

# Successfully Shipping Olympus BH-2 Microscopes

Revision 2



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Revision History		
Revision	Description of Changes	Date
1	*** Initial Release ***	April 10, 2018
2	Explain the fragile nature of the oculars and objectives	July 8, 2019

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## Introduction

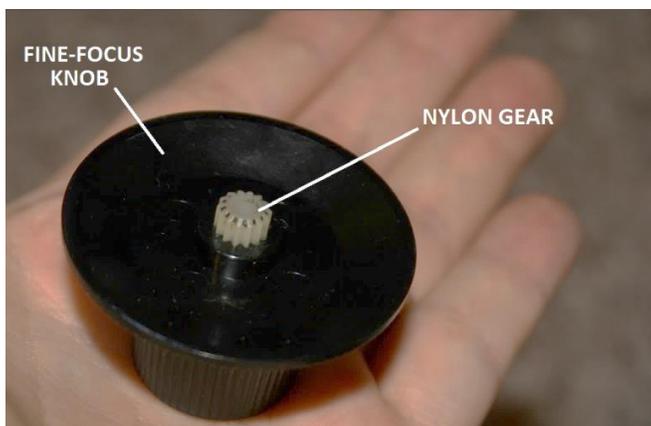
This document describes the proper method to prepare and package an Olympus BH-2 microscope stand for shipping. If no special precautions are taken to protect the fragile fine-focus mechanism of these stands, somewhere between 10-20% of them will arrive with the focus mechanism damaged. Since the mechanical parts required to repair this damage are no longer available from Olympus, it is critically important that these methods be followed.

## Scope

This document applies to the BHS, BHSU, BHT, and BHTU models in the Olympus BH-2 microscope family.

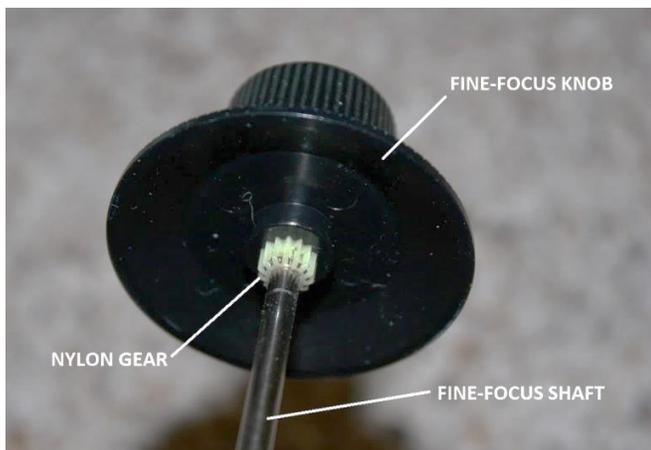
## Why Special Precautions are Necessary

The Achilles heel of the BH-2 microscope is the small plastic (nylon) gear that is pressed into the back side of the right-hand fine-focus knob. **Figure 1** shows the plastic gear pressed into this knob.



**Figure 1 – Plastic gear in the back of the fine-focus knob**

**Figure 2** shows the plastic gear in the fine-focus knob, with the fine-focus shaft inserted into the gear as well.



**Figure 2 – Shaft and gear in the fine-focus knob**

Although this plastic gear is sufficiently robust for its intended function, it is nonetheless fragile and frequently sustains damage when BH-2 stands are shipped without proper preparation and packaging. **Figure 3** shows a graphic example of what can happen to a BH-2 stand during shipping when these shipping guidelines are ignored. This is really bad news since this gear is no longer available from Olympus and the microscope stand can therefore not be repaired.



**Figure 3 – A fine-focus gear broken during shipping**

To prevent this kind of shipping damage, BH-2 stands must be packaged such that normal shocks which occur during shipping do not produce excessive stresses on this fragile plastic gear. This is accomplished by minimizing the mass attached to the sliding focus block, thereby reducing the stresses induced onto the plastic gear by shocks common in shipping.

## Preparing BH-2 Stands for Shipping

To prevent the damage shown in **Figure 3**, both the stage and the BH2-CH substage condenser carrier must be removed from the sliding focus block before the stand is shipped. After the BH2-CH substage condenser carrier has been removed, a stiff foam support should be placed and secured below the sliding focus block to prevent it from moving during shipping. Additionally, the ocular lenses, viewing head, and lighting lamp house should also be removed (if present) to prevent them from being damaged. The following sections describe these steps in detail.

### Remove the Lamp House

With the stand in its normal upright position, remove the lamp house from the back of the base. The lamp house simply plugs into the base and can be removed by grasping it and pulling it straight back (see **Figure 4**). Do not touch the halogen lamp with your fingers, as oils

from your skin may cause premature failure of the lamp. Wrap the lamp house with bubble wrap to provide physical protection during shipping.

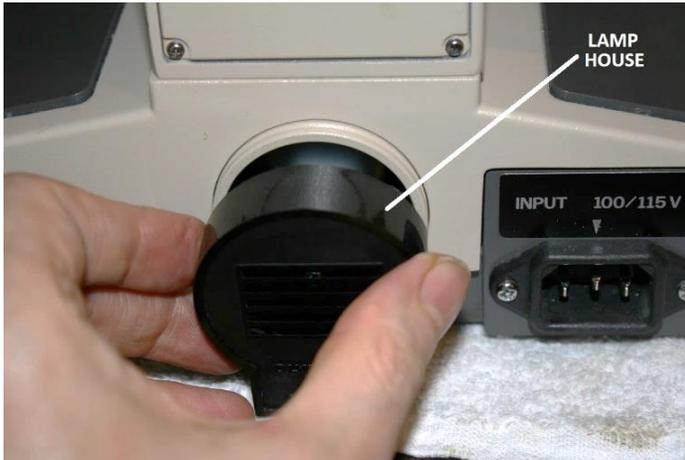


Figure 4 – Remove the lamp house from the base

If loose packaging material (e.g., Styrofoam peanuts) will be used to package the stand, cover the exposed lamp house port on the rear of the base with adhesive tape to keep the packing material from entering the lamp house port (see Figure 5).



Figure 5 – Cover the exposed lamp-house port

### Remove the Ocular Lenses

The ocular lenses are not secured in the eyepiece tubes of the viewing head, and these can easily fall out during shipping if they are not removed first. If ocular lenses are present, carefully remove them from the eyepiece tubes (see Figure 6) and wrap them **separately** with bubble wrap to provide physical protection during shipping. Be careful not to touch the exposed and fragile optical elements in the ocular lenses as you do this.

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Figure 6 – Remove the ocular lenses from eyepiece tubes

### Remove the Viewing Head

If a viewing head is present, loosen the mounting thumbscrew (see Figure 7) for the viewing head and carefully remove the viewing head from the top of the stand (see Figure 8). Wrap the viewing head with bubble wrap to provide physical protection during shipping. Make sure that the open eyepiece tubes are sufficiently covered to prevent foreign objects / debris from entering the tubes.



Figure 7 – Loosen mounting thumbscrew (binocular shown)



Figure 8 – Remove the viewing head (trinocular shown)

## Temporarily Remove the Objective Lenses

Carefully unscrew and remove any objective lenses from the rotating nosepiece turret (see [Figure 9](#)), to allow the stage and the BH2-CH substage condenser carrier to be removed without damaging the objective lenses. Carefully place the objective lenses aside, being careful not to touch or damage the exposed and fragile optical elements in the objective lenses. The objective lenses will be reinstalled back into the nosepiece turret after the stage and BH2-CH substage condenser carrier have been removed<sup>1</sup>.



**Figure 9 – Remove all objective lenses from the nosepiece**

## Remove the Stage

Remove the stage from the stage mounting ring of the BH2-CH substage condenser carrier by performing the following steps:

- 1) Adjust the condenser height knob on the left-hand side of the BH2-CH substage condenser carrier to raise the condenser (or the condenser mounting yoke, if no condenser is present) to the top of its range of travel (see [Figure 11](#)).
- 2) Adjust the coarse-focus knob (see [Figure 11](#)) to rack the stage to its lowest position.
- 3) Loosen the thumbscrew securing the stage to the circular mounting ring of the BH2-CH substage condenser carrier (see [Figure 10](#)).
- 4) Carefully lift and remove the stage from the circular mounting ring (see [Figure 10](#)).

Once the stage has been removed, wrap the stage with bubble wrap to provide physical protection during shipping.

<sup>1</sup> If you choose to wrap the objectives for shipping, rather than reinstalling them into the nosepiece turret, be sure to wrap each objective **separately** so that they are individually protected and do not damage each other while in transit.

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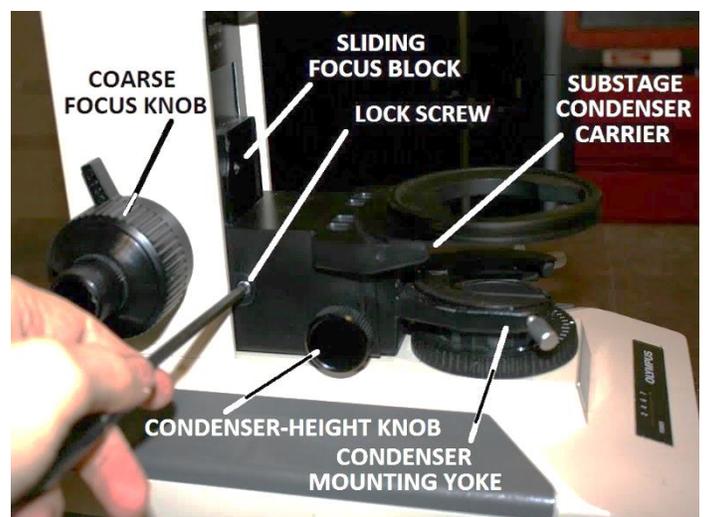


**Figure 10 – Remove the stage from stage-mounting ring**

## Remove the Substage Condenser Carrier

Remove the BH2-CH substage condenser carrier from the sliding focus block by performing the following steps:

- 1) Adjust the condenser-height knob on the left-hand side of the stand to raise the condenser (or the condenser mounting yoke, if no condenser is present) to the top of its range of travel (see [Figure 11](#)).
- 2) Adjust the coarse-focus knob to rack the stage-mounting ring to its lowest position (see [Figure 11](#)).
- 3) Use a 3mm Allen wrench or driver to loosen the Allen-head lock screw securing the BH2-CH substage condenser carrier to the sliding focus block (see [Figure 11](#)).
- 4) Grasp the BH2-CH substage condenser carrier and carefully lift it straight up to remove it from the sliding focus block (see [Figure 12](#)).



**Figure 11 – Unlock the substage condenser carrier**



Figure 12 – Lift and remove the substage condenser carrier

Figure 13, Figure 14, and Figure 15 show the stand, the stage, and the BH2-CH substage condenser carrier after the stage and the BH2-CH substage condenser carrier have been removed from the sliding focus block. Wrap the BH2-CH substage condenser carrier (with condenser, if present) with bubble wrap to provide physical protection during shipping.

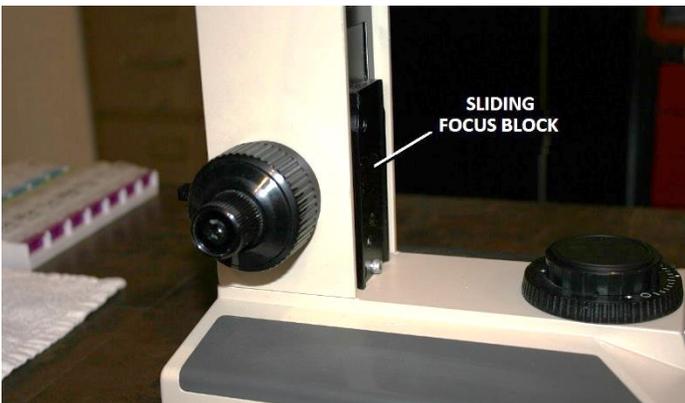


Figure 13 – BH-2 stand without substage condenser carrier

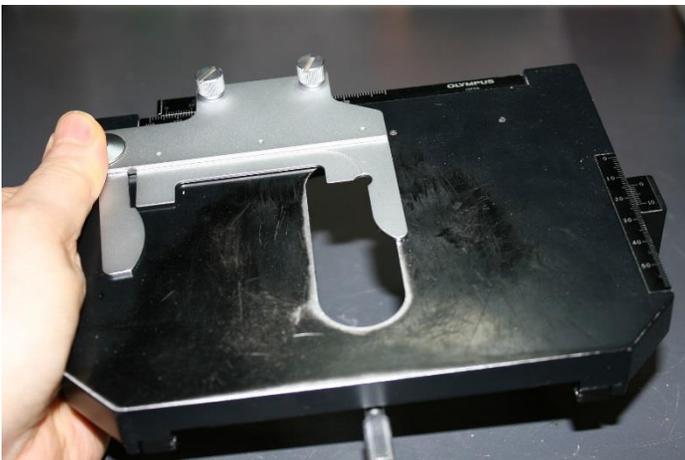


Figure 14 – The rectangular stage (BH2-SVR stage shown)



Figure 15 – The substage condenser carrier (w/o condenser)

### Reinstall the Objective Lenses

Carefully screw the objective lenses back into the rotating nosepiece turret (see Figure 16), being careful not to touch or damage the exposed and fragile optical elements in the objective lenses as you do. Note that for the purposes of shipping, it does not particularly matter into which holes the objective lenses are reinstalled, but it is best to arrange them in order of increasing or decreasing magnification, from one position to the next.



Figure 16 – Reinstall the objective lenses into nosepiece

### Support the Sliding Focus Block

Using the coarse-focus knob, rack the sliding focus block (see Figure 11) to nearly its top-most position. Place an appropriately sized piece of resilient foam below the sliding focus block to provide cushioning for the block (see Figure 17). Tape the foam piece into place under the sliding focus block to prevent it from falling out of position during shipping. This will prevent the sliding focus block from moving downwards during shipping.

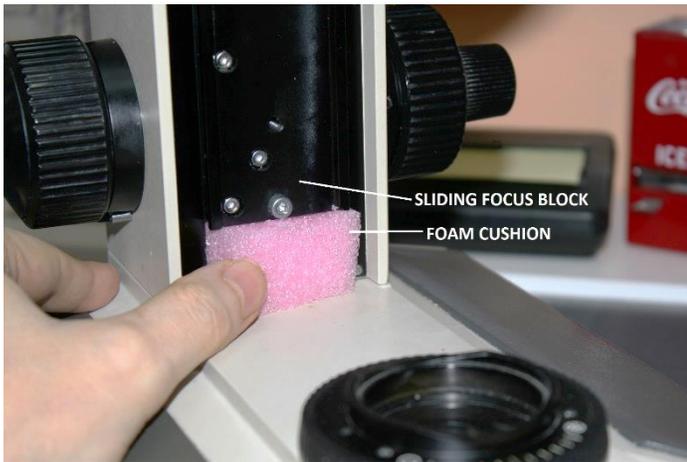


Figure 17 – Place foam below the sliding focus block

### Cover the Exposed Mounting Dovetail on the Arm

Cover the top of the microscope arm with a suitable plastic bag and secure this with a rubber band or adhesive tape, to keep dust and debris out (see [Figure 18](#)). This is especially important on BHSU and BHTU stands, which have an optical correction lens located just below the viewing head.



Figure 18 – Protect the top of the arm from dust and debris

### Wrapping the Stand

To protect the stand from physical damage, liberally wrap the stand with bubble wrap, making a few extra wraps around the focus knobs and around the top of the arm to provide extra protection to these fragile areas.

### Box the Stand and Components

Place the wrapped BH-2 stand, and all wrapped components that were removed from it, into a suitable shipping box. Be sure to orient the wrapped stand such that either the base or the rear spine of the stand is facing downwards and such that neither of the side knobs are in direct contact with the box. Place adequate packaging material (foam, newspapers, etc.) under, above, and around the wrapped stand and all

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components to prevent any movement and to adequately protect the equipment from any physical impacts to the shipping container.

### Shipping

Once prepared and packaged per the above procedures, the BH-2 stand will be sufficiently protected from the normal shocks and impacts that occur during handling by the shipper and can be shipped with the expectation of arriving safely at the destination, without damage.

### Shipping Hall of Shame

[Figure 19](#) shows an example of an improperly packaged BHTU microscope stand that I recently received. The entire microscope was just inverted and placed into the shipping box, binocular-head down, with no protective wrapping or padding of any sort. Empty Amazon Prime boxes were then used to fill the void spaces. To make matters worse, the seller did not remove the ocular lenses from the eyepiece tubes (which are not secured in place) before performing the invert-and-stuff maneuver. In this case, I had communicated with the seller before the stand was shipped, and per my instructions, the seller had removed both the stage and the BH2-CH substage condenser carrier from the sliding focus block (to protect the plastic fine-focus gear). To be fair, I didn't specify how to package the stand once those critical components had been removed, but I certainly didn't expect to see this when I opened the shipping box. The microscope gods were definitely looking out for me with this one, since the microscope arrived with no damage whatsoever!



Figure 19 – Very poor packaging of a BHTU stand

[Figure 20](#) shows an example of what happens way too often when well-meaning but uninformed sellers ship microscopes. These objective lenses were removed from the nosepiece turret and put into a single padded envelope for their protection. The problem here is that the objectives, which are **very** fragile, were allowed to

rattle around and bang against each other, thereby scratching the fragile and exposed optical elements and damaging the polished metal barrels during transit.



**Figure 20 – Incorrect packaging of objectives**

### **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](mailto:carlh6902@gmail.com)