

MOTORS

Repair Instructions

CE 400/401 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.

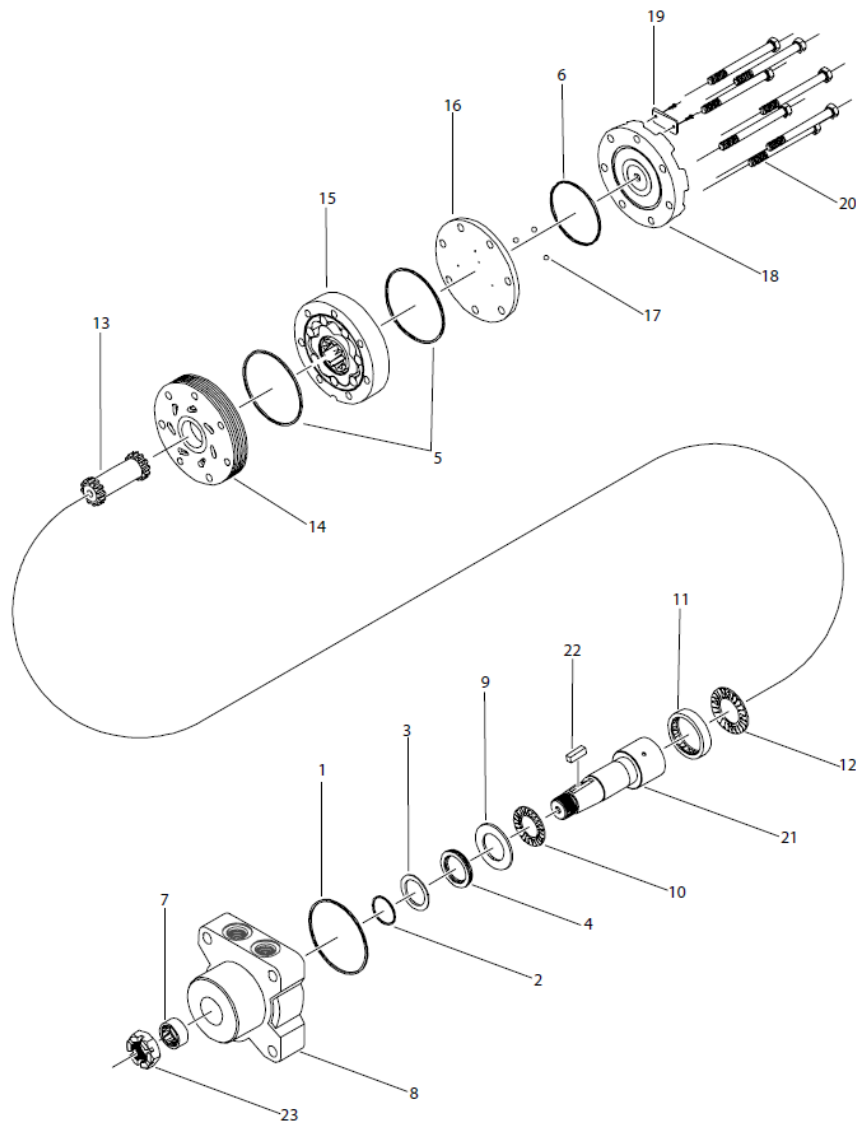
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Chapter 1

CE 400/401 Exploded View

Exploded View Diagram:



Description	Item Number
Housing seal	1
Metal back-up shim	2
Back-up seal	3
Shaft seal	4
Body seal	5
End cover seal	6
Front housing bearing	7
Housing	8

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Thrust washer	9
Front thrust bearing	10
Rear housing bearing	11
Thrust bearing	12
Drive link	13
Manifold	14
Rotor Assembly	15
Balance Plate	16
Steel Ball	17
End cover	18
I.D. tag	19
Assembly bolt	20
Shaft	21
Shaft key	22
Shaft nut	23

Table 1 Component list

Chapter 2

CE 400/401 Seal Kit Installation

dimensions: mm [in]

Note: 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.

1. Remove all shaft components from the shaft, (21), (i.e., keys, wire rings, nuts).
 - a) To aid in reassembly of the motor, make a “V” shaped set of lines from the endcover to the housing using either paint or a marker.
 - b) With the shaft facing down, secure the motor in a vise by clamping onto the housing, (8).
 - c) Loosen and remove the seven bolts, (20), holding the motor assembly together.
 - d) Remove the end cover, (18), from the motor.
2. Remove the balance plate, (16), rotor set, (15), and the manifold, (14), from the motor.
 - a) Remove all seals from the components and discard.



Caution: When removing the balance plate, do not allow the three check balls, (17), to fall out from the plate.



Caution: Do not allow the rolls to drop out from the rotor set assembly when removing the assembly from the motor.)

- b) Remove the manifold from the motor and lay aside.
 - c) Remove drive link, (13), from the motor and lay aside.
 - d) Remove the thrust bearing, (12), from the housing and lay aside.
 - e) From the front of the housing, gently tap the shaft, (21), upward and remove through the rear of the housing.
3. Using a slide and hammer type bearing puller, (see Figure 1), remove the rear housing bearing, (11), from the housing.



Figure 1: Bearing puller

- a) Remove the thrust bearing, (10), and lay aside, remove the thrust washer, (9), and lay aside.
 - b) Remove the shaft seal, (4), and discard, remove the back-up seal, (3), and discard, remove the metal shim, (2), 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.

4. Place the integral thrust washer/bearing, (10), onto the shaft.

The washer side should be against the shoulder of the shaft.

- a) Place a thrust washer, (9), onto the shaft on top of the thrust bearing.
 - b) Coat the shaft seal, (4), with a light coat of oil and install onto the shaft with the lip side down.
 - c) Place a light coat of oil on the back-up seal, (3), and place over the coat of oil on the metal back-up shim, (2), and place over the back-up seal.
5. With the pilot of the housing placed down, install the output end of the shaft through the rear bore of the housing.
6. The rear bearing is now ready to be installed. With the writing side of the bearing facing up, place the bearing, (11), into the housing bore.
- a) Using a hand press, the bearing should be pressed into the bore.
It is necessary that the bearing be pressed 3.0 - 3.3 [.120 - .130] deep into the bore of the housing to accommodate the width of the thrust bearing.
7. Install a thrust bearing, (12), on top of the shaft.
8. Install a lightly oiled body seal, (1), into the seal groove in the housing.
Make sure that this seal is in the seal groove and protruding approximately 0.2 [.007] over the top of the housing surface.



Caution: If a bump is felt in the seal remove the seal and make sure that there is no grit on the seal or in the seal groove.

9. Install the drive link, (13), into the housing.
The proper end of the drive link has a ‘hat’ machined in the top of the drive link on the 120-260 displacement. The drive link is to be placed in the shaft with the hat facing up on these displacements. The 300 displacements and above have a symmetrical head and either end can be put into the motor. a) Once the drive link has been installed, the shaft can be seated.
- b) This is done by bringing the arbor of the hand press down and putting pressure on the drive link.



Caution: Do not use excessive pressure as this could deform the thrust bearing and/or bearing races.

10. Place the manifold (14), (seven teardrop hole side down) on the housing. Line the bolt hole notches in the outside diameter of the manifold up with the seven bolt holes in the housing.
11. Install two oil coated body seals, (5), one on each side, into the seal grooves of the rotor set, (15). Place the deep groove side of the of the rotor set down on the manifold, (14).
12. Place the balance plate, (16), on top of the rotor set with the check balls, (17), up.
If the check balls were removed, install three check balls into the countersunk holes on the balance plate, one ball per hole.
13. Install an oil coated body seal, (6), into the seal groove of the end cover, (18). Place the end cover onto the motor with the tag holes directly above the housing ports.



Caution: It is very important that the body seal does not fall out of the end cover while being installed.

Extra care must be used to insure this doesn't happen.

14. Install the seven bolts, (20), into the motor.

Pre-torque bolts to 13.6 Nm [10 ft. lb.].

The final torque on the bolts is to be 69.8 ± 7.5 Nm [51.5 ± 5.5 ft. lb.].

Chapter 3

CE 400/401 Replacement list

Available Parts Kits

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

Seal kit

Description	Exploded View Item Number	Qty. In Kit	Order Number
Housing seal	1	1	400444200 (Includes item numbers 1-6) ¹
Metal shim	2	1	
Back-up seal	3	1	
Shaft seal	4	1	
Body seal	5	2	
End cover seal	6	1	

Table 2 Seal kit

Miscellaneous kits

Description	Exploded View Item Number	Qty. In Kit	Order Number
Front housing bearing	7	1	400180001
Front thrust washer	9	1	500018253
Front thrust bearing	10	1	500018252
Rear housing bearing	11	1	500018002
Rear thrust bearing	12	1	500018059
Forward manifold (CCW or "0")	14	1	500015006
Reverse manifold (CW or "1")	14	1	500015007
Balance plate	16	1	500012001
Steel balls	17	3	500018048

¹ Rear bearing (#11) must be removed to replace seal kit item numbers 2-4. It is recommended that a new rear bearing be installed when replacing these items.

End cover	18	1	500016001
1000 psi relief valve	Not shown	1	500018228
2000 psi relief valve	Not shown	1	500018231
¾-28 Slotted nut	Not shown	1	200229300
¾-28 Pack nut	Not shown	1	200018077
1.00-20 UNF solid nut	24	1	500449303
1.00-20 UNF lock nut	24	1	300339303P
1.00-20 UNF slotted nut	24	1	500449304

Table 2 Miscellaneous kits

Rotors, drive links, and bolts

When changing motor displacements, a matching rotor and bolt set kit must be ordered. A new drive link kit may be necessary.

Exploded View Item Number	15	15	13	20
Displacement	Standard Rotor Kit	Freeturn Rotor Kit	Drive Link Kit	Bolt Set Kit
120	500087005	500087008	400140007	500445006
160	500137005	500137011	400140007	500445006
200	500167004	500167011	400140012	500445012
230	500147002	500147004	400140014	500445014
260	500227000	500227004	400140016	500445014
300	500247005	500247011	400140018	500445018
350	500207000	500207004	400140020	500445026
375	500307005	500307011	400140024	500445024
470	500357003	500357005	400140020	500445026
540	500407005	500407011	400140032	500445032
750	500607005	500607011	400140045	500445045

Table 4 Rotors, drive links, and bolts

Housing kits

Housing kits include the front bearing (#7), metal shim (#2), back-up seal (#3), and shaft seal (#4) installed in the housing.

Description	Exploded View Item Number	Housing Kit
#W38-wheel mount W/1/2" BSP.F ports	8	400130005
#W31-wheel mount (7/8" O-ring ports)	8	400130007
#K31-wheel mount with brake mount (7/8" O-ring ports)	8	400130011
#K38-wheel mount with brake mount (1/2"-14 BSP.F ports)	8	400130031
#W38-wheel mount with valve cavity (1/2"-14 BSP.F ports)	8	400130035
#W31-wheel mount with valve cavity (7/8" O-ring ports)	8	400130037

Table 5 Housing kits

Shafts and related components kits

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

Exploded View Item Number	21	22	23	Not Shown	Not Shown	Not Shown
Description	Shaft Kit	Key Kit	Nut Kit	Bolt Kit	Washer Kit	Wire Ring Kit
#10-1" Straight	400110000	500449100	See <i>Table 2: Miscellaneous kits</i>	-	-	-
#13-1" Tapered	400110001	200229102		-	-	-
#02-6-B Spline (1")	400110002	-		-	-	-
#22-1-1/4" Tapered	400110003	500449101		-	-	-
#20-1-1/4" Straight	400110004	500449102		500449301	500449302	500449201

#23-14 Tooth spline (1- 1/4")	400110005	-		-	-	500449201
#25-1-1/4" Tapered extended	400110010	200229102		-	-	-

Table 6 Shafts and related components kits

Chapter 4

CE 400/401 SERIES MOTORS WITH ONE PIECE SHAFT SEAL

For Use With Seal Kit(s): 400444200B, refer to Exploded view dimensions: mm [in]

NOTE: 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.

- a) Remove all shaft components from the shaft, (19), (i.e., keys, wire rings, nuts). To aid in reassembly of the motor, make a "V" shaped set of lines from the endcover to the housing using either paint or a marker. With the shaft facing down, secure the motor in a vise by clamping onto the housing, (6). Loosen and remove the seven bolts, (18), holding the motor assembly together. Remove the endcover, (16), from the motor.
- b) Remove the balance plate, (14), rotor set, (13), and the manifold, (12), from the motor. Remove all seals from the components and discard. **(Caution - when removing the balance plate, do not allow the three check balls, (15), to fall out from the plate.) (Caution - do not allow the rolls to drop out from the rotor set assembly when removing the assembly from the motor.)** Remove the manifold from the motor and lay aside. Remove drive link, (11), from the motor and lay aside. Remove the thrust bearing, (10), from the housing and lay aside. From the front of the housing, gently tap the shaft, (19), upward and remove through the rear of the housing.
- c) Using a slide and hammer type bearing puller (see Figure 1), remove the rear housing bearing, (9), from the housing. Remove the thrust bearing, (8), and lay aside, remove the thrust washer, (7), and lay aside. Remove the shaft seal, (2), and discard.
- d) 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.
- e) Place the integral thrust washer/bearing, (8), onto the shaft. The washer side should be against the shoulder of the shaft. Place a thrust washer, (7), onto the shaft on top of the thrust bearing. Coat the shaft seal, (2), with a light coat of oil and install onto the shaft with the lip side down.
- f) With the pilot of the housing placed down, install the output end of the shaft through the rear bore of the housing.
- g) The rear bearing is now ready to be installed. With the writing side of the bearing facing up, place the bearing, (9), into the housing bore. Using a hand press, the bearing should be pressed into the bore. It is necessary that the bearing be pressed .120 - .130" deep into the bore of the housing to accommodate the width of the thrust bearing. **H** Install a thrust bearing, (10), on top of the shaft.

- h) Install a lightly oiled body seal, (1), into the seal groove in the housing. Make sure that this seal is in the seal groove and protruding approximately .007" over the top of the housing surface. **(Caution - if a bump is felt in the seal remove the seal and make sure that there is no grit on the seal or in the seal groove.)**
- i) Install the drive link, (11), into the housing. The proper end of the drive link has a 'hat' machined in the top of the drive link on the **07-16** displacement. The drive link is to be placed in the shaft with the hat facing up on these displacements. The **18** displacements and above have a symmetrical head and either end can be put into the motor. Once the drive link has been installed, the shaft can be seated. This is done by bringing the arbor of the hand press down and putting pressure on the drive link. **(Caution - do not use excessive pressure as this could deform the thrust bearing and/or bearing races.)**
- j) Place the manifold (12), (seven teardrop hole side down) on the housing. Line the bolt hole notches in the outside diameter of the manifold up with the seven bolt holes in the housing.
- k) Install two oil coated body seals, (3), one on each side, into the seal grooves of the rotor set, (13). Place the deep groove side of the of the rotor set down on the manifold, (12).
- l) Place the balance plate, (14), on top of the rotor set with the check balls, (15), up. If the check balls were removed, install three check balls into the countersunk holes on the balance plate, one ball per hole.
- m) Install an oil coated body seal, (4), into the seal groove of the endcover, (16). Place the endcover onto the motor with the tag holes directly above the housing ports. **(Caution - it is very important that the body seal does not fall out of the endcover while being installed. Extra care must be used to insure this doesn't happen.)**
- n) Install the seven bolts, (18), into the motor. Pre-torque bolts to 10 ft. lbs. The final torque on the bolts is to be 51.1 ± 5.5 ft. lbs.

Exploded view parts

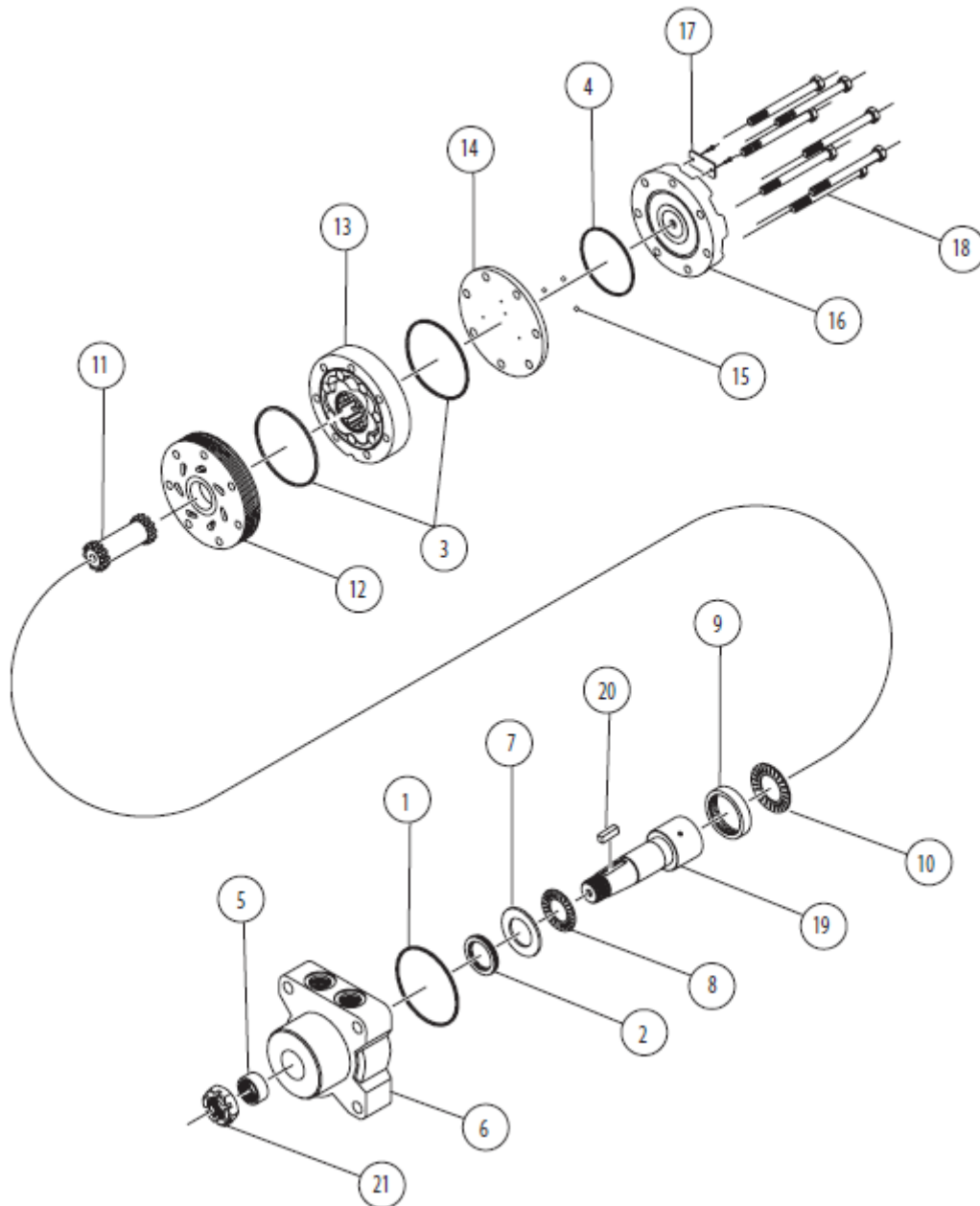


Figure 2: Exploded view diagram

Description	Item Number
Housing seal*	1
Shaft seal*	2
Body seals (2)*	3
End cover seal*	4
Front housing bearing	5
Housing	6
Thrust Washer	7
Front Thrust Bearing	8
Rear Housing Bearing	9
Thrust Bearing	10

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Drive link	11
Manifold	12
Rotor Assembly	13
Balance Plate	14
Steel Balls (3)	15
End cover	16
I. D. Tag	17
Assembly Bolts (7)	18
Shaft	19
Shaft key	20
Shaft nut	21

* Contained in seal kit 400444200B



White Drive Motors & Steering, LLC
110 Bill Bryan Blvd, Hopkinsville, Kentucky, 42240

White Drive Motors and Steering sp. z o.o.
ul. Logistyczna 1, Bielany Wrocławskie, 55-040 Kobierzyce

whitedriveproducts.com