

Service Manual

Interchangeable Lens for Digital Camera

Model No. **H-ES12060PP**

H-ES12060E

H-ES12060GK



WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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1 Safety Precautions

1.1 Information for Your Safety

Keep the unit as far away as possible from electromagnetic equipment (such as microwave ovens, TVs, video games, radio transmitters, high-voltage lines etc.).

- Do not use the camera near cell phones because doing so may result in noise adversely affecting the pictures and sound.
- If the camera is adversely affected by electromagnetic equipment and stops functioning properly, turn the camera off and remove the battery and/or the connected AC adaptor. Then reinsert the battery and/or reconnect the AC adaptor and turn the camera on.

The lens can be used with a digital camera compatible with the lens mount standard for the "Micro Four Thirds™ System".

- It cannot be mounted on the Four Thirds™ mount specification camera.
- The appearance and specifications of products described in this manual may differ from the actual products you have purchased due to later enhancements.
- Micro Four Thirds™ and Micro Four Thirds Logo marks are trademarks or registered trademarks of Olympus Imaging Corporation, in Japan, the United States, the European Union and other countries.
- Four Thirds™ and Four Thirds Logo marks are trademarks or registered trademarks of Olympus Imaging Corporation, in Japan, the United States, the European Union and other countries.
- G MICRO SYSTEM is an interchangeable lens type digital camera system of LUMIX based on a Micro Four Thirds System standard.
- LEICA is a registered trademark of Leica Microsystems IR GmbH. ELMARIT is a registered trademark of Leica Camera AG. The LEICA DG lenses are manufactured using measurement instruments and quality assurance systems that have been certified by Leica Camera AG based on the company's quality standards.
- Other names of systems and products mentioned in these instructions are usually the registered trademarks or trademarks of the manufacturers who developed the system or product concerned.

Precautions

■ Lens Care

- This lens has a dust-proof and splash-proof construction. When using it, please be careful of the following. If the lens is not working properly, consult the dealer or your nearest Service Center.
 - Please attach the lens to a dust-proof and splash-proof digital camera.
 - When detaching the lens from the digital camera, take care to ensure that sand, dust, splashes of water etc., do not get into the lens or the terminals.
 - This lens is not waterproof and cannot be used to record underwater. For splash-proofing, the lens is constructed to resist the entry of water. If splashes of water etc. do adhere to the lens, wipe after use with a soft dry cloth.
- To improve the dust-proofing and splash-proofing of this lens, a lens mount rubber is used in the mounting portion. After changing the lens a number of times, you may find that the lens mount rubber has marked the mount portion of the digital camera body, which does not affect its performance. For information on changing the lens mount rubber, contact your nearest Service Center.
- Do not press the lens with excessive force.
- When there is dirt (water, oil, and fingerprints, etc.) on the surface of the lens, the picture may be affected. Lightly wipe the surface of the lens with a soft, dry cloth before and after taking pictures.
- To prevent dust and other particles from accumulating on or entering the lens, attach the lens rear cap when the lens is not in use.
- To protect the lens contact points ①, do not place the lens with its mount surface facing down. In addition, do not allow the lens contact points to become dirty.
(See illustration **A**)



■ About Condensation (Fogging of the Lens)

- Condensation occurs when there are differences in temperature and humidity as described below. Condensation can cause the lens to become dirty and lead to mold and malfunctioning, so exercise caution in the following situations:
 - When the camera is brought indoors from outside during cold weather
 - When the camera is brought into an air-conditioned car
 - When cold air from an air conditioner is directly blown onto the lens
 - In humid places
- If condensation occurs, turn the power off and leave it for about two hours. Once the camera acclimatizes to the surrounding temperature the condensation will go away naturally.

1.2 Cautions for use

Take care not to drop or knock the lens. Also take care not to put a lot of pressure on the lens.

- Take care not to drop the bag that you inserted the lens in as it may strongly shock the lens. The camera may stop operating normally and pictures may no longer be recorded. Also, the lens may be damaged.
- When carrying the digital camera with the lens attached, hold both the digital camera and the lens.

When using pesticides and other volatile substances around the camera make sure that they do not get onto the lens.

- If such substances get onto the lens they can damage the exterior case or cause the paint to peel.

Do not point the lens at the sun or other strong light sources.

- This could cause the lens to collect an excessive amount of light, resulting in fire and malfunction.
- Under no circumstances should the unit be stored in any of the following locations since doing so may cause problems in operation or malfunctioning.
 - In direct sunlight or on a beach in summer
 - In locations with high temperatures and humidity levels or where the changes in temperature and humidity are acute
 - In locations with high concentrations of sand, dust or dirt
 - Where there is fire
 - Near heaters, air conditioners or humidifiers
 - Where water may make the unit wet
 - Where there is vibration
 - Inside a vehicle

- Refer also to the owner's manual of the digital camera.
- When the unit is not going to be used for a prolonged period, we recommend storing with a desiccant (silica gel). Failure to do so may result in performance failure caused by mold, etc. It is recommended that you check the unit's operation prior to use.
- Do not leave the lens in contact with rubber or plastic products for extended periods of time.
- Do not touch the lens contact point. Doing so can cause failure of the unit.
- Do not disassemble or alter the unit.

Do not use while directly touching the lens at low temperatures for a long period of time.

- In cold places (environments below 0 °C (32 °F), such as ski slopes), prolonged direct contact with the metal parts of the lens may cause skin injury. Use gloves or similar when using the lens for long periods.

Do not use benzine, thinner, alcohol or other similar cleaning agents to clean the lens glass or exterior cabinet.

- Using solvents can damage the lens or cause the paint to peel.
- Wipe off any dust or fingerprints with a soft, dry cloth.
- Use a dry, dust cloth to remove dirt and dust on the lens mount rubber, zoom ring, or focus ring.
- Do not use a household detergent or a chemically treated cloth.

Troubleshooting

**A sound is heard when the camera is turned on or off.
A sound is heard from the lens when taking a picture of a bright subject such as when outdoors.**

- This is the sound of lens or aperture movement and is not a malfunction.

2 Service Navigation

2.1 Introduction

This service manual contains technical information, which allow service personnel's to understand and service this model

Please place orders using the parts list and not the drawing reference numbers.

If the circuit is changed or modified, the information will be followed by supplement service manual.

2.2 Important Notice

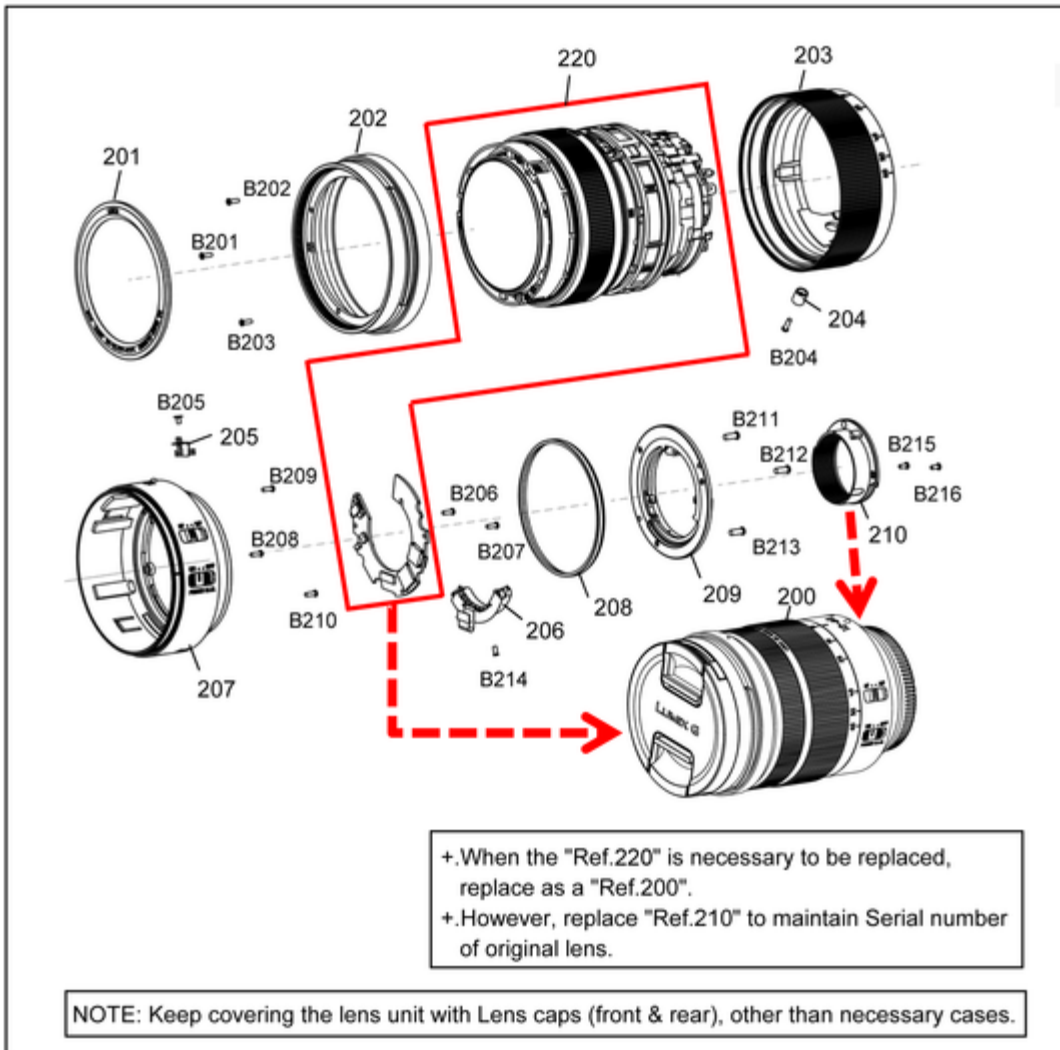
2.2.1 About LENS MAIN UNIT (Ref. 220)

1. LENS MAIN UNIT (Ref. 220) is not supplied due to difficulty of the transportation issue (Fragile, Dust-free packing), and requires critical lens adjustments.

Therefore, any needs of the "LENS MAIN UNIT" (Ref. 220), carefully confirm its performance in advance.

2. Once "LENS MAIN UNIT" (Ref. 220) is confirmed as defective, place order "LENS Unit" (Ref. 200) and replace SHADING FRAME (Ref. 210), to maintain Serial number of owner's original lens.

Fig. 1-1



3. No adjustment is required when replacing the part mentioned on Fig.1-1. But, when tighten the concerned screws, apply proper torque

mentioned on "6. Disassembly and Assembly Instruction" section.

3 Specifications

3.1 Specifications (Rated)

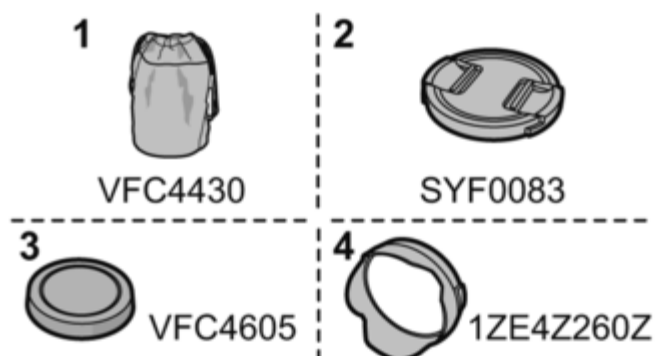
Specifications are subject to change without notice.

INTERCHANGEABLE LENS FOR DIGITAL CAMERA
“LEICA DG VARIO-ELMARIT 12-60 mm/F2.8-4.0 ASPH./
POWER O.I.S.”

Focal length
f=12 mm to 60 mm (35 mm film camera equivalent: 24 mm to 120 mm)
Aperture type
9 diaphragm blades/circular aperture diaphragm
Maximum aperture
F2.8 (Wide) to F4.0 (Tele)
Minimum aperture value
F22
Lens construction
14 elements in 12 groups (4 aspherical lenses, 2 ED lenses)
Nano surface coating
Yes
In focus distance
0.20 m (0.66 feet) to ∞ (Wide) / 0.24 m (0.79 feet) to ∞ (Tele) (from the focus distance reference line)
Maximum image magnification
0.3 \times (35 mm film camera equivalent: 0.6 \times)
Optical image stabiliser
Available
[O.I.S.] switch
Available (Switching ON/OFF)
[AF/MF] switch
Available (Switching AF/MF)
Mount
“Micro Four Thirds Mount”
Angle of view
84° (Wide) to 20° (Tele)
Filter diameter
62 mm
Max. diameter
Approx. 68.4 mm (2.7 inch)
Overall length

Approx. 86 mm (3.4 inch) (from the tip of the lens to the base side of the lens mount)
Mass
Approx. 320 g (0.70 lb)
Operating temperature
–10 °C to 40 °C (14 °F to 104 °F)
Dust-proof and splash-proof
Available

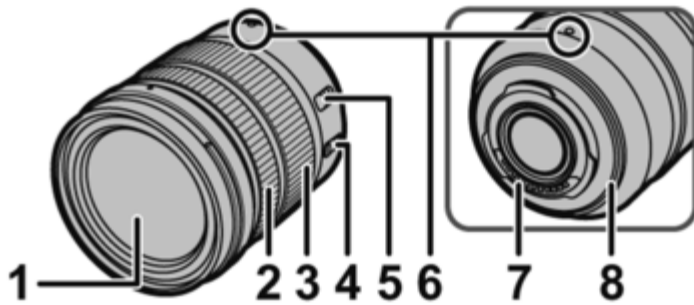
3.2 Accessories



- 1** Lens Pouch
- 2** Lens Cap
- 3** Lens Rear Cap
- 4** Lens Hood

- The lens rear cap and lens cap are attached to the interchangeable lens at the time of purchase.

4 Location of Controls and Components



- 1** Lens surface
- 2** Focus ring
Rotate to focus when taking pictures with manual focus (MF).
- 3** Zoom ring
Rotate the zoom ring when you wish to take large (tele) or wide (wide angle) pictures.
- 4** [O.I.S.] switch
When the lens is attached to the camera the stabilizer function is set to activate if the O.I.S. switch is set to [ON].
 - We recommend setting the O.I.S. switch to [OFF] when using a tripod.
- 5** [AF/MF] switch
This allows you to switch between Auto Focus (AF) and Manual Focus (MF).
 - When either the [AF/MF] switch of the lens or the setting of the camera is set to [MF], Manual Focus (MF) is enabled.
- 6** Lens fitting mark
- 7** Contact points
- 8** Lens mount rubber




Note

- When recording on the wide-angle side and using the flash, the periphery of the screen may darken. In such cases, we recommend using the external flash.
- If you zoom after focusing, focusing errors may occur. After zooming, please perform the focusing again.
- In very quiet situations Auto Focus operating sounds may be recorded during motion picture recording. This is not a malfunction. In such situations, switching to Manual Focus will improve the situation.
- If you set the O.I.S. to [ON] when recording a motion picture, operating sounds may be recorded. If they become bothersome, we recommend setting the O.I.S. switch to [OFF] and mounting the camera on a tripod.

5 Service Fixture & Tools

5.1 Service Fixture and Tools

The following Service Fixture and Tools are used for Checking & Servicing for this unit.

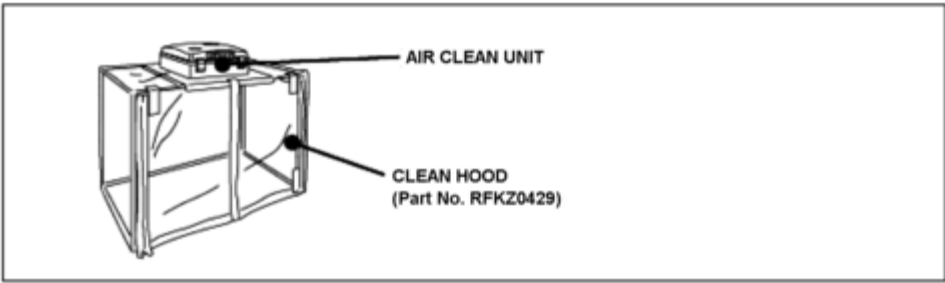
Lens Cleaning Kit (BK) VFK1900BK	Torque Driver RFKZ0542	Driver VFK1390
 * Only supplied 10 set/box.	 Spec: 2-30N・cm (Equiv.0,1-3kgf/cm)	

5.2 Clean Box

- The repair quality is considered, and it is recommended working in the environment of satisfied clean level less than class 10,000 (Federal Standard 209D).

[NOTE]

- Work in the environment of satisfied clean level less than class 10,000 (Federal Standard 209D) for cleaning the inside of the lens.



6 Disassembly and Assembly Instructions

6.1 Outline

Please be disassembly and assembly with reference to the flow chart and illustrations drawings.

Important:

1. It is recommended dealing with Clean Box, to keep maintaining the dustproof environment.
(Refef to " **5.2. Clean Box** " section of this Service Manual for details.)
2. To minimize the possibilities/risk of getting the dust/dirt on the lens surface, keep covering the lens unit with lens caps (front & rear), other than necessary cases.
3. Do not touch the surface of the lens glasses with your fingers.
4. Blow off the dust on the surface of the lens with a blower brush.
5. Use lens cleaning KIT (BK)(VFK1900BK).

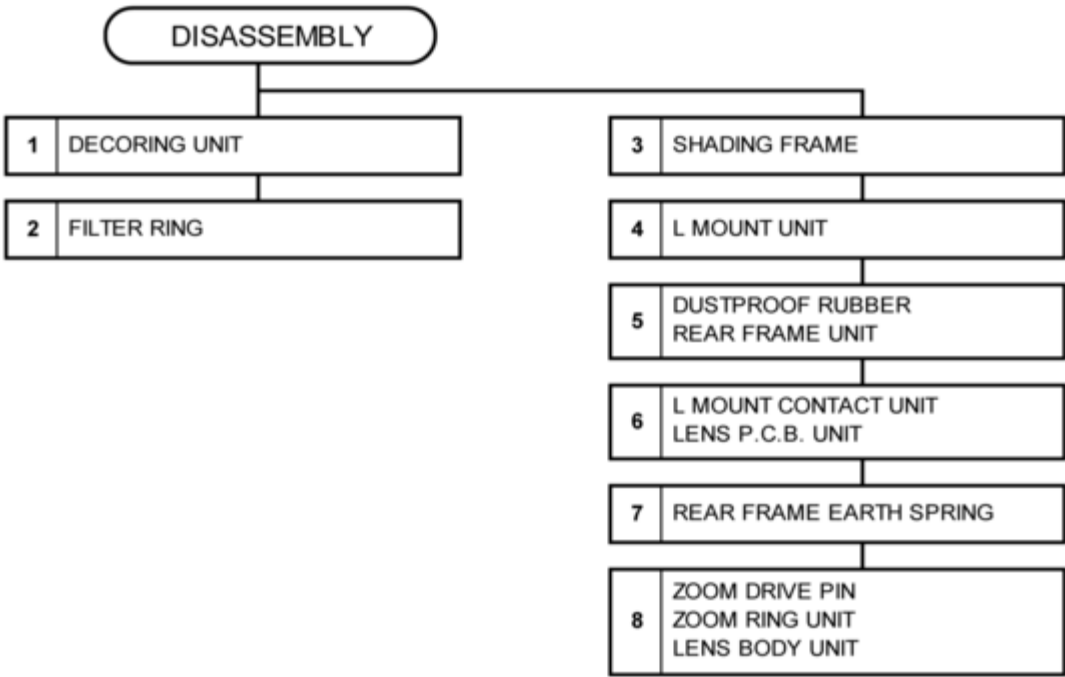
NOTE:

1. When installing the screws, be sure to use the torque driver (RFKZ0542) and tighten the screws with specified torque, mentioned on the following.

Caution

Keep covering the lens unit with Lens caps (front & rear), other than necessary cases.

6.2 Disassembly Flow Chart



6.3 Disassembly Procedure

Important:

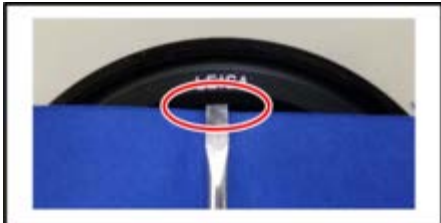
It must be performed inside of satisfied clean level.

(Satisfied clean level:

Less than class 10,000(Federal Standard 209D))

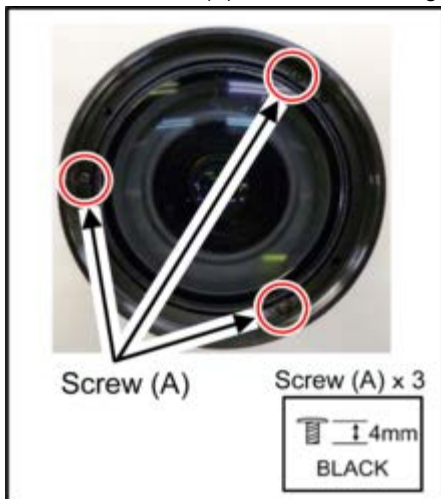
6.3.1 Removal of the Decoration Ring Unit

1. The Decoring Unit is stucked on the Filter Ring.
2. Put the sheet so that the lens glass is fully covered.
3. Insert the small flat blade screwdriver to Gap (between the Decoring Unit and lens glass), and peel off the Decoring Unit gently.



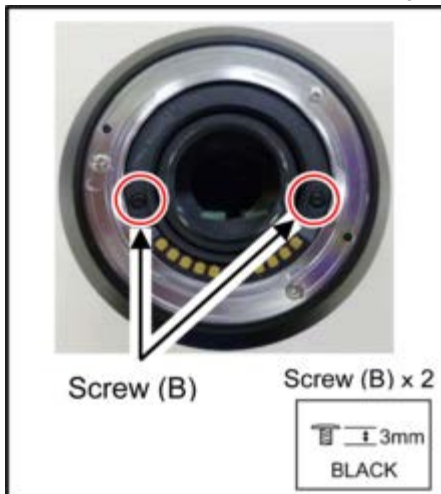
6.3.2 Removal of the Filter Ring

1. Remove 3 screws (A) and the Filter Ring.



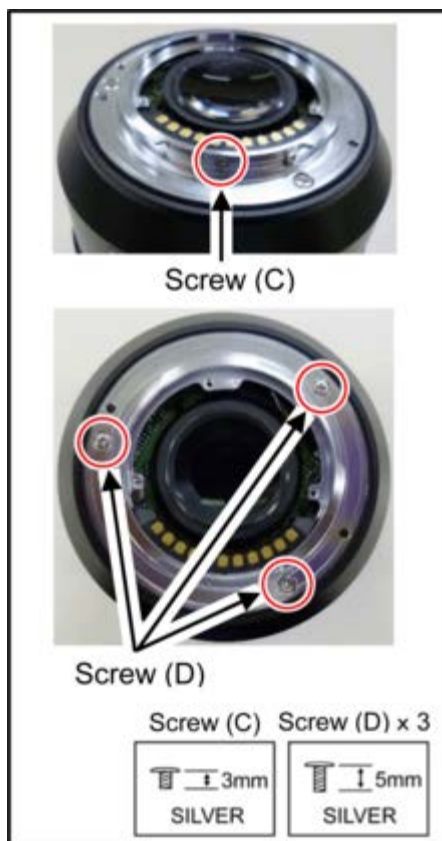
6.3.3 Removal of the Shading Frame

1. Remove 2 screws (B) and the Shading Frame.



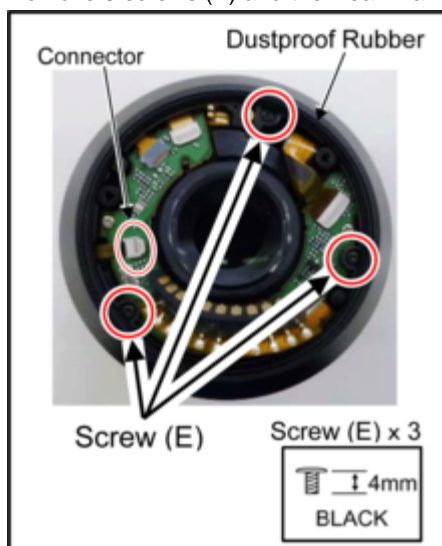
6.3.4 Removal of the L Mount Unit

1. Remove screw (C) and 3 screws (D).
2. Remove the L Mount Unit.



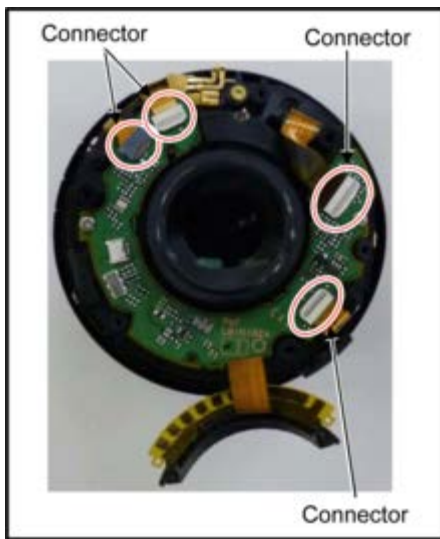
6.3.5 Removal of the Rear Frame Unit

1. Remove the Dustproof Rubber.
2. Disconnect the Connector of the Lens P.C.B..
3. Remove 3 screws (E) and the Rear Frame Unit.

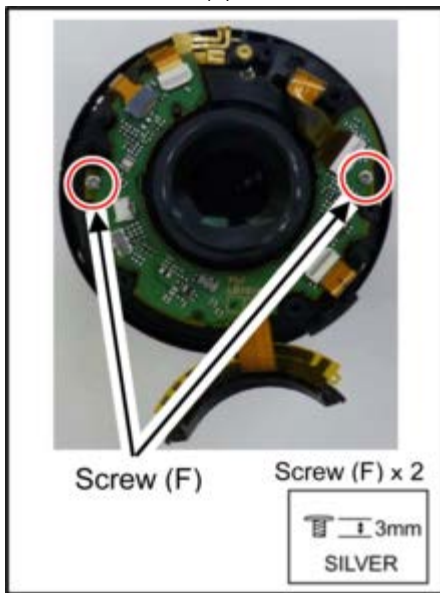


6.3.6 Removal of the Lens P.C.B. Unit and the L Mount Contact Unit

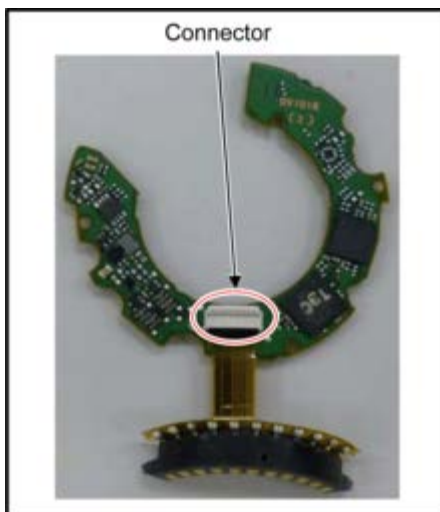
1. Disconnect the 4 Connectors of the Lens P.C.B..



2. Remove 2 screws (F) and the Lens P.C.B. with the L Mount Contact Unit.



3. Remove the L Mount Connect Unit from Lens P.C.B..



6.3.7 Removal of the Rear Frame Earth Spring

1. Remove screw (G) and the Rear Frame Earth Sprig.

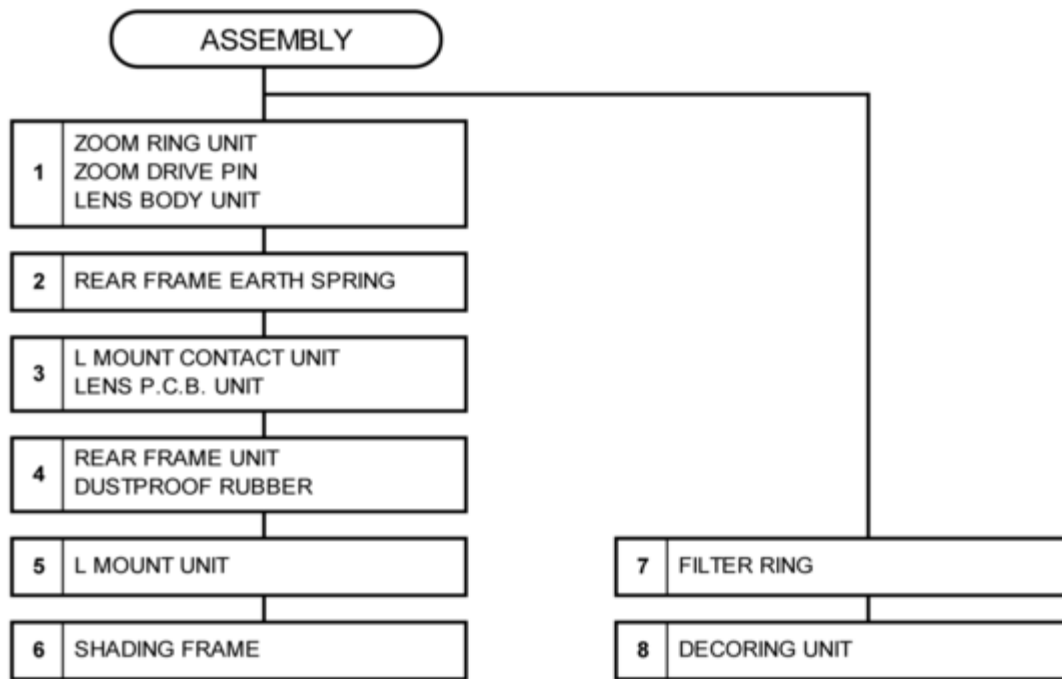


6.3.8 Removal of the Zoom Drive Pin and the Zoom Ring Unit

1. Remove screw (H) and the Zoom Drive Pin.
2. Remove the Zoom Ring Unit.



6.4 Assembly Flow Chart



6.5 Assembly procedure

Important:

1. When tightening the screw, use a torque driver (RFKZ0542) with specified torque described in each step.

6.5.1 Installation of the Zoom Ring Unit and the Zoom Drive Pin

1. Install the Zoom Ring Unit and the Zoom Drive Pin.
2. Tighten screw (H) by using the torque driver with specified torque.



6.5.2 Installation of the Rear Frame Earth Spring

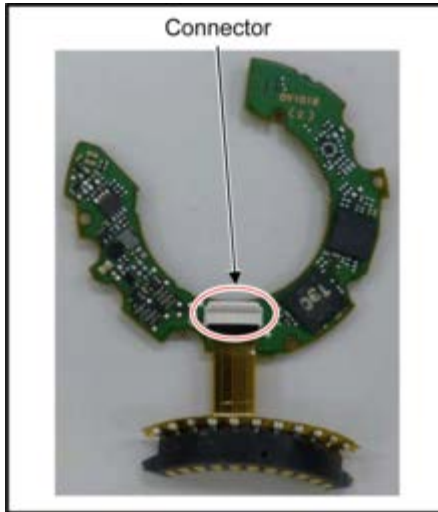
1. Install the Rear Frame Earth Spring.

2. Tighten screws (G) by using the torque driver with specified torque.

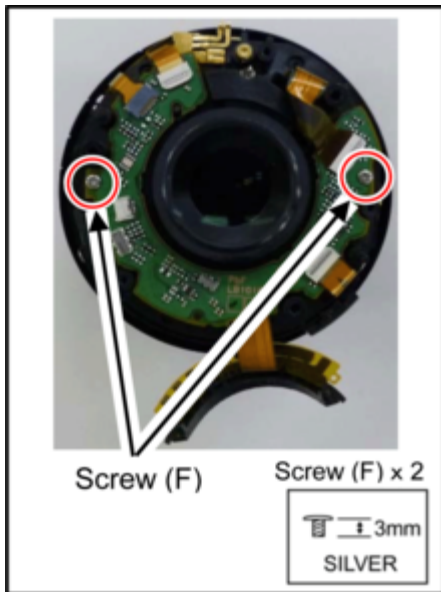


6.5.3 Installation of the L Mount Contact Unit and the Lens P.C.B.

1. Connect FPC of the Mount Connect Unit to connector.

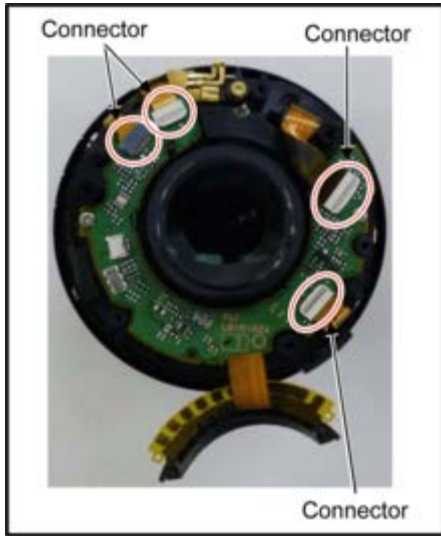


2. Installation the Main P.C.B. with the Mount Contact Unit.
3. Tighten 2 screws (F) by using the torque driver with specified torque.



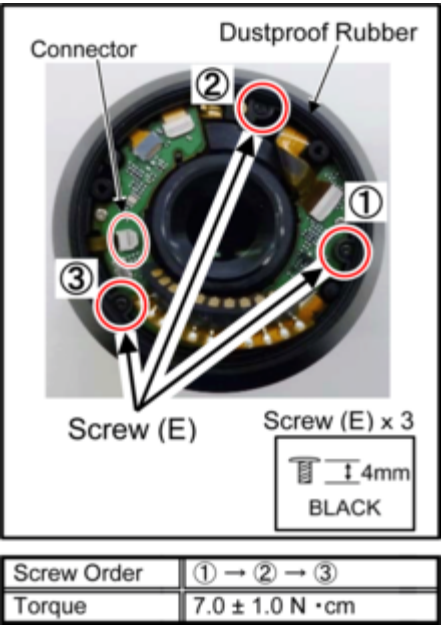
Screw Order	None specified
Torque	7.0 ± 1.0 N · cm

4. Connect FPCs to 4 connectors of the Lens P.C.B. Unit.



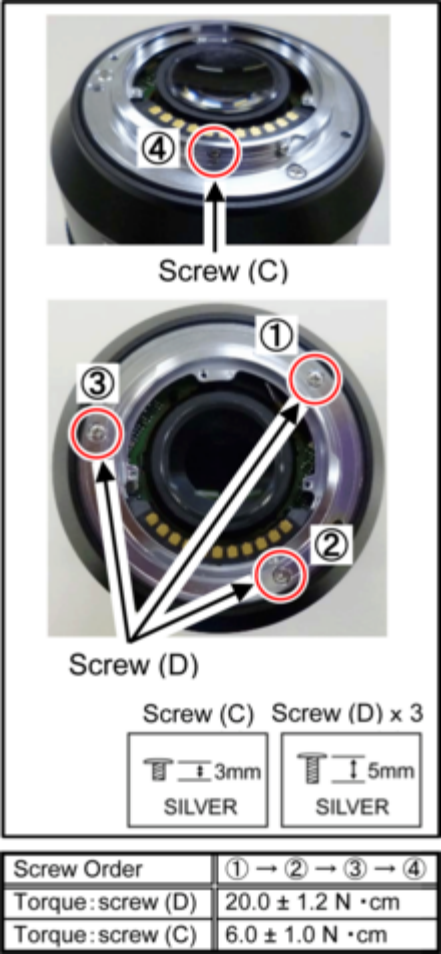
6.5.4 Installation of the Rear Frame Unit and the Dustproof Rubber

1. Install the Rear Frame Unit and the Dustproof Rubber.
2. Tighten 3 screws (E) in numerical order by using the torque driver with specified torque.



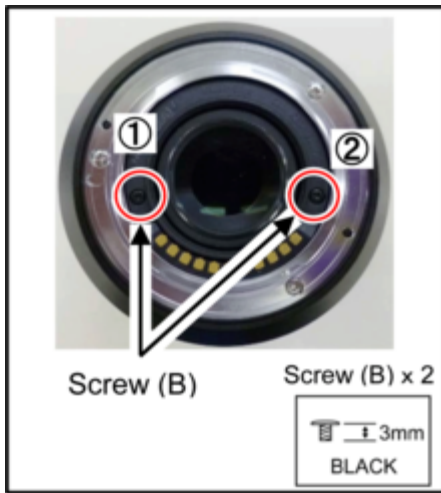
6.5.5 Installation of the L Mount Unit

- 1. Install the L Mount Unit.
- 2. Tighten screw (C) and 3 screws (D) in numerical order by using the torque driver with specified torque.



6.5.6 Installation of the Shading Frame

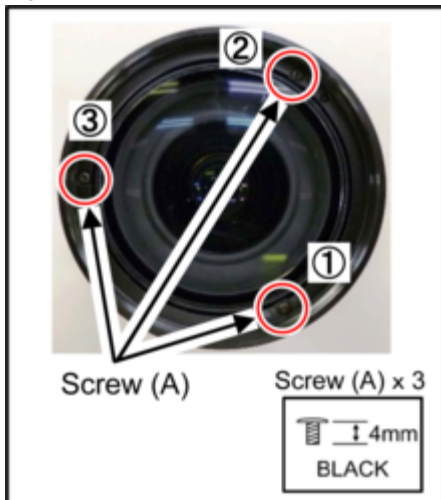
- 1. Install the Shading Frame.
- 2. Tighten 2 screws (B) in numerical order by using the torque driver with specified torque.



Screw Order	① → ②
Torque	10.0 ± 1.0 N · cm

6.5.7 Installation of the Filter Ring

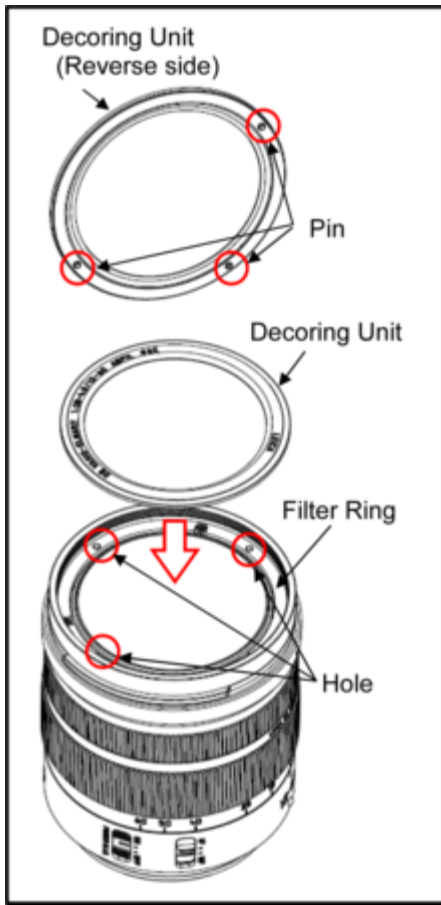
1. Install the Filter Ring.
2. Tighten 3 screws (A) in numerical order by using the torque driver with specified torque.



Screw Order	① → ② → ③
Torque	7.0 ± 1.0 N · cm

6.5.8 Installation of the Decoring Unit

1. Insert the 3 Pins of the Decoring Unit to the hole of the Filter Ring.
 - Use new one, do not use the one which is removed.
 - Double-stick tape sticks to the Decoring Unit of the repair part. Remove the old double-stick tape from the Filter Ring.
2. After installing the Decoring Unit, use a soft cloth to ress it into place.



7 Maintenance

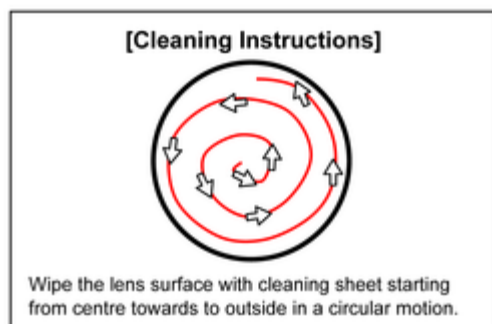
7.1 Dust / Dirt on the outer casing part(s)

1. Blow off the dust first, then sweep out the dust from narrower spaces with soft cleaning brush.
2. Wipe up the outer casing part with the dry fuzz-free cloth.

7.2 Dust / Dirt on the Lens Glasses (Lens Cleaning)

1. Blow off the dust on the Lens glass surface with the Blower, gently. (Do not blow strongly.)
2. Wipe out the dirt on the Lens glass surface with Lens Cleaning Kit (VFK1900BK) if necessary.

(Consult the instruction sheet which is included in the Lens Cleaning Kit in details.)

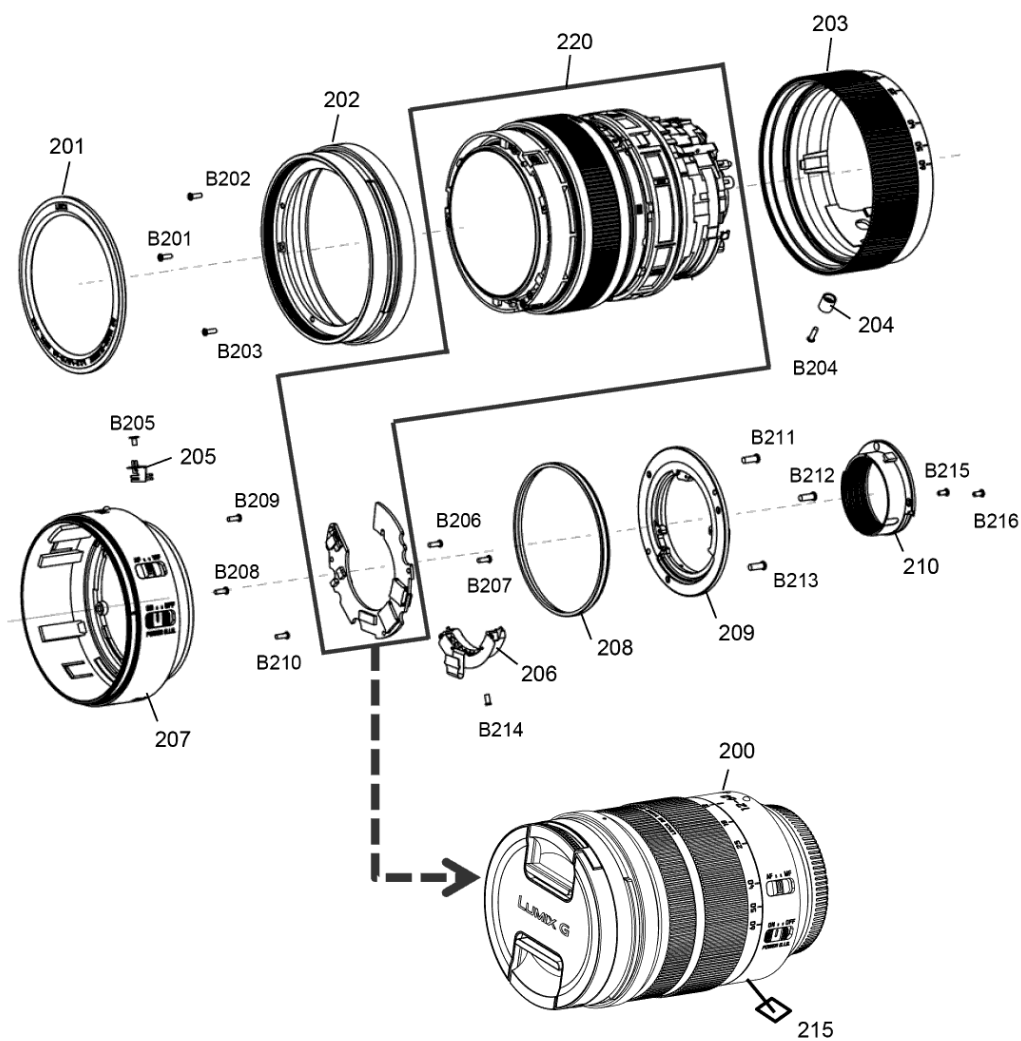


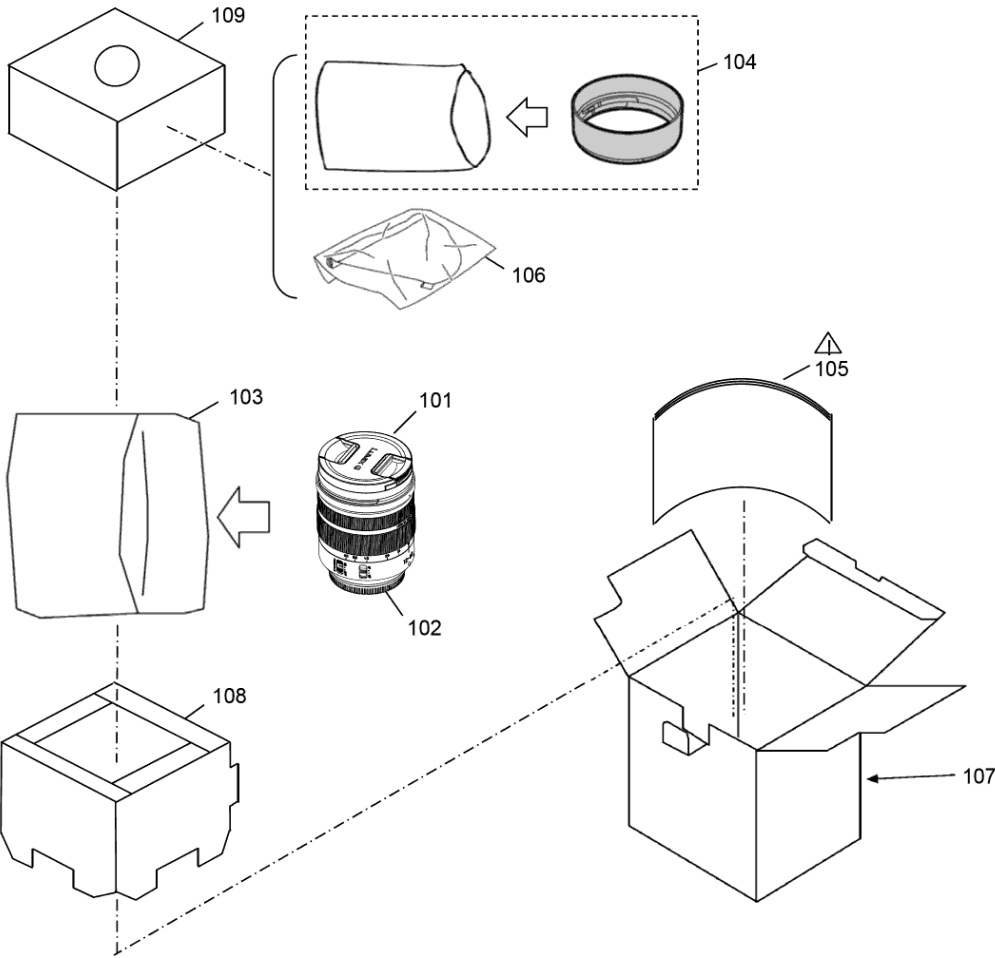
8 Exploded View and Replacement Parts List

Please click the radio button for "Diagrams II / Parts List" on the menu bar in XML Service Manual.

If you want to print, please click the icon button for "Print" on the icon bar and select the item.





Model No. : H-ES12060PP/E/GK Frame and Casing Section

**Model No. : H-ES12060PP/E/GK Packing Parts and Accessories**



Model No. : H-ES12060PP/E/GK Parts List

Change	Safety	Ref. No.	Part No.	Part Name & Description	Q'ty	Remarks
		101	SYF0083	LENS CAP	1	
		102	VFC4605-B	LENS REAR CAP	1	
		103	VPF1475	LENS BAG	1	
		104	1ZE4Z260Z	LENS HOOD	1	
				OPERATING INSTRUCTIONS (ENGLISH/CA		

		105	DVQX1160Z	NADIAN-FRENCH/SPANISH)	1	PP
		105	DVQX1161Z	OPERATING INSTRUCTIONS (ENGLISH/GERMAN/FRENCH/SPANISH)	1	E
		105	DVQX1162Z	OPERATING INSTRUCTIONS (ITALIAN/CHINESE (TRADITIONAL) /RUSSIAN)	1	E
		105	DVQX1163Z	OPERATING INSTRUCTIONS (CHINESE (SIMPLIFIED))	1	GK
		106	VFC4430	LENS POUCH	1	
		107	DVPK1022Z	PACKING CASE	1	E,PP
		107	1PE1Z260GK	PACKING CASE UNIT	1	GK
		108	DVPN1055Z	CHSHION	1	
		109	DVPN1056Z	ACCESSORY BOX	1	
		200	LOU3Z260Z	LENS UNIT	1	
		201	1HR1Z260CZ	DECORING UNIT	1	
		202	DVGX1028Z	FILTER RING	1	
		203	ADE3Z260Z	ZOOM RING UNIT	1	
		204	DVMH1028Z	ZOOM DRIVE PIN	1	
		205	DVUS1002Z	REAR FRAME EARTH SPRING	1	
		206	6SE2Z260Z	L MOUNT CONTACT UNIT	1	
		207	RDE4Z260Z	REAR FRAME UNIT	1	
		208	SMG0095-M	DUSTPROOF RUBBER	1	
		209	SXQ0649	L MOUNT UNIT	1	
		210	-----	SHADING FRAME	1	(NOT SUPPLIED)
		215	VQL1V24	WEEE LABEL	1	E
		215	VQL1W22	TEN YEARS LABEL	1	GK
		220	-----	LENS MAIN UNIT	1	(NOT SUPPLIED)
		B201	VHD2296	SCREW	1	
		B202	VHD2296	SCREW	1	
		B203	VHD2296	SCREW	1	
		B204	SHD0021	SCREW	1	
		B205	VHD2011	SCREW	1	
		B206	VHD2073	SCREW	1	
		B207	VHD2073	SCREW	1	
		B208	VHD2296	SCREW	1	
		B209	VHD2296	SCREW	1	
		B210	VHD2296	SCREW	1	
		B211	VHD2299	SCREW	1	
		B212	VHD2299	SCREW	1	
		B213	VHD2299	SCREW	1	
		B214	VHD2298	SCREW	1	
		B215	VHD2246	SCREW	1	
		B216	VHD2246	SCREW	1	