

ASW 24 Maintenance Manual

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2.4 Waterballast System

The waterballast installation allows the all-up mass of the ASW 24 to be increased to a maximum take-off mass of 500 kg (1102 lbs).

This corresponds to a wing loading of 50 kg/m² (10.24 lb/ft²).

For the operation of the waterballast valves, an electrical system is used, which then further simplifies the connection of the controls by means of automatic coupling of plug-and-socket connectors in the course of rigging the wings. The electrical system uses 6 V, but will still work at 4.5 V. The radio and electric vario will have ceased to function long before the battery voltage reduces to that level.

Further details of the electrical actuation circuit will be found in the circuit diagram Fig.2.6.-2.

The valves are commercial quality back pressure ball valves as supplied by Messrs. GF, in which a supplementary stainless-steel closed-position ball retaining spring has been fitted.

The waterballast drain valves are wired up in such a fashion that both valves are opened and closed by one switch only.

The water drain tubes (outside dia. 20 mm = 0.8 in; inside dia. 15 mm = 0.6 in) are covered by a fairing at the wing trailing edge under side, at approx. 0.65 m (2.13 ft) sideways of the fuselage.

The water ballast is filled into 2 mutually independent, double-walled plastic bags. (Otherwise according to TN no.3 single-wall "Smiley" water bags may be used.)

Filling the water ballast is best done by means of a Y-shaped hose coupling so that both water bags are filled simultaneously. The wings should be supported level.

If no Y-shaped hose coupling is used and each water bag is filled separately, the respective other drain valve must be closed and sealed by means of a suitable stopper (cork) while the water is filled. After closing the valves, the stopper must be removed from the wing and then check that both drain tubes are open !

CAUTION: Grossly unequal filling of ballast can cause failure of the wing shells during a spin. Therefore the water ballast system should be carefully maintained as follows:

- Use only clean water for ballast, which must be further filtered through the strainer in the filling appliance.
- As the prolonged effect of moisture can harm structures incorporating an epoxy resin matrix, (e.g. wavy deformation of the wing shell and impaired wing profile), it is strongly recommended that after each flight with waterballast the ballast bags should be checked for leakage.
- If the bags are not going to be used for any appreciable time they should in any case be removed.

- Never fill direct from the water supply, or by means of pumps. Even low pressures can damage the wing. A head-of-pressure of about 7 m = 0.7 bar (or 22.97 ft = 10.15 psi) will break the wing shells.
- It is essential always to fit double-walled water bags, except when using "Smiley" water bags as per TN no.3!

There are two ways of checking the symmetrical draining of the ballast bags :-

1. Each valve servo motor has two end position switches which activate either a green LED (valve open) or a red LED (valve closed) in the cockpit switch panel.
2. All water trails from drain valves are easily seen from the cockpit. This visual check should never be omitted !

Fitting and Dismantling of Water Ballast Bags, Maintenance Instructions

Open the water ballast valves, detach the vent tubes from the vent fitting in the fuselage and de-rig the wing. If the ventilation is integrated in the wing, the vent tubes are disconnected at the wing root.

As shown in Fig.2.2-6, the waterballast bag is fixed at the front root rib by means of two nylon cords. Untie the fixing cords and unscrew the bracket plate with the electrical connectors.

Tie the end of the longer fixing cord back to the root rib so that the cord cannot be pulled out of the wing.

Now remove the valve from the automatic plug connector by pulling the orange ring in flight direction which will separate the valve from the drain tube.

The water bags may now be carefully drawn out from the apertures in the root ribs; please pay attention that there is a plastic tube (about 2.5 m = 8.2 ft long) inside the bag, running from the valve to the constriction of the water bag, and that the re-inforcements at both ends of the bags should be presented in an oblique attitude during this operation. Lay the bags out on a clean surface. Untie the long nylon fixing cords from the bags and leave them inside the wing.

Testing the Valves

As shown in Fig. 2.4-1 the valve is opened for cleaning by unscrewing the union nut; inspect sealing ring, ball and spring and replace if necessary. If the valve has a leak at its actuation rod, replace the groove sealing ring. Inspect the foam rubber of the valve servo motor which operates the end-position indicator switches.

Re-assemble valve. When carrying out these tasks on or affecting the valve, care should be taken not to bend the brass mounting plate.

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Through the other vent tube, now inflate the water bag carefully by means of an air pump or compressed air to a pressure of about 0.2 bar (2.90 psi), or 2 m (6.56 ft) water column, (i.e. 2 m height difference between the two water surfaces in the U/tube manometer vent tube), and then close it. If no pressure drop can be observed after 5 minutes, it may be assumed that the bag is watertight.

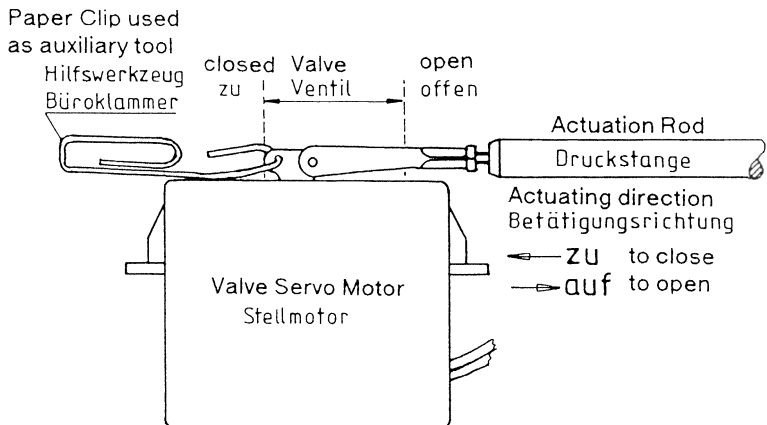


Fig. 2.4-3 Valve Operation

Open the valve in accordance with Fig. 2.4.-3 and release the pressure.

All water bags must be tested for leakage!

Re-Fitting of Water Ballast Equipment

- Tie the nylon fixing cords to the bags and draw the bags carefully into the wings by means of the fixing cords (the re-inforcements at both ends of the bags again should be presented in an oblique attitude during this operation).
- Re-fit the valve to the drain tube in the wing and check its tight seat by pulling the valve into flight direction.
- Tighten the fixing cords of the bags and tie them to the wing root rib; stow remaining cord in the wing.
- Screw back the bracket plate with the electrical connectors.
- If the vent fitting is in the wing:
Re-connect the vent tubes at the wing root rib.
- If the vent fitting is in the fuselage:
After rigging the wings, the vent tubes are re-connected at the vent fitting in the fuselage.

In case of difficulties or problems, consult Messrs.Schleicher.

Storing the bags outside the wing

Water bags must always be kept in a dark, cool and dry place.

Repair

"Smiley" water bags as per TN no.3 may be repaired using bicycle repair kit.

Instruments

The flight monitoring instruments are not normally subject to service life limitations. As a general rule, the makers' instructions should be complied with.

Oxygen Installation

Oxygen systems and oxygen supply must comply with JAR 22.1441 and 22.1449 ! .

For oxygen systems fitted, the relevant section of the appertaining Inspection Release Certificate states the overhaul time limit. Over and beyond this, the oxygen bottles must be re-inspected by a technical inspection institute every five years in accordance with pressure vessel regulations.

Water Bags

Water bags as per TN no.3 have a preliminary service life of 6 years. Prior to the expiry of this time limit the customer should contact SCHLEICHERS and check whether it is possible to increase this service life by means of a special Inspection Program.

7.1. Special Inspection Procedures

After Hard Landings

1. Check landing gear mountings at the top of the front main bulkhead !
2. Check landing gear wheel fork, as well as toggle strut, A- and horizontal struts for distortion !
3. Are the rubber buffers in the L/G springing still serviceable ?
4. Check tail wheel mountings!
5. Examine spar fork and tongue for white areas !
6. Inspect wing mounting drag pins on fuselage !
7. Check drag spar cross tubes and bulkheads in the fuselage !
8. Re-establish wing bending frequency and compare with the value shown in the last inspection report ! If they differ by more than 5 %, contact Messrs. Schleicher ! For correct fuselage support positions see Fig. 3.0-1.

After Groundloops

1. Inspect the tail boom at the fuselage-to-fin junction and the horizontal tail mountings at the fin !
2. Check wing mounting drag pins on fuselage !
3. Inspect drag spar cross tubes and bulkheads in fuselage !
4. Examine horizontal partition in fuselage (between front and rear main bulkhead) !

After Flying with Water Ballast

After de-rigging the aircraft, briefly raise the tips of the wings and check whether water originating from the ballast bags accumulates behind the root ribs.

If water is found there, the water bags and the valves should be checked for leaks. Seeping or leaking valves must be overhauled in accordance with Section 2.4 without fail.

Do not forget to dry the wings out !
Always picket the aircraft with valves open !

Trial Filling of Water Bags

In the course of the annual C of A inspection, a test filling of the ballast bags should be carried out. During this test, special attention should be paid to water seepage from the bags and to dripping valves.

Inspection and Pressure Test for water bags as per TN no.3 :

In addition to the annual inspection as described in Section 2.4, the water bags must be tested for leaks and porosity after two and four years as follows:

Dismantle the water bags and make a pressure check with water. After reaching the test pressure of 0.2 bar (2.90 psi) and after a temperature & pressure balance time of 2 min. the pressure drop after another 5 minutes must not be greater than 1 %, and after 30 min. no water pearls must be seen on the otherwise dry surface of the water bags.

12.6 Maintenance Instructions

The following Maintenance Instructions are established from time to time as required, in accordance with experience accumulated in operating the ASW 24. The Maintenance Manual is to be supplemented in case of new issues of Maintenance Instructions.

The general "Maintenance Instruction ALL FRP GLIDER MODELS dated June 19, 1986" describes the removing of play between the sockets (= bushings) and bolts (= pins) of the wing-to-fuselage transition.

The general Maintenance Instruction "PAINT CRACKS" dated June 26, 1989, describes how to inspect, preserve, and repair the paint surface.

The Maintenance Instruction A for the ASW 24 (dated Feb.5, 1990) describes how to apply or replace the elastic plastic fairing strips for the control surface gaps.

The Maintenance Instruction B for the ASW 24 (dated Feb.7, 1990) describes how to apply or replace the turbulators on the wing, and on the horizontal and vertical tail unit.

The Maintenance Instruction C for the ASW 24 (dated April 26, 1990) describes how to repair the landing gear box.