Specification: V3

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COMEN
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Ventilator

V3（N0.148-00）

Technical Specification

Physical Characteristics	
Dimensions	1389mm × 528 mm × 697 mm (Height × Width × Depth) (including trolley); 343.5mm × 312.5 mm × 258 mm (Height × Width × Depth) (excluding trolley)
Weight	60 kg (with all safe working load) 10 kg (main unit)
Air Supply	Integrated ultra-silent turbine
Screen	
Screen Size:	12.1” TFT touch screen
Resolution	1280 × 800
Brightness:	Adjustable
Ventilator Specification	
Ventilation mode	V-A/C (Volume assist/control) P-A/C (Pressure assist/control) V-SIMV (Volume - Synchronized Intermittent Mandatory Ventilation) P-SIMV (Pressure - Synchronized Intermittent Mandatory Ventilation) CPAP/PSV, DuoVent, APRV, PRVC PRVC-SIMV VS PSV-S/T
Invasive Mode	V-A/C, P-A/C, V-SIMV, P-SIMV, CPAP/PSV, DuoVent, PRVC, APRV, PRVC-SIMV, VS
Non-invasive Mode	P-A/C, P-SIMV, CPAP/PSV, DuoVent, APRV, PSV-S/T

Controlled parameter ranges	
O_2%:	21 - 100% (increments of 1 %)
TV (Tidal Volume):	Adult: 100 - 2200 mL (increments of 10 mL) Pediatric: 20 - 300 mL (increments of 1 mL)
Respiratory Rate (RR):	1 - 100 bpm (increments of 1 bpm)
fSIMV (Ventilation frequency in SIMV mode):	1 - 60 bpm (increments of 1 bpm).
I:E range:	4:1~1:10.
Tinsp (Inspiratory time):	0.10 - 10 s (increments of 0.05 s).
Tslope (Time of Pressure Rising):	0 - 2.00 s (increments of 0.05 s).
High Pressure Time (Thigh)]:	0.2 - 30 s (increments of 0.1 s)
Tlow (Low Pressure Time):	0.2 - 30 s (increments of 0.1 s)
Max inspiratory Time (Timax):	0.20 ~ 15.00 s(increments of 0.1 s)
Tpause:	5 % - 60 % (increments of 5 %), Off
ΔPinsp(Inspiratory pressure):	5 - 80 cmH_2O (increments of 1 cmH_2O)
ΔPsupp:	0 - 85 cmH_2O (increments of 1 cmH_2O)
Phigh (High Pressure Level):	0 - 80 cmH_2O (increments of 1 cmH_2O)
Plow (Low Pressure Level):	0 - 50 cmH_2O (increments of 1 cmH_2O)
PEEP:	0 - 50 cmH_2O (increments of 1 cmH_2O), Off
Flow trigger	0.5 -15 L/min (increments of 0.1 L/min), Off
Pressure trigger 叹息压力 0-45	-10 to - 0.5 cmH_2O (increments of 0.5 cmH_2O), Off

Exp % (Expiration termination/trigger level)	10 - 85% (increments of 5%), Auto
Apnea Ventilation	
TVapnea	Adult: 100 - 2200 mL (increments of 10 mL) Pediatric: 20 - 300 mL (increments of 1 mL)
ΔPapnea	5 - 80 cmH_2O (increments of 1 cmH_2O)
RRapnea (Apnea Respiratory Rate)	1 - 80 bpm (increments of 1 bpm)
Apnea Tinsp	0.20 - 10 s (increments of 0.05 s)
Sigh	
Sigh Switch	ON, Off
Interval	20 s - 180 min (increments of 1 s from 20 to 59 s, increments of 1 min from 1 to 180 min)
Cycles Sigh	1 - 20 (increments of 1)
Δint.PEEP	1 - 45 cmH_2O (increments of 1 cmH_2O), Off
Automatic Tube Resistance Compensation	
Tube Type	endotracheal intubation and tracheotomy tube
Tube I.D.	Adult: 5.0 - 12.0 mm (increments of 0.5 mm) Pediatric: 2.5 - 8.0 mm (increments of 0.5 mm)
Compensate	1 -100 % (increments of 1 %) off
Expiration Compensation Switch	ON, Off
Monitoring	
Airway pressure range	Ppeak, Pplat, Pmean (Range -20 - 120 cmH_2O)
PEEP	0～120 cmH2O
Tidal volume range:	0～4000 mL
Respiratory Rate	ftotal, fmand, fspn (Range 0 - 200 bpm)
Minute volume range	MV, MVspn, MVleak (Range 0 – 100.0 L/min)
Resistance	Rinsp, Rexp (0 - 600 cmH_2O/L/s)
Compliance	Cstat, Cdyn (0 - 300 mL/cmH_2O)
Inspired Oxygen (FiO_2)	15 - 100 %
WOB (Work of Breathing)	0 – 100.0 J/min
RCexp (Expiratory Time Constant)	0 - 10 s
Waveforms	Airway pressure - time, Flow - time, Volume - time
Weaning indicator	
P0.1	-20 - 0 cmH_2O
NIF (Maximum negative inspiratory pressure)	-45 - 0 cmH_2O
RSBI (Rapid Shallow Breathing Index)	0 - 999 /(L•min)
Special Function	
Manual Breath	
Expiration Hold	
Inspiration Hold	
Nebulizer	
O2↑(O2 enrichment)	
Sputum Suction	
Smart Pulmonary View	
Lung Recruitment Tool	Sustained Insufflation
PEEPi monitoring	
P-V Tool	Paw - Volume, Flow - Volume, Paw - Flow
Tube Resistance Compensation	TRC
Smart Sync	IntelliSynTec
O2 Therapy	2-60 L/min
CO2	EtCO2, Vdaw, VDaw/Tve, Vtalv, V'alv, SlopeCO2, V'CO2, VeCO2, ViCO2
Control accuracy	
O_2 %	± (3 vol.% +1 % of setting)
TV	± (10 mL + 10% of the set value)
Tinsp	± 0.1 s or ± 10 % of setting, whichever is greater
I: E	1:4~2:1: ± 10% of the set value; Other range: ± 15% of the set value.
RR	±1 bpm
fSIMV	±1 bpm
Tslope (Rising Time)	± (0.2s + 20% of the set value)
Phigh	± (2 cmH2O + 5% of the set value)
Plow	± (2 cmH2O + 5% of the set value)
Thigh	±0.2s or ± 10% of the set value, whichever is larger
Tlow	±0.2s or ± 10% of the set value, whichever is larger

Pressure Trigger	± (1 cmH2O + ± 10% of the set value)
Flow Trigger	± (1 L/min + 10% of the set value)
Δint.PEEP	2-45cmH2O± (2 cmH2O + 5% of the set value) (exclude 2)1-2cmH2O± (1% of the set value)
Exp %	±10% (absolute error)
Fapnea (Apnea Frequency)	±1bpm
ΔPapnea	± (2 cmH2O + 5% of the set value)
TVapnea	± (10 mL + 10% of the set value)
Apnea Tinsp	±0.1s or ± 10% of the set value, whichever is larger
Monitoring Accuracy	
Airway pressure (Ppeak, Pplat, Pmean, PEEP)	Within the range of -20cmH2O～120 cmH2O, ± (2 cmH2O + 4% of the actual reading)
Tidal Volume (TVi, TVe, TVe/IBW, TVe spn)	Within the range of 0 mL～100 mL, ± (10 mL + 3% of the actual reading); Within the range of 100 mL～4000 mL, ± (3 mL + 10% of the actual reading)
Minute Volume (MV, MVspn, MVleak)	Within the range of 0.0 L/min～100.0 L/min, ± (0.2 L/min + 10% of the actual reading)
Frequency (ftotal, fmand, fspn)	Within the range of 0 bpm～200 bpm, ±1 bpm or ±5% of the actual reading, whichever is larger
Inspired Oxygen (FiO_2)	Within the range of 15 vol.%～100 vol.%, ± (2.5 vol. % + 2.5% of the actual reading).
Resistance	Within the range of 0 cmH2O/(L/s) ～5 cmH2O/(L/s), the accuracy is not defined; Within the range of 5 cmH2O/(L/s) ～20 cmH2O/(L/s), ±10 cmH2O/(L/s); Within the range of 20 cmH2O/(L/s) ～500 cmH2O/(L/s)（exclude 20）, ±50% of the actual reading).
Compliance	Within the range of 0 mL/ cmH2O～300 mL/ cmH2O, ± (2 mL/ cmH2O + 20% of the actual reading).
RSBI	Within the range of 0 /(min·L)～999 /(min·L) , ± (3 /(min·L)+15% of the actual reading).
WOB	Within the range of 0.0 J/min～100.0 J/min, ± (1 J/min + 15% of the actual reading).
NIF	Within the range of -45.0 cmH2O～0.0 cmH2O, ± (2 cmH2O + 4% of the actual reading)
P0.1	Within the range of -20.0 cmH2O～0.0 cmH2O, ± (2 cmH2O + 4% of the actual reading).
RCexp	Within the range of 0.0s～10.0s, ± (0.2s + 20 % of the actual reading).
Alarm Settings	
Tidal Volume	Upper alarm limit Adult: 110~4000 mL, OFF Pediatric: 25~600 mL, OFF Lower alarm limit Adult: OFF, 50~3995 mL Pediatric: OFF, 10~595 mL
Minute Volume	Upper alarm limit: Adult: 0.2~100.0 L/min Pediatric: 0.2~60.0 L/min Lower alarm limit: Adult: 0.1~50.0 L/min Pediatric: 0.1~30.0 L/min
Airway pressure	
Frequency (Respiratory Rate)	
Inspired oxygen (FiO_2)	Upper alarm limit: 10~90 cmH2O. Lower alarm limit: OFF,5~ (upper alarm limit -5) cmH2O
Apnea alarm time	Upper alarm limit: 2~160 bpm, OFF Lower alarm limit: OFF,1~(upper alarm limit -1) bpm
SideStream CO2 module	
Displayed numerics	$EtCO_2$
Measurement Range	Comen SideStream: 0 mmHg～150 mmHg, 0%～19.7%, 0 kPa～20 kPa (at 760 mmHg) Respironics Capno SideStream: 0

	mmHg～99 mmHg, 0.0 %～13.0 %, 0 kPa～13.2 kPa (at 760 mmHg) Masimo ISA Capno SideStream: 0 mmHg～190 mmHg, 0 vol% ～ 25 vol% (at 760 mmHg)
Measurement accuracy	Comen SideStream: a) Within the range of 0 mmHg～40 mmHg, ± 2 mmHg; b) Within the range of 41 mmHg～70 mmHg, ± 5% of the reading; c) Within the range of 71 mmHg～100 mmHg, ± 8% of the reading; d) Within the range of 101 mmHg～150 mmHg, ± 10% of the reading. Respironics Capno SideStream: (Note: the gas temperature is 25℃, if respiratory rate is greater than 80 rpm, the accuracy is 12% of the reading): 0 mmHg～38 mmHg: ± 2 mmHg, 39 mmHg～99 mmHg: ± 10% of the actual reading. Masimo ISA Capno SideStream: CO2 accuracy (under the condition: 22℃ ± 5℃ 1013 ± 40 hPa; gas mixture of CO2 and N2.) a) Within the range of 0 mmHg ～114 mmHg, ± (1.52 mmHg + 2% of the reading). b) Within the range of 114 mmHg ～190 mmHg, the accuracy is not defined. CO2 accuracy (under all conditions): a) Within the range of 0 mmHg ～114 mmHg, ± (2.25 mmHg + 4% of the reading). b) Within the range of 115 mmHg ～190 mmHg, the accuracy is not defined
Waveforms	$EtCO_2$ - time
Resolution	

Sampling rate and accuracy	Comen SideStream: sampling rate: 50 mL/min; sampling rate control accuracy: ± 10mL/min; Respironics Capno SideStream: sampling rate: 50 mL/min; sampling rate control accuracy: ± 10 mL/min. Masimo ISA Capno SideStream: sampling rate: 50mL/min; sampling rate control accuracy: ± 10 mL/min.
System response time	Masimo mainstream: < 1 s; Masimo ISA Capno sidestream: < 3s (use a 2 m sampling line)
Rise time (Response time)	Masimo mainstream: < 1 s; Masimo ISA Capno sidestream: < 3s (use a 2 m sampling line)
$EtCO_2$ Alarm Upper Limits	Comen sidestream: (lower alarm limit + 2 mmHg) ～150 mmHg Respironics Capno sidestream: (lower alarm limit + 2 mmHg) ～99 mmHg Masimo ISA Capno sidestream: (lower alarm limit + 2 mmHg) ～ 190 mmHg
$EtCO_2$ Alarm Lower Limits	Comen sidestream:0 mmHg ～ (upper alarm limit － 2 mmHg) Respironics Capno sidestream: 0 mmHg ～ (upper alarm limit － 2 mmHg) Masimo ISA Capno sidestream: 0 mmHg ～ (upper alarm limit － 2 mmHg)
MainStream CO_2 Module	
Displayed numerics	$EtCO_2$
$EtCO_2$ Measurement range	Comen mainstream: 0 mmHg～150 mmHg,0%～19.7%,0 kPa～20 kPa (at 760 mmHg); Respironics CAPNOSTAT 5: 0 mmHg～150 mmHg, 0%～19.7%, 0 kPa～20 kPa (at 760 mmHg); Masimo IRMATM mainstream: 0 mmHg～190 mmHg, 0 vol% ～ 25 vol% (at 760 mmHg);
$EtCO_2$ Measurement Accuracy	Comen mainstream:

	a) Within the range of 0mmHg～40mmHg, ± 2 mmHg; b) Within the range of 41mmHg～70mmHg, ± 5% of the reading; c) Within the range of 71mmHg～100mmHg, ± 8% of the reading; d) Within the range of 101mmHg～150mmHg, ± 10% of the reading. Respironics CAPNOSTAT 5 mainstream: CO2 accuracy (Note: Temperature :35℃): a) Within the range of 0 mmHg～40 mmHg, ± 2 mmHg; b) Within the range of 41 mmHg～70 mmHg, ± 5% of the reading; c) Within the range of 71 mmHg～100 mmHg, ± 8% of the reading; d) Within the range of 101 mmHg～150 mmHg, ± 10% of the reading. Masimo IRMATM mainstream: CO2 accuracy (under the condition: 22℃ ± 5℃ 1013 ± 40 hPa; gas mixture of CO2 and N2.): a) Within the range of 0 mmHg ～114 mmHg, ± (1.52 mmHg + 2% of the reading); b) Within the range of 114 mmHg ～190 mmHg, the accuracy is not defined; CO2 accuracy (under all conditions): a) Within the range of 0 mmHg ～114 mmHg, ± (2.25 mmHg + 4% of the reading); b) Within the range of 114 mmHg ～190 mmHg, the accuracy is not defined;
Resolution	
Waveforms	$EtCO_2$ - time, V - CO_2
$EtCO_2$ Alarm Upper Limits	Comen mainstream: (lower alarm limit + 2 mmHg) ～150 mmHg Respironics CAPNOSTAT 5 mainstream: (lower alarm limit +2mmHg) ～150 mmHg Masimo IRMATM mainstream: (lower alarm limit + 2 mmHg) ～ 190 mmHg
$EtCO_2$ Alarm Lower Limits	Comen mainstream: 0 mmHg ～ (upper alarm limit - 2 mmHg) Respironics CAPNOSTAT 5 mainstream: 0 mmHg～ (upper alarm limit - 2 mmHg) Masimo IRMATM mainstream: 0 mmHg～ (upper alarm limit - 2 mmHg)
SpO_2 module:	
Display	Pulse rate (PR) waveform/parameter, SpO2
SpO2 measurement range	Nellcor SpO2: 0%～100% Masimo SpO2: 1%～100% Comen SpO2: 0%～100%
SpO2 accuracy	Nellcor SpO2: Within the range of 70%～100%, Adult/Pediatric measurement accuracy is ±2% (during non-motion state); Within the range of 0%～69%, measurement accuracy is not defined. Masimo SpO2: Within the range of 70%～100%, Adult/Pediatric measurement accuracy is ±2% (during non-motion state), ±3% (during motion state); Within the range of 1%～69%, the measurement accuracy is not defined. Comen SpO2: Within the range of 70%～100%, Adult/ Pediatric measurement accuracy is ±2% (during non-motion state); Within the range of 0%～69%, the measurement accuracy is not defined.
PR measurement range	Nellcor SpO2: 20 bpm～300 bpm Masimo SpO2: 25 bpm～240 bpm Comen SpO2: 20 bpm～300 bpm

PR measurement resolution	Nellcor SpO2: resolution: 1 bpm Masimo SpO2: resolution: 1 bpm Comen SpO2: resolution: 1 bpm
PR measurement accuracy	Nellcor SpO2: 20 bpm～250 bpm: the measurement error should be ±3 bpm; 251～300 bpm: measurement accuracy is not defined. Masimo SpO2: the measurement error should be ±3 bpm (during non-motion state) and ±5 bpm (during motion state) Comen SpO2: the measurement error should be ±2 bpm
Perfusion index range	Nellcor SpO2: / (Note: Nellcor SpO2 module has no perfusion index.) Masimo SpO2: 0.02%～20%, the accuracy is not defined. Comen SpO2: 0.05%～20%, the accuracy is not defined.
Data update period	≤ 2 s
Signal Quality Index (SIQ) indication function	Masimo SpO2 and Comen SpO2 should come with SIQ indication function
Regulatory compliance	should conform to the requirements of YY0784-2010
Upper SpO2 alarm limit	Nellcor SpO2: (Lower alarm limit +1%)~100% Masimo SpO2: (Lower alarm limit +1%)~100% Comen SpO2: (Lower alarm limit +1%)~100%
Lower SpO2 alarm limit	Nellcor SpO2: 20%~(Upper alarm limit -1%) Masimo SpO2: 1%~(Upper alarm limit -1%) Comen SpO2: 0%~(Upper alarm limit -1%)
Upper PR alarm limit	Nellcor SpO2: (Lower alarm limit +1 bpm)～300 bpm Masimo SpO2: (Lower alarm limit +1 bpm)～240 bpm Comen SpO2: (Lower alarm limit +1 bpm)～254 bpm
Lower PR alarm limit	Nellcor SpO2: 25bpm～(Upper alarm limit -1bpm) Masimo SpO2: 25bpm～(Upper alarm limit -1bpm) Comen SpO2: 20bpm～(Upper alarm limit -1bpm)

Trend

Type	Tabular, Graphic
Length	72 hours
Content	Monitor Parameters, Setting Parameters (Setting Ventilation mode and Parameters) includes parameter alarm events and parameter waveforms related to the alarm time

Data Review

Event logs	Up to 8000 event logs can be saved, including alarm logs and operation logs. The alarm log includes parameter alarm events and parameter waveforms related to the alarm time.
Freeze the waveform review	Freeze the waveform of the interface at the current time and use the knob to review the data. When freezing, 30 most recent historical waveforms can be reviewed by sliding the screen or rotating the knob.
Freeze the loop review	Up to 5 reference loops can be saved.

O_2 Therapy

O_2 %	15 - 100 % (increments of 1 %) ± (3 vol.% +1 % of setting)
Flow	2 - 60 L/min ± (1.5 L/min +10 % of setting) (BTPS)

Gas Circuit Specification

Gas type	Air, O2
Gas source requirement	Medical compressed oxygen
High-pressure O_2 source	
Gas source pressure range	280～600 kPa
Rated flow rate requirement	120 L/min
Input connector	NIST (ISO 5356-1) or DISS (CGA 1240)

Standards compliant	YY/T 0799-2010 EN ISO5359:2008
Low-pressure O_2 source	
Input pressure range	＜ 100 kPa
Maximum flow rate	15 L/min
Input connector	CPC quick coupling
Inspiratory module	
Peak flow rate	≥ 210 L/min
Nebulizer connector	Flow rate: 5 L/min～8 L/min
Safety pressure of respiration	≤ 12.5 kPa
Inspiratory-side external connector	Coaxial 22 mm/15 mm conical connector
Removable, sterilizable	can be entirety removed quickly; and can be entirety cleaned and disinfected.
Regulatory compliance	YY1040.1-2003 EN ISO5356-1:2004
Expiratory module	
Expiratory-side external connector	Coaxial 22 mm/15 mm conical connector
Removable, sterilizable	can be entirety removed quickly; and can be entirety cleaned and disinfected.
Regulatory compliance	YY1040.1-2003 EN ISO5356-1:2004
System compliance and resistance	
Compliance	Adult disposable circuit (including inspiratory safety valve, adult disposable breathing tube, water collection cup, expiratory valve): ≤ 4 mL/cmH2O; Adult reusable circuit (including inspiratory safety valve, adult reusable breathing tube, water collection cup, expiratory valve, Y-joint): ≤ 2 mL/cmH2O; Pediatric disposable circuit (including inspiratory safety valve, pediatric disposable breathing tube, water collection cup, expiratory valve): ≤ 2 mL/cmH2O; Pediatric reusable circuit (including inspiratory safety valve, pediatric reusable breathing tube, water collection cup, expiratory valve, Y-joint): ≤ 2 mL/cmH2O; Neonate reusable circuit (including inspiratory safety valve, neonate reusable breathing tube, water collection cup, expiratory valve, Y-joint): ≤ 1 mL/cmH2O.
Inspiratory resistance	≤ 6 cmH2O at the flow rate of 60 L/min (Adult); ≤ 6 cmH2O at the flow rate of 30 L/min (Pediatric); ≤ 6 cmH2O at the flow rate of 5 L/min (Neonate).
Expiratory resistance	≤ 6 cmH2O at the flow rate of 60 L/min (Adult); ≤ 6 cmH2O at the flow rate of 30 L/min (Pediatric); ≤ 6 cmH2O at the flow rate of 5 L/min (Neonate).
Basic performance	
Pressure monitoring range	-20~120 cmH2O
Safety pressure of system	In ventilation state: ≤ 125cmH2O In non-ventilation state or power failure or gas source failure (<0.12MPa): ≤ 14 cmH2O
Environmental specifications	
Temperature	5 - 40 °C (operating); -20 to 60 °C (storage and transport, O_2 sensor: -20 to 50°C)

Relative Humidity	5 - 95 % (operating); 5 - 95 % (storage and transport)
Barometric Pressure	62 - 106 kPa (operating); 50 -106 kPa (storage and transport)

Power Specification

External AC power supply	
Input voltage	100 - 240 V
Input frequency	50/60 Hz
Input current	1.2 – 0.5 A
Fuse	T3AL/250 V
External DC power supply	
Input voltage	12V
Input current	10A
Internal battery	
Number of batteries	One or Two
Battery type	Build-in Lithium-ion battery, 14.4 VDC, 6700mAh
Battery life	140 min (when a new fully charged battery is used in standard operating mode) 280 min (when two new fully charged batteries are used in standard operating mode)

I/O

Communication interface	Rs232, Ethernet, VGA, USB port, Nurse call

Trolley MC100

Dimensions	
Weight	20 kg