**Inputs**

Pressure sensor – Receives a voltage proportional to the pressure in the patient’s lungs. Used to determine max pressure reached during inspiration, and to trigger when the patient is attempting to breathe in during assist mode. Minimum pressure sensor selection:

* Differential (to sense negative pressures)
* Range of up to 100 cm H2O. This is a 2x safety factor.
* Accuracy on the order of 0.5 cm H2O

*Note on Plumbing: The pressure sensor must be connected to the Ambu bag’s sensing port or somewhere in the airflow, as close as possible to the patient, past any valves.*

Control knob potentiometers (POTs) should all be single turn, 10 KΩ. Single turn is to allow for specific settings to be marked on the face plate.

POT 1 – Varies inspired volume, sets angular oscillation of the arms. During operation, each arm varies by a maximum of approximately 20°, corresponding to fully squeezing a large bag. This dial varies position from 0% (fully open) to 100% (fully compressed).

POT 2 – Varies the BPM. This sets the rate from 0 to the maximum BPM given in the clinical document.

POT 3 – Varies the I:E ratio. Range as given in the clinical document.

Note: It is not essential that this be settable, one value greater than 1:1 can be selected and the POT repurposed as a threshold for over pressure. (Multiple clinicians have indicated that varying I:E is not critical.)

POT 4 – Sets the pressure threshold for detecting assist control. This varies as described in the clinical document.

Switch – Power on / off

E-stop – Instantly deactivates the system. This can be the main power switch, but a single pish must fully depower the system. This will allow the bag to be removed and immediate conversion to manual bagging in the case of any major failure.

Toggle Switch – Mode selection from volume to assist control.

Momentary Button 1 – Used to temporarily silence alarms. This must be debounced.

Momentary Button 1 – Used to confirm a change to one of the POTs. This is a necessary safety feature. This must be debounced.

Limit Switch – Used for homing the arms positions.

**Output**

LCD screen displays airway pressure in cm H2O. Other functions can be incorporated later. We are using a 20×4 character LCD display as this will display the minimum information, described in under interface. Any display better than this will be sufficient.

Audible alert buzzer will identify multiple fault conditions.