

H A S S E L B L A D[®]

Instructions

Underwater Housing for Hasselblad 500 EL/M



HASSELBLAD UNDERWATER HOUSING

General

The underwater housing for the Hasselblad 500EL and 500EL/M is made of acid-resistant steel 0.1" (3 mm) thick with sealing gaskets of the same material at each end. In combination with O-rings, this material provides an efficient seal between the housing's midsection and the end domes. The housing has a glass-blasted and polished surface finish. The top of the housing features an accessory bridge with 1/4" sockets for horizontal or vertical attachment of accessories. The base of the housing has a 3/8" tapped hole in a small bridge for tripod mounting, external ballast attachment, etc.

The domed end ports are made of 1/4" (6.35 mm) thick acrylic plastic with an 8" (203.2 mm) spherical diameter. They are of excellent optical quality. The front and rear domes are mutually interchangeable, an advantage if the front dome gets scratched. The viewing system consists of a specially designed underwater viewfinder which replaces the camera's ordinary viewfinder. The underwater viewfinder, plus the elements in the external rubber eyepiece, yield a viewfinder image enlarged 3.5x.

The internal controls are linked to the external controls via universal joints. This eliminates tensions in the double O-ring gaskets fitted at all lead-ins. Support and gears are made of heavily anodized aluminum.

Specifications

The underwater housing is designed for the Hasselblad 500EL and 500EL/M.

Magazines: A12, A24, A16, and 70.

Lenses	Angular field
50mm f/4 Distagon C	diagonal: approx. 75° horizontal: approx. 58°
60mm f/3.5 Distagon C	diagonal: approx. 66° horizontal: approx. 50°
80mm f/2.8 Planar C	diagonal: approx. 52° horizontal: approx. 38°

The housing is corrosion-resistant. Its midsection is made of acid-resistant, blasted and polished 0.1" (3 mm) thick steel. The front and rear of the midsection feature identical correction domes made of 1/4" (6.35 mm) thick acrylic plastic with a spherical diameter of 8" (203.2 mm).

Illumination of scales for distance, shutter speed and aperture is powered by two 9 V batteries, such as the Eveready 216, RCA VS 323, Burgess 2U6, Tudor 9T4 or National Hi-TOP OOGP-DE. 12V 50mA 0.6 W lamps, such as Taunus Licht, are used for scale illumination.

There is a contact for electronic or expendable flash synchronization at all shutter speeds, i.e. 1-1/500 s and B.

The housing loaded with a camera, the 50mm f/4 Distagon lens and Magazine 70 weighs about 27 1/2 lbs (12.5 kg) in air. Less camera and viewfinder, the housing weighs about 22 1/2 lbs (10.2 kg).

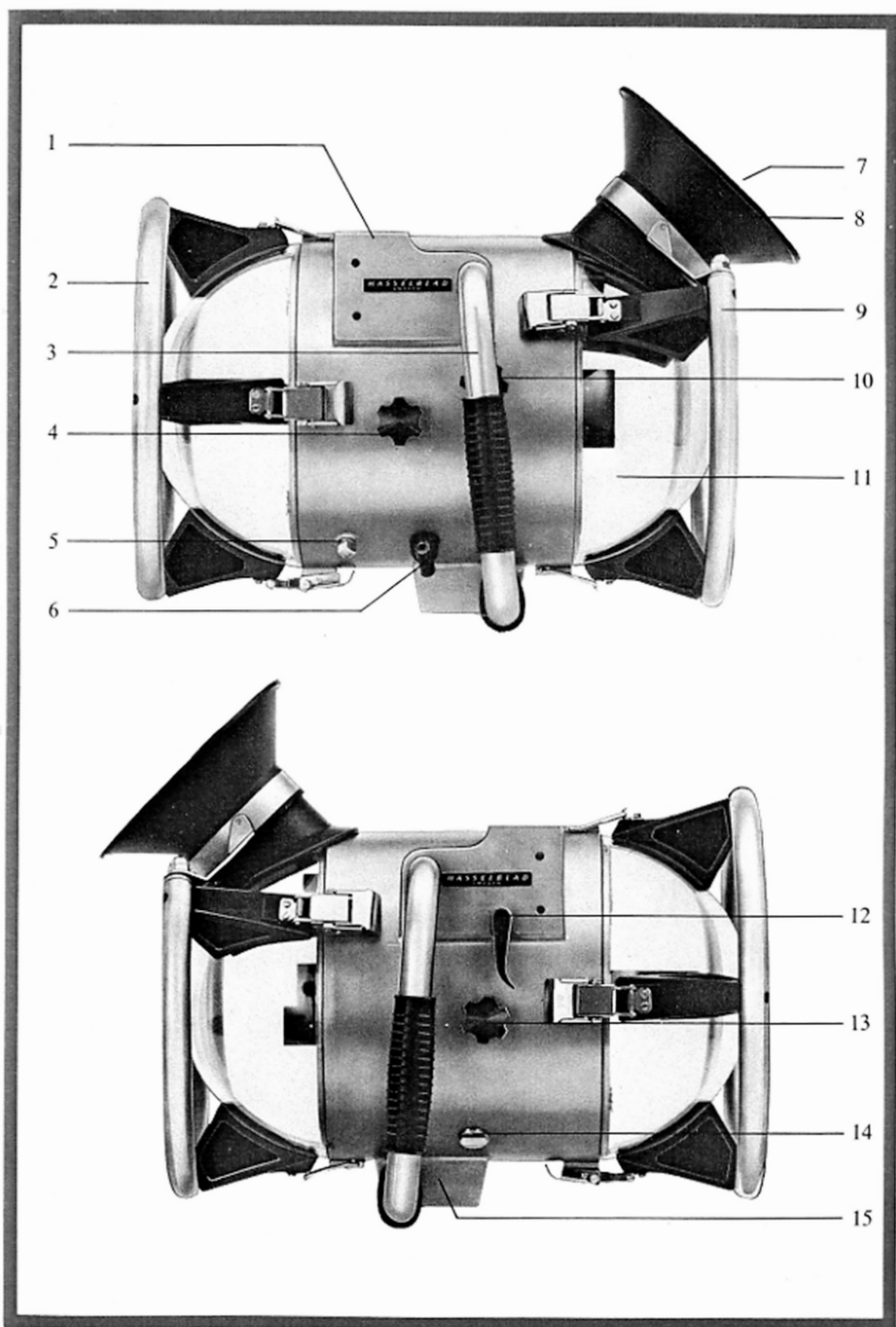
The unit's weight in water varies from 0-14 oz (0-600 g), depending on the lens and magazine used.

Each underwater housing is tested at a depth of 820 ft (250 m).

The base of the housing has a 3/8" W tripod socket. There is an accessory bridge on the top of the housing with 1/4" W sockets for the attachment of a flash unit, exposure meter, etc.

The underwater viewfinder, in combination with the elements in the rubber eyepiece, yields a viewfinder image enlarged 3.5x.

1. Accessory bridge with 1/4" W sockets
2. Front grip ring
3. Handgrip
4. Shutter speed knob
5. Pressure equalizing valve
6. EO contact
7. Eyepiece elements
8. Rubber eyepiece
9. Rear grip ring
10. Focusing knob
11. Rear dome
12. Combined release and illumination lever
13. Aperture knob
14. Reserve socket
15. Tripod socket, 3/8"

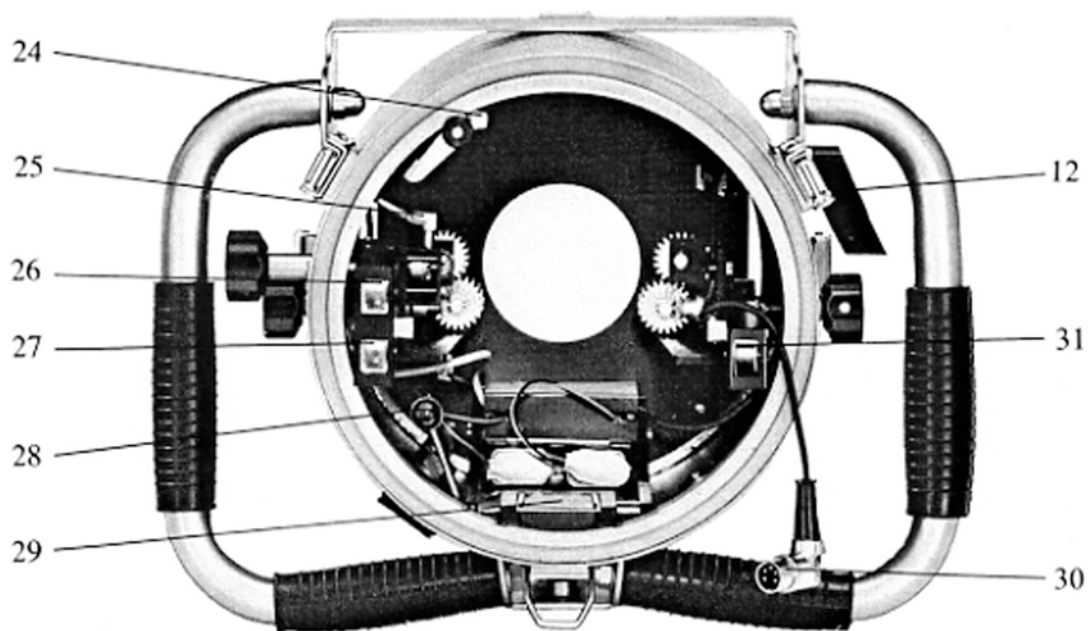
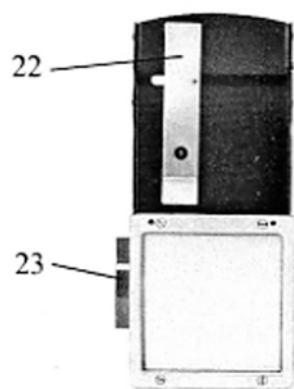
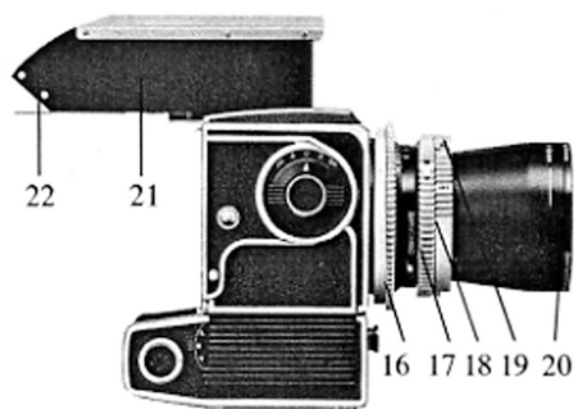


PREPARING A 500EL/M

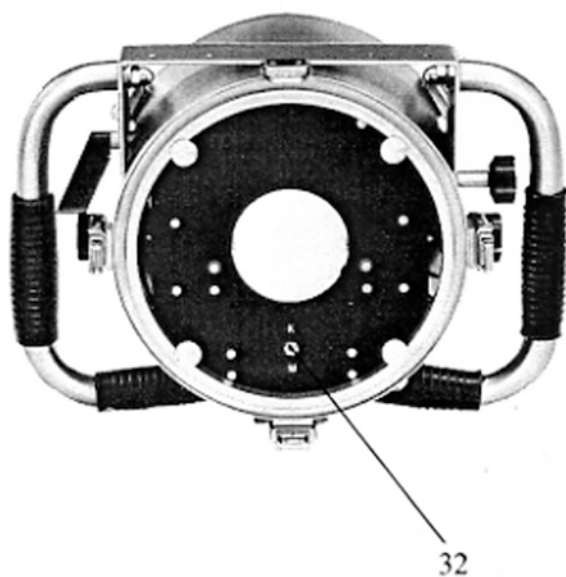
1. Slacken the stop screws in the toothed focusing ring (16). Slide the toothed ring onto the lens with the toothed side towards the front of the camera. Keep the toothed ring pressed against the lens grip ring and tighten one of the set screws. Make sure the screws are opposite a gap in the grip ring collar. Tighten slightly. Tighten the other screws in the same manner. Then tighten all the other screws more firmly.
2. Slacken the screw in the toothed shutter speed ring (18). Attach the toothed ring to the shutter speed ring on the lens so that the 500 on the toothed ring (19) is upside down with the "5" towards the front of the camera and opposite the 500 on the shutter speed scale. The lens grip ring will then mesh with the internal tracks of the ring. Tighten the screw.
3. Slacken the screw in the toothed aperture ring (17) completely. Attach the toothed ring to the aperture ring on the lens so that the cross-coupling release fits into the milled recess on the toothed collar. Tighten the screw. Make sure that the shutter and aperture cross-couplings are disconnected by rotating the rings in opposite directions.
4. Remove the film magazine. Remove the camera's focusing hood. Attach the underwater viewfinder (21). Then attach the film magazine while simultaneously pushing the arm (22) in the direction of the arrow. When the magazine is to be removed, the arm (22) is also pushed in the direction of the arrow.
5. Attach a supplementary correction lens (20) 50, 60 or 80, depending on the lens used (i.e. 50mm, 60mm or 80mm).

LOADING THE CAMERA INTO THE HOUSING

6. Stand the housing on its front ring. Open the two latches and lift the rear grip ring (9) off the fixed shackle.
7. Remove the rear dome (11). If the dome refuses to budge, see the instructions under "Pressure equalization valve."
8. Make sure the correct distance scale (26) is installed. See "Changing distance scale and lamp" for instructions on how to change scales.
9. Make sure the lens scale illumination is turned on and off with the release lever (12). The illumination should turn on when the release lever (12) is pushed forward and turn off when it is again pushed forward.
10. Set the focusing ring on the lens at the shortest distance setting and transfer the setting to the distance scale (26) in the underwater housing. Set the lens diaphragm at f/22 (depth-of-field indicators with maximum separation) and the shutter at 1/500 s (i.e. 500 on the toothed ring opposite the lens index) and transfer these values to the scales in the underwater housing.
11. *Remove the magazine slide.*
12. Make sure the locking arm (28) points towards the housing interior.
13. Slide in the camera on the quick-coupling (29). Check at the same time to ensure that the toothed rings mesh with the respective gears and that the detent recess (23) on the left side of the underwater viewfinder locks into the pivoting locking lever (24).
14. *Lock the quick-coupling by pulling the locking arm (28) forward until it stops.*
15. *Insert the release cord (30)-red index opposite red index on the camera. See "Change of lamp" for instructions on how to replace lamps.*
16. Reattach the rear dome (11) after ensuring that the dome edges are free from sand and grime.
17. Attach the rear grip ring (9) after ensuring that the grip ring's supports are free from sand and grime, by hooking it onto the fixed shackle. Close the latches.



16. Toothed focusing ring
17. Toothed aperture ring
18. Toothed shutter speed ring
19. 500 index
20. Supplementary correction lens
21. Underwater viewfinder
22. Arm
23. Detent recess
24. Pivoting locking lever
25. Synchronization cord
26. Distance scale
27. Shutter speed scale
28. Locking arm
29. Quick-coupling
30. Release cord
31. Aperture scale
32. Toggle switch



32

FLASH PHOTOGRAPHY

There is a contact enabling synchronized flash operation at all shutter speeds (1-1/500 s, B). The following steps must be taken before the camera is inserted into the housing. Flip the toggle switch (32) to the desired synchronization setting (X for electronic flash and M for expendable flash). The toggle switch (32) can be reached through the rear of the housing or from the front if the front grip and front dome are first removed. Set the lens synchronization selector lever at the same setting (X or M). Attach the underwater housing's synchronization cord (25) to the camera's synchronization terminal. Attach the cord from the expendable or electronic flash unit to the underwater housing's external EO contact (6).

Then proceed to step 11 under the heading "Loading the camera into the housing".

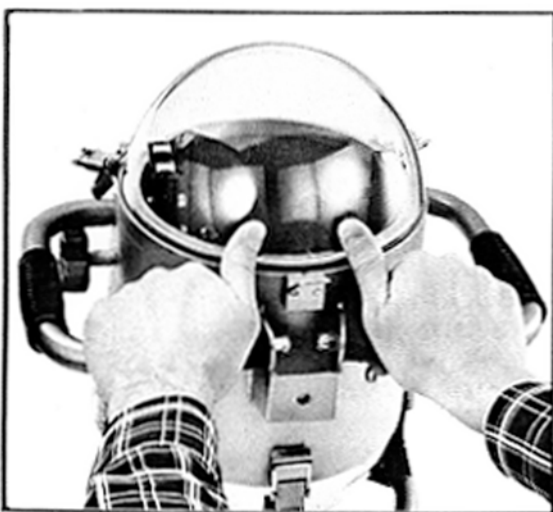
PRESSURE EQUALIZATION VALVE

When the underwater housing has either been closed for a long period of time or been used at great depths, the internal housing pressure may drop to a point at which it becomes difficult to remove the domes.

Then proceed as follows.

Remove the rear grip ring (9). Slacken the evacuation plug (5) on the right side of the housing and press on the dome with your thumbs (see the photograph).

Unscrew the evacuation plug completely if the dome still refuses to budge. Then screw in the attached valve and pump air into the housing with the bicycle pump until the dome loosens.



CHANGING DISTANCE SCALE AND LAMP

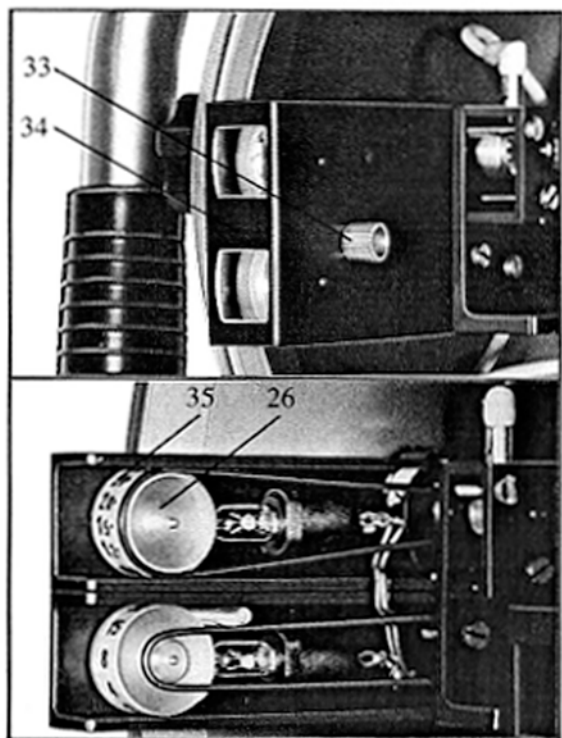
There is a specially designed distance scale for each lens. This scale must be changed whenever the lens is changed. The procedure is as follows.

Unscrew the nut (33) and remove the protective plate (34). Carefully lift off the belt (35) and remove the distance scale from its shaft. Attach the desired scale and replace the belt in the track on the distance scale. Reattach the protective plate in the rear track and tighten the nut.

NOTE: The distance scale wheels for the 50mm and 60mm Distagon C lenses are standard equipment and will be found inside the underwater housing.

Change of lamp

There is a lamp behind each lens scale wheel. You change lamps in the same way you change distance scale. After removal of the scale the old lamp is replaced by a new one which is screwed in counter-clockwise. **Note:** The lamps have bayonet-couplings. Put the scale back as described.



CORRECTION LENSES

In water the dome functions as a large negative lens. So a positive correction lens must be used on the lens to counteract this optical effect. Three correction lenses have been designed by Carl Zeiss, West Germany, for the 50mm Distagon C, 60mm Distagon C and 80mm Planar C lenses. These supplementary lenses have bayonet mounts, and their rims are engraved with designations indicating the lens for which they are intended. The correction lenses yield the following data (subject-to-focal plane focusing range in water) for each lens.

50mm Distagon C

Near focusing limit: 1.3 ft (0.4 m)

Far focusing limit: 8.5 ft (2.6 m)

Optimum distance: 4.1 ft (1.25 m)

60mm Distagon C

Near focusing limit: 1.5 ft (0.45 m)

Far focusing limit: 8.5 ft (2.6 m)

Optimum distance: 4.1 ft (1.25 m)

80mm Planar C

Near focusing limit: 2 ft (2.6 m)

Far focusing limit: 32.8 ft (10 m)

Optimum distance: 8.2 ft (2.5 m)

CARE AND MAINTENANCE

Note: Never store the domes with the O-rings under tension since the latter might be deformed and give rise to leaks.

Flush the housing with lukewarm fresh water after each dive.

Clean and lubricate the O-rings and lead-ins occasionally with Hasselblad silicone grease no. 57401. Don't get any grease on the domes.

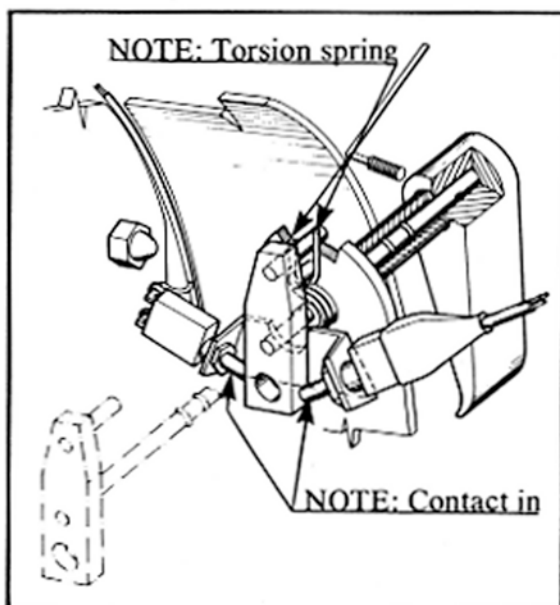
Disassembly of shaft lead-ins and O-rings

Remove the housing's left handgrip by unscrewing the two nuts.

The aperture knob and focusing knob shafts are then removed from the inside with the Allan wrench provided. Slacken one screw (adjacent to the housing wall) on each of the shafts, remove the shafts and lubricate.

The release shaft is removed with the screw on the release lever. Withdraw the shaft towards the inside of the housing and lubricate.

Make sure the torsion spring is correctly aligned in reassembly (see the photograph).



ELEMENTS IN THE RUBBER EYEPIECE

Use e.g. a spray bottle to spray fresh water into the eyepiece in order to remove any salt crystals on the elements. For more extensive cleaning, carefully remove the torsion spring and lift out the upper element. Dry with a soft, lintless cloth.

STORAGE IN CASE

When the underwater housing is stored in the case, rotate the grip ring 120° (1/3 of a turn) and turn the rubber eyepiece inside out.

EACH HOUSING IS SUPPLIED WITH THE FOLLOWING STANDARD ACCESSORIES:

- 57614 Front dome ring (attached)
- 57622 Rear dome ring (attached)
- 57630 Domes, 2 (attached)
- 57649 Reflex viewfinder
- 57657 Toothed focusing ring
- 57665 Toothed aperture ring
- 57673 Toothed shutter speed ring
- 57401 Special grease
 - Pump
 - Valve
- Distance scale for 80mm Planar C

OTHER ACCESSORIES

- O-ring 21808/1 (3)
- O-ring 21808/10 (1)
- O-ring 21808/11 (1)
- O-ring 21808/12 (1)
- O-ring 21808/13 (1)
- O-ring 21808/14 (1)
- Set screw SSS 3×4 (3)
- Set screw Sk6SS 3×8 (4)
- Set screw PSS 6×10 (3)
- Hex key N 1.5
- Lamp

The housing is supplied in case 57681

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