**INNOVATIONS:**

**GITAM SAISOHAM VENTILATOR DESIGN**

**PROF RADHAKRISHNAN PRADEEP KUMAR**

Control Mode: Assist Control Mode

CAM compression of BVM

**GITAM SAISOHAM Model**

**COMPONENTS**

Spirometer to measure flow-rate (and volume, by integrating over time)

Hand dynamometer to measure force exerted on the cam

Rotary motion sensor to measure cam angular displacement

Pressure sensor to measure internal air pressure

Potentiometer -coupled to the end of the shaft for use as a position feedback sensor

**Size** 12x7x8 inches

**Wt** 4-5 kg

**Controller**

Arduino Duemilanove microcontroller board

**Motor**

A PK51 DC gear motor with a stall torque of 2.8 Nm

Gear reduction ratio of 51:1, and an operating speed in the required range of 50-70 rpm.

**Motor Driver**

Motor driver comprises of two H-Bridge circuits

Speed of the motor is signalled with a pwm pin. The power is supplied directly from the battery

Solarbotics motor driver – 5 amps for two circuits

**User Interface**

Tidal volume, BPM and I:E

LCD display - input settings as well as airway pressure level and battery power status.

**Safety**

Airway pressure is monitored with a pressure sensor connected to a sensor output

Same pressure sensor used for initiation of assist control also triggers an alarm

To avoid over-inflation- device should l include a mechanical pressure relief valve.

**Power Delivery**

Alarms programmed for loss of power, loss of breathing circuit integrity and low battery life

Battery - 12-15 volt at least 3.5 Amps

Eg 14.8 volt, four-cell Li Ion battery pack capable of 4.2 Amps (limited by protective circuitry)capacity of 2200 mA-hr.

Test Battery life: Average consumption would be around 9 Watts

**Additions optional**: PEEP valve, a humidity exchanger and a blow-off valve

Minimize dead space: valves at the patient end of the tubing

**Parametric load**: maximum minute ventilation (Ve) of 21L and a minimum Ve of 1.5L.

6-8ml/kg Tidal Volume, negative inspiratory pressure that exceeds 2 cmH20 vacuum triggers the ventilator to deliver the set tidal volume.