# IOP

User manual

angénieux®

# Miscellaneous

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Before using the products described in this manual, be sure to read and understand all respective instructions. This instruction manual applies to all Optimo Prime lenses and IOP tooling set. Please also refer to Optimo Prime lenses user manual available on our website: https://www.angenieux.com/service-and-support/#downloads

# Foreword

Congratulations on the purchase of Angénieux Optimo Prime lenses and IOP tooling set. After 50 years almost fully dedicated to high-end zoom lens design and production, Angénieux chose the Cannes Film Festival to announce a complete set of high-end Full Frame Prime lenses – the Optimo Prime series, in partnership with Band Pro Film & Digital, Inc and Jebsen Industrial Technology Co LTD.

The Optimo Prime series of 12 lenses provides full frame 46.3mm image circle coverage with a consistent 1.8 T-stop for most of the lenses. To match with the legacy Optimo zooms, all Optimo Primes have identical colorimetry. Available with PL mount the Optimo Primes are the perfect companion for your digital camera. They can also be configured with LPL mount as an option.

**IMPORTANT:** Please be aware that Optimo Prime lenses won't fit on a camera with a reflex view finder.

All lenses support Cooke/i and are ARRI LDS2 ready; and offer a common gear size and position for all lenses in the 12-lens set.

The Optimo Prime series is composed of a total of 12 focal lengths with 18mm, 21mm, 24mm, 28mm, 32mm, 40mm, 50mm, 60mm, 75mm, 100mm, 135mm and 200mm.

Last but not least we allow you to go further than the standard Optimo Prime configuration to serve your creativity by using our unique Integrated Optical Palette (IOP) technology. This includes three methods to achieve your own personalized look with iris blade unit for different bokeh (including anamorphic effect), internal optical element and rear optical filter.

This user manual describes the different configurations and uses of your Optimo Prime IOP tooling set. If you need additional information don't hesitate to contact us at angenieuxservice@fr.thalesgroup.com. Additional product documentation is available on the Angénieux website at the service and support page: https://www.angenieux.com/service-and-support/.



# Infinite possibilities with IOP (Integrated Optical Palette) technology

**OPTIMO PRIME SERIES**



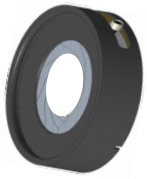

**IOP Inner filter (afocal area)**

Diffusion, vintage look, flares…



**IOP Iris sub assembly**

Various blade options



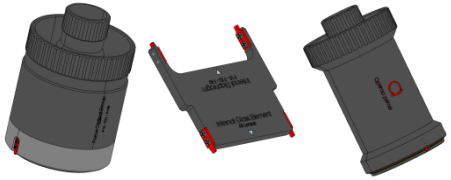
**IOP Rear filter**

Diffusion, vintage look, …



**IOP Tooling set**

To access to all inner IOP parts



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**CAUTION**

Always follow these guidelines to ensure against injury to yourself or others and damage to the system or other objects.

- This safety information comes in addition to the product specific operating instructions in general and must be strictly observed for safety reasons.
- Read and understand all safety and operating instructions before you operate or install the lens.
- Do not use accessories or attachments that are not recommended by Angénieux, as they may cause hazards and invalidate the warranty.
- Do not attempt to repair any part of the system! Repairs must only be carried out by authorized Angénieux Service Centers.
- Do always use a clean area to open any Optimo Prime lenses to prevent from dust pollution
- Do always perform IOP elements swapping using only the IOP spanners

**WARNINGS**

- Handle any lens with care.
- Do not expose lens to water or moisture.
- Do not subject the lens to severe shocks.
- Never insert objects of any kind into any part of the lens if these are not clearly qualified for the task in the manual.
- Do not remove any paint marked screws.
- Changing camera lenses should be done in a dry and dust-free environment. If this is not possible, take extra care that no dust enters the camera while the lens is off.
- Keep the protective caps on the lens when not set on camera or not in operation.
- Follow the cleaning instructions in this manual to avoid damage of the lens.
- Do not look at high intensity light directly through any lens.

## STORAGE CONDITIONS

- Store any lens in a dry place where the temperature does not exceed –40°C and +70°C (- 40°F and + 158°F).
- Do not store the lens in places where it may be subject to extreme temperatures, direct sunlight, high humidity, severe vibration, or strong magnetic fields.
- Condensation: When moving the lens from a cold to a warm location or when the lens is used in a damp environment, condensation may appear on glass surfaces and on internal or external electrical connections. Operating the lenses while condensation is present may result in damage to the equipment. Condensation on the optical components may have a visible effect on the output images. To prevent condensation, store the lens in a dry area. If the lens is in a humid area, dry it and store it a plastic bag with desiccant before using it. After moving the lens from cold to warm and humid environment, wait for some time for the lens to warm up to the ambient temperature to avoid condensation.

## TEMPERATURE OF OPERATION

- Any lens is designed to be used between - 20°C and + 45°C (- 4°F and + 113°F).
- The opto-mechanical design is passively athermalized. It allows Optimo Primes to prevent from a back focus shift with temperature changes.

## RECYCLING AND ENVIRONMENT

- Optimo Prime series and IOP tooling set are free of chemical substances covered by European Regulation REACH in excess of the thresholds set out. Follow the guidance sets up by your local authority for recycling the Optimo Prime lenses or the IOP tooling set.

# 1 - What’s in the box




5 spanners, 2 optical element holders, extra screws

and extra pins all within a dedicated transport case



In case you require any assistance or noticed a missing or broken item please contact our service team at: angenieuxservice@fr.thalesgroup.com

# 2 - General lens IOP configuration

| Focal length | 18 mm | 21 mm | 24 mm | 28 mm | 32 mm | 40 mm | 50 mm | 60 mm | 75 mm | 100 mm | 135 mm | 200 mm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Front ring | 4 screws | 8 screws | 8 screws | 8 screws | SPANNER 66067078AA | SPANNER 66067078AA | SPANNER 66067078AA | SPANNER 66067078AA | SPANNER 66067078AA | SPANNER 66067078AA | SPANNER 66067078AA | - |
| Front engraved ring | 4 screws | 6 screws (1) | 6 screws (1) | 6 screws (1) | 6 screws (1) | 6 screws (1) | 6 screws (1) | 6 screws (1) | 6 screws (1) | 6 screws (1) | 4 screws | - |
| Front group (Holder 66067062AA) | 8 screws | 8 screws | 4 screws and SPANNER 66067102AA | 8 screws and SPANNER 66067102AA | 6 screws and SPANNER 66067102AA | 6 screws and SPANNER 66067102AA | 6 screws and SPANNER 66067102AA | 4 screws and SPANNER 66067102AA | 4 screws and SPANNER 66067102AA | 4 screws and SPANNER 66067102AA | 8 screws | - |
| Focus group (Spanner 66067115AA and Holder 66067075AA) | YES | YES | NO | NO | NO | NO | NO | NO | NO | NO | YES | NO |
| Filter retainer (Spanner 66067121AA) | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Filter barrel (Spanner 66067121AA) | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Filter diaphragm (Spanner 66066961AA) | YES | NO | NO | NO | YES | YES | NO | NO | NO | NO | NO | NO |
| Filter (Spanner 66066961AA) | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Iris (Spanner 66067121AA) | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |

(1) : NOT MANDATORY TO REMOVE BUT EASE THE FRONT GROUP SCREWS ACCESSIBILITY AND FRONT GROUP REMOVING

# 3 - General IOP element swapping procedure

## Step 1



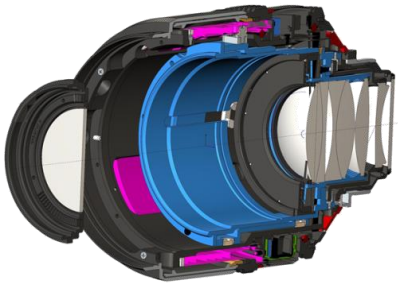
Front ring removal

## Step 2



Front group removal
Focus group removal F18-F21-F135

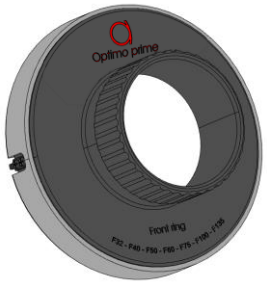
## Step 3



Internal glass element
Iris removal

## NECESSARY TOOLS

Front ring spanner
F32 to F135



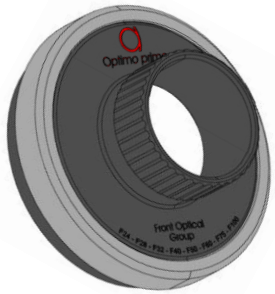
Or Philipps screwdriver
F18 to F28



Philipps screwdriver
F18 to F28



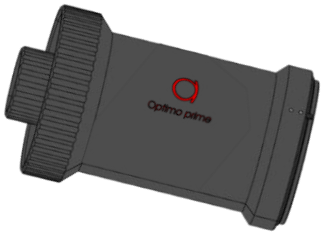
And front group spanner
F24 to F100



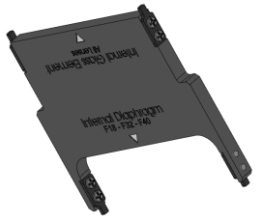
And Focus group spanner
F18-F21-F135



IOP element spanner



And Internal glass side



And Internal diaphram side
F18-F32-F40



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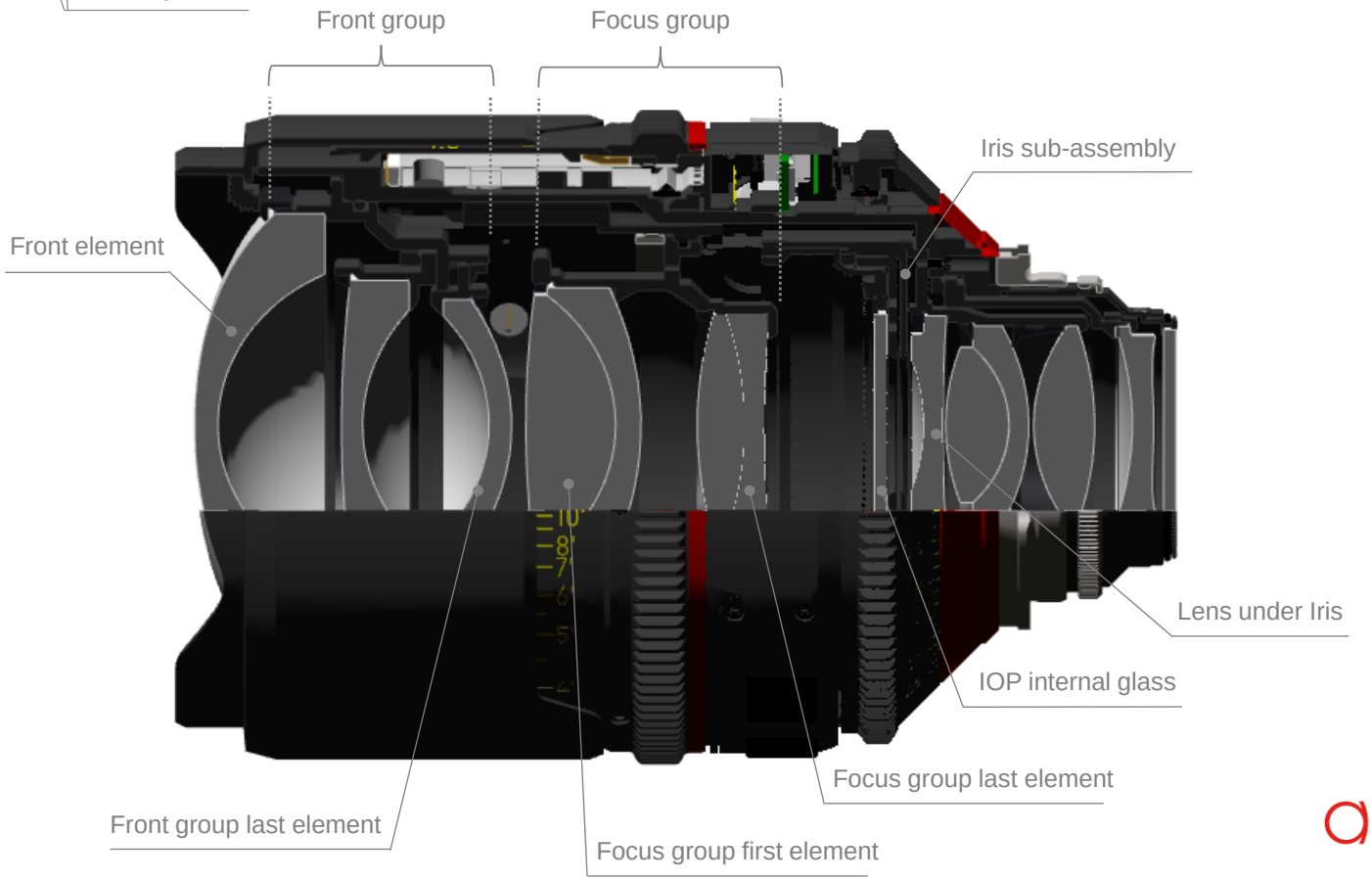
3 - Font engraved ring
2 - Front element
1 - Front ring
Front ring screws


Front group screw
Front engraved ring screw
Front group screws


Front group
Focus group
Iris sub-assembly
Front element
Lens under Iris
IOP internal glass
Focus group last element
Front group last element
Focus group first element

# 4 - Spare parts and optional accessories

| COMMON SPARE PARTS | |
|---|---|
| IOP tooling set | 66067558AA |
| Front ring spanner – only for F32-F40-F50-F60-F75-F100-F135 | 66067078AA (pins fixed with long screws 0981997) |
| Front group spanner – only for F24-F28-F32-F40-F50-F60-F75-F100 | 66067102AA |
| Front group holder | 66067062AA |
| Focus group spanner | 66067115AA ( pins fixed with short screws 0982007) |
| Focus group holder – only for F18-F21-F135 | 66067075AA |
| IOP element spanner | 66067121AA ( pins fixed with short screws 0982007) |
| IOP filter spanner | 66066961AA ( pins fixed with both short and long screws 0982007 and 0981997) |
| Focus group retainer – only for F18-F21-F135 | 400006353 |
| IOP clear filter | 66067677AA |
| IOP filter retainer | 400002896 |
| Screws for spanners pins | 0981997 (long) and 0982007 (short) |
| Spanner Pins | 66067081AA |
| Screws for front ring - only for F18, F21, F24, F28 (x8) | 33-000044 |
| Screws for front engraved ring | 33-000072 |
| Screws for front group | 33-000043 for F21, F32, F40, F50, F60<br>33-000044 for F18, F24, F28, F135<br>33-000072 for F75<br>33-000045 for F100 |

| SPECIFIC SPARE PARTS | F18 | F21 | F24 | F28 | F32 | F40 | F50 | F60 | F75 | F100 | F135 | F200 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) - Font ring | 400005236 | 400005165 | 400006623 | 400005012 | 400004602 | 400002944 | 400003584 | 400003584 | 400003584 | 400004816 | 400002685 | - |
| (2) - Front element | 324981 | 324767 | 66066951AA | 324766 | 324739 | 323806 | 324696 | 66066234AA | 324648 | 66066449AA | 324482 | 66066925AA |
| (3) –Last element of front group | 324983 | 324534 | 66066970AA | 323945 | 324743 | 323810 | 324692 | 66066243AA | 324655 | 66066463AA | 324471 | 66066932AA |
| (5) – Focus group front element | 324976 | 324536 | - | - | - | - | - | - | - | - | 324485 | - |
| (6) – Focus group last element | 324977 | 324543 | - | - | - | - | - | - | - | - | 324485 | - |
| (8) – Filter diaphragm | 400005179 | - | - | - | 400004672 | 400002708 | - | - | - | - | - | - |
| (9) – Filter barrel | 400004674 | 400003568 | 400003568 | 400002913 | 400004674 | 400002837 | 400003568 | 400003568 | 400004678 | 400004807 | 400002913 | - |
| (11) Standard Iris sub-assembly 9 blades | 400003742 | 400003742 | 400004599 | 400004412 | 400004599 | 400004018 | 400004599 | 400004599 | 400004599 | 400004412 | 400004412 | 400004412 |
| (12) Lens under Iris | 324978 | 324545 | 66066971 | 323947 | 324854 | 323818 | 324693 | 66066245 | 324644 | 66066454 | 324478 | 66066944AA |

# 5 – IOP element replacement

## ADDITIONAL TOOLS

In addition to your IOP tooling set you will need a Phillips screwdriver to remove the front rings, front engraved rings and front optical group holding screws. As an example we are using in factory the Phillips screwdriver VESSEL 9900 P.00-75. You will need also a pair of tweezers to pick accurately the screws you are removing to prevent any damage or screw drop.

**CAUTION:** as you are opening the product, this operation must be done with cautious in a clean environment to prevent dust or particles pollution inside the lens. We advise you to wear adapted gloves to leave no traces on the optical elements and mechanics.

**CAUTION:** when you are removing the screws holding the front rings or the front group, be cautious to secure the screws removing using a pair of tweezers to prevent from any drop on the front lens. Remove with cautious the retainers using your hand and a pair of tweezers to prevent from any drop or damage.

**CAUTION:** before removing a ring, a retainer or an element, do always check the thread or element cleanliness. If necessary, clean the thread or mechanical element blowing dry air and using a soft brush. For optical elements, blow dry air and do always use a soft optical cloth and an isopropyl alcohol liquid starting with the center and cleaning by turning outwards.

**CAUTION:** when putting back the focus or front group, we recommend blowing dry air onto the two side lenses of the optical sub-assembly. Don’t do this above the opened Optimo Prime lens to prevent from dust pollution. In case you need to clean a lens, do always use a soft optical cloth and an isopropyl alcohol liquid starting with the center and cleaning by turning outwards.

**CAUTION:** when putting back a retainer or a threaded front ring, check the thread cleanliness and clean the thread or mechanical element blowing dry air and using a soft brush. To be sure the thread fits perfectly, rotate the part you are putting back anti-clockwise with the hands or a pair of tweezers so it falls in the correct thread position before tightening it. Do not apply any strong torque and check if the element is rotating easily before tightening clockwise. You may put a very small amount of mechanical grease all around in the thread if you note some mechanical friction.

**CAUTION:** be cautious to handle all the elements you are removing or putting back with a maximum care. Do always respect the pin orientation on the elements you are putting back when there is one.

**CAUTION:** never use strong torque to tighten or untighten an element with any spanner. If you apply too much torque the spanner pins may break. If so this is not normal and either you applied too much torque than necessary or your lens may have been damaged or modified by someone. You have extra pins for replacement in those cases but we recommend contacting your local reseller or our service team at angenieuxservice@fr.thalesgroup.com.

**IMPORTANT:** do always use the dedicated Angenieux IOP spanners provided in the IOP tooling set and never use excessive torque to tighten the retainers, rings or screws. In case you require assistance or have any doubt doing an IOP element swapping and before damaging something, please contact your local reseller or our service team at angenieuxservice@fr.thalesgroup.com.

## STEP 1: REMOVE THE FRONT RING

THE BELOW PROCEDURE APPLIES FOR F18-F21-F24-F28:

0 - Remove the front cap.

1 - Untighten the front ring screws with an adapted size Phillips screwdriver.

2 - Remove one by one each screws with cautious and securely using a pair of tweezers.

3 - Remove the front ring with the hands or a pair of tweezers.

**TIP:** after removing the screws you can also take of the front ring by maintaining it and flipping the Optimo Prime upside down and catch the front ring with your hands. Do not hold the lens by the rear cap.



1



2



3

THE BELOW PROCEDURE APPLIES FOR F32-F40-F50-F60-F75-F100-F135:

0 - Remove the front cap.

1 - Put in position the front ring spanner 66067078AA by rotating it left or right so the two pins fit perfectly with the front ring holes.

2 - Untighten the front ring with the front ring spanner.

3 - Remove the spanner.

4 - Remove the front ring with the hands or a pair of tweezers.

**TIP:** if the front ring is not totally untightened you can finish untightening it with your hands or a pair of tweezers. You can also take of the front ring by flipping the Optimo Prime upside down and catch the front ring with your hands. Do not hold the lens by the rear cap.




1




2




4 - by hands from the front or upside down

## STEP 2: REMOVE THE FRONT ENGRAVED RING

This step is mandatory for F18-F135 and F200.

**IMPORTANT:** even if for the rest of the Optimo Prime series this step is not mandatory, the front group and front group screws access is easier when the front engraved ring is removed. See below the two pictures on the right showing the front group screws accessibility differences. We recommend removing the front engraved ring systematically to reduce risks of screw drop and secure the front group repositioning.

The below procedure applies for all Optimo Primes. Only the number of screws varies. Screws are silver Phillips type.

1 - Untighten the front engraved ring screws with an adapted size Phillipps screwdriver and remove them one by one with cautious and securely using a pair of tweezers.

2 – Pull out straightly the front engraved ring.



1



2



Front group screws access with and without front engraved ring

## STEP 3A: REMOVE THE FRONT GROUP

THE BELOW PROCEDURE APPLIES FOR F24-F28-F32-F40-F50-F60-F75-F100

1 - Untighten and remove the front group screws one by one with cautious and securely using a pair of tweezers. Screws are black Phillips type.

2 - Put in position the front group spanner 66067102AA and rotate it anti-clockwise so it falls in the correct thread position.

3 - Rotate clockwise the front group spanner up to the end-stop. Do not apply more torque after you reached the end-stop.

4 - Pull out straightly the front group. As there is an o-ring around the front group mechanics you need to pull out with enough force.

5 - Put in a secure area the front group with the spanner on onto the front group holder 66067062AA.



Front group screws location on F50



3



4



5

THE BELOW PROCEDURE APPLIES FOR F18-F21-F135

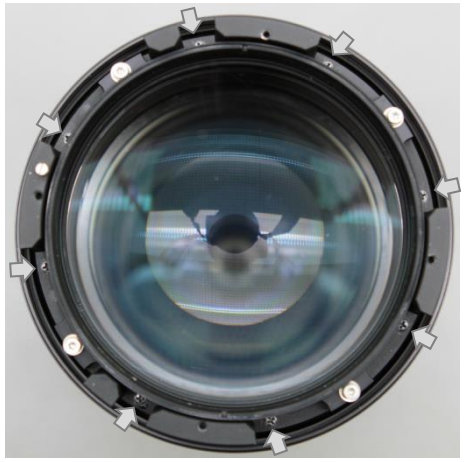
1 - Untighten and remove the front group screws one by one with cautious and securely using a pair of tweezers. Screws are black Phillips type.



F18 Front group screws location



F21 Front group screws location



F135 Front group screws location

2 - Pull out straightly with cautious the front group with your hands. As there is an o-ring around the front group mechanics you need to pull out with enough force.

A - For F18 (left image below) and F135 (right image below) you can easily take off the front group by taking it by the barrel.



F18 front group removal by hand



F135 front group removal by hand

B - For F21 it may be tricky and risky to take off by the hands only. You can help yourself with a plastic stick or plastic head tweezers. Put this on one edge and lift up slightly the front group to release the o-ring. Take the front group and pull it out with the hands.





**POSSIBLE BUT NOT RECOMMENDED:** For F18-F21-F135 it is possible to use vacuum system with plastic suction head or a suction grip to pull out the front group. Be aware that you must use those systems correctly to prevent from any damage on the front element. Angenieux will not be responsible of any damage caused using this method. Clean properly the front element and the suction head before putting it in place.





3 - Put in a secure area the front group onto the front group holder 66067062AA. You can put a tissue on the front element to protect it from dust pollution.



## STEP 3B: REMOVE THE FOCUS GROUP - ONLY FOR F18-F21-F135

THE BELOW PROCEDURE APPLIES FOR ALL F18-F21-F135

1 - Put in position the inner part of the focus group spanner 66067115AA and rotate it anti-clockwise so it falls in the correct thread position.

2 - Rotate clockwise up to the end-stop. Do not apply more torque after you reached the end-stop.

3 - Put in position the outer part of the focus group spanner and rotate it left or right so the two pins fit perfectly with the retainer holes.

4 - Untighten the focus group retainer.

5 - Pull out straightly the focus group. As there is an o-ring around the focus group mechanics you need to pull out with enough force. The focus group and the retainer will come out with the spanner.

6 - Put in a secure area the focus group with the spanner on onto the front group holder 66067075AA.



2



3



4



5



6

## STEP 4: REMOVE IOP INTERNAL FILTER AND IRIS SUB-ASSEMBLY

THE BELOW PROCEDURE APPLIES FOR ALL OPTIMO PRIME SERIES

1 - Put in position the inner part of the IOP element spanner 66067121AA and rotate it anti-clockwise so it falls in the correct thread position.

2 - Rotate clockwise up to the end-stop. Do not apply more torque after you reached the end-stop.

3 - Put in position the outer part of the IOP element spanner and rotate it left or right so the two pins fit perfectly with the retainer holes.

4 - Untighten the IOP internal filter retainer.

5 - Pull out straightly the IOP element spanner. The IOP internal filter and the retainer will come out with the spanner.

6 - Untighten and remove the inner filter barrel from the IOP element spanner.



2



3



4



5



6

7 - Open the iris so the guiding pin is free to go out.





8 - Put again the inner part of the IOP element spanner 66067121AA and rotate it anti-clockwise so it falls in the correct thread position.

9 - Rotate clockwise up to the end-stop. Do not apply more torque after you reached the end-stop.

10 - Pull out straightly the IOP element spanner. The iris sub-assembly will come out with the spanner.

11 - Untighten and remove the iris sub-assembly from the IOP element spanner



9



10

10 - For F18-F32-F40 use the







