

PRESSURE/VOLUME ISSUE:

BSI : pressure control + limitation for tidal volume ✓

Volume = flow \times *time* & pressure = flow \times *resistance*

PCV advantages:

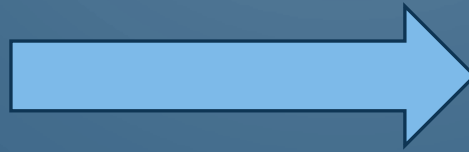
- cheap and accurate
- Increased mean airway pressure \Rightarrow improved oxygenation

ARDS PATIENTS:

- Plateau pressure $< 35 \text{ cmH}_2\text{O}$
- Peak pressure $< \text{plateau pressure} + 2 \text{ cmH}_2\text{O}$
- PEEP: 5-16 cmH_2O
- I:E ratio: 1:1-1:4
- Respiratory rate: 10-30 bpm
- Volume: 205-530 ml

MONITORING:

- Airway pressure
- Achieved tidal volume
- PEEP
- FiO₂



SENSORS:


pressure sensor : strain gauge

flow sensor

FiO₂



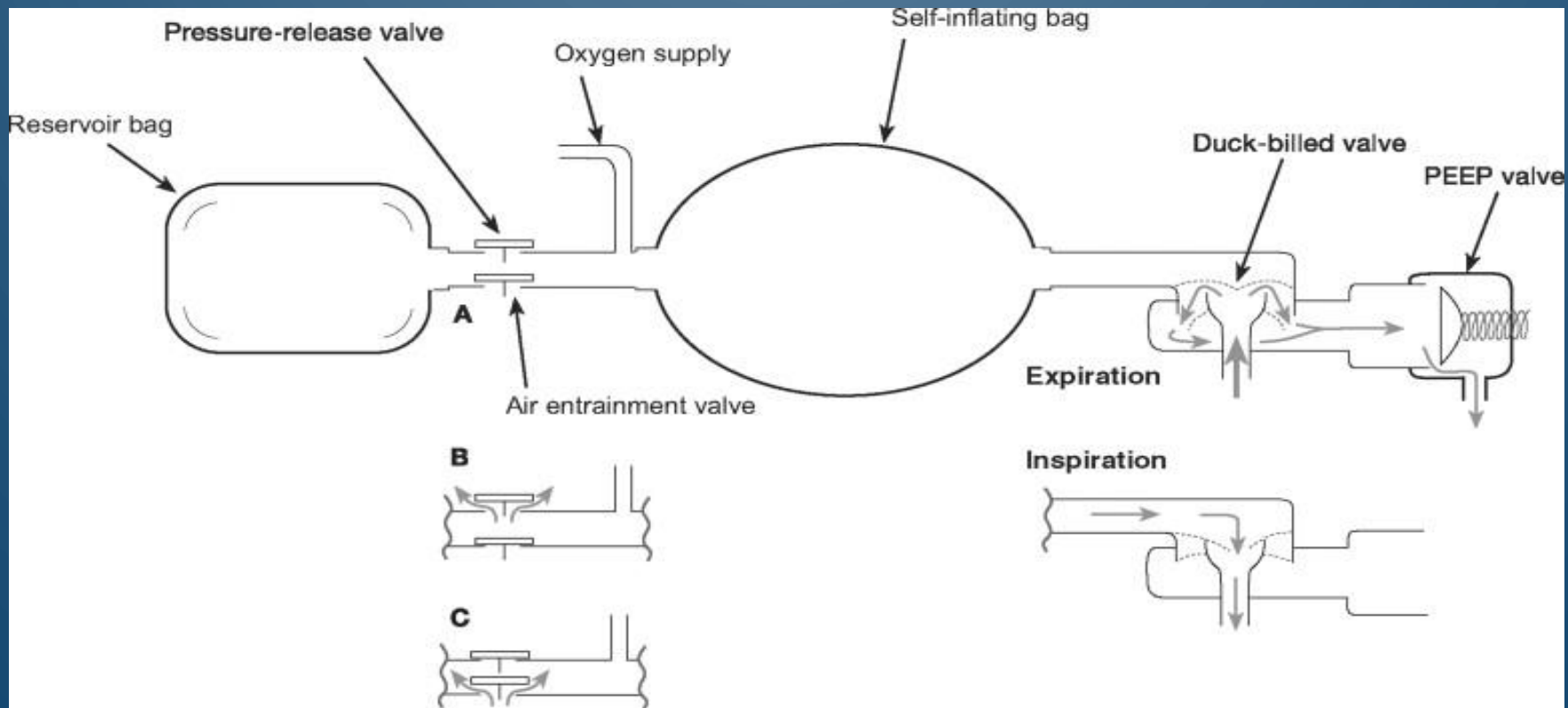
ALARMS:

- Power supply
 - Air/oxygen source
 - Pressure achievement
 - Tidal volume limits
- 



VALVES:

AS we want to keep it as simple as possible we have decided to use a valve system similar to the system used in ambu-bags.

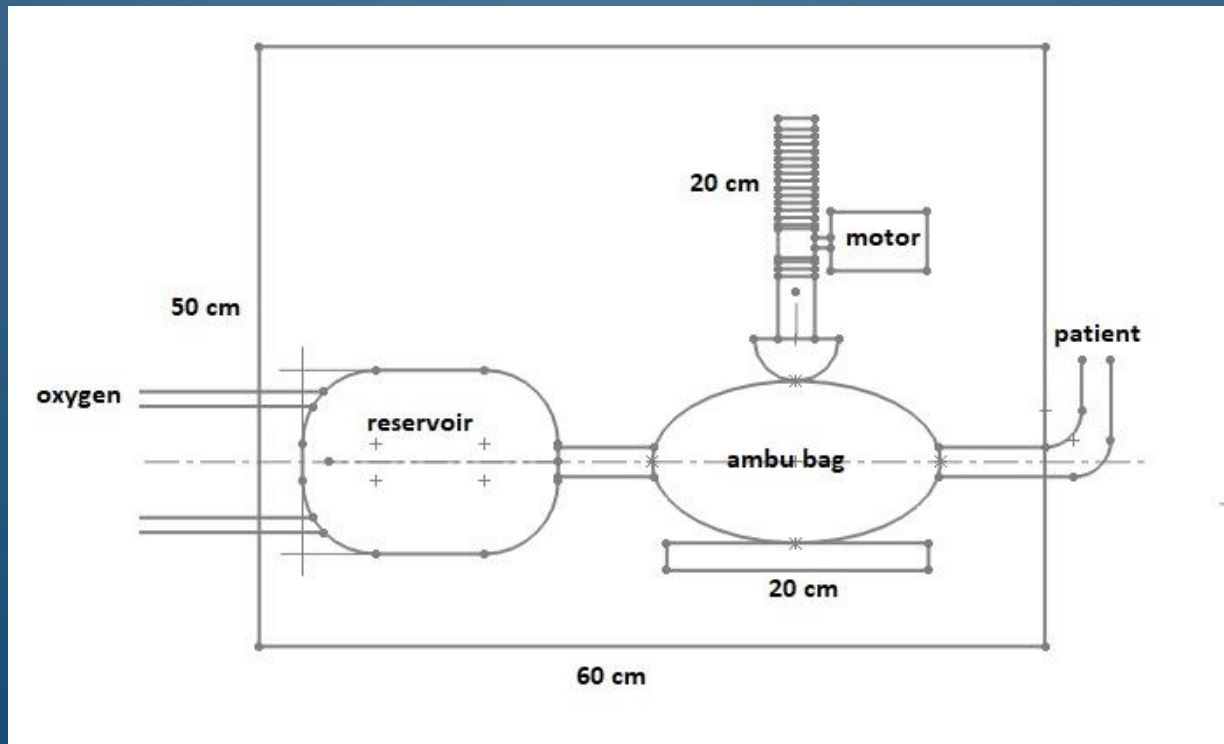


MOTOR:

- Stepper motor
- Ability to generate a torque of 50 N.cm
- Ability to rotate 100 times per minute

DIMENSIONS:

- Rack = 20 cm (length)
- Pinion = 1 cm (radius)
- Ambu bag = 1475 ml (standard size for adults)



ELECTRICAL CIRCUIT:

- Arduino : UNO

Microcontroller	ATmega328
Input Voltage	7-12V
Operating Voltage	5V
No. of Digital I/O Pins	14
No. PWM output Pins	6
No. of Analogue Input Pins	6
DC Current per I/O Pin	50 mA
Flash Memory	32 KB
SRAM and EEPROM	2KB and 1KB