# Jetsam Technologies Ltd.

## Product Information
## 2005

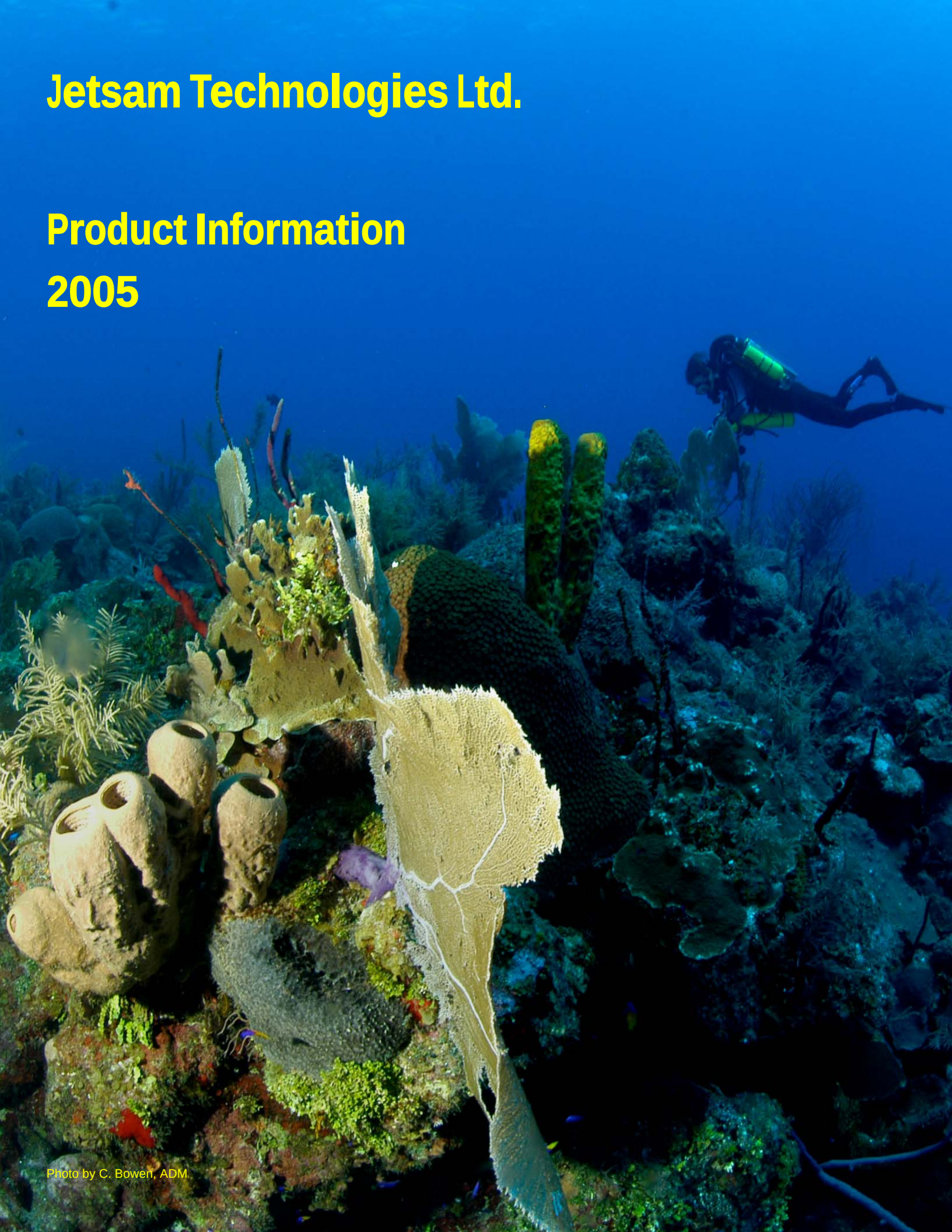


Photo by C. Bowen, ADM

# Classic KISS Rebreather Kit

## Specifications

- Weight with full 13 cu.ft. aluminum tanks, full scrubber, but no BC backplate or harness is 51 lb (22 kg).
- Bailout integrated DSV is included.
- Three independent PO2 displays. Each with it's own housing, battery and sensor.
- O2 is added both continuously by a feed orifice and manually as needed.
- Scrubber holds 5.7 lb (2.7 g) of 4-8 Sofnolime and is rated for 3 hours.
- The Classic KISS is a closed circuit rebreather designed for recreational and technical sport diving. It is not recommended for diving deeper than 250 feet (75 meters), cave diving or wreck penetrations.

## Features

The KISS Rebreather Kit comes with the orings NOT installed. You will have to do this yourself. However, the orings for the DSV, ADV, manual add valve and the displays are already in place.

### Oxygen Control

This is a manually controlled CCR. It is not electronically regulated in any way. The diver is completely responsible for maintaining the PO2.

### PO2 displays

This is the only CCR with totally independent, redundant, backlit displays. Battery's are user changeable. Each display can be replaced independently and spares are easily affordable.

### Scrubber

The scrubber has a basic axial flow design which is resistant to "channeling" (allowing the gas to bypass the scrubber bed) but has a higher breathing resistance than radial flow designs.

### Counterlungs

The CCR uses two back mounted counterlungs (split counterlung) that are available in three sizes; 2, 4, and 6 liter capacity. A combination of these will normally allow a good match between the counterlung volume and the divers lung capacity. This match permits easier control of buoyancy.

Back mounted counterlungs leave the chest area clear and reduce the number of hoses and fittings compared to over the shoulder counterlungs found on other CCR designs.

These counterlungs are also subject to changes in breathing resistance as the diver changes positions in the water. If you roll on your back you can expect a case of chipmunk cheeks. Nothing is perfect.

### DSV (Mouthpiece)

This mouthpiece can go to open circuit mode with a twist of a knob. It can provide an alternate method of adding diluent gas or even an alternative diluent depending on the connection. It is an easy way to purge the rebreather for verifying the sensor readings. It can also prevent panic in the case of a malfunction in the CCR by allowing a fast, simple way of getting your next breath.

### ADV (Automatic Diluent Valve)

This valve adds diluent when the loop volume is reduced by either descending or "breathing down" the volume of oxygen. Suddenly finding yourself unable to get a breath during a rapid descent could be a panic inducing situation.

The ADV must be set up "tight" enough that it doesn't add diluent without the diver being aware. It also needs to add enough gas so that a reasonable descent rate can be maintained.

Anytime the ADV triggers you need to check your PO2. You have either descended and compressed the gas in the loop or you have consumed enough oxygen to reduce the PO2 significantly. This may also have caused you to lose buoyancy and descend.

### Tanks

Using 13 cu.ft. tanks are recommended. As the limiting factor on the CCR is the 3 hour scrubber, this provides plenty of gas. A 13 cu.ft. oxygen tank will provide 5 hours of oxygen at a consumption rate of 1 liter per minute. A 13 cu.ft. diluent tank will provide enough gas for an experienced rebreather diver to do two, 1 hour long dives to 150 ft.

If you carry more gas than this, and you should, it should be in the form of emergency bailout, open circuit gas in separate tanks.

A larger diluent tank is not an adequate bailout gas supply. Carefully analyze the failure paths on your gas supply and don't put all your eggs (gas) in one basket (tank).

# KISS CLASSIC

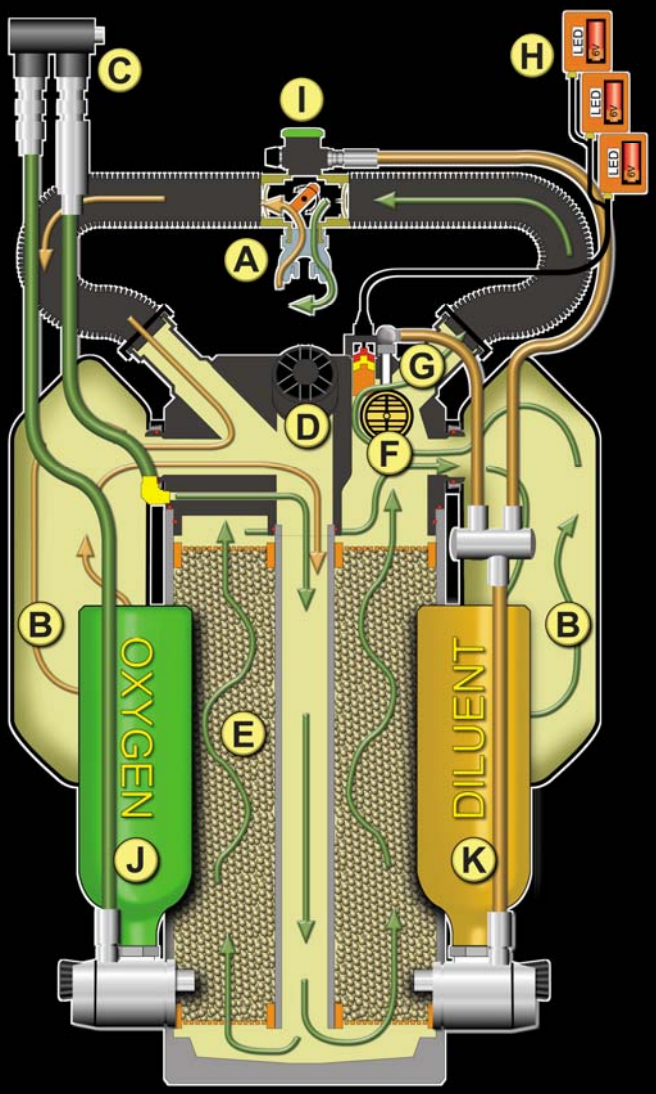



Illustration by Curt Bowen, ADM
www.advanceddivermagazine.com

A. **DSV:**
**Dive Surface Valve**

B. **Counterlungs:**
**2 liter, 4 liter, or 6 liter**

C. **Oxygen Manual Add Valve with 15 micron filter**

D. **Exhaust Valve**

E. **Scrubber Canister:**
**approximately 6 lbs (2.7 kg)**

F. **ADV: Automatic Diluent Valve**

G. **Triple Sensor Well:**
**R22D Teledyne Sensors**

H. **PPO2 Displays:**
**Three independent PPO2 displays. Each with its own housing, battery and sensor.**

I. **Bail-out Second Stage:**
**The bail-out second stage is incorporated into the DSV. To switch from closed circuit to open circuit bail-out, simply close the breathing loop. The bail-out second stage is plumbed to the diluent tank. NOTE: the bail-out second stage is for getting a sanity breath only. Divers should carry a redundant bail-out system for emergencies.**

J. **Oxygen Tank & First Stage:**
**13 cuft tanks are recommended.**

K. **Diluent Tank & First Stage:**
**The Classic KISS is compatible with either air or trimix as a diluent gas. 13 cuft tanks are recommended.**

# Sport KISS Rebreather Kit

## Specifications

- Weight with full 13 cu.ft. aluminum tanks, full scrubber, aluminum counterlung case, but no BC backplate or harness is 39 lb (17 kg). With the stainless steel counterlung case the weight is 45 lb (20 kg).
- Bailout integrated DSV is included.
- Three independent PO2 Displays. Each with it's own housing, battery and sensor.
- O2 is added both continuously by a feed orifice and manually as needed.
- Scrubber holds approximately 5 lbs (2.3 kg) of 4-8 Sofnolime and is rated for 2.5 hours.
- The Sport KISS is a closed circuit rebreather designed for recreational sport diving. It is not recommended for diving deeper than 165 feet (50 meters), cave diving or wreck penetrations.

The Sport KISS Rebreather Kit comes with the orings installed. However, the components do need to be assembled.

## Features

Many features of the Sport KISS Rebreather such as the Oxygen Control, PO2 displays, DSV, ADV, and the recommended tank size are the same as the Classic KISS Rebreather. Changes are as follows:

**Scrubber**

The scrubber is a bi-axial rectangular shaped container that has a divider in the middle between the exhalation and inhalation sides. The divider goes down about 2/3rds of the way leaving an opening at the bottom which joins both sides. Scrubber is added through 2 large openings at the top. Split counterlungs are attached at the bottom.

On exhaling the gas flows through one side of the scrubber into the exhalation counterlung. Once this lung is full, the gas will pass through the opening at the bottom of the canister to the inhale side and down into the inhalation counterlung. When the diver inhales the gas comes from the inhalation counterlung first and is then pulled across the container from the other lung. This means that the gas passes through the scrubber 2 times before being inhaled by the diver.

This configuration provides extremely low breathing resistance and is a very efficient use of the scrubber. The downside is that when the scrubber is used up, break through will happen abruptly.

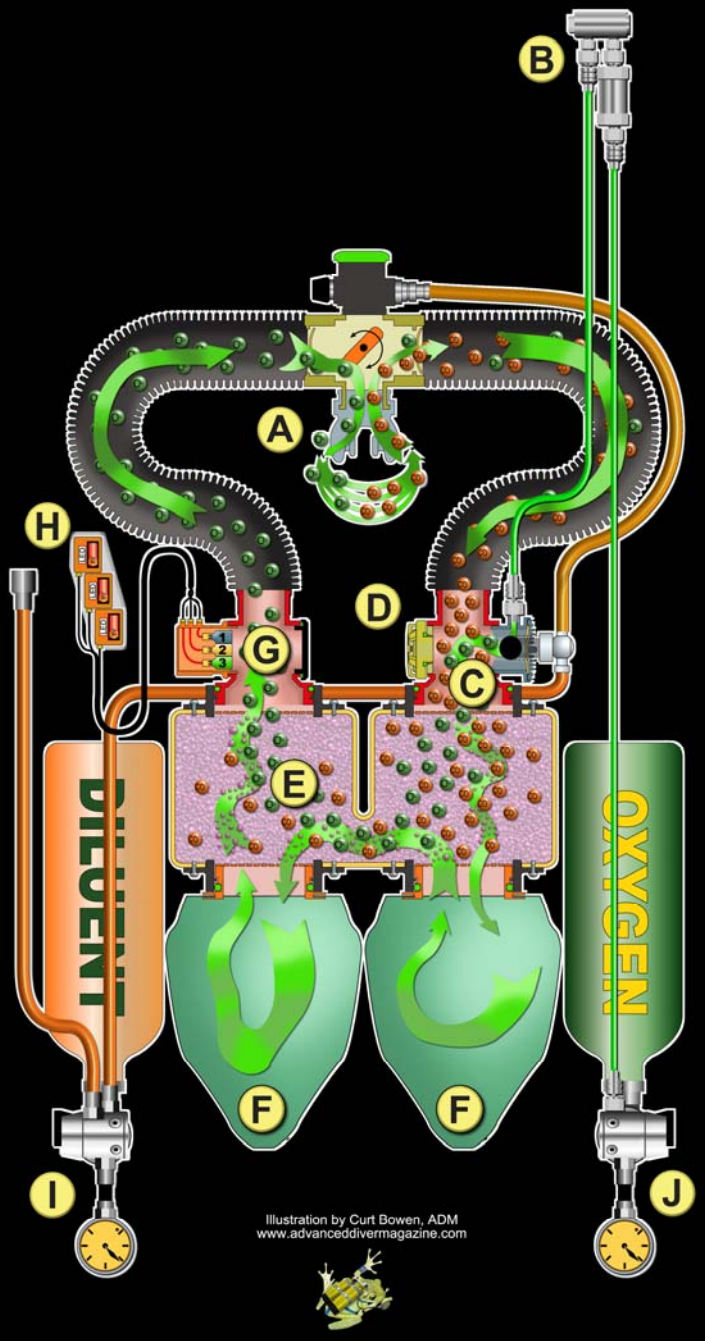
**Counterlungs**

The Sport KISS uses two back mounted counterlungs (split counterlung) that are available in three sizes. A combination of these will normally allow a good match between the counterlung volume and the divers lung capacity. This match permits easier control of buoyancy.

Back mounted counterlungs leave the chest area clear and reduce the number of hoses and fittings compared to over the shoulder counterlungs found on other CCR designs.

These counterlungs are also subject to changes in breathing resistance as the diver changes positions in the water. If you roll on your back you can expect a case of chipmunk cheeks. Nothing is perfect.


# KISS SPORT




**A. DSV:**
**Dive Surface Valve**

**B. Oxygen Manual Add Valve with 15 Micron filter**

**C. ADV:**
**Automatic Diluent Valve**

**D. Exhaust Valve**

**E. Scrubber Container:**
**Approximately 5 lbs (2.3 kg)**

**F. Counterlungs:**
**The counterlungs are made from urethane Coated Nylon and are available in 3 sizes**

**G. Sensor Housing:**
**K1D Teledyne Sensors**

**H. PPO2 Displays:**
**Three independent PPO2 displays. Each with its own housing battery and sensor**

**I. Diluent Tank & First Stage:**
**The Sport KISS is compatible with either air or trimix as a diluent gas. 13 cuft tanks are recommended.**

**J. Oxygen Tank & First Stage**

# Baby Booster

## Specifications

- Drive cylinder displacement, 17.67 cubic inches (.29 Liters)
- High pressure cylinder displacement, 0.767 cubic inches (.0126 Liters)
- Pressure ratio, 23:1. *(This is a mathematical ratio only. The actual pressure ratio will be less due to seal friction, dead space and gas compressibility.)
- Maximum drive gas pressure, 147 psi (10 bar) Air only!
- Maximum boost pressure @ 147 psi (10 bar) drive gas = 3200 psi (218 bar)
- Boost ratio, 5:1 with air, 3:1 with Helium
- Weight, 7 lbs. (3.2kg)

## Description

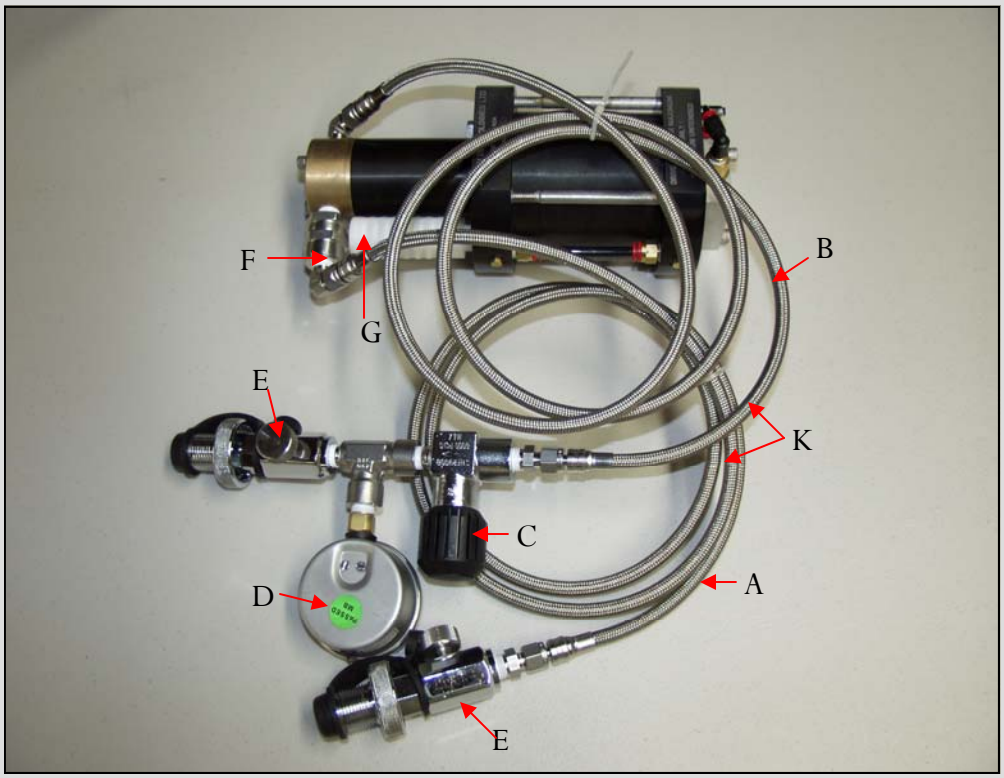
**The Baby Booster is intended for the traveling rebreather diver and allows both oxygen and diluent tanks to be filled when compressed air is the only source of power available. It will fill rebreather size dive tanks to 200 bar (3000 psi) when the supply tanks are as low as 34 bar (500 psi). With a weight of only 3.2 kg (7 pounds) it is light enough to be conveniently transported by air.**

**The pumping rate is a bit complicated with a pneumatic booster. The ratio between the drive piston and the output piston is 23:1. In theory a 147 psi (10 bar) drive gas will yield a 3381 psi (230 bar) output. In fact the seal friction and the gas compressibility reduces the output to around 3100 to 3230 psi (210-220 bar). The effective boost ratio between the supply tank and the output tank can be as much as 5:1 ( 3:1 with helium ). So you could pressurize a tank to 3000 psi (200 bar) from a supply tank at 588 psi (40 bar). In practice you would use far too much drive gas to make it practical. In reality, a 3:1 ratio is more realistic. When the supply tank pressure drops below 1100 psi (75 bar) the drive gas consumption becomes excessive if you are using a scuba tank to drive the booster. Other variables are the relative size of the supply and fill tanks.**

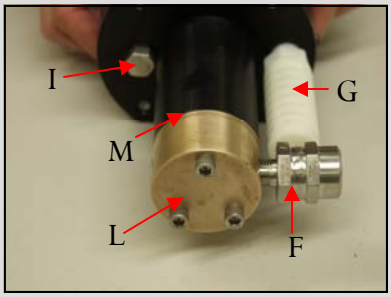
**Using the table, we can see that if we wanted to fill a 13cuft tank using an 80 cu.ft. tank as the supply tank, with the lines equalized, if we started at 1500 psi it would take 3.25 minutes for the fill tank to reach 2400 psi, 7.25 minutes to reach 3000 psi, and 9.75 minutes to reach 3200 psi.**

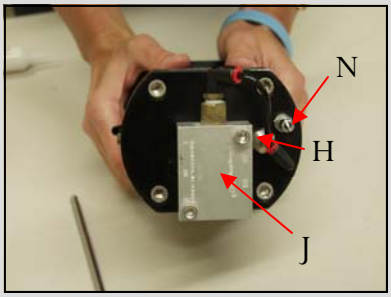
| Fill Target | 2400 | 3000 | 3200 |
|---|---|---|---|
| Supply psi | Time/ min. | | |
| 500 | 27.75 | 66 | |
| 1000 | 7.5 | 14.75 | 19.25 |
| 1100 | 6.5 | 12.25 | 16.25 |
| 1200 | 5.25 | 10.5 | 14 |
| 1300 | 4.5 | 9.25 | 12.25 |
| 1400 | 4 | 8 | 10.75 |
| 1500 | 3.25 | 7.25 | 9.75 |
| 1600 | 2.75 | 6.25 | 8.5 |
| 1700 | 2.25 | 5.5 | 7.75 |
| 1800 | 2 | 5 | 7.25 |
| 1900 | 1.5 | 4.5 | 6.25 |
| 2000 | 1.25 | 4 | 5.5 |
| 2100 | 1 | 3.25 | 3.25 |
| 2200 | 0.5 | 3 | 3 |
| 2300 | 0.25 | 2.5 | 2.5 |
| 2400 | 0 | 2.25 | 2.25 |

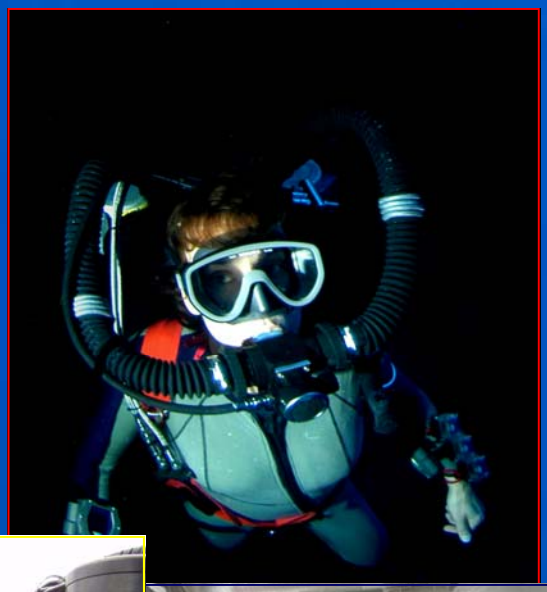
Fill times for a 13 cu.ft. fill from a 80 cu.ft based on controlled conditions with a new booster, using air. NOTE: Helium takes longer.

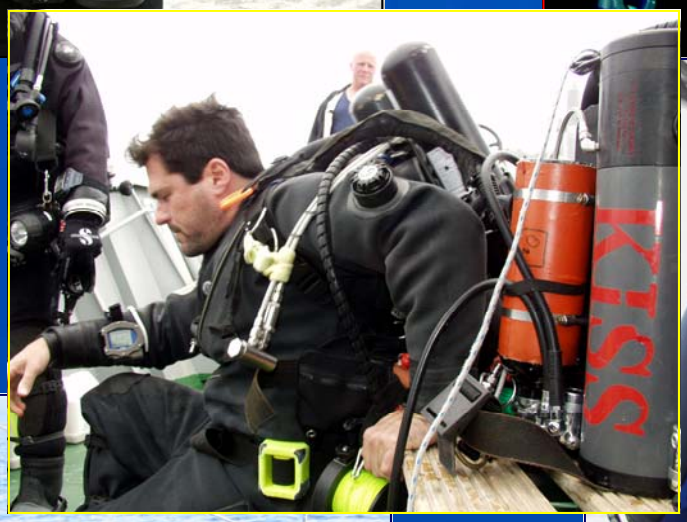



A. Supply (Inlet) whip
B. Fill (Outlet) whip
C. Line valve
D. Gauge
E. DIN bleeder blocks
F. Filter
G. Muffler
H. PV1
I. PV2
J. Humphrey valve
K. SS/Teflon whips, 5 ft length.
L. High pressure head
M. Valve plate
N. Inflator Stem









**Jetsam Technologies Ltd.**

**2817 Murray Street, Port Moody, B.C., V3H 1X3, Canada**

**Ph: 1 604 469 9176 Fx: 1 604 469 9974**

**Web: www.jetsam.ca Email: info@jetsam.ca**