mindray

SV800/SV600

Ventilator

All Intelligence Leads to Ease

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www.mindray.com

P/N: ENG-SV800/SV600-210285X8P-20221014

mindray
healthcare within reach

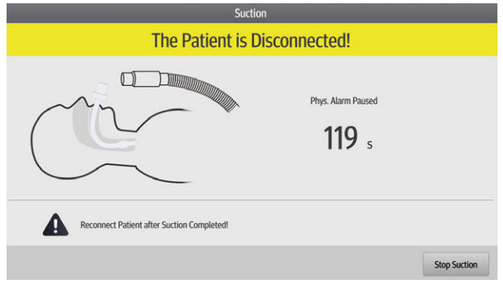
Operational freedom

In busy clinical environments, ease of use is a fundamental requirement for all medical devices. The new Mindray SV800/SV600 ventilators enable clinicians to set and deliver ventilation therapies quickly and easily via the intelligent ergonomic design and flat user interface.

- 1080p HD resolution
- Capitative touch screen supports screen gestures
- 360° view

PulmoSight™ Pro
Graphically displays resistance, compliance, spontaneous breathing status and lung injury risks in real-time. Together with the dynamic short trends, clinicians are able to monitor and evaluate changes in the patient's conditions.

User configurable UI
The SV800/SV600 ventilator offers exceptional usability. Users are able to configure frequently used parameter controls by creating quick-access shortcut keys in the UI. Also, the ventilation mode keys can be arranged in order of frequency of use. This enables you to customize the device, making the parameter adjustment easier and quicker.



Graphic guidelines
The new, more intuitive display features enhanced graphics which allows users to navigate and locate mode and parameter controls quickly, thereby reducing errors and improving efficiency.

Single level menu design
Moving away from more cumbersome, menu-style control, the flat-screen menu UI ensures that frequently used controls are located in the most easily accessible position of the UI.

Minimal Maintenance
Routine maintenance requires no tools. The new 'door design' means that no tools are required to perform regular routine maintenance of the oxygen sensors, water trap, fan dust filter, HEPA air intake dust filter, etc. This ensures your new device always remains clean and clutter free.

Make the right decision

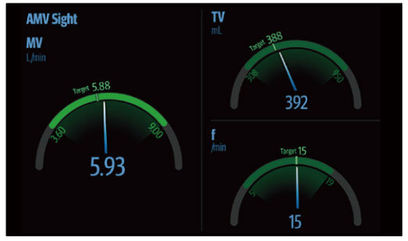
Ventilation modes and decision-supporting tools like Intelligent Assistant are developed on the basis of clinical needs and professional guidelines to help medical personnel calmly make clinical decisions.

Advanced Ventilation Modes

Intelligent ventilation AMV™

AMV™ is a ventilation mode that automatically adapts to patient status, relieving clinician's workload.

- Based on the widely recognized Otis minimum breathing work principle
- Automatically adjusts Vt, f, I:E
- Adapts to mandatory to full spontaneous ventilation
- AMV Sight graphically displays the control status



Emergency ventilation CPRV™

The innovation CPRV™ has been specially developed for CPR procedure.

- Integrates mindray unique Electronic Impendence Threshold Device (e-ITD™) technology
- Improves venous return and helps improve perfusion
- CO_2 monitoring to detect Return of Spontaneous Circulation (ROSC)

High flow oxygen therapy HFOT

HFOT combined with active humidification can improve oxygenation and enhance patient comfort.

- Max O_2 therapy flow up to 80L/min
- Support active humidification and warming
- Improved patient comfort and removal of CO_2

Powerful Tools

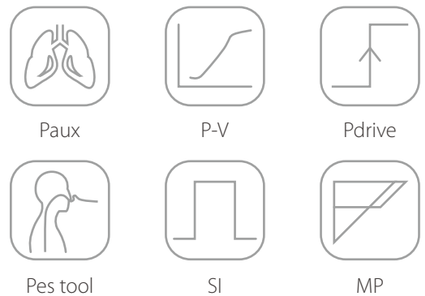
Advanced synchronization technology

IntelliCycle™ Pro automatically adapts to the patient breathing pattern based on waveform analysis thus improving the patient-ventilator synchrony.

- Reduces patient's work of breathing by adjusting inspiratory and expiratory trigger sensitivity
- Avoids pressure overshoot or flow starvation

Lung protection tools

Comprehensive lung protection tools include Auxiliary pressure monitoring, Pes tool(Catheter positioning tool, Pes filter, Pres baseline correction), Static PV Loop, lung recruitment tool (Sustain inflation), and advanced monitoring parameters, to help clinicians assess the status of the lung and conduct lung protective strategies.

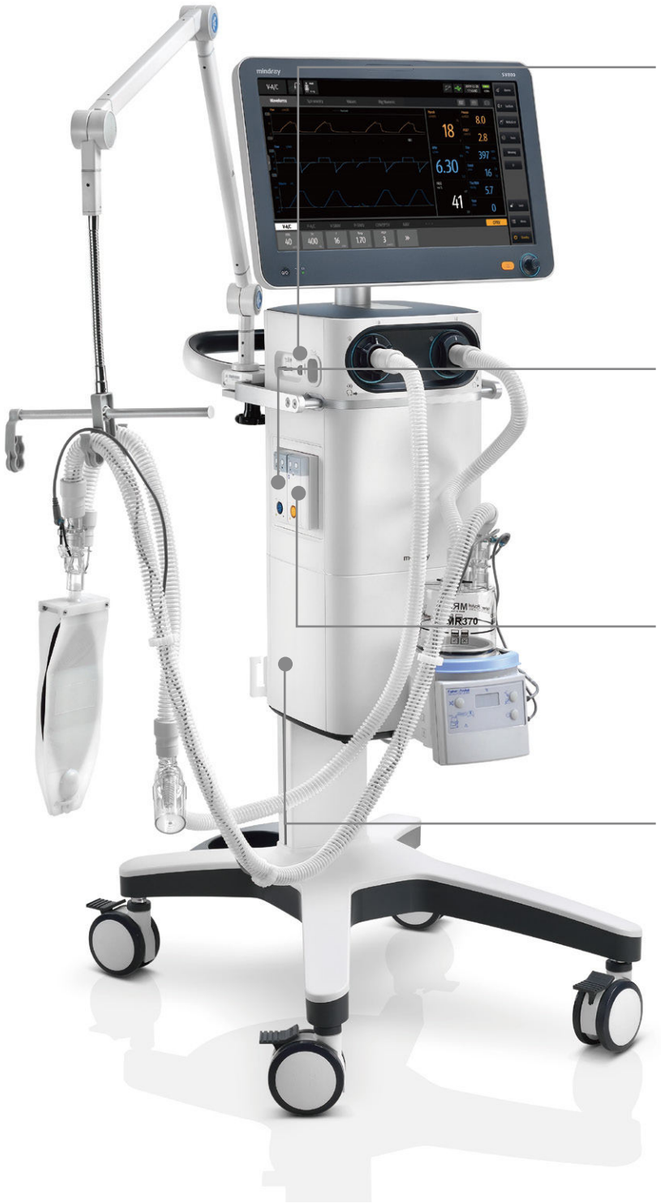


Easy-to-use weaning tools

Reduce clinicians' workload while ensuring patient safety using standardized weaning protocol with continuous monitoring and result prompts.
Provides comprehensive weaning assistive tools such as RSBI, NIF, P0.1 to evaluate the potential for weaning.

Connect freedom

The fields of clinical devices and internet technology continue to advance and become ever more integrated. Securing your devices' future relies on being able to expand your devices' capabilities by integrating or interacting with new concepts and technologies. The new SV800/SV600 ventilators are designed to be accessible to new technological advancements in both electronic software and hardware.



Integrated neonatal module (optional)

Thanks to the precision control technology of its proximal flow sensor, the new SV800/SV600 ventilators can accurately deliver minimum Tidal Volumes as low as 2 ml to meet both invasive and non-invasive ventilation requirements for neonatal patients.

SpO_2 module

Use the Plug & Play module which is compatible with auxiliary monitors. Its parameters can be integrated into weaning tools, and it can help to optimize the respiratory monitoring process, effectively decreasing the procurement and management costs of relevant departments.

CO_2 module

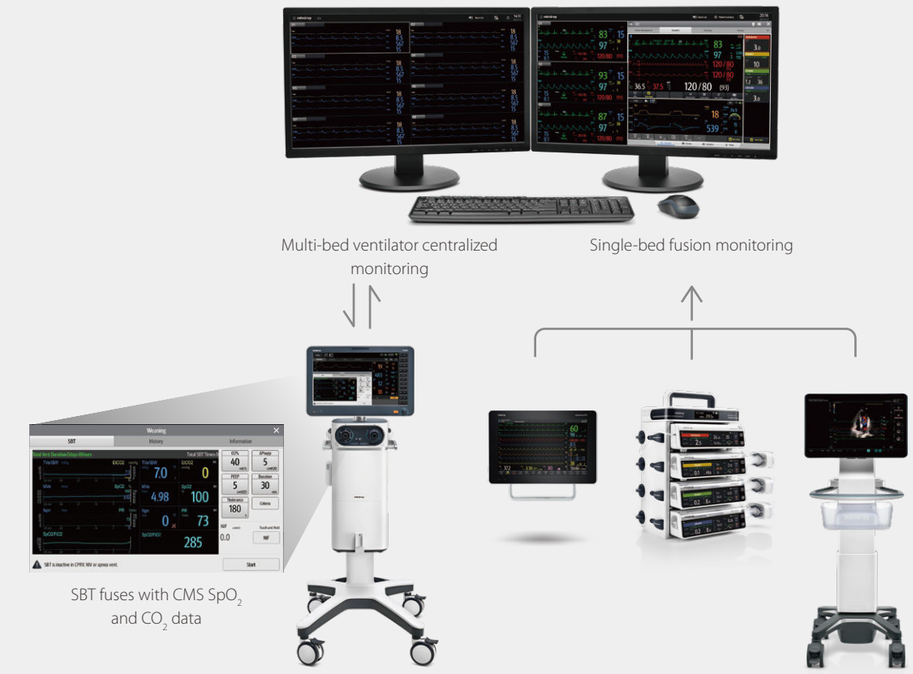
Both mainstream or sidestream Plug & Play CO_2 modules are compatible with monitors. CO_2 monitoring is an option for CPRV, and can be integrated into weaning tools.

Backup air supply

In the event of central air supply faliure, the new SV800 / SV600 ventilator switches quickly to a backup air supply.
The backup air supply utilizes a high-performance turbine enabling the user to continue to use the ventilator safely and with full functionality whilst benefiting from lower noise levels and longer service life.

Hospital network connection

The SV800/SV600 can be connected to central monitor system(CMS) easily via cable or Wi-Fi to realize multi-bed ventilator centralized monitoring and single-bed fusion monitoring. Among this ventilator can obtain SpO_2 and CO_2 data from CMS, help clinicians evaluate patient's weaning status more efficiently.



SV600

Ventilator

Physical Specification

Dimensions and weight	
Dimensions (HxWxD)	1395mmX530mmX674mm (Including trolley and backup air supply) 906mmX401mmX298mm (Including backup air supply and not trolley) 651mmX401mmX298mm (Excluding trolley and backup air supply)
Weight	Approximately 45kg (including trolley and backup air supply)

Display

Screen	15.6" Color active matrix TFT touch screen
Resolution (HxV)	1920X1080 pixels
Brightness	Adjustable

Trolley

Dimensions (HxWxD)	760mmX530mmX980mm
Weight	17 kg

Communication interface

Communication interface	
	RS-232, Nurse call connector, VGA connector, USB PortX4, Ethernet, wireless network

Ventilation Specifications

Patient Type	Adult, Pediatric, Neonate
Ventilation Mode	
	V-A/C (Volume assist/control)
	P-A/C (Pressure assist/control)
	V-SIMV (Volume-Synchronized Intermittent Mandatory Ventilation)
	P-SIMV (Pressure-Synchronized Intermittent Mandatory Ventilation)
	DuoLevel (Duo Level Ventilation)
	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)
	PSV-S/T (Pressure Support Ventilation-Spontaneous/Timed)
	nCPAP (Nasal Continuous Positive Airway Pressure ventilation)
	NIV (Non-invasive ventilation)
	Apnea Ventilation

Controlled Parameters

O_2%	21 to 100 vol.%
TV (Tidal Volume)	Adult: 100 to 4000 mL Pediatric: 20 to 300 mL Neonate: 2 to 100 mL
MV%	25% to 350%
f	Adult / Pediatric: 1 to 100 /min Neonate: 1 to 150 /min
fsimv (Ventilation frequency in SIMV mode)	
	1 to 60 /min
I:E	1:10 to 4:1
Tinsp	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	Adult: 6 to 180 L/min Pediatric: 6 to 30 L/min Neonate: 2 to 30 L/min
Flow Pattern	Square, 100% Decelerating, 50% Decelerating
ΔPinsp	1 to 100 cmH_2O
ΔPsupp	0 to 100 cmH_2O
Phigh	0 to 100 cmH_2O
Plow	0 to 50 cmH_2O
PEEP	0 to 50 cmH_2O
Flow trigger	OFF, Adult/Pediatric: 0.5 to 20.0 L/min; Neonate: 0.1 to 5.0 L/min
Pressure trigger	OFF, -20.0 to -0.5 cmH_2O
Exp% (Expiration termination level)	
	Auto, 1% to 85%
Neg.Plimit (CPRV)	-30 to 0 cmH_2O

Apnea Ventilation

TVapnea	Adult: 100 to 4000 mL Pediatric: 20 to 300 mL Neonate: 2 to 100 mL
ΔPapnea	1 to 100 cmH_2O
fapnea	Adult / Pediatric: 1 to 100 bpm Neonate: 1 to 150 bpm
Apnea Tinsp	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_2O

Automatic Tube Resistance Compensation

Tube Type	ET Tube, Trach Tube, Disable ATRC
Tube I.D.	Adult: 5.0 to 12.0 mm

	Pediatric: 2.5 to 8.0 mm
	Neonate: 2.5 to 5.0 mm
Compensate	1 to 100 %
Expiration Compensation Switch	
	ON, Off

O_2 Therapy

O_2%	21 to 100 vol.%
Flow	Adult/Pediatric: 2 to 80 L/min
	Neonate : 2 to 20 L/min

Automatic Leakage Compensation

Maximum leakage compensation flow	
	Adult: 65L/min
	Pediatric: 45L/min
	Neonate: 15L/min

IntelliCycle

Applicable patient type	
	Adult / Pediatric
Automatically adjust parameters	
	Trigger, Tslope, Exp%
IntelliCycle Switch	ON, Off

Monitored parameters

Airway pressure range	Ppeak, Pplat, Pmean
	(Range -20 to 120 cmH_2O)
	PEEP (Range 0 to 120 cmH_2O)
Tidal volume range	TVi, TVe, TVe spn (Range 0 to 6000 mL)
Frequency range	ftotal, fmand, fspn (Range 0 to 200 /min)
Minute volume range	MV, MVspn, MVleak
	(Range Adult/Pediatric: 0 to 100 L/min
	Neonate: 0 to 30 L/min)
Leak%	0 to 100%
Resistance	Rinsp, Rexp (Range 0 to 600 cmH_2O/L/s)
Compliance	Cstat, Cdyn (Range 0 to 300 mL/cmH_2O)
Inspired Oxygen (FiO_2)	15 to 100 vol.%
RSBI	0 to 9999 1/(min*L)
WOB	WOBtot, WOBvent, WOBimp, WOBpat
	(Range: 0 to 100 J/min)
P0.1	-20 to 0 cmH_2O
NIF	-45 to 0 cmH_2O
PEEPi	0 to 120 cmH_2O
Vtrap	0 to 4000 mL
RCexp	0 to 10 s
TVe/IBW	0 to 50 mL/kg
I:E	150:1 to1:150
Tinsp	0.00 to 60.00s
PIF (peak inspiratory flow)	
	Adult/Pediatric: 0 to 300 L/min
	Neonate: 0 to 30 L/min
PEF (peak expiratory flow)	
	Adult/Pediatric: 0 to 180 L/min
	Neonate: 0 to 30 L/min
EEF (end expiratory flow)	
	Adult/Pediatric: 0 to 180 L/min
	Neonate: 0 to 30 L/min
C20/C	0.00 to 5.00
Pdrive	0~120 cmH_2O
Ccw	0~300 mL/ cmH_2O
Clung	0~300 mL/ cmH_2O
Transpulmonary pressure range	
	PtpI, PtpE, ΔPtp, ΔPes (Range -99 to 99 cmH_2O)
Auxiliary pressure range	
	PesI, PesE, Paux2I, Paux2E (Range -40 to 120 cmH_2O)
Waveforms	Airway pressure-time, Flow-time, Volume-time, CO_2-time , Pleth-time
Loops	Paw-Volume, Flow-Volume, Paw-Flow, Volume-CO_2

Alarm settings

Tidal Volume	High	Neo: Off, 3 to 200 mL
		Ped: Off, 25 to 600 mL
		Adu: Off,110 to 6000 mL
	Low	Neo: Off, 1 to 195 mL
		Ped: Off, 10 to 595 mL
		Adu: Off, 50 to 5995 mL
Minute Volume	High	Neo: 0.02 to 30.0 L/min
		(can be set to Off in nCPAP)
		Ped: 0.2 to 60.0 L/min
		Adu: 0.2 to 100.0 L/min
	Low	Neo: 0.01 to 15 L/min
		Ped: 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 105 cmH_2O
	Low	OFF, 1 to 100 cmH_2O
Frequency	High	OFF, 2 to 160 /min
	Low	OFF, 1 to 159 /min
Inspired Oxygen (FiO_2)	High	FiO_2 exceeds the alarm limit for at leastn30 s, internal alarm limit: set value+max (7 vol.% or set value X10%) or 100 vol.%, whichever is lower.
	Low	FiO_2 lower than the alarm limit for at least 30 s, internal alarm limit: set value-max (7 vol.% or set valueX10%) or 18%, whichever is greater.
Apnea alarm time	Low	5 to 60 s (can be set to Off in nCPAP)
Other Alarms		Low battery voltage
		Gas supply pressure low
		Airway obstruction
		Tube disconnected
		PEEP too high

Trend

Type	Tabular, Graphic
Length	96 hours
Content	Monitor Parameters, Setting Parameters
	(Setting Ventilation mode and Parameters)

Log

Type	Alarm, Operation
Max number	5000

Screen Capture

Max number	50 pictures

Ventilator components

O_2 sensor	
Type	Calvanic fuel cell, paramagnetic sensor
Response time	< 23 s

Neonatal flow sensor

Flow Range	0.2 to 30 L/min
Dead space	<0.75 mL
Resistance	0.9 cmH_2O@10L/min

Sidestream CO_2 Module

Displayed numeric	$EtCO_2$
Measurement range	0 to 152 mmHg
Resolution	1 mmHg
Waveforms	CO_2-time
Sampling rate	Adult/Pediatric: 120 mL/min Neonate: 90 mL/min
System response time	Adult/ Pediatric: <5.5 s @ 120 mL/min Neonatal: <4.5 s @ 90 mL/min
Rise time	Adult/Pediatric: <300 ms @120 mL/min Neonatal : <330 ms @90 mL/min
Water trap cleaning time	
	Adult/Pediatric: ⩾26 h @120 mL/min
	Neonatal: ⩾35 h @90 mL/min
$EtCO_2$ High alarm limit	2 to 152 mmHg
$EtCO_2$ Low alarm limit	0 to 150 mmHg

Mainstream CO_2 Module

Displayed numerics	$EtCO_2$, $VeCO_2$, $ViCO_2$, $MVCO_2$, Vtalv, MValv, VDaw, VDaw/TVe, $SlopeCO_2$, VDalv, VDphy, VDphy/TVe, OI, P/F, VCO_2
Measurement range	0 to 150 mmHg
Resolution	1 mmHg
Waveforms / Loop	CO_2 - time, Volume - CO_2
System response time	< 2.0 s
$EtCO_2$ High alarm limit	2 to 150 mmHg
$EtCO_2$ Low alarm limit	0 to 148 mmHg

SpO_2 module

Displayed numeric	SpO_2, PR, PI
SpO_2 Measurement range	
	0 to 100 %
PR measurement range	20 to 300 1/min
PI measurement range	0.05 to 20 %
Waveform	Pleth
SpO_2 High alarm limit	2 to 100 %
SpO_2 Low alarm limit	0 to 98 %
SpO_2 Desat alarm limit	0 to 98 %
PR High alarm limit	17 to 300 1/min
PR Low alarm limit	15 to 298 1/min

Operation Data

Environmental specifications	
Temperature	10 to 40°C(operating); -20 to 60°C(storage)
Relative Humidity	10 to 95 % (operating); 10 to 95 % (storage)
Barometric Pressure	50 to 106 kPa (operating); 50 to 106 kPa (storage)

Gas supply

Gas type	O_2 and Air
Pipe Connector	NIST, DISS
Gas supply pressure	0.28 to 0.65MPa
Peak flow in case of single supply gas	
	⩾ 180 L/min (BTPS)*
Loss of gas supply	In the event of a gas supply failure, automatically switches over to the other gas supply available, so that the patient gets the preset volume and pressure

Backup air supply (Blower)

Maximum output flow	⩾ 200 L/min (BTPS)*
Maximum output pressure	
	⩾ 80 cmH_2O

Power and Battery Backup

Power input voltage	100 to 240 V
Power input frequency	50/60 Hz
Power input current	2.8 to 1.2 A
Fuse	220V/5.0A
Number of batteries	One or Two
Battery type	Build-in Lithium-ion battery, 11.3 VDC, 5600 mAh
Battery run time	90 min (Powered by one new fully-charged battery in standard working condition)* 180 min (Powered by two new fully-charged battery in standard working condition)

Special Functions and procedures

O_2↑
Suction
Nebulization
Manual breath
Inspiratory hold
Expiratory hold
PulmoSight Pro
PEEPi
P0.1
NIF
Static PV Loop
Weaning Tool
Lung Recruitment Tool (SI)
Alveolus ventilation calculation
Auxiliary Pressure measurement
Pes Catheter Positioning tool
Pes filter
Pes baseline correction

*BTPS =Body Temperature and Pressure Saturated
*The standard work condition is: Ventilation mode:V-A/C; TV:500 mL; f:10/min; Tinsp:2 s ; O_2 %:40 Vol.%; PEEP:3 cmH_2O ; R:5 $cmH_2O/L/s$; C:50 mL/cmH_2O ; Gas supply: O_2 and Air Pipeline gas supply, nominal work pressure: 400±100 kPa.

Some of functions marked with an asterisk may not be available. Please contact your local Mindray sales representative for the most current information.

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SV600

Ventilator

Operator's Manual

CE 0123

For this Operator's Manual, the issue date is November, 2022.

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Mindray is responsible for the effects on safety, reliability and performance of this product, only if:

- all installation operations, expansions, changes, modifications and repairs of this product are conducted by Mindray authorized personnel;
- the electrical installation of the relevant room complies with the applicable national and local requirements; and
- the product is used in accordance with the instructions for use.

WARNING: **It is important for the hospital or organization that employs this equipment to carry out a reasonable service/maintenance plan. Neglect of this may result in machine breakdown or personal injury.**

NOTE: **This equipment must be operated by skilled/trained clinical professionals.**

5. Battery indicator light

- Lit: indicates that the battery is being charged or is already fully charged, and the ventilator is operating on external power supply.
- Flash: when the ventilator is operating on battery power.
- 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. External power indicator light

- Lit: when the ventilator is connected to an external power supply.
- Not lit: when the ventilator is not connected to an external power supply.

7. Power switch (with indicator light)

Press to power on/off the system. Switch is lit when the system powers on the ventilator and not lit when the system powers off the ventilator.

The ventilator display shows ventilation parameters, pressure/flow/volume waveforms and spirometry loops, etc.

The following is an example of Waveforms screen. Display screen may vary subject to the configurations.

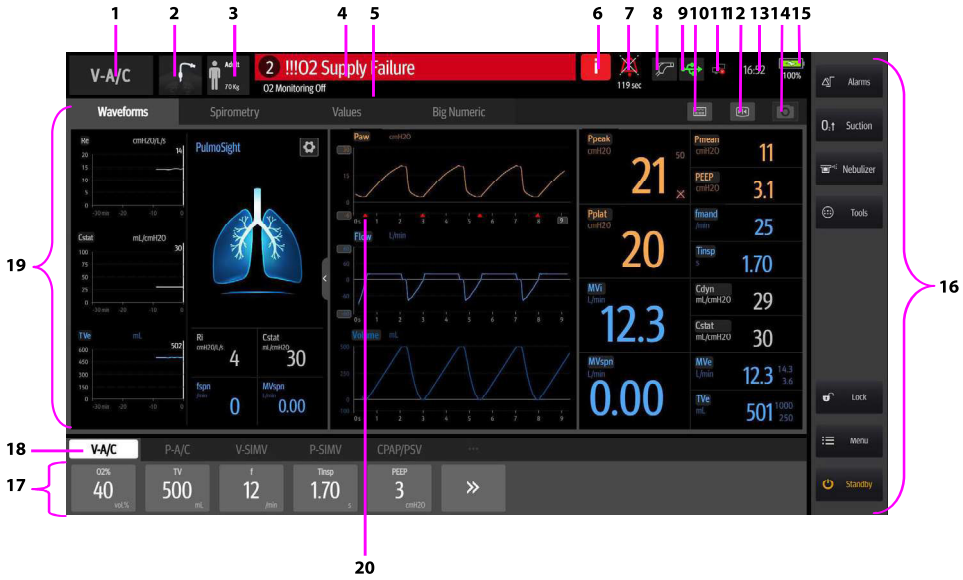


Figure 4-2

1. Ventilation mode field

Displays Standby or active ventilation mode and ventilation assist indication.

2. Ventilation type field

Displays Non-invasive or Invasive ventilation type:

- Displays the icon  for Non-invasive mask and NIV word when the ventilation type is Non-invasive.
- Displays the tube icon  when the ventilation type is invasive and the ATRC function is switched off.
- Displays the tube icon  and tube diameter when the ventilation type is invasive and the ATRC function is switched on.

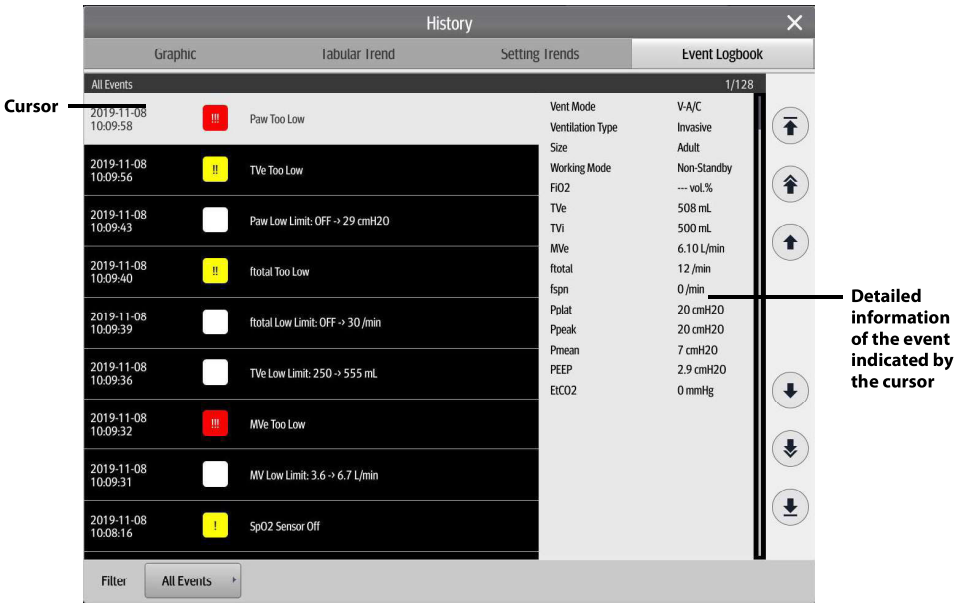


Figure 4-14

4.6.4.1 About Event Logbook

- Event Logbook displays the most recent record at the top.
- The system can store up to 5000 records of Event Logbook.

NOTE: **The system can store up to 5000 records of Event Logbook. When a new event occurs after 5000 events are already stored, the new event overwrites the earliest one.**

4.6.4.2 Filter

In the Event Logbook window, you can set [**Filter**] to [**High Alarms**], [**Med Alarms**], [**Low Alarms**], [**All Alarms**], [**Operation Information**], and [**All Events**].

4.7 Freeze

The freeze function's feature is that it can pause the real-time refreshing of waveforms and spirometry loops on the screen, so that you can have a close examination of the patient's status within this time period. The reviewed data are waveforms and spirometry loops in the 60 seconds before entering freeze state.

4.7.1 Enter Freeze Status

When in non-standby status and non-freeze status, press the [**Freeze**] key will display the [**Freeze active. Press the Freeze Key to Unfreeze**] prompt message on the screen and the system will enter freeze status. Freeze cursors will appear on the screen near the waveforms and loops. All displayed waves and loops are frozen, namely, they are not refreshed. The data in the parameter area are refreshed normally. In freeze status, the [Save Ref. Loop] key is disabled, and you cannot save a loop as a reference loop. However, you can view reference loops that are already saved.

The interface as shown below is displayed by pressing the key .

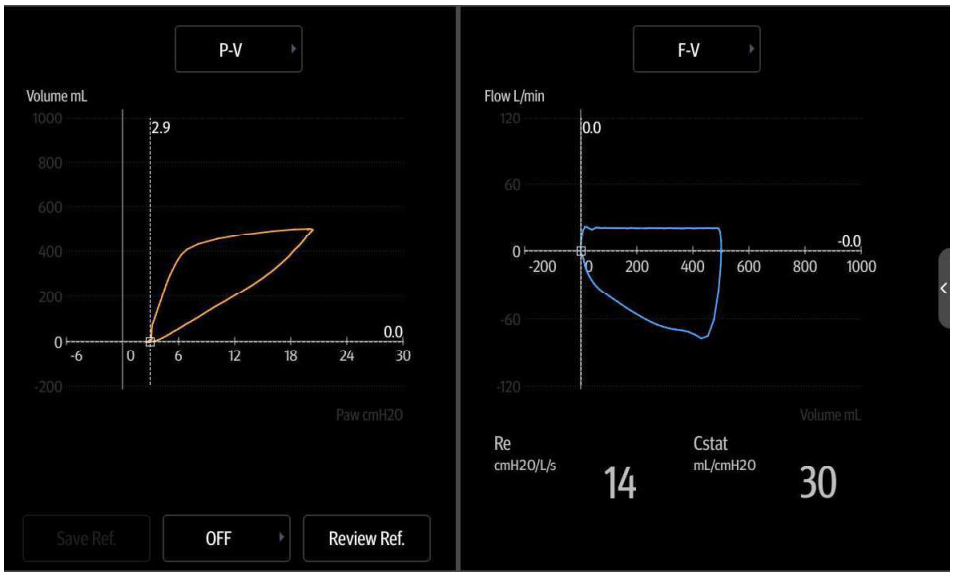


Figure 4-17

4.7.4 Exit Freeze Status

When in freeze status, press the [**Freeze**] key again to exit the freeze status. In freeze status, if no operation is performed on the ventilator for more than three (3) minutes, the system exits freeze status automatically.

4.8 Screen Capture

By pressing this key on the main screen , the system will capture and save the screen automatically. The screen capture is saved in "jpg" format. The system can store up to 50 screen captures.

4.9 Lock Screen

Press the [**Lock**] key on the main screen to enter locked status, and the prompt message [**Screen locked. Press the Lock button to unlock screen.**] will be displayed. During the period of screen locked, only , [**O_2↑ Suction**], and [**Lock**] keys are enabled. Touch screen, control knob, and other keys are disabled. Press this key a second time to unlock the screen.

5.1 Date & Time Settings

1. Select the system time field on the main screen to pop up time setup menu.
2. Set [**Date**] and [**Time**].
3. Set [**Date Format**] to [**YYYY-MM-DD**], [**MM-DD-YYYY**] or [**DD-MM-YYYY**].
4. Set [**Time Format**]: [**24 h**] or [**12 h**].

5.2 Export to USB

The ventilator's exportation function provides the ability to export some data or settings to USB device.

5.2.1 Export Screen

Screen exportation involves exporting a saved screen capture for the ventilator. The exported file is saved in "jpg" format. This ventilator could save up to 50 screen captures.

To export screen capture,

1. Insert the USB device into the USB connector of the ventilator. The  key is highlighted on the main screen.
2. By selecting the  key, the system will open the USB settings interface.
3. On the opened interface, select the [**Export Screenshot**] tab first and then click the [**Export Screenshot**] key. The system will run a check to verify that there is enough storage space available on the USB device. If there is sufficient space, the system will start to export the screen.
4. After exporting is completed, select [**Remove USB Device**] to remove the USB device.

5.2.2 Export Data

Exporting data means to export data from the ventilator, such as patient demographics, current setting parameters, current alarm limits, trend data and so on.

To export data,

1. Insert the USB device into the USB connector of the ventilator. The  key is highlighted on the main screen.
2. By selecting the  key, the system will open the USB settings interface.
3. On the opened interface, select the [**Export Data**] tab and then select the [**User Export**] key. The system will run a check to verify that there is enough storage space available on the USB device. If there is sufficient space, the system will export data including patient information, current parameter settings, current alarm limits, tabular trend, PEEPi measured value, P0.1 measured value, Vtrap measured value, and NIF measured value, etc. The format of the exported data is "html".
4. If you need to export calibration data, event logbook and self-check logbook in addition to the above data, select the [**Factory Export**] tab and enter password. The system will run a check to verify that there is sufficient storage space available on the USB device. If there is sufficient space, the system will start to export data. The exported data is encrypted in the format of "blg".
5. After exporting is completed, select [**Remove USB Device**] to remove the USB device.

NOTE: **If you need to check the exported data in format of "blg", please contact the Customer Service Department.**

5.5.9.1 Set Network Type

1. Select [**Menu**] → **[System]** → Enter system password → **[Interface]**.
2. Set [**Network Type**] to [**LAN**], [**WLAN**] or [**Hotspot**].

5.5.9.2 Set LAN/WLAN

1. Select [**Menu**] → **[System]** → Enter system password → **[Interface]**.
2. Select [**LAN Setup**] or [**WLAN Setup**] to set related items in the interface that appears.

5.5.9.3 Set Central Station

The ventilator can be connected to the central monitoring system for data transmission. The ventilator sends the parameters, waveforms, and alarms of the ventilator to the central monitoring system (CMS). You can view the patient's ventilation data and alarms on the CMS.

1. Select [**Menu**] → **[System]** → Enter system password → **[Interface]**.
2. Select [**Central Station Setup**] to set related items in the interface that appears.

- Set [**Network disconnection alarm**] to  (ON) or  (OFF). When this function is enabled, the ventilator will give an alarm when the ventilator is disconnected from the CMS, e-Gateway or the monitor.
- Set [**Select CMS**] to  (ON) or  (OFF). When this function is enabled, the central monitoring system can be selected for the ventilator.
- Select [**Add Central Station**] to set the relevant items of the central station to be added in the interface that appears.

5.5.9.4 Set Device Discover

Set the multicast parameters so that the ventilator and monitor, and the ventilator and central monitoring system can discover each other. Only the internal devices in the same multicast group can discover each other.

1. Select [**Menu**] → **[System]** → Enter system password → **[Interface]**.
2. Select [**Device Discover**] to set related items and check the network connection status in the interface that appears.

5.5.9.5 Set Information Security

1. Select [**Menu**] → **[System]** → Enter system password → **[Interface]**.
2. Select [**Information Security**] to set [**Encryption Connection Type**] in the interface that appears.

- [**Only Private Encryption**]: Mindray private encryption is used to encrypt the transmission data. Devices connected to the SSL (Secure Socket Layer) encryption are not supported.
- [**SSL Encryption Priority**]: Devices that support SSL encryption are preferentially connected in SSL encryption mode, and devices that do not support SSL encryption are connected in private encryption mode.

5.5.9.6 Set ADT

The ADT application gateway is usually deployed in the eGateway. You can receive patient information from the ADT server of the hospital through the ADT application gateway.

1. Select [**Menu**] → **[System]** → Enter system password → **[Interface]**.
2. Select [**ADT**] to set related items in the interface that appears.

6.1 Turn on the System

1. Insert the power cord into the power receptacle. Ensure the external power indicator light is lit.
2. Press the ⊙/Ö hard key.
3. The alarm indicator light flashes yellow and red once in turn, and then the system conducts a self check of the speaker and buzzer once respectively.
4. A start-up screen and start-up check progress bar appear. Then the System Check screen is displayed.

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.**

6.2 System Check

CAUTION: **If the ventilator fails any tests, remove it from clinical use. Do not use the ventilator until necessary repairs are completed and all tests have passed.**

CAUTION: **Before running System Check, disconnect the patient from the equipment and ensure that a backup ventilation mode is available for patient ventilation.**

To enter the System Check screen,

- The System Check screen is accessed automatically after powering on the system.
- On the non-standby screen, select the [**Standby**] key and enter the Standby status after your confirmation. Select the [**System Check**] key in the Standby status to enter the System Check screen.

The system check screen displays the last system check time and total system check result. Select the  key to query the last system check information of the ventilator system, including system check items and System Check results.

Connect the gas supply and block the Y piece as illustrated. Then select [**Continue**] to start System Check item by item.

System Check items include:

- Backup Air Supply Test: test the speed of backup air supply.
- O_2 Flow Sensor Test: test the O_2 Insp. Valve and O_2 Flow Sensor.
- Air Flow Sensor Test: test the Air Insp. Valve and Air Flow Sensor.
- Exp. Flow Sensor Test: test the expiratory flow sensor.
- Pressure Sensor Test: test the pressure sensors at the inspiratory and expiratory ports.
- Exp. Valve Test
- Safety Valve Test
- Leakage (mL/min)
- Compliance (mL/cmH_2O)

6.7.3 Automatic Tube Resistance Compensation (ATRC)

ATRC stands for the function of automatic tube resistance compensation. By selecting appropriate endotracheal (ET) tube or tracheostomy (Trach) tube of different diameters for the user, the ventilator can adjust gas delivery pressure automatically, so that the pressure at the end of the tube is consistent with the ventilator's pressure setting value as much as possible.

1. Select the ventilation type icon  and then select the [**ATRC**] tab in the opened menu to enter the ATRC interface.
2. Set ATRC Type, Tube I.D., Compensate, and Expiration on the accessed screen.

- [**ATRC Type**]: Disable ATRC, ET Tube and Trach Tube.
- [**Tube I.D.**]: ET tube diameter.
- [**Compensate**]: Percentage of ATRC.
- [**Expiration**] : Enable or disable compensation during exhalation.

3. Select [**Ok**] for the system to initiate ATRC. After ATRC has been enabled, if you enter the **ATRC** interface and then select [**Disable ATRC**], the system will terminate ATRC immediately in the ventilation.

When ATRC is enabled, Ptrach waveform is displayed with the Paw waveform. As shown in the figure below:

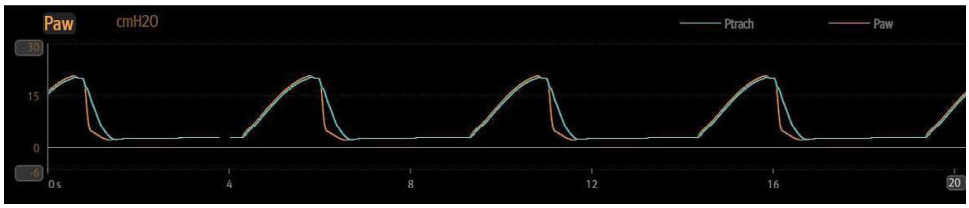


Figure 6-18

WARNING: **ATRC may induce autotriggering. If autotriggering occurs, first check the patient, breathing circuit, and other possible causes.**

NOTE: **Incorrect tube type or ID setting can endanger the patient. Make sure to set them properly.**

10.5 O_2↑(Oxygen Enrichment)

O_2↑ is also called as O_2 enrichment. It means to deliver oxygen with concentration higher than normal level within the specified time period. The oxygenation magnitude can be set by selecting [**Menu**] → [**Setup**] → [**Ventilation**]. The default oxygen enrichment magnitude is 60% for adult and pediatric patients, and 10% for neonate patients.

Press the [**O_2↑Suction**] key and the ventilator starts oxygen enrichment. At that time, the indicator light for [**O_2↑Suction**] key will be illuminated, and the remaining oxygen enrichment time will be displayed. Oxygen enrichment is active for maximum two minutes. During oxygen enrichment, the currently set oxygen concentration is displayed in the [**O_2 %**] parameter setup quick key field.

When the 2-minute period of oxygen enrichment is up or the [**O_2↑Suction**] key is pressed again, the ventilator terminates oxygen enrichment.

NOTE: **The system cannot start O_2↑ (oxygen enrichment) in the standby, oxygen therapy, or CPRV modes.**

NOTE: **The system cannot start O_2↑ (oxygen enrichment) in the Static PV Loop test process.**

NOTE: **When [O_2 Supply Failure] alarm or [No Gas Supply Pressure] alarm is triggered, click [O_2↑ Suction] key, O_2↑ is disabled and prompts [O_2 Supply Failure, O_2↑ disabled].**

NOTE: **If O_2↑ process triggers [O_2 Supply Failure] alarm or [No Gas Supply Pressure] alarm, O_2↑ stops.**

NOTE: **Removing the patient tubing during oxygen enrichment will start suction function. Refer to *10.6 Suctions*.**

10.6 Suction

The ventilator detects the procedure of disconnecting or reconnecting the patient tubing when the ICU staff conducts the suction maneuver for patients. The ventilator starts oxygen enrichment before and after the suction, and disables the otherwise relevant alarm messages during the suction.

1. Press the [**O_2↑ Suction**] key. The system delivers oxygen enrichment to the patient and monitors within the 120-second period of oxygen enrichment if the patient tubing are disconnected. Disconnect the patient tubing in this period.
2. After disconnecting the patient tubing, the system prompts [**The Patient is Disconnected! Reconnect Patient after Suction Completed!**] , system stops ventilating the patient. In this case, you can apply manual suction to the patient.
3. Reconnect the patient tubing after the suction. When patient connection is detected, the system delivers oxygen enrichment to the patient for 120s.

During the oxygen enrichment periods, pressing the [**Stop Suction**] key can terminate the procedure.

NOTE: **P0.1, PEEPi, and NIF are disabled after suction is activated.**

NOTE: **The system cannot start O_2↑ suction in the Standby modes, O_2 therapy or CPRV modes.**

D.0 *Alarm Messages*

Physiological Alarm Messages D-2
Technical Alarm Messages D-4

This chapter lists physiological and technical alarm messages.

Note that in this chapter:

- Column P stands for the default alarm level: H for high, M for medium and L for low.
- For each alarm message, corresponding actions are given instructing you to troubleshoot problems. If the problem persists, contact your service personnel.

D.1 Physiological Alarm Messages

D.1.1 Ventilator Parameters

Alarm Messages	P	Cause and Action
Paw Too High	H	The airway pressure exceeds the set pressure high alarm limit.
		1. Check the patient. 2. Check the ventilation parameter setup. 3. Check the alarm limits. 4. Check the patient tubing for occlusion.
Paw Too Low	H	Airway pressure setting is lower than the low limit of pressure alarm.
		1. Check the patient. 2. Check the ventilation parameter setup. 3. Check the alarm limits. 4. Check if the patient tubing are leaked or disconnected.
FiO_2 Too High	H	The inspired O_2 concentration is greater than the FiO_2 high alarm limit for at least 30s.
		1. Check air supply. 2. Check the HEPA filter for occlusion. 3. If the ventilator uses the O_2 cell, calibrate the O_2 sensor. If the ventilator uses the paramagnetic O_2 sensor, perform the System Check.
FiO_2 Too Low	H	The inspired O_2 concentration has been lower than the FiO_2 low alarm limit for at least 30 s or is less than 18%.
		1. Check air supply. 2. If the ventilator uses the O_2 cell, calibrate the O_2 sensor. If the ventilator uses the paramagnetic O_2 sensor, perform the System Check.
TVe Too High	M	The TVe monitored value is greater than TVe high alarm limit for continuous 3 mechanical ventilation cycles.
		1. Check the ventilation parameter setup. 2. Check the alarm limits.
TVe Too Low	M	The TVe monitored value is less than TVe low alarm limit for continuous 3 mechanical ventilation cycles.
		1. Check the patient. 2. Check the ventilation parameter setup. 3. Check the alarm limits. 4. Check the patient tubing for leakage or occlusion. 5. Perform System Check to test the leakage
MVe Too High	H	MVe is greater than MVe high alarm limit.
		1. Check the ventilation parameter setup. 2. Check the alarm limits.

Table D-1

MVe Too Low	H	MVe is less than MVe low alarm limit.
		1. Check the ventilation parameter setup. 2. Check the alarm limits. 3. Check the patient tubing for leakage or occlusion. 4. Perform System Check to test the leakage
Apnea	H	The time of failure to detect respiration exceeds Tapnea.
		1. Check the patient. 2. Manual breath. 3. Check apnea time setup. 4. Check if the patient tubing are disconnected.
Apnea Vent	H	The time of failure to detect respiration exceeds Tapnea. Start apnea ventilation mode.
		Check apnea ventilation parameter setup.
ftotal Too High	M	ftotal is greater than ftotal high alarm limit.
		1. Check the patient. 2. Check the ventilation parameter setup. 3. Check the alarm limits.
ftotal Too Low	M	ftotal is lower than the ftot low alarm limit.
		1. Check the patient. 2. Check the ventilation parameter setup. 3. Check the alarm limits.
Apnea Ventilation Ended	L	This alarm is given when apnea ventilation ends. There is no need to process this alarm.

Table D-1

D.1.2 CO_2 Module

Alarm Messages	P	Cause and Action
$EtCO_2$ Too High	M	The monitored parameter value exceeds the alarm limit.
		1. Check the patient type. 2. Check the alarm limits.
$EtCO_2$ Too Low	M	The monitored parameter value exceeds the alarm limit.
		1. Check the patient type. 2. Check the alarm limits.
Apnea CO_2	M	The time of failure to detect respiration by the CO_2 module exceeds Apnea Tinsp. Whenever the CO_2 apnea alarm is on, block the [**$EtCO_2$ Too High**] alarm and [**$EtCO_2$ Too Low**] alarm until the alarm is cleared.
		1. Check the patient. 2. Check apnea time setup. 3. Check the connections of CO_2 module sampling device.

Table D-2

D.1.3 SpO_2 Module

Alarm Messages	P	Cause and Action
SpO_2 Too High	M	SpO_2 value is greater than the high alarm limit.
		1. Check the patient's condition and ventilator settings. 2. Check the patient's inspiratory O_2%. 3. Check the alarm limits.
SpO_2 Too LOW	M	SpO_2 value is lower than the low alarm limit.
		1. Check the patient's condition and ventilator settings. 2. Check the patient's inspiratory O_2%. 3. Check the alarm limits.
SpO_2 Desat	H	SpO_2 value is lower than the desaturation alarm limit.
		1. Check the patient's condition and ventilator settings 2. Check the patient's inspiratory O_2%. 3. Check the alarm limits.
PR Too High	M	PR value exceeds the high alarm limit.
		1. Check the patient's condition. 2. Check ventilator settings. 3. Check the alarm limits.
PR Too LOW	M	PR value is lower than the low alarm limit.
		1. Check the patient's condition. 2. Check ventilator settings. 3. Check the alarm limits.
No pulse	H	The patient's pulse signal is too weak, and the system cannot perform analysis.
		1. Check the patient's condition. 2. Check SpO_2 sensor and measurement site connection

Table D-3

D.2 Technical Alarm Messages

D.2.1 Power Board

Alarm Messages	P	Cause and Action
Battery 1 Failure 02	H	Battery 1 Charge Failure
		Contact your service personnel.
Battery 1 Failure 03	H	Battery 1 Aging
		Contact your service personnel.
Battery 1 Failure 04	H	Battery 1 Comm Error
		Contact your service personnel.
Battery 1 Failure 05	H	Battery 1 Failure
		Contact your service personnel.
Battery 2 Failure 02	H	Battery 2 Charge Failure
		Contact your service personnel.
Battery 2 Failure 03	H	Battery 2 Aging
		Contact your service personnel.

Table D-4

Battery 2 Failure 04	H	Battery 2 Comm Error
		Contact your service personnel.
Battery 2 Failure 05	H	Battery 2 Failure
		Contact your service personnel.
Blower Battery Failure 02	H	Backup air supply battery failed.
		Contact your service personnel.
Blower Battery Failure 03	H	Backup air supply battery failed.
		Contact your service personnel.
Blower Battery Failure 04	H	Backup air supply battery failed.
		Contact your service personnel.
Blower Battery Failure 05	H	Backup air supply battery failed.
		Contact your service personnel.
Battery Temp. High. Connect Ext.Pwr.	M	Battery temperature is a bit high during discharge.
		Connect to the external power supply.
Battery Temp High. Syst maybe Down	H	Battery temperature is too high during discharge. The system may be down.
		Connect to the external power supply.
Battery in Use	L	The current system is powered by battery.
		Connect to the external power supply.
Low Battery. Connect Ext. Power.	M	The remaining battery power is lower than a threshold.
		Connect to the external power supply.
System DOWN. Connect Ext. Power.	H	Battery power is depleted. The system will shut down in a few minutes.
		Connect to the external power supply immediately.
Battery Undetected	H	No battery in main unit or backup air supply at present
		Contact your service personnel.
Fan Failure	M	Power board fan speed abnormal. If it can't be solved, please restart the machine.
		Contact your service personnel.
Device Failure 03	H	Power Board Selftest Error.
		Contact your service personnel.

Table D-4

D.2.2 Main Control Board

Alarm Messages	P	Cause and Action
Please Reset Date and Time	L	Button cell is available in the system. But the clock is powered down and reset.
		Re-set the date and time.
Key Error	L	Hardkey or rotary encoder is depressed continuously for more than 35s.
		Contact your service personnel.
Device Failure 04	H	Ctrl Module Init Error.
		Contact your service personnel.
Device Failure 05	H	Ctrl Module Comm Stop.
		Contact your service personnel.

Table D-5

Device Failure 19	H	Power Board Comm Stop. Contact your service personnel.
Device Failure 20	H	SpO_2 Module Comm Stop. Restart the ventilator or contact your service personnel.
Device Failure 22	H	Protecting Module Comm Stop. Contact your service personnel.
Network disconnected	M	The ventilator is disconnected with the central monitoring system (CMS), eGateway or monitor. 1. Check if the network connection mode (eg. wired/wireless network or monitor hotspot) of the ventilator is correct. 2. Check if the network cable between the ventilator and the central monitoring system (CMS), eGateway or monitor is connected, and if the WiFi router works properly. 3. Check the network setup (IP, gateway, etc.)

Table D-5

D.2.3 Monitor Board

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 08	M	Nebulizer Valve Failure. Contact your service personnel.
Technical Error 09	M	Insp. Temp Sensor Failure. Contact your service personnel.
Technical Error 10	L	Heating function of the expiration valve is faulty. 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	Air Insp. Limb Failure. Contact your service personnel.

Table D-6

Device Failure 13	H	O_2 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_2O (PEEP + 10 cmH_2O for APRV mode) within any fully mechanical ventilation cycle.
		1. Check the ventilation parameter setup. 2. Check the patient tubing for occlusion.
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_2 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_2O for 15 s consecutively.
		1. Check the patient. 2. Check the ventilation parameter setup. 3. Check the patient tubing for occlusion.
Airway Leak?	L	Tube is leaky.
		1. Check the patient tubing for leakage. 2. Perform System Check to test the leakage
Tube Disconnected?	H	Tube is disconnected.
		Re-connect the patient tubing.
Pressure Limited	L	In volume mode or pressure mode when ATRC function is enabled, 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	Pinsp is lower than the pressure setting value by 3 cmH_2O or 2/3 of the pressure setting value, whichever is less.
		1. Check the patient. 2. Check TV alarm limits. 3. Check the O_2 supply. 4. Check the patient tubing for leakage. 5. Check the HEPA filter for occlusion.

Table D-6

TV Not Achieved	L	TVi 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 high-pressure gas supply or the HEPA filter for occlusion. 4. Check the O_2 supply. 5. Check the patient tubing for leakage or occlusion.
Pressure Limited in Sigh cycle	L	The pressure reaches Paw high alarm limit-5 in sigh cycle.
		1. Check the patient. 2. Check pressure high alarm limit. 3. Check the patient tubing for occlusion. 4. Consider to turn off sigh.
O_2 Supply Failure	H	Oxygen supply is not sufficient to support normal ventilator operation.
		1. Check connection with O_2 supply. 2. Check O_2 supply pressure.
Air Supply Failure	H	Air supply is not sufficient to support normal ventilator operation.
		1. Check connection with Air supply. 2. Check air supply pressure
No Gas Supply Pressure	H	Both oxygen and air supply are not sufficient to support normal ventilator operation.
		1. Check connection with air and O_2 supply. 2. Check air and O_2 supply pressure. 3. For machines with backup air supply configuration, check whether the Blower Disabled switch for user maintenance is on. 4. Check backup air supply for failure.
Tinsp Too Long	L	In PSV mode, Tinsp exceeds 4s for adult, 1.5s for pediatric, and the maximum inspiration time set by the user for neonates for continuous 3 cycles.
		1. Check the patient. 2. Check the ventilation parameter setup. 3. Check the patient tubing for leakage.
Please Check Exp. Flow Sensor	H	Installing the expiratory flow sensor fails.
		Contact your service personnel.
Insp. Gas Temp Too High	H	The gas temperature exceeds 55°C.
		1. Disconnect the patient. 2.Restart the machine. Contact the specified service personnel if the issue persists.
Flow Sensor Type Error	H	Installation error with air flow sensor or O_2 flow sensor.
		Contact your service personnel.
Blower Fan Failure	M	Backup air supply fan speed error. If it can't be solved, restart the machine.
		Please contact your service personnel (turning off backup air supply could also resolve the alarm).
Blower Temperature High	H	Backup air supply temperature exceeds the threshold.
		1. Check if the operating ambient temperature of the machine exceeds the maximum operating temperature specified by the vendor. 2. Check if the fan inlet and outlet are occluded. If yes, clear the foreign substance and dust. 3. Check the rotation of the fan. If it runs abnormally (such as abnormal sound or rotation speed), replace the fan.

Table D-6

AMV: Cannot Meet Target	L	Cannot meet established MV% 1. Check the ventilation parameter setup. 2. Check the alarm limits setting.
Technical Error. Only Blower Gas Supply Available.	H	Three-way valve failure, only blower gas supply available. Contact your service personnel.
Blower Failure 3-way Valve Failure	H	Three-way valve failure, blower module disabled. Contact the specified service personnel.
Replace HEPA Filter	L	HEPA filter occluded, resistance increased. Contact the specified service personnel.
Blower Technical Error 01	M	Backup air supply Temp Sensor Failure. Contact your service personnel.
Blower Technical Error 02	M	HEPA Pressure Sensor Failure. Contact your service personnel.
Blower Technical Error 03	M	Backup air supply three-way valve microswitch failure. Contact your service personnel.
Blower Failure 01	H	Insp. Limb valve or flow sensor fails. 1. Use another device for ventilation. 2.Restart the machine. 3. Contact the specified service personnel if the issue persists.
Blower Failure 02	H	Insp. Valve Disconnected. Contact your service personnel.
Blower Failure 03	H	Backup air supply Temp Too High. Contact your service personnel.
Blower Failure 04	H	Backup air supply Failure. Contact your service personnel.
O_2 Sensor Unconnected	L	The O_2 sensor is not connected. Connect the O_2 sensor.
Please Replace O_2 Sensor.	M	The chemical O_2 sensor is expired. Please replace the O_2 sensor.
Please calibrate O_2 sensor	L	Please calibrate the O_2 sensor. Please calibrate O_2 concentration.
Please reset O_2 sensor	M	The oxygen concentration measured by the paramagnetic oxygen sensor has a large error. Contact your service personnel.
Please perform pressure calibration.	H	Calibrate the pressure sensor. Contact your service personnel.
Please perform flow calibration.	H	Calibrate the flow sensor. Please perform flow calibration.

Table D-6

D.2.4 CO_2 Module

Alarm Messages	P	Cause and Action
CO_2 Module Failure 01	M	Sidestream CO_2 module zeroing fails. The gain input signal offset is too large, exceeding the adjustable range.
		Contact your service personnel.
CO_2 Module Failure 02	M	CO_2 Init Error. An error occurs to the CO_2 module during initialization.
		Contact your service personnel.
CO_2 Module Failure 03	M	CO_2 self check error. An error occured in the CO_2 module during self check.
		Contact your service personnel.
CO_2 Module Failure 04	M	CO_2 Hardware Error.
		Contact your service personnel.
CO_2 Module Failure 05	M	CO_2 Comm Stop, CO_2 Module Failure, CO_2 Comm Error or communication failure reaches 10s.
		Contact your service personnel.
CO_2 Module Failure 06	M	Mainstream CO_2 module zeroing fails.
		Contact your service personnel.
CO_2 Sensor High Temp	L	The sensor temperature is too high (above 63ºC).
		Contact your service personnel.
CO_2 Sampleline Occluded	L	Sampling line is faulty or occluded.
		1. Check the sampling line for occlusion. 2. Replace the sampling line. 3. Replace the water trap.
CO_2 No Watertrap	L	The water trap is disconnected or not connected properly. Check the water trap.
		Re-install the water trap.
Et CO_2 Overrange	L	Parameter measured values exceed the measurement range (error range is included).
		1. Perform CO_2 module zeroing. 2. Contact your service personnel.
Please Replace CO_2 Sensor	M	The mainstream CO_2 module sensor is faulty.
		Contact your service personnel.
CO_2 No Sensor	L	The mainstream CO_2 module sensor is not connected.
		Connect the CO_2 sensor.

Table D-7

D.2.5 SpO_2 Module

Alarm Messages	P	Cause and Action
SpO_2 Sensor Off	L	Connected SpO_2 sensor became disconnected from patient tubing (e.g. wire disconnection or short circuit).
		Check SpO_2 sensor and measurement site connection.
Please Replace SpO_2 Sensor	M	SpO_2 sensor failed (e.g. wire disconnection or short circuit).
		1. Replace SpO_2 sensor. 2. Contact your service personnel.
SpO_2 No Sensor	L	Main cable has disconnected from module. Connection between sensor and main cable has disconnected.
		Check that SpO_2 cable is connected to the module.
SpO_2 Too Much Light	L	The light to which the sensor is exposed is so bright that the sensor's photodetector is absorbing the surrounding light.
		Put SpO_2 sensor in a place with lower ambient light levels.
SpO_2 No Pulse	L	SpO_2 sensor cannot obtain pulse signal (or incomplete signal).
		1. Check the patient's condition. 2. Check SpO_2 sensor and measurement site connection 3. Replace SpO_2 sensor.
SpO_2 Module Error	M	SpO_2 module error\SpO_2 initialization error
		1. Replace SpO_2 sensor. 2. Contact your service personnel.
SpO_2 Overrange	L	Measured values of parameter SpO_2 exceed the measurement range.
		1. Replace SpO_2 sensor. 2. Contact your service personnel.
PR Overrange	L	Measured values of parameter PR exceed the measurement range.
		1. Replace SpO_2 sensor. 2. Contact your service personnel.

Table D-8

D.2.6 Neo. Module

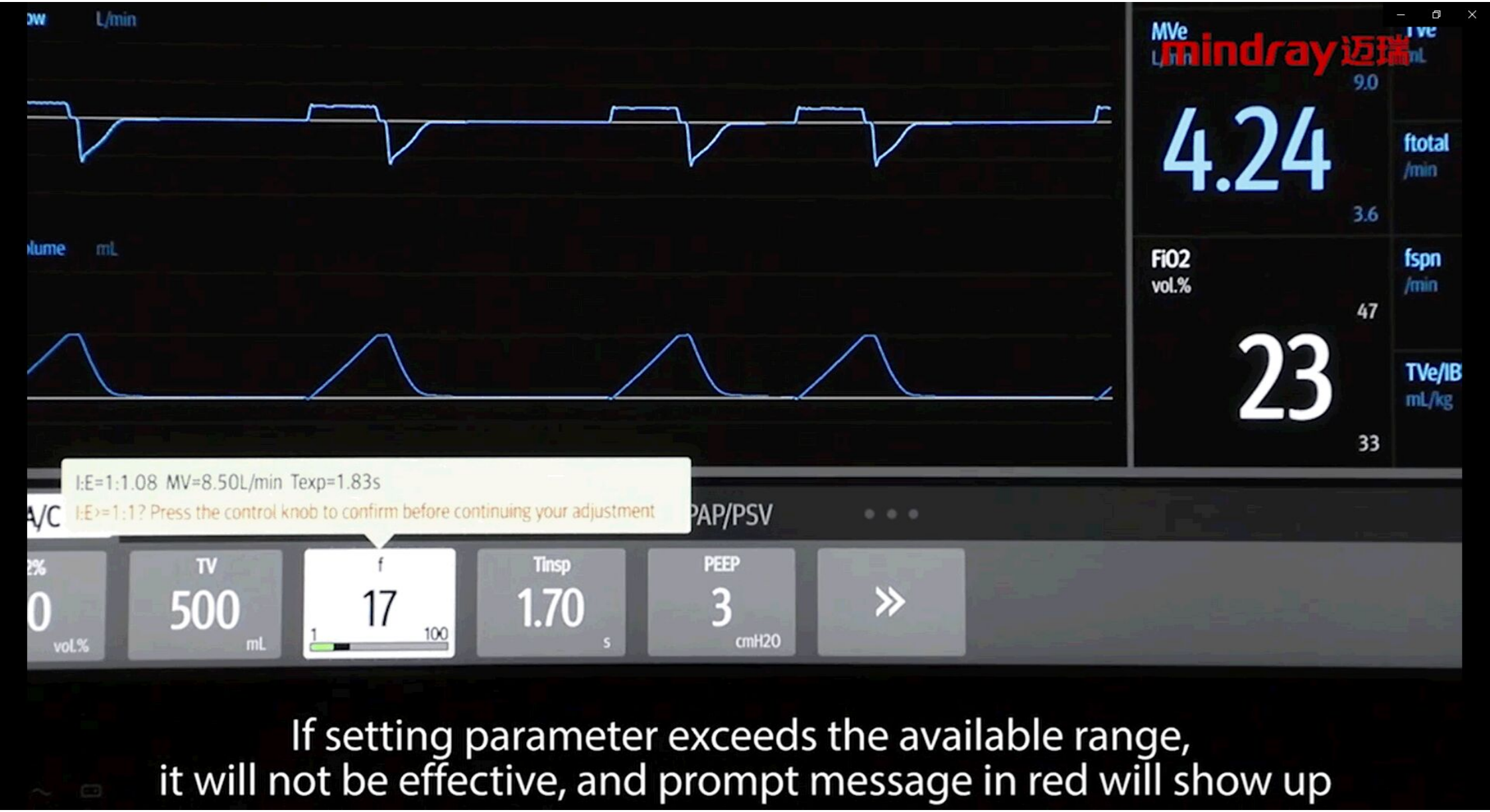
Alarm Messages	P	Cause and Action
Reverse the neonatal flow sensor.	H	Neonatal flow sensor connected reversed.
		Please reverse the neonatal flow sensor.
Neo. Flow Sensor Overrange	H	Range of neonatal flow sensor exceeds 32 L/min.
		1. Check the patient's condition and ventilator settings 2. Change patient type if necessary.
Neo. Flow Sensor Failure	H	Neonatal flow sensor failure.
		1. Replace neonatal flow sensor. 2. Contact your service personnel.
No Neo. Flow Sensor	M	The neonatal sensor cable is not connected or the neonatal sensor is not connected with the patient tube.
		Check if the neonatal sensor cable is connected Check the connection of the flow sensor and the patient tube.
Wrong Neo. Flow Sensor Type	H	Adult proximal flow sensor is used.
		Use neonatal flow sensor.
Neo. Flow Sensor Monitoring Off	M	Neonatal flow sensor monitor off in the volume mode.
		Neonatal flow sensor monitor on.
Clean Neo. Flow Sensor	H	Neonatal flow sensor is contaminated.
		Replace neonatal flow sensor, and Circuit Test is then recommended.

Table D-9

D.2.7 Auxiliary Pressure

Alarm Messages	P	Cause and action
Please calibrate auxiliary pressure sensor	H	Please calibrate auxiliary pressure sensor.
		Contact your service personnel.
Paux1 balloon pressure error	L	Paux1 balloon pressure error.
		1. Reinflate Pes balloon. 2. Confirm Pes balloon position. 3. Disconnect the auxiliary pressure catheter and zero the auxiliary pressure sensor if necessary.
Paux2 balloon pressure error	L	Paux2 balloon pressure error.
		1. Reinflate Pes balloon. 2. Confirm Pes balloon position. 3. Disconnect the auxiliary pressure catheter and zero the auxiliary pressure sensor if necessary.

Table D-10



If setting parameter exceeds the available range,
it will not be effective, and prompt message in red will show up

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Ventilator Accessories

CATALOGUE 2021.09

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P/N:ENG-Ventilator Accessories Catalogue-210285X26P-20210926

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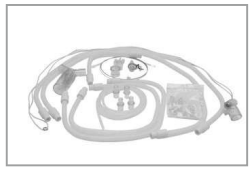
F&P disposable single heated breathing circuit kit (infant)

Picture	Description	Part No.	Apply to
	Disposable single heating breathing circuit (infant); Disposable water chamber	040-002891-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800

F&P reusable single heated breathing circuit kit (Adult)

Picture	Sub part	Part No.	Apply to
	**Including:** Adult Y-piece900MR126 Water trap 900MR139 Adaptor 900MR534 Hoes clip 900MR042 Adult tubing 900MR062, 2 pcs Adult tubing 900MR074 Adult tubing 900MR067 Temperature probe housing 900MR532 Heater wire 900MR751 Draw wire 900MR070	040-000715-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800

F&P reusable single heated breathing circuit kit (Infant)

Picture	Sub part	Part No.	Apply to
	**Including:** Infant tubing 900MR026, 2 pcs Infant tubing 900MR025, 2 pcs Infant tubing 900MR017 Heater wire 900MR755 Water trap 900MR139 Adaptor 900MR178, 4 pcs Temperature probe housing Infant Y-piece 900MR145 Adaptor 900MR143 Adaptor 900MR406 Draw wire 900MR070 Silicone pressure tubing 900MR075	040-000711-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800

Reusable breathing circuit kit (Adult)

Picture	Sub part	Part No.	Apply to
	**Including:** Breathing circuit, 4 pcs Y piece Water trap, 2 pcs Straight connector, 22M/22M Straight connector, 22M/15M L-shaped Connector,22M/15F,22F L-shaped connector, 22M/15F,15M Catheter Mount Filter	040-001892-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800

Reusable breathing circuit kit (Pediatric/Infant)

Picture	Sub part	Part No.	Apply to
	**Including:** Breathing circuit, 4 pcs Y piece Water trap, 2 pcs Straight connector, 22M/22M Straight connector, 22M/15M L-shaped Connector,22M/15F,22F Catheter Mount Filter	040-001894-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800

Reusable heated breathing circuit kit for JK530(Adult)

Picture	Sub part	Part No.	Apply to
	**Including:** Temperature probe 1.5m Reusable heater wire1.3m Reusable adaptor Draw wire 1.7m Breathing circuit	115-018062-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800

Picture	Description	Part No.	Apply to
	**HME** (for TV 250 ml- 1000ml, with bacteria filter)	040-001571-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800
	**Disposable bacteria filter**	040-001831-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600
	**Mindray reusable expiration valve, with flow sensor**	115-021461-00	SV300 SV300 Pro SV600 SV800
	**Mindray disposable expiration valve, with flow sensor, 10pcs**	115-078491-00	SV300 SV300 Pro SV600 SV800

Patient interface

Picture	Description	Part No.	Apply to
	**Nebulizer for ventalition**	040-000799-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800
	**NIV mask, with head band** (large size) **NIV mask, with head band** (medium size) **NIV mask, with head band** (small size)	040-001862-00 040-001861-00 040-001860-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800
	**F&P nasal cannula for O_2 therapy** (OPT846-large size) **F&P nasal cannula for O_2 therapy** (OPT844-medium size) **F&P nasal cannula for O_2 therapy** (OPT842-small size) **F&P nasal cannula for O_2 therapy** (OPT846-large size), 10 pcs **F&P nasal cannula for O_2 therapy** (OPT844-medium size), 10 pcs **F&P nasal cannula for O_2 therapy** (OPT842-small size), 10 pcs	040-002378-00 040-002377-00 040-002376-00 115-037831-00 115-037830-00 115-037829-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800

Humidifier & accessory

JIKE humidifier SH530 (Adult)

Apply to: SynoVent E3, SynoVent E5, SV300, SV300 Pro, SV600, SV800

Picture	Sub part	Part No.	Description
	**Including:**	115-018056-00	(EU, 230V)
	Humidifier SH530	115-018057-00	(India)
	Reusable water chamber	115-018060-00	(UK, 230V)
	Disposable heating wire package	115-018058-00	(US, 110V)
		115-018061-00	(US, 220V)

JIKE humidifier SH530 (Infant)

Apply to: SynoVent E3, SynoVent E5, SV300, SV300 Pro, SV600, SV800

Picture	Sub part	Part No.	Description
	**Including:**	115-028494-00	(EU, 230V)
	Humidifier SH530	115-028496-00	(India)
	Reusable water chamber	115-028498-00	(UK, 230V)
	Disposable heating wire package	115-028500-00	(US, 110V)
		115-028502-00	(US, 220V)

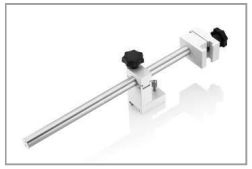
JIKE humidifier SH330

Apply to: SynoVent E3, SynoVent E5, SV300, SV300 Pro, SV600, SV800

Picture	Sub part	Part No.	Description
	**Including:**	115-018049-00	(EU, 230V)
	Humidifier SH330	115-018050-00	(India)
	Reusable water chamber	115-018053-00	(UK, 230V)
		115-018051-00	(US, 110V)
		115-018054-00	(US, 220V)

Picture	Description	Part No.	Apply to
	**Resuable water chamber** (Adult) **- F&P MR370**	040-000710-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800
	**Resuable water chamber** (Infant) **- F&P MR340E**	040-000709-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800
	**Reusable water chamber for JK530** (Adult)	040-001530-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800
	**Reusable water chamber for JK530** (Infant)	040-002174-00	SynoVent E3 SynoVent E5 SV300 SV300 Pro SV600 SV800

Trolley & Support arm

Picture	Description	Part No.	Apply to
	**Trolley**	115-025215-00	SV300 SV300 Pro
	**Trolley**	045-003318-00	SV600 SV800
	**Support arm**	045-000625-00	SV300 SV300 Pro SV600 SV800
	**Bracket-Pedant mount kit for humidifier**	115-006158-00	SV300 SV300 Pro SV600 SV800

Maintenance & Others

Picture	Description	Part No.	Apply to
	**Gas valve, high-pressure cylinder pressure reducer, 14Mpa**	082-001927-00	SV300 SV300 Pro
	**Gas supply hose assembly, O_2 supply** EU, 34I-OXY-DS/NS-0.6 **Gas supply hose assembly, O_2 supply** US,34I-OXY-DS/NS-0.6	082-001926-00 082-001918-00	SV300 SV300 Pro
	O_2 hose 3m, UK, NIST-2 O_2 hose 3m, Ger, NIST-2 O_2 hose 3m, Fra, NIST-2 O_2 hose 3m, Aus, NIST-2 O_2 hose 3m, US, DISS-2	115-008201-00 115-008257-00 115-008259-00 115-008261-00 115-008209-00	SV300 SV300 Pro SV600 SV800
	O_2 & Air hoses 3m, UK, NIST-2 O_2 & Air hoses 3m, Ger, NIST-2 O_2 & Air hoses 3m, Fra, NIST-2 O_2 & Air hoses 3m, Aus, NIST-2 O_2 & Air hoses 3m, US, dual connectors, DISS-2	115-008365-00 115-008366-00 115-008367-00 115-008368-00 115-008372-00	SV600 SV800

Picture	Description	Part No.	Apply to
	**Oxygen sensor** (MOX-3)	040-001275-00	SV300 SV300 Pro SV600 SV800
	**Low pressure transfer adapter** (LPO)	082-001920-00	SV300 SV300 Pro
	**One more battery**	115-034132-00	SV600 SV800
	**One more battery**	115-025022-00	SV300 SV300 Pro

Picture	Description	Part No.	Apply to
	**HEPA filter**	115-024794-00	SV300 Pro SV300 SV600 SV800
	**Test lung** (Adult)	040-000744-00	SynoVent E3 SynoVent E5 V300 Pro SV300 SV600 SV800
	**Test lung** (Infant)	040-000745-00	SynoVent E5 SV300 Pro SV300 SV600 SV800

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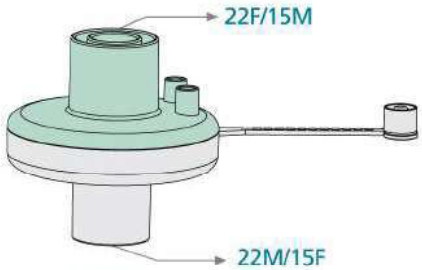
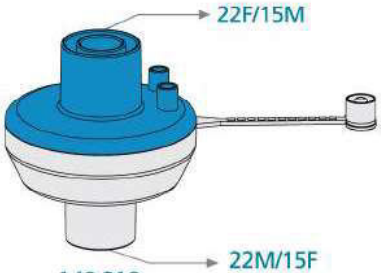


140 201

- BFE (Bakteriyel Filtre Etkinliği) %99.99998
- VFE (Viral Filtre Etkinliği) %99.9998
- Gaz Örnek Alma Portu
- Düşük Ölü Boşluk
- Düşük Akış Direnci
- Steril

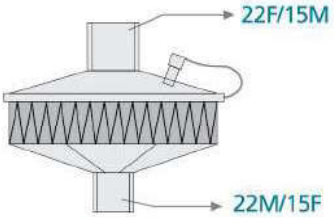
- *BFE (Bacterial Filtration Efficiency) %99.99998*
- *VFE (Viral Filtration Efficiency) %99.9998*
- *Gas Sampling Port*
- *Low Dead Space*
- *Low Flow Resistance*
- *Sterile*



140 210

- BFE (Bakteriyel Filtre Etkinliği) %99.99998
- VFE (Viral Filtre Etkinliği) %99.9998
- 500 ml Tidal Hacim ile Nem Çıkış Değeri 33.2 mg/lt
- Gaz Örnek Alma Portu
- Düşük Ölü Boşluk
- Düşük Akış Direnci
- Steril

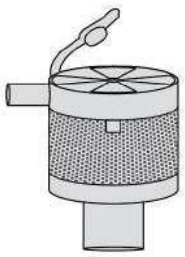
- *BFE (Bacterial Filtration Efficiency) %99.99998*
- *VFE (Viral Filtration Efficiency) %99.9998*
- *Moisture Output at 500 ml Tidal Volume 33.2 mg/lt*
- *Gas Sampling Port*
- *Low Dead Space*
- *Low Flow Resistance*
- *Sterile*



140 130

- BFE (Bakteriyel Filtre Etkinliği) %99.9999
- VFE (Viral Filtre Etkinliği) %99.9999
- Gaz Örnek Alma Portu
- Düşük Ölü Boşluk
- Düşük Akış Direnci
- Steril

- *BFE (Bacterial Filtration Efficiency) %99.9999*
- *VFE (Viral Filtration Efficiency) %99.9999*
- *Gas Sampling Port*
- *Low Dead Space*
- *Low Flow Resistance*
- *Sterile*



ZF-051

KOD / *CODE*	TİP / *TYPE*	KOLİ ADEDİ *QUANTITY PER BOX*
140 201	BAKTERİ FİLTRESİ *BACTERIAL FILTER*	100
140 210	HMEF (BAKTERİ VE NEM) FİLTRE *HMEF (BACTERIAL AND MOISTURE) FILTER*	100
140 130	HEPA FİLTRE *HEPA FILTER*	100
ZF-051	TRAKEOSTOMİ HME FİLTRE *TRACHEOSTOMY HME FILTER*	400

- 500 ml Tidal Hacim ile Nem Çıkış Değeri 24 hr: 28.8 mg/1 lt H_2O
- Aspirasyon Portu
- Oksijen Portu
- Düşük Ölü Boşluk
- Düşük Akış Direnci
- Steril

- *Moisture Output at 500 ml Tidal Volume 24 hr: 28.8 mg/1 lt H_2O*
- *Suction Port*
- *Oxygen Port*
- *Low Dead Space*
- *Low Flow Resistance*
- *Sterile*