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Find the *Molecular Devices ThermoMax* at our website: *Click HERE*

Installing Optional Optical Filters in Series I MAXline Microplate Readers

Warnings and Cautions

BIOHAZARD: Always wear gloves when performing any type of service, especially if it involves potential contact with spilled fluids or fluid residues of any kind.

WARNING: Always turn the instrument off and remove the power cord from the back prior to any maintenance or installation operation.

WARNING: Use only the tools described to perform the steps defined in the instructions.

WARNING: Never perform any operation on the instrument in an environment where liquids or potentially damaging gases are present.

WARNING: Risk of electrical shock, Refer servicing to qualified personnel.

CAUTION: Use of organic solvents (such as dichloromethane) may cause harm to the fiber optics in the microplate readers. Extreme caution is advised when using organic solvents. Always use a plate lid and avoid placing a plate containing these materials in the microplate reader for prolonged periods of time. Damage caused by the use of incompatible or aggressive solvents is NOT covered by the instrument warranty.

CAUTION: Never touch any of the fiber optic cables or their housing, manifold, or rotor connections. These fibers are extremely delicate and critical to the performance of the instrument.

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⚠ **CAUTION:** Do not touch or loosen any screws or parts other than those specifically designated in the instructions. Doing so could cause misalignment and possibly void warranty.

⚠ **CAUTION:** Never touch the surfaces of the interference filters or optical lenses.

Installing Optional Optical Filters

If you need additional optical filters not already installed on your instrument, order these directly from Molecular Devices. Our toll free number is (800) 635-5577. International calls may be placed to (408) 747-1700, or a telefacsimile sent to (408) 747-3602 or (408) 747-3601. Depending on the type of instrument you are using, standard filters having a 10-nm bandwidth can be ordered as follows:

- For THERMOmax™, between 340 nm and 750 nm;
- For Emax® and Vmax®, between 400 nm and 750 nm.

Filters having a 1-nm bandwidth can be special ordered for any wavelength within the overall instrument parameters given above (i.e., between 340 nm and 750 nm for THERMOmax, and between 400 nm and 750 nm for Emax and Vmax). Contact Molecular Devices for more information regarding ordering a special optical filter.

When your new filter(s) has arrived, please carefully review the installation instructions before installing the filter(s).

Tools: You will need a 3/32-inch hex wrench and a medium Phillips-head screwdriver to install your new filter(s).

I. Prepare the Microplate Reader

1) It is necessary that the drawer be empty and fully closed before commencing installation. If it is not, turn on the instrument, and after the drawer is completely out and any microplate has been removed, touch the SHIFT key and then the PRINT BLANK PATTERN key. This will close the drawer. When the drawer is all the way in, switch the power off so that the drawer remains in.
2) Unplug the power cord from the wall socket and from the rear panel of the instrument. Also, disconnect the printer or computer cable from the rear panel of the microplate reader. Make sure you have space behind the instrument approximately equal to the front to back width of the instrument.
3) Lay out a soft cloth in the space behind the instrument. Gently lift the instrument upward and turn it over onto the soft cloth so it is lying upside-down on the top casing as shown in Figure 7.

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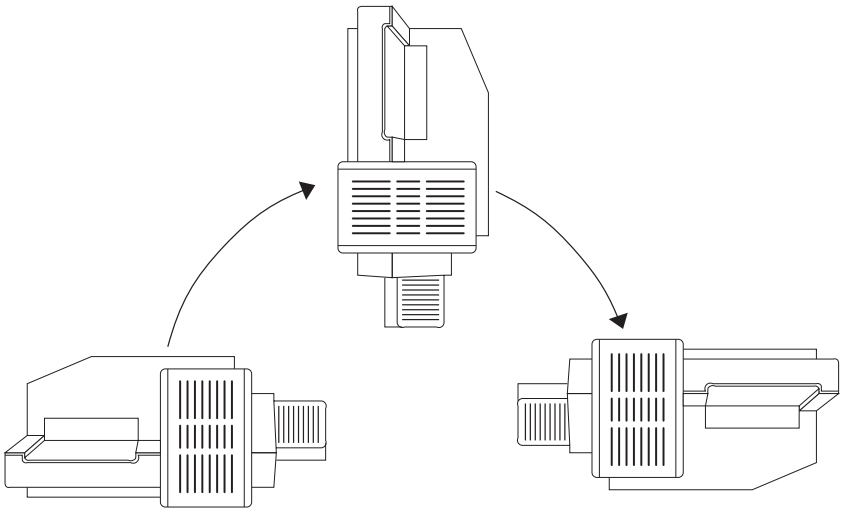


Figure 7: Turning the MAXline Microplate Reader Over (THERMOmax Shown)

4) Locate the seven silver topped screws as shown in Figure 8. Using a Phillips screwdriver, remove these seven screws from their slots on the bottom of the instrument. DO NOT LOOSEN OR REMOVE ANY BLACK TOPPED SCREWS. Note that two of the screws (5 and 6) are shorter than the other five. Put all seven screws in a secure location.

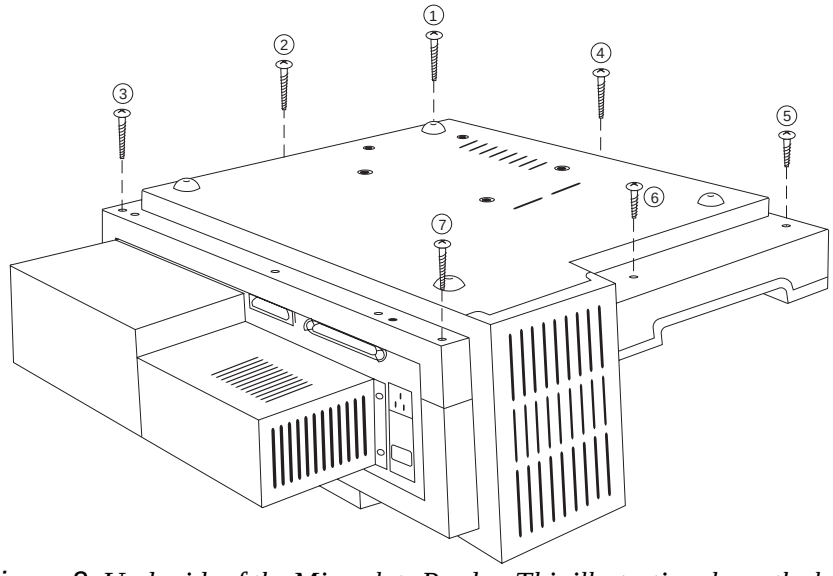


Figure 8: Underside of the Microplate Reader. This illustration shows the location of the seven screws that need to be removed before separating the top and bottom halves of the casing. Note: depending on the model you have, the back of the plate reader may not look exactly like this.

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5) Firmly holding the upper and lower portions of the case together, turn the instrument back over to the normal operating position.

6) Examine Figure 9 before performing this step. Carefully lift the upper portion of the MAXline Microplate Reader about eight inches straight up over the lower portion. Then move the upper portion straight back behind the lower portion and place it down.

⚠ **CAUTION:** Do not attempt to separate the two casing halves by more than 8 inches. A flat ribbon cable connects the lower portion of the instrument to the control panel. Do not attempt to disconnect this ribbon cable.

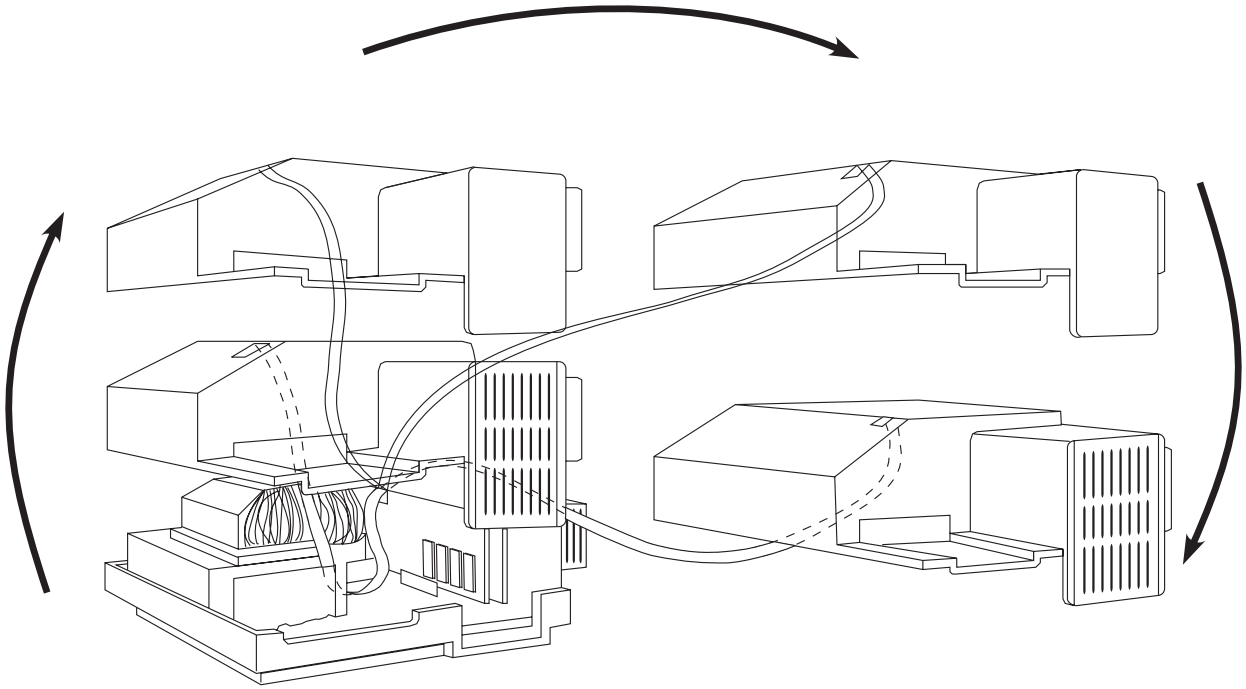


Figure 9: Separating the MAXline Microplate Reader Casing. Note the attachment of the ribbon cable and hence the importance of keeping the casing halves close together.

7) Locate the light source assembly at the rear left-hand side of the instrument as viewed from the front of the microplate reader.

NOTE: If installing a filter into an Emax or Vmax, the filter wheel housing will be clearly visible—you can skip to step 1 of the next section (Section II). If installing the filter into a THERMOmax, please follow steps 8 and 9, below.

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8) For the THERMOmax, unfasten the spring-loaded holding clasps on the top and left side of the light chamber assembly as shown in Figure 10.

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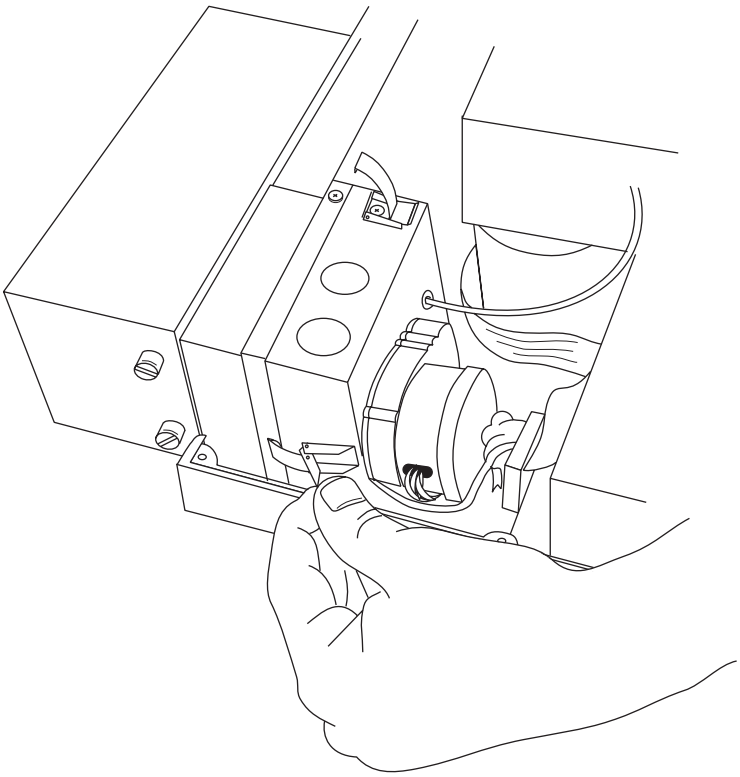


Figure 10: Light Source Assembly Spring Clamps

9) Grasp the front portion (nearest you) of the light source and gently slide it about two inches toward the front of the instrument as shown in Figure 11.

NOTE: The metal block of the light source is on a rail that curves inward slightly. This is normal.

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Tmax

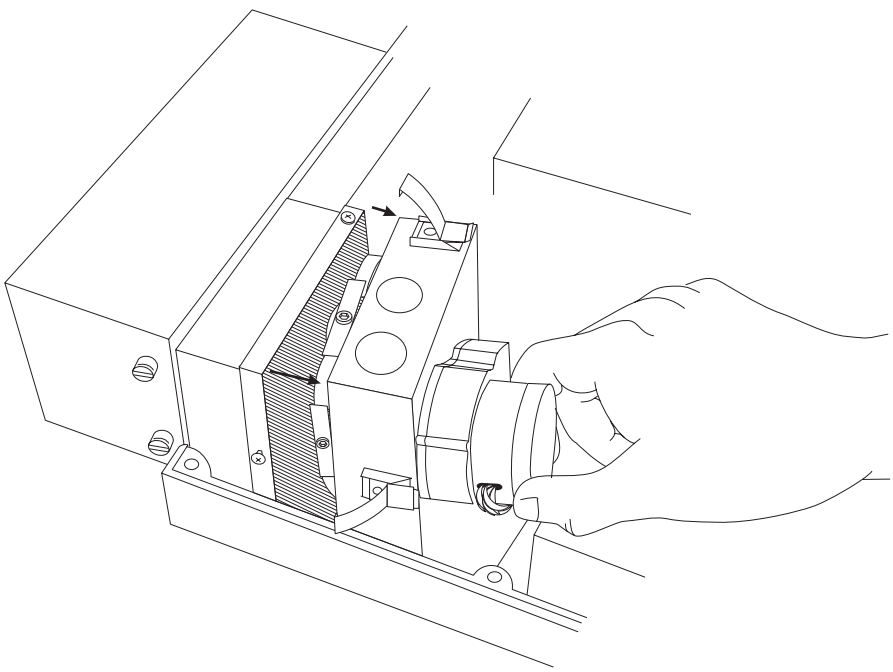


Figure 11: Opening the Light Source Front Cover

II. Install the Filter

1) The filter wheel housing and the filter wheel will be clearly visible. Do not touch the surfaces of the filters. Touching only the perimeter of the filter wheel, turn the wheel so that the filter slot with the black plastic disk (or the filter you are replacing) is in the top or highest position of the filter wheel.

2) Using a 3/32-inch hex wrench, LOOSEN the hex-head screw securing the bracket over the appropriate filter slot (about two full turns). Refer to Figure 12.

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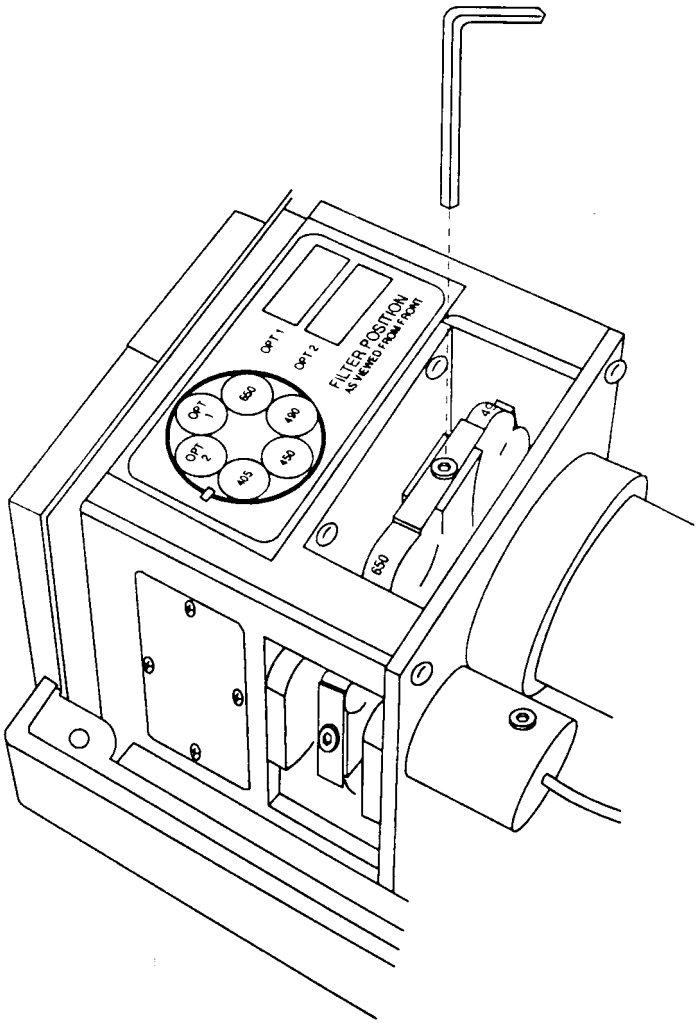


Figure 12: Filter Wheel Housing

3) DO NOT REMOVE THIS SCREW OR THE BRACKET(S). Turn the bracket sideways as shown in Figure 13.

NOTE: The home position (or Filter position #1) has only one bracket: on the right side of it is a vertical flag.

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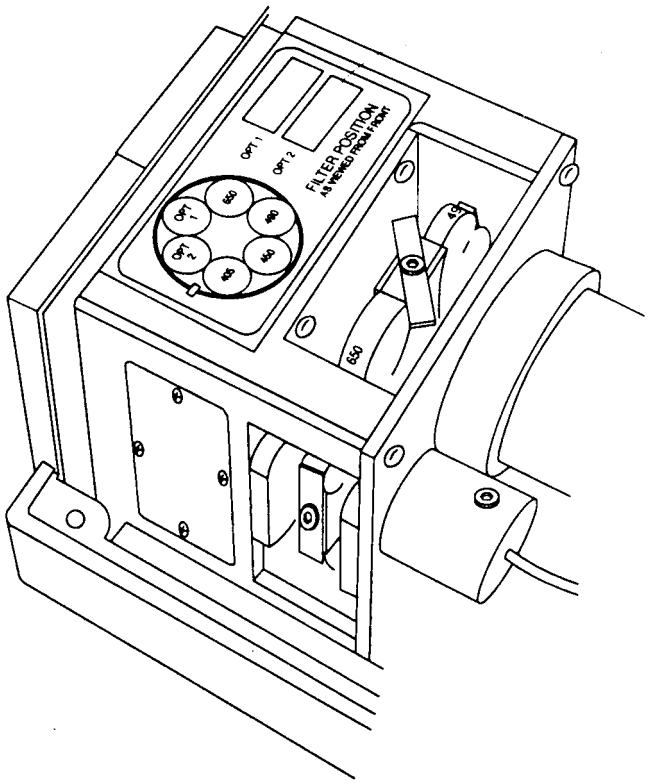


Figure 13: Filter Wheel Housing with Bracket Turned Sideways

4) Make a note of the position where you are installing the filter. You will need this information to update SOFTmax or SOFTmax PRO software and the instrument keypad. When counting the filters, the filter to the left of the vertical flag is #1 and the filter positions are then counted **clockwise** from 1 to 6.

5) Unpack the filter to be installed, being careful not to touch either optical surface. Inspect the filter: both surfaces should appear flat and monocolored. Identify the recessed side and the flat side of the filter. Also, note the wavelength in nanometers printed on the outer face of the metal ring around the filter. These features help orient the filter for installation.

6) Turn the filter so that it is parallel to the appropriate open slot on the filter wheel and so that the recessed side faces the front of the microplate reader while the flat side faces the reader. When properly oriented, the wavelength printed on the perimeter can be read from the front of the microplate reader. Carefully insert the filter into the open slot in the filter wheel (see Figure 14).

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NOTE: For the 340nm filter, both sides of the filter are recessed.

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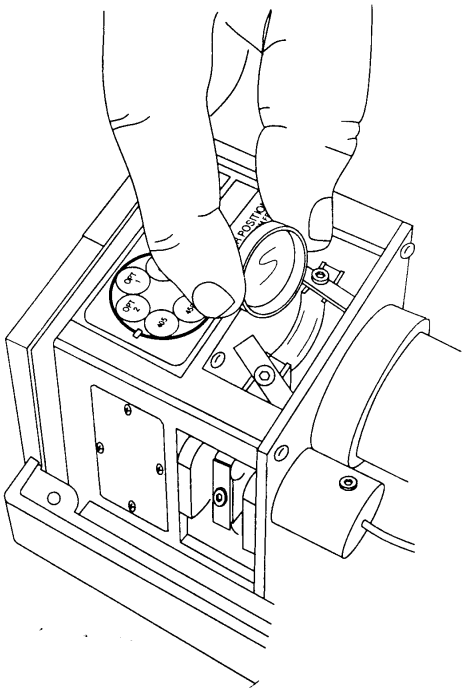


Figure 14: Installing the New Filter into the Filter Wheel

7) Turn the bracket back to the original position over the new filter and use the hex wrench to tighten the screw which holds the bracket. Repeat for all filters installed.

8) Gently spin the filter wheel to make sure it moves freely and to ensure that the optional filter has been seated correctly in the filter slot.

III. Reassemble the Microplate Reader

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1) Holding the clasps, gently slide the light source front cover on its rail to the point where it fits into the matching half.

2) Replace the spring-loaded holding clasps on the front and side of the chamber assembly.

3) Reexamine Figure 9 prior to this step. Pick up the top cover and carefully position it directly over the lower portion of the microplate reader without putting any stress on the ribbon cable. Be sure to align the two halves carefully on all edges before lowering the top cover into place.

4) Holding the upper and lower portions of the microplate reader firmly together, turn the instrument upside down.

5) Insert and tighten all seven screws in their slots. Recall that two of the screws are shorter, see Figure 8 for proper placement.

6) Turn the microplate reader right-side up and reconnect the power cable and printer or computer cable.

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IV. Update the Instrument Keypad

It is very important that the correct position of the filter installed be indicated on the instrument keypad.

1) Note where the filter is in the filter wheel (determined in Section II, Step 3, above).

2) Place the sticker that came with the filter or a piece of tape with the wavelength written on it next to the appropriate number on the front pad of the microplate reader.

V. Update the Software

If you are using the instrument in stand-alone mode, you are done with filter installation. If you are controlling the instrument with SOFTmax® software, please read the following section. It is very important that the filter you have installed in the microplate reader be called out in the software in the correct manner. The filter values in the software must match the positions of the filters in the filter wheel.

Instructions for SOFTmax for Windows or Macintosh Software

1) Launch the SOFTmax program.

2) Select *Filters* under the CONTROL menu.

3) Type the wavelength of the filter you have just installed into the appropriate position on the filter list and click OK. The position in this list MUST match the position of the filter on the filter wheel as noted in Section III, step 3, above.

4) Select *Instrument* under the SETUP menu. Your new filter should be available under the wavelength drop menu.

Instructions for SOFTmax PRO Software (Windows or Macintosh)

1) Launch the SOFTmax PRO program.

2) Select *Preferences* under the EDIT menu. Click on the [Filter] button.

3) Type the wavelength of the filter you have just installed into the appropriate position on the filter list. The position in this list MUST match the position of the filter on the filter wheel as noted in Section III, step 3, above.

4) Select *Instrument Setup* from the CONTROL menu, or press the [Instrument Setup] button on the Plate Section. Your new filter should now be available in the WAVELENGTH menu.

NOTE: Filter wavelengths in this menu appear in numerical order, not the order in which they are installed in the filter wheel.

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