

Covid-19 Emergency Ventilator Outline

Eliciae MV20



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Introduction to Metran

- ▶ Metran is a medical device manufacturer in Japan that specializes in High Frequency Oscillation (HFO) ventilators mainly used in neonatal ICUs.
- ▶ Metran, together with forward-thinking clinicians, invented the HFO ventilator and was the first company in the world to commercialize them.
- ▶ Today, our HFO ventilators are used in over 90% of NICUs in Japan and our patented technology is in wide demand throughout the world.
- ▶ Metran also has a line of veterinary anesthesia ventilators which are market share leaders in Japan and thousands of these devices have been safely and effectively used for over 20 years.

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Metrans response to the COVID-19 Pandemic

- ▶ Most health experts believe that the COVID-19 pandemic will overflow the limits of existing hospitals.
- ▶ To cope with this increased demand, governments will build make-shift hospitals, and existing hospitals will add temporary beds, outside the ICU.
- ▶ We believe that not only will there not be enough traditional ICU ventilators to meet this increased demand, but ventilators for these types of additional beds have different requirements than ICU ventilators. Specifically, these ventilators:
 - ▶ Will be managed by people not familiar with ventilator management
 - ▶ Must be extremely easy to use and safe under varied conditions
 - ▶ Must be compact, easily managed
- ▶ Metran has a ventilator based on a series that was originally designed for human patients, but was repurposed and marketed as the veterinary ventilator Compos-X since 2011. We are now finalizing validation for a modified configuration of this ventilator called Eliciae MV20 for use as an emergency ventilator to respond to the COVID-19 pandemic.

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The Eliciae MV20

- ▶ It provides time-cycled, pressure limited ventilation (PCV)
- ▶ The user-interface is extremely easy to use. Almost no setting changes required between patients.
- ▶ The system design is very compact, and rugged. Suitable for temporary hospitals and beds.



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Clinical Factors

- ▶ We manufacture several types of ventilation equipment including CPAPs, High-Flows, and ICU HFO vents. Even high-specification ICU ventilators, which we manufacture, are not appropriate for COVID from a usability standpoint. Clinicians that will need to deal with the overflow patients from the ICU will not be RTs or ICU intensivists.
- ▶ These users may be ventilator novices and having them try to manage a patient on a high-spec ICU ventilator will be dangerous.
- ▶ Our solution is for cuffed-intubated patients with all exhalation from the patient able to be collected by a scavenging unit. It is not a mask or a nasal unit.
- ▶ Our solution is a pressure controlled, time-limited device with automatic tidal volume supply. There will only be very minimal setting adjustments needed between patients, if at all. Just turn it on and it will work. Maybe you just need to adjust the respiratory rate and FiO₂ according to a simple protocol that will be developed by a leading university hospital in Japan that we are working with.



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Ventilation modes

- ▶ **Mandatory ventilation:** A/C (assist/control) all breaths are mechanical breaths. Ideal for muscle recovery: work of breathing is reduced, the patient triggers the ventilator does the work at the same size of the mechanical breaths. Tidal volume is always monitored.
- ▶ **Backup ventilation:** In this mode the Apnea setting controls the time allowed without activation of breaths before the ventilator starts sending mandatory breaths.
- ▶ **Monitor:** Keeps monitoring the tidal volume and pressure from a patient with spontaneous breathing

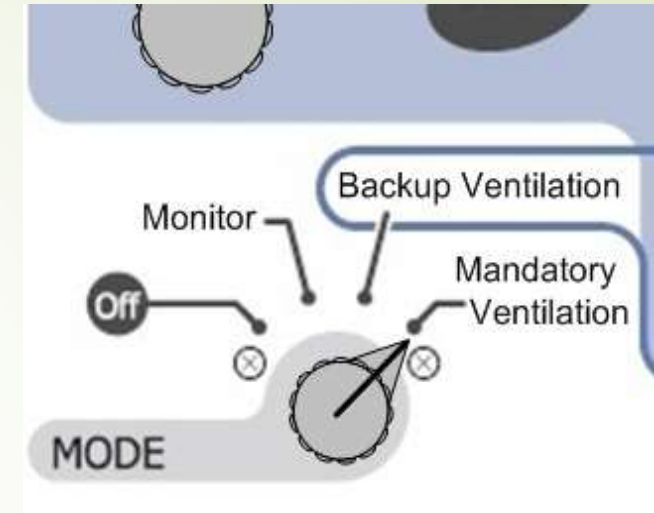
Specifications

General

Name	Eliciae MV20
Input power	AC 100 to 240V (50 to 60Hz)
Operating pressure	3 to 5 kgf/cm ²

Ventilation

Ventilation type	Time cycle, pressure limited (PCV)
Mode selection	Mandatory ventilation (A/C), Backup ventilation, Monitor
PIP	0 to 80cmH ₂ O 1cmH ₂ O resolution
PEEP	0 to 20cmH ₂ O 1cmH ₂ O resolution
Breath rate	1 to 255 BPM 1BPM resolution
Inspiration time	0.1 to 3.0sec 0.1sec resolution (no inverse ratio allowed)
Breath Detection	Flow-based, 0.1 to 10.0 Lpm sensitivity



Mandatory ventilation: A/C
Backup ventilation: Mandatory A/C breaths will be supplied when apnea is detected.
Monitor: Vt monitor capability

Alarms	
Paw high	LED alarm, audio alarm and auto alarm setting
Paw low	LED alarm, audio alarm and auto alarm setting
Low gas supply	LED alarm, audio alarm and auto alarm setting
Power failure	LED alarm, audio alarm
Apnea	LED alarm, audio alarm
Alarm mute	30 seconds

Monitoring	
Tidal volume	20mL to 2,000mL ±10%+10mL
PIP	0 to 80cmH ₂ O ±10%
PEEP	0 to 20cmH ₂ O ±10%
Airway pressure	-10cmH ₂ O to 80cmH ₂ O ±2cmH ₂ O
Apnea time	1 to 60 sec. Depending on flow trigger

Others	
Dimensions	260mm(W) × 190mm(H) × 283mm(D)
Weight	6kg

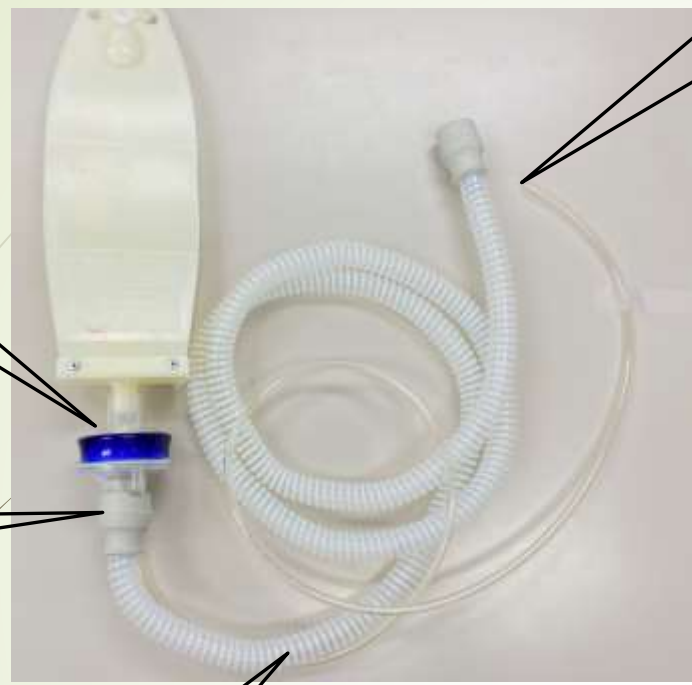
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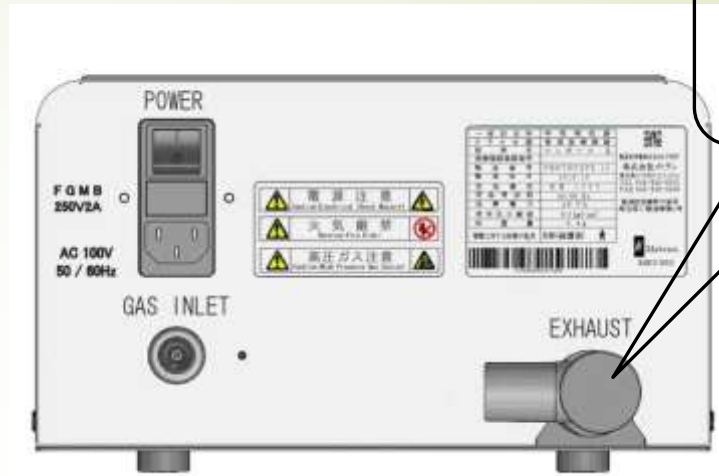
Heat and moisture exchanger (HME)

Fresh gas inlet connector

22mm circuit



Fresh gas supply connector



Exhaust port on the back, which can be attached to a gas scavenging system



- This gas can be supplied by a blender if FiO₂ control is required.
- This fresh gas enters the circuit near the patient-connection port, through a Jackson Rees type connector.
- The flow rate is supplied at a higher rate than the minute-volume ventilation of the patient, to ensure all gas going to the patient is from the fresh gas supply.

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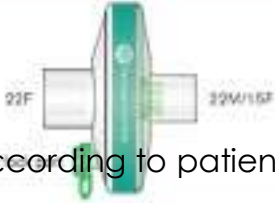
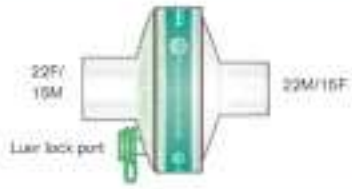
Metran Supply

- ▶ Metran will aim to supply the following:
 - ▶ Eliciae MV20 main unit
 - ▶ Test lung
 - ▶ Disposable patient circuits *
 - ▶ Heat & Moisture Exchanger with bacterial and viral filtration *
 - ▶ Key requirements for HME are (1) Resistance $<1.3\text{cm}@30\text{L}/\text{Min}$ & $<3.0\text{cm}@60\text{L}/\text{min}$ and (2)

* For the items with asterisk, Metran will aim to supply a limited quantity along with deliveries of the main unit, but it will be advisable to secure a local supply chain for replacement items.

Heat & Moisture Exchange (HME)

- Heat and Moisture Exchange with Bacterial and Viral Filtration efficiency. E
- Below is a typical specification for the HME.xample: (KEY POINT: Resistance <1.3cm@30L/Min & <3.0cm@60L/min
- & Min Vt >200ml)

Filita-Therm Plus and Clear-Therm HMEFs						
Filita-Therm Plus Bacterial and Viral Filtration efficiency	Moisture return at: VT500ml	Resistance to flow		Compressible volume	Weight	Minimum tidal volume
		30L/min	60L/min			
>99.999%	31.5mg H ₂ O/L	1.3cm H ₂ O	3.0cm H ₂ O	66ml	44g	200ml
Clear-Therm Bacterial and Viral Filtration efficiency	Moisture return at: VT500ml	Resistance to flow		Compressible volume	Weight	Minimum tidal volume
		30L/min	60L/min			
>99.99%	32mg H ₂ O/L	1.0cm H ₂ O	2.4cm H ₂ O	61ml	32g	200ml
1941001	70	1841000	35			
						
Filita-Therm Plus + luer lock port		Clear-Therm + luer lock port				

Selection according to patient

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Blender

- ▶ To provide mixed air and oxygen to the patient with the fraction of inspired oxygen needed (KEY POINT: Blender must have a flow controller and be able to supply a minimum 15L/min of blended gas)



Supply of
fresh gas to
the patient.

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Services / Accessories needed include

- oxygen supply (0.3~0.5MPa)
- compressed air (0.3~0.5MPa)
- treatment for the exhaust air to prevent cross-infection from the patient's expired breath, e.g. scavenging system
 - power supply. If using battery, power consumption is 40VA
- final patient interface (endotracheal tube)