TekMedika

TekMedika Pvt. Ltd.

INSPIRE-100

A Streamlined Emergency Respiration Assist Device

Product Overview

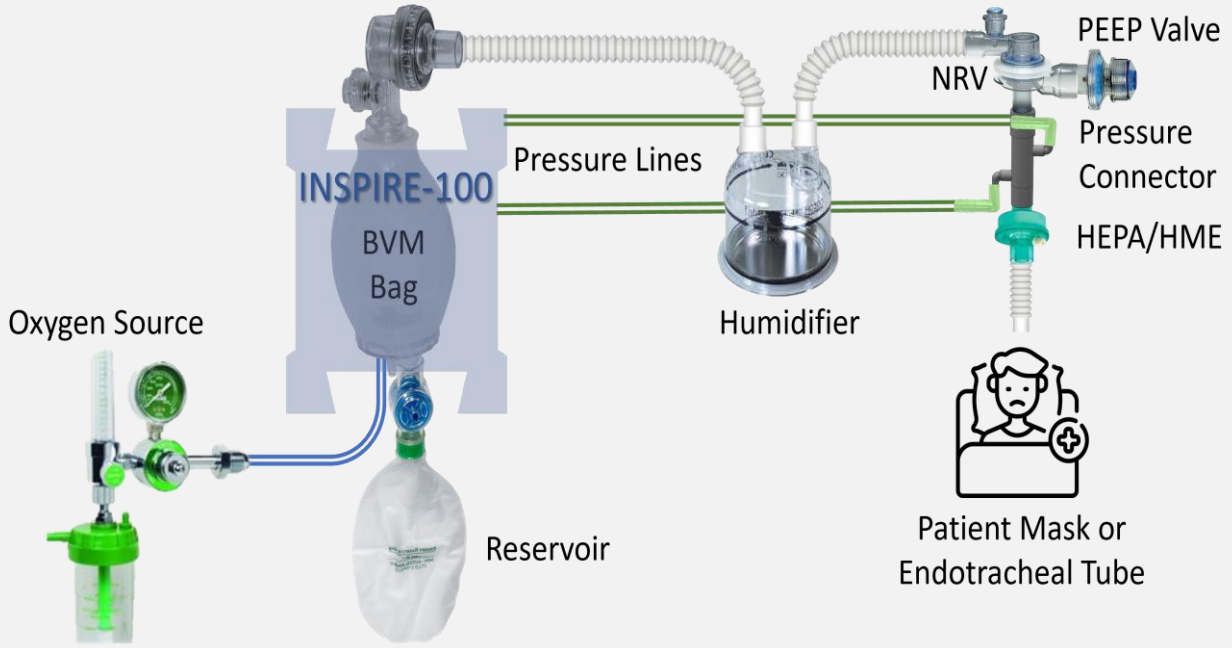
Salient Features

- *Exceptionally Budget Friendly*
- *Elaborate Remote Monitoring Capabilities*
- *Easy-to-use Easy-to-train Rugged & Robust*
- *No Need for Compressed air or Piped O_2*
- *Complete Set of Most-used Respiration Parameters*
- *Power Consumption 100W*

Patient Comfort

- *Mandatory Breaths synchronized with Patient-initiated Breaths*
- *No breath stacking*

Breathing Circuit



$$Q \propto \sqrt{\frac{(P_{G1}-P_{G2})}{(P_{G1}+P_{G2})+2*Patmosphere}}$$

An important and necessary simplification is that P_{G1} and P_{G2} encountered in our system are of the order of tens of cmH_2O while *Patmosphere* is of the order of a thousand cmH_2O of pressure. At sea level, *Patmosphere* is approximately 1000 cmH_2O. Even at an altitude of 15,000 feet, *Patmosphere* is approximately 600 cmH_2O . On the other hand, the P_{G1} and P_{G2} in the system range from 1 cmH_2O to 60 cmH_2O .

Thus the $(P_{G1} + P_{G2})$ term is negligible compared to $(2* Patmosphere)$, even more so since it is preceded by a [illegible]ot. The flow equation can be simplified to the one below.

$$Q \propto \sqrt{\frac{(P_{G1}-P_{G2})}{2*Patmosphere}}$$

Recalling *Equation 2* from the theory section above, this equation can be recast as below given that the [illegible] characteristics and pressure tap locations are the same for every system.

$$Q = C \sqrt{\frac{(P_{G1}-P_{G2})}{(Patmosphere)}}$$ where C is the [illegible]eyn[illegible]'s num[illegible]

At a given geographical location, *Patmosphere* is also a constant. So, the above equation further reduces to the one below.

$$Q = \left(\frac{C}{\sqrt{Patmoshpere}}\right) * \sqrt{(P_{G1}-P_{G2})}$$

The equation needs further simplification to ease the computation burden of the square root computation for and inexpensive micro-controller. The constraints are as below.

Patent Pending

Technical Specifications

Commonly used Ventilation Modes

CMV	Continuous Mandatory Ventilation
ACV	Synchronized Assist Control Ventilation
SIMV	Synchronized Intermittent Mandatory Ventilation
PSV	Pressure Support Ventilation

Full Set of Alarm Alerts

Max Pressure	Pressure Leak	Pressure Loss
Airway Blockage	Coughing Hiccupping	Inconsistent Parameters
Extreme Parameter Combination	System Temperature	And many more …

Volume Controlled Breaths

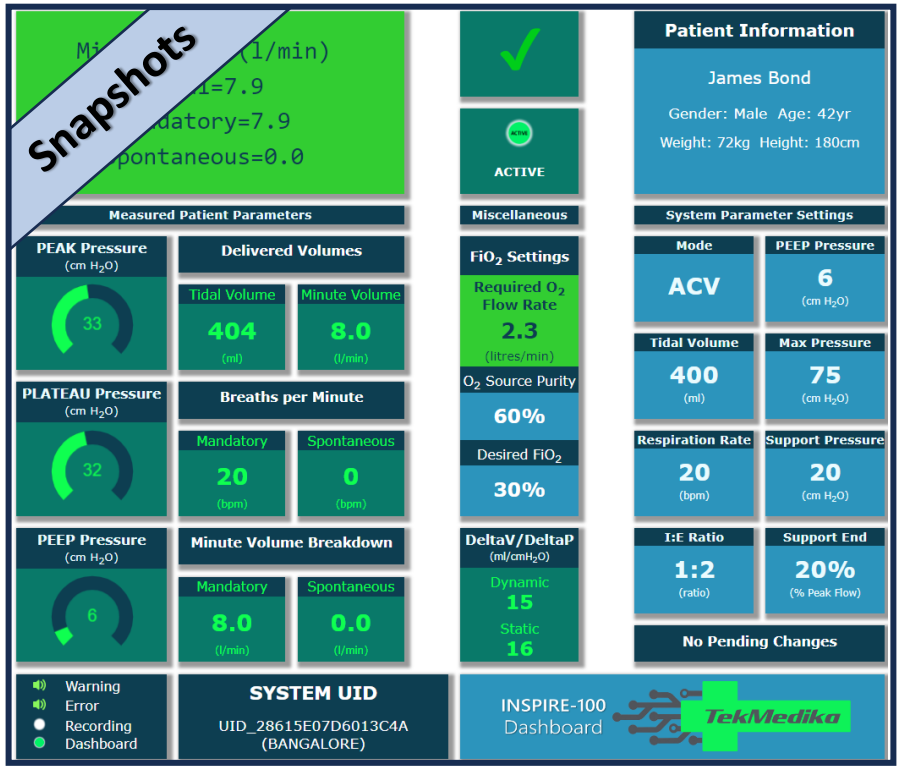
Tidal Volume **200 - 600 ml**	***Respiratory Rate*** **10 - 30 bpm**	***I:E Ratio*** **1:1 1:2 1:3**
PEEP **4 - 15 cmH_2O**	***Max Pressure*** **15 - 60 cmH_2O**	***FiO_2 Support*** **System Managed** **Externally Controlled**

Pressure Supported Breaths

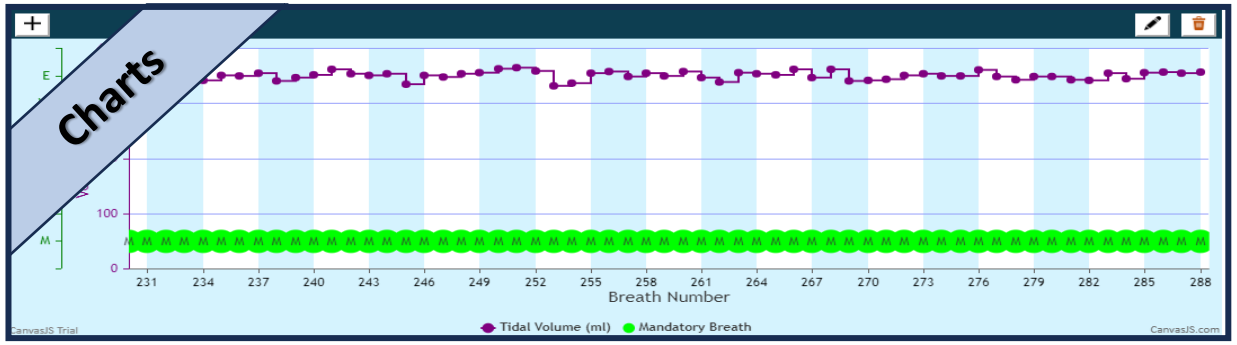
Support Pressure	5 - 35 cmH_2O
Support Pressure Termination	Flow Triggered Time Triggered

Elaborate Remote Monitoring

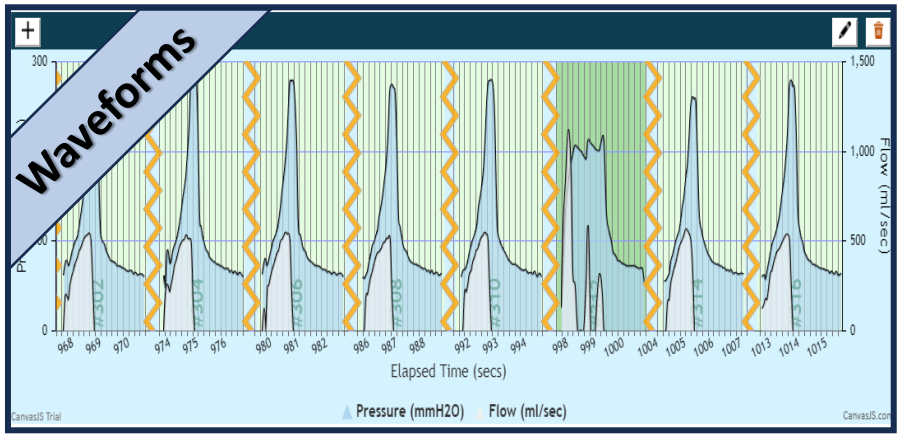
Snapshots



Charts



Waveforms



Statistics

Parameters Measured

Parameter	Units	Min	Max	Avg
	cmH20	27.0	30.0	28.6
	cmH20	17.0	29.0	27.1
	cmH20	5.0	5.0	5.0
ume Delivered	ml	384.0	412.0	399.8
Minute Volume	litres/min	8.0	8.1	8.0
andatory Minute Volume	litres/min	8.0	8.1	8.0
Spontaneous Minute Volume	litres/min	----	----	----
Mandatory BPM	bpm	20.0	20.0	20.0
Spontaneous BPM	bpm	----	----	----
FIO2	%	21.0	21.0	21.0
Static DeltaV/DeltaP	ml/cmH20	17.0	32.0	18.3
Dynamic DeltaV/DeltaP	ml/cmH20	16.0	18.0	17.0
System Temperature	degC	27.0	27.0	27.0

Miscellaneous Information

Information	Value
Number of Breaths	73
Number of Mandatory Breaths	73
Number of Spontaneous Breaths	0
Number of Maintenance Breaths	0
Number of CMV-mode Spontaneous Breaths	0
Number of Missing Intervals (Packet loss)	0
Number of WiFi or Server Disconnects	0
Number of Notifications	0
Number of Warnings	0
Number of Errors	0

Static Information

Patient Name: Rajnikanth Bond
Gender: Male Age: 69yr
Weight: 74kg Height: 181cm

System Location: Namma Bengaluru
Location Altitude: 3000 ft (915 mtrs)
Location Atmospheric Oxygen: 19%

Parameter Settings Used

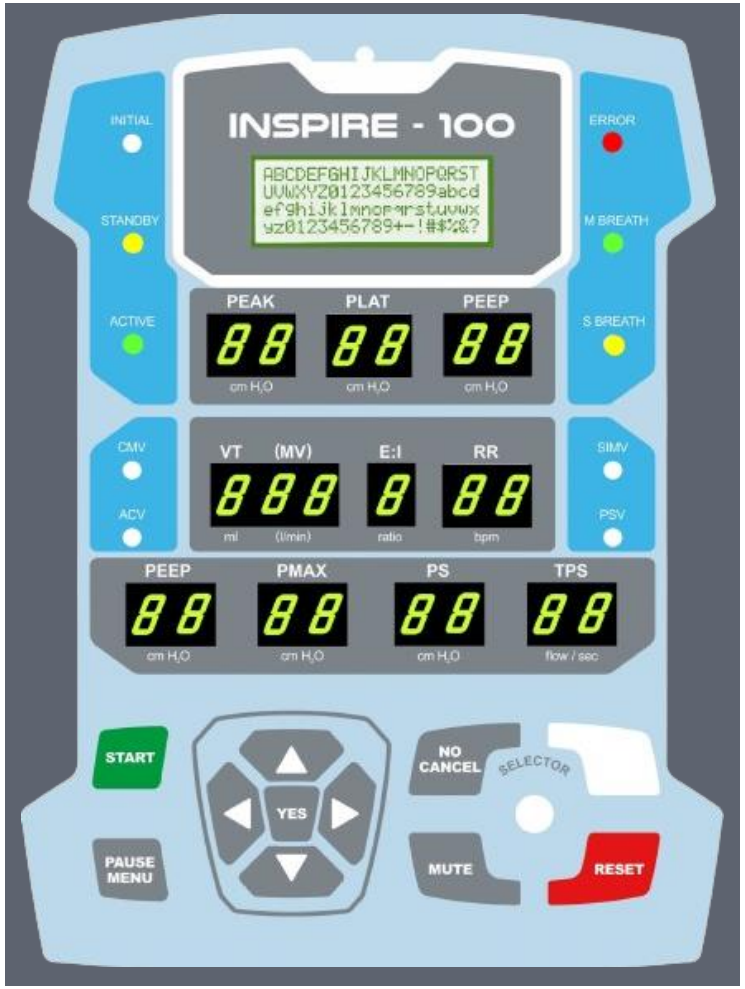
Parameter	Units	Values
Ventilation Mode	mode	ACV
Tidal Volume	ml	400
Minute Volume	l/min	10
Respiration Rate	bpm	20
I:E Ratio	ratio	1:2
PEEP Pressure	cmH20	5
Maximum Pressure	cmH20	50
Support Pressure	cmH20	20
Support Pressure Termination	%flow,secs	20%
FIO2	%	21

Sequence of Parameter Combinations

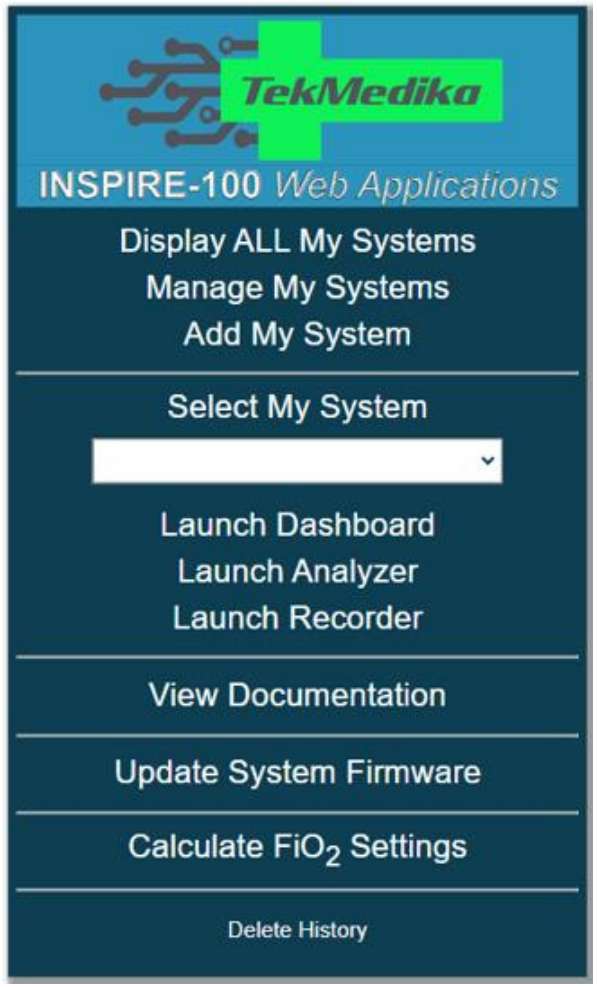
MODE	VT/MV	RR	I:E	PEEP	PMAX	PS	TPS	FIO2	# of BREATHS	Before BREATH#
?	?	?	?	?	?	?	?	?	1	0
ACV	400	20	1:2	5	50	20	20%	?	2	2
ACV	400	20	1:2	5	50	20	20%	21	70	4

Elegance in Simplicity

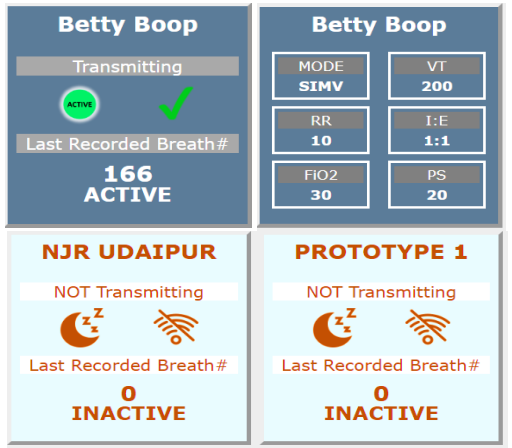
Menu-driven, Tactile, Intuitive and Easy-to-read Control Panel



Live Dashboard Recording and Analyzer



Multi-system Dashboard for Nurses' Station



Field Upgradeable