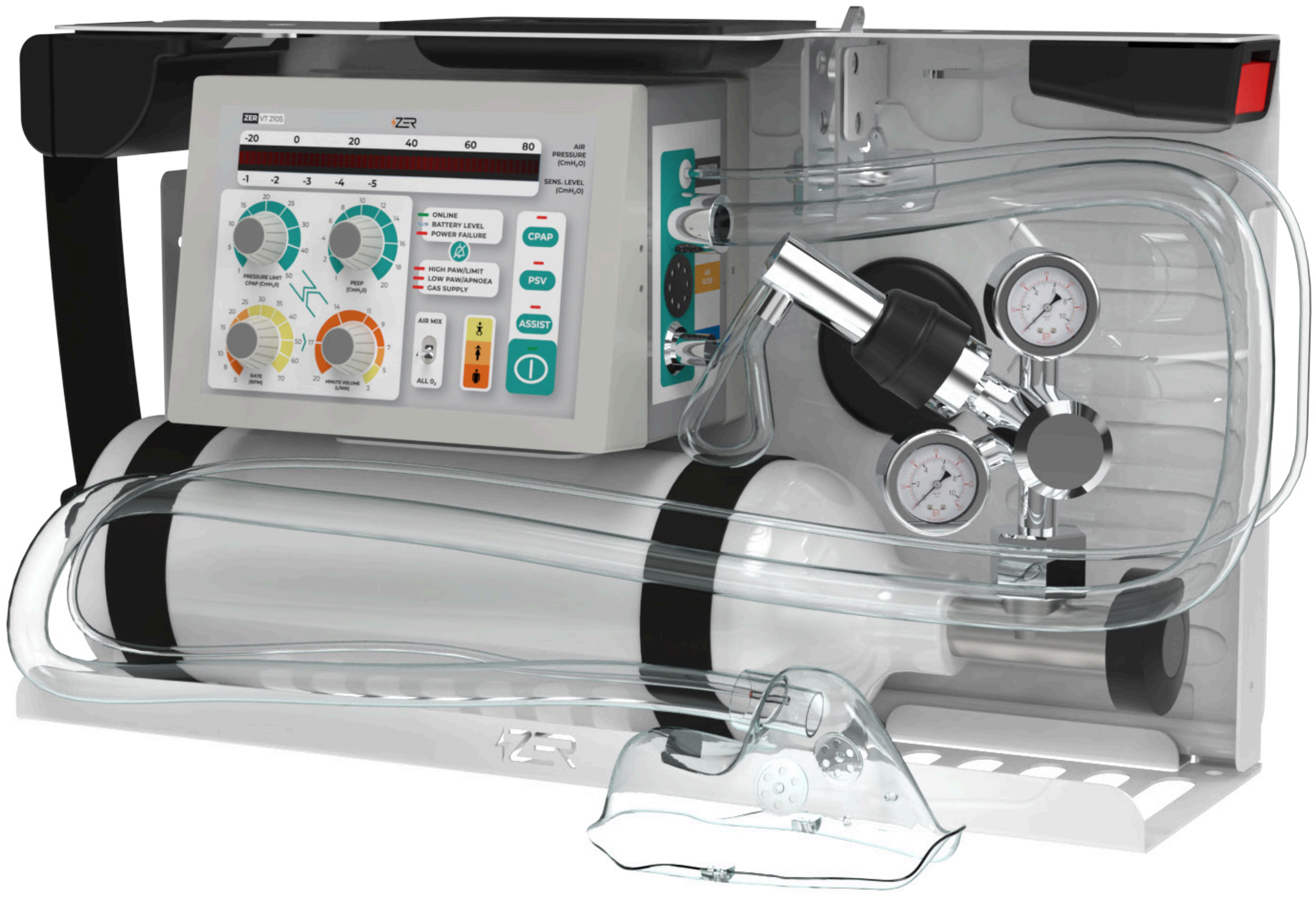
TRANSPORT VENTILATOR

ZER VT 2105



USER MANUAL

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Technical Specifications

ZER VT 2105

Feature	Explanation
Application	Emergency / First Aid / Patient Transport - Venturi System
Patient Type	Adult / Child / Baby (Excluding Newborn)
Ventilation Type	IPPV Volumetric - Pressure Supported IPPV Time Cycle
Control Management	Electronic
Gas Source	Oxygen or Compressed Medical Air
Gas Pressure	Max. (2.7 bar - 6 bar)
Flow Rate	50 L/min (max.)
Ventilation Modes	AUT-AST, PSV, Apnea Backup, CPAP and PEEP
Measurement Parameters	Airline Instantaneous Pressure
Nefes Alma Frekansı	Breathing Frequency
I:E Ratio	1:1.5
Inspiratory Rate	40% of Full Cycle
Inspiratory	Auto PSV Mode
Pressure Limiting Limit	Between 0 – 50 cmH2O
Minute Volume	1-16 L/min
Tidal Volume	15-3000 ml
Oxygen Mixer	50% O2 or 100% O2
Manometer	Digital
Trigger Sensitivity	Between 1-5 cmH2O
User Interface	Digital Manometer, LED Battery Level Indicator, External Power Supply Failure Indicator, LED and Audible Alarms, Control and Adjustment Keys
Warnings	Battery Level, Low and High Airway Pressure, Apnea, Gas Supply, Power Failure
Power Supply	12V DC or 100-240V AC 50 Hz to 12V DC Adapter
Current Consumption	20 mA (Idle) / 300 mA (Under Load)
Battery Support	4.5 Hours of Uninterrupted Operation
Charging Time	10 Hours Charge Time at Full Idle
Device Security	Adjustable Air Pressure Mechanical Limit: 0-50 cmH2O
Dimensions and Weight	Width: 186 mm Height: 132 mm Depth: 125 mm
Operating Temperature	-18 °C to 60 °C
Depolama Sıcaklığı	-40 °C to 70 °C
Operating Humidity	10% to 90% Relative Humidity (Non-Condensing)
Atmospheric Pressure Range	70 kPa to 110 kPa
Product Life	5 Years
Alarm Level	60 db(A)
Standard Accessories	220 V AC (50 Hz) – 12 V DC Adapter and Connection Cable, 12 V DC Vehicle Charge Connection Cable, Disposable Adult and Child Mask, Bacteria Filter, Test Balloon, Disposable PVC Patient Circuit and Expiratory Valve, Oxygen Hose Carrying Strap , Ambulance Connection Kit, User Manual

Usage Instructions

The proper and safe use of the ZER VT 2105 respiratory ventilator requires that both the patient and the operator are familiar with the recommendations and instructions provided in this manual.
The equipment must only be used for the purposes specified here and as described. Therefore, it is essential to follow the instructions carefully.
Intended Use

The ZER VT 2105 is a respiratory ventilator designed for use in emergency situations, first aid, and patient transport, as well as for adults, children, and infants.

Its functions allow providing respiratory assistance to the patient in the following ways:

1. Continuous airflow (CPAP).
2. Automatic synchronization with the patient's natural breathing activity. The timing adapts to the patient's natural respiratory cycle (AUT + AST).
3. Pressure support ventilation (PSV - Pressure Support Ventilation).

Adjustable Parameters in Normal Operation:

- Adjustment of breathing cycle frequency (interval) in AUT + AST mode (Fixed I:E Ratio 1:1.5).
- Adjustment of the delivered volume or airflow duration.
- Maximum air pressure limit adjustment in AUT + AST mode.
- Pressure support level adjustment in PSV mode.
- Oxygen concentration adjustment (MIXER 50 or 100%).

Measurements and Indicators:

- Real-time airway pressure measurement.
- Natural respiration monitoring in AUT + AST and PSV modes.
- Alarm notifications depending on the situation (LOW PAW/APNEA, GAS SUPPLY, LOW BATTERY, HIGH PAW/LIMIT, POWER FAILURE).


Important Note:
For critically ill patients who are not under continuous supervision, an external spirometer with an instant volume alarm must be used to ensure respiratory monitoring.

Adjustment Potentiometers

CPAP (cmH_2O) Adjustment Potentiometer

Also referred to as Pressure Limit. It allows adjusting the maximum pressure value applied while delivering air to the patient. The set value is displayed on the manometer screen.

PEEP (cmH_2O) Adjustment Potentiometer

Positive pressure resulting from expiration. Determines the amount of air that will remain in the lungs after inhalation and exhalation. (If the expiration hose is closed with a card, it provides the measured value.)

RATE (BPM) Adjustment Potentiometer

Determines the breathing rate (breaths per minute). Triggers the device based on the set value, regulating the duration of inhalation and exhalation.

MINUTE VOLUME (L/MIN) Adjustment Potentiometer

Indicates the amount of oxygen delivered to the patient per minute (flow rate); it is a mechanical valve.

Minute Volume is calculated as: Breaths per Minute × Tidal Volume.

Tidal volume; the amount of air entering the lungs with each breath.

Infant: 12 ml/kg
Child: 10 ml/kg
Adult: 8 ml/kg

Power On and Off Buttons

CPAP Mode On/Off Button

This is the mode selection button. It activates the device in CPAP mode.

PSV Mode On/Off Button

This is the mode selection button. It activates the device in PSV mode.

ASSIST Mode On/Off Button

This is the mode selection button. It activates the device in AUT+AST mode.

Device Power On/Off Button

A single press of the button turns the device on, proceeding to the mode selection step. Pressing and holding the button while the device is running will turn it off.

Device Silent Mode Button

Enables the device to switch to silent mode.

Front Panel LEDs

ONLINE

If the green LED is on, the device is charging and ready for use.

BATTERY LEVEL

Blue + Green LED: If an external power source is being used, the battery level LED turns blue. If the device is running on battery power:

White LED: If the battery charge is 12.5V or higher, the battery level LED turns white.

Green LED: If the battery charge is between 12.5V and 11.5V, the battery level LED turns green.

Yellow LED: If the battery charge is between 11.5V and 11V, the battery level LED turns yellow.

Red LED: If the battery voltage drops below 11V, the battery level LED turns red. If it is blinking, the remaining usage time is 10 minutes. The reset button cannot silence the alarm, and the device must be connected to a charger.

POWER FAILURE

This warning activates when the device is disconnected from the power supply and switches to battery mode. The device can operate on battery power for a maximum of 10 hours.

HIGH PAW/LIMIT

Activates if the air pressure delivered to the patient is too high. It may trigger if the Pressure Limit exceeds 40 cmH_2O. The tidal pressure should be adjusted, and the reset button should be pressed at optimal values to silence the alarm.

LOW PAW/APNOEA

This warning activates if the air pressure delivered to the patient is too low. The tidal volume is monitored, and the alarm can be silenced by pressing the reset button at optimal values.

GAS SUPPLY

For the device to operate, a pressure between 2.7 – 6 bar must be applied. If the oxygen tank or air source does not have a sufficient gas level, the device will not function, and this LED will activate as a warning, triggering the alarm.

Operation

For proper and complete operation, the equipment must be connected to the medical gas distribution system outlet or cylinder outlet.

In 21% O_2 applications, the equipment can be connected to medical pressurized air. In this case, the 50% and 100% mixture settings will have no effect on concentration.
The ZER VT 2105 contains an internal battery. When fully charged and in proper working condition, the device can operate for at least 6 hours. Additionally, an external 12V DC battery (such as in an ambulance or helicopter) can be used as a power source for the ZER VT 2105.

The ZER VT 2105 is delivered with the following components:

- **Airway pressure gauge to measure the patient's airway circulation,**
- **Sensor to track the patient’s natural breathing,**
- **Sensor that triggers an alarm in case of a drop in airway pressure.**

To prevent misinterpretation of the patient’s respiration, these sensors must be checked before use.

There are three operating modes:

- **AUT-AST (Automatic Assistant Mode):**
  - **If the patient has no spontaneous breathing (AUT), the device takes over, utilizing respiratory rate, pressure, and minute volume.**
  - **If the patient is breathing on their own, the assist mode (AST) is activated. The patient's breaths are supported by the preset pressure and minute volume.**
  - **If the patient’s spontaneous breaths fall below the ventilator's set value, the device automatically compensates to reach the required respiratory rate.**
  - **All parameters can be adjusted from the device's control panel.**
- **PSV (Pressure Support Ventilation):**
  - **Used when the patient can breathe independently but cannot achieve a sufficient tidal volume.**
  - **The patient initiates the breath, and the device ensures that the preset pressure is delivered to reach the required tidal volume.**
  - **If the patient does not breathe for approximately 20 seconds, the device automatically switches to AUT-AST mode.**
- **CPAP (Continuous Positive Airway Pressure):**
  - **Used in cases where the patient can breathe independently but has difficulty keeping the alveoli open.**
  - **Continuous positive airway pressure is applied, typically within a range of 5-8 cmH_2O.**
  - **In this mode, Rate and PEEP control potentiometers are inactive.**
  - **Oxygen is delivered continuously at the set level during both inspiration and expiration to maintain airway stability.**

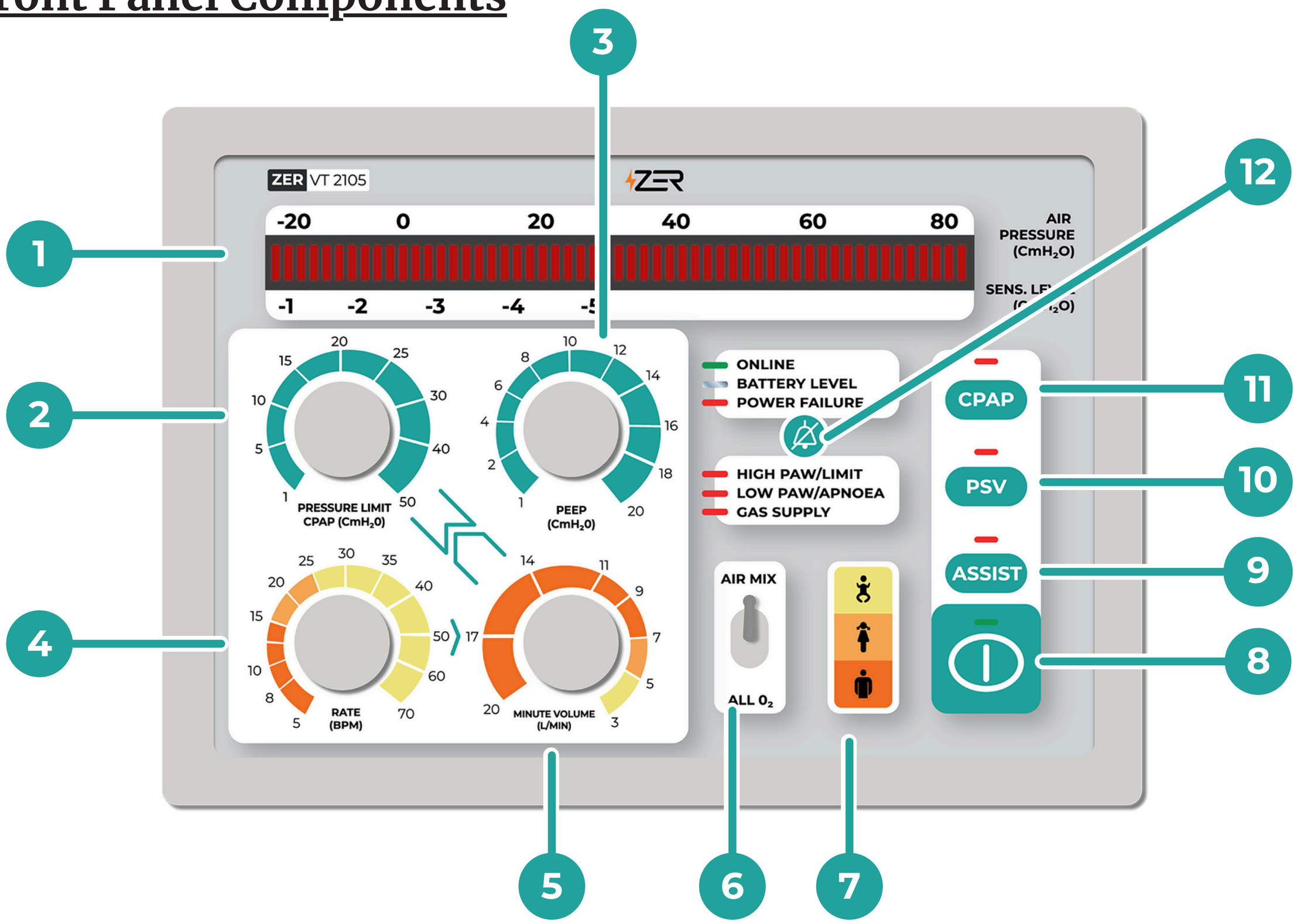
The Control Panel Has Five Different Settings:

- **Pressure Limit (CPAP) (cmH_2O):**
  - **Adjusts the maximum pressure applied when delivering air to the patient.**
  - **The set value is displayed on the manometer screen.**
- **Minute Volume (L/min):**
  - **Indicates the liters of oxygen delivered per minute (flow rate).**
  - **It is a mechanical valve.**
  - **Minute Volume is calculated as:**
  - **Breaths per Minute × Tidal Volume.**
  - **Tidal Volume (amount of air entering the lungs per breath):**
    - **Infant: 12 ml/kg**
    - **Child: 10 ml/kg**
    - **Adult: 8 ml/kg**
- **PEEP (cmH_2O):**
  - **Positive pressure resulting from expiration.**
  - **Determines the amount of air remaining in the lungs after exhalation.**
  - **If the expiration hose is blocked, the measured value is displayed.**
- **Rate (BPM):**
  - **Determines the breathing rate (breaths per minute).**
  - **The device triggers air intake and release based on the set value.**
- **FiO_2:**
  - **It is a mechanical valve.**
  - **Determines the required oxygen level to be delivered.**

Warning LEDs on the Device and Their Meanings:

- **Online LED:**
  - **If the green LED is on, the device is charging and ready for use.**
- **Battery Level LED:**
  - **If the orange LED is blinking and an audible warning is active, the remaining operation time is 2 hours.**
    - **The reset button can be pressed to mute the alarm.**
  - **If the red LED is blinking, the remaining operation time is 10 minutes.**
    - **The reset button cannot silence the alarm.**
    - **The device must be connected to a charger.**
- **High Paw/Limit:**
  - **Activates if the air pressure delivered to the patient is too high.**
  - **It may trigger if the Pressure Limit exceeds 40 cmH_2O.**
  - **Tidal pressure should be adjusted, and the reset button should be pressed at optimal values to mute the alarm.**
- **Low Paw/Apnoea:**
  - **Activates if the air pressure delivered to the patient is too low.**
  - **Tidal volume is monitored, and the reset button can be pressed at optimal values to silence the alarm.**
- **Gas Supply:**
  - **The device requires a pressure between 2.7 – 6 bar to operate.**
  - **If the oxygen tank or air source is insufficient, the device will not function, and this LED will activate as a warning, triggering the alarm.**
- **Power Failure:**
  - **This warning activates if the power connection is lost, and the device switches to battery mode.**
  - **The device can operate on battery power for a maximum of 10 hours.**

Front Panel Components



1. Real-Time Pressure Display Panel

2. CPAP (cmH_2O) Adjustment Potentiometer

3. PEEP (cmH_2O) Adjustment Potentiometer

4. RATE (BPM) Adjustment Potentiometer

5. MINUTE VOLUME (L/MIN) Adjustment Potentiometer

6. Airway O_2 Level Adjustment Switch

7. Color Indicator for Infant - Child - Adult Usage

8. Power On/Off Button

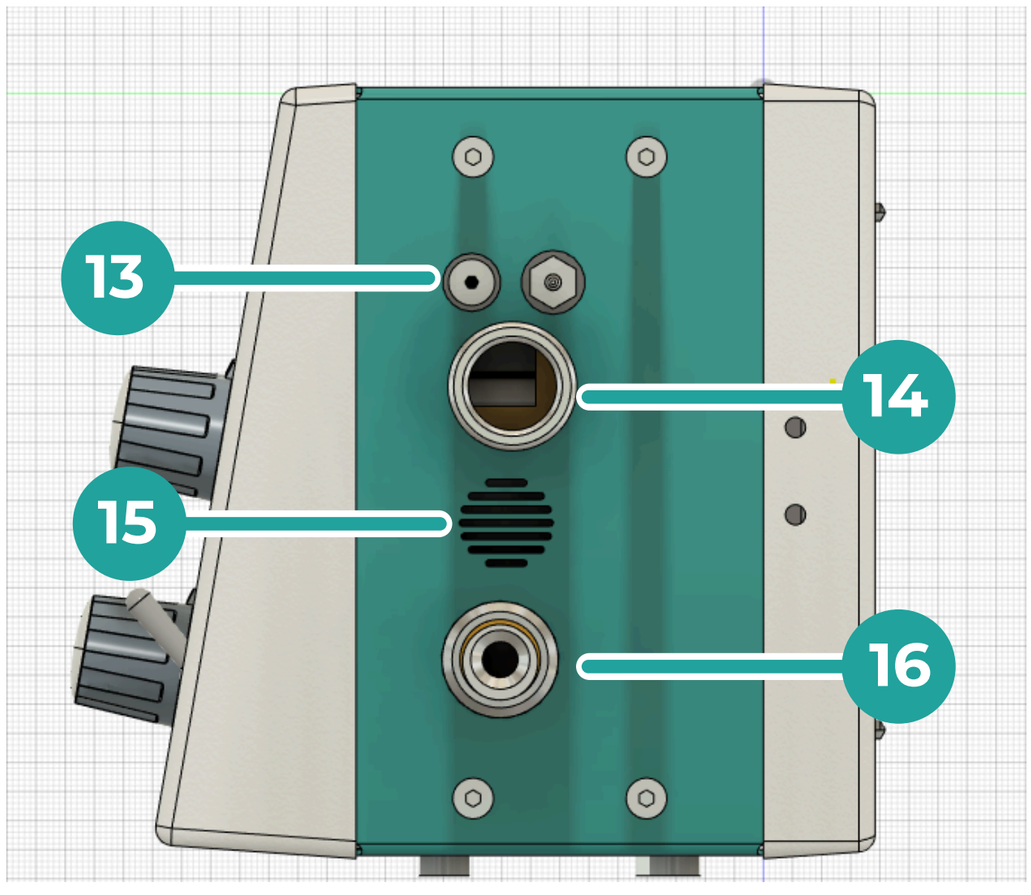
9. ASSIST Mode On/Off Button

10. PSV Mode On/Off Button

11. CPAP Mode On/Off Button

12. Device Silent Mode Button

Left Side View



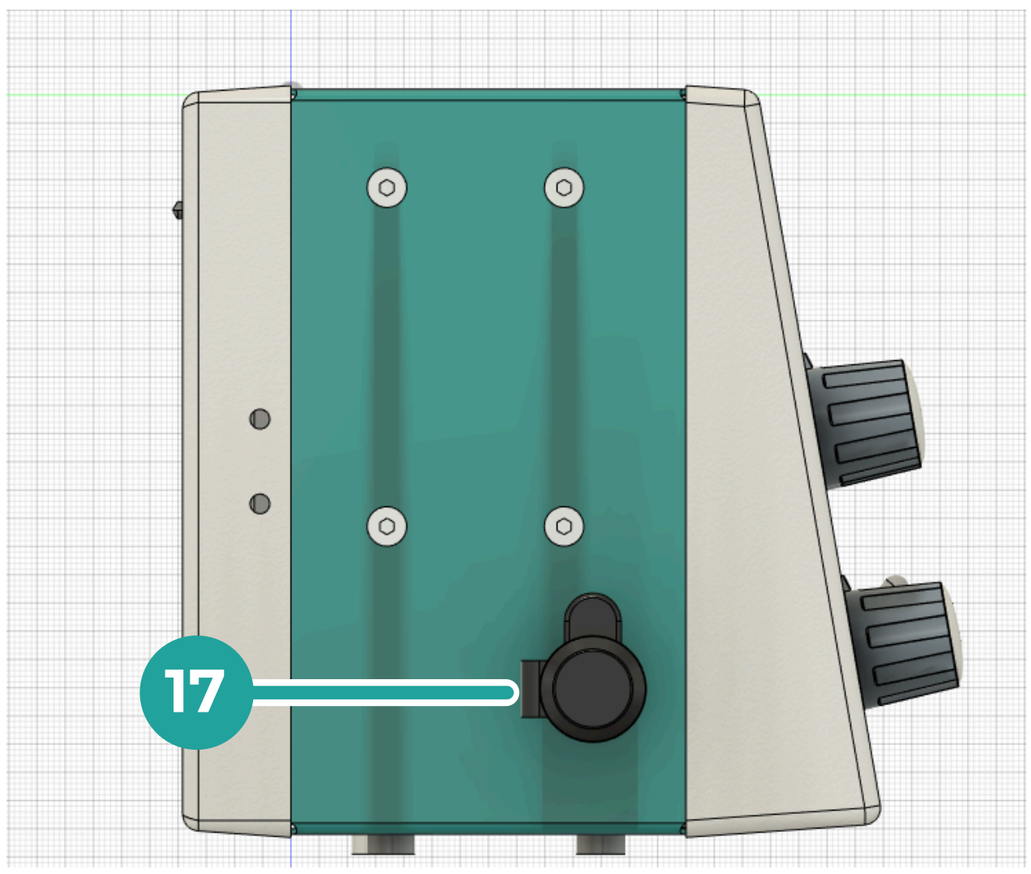
13. Patient Return Tube Inlet

14. Patient Outlet

15. External Air Inlet

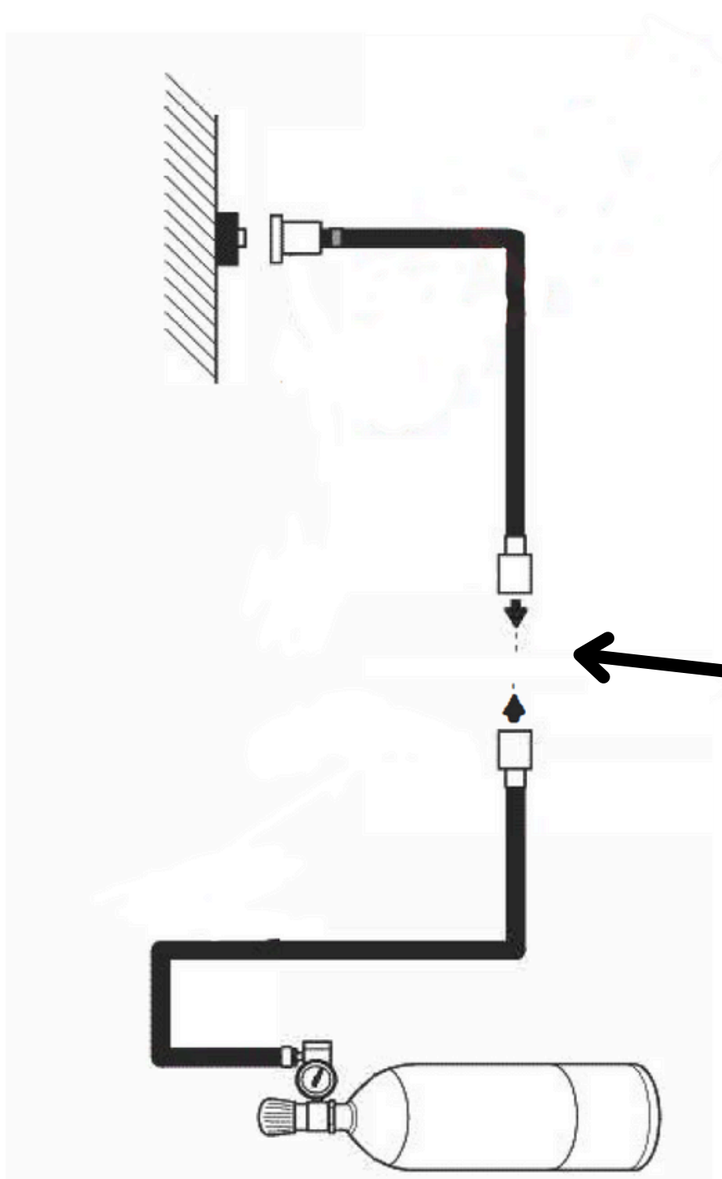
16. Oxygen Inlet

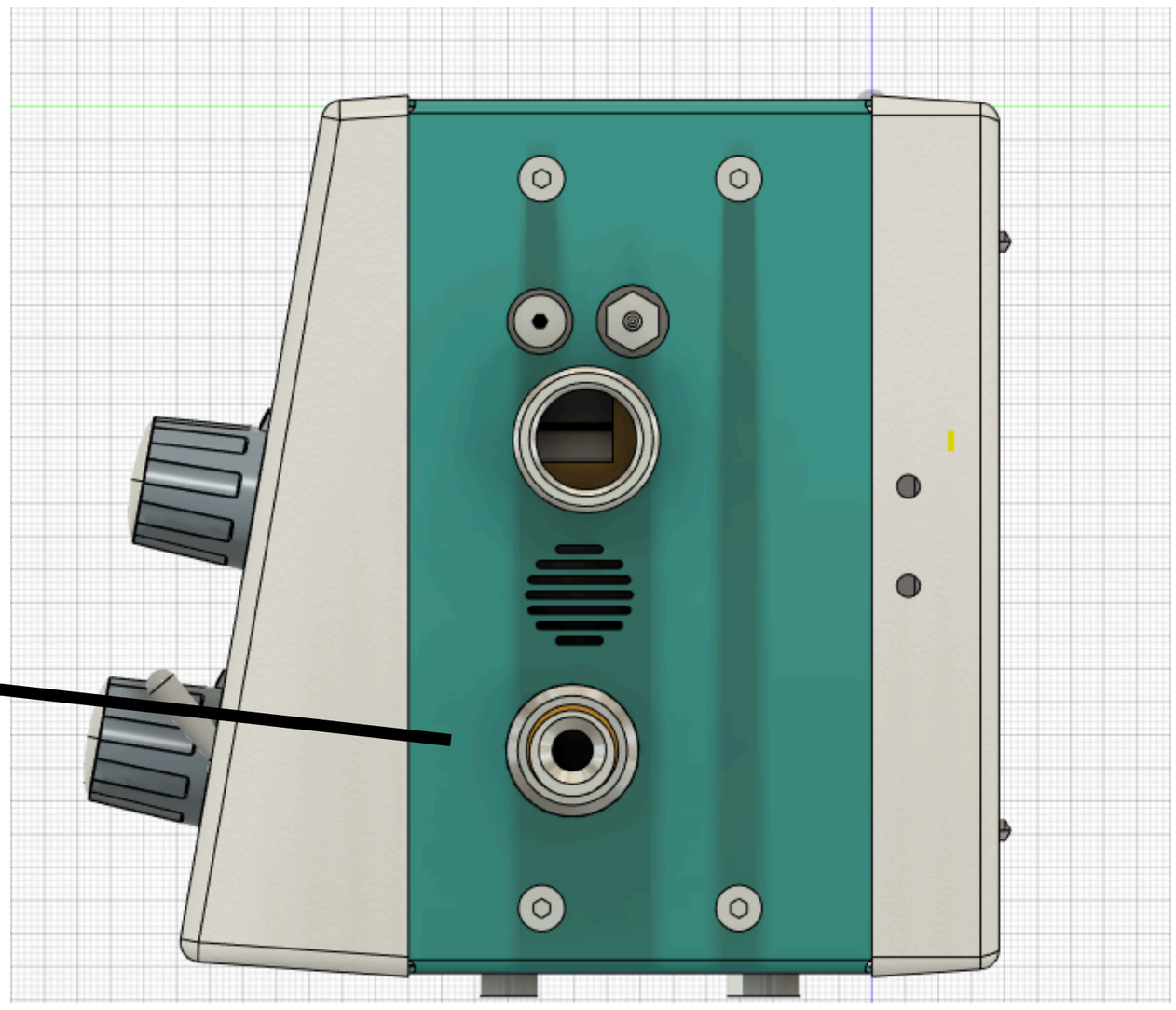
Right Side View



17. Power Input

Medical Gas Connection





This unit can be connected to the hospital's main gas (O_2 Air) supply line or to an oxygen cylinder.

Warning:
To eliminate the risk of reverse gas flow, which could lead to the patient's death, all maintenance operations and/or changes to the medical gas supply pipes should only be performed by highly qualified technicians when connecting to the hospital's main gas supply line.

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Istanbul Headquarters & Factory

Huzur Mah. Fazıl Kaftanoğlu Cad. No:11 34381 Sarıyer/ISTANBUL
Tel: +90 212 282 30 20
Fax: +90 212 282 53 54
Email: info@zerelektronik.com.tr

Ankara Regional Office

Çamlıca Mah. Anadolu Bulvarı Timco İnşaat Mal. Yapı Koop. M Blok No:1

Yenimahalle / ANKARA
Tel : +90 312 219 46 47
Fax : +90 312 219 79 22
Mail : info@zerelektronik.com.tr