International Datasheet

Panther 5 Series

Revision D

ORIGIN medical devices

Technical Specifications

General Information

Intended Use	The PANTHER 5 ventilator is: • Intended for respiratory treatment in invasive and non-invasive of neonatal(O), pediatric and adult patients • Used in hospitals, professional healthcare facilities and transportation of patients within such facilities
Instructions for use	Please read the Panther 5 operator's manual
Legal Manufacturer	Origin Medical Devices Inc.
Size (W x D x H)	350 x 360 x 390 mm 13.7" x 14.2" x 15.4"
Weight (Ventilator)	11 Kg (24 lbs)
Power	110 to 240 V AC 50 to 60 Hz
Internal Battery	Li-ion, 98W, 14.4V
Operating Time on Battery	> 3 hours under standard conditions
Recharge Time	Approximately 3 hours

Oxygen Supply and Monitoring

High Pressure Range	35 to 87 PSI
Connector Type	DISS 1240, NIST or other per region
Low Pressure	Low flow/pressure inlet
Monitoring	O_2 sensor on outlet. Galvanic or Paramagnetic options available

(O) Feature is available as an option

Operational

Enclosure Rating	IP22
Operating Temperature	10 to +40°C
Operating Humidity	10 to 90 % Non-Condensing
Storage Temperature	-20 to +60°C
Storage Humidity	10 to 90 % Non-Condensing
Barometric Pressure	Internally compensated
Operating Altitude	-381m to 5,000 m (-1,250 to 16,400 ft)
Air Inlet	Turbine (blower)

Functionality and safety standards

CE 0344	Complies with requirements and classification IIb of Medical Device Directive 93/42/EEC.
	ISO 80601-2-12:2011 ISO 60601-1-2:2014 Edition 4.0 EN 60601-1 Edition 3.1 ISO 60601-1-8:2007 + A11:2017 IEC 60601-2-49:2011 ISO 80601-2-55:2018

User Interface

Display	15” TFT with PCAP touchscreen
Control Interface	Touchscreen, Encoder knob with LED
Audible Indicators	Speaker and Buzzer
Additional Visual Indicators	RED, YELLOW, GREEN indicators for alarms, ventilation in power save
Additional Visual Sensors	Ambient light detector for automated display intensity control

Mode Selections

Types	Invasive Non-invasive High Flow O_2 Therapy

Invasive Ventilation Modes

Controlled Ventilation	Volume Control (VC) Pressure Control (PC) Pressure Regulated Volume Control (PRVC)
Spontaneous Ventilation	Pressure Support (PS) Volume Support (VS) (CPAP/NCPAP = PS set to 0)
SIMV (synchronized intermittent mandatory ventilation)	VC + VS VC + PS PC + PS PRVC + PS PRVC + VS
SMART Mode® (Automatic transition between a control mode and a spont mode based on presence or absence of patient efforts)	VC + VS VC + PS PC + PS PRVC + PS PRVC + VS
BiLevel	Dual PEEP with two defined PS levels
APRV	Dual PEEP CPAP

(O) Feature is available as an option

Non-Invasive Ventilation Modes

Controlled Ventilation	Volume Control (VC) Pressure Control (PC)
Spontaneous Ventilation	Pressure Support (PS)
SIMV (synchronized intermittent mandatory ventilation)	VC + PS PC + PS
SMART Mode®	VC + PS PC + PS
NIPPV(O) (NCPAP = NIPPV with Rate set to 0 and PS set to 0)	Nasal Intermittent Positive Pressure Ventilation (synchronized to patient efforts)

Leak Compensation

Max leak compensation	Adult and Pediatric • Inspiratory: 200 lpm • Expiratory: 60 lpm Neonatal(O) • Inspiratory: 25 lpm • Expiratory 20 lpm
Inspiratory volume compensation in VC	User selectable: ON/OFF When ON, volume is compensated for up to twice the set tidal volume

High Flow O2 Therapy

Oxygen	21 to 100 %
Flow	Adult: 1 to 80 lpm Pediatric: 1 to 80 lpm Neonate: 1 to 25 lpm(O)
Max Pressure	3 to 100 cmH_2O

SBT (Spontaneous Breathing Trial)

SBT Time	15 to 120 Minutes
Oxygen (O_2%)	21 to 100 %
PEEP	0 to 50 cmH_2O
Support Pressure	0 to 100 cmH_2O
Support Slope	1 to 10
Termination	Analyzes patient degradation using a variety of indications and automatically resumes normal ventilation when needed

Additional Functions

Speaking Valve	Automatically adjusts specific alarms, disables activation of conflicting features to enable safe use of a speaking valve. When turned off reactivates disabled features and returns alarms to normal
Demand Flow(O) (in VC only)	Detects patient's need of additional flow and automatically transitions to PS for that specific breath
Auto Exhalation Sensitivity (E_{SENS}) (O)	Automatic Breath-by-Breath ventilator management of the exhalation sensitivity setting
SMART Trigger®	Proprietary triggering mechanism which significantly improves trigger detection in high and varying leaks as well as COPD patients

(O) Feature is available as an option

IBW Calculation

Weight Ranges	Adult: 25 to 144 Kg Pediatric: 2.9 to 24 Kg Neonate: 0.4 to 2.8 Kg
Height Ranges	Adult: 125 to 256 cm Pediatric: 48 to 124 cm Neonate: 26.5 to 47 cm(O)
Units	Allows entry of height in cm or inches and weight in Kg or lbs
Gender	Male or Female

Display Configurations

Waveforms	• Circuit Pressure • Flow • Volume • Circuit + Tracheal Pressure (TC) (O) • CO_2(O) • SpO_2 Pleth(O) • Flow during High Flow O_2 Therapy
Loops	• Pressure Volume (PV) • Flow Volume (FV) • Single Breath CO_2 Curve(O)
Reference Loops	Shows up to two out of eight saved loops superimposed on the live loops along with event information prior to the loop save
Trends	• Shows two selected trends and 25 monitored values corresponding to the trend cursor position. • Trend views can be selected from 25 trended parameters • Views can be zoomed and scrolled with the x-axis or finger swipe • Trends record 72 hours of data

Maneuvers

P0.1 (P100)

User initiated automated maneuver to measure the patient's respiratory drive during the first 100 ms of inspiratory effort when the airway is occluded.

Max Time	Adult: 8 seconds Pediatric: 6 seconds

Smart NIF

User initiated automated maneuver to measure the patient's inspiratory muscle strength during airway occlusion. Provides visual and audible indications and automated analysis of patient fatigue to increase safety and patient synchronization.

Max maneuver Time	Adult: 20 seconds Ped/Neo: 10 seconds
Initiation	Audible BEEP and LED flashing indicated to the patient and clinician
Termination	Time and automated detection of patient fatigue

Suction Maneuver(O)

Provides an automated safe management of suction procedure by automatically transitioning between suction phases, adjusting alarms, and detecting reconnection to resume ventilation.

Types	• Open Suction • Closed Suction
O_2 settings	21 – 100 %
Phases	• Pre-Oxygenation at set O_2 level • Suction: auto detected on open suction, manual press in closed suction • Post-Oxygenation: auto detected on open suction, manual press in closed suction • Automated phase timeouts
Effects	Oxygen, alarms and delayed activation of alarms automated by the system.

(O) Feature is available as an option

PV (Slow Inflation/Deflation)(O)

A slow inflation/deflation PV Maneuver is both a diagnostic and therapeutic tool that provides information that may be used to optimize PEEP, tidal volume and other ventilator settings to allow lung protective ventilation. Upon maneuver completion, ventilation transitions back to the settings prior to the maneuver at the user defined End PEEP setting.

Start PEEP	0 to 40 cmH_2O
PEEP EQ Time	0.0 to 30.0 sec
Inflation/Deflation	2 to 5 cmH_2O / sec
Target Pressure	5 to 60 cmH_2O
Pause at Target	0.0 to 30.0 sec
End PEEP	0 to 40 cmH2O
Time limit	60 sec
Safety Termination	Time and on patient effort (resumes ventilation)
Views	• PV loop during the maneuver, auto scaled • Maneuver graph shows expected maneuver progress and progress during the maneuver
Measurement	Four cursors for four inflection points

Recruitment(O)

Single or multi-step recruitment maneuver (RM) via continuous ventilation at user defined step settings. Upon maneuver completion, ventilation transitions back to the settings prior to the maneuver at the user defined End PEEP setting.

Number of steps	1 to 20
T High	1.0 to 59.0 sec
T Low	1.0 to 5.0 sec
P High	10 to 40 cmH_2O
P Low	0 to 30 cmH_2O
End PEEP	0 to 30 cmH_2O
Views	Graphical representation of the maneuver and its progress

Direct Access Functions

Elevated O_2 (O_2 Enrichment)	User adjustable O_2 level active for up to 120 seconds
Manual Breath	Activates a mandatory breath upon pressing during the expiratory phase
Inspiratory Hold	Activates hold during the inspiratory phase
Expiratory Hold	Activates hold during the expiratory phase

Tube Compensation(O)

Activation	ON/OFF (restrictions apply)
Tube Type	• Endotracheal • Tracheostomy
Tube ID	Adult: 5.5 to 10.0 mm Pediatric: 4.0 to 6.5 mm Neonate: 2.0 to 4.5 mm(O)
Length	Adult: 2.0 to 30.0 cm Pediatric: 2.0 to 26.0 cm Neonate: 2.0 to 15.0 cm(O)
Support %	10 to 100 %

Nebulization

Pneumatic

Flow	7 lpm, Oxygen
Operating Time	5, 10, 20, 30, 60 minutes
Compensation	Volume is compensated for the added flow
Automation	Automated termination under violating conditions

Aerogen®

Method	Direct drive to nebulizer
Supported Types	SOLO or PRO
Controls	• Selection of type • Continuous option • Run time and Extend time
Visuals	• Time Requested • Time Active • Time Remaining • Operational status

(O) Feature is available as an option

Capnography(O)

Measurements	Measures $EtCO_2$ and real time inspired and expired CO_2

Calculated Parameters

End-Tidal CO_2	$EtCO_2$
Fractional End-Tidal CO_2 Concentration	$FetCO_2$
Partial Pressure of Mean Expired CO_2	$PeCO_2$
Fractional Concentration of Mean Expired CO_2	$FeCO_2$
Exhaled CO_2 Volume	$V_{TE}CO_2$
Inspired CO_2 Volume	$V_{TI}CO_2$
Exhaled Volume of CO_2 Per Minute	VCO_2/min
Alveolar Tidal Volume	Valv
Alveolar Minute Volume	Valv/min
Anatomical Dead Space	Vdana
Alveolar Dead Space	Vdalv
Physiological Dead Space to Tidal Volume Ratio	VD/VT Eng
Physiological Dead Space to Tidal Volume Ratio	VD/VT Bohr Est
Graphical	• Single breath CO_2 curve • Realtime exhaled CO_2 over time

Oximetry(O)

Measurements	• SpO_2 • Heart Rate • SpO_2/O_2 (Ratio Approximation to PaO_2/FiO_2) • Signal Level
Graphical	• Pleth waveform

Logs

Logged Information	• Changes • Alerts • Operations
Number of Entries	5,000
Download	Logs and Images

Settings

PEEP / CPAP	0 to 50 cmH_2O
Pressure (PC) (above PEEP)	5 to 100 cmH_2O
Support Pressure (PS) above PEEP	0 to 100 cmH_2O
Mandatory Slope (Mand Slope)	1 to 10 (1 is the fastest)
Spontaneous Slope (Support Slope)	1 to 10 (1 is the fastest)
Exhalation Sensitivity (Esens)	5 to 80 %
Max Spont Breath Time (Support TI)	Adult: 0.4 to 5.0 sec Pediatric: 0.4 to 3.0 sec Neonate: 0.2 to 2.0 sec(O)
Tidal Volume (VT) Range (VC)	Adult: 100 to 2500 ml Pediatric: 20 to 500 ml Neonate(O): 5(1) to 100 ml (see operating ranges)
Waveform (VC)	Square / Decelerating 50%
Inspiratory Time (TI)	Adult: 0.10 to 5.00 sec Pediatric: 0.10 to 4.00 sec Neonate: 0.10 to 3.00 sec(O) BiLevel: Up to 59.8 sec
Flow in VC	Adult: 3 to 200 lpm Pediatric: 3 to 60 lpm Neonate: 1 to 30 lpm(O)
Plateau Time (Insp Hold) (VC)	0.0 to 3.0 sec
Respiratory Rate	Adult: 1 to 110 b/min Pediatric: 1 to 120 b/min Neonate: 1 to 150 b/min(O)
SMART Time (Applies to SMART Mode®)	3 to 15 sec
Rate NIPPV(O)	1 to 150 b/min
Pressure Trigger	-15 to -0.1 cmH_2O
Flow Trigger	0.1 to 20 lpm
SMART Trigger®	1 to 7
Oxygen (O_2%)	21 to 100 %

Apnea

Apnea Time	0 to 60 sec and OFF (OFF allowed in SPONT when PS is set $\leq$ 5 cmH_2O)
Oxygen (O_2%)	21 to 100 %
Inspiratory Time (TI)	Adult: 0.10 to 5.00 sec Pediatric: 0.10 to 4.00 sec Neonate: 0.10 to 3.00 sec(O)
Pressure (PC) (above PEEP)	5 to 100 cmH_2O
Respiratory Rate	Adult: 1 to 110 b/min Pediatric: 1 to 120 b/min Neonate: 1 to 150 b/min(O)
Slope	Uses set Slope
Triggers	Uses set triggers

Operating Ranges

Pressure Range	-50 to +100 cmH_2O
Flow Range	0 to 240 lpm
Volume Range	2 ml(O) to 2500 ml

(O) Feature is available as an option
(1) 5ml in VC, 2ml in PRVC, VS and pressure modes

Monitored Parameters

Pressure

Peak Pressure	Ppeak
End Inspiratory Pressure	PInsp
Mean Airway Pressure	Pmean
End Expiratory Pressure	PEEP
Calculated Tracheal Pressure	Ptrach Insp
Plateau Pressure	P Plateau
Intrinsic (Auto) PEEP	Auto. PEEP
Total PEEP	PEEP Tot
Delta Air Pressure	dPAW
Breathing Drive Occlusion Pressure	P0.1
Negative Inspiratory Pressure	NIF

Volume

Inspired Tidal Volume	VTi
Exhaled Tidal Volume	VTe
Spontaneous VTi	Spont VTi
Spontaneous VTe	Spont VTe
VTI Normalized to Patient Body Weight	VTi /PBW
VTE Normalized to Patient Body Weight	VTe /PBW
Inspired Minute Volume	V̇i
Exhaled Minute Volume	V̇e
Spont Inspired Minute Volume	Spont V̇i
Spont Exhaled Minute Volume	Spont V̇e

Flow and Leak

Peak Inspiratory Flow	PIF
Peak Expiratory Flow	PEF
End Expiratory Flow to PEF Ratio	EEF/PEF %
Delivered Oxygen	O_2
Inspiratory Leak (lpm)	Insp Leak lpm
Inspiratory Leak (%)	Insp Leak %
Average Total Leak Rate	Avg Leak lpm
Inspiratory Leak Volume	Vleak ml

Rate and Timing

Total Breath Rate	Total BR
Mandatory Respiratory Rate	Mand BR
Spontaneous Respiratory Rate	Spont BR
Inspiratory Time	Last Ti
Expiratory Time	Te
Inspiratory Time Ratio in BiLevel and APRV	TH/Ttot
Ratio between THigh and TLow	TH:TL
Inspiratory to Expiratory Ratio	I:E
Percentage of Spontaneous Breaths During the Last Minute	% Spont

Mechanics

Inspiratory Pressure Time Product	PTP
Static Compliance	Cstat
Dynamic Compliance	Cdyn
Static Resistance	RStat
Expiratory Resistance	RE
Inspiratory Time Constant	RCInsp
Expiratory Time Constant	RCExp
Rapid Shallow Breathing Index	RSBI
Work of Breathing Imposed	WOB Imposed

Capnography and Oximetry(O)

See Capnography and Oximetry sections above.

(O) Feature is available as an option

Adjustable Alarms

Pressure High	6 to 104 cmH_2O
Pressure Low	3 to 101 cmH_2O
Minute Volume (V̇e) High	0.5 to 100 lpm Adult 0.5 to 30 lpm Pediatric 0.5 to 10 lpm Neonate(O)
Minute Volume (V̇e) Low	OFF to 0.1 to 99.5 lpm Adult OFF to 0.05 to 29.5 lpm Pediatric OFF to 0.01 to 9.5 lpm Neonate(O)
VTe High	25 to 3000 to OFF ml Adult 25 to 700 to OFF ml Pediatric 5 to 300 to OFF ml Neonate(O)
VTe Low	OFF to 1 to 2990 ml Adult OFF to 1 to 690 ml Pediatric OFF to 1 to 295 ml Neonate(O)
Spont VTe High	25 to 3000 to OFF ml Adult 25 to 700 to OFF ml Pediatric 5 to 300 to OFF ml Neonate(O)
Spont VTe Low	OFF to 1 to 2990 ml Adult OFF to 1 to 690 ml Pediatric OFF to 1 to 295 ml Neonate(O)
Rate High	10 to 110 b/min Adult 10 to 130 b/min Pediatric 10 to 170 b/min Neonate(O)
Rate Low	1 to 109 b/min Adult 1 to 129 b/min Pediatric 1 to 169 b/min Neonate(O)
Disconnect Sensitivity (Dsens)	20 to 95 %
VTi Limit	105 to 3000 ml Adult 25 to 750 ml Pediatric 6 to 300 ml Neonate(O)
Leak % (With leak Comp and NIV)	5 to 95 %

$ETCO_2$ High	10 to 150 to OFF mmHg
$ETCO_2$ Low	OFF to 5 to 60 mmHg
$VteCO_2$ High	0.2 to 100 to OFF ml
$VteCO_2$ Low	OFF to 0.1 to 99 ml
SBT Rate High	5 to 80 to OFF b/min
SBT Rate Low	OFF to 1 to 75 b/min
SBT RSBI High	5 to 900 to OFF
SBT RSBI Low	OFF to 5 to 895
SPO2 High	71 to 100%
SPO2 Low	70 to 99%
Heart Rate High	45 to 245 bpm
Heart Rate Low	40 to 240 bpm

Non-Adjustable Alarms

Standby	Occlusion
Low PEEP	High PEEP
PRVC Limited by High P	VS Limited by High P
Circuit Open	Apnea
Low O_2	High O_2
No O_2 Inlet Pressure	Aerogen Fault
Battery Gauge Error	Battery Hot
Battery Low	Battery Empty
Shutting Down	Charger Fault

Additional Technical Alarms
Additional CO_2 module related error alarms(O)
Additions SpO_2 module related error alarms(O)

(O) Feature is available as an option

Communication Interfaces

Serial RS232

- Sends automatic data to nurse call station
- Can be configured to send the required data under different conditions
- Software plug-ins for required protocols

Ethernet

- Sending automatic data as well as provides online monitoring, log reading and remote control
- Software enables connection to dedicated control/monitoring software that run on remote computers/tablets/phones or standard control centers

- USB Host connection for saving of logs, screen images and uploading software updates from standard USB memory sticks

External Interfaces

Capnography Module
SpO_2 Modules
Direct Aerogen Nebulizer
Dry contact remote alarm connections with/without cable disconnection detection

Ventilator Options

Software

Neonatal Suite	Neo patient type, NIPPV mode
Synchrony Suite	Demand Flow Auto E_{SENS} Tube Comp
Diagnostic and Therapeutic Suite	PV Maneuver Recruitment Maneuver Suction Maneuver
Extended Monitoring Suite	Volumetric Capnography and Oximetry monitoring, alarms and trending

Hardware

O_2 Sensor	Paramagnetic sensor

The ventilator includes all hardware to fully support all features and all software options. There is no need to install additional internal hardware for any option.