

The spindle of the external bearing system crank is a permanent part of either the left or right crank depending upon manufacturer. The other arm slides onto splines of the spindle, and is then secured. Crank installation and removal procedures vary between manufacturers.

There may be some service of the bearing for the external bearings of these systems. If the external cap can be safely pried free, the seal can then be lifted up and out with a bearing pick or a very small-tipped screwdriver (figure 7.15). The bearings may be cleaned if necessary and fresh grease added. Re-install seal and cap.

FIGURE 7.15



Carefully lift and remove seal to access bearings for cleaning

### Bearing Cup Installation

External bearing crank systems use threaded cups that press against the shell face. It is important that the shell surfaces are machined square to the threads and one another. Misaligned shell faces can cause the bearing cups to twist out of alignment as they seat and secure to the frame. A misaligned shell face may show up when a crank spindle appears to not be centering in one bearing after being installed through the opposite bearing. Another indication of poor shell face alignment is if the bearings do not seem to spin evenly or if the bearings wear out prematurely.

The triple crankset bearing cups of Shimano® Race Face®, and FSA® are designed to be 75.5mm apart. The cranksets are supplied with three spacers of 2.5mm. The crankset can be fitted to bikes with a 68mm or 73mm bottom bracket shell width. If the bike uses a front derailleur with a built-in mounting bracket ("E-type"), it is counted as a spacer. Any chain guide mount is also counted toward the width total. See Table 7.1 for arrangement of spacers.

TABLE 7.1 External Bearing Crankset System Spacer Arrangement

BOTTOM BRACKET SHELL WIDTH	LEFT SIDE OF BIKE	FRONT DERAILLEUR OR CHAIN-GUIDE	RIGHT SIDE OF BIKE
68mm	One 2.5mm spacer	Clamp-on front derailleur Two 2.5mm spacers	Two 2.5mm spacers
68mm	One 2.5mm spacer	E-type front derailleur	One 2.5mm spacer plus E-type bracket
73mm	No spacers	Clamp-on front derailleur	One 2.5mm spacer
73mm	No spacers	E-type front derailleur	E-type bracket

The Truvativ® Giga X Pipe Stylo uses spacers under the bearings. For the single speed or triple crankset, use one spacer per side with a 68mm shell, and no spacers for the 73mm shell.

The external bearing system design for double chainring cranksets (road) from Shimano®, FSA®, and Truvativ® are made for 68mm bottom bracket shells. No extra spacers are required or used for these systems. Bearings simply install into the shell.

The bearing cups from Shimano®, Campagnolo®, FSA®, Truvativ®, SRAM, and Race Face® all use the Park Tool BBT-9 or BBT-19 Bottom Bracket Torque Wrench. The cups have 16 notches that are used to apply torque. The BBT-9 is a hand tool. The BBT-19 is a torque wrench.

- The procedure for Shimano® Hollowtech II and FSA® MegaExo crank installation:
- Grease spindle surface and install drive side crank and spindle from the right side through both bearings (figure 7.17).
  - Place drive side crank in the 6 o'clock position. Hold left side arm in 12 o'clock position and press arm onto spindle using hand pressure.
  - Grease threads of crank cap and secure gently. Cap pushes arm to bearing. Recommended torque is only a very light 4 inch pounds. Crank should not push into bearing with force. Over tightening will cause bearings to drag and wear. FSA® MegaExo cranksets use an 8mm hex wrench for cap. Shimano Hollowtech II uses the star fitting of the Park Tool BBT-9 or equivalent tool.
  - Grease threads of arm pinch bolts and secure. Switch between bolts repeatedly to ensure both are fully tight.

FIGURE 7.16



Tighten bearings using Park Tool BBT-9 Bottom Bracket Torque Wrench

There is no bearing adjustment during bearing installation. Cranks are pushed slightly against the bearing for a light pre-load as part of crank installation for all models. Campagnolo® Ultra Torque cups contain no bearings. Bearings are installed on spindle.

### Crank Installation and Removal of Shimano® and FSA®

The Shimano® Hollowtech II and FSA® MegaExo may both use a left crank with a compression slot that is secured with pinch bolts. These systems do not use additional crank puller threads. The crank puller is applied to the bearing cups.

### Procedure for Shimano® Hollowtech II and FSA® MegaExo crank installation:

- Grease spindle surface and install drive side crank and spindle from the right side through both bearings (figure 7.17).
- Place drive side crank in the 6 o'clock position. Hold left side arm in 12 o'clock position and press arm onto spindle using hand pressure.
- Grease threads of crank cap and secure gently. Cap pushes arm to bearing. Recommended torque is only a very light 4 inch pounds. Crank should not push into bearing with force. Over tightening will cause bearings to drag and wear. FSA® MegaExo cranksets use an 8mm hex wrench for cap. Shimano Hollowtech II uses the star fitting of the Park Tool BBT-9 or equivalent tool.
- Grease threads of arm pinch bolts and secure. Switch between bolts repeatedly to ensure both are fully tight.

FIGURE 7.17



Install crank with spindle through both bearings

### The procedure for Shimano® Hollowtech II and FSA MegaExo removal:

- Loosen fully any pinch bolts on left side crank (figure 7.18).
- Remove the left side crank cap counter-clockwise. Shimano® cranks use the star fitting on the Park Tool BBT-9 or equivalent tool. Cap is fitted with an eight-point socket fitting (figure 7.19). FSA® crank caps use an 8mm hex wrench.
- Pull arm off spindle by hand. In some cases it may require light tapping with a soft mallet to remove arm if spindle/arm interface is dirty or sticky.
- Pull drive side arm to the right. This removes spindle from bearings and the bike. It may be necessary to use a mallet to tap the spindle.

FIGURE 7.18



Loosen pinch bolts

FIGURE 7.19



BBT-9 tool is used to remove crank cap