

Respiratory Module Specifications



Turbine blower based full functional respiratory module for ventilation

With the Respiratory Module a versatile and highly flexible solution for both neonatal and adult ventilators is available now. DEMCON Macawi offers you a solution for short time to market development of a ventilator in NICU, PICU, ICU and Emergency & transport

applications. The Respiratory Module is a unique OEM product which distinguishes itself from existing systems in size versus functionality, power consumption versus performance and robustness versus sensitivity.

Basic software

VENTILATION MODES Ventilation mode	Common commercial name
PC-CMV	PC (Pressure Control)
VC-CMV	VC (Volume Control)
PC-SIMV	SIMV(PC)
VC-SIMV	SIMV(VC)
PC-SIMV+	Bi-Level Ventilation, PC-BIPAP
PC-ACV	ACV(PC)
VC-ACV	ACV(VC)
Spn-CPAP	CPAP
CFLOW	Continuous Flow at pre-set O ₂ concentration

VENTILATION MANEUVERS Name	Remark
Inspiratory Hold	Manual start or generation of prolonged inspiration time

REAL-TIME SIGNALS Name	
Airway Pressure	
Patient Flow	
Patient Volume	

VENTILATION MODE OPTIONS Ventilation mode option	Commercial name
NIV (Non Invasive Ventilation)	
PS (Pressure Support) on top of PEEP	PSV
PCVR (Pressure Controlled Volume Regulation)	PRVC, AutoFlow, AVAPS, Volume Guarantee
HPO & LPO	High Pressure Oxygen & Low Pressure Oxygen

MEASUREMENTS Measurement	Explanation
VT	Tidal Volume (in- & exp.) [mand. & spont.]
MV	Mandatory Volume (in- & exp. & tot.) [mand. & spont.]
RR	Respiratory Rate [mand. & spont.]
P _{peak}	Peak Pressure (PIP)
P _{plat}	Plateau Pressure
PEEP	Positive End-Expiratory Pressure
MAP	Mean Airway Pressure
FiO ₂	Fractional Inspired Oxygen
Vleak	Leakage volume per breath

VENTILATION SETTINGS RANGE Setting	Range
V _T	2 - 2000 mL
RR	3 - 200 /min
P _{insp} , PS Low (Pressure Support)	1 - 90 mbar
Pressure Support	1 - 90 mbar
PEEP	0 - 40 mbar
Insp Flow	5000 - 100000 mL/min for VC with plateau
T _i , T _e and T _{ramp}	150 - 30000 ms (T _i & T _e) 60-30000 ms (T _{ramp})
FiO ₂	21 - 100 Vol. %

PERFORMANCE Name	Range
Maximum Pressure	100 mbar at sea level (> 80 mbar at 3000m altitude)
Maximum Flow	> 220 L/min

OTHER RELATED FUNCTIONALITY Functionality	Remark
Proximal patient flow measurement (including purge system)	
Proximal airway pressure measurement (including purge system)	
Triggering functionality in all modes on Flow and or Pressure	
Leakage compensation up to > 50 L/min	
Nebulizer control output (driver for valve)	
Compensation of compressible volume	For Volume controlled modes
Oxygen sensor interface	Galv. Analog sensor or paramagnetic digital sensor
System test and calibration functionality	
External Safety Valve	

Advanced software

ADDITIONAL VENTILATION MODES Ventilation mode	Common commercial name
PC-AMV	Assisted Manual Ventilation, Neonatal T-piece resuscitation
PC-APRV	Pressure controlled - Airway Pressure Release Ventilation
PC-MMV	Pressure controlled - Mandatory Minute Ventilation

ADDITIONAL VENTILATION MANEUVERS Maneuver	Remark
PS High (Pressure Support)	PS on top of inspiratory pressure
Recruitment	Generate a fixed number of elevated pressure strokes
PPS	Proportional Pressure Support
P0.1	measurement figure for weaning purposes
Tube Compensation	Automatic Tube Compensation (inspiratory and/or expiratory)
Sigh	Generate sigh maneuver at set time interval
Expiratory Hold	Manual generation of prolonged expiration time

ADDITIONAL MEASUREMENTS Measurement	Explanation
Flow _{peak_insp}	Inspiratory Peak Flow
Flow _{peak_exp}	Expiratory Peak Flow
P _{min_exp}	Expiratory Minimum Pressure
P0.1	Negative pressure after 100 ms no inspiratory support
RSBI	Rapid Shallow Breathing Index
PTP	Pressure Time Product
C _{stat}	Static Compliance
R _{insp}	Inspiratory Resistance
AutoPEEP	Intrinsic PEEP
Tracheal Pressure	Derived Tracheal Pressure

ADDITIONAL FUNCTIONALITY Maneuver	Remark
Distal and Proximal flow and pressure sensor support	

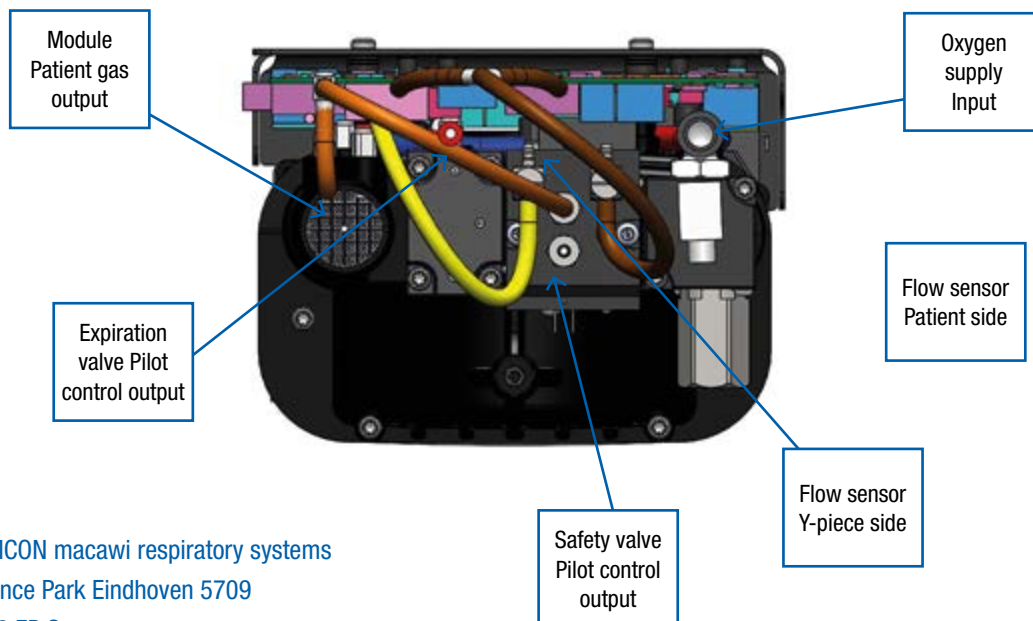
Operating conditions

ENVIRONMENTAL OPERATING CONDITIONS		
Quantity	Range	Remark
Operating temperature	-20 - + 55degrees C	
Relative air humidity	5 - 95% R.H.	
Air Pressure	500 - 1100 hPa.	
Module lifetime expectancy	> 30.000 hours	At moderate Ventilation level ¹
Noise generation	< 40 dB	At a pressure of 40 cmH2O, ISO 3744
¹ PInsp = 20 mbar, PEEP = 5 mbar, Tslope = 200ms, RR = 12 /min at Rp5C20		

ELECTRICAL OPERATING CONDITIONS		
Quantity	Range	Remark
Power Supply Voltage	24V DC \pm 10%	
Peak current	up to 5A	at 24V max. during 200 ms at maximum insp. pressure setting
Continuous current	up to 2.5A (during insp.)	at 24V at maximum inspiratory pressure setting
Nominal Power consumption	5 - 30 VA	at 24V depending on Ventilation settings and patient

Dimensions and weight

MODULE PROPERTIES	
Property	Value
Envelope dimensions	120 x 90 x 185 mm (standard)
Volume	< 2L
Module Weight	< 850 gram



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