



INTELLIGENT MECHANICAL VENTILATOR VI - C19

PRESENTATION AND TECHNICAL SPECIFICATION

ANVISA registration number: 82009460001 - Class III





OUR IDEA
OUR GOAL

INSPIRED...

Inspired by compassion;
Inspired to create;
Inspired to save lives!

Intelligent Mechanical Ventilators VI-C19

PROJECT INSPIRAR was driven by a desire to contribute in some way to prevent the expected collapse of the health system generated by the lack of mechanical ventilators.

The main objective of the project is to develop and provide intelligent mechanical ventilators, on a large scale, as soon as possible.



Special Features

The **VI-C19** ventilator has three modes of operation: PCV (Pressure Controlled Ventilation), VCV (Volume Controlled Ventilation) and PSV (Pressure Support Ventilation).

An exclusive technology enables the **VI-C19** ventilator to work with low pressure air, and an exclusive vacuum exhaust system isolates the ambient air from the patient's exhaled air (via the **USEAR** unit), thereby reducing the risk of contaminating other patients and healthcare professionals.

The **VI-C19** ventilator can also work with a hospital's existing high pressure air networks, facilitating its implementation in locations where these networks are already installed.

All of this is connected to a multi-language (english/french/spanish/portuguese) electronic interface with a ten-inch touch screen color display for better viewing and programming by the doctor.

VI-C19

Mechanical Ventilator for use in field hospitals or standard hospital settings.



Three levels of control and monitoring

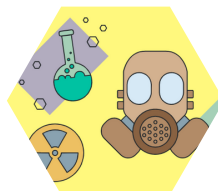
- Individual control of the **VI-C19** ventilator in the bed where it was installed for patient on-site monitoring.
- Assembled by the customer, the **Control and Monitoring Center** (CMC) is an infrastructure that allows remote monitoring of all equipment through 55-inch monitors, and displays clinical alarms and alerts for each **VI-C19** ventilator in operation. This infrastructure allows healthcare professionals to centrally monitor parameters of the various ventilators in operation, providing faster and more effective patient care.
- The **Technology Control Center** (TCC) is a centralized infrastructure that allows the monitoring of ventilators used throughout several different units. Each **VI-C19** ventilator is supplied with a mobile data communication chip, allowing Inspirar Monitoring Center to monitor performances of all field equipment.

FEATURES AND SETTINGS



High or low pressure air intake system

Exclusive technology works with both low pressure air and with compressed air.



Low pressure contaminated air exhaust system

The vacuum exhaust system isolates the air exhaled by the patient from the ambient air, thereby reducing the risk of contaminating health care professionals. (optional)



Control and Monitoring Center - CMC

Local control center allows mechanical ventilators to be monitored remotely with visualization of clinical alarms.



General Monitoring and Technology Center - GMTC

The performance of all installed equipment can be monitored at the INSPIRAR control center.

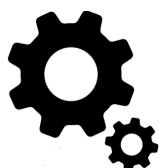
KEY FEATURES



Configurable alarms and automatic alerts such as: high and low minute volume, high and low tidal volume, high and low pressure.



Self-test at powerup to ensure everything is working as it should.



Three modes of operation: PCV, VCV and PSV, for pediatric and adult use.



Configuration of patient data for automatic calculation of predicted body weight (PBW) to help with calibrations.



History of events related to a patient, with details of each event, such as date and time of occurrence.



10 inch touch screen with intuitive interface.

TECHNICAL INFORMATION - FEATURES AND ALARMS

GENERAL FEATURES

Operation Modes: PCV, VCV and PSV

Regulated pressure and controlled volume: YES

Support Pressure: 5 - 30 cmH₂O range

Peak Pressure: 55 cmH₂O

PEEP: 0 - 30 cmH₂O range
(increments of 1)

I:E Ratio: 1:2 (adjustable
to 1:1-1:10 range)

Graphic Display: YES (pressure, flow and volume)

Breathing frequency: 04 - 50

Powerup test: YES

Battery status and ventilation mode: YES

Inspiratory pause: YES

Peak Pressure control, Plateau and PEEP: YES

Displays Tidal and Inspiratory Volume, frequency, PEEP, FiO₂ and ventilation mode: YES

Safety valve for pressures above 80 cmH₂O: YES

Patient data, alarm settings and FiO₂: YES

Backup ventilation for PSV mode (apnea patient): YES (PCV)

Tidal volume (inspiratory and expiratory): YES (adjustable)

Inspired FiO₂ control: YES

Oxygen monitor: YES

Airflow sensor: YES

TECHNICAL INFORMATION - FEATURES AND ALARMS

PROGRAMMABLE ALARMS AND ALERTS

High Tidal Volume: YES (audio and visual alarms only)

Low Tidal Volume: YES (audio and visual alarms only)

High Minute Volume: YES (audio and visual alarms only)

Low Minute Volume: YES (audio and visual alarms only)

High Pressure: YES (audio and visual alarms only)
Safety valve starting at 80 cmH₂O

Low Pressure: YES (audio and visual alarms only)

Low battery: YES

**Airway circuit
pressure exceeded:** YES

**Electricity and/or
gas network fail:** YES

Full obstruction: YES

High PEEP and low PEEP: YES

Apnea patiente: YES

PHYSICAL DETAILS

Material: steel

Dimensions: (H) 1092mm X (D) 500mm
X (W) 409mm

Weight: 16 Kg

Screen: 10" (inches) LCD touchscreen

TECHNICAL INFORMATION - PHYSICAL DETAILS

EXTERNAL POWER SOURCE

Model: MEAN WELL - RPS-60-15

Voltage: Input 90 -264 VAC | Output 15 VDC

Current: 1,8A

Power: 60W

Protection: short circuit, overcurrent and overvoltage

INTERNAL BATTERY

Nominal Voltage: 12V

Nominal Capacity: 2,6Ah

Runtime: 1,5 h minimum

Type: 2 stationary batteries (VRLA 1,3 Ah each)

GAS SUPPLY

Oxygen (O₂)

Pressure: 4,5 bar

Compressed air (low pressure)

Pressure: 60 cmH₂O

Medical compressed air (high pressure)

Pressure: 4,5 bar

TECHNICAL INFORMATION - PARAMETERS AND MONITORING

Intelligent Mechanical Ventilator Parameters - PCV mode

Delta Pressure Displayed in cmH₂O (centimeters of water), it is used to calculate the Peak Pressure inside the lung after opening the flow. It can vary between 5 and 30 (increments of 1) as long as it does not exceed 55 cmH₂O when added to PEEP.

Positive end-expiratory pressure (PEEP) Displayed in cmH₂O (centimeters of water), it is used as a parameter to measure positive pressure above atmospheric pressure at the end of exhalation. Ranges from 0 to 30, with increments of 1.

Inspiratory time Displayed in seconds, it is used as a basis for maintaining Plateau Pressure during inspiration, with a 0.1 to 5.0 seconds range.

Frequency Displayed in RPM, it is used as a basis to know how many inspiration / expiration cycles will be performed per minute. Ranges from 04 to 50 RPM.

Sensitivity Displayed in cmH₂O (centimeters of water), it is used as a basis to start the inspiratory flow, due to the negative pressure identified in the pressure outlet line. Ranges from 0 to -2 cmH₂O, with increments of 0.1.

Fraction of inspired oxygen (FiO₂) Displayed in percentages, it is used to estimate the percentage of oxygen that should be contained in the mixture (oxygen + air) delivered to the patient during inspiration. It has a 20 to 100 range, with increments of 5.

Intelligent Mechanical Ventilator Monitoring - PCV mode

Peak Pressure: (P_{peak}) Displayed in cmH₂O (centimeters of water), represents the Peak Pressure during inspiratory cycle. Min and max pressure alarms.

Tidal Volume (VT) Displayed in ml (milliliters), represents the total volume of air delivered by the ventilator for each ventilation cycle (min and max VT alarm).

Total Frequency (Total FR) Displayed in RPM, represents the respiratory rate measured in the patient after the application of the informed parameters.

Minute Volume (VE) Displayed in L/min (liters per minute), represents the calculation of the VT and Respiratory Rate data - min and max VE alarms.

TECHNICAL INFORMATION - PARAMETERS AND MONITORING

Intelligent Mechanical Ventilator Monitoring - PCV mode

I:E Ratio Indicates the ratio of inspiratory time to expiratory time in relation to the total time of the respiratory cycle.

Positive end-expiratory pressure (PEEP) Displayed in cmH₂O (centimeters of water), indicates the positive pressure measurement at the end of the patient's expiration.

Intelligent Mechanical Ventilator Parameters - VCV mode

Tidal Volume (VT) Displayed in ml (milliliters), represents the total volume of air that must be delivered to the patient on each breathing cycle. Ranges from 50 to 800 ml, with increments of 50.

Air Flow Displayed in L/min (liters per minute), represents the air flow that will be continuously delivered to the patient. Ranges from 2 to 80, with increments of 1.

Respiratory Rate (RR) Displayed in RPM, it is used as a basis to estimate the amount of inspiration/expiration cycles per minute. Ranges from 04 to 50, with increments of 1.

Positive end-expiratory pressure (PEEP) Displayed in cmH₂O (centimeters of water), it is used as a parameter to measure positive pressure above atmospheric pressure at the end of exhalation. With a 0 to 30 range, works in increments of 1.

Inspiratory Pause Displayed in seconds (s), it is used as a basis to identify and measure Plateau Pressure. Ranges from 0.0 to 2.0 seconds, with increments of 0.1.

Sensitivity Displayed in cmH₂O (centimeters of water), it is used as a basis to start the inspiratory flow, due to the negative pressure identified in the pressure outlet line. Ranges from 0 to -2 cmH₂O, with increments of 0.1.

Fraction of inspired oxygen (FiO₂) Displayed as a percentage, it is used to estimate the percentage of oxygen that should be contained in the mixture (oxygen + air) delivered to the patient during inspiration. It has a 20 to 100 range, with increments of 5.

TECHNICAL INFORMATION - PARAMETERS AND MONITORING

Intelligent Mechanical Ventilator Monitoring - VCV mode

Peak Pressure: (Ppeak) Displayed in cmH₂O (centimeters of water), represents the Peak Pressure during inspiratory cycle. Min and max pressure alarms.

Plateau Pressure (Pplat) Displayed in cmH₂O (centimeters of water), represents the pressure at the end of the inspiratory cycle. Min and max pressure alarms.

Minute Volume (VE) Displayed in L/min (liters per minute), represents the calculation of the VT and Respiratory Rate data. Min and max pressure alarms.

Total Respiratory Rate (TRR) Displayed in RPM, represents the patient Respiratory Rate after the application of the parameters informed previously.

Inspiratory Time (Ti) Displayed in seconds (s), estimates the total inspiration time.

Static Compliance (Cstat) Displayed in ml/cmH₂O (milliliters per centimeter of water), represents the calculation of the VT and Plateau Pressure data.

Airway Resistance (RAW) Displayed in cmH₂O/L/s (centimeters of water per liters per second), represents a calculation based on the Peak Pressure, Plateau Pressure and Air Flow data.

I:E Ratio Indicates the ratio of inspiratory time to expiratory time in relation to the total time of the respiratory cycle.

Positive end-expiratory pressure (PEEP) Displayed in cmH₂O (centimeters of water), indicates the positive pressure measurement at the end of the patient's expiration.

Intelligent Mechanical Ventilator Parameters - PSV mode

Support Pressure Displayed in cmH₂O (centimeters of water), complements patient efforts to overcome respiratory and ventilation system resistive and elastic forces. Ranges from 5 to 30, with increments of 1.

Positive end-expiratory pressure (PEEP) Displayed in cmH₂O (centimeters of water), it is used as a parameter to measure positive pressure above atmospheric pressure at the end of exhalation. Ranges from 0 to 30, with increments of 1.

Intelligent Mechanical Ventilator Parameters - PSV mode

Sensitivity	Displayed in cmH ₂ O (centimeters of water), it is used as a basis to start the inspiratory flow, due to the negative pressure identified in the pressure outlet line. Ranges from 0 to -2 cmH ₂ O, with increments of 0.1.
Fraction of inspired oxygen (FiO₂)	Displayed as a percentage, it is used to estimate the percentage of oxygen that should be contained in the mixture (oxygen + air) delivered to the patient during inspiration. It has a 20 to 100 range, with increments of 5.
Air Flow Peak	This parameter identifies the percentage of the Peak Inspiratory Flow where the pressure release ends and breathing begins. Ranges from 0 to 100, with increments of 1.
Apnea	Displayed in seconds, the apnea counter starts when the breathing cycle ends. The alarm is triggered and the PCV backup ventilation mode starts after a pre-configured time length. Ranges from 0 to 60, with increments of 1.

Intelligent Mechanical Ventilator Monitoring - PSV mode

Peak Pressure (P_{peak})	Displayed in cmH ₂ O (centimeters of water), represents the Peak Pressure during inspiratory cycle. Min and max pressure alarms.
Tidal Volume (VT)	Displayed in ml (milliliters), represents the total volume of air delivered by the ventilator for each ventilation cycle (min and max VT alarm).
Total Frequency (Total FR)	Displayed in RPM, represents the respiratory rate measured in the patient after the application of the informed parameters.
Minute Volume (VE)	Displayed in L/min (liters per minute), represents the calculation of the VT and Respiratory Rate data - min and max VE alarms.
I:E Ratio	Indicates the ratio of inspiratory time to expiratory time in relation to the total time of the respiratory cycle.
Positive end-expiratory pressure (PEEP)	Displayed in cmH ₂ O (centimeters of water), indicates the positive pressure measurement at the end of the patient's expiration.



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