EZ-BRETHE

Veterinary Ventilator
Instruction Manual

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The EZ-Breathe Ventilator (EZB) was designed by a practicing veterinarian to be the simplest, easiest to use and safest anesthesia ventilator available to veterinarians today. Unlike other ventilators that commandeer both the space in your operating room and the attention of your technicians, EZB becomes just one more part of your routine surgical procedure, fitting comfortably into any operating room size and protocol. In fact, EZ-Breathe is designed to be permanently attached to your anesthesia machine, ready to be used at the press of a button!

PARTS AND ACCESSORIES

- EZ - Breathe Ventilator
- Power Supply
- 1L Dual Bag Assembly
- 2L Dual Bag Assembly
- 3L Dual Bag Assembly
- Check Valve
- Test Lung
- Connecting hoses with 40 micron filter
- Scavenger adapter 19 mm ID X 22 mm ID

Accessories, colors, or other aspects of the EZ-Breathe may change without notice.

Note that EZ-Breathe is calibrated in **Centimeters of Water** NOT **Millimeters of Mercury**. If your manometer is marked in mm / Hg, we suggest replacing the manometer with one calibrated in cm / H2O **BEFORE** using EZB or REFER TO THE ALTERNATIVE MANUAL ONLINE.

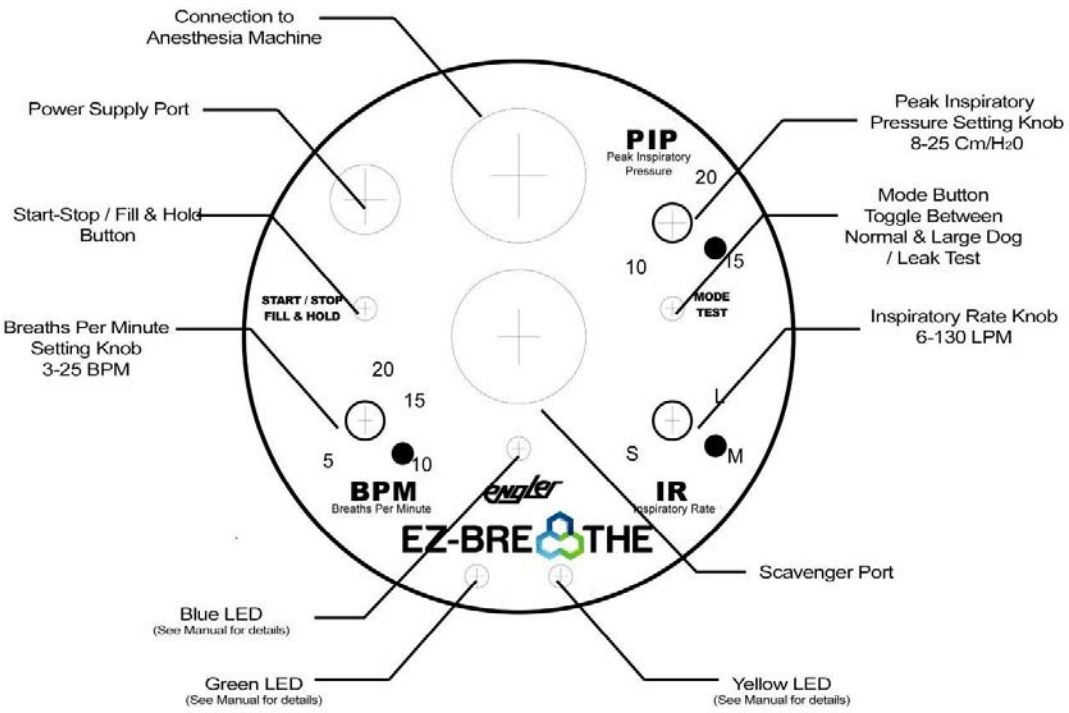
PLEASE READ VERY CAREFULLY

Engler Engineering Corporation (EEC) makes every effort to verify that all parts for this device including any optional accessories ordered with it are included in this shipment.
It is imperative that you inspect the package carefully. If any parts are damaged or missing, notify us immediately. Claims for damaged or missing parts will only be accepted within five days of receipt.

EEC makes every effort to verify that our devices are built and tested to approved standards. Any modification to the device, hoses or power supply nullifies all warranty statements. Engler Engineering Corporation will not be held liable in any way, for any damage, injury or death due to non-authorized service, improper installation, or improper use of this device.
This manual is not intended to teach anesthesiology. EZ-Breathe should only be used by appropriately trained individuals. EEC assumes no responsibility for misuse. Do not use EZ-Breathe in any manner inconsistent with it's labeling.

Colors, styles, function, and general appearance are subject to change without notice.

Top of EZB



Bottom of EZB

GET TO KNOW THE CONTROLS

The Buttons

START / STOP BUTTON

The **START / STOP** Button is located above the **BPM** Control. Pressing and *releasing* this button will start or stop the ventilation cycle. Pressing and *holding* this button will initiate **Fill & Hold**.

MODE / TEST

The **Mode / test** Button is located above the **IR** (**Inspiratory Rate**) knob. Pressing and *releasing* this button will toggle EZ-Breathe between Normal and Large Dog Modes. Pressing and *holding* this button will initiate a **Leak Test**.

THE KNOBS

PIP - **P**eak **I**nspiratory **P**ressure. Allows the operator to adjust the PIP from 8 to 25 cm of water.

IR – **I**nspiratory **R**ate. Controls the **I**nspiration **T**ime by controlling the flow rate of gas into the outer bag. This setting is based on the size of the patient, small, medium, and large.

BPM - **B**reaths **P**er **M**inute. Allows the operator to adjust **BPM** from 3 to 25 Breaths Per Minute.

ATTACHING AND SETTING UP THE EZ-BREATHE VENTILATOR

Unlike a "conventional" ventilator with its myriad of bulky tubes, fittings, bellows, boxes, cables, and wires, EZB can be attached to any anesthesia machine in under five minutes and takes up almost no space in your operating room. And it only weighs two pounds!

To Attach and Set Up

1. Disconnect the anesthesia machine from it’s oxygen supply.
2. Remove the reservoir bag from your anesthesia machine.
3. Slide EZB's top connector over the reservoir bag fitting and tighten the wing clamp firmly.

ATTACHING AND SETTING UP THE EZ-BREATHE VENTILATOR cont.

4. Connect the two shorter legs of the supplied tee tubing between the oxygen supply and your anesthesia machine.
5. Connect the third, longer leg of the tee connector to EZB's drive gas input connector at the bottom of the EZ-Breathe.
6. Disconnect the scavenger line from your anesthesia machine and connect it to EZB's scavenger port located on top of the ventilator. If your scavenger line is 19mm, use the included adapter to attach it to EZ-Breathe's 22mm port.
7. Place the included Check Valve on your anesthesia machine's pop-off valve. Leave the pop-off valve fully open.
8. Plug in the power supply, and insert the connector into EZB's power jack.
9. Select an appropriate Dual Bag Assembly* (1L, 2L, or 3L) and attach it to EZB's Bag Port, located at the bottom of the ventilator.

THE DUAL BAG ASSEMBLY (DBA)

*The Dual Bag Assembly (**DBA**) is the heart of EZ-Breathe. It is essentially a "bag within a bag". The inner reservoir bag acting as a Bellows and the outer bag being the Driver. EZ-Breathe works by directing pressurized drive gas between the two bags, squeezing the inner bag thereby ventilating the patient.
To attach the **DBA**, slightly extend the mouth of the inner bag and attach it to the inner pipe located on the bottom of the EZB. Then slide the outer bag onto the plastic fitting encircling the inner pipe and seat it firmly. The connection ports of the **DBA** should be wiped clean before attaching it to the ventilator to be sure a good seal is formed.

Because EZ-Breathe provides positive pressure ventilation at relatively high flow rates, we recommend the following guidelines in selecting a bag size:

Use a 1 L bag for patients weighing 1 kg to 20 kg.
Use a 2 L bag for patients weighing 21 kg to 80 kg.
Use a 3 L bag for patients weighing over 80 kg.

If it ever becomes necessary to "reassemble" a **DBA**, simply insert the inner bag into the opening of the outer bag, then gently "shake" the **DBA** to allow the inner bag to slide into the outer bag. “Rolling” the inner bag into a tight rod-like shape will help it slide into the outer bag.

USING THE EZ-BREATHE VENTILATOR

Warning!
Never use the Flush button when using a ventilator!
The high flow rate can cause serious lung damage to your patient!

Warning!
EZ-Breathe will not work with an oxygen concentrator.
Please be sure the oxygen supply pressure is set to 45 – 55 PSI.

The first thing new EZB users always want to know is "How do I decide what settings to use on this thing?" The answer is to let EZB do all (well, most) of the work!

- Attach and set-up EZB as detailed in the section above.
- Do a **Leak Test** as described below.
- Connect the patient to your anesthesia machine's patient circuit and set the vaporizer to an appropriate value.
- Set the flow meter on the anesthesia machine to 3 - 4 liters per minute and wait for the bag to fill. The patient will breathe from the gas in the bag as it fills. Once the bag is full, adjust the flow rate down to 1.5 LPM.

EZB has only 3 controls to set:

- Set Peak Inspiratory Pressure (**PIP**) to the dot on the dial (15 cm).
- Set Inspiratory Rate (**IR**) to the dot on the dial (medium dog).
- Set Breaths / Minute (**BPM**) to the dot on the dial (10 BPM).

Press and release the Start button. EZ-Breathe will beep twice and start cycling. To stop the ventilator, press and release the start button button. EZ-Breathe will beep, end the current breath, and stop cycling.

Over the first few breaths adjust the **IR** control as necessary:

If Inhale Time is too short;

- The green LED will light, continuous tone – turn **IR** up (CCW)

If Inhale Time is too long;

- The yellow LED will light, continuous tone – turn IR down (CW)

When the Inhale time is correct (.8 to1.5 seconds), both the green and yellow LEDs will be lit at the completion of inspiration.

YOU ARE NOW VENTILATING YOUR PATIENT!

Fine Tuning the Settings**

- **PIP** - **P**eak **I**nspiratory **P**ressure is the maximum (goal) pressure for each breath. Fortunately, all reasonably healthy lungs well-tolerate a wide range of PIPs, and most will do just fine at 13 - 17 cm of water. Small dogs and cats somewhat less, large dogs somewhat more. Watch the patient and adjust for a comfortable rise and fall of the chest wall.

- **IR** - The Inhalation Time for dogs and cats should be about 1 second, longer for large dogs, less for cats and smaller dogs. Adjust the **IR** control until both the green and yellow LEDs are lit.

- See Large Dog Mode for use in dogs weighing over 60 Kg.

- **BPM**. **B**reaths **P**er **M**inute varies from under 10 in large dogs to over 20 in some cats. Once the patient is venting well and fully anesthetized, adjust the **BPM** to maintain a reasonable (35-45) End Tidal CO2. The exact setting is not critical, ***but if the patient is breathing between ventilated breaths, it usually means the BPM should be increased.***

****** The settings described here are only a guide, your settings may vary. Patient condition, (age, weight, cardiac function, lung function, etc.) must be taken into consideration for any patient undergoing anesthesia. Anesthesia delivery is an art as much as it is a science - there is no substitute for operator experience.

LARGE DOG MODE

(For large dogs weighing approximately 60 kg. to 120 kg.)

For very large dogs (approximately 60 kg. to 120 kg.), EZ- Breathe has a special **L**arge **D**og **M**ode (**LDM**). To enter **LDM**, press and release the **Mode** Button. EZ-Breathe will beep twice and the blue LED will now blink to indicate that you are in **LDM**. Press and release it again to return to normal mode.

Note that Mode (LDM) cannot be changed while EZ-Breathe is cycling.

WEANING OFF THE VENTILATOR

Weaning your patient off EZ-Breathe to allow the resumption of spontaneous respiration is straightforward.

When the procedure is 5 -10 minutes from completion, turn the **BPM** Control to about half of the value you had been using. If, for instance, EZB had been set to 10 **BPM**, decrease it to 5 **BPM**. This allows the patient's CO2 level to gradually rise, resulting in the resumption of spontaneous respiration. Once the patient is breathing on his own, turn EZB off to avoid "fighting the vent", allowing your patient to breathe normally from the Reservoir Bag. Keep in mind that you are only controlling ventilation, and that you still have to adjust your vaporizer setting (down) to wake your patient.

The Disconnect / Low Pressure Alarm

At the end of inspiration, instead of the LED / beeper indicator, you may hear a loud, warbling tone accompanied by rapidly flashing green and yellow LEDs. This is the **Disconnect** or **Low Pressure alarm**. It sounds when EZ-Breathe is not able to reach the desired **PIP** while inhaling.

This is usually because there is not enough gas in the Inner (reservoir) Bag which paradoxically results in the outer bag being overly distended as it tries to compress an almost empty inner bag.

Possible causes:

- **Inspiratory Rate** setting much too low.
- Patient disconnected or ET tube pulled out.
- Flowmeter turned off or flow too low.
- Oxygen off or the tank is empty.
- Cuff leaking excessively.
- Active Scavenger malfunction producing excess vacuum***

- Check to be sure the patient is connected.
- The flowmeter and oxygen are on.
- The **IR** setting is in the middle range.
- The cuff is not leaking.

Note:
As the oxygen tank nears empty, it might still be able to deliver 1.5 LPM through the flow meter but unable to deliver a high enough flow to drive the ventilator.

Once it’s confirmed that there is enough oxygen, turn the flowmeter up to 4 - 6 LPM to quickly fill the reservoir bag. Within a few breaths, as the bag fills, EZB will be able to ventilate the patient properly and the alarm will cease. The flowmeter should then be set to the normal 1.5 LPM.

HIGH PRESSURE ALARM

The **High Pressure Alarm** (**HPA**) is a discontinuous beeping tone accompanied by slow flashing of all three LEDs. In most cases it will be caused by harmless, self-limiting events such as the patient “bucking the vent”, or someone manually compressing the bag (which is not recommended). It will also sound if the flowmeter has been set too high.

If the **H**igh **P**ressure **A**larm is continuous or lasts for more than a few seconds, do not use the EZ-Breathe until the problem has been corrected. Check the Scavenger Assembly as detailed in Maintenance below. If that doesn’t correct the problem, contact Engler Engineering at 305-688-8581.

***** Using EZ-Breathe with an Active Scavenger *****

EZ-Breathe is designed to work with both active and passive scavengers, as well as with F/Air™ or other scavenger canisters. If you are using an active scavenger that is not properly adjusted and maintained, you may find that to keep the bag filled, the flowmeter has to be set to a higher flow rate than the recommended 1.5 LPM. While EZ-Breathe will work at these settings, we strongly recommend that you have your scavenger tested and adjusted. In most cases excessive vacuum is caused by hair blocking the small vent screens or filters in the scavenger tubing.

Fill & Hold

Pressing and *holding* the **Start Button** will initiate a **Fill & Hold**. The pressure will rise at the current **IR** setting till it reaches the set **PIP**. It will then stop inhalation and hold the breath for as long as the button is depressed.
Releasing the button will allow a normal exhale. **F&H** can be used to rapidly increase (or decrease) the anesthesia level by forcing repeated deep breaths as well as testing the endotrachial tube cuff for leaks.

Warning: If **Fill & Hold** is implemented with the flow meter still providing fresh gas input, the pressure will continue to rise past the value set by the Peak Pressure Control. As a safety feature **F&H** will be terminated and a Low Pressure Alarm will sound if the pressure rises more than 3 cm of water over the control setting.

If you need to keep the patient in full inhale for an extended period, you must shut the flow meter off.

BE SURE TO TURN IT BACK ON WHEN YOU GO BACK TO NORMAL VENTILATION!

Note that **Fill & Hold** *can* be initiated while EZ-Breathe is cycling.

LEAK TEST

Pressing and Holding the **Mode** button will initiate a **Leak Test**.

*Use this to test for leaks **before** starting a procedure - it should **not** be performed with a patient connected to the EZB.*

Note that the **Leak Test** cannot be performed while the EZB is cycling.

- With the patient connector covered, press and hold the **Mode** button. The scavenger port will lock.
- While watching the manometer, turn the anesthesia machine's flowmeter to 1.5 LPM and fill the inner bag to 20 cm. of water.
- Turn off the flowmeter while continuing to depress the button. The pressure should stay at 20 cm of water for at least 10 seconds.
- If the pressure does not hold, check for a leak in the system.
- If all connections appear airtight and the system is still leaking, remove and replace the dual bag assembly - there may be a leak in the inner bag.

The check valve connected to the anesthesia machine's pop-off valve limits the maximum pressure to about 28 cm of water. This valve can be tested by leaving the flowmeter on (at 1.5 LPM) and watch the pressure. It should stop rising at 25 - 30 cm, indicating that the check valve is working correctly to vent the excess pressure. If the check valve fails to open by 32 cm., the **High Pressure Alarm** will sound and the scavenger will unlock, releasing the pressure.

Contact Engler Engineering Corp. for a replacement **Check Valve**.

Note:
When the button is released to end the **Leak Test**, the **High Pressure Alarm** may sound as pressure is released. This is normal and will cease within a few seconds.

TROUBLESHOOTING

Issue:

All LEDs flashing, warbling tone:

Possible Cause; Patient Disconnected, leaking cuff or insufficient fresh gas flow from the flowmeter.

Solution:

- Check cuff
- Reconnect patient
- Increase flow via flowmeter

Issue:

Green and Yellow LEDs flashing, warbling tone;

Possible cause; Patient pressure too high.

Solution:

- Check the scavenger port, make sure the ball inside is clean and not sticking to the roof of the scavenger port plug or to the hole in the bottom of the scavenger port.
- Check that the scavenger hose is not kinked or blocked in any way.
- Check that the flowmeter is not set too high
- Any other error, call Engler Engineering for assistance.

Issue:

Yellow LED flashing, warbling tone;

Possible cause; Outer bag pressure too high.

Solution:

- **IR** (Inspiratory Rate) set too high. Lower the **IR**.
- Flowmeter off. Turn it back on.

Issue:

Difficulty ventilating very small patients. Regulator may be out of calibration.

Solution:

Consider replacing old regulator.

MAINTENANCE

Do not use strong chemicals to clean EZ-Breathe. If necessary its outer surfaces can be cleaned with a lightly moistened cloth.

The Dual Bag Assembly should be replaced regularly, based on the number of hours used. With average usage (3 hours a day), we recommend replacing the **DBA** every 2 months.

It is recommended that the EZB be sent in for servicing every two years.
While Engler does provide a loaner at no charge, shipping is the responsibility of the customer.

For ANY issue not covered in this manual, call Engler Engineering Corp.
Your safety and the safety of your patients is our highest priority.

- 305-688-8581
- 800-445-8581
- For set-up videos, how-to, instructional, and maintenance videos, please visit engler411.com

TECHNICAL INFORMATION

Specifications

Ventilation Mode:	Pressure Limited*
Minimum Patient Weight:	1 kg
Maximum Patient Weight:	120 Kg
Drive Gas:	Oxygen or Clean Dry (Compressed) Air
Drive Gas Pressure:	50 psi @ 4.6 scfm at maximum flow
Breaths per minute:	5-25 BPM
Peak Inspiratory Pressure:	8-25 cm Water
Flow Rate - Standard Mode:	6-85 LPM
Flow Rate - Large Dog Mode:	75-130 LPM
I:E Ratio:	1:2 Fixed
PEEP:	3 cm Water (approx.)
Power Requirement:	100-240 VAC, 6 watts max

Physical Specifications

Weight:	2 Lbs
Size:	Main Body 4.33” Diameter x 3.75" High
Overall Height:	8.5"
Shipping:	
Box:	15” L X 13” W X 7” H
Shipping Weight:	6lbs

*EZ-Breathe is a "Pressure Limited" ventilator. This means the desired Peak Inspiratory Pressure (PIP) is set for the patient, the ventilator fills the lungs to that pressure, inhalation then stops to allow the patient to exhale.

This manual is intended as an operators manual and guide, it does not teach veterinary anesthesia. This equipment should only be used by qualified and trained medical personnel.

PLEASE READ VERY CAREFULLY

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1099 East 47 Street Hialeah, Florida 33013
For set-up videos, instructional and maintenance videos, brochures and accessories, please visit engler411.com.

COMPANY PROFILE

Engler Engineering Corporation has been in business since 1964 and occupies an 8000 square foot facility in Hialeah, Florida (USA). Engler manufactures high speed air units and table top ultrasonic dental scalers, polishers and combination units. Other devices include electrosurgery equipment and ultrasonic instruments for the veterinary market as well as a microprocessor controlled anesthesia delivery system and a respiratory monitor for veterinary use.

Engler Engineering Corp. acquired the exclusive manufacturing and marketing rights of Dynax products, including stretchers, gurneys, The Cat Grabber, comfort cots, warm water heater / circulator with pads, and other products. We also acquired the Alpha-Sonic, Ora-Sonic, and Pro-Sonic line of piezo scalers.

Engler manufactures all of the inserts and tips used in the Engler products as well as many others on the market today in the 18K and 25K frequency range.

Our repair department has the technical knowledge to repair and maintain a number of dental devices manufactured by other companies including Shorline.

Engler Engineering Corporation's foreign sales are handled through a large and growing network of veterinary distributors. At the present time we are represented throughout the Middle East, Europe, Central and South America, Canada, Asia, New Zealand, Australia, and most other countries.

ENGLER ENGINEERING CORPORATION'S BRAND NAME VETERINARY PRODUCTS

- **ADS 2000,** microprocessor controlled anesthesia delivery system / ventilator,

- **Excelsior,** high speed dental air unit with vacuum / electrosurgery / ultrasonic scaler / high speed drill / low speed polisher / air - water syringe, and on demand compressor,
- **Scale - Aire,** high speed dental air unit with ultrasonic scaler / high speed drill / low speed polisher / air - water syringe and on demand compressor,
- **Scale - Aire Mini,** high speed dental air unit with ultrasonic scaler / high speed drill / low speed polisher / air - water syringe,
- **Drill - Aire Plus**, high speed dental air unit, high speed drill / low speed polisher / air - water syringe,
- **Drill - Aire**, high speed dental air unit, high speed drill / air - water syringe,

- **Son - Mate II,** ultrasonic scaler / 35,000 RPM handpiece / low speed polisher,

- **Vet II**, 25K ultrasonic scaler / 35,000 RPM handpiece / low speed polisher,

- **Sonus II,** ultrasonic dental scaler,

- **Engler Piezo Ultrasonic Scaler**,

- **Piezo – Mate,** ultrasonic scaler / 35,000 RPM handpiece / low speed polisher

- **Tri - Mate,** ultrasonic scaler / 35,000 RPM handpiece / low speed polisher / electrosurge,

- **Electro - Son,** touch screen, mono / bi-polar electrosurgical unit,

- **Poli - X,** 35,000 RPM handpiece / low speed polisher,

- **Sentinel V.R.M**., respiratory monitor,

- **Engler Veterinary Respiratory Monitor (EVRM)**

- More coming soon!

www.ez-breathe.com

Web: www.englerusa.com / Email: info@englerusa.com
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