

# MOTORS

## Repair Instructions

*RE 500/501 Series*



*together in motion*

White is a leading global provider of motor and steering solutions that power the evolution of mobile and industrial applications around the world.

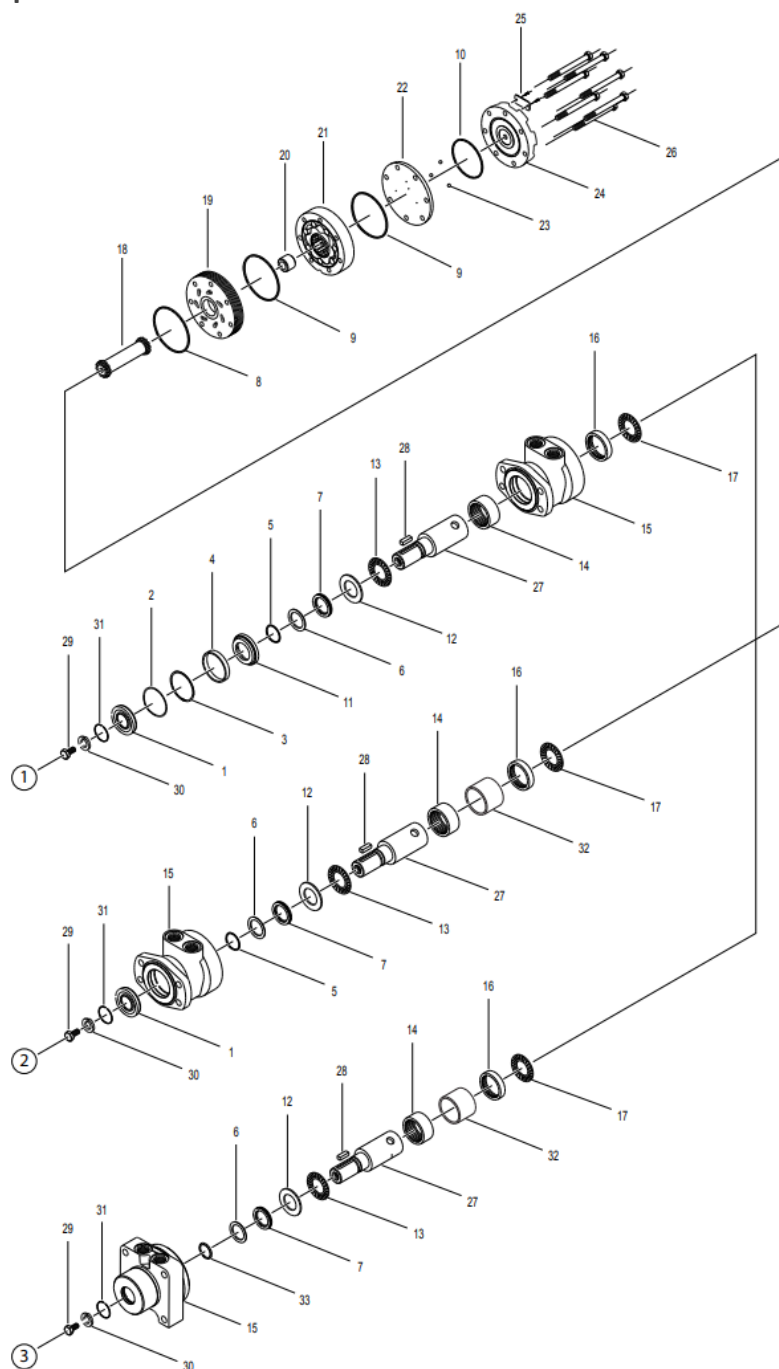


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# RE 500/501 Exploded View

## Exploded View



**Table 1: Seal Options**

Description	Option Number
Seal carrier design	1
Without seal carrier design	2
Excluder seal design	3

## Component List

Description	Item Number	Description	Item Number
Dust seal	1	Drive link	18
Split wire ring	2	Manifold	19
Metal backup shim	3	Drive link spacer	20
High pressure seal	4	Rotor assembly	21
Metal backup shim	5	Balance plate	22
Backup seal	6	Steel ball	23
Shaft seal	7	Endcover	24
Housing seal	8	ID tag assembly	25
Body seal	9	Assembly bolt	26
Endcover seal	10	Shaft	27
Seal carrier	11	Shaft key	28
Thrust washer	12	Shaft bolt	29
Front thrust bearing	13	Lock washer	30
Front housing bearing	14	Wire ring	31
Housing	15	Bearing spacer	32
Rear housing bearing	16	Excluder shaft seal	33
Rear thrust bearing	17		

**Note 1:** In December 2006 and again mid 2010, the 500 series incorporated design changes. Please refer to the Exploded View on page 6 to determine which design is being serviced and follow instructions for that design type.

**Note 2:** dimensions: mm [in]

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 500/501 Motor Section Disassembly

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### Same Instructions for Both Designs

1. Remove all shaft related components from shaft (27) (i.e. keys, wire rings, nuts).
  - a) To aid in reassembly of the motor, make a "V" shaped set of lines from the endcover (24) to the housing using either paint or a marker.
  - b) With shaft facing down, secure motor in vise by clamping on to housing (15).
2. Loosen and remove seven bolts (26) holding motor assembly together.
  - a) Remove endcover (24) and endcover seal (10).
  - b) Discard seal.
  - c) Remove balance plate (22) taking care not to drop the three steel balls (23) located in the three holes in the balance plate (22).
  - d) Remove rotor assembly (21), manifold (19), drive link spacer (20), drive link (18) and thrust bearing (17).

**Note:** Some motors do not use spacer.
  - e) Remove body seals (9) from rotor assembly (21) and housing seal (8) from housing (15) and discard seals.

**Note:** Compare old housing seal (8) to the two housing seals included in kit to determine which one to use.
  - f) Gently tap shaft (27) upward from housing (15) and remove through rear of housing and lay aside.

## RE 500/501 Housing/Shaft with Seal Carrier Disassembly & Assembly

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### Design That Utilizes a Seal Carrier (11)

1. Remove housing (15) from vise and turn over.
  - a) Pry dust seal (1) from housing.
  - b) Push the seal carrier (11), thrust washer (12) and thrust bearing (13) down until they make contact with the roller bearing (14) located in the housing bore.
2. Remove wire ring (2), steel backup shim (3) and high-pressure seal (4) from inner bore groove with a small screwdriver.
  - a) Lift seal carrier (11), thrust washer (12) and thrust bearing (13) from the housing bore.
  - b) Using a small screwdriver, carefully pry shaft seal (7), backup seal (6), and metal backup shim (5) from seal carrier (11) and discard.
  - c) Lay seal carrier (11), thrust washer (12) and thrust bearing (13) aside.

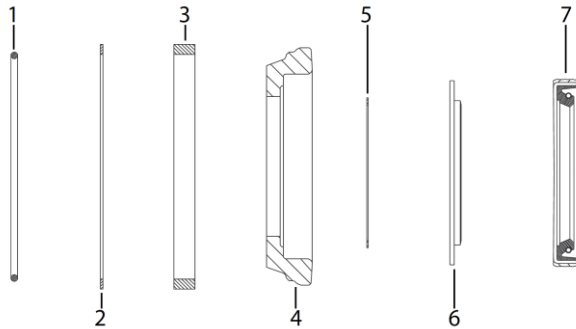
**Note:** If a new thrust washer (12) and seal carrier (11) is included in kit, old items may be discarded.

**Note:** At this point, all parts should be cleaned in an oil-base 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 shaft (27) on a clean flat surface with output end facing up.
  - a) Place thrust bearing (13).

**Note:** If thrust bearing has integral washer, make sure washer surface faces down.

- b) Then thrust washer (12) on shaft (See Technical Bulletin PI444004 to determine correct thrust washer to use).
- c) Lightly coat seal area of shaft with clean oil and place plastic installation sleeve with shaft seal (7) down onto shaft covering all splines, keyways and wire ring grooves.
- d) Slide shaft seal (7) down onto shaft (27) making sure that lip on seal faces until it contacts thrust washer (12).
- e) Remove plastic installation sleeve.
- f) Carefully install the backup seal (6) onto the shaft (27) with the flat side up and the seal lip facing the shaft seal (7).
- g) Place the metal backup shim (5) onto the shaft and against the backup seal (6).
- h) Place the seal carrier (11) onto the shaft (large end down) and carefully press the seal carrier (11) down onto the seal assembly using an arbor press and sleeve to compress the seal into the carrier.



- |   |                    |
|---|--------------------|
| 1 | Wire ring          |
| 2 | Metal backup shim  |
| 3 | High pressure seal |
| 4 | Seal carrier       |
| 5 | Metal backup shim  |
| 6 | Backup seal        |
| 7 | Shaft seal         |

4. With pilot side facing up, place housing (15) on spacers to raise housing approximately 6 [.25] above work surface.

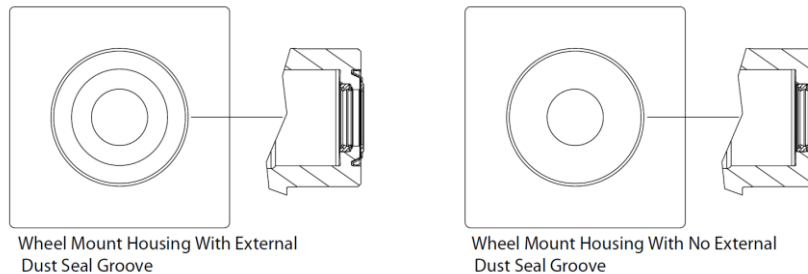
**Note:** Spacers should allow shaft to contact work surface.

- a) Place shaft/seal carrier assembly into housing (15).
  - b) Install high pressure seal (4) into groove in housing.
  - c) Install metal backup shim (3) against high pressure seal (4) in groove in housing bore by squeezing the shim (3) between thumb and forefinger to bow shim.
  - d) While maintaining bow in shim, start the shim into the groove and use a small screwdriver to push the shim into groove.
  - e) Install wire ring (2) into the groove making sure that the ends are butted.
5. While holding shaft into housing, place housing/shaft assembly in vise with shaft end down.
    - a) Making sure that end of drive link (18) with crowned splines goes into shaft end, install drive link (18) into shaft and tap lightly to seat the seal carrier against the wire ring (2).
    - b) Place thrust bearing (17) over drive link (18).
    - c) If seal carrier (11) is properly seated against wire ring (2), thrust bearing (17) will be flush with rear surface of housing.

## RE 500/501 Housing/Shaft without Seal Carrier Disassembly & Assembly

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

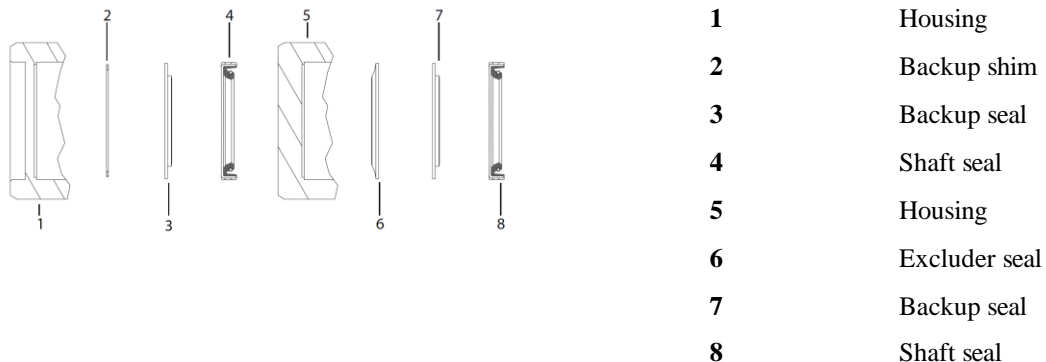
1. Position the housing (15) in vise and use a slide and hammer type bearing puller to remove the rear housing bearing (16).
  - a) Then remove the bearing spacer (32).
  - b) To remove the front housing bearing (14), flip the housing over and place a screwdriver or small chisel in between a roller in the bearing and rest it on the bottom of the bearing cage.
  - c) Strike the chisel or screwdriver with a hammer just until the cage stretches or chips enough to allow the rollers to fall out.
  - d) Clear away all rollers, then replace the housing in vise upside down and use the slide and hammer to remove bearing making sure that no finger of the puller is pulling on the weak point caused when removing the roller bearings.
  - e) Remove the thrust washer (12) and thrust bearing (13) and set aside.
  - f) Using a small screwdriver carefully pry the shaft seal (7), backup seal (6), and metal shim (5) from housing bore if present and discard.
  - g) Also remove excluder seal (33) if the motor design uses this seal and discard



2. Remove the housing from vise and turn over and pry the dust seal (1) from housing and discard (external dust seal is not used on models that use an internal excluder seal).

**Note:** At this point, all parts should be cleaned in an oil-base 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 (15) in vice with the seven bolt assembly holes facing up.
  - a) If model uses an excluder seal (33), place it in the recess of housing, if not, place the metal shim (5) in recess.
  - b) Install the backup seal (6) into the housing (15) with the flat side down and the seal lip facing up.
  - c) Insert shaft seal (7) down into housing (15) making sure that lip on seal faces up.
  - d) Install thrust washer (12) into housing and using an arbor press, seat the shaft seal (7) into housing (15), then place the thrust bearing (13) into housing.





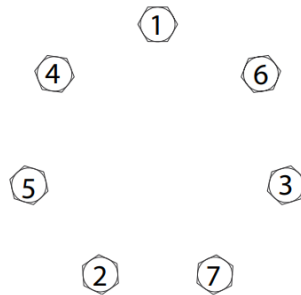
4. Place front housing bearing (14) onto housing and press bearing into housing to a depth of 60.1 [2.37] from the rear surface of the housing (15) to the top of the bearing.
  - a) Insert the bearing spacer (32) into the housing.
  - b) Place the rear housing bearing (16) onto the rear housing bore and press to a depth of 3.6 [.14] from the rear surface of the housing (15) to the top of the bearing (16).
  - c) Place the shaft (27) down into housing (15) and place thrust bearing (17) on top of shaft (27).
  - d) If shaft seals are properly seated against the housing (15), thrust bearing (17) will be flush with rear surface of housing.

## RE 500/501 Motor Section Assembly

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### Same Instructions For Both Designs

1. Install housing seal (8) into groove in housing (15).
  - a) Place manifold (19) onto housing, (15) side with only seven holes facing housing (15).
  - b) Place body seals (9) in grooves in both sides of rotor (21).
  - c) Place rotor (21) onto manifold (19) with side of rotor with chamfer in splines facing manifold (19).
2. Install balance plate (22) onto rotor (21) making sure holes for steel balls (23) faces up.
  - a) Install three steel balls (23) in holes in balance plate (22).
  - b) Install endcover seal (10) into groove in endcover (24) and place endcover onto balance plate (22).
  - c) Install seven assembly bolts (26) and pre-torque to 13,6 Nm [10 ft. lbs.].
  - d) Using the bolt torque sequence shown below, finally torque all bolts to 67.8 Nm [50 ft. lbs.]



3. Remove motor from vise and place on work surface with shaft (27) facing up.
  - a) Making sure that lip on seal (1) faces up, place dust seal (1) over shaft (27).
  - b) Using a sleeve and a hammer, carefully drive dust seal (1) into place.

## RE 500/501 Replacement Kits

### Available Kits

**Note:** Refer to the Exploded View on page 6 for item numbers.

**Table 2: Seal kits**

Description	Exploded View item Number	Qty. In Kit	Order Number
Dust seal	1	1	500444112B (Includes item numbers 1-10, 14, 16, &33)
Wire ring	2	1	
Metal backup shim	3	1	
High pressure seal	4	1	
Metal backup shim	5	1	
Polyamide seal	6	2	
Shaft seal	7	2	
Rear housing seal	8	1	
Body seal	9	2	
Endcover seal	10	1	
Excluder seal	33	1	
Seal Carrier	11	1	500444003(Includes item numbers 11 &12)
Thrust washer	12	1	

**Table 3: Miscellaneous kits**

Description	Exploded View Item Number	Order Number
Rear thrust bearing	17	500018059
Front housing bearing (1" wide)	14	500018003
Rear housing bearing (.5" wide)	16	500018002
Forward manifold (CCW or "0")	19	500015006
Reverse manifold (CW or "1")	19	500015007
Balance plate (3 balls included)	22	500012001
Steel ball	23	500018048
Endcover	24	500016001
Front thrust bearing	13	500018252
Dust seal	1	500018006
1000 psi relief valve	Not shown	500018228
2000 psi relief valve	Not shown	500018231
3000 psi relief valve	Not shown	500018221
1.00-20 UNEF slotted nut	Not shown	500449304
1.00-20 UNEF solid nut	Not shown	500449303

Description	Exploded View Item Number	Order Number
1.00-20 UNEF lock nut	Not shown	300339303P
Bearing spacer	32	500018305

### 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	21	21	18	20	26
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 #15

Standard housing kits include the front bearing (#14) and the rear bearing(#16) installed in the housing.

Description	Order Number
#F31- 4-hole without pilot & RS 4-hole bolt pattern	500130223
#W38- wheel mount with 1/2" BSP.F	500130523
#A38- 4-hole SAE "A" style with 1/2" BSP.F	500130623
#W31- wheel mount with 7/8" o-ring	500130723
#A31- 4-hole SAE "A" style with 7/8" o-ring	500130823
#A11- 2-hole SAE "A" style with 7/8" o-ring	500131623
#A18- 2-hole SAE "A" style with 1/2" BSP.F	500131723
#A51- 6-hole SAE "A" style with 7/8" o-ring	500131823
#A58- 6-hole SAE "A" style with 1/2" BSP.F	500131923
#W38- wheel mount with relief port with 1/2" BSP.F	500133523

Description	Order Number
#A38- 4-hole SAE "A" with relief port with 1/2" BSP.F	500133623
#W31- wheel mount with relief port with 7/8" o-ring	500133723
#A31- 4-hole SAE "A" with valve cavity with 7/8" o- ring	500133823
#A51- 6-hole SAE "A" with valve cavity with 7/8" o- ring	500134823
#A58- 6-hole SAE "A" with valve cavity with 1/2" BSP.F	500134923

### Shafts and related components kits

Shaft kits come with related components (i.e. keys, nuts, etc.). To order individual shaft components (i.e. keys, nuts, bolts, or wire rings) use the kit number for each individual part.

Exploded View Item Number	27	28	Not Shown	29	30	31
Description	Shaft Kit	Key Kit	Nut Kit	Bolt Kit	Washer Kit	Wire Ring Kit
#02- 6-B Spline	500011600	-	See Table 3: Miscellaneous kits	-	-	-
#22- 1-1/4" Tapered	500011300	500449101		-	-	-
#20- 1-1/4" Straight	500011200	500449102		500449301	500449302	500449201
#23- 14 Tooth spline	500011101	-		-	-	500449201
#10- 1" Straight	500011201	500449100		-	-	-
#12- 25mm Straight	500011109	500449104		-	-	-
#24- 19 Tooth spline	500011102	-		-	-	500449201
#21- 32mm Straight	500011203	500449103		-	-	500449201
#19- 1" Straight extended	500011202	500449100		-	-	-
#01- 13 Tooth spline	500011114	-		-	-	-
#29- 12 Tooth spline (BK)	500011116	-		-	-	-
#26- 1-1/4" Straight non-annealed	500011214	-		-	-	-



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