WATO EX-20Vet

Veterinary Anesthesia Machine

Physical Specifications

Dimensions and Weight

Height	1375 mm
Width	715 mm (without breathing system)
	880 mm (with breathing system)
Depth	620 mm
Weight	<120 kg
	(without vaporizers and cylinders)

Top Shelf

Weight limit	30 kg
Length	550 mm
Width	265 mm

Work Surface

Height	820 mm
Width	500 mm
Depth	310 mm

Drawer (Internal Dimension)

Height	171 mm
Width	390 mm
Depth	315 mm

Casters

Diameter	125 mm
Brakes	All four casters with brakes

Screen

Display type	Color active matrix TFT
Display size	7.0 inch
Pixel format	800 x 480
Display parameters	All setting and alarm parameters
	(including Breath rate, I/E ratio, Tidal volume,
	Minute volume, PEEP, MEAN, PEAK, PLAT, and
	O_2 concentration)
Display waveforms	P-T, F-T, V-T

Ventilator Specifications

Modes of Ventilation

Manual/Spontaneous Ventilation/Bypass

Volume Control Ventilation (VCV) with PLV function

Pressure Control Ventilation (PCV)
Synchronized Intermittent Mandatory Ventilation
(SIMV-Volume Controlled and SIMV-Pressure Controlled)
Pressure Support Ventilation (PS) with apnea backup

Compensation

Automatic circuit leakage and compliance compensation

Ventilation Parameters Range

Tidal volume	20~1500 mL ((Volume Mode)
	5~1500 mL (Pressure Mode)
Pinsp	5~60 cmH_2O (increments of 1 cmH_2O)
Plimit	10~100 cmH_2O (increments of 1 cmH_2O)
Rate	4~100 bpm (increments of 1 bpm)
I:E	4:1 - 1:8 (increments of 0.5)
Inspiratory pause	OFF, 5% - 60% (increments of 5%)

Positive End Expiratory Pressure (PEEP)

Type	Integrated, electronic controlled
Range	OFF, 4~30 cmH_2O
	(increments of 1 cm H_2O)

Ventilator Performance

Driving pressure	280 kPa to 600 kPa
Peak gas flow	120 L/min + Fresh Gas Flow

Monitoring Parameters

Minute volume	0 ~ 100 L/min
Tidal volume	0~2500 ml
Inspired oxygen (FiO_2)	18% ~ 100%
Peak airway pressure	-20 ~ 120 cmH_2O
Mean pressure	-20 ~ 120 cmH_2O

Plateau pressure	-20 ~ 120 cmH_2O
PEEP	0 ~ 70 cmH_2O
Sweep speed	12.5 or 6.25 mm/s

Control Accuracy

Volume delivery	< 75 ml: ± 15 ml
	≥75 ml: ± 20 ml or ± 10% of the set value, whichever is greater
Plimit	± 4.0 cmH_2O or ± 10% of the set value, whichever is greater
Pinsp	± 3.0 cmH_2O or ± 8% of the set value, whichever is greater
ΔPsupp	± 3.0 cmH_2O or ± 8% of the set value, whichever is greater
PEEP delivery	± 2.0 cmH_2O or ± 10% of the displayed value, whichever is greater

Monitoring Accuracy

Volume monitoring	< 75 ml: ± 15 ml
	≥75 ml and < 1500 ml: ± 20 ml or ± 10% of the reading, whichever is greater
	>1500ml: not defined
Pressure monitoring	± 3.0 cmH_2O or ± 8% of the reading, whichever is greater
PEEP monitoring	0 to 30 cmH_2O: ± 2.0 cmH_2O or ± 10% of the reading, whichever is greater
	>30 cmH_2O: not defined
MV monitoring	0 to 30L/min: ±1L/min or ±15% of the displayed value, whichever is greater
	Other range: not defined

Trend Chart

Continuous trend information together with time discrete events are stored and shown by lines for the latest 24 hours with 5 seconds resolution for Tve, Ppeak, MV, Pplat, PEEP, Pmean,Rate and optional FiO_2

New trend chart will be recorded when restart the machine

Trend Table

Continuous trend information together with time discrete events are stored and shown by table for the latest 24 hours for TVe, Ppeak, MV, Pplat, PEEP, Pmean,Rate and optional FiO_2

Resolution	30s,1min, 2min ro 4min optional

New trend form will be recorded when restart the machine

Alarm Setting

Tidal volume	Low: 0 ~ 1595 ml
	High: 5 ~ 1600 ml
Minute volume	Low: 0 ~ 99 L/min
	High: 0.2 ~ 100 L/min
Inspired oxygen	Low: 18% ~ 98%
	High: 20% ~ 100%
Apnea alarm	20s
Low airway pressure	0 ~98 cmH_2O
High airway pressure	2 ~100 cmH_2O

Vaporizers

Vaporizer	Mindray V60 Anesthetic Vaporizer or Penlon Sigma Delta Anesthetic Vaporizer
Support agents	Halothane, Enflurane, Isoflurane, Sevoflurane
Position	MAX.2
Mounting mode	Selectatec®, with interlocking function Plug-in®, with interlocking function

Electrical Specifications

Current Leakage

100 ~ 240V	< 500 μA

Power And Battery Backup

Power input	without isolation transformer:
	100-240 Vac, 50/60 Hz, 6.2~2.6A
	100-120 Vac, 50/60 Hz, 5.6A
	with isolation transformer:
	100-120 Vac, 50/60 Hz, 5.6A
	220-240 Vac, 50/60 Hz, 2.7A
Battery backup	90 min for 1 piece battery
	(powered by new fully-charged batteries with 25°C ambient temperature)
	150 min for 2 pieces battery
	(powered by new fully-charged batteries with 25°C ambient temperature)
Battery type	Build-in Li-ion battery, 11.1 VDC, 4400 mAh
Number of batteries	1 or 2 pieces
Time to shutdown	5 min at least (powered by new fully-charged batteries after the first low-power alarm)
Power cord	5 m

Auxiliary output supply

Output voltage	220 to 240 V, 100 to 120 V
Output frequency	50/60 Hz
Output current	220 to 240 V : 0.6 A
	100 to 120 V : 1.2 A
Fuse	T2AH/250V

Interface

Wire network	RJ 45 connector 100-Base-TX
	support upgrading of main unit

Pneumatic Specifications

ACGO (Auxiliary Common Gas Outlet)

Connector	ISO 22 mm OD and 15 mm ID

The outlet locates at the inspiratory limb

Gas Supply

Pipeline input range	0.28~0.6MPa
Pipeline connections	NIST, DISS
Cylinder input	PISS, Maximum 2 cylinders, optional

Primary regulator nominal output: 207kPa

O_2 Controls

Method	N_2O shut off with loss of O_2 pressure
Supply failure alarm	≤ 220.6 kPa
O_2 Flush	25 ~ 75 L/min

O_2-N_2O Link system

Type	Mechanical
Range	Provides a nominal minimum 25% concentration of oxygen in O_2/N_2O mixture

Mechanical Control Flow Meters

O_2 flow range	Two flow tubes with the ranges of 0 ~ 1 L/Min and 1 ~ 15 L/min
Air flow range	Two flow tubes with the ranges of 0 ~ 1 L/Min and 1 ~ 15 L/min
N_2O flow range	Two flow tubes with the ranges of 0 ~ 1 L/Min and 1 ~ 10 L/min
Accuracy	± 10% of the indicated value (under 20°C and 101.3 kPa, for flow between 10% and 100% of full scale)

Auxiliary O_2 Flowmeter (optional)

Range	0 ~ 15 L/min
Indicator	Flow tube

Oxygen Sensor (optional)

Type	Galvanic fuel cell
FiO2 displayed	18% to 100%
Accuracy	± (volume fraction of 2.5 % +2.5 % gas level)
Response Time	≤20 seconds

Environmental Specifications

Operating

Temperature	10 ~ 40°C
Relative humidity	15% ~ 95% (noncondensing)
Barometric (Kpa)	70 ~ 106 kPa

Storage

Temperature	-20 ~ 60°C for main unit,
	-20 ~ 50°C for O_2 sensor
Relative humidity	10% ~ 95% (noncondensing)
Barometric	50 ~ 106 kPa

Breathing Circuit Specification

Breathing system volume

Automatic ventilation	2600 ml
Manual ventilation	1800 ml
Operational Modes	closed and semi-closed circuit system
Volume of CO_2 canister	about 1500 mL
Water Trap	6 mL, easy to be disassembled

Breathing Circuit Parameters

Compliance	≤4 mL/100Pa (bag mode)
	Automatically compensates for compression losses within the breathing circuit in mechanical mode
Expiration resistance	< 6.0 cm H_2O @60 L/min
Inspiration resistance	< 6.0 cm H_2O @60 L/min

System Pressure Gauge

	Range: -20 ~ 100 cmH_2O
	Accuracy: ± (2% of the full scale reading + 4% of the actual reading)

Ports and Connectors

Exhalation	22 mm OD / 15 mm ID conical
Inhalation	22 mm OD /15 mm ID conical
Manual bag port	22 mm OD /15 mm ID conical

Bag-to-Ventilator Switch

Type	Bi-stable
Control	Switch between manual and mechanical ventilation

Adjustable Pressure Limiting (APL) Valve

Range	1 ~ 75 cmH_2O

Tactile knob indication at above 30 cmH_2O

Accuracy	± 10 cmH_2O or ± 15% of the setting value, which is greater
Start pressue	⩽ 2 cmH_2O

Anesthetic Gas Scavenging System (AGSS)

Type of disposal system	Active: High-flow or Low-flow
	Passive
Size (H x W x D)	Active: 430 x 132 x 114 mm
Applicable standard	ISO 80601-2-13
Pump rate	75 ~ 105 L/min (High-flow)
	25 ~ 50 L/min (Low-flow)

Pressure relief device: Pressure compensation opening to the air

State indication of the disposal system: The float falls below the "MIN" mark on the sight glass when the disposal system does not work or the pump rate is lower than 25 L/min (Low-flow) or 75 L/min (high-flow).

Filter	Stainless screen with hole diameter of 140 ~ 150 μm

Connector of the disposal system: ISO 9170-2

Materials

All materials in contact with exhaled patient gases are autoclavable and natural latex free, except flow sensors, O_2 sensor, and mechanical pressure gauge.

Please contact your local Mindray sales representative for the most current information.

www.mindray.com

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