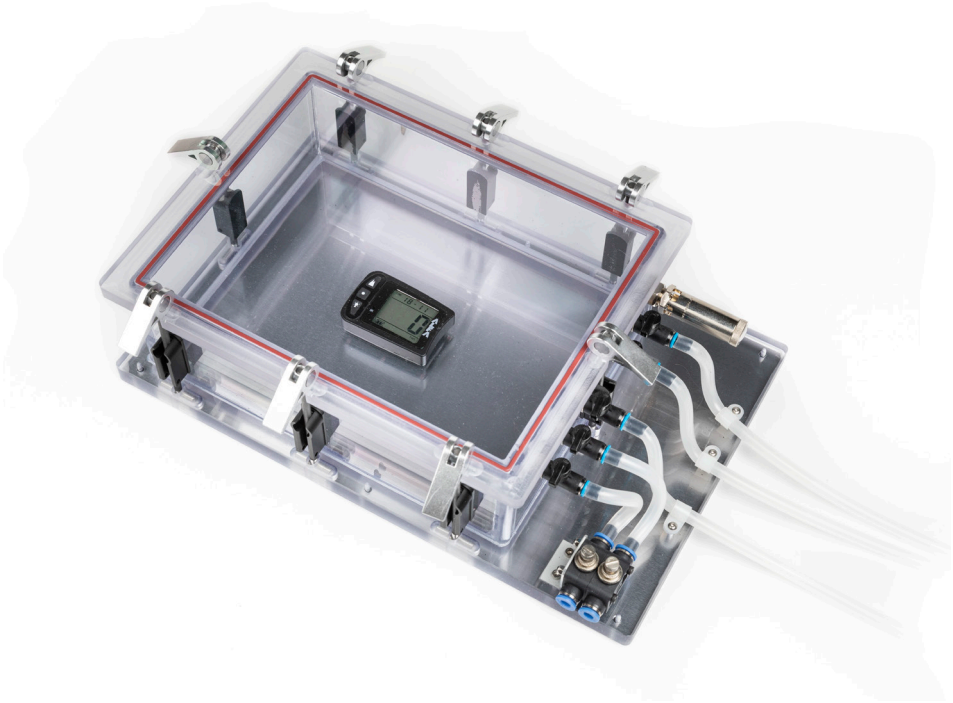
TACTICAL ALTIMETERS

AIR PRESSURE TEST CHAMBER™



INSTRUCTION MANUAL

rev. 1.04, November 2019

Table of Contents

Introduction

The LB Air Pressure Test Chamber™ is a compact, portable, field operational pressure chamber, secured in an air case.

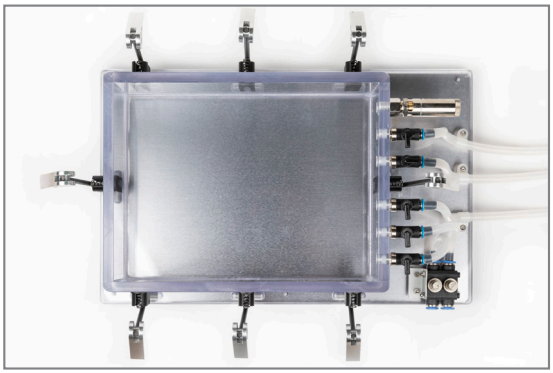
Main features

- Simulates climbs from 0-35,000 ft (0-10.000 m) MSL
- Positive air pressure. Simulates relative DZ elevations down to -10,000 ft (-3.000 m) MSL, starting from any elevation
- Water test chamber. Simulates water depths down to 15 ft (5 m)
- Preset release valves for simulating freefall speeds and canopy flights
- Field operational. No external power needed

Please read instructions prior to use.

The air pressure test chamber is equipped with a over pressure valve. The valve releases at 1.2 bar to protect the chamber from exceeding the limits of its design.

Section 1: Parts



Air pressure test chamber

Vacuum pump

Sucks air from the chamber, simulating aircraft climb.

Air pump

Pumps air into the chamber, simulating a lower DZ elevation or a water depth when performing waterproof test

LB ALFA reference unit
(included)

Air pressure tolerance +/- 0.5 mbar

Operating instructions
Section 6-1:
LB ALFA Reference Unit

Omega HHP-360-A
(optional accessory)

Calibrated reference unit with tolerance better than +/- 0.5 mbar

Operating instructions
Section 6-2:
Omega-HHP-360-A

Suunto Zoop Novo
(optional accessory)

Calibrated reference unit for waterproof testing

Operating instructions
Section 6-3:
Suunto Zoop Novo

Section 2: Setting Up the Test Chamber

The vacuum chamber is fully operational while in the case.

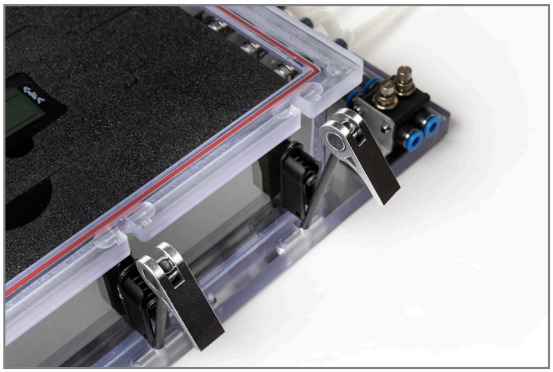
For clarity, the steps for setting up the test chamber are shown with the chamber outside the case on the following pages.

OPTIONAL STEPS

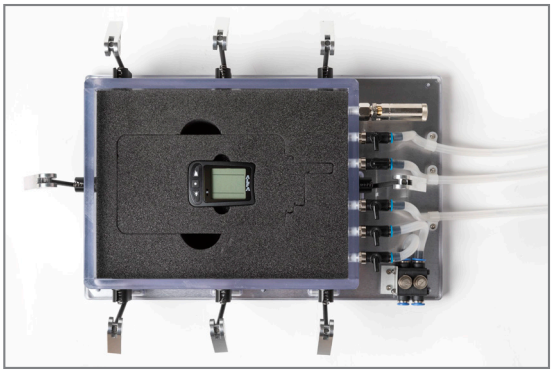
If preferred, the vacuum chamber can be removed from the case like this:

0A. Remove chamber from case.

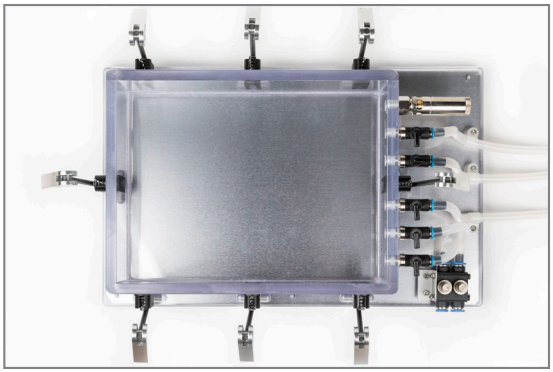
0B. Remove pumps.



1. Open 8 clamps.
Note: Open the side clamps last to prevent the lid from “hinging open”.

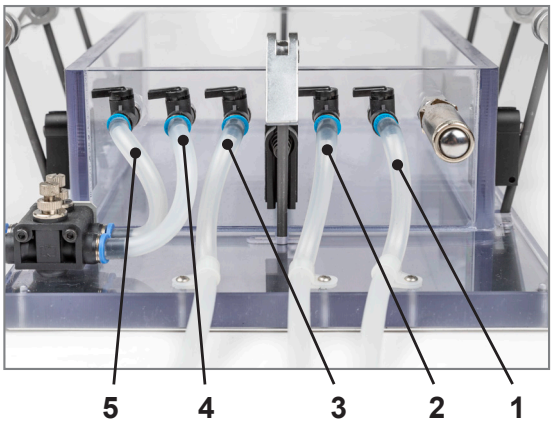


2. Remove lid.



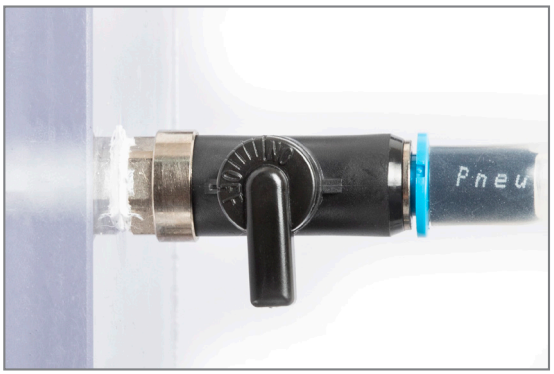
3. Remove any instruments and foam.

Foam bed may remain in the chamber when performing dry air pressure tests. Remove foam bed when performing waterproof testing.



4. Connect each line to its corresponding device:

Line 1 – Optional Omega
Line 2 – Air pump
Line 3 – Vacuum pump
Line 4 – Left manifold inlet
Line 5 – Right manifold inlet

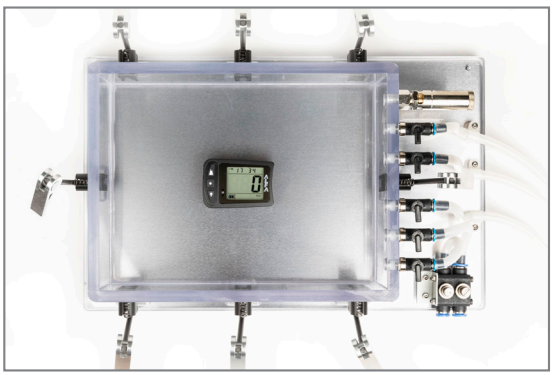


5. Verify that all valves are closed (90 degrees relative to valve bodies).

6. Push the corresponding tube firmly onto the nipple of the corresponding pump.
Note: To make a good seal, push the tube flush to the base of the nipple.

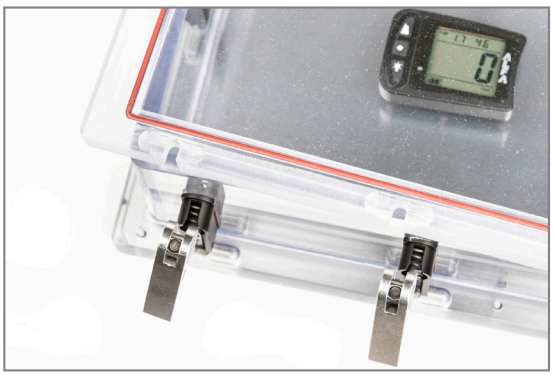
Section 3: Altitude Test

This test verifies the performance of an altimeter during climb, freefall and canopy flight.

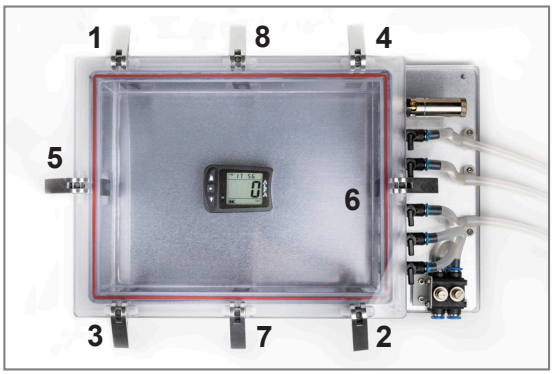


1. Connect the vacuum pump to line no. 3.

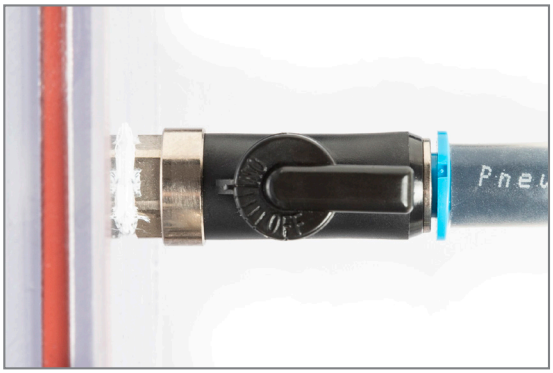
2. Zero or offset altimeters and place them in the chamber.
Note: Do not place devices against the side of the chamber.



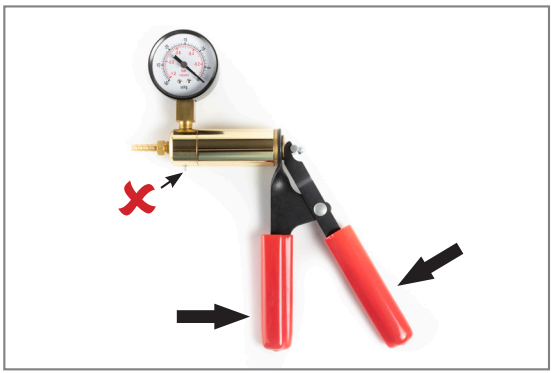
3. Verify that the lid and silicone o-ring are properly seated, clean, not damaged and that the ends of the gasket mates against each other.



4. For best sealing, secure the clamps in a star pattern.

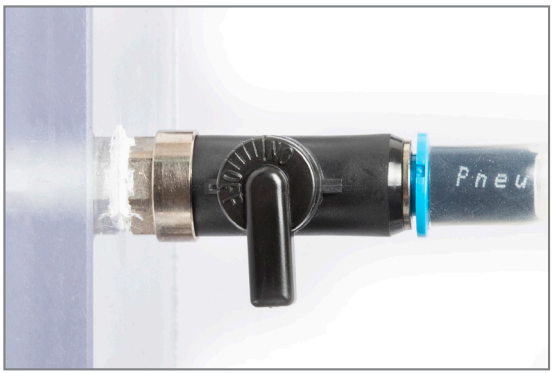


5. Open valve no. 3 (handle parallel with valve body).



6. Pump air out of the chamber by repeatedly squeezing the vacuum pump handles. 10 pumps equal approximately 1,000 ft (300 m) climb.
Note: Be careful not to press the pump cylinder air release valve.

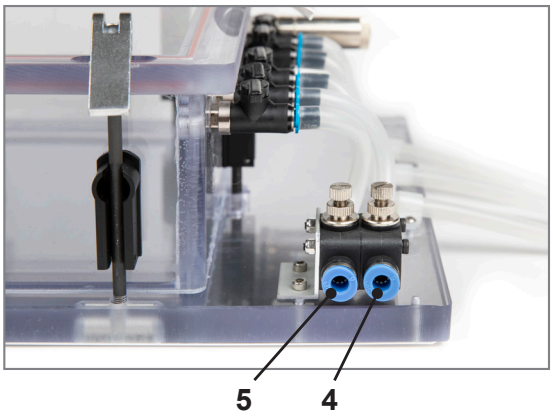
LB altimeters switch to Jump Mode at approximately 1000 ft (300 m).
Note: Do not exceed an air pressure change of more than 25 ft/s during the first 1,000 ft (300 m).



7. Go slightly above the desired altitude, close valve no. 3 and let the chamber's air pressure settle (it may take up to 60 seconds).

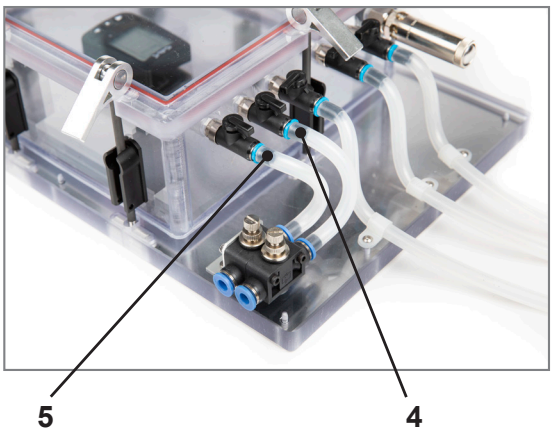
Slowly open valve no. 4 slightly and let air slowly into the chamber.

Close the valve when reaching the desired altitude.



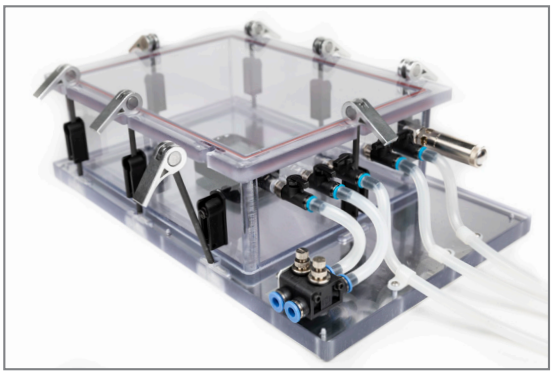
8. Descent rate.

Valves 4 and 5 can be set by the user to a preset descent rate.



9. Testing descents.

Open valves 4 and/or 5 to release air at the preset descent rate.



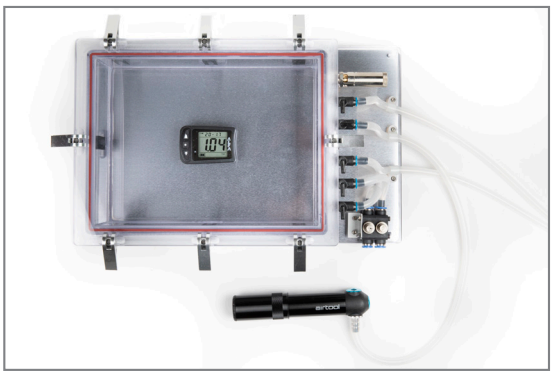
10. Removing the lid.

Open valves no. 4 and 5, then wait until the ALFA reference unit reads zero or wait two minutes before removing the lid.

Section 4: QFE Offset Test

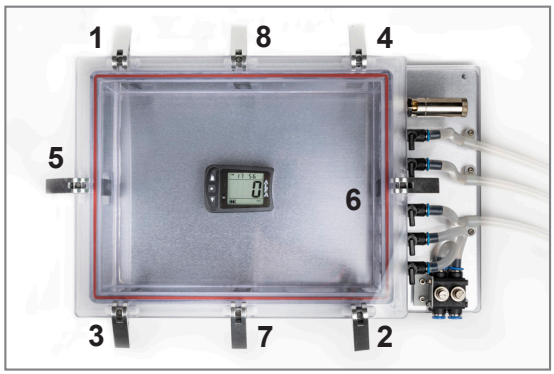
Use QFE offset test to verify a preset positive mbar offset.

Example: The takeoff elevation is at 1,000 ft (300 m) MSL and the DZ is at sea level.



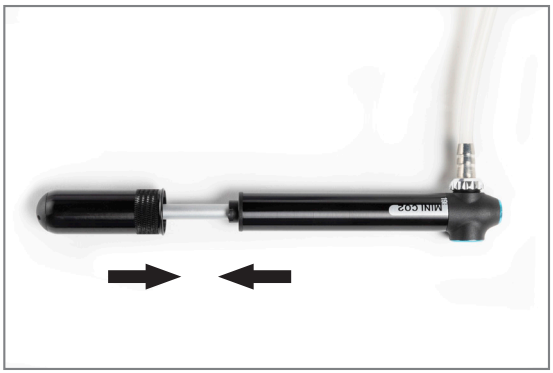
1. Preset the offset to 1,000 ft (300 m) and place the unit in the chamber.

2. Attach the air pump to line 2.



3. For best sealing, secure the clamps in a star pattern.

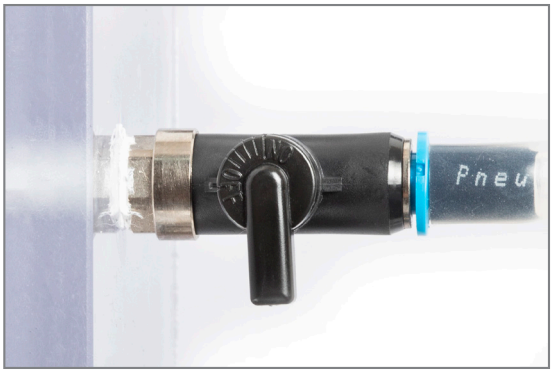
4. Open valve no. 2 (valve handle parallel with the valve body).



5. Pump air into the chamber

6-8 pumps equal approximately 1,000 ft (300 m).

Note: Do not exceed an air pressure change of more than 25 ft/s during the first 1,000 ft (300 m)



6. Go slightly below the desired altitude, close valve no. 2 and let the chamber's air pressure settle (it may take up to 60 seconds).

Open valve no. 4 slightly and let air slowly out of the chamber.

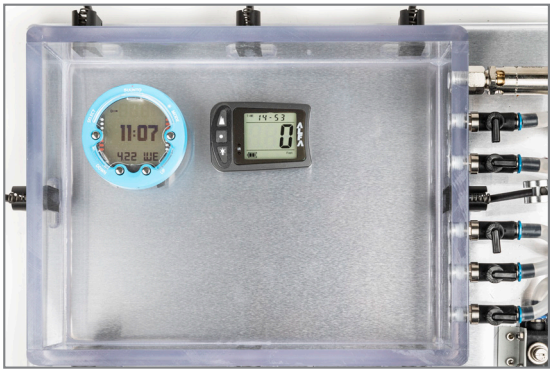
Close the valve when reaching the desired altitude.

Compare the reading against the ALFA reference unit to verify that the offset is functioning correctly.

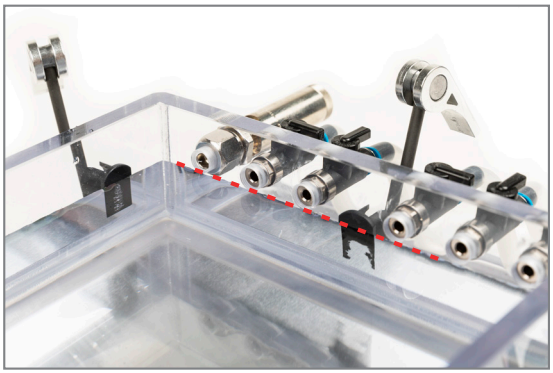
Open valve no. 4 and no. 5, then wait until the ALFA reference unit reads zero or wait two minutes before removing the lid.

Section 5: Waterproof Test

This test verifies the waterproofness. Leave the units in the chamber at the pressure (depth) and time specified in the instruction manuals.

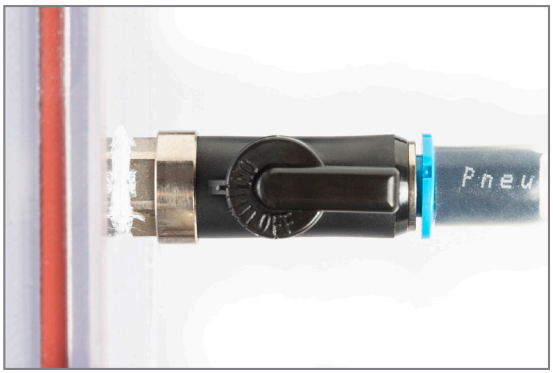


1. Place the Suunto Zoop Novo and units in the chamber.

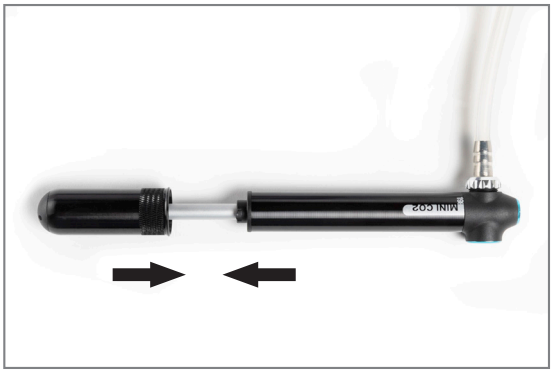


2. Carefully fill the chamber with water until it covers the altimeters, but not exceeding the maximum level, which is just below the bottom of the inlets.

Warning! All devices must be in the chamber prior to filling with water. Each device may displace enough water to cause overflow in the air pump valve.

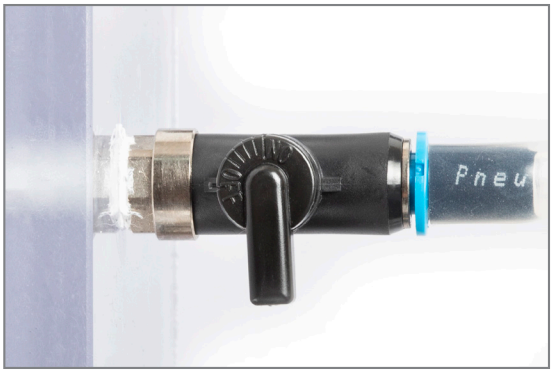


3. Open valve no. 2 (valve handle parallel with the valve body).

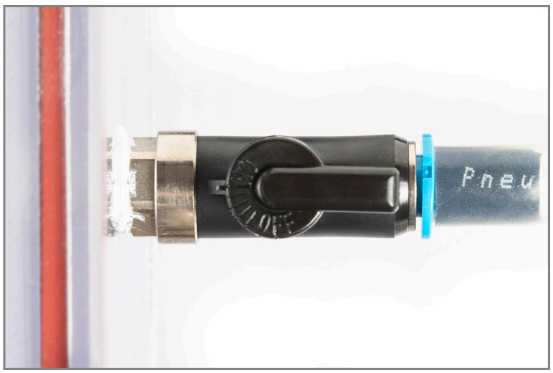


4. Pump air into the chamber by repeatedly moving the pump handle in and out.

12-20 pumps equal approximately 5 ft (1.5 m). The number of pumps varies greatly depending on the amount of water in the test chamber.



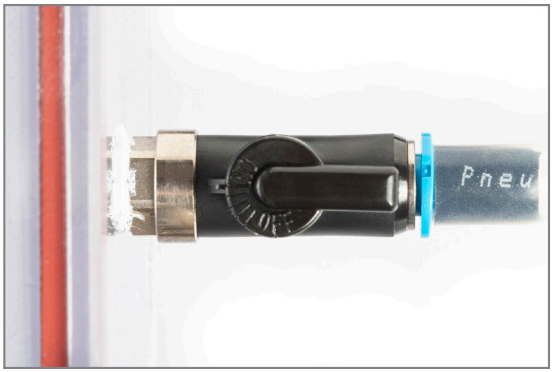
5. Go slightly below the desired depth and close valve no. 2. Let the chamber's air pressure settle (it may take up to 60 seconds).



Open valve no. 4 slightly and let air slowly out of the chamber. Close the valve when reaching the desired depth.
Note: only use valve no. 4 when there is water in the chamber.

The chamber's pressure settles after up to 60 seconds.

The simulated depth pressure will be desplayed on the top line of the Suunto Zoop Novo.



6. Open valve no. 4.
Note: Do not open any other valves that have inlets below the water line.

Section 6-1.A: Accessories - LB ALFA Reference Unit

The ALFA reference unit is a selected altimeter with an accuracy of +/- 0.5 mbar.

It has two display modes:

The default setting shows mbar pressure on the top of the screen and vertical speed (in MPH or KM/H) in the middle of the screen.

The display can be changed to read vertical speed (in ft/s or m/s) on the top of the screen and altitude (in ft or m) in the middle of the screen.

Turn the unit ON

1. Press and hold any button until the screen turns ON, then release the button.

The unit will remain ON for 14 hours after the last test or 14 hours after performing ACCESS.

The MODE button is the center button (2)
The UP button is the top button (1)
The DOWN button is the bottom button (3)

If the unit is set to display **speed** as the primary function, then the topline will show mbar reading (ie 1023.3 mbar).

If the unit is set to display **altitude** as the primary function, then the topline will show F.SEC, M.SEC, MPH or KMH.

Section 6-1.B: Changing Speed Readout Settings

1. Push and hold the “mode” button to turn the ALFA ON.

2. Press and hold the “mode” button and release it when the display shows the speed unit in the top line and a “-“ in the main screen.

The display will show a number from 1-4 while the top line shows a corresponding unit of speed.

3. Press “up” or “down” to toggle between each unit of speed

1: MPH (Miles Per Hour)
2: KMH (Kilometers Per Hour)
3: F.SEC (Feet Per Second)
4: M.SEC (Meters Per Second)

4. Press “mode” to save the setting.

The display will now show a number from 1-3 while the top or bottom line shows a corresponding unit of pressure.

5. Press “up” or “down” to toggle between each unit of pressure.

1: FEET (Altitude in feet)
2: METER (Altitude in meters)
3: MBAR (Pressure in mbar)

6. Press “mode” to save the setting.

Section 6-2: Accessories - Omega HHP-360-A

Omega HHP-360-A calibrated reference manometer (optional accessory) is used when testing units to very precise levels.

Download manual
https://www.omega.com/manuals/manualpdf/M4928.pdf

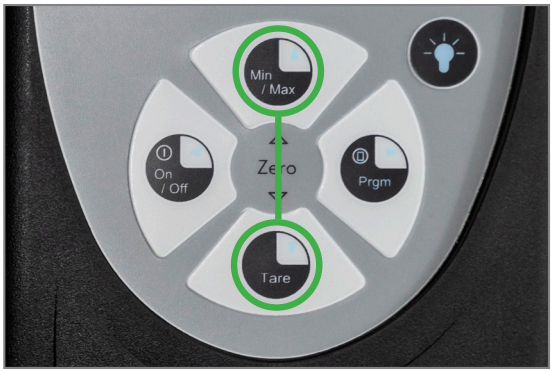
1. Attach the Omega HHP-360-A to line 1

Note: To ensure the best seal, line 1 should be pushed completely onto the inlet stem of the manometer.

2. Turn manometer ON and open valve no. 1 prior to starting a vacuum test.

Warning! Do not connect the Omega when the chamber is filled with water. Accidental opening of valve will destroy the Omega.

The manometer starts in monitoring mode, displaying altitude zeroed to the present elevation.



Zeroing the manometer in “TS” mode.

3. Press the “Min/Max” button and “Tare” button simultaneously.

4. When “ZEROING SOURCE:” appears, toggle up by pressing the “Min/Max” button.

5. When “FACTORY ZERO” appears, press “Prgm” to enter.

The manometer should read “0” in TS mode and your field elevation in “S” mode.

Section 6-3: Accessories - Suunto Zoop Novo

The Suunto Zoop Novo (optional accessory) can be used as a depth gauge for waterproof testing.

Download manual
https://ns.suunto.com/Manuals/Zoop_Novo/Userguides/Suunto_ZoopNovo_UserGuide_EN.pdf

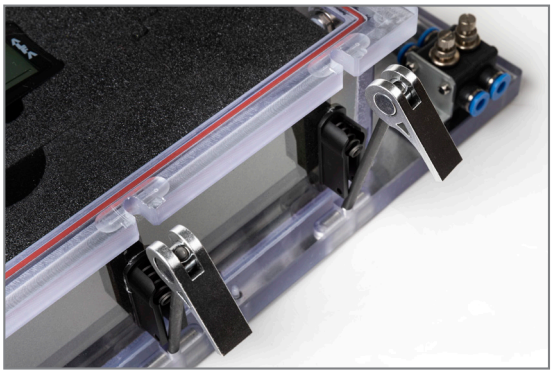
1. Wake up the Suunto Zoop Novo by pressing any button.
Note: To save battery life, the display will turn OFF after 30 minutes of inactivity.

2. To enter “dive mode”, push the mode button until “DIVE” appears on the screen.
Note: The dive type does not matter for this application.

The Suunto Zoop Novo should automatically switch to Dive Mode once the water pressure reaches a simulated 4 feet of depth, even from sleep mode. However, Suunto recommends waking up the Zoop Novo manually to check settings and battery life.

The Suunto Zoop Novo will read the simulated depth pressure on the top line.

Section 7: Storage



Leave clamps open during long term storage.

Keep Pelican case closed when not in use.

Troubleshooting

Altimeter not maintaining altitude:

- ensure the lid is properly sealed
- ensure the silicone o-ring is properly seated, clean, and damage free
- ensure the valves are closed after pumping
- the altimeter is broken

Part list

NSN	Supplier Part No.	NATO Description	OEM Item Name/Description
5330226339680	191014	Packing, Preformed	Pelican Air Case 1525 Air
6135009857845	Dp-Aa-Lr6	Battery, Nonrechargeable	Omega Hhp-360-A Batteries
6636226330583	191010	Chamber, Environmental Testing	Lb Test Chamber
6636226339676	191011	Chamber, Environmental Testing	Lb Test Chamber (Chamber Only)
6636226339677	191012	Chamber, Environmental Testing	Test Chamber Lid
6675226339665	285828-Tc	Indicator, Height	Alfa Reference Unit
6685016607660	191015	Manometer Assembly	Digital Barometer Precision Absolute Manometer
7610226339670	191010-Um	Manual, Technical	Instruction Manual, Test Chamber
8135226339686	191017	Cushioning Material, Packaging	Foam Insert
4320226339699	191013	Ejector Assembly, Air	Air Pump, Adapter Included
4320226339700	191021	Ejector Assembly, Air	Air Vacuum Pump
4720226339703	191018	Hose Assembly Set, Nonmetallic	Vacuum/Pressure Hoses
4920226339690	191020	Manifold, Test	Adjustment Manifold
6636226339677	191012	Chamber, Environmental Testing	Vacuum Chamber Lid
TBA	191022	TBA	Open/Close Valve
TBA	191023	TBA	Over Pressure Valve, Adapter Included
TBA	191024	TBA	Silicone O-ring
TBA	192025	TBA	Clasp, holder-spring-nut included
TBA	191016	TBA	Suunto Zoop Novo

Specifications

Pelican Air Case, Model 1525 Air:

Overall dimensions (LxWxD):	21.96 x 13.97 x 7.49 in (558 x 355 x 190 mm)
Weight (including “tools”):	19.84 lbs (9.0 kg)

Dust and crushproof case with a watertight O-ring gasket

Test Chamber:

Outside measurements:	14 x 8 x 4.5 in (350 x 200 x 108 mm)
Inside chamber:	9.5 x 7.5 x 2.7 in (239 x 179 x 70 mm)
Weight:	7.3 lbs (3.3 kg)
Material:	10 mm naturally transparent Polycarbonate
Holds up to:	12 ALFAs and/or ECHOs or 6 MA AltiTracks

Operating Limits:

Vacuum Pressure chamber:	simulates up to 35,000 ft (10.000 m) MSL altitudes
Positive pressure chamber:	simulates up to minus 10,000 ft (3.000 m) MSL, starting from any elevation
Water chamber:	simulates up to 15 ft (5 m) of water depth (pressure).
Operating Temperature Range:	-0 to +40 °C.
Operating Humidity Level:	0% to 95%

Minimum simulated altitude increments: 10 ft (3 m)

LB ALFA reference unit:

Spec. TBA

Warranty:
If within 12 months of the purchase of LB-Test Chamber™ a defect or damage is identified by faulty manufacture, LARSEN & BRUSGAARD will repair the unit at no cost the end user. To make a claim under this warranty, send the unit to an authorized dealer or directly to LARSEN & BRUSGAARD together with the dated purchase invoice or receipt.

The warranty becomes void if damage is caused by external circumstances or if the unit has been serviced or repaired by third parties unauthorized by our national agents or LARSEN & BRUSGAARD.

All further claims, especially for defects after skydiving accidents, are excluded.

LARSEN & BRUSGAARD has no obligation to honor any extension of warranty granted by any national agent.

Waiver of Liability:
The buyer and user of LB-Test Chamber™ indemnify the manufacturer and vendor from any liability for damage incurred before, during and after skydiving with any instrument tested in LB-Test Chamber. The buyer and user of LB-Test Chamber™ indemnify the manufacturer and vendor from any liability for damage incurred before, during and after use of LB-Test Chamber™.