

**SERVICE INSTRUCTIONS FOR THE WS [350 & 351] SERIES MOTORS**

For Use With Seal Kit: 355355001

dimensions: mm [in]

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 on the housing flange (7).

- A) Loosen and remove four bolts (17) holding the motor assembly together. Remove the endcover assembly (16).
- B) Flip the endcover assembly over. Remove the commutator (13), piston (14), and springs (15) from the endcover (16). Place the piston (14) on a flat clean surface with piston seals (5 & 6) facing up. Remove the piston seals from the piston (14) and discard.
- C) Remove the driver (12), manifold (11), rotor set (10) and wear plate (8) from the motor. Remove all seals (4) from components and discard. **(Caution: Do not allow rolls to drop from rotor assembly when removing rotor assembly from motor)**. Remove seal (3) from housing (7) and discard.
- D) To aid in the reassembly of the shaft sub-assembly make a "V" shaped set of line across the rear of the housing and the bearing retaining ring on the shaft assembly using either paint or a marker. Remove the housing (10) from the vise and flip over. Remove any shaft components from shaft (bolts, washers, keys, etc.)
- E) Using a press, press the shaft assembly (18) out of the rear of the housing (7). Remove shaft seal (2) and excluder seal (1) from housing (7) and discard all seals.

Clean all parts in an oil-based solvent and dry using compressed air (for safety, observe OSHA safety guidelines). All new seals should be lightly coated in clean oil prior to installation.

- F) Install excluder seal (1) into housing (7) with the lip facing down in the same direction of the output shaft (18). Align shaft seal (2) with flat side of seal facing excluder seal (1) and press seal in with a flat surface tool until seal stops. Press the shaft assembly (18) into housing (7) lining up the "V" set of lines on the bottom of the housing and shaft assembly.
 - G) Install o-ring (3) after a slight stretch to expand the diameter of the seal into seal groove of housing (7). Install drive link (9) and seat into shaft assembly (18).
- If a "V" shaped set of lines was drawn on the motor prior to disassembly, use them as a guide for reassembly to insure proper positioning of components.
- H) Install the wear plate (8) with the counter bore towards the housing (7). Replace seal (4) in the rotor set (10) and place onto the wear plate (8). Place driver (12) on top of driveline (9) engaging splines in rotor set (10). Make sure timing mark on the driver is pointing away from drive link (see Figures 1 and 2 for motor timing). Replace seal (4) in the manifold (11) and place over driver and onto rotor set (10).

Endcover Sub Assembly

- I) Place the endcover (16) on a flat clean surface with cavity facing up. Install the four springs (15) into holes in the bottom of the cavity.
- J) Install the O.D. and I.D. piston seals (5 & 6) onto the piston (14). The seals are cone shaped. The I.D. of the outer seal and the O.D. of the inner seal should be installed towards the piston. The opposite edges should be coming out away from the piston (see Figure 3 for installation of the piston seals).
- K) Install the piston (14) into the endcover (16). The two pins on the piston (14) should engage two of the springs inserted into the endcover (16). If the two pins are seated correctly, the piston will not spin in the endcover.
- L) Install the commutator (13) into the endcover (16) with the I.D. splines facing up and replace the last seal (4) on the endcover sub-assembly. The commutator must be timed correctly. There is one notch on the O.D. of the commutator (13). This notch must be aligned with the timing mark on the driver (12). See Figure 4 for timing the commutator correctly.
- M) Pick up the endcover sub-assembly and flip over. A small screwdriver can be inserted into a port to make sure the components stay together. Slide the endcover assembly over the driver (12) making sure that the notch in the commutator (13) aligns with the timing mark on the driver (12). The notch in the commutator does not need to be at a particular position in the endcover. With the notch aligned with the timing mark and the driver splines engaged in the commutator, the endcover assembly may be rotated to align the endcover with the rest of the motor. Do not align endcover with the rest of the motor unless the driver is engaged in the commutator and the notch and mark are in alignment as it could result in motor operation in the wrong direction.
- N) Install assembly bolts (17) into endcover. Pre-torque to 13,6 Nm [10 ft. lb.]. Final torque all bolts to 69,8 ± 7,5 Nm [51.5 ± 5.5 ft. lb.].

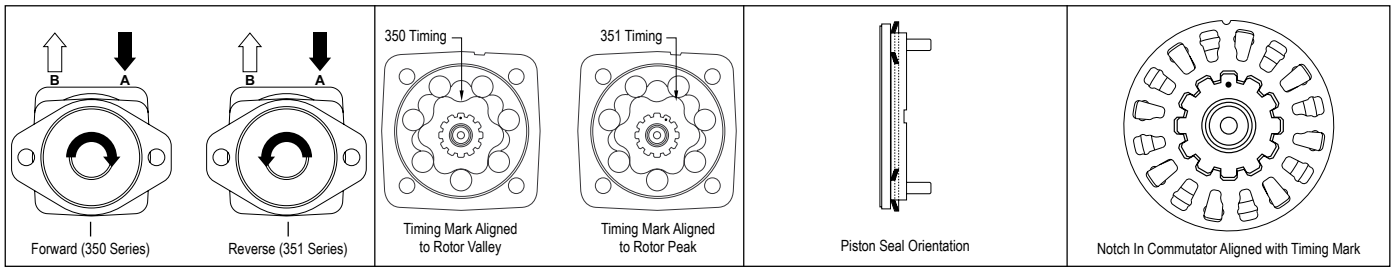
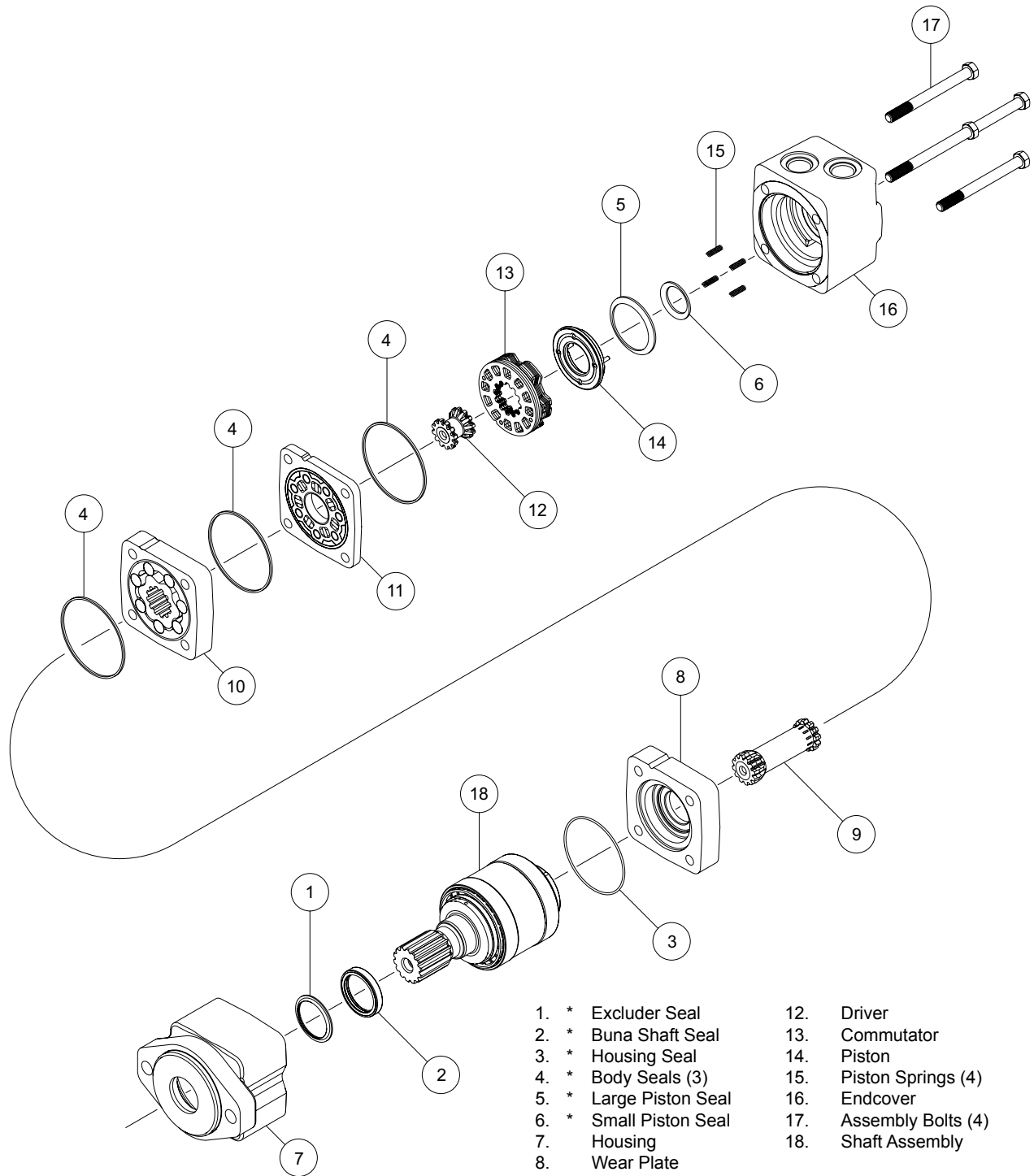


FIGURE 1

FIGURE 2

FIGURE 3

FIGURE 4



- | | |
|------------------------|------------------------|
| 1. * Excluder Seal | 12. Driver |
| 2. * Buna Shaft Seal | 13. Commutator |
| 3. * Housing Seal | 14. Piston |
| 4. * Body Seals (3) | 15. Piston Springs (4) |
| 5. * Large Piston Seal | 16. Endcover |
| 6. * Small Piston Seal | 17. Assembly Bolts (4) |
| 7. Housing | 18. Shaft Assembly |
| 8. Wear Plate | |
| 9. Drive Link | |
| 10. Rotor Assembly | |
| 11. Manifold | |

* Contained in Seal Kit 355355001

**SERVICE INSTRUCTIONS FOR THE WS [355 & 356] SERIES MOTORS**

For Use With Seal Kit: 355355001

dimensions: mm [in]

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 on the housing flange (7).

- A) Loosen and remove four bolts (18) holding the motor assembly together. Remove the endcover assembly (17).
- B) Flip the endcover assembly over. Remove the manifold (11), pin (12), driver (13), commutator (14), piston (15), and springs (16) from the endcover (17). Place the piston (15) on a flat clean surface with piston seals (5 & 6) facing up. Remove the piston seals from the piston (15) and discard.
- C) Remove rotor set (10) and wear plate (8) from the motor. Remove all seals (4) from components and discard. **(Caution: Do not allow rolls to drop from rotor assembly when removing rotor assembly from motor).** Remove seal (3) from housing (7) and discard. If servicing a short motor, the wear plate (8) becomes item the short motor mounting flange (20) and skip items D - H.
- D) To aid in the reassembly of the shaft sub-assembly make a "V" shaped set of line across the rear of the housing and the bearing retaining ring on the shaft assembly using either paint or a marker. Remove the housing (10) from the vise and flip over. Remove any shaft components from shaft (bolts, washers, keys, etc.)
- E) Using a press, press the shaft assembly (19) out of the rear of the housing (7). Remove shaft seal (2) and excluder seal (1) from housing (7) and discard all seals.

Clean all parts in an oil-based solvent and dry using compressed air (for safety, observe OSHA safety guidelines). All new seals should be lightly coated in clean oil prior to installation.

- F) Install excluder seal (1) into housing (7) with the lip facing down in the same direction of the output shaft (19). Align shaft seal (2) with flat side of seal facing excluder seal (1) and press seal in with a flat surface tool until seal stops. Press the shaft assembly (19) into housing (7) lining up the "V" set of lines on the bottom of the housing and shaft assembly.
- G) Install o-ring (3) after a slight stretch to expand the diameter of the seal into seal groove of housing (7). Install drive link (9) and seat into shaft assembly (19).

If a "V" shaped set of lines was drawn on the motor prior to disassembly, use them as a guide for reassembly to insure proper positioning of components.

- H) Install the wear plate (12) with the counter bore towards the housing (7). Note: Remember to align the "V"

Endcover & Rotor Set Sub-Assembly

- I) Place the endcover (17) on a flat clean surface with cavity facing up. Install two of the four springs (16) into holes in the bottom of the cavity 180° apart.
- J) Install the O.D. and I.D. piston seals (5 & 6) onto the piston (15). The seals are cone shaped. The I.D. of the outer seal and the O.D. of the inner seal should be installed towards the piston. The opposite edges should be coming out away from the piston. (See Figure 1 for installation of the piston seals.) Install the other two springs (16) onto piston alignment pins (15).
- K) Install the piston (15) into the endcover (17), holding the piston at a slight angle, with pins and springs inserting into the remaining two holes in the bottom of the end cover cavity (17).
- L) Install the manifold dowel pin (12) into the endcover; install the commutator (14) into the endcover (17) with the I.D. splines facing up. The commutator must be timed correctly. There is one notch on the O.D. of the commutator (14). Align the notch with the pin (12) in the end cover. Next, turn the commutator (14) CCW for 355 Series (CW for 356) until pin (12) aligns with the first landing between the valve holes. (See Figures 2 and 3 for timing the commutator correctly.)
- M) Install driver (13) with the larger tapered end, in commutator (14), install manifold (11) into the endcover with the large openings facing up and the slot on the O.D. aligned with the dowel pin (12), install rotor set aligning any valley with the pin (12) with I.D. spline chamfer facing up. Install body seal (4) into rotor set (10) seal groove. Rotor set must be timed. (See Figure 4 for correct rotor lobe orientation.)
- N) Pick up the end cover assembly, with rotor assembly (10), and place onto the wear plate (8) making sure that the drive link (9) engages the splines in the rotor assembly (10). In short motor assembly the wear plate (8) becomes the flange (20).
- O) Install assembly bolts (18) into endcover. Pre-torque to 13,6 Nm [10 ft. lb.]. Final torque all bolts to 69,8 ± 7,5 Nm [51.5 ± 5.5 ft. lb.].

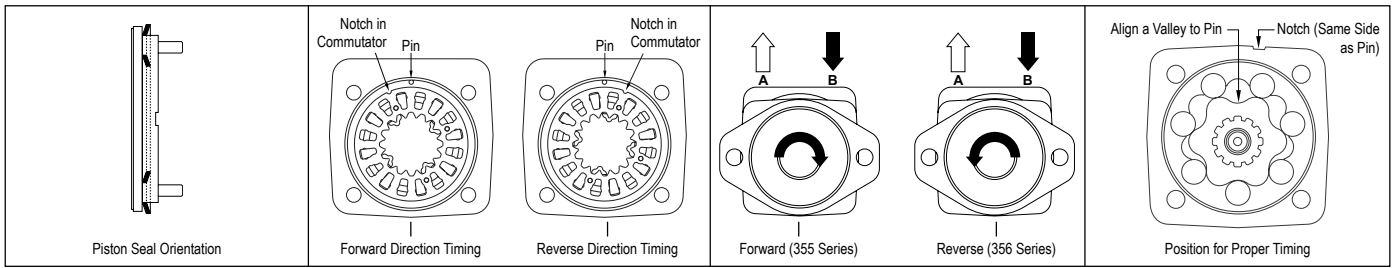


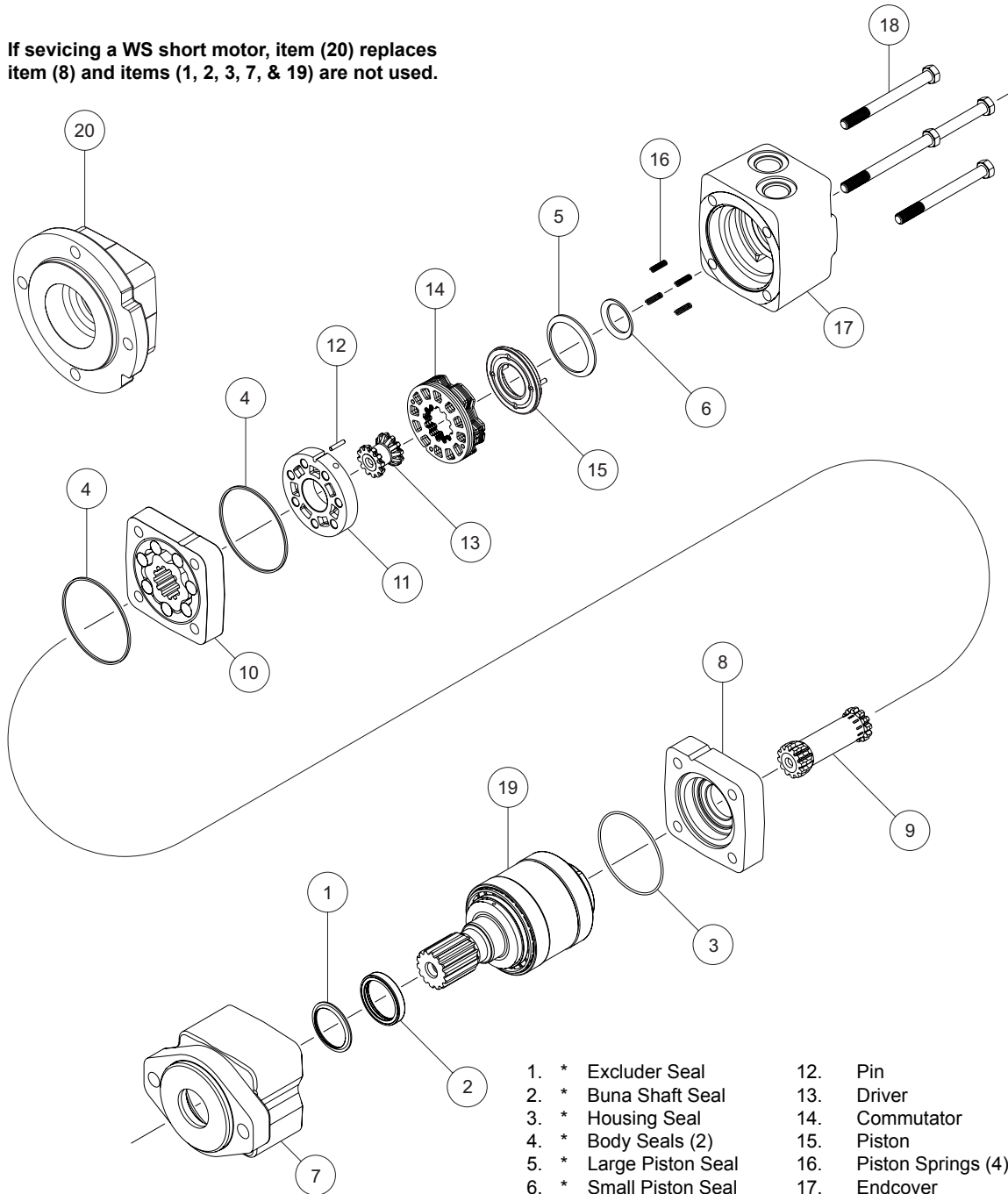
FIGURE 1

FIGURE 2 - Commutator Orientation

FIGURE 3 - Direction Explanation

FIGURE 4

If servicing a WS short motor, item (20) replaces item (8) and items (1, 2, 3, 7, & 19) are not used.



- | | |
|------------------------|-----------------------------------|
| 1. * Excluder Seal | 12. Pin |
| 2. * Buna Shaft Seal | 13. Driver |
| 3. * Housing Seal | 14. Commutator |
| 4. * Body Seals (2) | 15. Piston |
| 5. * Large Piston Seal | 16. Piston Springs (4) |
| 6. * Small Piston Seal | 17. Endcover |
| 7. Housing | 18. Assembly Bolts (4) |
| 8. Wear Plate | 19. Shaft Assembly |
| 9. Drive Link | 20. Short Motor Mounting Flange |
| 10. Rotor Assembly | |
| 11. Manifold | * Contained in Seal Kit 355355001 |