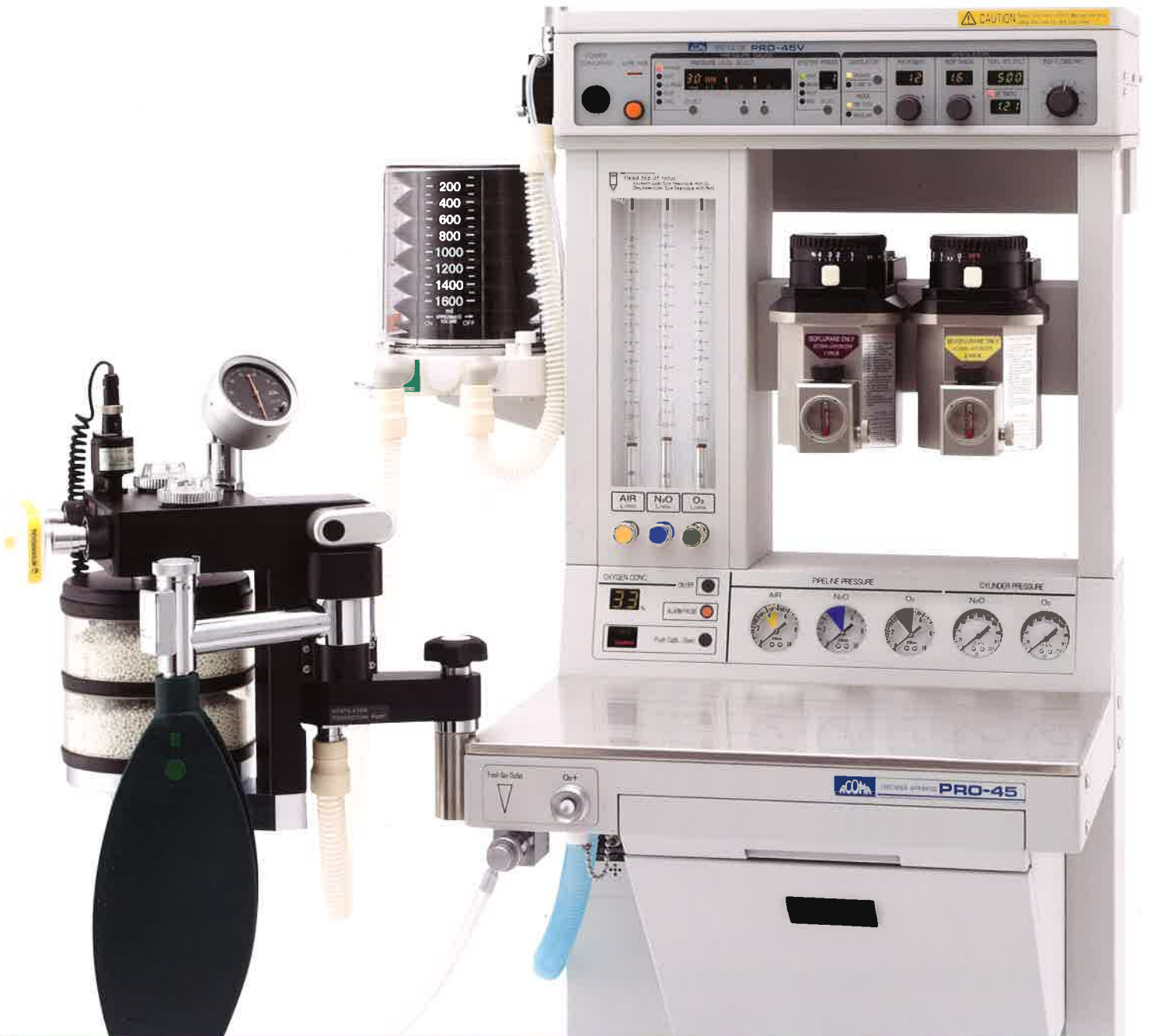


Professional quality designed
for reliability and efficiency

ACOMA

ACOMA ANESTHESIA APPARATUS

PRO-45



Compact, Highly Versatile Unit Capable of Speedily Handling a Wide Range of Usage Conditions

Combining enhanced basic functions with greater application versatility results in creating an optimal anesthetic environment capable of meeting each patient's needs. Extra-trustworthy safety/alarm system ensures worry-free operation. Rich, wide array of "user most-favored prioritized" application tools.

PRO-45

No.204-35-10 (Standard)
No.204-35-46 (Low flow rate compatible)



Major characteristics

1 Sophisticated flow control function

- ① Patented (#1737472) Low Oxygen Conc. Auto Prevention System
Three special flowmeters, AIR, and the patented interlocking gears of the N₂O and O₂ ones ensure quick, accurate control of these gases, as well as safely ensuring that the minimum oxygen concentration never goes below 30%.
- ② Designed For More Precise, Easier Reading Of All Flowmeters
Stabilized type rotor needle offers less shake, hence more accurate flow rate graduation observation.

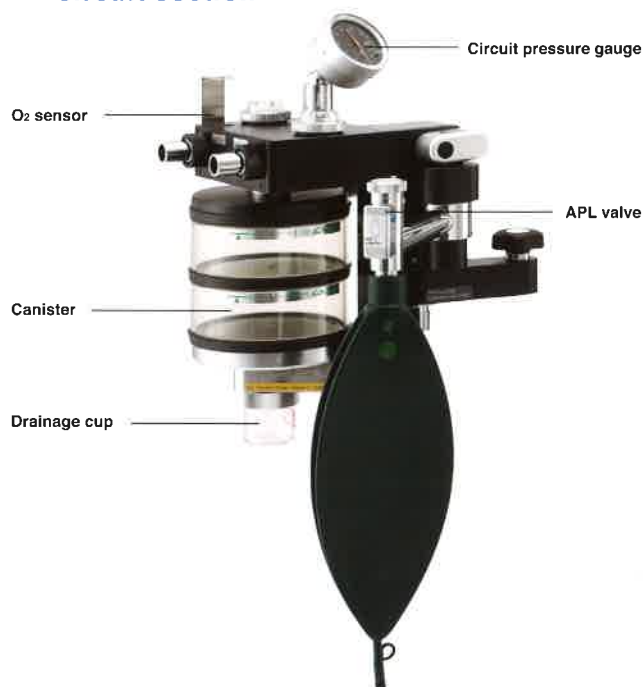
★ Vaporizers and breathing bag shown in this photo are optional.

2 Built-in "Safety Block" with anesthetic gas mixture-prevention device

- ① ACOMA's Original Safety System
Specially designed for mounting two Acoma MKIII Block Type vaporizers onto the Safety Block, both configurations have a built-in safety device that automatically activates to lock OFF the "Concentration Control Dial" of the other vaporizer not being used.
- ② Designed for very simple mounting the vaporizer is set merely by placing it on the connector and turning the handle/ tightening the bolt with a wrench.



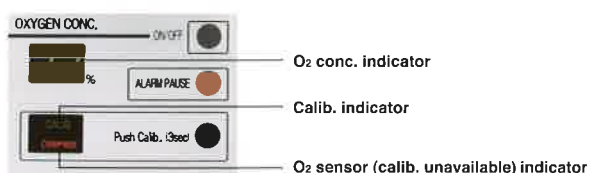
3 Extra-easily controlled respiratory circuit section



- ① The circuit and ventilator (PRO-45V, PRO-VmkII, ACE-3000) can be simultaneously controlled with a single action when the canister unit and the "Auto /Manual Remote Terminal" on the ventilator are connected with a dedicated cable (optional).
- ② Accurate, easily checked circuit pressure gauge (freely rotatable 360° horizontally).
- ③ The canister chamber can be opened or closed with a one-touch lever.
- ④ Superbly wide range of circuit positional adjustability.
- ⑤ Large, easily detachable/attachable "Drainage Cup" (autoclave sterilization possible).
- ⑥ Use of an "I/E Valve" for less respiratory resistance.
- ⑦ Single-action Connection Adaptor offers quick attachment of an optional "PEEP Unit".

4 Highly reliable oxygen monitor with auto-input system

- ① Auto ON switching system avoids problem of forgetting to turn the monitor on.
- ② Multiple-monitoring system feature offers prompt alarm recognition of such irregularities as O₂ below 25% or 18%, "Oxygen sensor cable" discontinuous or not connected, and "Oxygen sensor" defective or life expired.
- ③ Auto calibration accomplished simply by keeping the button pushed in for 3 seconds.
- ④ Economical, long-lived "Oxygen sensor" lasts for approx. one year.



5 Redundant Low-oxygen Prevention Mechanisms

In addition to the patented N₂O/O₂ interlocking flowmeters and built-in oxygen monitor, further backup safety/alarm devices are.

- ① Oxygen supply pressure alarm... If oxygen supply pressure drops below 250kPa, a whistle sounds; Rated supply pressure within the range of 350 ~ 500kPa.
- ② Gas shut-off device... If it goes below 200kPa, a whistle sounds, and at the same time, flow of N₂O gas into the respiratory circuit is automatically stopped.

6 Surplus Gas Fully Eliminated

- ① In the "manual" mode, surplus anesthetic gas is safely discharged via the "APL Valve" by using the ventilator circuit.
- ② Gas Pocket incorporated.
- ③ Surplus anesthetic gas can be easily disposed of when using the open circuit, as well, merely by connecting a corrugated tube.
- ④ Monitor gas is discharged through the suction port.

7 Direct Oxygen Flush Function Available



8 Convenient Double Storage Drawers

- ① Upper drawer ... Ideally suited for storing anesthetic records, etc. as up to B/4-size paper can be accommodated.
- ② Lower drawer ... Deep enough for holding small anesthesiarelated equipment, vaporizer medicinal bottles, etc.



PRO-45 Standard Accessories

1	Corrugated tube for surplus gas removal (φ19mm, 90cm)	1
2	Flexible tube set	1
3	Pressure tube 5 m long (AIR, N ₂ O, O ₂)	1 each
4	Spanner for pressure tube (19×22mm)	1
5	Test lung (1L)	1
6	Breathing bag (3L)	1
7	Canister joint	1
8	Oxygen sensor w/cable	1
9	Auxiliary cylinder handle	1
10	Instruction manual	1

Gas driven system, monitor shelf mounted

PRO-45V

No.204-35-45 (Standard)
No.204-35-60 (with PEEP unit)

With its easily & speedily preset parameters electronically controlled, this flow generator based unit truly shines in delivering highly versatile respiratory control responding to every newborn through adults patient need, and thus always realizing an ideal ventilation environment.

Major characteristics

- 1** A simple push of the Select Button switches between "Time cycling" and "pressure limited" respiratory modes.
- 2** With "Auto/manual remote cable" (optional) connected, smooth, speedy switching between "Manual" and "Ventilator" controls possible.
- 3** Simple handling with easy-to-read displays
 - ① Basic operations are designed control simplicity: mere presetting of "Respiratory rate", "Inspiratory time" (or, "Inspiratory pressure" in the "pressure limited" mode), and "inspiratory flow rate".
 - ② "I/E ratio" is automatically calculated on the basis of the preset "Respiratory rate", and "inspiratory time" (or "inspiratory pressure" in the "pressure limited" mode), and digitally displayed on the indicator.
 - ③ "Tidal volume" accurately viewable.
 - * By means of the "Compliance compensation function" ["in-circuit compression volume" is displayed on the basis of estimation from "inspiratory pressure" (Compensation range: 0 ~ -10mL/hPa)], precise "Tidal volume" which is to be actually used within the respiratory circuit, can be preset.
 - ④ "Circuit pressure gauge" ensures continual multifaceted pressure monitoring.
- 4** Sophisticated Plateau(EIP) function
- 5** Extensive capabilities offers wideranging applications, coverage from neonates through adults

Extra-precise control performance based on sophisticated electronic integrated system design offers superb use in combination with a Jackson-Lee's or Infant Circle Absorber, along with the heightened safety needed for neonates and infants.



- 6** Easily detached/attached Expiratory valve unit (can be autoclave sterilized) for simple maintenance
- 7** Added patient safety through fully integrated alarm system

* Integrated, redundant indicators and sound alarms activate to quickly catch any malfunction.
* Once corrective actions have been completed, indicators/alarms automatically are cancelled, but recycle immediately to warn should any trouble reappear.

● PRO-45V Standard Accessories

Either O ₂ or AIR pressure tube (5m long, as selected)	1
Corrugated tube for surplus gas removal (φ19mm, 90cm)	1
Instruction manual	1
Anesthesia apparatus connection corrugated tube (150cm)	1

Electronically driven unit, housed within apparatus stand

PRO-VmkII

No.207-35-40

An independent volume limited, time cycling type CMV dedicated ventilator developed with the primary design emphasis placed on operational ease, that as such requires only four items (including power switching on) for basic operation.

Major characteristics

- 1 All that's required to preset ventilation conditions is to adjust "Tidal volume", "Respiratory rate" and "I/E ratio" to the desired levels.
- 2 As the measuring device dedicated to the spirometer is built in, connection of "Flow sensor" (optional) to the respiratory circuit enables display of actually measured "Tidal volume" and "Respiratory rate" values.
- 3 When "Auto/manual remote cable" connected (optional), off-machine Auto-Manual switching possible.
- 4 Bellows system allows visual grasp of real ventilation conditions.
- 5 Simple attachment/detachment of "Gas connection unit", "Bellows unit" and "Drainage cup" designed for emphasis of easy maintenance.
- 6 Warning/alarm devices signal "Low inspiratory pressure", "Preset failure", "Periodical inspection", "Power failure", "Standby" and "CPU malfunctioning".



• PRO-Vmk II Standard accessories

Anesthesia apparatus connection corrugated tube (100cm)	1
Corrugated tube for surplus gas removal (φ 19mm, 90cm)	1
Metal fitting and bolt to be used to fix to anesthesia apparatus 1 each	1
Instruction manual	1

Optional Peripheral Accessories

● Low flow rate compatible flowmeter

No.204-35-46



For greater pinpoint reading /adjustment this special, more finely graduated(0.1 ~ 1L/min), flowmeter set can more safely meet the needs of extremely precise low flow rate control.

● Flowmeter backlight

No.204-37-00



Offers more easily visible rotor reading such as during endoscopic surgical procedures.

● PEEP unit

No.207-21-43



One-touch connectable; preset range · · · 0 ~ 20hPa
 ★The anesthesia unit's regular "Expiratory port" and "Inspiratory port" need to be replaced with a one-touch "I/Eport unit".
 ★An "Inspiratory port extension pipe" for connection to the anesthesia unit's "inspiratory port" is also optionally available.

● Side rail (Vertical type)

No.204-37-01



A "Bellows unit", "Supporting arm", "Sphygmomanometer", as well as various other accessories can be attached here.

● Side rail (Horizontal type)

No.204-37-02



Can be used both as a transport handle and as a holder for a "Suction catheter".

● Suction pump for surplus anesthetic gas removal

No.104-10-10



Efficiently removes surplus anesthetic gas from equipment without leakage for elimination from the operation theater.

● Wide shelf

No.204-37-04



Standard 30cm depth is extended to 40cm in the wide shelf, and this shelf is recommended for use when mounting large sized monitoring devices.

● Elevating type bellows

No.307-00-00



As both the exhaust and drive gas connection ports of this bellows have the same configuration, only two corrugated tubes are required to connect the anesthesia apparatus to the ventilator, thus allowing for neat, simplified attachment.

★ Even during usage at a low flow rate, mixture of driving/anesthetic gases is prevented, thus ensuring stable anesthetic gas concentration.
 ★ Added safety is realized through easy visual confirmation of the approx. Ventilation volume plus leakage existence.

● Vaporizer MK III



Standard type

(Medical Equipment Approval No.)
 20200BZZ00038000,
 20500BZZ00302000,
 20200BZZ00424000,
 20200BZZ00425000,
 20200BZZ00426000

Only MK III (Block type) vaporizers can be mounted on PRO series anesthesia apparatus. Any combination (1 or 2) from among the four · · ·



Keyed filler type

(Medical Equipment Approval No.)
 20600BZZ01183000,
 20600BZZ01184000,
 20500BZZ00302000,
 20600BZZ01185000,
 20600BZZ01186000

Sevoflurane, Enflurane can be selected to meet individual needs.
 ★ When using the Keyed filler type, a key bottle adaptor (optional) is necessary.

Conc. preset range: Isoflurane, Halothane ... 0.3 ~ 4vol.%,
 Sevoflurane, Enflurane ... 0.5 ~ 5vol.%,
 Flow rate range; 0.5 ~ 10L/min.

● Flow sensor M(for spirometer)

No.204-38-50



One-touch connection system w/cable protector

* This sensor is also common for the PRO-VmkII ventilator's Spirometer.
 * The anesthesia unit's regular "Expiratory port" and "Inspiratory port" need to be replaced with a one-touch "I/E port unit".
 * An "inspiratory port extension pipe" for connection to the anesthesia unit's "Inspiratory port" is also optionally available.

● Expiratory valve unit with PEEP unit

No.207-22-05



To be attached to the PRO-45V ventilator.Preset range:0~20hPa

● O₂ T-type pressure tube

No.207-03-13



w/One-touch connector for PRO-45V driving gas

● O₂ pressure tube

No.204-01-60



● H-type pressure tube w/AIR filter

No.207-03-14



w/One-touch connector for PRO-45V driving gas

● Pressure tube w/AIR filter

No.207-03-16



* The "O₂ T-type pressure tube" or "Htype pressure tube w/AIR filter" may be added to the furnished accessories (extra charge).
 (Selectable in the standard accessories is "O₂ pressure tube" or "pressure tube w/AIR filter" only.)

● Auto/manual remote cable

No.207-37-00



This cable is used to connect the ventilator to the anesthesia apparatus' "Auto/manual selector knob" also acts as a onetouch switching of the ventilator's "Standby/Operation".
#Common to PRO-45V and PRO-VmkII

● OS-B3MA O₂ sensor (DX type only)

No.104-47-50

Cable:No.104-47-51



Durability:12 months after breaking the seal of the tin package.(Cable not included)

● Connection metal fitting (for pressure detection)

No.207-01-00



w/silicone tube
Used when pressure measurement is to be made at the patient's mouth or while monitoring pressure in the "Manual mode".

● Filter-guard 1944

No.385-40-41

Product of Intersurgical Ltd.(UK)
Attached to the apparatus side.
No HME function.
Medical Device Approval
No:13B1X000880IS008
*Disposable



● Inspiratory port extension pipe

No.204-38-04



Extension pipe for adjusting tube lengths when using flow sensor M.

● Spherasorb

1kg:No.385-97-10
5L:No.385-97-50

Product of Intersurgical Ltd.(UK)
CO₂-absorbent:homogeneous round granules effectively absorb CO₂ gas.



■ PRO-45 Anesthesia Apparatus

Name	PRO-45V Anesthesia Apparatus
Medical device approval No.	11BZ0608
Code	204-35-10(standard) 204-35-46(Low flow rate compatible)

[POWER SUPPLY UNIT]

Rated power voltage	AC100~240V (as specified)	
Power input	7VA (w/Flowmeter backlight,16VA)	
Power frequency	50/60Hz	
Auxiliary power outlet	Four;Maximum rated amperage 5A or less (w/circuit breaker)	
Type of protection against electric shock	Type	Class I
	Level	B type equipment
Electromagnetic compatibility(EMC)	JIS T 0601-1-2(2002)	
Usage conditions	Room temperature	10~40°C
	Relative humidity	30~85%

[ANESTHESIA CIRCUIT]

Flowmeter(285mm)	Flow rate range (steplessly variable)	O ₂ ...0~10L/min. N ₂ O...0~10L/min. AIR...0~10L/min. (All pressure gauges supplied as standard) (0~10×100kPa) ★Minimum graduations:O ₂ and AIR...0.1L/min.,N ₂ O...0.5L/min.
	Min. O ₂ conc. (w/N ₂ O/O ₂ interlocking gear safety device)	30%±3Vol.% ★Provided that O ₂ flow rate is over 1L/min
Gas supply pressure	350~500kPa(common to O ₂ , N ₂ O, AIR)	
Vaporizer Safety Block (vaporizer mounting stand)	Vaporizer (optional)	Acoma Vaporizer MKIII (Block Type) only can be mounted. Once one is selected, other one lock (max.two,)(w/anesthetic gas mixing prevention device)
Canister (CO ₂ absorption device)	Capacity	1,340mL(1,200g)
Auxiliary cylinder yokes (only for standard type)	One each,O ₂ and N ₂ O, w/pressure gauge (0~200×100kPa)	
Oxygen flush	Flow rate	Approx. 35~75L/min.

[ALARMS]

Calibration not possible	When O ₂ sensor is dead or defective,"calibration unavailable" indicator blinks as alarm sounds.
O ₂ concentration	Alarm level presettable in two steps, 25% or 18%. If O ₂ conc.goes below this level(25% or 18%),O ₂ conc. indicator blinks in red, and alarm sounds.
O ₂ supply pressure	If this pressure goes below 250kPa,"Whistle" sounds. If it goes 200kPa, "Whistle" sounds and N ₂ O supply is shut off.

[CIRCUIT MONITORS]

Circuit pressure gauge	Measuring range	-10~70hPa
	Display resolution	1hPa
Oxygen monitor	Viewable range	Horizontally rotatable
	Sensor system	Diaphragm type galvanic cell
	Input method	Button switch ON/OFF and Flow detection switch (If the total flow goes over "1L/min.",switches ON.)
	Measuring range	0~100% O ₂
	Measuring sensitivity	1%
	Measurement accuracy	±3 Vol.%
	Sensor life	Approx. one year

[DIMENSIONS/WEIGHT]

With the PRO-45 series anesthesia apparatus, two types of Gas Supply System are available : a. Pipeline System...PRO-45S (standard);
b. Cylinder System...PRO-45C.

Item	Model	PRO-45S
Outer dimensions		570(w)×700(d)×1,355(h) mm
Monitor shelf dimensions		490(w)×300 (d) mm ★400mm depth of optional "WideType"
Monitor shelf (Max supportable combined instrument weight)		Approx. 30kgs
Table top dimensions		480(w)×325(d)×870(h)mm
Drawer dimensions		Upper 285(w)×370(d)×30(h)mm Lower 285(w)×300(d)×125(h)mm
Respiratory circuit movable range	Horizontal rotation	Approx. 200°
Breathing bag attachment section movable range	Horizontal rotation	Approx. 195°
Total weight of main unit		Approx.90kgs. ★Weight differs according to accessories (standard and optional) furnished.

PRO-45V Ventilator (optional)

Name	PRO-45V Ventilator (optional)	
Medical device approval No.	21500BZZ0042400	
Code	207-35-45(standard)	207-35-60(with PEEP)

[POWER SUPPLY UNIT]

Rated power voltage	AC100~240V (as specified)	
Power input	37VA	
Power frequency	50/60Hz	
Type of protection against electric shock	Type	Class I
Electromagnetic compatibility(EMC)	Level	B type equipment
	JIS T 0601-1-2(2002)	

[GAS SUPPLY UNIT]

Gas supply pressure	O ₂ or AIR—350~500kPa
---------------------	----------------------------------

[CONTROL UNIT]

Application	Neonates, infants through adult patients
Ventilation system (Gas-driven type, time-cycling flow generator)	Volume preset, time cycling
Respiratory mode	Pressure preset, time cycling
Tidal volume	Time cycling, pressure limited, CMV, IMV, Assisted ventilation, plateau(EIP), PEEP
Inspiratory pressure limit	0~2,660mL(actual value digitally displayed; w/compliance compensation function)
Respiratory rate	4~70hPa(in the pressure limit mode), in 1hPa increments
Inspiratory time	0~180 times/min in 54 steps (digital display)
I/E ratio	0.1~4 seconds in 53 steps (digital display)
Inspiratory flow rate	1:0.5~1:9.9 (digital display)
Compliance compensation	* In the "pressure limit" mode, actual value displayed
Trigger sensitivity	3~40L/min (variable steplessly)
Inspiratory plateau(EIP)	0~10mL/hPa(display value compensated on the basis of the actually measured value)
Relief pressure	-9~+20hPa(max. sensitivity:-1hPa)
Memory backup	* Not compensated during PEEP
	Preset to either 20% or 30% of inspiratory time
	15~65hPa(variable steplessly)
	Each alarm's preset values and the mode "stand-by / operation" stored in memory for approx. 10min, even after power switching off

[CIRCUIT MONITORS]

Circuit pressure gauge	-10~70hPa	-4~54hPa displayed as a bar graph(in 2hPa steps)
	Instantaneous value	
Total hour meter	Up to 999999.9 hours digitally displayed	

[DIMENSIONS/WEIGHT]

Outer dimensions	545(w)×350(d)×125(h)mm
Weight	Approx. 20kgs

PRO-Vmk II Ventilator (optional)

Name	PRO-Vmk II Ventilator (optional)	
Medical device approval No.	21300BZZ00492000	
Code	207-35-40	

[POWER SUPPLY UNIT]

Rated power voltage	AC100~240V(as specified)	
Power input	85VA	
Power frequency	50/60Hz	
Type of protection against electric shock	Type	Class I
Electromagnetic compatibility(EMC)	Level	B type equipment
	JIS T 0601-1-2(2002)	

[SAFETY/ALARM DEVICES]

Low inspiratory pressure	Activates if pressure over "6hPa" is not applied continuously for "15 seconds". (Alarm sounds while display blinks)
Preset failure	Activates if it is preset so that the "flow rate" goes out of the range "3~62.8L/min". (Alarm sounds while display blinks)
Periodical inspection	Activates when the total hours of usage have gone over "4,500 hours" (Alarm sounds while display blinks)
Power failure	If power failure occurs, or power cord becomes discontinuous, alarm sounds (sound level adjustment not possible)
Standby	When the "Auto/manual remote cable" (optional) is connected, the indicator blinks, but only while set to the "manual mode".
CPU malfunction	Should any abnormality or trouble take place in the CPU, the "preset failure" alarm activates irrespective of proper presetting.

[SAFETY/ALARM DEVICES]

Excess pressure	Activates when circuit pressure goes over preset value. • Immediately switches over to "expiratory phase" • At the same time the "alarm indicator" and the "excess pressure display value"(on the bar graph) blink, and alarm sounds.	
Low inspiratory pressure	Presets range	In auto 14~70hPa Manual 0~70hPa
	Activates unless the circuit pressure reaches the preset value within the standby duration. • Only in the "time cycling" mode • The "alarm indicator" and the "low inspiratory pressure display value"(on the bar graph) blink, and alarm sounds.	Presets range
Inspiratory pressure	Activates unless circuit pressure reaches preset value within the preset duration. • Only in the "pressure limit" mode • The "alarm indicator" and the "low inspiratory pressure display value"(on the bar graph) blink, and alarm sounds.	
PEEP	Activates if the positive end expiratory pressure goes out of the preset value (upper/low limits) within the duration of expiration. • The "alarm indicator" and the "PEEP display value" (on the bar graph) blink, and alarm sounds.	
Apnea	Presets range 0~20hPa While the trigger is set to ON, activates if not triggered within the standby duration(IMV mode), or within the inspiratory duration(CMV mode). • The "alarm indicator" and the "apnea display value" (on the bar graph) blink, and alarm sounds.	
I/E ratio reversing	Activates if the I/E ratio goes below 1:0.5. • When the I/E ratio is below 1:1, the digital indicator blinks. • If it goes below 1:0.5, the "alarm indicator" blinks, and alarm sounds.	
Power failure	When the power is turned on, if power fails, cord becomes discontinuous and/or plug detaches, alarm sounds. * Sound level fixed.	
CPU malfunction	Should any abnormality occur in the electronic control unit, alarm sounds.	
Alarm standby duration	Switchable to "15seconds" or "30seconds".	
Alarm pause	Alarm ON/OFF In "manual" operation, alarm can be switched ON or OFF. Pushing the "alarm pause button" silences alarm. • Pause available for: "Low inspiratory pressure", "I/E ratio reversing", "PEEP", "apnea". • During pause, the indicator "blinks", and once the conditions are corrected, alarm cancels. (Simultaneously with cancellation, indicator goes out.)	

[USAGE CONDITION]

Room temperature	10~40°C
Relative humidity	30~85%

[CONTROL UNIT]

Ventilation system	Volume preset, time cycling
Respiratory mode	CMV(volume limited)
Tidal volume	100~1,200mL(in 10mL increments)
Respiratory rate	5~40 times/min. (in "1 time/min" increments)
I/E ratio	1:1~1:3([1:]0.5 increments)
Flow rate	3~62.8L/min

[CIRCUIT MONITORS]

Tidal volume	10~2,000mL(digital display)
Respiratory rate	5~60 times/min. (digital display)

[DIMENSIONS/WEIGHT]

Outer dimensions	395(w)×285(d)×326(h)mm
Weight	Approx. 17kgs

[USAGE CONDITION]

Room temperature	10~40°C
Relative humidity	35~85%

*Specifications and design are subjected to change without prior notice.

Professional quality designed for reliability and efficiency.

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