

Complete Teardown, Cleaning, and Reassembly of the Olympus BH-2 Sliding Focus Block

(Revision 1)



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Introduction

The microscopes in the Olympus BH-2 line (BHS, BHSU, BHT, and BHTU) have largely been replaced in the professional and clinical world, due to their advancing age and the lack of repair parts from Olympus. A great many of these microscopes were produced in their day, and because of this are they readily available on the used market for very reasonable prices. Thanks to their excellent build quality and solid optical performance, these scopes are now very popular with hobbyists, providing an affordable, high-quality alternative to the Chinese-made scopes prevalent today. One problem that might be encountered when purchasing one of these scopes is that the focus action may be stiff, due to the decades-old grease in the coaxial focus mechanism and in the sliding focus block mechanism.

Scope of this Document

This document describes the complete teardown, cleaning, and reassembly of the sliding focus block mechanism in an Olympus BHTU stand. Since the various BH-2 stands use the same sliding focus block as the BHTU, this document should allow a hobbyist with reasonable mechanical abilities to service the sliding focus block on any of the BH-2 stands. Note that this document covers the specific configuration of the sliding focus block mechanism which utilizes crossed rollers to provide smooth linear motion of the focus block. The vast majority of the BH-2 stands that were ever produced used this mechanical configuration. The very early stands that were manufactured (i.e., the first 200 or so) utilized bearing balls instead of crossed rollers in the slide mechanism, and these early units are outside the scope of this document¹.

A Caution Regarding Stiff Focus Mechanisms

Avoid turning the focus knobs on any BH-2 microscope stand whose focus mechanism feels abnormally stiff. Turning these knobs when there is excess resistance in the mechanism, such as may be caused by dried grease, puts high stresses on the plastic drive gears in the fine-focus mechanism, and these can be damaged if these stresses are too high.

Tools Needed

The following tools will be needed to complete the teardown, cleaning, and reassembly of the sliding focus block mechanism in a BH-2 microscope stand:

- Allen wrench or driver: 2.5mm (item 1 of [Appendix 2](#))

- Allen wrench or driver: 4.0mm (item 2 of [Appendix 2](#))
- Allen wrench or driver: 5.0mm, (item 3 of [Appendix 2](#))
- Screwdriver set, JIS (item 4 of [Appendix 2](#))

A Few Words about JIS Screws

Screws with JIS heads are frequently found in much of the equipment designed and manufactured in Japan. JIS screws look very much like standard Phillips screws, but they differ in that JIS screws were designed to not cam-out under torque, whereas Phillips screws were designed to intentionally cam-out as a means to limit the torque applied to the fasteners. Because of this crucial difference in the geometry of the two screw types, JIS screws will be damaged by standard Phillips drivers if too much torque is applied. JIS screws can usually be identified by the presence of a single dot (or by an "X") stamped into one of the four quadrants of the cross-point depression (see [Figure 1](#)).

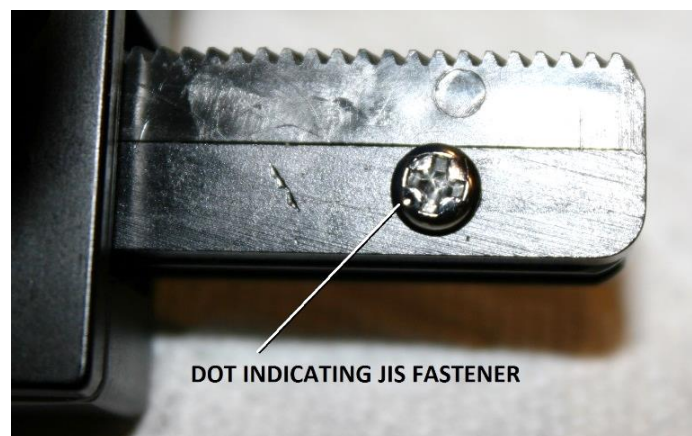


Figure 1 – Head of a typical JIS screw

Supplies Needed

The following supplies will be needed to complete the teardown, cleaning, and reassembly of the sliding focus block mechanism in a BH-2 microscope stand:

- Cleaning solvents (see [Recommended Solvents](#) below)
- Cotton swabs
- Lubricant (see [Recommended Lubricants](#) below)
- Tissues, oil free

Recommended Solvents

Some type of cleaning solvent will be needed to remove the old grease from the various components of the sliding focus block mechanism. Solvents that can be used are acetone (commonly sold as fingernail polish remover), diethyl ether, heptane, hexane, mineral spirits, turpentine, and xylene.

Safety Considerations with Solvents

Regardless of which solvent is chosen, make sure that adequate ventilation is present during the cleaning

¹ A future revision of this document may include the ball-slide configuration, if a suitable stand ever becomes available for this purpose.

process, and that any necessary personal protective equipment is utilized to minimize exposure. Consult the MSDS sheet before using any unfamiliar solvents. Many of the solvents listed above are flammable, and their vapors may represent an explosion hazard if mishandled. Whichever solvents are chosen, be sure to follow all manufacturer's instructions and safety precautions.

Solvent Compatibility with Parts and Finishes

Many solvents will damage the finish of painted surfaces (isopropyl alcohol or 409 Cleaner may be safely used to clean most painted surfaces) or will dissolve or damage plastic parts. Do not allow untested solvents to contact any plastic parts or any painted surfaces. Before using a solvent to clean plastic parts or painted surfaces, test a small amount of the solvent in an inconspicuous area (such as inside a plastic knob) to ensure compatibility with the plastic part or painted surface. Never use xylene to clean nylon parts, as xylene dissolves nylon. Isopropyl alcohol and trichloroethylene will cause swelling of nylon due to solvent absorption. The list of solvents generally considered safe for nylon includes acetone, diethyl ether, heptane, mineral spirits, naphthalene, and turpentine.

Recommended Lubricants

The Olympus BH2 (BHS) repair manual (see the [Original Olympus Documentation](#) section of this document) recommends using grease in the sliding focus block mechanism. However, based on decades of experience servicing BH-2 equipment in the field, many microscope repair technicians recommend omitting the grease entirely from the sliding focus block, in order to reduce the fouling of the mechanism which can occur if dust and debris accumulates in the greased slide, as well as reducing any stiffness or sluggishness that will result from thickening of the grease. Given this conflicting guidance, consider that grease may be applied to the slide per the Olympus guidance, at the risk of requiring more frequent maintenance to keep the mechanism clean and freely moving, and grease may be omitted, at the risk of more long-term wear of the mechanical components. Mobil Polyrex™ EM or Molykote® 44 (items 7 and 5 of [Appendix 2](#)) are recommended if lubrication is desired in the slide. Regardless of whether or not lubrication is used in the slide, a heavy grease such as Dow Molykote® 111 (item 6 of [Appendix 2](#)) should be used to hold the guide rails in place during reassembly, and any excess grease remaining after the guide rails have been installed should be thoroughly

removed before proceeding with the reassembly of the sliding focus block mechanism.

Label Parts for Identification and Reassembly

There are many small parts that make up the sliding focus block mechanism. It is critical that these be bagged and tagged as they are removed to prevent them from getting lost, and to facilitate their proper identification during reassembly.

Part of a Comprehensive Focus Overhaul

Maintenance of the sliding focus block is best performed as part of a comprehensive overhaul of the entire focus mechanism. It is best performed after a teardown of the coaxial focus mechanism has been performed, since this service is much easier to perform while the focus knobs and other focus parts are not present on the arm. Accordingly, this document describes (and the accompanying photographs show) the service being performed on a stand that has had the coaxial focus block completely disassembled, per the [Complete Teardown, Cleaning, and Reassembly of the BH-2 Coaxial Focus Mechanism](#) document. In almost every case where the sliding focus block is sluggish and needs to be serviced, the coaxial focus mechanism is also in need of a similar service, so it makes sense to perform both repairs at the same time.

Protect the Exposed Mounting Dovetails

Before proceeding with the teardown described in this document, cover the top of the microscope arm (i.e., the exposed mounting dovetails for the viewing head and nosepiece, if applicable) with a clean plastic bag and secure this with a rubber band or adhesive tape to keep dust out (see [Figure 2](#)). This is especially important on BHSU and BHTU stands which have an optical correction lens located just below the viewing head to correct for the difference in tube length introduced with the reversed nosepiece.



Figure 2 – Protect the top of the arm from dust

Separate the Arm from the Base of the Stand

Separate the arm from the base of the stand per the following procedure.

Remove the Lamphouse

Remove the lamphouse from the base by grasping it and pulling it straight back (see [Figure 3](#)). Do not touch the halogen lamp with your fingers, as oils from your skin may cause premature failure of the bulb. If the bulb is accidentally touched, clean it with isopropyl alcohol.



Figure 3 – Remove the lamphouse from the base

Remove the Electrical Base

Carefully turn the stand upside down. Use a 4mm (or 5/32”) Allen wrench or driver to remove the four M5x12 hex, socket-head cap screws and the associated washers from the bottom of the stand (see [Figure 4](#)).



Figure 4 – Bottom view of the BHT/BHTU electrical base

Hold the electrical base in place and set the stand in its normal upright position on a flat surface, being careful not to let the electrical base shift as you do so. Lift the stand from the electrical base by grasping the arm and lifting straight up until the bottom of the stand well clears the electrical base. If the stand contains a light-

preset control/switch (see [Figure 5](#)), be sure to disengage the preset control/switch from the notch in the side of the base before lifting the stand clear of the electrical base. Set the electrical base aside.

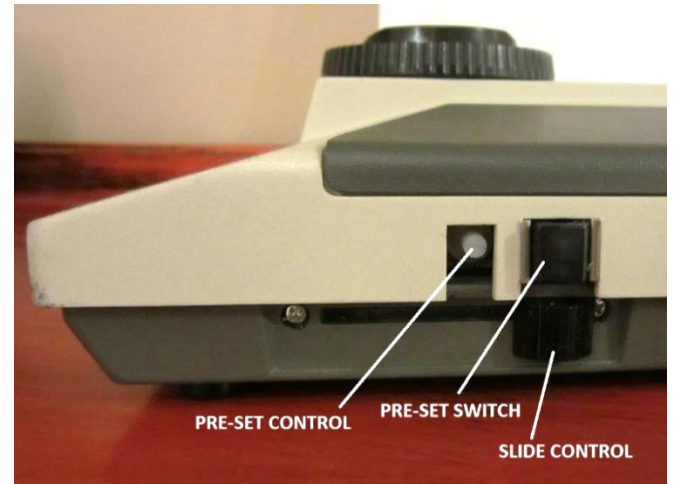


Figure 5 – Light pre-set control and pre-set switch

Remove the Arm from the Base

Lay the stand on its back. Use a 5mm Allen wrench or driver to remove the four M6x25 hex, socket-head cap screws securing the arm to the base (see [Figure 6](#)) and separate the arm from the base (see [Figure 7](#)).

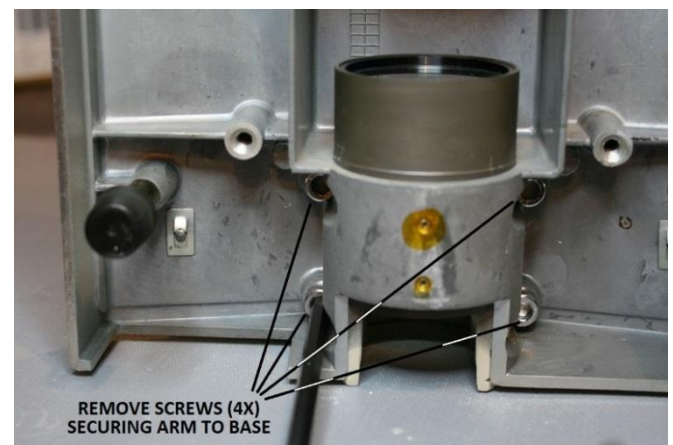


Figure 6 – Remove screws securing the arm to the base



Figure 7 – Separate the arm from the base

With the electrical base removed, fragile lighting components are exposed on the open bottom of the base which may be damaged if the base is not placed on a suitable surface. Place the base in its normal upright position on a clean, flat surface someplace out of harm's way and where dust and debris will not accumulate on the exposed lighting components.

Disassemble the Sliding Focus Block

Disassemble the sliding focus block mechanism per the following procedure.

Remove the Trim Cover

Use a suitable JIS screwdriver to remove the four M2x4 screws securing the U-shaped trim cover onto the arm of the stand (see [Figure 8](#)).

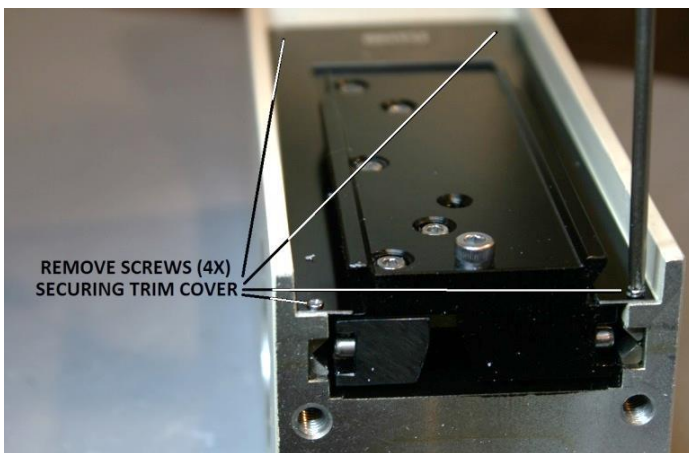


Figure 8 – Remove screws securing the trim cover

Remove the (now loose) trim cover from the arm of the stand (see [Figure 9](#)).

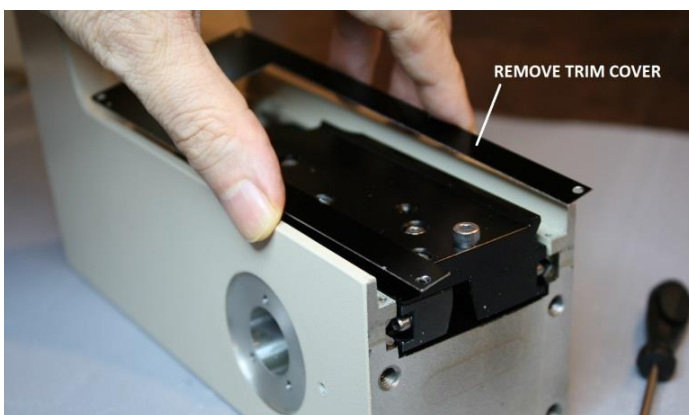


Figure 9 – Remove the loose trim cover from the arm

Loosen the Screws Tensioning the Slide Mechanism

Use a 2.5mm Allen wrench or driver to loosen (but do not remove) the three M3x12 hex, socket-head cap screws securing the guide block into position on the back side of the focus block (see [Figure 10](#)).

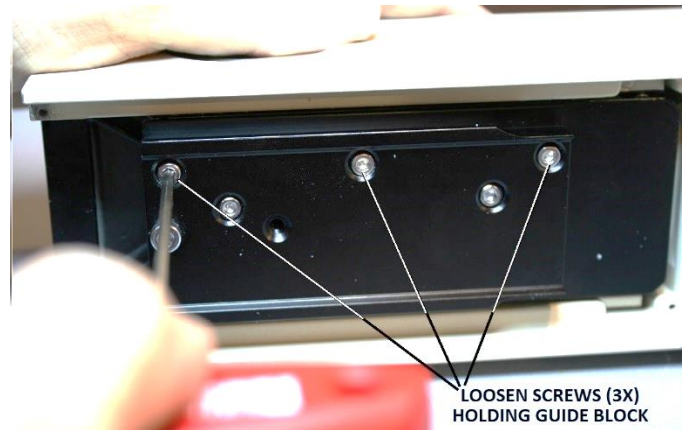


Figure 10 – Loosen screws securing guide block in place

Use a 2.5mm Allen wrench or driver to loosen (but do not remove) the two M3x16 hex, socket-head cap screws tensioning the slide mechanism (see [Figure 11](#)).

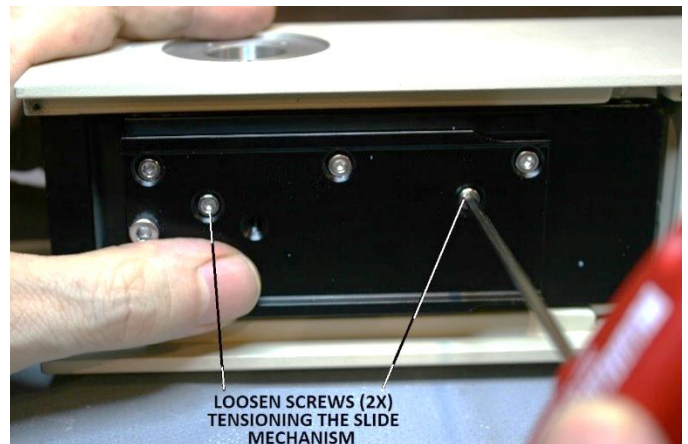


Figure 11 – Loosen screws tensioning slide mechanism

Remove the Focus Block Assembly from the Arm

Carefully slide the focus block (with attached guide block) out the bottom of the arm (see [Figure 12](#)), being careful to not lose any of the cylindrical rollers or spacer rods in the process (there are eight rollers and one spacer rod on each side of the slide mechanism).

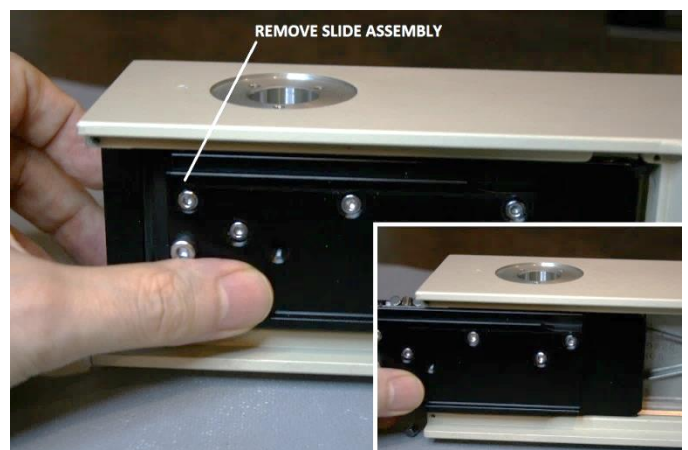


Figure 12 – Withdraw the focus block assembly from arm

Use a 2.5mm Allen wrench or driver to remove the three M3x12 hex, socket-head cap screws securing the guide block to the back side of the focus block (see [Figure 13](#)).

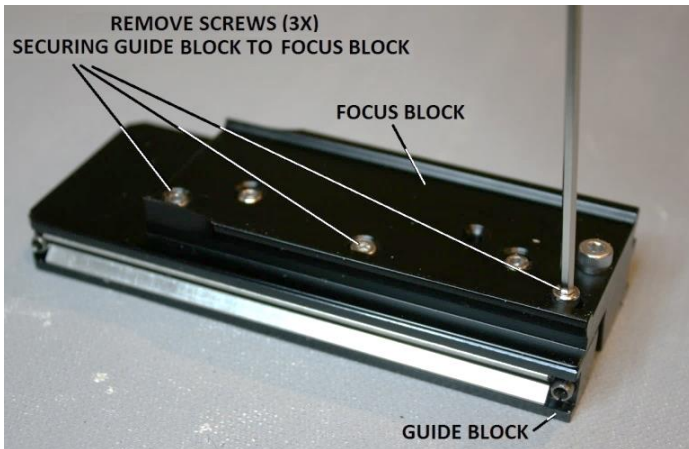


Figure 13 – Remove screws securing the guide block

Separate the (now loose) guide block from the focus block (see [Figure 14](#)).

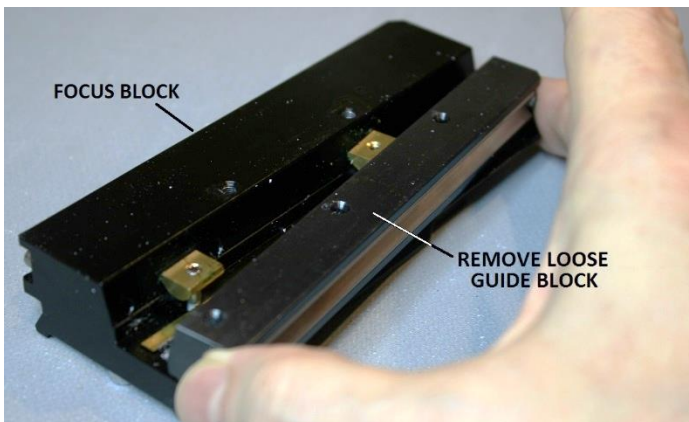


Figure 14 – Remove the guide block from the focus block

The components of the focus block assembly are shown in [Figure 15](#).

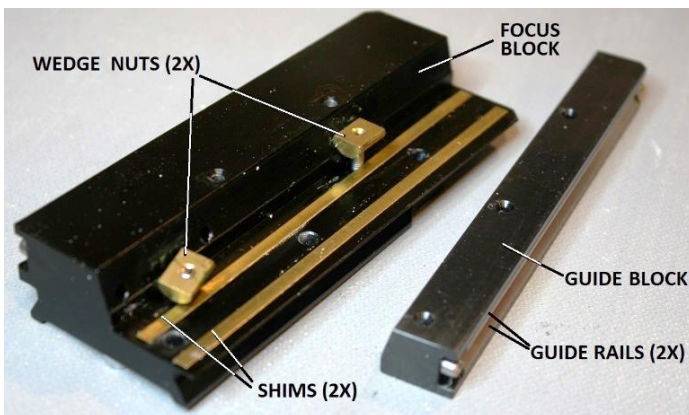


Figure 15 – The components of the focus block assembly

Remove the two brass shims from between the guide block and the focus block (see [Figure 16](#)).

Complete Teardown, Cleaning, and Reassembly of the Olympus BH-2 Sliding Focus Block

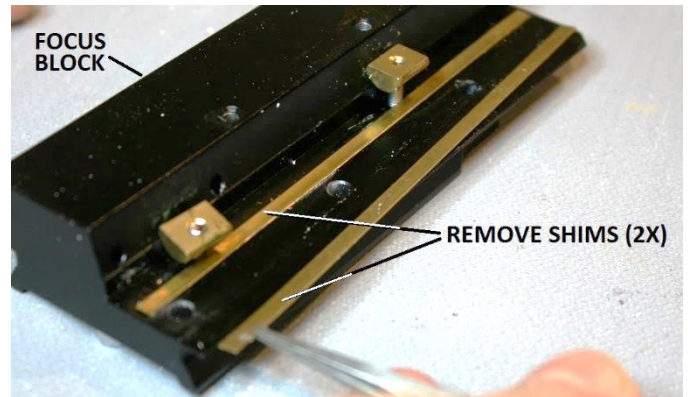


Figure 16 – Remove brass shims beneath guide block

Use a 2.5mm Allen wrench or driver to remove the two M3x16 hex, socket-head cap screws from the wedge nuts, and remove the (now loose) wedge nuts (see [Figure 17](#)).

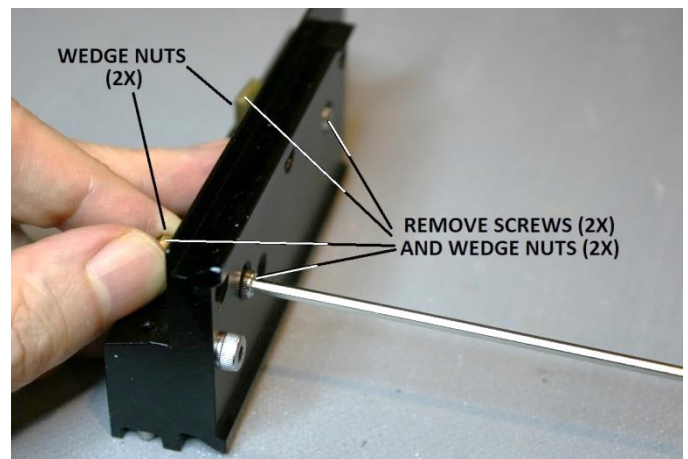


Figure 17 – Remove screws and wedge nuts

Clean the Various Slide Components

Disassemble and clean the various components of the sliding focus block mechanism, per the following procedure.

Remove the Guide Rails from the Arm of the Stand

Remove the four long guide rails from the two side grooves in the arm of the stand (see [Figure 18](#)).

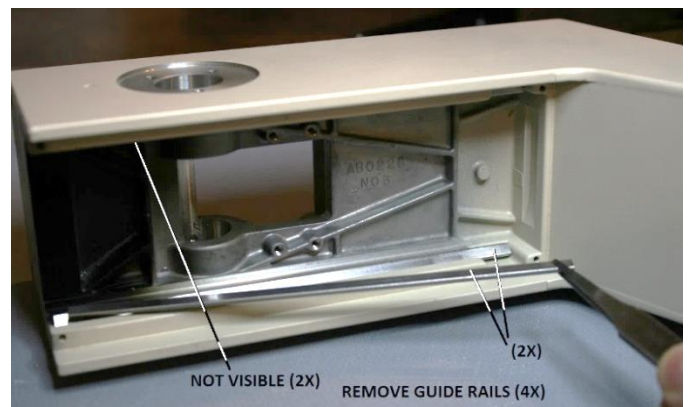


Figure 18 – Remove four guide rails from the arm

Use a suitable solvent (e.g., acetone) to remove any grease from the four long guide rails (see [Figure 19](#)) and from the side grooves in the arm (see [Figure 20](#)).

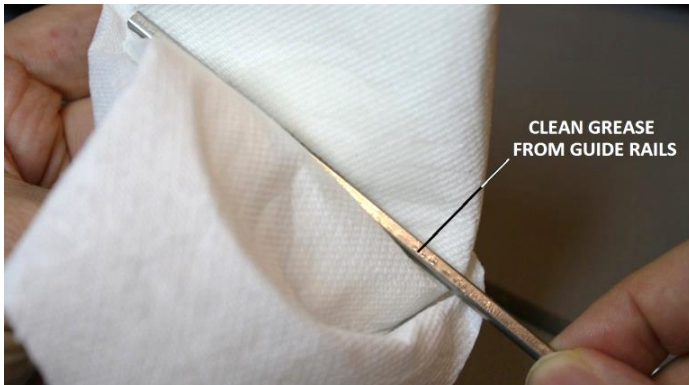


Figure 19 – Clean grease from the guide rails

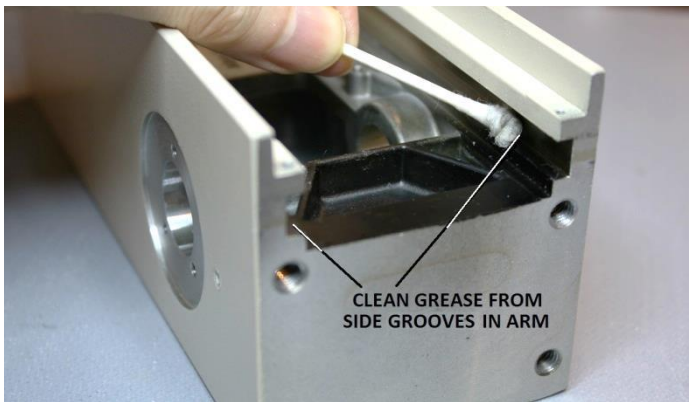


Figure 20 – Clean grease from the side grooves in the arm

Remove the Guide Rails from the Focus Block

Remove the two short guide rails from the side groove in the focus block (see [Figure 21](#)).

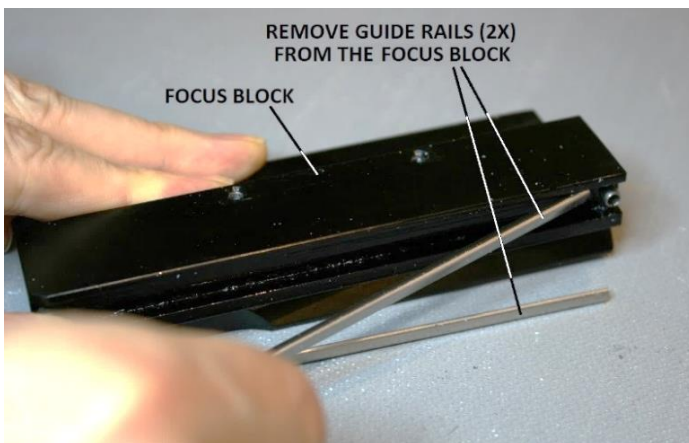


Figure 21 – Remove two guide rails from the focus block

Use a suitable solvent (e.g., acetone) to remove any grease from two short guide rails (see [Figure 19](#)) and from the side groove in the focus block (see [Figure 22](#)).



Figure 22 – Clean grease from side groove in focus block

Remove the Guide Rails from the Guide Block

Remove the two short guide rails from the side groove in the guide block (see [Figure 23](#)).

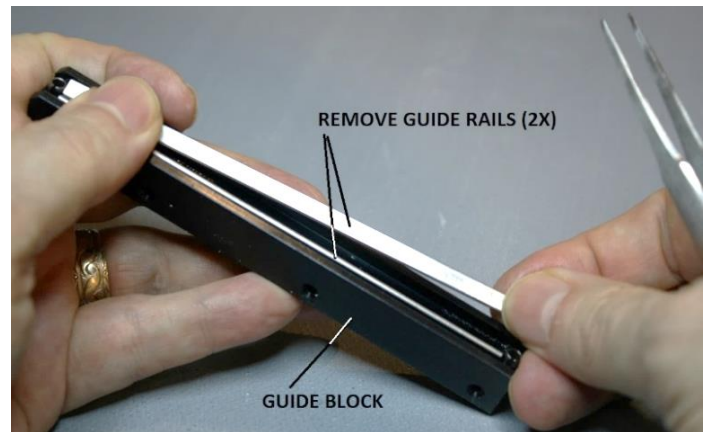


Figure 23 – Remove guide rails from the guide block

Use a suitable solvent (e.g., acetone) to remove any grease from two short guide rails (see [Figure 19](#)) and from the side groove in the guide block (see [Figure 24](#)).



Figure 24 – Clean grease from side groove in guide block

Clean the Cylindrical Rollers

Soak the cylindrical rollers in a suitable solvent (e.g., acetone) to remove any grease from the rollers (see [Figure 25](#)).

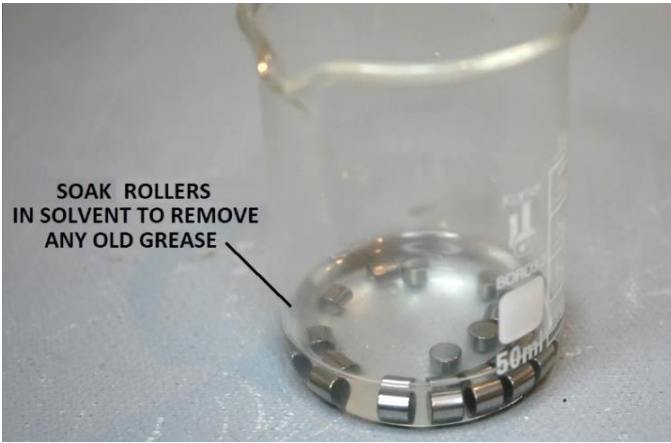


Figure 25 – Soak the rollers in solvent to remove grease

Reassemble the Sliding Focus Block

Reassemble the sliding focus block mechanism per the following procedure.

Reinstall the Guide Rails into the Arm of the Stand

Per the procedure described in [Appendix 1](#) of this document, reinstall the four long guide rails into the two side grooves of the arm of the stand (see [Figure 26](#)) and remove any exposed grease from the four guide rails (see [Figure 27](#) and [Figure 28](#)).

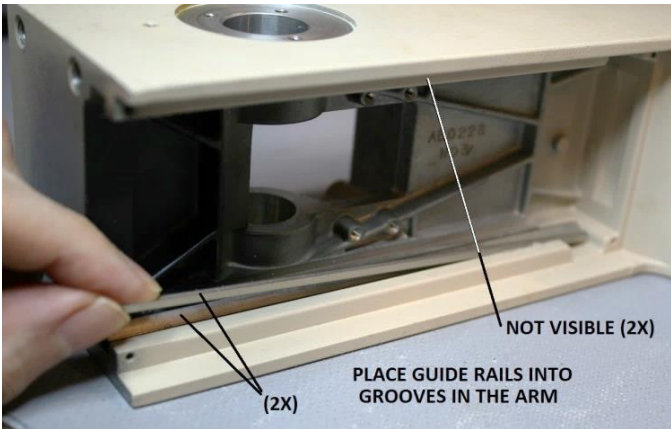


Figure 26 – Reinstall the long guide rails into the arm

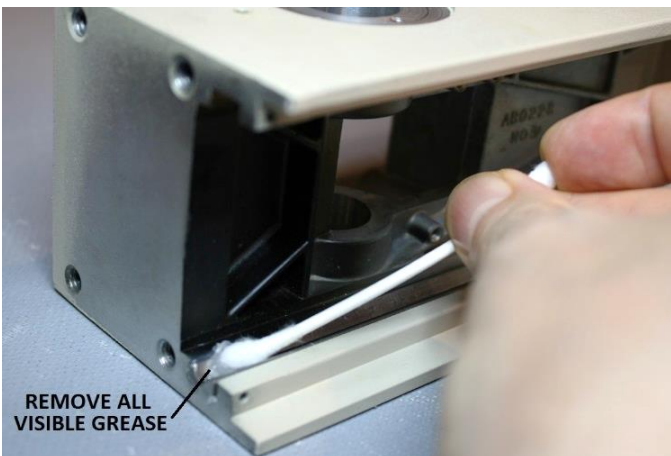


Figure 27 – Scrub grease from guide rails and arm

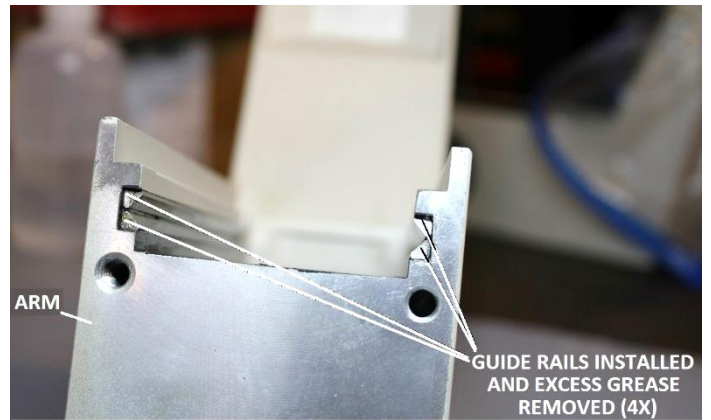


Figure 28 – Guide rails installed into the arm

Reinstall the Guide Rails into the Focus Block

Per the procedure described in [Appendix 1](#) of this document, reinstall two of the short guide rails into the side groove in the focus block (see [Figure 29](#)) and remove any exposed grease from the two guide rails (see [Figure 30](#) and [Figure 31](#)).



Figure 29 – Reinstall short guide rails into the focus block



Figure 30 – Scrub grease from guide rails and focus block



Figure 31 – Guide rails installed into the focus block

Reinstall the Guide Rails into the Guide Block

Per the procedure described in [Appendix 1](#) of this document, reinstall the two remaining short guide rails into the side groove in the guide block (see [Figure 32](#)) and remove any exposed grease from the two guide rails (see [Figure 33](#) and [Figure 34](#)).

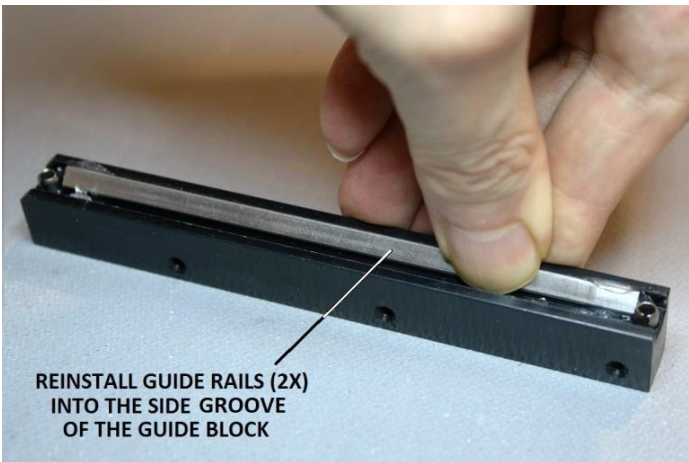


Figure 32 – Reinstall short guide rails into the guide block

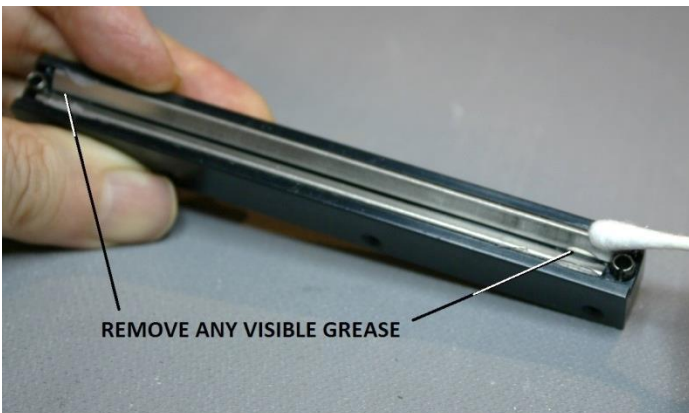


Figure 33 – Scrub grease from guide rails and guide block



Figure 34 – Guide rails installed into the guide block

Apply Grease to the Guide Rails (Optional)

IF GREASE IS TO BE USED IN THE SLIDING FOCUS BLOCK

Lightly coat the exposed surfaces of the four long guide rails in the arm, the two short guide rails in the guide block, and the two short guide rails in the focus block with suitable grease (item 5 or 7 of [Appendix 2](#)).

Place the Guide Block into Position on the Focus Block

Reinstall the two brass shims onto the focus block, using a small dab of heavy grease (item 6 of [Appendix 2](#)) at each end of the shims to hold them in position during the subsequent reassembly steps (see [Figure 35](#)).

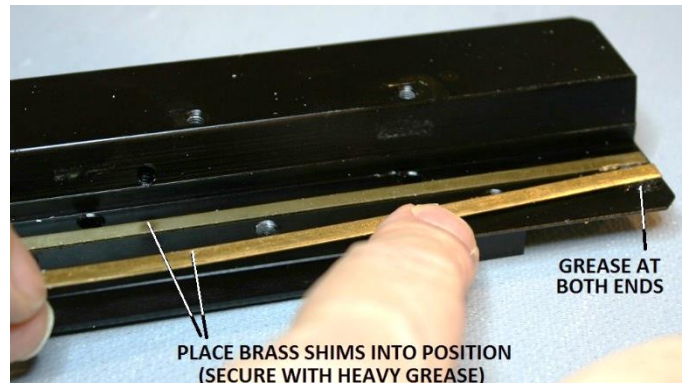


Figure 35 – Reinstall the brass shims onto the focus block

After placing the two brass shims into position on the back of the focus block, wipe away any exposed grease (see [Figure 36](#)).



Figure 36 – Clean exposed grease from the focus block

Place the guide block, with two short guide rails installed into its side groove, into position on the two brass shims sitting on the focus block (see [Figure 37](#)). Note the proper orientation of the beveled edge of the guide block (see [Figure 38](#)).

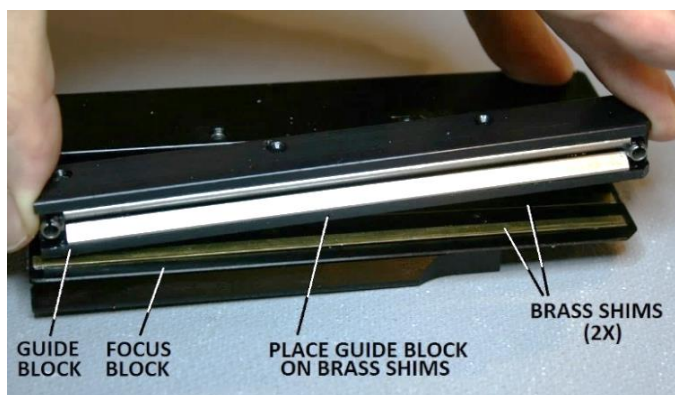


Figure 37 – Reinstall guide block onto the focus block

Place two M3X16 hex, socket-head cap screws through the holes in the focus block, and use a 2.5mm Allen wrench or driver to engage the threads of the screws with the two wedge nuts (see [Figure 38](#)).

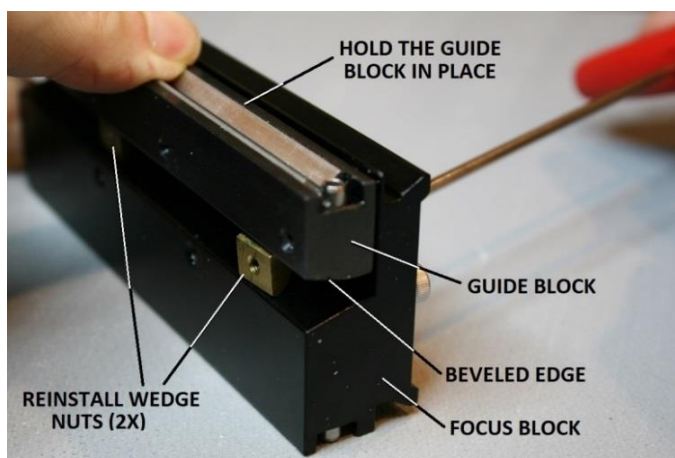


Figure 38 – Loosely engage screws with the wedge nuts

Place Cylindrical Rollers onto Lower Guide Rails

IF GREASE IS TO BE USED IN THE SLIDING FOCUS BLOCK:

Lightly coat eight of the cylindrical rollers and one of the plastic spacer rods with suitable grease (item 5 or 7 of [Appendix 2](#)). Place these eight greased cylindrical rollers and the greased plastic spacer rod onto the greased guide rails in the bottom channel of the arm of the stand (see [Figure 39](#), shown without grease for clarity). Note the alternating orientation of the rollers.

IF GREASE IS NOT TO BE USED IN THE SLIDING FOCUS BLOCK:

Place eight of the cylindrical rollers and the one of the plastic spacer rods onto the guide rails in the bottom channel of the arm of the stand (see [Figure 39](#)). Note the alternating orientation of the rollers.

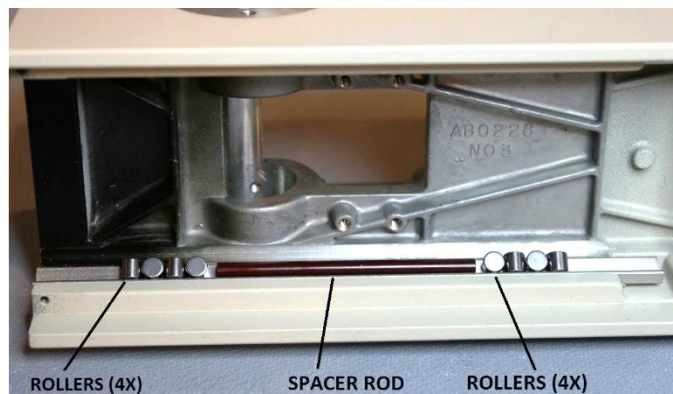


Figure 39 – Place rollers and rod onto bottom guide rails

Place Focus Block Assembly onto Cylindrical Rollers

Carefully place the focus block assembly, with the guide block held loosely in place on the back side of the focus block, onto the cylindrical rollers on the guide rails in the bottom groove of the arm (see [Figure 40](#)).



Figure 40 – Place focus block assembly onto rollers

Withdraw about half the length of the guide block from behind the focus block, making sure to not disturb the positioning of the two brass shims stuck onto the back side of the focus block or the guide rails seated in the side groove of the guide block (see [Figure 41](#)).

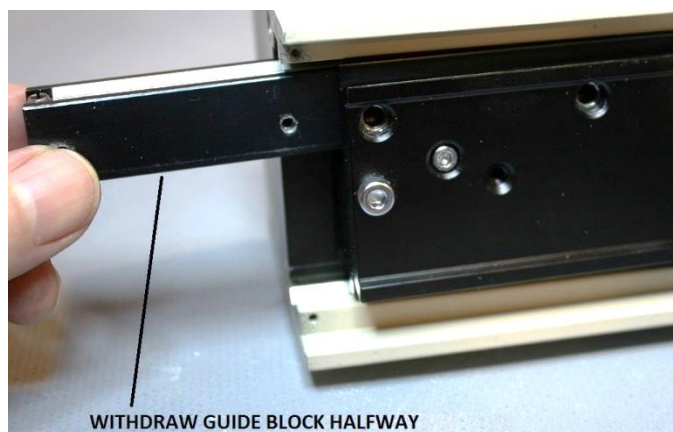


Figure 41 – Withdraw the guide block about halfway

Place Cylindrical Rollers onto the Upper Guide Rails

IF GREASE IS TO BE USED IN THE SLIDING FOCUS BLOCK:

Lightly coat four of the cylindrical rollers and the remaining plastic spacer rod with a suitable grease (item 5 or 7 of [Appendix 2](#)). Place these four greased cylindrical rollers onto the greased guide rails in the groove on top of the guide block, where the guide block is protruding from the left-hand side of the arm (see [Figure 42](#), shown without grease for clarity). Orient the rollers as shown in the inset.

IF GREASE IS NOT TO BE USED IN THE SLIDING FOCUS BLOCK:

Place four of the cylindrical rollers onto the guide rails in the groove on top of the guide block, where the guide block is protruding from the left-hand side of the arm (see [Figure 42](#)). Orient the rollers as shown in the inset.

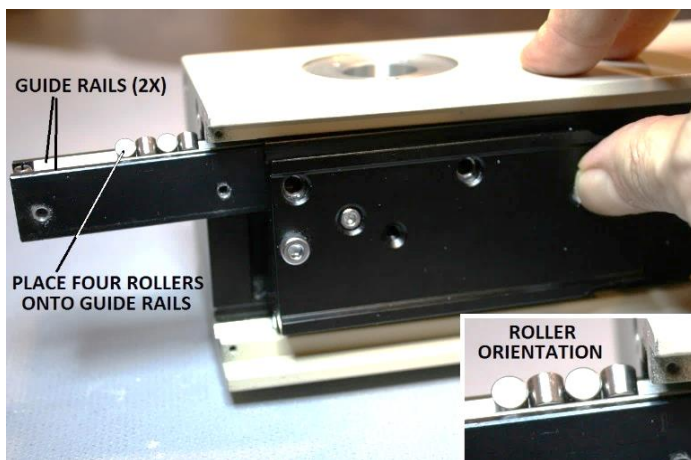


Figure 42 – Place four rollers on the upper guide rails

Use the remaining plastic spacer rod to carefully push the four cylindrical rollers into the opening formed by the four guide rails (two in the focus block and two in the frame of the arm), making sure that the rollers do not come out of position on the guide rails as they are pushed into the opening (see [Figure 43](#)).

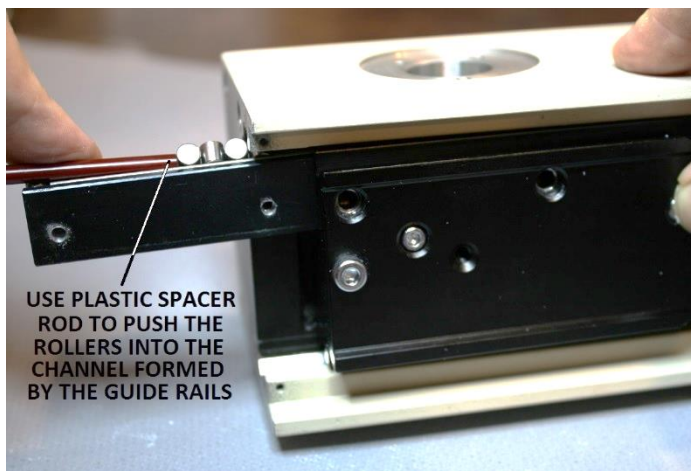


Figure 43 – Push cylindrical rollers into guide-rail opening

After the four cylindrical rollers have been pushed into the opening formed by the four guide rails, continue pushing the plastic spacer rod into the opening until just the tip is visible (see [Figure 44](#)).

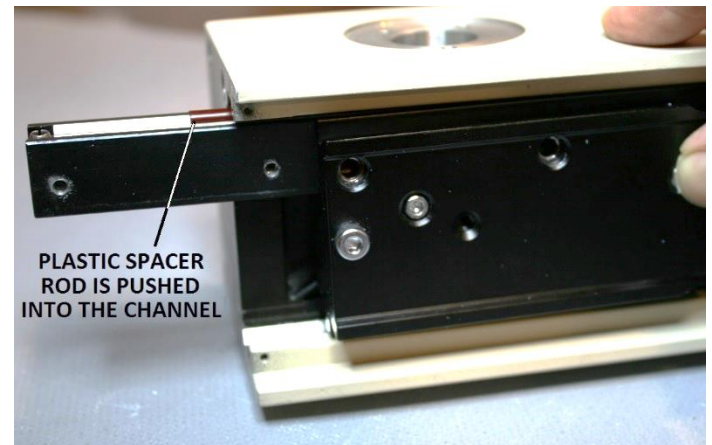


Figure 44 – Push the spacer rod into guide-rail opening

IF GREASE IS TO BE USED IN THE SLIDING FOCUS BLOCK:

Lightly coat the remaining four cylindrical rollers with a suitable grease (item 5 or 7 of [Appendix 2](#)). Place these four greased cylindrical rollers onto the greased guide rails in the side channel of the guide block protruding from the left-hand side of the arm (see [Figure 45](#), shown without grease for clarity). Orient the rollers as shown.

IF GREASE IS NOT TO BE USED IN THE SLIDING FOCUS BLOCK:

Place the four remaining cylindrical rollers onto the guide rails in the side channel of the guide block protruding from the left-hand side of the arm (see [Figure 45](#)). Orient the rollers as shown.

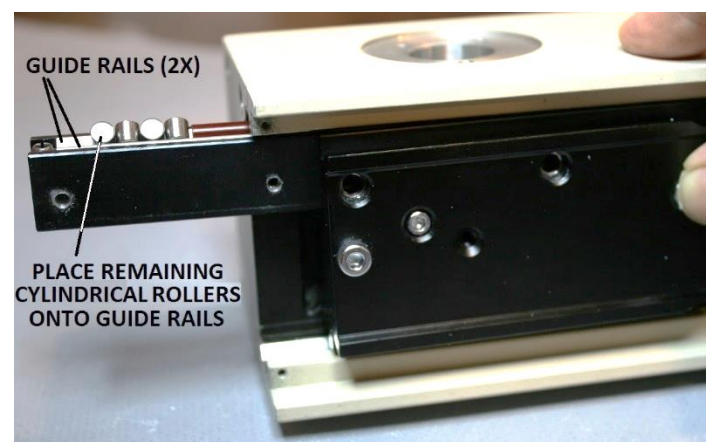


Figure 45 – Place remaining rollers onto upper guide rails

Carefully push the protruding guide block (with the four cylindrical rollers sitting on top of the guide rails) into the opening formed by the four guide rails, making sure that the rollers do not come out of position on the guide rails as they are pushed into the opening. Align

the three holes in the focus block with the tapped holes in the guide block (see [Figure 46](#)).

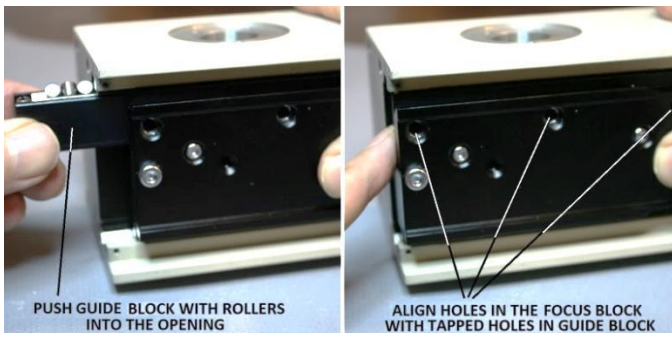


Figure 46 – Push guide block and rollers into the opening

Mount the Guide Block into Position

Hold the guide block in position such that the three holes in the focus block are aligned with the tapped holes in the guide block. Make sure that the brass shims are not visible through the three holes in the focus block, otherwise the screws may damage these shims when they are reinstalled (if necessary, use a toothpick or some other pointed tool to reposition the shims so that the screws will not damage the shims when they are reinstalled). While holding the guide block in this position, use a 2.5mm Allen wrench or driver to reinstall three M3x12 hex, socket-head cap screws to secure the guide block to the focus block (see [Figure 47](#)). Initially, snug these three screws slightly, then back them off approximately one-half turn to allow the guide block to float relative to the focus block. This float will allow the wedge nuts to position the sliding focus block, as the tension screws are adjusted to eliminate the lateral play in the slide.

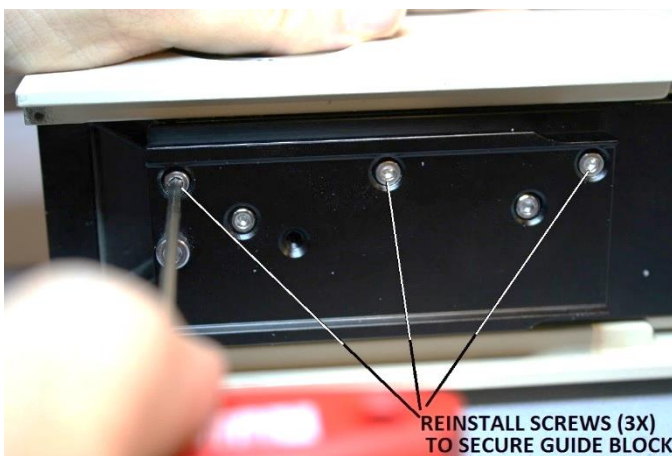


Figure 47 – Reinstall screws to secure the guide block

Adjust for No Lateral Play in the Sliding Focus Block

Use a 2.5mm Allen wrench or driver to snug the two M3x16 hex, socket-head cap screws to tighten the wedge nuts (and thereby position the guide block) such

that the focus block slides freely, without stiffness, binding, or lateral play throughout the normal range of motion (see [Figure 48](#)).



Figure 48 – Adjust for free motion without lateral play

Secure the Guide Block in Position

Use a 2.5mm Allen wrench or driver to tighten the three M3x12 hex, socket-head cap screws to secure the guide block in position on the focus block (see [Figure 49](#)).

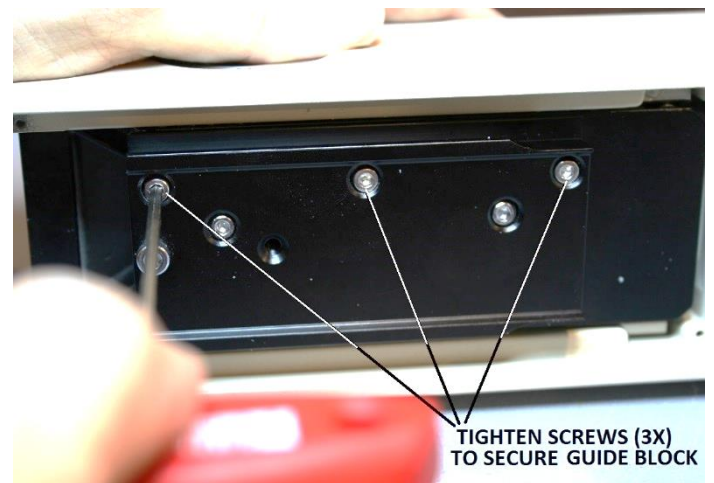


Figure 49 – Secure the guide block in position

Test the Focus Block for Freedom of Motion

Test the freedom of motion of the sliding focus block, making sure that there is no significant stiffness, binding, or lateral play at any point throughout the full range of motion of the focus block (see [Figure 50](#)). If necessary, loosen the three M3x12 hex, socket-head cap screws securing the guide block to the focus block, and the two M3x16 hex, socket-head cap screws that tension the guide block, and readjust per the above procedure until the resulting motion of the sliding focus block is smooth, unrestricted, and without significant lateral play.



Figure 50 – Test the sliding focus block for proper motion

Reinstall the Trim Cover

Carefully position the U-shaped trim cover into position on the arm, aligning the four holes in the trim cover with the four tapped holes in the arm (see Figure 51). Be careful to avoid bending, denting, or scratching this fragile part.



Figure 51 – Reposition the trim cover onto the arm

Use a suitable JIS screwdriver to reinstall four M2x4 JIS screws to secure the trim cover onto the arm (see Figure 52).



Figure 52 – Reinstall screws to secure the trim cover

Reinstall the Arm onto the Base of the Stand

Place the arm flat on its back on the work surface (see Figure 53).

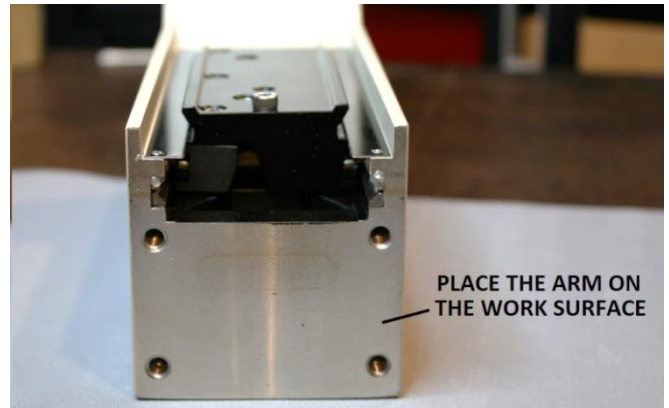


Figure 53 – Place the arm flat on the work surface

Hold the base of the stand in position such that the four holes in the base align with the four tapped holes in the bottom surface of the arm (see Figure 54).

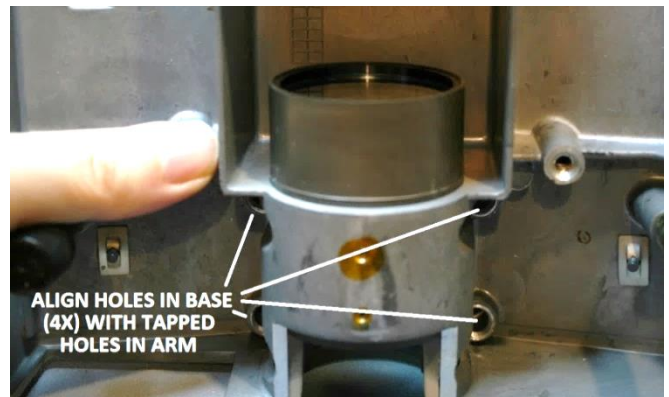


Figure 54 – Align holes in the base with holes in the arm

Use a 5mm Allen wrench or driver to loosely reinstall four M6x25 hex, socket-head cap screws to attach the base of the stand onto the arm of the stand (see Figure 55).

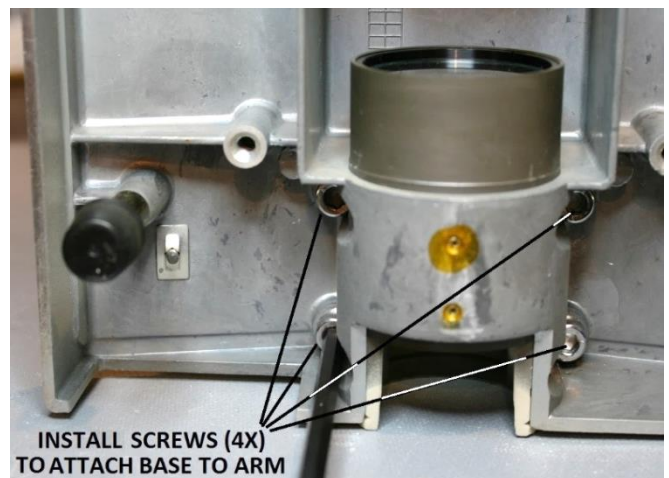


Figure 55 – Attach the base onto the arm of the stand

Check the alignment of the arm (relative to the base) and adjust the positioning as necessary for an acceptable cosmetic appearance at the interface. Tighten the four M6x25 screws to secure the base to the arm (see [Figure 56](#)).

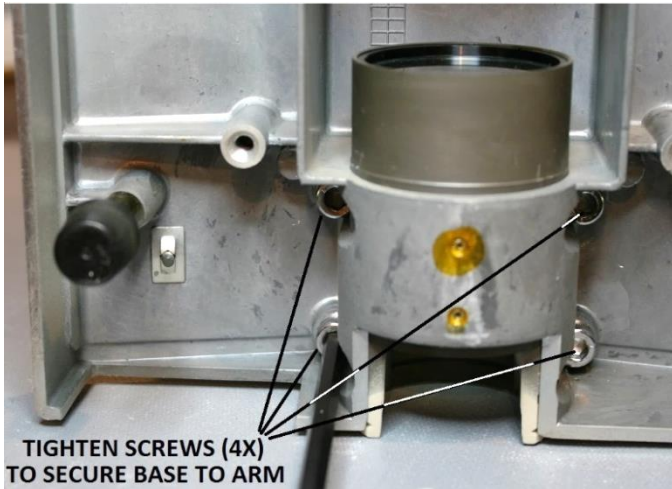


Figure 56 – Secure the base onto the arm of the stand

Reinstall the Electrical Base

Carefully lower the assembled stand over the electrical base, maintaining proper alignment relative to the electrical base (to prevent damage to the optical components in the base) until the stand seats onto the base. If the electrical base contains a light-preset control/switch (see [Figure 5](#)), be sure to reengage this into the notch in the side of the base before seating the stand onto the electrical base. While holding the electrical base in place so that it does not shift, lay the stand onto its back or side on the work surface. Use a 4mm (or 5/32”) Allen wrench or driver to reinstall four M5x12 hex, socket-head cap screws and associated washers to secure the electrical base to the stand (see [Figure 57](#)). Return the assembled stand to its normal upright position.



Figure 57 – Reinstall screws to secure the electrical base

Continue with the Coaxial Focus Overhaul

The sliding focus block is now ready for many more years of service. At this point (if applicable), continue with the overhaul of the coaxial focus mechanism, per the appropriate point in the [Complete Teardown, Cleaning, and Reassembly of the Olympus BH-2 Coaxial Focus Mechanism](#) document.

Original Olympus Documentation

An early version of the Olympus BH2 (BHS) repair manual (see [Figure 58](#)) was referenced during the preparation of this document. A scanned PDF version of this manual is available for download at various microscope-related hobbyist sites on the internet, and can be readily located by searching for the title in an internet search engine, such as Google or Bing.

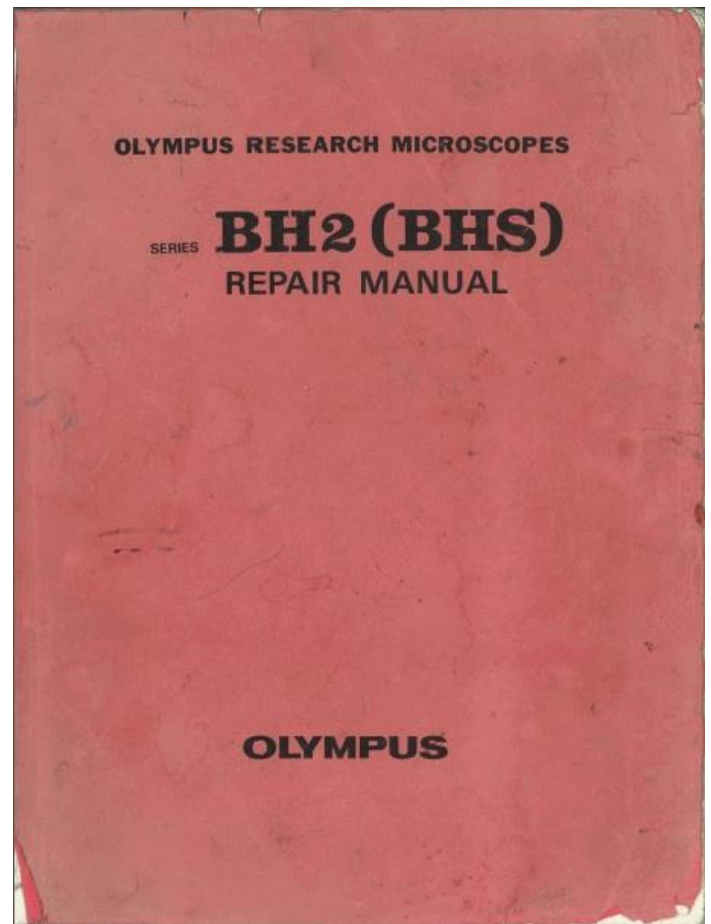


Figure 58 – The Olympus BH2 (BHS) repair manual

How to Contact the Author

Please feel free to direct any questions or comments regarding this document (or BH-2 microscopes in general) to the author, at the following email address:

carlh6902@gmail.com

Appendix 1

How to Install the Guide Rails in the Sliding Focus Block Mechanism

Placement of Guide Rails in the Side Grooves

During reassembly of the sliding focus block mechanism, the guide rails must be seated into the inside corners of the side grooves in the various components (i.e., the guide block, the focus block, and the arm of the stand). Note that the guide rails are manufactured such that their cross-sectional profile forms a right-triangle, as can be seen in the end view shown in [Figure 59](#). It is critical when installing these rails that they be placed such that the two sides which form the 90° angle are placed into the 90° inside corners of the side grooves, and that the side that forms the hypotenuse is facing outwards, providing a suitable low-friction surface for the cylindrical rollers to roll on.



Figure 59 – Correct orientation of the guide rails

Holding the Guide Rails in Place for Reassembly

During reassembly of the sliding focus block mechanism, the guide rails will need to be held in place in the focus block, guide block, and arm until the slide mechanism has been fully reassembled. The guide rails do not need to be permanently staked in place, since the cylindrical rollers will hold the guide rails in place once the slide mechanism has been fully reassembled. Accordingly, do not use any adhesive to secure the guide rails in place, otherwise the adhesive could end up on the exposed bearing surfaces of the guide rails, which would interfere with the cylindrical rollers and prevent free motion of the sliding focus block. Rather than utilizing adhesive, the guide rails should instead be held in place during reassembly by applying heavy grease to both ends of the side grooves in the slide parts (in the inside corners) and then pressing the guide rails firmly into this grease as they are reinstalled into position (making sure to properly orient them per the profile view in [Figure 59](#)). After the guide rails have been placed in position and pressed into the heavy grease, any remaining visible grease should be

thoroughly removed before proceeding with the reassembly of the sliding focus block mechanism. Refer to the following detailed procedure for the suggested installation method for the guide rails.

Reinstalling Guide Rails into the Guide Block

This procedure describes the suggested method to be used to install the guide rails into the various parts (i.e., the guide block, the focus block, and the arm) of the sliding focus block mechanism. The guide block is used in this specific example, but the same procedure applies to the focus block and to the arm of the stand, as well.

Clean the Old Grease from the Slide Parts

Use a suitable solvent (e.g., acetone) to clean all traces of oil or grease from the guide rails (see [Figure 60](#)) and from the side groove of the guide block (see [Figure 61](#)).

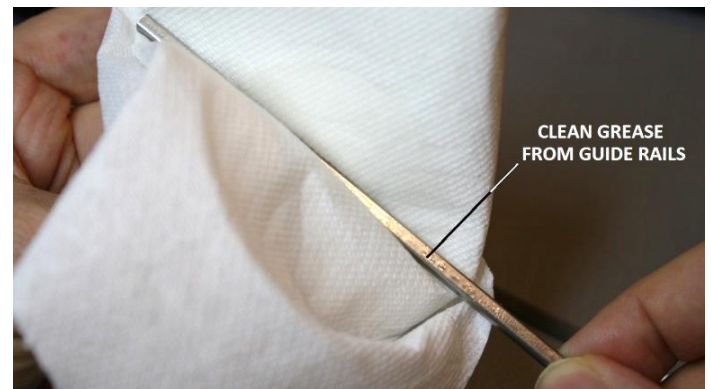


Figure 60 – Thoroughly clean the guide rails

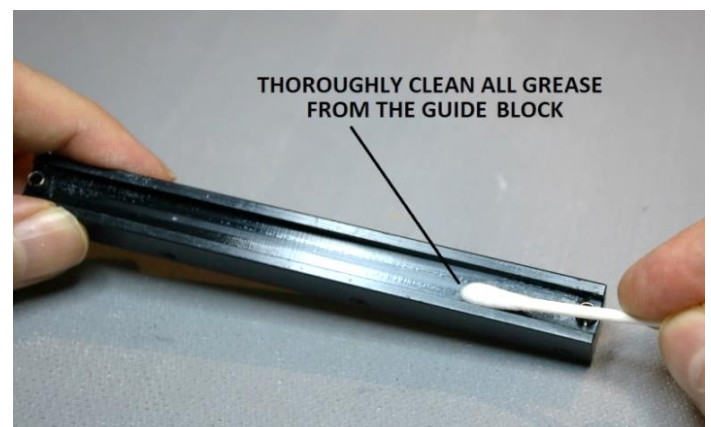


Figure 61 – Thoroughly clean the guide block

Apply Heavy Grease to Both Ends of the Guide Block

Apply a heavy grease (item 6 of [Appendix 2](#)) to the inside corners of both ends of the side groove in the guide block (see [Figure 62](#)).

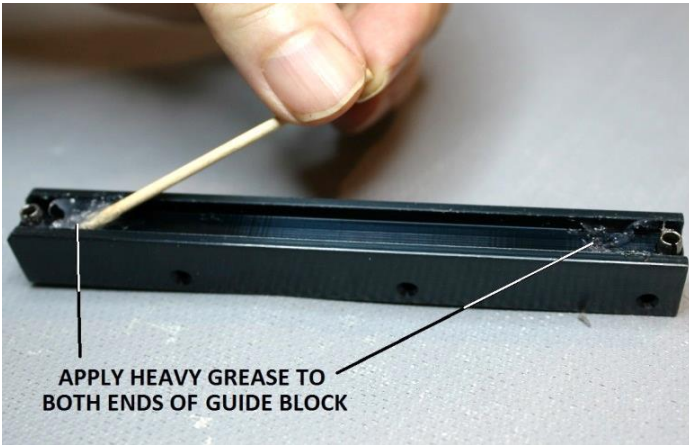


Figure 62 – Apply grease to both ends of the guide block

Set the Guide Rails into the Greased Guide

Place one of the guide rails into one of the inside corners of the side groove of the guide block (see **Figure 63**) and press the guide rail down firmly at the ends to thoroughly embed it into the grease (see **Figure 64**).



Figure 63 – Place first guide rail into the guide block



Figure 64 – Set the first guide rail into the grease

Place the second guide rail into the other inside corner of the side groove of the guide block (see **Figure 65**) and press the guide rail down firmly at the ends to thoroughly embed it into the grease (see **Figure 66**).



Figure 65 – Place second guide rail into the guide block



Figure 66 – Set the second guide rail into the grease

Clean Grease after Reinstalling the Guide Rails

After the guide rails have both been placed in the guide block and pressed down firmly into the grease, any visible traces of the grease should then be removed from the guide block and guide rails. The best way to do this is to use dry cotton swabs to scrub the grease away (see **Figure 67**).



Figure 67 – Scrub any visible grease from the guide rails

The fresh grease should come off easily with dry cotton swabs. Do not use any solvent here, as the solvent may run under the guide rails and foul the grease holding them in place. Carefully work from the inside out when

cleaning with the cotton swabs, to avoid transferring the grease further onto the guide rails. Keep at this until all visible traces of grease have been scrubbed from the parts. Thorough removal of this grease is important, since any exposed grease can lead to an accumulation of dust and debris which might eventually foul the sliding focus block mechanism.

The Prepared Guide Block is Ready to be Reinstalled

The prepared guide block, with the guide rails installed into the side groove and held in place by the heavy grease, is now ready to be reinstalled into the sliding focus-block mechanism (see **Figure 68**).



Figure 68 – Cleaned guide block is ready for reinstallation

Appendix 2

Sources for Replacement Tools and Supplies Referenced in this Document

Table 1 and **Table 2** list specific information for the various tools, and supplies discussed in this document. These tables list only the items that may be difficult to source locally. The pricing and availability listed below is accurate as-of September 2017, but is subject to change without notice.

Item	Description	Manufacturer	Manufacturer Model / #	Vendor	Vendor #	Price
1	2.5mm Allen Driver, T-Handle	Wiha	33437	Amazon	---	\$8.59
2	4.0mm Allen Driver, T-Handle	Wiha	33408	Amazon	---	\$8.25
3	5.0mm Allen Driver, T-Handle	Wiha	33411	Amazon	---	\$8.89
4	Screwdriver set, JIS, 4 pieces	Hozan	JIS-4	Amazon	---	\$19.66

Table 1 – Tools referenced in this document

Item	Description	Manufacturer	Manufacturer Model / #	Vendor	Vendor #	Price
5	Molykote® 44 medium grease, 28g	Dow Corning	Molykote® 44	Amazon	---	\$6.95
6	Molykote® 111 heavy grease, 1/2oz	Dow Corning	Molykote® 111	Amazon	---	\$5.78
7	Mobil electric motor grease, 14oz.	Mobil	Polyrex™ EM	Amazon	---	\$13.87

Table 2 – Supplies referenced in this document

Table 3 lists the contact information for the vendors referenced in **Table 1** and **Table 2**.

Vendor	URL	Local Phone	Toll Free	Fax	email
Amazon	www.amazon.com	---	---	---	---

Table 3 – Vendor Listing