# SV300

# Ventilator

# Operator’s Manual

Digitally signed by Prodan Sveatoslav
Date: 2021.05.28 11:58:34 EEST
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For this Operator's Manual, the issue date is September, 2020.

# 4.5 History Data

Select the [**History**] button to access the window as shown below. You can view tabular trend, graphic trend, setting trends, and event logbook in the History window.

## 4.5.1 Tabular Trend

You can view the patient's monitored parameter data and events under the Tabular Trend tab. Trend data displays at one-minute intervals by default.

### 4.5.1.1 About Tabular Trend

- Tabular Trend displays the time and date on the horizontal axis.
- Tabular Trend displays the parameter data on the vertical axis.
- Tabular Trend displays the most recent trend data on the rightmost side.
- Tabular Trend is not stored when the machine is in standby status.
- The system can display a rolling 72 hours of continuous trend data.
- Tabular Trend highlights the parameter data in the corresponding alarm color if an alarm condition existed for the parameter at the time of trend record storage.

### 4.5.1.2 Navigating in Tabular Trend

| Button | Function |
|---|---|
| <br> | Moves the cursor one record back/forward from its current position. |
| <br> | Moves the cursor up/down one parameter from its current position. |
| <br> | Moves the cursor one page back/forward from its current position. |
| <br> | Moves the cursor up/down one page from its current position. |
| <br> | Moves the cursor to the oldest/newest record from its current position. |
| <br> | Moves the cursor to the top/bottom parameter from its current position. |
| Previous Event | Moves the cursor to the previous event from its current position. |
| Next Event | Moves the cursor to the next event from its current position. |

### 4.5.1.3 Interval

In the Tabular Trend window, you can set [**Interval**] to [**1min**], [**5min**], [**10min**], [**15min**], [**30min**], [**1h**], and [**2h**].

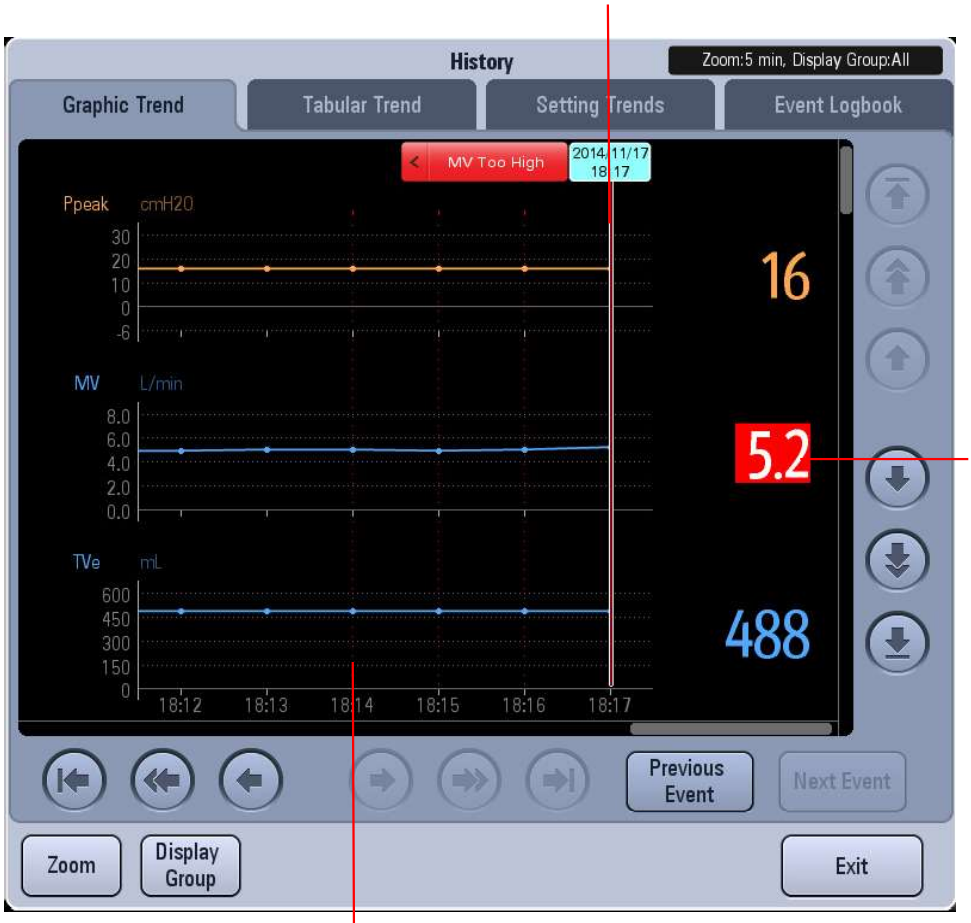
### 4.5.1.4 Display Group

In the Tabular Trend window, you can set [**Display Group**] to [**Pressure**], [**Volume**], [**Time**], [**Gas**], [**SpO$_2$**], [**Other**], and [**All**].

## 4.5.2 Graphic Trend

Graphic trend records the trend of parameter values. It is reflected through a curve. Every point on the curve corresponds to the value of physiological parameter at a specific time point. Graphic trend also records parameter alarm events. Graphic trend data displays at one-minute intervals by default unless the zoom is selected.

Current cursor. The corresponding time displays above the cursor. If alarms occurred at that time, the corresponding alarm information will also be displayed above the cursor.




The parameter data of the time indicated by cursor.

Event marker. The dotted, colored line indicates a parameter alarm event occurred at that time. A parameter alarm event is indicated by a dotted line in the same color with alarm. If multiple events occurred, the dotted line is in the same color of the highest level alarm.

### 4.5.2.1 About Graphic Trend

- Graphic Trend displays the time and date on the horizontal axis.
- Graphic Trend displays the parameter data on the vertical axis.
- Graphic Trend displays the most recent trend data on the rightmost side.
- Graphic Trend is not stored when the machine is in standby status.
- The system can display a rolling 72 hours of continuous trend data.
- Graphic Trend highlights the parameter data in the corresponding alarm color if an alarm condition existed for the parameter at the time of trend record storage.

### 4.5.2.2 Navigating in Graphic Trend

| Button | Function |
|---|---|
| <br> | Moves the cursor one record back/forward from its current position. |
| <br> | Moves the cursor up/down one parameter from its current position. |
| <br> | Moves the cursor one page back/forward from its current position. |
| <br> | Moves the cursor up/down one page from its current position. |
| | Moves the cursor to the oldest/newest record from its current position. |

| | |
|---|---|
| | |
| <br> | Moves the cursor to the top/bottom parameter from its current position. |
| Previous Event | Moves the cursor to the previous event from its current position. |
| Next Event | Moves the cursor to the next event from its current position. |

#### 4.5.2.3 Zoom

In the Graphic Trend window, you can set [**Zoom**] to [**5min**], [**10min**], [**15min**], [**30min**], [**1h**], and [**2h**].

#### 4.5.2.4 Display Group

In the Graphic Trend window, you can set [**Display Group**] to [**Pressure**], [**Volume**], [**Time**], [**Gas**], [**SpO₂**], [**Other**], and [**All**].

### 4.5.3 Setting Trends

Setting Trends is used to record ventilation mode settings and parameter settings.

### 4.5.3.1 About Setting Trends

- Settings Trends displays the time and date on the horizontal axis.
- Settings Trends displays the ventilation mode and setting parameter on the vertical axis.
- Settings Trends displays the most recent trend data on the rightmost side.
- The system can store up to 5000 records of Setting Trends.

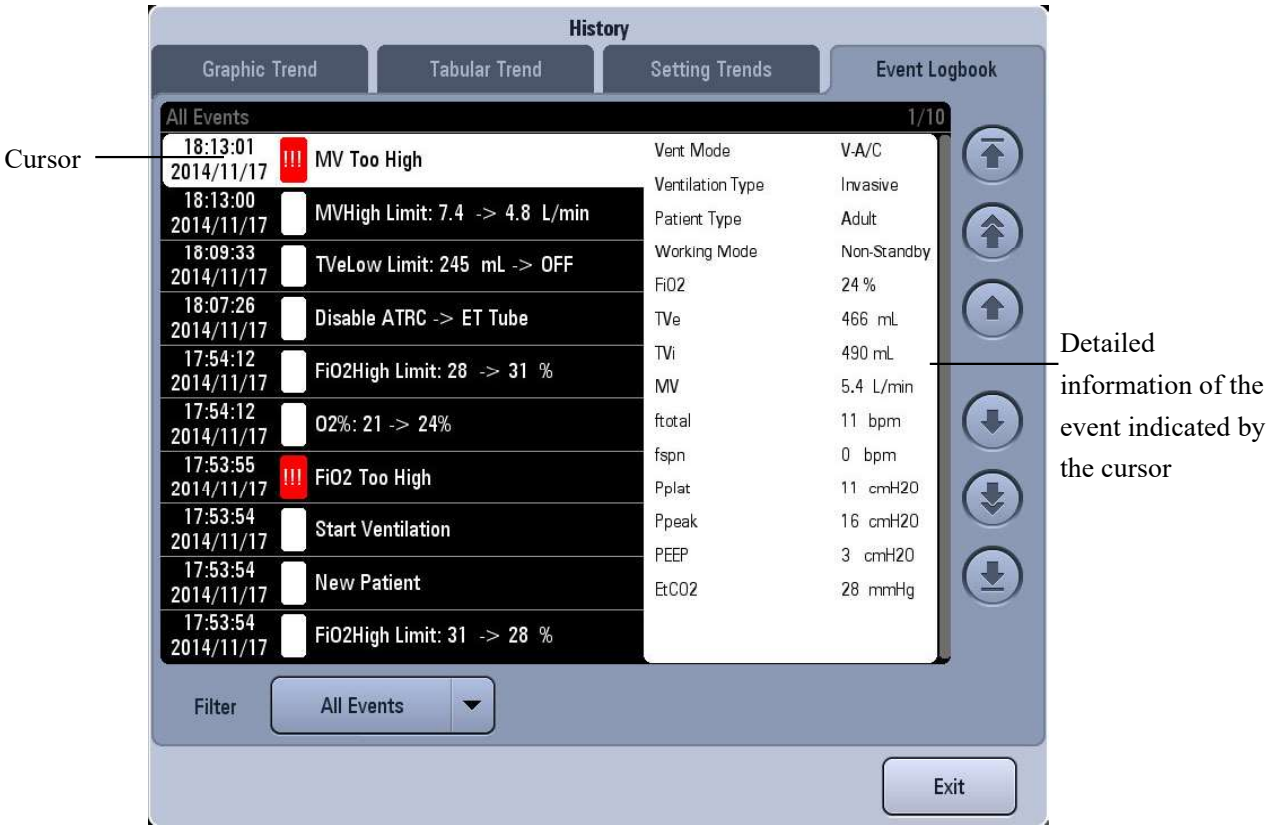
### 4.5.3.2 Navigating in Setting Trends

| Button | Function |
|---|---|
| <br> | Moves the cursor one record back/forward from its current position. |
| <br> | Moves the cursor up/down one parameter from its current position. |
| <br> | Moves the cursor one page back/forward from its current position. |
| <br> | Moves the cursor up/down one page from its current position. |
| <br> | Moves the cursor to the oldest/newest record from its current position. |

| | |
|---|---|
| | Moves the cursor to the top/bottom parameter from its current position. |

## 4.5.4 Event Logbook

Event Logbook records such events as power-on/off, ventilation mode setup, ventilation parameter setup, technical alarm, physiological alarm, standby status, starting ventilation, new patient, special function, default settings management, calibration, System Check, and alarm AUDIO PAUSED.



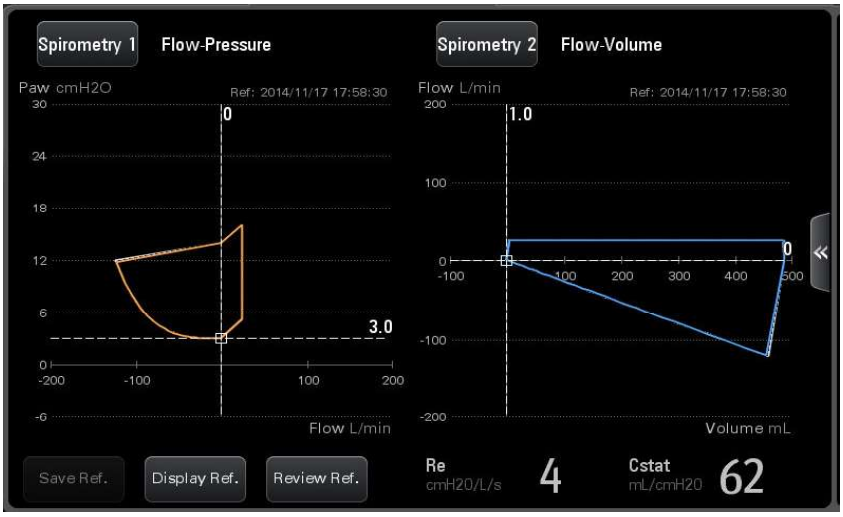

### 4.5.4.1 About Event Logbook

- 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.**

The screen as shown below is displayed by pressing the button.




## 4.6.4 Exit freeze status

In freeze status, press the [**Freeze**] key to exit 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.

# 4.7 Lock Screen

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

**FOR YOUR NOTES**

## A.1.2 Parts List

| Symbol | Description | Symbol | Description |
|---|---|---|---|
| Air Low-Pressure Inlet | Air supply (low pressure) | SOL1 | Zeroing three-way valve |
| F1 | Dust filter (Air) | PI | Inspiratory pressure sensor |
| F2 | HEPA filter (Air) | F6 | Inspiratory pressure sensor filter |
| Pfilter | Vacuum sensor (Air) | Humidifier | Humidifier |
| $O_2$ Low-Pressure Inlet | $O_2$ supply(low pressure) | WT1 | Water trap |
| CV1 | Check valve | Patient | Patient |
| $O_2$ High-Pressure Inlet | $O_2$ supply(high pressure) | NCV | Nebulizer switch |
| F3 | Filter ($O_2$) | R1 | Nebulizer resistor |
| REG | Regulator | Nebulizer | Nebulizer |
| PSOL | Proportional solenoid valve | WT2 | Water trap |
| F4 | Filter screen | F7 | Bacteria filter (connecting to inspiratory port) |
| Q1 | Flow sensor | Q3 | Expiratory flow sensor |
| SD1 | Level 1 mixed noise reduction chamber | F8 | Bacteria filter (connecting to patient port) |
| Tblower | Temperature sensor | F9 | Filter |
| Blower | Turbine blower | F10 | Filter |
| SD2 | Level 2 mixed noise reduction chamber | SOL2 | Zeroing three-way valve |
| Heat Exchanger | Heat exchanger | SOL3 | Zeroing three-way valve |
| Insp. valve | Inspiration valve | PQ3 | Expiratory differential pressure sensor |
| OS | $O_2$ concentration sensor | PE | Expiratory pressure sensor |
| F5 | Filter screen | F11 | Filter |
| Q2 | Flow sensor | R2 | Resistor |
| CV2 | Check valve | R3 | Resistor |
| SV | Safety valve | EV | Expiration valve |
| Atmosphere | Atmosphere | CV3 | Expiratory check valve |

Note: the nebulizer mentioned in this manual shall be the legal product with medical device certificate registered in the People's Republic of China. This requirement applies to nebulizers mentioned in other places than here.

## A.1.3 Theory

This product is an electronically driven and electronically controlled ventilator. Oxygen is provided by high- or low-pressure oxygen port. Air is inhaled from the ambient atmosphere due to vacuum produced by the turbine motor. During the inspiratory phase, the inspiration valve opens. Gas with specific $O_2$ concentration is formed in the upstream of inspiration valve after Air and $O_2$ are mixed. Such gas becomes gas with specific flow or pressure after passing through the inspiration valve and enters the patient's lungs via inspiratory tube. During the expiratory phase, the inspiration valve is closed while the expiration valve opens. The gas reaches the expiration valve from the lungs via the expiratory tube and is finally discharged out of the human body.

When the turbine works to inhale Air from the ambient atmosphere, Filter (F1) filters dust in the Air. Filter (F2) is an HEPA filter for filtering bacteria. After the machine is used or placed for a period of time, dust or foreign substance absorbed on the surfaces of the two filters at the Air inlet can occlude the Air inlet when the dust or foreign substance is accumulated to a certain extent. This may cause insufficient Air intake of the machine and compromise the ventilation performance of the machine. Vacuum sensor (Pfilter) at the Air inlet monitors the vacuum at the Air inlet in real-time, effectively judges filter occlusion at the Air inlet, and gives the replacement prompt.

Check valve (CV1) ensures unidirectional flow of low-pressure $O_2$. Filter (F3) filters foreign substance in the high-pressure $O_2$ supply. Regulator (REG) regulates and stabilizes the pressure of high-pressure $O_2$ supply to ensure the stability and repetitiveness of flow outputted by the rear proportional solenoid valve (PSOL).

Filter screen (F4) is placed before the flow sensor to stabilize gas flow for the convenience of sensor measurement. Flow sensor (Q1) is a hot-wire mass flow sensor which does not require calibration.

The gas supply part includes three parallel limbs: high-pressure $O_2$, low-pressure $O_2$, and low-pressure Air. The high-pressure $O_2$ and low-pressure $O_2$ converge before mixing with Air. High-pressure $O_2$ and low-pressure $O_2$ cannot be used at the same time. Flow sensor (Q1) is placed at the common outlet of low-pressure $O_2$ and high-pressure $O_2$ to monitor $O_2$. Room air enters the machine after passing through filter (F1) and HEPA filter (F2).

Turbine blower (Blower) inhales the room air and externally connected $O_2$ and outputs them to the rear end of the inspiratory limb after compression. The turbine blower module contains two levels of labyrinth, which are located in the upstream and downstream of the turbine blower respectively. Air and $O_2$ are inhaled by the turbine blower after going through the first level of labyrinth chamber (SD1). The mixed gas of Air and $O_2$ is then compressed by the turbine blower and enters the second level of labyrinth chamber (SD2). These two levels of labyrinth chamber mix Air and $O_2$ and reduce noise. The turbine blower motor has a thermal conductive metal piece which conducts heat for heat dissipation via a cooling fan.

The large-diameter inspiration valve (Insp. valve) controls inspiratory pressure or flow. This valve uses voice coil motor as the driving component. In case of power failure, the valve port is automatically sealed via spring preload. When the voice coil motor takes actions, the valve port opens. Different output flows or pressures are acquired by exerting different control currents to the voice coil motor.

The outlet of large-diameter inspiration valve is connected to flow sensor (Q2) which monitors the flow in the inspiratory limb. Flow sensor (Q2) is a hot-wire mass flow sensor which does not require calibration. $O_2$ sensor (OS) monitors $O_2$ volume percentage concentration in the inspiratory limb.

Check valve (CV2) prevents patient's expired gas from polluting the components in the upstream of this valve under the single fault condition of expiratory limb being occluded.

Safety valve (SV) ensures that the pressure in the inspiratory limb is kept within the safe range and provides flow to the spontaneous inspiratory channel when the system is powered down. It is controlled by electromagnet. When the ventilator is in normal working state, the electromagnet is powered on and the safety valve is in closed state. When the pressure in the inspiratory limb exceeds the system setting pressure, the electromagnet is powered down and the safety valve is opened to release excess pressure. When the system is powered down, the electromagnet is in power-down state and the safety valve is opened by default. The patient inhales the external gas through the spontaneous inspiratory channel.

The expiration valve assembly integrates the expiration valve (EV) and flow sensor (Q3). Q3 is a diaphragm differential pressure flow sensor. It monitors the front and rear pressure and Flow Calibration processes for calibration via the differential pressure sensor PQ3. PE is an expiratory pressure sensor which monitors the airway pressure. F9, F10 and F11 are filters which protect the upstream components from being polluted by the patient's expired gas. R2 and R3 are resistors which flush weak flow introduced to the expiration valve from the gas source, preventing water vapour condensation from occluding the pressure measurement tubes. CV3 is a check valve which prevents gas from flowing in the reverse direction.

| Audio indicator | |
|---|---|
| Speaker | Gives off alarm tones and key tones; supports multi-level tone modulation. The alarm tones comply with the requirements of IEC60601-1-8. |
| Buzzer | Gives off auxiliary audio alarm in case of speaker malfunction. |
| **Connector** | |
| Network connector | A connector which supports connection with a PC to perform software upgrade and connection with external medical and information device. |
| RS-232 connector | Connects to the external calibration device for calibrating pressure. An external medical device can be connected via this connector to communicate with the ventilator. |
| USB connector | Exports captured screen, conducts ventilator software upgrade, configuration information export and history data (such as patient data, alarm log, calibration table) export, configuration transfer between machines of the same type via USB device. |
| Nurse call connector | Connects to the hospital's nurse call system. |
| VGA connector | Outputs VGA video signals with the same contents to the primary display and connects to the external display (supporting display with resolution of 1280*800). |

## B.5 Pneumatic System Specifications

### NOTE

- **All gas volume, flow and leakage specification are expressed at STPD except those associated with the VBS which are expressed at BTPS.**

| High-pressure oxygen inlet | |
|---|---|
| Gas type | $O_2$ |
| Pressure range | 280 to 600 kPa |
| Rated flow requirement | No less than 120 L/min (STPD) |
| Connector | NIST or DISS |
| Fresh gas | Fresh gas is called after supplied Air and $O_2$ are mixed. |
| **Low-pressure oxygen inlet** | |
| Pressure range | Less than 100 kPa |
| Maximum flow | 15 L/min(STPD) |
| Connector | CPC quick connector |
| **Inspiration module** | |
| Peak flow in case of single supply gas(air) | ≥210 L/min(BTPS) |

## B.8.2 Internal Alarms

| Parameter | | Alarming condition |
|---|---|---|
| $FiO_2$ | High limit | High-pressure oxygen:<br>$FiO_2$ exceeds the alarm limit for at least 30s.<br>Internally set alarm limit: min (Set value + max (7 Vol.% or set value x 10%), 100 Vol.%). |
| | Low limit | High-pressure oxygen:<br>$FiO_2$ is lower than the alarm limit for at least 30s.<br>Internally set alarm limit: max (18 Vol.%, set value - max (7 Vol.% , set value x 10%)).<br>Absolute $FiO_2$ low limit: 18 Vol.% |
| Sustained Airway Pressure | | Internally set alarm limit: PEEP+15 $cmH_2O$<br>The alarm limit is exceeded for 15 s continuously. |

# B.9 Special Functions

| Function | Specification |
|---|---|
| Inspiration Hold | Push and hold the Insp. Hold key to activate this function.<br>Inspiration Hold is active for a maximum of 30s. |
| Expiration Hold | Push and hold the Exp. Hold key to activate this function.<br>Expiration Hold is active for a maximum of 30s. |
| $O_2$ ↑ | $O_2$ ↑ is delivered for a fixed 2 min.<br>During $O_2$ ↑ , $O_2$ concentration for adult patients is 100% and that for pediatric patients is 1.25 times of the currently set $O_2$ concentration or 100%, whichever is less. |
| Suction | Phase 1: $O_2$ ↑ before suction. Delivering 100% $O_2$ lasts for a maximum of 120 s. $O_2$ concentration for adult patients is 100% and that for pediatric patients is 1.25 times of the currently set $O_2$ concentration or 100%, whichever is less. When patient disconnection is detected, the system enters next phase automatically.<br>Phase 2: suction. Suction lasts for a maximum of 120s. When patient reconnection is detected, the system enters next phase automatically.<br>Phase 3: $O_2$ ↑ after suction. Delivering 100% $O_2$ lasts for a maximum of 120s. $O_2$ concentration for adult patients is 100% and that for pediatric patients is 1.25 times of the currently set $O_2$ concentration or 100%, whichever is less. |
| Nebulizer | Supports jet nebulizer;<br>Supports to set nebulizer time ranging from 1 to 60 min. |
| Manual Breath | One breath is delivered in the expiratory stage.<br>Manual breath is not responded if one breath is delivered in the inspiratory stage or when the expiratory stage is not finished. |
| P0.1 | The pressure drop in the first 100 ms when the patient starts spontaneous breathing. |

## D.2 Technical Alarm Messages

| Source | Alarm message | P | Cause and action |
|---|---|---|---|
| **Power board** | Battery 1 Failure 01 | H | The temperature of battery 1 is higher than expected. |
| | | | Contact your service personnel. |
| | 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 01 | H | The temperature of battery 2 is higher than expected. |
| | | | 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. |
| | 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. |
| | | | 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. |
| | Power Board Comm Stop | H | Power board communication stops. |
| | | | Contact your service personnel. |

| | | | |
|---|---|---|---|
| | Battery Undetected | H | Battery is not available in the current system.<br>Contact your service personnel. |
| **Main control board** | Please Reset Date and Time | L | Button cell is available in the system. But the clock is powered down and reset.<br>Re-set the date and time. |
| | Apnea Ventilation Ended | L | This alarm is given when apnea ventilation ends. There is no need to process this alarm. |
| | Key Error | L | Hardkey or rotary encoder is depressed continuously for more than 35s.<br>Contact your service personnel. |
| | Technical Error 01 | M | Keyboard Comm Stop. Keys are faulty.<br>Contact your service personnel. |
| | Technical Error 02 | M | Keyboard Selftest Error.<br>Contact your service personnel. |
| | Device Failure 04 | H | Ctrl Module Init Error.<br>Contact your service personnel. |
| | Device Failure 05 | H | Ctrl Module Comm Stop.<br>Contact your service personnel. |
| | Device Failure 19 | H | Power Board Comm Stop.<br>Contact your service personnel. |
| | Device Failure 20 | H | $SpO_2$ Comm Stop.<br>Restart the ventilator or contact your service personnel. |
| | Device Failure 21 | H | Pressure Sensor Zero Point Error.<br>Contact your service personnel. |
| **Monitor board** | Technical Error 03 | M | Turbine blower Temp Sensor Failure.<br>Contact your service personnel. |
| | Technical Error 04 | M | Buzzer Failure.<br>Contact your service personnel. |
| | Technical Error 05 | M | Atmospheric Pressure Sensor Failure.<br>Contact your service personnel. |
| | Technical Error 06 | M | HEPA Pressure Sensor Failure.<br>Contact your service personnel. |
| | Technical Error 07 | M | 3-way Valve Failure.<br>Contact your service personnel. |
| | Technical Error 08 | M | Nebulizer Valve Failure.<br>Contact your service personnel. |
| | Technical Error 09 | M | Insp. Temp Sensor Failure.<br>Contact your service personnel. |
| | Device Failure 01 | H | Power Supply Voltage Error.<br>Contact your service personnel. |
| | Device Failure 02 | H | Memory Error.<br>Contact your service personnel. |

| | | | |
|---|---|---|---|
| | Device Failure 03 | H | Power Board Selftest Error. |
| | | | Contact your service personnel. |
| | Device Failure 06 | H | Ctrl Module Selftest Error. |
| | | | Contact your service personnel. |
| | Device Failure 07 | H | Insp. Module Comm stop. |
| | | | Contact your service personnel. |
| | Device Failure 08 | H | Exp. Module Comm stop. |
| | | | 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 | Insp. Limb Failure. |
| | | | Contact your service personnel. |
| | Device Failure 13 | H | $O_2$ Limb Failure. |
| | | | Contact your service personnel. |
| | Device Failure 14 | H | Turbine blower Failure. |
| | | | Contact your service personnel. |
| | Device Failure 15 | H | Turbine blower Temp Too High. |
| | | | Contact your service personnel. |
| | Device Failure 16 | H | Insp. Valve Disconnected. |
| | | | Contact your service personnel. |
| | Device Failure 17 | H | Insp. Module Selftest Error. |
| | | | Contact your service personnel. |
| | Device Failure 18 | H | Exp. Module Selftest Error. |
| | | | Contact your service personnel. |
| | Device Failure 21 | H | Pressure Sensor Zero Point 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.<br>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.<br>2. Perform System Check to test the leakage. |
| | Airway Obstructed? | H | Tube is occluded. |
| | | | 1. Check and clean the patient tubing.<br>2. Check and clean the expiration valve. |
| | Sustained Airway Pressure | H | The airway pressure measured by any pressure sensor is greater than or equal to the setting PEEP+15 $cmH_2O$ for continuous 15 s. |

| | | | |
|---|---|---|---|
| | | | 1. Check the patient.<br>2. Check the ventilation parameter setup.<br>3. Check the patient tubing for occlusion. |
| | Airway Leak? | L | Tube is leaky. |
| | | | 1. Check the patient tubing for leakage.<br>2. Perform System Check to test the leakage |
| | Tube Disconnected? | H | Tube is disconnected. |
| | | | Re-connect the patient tubing. |
| | 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. |
| | 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.<br>2. Check the ventilation parameter setup.<br>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.<br>2. Check the ventilation parameter setup.<br>3. Check the alarm limits. |
| | Pinsp Not Achieved | L | Pinsp is less than the pressure setting value by 3 $cmH_2O$ or 1/3 of the pressure setting value, whichever is less. |
| | | | 1. Check the patient.<br>2. Check TV alarm limits.<br>3. Check the $O_2$ supply.<br>4. Check the patient tubing for leakage.<br>5. Check the HEPA filter for occlusion. |
| | TV Not Achieved | L | TVi is less than the TV setting value for a period time. |
| | | | 1. Check the patient.<br>2. Check pressure high alarm limit.<br>3. Check the HEPA filter for occlusion.<br>4. Check the $O_2$ supply.<br>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.<br>2. Check pressure high alarm limit.<br>3. Check the patient tubing for occlusion.<br>4. Consider to turn off sigh. |
| | $O_2$ Supply Failure | H | $O_2$ pressure is low or high-pressure $O_2$ is not connected. |

| | | | |
|---|---|---|---|
| | | | 1. Check connection with $O_2$ supply.<br>2. Check $O_2$ supply pressure. |
| | Tinsp Too Long | L | In PSV mode, Tinsp exceeds 4s for adult and 1.5s for pediatric for continuous 3 cycles. This alarm is not triggered again after pressure sensor or flow sensor failure. |
| | | | 1. Check the patient.<br>2. Check the ventilation parameter setup.<br>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 45℃. Restart the machine. |
| | | | 1. Disconnect the patient.<br>2.Clean the fan dust filter.<br>3. Restart the ventilator. |
| | Replace HEPA Filter | L | The resistance of HEPA becomes intense. |
| | | | Contact your service personnel. |
| | Fan Failure | M | Fan speed error. Restart the machine if the error cannot be corrected. |
| | | | Contact your service personnel. |
| | Flow Sensor Type Error | H | Installation error of Air flow sensor or $O_2$ flow sensor. |
| | | | Contact your service personnel. |
| | Blower Temperature High | H | Turbine blower temperature exceeds the threshold. |
| | | | 1. Check if the operating ambient temperature of the machine exceeds the maximum operating temperature specified by the vendor.<br>2. Check if the fan inlet and outlet are occluded. If yes, clear the foreign substance and dust.<br>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.<br>2. Check the alarm limits setting. |
| | $O_2$ Sensor Unconnected | L | The $O_2$ sensor is not connected. |
| | | | Connect the $O_2$ sensor. |
| | Please Replace $O_2$ Sensor. | M | The $O_2$ sensor is used up. |
| | | | Replace the $O_2$ sensor. |
| | Please calibrate $O_2$ sensor. | L | Calibrate the $O_2$ sensor. |
| | | | Calibrate $O_2$ concentration. |
| | Please perform pressure calibration. | H | Calibrate the pressure sensor. |
| | | | Contact your service personnel. |
| | Please perform flow | H | Calibrate the flow sensor. |