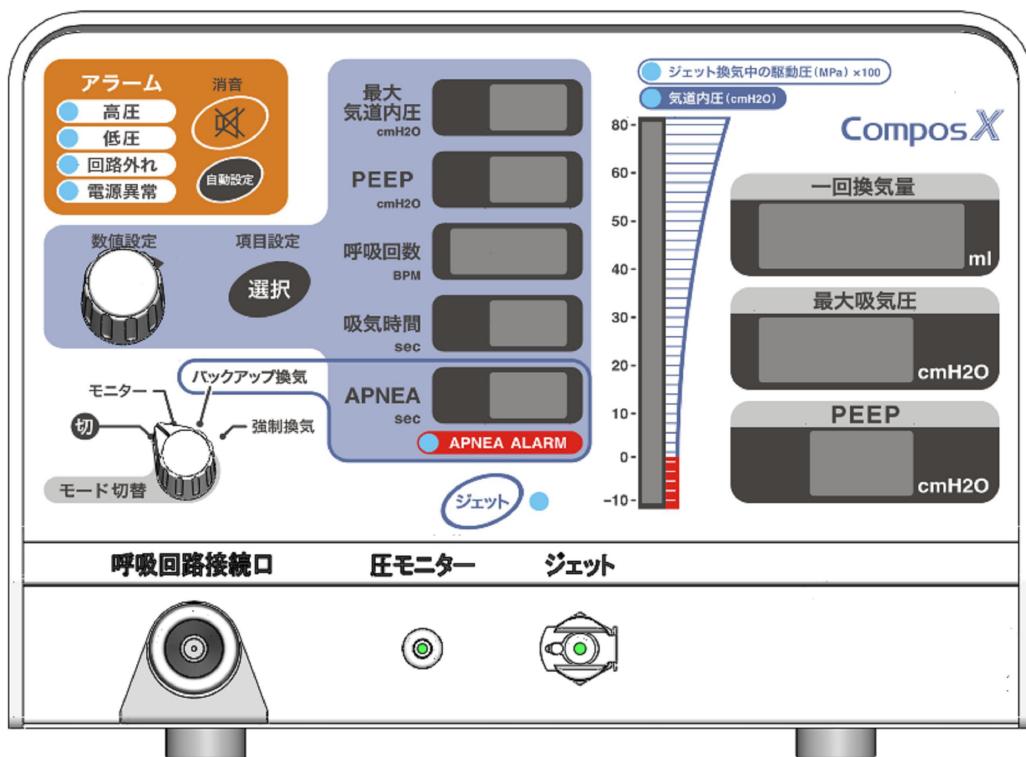




Veterinary Mechanical Ventilator

Compos X Operation Manual

Rev. 1.00



Warning

Safety and Accident Prevention during normal use

1. Allow only trained and skilled person to use this device.
2. Be aware of the following points when choosing the installing location for the device.
 - ① Place the device in an environment where the device is free from being splashed with water.
 - ② Place the device where there is no danger of adverse effects originated from air conditioning, abnormal pressures, temperature, humidity, ventilation, direct sunlight, dust, salt content and ion content.
 - ③ Place the device in a fixed location without vibrations, slopes or shocks.
 - ④ Do not place the device in areas close to chemical storage and pressurized gas generation areas.
 - ⑤ Verify the power source voltage and frequency as well as power consumption allowances before plugging the device.
 - ⑥ Use a ground connection.
3. Do not use in the following condition.
 - ① Since malfunction may be caused under the environment where an electromagnetic interference wave exists, do not install this device around equipments that may generate electromagnetic waves, such as a computer, communication equipment, and an elevator. Do not use computer, games or mobile phones around this device, it may cause malfunction
4. Be aware of the following items before operating the device.
 - ① Check all switch positions, switch polarities, dial settings and meter settings to make sure the device is in a proper operation condition.
 - ② Check that the device is properly grounded via the ground connection on the power terminal.
 - ③ Check that all cords and connections are properly connected and secure.
 - ④ Keep in mind that the combined usage of the multiple devices may result in a failure of accurate diagnosis and potentially cause a high risk.
 - ⑤ Double check the outer part of the patient circuit that is directly connected to the patient.
5. Make sure to take care of the following items when the device is in operation.
 - ① Check that the operating time does not exceed what is required for normal diagnosis and treatment of the patient.
 - ② Check continuously the patient and the device for abnormalities.
 - ③ When finding any abnormality in the patient or device, stop the device immediately to ensure the safety of the patient.
 - ④ Check that the device is not in direct contact with the patient at any time.
6. Follow the next steps after operating the device
 - ① Turn off the device only after returning all switches and dials to the starting position according to the prescribed operating procedures.
 - ② Do not use excess force when unplugging the cords and peripherals from the device.
7. Follow the next steps concerning storage.
 - ① Place the device in an environment where the device is free from being splashed with water.
 - ② Place the device where there is no danger of adverse effects originated from air conditioning, abnormal pressures, temperature, humidity, ventilation, direct sunlight, dust, salt content and ion content.
 - ③ Place the device in a fixed location without vibrations, slopes or shocks.

- | |
|---|
| <ul style="list-style-type: none">④ Do not place the device in areas close to chemical storage and pressurized gas generation areas.⑤ Clean all peripherals and cords and store them in an appropriate way.⑥ Be sure to clean the device for avoiding troubles for next operation. |
| <ul style="list-style-type: none">8. Send the device to an authorized maintenance dealer when finding any troubles with the device. Do not attempt to fix the problems by opening the device by your own.9. Do not try to modify or alter the device in any way. |
| <ul style="list-style-type: none">10. Maintenance and inspection<ul style="list-style-type: none">① Be sure to periodically inspect the device and parts, following the recommended maintenance and overhaul cycle.② Be sure that the device is in proper working condition when using the device for first time after a long period of inoperation. |
| <ul style="list-style-type: none">11. Backup Battery<ul style="list-style-type: none">① This device uses nickel-hydrogen battery for power alarm. Since it may discharge automatically when not in use for a long period of time, even when the device is not in use, make sure to turn ON the device for about 8 hours once a month.② The backup battery is a disposable item. Exchange the battery as necessary by periodic maintenance check. |
| <ul style="list-style-type: none">12. Others<ul style="list-style-type: none">① Be sure to have a manual ventilator ready for use in case the ventilator stops its operation for any reasons.② Be sure that the indicating disconnection of the airway hose is active. Also, be sure to set a correct value to indicate leakage.③ Always check that selected ventilation mode, ventilation criteria and alarms settings are working appropriately.④ Use the genuine parts for the device, unless otherwise indication.⑤ Keep checking the device for cracks or other damages. When finding any damages, contact an authorized dealer.⑥ Do not use any sharp or pointy objects to set switches or dials in order to avoid potential damages to the device.⑦ Properly wash your hands before touching the device, breathing circuit or the patient. |

 **Caution**

Failure to comply or ignore the following items may cause serious injury or death of human/animal. It may also cause fire.



※1 Fire Prohibition

This device is using oxygen. Do not bring fire close by any means during operation.



※2 High pressurized gas caution

This device is using high pressure gas. Be cautious of whether there is any loose connection. When a gas leak occurs, stop using of the device immediately.

※3 Battery

This device uses nickel-hydrogen battery for power alarm. Since it may discharge automatically when not in use for a long period of time, even when the device is not in use, make sure to turn ON the device for about 8 hours once a month.

The battery currently used is 4/V80H (VARTA product).



※4 Electrical Power Caution

In this device, there are areas where high voltage is applied, and it may cause electric shock. When performing maintenance check, sterilization or disinfection, make sure to turn off the power switch and pull out the AC cord.

Preface

Thank you for purchasing Veterinary Mechanical Ventilator "Compos X".

This operation manual describes the operating procedures and precautions for the Compos X.

Before using the Compos X, be sure to thoroughly read this operation manual and understand the instructions set forth in it.

This operation manual should be stored at a predetermined place so that it can readily be referred to whenever operating instructions need to be confirmed.

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1. Precautions of use

Explanation of the symbols (DANGER, WARNING and CAUTION) used in this operation manual is as follows.

DANGER, WARNING and CAUTION

Please reconsider all warnings and cautions indicated on this operation manual before operation of the device.

When using the ventilator, thoroughly understand and observe the instructions set forth in all sections of this operation manual. Use the ventilator only for the purpose that is stated under "Purpose of Use." Further, while you use the ventilator, properly observe and monitor the patient. Be sure to observe the DANGER, WARNING and CAUTION that are indicated in this operation manual and on the product labels.



Danger

DANGER is used to indicate the presence of a hazard that will cause severe injury or death to the patient if the danger is ignored.



Warning

WARNING is used to indicate the presence of a hazard that may cause severe personal injury or death if the warning is ignored.



Caution

CAUTION is used to indicate the presence of a hazard that can cause minor personal injury or property damage if the warning is ignored.

Notice

NOTICE is used to notify users about different facts that may help to perform operations easily and effectively.

General Important Notes

Danger

- Do not use the device with flammable anesthetic gas, or in places with high density oxygen, it would cause explosions and start fire.
- Do not use the device within inflammable anesthetic gas and high oxygen concentration environment, it would cause explosions and start fire.
- Do not use with high pressure oxygen tank indoors, it may cause explosion and fire.

Warning

- The operator must not be in physical contact with the patient or any equipment, cables or metal in contact to the patient.
- When using a defibrillator, be sure that neither the patient body nor any metallic part connected to the patient gets in touch with the defibrillator.
Do not use this device in an MRI (MRT, NMR, NMI) laboratory. Due to strong magnetic fields damage or malfunctions to the device may be observed.
- Do not let the ventilator be closed to fire or an electric scalpel. High frequency energy coming from the electric scalpel can damage the ventilator.
- Do not use this device together with radiotherapy equipments.
- In order to avoid malfunction at the electrical components that may stop the ventilator, do not operate this device in environment temperature over 40°C.
- This device should be used under the supervision of health workers, who can deal properly with abnormal circumstances.
- Prompt action is necessary when any abnormality is found while using this device.
- Do not use AC cord different from the 3pin plug AC cord included with this device. The use of different cord may cause electric shock to the patient or operator.
- Do not leave liquids close to the ventilator. Liquid may damage the device or cause an electric shock.
- Please use "medical grade" outlets which have earth installed.
- Do not use any device which is not approved by the manufacture and do not introduce any metallic object in the open terminals of the main unit. They may damage and cause electrical shock.
- Only specialized personnel are allowed to disassemble the main body, flow sensor or any other components of this device.
- All the maintenance service of this device should be genuine replacement parts and be done by trained / qualified personnel.
- Make sure this device is working correctly during conventional ventilation before apply it to the patient.

Caution

- To prevent malfunction caused by electromagnetic waves, keep cell phones and others communication equipment more than 15cm from the device.
- In order to prevent damage to this device, do not close the exhaust port or the oxygen exhaust port.

Notice

- The battery is a 4/V80H (VARTA type).

Cautions about gas supply



- Do only use clean and dry pressurized air and medical grade oxygen gas. Other type of gas can cause not only malfunction but also corrosion even explosion of the device.



- Disconnect the O2 and Air pressure hoses during storage or when not using the ventilator for a long period. Even in a power OFF mode condition, gas will be consumed by the breathing circuit monitor line and others pressure accessories and there is a possibility for this pressure to reduce the components life time.
- This device uses high pressured gas. Make sure there is no loose connection. Gas leakage from loose connections may cause fire or explosion. Stop the device operation in case of leakage.

Cautions about the internal battery



- Keep internal battery recharged.
- This device uses nickel-hydrogen battery for power failure alarm.
- The internal battery takes 8 hours for full charge. To recharge the battery, turn ON the SW switch in the back of the ventilator. It is not necessary to operate the ventilator.
- The internal battery is provided for power failure alarm only. It cannot be used as main source of power.
- The internal battery will become empty due to internal monitoring, if the ventilator has been stored for long time. Please recharge it for about 8 hours when using the ventilator again.
- The internal battery is fully charged before shipment but it may become discharged during the transportation. We recommend checking and recharging the internal battery before using the ventilator.

Notice

- This device uses a 4/V80H (VARTA type) battery.

Caution about the breathing circuit and jet tube



Caution

- Only use clean and sterilized breathing circuit and jet tub. Use of unclean breathing circuit or jet tube may cause infection.
- Do not use damaged breathing circuit or jet tube (crack, pinholes) even if they are reusable parts. Use only undamaged breathing circuits and jet tubes.

Warning about inspection before use



Warning

- Apply the inspection in order to make sure this device can operate normally. Using this device without inspection the pressure setting may be irregular and injury to the patient.
- In order to use this device safely, do always apply the inspection before use it.

Warning during operation



- When using a mechanical ventilator, be aware of the patient conditions for swift action.
- Use an alternate monitor in case of abnormality in this device monitor. The operator is responsible to ensure the safe working of the ventilator.
- In case of abnormality in this device, remove it from the patient and apply an alternative respirator (such as ambu bag or any other device that can offer PEEP and oxygen to the patient).
- In case of abnormality, distinct it from others devices and repair it.
- Do not set PIP, PEEP, breathing rate or inspiratory time against the patient's respiratory physiology.
- When pressing a button, do not conflict it with others operations. If a duplicated operation occurs, the prior operation may continue.
- Make sure this device will not operate when the patient accidentally moves the breathing circuit.

Warning about the alarm



- Solve the cause of problems prior to muting the alarm. Be ready to provide manual breath at any moment.
- The operator should be always in a place where he can hear the audio alarm. Set alarm parameters appropriately. Alarms are very important to show any risk for the patient.

Warning about cleaning, disinfection and sterilization



- Do not use auto-clave, EOG and others sterilization types to clean the ventilator.
- When using ethylene oxide gas (EOG) for components sterilization, make sure to ventilate the room air until the concentration becomes at a safe density.
- Disassemble the flow meter for cleaning. Do not sterilize.



- Use of not proper cleaned jet ASSY or breathing circuit may cause secondary contamination. Use only proper cleaned and sterilized with autoclave sterilization (121 degrees Celsius) jet ASSY and breathing circuit.
- Use of not proper cleaned exhaust adapter may cause secondary contamination. Use only proper cleaned and sterilized with autoclave sterilization (121 degrees Celsius) exhaust adapter.

Warning about maintenance



- Be sure to conduct periodical inspections. Without proper maintenance, problems may occur during the operation, causing risk to the patient.



- For safe use of this device, perform periodical maintenance after every 2000 operation hours or every 2 years.
- For safe use of the jet ASSY, perform periodical maintenance after being sterilized by autoclave over 40 times or every 2 years.

Caution about storage



- Store the ventilator in place where there is no risk of exposure to any liquid. It may damage this device.



- Do not store the ventilator in places where the air contains inadequate pressure, humidity, temperature, ventilation, sunlight, dust, salt and ion. It may cause malfunction of the equipment.
- Keep this device in safe place, away from inclination, oscillation or shock (even during the transportation).

Caution during operation

- Read the instructions on this manual thoroughly.
- Only use this ventilator after understanding of the operation manual and the attached documents.
- Ask the manufacturer or the authorized dealer information related to maintenance.
- For equipments used with this ventilator but from different manufacturer, follow the instructions of each manufacturer.
- This device's specifications may vary from different versions. Ask the manufacturer for details.

Responsibility for the patient safety

Read the instructions in this operation manual for safe and correct use of this ventilator.

The design, manuals, and labels of this device were designed to be understood by persons with general knowledge and training in artificial ventilators. The manual indications, notes and warnings are based on the device structure. In this manual we are not discussing the dangers of improper use of the device resulting in troubles, or bad effects to the patient which are fully understood by the medical worker. The manufacturer will not be responsible for risk well known by the medical professional, trouble caused by misuse or side effects in the patient. The manufacturer will not be responsible for the results of combination with others devices that are not recommended by the manufacturer.

Operating conditions and selection of the patient monitoring type must be the operator responsibility. The operator will be responsible for selection of devices needed in patient monitoring. Electronic devices cannot replace visual check and observation of the patient conditions by the medical worker.

Warranty

A written warranty is supplied with the ventilator. The ventilator is warranted under this written warranty.

However, the warranty does not cover the following defects:

- Damages caused by wrong use or wrong operation of the device.
- Damages caused by any modification that is not authorized by the manufacturer.
- Damages caused by unauthorized maintenance and repair.
- Damages caused when the device is used in a different form from its purpose of use.

If the ventilator is found to be defective in material or workmanship, it will be repaired or replaced. The manufacturer cannot be responsible for deterioration, wear, and abuse of the ventilator. In no event shall the manufacturer's liability exceed the selling price of the ventilator.

The warranty procedure will be applicable based on the following conditions:

- Contact us immediately when damages are found to the material or equipment.
- Return the damaged material and equipment back to the manufacturer.
- The manufacturer must investigate by own test to determine if the damages will be covered by the warranty.

This is the only warranty provided by the manufacturer. There is no other warranty offered by the manufacturer.

The distributor cannot modify the conditions of this warranty. Please always read the warranty certificate.

2. Glossary

The following describes some items of this manual.

Symbol	Explanation
AC	Alternating current
DC	Direct current
V	Voltage
A	Ampere
Hz	Hertz
kg	Kilogram
sec	Second
cmH ₂ O	Centimeter per water (unit of pressure)
mL	Milliliter
ASSY	Assembly
kPa	kilo Pascal
APNEA	Absence of breath
LED	Light Emitting Diode
BPM	Breath per minute
LPM	Liter per minute (unit of flow)
I : E ratio	Inspiratory and expiratory phases time ratio
IPPV	Intermittent positive pressure ventilation
PCV	Pressure-controlled ventilation
PEEP	Positive end -expiratory pressure

3. Main Unit and Accessories

The following things are enclosed by this product. Please confirm the enclosed things at first.

3-1. Main Unit



3-2. Accessories

3-2-1. Pressure hose (oxygen)



3-2-3. Jet Tube



3-2-5. AC cord



3-2-2. Breathing circuit (reusable)

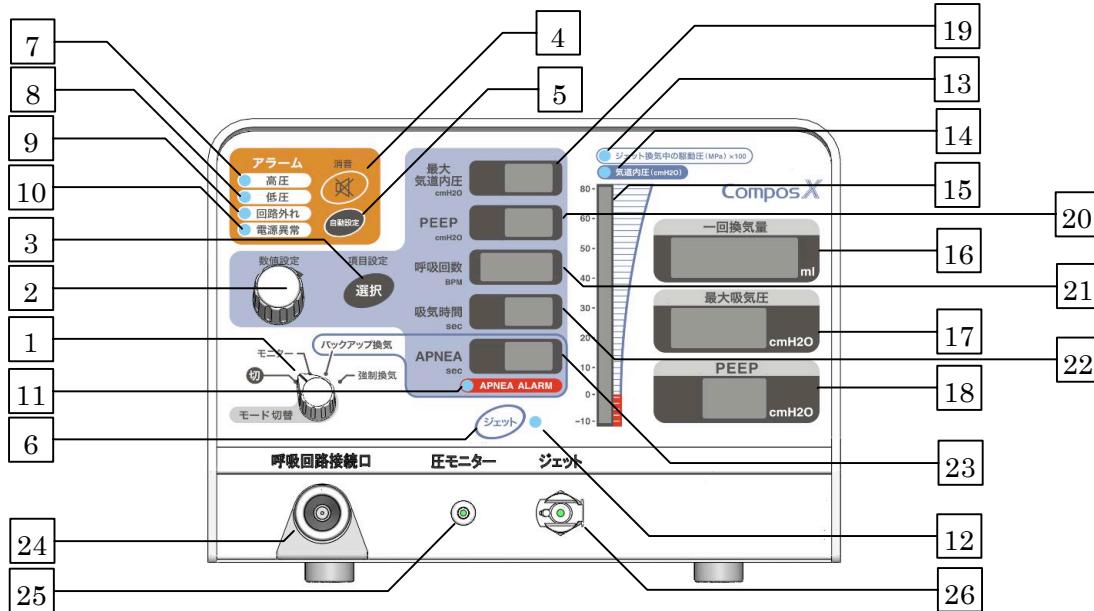


3-2-4. Exhaust adapter



4. Part names and functions

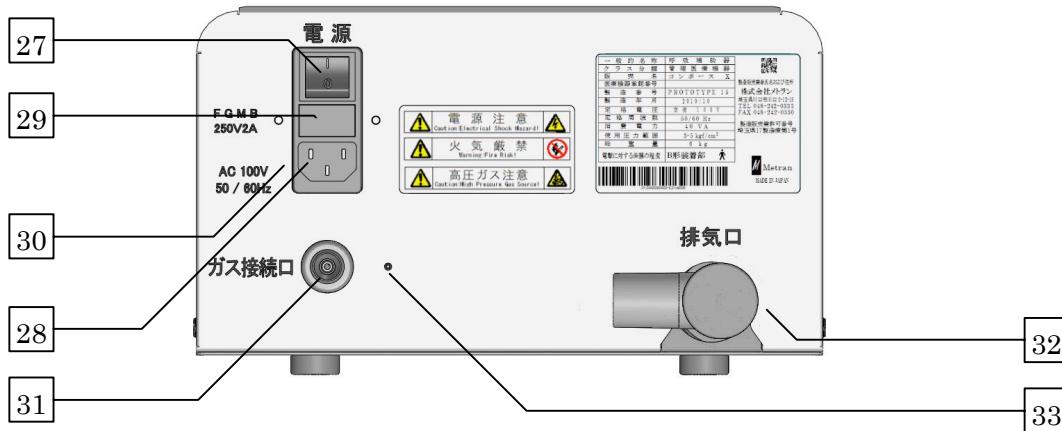
4-1. Front



No.	Name	Function
1	Mode switch	4 modes selectable (OFF, Monitor, Backup and Mandatory Ventilation).
2	Adjust knob	Along with select button to select the item, set the value of the item.
3	Select button	With adjust knob for value settings, select the item.
4	Mute button	Mutes the audio alarm of Paw high and low and low gas supply for 30 seconds.
5	Auto setting button	When pressing this button, after completing the settings, paw high, paw low and low gas supply alarms will be set according to PIP value.
6	Jet button	Performs output selection from breathing circuit port or jet port.
7	Paw high alarm LED	Blinks when the pressure measured at the pressure monitor port reaches the paw high alarm threshold.
8	Paw low alarm LED	Blinks when the pressure measured at the pressure monitor port becomes lower than paw low alarm threshold.
9	Low gas supply alarm LED	Blinks when the pressure measured at the pressure monitor port becomes lower than low gas supply alarm, during inspiratory phase.
10	Power failure alarm LED	Illuminates when electric power is not supplied and the mode switch is set to anything other than "OFF".
11	APNEA alarm	Blinks when the time from the last breath reaches and exceeds the pre-set apnea time during backup mode, and then the device automatically initiates mandatory ventilation.

12	Jet ventilation operation LED	Activates while blinking when the ventilation port changes from inspiratory port to jet port by pressing the jet button.
13	Jet working pressure LED	Activates during jet ventilation, by pressing jet button, and bar-graph unit that is being used is MPa (x100).
14	Airway pressure LED	Activates when not applying jet ventilation and bar-graph unit that is being used is cmH2O.
15	Pressure bar-graph	Pressure bar-graph monitor (MPa units during jet ventilation and cmH2O units during the others modes).
16	Tidal volume display	Displays the amount of ventilation per breath during inspiratory phase.
17	PIP display	Displays the peak pressure from inspiratory to expiratory phase.
18	PEEP display	Displays the minimum pressure of end-expiratory phase.
19	PIP setting display	Displays the setting value of the peak inspiratory pressure.
20	PEEP setting display	Displays the setting value of the end-expiratory pressure.
21	Breath rate setting display	Displays the setting value of breath amount per minute. It automatically adjusts the ventilation time in order not to let breathing ratio exceeds 1:1 I:E ratio.
22	Inspiration time setting display	Displays the setting value of inspiration time. If breath rate is adjusted, it will automatically adjust the ventilation time in order not to let breathing ratio exceeds 1:1 I:E ratio.
23	APNEA setting display	Displays the setting value of apnea setting. It initiates mandatory ventilation when the time from the last breath reaches and exceeds the pre-set apnea time during backup mode.
24	Breathing circuit port	Port for the accessory Breathing Circuit (reusable) shown in 3-2-2.
25	Pressure monitor port	Port for pressure monitor tube of the accessory Breathing Circuit (reusable) shown in 3-2-2.
26	Jet port	Port for the accessory Jet Tube shown in 3-2-3.

4-2. Back



No.	Name	Function
27	Power switch	Power ON/OFF
28	AC cord inlet	Port for the accessory AC cord shown in 3-2-5.
29	Fuse box	Fuse for overcurrent protection. The fuse is a disposable product. Use 2 fuses (specifications are as follows). 【Specifications】 250V 2A B Size: φ5.2x20mm Go to chapter 11-6 for more information about fuse replacement.
30	Lock lever	Locking accessory for connecting AC cord shown in 3-2-5.
31	Gas inlet port	Port for the accessory Pressure Hose (oxygen) shown in 3-2-1.
32	Exhaust port	Exhaust terminal for surplus gas from the breathing circuit. Exhaust direction is changeable by using the accessory Exhaust adapter shown in 3-2-4.
33	Oxygen outlet	Exhaust terminal of the surplus gas from the device's circuit.

5. Preparation

5-1. Placement

Make sure to have this device in a safe and horizontal location.

Check if there is enough space between the AC cord (3-2-5.) and the power plug as well as between the pressure hose (3-2-1.) and the oxygen supply terminal.

5-2. Breathing Circuit Connection

5-2-1. Assembling procedure

Make sure the power switch is set OFF.

Make sure to have the breathing circuit (3-2-2.) connected to the device's breathing circuit port completely.

Connect the pressure monitor tube to the pressure monitor port completely.

Set the test lung to the breathing circuit's mouth connector.

5-2-2. Disassembling procedure

Make sure the power switch is set OFF.

Release the breathing circuit's pressure monitor tube from the pressure monitor port.

Release the breathing circuit (3-2-2.) from the breathing circuit port.

5-3. Power Connection

5-3-1. Assembling procedure

Make sure the mode switch is set OFF.

Make sure the power switch is set OFF.

Hold up the lock lever at the device's back.

Connect the AC cord (3-2-5.) to the device's AC cord inlet.

Pull down the lock lever and make sure the AC cord is lock.

Plug the AC cord (3-2-5.).

5-3-2. Disassembling procedure

Make sure the mode switch is set OFF.

Make sure the power switch is set OFF.

Hold up the lock lever at the device's back and release the AC cord.

Unplug the AC cord (3-2-5.).

5-4. Pressure Hose Connection

5-4-1. Assembling procedure

Make sure the power switch is set OFF.

Connect the pressure hose (3-2-1.) to the gas inlet port and lock it by turning its nut in clockwise direction.

Check if the pressure hose (3-2-1.) nut is not loose.

Connect the pressure hose (3-2-1.) to the oxygen gas supply terminal.

5-4-2. Disassembling procedure

Make sure the power switch is set OFF.

Release the pressure hose (3-2-1.) from the oxygen gas supply terminal.

Release the pressure hose (3-2-1.) from the gas inlet port, unlocking the nut by turning it in anticlockwise direction.

5-5. Jet Tube Connection

5-5.1. Assembling procedure

Make sure the power switch is set OFF.

Check if the jet port coupler is unlocked.

If it is locked, press both sides of the coupler until it makes a sound.

Connect the jet tube (3-2-3.). The coupler will lock by setting the jet tube completely.

5-5.2. Disassembling procedure

Make sure the power switch is set OFF.

To unlock the coupler, press both sides of the coupler until it makes a sound.

Release the jet tube (3-2-3.).

5-6. Exhaust Adapter Connection

5-6.1. Assembling procedure

Make sure the power switch is set OFF.

Connect the wide side of the exhaust adapter (3-2-4.) to the exhaust port.

Connect the exhaust adapter (3-2-4.) conforming the setting condition direction.

It is possible to connect a hose to the exhaust adapter (3-2-4.) slim terminal (the one with 4 holes on it).

5-6.2. Disassembling procedure

Make sure the power switch is set OFF.

Release the hose from the exhaust adapter (3-2-4.) slim terminal (the one with 4 holes on it).

Remove the exhaust adapter (3-2-4.) from the exhaust port.

6. Functions

Veterinary mechanical ventilator Compos X has three (3) main functions.

6-1. Mandatory ventilation mode

Mandatory ventilation can be applied by setting the PIP, PEEP, breath rate and inspiration time.

6-2. Backup ventilation mode

Backup ventilation can be applied by setting the PIP, PEEP, breath rate and APNEA. Mandatory ventilation will be applied when apnea time exceeds the APNEA setting value.

6-3. Monitoring mode

This mode does not apply mandatory ventilation. It measures the tidal volume.

7. Mandatory ventilation mode operation

7-1. Turning ON

Turn ON the power switch located at the back of Compos X.

7-2. Selecting the mode

Turn the mode switch to Mandatory ventilation.

All LEDS and audio alarm will activate for the first second. Check if all LED and audio alarm are operating normally.

7-3. Setting the ventilation

Press select button until PIP LED starts to blink.

Select PEEP, Breath rate, Inspiration time, APNEA and PIP by pushing select button. The setting value pointed by blinked LED can be adjusted by turning the adjust knob.

7-4. Auto setting button

After completing "7-3. Setting the ventilation", paw high, paw low and low gas supply alarms will be set automatically by pressing auto setting button.

If any settings are readjusted after performing the auto setting button process, the alarms of previous setting will persist until pressing the auto setting button again to update the alarms values.

7-5. Muting the alarm

When alarm activates, pressing the mute button will silent the alarm sound for 30 seconds. Power failure alarm cannot be muted by pressing this button. In order to mute power failure alarm, check if the AC cord (3-2-5.) is well connected/plugged and turn ON the power switch.

7-6. Jet

Breathing circuit port and jet port output will switch when pressing the jet button during the ventilation.

When jet port output is selected, jet ventilation operation LED activates, and pressure bar-graph unit will change to MPa and jet working pressure LED activates.

By pressing the jet button again, the output will switch to the breathing circuit port, jet ventilation operation LED deactivates and jet working pressure LED will switch to airway pressure LED.

7-7. Turning OFF

Turn OFF the power switch located at the back of Compos X

8. Backup ventilation mode operation

8-1. Turning ON

Turn ON the power switch located at the back of Compos X.

8-2. Selecting the mode

Turn the mode switch to Backup ventilation.

All LEDs and audio alarm will activate for the first second. Check if all LEDs and audio alarm are operating normally.

8-3. Setting the ventilation

Select PEEP, Breath rate, Inspiration time, APNEA and PIP by pressing the select button. The setting value pointed by blinked LED can be adjusted by turning the adjust knob.

The ventilation does not start immediately after completing the settings, but it starts monitoring first and when apnea time exceeds the APNEA set value, mandatory ventilation will be activated for the patient.

This device's backup ventilation mode monitors the spontaneous breath applying mandatory breath when necessary.

To turn back to spontaneous breath monitoring, after APNEA alarm activates, turn the mode switch to Monitor, then turn it back to Backup ventilation.

8-4. Auto setting button

After completing "8-3. Setting the ventilation", paw high, paw low and low gas supply alarms will be set automatically by pressing the auto setting button.

If any settings are readjusted after performing the auto setting button process, the alarms of previous setting will persist until press the auto setting button again to update the alarms values.

8-5. Muting the alarm

When alarm activates, pressing the mute button will silent the alarm sound for 30 seconds.

Power failure alarm cannot be mute by pressing this button. In order to mute power failure alarm, check if the AC cord (3-2-5.) is well connected/plugged and turn ON the power switch.

8-6. Jet

Jet button does not operate in backup ventilation.

8-7. Turning OFF

Turn OFF the power switch located at the back of Compos X

9. Monitoring mode operation

9-1. Turning ON

Turn ON the power switch located at the back of Compos X.

9-2. Selecting the mode

Turn the mode switch to Monitoring.

All LEDs and audio alarm will activate for the first second. Check if all LEDs and audio alarm are operating normally.

Monitor display indicates tidal volume, PIP and PEEP. The Ventilation does not activate in the monitoring mode.

9-3. Setting the ventilation

No ventilation can perform in the monitoring mode, however, the following settings can be adjusted:

Press the select button until PIP LED starts to blink.

Select PEEP, Breath rate, Inspiration time, APNEA and PIP by pressing the select button. The setting value, of blinking LED item, can be adjust by turning the adjust knob.

9-4. Auto setting button

Auto setting button does not operate in monitoring mode.

9-5. Alarm detection

It detects power failure alarm, but not paw high, paw low and low gas supply alarms.

9-6. Muting the alarm

It is not possible to mute alarm, by pressing the mute button, during monitoring mode operation.

9-7. Turning OFF

Turn OFF the power switch located at the back of Compos X

10. Product Inquiry



**METRAN CO., LTD.
12-18, 2 CHOME KAWAGUCHI, KAWAGUCHI-SHI,
SAITAMA-KEN, 332-0015 JAPAN
TEL: +81- 48-242-0333 FAX: +81-48-242-0550**

11. Maintenance

In order to ensure continuous safe usage of this device, regular maintenance (prior to use and periodical maintenance checks) is required.

Make sure to follow the instructions on chapter 5 (Preparation).

11-1. Inspection before using this device

Follow the instructions on chapter 13 (Trouble shooting) in case of alarm or any other abnormality during operation.

Breathing circuit and jet tube may degrade after several usages and sterilizations. Make sure to have spare parts of those accessories ready for use at any and all the time.

11-2. Sterilization of jet ASSY

11-2-1. Removing jet ASSY

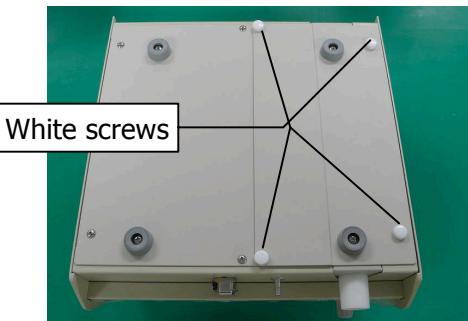
Check if the AC cord (3-2-5.) is unplugged.

Check if the breathing circuit (3-2-2.) is disconnected from the breathing circuit port.

Check if the pressure hose (3-2-1.) is disconnected from the gas inlet port.

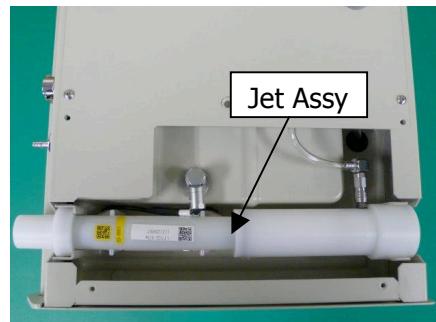
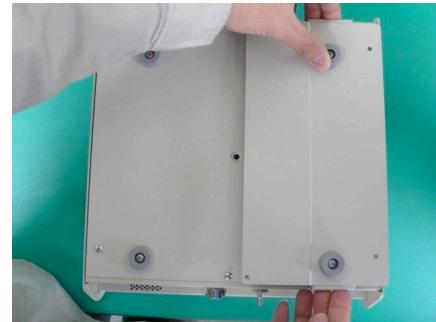
Check if the jet tube (3-2-3.) is disconnected from the jet port.

Release these four (4) white screws from the bottom plate of the unit.

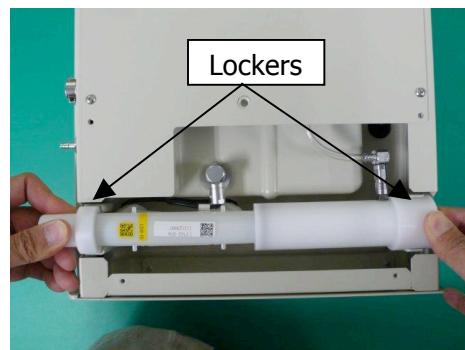


Remove the plate.

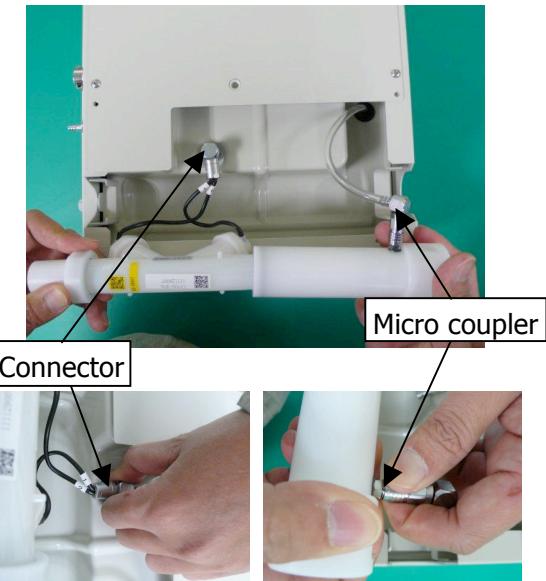
Jet ASSY will appear under the plate.



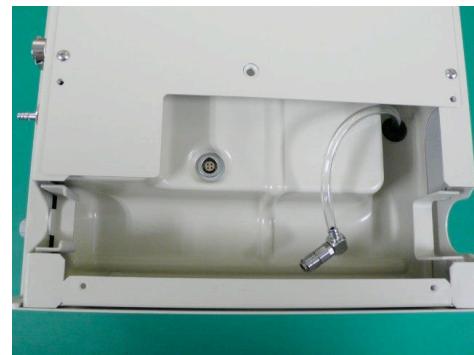
Use both hands to pull up and remove the jet ASSY from its locker.



Put the jet ASSY at the side and release the connector and micro coupler. Both can be released by pulling them.



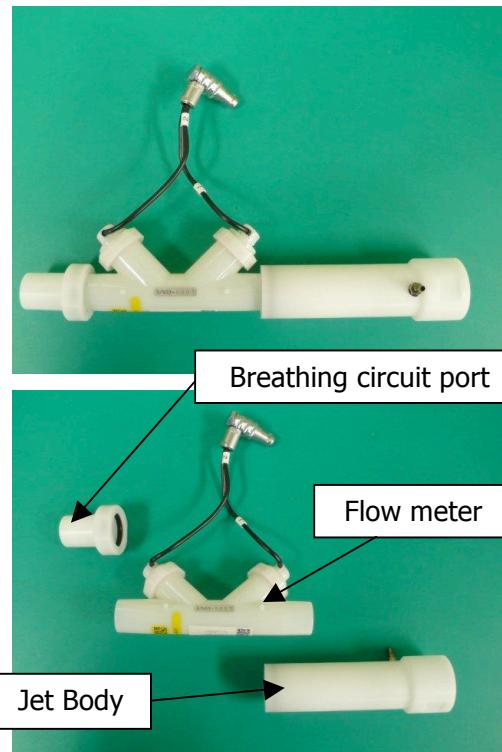
Jet ASSY removed.



Jet ASSY can be divided in 3 parts as shown in the picture on right.

[Caution]

To surely sterilize the jet ASSY, make sure to divided it in these three (3) individual parts. There is a possibility of insufficient sterilization if it is not divided in these individual parts.



Warning

Disassemble the jet ASSY in 3 individual parts in order to apply proper disinfection and sterilization. Without disassemble, jointed parts cannot be disinfected or sterilized.

Notice

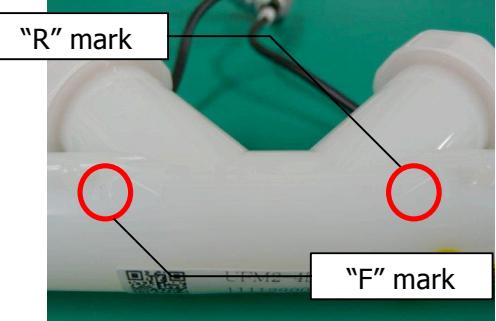
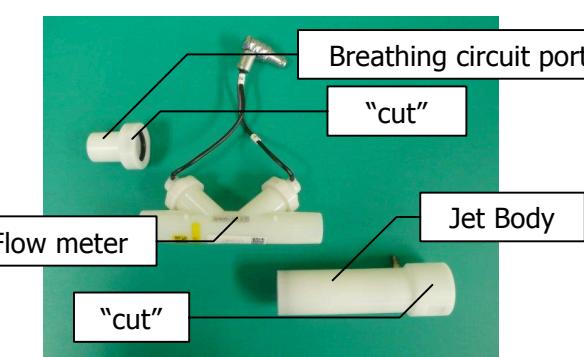
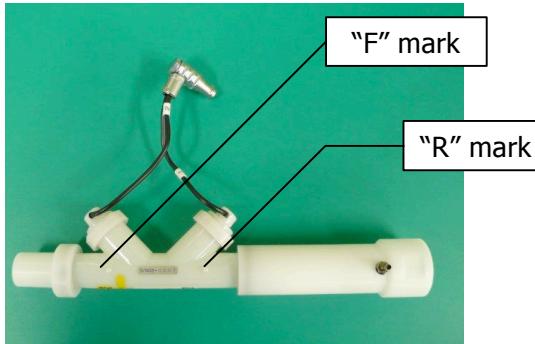
After use the exhaust adapter, apply disinfection and sterilization together with the jet ASSY.

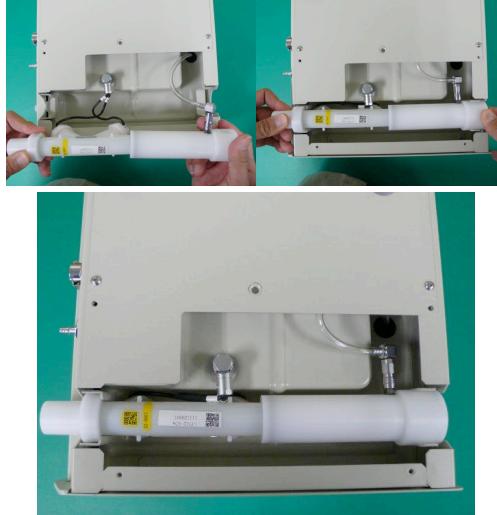
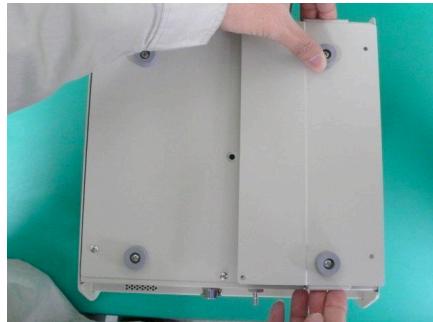
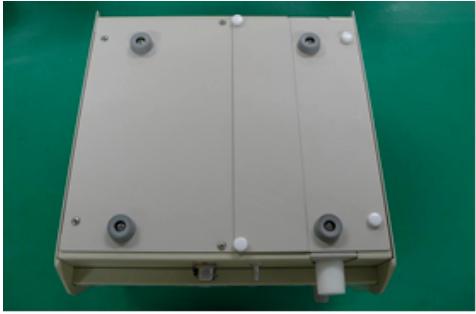
11-2-2. Assembling the sensor, jet ASSY

Check if the AC cord (3-2-5.) is unplugged.

Check if the pressure hose (3-2-1.) is disconnected from the gas inlet port.

Check if the jet tube (3-2-3.) is disconnected from the jet port.

<p>There is a print of "F" ⇔ "R" at the flow meter body. "F" for the front and "R" for the back side.</p>	
<p>Connect the flow meter's "R" side to the jet body. Connect the flow meter's "F" side to the breathing circuit port connector. There are vertical cuts on each connector that must be on vertical position in order to fit with the locker.</p>	 
<p>Connect the flow meter connector to the red mark position and make sure to have it firmly locked.</p>	

Insert the jet body's micro coupler until it completely locks.	
The flow meter's sensor lead line must be pointing down and the "F" mark (breathing circuit port) on the front part of the device's body. Both cuts must fit with the locker.	
Use both hands to set the jet ASSY completely deep into the compartment.	
Set the bottom plate. There are metal parts on the bottom plate that fits with the jet ASSY. Set the bottom plate carefully.	
Complete setting the bottom plate by locking the four (4) white screws.	

11-2-3. Jet ASSY sterilization method

Autoclave sterilization (115°C for 30 minutes or 121°C for 20 minutes) can be used.
EOG or low temperature plasma sterilization can also be applied.

11-2-4. Life expectancy of the Flow meter in case of sterilization

The life expectancy is approximately 40 times of autoclave sterilization.
We recommend this value of autoclave sterilization.



After being sterilized over 40 times, by autoclave, the flow meter electrical components may be damaged; the tidal volume measurement incorrect and the flow meter function may not operate.



The jet ASSY must be exchanged every 2 years during periodical maintenance.
After use the exhaust adapter, apply disinfection and sterilization together with the jet ASSY.

11-3. Periodical maintenance

When turning the mode switch to OFF, after exceeding 2,000 hours of total usage, the tidal volume LED will blink for 5 seconds. This blink suggests that the device should go to periodical maintenance.



Apply the periodical maintenance when this symbol appears.

We offer paid services of periodic maintenance check and overhaul. Contact us for more detailed information.

11-4. Cleaning

Wipe with soft cloth wring water for dust cleaning.

Turn the power switch ON, after cleaning the device, in order to recharge the power failure alarm battery.

11-5. Cycle

Apply sterilization before each usage.

Notice

Apply cleaning before each usage or monthly when the device is not in use.

11-6. Exchange of the fuses

With the AC cord (3-2-5.) disconnected, pullout the fuse box.



Pull it out by using your finger.



Pull the fuse box until have complete view of the fuses.

Notice

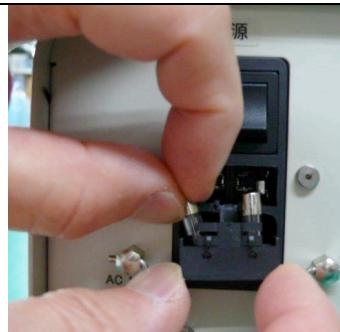
Since the fuse box cannot be removed from the main unit, make sure that you do not pull it with too much force.

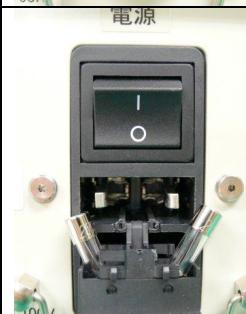


This picture shows the fuse box being released.



Hold the fuse box with one hand and exchange the fuses with the other hand.



Remove the second fuse in the same way.	
It must be exchanged with two (2) new fuses. (250V 2A Bφ5.2x20mm size)	
Set the new fuses into the fuse box.	
Set the fuses vertically.	
Hold the bottom part to keep the fuse box on horizontal position.	

After the fuse box becomes horizontal.	
Push the fuse box to the complete state.	

11-7 Maintenance Mode

This device maintenance mode provides the functions bellow.

- 1- Serial number display
- 2- External time display
- 3- Internal time display
- 4- Supply solenoid valve used time display
- 5- Circuit/Jet used time display
- 11- System compliance calibration
- 12- System compliance validation selection

Notice

Items 6 to 10 are also displayed but can only be use by service personnel.

11-7-1. Maintenance Mode

Maintenance mode can be use when turning on the device by the method bellow.

- Prepare the device by connecting the power and pressure hose.
- Turn ON the power switch on the back of the device.
- Turn the mode switch to monitor with mute and auto setting buttons pressed together.
- During maintenance mode the function number, from 1 to 12, are displayed at PIP setting display and the item of each function at the PEEP setting display.
- The function number can be selected by turning the adjust knob.
- The mode item can be selected by pressing the select button and the posterior item by pressing the mute button.
- Turn the mode switch to OFF in order to end the maintenance mode.

Notice

During maintenance mode the device will not operate, even by turning the switch mode knob to backup or mandatory ventilation modes.

11-7-2. Serial Number display

The serial number is displayed at the device's spec.

When turn ON the maintenance mode the value 01 appears at the PIP setting display as 11-7-1 item.

The serial number will be displayed at the tidal volume, PIP and PEEP displays as:

- PIP display: Manufactured year
- PEEP display: Manufactured month
- Tidal Volume display: Device number

11-7-3. External time display

External time display shows the operation time from the last maintenance and can be reset.

During the maintenance mode turn the adjust knob until the value 02 appears at the PIP setting display as showed at the 11-7-1 item.

External time value will be displayed at the tidal volume and PIP displays as:

- Tidal volume display: Unit value for thousands
- PIP display: Unit for values bellow one thousand

11-7-4. Internal time display

Internal time display shows the operation time from the manufactured date and cannot be reset.

During the maintenance mode turn the adjust knob until the value 03 appears at the PIP setting display as showed at the 11-7-1 item.

External time value will be displayed at the tidal volume and PIP displays as:

- Tidal volume display: Unit value for thousands
- PIP display: Unit for values bellow one thousand

11-7-5. Supply solenoid valve used time display

It shows the supply solenoid valve operated number time and can be reset.

During the maintenance mode turn the adjust knob until the value 04 appears at the PIP setting display as showed at the 11-7-1 item.

External time value will be displayed at the tidal volume and PIP displays as:

- Tidal volume display: Unit value for thousands
- PIP display: Unit for values bellow one thousand

11-7-6. Circuit/Jet used time display

It shows the Circuit/Jet operated number time and can be reset.

During the maintenance mode turn the adjust knob until the value 05 appears at the PIP setting display as 11-7-1 item.

External time value will be displayed at the tidal volume and PIP displays as:

- Tidal volume display: Unit value for thousands
- PIP display: Unit for values bellow one thousand

Notice

Items 6 to 10 are also displayed at the PIP display but can only be use by service personnel.

11-7-7. System compliance calibration

- Preparation:

Connect the breathing circuit to the breathing circuit and pressure monitor port in order to apply the system compliance calibration.

- Process:

During the maintenance mode turn the adjust knob until the value 11 appears at the PIP setting display as showed at the 11-7-1 item.

PEEP setting display will show the value 01 then the tidal volume display shows system compliance value for 60cmH₂O.

Press the select button until the PEEP setting display shows the value 02. PIP, tidal volume and PEEP displays will show the value 0.

Press the select button until the PEEP setting display shows the value 04. The calibration will start automatically.

During the calibration tidal volume display will blink for a pressure of 60cmH₂O that will be showed at the PIP display as the peak pressure and the PEEP display will show the number of times the calibration test has been applied.

The calibration range is 60±2cmH₂O and will automatically end after been applied 10 times. If the calibration cannot reach the range of 60±2cmH₂O it will continue until it reaches the range.

PEEP display will show the value 10 and calibration data will be memorized. The calibration finishes when PEEP setting display shows the value 01.

Notice

Press mute button to turn back one item.

When the system compliance setting is invalid it automatically will become valid after apply the calibration.

11-7-8. System compliance validation selection

During the maintenance mode turn the adjust knob until the value 12 appears at the PIP setting display as showed at the 11-7-1 item.

PEEP setting display will show the value 01 then the tidal volume display shows system compliance validation value of 0001 or invalidation value of 0000.

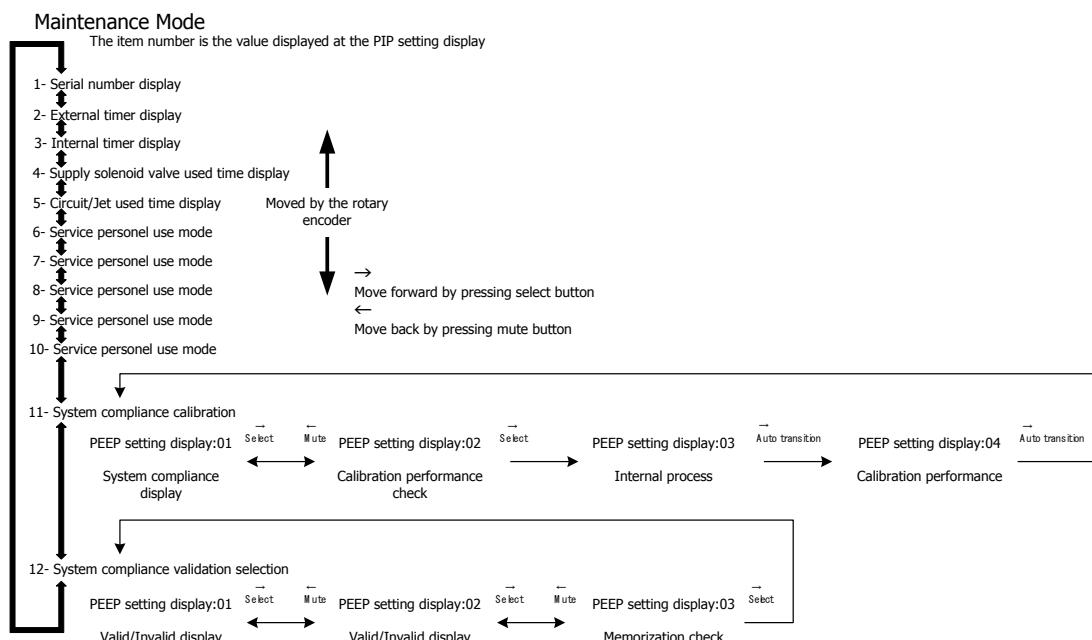
Press the select button until the PEEP setting display shows the value 02. Tidal volume display will blink and the valid (0001) and invalid (0000) values can be selected by turning the adjust knob.

After pressing again the select button to value 03 (PEEP setting display) tidal volume, PIP and PEEP displays will blink.

The selected information will be memorized after pressing the select button and changing the PEEP setting display value from 03 to 01.

Notice

Press mute button to turn back one item.



12. Disposing the Compos X and its accessories

Contact the sales distributor for disposing the Compos X and its accessories.

13. Trouble shooting

When the alarm activates and you do not know how to fix it, first make sure to secure the patient's safety, and then follow the instructions bellow.

The following instructions are for the device trouble shooting purpose and not for any problem concerning the patient. The order of the trouble shoots below is unrelated to the frequency of occurrence.

13-1. Trouble shooting when alarm activates

Trouble	Reason	Trouble shooting
Paw high	Paw high alarm setting is too low	Press the auto setting button.
	Exhaust port is blocked	Check if there is anything blocking the exhaust port.
	others	Call the emergency contact.
Paw low Low gas supply	Breathing circuit leakage	Check if there is no damage on the breathing circuit. Check if all breathing circuit connectors are firmly connected.
	Decrease of supply gas	Check if there is no leakage in the gas supply device.
	others	Call the emergency contact.
	If paw low alarm or low gas supply alarm is too frequently	Press the auto setting button.
APNEA	There is no spontaneous breath from the patient	Switch to mandatory ventilation mode.
Power failure	The AC cord is unplugged	Plug the AC cord (3-2-5.).
	There is no electrical power coming to the device	Check if the power switch is not set OFF.
	Disconnection of the AC cord	Call the emergency contact.
	others	Call the emergency contact.
	The device is malfunction	Call the emergency contact.
Jet button does not operate	others	Call the emergency contact.

13-2. During operation

Trouble	Reason	Trouble shooting
PIP does not increase	Breathing circuit leakage	<p>Check if there is no damage on the breathing circuit (3-2-2.).</p> <p>Check if all breathing circuit (3-2-2.) connectors are firmly connected.</p>
	Decrease of supply gas	Check if there is no leakage in the gas supply device.
	others	Call the emergency contact.

14. Technical characteristic

14-1. Technical characteristic

14-1-1. Transport and storage condition.

- Place the device in an environment where the device is free from being splashed with water.
- Place the device where there is no danger of adverse effects originated from air conditioning, abnormal pressures, temperature, humidity, ventilation, direct sunlight, dust, salt content and ion content.
- Place the device in a fixed place without vibrations, slopes or shocks.
- Do not place the device in areas close to chemical storage and pressurized gas generation areas.

14-1-2. Transport and storage environment

Ambient temperature range: -20 to 60°C

Ambient humidity range: 0 to 95% (without condensation)

Relative pressure: 500hPa to 1060 hPa (altitude -264 to 3,165 meter)

14-1-3. Guaranteed terms of operation

Ambient temperature range: 5 to 40°C

Ambient humidity range: 0 to 95% (without condensation)

14-2. Specification

General	
Name	Compos X
Input power	AC100 to 240V (50 to 60Hz)
Power consumption	40VA
Operating pressure	3 to 5kgf/cm ²
Ventilation	
Ventilation type	Time cycle, pressure limit
PIP	0 to 80cmH ₂ O 1cmH ₂ O unit
PEEP	0 to 20cmH ₂ O 1cmH ₂ O unit
Breath rate	1 to 255 BPM 1BPM unit
Inspiration time	0.1 to 3.0sec 0.1sec unit (but with no invert I:E ratio)
Alarm	
Paw high	LED alarm, audio alarm and auto alarm setting
Paw low	LED alarm, audio alarm and auto alarm setting
Low gas supply	LED alarm, audio alarm and auto alarm setting
Power failure	LED alarm, audio alarm
Apnea	LED alarm, audio alarm
Alarm mute	30 seconds
Monitoring	
Tidal volume	20mL to 2,000mL ±10%+10mL
PIIP	0 to 80cmH ₂ O ±10%
PEEP	0 to 20cmH ₂ O ±10%
Airway pressure	-10cmH ₂ O to 80cmH ₂ O ±2cmH ₂ O
Jet ventilation pressure	0 to 0.8MPa ±0.02MPa
Apnea	1 to 60 sec. Depending on flow trigger
Others	
Dimensions	260mm(W)×190mm(H)×283mm(D)
Weight	6kg

Category	
IP protection class	IPX0
Electric shock protection	Class I
	B type
	<p>Caution Read the operation manual. Failure to comply or ignore the following items may cause serious injury or death of human/animal. It may also cause fire.</p>
	Do not expose to fire
	High pressure gas hazard
	Electrical shock hazard
	Equipment of continuous operation

Emergency contact

METRAN CO., LTD.
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