

1.

# TV50

## Ventilator



### Physical Specification

#### Dimensions and weight

Dimensions (HxWxD) 222 mm×294 mm×210 mm  
(Excluding the trolley)

2.1. Weight **svoris** Approximately 4.5kg  
(Excluding the trolley)

### Display

Screen 7" Capacitive TFT touch screen  
Resolution (HxV) 800×480 pixels  
Brightness Adjustable (Manual, automatic)

### Ink screen

Ventilator ON Outdoor mode  
Ventilator OFF Battery indicator

### Mounting method Mounting handle, dock, trolley

### Communication interface

USB Port, Ethernet, wireless network, 5G,  
bluetooth

### Ventilation Specifications

Patient Type Adult, Pediatric, Infant

Ventilation Mode 4.1.

4.5. V-A/C (Volume assist/control)

P-A/C (Pressure assist/control)

4.3. V-SIMV (Volume-Synchronized Intermittent  
Mandatory Ventilation)

P-SIMV (Pressure-Synchronized Intermittent  
Mandatory Ventilation)

DuoLevel (Duo Level Ventilation)

4.4. CPAP (Continuous Positive Airway Pressure)

PSV (Pressure Support Ventilation)

VS (Volume Support)

APRV (Airway Pressure Release Ventilation)

PRVC (Pressure Regulated Volume Control)

PRVC-SIMV (PRVC-Synchronized Intermittent  
Mandatory Ventilation)

AMV (Adaptive Minute Ventilation)

CPRV (Cardio-Pulmonary Resuscitation  
Ventilation)

4.6. NIV (Non-invasive ventilation)

O<sub>2</sub> Therapy

### Controlled Parameters

Flow (O<sub>2</sub> Therapy) 2 to 80 L/min

O<sub>2</sub>% 21 to 100 vol.%

6.2. TV (Tidal Volume) Adult: 100 to 4000 mL

Pediatric: 20 to 300 mL

Infant: 20 to 100 mL

MV% 25% to 350%

6.1. f 1 to 100 /min

fsimv (Ventilation frequency in SIMV mode)

1 to 60 /min

6.5. I:E 1:10 to 4:1

6.3. T<sub>insp</sub> 0.10 to 10.00 s

Tslope (Time of pressure rising)

0.00 to 2.00 s

Thigh 0.10 to 30.00 s

Tlow 0.20 to 30.00 s

Tpause OFF, 5% to 60%

Flow Pattern Square, 100% Decelerating,  
50% Decelerating

ΔP<sub>insp</sub> 1 to 60 cmH<sub>2</sub>O

6.7. ΔP<sub>supp</sub> 0 to 60 cmH<sub>2</sub>O

6.6. P<sub>high</sub> 0 to 60 cmH<sub>2</sub>O

P<sub>low</sub> 0 to 50 cmH<sub>2</sub>O

6.4. PEEP 0 to 50 cmH<sub>2</sub>O

6.8. Flow trigger OFF, 0.5 to 20.0 L/min;

Pressure trigger OFF, -20.0 to -0.5 cmH<sub>2</sub>O

Exp% (Expiration termination level)

Auto, 1% to 85%

### Apnea Ventilation

TVapnea Adult: 100 to 4000 mL

Pediatric: 20 to 300 mL

Infant: 20 to 100 mL

ΔP<sub>apnea</sub> 1 to 60 cmH<sub>2</sub>O

fapnea 1 to 100 /min

Apnea T<sub>insp</sub> 0.10 to 10.00 s

### Sigh

Sigh Switch ON, OFF

Interval 20 s to 180 min

Cycles Sigh 1 to 20

Δint. PEEP OFF, 1 to 40 cmH<sub>2</sub>O

### Automatic Leakage Compensation

Maximum leakage compensation flow

Adult: 65L/min

Pediatric: 45L/min

Infant: 15L/min

### IntelliCycle

Automatically adjust parameters

Trigger, Tslope, Exp%

IntelliCycle Switch ON, Off

### Monitored parameters

Airway pressure range P<sub>peak</sub>, P<sub>plat</sub>, P<sub>mean</sub>

(Range -20 to 120 cmH<sub>2</sub>O)

PEEP (Range 0 to 120 cmH<sub>2</sub>O)

7.2. Tidal volume range TV<sub>i</sub>, TV<sub>e</sub>, TV<sub>e</sub> spn (Range 0 to 6000 mL)

Frequency range f<sub>total</sub>, f<sub>mand</sub>, f<sub>spn</sub> (Range 0 to 200 /min)

Minute volume range MV, MV<sub>spn</sub>, MV<sub>leak</sub> (Range 0 to 100 L/min)

Leak% 0 to 100%

Resistance R<sub>insp</sub>, R<sub>exp</sub> (Range 0 to 600 cmH<sub>2</sub>O/L/s)

Compliance C<sub>stat</sub>, C<sub>dyn</sub> (Range 0 to 300 mL/cmH<sub>2</sub>O)

Inspired Oxygen (FiO<sub>2</sub>) 15 to 100 vol.%

RSBI 0 to 9999 1/(min\*L)

WOB 0 to 100 J/min

P0.1 -20 to 0 cmH<sub>2</sub>O

PEEP<sub>i</sub> 0 to 50 cmH<sub>2</sub>O

RC<sub>exp</sub> 0 to 10 s

I:E 100:1 to 1:150

Tinsp	0.00 to 60.00s
Waveforms	Airway pressure-time, Flow-time, Volume-time, CO <sub>2</sub> -time
Loops	Paw-Volume, Flow-Volume, Paw-Flow

EN1789, EN13718-1, RTCA DO-160G, ISO 80601-2-84(EN 794-3), MIL-STD-461G, MIL-STD-810G

### Alarm settings

Tidal Volume	High	Infant: Off, 21 to 200 mL Ped: Off, 25 to 600 mL Adu: Off, 110 to 4000 mL
	Low	Infant: Off, 5 to 195 mL Ped: Off, 10 to 595 mL Adu: Off, 50 to 5995 mL
	Minute Volume	High Ped/Infant: 0.2 to 60.0 L/min Adu: 0.2 to 100.0 L/min Low Ped/Infant: 0.1 to 30.0 L/min Adu: 0.1 to 50.0 L/min (can be set to Off in NIV)
Airway pressure	High	10 to 65 cmH <sub>2</sub> O
Frequency	High	OFF, 2 to 160 /min
Inspired Oxygen (FiO <sub>2</sub> )	High	Auto, internal alarm limit: min (FiO <sub>2</sub> set value + max (7 vol.% or FiO <sub>2</sub> set value ×10%), 100 vol.%).
	Low	Auto, internal alarm limit: max (FiO <sub>2</sub> setvalue-max (7 vol.% or set value×10%), 18%).
Apnea alarm time	Low	5 to 60 s

### Trend

Type	Tabular, Graphic
Length	120 hours
Content	Monitor Parameters, Setting Parameters

### Log

Type	Alarm, Operation
Max number	10000

Screenshot	50 pictures
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### O<sub>2</sub> sensor

Type	Non-consuming O <sub>2</sub> sensor
Response time	< 18 s

## 5. Mainstream CO<sub>2</sub> Module

Displayed numerics	EtCO <sub>2</sub>
Measurement range	0 to 150 mmHg
Resolution	1 mmHg
Waveforms / Loop CO <sub>2</sub> - time	
System response time	< 2.0 s
EtCO <sub>2</sub> High alarm limit	2 to 150 mmHg
EtCO <sub>2</sub> Low alarm limit	0 to 148 mmHg

### Safety specifications

Classification	Class IIb
Water protection	IP44
Major standards used	IEC 60601-1-12, ISO 80601-2-12, ISO 80601-2-55, ISO 80601-2-61, IEC60601-1-2:2020

### Environmental specifications

Temperature	-20 to 50°C(operating); -20 to 60°C(storage)
Relative Humidity	5 to 95 % (operating); 10 to 95 % (storage)
Barometric Pressure	37.6 to 110 kPa (operating); 60 to 110 kPa (storage)
Altitude compensation	Automatic compensation

### O<sub>2</sub> supply

2. 2. High pressure O <sub>2</sub>	0.28 ~0.65MPa
3. Pipe Connector	NIST, DISS
Low pressure O <sub>2</sub>	≤ 0.1MPa
Low pressure O <sub>2</sub> Flow	≤ 15L/min

### Air supply (Blower)

Maximum flow	≥ 210 L/min
Maximum pressure	≥ 60 cmH <sub>2</sub> O

### External AC power supply

Power input voltage	100 to 240 V	2.3.1.
Power input frequency	50/60 Hz	
Power input current	2.2 to 1.0 A	
Fuse	T3.15 A/250 V	

### External DC power supply

Power input voltage	12 to 28V
Power input current	15 to 6.5 A

### Internal battery

Number of batteries	One or Two
Battery type	Build-in Lithium-ion battery, 14.4 VDC, 6600 mAh
Battery run time	300 min (Powered by one new fully-charged battery according to ISO 80601-2-12)
2. 3. 2.	600 min (Powered by two new fully-charged battery according to ISO 80601-2-12)
Charging time	≤ 3h (One battery, from 0 to 90%) ≤ 6h (Two battery, from 0 to 90%)

### Special Functions and procedures

Sigh
O <sub>2</sub> ↑
Suction
Manual breath
Inspiratory hold
Screen lock
Oxygen consumption calculation
Storage mode

Specifications are subject to change without notice. Some features are options. Not all features/products are available in all markets. Please contact your local Mindray sales representative for the most current information.

**www.mindray.com**

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healthcare within reach

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**TV50**

Ventilator

Mini, Mighty, More



reddot winner 2023



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healthcare within reach



# When Mini Meets Mighty

Introducing our revolutionary compact and powerful transport ventilator, the TV50 is designed with clinical focus to meet various medical needs. With its integrated turbine, the TV50 enables seamless and efficient ventilation even without compressed gas inlet. Say goodbye to cumbersome setups, as this portable all-in-one transport ventilator ensures a quick, smooth, and hassle-free patient transport experience.

## Compact and Easy to use

With its lightweight design of just 4.5kg and a built-in high-performance turbine, the TV50 is incredibly portable for on-the-go use. It is equipped with battery and oxygen management functions, alleviating the concerns of medical staff regarding insufficient oxygen supply or battery life during transport.

## Powerful and Versatile

Despite its mini size, the TV50 doesn't compromise on performance. Packed with clinical-oriented functions, it supports invasive, non-invasive, and O<sub>2</sub> therapy, along with mainstream CO<sub>2</sub> monitoring. It is robust and reliable in diverse transport scenarios, exceeding the strict standards for vehicles like helicopters or ambulances.

2.4. Integruotas splvotas ekranas



7.5. Baterijos įkrovos likutis

Transportavimas viduje  
1.

9.1.

Tvirtinimas prie paciento lovos



## Extremely Light for Easy Move

Whether you're navigating through tight spaces or responding to remote locations, our remarkably lightweight ventilator will be your trusted companion. The TV50 Transport Ventilator features a compact body and a powerful turbine to ease the transport process. With its universal mount handle, it can flexibly meet various mounting requirements during the transport.

### 2.5. Didelio našumo turbina High performance turbine

- Built-in turbine driven, more independent and portable
- Peak flow ≥210L/min, more effective NIV support
- Precise FiO<sub>2</sub> adjustment in the range of 21%~100%
- Integruota turbina, nepriklausomesnis ir mobilesnis
- Didžiausias srautas •210 l/min., efektyvesnis NIV palaikymas
- Tikslus FiO<sub>2</sub> reguliavimas 21-100 % diapazone



### Small and light

- Weighs only 4.5kg, easy to carry with one hand
- Small in size, saving transport space



### Portable

- Universal mount handle to meet the various mounting requirements
- Preconfigured with optional fixed base, a mobile trolley or a gas cylinder carrier to meet the needs of intra-hospital and pre-hospital transport







# Putting Care First: Intuitive, Easy to use, Confident

Thoughtful battery and oxygen management function of TV50 transport ventilator makes the daily usage and maintenance of the transport ventilator more convenient. Design with intuitive of use in mind, the TV50 keeps you informed with real-time battery display at all time with outdoor display mode to clearly see various in environments.

## Intuitive and Easy to use

- 7- inch HD capacitive touch screen
- Similar UI and operation to bedside ventilator
- Auto-Brightness adjustment



## Confident and Worry-free

- Non-consuming O<sub>2</sub> sensor: Long lasting with zero maintenance
- Real-time O<sub>2</sub> consumption monitoring: efficiently mastering the available time of oxygen
- Long-lasting hot-swappable battery: operating time ≥10 hours with real-time battery display even when powered off
- Outdoor Mode: Improve viewing under sunlight or bright ambient light with one touch

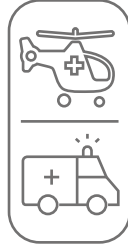


9. 4. Deguonies tiekimo į DPV aparatą žarnelė su jungtimi, skirta prijungimui prie nešiojamo deguonies baliono

## Adapting to the Most Demanding Environment

TV50 provides a impressive 20G force resistance, providing unparalleled durability and reliability even harsh conditions such as severe cold, scorching heat, heavy rain, plateaus. TV50 can withstand significant shocks and vibration, ensuring it remains in top-notch condition to deliver consistence performance throughout its usage. Whether you're in a demanding industrial environment, over the rugged terrains, or on the air, rest assured that the TV50 will be a reliable assistant for medical professional ,ensuring peace of mind and continuity of seamless operation through transport and respiratory support.

It meets various standards for transport vehicles such as helicopters and ambulances, and supports various types of transport.



RTCA/DO-160G  
EN 13718-1  
EN 1789  
ISO 80601-2-84 (EN 794-3)



## Exceeding Rigorous Tests

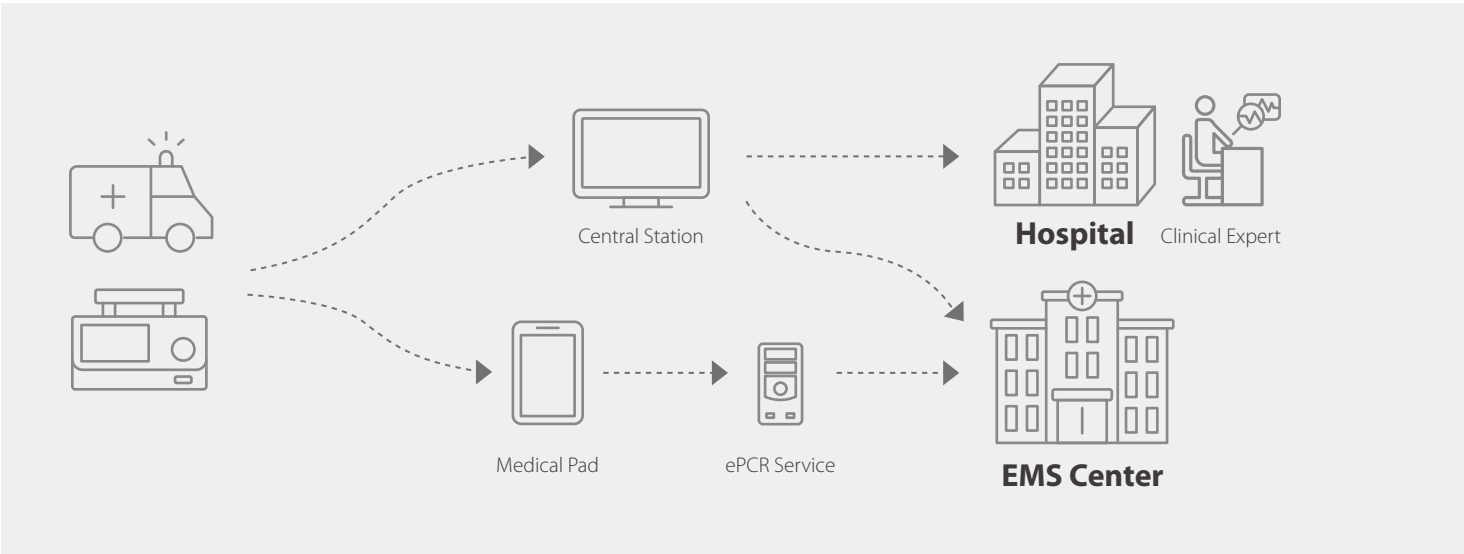
- |  |   |   |  |  |
|--|---|---|--|--|
| <br>-20~50°C<br>Working temperature | <br>7600m<br>Automatic altitude compensation | <br>IP34<br>Dustproof and waterproof grade | <br>6 sides 75cm<br>Drop protection | <br>20G<br>Force resistance |
|--|---|---|--|--|





# Seamless Integration with Telemedicine Capabilities

In any first response situation, the time is of the essence. The TV50 transport ventilator is equipped with rich data communication interfaces, allowing for the seamless and real-time transmission of patient ventilation data to the hospital, shortening the response time as well as supporting timely care for patients.

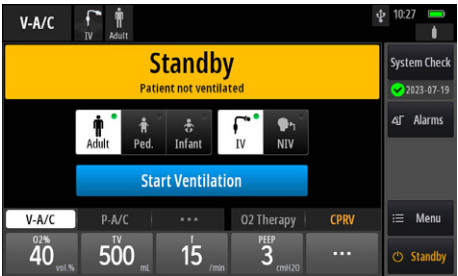


## Powerful and Comprehensive Support

The TV50 transport ventilator combines the portability and durability of the transport ventilator with the power of the intensive care ventilator, aiming to provide the ideal ventilation support for various physiological alteration throughout the patient transport process.

### Comprehensive Ventilation Support

- Versatile: Supporting invasive, non-invasive and O<sub>2</sub> therapy ventilation for adult, pediatric, and infant
- Same ventilation mode as the bedside ventilator, realizing continuous ventilation therapy throughout patient transport
- AMV (Adaptive Minute Ventilation) ventilation mode that automatically adapts to patient status, to ease clinician's workload
- Emergency ventilation CPRV mode, one-button quickly accesses preconfigurable CPR ventilation settings to optimize safer resuscitation process



#### 5. Mainstream CO<sub>2</sub> monitoring

The TV50 transport ventilator supports Mindray mainstream CO<sub>2</sub> monitoring and provides reusable and disposable adapters. This allows for widespread utilization of EtCO<sub>2</sub> monitoring in various clinical scenarios, such as confirming the position of artificial airway and assessing patient condition<sup>[1]</sup>.



[1] Pediatr Emer Care 2018;34: 888–894.

### Flexible Data Transfer

The TV50 transport ventilator supports 5G, WiFi and Bluetooth, which can transmit data such as ventilator setting parameters and monitoring parameters to the ePCR system or other medical hand-held system.

### Pre-arrival Clinical Data

When the TV50 transport ventilator is connected to the CMS (Central Monitoring System) of the hospital, the ventilation data of the patient can be transmitted to the target hospital CMS viewer during transport, so the treatment plan can be formulated as soon as possible.



Note: Some functions are optional, please consult your local sales representative for availability.



**TV50**

**Ventilator**

**Operator's Manual**

Charging time	no more than 3 hours from 0% to 90% when the ventilator is powered by one new battery in powered-off status or standby status; or no more than 6 hours from 0% to 90% when the ventilator is powered by two new batteries in powered-off status or standby status.
Minimum battery run time	300 min (powered by one aged fully-charged battery according to ISO 80601-2-12); 600 min (powered by two aged fully-charged batteries according to ISO 80601-2-12). Note: Ventilator's working condition complies with ISO 80601-2-12.

**Table B-3** Power Requirements

## B.4 Physical Specifications

SYSTEM NOISE	
System noise	A-weighted sound pressure level ( $L_{pA}$ ) 48 dB(A) A-weighted sound power level ( $L_{WA}$ ) 56 dB (A)
OVERALL DIMENSIONS	
Dimensions	<p>1.1.2.1</p> <p>1253 mm</p> <p>555 mm</p> <p>540 mm</p> <p>192 mm</p> <p>65 mm</p> <p>157 mm</p> <p>294 mm</p> <p>Plotis</p> <p>60 mm</p> <p>150 mm</p> <p>Gylis</p> <p>*Dimension error: <math>\pm 10</math> mm</p> <p>Aukštis be rankenos</p>
Weight	<p>About 4.5 kg (including the main unit)</p> <p>8 kg (whole machine, including the main unit and the portable gas cylinder bracket)</p> <p>30 kg (whole machine, including the main unit and the trolley)</p> <p>Note: The whole machine includes the main unit (with one battery), display, trolley, and excludes the patient tubing assembly, support arm and humidifier.</p>
CASTER	

**Table B-4** Physical Specifications



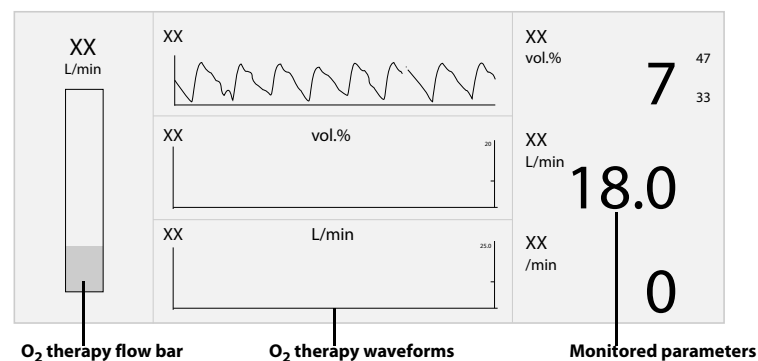
1. Mount the filter onto the inspiratory port.
2. Connect the inspiratory filter to the humidifier inlet via the tube.
3. Connect the humidifier outlet to the nasal cannula via the tube with heating function.
4. The expiratory port is not connected with a tube.
5. Place the tubes onto the support arm hook.

### 6.5.16.2 Switching on O<sub>2</sub> Therapy

**WARNING:** The device must only be used under the supervision of qualified medical staff, so that help is immediately available if malfunctions occur or the patient has insufficient spontaneous breathing.

**WARNING:** This ventilator is a high flow device and should only be connected to a pipeline installation that allows for the indicated required flow at the terminal outlets, in order to avoid exceeding the pipeline flow capabilities and to minimize the risk that the ventilator interferes with adjacent equipment operation.




1. Select [O<sub>2</sub> Therapy] key in the ventilation mode area. The screen shows the ventilation parameters that can be set in the ventilation mode.
2. Set [Flow] and [O<sub>2</sub>%] to appropriate values as required.
3. Select [Ok] after setting values.



**Figure 6-17** O<sub>2</sub> Therapy Screen

### 6.5.16.3 O<sub>2</sub> Therapy Timing/Timer



Select the O<sub>2</sub> Therapy Timing/Timer area in the top left corner.

Timing can be stopped or started by pressing the  or  keys. The time displayed on the timer can be reset to zero by selecting the  key.

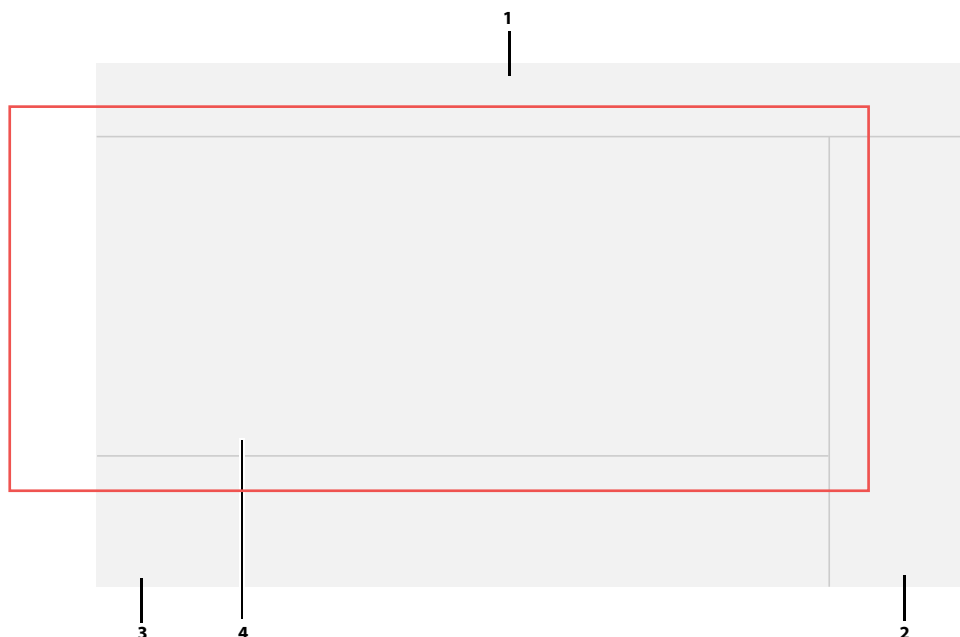
Apnea Tinsp	0.10 to 10.00	0.10 to 1.00: 0.01 1.00 to 10.00: 0.05	s
MV%	25 to 350	1	%
Flow	Adult: 6 to 120 Pediatric: 6 to 30	10 to 120: 1.0 6 to 10: 0.1	L/min
<b>MONITORED PARAMETERS</b> Monitoruojami parametrai			
PARAMETER	RANGE	RESOLUTION	UNIT
FiO <sub>2</sub>	15 to 100	1	Vol. %
TVi	0 to 6000 (BTPS)	<100 mL: 0.1 100 mL: 1	mL
TVe			
TVe spn			
MV	0.0 to 100.0	<10.0 L/min: 0.01 10.0 L/min: 0.1	L/min
MVspn			
MVleak			
Ppeak	-20 to 120	Absolute value <10 cmH <sub>2</sub> O: 0.1 Absolute value 10 cmH <sub>2</sub> O: 1	cmH <sub>2</sub> O
Pplat			
Pmean			
PEEP	0 to 120	<10 cmH <sub>2</sub> O: 0.1 10 cmH <sub>2</sub> O: 1	cmH <sub>2</sub> O
ftotal	0 to 200	1	/min
fmand			
fspn			
Tinsp	0.00 to 60.00	0.01	s
I:E	150:1 to 1:150	0.1	/
WOB	0.00 to 100.00	0.01	J/min
	0.00 to 20.00	0.01	J/L
Leak%	0 to 100	1	%
Ri	0 to 600	1	cmH <sub>2</sub> O/ (L/s)
Re			
Cstat	0 to 300	<10 mL/cmH <sub>2</sub> O: 0.1 10 mL/cmH <sub>2</sub> O: 1	mL/ cmH <sub>2</sub> O
Cdyn			
RSBI	0 to 9999	1	1/(L•min)
RCexp	0.00 to 10.00	0.01	s
Flow (O <sub>2</sub> Therapy)	0.0 to 100.0	0.1	L/min
PEEPi	0 to 50	0.1	cmH <sub>2</sub> O
PEEPtot	0 to 120	0.1	cmH <sub>2</sub> O
P0.1	-20.0 to 0.0	0.1	cmH <sub>2</sub> O

Table B-6 Ventilator Specifications



7. Outdoor mode/Power-off battery level display  
When the ventilator is powered on, this button displays the icon . Press this key to enter/exit the outdoor mode. When the ventilator is shut down, this button displays the remaining battery level icon .
8. Control knob  
Press the control knob to select menu items or confirm settings. Rotate the knob clockwise or anticlockwise to scroll through menu items or change settings.
9. Lock screen button  
Press the lock screen button to lock or unlock the screen.
10. AUDIO PAUSED key  
Press to initiate the AUDIO PAUSED for 120 seconds, so that audible alarm tones of the active alarms are switched off. The system automatically exits the AUDIO PAUSED state after 120 seconds and resumes the prompt tone of alarms. If a new alarm is triggered when the AUDIO PAUSED state is on, the system automatically exits the AUDIO PAUSED state and sounds the prompt tone of the new alarm. You can press the key again in the AUDIO PAUSED state to cancel the AUDIO PAUSED state.

7. The ventilator display shows ventilation parameters and pressure/flow/volume waveforms, etc. The following is a general layout of the main screen.



**Figure 4-2** Main Screen








NO.	MAIN SCREEN	DESCRIPTION
1	Icon field	<p>It displays the following information:</p> <ul style="list-style-type: none"> <li>Ventilation mode icon: shows the current ventilation mode. Setting the ventilation mode is allowed.</li> <li>Ventilation type icon: displays the icon  when the ventilation type is non-invasive; displays the icon  when the ventilation type is invasive.</li> <li>Patient type icon.</li> <li>Alarm message icon: includes physiological alarms, technical alarms and prompt messages, as well as the number of current alarms and prompt messages. Select the field to display a list of all active alarms.</li> <li>When the AUDIO PAUSED hard key is selected, the Audio Pause icon  and the 120-second countdown are displayed.</li> <li>Network status icon: displays the icon  when the [Network Type] is [WLAN] or [Hotspot]; displays the icon  when the [Network Type] is [LAN]; displays the icon  when the [Network Type] is [5G].</li> <li>USB status icon: The icon  is highlighted when the system is connected to an identifiable USB device. By selecting this icon you can export screen, data and transfer settings in the opened interface.</li> <li>Bluetooth icon.</li> <li>System time icon.</li> <li>Power status icon.</li> <li>Oxygen consumption monitoring icon: displays the speed of oxygen consumption (L/min) or the remaining oxygen supply time of the gas cylinder. In service menu, when the switch [Display oxygen cylinder remaining time] is on, the system displays the remaining time of the oxygen supply; when it is off, the system displays the oxygen consumption speed.</li> </ul>
2	Softkey field	Displays system check, patient information, alarm setup, screenshot, O2 Suction, Manual, menu and standby softkeys.

Table 4-1 Main Screen

3	Ventilation mode and parameter setup field	Displays the keys for setting up ventilation modes and parameters.
4	Waveform/ Spirometry/ Values/Big Numeric screen field	Displays ventilator-related waveforms, spirometry, monitored values, or big numerics.

Table 4-1 Main Screen

## 4.2 Waveforms Screen

After ventilation is started, the ventilator enters the waveform screen by default, as shown in the following figure.

Skaitinė išraiška

Grafinis atvaizdavimas

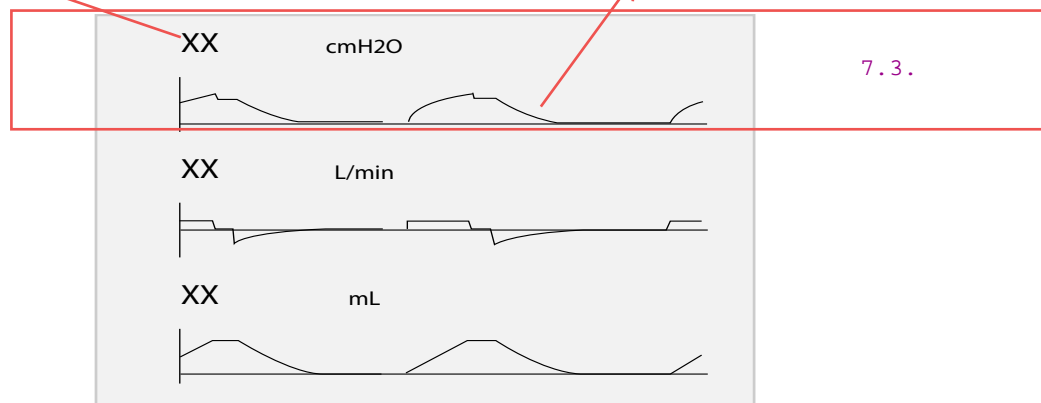


Figure 4-3 Waveforms Screen



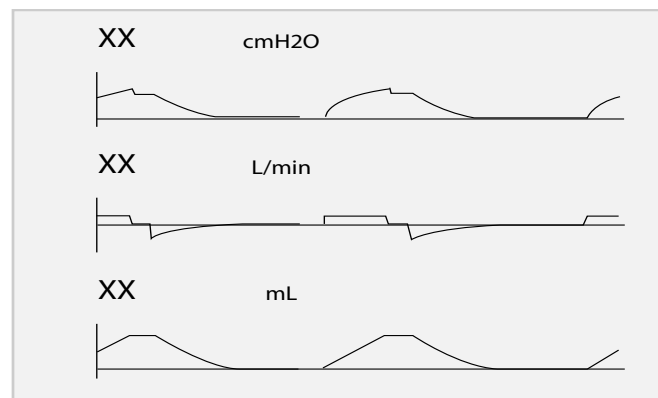
3	Ventilation mode and parameter setup field	Displays the keys for setting up ventilation modes and parameters.
4	Waveform/Spirometry/Values/Big Numeric screen field	Displays ventilator-related waveforms, spirometry, monitored values, or big numerics.

**Table 4-1** Main Screen

## 4.2 Waveforms Screen

After ventilation is started, the ventilator enters the waveform screen by default, as shown in the following figure.

1.1.6.

**Figure 4-3** Waveforms Screen

## 9.1 Introduction

8.

Alarms, triggered by a vital sign that appears abnormal or by technical problems of the ventilator, are indicated to the user by visual and audible alarm indications.

**NOTE:** When the ventilator is started, the system detects whether audible alarm tones and alarm lamp function normally. If yes, the alarm lamp flashes yellow and red successively, and the speaker and the buzzer give check tones. If not, do not use the equipment and contact us immediately.

**NOTE:** When multiple alarms of different priorities occur simultaneously, the ventilator selects the alarm of the highest priority and gives visual and audible alarm indications accordingly.

**NOTE:** If more than one alarms are triggered at the same level, alarm messages will be shown by the sequence of alarms triggered.

**NOTE:** The ventilator restore the latest configuration if restarts after the power failure.

**WARNING:** A potential hazard can exist if different alarm presets are used for the same or similar equipment in any single area, e.g. an intensive care unit or cardiac operating room.

**WARNING:** When monitoring patients that are not continuously attended by a clinical operator, properly configure the alarm system and adjust alarm settings as per the patient's condition.

## 9.7 Setting Alarm Limits

**CAUTION:** In the case that high pressure alarm limit of 60 cmH<sub>2</sub>O is not required under clinical conditions, setting the high pressure alarm limit to 60 cmH<sub>2</sub>O or less is recommended so as to extend the service life of the spare air supply and the battery.

**NOTE:** An alarm is triggered when the parameter value is higher than the high limit or lower than the low limit.

**NOTE:** When using the ventilator, always keep an eye on whether the alarm limits of a specific parameter are set to the appropriate values.

Select [**Alarms**] [**Vent Limits**] or [**Module Limits**], or select the flashing active monitored values to set ventilation or module-related alarm limits.

### 9.7.1 Auto Alarm Limits

Select [**Alarms**] [**Vent Limits**] [**Auto Limits**], the ventilator will update the parameter alarm limits based on the monitored value. The relationship is shown in the table below.

	ALARM LIMIT	ADJUST FORMULA
	Paw high limit	Average peak pressure+10cmH <sub>2</sub> O or 35cmH <sub>2</sub> O, whichever is greater
	Low airway pressure limit	PEEP + 4 cmH <sub>2</sub> O
8.1.	MV high limit	1.5×MVe monitored value
8.2.	MV low limit	0.6×MVe monitored value
	TV high limit	1.5×TVe average value
	TV low limit	0.5×TVe average value
	ftotal high limit	1.4×Total frequency monitoring value, not more than 160/min
	ftotal low limit	0.6×ftotal monitored value
8.3.	Apnea time	15 s

**Table 9-1** Auto Alarm Limits of Ventilator

The value used for average uses the monitoring value of the last eight ventilation cycles or the monitoring value in one minute, whichever is smaller.

If the calculated alarm limit is more than the high threshold of setting range or less than the low threshold, the corresponding threshold is used as the auto alarm limit.



- A. Alarm limits setup for ventilation parameters
- B. Current alarms
- C. Recent alarms
- D. Setup for alarm volume and alarm management
- E. Help information soft key

Press this soft key to display Help Information in the window that appears. Press this soft key again to close the Help Information window.


- F. Help information
- G. Associated information

Select the key to open the corresponding settings menu.

## 9.10 Recent Alarm

The  icon will appear if there is inactivated alarm (alarms) for which the alarm trigger condition has disappeared. By pressing the  icon, you can view the recent inactivated alarms in the opened window. You can also clear the recent inactivated alarms by pressing the **[Reset]** key.

## 9.11 ALARM OFF

When the alarm limit is set as **[OFF]** or alarm is disabled, the system will display an ALARM OFF icon  showing the parameter alarm limits, and corresponding physiological alarms will be closed. Namely, the alarm message, alarm lamp, audible alarm tones, and flashing alarm numeric for this physiological alarm will be all switched off.

**WARNING:** Switching off alarms can endanger the patient. Handle with care.

## 9.12 Alarm Tests

### 9.12.1 Loss of Power

1. Connect the ventilator to AC power and press the power button.
2. After the system starts up, disconnect the external power supply when the battery is fully charged.
3. Connect a test lung to the ventilator and start normal ventilation.
4. Ventilation time is approximately 5 hours for a ventilator configured with one battery, and approximately 10 hours for a ventilator configured with two batteries. When the battery power is depleted, the **[System DOWN. Connect Ext. Power.]** alarm is activated.
5. Reconnect the external power supply.
6. Verify that the alarm resets and the ventilator is again powered by external power supply.



.Per aukštas/žemas slėgis kvėpavimo takuose

## 9.12.2

## Paw Too High

1.1.7.2.

1. After the ventilator system starts up normally, connect a test lung to the ventilator and start ventilation.
2. Set Paw high alarm limit to current Peak+5 cmH<sub>2</sub>O.
3. Squeeze the test lung hard during inspiration.
4. Verify that the [**Paw Too High**] alarm is activated, the ventilator cycles into expiration, and airway pressure falls to PEEP level.

## 9.12.3

## Paw Too Low

1.1.7.2.

1. After the ventilator system starts up normally, connect a test lung to the ventilator and start ventilation.
2. Set Paw low alarm limit to current Peak+5 cmH<sub>2</sub>O.
3. Check whether the [**Paw Too Low**] alarm is activated.

## 9.12.4

## TVe Too Low

1. After the ventilator system starts up normally, connect a test lung to the ventilator and start ventilation.
2. Set the TV low alarm limit to be greater than the current TVe. Verify that the [**TVe Too Low**] alarm is activated.

## 9.12.5

## TVe Too High

1. After the ventilator system starts up normally, connect a test lung to the ventilator and start ventilation.
2. Set the TV high alarm limit to be less than the current TVe. Verify that the [**TVe Too High**] alarm is activated.

## 9.12.6

## MVe Too Low

1. After the ventilator system starts up normally, connect a test lung to the ventilator and start ventilation.
2. Set the MV low alarm limit to be greater than the current MV. Verify that the [**MVe Too Low**] alarm is activated.

## 9.12.7

O<sub>2</sub> Supply Failure

1. Connect the ventilator to high-pressure O<sub>2</sub> supply, and set the O<sub>2</sub> supply type to high-pressure O<sub>2</sub> supply in the ventilator.
1. Close the high-pressure O<sub>2</sub> supply and verify whether the [**O2 Supply Failure**] alarm has been activated.

## 9.12.8

## PEEP Too Low

1. Remove the expiration valve membrane and install the expiration valve.
2. After the ventilator system starts up normally, connect a test lung to the ventilator and start ventilation.
3. Set PEEP to 30 cmH<sub>2</sub>O. Verify that the [**PEEP Too Low**] alarm is activated.

### 9.12.9 Airway Obstructed

1. After the ventilator system starts up normally, connect a test lung to the ventilator and set the ventilator to pressure mode to start ventilation.
2. Disconnect the patient tubing from the test lung and plug the patient tubing with the leak test plug.
3. Verify that the **[Airway Obstructed?]** alarm is activated after several breathing cycles.
4. Connect patient tubing with the test lung and verify this alarm is reset automatically.

### 9.12.10 FiO<sub>2</sub> Too High

1. Connect the ventilator to low-pressure O<sub>2</sub> supply. Set the O<sub>2</sub> supply type to LPO.
2. Connect a test lung to the ventilator and start ventilation.
3. Set the FiO<sub>2</sub> high alarm limit to be less than the current O<sub>2</sub> concentration monitored value after ventilation is stable.
4. Verify that the **[FiO2 Too High]** alarm is activated. Please resume the setting of the backup air supply after the test.

### 9.12.11 FiO<sub>2</sub> Too Low

1. Connect the ventilator to high-pressure O<sub>2</sub> supply. Set the O<sub>2</sub> supply type to HPO.
2. Connect a test lung to the ventilator and start ventilation.
3. Switch off the high-pressure O<sub>2</sub> supply after ventilation is stable.
4. Verify that the **[FiO2 Too Low]** alarm is activated.

### 9.12.12 EtCO<sub>2</sub> Too High

1. Connect a test lung to the ventilator and start ventilation.
2. Connect the CO<sub>2</sub> test module and set the CO<sub>2</sub> test module to operating mode.
3. After CO<sub>2</sub> warm-up is completed and the CO<sub>2</sub> module enters operating mode, deliver 3 % to 7 % of CO<sub>2</sub> standard gas to the airway adapter of mainstream CO<sub>2</sub> module. Set the EtCO<sub>2</sub> high alarm limit to be less than the standard gas concentration.
4. Verify that the **[EtCO2 Too High]** alarm is activated.

### 9.12.13 EtCO<sub>2</sub> Too Low

1. Connect the CO<sub>2</sub> test module and set the CO<sub>2</sub> test module to operating mode.
2. Connect a test lung to the ventilator and start ventilation.
3. After CO<sub>2</sub> warm-up is completed and the CO<sub>2</sub> module enters operating mode, deliver 3 % to 7 % of CO<sub>2</sub> standard gas to the airway adapter of mainstream CO<sub>2</sub> module. Set the EtCO<sub>2</sub> low alarm limit to be greater than the standard gas concentration.
4. Verify that the **[EtCO2 Too Low]** alarm is activated.

### 9.12.14 Tube Disconnected

1. After the ventilator system is started normally, connect the ventilator to a test lung and start ventilation.
2. Disconnect the test lung.

8.4. 3. Verify that the [Tube Disconnected?] alarm is activated.

## 9.13 When an Alarm Occurs

When an alarm occurs, do as follows:

1. Check the patient's condition.
2. Determine the alarming parameter or alarm category.
3. Identify the alarm source.
4. Take proper actions to eliminate the alarm condition.
5. Make sure the alarm condition is corrected.

For details about how to troubleshoot alarms, refer to **D.0 Alarm Messages**.

**WARNING:** To prevent possible patient injury when alarms are active, ensure that the patient receives adequate ventilation. Identify and remove the cause of the alarms. Readjust the alarm limits only when they are inappropriately set for the current conditions.

**CAUTION:** Contact the Customer Service Department if the alarm persists without obvious cause.

## D.2.3 Monitor Board

1.1.7.4. Aliarmo pranešimai

ALARM MESSAGES	P	CAUSE AND ACTION
Technical Error 04	L	Buzzer Failure. Contact your service personnel.
Technical Error 05	M	Atmospheric Pressure Sensor Failure. Contact your service personnel.
Technical Error 07	M	3-way Valve Failure. Contact your service personnel.
Technical Error 09	M	Insp. Temp Sensor Failure. Contact your service personnel.
Device Failure 01	H	Power Supply Voltage Error. Contact your service personnel.
Device Failure 02	H	Memory Error. Contact your service personnel.
Device Failure 05	H	Ctrl Module Comm Stop. Contact your service personnel.
Device Failure 06	H	Ctrl Module Selftest Error. Contact your service personnel.
Device Failure 09	H	Pressure Sensor Failure. Contact your service personnel.
Device Failure 10	H	Safety Valve Failure. Contact your service personnel.
Device Failure 12	H	Total Inspiratory Limb Failure. Contact your service personnel.
Device Failure 13	H	O <sub>2</sub> Limb Failure. Contact your service personnel.
Device Failure 21	H	Pressure Sensor Zero Point Error. Contact your service personnel.
Device Failure 22	H	Protecting Module Comm Stop. Contact your service personnel.
Device Failure 23	H	Protection Module Self Check Error. Contact your service personnel.
PEEP Too High	H	Monitored PEEP exceeds PEEP + 5 cmH <sub>2</sub> O (PEEP + 10 cmH <sub>2</sub> O for APRV mode) within any fully mechanical ventilation cycle. 1. Check the ventilation parameter setup. 2. Check the patient tubing for occlusion.

**Table D-5** Monitor Board



PEEP Too Low	M	Patient's PEEP is less than the setting value to a certain extent. 1. Check the patient tubing for leakage. 2. Perform System Check to test the leakage
Airway Obstructed?	H	Tube is occluded. 1. Check and clean the patient tubing. 2. Check and clean the expiration valve.
Insp. Limb Airway Obstructed?	M	The patient tubing is bent or occluded in case of O <sub>2</sub> therapy. Check if the patient tubing is occluded or bent. If yes, clear it.
Sustained Airway Pressure	H	The airway pressure measured by any pressure sensor is greater than the setting PEEP + 15 cmH <sub>2</sub> O for 15 s consecutively. 1. Check the patient. 2. Check the ventilation parameter setup. 3. Check the patient tubing for occlusion.
1.1.7.4.		
Airway Leak?	L	Tube is leaky. 1. Check the patient tubing for leakage. 2. Perform System Check to test the leakage
Kv įpavimo taką nutekėjimas?		
Tube Disconnected?	H	Tube is disconnected. Re-connect the patient tubing.
Pressure Limited	L	In volume mode, the pressure reaches Paw high alarm limit-5. 1. Check the patient. 2. Check the ventilation parameter setup. 3. Check pressure high alarm limit.
Volume Limited	L	In pressure mode, delivered gas volume exceeds the set TV high limit. 1. Check the patient. 2. Check the ventilation parameter setup. 3. Check the alarm limits.
Pinsp Not Achieved	L	P <sub>insp</sub> is lower than the pressure setting value by 3 cmH <sub>2</sub> O or 2/3 of the pressure setting value, whichever is less. 1. Check the patient. 2. Check TV alarm limits. 3. Check the O <sub>2</sub> supply. 4. Check the patient tubing for leakage. 5. Check the HEPA filter for occlusion.
TV Not Achieved	L	TV <sub>i</sub> is less than the TV setting value by more than 10 mL + 10% of the setting value. 1. Check the patient. 2. Check pressure high alarm limit. 3. Check the HEPA filter for occlusion. 4. Check the O <sub>2</sub> supply. 5. Check the patient tubing for leakage or occlusion.

Table D-5 Monitor Board



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## Ventilator Accessories

CATALOGUE


2024.11

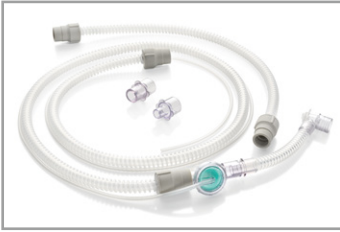
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Picture	Description	Part No.	Apply to
	<b>Reusable adult circuit, single limb, with exp.valve</b> <b>Including:</b> <ul style="list-style-type: none"> <li>- Breathing circuit, 2 pcs</li> <li>- Straight connector, 22M/19M, 1 pc</li> <li>- Straight connector, 22M/15M, 1 pc</li> <li>- Valve control tube, 1 pc</li> <li>- Catheter mount, 1pc</li> </ul>	040-006958-00	TV50

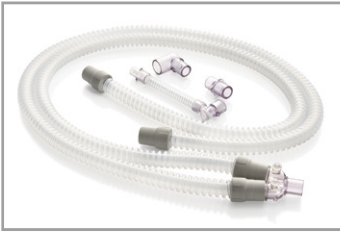


**Reusable pediatric circuit, single limb, with exp. valve, Including:**

- Breathing circuit, 2 pcs
- Straight connector, 22M/19M, 1 pc
- Straight connector, 22M/15M, 1 pc
- Valve control tube, 1 pc
- Catheter mount, 1pc

040-006959-00

TV50

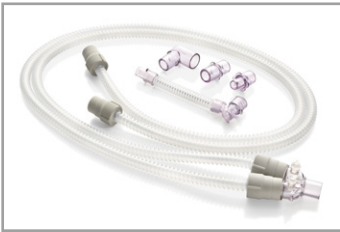


**Reusable adult circuit, dual limb, lightweight, without water trap, Including:**

- Breathing circuit, 3 pcs
- Straight connector, 19M/19M, 1 pc
- Elbow connector, 22M/19M, 1 pc
- Y piece, 1 pc
- Catheter mount, 1pc

115-094270-00

TV80




**Reusable pediatric circuit, dual limb, lightweight, without water trap, Including:**

- Breathing circuit, 3 pcs
- Straight connector, 19M/19M, 1 pc
- Straight connector, 19M/15M, 1 pc
- Elbow connector, 22M/19M, 1 pc
- Y piece, 1 pc
- Catheter mount, 1pc

115-094271-00

TV80

Picture	Description	Part No.	Apply to
	<b>Reusable adult circuit, dual limb, longer auxiliary circuit, with water trap, Including:</b> <ul style="list-style-type: none"> <li>- 0.6m breathing circuit, 5 pcs</li> <li>- Y piece</li> <li>- Water trap, 2 pcs</li> <li>- Straight connector, 22M/22M</li> <li>- Catheter Mount</li> </ul>	115-094299-00	TV80

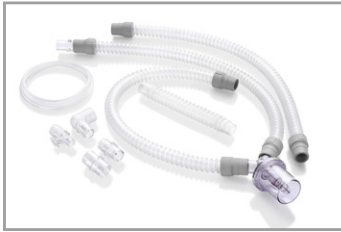


**Reusable pediatric circuit, dual limb, longer auxiliary circuit, with water trap, Including:**

- 0.6m breathing circuit, 5 pcs
- Y piece
- Water trap, 2 pcs
- Straight connector, 22M/22M
- Catheter Mount

115-094300-00

TV80

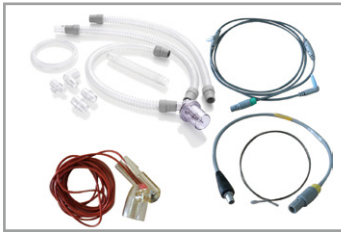


**Reusable NIV non-heated breathing circuit, Adult Including:**

- Breathing circuit, 3 pcs
- Pressure sampling tube, 1 pc
- Straight connector, 22M/22M, 1 pc
- Straight connector, 19M/19M, 1 pc
- Elbow connector, 22M/15M, 1 pc
- Expiration valve, 19M/15M, 1pc
- Water trap, 1 pc

040-006322-00

SV70



**Reusable NIV heated breathing circuit kit/Jike, Adult, including:**

- Temperature probe 1.5m, 1 pc
- Reusable heater wire 1.3m, 1 pc
- Inspiratory heater wire adapter, 1 pc
- Draw wire 1.7m, 1 pc
- Reusable NIV breathing circuit, Adult, 1 pc

115-081877-00

SV70



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## Accessories and Consumables

CATALOGUE




2024.07

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Picture	Model	Part No.	No. Description	Purchasing Unit
	6412	0010-10-42663	Single-Patient Use Air way Adapter, Adu/Ped, with mouthpiece	Each
		0010-10-42665	Reusable airway adapter, Adu/Ped	Each
		0010-10-42666	Neonatal reusable airway adapter (Respironics)	Each

8.4.

Main-stream CO<sub>2</sub> Accessory Kit (Capnostat)




For BeneVision, ePM series monitors

Part No.	No. Description	Purchasing Unit
6800-30-50613	Mainstream CO <sub>2</sub> kit, Adu/Ped/Neo Including: Capnostat CO <sub>2</sub> sensor, 1 pcs 6063 Single-Patient Use Airway Adapter, Adu/Ped, 1 pcs 6312 Single-Patient Use Airway Adapter, Neo, 1 pcs	Set

Main-stream CO<sub>2</sub> Accessories (Mindray)

- Designed for intubated patients.
- Short response time
- Reusable & disposable adapter
- Latex free
- Good biocompatibility

For BeneVision, ePM, new uMEC series monitors

Picture	Model	Part No.	No. Description	Purchasing Unit
	GA3701	125-000278-00	MR Main-stream CO <sub>2</sub> sensor, 2.6m	Each
<p>9.6. CO2 matavimo jutiklis – 1 vnt. Daugkartinio naudojimo CO2 matavimo kiuvetės, skirtos suaugusiųjų kontūrams – 2 vnt.</p>				
	GA3211	040-006830-00	MR Reusable Main-stream CO <sub>2</sub> airway adapter, Adu/Ped	Each
	GA3212	040-006831-00	MR Reusable Main-stream CO <sub>2</sub> airway adapter, Neo	Each



TV50

Ventilator

Operator's Manual

Humidifier kit (including humidifier, water tank, heated patient tubing, etc.)	Jike SH330/EU	115-018049-00
	Jike SH330/India	115-018050-00
	Jike SH330/US/110V	115-018051-00
	Jike SH330/UK	115-018053-00
	Jike SH330/US/220V	115-018054-00
	Jike SH330/BR/230V	115-032096-00
	Jike SH330/BR/110V	115-032097-00
Humidifier water tank	Disposable water chamber for Jike humidifier	040-002173-00
	Reusable water chamber for Jike humidifier	040-001530-00
Gas supply hose assembly	Ventilator oxygen hose accessories kit (German)	115-008257-00
	Ventilator oxygen hose accessories kit (French)	115-008259-00
	Ventilator oxygen hose accessories kit (Australian)	115-008261-00
	Ventilator oxygen hose accessories kit (US/dual connector/DISS)	115-008209-00
	Ventilator oxygen hose accessories kit (British)	115-008201-00
Mainstream CO <sub>2</sub> module accessories	Mainstream CO <sub>2</sub> accessory kit (Disposable)	115-091760-00
	Mainstream CO <sub>2</sub> accessory kit (Reuse)	115-093194-00
	Disp. main CO <sub>2</sub> adapter, Adu/Ped, 10 pcs	125-000280-00
	Reusable main CO <sub>2</sub> adapter, Adu/Ped	040-006830-00
Flow sensor	Reusable flow sensor kit (adult/ pediatric, diff. pressure type)	115-090657-00
	Disposable flow sensor kit (adult/ pediatric, diff. pressure type)	115-090659-00
	Disposable flow sensor kit (Adu/ped/10 set)	115-094093-00
Power adapter	AC power adapter (100-240V)	022-000599-00
	DC power adapter, with power cord (12-28V)	022-000646-00
Lithium battery	Lithium battery kit	115-079845-00
	Lithium battery kit	115-096070-00
Power cord	AC power cord of adapter (Brazil)	009-003699-00
	AC power cord of adapter (UK)	009-003701-00
	AC power cord of adapter (US/110V)	009-003702-00
	AC power cord of adapter (EU)	009-003703-00
	AC power cord of adapter (India)	009-010943-00
	AC power cord of adapter (AUS)	009-004941-00
	AC power cord of adapter (ZA)	009-015291-00
	AC power cord of adapter (US/220V)	009-015324-00
Support arm	Support arm	034-000652-00
Trolley	Trolley	045-005884-00

Laidas prietaiso mašinimui prijungti  
1.1.8.3.

Table 12-1 Accessories List



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# Ventilator Accessories

CATALOGUE

2024.11

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[www.mindray.com](http://www.mindray.com)

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Central gas supply hose

Hose length 3m



Standard: UK

Part No.	Speci cation	Gas supply	Hose color	Gas outlet (machine)	Gas inlet (wall)
115-008201-00	34I-OXY-BS/NS-3	O <sub>2</sub>	White	NIST	British standard
115-008365-00	34I-OXY-BS/NS-3 34I-AIR-BS/NS-3	O <sub>2</sub> Air	White Black & White		

Standard: Germen

Part No.	Speci cation	Gas supply	Hose color	Gas outlet (machine)	Gas inlet (wall)
115-008257-00	34I-OXY-GS/NS-3	O <sub>2</sub>	White	NIST	Germany
115-008366-00	34I-OXY-GS/NS-3 34I-AIR-GS/NS-3	O <sub>2</sub> Air	White Black & White		

Standard: France

Part No.	Speci cation	Gas supply	Hose color	Gas outlet (machine)	Gas inlet (wall)
115-008259-00	34I-OXY-FS/NS-3	O <sub>2</sub>	White	NIST	French standard
115-008367-00	34I-OXY-FS/NS-3 34I-AIR-FS/NS-3	O <sub>2</sub> Air	White Black & White		

Standard: Australia

Part No.	Speci cation	Gas supply	Hose color	Gas outlet (machine)	Gas inlet (wall)
115-008261-00	34I-OXY-SIS/NS-3	O <sub>2</sub>	White	NIST	Austrilian
115-008368-00	34I-OXY-SIS/NS-3 34I-AIR-SIS/NS-3	O <sub>2</sub> Air	White Black & White		

Standard: USA

Part No.	Speci cation	Gas supply	Hose color	Gas outlet (machine)	Gas inlet (wall)
115-008209-00	34U-OXY-BS/DS-3	O <sub>2</sub>	Green	DISS	British standard
115-008372-00	34U-OXY-BS/DS-3 34U-AIR-BS/DS-3	O <sub>2</sub> Air	Green Yellow		



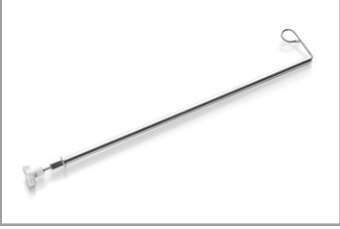


Hose length 0.6m



Part No.	Speci cation	Gas supply	Hose color	Gas outlet (machine)	Gas inlet (wall)
082-001926-00	EU standard, 34I-OXY-DS/NS-0.6	O <sub>2</sub>	White	DISS	NIST
082-001918-00	US standard, 34U-OXY-DS/DS-0.6	O <sub>2</sub>	Green		

Trolley & Support arm

Picture	Description	Part No.	Apply to
	Trolley	115-025215-00	SV300 SV300 Pro
	Trolley	045-003318-00	SV600 SV800
	Trolley	045-004835-00	SV70
	Trolley	045-005884-00	TV50 TV80

Picture	Description	Part No.	Apply to
	Support arm (non-wrench type)	045-000625-00	SV300 SV300 Pro SV600 SV800
	Support arm (wrench type)	034-000652-00	TV50 TV80 SV70
	Support arm (wrench type), with trolley adapter	115-085693-00	SV300 SV300 Pro SV600 SV800
	IV pole	034-000653-00	TV50 TV80 SV70
	Ventilator main unit horizontal xation base	115-093877-00	TV50

**TV50**

**Ventilator**

**Operator's Manual**

Papnea	It is inspiration pressure in apnea ventilation when pressure mode is selected for apnea ventilation. It is a relative value relative to PEEP or P <sub>low</sub> .
fapnea	Breathing frequency set in apnea ventilation mode.
TVapnea	It is delivered tidal volume in apnea ventilation when volume mode is selected for apnea ventilation.
Apnea T <sub>insp</sub>	Inspiration time set in apnea ventilation mode.
Sigh	Turn on or turn off sigh function.
Interval	It is the setting value of time interval between two groups of sigh ventilation.
Cycles Sigh	It is the setting value of number of cycles of every group of sigh ventilation.
int.PEEP	It is intermittent PEEP augmentation, added during the sigh cycle.
Size	Choose between adult, pediatric and infant.
IBW	Used for calculating the patient's ideal minute volume.
Compression Prompt	Compression prompt switch.
Comp. f	The number of compression in one minute.
IntelliCycle	Turn on or off the IntelliCycle function

#### MONITORED PARAMETER

#### DESCRIPTION

P <sub>peak</sub>	The maximum pressure value in one breathing cycle.
P <sub>plat</sub>	The airway pressure during inspiratory pause.
P <sub>mean</sub>	The mean pressure value in one breathing cycle.
PEEP	Positive end-expiratory pressure.
TV <sub>i</sub>	The inspired tidal volume in one cycle.
7.2. TV <sub>e</sub>	The expired tidal volume in one cycle.
TV <sub>e</sub> spn	The spontaneous expired tidal volume in one cycle.
TV <sub>e</sub> /IBW	Delivered tidal volume per ideal body weight.
7.1. MV <sub>e</sub>	The accumulated expired tidal volume in one minute.
MV <sub>i</sub>	The inspiratory tidal volume accumulated in one minute.
MV <sub>spn</sub>	The accumulated spontaneous expired tidal volume in one minute.
MV <sub>leak</sub>	The accumulated leakage (inspiratory volume minus expiratory volume) in one minute.
Leak%	The percentage of gas leakage volume in total volume of the ventilator.
I:E	Ratio of inspiration time to expiration time in one cycle
T <sub>insp</sub>	Duration of the inspiratory phase
f <sub>total</sub>	The accumulated number of breaths in one minute.

Table 6-20 Ventilation Parameters



## 4.1 Display Controls

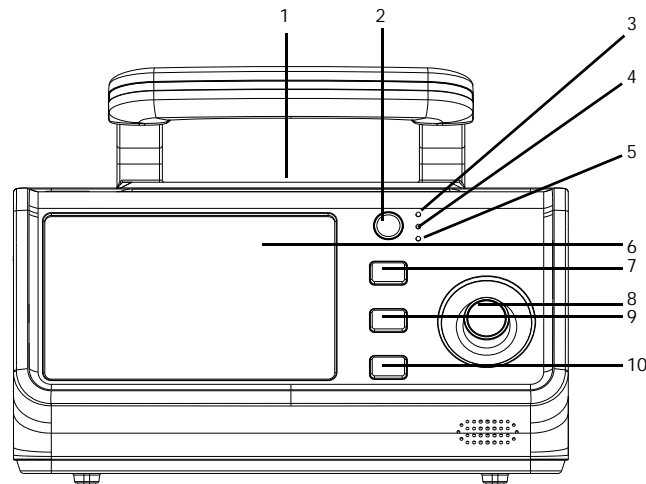


Figure 4-1 Display Controls

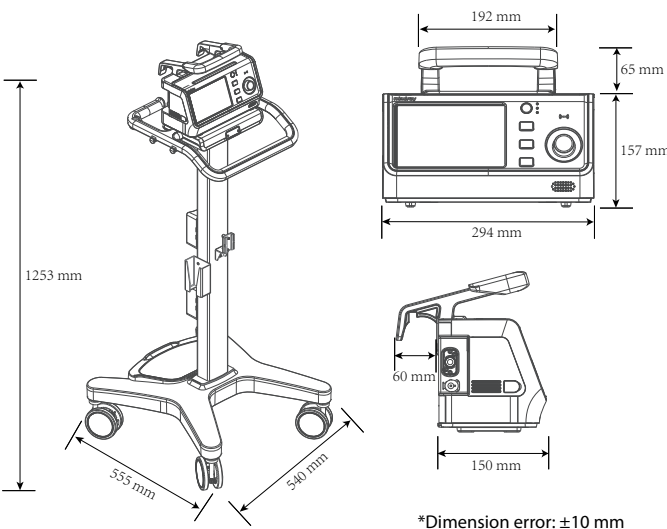
The control unit is composed of a small number of operating components. Main operating components are:

1. Alarm indicator  
The alarm indicator indicates different levels of alarms with different colors and flashing frequencies when an alarm is triggered.
2. Power switch (with indicator)  
You can press the key to power on/off the system. The indicator is on when the ventilator is powered on and off when the ventilator is powered off.
3. External power indicator
  - Lit: when the ventilator is connected to an external power supply.
  - Not lit: when the ventilator is not connected to an external power supply.
4. Ambient light sensor  
When screen brightness is set to auto, the system automatically adjusts screen brightness according to the ambient light intensity.
5. Battery indicator
  - Lit: indicates that the battery is being charged or is already fully charged, and the ventilator is operating on external power supply.
  - Flashing: indicates that the ventilator is being powered by the batteries.
  - Not lit: indicates that the ventilator is not connected to an external power supply, or that the ventilator does not have a battery installed, or that there is a fault with the battery.
6. Display (touch screen)  
2.4. The display shows the software interface of the ventilator system. You can select and change settings by touching the screen.

Charging time	no more than 3 hours from 0% to 90% when the ventilator is powered by one new battery in powered-off status or standby status; or no more than 6 hours from 0% to 90% when the ventilator is powered by two new batteries in powered-off status or standby status.
Minimum battery run time	300 min (powered by one aged fully-charged battery according to ISO 80601-2-12); 600 min (powered by two aged fully-charged batteries according to ISO 80601-2-12). Note: Ventilator's working condition complies with ISO 80601-2-12.

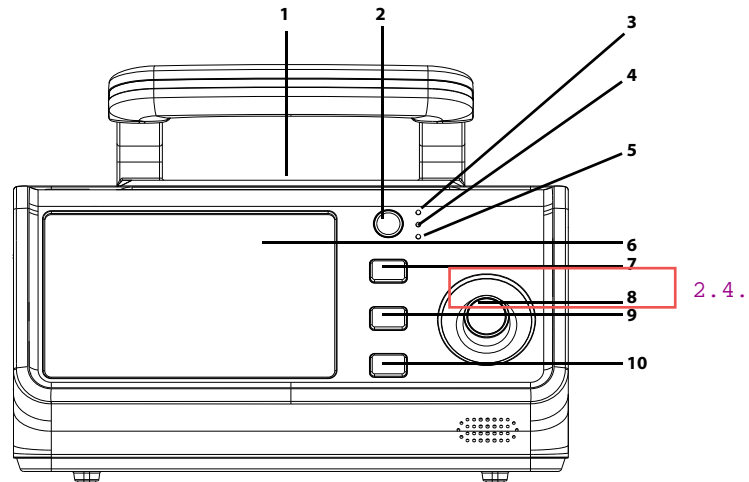
**Table B-3** Power Requirements

## B.4 Physical Specifications

SYSTEM NOISE	
System noise	A-weighted sound pressure level ( $L_{pA}$ ) $\leq$ 48 dB(A) A-weighted sound power level ( $L_{WA}$ ) $\leq$ 56 dB (A)
OVERALL DIMENSIONS	
Dimensions	 <p>*Dimension error: <math>\pm 10</math> mm</p>
Weight	<p><b>2.1.</b> About 4.5 kg (including the main unit)</p> <p><math>\leq</math> 8 kg (whole machine, including the main unit and the portable gas cylinder bracket)</p> <p><math>\leq</math> 30 kg (whole machine, including the main unit and the trolley)</p> <p>Note: The whole machine includes the main unit (with one battery), display, trolley, and excludes the patient tubing assembly, support arm and humidifier.</p>
CASTER	

**Table B-4** Physical Specifications



## 4.1 Display Controls



**Figure 4-1** Display Controls

The control unit is composed of a small number of operating components. Main operating components are:

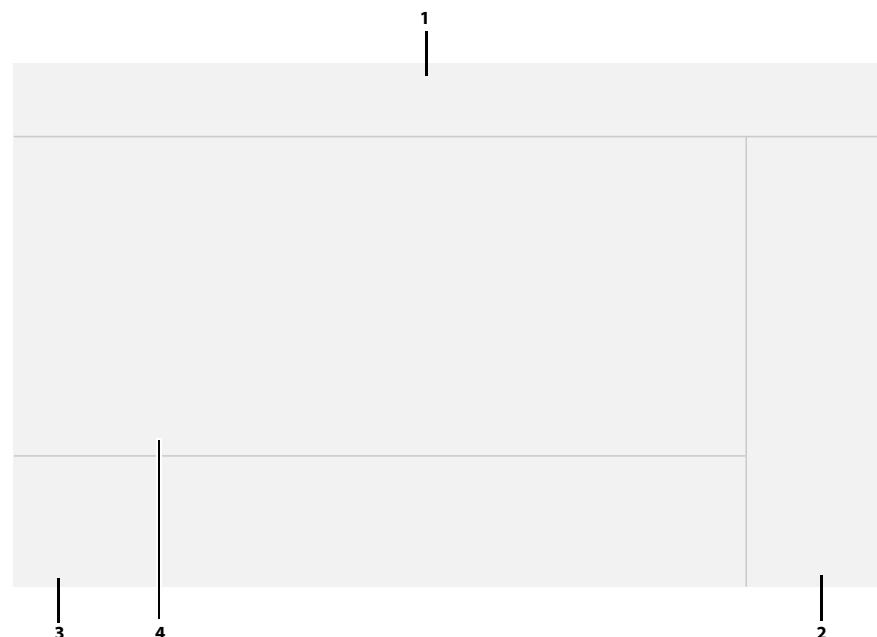
- 1. Alarm indicator**  
The alarm indicator indicates different levels of alarms with different colors and flashing frequencies when an alarm is triggered.
- 2. Power switch (with indicator)**  
You can press the key to power on/off the system. The indicator is on when the ventilator is powered on and off when the ventilator is powered off.
- 3. External power indicator**
  - Lit: when the ventilator is connected to an external power supply.
  - Not lit: when the ventilator is not connected to an external power supply.
- 4. Ambient light sensor**  
When screen brightness is set to auto, the system automatically adjusts screen brightness according to the ambient light intensity.
- 5. Battery indicator**
  - Lit: indicates that the battery is being charged or is already fully charged, and the ventilator is operating on external power supply.
  - Flashing: indicates that the ventilator is being powered by the batteries.
  - Not lit: indicates that the ventilator is not connected to an external power supply, or that the ventilator does not have a battery installed, or that there is a fault with the battery.
- 6. Display (touch screen)**  
The display shows the software interface of the ventilator system. You can select and change settings by touching the screen.

7. Outdoor mode/Power-off battery level display  
When the ventilator is powered on, this button displays the icon . Press this key to enter/exit the outdoor mode. When the ventilator is shut down, this button displays the remaining battery level icon .

2. 4. 8. **Control knob**  
Press the control knob to select menu items or confirm settings. Rotate the knob clockwise or anticlockwise to scroll through menu items or change settings.

9. Lock screen button  
Press the lock screen button to lock or unlock the screen.
10. AUDIO PAUSED key  
Press to initiate the AUDIO PAUSED for 120 seconds, so that audible alarm tones of the active alarms are switched off. The system automatically exits the AUDIO PAUSED state after 120 seconds and resumes the prompt tone of alarms. If a new alarm is triggered when the AUDIO PAUSED state is on, the system automatically exits the AUDIO PAUSED state and sounds the prompt tone of the new alarm. You can press the key again in the AUDIO PAUSED state to cancel the AUDIO PAUSED state.

The ventilator display shows ventilation parameters and pressure/flow/volume waveforms, etc. The following is a general layout of the main screen.

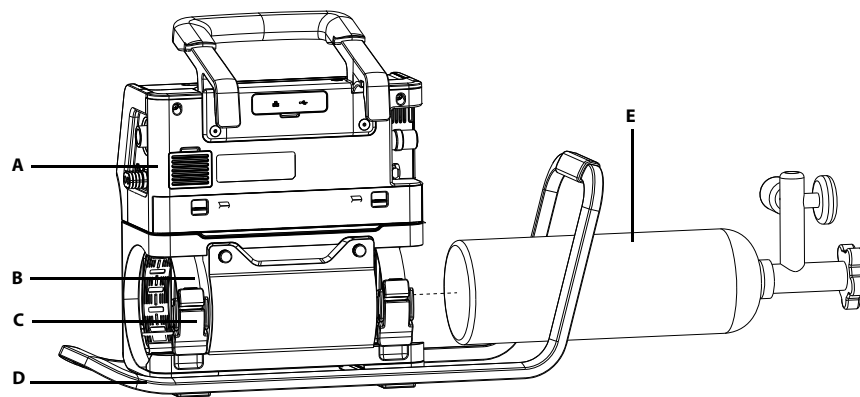


**Figure 4-2** Main Screen

## 3.7 Replacing the Portable Gas Cylinder

3.

**CAUTION:** Ensure that the oxygen cylinder is equipped with a pressure relief valve.



**Figure 3-7** Replacing the Portable Gas Cylinder

- A.** Main unit
- B.** Cylinder fixing buckle
- C.** Fastening wrench
- D.** Portable gas cylinder bracket
- E.** Gas cylinder

- 1.** Disconnect the main unit from the pipe of the gas cylinder.
- 2.** Lift the fastening wrench and loosen the cylinder fixing buckle, and then take the cylinder out.
- 3.** Put the new cylinder into the cylinder assembly from the arch of the elbow, tighten the fixing buckle of the cylinder, and pull down the fastening wrench to tighten the cylinder.

The portable gas cylinder bracket is used to fix and carry the oxygen cylinder, and the bracket can be connected with the main unit of the ventilator to realize the integration of the main unit of the ventilator and the oxygen cylinder, and provide ventilation support with higher oxygen concentration for patients in time.

**WARNING:** When installing and replacing the oxygen cylinder, tighten the rotary switches on the oxygen cylinder and pressure relief valve by hand. Do not use tools to avoid damage to screw threads and sealing materials, which may cause leakage.

The accessory carrying bag can be hung onto the portable gas cylinder bracket. The accessory carrying bag can be used to carry and store the ventilator-related accessories, including the patient tubing, flow sensor, tube protective case, and test lung. Before replacing the gas cylinder, you need to lift the bag to take it out, and then loosen the cylinder fixing buckle.

## 4.3 Big Numeric Screen

Select **[Menu]** → **[Screen]** → **[Choose Screen]** → **[Big Numeric Screen]** to open the screen as shown below.

In addition to selecting the menu button, you can also directly slide the screen to switch between screens.



Figure 4-4 Big Numeric Screen

## 4.4 Measured Values Screen

Select **[Menu]** → **[Screen]** → **[Choose Screen]** → **[Values Screen]** to open the interface as shown below.

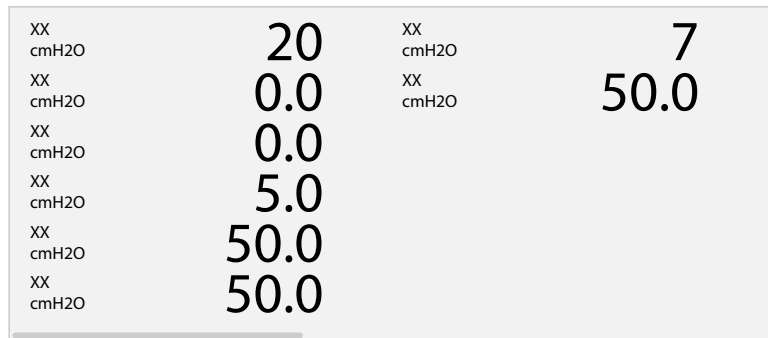


Figure 4-5 Measured Values Screen

- A. Main unit
- B. Dock
- C. Unlock button
- D. AC adapter holder

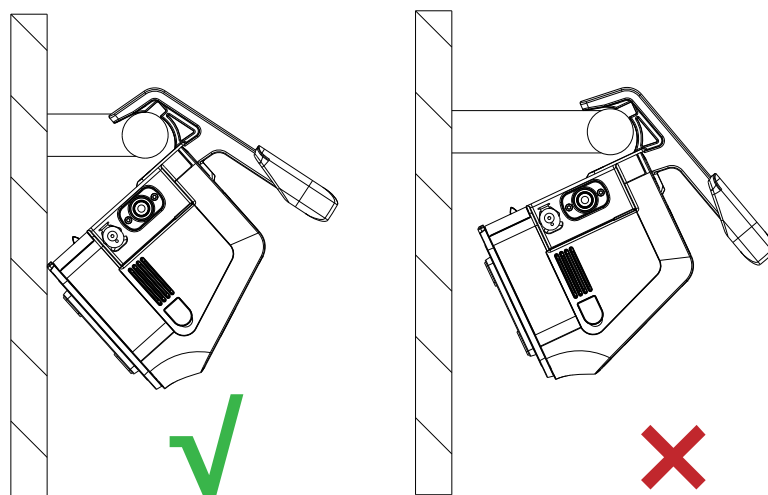
1. Align the main unit with the slot on the dock and place it on the dock.
2. Connect the AC adapter.

To remove the main unit from the dock, press the unlock button on the dock with one hand, and lift the main unit with the other hand simultaneously.

When the ventilator is bumped or shaken (such as on an ambulance), secure the ventilator with a dock to prevent excessive movement or accidental fall of the equipment during transfer.

## 3.9 Attaching to the Rail System

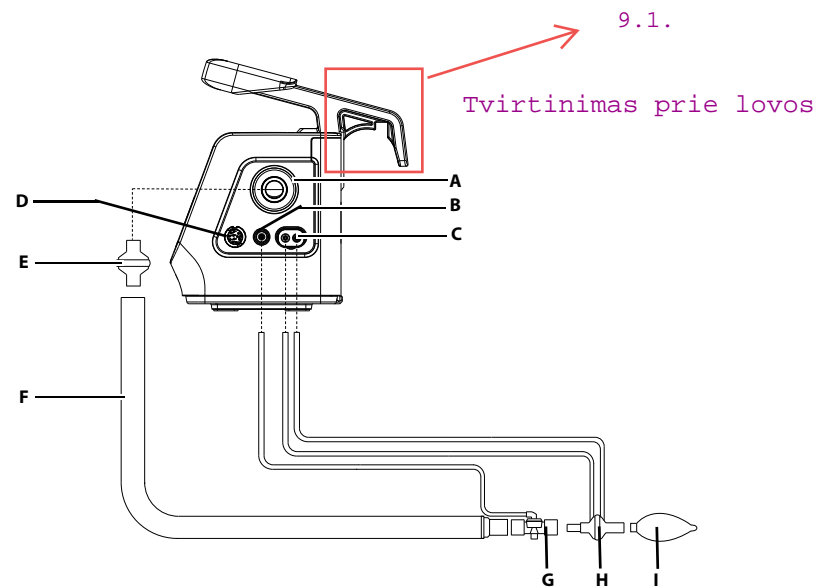
This device can be attached to rail systems or stretcher bars with diameters not exceeding 38 mm by a rail holder. During installation, ensure that there is a distance of at least 60 mm between the rail and the wall. Attach the device to a position that suitable for the patient.



**Figure 3-10** Attaching to the Rail System

**WARNING:** When transporting the ventilator with the rail holder, follow the wall clearance requirements and use other methods (such as Dock or fixing bracket) to secure or protect the device to prevent accidental loosening and falling.





**Figure 10-3** Patient Tubing

- |                                      |                            |
|--------------------------------------|----------------------------|
| <b>A.</b> Inspiratory port           | <b>F.</b> Patient tubing   |
| <b>B.</b> Expiratory valve port      | <b>G.</b> Expiratory valve |
| <b>C.</b> Flow sensor port           | <b>H.</b> Flow sensor      |
| <b>D.</b> Mainstream CO2 module port | <b>I.</b> Test lung        |
| <b>E.</b> Bacteria filter            |                            |

- To disassemble:  
Pull out the patient tubing one by one.
- To install:  
Refer to **3.4 Installing the Patient Tubing**.

### 10.3.4 Electronic Nebulizer

**NOTE:** Install the specified nebulizer. The nebulizer assembly, its installation and disassembling steps described in this section are only for reference.

# Ventilator Release Note

**Release Date:** 12<sup>th</sup>, Aug 2025

**Product:** Accessories for TV series ventilator

## Release content:

9.1.

### 1 Wall mounting bracket

As the expansion of pre-hospital transport solution and fit in various mounting scenarios, Mindray now provides wall mounting bracket for both TV50 and TV80 series. The new brackets have passed dynamic tests under EN1789.

034-001201-00  
Wall mounting bracket for TV80 series



9.1.

034-001200-00  
Wall mounting bracket for TV50 series



Now the available languages of IFU include:

English	French	Spanish	Russian	German
Italian	Polish	Turkish	Portuguese	Brazilian
Hungarian	Dutch	Czech	Ukrainian	Bulgarian
Romanian	Lithuanian	Norwegian	Danish	Greek
Swedish	Finnish	Slovak		

Note: Wall mounting brackets are **not available** for the countries below, local requirement on this solution shall be discussed separately based on local RA judgement:

Brazil	Indonesia	Belarus	Saudi Arabia
Russia	Thailand	Ukraine	Ecuador
Korea	Egypt	Sri Lanka	Peru
India	Morocco	Mexico	Uzbekistan
Malaysia	Kazakhstan	Turkey	

Mindray Building, Keji 12th Road South, Hi-tech Industrial Park,  
Nanshan, Shenzhen, 518057 P. R. China  
Shenzhen Mindray Bio-Medical Electronics Co., LTD.

**mindray** 迈瑞

## 2. 3m coaxial circuit and flow sensor

To meet the demand for longer circuit for ventilation during CT scanning, Mindray now release coaxial circuit and flow sensor of 3 meters lengths in **CE region**.

Now the languages available to **flow sensor IFU** include:

English	French	Spanish	Russian	German
Italian	Polish	Turkish	Portuguese	Brazilian
Hungarian	Dutch	Czech	Ukrainian	Bulgarian
Romanian	Lithuanian	Norwegian	Danish	Greek
Swedish	Finnish	Slovak		

PN codes of the materials are as below:

Part Number	Description
115-112508-00	Disposable coaxial circuit kit (3m, with flow sensor, 1 pc)
115-112505-00	Disposable flow sensor (3m, adult/pediatric, 10 pcs)

Requirement from other regions shall be discussed separately based on local RA judgement.

## 3. PN code replacement for reusable circuits

The PN codes of the following reusable breathing circuit of TV80 will be replaced for future ordering due to supplier issue. The old PN code will **remain available until 30<sup>th</sup> Sep 2025**.

Description	PN Code Before	PN Code After
Reusable adult circuit, dual limb, longer auxiliary circuit, with water trap	115-094299-00	040-007376-00
Reusable pediatric circuit, dual limb, longer auxiliary circuit, with water trap	115-094300-00	040-007377-00

## Product materials update:

The following materials are now updated or released:

1. IFU of wall mounting bracket (EN + multi-languages)
2. Pictures of wall mounting bracket
3. IFU of 3m coaxial circuit and flow sensor (EN + multi-languages)
4. CE DOC of 3m coaxial circuit and flow sensor
5. Mindray Ventilator Config Price List\_20250729-final!!



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## Ventilator Accessories

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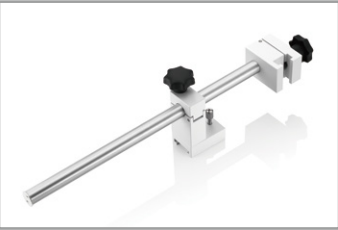
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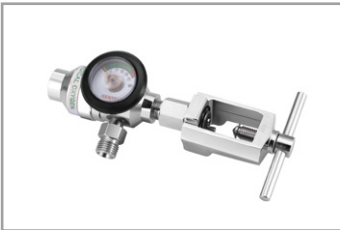







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Maintenance & Others

Picture	Description	Part No.	Apply to
	Ventilator main unit horizontal fixation base	115-094147-00	TV80
	Cylinder bracket for TV50 Able to fix up to 2L cylinder together with main unit	045-005932-00	TV50
	Accessory carrying bag Need to be mounted on the cylinder bracket	048-011389-00	TV50
	Bracket-Pedant mount kit for humidifier	115-006158-00	SV300 SV300 Pro SV600 SV800 SV70 TV50 TV80

Picture	Description	Part No.	Apply to
	Pressure reducer for high pressure O <sub>2</sub> cylinder, Pin Index (CGA 870)/DISS	082-001927-00	SV300 SV300 Pro SV600 SV800 SV70 TV50 TV80
	Pressure reducer for high pressure O <sub>2</sub> cylinder, 3/4"(DIN 477)/DIN	082-004343-00	TV50 TV80
	Pressure reducer for high pressure O <sub>2</sub> cylinder, 5/8BE(BS 341)/DIN	082-004344-00	
	Pressure reducer for high pressure O <sub>2</sub> cylinder, CGA 540/DISS	082-004345-00	
	Pressure reducer for high pressure O <sub>2</sub> cylinder, Pin Index(CGA 870)/DISS	082-004346-00	
	Pressure reducer for high pressure O <sub>2</sub> cylinder, Pin Index(CGA 870)/DIN	082-004347-00	
	AC adapter fixing base	115-095424-00	TV50 TV80
	Oxygen sensor (MOX-3)	040-001275-00	SV300 SV300 Pro SV600 SV800 SV70



## Declaration of Conformity



**Manufacturer:** Shenzhen Mindray Bio-Medical Electronics Co., Ltd.  
Mindray Building, Keji 12th Road South, Hi-tech Industrial  
Park, Nanshan, Shenzhen, 518057, P. R. China

**Manufacturer SRN:** /

**EC-Representative** Shanghai International Holding Corp. GmbH (Europe)  
Eiffestraße 80, 20537 Hamburg, Germany

**Product:** Ventilator (Including Accessories)

**Model:** TV50/TV55/TV50S

**Basic UDI-DI:** 69449040AB0200002743

**Classification:** IIb (According to Rule 12 of MDR Annex VIII)

**Conformity Assessment Route:** Annex IX excluding CHAPTER II

**CND code** Z120301

**Intended purpose:** The ventilator is intended for providing ventilation  
assistance and breathing support for patients.

We declare that the above mentioned products meet the provisions of the  
REGULATION (EU) 2017/745 OF THE EUROPEAN PARLIAMENT. All  
supporting documentations are retained under the premises of the manufacturer.  
This declaration of conformity is issued under the sole responsibility of the  
manufacturer.

**References to CS:** /

**Notified Body:** TÜV SÜD Product Service GmbH  
Ridlerstraße 65  
80339 München, Germany.

**Notified Body No. :** 0123

**Identification of the Certificate:** G10 044751 0176 Rev. 01

**Start of CE-Marking:** 2022.11.18

I hereby am appointed as the authorized person to deal with all the registration and quality  
management affairs in my capacity as Deputy Director of Technical Regulation Department  
of Shenzhen Mindray Bio-Medical Electronics Co., Ltd, Effective immediately.

**Place, Date of Issue:**

Shenzhen, 2023.5.18

**Signature:**

**Name of Authorized Signatory:**

Mr. Wang Xinbing

**Position Held in Company:**

Deputy Director, Technical Regulation

## Applied Standards List

<b>Product:</b>	<b>Ventilator</b>
<b>Model:</b>	<b>TV50/TV55/TV50S</b>

### Applied Standards:

ISO 14971:2019	Medical devices -- Application of risk management to medical devices
IEC 62304:2006+A1:2015	Medical device software - Software lifecycle processes
IEC 60601-1:2005+A1:2012+A2:2020	Medical electrical equipment - Part 1: General requirements for basic safety and essential performance
IEC 60601-1-8:2006+A1:2012+A2:2020	Medical electrical equipment - Part 1-8: General requirements for basic safety and essential performance - Collateral Standard: General requirements, tests and guidance for alarm systems in medical electrical equipment and medical electrical systems
EN 60601-1-12:2015+A1:2020/ IEC 60601-1-12:2014+AMD1:2020	Medical electrical equipment -Part 1-12: General requirements for basic safety and essential performance -Collateral Standard: Requirements for medical electrical equipment and medical electrical systems intended for use in the emergency medical services environment
ISO 80601-2-12 :2020	Medical electrical equipment - Part 2-12: Particular requirements for basic safety and essential performance of critical care ventilators
EN ISO 80601-2-55:2018/ISO 80601-2-55:2018	Medical electrical equipment - Part 2-55: Particular requirements for the basic safety and essential performance of respiratory gas monitors
ISO 80601-2-84:2020	Medical electrical equipment — Part 2-84: Particular requirements for the basic safety and essential performance of ventilators for the emergency medical services environment
ISO 80601-2-90:2021	Medical electrical equipment - Part 2-90: Particular requirements for basic safety and essential performance of respiratory high-flow therapy equipment
EN 1789:2020	Medical vehicles and their equipment - Road ambulances
EN 13718-1:2014+A1:2020	Medical vehicles and their equipment-Air ambulances-Part 1: Requirements for medical devices used in air ambulances
IEC 60601-1-6:2010+A1:2013+A2:2020	Medical electrical equipment -- Part 1-6: General requirements for basic safety and essential performance - Collateral standard: Usability



IEC 62366-1:2015+A1:2020	Medical devices - Application of usability engineering to medical devices
ISO 20417:2021	Medical devices — Information to be supplied by the manufacturer
EN ISO 5359:2014+A1:2017/ ISO 5359:2014+A1:2017	Anaesthetic and respiratory equipment - Low-pressure hose assemblies for use with medical gases
EN ISO 5356-1:2015/ ISO 5356-1:2015	Anaesthetic and respiratory equipment - Conical connectors - Part 1: Cones and sockets
EN ISO 18082:2014+A1:2017 /ISO 18082:2014+A1:2017	Anaesthetic and respiratory equipment - Dimensions of noninterchangeable screw-threaded (NIST) low-pressure connectors for medical gases
EN ISO15223-1:2021	Medical devices - Symbols to be used with medical device labels, labelling and information to be supplied - Part 1: General requirements
IEC 60601-1-2:2020	Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral Standard: Electromagnetic disturbances - Requirements and tests
ISO 10993-1:2018	Biological evaluation of medical devices - Part 1: Evaluation and testing within a risk management process
ISO 10993-5:2009	Biological evaluation of medical devices - Part 5: Tests for in vitro cytotoxicity
ISO 10993-10:2010	Biological evaluation of medical devices - Part 10: Tests for irritation and skin sensitization
ISO 10993-18:2020	Biological evaluation of medical devices — Part 18: Chemical characterization of medical device materials within a risk management process
ISO 18562-1:2017	Biocompatibility evaluation of breathing gas pathways in healthcare applications Part 1: Evaluation and testing within a risk management process
ISO 18562-2:2017	Biocompatibility evaluation of breathing gas pathways in healthcare applications Part 2: Tests for emissions of particulate matter
ISO 18562-3:2017	Biocompatibility evaluation of breathing gas pathways in healthcare applications Part 3: Tests for emissions of volatile organic compounds (VOCs)
ISO 18562-4:2017	Biocompatibility evaluation of breathing gas pathways in healthcare applications Part 4: Tests for leachables in condensate



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## Ventilator Accessories

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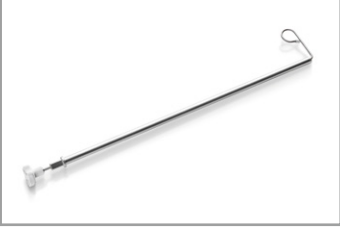


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Trolley & Support arm

Picture	Description	Part No.	Apply to
	Trolley	115-025215-00	SV300 SV300 Pro
	Trolley	045-003318-00	SV600 SV800
	Trolley	045-004835-00	SV70
	Trolley	045-005884-00	TV50 TV80

Picture	Description	Part No.	Apply to
	Support arm (non-wrench type)	045-000625-00	SV300 SV300 Pro SV600 SV800
	Support arm (wrench type)	034-000652-00	TV50 TV80 SV70
	Support arm (wrench type), with trolley adapter	115-085693-00	SV300 SV300 Pro SV600 SV800
	IV pole	034-000653-00	TV50 TV80 SV70
	Ventilator main unit horizontal fixation base	115-093877-00	TV50