

# MOTORS

**Repair Instructions**

*RE 540/541 Series*



*together in motion*

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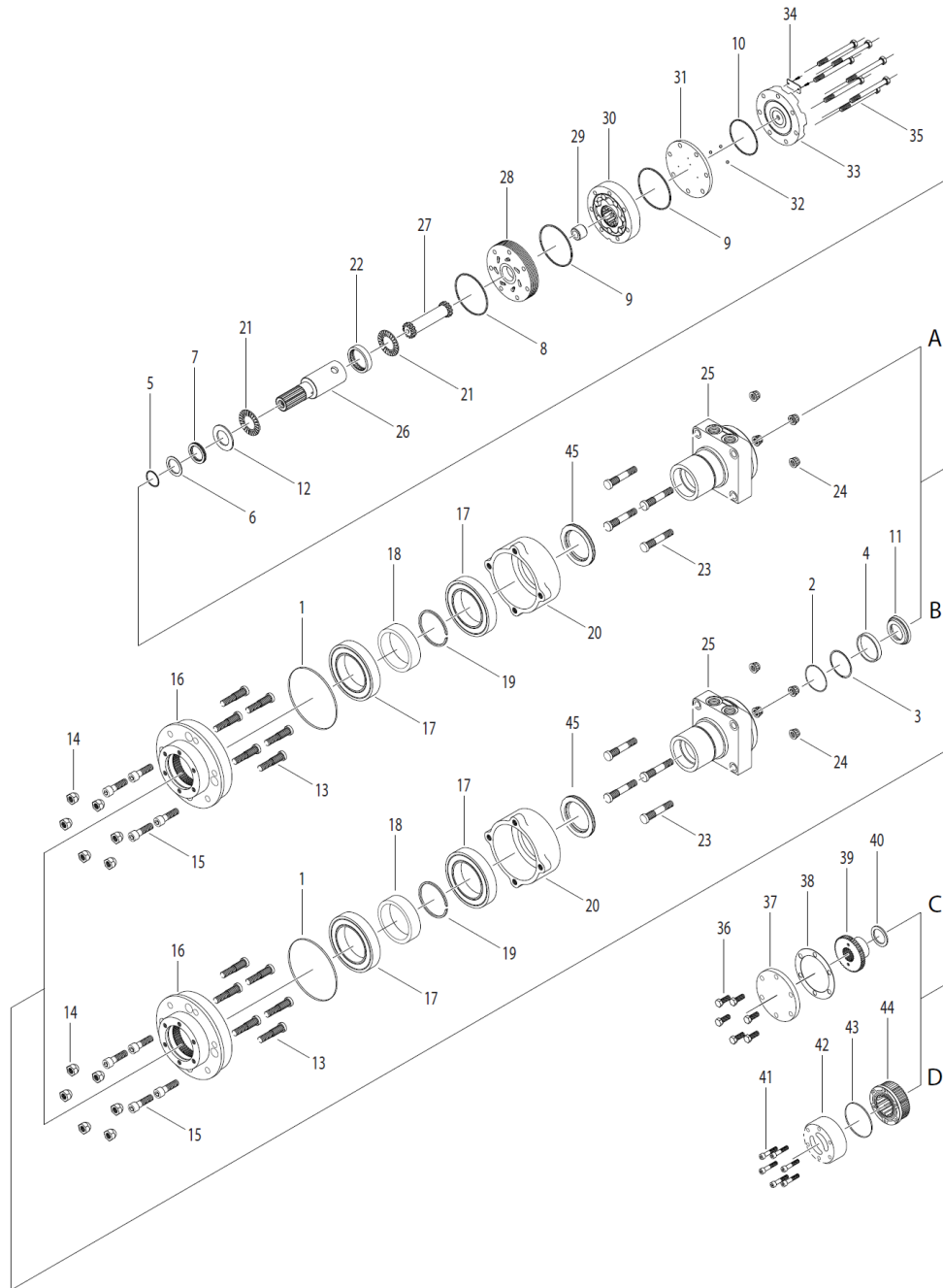


## Contents

<b>RE 540/541 Exploded View</b> _____	<b>4</b>
Exploded View _____	4
<b>RE 540/541 Motor Section Disassembly</b> _____	<b>5</b>
RE 540/541 Direct Drive Option Disassembly _____	6
RE 540/541 Locking Hub Option Disassembly _____	6
RE 540/541 Motor Section General Disassembly _____	6
<b>RE 540/541 Housing/Shaft with Seal Carrier Disassembly &amp; Assembly</b> _____	<b>7</b>
<b>RE 540/541 Housing/Shaft Assembly without Seal Carrier Disassembly &amp; Assembly</b> _____	<b>8</b>
<b>RE 540/541 Motor Section Assembly</b> _____	<b>9</b>
RE 540/541 Motor Section General Assembly _____	9
RE 540/541 Direct Drive Option Assembly _____	9
RE 540/541 Locking Hub Option Assembly _____	10
<b>RE 540/541 Replacement Kits</b> _____	<b>10</b>
Available Kits _____	10
Rotors, drive links and spacers, and bolts _____	11
Housing kits _____	11

# RE 540/541 Exploded View

## Exploded View



**Table 1: Options**

Description	Option Letter
Design without seal carrier	A
Seal carrier design	B
Direct drive option	C
Locking hub option	D

## Component List

Description	Item Number	Description	Item Number
Flange seal	1	Mounting nut	24
Wire ring	2	Housing	25
Metal backup shim	3	Shaft	26
High pressure seal	4	Drive link	27
Metal backup shim	5	Manifold	28
Backup seal	6	Drive link spacer	29
Shaft seal	7	Rotor assembly	30
Housing seal	8	Balance plate	31
Body seal	9	Steel ball	32
Endcover seal	10	Endcover	33
Seal carrier	11	ID tag assembly	34
Thrust washer	12	Assembly bolt	35
Stud	13	Driver cover screw	36
Lug nut	14	Driver cover	37
Capscrew	15	Paper gasket	38
Wheel flange	16	Driver	39
125mm bearing	17	Spacer	40
Bearing spacer	18	Screw	41
Thrust ring	19	Locking hub	42
Bearing hub	20	Wire ring	43
Thrust bearing	21	Locking hub spline assembly	44
Rear housing bearing	22	Motor/Hub seal	46
Planetary mount stud	23		

**Note:** The motor design that utilizes a seal carrier will use the larger O.D. backup seal and shaft seal.

## RE 540/541 Motor Section Disassembly

dimensions: mm [in]

**Note:** In December 2006, the 540 series incorporated a design change. This set of instructions will aid in the disassembly and assembly for both designs. Please refer to the exploded view drawing to determine which design is being repaired and follow the appropriate instructions for that design.

The 540 Series is available with either a direct drive option or a locking hub option. After determining which option you have, use the appropriate instruction.

All internal seals on products manufactured after July 1, 2016 are o-ring seals. Prior to this date the internal seals were square cut seals. It is recommended that if the product being serviced has square seals to replace with the square seals in this kit, likewise if the product has o-ring seals, replace with the o-ring seals in this kit.

## RE 540/541 Direct Drive Option Disassembly

### Uses items 36-40

Remove six bolts (36) from end cap (37).

- a) Lift end cap (37) off wheel flange (16).
- b) Peel or scrape paper gasket (38) off of end cap and/or wheel flange (16).
- c) If grease is between end cap (37) and driver (39), remove grease.
- d) Screw a 1/4-20 bolt (NOT INCLUDED) into one of the two threaded holes in the driver (39) and lift the driver out of the wheel flange (16).
- e) If grease is between driver (39) and housing pilot (25), remove grease.
- f) If spacer (40) did not come out with driver (39), remove it at this time and lay aside.

## RE 540/541 Locking Hub Option Disassembly

### Uses Items 41-44

Remove six screws (41) from locking hub (42).

- a) Lift locking hub (42) off of wheel flange (16).
- b) Remove wire ring (43).
- c) Install two screws (41) in opposite holes in the locking hub splined assembly (44) and use to lift locking hub spline assembly (44) out of wheel flange (16).
- d) If grease is between locking hub spline assembly (44) and housing (25) pilot, remove grease.
- e) Lay parts aside.

**Note:** The two bearings (17) are Loctited to bearing hub (20), wheel flange (16) and housing pilot (25). The four capscrews (15) are also Loctited. It is not necessary to remove these components to install this seal kit in the motor. Unless the bearings are damaged, it is not recommended to disassemble of these components. If damage has occurred to the bearings, it is recommended to return the unit to the factory for service, however dust seal (45) is included in this kit in the event the bearing hub is disassembled despite the recommendation listed above.

## RE 540/541 Motor Section General Disassembly

### Same Instructions For Both Designs & Drive Options

1. To aid in reassembly of motor, make a "V" shaped set of lines from the endcover (33) to the housing (25) using either paint or a marker.
  - a) With shaft end facing down, secure motor in vise by clamping on to the housing (25).
  - b) Loosen and remove seven bolts (35) holding motor assembly together.
  - c) Remove end cover (33) and endcover seal (10).
  - d) Discard seal.
2. Remove balance plate (31) taking care not to drop the three steel balls (32) located in the three holes in the balance plate (31).
  - a) Remove rotor assembly (30), manifold (28), drive link spacer (29), drive link (27) and thrust bearing (21).

**Note:** Some motors do not use spacer.
  - b) Remove body seals (9) from rotor assembly (30) and housing seal (8) from housing (25) and discard seals.
  - c) Remove shaft (26) up through the housing.

# RE 540/541 Housing/Shaft with Seal Carrier Disassembly & Assembly

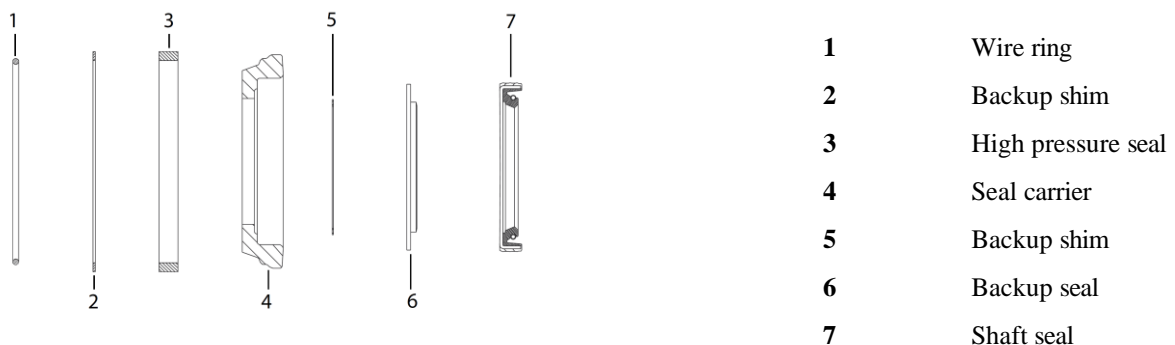
## Design That Utilizes A Seal Carrier (11)

1. Remove housing (25) from vise and place on a clean flat surface with hub end facing up.
  - a) Using shaft (26) and rubber mallet, tap seal carrier (11) down to expose wire ring (2).
  - b) Remove wire ring (2), steel backup shim (3) and high-pressure seal (4) from inner bore groove with a long narrow screwdriver.
  - c) Lift the seal carrier (11), thrust washer (12) and thrust bearing (21) from the housing bore.
  - d) Using a small screwdriver, carefully pry shaft seal (7), backup seal (6), and metal backup shim (5) from seal carrier (11) and discard.
  - e) Lay seal carrier (11), thrust washer (12) and thrust bearing (21) aside.

**Note:** If a new thrust washer (12) and seal carrier (11) is included in the kit, old items may be discarded.

**Note:** At this point, all parts should be cleaned in an oil-based solvent and dried using compressed air (for safety, observe all OSHA safety guidelines). All new seals should be lightly coated in clean oil prior to installation.

2. Place shaft (26) on a clean surface with output end facing up.
  - a) Place thrust bearing (21) over shaft (26) and then place thrust washer (12) over shaft (26).
  - b) After thoroughly coating shaft seal (7) and backup seal (6) with clean oil, place plastic installation sleeve down over shaft making sure to cover all splines, keyways, etc.
  - c) Making sure lip on shaft seal (7) faces down, push shaft seal down plastic installation sleeve until it contacts thrust washer (12).
  - d) Remove installation sleeve.
  - e) Install backup seal (6) making sure that lip faces shaft seal (See Figure 1 for correct seal positions).
  - f) Install metal backup shim (5) down against backup seal (6).
  - g) Place seal carrier (11) onto shaft with large end facing down.
  - h) Using an arbor press, carefully press seal carrier down to seat shaft seal (7) in carrier.



**Figure 1**

3. Place hub/housing assembly on a clean flat surface with hub end facing up.
  - a) Due to planetary mounting studs (23), a spacer should be placed under housing (25) to prevent shaft (26) from dropping to work surface.
  - b) Spacer should allow shaft to be about 13 [.50] below rear surface of housing.
  - c) Place shaft (26) assembly into housing (25).
  - d) Install high pressure seal (4) in seal groove in housing pilot (25).
  - e) Install metal backup shim (3) against high pressure seal (4) by squeezing the shim (3) between thumb and forefinger to bow shim.
  - f) While maintaining bow in shim, start the shim into the groove and use a small screwdriver

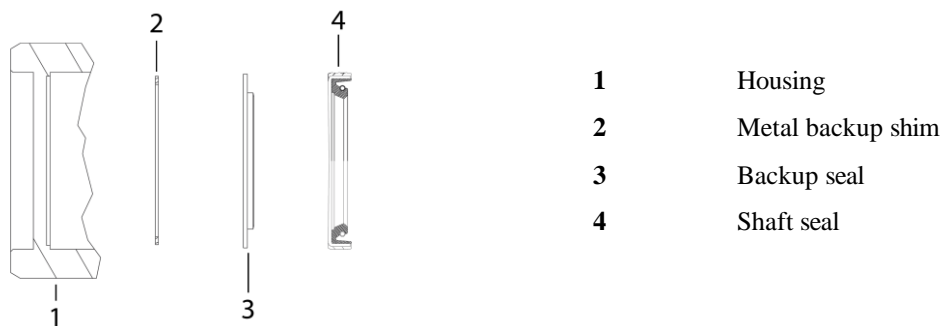
- to push the shim into groove.
- g) Install wire ring (2) into groove making sure that the ends are butted.
4. Turn hub/housing assembly over, with hub facing down, and place drive link (27) into shaft (26) making sure that end of drive link with crowned splines goes into shaft (26).
- a) Using an arbor press, carefully press the shaft down to seat seal carrier against wire ring (2) install thrust bearing (21) onto end of shaft.
- b) If all pieces are seated properly, thrust bearing (21) will be flush with rear face of housing (25).

## RE 540/541 Housing/Shaft Assembly without Seal Carrier Disassembly & Assembly

### Design That Does NOT Utilizes A Seal Carrier (11)

1. Position the housing (25) in vise and use a slide and hammer type bearing puller to remove the rear housing bearing (22).
  - a) Remove the thrust washer (12) and thrust bearing (21) and set aside.
  - b) Using a small screwdriver carefully pry the shaft seal (7), backup seal (6) and metal shim (5) from housing bore and discard.
2. Remove the housing from vise and turn over and pry the dust seal (1) from housing and discard.
 

**Note:** At this point, all parts should be cleaned in an oil-based solvent and dried using compressed air (for safety, observe all OSHA safety guidelines). All new seals should be lightly coated in clean oil prior to installation.
3. Place housing (25) in vice with the seven bolt assembly holes facing up.
  - a) Place metal shim (5) in the smallest diameter recess in the housing (25).
  - b) Install the backup seal (6) into the housing (25) with the flat side down and the seal lip facing up.
  - c) Insert shaft seal (7) down into housing (25) making sure that lip on seal faces up (See Figure 2 for correct seal orientation).
  - d) Install thrust washer (12) into housing and using an arbor press, seat the shaft seal (7) into housing (25), then place the thrust bearing (21) into housing.



**Figure 2**

4. Place the rear housing bearing (22) onto the rear housing bore and press to a depth of 58.4 [2.3] from the rear surface of the housing (25) to the top of the bearing (22).
  - a) Place the shaft (26) down into housing (25) and place thrust bearing (21) on top of shaft (26).
  - b) If shaft seals are properly seated against the housing (25), thrust bearing (21) will be flush with rear surface of housing.



## RE 540/541 Motor Section Assembly

### RE 540/541 Motor Section General Assembly

#### Same Instructions For Both Designs & Drive Options

1. Install housing seal (8) into groove in housing (25). Place manifold (28) onto housing (25) aligning bolt holes.
 

**Note:** Manifold side with only seven valving hole goes toward housing.
2. Install a body seal (9) into the seal groove in both sides of rotor assembly (30).
  - a) Place rotor assembly (30) on manifold with side of rotor with chamfer in splines facing manifold (28).
  - b) Turn rotor assembly (30) to align bolt holes and alignment marks.
3. If motor came with spacer (29), place spacer (29) on end of drive link (27).
  - a) Using alignment marks as a guide, place balance plate (31) onto the rotor assembly (30) with three holes for steel balls (32) facing up.
  - b) Install three steel balls (32) into the holes in the balance plate (31).
4. Install endcover seal (10) into groove in endcover (33).
  - a) Place endcover (33) onto the balance plate (31) and align bolt holes.
  - b) Insert seven bolts (35) into motor assembly. Pre-torque bolts to 13.6 Nm [10 ft. lb.].
  - c) Using the bolt torque pattern in Figure 3, final torque all bolts to  $69.8 \pm 7.5$  Nm [ $51.5 \pm 5.5$  ft. lb.].

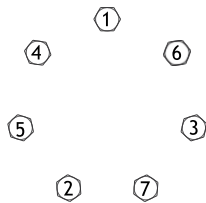


Figure 3

5. Turn motor over with hub end facing up. Reapply grease in housing pilot.

### RE 540/541 Direct Drive Option Assembly

#### USES ITEMS 36-40

Place spacer (40) over shaft (26).

- a) Place driver (39) over shaft (26) while rotating wheel flange (16) slightly to allow splines to mate.
- b) Place paper gasket (38) onto wheel flange (16).
- c) Reapply grease between driver (39) and end cap (37) (Only if end cap (37) does not have grease fitting).
- d) Place end cap (37) onto wheel flange (16).
- e) Install six bolts (36) and torque to  $69.8 \pm 7.5$  Nm [ $51.5 \pm 5.5$  ft. lb.] using the bolt torque sequence shown in Figure 4.
- f) If end cap (37) has grease fitting, apply grease.

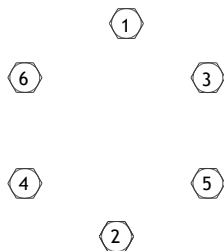


Figure 4

## RE 540/541 Locking Hub Option Assembly

### USES ITEMS 41-44

Place locking hub spline assembly (44) into wheel flange (16) while rotating wheel flange (16) slightly to allow splines to mate.

- a) Install wire ring (43).
- b) Align screw holes of locking hub (42) with screw holes in locking hub spline assembly (44) and gently press together
- c) Install six screws (41) into locking hub (42) and torque to  $3.3 \pm 0.2$  Nm [ $29 \pm 2$  in. lb.].

## RE 540/541 Replacement Kits

### Available Kits

**Note:** Refer to the Exploded View for item numbers.

**Table 2: Seal kits**

Description	Exploded View Item Number	Qty. In Kit	Order Number
Flange seal	1	1	500444125 (Includes item numbers 1-10 & 38)
Wire ring	2	1	
Metal backup shim	3	1	
High pressure seal	4	1	
Metal backup shim	5	1	
Backup seal	6	2	
Shaft seal	7	2	
Rear housing seal	8	1	
Body seal	9	1	
Endcover seal	10	1	
Paper gasket	38	1	500444003 (Includes item numbers 11 & 12)
Seal carrier	11	1	
Thrust washer	12		

**Table 3: Miscellaneous kits**

Description	Exploded View Item Number	Qty. In Kit	Order Number
Stud	13	1	500018081
Lug nut	14	1	500018151
Capscrew	15	4	500018086
Wheel flange	16	1	500013035
125mm bearing	17	1	500018095
Bearing spacer	18	1	500018194
Thrust ring	19	1	500018062
Bearing hub	20	1	500013055
Thrust bearing	21	1	500018059
Rear housing bearing	22	1	500018002
Planetary mount stud	23	1	500018081
Mounting nut	24	1	500018112

Description	Exploded View Item Number	Qty. In Kit	Order Number
Forward manifold (CCW or "0")	28	1	500015006
Reverse manifold (CW or "1")	28	1	500015007
Balance plate (3 balls included)	31 & 32	1	500012001
Steel ball	32	3	500018048
Endcover	33	1	500016001
Driver cover screw	36	6	500018085
Driver cover	37	1	700018001
Driver	39	1	500018179
Spacer	40	1	500018114
Warn hub assembly	41-44	1	500018099

## Rotors, drive links and spacers, and bolts

When changing motor displacements, a matching rotor and bolt set kit must be ordered. A new drive link kit may be necessary. Drive link spacers are included in drive link kits, but may also be ordered separately by using the drive link spacer kit number.

Exploded View Item Number	30	30	27	29	35
Displacement	Standard Rotor Kit	Freeturn Rotor Kit	Drive Link Kit	Drive Link Spacer kit	Bolt Set Kit
120	500087005	500087008	500014009	-	500445006
160	500137005	500137011	500014009	-	500445006
200	500167004	500167011	500014009	500018075	500445012
230	500147002	500147004	500014009	500018185	500445014
260	500227000	500227004	500014039	-	500445014
300	500247005	500247011	500014007	-	500445018
350	500207000	500207004	500014042	-	500445026
375	500307005	500307011	500014008	-	500445024
470	500357003	500357005	500014042	-	500445026
540	500407005	500407011	500014044	-	500445032
750	500607005	500607011	500014047	-	500445045

## Housing kits

Exploded view item #25

Standard housing kits include rear housing bearing(#22) installed in the housing.

Description	Order Number
#W31- setback with 7/8" o-ring	500131023

## Internal shaft

Exploded view item #26

Description	Shaft Kit
#24- 19 Tooth spline	500011102

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