

USFW-100

Oriel[®] Universal Filter Wheel



User's Manual

Oriel[®]
INSTRUMENTS
A Newport Corporation Brand

TABLE OF CONTENTS

1.	GENERAL INFORMATION.....	4
1.1.	SYMBOLS AND DEFINITIONS	4
1.2.	GENERAL WARNINGS	5
1.3.	ELECTRICAL HAZARDS	5
1.4.	FIRE HAZARDS	5
2.	INTRODUCTION.....	6
3.	UNPACKING AND SETUP	7
3.1.	ITEMS INCLUDED.....	7
3.2.	UNPACKING.....	7
3.3.	CHOOSING A LOCATION.....	7
3.4.	CONFIGURING THE FLANGES.....	7
4.	FILTER INSTALLATION.....	9
4.1.	LIGHT STOPPER	11
5.	ELECTRICAL CONNECTION	11
5.1.	STAND-ALONE OPERATION.....	12
5.2.	ORIEL MONOCHROMATOR OR SPECTROGRAPH AS A POWER SUPPLY	13
6.	CONTROLLING THE FILTER WHEEL	13
6.1.	MANUAL CONTROL	14
6.2.	ALL WHEEL DRIVE UNIVERSAL FILTER WHEEL UTILITY PROGRAM.....	14
6.3.	ORIEL MONOCHROMATOR OR SPECTROGRAPH INTERFACE.....	15
6.3.1.	Oriel Mono Utility Program	17
6.3.2.	Oriel TracQ Basic Data Acquisition and Radiometry Software.....	18
6.3.3.	Optional Monochromator Hand Controller	19
6.3.4.	Low Level Command Set.....	19
7.	ALL WHEEL DRIVE (AWD) UNIVERSAL FILTER WHEEL UTILITY SOFTWARE	20
7.1.	SYSTEM REQUIREMENTS	20
7.2.	USB DRIVER INSTALLATION PROCEDURE	21
7.3.	SOFTWARE INSTALLATION PROCEDURE.....	21
7.4.	USING THE FILTER WHEEL UTILITY SOFTWARE.....	25
8.	ACCESSORIES.....	29
8.1.	LT SERIES FLANGE ADAPTERS	29
8.2.	ORIEL COUPLING RINGS	29
8.3.	STEP UP/DOWN ADAPTERS.....	30
8.4.	LENS TUBE FILTER HOLDERS AND SPANNER WRENCH.....	30
8.5.	CABLES.....	31
9.	MAINTENANCE.....	31
9.1.	CLEANING	31
10.	SPECIFICATIONS.....	33
10.1.	UNIVERSAL FILTER WHEEL.....	33
10.2.	UNIVERSAL FILTER WHEEL UTILITY SOFTWARE.....	34
11.	EU DECLARATION OF CONFORMITY	35
12.	WARRANTY AND SERVICE.....	36
12.1.	CONTACTING ORIEL INSTRUMENTS	36
12.2.	REQUEST FOR ASSISTANCE / SERVICE.....	37
12.3.	REPAIR SERVICE	37
12.4.	NON-WARRANTY REPAIR.....	37
12.5.	WARRANTY REPAIR.....	38

12.6. LOANER / DEMO MATERIAL39

LIST OF FIGURES





Figure 1: Dimensional Diagram 6
Figure 2: Male and Female Flanges 8
Figure 3: Removing the access plate to add/remove filters 9
Figure 4: Removing the retaining ring from the LT10-05 10
Figure 5: A filter installed in place 11
Figure 6: AC Power Connection and ON/OFF Switch 13
Figure 7: Pushbutton for manual control 14
Figure 8: Ribbon cable connections for filter wheel interface with CS130, CS260, and MS260i instruments 16
Figure 9: Ribbon cable connections for filter wheel interface with MS257 instruments 16
Figure 10: Filter Control Menu of Oriel's Mono Utility Program 17
Figure 11: Filter Selection Menu of TracQ Basic 18
Figure 12: 74009 (left) and 77709 (right) hand controllers 19
Figure 13: Setup Application 20
Figure 14: Setup Application 21
Figure 15: Setup Application 22
Figure 16: Destination Directory Selection 23
Figure 17: Accept License Agreements 23
Figure 18: Start Installation 24
Figure 19: Finish Installation 24
Figure 20: Connect to Filter Wheel 25
Figure 21: Main Control Panel 26
Figure 22: Change Custom Sequence 27
Figure 23: Custom Sequence Page 27
Figure 24: Load/Save Selection 28
Figure 25: Change Custom Sequence 28
Figure 26: LT Series 1-Inch and 2-Inch Adapters 29
Figure 27: 77792 Quick Connect Coupling Ring 30
Figure 28: 66920 Step Down Adapter 30
Figure 29: LT10-05 lens tube (left) and LT10-WR spanner wrench (right) 31

1. GENERAL INFORMATION

Thank you for your purchase of this model USFW-100 universal filter wheel from Newport Corporation.

Please carefully read the following important safety precautions prior to unpacking and operating this equipment. In addition, please read the complete User's Manual for additional important notes and cautionary statements regarding the use and operation of the system.

1.1. SYMBOLS AND DEFINITIONS

	WARNING Situation has the potential to cause bodily harm or death.
	CAUTION Situation has the potential to cause damage to property or equipment.
	ELECTRICAL SHOCK HAZARD Hazard arising from dangerous voltage. Any mishandling could result in irreparable damage to the equipment, and personal injury or death.
	EUROPEAN UNION CE MARK The presence of the CE Mark on Newport Corporation equipment means that it has been designed, tested and certified as complying with all applicable European Union (CE) regulations and recommendations.
NOTE:	Additional important information the user or operator should consider.

Please read all instructions that were provided prior to operation of the equipment.

If there are any questions, please contact Oriel Instruments or the representative through whom the system was purchased.

1.2. GENERAL WARNINGS

- Read all warnings and operating instructions for this system prior to setup and use.
- Do not use this equipment in or near water.
- To prevent damage to the equipment, read the instructions in Section 5: 11 for proper input voltage.
- This equipment is grounded through the grounding conductor of the power cord.
- Route the power cord and other cables so they are not likely to be damaged.
- Disconnect power before cleaning the equipment.
- Do not use liquid or aerosol cleaners; use only a dry lint-free cloth.
- Lock out all electrical power sources before servicing the equipment.
- To avoid explosion, do not operate this equipment in an explosive atmosphere.
- Qualified service personnel should perform safety checks after any service.
- If this equipment is used in a manner not specified in this manual, the protection provided by this equipment may be impaired.
- Do not block ventilation openings.
- Do not position this product in such a manner that would make it difficult to disconnect the power cord.
- This product should only be powered as described in the manual.
- Do not remove the cover for normal usage.

1.3. ELECTRICAL HAZARDS

Make all connections to or from the power supply with the power off.

Do not use the power supply without its cover in place. Lethal voltages are present inside.

1.4. FIRE HAZARDS

Lamps are extremely hot during operation, and for several minutes after being shut off. Keep flammable objects away from the light source, filter wheel and coupling accessories.

2. INTRODUCTION

The USFW-100 is a six-position motorized filter. The wheel holds up to six 1.0 inch [25.4 mm] diameter filters or other optical components. The filter wheel can be controlled remotely by a USB 2.0 interface, All Wheel Drive (AWD) filter wheel utility software or manually via the pushbutton on the housing.

The USFW-100 is designed to operate with the Oriel CS130B™, CS260™ and MS257™ monochromators, as well as the MS260i™ and MS257™ spectrographs. The filter wheel can be controlled through its connection to the previously mentioned instrument using the instrument's own utility software, low level command set, TracQ™ Basic software or hand controller.

Up to two filter wheels can be connected to an MS257 monochromator or spectrograph. All other instruments can only control a single filter wheel. If multiple filter wheels are required, direct filter wheel control may be employed.

If a monochromator or spectrograph is not being used, this model may be operated as a stand-alone filter wheel via USB or manual pushbutton control.

NOTE:

In this user's manual, the term "monochromator" is used throughout the text. However, the USFW-100 may be operated with both monochromators and spectrographs.

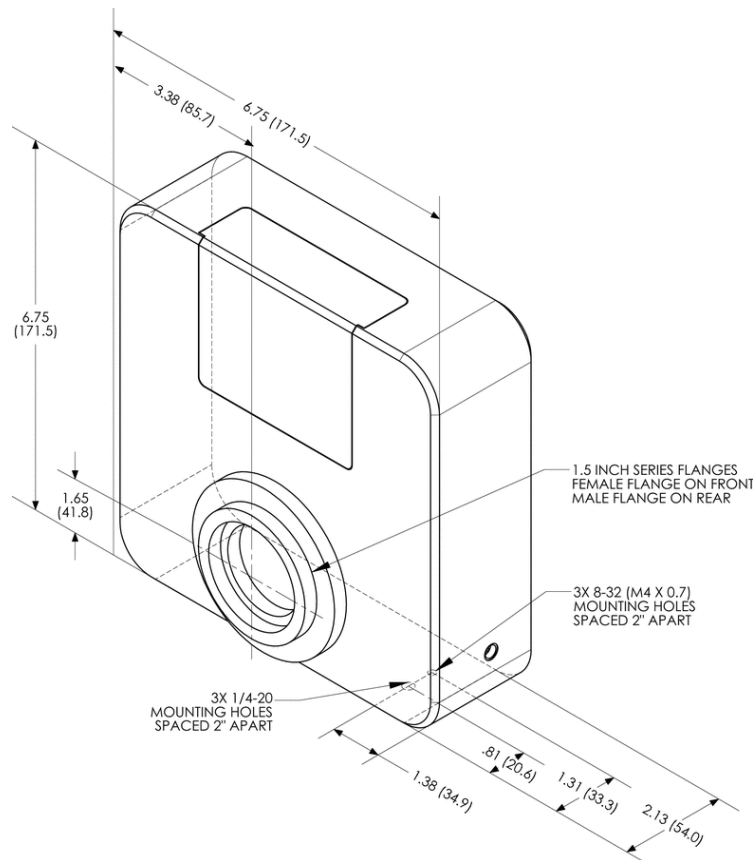


Figure 1: Dimensional Diagram

3. UNPACKING AND SETUP

3.1. ITEMS INCLUDED


The USFW-100 includes the following list of items. Filters, additional light path couplers, and mounting post hardware are ordered separately.

- Universal Filter Wheel
- AC adapter with US voltage cable
- USB 2.0 cable
- This User's Manual
- All Wheel Drive Utility Software on USB flash drive

3.2. UNPACKING

Remove all items from the shipping container and verify each item is accounted for. The USFW-100 is carefully packaged to minimize the possibility of damage during shipment. It is suggested to save the packaging material and shipping container, in case the equipment needs to be relocated at a future date.

Inspect the shipping box for external signs of damage or mishandling. Inspect the contents for damage. If any item is missing or damaged, immediately contact Newport Corporation or the representative from whom the system was purchased.

	<p>WARNING</p> <p>Do not attempt to operate this equipment if there is evidence of shipping damage or there is suspicion that the equipment will not operate correctly. Damaged equipment may present hazards.</p>
-------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

3.3. CHOOSING A LOCATION

Choose an installation location where the power requirements can be met for the USFW-100. Be sure power is not applied to the system until the filters are installed, cover is in place and the power switch is confirmed to be in the OFF position (marked **O**). When power is to be applied, move the rocker switch located on the side of the filter wheel to the ON position (marked **I**).

The environment should be that of a typical laboratory atmosphere, without excessive humidity and contaminants in the air. Do not allow the ventilation holes on the filter wheel or its computer to be blocked. Air should be able to circulate freely around the unit.

3.4. CONFIGURING THE FLANGES

The USFW-100 uses standard Oriel 1.5-inch series flanges. One side is equipped with a male flange, and the other with a female flange. These flange locations are interchangeable.

When determining the most suitable flange arrangement, it is suggested to orient them so that the filter wheel access panel will not be blocked by other items in the optical path. This allows filter to

be replaced without requiring system reassembly and realignment. A Philips head screwdriver is needed to loosen the three screws holding each flange in place.



Figure 2: Male and Female Flanges

4. FILTER INSTALLATION

To install filters, the access panel must be removed first. Before starting this procedure, it is important to confirm that the filter wheel is switched off and unplugged from its AC adapter.

At the top of the filter wheel, two 4-40 socket cap screws secure the filter wheel access panel in place. Remove these screws, then slide the access panel upward to remove it. Set the access panel aside.



Figure 3: Removing the access plate to add/remove filters

The USFW-100 is designed to fit Newport's LT10-05, or ½ inch length, 1 inch LT series Lens Tubes. If filters are not already installed in these Lens Tubes see the instructions below on how to install a filter into the Lens Tube.

	<p>CAUTION</p> <p>Always wear powder-free gloves or finger cots when handling the filters. Handle the filters from the outside edges to avoid causing contamination or permanent damage.</p>
-------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------



Figure 4: Removing the retaining ring from the LT10-05

Using a spanner wrench such as Newport's LT10-WR, insert the prongs of the wrench into the correlating notches on the retaining ring of the LT10-05 Lens Tube. Rotate counter-clockwise until the retaining ring is removed from the Lens Tube as shown in Figure 4. Install the desired filter into the Lens Tube, then place the retaining ring over the filter, and secure the filter in place by rotating the retaining ring clockwise with the spanner wrench.

Once the filter is installed into the Lens Tube, screw the Lens Tube into the desired slot on the filter wheel by rotating the filter wheel to the desired numerical filter position and rotating the Lens Tube clockwise into place.

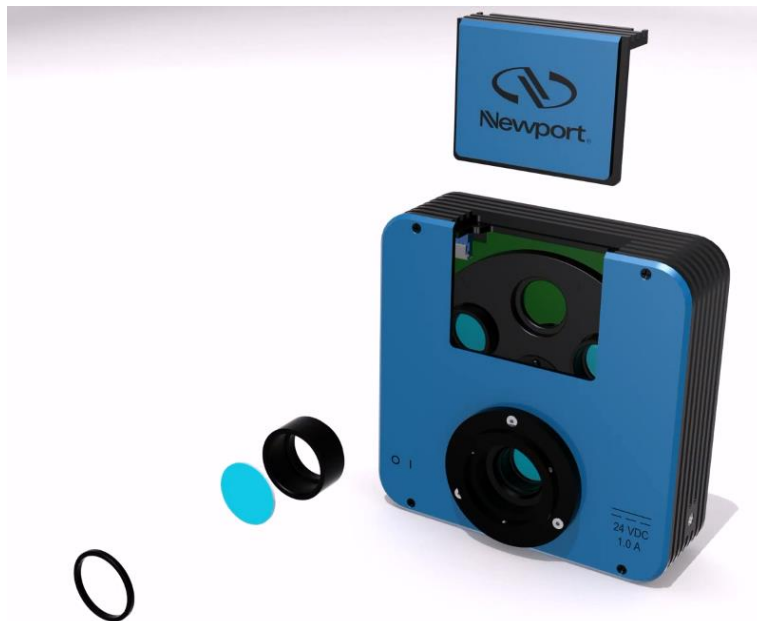




Figure 5: A filter installed in place

Note: Always keep track of which filters are installed at each position. It is suggested to write down this information and update it whenever the configuration is changed. This is particularly helpful in a multi-user environment.


When the installation of filter(s) is completed, replace the filter wheel access panel by sliding it into place, and replace the two 4-40 socket cap screws to secure it.

4.1. LIGHT STOPPER

Frequent ignition or starting of a lamp is stressful on the lamp and can greatly shorten lamp lifetime. A setup may often need to be temporarily shielded from input light while a minor adjustment is made. To prevent the need for frequent lamp ignitions or starts, rotating the filter wheel to the position with a light stopper installed allows the filter wheel to act as an improvised shutter. This light stopper is installed in the same manner a filter is installed as described in Section 4 of this manual. A light stopper is not included with the filter wheel and must be ordered separately.

5. ELECTRICAL CONNECTION


Electricity can be supplied to the filter wheel using the included AC adapter or by connecting to an Oriol CS130, CS260, or MS257 monochromator or MS260i or MS257 spectrograph.

	<p>CAUTION</p> <p>Do not turn on the USFW-100 until all connections have been made to the monochromator, computer, hand controller or external DC voltage power supply.</p>
-----------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

5.1. STAND-ALONE OPERATION

Before powering up the system for the first time, it is suggested to have a qualified electrician verify the wall socket to be used with the USFW-100 meets the requirements for operation as noted.

The line voltage requirements for the USFW-100 is 100 to 240 VAC, 50-60 Hz. Before making any electrical connections, verify the power switches are in the OFF position for the USFW-100 and monochromator, if being used.

	<p>ELECTRICAL SHOCK HAZARDS</p> <p>Never attempt to open the power supply. This item does not contain any user serviceable parts. Failure to follow this warning can result in severe injury or death.</p>
------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

The USFW-100 and its DC power supply conform to CE standards for both safety and EMC. During normal use, this equipment will not pose any electrical hazard to the user. Read all warnings before installing or operating this unit. Never open the USFW-100 cover and attempt to work inside without first turning the instrument off and disconnecting the power cord from the AC mains. The power supply contains no user-serviceable parts and must never be opened or otherwise tampered with.

A dedicated power line or line isolation may be required in certain locations, as the electronics contained in the instrument are sensitive to static electricity and radiated electromagnetic fields. Operation of the system near intense pulsed sources (lasers, Xenon flash lamps, etc.) may compromise performance.

If there are any questions or concerns, contact Newport Corporation or regional sales representative.

To use the AC adapter, plug the end of the AC power adapter terminated for filter wheel connection, into the filter wheel AC adapter termination on the side of the filter wheel housing. This should be done before plugging the other end of the adapter into an AC power outlet. After the filter wheel has been plugged in, the ON/OFF switch on the opposite side of the housing can be used to turn the filter wheel on. The position marked | indicates the filter wheel is on.



Figure 6: AC Power Connection and ON/OFF Switch

5.2. ORIEL MONOCHROMATOR OR SPECTROGRAPH AS A POWER SUPPLY

When possible, it is most desirable to use the monochromator or spectrograph as a power source because it also enables the instrument and its software to control the filter wheel. Applying power to the spectroscopy instrument would also apply power simultaneously to the filter wheel. Connections to the spectroscopy instrument are discussed further in Section 6.3 of this User's Manual.

The AC adapter provided with the filter wheel does not need to be utilized when the filter wheel is connected to the spectroscopy instrument. When the power supply is not in use, the position of the ON/OFF switch on the filter wheel housing has no effect.

6. CONTROLLING THE FILTER WHEEL

The filter wheel can be controlled via the following methods:

The filters may be selected using the following:

- Manual pushbutton control
- All Wheel Drive Universal Filter Wheel Utility Program
- Oriel Mono-Utility Program
- Oriel TracQ Basic Data Acquisition and Radiometry Software
- Monochromator Hand Controller
- Low level command set

6.1. MANUAL CONTROL

Pressing the pushbutton located on filter wheel housing as shown in Figure 7, advances the filter by one position. The LCD screen located near the pushbutton indicates which position the filter wheel is at.



Figure 7: Pushbutton for manual control

6.2. ALL WHEEL DRIVE UNIVERSAL FILTER WHEEL UTILITY PROGRAM

More information on controlling the filter wheel with the included AWD Universal Filter Wheel Utility Program can be found in Section 7.

6.3. ORIEL MONOCHROMATOR OR SPECTROGRAPH INTERFACE

The universal filter wheel can be controlled by the same methods used to control the following Oriel spectroscopy instruments:

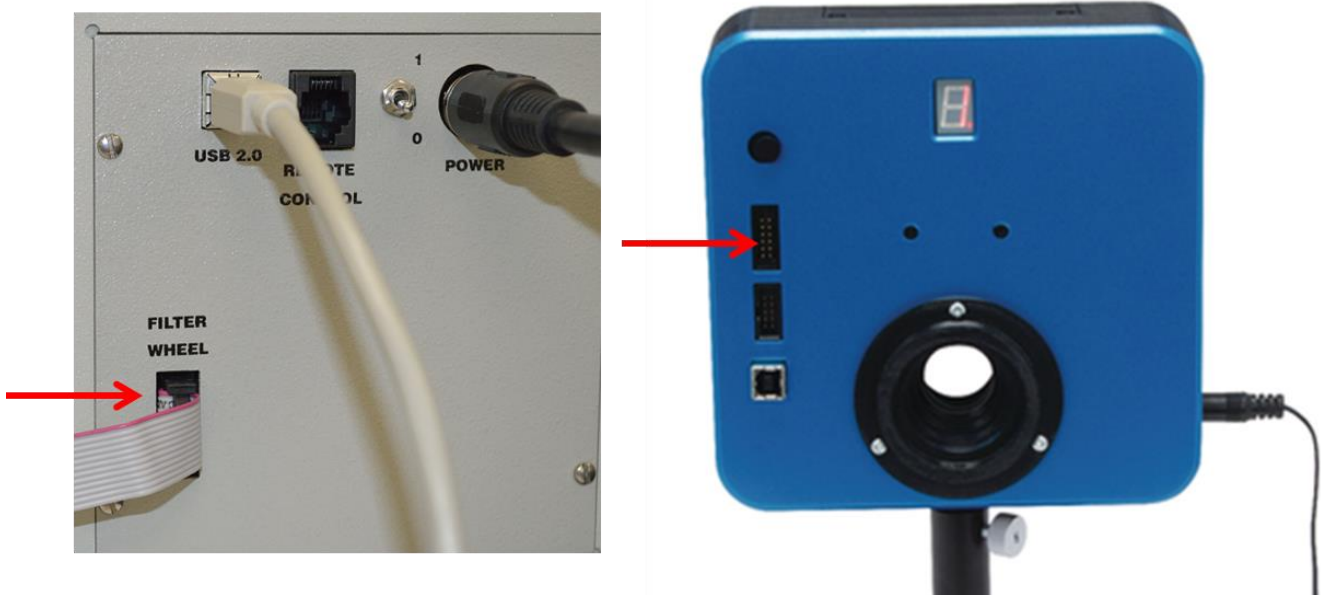
- CS130, CS260, and MS257 monochromators
- MS260i and MS257 imaging spectrographs

See the instructions below for connecting these instruments to the universal filter wheel:

Before beginning, ensure the power switch for the spectroscopy instrument is in the off position (marked as O). Then connect the power adapter and all other cables to the monochromator or spectrograph.

Connecting the filter wheel to a CS130, CS260, or MS260i requires a CBL-CSMS-FW ribbon cable. Connecting the filter wheel to an MS257 monochromator or imaging spectrograph requires a CBL-MS257-FW. This is illustrated in Figure 8 and Figure 9.

Note: If the USFW-100 was purchased to replace the 74010, or 77727 Legacy Filter Wheels previously offered by Oriel, the ribbon cable assemblies included with these filter wheels can also be used to interface the spectroscopy instrument with the USFW-100.



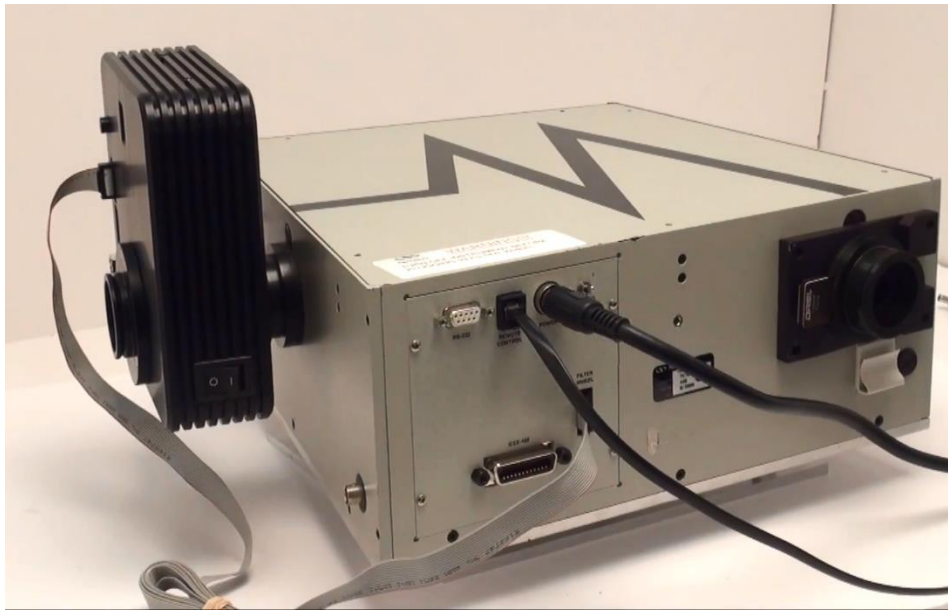


Figure 8: Ribbon cable connections for filter wheel interface with CS130, CS260, and MS260i instruments

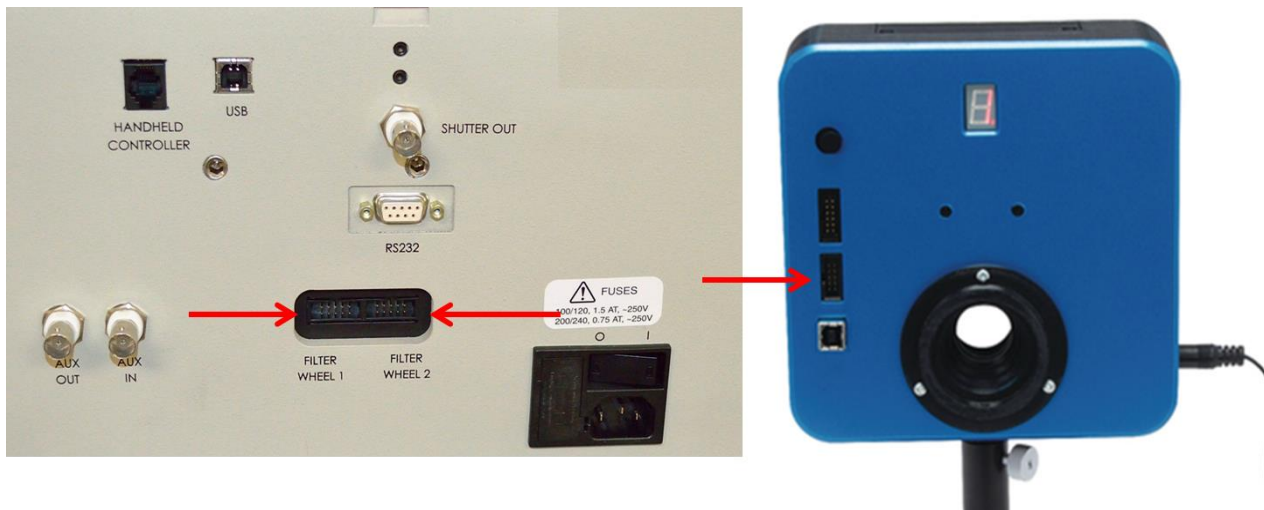


Figure 9: Ribbon cable connections for filter wheel interface with MS257 instruments

Note: When using the filter wheel with an MS257 instruments, only filter wheel positions 1 through 5 will be selectable. All 6 filter wheel positions are selectable when the filter wheel is used with CS130, CS260, and MS260i instruments.

Apply power to the instrument only after all connections have been made, as the instrument and the filter wheel will power up simultaneously. Once the filter wheel and instrument are powered on, the instrument allows the user to select which filter is placed in the optical path.

6.3.1. Oriel Mono Utility Program

The Filter Control Menu of Oriel Instruments Mono Utility Program can be used to program the filter wheel to place a particular filter in the light path over a selected wavelength range of the monochromator/spectrograph. For details on installation and operation of the filter wheel, consult the Mono-Utility: Oriel Utility Software for Monochromators and Spectrographs Quick Start Guide.

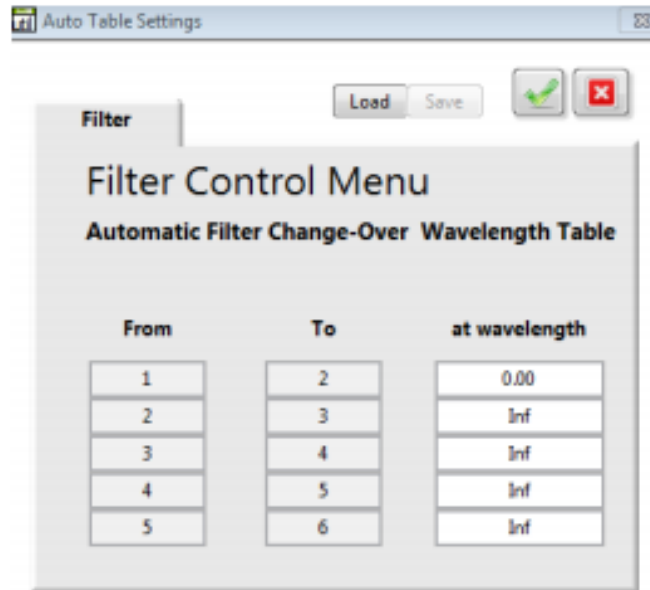


Figure 10: Filter Control Menu of Oriel's Mono Utility Program

6.3.2. Oriel TracQ Basic Data Acquisition and Radiometry Software

In order to ensure that the light exiting the monochromator or spectrograph maintains its spectral purity, it is necessary to incorporate optical filters into the design. The physics of diffraction gratings is such that higher order wavelengths need to be blocked. The filters installed into the USFW-100 can to be chosen to block unwanted wavelengths.

By setting the filter parameters in the Oriel TracQ™ Basic software, the monochromator automatically selects the appropriate filter for any desired wavelength. Refer to the TracQ Basic manual for more information.

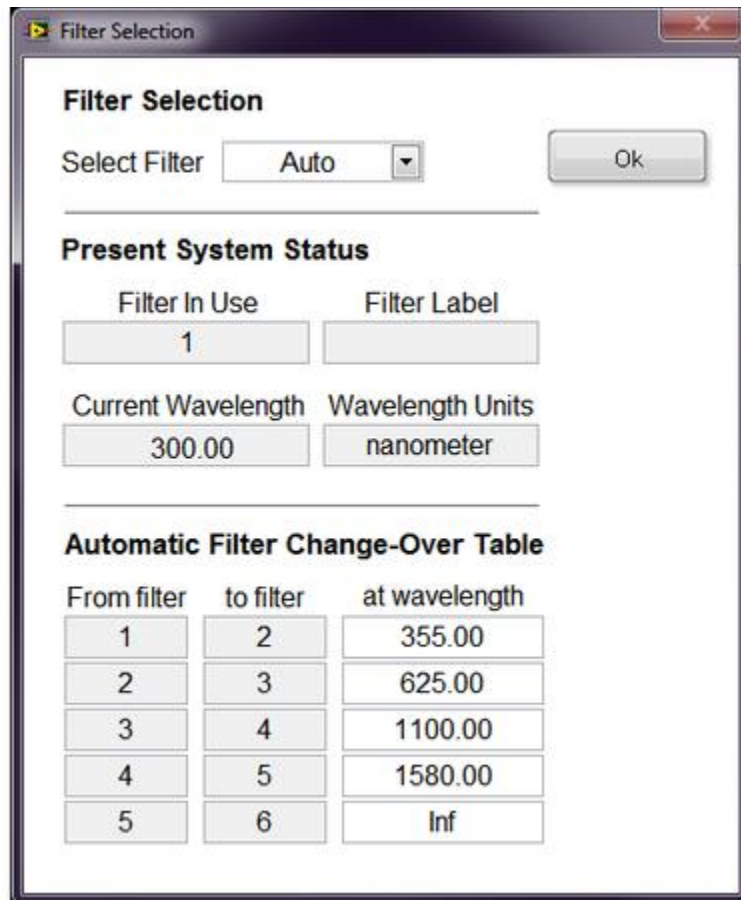


Figure 11: Filter Selection Menu of TracQ Basic

NOTE: The parameters entered in Figure 11 are an example. The actual filter changeover parameters depend on the monochromator configuration and filters being used.

6.3.3. Optional Monochromator Hand Controller

For those who do not wish to use a computer to control the monochromator/spectrograph and filter wheel, Newport offers hand controllers which plug directly into the monochromator. The 74009 hand controller is used to interface with Cornerstone 130 and 260 monochromators and MS260i spectrographs, and the 77709 hand controller is used to interface with MS257 monochromators and spectrographs, respectively. When the USFW-100 is connected to the monochromator, the hand controller can be used to select a filter. Refer to the monochromator/spectrograph's User's Manual for more information.



Figure 12: 74009 (left) and 77709 (right) hand controllers

6.3.4. Low Level Command Set

The low level command set included with each monochromator and spectrograph instrument can also be used to control the universal filter wheel. Refer to the monochromator/spectrograph's User's Manual for more information.

7. ALL WHEEL DRIVE (AWD) UNIVERSAL FILTER WHEEL UTILITY SOFTWARE

The following will acquaint the first time user with the installation and use of the All Wheel Drive (AWD) Universal Filter Wheel Utility Software. Do not be concerned if your display does not exactly agree with the figures shown. The focus of this section is to help the first time user learn how to install and use the software. It is highly recommended that the first time user read these instructions before attempting to use or install the software. To install and use the software, a USB 2.0 A/B cable and a compatible computer are required.



Figure 13: Setup Application

Installation of the AWD Utility Software will create:

- a folder called C:\Program Files\Newport - Oriel Instruments\AWD Utility or (64 Bit OS) C:\Program Files (x86)\Newport - Oriel Instruments\AWD Utility (an alternative directory may be chosen during the installation process)
- an icon called "AWD Utility" in the start menu
- an icon for NI Max on the desktop

7.1. SYSTEM REQUIREMENTS

Operating System	Minimum Microsoft Windows XP, Service Pack 3 Microsoft Windows 7,8,10, 32-bit or 64-bit
Processor Speed	2 GHz minimum
Random Access Memory (RAM)	1 GB minimum
Peripheral Hardware	USB 2.0 port
Hard Drive Space	800 MB minimum

7.2. USB DRIVER INSTALLATION PROCEDURE

1. Turn on the computer following the manufacturer's instructions. Before installing the software, close all applications. Disconnect all instruments from the computer before installing this software.
2. Insert the AWD Utility Software installation flash drive into one of the computer's USB ports.
3. On the drive open the USB_Driver folder. Then Right click the **UnivFiltW.inf** file, shown in Figure 14, and Select Install from the dialog for driver installation. The install should indicate success when done. This installation takes just seconds to complete.

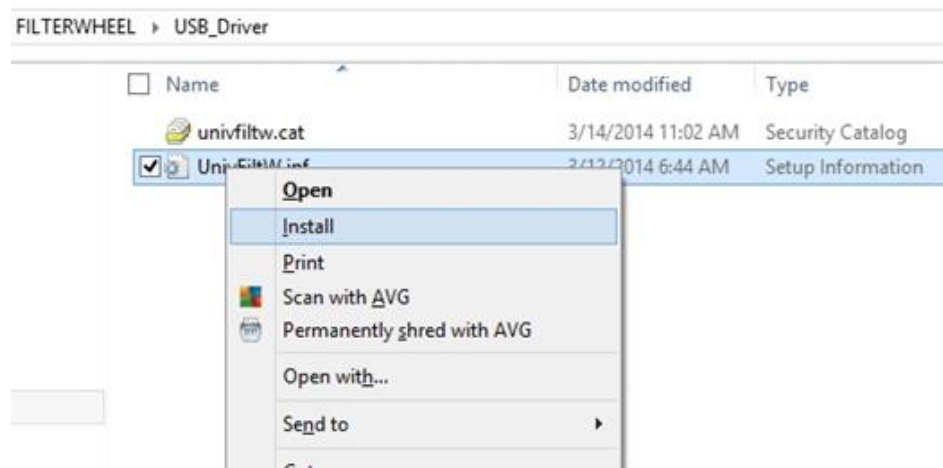


Figure 14: Setup Application

7.3. SOFTWARE INSTALLATION PROCEDURE

Note: The USB driver should be installed per Section 7.2 before attempting to install the software.

1. Turn on the computer following the manufacturer's instructions. Before installing the software, close all applications. Disconnect all instruments from the computer before installing this software.
2. Insert the AWD Utility Software installation flash drive into one of the computer's USB ports. The "AutoPlay" dialog box may open. Select "Open folder to view files." If the "AutoPlay" does not start installing the software automatically, open the contents of the installation disk.
3. Double click the Setup.exe application, shown in Figure 15, application to begin the installation.

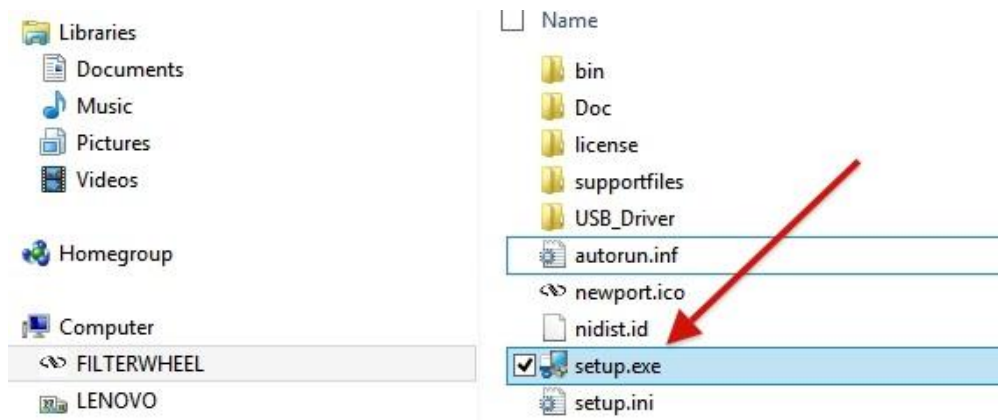


Figure 15: Setup Application

- When the “Destination Directory” screen appears, the option is available to install the software into the default location or a different location. To install software into a different location, click the “Browse” button and select another directory. There are separate directories for AWD Utility and National Instruments (supporting) Products, as shown in Figure 16. Click “Next” to continue. During the installation, it is normal for other dialog boxes to flash as software is added.

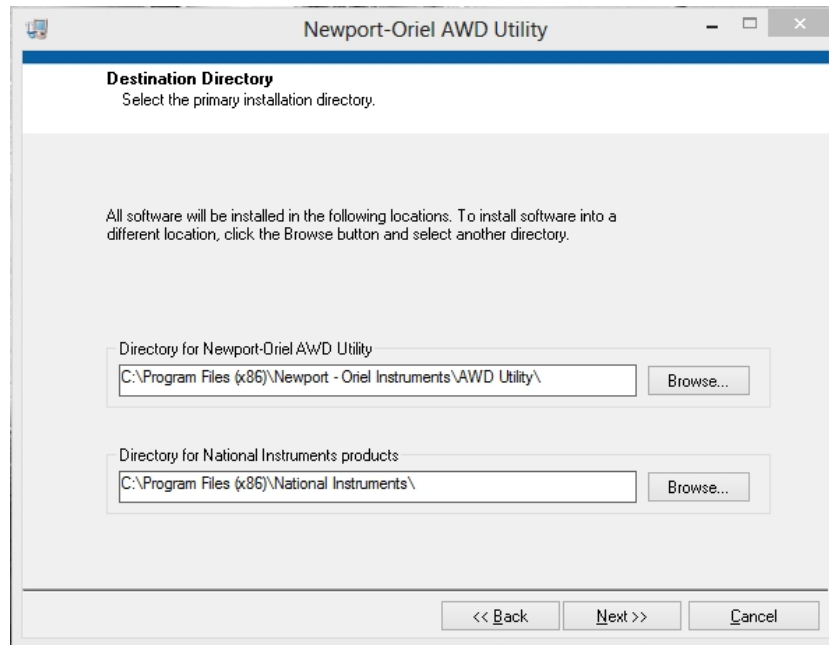


Figure 16: Destination Directory Selection

- Choose to accept the license agreements, if needed, and then click Next.

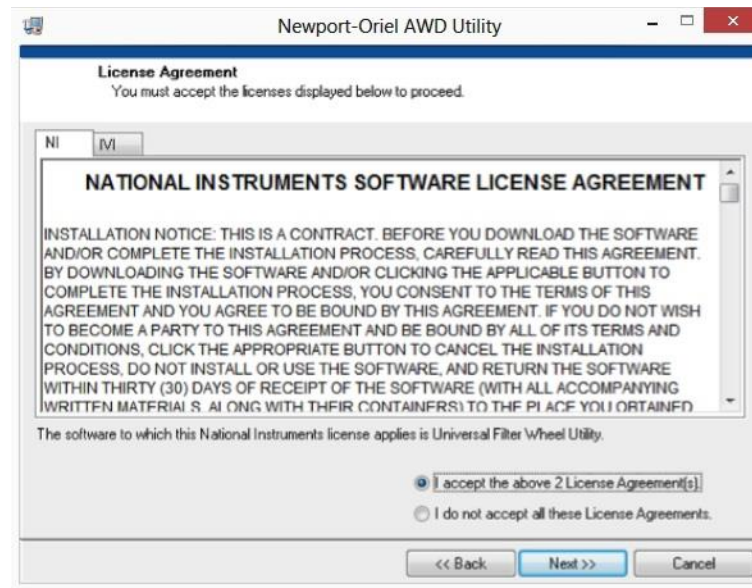


Figure 17: Accept License Agreements

6. Click “Next” to start installation. Otherwise click “Back” to change the installation settings.

Note: Clicking “Save File” will save a file in Rich Text File format (*.rtf). The .rtf file will list the installation summary text. This file will be named “save as install.rtf”.

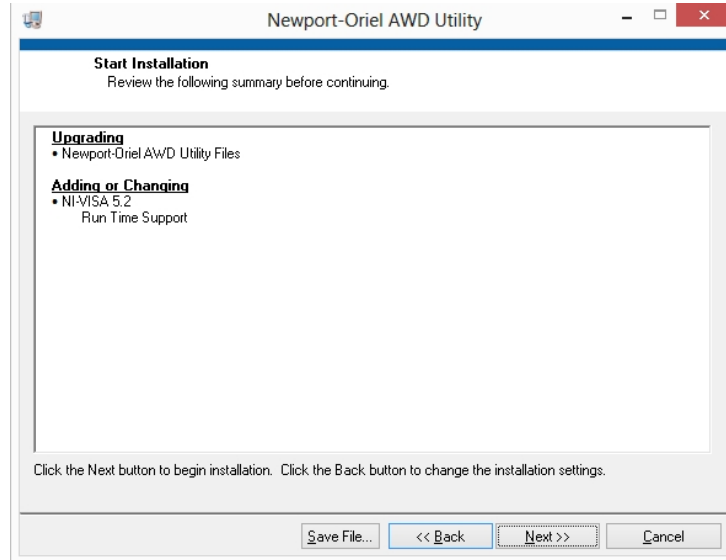


Figure 18: Start Installation

7. During installation, a status indicator will show the overall progress. Selecting “Cancel” brings up a dialog box to verify cancellation.
8. When the installation is complete, click “Finish”. Refer to Figure 19.

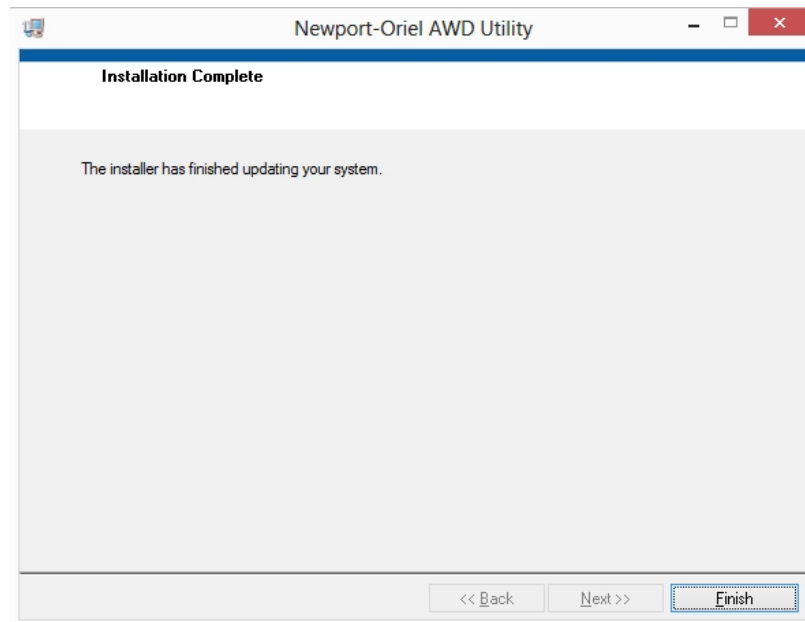


Figure 19: Finish Installation

9. On most computers, a dialog box will appear to restart the computer. This software can be used only after the computer is restarted.
10. After the computer restarts, the Start menu shall contain the AWD Utility Software and the National Instruments "NI Max" icon shall appear on the desktop.

7.4. USING THE FILTER WHEEL UTILITY SOFTWARE

1. After the AWD Utility Software is installed and the computer has been restarted, connect the Universal Filter Wheel to the computer via USB cable.
2. Run the AWD Utility Software.
3. If the filter wheel is found, click the "Connect" icon. If more than one AWD is connected to computer, first set the "Active Filter Wheel" selection.

NOTE: If the software is unable to connect, check in the device manager to ensure that the USB driver has been installed correctly and the instrument is listed (follow USB Driver Installation directions in Section 7.2 and then disconnect and reconnect the USB cable to unit).

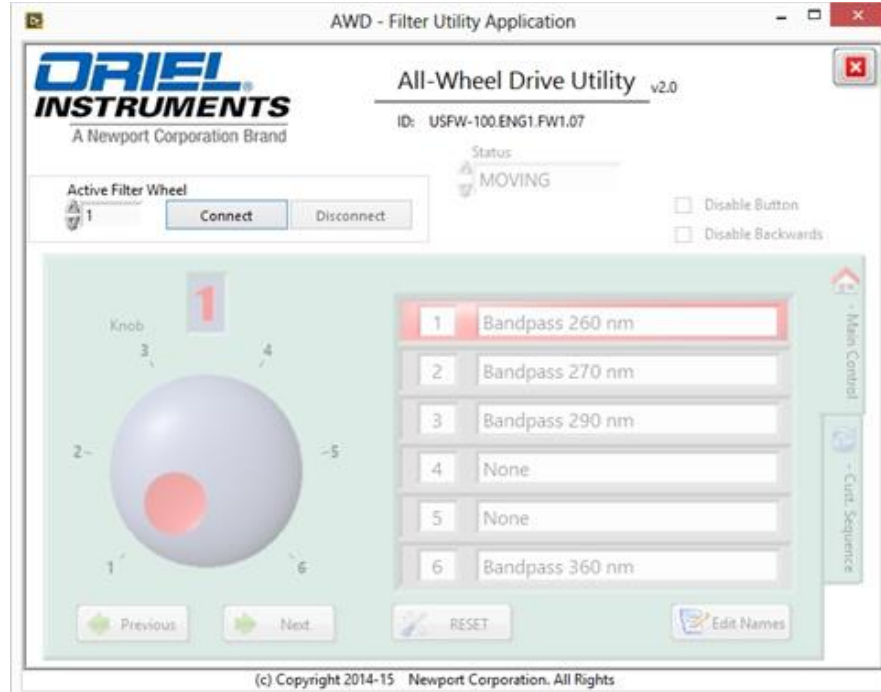


Figure 20: Connect to Filter Wheel

4. To verify communication, click the “NEXT” icon and filter will rotate.

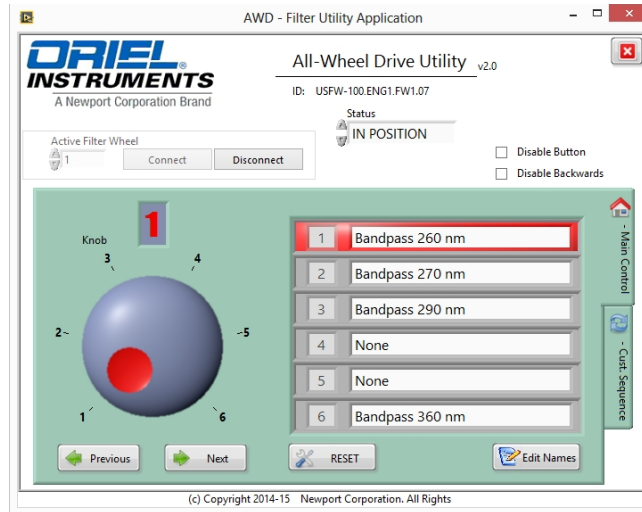


Figure 21: Main Control Panel

5. To select a filter, click the filter number/name on the right side of the Application or rotate the knob with the mouse by clicking the mouse while the cursor is in the red portion of the knob, rotating the knob, and releasing the mouse button when the desired position has been reached. You will hear the filter moving and see the updated position on the numerical display above the knob. While the filter wheel is moving, an indicator at the top will display the Status as MOVING and once in position, it will be display IN POSITION. Checking the box next to “Disable Button” will disable the manual pushbutton of the filter wheel. Clicking the box next to “Disable Backwards” will disable backwards, or counterclockwise motion of the wheel. Clicking the “Previous” and “Next” icons will move the filter wheel up/down one row, respectively. Clicking the RESET icon will restore factory default settings, enabling the pushbutton and backwards rotation of the filter wheel and restoring the filter wheel position to filter 1. If the filter wheel is already at filter 1 when the RESET icon is clicked, the filter wheel will make one complete rotation and return at filter 1.
6. To change the names of the filter labels, click on the “Edit Names” icon. The dialog will allow you to change the text label for each filter. When the “SAVE” is clicked these names will be stored to the AWD Utility Software.

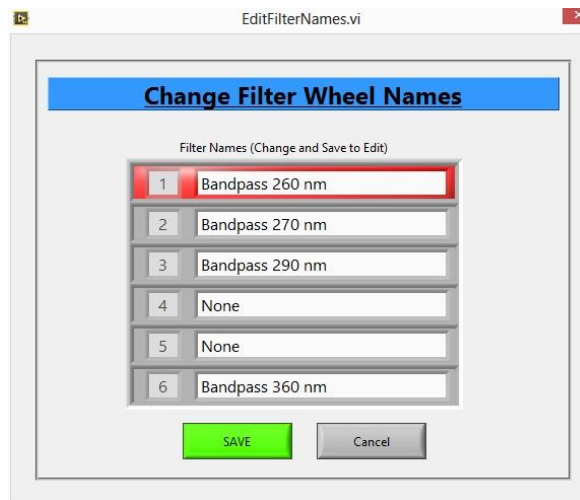


Figure 22: Change Custom Sequence

7. Custom Sequence – A custom order of filters and durations at each filter can be selected. On the right side of the Application is a tab selector; you can click the “Cust. Sequence” tab to see this page. (see Figure 23) Clicking on a row will move to that filter position. Clicking the “Run” icon will run the sequence once from top to bottom. Clicking the “Continuous” icon will run the sequence repeatedly. Clicking the “Stop” icon will stop any currently running Sequence, and the filter wheel will pause at its current position.

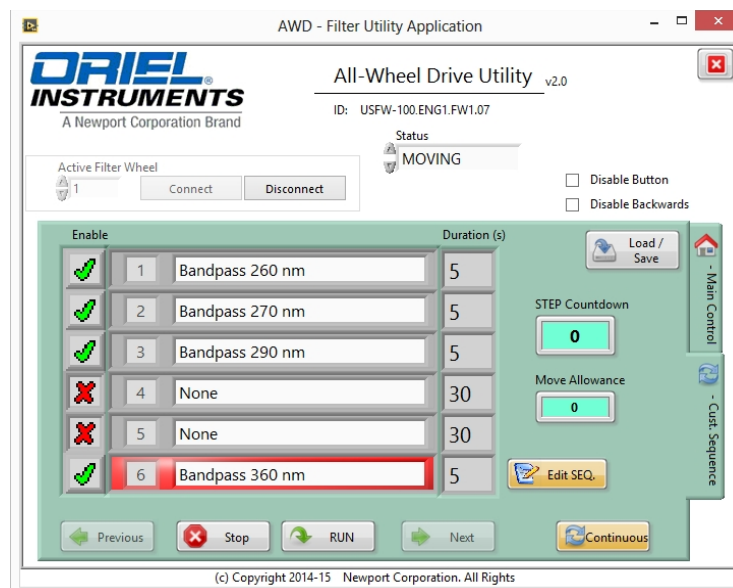


Figure 23: Custom Sequence Page

8. Load/Save – Clicking the “Load/Save” icon will allow you to Load or Save a particular sequence. Loading a configuration file with *.cfg as an extension will load the saved sequence steps, duration, and enable settings only. If you desire to overwrite the filter names on the filter wheel

(to restore filter names of a previous Custom Sequence), loading the same file with an *.ini extension will also restore filter names in that file. All saved files are in text format and can be read in a text editor program.



Figure 24: Load/Save Selection

- To change the sequence settings, click on the “Edit SEQ.” button while in the Cust. Sequence tab. The sequence has a fixed size of 6 rows, and each row can be Enabled or Disabled by clicking the icon under the ENABLE column in each row. A green checkmark indicates that row is enabled. Clicking this green checkmark to change it to a red X will disable that row. When disabled, that row will be skipped. The numeric index under the FILTER column is used to change the filter for a given row, and the indicator to the right of the row will update with that filter position’s name. The Duration(s) column indicates how many seconds that the filter wheel will remain on that position, and can be set from 1-999 s. Note that in order to guarantee the filter wheel is not moving during this time, the filter wheel waits a short period of time called “a moving allowance” before this set Duration time is started. This moving allowance is 3 seconds when multi-directional movement (clockwise and counter-clockwise) of the filter wheel is allowed, and 6 seconds when Disable Backwards is checked, allowing movement of the filter wheel only in the forward/clockwise direction. This fixed time is to allow repeatable operation when interacting/coordinating with external systems.

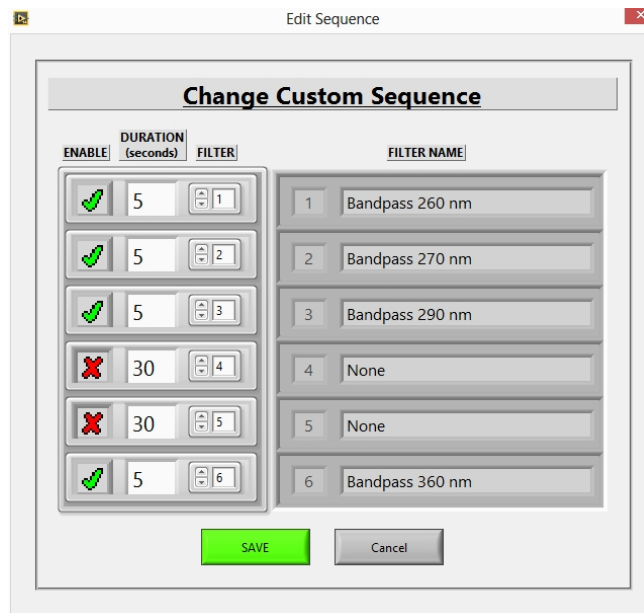


Figure 25: Change Custom Sequence

10. To disconnect communication with the current filter wheel, click “Disconnect”.

8. ACCESSORIES

The following is a small list of the optional accessories available which may be used with the USFW-100. For more information, visit Newport’s website or contact Newport’s technical sales engineers. They can help configure a full system from the extensive Oriel and Newport product selection.

8.1. LT SERIES FLANGE ADAPTERS

The LT10-UADPT allows an Oriel 1.5-inch series flange to mate with Newport’s 1-inch LT series lens tubes and accessories. The LT20-UADPT is the mating adapter for 2-inch TL series lens tubes. This allows the USFW-100 to be a truly universal filter wheel that is compatible across many Newport products.



Figure 26: LT Series 1-Inch and 2-Inch Adapters

8.2. ORIEL COUPLING RINGS

For coupling flanges of the same gender, Oriel offers coupling rings to make the filter wheel compatible with any existing setup utilizing Oriel instruments. Set screw type coupling rings are useful for setups intended to be permanent and not frequently disassembled. Quick connect type coupling rings are convenient for setups that are frequently disassembled and reassembled. Quick connect type coupling rings are also light tight. The following coupling rings are offered by Oriel:

- 77829: set screw type, has two 1.5 inch female flanges, useful for coupling two 1.5 inch male flanged components
- 77791: quick connect type, has two 1.5 inch female flanges, useful for coupling two 1.5 inch male flanged components
- 77792: quick connect type, has two 1.5 inch male flanges, useful for coupling two 1.5 inch female flanged components

- 66292: step down adapter, has 2 inch male and 1.5 inch female flanges



Figure 27: 77792 Quick Connect Coupling Ring

8.3. STEP UP/DOWN ADAPTERS

For coupling two components of different flange sizes, Oriel offers the following step up/down adapters:

- 66292: has 2 inch male and 1.5 inch female flanges
- 66290: has 3 inch male and 1.5 inch female flanges



Figure 28: 66290 Step Down Adapter

8.4. LENS TUBE FILTER HOLDERS AND SPANNER WRENCH

The filter wheel can hold up to 6 filters. Each filter must be installed into a LT10-05 1 inch diameter, ½ inch length lens tube to be mounted into the filter wheel. The LT10-WR is required to remove the retaining ring of the LT10-05 lens tube to allow a filter to be installed. The LT10-WR and each LT10-05 required for the user's application must be purchased separately.



Figure 29: LT10-05 lens tube (left) and LT10-WR spanner wrench (right)

8.5. CABLES

The USFW-100 is designed to be a direct replacement for all Legacy Oriel filter wheels. The CBL-CSMS-FW and CBL-MS257-FW cables are sold separately and available on Newport’s website. If the USFW-100 is purchased as a replacement to a setup currently integrating the 74010 or 77737 Legacy filter wheels, these cables do not need to be purchased a second time. If a cable is needed, see the table below to confirm which cable is required.

Legacy Filter Wheel	Oriel Monochromator/Spectrograph	Cable Required
74010	CS130 Monochromator	CBL-CSMS-FW
	CS260 Monochromator	
	MS260i Imaging Spectrograph	
77737	MS257 Monochromator	CBL-MS257-FW
	MS257 Spectrograph	

For users intending to control the filter wheel with the included All Wheel Drive Universal Filter Wheel Utility Software, a USB 2.0 cable is required. This cable is available from Newport as part 70044.

9. MAINTENANCE

9.1. CLEANING

Clean the exterior of the USFW-100 when the filter wheel is not hot from use. Use a clean, dry cloth. Ensure that the ventilation holes are not blocked with dust. Vacuum the openings, if necessary, from the outside of the unit.

Do not allow any contaminants or fingerprints to adhere to the filters. Always wear powder-free gloves when handling filters. Handle each filter by holding it by the outside edge only. If a filter becomes contaminated, do not use it before cleaning it. Dry completely before installing. Remove any particulates such as dust using a bulb blower.

When not in use, cover the flanges of the filter wheel to prevent contaminants from entering the housing. Always be sure to remove both covers prior to use.

10. SPECIFICATIONS

10.1. UNIVERSAL FILTER WHEEL

Parameter	Specification
Communication	Control up to two units simultaneously using the following methods: <ul style="list-style-type: none"> • External pushbutton control • PC control via USB 2.0 • Oriel monochromator/spectrograph interface (see Compatible Instruments)
Compatible Instruments	<ul style="list-style-type: none"> • CS130, CS260, MS257 monochromators • MS260i, MS257 imaging spectrographs
Display	<ul style="list-style-type: none"> • LED display indicates active filter position at all times • Display can be turned on/off via included AWD Utility Software
Filter Holding Capacity	6 filter positions selectable via all communication methods except when MS257 monochromator/imaging spectrograph is used-only positions 1-5 can be used with these instruments
Filter Diameter	<ul style="list-style-type: none"> • 1 inch [25.4 mm] • Filter wheel can accommodate Newport filters with frames, such as model 10SWF-500-B
Filter Thickness	0.390 inch [1 mm] min, 0.600 inch [15.24 mm] max
Filter Clear Aperture Diameter	0.875 inch [22.2 mm]
Motor Drive	0.9° per step
Access Time from Filter to Filter	Less than 2.0 s
Accuracy/Repeatability	Better than 0.5° at each location
AC input	90 to 132 and 190 to 264 VAC, 47/63 Hz
Operating Environment	5 °C to 40 °C; < 3000 m Altitude; Indoor Use only; Installation Category II; Pollution Degree 2
Storage Temperature Range:	0 °C to 50 °C, relative humidity does not exceed
Humidity, Relative	80% maximum, non-condensing
Mounting	#8-32 and M4 holes
Size	6.68 x 6.38 x 1.6 inch [169.7 x 162.1 x 40.6 mm] max. 1.5 inch [38.1 mm] max from optical axis to bottom of housing
Weight	4.0 lbs [1.8 kg]
Humidity, Relative	20% to 80%, non-condensing
CE Compliance	EU Directive 2014/30/EU & 2006/95/EC Safety: EN 61010-1:2010 EMC: EN 61326-1:2013
RoHS Compliance	Yes

10.2. UNIVERSAL FILTER WHEEL UTILITY SOFTWARE

Parameter	Specification
Operating System	Microsoft Windows XP, Service Pack 3 Microsoft Windows 7, 32-bit and 64-bit Requires Microsoft .net Framework 4.0
Processor Speed	2 GHz minimum
Random Access Memory (RAM)	1 GB minimum
Peripheral Hardware	USB 2.0 port
Hard Drive Space	800 MB minimum

Note: One USB 2.0 port is required to connect between the computer and one (1) USFW-100 filter wheel. Additional USB ports may be required when controlling other instruments, such as a monochromator, lock-in amplifier, power meter, etc.

11. EU DECLARATION OF CONFORMITY

We declare that the accompanying product, identified with the **CE** mark, complies with requirements of the Electromagnetic Compatibility Directive, 2014/30/EU and the Low Voltage Directive 2006/95/EC.

Model Number:

USFW-100

Year **CE mark affixed:** 2015

Type of Equipment: Electrical equipment for measurement, control and laboratory use in industrial locations.

Manufacturer: Newport Corporation
1791 Deere Avenue
Irvine, CA 92606

Standards Applied:

Compliance was demonstrated to the following standards to the extent applicable:
BS EN61326-1: 2013 “Electrical equipment for measurement, control and laboratory use – EMC requirements” for use in a controlled electromagnetic environment.

This equipment meets the EN55011:2009+A1:2010 Class A Group 1 radiated and conducted emission limits.

BS EN 61010-1:2010, “Safety requirements for electrical equipment for measurement, control and laboratory use”.



Mark Carroll
Sr. Director, Instruments Business
Newport Corporation
1791 Deere Ave, Irvine, CA92606 USA

12. WARRANTY AND SERVICE

12.1. CONTACTING ORIEL INSTRUMENTS

Oriel Instruments belongs to Newport Corporation's family of brands. Thanks to a steadfast commitment to quality, innovation, hard work and customer care, Newport is trusted the world over as the complete source for all photonics and laser technology and equipment.

Founded in 1969, Newport is a pioneering single-source solutions provider of laser and photonics components to the leaders in scientific research, life and health sciences, photovoltaics, microelectronics, industrial manufacturing and homeland security markets.

Newport Corporation proudly serves customers across Canada, Europe, Asia and the United States through numerous international subsidiaries and sales offices worldwide. Every year, the Newport Resource catalog is hailed as the premier sourcebook for those in need of advanced technology products and services. It is available by mail request or through Newport's website. The website is where one will find product updates, interactive demonstrations, specification charts and more.

To obtain information regarding sales, technical support or factory service, United States and Canadian customers should contact Newport Corporation directly.

Newport - Oriel Instruments
1791 Deere Avenue
Irvine, CA 92606 USA

Telephone: 800-222-6440 (toll-free in United States)
949-863-3144

Fax: 949-253-1680

Sales: oriel.sales@newport.com
Technical assistance: oriel.tech@newport.com
Repair Service: rma.service@newport.com

Customers outside of the United States must contact their regional representative for all sales, technical support and service inquiries. A list of worldwide representatives can be found on the following website: <http://www.newport.com/oriel>.

12.2. REQUEST FOR ASSISTANCE / SERVICE

Please have the following information available when requesting assistance or service:

Contact information for the owner of the product.
Instrument model number (located on the product label).
Product serial number and date of manufacture (located on the product label).
Description of the problem.

To help Oriel's Technical Support Representatives diagnose the problem, please note the following:

Is the system used for manufacturing or research and development?
What was the state of the system right before the problem?
Had this problem occurred before? If so, when and how frequently?
Can the system continue to operate with this problem, or is it non-operational?
Were there any differences in the application or environment before the problem occurred?

12.3. REPAIR SERVICE

This section contains information regarding factory service for this product. The user should not attempt any maintenance or service of the system beyond the procedures outlined in this manual. This product contains no user serviceable parts other than what is noted in this manual. Any problem that cannot be resolved should be referred to Oriel Instruments.

If the instrument needs to be returned for service, a Return Material Authorization (RMA) number must be obtained prior to shipment to Oriel Instruments. This RMA number must appear on both the shipping container and the package documents.

Return the product to Oriel Instruments, freight prepaid, clearly marked with the RMA number and it either will be repaired or replaced at Oriel's discretion.

Oriel is not responsible for damage occurring in transit. The Owner of the product bears all risk of loss or damage to the returned Products until delivery at Oriel's facility. Oriel is not responsible for product damage once it has left the facility after repair or replacement has been completed.

Oriel is not obligated to accept products returned without an RMA number. Any return shipment received by Oriel without an RMA number may be reshipped by Newport, freight collect, to the Owner of the product.

12.4. NON-WARRANTY REPAIR

For Products returned for repair that are not covered under warranty, Newport's standard repair charges shall be applicable in addition to all shipping expenses. Unless otherwise stated in Newport's repair quote, any such out-of-warranty repairs are warranted for ninety (90) days from date of shipment of the repaired Product.

Oriel will charge an evaluation fee to examine the product and determine the most appropriate course of action. Payment information must be obtained prior to having an RMA number assigned. Customers may use a valid credit card, and those who have an existing account with Newport Corporation may use a purchase order.

When the evaluation had been completed, the owner of the product will be contacted and notified of the final cost to repair or replace the item. If the decision is made to not proceed with the repair, only the evaluation fee will be billed. If authorization to perform the repair or provide a replacement is obtained, the evaluation fee will be applied to the final cost. A revised purchase order must be submitted for the final cost. If paying by credit card, written authorization must be provided that will allow the full repair cost to be charged to the card.

12.5. WARRANTY REPAIR

If there are any defects in material or workmanship or a failure to meet specifications, notify Oriel Instruments promptly, prior to the expiration of the warranty.

Except as otherwise expressly stated in Oriel's quote or in the current operating manual or other written guarantee for any of the Products, Oriel warrants that, for the period of time set forth below with respect to each Product or component type (the "Warranty Period"), the Products sold hereunder will be free from defects in material and workmanship, and will conform to the applicable specifications, under normal use and service when correctly installed and maintained. Oriel shall repair or replace, at Oriel's sole option, any defective or nonconforming Product or part thereof which is returned at Buyer's expense to Oriel facility, provided, that Buyer notifies Oriel in writing promptly after discovery of the defect or nonconformity and within the Warranty Period. Products may only be returned by Buyer when accompanied by a return material authorization number ("RMA number") issued by Oriel, with freight prepaid by Buyer. Oriel shall not be responsible for any damage occurring in transit or obligated to accept Products returned for warranty repair without an RMA number. Buyer bears all risk of loss or damage to the Products until delivery at Oriel's facility. Oriel shall pay for shipment back to Buyer for Products repaired under warranty.

WARRANTY PERIOD

All Products (except consumables such as lamps, filters, etc.) described here are warranted for a period of twelve (12) months from the date of shipment or 3000 hours of operation, whichever comes first.

Lamps, gratings, optical filters and other consumables / spare parts (whether sold as separate Products or constituting components of other Products) are warranted for a period of ninety (90) days from the date of shipment.

WARRANTY EXCLUSIONS

The above warranty does not apply to Products which are (a) repaired, modified or altered by any party other than Oriel; (b) used in conjunction with equipment not provided or authorized by Oriel; (c) subjected to unusual physical, thermal, or electrical stress, improper installation, misuse, abuse, accident or negligence in use, storage, transportation or handling, alteration, or tampering, or (d) considered a consumable item or an item requiring repair or replacement due to normal wear and tear.

DISCLAIMER OF WARRANTIES: EXCLUSIVE REMEDY

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES. EXCEPT AS EXPRESSLY PROVIDED HEREIN, ORIEL MAKES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, STATUTORY OR OTHERWISE, REGARDING THE PRODUCTS, SOFTWARE OR SERVICES. NEWPORT EXPRESSLY DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE FOR THE PRODUCTS, SOFTWARE OR SERVICES. THE OBLIGATIONS OF ORIEL SET FORTH IN THIS SECTION SHALL BE ORIEL'S SOLE LIABILITY, AND BUYER'S SOLE REMEDY, FOR BREACH OF THE FOREGOING WARRANTY. Representations and warranties made by any person including distributors, dealers and representatives of Oriel / Newport Corporation which are inconsistent or in conflict with the terms of this warranty shall not be binding on Oriel unless reduced to writing and approved by an expressly authorized officer of Newport.

12.6. LOANER / DEMO MATERIAL

Persons receiving goods for demonstrations or temporary use or in any manner in which title is not transferred from Newport shall assume full responsibility for any and all damage while in their care, custody and control. If damage occurs, unrelated to the proper and warranted use and performance of the goods, recipient of the goods accepts full responsibility for restoring the goods to their original condition upon delivery, and for assuming all costs and charges.

Confidentiality & Proprietary Rights

Reservation of Title:

The Newport programs and all materials furnished or produced in connection with them ("Related Materials") contain trade secrets of Newport and are for use only in the manner expressly permitted. Newport claims and reserves all rights and benefits afforded under law in the Programs provided by Newport Corporation.

Newport shall retain full ownership of Intellectual Property Rights in and to all development, process, align or assembly technologies developed and other derivative work that may be developed by Newport. Customer shall not challenge, or cause any third party to challenge the rights of Newport.

Preservation of Secrecy and Confidentiality and Restrictions to Access:

Customer shall protect the Newport Programs and Related Materials as trade secrets of Newport, and shall devote its best efforts to ensure that all its personnel protect the Newport Programs as trade secrets of Newport Corporation. Customer shall not at any time disclose Newport's trade secrets to any other person, firm, organization, or employee that does not need (consistent with Customer's right of use hereunder) to obtain access to the Newport Programs and Related Materials. These restrictions shall not apply to information (1) generally known to the public or obtainable from public sources; (2) readily apparent from the keyboard operations, visual display, or output reports of the Programs; (3) previously in the possession of Customer or subsequently developed or acquired without reliance on the Newport Programs; or (4) approved by Newport for release without restriction.

First printing 2015

© 2015 by Newport Corporation, Irvine, CA. All rights reserved.

No part of this manual may be reproduced or copied without the prior written approval of Newport Corporation.

This manual has been provided for information only and product specifications are subject to change without notice. Any change will be reflected in future printings.

Newport Corporation 1791 Deere Avenue Irvine, CA, 92606 USA