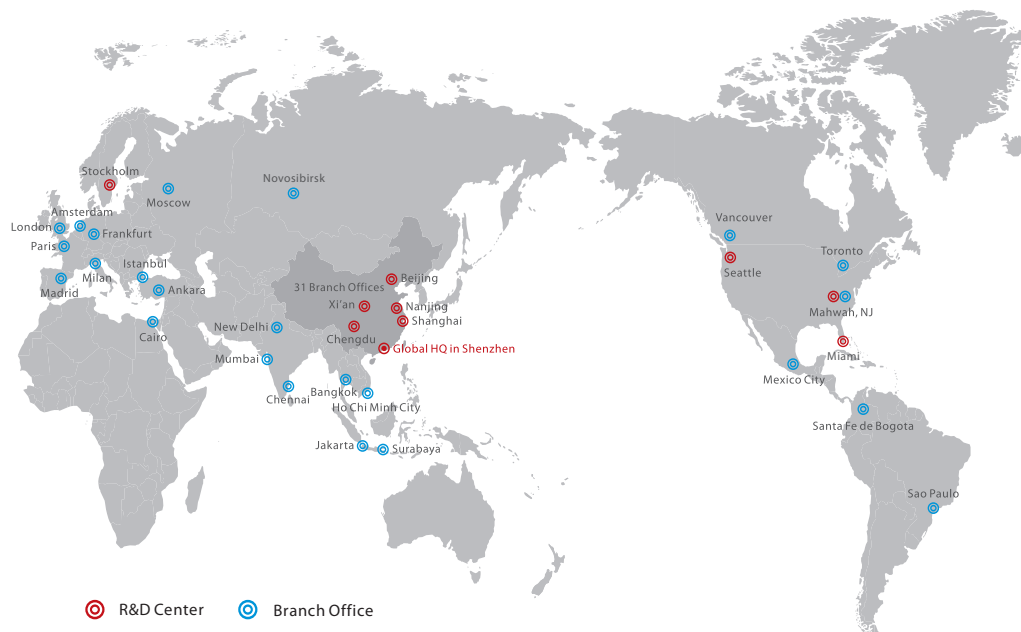




 R&D Center Branch Office

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SynoVent E3

Ventilator

Technical Specifications

Physical Specifications

Dimensions and Weight	
Height * Width * Depth:	330mm * 390mm * 460mm
Weight:	Approximately 20kg
Caster	
Diameter:	100mm
Brakes:	Individual lock of front casters
Display	
Screen:	10.4" Color active matrix TFT touch screen
Brightness:	Adjustable
CPU	
Type:	Dual-CPU
Patient type	Pediatric to adult (body weight at least 4kg)
Ventilator Specifications	
Modes of ventilation (standard)	
V-AC (volume assist/control)	
P-A/C (pressure assist/control)	
V-SIMV (Synchronized intermittend mandatory ventilation, volume assist)	
P-SIMV (Synchronized intermittend mandatory ventilation, pressure assist)	
PSV (Pressure support ventilation)	
CPAP (Continuous positive airway pressure)	
DuoLevel	
Apnea ventilation	
Modes of Ventilation (optional)	
NIV Non invasive ventilation	
Ventilation Parameters Ranges	
O ₂ %:	21~100%
TV (Tidal volume range):	Pediatric: 40~300 ml (increments of 1 ml)
Adult:	100~2000 ml (increments of 10 ml)
f(Ventilation frequency) range:	1~120 bpm (f SIMV : 1~60 bpm)
I:E range	4:1-1:10 (increments of 0.5)
T _{insp} (inspiratory time) range:	0.02~10 s (increments of 0.5s)
T _{slope} range:	0~2.00 s (increments of 0.05s)
T _{high} range:	0.2~30s (increments of 0.1s)
T _{low} range:	0.2~30s (increments of 0.1s)
Flow range:	0; 6-120L/min
P _{limit} range:	5~105 cmH ₂ O (increments of 1 cmH ₂ O)
P _{expir} range:	5~100 cmH ₂ O (increments of 1 cmH ₂ O)
ΔP _{supp} :	0~100 cmH ₂ O (increments of 1 cmH ₂ O)
P _{high} :	0 ~ 100cmH ₂ O (increments of 1cmH ₂ O)
P _{low} :	0 ~ 50cmH ₂ O (increments of 0.5 cmH ₂ O)
PEEP:	Off, 1~ 45cmH ₂ O (increments of 1cmH ₂ O)
Δint.PEEP:	Off, 1~ 40cmH ₂ O (increments of 1 cmH ₂ O)
Flow trigger:	0.5 ~ 15L/min (increments of 0.1L/min)
Pressure trigger:	-10 ~ ~ -0.5 cmH ₂ O (increments of 0.5 cmH ₂ O)

Exp% (Expiration termination level):	10 ~ 85% (increments of 5%)
f _{apnea} (frequency for apnea-ventilation):	Pediatric 1 ~ 100 bpm (increments of 1bpm)
	Adult 1 ~ 100 bpm (increments of 1bpm)
Δp _{apnea} :	refer to Pinsp specification
Ventilator performance	
Pressure range at inlet:	280kPa ~ 650kPa
Peak gas flow:	> 120L/min
Ventilator monitor	
Airway pressure range:	P _{peak} (peak pressure), P _{plat} (plateau pressure), P _{mean} (mean pressure) (-20 ~ +120 cm H ₂ O)
Tidal volume range:	TV _i , TV _e , TV _{e,spn} (0 ~ 4000 mL)
Frequency range:	f _{total} , f _{mand} , f _{spn} (0 ~ 200 bpm)
Minute volume range:	MV , MV _{spn} , MV _{leak} (0 ~ 100 L/min)
PEEP:	0 ~ 120cmH ₂ O
Inspired oxygen (FIO ₂):	15 ~ 100%
Resistance (R):	R _{insp} , R _{exp} (0 ~ 600 cmH ₂ O / (L/s)
Compliance (C):	C _{stat} , C _{dyn} (0 ~ 300 mL/ cmH ₂ O)
PEEPi:	0 ~ 120 cmH ₂ O
RSBI (rapid shallow breathing index):	0 ~ 9999 / (min)
WOB (work of breathing, optional) :	0 ~ 100 J/min
NIF (negative inspiratory force,optional):	-45 ~ 0 cmH ₂ O
P0.1(optional):	-20 ~ 0 cmH ₂ O
Waveforms:	Airwaypressure-time, Flow-time, Volume-time, EtCO ₂ -time
Loops:	Paw-Volume, Flow-Volume, Paw-Flow
EtCO ₂ (optional):	0 ~ 99 mmHg
FICO ₂ (optional):	0 ~ 99 mmHg
Trend	
Continuous waveform and tabular trend information together with time discrete events are stored and shown for the latest 72 hours for	
P _{peak} , P _{plat} , P _{mean} , PEEP, R _i , R _e , MV, MV _{leak} , MV _{spn} , C _{dyn} , TV _e , TV _i , TV _{e,spn} , RSBI, f _{tot} , f _{mand} , f _{spn} , FIO ₂ , and optional WOB, EtCO ₂ , and FICO ₂ .	
New trend form will be recorded when restarting the machine	
Ventilator accuracy	
Control accuracy	
O ² %:	±3vol.% or ±5% of setting, whichever is greater
TV (Tidal volume range):	±10mL or ±10% of setting, whichever is greater
T _{insp} (inspiratory time) range:	±0.1s or ±10% of setting, whichever is greater
P _{limi} range:	±2.0cmH ₂ O or ±10% of setting, whichever is greater
P _{insp} range:	±2.0cmH ₂ O or ±10% of setting, whichever is greater
PEEP:	±2.0cmH ₂ O or ±10% of setting, whichever is greater
Flow trigger:	±1.0L/min or ±20% of reading, whichever is greater
Pressure trigger:	±1.0cmH ₂ O or ±10% of setting, whichever is greater
Monitor accuracy	
Airway pressure range:	±(2.0cmH ₂ O ÷ 4% of the actual reading)
Tidal Volume range:	±15mL or 8% of reading, whichever is greater
Minute volume range:	±0.3L/min or 8% of reading, whichever is greater
Inspired oxygen (FIO ₂):	21%~100%; ±3vol.%
Alarm settings	
Tidal volume:	High: Pediatric: 25 ~ 4000mL,OFF Adult: 110 ~ 4000mL,OFF
Minute volume:	High: (non-NIV) Pediatric: 0.2 ~ 60.0L/min; Adult: 0.2~ 100.0L/min (NIV) Pediatric: 0.1 ~ 60.0L/min; Adult: 0.1 ~ 100.0L/min
	Low: (non-NIV) Pediatric: 0.1 ~ 30.0L/min; Adult: 0.1~ 50.0L/min (NIV) Pediatric: 0.1 ~ 30.0L/min, OFF; Adult: 0.1~ 50.0L/min ,OFF
Air pressure:	High: 10~105cmH ₂ O Low (auto): PEEP+4cmH ₂ O
Frequency:	High: 1~160bpm, OFF
Inspired oxygen (FIO ₂):	High (auto): FIO ₂ exceeds the alarm limit for at least 20s, internal alarm limit: set value+max(7% or set value*10%) Low (auto): FIO ₂ is lower than the alarm limit for at least 20s, internal alarm limit: set value-max(7% or set value*10%)
	Absolute FIO ₂ low limit: 18% O ₂
Sustained airway pressure:	(auto) internally set alarm limit: PEEP+15 cmH ₂ O; The alarm limit is exceeded for 15s continuously

Ventilator components	
Flow sensor	
Type:	Variable orifice flow sensor
Location:	Expiratory port
Oxygen sensor	
Type:	Galvanic fuel cell
Response time:	<15s
Communication ports	
RS-232 connector	
Ethernet (RJ-45)	
CO ₂ /calibration connector	
Nurse call connector	
VGA connector	
USB Port (2)	
Carbon Dioxide (CO₂) Monitor	
Side-Stream Carbon Dioxide (CO₂) Module	
Method:	Infrared absorption
Displayed numerics:	EtCO ₂ , FICO ₂
Waveforms:	Capnography
Work mode:	Standby or measurement
Measurement range:	0 ~ 99 mmHg
Accuracy:	0 ~ 40 mmHg (2 mmHg) 41 ~ 76 mmHg (5%) 77 ~ 99 mmHg (10%)
Resolution	1mmHg
Sampling rate:	70 or 100mL/min
Sampling rate accuracy:	±15%of set value or 15mL/min, whichever is larger
Response time:	When measured with a neonatal watertap and a 2.5m-long neonatal sampling line <3 s @ 100mL/min; <3.5 s @ 70mL/min
	When measured with an adult watertap and a 2.5m-long neonatal sampling line <5 s @ 100mL/min; <6.5 s @ 70mL/min
Rise time:	<330 s @ 100mL/min; <400 s @ 70mL/min
Operation Data	
Environmental specifications	
Temperature:	10~ 400℃ (operating); -20 ~ +60 ℃(storage and transport, O2 sensor: -20 ~ +50 ℃Q
Relative humidity (non-condensing):	15~ 95% (operating); 10 ~ 95% (storage and transport)
Barometric pressure (kPa):	50~ 106 (operating); 50 ~ 106 (storage and transport)
Power and Battery Backup	
Power input:	220 ~ 240 Vac, 50/60 Hz, 10A 100 ~ 120 Vac, 50/60 Hz, 15A
Main unit power supply:	100 ~ 240 Vac, 50/60 Hz, 1.6 ~ 0.8A
Battery backup:	90 minutes with 1 battery (powered by new fully-charged batteries with 25℃ ambient temperature) 180 minutes with 2 batteries (powered by new fully-charged batteries with 25℃ ambient temperature)
Battery type:	Built-in Li-ion battery, 11.1 VDC, 4500 mAh
Number of batteries:	1 or 2
Gas supply	
Gas type:	O ₂ and Air
Pipeline input range:	0.28 ~ 0.65MPa
Pipeline connections:	NIST or DISS
Electromagnetic compatibility	
Immunity:	Complies with all requirements of IEC 60601-1-2
Emissions:	CISPR 11 group 1 class B, class A; IEC 60601-1-2; IEC61000-3-2; IEC 61000-3-3
Air compressor	
Power input:	220 ~ 240 Vac, 50/60 Hz, 3A or 100 ~120 Vac, 60 Hz, 6A
Output pressure range:	300~ 450 kPa
Noise:	<50dB (A)
Continuous flow:	≥30L/min at out-put pressure of 300kPa
Peak flow:	> 180L/min for more than 0.8s at one barometric pressure

Trolley	
Dimensions:	730mm(depth) * 560mm(width) *990mm (height)
Weight:	27kg
Power:	220-240V ~ 50/60Hz 10A or 100-120V ~ 50/60Hz 15A
Output1 (air compressor):	220-240V~ 50/60Hz 3A or 100-120V ~ 50/60Hz 6A
Output2:	220-240V~ 50/60Hz 3A or 100-120V ~ 50/60Hz 3.5A
Output3:	220-240V~ 50/60Hz 3A or 100-120V ~ 50/60Hz 3.5A
System Check	
O ₂ /Air/Exp.flow sensor test	
Pressure sensor test	
Exp./Safety valve test	
O ₂ sensor test	
Leakage/compliance/circuit resistance measurement	
Leakage, resistance and compliance are automatically compensated during ventilation	
Special functions and procedures	
Sigh	
100% O ₂	
Suction support	
Manual breath	
Expiratory hold	
Inspiratory hold	
P0.1	
NIF	
PEEPi	
Apnea ventilation	
Alarms	
Physiological alarms	
Airway pressure too high/low	
FIO ₂ too high/low	
TV _e too high	
MV too high/low	
Apnea	
Frequency too high	
Pressure limited	
EtCO ₂ too high/low	
FICO ₂ too high	
Selected technical alarms	
Low battery voltage	
Battery in use	
Power supply voltage error	
Air supply pressure low	
O ₂ supply presure low	
Airway leak	
Airway obstruction	
Tube disconnected	
TV not achieved	
P _{insp} not achieved	
Sustained airway pressure	
PEEP too high	
T _{insp} too long	
O ₂ sensor disconnected	
Nebulizer valve failure	

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