Basic Anesthetic Machine Components

Anesthetic machines play a key role in keeping a patient anesthetized. They deliver oxygen and anesthetic gas to the patient as well as filter out harmful expiratory carbon dioxide. It is imperative to understand the anesthetic machine and its breathing systems to safely and effectively anesthetize the patient while keeping environmental pollutants to a minimum.

Compressed Gases
- **Oxygen, Nitrous Oxide, etc.**
  - Color coded.
  - Gases/liquid under high pressure.
  - Attached to the anesthetic machine with a hanger yoke or a high-pressure hose.
  - Used as carrier gases for the inhaled anesthetics.

Pressure Regulator
- **Reduces the high pressure** of the incoming gas to a lower pressure.
- Allows the anesthetic machine to operate at a lower pressure making it safer and easier to use for the patient and anesthetist.
- Indicates amount of gas contained in cylinder.

Flowmeter
- **Controls the rate** that a carrier gas is delivered, (ml/min; L/min)
- Gas specific.

Anesthetic Vaporizers
- Isoflurane, Sevoflurane, etc.
- Volatilizes the liquid anesthetic to a gas anesthetic.
- Used to deliver a precise concentration of a specific inhaled anesthetic.
- Vaporizers can be located out of the circle circuit (VOC) or in the circle circuit (VIC)

Oxygen Flush Valves
- Delivers fresh oxygen to the common gas outlet by bypassing the vaporizer.
- Used for pressure testing the system and flushing the system of anesthetic.

Carbon dioxide absorbent canister
- Chemically removes carbon dioxide from the patient's exhaled air.
- Medium needs changed every 6 to 8 hours of use.
- Absorbent turns blue or violet as the medium is exhausted. (This color change will revert back to normal if the absorbent is rested.)
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Pressure Relief (pop-off valves)
- Allows the escape of excess pressure in the system.
- Valves can be closed to manually breathe for the patient or to pressure test the system.

Scavenging systems
- Collects the anesthesia machines waste gasses and disposes of them properly.
- Passive scavenging systems use a canister of activated charcoal to nullify the harmful gases.
- Active scavenging systems use a vacuum or other device to draw the waste gases to the outside.

Reservoir bag
- Collects oxygen and anesthetic gas before it is delivered to the patient.
- Can be used to manually breathe for the patient.
- Prevents immediate pressure build up if the pop-off valve is left closed.
- Available in different sizes dependent of the patient’s tidal volume.

Rebreathing tubes
- Connects the anesthetic machine to the patient.
- Pediatric circle circuits are for patients less than 5kg.
- Adult circle circuits are for patients over 5kg.
- Universal-F is a type of circle circuit where the inspiratory tube runs inside the expiratory tube. The expiratory tube warms the inspiratory air aiding in patient warming and humidification.

Pressure manometer
- Indicates the amount of positive pressure in the anesthetic system.
- Unit of measurement is cm of H2O.

Reference: