT SIZE	FINAL TORQUE (Nm)	AXIAL FORCE (ton)
M58 x 1.5	435-480	5 – 6 T
M75 x 1.5	635-700	7 – 8 T
M86 x 2.0	900 - 1000	9 – 10 T

- Using a suitable chisel or punch stake the nut into the key way as indicated below.



- Apply loctite 518 between the axle shafts and the Hubs. Fit the axle shafts, (see Torque Chart below)

BOLT	MAX. TORQUE (Nm)	MIN. TORQUE (Nm)
M12x1.75	136	124
M16x2	346	314

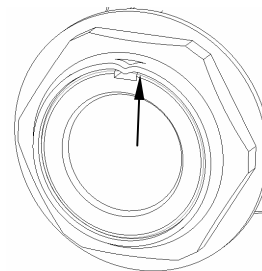
NOTE: Verbus Ripp, 10.9, 6g, phosphated.

- Fit the Brake Caliper to the Axle, (see Torque Chart below)

BOLT	STANDARD	MAX. TORQUE (Nm)	MIN. TORQUE (Nm)
M14 x 1.5	Une-En-1662	216	193
M16 x 1.5	Une-En-1662	328	293
M18 x 1.5	Une-En-1662	474	423
M20 x 2	Une-En-1662	665	593

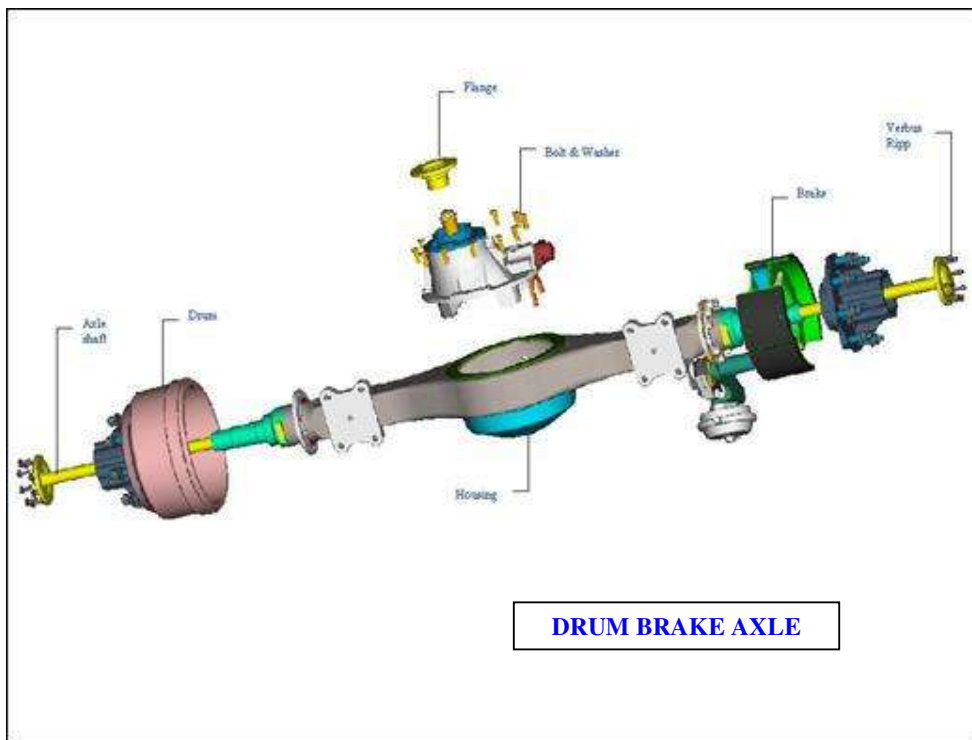
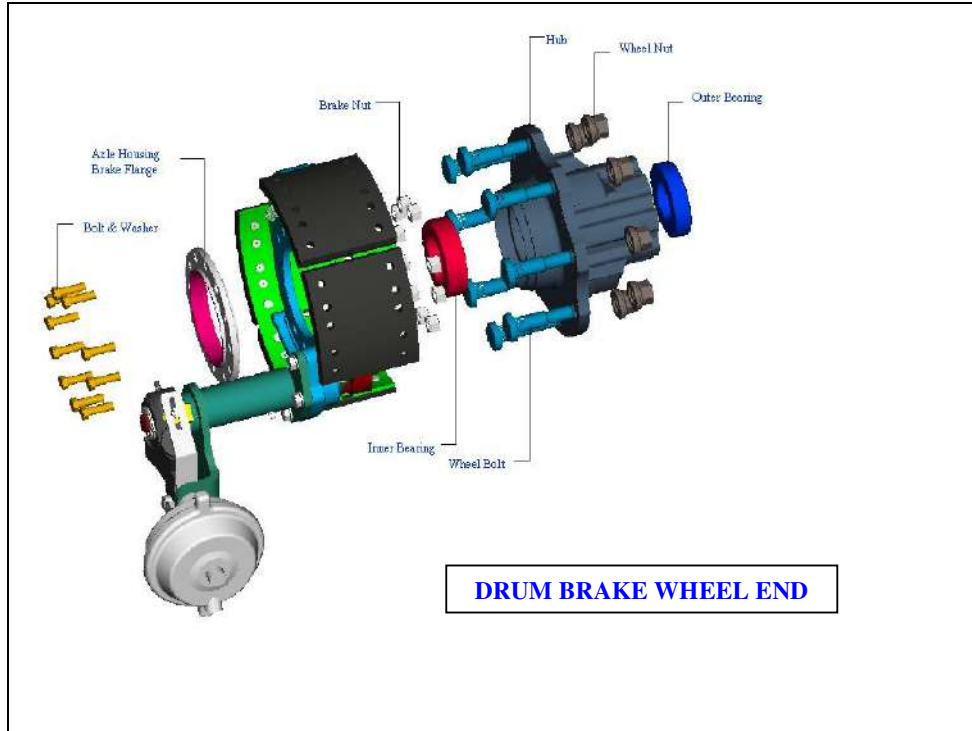
NOTE: Une-En-1662 are exagonal flanged bolts, 10.9, 6g, phosphated.

CAUTION: When disassembling bend out the staked area of the nut fully so as not to damage the threads when removing the nut.



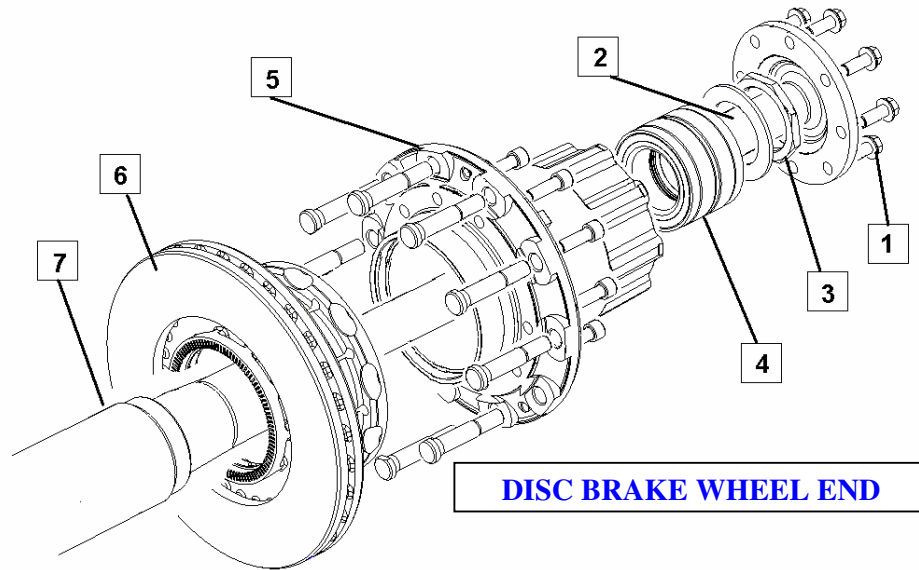
SERVICE MANUAL - WHEEL ENDS

Single Drive Axles

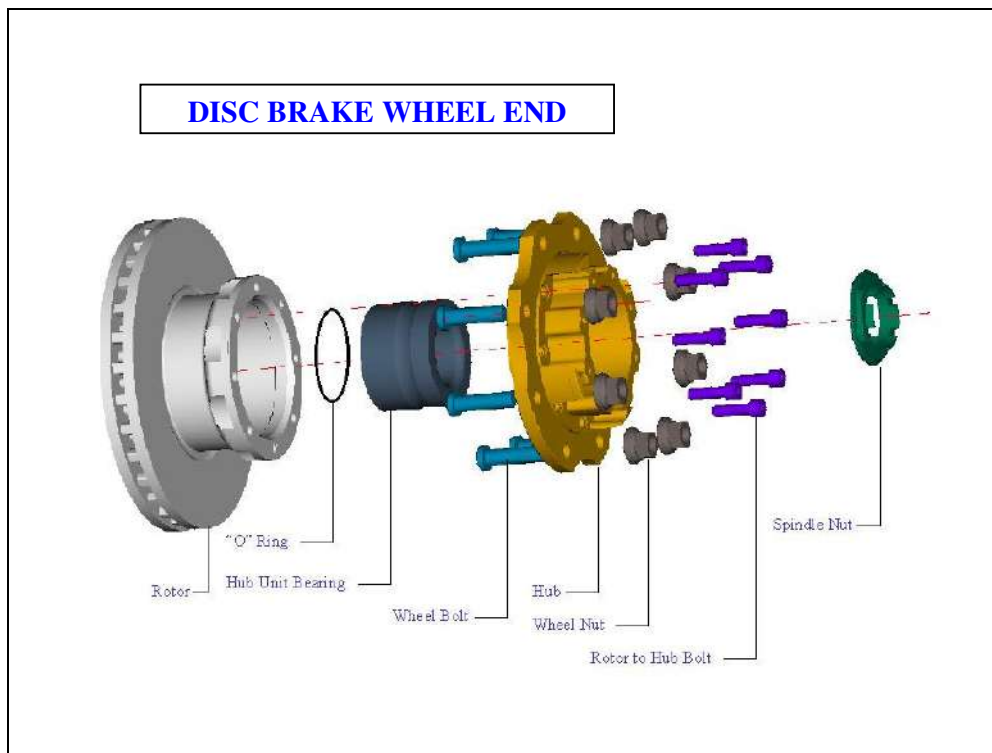


SERVICE MANUAL - WHEEL ENDS

Single Drive Axles



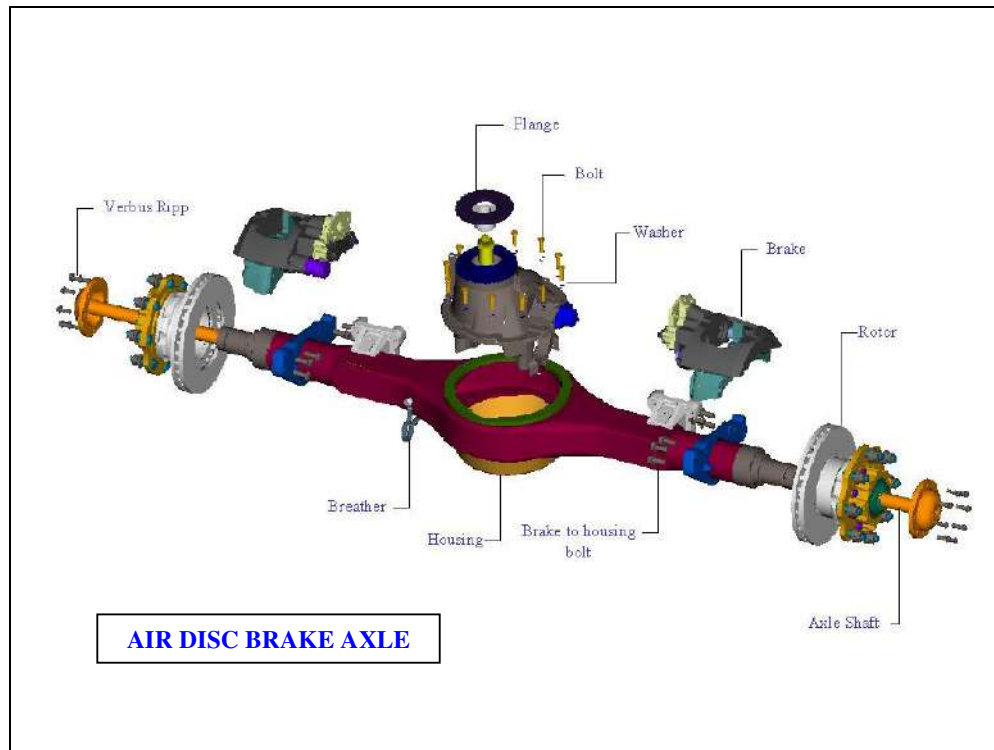
Disc Brake Wheel End - Superseal 90 mm ID bearing



Disc Brake Wheel End: Non-Superseal (other unitised bearings)

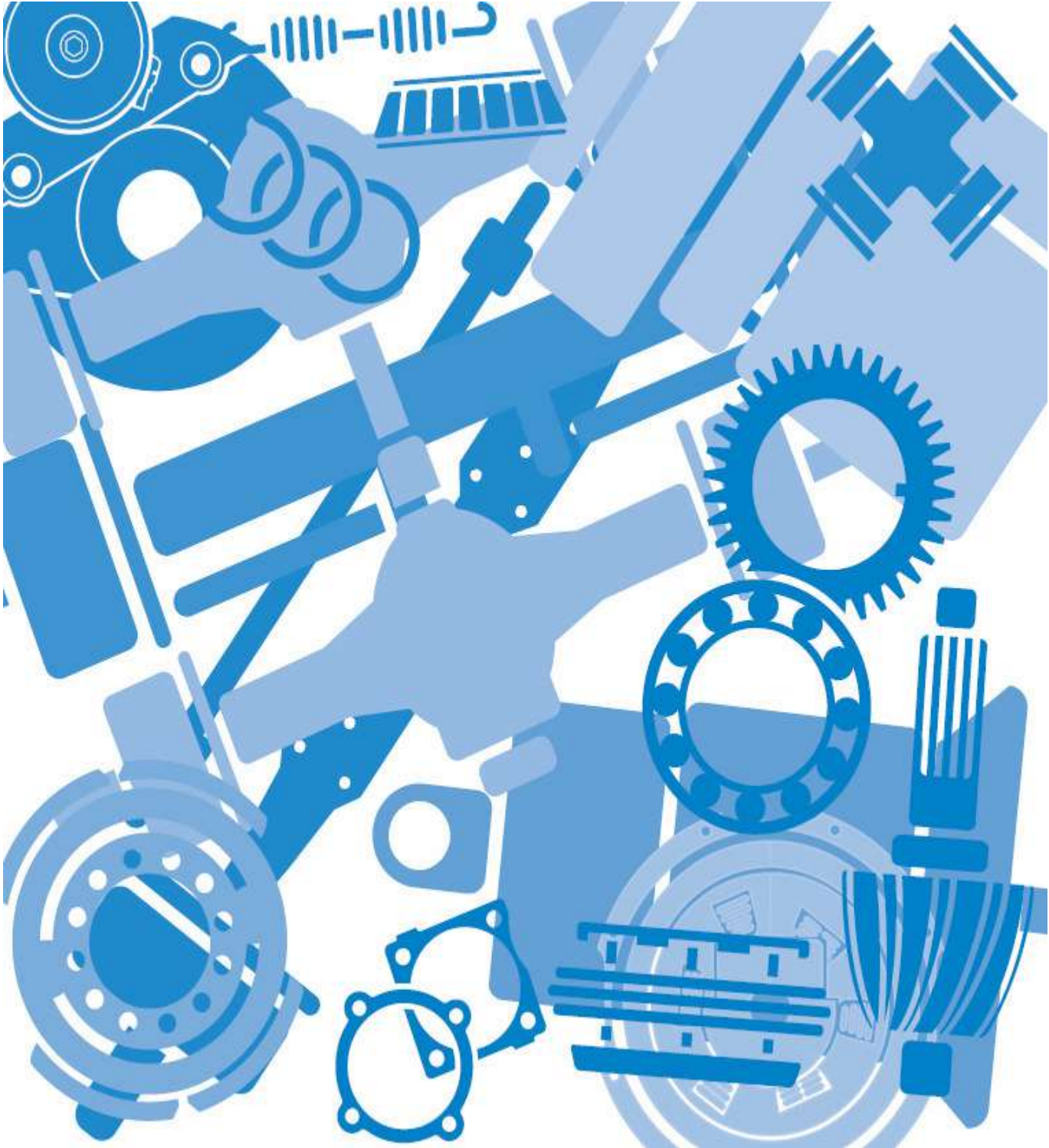
SERVICE MANUAL - WHEEL ENDS

Single Drive Axles



SERVICE MANUAL - WHEEL ENDS

Single Drive Axles



Dana Corporation / Commercial Vehicle Systems & Speciality – Europe
Pamplona Operation / Dana Automoción
Polígono Industrial de Landaben, Calle E
31012 Pamplona / Spain
TEL (+34-948) 289 100 FAX (+34-948) 281 099
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