SV600

Ventilator

Operator’s Manual

Digitally signed by Prodan Sveatoslav
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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_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 System Settings

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 "bmp" format. This ventilator could save up to 20 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 USD 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.**

5.2.3 Transfer Settings

You can export or import settings, while unit is in standby.

To export settings,

1. Make sure that the machine is in Standby status.
2. Insert the USB device into the USB connector of the ventilator. The key is highlighted on the main screen .
3. By selecting the key, the system will open the USB settings interface.
4. Select [**Transfer Settings**] → Enter system password → [**Export Settings**] in the opened interface. 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 save the current settings and machine defaults to the USB device.
5. After exporting is completed, select [**Remove USB Device**] to remove the USB device.

6 Start Ventilation

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 ⊙/Ȯ 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.**
- **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)
- Circuit Resistance (cmH_2O/L/S)
- O_2 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_2 sources are not connected.
- Monitoring Off: indicates that sensor monitoring function may not be switched on when O_2 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 seftest.
- 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.

⚠WARNING

- **During the use of the electronic nebulizer, please pay attention to the connection of the nebulizer to prevent the nebulization interruption .**

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.**
- **The system cannot start O_2↑ (oxygen enrichment) in the P-V tool test process.**
- **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].**
- **If O_2↑ process triggers [O_2 Supply Failure] alarm or [No Gas Supply Pressure] alarm, O_2↑ stops.**
- **Removing the patient tubing during oxygen enrichment will start suction function. Refer to 10.6Suction section.**

B Product Specifications

The ventilator is already integrated with an expiratory volume monitor, pressure measurement device, pressure release device, built-in gas mixer, alarm system, SpO_2 monitor, O_2 monitor, and CO_2 monitor. Among them:

- The expiratory volume monitor, pressure measurement device, and pressure release device comply with ISO 80601-2-12.
- The alarm system complies with IEC 60601-1-8.
- The gas mixer complies with ISO 11195.
- The SpO_2 monitor complies with ISO 80601-2-61;
- The O_2 monitor complies with ISO 80601-2-55.
- The CO_2 monitor complies with ISO 80601-2-55.
- The gas supply hose assembly complies with ISO 5359.

B.1 Safety Specifications

Type of protection against electric shock	Ventilator: Class I device with internal electrical power supply. Air compressor: Class I device.
Degree of protection against electric shock	Ventilator: Mixed BF and CF applied part type, with respiratory circuit, and CO_2 being BF type, and SpO_2 being CF type. Air compressor: No applied part.
Operating mode	Continuous
Degree of protection against hazards of explosion	Ordinary equipment, without protection against explosion; not for use with flammable anaesthetics.
Degree of protection against harmful ingress of water	Ventilator: Degrees of protection provided by enclosures(IP Code)—IP21 Air compressor: Degrees of protection provided by enclosures(IP Code)—IPX0 Protection Index according the EN 60529 standard: 2: Protected against solid foreign objects of 12.5 mm diameter and greater 1: Protected against vertically falling water drops 0: no protection
Disinfection and sterilization methods.	Ventilator: The device disinfection and sterilization methods are recommended by manufacturer. Air compressor: The device does not require disinfection and sterilization.
Equipment type	Mobile

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_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.
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.

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.

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

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_2 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_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.
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℃.
		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.
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_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.

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 63℃).
		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.

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.

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.