



Installation & Removal Instructions for B-LOC® Keyless Bushings

B-LOC® Keyless Bushings provide a high capacity, zero-backlash shaft/hub or coupling connection by means of a mechanical interference fit. Referring to the series, please follow these **Installation & Removal Instructions** carefully to ensure proper performance of your B-LOC® unit.

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INSTALLATION AND REMOVAL INSTRUCTIONS FOR B-LOC® KEYLESS BUSHING SERIES B106 & B103

B-LOC® Keyless Bushings provide a high capacity, zero-backlash shaft/hub or coupling connection by means of a mechanical interference fit. Please follow these INSTALLATION AND REMOVAL INSTRUCTIONS carefully to ensure proper performance of this **B-LOC®** unit.

ⓘ WARNING ⓘ

When installing or removing **B-LOC®** products, always adhere to the following safety standards:

1. Be sure that all power switches are locked out before installing or removing **B-LOC®** products.
2. Eye protection is required when installing or removing **B-LOC®** products - please wear safety glasses and protective clothing.

INSTALLATION

(Refer to Figure 1)

B-LOC® Series B103 and B106 Keyless Bushings are supplied lightly oiled and ready for installation. They are self-centering and fit straight-thru hub bores. Note that Series B103 units permit axial hub movement during installation. In contrast, the extended flange on Series B106 units results in an axially fixed hub position during assembly. When reinstalling a used unit, make sure that all slits are aligned. The frictional torque capacity of these devices is based on a coefficient of friction of 0.12 for lightly oiled screw, taper, shaft and bore contact areas.

Therefore, it is important *not* to use Molybdenum Disulfide (e.g., Molykote, Never-Seize or similar lubricants) in any Keyless Bushing installation.

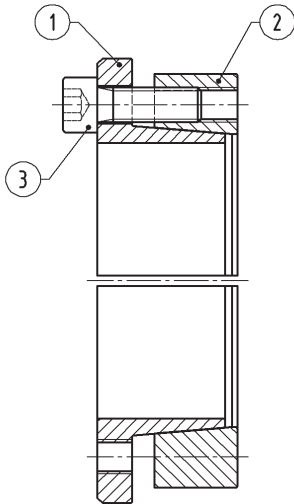


Figure 1

1. Make sure that locking screw, taper, shaft and bore contact areas are clean and lightly oiled and that all collar slits are aligned.
2. Loosen all locking screws by a minimum of four (4) turns and transfer at least three (3) screws into push-off threads in order to keep Parts 1 and 2 separated during assembly (see Figure 2).
3. After inserting Keyless Bushing into hub bore, relocate locking screws used for separating Parts 1 and 2.
4. Hand tighten locking screws and confirm that collar Item 1 is parallel and in full contact with face of part to be attached to shaft.
5. Use torque wrench and set it approximately 5% higher than specified tightening torque M_a . Tighten locking screws in either a clockwise or counterclockwise sequence (it is not necessary to tighten in a diametrically opposite pattern), using only 1/4 (i.e., 90°) turns for several passes until 1/4 turns can no longer be achieved.
6. Continue to apply overtorque for 1 to 2 more passes. This is required to compensate for a system-related relaxation of locking screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, an infinite number of passes would be needed to reach specified tightening torque.
7. Reset torque wrench to specified torque (M_a) and check all locking screws. No screw should turn at this point, otherwise repeat Step 6 for 1 or 2 more passes. It is not necessary to re-check tightening torque after equipment has been in operation.

NOTE: The torque capacity of these units can be increased by approximately 25% by thoroughly cleaning the shaft and Keyless Bushing bore of any lubricant. In applications subject to extreme corrosion, the slits in all collars should be sealed with a suitable caulking compound or equivalent. Likewise, push-off threads should be protected from corrosion.

INSTALLATION OF B-LOC® KEYLESS BUSHING OVER SHAFT KEYWAYS

The Keyless Bushing should be positioned so that slits in Keyless Bushing collars that contact the shaft are located approximately opposite the keyway. In addition, a locking screw should be centered directly over the keyway.

When tightening locking screws, it is important to follow the installation procedure outlined above, which specifies equal 1/4 turns of each locking screw. Failure to follow these instructions could result in excessive tightening of the screw over the keyway, possibly causing permanent deformation of the Keyless Bushing collars. Even after 1/4 turns can no longer be achieved, it is important to continue to use equal turning angles for every screw until the specified tightening torque is reached.

REMOVAL

(Refer to Figure 2)

Prior to initiating the following removal procedure, check to ensure that no torque or thrust loads are acting on the Keyless Bushing, shaft or any mounted components.

IMPORTANT! Make sure ends of locking screws used for removal are ground flat and are slightly chamfered to prevent damage to screw and collar threads during push-off.

1. Check to ensure that axial movement of collars - necessary for release of connection - is not restricted. Likewise, ensure that push-off threads are in good condition.
2. Relax all locking screws by approx. four (4) complete turns and transfer screws to all push-off threads located in flange of collar Item 1.
3. Release connection by evenly tightening all push-off screws (not exceeding 1/4 turns) in a diametrically opposite sequence.

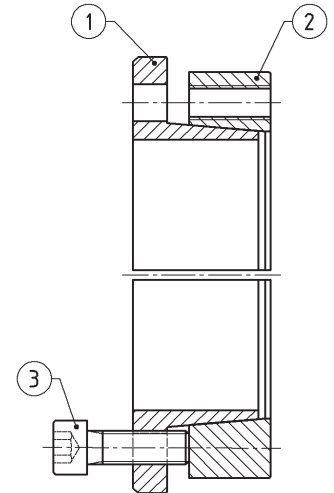


Figure 2

LOCKING SCREW SIZES AND SPECIFIED TIGHTENING TORQUE M_a

Metric Series	Inch Series	Tightening Torque M_a (ft-lbs)		Screw Size	Hex Key Size (mm)
		B106	B103		
20 x 47 to 40 x 65	3/4 to 1-1/2	12	10	M 6	5
45 x 75 to 65 x 95	1-5/8 to 2-9/16	30	25	M 8	6
70 x 110 to 95 x 135	2-11/16 to 3-3/4	60	50	M 10	8
100 x 145 to 120 x 165	3-15/16 to 4-3/4	105	90	M 12	10
130 x 180 to 200 x 260	4-15/16 to 8	166	135	M 14	12
220 x 285 to 260 x 325		257	219	M 16	14
280 x 355 to 300 x 375		350	290	M 18	14
320 x 405 to 340 x 425		500	420	M 20	17
360 x 455 to 400 x 495		675	560	M 22	17

INSTALLATION AND REMOVAL INSTRUCTIONS FOR B-LOC® KEYLESS BUSHING SERIES B109

B-LOC® Keyless Bushings provide a high capacity, zero-backlash shaft/hub or coupling connection by means of a mechanical interference fit. Please follow these INSTALLATION AND REMOVAL INSTRUCTIONS carefully to ensure proper performance of this **B-LOC®** unit.

ⓘ WARNING ⓘ

When installing or removing **B-LOC®** products, always adhere to the following safety standards:

1. Be sure that all power switches are locked out before installing or removing **B-LOC®** products.
2. Eye protection is required when installing or removing **B-LOC®** products - please wear safety glasses and protective clothing.

INSTALLATION

(Refer to Figure 1)

B-LOC® Mini Series B109 Keyless Bushings are supplied lightly oiled and ready for installation. They are self-centering and fit straight-thru hub bores. Note that the extended flange on Series B109 units results in an axially fixed hub position during assembly. When reinstalling a used unit, make sure that all slits are aligned. The frictional torque capacity of these devices is based on a coefficient of friction of 0.12 for lightly oiled screw, taper, shaft and bore contact areas.

Therefore, it is important **not** to use Molybdenum Disulfide (e.g., Molykote, Never-Seeze or similar lubricants) in any Keyless Bushing installation.

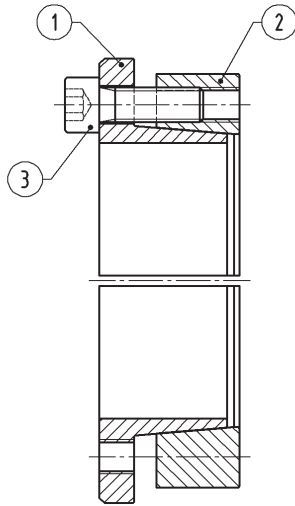


Figure 1

1. Make sure that locking screw, taper, shaft and bore contact areas are clean and lightly oiled and that all collar slits are aligned.
2. Loosen all locking screws by a minimum of four (4) turns and transfer at least three (3) screws into push-off threads in order to keep Parts 1 and 2 separated during assembly (see Figure 2).
3. After inserting Keyless Bushing into hub bore, relocate locking screw(s) used for separating Parts 1 and 2.
4. Hand tighten locking screws and confirm that collar Item 1 is parallel and in full contact with face of part to be attached to shaft.
5. Use torque wrench and set it approximately 5% higher than specified tightening torque M_a . Tighten locking screws in either a clockwise or counterclockwise sequence (it is not necessary to tighten in a diametrically opposite pattern), using only 1/4 (i.e., 90°) turns for several passes until 1/4 turns can no longer be achieved.
6. Continue to apply overtorque for 1 to 2 more passes. This is required to compensate for a system-related relaxation of locking screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, an infinite number of passes would be needed to reach specified tightening torque.

7. Reset torque wrench to specified torque (M_a) and check all locking screws. No screw should turn at this point, otherwise repeat Step 6 for 1 or 2 more passes. It is not necessary to re-check tightening torque after equipment has been in operation.

NOTE: The torque capacity of these units can be increased by approximately 25% by thoroughly cleaning the shaft and Keyless Bushing bore of any lubricant. In applications subject to extreme corrosion, the slits in all collars should be sealed with a suitable caulking compound or equivalent. Likewise, push-off threads should be protected from corrosion.

INSTALLATION OF B-LOC® KEYLESS BUSHING OVER SHAFT KEYWAYS

The Keyless Bushing should be positioned so that slits in Keyless Bushing collars that contact the shaft are located approximately opposite the keyway. In addition, a locking screw should be centered directly over the keyway.

When tightening locking screws, it is important to follow the installation procedure outlined above, which specifies equal 1/4 turns of each locking screw. Failure to follow these instructions could result in excessive tightening of the screw over the keyway, possibly causing permanent deformation of the Keyless Bushing collars. Even after 1/4 turns can no longer be achieved, it is important to continue to use equal turning angles for every screw until the specified tightening torque is reached.

REMOVAL

(Refer to Figure 2)

Prior to initiating the following removal procedure, check to ensure that no torque or thrust loads are acting on the Keyless Bushing, shaft or any mounted components.

IMPORTANT! Make sure ends of locking screws used for removal are ground flat and are slightly chamfered to prevent damage to screw and collar threads during push-off.

1. Check to ensure that axial movement of collars - necessary for release of connection - is not restricted. Likewise, ensure that push-off threads are in good condition.
2. Relax all locking screws by approx. four (4) complete turns and transfer screws to all push-off threads located in flange of collar Item 1.
3. Release connection by evenly tightening all push-off screws (not exceeding 1/4 turns) in a diametrically opposite sequence.

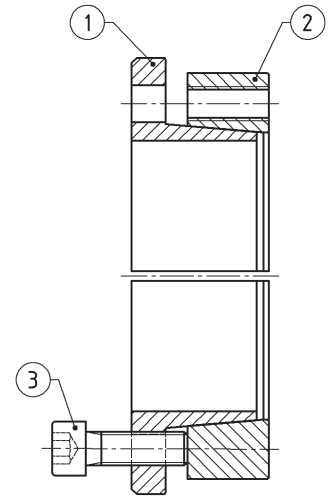


Figure 2

LOCKING SCREW SIZES AND SPECIFIED TIGHTENING TORQUE M_a

Size	Tightening Torque M_a (in-lbs)	Screw Size	Hex Key Size (mm)
1/4" or 6 mm	38	M 4	3
5/16" or 8 mm to 3/4" or 19 mm	42.5	M 4	3
7/8" or 20 mm to 1-3/8" or 35 mm	87	M 5	4

INSTALLATION AND REMOVAL INSTRUCTIONS FOR B-LOC® KEYLESS BUSHING SERIES B112

B-LOC® Keyless Bushings provide a high capacity, zero-backlash shaft/hub or coupling connection by means of a mechanical interference fit. Please follow these **INSTALLATION AND REMOVAL INSTRUCTIONS** carefully to ensure proper performance of this **B-LOC®** unit.

ⓘ WARNING ⓘ

When installing or removing **B-LOC®** products, always adhere to the following safety standards:

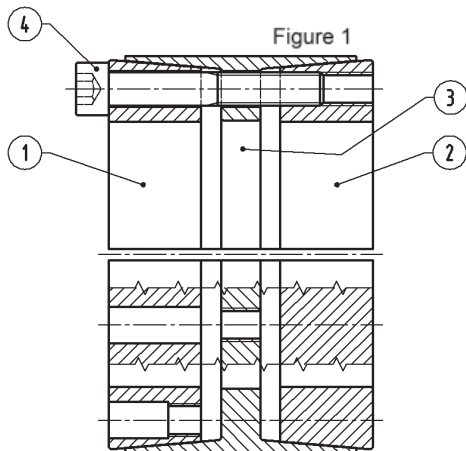
1. Be sure that all power switches are locked out before installing or removing **B-LOC®** products.
2. Eye protection is required when installing or removing **B-LOC®** products - please wear safety glasses and protective clothing.

INSTALLATION

(Refer to Figures 1 and 2)

B-LOC® Keyless Bushings are supplied lightly oiled and ready for installation. When reinstalling a used unit, make sure that all slits are aligned and that front and rear clamp collars are not reversed (when assembled correctly there are no holes or threads behind taps in clamp collar Item 1, and no threads behind taps in center collar Item 3). The frictional torque capacity of these devices is based on a coefficient of friction of 0.12 for lightly oiled screw, taper, shaft and bore contact areas.

Therefore, it is important **not** to use Molybdenum Disulfide (e.g., Molykote, Never-Seeze or similar lubricants) in any Keyless Bushing installation.



1. Make sure that locking screw, taper, shaft and bore contact areas are clean and lightly oiled and that all collar slits are aligned.
2. Loosen all locking screws by a minimum of four (4) turns and transfer at least two (2) screws to push-off threads in clamp collar Item 1 to disengage this part from center collar Item 3. Similarly, transfer at least two (2) screws to push-off threads in center collar Item 3 to disengage this part from clamp collar Item 2 (see Figure 2).
3. Completed assembly can now be placed on shaft and inserted into hub bore by pushing against face of collar Item 1 while ensuring that collar Item 2 is not engaged at tapers during this phase.
4. After placement of Keyless Bushing, relocate locking screws used for separation of collars.
5. Hand tighten connection and confirm that clamp collar Item 1 is parallel with face of part to be attached to shaft and/or with the front facing edge of center collar Item 3.
6. Use torque wrench and set it approximately 5% higher than specified tightening torque M_a . Tighten locking screws in either a clockwise or counterclockwise sequence (it is not necessary to tighten in a diametrically opposite pattern), using only 1/4 (i.e., 90°) turns for several passes until 1/4 turns can no longer be achieved.
7. Continue to apply overtorque for 1 to 2 more passes. This is required to compensate for a system-related relaxation of locking screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, an infinite number of passes would be needed to reach specified tightening torque.
8. Reset torque wrench to specified torque (M_a) and check all locking screws. No screw should turn at this point, otherwise repeat Step 7 for 1 or 2 more passes. It is not necessary to re-check tightening torque after equipment has been in operation.

NOTE: In installations subjected to extreme corrosion, the slits in clamp collars Item 1 and Item 2, as well as in center collars, should be sealed with a suitable caulking compound or equivalent. Likewise, push-off threads should also be protected from corrosion.

INSTALLATION OF B-LOC® KEYLESS BUSHING OVER SHAFT KEYWAYS

The Keyless Bushing should be positioned so that slits in Keyless Bushing collars that contact the shaft are located approximately opposite the keyway. In addition, a locking screw should be centered directly over the keyway.

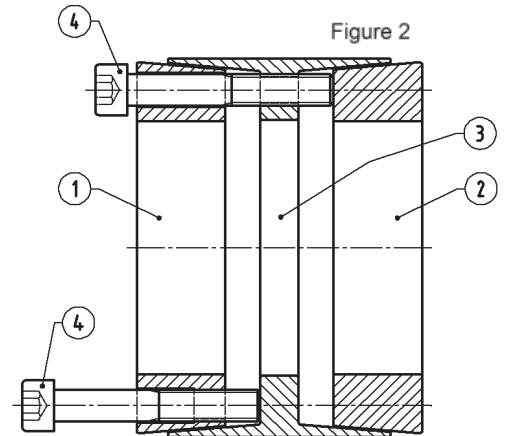
When tightening locking screws, it is important to follow the installation procedure outlined above, which specifies equal 1/4 turns of each locking screw. Failure to follow these instructions could result in excessive tightening of the screw over the keyway, possibly causing permanent deformation of the Keyless Bushing collars. Even after 1/4 turns can no longer be achieved, it is important to continue to use equal turning angles for every screw until the specified tightening torque is reached.

REMOVAL (Refer to Figure 2)

Prior to initiating the following removal procedure, check to ensure that no torque or thrust loads are acting on the Keyless Bushing, shaft or any mounted components.

IMPORTANT! Make sure ends of locking screws used for removal are ground flat and are slightly chamfered to prevent damage to screw and collar threads during push-off.

1. Check to ensure that axial movement of clamp collars - necessary for release of connection - is not restricted. Likewise, ensure that push-off threads are in good condition.
2. Remove all locking screws. Transfer required number of screws into all push-off threads of clamp collar Item 1 (see Figure 2).
3. Release collar Item 1 by progressively tightening all push-off screws. Typically, the push-off screws appear to be completely tight after just one pass of tightening without any noticeable separation of clamp collars. Although it seems that the screws cannot be tightened further, several more rounds of torquing in either a clockwise or counterclockwise sequence will increase the push-off force in the system and ultimately release part of the front collar. Afterwards, only the screws which are still tight should be tightened further until complete dismounting is achieved. Remove clamp collar Item 1.
4. Transfer locking screws used for dismounting of clamp collar Item 1 into all push-off threads in center collar Item 3 (see Figure 2). Release clamp collar Item 2 by repeating procedures outlined in Step 3.



LOCKING SCREW SIZES AND SPECIFIED TIGHTENING TORQUE M_a B112 KEYLESS BUSHING

Metric Series	Inch Series	Tightening Torque M_a (ft-lbs)	Screw Size	Hex Key Size (mm)
25 x 55 to 35 x 60	1 to 1-7/16	12	M 6	5
40 x 75 to 65 x 95	1-1/2 to 2-9/16	30	M 8	6
70 x 110 to 90 x 130	2-5/8 to 3-5/8	60	M 10	8
100 x 145 to 120 x 165	3-3/4 to 4-3/4	105	M 12	10
130 x 180 to 160 x 210	4-15/16 to 6	166	M 14	12
170 x 225 to 260 x 325	6-7/16 to 8	257	M 16	14
280 x 355 to 340 x 425		500	M 20	17
360 x 455 to 600 x 695		675	M 22	17

INSTALLATION AND REMOVAL INSTRUCTIONS FOR B-LOC® KEYLESS BUSHING SERIES B113

B-LOC® Keyless Bushings provide a high capacity, zero-backlash shaft/hub or coupling connection by means of a mechanical interference fit. Please follow these **INSTALLATION AND REMOVAL INSTRUCTIONS** carefully to ensure proper performance of this **B-LOC®** unit.

ⓘ WARNING ⓘ

When installing or removing **B-LOC®** products, always adhere to the following safety standards:

1. Be sure that all power switches are locked out before installing or removing **B-LOC®** products.
2. Eye protection is required when installing or removing **B-LOC®** products – please wear safety glasses and protective clothing.

INSTALLATION

(Refer to Figure 1)

B-LOC® Keyless Bushings are supplied lightly oiled and ready for installation. When reinstalling a used unit, make sure that all slits are aligned and that front and rear clamp collars are not reversed. The frictional torque capacity of these devices is based on a coefficient of friction of 0.12 for lightly oiled screw, taper, shaft and bore contact areas.

Therefore, it is important not to use Molybdenum Disulfide (e.g., Molykote, Never-Seeze or similar lubricants) in any Keyless Bushing installation.

1. Make sure that locking screw, taper, shaft and bore contact areas are clean and lightly oiled and that all collar slits are aligned.
2. Loosen all locking screws by a minimum of four (4) turns and transfer at least three (3) screws to equally spaced push-off threads in clamp collar Item 1 to disengage this part from center collar Item 3. To disengage collar Item 2 from taper interface, lightly tap heads of three (3) equally spaced locking screws that have been engaged at least four (4) turns into collar Item 2 (see Figure 1).

3. Completed assembly can now be placed on shaft and inserted into hub bore by pushing against face of collar Item 1 while ensuring that collar Item 2 is not engaged at tapers during this phase.

4. After placement of Keyless Bushing, relocate locking screws used for separation of collars.

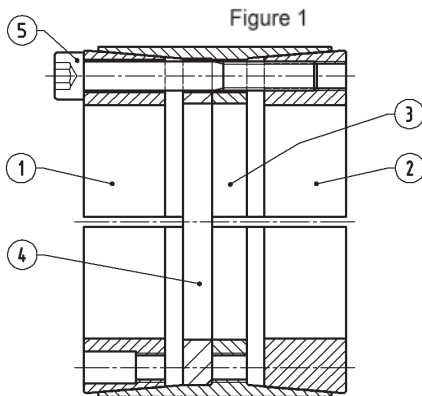
5. Hand tighten connection and confirm that clamp collar Item 1 is parallel with face of part to be attached to shaft and/or with the front facing edge of center collar Item 3.

6. Use torque wrench and set it approximately 5% higher than specified tightening torque M_a . Tighten screws in either a clockwise or counterclockwise sequence (it is not necessary to tighten in a diametrically opposite pattern), using only 1/4 (i.e., 90°) turns for several passes until 1/4 turns can no longer be achieved.

7. Continue to apply overtorque for 1 to 2 more passes. This is required to compensate for a system-related relaxation of locking screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, an infinite number of passes would be needed to reach specified tightening torque.

8. Reset torque wrench to specified torque (M_a) and check all locking screws. No screw should turn at this point, otherwise repeat Step 7 for 1 or 2 more passes. It is not necessary to re-check tightening torque after equipment has been in operation.

NOTE: In installations subjected to extreme corrosion, the slits in clamp collars Item 1 and Item 2, as well as in center collars, should be sealed with a suitable caulking compound or equivalent. Likewise, push-off threads should also be protected from corrosion.



INSTALLATION OF B-LOC® KEYLESS BUSHING OVER SHAFT KEYWAYS

The Keyless Bushing should be positioned so that slits in Keyless Bushing collars that contact the shaft are located approximately opposite the keyway. In addition, a locking screw should be centered directly over the keyway.

When tightening locking screws, it is important to follow the installation procedure outlined above, which specifies equal 1/4 turns of each locking screw. Failure to follow these instructions could result in excessive tightening of the screw over the keyway, possibly causing permanent deformation of the Locking Assembly collars. Even after 1/4 turns can no longer be achieved, it is important to continue to use equal turning angles for every screw until the specified tightening torque is reached.

REMOVAL

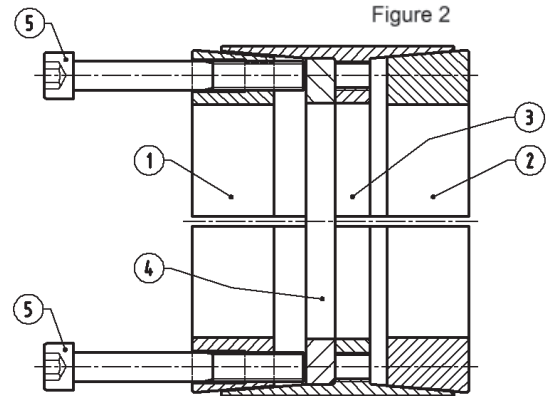
(Refer to Figures 2 and 3)

Prior to initiating the following removal procedure, check to ensure that no torque or thrust loads are acting on the Keyless Bushing, shaft or any mounted components.

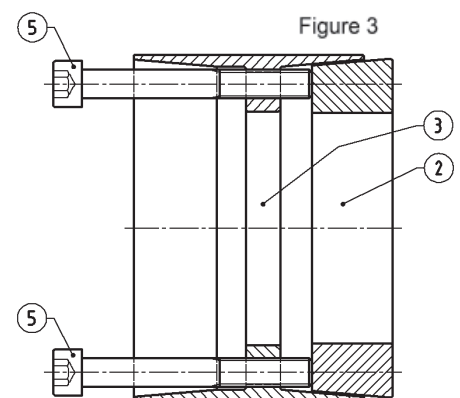
IMPORTANT! Make sure ends of locking screws used for removal are ground flat and are slightly chamfered to eliminate damage to screw and collar threads during push-off.

1. Check to ensure that axial movement of clamp collars - necessary for release of connection - is not restricted. Likewise, ensure that push-off threads are in good condition.

2. Remove all locking screws. Transfer required number of screws into all push-off threads of clamp collar Item 1 (see Figure 2).



3. Release collar Item 1 by progressively tightening all push-off screws. Typically, the push-off screws appear to be completely tight after just one pass of tightening without any noticeable separation of clamp collars. Although it seems that the screws cannot be tightened further, several more rounds of torquing in either a clockwise or counterclockwise sequence will increase the push-off force in the system and ultimately release part of the front collar. Afterwards, only the screws which are still tight should be tightened further until complete dismounting is achieved. Remove collar Item 1 and cover plate Item 4 (cover plate Item 4 is supplied with two [2] smaller threads at the collar face for this purpose).



4. Transfer locking screws used for dismounting of collar Item 1 into all push-off threads in center collar Item 3 (see Figure 3). Release collar Item 2 by repeating procedures outlined in Step 3.

LOCKING SCREW SIZES AND SPECIFIED TIGHTENING TORQUE M_a B113 KEYLESS BUSHING - METRIC SIZES ONLY

	Screw Size	Tightening Torque M_a (ft-lb)	Hex Key Size (mm)
180 x 285 to 220 x 325	M22 x 180	675	17
240 x 355 to 300 x 425	M24 x 180	870	19
320 x 455 to 560 x 695	M27 x 220	1,300	19

INSTALLATION AND REMOVAL INSTRUCTIONS FOR B-LOC® KEYLESS BUSHING SERIES B115

B-LOC® Keyless Bushings provide a high capacity, zero-backlash shaft/hub or coupling connection by means of a mechanical interference fit. Please follow these **INSTALLATION AND REMOVAL INSTRUCTIONS** carefully to ensure proper performance of this **B-LOC®** unit.

ⓘ WARNING ⓘ

When installing or removing **B-LOC®** products, always adhere to the following safety standards:

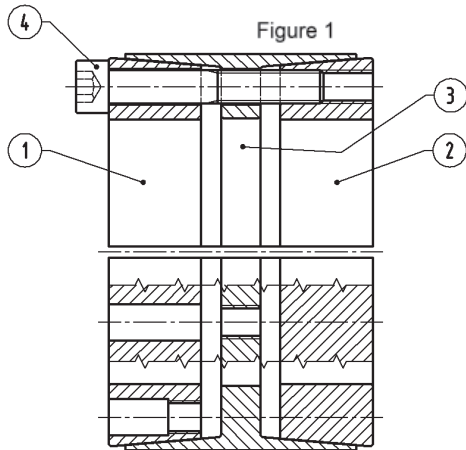
1. Be sure that all power switches are locked out before installing or removing **B-LOC®** products.
2. Eye protection is required when installing or removing **B-LOC®** products - please wear safety glasses and protective clothing.

INSTALLATION

(Refer to Figures 1 and 2)

B-LOC® Keyless Bushings are supplied lightly oiled and ready for installation. When reinstalling a used unit, make sure that all slits are aligned and that front and rear clamp collars are not reversed (when assembled correctly there are no holes or threads behind taps in clamp collar Item 1, and no threads behind taps in center collar Item 3). The frictional torque capacity of these devices is based on a coefficient of friction of 0.12 for lightly oiled screw, taper, shaft and bore contact areas.

Therefore, it is important **not** to use Molybdenum Disulfide (e.g., Molykote, Never-Seize or similar lubricants) in any Keyless Bushing installation.



1. Make sure that locking screw, taper, shaft and bore contact areas are clean and lightly oiled and that all collar slits are aligned.
2. Loosen all locking screws by a minimum of four (4) turns and transfer at least two (2) screws to push-off threads in clamp collar Item 1 to disengage this part from center collar Item 3. Similarly, transfer at least two (2) screws to push-off threads in center collar Item 3 to disengage this part from clamp collar Item 2 (see Figure 2).
3. Completed assembly can now be placed on shaft and inserted into hub bore by pushing against face of collar Item 1 while ensuring that collar Item 2 is not engaged at tapers during this phase.
4. After placement of Keyless Bushing, relocate locking screws used for separation of collars.
5. Hand tighten connection and confirm that clamp collar Item 1 is parallel with face of part to be attached to shaft and/or with the front facing edge of center collar Item 3.
6. Use torque wrench and set it approximately 5% higher than specified tightening torque M_a . Tighten locking screws in either a clockwise or counterclockwise sequence (it is not necessary to tighten in a diametrically opposite pattern), using only 1/4 (i.e., 90°) turns for several passes until 1/4 turns can no longer be achieved.
7. Continue to apply overtorque for 1 to 2 more passes. This is required to compensate for a system-related relaxation of locking screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, an infinite number of passes would be needed to reach specified tightening torque.
8. Reset torque wrench to specified torque (M_a) and check all locking screws. No screw should turn at this point, otherwise repeat Step 7 for 1 or 2 more passes. It is not necessary to re-check tightening torque after equipment has been in operation.

NOTE: In installations subjected to extreme corrosion, the slits in clamp collars Item 1 and Item 2, as well as in center collars, should be sealed with a suitable caulking compound or equivalent. Likewise, push-off threads should also be protected from corrosion.

INSTALLATION OF B-LOC® KEYLESS BUSHING OVER SHAFT KEYWAYS

The Keyless Bushing should be positioned so that slits in Keyless Bushing collars that contact the shaft are located approximately opposite the keyway. In addition, a locking screw should be centered directly over the keyway.

When tightening locking screws, it is important to follow the installation procedure outlined above, which specifies equal 1/4 turns of each locking screw. Failure to follow these instructions could result in excessive tightening of the screw over the keyway, possibly causing permanent deformation of the locking assembly collars. Even after 1/4 turns can no longer be achieved, it is important to continue to use equal turning angles for every screw until the specified tightening torque is reached.

REMOVAL

(Refer to Figure 2)

Prior to initiating the following removal procedure, check to ensure that no torque or thrust loads are acting on the Keyless Bushing, shaft or any mounted components.

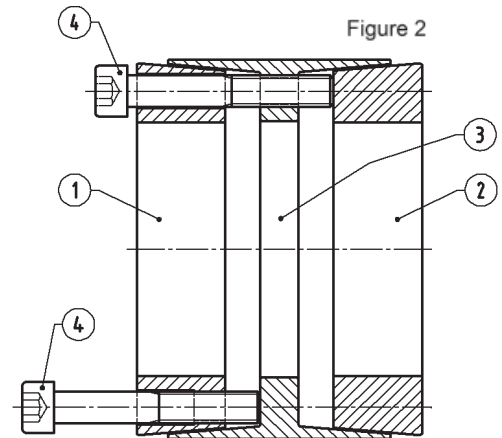
IMPORTANT! Make sure ends of locking screws used for removal are ground flat and are slightly chamfered to prevent damage to screw and collar threads during push-off.

1. Check to ensure that axial movement of clamp collars - necessary for release of connection - is not restricted. Likewise, ensure that push-off threads are in good condition.

2. Remove all locking screws. Transfer required number of screws into all push-off threads of clamp collar Item 1 (see Figure 2).

3. Release collar Item 1 by progressively tightening all push-off screws. Typically, the push-off screws appear to be completely tight after just one pass of tightening without any noticeable separation of clamp collars. Although it seems that the screws cannot be tightened further, several more rounds of torquing in either a clockwise or counterclockwise sequence will increase the push-off force in the system and ultimately release part of the front collar. Afterwards, only the screws which are still tight should be tightened further until complete dismounting is achieved. Remove clamp collar Item 1.

4. Transfer locking screws used for dismounting of clamp collar Item 1 into all push-off threads in center collar Item 3 (see Figure 2). Release clamp collar Item 2 by repeating procedures outlined in Step 3.



LOCKING SCREW SIZES AND SPECIFIED TIGHTENING TORQUE M_a B115 KEYLESS BUSHING

Metric Series	Inch Series	Tightening Torque M_a (ft-lbs)	Screw Size	Hex Key Size (mm)
70 x 110 to 90 x 130	2-3/4 to 3-1/2	60	M 10	8
100 x 145 to 160 x 210	3-15/16 to 6	105	M 12	10
170 x 225 to 200 x 260	6-7/16 to 8	166	M 14	12
220 x 285 to 260 x 325		257	M 16	14
280 x 355 to 340 x 425		500	M 20	17
360 x 455 to 600 x 695		675	M 22	17

INSTALLATION AND REMOVAL INSTRUCTIONS FOR B-LOC® KEYLESS BUSHING SERIES B400

B-LOC® Keyless Bushings provide a high capacity, zero-backlash shaft/hub or coupling connection by means of a mechanical interference fit. Please follow these **INSTALLATION AND REMOVAL INSTRUCTIONS** carefully to ensure proper performance of this **B-LOC®** unit.

ⓘ WARNING ⓘ

When installing or removing **B-LOC®** products, always adhere to the following safety standards:

1. Be sure that all power switches are locked out before installing or removing **B-LOC®** products.
2. Eye protection is required when installing or removing **B-LOC®** products. Please wear safety glasses and protective clothing.

INSTALLATION

(Refer to Figure 1)

B-LOC® Keyless Bushings are supplied lightly oiled and ready for installation. The frictional torque capacity of these devices is based on a coefficient of friction of 0.12 for lightly oiled screw, taper, shaft and bore contact areas.

Therefore, it is important **not** to use Molybdenum Disulfide (e.g., Molykote, Never-Seeze or similar lubricants) in any Keyless Bushing installation.

1. Make sure that locking screw, taper, shaft and bore contact areas are clean and lightly oiled.

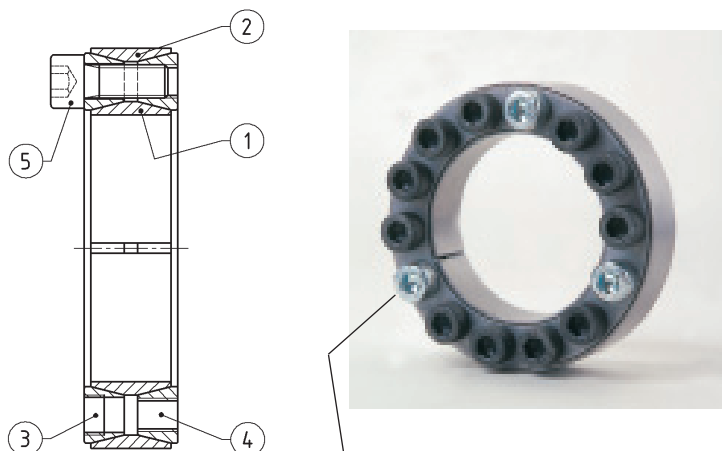


Figure 1

Cadmium plated screws

2. Insert Keyless Bushing into hub counterbore prior to shaft installation.
3. After confirming correct hub position, hand-tighten three (3) or four (4) equally spaced locking screws until initial contact with shaft and hub bore is established.
4. Use torque wrench and set it approximately 5% higher than specified tightening torque M_a . Tighten locking screws in either a clockwise or counterclockwise sequence (it is not necessary to tighten in a diametrically opposite pattern), using only 1/4 (i.e., 90°) turns for several passes until 1/4 turns can no longer be achieved.
5. Continue to apply overtorque for 1 to 2 more passes. This is required to compensate for a system-related relaxation of locking screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, an infinite number of passes would be needed to reach specified tightening torque.
6. Reset torque wrench to specified torque (M_a) and check all locking screws. No screw should turn at this point, otherwise repeat Step 5 for 1 or 2 more passes. It is not necessary to re-check tightening torque after equipment has been in operation.

NOTE: In applications subject to extreme corrosion, the slits in all collars can be sealed with a suitable caulking compound or equivalent.

INSTALLATION OF B-LOC® KEYLESS BUSHING OVER SHAFT KEYWAYS

The Keyless Bushing should be positioned so that slits in Keyless Bushing collars that contact the shaft are located approximately opposite the keyway. In addition, a locking screw should be centered directly over the keyway.

When tightening locking screws, it is important to follow the installation procedure outlined above, which specifies equal 1/4 turns of each locking screw. Failure to follow these instructions could result in excessive tightening of the screw over the keyway, possibly causing permanent deformation of the Keyless Bushing collars. Even after 1/4 turns can no longer be achieved, it is important to continue to use equal turning angles for every screw until the specified tightening torque is reached.

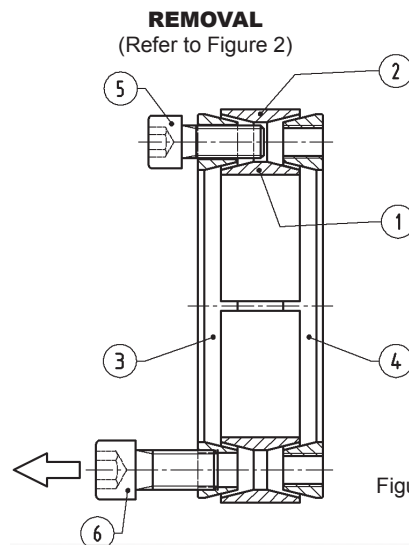


Figure 2

Prior to initiating the following removal procedure, check to ensure that no torque or thrust loads are acting on the Keyless Bushing, shaft or any mounted components.

1. Loosen locking screws in several stages by using approx. 1/4 turns, following either a clockwise or counterclockwise sequence.

NOTE: **B-LOC®** Series B400 Keyless Bushings feature self-releasing tapers, meaning collars should release during Step 1. However, if for some reason the thrust collars jam, a light tap on three (3) equally spaced heads of loosened locking screws will positively release the connection.

2. Hub and Keyless Bushing are normally removed together. Removal of Keyless Bushing only from deep counterbores is accomplished by inserting pull-off screws (not provided) into threads located under cadmium plated locking screws. These threads are NOT to be used for high pulling forces, as thrust collar is only partially threaded.

LOCKING SCREW SIZES AND SPECIFIED TIGHTENING TORQUE M_a - B400 KEYLESS BUSHINGS

Metric Series	Inch Series	M_a ft-lb	S mm	K	dB
20 x 47 to 40 x 65	3/4 to 1-1/2	11	M 6	5	M 8
42 x 75 to 65 x 95	1-5/8 to 2-9/16	26	M 8	6	M 10
70 x 110 to 95 x 135	2-5/8 to 3-3/4	51	M 10	8	M 12
100 x 145 to 160 x 210	3-7/8 to 6	91	M 12	10	M 14
170 x 225 to 200 x 260	6-7/16 to 8	138	M 14	12	M 16
220 x 285 to 260 x 325		214	M 16	14	M 20
280 x 355 to 300 x 375		293	M 18	14	M 22
320 x 405 to 340 x 425		420	M 20	17	M 24
360 x 455 to 420 x 515		565	M 22	17	M 27
440 x 545 to 1000 x 1110		725	M 24	19	M 30

M_a = Tightening Torque

S = Screw Size

K = Hex Key Size

dB = pull-off thread, located only under cadmium plated screws of front thrust collar

INSTALLATION AND REMOVAL INSTRUCTIONS FOR B-LOC® KEYLESS BUSHING SERIES B800

B-LOC® Keyless Bushings provide a high capacity, zero-backlash shaft/hub or coupling connection by means of a mechanical interference fit. Please follow these **INSTALLATION AND REMOVAL INSTRUCTIONS** carefully to ensure proper performance of this **B-LOC®** unit.

ⓘ WARNING ⓘ

When installing or removing **B-LOC®** products, always adhere to the following safety standards:

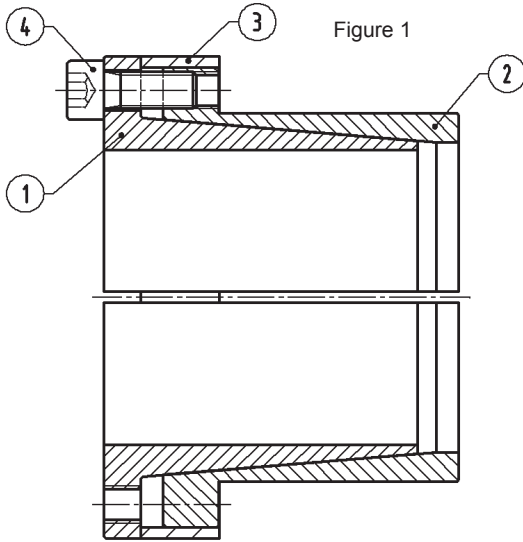
1. Be sure that all power switches are locked out before installing or removing **B-LOC®** products.
2. Eye protection is required when installing or removing **B-LOC®** products - please wear safety glasses and protective clothing.

INSTALLATION

(Refer to Figure 1)

B-LOC® Keyless Bushings are supplied lightly oiled and ready for installation. When reinstalling a used unit, make sure that all slits are aligned. The frictional torque capacity of these devices is based on a coefficient of friction of 0.12 for lightly oiled screw, taper, shaft and bore contact areas.

Therefore, it is important not to use Molybdenum Disulfide (e.g., Molykote, Never-Seeze or similar lubricants) in any Keyless Bushing installation.



1. Make sure that locking screw, taper, shaft and bore contact areas are clean and lightly oiled and that all collar slits are aligned.
2. Loosen all locking screws by a minimum of two (2) turns and transfer at least three (3) screws into push-off threads in order to keep Parts 1 and 2 separated during assembly (see Figure 2).
3. After inserting Keyless Bushing into hub bore, relocate locking screws used for separating Parts 1 and 2.
4. Hand tighten locking screws and confirm that collar Item 1 is parallel with face of part to be attached to shaft, and that spacer sleeve fully contacts both part and Keyless Bushing face.
5. Use torque wrench and set it approximately 5% higher than specified tightening torque M_a . Tighten locking screws in either a clockwise or counterclockwise sequence (it is not necessary to tighten in a diametrically opposite pattern), using only 1/4 (i.e., 90°) turns for several passes until 1/4 turns can no longer be achieved.
6. Continue to apply overtorque for 1 to 2 more passes. This is required to compensate for a system-related relaxation of locking screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, an infinite number of passes would be needed to reach specified tightening torque.
7. Reset torque wrench to specified torque (M_a) and check all locking screws. No screw should turn at this point, otherwise repeat Step 6 for 1 or 2 more passes. It is not necessary to re-check tightening torque after equipment has been in operation.

NOTE: In applications subject to extreme corrosion, the slits in all collars should be sealed with a suitable caulking compound or equivalent. Likewise, push-off threads should be protected from corrosion.

INSTALLATION OF B-LOC® KEYLESS BUSHING OVER SHAFT KEYWAYS

The Keyless Bushing should be positioned so that slits in Keyless Bushing collars that contact the shaft are located approximately opposite the keyway. In addition, a locking screw should be centered directly over the keyway.

When tightening locking screws, it is important to follow the installation procedure outlined above, which specifies equal 1/4 turns of each locking screw. Failure to follow these instructions could result in excessive tightening of the screw over the keyway, possibly causing permanent deformation of the Keyless Bushing collars. Even after 1/4 turns can no longer be achieved, it is important to continue to use equal turning angles for every screw until the specified tightening torque is reached.

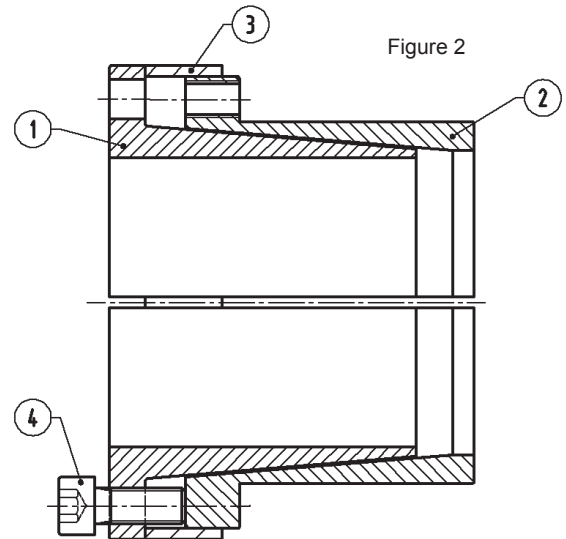
REMOVAL

(Refer to Figure 2)

Prior to initiating the following removal procedure, check to ensure that no torque or thrust loads are acting on the Keyless Bushing, shaft or any mounted components.

IMPORTANT! Make sure ends of locking screws used for removal are ground flat and are slightly chamfered to prevent damage to screw and collar threads during push-off.

1. Check to ensure that axial movement of collars - necessary for release of connection - is not restricted. Likewise, ensure that push-off threads are in good condition.
2. Loosen locking screws in several stages by using approx. 1/4 turns, following either a clockwise or counterclockwise sequence. Transfer required number of screws into all push-off threads of clamp collar Item 1 (see Figure 2).
3. Release connection by evenly tightening all push-off screws (not exceeding 1/4 turns) in either a clockwise or counterclockwise sequence.



LOCKING SCREW SIZES AND SPECIFIED TIGHTENING TORQUE M_a B800 KEYLESS BUSHING

Metric Series	Inch Series	Tightening Torque M_a (ft-lbs)	Screw Size	Hex Key Size (mm)
6 x 14 to 14 x 23	1/4 to 1/2	3.55	M 4	3
15 x 24 to 42 x 55	5/8 to 1-5/8	12	M 6	5
45 x 59 to 65 x 84	1-11/16 to 2-1/2	30	M 8	6
70 x 90 to 95 x 120	2-5/8 to 3-3/4	60	M 10	8
100 x 125 to 130 x 165	3-7/8 to 4-15/16	105	M 12	10

INSTALLATION AND REMOVAL INSTRUCTIONS FOR B-LOC® SHRINK DISCS

B-LOC® Keyless Bushings provide a high capacity, zero-backlash shaft/hub or coupling connection by means of a mechanical interference fit. Please follow these **INSTALLATION AND REMOVAL INSTRUCTIONS** carefully to ensure proper performance of this **B-LOC®** unit.

ⓘ WARNING ⓘ

When installing or removing **B-LOC®** products, always adhere to the following safety standards:

1. Be sure that all power switches are locked out before installing or removing **B-LOC®** products.
2. Eye protection is required when installing or removing **B-LOC®** products. Please wear safety glasses and protective clothing.

INSTALLATION

(Refer to Figure 1)

B-LOC® Shrink Discs are supplied ready for installation. However, prior to tightening of locking screws it is necessary to remove wooden spacers that may have been used during shipping.

Important: Never tighten locking screws before shaft installation, as inner ring of Shrink Disc and/or hub can be permanently contracted even at relatively low tightening torques.

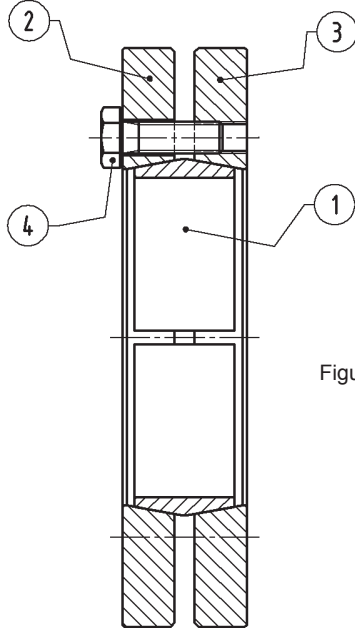


Figure 1

1. Clean hub O.D. and Shrink Disc bore. Lightly lubricate hub O.D. before assembling Shrink Disc on hub.
2. Carefully clean shaft and hub bore of any lubricant prior to mounting hub onto shaft. **This step is critical, as any lubricant on the shaft/hub bore interface will greatly reduce the torque transmitting capacity of a B-LOC® Shrink Disc connection.**
3. After confirming correct position of hub and Shrink Disc, hand-tighten three (3) or four (4) equally spaced locking screws and make sure that outer collars of Shrink Disc are parallel. Hand-tighten remaining locking screws.
4. Use torque wrench and set it approximately 5% higher than specified tightening torque M_a . Tighten locking screws in either a clockwise or counterclockwise sequence, using approx. 1/4 (i.e., 90°) turns (even if initially some locking screws require a very low tightening torque to achieve 1/4 turns) for several passes until 1/4 turns can no longer be achieved.
5. Continue to apply overtorque for 1 to 2 more passes. This is required to compensate for a system-related relaxation of locking screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, an infinite number of passes would be needed to reach specified tightening torque.
6. Reset torque wrench to specified torque (M_a) and check all locking screws. No screw should turn at this point, otherwise repeat Step 5 for 1 or 2 more passes. It is not necessary to re-check tightening torque after equipment has been in operation.

REMOVAL

(Refer to Figure 2)

Prior to initiating the following removal procedure, check to ensure that no torque or thrust loads are acting on the Keyless Bushing, shaft or any mounted components.

1. Loosen all locking screws in several stages by using approx. 1/2 turns, following either a clockwise or counterclockwise sequence, until Shrink Disc can be moved on hub. The Shrink Disc, hub and shaft will return to their original clearance fits.

ⓘ WARNING ⓘ

DO NOT completely remove locking screws before outer collars are disengaged from inner ring. A sudden release of the outer collars involves high separating forces and could result in permanent injury or death. Be certain that outer collars are disengaged from inner ring before completely removing locking screws.

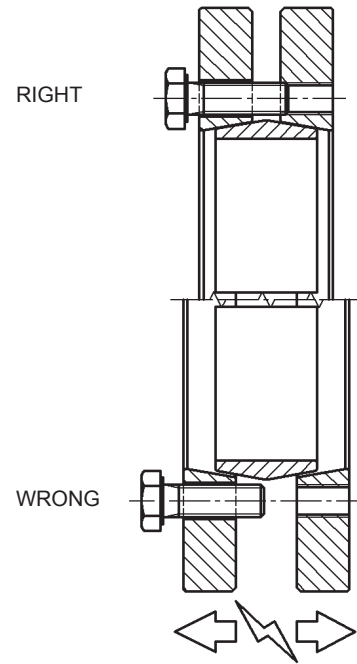


Figure 2

REINSTALLATION OF SHRINK DISCS

In relatively clean operating conditions, Shrink Discs can be re-used without prior cleaning. Shrink Discs used under severe conditions, however, require thorough cleaning and re-lubrication with Dow Corning® Molykote® G-n Metal Assembly Paste or equivalent.

LOCKING SCREW SIZES AND SPECIFIED TIGHTENING TORQUE M_a

Screw Size	M5	M6	M8	M10	M12	M16	M20	M24	M27
Tightening Torque M_a (ft-lbs)									
	3.6	8.7	22	44	74	185	362	620	922
Wrench Size Across Flats (mm)									
	8	10	13	17	19	24	30	36	41

INSTALLATION AND REMOVAL INSTRUCTIONS FOR B-LOC® WK RIGID COUPLING

Please follow these **INSTALLATION AND REMOVAL INSTRUCTIONS** carefully to ensure proper performance of this B-LOC® unit.

ⓘ WARNING ⓘ

When installing or removing **B-LOC®** products, always adhere to the following safety standards:

1. Lockout/Tagout all energy sources and assure all stored energy has been released.
2. Approved eye protection is recommended.

INSTALLATION (Refer to Figure 1)

B-LOC® WK Rigid Couplings are supplied ready for installation. For increased torque transmission, see *Special Considerations*.

Important: Never tighten locking screws before shaft installation, as the WK Rigid Coupling inner ring (3) can be permanently deformed even at relatively low tightening torques.

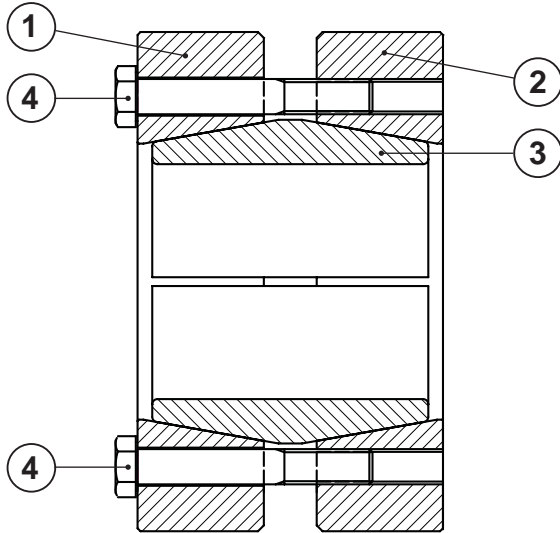


Figure 1

1. Using a non-petroleum based solvent, carefully clean shafts of any lubricants prior to mounting coupling on shafts. **This step is critical, as any contaminants on the shafts may alter the performance of a B-LOC® WK Rigid Coupling connection.**
2. Center coupling over shaft ends. Hand-tighten three or four equally spaced locking screws (4) assuring outer collars (1, 2) of WK Rigid Coupling are parallel. Hand-tighten remaining locking screws.
3. Use a torque wrench set to the overtorque valued listed in the chart. This value is ~5% higher than specified install torque, M_a . Tighten locking screws in either a clockwise or counterclockwise sequence, using approximately 1/4 (i.e., 90°) turns (even if initially some locking screws require a very low tightening torque to achieve 1/4 turns) for several passes until 1/4 turns can no longer be achieved.
4. Continue to apply overtorque for one to two more passes. This is required to compensate for a system-related relaxation of locking screws since tightening of a given screw will always relax adjacent screws. Without overtorquing, an infinite number of passes would be needed to reach specified install torque.
5. Reset torque wrench to specified install torque (M_a) and check all locking screws. No screw should turn at this point, otherwise repeat Step 3 for one or two more passes. It is not necessary to recheck tightening torque after equipment has been in operation.

REMOVAL (Refer to Figure 1)

ⓘ WARNING ⓘ

Prior to initiating the following removal procedure, check to ensure that no torque or thrust loads are acting on the WK Rigid Coupling, shaft or any mounted components.

ⓘ WARNING ⓘ

DO NOT completely remove locking screws (4) before outer collars (1, 2) are disengaged from inner ring (3). A sudden release of the outer collars involves high separating forces and could result in permanent injury or death. Be certain that outer collars are disengaged from inner ring before completely removing locking screws. **Refer to Figure 1.**

Loosen all locking screws in several stages by using approximately 1/2 turns, following either a clockwise or counterclockwise sequence, until the WK Rigid Coupling can be moved on the shafts. The WK Rigid Coupling will return to its original clearance fit.

REINSTALLATION OF WK RIGID COUPLINGS

In relatively clean operating conditions, WK Rigid Couplings can be reused without prior cleaning. WK Rigid Couplings used under severe conditions, however, require thorough cleaning. Relubricate screws and tapers with Dow Corning® Molykote® G-n Metal Assembly Paste or equivalent. Lightly coat the remainder of the unit with standard machining oil. Upon doing so, install following **INSTALLATION** portion of this document.

SPECIAL CONSIDERATIONS

If your application requires increased torque transmission and/or thrust, in addition to using a non-petroleum based solvent to clean the shafts (as stated in step 1), the bore of the WK Rigid Coupling needs to be cleaned with a non-petroleum based solvent to produce an oil free connection. This in turn will result in up to a 20% increase in M_t and T_h performance values.

LOCKING SCREW SIZES & SPECIFIED INSTALL TORQUE M_a

Screw Type	M6	M8	M10	M12
Overtorque (ft lb)	9.1	23	46	78
Install Torque (ft lb)	8.7	22	44	74
Wrench Size Across Flats (mm)	10	13	16	18

These Screw Sizes Are Installed on the Following WK Series:

M6 – WK 15, 20, 25, 30
M8 – WK 40, 50, 60
M10 – WK 70
M12 – WK 80, 90, 100

Contact Fenner Drives Applications Engineering at ae@fennerdrives.com for additional details.