ELECTRO-MOTIVE

MAINTENANCE INSTRUCTION

M.I. 276
*Rev. B

CONVERSION OF TURBOCHARGERS FOR OPPOSITE ENGINE ROTATION

INTRODUCTION

The purpose of this maintenance instruction is to provide conversion procedures and parts lists for modifying Model 567 and 645 engine turbochargers for application to engines having opposite rotation. Left-hand rotation engines turn counterclockwise when viewed from the flywheel end and are considered a standard or "normal" rotation engine. Right-hand rotation engines turn clockwise when viewed from the flywheel end and are generally built for paired operation in multiple engine propulsion installations.

The most common practice in installations where both the standard left-hand rotation engine and the special right-hand rotation engine are used is to stock a left-hand rotation engine turbocharger as a spare with the necessary parts to convert the turbocharger to a right-hand rotation engine if required. The parts required vary with the configuration of engine and type of gear train used on the turbocharger. This instruction provides parts listings for conversion of all 567 and 645 turbochargers adaptable to both engine rotations. Separate procedures are provided for conversion of the 567 and 645 engine turbochargers. The more common part lists are assigned conversion kit part numbers for convenience.

In addition, parts lists have been provided for the less common modification of right-hand rotation engine turbochargers for use on left-hand rotation engines.

The main housing components of each sub-assembly are aligned and doweled to each other. These components, referred to as the turbo doweling assembly, Fig. 1, are mated together, marked with the same serial number, and cannot be replaced or interchanged.

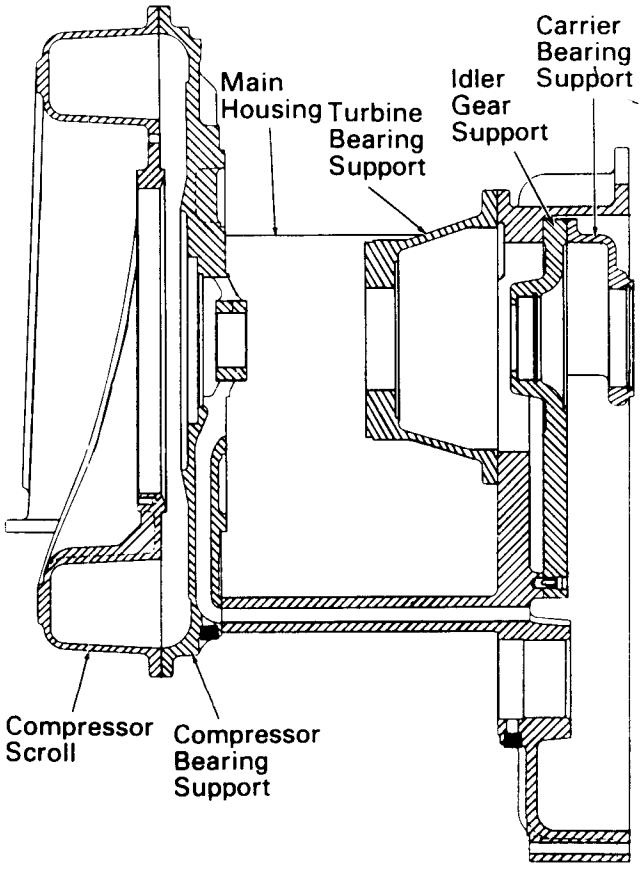
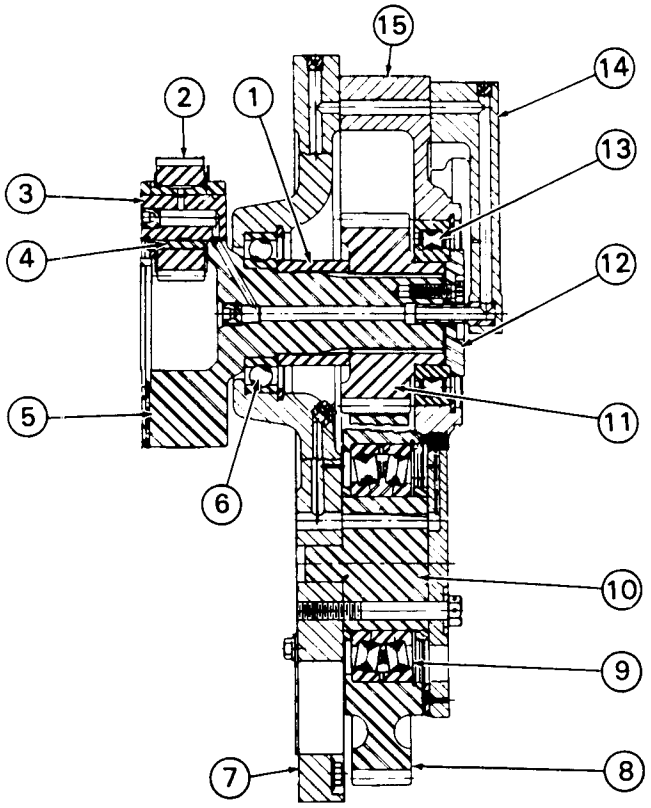


Fig.1 - Turbocharger Doweling Assembly

The carrier bearing and/or idler gear supports, Fig. 2, should never be exchanged during this operation. It is extremely important that these parts not be removed from the original turbocharger. The doweling assembly serial number is stamped on the

*This bulletin is revised and supersedes previous issues of this number. Areas of change are indicated by vertical bars in the margins.



1. Carrier shaft Spacer
2. Set Of 3 Matched Planet Gears
   Planet Gear Shafts
   Planet Gear Bearings
3. Carrier Shaft
6. Idler Gear Support Ball Bearing
7. Idler Gear Support
8. Idler Gear
9. Idler Gear Roller Bearing
10. Idler Shaft
11. Carrier Drive Gear
12. Carrier Shaft Retainer Plate
13. Carrier Gear Roller Bearing
14. Lube Oil Jumper Assembly
15. Carrier Bearing Support

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Fig.2 - Gear Drive Section

top of these supports and will correspond with serial numbers of all mating doweling components. Alignment of the doweling assembly bores is held to within .0005" during manufacture.

When incorrect doweling items are assembled, the bore through the turbocharger will become misaligned. This will have a serious effect on rotating assembly alignment and gear train geometry.

A list of part numbers for turbochargers adaptable to both engine rotations may be found in Marine Engine Parts Catalogs.

GENERAL CONTENTS

MODEL 567D ENGINE

CONVERSION PROCEDURES

LEFT-HAND TO RIGHT-HAND ROTATION ENGINES

Having a completely assembled left-hand rotation engine turbocharger in serviceable condition available, refer to Fig. 3, and perform the following steps:

1. Remove lockwire and the two bolts (1) and four bolts (7) holding jumper assembly (6) in place. Remove jumper assembly and the top thrust washer (13).

2. Remove lockwire and three bolts (2) holding carrier shaft drive gear retainer (3). Prevent gears from rotating by blocking gear teeth with a wood or brass rod.

NOTE

Flange on roller bearing outer race will not pass over carrier shaft drive gear retainer.

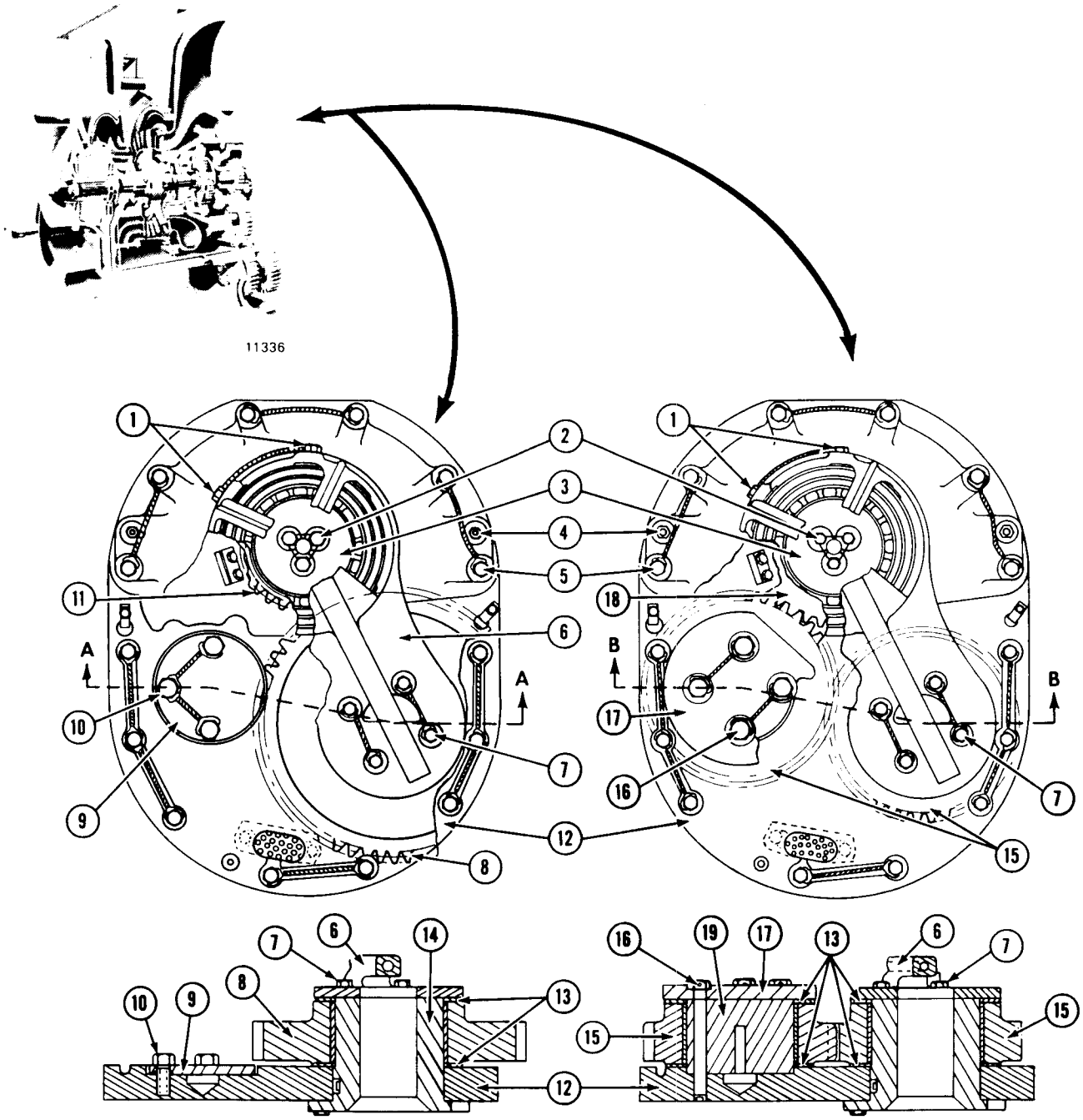
3. Remove lockwire and six bolts (5) holding carrier bearing support (12).

4. Remove the two nuts (4) and washers which lock the two long taper dowels between the carrier bearing support and the idler gear support. Use hardened drift punch 9525495, Fig. 4, which will clear the threads on the dowel projection and will shoulder on the end of the dowel, to drive the dowel back slightly. This dowel is tapered and is held in position by the nut and washer. It cannot be removed from the exposed end.

CAUTION

Do not drive dowel out by hitting the threaded extension as the dowel has been hardened and the extension will snap off.

5. When the dowels are free, the carrier bearing support (12), Fig. 3, can be removed. The outer



1. Bolt, 5/16"-18
2. Bolt, 3/8"-24
3. Carrier Shaft Drive Gear Retainer
4. Nut, 5/16"-24
5. Bolt, 3/18"-16
6. Jumper Assembly
7. Bolt, 3/8"-24
8. Idler Gear & Bearing Assembly (LH Rot. Only)
9. Cover (LH Rot. Only)
10. Bolt, 1/2"-13 (LH Rot. Only)
11. Carrier Drive Gear (LH Rot. Only)
12. Carrier Bearing Support
13. Idler Gear Thrust Washer
14. Idler Shaft
15. Idler Gear & Bearing Assembly (RH Rot. Only)
16. Bolt, 1/2"-13 (RH Rot. Only)
17. Flange (RH Rot. Only)
18. Carrier Drive Gear (RH Rot. Only)
19. Idler Shaft (RH Rot. Only)
20. Idler Gear Support

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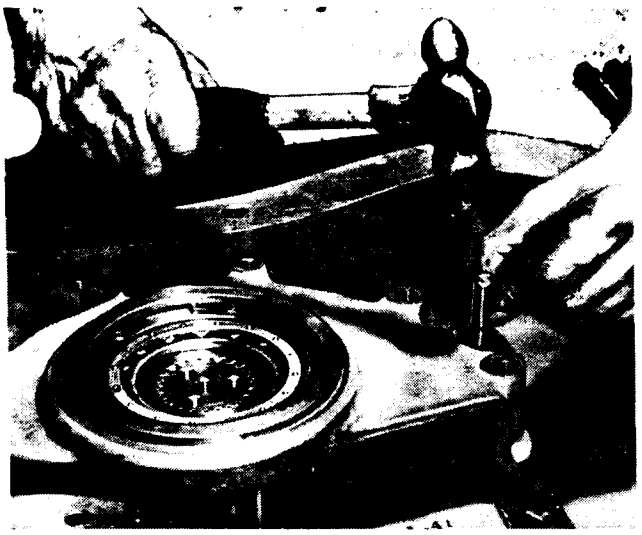
Fig.3 – Turbocharger Conversion Details – 567D Engines



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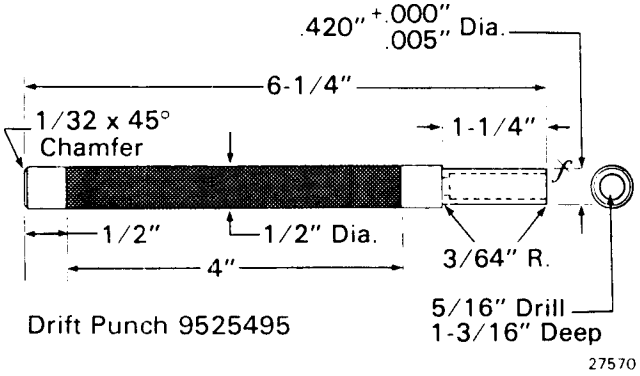


Fig.4 - Freeing Dowels From Carrier Bearing Support

race of the roller bearing will remain in the support, and care should be taken to insure that the carrier drive gear does not slide off with the support. The carrier shaft will remain in place, being held by the ball bearing at the other end of the carrier shaft.

6. Slide the carrier drive gear (11), Fig. 3, off of the carrier shaft.

7. Slide the turbocharger idler gear (8) off of the idler shaft (14) with the bottom thrust washer (13).

8. Remove lockwire and three bolts (10) from the cover (9) and remove cover. If the cover sticks, counterbores have been provided to permit insertion of a screwdriver to pry off the cover. Care should be exercised so that the bottom surface of the counterbore and the pilot are not damaged. Any raised edges or nicks will affect the squareness of the second idler shaft.

Using the additional parts required for the conversion, and referring to Fig. 1, complete the conversion as follows:

9. Clean the counterbore for the idler shaft (19) and check for burrs and foreign matter on the shaft and in the counterbore.

10. Install the idler shaft in the pilot and draw into the installed position with the flange (17) and four bolts (16). Torque bolts to 110 N·m (82 ft-lbs).

Check the idler shaft installation by measuring either the minimum distance between the two shafts or the maximum distance over the outside of the two shafts. Two measurements should be taken, one at each end of the shafts approximately 10 mm (3/8") from the ends of the shafts. The two dimensions should be within 0.046 mm (.0018").

12. Remove bolts (16) and flange (17). Apply idler gear (41 teeth) and bearing assembly (15), and two thrust washers (13) which were previously removed. Reapply flange (17) and bolts (16). Torque bolts to 110 N·m (82 ft-lbs) and check idler gear end thrust for 0.20-0.48 mm (.008"-.019") clearance. Lockwire bolts.

13. Remove the roller bearing inner race from the carrier drive gear, which was removed in step 6. The fit between the gear and the inner race is a light tap fit and the race can be removed by using two screwdrivers and lifting simultaneously under two sides.

14. Tap the inner race into position on the new carrier drive gear (18).

15. Install the carrier drive gear on the splined carrier shaft.

16. Apply the other idler gear (41 teeth) and bearing assembly (15) and one thrust washer (13).

17. Reapply the carrier bearing support (12) over two long tapered dowels. Apply the dowel washers and locknuts (4) and tighten. Dowels should be tightened prior to applying the bolts in order to obtain proper alignment.

18. Apply the six washers and bolts (5) and torque to 46 N·m (34 ft-lbs). Lockwire bolts.

19. Reapply carrier shaft drive gear retainer (3). Apply three bolts (2) and torque to 52 N·m (38 ft-lbs). Lockwire bolts.

20. Reapply jumper assembly (6) and thrust washer (13). Apply four bolts (7) and torque to 52 N·m (38 ft-lbs); and two bolts (1) and torque 24 N·m (18 ft-lbs). Lockwire bolts.

21. Check idler gear end thrust for 0.20-0.48 mm (.008"-.019") clearance. Check backlash between two idler gears (15) and between second idler gear and carrier drive gear. Backlash should be 0.15-0.25 mm (.006"-.010").

This completes the conversion of a left-hand to right-hand rotation turbocharger.

RIGHT-HAND TO LEFT-HAND ROTATION ENGINES

Using the material as applicable to right-hand to left-hand rotation engine conversion, refer to Fig. 3 and to the procedural steps as detailed for the left-hand to right-hand conversion. However, the pilot for the idler shaft (19) is an interference fit and must be removed with a puller. A straddle type puller must be used as the puller bolt holes do not go through the stubshaft. It is not desirable to jack against the seat for the idler shaft.

When the conversion is completed, the remaining material will correspond to the list of material required for the left-hand to right-hand rotation conversion.

PARTS LISTS

APPLICATION: 567D MARINE TURBOCHARGERS, 16-CYLINDER ENGINES

PARTS NEEDED TO CONVERT LEFT-HAND ROTATION ENGINE TURBOCHARGER TO RIGHT-HAND ROTATION ENGINE TURBOCHARGER

8344787 (New Left-Hand Turbocharger) to 8349363 (New Right-Hand Turbocharger)
8296473 (UTEX Left-Hand Turbocharger) to 8296475 (UTEX Right-Hand Turbocharger)
8422031 (Obs. Left-Hand Turbocharger) to 8422032 (Obs. Right-Hand Turbocharger)

PART NO.	QTY.	DESCRIPTION	ITEM (Fig. 3)
8284500	2	Idler Gear and Bearing Assembly	15
8261102	2	Thrust Washers	13
8309726	1	Idler Shaft	19
8309760	1	Flange	17
8314058	4	Bolt 1/2"-13	16
8261208	1	Carrier Drive Gear	18

NOTE

This also represents the list of parts which should be left over when a right-hand turbocharger is converted to a left-hand turbocharger.

PARTS NEEDED TO CONVERT RIGHT-HAND ROTATION ENGINE TURBOCHARGER TO LEFT-HAND ROTATION ENGINE TURBOCHARGER

8349363 (New Right-Hand Turbocharger) to 8344787 (New Left-Hand Turbocharger)
8296475 (UTEX Right-Hand Turbocharger) to 8296473 (UTEX Left-Hand Turbocharger)

PART NO.	QYT.	DESCRIPTION	ITEM (Fig. 3)
8309723	1	Idler Gear And Bearing Assembly	8
8307199	1	Cover Plate	9
8314057	3	Bolt 1/2"-13	10
8309724	1	Carrier Drive Gear	11

NOTE

This also represents the list of parts which should be left over when left-hand turbocharger is converted to a right-hand turbocharger.

MODEL 645 ENGINES

CONVERSION PROCEDURES

LEFT-HAND TO RIGHT-HAND ROTATION ENGINE

Having a completely assembled left-hand rotation engine turbocharger in serviceable condition available, refer to Fig. 5, and perform the following steps:

1. Remove lockwire and the two bolts (1) holding jumper assembly (2) in place. Remove jumper assembly.

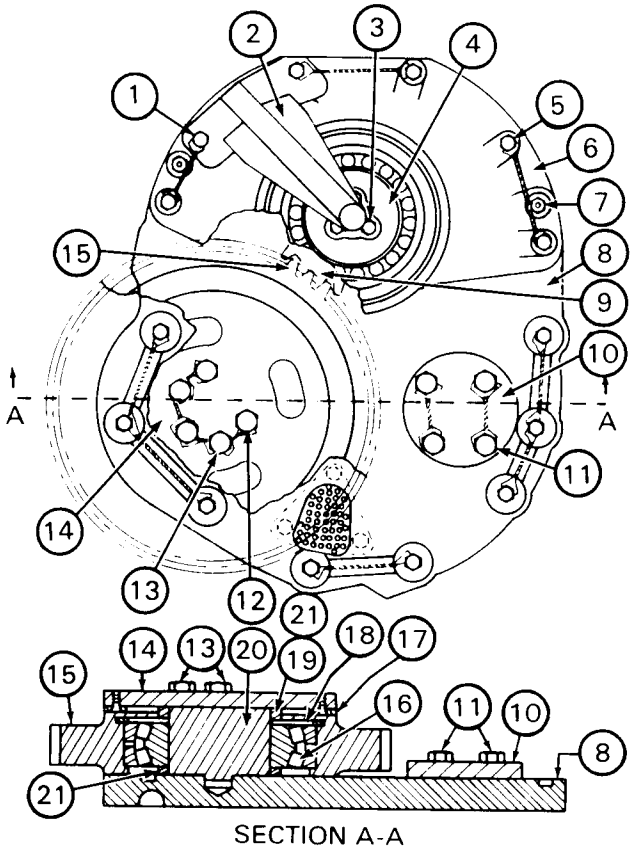
2. Remove lockwire and three bolts (3) holding carrier shaft drive gear retainer (4). Prevent gears from rotating by blocking gear teeth with a wood or brass rod.

3. Remove lockwire and the remaining four bolts (5) holding the carrier bearing support (6).

4. Remove the two nuts (7) and washers which lock the two long tapered dowels between the carrier bearing support (6) and the idler gear support (8). Use hardened drift punch 9525495, Fig. 4, which will clear the threads on the dowel projection and will shoulder on the end of the dowel, to drive the dowel back slightly. This dowel is tapered and is held in position by the nut and washer. It cannot be removed from the exposed end.

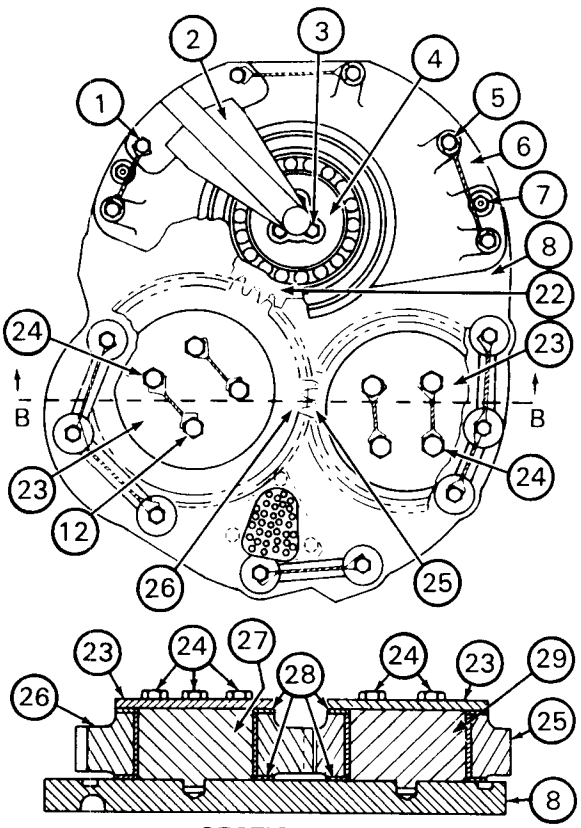
CAUTION

Do not drive dowel out by hitting the threaded extension as the dowel has been hardened and the extension will snap off.



SECTION A-A

LEFT-HAND ROTATION ENGINES



SECTION B-B

RIGHT-HAND ROTATION ENGINES

1. Bolt, 3/8"-16 x 4-3/4"
2. Jumper Assembly
3. Bolt, 3/8"-24 x 1"
4. Carrier Shaft Drive Gear Retainer
5. Bolt, 3/8"-16 x 4-1/4"
6. Carrier Bearing Support
7. Nut 5/16"-24
8. Idler Gear Support
9. Carrier Drive Gear
10. Cover
11. Bolt, 1/2"-13 x 1-1/8"
12. Bolt, 1/2"-13 x 4-3/4"
13. Bolt, 1/2"-13 x 3-1/2"
14. Retainer Plate
15. Idler Gear
16. Roller Bearing
*17. Thrust Washer
18. Retaining Ring
19. Outer Spacer
20. Idler Gear Stubshaft
21. Inner Or Outer Spacer
22. Carrier Drive Gear
23. Retainer Plate
24. Bolt, 1/2"-13 x 3-3/4"
25. Drive Idler Gear And Bearing Assembly
26. Carrier Idler Gear And Bearing Assembly
27. Idler Gear Stubshaft
28. Thrust Washer
29. Idler Gear Stubshaft

*Not used on high capacity gear train units.

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Fig.5 - Turbocharger Conversion Details - 645 Engines

5. When the dowels are free, the carrier bearing support (6), Fig. 5, can be removed. The carrier shaft will remain in place, being held by the ball bearing at the other end of the carrier shaft.

6. Slide the carrier drive gear (9) off of the carrier shaft.

7. Remove the roller bearing inner race from the carrier drive gear. This is a tap fit and the race can be removed by prying under opposite sides of the race.

8. Tap the inner race on carrier drive gear (22) with a non-metallic mallet.

9. Remove the lockwire and bolts (12 & 13) from the idler gear retainer plate (14) and remove plate with attached thrust washer (17).

NOTE

Thrust washer (17) not applied on turbochargers with high capacity gear trains. Use is on units with standard gear train only.

10. Lift off outer spacer (19) and remove idler gear (15), bearing assembly (16), idler gear shaft (20), and inner spacer (21) from idler gear support (8).

11. Perform the following if it is desired to disassemble the idler gear (15) and bearing (16) from the idler shaft (20), as they were removed as an assembly.

    a. Press idler stubshaft (20) out of bearing (16) from end opposite pilot. Apply pressing forces on inner race of bearing.

    b. Remove retainer ring (18) from gear inner bore. Press against outer race of bearing from end opposite thrust washer (17) and remove bearing (16) from gear (15).

12. Remove lockwire and four bolts (11) from the cover (10) and remove cover. If cover sticks, counterbores have been provided to permit insertion of a screwdriver to pry off the cover. Care should be exercised so that the flat surface of the idler gear support and the pilot are not damaged. Any raised edges or nicks will affect the squareness of the second idler stubshaft and should be removed by stoning.

ing the additional parts required for the conversion, id referring to Fig. 5, complete the conversion as follows:

13. Clean the counterbores for the idler stubshafts (27 & 29) and check for burrs and foreign matter on shafts, in counterbores, and on clamping surfaces.

14. Install the idler stubshafts (27 & 29) in the pilots and draw into the installed position with the retainer plates (23) and bolts (12 & 24). Torque bolts to 110 N·m (82 ft-lbs).

15. Remove bolts and retainer plates. Place inner thrust washer (28) over shaft and apply idler gear (41 teeth) and bearing assembly (25). Place outer thrust washer (28) on gear and reapply retainer plate (23) and four bolts (24). Torque bolts to 110 N·m (82 ft-lbs) and check idler gear end thrust. Lockwire bolts.

16. Place inner thrust washer (28) over shaft and apply the idler gear (47 teeth) and bearing assembly (26). Place outer thrust washer (28) on gear and reapply retainer plate (23) and three bolts (24) and one bolt (12). Torque bolts to 110 N·m (82 ft-lbs) and check idler gear end thrust. Lockwire bolts.

17. Install the carrier drive gear (22) on the carrier shaft.

18. Reapply the carrier bearing support (6) over the two long tapered dowels. Apply the dowel washers and locknuts (7) and tighten. Dowels should be tightened prior to applying the bolts in order to obtain proper alignment.

19. Apply the four washers and bolts (5) and torque to 46 N·m (34 ft-lbs). Lockwire bolts.

20. Reapply carrier shaft drive gear retainer (4). Apply three bolts (3) and torque to 52 N·m (38 ft-lbs). Lockwire bolts.

21. Reapply jumper assembly (2). Apply two bolts (1) and torque to 46 N·m (34 ft-lbs). Lockwire bolts.

22. Check thrust measurement between idler gear and stubshaft at two different points 180° apart. The average value of the two readings is used. For right-hand rotating to left-hand rotating conversions the average value must be between 0.13 mm -1.25 mm (.005"-.049").

    For left-hand rotating to right-hand rotating conversions the average value must be between 0.23 mm-0.48 mm (.009"-.019").

23. Check backlash between two idler gear (25 & 26), and between second idler gear (26) and carrier drive gear (22). Backlash should be 0.15-0.25 mm (.006"-.010").

This completes the conversion of a left-hand to right-hand rotating engine turbocharger.

RIGHT-HAND TO LEFT-HAND ROTATION ENGINE

Use the material as applicable to right-hand to left-hand conversion. Refer to Fig. 5 and to the procedural steps as detailed for the left-hand to right-hand conversion.

When the conversion is completed, the remaining material will correspond to the list of material required for the left-hand to right-hand conversion.

CONVERSION PARTS LIST (Kit No. 9548053)

APPLICATION: 8-CYLINDER "STANDARD" TURBOCHARGERS, 645 ENGINES

PARTS NEEDED TO CONVERT LEFT-HAND ROTATION ENGINE TURBOCHARGER TO RIGHT-HAND ROTATION ENGINE TURBOCHARGER

9319023 (New L8E5/E7) to 9319024 (New R8E5/E7) (Discontinued)
9319025 (UTEX L8E5/E7) to 9319026 (UTEX R8E5/E7) (Discontinued)
8431867 (Obs. L8E5) to 8432523 (Obs. R8E5) (Ratchet Clutch) (Discontinued)
9503219 (New L8E7B) to 9503220 (New R8E7B)
9526868 (UTEX L8E7B) to 9526869 (UTEX R8E7B)
9546861 (New L8E7C) to 9546863 (New R8E7C)

NOTE

Turbocharger assembly part numbers listed for Model E5 and E7 engines are discontinued - replaced by equivalent part numbers for Model E7B engines. As of December 1, 1981, all units provided by EMD for E5 or E7 applications on a new, UTEX, or Repair and Return basis are of the E7B configuration.

PART NO.	QTY.	DESCRIPTION	ITEM (Fig. 5)
8387223	3	Washer, 1/2", Hardened (Used With 8364017)	*
8364009	7	Bolt 1/2"-13	24
8363958	1	Retaining Plate - Drive Gear Idler	23
8425304	1	Carrier Drive Gear	22
8411280	1	Idler Stubshaft - Drive Gear Idler	29
8364017	1	Gear and Bearing Assembly - Carrier Gear Idler	26
8261102	4	Thrust Washer	28
8364016	1	Gear and Bearing Assembly - Drive Gear Idler	25
8425303	1	Retainer Plate - Carrier Gear Idler	23
8467289	1	Idler Stubshaft - Carrier Gear Idler	27

*Not illustrated.

NOTE

This also represents the list of parts which should be left over when a right-hand turbocharger is converted to a left-hand turbocharger.

CONVERSION PARTS LIST (Kit No. 9548054)

APPLICATION: 8-CYLINDER "STANDARD" TURBOCHARGERS, 645 ENGINES

PARTS NEEDED TO CONVERT RIGHT-HAND ROTATION ENGINE TURBOCHARGER TO LEFT-HAND ROTATION ENGINE TURBOCHARGER

9319024 (New R8E5 E7) to 9319023 (New L8E5 E7) (Discontinued)
9319026 (UTEX R8E5 E7) to 9319025 (UTEX L8E5 E7) (Discontinued)
9503220 (New R8E7B) to 9503219 (New L8E7B)
9526869 (UTEX R8E7B) to 9526868 (UTEX L8E7B)
9546863 (UTEX R8E7C) to 9546861 (New L8E7C)

NOTE

Turbocharger assembly part numbers listed for Model E5 and E7 engines are discontinued replaced by equivalent part numbers for Model E7B engines. As of December 1, 1981, all units provided by EMD for E5 or E7 applications on a new, UTEX, or Repair and Return basis are of the E7B configuration.

PART NO.	QTY.	DESCRIPTION	ITEM (Fig. 5)
100803	4	Screw No. 6-32 (Attaches 8358579 To 8358574)	*
8358567	4	Bolt 1/2"-13	12
9432384	1	Bearing	16
8358571	1	Spacer	19
8358573	1	Retaining Ring	18
8358574	1	Retainer Plate	14
8391273	1	Carrier Drive Gear	9
8411281	1	Idler Stubshaft	20
8391274	1	Idler Gear	15
8358579	1	Thrust Washer	17
8358582	1	Spacer	21
9433120	1	Bearing (Alternate For 9432384)	16
8314057	4	Bolt 1/2"-13	11
8363847	1	Cover Plate	10

*Not illustrated.

NOTE

This also represents the list of parts which should be left over when a left-hand turbocharger is converted to a right-hand turbocharger.

CONVERSION PARTS LIST

APPLICATION: 12-, 16- & 20-CYLINDER "STANDARD" TURBOCHARGERS, 645 ENGINES

PARTS NEEDED TO CONVERT LEFT-HAND ROTATION ENGINE TURBOCHARGER TO RIGHT-HAND ROTATION ENGINE TURBOCHARGER

8369662 (New L12E5 E7) to 8369663 (New R12E5 E7)
8379296 (UTEX L12E5 E7) to 8379297 (UTEX R12E5 E7)
8412598 (Obs. L12E5) to 8412599 (Obs. R12E5) (Ratchet Clutch)

8363759 (New L16E5 E7) to 8363760 (New R16E5 E7) (Roller Clutch)
8379294 (UTEX L16E5 E7) to 8379295 (UTEX R16E5 E7) (Roller Clutch)
8411799 (Obs. L16E5) to 8411800 (Obs. R16E5) (Ratchet Clutch)
8490641 (Obs. L16E7) to 8490642 (Obs. R16E7) (Ratchet Clutch)

8374985 (New L20E5 E7) to 8374986 (New R20E5 E7) (Roller Clutch)
8380124 (UTEX L20E5 E7) to 8380125 (UTEX R20E5 E7) (Roller Clutch)
8412429 (Obs. L20E5) to 8412430 (Obs. R20E5) (Ratchet Clutch)
8419245 (Obs. L20E5) to 8419246 (Obs. R20E5) (Ratchet Clutch)

NOTE

All turbocharger assembly part numbers listed above for Model E5 and E7 engines have been discontinued replaced by equivalent part numbers for Model E7B engines with "High Capacity" gear trains as listed on page 13. As of December 1, 1981, all units provided by EMD for E5 or E7 applications on a new, UTEX, or Repair and Return basis are of the E7B configuration.

PART NO.	QTY.	DESCRIPTION	ITEM (Fig. 5)
8387223	3	Washer 1 2", Hardened (Used With 8364017)	*
8364009	7	Bolt 1 2"-13	24
8363958	2	Retainer Plates - Carrier & Drive Gear Idlers	23
8363810	1	Carrier Drive Gear	22
8411280	2	Idler Stubshafts - Carrier & Drive Gear Idlers	27 & 29
8364017	1	Gear and Bearing Assembly - Carrier Gear Idler	26
8261102	4	Thrust Washer	28
8364016	1	Gear and Bearing Assembly - Drive Gear Idler	25

*Not illustrated.

NOTE

This also represents the list of parts which should be left over when a right-hand turbocharger is converted to a left-hand turbocharger.

CONVERSION PARTS LIST

APPLICATION: 12-, 16- & 20-CYLINDER "STANDARD" TURBOCHARGERS, 645 ENGINES

PARTS NEEDED TO CONVERT RIGHT-HAND ROTATION ENGINE TURBOCHARGER TO LEFT-HAND ROTATION ENGINE TURBOCHARGER

8369663 (New R12E5/E7) to 8369662 (New L12E5/E7)
8379297 (UTEX R12E5/E7) to 8379296 (UTEX L12E5/E7)

8363760 (New R16E5/E7) to 8363759 (New L16E5/E7) (Roller Clutch)
8379295 (UTEX R16E5/E7) to 8379294 (UTEX L16E5/E7) (Roller Clutch)
8411800 (Obs. R16E5) to 8411799 (Obs. L16E5) (Ratchet Clutch)
8490642 (Obs. R16E7) to 8490641 (Obs. L16E7) (Ratchet Clutch)

8374986 (New R20E5/E7) to 8374985 (New L20E5/E7) (Roller Clutch)
8380125 (UTEX R20E5/E7) to 8380124 (UTEX L20E5/E7) (Roller Clutch)
8412430 (Obs. R20E5) to 8412429 (Obs. L20E5) (Ratchet Clutch)
8419246 (Obs. R20E5) to 8419245 (Obs. L20E5) (Ratchet Clutch)

NOTE

All turbocharger assembly part numbers listed above for Model E5 and E7 engines have been discontinued replaced by equivalent part numbers for Model E7B engines with "High Capacity" gear trains as listed on page 14. As of December 1, 1981, all units provided by EMD for E5 or E7 applications on a new, UTEX, or Repair and Return basis are of the E7B configuration.

PART NO.	QTY.	DESCRIPTION	ITEM (Fig. 5)
100803	4	Screw No. 6-32 (Attaches 8358579 To 8358574)	*
8358567	4	Bolt 1/2"-13	12
9432384	1	Bearing	16
8358571	1	Spacer	19
8358573	1	Retaining Ring	18
8358574	1	Retainer Plate	14
8358575	1	Carrier Drive Gear	9
8411281	1	Idler Stubshaft	20
8358578	1	Idler Gear	15
8358579	1	Thrust Washer	17
8358582	1	Spacer	21
9433120	1	Bearing (Alternate For 9432384)	16
8314057	4	Bolt 1/2"-13	11
8363847	1	Cover Plate	10

*Not illustrated.

NOTE

This also represents the list of parts which should be left over when a left-hand turbocharger is converted to a right-hand turbocharger.

CONVERSION PARTS LIST (Kit No. 9548050)

APPLICATION: 12-, 16- & 20-CYLINDER HIGH CAPACITY GEAR TRAIN, 645 ENGINES

PARTS NEEDED TO CONVERT LEFT-HAND ROTATION ENGINE TURBOCHARGER TO RIGHT-HAND ROTATION ENGINE TURBOCHARGER

9328969 (New L12E5 E7B) to 9326195 (New R12E5 E7B)
9084530 (UTEX L12E5 E7B) to 9084531 (UTEX R12E5 E7B)
9547271 (New L12E7C) to 9547272 (New R12E7C)

9544364 (New L16E7) to 9544363 (New R16E7)
9084532 (New L16E5 E7) to 9084533 (New R16E5 E7) (Discontinued)
9087159 (UTEX L16E5 E7) to 9087158 (UTEX R16E5 E7) (Discontinued)
9509652 (New L16E7B) to 9509654 (New R16E7B)
9526870 (UTEX L16E7B) to 9526871 (UTEX R16E7B)
9546632 (New L16E7C) to 9546634 (NEW R16E7C)

9085862 (New L20E5 E7) to 9085863 (New R20E5 E7) (Discontinued)
9093611 (UTEX L20E5 E7) to 9093612 (UTEX R20E5 E7) (Discontinued)
9509658 (New L20E7B) to 9509660 (New R20E7B)
9526872 (UTEX L20E7B) to 9526873 (UTEX R20E7B)
9546525 (New L20E7C) to 9546719 (New R20E7C)

NOTE

Most turbocharger assembly part numbers listed above for Model E5 and E7 engines have been discontinued replaced by equivalent part numbers for Model E7B engines. As of December 1, 1981, all units provided by EMD for E5 or E7 applications on a new, UTEX, or Repair and Return basis are of the E7B configuration.

PART NO.	QTY.	DESCRIPTION	ITEM (Fig. 5)
8387223	3	Washer 1/2", Hardened (Used With 8364017)	*
8364009	7	Bolt 1/2"-13	24
8363958	1	Retainer Plate - Drive Gear Idler	23
8411280	1	Idler Stubshaft - Drive Gear Idler	29
8364017	1	Gear and Bearing Assembly - Carrier Gear Idler	26
8261102	4	Thrust Washer	28
8364016	1	Gear and Bearing Assembly - Drive Gear Idler	25
8425303	1	Retainer Plate - Carrier Gear Idler	23
8467289	1	Idler Stubshaft - Carrier Idler	27

*Not illustrated.

NOTE

This also represents the list of parts which should be left over when a right-hand turbocharger is converted to a left-hand turbocharger. Carrier drive gear 8425304 is re-used.

NOTE

To change gear ratio from Standard 16.8:1 to 17.9:1, substitute 9534379 Idler Stubshaft (item 27) for 8467289, 9538682 Retainer Plate (item 23) for 8425303, and replace Carrier Drive Gear 8425304 with 8358575.

CONVERSION PARTS LIST (Kit No. 9548051)

APPLICATION: 12-, 16- & 20-CYLINDER HIGH CAPACITY GEAR TRAIN, 645 ENGINES

PARTS NEEDED TO CONVERT RIGHT-HAND ROTATION ENGINE TURBOCHARGER TO LEFT-HAND ROTATION ENGINE TURBOCHARGER

9326195 (New R12E5/E7B) to 9328969 (New L12E5/E7B)
9084531 (UTEX R12E5/E7B) to 9084530 (UTEX L12E5/E7B)
9547272 (New R12E7C) to 9547271 (New L12E7C)

9544363 (New R16E7) to 9544364 (New L16E7)
9084533 (New R16E5/E7) to 9084532 (New L16E5/E7) (Discontinued)
9087158 (UTEX R16E5/E7) to 9087159 (UTEX L16E5/E7) (Discontinued)
9509654 (New R16E7B) to 9509652 (New L16E7B)
9526871 (UTEX R16E7B) to 9526870 (UTEX L16E7B)
9546634 (New R16E7C) to 9546632 (New L16E7C)

9085863 (New R20E5/E7) to 9085862 (New L20E5/E7) (Discontinued)
9093612 (UTEX R20E5/E7) to 9093611 (UTEX L20E5/E7) (Discontinued)
9509660 (New R20E7B) to 9509658 (New L20E7B)
9526873 (UTEX R20E7B) to 9526872 (UTEX L20E7B)
9546719 (New R20E7C) to 9546525 (New L20E7C)

NOTE

Most turbocharger assembly part numbers listed above for Model E5 and E7 engines have been discontinued - replaced by equivalent part numbers for Model E7B engines. As of December 1, 1981, all units provided by EMD for these E5 or E7 applications on a new, UTEX, or Repair and Return basis are of the E7B configuration.

PART NO.	QTY.	DESCRIPTION	ITEM (Fig. 5)
8358567	3	Bolt 1/2"-13	12
9432384	1	Bearing	16
8358573	1	Retaining Ring	18
8493678	1	Retainer Plate	14
8493677	1	Idler Stubshaft	20
8493361	1	Idler Gear	15
8358580	1	Bolt 1/2"-13	13
8358582	2	Spacers	19 & 21
9433120	1	Bearing (Alternate For 9432384)	16
8314057	4	Bolt 1/2"-13	11
8363847	1	Cover Plate	10

NOTE

This also represents the list of parts which should be left over when a left-hand turbocharger is converted to a right-hand turbocharger. Carrier drive gear 8425304 is re-used.

NOTE

To change gear ratio from standard 16.8:1 to 17.9:1, substitute 9319941 Idler Stubshaft (item 20) for 8493677, 9319942 Retainer Plate (item 14) for 8493678, and replace Carrier Drive Gear 8425304 with 8358575.

CONVERSION PARTS LISTS

APPLICATION: 16-CYLINDER MILITARY HIGH SHOCK TURBOCHARGERS, 645 ENGINES

PARTS NEEDED TO CONVERT LEFT-HAND ROTATION ENGINE TURBOCHARGER TO RIGHT-HAND ROTATION ENGINE TURBOCHARGER

8387018 (New L16E7) to 8387019 (New R16E7)
9545016 (New L16E5N) to 9545017 (New R16E5N)

PART NO.	QTY.	DESCRIPTION	ITEM (Fig. 5)
8387223	3	Washer 1 2", Hardened (Used With 8364017)	*
8364016	1	Idler & Bearing Assembly - Drive Gear Idler	25
8364009	7	Bolt 1 2"-13	24
8364017	1	Idler & Bearing Assembly - Carrier Gear Idler	26
8261102	4	Thrust Washer	28
8363958	2	Retainer Plates - Carrier & Drive Gear Idlers	23
8363810	1	Carrier Drive Gear	22
8411280	2	Idler Stubshafts - Carrier & Drive Gear Idlers	27 & 29

*Not illustrated.

NOTE

This also represents the list of parts which should be left over when a right-hand turbocharger is converted to a left-hand turbocharger.

PARTS NEEDED TO CONVERT RIGHT-HAND ROTATION ENGINE TURBOCHARGER TO LEFT-HAND ROTATION ENGINE TURBOCHARGER

8387019 (New R16E7) to 8387018 (New L16E7)
9545017 (New R16E5N) to 9545016 (New L16E5N)

PART NO.	QTY.	DESCRIPTION	ITEM (Fig. 5)
100803	4	Screw No. 6-32 (Attaches 8358579 To 8358574)	*
8363847	1	Cover Plate	10
9432384	1	Bearing	16
8358571	1	Spacer	19
8358573	1	Retaining Ring	18
8358574	1	Retainer Plate	14
8358575	1	Carrier Drive Gear	9
8411281	1	Idler Stubshaft	20
8358578	1	Idler Gear	15
8358579	1	Thrust Washer	17
8358582	1	Spacer	21
8314057	4	Bolt 1/2"-13	11
9433120	1	Bearing (Alternate for 9432384)	16
8358567	4	Bolt 1/2"-13	13

*Not illustrated.

NOTE

This also represents the list of parts which should be left over when a left-hand turbocharger is converted to a right-hand turbocharger.