

**SV600**

**Ventilator**

**Operator's Manual**



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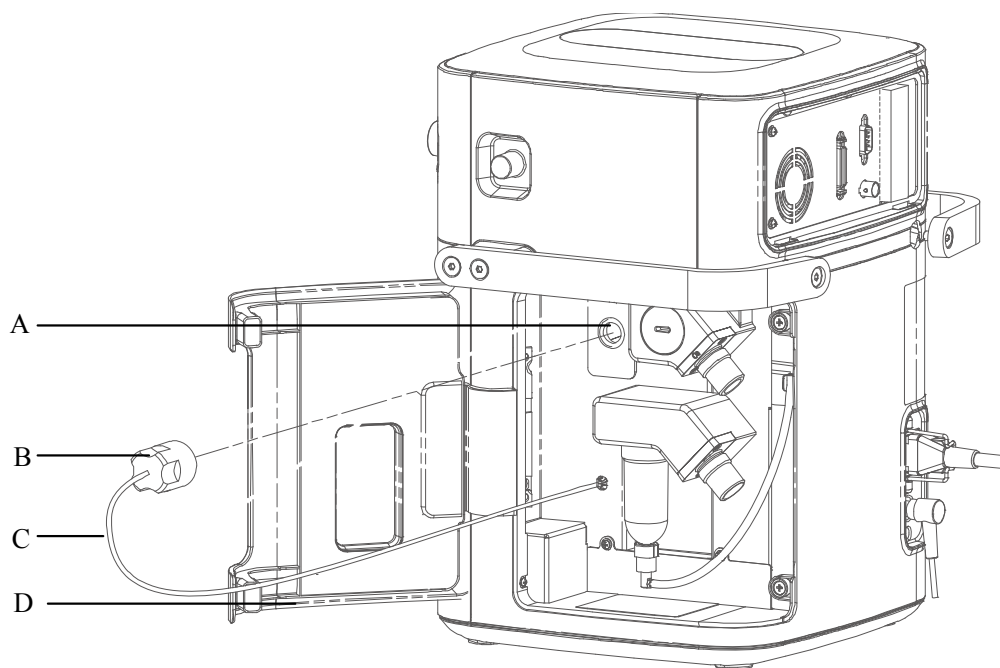
For this Operator's Manual, the issue date is December, 2019.

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## 3.8 Install the Oxygen Sensor

This ventilator could be equipped with O<sub>2</sub> Cell or Paramagnetic O<sub>2</sub> Sensor. O<sub>2</sub> Cell is a consumable product and the service life is around 1 year and thus needs to be replaced periodically. O<sub>2</sub> Cell need to be calibrated regularly. Please refer to **13.2 Maintenance Schedule** for calibration cycle. The Paramagnetic O<sub>2</sub> Sensor could be used for a long term and no replacement is needed.

### 3.8.1 O<sub>2</sub> Cell



- |  |                               |
|--|-------------------------------|
| A. Fixing seat                         | B. O <sub>2</sub> Cell        |
| C. O <sub>2</sub> Cell connector cable | D. Main unit maintenance door |

1. Rotate the O<sub>2</sub> Cell clockwise to install it.
2. Connect the O<sub>2</sub> Cell connection cable.
3. Close the main unit maintenance door.


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### CAUTION


- To reduce the risk of explosion, do not burn the O<sub>2</sub> cell or force the cell open.
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## 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 “bmp” format. The system can store up to 20 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<sub>2</sub>↑ 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.



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## 5.4 Screen Settings



### 5.4.1 Adjust Screen Brightness

1. Select [Menu] → [Screen] → [Brightness/Volume].
2. Select  or  and switch to corresponding screen brightness default.
3. If the above screen brightness is not satisfactory, set [Brightness] directly: 1 to 10. T1 is the darkest setting and 10 is the brightest. If the ventilator is battery powered, you can select a less bright screen to save battery capacity.

### 5.4.2 Adjust Key Volume

1. Select [Menu] → [Screen] → [Brightness/Volume].
2. Select  or  and switch to corresponding key volume default.
3. Set [Key Volume]: 0 to 10. Select 0 to turn off key sound and 10 to obtain maximum key volume.


### 5.4.3 Screen Setup

1. Select [Menu] → [Screen] → [Screen Setup].
2. Select corresponding icons to set the displayed number of waveforms and the wave drawing method.
3. If you need to adjust the specific waveform and measured values at each position, please set [Layout Setup Switch] as  (ON). Then select the waveform or measured value in the main screen and set the required waveform or measured value name in the interface that is displayed. If you need to close this function, please set [Layout Setup Switch] to  (OFF).
4. Select [Defaults] when necessary to restore the settings to default.

# 6 Start Ventilation

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## 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  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.**
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## 6.2 System Check

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

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System Check items include:

- Backup Air Supply Test: test the speed of backup air supply.
- O<sub>2</sub> Flow Sensor Test: test the O<sub>2</sub> Insp. Valve and O<sub>2</sub> 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<sub>2</sub>O)
- Circuit Resistance (cmH<sub>2</sub>O/L/S)
- O<sub>2</sub> Sensor Test
- Neonatal Flow Sensor Test

System Check result can be:

- Pass: indicates that check of this item is completed and is passed;
- Fail: indicates that check of this item is completed but is failed;
- Cancel: indicates that check of this item is cancelled;
- No Gas Supply: indicates that air or O<sub>2</sub> sources are not connected.
- Monitoring Off: indicates that sensor monitoring function may not be switched on when O<sub>2</sub> sensor test or neonatal flow sensor test is being carried out.
- No Sensor: indicates that the neonatal flow sensor is not connected.
- Sensor Reversed: indicates that the neonatal flow sensor is connected reversed.
- Sensor Failure: indicates that the oxygen sensor may not be working.
- High leakage: indicates that there is high leakage from the test tubing, probably because the tubing is disconnected, not properly installed, the safety valve is not closed, or the expiratory valve membrane is not installed.

Total selftest results are listed as follows after all selftest items have been completed:

- Pass: all selftest items successfully pass the selftest.
- Partially Pass: some selftest items fail, but the mechanical ventilation is allowed.
- Fail. Ventilation Disabled: some important selftest items fail, but the mechanical ventilation is not allowed.
- High Leakage, Ventilation Disabled: Exp. Flow Sensor Test, Pressure Sensor Test, Exp. Valve Test, or Safety Valve Test fails, the mechanical ventilation is not allowed.
- Cancel: some selftest items cancelled and other selftest items have been successfully passed.

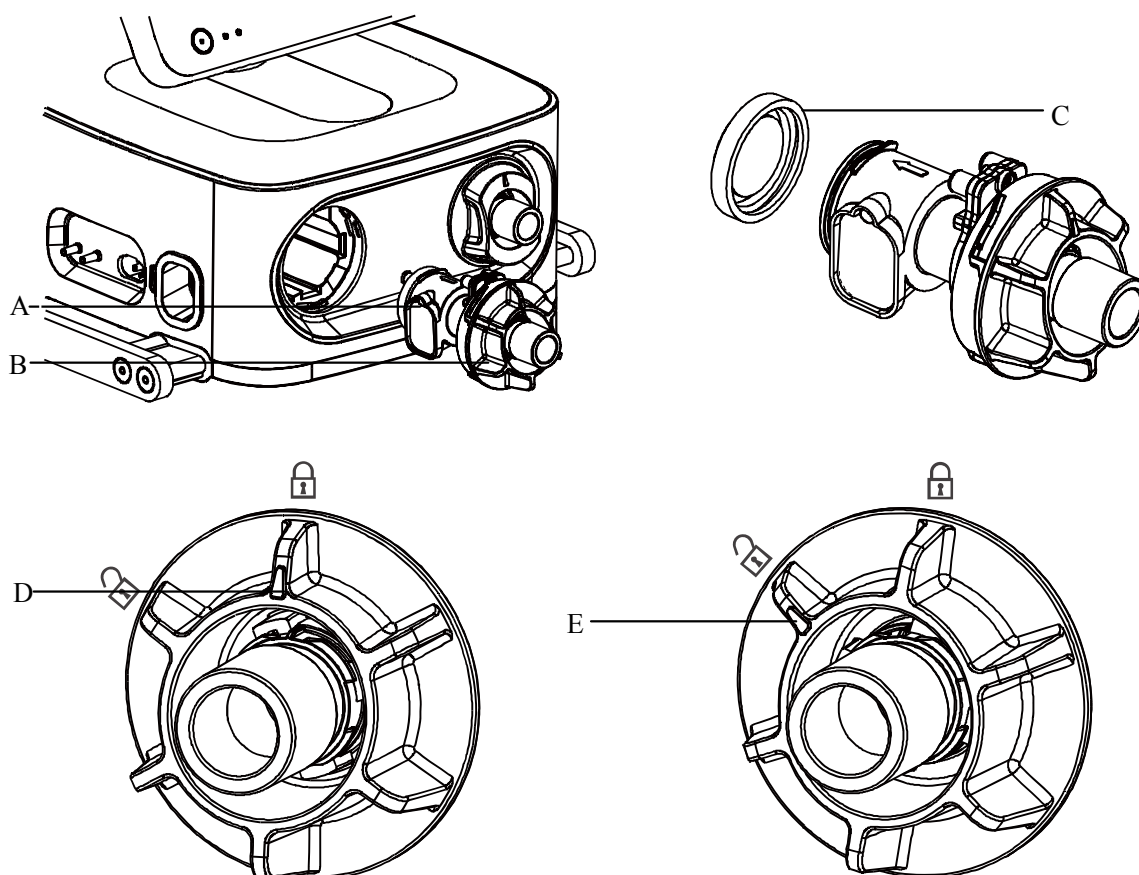
The table below lists the cleaning and disinfecting agents and autoclaving process that may be used on the ventilator.

Name	Type
Ethanol (75%)	Moderately efficient disinfectant
Isopropanol (70%)	Moderately efficient disinfectant
Glutaraldehyde (2%)	Highly efficient disinfectant
Ortho-Phthalaldehyde disinfectant (such as Cidex®OPA)	Highly efficient disinfectant
Soap water (pH value of 7.0~10.5)	Rinsing agent
Clean water	Rinsing agent
Steam autoclave*	Highly efficient disinfection

Steam autoclave\*: The recommended temperature of this disinfection method is 134°C (273°F).

## 12.2 Disassemble the Ventilator's Cleanable and Disinfectable Parts



### 12.2.1 Expiration Valve Assembly and Membrane









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- A. Expiration valve assembly
  - B. Expiration valve handwheel
  - C. Expiration valve membrane
  - D. Locked state of the expiration valve
  - E. Unlocked state of the expiration valve

■ To disassemble:

1. Rotate the expiration valve handwheel until the indicating arrow  on the handwheel is aligned with the  position. Then pull the expiration valve assembly out of the assembly horizontally.
2. Remove the expiration valve membrane.

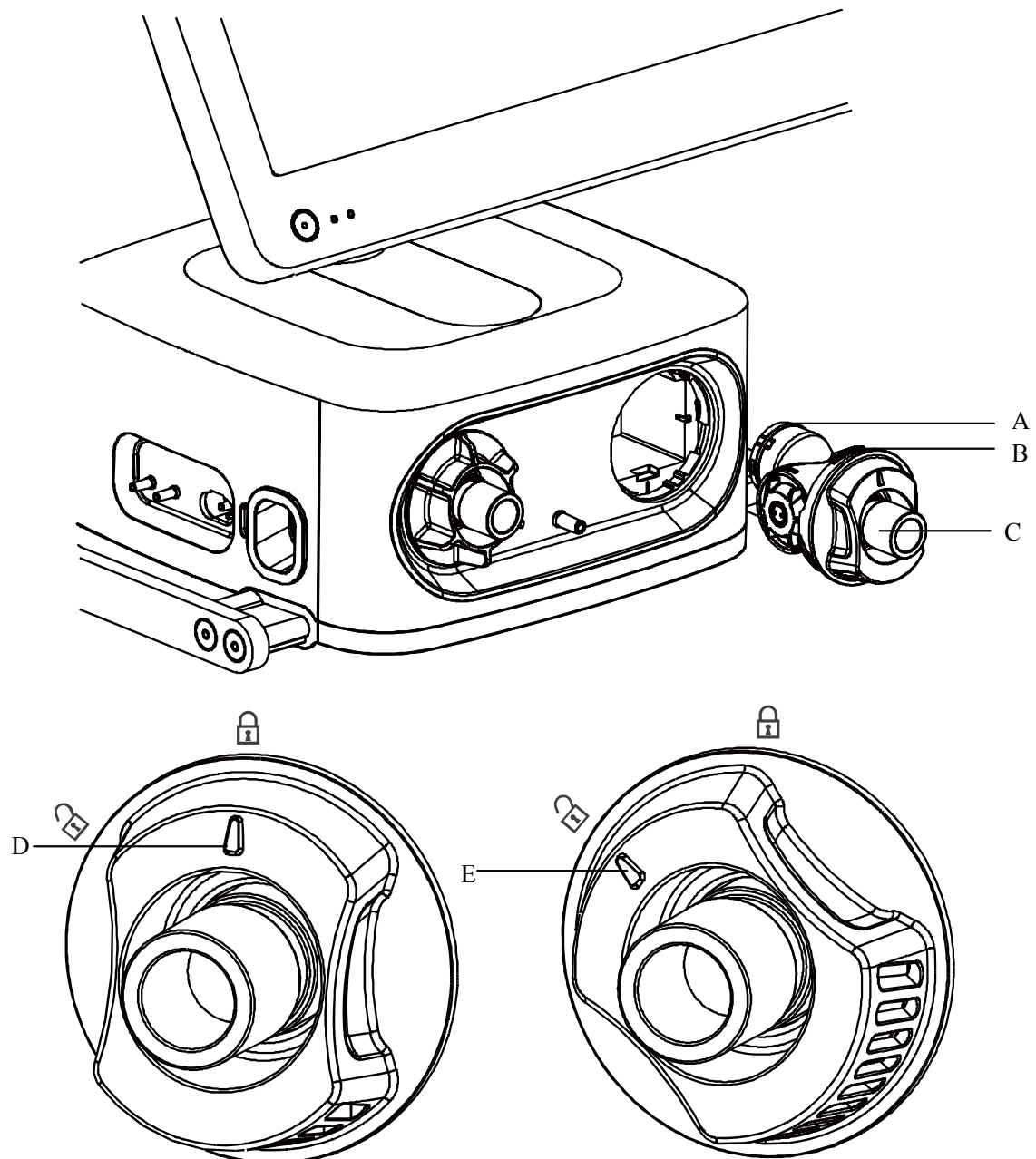
■ To install:

1. Install the expiration valve membrane onto the expiration valve assembly.
2. Ensure that the indicating arrow  on the handwheel is aligned with the  position. Push the expiratory valve assembly into the corresponding connector on the ventilator horizontally until it is fully inserted. Then rotate the expiratory valve handwheel clockwise (and press the handwheel in the direction the expiratory valve is installed) until the indicating arrow  on the handwheel is aligned with the  position.

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## 12.2.2 Inspiration safety valve assembly

### 12.2.2.1 Inspiration safety valve assembly



A. Sealing ring



C. Safety valve handwheel

B. Safety valve assembly





D. Locked state of the inspiration safety valve

E. Unlocked state of the inspiration safety valve

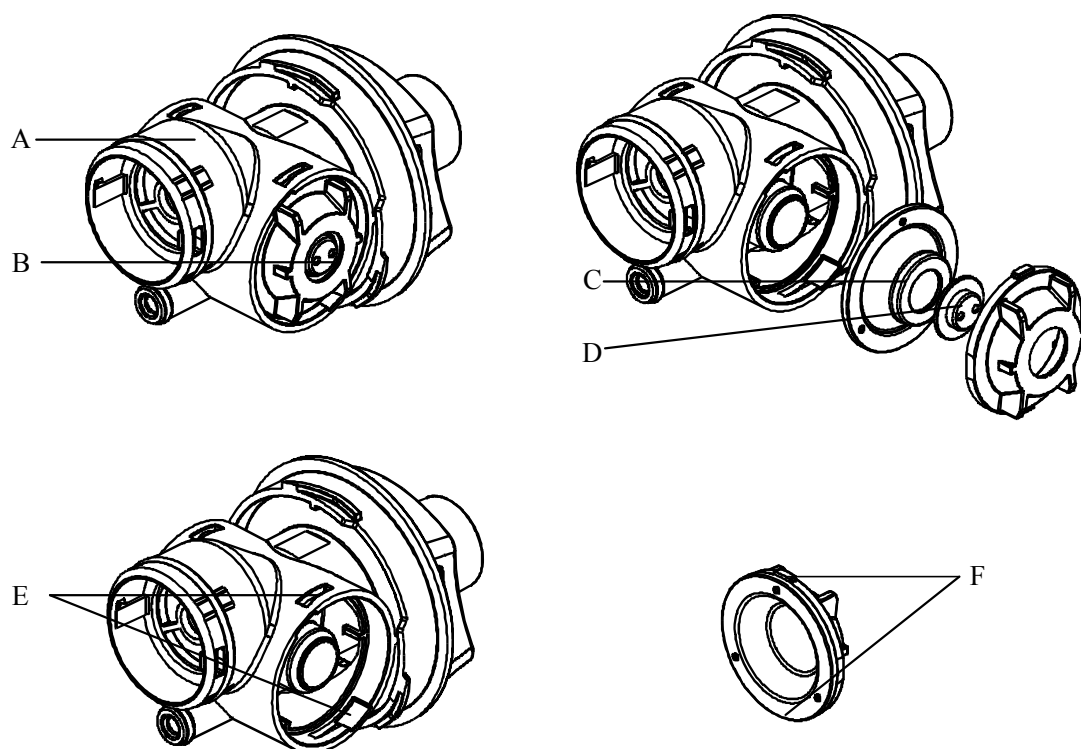
■ To disassemble:

Ensure the ventilator in standby or off status. Rotate the inspiratory safety valve knob anticlockwise until the indicating arrow  on the safety valve knob is aligned with the  position. Then pull out the inspiratory safety valve assembly horizontally. Check if the sealing ring at the end of the inspiration safety valve is disconnected. If it is disconnected, re-install the sealing ring onto the inspiration safety valve.

■ To install:

Push the inspiratory safety valve assembly into the corresponding connector on the ventilator horizontally until it is fully inserted. Ensure that the indicating arrow  on the knob is aligned with the  position. Then rotate the inspiratory safety valve knob clockwise (and press the knob in the direction the inspiratory safety valve is installed) until the indicating arrow  on the knob is aligned with the  position.

### 12.2.2.2 Inspiration safety valve membrane



- |                                   |                                |                          |
|-----------------------------------|--------------------------------|--------------------------|
| A. Safety valve body              | B. Membrane fixing knob        | C. Safety valve membrane |
| D. Membrane support               | E. Groove of safety valve body |                          |
| F. Guides on membrane fixing knob |                                |                          |

# D Alarm Messages

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 <sub>2</sub> Too High	H	The inspired O <sub>2</sub> concentration is greater than the FiO <sub>2</sub> 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 <sub>2</sub> cell, calibrate the O <sub>2</sub> sensor. If the ventilator uses the paramagnetic O <sub>2</sub> sensor, perform the System Check.
FiO <sub>2</sub> Too Low	H	The inspired O <sub>2</sub> concentration has been lower than the FiO <sub>2</sub> low alarm limit for at least 30 s or is less than 18%.
		1. Check air supply. 2. If the ventilator uses the O <sub>2</sub> cell, calibrate the O <sub>2</sub> sensor. If the ventilator uses the paramagnetic O <sub>2</sub> 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.
		<ol style="list-style-type: none"> <li>1. Check the patient.</li> <li>2. Check the ventilation parameter setup.</li> <li>3. Check the alarm limits.</li> <li>4. Check the patient tubing for leakage or occlusion.</li> <li>5. Perform System Check to test the leakage</li> </ol>
MVe Too High	H	<p>MVe is greater than MVe high alarm limit.</p> <ol style="list-style-type: none"> <li>1. Check the ventilation parameter setup.</li> <li>2. Check the alarm limits.</li> </ol>
MVe Too Low	H	<p>MVe is less than MVe low alarm limit.</p> <ol style="list-style-type: none"> <li>1. Check the ventilation parameter setup.</li> <li>2. Check the alarm limits.</li> <li>3. Check the patient tubing for leakage or occlusion.</li> <li>4. Perform System Check to test the leakage</li> </ol>
Apnea	H	<p>The time of failure to detect respiration exceeds Tapnea.</p> <ol style="list-style-type: none"> <li>1. Check the patient.</li> <li>2. Manual breath.</li> <li>3. Check apnea time setup.</li> <li>4. Check if the patient tubing are disconnected.</li> </ol>
Apnea Vent	H	<p>The time of failure to detect respiration exceeds Tapnea. Start apnea ventilation mode.</p> <p>Check apnea ventilation parameter setup.</p>
ftotal Too High	M	<p>ftotal is greater than ftotal high alarm limit.</p> <ol style="list-style-type: none"> <li>1. Check the patient.</li> <li>2. Check the ventilation parameter setup.</li> <li>3. Check the alarm limits.</li> </ol>
ftotal Too Low	M	<p>ftotal is lower than the ftot low alarm limit.</p> <ol style="list-style-type: none"> <li>1. Check the patient.</li> <li>2. Check the ventilation parameter setup.</li> <li>3. Check the alarm limits.</li> </ol>
Apnea Ventilation Ended	L	This alarm is given when apnea ventilation ends. There is no need to process this alarm.

## D.1.2 CO<sub>2</sub> Module

Alarm Messages	P	Cause and action
EtCO <sub>2</sub> Too High	M	<p>The monitored parameter value exceeds the alarm limit.</p> <ol style="list-style-type: none"> <li>1. Check the patient type.</li> <li>2. Check the alarm limits.</li> </ol>
EtCO <sub>2</sub> Too Low	M	<p>The monitored parameter value exceeds the alarm limit.</p> <ol style="list-style-type: none"> <li>1. Check the patient type.</li> <li>2. Check the alarm limits.</li> </ol>

Apnea CO <sub>2</sub>	M	The time of failure to detect respiration by the CO <sub>2</sub> module exceeds Apnea Tinsp. Whenever the CO <sub>2</sub> apnea alarm is on, block the [EtCO <sub>2</sub> Too High] alarm and [EtCO <sub>2</sub> Too Low] alarm until the alarm is cleared.
		<ol style="list-style-type: none"> <li>1. Check the patient.</li> <li>2. Check apnea time setup.</li> <li>3. Check the connections of CO<sub>2</sub> module sampling device.</li> </ol>

### D.1.3 SpO<sub>2</sub> Module

Alarm Messages	P	Cause and action
SpO <sub>2</sub> Too High	M	SpO <sub>2</sub> value is greater than the high alarm limit.
		<ol style="list-style-type: none"> <li>1. Check the patient's condition and ventilator settings.</li> <li>2. Check the patient's inspiratory O<sub>2</sub>%.</li> <li>3. Check the alarm limits.</li> </ol>
SpO <sub>2</sub> Too LOW	M	SpO <sub>2</sub> value is lower than the low alarm limit.
		<ol style="list-style-type: none"> <li>1. Check the patient's condition and ventilator settings.</li> <li>2. Check the patient's inspiratory O<sub>2</sub>%.</li> <li>3. Check the alarm limits.</li> </ol>
SpO <sub>2</sub> Desat	H	SpO <sub>2</sub> value is lower than the desaturation alarm limit.
		<ol style="list-style-type: none"> <li>1. Check the patient's condition and ventilator settings</li> <li>2. Check the patient's inspiratory O<sub>2</sub>%.</li> <li>3. Check the alarm limits.</li> </ol>
PR Too High	M	PR value exceeds the high alarm limit.
		<ol style="list-style-type: none"> <li>1. Check the patient's condition.</li> <li>2. Check ventilator settings.</li> <li>3. Check the alarm limits.</li> </ol>
PR Too LOW	M	PR value is lower than the low alarm limit.
		<ol style="list-style-type: none"> <li>1. Check the patient's condition.</li> <li>2. Check ventilator settings.</li> <li>3. Check the alarm limits.</li> </ol>
No pulse	H	The patient's pulse signal is too weak, and the system cannot perform analysis.
		<ol style="list-style-type: none"> <li>1. Check the patient's condition.</li> <li>2. Check SpO<sub>2</sub> sensor and measurement site connection</li> </ol>

## 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.
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.	H	Battery power is depleted. The system will shut down in a few minutes.

Power.		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.

## 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.
Device Failure 19	H	Power Board Comm Stop.
		Contact your service personnel.
Device Failure 20	H	SpO <sub>2</sub> Module Comm Stop.
		Restart the ventilator or contact your service personnel.
Device Failure 22	H	Protecting Module Comm Stop.
		Contact your service personnel.

## 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.
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.
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.
Airway Leak?	L	Tube is leaky.

		<ol style="list-style-type: none"> <li>1. Check the patient tubing for leakage.</li> <li>2. Perform System Check to test the leakage</li> </ol>
Tube Disconnected?	H	<p>Tube is disconnected.</p> <p>Re-connect the patient tubing.</p>
Pressure Limited	L	<p>In volume mode or pressure mode when ATRC function is enabled, the pressure reaches Paw high alarm limit-5.</p> <ol style="list-style-type: none"> <li>1. Check the patient.</li> <li>2. Check the ventilation parameter setup.</li> <li>3. Check pressure high alarm limit.</li> </ol>
Volume Limited	L	<p>In pressure mode, delivered gas volume exceeds the set TV high limit.</p> <ol style="list-style-type: none"> <li>1. Check the patient.</li> <li>2. Check the ventilation parameter setup.</li> <li>3. Check the alarm limits.</li> </ol>
Pinsp Not Achieved	L	<p>Pinsp 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.</p> <ol style="list-style-type: none"> <li>1. Check the patient.</li> <li>2. Check TV alarm limits.</li> <li>3. Check the O<sub>2</sub> supply.</li> <li>4. Check the patient tubing for leakage.</li> <li>5. Check the HEPA filter for occlusion.</li> </ol>
TV Not Achieved	L	<p>TVi is less than the TV setting value by more than 10 mL + 10 % of the setting value.</p> <ol style="list-style-type: none"> <li>1. Check the patient.</li> <li>2. Check pressure high alarm limit.</li> <li>3. Check the high-pressure gas supply or the HEPA filter for occlusion.</li> <li>4. Check the O<sub>2</sub> supply.</li> <li>5. Check the patient tubing for leakage or occlusion.</li> </ol>
Pressure Limited in Sigh cycle	L	<p>The pressure reaches Paw high alarm limit-5 in sigh cycle.</p> <ol style="list-style-type: none"> <li>1. Check the patient.</li> <li>2. Check pressure high alarm limit.</li> <li>3. Check the patient tubing for occlusion.</li> <li>4. Consider to turn off sigh.</li> </ol>
O <sub>2</sub> Supply Failure	H	<p>Oxygen supply is not sufficient to support normal ventilator operation.</p> <ol style="list-style-type: none"> <li>1. Check connection with O<sub>2</sub> supply.</li> <li>2. Check O<sub>2</sub> supply pressure.</li> </ol>
Air Supply Failure	H	<p>Air supply is not sufficient to support normal ventilator operation.</p> <ol style="list-style-type: none"> <li>1. Check connection with Air supply.</li> <li>2. Check air supply pressure</li> </ol>
No Gas Supply Pressure	H	<p>Both oxygen and air supply are not sufficient to support normal ventilator operation.</p> <ol style="list-style-type: none"> <li>1. Check connection with air and O<sub>2</sub> supply.</li> <li>2. Check air and O<sub>2</sub> supply pressure.</li> <li>3. For machines with backup air supply configuration, check whether</li> </ol>

		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 <sub>2</sub> 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.
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	M	Backup air supply three-way valve microswitch failure.

Error 03		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 <sub>2</sub> Sensor Unconnected	L	The O <sub>2</sub> sensor is not connected.
		Connect the O <sub>2</sub> sensor.
Please Replace O <sub>2</sub> Sensor.	M	The chemical O <sub>2</sub> sensor is expired.
		Please replace the O <sub>2</sub> sensor.
Please calibrate O <sub>2</sub> sensor	L	Please calibrate the O <sub>2</sub> sensor.
		Please calibrate O <sub>2</sub> concentration.
Please reset O <sub>2</sub> 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.

## D.2.4 CO<sub>2</sub> Module

Alarm Messages	P	Cause and action
CO <sub>2</sub> Module Failure 01	M	Sidestream CO <sub>2</sub> module zeroing fails. The gain input signal offset is too large, exceeding the adjustable range.
		Contact your service personnel.
CO <sub>2</sub> Module Failure 02	M	CO <sub>2</sub> Init Error. An error occurs to the CO <sub>2</sub> module during initialization.
		Contact your service personnel.
CO <sub>2</sub> Module Failure 03	M	CO <sub>2</sub> self check error. An error occurred in the CO <sub>2</sub> module during self check.
		Contact your service personnel.
CO <sub>2</sub> Module Failure 04	M	CO <sub>2</sub> Hardware Error.
		Contact your service personnel.
CO <sub>2</sub> Module Failure 05	M	CO <sub>2</sub> Comm Stop, CO <sub>2</sub> Module Failure, CO <sub>2</sub> Comm Error or communication failure reaches 10s.
		Contact your service personnel.

CO <sub>2</sub> Module Failure 06	M	Mainstream CO <sub>2</sub> module zeroing fails.
		Contact your service personnel.
CO <sub>2</sub> Sensor High Temp	L	The sensor temperature is too high (above 63 °C).
		Contact your service personnel.
CO <sub>2</sub> 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 <sub>2</sub> No Watertrap	L	The water trap is disconnected or not connected properly. Check the water trap.
		Re-install the water trap.
Et CO <sub>2</sub> Overrange	L	Parameter measured values exceed the measurement range (error range is included).
		1. Perform CO <sub>2</sub> module zeroing. 2. Contact your service personnel.
Please Replace CO <sub>2</sub> Sensor	M	The mainstream CO <sub>2</sub> module sensor is faulty.
		Contact your service personnel.
CO <sub>2</sub> No Sensor	L	The mainstream CO <sub>2</sub> module sensor is not connected.
		Connect the CO <sub>2</sub> sensor.

## D.2.5 SpO<sub>2</sub> Module

Alarm Messages	P	Cause and action
SpO <sub>2</sub> Sensor Off	L	Connected SpO <sub>2</sub> sensor became disconnected from patient tubing (e.g. wire disconnection or short circuit).
		Check SpO <sub>2</sub> sensor and measurement site connection.
Please Replace SpO <sub>2</sub> Sensor	M	SpO <sub>2</sub> sensor failed (e.g. wire disconnection or short circuit).
		1. Replace SpO <sub>2</sub> sensor. 2. Contact your service personnel.
SpO <sub>2</sub> No Sensor	L	Main cable has disconnected from module. Connection between sensor and main cable has disconnected.
		Check that SpO <sub>2</sub> cable is connected to the module.
SpO <sub>2</sub> 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 <sub>2</sub> sensor in a place with lower ambient light levels.
SpO <sub>2</sub> No Pulse	L	SpO <sub>2</sub> sensor cannot obtain pulse signal (or incomplete signal).
		1. Check the patient's condition. 2. Check SpO <sub>2</sub> sensor and measurement site connection 3. Replace SpO <sub>2</sub> sensor.
SpO <sub>2</sub> Module Error	M	SpO <sub>2</sub> module error\SpO <sub>2</sub> initialization error
		1. Replace SpO <sub>2</sub> sensor. 2. Contact your service personnel.
SpO <sub>2</sub> Overrange	L	Measured values of parameter SpO <sub>2</sub> exceed the measurement range.

		1. Replace SpO <sub>2</sub> sensor. 2. Contact your service personnel.
PR Overrange	L	Measured values of parameter PR exceed the measurement range. 1. Replace SpO <sub>2</sub> sensor. 2. Contact your service personnel.

## D.2.6 Neo. Module

Alarm Messages	P	Cause and action
Reverse the neonatal flow sensor.	M	Neonatal flow sensor connected reversed. Please reverse the neonatal flow sensor.
Neo. Flow Sensor Overrange	M	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	L	Neonatal flow sensor failure. 1. Replace neonatal flow sensor 2. Contact your service personnel.
No Neo. Flow Sensor	M	Serial cable of neonatal flow sensor is not connected. Sampling line of neonatal flow sensor is not connected. Check the connection of the neonatal flow sensor cable and sampling line.
Wrong Neo. Flow Sensor Type	L	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.