

Oasis Filter Wheel

User Manual

Version 1.2

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1. Product Introduction

Oasis Filter Wheel has the following features:

- Completely flat with 21mm thickness
- Special driving mode and very high accurate repeatable filter position
- Large bearings and stable disc running
- Central screw improves the overall rigidity of the filter wheel
- Completely and easy anti-light-leakage
- Support multiple brands of camera and OAG
- No need to remove the filter disc when connecting the camera with screws
- Support running temperature low to -30°C

The 7x36mm filter wheel is compatible with 36mm/31mm unmounted, and 1.25" mounted filters.

The 7x2" filter wheel is compatible with 2inch mounted filters and 50mm unmounted filters.

Besides, this product has additional features as follows:

- 1、 USB Type-C power supply and data port
- 2、 Support USB HID device interface, driver-free for Operating Systems
- 3、 Support ASCOM interface
- 4、 Support INDI
- 5、 Built-in temperature sensor

Note

Please Do Not remove the filter disc. There is no need to remove the filter disc when connecting cameras etc. The installation of the filter disc requires some skill, and incorrect installation of the disc may affect the accuracy of the filter positioning.

2. Packing list

2.1. Packing list of 7x36mm filter wheel

The 7x36mm filter wheel has the following items as Figure 2-1.



Figure 2-1 7x36mm filter wheel packing list

Descriptions of each component are shown below.

Name	Description
Main body	The main component of this product, which integrates the motor, the control board as well as filter disc etc.
36mm filter frame	Used to install 36mm unmounted filters
Darkening gasket	When using screws to connect cameras or OAGs to the filter wheel, the gasket can be used to shade the gap between the filter wheel and the camera or OAG. This prevents light-leakage between the filter wheel and the camera or OAG.
M48-M42 male adapter	This adapter converts M48 female thread to M42 male thread
M48-M42 female adapter	This adapter converts M48 female thread to M42 female thread
Adapter loosener	This tool can be used to loosen M48-M42 adapters
USB Type A to C Cable	For power supply and data communication
M2 hex key	Used to lock or remove the central screw between the front and back shells

Frame tool	Used to install 36/31mm unmounted filters into the filter frame
Locator	When using screws to connect camera to the filter wheel, use this tool to fix the filter disc in a certain position to make it easier to tighten the screws
Screws	They are used to connect the front and back shells, connect the camera, and plug the screw holes
O-ring belt	It is used for driving the disc by the motor. It is only for backup purposes and does not need to be used by users.

2.2. Packing list of 7x2" filter wheel

The 7x2" filter wheel has the following items as Figure 2-2.



Figure 2-2 7x2" filter wheel packing list

Descriptions of each component are shown below.

Name	Description
Main body	The main component of this product, which integrates the motor, the control board as well as filter disc etc.
Filter mask	Used to install 50mm unmounted filters. They are made of aluminum alloy material
Filter gasket A	Used as a cushioning material between the 50mm unmounted filter and the metal filter mask. This gasket can be used when the thickness of the 50mm unmounted filter is less than 2.5mm
Filter gasket B	Used as a cushioning material between the 50mm unmounted filter and the metal filter mask. This gasket can be used when the thickness of the 50mm unmounted filter is bigger than 2.5mm

Darkening gasket A (Camera side)	When using screws to connect cameras to the filter wheel, this gasket can be used to shade the gap between the filter wheel and the camera. This prevents light-leakage between the filter wheel and the camera.
Darkening gasket B (Telescope side)	When using screws to connect OAG to the filter wheel, this gasket can be used to shade the gap between the filter wheel and the OAG. This prevents light-leakage between the filter wheel and the OAG.
M54-M42 male adapter	This adapter converts M54 female thread to M42 male thread
M54-M42 female adapter	This adapter converts M54 female thread to M42 female thread
M48-M54 adapter	This adapter can be used to connect the telescope and the filter wheel
Adapter loosener	This tool can be used to loosen M54-M42 adapters
USB Type A-C Cable	For power supply and data communication
M2 hex key	Used to lock or remove the central screw between the front and back shells
Locator	When using screws to connect camera to the filter wheel, use this tool to fix the filter disc in a certain position to make it easier to tighten the screws
Screws	They are used to connect the front and back shells, connect the camera, and plug the screw holes
Screwdriver	Used to fix 50mm filter masks with M2 screws
O-ring belt	It is used for driving the disc by the motor. It is only for backup purposes and does not need to be used by users

3. Dimension diagram

3.1. Dimension diagram of 7x36mm filter wheel

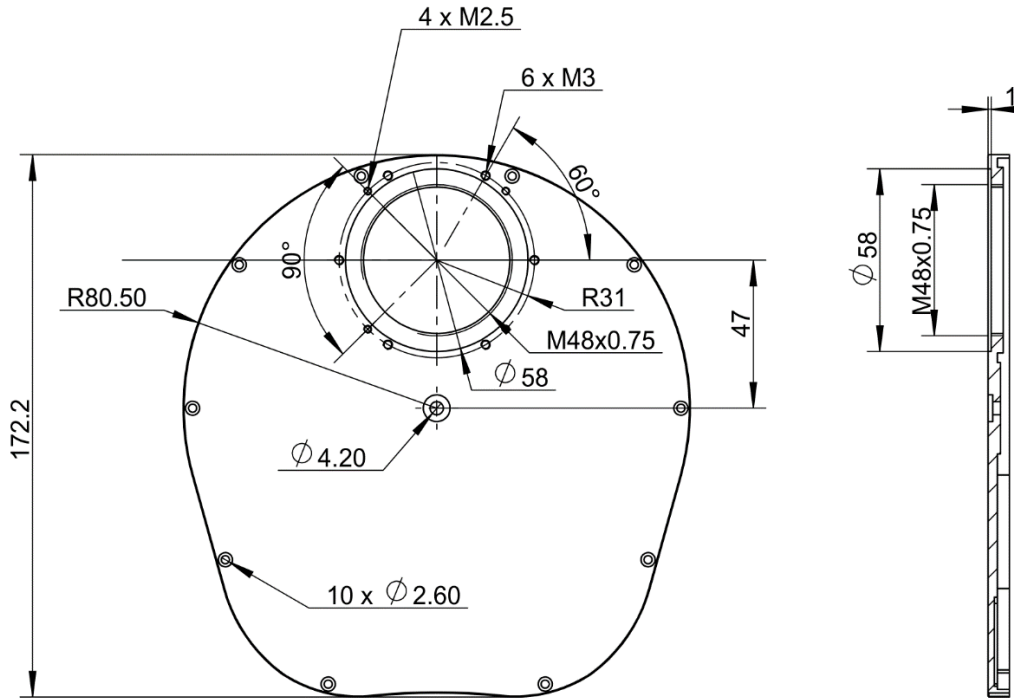


Figure 3-1 Front shell (Telescope side)

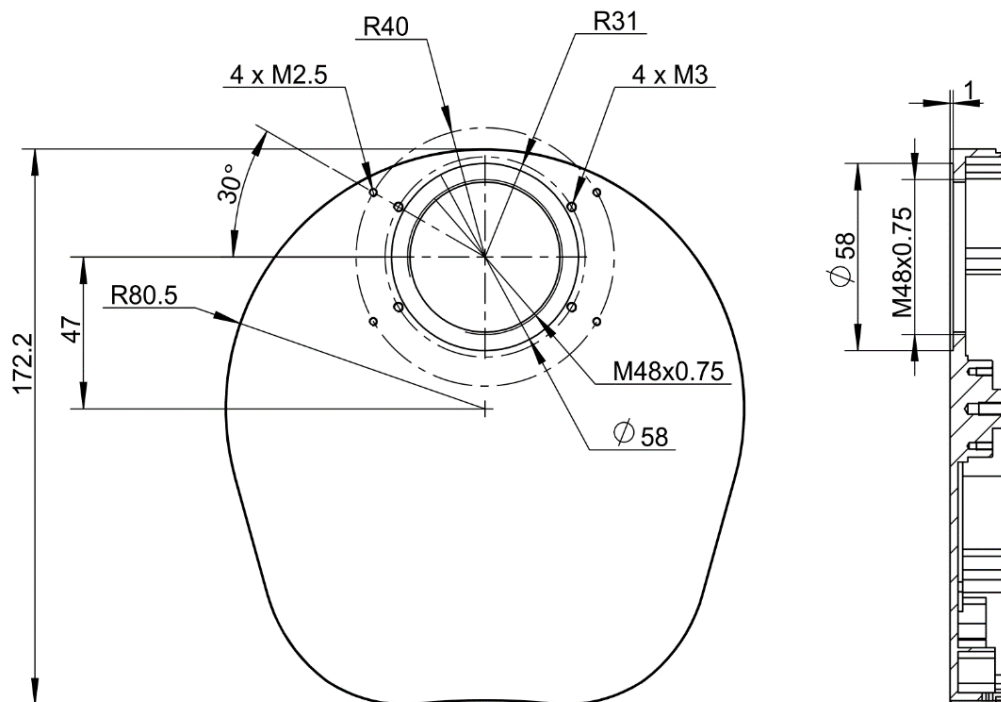


Figure 3-2 Back shell (Camera side)

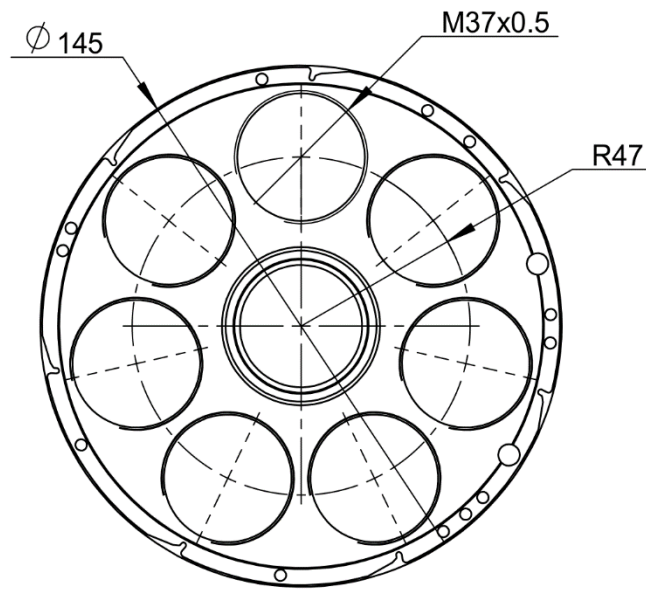


Figure 3-3 Filter disc

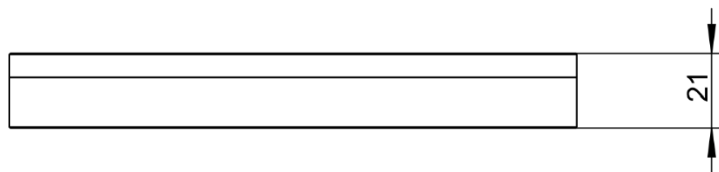


Figure 3-4 Overall thickness

3.2. Dimension diagram of 7x2" filter wheel

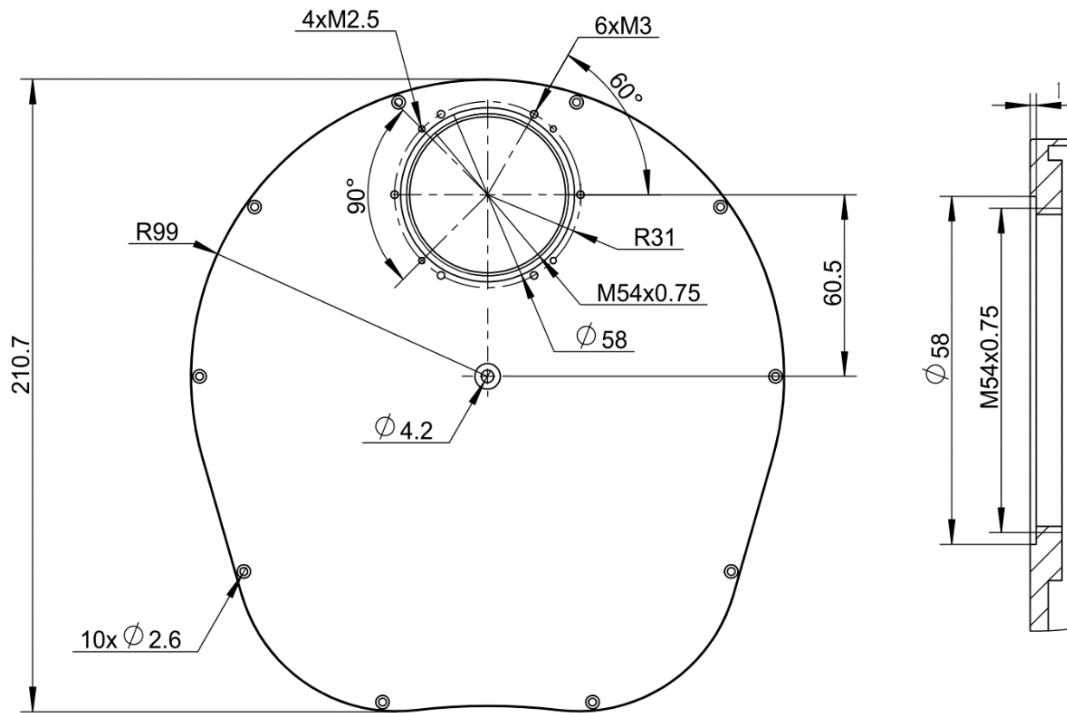


Figure 3-5 Front shell (Telescope side)

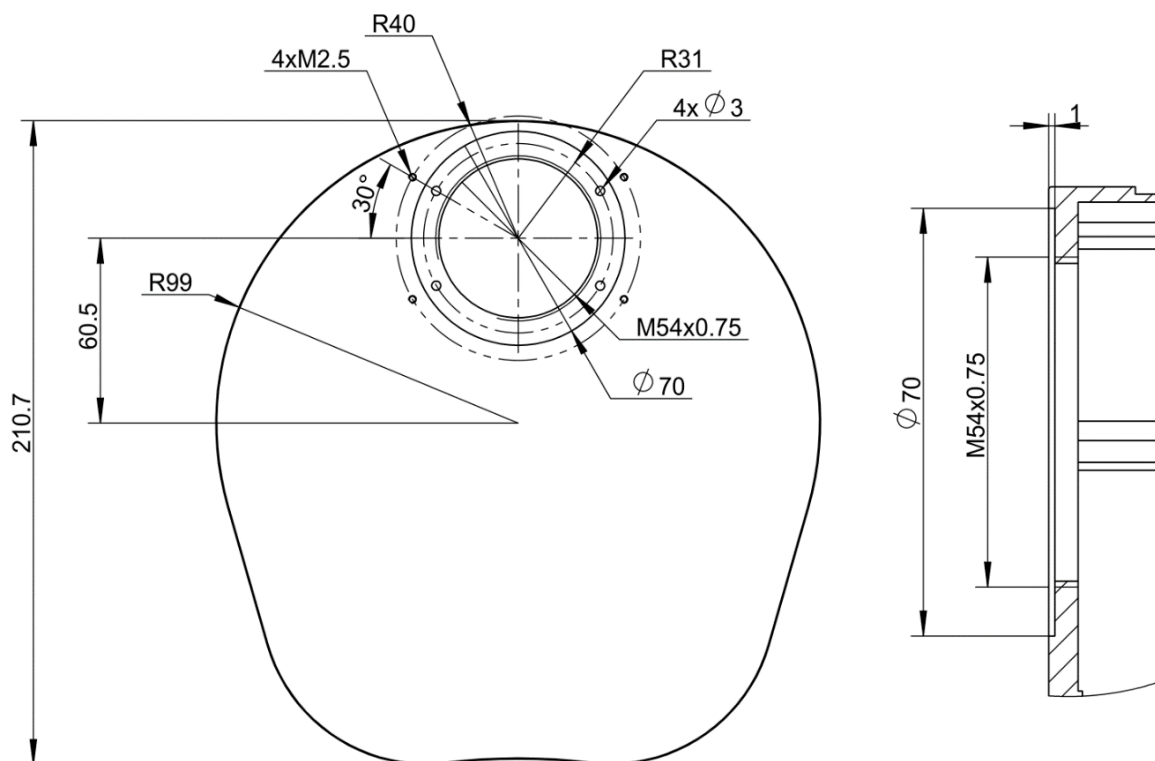


Figure 3-6 Back shell (Camera side)

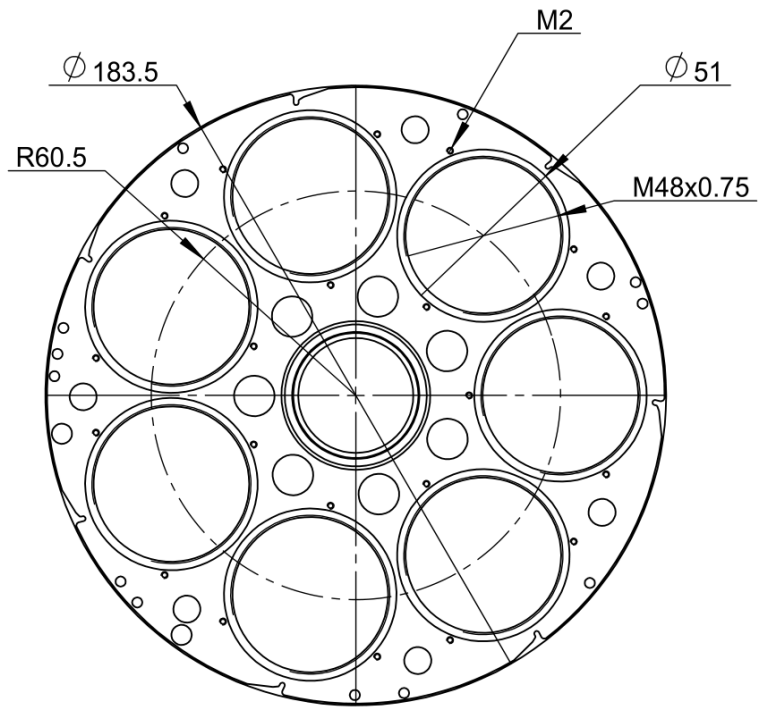


Figure 3-7 Filter disc

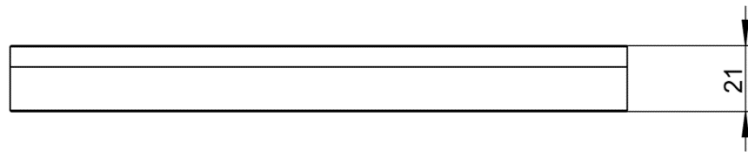


Figure 3-8 Overall thickness

4. Filter installation

4.1. Filter installation on 7x36mm filter wheel

The 7x36mm filter wheel is equipped with dedicated filter frames for 36mm unmounted filters. With the filter frames, the 36mm unmounted filters become mounted filters, just like normal mounted filters. We also provide filter frames for 31mm unmounted filters, and 1.25"-36mm adapter for 1.25" mounted filters.



Figure 4-1 36mm filter frame



Figure 4-2 31mm filter frame (Optional)



Figure 4-3 1.25"-36mm adapter (Optional)

Frame tool can be used to install the filter into the filter frame or remove the filter from the filter frame.



Figure 4-4 Frame tool



Figure 4-5 Filter disc with filters installed

4.2. Filter installation on 7x2" filter wheel

The 2-inch mounted filter can be screwed directly into the filter disc through threads, as shown in Figure 4-6.



Figure 4-6 2" filter installation

50mm unmounted filters can be installed to the filter disc with filter masks (Figure 4-7).



Figure 4-7 50mm filter mask

The filter mask is made of aluminum alloy. In order to prevent the filter mask from damaging the filter, two types of filter gasket are provided. They can be put between the filter and the filter mask.

The depth of the area on the filter disc which holds the 50mm filter is 2.5mm. Gasket A (Figure 4-8) can be used when the filter thickness is less than 2.5 mm, and gasket B (Figure 4-9) can be used when

the filter thickness is bigger than 2.5 mm.

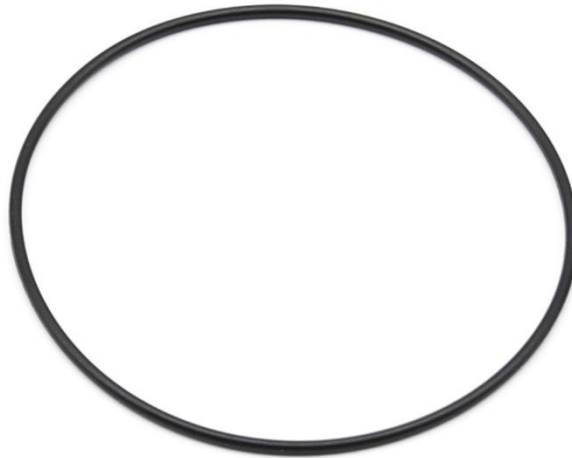


Figure 4-8 Filter gasket A

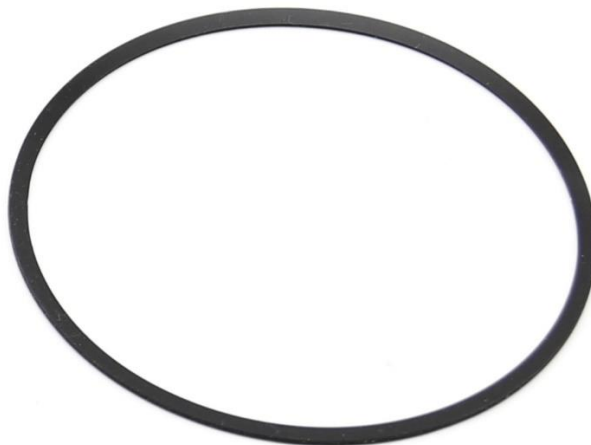


Figure 4-9 Filter gasket B

Figures 4-10 and 4-11 are the installation with filter gasket A and filter gasket B, respectively. Figure 4-12 shows the final effect of the 50mm filter after it is installed.



Figure 4-10 Gasket A used



Figure 4-11 Gasket B used



Figure 4-12 50mm filter installed

4.3. Note

- 1、 We also provide filter frames for 31mm unmounted filters, and 1.25"-36mm adapter for 1.25" mounted filters for the 7x36mm filter wheel. With these frames or adapters, 36mm/31mm unmounted filters, and 1.25" mounted filters can be used simultaneously in a single filter wheel. **Unless otherwise specified, seven 36mm filter frames are included in the filter suit by default, while 31mm filter frame and 1.25" adapter are optional.**
- 2、 When using screws to connect the camera, it is recommended to install the filter into the filter disc after the camera is connected. This helps to prevent the screws or screwdriver from accidentally damaging the filter during the operation of connecting the camera.
- 3、 If the number of filters installed is small, it is recommended to balance the installation position of the filter in the filter disc. This may help improve the stability of the filter disc. For example, if you only have 3 filters in the filter disc, it is recommended to install them separately rather than consecutively. Figure 4-13 is the unrecommended installation position, while Figure 4-14 is the recommended installation position.



Figure 4-13 Unrecommended



Figure 4-14 Recommended

5. Adapter

5.1. Adapter for 7x36mm filter wheel

There is a 1mm depth and 58mm diameter area on both sides of the filter wheel, which can hold the darkening gasket or M48-M42 adapter.

This product is equipped with an M48-M42 male adapter, and an M48-M42 female adapter. Those adapters can be used to connect cameras or telescopes to the filter wheel. The adapters have 1mm thickness.

This product is equipped with an adapter loosener, which can be used to remove adapters from the filter wheel.

Figure 5-1 shows the adapter, adapter loosener, and their installation effect after the adapter is installed on the filter wheel body.



Figure 5-1

5.2. Adapter for 7x2" filter wheel

There is a 1mm depth and 58mm diameter area on the telescope side of the filter wheel, which can hold the darkening gasket.

There is a 1mm depth and 70mm diameter area on camera side of the filter wheel, which can hold the darkening gasket or M54-M42 adapter.

This product is equipped with an M54-M42 male adapter, and an M54-M42 female adapter. Those adapters can be used to connect cameras to the filter wheel. The adapters have 1mm thickness.

This product is equipped with an adapter loosener, which can be used to remove adapters from the filter wheel.

This product is also equipped with an M48-M54 adapter, which can be used to connect telescopes to the filter wheel. The adapters have 16.5mm thickness.

Figure 5-2 shows the adapter, adapter loosener, and their installation effect after the adapter is installed on the filter wheel body.



Figure 5-2

6. Connecting camera with screws

6.1. Screw hole introduction

Please use the back shell (camera side) of the filter wheel to connect the camera. There are two sets of screw holes or through holes on the back shell. Those holes are listed in the following table.

Filter wheel model	Hole Spec.	Type	Position	Amount	Relative Angle
7x36mm	M3	Screw hole	R31	4	60°/120°
7x2"	Φ3	Through hole			
7x36/7x2"	M2.5	Screw hole	R40	4	60°/120°

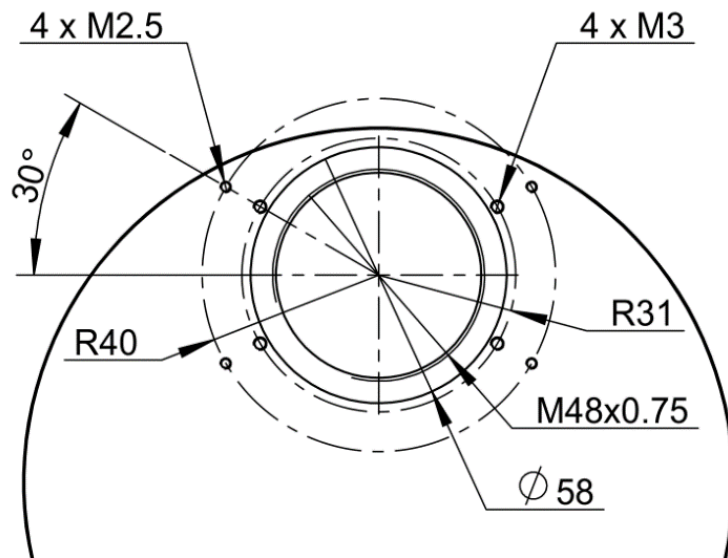


Figure 6-1 Back shell of 7x36mm filter wheel (Camera side)

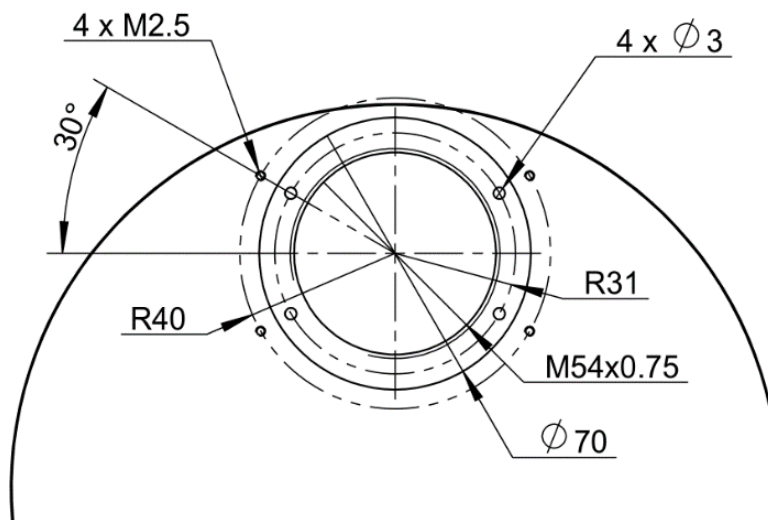


Figure 6-2 Back shell of 7x2" filter wheel (Camera side)

Since both the holes on camera and the filter wheel are screw holes (except for the holes at R31 position of 7x2" filter wheel), the camera and the filter wheel can not be connected properly with normal screws. So we use special half-thread screws (Figure 6-3) to connect cameras.



Figure 6-3 M2.5 and M3 half-thread screws

Note:

Please Do Not remove the filter disc during camera connection. There is no need to remove the filter disc when connecting camera. The installation of the filter disc requires some skill, and incorrect installation of the disc may affect the accuracy of the filter positioning.

6.2. Steps of connecting the camera

Before installation, please turn off the power of the filter wheel, that is, unplug the USB cable.

- 1、 It is recommended to remove the filter from the filter disc before using screws to connect the camera. This helps avoid accidental damage to the filter by screws or screwdrivers during the operation.
- 2、 1) If the 7x36mm filter wheel is used, then turn the filter disc counterclockwise so that the filter disc reaches a specific position where we can see the two R31 screw holes through the two holes on the filter disc which are near the disc edge.

When the filter disc reaches this position, insert the locator into the second hole of the three-hole group and fix the locator into a small hole at the corresponding position of the back shell to prevent the filter disc from moving, as shown in Figure 6-4.

If the locator does not fit into the small hole of the back shell, please slightly rotate the filter disc clockwise or counterclockwise to adjust it.

When using the screw hole at R31 to connect the camera, the screw and screwdriver can be threaded through the two holes on the filter disc to connect the camera.



Figure 6-4

2) If holes at R31 of the 7x2" filter wheel are used to connect the camera, just turn the filter disc counterclockwise so that we can see the $\Phi 3$ through hole at R31 through any small hole of the filter disc, as shown in Figure 6-5 and 6-6.



Figure 6-5



Figure 6-6

3) If the holes at R40 of 7x2" filter wheel are used to connect the camera, then turn the filter disc counterclockwise so that the filter disc reaches a specific position where we can see the two R40 screw holes through the two holes on the filter disc which are near the disc edge.

When the filter disc reaches this position, insert the locator into the second hole of the three-hole group and fix the locator into a small hole at the corresponding position of the back shell to prevent the filter disc from moving, as shown in Figure 6-7.

If the locator does not fit into the small hole of the back shell, please slightly rotate the filter disc clockwise or counterclockwise to adjust it.

When using the screw hole at R40 to connect the camera, the screw and screwdriver can be threaded through the two holes on the filter disc to connect the camera.



Figure 6-7

- 3、Put a darkening gasket between the 1mm depth area of the back shell and the camera to prevent light leakage. 3 or 4 pieces of double-sided tape can be used to glue the darkening gasket to the back shell for easy operation.
- 4、Depending on the model of the camera you are using, use the M2.5 or M3 half-thread screws to connect the camera. When connecting the camera with screws through the hole at R31 of 7x2" filter wheel, regular M2.5 or M3 screws instead of half-thread screws can be used.

Note:

1. When using the 7x36mm filter wheel with M3 half-thread screws through the M3 screw hole at R31, or M2.5 half-thread screws through the M2.5 screw hole at R40 to connect the camera, the 4 screws need to be tightened slowly and synchronized.
2. When using the 7x36mm filter wheel with M2.5 half-thread screws through the M3 screw hole at R31 to connect the camera, the 4 screws don't need to be synchronized when they are being tightened.
3. When using the 7x2" filter wheel with M2.5 half-thread screws through the M2.5 screw hole at R40 to connect the camera, the 4 screws need to be tightened slowly and synchronized.
4. When using the 7x2" filter wheel with M3 or M2.5 screws through the $\Phi 3$ through hole at R31 to connect the camera, the 4 screws don't need to be synchronized when they are being tightened.

7. Connecting OAG with screws

7.1. Screw hole introduction

Please use the front shell (telescope side) of the filter wheel to connect the camera. There are two sets of screw holes on the front shell. Those holes are listed in the following table.

Position	Hole Spec.	Type	Amount	Relative Angle
R31	M3	Screw hole	6	60°
R31	M2.5	Screw hole	4	90°

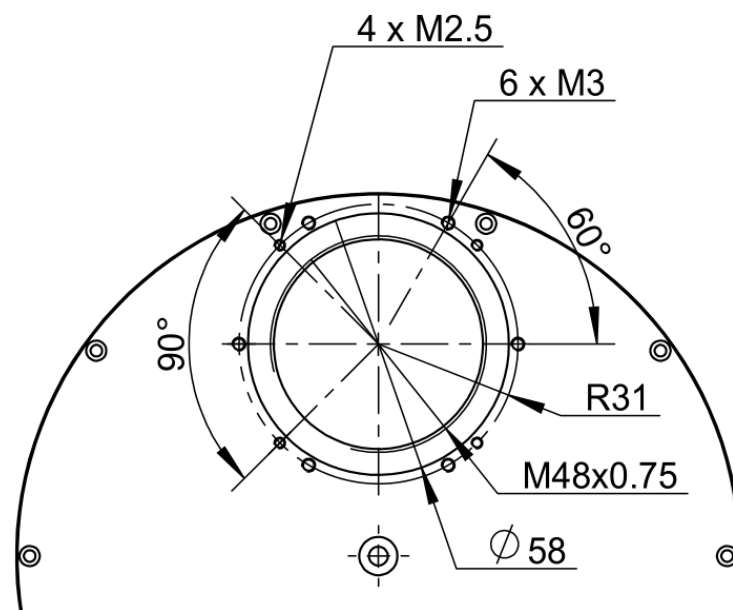


Figure 7-1 Front shell of 7x36mm filter wheel (Telescope side)

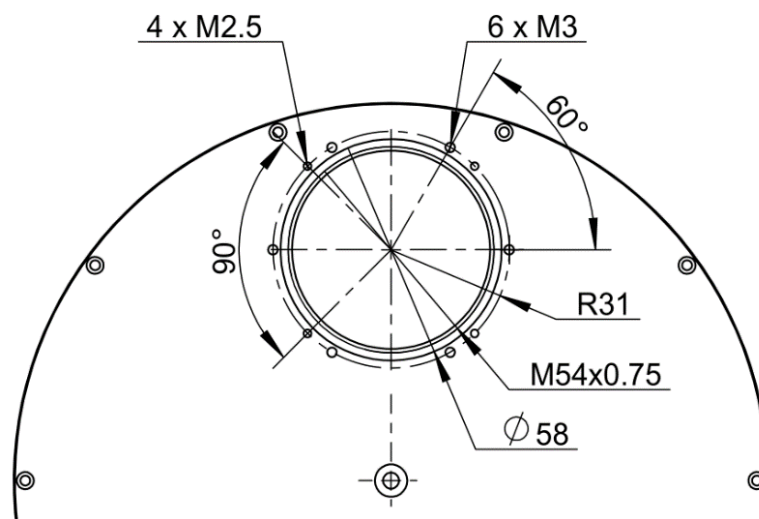


Figure 7-2 Front shell of 7x2" filter wheel (Telescope side)

When connecting the OAG, screw the OAG and the filter wheel from the OAG side. Due to the different screw lengths used for different OAGs, we do not provide screws for connecting the OAG and the filter wheel. Please use the M2.5 or M3 screws supplied by the OAG manufacturer to connect the OAG to the filter wheel.

7.2. Steps of connecting the OAG

- 1、 Put a darkening gasket between the 1mm depth area of the front shell and the OAG to prevent light leakage. For the 7x36mm filter wheel, choose to use darkening gasket A or darkening gasket B as needed (e.g. depending on the type of OAG). For 7x2" filter wheel, use darkening gasket B. Figures 7-3, 7-4, and 7-5 show the effect of using a darkening gasket.
- 2、 Depending on the model of OAG you are using, use M2.5 or M3 screws to connect the OAG to the filter wheel from the OAG side.



Figure 7-3 7x36mm filter wheel, darkening gasket A used



Figure 7-4 7x36mm filter wheel, darkening gasket B used



Figure 7-5 7x2" filter wheel, darkening gasket B used

8. Hole-protecting screws

When part or all of the screw holes for camera/OAG connecting are not in use, hole-protecting screws can be used to screw these holes from the inside of the filter wheel to prevent light leakage from these screw holes.

Note: The screw holes at R31 of the back shell of the 7x2" filter wheel are through holes. They are located in the 1mm depth area and can be protected by the darkening gasket. So, there is no need to use hole-protecting screws for them.

8.1. Type of the screw hole

The screw holes are divided into two types, one of which is countersunk holes, as shown in Figure 8-1. The other type is not countersunk holes, as shown in Figure 8-2.



Figure 8-1 Countersunk holes



Figure 8-2 Not countersunk holes

8.2. Countersunk screws for hole-protecting

The back shell of the filter wheel, as well as the front shell of some versions of filter wheel, have countersunk screw holes. For those screw holes, M2.5x3 or M3x3 countersunk screws can be used to protect the holes, as shown in Figure 8-3.



Figure 8-3 M2.5 (left) and M3 (right) countersunk screws

Figure 8-4, Figure 8-5, and Figure 8-6 show the effect of protecting the screw holes with countersunk screws.



Figure 8-4



Figure 8-5



Figure 8-6

8.3. Flat-head screws for hole-protecting

For some filter wheel front shell, there are no countersunk heads in the screw holes (Figure 8-2). For those screw holes, we can use M2.5x4 or M3x4 thin flat-head screws to protect the holes, as shown in Figure 8-7.



Figure 8-7 M2.5 (left) 和 M3 (right) flat-head screws

Figure 8-8 shows the effect of protecting those screw holes with flat-head screws.



Figure 8-8

9. Software installation

Oasis Filter Wheel has a USB Type C port (Figure 9-1). It is both a power supply port and a USB data communication interface. The USB cable used can be either Type A or Type C for the USB host side



Figure 9-1

9.1. Using Oasis Filter Wheel with Windows

Oasis filter wheel can be connected to a PC via a USB cable and is implemented as an HID device, which is automatically recognized on a Windows PC without the need to install drivers.

In order to use Oasis Filter Wheel in applications that support ASCOM, please download and install its ASCOM driver.

Please follow the steps below to download and install the ASCOM driver and test the filter wheel:

- 1、 Download Oasis Filter Wheel ASCOM driver at <https://www.astroasis.com/en/download> and install the driver after download completes.
- 2、 Connect the filter wheel to Windows PC using USB cable.
- 3、 Open an astronomical application software that supports ASCOM interface, such as Sharpcap, Sequence Generator Pro, NINA etc.
- 4、 Take Sequence Generator Pro as an example. After ASCOM driver is successfully installed, there will be "Oasis Filter Wheel" item in the ASCOM FilterWheel drop-down selection list as shown in Figure 9-2. Select "Oasis Filter Wheel" and then click "Properties" button, the setup dialog will appear as shown in Figure 9-3. Then you can click the filter buttons to change the current filter. You can also test other functions such as calibrating and restoring factory settings.

Note

Oasis Filter Wheel software performs calibration automatically when the calibration is needed. So normally you don't need to perform calibration manually by clicking "Calibrate" button.

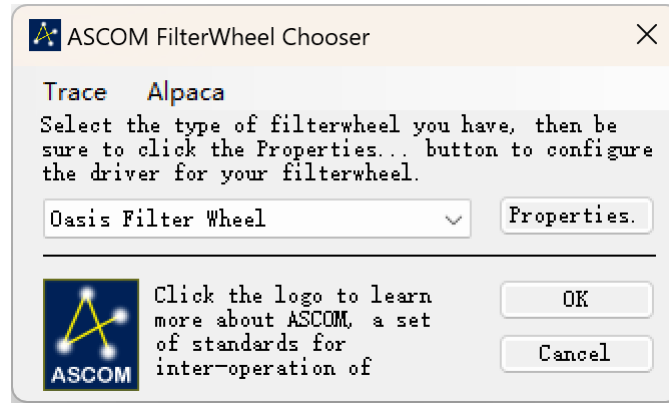


Figure 9-2

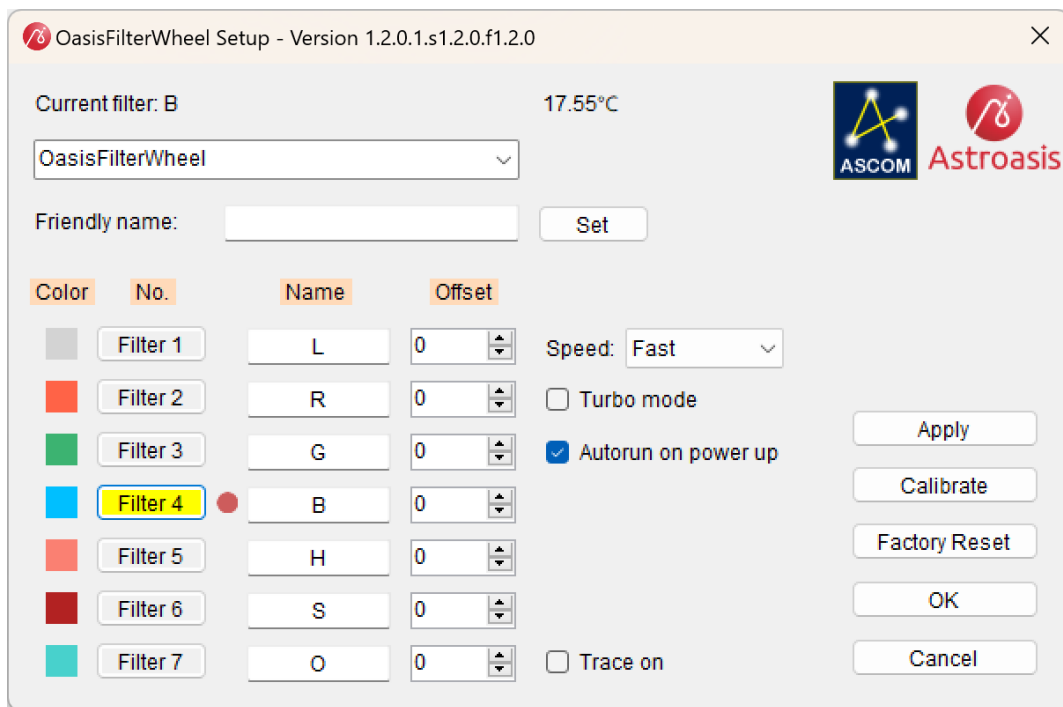


Figure 9-3

9.2. Using Oasis Filter Wheel in INDI

Oasis Filter Wheel supports INDI. After INDI server and INDI client application such as KStars are installed and start up, you can start using the Oasis Filter Wheel in INDI.